PACSystems RX3i Controller..... 1.3

CPUs.....1.4
Baseplates.....1.8
Power Supplies.....1.9
Discrete Input Modules..... 1.12
Analog Input Modules 1.15
Discrete Output Modules..... 1.20
Analog Output Modules 1.25
Analog Mixed Modules 1.29
Millivolt I/O Modules..... 1.30
RTD I/O Modules 1.32
Strain Gage I/O Modules..... 1.34
Temperature Control Modules..... 1.36
Thermocouple I/O Modules..... 1.37
Resistive I/O Modules 1.40
Network and Distributed I/O Systems 1.41
Co-Processor and Serial Communications Modules..... 1.44
Motion Control (Servo Control) 1.45
Power Measurement Modules..... 1.46
Pneumatic Module 1.47
Expansion Module..... 1.48
CEP Carriers 1.49
Serial Bus Transmitter Module..... 1.50
Accessories; Terminal Blocks; Cables; Kits 1.51
Configuration Guidelines; Typical Application 1.53

PACSystems RXi Controller..... 1.58

Controller..... 1.59

RSTi-EP I/O..... 1.60

Network Adapters..... 1.61
Digital Input Modules..... 1.62
Analog Input Modules 1.63
Digital Output Modules..... 1.65
Analog Output Modules 1.67
Safe Feed Input Modules 1.68
Specialty Modules..... 1.69
Power-Feed and Power Distribution Modules..... 1.71

RSTi Slice I/O.....1.72

Network Interfaces..... 1.73
Network Interfaces with Built-in I/O 1.75
Discrete I/O Modules (Input)..... 1.86
Analog I/O Modules (Input) 1.89
Discrete I/O Modules (Output)..... 1.92
Analog I/O Modules (Output) 1.96
RTD Modules..... 1.99
Thermocouple Modules 1.100
Serial Communications Modules..... 1.101
High Speed Counting..... 1.103
Motion Control..... 1.105
Power Modules..... 1.107
Configuration Tools..... 1.110
Accessories and Cables 1.112
Typical Application 1.113

Continued next page

VersaMax Control 1.114
CPUs 1.115
Carriers 1.116
I/O Interposing Bases 1.119
Power Supplies 1.121
Discrete Mixed I/O Modules 1.123
Discrete Input Modules 1.127
Discrete Output Modules 1.132
Analog Input Modules 1.136
Analog Output Modules 1.138
Analog Mixed Modules 1.140
RTD and Thermocouple Modules 1.141
Speciality Modules 1.142
Expansion Modules 1.143
Remote I/O Units 1.144
Network Interface Modules 1.146
Serial Communications 1.147
Accessories, Cables, Kits 1.148
Configuration Guidelines; Typical Applications 1.149

VersaPoint I/O 1.151
Network Interface Modules 1.152
Power Terminals 1.153
Segment Terminals 1.154
Discrete Input Modules 1.155
Discrete Output Modules 1.156
Analog Input Modules 1.158
Analog Output Modules 1.159
Motion Modules 1.160
Motor Starter Modules 1.161
Serial Communications Modules 1.162
Accessories and Cables 1.163
Configuration Guidelines; Typical Applications 1.164
VersaSafe Machine Safety I/O 1.165
VersaSafe Starter Kit 1.166

VersaMax IP 1.167
Stand Alone Input and Output Modules 1.168
VersaMax IP Modular 1.169
Accessories and Cables 1.171
Configuration Guidelines; Typical Applications 1.172

PACSystems RX3i Controllers

PACSystems RX3i is the high performance, modular and scalable control system that supports the PACSystem engine. This rack-based system is built on PCI standards and provides fast, consistent control between the modules. In addition to more than one hundred discrete and process I/O points, the PACSystems RX3i features:

- **PACSystems High Availability** – This scalable, synchronized, highly available control platform helps ensure uninterrupted control of your applications and processes — with total transparency.
- **Proficy Process Systems** – A scalable, fully integrated system for process automation and control.
- **Integrated PROFINET** provides real time control of distributed I/O.
- **Machine Edition** – Develop, configure and maintain all of your control functions including motion, visualization and networking with complete software package.
- **HART Pass-through** – Fully integrated into the PLC system over a monitored communications network, you can simply and securely access HART instruments directly to remotely manage and mitigate operational issues with no additional equipment required.

PACSystems RX3i also offers an outstanding migration path for moving any Series 90 application to the PACSystems architecture.

We work hard to provide easy upgrade paths for our customers so they benefit from new capability without sacrificing their previous work. The PACSystems RX3i is the perfect example of evolving a proven product, the Series 90-30, by adding new technology to help customers conquer new challenges. Changing out 3 components turns a PLC into an advanced analytical control, providing better secure connectivity, greater operational insights, and improved productivity. This upgradability and advanced functionality has propelled the PACSystems RX3i to the top of the PLC/PAC industry.



Power Supplies pages 1.9-1.11

CPUs pages 1.4-1.6

Discrete Input Modules pages 1.12-1.14
Discrete Output Modules pages 1.20-1.24

Analog Input Modules pages 1.15-1.19
Analog Output Modules pages 1.25-1.28

Pneumatic Module page 1.46
Expansion Modules page 1.47

Baseplates page 1.8

Specialty Modules pages 1.29-1.40, 1.44

Serial Communication Modules page 1.44

Networks and Distributed I/O Systems page 1.41-1.43

RX3i Accessories pages 1.48-1.52

RX3i Configuration Guidelines pages 1.53-1.55

Publication Reference Chart

GFK-2222	PACSystems CPU Reference Manual
GFK-2224	TCP/IP Ethernet Communications for PACSystems
GFK-2225	PACSystems Station Manager User's Manual
GFK-2259	C Programmer's Toolkit for PACSystems User's Manual
GFK-2308	PACSystems Hot Standby CPU Redundancy User's Manual
GFK-2314	PACSystems RX3i Hardware and Installation Manual



CPUs

The high-performance CPU is based on the latest technology processor with fast computation and high throughput. The controller can manage up to 32K of I/O in a number of standard languages. The powerful CPU enables complex applications to be easily solved with the high performance processor and up to 64 Mbytes of user memory. The RX3i supports multiple IEC languages and C programming to give you program flexibility. The RX3i increases machine cycle times, reduces downtime with its extensive diagnostics and hot swap capability, and enables you to store large amounts of data to reduce external hardware cost.

	IC695CPE330	IC695CPK330	IC695CPE305
Product Name	**RX3i CPU (only) with Ethernet port**	**RX3i CPU (with Energy Pack) with Ethernet port**	**RX3i CPU with built-in USB Master port, Ethernet port and serial port**
Lifecycle Status	Active	Active	Active
Module Type	Controller	Controller	Controller
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Boolean Execution Speed (ms/K)			.072
User Logic Memory	64Meg bytes	64Meg bytes	5Meg bytes
Battery Backed Real Time Clock	Yes	Yes	Yes
Dynamic Data Back-up	Battery Backup only	Energy Pack Support (Battery-less Backup)	Energy Pack Support (Battery-less Backup)
I/O Discrete Points	32K	32K	32K
I/O Analog Points	32K	32K	32K
Type of Memory Storage	1CFast (Very high speed Compactflash)	1CFast (Very high speed Compactflash)	SRAM, Flash
Processor Speed (MHz)	1.6GHz Dual Core	1.6GHz Dual Core	1.1GHz
USB -A 2.0 Master Port	Yes. CPU application upload/download to a Thumb Drive or Smart Phone	Yes. CPU application upload/download to a Thumb Drive or Smart Phone	Yes. CPU application upload/download to a Thumb Drive or Smart Phone
Built-in Ethernet Ports	One RJ-45 port, 10/100/1000Mbaud. One 2-port switch 10/100/1000	One RJ-45 port, 10/100/1000Mbaud. One 2-port switch 10/100/1000	One RJ-45 port, 10/100Mbaud. SRTP support for programmer only
Built-in Serial Ports	None. Serial functionality should be moved to the IC695CMM002 or IC695CMM004 when migrating to the CPE330.	None. Serial functionality should be moved to the IC695CMM002 or IC695CMM004 when migrating to the CPK330.	One RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)
Total Number of Local Racks	8	8	8
Communications Options	IEC104, DNP3 outstation, IEC61850 client, HART SNP, SRTP, OPC-UA EGD	IEC104, DNP3 outstation, IEC61850 client, HART SNP, SRTP, OPC-UA EGD	Serial, Genius, CMX (Reflective Memory), Ethernet
Supported IO Protocols	PROFINET, EGD, Modbus TCP, PROFIBUS, Genius, DeviceNet, ModBus RTU, Reflective Memory (CMX)	PROFINET, EGD, Modbus TCP, PROFIBUS, Genius, DeviceNet, ModBus RTU, Reflective Memory (CMX)	PROFINET, EGD, Modbus TCP, PROFIBUS, Genius, DeviceNet, ModBus RTU, Reflective Memory (CMX)
Software Programming Support	Machine Edition Logic Developer PLC 8.60 SIM 8 or above	Machine Edition Logic Developer PLC 8.60 SIM8 or above	Machine Edition Logic Developer Professional edition 7.0 SIM 3 or above
Program Languages Supported	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram
Internal Power Used	+3.3 VDC: 0.0 A +5 VDC: 0.0A (up to 1.5 A if USB is fully loaded with 0.5 A) +24 VDC: 0.625A without Energy Pack, G280.750 A with IC695ACC402 Energy Pack	+3.3 VDC: 0.0 A +5 VDC: 0.0A (up to 1.5 A if USB is fully loaded with 0.5 A) +24 VDC: 0.625A without Energy Pack, G280.750 A with IC695ACC402 Energy Pack	+3.3 VDC: 1.0 A +5 VDC: 1.0 A (up to 1.5 A if USB is fully loaded with 0.5 A) +24 VDC: 0.5A at startup, 0.1 A during run time (Applies only if Energy Pack is connected to the CPE305.)
Number of Slots Module Occupies on Backplane	2	2	1
HART Pass-through	HART Pass-through – Fully integrated into the PLC system over a monitored communications network, you can simply and securely access HART instruments directly to remotely manage and mitigate operational issues with no additional equipment required.		



CPUs

The high-performance CPU is based on the latest technology processor with fast computation and high throughput. The controller can manage up to 32K of I/O in a number of standard languages. The powerful CPU enables complex applications to be easily solved with the high performance processor and up to 64 Mbytes of user memory. The RX3i supports multiple IEC languages and C programming to give you program flexibility. The RX3i increases machine cycle times, reduces downtime with its extensive diagnostics and hot swap capability, and enables you to store large amounts of data to reduce external hardware cost.

	IC695CPE310	IC695CPU320	IC695CPU315
Product Name	**RX3i CPU with built-in USB Master port, Ethernet port and 2 serial ports**	**RX3i CPU with two built-in serial ports**	**RX3i CPU with two built-in serial ports**
Lifecycle Status	Active	Mature w/ replacement	Mature w/ replacement
Module Type	Controller	Controller	Controller
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Boolean Execution Speed (ms/K)	.072	0.047	0.047
User Logic Memory	10Meg bytes	64Mega bytes	20Meg bytes
Battery Backed Real Time Clock	Yes	Yes	Yes
Dynamic Data Back-up	Energy Pack Support (Battery-less Backup)	Battery Backup only	Battery Backup only
I/O Discrete Points	32K	32K	32K
I/O Analog Points	32K	32K	32K
Type of Memory Storage	SRAM, Flash	SRAM, Flash	SRAM, Flash
Processor Speed (MHz)	1.1GHz	1GHz	1GHz
USB -A 2.0 Master Port	Yes. CPU application upload/download to a Thumb Drive or Smart Phone	No	No
Built-in Ethernet Ports	One RJ-45 port, 10/100Mbaud. SRTP support for programmer only		
Built-in Serial Ports	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)
Total Number of Local Racks	8	8	8
Communications Options	Serial, Genius, CMX (Reflective Memory), Ethernet	Serial, Genius, CMX (Reflective Memory), Ethernet	Serial, Genius, CMX (Reflective Memory), Ethernet
Supported IO Protocols	Ethernet (PROFINET, Ethernet Global Data, Channels, Modbus TCP Server and Client), Genius, PROFIBUS DP, DeviceNet	Ethernet (PROFINET, Ethernet Global Data, Channels, Modbus TCP Server and Client), Genius, PROFIBUS DP, DeviceNet	Ethernet (PROFINET, Ethernet Global Data, Channels, Modbus TCP Server and Client), Genius, PROFIBUS DP, DeviceNet
Software Programming Support	Machine Edition Logic Developer Professional edition 7.0 SIM 3 or above	Machine Edition Logic Developer Professional edition 5.6 or above	Machine Edition Logic Developer Professional edition 5.6 or above
Program Languages Supported	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram
Internal Power Used	+3.3 VDC: 1.0 A +5 VDC: 1.0 A (up to 1.5 A if USB is fully loaded with 0.5 A) +24 VDC: 0.5A at startup, 0.1 A during run time (Applies only if Energy Pack is connected to the CPE305.)	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC	1750 mA @ 3.3VDC; 1200 mA @ 5VDC (Check Data sheet)
Number of Slots Module Occupies on Backplane	2	2	2
HART Pass-through	HART Pass-through – Fully integrated into the PLC system over a monitored communications network, you can simply and securely access HART instruments directly to remotely manage and mitigate operational issues with no additional equipment required.		



High Availability Redundant Controllers

High Availability CPU Redundancy family allows critical application or process to continue operating if a failure occurs in any single component. A High Availability system uses two or more CPUs; an active unit that actively controls the process, and one or more backup units that are synchronized with the active unit and can take over the process should it becomes necessary.

An RX3i QuadPAC solution utilizes four CRU320QP controllers — one is a master controller and three are synchronized backup controllers. The QuadPAC solution features "Smart Redundancy," a patent pending algorithm that calculates the relative system availability in real time and identifies the most available controller as master. The I/O racks may be grouped into either single (one I/O rack), redundant (two I/O racks), or triple redundant (three I/O racks) rack configurations.

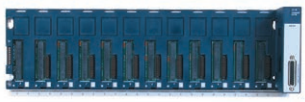
	IC695CRU320	IC695CRU320QP
Product Name	**RX3i Bumpless Redundant High Availability CPU with two built-in serial ports. (Requires IC695RMX128 Data Sync Module)**	**QuadPAC CPU for RX3i Bumpless Redundant High Availability CPU with two built-in serial ports. (Requires IC695RMX128 Data Sync Module AND Quad Redundancy Solution Code)**
Lifecycle Status	Mature w/ replacement	Mature w/ replacement
Module Type	Redundant Controller	Quad System Redundant Controller
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Boolean Execution Speed (ms/K)	0.047	0.047
User Logic Memory	64Meg bytes	64Meg bytes
Battery Backed Real Time Clock	Yes	Yes
I/O Discrete Points	32K	32K
I/O Analog Points	32K	32K
Type of Memory Storage	SRAM, Flash	SRAM, Flash
Dynamic Data Back-up	Battery Backup only	Battery Backup only
Processor Speed	1GHz	1GHz
Built-in Communication Ports	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)
Total Number of Racks	8	8
Communications Options	Serial, Genius, CMX, Ethernet, PROFINET, PROFIBUS, and DeviceNet	Serial, Genius, CMX, Ethernet, PROFINET, PROFIBUS, and DeviceNet
Supported IO Protocols	Ethernet (Ethernet Global Data, Channels, Modbus TCP Server and Client), PROFIBUS DP, DeviceNet	Ethernet (Ethernet Global Data, Channels, Modbus TCP Server and Client), PROFIBUS DP, DeviceNet
Software Programming Support	Machine Edition Logic Developer Professional edition 5.7 or above	Machine Edition Logic Developer Professional edition 7.0 SIM 8 or above
Program Languages Supported	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram
Redundancy Maximum amount of data in for Syncronization	Up to 2 Mbytes beginning and end of scan	Up to 2 Mbytes beginning and end of scan
Redundancy Typical Base Sweep Time (Reference Data Transfer List Impact)	3.66 msec: 1K Discrete I/O, 125 Analog I/O and 1K Registers 3.87 msec: 2K Discrete I/O, 250 Analog I/O and 2K Registers 4.30 msec: 4K Discrete I/O, 500 Analog I/O and 4K Registers 5.16 msec: 8K Discrete I/O, 1K Analog I/O and 8K Registers	3.66 msec: 1K Discrete I/O, 125 Analog I/O and 1K Registers 3.87 msec: 2K Discrete I/O, 250 Analog I/O and 2K Registers 4.30 msec: 4K Discrete I/O, 500 Analog I/O and 4K Registers 5.16 msec: 8K Discrete I/O, 1K Analog I/O and 8K Registers
Redundancy Switchover Time	Maximum 1 logic scan, minimum 3.133 msec.	Maximum 1 logic scan, minimum 3.133 msec.
CPU Scan Syncronization	Automatic Each Scan	Automatic Each Scan
Redundant Synch LAN	Yes	Yes
Redundant I/O LAN	Yes	Yes
Internal Power Used	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC
Number of Slots Module Occupies on Backplane	2	2
HART Pass-through	HART Pass-through – Fully integrated into the PLC system over a monitored communications network, you can simply and securely access HART instruments directly to remotely manage and mitigate operational issues with no additional equipment required.	



High Availability Data Synch

The Redundancy Memory Xchange (RMX) module operates as a dedicated link between CPUs in an RX3i Hot Standby CPU (IC695CRU320) Redundancy system. The RMX modules provide a path for transferring data between the two redundancy CPUs in the redundant system. A complete communications path consists of one RMX in the primary unit, one RMX in the secondary unit, and two high-speed fiber optic cables connecting them to each other. One or two redundancy links are supported per high availability CPU.

	IC695RMX128
Product Name	**RX3i Control Memory Xchange Module for Peer to Peer network. 128Megbytes of user shared memory.**
Lifecycle Status	Active
Module Type	High Availability Data Syncronization Link
Backplane Support	Universal Backplane Only. Uses PCI Bus.
Sync Link Speed	2.1 Gbits/s
Communications Data Rate	2.12Gbaud
Synchronzed Link Transfer Rate	43 Mbyte/s (4 byte packets) to 174 Mbyte/s (64 byte packets)
Maximum Data Syncronization	Up to 2 megabytes. Twice per Scan.
Bus Diagnostics	Network error detection.
Redundant RMX Support	Yes
Maximum Distance Between Redundant Controllers	300 meters
Connector Type	-Fiber optic LC type, conforms to IEC 61754-20 - Zirconium ceramic ferrule -Insertion loss: 0.35 dB (maximum) -Return loss: -30dB
Internal Power Used	660 mA @ +3.3 VDC 253 mA @ +5 VDC
Number of Slots Module Occupies on Backplane	1



Baseplates

RX3i baseplates are available in 7, 12 and 16 slot configurations to the meet the needs of your application. The RX3i Universal baseplates support hot swap capability to reduce downtime. Expansion bases are available in 5 and 10 slot versions to maximize flexibility.

	IC695CHS007	IC695CHS012	IC695CHS016	IC694CHS398	IC693CHS399	IC694CHS392	IC693CHS393
Product Name	**PACSystems RX3i 7 slot high speed controller base supports only 5 serial bus slots supported. Not expandable.**	**PACSystems RX3i 12 slot high speed controller base supports PCI and serial bus**	**PACSystems RX3i 16 slot high speed controller base supports PCI and serial bus**	**PACSystems RX3i serial 5-slot Expansion Baseplate (serial bus only)**	**PACSystems RX3i serial 5-slot Remote Baseplate (serial bus only)**	**PACSystems RX3i serial 10-slot Expansion Baseplate (serial bus only)**	**PACSystems RX3i serial 10-slot Remote Baseplate (serial bus only)**
Lifecycle Status	Active	Active	Active	Active	Mature	Active	Mature
Module Type	Universal Controller and I/O Base	Universal Controller and I/O Base	Universal Controller and I/O Base	Standard I/O	Standard I/O	Standard I/O	Standard I/O
Backplane Support	Supports both PCI and High Speed Serial	Supports both PCI and High Speed Serial.	Supports both PCI and High Speed Serial.	Supports High Speed Serial Only. No PCI support.	Supports High Speed Serial Only. No PCI support.	Supports High Speed Serial Only. No PCI support.	Supports High Speed Serial Only. No PCI support.
Module Hot Swap Support	Yes	Yes	Yes	No	No	No	No
Baseplate Option	Controller Base and Ethernet Expansion Base. No local base expansion	Controller Base and Ethernet Expansion Base	Controller Base and Ethernet Expansion Base	Expansion	Expansion	Expansion	Expansion
Distance	N/A	N/A	N/A	Up to 50 feet	Up to 700 feet	Up to 50 feet	Up to 700 feet
Number of Slots	7	12	16	5	5	10	10
Dimension (W x H x D) in. (mm)	10.43 x 5.57 x 5.80 (265 x 142 x 147)	18.01 x 5.57 x 5.80 (458 x 142 x 147)	23.7 x 5.57 x 5.80 (602 x 142 x 147)	10.43 x 5.12 x 5.59 (245 x 130 x 142)	10.43 x 5.12 x 5.59 (245 x 130 x 142)	17.44 x 5.12 x 5.59 (443 x 130 x 142)	17.44 x 5.12 x 5.59 (443 x 130 x 142)
Internal Power Used	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	170 mA @ 5 VDC	480 mA @ 5 VDC	150 mA @ 5 VDC	460 mA @ 5 VDC



Universal Bases Power Supplies

The RX3i power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features. The multipurpose power supplies can be configured for incremental capacity or redundancy.

	IC695PSA040	IC695PSD040	IC695PSA140	IC695PSD140	IC695ACC402
Product Name	**Power Supply, 120/240 VAC, 125 VDC (Can not be on the same backplane with more than one power supply)**	**Power Supply, 24 VDC (Can not be on the same backplane with more than one power supply)**	**Multipurpose Power Supply, 120/240 VAC, 125 VDC. Supports multiple multi-purpose power supplies.**	**Multipurpose Power Supply, 24 VDC. Supports multiple multi-purpose power supplies.**	**Multipurpose Power Supply, 24 VDC. Supports multiple multi-purpose power supplies.**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Universal Base Power Supply	Universal Base Power Supply	Universal Base Power Supply	Universal Base Power Supply	Universal Base Power Supply
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	2	1	2	1	1
Power Source	100-240 VAC or 125 VDC	24 VDC	100-240 VAC or 125 VDC	24 VDC	24 VDC
Redundant and Added Capacity Support	No	No	Yes, Up to 4 Multipurpose power supplies supported on a Universal base	Yes, Up to 4 Multipurpose power supplies supported on a Universal base	Yes, Up to 4 Multipurpose power supplies supported on a Universal base
Output Source	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available.	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available.	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available.
Number of Redundant Power Supplies Supported	N/A	N/A	Two Multipurpose Power Supplies are supported on the Universal Base configured for redundancy	Two Multipurpose Power Supplies are supported on the Universal Base configured for redundancy	Two Multipurpose Power Supplies are supported on the Universal Base configured for redundancy



Remote Base Power Supplies

The RX3i power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. RX3i power supplies are tied into the performance of the CPU for simplex, fail-safe, and fault tolerance. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features.

	IC694PWR321	IC694PWR330	IC694PWR331	IC693PWR332
Product Name	**Power Supply, 120/240 VAC, 125 VDC**	**Power Supply, 120/240 VAC, 125 VDC**	**Power Supply, 24 VDC**	**Power Supply, 12 VDC**
Lifecycle Status	Active	Active	Active	Active
Module Type	Expansion Power Supply	Expansion Power Supply	Expansion Power Supply	Expansion Power Supply
Backplane Support	Remote Bases Only	Remote Bases Only	Remote Bases Only	Remote Bases Only
Power Source	100-240 VAC or 125 VDC	100-240 VAC or 125 VDC	24 VDC	12 VDC
High Capacity	No	Yes	Yes	Yes
Output Source	30 watts total; 15 watts 5 VDC; 15 watts 24 VDC relay; 20 watts 24 VDC isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
Cable Length to Redundant Power Supply Adapter	N/A	N/A	N/A	N/A
Redundant Power Supply Adapter Rack Compatibility	N/A	N/A	N/A	N/A
24 VDC Output Current Capacity	0.8 A	0.8 A	0.8 A	0.8 A



Remote Base Power Supplies

The RX3i power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. RX3i power supplies are tied into the performance of the CPU for simplex, fail-safe, and fault tolerance. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features.

	IC693PWR328
Product Name	**Power Supply, 48 VDC**
Lifecycle Status	Active
Module Type	Expansion Power Supply
Backplane Support	Remote Bases Only
Power Source	48 VDC
High Capacity	No
Output Source	30 watts total; 15 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
Cable Length to Redundant Power Supply Adapter	N/A
Redundant Power Supply Adapter Rack Compatibility	N/A
24 VDC Output Current Capacity	0.8 A



Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694ACC300	IC694MDL230	IC694MDL250	IC694MDL231	IC694MDL240
Product Name	**PACSystems RX3i DC Voltage Input Simulator, 8/16 Points**	**PACSystems RX3i AC Voltage Input Module, 120 VAC Isolated, 8 Point Input**	**PACSystems RX3i AC Voltage Input Module, 120 VAC Isolated, 16 Point Input**	**PACSystems RX3i AC Voltage Input Module, 240 VAC Isolated, 8 Point Input**	**PACSystems RX3i AC Voltage Input Module, 120 VAC, 16 Point Input**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Input Simulator	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Input Voltage Range	N/A	0-132 VAC	0-132 VAC	0-264 VAC	0-132 VAC
Input Current (mA)	N/A	14.5	14.5	15	12
Number of Points	16	8	16	8	16
Response Time (ms)	20 on/30 off	30 on/45 off	30 on/45 off	30 on/45 off	30 on/45 off
Trigger Voltage	N/A	74-132	74-132	148-264	74-132
Points per Common	16	1	1	1	16
Diagnostic Supported	N/A	N/A	N/A	N/A	N/A
Connector Type	Switches	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	120 mA @ 5 VDC	60 mA @ 5 VDC	60 mA @ 5 VDC	60 mA @ 5 VDC	90 mA @ 5 VDC



Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL260	IC694MDL241	IC694MDL632	IC694MDL634	IC694MDL645
Product Name	**PACSystems RX3i AC Voltage Input Module, 120 VAC, 32 Point Input**	**AC/DC Voltage Input Module, 24 VAC/VDC**	**PACSystems RX3i DC Voltage Input Module, 125 VDC Pos/Neg Logic, 8 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 8 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 16 Point Input**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Input Voltage Range	0-132 VAC	0-30 VDC	0-150 VDC	0-30 VDC	0-30 VDC
Input Current (mA)	12	7	4.5	7	7
Number of Points	32	16	8	8	16
Response Time (ms)	30 on/45 off	12 on/28 off	7 on/7 off	7 on/7 off	7 on/7 off
Trigger Voltage	74-132	11.5-30	90-150	11.5-30	11.5-30
Points per Common	16	16	4	8	16
Diagnostic Supported	N/A	N/A	N/A	N/A	N/A
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	90 mA @ 5 VDC	80 mA @ 5 VDC; 125 mA @ 24 VDC	40 mA @ 5 VDC	45 mA @ 5 VDC; 62 mA @ 24 VDC Isolated Isolated	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated



Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs

	IC694MDL646	IC694MDL654	IC694MDL655	IC694MDL660	IC695MDL664
Product Name	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, FAST, 16 Point Input**	**PACSystems RX3i DC Voltage Input Module, 5/12 VDC (TTL) Pos/Neg Logic, 32 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 32 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 32 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24VDC Positive Logic, Advanced Diagnostics, 16 Point Input**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	Universal PCI Slot Only
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Input Voltage Range	0-30 VDC	0-15 VDC	0-30 VDC	0-30 VDC	0-30 VDC
Input Current (mA)	7	3.0 @ 5 V, 8.5 @ 12 V	7	7	12.2
Number of Points	16	32	32	32	16
Response Time (ms)	1 on/1 off	1 on/1 off	2 on/2 off	0.5ms, 1.0ms, 2.0ms, 5ms, 10ms, 50ms and 100ms, selectable per module. On and off.	0.5ms, 1.0ms, 2.0ms, 5ms, 10ms, 50ms and 100ms, selectable per module. On and off.
Trigger Voltage	11.5-30	4.2-15	11.5-30	11.5-30	0.5 × VIN VDC
Points per Common	16	8	8	8	8
Diagnostic Supported	N/A	N/A	N/A	N/A	Open Wire, Short to DC Negative Input Pulse Test Short to DC Plus
Connector Type	Terminal Block (20 screws), included with module.	Fujitsu Connector	Fujitsu Connector	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBB032 or IC694TBS032
Internal Power Used	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated	5 VDC -195 mA @ 5 VDC; 12 VDC -440 mA @ 5 VDC	195 mA @ 5 VDC	300 mA @ 5 VDC	225 mA @ 5 VDC; 95 mA @ 3.3 VDC



Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC694ALG232	IC694ALG233	IC695ALG600
Product Name	**PACSystems RX3i Analog Input, Voltage, High Density (16 Channel) 16 Bit with advanced diagnostics**	**PACSystemsRX3i Analog Input, Current, High Density (16 Channel) 16 Bit with advanced diagnostics**	**PACSystems RX3i Analog Input. Configurable per channel for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032). Cold Junction Compensation are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**
Lifecycle Status	Active	Active	Active
Module Type	Analog Input	Analog Input	Universal Analog Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	-10 V to +10 V, 0 to 10 V	0-20 mA, 4-20 mA, 4-20 mA Enhanced	Voltage: +50 mV, +150 mV, 0–5 V, 1–5 V, 0–10 V, +10 V; Current: 0–20 mA, 4–20 mA, +20 mA; Thermocouple Inputs: B, C, E, J, K, N, R, S, T; RTD Inputs: PT 385 / 3916, N 618 / 672, NiFe 518, CU 426: Resistance Inputs: 0 to 250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms
HART Support	N/A	N/A	N/A
Channel-to-Channel Isolation	No	No	Two Groups of Four
Number of Channels	16 Single Ended, 8 Differential	16	8
Update Rate	Single Ended: 5 ms for all channels Differential: 3 ms all channels	6 ms all channels	10ms per Channel; 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.
Resolution	16 bit; ±10 V, 0.3125 mV, 1 LSB; 0-10 V, 0.3125 mV, 1 LSB	16 bit; 0-20 mA, 0.625 µA/bit; 4-20 mA, 0.5 µA/bit; 4-20 mA Enhanced, 0.5 µA/bit	11 to 16 bits, depending on configured range and A/D filter frequency
Accuracy	0.25% at 25°C (77°F)	0.25% at 25°C (77°F)	Calibrated Accuracy at 25°C. Better than 0.1% of range (except 10 ohm CU RTD) Accuracy depends on A/D filter, data format, input noise, and ambient temperature.
Input Impedance	500K Ohms (single-ended mode) 1 MegaOhms (differential mode)	250 ohms	Current 249 ohms ±1%
Input Filter Response	23 Hz (single-ended mode) 38 Hz (differential mode)	23 Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 1000Hz
Notch Filter	N/A	N/A	Yes
Diagnostics	Under Range/Over Range, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Under Range/Over Range, Open Wire, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Open Wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low
Internal Power Used	112 mA (maximum) @ +5 VDC	120 mA @ +5 VDC	400 mA @ 5 V; 350 mA @ 3.3 V
External Power Requirement	110 mA (maximum) +24 VDC supply connected to TB1 on IC695CHSxxx	65 mA @ 24 VDC	N/A
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.



Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC695ALG608	IC695ALG616	IC695ALG628
Product Name	**PACSystems RX3i Analog Input. Configurable per channel for Current or Voltage. High Density (8 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Analog Input. Configurable per channel for Current or Voltage. High Density (16 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Analog Input with HART Communications. Configurable per channel for Current or Voltage. High Density (8 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**
Lifecycle Status	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input with HART Communications
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V
HART Support	N/A	N/A	Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) Enterprise HART Pass-Thru Command (Function 3)
Channel-to-Channel Isolation	One Group of Eight	One Group of Sixteen	One Group of Eight
Number of Channels	8	16	8
Update Rate	All 8 Channels at 5 msec @ 500Hz. Performance is dependent on filtering.	All 16 Channels at 9 msec @ 500Hz. Performance is dependent on filtering.	All 8 Channels at 5 msec @ 500Hz. Performance is dependent on filtering and HART enabled channels could add 6 to 8 seconds.
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	Selectable per channel
Accuracy	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input types: 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input types: 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input types: 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA
Input Impedance	Current 249 ohms ±1%	Current 249 ohms ±1%	Current 249 ohms ±1%
Input Filter Response	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz
Notch Filter	Yes	Yes	Yes
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low
Internal Power Used	450 mA @ 5 V; 600 mA @ 3.3 V	450 mA @ 5 V; 600 mA @ 3.3 V	450 mA @ 5 V; 600 mA @ 3.3 V
External Power Requirement	N/A	N/A	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032 Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032 Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.



Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC695ALG626	IC695ALG106	IC695ALG112
Product Name	**PACSystems RX3i Analog Input with HART Communications. Configurable per channel for Current or Voltage. High Density (16 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Isolated Analog Input Configurable per channel for Current or Voltage. High Density (6 Isolated Channels) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Isolated Analog Input. Configurable per channel for Current or Voltage. High Density (12 Isolated Channels) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**
Lifecycle Status	Active	Active	Active
Module Type	Analog Input with HART Communications	Analog Input with Channel to Channel Isolation	Analog Input with Channel to Channel Isolation
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V
HART Support	Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) Enterprise HART Pass-Thru Command (Function 3)	N/A	N/A
Channel-to-Channel Isolation	One Group of Sixteen	Yes (250 VAC continuous, 1500 VAC for 1 minute per channel)	Yes (250 VAC continuous, 1500 VAC for 1 minute per channel)
Number of Channels	16	6	12
Update Rate	All 16 Channels at 9 msec @ 500Hz. Performance is dependent on filtering and HART enabled channels could add 6 to 8 seconds.	1 ms for all channels.	1 ms for all channels
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input : types 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA	±0.1% of span at 25°C, ±0.25% of span over operating temperature range	±0.1% of span at 25°C, ±.25% of span over operating temperature range
Input Impedance	Current 249 ohms ±1%	Current = 250 ohms ±1%, Voltage >= 500k Ohms	Current = 250 ohms ±1%, Voltage >= 500k Ohms
Input Filter Response	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable low-pass: 8Hz, 12Hz, 16Hz, 40Hz, 250Hz, and 1000Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 250Hz, and 1000Hz
Notch Filter	Yes	N/A	N/A
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, under range, over range, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, under range, over range, positive/negative rate of change, High, High-High, Low, Low-Low
Internal Power Used	450 mA @ 5 V; 600 mA @ 3.3 V	400 mA @ 5 V; 600 mA @ 3.3 V	800 mA @ 5 V; 600 mA @ 3.3 V
External Power Requirement	N/A	19.2 V to 30 VDC, Current required: 500 mA	19.2 V to 30 VDC, Current required: 500 mA
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.



Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC694ALG220	IC694ALG221	IC694ALG222	IC694ALG223
Product Name	**PACSystems RX3i Analog Input, Voltage, 4 Channel**	**PACSystems RX3i Analog Input, Current, 4 Channel**	**PACSystems RX3i Analog Input,Voltage, High Density (16 Channel)**	**PACSystems RX3i Analog Input, Input, Current, High Density (16 Channel)**
Lifecycle Status	Active	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input	Analog Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Range	-10 V to +10 V	4-20 mA, 0-20 mA	-10 V to ±10 V, 0 to 10 V	0-20 mA, 4-20 mA
HART Support	N/A	N/A	N/A	N/A
Channel-to-Channel Isolation	N/A	N/A	N/A	N/A
Number of Channels	4	4	1	16
Update Rate	4 ms all channels	2 ms all channels	13 ms all channels	13 ms all Channels
Resolution	12 bit; 5 mV/20 µA/bit	12 bit; 0-20 mA, 5 µA/bit; 4-20 mA, 4 µA/bit	12 bit; ±10 V, 5 mV/20 µA/bit; 0-10 V, 5 mV/20 µA/bit	12 bit; 0-20 mA, 5 µA/bit; 4-20 mA, 4 µA/bit; 4-20 mA Enhanced, 5µA/bit
Accuracy	±10 mV/40µA at 25°C (77°F)	0.1 % full scale	0.25% at 25°C (77°F)	0.25% at 25°C (77°F)
Input Impedance	>9 Megohms	250 ohms	250 ohms	250 ohms
Input Filter Response	17 Hz	325 Hz	200 Hz	200 Hz
Notch Filter	N/A	N/A	N/A	N/A
Diagnositics	N/A	N/A	N/A	N/A
Internal Power Used	27 mA @ 5 VDC; 98 mA @ 24 VDC Isolated	25 mA @ 5 VDC; 100 mA @ 24 VDC Isolated	112 mA @ 5 VDC; 4150 mA- User Supplied 24 VDC	120 mA @ 5 VDC; 65 mA-User Supplied 24 VDC
External Power Requirement	N/A	N/A	N/A	N/A
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.



Analog I/O Modules (Input)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	HE693ADC410	HE693ADC420
Product Name	**Isolated Analog Input Module, Voltage, 1500 VAC, Isolation**	**Isolated Analog Input Module, Current, 1500 VAC, Isolation**
Lifecycle Status	Mature	Mature
Module Type	Analog Input	Analog Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Range	±10 V	4-20 mA, ±20 mA
Number of Channels	4	4
Channel-to-Channel Isolation	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Input Impedance	1 Megohm	100 ohms
A/D Type, Resolution	Integrating, 18 bits	Integrating, 18 bits
Useable Resolution	13 bits plus sign	13 bits plus sign
I/O Required	4 %AI, 4 %AQ, 16 %I	8 %AI, 8 %AQ, 16 %I
Sample Rate	45 channels/second	45 channels/second
Analog Filtering	1 KHz, 3 pole Bessel	1 KHz, 3 pole Bessel
Digital Filtering	1-128 samples/update	1-128 samples/update
Maximum Error	.05% full scale	.05% full scale
Common Mode Range	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Common Mode Rejection	>100 dB	>100 dB
Power Consumption at Steady State, Maximum	.7 W @ 5 V, 1.2 W @ 24 V	.7 W @ 5 V, 1.2 W @ 24 V
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
External Power Requirement	N/A	N/A
Internal Power Used	140 mA @ 5 VDC; 50 mA @ 24 VDC Relay	140 mA @ 5 VDC; 50 mA @ 24 VDC Relay



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL310	IC694MDL330	IC694MDL340	IC694MDL390
Product Name	**PACSystems RX3i AC Voltage Output Module, 120 VAC, 0.5A, 12 Point Output**	**PACSystems RX3i AC Voltage Output Module, 120/240 VAC, 1A, 8 Point Output**	**PACSystems RX3i AC Voltage Output Module, 120 VAC, 0.5A, 16 Point Output**	**PACSystems RX3i AC Voltage Output Module, 120/240 VAC Isolated, 2A, 5 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	85-132 VAC	85-264 VAC	85-132 VAC	85-264 VAC
Number of Points	12	8	16	5
Isolation	N/A	N/A	N/A	Yes
Diagnostics	N/A	N/A	N/A	N/A
Load Current per Point	0.5 A	1 A	0.5 A	2 A
Response Time (ms)	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off
Output Type	Triac	Triac	Triac	Triac
Polarity	N/A	N/A	N/A	N/A
Points per Common	6	4	4	1
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	210 mA @ 5 VDC	160 mA @ 5 VDC	315 mA @ 5 VDC	110 mA @ 5 VDC



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL350	IC694MDL732	IC694MDL734	IC694MDL740
Product Name	**PACSystems RX3i AC Voltage Output Module, 120/240 VAC Isolated, 2A, 16 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5A, 8 Point Output**	**PACSystems RX3i DC Voltage Output Module, 125 VDC Pos/Neg Logic, 6 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5A, 16 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	74-264 VAC	12-24 VDC	11-150 VDC	12-24 VDC
Number of Points	16	8	6	16
Isolation	Yes	N/A	N/A	N/A
Diagnostics	N/A	N/A	N/A	N/A
Load Current per Point	Per Point 2A max. @ 30°C & 1A max. @ 60°C (Linear derating)	0.5 A	1 A	0.5 A
Response Time (ms)	1 on 1/2 cy off	2 on/2 off	7 on/5 off	2 on/2 off
Output Type	Triac	Transistor	Transistor	Transistor
Polarity	N/A	Positive	Positive/Negative	Positive
Points per Common	1	8	1	8
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	110 mA @ 5 VDC	50 mA @ 5 VDC	90 mA @ 5 VDC	110 mA @ 5 VDC



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL741	IC694MDL742	IC694MDL752	IC694MDL753
Product Name	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Negative Logic, 0.5A, 16 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic ESCP, 1A, 16 Point Output**	**PACSystems RX3i DC Voltage Output Module, 5/24 VDC (TTL) Negative Logic, 0.5A, 32 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5A, 32 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	12-24 VDC	12-24 VDC	5, 12-24 VDC	12-24 VDC
Number of Points	16	16	32	32
Isolation	N/A	N/A	N/A	N/A
Diagnostics	N/A	N/A	N/A	N/A
Load Current per Point	0.5 A	1 A	0.5 A	0.5 A
Response Time (ms)	2 on/2 off	2 on/2 off	0.5 on/0.5 off	0.5 on/0.5 off
Output Type	Transistor	Transistor	Transistor	Transistor
Polarity	Negative	Positive	Negative	Positive
Points per Common	8	8	8	8
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Fujitsu Connector	Fujitsu Connector
Internal Power Used	110 mA @ 5 VDC	130 mA @ 5 VDC	260 mA @ 5 VDC	260 mA @ 5 VDC



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL758	IC694MDL754	IC695MDL765	IC694MDL930
Product Name	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic with ESCP (Self Healing) per group, 0.5 A, 32 Point Output (Two groups of 16)**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic with ESCP (Self Healing), 0.75 A, 32 Point Output**	**RX3i DC Voltage Output Module, 24/125 volt DC 2 A Smart Digital Output module, 16 Point Output**	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.O., 4 A Isolated, 8 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	12-24 VDC	12-24 VDC	18 to 30 VDC 105 to 132 VDC	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal
Number of Points	32	32	16	8
Isolation	N/A	N/A	N/A	Yes
Diagnostics	Electronic Short Circuit Detection Per 16 points	Short Circuit Detection	Output Pulse Test Over temperature Failed Switch Detection Overload Detection and Shutdown No-load Detection	N/A
Load Current per Point	0.50 A	0.75 A	2 A	2 A
Response Time (ms)	0.5 on/0.5 off	0.5 on/0.5 off	1 msec maximum	15 on/15 off
Output Type	Transistor	Transistor	Transistor	Relay
Polarity	Positive	Positive	Positive	N/A
Points per Common	16	16	16	1
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	250 mA @ 5 VDC	300 mA @ 5 VDC	540 mA @ 5.1 VDC; 152 mA @ 3.3 VDC	6 mA @ 5 VDC; 70 mA @ 24 VDC Relay



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL916	IC694MDL931	IC694MDL940	HE693RLY100	HE693RLY110
Product Name	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.O., 4 A Isolated, 16 Point Output**	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.C. and Form C, 8 A Isolated, 8 Point Output**	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.O., 2 A, 16 Point Output**	**DC/AC Voltage Relay Output Module High Current**	**DC/AC Voltage Relay Output Module High Current (fused)**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Output Voltage Range	5 to 125 VDC 5/24/125 VDC nominal 5 to 250 VAC (47 to 63 Hz), 120/240 VAC nominal	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	12-120 VAC, 12-30 VDC	12-120 VAC, 12-30 VDC
Number of Points	16	8	16	8	8
Isolation	Yes	Yes	N/A	N/A	Yes
Diagnostics	N/A	N/A	N/A	N/A	N/A
Load Current per Point	4 A	8 A	2 A	8 A	8 A
Response Time (ms)	10ms maximum (At nominal voltage excluding contact bounce)	15 on/15 off	15 on/15 off	11 on/11 off	11 on/11 off
Output Type	Relay	Relay	Relay	Relay	Relay
Polarity	N/A	N/A	N/A	N/A	N/A
Points per Common	1	1	4	N/A	1
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	300 mA @ 5 VDC from backplane maximum (all outputs ON)	6 mA @ 5 VDC; 110 mA @ 24 VDC Relay	7 mA @ 5 VDC; 135 mA @ 24 VDC Relay	180 mA @ 5 VDC; 200 mA @ 24 VDC Relay	180 mA @ 5 VDC; 200 mA @ 24 VDC Relay



Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC694ALG392	IC695ALG704
Product Name	**PACSystems RX3i Analog Output, Current/Voltage, 8 Channel**	**PACSystems RX3i Analog Output, Current/Voltage, 4 Channel**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output
Backplane Support	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Diagnostics	N/A	High and Low Alarm, Ramp Rate Control Clamping, Overrange and Underrange
Protection	Reverse polarity and undervoltage on external power supply	N/A
Range	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V
HART Support	N/A	N/A
Number of Channels	8	4
Channel-to-Channel Isolation	N/A	N/A
Update Rate	8 ms all channels	8 ms all channels
Resolution	16 bit; 0.312 mV/bit	±10 V: 15.9 bits; 0 to 10 V: 14.9 bits; 0 to 20 mA: 15.9 bits; 4 to 20 mA: 15.6 bits
Accuracy	0-20 mA, 4-20 mA ±0.1% at 25°C (77°F); 0-10 V, -10F + 10 V ±0.25 at 25°C (77°F)	Accurate to within 0.15% of full scale at 25°C. Accurate to within 0.30% of full scale at 60°C
Maximum Output Load	5 mA (2 K ohms)	Current -850ohm max @ Vuser = 20 V; Voltage -2k ohm max load (minimum resistance)
Output Load Capacitance	2000 pF, Inductance 1H	Current: 10uH max.; Voltage: 1uF max.
External Power Requirement	N/A	Voltage Range: 19.2 V to 30 V Current required: 160 mA
Connector Type	Terminal Block (20 screws), included with module.	IC694TBB032 or IC694TBS032. Sold Separately.
Internal Power Used	110 mA @ 5 VDC; 315 mA -User Supplied 24 VDC	375 mA @ 3.3 V (internal) 160 mA @ 24 V (external)



Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC695ALG708	IC695ALG728
Product Name	**PACSystems RX3i Analog Output, Current/Voltage, 8 Channel**	**PACSystems RX3i Analog Output with HART Communications, Current/Voltage, 8 Channel**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output with HART Communications
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Diagnostics	High and Low Alarm, Ramp Rate Control Clamping, Overrange and Underrange	High and Low Alarm, Ramp Rate Control, Clamping, Overrange and Underrange
Protection	N/A	N/A
Range	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V
HART Support	N/A	-Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) -Enterprise HART Pass-Thru Command (Function 3)
Number of Channels	8	8
Channel-to-Channel Isolation	N/A	N/A
Update Rate	8 ms all channels	8 ms all channels and HART enabled channels could add 6 to 8 seconds.
Resolution	10 V: 15.9 bits; 0 to 10 V: 14.9 bits; 0 to 20 mA: 15.9 bits; 4 to 20 mA: 15.6 bits	±10 V: 15.9 bits; 0 to 10 V: 14.9 bits; 0 to 20 mA: 15.9 bits; 4 to 20 mA: 15.6 bits
Accuracy	Accurate to within 0.15% of full scale at 25°C. Accurate to within 0.30% of full scale at 60°C	Accurate to within 0.15% of full scale at 25°C. Accurate to within 0.30% of full scale at 60°C
Maximum Output Load	Current -850ohm max @ Vuser = 20 V; Voltage -2k ohm max load (minimum resistance)	Current -850ohm max @ Vuser = 20 V; Voltage -2k ohm max load (minimum resistance)
Output Load Capacitance	Current: 10uH max.; Voltage: 1uF max.	Current: 10uH max.; Voltage: 1uF max.
External Power Requirement	Voltage Range: 19.2 V to 30 V Current required: 315 mA	Voltage Range: 19.2 V to 30 V Current required: 315 mA
Connector Type	IC694TBB032 or IC694TBS032. Sold Separately	IC694TBB032 or IC694TBS032. Sold Separately.
Internal Power Used	375 mA @ 3.3 V (internal) 315 mA @ 24 V (external)	375 mA @ 3.3 V (internal) 315 mA @ 24 V (external)



Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC695ALG808	IC694ALG390	IC694ALG391
Product Name	**PACSystems RX3i Isolated Analog Output, Current/Voltage, 8 Isolated Channels**	**PACSystems RX3i Analog Output, Voltage, 2 Channel**	**PACSystems RX3i Analog Output, Current, 2 Channel**
Lifecycle Status	Active	Active	Active
Module Type	Analog Output with Channel to Channel Isolation	Analog Output	Analog Output
Backplane Support	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Diagnostics	High and Low Alarm, Ramp Rate Control, Clamping, Overrange and Underrange	N/A	N/A
Protection	N/A	N/A	N/A
Range	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V	-10 V to +10 V, 4-20 mA	1-5 V and 0-5 V, 0-20 mA, 4-20 mA
HART Support	N/A	N/A	N/A
Number of Channels	8	2	2
Channel-to-Channel Isolation	Yes (250 VAC continuous, 1500 VAC for 1 minute per channel)	N/A	N/A
Update Rate	8 ms all channels (1 msec per channel)	5 ms all channels	5 ms all channels
Resolution	±10 V @ 15.9 bits minimum 0 to 10 V @ 14.9 bits minimum 0 to 20 mA @ 15.9 bits minimum 4 to 20 mA @ 15.6 bits minimum	12 bit; 2.5 mV/bit	12 bit;0-20 mA, 5µA/bit
Accuracy	Accurate to within ±0.1% of span at 25C, ± 0.25% of span over operating temperature range	±5 mV at 25°C (77°F)	0-20 mA, ±8 µA at 25°C (77°F); 0-20 mA, 4-20 mA ±0.1% at 25°C (77°F)
Maximum Output Load	Current: 1350 ohm maximum resistance, 10uH max inductance Voltage: 2k Ohm minimum resistance, 1uF max capacitance	5 mA (2 K ohms)	5 mA (2 K ohms)
Output Load Capacitance	Current: 10uH max.; Voltage: 1uF max.	2000 pF	2000 pF, Inductance 1H
External Power Requirement	500 mA @ 24 VDC	N/A	N/A
Connector Type	IC694TBBx32 or IC694TBSx32 Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	450 mA @ 3.3 V Maximum, all channels on	32 mA @ 5 VDC; 120 mA @ 24 VDC Isolated	30 mA @ 5 VDC; 215 mA 24 VDC Isolated



Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	HE693DAC410	HE693DAC420
Product Name	**Isolated Analog Output Module, Voltage**	**Isolated Analog Output Module, Current**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Diagnostics	N/A	N/A
Protection	N/A	N/A
Range	±10 V	4-20 mA or 0-20 mA
HART Support	N/A	N/A
Number of Channels	4	4
Channel-to-Channel Isolation	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Update Rate	N/A	N/A
Resolution	1.2 5 mV	2.0 µA (4-20 mA); 2.5 µA (±20 mA)
Accuracy	N/A	N/A
Maximum Output Load	N/A	N/A
Output Load Capacitance	N/A	N/A
External Power Requirement	N/A	2-32 VDC
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	500 mA @ 5 VDC; 150 mA @ 24 VDC Relay	150 mA @ 5 VDC; 110 mA @ 24 VDC Relay



Analog Mixed I/O Modules (Input and Output)

The analog mixed modules (four in and two out) are available with or without advanced diagnostics. The advanced diagnostics includes alarms, open wire, rate of change, over range and under range. Additional features include 16 bit resolution, analog output clamp limits and output ramp mode option.

	IC694ALG542	IC694ALG442
Lifecycle Status	Active	Active
Module Type	**Analog Combination 4 In and 2 Out with Advanced Diagnostics, Output Clamp and Ramp Control**	**Analog Combination 4 In and 2 Out**
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Range	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA per Channel	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA per Channel
Channel-to-Channel Isolation	N/A	N/A
Number of Channels	4 in/2 out	4 in/2 out
Update Rate	2ms all channels	2ms all channels
Resolution	(Input)16 bit; 0 V to 10 V, 0.3125 mV/bit; -10 V to +10 V, 0.3125 mV/bit; 0-20 mA, 0.625 µA 4-20 mA 0.5 µA/bit (Output) 16 bit; 0 to 20 mA: 0.625 µA; 4 to 20 mA: 0.5 µA; –10 V to +10 V: 0.3125 mV; 0 to +10 V: 0.3125 mV	(Input)12 bit; 0 V to 10 V, 2.5 mV/bit; -10 V to +10 V, 5 mV/bit; 0-20 mA, 4-20 mA 5 µA/bit (Output) 16 bit; 0.312 mV/bit; 4-20 mA 0.5 µA/bit; 0-20 mA 0.625 µA/bit
Accuracy	Current Input 0 to 20 mA ±0.25% of full scale @ 25°C (77°F); ±0.5% of full scale over specified operating temperature range Current Input 4 to 20 mA ±0.25% of full scale @ 25°C (77°F); ±0.5% of full scale over specified operating temperature range 4 to 20 mA Enhanced Mode ±0.25% of full scale @ 25°C (77°F); ±0.5% of full scale over specified operating temperature range Current Output ±0.1% of full scale @ 25°C (77°F), typical ±0.25% of full scale @ 25°C (77°F), maximum ±0.5% of full scale over operating temperature range (maximum) Voltage Output ±0.25% of full scale @ 25°C (77°F), typical ±0.5% of full scale @ 25°C (77°F), maximum ±1.0% of full scale over operating temperature range (maximum)	(Input) 0.25% at 25°C (77°F) (Output) 0-20 mA, 4-20 mA ±0.1% at 25°C (77°F)
Input Impedence	Current mode - 250 ohms Voltage mode - 800 K ohms	Current mode - 250 ohms Voltage mode - 800 K ohms
Input Filter Response	Current mode - 55 Hz Voltage mode - 55 Hz	Current mode - 38 Hz Voltage mode - 38 Hz
Maximum Output Load	Voltage: 5 mA (2 K ohms) Current Inductance:1 H (maximum)	Voltage: 5 mA (2 K ohms) Current Inductance:1 H (maximum)
Output Load Capacitance	Voltage:1 µF (maximum) Current: 2000 pF (maximum)	Voltage:1 µF (maximum) Current: 2000 pF (maximum)
Diagnostics	Under Range/Over Range, Open Wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	N/A
Internal Power Used	95 mA @ 5 VDC; 150 mA external 24 VDC Isolated	95 mA @ 5 VDC; 150 mA external 24 VDC Isolated
External Power Requirement	24VDC: Current: 5 µA/V (typical), 10 µA/V (maximum) Voltage: 25 mV/V (typical), 50 mV/V (maximum)	24VDC: Current: 5 µA/V (typical), 10 µA/V (maximum) Voltage: 25 mV/V (typical), 50 mV/V (maximum)
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.



Millivolt I/O Modules

The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	IC695ALG600 Millivolt	IC695ALG306 Millivolt
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Thermocouple Input module provides six isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**
Lifecycle Status	Active	Active
Module Type	Millivolt Input	Strain Gage Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Range	±150mV or ±50mV	±150mV or ±50mV
Diagnostics	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Number of Channels	8	6
Notch Filter	Yes	From 2.3 Hz to 28 Hz per channel
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format)	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format)
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.
Input Impedance	>1M ohm	Voltage: >=500k ohm
I/O Required	N/A	N/A
A/D Conversion Type	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Strain Gages Supported	Yes	Yes
Maximum Normal Voltage Input	N/A	N/A
Maximum Voltage Input	±14.5 VDC continuous	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5V; 400 mA @ 3.3V



Millivolt I/O Modules

The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	IC695ALG312 Millivolt	HE693ADC409
Product Name	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Analog I/O Module, Millivolt Input**
Lifecycle Status	Active	Active
Module Type	Strain Gage Input	Millivolt Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Range	±150mV or±50mV	±25 mV, ±50 mV and ±100 mV
Diagnostics	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	N/A
Channel-to-Channel Isolation	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	N/A
Number of Channels	12	4
Notch Filter	From 2.3 Hz to 28 Hz per channel	N/A
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	3 µV, 6µV, 9µV (respectively)
Accuracy	±0.1% of voltage span at 25°C ±0.25% of span over temperature range.	±0.5%
Input Impedance	Voltage: >=500k ohm	>20 Mohms
I/O Required	N/A	4% AI
A/D Conversion Type	Sigma Delta	Integrating
A/D Conversion Time	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	35 Channels/second
Strain Gages Supported	Yes	Bridged (load cells)
Maximum Normal Voltage Input	N/A	100 mV
Maximum Voltage Input	N/A	±35 V
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	300 mA @ 5 V; 400 mA @ 3.3 V	100 mA @ 5 VDC



RTD I/O Modules

The RTD Input Modules provide RTD inputs that allow the direct connection of 2 and 3-wire RTD temperature sensors without using external signal processing (transducers, transmitters, etc.). All analog and digital processing of the RTD signal is performed on the module.

	IC695ALG600 RTD	IC695ALG508 RTD	HE693RTD600
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated RTD Input module (also supports Resistive) provides eight isolated differential Resistive or RTD input channels. Each channel can be individually configured for 2, 3, 4 wire RTD or Resistance.**	**RTD Input Module, Low Resolution**
Lifecycle Status	Active	Active	Active
Module Type	RTD Input	RTD (and Resistive) Input Channel to Channel Isolation	RTD Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Number of Channels	8	8	6
RTD Types Supported	2 and 3 wire PT 385 / 3916, N 618 / 672, NiFe 518, CU 426	2, 3 and 4 wire 50, 100, 200, 500, and 1000 ohm Pt 385; 50, 100, 200, 500, and 1000 ohm Pt 391.6; 100, 200, 500, and 1000 ohm Ni 618; 120 ohm Ni 672; 604 ohm NiFe 518; 10, 50 and 100 ohm Cu 426	3-wire, Pt-100E, Pt-100C, Pt-100Z, Pt-1000, Cu-10, Cu-50, PT-100, Cu-53, Cu-100, Ni-120, TD5R, TD5R, Pt-90 (MIL-7990)
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	N/A
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	N/A
Notch Filter	Yes	N/A	N/A
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	0.5°C or 0.5°F
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	Calibrated Accuracy at 25°C. Typical is ±0.5%	±0.5°C, typical
Input Impedance	>1M ohm	N/A	>1000 Megohms
I/O Required	N/A	N/A	6 %AI
Fault Protection	N/A	N/A	Zener Diode Clamp
Update Time	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter)Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	50 Channels/second
A/D Conversion Type	Sigma Delta	Sigma Delta	18 bit, integrating
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5 V; 300 mA @ 3.3 V	70 mA @ 5 VDC



RTD I/O Modules

The RTD Input Modules provide RTD inputs that allow the direct connection of 2 and 3-wire RTD temperature sensors without using external signal processing (transducers, transmitters, etc.). All analog and digital processing of the RTD signal is performed on the module.

	HE693RTD601	HE693RTD660
Product Name	**RTD Input Module, High Resolution**	**RTD Input Module, Isolated**
Lifecycle Status	Active	Active
Module Type	RTD Input	RTD Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Number of Channels	6	6
RTD Types Supported	3-wire, Pt-100E, Pt-100C, Pt-100Z, Pt-1000, Cu-10, Cu-50, PT-100, Cu-53, Cu-100, Ni-120, TD5R, TD5R, Pt-90 (MIL-7990)	3 wire, Pt-100E, Pt-100C, Ni-120, Cu-10, Pt-1000,TD5R Si
Diagnostics	N/A	N/A
Channel-to-Channel Isolation	N/A	5 VAC
Notch Filter	N/A	None
Resolution	0.125°C , 0.1°C, or 0.1°F	0.05°C, 0.05°F, 0.1°C, 0.1°F, 0.5°C or 0.5°F
Accuracy	±0.5°C, typical	±0.3°C
Input Impedance	>1000 Megohms	>1000 Megohms
I/O Required	6 %AI	6% AI, 6% AQ, 16% I
Fault Protection	Zener Diode Clamp	Suppression Diode
Update Time	50 Channels/second	50 Channels/second
A/D Conversion Type	18 bit, integrating	18 bit, integrating
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	70 mA @ 5 VDC	200 mA @ 5 VDC



Strain Gage I/O Modules

The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

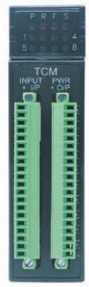
	IC695ALG600 Strain Gage	IC695ALG306 Strain Gage	IC695ALG312 Strain Gage
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Thermocouple Input module provides six isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**
Lifecycle Status	Active	Active	Active
Module Type	Strain Gage Input	Strain Gage Input	Strain Gage Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	±150mV or ±50mV	±150mV or ±50mV	±150mV or ±50mV
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Number of Channels	8	6	12
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.
Input Impedance	>1M ohm	Voltage: >=500k ohm	Voltage: >=500k ohm
I/O Required	N/A	N/A	N/A
A/D Conversion Type	Sigma Delta	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Strain Gages Supported	Yes	Yes	Yes
Maximum Normal Voltage Input	N/A	N/A	N/A
Maximum Voltage Input	±14.5 VDC continuous	N/A	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5 V; 400 mA @ 3.3 V	300 mA @ 5 V; 400 mA @ 3.3 V



Strain Gage I/O Modules

The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	IC695ALG412	HE693STG883	HE693STG884
Product Name	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV. Offers a 10 dB improvement in noise rejection compared to ALG312 thermocouple inputs.**	**Analog I/O Module, Strain Gage**	**Analog I/O Module, Strain Gage**
Lifecycle Status	Active	Active	Active
Module Type	Strain Gage Input	Strain Gage Input	Strain Gage Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Range	±50mV	N/A	N/A
Diagnostics	Open wire, Short Circuit, Positive/Negative rate of Change, High, High-High, Low, Low-Low	N/A	N/A
Channel-to-Channel Isolation	Channel to Channel Isolation. 250VAC Continuous; 1500VAC 1 minute; 2550VDC 1 second	N/A	N/A
Number of Channels	12	8	8
Resolution	32-bit IEEE floating point or 16 bit integer (in 32 bit field) input data format	0.6 µV, 0.8 µV, 0.9 µV (respectively)	0.8 µV, 1.6 µV, 3.2 µV (respectively)
Accuracy	± 0.1% of voltage span at 25 °C. ± 0.25% of span over temperature range.	±0.3%	±0.3%
Input Impedance	Voltage: >=500k ohm	>1000 Mohms	>1000 Mohms
I/O Required	N/A	8% AI, 16% I, 8% AQ, 16% Q	8% AI, 16% I, 8% AQ, 16% Q
A/D Conversion Type	Sigma Delta	Integrating	Integrating
A/D Conversion Time	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	35 Channels/second	35 Channels/second
Strain Gages Supported	Yes	Bridged (load cells)	Bridged (load cells)
Maximum Normal Voltage Input		100 mV	100 mV
Maximum Voltage Input		±35 V	±35 V
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	425 mA @ 5 V; 400 mA @ 3.3 V	60 mA @ 5 VDC; 30 mA @ 24 VDC Relay	60 mA @ 5 VDC; 30 mA @ 24 VDC Relay



Temperature Control Modules

The Temperature Control Module (TCM), is a high performance control module providing eight channels of thermocouple input and eight channels of control output in a single RX3i module. Each channel can operate in closed or open loop mode relieving the PLC of providing the temperature control functions. The module also supports Autotuning.

	IC693TCM302	IC693TCM303
Product Name	**PACSystems RX3i Temperature Control Module, (8) T/C, (1) RTD and (8) 24 VDC Output**	**PACSystems RX3i Temperature Control Module, Extended Range, (8) T/C, (1) RTD and (8) 24 VDC Output**
Lifecycle Status	Mature	Mature
Module Type	Temperature Control	Temperature Control
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Number of Channels	8 T/C In/ 8 DC Out	8 T/C In/ 8 DC Out
Range	J=0-600°C K=0-1050°C L=0-600°C	J=0-450°C K=0-600°C L=0-450°C
Output Voltage Range	18 to 30 volts DC	18 to 30 volts DC
Load Current per Point	100 mA maximum sourcing	100 mA maximum sourcing
Diagnostics	Open thermocouple and reverse connection detection capability Detection and indication of out-of-tolerance temperature readings	Open thermocouple and reverse connection detection capability Detection and indication of out-of-tolerance temperature readings
Connector Type	Two 20 pin connectors (screw type)	Two 20 pin connectors (screw type)
Internal Power Used	150 mA @ 5 VDC	150 mA @ 5 VDC



Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	IC695ALG600 Thermocouple	IC695ALG306	IC695ALG312	IC695ALG412
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Thermocouple Input module provides six isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±50mV. The ALG412 offers a 10dB improvement in noise rejection compared to the ALG312 thermocouple input module.**
Lifecycle Status	Active	Active	Active	ACtive
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input	Thermocouple Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1	1
Range	B, C, E, J, K, N, R, S, T	J, K, T, E, R, S, B, N, or C	J, K, T, E, R, S, B, N, or C	J, K, T, E, R, S, B, N, or C
Diagnostics	Open wire, Short Circuit, Positive/ Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/ Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/ Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/ Negative Rate of Change, High, High-High, Low, Low-Low
Number of Channels	8	6	12	12
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Common Mode Rejection	120dB minimum @ 50/60 Hz with 8 Hz filter 110dB minimum @ 50/60 Hz with 12 Hz filter	2.3 Hz filter, 50/60Hz: 100 dB 4 Hz filter, 50Hz: 100 dB 4.7 Hz filter, 60Hz: 100 dB	2.3 Hz filter, 50/60Hz: 100 dB 4 Hz filter, 50Hz: 100 dB 4.7 Hz filter, 60Hz: 100 dB	All filters, 50/60 Hz: 110 dB
Chanel to Channel Crosstalk		70 dB minimum	70 dB minimum	70 dB minimum
Notch Filter	Yes	From 2.3 Hz to 28 Hz per channel	From 2.3 Hz to 28 Hz per channel	From 2.3 Hz to 28 Hz per channel
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.	±0.1% of voltage span at 25°C ±0.25% of span over temperature range.	±0.1% of voltage span at 25°C ±0.25% of span over temperature range.
Update Rate	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter)Channels that are disabled are not scanned, shortening scan time.	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter)Channels that are disabled are not scanned, shortening scan time.	Configurable from 15 msec to 120 msec.
I/O Required	N/A	N/A	N/A	N/A
A/D Conversion Type	Sigma Delta	Sigma Delta	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Connector Type	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	225 mA @ 5V; 400 mA @ 3.3V	425mA @ 5V; 400 mA @ 3.3V	425mA @ 5V; 400 mA @ 3.3V



Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	HE693THM166	HE693THM409	HE693THM449
Product Name	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module**
Lifecycle Status	Active	Active	Active
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Range	J, K, N, T, E, R, S, B, C, X	J, K, N, T, E, R, S,	J, K, N, T, E, R, S,
Diagnostics	Yes	No	Yes
Number of Channels	16	4	4
Channel-to-Channel Isolation	N/A	N/A	N/A
Common Mode Rejection	N/A	N/A	N/A
Channel to Channel Crosstalk	N/A	N/A	N/A
Notch Filter	N/A	N/A	N/A
Resolution	0.5°C or 0.5°F	0.5°C or 0.5°F	0.5°C or 0.5°F
Accuracy	±0.5°C, typical (J, K, N, T)	±0.5°C, typical (J, K, N, T)	±0.5°C, typical (J, K, N, T)
Update Rate	N/A	N/A	N/A
I/O Required	16% AI, 16% I	4% AI	4% AI, 16% I
A/D Conversion Type	Integrating	Integrating	Integrating
A/D Conversion Time	40 Channels/second	40 Channels/second	40 Channels/second
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	80 mA @ 5 VDC; 30 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay



Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	HE693THM809	HE693THM884	HE693THM888	HE693THM889
Product Name	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module (Enhanced)**	**Analog I/O Thermocouple Input Module (Enhanced)**	**Analog I/O Thermocouple Input Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input	Thermocouple Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Range	J, K, N, T, E, R, S	J, K, N, T, E, R, S, B, C	J, K, N, T, E, R, S, B, C	J, K, N, T, E, R, S
Diagnostics	No	Yes	Yes	Yes
Number of Channels	8	8	8	8
Channel-to-Channel Isolation	N/A	N/A	N/A	N/A
Common Mode Rejection	N/A	N/A	N/A	N/A
Channel to Channel Crosstalk	N/A	N/A	N/A	N/A
Notch Filter	N/A	None	60 Hz	N/A
Resolution	0.5°C or 0.5°F	N/A	N/A	0.5°C or 0.5°F
Accuracy	±0.5°C, typical (J,K,N,T)	N/A	N/A	±0.5°C, typical (J,K,N,T)
Update Rate	N/A	N/A	N/A	N/A
I/O Required	8% AI	8% AI, 8% AQ, 16% I	8% AI, 8% AQ, 16% I	8% AI, 16% I
A/D Conversion Type	Integrating	Integrating	Integrating	Integrating
A/D Conversion Time	40 Channels/second	N/A	N/A	40 Channels/second
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay	100 mA @ 5 VDC; 60 mA @ 24 VDC Relay	100 mA @ 5 VDC; 60 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay



Resistive I/O Module

The Resistive module allows the user to easily connect to resistive loads without the need of external devices.

	IC695ALG600 Resistive	IC695ALG508 Resistive
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Resistive Input module (also supports RTD) provides eight isolated differential Resistive or RTD input channels. Each channel can be individually configured for 2, 3, 4 wire RTD or Resistance.**
Lifecycle Status	Active	Active
Module Type	Resistive Input	Resistive (and RTD) Input Channel to Channel Isolation
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Range	0 to 250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms	250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low
Number of Channels	8	8
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Notch Filter	Yes	N/A
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	Calibrated Accuracy at 25°C. Typical is ± 0.5%
Input Impedance	>1M ohm	N/A
Input Filter Response	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 1000Hz	Configurable: 2.3Hz, 4Hz, 4.7Hz, 24Hz, 28Hz
A/D Conversion Type	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Maximum Voltage Input	±14.5 VDC continuous	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5 V; 300 mA @ 3.3 V



Networks and Distributed I/O Systems

The RX3i features a variety of communications options for distributed control and/or I/O. Choose from PROFINET Controller, Ethernet EGD, PROFIBUS-DP, Genius and DeviceNet. These high-performance communication modules are easy to install, quick to configure, and can be provided as “in rack” solutions to reduce engineering design cycles and system complexity. In addition, communication capabilities up to the SCADA level and down to the device (IED) level improve connectivity, and time stamping capabilities deliver insight into operations to improve productivity and uptime.

	IC695ETM001	IC695PNC001	IC695PNS001	IC695CMX128
Product Name	**PACSystems RX3i Ethernet TCP/IP 10/100Mbits, two RJ-45 ports with built-in switch**	**PROFINET Controller (PNC) module, connects a PACSystems RX3i controller to a high-speed PROFINET local area network. It enables the RX3i controller to communicate with IO-Devices on the LAN.**	**PACSystems RX3i PROFINET Scanner (PNS) module, connects a remote node of 90-30 or RX3i modules to a PROFINET IO-Controller**	**RX3i Control Memory Xchange Module for Peer to Peer network. 128Megbytes of user shared memory.**
Lifecycle Status	Active	Active	Active	Active
Module Type	Ethernet	PROFINET Controller	PROFINET Scanner	Reflective Memory
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1	1
Protocol Support	SRT, Ethernet Global Data (EGD), Channels (Client and Server), Modbus TCP (Client and Server)	PROFINET	PROFINET	None Required
Entity Type	Client/Server	Master	I/O Device (Scanner)	Deterministic Peer to Peer. Programmable Interrupt support.
Communication Ports	Two RJ-45 ports one MAC Address	Two RJ-45 and Two SFP Cages (SFPs not included, available separately). 5 MAC addresses.	Two RJ-45 and Two SFP Cages (SFPs not included, available separately). 5 MAC addresses.	
Bus Speed	10/100Mbaud	10/100/1000Mbaud	10/100/1000Mbaud	Network link speed of 2.1 Gigabits/sec. Network transfer rate of 43 Mbyte/s (4 byte packets) to 174 Mbyte/s (64 byte packets)
I/O Device Update Rate	N/A	Configurable: 1 ms to 512 ms	Configurable: 1 ms to 512 ms	
Maximum I/O Memory	N/A	128 Kbytes of combined input/output memory per PROFINET Controller	2880 bytes total: 1440 bytes of input data, 1440 bytes of output data	
System Maximum Limits	N/A	Up to 4 PNC001 per CPU IO 64 IO-Devices per Network 255 IO-Devices across 4 PROFINET controllers per CPU 256 PROFINET Slots per device 2048 Number of PROFINET Submodules per CPU	1 PNS per rack 32 input status bits and 32 output control bits	
Network Distance	Network Dependent	100 meters for copper Up to 70,000 meters with Fiber	100 meters for copper Up to 70,000 meters with Fiber	Multimode Fiber up to 300 meters between nodes. 10Km when HUB is used
Bus Diagnostics	Yes	Yes	Yes	Network error detection.
Number of Drops Supported	Network Dependent	64 Drops 256 Subslots	Supports number of modules allowed per rack Does not support LRE for Series 90-30 expansion racks	256
Message Size	N/A	N/A	N/A	Up to 128 Mbytes reflective memory with parity. Dynamic packet sizes of 4 to 64 bytes, automatically controlled by the CMX module
Connector Type	Two RJ-45	Two RJ-45 and two optional SFP plug connectors for copper or fiber (single or multimode) connections	Two RJ-45 and two optional SFP plug connectors for copper or fiber (single or multimode) connections	Fiber optic LC type, conforms to IEC 61754-20; Zirconium ceramic ferrule; Insertion loss 0.35 dB (maximum); Return loss -30 dB
Internal Power Used	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	3.3 V: 0.5 A with no SFP devices installed 1.2 A maximum (two SFP devices installed, 0.35 A per SFP device) 5 V: 1.5 A maximum	3.3 V: 0.5 A with no SFP devices installed 1.2 A maximum (two SFP devices installed, 0.35 A per SFP device) 5 V: 1.5 A maximum	660 mA @ 3.3 VDC; 253 mA @ 5 VDC



Networks and Distributed I/O Systems

The RX3i features a variety of communications options for distributed control and/or I/O. Choose from PROFINET Controller, Ethernet EGD, PROFIBUS-DP, Genius and DeviceNet. These high-performance communication modules are easy to install, quick to configure, and can be provided as “in rack” solutions to reduce engineering design cycles and system complexity. In addition, communication capabilities up to the SCADA level and down to the device (IED) level improve connectivity, and time stamping capabilities deliver insight into operations to improve productivity and uptime.

	IC695PBM300	IC695PBS301	IC694BEM331	IC694DNM200
Product Name	**PACSystems RX3i PROFIBUS Master Module, Supports DPV1 Class 1 and Class 2.**	**PACSystems RX3i PROFIBUS Slave Module, Supports DPV1 Class 1 and Class 2.**	**PACSystems RX3i Genius Bus Controller**	**PACSystems RX3i DeviceNet Master Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	PROFIBUS Master	PROFIBUS Slave	Genius Bus Controller	DeviceNet Master
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	CPU Rack Only
Number of Slots Module Occupies on Backplane	1	1	1	1
Protocol Support	PROFIBUS DPV1	PROFIBUS DPV1	Genius	DeviceNet
Entity Type	Master	Slave	Master	Master
Communication Ports	PROFIBUS DB-9 connector	PROFIBUS DB-9 connector	Screw Terminal	Screw Terminal
Bus Speed	12Mbaud	12Mbaud	153.6Kbaud	500Kbaud
I/O Device Update Rate				
Maximum I/O Memory				
System Maximum Limits				
Network Distance	Baud Rate Dependent. Supports all standard data rates (9.6 kBit/s, 19.2 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s and 12 MBit/s)	Baud Rate Dependent. Supports all standard data rates (9.6 kBit/s, 19.2 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s and 12 MBit/s)	7500 feet (2286 meters) at 38.4 Kbaud; 4500 feet (1371 meters) at 76.8 Kbaud; 3500 feet (1066 meters) at 153.6 Kbaud extended; 2000 feet (609 meters) at 153.6 Kbaud standard. Maximum length at each baud rate also depends on cable type.	500Kbaud 100 meters to 125Kbaud 500 meters. Maximum length at each baud rate also depends on cable type.
Bus Diagnostics	Yes, Slave Status Bit Array Table, Network Diagnostic Counters, DP Master Diagnostic Counters, Firmware Module Revision, Slave Diagnostic Address	Yes, Alarms	Yes	Yes
Number of Drops Supported	Up To 125 (Requires repeater every 25 nodes)	N/A	32	64
Message Size	244 bytes of input and 244 bytes of output for each slave. Not to exceed 3584 bytes input and 3584 bytes outputs total for the system.	244 bytes of input and 244 bytes of output	128 bytes	127 bytes
Connector Type	PROFIBUS Connector	PROFIBUS Connector	Screw Terminal	Screw Terminal
Internal Power Used	420 mA @ 5 VDC	420 mA @ 5 VDC	300 mA @ 5 VDC	300 mA @ 5 VDC



Networks and Distributed I/O Systems

The RX3i features a variety of communications options for distributed control and/or I/O. Choose from PROFINET Controller, Ethernet EGD, PROFIBUS-DP, Genius and DeviceNet. These high-performance communication modules are easy to install, quick to configure, and can be provided as “in rack” solutions to reduce engineering design cycles and system complexity. In addition, communication capabilities up to the SCADA level and down to the device (IED) level improve connectivity, and time stamping capabilities deliver insight into operations to improve productivity and uptime.

	IC695EDM001	IC695EDS001	IC695EIC001	IC695EIS001	IC695E61850
Product Name	**PACSystems RX3i DNP3 Ethernet Master**	**PACSystems RX3i DNP3 Ethernet Outstation**	**PACSystems RX3i IEC60870-5-104 Ethernet Client**	**PACSystems RX3i IEC60870-5-104 Ethernet Server**	**PACSystems RX3i IEC61850 Client**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Ethernet	Ethernet	Ethernet	Ethernet	Ethernet
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Protocol Support	IC695ETM plus DNP3 Master	IC695ETM plus DNP3 Outstation	IC695ETM plus IEC60870-5-104 Client	IC695ETM plus IEC60870-5-104 Server	IEC61850 Client: MMS, GOOSE (under development)
Entity Type	Master	Slave	Master	Slave	Master
Communication Ports	Two RJ-45 ports one MAC Address	Two RJ-45 ports one MAC Address	Two RJ-45 ports one MAC Address	Two RJ-45 ports one MAC Address	Two RJ-45 and Two SFP Cages (SFPs not included, available separately). 5 MAC addresses.
Bus Speed	10/100Mbaud	10/100Mbaud	10/100Mbaud	10/100Mbaud	10/100/1000Mbaud
I/O Device Update Rate	Configurable: 100 ms to 64 sec	Configurable: 10 ms to 3200 ms	Configurable: 100 ms to 64 sec	Configurable: 10 ms to 3200 ms	less than 1 second
Maximum I/O Memory	10,000 points	12,072 points, 20000 events	10,000 points	12,072 points, 20000 events	5000 variables
System Maximum Limits	N/A	N/A	N/A	N/A	Up to 4 per CPU
Network Distance	Network Dependent	Network Dependent	Network Dependent	Network Dependent	100 meters for copper Up to 70,000 meters with Fiber
Bus Diagnostics	Yes	Yes	Yes	Yes	Yes
Number of Drops Supported	Up to 64 DNP3 Outstations	Up to 4 DNP3 Masters	Up to 64 Servers	Up to 4 clients	32 devices
Message Size	N/A	N/A	N/A	N/A	N/A
Connector Type	Two RJ-45	Two RJ-45	Two RJ-45	Two RJ-45	Two RJ-45 and two optional SFP plug connectors for copper or fiber (single or multimode) connections
Internal Power Used	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	3.3 V: 0.5 A with no SFP devices installed 1.2 A maximum (two SFP devices installed, 0.35 A per SFP device) 5 V: 1.5 A maximum



Co-Processor and Serial Communications Modules

RX3i features a wide range of Specialty Modules to meet all of your application needs. From temperature controls, high-speed counters, I/O processors, coprocessors, to PID auto-tuning modules, these Specialty Modules are designed to meet the demand for versatile industrial solutions.

	IC695CMM002	IC695CMM004	IC695PRS015	HE693ASC900
Product Name	**Two Port Serial Module**	**Four Port Serial Module**	**Pressure Transducer Module supporting Honeywell LG1237 Smart Sensors**	**Horner ASCII Basic Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	Serial Communications 2 Isolated Serial Ports	Serial Communications 4 Isolated Serial Ports	Serial Communications	Serial Communications 4 Isolated Serial Ports ASCII Basic Co-Processor
Backplane Support	Universal Backplane Only. Uses PCI Bus	Universal Backplane Only. Uses PCI Bus	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Protocols Supported	Serial Read/Write Modbus Master/Slave DNP 3.0 Master/ Slave CCM Slave and Custom Protocols	Serial Read/Write Modbus Master/Slave DNP 3.0 Master/ Slave CCM Slave and Custom Protocols	Pressure Transducer Honeywell LG1237 Smart Pressure Transducer sensors (Up to 15 sensors)	N/A
Programming Languages	None required. Communications set up in Machine Edition	None required. Communication set up in Machine Edition		BASIC
Program Storage	FLASH	FLASH	FLASH	EEPROM
Communication Ports	(2) Isolated RS-232 or RS-485/422	(4) Isolated RS-232 or RS-485/422	(1) RS-485	RS-232, RS-232/485
Network Data Rate	Selectable Baud Rates: 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K	Selectable Baud Rates: 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K	375K baud	N/A
Internal Power Used	0.7 Amps maximum @ 3.3 VDC 0.115 Amps maximum @ 5 VDC	0.7 Amps maximum @ 3.3 VDC 0.150 Amps maximum @ 5 VDC	0.7 Amps maximum @ 3.3 VDC 0.115 Amps maximum @ 5.0 VDC	375 mA @ 5 VDC



Motion Control (Servo Control)

Motion control integrated into the RX3i fosters high performance point-to-point applications. GE Motion Control modules can be flexibly applied to a variety of digital, analog, and stepper motion applications.

	IC694DSM324	IC694DSM314
Product Name	**PACSystems RX3i Digital Servo Module, 4-Axis (Fiber Optic Interface to Amplifiers)**	**PACSystems RX3i Digital Servo Module, 4-Axis**
Lifecycle Status	Active	Active
Module Type	Servo Motion	Servo Motion
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Drive	Beta i Series Digital Servos	Alpha and Beta Series Digital and Analog Servos
Drive Interface	Fiber Optic, Up to 100 meters between amplifiers with total length of 400 meters.	Digital for Alpha and Beta Series; ±10 V velocity or torque command for analog
Axes	4 Digital	2 Digital and 1 Analog or 4 Analog
Master Encoder Support	Incremental Master (1Mhz)	Incremental Master (1Mhz)
Electronic Cam	Yes	Yes
Velocity Feed-Forward	Yes	Yes
Encoder Feedback (Serial)	Yes	Yes
Temposonic Feedback	Yes	Yes
Number of Programs	15 Kbytes (10 + 40 Subroutines)	15 Kbytes (10 + 40 Subroutines)
User Memory (Number of Programs)	15 KBytes	15 KBytes
Feedback Inputs	3	3
Encoder Input Type/Maximum Rate	TTL Diff/Single, 175kHz	TTL Diff/Single, 175kHz
Analog Inputs	2	4 - In Digial Mode 8 - In Analog Mode
Analog Outputs	2	4 - In Digial Mode 0 - In Analog Mode
Internal Power Used	1360 mA @ 5 VDC	1300 mA @ 5 VDC



Power Measurement Modules

The Power Transducer Module (PTM) and Power Synchronization and Measurement (PSM) module measure and calculate critical data for control of electrical power systems and synchronization of power grids. Both the PTM and PSM connect to user supplied current and potential transformers, which translate power grid signals to proportionate, low-level signals for measurement and analysis. The PTM module is not intended to provide a protective relay function or be used for energy billing purposes. The PSM module provides ANSI protective relay calculations and revenue grade monitoring for a complete genset, paralleling switchgear or infrastructure management solution. Both the PTM and PSM consist of a processing module that plugs into the PLC backplane, an interface module for field wiring connections, and cables to interconnect the two modules. The PTM and PSM can be used with Wye or Delta type three-phase power or with single-phase power systems.

	IC693PTM101	IC694PSM001
Product Name	**Power Transducer Module Processing Module interface board (a panel mounted circuit board). This board interfaces between the Power Transducer module and the input transformers (current and potential), 1.0 meter Interface cable that connects the module to the Interface board.**	**Power Synchronization and Measurement Module and Interface Module (a panel mounted terminal block). The interface module translates power grid signals from external, user supplied potential and current transformers (PT's and CT's) to low voltage signals suitable for the processing module. 2.0 meter Interface cables connect the processing module to the Interface module.**
Lifecycle Status	Mature	Active
Module Type	Power Transducer Modules	Power Synch and Measurement Module
Input Voltage Range	10-120 VAC (nominal)	20-600 VAC (nominal)
Power Measurement Configurations	Grids / Circuits 1 / 0 0 / up to 4	Grids / Circuits 2 / 0 1 / up to 3 0 / up to 6
Current Input Range	0 to 7.5 Amps RMS (5 A RMS nominal)	0 to 7.5 Amps RMS (5 A RMS nominal)
Frequency Range	35Hz to 70Hz	40Hz to 70Hz
Output Rating	N/A	150 VAC/VDC, 1 A
Number of Outputs	0	1 (provided as redundant, isolated, solid-state contacts)
Data	Data availability • Data calculation rate: 20ms @ 50Hz, 16.67ms @ 60Hz • Data latency: 15ms @ 50Hz, 16.67ms @ 60Hz Measured Data • RMS voltage of phase A, B, and C (in Volts x 10) • RMS currents of phase A, B, C, and Neutral (in Amperes x 1000) for each grid • DC component of measured RMS voltages (in Volts x 10) • Frequency of phase A grid 1 (in Hz x 100) • Phase angle between phase A grid 1 and phase A grid 2 (in degrees x 10) Power and Energy Data • Active and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR) • Active and reactive total energy consumption in Watt-Seconds and Volt-Amperes-Reactive-Seconds (updated once per second), re-settable by the user • Total power factor • Average real and reactive power consumption (sliding 15 minute window updated once per second)	Data availability • Data measurement rate: 20ms @ 50Hz, 16.67ms @ 60Hz. • Data latency: 8ms Measured Data • RMS voltage of phase A, B, and C (in Volts x 10) • RMS currents of phase A, B, C, and Neutral (in Amperes x 1000) for each grid • DC component of measured RMS voltages (in Volts x 10) • Frequency of phase A grid 1 and phase A grid 2 (in Hz x 100) • Phase angle between phase A grid 1 and phase A grid 2 (in degrees x 10) Calculated Data • Real and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR) • Real and reactive total energy consumption, integrated over the past 1-second, in Kilo Watt-Hours (kWh) and Kilo Volt-Amperes-Reactive-Hours (kVARh) • Total power factor • Average real and reactive power consumption (sliding 15 minute window updated once per second)
Status and Diagnostics	• Module Heartbeat (indicates module health) • Utility Phase A voltage present • Phase polarity valid • Voltage measurements valid • Current measurements valid	• Module Heartbeat (indicates module health) • Field connection OK • Any grid alarm (single bit indication of power grid health) • Grid Voltage fault • Grid Current fault • Mixed Polarity fault • ANSI Protection Relay Calculations Grid Synchronization (ANSI 25) Phase Shift OK Voltage Difference OK Frequency Difference OK Close Relay OK Under Voltage alarm (ANSI 27) Reverse Power alarm (ANSI 32) Negative Sequence alarm (ANSI 46) Over Current alarm (ANSI 50) Over Voltage alarm (ANSI 59) VA Imbalance alarm (ANSI 60) Under Frequency alarm (ANSI 81U) Over Frequency alarm (ANSI 81O)
Internal Power Used	400 mA @ 5 VDC	190 mA @ 5 VDC



RX3i Pneumatic Module

This IC693MDL760 output module provides eleven pneumatic outputs and five 24 VDC sourcing outputs. For each pneumatic output, the module contains an internal 3-way solenoid-actuated valve and an associated output fitting, which is located on the front panel. When an output is turned ON, its internal valve connects a user supplied pressure source (100 psi maximum) to the output fitting. The pressure source is connected to the fitting on the bottom of the module. When the output is turned OFF, the valve's output port is vented to atmosphere inside the module. Solenoid power is supplied from an external 24 VDC source to the "DC Outputs" connector on the front panel.

	IC693MDL760
Product Name	**RX3i Solenoid Module**
Lifecycle Status	Active
Number of Points	(11) Pneumatic Outputs (5) 24 VDC Outputs
Pneumatic Outputs	11
Supply Pressure	100 PSI
Pressure Drop	25 psi max.@ 0.25scfm
External Solenoid Power	21.6-26.4 VDC, 24 VDC nominal
ON Response Time/Off Response Time	12ms max. ON 12ms max. OFF
Solenoid Inrush Current	33 mA/valve @ 24 VDC
Solenoid Holding Current	13 mA/valve @ 24 VDC
Output Fitting	Threaded for 10-32 adapter, 1/16" hose barb provided
Supply Fitting	Threaded for 10-32 adapter, 1/8" hose barb provided
Load Current per Point	0.5A @ 30 VDC per point, 2.0A total for all five points
Response Time (ms)	0.5 on/0.5 off
Output Type	Transistor
Polarity	Positive
Internal Power Used	75 mA from 5 VDC bus (solenoid LEDs are powered from external power source)



Expansion Modules for Local and Remote I/O

The RX3i supports various expansion options for local and remote I/O to optimize configurations. The RX3i can be expanded up to 8 expansion bases using local remote expansion module. The RX3i also supports Ethernet remote I/O using the RX3i Ethernet Network Interface module (IC695NKT001) Series 90-30 Ethernet Network Interface module (IC693NIU004) for more distributed I/O.

	IC695NKT001	IC693NIU004	IC695LRE001
Product Name	**PACSystems RX3i Ethernet Remote I/O Expansion Kit. Kit includes a NIU001 with two built-in serial ports and ETM001**	**PACSystems RX3i Ethernet Remote I/O Expansion (Slave)**	**PACSystems RX3i Expansion Module**
Lifecycle Status	Active	Active	Active
Module Type	Ethernet Communications (Supports redundant Ethernet modules)	Ethernet Communications	High Speed Serial Expansion Module
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Compatible with Series 90-30 bases only	Universal Backplane Only
Number of Slots Module Occupies on Backplane	3 (2 for NIU and 1 for Ethernet module)	N/A	No I/O slot used
Built-in Communication Ports	RJ-45 with built-in switch. 1 RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master	N/A	N/A
I/O Discrete Points	2048 Inputs/2048 Outputs maximum	2048 Inputs/2048 Outputs maximum	N/A
I/O Analog Points	1264 Inputs and 512 Outputs maximum	1264 Inputs and 512 Outputs maximum	N/A
User Logic Memory	5Kbytes of local logic	No local logic	N/A
Network Data Rate	10/100Mbit ports (RJ-45)	10/100Mbit ports (RJ-45)	1 Mbaud
Entity Type	Slave	Slave	Master
Network Distance	Network Dependent	Network Dependent	Up to 700 feet (213 meters)
Bus Diagnostics	Supported	Supported	Yes
Number of Drops Supported	Network Dependent Each Ethernet NIU can also support up to 7 additional local I/O racks (IC694CHSxxx)	Network Dependent Each Ethernet NIU can also support up to 7 additional local I/O racks (IC694CHSxxx)	Supports 7 local expansion racks. Discrete I/O: Maximum 320 In, 320 Out, Analog I/O: Maximum 160 In, 80 Out per base
Internal Power Used	1250 mA @ 3.3 VDC; 1000 mA @ 5 VDC for NIU controller and 840 mA @ 3.3 VDC; 614 mA @ 5 VDC for each Ethernet module	1.4 Amps @ 5 VDC	132 mA @ 5 VDC



RX3i CEP Carriers

The PACSystems* RX3i Carrier IC695CEP001 interfaces a remote node, consisting of one RX3i I/O module, to a PROFINET I/O Local Area Network (LAN).

The optional RX3i Expansion Carrier IC694CEE001 attaches to the RX3i CEP001 Carrier and provides the ability to add one additional RX3i IC694 I/O module to the remote node.

The RX3i CEP001 Carrier functions as a PROFINET IO-Device.

	IC695CEP001	IC694CEE001
Product Name	**RX3i CEP001 Carrier with RJ-45 Copper Ethernet Interface**	**RX3i CEE001 Expansion Carrier**
Lifecycle Status	Active	Active
PROFINET support	PROFINET Version 2.3 Class A IO-Device	PROFINET Version 2.3 Class A IO-Device
RX3i Controller version required	IC695CPU315/CPU320/CPE305/CPE310/ CPE330/CRU320, firmware v8.50 or later	IC695CPU315/CPU320/CPE305/CPE310/ CPE330/CRU320, firmware v8.50 or later
	IC69PNC001 PROFINET IO-controller with firmware version 2.20 or later	IC69PNC001 PROFINET IO-controller with firmware version 2.20 or later
RXi Controller version required	RXi Controller, ICRXICTL000, with firmware version 7.80 or later is compatible with CEP001 up to version 2.01, but is not compatible with CEP001 version 2.30.	
Proficy Machine Edition version required	Version 8.6 with SIM 3 or later	Version 8.6 with SIM 3 or later
Power requirements[1]	IC695CEP001: 5.25W (0.22 A) at 24 Vdc with or without Expansion Carrier (IC694CEE001)	IC695CEP001: 5.25W (0.22 A) at 24 Vdc with or without Expansion Carrier (IC694CEE001)
	DC power supply input range: 19.2 to 30 Vdc	DC power supply input range: 19.2 to 30 Vdc
Module dimensions mm(in)	177.2 x 51 x 35 mm (6.98" x 2.01" x 1.38").	177.2 x 51 x 35 mm (6.98" x 2.01" x 1.38").
Operating temperature	0°C to 60°C (32°F to 140°F) maximum surrounding air temperature	0°C to 60°C (32°F to 140°F) maximum surrounding air temperature
Number of Ethernet port connectors	Two RJ-45 10/100Base-TX receptacles	None
USB connector (for firmware upgrades)	One Micro-B connector. USB 2.0 compliant running at full-speed (12 MHz) in device mode	None
PNS status and control bits	32 input status bits and 32 output control bits	32 input status bits and 32 output control bits
I/O data update on the PROFINET LAN	Configurable: 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms, 128ms, 256ms and 512ms	Configurable: 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms, 128ms, 256ms and 512ms
Number of IP addresses	One; supports Classless Inter-Domain Routing (CIDR)	One; supports Classless Inter-Domain Routing (CIDR)
Number of MAC addresses	Three; one per external port and one internal. External MAC addresses are only used for specialized Ethernet protocols such as MRP or LLDP.	Three; one per external port and one internal. External MAC addresses are only used for specialized Ethernet protocols such as MRP or LLDP.
I/O station maximum limits		
Number of I/O modules per station	1 ; 2 (with IC694CEE001)	
I/O data per station	1024 bytes total 512 bytes of input data 512 bytes of output data	1024 bytes total 512 bytes of input data 512 bytes of output data
Configuration	Configured using Proficy Machine Edition when used with a PACSystems RX3i PROFINET Controller module as part of an RX3i High-speed I/O LAN system. V2.3 GSDML file available for import into 3rd-Party tools.	Configured using Proficy Machine Edition when used with a PACSystems RX3i PROFINET Controller module as part of an RX3i High-speed I/O LAN system. V2.3 GSDML file available for import into 3rd-Party tools.

[1]Value does not include the power consumption of the installed I/O modules. When calculating the total power requirements, add the power consumption of the I/O modules according to the I/O module datasheet.



RX3i Serial Bus Transmitter Module

The RX3i Serial Bus Transmitter Module, IC695LRE001, provides communications between a PACSystems RX3i Universal Backplane (IC695-model number), and serial expansion and remote backplanes (IC694- or IC693-model numbers). It translates the signal levels present in the Universal Backplane to the signal levels required by a Serial Expansion Backplane.

	IC695LRE001
Product Name	**Serial Bus Transmitter Module**
Lifecycle Status	Active
Current Required from Backplane	5.0V: 132mA
Maximum Total Expansion Cable Length	15 meters (50 feet) – Expansion Backplanes 213 meters (700 feet) – Remote Backplanes
Effective Data Rate	500k Bytes per second if the expansion bus includes Remote backplanes.
Electrical Isolation	Non-isolated differential communications
Serial Port	Station Manager Port: RS-232 DCE, 1200 - 115200 bps.
Cable Specifications:	
Cable Belden 8107 only (no substitutes):	Computer cable, overall braid over foil shield, twisted-pair 30 volt/80°C (176°F), 24 AWG (.22mm^2) tinned copper, 7 x 32 stranding Velocity of propagation = 70% , Nominal impedance = 100 Ohms
25 Pin Male Connector	Crimp Plug = Amp 207464–7; Pin = Amp 66506–9 Solder Plug = Amp 5-747912–2
25 Pin Female Connector	Crimp Receptacle = Amp 207463–1; Pin = Amp 66504–9 Solder Receptacle = Amp 5-747913–2
Connector Shell	Kit – Amp 5745833–5: Metal–plated plastic (plastic with nickel over copper), Crimp ring – Amp 745508–1, split ring ferrule

Accessories

Part Number	Description	Lifecycle Status
IC694TBB032	High Density 32 Point Terminal Block Box Style	Active
IC694TBB132	High Density 32 Point Terminal Block Box Style with Extended Shroud for Large Wiring Bundles	Active
IC694TBS032	High Density 32 Point Terminal Block Spring Style	Active
IC694TBS132	High Density 32 Point Terminal Block Spring Style with Extended Shroud for Large Wiring Bundles	Active
IC694TBC032	High Density 32 Point Terminal Block with a 40 pin Fujitsu connector. Compatible with DC Inputs, Analog Modules only. Not compatible with DC or AC output modules.	Active
IC694ACC310	Filler Module, Blank Slot	Active
IC694ACC311	Terminal blocks, 20 terminals (qty 6) for IC694xxx low density modules	Active
IC695ACC600	RX3i Cold Junction Compensation Kit (Contains 2 CJCs) for Universal Analog and Thermocouple Input Modules	Active
IC698ACC701	Lithium Batter pack that installs in CPU for CPU310 and CMU310 only (28 days of continuous battery backup)	Active
IC693ACC302	External High capacity battery pack. (1.3 years of continuous battery backup for CPU310/CMU310 and 1 month for CPU320/CRU320.)	Active
IC690RBK001	Rechargeable battery kit. Includes battery (IC690RBT001) and battery charger (IC690CRG001). The rechargeable battery is compatible with PAC controllers CPU310,CPU315, CPU320 and CRU320 only. Also compatible with Series 90-30 and Series 90-70 CPUs.	Active
IC690CRG001	Battery charger. Compatible with rechargeable battery (IC690RBT001) only. The rechargeable battery is compatible with PAC controllers CPU310,CPU315, CPU320 and CRU320 only. Also compatible with Series 90-30 and Series 90-70 CPUs.	Active
IC690RBT001	Rechargeable battery is compatible with IC690CRG001 battery charger only. The rechargeable battery is compatible with PAC controllers CPU310, CPU315, CPU320 and CRU320 only. Also compatible with Series 90-30 and Series 90-70 CPUs., Series 90-30 and Series 90-70.	Active
IC690ACC001	Real Time Clock Battery for CPE305 and CPE310	Active
IC695ACC400	CPE305 and CPE310 CPU Battery-less Energy Pack for backing up dynamic data	Active
IC695CBL001	Energy Pack Cable	Active
IC690ACC901	Mini-Converter Kit with cable (RS-485/RS-232)	Active
IC690ACC903	RS-485 Port Isolator	Active
IC693CBL316	RS-232 cable for RX3i CPE305 programming port and also the Station Manager Cable for the Ethernet ETM001	Active
IC690CDR002	User Manuals, InfoLink CD-ROM Documentation, single-user license	Active
IC693ACC307	I/O Bus Terminator Plug	Active
IC693ACC311	Series 90-30 style IC693 I/O modules Terminal Blocks, 20 terminals (qty 6)	Active

External Power Supplies

Part Number	Description	Lifecycle Status
IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply	Active
IC690PWR124	24 VDC, 10 Amp Output Power and 120/230 VAC Input Power Power Supply	Active

Terminal Block Quick Connect

Terminal Block Quick Connect (TBQC) for selected I/O modules enables the user to easily connect interposing terminal blocks. The TBQC consists of an I/O faceplate adapter that includes a 24 pin Fujitsu male connector (the faceplate replaces the 20 screw terminal connector on front of I/O module, not compatible with the high density 36 screw terminals), cable and interposing terminal block.

TBQC I/O Module Face Plate Adapter

Part Number	Description	Lifecycle Status
IC693ACC334	I/O module face plate adapter for 20 screw type I/O modules. Faceplate provides a 24 pin male Fujitsu connector.	Active

TBQC Interposing Terminal Block

Part Number	Description	Lifecycle Status
IC693ACC329	Interposing terminal block base for IC694MDL645, IC694MDL646, and IC694MDL240. The base can also be used with any 20 point terminal discrete or analog modules not listed.	Active
IC693ACC330	Interposing terminal block base for IC694MDL740 and IC694MDL742	Discontinued
IC693ACC331	Interposing terminal block base for IC694MDL741	Discontinued
IC693ACC332	Interposing terminal block base for IC694MDL940	Active
IC693ACC333	Interposing terminal block base for IC694MDL340	Active
IC693ACC337	Interposing terminal block base for IC693MDL654/655/752/753 and IC694MDL654/655/752/753	Active

TBQC Cables

Part Number	Description	Lifecycle Status
IC693CBL327	Cable, Left Side, One -24 Pin 90 Degree Connector, 3 Meter. Cable has a connector on only one end and open on the other. Cable used with TBQC I/O Face Plate Adapter or Fujitsu style I/O modules.	Active
IC693CBL328	Cable, Right Side, One -24 Pin 90 Degree Connector, 3 Meter. Cable has a connector on only one end and open on the other. Cable used with TBQC I/O Face Plate Adapter or Fujitsu style I/O modules.	Active
IC693CBL329	Cable, Left Side, One -24 Pin 90 Degree Connector, 1 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL330	Cable, Right Side, One -24 Pin 90 Degree Connector, 1 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL331	Cable, Left Side, One -24 Pin 90 Degree Connector, 2 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL332	Cable, Right Side, One -24 Pin 90 Degree Connector, 2 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL333	Cable, Left Side, One -24 Pin 90 Degree Connector, 0.5 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL334	Cable, Right Side, One -24 Pin 90 Degree Connector, 0.5 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active

High Density Terminal Block Quick Connect (32 point I/O terminals)

High Density Terminal Block Quick Connect (TBQC) for selected I/O modules enables the user to easily connect interpossing terminal blocks. The HDTBQC consist of a I/O module terminal block with a 40 pin Fujitsu male connector, cable and interposing terminal block. The HDTBQC is compatible with modules that accept IC694TBC032 (24 VDC discrete inputs and analog input and output modules. The HDTBQC is not compatible with discrete output modules).

HDTBQC I/O Module Face Plate Adapter

Part Number	Description	Lifecycle Status
IC694TBC032	High-density, 36-point, terminal block with cable connector. IC695ALGxxx, IC69xMDL660 and IC694MDL664 modules only. Discrete output modules not supported.	Active

HDTBQC Interposing Terminal Block

Part Number	Description	Lifecycle Status
IC694RTB032	High-density remote base, 36-point, with shield ground lug and removable terminal blocks. IC695ALGxxx, IC69xMDL660 and IC694MDL664 modules only. Discrete output modules not supported.	Active

HDTBQC Interface Cables

Part Number	Description	Lifecycle Status
IC694CBL005	Shielded 0.5 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Active
IC694CBL010	Shielded 1.0 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Active
IC694CBL030	Shielded 3.0 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Active
IC694CBL130	Shielded 3.0 meter cable with termination on one end that connects to the IC694TBC032 terminal block. The other end of the cable is non-terminated wires.	Active

RMX and CMX Reflective Memory Fiber Optic Cables

Simplex LC to LC connector, Fiber-Optic Cable – Multimode 62.5 Micron core.
Simplex (single) cabling is used for daisy chaining Tx to Rx to/from another node until final device circles back to beginning node.
Each CMX module requires two Simplex cables per module.

Part Number	Description	Lifecycle Status
CBL-000-F5-000	.5 feet (0.15 m)	Active
CBL-000-F5-001	1 foot (.31 m)	Active
CBL-000-F5-002	5 feet (1.52 m)	Active
CBL-000-F5-003	10 feet (3.04 m)	Active
CBL-000-F5-004	25 feet (7.62 m)	Active
CBL-000-F5-005	50 feet (15.24 m)	Active
CBL-000-F5-006	80 feet (24.40 m)	Active
CBL-000-F5-007	100 feet (30.49 m)	Active
CBL-000-F5-008	150 feet (45.72 m)	Active
CBL-000-F5-009	200 feet (60.98 m)	Active
CBL-000-F5-010	250 feet (76.20 m)	Active
CBL-000-F5-011	350 feet (106.68 m)	Active
CBL-000-F5-012	500 feet (152.15 m)	Active
CBL-000-F5-014	656 feet (200 m)	Active
CBL-000-F5-015	820 feet (250 m)	Active
CBL-000-F5-016	1,000 feet (304.30 m)	Active

Duplex LC to LC connector, Fiber-Optic Cable - Multimode 62.5 Micron core.
Duplex cabling is generally used with RMX system and is also good for CMX module to HUB connections. Duplex has a pair of cables connected together.
Each CMX module requires one Duplex cable per module to a hub.

Part Number	Description	Lifecycle Status
CBL-000-F6-000	3 feet (0.9144 m)	Active
CBL-000-F6-001	6 feet (1.8288 m)	Active
CBL-000-F6-002	10 feet (3.048 m)	Active
CBL-000-F6-003	16 feet (4.8768 m)	Active
CBL-000-F6-004	32 feet (9.7536 m)	Active
CBL-000-F6-005	66 feet (20.1168 m)	Active
CBL-000-F6-006	98 feet (29.8704 m)	Active
CBL-000-F6-007	164 feet (49.9872 m)	Active
CBL-000-F6-008	230 feet (70.104 m)	Active
CBL-000-F6-009	328 feet (99.9744 m)	Active
CBL-000-F6-010	393 feet (119.7864 m)	Active
CBL-000-F6-011	426 feet (129.8448 m)	Active
CBL-000-F6-012	492 feet (149.9616 m)	Active
CBL-000-F6-013	557 feet (169.7736 m)	Active
CBL-000-F6-014	656 feet (199.9488 m)	Active
CBL-000-F6-015	721 feet (219.7608 m)	Active
CBL-000-F6-016	754 feet (229.8192 m)	Active
CBL-000-F6-017	820 feet (249.936 m)	Active
CBL-000-F6-018	885 feet (269.748 m)	Active
CBL-000-F6-019	984 feet (299.9232 m)	Active

CMX and RMX Reflective Memory HUB (Contact GE for additional HUB configurations)

Part Number	Description	Lifecycle Status
HUB-5595-308	DIN-rail Mount Reflective Memory Hub. 21 -32 VDC Power supply, 1x 10BaseT Ethernet, 1x RS232, 8x Multimode Pluggable transceivers	Active
HUB-5595-380	DIN-rail Mount Reflective Memory Hub. 21 -32 VDC Power supply, 1x 10BaseT Ethernet, 1x RS232, 8x Single mode Pluggable transceivers	Active
ACC-5595-208	Rack Mount or Desktop Reflective Memory Hub. Universal power supply, 1x 10BaseT Ethernet, 1x RS232, 8x multimode pluggable transceivers	Active
ACC-5595-280	Rack Mount or Desktop, 8 Single mode Pluggable Transceivers. And no Multimode Pluggable Transceivers	Active

IC694 Rack to Rack Expansion Cables

Part Number	Description	Lifecycle Status
IC693CBL300	Cable, I/O Base Expansion, 1 Meter, Shielded	Active
IC693CBL301	Cable, I/O Base Expansion, 2 Meters, Shielded	Active
IC693CBL302	Cable, I/O Base Expansion, 15 Meter, Shielded with built-in terminator	Active
IC693CBL312	Cable, I/O Base Expansion, 0.15 Meter, Shielded	Active
IC693CBL313	Cable, I/OBase Expansion, 8 Meters, Shielded	Active
IC693CBL314	Cable, I/O Base Expansion, 15 Meters, Shielded with no built-in terminator	Active
IC693ACC307	I/O Bus Terminator Plug	Active

Configuration Guidelines

When configuring a RX3i the following guidelines should be considered:

1. IC695 part numbers can only be installed in a Universal Rack (IC695CHSxxx).
2. CPU, NIU and AC Power Supply require 2 slots each on the base plate.
3. IC695 I/O modules and high density IC694 I/O modules require a terminal block assembly. IC694TBSxxx (spring clamp termination) or IC694TBBxxx (box style termination) are required.
4. If the CPU is powered down frequently a high capacity battery should be considered. (IC693ACC302)

Examples of Typical Application

Configuration for Controller (Example application requiring (120) 24 VDC inputs and (80) Relay outputs AC power supply)

Backplane Slots Required	Power Supply Current Required (mA)	Qty	Part Number	Description
2	1000 mA @ 3.3 VDC; 1000 mA @ 5 VDC	1	IC695CPE330	CPU with three built-in serial ports
2		1	IC695PSA040	120/240 VAC, 125 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	1	IC695CHS012	12 Slot Universal Base
4	1200 @ 5 V	2	IC694MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
5	35 mA @ 5 V; 110 mA @ 24 VDC Relay	2	IC694MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
		2	IC694TBB032	Terminal Block, Box Style
		1		PME Professional Development Suite
13	Total current from power supply required: 2475 mA @ 5 V; 1600 @ 3.3 V; 110 mA @ 24 VDC Relay. Only one power supplied needed.			

Configuration for Controller	(100) 24 VDC inputs, (50) 24 VDC Outputs with ESCP protection, (20) Relay outputs also (2) 4 to 20 mA Analog Inputs, (3) Type J Thermocouple, (1) RTD, (5) Strain Gage, (12) 4 to 20 mA Analog Outputs and 24 VDC power supply. Also requires PROFIBUS Master and Ethernet communications.			
Backplane Slots Required	**Power Supply Current Required (mA)**	**Qty**	**Part Number**	**Description**
2 on Universal Base	1000 mA @ 3.3 VDC; 1000 mA @ 5 VDC	1	IC695CPE310	CPU with two built-in serial ports
1 on Universal Base		1	IC695PSD040	24 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	1	IC695CHS016	16 Slot Universal Base
4 expansion base slots	1200 @ 5 VDC	4	IC694MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
2 expansion base slots	600 mA @ 5 VDC	2	IC694MDL754	Discrete Output Module, 24 VDC Output with ESCP, 32 points (Requires terminal block)
2 expansion base slots	35 mA @ 5 VDC; 110 mA @ 24 VDC Relay	2	IC694MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
2 on Universal Base	700 mA @ 3.3 VDC; 800 mA @ 5 VDC	2	IC695ALG600	Universal Analog Input module, supports Thermocouple, RTD, Voltage, Current and Strain Gage, 8 channels (Requires terminal block)
2 on Universal Base	220 mA @ 5 VDC 630 mA @ 24 VDC user supply	2	IC694ALG392	Analog Output module, supports voltage and current, 8 channels
1 on Universal Base	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	1	IC695ETM001	Ethernet module 10/100Mbits
1 on Universal Base	420 mA @ 5 VDC	1	IC695PBM300	PROFIBUS Master module, supports V1
	150 mA @ 5 VDC	1	IC694CHS392	High Speed Serial 10 slot expansion rack (Only IC694xxx modules can go in rack)
		1	IC694PWR331	24 VDC Power Supply for High Speed Serial base,
		1	IC693CBL312	Rack Expansion Cable, 0.15 meters
		1	IC693ACC307	I/O Bus Terminator Plug
	132 mA @ 5 VDC	1	IC695LRE001	Universal Base High Speed Serial expansion module (Module does not occupy a I/O slot)
		8	IC694TBB032	Terminal Block, Box Style
		1	IC646MPP001	Logic Developer -PLC Professional
9 slots on Universal base and 8 slots of standard base	In the above configuration, all of the modules can not go into one base. Therefor the I/O modules are divided into two bases. The IC695xxx part numbers will be used on the Universal base and the IC694 part numbers will use the standard high speed serial bus base. The Universal base can accept both IC695xxx and IC694xxx modules but the standard base will only accept IC694xxx and IC693xxx modules. Total current from Universal base power supply: 3140 mA @ 5 VDC ; 3140 @ 3.3 VDC. Only one power supplied needed. Total current from Standard base power supply: 1985 mA @ 5 VDC; 110 mA @ 24 VDC			

Options to consider

2	IC695PSD140	Multipurpose 24 VDC power supply. By adding two IC665PSD140 the system would have redundant power supplies for maximum availability.
1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
1	IC755CSW07CDA	QuickPanel+ 7 inch TFT-Color

Redundant Controller Configuration requiring (100) 24 VDC inputs, (50) 24 VDC Outputs with ESCP protection, (20) Relay outputs also (2) 4 to 20 mA Analog Inputs, (3) Type J Thermocouple, (1) RTD, (5) Strain Gage, (12) 4 to 20 mA Analog Outputs and 24 VDC power supply. Also requires PROFIBUS Master in I/O rack to talk to (3) Variable Frequency Drives. Ethernet communications is also required to connect to HMIs.

Redundant Controllers Configuration

Backplane Slots Required	Power Supply Current Required (mA)	Qty	Part Number	Description
2 slots per Universal Base	1250 mA @ 3.3 VDC; 1000 mA @ 5 VDC	2	IC695CMU310	Redundant Controller, CPU with two built-in serial ports
1 slot per Universal Base		2	IC695PSD040	24 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	2	IC695CHS012	12 Slot Universal Base
2 slots per Universal Base	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	4	IC695ETM001	Ethernet module 10/100Mbits
		1	IC646MXN001	Redundant Controller configuration software. Max-ON Extended Software for PACSystems Rx3i Hot Standby Redundancy

Note: The above configuration has two separate racks. Each rack has its own power supply, redundant CPU, Ethernet communications to remote I/O and another Ethernet module for LAN connections to HMIs. GE highly recommends that the Ethernet I/O be separated from the enterprise network to minimize data traffic issues.

I/O for Redundant Controllers

3 on Universal Base (2 for the NIU and 1 for the Ethernet Module)	1250 mA @ 3.3 VDC; 1000 mA @ 5 VDC	1	IC695NKT001	Ethernet Remote I/O Expansion Kit. Kit includes a IC695NIU001 and a IC695ETM001
1 on Universal Base		1	IC695PSD040	24 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	1	IC695CHS016	16 Slot Universal Base
4 expansion base slots	1200 @ 5 VDC	4	IC694MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
2 expansion base slots	600 mA @ 5 VDC	2	IC694MDL754	Discrete Output Module, 24 VDC Output with ESCP, 32 points (Requires terminal block)
2 expansion base slots	35 mA @ 5 VDC; 110 mA @ 24 VDC Relay	2	IC694MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
2 on Universal Base	700 mA @ 3.3 VDC; 800 mA @ 5 VDC	2	IC695ALG600	Universal Analog Input module, supports Thermocouple, RTD, Voltage, Current and Strain Gage, 8 channels (Requires terminal block)
2 on Universal Base	750 mA @ 3.3 VDC	2	IC695ALG708	Analog Output module, supports voltage and current, 8 channels (Requires terminal block)
1 on Universal Base	420 mA @ 5 VDC	1	IC695PBM300	PROFIBUS Master module, supports V1
	150 mA @ 5 VDC	1	IC694CHS392	High Speed Serial 10 slot expansion rack (Only IC694xxx modules can go in rack)
		1	IC694PWR331	24 VDC Power Supply for High Speed Serial base,
		1	IC693CBL312	Rack Expansion Cable, 0.15 meters
		1	IC693ACC307	I/O Bus Terminator Plug
	132 mA @ 5 VDC	1	IC695LRE001	Universal Base High Speed Serial expansion module (Module does not occupy an I/O slot)
		10	IC694TBB032	Terminal Block, Box Style
		1	IC646MPP001	Logic Developer -PLC Professional
9 slots on Universal base and 8 slots of standard base	In the above configuration, all of the modules can not go into one base. Therefore the I/O modules are divided into two bases. The IC695xxx part numbers will be used on the Universal base and the IC694 part numbers will use the standard high speed serial bus base. The Universal base can accept both IC695xxx and IC694xxx modules but the standard base will only accept IC694xxx and IC693xxx modules. Total current from Universal base power supply: 2460 mA @ 5 VDC; 3300 @ 3.3 VDC. Only one power supplied needed. Total current from Standard base power supply: 1985 mA @ 5 VDC; 110 mA @ 24 VDC			

Options to Consider

	IC695PSD140	Multipurpose 24 VDC power supply. By adding two IC665PSD140 the system would have redundant power supplies for maximum availability on the Un.
	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
	IC693ACC302	Long term battery for CPU
	IC755CSW07CDA	QuickPanel+ 7 inch TFT-Color

PACSystems RXi Controller

The PACSystems RXi family is an advanced, high-performance, small footprint control and computing platform for distributed applications (process or discrete). With a high performance dual core CPU and Gigabit PROFINET (with built-in MRP redundancy) and Ethernet ports, every aspect of the RXi has been designed for performance.

Development, commissioning, and maintenance are performed using Machine Edition – providing a single environment for discrete and process applications.

- **COMExpress CPU Technology** – The RXi features a dual core processor for high performance in rugged applications. This rugged technology with wider temperature ranges, higher shock and vibration designs makes the RXi suitable for industrial applications. The carrier and enclosure designs last across multiple CPU lifespans to provide faster performance enhancements.
- **Integrated Redundant PROFINET I/O Interface** – Provides a Gigabit Ethernet I/O network connection with built-in cable redundancy (MRP) delivering IO cabling redundancy with no external switches.
- **High-speed Interconnect Bus** – Enables truly unique combinations of control and Machine Edition (or other Microsoft® Windows® or Linux applications).
- **Built-in Data Storage** – Internal industrial grade SSD drive provides local long-term data retention.
- **USB and SD Interfaces** – Interfaces enable program loading, serial communications and data storage via standard devices. (future release)

Controller page 1.57



Publication Reference Chart

GFK-2816	PACSystems RXi User's Manual
GFK-2815	PACSystems RXi Quick Start Guide



Controller

The PACSystems RXi controller features COMExpress CPU technology – a dual core processor for high performance in rugged applications. The integrated redundant PROFINET I/O Interface provides a Gigabit Ethernet I/O network connection with built-in cable redundancy (MRP) delivering IO cabling redundancy with no external switches.

The RXi has a high-speed interconnect bus, built-in data storage for local long-term data retention and USB and SD interfaces for program loading, serial communications and data storage via standard devices.

	ICRXICTL000A
Product Name	**PACSystems RXi Distributed IO Controller Platform**
Lifecycle Status	Active
Module Type	Controller
User Logic Memory	10MB User Flash
Storage Memory	10MB User Flash
Battery Backed Real Time Clock	Yes - coin cell battery backup
Data Retention	Energy Pak provides power during power failure while data is written to NV RAM
I/O Discrete Points	32K
I/O Analog Points	32K
Type of Memory Storage	Flash
Processor Speed	Dual Core 1.0GHz
USB Interface	2 USB 2.0 Standard Size
Built-in Ethernet Ports	2 Port (shared MAC) GB PROFINET with MRP; 1 Ethernet (10, 100, 1000 Mbit)
Other Ports	SD Card (on Intelligent Display Cover or Intelligent Faceplate)
Distributed I/O Network	Integrated PROFINET
Software Programming Support	Machine Edition
Program Languages Supported	Ladder Logic, Structured Text, C, Function Block Diagram
Input Power	24 VDC
Mounting	Panel Mount; DIN-rail Mount with Optional DIN Mount Plate

RSTi-EP I/O

The RSTi-EP remote I/O system is well suited for Industrial Internet enabled applications. It features an extended operating temperature range, enhanced diagnostics, plug-and-play connectivity and high channel density– all designed to simplify machine design and maintenance.

Advanced diagnostics make RSTi-EP ideal for remote applications, especially those where I/O can be difficult to reach. And RSTi-EP I/O is easily expandable, making it easy to adapt and extend coverage as your system evolves.

Benefits of RSTi-EP

- **Wide Range of Communication Options:** RSTi-EP offers network adapter support for PROFINET RT, PROFIBUS, Modbus TCP and EtherCAT.
- **Small Footprint:** Accommodates up to 64 modules and 1024 I/O points per drop, yet its 11.5 mm I/O slices are smallest in the industry, helping to maximize limited cabinet space. It's possible to incorporate smaller cabinet sizes into user-friendly system designs, and reduce wiring costs by placing I/O closer to the sensors.
- **Improved System Availability:** Designed with hot-swap IO and inputs and outputs that can be switched off independently. These features enable service activities to be performed while the sensor system is active.
- **Easier Maintenance & Troubleshooting:** Further shorten production downtimes with unique plain text diagnostics via the integrated web server. In case of an emergency stop it is simpler to identify and prioritize errors faster.
- **Easy Error Diagnosis:** Localize errors instantly with an LED directly on the channel and status indicators on every module. An indispensable benefit for secure commissioning and rapid system maintenance.
- **Higher Performance:** High speed system bus communicates up to 256 discrete inputs or discrete outputs in 20 microseconds. 100 MBps Ethernet on Ethernet enabled network adapters help move more data with precision and confidence for improved application performance and productivity.





Network Adapters

RSTi EP offers a wide range of communication options with network adapter support for PROFINET RT, PROFIBUS, Modbus TCP and EtherCAT.

	EPXETC001	EPXMBE001	EPXPBS001	EPXPNS001
Product Name	**Ethercat Network Adapter**	**Modbus TCP Network Adapter**	**PROFIBUS DP-V1 Network Adapter**	**PROFINET IRT Network Adapter**
Lifecycle Status	Active	Active	Active	Active
Module Type	Ethercat Network Adapter	Modbus TCP Network Adapter	PROFIBUS DP-V1 Network Adapter	PROFINET IRT Network Adapter
Field Busses/Device Networks	Ethernet	Modbus TCP	PROFIBUS DP-V1	PROFINET IRT
Baud Rate	NA	NA	Max 12MB/S	NA
Transfer Rate	100 MB/S	100 MB/S	100 MB/S	100 MB/S
I/O Data Size	1024 bytes (input & output)	2048 bytes (input & output)		1024 bytes (input & output)
LEDs	Ref Manual	Ref Manual	Ref Manual	Ref Manual
Diagnostic Supported	Yes	Yes	Yes	Yes
Maximum Bus Length	100 meters to 1.2K depending on baud rate	100 meters to 1.2K depending on baud rate	100 meters to 1.2K depending on baud rate	100 meters to 1.2K depending on baud rate
Maximum Number of Nodes Supported	65,535	limited by IP address	125	limited by IP address
Number of Expansion I/O Supported	64	64	64	64
Interface Connector Type	Two copper RJ-45	Two copper RJ-45		Two copper RJ-45
Configuration Tool	EDS file	Auto config	PME or GSD file	PME or GSDML
Field Power Requirement	24 VDC (20.4 - 28.8 VDC)	24 VDC (20.4 - 28.8 VDC)	24 VDC (20.4 - 28.8 VDC)	24 VDC (20.4 - 28.8 VDC)
Dimensions (H x W x D) in mm	120 x 52 x 76	120 x 52 x 76	120 x 52 x 76	120 x 52 x 76



Digital Input Modules

GE provides a range of RSTi-EP digital input modules with 4, 8 or 16 inputs, which are primarily used to receive binary control signals from sensors, transmitters, switches or proximity switches. Their flexible design allows them to meet your demands with reserve potential.

	EP-1214	EP-1218	EP-1318	EP-125F	EP-12F4
Product Name	**Digital Input Module, 24 VDC, Pos Logic, 4 Points, 2, 3 or 4 Wire**	**Digital Input Module, 24 VDC, Pos Logic, 8 Points, 2 Wire**	**Digital Input Module, 24 VDC, Pos Logic, 8 Points, 3 Wire**	**Digital Input Module, 24 VDC, Pos Logic, 16 Points, 1 Wire**	**Digital Input Module, 24 VDC, Pos Logic, 4 Points, 2, 3 or 4 Wire, Time Stamp**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Digital Input	Digital Input	Digital Input	Digital Input	Digital Input
System Bus Transfer Rate	48 Mbps	48 Mbps	48 Mbps	48 Mbps	48 Mbps
Channels	4	8	8	16	4
Sensor Types	Type 1 and Type 3 sensors as per IEC 61131-2	Type 1 and Type 3 sensors as per IEC 61131-2	Type 1 and Type 3 sensors as per IEC 61131-2	Type 1 and Type 3 sensors as per IEC 61131-2	Type 1 and Type 3 sensors as per IEC 61131-2
Input Filter	Input delay adjustable from 0 to 40 ms†	Input delay adjustable from 0 to 40 ms†	Input delay adjustable from 0 to 40 ms†	Input delay 3 ms	Input delay adjustable from 0 to 40 ms†
Off Voltage	< 5 V	< 5 V	< 5 V	< 5 V	< 5 V
On Voltage	> 11 V	> 11 V	> 11 V	> 11 V	> 11 V
Max. Input Current Per Channel	N/A	N/A	N/A	N/A	3 mA
Sensor Supply	max. 2 A per plug, total max. 8 A	max. 15 mA per channel	max. 2 A per plug, total max. 8 A	No	Yes
Sensor Connection	2-wire, 3-wire, 3-wire + FE	2-wire	2-wire, 3-wire	1-wire	2-wire, 3-wire, 3-wire + FE
Reverse Polarity Protection	Yes	Yes	Yes	Yes	Yes
Module Diagnostics	Yes	Yes	Yes	Yes	Yes
Individual Channel Diagnosis	No	No	No	No	No
Supply Voltage	20.4V – 28.8V	20.4V – 28.8V	20.4V – 28.8V	20.4V – 28.8V	20.4V – 28.8V
Current consumption from system current path I_{SYS}	8 mA	8 mA	8 mA	8 mA	8 mA
Current consumption from input current path I_{IN}	18 mA	30 mA	30 mA	52 mA	18 mA
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz (g)	3.07 (87)	2.99 (85)	2.93 (83)	3.07 (87)	3.07 (87)

†When used with Profibus-DP network adapter, it is limited to 20 ms.



Analog Input Modules

GE provides a range of RSTi-EP analog input modules with 4 or 8 inputs and up to 16-bit resolution. The measurement range is defined by parameterization with an accuracy of 0.1% FSR with the exception of EP3124, which 0.25% FSR. The parameters for the measurement range can be individually set for each channel.

	EP-3124	EP-3164	EP-3264	EP-3368	EP-3468
Product Name	**Analog Input, 4 Channels Voltage/Current 12 Bits 2, 3, or 4 Wire**	**Analog Input, 4 Channels Voltage/Current 16 Bits 2, 3, or 4 Wire**	**Analog Input, 4 Channels Voltage/Current 16 Bits with Diagnostics 2, 3, or 4 Wire**	**Analog Input, 8 Channels Current 16 Bits 2, 3, or 4 Wire**	**Analog Input, 8 Channels Current 16 Bits 2, 3, or 4 Wire, Channel Diagnostic**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input	Analog Input	Analog Input
System Bus Transfer Rate	48 Mbps	48 Mbps	48 Mbps	48 Mbps	48 Mbps
Potential Isolation	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II
Common Mode Voltage	Against: 0V - ±50V Channel-Channel: ±3V	Against: 0V - ±50V Channel-Channel: ±3V	Against: 0V - ±50V Channel-Channel: ±3V	Against: 0V - ±50V Channel-Channel: ±3V	Against: 0V - ±50V Channel-Channel: ±3V
Number of Inputs	4	4	4	8	8
Input Values	Voltage (0 to 5 V, ±5 V, 0 to 10 V, ±10 V, 1 to 5 V, 2 to 10 V) Current (0 to 20 mA, 4 to 20 mA)	Voltage (0 to 5 V, ±5 V, 0 to 10 V, ±10 V, 1 to 5 V, 2 to 10 V) Current (0 to 20 mA, 4 to 20 mA)	Voltage (0 to 5 V, ±5 V, 0 to 10 V, ±10 V, 1 to 5 V, 2 to 10 V) Current (0 to 20 mA, 4 to 20 mA)	Current input (0 to 20 mA, 4 to 20 mA)	Current input (0 to 20 mA, 4 to 20 mA)
Resolution	12 bits	16 bits	16 bits	16 bits	16 bits
Frequency Suppression	Options: disabled (0) / 50 Hz (1) / 60 Hz (2) / Average over 16 values (3) Default: disabled	Options: disabled (0) / 50 Hz (1) / 60 Hz (2) / Average over 16 values (3) Default: disabled	Options: disabled (0) / 50 Hz (1) / 60 Hz (2) / Average over 16 values (3) Default: disabled	Options: disabled (0) / 50 Hz (1) / 60 Hz (2) / Average over 16 values (3) Default: disabled	Options: disabled (0) / 50 Hz (1) / 60 Hz (2) / Average over 16 values (3) Default: disabled
Accuracy	0.25 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient max. −10 mV/A additional inaccuracy in the voltage mode due to sensor power supply current	0.1 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient max. −10 mV/A additional inaccuracy in the voltage mode due to sensor power supply current	0.1 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient max. −10 mV/A additional inaccuracy in the voltage mode due to sensor power supply current	0.1 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient	0.1 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient
Sensor Supply	max. 2 A per plug, total max. 8 A	max. 2 A per plug, total max. 8 A	max. 0.5 A per plug	max. 125 mA per channel; channel 0 to 3 and 4 to 7 respectively are fused in combination	max. 125 mA per channel; channel 0 to 3 and 4 to 7 respectively are fused in combination
Sensor Connection	2-wire, 3-wire, 3-wire + FE	2-wire, 3-wire, 3-wire + FE	2-wire, 3-wire, 3-wire + FE	2-wire, 3-wire, 3-wire + FE	2-wire, 3-wire, 3-wire + FE
Conversion time	1 ms	1 ms	1 ms	1 ms	1 ms
Reverse Polarity Protection	Yes	Yes	Yes	Yes	Yes
Short-Circuit Proof	Yes	Yes	Yes	Yes	Yes
Response Time of Protective Circuit	< 0.1 s with short-circuit to +24 V	< 50 ms	< 50 ms	< 0.1 s with short-circuit to +24 V	< 0.1 s with short-circuit to +24 V
Reset Time	N/A	N/A	N/A	Temperature-dependent (< 30 s at 20°C)	Temperature-dependent (< 30 s at 20°C)
Module Diagnostics	Yes	Yes	Yes	Yes	Yes
Individual Channel Diagnostics	No	No	Yes	No	Yes
Supply Voltage	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus
Current consumption from system current path I_{SYS}	8 mA	8 mA	8 mA	8 mA	8 mA
Current consumption from input current path I_{IN}	25 mA + sensor supply current	25 mA + sensor supply current	25 mA + sensor supply current	20 mA + load	20 mA + load
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz (g)	3.07 (87)	3.14 (89)	3.14 (89)	3.17 (90)	3.17 (90)



Analog Input Modules

GE provides a range of RSTi-EP analog input modules with 4 or 8 inputs and up to 16-bit resolution. The measurement range is defined by parameterization with an accuracy of 0.1% FSR with the exception of EP3124, which 0.25% FSR. The parameters for the measurement range can be individually set for each channel.

	EP-3704	EP-3804†
Product Name	**Analog Input, 4 Channels RTD 16 Bits with Diagnostics 2, 3, or 4 Wire**	**Analog Input, 4 Channels TC 16 Bits with Diagnostics 2, 3, or 4 Wire**
Lifecycle Status	Active	Active
Module Type	Analog Input	Analog Input
System Bus Transfer Rate	48 Mbps	48 Mbps
Potential Isolation	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II
Common Mode Voltage	Against: 0V - ±50V Channel-Channel: ±3V	Against: 0V - ±50V Channel-Channel: ±3V
Number of Inputs	4	4
Sensor Types	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni 200, Ni500, Ni1000, Cu10, and resistors with 40 Ω, 80 Ω, 150 Ω, 300 Ω, 500 Ω, 1 kΩ, 2 kΩ, 4 kΩ	J, K, T, B, N, E, R, S, L, U, C, mV
Resolution	16 bits	16 bits
Accuracy	max. 0.2 % FSR / 0.3 % FSR for Ni sensors / 0.6 % FSR for Cu10	Conversion time ≥ 80 ms: 10 µV + 0.1 % of voltage measurement range (without cold-junction measurement error)
Temperature Coefficient	±50 ppm/K max.	50 ppm
Sensor Connection	2-wire, 3-wire, 4-wire	2-wire
Sensor Current	Depending on the sensor type 0.75 mA (Pt100, Ni100, Ni120, Cu10, 40 Ω, 80 Ω, 150 Ω, 300 Ω) or 0,25 mA (Pt200, Pt500, Pt1000, Ni200, Ni500, Ni1000, 500 Ω, 1 kΩ, 2 kΩ, 4 kΩ)	0.25 mA for the cold-junction compensation with a Pt1000
Cold Junction Compensation	N/A	Internal and external (Pt1000), int. accuracy ≤ 3 K
Max. Wire Resistance / Measurement Range	2.5 Ω / 40 Ω, 5 Ω / 80 Ω, 10 Ω / 150 Ω and Cu10, 25 Ω in all other measuring ranges	N/A
Temperature Range	-200 to +850°C (-328 to 1562 °F)	-200 to +850°C (-328 to 1562 °F)
Conversion Time	36 to 240 ms, adjustable	36 to 240 ms, adjustable
Internal Resistance	N/A	> 1 MΩ
Common Mode Input Voltage Range	Channel to channel: max. ±2 V; Channel to voltage supply: max. ±50 V	Channel to voltage supply: max. ±50 V
Reverse Polarity Protection	Yes	Yes
Module Diagnostics	Yes	Yes
Individual Channel Diagnostics	Yes	Yes
Supply Voltage	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus
Current consumption from system current path I_{SYS}	8 mA	8 mA
Current consumption from input current path I_{IN}	20 mA	20 mA
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz (g)	3.21 (91)	3.03 (86)

†Warm up time for the module to get the required accuracy is 30 minutes.



Digital Output Modules

GE provides a range of RSTi-EP digital output modules with 4, 8 or 16 outputs, which are primarily used for the incorporation of decentralized actuators.

	EP-2214	EP-2614	EP-2634	EP-2218	EP-225F
Product Name	**Digital Output, 4 Points, Positive Logic 24VDC, 0.5A, 2,3, or 4 Wire**	**Digital Output, 4 Points, Positive Logic 24VDC, 2.0A, 2,3, or 4 Wire**	**Digital Output, 4 Points, Positive/Negative Logic 24VDC, 2.0A, 2,3, or 4 Wire**	**Digital Output, 8 Points, Positive Logic, 24VDC, 0.5A, 2 Wire**	**Digital Output, 16 Points, Positive Logic, 24VDC, 0.5A, 1 Wire**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Digital Output	Digital Output	Digital Output	Digital Output	Digital Output
System Bus Transfer Rate	48 Mbps	48 Mbps	48 Mbps	48 Mbps	48 Mbps
Number of Outputs	4	4	4	8	16
Type	P-Logic	P-Logic	Switchable P- or N-Logic	P-Logic	P-Logic
Type of Load	ohmic, inductive, lamp load	ohmic, inductive, lamp load	ohmic, inductive, lamp load	ohmic, inductive, lamp load	ohmic, inductive, lamp load
Response Time	low » high max. 100 µs; high » low max. 250 µs	low » high max. 100 µs; high » low max. 250 µs	low » high max. 100 µs; high » low max. 250 µs	low » high max. 100 µs; high » low max. 250 µs	low » high max. 100 µs; high » low max. 250 µs
Max. Output Current per Channel	0.5 A	2 A	2 A	0.5 A	0.5 A
Max. Output Current per Modules	2 A	8 A	8 A	4 A	8 A
Breaking Energy (inductive)	150 mJ per channel	150 mJ per channel	150 mJ per channel	150 mJ per channel	150 mJ per channel
Switching Frequency Resistive load (min. 47 Ω)	1 kHz	1 kHz	1 kHz	1 kHz	1 kHz
Switching Frequency Inductive load (DC 13)	0.2 Hz without free-wheeling diode; 1 kHz with suitable free-wheeling diode	0.2 Hz without free-wheeling diode; 1 kHz with suitable free-wheeling diode	0.2 Hz without free-wheeling diode; 1 kHz with suitable free-wheeling diode	0.2 Hz without free-wheeling diode; 1 kHz with suitable free-wheeling diode	0.2 Hz without free-wheeling diode; 1 kHz with suitable free-wheeling diode
Switching Frequency Lamp load (12 W)	1 kHz	1 kHz	1 kHz	1 kHz	1 kHz
Actuator Connection	2-wire, 3-wire, 3-wire + FE	2-wire, 3-wire, 3-wire + FE	2-wire, 3-wire, 3-wire + FE	2-wire	1-wire
Actuator Supply	max. 2 A per plug, total max. 8 A	max. 2 A per plug, total max. 8 A	max. 2 A per plug, total max. 8 A	N/A	N/A
Short-Circuit-Proof	Yes	Yes	Yes	Yes	Yes
Protective Circuit	Constant current with thermal switch-off and automatic restart	Constant current with thermal switch-off and automatic restart	Constant current with thermal switch-off and automatic restart	Constant current with thermal switch-off and automatic restart	Constant current with thermal switch-off and automatic restart
Response Time of Current Limiting Circuit	< 100 µs	< 100 µs	< 100 µs	< 100 µs	< 100 µs
Module Diagnostics	Yes	Yes	Yes	Yes	Yes
Individual Channel Diagnostics	No	No	No	No	
Reactionless	Yes	N/A	Yes	Yes	Yes
Can be used with EP-19xx	Yes	Yes	Yes	N/A	N/A
Supply Voltage	20.4V – 28.8V	20.4V – 28.8V	20.4V – 28.8V	20.4V – 28.8V	
Current consumption from system current path I_{SYS}	8 mA	8 mA	8 mA	8 mA	8 mA
Current consumption from output current path I_{OUT}	20 mA + load	25 mA + load	20 mA + load	35 mA + load	25 mA + load
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz. (g)	3.03 (86)	3.03 (86)	3.03 (86)	3.03 (86)	2.93 (83)



Digital Output Modules

GE provides a range of RSTi-EP digital output modules with 4, 8 or 16 outputs, which are primarily used for the incorporation of decentralized actuators.

	EP-2714	EP-2814
Product Name	**Digital Relay Output, 4 Points, Positive Logic, 24 - 220 VDC/VAC, 6A, 2 Wire**	**Digital Output, 4 Points, Positive Logic, 230 VAC, 1A**
Lifecycle Status	Active	Active
Module Type	Digital Output	Digital Output
System Bus Transfer Rate	48 Mbps	48 Mbps
Number of Outputs	4	4
Type	Relay from - C	SSR / triac
Material for Power and Data Contacts	Ni-Au, 3 µm	N/A
Switching Characteristic	N/A	Closing when the voltage crosses zero, Opening when the current crosses zero
Response Time	20 ms	10 ms
Minimum Switching Current	N/A	50 mA per channel
Maximum switching current	N/A	1 A per channel; 4 A per module
Max. Output Current	5 A at 60°C (140 °F) / 6 A at 55°C (131 °F) per channel 20 A at 60°C (140 °F) / 24 A at 55°C (131 °F) per module	N/A
Holding Current	N/A	25 mA
Switching Frequency	max. 5 Hz	up to 20 Hz
Short-Circuit-Proof	No	No
Defined Trip Behavior of the Prescribed External Fuse	N/A	1 A super quick-acting
Protective Circuit	External fusing with 6 A prescribed	N/A
Service Life with AC-15 Load and 1-A switching Current	> 300,000 switching cycles	N/A
Max. Switching Voltage	255 V AC, UL: 277 V AC, DC corresponding to the derating curve	255 V AC, UL: 277 AC
Reactionless	Yes	Yes
Module Diagnosis	Yes	Yes
Individual Channel Diagnostics	No	No
Supply Voltage	20.4V – 28.8V	20.4V – 28.8V
Current consumption from system current path I_{SYS}	8 mA	11 mA
Current consumption from output current path I_{OUT}	20 mA	N/A
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz. (g)	2.93 (83)	2.93 (83)



Analog Output Modules

GE provides RSTi-EP analog output modules with up to 4 analog outputs at +/-10 V, +/-5 V, 0-10 V, 0-5 V, 2-10 V, 1-5 V, 0-20 mA or 4-20 mA. The resolution is 16 bit per channel. An output can be connected to each connector, the internal switching is carried out automatically.

	EP-4164	EP-4264
Product Name	**Analog Output, 4 Channels Voltage/ Current 16 Bits 2, 3, or 4-Wire**	**Analog Output, 4 Channels Voltage/ Current 16 Bits with Diagnostics 2, 3, or 4-Wire**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output
System Bus Transfer Rate	48 Mbps	48 Mbps
Potential Isolation	Channel/system bus = yes Channel/channel = no	Channel/system bus = yes Channel/channel = no
Number of Outputs	4	4
Output Levels	Voltage (0 – 5 V, ±5 V, 0 – 10 V, ±10 V, 1 – 5 V, 2 – 10 V); Current (0 – 20 mA, 4 – 20 mA)	Voltage (0 – 5 V, ±5 V, 0 – 10 V, ±10 V, 1 – 5 V, 2 – 10 V); Current (0 – 20 mA, 4 – 20 mA)
Response Time	1 ms for 4 channels	1 ms for 4 channels
Resolution	16 bits	16 bits
Accuracy	0.1 % FSR max., 0.05 % FSR typ.	0.1 % FSR max., 0.05 % FSR typ.
Temperature Coefficient	20 ppm voltage / 31 ppm current measurement / K	20 ppm voltage / 31 ppm current measurement / K
Max. Error Between T_{min} and T_{max}	±220 ppm FSR	±220 ppm FSR
Monotony	Yes	Yes
Crosstalk Between Channels	±0.001 % FSR max.	±0.001 % FSR max.
Repeat Accuracy	< ±1 mV eff.	< ±1 mV eff.
Output Ripple	max. 0.001 %	max. 0.001 %
Voltage Load Resistance	≥ 1 kΩ (at > 50°C (122 °F) max ambient temperature, total sensor current of 10 mA per channel but 25 mA per module)	≥ 1 kΩ (at > 50°C (122 °F) max ambient temperature, total sensor current of 10 mA per channel but 25 mA per module)
Current Load Resistance	≤ 600 Ω including field cable resistance	≤ 600 Ω including field cable resistance
Actuator Connection	2-wire (current and voltage; automatic detection), 4-wire (voltage)	2-wire (current and voltage; automatic detection), 4-wire (voltage)
Short-Circuit-Proof	Yes	Yes
Module Diagnosis	Yes	Yes
Individual Channel Diagnosis	No	Yes
Substitute Value	Yes	Yes
Can be used with EP-19xx Module	Yes	Yes
Supply Voltage	20.4V – 28.8V	20.4V – 28.8V
Current consumption from system current path I_{SYS}	8 mA	8 mA
Current consumption from output current path I_{OUT}	85 mA	85 mA
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz. (g)	2.93 (83)	3.47 (98)



Safe Feed Input Modules

GE provides 3 varients of RSTi-EP safe feed modules EP 1901: one safe input, EP 1902: two safe inputs and EP 1922: two safe inputs, with delayed disconnection, which are intended for connecting safety-related equipment.

	EP-1901	EP-1902	EP-1922
Product Name	**1 Safe Feed-Input, 24 VDC**	**2 Safe Feed-Inputs, 24 VDC**	**2 Safe Feed-Inputs, 24 VDC, Programmable Delay**
Lifecycle Status	Active	Active	Active
Module Type	Safe Feed Input	Safe Feed Input	Safe Feed Input
System Bus Transfer Rate	48 Mbps	48 Mbps	48 Mbps
Achievable Safety Level	SIL3 (IEC 61508), SIL CL3 (IEC 62061), PLe and Cat. 4 (DIN EN ISO 13849-1), regarding the entire safety chain	SIL3 (IEC 61508), SIL CL3 (IEC 62061), PLe and Cat. 4 (DIN EN ISO 13849-1), regarding the entire safety chain	SIL3 (IEC 61508), SIL CL3 (IEC 62061), PLe and Cat. 4 (DIN EN ISO 13849-1), regarding the entire safety chain
DC (Diagnostic Coverage)	96.64%	96.64%	96.64%
MTTFd (Mean Time To Failure dangerous)	> 100 years	> 100 years	> 100 years
PFH (Probability of Failure per Hour)	6.27 x 10^{-9} 1/h	6.27 x 10^{-9} 1/h	6.27 x 10^{-9} 1/h
SSF (Safe Failure Fraction)	98.58%	98.58%	98.58%
HFT (Hardware Fault Tolerance)	1	1	1
Safety Inputs	1 x 2 channel	2 x 2 channel	2 x 2 channel
Inputs for Start Function	2 (manual start and autostart)	2 (manual start and autostart)	2 (manual start and autostart)
Input Type	Type 3 as per IEC 61131-2	Type 3 as per IEC 61131-2	Type 3 as per IEC 61131-2
Safety Output (OSSD)	1	1	1
Output Current	8 A (not for capacitive load)	8 A (not for capacitive load)	8 A (not for capacitive load)
Overload Protection	Excess temperature proof and overload-proof, short circuit proof with external fuse	Excess temperature proof and overload-proof, short circuit proof with external fuse	Excess temperature proof and overload-proof, short circuit proof with external fuse
Turn-off Time	< 20 ms	< 20 ms	< 20 ms
Turn-on Time	< 2 s	< 2 s	< 2 s
Output SS1	N/A	N/A	1
Output Current	N/A	N/A	0.5 A, overload behavior as per IEC 61131-2
Overload Protection	N/A	N/A	Over-temperature, Overload and Short Circuit protection with external fuse
Auxiliary Outputs	2 x 2	3 x 2	3 x 2
Output Current	max. 10 A (only to support the inputs dedicated inputs)	max. 10 A (only to support the inputs dedicated inputs)	max. 10 A (only to support the inputs dedicated inputs)
Module Diagnosis	Yes	Yes	Yes
Individual Channel Diagnosis	Yes	Yes	Yes
Supply Voltage	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus
External Pre-fusing	mandatory: super fast, max. 8 A	mandatory: super fast, max. 8 A	mandatory: super fast, max. 8 A
Reverse Battery Protection	Yes	Yes	Yes
Current consumption (I_{IN} in the power segment of the fieldbus network adapter), typ.	8 mA	8 mA	8 mA
Current consumption (I_{IN} in the respective power segment)	45 mA	45 mA	45 mA
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz. (g)	2.82 (80)	2.89 (82)	2.96 (84)



Specialty Modules

GE provides several RSTi-EP specialty modules, which can be used to meet specific needs in your system. Each module has a Module Status LED and each channel has a LED for visual indication of connectivity.

	EP-5111	EP-5112	EP-5212
Product Name	**1 Channel High Speed Counter, AB 100 kHz 1 DO 24VDC, 0.5A**	**2 Channel High Speed Counter, AB 100 kHz**	**2 Channel Frequency Measurement, 100 kHz**
Lifecycle Status	Active	Active	Active
Module Type	High Speed Counter	High Speed Counter	Frequency Measurement
System Bus Transfer Rate	48 Mbps	48 Mbps	48 Mbps
Galvanic Isolation	N/A	500 V DC between the current paths	500 V DC between the current paths
Number of Counter Inputs	1	2	2
Type	Incremental encoders and other input characteristics for sensor types 1 and 3 are in accordance with EN 61131-2	Incremental encoders and other input characteristics for sensor types 1 and 3 are in accordance with EN 61131-2	N/A
Input Filter	Filter time adjustable from 0.01 to 1 ms	Filter time adjustable from 0.01 to 1 ms	Adjustable between 3 Hz and 187 kHz (333 ms and 5 µs)
Low Input Voltage	< 5 V	< 5 V	< 5 V
High Input Voltage	> 11 V	> 11 V	> 11 V
Max. Input Current per Channel	3.5 mA	3.5 mA	3.5 mA
Sensor Supply	Yes	Yes	Yes
Sensor Connection	2-wire and 3-wire	2-wire and 3-wire	2-wire and 3-wire
Reverse Polarity Protection	Yes	Yes	Yes
Module Diagnostics	Yes	Yes	Yes
Individual Channel Diagnostics	Yes	Yes	No
Counter Width	32 bits	32 bits	32 bits
Maximum Input Frequency	100 kHz	100 kHz	100 kHz
Latch, Gate, Reset Input	Yes	N/A	N/A
Mode of Operation	Pulse and direction / AB mode with 1-, 2-, 4-times sampling	Pulse and direction / AB mode with 1-, 2-, 4-times sampling	Pulse rising edge
Status Indicator	Yes	Yes	Yes
Process Alarm	Yes, parametrizable	Yes, parametrizable	N/A
Diagnostic Alarm	Yes	Yes	N/A
Number of Outputs	1	N/A	N/A
Output Current	0.5 A	N/A	N/A
Reverse Polarity Protection	Yes	N/A	N/A
Module Diagnosis	Yes	N/A	N/A
Individual Channel Diagnosis	Yes	N/A	N/A
Supply Voltage	20.4V – 28.8V	20.4V – 28.8V	20.4V – 28.8V
Current consumption from system current path I_{SYS}	8 mA	8 mA	8 mA
Current consumption from output current path I_{IN}	35 mA plus output current for the digital output	35 mA	35 mA plus sensor supply current
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz. (g)	2.93 (83)	2.54 (72)	2.93 (83)



Specialty Modules

GE provides several RSTi-EP specialty modules, which can be used to meet specific needs in your system. Each module has a Module Status LED and each channel has a LED for visual indication of connectivity.

	EP-5422		EP-5442	
Product Name	**2 Channels PWM Output, Positive Logic, 24VDC, 2.0 A**		**2 Channels PWM Output, Positive Logic, 24VDC, 0.5 A**	
Lifecycle Status	Active		Active	
Module Type	PWM Output		PWM Output	
System Bus Transfer Rate	48 Mbps		48 Mbps	
Number of Outputs	2		2	
Type	PN output stage		PN output stage	
Response Time	< 0.1 µs		< 0.1 µs	
Period Duration	25 µs t o 175 ms (40 kHz to 6 Hz)		25 µs t o 175 ms (40 kHz to 6 Hz)	
Max. Output Current	per channel	0.5 A	per channel	2 A
	per module	1 A	per module	4 A
Switching Frequency	Resistive load (min. 47 Ω)	static, 6 Hz to 40 kHz	Resistive load (min. 12 Ω)	6 Hz to 40 kHz
	Inductive load (DC 13)	static, 6 Hz to 40 kHz	Inductive load (DC 13)	6 Hz to 40 kHz
	Lamp load (12 W)	static, 6 Hz to 40 kHz	Lamp load (48 W)	6 Hz to 40 kHz
Actuator Connection	2-wire, 3-wire, 3-wire + FE		2-wire, 3-wire, 3-wire + FE	
Actuator Supply	max. 2 A per plug, total max. 4 A		max. 2 A per plug, total max. 8 A	
Pulse/period Ratio	0–100 % PN-switching or P-switching, adjustable		0–100 % PN-switching or P-switching, adjustable	
Short-Circuit-Proof	Yes		Yes	
Response Time of Protective Circuit	< 100 µs		< 100 µs	
Module Diagnosis	Yes		Yes	
Individual Channel Diagnosis	No		No	
Reactionless	Yes		Yes	
Supply Voltage	20.4V – 28.8V		20.4V – 28.8V	
Current consumption from system current path ISYS	8 mA		8 mA	
Current consumption from output current path IOUT	40 mA + Load		40 mA + Load	
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)		-20°C to +60°C (-4 °F to +140 °F)	
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)		-40°C to +85°C (-40 °F to +185 °F)	
Humidity	5% to 95%, noncondensing		5% to 95%, noncondensing	
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)		4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	
Weight oz. (g)	2.72 (77)		2.89 (82)	



Power-Feed and Power Distribution Modules

GE provides RSTi-EP power-feed modules (EP-7631 and EP-7641), which are used to refresh the current paths and isolate the power supply. The RSTi-EP station's main power supply is always fed in through the network adapter. Each module has a Module Status LED and connector block LEDs for inspection.

	EP-7631	EP-7641	EP-711F	EP-751F	EP-700F	EP-710F	EP-750F
Product Name	**Power Module, 1 Channel 24VDC Input Flow 10A**	**Power Module, 1 Channel 24VDC Output Flow 10A**	**Power Module, 16 Channels 24VDC Potential Distribution +24 VDC from Input Current Path**	**Power Module, 16 Channels 24VDC Potential Distribution +24 VDC from Output Current Path**	**Power Module, 16 Channels 24VDC Potential Distribution Functional Earth**	**Power Module, 16 Channels 24VDC Potential Distribution +0VDC from Input Current Path**	**Power Module, 16 Channels 24VDC Potential Distribution +0VDC from Output Current Path**
Lifecycle Status	Active	Active	Active	Active	Active	Active	Active
Module Type	Power-Feed	Power-Feed	Power Distribution	Power Distribution	Power Distribution	Power Distribution	Power Distribution
Supply voltage	20.4V – 28.8V	20.4V – 28.8V	None	20.4V – 28.8V	20.4V – 28.8V	0 V (from input current path)	0 V (from input current path)
Maximum feed current for input modules	10A	--					
Current consumption from output input path I_{IN}	10 mA	--					
Maximum feed current for output modules	--	10A					
Current consumption from output input path I_{OUT}	--	10 mA					
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)					
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)					
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing					
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)					
Weight oz. (g)	2.68 (76)	2.68 (76)	2.96 (84)	2.96 (84)	2.96 (84)	2.96 (84)	2.96 (84)

RSTi Slice I/O

The new RSTi I/O system is PROFINET enabled and ideal for distributed control applications. The compact, granular "build as you go" design of the RSTi enables the user to optimize the design of the system and therefore minimize cost.

The RSTi is also Network Independent with over 10 different bus interfaces available such as PROFIBUS, Modbus (serial and Ethernet), EthernetIP, EtherCAT, CANopen, and CCLink. The RSTi is supported by over 80 discrete, analog, motion and specialty I/O modules to address simple to complex applications.

Benefits of RSTi

- Network Independence: OEMs and System Integrators can standardize on their I/O layout without worrying about the controller it is connected to.
- Reduced Development Time: Panels can be fabricated in advance, independent of the control system, by simply changing out the network/bus interface without impact to wiring.
- Reduced Installation Cost: Distributed I/O networks reduce installation and wiring cost.
- Lower Cost Per Point: The RSTi can be configured to meet application needs. The granular design reduces panel space and module cost.
- "Build as You Go": Expansion is simple; just slide in a RSTi I/O module without impacting the wiring back to the main control panel.
- System Simplification: The distributed nature of the RSTi greatly reduces the time to dis-assemble and re-assemble a machine, therefore reducing machine commissioning.

The RSTi is ideal for distributed I/O systems with as a few 4 I/O per location or hundreds of I/O.



Network Interfaces pages 1.xx-1.xx

Network Interfaces with Built-in I/O pages 1.xx-1.xx

Discrete I/O Modules (Input) pages 1.xx-1.xx

Discrete I/O Modules (Output) pages 1.xx-1.xx

Analog I/O Modules (Input) pages 1.xx-1.xx

Analog I/O Modules (Output) pages 1.xx-1.xx

High Speed Counting pages 1.xx-1.xx

Serial Communications Modules pages 1.xx-1.xx

RTD Modules page 1.xx

Power Modules pages 1.xx-1.xx

Thermocouple Modules page 1.xx

Motion Control pages 1.xx-1.xx

Configuration Tools pages 1.xx-1.xx

Accessories page 1.xx

Typical Application page 1.xx

Publication Reference Chart

GFK-2745	RSTi I/O User Manual
GFK-2746	RSTi Network Adapter Manual



Network Interfaces

RSTi offers a wide range of network interfaces for Ethernet, Fieldbuses and serial networks. The network independence of the RSTi enables to user to be flexible on system layouts.

	STXPNS001	STXPBS001	STXDNS001	STXCAN001	STXMBS001
Product Name	**Slave Network Interface**	**Slave Network Interface**	**Slave Network Interface**	**Slave Network Interface**	**Slave Network Interface**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	PROFINET Ethernet	PROFIBUS V1	DeviceNet	CANopen	Modbus RS-232
Protocol Supported	PROFINET RT	Freeze mode Sync mode Auto baud rate Fail safe mode	I/O Slave Message (Group 2 only slave) Poll command. Bit_strobe command Cyclic command, COS command		RTU and ASCII
Features	Line or Star topology Built-in Ethernet Switch				
Baud Rate	100Mbps	9.6K to 12Mbps	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	10KBps to 1Mbps	1200 to 115.2Kbps
I/O Data Size	Total: Inputs 128bytes/ Outputs 128bytes	Total: Inputs 128bytes/ Outputs 128bytes	Total: Inputs 252bytes/ Outputs 252bytes Max. Discrete I/O: 2016 Inputs/2016 Outputs Max. Analog I/O: 126 Inputs/126 Outputs	Total: Inputs 64 bytes/ Outputs 64 bytes	Total: Inputs 252bytes/ Outputs 252bytes
LEDs	Module Status Network Status I/O Status Port 1 Link Activity Port 2 Link Activity Field Power Status	Module Status Network Status Expansion Module Status Field Power Status	Module Status Network Status Expansion Module Status Field Power Status	Module Status Network Status Expansion Module Status Field Power Status	Module Status Transmit Data Received Data Expansion Module Status Field Power Status
Diagnostic Supported	Yes	Yes	Yes	Yes	Yes
Maximum Bus Length	100 meters between nodes	100 meters to 1.2Km depending on baud rate	Up to 500 meters depending on baud rate		15 meters
Maximum Number of Nodes Supported	Limited by the IP address	100	64	99	1
Number of Expansion I/O Supported	32	32	32	32	32
Interface Connector Type	Two RJ-45 with built-in switch	DB 9 connector (RS-485)	5 pin connector	5 pin connector	DB 9 connector (RS-232)
Configuration Tool	Proficy Machine Edition or GSDML	GSM File	EDS File	EDS File	I/O Guide Pro
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Power Dissipation	115 mA typical @ 24 VDC	60 mA typical @ 24 VDC	300 mA typical	100 mA typical @ 24 VDC	70 mA typical @ 24 VDC
Internal Power Used (5 VDC loading)	1.5 A @ Maximum 5 VDC	1.5 A @ Maximum 5 VDC	1.2 A @ Maximum 5 VDC	1.5 A @ Maximum 5 VDC	1.5 A @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 45 x 70	99 x 45 x 70	99 x 42 x 70	99 x 42 x 70	99 x 45 x 70



Network Interfaces

RSTi offers a wide range of network interfaces for Ethernet, Fieldbuses and serial networks. The network independence of the RSTi enables to user to be flexible on system layouts.

	STXMBS002	STXECT001	STXEIP001	STXMBE001
Product Name	**Slave Network Interface**	**Slave Network Interface**	**Slave Network Interface**	**Slave Network Interface**
Lifecycle Status	Active	Target Release July 2013	Target Release July 2013	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	Modbus RS-485	EtherCAT Ethernet	Ethernet/IP Ethernet	Modbus TCP Ethernet
Protocol Supported	RTU and ASCII	EtherCAT	16 IO message connections 64 CIP connections 64 Explicit message connections	8 Modbus/TCP, 4 HTTP, BOOTP, TBD
Features		Built-in Ethernet Switch		
Baud Rate	1200 to 115.2Kbps	100Mbps	10/100Mbps	10/100Mbps
I/O Data Size	Total: Inputs 252bytes/ Outputs 252bytes	Total: Inputs 252bytes/ Outputs 252bytes	Total: Inputs 252bytes/ Outputs 252bytes	Total: Inputs 252bytes/ Outputs 252bytes
LEDs	Module Status Transmit Data Received Data Expansion Module Status Field Power Status	Module Status Network Status Expansion Module Status Field Power Status	Module Status Network Status I/O Status Link Activity Field Power Status	Module Status Network Status I/O Status Link Activity Field Power Status
Diagnostic Supported	Yes	Yes	Yes	Yes
Maximum Bus Length	1200 meters	100 meters between EtherCAT nodes	100 meters between nodes	100 meters between nodes
Maximum Number of Nodes Supported	64	65,535	Limited by the IP address	Limited by the IP address
Number of Expansion I/O Supported	32	32	32	32
Interface Connector Type	DB 9 connector (RS-485)	Two RJ-45 with built-in switch	One RJ-45	One RJ-45
Configuration Tool	I/O Guide Pro	I/O Guide Pro	EDS File	I/O Guide Pro
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (16 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Power Dissipation	70 mA typical @ 24 VDC	100 mA typical @ 24 VDC	60 mA typical @ 24 VDC	60 mA typical @ 24 VDC
Internal Power Used (5 VDC loading)	1.5 A @ Maximum 5 VDC	1.5 A @ Maximum 5 VDC	1.5 A @ Maximum 5 VDC	1.5 A @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 45 x 70	99 x 54.2 x 70	99 x 45 x 70	99 x 45 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXPBS032	STXPBS132	STXPBS232
Product Name	**Slave Network Interface with 32 Positive Logic Inputs Built-in**	**Slave Network Interface with 32 Negative Logic Inputs Built-in**	**Slave Network Interface with 32 Sink Outputs Built-in**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	PROFIBUS V1	PROFIBUS V1	PROFIBUS V1
Protocol Supported	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode Auto baudrate, Fail safe mode
Features	PROFIBUS DP Network Slave has built-in 32 Positive Logic Inputs with expansion support	PROFIBUS DP Network Slave has built-in 32 Negative Logic Inputs with expansion support	PROFIBUS DP Network Slave has built-in 32 Sink Outputs with expansion support
Baud Rate	9.6K to 12Mbps	9.6K to 12Mbps	9.6K to 12Mbps
I/O Data Size	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate
Maximum Number of Nodes Supported	100	100	100
Number of Expansion I/O Supported	8	8	8
Number of Points	32	32	32
System Power Requirement	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	32 Point 24 VDC Positive Logic	32 Point 24 VDC Negative Logic	
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	
Input Impedance	~5.4K ohms	~5.4K ohms	
Input Signal Delay	< 0.5msec	< 0.5msec	
Response Time (ms)			< 0.3msec
Trigger Voltage	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC	
Points per Common	32	32	32
Output Type			32 Point 24 VDC Negative Logic
Output Range			Nominal 0 VDC; 11 to 28.8 VDC
Protection			Short protection, Over Temperature Protection, Over Current Limit
Minimum Output Load			
Load Current per Point			0.5 Amps per point
Output Inrush Current			
Polarity			Sink
Configuration Tool	GSM File	GSM File	GSM File
Interface Connector Type	DB 9 connector (RS-485)	DB 9 connector (RS-485)	DB 9 connector (RS-485)
Power Dissipation	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 83 x 70	99 x 83 x 70	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXPBS332	STXPBS016	STXPBS116
Product Name	**Slave Network Interface with 32 Source Outputs Built-in**	**Slave Network Interface with 16 Relay Outputs**	**Slave Network Interface with 16 Isolated Relay Outputs**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	PROFIBUS V1	PROFIBUS V1	PROFIBUS V1
Protocol Supported	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode, Auto baudrate, Fail safe mode
Features	PROFIBUS DP Network Slave has built-in 32 Source Outputs with expansion support	PROFIBUS DP Network Slave has built-in 16 Relay Outputs with expansion support	PROFIBUS DP Network Slave has built-in 16 Isolated Relay Outputs with expansion support
Baud Rate	9.6K to 12Mbps	9.6K to 12Mbps	9.6K to 12Mbps
I/O Data Size	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 32bytes/Outputs 32bytes; Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate
Maximum Number of Nodes Supported	100	100	100
Number of Expansion I/O Supported	8	8	8
Number of Points	32	16	16
System Power Requirement	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type			
Input Voltage Range			
Input Impedance			
Input Signal Delay			
Response Time (ms)	< 0.3msec	10msec	10msec
Trigger Voltage			
Points per Common	32	4	1
Output Type	32 Point 24 VDC Positive Logic	16 Point Relay	16 Isolated Relay
Output Range	Nominal 24 VDC; 11 to 28.8 VDC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC
Protection	Short protection, Over Temperature Protection, Over Current Limit		
Minimum Output Load		100 micro Amps, 100 millivolts VDC per point	100 micro Amps, 100 millivolts VDC per point
Load Current per Point	0.5 Amps per point	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC
Output Inrush Current			
Polarity	Source		
Configuration Tool	GSM File	GSM File	GSM File
Interface Connector Type	DB 9 connector (RS-485)	DB 9 connector (RS-485)	DB 9 connector (RS-485)
Power Dissipation	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 83 x 70	99 x 83 x 70	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXPBS432	STXPBS532	STXPBS824
Product Name	**Slave Network Interface with 16 Positive Logic Inputs and 16 Source Outputs**	**Slave Network Interface with 16 Negative Logic Inputs and 16 Sink Outputs**	**Slave Network Interface with 16 Positive Logic Inputs and 16 Relay Outputs**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	PROFIBUS V1	PROFIBUS V1	PROFIBUS V1
Protocol Supported	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode, Auto baudrate, Fail safe mode
Features			
Baud Rate	9.6K to 12Mbps	9.6K to 12Mbps	9.6K to 12Mbps
I/O Data Size	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate
Maximum Number of Nodes Supported	100	100	100
Number of Expansion I/O Supported	8	8	8
Number of Points	16 In/16 Out	16 In/16 Out	16 In/16 Out
System Power Requirement	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic	16 Point 24 VDC Positive Logic
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Impedance	~5.4K ohms	~5.4K ohms	~5.4K ohms
Input Signal Delay	< 0.5msec	< 0.5msec	< 0.5msec
Response Time (ms)	< 0.3msec	< 0.3msec	10msec
Trigger Voltage	ON State: 9 VDC OFF State: 5 VDC	ON State: 9 VDC OFF State: 5 VDC	ON State: 9 VDC OFF State: 5 VDC
Points per Common	32	32	16 for Inputs and 4 for Outputs
Output Type	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic	16 Point Relay
Output Range	Nominal 24 VDC; 11 to 28.8 VDC	Nominal 24 VDC; 11 to 28.8 VDC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC
Protection	Short protection, Over Temperature Protection, Over Current Limit	Short protection, Over Temperature Protection, Over Current Limit	
Minimum Output Load			100 micro Amps, 100 millivolts VDC per point
Load Current per Point	0.5 Amps per point	0.5 Amps per point	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC
Output Inrush Current			
Polarity	Source	Sink	
Configuration Tool	GSM File	GSM File	GSM File
Interface Connector Type	DB 9 connector (RS-485)	DB 9 connector (RS-485)	DB 9 connector (RS-485)
Power Dissipation	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 83 x 70	99 x 83 x 70	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXPBS924	STXPBS825	STXPBS925
Product Name	**Slave Network Interface with 16 Negative Logic Inputs and 16 Relay Outputs**	**Slave Network Interface with 16 Positive Logic Inputs and 16 Isolated Relay Outputs**	**Slave Network Interface with 16 Negative Logic Inputs and 16 Isolated Relay Outputs**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	PROFIBUS V1	PROFIBUS V1	PROFIBUS V1
Protocol Supported	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode, Auto baudrate, Fail safe mode	Freeze mode, Sync mode, Auto baudrate, Fail safe mode
Features			
Baud Rate	9.6K to 12Mbps	9.6K to 12Mbps	9.6K to 12Mbps
I/O Data Size	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out	Total: Inputs 36 bytes/Outputs 36 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/32 bytes Out for expansion modules); Discrete I/O: Maximum Discrete I/O: 256 inputs/ 256 outputs; Analog I/O: 16 Channels In/ 16 Channels Out
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate	100 meters to 1.2Km depending on baud rate
Maximum Number of Nodes Supported	100	100	100
Number of Expansion I/O Supported	8	8	8
Number of Points	16 In/16 Out	16 In/16 Out	16 In/16 Out
System Power Requirement	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	16 Point 24 VDC Negative Logic	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Impedance	~5.4K ohms	~5.4K ohms	~5.4K ohms
Input Signal Delay	< 0.5msec	< 0.5msec	< 0.5msec
Response Time (ms)	10msec	10msec	10msec
Trigger Voltage	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC
Points per Common	16 for Inputs and 1 for Outputs	16 for Inputs and 1 for Outputs	16 for Inputs and 1 for Outputs
Output Type	16 Point Relay	16 Point Isolated Relay	16 Point Isolated Relay
Output Range	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC
Protection			
Minimum Output Load	100 micro Amps, 100 millivolts VDC per point	100 micro Amps, 100 millivolts VDC per point	100 micro Amps, 100 millivolts VDC per point
Load Current per Point	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC
Output Inrush Current			
Polarity			
Configuration Tool	GSM File	GSM File	GSM File
Interface Connector Type	DB 9 connector (RS-485)	DB 9 connector (RS-485)	DB 9 connector (RS-485)
Power Dissipation	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC	50 mA typical @ 24 VDC
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC	400 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 83 x 70	99 x 83 x 70	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXDNS032	STXDNS132	STXDNC032
Product Name	**Slave Network Interface with 32 Positive Logic Inputs Built-in**	**Slave Network Interface with 32 Negative Logic Inputs Built-in**	**Slave Network Interface with 32 Positive Logic Inputs Built-in**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	DeviceNet	DeviceNet	DeviceNet
Protocol Supported	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command"
Features			
Baud Rate	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)
I/O Data Size	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)	Total: Inputs 4 bytes/Outputs 4 bytes
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate
Maximum Number of Nodes Supported	64	64	64
Number of Expansion I/O Supported	10	10	None Supported
Number of Points	32 In	32 In	32
System Power Requirement	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	32 Point 24 VDC Positive Logic	32 Point 24 VDC Negative Logic	32 Point 24 VDC Positive Logic
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Impedance	~5.4K ohms	~5.4K ohms	~5.4K ohms
Input Signal Delay	< 0.5msec	< 0.5msec	< 0.5msec
Response Time (ms)			
Trigger Voltage	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5VD
Points per Common	16 for Inputs and 1 for Outputs	16 for Inputs and 1 for Outputs	16
Output Type			
Output Range			
Protection			
Minimum Output Load			
Load Current per Point			
Output Inrush Current			
Polarity			
Configuration Tool	EDS File	EDS File	EDS File
Interface Connector Type	5 pin connector	5 pin connector	5 pin connector
Power Dissipation	110 mA typical	110 mA typical	80 mA typical
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Connector Type
Internal Power Used (5 VDC loading)	600 mA @ Maximum 5 VDC	600 mA @ Maximum 5 VDC	Not Applicable
Dimensions (H x W x D) in mm	99 x 83 x 70	99 x 83 x 70	80 x 35 x 55



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXDNC132	STXDNS232	STXDNS332
Product Name	**Slave Network Interface with 32 Negative Logic Inputs Built-in**	**Slave Network Interface with 32 Sink Outputs Built-in**	**Slave Network Interface with 32 Source Outputs Built-in**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	DeviceNet	DeviceNet	DeviceNet
Protocol Supported	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command
Features			
Baud Rate	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)
I/O Data Size	Total: Inputs 4 bytes/Outputs 4 bytes	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate
Maximum Number of Nodes Supported	64	64	64
Number of Expansion I/O Supported	None Supported	10	10
Number of Points	32	32	32
System Power Requirement	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	32 Point 24 VDC Negative Logic		
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)		
Input Impedance	~5.4K ohms		
Input Signal Delay	< 0.5msec		
Response Time (ms)		< 0.3msec	< 0.3msec
Trigger Voltage	ON State: 9 VDC, OFF State: 5 VDC		
Points per Common	16	32	32
Output Type		32 Point 24 VDC Negative Logic	32 Point 24 VDC Positive Logic
Output Range		Nominal 0 VDC; 11 to 28.8 VDC	Nominal 24 VDC; 11 to 28.8 VDC
Protection		Short protection, Over Temperature Protection, Over Current Limit	Short protection, Over Temperature Protection, Over Current Limit
Minimum Output Load			
Load Current per Point		0.5 Amps per point	0.5 Amps per point
Output Inrush Current			
Polarity		Sink	Source
Configuration Tool	EDS File	EDS File	EDS File
Interface Connector Type	5 pin connector	5 pin connector	5 pin connector
Power Dissipation	80 mA typical	110 mA typical	110 mA typical
Connector Type	Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	Not Applicable	600 mA @ Maximum 5 VDC	600 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	80 x 35 x 55	99 x 83 x 70	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXDNC232	STXDNC332	STXDNS016
Product Name	**Slave Network Interface with 32 Sink Outputs**	**Slave Network Interface with 32 Source Outputs**	**Slave Network Interface with 16 Relay Outputs**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	DeviceNet	DeviceNet	DeviceNet
Protocol Supported	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command"
Features			
Baud Rate	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)
I/O Data Size	Total: Inputs 4 bytes/Outputs 4 bytes	Total: Inputs 4 bytes/Outputs 4 bytes	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate
Maximum Number of Nodes Supported	64	64	64
Number of Expansion I/O Supported	None Supported	None Supported	10
Number of Points	32	32	16
System Power Requirement	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type			
Input Voltage Range			
Input Impedance			
Input Signal Delay			
Response Time (ms)	< 0.3msec	< 0.3msec	10msec
Trigger Voltage			
Points per Common	16	16	
Output Type	32 Point 24 VDC Negative Logic	32 Point 24 VDC Positive Logic	16 Point Relay
Output Range	Nominal 24 VDC; 11 to 28.8 VDC	Nominal 24 VDC; 11 to 28.8 VDC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC
Protection	Short protection, Over Temperature Protection, Over Current Limit	Short protection, Over Temperature Protection, Over Current Limit	
Minimum Output Load			100 micro Amps, 100 millivolts VDC per point
Load Current per Point	0.5 Amps per point	0.5 Amps per point	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC
Output Inrush Current			
Polarity	Sink	Source	
Configuration Tool	EDS File	EDS File	EDS File
Interface Connector Type	5 pin connector	5 pin connector	5 pin connector
Power Dissipation	80 mA typical	80 mA typical	110 mA typical
Connector Type	Connector Type Hirose, HIF3A-40D-2.54R (ribbon cable), HIF2C-40D-2.54C (crimp con-nector), HIF2C-2226SCFA (crimp pin) or equal	Connector Type Hirose, HIF3A-40D-2.54R (ribbon cable), HIF2C-40D-2.54C (crimp con-nector), HIF2C-2226SCFA (crimp pin) or equal	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	Not Applicable	Not Applicable	600 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	80 x 35 x 55	80 x 35 x 55	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXDNS116	STXDNS432	STXDNS532
Product Name	**Slave Network Interface with 16 Isolated Relay Outputs**	**Slave Network Interface with 16 Positive Logic Inputs and 16 Source Outputs**	**Slave Network Interface with 16 Negative Logic Inputs and 16 Sink Outputs**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	DeviceNet	DeviceNet	DeviceNet
Protocol Supported	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command"
Features			
Baud Rate	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)
I/O Data Size	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate
Maximum Number of Nodes Supported	64	64	64
Number of Expansion I/O Supported	10	10	10
Number of Points	16	16 In/ 16 Out	16 In/ 16 Out
System Power Requirement	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type		16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic
Input Voltage Range		24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Impedance		~5.4K ohms	~5.4K ohms
Input Signal Delay		< 0.5msec	< 0.5msec
Response Time (ms)	10msec	< 0.3msec	< 0.3msec
Trigger Voltage		ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC
Points per Common		32	32
Output Type	16 Point Isolated Relay	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic
Output Range	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC	Nominal 24 VDC; 11 to 28.8 VDC	Nominal 24 VDC; 11 to 28.8 VDC
Protection		Short protection, Over Temperature Protection, Over Current Limit	Short protection, Over Temperature Protection, Over Current Limit
Minimum Output Load	100 micro Amps, 100 millivolts VDC per point		
Load Current per Point	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC	0.5 Amps per point	0.5 Amps per point
Output Inrush Current			
Polarity		Source	Sink
Configuration Tool	EDS File	EDS File	EDS File
Interface Connector Type	5 pin connector	5 pin connector	5 pin connector
Power Dissipation	110 mA typical	110 mA typical	110 mA typical
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	600 mA @ Maximum 5 VDC	600 mA @ Maximum 5 VDC	600 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 83 x 70	99 x 83 x 70	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXDNC432	STXDNC532	STXDNC632
Product Name	**Slave Network Interface with 16 Positive Logic Inputs and 16 Source Outputs**	**Slave Network Interface with 16 Negative Logic Inputs and 16 Sink Outputs**	**Slave Network Interface with 16 Positive Logic Inputs and 16 Sink Outputs**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	DeviceNet	DeviceNet	DeviceNet
Protocol Supported	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command
Features			
Baud Rate	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)
I/O Data Size	Total: Inputs 4 bytes/Outputs 4 bytes	Total: Inputs 4 bytes/Outputs 4 bytes	Total: Inputs 4 bytes/Outputs 4 bytes
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate
Maximum Number of Nodes Supported	64	64	64
Number of Expansion I/O Supported	None Supported	None Supported	None Supported
Number of Points	16 In/ 16 Out	16 In/ 16 Out	16 In/ 16 Out
System Power Requirement	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic	16 Point 24 VDC Positive Logic
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Impedance	~5.4K ohms	~5.4K ohms	~5.4K ohms
Input Signal Delay	< 0.5msec	< 0.5msec	< 0.5msec
Response Time (ms)	< 0.3msec	< 0.3msec	< 0.3msec
Trigger Voltage	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC
Points per Common	16	16	16
Output Type	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic	16 Point 24 VDC Positive Logic
Output Range	Nominal 24 VDC; 11 to 28.8 VDC	Nominal 24 VDC; 11 to 28.8 VDC	Nominal 24 VDC; 11 to 28.8 VDC
Protection	Short protection, Over Temperature Protection, Over Current Limit	Short protection, Over Temperature Protection, Over Current Limit	Short protection, Over Temperature Protection, Over Current Limit
Minimum Output Load			
Load Current per Point	0.5 Amps per point	0.5 Amps per point	0.5 Amps per point
Output Inrush Current			
Polarity	Source	Sink	Sink
Configuration Tool	EDS File	EDS File	EDS File
Interface Connector Type	5 pin connector	5 pin connector	5 pin connector
Power Dissipation	80 mA typical	80 mA typical	80 mA typical
Connector Type	Connector Type Hirose, HIF3A-40D-2.54R (ribbon cable), HIF2C-40D-2.54C (crimp connector), HIF2C-2226SCFA (crimp pin) or equal	Connector Type Hirose, HIF3A-40D-2.54R (ribbon cable), HIF2C-40D-2.54C (crimp connector), HIF2C-2226SCFA (crimp pin) or equal	Connector Type Hirose, HIF3A-40D-2.54R (ribbon cable), HIF2C-40D-2.54C (crimp connector), HIF2C-2226SCFA (crimp pin) or equal
Internal Power Used (5 VDC loading)	Not Applicable	Not Applicable	Not Applicable
Dimensions (H x W x D) in mm	80 x 35 x 55	80 x 35 x 55	80 x 35 x 55



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXDNC732	STXDNS824	STXDNS924
Product Name	**Slave Network Interface with 16 Negative Logic Inputs and 16 Source Outputs**	**Slave Network Interface with 16 Positive Logic Inputs and 16 Relay Outputs**	**Slave Network Interface with 16 Negative Logic Inputs and 16 Relay Outputs**
Lifecycle Status	Active	Active	Active
Module Type	Slave Network Interface	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	DeviceNet	DeviceNet	DeviceNet
Protocol Supported	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command
Features			
Baud Rate	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)
I/O Data Size	Total: Inputs 4 bytes/Outputs 4 bytes	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes	Yes
Maximum Bus Length	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate
Maximum Number of Nodes Supported	64	64	64
Number of Expansion I/O Supported	None Supported	10	10
Number of Points	16 In/ 16 Out	16 In/ 16 Out	16 In/ 16 Out
System Power Requirement	24 VDC (11 VDC to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	16 Point 24 VDC Negative Logic	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Impedance	~5.4K ohms	~5.4K ohms	~5.4K ohms
Input Signal Delay	< 0.5msec	< 0.5msec	< 0.5msec
Response Time (ms)	< 0.3msec	10msec	10msec
Trigger Voltage	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC
Points per Common	16	16 for Inputs and 4 for Outputs	16 for Inputs and 1 for Outputs
Output Type	16 Point 24 VDC Negative Logic	16 Point Relay	16 Point Relay
Output Range	Nominal 24 VDC; 11 to 28.8 VDC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC
Protection	Short protection, Over Temperature Protection, Over Current Limit		
Minimum Output Load		100 micro Amps, 100 millivolts VDC per point	100 micro Amps, 100 millivolts VDC per point
Load Current per Point	0.5 Amps per point	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC
Output Inrush Current			
Polarity	Source		
Configuration Tool	EDS File	EDS File	EDS File
Interface Connector Type	5 pin connector	5 pin connector	5 pin connector
Power Dissipation	80 mA typical	110 mA typical	110 mA typical
Connector Type	Connector Type Hirose, HIF3A-40D-2.54R (ribbon cable), HIF2C-40D-2.54C (crimp connector), HIF2C-2226SCFA (crimp pin) or equal	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	Not Applicable	600 mA @ Maximum 5 VDC	600 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	80 x 35 x 55	99 x 83 x 70	99 x 83 x 70



Network Interfaces with Built-in I/O

The PROFIBUS and DeviceNet Network Interfaces are also available with built-in I/O to reduce cost and footprint. The network interfaces can be expanded and support all of the RSTi I/O types.

	STXDNS825	STXDNS925
Product Name	**Slave Network Interface with 16 Positive Logic Inputs and 16 Isolated Relay Outputs**	**Slave Network Interface with 16 Negative Logic Inputs and 16 Isolated Relay Outputs**
Lifecycle Status	Active	Active
Module Type	Slave Network Interface	Slave Network Interface
Field Busses/Device Networks	DeviceNet	DeviceNet
Protocol Supported	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command	I/O Slave Message (Group 2 only slave), Poll command. Bit_strobe command, Cyclic command, COS command
Features		
Baud Rate	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)	125K bits/s, 250Kbps, 500Kbps (Auto baud rate selection)
I/O Data Size	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)	Total: Inputs 36 bytes/Outputs 34 bytes total (4 bytes In/ 4 bytes Out for base module and 32 bytes In/30 bytes Out for expansion modules)
LEDs	Module Status, Network Status, I/O Status	Module Status, Network Status, I/O Status
Diagnostic Supported	Yes	Yes
Maximum Bus Length	Up to 500 meters depending on baud rate	Up to 500 meters depending on baud rate
Maximum Number of Nodes Supported	64	64
Number of Expansion I/O Supported	10	10
Number of Points	16 In/ 16 Out	16 In/ 16 Out
System Power Requirement	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection	24 VDC (19.2 to 28.8 VDC) with Current Limit, Reverse Polarity Protection
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Type	16 Point 24 VDC Positive Logic	16 Point 24 VDC Negative Logic
Input Voltage Range	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Input Impedance	~5.4K ohms	~5.4K ohms
Input Signal Delay	< 0.5msec	< 0.5msec
Response Time (ms)	10msec	10msec
Trigger Voltage	ON State: 9 VDC, OFF State: 5 VDC	ON State: 9 VDC, OFF State: 5 VDC
Points per Common	16 for Inputs and 1 for Outputs	16 for Inputs and 1 for Outputs
Output Type	16 Point Isolated Relay	16 Point Isolated Relay
Output Range	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC	5 to 28.8 VDC, 48 VDC, 110 VDC, 250 VAC
Protection		
Minimum Output Load	100 micro Amps, 100 millivolts VDC per point	100 micro Amps, 100 millivolts VDC per point
Load Current per Point	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC	2 Amps at 5 to 28.8 VDC, 0.8 Amps at 48 VDC, 0.5 Amps at 110 VDC, 2 Amps at 250 VAC
Output Inrush Current		
Polarity		
Configuration Tool	EDS File	EDS File
Interface Connector Type	5 pin connector	5 pin connector
Power Dissipation	110 mA typical	110 mA typical
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	600 mA @ Maximum 5 VDC	600 mA @ Maximum 5 VDC
Dimensions (H x W x D) in mm	99 x 83 x 70	99 x 83 x 70



Discrete I/O Modules (Input)

RSTi discrete input modules are available for a wide range of applications requiring DC voltages (5 VDC, 24 VDC, 48 VDC) and AC voltages (110 VAC, 220 VAC). The input modules are available in 4, 8 or 16 point density to optimize panel space.

	ST-1124	ST-1114	ST-1214	ST-1224	ST-1314
Product Name	**5 VDC Input, 4 points Negative Logic**	**5 VDC Input, 4 points Positive Logic**	**12/24 VDC Input, 4 points Positive Logic**	**12/24 VDC Input, 4 points Negative Logic**	**48 VDC Input, 4 points Positive Logic**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Input Voltage Range	5 VDC (4.5 VDC to 5.5 VDC)	5 VDC (4.5 VDC to 5.5 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (10.2 VDC to 28.8 VDC)	48 VDC (34 VDC to 60 VDC)
Number of Points	4	4	4	4	4
Points per Common	4	4	4	4	4
Input Impedance	~1.3K ohms	~1.3K ohms	~5.1K ohms	~5.1K ohms	~12K ohms
Input Signal Delay	< 0.5msec	< 0.5msec	3.0msec	3.0msec	3.0msec
Filtering Time	Typical 1.5 msec. (software filtering)	Typical 1.5 msec. (software filtering)	Typical 1.5 msec.	Typical 1.5 msec.	
Trigger Voltage	On State: 2.4 VDC to 5.5 VDC OFF State: 0.8 VDC	On State: 2.4 VDC to 5.5 VDC OFF State: 0.8 VDC	ON State: 10.2 to 28.8 VDC OFF State: 5 VDC	ON State: 10.2 to 28.8 VDC OFF State: 5 VDC	ON State: 48 VDC (34 VDC to 60 VDC) OFF State: 10 VDC
Maximum On State Current	4.5 mA per point at 5.5 VDC	4.5 mA per point at 5.5 VDC	6 mA per point at 28.8 VDC	6 mA per point at 28.8 VDC	4 mA per point at 48 VDC
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	35 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Discrete I/O Modules (Input)

RSTi discrete input modules are available for a wide range of applications requiring DC voltages (5 VDC, 24 VDC, 48 VDC) and AC voltages (110 VAC, 220 VAC). The input modules are available in 4, 8 or 16 point density to optimize panel space.

	ST-1324	ST-131F	ST-1218	ST-1228	ST-121F
Product Name	**48 VDC Input, 4 points Negative Logic**	**48 VDC Input, 16 points Positive Logic**	**12/24 VDC Input, 8 points Positive Logic**	**12/24 VDC Input, 8 points Negative Logic**	**12/24 VDC Input, 16 points Positive Logic**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Input Voltage Range	48 VDC (34 VDC to 60 VDC)	48 VDC (34 VDC to 60 VDC)	24 VDC (10.2 VDC to 28.8 VDC)	24 VDC (10.2 VDC to 28.8 VDC)	24 VDC (10.2 VDC to 28.8 VDC)
Number of Points	4	16	8	8	16
Points per Common	4	16	8	8	16
Input Impedance	~12K ohms	~12K ohms	~5.1K ohms	~5.1K ohms	~5.1K ohms
Input Signal Delay	3.0msec	3.0msec	3.0msec	3.0msec	3.0msec
Filtering Time		Typical 1.5 msec.	Typical 1.5 msec.	Typical 1.5 msec.	Typical 1.5 msec.
Trigger Voltage	ON State: 48 VDC (34 VDC to 60 VDC) OFF State: 10 VDC	ON State: 48 VDC (34 VDC to 60 VDC) OFF State: 10 VDC	ON State: 10.2 to 28.8 VDC OFF State: 5 VDC	ON State: 10.2 to 28.8 VDC OFF State: 5 VDC	ON State: 10.2 to 28.8 VDC OFF State: 5 VDC
Maximum On State Current	4 mA per point at 48 VDC	2.5 mA per point at 60 VDC	6 mA per point at 28.8 VDC	6 mA per point at 28.8 VDC	6 mA per point at 28.8 VDC
Connector Type	Spring Clamp Terminal Block	Connector Type Hirose, HIF3BA-20D-2.54DSA	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Connector Type Hirose, HIF3BA-20D-2.54DSA
Internal Power Used (5 VDC loading)	35 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Discrete I/O Modules (Input)

RSTi discrete input modules are available for a wide range of applications requiring DC voltages (5 VDC, 24 VDC, 48 VDC) and AC voltages (110 VAC, 220 VAC). The input modules are available in 4, 8 or 16 point density to optimize panel space.

	ST-122F	ST-1804	ST-1904
Product Name	**12/24 VDC Input, 16 points Negative Logic**	**110 VAC Input, 4 points (47 to 63Hz)**	**240 VAC Input, 4 points (47 to 63Hz)**
Lifecycle Status	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input
Input Voltage Range	24 VDC (10.2 VDC to 28.8 VDC)	120 VAC (85 VAC to 132 VAC)	240 VAC (170 VAC to 264 VAC)
Number of Points	16	4	4
Points per Common	16	4	4
Input Impedance	~5.1K ohms	~11K ohms	~22K ohms
Input Signal Delay	3.0msec	10.0msec	10.0msec
Filtering Time	Typical 1.5 msec.		
Trigger Voltage	ON State: 10.2 to 28.8 VDC OFF State: 5 VDC	ON State: 85 VAC to 132 VAC OFF State: 60 VAC	ON State: 170 VAC to 264 VAC OFF State: 130 VAC
Maximum On State Current	6 mA per point at 28.8 VDC	8 mA per point at 132 VAC	12 mA per point at 264 VAC
Connector Type	Connector Type Hirose, HIF3BA-20D-2.54DSA	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	45 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Analog I/O Modules (Input)

RSTi analog input modules are available in a wide range of voltage and current signals. Analog input modules are available in 12 bit or 14 bit resolution.

	ST-3114	ST-3118	ST-3134	ST-3214	ST-3218
Product Name	**Analog 0 to 20 mA, 12bit Input, 4 channels**	**Analog 0 to 20 mA, 12bit Input, 8 channels**	**Analog 0 to 20 mA, 14bit Input, 4 channels**	**Analog 4 to 20 mA, 12bit Input, 4 channels**	**Analog 4 to 20 mA, 12bit Input, 8 channels**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input	Analog Input	Analog Input
Range	0 to 20 mA Range	0 to 20 mA Range	0 to 20 mA Range	4 to 20 mA Range	4 to 20 mA Range
Number of Points	4	8	4	4	8
Points per Common	4	8	4	4	8
Diagnostic Supported				Open Wire if < 3 mA	
Update Rate	4msec/All channels	4msec/All channels	4msec/All channels	4msec/All channels	4msec/All channels
Resolution	12 bits: 4.88 microAmp/bit	12 bits: 4.88 microAmp/bit	14 bits: 1.22 microAmp/bit	12 bits: 3.9 microAmp/bit	12 bits: 3.9 microAmp/bit
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C
Input Impedance	120 ohms	120 ohms	120 ohms	120 ohms	120 ohms
Internal Power Used (5 VDC loading)	165 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum	165 mA @ 5.0 VDC Maximum	165 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Analog I/O Modules (Input)

RSTi analog input modules are available in a wide range of voltage and current signals. Analog input modules are available in 12 bit or 14 bit resolution.

	ST-3234	ST-3274	ST-3424	ST-3428	ST-3444
Product Name	**Analog 4 to 20 mA, 14bit Input, 4 channels**	**Analog 4 to 20 mA, 12bit Input, 4 channels (connector type)**	**Analog 0 to 10 VDC, 12bit Input, 4 channels**	**Analog 0 to 10 VDC, 12bit Input, 8 channels**	**Analog 0 to 10 VDC, 14bit Input, 4 channels**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input	Analog Input	Analog Input
Range	4 to 20 mA Range	4 to 20 mA Range	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC
Number of Points	4	4	4	8	4
Points per Common	4	4	4	8	4
Diagnostic Supported	Open Wire if < 3 mA	Open Wire if < 3 mA			
Update Rate	4msec/All channels	4msec/All channels	4msec/All channels	4msec/All channels	4msec/All channels
Resolution	14 bits: 0.9 microAmp/bit	12 bits: 3.9 microAmp/bit	12 bits: 2.44 mV/bit	12 bits: 2.44 mV/bit	14 bits: 0.6 mV/bit
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C
Input Impedance	120 ohms	120 ohms	500K ohms	500K ohms	500K ohms
Internal Power Used (5 VDC loading)	165 mA @ 5.0 VDC Maximum	165 mA @ 5.0 VDC Maximum	165 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum	170 mA @ 5.0 VDC Maximum
Connector Type	Spring Clamp Terminal Block	Requires Sensor Connect 3M Mini-Clamp Plug, 37104 Series	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Analog I/O Modules (Input)

RSTi analog input modules are available in a wide range of voltage and current signals. Analog input modules are available in 12 bit or 14 bit resolution.

	ST-3524	ST-3544	ST-3624	ST-3644
Product Name	**Analog -10 to 10 VDC, 12bit Input, 4 channels**	**Analog -10 to 10 VDC, 14bit Input, 4 channels**	**Analog 0 to 5 VDC, 12bit Input, 4 channels**	**Analog 0 to 5 VDC, 14bit Input, 4 channels**
Lifecycle Status	Active	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input	Analog Input
Range	-10 to 10 VDC	-10 to 10 VDC	0 to 5 VDC	0 to 5 VDC
Number of Points	4	4	4	4
Points per Common	4	4	4	4
Diagnostic Supported				
Update Rate	4msec/All channels	4msec/All channels	4msec/All channels	4msec/All channels
Resolution	12 bits: 4.8 mV/bit	14 bits: 1.2 mV/bit	12 bits: 1.22 mV/bit	14 bits: 0.3 mV/bit
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C
Input Impedance	500K ohms	500K ohms	500K ohms	500K ohms
Internal Power Used (5 VDC loading)	170 mA @ 5.0 VDC Maximum	170 mA @ 5.0 VDC Maximum	170 mA @ 5.0 VDC Maximum	170 mA @ 5.0 VDC Maximum
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Discrete I/O Modules (Output)

RSTi discrete output modules are available for a wide range of applications requiring DC voltages (5 VDC, 24 VDC, 48 VDC) and AC voltages (12 VAC, 125 VAC). The modules are available in 4, 8 or 16 point density to optimize panel space. Relay output modules are also available. The ST-2792 has an added feature of manual/automatic override.

	ST-2114	ST-2124	ST-2314	ST-2324
Product Name	**5 VDC/20 mA TTL Inverting Output, 4 points**	**5 VDC, 4 Points, TTL Non-Inverting Output (Default: 0V)**	**4 points, 24 VDC Negative Logic, Output 0.5 Amps**	**4 points, 24 VDC Positive Logic, Output 0.5 Amps**
Lifecycle Status	Active	Active	Active	Active
Module Type	Digital Outputs	Digital Outputs	Digital Outputs	Digital Outputs
Output Range	5 VDC nominal, Min. 4.5 VDC to Max. 5.5 VDC	5 VDC nominal, Min. 4.5 VDC to Max. 5.5 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC
Number of Points	4	4	4	4
Points per Common	4	4	4	4
Diagnostic Supported				
Protection	Output Short-Circuit protection Field Power Over Voltage Protection (about 6.7 VDC) Field Power Reverse Voltage Protection	Output Short-Circuit protection Field Power Over Voltage Protection (about 6.7 VDC) Field Power Reverse Voltage Protection	Over Temperature shut down: Min. 150°C Over Current Limit : Min. 3.5A/Max. 7A Per Channel Short Circuit Protection ESD Protection: 16.5Kv	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max.7.5A Per Channel Short Circuit Protection ESD Protection: 5.0Kv
ON Voltage/OFF Voltage	Min. 4.8 VDC @ 5 VDC, 5 mA	Max. 0.3 VDC @ 0 VDC, 5 mA		
Load Current per Point	Max. 20 mA Per Channel Max. 80 mA All Common	Max. 20 mA Per Channel Max. 80 mA All Common	Max. 0.5A Per Channel Max. 2.0A All Common	Max. 0.5A Per Channel Max. 2.0A All Common
Output Inrush Current	40 mA For 10ms, Repeatable Every 1 Sec.	40 mA For 10ms, Repeatable Every 1 Sec.		
Response Time (ms)	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON : Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms
Polarity	TTL Inverting	TTL Non-Inverting	Negative Logic	Positive Logic
Field Power Requirement	5 VDC (4.5 VDC to 5.5 VDC)	5 VDC (4.5 VDC to 5.5 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Power Dissipation			5 mA @ 28.8 VDC Per Channel	5 mA @ 28.8 VDC Per Channel
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	50 mA @ 5.0 VDC Maximum	50 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Discrete I/O Modules (Output)

RSTi discrete output modules are available for a wide range of applications requiring DC voltages (5 VDC, 24 VDC, 48 VDC) and AC voltages (12 VAC, 125 VAC). The modules are available in 4, 8 or 16 point density to optimize panel space. Relay output modules are also available. The ST-2792 has an added feature of manual/automatic override.

	ST-2414	ST-2424	ST-2514	ST-2524
Product Name	**4 points, 24 VDC Negative Logic, Output 0.5 Amps with Diagnostics**	**4 points, 24 VDC Positive Logic, Output 0.5 Amps with Diagnostics**	**4 points, 24 VDC Negative Logic, Output 2 Amps with Diagnostics**	**4 points, 24 VDC Positive Logic, Output 2 Amps with Diagnostics**
Lifecycle Status	Active	Active	Active	Active
Module Type	Digital Outputs	Digital Outputs	Digital Outputs	Digital Outputs
Output Range	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC
Number of Points	4	4	4	4
Points per Common	4	4	4	4
Diagnostic Supported	Point Fault Reported to Network Interface	Point Fault Reported to Network Interface	Point Fault Reported to Network Interface	Point Fault Reported to Network Interface
Protection	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max. 7A Per Channel Short Circuit Protection ESD Protection: 16.5Kv	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max.7.5A Per Channel Short Circuit Protection ESD Protection: 5.0Kv	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max. 7A Per Channel Short Circuit Protection ESD Protection: 16.5Kv	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 6A/Max. 15A Per Channel Short Circuit Protection ESD Protection: 5.0Kv
ON Voltage/OFF Voltage				
Load Current per Point	Max. 0.5A Per Channel Max. 2.0A All Common	Max. 0.5A Per Channel Max. 2.0A All Common	Max. 2A Per Channel Max. 8A All Common	Max. 2A Per Channel Max. 8A All Common
Output Inrush Current				
Response Time (ms)	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON : Max. 0.3ms ON to OFF: Max. 0.3ms
Polarity	Negative Logic	Positive Logic	Negative Logic	Positive Logic
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Power Dissipation	5 mA @ 28.8 VDC Per Channel	5 mA @ 28.8 VDC Per Channel	5 mA @ 28.8 VDC Per Channel	5 mA @ 28.8 VDC Per Channel
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	45 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Discrete I/O Modules (Output)

RSTi discrete output modules are available for a wide range of applications requiring DC voltages (5 VDC, 24 VDC, 48 VDC) and AC voltages (12 VAC, 125 VAC). The modules are available in 4, 8 or 16 point density to optimize panel space. Relay output modules are also available. The ST-2792 has an added feature of manual/automatic override.

	ST-2318	ST-2328	ST-221F	ST-222F
Product Name	**8 points, 24 VDC Negative Logic, Output 0.5 Amps**	**8 points, 24 VDC Positive Logic, Output 0.5 Amps**	**16 points, 24 VDC Negative Logic, Output 0.5 Amps (Connector Style)**	**16 points, 24 VDC Positive Logic, Output 0.5 Amps (Connector Style)**
Lifecycle Status	Active	Active	Active	Active
Module Type	Digital Outputs	Digital Outputs	Digital Outputs	Digital Outputs
Output Range	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC	24 VDC nominal, Min. 11 VDC to Max. 28.8 VDC
Number of Points	8	8	16	16
Points per Common	8	8	16	16
Diagnostic Supported				
Protection	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max. 7A Per Channel Short Circuit Protection ESD Protection: 16.5Kv	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max. 7A Per Channel Short Circuit Protection ESD Protection : 16.5Kv	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max. 7A Per Channel Short Circuit Protection ESD Protection : 16.5Kv	Over Temperature shut down: Min. 150°C Over Current Limit: Min. 3.5A/Max. 7A Per Channel Short Circuit Protection ESD Protection: 16.5Kv
ON Voltage/OFF Voltage				
Load Current per Point	Max. 0.5A Per Channel Max. 2.0A All Common	Max. 0.5A Per Channel Max. 2.0A All Common	Max. 0.5A Per Channel Max. 4.0A All Common	Max. 0.5A Per Channel Max. 4.0A All Common
Output Inrush Current				
Response Time (ms)	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms
Polarity	Negative Logic	Positive Logic	Negative Logic	Positive Logic
Field Power Requirement	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Power Dissipation	5 mA @ 28.8 VDC Per Channel	5 mA @ 28.8 VDC Per Channel	3 mA @ 28.8 VDC Per Channel	3 mA @ 28.8 VDC Per Channel
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Connector Type Hirose, HIF3BA-20D-2.54DSA	Connector Type Hirose, HIF3BA-20D-2.54DSA
Internal Power Used (5 VDC loading)	60 mA @ 5.0 VDC Maximum	45 mA @ 5.0 VDC Maximum	80 mA @ 5.0 VDC Maximum	80 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Discrete I/O Modules (Output)

RSTi discrete output modules are available for a wide range of applications requiring DC voltages (5 VDC, 24 VDC, 48 VDC) and AC voltages (12 VAC, 125 VAC). The modules are available in 4, 8 or 16 point density to optimize panel space. Relay output modules are also available. The ST-2792 has an added feature of manual/automatic override.

	ST-2742	ST-2744	ST-2748	ST-2852
Product Name	**2 points, Relay Output, 2 Amps**	**4 points, Relay Output, 2 Amps**	**8 points, Relay Output, 2 Amps**	**2 points, 12 to 125 VAC Output, 0.5 Amps**
Lifecycle Status	Active	Active	Active	Active
Module Type	Digital Outputs	Digital Outputs	Digital Outputs	Digital Outputs
Output Range	5~28.8 VDC @ 2.0A Resistive 48 VDC @ 0.8A Resistive 110 VDC @ 0.5A Resistive 250 VAC @ 2.0A Resistive	5~28.8 VDC @ 2.0A Resistive 48 VDC @ 0.8A Resistive 110 VDC @ 0.5A Resistive 250 VAC @ 2.0A Resistive	5~28.8 VDC @ 2.0A Resistive 48 VDC @ 0.8A Resistive 110 VDC @ 0.5A Resistive 250 VAC @ 2.0A Resistive	15~132 VAC 47 to 63Hz
Number of Points	2	4	8	2
Points per Common	1	4	8	2
Diagnostic Supported				
Protection				
ON Voltage/OFF Voltage				
Load Current per Point	2A @ 5~28.8 VDC 0.8A @ 48 VDC 0.5A @ 110 VDC 2A @ 250 VAC	2A @ 5~28.8 VDC 0.8A @ 48 VDC 0.5A @ 110 VDC 2A @ 250 VAC	2A @ 5~28.8 VDC 0.8A @ 48 VDC 0.5A @ 110 VDC 2A @ 250 VAC	0.5 Amp
Output Inrush Current				40 Amp for 16 mSec. or 4 Amp for 30 Sec.
Response Time (ms)	OFF to ON : Max. 10ms ON to OFF: Max. 10ms	OFF to ON: Max. 10ms ON to OFF: Max. 10ms	OFF to ON: Max. 10ms ON to OFF: Max. 10ms	OFF to ON: Max. 3ms ON to OFF: Max. 1/2 Cycle plus 3ms
Polarity				
Field Power Requirement	24 VDC, 240 VAC	No Connection with Field Power Field Power passes though to the next module	No Connection with Field Power Field Power passes though to the next module	120 VAC nominal Voltage Range: 12~125 VAC
Power Dissipation				
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	65 mA @ 5.0 VDC Maximum	130 mA @ 5.0 VDC Maximum	150 mA @ 5.0 VDC Maximum	35 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 24 x 70	99 x 12 x 70



Analog I/O Modules (Output)

RSTi analog output modules are available in a wide range of voltage and current signals. Specialty analog modules are also available for manual over-ride and 0 to 1 Amp analog out.

	ST-4112	ST-4114	ST-4212	ST-4214
Product Name	**2 channels Current Output, 0 to 20 mA, 12bit**	**4 channels Current Output, 0 to 20 mA, 12bit**	**2 channels Current Output, 4 to 20 mA, 12bit**	**4 channels Current Output, 4 to 20 mA, 12bit**
Lifecycle Status	Active	Active	Active	Active
Module Type	Analog Output	Analog Output	Analog Output	Analog Output
Output Range	0 to 20 mA	0 to 20 mA	4 to 20 mA	4 to 20 mA
Number of Points	2	4	2	4
Points per Common	2	4	2	4
Resolution	12 bits : 4.88uA/Bit	12 bits : 4.88uA/Bit	12 bits : 3.9uA/Bit	12 bits : 3.9uA/Bit
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C (100uA~20 mA) ±0.25% Full Scale @ 25°C(0uA~100uA) ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C
Update Rate	2msec for all channels	4msec for all channels	2msec for all channels	4msec for all channels
Maximum Output Load	Max. 500 Ω	Max. 500 Ω	Max. 500 Ω	Max. 500 Ω
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	60 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Analog I/O Modules (Output)

RSTi analog output modules are available in a wide range of voltage and current signals. Specialty analog modules are also available for manual over-ride and 0 to 1 Amp analog out.

	ST-4274	ST-4422	ST-4424	ST-4474
Product Name	**4 channels Current Output, 4 to 20 mA, 12bit (Connector Style)**	**2 channels Voltage Output, 0 to 10 VDC, 12bit**	**4 channels Voltage Output, 0 to 10 VDC, 12bit**	**4 channels Current Output, 0 to 10 VDC, 12bit (Connector Style)**
Lifecycle Status	Active	Active	Active	Active
Module Type	Analog Output	Analog Output	Analog Output	Analog Output
Output Range	4 to 20 mA	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC
Number of Points	4	2	4	4
Points per Common	4	2	4	4
Resolution	12 bits : 3.91uA/Bit	12 bits : 2.44mV/Bit	12 bits : 2.44mV/Bit	12 bits : 2.44mV/Bit
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C
Update Rate	1.2msec for all channels	2msec for all channels	4msec for all channels	1.2msec for all channels
Maximum Output Load	Max. 500 Ω	Min. 5 kΩ	Min. 2 kΩ	Min. 2 kΩ
Connector Type	Requires Sensor Connect 3M Mini-Clamp Plug, 37104 Series AWG#20~22 available	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Requires Sensor Connect 3M Mini-Clamp Plug, 37104 Series AWG#20~22 available
Internal Power Used (5 VDC loading)	40 mA @ 5.0 VDC Maximum	155 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Analog I/O Modules (Output)

RSTi analog output modules are available in a wide range of voltage and current signals. Specialty analog modules are also available for manual over-ride and 0 to 1 Amp analog out.

	ST-4491	ST-4522	ST-4622	ST-4911
Product Name	**1 channels Voltage Output, 0 to 10 VDC, 12bit. (Manual Override or Automatic Operation)**	**2 channels Voltage Output, -10 to +10 VDC, 12bit**	**2 channels Voltage Output, 0 to 5 VDC, 12bit**	**1 channels Voltage Output, 0 to 1 Amp, 12bit.**
Lifecycle Status	Active	Active	Active	Active
Module Type	Analog Output	Analog Output	Analog Output	Analog Output
Output Range	0 to 10 VDC	-10 to +10 VDC	0 to 5 VDC	0 to 1 Amp
Number of Points	1	2	2	1
Points per Common	1	2	2	1
Resolution	12 bits : 2.44mV/Bit	12 bits : 4.88mV/Bit	12 bits : 1.22mV/Bit	12 bits : 2.44 mA/Bit
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C
Update Rate	1.2msec for all channels	2msec for all channels	2msec for all channels	1msec for all channels
Maximum Output Load	Min. 2 kΩ	Min. 5 kΩ	Min. 5 kΩ	13 Ω, ±5%
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	60 mA @ 5.0 VDC Maximum	155 mA @ 5.0 VDC Maximum	155 mA @ 5.0 VDC Maximum	60 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



RTD Modules

RSTi RTD input modules 2 and 3 wire sensors. The modules also support diagnostics.

RTD Input Types

- PT100, PT200, PT500, PT1000, PT50
- JPT100, JPT200, JPT500, JPT1000, JPT50
- NI100, NI200, NI500, NI000
- NI120, NI1000LG
- CU10

Resistance Input

- 100 mΩ/bit, 10 mΩ/bit, 20 mΩ/bit, 50 mΩ/bit

	ST-3702	ST-3704	ST-3708
Product Name	**2 Channels, RTD Input (2 and 3 Wire)**	**4 Channels, RTD Input (3 Wire) Connector Style**	**8 Channels, RTD Input (3 Wire) Connector Style**
Lifecycle Status	Active	Active	Active
Module Type	Temperature Sensing	Temperature Sensing	Temperature Sensing
Range	PT50, PT100, PT200, PT500, PT1000, JPT100, JPT200, JPT500, JPT1000, NI100, NI200, NI500, NI1000, NI120, CU10, Resistance 100 mΩ/Bit, Resistance 10 mΩ/Bit, Resistance 20 mΩ/Bit	PT100, PT200, PT500, PT1000, PT50 JPT100, JPT200, JPT500, JPT1000, JPT50 NI100, NI200, NI500, NI000 NI120, NI1000LG Resistance Input 100 mΩ/bit, 10 mΩ/bit, 20 mΩ/bit, 50 mΩ/bit	PT100, PT200, PT500, PT1000, PT50 JPT100, JPT200, JPT500, JPT1000, JPT50 NI100, NI200, NI500,NI1000 NI120, NI1000LG Resistance Input 100 mΩ/bit, 10 mΩ/bit, 20 mΩ/bit, 50 mΩ/bit
Number of Points	2	4	8
Points per Common	2	4	8
Diagnostic Supported	Open Channel	Open Channel Over Range	Open Channel Over Range
Resolution	0.1°C / 10 mΩ	±0.1°C/ F, 10 mΩ	±0.1°C/ F, 10 mΩ
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.3% Full Scale @ 25°C ±0.5% Full Scale @ 0°C, 60°C	±0.3% Full Scale @ 25°C ±0.5% Full Scale @ 0°C, 60°C
Update Rate	200msec for all channels	30msec per channel	30msec per channel
Internal Power Used (5 VDC loading)	70 mA @ 5.0 VDC Maximum	100 mA @ 5.0 VDC Maximum	100 mA @ 5.0 VDC Maximum
Connector Type	Spring Clamp Terminal Block	Requires connector type Hirose, HIF3BA-20D-2.54C	Requires connector type Hirose, HIF3BA-20D-2.54C
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Thermocouple Modules

RSTi Thermocouple/mV input modules support a wide range of thermocouple sensors. The modules also support diagnostics and Cold Junction Compensation.

Thermocouple Inputs
- Type K/J/T/B/R/S/E/N/L/U/C/D

mV Input
- 10uV/bit, 1uV/bit, 2uV/bit

	ST-3802	ST-3804	ST-3808
Product Name	**2 Channels, Thermocouple Input/mV**	**4 Channels, Thermocouple Input/mV (External CJC support)**	**8 Channels, Thermocouple Input/mV (External CJC support)**
Lifecycle Status	Active	Active	Active
Module Type	Temperature Sensing	Temperature Sensing	Temperature Sensing
Range	Type K/J/T/B/R/S/E/N/L/U/C/D mV Input 10uV/Bit, 1uV/Bit, 2uV/Bit	Type K/J/T/B/R/S/E/N/L/U/C/D mV Input 10uV/bit, 1uV/bit, 2uV/bit	Type K/J/T/B/R/S/E/N/L/U/C/D mV Input 10uV/bit, 1uV/bit, 2uV/bit
Number of Points	2	4	8
Points per Common	2	4	8
Diagnostic Supported	Open Channel	Open Channel Over Range	Open Channel Over Range
Resolution	0.1°C / 10mΩ	0.1°C / °F , 10uV	±0.1°C / F, 1uV
Accuracy	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C	±0.1% Full Scale @ 25°C ±0.3% Full Scale @ 0°C, 60°C
Update Rate	200msec for all channels	30msec per channel	30msec per channel
Internal Power Used (5 VDC loading)	70 mA @ 5.0 VDC Maximum	120 mA @ 5.0 VDC Maximum	140 mA @ 5.0 VDC Maximum
Connector Type	Spring Clamp Terminal Block	Requires connector type Hirose, HIF3BA-20D-2.54C	Requires connector type Hirose, HIF3BA-20D-2.54C
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Serial Communications Modules

RSTi serial communications modules enable serial devices, such as bar code readers, scales and printers, to connect to the network interface.

	ST-5211	ST-5212	ST-5221
Product Name	**1 Channel Serial RS-232**	**2 Channel Serial RS-232**	**1 Channel Serial RS-422**
Lifecycle Status	Active	Active	Active
Module Type	Serial Communications	Serial Communications	Serial Communications
Protocol Supported	ASCII, TxD, RxD, Full Duplex	ASCII, TxD, RxD, Full Duplex	ASCII, TxD, RxD, Full Duplex
Interface Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Baud Rate	300 to 115,200 bps	300 to 115,200 bps	300 to 115,200 bps
I/O Data Size	6 Bytes In/6 Bytes Out Buffer: RxD 1024 Bytes; TxD 256 Bytes	12 Bytes In/12 Bytes Out Buffer: RxD 1024 Bytes; TxD 256 Bytes	6 Bytes In/6 Bytes Out Buffer: RxD 1024 Bytes; TxD 256 Bytes
Internal Power Used (5 VDC loading)	95 mA @ 5.0 VDC Maximum	110 mA @ 5.0 VDC Maximum	155 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Serial Communications Modules

RSTi serial communications modules enable serial devices, such as bar code readers, scales and printers, to connect to the network interface.

	ST-5231	ST-5232
Product Name	**1 Channel Serial RS-485**	**2 Channel Serial RS-485**
Lifecycle Status	Active	Active
Module Type	Serial Communications	Serial Communications
Protocol Supported	ASCII, TxD, RxD, Full Duplex	ASCII, TxD, RxD, Full Duplex
Interface Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Baud Rate	300 to 115,200 bps	300 to 115,200 bps
I/O Data Size	6 Bytes In/6 Bytes Out Buffer: RxD 1024 Bytes; TxD 256 Bytes	12 Bytes In/12 Bytes Out Buffer: RxD 1024 Bytes; TxD 256 Bytes
Internal Power Used (5 VDC loading)	110 mA @ 5.0 VDC Maximum	155 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70



High Speed Counting

RSTi High Speed Counter modules interface to encoders and high speed pulse input devices. The RSTi offers a wide range of counting functions and control. SSI interface is also supported by the RSTi.

	ST-5101	ST-5111	ST-5112
Product Name	**1 Channel High Speed Counter, 5 VDC Input and 1 Output**	**1 Channel High Speed Counter, 24 VDC Input and 1 Output**	**2 Channel High Speed Counter, 24 VDC Inputs and 2 Outputs**
Lifecycle Status	Active	Active	Active
Module Type	High Speed Counter	High Speed Counter	High Speed Counter
Counter Operation			1-Input Mode - Up, Down 2-Input Mode - Up/Inhibit, Up/Reset, Down/ Inhibit, Down/Reset, Up/Down, Clock/Direction Encoder 1x, Encoder 2x, Encoder 4x
Count Rate	1.5Mhz	1.5Mhz	0~100KHz except Encoder 4x 0~50KHz, Encoder 4x
Counter Range			32 bit wide/channel
Input/Output Type	(1) 5 VDC Input / (1) 24 VDC (5 to 28.8 VDC) Output	(1) 24 VDC Input / (1) 24 VDC (5 to 28.8 VDC) Output	(2) 24 VDC Input / (2) 24 VDC Output 0.5 Amp
Protection			Short Protection
Off State Leakage Current	Max. 0.5 mA	Max. 0.5 mA	
Input Filters (Selectable)	Bypass / 1usec / 5usec / 10usec / 50usec / 100usec / 500usec / 1msec / 5msec / 10msec	Bypass / 1usec / 5usec / 10usec / 50usec / 100usec / 500usec / 1msec / 5msec / 10msec	
Selectable On/Off Output Presets	Force OFF/ON Greater Than Less Than Equal Overflow/Underflow PWM Output	Force OFF/ON Greater Than Less Than Equal Overflow/Underflow PWM Output	
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	80 mA @ 5.0 VDC Maximum	80 mA @ 5.0 VDC Maximum	160 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



High Speed Counting

RSTi High Speed Counter modules interface to encoders and high speed pulse input devices. The RSTi offers a wide range of counting functions and control. SSI interface is also supported by the RSTi.

	ST-5114	ST-5351
Product Name	**4 Channel High Speed Counter, 24 VDC Inputs and 2 Outputs**	**1 Channel SSI Interface. Gray Code or Natural Binary**
Lifecycle Status	Active	Active
Module Type	High Speed Counter	High Speed Counter
Counter Operation	1-Input Mode - Up, Down 2-Input Mode - Up/Inhibit, Up/Reset, Down/Inhibit, Down/Reset, Up/Down, Clock/Direction Encoder 1x, Encoder 2x, Encoder 4x	
Count Rate	0~50KHz except Encoder 4x 0~25KHz, Encoder 4x	62.5K, 100K, 125K, 250K, 500K, 1M, 2Mbps
Counter Range	32 bit wide/channel	Max. 30 bit
Input/Output Type	(4) 24 VDC Input / (2) 24 VDC Output 0.5 Amp	D+, D- RS422 Differential Input C+, C- RS422 Differential Output
Protection	Short Protection	
Off State Leakage Current		
Input Filters (Selectable)		
Selectable On/Off Output Presets		
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5VDC loading)	160 mA @ 5.0 VDC Maximum	150 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70



Motion Control

RSTi motion options include Pulse Width Modulation and Pulse Train outputs for simple motion applications. A wide range of control amplifiers is supported with the RSTi motion modules.

	ST-5422	ST-5442	ST-5444
Product Name	**2 Channels PWM Output, 1.5A/24 VDC, Source**	**2 Channels PWM Output, 0.5A/24 VDC, Source**	**4 Channels PWM Output, 0.5A/24 VDC, Source**
Lifecycle Status	Active	Active	Active
Module Type	Motion Control	Motion Control	Motion Control
Drive Type	PWM	PWM	PWM
Number of Axes	2	2	4
Diagnostic Supported	Short Protection	Short Protection	Short Protection
Encoder Support	No	No	No
Load Current per Point	1.5 Amp/Ch, 3 Amp/All Channel, short protection	0.5 Amp/Ch, 1 Amp/All Channel, short protection	0.5 Amp/Ch, 2 Amp/All Channel, short protection
Output Inrush Current	Max. 2 A, 100ms/Channel	Max. 1.5 A, 100ms/Channel	Max. 1.5 A, 100ms/Channel
Frequency	1~2500Hz±0.5%	1~2500Hz±0.5%	1~2500Hz±0.5%
Duty	0.0~100.0%±1.0(0.1%/1LSB), Ton>5us, Toff>5us	0.0~100.0%±1.0(0.1%/1LSB), Ton>5us, Toff>5us	0.0~100.0%±1.0(0.1%/1LSB), Ton>5us, Toff>5us
Field Power Requirement	24 VDC (18 VDC to 28.8 VDC)	24 VDC (18 VDC to 28.8 VDC)	24 VDC (18 VDC to 28.8 VDC)
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	150 mA @ 5.0 VDC Maximum	150 mA @ 5.0 VDC Maximum	150 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Motion Control

RSTi motion options include Pulse Width Modulation and Pulse Train outputs for simple motion applications. A wide range of control amplifiers is supported with the RSTi motion modules.

	ST-5641	ST-5642	ST-5651
Product Name	**1 Channel Pulse and Direction Output, 0.5 A/24 VDC, Source**	**2 Channel Pulse and Direction Output, 0.5 A/24 VDC, Source**	**1 Channel Pulse and Direction Output, RS-422**
Lifecycle Status	Active	Active	Active
Module Type	Motion Control	Motion Control	Motion Control
Drive Type	Pulse Output	Pulse Output	Pulse Output
Number of Axes	1	2	1
Diagnostic Supported	Short Protection	Short Protection	
Encoder Support	No	No	No
Load Current per Point	0.5 Amp/Ch, 1 Amp/All Channel, short protection	0.5 Amp/Ch, 2 Amp/All Channel, short protection	Max. 10 Amps
Output Inrush Current			
Frequency	1~20,000Hz±0.5% Continuous Pulse Output Max. +1~+32767: Pulse Direction Output OFF Max. -1~-32767: Pulse Direction Output ON.	1~20,000Hz±0.5% Continuous Pulse Output Max. +1~+32767: Pulse Direction Output OFF Max. -1~-32767: Pulse Direction Output ON.	5~20,000Hz±1.0% Continuous Pulse Output Max. +1~+32767: Pulse Direction Output OFF Max. -1~-32767: Pulse Direction Output ON.
Duty	50%±3.0% Fixed, Ton>5us, Toff>5us	50%±3.0% Fixed, Ton>5us, Toff>5us	50%±0.1% Fixed,Ton>10ns, Toff>10ns
Field Power Requirement	24 VDC (18 VDC to 28.8 VDC)	24 VDC (18 VDC to 28.8 VDC)	24 VDC (11 VDC to 28.8 VDC)
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	150 mA @ 5.0 VDC Maximum	150 mA @ 5.0 VDC Maximum	150 mA @ 5.0 VDC Maximum
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Power Modules

The RSTi provides various power modules to reduce wiring and simplify installation. Modules that support Smart Module ID will require one of the addresses on the bus.

The ST-7241 and ST-7641 enable multiple voltages to be supported on the RSTi bus such as 120 VAC. All modules to the right of the module will be based on the supply voltage of the ST-7x41.

The ST-7111 and ST-7511 boost the 5 VDC on the backplane bus when module power requirement is exceeded. The ST-7x11 supplies 1.0 Amps of 5 VDC to the modules to the right of the ST-7x11.

	ST-7008	ST-7408	ST-7108	ST-7508
Product Name	**Shield Signal Module, 8 channels**	**Shield Signal Smart Module, 8 channels**	**Common for 0 Volts Module, 8 channels**	**Common for 0 Volts Smart Module, 8 channels**
Lifecycle Status	Active	Active	Active	Active
Module Type	Power Modules	Power Modules	Power Modules	Power Modules
Smart Module (Uses Module ID)	No	Yes	No	Yes
Load Current per Point	Max. 10 Amps	Max. 10 Amps	Max. 10 Amps	Max. 10 Amps
LEDs	No	1 Green/Red LED, Module Status	No	1 Green/Red LED, Module Status
Diagnostic Supported	No	No	No	No
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	None	Max. 18 mA @ 5 VDC	None	Max. 18 mA @ 5 VDC
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Power Modules

The RSTi provides various power modules to reduce wiring and simplify installation. Modules that support Smart Module ID will require one of the addresses on the bus.

The ST-7241 and ST-7641 enable multiple voltages to be supported on the RSTi bus such as 120 VAC. All modules to the right of the module will be based on the supply voltage of the ST-7x41.

The ST-7111 and ST-7511 boost the 5 VDC on the backplane bus when module power requirement is exceeded. The ST-7x11 supplies 1.0 Amps of 5 VDC to the modules to the right of the ST-7x11.

	ST-7118	ST-7518	ST-7188	ST-7588
Product Name	**Common for 24 VDC Module, 8 channels**	**Common for 24 VDC Smart Module, 8 channels**	**Common for (4) 24 VDC Channels and (4) 0 VDC Channels**	**Common Smart Module for (4) 24 VDC Channels and (4) 0 VDC Channels**
Lifecycle Status	Active	Active	Active	Active
Module Type	Power Modules	Power Modules	Power Modules	Power Modules
Smart Module (Uses Module ID)	No	Yes	No	Yes
Load Current per Point	Max. 10 Amps	Max. 10 Amps	Max. 10 Amps	Max. 10 Amps
LEDs	No	1 Green/Red LED, Module Status	No	1 Green/Red LED, Module Status
Diagnostic Supported	No	No	No	No
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	None	Max. 18 mA @ 5 VDC	None	Max. 18 mA @ 5 VDC
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70



Power Modules

The RSTi provides various power modules to reduce wiring and simplify installation. Modules that support Smart Module ID will require one of the addresses on the bus.

The ST-7241 and ST-7641 enable multiple voltages to be supported on the RSTi bus such as 120 VAC. All modules to the right of the module will be based on the supply voltage of the ST-7x41.

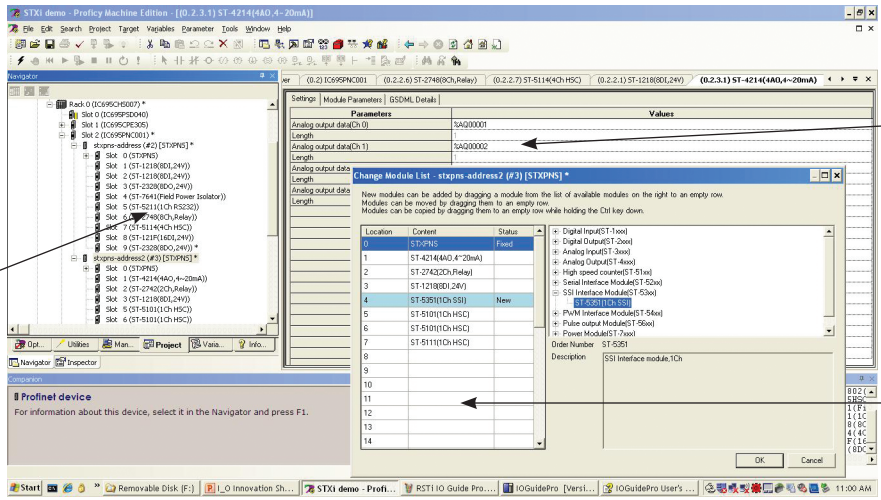
The ST-7111 and ST-7511 boost the 5 VDC on the backplane bus when module power requirement is exceeded. The ST-7x11 supplies 1.0 Amps of 5 VDC to the modules to the right of the ST-7x11.

	ST-7111	ST-7511	ST-7241	ST-7641
Product Name	**Bus Expansion Power Supply (Input 24 VDC, Output 1.0 Amp/5 VDC)**	**Bus Expansion Smart Power Supply (Input 24 VDC, Output 1.0 Amp/5 VDC)**	**Power Distribution (5 VDC, 24 VDC, 48 VDC, 110 VAC, 220 VAC)**	**Power Distribution Smart Module (5 VDC, 24 VDC, 48 VDC, 110 VAC, 220 VAC)**
Lifecycle Status	Active	Active	Active	Active
Module Type	Power Modules	Power Modules	Power Modules	Power Modules
Smart Module (Uses Module ID)	No	Yes	No	Yes
Load Current per Point	Max. 10 Amps	Max. 10 Amps	Max. 10 Amps	Max. 10 Amps
LEDs	Yes	1 Green/Red LED, Module Status	No	1 Green/Red LED, Module Status
Diagnostic Supported	No	No	No	No
Connector Type	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block	Spring Clamp Terminal Block
Internal Power Used (5 VDC loading)	1.0 Amp 5 VDC booster	Max. 14 mA @ 24 VDC	None	Max. 18 mA @ 5 VDC
Dimensions (H x W x D) in mm	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70	99 x 12 x 70

Powerful Configuration Tools

The RSTi is tightly integrated with GE Machine Edition. The user can easily select an I/O module and configure parameters. The configuration is stored in the folder and once download to the controller it is automatically loaded to the RSTi with a single point of connect.

RSTi modules are part of the controller hardware configuration

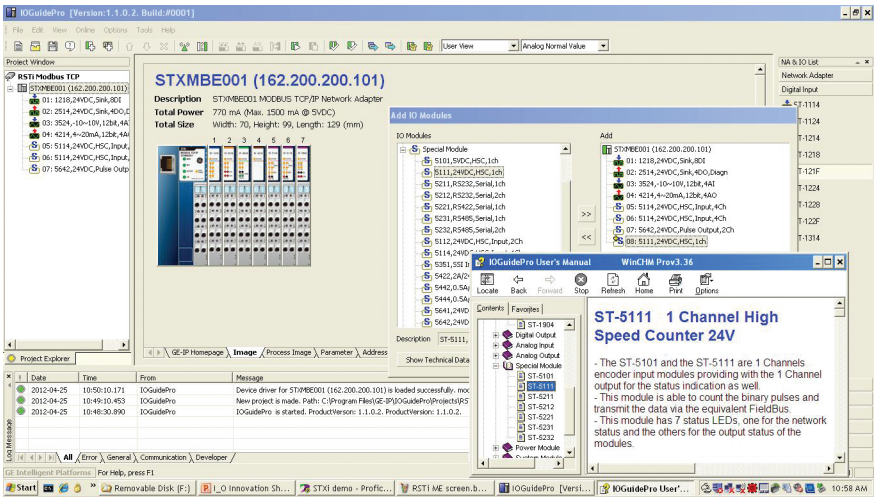


Data is easily mapped to reference memory or symbolic

Module pick list with part number and brief description

IO Guide Pro - Third Party Configuration Tool

The IO Guide Pro enables integrators network independence. I/O systems can be easily configured using the various RSTi network interfaces. Changing from Ethernet IP to PROFIBUS is as simple as a mouse click without impacting the rest of the I/O configuration. The tool provides technical data, address mapping, product image and bus loading.



Network Interface	Configuration Tool
PROFINET	Integrated into Machine Edition and also a GSDML file is available for other platforms
PROFIBUS DP/V1	IO Guide Pro software tool and GSD file
DeviceNet	IO Guide Pro software tool and EDS file
Modbus TCP	IO Guide Pro software tool
Modbus Serial	IO Guide Pro software tool
EtherCAT	IO Guide Pro software tool
Ethernet IP	IO Guide Pro software tool and EDS file
CANOpen	IO Guide Pro software tool and EDS file
CC-Link	CSP file

Accessories

Part Number	Description	Lifecycle Status
STXACC004	End Module, 7pcs (included with network interface)	Active
STXRTB009	Removable Terminal Block, 9pcs (included with modules)	Active
STXACC001	MARKER 100pcs (included with modules)	Active
STXACC002	BLANK MARKER 100pcs	Active

Expansion Cables

Part Number	Description	Lifecycle Status
STXCBL005	0.5 meter expansion cable for ST-5725 and ST-5726	Active
STXCBL010	1.0 meter expansion cable for ST-5725 and ST-5726	Active
STXCBL030	3.0 meter expansion cable for ST-5725 and ST-5726	Active

Starter Kits

Part Number	Description	Lifecycle Status
STXKITPNS001	PACSystems RSTi PROFINET Starter Kit, PROFINET RT Slave built-in switch, eight 24 VDC positive local inputs module, eight 24 VDC source outputs modules, four 4-20 mA current inputs module, two 4-20 mA current outputs module	Active

Examples of Typical Application

PROFINET Network Interface	with (20) 24 VDC Positive Logic inputs, (12) 24 VDC Source outputs 2 Amps and (8) Relay outputs.		
5 VDC RSTi Bus required (mA)	**Qty**	**Part Number**	**Description**
1500 mA of Provided	1	STXPNS001	PROFINET RT Network Adapter
35 mA x 3 = 105 mA	3	ST-1228	8 points, Negative Logic, Source Input module 12V/ 24 VDC
45 mA x 3 = 135 mA	3	ST-2624	4 points, Source, 24 VDC/ 2 A
150 mA	1	ST-2748	Isolated Relay Output 8 Points, 230 VAC/ 2 A
Total:	**5 VDC Current Required from Network Interface: 390 mA**		
	Total 1500 mA @ 5 VDC available from STXPNS001 PROFINET Network Adapter. Total I/O current requirement is 390 mA @ 5V. No 5 VDC booster required.		
PROFINET Network Interface	with (40) 24 VDC inputs, (20) 24 VDC Outputs with ESCP protection, (20) Relay outputs also (6) 4 to 20 mA Analog Inputs, (3) Type J Thermocouple, (4) 4 to 20 mA Analog Outputs, (14) 120 VAC Inputs and (8) 120 VAC Outputs		
1500 mA of Provided	1	STXPNS001	PROFINET RT Network Adapter
35 mA x 5 = 175 mA	5	ST-1228	8 points, Negative Logic, Source Input module 12V/ 24 VDC
60 mA x 3 = 180 mA	3	ST-2328	8 points output, Source, 24 VDC/ 0.5 A
150 mA x 3 = 450 mA	3	ST-2748	Isolated Relay Output 8 Points, 230 VAC/ 2 A
60 mA x 1 = 60 mA	1	ST-3218	Analog Input 8 Channels, 4~20 mA, 12 bit
120 mA x 1 = 120 mA	1	ST-3804	4 Channels, Thermocouple Connector Type
60 mA x 1 = 60 mA	1	ST-4214	Analog Out 4 Channels, 4~20 mA, 12 bit
18 mA x 1 = 18 mA	1	ST-7641*	Isolated Field Power Distribution 5, 24, 48, AC , 10 Amp with LED status
35 mA x 4 = 140 mA	4	ST-1804	4 points, 110 VAC (AC 85V ~ 132V) inputs
35 mA x 4 = 140 mA	4	ST-2852	Triac Output 2 points, 12V ~ 125 VAC/ 0.5 A
Total:	**5 VDC Current Required from Network Interface: 1343 mA** Modules occupy 23 of the 32 module addresses available		
	Total 1500 mA @ 5 VDC available from STXPNS001 PROFINET Network Adapter. Total I/O current requirement is 1343 mA @ 5V. No 5 VDC booster required.		

*ST-7641 is required for providing AC bus power to the ST-1804 and ST-2852. All bus power to the right of the ST-7641 will be AC.

VersaMax Control

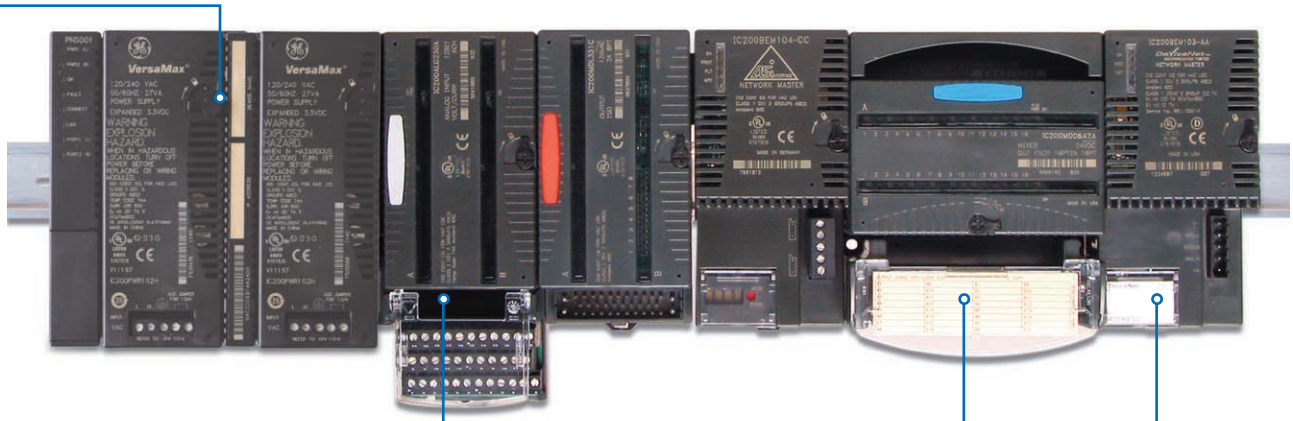
By choosing GE, customers gain access to a complete line of highly versatile and robust I/O modules that offer seamless integration with the PACSystems control family, for reliable, high performance solutions.

The modular design of VersaMax I/O addresses a wide range of discrete and process applications. Its innovative modular architecture combines power and versatility to help provide performance in a compact control solution.

The VersaMax PROFINET network interface provides integrated I/O to PACSystems controllers in both copper and fiber interface. Ideal for any remote I/O application, the PROFINET interface supports ring topology, which permits a node to go down or break without transmission interruption.

Equipment builders are continuously looking for ways to improve the performance of their equipment while augmenting usability and reducing size and complexity. These requirements extend to the I/O that they use. GE's I/O solutions provide the high performance control solutions with best-in-class integration of distributed (networked) I/O to meet these demanding applications.

Power Supplies pages 1.xx-1.xx



CPUs pages 1.xx

Analog I/O Modules pages 1.xx-1.xx

Discrete I/O Modules pages 1.xx-1.xx

Network Interface Modules page 1.xx

Carriers pages 1.xx-1.xx

I/O Interposing Bases pages 1.xx-1.xx

Expansion Modules page 1.xx

RTD and Thermocouple Modules page 1.xx

Specialty Modules page 1.xx

Remote I/O Units pages 1.xx-1.xx

Serial Communications page 1.xx

Accessories page 1.xx

Configuration Guidelines pages 1.xx-1.xx

Publication Reference Chart

GFK-1179	Installation Requirements for Conformance to Standards
GFK-1503	VersaMax PLC User's Manual
GFK-1504	VersaMax Modules, Power Supplies, and Carriers User's Manual
GFK-1533	VersaMax System DeviceNet Communications Modules User's Manual
GFK-1534	VersaMax System PROFIBUS Network Modules User's Manual
GFK-1535	VersaMax System Genius Network Interface Unit User's Manual
GFK-1563	VersaMax I/O and Industrial Networking Application Guide
GFK-1697	VersaMax System AS-i Network Master Module User's Manual
GFK-1847	Remote I/O Manager User's Manual
GFK-1852	VersaMax Serial to Ethernet Adapter User's Manual
GFK-1860	VersaMax System Ethernet Network Interface Unit User's Manual
GFK-1868	Machine Edition Getting Started Guide
GFK-1876	VersaMax Ethernet Station Manager Manual
IC690CDU002	InfoLink for PLC CD-ROM



CPUs

VersaMax CPUs supply a number of features usually found only in PLCs with larger footprints, including up to 128K of memory for application programs, floating point math, and real-time clock. With a modular and scalable architecture, the VersaMax CPU is ideal for standalone control applications with up to 256 local I/O or expanded systems of up to 4,096 I/O points.

	IC200CPU001	IC200CPU002	IC200CPU005	IC200CPUE05
Product Name	**VersaMax PLC CPU 32K Configurable Memory, 2 Ports RS-232 and RS-485**	**VersaMax PLC CPU 42K Configurable Memory, 2 Ports RS-232 and RS-485**	**VersaMax PLC CPU 128K Configurable User Memory, 2 Ports RS-232 and RS-485**	**VersaMax PLC CPU 128K Configurable User Memory, 2 Ports RS-232 and RS-485, 10 MBIT Ethernet Port. Supports EGD and SRTP.**
Lifecycle Status	Active	Active	Active	Active
I/O Discrete Points	2048 in, 2048 out	2048 in, 2048 out	2048 in, 2048 out	2048 in, 2048 out
I/O Analog Words	Configurable	Configurable	Configurable	Configurable
Registers	Configurable	Configurable	Configurable	Configurable
Discrete Internal Bits	1024 points	1024 points	1024 points	1024 points
Discrete Temporary Bits	256 points	256 points	256 points	256 points
Global Discrete Bits	1280 points	1280 points	1280 points	1280 points
Program Memory	Configurable	Configurable	Configurable	Configurable
Boolean Execution Speed	1.8 ms/K (typical)	1.8 ms/K (typical)	0.8 ms/K (typical)	0.8 ms/K (typical)
Floating Points	Yes	Yes	Yes	Yes
Override	Yes	Yes	Yes	Yes
Built-in Communications	SNP Slave, RTU Master and Slave, Serial I/O	SNP Slave, RTU Master and Slave, Serial I/O	SNP Slave, RTU Master and Slave, Serial I/O	10 MBIT Ethernet Port, Slave, RTU Master and Slave, Serial I/O
Type of Memory Storage	System flash, battery-backed RAM	System flash, battery-backed RAM	System flash, battery-backed RAM	System flash, battery-backed RAM
Battery-Backed Real-time Clock	Yes	Yes	Yes	Yes
5V Backplane Current Consumption (mA)	40 with no EZ Store attached; 140 when EZ Store attached	40 with no EZ Store attached; 140 when EZ Store attached	80 with no EZ Store attached; 180 when EZ Store attached	160 with no EZ Store attached; 260 when EZ Store attached
3.3V Backplane Current Consumption (mA)	100	100	290 (Requires a power supply with 3.3 VDC expanded)	650 (Requires a power supply with 3.3 VDC expanded)
Dimensions (W x H)	2.63" (66.8 mm) x 5.04" (128 mm)	2.63" (66.8 mm) x 5.04" (128 mm)	4.20" (106.7 mm) x 5.04" (128 mm)	4.95" (126 mm) x 5.04" (128 mm)



Carriers

VersaMax provides several types of snap-together I/O carriers and interposing terminals to provide maximum wiring flexibility, as well as module hot insertion and removal. VersaMax carriers support IEC box-style, spring-style, and barrier-style terminals and are also available as snap-on auxiliary terminal strips and interposing terminals that can be mounted separately and connected to a connector-style carrier by an I/O cable.

	IC200CHS022	IC200CHS025
Product Name	**VersaMax Compact I/O Carrier, Local Box Clamp Connection Style**	**VersaMax Compact I/O Carrier, Local Spring Clamp Connection Style**
Lifecycle Status	Active	Active
Field Termination Type	Integrated	Integrated
Wiring Termination Style	Local Box	Local Spring
Orientation on Module on Base	Vertical	Vertical
Dimensions (W x H x D)	66.8 mm (2.63 in) x 163.5 mm (6.45 in) x 70 mm (2.75 in), not including the height of DIN-rail	66.8 mm (2.63 in) x 163.5 mm (6.45 in) x 70 mm (2.75 in), not including the height of DIN-rail
Cables	N/A	N/A



Carriers

VersaMax provides several types of snap-together I/O carriers and interposing terminals to provide maximum wiring flexibility, as well as module hot insertion and removal. VersaMax carriers support IEC box-style, spring-style, and barrier-style terminals and are also available as snap-on auxiliary terminal strips and interposing terminals that can be mounted separately and connected to a connector-style carrier by an I/O cable.

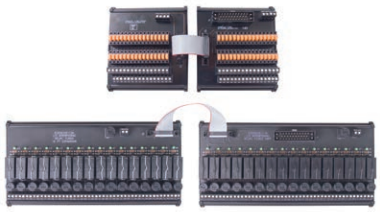
	IC200CHS001	IC200CHS002	IC200CHS005
Product Name	**VersaMax I/O Carrier, Local Barrier Style**	**VersaMax I/O Carrier, Local Box Style**	**VersaMax I/O Carrier, Local Spring Clamp Connection Style**
Lifecycle Status	Active	Active	Active
Field Termination Type	Integrated	Integrated	Integrated
Wiring Termination Style	Barrier	Box	Spring
Orientation on Module on Base	Horizontal	Horizontal	Horizontal
Dimensions (W x H x D)	110.5 mm (4.35 in) x 139.7 mm (5.5 in) x 70 mm (2.75 in), not including the height of DIN-rail	110.5 mm (4.35 in) x 139.7 mm (5.5 in) x 70 mm (2.75 in), not including the height of DIN-rail	110.5 mm (4.35 in) x 139.7 mm (5.5 in) x 70 mm (2.75 in), not including the height of DIN-rail
Cables	N/A	N/A	N/A



Carriers

VersaMax provides several types of snap-together I/O carriers and interposing terminals to provide maximum wiring flexibility, as well as module hot insertion and removal. VersaMax carriers support IEC box-style, spring-style, and barrier-style terminals and are also available as snap-on auxiliary terminal strips and interposing terminals that can be mounted separately and connected to a connector-style carrier by an I/O cable.

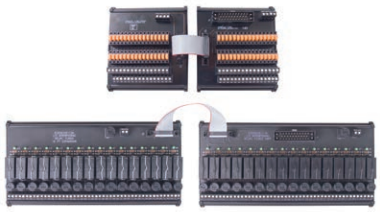
	IC200CHS003	IC200CHS011	IC200CHS012	IC200CHS014	IC200CHS015
Product Name	**VersaMax I/O Carrier, VersaMax I/O Carrier, Connector Style. Interposing Barrier A connecting cable Style (Requires (IC200CBL1xxx) and IC200CHS003 base interposing base (IC200CHS011, and connecting CHS012, CHS014, CHS015, cable IC200CBL1xxx) IC200CHS1xx or IC200CHS2xx) are required. This carrier can be used with all VersaMax I/O modules EXCEPT the following, due to their high isolation requirements: IC200MDL144 Input 240 VAC 4 Point Isolated Module; IC200MDL244 Input 240 VAC 8 Point Isolated Module; IC200MDD850 Mixed 240 VAC Isolated 4 Point / Output Relay 2.0A Isolated 8 Point Module**	**VersaMax I/O Carrier, Interposing Box Style (Requires IC200CHS003 base and connecting cable IC200CBL1xxx)**	**VersaMax I/O Carrier, Interposing Box Thermocouple Compensation (Requires IC200CHS003 base and connecting cable IC200CBL1xxx)**	**VersaMax I/O Carrier, Interposing Spring Clamp (Requires IC200CHS003 base and connecting cable IC200CBL1xxx)**	**VersaMax I/O Carrier, Interposing Spring Clamp (Requires IC200CHS003 base and connecting cable IC200CBL1xxx)**
Lifecycle Status	Active	Active	Active	Active	Active
Field Termination Type	Integrated	Non-Integrated	Non-Integrated	Integrated	Non-Integrated
Wiring Termination Style	Connector	Barrier	Box	Box-Thermocouple Compensation	Spring
Orientation on Module on Base	Vertical	N/A	N/A	N/A	N/A
Dimensions (W x H x D)	66.8 mm (2.63 in) x 133.4 mm (5.25 in) x 70 mm (2.75 in), not including the height of DIN-rail	110.5 mm (4.35 in) x 105.4 mm (2.63 in) x 70 mm (2.75 in), not including the height of DIN-rail	110.5 mm (4.35 in) x 105.4 mm (2.63 in) x 70 mm (2.75 in), not including the height of DIN-rail	110.5 mm (4.35 in) x 105.4 mm (2.63 in) x 70 mm (2.75 in), not including the height of DIN-rail	110.5 mm (4.35 in) x 105.4 mm (2.63in) x 70 mm (2.75 in), not including the height of DIN-rail
Cables	Requires a IC200CBL1xxx cable	Requires a IC200CBL1xxx cable	Requires a IC200CBL1xxx cable	Requires a IC200CBL1xxx cable	Requires a IC200CBL1xxx cable



I/O Interposing Bases

VersaMax I/O interposing disconnect bases enable the IC200CHS003 to connect to a wide range of termination bases. The Relay bases provide additional protection and higher amperage outputs. The Disconnect bases enables the user to easily disconnect signals, on a per point bases, from the I/O module.

	IC200CHS003	IC200CHS101	IC200CHS102	IC200CHS111
Product Name	**VersaMax I/O Carrier, Connector Style. A connecting cable (IC200CBL1xxx) and interposing base (IC200CHS011, CHS012, CHS014, CHS015, IC200CHS1xx or IC200CHS2xx) are required. This carrier can be used with all VersaMax I/O modules EXCEPT the following, due to their high isolation requirements: IC200MDL144 Input 240 VAC 4 Point Isolated Module; IC200MDL244 Input 240 VAC 8 Point Isolated Module; IC200MDD850 Mixed 240 VAC Isolated 4 Point / Output Relay 2.0A Isolated 8 Point Module**	**Input or Output Interposing Disconnect Style 16 Points. The base has an individual knife-switch disconnect for each signal and common terminal and its corresponding pin on the VersaMax cable connector. Requires IC200CHS003 and a connecting cable IC200CBL1xxx.**	**Expansion Input or Output Interposing Disconnect Style 16 Points. The base has an individual knife-switch disconnect for each signal and common terminal and its corresponding pin on the VersaMax cable connector. Requires a IC200CHS101 main base, can not be directly connected to IC200CHS003.**	**I/O Interposing Relay Base (replaceable relays), fused (8 amps, replaceable), 16 points. The relays on these interposing terminals are intended to be controlled with standard 24 VDC 0.5A VersaMax output modules (IC200MDL740 and IC200MDL750 using IC200CHS003 base and connected by IC200CBL1xxx).**
Lifecycle Status	Active	Active	Active	Active
Field Termination Type	Integrated	Non-Integrated	Non-Integrated	Non-Integrated
Wiring Termination Style	Connector	Box	Box	Box
Removable Terminals Connectors	N/A	No	No	No
Input Voltage	N/A	All discrete modules supported except MDL144, 244, 331, 730 and MDD840, 843, 850.	All discrete modules supported except MDL144, 244, 331, 730 and MDD840, 843, 850.	24 VDC from MDL740 and MDL750
Output Voltage	N/A	All discrete modules supported except MDL144, 244, 331, 730 and MDD840, 843, 850.	All discrete modules supported except MDL144, 244, 331, 730 and MDD840, 843, 850.	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Load Current per Point	N/A	N/A	N/A	8.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC (Replaceable Fuse)
Protection	N/A	N/A	N/A	Replaceable Fuse
Points per Common	N/A	N/A	N/A	Isolated Per Point
Dimensions (W x H x D)	66.8 mm (2.63 in) x 133.4 mm (5.25 in) x 70 mm (2.75 in), not including the height of the DIN-rail	115 mm (4.5 in) x 126 mm (4.95 in) x 65 mm (2.6 in), not including the height of the DIN-rail	115 mm (4.5 in) x 126 mm (4.95 in) x 65 mm (2.6 in), not including the height of the DIN-rail	253.7 mm (9.9 in) x 126 mm (4.95 in) x 73 mm (2.8 in), not including the height of the DIN-rail
Cables	Requires a IC200CBL1xxx cable	Requires a IC200CBL1xxx cable	N/A	Requires a IC200CBL1xxx cable



I/O Interposing Bases

VersaMax I/O interposing disconnect bases enable the IC200CHS003 to connect to a wide range of termination bases. The Relay bases provide additional protection and higher amperage outputs. The Disconnect bases enables the user to easily disconnect signals, on a per point bases, from the I/O module.

	IC200CHS112	IC200CHS211	IC200CHS212
Product Name	**I/O Interposing Relay Base (replaceable relays), fused (8 amps, replaceable), 16 points. The relays on these interposing terminals are intended to be controlled with standard 24 VDC 0.5A VersaMax output modules (IC200MDL740 and IC200MDL750 using IC200CHS003 base and connected by IC200CBL1xxx). Expansion base.**	**I/O Interposing Relay Base (replaceable relays), fused (8 amps, replaceable), 16 points. Field terminals are removable. The relays on these interposing terminals are intended to be controlled with standard 24 VDC 0.5A VersaMax output modules (IC200MDL740 and IC200MDL750 using IC200CHS003 base and connected by IC200CBL1xxx).**	**I/O Interposing Relay Base (replaceable relays), fused (8 amps, replaceable), 16 points. Field terminals are removable. The relays on these interposing terminals are intended to be controlled with standard 24 VDC 0.5A VersaMax output modules (IC200MDL740 and IC200MDL750 using IC200CHS003 base and connected by IC200CBL1xxx). Expansion base.**
Lifecycle Status	Active	Active	Active
Field Termination Type	Non-Integrated	Non-Integrated	Non-Integrated
Connection Style	Box	Box	Box
Removable Terminals Connectors	No	Yes	Yes
Input Voltage	24 VDC from MDL740 and MDL750	24 VDC from MDL740 and MDL750	24 VDC from MDL740 and MDL750
Output Voltage	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Load Current per Point	8.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC (Replaceable Fuse)	8.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC (Replaceable Fuse)	8.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC (Replaceable Fuse)
Protection	Replaceable Fuse	Replaceable Fuse	Replaceable Fuse
Points per Common	Isolated Per Point	Isolated Per Point	Isolated Per Point
Dimensions (W x H x D)	253.7 mm (9.9 in) x 126 mm (4.95 in) x 73 mm (2.8 in), not including the height of the DIN-rail	253.7 mm (9.9 in) x 126 mm (4.95 in) x 73 mm (2.8 in), not including the height of the DIN-rail	253.7 mm (9.9 in) x 126 mm (4.95 in) x 73 mm (2.8 in), not including the height of the DIN-rail
Cables	N/A	Requires a IC200CBL1xxx cable	N/A



Power Supplies

VersaMax Power Supply modules snap onto any VersaMax CPU or Network Interface Unit or onto a power supply booster carrier. Each power supply can be used as the main power source for modules in the I/O station, or as a source of supplemental power for larger I/O applications.

	IC200PWR001	IC200PWR002	IC200PWR011	IC200PWR012	IC200PWR101
Product Name	**24 VDC Power Supply**	**24 VDC Power Supply with Expanded 3.3 V**	**24VDC Isolated Power Supply**	**24VDC Isolated Power Supply with Expanded 3.3 V**	**120/240 VAC Power Supply**
Lifecycle Status	Active	Active	Active	Active	Active
Input Voltage	24 VDC	24 VDC	24 VDC	24 VDC	120/240 VAC
Output Voltage	5 VDC, 3.3 VDC	5 VDC, 3.3 VDC	5 VDC, 3.3 VDC	5 VDC, 3.3 VDC	5 VDC, 3.3 VDC
Extended Power	No	Yes	No	Yes	No
Input Power	11 W	11 W	11 W	11 W	27 VA
Isolated Power	No	No	Yes	Yes	N/A
Holdup Time	10 ms	10 ms	10 ms	10 ms	20 ms
Inrush Current	20 A @ 24 VDC; 25 A @ 30 VDC	20 A @ 24 VDC; 25 A @ 30 VDC	20 A @ 24 VDC; 25 A @ 30 VDC	20 A @ 24 VDC; 25 A @ 30 VDC	N/A
Protection	Short circuit, overload, reverse polarity	Short circuit, overload, reverse polarity	Short circuit, overload, reverse polarity	Short circuit, overload, reverse polarity	Short circuit, overload
Total Output Current	1.5 A maximum	1.5 A maximum	1.5 A maximum	1.5 A maximum	1.5 A maximum
3.3V Output Current	0.25 A maximum	1.0 A maximum	0.25 A maximum	1.0 A maximum	0.25 A maximum
5V Output Current	1.5 A minus the 3.3 V current used, maximum	1.5 A minus the 3.3 V current used, maximum	1.5 A minus the 3.3 V current used, maximum	1.5 A minus the 3.3 V current used, maximum	1.5 A minus the 3.3 V current used, maximum
Dimensions (W x H x D)	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail



Power Supplies

VersaMax Power Supply modules snap onto any VersaMax CPU or Network Interface Unit or onto a power supply booster carrier. Each power supply can be used as the main power source for modules in the I/O station, or as a source of supplemental power for larger I/O applications.

	IC200PWR102	IC200PWR201	IC200PWR202	IC200PWB001
Product Name	**120/240 VAC Power Supply with Expanded 3.3 VDC**	**12 VDC Power Supply**	**12 VDC Power Supply with Expanded 3.3 VDC**	**VersaMax Power Supply Booster Carrier. Supplies power to all modules to the right of booster. Requires power supply.**
Lifecycle Status	Active	Active	Active	Active
Input Voltage	120/240 VAC	9.6-15 VDC, 12 VDC nominal	9.6-15 VDC, 12 VDC nominal	N/A
Output Voltage	5 VDC, 3.3 VDC	5 VDC, 3.3 VDC	5 VDC, 3.3 VDC	N/A
Extended Power	Yes	No	Yes	N/A
Input Power	27 VA	11 W	11 W	N/A
Isolated Power	N/A	No	No	N/A
Holdup Time	20 ms	10 ms	10 ms	N/A
Inrush Current	N/A	25 A at 12 VDC; 30 A at 15 VDC	25 A at 12 VDC; 30 A at 15 VDC	N/A
Protection	Short circuit, overload	Short circuit, overload, reverse polarity	Short circuit, overload, reverse polarity	N/A
Total Output Current	1.5 A maximum	1.5 A maximum	1.5 A maximum	N/A
3.3V Output Current	1.0 A maximum	0.25 A maximum	1.0 A maximum	N/A
5V Output Current	1.5 A minus the 3.3 V current used, maximum	1.5 A minus the 3.3 V current used, maximum	1.5 A minus the 3.3 V current used, maximum	N/A
Dimensions (W x H x D)	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail	49 mm (1.93 in) x 133.4 mm (5.25 in) x 39 mm (1.54 in), not including the height of the carrier or the DIN-rail	66.8 mm (2.63 in) x 133.4 mm (5.25 in) x 70 mm (2.75 in), not including the height of DIN-rail



Discrete Mixed I/O Modules

Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Modules require a carrier base (IC200CHSxxx).

	IC200MDD840	IC200MDD842	IC200MDD843
Product Name	**VersaMax Discrete Mixed Modules, 24 VDC Pos Logic Input 20 points/ Output Relay 2.0 A, 12 points**	**VersaMax Discrete Mixed Modules 24 VDC Pos Logic Input 16/Output 24 VDC 0.5 A with ESCP**	**VersaMax Discrete Mixed Modules 24 VDC Positive Logic Input 10/Output Relay 6**
Lifecycle Status	Active	Active	Active
Input Voltage	24 VDC	24 VDC	24 VDC
Output Voltage	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	24 VDC	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Number of Points	20 in/12 out	16 in/16 out	10 in/6 out
Channel to Channel Isolation	No	No	No
Load Current per Point	2.0 A for 5-265 VAC, 2.0 A for 5-30 VDC	0.5 A for 30 VDC	2.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC
Input and Output Response Time- On/Off(ms)	0.5 and 10	0.5 and 0.5	0.5 and 10
Protection	No internal fuses or snubbers	Short circuit protection, overcurrent protection, free-wheeling diodes	No internal fuses or snubbers
On State Current	2.0-5.5 mA	2.0-5.5 mA	2.0-5.5 mA
Off State Current	0-0.5 mA	0-0.5 mA	0-0.5 mA
External Power Supply	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	18-30 VDC, 24 VDC nominal	0-125 VDC, 5/24/125 VDC nominal, 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Input Impedance	10 kOhms maximum	10 kOhms maximum	10 kOhms maximum
Load Current	2.0 A for 5-265 VAC or 5-30 VDC, 0.2 A for 31-125 VDC	0.5 Amp at 30 VDC maximum (resistive); 2.0 Amps maximum for 100ms inrush	10 mA per point minimum, 8.0 A maximum per module; 2.0 Amps for 5 to 265 VAC maximum (resistive); 2.0 Amps for 5 to 30 VDC maximum (resistive); 0.2 Amp for 31 to 125 VDC maximum (resistive)
5V Backplane Current Consumption (mA)	375 maximum	100 maximum	190 maximum
LED Indicators	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Mixed I/O Modules

Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Modules require a carrier base (IC200CHSxxx).

	IC200MDD844	IC200MDD845	IC200MDD846
Product Name	**VersaMax Discrete Mixed Modules 24 VDC Positive Logic Input 16/Output 24 VDC 0.5 A 16 points**	**VersaMax Discrete Mixed Modules 24 VDC Positive Logic Input 16/Output Relay 2.0A Isolated 8 points**	**VersaMax Discrete Mixed Modules 120 VAC Input 8 points/Outpoints Relay 2.0A Isolated 8 points**
Lifecycle Status	Active	Active	Active
Input Voltage	24 VDC	24 VDC	120 VAC
Output Voltage	24 VDC	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Number of Points	16 in/16 out	16 in/8 out	8 in/8 out
Channel to Channel Isolation	No	Yes, outputs	Yes, outputs
Load Current per Point	0.5 A for 30 VDC	2.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC	2.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC
Input and Output Response Time- On/Off(ms)	0.5 and 0.2 ON / 1.0 OFF	0.5 and 10	1 AC cycle minimum and 2 AC cycle (Hz dependent) maximum and 10.0 OFF
Protection	No internal fuses	No internal fuses or snubbers	No internal fuses or snubbers
On State Current	2.0-5.5 mA	2.0-5.5 mA	5 mA minimum
Off State Current	0-0.5 mA	0-0.5 mA	2.5 mA maximum
External Power Supply	18-30 VDC, 24 VDC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Input Impedance	10 kOhms maximum	10 kOhms maximum	8.6 kOhms (reactive) at 60 Hz, typical; 10.32 kOhms (reactive) at 50 Hz, typical
Load Current	0.5 Amp at 30 VDC maximum (resistive) 2.0 Amps maximum for 100ms inrush	10 mA per point minimum 2.0 A for 5 to 265 VAC maximum (resistive) 2.0 A for 5 to 30 VDC maximum (resistive) 0.2 A for 31 to 125 VDC maximum (resistive)	10 mA per point minimum 2.0 A for 5 to 265 VAC maximum (resistive) 2.0 A for 5 to 30 VDC maximum (resistive) 0.2 A for 31 to 125 VDC maximum (resistive)
5V Backplane Current Consumption (mA)	70 maximum	270 maximum	300 maximum
LED Indicators	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Mixed I/O Modules

Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Modules require a carrier base (IC200CHSxxx).

	IC200MDD847	IC200MDD848	IC200MDD849
Product Name	**VersaMax Discrete Mixed Modules 240 VAC Input 8 points/Output Relay 2.0A Isolated 8 points**	**VersaMax Discrete Mixed Modules 120 VAC Input 8 points/Output 120 VAC 0.5A Isolated 8 points**	**VersaMax Discrete Mixed Modules 120 VAC Input Isolated 8 points/Output Relay 2.0 A Isolated 8 points**
Lifecycle Status	Active	Active	Active
Input Voltage	240 VAC	120 VAC	0-132 VAC (47 to 63 Hz), 120 VAC nominal
Output Voltage	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	120 VAC	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Number of Points	8 in/8 out	8 in/8 out	8 in/8 out
Channel to Channel Isolation	Yes, outputs	Yes	Yes
Load Current per Point	2.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC	10 mA min, 0.5 A max., 5 A for 1 cycle (20 ms) max. inrush	2.0 A
Input and Output Response Time- On/Off(ms)	1 AC cycle minimum and 2 AC cycle (Hz dependent) maximum and 10.0 OFF	1 cycle/2 cycle and <1/2 cycle/<1/2 cycle	1 cycle/2 cycle and 10/10
Protection	No internal fuses or snubbers	Snubber and MOVs (each output)	No internal fuses or snubbers
On State Current	4 mA minimum	5 mA minimum	5 mA minimum
Off State Current	1.5 mA maximum	2.5 mA maximum	2.5 mA maximum
External Power Supply	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	N/A
Input Impedance	38.5 kOhms (reactive) at 60 Hz, typical; 46.3 kOhms (reactive) at 50 Hz, typical	8.6 kOhms (reactive) at 60 Hz, typical; 10.32 kOhms (reactive) at 50 Hz, typical	8.6 kOhms (reactive) at 60 Hz, typical; 10.32 kOhms (reactive) at 50 Hz, typical
Load Current	10 mA per point minimum 2.0 Amps for 5 to 265 VAC maximum (resistive) 2.0 Amps for 5 to 30 VDC maximum (resistive) 0.2 Amp for 31 to 125 VDC maximum (resistive)	10 mA minimum per point, 0.5 A maximum per point, 5.0 A for one cycle (20 ms) maximum inrush	10 mA per point minimum; 2.0 A for 5-265 VAC maximum (resistive); 2.0 A for 5-30 VDC maximum (resistive); 0.2 A for 31-125 VDC maximum (resistive)
5V Backplane Current Consumption (mA)	300 maximum	125 maximum	300 maximum
LED Indicators	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm 1.956 in), not including the height of (the carrier or the mating connectors

Discrete Mixed I/O Modules



Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Modules require a carrier base (IC200CHSxxx).

	IC200MDD850	IC200MDD851
Product Name	**VersaMax Discrete Mixed Modules 240 VAC Input Isolated 4 points/Output Relay 2.0 A Isolated 8 points**	**VersaMax Discrete Mixed Modules 5/12 VDC Input 16 points/Output 12/24 VDC 16 points**
Lifecycle Status	Active	Active
Input Voltage	0-264 VAC (47-63 Hz), 240 VAC nominal	0 to 15 VDC, +5/12 VDC nominal
Output Voltage	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	+10.2 to +30 VDC, +12/24 VDC nominal
Number of Points	8 out/4 in	16 out/16 in
Channel to Channel Isolation	Yes	No
Load Current per Point	2.0 A	0.5 Amps at 30 VDC maximum (resistive) 2.0 Amps maximum for 100ms inrush
Input and Output Response Time- On/Off(ms)	1 cycle/2 cycle and 10/10	0.25ms maximum/0.2ms ON and 1.0ms OFF maximum
Protection	No internal fuses or snubbers	No internal fuses or snubbers
On State Current	4 mA minimum	1.45 mA minimum
Off State Current	1.5 mA maximum	0 to 0.7 mA maximum
External Power Supply	N/A	+10.2 to +30 VDC, +12/24 VDC nominal
Input Impedance	38.5 kOhms (reactive) at 60 Hz, typical; 46.3 kOhms (reactive) at 50 Hz, typical	2.4kOhms typical @ 12 VDC
Load Current	10 mA per point minimum; 2.0 A for 5-265 VAC maximum (resistive); 2.0 A for 5-30 VDC maximum (resistive); 0.2 A for 31-125 VDC maximum (resistive)	0.5 Amps at 30 VDC maximum (resistive); 2.0 Amps maximum for 100ms inrush
5V Backplane Current Consumption (mA)	260 maximum	115 maximum
LED Indicators	One LED per point shows individual point on/off state logic side); OK LED indicates backplane power is present	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Input Modules

Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Modules require a carrier base (IC200CHSxxx).

	IC200MDL140	IC200MDL141	IC200MDL143
Product Name	**VersaMax Discrete Input Module 120 VAC, 8 points**	**VersaMax Discrete Input Module 240 VAC, 8 points**	**VersaMax Discrete Input Module 120 VAC Isolated, 8 points**
Lifecycle Status	Active	Active	Active
Input Voltage	0-132 VAC	0-264 VAC	0-132 VAC
Number of Points	8	8	8
Channel to Channel Isolation	No	No	Yes
Input and Output Response Time- On/Off (ms)	1 cycle/2 cycles	1 cycle/2 cycles	1 cycle/2 cycles
Points per Common	1 group of 8	1 group of 8	8 groups of 1
On State Current	5 mA minimum	7 mA minimum	5 mA minimum
Off State Current	2.5 mA maximum	1.5 mA maximum	2.5 mA maximum
Input Impedance	8.6 kOhms (reactive) at 60 Hz, typical; 10.32 kOhms (reactive) at 50 Hz, typical	38.5 kOhms (reactive) at 60 Hz, typical; 46.3 kOhms (reactive) at 50 Hz, typical	8.6 kOhms (reactive) at 60 Hz, typical; 10.32 kOhms (reactive) at 50 Hz, typical
5V Backplane Current Consumption (mA)	55 maximum	55 maximum	50 maximum
LED Indicators	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Input Modules

Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Modules require a carrier base (IC200CHSxxx).

	IC200MDL144	IC200MDL240	IC200MDL241
Product Name	**VersaMax Discrete Input Module 240 VAC Isolated, 4 points**	**VersaMax Discrete Input Module, 120 VAC Positive Logic, 16 points**	**VersaMax Discrete Input Module, 240 VAC Positive Logic, 16 points**
Lifecycle Status	Active	Active	Active
Input Voltage	0-264 VAC	0-132 VAC	0-264 VAC
Number of Points	4	16	16
Channel to Channel Isolation	Yes	No	No
Input and Output Response Time- On/Off (ms)	1 cycle/2 cycles	1 cycle/2 cycles	1 cycle/2 cycles
Points per Common	4 groups of 1	2 groups of 8	2 groups of 8
On State Current	7 mA minimum	5 mA minimum	4 mA minimum
Off State Current	3 mA maximum	2.5 mA maximum	1.5 mA maximum
Input Impedance	38.5 kOhms (reactive) at 60 Hz, typical; 46.3 kOhms (reactive) at 50 Hz, typical	8.6 kOhms (reactive) at 60 Hz, typical; 10.32 kOhms (reactive) at 50 Hz, typical	38.5 kOhms (reactive) at 60 Hz, typical; 46.3 kOhms (reactive) at 50 Hz, typical
5V Backplane Current Consumption (mA)	30 maximum	110 maximum	110 maximum
LED Indicators	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Input Modules

Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Modules require a carrier base (IC200CHSxxx).

	IC200MDL243	IC200MDL244	IC200MDL631
Product Name	**VersaMax Discrete Input Module, 120 VAC Isolated, 16 points**	**VersaMax Discrete Input Module, 240 VAC Isolated, 8 points**	**VersaMax Discrete Input Module 125 VDC, Pos/Neg Logic, Isolated, 8 points**
Lifecycle Status	Active	Active	Active
Input Voltage	0-132 VAC	0-264 VAC	0-150 VDC, 125 VDC nominal
Number of Points	16	8	8 isolated inputs
Channel to Channel Isolation	Yes	Yes	Yes
Input and Output Response Time- On/Off (ms)	1 cycle/2 cycles	1 cycle/2 cycles	0.5 maximum
Points per Common	16 groups of 1	8 groups of 1	8 groups of 1
On State Current	5 mA minimum	7 mA minimum	1.0 mA minimum
Off State Current	2.5 mA maximum	3 mA maximum	0 to 0.1 mA maximum
Input Impedance	8.6 kOhms (reactive) at 60 Hz, typical; 10.32 kOhms (reactive) at 50 Hz, typical	38.5 kOhms (reactive) at 60 Hz, typical; 46.3 kOhms (reactive) at 50 Hz, typical	74 K Ohm typical at 125 VDC
5V Backplane Current Consumption (mA)	100 maximum	60 maximum	40 maximum
LED Indicators	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Input Modules

Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Modules require a carrier base (IC200CHSxxx).

	IC200MDL632	IC200MDL635	IC200MDL636
Product Name	**VersaMax Discrete Input Module 125 VDC, Pos/Neg Logic, Isolated, 16 points**	**VersaMax Discrete Input Module 48 VDC, Pos/Neg Logic (2 Groups of 8), 16 points**	**VersaMax Discrete Input Module 48 VDC, Pos/Neg Logic (4 Groups of 8), 32 points**
Lifecycle Status	Active	Active	Active
Input Voltage	0-150 VDC, 125 VDC nominal	0-60 VDC, 48 VDC nominal	0-60 VDC, 48 VDC nominal
Number of Points	16 isolated inputs	16 inputs (2 groups of 8)	32 (4 groups of 8)
Channel to Channel Isolation	Yes	No	No
Input and Output Response Time- On/Off (ms)	0.5 maximum	0.5 maximum	0.5 maximum
Points per Common	16 groups of 1	2 groups of 8	4 groups of 8
On State Current	1.0 mA minimum	1.0 mA minimum	1.0 mA minimum
Off State Current	0 to 0.1 mA maximum	0 to 0.4 mA maximum	0 to 0.4 mA maximum
Input Impedance	74 K Ohm typical at 125 VDC	28 K Ohm typical	28 K Ohm typical
5V Backplane Current Consumption (mA)	80 maximum	70 maximum	140 maximum
LED Indicators	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Input Modules

Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Modules require a carrier base (IC200CHSxxx).

	IC200MDL640	IC200MDL643	IC200MDL644	IC200MDL650
Product Name	**VersaMax Discrete Input Module, 24 VDC Pos/Neg Logic, 16 points**	**VersaMax Discrete Input Module, 5/12 VDC (TTL) Pos/Neg Logic, 16 points**	**VersaMax Discrete Input Module, 5/12 VDC (TTL) Pos/Neg Logic, 32 points**	**VersaMax Discrete Input Module, 24 VDC Positive Logic, 32 points**
Lifecycle Status	Active	Active	Active	Active
Input Voltage	0-30 VDC	0-15 VDC	0-15 VDC	0-30 VDC
Number of Points	16	16	32	32
Channel to Channel Isolation	No	No	No	No
Input and Output Response Time- On/Off (ms)	0.5	0.25	0.25	0.5
Points per Common	2 groups of 8	2 groups of 8	4 groups of 8	2 groups of 8
On State Current	2.0-5.5 mA	1.45 mA minimum	1.45 mA minimum	2.0-5.5 mA
Off State Current	0-0.5 mA	0-0.7 mA maximum	0-0.7 mA maximum	0-0.5 mA
Input Impedance	10 kOhms maximum	2.4 kOhms at 12 VDC, typical	2.4 kOhms at 12 VDC, typical	10 kOhms maximum
5V Backplane Current Consumption (mA)	25 maximum	70 maximum	140 maximum	50 maximum
LED Indicators	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status. OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Output Modules

Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Modules require a carrier base (IC200CHSxxx).

	IC200MDL329	IC200MDL330	IC200MDL331
Product Name	**VersaMax Discrete Output Module, 120 VAC, 0.5A per point Isolated, 8 points**	**VersaMax Discrete Output Module, 120 VAC 0.5A per point Isolated, 16 points**	**VersaMax Discrete Output Module, 120 VAC 2.0A per point Isolated, 8 points**
Lifecycle Status	Active	Active	Active
Output Voltage	85-132 VAC (47-63 Hz), 120 VAC nominal	85-132 VAC (47-63 Hz), 120 VAC nominal	85-132 VAC (47-63 Hz), 120 VAC nominal
Number of Points	8	16	8
Channel to Channel Isolation	Yes	Yes	Yes
Load Current per Point	0.5 A per point	0.5 A per point	2.0 A per point
Input and Output Response Time- On/Off (ms)	<1/2 cycle/<1/2 cycle	<1/2 cycle/<1/2 cycle	<1/2 cycle/<1/2 cycle
Protection	Snubber and MOVs (each output)	Snubber and MOVs (each output)	Snubber and MOVs (each output)
Points per Common	8 groups of 1	Isolated points	Isolated points
External Power Supply	85-132 VAC (47-63 Hz), 120 VAC nominal	85-132 VAC (47-63 Hz), 120 VAC nominal	85-132 VAC (47-63 Hz), 120 VAC nominal
Load Current	10 mA minimum per point, 0.5 A maximum per point, 5.0 A for one cycle (20 ms) maximum inrush	10 mA minimum per point, 0.5 A maximum per point, 5.0 A for one cycle (20 ms) maximum inrush	10 mA minimum per point, 2.0 A maximum per point, 20 A for one cycle (20 ms) maximum inrush
5V Backplane Current Consumption (mA)	70 maximum	140 maximum	85 maximum
LED Indicators	One LED per point shows individual point ON/OFF status (logic side). OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status (logic side). OK LED indicates backplane power is present	One LED per point shows individual point ON/OFF status (logic side). OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Output Modules

Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Modules require a carrier base (IC200CHSxxx).

	IC200MDL730	IC200MDL740	IC200MDL741
Product Name	**VersaMax Discrete Output Module, 24 VDC Positive Logic 2.0A per point w/ESCP, 8 points**	**VersaMax Discrete Output Module, 24 VDC Positive Logic, 0.5A per point, 16 points**	**VersaMax Discrete Output Module, 24 VDC Positive Logic, 0.5A per point w/ESCP, 16 points**
Lifecycle Status	Active	Active	Active
Output Voltage	17.5-30 VDC, 24 VDC nominal	10.2-30 VDC, 12/24 VDC nominal	18-30 VDC, 24 VDC nominal
Number of Points	8	16	16
Channel to Channel Isolation	No	No	No
Load Current per Point	2.0 A per point	0.5 A per point	0.5 A per point
Input and Output Response Time- On/Off (ms)	0.5	0.2/1.0	0.5/0.5
Protection	Short circuit protection, overcurrent protection (each output)	No internal fuses (each output)	Short circuit protection, overcurrent protection, free-wheeling diodes (each output)
Points per Common	1 group of 8	1 group of 16	1 group of 16
External Power Supply	18-30 VDC, 24 VDC nominal	10.2-30 VDC, 12/24 VDC nominal	18-30 VDC, 24 VDC nominal
Load Current	2.0 A at 30 VDC maximum (resistive) per point, 8.0 A max. per module	0.5 A at 30 VDC maximum (resistive); 2.0 A inrush maximum for 100 ms	0.5 A at 30 VDC maximum (resistive); 2.0 A inrush maximum for 100 ms
5V Backplane Current Consumption (mA)	50 maximum	45 maximum	75 maximum
LED Indicators	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Output Modules

Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Modules require a carrier base (IC200CHSxxx).

	IC200MDL742	IC200MDL743	IC200MDL744
Product Name	**VersaMax Discrete Output Module, 24 VDC Positive Logic 0.5A with ESCP, 32 points**	**VersaMax Discrete Output Module, 5/12/24 VDC Negative Logic, 0.5 A per point (1 group of 16) 16 points**	**VersaMax Discrete Output Module, 5/12/24 VDC Negative Logic, 0.5 A per point (2 groups of 16) 32 points**
Lifecycle Status	Active	Active	Active
Output Voltage	18-30 VDC, 24 VDC nominal	5/12/24 VDC	5/12/24 VDC
Number of Points	32	16 (1 group of 16)	32 (2 groups of 16)
Channel to Channel Isolation	No	No	No
Load Current per Point	0.5 A per point	0.5 A per point	0.5 A per point
Input and Output Response Time- On/Off (ms)	0.5/0.5	0.2/1.0	0.2/1.0
Protection	Short circuit protection, overcurrent protection, free-wheeling diodes (each output)	No internal fuse	No internal fuse
Points per Common	2 groups of 16	1 group of 16	2 groups of 16
External Power Supply	18-30 VDC, 24 VDC nominal	4.75 to 5.25 VDC, 5 VDC nominal for 5 VDC-TTL mode; 10.2 to 30 VDC, 12/24 VDC nominal for 12/24 VDC mode	4.75 to 5.25 VDC, 5 VDC nominal for 5 VDC-TTL mode; 10.2 to 30 VDC, 12/24 VDC nominal for 12/24 VDC mode
Load Current	0.5 A at 30 VDC maximum (resistive); 2.0 A inrush maximum for 100 ms	25 mA maximum for 5 VDC-TTL mode, 0.5 A at 30 VDC maximum, 2.0 A inrush maximum for 100 ms for 12/24 VDC mode	25 mA maximum for 5 VDC-TTL mode, 0.5 A at 30 VDC maximum, 2.0 A inrush maximum for 100 ms for 12/24 VDC mode
5V Backplane Current Consumption (mA)	150 maximum	70 maximum	140 maximum
LED Indicators	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Discrete Output Modules

Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Modules require a carrier base (IC200CHSxxx).

	IC200MDL750	IC200MDL930	IC200MDL940
Product Name	**VersaMax Discrete Output Module, 24 VDC Positive Logic, 0.5A per point, 32 points**	**VersaMax Discrete Output Module, Relay 2.0 A per point Isolated Form A, 8 points**	**VersaMax Discrete Output Module, Relay 2.0 A per point Isolated Form A, 16 points**
Lifecycle Status	Active	Active	Active
Output Voltage	10.2-30 VDC, 12/24 VDC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Number of Points	32	8	16
Channel to Channel Isolation	No	Yes	Yes
Load Current per Point	0.5 A per point	2.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC	2.0 A for 5-265 VAC, 2.0 A for 5-30 VDC, 0.2 A for 31-125 VDC
Input and Output Response Time- On/Off (ms)	0.2/1.0	10.0/10.0	10.0/10.0
Protection	No internal fuses	No internal fuses or snubbers	No internal fuses or snubbers
Points per Common	2 groups of 16	Isolated points	Isolated points
External Power Supply	10.2-30 VDC, 12/24 VDC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal	0-125 VDC, 5/24/125 VDC nominal; 0-265 VAC (47-63 Hz), 120/240 VAC nominal
Load Current	0.5 A at 30 VDC maximum (resistive); 2.0 A inrush maximum for 100 ms	10 mA per point minimum; 2.0 A for 5-265 VAC maximum (resistive); 2.0 A for 5-30 VDC maximum (resistive); 0.2 A for 31-125 VDC maximum (resistive)	10 mA per point minimum; 2.0 A for 5-265 VAC maximum (resistive); 2.0 A for 5-30 VDC maximum (resistive); 0.2 A for 31-125 VDC maximum (resistive)
5V Backplane Current Consumption (mA)	90 maximum	245 maximum	490 maximum
LED Indicators	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	One LED per point shows individual point ON/OFF state (logic side). FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Analog Input Modules

Analog input modules receive signals from current and voltage input devices. Modules require a carrier base (IC200CHSxxx).

	IC200ALG230	IC200ALG240	IC200ALG260	IC200ALG261
Product Name	**VersaMax Analog Input Module, 12 Bit Voltage/Current, 4 Channels**	**VersaMax Analog Input Module, 16 Bit Voltage/Current Isolated, 8 Channel**	**VersaMax Analog Input Module, 12 Bit Voltage/Current, 8 Channel**	**VersaMax Analog Input Module, 15 Bit Differential Voltage, 8 Channel**
Lifecycle Status	Active	Active	Active	Active
Input Range	±10 VDC or 0-10 VDC	±10 VDC, 4-20 mA	4-20 mA, ±10 VDC or 0-10 VDC	±10 VDC
Number of Channels	4	8 Channel to channel isolated	8	8
External Power Supply	None	Range: 19.5-30 VDC including ripple; Current consumption: 100 mA maximum plus load currents	None	None
Resolution	Bipolar mode: 2.5 mV = 8 counts, Unipolar mode: 2.5 mV = 8 counts	Current mode: 381 nA nominal Voltage mode: 381 µV nominal	Current mode: 4 µA = 8 counts, Bipolar mode: 2.5 mV = 8 counts, Unipolar mode: 2.5 mV = 8 counts	Bipolar mode: 0.3125 mV = 1 counts
Update Rate	0.4 ms	Approximately 20 mS max. @ 50 Hz filter frequency Approximately 16.7 mS max. @ 60 Hz filter frequency	0.4 ms	7.5 ms
Accuracy at 25°C	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.1% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale
Input Impedance	Voltage mode: 126 kOhms maximum, Current mode: 200 Ohms maximum	N/A	Voltage mode: 126 kOhms maximum, Current mode: 200 Ohms maximum	Voltage mode: 100 kOhms maximum
Input Filter Response	5.0 ms	N/A	5.0 ms	N/A
5V Backplane Current Consumption (mA)	125 maximum	15 maximum	130 maximum	200 maximum
3.3V Backplane Current Consumption (mA)	N/A	120 maximum	N/A	N/A
LED Indicators	INT PWR LED indicates internally-generated field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates the presence of both logic power and user power. OK LED indicates module status.	INT PWR LED indicates internally-generated field power is present. OK LED indicates backplane power is present.	INT PWR LED indicates internally-generated field power is present. OK LED indicates backplane power is present.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Analog Input Modules

Analog input modules receive signals from current and voltage input devices. Modules require a carrier base (IC200CHSxxx).

	IC200ALG262	IC200ALG263	IC200ALG264
Product Name	**VersaMax Analog Input Module, 15 Bit Differential Current, 8 Channel**	**VersaMax Analog Input Module, 15 Bit Voltage, 15 Channel**	**VersaMax Analog Input Module, 15 Bit Current, 15 Channel**
Lifecycle Status	Active	Active	Active
Input Range	0 to 20 mA or 4 to 20 mA	±10 VDC	0 to 20 mA or 4 to 20 mA
Number of Channels	8	15	15
External Power Supply	None	None	None
Resolution	4 to 20 mA: 0.5micro Amp= 1 count; 0 to 20 mA: 0.625micro Amp = 1 count	Bipolar mode: 0.3125 mV = 1 count	4 to 20 mA: 0.5micro Amp= 1 count; 0 to 20 mA: 0.625micro Amp = 1 count
Update Rate	7.5 ms	7.5 ms	7.5 ms
Accuracy at 25°C	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale
Input Impedance	Current mode: 100 kOhms maximum	Voltage mode: 100 kOhms maximum	Voltage mode: 100 kOhms maximum, Current mode: 200 Ohms maximum
Input Filter Response	N/A	N/A	24 Hz ±20%
5V Backplane Current Consumption (mA)	200 maximum	150 maximum	100 maximum
3.3V Backplane Current Consumption (mA)	N/A	N/A	N/A
LED Indicators	INT PWR LED indicates internally-generated field power is present. OK LED indicates backplane power is present.	INT PWR LED indicates internally-generated field power is present. OK LED indicates backplane power is present.	INT PWR LED indicates internally-generated field power is present. OK LED indicates backplane power is present.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in) , not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in) , not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in) , not including the height of the carrier or the mating connectors

Analog Output Modules



Analog output modules provide voltage or current signals to analog output devices. Modules require a carrier base (IC200CHSxxx).

	IC200ALG320	IC200ALG321	IC200ALG322
Product Name	**VersaMax Analog Output Module, 12 Bit Current, 4 Channel**	**VersaMax Analog Output Module, 12 Bit 0-10V Voltage, 4 Channel**	**VersaMax Analog Output Module, 12 Bit ±10V Voltage, 4 Channel**
Lifecycle Status	Active	Active	Active
Output Range	4-20 mA	0-10 VDC	±10 VDC
Number of Channels	4	4	4
External Power Supply	Range: 18-30 VDC including ripple; Current consumption: 160 mA maximum including load current	Range: 18-30 VDC including ripple; Current consumption: 125 mA maximum	Range: 18-30 VDC including ripple; Current consumption: 125 mA maximum
Resolution	4 uA = 8 counts	2.5 mV = 8 counts	5 mV = 16 counts
Update Rate	0.3 ms maximum	0.3 ms maximum	0.3 ms maximum
Accuracy at 25°C	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale
5V Backplane Current Consumption (mA)	50 maximum	50 maximum	50 maximum
3.3V Backplane Current Consumption (mA)	N/A	N/A	N/A
LED Indicators	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors

Analog Output Modules



Analog output modules provide voltage or current signals to analog output devices. Modules require a carrier base (IC200CHSxxx).

	IC200ALG325	IC200ALG326	IC200ALG327	IC200ALG328	IC200ALG331
Product Name	**VersaMax Analog Output Module, 13 Bit ±10 VDC or 0 to 10 VDC Voltage, 8 Channel**	**VersaMax Analog Output Module, 13 Bit Current, 8 Channel**	**VersaMax Analog Output Module, 13 Bit ±10 VDC or 0 to 10 VDC Voltage, 12 Channel**	**VersaMax Analog Output Module, 13 Bit, 0 - 20 mA, 4-20 mA Current, 12 Channel**	**VersaMax Analog Output Module, 14 Bit Voltage/ Current 1500 VAC Isolation, 4 Channel**
Lifecycle Status	Active	Active	Active	Active	Active
Output Range	±10 VDC or 0 to 10 VDC	4 to 20 mA (default) 0 to 20 mA (configured with jumper)	±10 VDC or 0 to 10 VDC	4 to 20 mA (default) 0 to 20 mA (configured with jumper)	±10 VDC, 4-20 mA
Number of Channels	8	8	12	12 single ended, one group	4
External Power Supply	Range: 18-30 VDC including ripple; Current consumption: 102 mA maximum	Range: 18-30 VDC including ripple; 2A inrush maximum, 100 mA maximum (no load), 185 mA maximum (all 8 outputs at full scale)	Range: 18-30 VDC including ripple; Current consumption: 112 mA maximum	Range: 18-30 VDC including ripple; Current consumption: 2A inrush maximum 100 mA maximum (no load) 270 mA maximum (all 12 outputs at full scale)	Range: 19.5-30 VDC including ripple; Current consumption: 100 mA maximum plus load currents
Resolution	1.25 mV = 4 counts	4-20 mA: 5 counts = 2.5 uA (~12.7 bits) 0-20 mA: 4 counts = 2.5 uA (13 bits)	1.25 mV = 4 counts	4-20 mA: 5 counts = 2.5 uA (~12.7 bits) 0-20 mA: 4 counts = 2.5 uA (13 bits)	Current mode: 381 nA nominal Voltage mode: 381 µV nominal
Update Rate	15.0 ms maximum	15.0 ms maximum	10.0 ms maximum	15 ms maximum	7 ms maximum
Accuracy at 25¢XC	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% of full scale (typical), ±0.5% of full scale (max.) ±1% of full scale (max.)	±0.3% typical of full scale, ±0.5% maximum of full scale	+/- 0.3% of full scale (typical), +/- 0.5% of full scale (max.) +/-1% of full scale (max.)	±0.1% maximum of full scale
5V Backplane Current Consumption (mA)	50 maximum	50 maximum	50 maximum	50 maximum	10 maximum
3.3V Backplane Current Consumption (mA)	N/A	N/A	N/A	N/A	115 maximum
LED Indicators	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates the presence of both logic power and user power. OK LED indicates module status.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Analog Mixed Modules

Analog mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Modules require a carrier base (IC200CHSxxx).

	IC200ALG430	IC200ALG431	IC200ALG432
Product Name	**VersaMax Analog Mixed Module, 12 Bit Input Current 4 Channel/Output Current 2 Channel**	**VersaMax Analog Mixed Module, 12 Bit 0-10V Input 4 Channel/Output 0-10V 2 Channel**	**VersaMax Analog Mixed Module, 12 Bit ±10V Input 4 Channel/Output ±10V 2 Channel**
Lifecycle Status	Active	Active	Active
Input Range	4-20 mA	0-10 VDC	-10 to +10 VDC
Output Range	4-20 mA	0-10 VDC	-10 to +10 VDC
External Power Supply	Range: 18-30 VDC including ripple; Current consumption: 125 mA maximum	Range: 18-30 VDC including ripple; Current consumption: 125 mA maximum	Range: 18-30 VDC including ripple; Current consumption: 125 mA maximum
Resolution	4 uA = 8 counts	2.5 mV = 8 counts	Input: 2.5 mV = 8 counts, Output: 5 mV = 16 counts
Update Rate	0.3 ms maximum	0.3 ms maximum	0.3 ms maximum
Accuracy at 25°C	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale	±0.3% typical of full scale, ±0.5% maximum of full scale
Input Impedance	200 Ohms maximum	120 kOhms minimum	125 kOhms minimum
Input Filter Response	5.0 ms	5.0 ms	5.0 ms
LED Indicators	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.	FLD PWR LED indicates field power is present. OK LED indicates backplane power is present.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors

RTD and Thermocouple Modules



Specialty modules are available for RTD and Thermocouple inputs. Modules require a carrier base (IC200CHSxxx).).

	IC200ALG620	IC200ALG630
Product Name	**VersaMax Analog Input Module, 16 Bit RTD, 4 Channel**	**VersaMax Analog Input Module, 16 Bit Thermocouple, 7 Channel**
Lifecycle Status	Active	Active
Input Range	RTD types: 25, 100, and 1000 ohm platinum 10, 50, and 100 ohm copper 100 and 120 ohm nickel 604 ohms nickel/iron	Thermocouple types: J, K, T, S, R, none (used for mV inputs)
Number of Channels	4	7
Resolution	15 bits plus sign	15 bits plus sign
Update Rate	60 Hz: approximately 210 milliseconds per channel 50 Hz: approximately 230 milliseconds per channel	60 Hz: approximately 60 milliseconds per channel 50 Hz: approximately 70 milliseconds per channel
Accuracy at 25°C	on voltage measurement: ±0.15% on resistance measurement on temperature measurement: ±0.15% on RTD (temperature) measurement	on voltage measurement: ±0.2% on temperature measurement:±0.15%
5 V Backplane Current Consumption (mA)	125 maximum	125 maximum
3.3 V Backplane Current Consumption (mA)	125 maximum	125 maximum
LED Indicators	OK LED: green indicates backplane power is present. Amber indicates module fault.	OK LED: green indicates backplane power is present. Amber indicates module fault.
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Specialty Modules

Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed. Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states. Discrete mixed modules provide maximum flexibility by combining inputs and outputs in a single, compact module. Modules require a carrier base (IC200CHSxxx).

	IC200MDD841
Product Name	**VersaMax Discrete Mixed Modules 24VDC Pos Logic Input 20/Output 12/HSC, PWM or Pulse Train**
Lifecycle Status	Active
Input Voltage	24 VDC
Output Voltage	24 VDC
Number of Points	20 in/12 out/4 configurable
Channel to Channel Isolation	No
Inrush Current	2.0 A maximum for 100 ms
Input and Output Response Time- On/Off (ms)	7 and 0.5
Protection	No internal fuses
On State Current	3.0-8.0 mA
Off State Current	0-0.5 mA
External Power Supply	24 VDC nominal, 18-30 VDC
Input Impedance	9.6 kOhms maximum
Load Current	0.5 A maximum
5V Backplane Current Consumption (mA)	30
LED Indicators	One LED per point shows individual point on/off state (logic side); OK LED indicates backplane power is present
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors



Expansion Modules

Expansion Modules can be used to extend a VersaMax PLC or I/O station to include up to seven additional groups of up to eight modules each, providing the architectural flexibility to accommodate larger applications.

	IC200ERM001	IC200ERM002	IC200ETM001
Product Name	**Expansion Receiver Module, Isolated**	**Expansion Receiver Module, Non-Isolated**	**Bus Transmitter Expansion Module**
Lifecycle Status	Active	Active	Active
Expansion Type	Receiver	Receiver	Transmitter
Distance	Up to 2460 feet	Up to 50 feet	N/A
5 V Backplane Current Consumption (mA)	430	70	44
3.3 V Backplane Current Consumption (mA)	20	20	N/A
LED Indicators	PWR LED indicates 5 VDC power status; EXP RX LED indicates status of the expansion bus; SCAN indicates whether CPU/NIU is scanning I/O in expansion racks	PWR LED indicates 5 VDC power status; EXP RX LED indicates expansion bus communications status; SCAN indicates whether CPU/NIU is scanning I/O in expansion racks	PWR LED indicates 5 VDC power status; EXP TX LED indicates expansion bus communication status
Dimensions (W x H x D)	2.63 (66.8 mm) x 5.04 (128 mm) not including the height of power supply	2.63 (66.8 mm) x 5.04 (128 mm) not including the height of power supply	37 mm (1.45 in) x 5.04 (128 mm)



Remote I/O Units

A Remote I/O Unit connects VersaMax I/O modules to a host PLC or computer via a variety of networks. This makes it easy to include VersaMax I/O in the innovative PROFINET interface, as well as Genius, PROFIBUS-DP, DeviceNet, or other Ethernet installations. Together, the Remote I/O Unit and its modules form an I/O station capable of providing up to 256 points of I/O.

	IC200PNS001	IC200PNS002	IC200DBI001	IC200EBI001
Product Name	**Remote I/O PROFINET Network Interface Unit (Cooper Media) with built-in switch**	**Bus Transmitter Expansion Module (Fiber Media) with built-in switch**	**Remote I/O DeviceNet Network Interface Unit (Slave)**	**Remote I/O Ethernet Network Interface Unit**
Lifecycle Status	Active	Active	Active	Active
Protocol Supported	PROFINET Slave, Version 2.2 Class A IO-Device	PROFINET Slave, Version 2.2 Class A IO-Device	DeviceNet Slave	EGD and Modbus TCP Server
Distance	100 Meters max. drop length 10/100Mbaud	2 – 2,000 (Full-Duplex) 2 – 400 (Half-Duplex)	500Kbps 100m bus length and branches totaling < 39m 250Kbps 250m bus length and branches totaling < 78m 125Kbps 500m bus length and branches totaling < 156m	100 Meters max. drop length 10/100Mbaud
I/O Discrete Points	2880 bytes total 1440 bytes of input data 1440 bytes of output data	2880 bytes total 1440 bytes of input data 1440 bytes of output data	Includes both discrete and analog. Up to 128 bytes of inputs + 2-byte status word Up to 128 bytes of outputs + 2-byte control word.	1024 bytes maximum both discrete and analog. %I: 2048 points %Q: 2048 points
I/O Analog Words	2880 bytes total 1440 bytes of input data 1440 bytes of output data	2880 bytes total 1440 bytes of input data 1440 bytes of output data	Includes both discrete and analog. Up to 128 bytes of inputs + 2-byte status word Up to 128 bytes of outputs + 2-byte control word.	1024 bytes maximum both discrete and analog. %AI: 128 channels %AQ: 128 channels
I/O Data	N/A	N/A	Up to 128 bytes of inputs + 2-byte status word Up to 128 bytes of outputs + 2-byte control word.	256 Bytes of input, output, Analog input and Analog output
I/O Data Update Rate	Configurable: 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms, 128ms, 256ms and 512ms	Configurable: 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms, 128ms, 256ms and 512ms	N/A	N/A
Network Topology	Daisy-chain/line, star, or ring (redundant media) topology.	Daisy-chain/line, star, or ring (redundant media) topology.	Linear bus (trunkline/dropline); power and signal on the same network cable	Network dependent
Transmission Media	10/100BASE-T	Fiber 100BASE-FX	Shielded, dual twisted pair cable, terminated at both ends	Ethernet twisted pair
Connector	(2) RJ45 with built-in switch	(2) SC or SC-Duplex with built-in switch	5-pin open pluggable connector	RJ-45
User Diagnostic Data	32 input status bits and 32 output control bits	32 input status bits and 32 output control bits	2 bytes of status/control	4
Number of Modules	8 per NIU/station, not expandable	8 per NIU/station, not expandable	8 per NIU/station	8 per NIU/station
Redundancy	No	No	N/A	No
5V Backplane Current Consumption (mA)	3 Watts	5 Watts	160	175
3.3V Backplane Current Consumption (mA)	N/A	N/A	10	425
Dimensions (W x H x D)	134mm (5.28 in) x 132mm (5.2 in)	134mm (5.28 in) x 132mm (5.2 in)	133.4 mm (5.25 in) x 85.9 mm (3.38 in) not including the height of power supply	133.4 mm (5.25 in) x 85.9 mm (3.38 in) not including the height of power supply



Remote I/O Units

A Remote I/O Unit connects VersaMax I/O modules to a host PLC or computer via a variety of networks, which makes it easy to include VersaMax I/O in Genius, PROFIBUS-DP, DeviceNet, or Ethernet installations. Together, the Remote I/O Unit and its modules form an I/O station capable of providing up to 256 points of I/O.

	IC200GBI001	IC200PBI001
Product Name	**Genius Network Interface Unit**	**Remote I/O PROFIBUS-DP Network Interface Unit (Slave)**
Lifecycle Status	Active	Active
Protocol Supported	Genius	PROFIBUS DP
Distance	1372 to 2286 meters - 38.4 Kbaud supports a maximum of 16 devices. 1067 to 1372 meters 76.8 Kbaud supports a maximum of 32 devices. 609 to 1067 meters - 153. 6 Kbaud extended supports a maximum of 32 devices. Less than 609 meters 153.6 Kbaud standard or 153.6 Kbaud extended supports a maximum of 32 devices.	9.6Kbits - 1,200 meters 19.2Kbits - 1,200 meters 93.75Kbits - 1,200 meters 187.5Kbits - 600 meters 500Kbits - 400 meters 1.5Mbits - 200 meters 3Mbits; 6Mbits; 12Mbits - 100 meters
I/O Discrete Points	1024 Inputs and 1024 Outputs	375 bytes maximum. Up to 244 bytes of inputs or 244 bytes of outputs
I/O Analog Words	64 Analog In and 64 Analog Out	375 bytes maximum. Up to 244 bytes of inputs or 244 bytes of outputs
I/O Data	128 bytes in and 128 out per bus scan	375 bytes maximum. Up to 244 bytes of inputs or 244 bytes of outputs.
I/O Data Update Rate	N/A	N/A
Network Topology	Bus	Linear bus, terminated at both ends. Stubs are possible.
Transmission Media	Shielded, twisted pair, fiber optic (external option)	Shielded, twisted pair cable
Connector	Removable Connector	9-pin D-sub connector
User Diagnostic Data	Yes	2 bytes of status/control, 5 bytes of standard PROFIBUS diagnostics
Number of Modules	8 per NIU/station	8 per NIU/station
Redundancy	Full media and hardware redundancy supported	N/A
5V Backplane Current Consumption (mA)	250	250
3.3V Backplane Current Consumption (mA)	10	10
Dimensions (W x H x D)	133.4 mm (5.25 in) x 85.9 mm (3.38 in) not including the height of power supply	133.4 mm (5.25 in) x 85.9 mm (3.38 in) not including the height of power supply



Network Interface Modules

Network Interface Modules allow a VersaMax PLC to operate as a master or slave on a network. Modules currently available support DeviceNet master or slave communications and PROFIBUS-DP slave communications. An AS-i master communications is also available.

	IC200BEM002	IC200BEM003	IC200CHS006
Product Name	**PLC Network Communications PROFIBUS-DP (Slave). Requires IC200CHS006 Communications Carrier.**	**PLC Network Communications PROFIBUS-DP (Master). Requires IC200CHS006 Communications Carrier.**	**VersaMax I/O, Local Communications Carrier (Supports IC200BEMxxx Modules)**
Lifecycle Status	Active	Active	Active
Number of Stations	32 without repeaters; up to 125 with repeaters	125 PROFIBUS DP Slave devices	N/A
I/O Data	384 Bytes maximum; up to 244 bytes of inputs or 244 bytes of outputs	With a VersaMax CPUx05 CPU: A maximum of 3584 bytes of input data and 3584 bytes of output data With a VersaMax PROFINET Network Slave: A maximum of 1440 bytes of input data and 1440 bytes of output data With either CPU or PNS head end, a maximum of 244 bytes of input data and 244 bytes of output data for each slave.	N/A
Network Data Rate	9.6 Kbaud to 12 Mbaud	9.6 Kbaud to 12 Mbaud	N/A
Network Topology	Linear bus, terminated at both ends. Stubs are possible	Linear bus, terminated at both ends. Stubs are possible.	N/A
Transmission Media	Shielded, twisted pair cable	Shielded, twisted pair cable	N/A
Connector	9-pin D-sub connector	9-pin D-sub connector	N/A
Number of Nodes	N/A	N/A	N/A
User Diagnostic Data	N/A	Slave Status Bit Array Table, Firmware Module Revision, Slave Diagnostic Address	N/A
Power Consumption	460 mA maximum from 5 V output, 5 mA from +3.3 V output	450 mA maximum from 5 V output, 5 mA from +3.3 V output	N/A
Dimensions (W x H x D)	110 mm (4.3 in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	110 mm (4.3in) x 66.8 mm (2.63 in) x 50 mm (1.956 in), not including the height of the carrier or the mating connectors	66.8 mm (2.63 in) x 133.4 mm (5.25 in) x 70 mm (2.75 in), not including the height of DIN-rail



Serial Communications

The serial communications expansion module provides a Modbus Master port for a Genius NIU remote I/O drop. The serial port can be used to interface with a wide range of Modbus slave devices such as controllers, VFDs, bar code readers, marques and much more. The data is transferred to and from the NIU over the Genius LAN and is compatible with any controller that supports Genius Global Data.

	IC200CMM020
Product Name	**Modbus Master Module, 1 RS-485 port. Requires IC200CHS006 Communications Carrier.**
Lifecycle Status	Active
Module Type	Modbus Master
NIU Type Supported	Genius and PROFINET Slave
Number of Serial Communications Modules	Up to 2 per Genius NIU I/O Station
Number of RTU slaves per Serial Communications Module	1 to 247
Serial Port Type	RS-485. 15-pin subminiature 'D' connector. For RS-232 communications, an RS-485 to RS-232 adapter such as IC690ACC901 can be used. Adapter IC690ACC901 can be installed with its right-angle cable hanging down.RS-485 supports both 2-wire and 4-wire electrical interfaces
Baud Rate Supported	1200, 2400, 4800, 9600, and 19200, and half or full duplex operation
COMMREQ command memory (%AQ) required in the GENERIC_COMM module hardware configuration	Depends on individual COMMREQ content. Minimum: 22 words Maximum: 64 words
RTU Master Commands	65520, Initialize RTU Master Port 8000, Clear RTU Master Diag. Status 8001, Read RTU Master Diag. Status 8002, Send RTU Read/Force/Preset Query 8003, Send RTU Diagnostic Query
Power Consumption	460 mA maximum from 5 V output, 5 mA from +3.3 V output
Dimensions (W x H x D)	110mm (4.3in) x 66.8mm (2.63in) x 50mm (1.956 in), not including the height of the carrier or the mating connectors

Accessories

Part Number	Description	Lifecycle Status
IC200ACC001	Replacement Battery for VersaMax CPUs	Active
IC200ACC003	EZ Program Store, CPU RS-485 Port Update Device	Active
IC200ACC201	Expansion Terminator QTY 1	Active
IC200ACC202	Expansion Terminator QTY 2	Active
IC690ACC905	Encapsulated Thermistor Kit QTY 2	Active
IC200ACC301	I/O Filler Module	Active
IC200ACC302	I/O Input Simulator	Active
IC200ACC303	I/O Shorting Bar QTY 2	Active
IC200ACC304	Cable Connector Kit, QTY 2, for connector base (IC200CHS003) I/O Base (IC200CHS011, CHS012, CHS014, CHS015 and CHS1xx bases)	Active
IC200ACC313	DIN-rail clips (Qty 2) to secure modules on DIN-rail	Active
IC200TBM001	I/O Auxiliary Terminal Strip, 18 Internally Bussed, Barrier Style	Active
IC200TBM002	I/O Auxiliary Terminal Strip, 18 Internally Bussed, Box Style	Active
IC200TBM005	I/O Auxiliary Terminal Strip, 18 Internally Bussed, Spring Clamp Style	Active

Cables for Connector Type Carrier

Part Number	Description	Lifecycle Status
IC200CBL105	Cable, I/O Non-Shielded, 2 Connectors. 0.5M used with IC200CHS003 and IC200CHS011, 012, 015.	Active
IC200CBL110	Cable, I/O Non-Shielded, 2 Connectors, 1.0M used with IC200CHS003 and IC200CHS011, 012, 015.	Active
IC200CBL120	Cable, I/O Non-Shielded, 2 Connectors, 2.0M used with IC200CHS003 and IC200CHS011, 012, 015.	Active
IC200CBL230	Cable, I/O Non-Shielded, 1 Connector, 3.0M used with IC200CHS003 and IC200CHS011, 012, 015.	Active

Cables to Connect Rack to Rack Expansion

Part Number	Description	Lifecycle Status
IC200CBL600	Rack Expansion Cable, Shielded, Single Ended, 1M to One Expansion Receiver Module (IC200ERM00x)	Active
IC200CBL601	Rack Expansion Cable, Shielded, 2 Connectors, 1M. Supports Multidrop to Multiple Expansion Receiver Modules (IC200ERM00x)	Active
IC200CBL602	Rack Expansion Cable, Shielded, 2 Connectors, 2M. Supports Multidrop to Multiple Expansion Receiver Modules (IC200ERM00x)	Active
IC200ACC304	Cable Connector Kit, QTY 2, for connector base (IC200CHS003) I/O Base (IC200CHS011, CHS012, CHS014, CHS015 and CHS1xx bases)	Active

Starter Kits

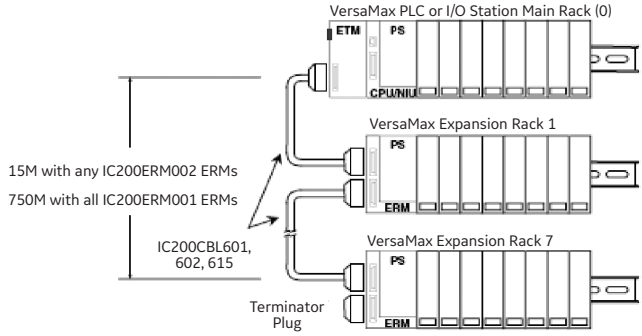
Part Number	Description		Lifecycle Status
IC200PKG001	PLC Starter Kit CPU001	Contains CPU001, PWR101, MDD845, CHS002, ACC302, CBL001, GFK-1503, GFK-1504, 641VPS300 (Infolink included), coffee mug, and plastic carry case. Does not include 24 VDC power supply for inputs.	Active
IC200PKG010	PLC Starter Kit CPUE05	Contains CPUE05, PWR101, MDD845, CHS002, ACC302, CBL001, GFK-1503, GFK-1504, Machine Edition (Infolink included), coffee mug, and plastic carry case. Does not include 24 VDC power supply for inputs.	Active
IC200PKG101	I/O Starter Kit GENIUS	Contains GBI001, PWR101, MDD845, CHS002, ACC302, CBL001, GFK-1535, GFK-1504, 690CDR002 (Infolink), coffee mug, and plastic carry case. Does not include 24 VDC power supply for inputs.	Active
IC200PKG102	I/O Starter Kit PROFIBUS-DP	Contains PBI001, PWR101, MDD845, CHS002, ACC302, CBL001, GFK-1534, GFK-1504, 690CDR002 (Infolink), coffee mug, and plastic carry case. Does not include 24 VDC power supply for inputs.	Active
IC200PKG103	I/O Starter Kit DeviceNet	Contains DBI001, PWR101, MDD845, CHS002, ACC302, CBL001, GFK-1533, GFK-1504, 690CDR002 (Infolink), coffee mug, and plastic carry case. Does not include 24 VDC power supply for inputs.	Active
IC200PKG104	I/O Starter Kit Ethernet	Contains EBI001, PWR101, MDD845, CHS002, ACC302, CBL001, GFK-1534, GFK-1504, Machine Edition (Infolink), coffee mug, and plastic carry case. Does not include 24 VDC power supply for inputs.	Active

Configuration Guidelines

When configuring a VersaMax Modular the following guidelines should be considered:

1. All I/O modules require an I/O Carrier (IC200CHS001, 002, 003, 005, 022 or 025).
2. When an I/O Connector Carrier (IC200CHS003) is selected, a cable (IC200CBL6xx) and interposing remote base (IC200CHS011, 012, 014 or 015) are required.
3. When configuring a system, the power consumptions should be tracked to determine what power supply and how many power supplies may be required.
4. DIN-rail clips should be used to secure the VersaMax modules (IC200ACC313).
5. A maximum of 8 carriers, any combination of I/O or communications, can be connected directly to either an NIU or CPU. (Power Supply Booster base is not counted as a carrier). CPUs and NIUs can be expanded beyond the 8 carriers using the Bus Transmitter Expansion (IC200ETM001) and up to 7 Expansion Receiver Modules (IC200ERM00x) for a total of 64 carrier modules.

For a multiple-rack expansion system, connect the cable from the expansion port on the Expansion Transmitter to the Expansion Receivers as shown below. If all the Expansion Receivers are the Isolated type (IC200ERM001), the maximum overall cable length is 750 meters. If the expansion bus includes any non-isolated Expansion Receivers (IC200ERM002), the maximum overall cable length is 15 meters.



Install the Terminator Plug (supplied with the Expansion Transmitter module) into the lower port on the last Expansion Receiver. Spare Terminator Plugs can be purchased separately as part number IC200ACC201 (Qty 2).

Examples of Typical Application

Configuration for Controller (Example application requiring (30) 24 VDC inputs and (10) Relay outputs AC power supply)

Power Supply Current Required (mA)	Qty	Part Number	Description
40@ 5 V and 100@ 3 V	1	IC200CPU001	VersaMax PLC CPU 32K Configurable Memory, 2 Ports RS-232 and RS-485
	1	IC200PWR101	VersaMax 120/240 VAC Power Supply (1.5 amps 5 V and 0.25 amps 3.3 V)
50 @ 5 V	1	IC200MDL650	VersaMax Discrete Input Module, 24 VDC Positive Logic, 32 points
490 @ 5 V	1	IC200MDL940	VersaMax Discrete Output Module, Relay 2.0 A per point Isolated Form A, 16 points
	2	IC200CHS022	VersaMax Compact I/O Carrier, Local Box Clamp Connection Style
	1	IC200ACC313	DIN-rail clips (Qty 2) to secure modules on DIN-rail
	1	IC646MPS101	Logic Developer - PLC Standard - w/Programming Cable
Total:	**580 @ 5 V and 100 @ 3 V (820 mA remaining). 1500 mA available for 5 V and 3.3 V.**		
Options to consider			
	1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
100 @ 5 V	1	IC200ACC003	EZ Program Store, CPU RS485 Port Update Device

Configuration for Controller (Application requiring 20K of Registers, (60) 24 VDC inputs, (15) AC Inputs, (12) AC Outputs and (20) Relay outputs also (16) Analog Inputs, (12) Isolated Analog Outputs and 24 VDC power supply. Also requires PROFIBUS Slave connection)

Power Supply Current Required	Qty	Part Number	Description
80 @ 5 V and 650 @ 3 V	1	IC200CPU005	VersaMax PLC CPU 128K Configurable User Memory, 2 Ports RS-232 and RS-485
	3	IC200PWR002	24 VDC Power Supply with Expanded 3.3 V (Logic side supply of 1.5 amps maximum. Up to 1.0 amp can be allocated for 3.3 V usage.)
100 @ 5 V	2	IC200MDL650	VersaMax Discrete Input Module, 24 VDC Positive Logic, 32 points
110 @ 5 V	1	IC200MDL240	VersaMax Discrete Input Module, 120 VAC Positive Logic, 16 points
170 @ 5 V	2	IC200MDL331	VersaMax Discrete Output Module, 120 VAC 2.0 A per point Isolated, 8 points
980 @ 5 V	2	IC200MDL940	VersaMax Discrete Output Module, Relay 2.0 A per point Isolated Form A, 16 points
400 @ 5 V	2	IC200ALG262	VersaMax Analog Input Module, 15 Bit Differential Current, 8 Channel
10 @ 5 V and 115 @ 3 V	2	IC200ALG331	VersaMax Analog Output Module, 14 Bit Voltage/Current 1500 VAC Isolation, 8 Channel
	11	IC200CHS022	VersaMax Compact I/O Carrier, Local Box Clamp Connection Style
460 @ 5 V and 5 @ 3 V	1	IC200BEM002	PLC Network Communications PROFIBUS-DP (Slave)
	1	IC200PWB001	VersaMax Power Supply Booster Carrier. Supplies power to all modules to the right of booster. Requires power supply.
		IC200CHS006	VersaMax I/O, Local Communications Carrier
44 @ 5 V	1	IC200ETM001	Bus Transmitter Expansion Module
70 @ 5 V and 20 @ 3 V	1	IC200ERM002	Expansion Receiver Module, Non-Isolated
	1	IC200CBL600	Cable Expansion Shielded Single Ended 1M
	1	IC200ACC313	DIN-rail clips (Qty 2) to secure modules on DIN-rail
	1	IC646MPS101	Logic Developer - PLC Standard - w/Programming Cable
Total:	**2424 @ 5 V and 790 @ 3 V Required. 4500 mA available for 5 V and 3.3 V. Power Supply to meet power requirements.**		

(continued on next page)

Options to consider			
	1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
	1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch DC
100 @ 5 V	1	IC200ACC003	EZ Program Store, CPU RS485 Port Update Device

Configuration for Controller Ethernet connectivity, (60) 24 VDC inputs, (20) Relay outputs, (16) Analog Inputs, (12) Thermocouples on a remote Ethernet drop, (12) Isolated Analog Outputs and 24 VDC power supply. Also requires Color TFT Operator Interface with Touch Screen.

Power Supply Current Required	Qty	Part Number	Description
160 @ 5 V and 650 @ 3 V	1	IC200CPUE05	VersaMax PLC CPU 128K Configurable User Memory, 2 Ports RS-232 and RS-485, 10 MBIT Ethernet Port. Supports SRTP and EGD.
	2	IC200PWR002	24 VDC Power Supply with Expanded 3.3 V (Logic side supply of 1.5 amps maximum. Up to 1.0 amp can be allocated for 3.3 V usage.)
	1	IC200PWB001	VersaMax Power Supply Booster Carrier. Supplies power to all modules to the right of booster. Requires power supply.
100 @ 5 V	2	IC200MDL650	VersaMax Discrete Input Module, 24 VDC Positive Logic, 32 points
980 @ 5 V	2	IC200MDL940	VersaMax Discrete Output Module, Relay 2.0 A per point Isolated Form A, 16 points
400 @ 5 V	2	IC200ALG262	VersaMax Analog Input Module, 15 Bit Differential Current, 8 Channel
10 @ 5 V and 115 @ 3 V	2	IC200ALG331	VersaMax Analog Output Module, 14 Bit Voltage/Current 1500 VAC Isolation, 8 Channel
	8	IC200CHS022	VersaMax Compact I/O Carrier, Local Box Clamp Connection Style
	2	IC200ACC313	DIN-rail clips (Qty 2) to secure modules on DIN-rail
	1	IC646MBT001	Logic Developer PLC Standard Edition and View for QuickPanel with 15 mos. of Proficy GlobalCare which is renewable on an annual basis.
	1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch DC
Total:	**1650 @ 5 V and 765 @ 3 V. 3000 mA available for 5 V and 3.3 V.**		

Ethernet Remote Drop			
175 @ 5 V and 425 @ 3 V	1	IC200ETM001	Bus Transmitter Expansion Module
	1	IC200PWR002	24 VDC Power Supply with Expanded 3.3 V (Logic side supply of 1.5 amps maximum. Up to 1.0 amp can be allocated for 3.3 V usage.)
250 @ 5 V and 250 @ 3 V	2	IC200ALG630	VersaMax Analog Input Module, 16 Bit Thermocouple, 7 Channel
	1	IC690ACC905	Encapsulated Thermistor Kit Qty 2
	2	IC200CHS022	VersaMax Compact I/O Carrier, Local Box Clamp Connection Style
	1	IC200ACC313	DIN-rail clips (Qty 2) to secure modules on DIN-rail
Total:	**2424 @ 5 V and 790 @ 3 V Required. 4500 mA available for 5 V and 3.3 V. Power Supply Booster required with extra Power Supply to meet power requirements.**		

Options to consider			
	1	IC690PWR124	24 VDC, 10 Amp Output Power and 120/230 VAC Input Power Power Supply
100 @ 5 V	1	IC200ACC003	EZ Program Store, CPU RS485 Port Update Device

VersaPoint I/O

The VersaPoint Distributed I/O system provides compact flexibility and allows users to install just the right amount of I/O needed for each application. Adhering to open communications standards including Ethernet, PROFIBUS-DP and DeviceNet™, VersaPoint connects easily to a wide variety of PLCs, DCSs and PC-based control systems. It is ideal for packaging and materials handling applications as well as for supervisory control and data acquisition.

VersaPoint accommodates a series of discrete and analog I/O modules with densities from 1 to 16 points. It also supports a host of specialized modules, from RTD and Thermocouple inputs to positioning and counter modules.

Its compact design results in space savings up to 50 percent compared to conventional systems. The modules snap quickly and securely onto a DIN-rail, and the integrated I/O terminals and internal power bus help reduce wiring by as much as 80 percent.

GE Machine Edition

GE Machine Edition is an advanced software environment for the development and maintenance of machine level automation. Visualization, motion control, and execution logic are developed with a single programmer.

Network Interface Module page 1.xxx

Power Terminals page 1.xxx

Segment Terminals page 1.xxx

Discrete Input Modules page 1.xxx

Discrete Output Modules pages 1.xxx-1.xxx

Analog Input Modules page 1.xxx

Analog Output Modules page 1.xxx

Motion Modules page 1.xxx

Motor Starter Modules page 1.xxx

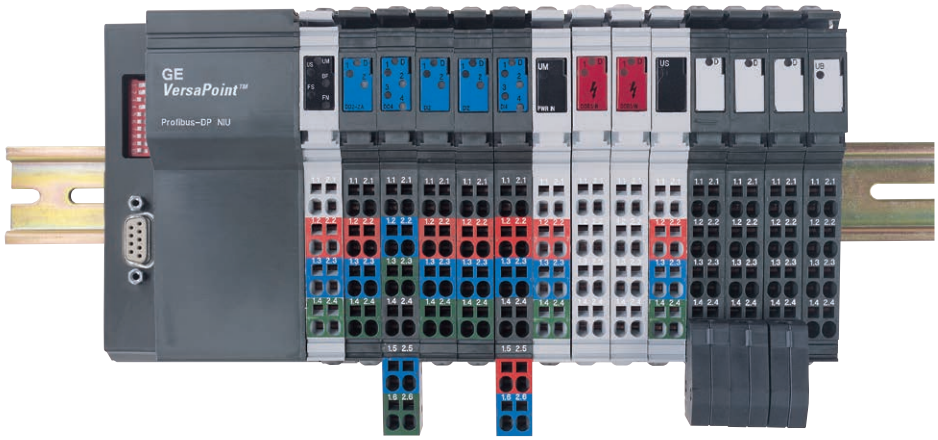
Serial Communications Modules page 1.xxx

Accessories and Cables page 1.xxx

Configuration Guidelines page 1.xxx

VersaSafe Machine Safety I/O page 1.xxx

VersaSafe Starter Kit page 1.xxx



Publication Reference Chart

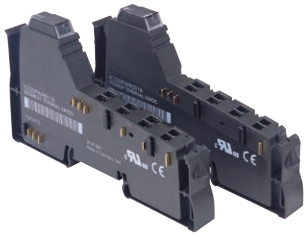
GFK-2134	VersaPoint Motor Starters Manual
GFK-2125	VersaPoint Positioning Modules Manual
GFK-1911	VersaPoint I/O System PROFIBUS-DP NIU
GFK-1912	VersaPoint I/O System DeviceNet NIU User's Manual
GFK-2087	VersaPoint Ethernet NIU (IC220EBI001 and IC220EBI002)



Network Interface Modules

An I/O Network Interface Unit connects VersaPoint I/O modules to a host PLC or computer via a variety of networks, which makes it easy to include VersaPoint I/O in PROFIBUS-DP, Ethernet or DeviceNet installations. Together, the NIU is capable of handling up to 63 modules in one node.

	IC220PNS001	IC220PNS002	IC220EBI001	IC220PBI002	IC220DBI001
Product Name	**Profinet Network Interface Unit with 2 Copper Ports**	**Profinet Network Interface Unit with 2 Fiber Ports**	**Ethernet TCP/IP Advanced Network Interface Unit - 10/100 Base-T(X) - PCP Support**	**PROFIBUS-DP Network Interface Unit**	**DeviceNet Network Interface Unit**
Lifecycle Status	Active	Active	Active	Active	Active
Protocol	PROFINET IO	PROFINET IO	Modbus TCP	PROFIBUS DP (V1)	DeviceNet Slave
Data Rate	100 Mbps	100 Mbps	10/100 Base-T(X)	Up to 12Mbits per second	Up to 500 Kbaud
Serial Communications Support	None	None	Yes	Yes	Yes
Firmware Upgrade	No	No	Yes	No	No
Nominal Power Input Voltage	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Power Voltage Range	19.2 - 30 VDC	19.2 - 30 VDC	19.2 - 30 VDC	19.2 - 30 VDC	19.2 - 30 VDC
Current for Local Bus UL	0.8 Amp	0.8 Amp	2 Amp	2 Amp	2 Amp
Current for Local Bus UA (ma)	500 mA	500 mA	500 mA	500 mA	500 mA
Maximum Supported Modules	63 (including on-board IO)	63 (including on-board IO)	63	63	63
Digital Inputs	8 @ 24 VDC	8 @ 24 VDC	-	-	-
Digital Outputs	4 @ 24VDC	4 @ 24VDC	-	-	-
Power In	8 Amp maximum	8 Amp maximum	8 Amp maximum	8 Amp maximum	8 Amp maximum
LED Indicators	Bus diagnostics and status indication of voltage	Bus diagnostics and status indication of voltage	Bus diagnostics and status indication of voltage	Bus diagnostics and status indication of voltage	Bus diagnostics and status indication of voltage
Numeric LCD Display	None	None	Yes	None	None
Web Support	None	None	Web Pages SNMP XML Data Monitoring	None	None
Required Terminal Strip	Included	Included	(1) IC220TBK082 (Contains 10 strips)	(1) IC220TBK087 (Contains 10 strips)	(1) IC220TBK201 (Contains 10 strips)
Dimensions (W x H x D)	80 mm x 119.8 mm x 71.5 mm (3.149 in. x 4.717 in. x 2.814 in.)	80 mm x 119.8 mm x 71.5 mm (3.149 in. x 4.717 in. x 2.814 in.)	90 mm x 72 mm x 116 mm (3.543 in. x 2.835 in. x 4.567 in.)	91 mm x 120 mm x 71.5 mm (2.874 in. x 4.724 in. x 2.795 in.)	48.8 mm x 120 mm x 71.5 mm (1.92 in. x 4.72 in. x 2.82 in.)



Power Terminals

Power Terminal modules supply power to the main circuit (UM). In addition, this module can be used to supply power for a segment circuit (Us).

	IC220PWR001	IC220PWR002	IC220PWR003	IC220PWR101	IC220PWR201
Product Name	**Power Terminal 24 VDC**	**Power Terminal Fused 24 VDC**	**Power Terminal Fused with Diagnostics 24 VDC**	**Power Terminal 120 VAC**	**Power Terminal 230 VAC**
Lifecycle Status	Active	Active	Active	Active	Active
Input Voltage	24 VDC	24 VDC	24 VDC	120 VAC	230 VAC
Input Voltage Range	19.2 - 30 VDC	19.2 - 30 VDC	19.2 - 30 VDC	108 -135 VAC	12 -253 VAC
Maximum Current	8 Amps	8 Amps	6.3 Amps	8 Amps	8 Amps
Overload/Short Circuit in Segment Circuit	No	Fuse	Fuse	No	No
Surge Voltage/Over Voltage	Yes, suppressor diode for voltage limitation	Yes, suppressor diode for voltage limitation	Yes, suppressor diode for voltage limitation	Yes, VAR 275 VAC	Yes, VAR 275 VAC
Polarity Reversal	Yes, diode connected in parallel as protection against polarity reversal	Yes, diode connected in parallel as protection against polarity reversal	Yes, diode connected in parallel as protection against polarity reversal	N/A	N/A
Current Consumption from Local Bus UL (mA)	N/A	N/A	25 mA, maximum	N/A	N/A
LED Indicators	24 VDC Voltage Present	24 VDC Voltage Present and Blown Fuse	Bus Diagnostics and Blown Fuse	120 VAC supply Present	230 VAC supply Present
Required Terminal Strip	(1) IC220TBK087 (Contains 10 strips)	(1) IC220TBK087 (Contains 10 strips)	(1) IC220TBK087 (Contains 10 strips)	(1) IC220TBK204	(1) IC220TBK204



Segment Terminals

Segment Terminals are used to create a partial circuit (segment circuit) within a main 24 VDC circuit.

	IC220PWR011	IC220PWR012	IC220PWR013	IC220PWR014
Product Name	**Segment Terminal 24 VDC**	**Segment Terminal Fused 24 VDC**	**Segment Terminal Fused with Diagnostics 24 VDC**	**Segment Terminal Electronic Fused 24 VDC**
Lifecycle Status	Active	Active	Active	Active
Input Voltage	24 VDC	24 VDC	24 VDC	24 VDC
Input Voltage Range	19.2 - 30 VDC	19.2 - 30 VDC	19.2 - 30 VDC	19.2 - 30 VDC
Maximum Current	8 Amps	8 Amps	6.3 Amps	8 Amps
Overload/Short Circuit in Main Circuit	No	6.3 Amp slow blow fuse	6.3 Amp slow blow fuse	Electronic Fuse
Surge Voltage/Over Voltage	Protective circuits of the power terminal	Protective circuits of the power terminal	Protective circuits of the power terminal	Protective circuits of the power terminal
Polarity Reversal	Protective circuits of the power terminal	Protective circuits of the power terminal	Protective circuits of the power terminal	Protective circuits of the power terminal
Current Consumption from Local Bus UL (mA)	N/A	N/A	25 mA, maximum	30 mA, maximum
LED Indicators	24 VDC Voltage Present	24 VDC Voltage Present and Blown Fuse	Bus Diagnostics and Blown Fuse	Bus Diagnostics and Blown Fuse
Required Terminal Strip	(1) IC220TBK087 (Contains 10 strips)	(1) IC220TBK087 (Contains 10 strips)	(1) IC220TBK087 (Contains 10 strips)	(1) IC220TBK087 (Contains 10 strips)



Discrete Input Modules

Discrete input modules receive signals from input devices such as sensors, pushbuttons, and switches that can have two states: on or off, open or closed.

	IC220MDL641	IC220MDL642	IC220MDL643	IC220MDL644	IC220MDL661
Product Name	**Input 24 VDC Positive Logic 2 Points**	**Input 24 VDC Positive Logic 4 Points**	**Input 24 VDC Positive Logic 8 Points**	**Input 24 VDC Positive Logic 16 Points**	**Input 24 VDC Negative Logic 2 Points**
Lifecycle Status	Active	Active	Active	Active	Active
Input Voltage	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC
Number of Points	2	4	8	16	2
Connection Style	2, 3, and 4 wire	2 and 3 wire	2, 3, and 4 wire	2 and 3 wire	2, 3, and 4 wire
Input Response Time	Less than 1 msec.	Less than 1 msec.	Less than 1 msec.	Less than 1 msec.	Less than 1 msec.
On State Current	5 mA	4 mA	5 mA	4 mA	5 mA
Off State Current	0.4 mA	0.4 mA	0.4 mA	0.4 mA	0.4 mA
Current Consumption for Local Bus UL (mA)	35 mA	40 mA	50 mA	60 mA	35 mA, maximum
Nominal Current Consumption of US	0.5 Amp max.	1.0 Amp max.	2.0 Amp max.	4.0 Amp max.	0.5 A (2 x 0.25 A), maximum
LED Indicators	Bus Diagnostics Status indication of inputs	Bus Diagnostics Status indication of inputs	Bus Diagnostics Status indication of inputs	Bus Diagnostics Status indication of inputs	Bus Diagnostics Status indication of inputs
Required Terminal Strip	(1) IC220TBK082 (Contains 10 strips)	(1) IC220TBK122 (Contains 10 strips)	(4) IC220TBK082 (Contains 10 strips)	(4) IC220TBK122 (Contains 10 strips)	(1) IC220TBK082 (Contains 10 strips)



Discrete Output Modules

Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states.

	IC220MDL751	IC220MDL721	IC220MDL752	IC220MDL753
Product Name	**Output 24 VDC Positive Logic 0.5 A 2 Points**	**Output 24 VDC Positive Logic 2.0 A 2 Points**	**Output 24 VDC Positive Logic 0.5 A 4 Points**	**Output 24 VDC Positive Logic 0.5 A 8 Points**
Lifecycle Status	Active	Active	Active	Active
Output Voltage	24 VDC	24 VDC	24 VDC	24 VDC
Number of Points	2	2	4	8
Connection Style	2, 3, and 4 wire	2, 3, and 4 wire	2 and 3 wire	2, 3, and 4 wire
Load Current per Point	0.5 A	2.0 A	0.5 A	0.5 A
Protection	Electronic Short Circuit, Overload Protection	Electronic Short Circuit, Overload Protection	Electronic Short Circuit, Overload Protection	Electronic Short Circuit, Overload Protection
Current Consumption from Local Bus UL (mA)	33 mA max.	35 mA max.	44 mA max.	60 mA max.
Nominal Current Consumption of US	1 Amp max.	4 Amp max.	2 Amp max.	4 Amp max.
LED Indicators	Bus Diagnostics Status indication of outputs	Bus Diagnostics Status indication of outputs	Bus Diagnostics Status indication of outputs	Bus Diagnostics Status indication of outputs
Required Terminal Strip	(1) IC220TBK082 (Contains 10 strips)	(1) IC220TBK082 (Contains 10 strips)	(1) IC220TBK123 (Contains 10 strips)	(4) IC220TBK082 (Contains 10 strips)



Discrete Output Modules

Discrete output modules send control signals to devices such as contactors, indicator lamps, and interposing relays that can also have two states.

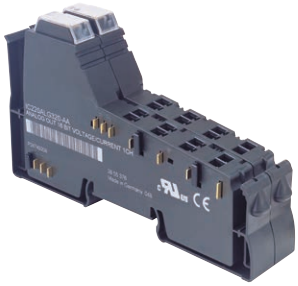
	IC220MDL754	IC220MDL761	IC220MDL930	IC220MDL940
Product Name	**Output 24 VDC Positive Logic 0.5 A 16 Points**	**Output 24 VDC Negative Logic 0.5 A 2 Points**	**Output Relay 3.0 A 1 Point**	**Output Relay 3.0 A 1 Point**
Lifecycle Status	Active	Active	Active	Active
Output Voltage	24 VDC	24 VDC	5 - 253 VAC	5 - 253 VAC
Number of Points	16	2	1	4
Connection Style	2 and 3 wire	2, 3, and 4 wire	2 and 3 wire	2 and 3 wire
Load Current per Point	0.5 A	0.5 A	3.0 A	3.0 A
Protection	Electronic Short Circuit, Overload Protection	Electronic Short Circuit, Overload Protection	N/A	N/A
Current Consumption from Local Bus UL (mA)	90 mA max.	32 mA max.	60 mA max.	187 mA max.
Nominal Current Consumption of US	8 Amp max.	1 Amp (2 x 0.5 A), maximum	N/A	N/A
LED Indicators	Bus Diagnostics Status indication of outputs	Bus Diagnostics Status indication of outputs	Bus Diagnostics Status indication of outputs	Bus Diagnostics Status indication of outputs
Required Terminal Strip	(4) IC220TBK123 (Contains 10 strips)	(1) IC220TBK082 (Contains 10 strips)	(1) IC220TBK085 (Contains 10 strips) Requires Relay Isolation Set (IC220ACC201 and IC220TBK206) if switching voltages are not available in the segment.	(1) IC220TBK085 (Contains 10 strips) Requires Relay Isolation Set (IC220ACC201 and IC220TBK206) if switching voltages are not available in the segment.



Analog Input Modules

Analog input modules receive signals from current and voltage input devices. Specialty modules are available for RTD and Thermocouple inputs.

	IC220ALG220	IC220ALG221	IC220ALG620	IC220ALG630
Product Name	**Analog In 15 Bit Voltage/ Current 2 Channels**	**Analog In 15 Bit Voltage/ Current 8 Channel**	**Analog In 16 Bit RTD 2 Channels**	**Analog In 16 Bit Thermocouple 2 Channels**
Lifecycle Status	Active	Active	Active	Active
Input Voltage	0 - 20 mA, 4 - 20 mA, ±20 mA, 0 - 10 V, ±10 V	0 - 20 mA, 4 - 20 mA, ±20 mA, 0 - 10 V, ±10 V	RTD PT, Ni, Cu, KTY	Thermocouple B, C, E, J, K, L, N, R, S, T, U, W, HK
Number of Points	2	8	2	2
Connection Style	2 wire, shielded sensor cable	2 wire, shielded sensor cable	2, 3, and 4 wire, shielded sensor cable	2 wire, shielded sensor cable
Converter	120 micro seconds	10 micro seconds	120 micro seconds	120 micro seconds
Module Update Rate	Less than 1.5 msec	Less than 0.8 to 1.3 msec	20 to 30 msec (depending on connection method)	30 msec
Input Resistance	Greater than 220 Kohm (voltage) and 50 ohm (current)	Greater than 240 Kohm (voltage) and 25 ohm (current)	N/A	N/A
Limit Frequency of the Input Filter	40 Hz	3.5 Hz	N/A	48 Hz
Current Consumption for Local Bus UL (mA)	45 mA, typical	48 mA, typical	43 mA, typical	43 mA, typical
Nominal Current Consumption of US	N/A	N/A	N/A	N/A
LED Indicators	Bus Diagnostics	Bus Diagnostics	Bus Diagnostics	Bus Diagnostics
Required Terminal Strip	(1) IC220TBK062 (Contains 5 strips)	(4) IC220TBK062 (Contains 5 strips)	(1) IC220TBK062 (Contains 5 strips)	(1) IC220TBK062 (Contains 5 strips)



Analog Output Modules

Analog output modules provide voltage or current signals to analog output devices.

	IC220ALG320	IC220ALG321	IC220ALG322
Product Name	**Analog Out 16 Bit Voltage/ Current 1 Channel**	**Analog Out 16 Bit Voltage 1 Channel**	**Analog Out 13 Bit Voltage 2 Channels**
Lifecycle Status	Active	Active	Active
Output Voltage	0 - 20 mA, 4 - 20 mA, 0 - 10 V	0 - 10 V	0 - 10 V, ±10 V
Number of Points	8	1	2
Connection Style	2 wire, shielded sensor cable	2 wire, shielded sensor cable	2 wire, shielded sensor cable single ended
Module Update Rate	Less than 1 msec	Less than 1 msec	Less than 1 msec
Output Load	Voltage: 2 k ohm minimum Current: 500 k ohm maximum	2 k ohm minimum	2 k ohm minimum
Current Consumption for Local Bus UL (mA)	30 mA typical, 40 mA maximum	30 mA typical, 40 mA maximum	33 mA typical, 40 mA maximum
Current Consumption from Analog Bus UANA (mA)	50 mA typical, 65 mA maximum	15 mA typical, 20 mA maximum	25 mA typical, 35 mA maximum
Nominal Current Consumption of US	N/A	N/A	N/A
LED Indicators	Bus Diagnostics, I/O Voltage for analog terminals present	Bus Diagnostics	Bus Diagnostics Default state set
Required Terminal Strip	(1) IC220TBK203 (Contains 1 strip)	(1) IC220TBK061 (Contains 5 strips)	(1) IC220TBK062 (Contains 5 strips)



Motion Modules

Motion modules enable the user to easily connect to high speed input devices.

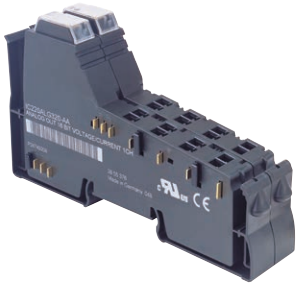
	IC220MDD840	IC220MDD841	IC220MDD842
Product Name	**High Speed Counter Input, 1 control input, 1 control output**	**Absolute Encoder Input, 4 digital inputs and 4 digital outputs**	**Incremental Encoder Input, 4 digital inputs and 4 digital outputs**
Lifecycle Status	Active	Active	Active
Number of Points	1	One SSI Encoder	One A QUAD B
Input Frequency	100Khz	400Khz	Up to 500Khz
Maximum Resolution	N/A	26 bit	26 bit
Number of Inputs	1	4	4
Input Voltage	24 VDC / 5 VDC	24 VDC	24 VDC
Number of Outputs	1	4	4
Output Voltage	24 VDC, 500 mA	24 VDC, 500 mA	24 VDC, 500 mA
Connection Style	Input: 2 and 3 wire Output: 2 wire	Input: 2 and 3 wire Output: 2 and 3 wire	Input: 2 and 3 wire Output: 2 and 3 wire
Protection	Short Circuit Protection	Short Circuit Protection	Short Circuit Protection
Current Consumption for Local Bus UL (mA)	40 mA typical, 50 mA maximum	60 mA	110 mA
Nominal Current Consumption of US	1.0 Amp maximum	2.0 Amp maximum	2.0 Amp maximum
LED Indicators	Bus Diagnostics, Sensor supply short circuit, Counter input status, Control input status, Output status	Bus Diagnostics, Sensor supply short circuit, Counter input status, Control input status, Output status	Bus Diagnostics, Sensor supply short circuit, Counter input status, Control input status, Output status
Required Terminal Strip	(1) IC220TBK203 (Contains 1 strip)	(1) IC220TBK202 (Contains 1 strip)	(1) IC220TBK202 (Contains 1 strip)



Motor Starter Modules

VersaPoint motor starter modules enable the user to easily connect directly to three phase motors. The starter control (ON/OFF) and diagnostics is via the VersaPoint bus and no additional I/O modules required. The motor starter modules reduce wiring and installation.

	IC220STR001	IC220STR002	IC220STR003
Product Name	**Motor Starter Direct, up to 1.5 kW / 400 VAC (No UL)**	**Motor Starter Direct, up to 3.7 kW / 480 VAC (UL Approved)**	**Motor Starter Reversing, up to 1.5 kW / 400 VAC (No UL)**
Lifecycle Status	Active	Active	Active
Number of Points	N/A	N/A	N/A
Connection Style	3 - Phase	3 - Phase	3 - Phase
Output Voltage	400 VAC	480 VAC (±10%)	400 VAC
Power Voltage Range	187 VAC to 440 VAC	187 VAC to 519 VAC	187 VAC to 440 VAC
Frequency	50/60Hz	50/60Hz	50/60Hz
Motor Current Range	0.2 to 3.6 A	0.2 to 8.0 A	0.2 to 3.6 A
Protection	Electronic - Configurable Over Current	Electronic - Configurable Over Current	Electronic - Configurable Over Current
Switching Method	Electronic	Mechanical Contactor	Electronic
Current Consumption from Local Bus UL (mA)	45 mA	50 mA	45 mA
LED Indicators	Bus Diagnostics, Motor Protection (group error message), Motor (on/off), Manual Mode (on/off)	Bus Diagnostics, Motor Protection (group error message), Motor (on/off), Manual Mode (on/off)	Bus Diagnostics, Motor Protection (group error message), Motor (on/off), Manual Mode (on/off)
Required Terminal Strip	(1) IC220ACC105 (Contains 10 strips) and (1) IC220ACC103 or IC220ACC104	(1) IC220ACC105 (Contains 10 strips) and (1) IC220ACC103 or IC220ACC104	(1) IC220ACC105 (Contains 10 strips) and (1) IC220ACC103 or IC220ACC104



Serial Communications Modules

The serial interface modules enable the VersaPoint to connect to serial devices via RS-232 or RS-485/422. The modules support the following features:

- Serial I/O channel
- Supports various protocols
- Adjustable number of data bits, stop bits, and parity
- 4 kbyte receive buffer, 1 kbyte transmit buffer
- Supports DTR/CTS handshake
- Baud rate adjustable up to 38400 baud
- Configuration and data exchange using PCP communications services.
- LED diagnostic and status indicators

	IC220BEM232	IC220BEM485
Product Name	**RS-232 Communications Module interfaces serial I/O devices to a VersaPoint I/O Station.**	**RS-485/422 Communications Module interfaces serial I/O devices to a VersaPoint I/O Station.**
Lifecycle Status	Active	Active
Number of Points	1	1
Connection Style	RS-232	RS-485 half duplex/422 full duplex
Protocol	Transparent, End-to-end, Dual buffer, 3964R, XON/XOFF	Transparent, End-to-end, Dual buffer, 3964R, XON/XOFF, Modbus RTU, Modbus ASCII
Data Rate	110, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400	110, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400
Data Buffer	4-kbyte receive buffer and 1-kbyte transmit buffer	4-kbyte receive buffer and 1-kbyte transmit buffer
Current Consumption for Local Bus UL (mA)	155 mA typical, 225 mA maximum	170 mA typical, 260 mA maximum
LED Indicators	Bus Diagnostics, Transmit and Receive	Bus Diagnostics, Transmit and Receive
Required Terminal Strip	IC220TBK203	IC220TBK203

Accessories and Cables

Part Number	Description	Lifecycle Status
IC220ACC001	Module Labels Narrow, Qty 10	Active
IC220ACC002	Module Labels Wide, Qty 10	Active
IC220ACC003	Point Labels Numbered 1-100, Qty 10	Active
IC220ACC004	Point Labels Blank, Qty 1000	Active
IC220ACC005	Module Keying Tabs, Qty 100	Active
IC220ACC100	Motor Starter Brake Module DC	Active
IC220ACC101	Motor Starter Brake Module AC/DC	Active
IC220ACC103	Motor Starter Power Connector	Active
IC220ACC104	Motor Starter Power Bridge	Active
IC220ACC105	Motor Circuit Connector, Qty 10	Active
IC220ACC201	Relay Module Isolation Set (Requires 1 IC220TBK206)	Active
IC220BEM002	Transition module to enable connection of VersaMax IP I/O to VersaPoint (requires IC677CBLLBFLY0020 cable)	Active
IC220FOS001	Media converter for converting 10/100Base-T to polymer and HCS fibers	Active
IC677CBLLBFLY0020	IP67 Local Communication Cable, 2M M12 B-code w/LEADS	Active
IC220TBK061	I/O W/Shield, 6 Position Spring Style, Qty 5	Active
IC220TBK062	I/O Terminal Strip W/Dual Shield, 6 Position Spring Style, Qty 5	Active
IC220TBK082	I/O Terminal Strip, 8 Position Spring Style, Qty 10	Active
IC220TBK085	I/O Terminal Strip, 8 Position Spring Style, Relay, Qty 10	Active
IC220TBK087	Power Terminal Strip, 8 Position Spring Style, Qty 10	Active
IC220TBK122	I/O Terminal Strip, 12 Position Spring Style, Input, Qty 10	Active
IC220TBK123	I/O Terminal Strip, 12 Position Spring Style, Output, Qty 10	Active
IC220TBK201	Terminal Strip Set, Spring Style, DEVICENET NIU	Active
IC220TBK202	Terminal Strip Set, Spring Style, Encoder	Active
IC220TBK203	Terminal Strip Set, Spring Style, Analog Out/HSC	Active
IC220TBK204	Terminal Strip Set, Spring Style, AC Power Terminal	Active
IC220TBK206	Terminal Strip Set, Spring Style, Relay Isolation	Active

Configuration Guidelines

When configuring a VersaPoint the following guidelines should be considered:

1. VersaPoint is limited to 63 modules per Network Interface Unit.
2. Each module requires a terminal strip.
3. Each voltage requires a Power Terminal to separate voltages.
4. Segment Terminals can be used to easily group points within a voltage segment.
5. Internal power/current rating of connectors is 2 amps. A power terminal is required if this rating is exceeded.

Cable Selection
Examples of Typical Application

Configuration for Controller (Example application requiring (120) 24 VDC inputs and (80) Relay outputs AC power supply) for local control. System also has five remote cabinets, with each cabinet requiring (8) 24 VDC Inputs, (4) 24 VDC 0.5 Amp, Source Outputs and (2) current inputs and (2) current outputs (24 VDC power source) over PROFIBUS DP.

Control Cabinet

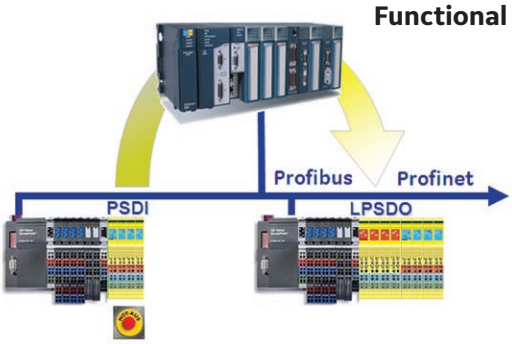
Backplane Slots Required	Power Supply Current Required (mA)	Qty	Part Number	Description
2	1250 mA @ 3.3 VDC; 1000 mA @ 5 VDC	1	IC695CPU310	CPU with two built-in serial ports
2		1	IC695PSA040	120/240 VAC, 125 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	1	IC695CHS016	16 Slot Universal Base
4	1200 mA @ 5V	4	IC694MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
5	35 mA @ 5V; 110 mA @ 24 VDC Relay	5	IC694MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
		4	IC694TBB032	Terminal Block, Box Style
1	420 mA @ 5 VDC	1	IC695PBM300	PROFIBUS DP Master Module
		1	BC646MPP001	Logic Developer - PLC Professional
14	Total current from power supply required: 2895 mA @ 5V; 1850 @ 3.3V; 110 mA @ 24 VDC Relay. Only one power supplied needed.			

Remote Cabinets (Qty 5)

5	IC220PBI001	PROFIBUS-DP Network Interface Unit (Requires 1 IC220TBK087)
5	IC220MDL643	Input, 24 VDC Positive Logic, 8pt (Requires 4 IC220TBK082)
5	IC220MDL752	Output, 24 VDC Positive Logic 0.5A, 4pt (Requires 1 IC220TBK123)
5	IC220ALG220	Analog In, 15 Bit, Voltage/Current, 2ch (Requires 1 IC220TBK061)
10	IC220ALG320	Analog Out, 16 Bit, Voltage/Current, 1ch (Requires 1 IC220TBK203)
5	IC220PWR003	Power Terminal, Fused with diag 24 VDC Requires 1 IC220TBK087)
1	IC220TBK087	Power Terminal Strip, 8 Position Spring Style, Qty 10
2	IC220TBK082	I/O Terminal Strip, 8 Position Spring Style, Qty 10
1	IC220TBK123	I/O Terminal Strip, 12 Position Spring Style, Output, Qty 10
1	IC220TBK061	I/O Terminal Strip with Shield, 6 Position Spring Style, Qty 5
1	IC220TBK203	Terminal Strip Set, Spring Style, Analog Out/HSC

Options to Consider

840 mA @ 3.3 VDC; 614 mA @ 5 VDC	1	IC695ETM001	RX3i Ethernet module 10/100 Mbits 2 RJ45 connections one IP address occupies one slot on system base
	6	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
	1	IC693ACC302	RX3i Long term battery for CPU
	1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch Operator Interface



Functional Safety Modules

VersaSafe is a SIL3 TUV certified safety solution, well integrated in the PACSystems RX3i platform.

VersaSafe technology offers RX3i users, in particular machine OEMs, a scalable and cost efficient SIL 3 safety solution, without need of an additional, complex safety PLC and safety network. Users can add the exact number of safe I/O modules required, with the ability to expand to more than 100 safe I/Os. Even if the application requires a low number of safe I/O, VersaSafe still offers a cost efficient solution.

The safety I/O is distributed via VersaPoint PROFIBUS NIU or PROFINET RT NIU, and can be combined with any standard I/O on the same network.

Well integrated into the RX3i system, VersaSafe is easy to use. Since the RX3i is the single point of connection, both safe and standard I/O can be combined in the same logic program. Integration into the RX3i also enables significant cost reduction because the status of all safe I/Os is directly available in the standard application logic without the need to hard wire. The safety programming tool provides a safe function block library so standard machine safety applications can be realized with configuration instead of complex programming.

	IC220SDL543	IC220SDL544	IC220SDL953	IC220SDL963	IC220SDL753	IC220SDL752	IC220SDL840
Product Name	**Safe Input, 24 VDC Positive Logic**	**Safe Input, 24 VDC Positive Logic**	**Safety Logic Module (V2), Safe Output, 24 VDC Positive Logic**	**Enhanced Safety Logic Module (V3), Safe Output, 24 VDC Positive Logic**	**Safe Output, 24 VDC Positive Logic 2 A**	**Safe Output, 24 VDC Sink/ Source**	**Safe Output, Relay 4A, 4PT, with 2 contacts each**
Lifecycle Status	Active	Active	Active	Active	Active	Active	Active
Voltage	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	24V and 230V
Applications	Safe Input	Safe Input	Safe Logic Output	Enh. Safe Logic Output	Safe Output	Safe Output	Safe Relay Output
Number of Points SIL2 / CAT3	8	16	8	8	8	4	4
Number of Points SIL3 / CAT4	4	8	4	4	4	2	2
Clock Outputs	2	2	-	-	-	-	2
Diagnostic Inputs	-	-	-	-	-	-	2
Diagnostic Bits	-	-	32 Bits In 32 Bits Out	32 Bits In 32 Bits Out	-	-	-
Max. Safety Level SIL / IEC61508	3	3	3	3	3	3	3
Max. Safety Level SILC / IEC62061	3	3	3	3	3	3	3
Max. Safety Level PL / ISO 13849-1	e	e	e	e	e	e	e
Max. Safety Level Category / CAT	4	4	4	4	4	4	4

Starter Kits

Part Number	Description	Lifecycle Status
IC220KITPNS001	VersaSafe PROFINET Distributed Safety Evaluation Kit. PROFINET RT Slave built-in switch, eight 24 VDC positive standard inputs module, eight 24 VDC standard outputs modules, eight 24 VDC safe inputs module, eight 24 VDC safe outputs modules	Active

VersaMax IP

VersaMax IP is designed to offer the ruggedness and reliability of a standard I/O system installed in a NEMA 4 cabinet, without the cost and effort to build the cabinet. VersaMax IP is IP67 rated so it can be bolted right to the equipment it controls without the need for an enclosure. I/O, communications, and power connections are made to the blocks with off-the-shelf cordsets – reducing design and installation time and possible wiring errors.

Once installed, VersaMax IP's diagnostics make troubleshooting a snap. In the event of a failure, the connector-style wiring interface comes into play once again, greatly reducing replacement time and the possibility of wiring errors.

The VersaMax IP includes PROFINET/ PROFIBUS I/O blocks, network cordsets, and power cordsets. The I/O blocks provide the following:

- Connection to PROFINET/ PROFIBUS-DP using M12 connectors
- Baud rates up to 12 MB – autoselect
- Connections to digital sensors using M12 connectors (Input Blocks)
- Connection to digital actuators using M12 connectors, each with load capacity up to 2A (Output Blocks)
- Flexible voltage supply
- Diagnostics and Status indicators
- Short Circuit and Overload protection of Sensor Supply and/or outputs
- IP65 and IP67 Protection
- Operating Temperature: -25°C to 60°C

GE Machine Edition

GE Machine Edition is an advanced software environment for the development and maintenance of machine level automation. Visualization, motion control, and execution logic are developed with a single programmer.



Stand Alone Input and Output Modules page 1.xxx

VersaMax IP Modular pages 1.xxx-1.xxx

Accessories and Cables page 1.xxx

Configuration Guidelines page 1.xxx

Publication Reference Chart

GFK-2307	VersaMax IP Installation Manual



Stand Alone Input and Output Modules

VersaMax IP modules are designed for distributed automation tasks in harsh environmental conditions. Modules meet the requirements for both IP65/IP67 protection. They enable the direct connection of sensors and actuators in an environment close to the station. Every VersaMax IP device is connected directly to the bus system.

	IC676PBI008	IC676PBI016	IC676PBM442	IC676PBO082
Product Name	**8 Point Input Module, PROFIBUS**	**16 Point Input Module, PROFIBUS**	**4 Point Input and 4 Point (2 Amp) Output Module, PROFIBUS**	**8 Point (2 Amp) Output Module, PROFIBUS**
Lifecycle Status	Active	Active	Active	Active
Protocol	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP
Module Power	24 VDC	24 VDC	24 VDC	24 VDC
Module Power Range	18 VDC to 30 VDC	18 VDC to 30 VDC	18 VDC to 30 VDC	18 VDC to 30 VDC
Module Current Consumption UL at 24 VDC	35 mA typical, 100 mA maximum	35 mA typical, 100 mA maximum	40 mA typical, 100 mA maximum	40 mA typical, 100 mA maximum
Module Current Consumption US at 24 VDC	4.5 mA typical plus sensor current 700 mA maximum	8 mA typical plus sensor current 1.2 A maximum	4.5 mA typical plus sensor current 700 mA maximum	3 mA typical plus sensor current 700 mA maximum
Module Current Consumption UAXX at 24 VDC	N/A	N/A	6 mA typical plus actuator current, 4 A maximum	12 mA typical plus actuator current, 4 A maximum
Connection Style (M12)	2-, 3-, and 4-wire	2-, 3-, and 4-wire (Y connector to support two sensors per connector)	2- or 3-wire	2- or 3-wire
Operating Temperature	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)
Degree of Protection	95%. Slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods
Class of Protection	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529
Housing Dimensions (W x H x D)	60 mm x 160 mm x 44.5 mm	60 mm x 160 mm x 44.5 mm	60 mm x 178 mm x 49.3 mm	60 mm x 178 mm x 49.3 mm



VersaMax IP Modular

VersaMax IP Modular modules are designed for distributed automation tasks in harsh environmental conditions. Modules meet the requirements for both IP65/IP67 protection. They enable the direct connection of sensors and actuators in an environment close to the station. Every VersaMax IP device is connected directly to the bus system. Up to 16 expansion modules can be connected to one PROFIBUS VersaMax IP Modular local bus master, supporting up to 136 digital or 64 analog signals or a combination of the two.

	IC677PNS001	IC677PBI001	IC677DBI008	IC677DBO085
Product Name	**VersaMax IP PROFINET Scanner with (8) 24 VDC inputs**	**PROFIBUS VersaMax IP Modular local bus master with (8) 24 VDC inputs**	**Expansion VersaMax IP Modular slave with (8) 24 VDC inputs**	**Expansion VersaMax IP Modular slave with (8) 24 VDC outputs**
Lifecycle Status	Active	Active	Active	Active
Protocol	PROFINET	PROFIBUS DP	Local Bus	Local Bus
Number of Points	8	8	8	8
Module Power	24 VDC	24 VDC	24 VDC	24 VDC
Module Power Range	18 VDC to 30 VDC	18 VDC to 30 VDC	18 VDC to 30 VDC	18 VDC to 30 VDC
Module Current Consumption UL at 24 VDC	118 mA typical	75 mA typical, 100 mA maximum	35 mA typical (50 mA maximum) @ 500Kbaud; 40 mA typical (50 mA maximum) @ 2Mbaud	40 mA typical (50 mA maximum) @ 500Kbaud; 45 mA typical (50 mA maximum) @ 2Mbaud
Module Current Consumption US at 24 VDC	5 mA typical plus sensor current 600 mA maximum	15 mA typical plus sensor current 600 mA maximum	5 mA typical plus sensor current 600 mA maximum	5 mA typical plus actuator current 600 mA maximum
Module Current Consumption UAXX at 24 VDC	N/A	12 mA typical plus actuator current, 4 A maximum	N/A	N/A
Connection Style (M12)	2-, 3-, and 4-wire (Y connector to support two sensors per connector)	2-, 3-, and 4-wire (Y connector to support two sensors per connector)	2-, 3-, and 4-wire	2-, 3-, and 4-wire
Operating Temperature	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)
Degree of Protection	95% slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods
Class of Protection	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529
Housing Dimensions (W x H x D)	70 mm x 178 mm x 49.3 mm	70 mm x 178 mm x 49.3 mm	70 mm x 178 mm x 49.3 mm	70 mm x 178 mm x 49.3 mm



VersaMax IP Modular

VersaMax IP Modular modules are designed for distributed automation tasks in harsh environmental conditions. Modules meet the requirements for both IP65/IP67 protection. They enable the direct connection of sensors and actuators in an environment close to the station. Every VersaMax IP device is connected directly to the bus system. Up to 16 expansion modules can be connected to one PROFIBUS VersaMax IP Modular local bus master, supporting up to 136 digital or 64 analog signals or a combination of the two.

	IC677DBM442	IC677ABI004	IC677ABO004
Product Name	**Expansion VersaMax IP Modular slave with (4) 24 VDC inputs and 4 outputs (2 amp)**	**Expansion VersaMax IP Modular slave with (4) analog inputs**	**Expansion VersaMax IP Modular slave with (4) analog outputs**
Lifecycle Status	Active	Active	Active
Protocol	Local Bus	Local Bus	Local Bus
Number of Points	4 In/ 4 Out	4	4
Module Power	24 VDC	24 VDC	24 VDC
Module Power Range	18 VDC to 30 VDC	18 VDC to 30 VDC	18 VDC to 30 VDC
Module Current Consumption UL at 24 VDC	40 mA typical (50 mA maximum) @ 500Kbaud; 45 mA typical (50 mA maximum) @ 2Mbaud	70 mA, typical	70 mA, typical
Module Current Consumption US at 24 VDC	5 mA typical plus sensor current 600 mA maximum	500 mA typical plus sensor current 400 mA maximum	5 mA typical plus actuator current 400 mA maximum
Module Current Consumption UAXX at 24 VDC	3 mA typical plus actuator current, 4 A maximum	N/A	N/A
Connection Style (M12)	2-, 3-, and 4-wire for sensor; 2 or 3-wire actuator control	2 or 4 wire technology (shielded)	2 or 4 wire technology (shielded)
Operating Temperature	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)	Range: -25°C to +60°C (-13°F to +131°F)
Degree of Protection	95%. Slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods	95%. Slight condensation is permitted occasionally on the outer housing, for short periods
Class of Protection	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529	IP65 and IP67 according to IEC 60529
Housing Dimensions (W x H x D)	70 mm x 178 mm x 49.3 mm	70 mm x 178 mm x 49.3 mm	70 mm x 178 mm x 49.3 mm

Accessories and Cables

Part Number	Description	Lifecycle Status
IC676ACC001	VersaMax IP Point Labels - Qty 50	Active
IC676ACC002	Protective Caps -Male (For unused I/O connectors and/or outgoing bus & power connectors) - Qty 5	Active
IC676ACC003	Protective Caps -Female (For unused incoming power connectors) - Qty 5	Active
IC676ACC004	PROFIBUS Network Termination Resistor	Active
IC676ACC005	PROFIBUS Network Tee	Active
IC676CBLPBB003	IP67 PROFIBUS Cordset - 0.3 Meters	Active
IC676CBLPBB005	IP67 PROFIBUS Cordset - 0.5 Meters	Active
IC676CBLPBB010	IP67 PROFIBUS Cordset -1 Meter	Active
IC676CBLPBB020	IP67 PROFIBUS Cordset - 2 Meters	Active
IC676CBLPBB050	IP67 PROFIBUS Cordset - 5 Meters	Active
IC676CBLPBB100	IP67 PROFIBUS Cordset - 10 Meters	Active
IC676CBLPBF020	IP67 PROFIBUS Cordset - 2 Meters - Female Connector w/Leads	Active
IC676CBLPBF050	IP67 PROFIBUS Cordset - 5 Meters - Female Connector w/Leads	Active
IC676CBLPBF100	IP67 PROFIBUS Cordset - 10 Meters -Female Connector w/Leads	Active
IC676CBLPBM020	IP67 PROFIBUS Cordset - 2 Meters, Male Connector w/Leads	Active
IC676CBLPBM050	IP67 PROFIBUS Cordset - 5 Meters, Male Connector w/Leads	Active
IC676CBLPBM100	IP67 PROFIBUS Cordset - 10 Meters -Male Connector w/Leads	Active
IC676CBLPWB003	IP67 Power Cordset - 0.3 Meters	Active
IC676CBLPWB005	IP67 Power Cordset - 0.5 Meters	Active
IC676CBLPWB010	IP67 Power Cordset -1 Meter	Active
IC676CBLPWB020	IP67 Power Cordset - 2 Meters	Active
IC676CBLPWB050	IP67 Power Cordset - 5 Meters	Active
IC676CBLPWB100	IP67 Power Cordset -10 Meters	Active
IC676CBLPWF020	IP67 Power Cordset - 2 Meters - Female Connector w/Leads	Active
IC676CBLPWF050	IP67 Power Cordset - 5 Meters - Female Connector w/Leads	Active
IC676CBLPWF100	IP67 Power Cordset -10 Meters -Female Connector w/Leads	Active
IC676CBLPWM020	IP67 Power Cordset - 2 Meters - Male Connector w/Leads	Active
IC676CBLPWM050	IP67 Power Cordset - 5 Meters - Male Connector w/Leads	Active
IC676CBLPWM100	IP67 Power Cordset -10 Meters - Male Connector w/Leads	Active
IC676CBLPNRJ45010A	IP67 PROFINET Cordset, Straight M12 to RJ45 connector, D-coded - 1 Meters	Active
IC676CBLPNRJ45020A	IP67 PROFINET Cordset, Straight M12 to RJ45 connector, D-coded - 2 Meters	Active
IC676CBLPNRJ45050A	IP67 PROFINET Cordset, Straight M12 to RJ45 connector, D-coded - 5 Meters	Active
IC676CBLPNRJ45100A	IP67 PROFINET Cordset, Straight M12 to RJ45 connector, D-coded - 10 Meters	Active
IC676CBLPNFLY010A	IP67 PROFINET Cordset, Straight M12 to Flying Leads, D-coded - 1 Meters	Active
IC676CBLPNFLY020A	IP67 PROFINET Cordset, Straight M12 to Flying Leads, D-coded - 2 Meters	Active
IC676CBLPNFLY050A	IP67 PROFINET Cordset, Straight M12 to Flying Leads, D-coded - 5 Meters	Active
IC676CBLPNFLY100A	IP67 PROFINET Cordset, Straight M12 to Flying Leads, D-coded - 10 Meters	Active

VersaMax IP Modular Inter-connection Cables

Part Number	Description	Lifecycle Status
IC677CBLPWB0013	IP67 Voltage supply cable for local bus; A-coded, 5 position, unshielded 13.5 cm.	Active
IC677CBLLBB0013	IP67 Local communications cable for local bus; B-coded, 5 position, shielded 13.5 cm.	Active

Configuration Guidelines

When configuring a VersaMax IP the following guidelines should be considered

1. Remember to select the proper cord set and termination resistor
2. VersaMax IP Modular can support up to 16 Modular expansions with a total expansion length of 20 meters

Examples of Typical Application

Configuration for Controller (Example application requiring (120) 24VDC inputs and (80) Relay outputs AC power supply) for local control. System also has five remote drops that will be mounted external to the machine. Each remote drop requires (8) 24VDC Inputs, (4) 24VDC 0.5 Amp, Source Outputs and (2) current inputs and (2) current outputs (24VDC power source) over PROFIBUS DP.

Control Cabinet

Backplane Slots Required	Power Supply Current Required (mA)	Qty	Part Number	Description
2	1250 mA @ 3.3 VDC; 1000 mA @ 5 VDC	1	IC695CPU310	CPU with two built-in serial ports
2		1	IC695PSA040	120/240 VAC, 125 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	1	IC695CHS016	16 Slot Universal Base
4	1200 mA @ 5 V	4	IC694MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
5	35 mA @ 5 V; 110 mA @ 24 VDC Relay	5	IC694MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
		4	IC694TBB032	Terminal Block, Box Style
1	420 mA @ 5 VDC	1	IC695PBM300	PROFIBUS DP Master Module
		1	BC646MPP001	Logic Developer -PLC Professional
14	Total current from power supply required: 2895 mA @ 5 V; 1850 @ 3.3 V; 110 mA @ 24 VDC Relay. Only one power supplied needed.			

Remote Cabinets (Qty 5)

		5	IC677PBI001	PROFIBUS VersaMax IP Modular local bus master with (8) 24 VDC inputs
		5	IC677DBO085	Expansion VersaMax IP Modular slave with (8) 24 VDC outputs
		5	IC677ABI004	Expansion VersaMax IP Modular slave with (4) analog inputs
		5	IC677ABO004	Expansion VersaMax IP Modular slave with (4) analog outputs
		5	IC676CBLPBB100	IP67 PROFIBUS Cordset -10 Meters
		5	IC676CBLPWB100	IP67 Power Cordset -10 Meters
		15	IC677CBLPWB0013	IP67 Voltage supply cable for local bus; A-coded, 5 position, unshielded 13.5 cm.
		15	IC677CBLLBB0013	IP67 Local communications cable for local bus; B-coded, 5 position, shielded 13.5 cm.

Options to Consider

	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	1	IC695ETM001	RX3i Ethernet module 10/100 Mbits 2 RJ45 connections one IP address occupies one slot on system base
		6	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
		1	IC693ACC302	RX3i Long term battery for CPU
		1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch Operator Interface

QuickPanel+ 2.3

Operator Interface for the Industrial Internet 2.4

6” units 2.4

7” units 2.5

10” units 2.6

12” units 2.7

15” units 2.8

Accessories 2.9

QuickPanel+

Streamline your system and simplify development and maintenance by relying on one powerful device for operator interface (OI) and control requirements. QuickPanel+ is an all-in-one device: an OI/HMI, a PLC/process controller, machine gateway, and a data historian.

QuickPanel+ incorporates the latest display and multi-touch technology to provide an exceptional user experience. The capacitive, multi-touch screen is built to last in an industrial environment, yet is as sensitive as a smartphone or tablet. The high-resolution display provides vivid, clear images and enhanced process visualization. Viewing system-wide details is easy with the new multi-touch capabilities. Double-tap or pinch to view your interface at up to 400% and then tap twice to return to the original size. Just swipe to navigate between interactive schematics. Accessing information and visualizing processes has never been easier.

Features include:

- Display sizes of 6", 7", 10", 12" and 15"
- Microsoft® Windows® Embedded Compact 7 operating system
- Control capability with GE and third-party I/O
- Plug and play connectivity
- Designed for easy installation and configuration by automation engineers
- Fully integrated view, control and data historian
- Multi-touch for optimum responsiveness
- Vivid images for more complete process visualization
- Fully functional web browser with multimedia capability
- Email and text alerts based on user-defined settings
- Custom, web-enabled reports and graphs
- Remote diagnostics and security
- Powerful scripting options
- Object-based programming functionality comparable to a PAC
- Compatibility with third-party PLCs

6" TFT-Color



7" TFT-Color



10" TFT-Color



12" TFT-Color



15" TFT-Color





Operator Interface for the Industrial Internet

A pivotal point within automation architecture is the operator interface (OI)—where people and machines connect. The GE QuickPanel+ is an OI for the Industrial Internet. This multifunctional device delivers the data and insight needed to face the challenges and demands of the connected world.

QuickPanel+ integrates process control, view, and an option to run embedded data historian for improved real-time control of operations and better integration into plant-wide systems. The latest addition to GE's OI product line, the QuickPanel+ takes machine interfaces into the Industrial Internet age for new levels of productivity, insight, and user experience.

	IC755CSS06RDA	IC755CBS06RDA
Product Name	**QuickPanel+ Operator Interface, 6" TFT-Color, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 6" TFT-Color, Blank Bezel**
Lifecycle Status	Active	Active
Display Size	6" (Diagonal)	6" (Diagonal)
Display Type	6" Color-TFT	6" Color-TFT
Resolution	320 x 240 pixels	320 x 240 pixels
Memory: DRAM	512MB	512MB
Memory: Expandable	No	No
Serial: Com #1	RS 232	RS 232
Serial: Com #2	None	None
Ethernet: LAN #1	10/100 Mbps	10/100 Mbps
Ethernet: LAN #2	None	None
USB	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)
Communication Expansion	None	None
External Storage	one, SD/SDHC	one, SD/SDHC
Compliance	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS
Panel Cut-Out (W x H)	7.22" x 5.06" (183.5mm x 128.5mm)	7.22" x 5.06" (183.5mm x 128.5mm)
Front of Panel & Depth (W x H x D)	7.56" x 5.39" x 1.42" (192mm x 137mm x 36mm)	7.56" x 5.39" x 1.42" (192mm x 137mm x 36mm)
Input Voltage	24 VDC @ ±20%	24 VDC @ ±20%
Power Consumption	15W max.	15W max.
Operating Temperature	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)
Storage Temperature	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)
Operating Humidity	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C
Indicators - LEDs	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)



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	IC755CSW07CDA	IC755CSW07CDACA	IC755CBW07CDA
Product Name	**QuickPanel+ Operator Interface, 7" Wide-screen TFT-Color, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 7" Wide-screen TFT-Color, Conformal Coated, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 7" Wide-screen TFT-Color, Blank Bezel**
Lifecycle Status	Active	Active	Active
Display Size	7" (Diagonal)	7" (Diagonal)	7" (Diagonal)
Display Type	7" Color-TFT	7" Color-TFT	7" Color-TFT
Resolution	800 x 480 pixels	800 x 480 pixels	800 x 480 pixels
Memory: DRAM	512MB	512MB	512MB
Memory: Expandable	No	No	No
Serial: Com #1	RS 232	RS 232	RS 232
Serial: Com #2	None	None	None
Ethernet: LAN #1	10/100 Mbps	10/100 Mbps	10/100 Mbps
Ethernet: LAN #2	None	None	None
USB	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)
Communication Expansion	None	None	None
External Storage	one, SD/SDHC	one, SD/SDHC	one, SD/SDHC
Compliance	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS DNV Marine Certification	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS
Panel Cut-Out (W x H)	7.22" x 5.06" (183.5mm x 128.5mm)	7.22" x 5.06" (183.5mm x 128.5mm)	7.22" x 5.06" (183.5mm x 128.5mm)
Front of Panel & Depth (W x H x D)	7.56" x 5.39" x 1.42" (192mm x 137mm x 36mm)	7.56" x 5.39" x 1.42" (192mm x 137mm x 36mm)	7.56" x 5.39" x 1.42" (192mm x 137mm x 36mm)
Input Voltage	24 VDC @ ±20%	24 VDC @ ±20%	24 VDC @ ±20%
Power Consumption	Less than 15W	Less than 15W	Less than 15W
Operating Temperature	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)
Storage Temperature	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)
Operating Humidity	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C
Indicators - LEDs	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)



Operator Interface for the Industrial Internet

A pivotal point within automation architecture is the operator interface (OI)—where people and machines connect. The GE QuickPanel+ is an OI for the Industrial Internet. This multifunctional device delivers the data and insight needed to face the challenges and demands of the connected world.

QuickPanel+ integrates process control, view, and an option to run embedded data historian for improved real-time control of operations and better integration into plant-wide systems. The latest addition to GE's OI product line, the QuickPanel+ takes machine interfaces into the Industrial Internet age for new levels of productivity, insight, and user experience.

	IC755CSS10CDA	IC755CSS10CDACA	IC755CBS10CDA
Product Name	**QuickPanel+ Operator Interface, 10" TFT-Color, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 10" TFT-Color, Conformal Coated, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 10" TFT-Color, Blank Bezel**
Lifecycle Status	Active	Active	Active
Display Size	10.4" (Diagonal)	10.4" (Diagonal)	10.4" (Diagonal)
Display Type	10" Color-TFT	10" Color-TFT	10" Color-TFT
Resolution	800 x 600 pixels	800 x 600 pixels	800 x 600 pixels
Memory: DRAM	1GB	1GB	1GB
Memory: Expandable	No	No	No
Serial: Com #1	RS 232	RS 232	RS 232
Serial: Com #2	RS 422/485/232	RS 422/485/232	RS 422/485/232
Ethernet: LAN #1	10/100 Mbps	10/100 Mbps	10/100 Mbps
Ethernet: LAN #2	10/100 Mbps	10/100 Mbps	10/100 Mbps
USB	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)
Communication Expansion	None	None	None
External Storage	one, SD/SDHC	one, SD/SDHC	one, SD/SDHC
Compliance	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS
Panel Cut-Out (W x H)	10.47" x 8.27" (266mm x 210mm)	10.47" x 8.27" (266mm x 210mm)	10.47" x 8.27" (266mm x 210mm)
Front of Panel & Depth (W x H x D)	10.94" x 8.74" x 2.20" (278mm x 222mm x 65mm)	10.94" x 8.74" x 2.20" (278mm x 222mm x 65mm)	10.94" x 8.74" x 2.20" (278mm x 222mm x 65mm)
Input Voltage	24 VDC @ ±20%	24 VDC @ ±20%	24 VDC @ ±20%
Power Consumption	30W max.	30W max.	30W max.
Operating Temperature	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)
Storage Temperature	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)
Operating Humidity	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C
Indicators - LEDs	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)



Operator Interface for the Industrial Internet

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	IC755CSS12CDB	IC755CSS12CDBCA	IC755CBS12CDB
Product Name	**QuickPanel+ Operator Interface, 12" TFT-Color, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 12" TFT-Color, Conformal Coated, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 12" TFT-Color, Blank Bezel**
Lifecycle Status	Active	Active	Active
Display Size	12.1" (Diagonal)	12.1" (Diagonal)	12.1" (Diagonal)
Display Type	12" Color-TFT	12" Color-TFT	12" Color-TFT
Resolution	800 x 600 pixels	800 x 600 pixels	800 x 600 pixels
Memory: DRAM	1GB	1GB	1GB
Memory: Expandable	No	No	No
Serial: Com #1	RS 232	RS 232	RS 232
Serial: Com #2	RS 422/485/232	RS 422/485/232	RS 422/485/232
Ethernet: LAN #1	10/100 Mbps	10/100 Mbps	10/100 Mbps
Ethernet: LAN #2	10/100 Mbps	10/100 Mbps	10/100 Mbps
USB	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)
Communication Expansion	None	None	None
External Storage	one, SD/SDHC	one, SD/SDHC	one, SD/SDHC
Compliance	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS ATEX Zone 2	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS
Panel Cut-Out (W x H)	11.89" x 8.98" (302mm x 228mm)	11.89" x 8.98" (302mm x 228mm)	11.89" x 8.98" (302mm x 228mm)
Front of Panel & Depth (W x H x D)	13.27" x 10.35" x 2.76" (337mm x 263mm x 70mm)	13.27" x 10.35" x 2.76" (337mm x 263mm x 70mm)	13.27" x 10.35" x 2.76" (337mm x 263mm x 70mm)
Input Voltage	24 VDC @ ±20%	24 VDC @ ±20%	24 VDC @ ±20%
Power Consumption	30W max.	30W max.	30W max.
Operating Temperature	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)
Storage Temperature	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)
Operating Humidity	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C
Indicators - LEDs	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)



Operator Interface for the Industrial Internet

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	IC755CSS15CDA	IC755CSS15CDACA	IC755CBS15CDA
Product Name	**QuickPanel+ Operator Interface, 15" TFT-Color, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 15" TFT-Color, Conformal Coated, GE Monogram Bezel**	**QuickPanel+ Operator Interface, 15" TFT-Color, Blank Bezel**
Lifecycle Status	Active	Active	Active
Display Size	15.1" (Diagonal)	15.1" (Diagonal)	15.1" (Diagonal)
Display Type	15" Color-TFT	15" Color-TFT	15" Color-TFT
Resolution	1024 x 768 pixels	1024 x 768 pixels	1024 x 768 pixels
Memory: DRAM	1GB	1GB	1GB
Memory: Expandable	No	No	No
Serial: Com #1	RS 232	RS 232	RS 232
Serial: Com #2	RS 422/485/232	RS 422/485/232	RS 422/485/232
Ethernet: LAN #1	10/100 Mbps	10/100 Mbps	10/100 Mbps
Ethernet: LAN #2	10/100 Mbps	10/100 Mbps	10/100 Mbps
USB	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)	2x USB 2.0 (Type-A); 1x USB 2.0 (Mini Type-B)
Communication Expansion	None	None	None
External Storage	one, SD/SDHC	one, SD/SDHC	one, SD/SDHC
Compliance	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS ATEX Zone 2	UL Listed US/CAN Hazardous locations: Class 1 Div 2; Class 2 Div 2; Class 3 Div 1 & 2 UL TYPE 4X CE (EN 60950-1, EN 61000-6-4, 61000-6-2) FCC Part 15 Class A IP65F (JEM 1030) RoHS
Panel Cut-Out (W x H)	14.92" x 12.01" (379mm x 305mm)	14.92" x 12.01" (379mm x 305mm)	14.92" x 12.01" (379mm x 305mm)
Front of Panel & Depth (W x H x D)	15.71" x 12.72" x 2.76" (399mm x 323mm x 70mm)	15.71" x 12.72" x 2.76" (399mm x 323mm x 70mm)	15.71" x 12.72" x 2.76" (399mm x 323mm x 70mm)
Input Voltage	24 VDC @ ±20%	24 VDC @ ±20%	24 VDC @ ±20%
Power Consumption	30W max.	30W max.	30W max.
Operating Temperature	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)	0 to 55°C (32 to 131°F)
Storage Temperature	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)	-10 to 60°C (14 to 140°F)
Operating Humidity	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C	85% RH (non-condensing) at 30°C
Indicators - LEDs	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)	Tri-color LED (Amber/Green/Red)

Accessories

Part Number	Description	Lifecycle Status
IC755ACC07GAS	QuickPanel+ 7"/6" Replacement Gasket	Active
IC755ACC07MNT	QuickPanel+ 7"/6" Accessory Kit - Replacement Mounting Clips, Power & Serial Port Connectors	Active
IC755ACC07PRO	QuickPanel+ 7" Replacement Screen Protectors, Package of 3	Active
IC755ACC07ADP	QuickPanel+ Panel Adapter Kit - 8" QP View/Control to 7" QuickPanel+	Active
IC755ACCBATT	QuickPanel+ Replacement Battery Pack	Active
IC755ACC10GAS	QuickPanel+ 10" Replacement Gasket	Active
IC755ACC10MNT	QuickPanel+ 10" Accessory Kit - Replacement Mounting Clips, Power & Serial Port Connectors	Active
IC755ACC10PRO	QuickPanel+ 10" Replacement Screen Protectors, Package of 3	Active
IC755ACCBATTNL	Replacement Battery (No Leads), for use with 10", 12", and 15"	Active
IC755ACC12GAS	QuickPanel+ 12" Replacement Gasket	Active
IC755ACC12MNT	QuickPanel+ 12" Accessory Kit - Replacement Mounting Clips, Power & Serial Port Connectors	Active
IC755ACC12PRO	QuickPanel+ 12" Replacement Screen Protectors, Package of 3	Active
IC755ACC15GAS	QuickPanel+ 15" Replacement Gasket	Active
IC755ACC15MNT	QuickPanel+ 15" Accessory Kit - Replacement Mounting Clips, Power & Serial Port Connectors	Active
IC755ACC15PRO	QuickPanel+ 15" Replacement Screen Protectors, Package of 3	Active

RXi Industrial PCs 3.3

PACSystems RXi Box IPC 3.4

Accessories and Starter Kits.....3.5

PACSystems RXi-EP Box IPC 3.6

PACSystems RXi-EP Slim IPC 3.8

Accessories 3.9

PACSystems RXi-XP IPC 3.10

PACSystems RXi-XP Slim IPC 3.12

Accessories 3.13

Marine IPC 3.14

Accessories 3.15

RXi-XR Transportation IPC 3.16

SCADA Edge IPC..... 3.17

RXi Monitor 3.19

RXi Display 3.20

Wolverine III HAZLOC PCs 3.21

Wolverine III HAZLOC Flat Panel Computer 3.22

Accessories 3.23

Standard and Extended Service Parts..... 3.24

PACSystems RXi IPC Family

GE's PACSystems RXi industrial computing platform delivers compact, rugged, high-performance computing capabilities to run HMI, historian, and analytics applications right at the machine. The result is improved real-time control of operations and better integration into plant-wide systems. These innovative IPCs incorporate the latest industry standard technologies to deliver the ultimate in performance, flexibility and value and demonstrate how GE is changing what's possible in industrial automation with solutions for a connected world.

Performance

GE's RXi IPCs contain a dual core processor as the computing platform, which provides excellent balance of performance with low power consumption. With 4-8 GB of RAM depending on model, multiple Gigabit Ethernet interfaces, and industrial grade high-speed SSD storage, it is an ideal platform for running GE's SCADA applications or other industrial applications right at the machine, even in the harshest environments. The platform incorporates patented thermal monitoring technology with sophisticated passive cooling techniques for a high performance computing "fanless" industrial computing platform that greatly reduces the risk of thermal shutdown. Additionally, the use of COM Express technology with wider temperature ranges, higher shock and vibration designs make GE's RXi IPCs suitable for industrial applications in harsh environments.

Flexibility

The RXi IPCs can be used in conjunction with GE's RXi Modular Displays, a family of high performance industrial touch screen displays to create a modular panel PC solution for visualization on the factory floor.

Low Total Cost of Ownership

Reliability is just one aspect of how GE's RXi IPCs can deliver value and reduce your total cost of ownership (TCO). The RXi Box IPC delivers low TCO through features such as compact size, reduced maintenance, low power consumption, and ease of future performance upgrades. Through the incorporation of rugged COM Express technology in the computing platform, users can take advantage of new processor technology as it is introduced in the future. GE will offer COM Express CPU upgrades as chip sets with additional computing power become available.

PACSystems RXi Box IPC	page 3.4
PACSystems RXi-EP Box IPC	page 3.6
PACSystems RXi-EP Slim IPC	page 3.8
PACSystems RXi-XP IPC	page 3.10
PACSystems RXi-XP Slim IPC	page 3.12
Marine IPC	page 3.14
RXi-XR Transportation IPC	page 3.16
SCADA Edge IPC	page 3.17
RXi Monitor	page 3.19
RXi Display	page 3.20



Publication Reference Chart

GFA-1909	PACSystems RXi Box IPC Datasheet http://www.ge-ip.com/account/download/13232/3656
GFK-2785	PACSystems RXi Box IPC Manual http://support.ge-ip.com/support/resources/sites/GE_FANUC_SUPPORT/content/live/DOCUMENT/2000/DO2407/en_US/GFK2785A.pdf
GFA-1910	PACSystems RXi Box IPC-EP Datasheet http://www.ge-ip.com/account/download/13234/3658



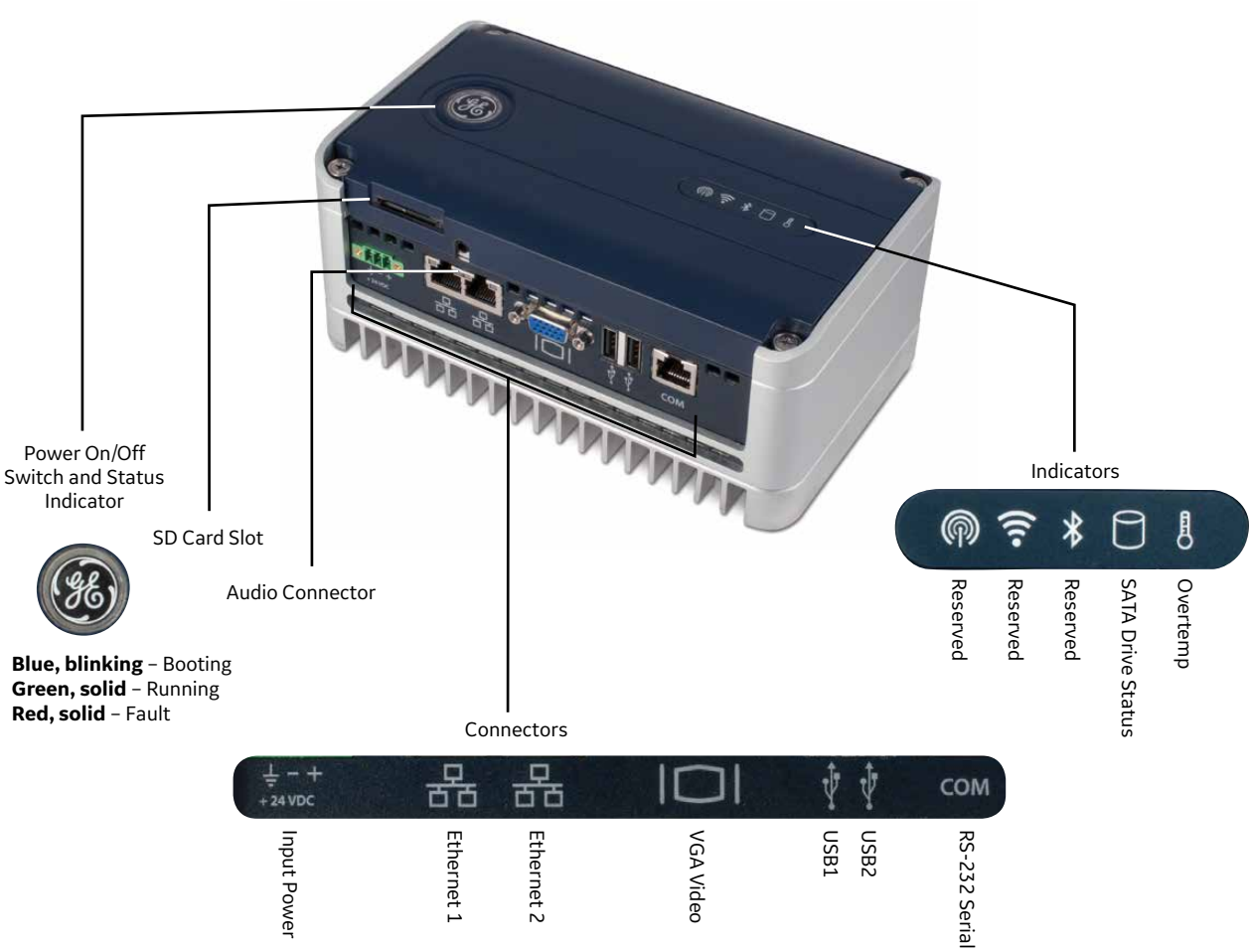
PACSystems RXi Box IPC

The RXi Box IPC is a high-performance, compact industrial computer designed for improved performance, flexibility and value. From the use of all industrial grade components to its fanless design, all aspects of the RXi Box IPC have been engineered for reliability in harsh environments. The core of the RXi Box IPC architecture is GE's rugged COM Express modular CPU platform, whose patented thermal monitoring technology with sophisticated passive cooling techniques enables a high-performance, fanless design that can operate from -25°C to +65°C. Additionally, the integration of COM Express into the IPC's design enables extended lifecycle management as boards can be easily upgraded when new, higher-performing technologies become commercially available.

	ICRXIBN7E000A	ICRXIBN7M000A	ICRXIBN0E000A	ICRXIBN0M000A
Product Name	**RXi Box IPC, Solid State Drive, Windows® 7**	**RXi Box IPC, Hard Disk Drive, Windows® 7**	**RXi Box IPC, Solid State Drive, No Operating System Installed**	**RXi Box IPC, Hard Disk Drive, No Operating System Installed**
Lifecycle Status	Active	Active	Active	Active
CPU Type	Via Eden™ - Dual Core - 1.0 GHz	Via Eden™ - Dual Core - 1.0 GHz	Via Eden™ - Dual Core - 1.0 GHz	Via Eden™ - Dual Core - 1.0 GHz
Operating System (OS)	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded	None Loaded	None Loaded
Data Storage	32 GB Solid State Drive	250 GB SATA Hard Drive	32 GB Solid State Drive	250 GB SATA Hard Drive
User Memory	4 GB	4 GB	4 GB	4 GB
Removeable Memory	SD Card Slot On Intelligent Faceplate	SD Card Slot On Intelligent Faceplate	SD Card Slot On Intelligent Faceplate	SD Card Slot On Intelligent Faceplate
Ethernet	2 Ethernet (10,100,1000 Mbit)	2 Ethernet (10,100,1000 Mbit)	2 Ethernet (10,100,1000 Mbit)	2 Ethernet (10,100,1000 Mbit)
Video	VGA Port (up to 2560 x 1440 resolution @ 60 Hz)	VGA Port (up to 2560 x 1440 resolution @ 60 Hz)	VGA Port (up to 2560 x 1440 resolution @ 60 Hz)	VGA Port (up to 2560 x 1440 resolution @ 60 Hz)
Audio	Mini DIN Audio Jack (on Intelligent Faceplate)	Mini DIN Audio Jack (on Intelligent Faceplate)	Mini DIN Audio Jack (on Intelligent Faceplate)	Mini DIN Audio Jack (on Intelligent Faceplate)
Serial Communications	1 RS-232 port (RJ-45)	1 RS-232 port (RJ-45)	1 RS-232 port (RJ-45)	1 RS-232 port (RJ-45)
USB Interface	2 USB 2.0 (Standard Size)	2 USB 2.0 (Standard Size)	2 USB 2.0 (Standard Size)	2 USB 2.0 (Standard Size)
Expansion	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc)	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc)	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc)	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc)
Indicators	Power, SATA, Eth Link / Activity, Battery Status, Over-temperature	Power, SATA, Eth Link / Activity, Battery Status, Over-temperature	Power, SATA, Eth Link / Activity, Battery Status, Over-temperature	Power, SATA, Eth Link / Activity, Battery Status, Over-temperature
Environmental (Operating)	Temperature -25°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +50°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature -25°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +50°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)
Dimensions (H x W x D)	7.55" x 4.55" x 3.1" (192mm x 116mm x 79mm)	7.55" x 4.55" x 3.1" (192mm x 116mm x 79mm)	7.55" x 4.55" x 3.1" (192mm x 116mm x 79mm)	7.55" x 4.55" x 3.1" (192mm x 116mm x 79mm)
Power	24 VDC (±25%) with protection - 1.8 A at 24 VDC	24 VDC (±25%) with protection - 1.8 A at 24 VDC	24 VDC (±25%) with protection - 1.8 A at 24 VDC	24 VDC (±25%) with protection - 1.8 A at 24 VDC
Agency Approvals	UL, CE, Class 1 Div 2 Pending	UL, CE, Class 1 Div 2 Pending	UL, CE, Class 1 Div 2 Pending	UL, CE, Class 1 Div 2 Pending

Accessories and Starter Kits

Part Number	Description	Lifecycle Status
ICRXIACCBPL	RXi DIN mounting backplate	Active
ICRXIBN7EKITA	RXi Box IPC Starter kit – includes ICRXIBN7E000A Box IPC with 32 GB Solid State Drive and Windows 7 Professional Installed, ICRXIACCBPL DIN mounting plate, and a light duty 24 VDC Power Supply.	Active





PACSystems RXi-EP Box IPC

The RXi-EP Box IPC is the mid-range offering in the RXi IPC family, featuring the added expandability of both mini PCI express and low profile PCI express slots and CFast storage. The RXi-EP Box IPC has multiple Gigabit Ethernet interfaces, and industrial grade high-speed SSD storage (or optional larger hard disk storage) to complete the high-performance design. Expandability combined with the highest performance CPUs delivers truly high performance computing.

	ICRXIFF7R111A	ICRXIFF7F111A	ICRXIFE7R111A
Product Name	**RXi-EP Box IPC - Flat (Wall) Mount, 320 GB Hard Drive, Windows® 7**	**RXi-EP Box IPC - Flat (Wall) Mount, 128 GB Solid State Drive, Windows® 7**	**RXi-EP Box IPC - Flat (Wall) Mount, 320 GB Hard Drive, Windows® 7**
Lifecycle Status	Active	Active	Active
CPU Type	Intel® Celeron - 1.4 GHz	Intel® Celeron - 1.4 GHz	Intel® ULV - 1.7 GHz
Operating System (OS)	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded
Data Storage	320 GB HDD	128 GB SSD	320 GB HDD
User Memory	4 GB DDR3	4 GB DDR3	4 GB DDR3
Removeable Memory	1 CFast - External - Bootable	1 CFast - External - Bootable	1 CFast - External - Bootable
Ethernet	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT
Video	VGA port	VGA port	VGA port
Audio			
Serial Communications	Via Expansion	Via Expansion	Via Expansion
USB Interface	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size
Expansion	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc.) 0 (Slim version) or 2 to 4 Full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc.) 0 (Slim version) or 2 to 4 Full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc.) 0 (Slim version) or 2 to 4 Full size PCI Expansion slots
Indicators	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature
Environmental (Operating)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)
Dimensions (H x W x D)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)
Power	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection
Agency Approvals	Designed to meet UL1950, CE Class A, FCC-A	Designed to meet UL1950, CE Class A, FCC-A	Designed to meet UL1950, CE Class A, FCC-A



PACSystems RXi-EP Box IPC

The RXi-EP Box IPC is the mid-range offering in the RXi IPC family, featuring the added expandability of both mini PCI express and low profile PCI express slots and CFast storage. The RXi-EP Box IPC has multiple Gigabit Ethernet interfaces, and industrial grade high-speed SSD storage (or optional larger hard disk storage) to complete the high-performance design. Expandability combined with the highest performance CPUs delivers truly high performance computing.

	ICRXIFE7F111A	ICRXIFF0F111A	ICRXIFE0F111A
Product Name	**RXi-EP Box IPC - Flat (Wall) Mount, 128 GB Solid State Drive, Windows® 7**	**RXi-EP Box IPC - Flat (Wall) Mount, 128 GB Solid State Drive, No OS**	**RXi-EP Box IPC - Flat (Wall) Mount, 128 GB Solid State Drive, No OS**
Lifecycle Status	Active	Active	Active
CPU Type	Intel® ULV - 1.7 GHz	Intel® Celeron - 1.4 GHz	Intel® ULV - 1.7 GHz
Operating System (OS)	Windows 7 Professional Preloaded	None Installed Supports Windows 7 Professional, Linux Kernal 2.6.32	None Installed Supports Windows 7 Professional, Linux Kernal 2.6.32
Data Storage	128 GB SSD	128 GB SSD	128 GB SSD
User Memory	4 GB DDR3	4 GB DDR3	4 GB DDR3
Removeable Memory	1 CFast - External - Bootable	1 CFast - External - Bootable	1 CFast - External - Bootable
Ethernet	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT
Video	VGA port	VGA port	VGA port
Audio			
Serial Communications	Via Expansion	Via Expansion	via expansion
USB Interface	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size
Expansion	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc.) 0 (Slim version) or 2 to 4 Full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc.) 0 (Slim version) or 2 to 4 Full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc.) 0 (Slim version) or 2 to 4 Full size PCI Expansion slots
Indicators	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature
Environmental (Operating)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C ltitude 40000 ft. (12 km)
Dimensions (H x W x D)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)
Power	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection
Agency Approvals	Designed to meet UL1950, CE Class A, FCC-A	Designed to meet UL1950, CE Class A, FCC-A	Designed to meet UL1950, CE Class A, FCC-A



PACSystems RXi-EP Slim IPC

The RXi-EP IPC is the mid-range offering in the RXi IPC family, featuring the added expandability of both mini PCI express and low profile PCI express slots and CFast storage. The RXi-EP Box IPC has multiple Gigabit Ethernet interfaces, and industrial grade high-speed SSD storage (or optional larger hard disk storage) to complete the high-performance design. Expandability combined with the highest performance CPUs delivers truly high performance computing.

	RXE0N0N7G102A	RXE0N0E0G102A	RXE0N0E7G102A
Product Name	**RXi-EP Slim IPC - Flat (Wall) Mount, 0 Slot, 128 GB Solid State Drive, Windows® 7**	**RXi-EP Slim IPC - Flat (Wall) Mount, 0 Slot, 128 GB Solid State Drive, No OS**	**RXi-EP Slim IPC - Flat (Wall) Mount, 0 Slot, 128 GB Solid State Drive, Windows® 7**
Lifecycle Status	Active	Active	Active
CPU Type	Intel® Celeron - 1.4 GHz	Intel® Core i7 ULV - 1.7 GHz	Intel® Core i7 ULV - 1.7 GHz
Operating System (OS)	Windows 7 Professional Preloaded	None Installed Supports Windows 7 Professional, Linux Kernal 2.6.32	Windows 7 Professional Preloaded
Data Storage	128 GB SSD	128 GB SSD	128 GB SSD
User Memory	4 GB DDR3	4 GB DDR3 ECC	4 GB DDR3 ECC
Removeable Memory	1 CFast - External - Bootable	1 CFast - External - Bootable	1 CFast - External - Bootable
Ethernet	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	3 Ethernet (10, 100, 1000 Mbit) ports 10/100/1000BaseT auto-negotiation 2 ports (1 & 2) support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT
Video	VGA port	Display port, VGA port	Display port, VGA port
Audio			
Serial Communications	Via Expansion	Via Expansion	Via Expansion
USB Interface	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size	4 External USB 2.0 - Standard Size 2 Internal USB 2.0 - Standard Size
Expansion	None	None	None
Indicators	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature	Power, SATA, Eth 1, 2 & 3 (Link / Activity); Battery Status, Over-temperature
Environmental (Operating)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +65°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)
Dimensions (H x W x D)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)	7.16" x 9.2" x 3.86" (182mm x 233mm x 98mm)
Power	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection
Agency Approvals	Designed to meet UL1950, CE Class A, FCC-A	Designed to meet UL1950, CE Class A, FCC-A	Designed to meet UL1950, CE Class A, FCC-A

Accessories

Part Number	Description	Lifecycle Status
ICRXIACCMP02	10 pcs Flat Mounting Kit	Active
ICRXIACCMP05	1 pcs Flat Mounting Kit	Active
ICRXIACCRM04	1 pcs Slim DIN Rail Kit ICXE	Active
ICRXIACCRM05	1 pcs Flat DIN Rail Kit	Active
ICRXIACCMP06	1 pcs Slim 70 Mount Kit RXE	Active



PACSystems RXi-XP IPC

The RXi-XP IPC is the highest-performance, compact industrial computer available in the RXi family, with the added expandability of 2 to 4 PCI slots, 1 mini PCI Express slot and CFast storage. From the use of all industrial grade components to its fanless design, all aspects of the RXi-XP IPC have been engineered for reliability in harsh environments. The core of the RXi-XP IPC architecture is GE's rugged COM Express modular CPU platform, whose patented thermal monitoring technology with sophisticated passive cooling techniques enables a high-performance, fanless design that can operate from -25°C to +65°C. Additionally, the integration of COM Express into the IPC's design enables extended lifecycle management as boards can be easily upgraded when new, higher-performing technologies become commercially available.

	RXE2N0F7H132A	RXE2N0F7G132A	RXE2N0Q7H132A	RXE2N0Q7G132A
Product Name	**RXi-XP IPC, Hard Drive, 2-slot, Dual Core, Windows® 7**	**RXi-XP IPC, Solid State Drive, 2-slot, Dual Core, Windows® 7**	**RXi-XP IPC, Hard Drive, 2-slot, Quad Core, Windows® 7**	**RXi-XP IPC, Solid State Drive, 2-slot, Quad Core, Windows® 7**
Lifecycle Status	Active	Active	Active	Active
CPU Type	Intel® i7 - Dual Core - 2.5 GHz	Intel® i7 - Dual Core - 2.5 GHz	Intel® i7 - Quad Core - 2.1 GHz	Intel® i7 - Quad Core - 2.1 GHz
Operating System (OS)	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded
Data Storage	320 GB HDD	128 GB SSD	320 GB HDD	128 GB SSD
User Memory	8 GB	8 GB	8 GB	8 GB
Removeable Memory	CFast Card Slot	CFast Card Slot	CFast Card Slot	CFast Card Slot
Ethernet	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT
Video	Display Port; VGA Port	Display Port; VGA Port	Display Port; VGA Port	Display Port; VGA Port
Audio				
Serial Communications	2 RS-232 ports	2 RS-232 ports	2 RS-232 ports	2 RS-232 ports
USB Interface	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal
Expansion	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots
Indicators	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature
Environmental (Operating)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)
Dimensions (H x W x D)	8.15" x 9.92" x 4.76" (207mm x 252mm x 121mm)	8.15" x 9.92" x 4.76" (207mm x 252mm x 121mm)	8.15" x 9.92" x 4.76" (207mm x 252mm x 121mm)	8.15" x 9.92" x 4.76" (207mm x 252mm x 121mm)
Power	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection
Agency Approvals				



PACSystems RXi-XP IPC

The RXi-XP IPC is the highest-performance, compact industrial computer available in the RXi family, with the added expandability of 2 to 4 PCI slots, 1 mini PCI Express slot and CFast storage. From the use of all industrial grade components to its fanless design, all aspects of the RXi-XP IPC have been engineered for reliability in harsh environments. The core of the RXi-XP IPC architecture is GE's rugged COM Express modular CPU platform, whose patented thermal monitoring technology with sophisticated passive cooling techniques enables a high-performance, fanless design that can operate from -25°C to +65°C. Additionally, the integration of COM Express into the IPC's design enables extended lifecycle management as boards can be easily upgraded when new, higher-performing technologies become commercially available.

	RXE4N0F7H134A	RXE4N0F7G134A	RXE4N0Q7H134A	RXE4N0Q7G134A
Product Name	**RXi-XP IPC, Hard Drive, 4-slot, Dual Core, Windows® 7**	**RXi-XP IPC, Solid State Drive, 4-slot, Dual Core, Windows® 7**	**RXi-XP IPC, Hard Drive, 4-slot, Quad Core, Windows® 7**	**RXi-XP IPC, Solid State Drive, 4-slot, Quad Core, Windows® 7**
Lifecycle Status	Active	Active	Active	Active
CPU Type	Intel® i7 - Dual Core - 2.5 GHz	Intel® i7 - Dual Core - 2.5 GHz	Intel® i7 - Quad Core - 2.1 GHz	Intel® i7 - Quad Core - 2.1 GHz
Operating System (OS)	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded
Data Storage	320 GB HDD	128 GB SSD	320 GB HDD	128 GB SSD
User Memory	8 GB	8 GB	8 GB	8 GB
Removeable Memory	CFast Card Slot	CFast Card Slot	CFast Card Slot	CFast Card Slot
Ethernet	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT
Video	Display Port; VGA Port	Display Port; VGA Port	Display Port; VGA Port	Display Port; VGA Port
Audio				
Serial Communications	2 RS-232 ports; 2 RS422/485 ports	2 RS-232 ports; 2 RS422/485 ports	2 RS-232 ports; 2 RS422/485 ports	2 RS-232 ports; 2 RS422/485 ports
USB Interface	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal
Expansion	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 2 to 4 full size PCI Expansion slots
Indicators	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature
Environmental (Operating)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)
Dimensions (H x W x D)	8.15" x 9.92" x 6.22" (207mm x 252mm x 158mm)	8.15" x 9.92" x 6.22" (207mm x 252mm x 158mm)	8.15" x 9.92" x 6.22" (207mm x 252mm x 158mm)	8.15" x 9.92" x 6.22" (207mm x 252mm x 158mm)
Power	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection
Agency Approvals				



PACSystems RXi-XP Slim IPC

The RXi-XP Slim IPC is the highest-performance, compact industrial computer available in the RXi family, with the added expandability of 2 to 4 PCI slots, 1 mini PCI Express slot and CFast storage. From the use of all industrial grade components to its fanless design, all aspects of the RXi-XP Slim IPC have been engineered for reliability in harsh environments. The core of the RXi-XP IPC architecture is GE's rugged COM Express modular CPU platform, whose patented thermal monitoring technology with sophisticated passive cooling techniques enables a high-performance, fanless design that can operate from -25°C to +65°C. Additionally, the integration of COM Express into the IPC's design enables extended lifecycle management as boards can be easily upgraded when new, higher-performing technologies become commercially available.

	RXE0N0F7G102A	RXE0N0Q7G102A
Product Name	**Rxi-XP Slim IPC, Solid State Drive, 0-slot, Dual Core, Windows® 7**	**Rxi-XP Slim IPC, Solid State Drive, 0-slot, Quad Core, Windows® 7**
Lifecycle Status	Active	Active
CPU Type	Intel® i7 - Dual Core - 2.5 GHz	Intel® i7 - Quad Core - 2.5 GHz
Operating System (OS)	Windows 7 Professional Preloaded	Windows 7 Professional Preloaded
Data Storage	128 GB SSD	128 GB SSD
User Memory	8 GB	8 GB
Removeable Memory	CFast Card Slot	CFast Card Slot
Ethernet	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT
Video	Display Port; VGA Port	Display Port; VGA Port
Audio		
Serial Communications	2 RS-232 ports	2 RS-232 ports
USB Interface	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal	4 USB 2.0 (Standard Size) External; 1 USB 2.0 (Standard Size) Internal
Expansion	0 (Slim version) or 2 to 4 Full size PCI Expansion slots	0 (Slim version) or 2 to 4 Full size PCI Expansion slots
Indicators	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature
Environmental (Operating)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)
Dimensions (H x W x D)		
Power	24 VDC (±25%) with protection	24 VDC (±25%) with protection
Agency Approvals		

Accessories

Part Number	Description	Lifecycle Status
ICRXIACCMP02	10 pcs Flat Mounting Kit	Active
ICRXIACCMP05	1 pcs Flat Mounting Kit	Active
ICRXIACCRM05	1 pcs Flat DIN Rail Kit	Active
ICRXIACCMP06	1 pcs Slim 70 Mount Kit RXE	Active



Marine IPC

GE's Marine IPC is a rugged, versatile, high-performance. Industrial PC, based on the RXi-XP IPC industrial computing platform, designed specifically for demanding marine applications. It features a fanless design and extended temperature range for reliable operation in bridge, control room, and machinery room applications. It has been certified by DNV GL, the world's largest ship and offshore classification society, to comply with marine-grade standards for temperature, humidity, vibration, and electromagnetic compatibility (EMC). The Marine IPC offers expandability of 0, 2, or 4 PCI slots, 1 mini PCI Express slot and CFast storage.

	RXE0NMF0G102A	RXE0NMN0G102A	RXE2NMN0G132A	RXE4NMF0G134A
Product Name	**Marine IPC, 0 Slot, Dual Core i7, 128 GB Solid State Drive, No OS**	**Marine IPC, 0 Slot, Celeron, 128 GB Solid State Drive, No OS**	**Marine IPC, 2 Slot, Celeron, 128 GB Solid State Drive, No OS**	**Marine IPC, 4 Slot, Dual Core i7, 128 GB Solid State Drive, No OS**
Lifecycle Status	Active	Active	Active	Active
CPU Type	Intel® i7 - Dual Core - 2.5 GHz	Intel Celeron - 1.4GHz	Intel Celeron - 1.4GHz	Intel® i7 - Dual Core - 2.5 GHz
Operating System (OS)	None	None	None	None
Data Storage	128 GB Solid State Drive	128 GB Solid State Drive	128 GB Solid State Drive	128 GB Solid State Drive
User Memory	4 GB DDR3			4 GB DDR3
Removeable Memory	CFast Card Slot	CFast Card Slot	CFast Card Slot	CFast Card Slot
Ethernet	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT	5 Ethernet (10,100,1000 Mbit); 10/100/1000BaseT auto-negotiation support Time SYNC (IEEE1588 and 802.1AS) based on Intel 82574IT
Video	Display Port	Display Port	Display Port	Display Port
Audio				
Serial Communications	2x RS232 (can be customized to RS422/485)	2x RS232 (can be customized to RS422/485)	2x RS232 (can be customized to RS422/485)	2x RS232, 2x RS422/485
USB Interface	4 USB 2.0 Standard Size ports – External; 1 USB 2.0 Standard Size ports – Internal	4 USB 2.0 Standard Size ports – External; 1 USB 2.0 Standard Size ports – Internal	4 USB 2.0 Standard Size ports – External; 1 USB 2.0 Standard Size ports – Internal	4 USB 2.0 Standard Size ports – External; 1 USB 2.0 Standard Size ports – Internal
Expansion	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 0 (Slim version) or 2 to 4 Full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 0 (Slim version) or 2 to 4 Full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 0 (Slim version) or 2 to 4 Full size PCI Expansion slots	Internal Mini PCIe card site (e.g. for WLAN, GPRS, etc); 0 (Slim version) or 2 to 4 Full size PCI Expansion slots
Indicators	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature	Power, SATA, Ethernet Link / Activity, Battery Status, Over-temperature
Environmental (Operating)[1]	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +60°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +55°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)	Temperature 0°C to +55°C Humidity 5-95% @ +40°C Altitude 15000 ft. (4.5 km)
Environmental (Storage)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)	Temperature -40°C to +85°C Humidity 5-95% @ +40°C Altitude 40000 ft. (12 km)
Dimensions (H x W x D)			8.15" x 9.92" x 4.76" (207mm x 252mm x 121mm)	8.15" x 9.92" x 6.22" (207mm x 252mm x 158mm)
Power	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection	24 VDC (±25%) with protection
Agency Approvals	DNV Class A; UL1950, CE class A, FCC-A	DNV Class A; UL1950, CE class A, FCC-A	DNV Class A; UL1950, CE class A, FCC-A	DNV Class A; UL1950, CE class A, FCC-A

[1]Temperature rating requires vertical orientation of the heat sink fins.

Accessories

Part Number	Description	Lifecycle Status
ICRXIACCMP02	10 pcs Flat Mounting Kit	Active
ICRXIACCMP05	1 pcs Flat Mounting Kit	Active
ICRXIACCRM05	1 pcs Flat DIN Rail Kit	Active
ICRXIACCMP06	1 pcs Slim 70 Mount Kit RXE	Active



RXi-XR Transportation IPC

The RXi-XR IPC delivers compact, rugged, high performance computing capabilities for demanding railway applications and other harsh environments. It features a fanless design and extended temperature range for reliable operation in the toughest environments. It meets EN50155 standards for railway applications and is IP67 rated for dust and moisture protection. COM Express technology allows for use of the same chassis with different COM Express board. Create different IPCs for different applications on a standard platform. CAN BUS protocol lets the RXi-XR communicate with other devices without a host computer.

	IPCXRFG11111F	IPCXREG11111F
Product Name	**RXi-XR Celeron 1.4 GHz, 4GB, Windows® 7, 128 GB Solid State Drive**	**RXi-XR ULV 1.7 GHz, 4GB, Windows® 7, 128 GB Solid State Drive**
Lifecycle Status	Active	Active
CPU Type	Intel Celeron - 1.4GHz	Intel® Core i7 - 1.7 GHz
Operating System (OS)	Windows 7 Standard Preloaded	Windows 7 Standard Preloaded
Data Storage	128 GB Solid State Drive	128 GB Solid State Drive
User Memory	4 GB DDR3	4 GB DDR3
Removeable Memory		
Ethernet	2 x M12 8-pin X-coded connectors for 10/100/1000BaseT	2 x M12 8-pin X-coded connectors for 10/100/1000BaseT
Video	1 x 15-pin DSUB VGA connector	1 x 15-pin DSUB VGA connector
Audio		
Serial Communications		
USB Interface	2 x M8 4-pin connectors for USB 2.0	2 x M8 4-pin connectors for USB 2.0
Expansion		
Indicators	Power button disabled in H/W, Power status LED (Green)	Power button disabled in H/W, Power status LED (Green)
Environmental (Operating)	Temperature -40°C to +70°C Altitude 8200 ft. (2.5 km)	Temperature -40°C to +70°C Altitude 8200 ft. (2.5 km)
Environmental (Storage)	Temperature -40°C to +70°C Altitude 8200 ft. (2.5 km)	Temperature -40°C to +70°C Altitude 8200 ft. (2.5 km)
Dimensions (H x W x D)	8.15" x 9.92" x 4.76" (207mm x 252mm x 121mm)	8.15" x 9.92" x 4.76" (207mm x 252mm x 121mm)
Power	9VDC - 34VDC input power range, 35W max. power consumption	9VDC - 34VDC input power range, 35W max. power consumption
Agency Approvals	UL1950, CE Class A, FCC-A; EN50155 Compliance- EMC, Temperature, Shock & Vibration – Class A	UL1950, CE Class A, FCC-A; EN50155 Compliance- EMC, Temperature, Shock & Vibration – Class A



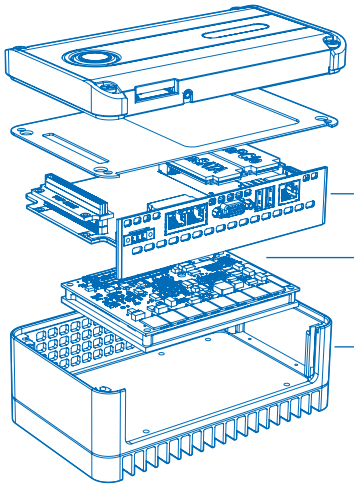
SCADA Edge IPC

SCADA Edge is a preconfigured control and automation software application, to speed time to solution for Industrial Internet applications. It is built on one of three compact and rugged Industrial PC platforms. With a choice of dual core to quad core processors, the robust RXi IPC platform provides the computing power needed for most applications. The IPC hard drive is expandable and includes options like VIA Eden to Intel Core i7 and storage capacity of 4 or 8 GB. It features special SSD drives, multiple Ethernet interfaces and a number of different expansion slots. SCADA Edge is preconfigured with either GE's HMI/SCADA CIMPLICITY or HMI/SCADA iFIX software. Scalable and upgradeable, the SCADA Edge solution meets the needs of small/medium size operations and can expand along with them.

	ICRXIIFIX1002	ICRXICIMP1002
Product Name	**RXi EP with iFIX**	**RXi EP with CIMPLICITY**
Lifecycle Status	Active	Active
Included in Package	iFIX Embedded Historian for SCADA 500/1500/3000 tags Runtime, IGS 500 pt Buffer 2 Webspace Clients Standalone or Networked	CIMPLICITY Historian for SCADA 500/1500/3000 tags Runtime, IGS 500 pt Buffer 2 Webspace Clients Standalone or Networked

Performance and Power Tailored to Requirements

1. Build your hardware



2. Choose your software

iFIX

iFIX is ideally suited for process applications, ranging from fundamental HMI such as manual data entry and validation to very complex SCADA such as batch, filtration and distributed alarm management.

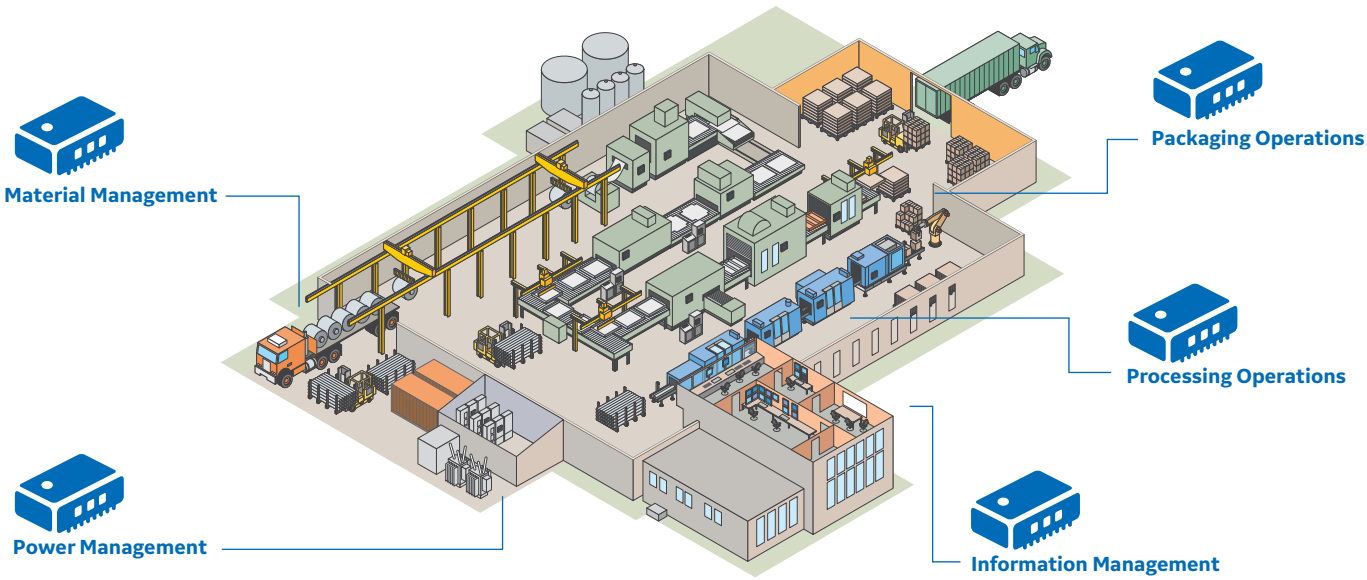
CIMPLICITY

CIMPLICITY offers true client/server based visualization and control that helps you manage your operations, perform supervisory automation and deliver reliable information in discrete applications that require higher-level analytics.

HISTORIAN

GE HISTORIAN is a powerful, enterprise-wide software that collects, archives and distributes tremendous volumes of real-time production information at extremely high speeds. Historian improves visibility, provides context to raw data, and aggregates islands of information for faster more accurate decisions, increased productivity and reduced costs across your entire system.

3. Connect and optimize your operations





RXi Monitor

The RXi monitor is designed and constructed for use in harsh industrial conditions. The front bezel is IP65 rated, so it is resistant to dust, oil, water, and other non-corrosive materials. An operating temperature range of –10°C to 60°C makes the RXi suitable for use in a variety of extreme environments.

The RXi monitor has a TFT LCD display that provides superior image quality. The 5-wire resistive touchscreen can be operated with both gloved and bare fingers, or the included stylus. LED backlight increases readability in low light conditions. Use the RXi monitor as an interface for GE's complete line of RXi Industrial PCs to quickly access HMI, web reports and graphs, training videos, technical documentation and other critical information via a secure network.98 Plug-and-play interoperability means the RXi supports a range of hardware, including third party devices.

	ZMTFRI15.0
Product Name	**RXi Monitor, 15" TFT LCD**
Lifecycle Status	Active
Display Size	15" 1024 x 768
Display Type	Color TFT LCD
Display Color	16.2M colors
Light Transmission	80%
Backlight Life	50,000 hrs.
External I/O	1 x VGA input 1 x USB for touch 1 x DC 11~32V power input
On Screen Display (OSD)	On rear side
Construction	Steel front bezel and steel chassis
Dimensions (W x H x D)	16.14" x 12.2" x 2.35" (410mm x 310mm x 59.7mm)
Mounting	Support VESA 75 x 75 mount and panel mount
Operating Temperature	-10~60°C
Storage Temperature	-20~60°C
Relative Humidity	10~90% @ 40°C Non-condensing
IP Rating	Front bezel IP65, back cover IP20
Approvals	Meet CE/FCC class A design



RXi Display

The RXi Display combines the latest in touchscreen technology with a widescreen display to give operators an enhanced view into their processes. When paired with the RXi Box PC, the RXi Display creates a high-performance system. The RXi Display was designed for ease of operation. Its front-mounted SD memory card slot can be accessed without opening the cabinet. For fast and easy installation, the RXi Display has a unique mounting system, designed to be completed by a single person without the need for special tools or fasteners. The RXi Display's solid aluminum bezel design is built to last. Its 9H-rated hardened capacitive multi-touch screen provides an intuitive, smartphone-like experience.

	ICRXIDIXNE19LCTA	ICRXIDIXNM19LCTA	ICRXIDI0NE19LCTA	ICRXIDI0NM19LCTA
Product Name	**RXi Display, 15" TFT LCD SSD Windows 7**	**RXi Display, 15" TFT LCD HDD Windows 7**	**RXi Display, 15" TFT LCD SSD No Operating System Installed**	**RXi Display, 15" TFT LCD HDD No Operating System Installed**
Lifecycle Status	Active	Active	Active	Active
Memory Type	SSD	HDD	SSD	HDD
Operating System	Windows® 7 Professional	Windows® 7 Professional	None	None
Display Size	18.81" (Diagonal)	18.81" (Diagonal)	18.81" (Diagonal)	18.81" (Diagonal)
Display Type	TFT LCD	TFT LCD	TFT LCD	TFT LCD
Display Color	16.7M colors	16.7M colors	16.7M colors	16.7M colors
Display Resolution	1366 x 768	1366 x 768	1366 x 768	1366 x 768
Aspect Ratio	16:9	16:9	16:9	16:9
Backlight Life	LED/50,000 hrs.	LED/50,000 hrs.	LED/50,000 hrs.	LED/50,000 hrs.
Touch Screen	Capacitive Multi-Touch	Capacitive Multi-Touch	Capacitive Multi-Touch	Capacitive Multi-Touch
Contrast Ratio	600 (minimum)/1000 (typical)	600 (minimum)/1000 (typical)	600 (minimum)/1000 (typical)	600 (minimum)/1000 (typical)
Brightness (nits)	300	300	300	300
Peripherals	External Front Accessible SD Card Slot On/Off and 3 User-Defined Capacitive-Touch Front Panel Buttons	External Front Accessible SD Card Slot On/Off and 3 User-Defined Capacitive-Touch Front Panel Buttons	External Front Accessible SD Card Slot On/Off and 3 User-Defined Capacitive-Touch Front Panel Buttons	External Front Accessible SD Card Slot On/Off and 3 User-Defined Capacitive-Touch Front Panel Buttons
Power	18-32 VDC (24 VDC nominal) 2.6 A at 24 VDC	18-32 VDC (24 VDC nominal) 2.6 A at 24 VDC	18-32 VDC (24 VDC nominal) 2.6 A at 24 VDC	18-32 VDC (24 VDC nominal) 2.6 A at 24 VDC
Dimensions (W x H)	18.88" x 12.72" (479.6mm x 323.1mm)	18.88" x 12.72" (479.6mm x 323.1mm)	18.88" x 12.72" (479.6mm x 323.1mm)	18.88" x 12.72" (479.6mm x 323.1mm)
Depth to Panel	0.4" (10.16mm)	0.4" (10.16mm)	0.4" (10.16mm)	0.4" (10.16mm)
Panel Cutout Dimensions	18" x 11.5" (457.2mm x 292.1mm)	18" x 11.5" (457.2mm x 292.1mm)	18" x 11.5" (457.2mm x 292.1mm)	18" x 11.5" (457.2mm x 292.1mm)
Operating Temperature	0-60°C	0-40°C	0-60°C	0-40°C
Operating Vibration (sine)	10-57 Hz, 0.006 in disp; 57-500 Hz, 1.0g		10-57 Hz, 0.006 in disp; 57-500 Hz, 1.0g	
Shock (half-sine)	15g pk, 11ms	15g pk, 11ms	15g pk, 11ms	15g pk, 11ms
Front Glass Hardness	9H	9H	9H	9H
Approvals	UL 60950-1 UL508 CAN/CSA-C22.2 NO. 60950-1-07 CE Mark	UL 60950-1 UL508 CAN/CSA-C22.2 NO. 60950-1-07 CE Mark	UL 60950-1 UL508 CAN/CSA-C22.2 NO. 60950-1-07 CE Mark	UL 60950-1 UL508 CAN/CSA-C22.2 NO. 60950-1-07 CE Mark

Wolverine III HAZLOC Flat Panel Computer

GE's Wolverine III raises the bar for ATEX Zone 2 and Class 1 Div 2 rated rugged panel PCs. It weighs less than 23 lbs. without compromising ruggedization, and operates reliably in temperatures from –40° to +60°C. The modular design is easy to upgrade, and sets a new standard for field serviceability. Wolverine III is designed specifically to withstand the rigors of deployment in harsh, hazardous (HAZLOC) applications such as oil and gas exploration and production where salt, spray, dust, shock, vibration and extremes of temperature provide the most challenging environments for computers.

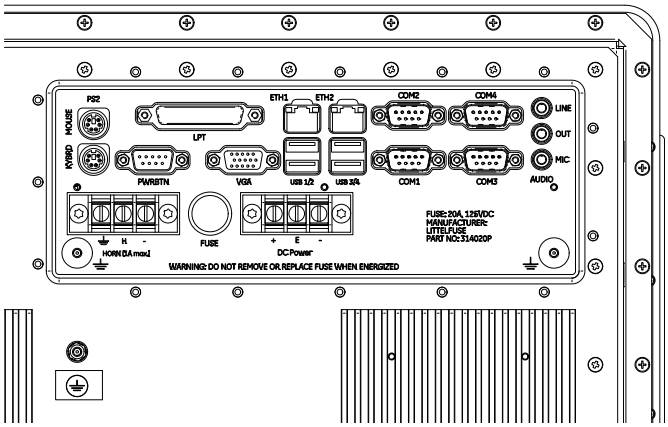
Wolverine III Features

- High performance Intel® Core™ 2 Duo-based modular computer with all soldered components for maximum rugged construction
- Field-replaceable SATA solid-state hard drive
- Sunlight readable 15" 1024 x 768 LED backlit AMTFT display
- 5-wire resistive touchscreen with anti-glare and scratch resistant coating
- AC and DC power supply options
- Multiple mounting options for flexible deployment
- Wide temperature range (-40°C to +60°C) with fast turn-on at -20°C
- Windows® XP, Windows® 7, Linux® support
- Onboard system diagnostics for temperature, power-on hours and acceleration
- Compliance
  - CE
  - ATEX Zone 2
  - Class 1 Div 2
  - IP66
  - NEMA 4X
  - FCC Subpart B Class A



Wolverine III HAZLOC Flat Panel Computer pages 3.22 and 3.23
Accessories and Service Parts page 3.24

I/O Plate



Publication Reference Chart

GFA-1836	Product Datasheet http://www.ge-ip.com/account/download/12994/3662
GFK-2791A	Quick Start Guide http://www.ge-ip.com/account/download/13188/
GFK-2789	User Manual http://www.ge-ip.com/account/download/13217/
GFK-2790	Extended Service Manual http://support.ge-ip.com/support/resources/sites/GE_FANUC_SUPPORT/content/staging/DOCUMENT/2000/DO2410/en_US/1.0/GFK2790_WV3%20Extended%20Service.pdf



Wolverine III HAZLOC Flat Panel Computer

GE's Wolverine III raises the bar for ATEX Zone 2 and Class 1 Div 2 rated rugged panel PCs. It weighs less than 23 lbs. without compromising ruggedization, and operates reliably in temperatures from –40° to +60°C. The modular design is easy to upgrade, and sets a new standard for field serviceability. Wolverine III is designed specifically to withstand the rigors of deployment in harsh, hazardous (HAZLOC) applications such as oil and gas exploration and production where salt, spray, dust, shock, vibration and extremes of temperature provide the most challenging environments for computers.

	WV3402114010	WV3402124010	WV3402114020	WV3402124020
Product Name	**Wolverine II Flat Panel Computer, Windows® XP, DC Power, IOP1 Cover**	**Wolverine II Flat Panel Computer, Windows® XP, AC Power, IOP1 Cover**	**Wolverine II Flat Panel Computer, Windows® 7, DC Power, IOP1 Cover**	**Wolverine II Flat Panel Computer, Windows® 7, AC Power, IOP1 Cover**
Lifecycle Status	Active	Active	Active	Active
CPU Type	Intel® Core™ 2 Duo - 2.26 GHz	Intel® Core™ 2 Duo - 2.26 GHz	Intel® Core™ 2 Duo - 2.26 GHz	Intel® Core™ 2 Duo - 2.26 GHz
Operating System (OS)	Windows XP Pro	Windows XP Pro	Windows 7	Windows 7
Data Storage	32 GB Solid State Drive	32 GB Solid State Drive	32 GB Solid State Drive	32 GB Solid State Drive
User Memory	4 GB	4 GB	4 GB	4 GB
Display	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output
I/O Gland Connections	IOP1 (glands on the back cover)	IOP1 (glands on the back cover)	IOP1 (glands on the back cover)	IOP1 (glands on the back cover)
Ethernet	2 Ethernet (10,100,1000 Mbit) - RJ-45	2 Ethernet (10,100,1000 Mbit) - RJ-45	2 Ethernet (10,100,1000 Mbit) - RJ-45	2 Ethernet (10,100,1000 Mbit) - RJ-45
Serial Communications	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)
USB Interface	4x USB 2.0 ports (1 IS port on IOP cover standard)	4x USB 2.0 ports (1 IS port on IOP cover standard)	4x USB 2.0 ports (1 IS port on IOP cover standard)	4x USB 2.0 ports (1 IS port on IOP cover standard)
Audio	3.5 mm (Mic, Line, Out)	3.5 mm (Mic, Line, Out)	3.5 mm (Mic, Line, Out)	3.5 mm (Mic, Line, Out)
Indicators	Power/Clean/Brightness F1-F12 Buttons	Power/Clean/Brightness F1-F12 Buttons	Power/Clean/Brightness F1-F12 Buttons	Power/Clean/Brightness F1-F12 Buttons
Environmental (Operating)	-40° to +60°C	-40° to +60°C	-40° to +60°C	-40° to +60°C
Environmental (Storage)	-40° to +70°C	-40° to +70°C	-40° to +70°C	-40° to +70°C
Dimensions (H x W x D)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)
Mounting	Rear Mount (Panel or Yoke Optional)	Rear Mount (Panel or Yoke Optional)	Rear Mount (Panel or Yoke Optional)	Rear Mount (Panel or Yoke Optional)
Power	11-32 VDC 85 W (200 W max. while heating)	100-240 VAC (auto-ranging) 47-63 Hz 85 W (200 W max. while heating)	11-32 VDC 85 W (200 W max. while heating)	100-240 VAC (auto-ranging) 47-63 Hz 85 W (200 W max. while heating)
Agency Approvals	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A
Weight	22.5 lbs., 10.2 kg	22.5 lbs., 10.2 kg	22.5 lbs., 10.2 kg	22.5 lbs., 10.2 kg



Wolverine III HAZLOC Flat Panel Computer

GE's Wolverine III raises the bar for ATEX Zone 2 and Class 1 Div 2 rated rugged panel PCs. It weighs less than 23 lbs. without compromising ruggedization, and operates reliably in temperatures from –40° to +60°C. The modular design is easy to upgrade, and sets a new standard for field serviceability. Wolverine III is designed specifically to withstand the rigors of deployment in harsh, hazardous (HAZLOC) applications such as oil and gas exploration and production where salt, spray, dust, shock, vibration and extremes of temperature provide the most challenging environments for computers.

	WV3402414010	WV3402424010	WV3402414020	WV3402424020
Product Name	**Wolverine II Flat Panel Computer, Windows® XP, DC Power, IOP3 Cover**	**Wolverine II Flat Panel Computer, Windows® XP, AC Power, IOP3 Cover**	**Wolverine II Flat Panel Computer, Windows® 7, DC Power, IOP3 Cover**	**Wolverine II Flat Panel Computer, Windows® 7, AC Power, IOP3 Cover**
Lifecycle Status	Active	Active	Active	Active
CPU Type	Intel® Core™ 2 Duo - 2.26 GHz	Intel® Core™ 2 Duo - 2.26 GHz	Intel® Core™ 2 Duo - 2.26 GHz	Intel® Core™ 2 Duo - 2.26 GHz
Operating System (OS)	Windows XP Pro	Windows XP Pro	Windows 7	Windows 7
Data Storage	32 GB Solid State Drive	32 GB Solid State Drive	32 GB Solid State Drive	32 GB Solid State Drive
User Memory	4 GB	4 GB	4 GB	4 GB
Display	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output	15" XVGA; 1024 x 768, 16.2M color AMTFT LCD; sunlight readable with LED backlight VGA Output
I/O Gland Connections	IOP3 (glands on the bottom of cover)	IOP3 (glands on the bottom of cover)	IOP3 (glands on the bottom of cover)	IOP3 (glands on the bottom of cover)
Ethernet	2 Ethernet (10,100,1000 Mbit) - RJ-45	2 Ethernet (10,100,1000 Mbit) - RJ-45	2 Ethernet (10,100,1000 Mbit) - RJ-45	2 Ethernet (10,100,1000 Mbit) - RJ-45
Serial Communications	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)	4x serial ports (2x optically protected RS-232, 2x RS-232/422/485)
USB Interface	4x USB 2.0 ports (1 IS port on IOP cover standard)	4x USB 2.0 ports (1 IS port on IOP cover standard)	4x USB 2.0 ports (1 IS port on IOP cover standard)	4x USB 2.0 ports (1 IS port on IOP cover standard)
Audio	3.5 mm (Mic, Line, Out)	3.5 mm (Mic, Line, Out)	3.5 mm (Mic, Line, Out)	3.5 mm (Mic, Line, Out)
Indicators	Power/Clean/Brightness F1-F12 Buttons	Power/Clean/Brightness F1-F12 Buttons	Power/Clean/Brightness F1-F12 Buttons	Power/Clean/Brightness F1-F12 Buttons
Environmental (Operating)	-40° to +60°C	-40° to +60°C	-40° to +60°C	-40° to +60°C
Environmental (Storage)	-40° to +70°C	-40° to +70°C	-40° to +70°C	-40° to +70°C
Dimensions (H x W x D)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)	13.75" x 15.9" x 5.02" 349mm x 408mm x 98mm (144mm with IOP cover)
Mounting	Rear Mount (Panel or Yoke Optional)	Rear Mount (Panel or Yoke Optional)	Rear Mount (Panel or Yoke Optional)	Rear Mount (Panel or Yoke Optional)
Power	11-32 VDC 85 W (200 W max. while heating)	100-240 VAC (auto-ranging) 47-63 Hz 85 W (200 W max. while heating)	11-32 VDC 85 W (200 W max. while heating)	100-240 VAC (auto-ranging) 47-63 Hz 85 W (200 W max. while heating)
Agency Approvals	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A	CE, ATEX Zone 2, NEMA 4X, IP65, FCC Subpart B Class A
Weight	22.5 lbs., 10.2 kg	22.5 lbs., 10.2 kg	22.5 lbs., 10.2 kg	22.5 lbs., 10.2 kg

Accessories

Part Number	Description	Lifecycle Status
WV3ACCYOKEM0	Yoke Mounting Kit - no keyboard tray or sun shield	Active
WV3ACCYOKEM1	Yoke Mounting Kit - with keyboard tray and no sun shield	Active
WV3ACCYOKEM2	Yoke Mounting Kit - no keyboard tray but with sun shield	Active
WV3ACCYOKEM3	Yoke Mounting Kit - with keyboard tray and sun shield	Active
WV3ACCPANLMT	Panel Mounting Kit	Active
WV3ACCSUNSHD	Standalone Sun Shield - must be used with a yoke	Active
WV3ACCKYBDTR	Standalone Keyboard Tray - must be used with a yoke	Active

Standard Service Parts

Part Number	Description	Lifecycle Status
WV3SPGLNDPL0	Gland Plate , IOP3	Active
WV3SPGLNDPL1	Gland Plate , IOP1	Active
WV3SPFUSEAC0	Fuse for AC Unit	Active
WV3SPFUSEDC0	Fuse for DC Unit	Active
WV3SPDESICNT	Desiccant	Active
WV3SPSSD16G0	2.5" 16 GB SATA SSD	Active
WV3SPSSD32G0	2.5" 32 GB SATA SSD	Active
WV3SPSSD64G0	2.5" 64 GB SATA SSD	Active
WV3SPFPLATE0	03 Front Plate/Touchscreen	Active
WV3SPFPLATE1	01 Front Plate/Touchscreen	Active
WV3SPPMOUNT0	Replacement Gasket for Panel Mount Kit	Active
WV3SPFANKIT0	Fan Assembly	Active
WV3SPBATT000	Battery	Active
WV3SPORINGS0	O Ring Kit	Active

Extended Service Parts

Part Number	Description	Lifecycle Status
WV3EXTIOBRD0	I/O Board Kit	Active
WV3EXTCOME00	ComE SBC Kit - 1.26 GHz	Active
WV3EXTCOME01	ComE SBC Kit - 2.26 GHz	Active
WV3EXTCARR00	Carrier Kit	Active
WV3EXTPSUAC0	AC PSU Kit	Active
WV3EXTPSUDC0	DC PSU Kit	Active
WV3EXTLCDKT0	LCD Kit	Active
WV3EXTDMBRD0	DM Board Kit	Active
WV3EXTWLAN00	WLAN Kit	Active

Motion Controllers 4.3

PACMotion 4.3

Servo Amplifiers 4.21

VersaMotion Series 4.22

αi and βi Series 4.32

Servo Motors 4.47

VersaMotion Motors 4.47

αi Series 4.57

βi Series 4.69

VersaMax MicroMotion 4.87

Motion Software 4.88

Servo Sizing Software 4.88

FANUC Digital Servos



RX3i

ME Logic Developer-PLC

IC695PMM335

IC695FTB001
Fiber Terminal I/O Block

A66L-6001-0023#Lxxxxx (unsheathed)
A66L-6001-0026#Lxxxxx (sheathed)
FSSB Servo Command Cable







βi SERIES

Motors (cont-peak torque)
- β0.4/5000*is* (0.4-1 Nm)
- β0.5/6000*is* (0.65-2.5 Nm)
- β1/6000*is* (1.2-5 Nm)
- β2/4000*is* (2-7 Nm)
- β4/4000*is* (3.5-10 Nm)
- β8/3000*is* (7-15 Nm)
- β12/3000*is* (11-27 Nm)
- β22/2000*is* (20-45 Nm)

Amplifier Kits
- IC800BIK020
- IC800BIK020
- IC800BIK020
- IC800BIK040
- IC800BIK040

Encoder Cables
(Straight x=0; Right Angle x=7)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)

Power Cables
(Standard x=P; Shielded x=E)
- CP8B-1WxB-0070-AZ (7m)
- CP3B-0WxB-0070-AZ (7m)
- CP5B-0WxB-0070-AZ (7m)
- CP6B-0WxB-0070-AZ (7m)
- CP8B-1WxB-0140-AZ (14m)
- CP3B-0WxB-0140-AZ (14m)
- CP5B-0WxB-0140-AZ (14m)
- CP6B-0WxB-0140-AZ (14m)

Power & Brake Cable
(Standard x=P; Shielded x=E)
- CP9B-0WxB-0070-AZ (7m)
- CP9B-0WxB-0140-AZ (14m)

Brake Cables (Optional)
- CB6N-5WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB6N-5WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)

Encoder Battery (Optional)

Built-In (1-axis)	Panel Mounted*
IC800BBK021	IC800ABK001
IC800BBK021	IC800ABK001
IC800BBK021	IC800ABK001
IC800BBK021	IC800ABK001
IC800BBK021	IC800ABK001

βHVi SERIES

Motors (cont-peak torque)
- β2/4000*is* (2-7 Nm)
- β4/4000*is* (3.5-10 Nm)
- β8/3000*is* (7-15 Nm)
- β12/3000*is* (11-27 Nm)
- β22/2000*is* (20-45 Nm)

Amplifier Kits
- IC800BIHV010
- IC800BIHV010
- IC800BIHV020
- IC800BIHV020

Encoder Cables
(Straight x=0; Right Angle x=7)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)

Power Cables
(Standard x=P; Shielded x=E)
- CP3I-0WxB-0070-AZ (7m)
- CP3I-0WxB-0070-AZ (7m)
- CP4I-0WxB-0070-AZ (7m)
- CP3I-0WxB-0140-AZ (14m)
- CP3I-0WxB-0140-AZ (14m)
- CP4I-0WxB-0140-AZ (14m)

Power & Brake Cable
(Standard x=P; Shielded x=E)
- CP2I-0WxB-0070-AZ (7m)
- CP2I-0WxB-0140-AZ (14m)

Brake Cables (Optional)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)

Encoder Battery (Optional)
- IC800BBK021
- IC800BBK021
- IC800BBK021
- IC800BBK021

αHVi SERIES

Motors (cont-peak torque)
- α2/6000HV*is* (2-6 Nm)
- α2/6000HV*is* (2-6 Nm)
- α4/5000HV*is* (4-8.8 Nm)
- α4/5000HV*is* (4-8.8 Nm)
- α8/6000HV*is* (8-22 Nm)
- α8/6000HV*is* (8-22 Nm)
- α12/4000HV*is* (12-46 Nm)
- α12/4000HV*is* (12-46 Nm)
- α22/4000HV*is* (22-70 Nm)
- α30/4000HV*is* (30-100 Nm)
- α40/4000HV*is* (40-115 Nm)
- α50/3000HV*is* (75-215 Nm)
- α100/2500HV*is* (140-274 Nm)

Amplifier Kits
- IC800BIHV010
- IC800BIHV040
- IC800AIHV010
- IC800AIHV040
- IC800AIHV080
- IC800AIHV180
- IC800AIHV180

Dynamic Braking Module
- ZA06B-6079-H401
- ZA06B-6079-H401

Encoder Cables
(Straight x=0; Right Angle x=7)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0070-AZ (7m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)
- CFDA-xWPB-0140-AZ (14m)

Power Cables
(Standard x=P; Shielded x=E)
- CP2I-0WxB-0070-AZ (7m)
- CP2I-0WxB-0070-AZ (7m)
- CP3I-0WxB-0070-AZ (7m)
- CP3I-0WxB-0070-AZ (7m)
- CP4I-0WxB-0070-AZ (7m)
- CP4I-0WxB-0070-AZ (7m)
- CP9I-0MxB-0070-AZ (7m)
- Supplied by Customer
- CP2I-0WxB-0140-AZ (14m)
- CP2I-0WxB-0140-AZ (14m)
- CP3I-0WxB-0140-AZ (14m)
- CP3I-0WxB-0140-AZ (14m)
- CP4I-0WxB-0140-AZ (14m)
- CP4I-0WxB-0140-AZ (14m)
- CP9I-0MxB-0140-AZ (14m)
- Supplied by Customer

Brake Cables (Optional)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0070-AZ (7m)
- CB4N-0WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)
- CB4N-0WPM-0140-AZ (14m)

Encoder Battery (Optional)

Built-In (1-axis)	Panel Mounted*
IC800BBK021	IC800ABK001
IC800BBK021	IC800ABK001
IC800ABK002	IC800ABK001
IC800ABK002	IC800ABK001
IC800ABK003	IC800ABK001
IC800ABK003	IC800ABK001
IC800ABK002	IC800ABK001

Power Supply Kits†
- IC800PSHV011 (11kW)
- IC800PSHV018 (18kW)
- IC800PSHV030 (30kW)
- IC800PSHV045 (45kW)

NOTE: Color coding indicates compatible product matches and applies to products within a specific series.

* Each panel mounted battery pack can support up to 6 encoders
† One PSM power supply can support up to six αHV*i* amplifiers depending on the motor ratings. The power supply must be sized to match to system power requirements. See the section "Selecting a Power Supply" on page 4.46.

Motion Controllers



PACMotion Series

The PACMotion multi-axis motion controller, matched with world class FANUC digital servos, is designed to deliver unsurpassed machine productivity required for today's high-speed machines and lean manufacturing environments. Hosted by the powerful PACSystems RX3i controller, PACMotion is part of a complete automation control solution.

Feature	PACMotion
Architecture	PAC-based
Number of Axes	Up to 4 FANUC Digital Servos Up to 2 analog servos
Dedicated Master Axis	Virtual or Incremental Encoder
Servo Command Interface	Fiberoptic (FANUC Servos) Analog Velocity/Torque
Position Feedback Type	Serial Encoder; Quad Encoder (analog)
Motor Feedback Resolution (counts/rev)	64K, 128K, 1M (FANUC Servos)
Motion Logic Program	Interrupt Driven Task in PAC
PAC/PLC High Speed Interrupts	3 (time or event)
Motion Program	Integrated Function Blocks or Structured Text
Motion Types	
Incremental Moves	Yes
Absolute Moves	Yes
Synchronized Start	Up to 8 axes
Delayed Start	Up to 8 axes
Superimposed Motion	Yes
Jogging	Yes
Homing	Yes
Acc/Dec	Linear/ Programmable Jerk
Cam Function	Advanced
Cam Queuing	Yes
Cam Scaling	Master and Slave
Cam Phase Correction	Yes
Normalized Cam Profiles	Yes
Dynamic Cam Profile Changes	Yes
Cam Curve Fitting	1/2/3/5th order
Ramping onto Cam Profile	Yes
Number of Cam Profiles	2048
Electronic Gearing (Follower)	Advanced
Digital Cam Switch	4 High Speed Outputs
Shortest Path Absolute Moves	Yes
Move Queuing and Blending	Advanced
Master/Slave Configuration	Up to 40 Axes over PLC Backplane

Publication Reference Chart

GFA-738	PACMotion Data Sheet http://www.ge-ip.com/account/download/11538/2645
GFT-708	Integrated Motion Control in Packaging Machines Delivers Value http://www.ge-ip.com/account/download/3883/
GFK-2448	PACMotion Multi-Axis Motion Controller User's Manual http://support.ge-ip.com/support/resources/sites/GE_FANUC_SUPPORT/content/live/DOCUMENT/2000/DO2209/en_US/GFK2448B.pdf

PACMotion



PACMotion

The PACMotion controller is a versatile servo motion controller that combines the benefits of a highly integrated motion and machine logic solution with the performance, flexibility and scalability required for advanced machine automation. PACMotion is designed to deliver unsurpassed machine productivity required for today's high-speed machines and lean manufacturing environments. The 4-axis servo motion controller is built on a high performance hardware platform, with a new enhanced motion engine, operating system, and open standard integrated programming paradigm. Add to that world class reliability of FANUC servos and you have a motion system designed to give you the best productivity and accuracy possible.

Performance to Improve Machine Productivity

- Real-time synchronization of up to 40 axes
- Three high speed time-based or event-driven interrupts enable fast deterministic event response and synchronization
- Demand-driven data exchange model between the PACSystems RX3i CPU and PACMotion modules may significantly reduce scan time impact
- Digital cam switch (PLS) function with multi-track high-speed outputs with microsecond level response
- Reduced downtime with industry leading FANUC servos featuring MTBF ratings in excess of 400,000 hours
- Low MTTR FANUC servos require no tuning or parameter setting; over 5 million axes sold

Open and Integrated to Improve Engineering Productivity

- Single software development environment with shared tag database for logic, motion, I/O and operator interface
- Motion and machine logic in a common program greatly simplifies programming
- Motion function blocks and state model designed to comply with the PLCopen programming standard to reduce learning curve and training costs
- Buffer mode allows program logic to queue motion command sequences and specify or change the velocity transition between buffered moves on-the-fly
- Advanced diagnostic tools included in software speed diagnostics and machine time to market

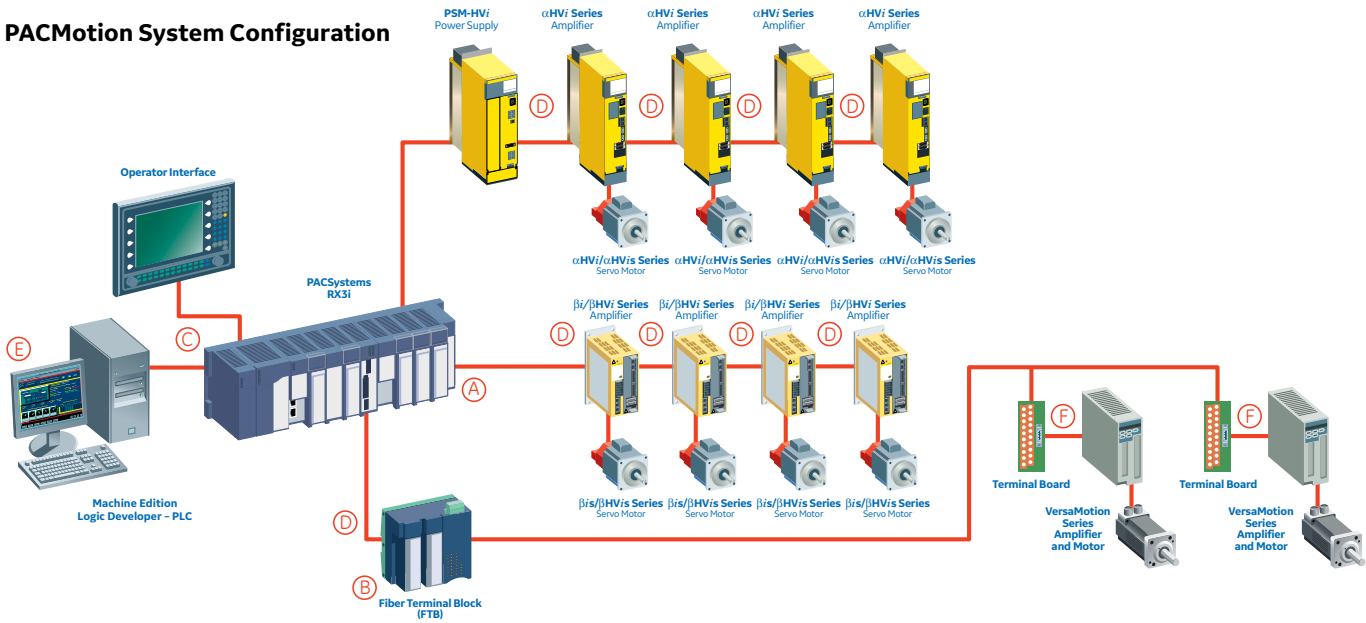
Flexibility and Scalability

- Four servo axes per module; Up to 40 axes in a single PACSystems RX3i rack
- Built-in faceplate I/O and optional fiber I/O terminal block supports extensive user configurable digital and analog I/O
- Amplifiers and motion I/O can be physically distributed using noise immune fiber optic interfaces
- Virtual (time-based) or real (encoder) master axes over the backplane support advanced cam and electronic gearing applications for flexible electronic line shaft applications

PACMotion

Each PACMotion module can control up to 4 axes of FANUC βi, βHVi or αHVi servos via a fiber optic command interface for superior noise immunity, especially in distributed systems. By combining the versatility of the GE PACSystems RX3i and QuickPanel operator interface products, GE provides customers with a complete integrated machine control solution. This single-source system results in such benefits as ease of integration and programming, shorter development cycles, and higher reliability.

PACMotion System Configuration



	Part Number	Description
A Motion Controller	IC695PMM335	PACMotion Motion Controller for RX3i
B Motion I/O Expansion	IC695FTB001	Optional Fiber Terminal Block (without terminal headers)
	IC695FTB1B032	Optional Fiber I/O Terminal Block (with screw terminal headers)
	IC695FTB1S032	Optional Fiber I/O Terminal Block (with spring clip terminal headers)
	IC695FTB1B132	Optional Fiber I/O Terminal Block (with extended shroud screw terminal headers)
	IC695FTB1S132	Optional Fiber I/O Terminal Block (with extended shroud spring clip terminal headers)
C Communication Cable	IC693CBL316	Serial Cable for Programming - 3m (1 per system)
D Fiber Optic Cables	ZA66L-6001-0023#L150R0	FSSB and FTB I/O Cable 0.15 Meter
	ZA66L-6001-0023#L300R0	FSSB and FTB I/O Cable 0.3 Meter
	ZA66L-6001-0023#L1R003	FSSB and FTB I/O Cable 1 Meter
	ZA66L-6001-0023#L2R003	FSSB and FTB I/O Cable 2 Meter
	ZA66L-6001-0023#L3R003	FSSB and FTB I/O Cable 3 Meter
	ZA66L-6001-0026#L1R003	FSSB and FTB I/O Cable Sheathed, 1 Meter
	ZA66L-6001-0026#L3R003	FSSB and FTB I/O Cable Sheathed, 3 Meter
	ZA66L-6001-0026#L5R003	FSSB and FTB I/O Cable Sheathed, 5 Meter
	ZA66L-6001-0026#L10R03	FSSB and FTB I/O Cable Sheathed, 10 Meter
	ZA66L-6001-0026#L20R03	FSSB and FTB I/O Cable Sheathed, 20 Meter
	ZA66L-6001-0026#L30R03	FSSB and FTB I/O Cable Sheathed, 30 Meter
	ZA66L-6001-0026#L50R03	FSSB and FTB I/O Cable Sheathed, 50 Meter
	ZA66L-6001-0026#L100R3	FSSB and FTB I/O Cable Sheathed, 100 Meter
E Programming Software	IC646MPP001	Logic Developer PLC Professional without GlobalCare. Complete with Software key
	IC646MBP001	Machine Edition Professional Development Suite without GlobalCare. Complete with Software key
F VersaMotion Interface	IC800VMTBC005	I/O breakout terminal board and 0.5 meter cable (1 per VersaMotion axis)

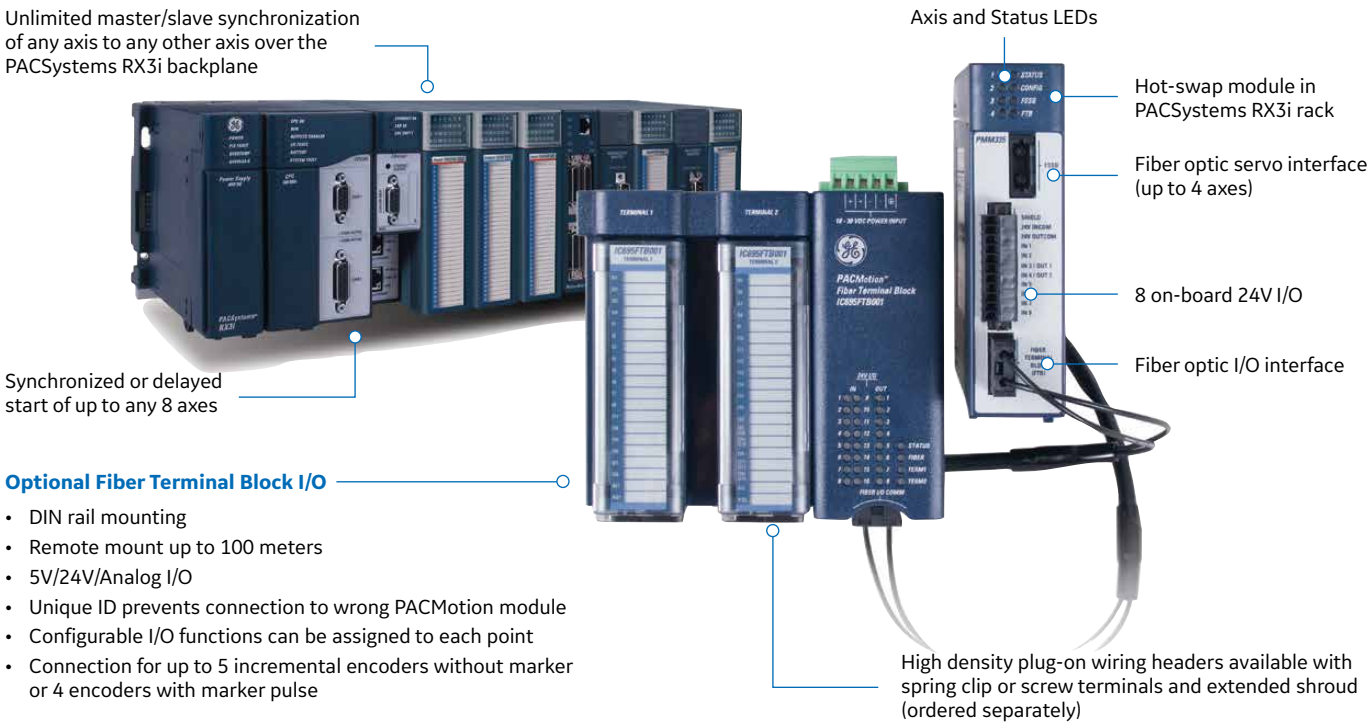
APPLICATIONS

- High-speed printing
- Packaging systems
- High-speed assembly
- Woodworking machinery
- Automotive assembly
- Material handling
- Web handling applications
- Infeed conveyors
- Labeling
- Filling

PACMotion

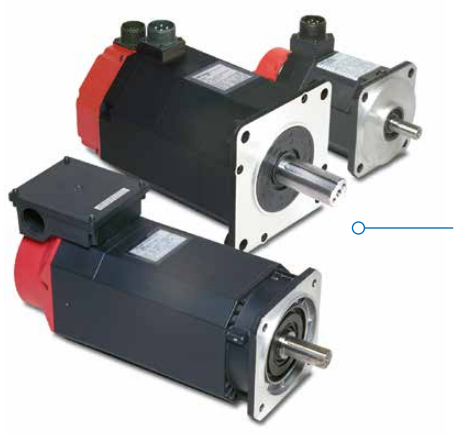
PACMotion Controller Features

- Fast motion path (1ms) planning and position update rates (500µs) deliver improved accuracy and faster response to changing control requirements
- Unlike most PLC-based motion, PACMotion delivers consistent motion update rate regardless of the number of axes
- High reliability FANUC servos improve machine uptime
- High speed synchronization of up to 40 axis over the PACSystems RX3i backplane
- Advanced cam and gearing features for electronic line shaft applications
- Single software development environment for complete automation control solution simplifies programming
- Distributed architecture for greater machine flexibility–up to 100 meters between axes using noise immune fiber cables
- Optional Fiber Terminal Block allows distributed motion centric I/O to reduce wiring complexity and cost
- Two high-speed position capture inputs per axis for registration and sequence control



Optional Fiber Terminal Block I/O

- DIN rail mounting
- Remote mount up to 100 meters
- 5V/24V/Analog I/O
- Unique ID prevents connection to wrong PACMotion module
- Configurable I/O functions can be assigned to each point
- Connection for up to 5 incremental encoders without marker or 4 encoders with marker pulse



βi and βHVi Servos

- 0.4 to 22 Nm cont. torque range
- 230 and 460 VAC models
- Noise immune fiber optic interface
- Absolute feedback with optional battery
- 64K or 128K count/rev serial encoder
- Optional holding brake

αHVi and αHVis Series Servos

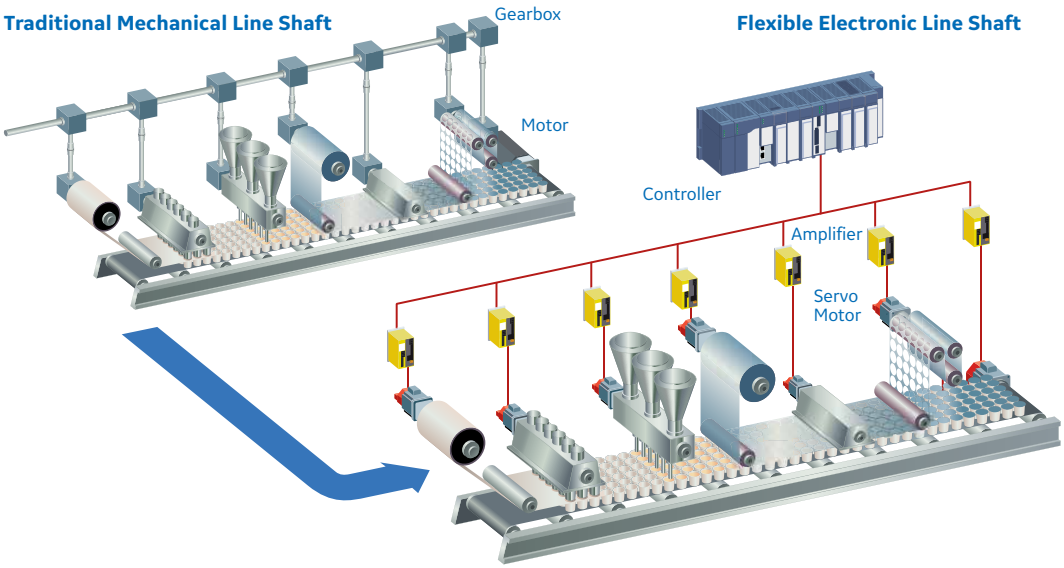
- 2 to 140 Nm cont. torque range
- 460 VAC line regenerative power supplies
- Noise immune fiber optic interface
- Absolute feedback with optional battery
- 1M count/rev serial encoder
- Optional holding brake

PACMotion

Packaging

Faster product turnover, greater variability and shorter production runs are at the heart of some key packaging machinery automation trends in industries such as pharmaceutical, food and beverage and consumer packaged goods. Today's automation systems must provide the flexibility and scalability to keep pace with this explosion of new product introductions, while delivering higher speed, accuracy and reliability to boost line productivity and asset utilization. End users and OEMs alike are now choosing innovation over supplier standardization in order to optimize machine performance. Partnering with automation suppliers who offer complete integrated control solutions can speed time to market and reduce development and deployment costs. Third generation packaging machines demand the PACMotion advantage...high performance multi-axis motion control tightly integrated with a Process Automation Controller (PAC), operator interface and extensive communications options all tied by one powerful software environment... PACMotion delivers.

- Form, fill and seal
- Smart conveyors
- Cartoning
- Wrapping
- Filling and capping
- High speed labeling
- Sorting/Diverting



Printing

Many of the trends driving automation changes in the packaging industry are mirrored by the printing industry. Shorter print runs with greater product variability require flexible, modular machine configurations, higher production speeds while maintaining accurate registration and quick start-up and changeover.

Shaftless press designs offer mechanical simplicity, reduced noise levels, improved flexibility and high reliability to reduce total cost of ownership. PACMotion is part of a complete automation system that tightly integrates line control, motion and operator interface functions in a single software environment, reducing the design cycle for new press designs or line retrofits. PACMotion delivers the performance and scalability required by today's printing lines.

- Flexographic
- Gravure
- Offset
- Winders/Unwinders
- Laminators
- Registration
- Dryer control
- Infeed rollers
- Draw rollers



PACMotion

Material Handling and High-Speed Assembly

Price pressure, smaller products and shorter life cycles in automotive, medical and electronic products require lean manufacturing lines with the flexibility to allow assemblers to reduce time to market for new products and build many product variations on the same line.

Smaller products require automation and motion control systems that can meet the increased assembly precision at ever increasing production speeds. System reliability is a crucial element to maintaining the high production rates necessary to reduce total cost per assembly.

PACMotion is part of a complete automation system that tightly integrates material handling and assembly line control, motion and operator interface functions in a single software environment, improving engineering productivity and delivering faster time to market. PACMotion delivers the precision and flexibility to meet demanding assembly and handling challenges.

- Engine/Transmission Assembly
- Transfer Lines
- Test Stands
- Rotary Dial Tables
- Electronic Assembly
- Adhesive Dispensing
- Smart Conveyors
- Baggage Handling Systems



Converting and Web Handling

Increasing line speed while reducing scrap is a critical factor in maintaining a competitive edge in the web handling and material converting applications. Greater product variability requires flexible modular control systems that enable instant changeover from one product run to the next. Adjusting for different web widths, repositioning edge guides and slitter position, changing cut length, and rewind tension must be fast and accurate. Servo control technology replaces traditional mechanical adjustments, allowing for precise and repeatable adjustments. Programmable jerk control reduces web breaks and film stretching while high servo response ensures fast corrections to web disturbances. PACMotion is part of an integrated automation system for device and I/O control, motion and operator interface to facilitate efficient programming and powerful diagnostics in a single software environment.

- Laminating
- Carton Folding
- Rotary Die Cutting
- Folder/Gluers
- Unwinders/Rewinders
- Slitter Positioning

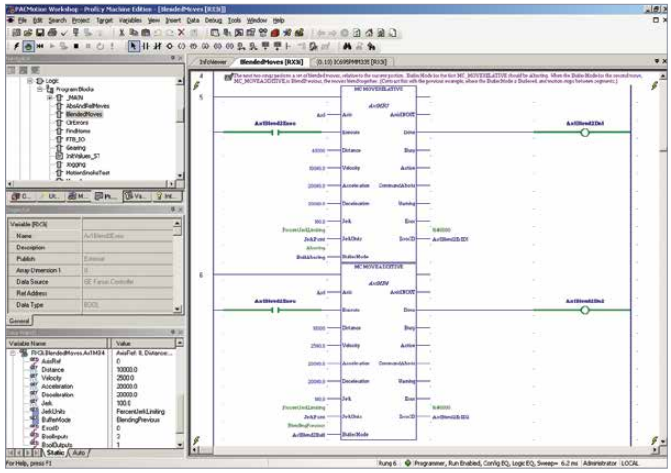


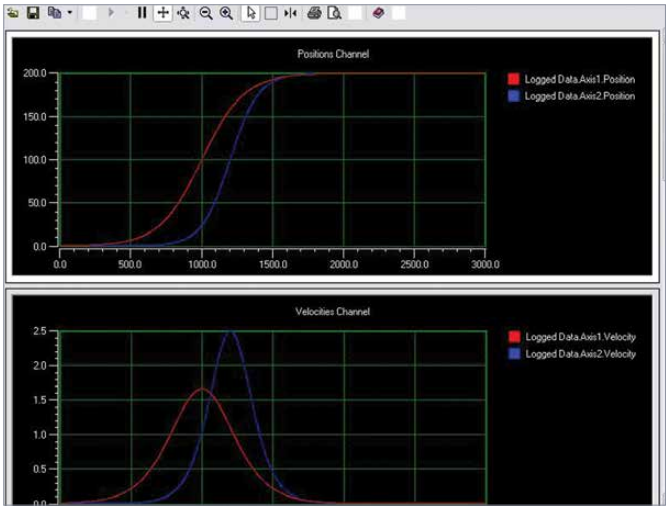
PACMotion

Open and Integrated to Improve Engineering Productivity

Synchronization of separate motion and logic programs and the lack of open motion programming standards can present a challenge even for simple motion applications. Machine Edition provides one tool for control, view, and motion and provides one universal engineering development environment for all programming, configuration, and diagnostics, resulting in faster time to solution, reduced training, and more compact, efficient design. The high level of PACMotion integration with the RX3i platform can significantly reduce system engineering and commissioning costs:

- Motion and machine logic in a common program greatly simplifies programming
- Motion function blocks and state model designed to comply with the PLC open programming standard, reduce learning curve and training costs
- Buffer mode allows program logic to queue motion command sequences and specify or change the velocity transition between buffered moves on-the-fly
- All Machine Edition components— view, logic, and motion— share a common database and common objects across applications, including logic, scripts, and animation. Once a variable is created, it can easily be used in all other domains of the application.
- Machine Edition components share common development tools such as a common user interface, drag-and-drop editing, and takes full advantage of industry-standard technologies like MEL, COM/DOM, OPC and ActiveX.
- Machine Edition supports IEC languages such as Relay Ladder, Instruction List, Structured Text, Function Block, and SFC programming. In addition, C programming and Open Process are available.





Powerful Diagnostic Tools

The Data Logger supports the high-speed capture of up to 48 parameters per PACMotion module.

- Logging session can be single shot or continuous
- Sample rates as fast as 500 µs
- Data collection can be set to start based on a trigger event
- Captured data is stored as PLC files and can be archived or viewed using the Data Logger Window

The Diagnostic Logic Block is a separate program that runs independently of the main application program.

- Uses the standard Ladder editor
- Can be executed with the PLC in the Run or Stop I/O Enabled mode
- Library of DLBs can be reused for functions such as machine troubleshooting, servo tuning, data logging, etc.
- DLBs can be saved as toolchest objects
- Program code can be cut/pasted between a DLB and the main program providing a convenient way to test new code segments



PACMotion Servo Control

The PACMotion controller is a versatile servo motion controller that combines the benefits of a highly integrated motion and machine logic solution with the performance, flexibility and scalability required for advanced machine automation. PACMotion is designed to deliver unsurpassed machine productivity required for today's high-speed machines and lean manufacturing environments. The 4-axis servo motion controller is built on a high performance hardware platform, with a new enhanced motion engine, operating system, and open standard integrated programming paradigm. Add to that world-class reliability of FANUC servos and you have a motion system designed to give you the best productivity and accuracy possible. Please see GE Motion Solutions Catalog GFA-483 for more information about motion offerings.

	IC695PMM335
Product Name	**PACMotion Module**
Lifecycle Status	Active
Module Type	Servo Motion
Backplane Support	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1
Motion Path Planning	1 ms, Consistent update regardless of the number of axes in the system
Position Loop Update Rate	500 µs, All axes in the RX3i rack are updated simultaneously
Velocity Loop Update Rate	125 µs, All axes in the RX3i rack are updated simultaneously
Torque Loop Update Rate	62.5 µs, All axes in the RX3i rack are updated simultaneously
Controlled Axes/Module	4 βi, βHV*i* or αHV*i* series servos are supported via a fiber optic interface
Master Axes/Module	1, Can be a virtual time-based or incremental encoder master
Servo Command Interface	Fiber Optic 50 Mb/s FANUC Serial Servo Bus (FSSB)
Fiber Terminal Block Cable Length	Max. 100 meters between nodes 400 meters maximum for a 4 axis system
Maximum Axes per RX3i	DC Power Supplies: 40 + 10 master axes (Requires 16 slot backplane, CPU and 4 DC power supplies) AC Power Supplies: 32 + 8 master axes (Requires 16 slot backplane, CPU and 3 AC power supplies)
Position Resolution	αHV*i* Series 1,048,576 counts/rev, β*i* and βHV*i* Series 65,536 or 131,072 counts/rev. β2*i* and larger motors support the higher resolution.
Feedback Type	Incremental/Absolute Serial Encoder. Optional battery backup required for absolute feedback mode.
Faceplate I/O	24V General Purpose Inputs: 4 optically isolated; source/sink 24V High-Speed Inputs: 2 optically isolated; source/sink Open circuit detection; can be used to connect a quadrature master encoder (500 kHz max) 24V General Purpose Inputs/Outputs: 2 optically isolated; source/sink 125 mA maximum output current each "Connecto" Plug-on Screw Terminal
Floating Point Support	Yes, Double precision IEEE 754.
Module Hot Insertion/Removal	Yes
Cam Profiles per Module	256 at one time. Up to 2048 profiles can be stored in the RX3i file system for use by any module.
Synch/Delayed Start	Up to 8 axes Axes can be on any module and are synchronized over the backplane.
High Speed Position Capture	±2 Inputs per axis: ±1 count = 10 µs jitter
Connector Type	Plug-on Screw Terminal and Fiber
Internal Power Used	5 VDC 0.45A @ 5 VDC; 1.1A & 3.3 VDC



PACMotion I/O Fiber Terminal Block

The optional Fiber Terminal Block enables PACMotion controller to connect remote I/O over a fiber cable. The Fiber Terminal Block is DIN-rail mounted and can be up to 100 meters away from the PACMotion module. The module is configurable per point for 5 VDC, 24 VDC and analog I/O. The Fiber Terminal Block provides a unique ID that prevents connection to wrong PACMotion modules. The module supports up to 5 incremental encoders without marker or 4 encoders with marker pulse.

	IC695FTB001
Product Name	**PACMotion I/O Fiber Terminal Block**
Lifecycle Status	Active
Module Type	I/O Terminal Block for PACMotion
Mounting/Dimensions	35 mm DIN-rail (5.56 W x 4.94 H x 2.46 D inches; 141.2 W x 125.5 H x 62.5 D mm)
Interface to PACMotion Module	Fiber Optic Cable. Maximum cable length is 100 meters; Interface uses a unique ID for each PMM/FTB pair to prevent cross-connection.
Power Requirements	19.2 VDC —28.8 VDC; 0.45 Amps @ 24 V
24 V Outputs (differential)	Eight optically isolated; source; open load & short detection. 2 groups of 4; 0.5 A max. per point; 4 A max. per group
24 V General Purpose Inputs	Sixteen optically isolated; source/sink 4 groups of 4
5 V Outputs (differential)	Four RS422 Line Driver with short circuit protection; 48 mA max.
5 V Inputs (differential/single-ended)	Six RS422 / RS485 Line Receiver with fault detection
5 V Inputs (differential)	Six RS422 / RS485 Line Receiver with fault detection
Analog Inputs	Two, ±10V differential 14 bit resolution
Analog Outputs	Two, ±10V differential 14 bit resolution
24 V Power Output	Reverse polarity protected by replaceable fuse
5 V Power Output	0.5 amp max. electronic overload protected
Quad Encoder Open Circuit Detection	Yes
I/O Function Assignment	Configurable I/O functions are assigned during module hardware configuration
Terminal Header Options	IC694TBxx32



Motion Control (High Speed Counting)

The High Speed Counters can be used for a wide range of applications. The following types are supported.
Type A - Up or Down-Independent Pulse-4 counters

Type B - Both Directions-A QUAD B Encoder Inputs-2 Counters

Type C - Difference Between 2 changing values-A QUAD B Encoder Inputs -1 Counter

Type D - provides homing capability with count inputs and a Home Marker input. In A quad B mode, the counter detects quadrature errors

Type E - Pre-defined Counter Type that occupies two of the module's internal counters, primarily a down counter, but can handle up counts to account for A quad B jitter

Type E counter counts down to zero, it uses a second counter block to turn on a dedicated output for a configurable time. Type E can be set up for sequenced strobing, which links all four strobes on so that they are all triggered by strobe input 1

Type Z - Two regular Clock inputs, a software controlled Preload and a special Clock Input Z. The Z input triggers a store of the Accumulator value to the Strobe 1 register. After the store, the counter can optionally reset the Accumulator to 0. It can then either restart immediately or after wait until the Clock Input Z is no longer set User-Defined Counter Type - Create a customized counter type by selecting High-Speed Counter features that are suited to the application. This counter type provides a Clear input that can be used to immediately reset the Accumulator to the starting value.

	IC694APU300	IC695HSC304	IC695HSC308	IC694APU305
Product Name	**PACSystems RX3i High Speed Counter**	**PACSystems RX3i High Speed Counter**	**PACSystems RX3i High Speed Counter**	**PACSystems RX3i I/O Processor Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	High Speed Counter (*Enhanced Mode support: 1Mhz input frequency, expanded filtering, single ended, differential encoders, 32 bit counters, Z counter and windowing)	High Speed I/O Processing (4 counters) Module supports High Speed Counting, PLS (Programmable Limit Switch), Camming, Input Interrupts and Pulse Width Timing	High Speed I/O Processing (8 counters) Module supports High Speed Counting, PLS (Programmable Limit Switch), Camming, Input Interrupts and Pulse Width Timing	I/O Processor Module
Backplane Support	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Input/Output Type	Positive Logic	Positive Logic	Positive Logic	N/A
Off State Leakage Current	10 µA per point	200 µA	200 µA	10 µA per point
Output Protection	3 Amp Fuse for all points, Enhanced Module will have ESCP protection	1.5 A maximum per channel, 10.5 A maximum per module	1.5 A maximum per channel, 10.5 A maximum per module	5 A Fuse for all points
Counter Operation	Type A, Type B, and Type C Enhanced Mode Type Z	Type A, Type B, Type C, Type D, Type E, Type Z and User-Defined Counter	Type A, Type B, Type C, Type D, Type E, Type Z and User-Defined Counter	Gray Code Encoder or A Quad B Encoder every 500 microseconds
CPU Interrupt Support	No	Yes	Yes	N/A
PLS and Camming Support	No	Yes	Yes	N/A
Input Filters (Selectable)	High Frequency Filter - 2.5 µs; Low Frequency Filter - 12.5 ms; *Enhancement Mode: 5 ms, 500 µs, 10 µs and no filter	30 Hz, 5 KHz, 50 KHz, 500 KHz, 5 MHz	30 Hz, 5 KHz, 50 KHz, 500 KHz, 5 MHz	N/A
Count Rate	High Frequency - 80 kHz; Low Frequency - 20 Hz; *Enhanced Mode Up to 1MHz with 2MHz internal Oscillator	High Frequency 1.5 MHz (internal 2 MHz oscillator)	High Frequency 1.5 MHz (internal 2 MHz oscillator)	30 kHz (Absolute Encoder) 200 kHz (A Quad B Encoder)
Counter Range	-65,535 to 65,535 ; *Enhanced Mode -2,147,483,648 to 2,147,483,647 with roll over detection	-2,147,483,648 to 2,147,483,648	-2,147,483,648 to 2,147,483,648	N/A
Selectable On/Off Output Presets	Each Counter has 2 present points, On and Off; *Enhanced Mode up to 4 configurable outputs	Each Counter has 4 present points, On and Off	Each Counter has 4 present points, On and Off	N/A
Counters per Timebase	Each counter stores the number of counts that have occurred in a specified time. A timebase value measurement from 1 ms to 65535 ms is configurable.	A Timebase from 100 nanoseconds to 429,496 milliseconds can be selected for each counter.	A Timebase from 100 nanoseconds to 429,496 milliseconds can be selected for each counter.	N/A
Strobe Register	Each counter has one or more strobe registers that capture the current accumulator value when a strobe input transition in the direction selected during the last configuration of the module.	Each counter has one or more strobe registers that capture the current accumulator value when a strobe input transition in the direction selected during the last configuration of the module.	Each counter has one or more strobe registers that capture the current accumulator value when a strobe input transition in the direction selected during the last configuration of the module.	N/A
Local Fast Inputs	(12) 5 VDC or 10 to 30 VDC	(8 inputs) 5 VDC nominal: 4.7 VDC to 5.5 VDC 12 to 24 VDC nominal: 10 VDC to 26.4 VDC Inputs are mapped to any counter or to the controller as interrupts.	(16 inputs) 5 VDC nominal: 4.7 VDC to 5.5 VDC 12 to 24 VDC nominal: 10 VDC to 26.4 VDC Inputs are mapped to any counter or to the controller as interrupts.	(12) 8.0 VDC (non-VTTL), 1.5 VDC (TTL)
Local Fast Outputs	(4) 10 to 30 VDC @ 500 mA maximum; *Enhanced Mode: 1.5 A with ESCP 4.75 to 6 VDC @ 20 mA maximum	(7 outputs) 4.7 to 40 VDC 1.5 A maximum per channel, 10.5 A maximum per module Outputs can be used by the counters or as standard outputs from the controller.	(14 outputs) 4.7 to 40 VDC 1.5 A maximum per channel, 10.5 A maximum per module Outputs can be used by the counters or as standard outputs from the controller.	Continuous Output Current (10°V30 VDC supply) 1.0 A (each output 1-V4) 0.5 A (each output 5-V8)
Connector Type	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	250 mA @ 5 VDC	64 mA maximum @ 5 V; 457 mA maximum @ 3.3 V	94 mA maximum @ 5 V; 561 mA maximum @ 3.3 V	360 mA @ 5 VDC



Motion Control (Servo Control)

Motion control integrated into the RX3i fosters high performance point-to-point applications. GE Motion Control modules can be flexibly applied to a variety of digital, analog, and stepper motion applications.

	IC694DSM324	IC694DSM314
Product Name	**PACSystems RX3i Digital Servo Module, 4-Axis (Fiber Optic Interface to Amplifiers)**	**PACSystems RX3i Digital Servo Module, 4-Axis**
Lifecycle Status	Active	Active
Module Type	Servo Motion	Servo Motion
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Drive	Beta i Series Digital Servos	Alpha and Beta Series Digital and Analog Servos
Drive Interface	Fiber Optic, Up to 100 meters between amplifiers with total length of 400 meters.	Digital for Alpha and Beta Series; ±10 V velocity or torque command for analog
Axes	4 Digital	2 Digital and 1 Analog or 4 Analog
Master Encoder Support	Incremental Master (1Mhz)	Incremental Master (1Mhz)
Electronic Cam	Yes	Yes
Velocity Feed-Forward	Yes	Yes
Encoder Feedback (Serial)	Yes	Yes
Temposonic Feedback	Yes	Yes
Number of Programs	15 Kbytes (10 + 40 Subroutines)	15 Kbytes (10 + 40 Subroutines)
User Memory (Number of Programs)	15 KBytes	15 KBytes
Feedback Inputs	3	3
Encoder Input Type/Maximum Rate	TTL Diff/Single, 175kHz	TTL Diff/Single, 175kHz
Analog Inputs	2	4 - In Digial Mode 8 - In Analog Mode
Analog Outputs	2	4 - In Digial Mode 0 - In Analog Mode
Internal Power Used	1360 mA @ 5 VDC	1300 mA @ 5 VDC

PACMotion

PACMotion Module Specifications

Specification	Details	Comments
Motion Path Planning	1 ms	Consistent update regardless of the number of axes in the system
Position Loop Update Rate	500 µs	All axes in the RX3i rack are updated simultaneously
Velocity Loop Update Rate*	125 µs	All axes in the RX3i rack are updated simultaneously
Torque Loop Update Rate*	62.5 µs	All axes in the RX3i rack are updated simultaneously
Controlled Axes/Module	4	βi, βHV*i* or αHV*i* series servos are supported via a fiber optic interface
	2	VersaMotion or third party servos via 10Vdc analog velocity or torque command interface
Master Axes/Module	1	Can be a virtual time-based or incremental encoder master
Servo Command Interface	Fiber Optic	50 Mb/s FANUC Serial Servo Bus (FSSB)
FSSB Cable Length	max. 100 meters between nodes	400 meters maximum for a 4 axis system
Maximum Axes per RX3i:		
DC Power Supplies	40 + 10 master axes	Requires 16 slot backplane, CPU and 4 DC power supplies
AC Power Supplies	32 + 8 master axes	Requires 16 slot backplane, CPU and 3 AC power supplies
Position Resolution:		
αHV*i* Series	1,048,576 counts/rev	—
β*i* and βHV*i* Series	65,536 or 131,072 counts/rev	β2*i* and larger motors support the higher resolution
Analog Axes	10,000 counts/rev	VersaMotion servo resolution (third party servo resolution dependent on feedback used)
Feedback Type	Incremental/Absolute Serial Encoder	Optional battery backup required for absolute feedback mode
Faceplate I/O:		
24V General Purpose Inputs	4 optically isolated; source/sink	—
24V High-Speed Inputs	2 optically isolated; source/sink	Open circuit detection; can be used to connect a quadrature master encoder (500 kHz max)
24V General Purpose Inputs/Outputs	2 optically isolated; source/sink	125 mA maximum output current each
Connector	Plug-on Screw Terminal	—
Floating Point Support	Yes	Double precision IEEE 754
Module Hot Insertion/Removal	Yes	—
Cam Profiles per Module	256 at one time	Up to 2048 profiles can be stored in the RX3i file system for use by any module
Synch/Delayed Start	Up to 8 axes	Axes can be on any module and are synchronized over the backplane
High Speed Position Capture	2 Inputs per axis	± 1 count = 10 µs jitter

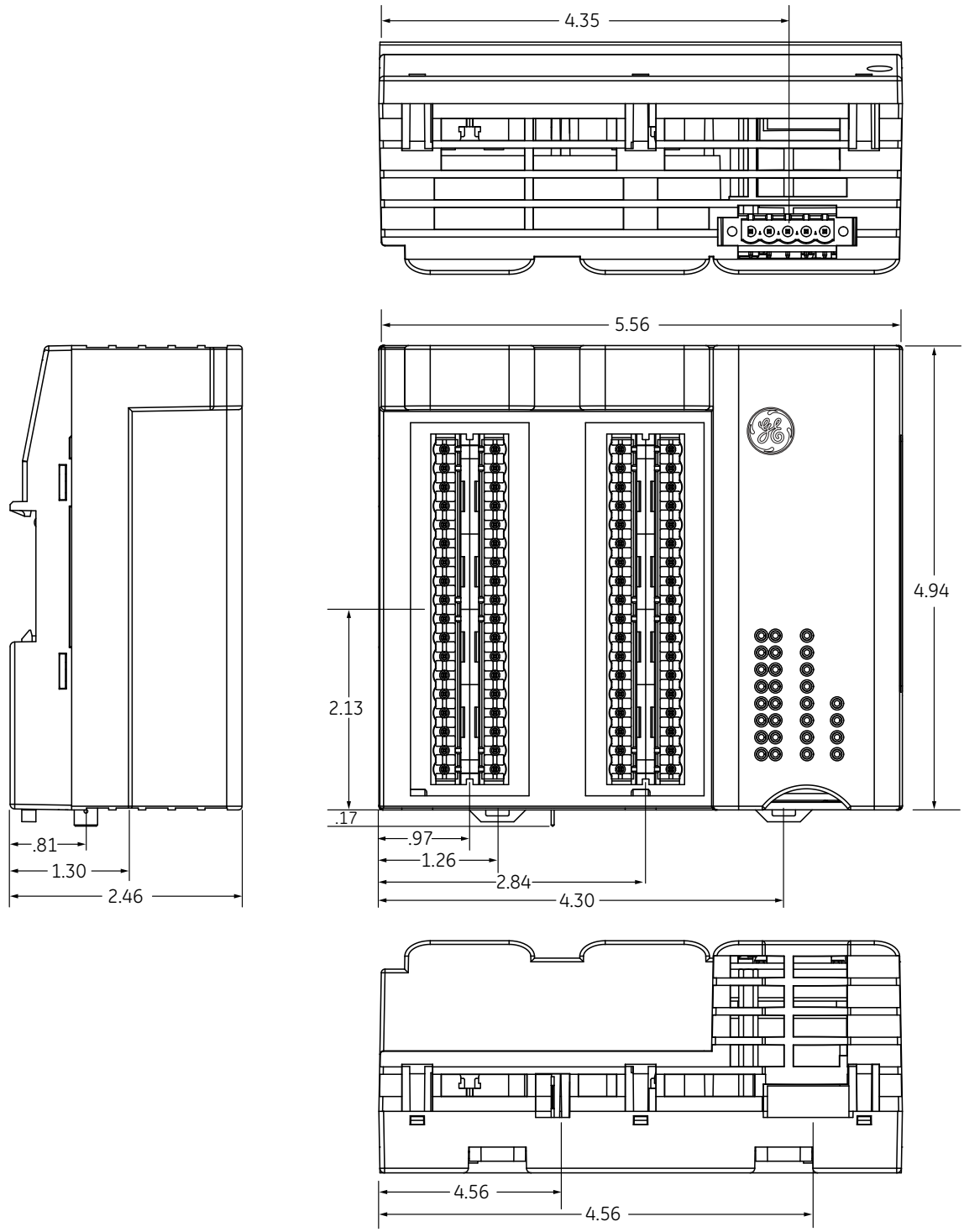
* For analog servos the velocity and the torque loop update rate will depend on the command interface mode selected in the PACMotion module and the update rate of the specific analog amplifier.

Fiber Terminal Block Specifications

Specification	Details	Comments
Mounting	35 mm DIN Rail	Must be mounted on a vertical surface for proper cooling
Dimensions:		
inches	5.56 W x 4.94 H x 2.46 D	—
mm	141.2 W x 125.5 H x 62.5	—
Interface to PACMotion Module	Fiber Optic Cable	Maximum cable length is 100 meters; Interface uses a unique ID for each PMM/FTB pair to prevent cross-connection
Terminal Header Options		
IC694TBS032	High Density 36 point Spring Clip Terminals	2 required per FTB (ordered separately); 14-26 AWG
IC694TBB032	High Density 36 point Captive Screw Terminals	2 required per FTB (ordered separately); 14-26 AWG
IC694TBS132	High Density Spring Clip Terminals, Extended Shroud	2 required per FTB (ordered separately); 14-28 AWG
IC694TBB132	High Density Captive Screw Terminals, Extended Shroud	2 required per FTB (ordered separately); 14-28 AWG
Power Requirements	19.2VDC —28.8VDC; 0.45 Amps @ 24V	one AWG #14 (2.1mm^2) or two AWG #16 (1.3mm^2) copper wires per terminal
24V Outputs (differential)	8 optically isolated; source; open load & short detection	2 groups of 4; 0.5 A max. per point; 4 A max. per group
24V General Purpose Inputs	16 optically isolated; source/sink	4 groups of 4
5V Outputs (differential)	4	RS422 Line Driver with short circuit protection; 48 mA max.
5V Inputs (differential/single-ended)	6	RS422 / RS485 Line Receiver with fault detection
5V Inputs (differential)	6	RS422 / RS485 Line Receiver with fault detection
Analog Inputs	2, ±10V differential	14 bit resolution
Analog Outputs	2, ±10V single-ended	12 bit resolution
24 V Power Output		Reverse polarity protected by replaceable fuse
5 V Power Output	0.5 amp max.	electronic overload protected
Quad Encoder Open Circuit Detection	Yes	—
I/O Function Assignment	Configurable	I/O functions are assigned during module hardware configuration

PACMotion

Fiber Terminal Block (FTB) Dimensions



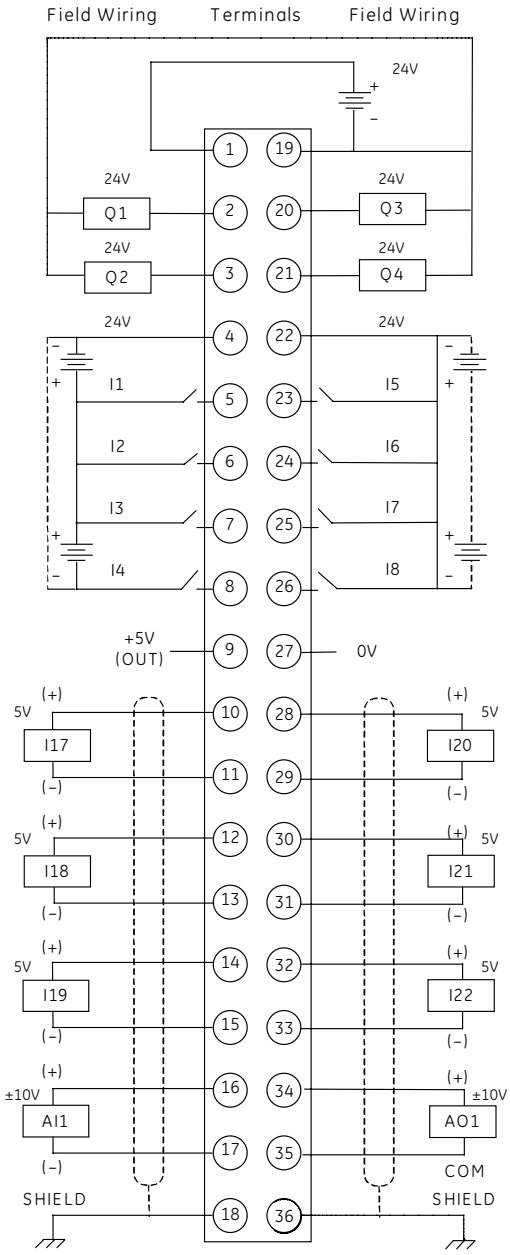
PACMotion

Fiber Terminal Block IC695FTB001 Wiring Diagram and Pin Assignments

FTB Terminal 1 Pin Assignments

Pin	Circuit Identifier	Circuit Type	Default Circuit Function
1	24V+	24V Output	Q1—Q4 Power
2	Q1	24 VDC (ESCP) Output	24V Output
3	Q2	24 VDC (ESCP) Output	24V Output
4	24-	24V-	I1—I4 Common
5	I1	24 VDC Input	Digital Input
6	I2	24 VDC Input	Digital Input
7	I3	24 VDC Input	Digital Input
8	I4	24 VDC Input	Digital Input
9	+5V (OUT)	+5V Output	External Power
10	I17+	5V Diff Input+	Fast Digital Input
11	I17-	5V Diff Input-	Fast Digital Input
12	I18+	5V Diff Input+	Fast Digital Input
13	I18-	5V Diff Input-	Fast Digital Input
14	I19+	5V Diff Input+	Fast Digital Input
15	I19-	5V Diff Input-	Fast Digital Input
16	AI1+	± 10V Analog Input	Analog In 1 (+)
17	AI1-	± 10V Analog Input	Analog In 1 (–)
18	Shield	Shield	Frame Ground
19	24V-	24V-	Q1—Q4 Common
20	Q3	24 VDC (ESCP) Output	24V Output
21	Q4	24 VDC (ESCP) Output	24V Output
22	24V-	24V-	I5—I8 Common
23	I5	24 VDC Input	Digital Input
24	I6	24 VDC Input	Digital Input
25	I7	24 VDC Input	Digital Input
26	I8	24 VDC Input	Digital Input
27	0V	0V	External Power
28	I20+	5V Diff Input+	Fast Digital Input
29	I20-	5V Diff Input-	Fast Digital Input
30	I21+	5V Diff Input+	Fast Digital Input
31	I21-	5V Diff Input-	Fast Digital Input
32	I22+	5V Diff Input+	Fast Digital Input
33	I22-	5V Diff Input-	Fast Digital Input
34	AO1+	±10V Analog Output	Analog Out 1
35	COM	±10V Analog Output	AO1 Common
36	Shield	Shield	Frame Ground

FTB Terminal 1 Wiring Diagram



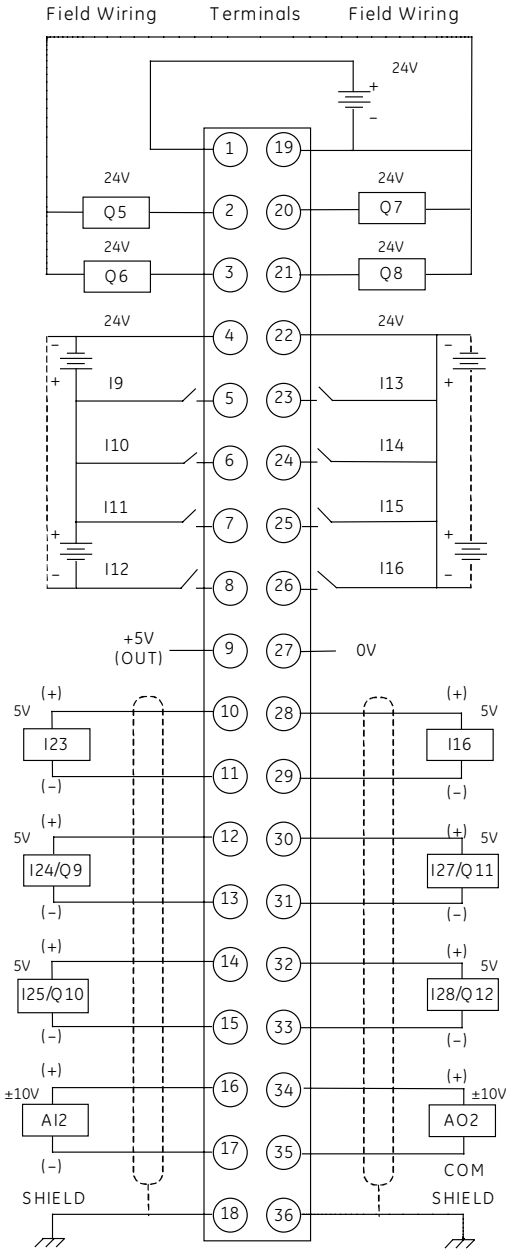
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Fiber Terminal Block IC695FTB001 Wiring Diagram and Pin Assignments

FTB Terminal 2 Pin Assignments

Pin	Circuit Identifier	Circuit Type	Default Circuit Function
1	24V+	24V Output	Q5—Q8 Power
2	Q5	24 VDC (ESCP) Output	24V Output
3	Q6	24 VDC (ESCP) Output	24V Output
4		24V+	I9—I12 Common
5	I9	24 VDC Input	Digital Input
6	I10	24 VDC Input	Digital Input
7	I11	24 VDC Input	Digital Input
8	I12	24 VDC Input	Digital Input
9	+5V (OUT)	+5V OUT	External Power
10	I23+	5V Diff Input+	Fast Digital Input
11	I23-	5V Diff Input-	Fast Digital Input
12	I24+/Q9+	5V Diff Input+/5V Diff Output+	Fast Digital Input
13	I24-/Q9-	5V Diff Input-/5V Diff Output-	Fast Digital Input
14	I25+/Q10+	5V Diff Input+/5V Diff Output+	Fast Digital Input
15	I25-/Q10-	5V Diff Input-/5V Diff Output-	Fast Digital Input
16	AI2+	±10V Analog Input	Analog In 2 (+)
17	AI2-	±10V Analog Input	Analog In 2 (-)
18	SHIELD	Frame Ground	Shield
19	24V-	24V-	Q5—Q8 Common
20	Q7	24 VDC (ESCP) Output	24V Output
21	Q8	24 VDC (ESCP) Output	24V Output
22	24V+	24V+	I13—I16 Common
23	I13	24 VDC (ESCP) Input	Digital Input
24	I14	24 VDC (ESCP) Input	Digital Input
25	I15	24 VDC (ESCP) Input	Digital Input
26	I16	24 VDC (ESCP) Input	Digital Input
27	0V	0V	External Power
28	I26+	5V Diff Input	Fast Digital Input
29	I26-	5V Diff Input	Fast Digital Input
30	I27/Q11+	5V Diff Input+/5V Diff Output+	Fast Digital Input
31	I27/Q11-	5V Diff Input-/5V Diff Output-	Fast Digital Input
32	I28/Q12+	5V Diff Input+/5V Diff Output+	Fast Digital Input
33	I28/Q12-	5V Diff Input-/5V Diff Output-	Fast Digital Input
34	AO2+	± 10V Analog Output	Analog Output 2
35	COM	± 10V Analog Output	AO2 Common
36	SHIELD	Frame Ground	Shield

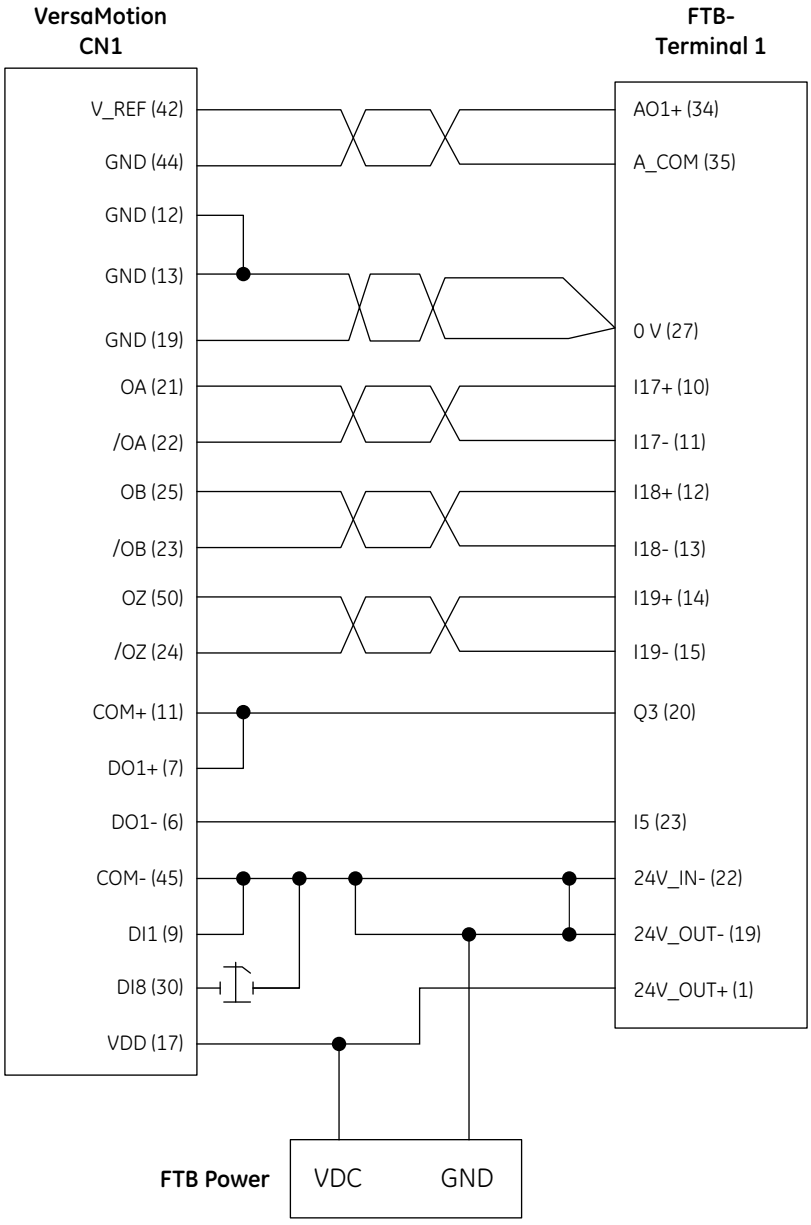
FTB Terminal 2 Wiring Diagram



PACMotion

VersaMotion amplifier connection to the PACMotion Fiber Terminal Block

Up to two VersaMotion amplifiers can be connected to each PACMotion module using the two analog outputs on the Fiber Terminal Block (FTB). The VersaMotion amplifier includes an encoder output that is also connected to the FTB for axis feedback. The interface between the VersaMotion amplifier CN1 connector and the FTB can be made directly using the IC800VMCI010 (1 m) or IC800VMCI030 (3 m) flying lead I/O interface cable or using the IC800VMTBC005 I/O terminal breakout board and included 0.5 meter cable. This terminal board will allow easy access to any additional I/O connections to the VersaMotion amplifier from field devices such as emergency stop circuits. The proper wiring interface is shown for direct connection to the CN1 connector however, terminal numbers are the same for the breakout terminal board.



PACMotion

Motion Functions

Function Block Name	Description
Single Axis Administrative Function Blocks	
MC_Power	Controls the Power Stage (MCON); causes all control loops to be closed and the control to be in the Standstill state ready to perform motion commands
MC_ReadStatus	Returns in detail the current axis status of the axis selected
MC_ReadAxisError	Indicates general axis errors not relating to the execution of Functions or Function Blocks; used to read a current error or warning on the axis
MC_ReadParameter	Returns the value of a parameter; used to read an axis parameter
MC_ReadParameters	Returns the values of parameters; used to read one or more axis parameters
MC_ReadBoolParameter	Returns the value of a Boolean parameter; used to read an axis parameter
MC_ReadBoolParameters	Returns the values of Boolean parameters; used to read one or more axis parameters
MC_ReadDwordParameters	Returns the values of 32 bit word parameters; used to read one or more axis parameters
MC_WriteParameter	Modifies the value of a parameter; used to write an axis parameter
MC_WriteParameters	Modifies multiple parameter values; used to write multiple axis parameters
MC_WriteBoolParameter	Modifies the value of a vendor specific parameter; used to write an axis parameter
MC_WriteBoolParameters	Modifies multiple Boolean parameter values; used to write multiple axis parameters
MC_WriteDwordParameters	Modifies multiple 32 bit word parameter values; used to write parameters that can not be expressed as real including packed bits
MC_ReadActualPosition	Used to read the actual axis position
MC_Reset	Makes the transition from the state ErrorStop to StandStill by resetting all internal axis-related errors; used to attempt to clear any errors on an axis and return it from the ErrorStop state to the Standstill state
MC_ModuleReset	Makes the transition from the state ErrorStop to StandStill by resetting all internal errors; used to attempt to clear any errors on a module and return any axes in the ErrorStop state to the Standstill state
MC_ReadDigitalInput	Gives access to the value of the input, referenced by the datatype INPUT_REF; provides the value of the referenced input (BOOL).
MC_ReadDigitalOutput	Gives access to the value of an output, referenced by the datatype OUTPUT_REF; provides the value of the referenced output (BOOL)
MC_WriteDigitalOutput	Writes a value to a discrete output once (with Execute), referenced by the datatype OUTPUT_REF
MC_SetPosition	Shifts the coordinate system of an axis by manipulating both the set-point position as well as the actual position of an axis with the same value without any movement caused. (Re-calibration with same following error).
MC_SetOverride	Sets the values of override for the whole axis, and all functions that are working on that axis
MC_ReadActualVelocity	Returns the value of the actual velocity as long as Enable (EN) is set
MC_ReadTorqueCommand	Returns the value of the torque command as long as Enable (EN) is set
MC_LibraryStatus	Provides the user with visibility into their cam-profile memory usage; provides the number of selected cam-profiles, the total number of bytes available, and the percentage of memory used
MC_ReadAnalogInput	Gives access to the value of an analog input, referenced by the datatype INPUT_REF
MC_ReadAnalogOutput	Gives access to the value of an analog output, referenced by the datatype OUTPUT_REF
MC_WriteAnalogOutput	Writes a value to an analog output once (with Execute), referenced by the datatype OUTPUT_REF
MC_ReadEventQueue	Returns the current PMM module event queue
MC_TouchProbe	Used to record an axis position at a strobe trigger event
MC_AbortTrigger	Used to abort MC_TouchProbe function blocks
MC_DigitalCamSwitch	Commands a group of discrete output bits to switch in analogy to a set of mechanical cam controlled switches connected to an axis
MC_DL_Configure	Specifies the configuration parameters for data logged on the PMM
MC_DL_Activate	Used to start data logging on the module in normal start mode
MC_DL_Get	Writes the data logged into a file specified by the DATALOG_FILE_REF input
MC_DL_Delete	Responsible for deleting data logger configuration from the PMM memory
Single Axis Motion Function Blocks	
MC_MoveAbsolute	Commands a controlled motion at a specified position
MC_MoveRelative	Commands a controlled motion of a specified distance relative to the actual position at the time of the execution
MC_MoveAdditive	Commands a controlled motion of a specified relative distance additional to the original commanded position in the discrete motion state
MC_MoveSuperimposed	Commands a controlled motion of a specified relative distance additional to an existing motion
MC_MoveVelocity	Commands a never ending controlled motion at a specified velocity
MC_Home	Commands the axis to perform the «search home» sequence
MC_Stop	Commands a controlled motion stop and transfers the axis to the state “Stopping”
MC_JogAxis	Jogs an axis forward or backward at the manual operation velocity and acceleration
MC_Halt	Commands a controlled motion stop

PACMotion

Motion Functions

Function Block Name	Description
Multiple Axis Administrative Function Blocks	
MC_CamTableSelect	Selects the cam-tables (cam-profiles) by setting the pointers to the relevant tables
MC_CamTableDeselect	Deletes a cam-profile from the specified module to free memory
Multiple Axis Motion Function Blocks	
MC_CamIn	Engages a cam
MC_CamOut	Disengages a slave axis from the master
MC_GearIn	Commands the slave axis velocity at a ratio of the master axis velocity
MC_GearOut	Used to disengage from a MC_GearIn function block
MC_Phasing	Provides dynamic phase shifting capability for cam profiles
MC_GearInPos	Commands a gear ratio between the position of the slave and master axes from the synchronization point onwards
MC_SyncStart	Identifies which axes should be started at the same time and how much time can elapse before the motion must start
MC_DelayedStart	Identifies which axes should be started with a delay relative to each other and how much time can elapse before the motion must start
PLC Support Function Blocks	
MC_CamFileRead	Copies the contents of a cam file from the PLC file system into reference memory
MC_CamFileWrite	Copies cam data from reference memory to an existing cam file in the PLC file system, overwriting the original data in the cam file

Servo Amplifiers

VersaMotion* Series

The VersaMotion family of servo amplifiers offers a cost effective solution for a broad range of motion applications. These versatile amplifiers support stand-alone positioning capability using up to 8 stored motion profiles, or can be connected to any motion controller using an analog or pulse command interface. The VersaMotion Servo Amplifiers are matched for use with the VersaMotion Servo Motors.

αi and βi Series

The all digital αi and βi Series Servo Amplifiers, with over five million installed worldwide, offer superior reliability and performance for unprecedented mean time between failure. They are available in a wide range of ratings for use with GE PACMotion Series motion controller, and are matched for use with the αi and βi Series Servo Motors.



Publication Reference Chart

VersaMotion	
GFA-1923	VersaMotion Data Sheet http://www.ge-ip.com/account/download/13269/3679
GFK-2480	VersaMotion Servo Motors and Amplifiers User's Manual http://support.ge-ip.com/support/resources/sites/GE_FANUC_SUPPORT/content/live/DOCUMENT/2000/DO2041/en_US/GFK2480.pdf
Alpha and Beta Series Servo	
GFH-001	Servo Products Specification Guide http://support.ge-ip.com/support/resources/sites/GE_FANUC_SUPPORT/content/staging/DOCUMENT/0/DO474/en_US/3.0/GFH001G.pdf

VersaMotion

The VersaMotion family of servo amplifiers offers a cost effective solution for a broad range of motion applications. These versatile amplifiers support simple stand-alone positioning capability using up to 8 stored motion profiles or can be connected to any motion controller using an analog or pulse command interface. A built-in touchpad and display provides convenient access to configuration parameters and system information. The serial interface supports multi-drop system configurations and Modbus communication protocol.

Amplifier setup can be accomplished using the VersaMotion software included with Machine Edition or using the convenient front panel keypad.



Key Features

- Versatile analog (speed or torque) or pulse command interface
- Position/Speed/Torque modes
- Dual control modes
- Standalone single-axis position control mode for simple point-to-point motion control
- Electronic gearing with user-defined ratio
- External JOG function
- Speed/Torque limit operation
- Built-in keypad/display for setup and diagnostics
- Motor settling time below 1 ms for fast response
- Low speed stability and performance: less than 0.5% error at 1 RPM
- 10msec acceleration time from running without load -/+ 3000 RPM

Built-in Functions

- Simple stand-alone point-to-point positioning control with 8 internal stored position settings (positions can be changed over Modbus for greater application flexibility)
- Move to Home function
- Position Teaching capability
- Incremental encoder feedback (2500 ppr/10,000 counts/rev)
- User-definable Acceleration/Deceleration with jerk limiting (s-curve)
- Feed step control function
- Modbus Slave serial port (RS-485/RS-422) for reading and writing parameters from Machine Edition or updating stored position set points from a host controller.

Machine Edition VersaMotion Set-up Features

- Configuration Parameter Editor (clear, read, write functions) and initial configuration wizard
- Calculation tools to determine proper conversion from encoder counts to desired user programming units
- Three channel digital oscilloscope to display and record drive status on-line
- Alarm history and status monitor diagnostic screens
- Digital I/O set-up, monitoring and forcing. Each I/O point can be individually set to one of the built-in functions (45 digital input functions and 11 digital output functions)

VersaMotion

Servo Amplifier Part Number Sequence

IC800VMA | **04** | **2**

Input Voltage

2– 220 VAC

Rated Power

01– 100 Watts	**10**– 1000 Watts
02– 200 Watts	**20**– 2000 Watts
04– 400 Watts	**30**– 3000 Watts
07– 750 Watts	

Example: IC800VMA042 is a 400 Watt 220 VAC servo amplifier



Amplifier Specifications

Part Number	IC800VMA012	IC800VMA022	IC800VMA042	IC800VMA072	IC800VMA102	IC800VMA202	IC800VMA302
Rated Output Power	100W	200W	400W	750W	1000W	2000W	3000W
Voltage/ Frequency	Three-phase or Single-phase 220VAC; 50/60 Hz	Three-phase or Single-phase 220VAC; 50/60 Hz	Three-phase or Single-phase 220VAC; 50/60 Hz	Three-phase or Single-phase 220VAC; 50/60 Hz	Three-phase or Single-phase 220VAC; 50/60 Hz	Three-phase 220VAC; 50/60 Hz	Three-phase 220VAC; 50/60 Hz
Permissible Voltage Fluctuation	Three-phase: 170 ~ 255VAC Single-phase: 200 ~ 255VAC	Three-phase: 170 ~ 255VAC Single-phase: 200 ~ 255VAC	Three-phase: 170 ~ 255VAC Single-phase: 200 ~ 255VAC	Three-phase: 170 ~ 255VAC Single-phase: 200 ~ 255VAC	Three-phase: 170 ~ 255VAC Single-phase: 200 ~ 255VAC	Three-phase: 170 ~ 255VAC	Three-phase: 170 ~ 255VAC
Cooling System	Convection	Convection	Convection	Fan Cooling	Fan Cooling	Fan Cooling	Fan Cooling
Electronic Gear Ratio	Gear Ratio = N/M where N: 1~32767, M: 1:32767 (1/50<N/M<200)	Gear Ratio = N/M where N: 1~32767, M: 1:32767 (1/50<N/M<200)	Gear Ratio = N/M where N: 1~32767, M: 1:32767 (1/50<N/M<200)	Gear Ratio = N/M where N: 1~32767, M: 1:32767 (1/50<N/M<200)	Gear Ratio = N/M where N: 1~32767, M: 1:32767 (1/50<N/M<200)	Gear Ratio = N/M where N: 1~32767, M: 1:32767 (1/50<N/M<200)	Electronic gear N/M multiple N: 1~32767, M: 1:32767 (1/50<N/M<200)

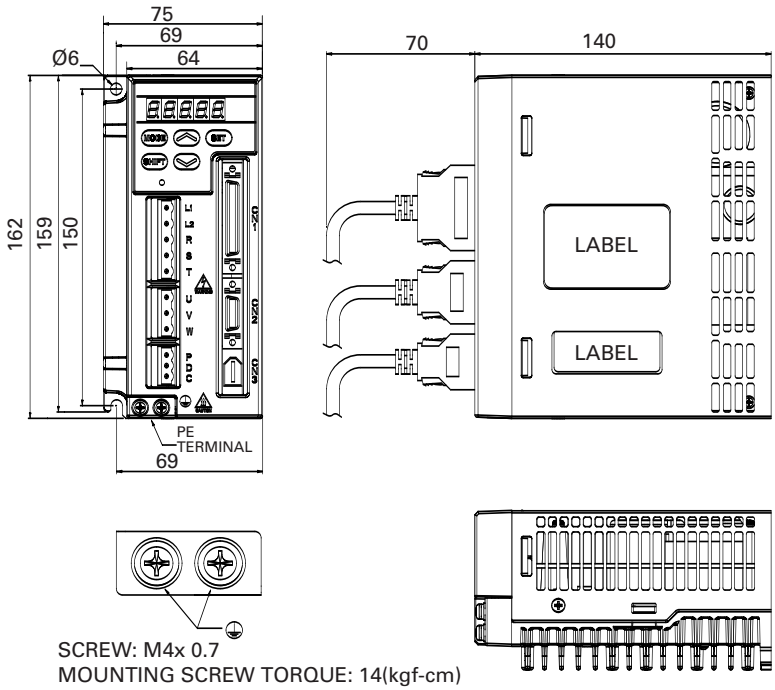
Amplifier

Permissible Frequency Fluctuation	50 / 60 Hz +/-5%
Resolution/Quadrature Feedback Counts	2500 ppr /10000 cpr
Control Modes	Position/Velocity/Torque
Dynamic Brake	Built-in
Position Control Mode:	
Maximum Input Pulse Frequency	500KPPS (Line Driver) / Maximum 200KPPS (Open Collector)
Pulse Type	Pulse/Direction; CW/CCW; A/B Phase
Command Source	External pulse train/ Internal parameters
Torque Limit Operation	Yes
Feed Forward Compensation	Yes
Analog Commands: Voltage Range	0 to +/-10 VDC
Torque and Velocity Control Mode Command Source	External analog signal / Discrete set points stored by internal parameters
Speed Control Range	1:5000
Speed Control Frequency Response	Maximum 450 Hz
Torque Control Mode Permissible Time for Overload	8 seconds under 200% rated output
Communications Interface	RS-232 / RS-485 /RS-422
Environmental	
Altitude	Altitude 1000 meters above sea level or lower
Operating Temperature	0 to 55°C (Forced cooling for operation above 55°C)
Storage Temperature	-20°C to 65°C
Humidity	0 to 90% (Non condensing)
Vibration	<20 Hz: 9.8 m/sec/sec (1G); 20 to 50 Hz: 5.88 m/sec/sec (0.6 G)
Standards	CE (IEC/EN 61800-5-1), UL/cUL (508C), TUV, C-tick

VersaMotion

Dimensions

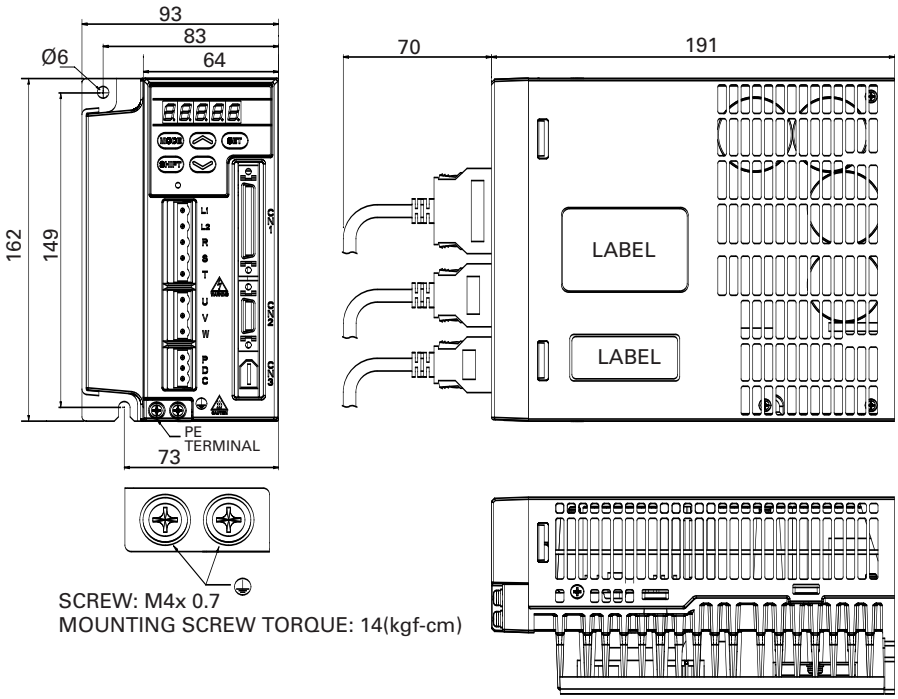
IC800VMA012, IC800VMA022, IC800VMA042



SCREW: M4x 0.7
MOUNTING SCREW TORQUE: 14(kgf-cm)

Dimensions shown in mm

IC800VMA072, IC800VMA102



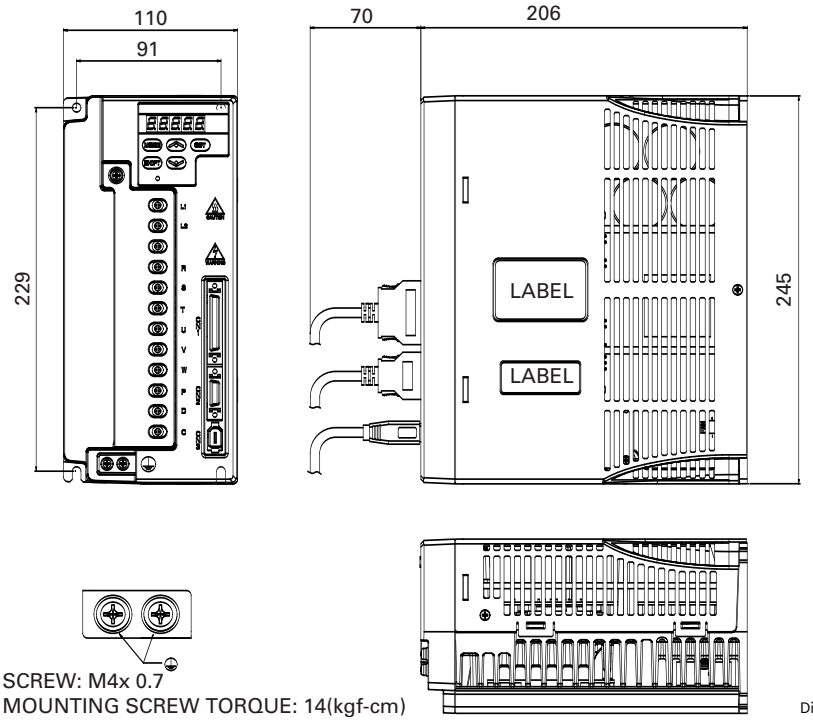
SCREW: M4x 0.7
MOUNTING SCREW TORQUE: 14(kgf-cm)

Dimensions shown in mm

VersaMotion

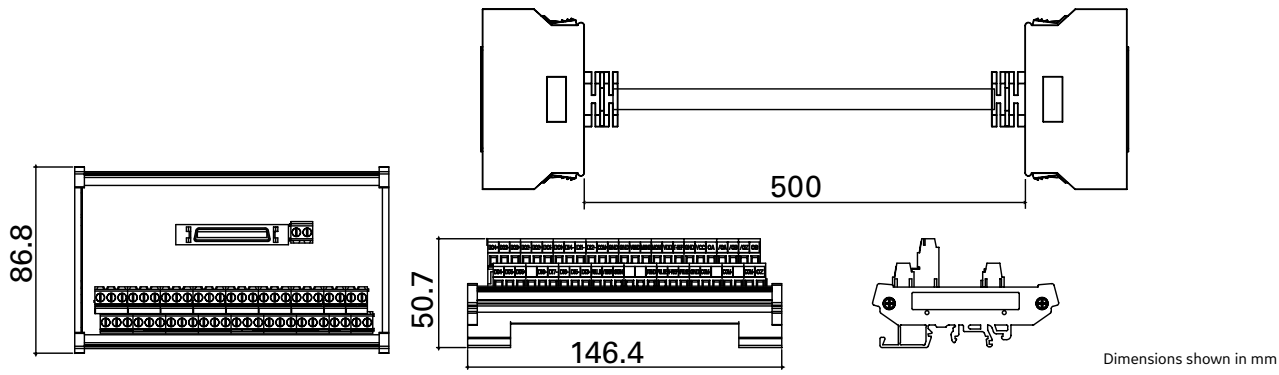
Dimensions

IC800VMA202, IC800VMA302



Dimensions shown in mm

Optional Cable and Terminal Block

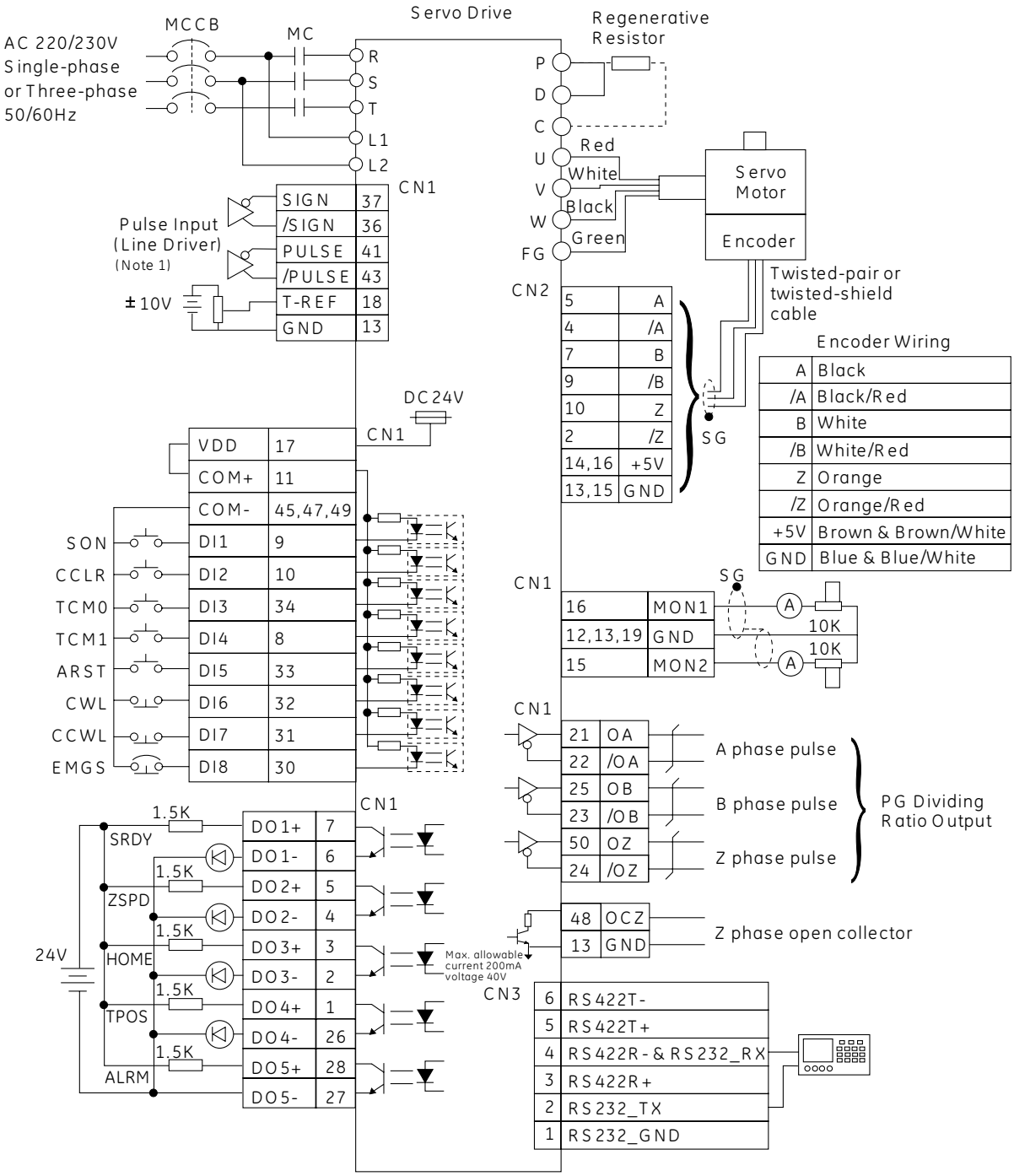


Dimensions shown in mm

VersaMotion

Connection Diagrams

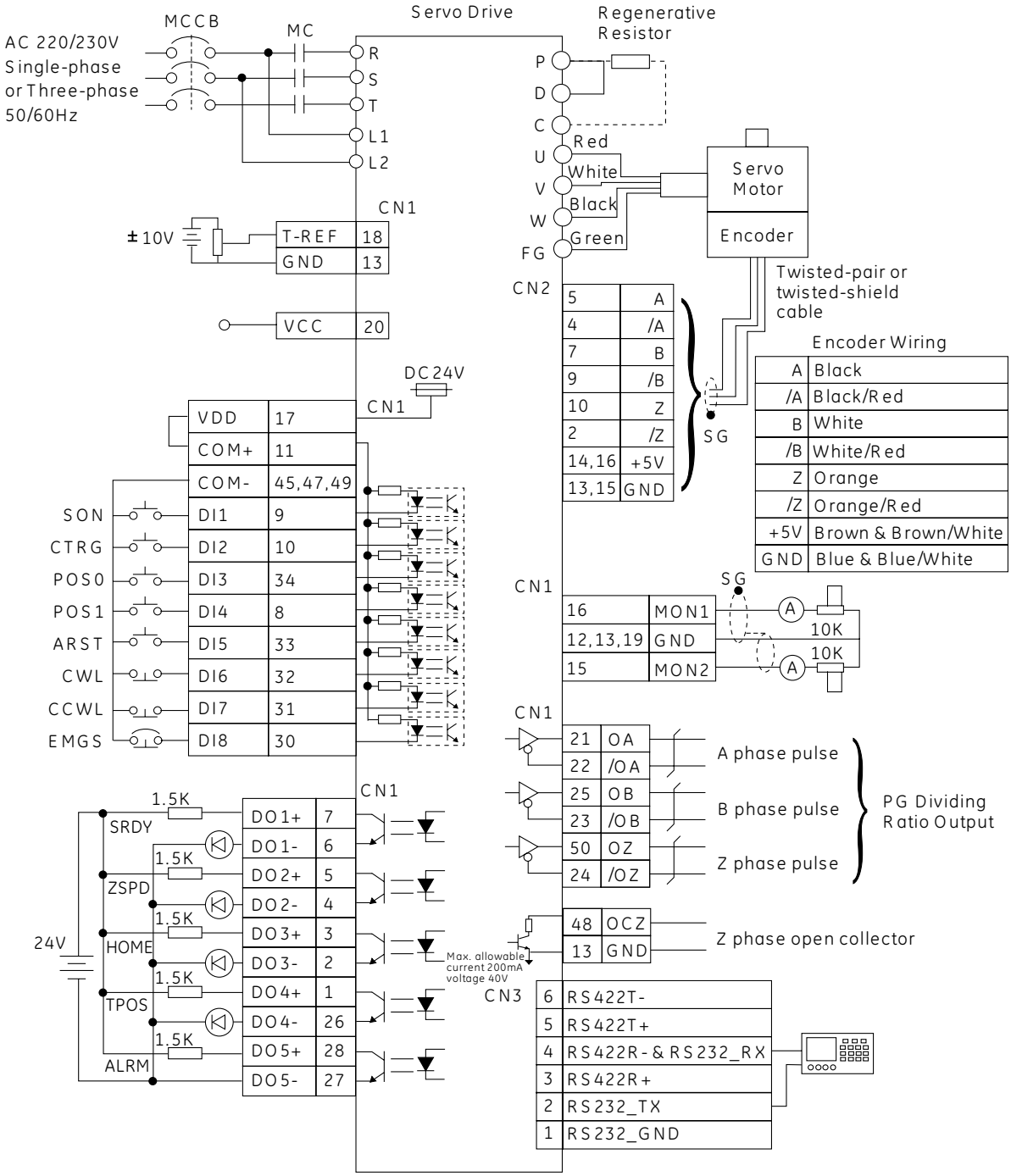
Position Control Mode - Pulse Follower Mode



VersaMotion

Connection Diagrams

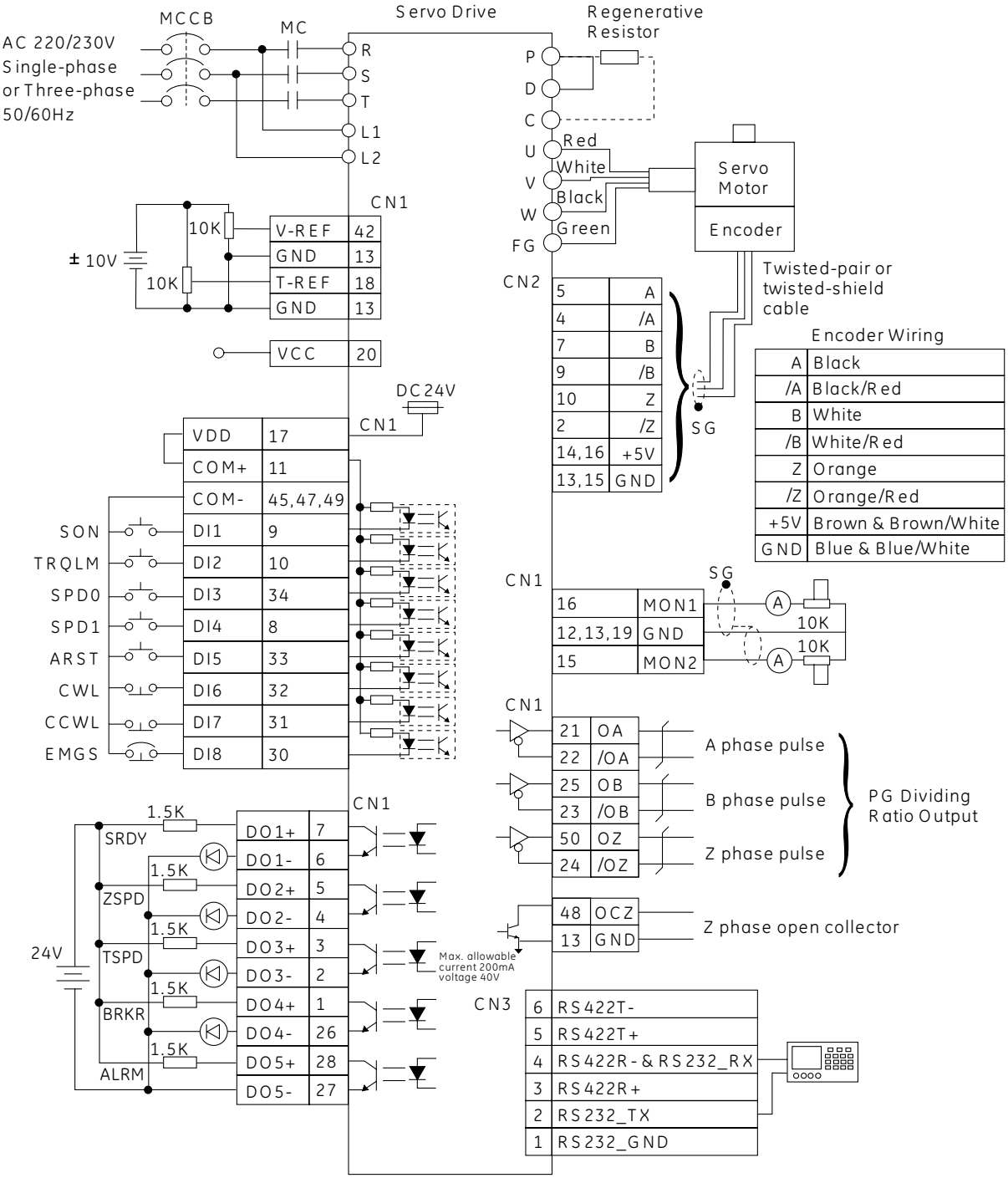
Position Control Mode - Stored Position Commands Mode



VersaMotion

Connection Diagrams

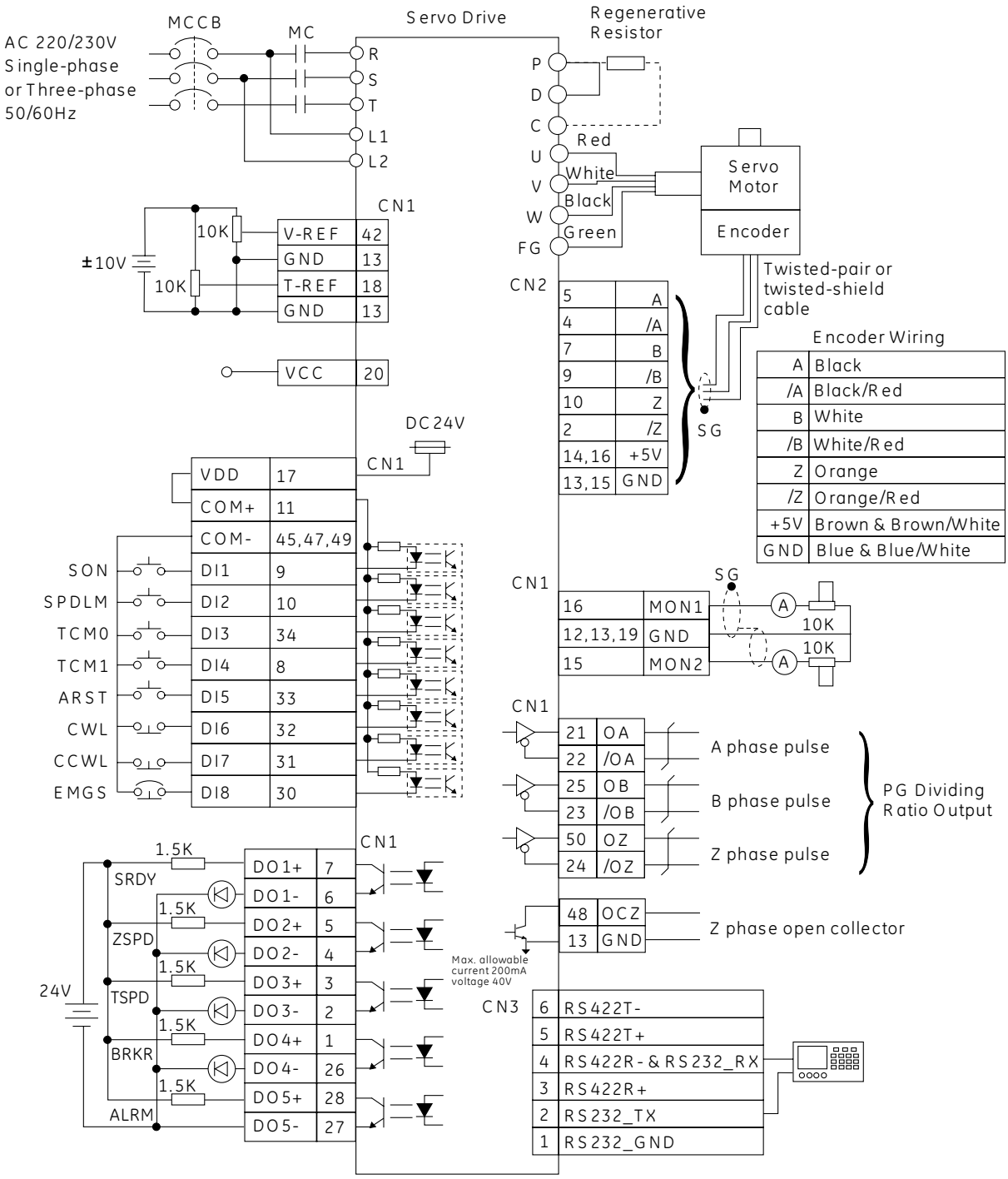
Speed Control Mode



VersaMotion

Connection Diagrams

Torque Control Mode



VersaMotion

Ordering Information

Model		VersaMotion 100 Watt	VersaMotion 200 Watt	VersaMotion 400 Watt	VersaMotion 750 Watt
Motor Part Number		IC800VMM01LNKSE25	IC800VMM02LNKSE25	IC800VMM04LNKSE25	IC800VMM07LNKSE25
Motor/Brake Part Number		N/A	IC800VMM02LBKSE25	IC800VMM04LBKSE25	IC800VMM07LBKSE25
Amplifier Part Number		IC800VMA012	IC800VMA022	IC800VMA042	IC800VMA072
Cables					
Power Cable	3 m	IC800VMCP030	IC800VMCP030	IC800VMCP030	IC800VMCP030
	5 m	IC800VMCP050	IC800VMCP050	IC800VMCP050	IC800VMCP050
	10 m	IC800VMCP100	IC800VMCP100	IC800VMCP100	IC800VMCP100
	20 m	IC800VMCP200	IC800VMCP200	IC800VMCP200	IC800VMCP200
Brake and Power Cable	3 m	N/A	IC800VMCB030	IC800VMCB030	IC800VMCB030
	5 m	N/A	IC800VMCB050	IC800VMCB050	IC800VMCB050
	10 m	N/A	IC800VMCB100	IC800VMCB100	IC800VMCB100
	20 m	N/A	IC800VMCB200	IC800VMCB200	IC800VMCB200
Encoder Cable	3 m	IC800VMCE030	IC800VMCE030	IC800VMCE030	IC800VMCE030
	5 m	IC800VMCE050	IC800VMCE050	IC800VMCE050	IC800VMCE050
	10 m	IC800VMCE100	IC800VMCE100	IC800VMCE100	IC800VMCE100
	20 m	IC800VMCE200	IC800VMCE200	IC800VMCE200	IC800VMCE200
Communications & I/O Interface Cables					
Communications Cable	3 m	IC800VMCS030	IC800VMCS030	IC800VMCS030	IC800VMCS030
Flying lead I/O interface Cable	1 m	IC800VMCI010	IC800VMCI010	IC800VMCI010	IC800VMCI010
	3 m	IC800VMCI030	IC800VMCI030	IC800VMCI030	IC800VMCI030
Amplifier Connectors					
CN1 I/O Connector (Note 1)		IC800VMACONCN1	IC800VMACONCN1	IC800VMACONCN1	IC800VMACONCN1
CN2 Encoder Connector (Note 2)		IC800VMACONCN2	IC800VMACONCN2	IC800VMACONCN2	IC800VMACONCN2
CN3 Communication Connector (Note 3)		IC800VMACONCN3	IC800VMACONCN3	IC800VMACONCN3	IC800VMACONCN3
AC Power Connector (Note 4)		IC800VMACONACP	IC800VMACONACP	IC800VMACONACP	IC800VMACONACP
Motor Power Connector (Note 4)		IC800VMACONMTRP	IC800VMACONMTRP	IC800VMACONMTRP	IC800VMACONMTRP
External Braking Resistor Connector (Note 4)		IC800VMADBR001	IC800VMADBR001	IC800VMADBR001	IC800VMADBR001
Motor Connectors					
Power Connector (motor only)		IC800VMMCONP001	IC800VMMCONP001	IC800VMMCONP001	IC800VMMCONP001
Power Connector (motor & brake)		N/A	IC800VMMCONP002	IC800VMMCONP002	IC800VMMCONP002
Encoder Connector		IC800VMMCONE001	IC800VMMCONE001	IC800VMMCONE001	IC800VMMCONE001
Accessories					
I/O Terminal Breakout Board and Cable (Note 5)	0.5 m	IC800VMTBC005	IC800VMTBC005	IC800VMTBC005	IC800VMTBC005
External Braking Resistor (Note 6) 40Ω, 400 Watt		IC800VMBR040	IC800VMBR040	IC800VMBR040	IC800VMBR040
External Braking Resistor (Note 6) 20Ω, 1000 Watt		IC800VMBR020	IC800VMBR020	IC800VMBR020	IC800VMBR020

1) The CN1 connector is only required when the I/O breakout terminal board (IC800VMTBC005) or flying lead I/O interface cable (IC800VMCI0xx) are not used for wiring access to the amplifier I/O points.
2) The CN2 encoder connector is part of the separately ordered GE feedback cable. This connector is only required when user will manufacture their own motor feedback cable.
3) The CN3 communication connector is part of the separately ordered GE serial communication cable (IC800VMCS030). This connector is only required when user will manufacture their own communication cable.
4) These connectors are shipped with each VersaMotion amplifier (100W to 1 kW) and are only necessary to replace lost or damaged connector mates. Amplifiers rated 2 kW and larger have fixed wiring terminals and do not use a plug-on connector mate.
5) The optional breakout terminal board provides screw terminations for wiring each I/O point on the amplifier CN1 I/O connector. The flying lead I/O interface cable (IC800VMCI0xx) or CN1 connector (IC800VMACONCN1) may be used.
6) The optional external braking resistors are used to dissipate excessive renenerated energy during fast deceleration of large loads from high speeds.

VersaMotion

Ordering Information (continued)

Model		VersaMotion 1000 Watt	VersaMotion 2000 Watt	VersaMotion 3000 Watt
Motor Part Number		IC800VMM10LNKSE25 IC800VMM10MNKSE25	IC800VMM20LNKSE25 IC800VMM20MNKSE25	IC800VMM30MNKSE25
Motor/Brake Part Number		IC800VMM10LBKSE25 IC800VMM10MBKSE25	IC800VMM20LBKSE25 IC800VMM20MBKSE25	IC800VMM30MBKSE25
Amplifier Part Number		IC800VMA102	IC800VMA202	IC800VMA302
Cables				
Power Cable	3 m	IC800VMCP1030	IC800VMCP2030	IC800VMCP3030
	5 m	IC800VMCP1050	IC800VMCP2050	IC800VMCP3050
	10 m	IC800VMCP1100	IC800VMCP2100	IC800VMCP3100
	20 m	IC800VMCP1200	IC800VMCP2200	IC800VMCP3200
Brake and Power Cable	3 m	IC800VMCB1030	IC800VMCB2030	IC800VMCB3030
	5 m	IC800VMCB1050	IC800VMCB2050	IC800VMCB3050
	10 m	IC800VMCB1100	IC800VMCB2100	IC800VMCB3100
	20 m	IC800VMCB1200	IC800VMCB2200	IC800VMCB3200
Encoder Cable	3 m	IC800VMCE1030	IC800VMCE1030	IC800VMCE1030
	5 m	IC800VMCE1050	IC800VMCE1050	IC800VMCE1050
	10 m	IC800VMCE1100	IC800VMCE1100	IC800VMCE1100
	20 m	IC800VMCE1200	IC800VMCE1200	IC800VMCE1200
Communications & I/O Interface Cables				
Communications Cable	3 m	IC800VMCS030	IC800VMCS030	IC800VMCS030
Flying lead I/O interface Cable	1 m	IC800VMCI010	IC800VMCI010	IC800VMCI010
	3 m	IC800VMCI030	IC800VMCI030	IC800VMCI030
Amplifier Connectors				
CN1 I/O Connector		IC800VMACONCN1	IC800VMACONCN1	IC800VMACONCN1
CN2 Encoder Connector		IC800VMACONCN2	IC800VMACONCN2	IC800VMACONCN2
CN3 Communication Connector		IC800VMACONCN3	IC800VMACONCN3	IC800VMACONCN3
AC Power Connector		IC800VMACONACP	N/A	N/A
Motor Power Connector		IC800VMACONMTRP	N/A	N/A
External Braking Resistor Connector		IC800VMADBR001	N/A	N/A
Motor Connectors				
Power Connector (motor only)		IC800VMMCONP003	IC800VMMCONP003	IC800VMMCONP004
Power Connector (motor & brake)		IC800VMMCONP003	IC800VMMCONP003	IC800VMMCONP004
Encoder Connector		IC800VMMCONE002	IC800VMMCONE002	IC800VMMCONE002
Accessories				
I/O Terminal Breakout Board and Cable	0.5 m	IC800VMTBC005	IC800VMTBC005	IC800VMTBC005
External Braking Resistor 40Ω, 400 Watt		IC800VMBR040	IC800VMBR040	IC800VMBR040
External Braking Resistor 20Ω, 1000 Watt		IC800VMBR020	IC800VMBR020	IC800VMBR020

αi and βi Series Servo Amplifiers





All Digital Servo Systems Offer High Performance and Reliability.

GE αi and βi Series Servo Drives, based on over five million axes installed worldwide, offer superior reliability and performance for unprecedented mean time between failure. The αi and βi Series Servos are available in a wide range of ratings for use with GE PACMotion PMM335 Series motion controller.



High-Performance Serial Encoders

Standard serial encoders built into the motors provide exceptional feedback resolution of 64K or 128K counts per revolution. Serial encoders support higher resolutions at high motor velocities than standard quadrature encoders and are more immune to noise. An optional battery connection provides absolute position feedback, eliminating the need to home the system after a power shutdown.

Reduced Tuning and Setup

There is no need for potentiometer tuning or personality modules; little tuning is required for properly sized drives. All drive parameters are stored in the controller in a standard motor database. Configuration settings are not stored in the drive, making it possible to replace drives with little set-up time. Stored drive and machine parameters are quickly transferred to repeat production machines.

All-Digital System

All control loops—current, velocity, and position—are closed in the GE motion controller. High-speed microprocessors and/or digital signal processors (DSPs) in the controller provide loop update times of 250 µs. The high response servo system can compensate for machine design limitations, yielding faster acceleration/deceleration rates and better responses to load changes.

All-Digital Servo Command Signals

The PACMotion PMM335 motion controllers use a high speed fiber optic command interface to the αi and βi Series amplifiers. With its superior noise immunity, both of these GE digital command interfaces allows for an increased signal to noise ratio for improved accuracy and performance.

Series	Motor Series	Controller	Command Interface	Continuous Torque Range In-lb	Nm	Power Supply
αHVi	αHVi, αHVis	PMM335	Fiber Optic	17.7-1150	2-130	Separate PSM
βi	βis	PMM335	Fiber Optic	3.5-177	0.4-20	Built-in
βHVi	βHVis	PMM335	Fiber Optic	17.7-177	2-20	Built-in

Agency Approvals

UL, IEC rating and CE mark compliant

Info

For application, installation, and tuning information, consult the Services website at www.geautomation.com.

αi and βi Series Servo Amplifiers

System Power Requirements

Amplifier Specification	βi Series	αHVi*/βHVi Series
Voltage (-15%, +10%):		
3-phase	200-240VAC	400-480VAC
1-phase (see below)	220-240VAC	n/a
Frequency	50/60Hz	50/60 Hz
Allowable frequency fluctuation	±2 Hz	±2 Hz
Voltage fluctuation during acceleration/deceleration	7% or less	7% or less
Ambient Temperature Range	0-55°C	0-55°C
Humidity (non-condensing)	90%	90%
Vibration	Less than 0.5G	Less than 0.5G

*αHV*i* series amplifiers use a separately mounted shared power supply.

The 4A and 20A βi Series Servo amplifiers can be run on single phase power; however, the lifetime of the amplifier is reduced because of higher input and ripple current. An AC line filter is strongly recommended to suppress the influences of high-frequency input line noise on the drive power supply.

If a power source within the specified voltage range is not available, a transformer is required. The kVA rating of the transformer should be equal to or greater than the sum of all motor kW ratings. If an isolation-type power transformer is used, an AC line filter is not required.

GE offers the following line filters; transformers must be supplied by the user as required.

Part Number	Description	Amplifier Series
ZA81L-0001-0083#3C	5.4 kW, 3-phase AC line filter	βi
ZA81L-0001-0101#C	10.5 kW, 3-phase AC line filter	βi
ZA81L-0001-0168	5.4 kW, 3-phase AC line filter	βHVi
ZA81L-0001-0169	10.5 kW, 3-phase AC line filter	βHVi
ZA81L-0001-0163	18kW, 3-phase AC line filter	PSM-11HVi, PSM-18HVi
ZA81L-0001-0164	45kW, 3-phase AC line filter	PSM-30HVi, PSM-45HVi

Control Power Specification

The βi and βHVi Series amplifiers require a 24VDC power supply for amplifier control power. This DC power supply must be supplied by the user. We recommend the GE 24VDC power supply, part number IC690PWR024. The same external DC power supply can be used to provide power to multiple amplifiers as long as the supply is rated for the total current requirements of all of the amplifiers.

The αHVi series power supplies require a single phase 200-230VAC control power input.



Motor Model	Max. kW Rating
β0.4/5000 is	0.13
β0.5/6000 is	0.35
β1/6000 is	0.5
β2/4000 is	0.5
β4/4000 is	0.75
β8/3000 is	1.2
β12/3000 is	1.8
β22/2000 is	2.5
β2/4000 HVis	0.5
β4/4000 HVis	0.75
β8/3000 HVis	1.2
β12/3000 HVis	1.8
β22/2000 HVis	2.5
α2/6000HVis	1.0
α4/5000HVis	1.0
α8/6000HVis	2.2
α12/4000HVis	2.5
α22/3000HVi	4.0
α22/4000HVis	4.5
α30/4000HVis	5.5
α40/4000HVis	5.5
α50/3000HVis w/fan	14
α100/2500HVis	11

Incoming DC Power for βi Series

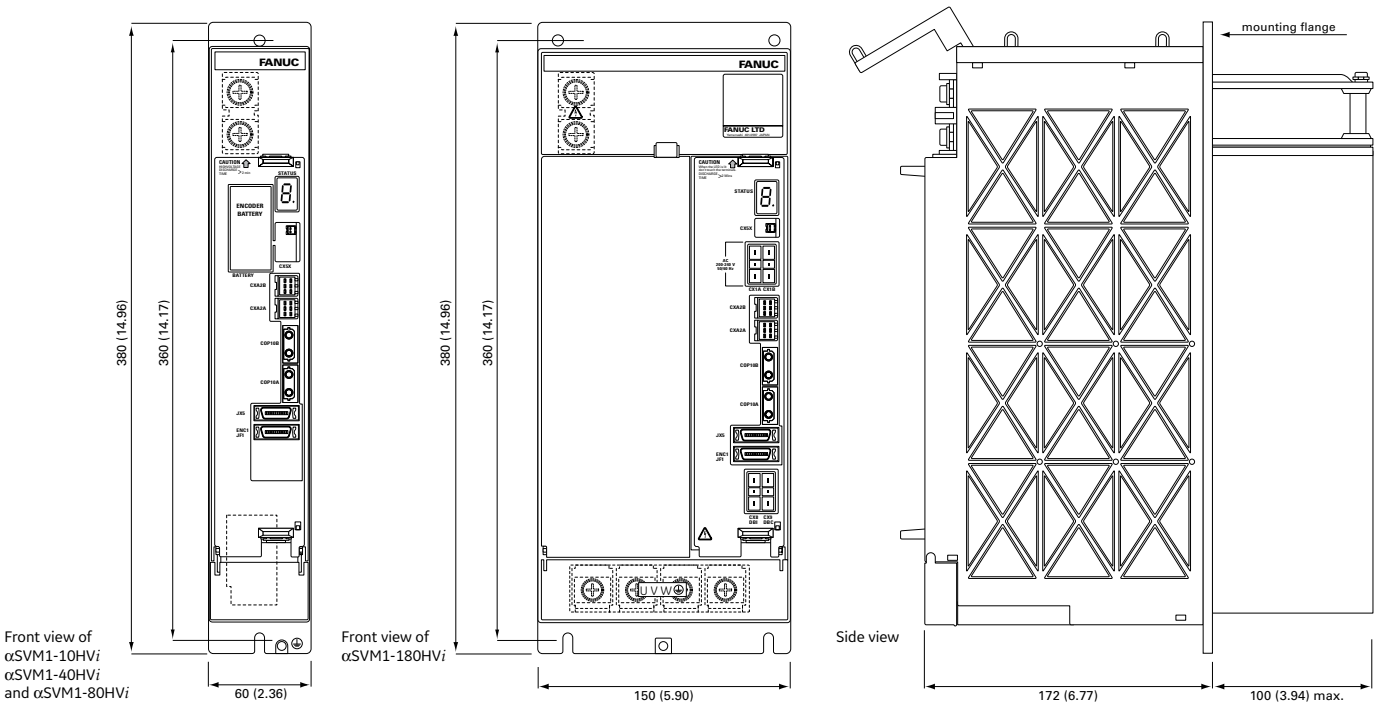
Input Voltage	24VDC (±10%)
Current Requirement (per amplifier):	
βi Series	0.9 amps
βHVi Series	0.9 amps

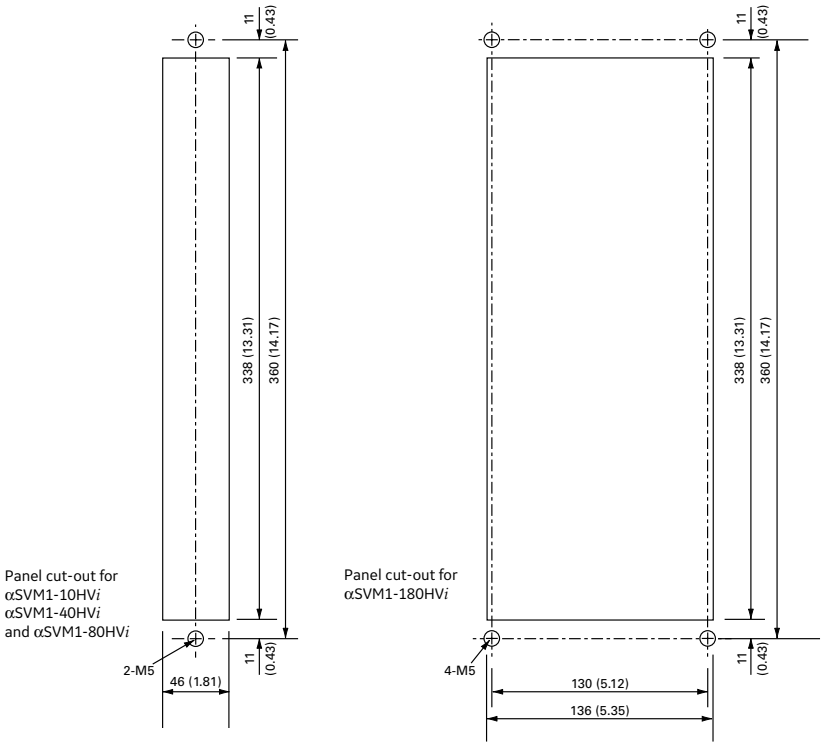
αHV*i* Series Servo Amplifiers and Power Supplies

Dimensions

The αHV*i* Series amplifiers and PSM-HV*i* power supplies are designed with a rear-mounted heat sink that extends through a hole in the mounting plate. This design eliminates most of the heat dissipation inside the control cabinet, reducing the temperature rise in the cabinet and the load on cabinet cooling equipment.

αHV*i* Amplifier Dimension Drawings

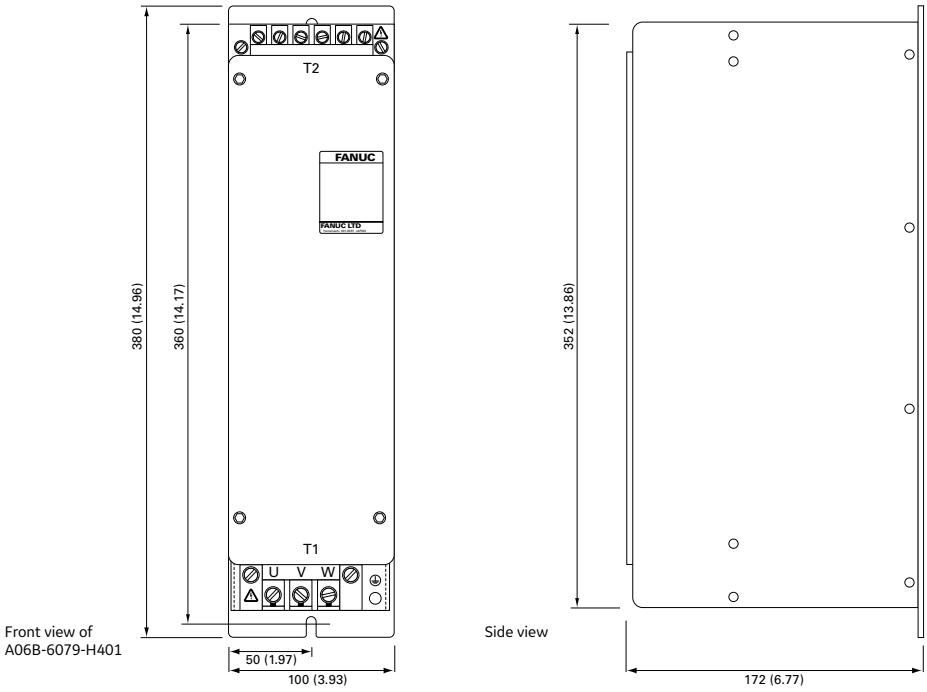




αHV*i* Series Servo Amplifiers and Power Supplies

Dimensions

Dynamic Brake Module Dimension Drawings



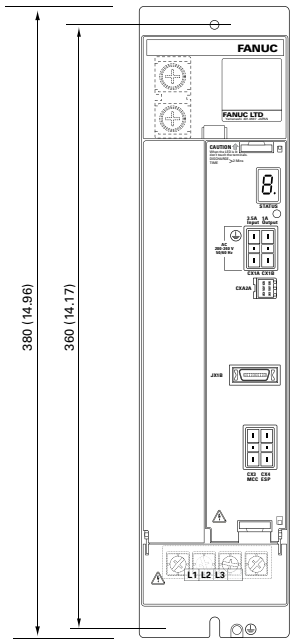
Front view of A06B-6079-H401

Side view

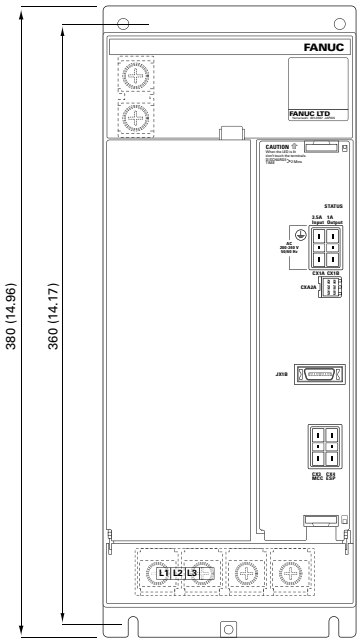
αHV*i* Series Servo Amplifiers and Power Supplies

Dimensions

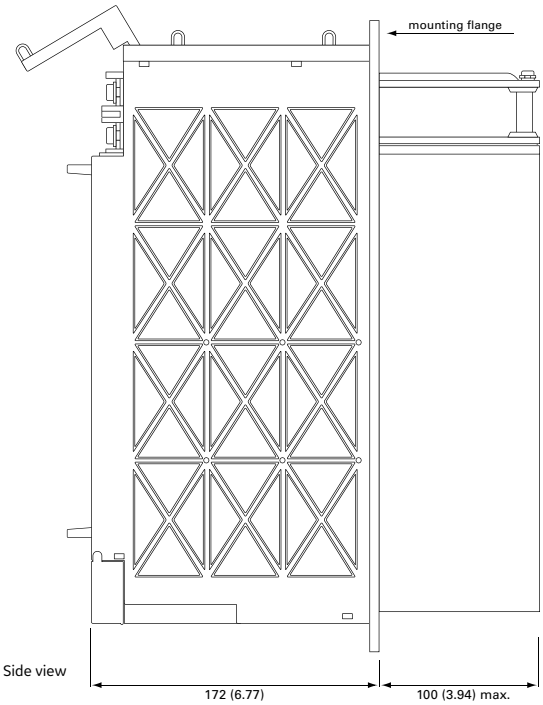
Power Supply Dimension Drawings



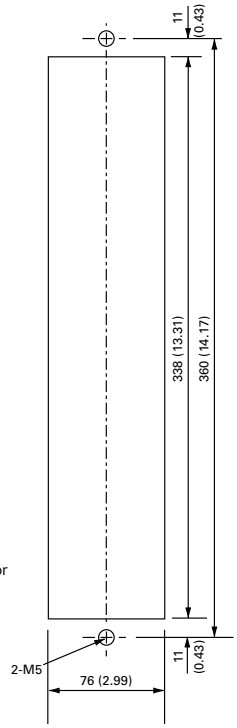
Front view of PSM-11HV*i* and PSM-18HV*i*



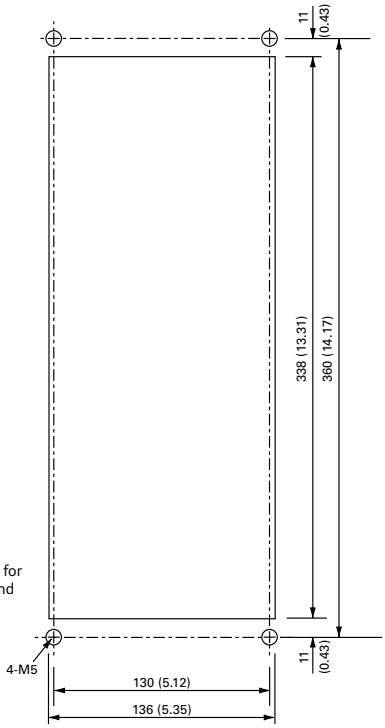
Front view of PSM-30HV*i* and PSM-45HV*i*



Side view



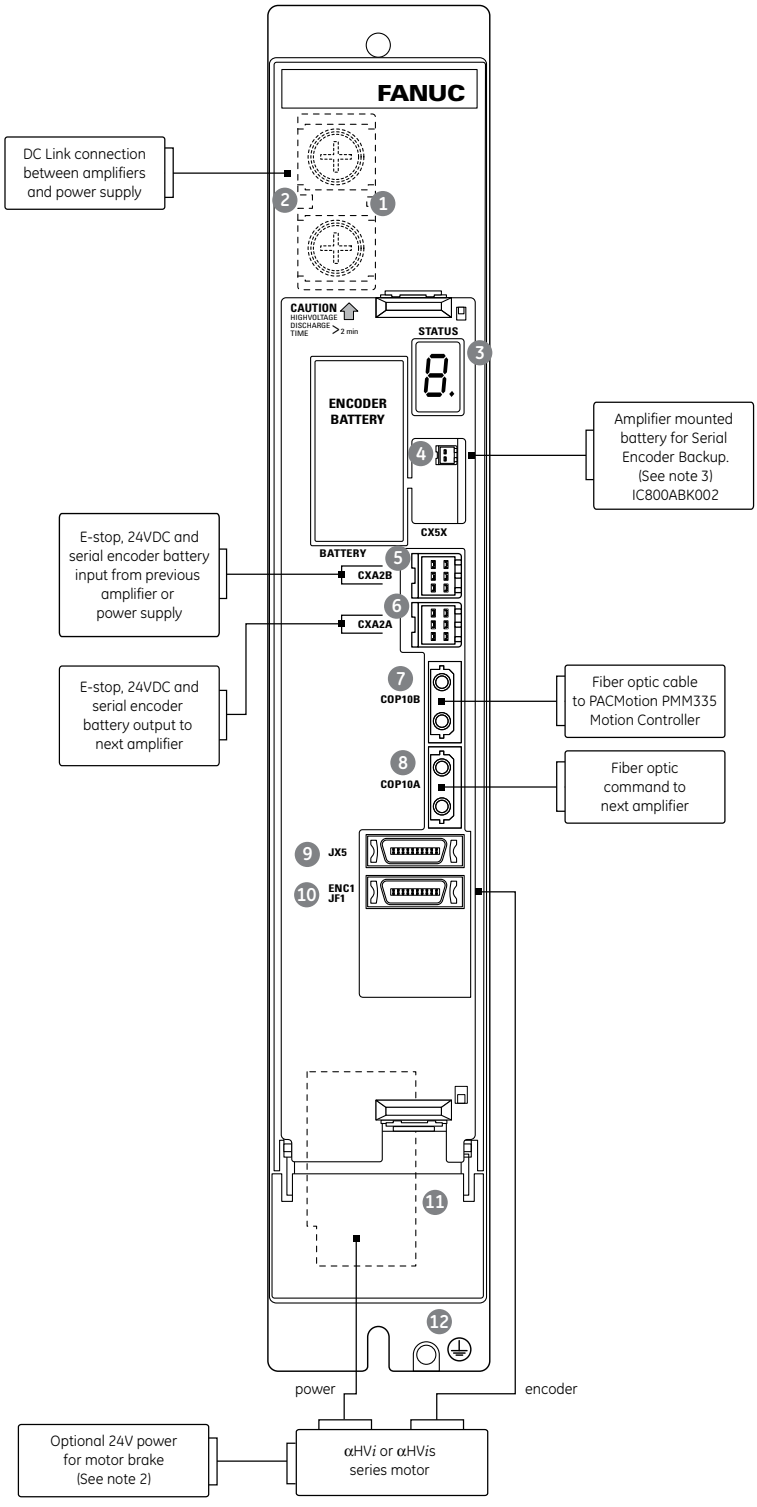
Panel cut-out for PSM-11HV*i* and PSM-18HV*i*



Panel cut-out for PSM-30HV*i* and PSM-45HV*i*

αHV*i* Series Servo Amplifiers and Power Supplies

αSVM1-10HV*i*, αSVM1-40HV*i*, αSVM1-80HV*i* Connection Diagram



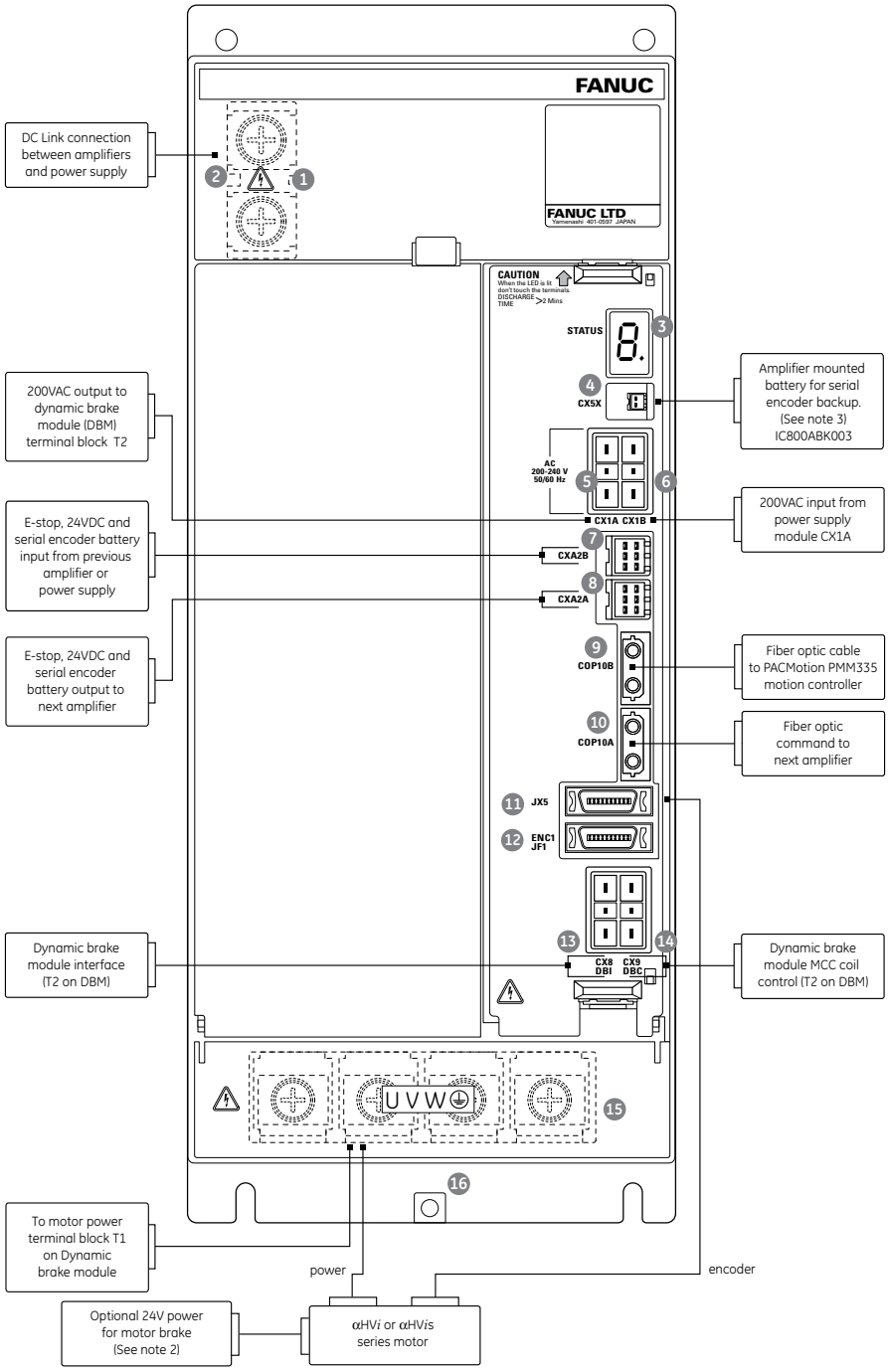
No.	Name	Remarks
1		DC link terminal block
2		DC link charge LED
3	STATUS	Status LED
4	CX5X	Absolute encoder battery input
5	CXA2B	Input connector for PSM interface
6	CXA2A	Output connector for PSM interface
7	COP10B	Fiber optic servo command input
8	COP10A	Fiber optic servo command output
9	JX5	No connection
10	ENC1/JF1	Serial encoder feedback
11	CZ2	Motor power connector
12	⏚	Tapped hole for grounding the amplifier

Notes:

1. Always install the circuit breakers, magnetic contactor, and AC line filter.
2. Use a regulated 24 VDC power supply for the amplifier. 24 VDC power supply for the amplifier and power supply for the motor brake cannot be shared.
3. The IC800ABK001 encoder battery pack mounts separately on the panel and can power up to 4 axes. Alternatively, the IC800ABK002 1-axis lithium battery can be snapped onto each amplifier.

αHV*i* Series Servo Amplifiers and Power Supplies

αSVM1-180HV*i*, Connection Diagram



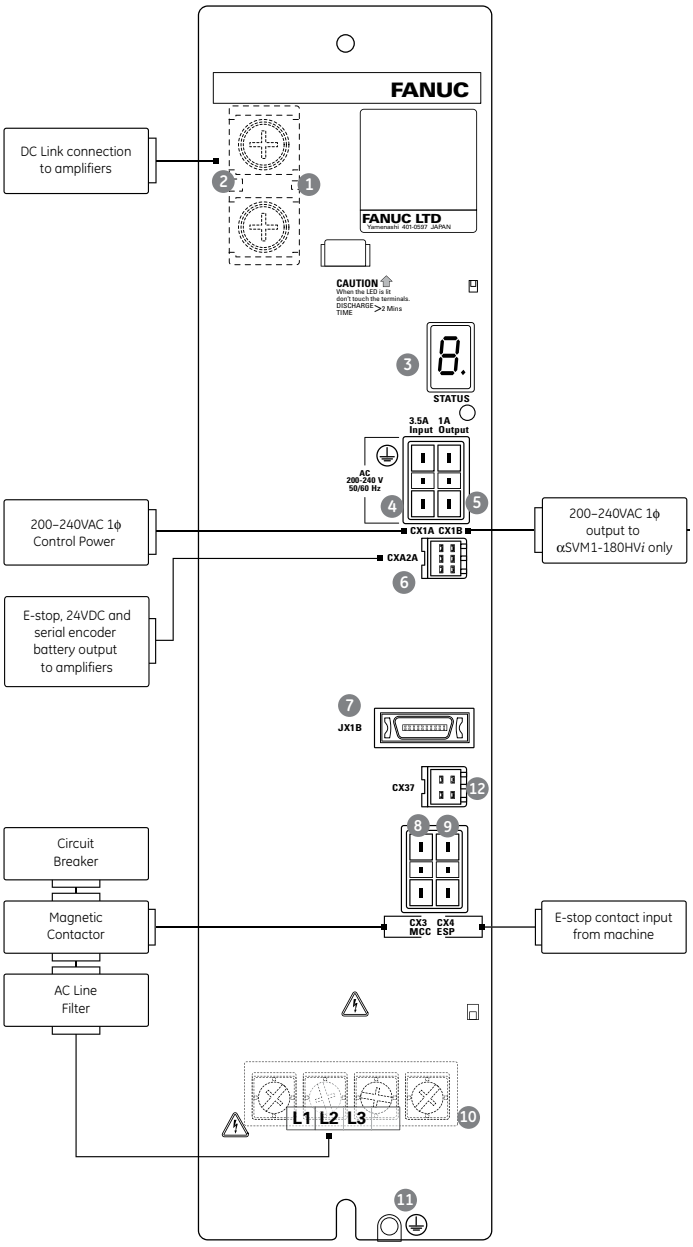
No.	Name	Remarks
1		DC link terminal block
2		DC link charge LED
3	STATUS	Status LED
4	CX5X	Absolute encoder battery input
5	CX1A	200VAC power supply output connector
6	CX1B	200VAC power supply input connector
7	CXA2B	Input connector for PSM interface
8	CXA2A	Output connector for PSM interface
9	COP10B	Fiber optic servo command input
10	COP10A	Fiber optic servo command output
11	JX5	No connection
12	ENC1/JF1	Serial encoder feedback
13	CX8	Dynamic brake module interface connector
14	CX9	Connector for the magnetic contactor (MCC) drive coil of the dynamic brake module
15	TB2	Motor power connector
16	⏚	Tapped hole for grounding the amplifier

Notes:

1. Always install the circuit breakers, magnetic contactor, and AC line filter.
2. Use a regulated 24 VDC power supply for the amplifier. 24 VDC power supply for the amplifier and power supply for the motor brake cannot be shared.
3. The IC800ABK001 encoder battery pack mounts separately on the panel and can power up to 4 axes. Alternatively, the IC800ABK003 1-axis lithium battery can be snapped onto each amplifier.

αHV*i* Series Servo Amplifiers and Power Supplies

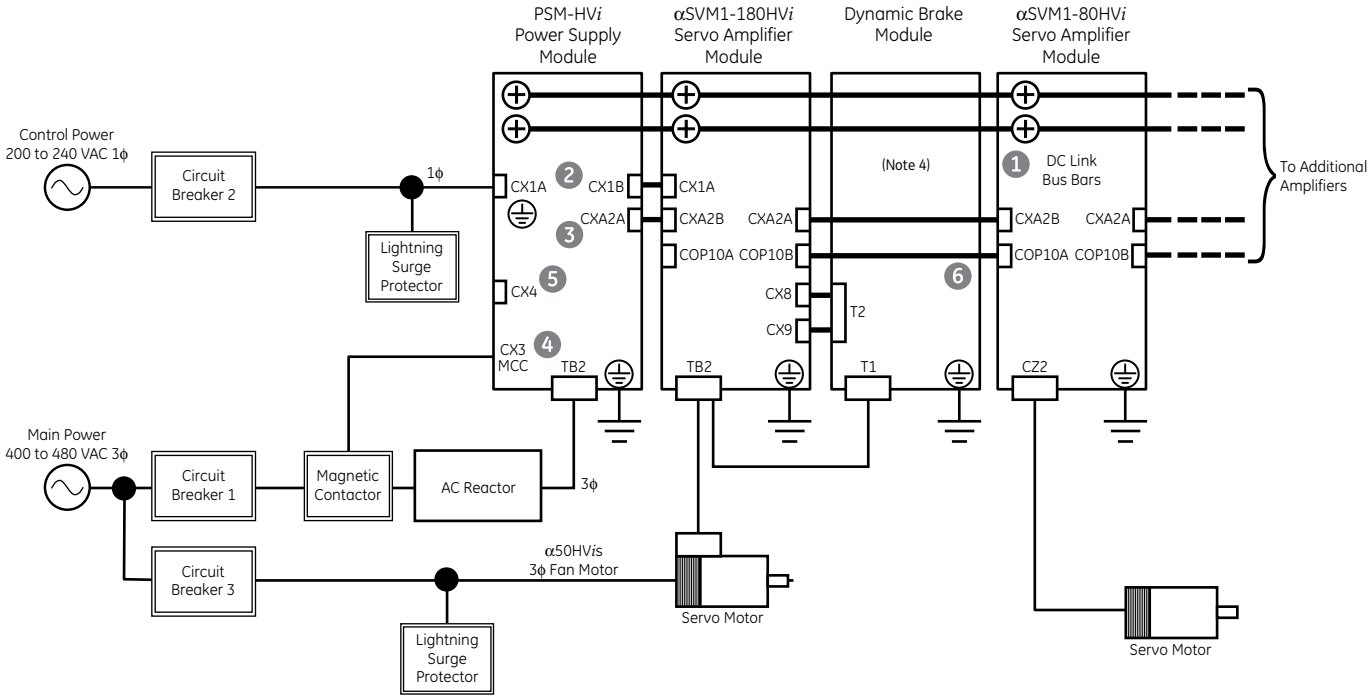
PSM-HV*i* Power Supply Connection Diagram



No.	Name	Remarks
1		DC link terminal block
2		DC link charge LED
3	STATUS	Status LED
4	CX1A	200VAC power supply input connector
5	CX1B	200VAC power supply output connector (used with αSVM1-180HV*i* only)
6	CXA2A	Output connector for PSM interface
7	JX1B	Not used
8	CX3	Connector for the main magnetic contactor (MCC) drive coil control signal
9	CX4	Connector for ESP signal
10	TB2	Terminal block for main AC power line
11	⏚	Tapped hole for grounding the power supply
12	CX37	Power failure detection output

αHV*i* Series Servo Amplifiers and Power Supplies

αHV*i* System Connections



No.	Name	Remarks	Part Numbers
1	DC Link Bus Bars	30, 60 or 90 mm long bar kits available based on width of module[1]	60 mm kit: Z44A718031-G05 90 mm kit: Z44A718031-G03 150 mm kit: Z44A718031-G12
2	CX1A/CX1B	200VAC 1 phase control power unit[2]	ZA06B-6071-K203 (PSM connector kit) ZA02B-0120-K321 (2 required for αSVM1-180HV*i* only)
3	CXA2A/CXA2B	Output/input connectors for PSM interface[3]	ZA06B-6110-K210 (connector: 2 required) Z44C746453-001 (200 mm cable for shared encoder battery) Z44C746453-002 (200 mm cable for built-in encoder battery or no battery backup)
4	CX3	Connector for main magnetic contactor (MCC) control signal[2]	ZA06B-6071-K203 (PSM connector kit)
5	CX4	E-Stop signal connector[2]	ZA06B-6071-K203 (PSM connector kit)
6	COP10A/COP10B	Fiber optic command cable	See page 4.5 for cable options

Notes:

1. Power supply and amplifier kits include appropriate length DC link bus bars.
2. The power supply connector kit included with all power supply module kits includes connectors for CX1A, CX3 and CX4. Each αSVM1-180HV*i* amplifier kit includes two of the CX1A/B connectors to jumper the 200VAC single phase power from the power supply module.
3. The PSM interface on connectors CXA2A/B supplies 24VDC power from the PSM power supply module to the connected amplifiers. Additionally, this interface allows shared signals such as system emergency stop and battery backup for the motor serial encoders. Connectors are included in the amplifier and power supply kits. Prefabricated cables are also available. Select the correct cable based on the battery type used to backup the motor serial encoder feedback for absolute positioning.
4. Position of dynamic brake module is for reference only. Normally this module is mounted above or below the amplifiers or at the end of the module line up so that the standard DC link bus bar length is adequate to make the link connection between adjacent amplifiers.

αHV*i* Series Servo Amplifiers and Power Supplies

Ordering Information

The αHV*i* series amplifiers and PSM-HV*i* power supply modules can be ordered as individual components or as kits that include connectors, spare fuses, and DC link bus bars. The kits are recommended for new installations while spare parts and replacement units should use the part number for the amplifier or power supply module. To place an order for a complete system, select the servo motor(s) that meet your application requirements, then select the amplifier kit(s), power supply kit, cables, connectors and accessories.

αHV*i* Amplifier Kits

Part Number	Kit Description	Qty.	Kit Contents
IC800AIHV010	10 Amp αHV*i* Series Amplifier Package	1	αSVM1-10HV*i* FSSB Amplifier (ZA06B-6127-H102)
		1	SVM Spare Control Power Fuse (ZA06B-6073-K250)
		2	CXA2A/B Connector (ZA06B-6110-K210)
		1	CZ2 Motor Power Output Connector (ZA06B-6110-K203#ZZM)
		1	Bus Bar Kit for 60 mm Module (Z44A718031-G05)
IC800AIHV040	40 Amp αHV*i* Series Amplifier Package	1	αSVM1-40HV*i* FSSB Amplifier (ZA06B-6127-H104)
		1	SVM Spare Control Power Fuse (ZA06B-6073-K250)
		2	CXA2A/B Connector (ZA06B-6110-K210)
		1	CZ2 Motor Power Output Connector (ZA06B-6110-K203#ZZM)
		1	Bus Bar Kit for 60 mm Module (Z44A718031-G05)
IC800AIHV080	80 Amp αHV*i* Series Amplifier Package	1	αSVM1-80HV*i* FSSB Amplifier (ZA06B-6127-H105)
		1	SVM Spare Control Power Fuse (ZA06B-6073-K250)
		2	CXA2A/B Connector (ZA06B-6110-K210)
		1	CZ2 Motor Power Output Connector (ZA06B-6110-K203#ZZM)
		1	Bus Bar Kit for 60 mm Module (Z44A718031-G05)
IC800AIHV180	180 Amp αHV*i* Series Amplifier Package	1	αSVM1-180HV*i* FSSB Amplifier (ZA06B-6127-H106)
		1	SVM Spare Control Power Fuse (ZA06B-6073-K250)
		2	CXA2A/B Connector (ZA06B-6110-K210)
		1	CX8/CX9 DB Module Interface Connector Kit (ZA06B-6073-K216)
		1	Bus Bar Kit for 150 mm Module (Z44A718031-G12)
		2	CX1A/B Control Power Connector Kit (ZA02B-0120-K321)

PSM-HV*i* Power Supply Kits

Part Number	Kit Description	Qty.	Kit Contents
IC800PSHV011	11 kW Power Supply Module Package	1	PSM-11HV*i* 11 kW HV Power Supply Module (ZA06B-6150-H011)
		1	Spare Control Power Fuse (ZA06B-6077-K250)
		1	Bus Bar Kit for 90 mm Module (Z44A718031-G03)
		1	Power Supply Connector Kit (ZA06B-6071-K203)
IC800PSHV018	18 kW Power Supply Module Package	1	PSM-18HV*i* 18 kW HV Power Supply Module (ZA06B-6150-H018)
		1	Spare Control Power Fuse (ZA06B-6077-K250)
		1	Bus Bar Kit for 90 mm Module (Z44A718031-G03)
		1	Power Supply Connector Kit (ZA06B-6071-K203)
IC800PSHV030	30 kW Power Supply Module Package	1	PSM-30HV*i* 30 kW HV Power Supply Module (ZA06B-6150-H030)
		1	Spare Control Power Fuse (ZA06B-6077-K250)
		1	Bus Bar Kit for 150 mm Module (Z44A718031-G12)
		1	Power Supply Connector Kit (ZA06B-6071-K203)
IC800PSHV045	45 kW Power Supply Module Package	1	PSM-45HV*i* 45 kW HV Power Supply Module (ZA06B-6150-H045)
		1	Spare Control Power Fuse (ZA06B-6077-K250)
		1	Bus Bar Kit for 150 mm Module (Z44A718031-G12)
		1	Power Supply Connector Kit (ZA06B-6071-K203)

The αHV*i* series amplifiers use a separately mounted shared power supply for one or more axes. These power supplies can regenerate energy back to the AC line so no regenerative resistors or modules are required.

αHV*i* Series Amplifier and Motor

Ordering Information

Motor Model		αi2/6000HV*is*	αi4/5000HV*is*	αi8/6000HV*is*
Motor Part Number		ZA06B-0219-B200	ZA06B-0216-B200	ZA06B-0233-B200
Motor/Brake Part Number		ZA06B-0219-B500	ZA06B-0216-B500	ZA06B-0233-B500
Beta Amplifier Model		βSVM1-10HV*i*	βSVM1-10HV*i*	βSVM1-40HV*i*
Beta Amplifier Part Number		ZA06B-6131-H001	ZA06B-6131-H001	ZA06B-6131-H003
Beta Amplifier Fan Kit (Note1)		n/a	n/a	ZA06B-6134-K002
Beta Amplifier Kit		IC800BIHV010	IC800BIHV010	IC800BIHV040
Alpha Amplifier Model		αSVM1-10HV*i*	αSVM1-10HV*i*	αSVM1-40HV*i*
Alpha Amplifier Part Number		ZA06B-6127-H102	ZA06B-6127-H102	ZA06B-6127-H104
Alpha Amplifier Kit		IC800AIHV010	IC800AIHV010	IC800AIHV040
Cables		**αi2/6000HV*is***	**αi4/5000HV*i***	**αi8/6000HV*is***
Power Cable	7 M	CP2I-0WPB-0070-AZ	CP2I-0WPB-0070-AZ	CP3I-0WPB-0070-AZ
	14 M	CP2I-0WPB-0140-AZ	CP2I-0WPB-0140-AZ	CP3I-0WPB-0140-AZ
Power Cable	7 M	CP2I-0WEB-0070-AZ	CP2I-0WEB-0070-AZ	CP3I-0WEB-0070-AZ
(Shielded)	14 M	CP2I-0WEB-0140-AZ	CP2I-0WEB-0140-AZ	CP3I-0WEB-0140-AZ
Feedback Cable	7 M	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ
(Right Angle)	14 M	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ
Feedback Cable	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
(Straight)	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Brake Power Cable	7 M	Integrated with power cable	Integrated with power cable	CB4N-0WPM-0070-AZ
	14 M	Integrated with power cable	Integrated with power cable	CB4N-0WPM-0140-AZ
PSM Interface Cable (External Battery)	200 mm	Z44C746453-001	Z44C746453-001	Z44C746453-001
PSM Interface Cable (Built-in or No Battery)	200 mm	Z44C746453-002	Z44C746453-002	Z44C746453-002
Fiber Optic Command Cable	15 CM		ZA66L-6001-0023#L150R0	
	30 CM		ZA66L-6001-0023#L300R0	
	1 M		ZA66L-6001-0023#L1R003	
	2 M		ZA66L-6001-0023#L2R003	
	3 M		ZA66L-6001-0023#L3R003	
Fiber Optic Cable (Sheathed)	1 M		ZA66L-6001-0026#L1R003	
	3 M		ZA66L-6001-0026#L3R003	
	5 M		ZA66L-6001-0026#L5R003	
	10 M		ZA66L-6001-0026#L10R03	
	20 M		ZA66L-6001-0026#L20R03	
	30 M		ZA66L-6001-0026#L30R03	
	50 M		ZA66L-6001-0026#L50R03	
	100 M		ZA66L-6001-0026#L100R3	
Connector Kits		**αi2/6000HV*is***	**αi4/5000HV*i***	**αi8/6000HV*is***
Encoder Feedback Connector (JF1)		ZA06B-6073-K214	ZA06B-6073-K214	ZA06B-6073-K214
CXA2A/B Jumper Connector (2 Req)		ZA06B-6110-K210	ZA06B-6110-K210	ZA06B-6110-K210
CZ2 Motor Power Output Connector		ZA06B-6110-K203#ZZM	ZA06B-6110-K203#ZZM	ZA06B-6110-K203#ZZM
Motor Half Keys		Z44A730465-001	Z44A730465-016	Z44A730465-002
Motor Feedback Connector Kit	90 Deg	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E
	Straight	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S
Motor Power/Brake Connector Kit	90 Deg	ZA06B-6114-K220#E	ZA06B-6114-K220#E	n/a
	Straight	ZA06B-6114-K220#S	ZA06B-6114-K220#S	n/a
Motor Power Connector Kit	90 Deg	n/a	n/a	Z44A730464-G18
	Straight	n/a	n/a	Z44A730464-G17
Motor Brake Connector Kit	90 Deg	n/a	n/a	ZA06B-6114-K213#E
	Straight	n/a	n/a	ZA06B-6114-K213#S
Accessories		**αi2/6000HV*is***	**αi4/5000HV*i***	**αi8/6000HV*is***
DC Link Bus Bars		Z44A718031-G05	Z44A718031-G05	Z44A718031-G05
Spare Amplifier Control Power Fuse		ZA06B-6073-K250	ZA06B-6073-K250	ZA06B-6073-K250
Encoder Battery Back-up (Multi-Axis Panel Mounted Kit) (Note 2)		IC800ABK001	IC800ABK001	IC800ABK001
Encoder Battery Back-up (Single-Axis Built-in) (Note 2)		IC800ABK002	IC800ABK002	IC800ABK002

1) Separate user installed cooling fan is only required for the βSVM1-40HVi amplifier. This fan kit is included in the IC800BIHV040 amplifier kit but must be separately ordered when the ZA06B-6131-H003 amplifier is ordered.
2) Contents of encoder battery kits is shown on page 4.73

αHV*i* Series Amplifier and Motor

Ordering Information

Motor Model		αi12/4000HV*is*	αi22/3000HV*i*	αi22/4000HV*is*
Motor Part Number		ZA06B-0239-B200	ZA06B-0249-B200	ZA06B-0266-B200
Motor/Brake Part Number		ZA06B-0239-B500	ZA06B-0249-B500	ZA06B-0266-B500
Beta Amplifier Model		βSVM1-40HV*i*	βSVM1-40HV*i*	n/a
Beta Amplifier Part Number		ZA06B-6131-H003	ZA06B-6131-H003	n/a
Beta Amplifier Fan Kit (Note1)		ZA06B-6134-K002	ZA06B-6134-K002	n/a
Beta Amplifier Kit		IC800BIHV040	IC800BIHV040	n/a
Alpha Amplifier Model		αSVM1-40HV*i*	αSVM1-40HV*i*	αSVM1-80HV*i*
Alpha Amplifier Part Number		ZA06B-6127-H104	ZA06B-6127-H104	ZA06B-6127-H105
Alpha Amplifier Kit		IC800AIHV040	IC800AIHV040	IC800AIHV080
Cables		**αi12/4000HV*is***	**αi22/3000HV*i***	**αi22/4000HV*is***
Power Cable	7 M	CP3I-0WPB-0070-AZ	CP4I-0WPB-0070-AZ	CP4I-0WPB-0070-AZ
	14 M	CP3I-0WPB-0140-AZ	CP4I-0WPB-0140-AZ	CP4I-0WPB-0140-AZ
Power Cable	7 M	CP3I-0WEB-0070-AZ	CP4I-0WEB-0070-AZ	CP4I-0WEB-0070-AZ
(Shielded)	14 M	CP3I-0WEB-0140-AZ	CP4I-0WEB-0140-AZ	CP4I-0WEB-0140-AZ
Feedback Cable	7 M	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ
(Right Angle)	14 M	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ
Feedback Cable	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
(Straight)	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Brake Power Cable	7 M	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ
	14 M	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ
PSM Interface Cable (External Battery)	200 mm	Z44C746453-001	Z44C746453-001	Z44C746453-001
PSM Interface Cable (Built-in or No Battery)	200 mm	Z44C746453-002	Z44C746453-002	Z44C746453-002
Fiber Optic Command Cable	15 CM		ZA66L-6001-0023#L150R0	
	30 CM		ZA66L-6001-0023#L300R0	
	1 M		ZA66L-6001-0023#L1R003	
	2 M		ZA66L-6001-0023#L2R003	
	3 M		ZA66L-6001-0023#L3R003	
Fiber Optic Cable (Sheathed)	1 M		ZA66L-6001-0026#L1R003	
	3 M		ZA66L-6001-0026#L3R003	
	5 M		ZA66L-6001-0026#L5R003	
	10 M		ZA66L-6001-0026#L10R03	
	20 M		ZA66L-6001-0026#L20R03	
	30 M		ZA66L-6001-0026#L30R03	
	50 M		ZA66L-6001-0026#L50R03	
	100 M		ZA66L-6001-0026#L100R3	
Connector Kits		**αi12/4000HV*is***	**αi22/3000HV*i***	**αi22/4000HV*is***
Encoder Feedback Connector (JF1)		ZA06B-6073-K214	ZA06B-6073-K214	ZA06B-6073-K214
CXA2A/B Jumper Connector (2 Req)		ZA06B-6110-K210	ZA06B-6110-K210	ZA06B-6110-K210
CZ2 Motor Power Output Connector		ZA06B-6110-K203#ZZM	ZA06B-6110-K203#ZZM	ZA06B-6110-K203#ZZM
Motor Half Keys		Z44A730465-015	Z44A730465-003	Z44A730465-003
Motor Feedback Connector Kit	90 Deg	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E
	Straight	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S
Motor Power Connector Kit	90 Deg	Z44A730464-G18	Z44A730464-G20	Z44A730464-G20
	Straight	Z44A730464-G17	Z44A730464-G19	Z44A730464-G19
Motor Brake Connector Kit	90 Deg	ZA06B-6114-K213#E	ZA06B-6114-K213#E	ZA06B-6114-K213#E
	Straight	ZA06B-6114-K213#S	ZA06B-6114-K213#S	ZA06B-6114-K213#S
Accessories		**αi12/4000HV*is***	**αi22/3000HV*i***	**αi22/4000HV*is***
DC Link Bus Bars		Z44A718031-G05	Z44A718031-G05	Z44A718031-G05
Spare Amplifier Control Power Fuse		ZA06B-6073-K250	ZA06B-6073-K250	ZA06B-6073-K250
Encoder Battery Back-up (Multi-Axis Panel Mounted Kit) (Note 2)		IC800ABK001	IC800ABK001	IC800ABK001
Encoder Battery Back-up (Single-Axis Built-in) (Note 2)		IC800ABK002	IC800ABK002	IC800ABK002

1) Separate user installed cooling fan is only required for the βSVM1-40HVi amplifier. This fan kit is included in the IC800BIHV040 amplifier kit but must be separately ordered when the ZA06B-6131-H003 amplifier is ordered.
2) Contents of encoder battery kits is shown on page 4.73

αHV*i* Series Amplifier and Motor

Ordering Information (continued)

Motor Model		αHV*is*-30/4000	αHV*is*-40/4000
Motor Part Number		ZA06B-0269-B200	ZA06B-0273-B200
Motor/Brake Part Number		ZA06B-0269-B500	ZA06B-0273-B500
Alpha Amplifier Model		αSVM1-80HV*i*	αSVM1-80HV*i*
Alpha Amplifier Part Number		ZA06B-6127-H105	ZA06B-6127-H105
Alpha Amplifier Kit		IC800AIHV080	IC800AIHV080
Dynamic Braking Module		n/a	n/a

Cables		αHV*is*-30/4000	αHV*is*-40/4000
Power Cable	7 M	CP4I-0WPB-0070-AZ	CP4I-0WPB-0070-AZ
	14 M	CP4I-0WPB-0140-AZ	CP4I-0WPB-0140-AZ
Power Cable	7 M	CP4I-0WEB-0070-AZ	CP4I-0WEB-0070-AZ
(Shielded)	14 M	CP4I-0WEB-0140-AZ	CP4I-0WEB-0140-AZ
Feedback Cable	7 M	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ
(Right Angle)	14 M	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ
Feedback Cable	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
(Straight)	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Brake Power Cable	7 M	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ
	14 M	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ
Fan Cable	7 M	n/a	n/a
	14 M	n/a	n/a
PSM Interface Cable (External Battery)	200 mm	Z44C746453-001	Z44C746453-001
PSM Interface Cable (Built-in or No Battery)	200 mm	Z44C746453-002	Z44C746453-002
Fiber Optic Command Cable	15 CM	ZA66L-6001-0023#L150R0	
	30 CM	ZA66L-6001-0023#L300R0	
	1 M	ZA66L-6001-0023#L1R003	
	2 M	ZA66L-6001-0023#L2R003	
	3 M	ZA66L-6001-0023#L3R003	
Fiber Optic Cable (Sheathed)	1 M	ZA66L-6001-0026#L1R003	
	3 M	ZA66L-6001-0026#L3R003	
	5 M	ZA66L-6001-0026#L5R003	
	10 M	ZA66L-6001-0026#L10R03	
	20 M	ZA66L-6001-0026#L20R03	
	30 M	ZA66L-6001-0026#L30R03	
	50 M	ZA66L-6001-0026#L50R03	
	100 M	ZA66L-6001-0026#L100R3	

Connector Kits		αHV*is*-30/4000	αHV*is*-40/4000
Encoder Feedback Connector (JF1)		ZA06B-6073-K214	ZA06B-6073-K214
CXA2A/B Jumper Connector (2 Req)		ZA06B-6110-K210	ZA06B-6110-K210
CZ2 Motor Power Output Connector		ZA06B-6110-K203#ZZM	ZA06B-6110-K203#ZZM
CX8/CX9 DB Module Interface Connector Kit		n/a	n/a
CX1A/B 180HVi Amplifier Control Power		n/a	n/a
Motor Half Keys		Z44A730465-003	Z44A730465-003
Motor Feedback Connector Kit	90 Deg	ZA06B-6114-K204#E	ZA06B-6114-K204#E
	Straight	ZA06B-6114-K204#S	ZA06B-6114-K204#S
Motor Power Connector Kit	90 Deg	Z44A730464-G20	Z44A730464-G20
	Straight	Z44A730464-G19	Z44A730464-G19
Motor Brake Connector Kit	90 Deg	ZA06B-6114-K213#E	ZA06B-6114-K213#E
	Straight	ZA06B-6114-K213#S	ZA06B-6114-K213#S
Motor Fan Connector Kit	90 Deg	n/a	n/a
	Straight	n/a	n/a

Accessories	αHV*is*-30/4000	αHV*is*-40/4000
DC Link Bus Bars	Z44A718031-G05	Z44A718031-G05
Spare Amplifier Control Power Fuse	ZA06B-6073-K250	ZA06B-6073-K250
Encoder Battery Back-up (Panel Mounted Kit) [Note 1]	IC800ABK001	IC800ABK001
Encoder Battery Back-up (Built-in) [Note 1]	IC800ABK002	IC800ABK002

1) Contents of encoder battery kits is shown on page 4.73

αHV*i* Servo System Connection

Ordering Information (continued)

Motor Model		αHV*i*s w/ Fan	αHV*i*s w/ Fan
		α50/3000HV*i*s w/ Fan	**α100/2500HV*i*s w/ Fan**
Motor/Brake Part Number		ZA06B-0276-B210	ZA06B-0286-B310
Motor Part Number		ZA06B-0276-B510	ZA06B-0286-B010
Beta Amplifier Model		n/a	n/a
Beta Amplifier Kit Number		n/a	n/a
Beta Amplifier Part Number		n/a	n/a
Alpha Amplifier Model		αSVM1-180HV*i*	aSVM1-180HVi
Alpha Amplifier Part Number		ZA06B-6124-H106	ZA06B-6124-H106
Alpha Amplifier Kit Number		IC800AIHV180	IC800AIHV180
Dynamic Braking Module (req for SVM1-180HVi)		ZA06B-6079-H401	ZA06B-6079-H401
Cables		**α50/3000HV*i*s w/ Fan**	**α100/2500HV*i*s w/ Fan**
Motor Power Cable	7 M	CP9I-0MPB-0070-AZ	Supplied by customer
	14 M	CP9I-0MPB-0140-AZ	
Motor Power Cable	7 M	CP9I-0MEB-0070-AZ	Supplied by customer
(Shielded)	14 M	CP9I-0MEB-0140-AZ	
Motor Feedback Cable	7 M	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ
(Right Angle)	14 M	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ
Motor Feedback Cable	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
(Straight)	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Motor Brake Power Cable	7 M	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ
	14 M	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ
Motor Fan Cable	7 M	CB5N-0WPM-0070-AZ	CB5N-0WPM-0070-AZ
	14 M	CB5N-0WPM-0140-AZ	CB5N-0WPM-0140-AZ
PSM Interface Cable (External Battery)	200 mm	Z44C746453-001	Z44AC746453-001
PSM Interface Cable (Built-in or No Battery)	200 mm	Z44C746453-002	Z44AC746453-002
Fiber Optic Command Cable	15 CM	ZA66L-6001-0023#L150R0	
	30 CM	ZA66L-6001-0023#L300R0	
	1 M	ZA66L-6001-0023#L1R003	
	2 M	ZA66L-6001-0023#L2R003	
	3 M	ZA66L-6001-0023#L3R003	
Fiber Optic Command Cable (Sheathed)	1 M	ZA66L-6001-0026#L1R003	
	3 M	ZA66L-6001-0026#L3R003	
	5 M	ZA66L-6001-0026#L5R003	
	10 M	ZA66L-6001-0026#L10R03	
	20 M	ZA66L-6001-0026#L20R03	
	30 M	ZA66L-6001-0026#L30R03	
	50 M	ZA66L-6001-0026#L50R03	
	100 M	ZA66L-6001-0026#L100R3	
Connector Kits		**α50/3000HV*i*s w/ Fan**	**α100/2500HV*i*s w/ Fan**
Amplifier Encoder Feedback Connector (JF1)		ZA06B-6073-K214	ZA06B-6073-K214
CXA2A/B Jumper Connector (2 Req)		ZA06B-6110-K210	ZA06B-6110-K210
CZ2 Motor Power Output Connector		ZA06B-6110-K203#ZZM	n/a
CX8/CX9 DB Module Interface Connector Kit		ZA06B-6073-K216	ZA06B-6073-K216
CX1A/B 180HVi Amplifier Control Power		ZA02B-0120-K321	ZA02B-0120-K321
Motor Half Keys		n/a	n/a
Motor Feedback Connector Kit	90 Deg	ZA06B-6114-K204#E	ZA06B-6114-K204#E
	Straight	ZA06B-6114-K204#S	ZA06B-6114-K204#S
Motor Power Connector Kit	90 Deg	Z44A730464-G20	n/a
	Straight	Z44A730464-G19	n/a
Motor Brake Connector Kit	90 Deg	ZA06B-6114-K213#E	ZA06B-6114-K213#E
	Straight	ZA06B-6114-K213#S	ZA06B-6114-K213#S
Motor Fan Connector Kit	90 Deg	ZA06B-6114-K214#E	ZA06B-6114-K214#E
	Straight	ZA06B-6114-K214#S	ZA06B-6114-K214#S
Accessories		**α50/3000HV*i*s w/ Fan**	**α100/2500HV*i*s w/ Fan**
DC Link Bus Bars		Z44A718031-G12	Z44A718031-G12
Spare Amplifier Control Power Fuse		ZA06B-6073-K250	ZA06B-6073-K250
Encoder Battery Back-up (Panel Mounted Kit)		IC800ABK001	IC800ABK001
Encoder Battery Back-up (Built-in)		IC800ABK002	IC800ABK002

PSM-HV*i* Power Supply

Ordering Information

The αHV*i* series amplifiers use a separately mounted shared power supply. A power supply module (PSM) can service multiple amplifiers in a multi-axis system. A maximum of six amplifiers may be connected to one power supply module; however, the number of amplifier may be limited by the power supply ratings.

Model Number		PSM-11HV*i*	PSM-18HV*i*	PSM-30HV*i*	PSM-45HV*i*
Power Supply Kit		IC800PSHV011	IC800PSHV018	IC800PSHV030	IC800PSHV045
Power Supply Only		ZA06B-6150-H011	ZA06B-6150-H018	ZA06B-6150-H030	ZA06B-6150-H045
Continuous Output Rating		11	18	30	45
Peak Output Rating*		34	58	87	124
DC Link Bus Bars		Z44A718031-G03	Z44A718031-G03	Z44A718031-G12	Z44A718031-G12
Connectors and Cables					
Connector Kit (Includes CX4 Estop, CX3 MCC and CX1A Control Power Connectors)		ZA06B-6071-K203	ZA06B-6071-K203	ZA06B-6071-K203	ZA06B-6071-K203
MCC Coil Control Output Flying Lead Cable	10 Ft	Z44C742171-001	Z44C742171-001	Z44C742171-001	Z44C742171-001
200V Control Power Input Flying Lead Cable	25 Ft	Z44C742172-001	Z44C742172-001	Z44C742172-001	Z44C742172-001
Estop Input Flying Lead Cable	10 Ft	Z44C742176-001	Z44C742176-001	Z44C742176-001	Z44C742176-001
Accessories					
Spare Control Power Fuse		ZA06B-6077-K250	ZA06B-6077-K250	ZA06B-6077-K250	ZA06B-6077-K250
AC Line Filter		ZA81L-0001-0163	ZA81L-0001-0163	ZA81L-0001-0164	ZA81L-0001-0164
Noise Filter for PSM (required for CE)		ZA06B-6077-K155	ZA06B-6077-K156	ZA06B-6077-K156	ZA06B-6077-K157

*Peak rating is for 0.3 seconds

Selecting a Power Supply

Step 1 - Determine the total number and type of αHV*i* or αHV*i*s series motors that will be required from the list below. If more than six axes are required divide them into groups of no more than six motors.

Motor Model	Continuous Output	Acceleration Output
α22/3000HV*i*	4.0 kW	9.6 kW
α22/4000HV*i*s	4.5 kW	20 kW
α30/4000HV*i*s	5.5 kW	22 kW
α40/4000HV*i*s	5.5 kW	24 kW
α50/3000HV*i*s with fan	14 kW	39 kW
α100/2500HV*i*s with fan	11 kW	38 kW

Step 2 - Total the continuous output for all motors in a group and multiply by 0.6.

Step 3 - Total the acceleration output for all motors in each group.

Step 4 - Compare the continuous and acceleration output totals for each group to the continuous rating and peak rating for the power supply modules and select a PSM module to meet the following conditions:
a) Motor Continuous Output Total * 0.6 must be less than the PSM Continuous Output Rating
b) Motor Acceleration Output Total must be less than the PSM Peak Output Rating

Example:

An application requires the following motors:

Qty 2 α22/4000HV*i*s
Qty 2 α30/4000HV*i*s
Qty 1 α50/3000HV*i*s with fan

Since the total number of motors is less than six, assume that one PSM will be used. Therefore, the total ratings for the system are:
Total the continuous output for all motors multiplied by 0.6 = 28 kW * 0.6 = 16.8 kW
Total the acceleration output for all motors = 123 kW

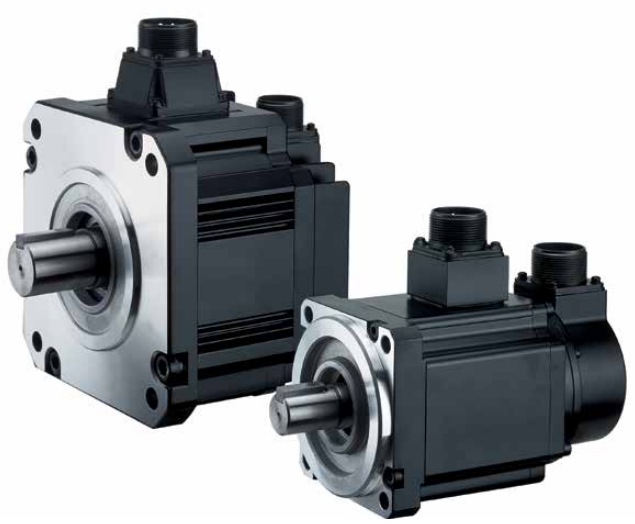
Select the PSM-45HV*i* module with a continuous output rating of 45 kW and peak output rating of 124 kW.

Servo Motors

VersaMotion Servo Motors

Motor Specifications

Feature	VersaMotion Series
Cont. Stall Torque Range (In-lb (Nm))	2.83-126 (0.32-14.3)
Cont. Speed Range (RPM)	1500 – 3000
Max. Speed Range (RPM)	3000 – 5000
Compatible Amplifiers	VersaMotion Series
Compatible Controllers	DSM314
Mounting	Metric
Shaft Configuration	Straight/Keyway
Brushless Construction	Yes
Optional Brake	24 VDC
Feedback Type	Incremental Encoder
Feedback Resolution (Counts/rev)	10,000
Absolute Feedback	No
Amplifier Line Voltage	200-255 VAC 1φ (100 W to 1 kW); 170-255 VAC 3φ
Shaft Seal	Standard
Protection Rating	IP65
Inertia	Low/Medium



Motor Part Numbers

IC800VMM **30** **L** **B** **K** **S** **E25**

Rated Power
- **01**– 100 Watts
- **02**– 200 Watts
- **04**– 400 Watts
- **07**– 750 Watts
- **10**– 1000 Watts
- **20**– 2000 Watts
- **30**– 3000 Watts

Inertia
- **L**– Low Inertia
- **M**– Medium Inertia

Brake
- **N**– No brake
- **B**– 24 VDC Brake (except 100 Watt Motor)

Key
- **K**– Shaft Key

Shaft Seal
- **S**– Shaft Oil Seal

Feedback
- **E25**– 2500 PPR Incremental Encoder

Publication Reference Chart

VersaMotion	
GFA-1923	VersaMotion Data Sheet http://www.ge-ip.com/account/download/13269/3679
GFK-2480	VersaMotion Servo Motors and Amplfiers User's Manual http://support.ge-ip.com/support/resources/sites/GE_FANUC_SUPPORT/content/live/DOCUMENT/2000/DO2041/en_US/GFK2480.pdf

VersaMotion Servo Motors

Specifications

Specifications	IC800VMM01L	IC800VMM02L	IC800VMM04L	IC800VMM07L
Product Name	VersaMotion 100 Watt	VersaMotion 200 Watt	VersaMotion 400 Watt	VersaMotion 750 Watt
Rated Output (kW)	0.1	0.2	0.4	0.75
Rated Torque (Nm)	0.32	0.64	1.27	2.39
Maximum Torque (Nm)	0.96	1.92	3.82	7.16
Rated Speed (RPM)	3000	3000	3000	3000
Maximum Speed (RPM)	5000	5000	5000	5000
Rated Current (Amps)	0.9	1.55	2.6	5.1
Maximum Current (Amps)	2.7	4.65	7.8	15.3
Rotor Moment of Inertia ($Kg.m^2 \times 10^{-4}$)	0.037	0.177	0.277	1.13
Mechanical Time Constant (msec)	0.75	0.8	0.53	0.63
Torque Constant - KT (Nm/A)	0.36	0.41	0.49	0.47
Voltage Constant - KE (mV/rpm)	13.6	16	17.4	17.2
Armature Resistance (Ohm)	9.3	2.79	1.55	0.42
Armature Inductance (mH)	24	10.84	6.84	3.53
Electrical Time Constant (msec)	2.58	3.89	4.43	8.37
Maximum Radial Shaft Load (Newton)	78.4	196	196	245
Maximum Thrust Shaft Load (Newton)	39.2	68	68	98
Amplifier Model	IC800VMA012	IC800VMA022	IC800VMA042	IC800VMA072

Motor Technical Data

Insulation Class	Class B
Insulation Resistance	>100M ohm, 500 VDC
Insulation Strength	1500 VAC, 50Hz, 60 seconds
Vibration Grade (um)	15
Brake Power (VDC)	24
Vibration	2.5G
IP Rating	IP65 (except shaft and connector)

Environmental Specifications

Relative Humidity	20~90%RH (non condensing)
Operating Temperature	0 to 40°C
Storage Temperature	-10 to 80°C

VersaMotion Servo Motors

Specifications (continued)

Specifications	IC800VMM10L	IC800VMM10M	IC800VMM20L	IC800VMM20M	IC800VMM30M
Product Name	VersaMotion 1000 Watt	VersaMotion 1000 Watt	VersaMotion 2000 Watt	VersaMotion 2000 Watt	VersaMotion 3000 Watt
Rated Output (kW)	1.0	1.0	2.0	2.0	3.0
Rated Torque (Nm)	3.18	4.77	6.37	9.55	14.32
Maximum Torque (Nm)	9.54	14.32	19.11	28.66	42.96
Rated Speed (RPM)	3000	2000	3000	2000	2000
Maximum Speed (RPM)	5000	3000	5000	3000	3000
Rated Current (Amps)	7.3	5.6	11.3	11.0	16.1
Maximum Current (Amps)	21.9	24.9	33.9	33.0	48.3
Rotor Moment of Inertia ($Kg.m^2 \times 10^{-4}$)	2.65	9.14	4.45	15.88	55
Mechanical Time Constant (msec)	0.74	1.64	0.66	1.05	1.06
Torque Constant - KT (Nm/A)	0.44	0.85	0.53	0.87	0.89
Voltage Constant - KE (mV/rpm)	16.8	31.9	19.2	31.8	32
Armature Resistance (Ohm)	0.20	0.465	0.14	0.174	0.052
Armature Inductance (mH)	2.0	5.99	1.53	2.76	1.38
Electrical Time Constant (msec)	10.26	12.88	10.63	15.86	26.39
Maximum Radial Shaft Load (Newton)	490	490	490	490	1470
Maximum Thrust Shaft Load (Newton)	98	98	98	98	490
Amplifier Model	IC800VMA102	IC800VMA102	IC800VMA202	IC800VMA202	IC800VMA302

Motor Technical Data

Insulation Class	Class B
Insulation Resistance	>100M ohm, 500 VDC
Insulation Strength	1500 VAC, 50Hz, 60 seconds
Vibration Grade (um)	15
Brake Power (VDC)	24
Vibration	2.5G
IP Rating	IP65 (except shaft and connector)

Environmental Specifications

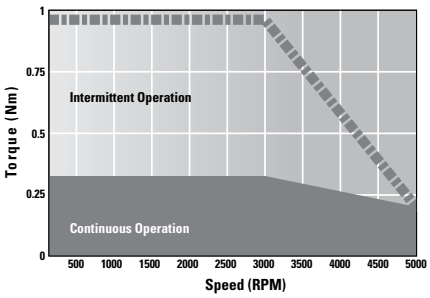
Relative Humidity	20~90%RH (non condensing)
Operating Temperature	0 to 40°C
Storage Temperature	-10 to 80°C

VersaMotion Servo Motors

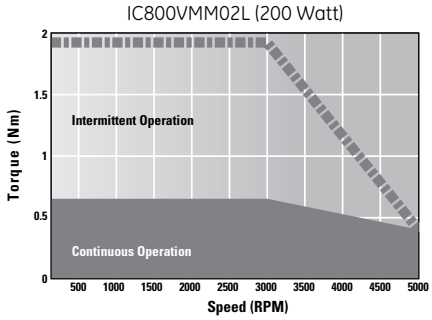
Speed Torque Curves

The curves illustrate the relationship between motor speed and output torque. The motor can operate continuously at any combination of speed and torque within the prescribed continuous operating zone. The limit of the continuous operating zone is determined with the motor's ambient temperature at 20°C and its drive current as a pure sine wave. Actual operation is limited by the current of the servo drive unit. The continuous operating zone must be derated for ambient temperature above 20°C.

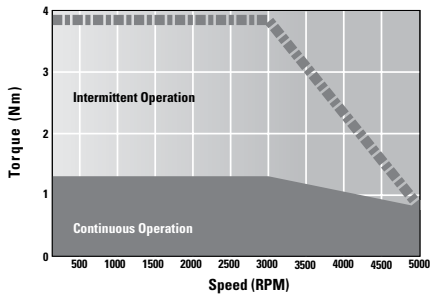
IC800VMM01L (100 Watt)



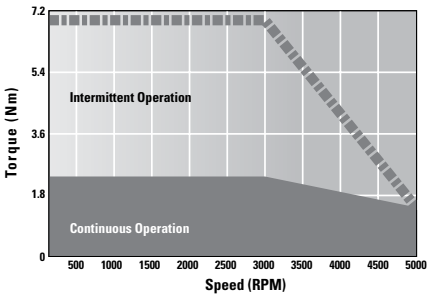
IC800VMM02L (200 Watt)



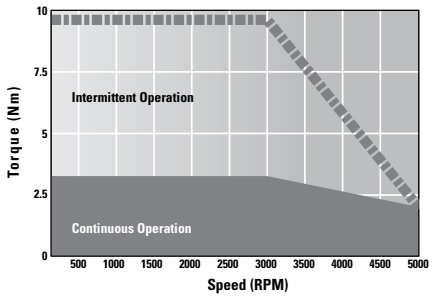
IC800VMM04L (400 Watt)



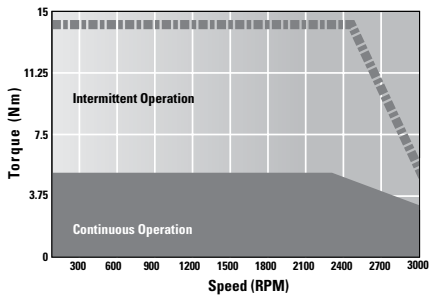
IC800VMM07L (750 Watt)



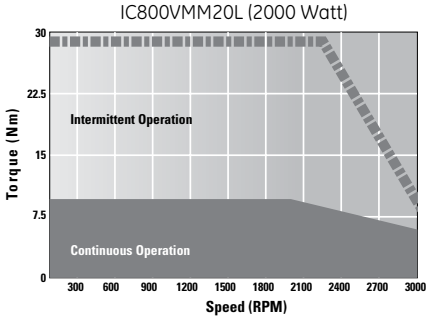
IC800VMM10L (1000 Watt)



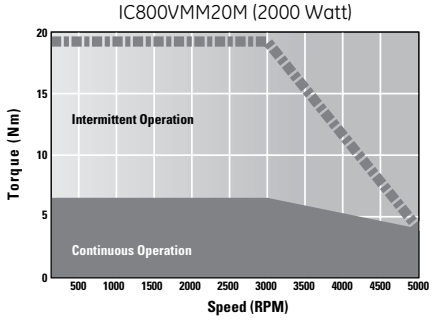
IC800VMM10M (1000 Watt)



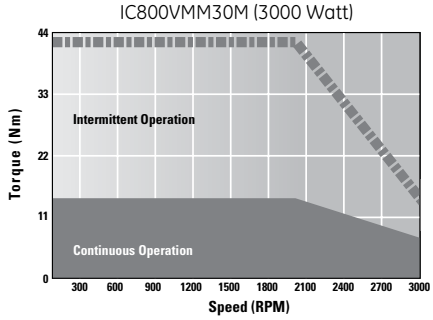
IC800VMM20L (2000 Watt)



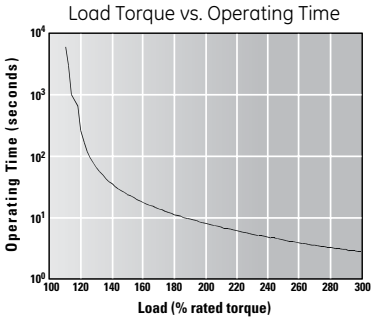
IC800VMM20M (2000 Watt)



IC800VMM30M (3000 Watt)



Load Torque vs. Operating Time

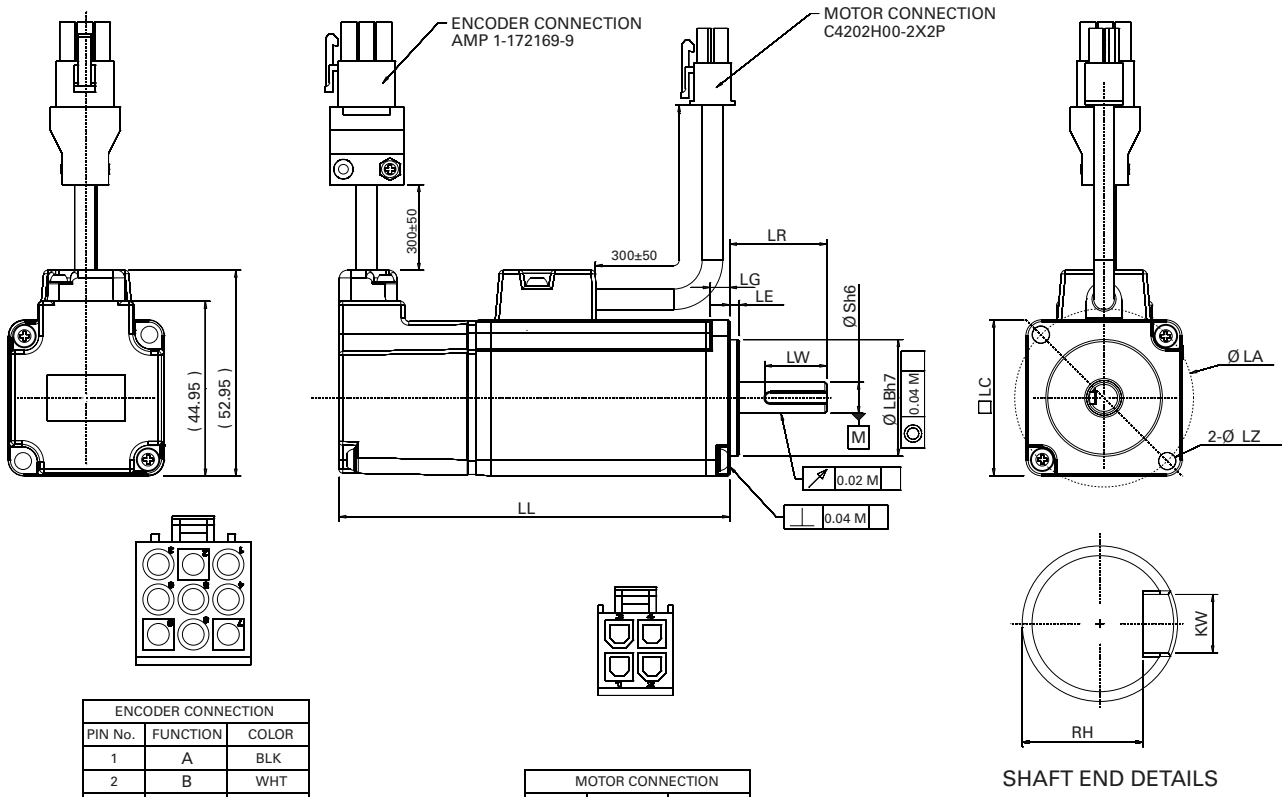


Load	Operating Time
120%	263.8 s
140%	35.2 s
160%	17.6 s
180%	11.2 s
200%	8 s
220%	6.1 s
240%	4.8 s
260%	3.9 s
280%	3.3 s
300%	2.8 s

VersaMotion Servo Motors

Dimensions

IC800VMM01L



ENCODER CONNECTION		
PIN No.	FUNCTION	COLOR
1	A	BLK
2	B	WHT
3	Z	ORG
4	$\overline{A}$	BLK/RED
5	$\overline{B}$	WHT/RED
6	$\overline{Z}$	ORG/RED
7	DC+5V	BRN
8	GND	BLU
9	SHIELD	SHIELD

MOTOR CONNECTION		
PIN No.	FUNCTION	COLOR
1	U	RED
2	V	WHT
3	W	BLK
4	C.G.	GRN/YEL

Dimensions shown mm

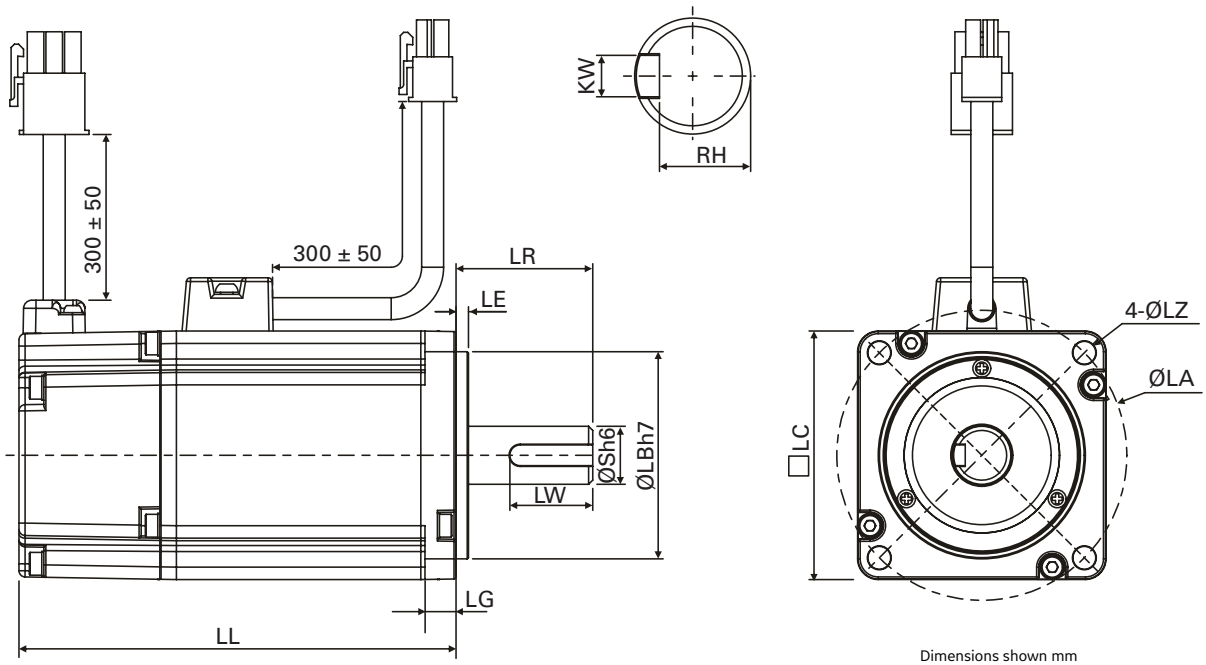
Dimension	IC800VMM01L□
LC	40
LZ	4.5
LA	46
S	8
LB	30
LL	100.6
LL with brake	N/A (no brake available on 100 Watt model at this time)
LR	25
LE	2.5
LG	5
LW	16
RH	6.2
KW	3

The boxes (□) at the ends of the model names are for shaft type or options (keyway, brake and oilseal)

VersaMotion Servo Motors

Dimensions

IC800VMM02L, IC800VMM04L, IC800VMM07L



Dimensions shown mm

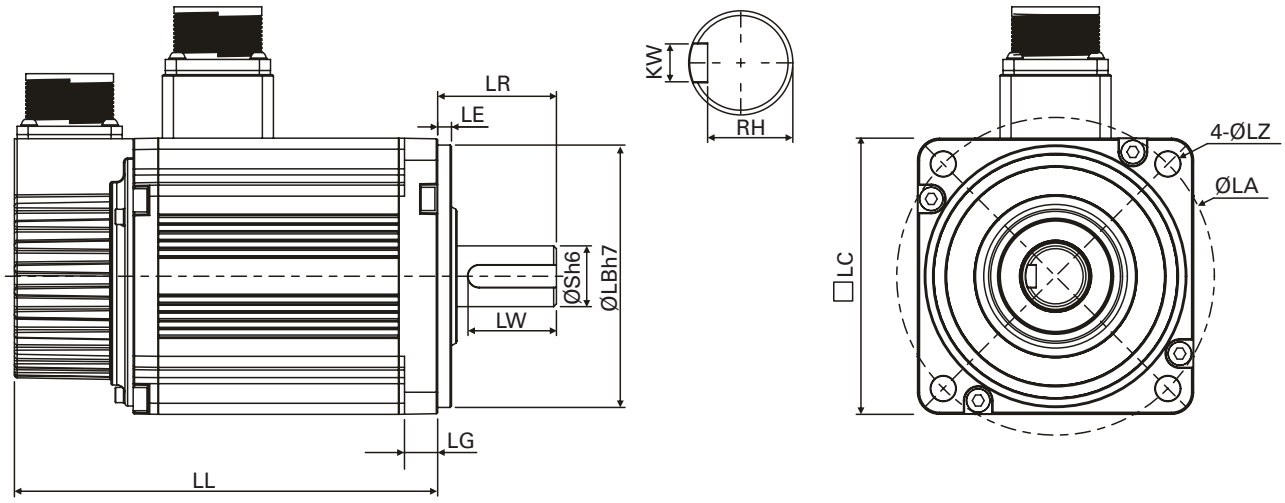
Dimension	IC800VMM02L□	IC800VMM04L□	IC800VMM07L□
LC	60	60	80
LZ	5.5	5.5	6.6
LA	70	70	90
S	14	14	19
LB	50	50	70
LL	105.5	130.7	138.3
LL with brake	141.6	166.8	178
LR	30	30	35
LE	3	3	3
LG	7.5	7.5	8
LW	20	20	25
RH	11	11	15.5
KW	5	5	6

The boxes (□) at the ends of the model names are for shaft type or options (keyway, brake and oilseal)

VersaMotion Servo Motors

Dimensions

IC800VMM10L, IC800VMM10M, IC800VMM20L, IC800VMM20M, IC800VMM30M



Dimensions shown mm

Dimension	IC800VMM10L□	IC800VMM10M□	IC800VMM20L□	IC800VMM20M□	IC800VMM30M□
LC	100	130	100	130	180
LZ	9	4	9	4	13.5
LA	115	145	115	145	200
S	22	22	22	22	35
LB	95	110	95	110	114.3
LL	153.5	147.5	199	187.5	202.1
LL with brake	192.5	183.5	226	216	235
LR	45	55	45	55	79
LE	5	6	5	6	4
LG	12	11.5	12	11.5	20
LW	32	36	32	36	63
RH	18	18	18	18	30
KW	8	8	8	8	10

The boxes (□) at the ends of the model names are for shaft type or options (keyway, brake and oilseal)

VersaMotion Servo Motors

Ordering Information

Part Number		
Motor Only	**Description**	**Amplifier**
IC800VMM01LNKSE25	100 Watt VersaMotion Servo Motor	IC800VMA012
IC800VMM02LNKSE25	200 Watt VersaMotion Servo Motor	IC800VMA022
IC800VMM02LBKSE25	200 Watt VersaMotion Servo Motor with Brake	IC800VMA022
IC800VMM04LNKSE25	400 Watt VersaMotion Servo Motor	IC800VMA042
IC800VMM04LBKSE25	400 Watt VersaMotion Servo Motor with Brake	IC800VMA042
IC800VMM07LNKSE25	750 Watt VersaMotion Servo Motor	IC800VMA072
IC800VMM07LBKSE25	750 Watt VersaMotion Servo Motor with Brake	IC800VMA072
IC800VMM10LNKSE25	1000 Watt VersaMotion Servo Motor	IC800VMA102
IC800VMM10MNKSE25	1000 Watt VersaMotion Servo Motor	IC800VMA102
IC800VMM10LBKSE25	1000 Watt VersaMotion Servo Motor with Brake	IC800VMA102
IC800VMM10MBKSE25	1000 Watt VersaMotion Servo Motor with Brake	IC800VMA102
IC800VMM20LNKSE25	2000 Watt VersaMotion Servo Motor	IC800VMA202
IC800VMM20MNKSE25	2000 Watt VersaMotion Servo Motor	IC800VMA202
IC800VMM20LBKSE25	2000 Watt VersaMotion Servo Motor with Brake	IC800VMA202
IC800VMM20MBKSE25	2000 Watt VersaMotion Servo Motor with Brake	IC800VMA202
IC800VMM30MNKSE25	3000 Watt VersaMotion Servo Motor	IC800VMA302
IC800VMM30MBKSE25	3000 Watt VersaMotion Servo Motor with Brake	IC800VMA302

Motor Cables

See applicable amplifier section for information about the proper cables to use with each motor.

αi and βi Series Servo Motors



Servo Motor Performance for Demanding Applications

The FANUC Servo motors are a rugged family of brushless servo motors covering a broad torque and speed range. These motors utilize high energy rare earth magnets for superior cost/performance ratio. Low inertia design provides high acceleration rates for improved machine cycle rates. The αi and βi Series motors use high resolution serial encoder feedback and are matched with amplifiers and PACMotion PMM335 Motion Controllers.

Feature Comparison

Feature	αHVis Series	βis Series	βHVis Series
Cont. Stall Torque Range (In-lb (Nm))	17.7-664 (2-75)	3.5-177 (0.4-20)	17.7-177 (2-20)
Cont. Speed Range (RPM)	2000-6000	2000-6000	2000-4000
Max. Speed Range (RPM)	3000-6000	2000-6000	2000-4000
Compatible Amplifiers	αHVi Series	βi Series	βHVi Series
Compatible Controllers	PMM335/DSM324i	PMM335/DSM324i	PMM335/DSM324i
Mounting	Metric	Metric	Metric
Shaft Configuration	Straight/Keyway	Straight/Keyway	Straight/Keyway
Brushless Construction	Yes	Yes	Yes
Optional Brake	24VDC	24 VDC	24 VDC
Feedback Type	Serial Encoder	Serial Encoder	Serial Encoder
Feedback Resolution (Counts/rev)	1 M	64 K/128 K	128 K
Absolute Feedback	Yes*	Yes*	Yes*
Amplifier Line Voltage	400-480 VAC 3 φ	220-240 VAC 1 φ 200-240 VAC 3 φ	400-480 VAC 3 φ
Shaft Seal	Standard	Standard	Standard
Protection Rating	IP65 Standard IP67 Optional	IP65 Standard IP67 Optional	IP65 Standard IP67 Optional
Inertia	Low	Medium	Medium

*Absolute feedback requires optional encoder battery backup for αHVi Series, βi Series, or βHVi Series amplifiers.

Publication Reference Chart

Alpha and Beta Series Servo

GFH-001	Servo Products Specification Guide http://support.ge-ip.com/support/resources/sites/GE_FANUC_SUPPORT/content/staging/DOCUMENT/0/DO474/en_US/3.0/GFH001G.pdf

αHV*i* and αHV*is* Series Servo Motors

Motor Part Numbers

ZA06B -0 249 -B 2 0 0

Motor Model

αHV*i* Series

- **219-** α2/6000HV*is*
- **216-** α4/5000HV*is*
- **233-** α8/6000HV*is*
- **239-** α12/4000HV*is*
- **249-** α22/3000HV*i*
- **266-** α22/4000HV*is*
- **269-** α30/4000HV*is*
- **273-** α40/4000HV*is*
- **276-** α50/3000HV*is*
- **286-** α100/2500HV*is*

0 - Straight Shaft with Keyway (Except α50/3000HV*is* which does not have a Shaft Key)

0 - No Fan Cooling

1 - Fan Cooling (α50/3000HV*is* and α100/2500HV*is* only)

0 - No Brake (α100/2500HV*is* model only)

2 - No Brake (all other models)

3 - 24 VDC Brake (α100/2500HV*is* model only)

5 - 24 VDC Brake (all other models)

β*is* and βHV*is* Series Servo Motors

Motor Part Numbers

ZA06B -0 114 -B 2 0 3 #0100

Motor Model

β*i* Series

- **114-** β0.4/5000*is*
- **115-** β0.5/5000*is*
- **116-** β1/5000*is*
- **061-** β2/4000*is*
- **062-** β2/4000HV*is*
- **063 -** β4/4000*is*
- **064-** β4/4000HV*is*
- **075-** β8/3000*is*
- **076-** β8/3000HV*is*
- **078-** β12/3000*is*
- **079-** β12/3000HV*is*
- **085-** β22/2000*is*
- **086-** β22/2000HV*is*

Protection

- **Blank-** IP65 (standard)
- **#0100-** IP67 (optional)

Shaft

- **3-** Straight Shaft with Keyway

Fan Cooling

- **0-** No Fan Cooling

Brake

- **2-** No Brake
- **5-** 24 VDC Brake

αHV*i* and αHV*is* Series Servo Motors

Specifications

Motor Model	Unit	α2/6000HV*is*	α4/5000HV*is*	α8/6000HV*is*	α12/4000HV*is*	α22/3000HV*i*
Cont Stall Torque*	Nm	2	4	8	12	22
	in-lb	17.7	35.4	70.8	106	195
Peak Torque*	Nm	6	8.8	22	46	64
	in-lb	53.1	77.9	194.7	407	566
Rotor Inertia	$kgm^2 \times 10^{-4}$	2.91	5.15	11.7	22.8	120
	$in\text{-}lb\text{-}s^2 \times 10^{-4}$	25.75	45.58	103.54	201.7	1062
Rated Speed	RPM	6000	4000	6000	3000	3000
No Load Speed	RPM	6000	5000	6000	4000	4000
Encoder Resolution	Counts/Rev	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Flange Size	mm	90	90	130	130	174
Mechanical Data						
Weight	kg	3	4.3	8	11.9	29
	lb	6.6	9.46	17.6	26.2	63.8
Axial Load Rating	kg	8	8	20	20	60
	lb	17.6	17.6	44	44	132
Radial Load Rating	kg	25	25	70	70	200
	lb	55	55	154	154	440
Mechanical Time Constant	msec	5	3	2	2	4
Thermal Time Constant	min	15	20	20	25	60
Static Friction	Nm	0.1	0.2	0.3	0.3	1.2
Electrical Data						
Torque Constant*	Nm/A	0.99	1.32	0.89	1.8	2.41
	in-lb/A	8.76	11.68	7.87	15.9	21.33
Resistance*	ohms	5.6	2.8	0.5	0.84	0.66
Back EMF Constant*	V(rms)/krpm	35	46	31	63	84
Rated Motor Power	kW	1	1	2.2	2.5	4
	HP	1.3	1.3	3	3.4	5.4
Cont. Stall Current	A (rms)	2	3	9	6.7	9.1
Max Current	A (peak)	40	40	40	40	40
Insulation		Class F	Class F	Class F	Class F	Class F
Amplifier Model						
α Amp Model Number		αSVM1-10HV*i*	αSVM1-10HV*i*	αSVM1-40HV*i*	αSVM1-40HV*i*	αSVM1-40HV*i*
β Amp Model Number		βSVM1-10HV*i*	βSVM1-10HV*i*	βSVM1-40HV*i*	βSVM1-40HV*i*	βSVM1-40HV*i*
Brake Data						
Holding Torque	Nm	3	3	8	8	35
	in-lb	26.6	26.6	71	71	310
Inertia Adder	$kgm^2 \times 10^{-4}$	0.2	0.2	0.7	0.7	6
	$in\text{-}lb\text{-}s^2 \times 10^{-4}$	1.77	1.77	6.18	6.18	53
Weight Adder	kg	1	1	2.2	2.2	6
	lb	2.2	2.2	4.9	4.9	13.2
Current	A	0.9	0.9	1.1	1.1	1.2
Voltage	VDC	24	24	24	24	24
Engage Time	msec	20	20	30	30	30
Release Time	msec	60	60	160	160	160
Cooling Fan Data						
AC Input 60 Hz	VAC	n/a	n/a	n/a	n/a	n/a
AC Input 50 Hz	VAC	n/a	n/a	n/a	n/a	n/a
Rated Current 60 Hz	A (rms)	n/a	n/a	n/a	n/a	n/a
Rated Current 50 Hz	A (rms)	n/a	n/a	n/a	n/a	n/a

Environmental Specifications

Humidity	80% non-condensing
Ambient Temperature	0 to 40°C
Vibration	less than 5G (operating)
Altitude	3300 feet (1000 m)

*Data shown are nominal values at 20°C

αHV*i* and αHV*is* Series Servo Motors

Specifications

Motor Model Motor Model	Unit	α22/4000HV*is*	α30/4000HV*is*	α40/4000HV*is*	α50/3000HV*is* with fan	α100/2500HV*is* with fan
Cont Stall Torque*	Nm	22	30	40	75	140
	in-lb	195	266	354	664	1240
Peak Torque*	Nm	70	100	115	215	274
	in-lb	620	885	1018	1903	2425
Rotor Inertia	$kgm^2 \times 10^{-4}$	52.7	75.9	99	145	252
	$in\text{-}lb\text{-}s^2 \times 10^{-4}$	466	672	876	1283	2230
Rated Speed	RPM	3000	3000	3000	3000	2000
No Load Speed	RPM	4000	4000	4000	3000	2500
Encoder Resolution	Counts/Rev	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Flange Size	mm	174	174	174	174	265
Mechanical Data						
Weight	kg	17	23	28	42	100
	lb	37.4	50.6	61.6	92.4	220
Axial Load Rating	kg	60	60	60	60	250
	lb	132	132	132	132	550
Radial Load Rating	kg	200	200	200	200	900
	lb	440	440	440	440	1980
Mechanical Time Constant	msec	2	2	1	1	.06
Thermal Time Constant	min	30	35	40	30	40
Static Friction	Nm	0.8	0.8	1.2	1.8	2.2
Electrical Data						
Torque Constant*	Nm/A	1.42	1.9	2.2	1.9	2.53
	in-lb/A	12.57	16.82	19.47	16.82	22.39
Resistance*	ohms	0.25	0.25	0.23	0.1	0.052
Back EMF Constant*	V(rms)/krpm	50	66	77	66	88
Rated Motor Power	kW	4.5	5.5	5.5	14	22
	HP	6.0	7.4	7.4	18.8	30
Cont. Stall Current	A (rms)	15.5	15.9	18.1	39.6	55
Max Current	A (peak)	80	80	80	180	180
Insulation		Class F	Class F	Class F	Class F	Class F
Amplifier Model						
α Amp Model Number		αSVM1-80HV*i*	αSVM1-80HV*i*	αSVM1-80HV*i*	αSVM1-180HV*i*	αSVM1-180HV*i*
β Amp Model Number		n/a	n/a	n/a	n/a	n/a
Brake Data						
Holding Torque	Nm	35	35	35	35	150
	in-lb	310	310	310	310	1327
Inertia Adder	$kgm^2 \times 10^{-4}$	6	6	6	6	10
	$in\text{-}lb\text{-}s^2 \times 10^{-4}$	53	53	53	53	88.5
Weight Adder	kg	6	6	6	6	15
	lb	13.2	13.2	13.2	13.2	33
Current	A	1.2	1.2	1.2	1.2	2.5
Voltage	VDC	24	24	24	24	24
Engage Time	msec	30	30	30	30	60
Release Time	msec	160	160	160	160	360
Cooling Fan Data						
AC Input 60 Hz	VAC	n/a	n/a	n/a	170-220 1-phase	391 to 528 3-phase
AC Input 50 Hz	VAC	n/a	n/a	n/a	170-242 1-phase	323 to 440 3-phase
Rated Current 60 Hz	A (rms)	n/a	n/a	n/a	0.27	0.2
Rated Current 50 Hz	A (rms)	n/a	n/a	n/a	0.32	0.2

Environmental Specifications

Humidity	80% non-condensing
Ambient Temperature	0 to 40° C
Vibration	less than 5G (operating)
Altitude	3300 feet (1000 m)

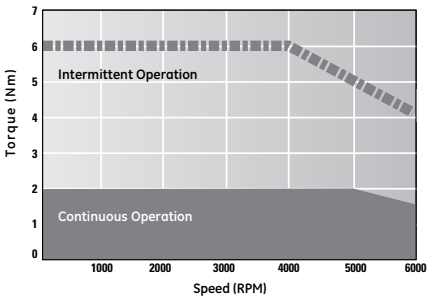
*Data shown are nominal values at 20° C

αHV*i* and αHV*is* Series Servo Motors

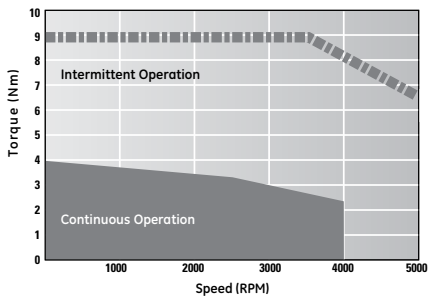
Speed Torque Curves

The curves illustrate the relationship between motor speed and output torque. The motor can operate continuously at any combination of speed and torque within the prescribed continuous operating zone. The limit of the continuous operating zone is determined with the motor's ambient temperature at 20°C and its drive current as a pure sine wave. Actual operation is limited by the current of the servo drive unit. The continuous operating zone must be derated for ambient temperature above 20°C.

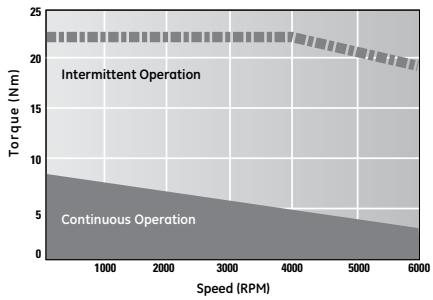
α2/6000HV*is*



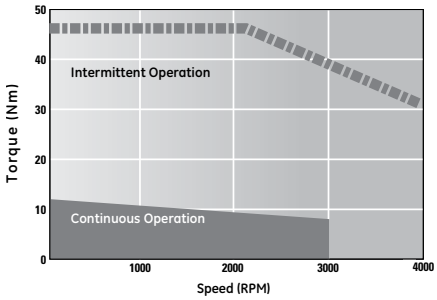
α4/5000HV*is*



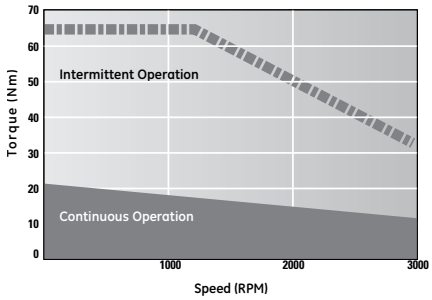
α8/6000HV*is*



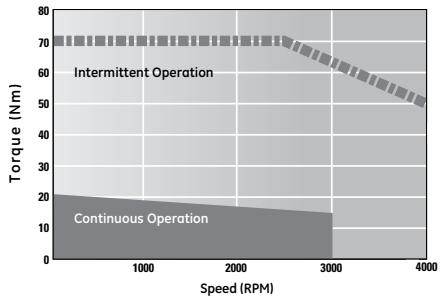
α12/4000HV*is*



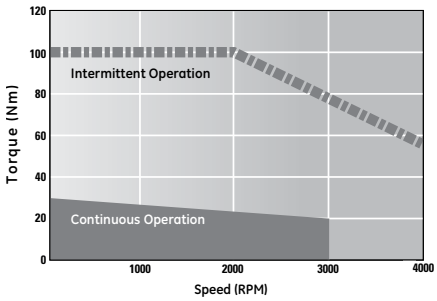
α22/3000HV*i*



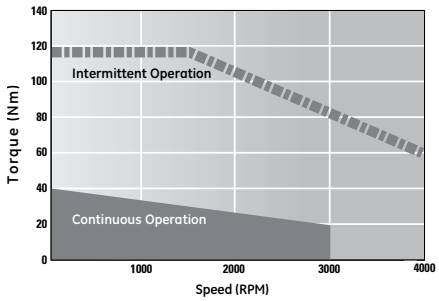
α22/4000HV*is*



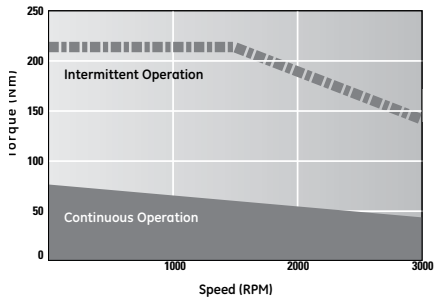
α30/4000HV*is*



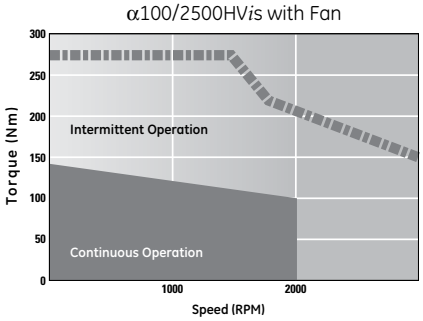
α40/4000HV*is*



α50/3000HV*is* w/Fan



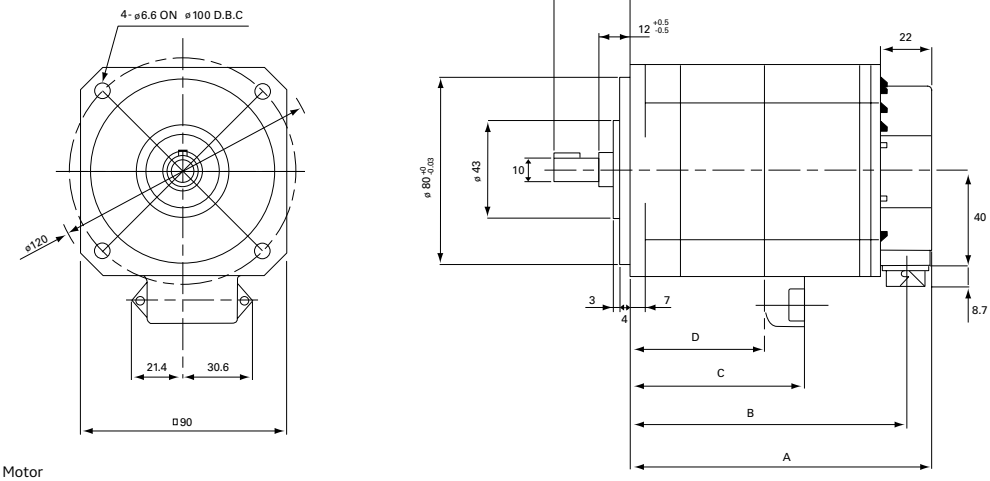
α100/2500HV*is* with Fan



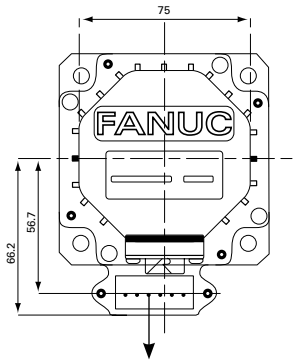
αHV*i* Series Servo Motors

Dimensions

α2/6000HV*i*s



Motor

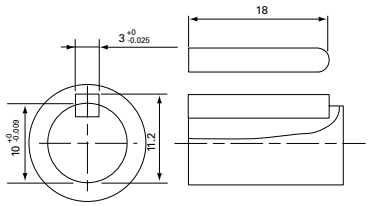


Power Connections

1	2	3	4	5	6
U	V	W	G		

Power/Brake Connections

1	2	3	4	5	6
U	V	W	G	B	B



Shaft detail

Dimensions shown mm

Dimension	α2/6000HV*i*s
A	130
A with brake	159
B	119
B with brake	148
C	75
C with brake	75
D	59
D with brake	59

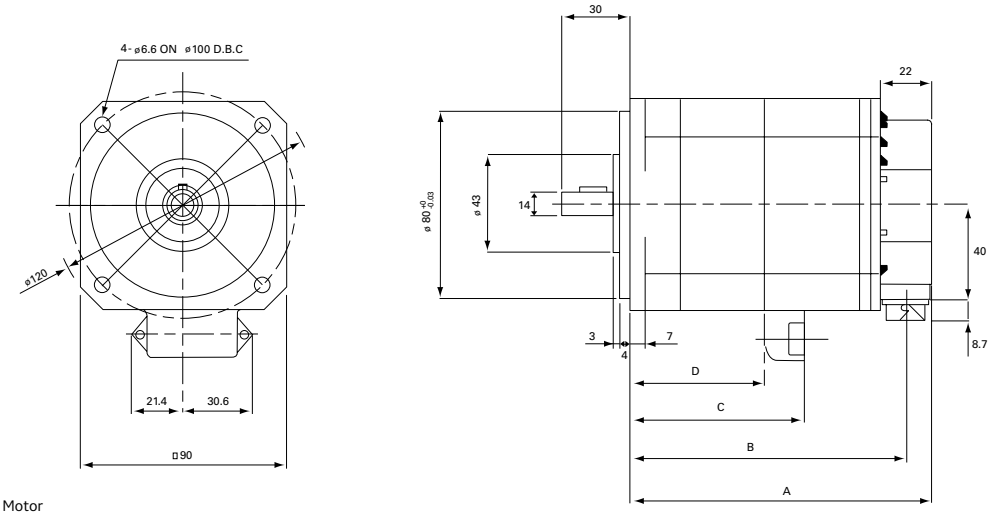
Notes:

1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 25 kgf (55 lb)

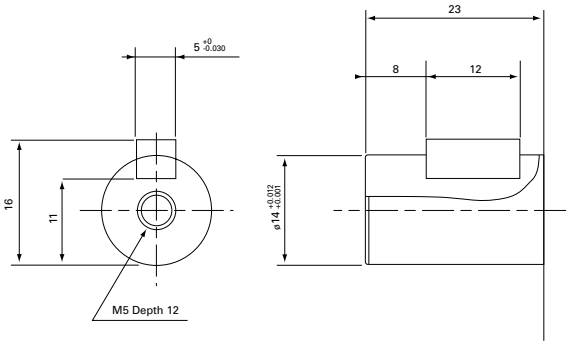
αHV*i* Series Servo Motors

Dimensions

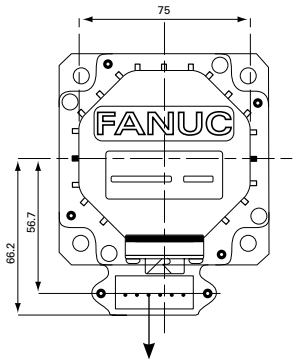
α4/5000HV*i*s



Motor



Shaft detail



Power Connections

1	2	3	4	5	6
U	V	W	G		

Power/Brake Connections

1	2	3	4	5	6
U	V	W	G	B	B

Dimensions shown mm

Dimension	α4/5000HV*i*s
A	166
A with brake	195
B	155
B with brake	184
C	111
C with brake	111
D	95
D with brake	95

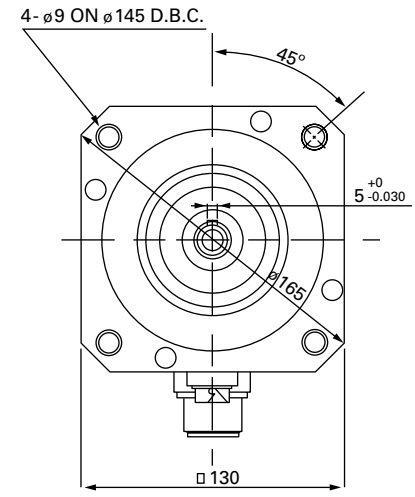
Notes:

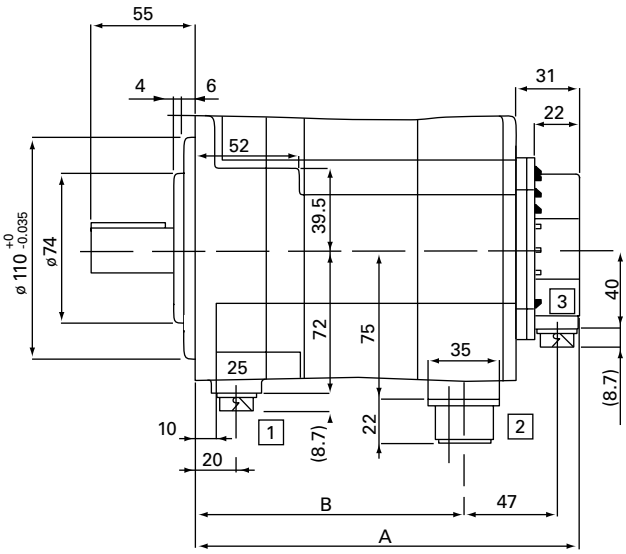
1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 25 kgf (55 lb)

αHV*i* Series Servo Motors

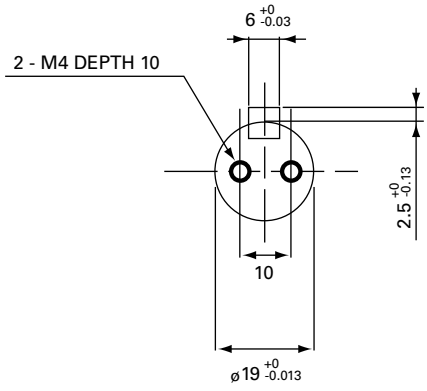
Dimensions

α8/6000HV*i*s and α12/4000HV*i*s



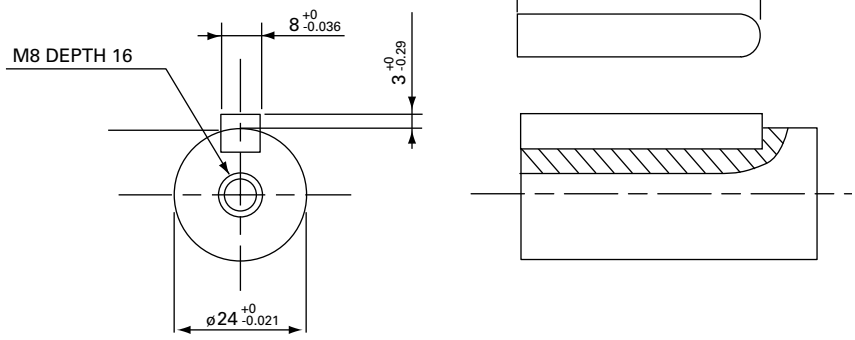


Motor



Shaft detail

β8/3000*i*s
β8/3000HV*i*s



β12/3000*i*s
β12/3000HV*i*s

Dimension	α8/6000HV*i*s	α12/4000HV*i*s
A	166	222
A with brake	191	247
B	108	164
B with brake	133	189
C	47	47
C with brake	47	47

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

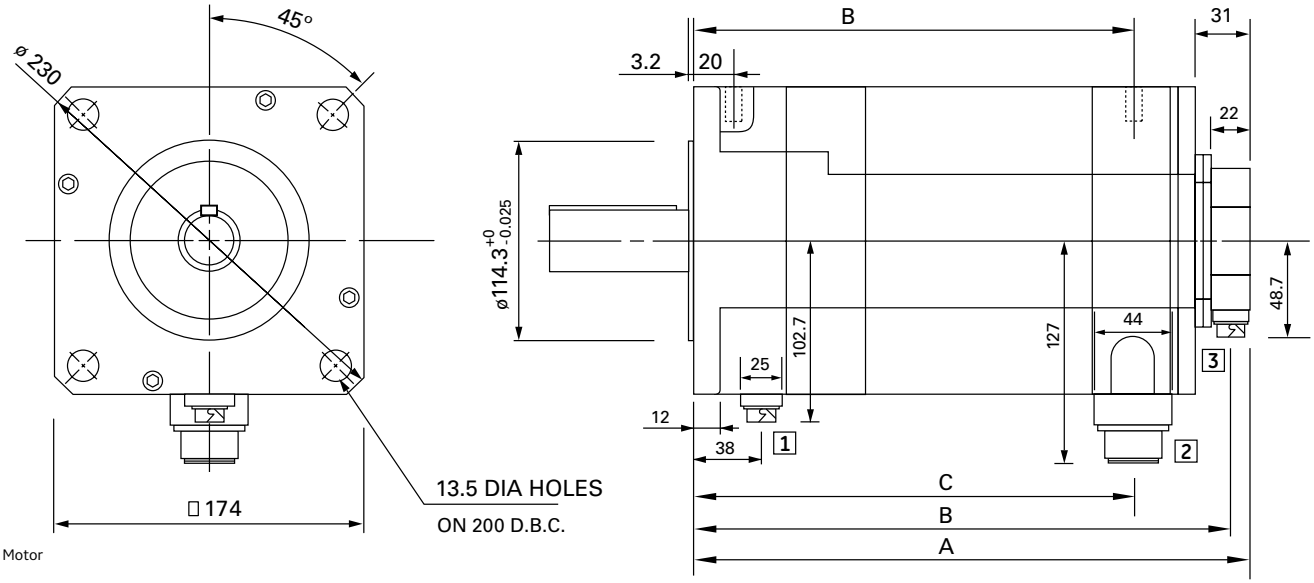
Notes:

1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.05 mm max
3. Maximum radial load for output shaft is 70 kgf (154 lb)

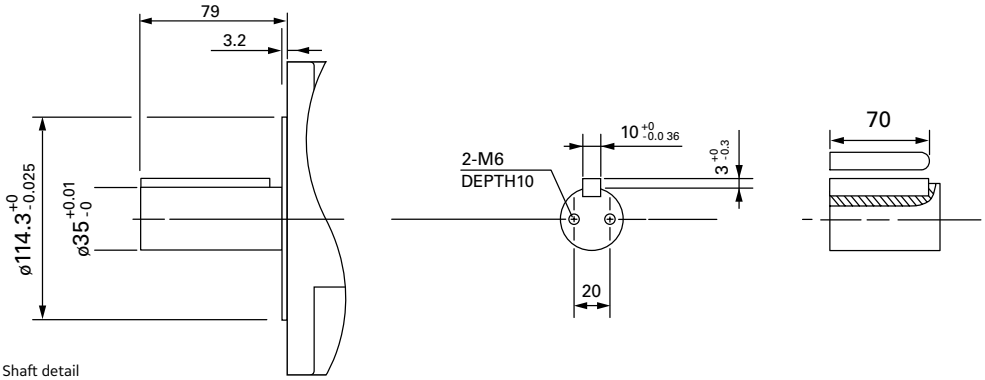
αHV*i* Series Servo Motors

Dimensions

α22/3000HV*i*



Motor



Shaft detail

Dimensions shown mm

Dimension	α22/3000HV*i*
A	276
A with brake	317
B	265
B with brake	306
C	215
C with brake	256

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

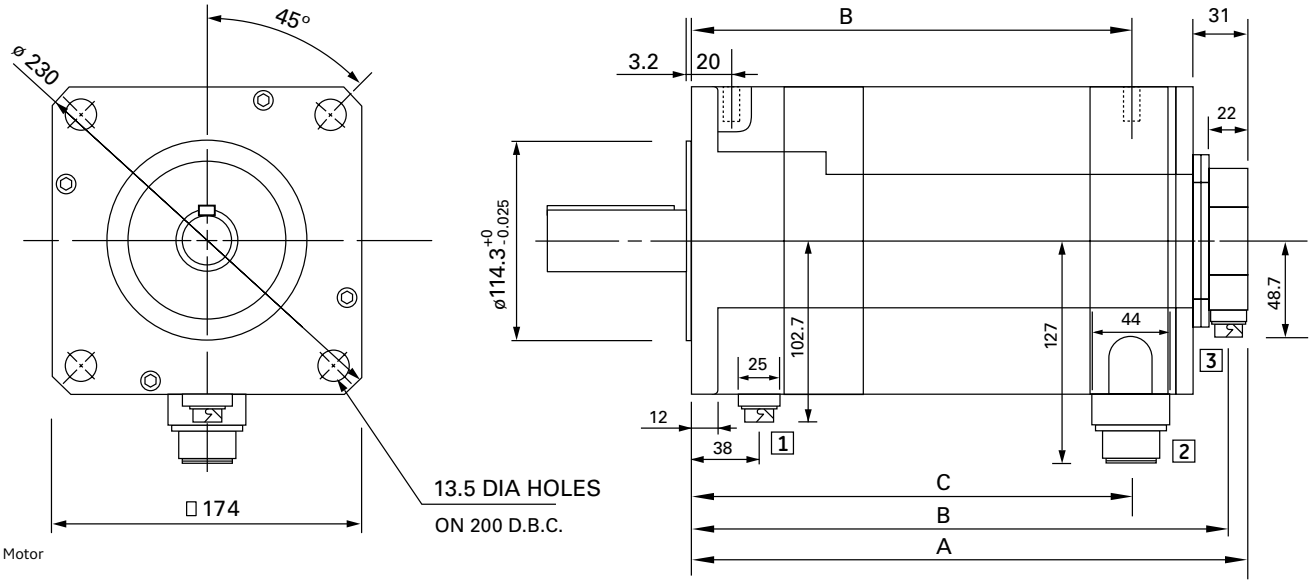
Notes:

1. Shaft diameter runout = 0.03 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 200 kgf (440 lb)

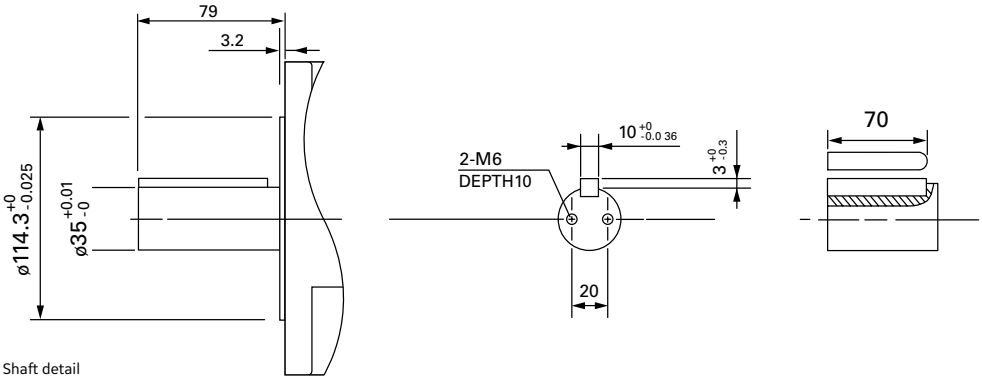
αHV*i* Series Servo Motors

Dimensions

α22/4000HV*i*s, α30/4000HV*i*s, α40/4000HV*i*s



Motor



Shaft detail

Dimensions shown mm

Dimension	α22/4000HV*i*s	α30/4000HV*i*s	α40/4000HV*i*s
A	202	239	276
A with brake	243	280	317
B	191	228	265
B with brake	232	269	306
C	141	178	215
C with brake	182	219	256

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

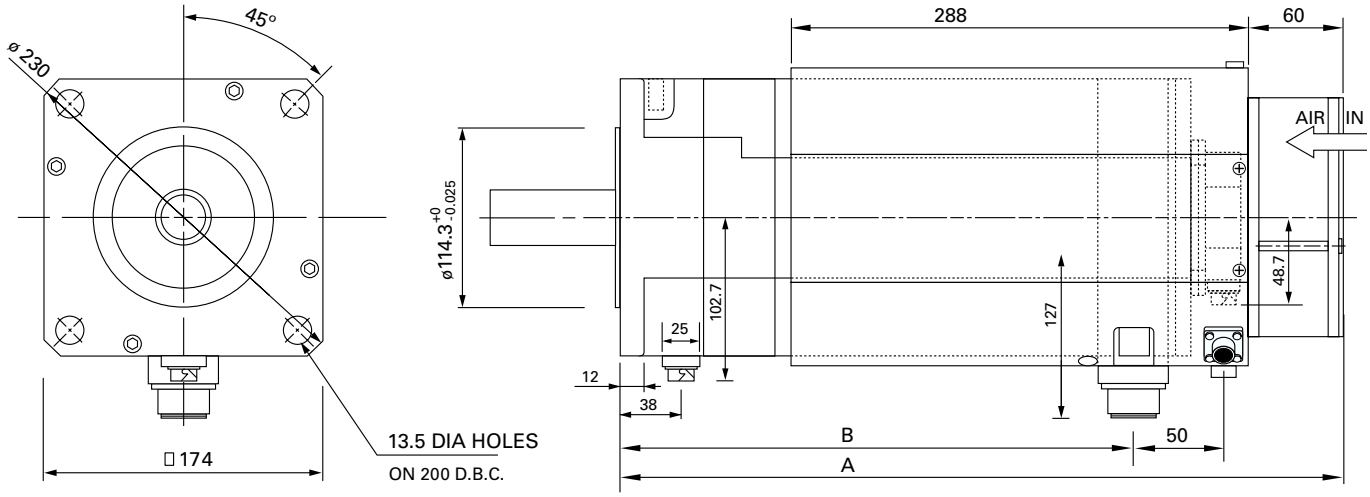
Notes:

1. Shaft diameter runout = 0.03 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 200 kgf (440 lb)

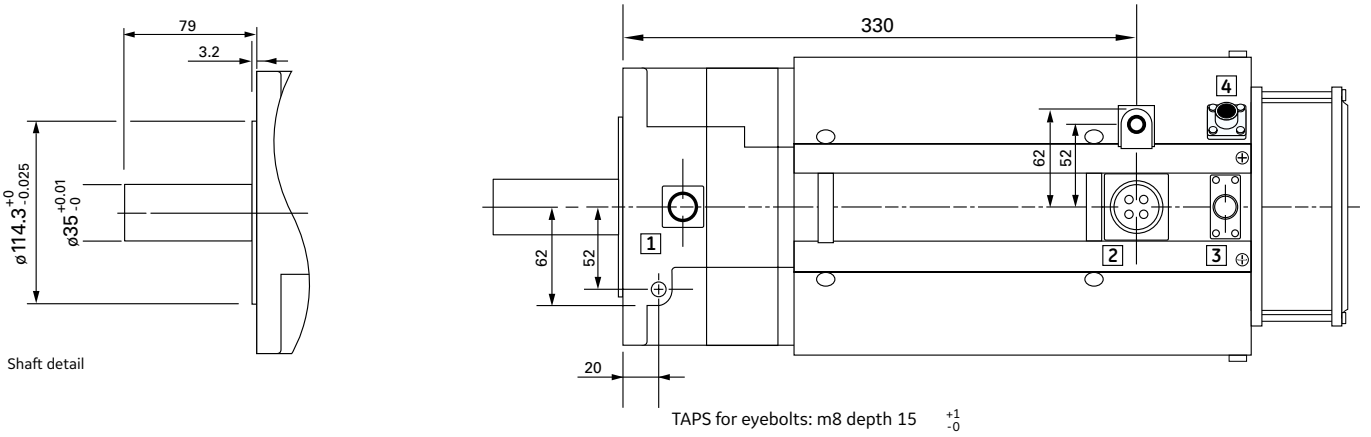
αHV*i* Series Servo Motors

Dimensions

α50/3000HV*i*s with Fan



Motor



Shaft detail

Dimensions shown mm

Dimensions shown mm

Dimension	α50/3000HV*i*s with Fan
A	416
A with brake	457
B	289
B with brake	330

Connector	Description
1	Brake (optional)
2	Power
3	Encoder
4	Fan

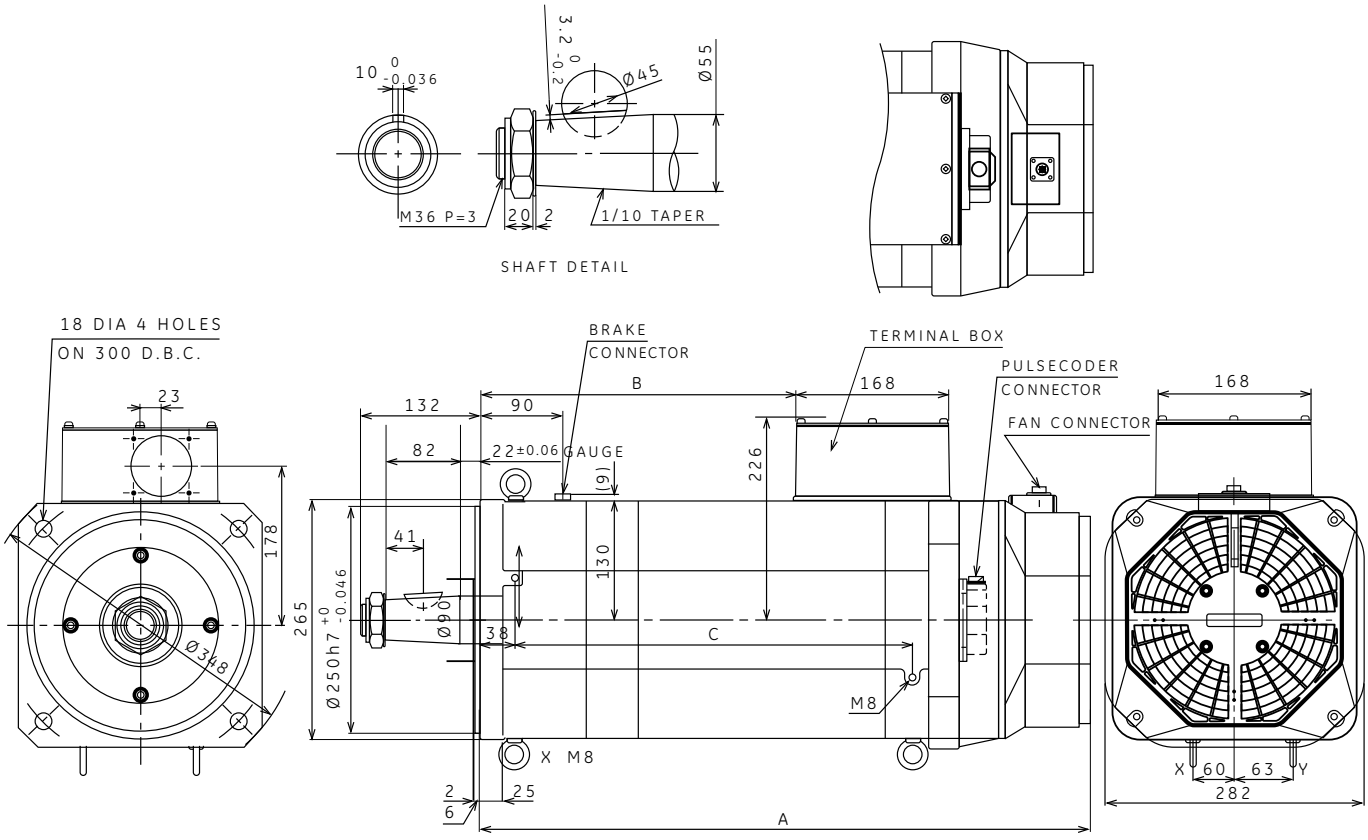
Notes:

1. Shaft diameter runout = 0.03 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 200 kgf (440 lb)

α100/2500HV*is* Series Servo Motors

Dimensions

α100/2500HV*is*



Dimension	α100/2500HV*is*
A	452
A with brake	584
B	129
B with brake	225
C	220
C with brake	316

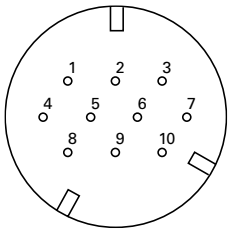
Notes

1. Shaft diameter runout = 0.03 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 900 kgf (1980 lb)

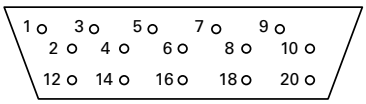
αHV*i* and αHV*is* Series Servo Motors

Connections

Serial Encoder Connections



All αHV*i* and αHV*is* Motors



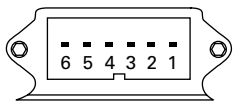
αHV*i* Amplifier (JF1)

Description	αHV*i* and αHV*is* Motors	αHV*i* Series Amplifier JF1 Connector
N/C	2	1
N/C	1	2
RD	6	5
$\overline{RD}$	5	6
+5 VDC	8, 9	9, 20
0 VDC	7, 10	12, 14
+6 VA (battery)	4	7
Frame Ground	3	16
Cable Shield	3	16

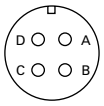
GE Mating Motor Connector:
ZA06B-6114-K204#E (90 degree)
ZA06B-6114-K204#S (Straight)

Amplifier Mating Connector (JF1):
ZA06B-6073-K214

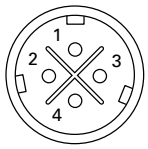
Power and Brake Connections



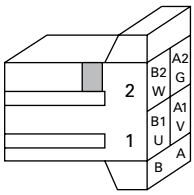
α2/6000HV*is* and α4/5000HV*is* Motor Power/Brake



All other αHV*i* and αHV*is* Motor Power



All other αHV*i* and αHV*is* Brake



αSVM1-10HV*i*, αSVM1-40HV*i* and αSVM1-80HV*i* Amplifier (CZ2)

Description	α2HV*is* and α4HV*is* Motor Connector	All other αHV*i* and αHV*is* Motor Connector	αSVM1-10HV*i*/ 40HV*i*/80HV*i* CZ2 Connector	αSVM1-180HV*i* Amplifier TB2 Connector
Phase U	1	A	B1	U
Phase V	2	B	A1	V
Phase W	3	C	B2	W
Earth (case)	4	D	A2	PE
Brake VDC	5	n/a	n/a	n/a
Brake VDC	6	n/a	n/a	n/a

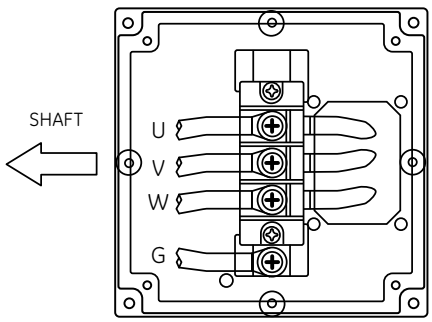
GE Mating Motor Connector:
ZA06B-6114-K220#E (90 degree) (α2HV*is* and α4HV*is*)
ZA06B-6114-K220#S (Straight) (α2HV*is* and α4HV*is*)
Z44A730464-G20 (90 degree) (αHV*i* and αHV*is*)
Z44A730464-G19 (Straight) (αHV*i* and αHV*is*)
Z44A730464-G18 (90 degree) (α12/4000HV*is*)
Z44A730464-G17 (Straight) (α12/4000HV*is*)

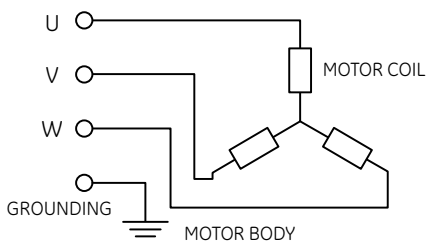
Amplifier Mating Connector (CZ2):
ZA06B-6110-K203#ZZN

Description	α8HV*is*, α12HV*is*, α22HV*i*, α22HV*is*, α30HV*is*, α40HV*is*, α50HV*is*, α100HV*is* Motor Brake Connector
Brake VDC	1
Brake VDC	2
Earth (case)	4

GE Mating Motor Connector:
ZA06B-6114-K213#E (90 degree)
ZA06B-6114-K213#S (Straight)

24 VDC Brake power connections are not polarized.





αHV*i* and αHV*is* Series Servo Motor

Ordering Information

Model Number	Description
ZA06B-0216-B200	α4/5000HV*is* Servo Motor
ZA06B-0216-B500	α4/5000HV*is* Servo Motor with Brake
ZA06B-0219-B200	α2/6000HV*is* Servo Motor
ZA06B-0219-B500	α2/6000HV*is* Servo Motor with Brake
ZA06B-0233-B200	α8/6000HV*is* Servo Motor
ZA06B-0233-B500	α8/6000HV*is* Servo Motor with Brake
ZA06B-0239-B200	α12/4000HV*is* Servo Motor
ZA06B-0239-B500	α12/4000HV*is* Servo Motor with Brake
ZA06B-0249-B200	α22/3000HV*i* Servo Motor
ZA06B-0249-B500	α22/3000HV*i* Servo Motor with Brake
ZA06B-0266-B200	α22/4000HV*is* Servo Motor
ZA06B-0266-B500	α22/4000HV*is* Servo Motor with Brake
ZA06B-0269-B200	α30/4000HV*is* Servo Motor
ZA06B-0269-B500	α30/4000HV*is* Servo Motor with Brake
ZA06B-0273-B200	α40/4000HV*is* Servo Motor
ZA06B-0273-B500	α40/4000HV*is* Servo Motor with Brake
ZA06B-0276-B210	α50/3000HV*is* Servo Motor with Fan
ZA06B-0276-B510	α50/3000HV*is* Servo Motor with Fan and Brake
ZA06B-0286-B010	α100/2500HV*is* Servo Motor
ZA06B-0286-B310	α100/2500HV*is* Servo Motor with Brake

Motor Cables

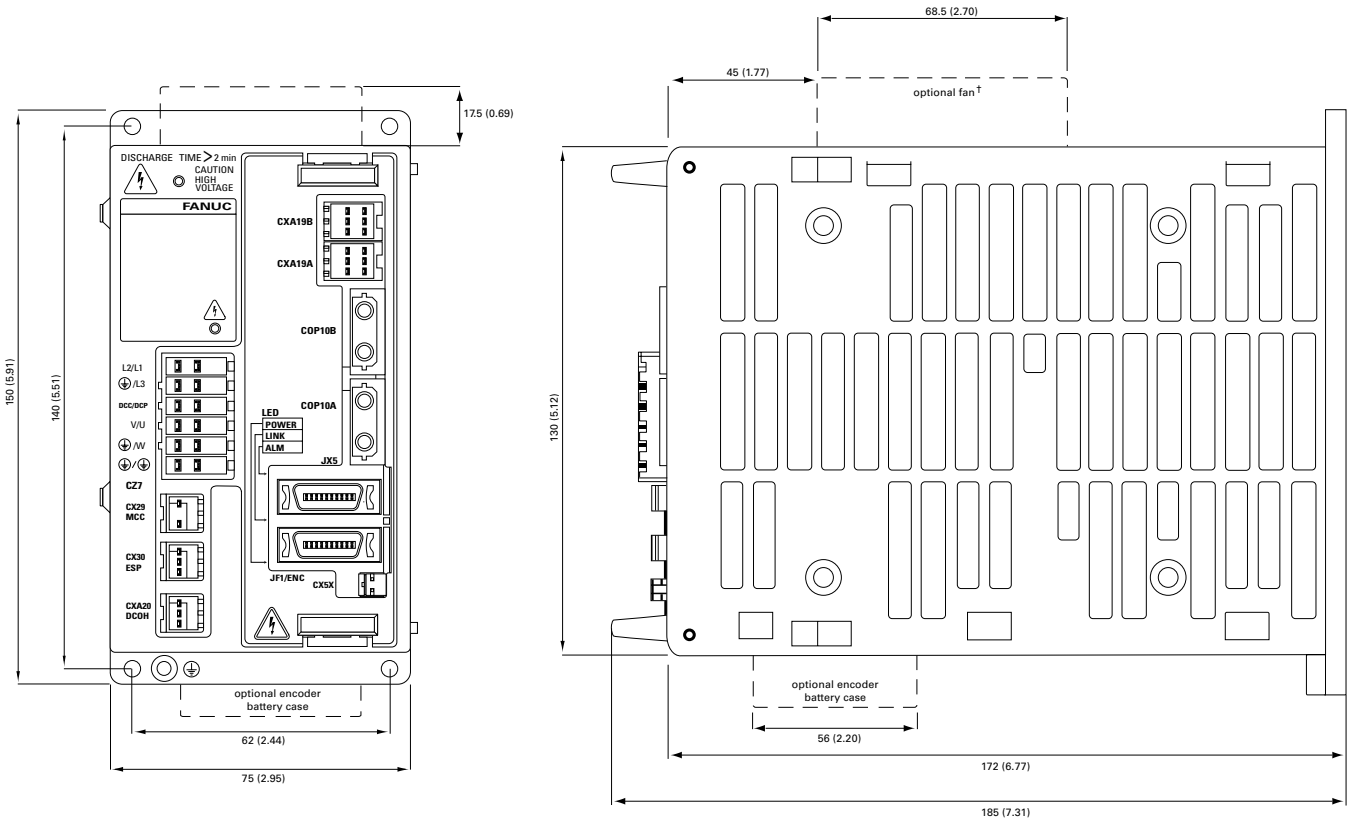
See applicable amplifier section for information about the proper cables to use with each motor.

βi Series Servo Amplifiers

Dimensions

The βi Series amplifiers are panel mounted devices with dimensions as shown. The βi Series amplifiers must be paired with the βis Series motors. When installing the amplifiers make sure to maintain the specified clearances above, below and between adjacent amplifiers to allow for proper convection cooling.

βi Series Servo Amplifier Unit
βSVM1-20i



Dimensions shown in mm (in).

βi Series Servo Amplifiers Electrical Specifications

Model		βSVM1-20i
Rated output current (rms amps)		6.8
Current limit (Peak amps)		20
AC Power		200-240 VAC (3-phase), 220-240 VAC (1-phase) 50/60 Hz ± 2 Hz
DC Control Power		24 VDC ± 10% @ 0.9 Amp per amplifier
Max. Heat loss (watts)		66
Regenerative discharge		16J
Maintenance Clearances:	Above and below amplifier	40 (1.57)
	Beside and between amplifiers	10 (0.39)

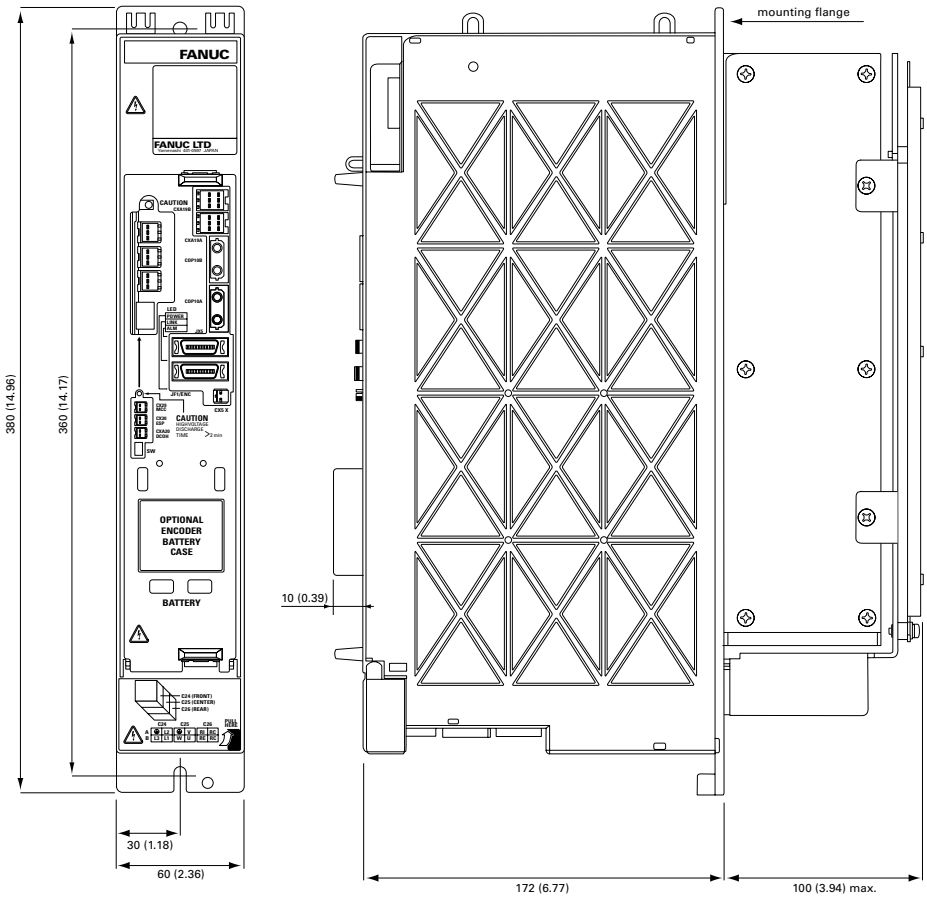
*These values are standard values at 20°C with a tolerance of ±10%. The speed-torque characteristics vary depending on the parameter setting and input voltage of the digital servo amplifiers. (The above figures show average values.) These values may be changed without prior notice.
† Separately installed cooling fan required for β4is motor when a single phase AC power source is used and always with the β8is motor.

βi Series Servo Amplifiers

Dimensions

The βi Series amplifiers are panel mounted devices with dimensions as shown. The βi Series amplifiers must be paired with the βis Series motors. When installing the amplifiers make sure to maintain the specified clearances above, below and between adjacent amplifiers to allow for proper convection cooling.

βi Series Servo Amplifier Unit
βSVM1-40*i*
βSVM1-10HV*i*
βSVM1-40HV*i*



Dimensions shown in mm (in).

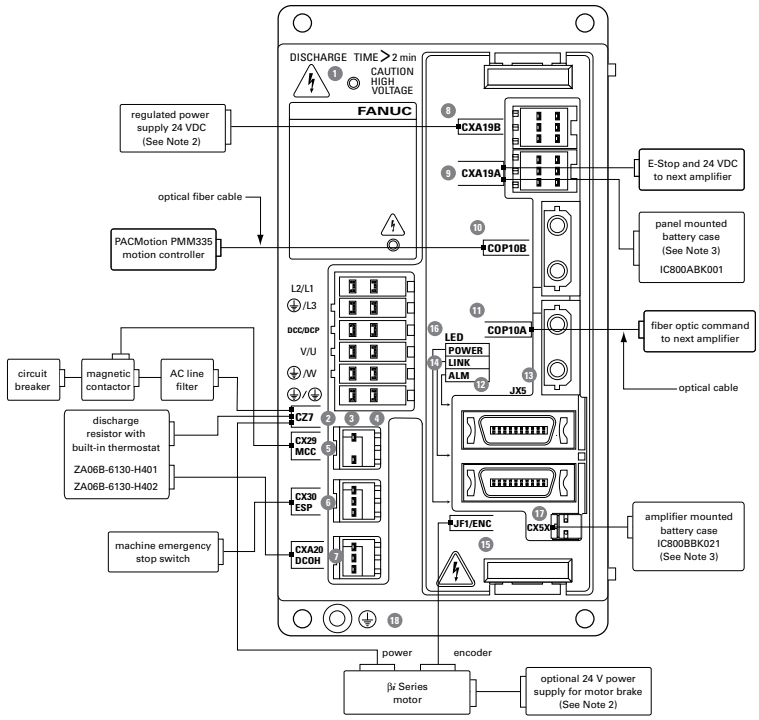
βi Series Servo Amplifiers Electrical Specifications

Model		βSVM1-40*i*	βSVM1-10HV*i*	βSVM1-20HV*i*	βSVM1-40HV*i*
Rated output current (rms amps)		12	3.1	5.6	9.2
Current limit (Peak amps)		40	10	20	40
AC Power	1-phase	n/a	n/a	n/a	n/a
	3-phase	200-240 VAC, 50/60 Hz ± 2 Hz	400-480 VAC	400-480 VAC	400-480 VAC
DC Control Power (per amplifier)		24 VDC ± 10% @ 0.9 Amp	24 VDC ± 10% @ 0.9 Amp	24 VDC ± 10% @ 0.9 Amp	24 VDC ± 10% @ 0.9 Amp
Max. Heat loss (watts)		100	54	82	122
Regenerative discharge		50W	50W	50W	50W
Maintenance Clearances:	Above and below amplifier	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)
	Beside and between amplifiers	n/a	n/a	n/a	n/a

*These values are standard values at 20°C with a tolerance of ±10%. The speed-torque characteristics vary depending on the parameter setting and input voltage of the digital servo amplifiers. (The above figures show average values.) These values may be changed without prior notice.

βi Series Servo Amplifiers

βSVM1-20i Connection Diagram

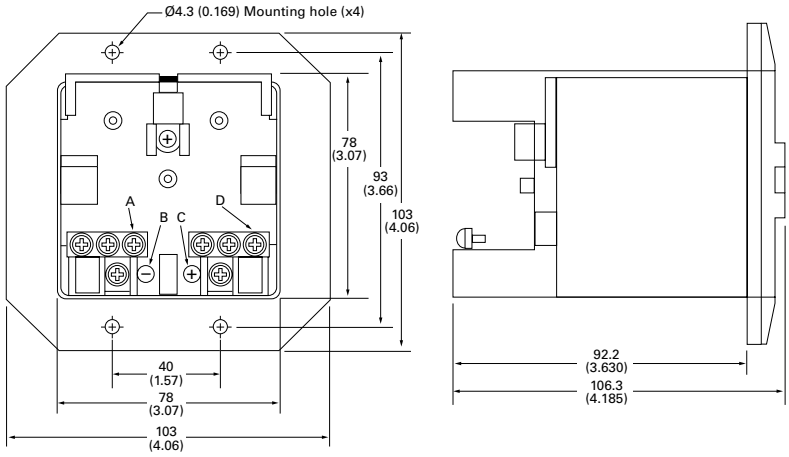


Connector Location

No.	Name	Remarks
1		DC link charge LED
2	CZ7-1	Main power input connector
3	CZ7-2	Discharge resistor connector
4	CZ7-3	Motor power connector
5	CX29	Connector for main power MCC control signal
6	CX30	E-Stop signal connector
7	CXA20	Regenerative resistor overtemperature switch connector
8	CXA19B	24 VDC power input
9	CXA19A	24 VDC power input
10	COP10B	Fiber optic servo command input
11	COP10A	Fiber optic servo command output
12	ALM	Servo alarm status LED
13	JX5	Reserved
14	LINK	Fiberoptic link status LED
15	JF1	Serial Encoder Feedback
16	POWER	Control power status display LED
17	CX5X	Absolute encoder battery
18	⏚	Tapped hole for grounding the amplifier

IC800ABK001 Encoder Battery Kit Dimensions Key:

A	3-M3 negative terminals
B	Negative terminal indication
C	Positive terminal indication
D	3-M3 positive terminals
E	4-Ø4.3 (0.169) mounting holes



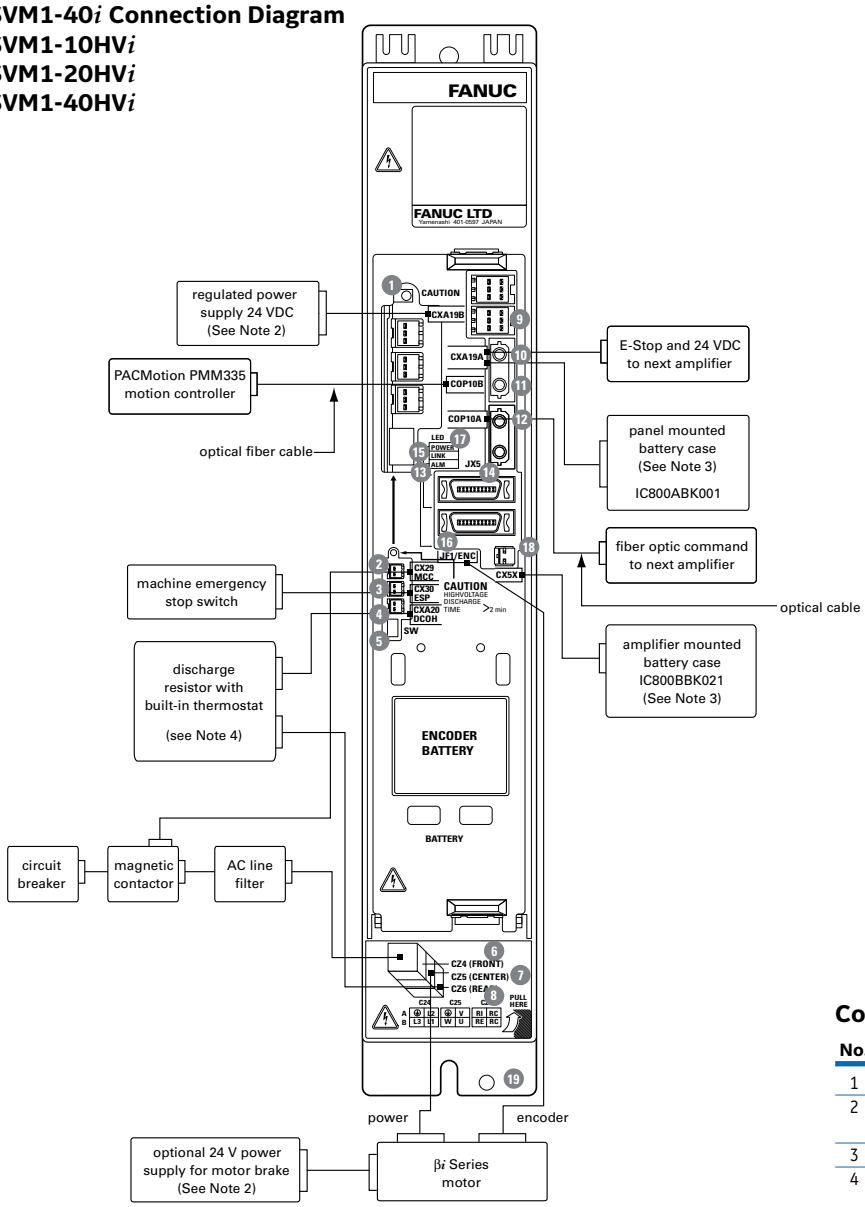
IC800ABK001 Absolute encoder battery pack

Notes:

1. Always install the circuit breakers, magnetic contactor, and AC line filter.
2. Use a regulated 24 VDC power supply for the amplifier. 24 VDC power supply for the amplifier and power supply for the motor brake cannot be shared.
3. The IC800ABK001 encoder battery pack mounts separately on the panel and can power up to 4 axes. Alternatively, the IC800BBK021 1-axis lithium battery can be snapped onto each amplifier.

βi Series Servo Amplifiers

βSVM1-40*i* Connection Diagram
βSVM1-10HV*i*
βSVM1-20HV*i*
βSVM1-40HV*i*



Connector Location

No.	Name	Remarks
1		DC link charge LED
2	CX29	Connector for main power MCC control signal
3	CX30	E-Stop signal connector
4	CXA20	Regenerative resistor overtemperature switch connector
5	SW	Setting switch (DC alarm level)
6	CZ4	Main power input connector
7	CZ5	Motor power connector
8	CZ6	Discharge resistor connector
9	CXA19B	24 VDC power input
10	CXA19A	24 VDC power input
11	COP10B	Fiber optic servo command input
12	COP10A	Fiber optic servo command output
13	ALM	Servo alarm status LED
14	JX5	Reserved
15	LINK	Fiberoptic link status LED
16	JF1	Serial Encoder Feedback
17	POWER	Control power status display LED
18	CX5X	Absolute encoder battery
19	⏚	Tapped hole for grounding the amplifier

Notes:

1. Always install the circuit breakers, magnetic contactor, and AC line filter.
2. Use a regulated 24 VDC power supply for the amplifier. 24 VDC power supply for the amplifier and power supply for the motor brake cannot be shared.
3. The IC800ABK001 encoder battery pack mounts separately on the panel and can power up to 4 axes. Alternatively, the IC800BBK021 1-axis lithium battery can be snapped onto each amplifier.
4. The BSVM1-40*i* can use the ZA06B-6089-H500 or ZA06B-6089-H713 resistors. All Beta HV*i* series amplifiers must use optional ZA06B-6130-H403 resistor when external regeneration capacity is required.

βi Series Servo Amplifiers

Ordering Information

The βi series amplifiers can be ordered as individual components or as kits that include connectors, regenerative discharge resistor and spare fuses. The kit is recommended for new installation while spare parts, or replacement units, should use the amplifier only model number.

To place an order for a complete servo system, select the Servo Motor that meets your application requirements, then select the amplifier kit, cables or connectors (customer built cables) and accessories.

βi and βHVi Series Servo Amplifier Kits*

Part Number	Qty.	Kit Contents
IC800BIK020	1	βSVM1-20i Amplifier (ZA06B-6130-H002)
20 Amp βi Series Amplifier Package	1	20 W Regenerative Discharge Resistor (ZA06B-6130-H401)
	1	Spare 24 VDC Fuse (ZA06B-6073-K250)
	1	CZ7 Power Connector Kit (ZA06B-6130-K200)
	2	CXA19 24 VDC Connector Kit (ZA06B-6130-K201)
	1	CXA20 Regenerative Discharge Thermostat Connector Kit (ZA06B-6130-K202)
	1	CX29 MCC Connector Kit (ZA06B-6130-K203)
	1	CX30 E-Stop Connector Kit (ZA06B-6130-K204)
IC800BIK040	1	βSVM1-40i Amplifier (ZA06B-6130-H003)
40 Amp βi Series Amplifier Package	1	Spare 24 VDC Fuse (ZA06B-6073-K250)
	1	CZ4 Power Connector Kit (ZA06B-6110-K200#XXS)
	1	CZ5 Motor Power Connector Kit (ZA06B-6110-K202#YYS)
	1	CZ6 Regenerative Discharge Resistor Connector Kit (ZA06B-6110-K201#XYM)
	2	CXA19 24 VDC Connector Kit (ZA06B-6130-K201)
	1	CXA20 Regenerative Resistor Thermostat Connector Kit (ZA06B-6130-K202)
	1	CX29 MCC Connector Kit (ZA06B-6130-K203)
	1	CX30 E-Stop Connector Kit (ZA06B-6130-K204)
IC800BIHV010	1	βSVM1-10HVi Amplifier (ZA06B-6131-H001)
10 Amp βHVi Series Amplifier Package	1	Spare 24 VDC Fuse (ZA06B-6073-K250)
	1	CZ4 Power Connector Kit (ZA06B-6110-K200#XXS)
	1	CZ5 Motor Power Connector Kit (ZA06B-6110-K202#YYS)
	1	CZ6 Regenerative Discharge Resistor Connector Kit (ZA06B-6110-K201#XYM)
	2	CXA19 24 VDC Connector Kit (ZA06B-6130-K201)
	1	CXA20 Regenerative Resistor Thermostat Connector Kit (ZA06B-6130-K202)
	1	CX29 MCC Connector Kit (ZA06B-6130-K203)
	1	CX30 E-Stop Connector Kit (ZA06B-6130-K204)
IC800BIHV020	1	βSVM1-20HVi Amplifier (ZA06B-6131-H002)
20 Amp βHVi Series Amplifier Package	1	Spare 24 VDC Fuse (ZA06B-6073-K250)
	1	CZ4 Power Connector Kit (ZA06B-6110-K200#XXS)
	1	CZ5 Motor Power Connector Kit (ZA06B-6110-K202#YYS)
	1	CZ6 Regenerative Discharge Resistor Connector Kit (ZA06B-6110-K201#XYM)
	2	CXA19 24 VDC Connector Kit (ZA06B-6130-K201)
	1	CXA20 Regenerative Resistor Thermostat Connector Kit (ZA06B-6130-K202)
	1	CX29 MCC Connector Kit (ZA06B-6130-K203)
	1	CX30 E-Stop Connector Kit (ZA06B-6130-K204)
IC800BIHV040	1	βSVM1-40HVi Amplifier (ZA06B-6131-H003)
40 Amp βHVi Series Amplifier Package	1	Spare 24 VDC Fuse (ZA06B-6073-K250)
	1	CZ4 Power Connector Kit (ZA06B-6110-K200#XXS)
	1	CZ5 Motor Power Connector Kit (ZA06B-6110-K202#YYS)
	1	CZ6 Regenerative Discharge Resistor Connector Kit (ZA06B-6110-K201#XYM)
	2	24 VDC Connector Kit (ZA06B-6130-K201 CXA19)
	1	CXA20 Regenerative Resistor Thermostat Connector Kit (ZA06B-6130-K202)
	1	CX29 MCC Connector Kit (ZA06B-6130-K203)
	1	CX30 Estop Connector Kit (ZA06B-6130-K204)
	1	Amplifier cooling fan kit (ZA06B-6134-K002)

*Amplifier kits provide all of the required amplifier components for complete installation; we strongly encourage kits be ordered for new systems. Separate amplifiers are available for spare or replacement units.

**See dimensions of battery pack on page 4.71

Holding Brake: For system designs which include a vertical axis that must hold its position when power is removed, a motor holding brake option is available. User supplied 24VDC power is required. To connect to the power, a separate brake cable is required on all motors except β2is, β4is, β2HVis and β4HVis models.

Encoder Battery Kit: All βis Series Servo motors feature a built-in serial encoder that can be used in either incremental or absolute mode. In order to utilize the absolute capability, an optional encoder battery pack must be installed. This pack allows the encoder's position information to be retained so that the machine does not need to be referenced to a home position every time power is restored to the system.

The 1-axis battery pack includes a small lithium battery and case which snaps on the amplifier unit. The 4-axis battery pack is panel mounted and uses standard D-cell batteries.

Battery Kits

Part Number	Qty.	Kit Contents
IC800BBK021	1	Lithium Battery (ZA06B-6093-K001)
1-Axis βi Battery Kit	1	Battery Holder (ZA06B-6093-K002)
IC800ABK001	4	D-Cell Alkaline Battery (ZA98L-0031-0005)
4-Axis D-Cell Panel Mounted Battery Pack	1	Panel Mounted Battery Pack (ZA06B-6050-K060)**
IC800ABK002	1	Lithium Battery (ZA06B-6114-K504)
1-Axis αHVi Battery Kit	1	Battery Holder (ZA06B-6114-K505)
IC800ABK003	1	Lithium Battery (ZA06B-6114-K504)
1-Axis αHVi Battery Kit for αSVM-180HVi Amplifier	1	Battery Holder (ZA06B-6114-K506)

βHV*i* Series Servo Amplifier and βHV*is* Series Servo Motor

Ordering Information

Model Number	β2/4000HV*is*	β4/4000HV*is*	β8/3000HV*is*	β12/3000HV*is*	β22/2000HV*is*
Servo Motor	ZA06B-0062-B203	ZA06B-0064-B203	ZA06B-0076-B203	ZA06B-0079-B203	ZA06B-0086-B203
Servo Motor w/ Holding Brake	ZA06B-0062-B503	ZA06B-0064-B503	ZA06B-0076-B503	ZA06B-0079-B503	ZA06B-0086-B503
Amplifier Kit	IC800BIHV010	IC800BIHV010	IC800BIHV010	IC800BIHV020	IC800BIHV020
Amplifier Only	ZA06B-6131-H001	ZA06B-6131-H001	ZA06B-6131-H001	ZA06B-6131-H002	ZA06B-6131-H002

Cables and Accessories Ordering Information

Model Number		β2/4000HV*is*	β4/4000HV*is*	β8/3000HV*is*	β12/3000HV*is*	β22/2000HV*is*
Power Cable	7 M	CP2I-0WPB-0070-AZ	CP2I-0WPB-0070-AZ	CP3I-0WPB-0070-AZ	CP3I-0WPB-0070-AZ	CP4I-0WPB-0070-AZ
	14 M	CP2I-0WPB-0140-AZ	CP2I-0WPB-0140-AZ	CP3I-0WPB-0140-AZ	CP3I-0WPB-0140-AZ	CP4I-0WPB-0140-AZ
Power Cable (Shielded)	7 M	CP2I-0WEB-0070-AZ	CP2I-0WEB-0070-AZ	CP3I-0WEB-0070-AZ	CP3I-0WEB-0070-AZ	CP4I-0WEB-0070-AZ
	14 M	CP2I-0WEB-0140-AZ	CP2I-0WEB-0140-AZ	CP3I-0WEB-0140-AZ	CP3I-0WEB-0140-AZ	CP4I-0WEB-0140-AZ
Feedback Cable	7 M	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ
(Right Angle Motor Connector)	14 M	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ
Feedback Cable	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
(Straight Motor Connector)	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Holding Brake Power Cable	7 M	Integrated with Power Cable	Integrated with Power Cable	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ
	14 M			CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ
External Regen Resistors		ZA06B-6130-H403	ZA06B-6130-H403	ZA06B-6130-H403	ZA06B-6130-H403	ZA06B-6130-H403
CZ4 Power Connector Kit		ZA06B-6110-K200#XXS	ZA06B-6110-K200#XXS	ZA06B-6110-K200#XXS	ZA06B-6110-K200#XXS	ZA06B-6110-K200#XXS
CZ5 Motor Power Connector Kit		ZA06B-6110-K202#YYS	ZA06B-6110-K202#YYS	ZA06B-6110-K202#YYS	ZA06B-6110-K202#YYS	ZA06B-6110-K202#YYS
CZ6 Regen Resistor Thermostat Connector Kit		ZA06B-6110-K201#XYM	ZA06B-6110-K201#XYM	ZA06B-6110-K201#XYM	ZA06B-6110-K201#XYM	ZA06B-6110-K201#XYM
CXA19 Connector Kit		ZA06B-6130-K201	ZA06B-6130-K201	ZA06B-6130-K201	ZA06B-6130-K201	ZA06B-6130-K201
CXA20 Regen Thermostat Connector Kit		ZA06B-6130-K202	ZA06B-6130-K202	ZA06B-6130-K202	ZA06B-6130-K202	ZA06B-6130-K202
CX29 MCC Connector Kit		ZA06B-6130-K203	ZA06B-6130-K203	ZA06B-6130-K203	ZA06B-6130-K203	ZA06B-6130-K203
CX30 Estop Input Connector Kit		ZA06B-6130-K204	ZA06B-6130-K204	ZA06B-6130-K204	ZA06B-6130-K204	ZA06B-6130-K204
Motor Feedback Connector Kit	90 Deg	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E
	Straight	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S
Motor Half Key (Note 2)		Z44A730465-001	Z44A730465-016	Z44A730465-002	Z44A730465-015	Z44A730465-003
Motor Power/Brake	90 Deg	ZA06B-6114-K220#E	ZA06B-6114-K220#E	N/A	N/A	N/A
Connector Kit	Straight	ZA06B-6114-K220#S	ZA06B-6114-K220#S	N/A	N/A	N/A
Motor Power Connector Kit	90 Deg	N/A	N/A	Z44A730464-G18	Z44A730464-G18	Z44A730464-G20
	Straight	N/A	N/A	Z44A730464-G17	Z44A730464-G17	Z44A730464-G19
Motor Brake Connector Kit	90 Deg	N/A	N/A	ZA06B-6114-K213#E	ZA06B-6114-K213#E	ZA06B-6114-K213#E
	Straight	N/A	N/A	ZA06B-6114-K213#S	ZA06B-6114-K213#S	ZA06B-6114-K213#S
Spare Control Power Fuse		ZA06B-6073-K250				
Encoder Battery Kits	1 axis	IC800BBK021 (Note 1)				
	4 axis	IC800ABK001 (Note 1)				
Fiberoptic Command Cable	15 cm	ZA66L-6001-0023#L150R0				
	1 M	ZA66L-6001-0023#L1R003				
	2 M	ZA66L-6001-0023#L2R003				
	3 M	ZA66L-6001-0023#L3R003				
Sheathed Fiberoptic Cable	1 M	ZA66L-6001-0026#L1R003				
	5 M	ZA66L-6001-0026#L5R003				
	10 M	ZA66L-6001-0026#L10R03				
	20 M	ZA66L-6001-0026#L20R03				
	30M	ZA66L-6001-0026#L30R03				
	50M	ZA66L-6001-0026#L50R03				
	100 M	ZA66L-6001-0026#L100R3				
Feedback Connector (JF1)		ZA06B-6073-K214				
AC Line Filter	5.4 kW	ZA81L-0001-0168				
	10.5 kW	ZA81L-0001-0169				
Replacement Encoder Battery		ZA06B-6093-K001 (IC800BBK021 kit); ZA98L-0031-0005 (IC800ABK001 kit)				

1) The IC800ABPK001 panel mounted encoder battery pack requires CXA19 connector kit for user supplied cable. Uses 4 D-cell batteries. See breakdown of kit contents in the Ordering Information section.
2) Half Keys are used to fill the motor shaft Keyway when a compression type coupling is used in order to preserve the rotational balance of the motor.

βi Series Servo Amplifier and βi Series Servo Motor

Ordering Information

Model Number	β0.4/5000is	β0.5/6000is	β1/6000is	β2/4000is
Servo Motor	ZA06B-0114-B203	ZA06B-0115-B203	ZA06B-0116-B203	ZA06B-0061-B203
Servo Motor w/ Holding Brake	ZA06B-0114-B503	ZA06B-0115-B503	ZA06B-0116-B503	ZA06B-0061-B503
Amplifier Kit	IC800BIK020	IC800BIK020	IC800BIK020	IC800BIK020
Amplifier Only	ZA06B-6130-H002	ZA06B-6130-H002	ZA06B-6130-H002	ZA06B-6130-H002
Amplifier Fan Kit (Note 1)	N/A	N/A	N/A	N/A

Cables and Accessories Ordering Information

Model Number		β0.4/5000is	β0.5/6000is	β1/6000is	β2/4000is
Power Cable	7 M	CP8B-1WPB-0070-AZ	CP8B-1WPB-0070-AZ	CP8B-1WPB-0070-AZ	CP9B-0WPB-0070-AZ
	14 M	CP8B-1WPB-0140-AZ	CP8B-1WPB-0140-AZ	CP8B-1WPB-0140-AZ	CP9B-0WPB-0140-AZ
Power Cable (Shielded)	7 M	CP8B-1WEB-0070-AZ	CP8B-1WEB-0070-AZ	CP8B-1WEB-0070-AZ	CP9B-0WEB-0070-AZ
	14 M	CP8B-1WEB-0140-AZ	CP8B-1WEB-0140-AZ	CP8B-1WEB-0140-AZ	CP9B-0WEB-0140-AZ
Feedback Cable (Right Angle motor connector)	7 M	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ
	14 M	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ
Feedback Cable (Straight motor connector)	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Holding Brake Power Cable	7 M	CB6N-5WPM-0070-AZ	CB6N-5WPM-0070-AZ	CB6N-5WPM-0070-AZ	Integrated with Power Cable
	14 M	CB6N-5WPM-0140-AZ	CB6N-5WPM-0140-AZ	CB6N-5WPM-0140-AZ	Integrated with Power Cable
External Regen Resistors	20 W	ZA06B-6130-H401	ZA06B-6130-H401	ZA06B-6130-H401	ZA06B-6130-H401
	100 W	ZA06B-6130-H402	ZA06B-6130-H402	ZA06B-6130-H402	ZA06B-6130-H402
	200 W	N/A	N/A	N/A	N/A
	800 W	N/A	N/A	N/A	N/A
CZ7 Power Connector Kit		ZA06B-6130-K200	ZA06B-6130-K200	ZA06B-6130-K200	ZA06B-6130-K200
CZ4 Power Connector Kit		N/A	N/A	N/A	N/A
CZ5 Motor Power Connector Kit		N/A	N/A	N/A	N/A
CZ6 Regen Resistor Thermostat Connector Kit		N/A	N/A	N/A	N/A
CXA19 24 VDC Connector Kit		ZA06B-6130-K201	ZA06B-6130-K201	ZA06B-6130-K201	ZA06B-6130-K201
CXA20 Regen Thermostat Connector Kit		ZA06B-6130-K202	ZA06B-6130-K202	ZA06B-6130-K202	ZA06B-6130-K202
CX29 MCC Connector Kit		ZA06B-6130-K203	ZA06B-6130-K203	ZA06B-6130-K203	ZA06B-6130-K203
CX30 E-Stop Input Connector Kit		ZA06B-6130-K204	ZA06B-6130-K204	ZA06B-6130-K204	ZA06B-6130-K204
Motor Feedback Connector Kit	90 Deg	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E
	Straight	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S
Motor Half Key (Note 3)		Z44A730465-013	Z44A730465-013	Z44A730465-011	Z44A730465-001
Motor Power/Brake Connector Kit	90 Deg	N/A	N/A	N/A	ZA06B-6114-K220#E
	Straight	N/A	N/A	N/A	ZA06B-6114-K220#S
Motor Power Connector Kit	90 Deg	ZA06B-6114-K230#E	ZA06B-6114-K230#E	ZA06B-6114-K230#E	N/A
	Straight	ZA06B-6114-K230#S	ZA06B-6114-K230#S	ZA06B-6114-K230#S	N/A
Motor Brake Power Connector Kit	90 Deg	ZA06B-6114-K232#E	ZA06B-6114-K232#E	ZA06B-6114-K232#E	N/A
	Straight	ZA06B-6114-K232#S	ZA06B-6114-K232#S	ZA06B-6114-K232#S	N/A
Spare Amplifier Control Power Fuse		ZA06B-6073-K250			
Encoder Battery Kits	1 axis	IC800BBK021 (Note 2)			
	4 axis	IC800ABK001 (Note 2)			
Fiberoptic Command Cable	15 cm	ZA66L-6001-0023#L150R0			
	1 M	ZA66L-6001-0023#L1R003			
	2 M	ZA66L-6001-0023#L2R003			
	3 M	ZA66L-6001-0023#L3R003			
Fiberoptic Command Cable (sheathed)	1 M	ZA66L-6001-0026#L1R003			
	5 M	ZA66L-6001-0026#L5R003			
	10 M	ZA66L-6001-0026#L10R03			
	20 M	ZA66L-6001-0026#L20R03			
	30 M	ZA66L-6001-0026#L30R03			
	50 M	ZA66L-6001-0026#L50R03			
	100 M	ZA66L-6001-0026#L100R3			
Amplifier Feedback Connector (JF1)		ZA06B-6073-K214			
AC Line Filter	5.4 kW	ZA81L-0001-0083#3C			
	10.5 kW	ZA81L-0001-0101#C			
Replacement Encoder Battery		ZA06B-6093-K001 (IC800BBK021 kit); ZA98L-0031-0005 (IC800ABK001 kit)			

1) Separate user installed cooling fan is only required for the βSVM1-20i amplifier and β8/3000is motor or when single phase supply is used with the β4/4000is motor
2) The IC800ABK001 panel mounted encoder battery pack requires CXA19 connector kit for user supplied cable. Uses 4 D-cell batteries. See breakdown of kit contents in the Ordering Information section.
3) Half Keys are used to fill the motor shaft Keyway when a compression type coupling is used in order to preserve the rotational balance of the motor.

βi Series Servo Amplifier and βi Series Servo Motor

Ordering Information

Model Number	β4/4000is	β8/3000is	β12/3000is	β22/2000is
Servo Motor	ZA06B-0063-B203	ZA06B-0075-B203	ZA06B-0078-B203	ZA06B-0085-B203
Servo Motor w/ Holding Brake	ZA06B-0063-B503	ZA06B-0075-B503	ZA06B-0078-B503	ZA06B-0085-B503
Amplifier Kit	IC800BIK020	IC800BIK020	IC800BIK040	IC800BIK040
Amplifier Only	ZA06B-6130-H002	ZA06B-6130-H002	ZA06B-6130-H003	ZA06B-6130-H003
Amplifier Fan Kit (Note 1)	ZA06B-6134-K003	ZA06B-6134-K003	N/A	N/A

Cables and Accessories Ordering Information

Model Number		β4/4000is	β8/3000is	β12/3000is	β22/2000is
Power Cable	7 M	CP9B-0WPB-0070-AZ	CP3B-0WPB-0070-AZ	CP5B-0WPB-0070-AZ	CP6B-0WPB-0070-AZ
	14 M	CP9B-0WPB-0140-AZ	CP3B-0WPB-0140-AZ	CP5B-0WPB-0140-AZ	CP6B-0WPB-0140-AZ
Power Cable (Shielded)	7 M	CP9B-0WEB-0070-AZ	CP3B-0WEB-0070-AZ	CP5B-0WEB-0070-AZ	CP6B-0WEB-0070-AZ
	14 M	CP9B-0WEB-0140-AZ	CP3B-0WEB-0140-AZ	CP5B-0WEB-0140-AZ	CP6B-0WEB-0140-AZ
Feedback Cable (Right Angle motor connector)	7 M	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ	CFDA-7WPB-0070-AZ
	14 M	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ	CFDA-7WPB-0140-AZ
Feedback Cable (Straight motor connector)	7 M	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ	CFDA-0WPB-0070-AZ
	14 M	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ	CFDA-0WPB-0140-AZ
Holding Brake Power Cable	7 M	Integrated with Power Cable	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ	CB4N-0WPM-0070-AZ
	14 M	Integrated with Power Cable	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ	CB4N-0WPM-0140-AZ
External Regen Resistors	20 W	ZA06B-6130-H401	ZA06B-6130-H401	N/A	N/A
	100 W	ZA06B-6130-H402	ZA06B-6130-H402	N/A	N/A
	200 W	N/A	N/A	ZA06B-6089-H500	ZA06B-6089-H500
	800 W	N/A	N/A	ZA06B-6089-H713	ZA06B-6089-H713
CZ7 Power Connector Kit		ZA06B-6130-K200	ZA06B-6130-K200	N/A	N/A
CZ4 Power Connector Kit		N/A	N/A	ZA06B-6110-K200#XXS	ZA06B-6110-K200#XXS
CZ5 Motor Power Connector Kit		N/A	N/A	ZA06B-6110-K202#YYS	ZA06B-6110-K202#YYS
CZ6 Regen Resistor Thermostat Connector Kit		N/A	N/A	ZA06B-6110-K201#XYM	ZA06B-6110-K201#XYM
CXA19 24 VDC Connector Kit		ZA06B-6130-K201	ZA06B-6130-K201	ZA06B-6130-K201	ZA06B-6130-K201
CXA20 Regen Thermostat Connector Kit		ZA06B-6130-K202	ZA06B-6130-K202	ZA06B-6130-K202	ZA06B-6130-K202
CX29 MCC Connector Kit		ZA06B-6130-K203	ZA06B-6130-K203	ZA06B-6130-K203	ZA06B-6130-K203
CX30 E-Stop Input Connector Kit		ZA06B-6130-K204	ZA06B-6130-K204	ZA06B-6130-K204	ZA06B-6130-K204
Motor Feedback Connector Kit	90 Deg	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E	ZA06B-6114-K204#E
	Straight	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S	ZA06B-6114-K204#S
Motor Half Key (Note 3)		Z44A730465-016	Z44A730465-002	Z44A730465-015	Z44A730465-003
Motor Power/Brake Connector Kit	90 Deg	ZA06B-6114-K220#E	N/A	N/A	N/A
	Straight	ZA06B-6114-K220#S	N/A	N/A	N/A
Motor Power Connector Kit	90 Deg	N/A	Z44A730464-G18	Z44A730464-G18	Z44A730464-G20
	Straight	N/A	Z44A730464-G17	Z44A730464-G17	Z44A730464-G19
Motor Brake Power Connector Kit	90 Deg	N/A	ZA06B-6114-K213#E	ZA06B-6114-K213#E	ZA06B-6114-K213#E
	Straight	N/A	ZA06B-6114-K213#S	ZA06B-6114-K213#S	ZA06B-6114-K213#S
Spare Amplifier Control Power Fuse		ZA06B-6073-K250			
Encoder Battery Kits	1 axis	IC800BBK021 (Note 2)			
	4 axis	IC800ABK001 (Note 2)			
Fiberoptic Command Cable	15 cm	ZA66L-6001-0023#L150R0			
	1 M	ZA66L-6001-0023#L1R003			
	2 M	ZA66L-6001-0023#L2R003			
	3 M	ZA66L-6001-0023#L3R003			
Fiberoptic Command Cable (sheathed)	1 M	ZA66L-6001-0026#L1R003			
	5 M	ZA66L-6001-0026#L5R003			
	10 M	ZA66L-6001-0026#L10R03			
	20 M	ZA66L-6001-0026#L20R03			
	30 M	ZA66L-6001-0026#L30R03			
	50 M	ZA66L-6001-0026#L50R03			
	100 M	ZA66L-6001-0026#L100R3			
Amplifier Feedback Connector (JF1)		ZA06B-6073-K214			
AC Line Filter	5.4 kW	ZA81L-0001-0083#3C			
	10.5 kW	ZA81L-0001-0101#C			
Replacement Encoder Battery		ZA06B-6093-K001 (IC800BBK021 kit); ZA98L-0031-0005 (IC800ABK001 kit)			

1) Separate user installed cooling fan is only required for the βSVM1-20i amplifier and β8/3000is motor or when single phase supply is used with the β4/4000is motor
2) The IC800ABK001 panel mounted encoder battery pack requires CXA19 connector kit for user supplied cable. Uses 4 D-cell batteries. See breakdown of kit contents in the Ordering Information section.
3) Half Keys are used to fill the motor shaft Keyway when a compression type coupling is used in order to preserve the rotational balance of the motor.

β*is* Series Servo Motors

Specifications

Motor Model	Unit	β0.4/5000*is*	β0.5/6000*is*	β1/6000*is*	β2/4000*is*	β4/4000*is*	β8/3000*is*	β12/3000*is*	β22/2000*is*
Cont Stall Torque*	in-lb (Nm)	3.5 (0.4)	5.8 (0.65)	10.6 (1.2)	17.7 (2)	31 (3.5)	62 (7)	97.4 (11)	177 (20)
Peak Torque*	in-lb (Nm)	8.9 (1)	22.1 (2.5)	44.3 (5)	62 (7)	88.5 (10)	132.8 (15)	239 (27)	398.3 (45)
Rotor Inertia	in-lb-s^2 x 10^{-4}	0.885	1.593	3.009	25.76	45.58	103.55	201.80	466.43
	(kg-m^2 x 10^{-4})	(0.1)	(0.18)	(0.34)	(2.91)	(5.15)	(11.7)	(22.8)	(52.7)
Rated Speed	RPM	4000	6000	6000	4000	3000	2000	2000	2000
No Load Speed	RPM	5000	6000	6000	4000	4000	3000	3000	2000
Encoder Resolution	Counts/Rev	65,536	65,536	65,536	131,072	131,072	131,072	131,072	131,072
Flange Size	mm	60	60	60	90	90	130	130	174
Mechanical Data									
Weight	lb (kg)	1.76 (0.8)	2.2 (1)	3.3 (1.5)	6.16 (2.8)	9.46 (4.3)	16.28 (7.4)	26.18 (11.9)	37.4 (17)
Axial Load Rating	lb (kg)	11 (5)	11 (5)	11 (5)	17.6 (8)	17.6 (8)	44 (20)	44 (20)	132 (60)
Radial Load Rating	lb (kg)	44 (20)	44 (20)	44 (20)	55 (25)	55 (25)	154 (70)	154 (70)	440 (200)
Mechanical Time Constant	msec	1	0.9	0.7	4	3	3	2	2
Thermal Time Constant	min	8	10	15	15	20	20	25	30
Static Friction	Nm	0.04	0.04	0.04	0.1	0.2	0.3	0.4	0.8
Electrical Data									
Torque Constant*	in-lb/A (Nm/A)	0.99 (0.11)	1.97 (0.22)	3.98 (0.45)	5.49 (0.62)	6.64 (0.75)	10.27 (1.16)	9.56 (1.08)	15.66 (1.77)
Resistance*	ohms	0.55	0.85	1.5	1.6	0.94	1	0.39	0.44
Back EMF*	V(rms)/krpm	4	7.7	15.4	21	26	41	38	62
Rated Motor Power*	HP (kW)	0.17 (0.13)	0.47 (0.35)	0.67 (0.5)	0.67 (0.5)	1 (0.75)	1.6 (1.2)	2.4 (1.8)	3.4 (2.5)
Cont. Stall Current	A (rms)	3.6	2.9	2.7	3.3	4.7	6	10.2	11.3
Max Current	A (peak)	20	20	20	20	20	20	40	40
Insulation		Class F	Class F	Class F	Class F	Class F	Class F	Class F	Class F
Amplifier Model									
Amp Model Number		βSVM1-20*i*	βSVM1-20*i*	βSVM1-20*i*	βSVM1-20*i*	βSVM1-20*i*	βSVM1-20*i*	βSVM1-40*i*	βSVM1-40*i*
Brake Data									
Holding Torque	in-lb (Nm)	5.8 (0.65)	5.8 (0.65)	10.6 (1.2)	26.6 (3)	26.6 (3)	70.8 (8)	70.8 (8)	309.8 (35)
Inertia Adder	in-lb-s^2 x 10^{-4} (kg-m^2 x 10^{-4})	0.797 (0.09)	0.797 (0.09)	0.797 (0.09)	1.770 (0.2)	1.770 (0.2)	6.195 (0.7)	6.195 (0.7)	53.100 (6)
Weight Adder	lb (kg)	0.88 (0.4)	0.88 (0.4)	0.88 (0.4)	2.2 (1)	2.2 (1)	4.84 (2.2)	4.84 (2.2)	13.2 (6)
Current	A	0.5	0.5	0.5	0.9	0.9	1.1	1.1	1.2
Voltage	VDC	24	24	24	24	24	24	24	24
Engage time	msec	20	20	20	10	10	30	30	30
Release time	msec	40	40	40	60	60	160	160	160

*Data shown are nominal values at 20°C

Environmental Specifications

Humidity	80% non-condensing
Ambient Temperature	0 to 40°C
Vibration	less than 5G (operating)
Altitude	3300 feet (1000 m)

βHV*is* Series Servo Motors

Specifications

Motor Model	Unit	β2/4000HV*is*	β4/4000HV*is*	β8/3000HV*is*	β12/3000HV*is*	β22/2000HV*is*
Cont Stall Torque*	Nm	2	3.5	7	11	20
	in-lb	17.7	31	62	97.4	177
Peak Torque*	Nm	7	10	15	27	45
	in-lb	62	88.5	132.8	239	398.3
Rotor Inertia	$kgm^2 \times 10^{-4}$	2.91	5.15	11.7	22.8	52.7
	$in\text{-}lb\text{-}s^2 \times 10^{-4}$	25.76	45.58	103.55	201.80	466.43
Rated Speed	RPM	4000	3000	2000	2000	2000
No Load Speed	RPM	4000	4000	3000	3000	2000
Encoder Resolution	Counts/Rev	131,072	131,072	131,072	131,072	131,072
Flange Size	mm	90	90	130	130	174
Mechanical Data						
Weight	kg	2.8	4.3	7.4	11.9	17
	lb	6.16	9.46	16.28	26.18	37.4
Axial Load Rating	kg	8	8	20	20	60
	lb	17.6	17.6	44	44	132
Radial Load Rating	kg	25	25	70	70	200
	lb	55	55	154	154	440
Mechanical Time Constant	msec	4	3	3	2	2
Thermal Time Constant	min	15	20	20	25	30
Static Friction	Nm	0.1	0.2	0.3	0.4	0.8
Electrical Data						
Torque Constant *	Nm/A	1.23	1.5	2.32	2.16	3.5
	in-lb/A	10.89	13.28	20.53	19.12	30.98
Resistance*	ohms	6.6	4	3.9	1.6	1.8
Back EMF Constant*	V(rms)/krpm	43	53	81	76	120
Rated Motor Power*	kW	0.5	0.75	1.2	1.8	2.5
	HP	0.67	1	1.6	2.4	3.4
Cont. Stall Current	A (rms)	1.6	2.3	3	5.1	5.6
Max Current	A (peak)	10	10	10	20	20
Insulation	Class F	Class F	Class F	Class F	Class F	Class F
Amplifier Model						
Amp Model Number		βSVM1-10HV*i*	βSVM1-10HV*i*	βSVM1-10HV*i*	βSVM1-20HV*i*	βSVM1-20HV*i*
Brake Data						
Holding Torque	in-lb	26.6	26.6	70.8	70.8	309.8
	Nm	3	3	8	8	35
Inertia Adder	$kgm^2 \times 10^{-4}$	0.2	0.2	0.7	0.7	6
	$in\text{-}lb\text{-}s^2 \times 10^{-4}$	1.770	1.770	6.195	6.195	53.100
Weight Adder	lb	2.2	2.2	4.84	4.84	13.2
	kg	1	1	2.2	2.2	6
Current	A	0.9	0.9	1.1	1.1	1.2
Voltage	VDC	24	24	24	24	24
Engage time	msec	10	10	30	30	30
Release time	msec	60	60	160	160	160

*Data shown are nominal values at 20°C

Environmental Specifications

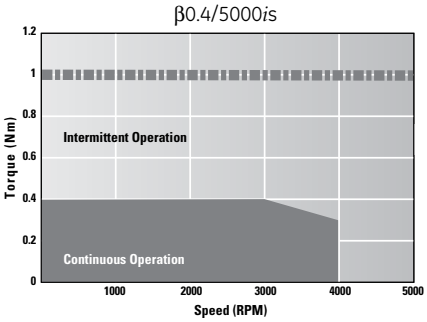
Humidity	80% non-condensing
Ambient Temperature	0 to 40° C
Vibration	less than 5G (operating)
Altitude	3300 feet (1000 m)

β*is* and βHV*is* Series Servo Motors

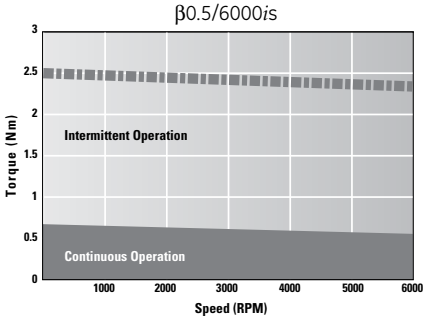
Speed Torque Curves

The curves illustrate the relationship between motor speed and output torque. The motor can operate continuously at any combination of speed and torque within the prescribed continuous operating zone. The limit of the continuous operating zone is determined with the motor's ambient temperature at 20°C and its drive current as a pure sine wave. Actual operation is limited by the current of the servo drive unit. The continuous operating zone must be derated for ambient temperature above 20°C.

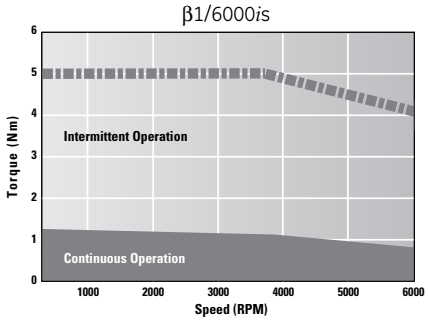
β0.4/5000*is*



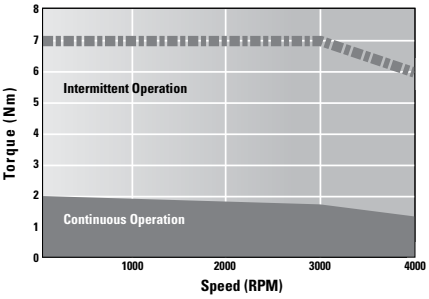
β0.5/6000*is*



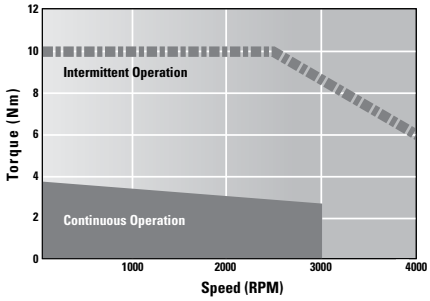
β1/6000*is*



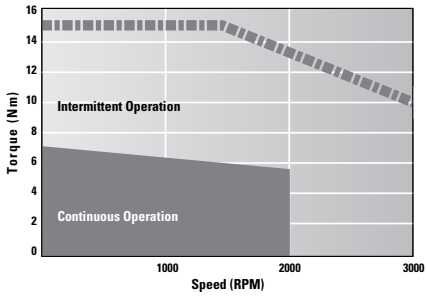
β2/4000*is* and β2/4000HV*is*



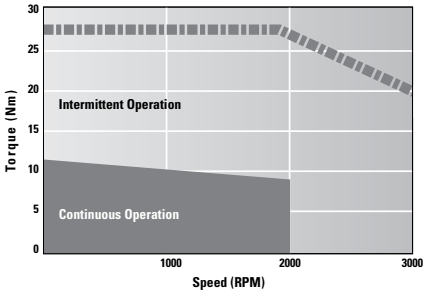
β4/4000*is* and β4/4000HV*is*



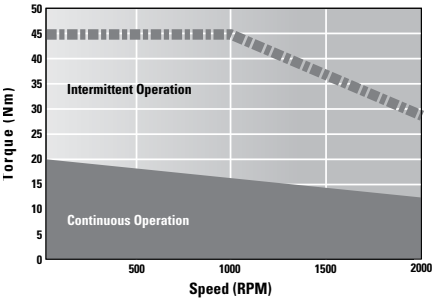
β8/3000*is* and β8/3000HV*is*



β12/3000*is* and β12/3000HV*is*



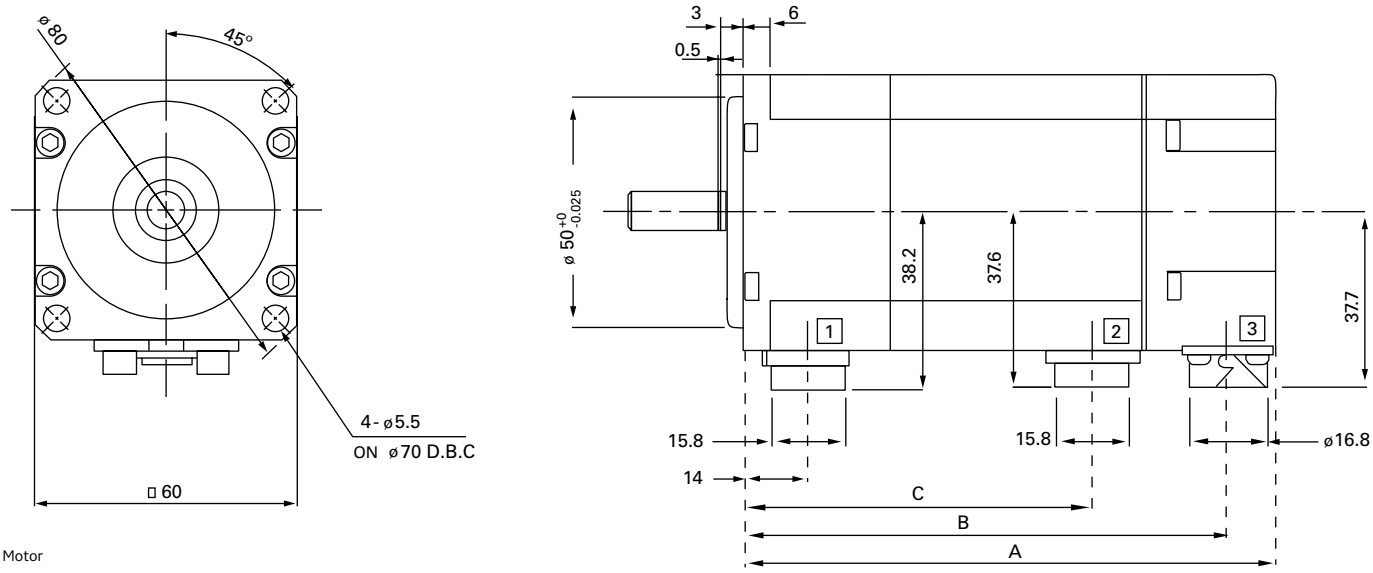
β22/2000*is* and β22/2000HV*is*



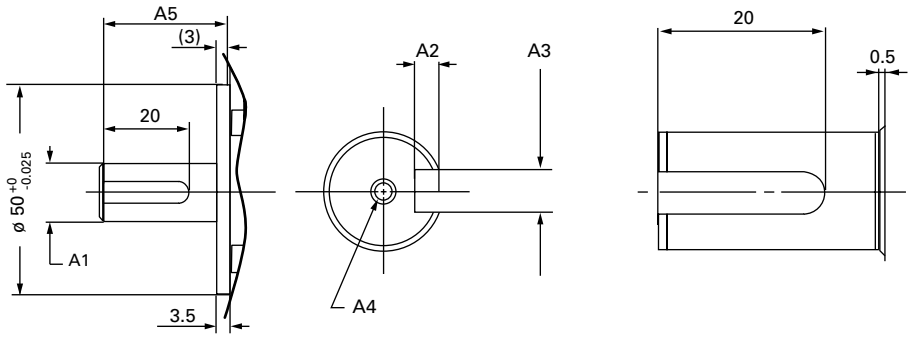
βis Series Servo Motors

Dimensions

β0.4/5000is, β0.5/6000is, β1/6000is



Motor



Shaft detail

Dimensions shown mm

Dimension	β0.4/5000is	β0.5/6000is	β1/6000is
A	75	89.5	118.5
A with brake	101.5	116	145
A1	ø9 $^{0}_{-0.009}$	ø9 $^{0}_{-0.009}$	ø14 $^{0}_{-0.011}$
A2	1.2 $^{0}_{-0.1}$	1.2 $^{0}_{-0.1}$	2 $^{0}_{-0.1}$
A3	3 $^{0}_{-0.025}$	3 $^{0}_{-0.025}$	5 $^{0}_{-0.33}$
A4	M3 Depth 6	M3 Depth 6	M4 Depth 10
A5	25	25	30
B	65	79.5	108.5
B with brake	91.5	106	135
C	34.5	49	78
C with brake	61	75.5	104.5

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

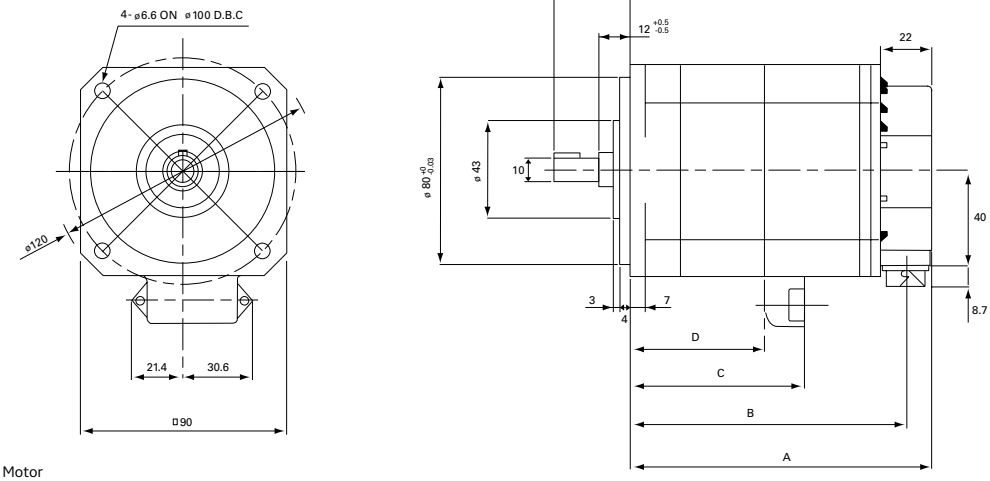
Notes

1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 20 kgf (44 lb)

βis Series Servo Motors

Dimensions

β2/4000is, β2/4000HVis



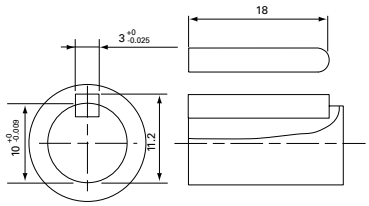
Motor

Power Connections

1	2	3	4	5	6
U	V	W	G		

Power/Brake Connections

1	2	3	4	5	6
U	V	W	G	B	B



Shaft detail

Dimensions shown mm

Dimension	β2/4000is β2/4000HVis
A	130
A with brake	159
B	119
B with brake	148
C	75
C with brake	75
D	59
D with brake	59

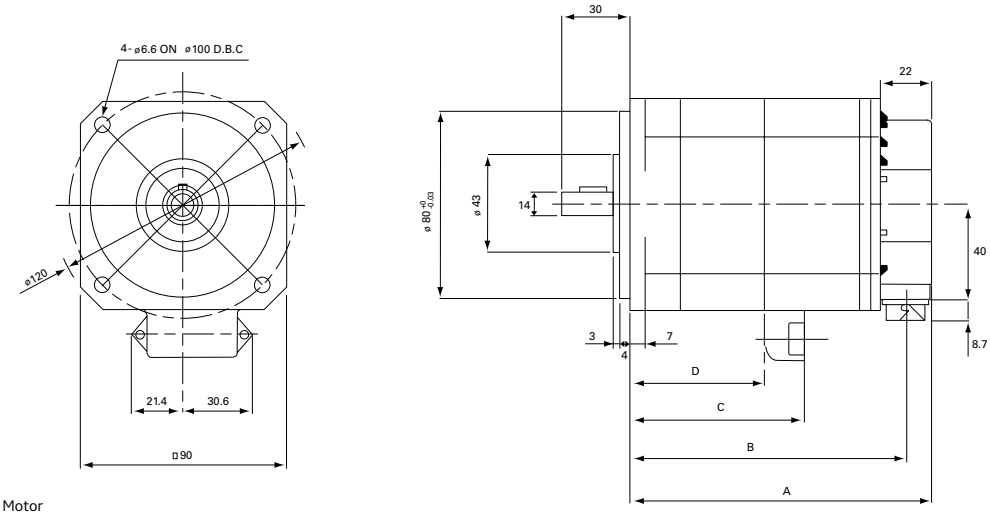
Notes

1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 25 kgf (55 lb)

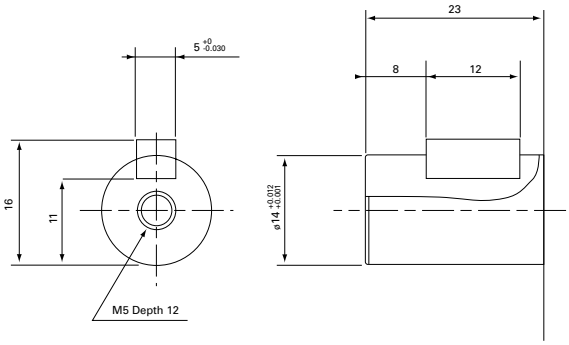
βis Series Servo Motors

Dimensions

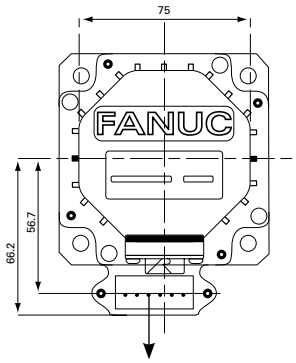
β4/4000is, β4/4000HVis



Motor



Shaft detail



Power Connections

1	2	3	4	5	6
U	V	W	G		

Power/Brake Connections

1	2	3	4	5	6
U	V	W	G	B	B

Dimensions shown mm

Dimension	β4/4000is β4/4000HVis
A	166
A with brake	195
B	155
B with brake	184
C	111
C with brake	111
D	95
D with brake	95

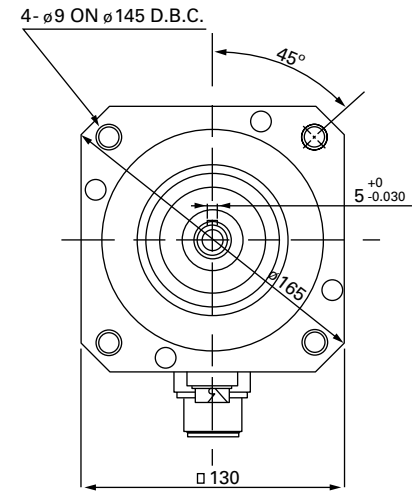
Notes

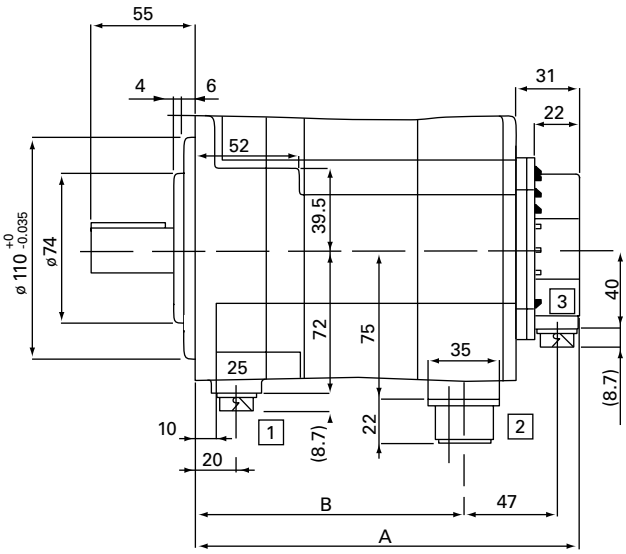
1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 25 kgf (55 lb)

β*is* Series Servo Motors

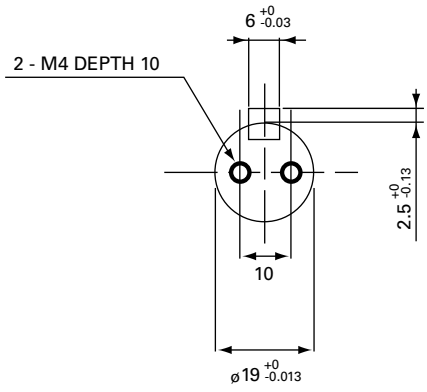
Dimensions

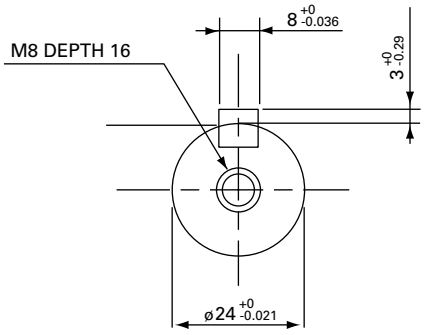
β8/3000*is*, β8/3000HV*is*,
β12/3000*is*, β12/3000HV*is*

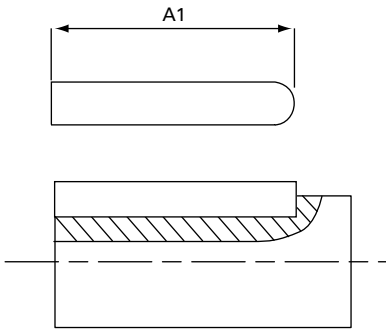




Motor







Shaft detail

β8/3000*is*
β8/3000HV*is*

β12/3000*is*
β12/3000HV*is*

Dimensions shown mm

Dimension	β8/3000*is* β8/3000HV*is*	β12/3000*is* β12/3000HV*is*
A	166	222
A with brake	191	247
A1	36	45
B	108	164
B with brake	133	189

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

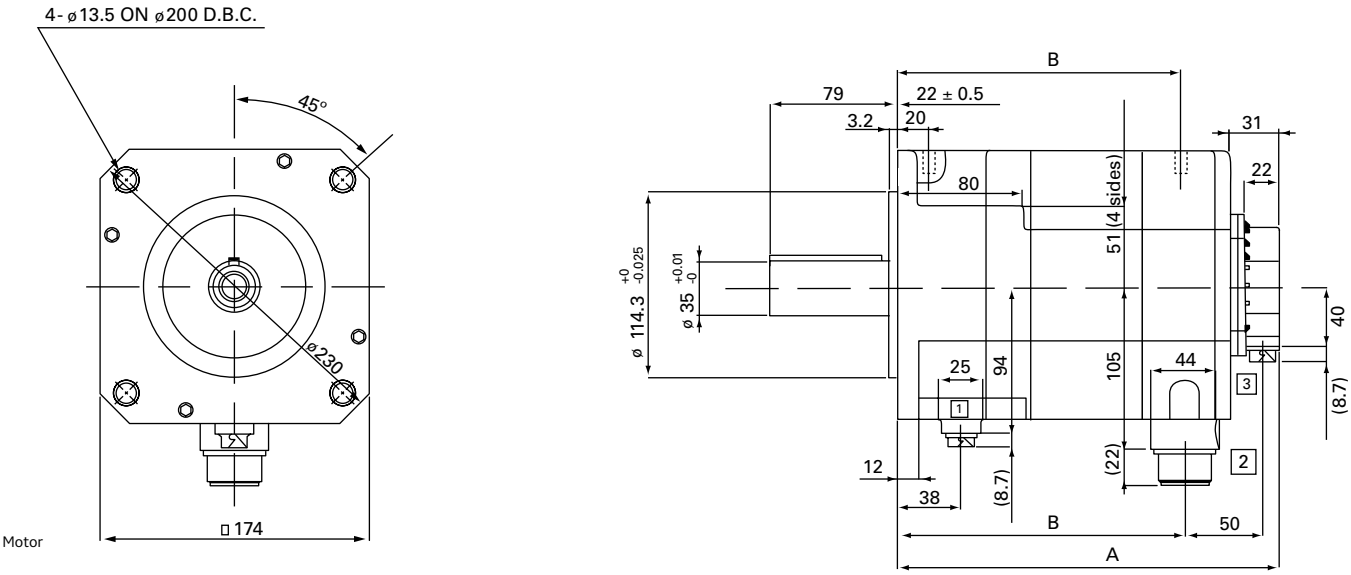
Notes

1. Shaft diameter runout = 0.02 mm max
2. Flange surface runout = 0.05 mm max
3. Maximum radial load for output shaft is 70 kgf (154 lb)

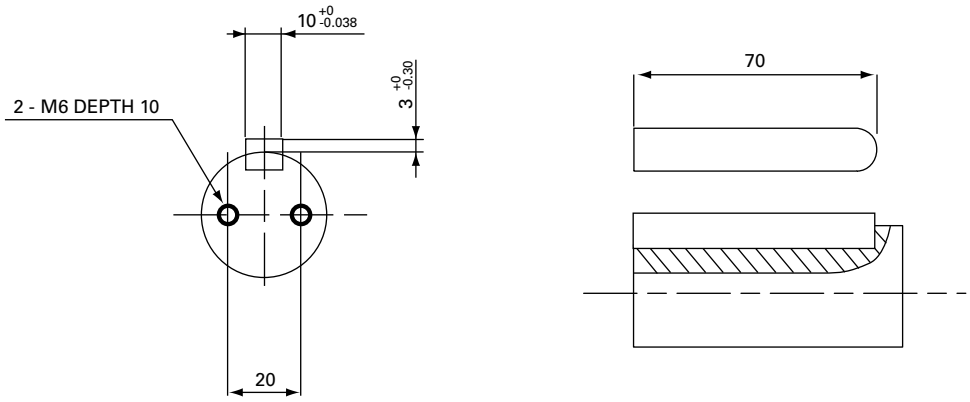
βis Servo Series Motors

Dimensions

β22/2000is, β22/2000HVis



Motor



Shaft detail

Dimensions shown mm

Dimension	β22/2000is β22/2000HVis
A	202
A with brake	243
B	141
B with brake	182

Connector	Description
1	Brake (optional)
2	Power
3	Encoder

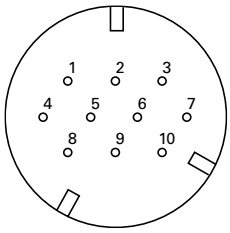
Notes

1. Shaft diameter runout = 0.03 mm max
2. Flange surface runout = 0.06 mm max
3. Maximum radial load for output shaft is 200 kgf (440 lb)

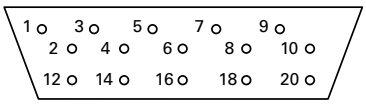
βis and βHVis Series Servo Motors

Connections

Serial Encoder Connections



All βis and βHVis Motors

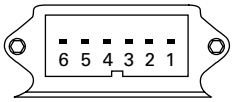


βi and βHVis Amplifier (JF1)

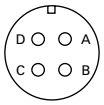
Description	βis and βHVis Motors	βi Series Amplifier JF1 Connector
N/C	2	1
N/C	1	2
RD	6	5
$\overline{RD}$	5	6
+5 VDC	8, 9	9, 20
0 VDC	7, 10	12, 14
+6 VA (battery)	4	7
Frame Ground	3	16
Cable Shield	3	16

GE Mating Motor Connector:
ZA06B-6114-K204#E (90 degree)
ZA06B-6114-K204#S (Straight)

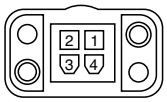
Power and Brake Connections



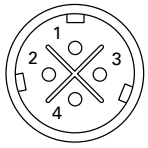
β2is and β4is Motor Power/Brake
β2HVis and β4HVis Motor Power/Brake



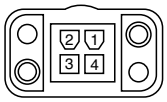
β8is, β12is and β22is Motor Power
β8HVis, β12HVis and β22HVis Motor Power



β0.4is, β0.5is and β1is Motor Power



β8is, β12is and β22is Brake
β8HVis, β12HVis and β22HVis Brake



β0.4is, β0.5is and β1is Brake

Description	β0.4is, β0.5is & β1is Motor Connector	β2is & β4is β2HVis & β4HVis Motor Connector	β8is, β12is, & β22is β8HVis, β12HVis, & β22HVis Motor Connector	βi -Series Amplifier CZ7/CZ5 Connector
Phase U	1	1	A	U
Phase V	2	2	B	V
Phase W	3	3	C	W
Earth (case)	4	4	D	PE
Brake VDC	n/a	5	n/a	n/a
Brake VDC	n/a	6	n/a	n/a

GE Mating Motor Connector:
ZA06B-6114-K220#E (90 degree) (β2is, β4is, β2HVis, β4HVis)
ZA06B-6114-K220#S (Straight) (β2is, β4is, β2HVis, β4HVis)
Z44A730464-G18 (90 degree) (β8is, β12is, β8HVis, β12HVis)
Z44A730464-G17 (Straight) (β2is, β4is, β2HVis, β4HVis)
ZA06B-6114-K230#E (β0.4is, β0.5is, β1is)
Z44A730464-G20 (90 degree) (β22is, β22HVis)
Z44A730464-G19 (Straight) (β22is, β22HVis)

Amplifier Mating Connector:
ZA06B-6130-K200 (β0.4 to β8is)
ZA06B-6110-K202#YYS (β12is, β22is, All βHVis)

Description	β0.4is, β0.5is & β1is Motor Brake Connector	β8is, β12is, & β22is β8HVis, β12HVis, & β22HVis Motor Brake Connector
Brake VDC	1	1
Brake VDC	2	2
Earth (case)	4	4

GE Mating Motor Connector:
ZA06B-6114-K213#E (90 degree) (β8is, β12is, β22is, β8HVis, β12HVis, β22HVis)
ZA06B-6114-K213#S (Straight) (β8is, β12is, β22is, β8HVis, β12HVis, β22HVis)
ZA06B-6114-K232#E (β0.4is, β0.5is, β1is)

24 VDC Brake power connections are not polarized.

β*is* Series Servo Motors

Ordering Information

Model Number	Description
ZA06B-0114-B203	β0.4/5000*is* Servo Motor
ZA06B-0114-B203#0100	β0.4/5000*is* Servo Motor, IP67 Protection
ZA06B-0114-B503	β0.4/5000*is* Servo Motor with Brake
ZA06B-0114-B503#0100	β0.4/5000*is* Servo Motor with Brake, IP67 Protection
ZA06B-0115-B203	β0.5/6000*is* Servo Motor
ZA06B-0115-B203#0100	β0.5/6000*is* Servo Motor, IP67 Protection
ZA06B-0115-B503	β0.5/6000*is* Servo Motor with Brake
ZA06B-0115-B503#0100	β0.5/6000*is* Servo Motor with Brake, IP67 Protection
ZA06B-0116-B203	β1/6000*is* Servo Motor
ZA06B-0116-B203#0100	β1/6000*is* Servo Motor, IP67 Protection
ZA06B-0116-B503	β1/6000*is* Servo Motor with Brake
ZA06B-0116-B503#0100	β1/6000*is* Servo Motor with Brake, IP67 Protection
ZA06B-0061-B203	β2/4000*is* Servo Motor
ZA06B-0061-B203#0100	β2/4000*is* Servo Motor, IP67 Protection
ZA06B-0061-B503	β2/4000*is* Servo Motor with Brake
ZA06B-0061-B503#0100	β2/4000*is* Servo Motor with Brake, IP67 Protection
ZA06B-0063-B203	β4/4000*is* Servo Motor
ZA06B-0063-B203#0100	β4/4000*is* Servo Motor, IP67 Protection
ZA06B-0063-B503	β4/4000*is* Servo Motor with Brake
ZA06B-0063-B503#0100	β4/4000*is* Servo Motor with Brake, IP67 Protection
ZA06B-0075-B203	β8/3000*is* Servo Motor
ZA06B-0075-B203#0100	β8/3000*is* Servo Motor, IP67 Protection
ZA06B-0075-B503	β8/3000*is* Servo Motor with Brake
ZA06B-0075-B503#0100	β8/3000*is* Servo Motor with Brake, IP67 Protection
ZA06B-0078-B203	β12/3000*is* Servo Motor
ZA06B-0078-B203#0100	β12/3000*is* Servo Motor, IP67 Protection
ZA06B-0078-B503	β12/3000*is* Servo Motor with Brake
ZA06B-0078-B503#0100	β12/3000*is* Servo Motor with Brake, IP67 Protection
ZA06B-0085-B203	β22/2000*is* Servo Motor
ZA06B-0085-B203#0100	β22/2000*is* Servo Motor, IP67 Protection
ZA06B-0085-B503	β22/2000*is* Servo Motor with Brake
ZA06B-0085-B503#0100	β22/2000*is* Servo Motor with Brake, IP67 Protection

βHV*is* Series Servo Motors

Ordering Information

Model Number	Description
ZA06B-0062-B203	β2/4000HV*is* Servo Motor
ZA06B-0062-B203#0100	β2/4000HV*is* Servo Motor, IP67 Protection
ZA06B-0062-B503	β2/4000HV*is* Servo Motor with Brake
ZA06B-0062-B503#0100	β2/4000HV*is* Servo Motor with Brake, IP67 Protection
ZA06B-0064-B203	β4/4000HV*is* Servo Motor
ZA06B-0064-B203#0100	β4/4000HV*is* Servo Motor, IP67 Protection
ZA06B-0064-B503	β4/4000HV*is* Servo Motor with Brake
ZA06B-0064-B503#0100	β4/4000HV*is* Servo Motor with Brake, IP67 Protection
ZA06B-0076-B203	β8/3000HV*is* Servo Motor
ZA06B-0076-B203#0100	β8/3000HV*is* Servo Motor, IP67 Protection
ZA06B-0076-B503	β8/3000HV*is* Servo Motor with Brake
ZA06B-0076-B503#0100	β8/3000HV*is* Servo Motor with Brake, IP67 Protection
ZA06B-0079-B203	β12/3000HV*is* Servo Motor
ZA06B-0079-B203#0100	β12/3000HV*is* Servo Motor, IP67 Protection
ZA06B-0079-B503	β12/3000HV*is* Servo Motor with Brake
ZA06B-0079-B503#0100	β12/3000HV*is* Servo Motor with Brake, IP67 Protection
ZA06B-0086-B203	β22/2000HV*is* Servo Motor
ZA06B-0086-B203#0100	β22/2000HV*is* Servo Motor, IP67 Protection
ZA06B-0086-B503	β22/2000HV*is* Servo Motor with Brake
ZA06B-0086-B503#0100	β22/2000HV*is* Servo Motor with Brake, IP67 Protection

Motor Cables

See applicable amplifier section for information about the proper cables to use with each motor.



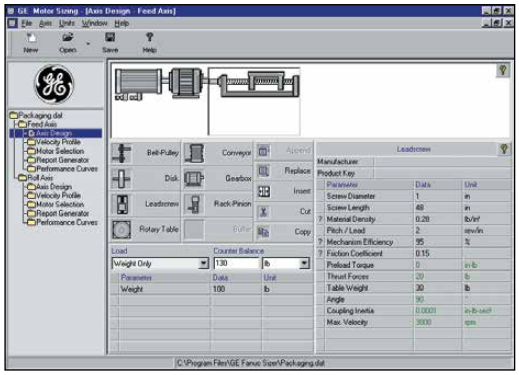
MicroMotion Expansion Unit

The MicroMotion expansion module is ideal for either Micro integrated motion control or standalone motion control over serial or Ethernet networking. The MicroMotion expansion module is loaded with features and supports a wide range of stepper and servo control. The module supports a powerful function set, with up to 256 move profiles stored on the module. MicroMotion module supports the Portable Memory device (removable Flash device) for easy program storage of the motion moves.

	IC200UMM002	IC200UMM102
Product Name	**VersaMax Micro 2 Axis Motion Module**	**VersaMax Micro 2 Axis Motion Module**
Lifecycle Status	Active	Active
Micro Type Restrictions	Micro 20, 40, 64 Support Only	Micro 20, 40, 64 Support Only
Number of Axis	2	2
Follower Mode	Axis A can follow B or Axis B can follow A within the module only.	Axis A can follow B or Axis B can follow A within the module only.
Motion Control Method	Motion commands can be controlled by Micro 20, 40, 64 or by Modbus Slave interface (RS-232 IC200USB001 or RS-485 IC200USB002) or Ethernet (IC200UEM001)	Motion commands can be controlled by Micro 20, 40, 64 or by Modbus Slave interface (RS-232 IC200USB001 or RS-485 IC200USB002) or Ethernet (IC200UEM001)
Power Voltage	24 VDC	120/240VAC
Input Voltages	line driver (5V) 24 DC	line driver (5V) 24 DC
Output Voltages	5VDC and 24VDC	5VDC and 24VDC
Max Speed	500k Pulse/s	500k Pulse/s
Number of Moves Stored on Unit	256 (non-volatile)	256 (non-volatile)
Move Types	(1) Absolute + Increment method (2) Increment method	(1) Absolute + Increment method (2) Increment method
Position Rollover	Linear, rotation	Linear, rotation
Positioning Command Unit	Pulse, µm, inch, degree, Free-form	Pulse, µm, inch, degree, Free-form
Speed Command Range	6.25 to 500k Pulse/second	6.25 to 500k Pulse/second
Acceleration and Deceleration	Liner Acc/Dec, S-shaped Acc/Dec	Liner Acc/Dec, S-shaped Acc/Dec
Dwell Time	0 to 65535 ms (1 ms unit)	0 to 65535 ms (1 ms unit)
Acc/Dec Rate	1 to 50,000,000 (pulse/s2, µm/s2, inch/s2, degree/s2)	1 to 50,000,000 (pulse/s2, µm/s2, inch/s2, degree/s2)
Backlash Correction	0 to 65,535 (pulses, µm, inch, degree, Free-form)	0 to 65,535 (pulses, µm, inch, degree, degree, Free-form)
Range	Range +2,147,463,647 to –2,147,463,648 pulses	Range +2,147,463,647 to –2,147,463,648 pulses
Pulse Output Type	(1) Pulse column [CW / CCW] (2) Clock + direction signal [CK/direction]	(1) Pulse column [CW / CCW] (2) Clock + direction signal [CK/direction]
Pulse Output Method	Line Driver Output	Line Driver Output
Operating Mode	Auto operation and manual operation	Auto operation and manual operation
Home Function	Free homing Low-speed homing High-speed homing 1 (OFF edge) High-speed homing 2 (marker stop)	Free homing Low-speed homing High-speed homing 1 (OFF edge) High-speed homing 2 (marker stop)
Manual (JOG) operation	Manual input signal or pulse output by command	Manual input signal or pulse output by command
Feedrate Override Function	1 to 100% (Speed scale rate)	1 to 100% (Speed scale rate)
High Speed Input Registration	Differential Input. Supports Windowing	Differential Input. Supports Windowing
Motion Module I/O Assignment	Inputs: A-Channel position data from encoder. (differential) B-Channel position data from encoder. (differential) Z-Channel position data from encoder. (differential) Positioning finish signal from servo driver (COIN) Home limit switch input Common for Digital Inputs Jog Forward Jog Reverse Feedrate Override Estop Drive OK/Ready Outputs: Clockwise Pulse (Pulse) (differential) Counter Clockwise Pulse (Direction) (differential)	Inputs: A-Channel position data from encoder. (differential) B-Channel position data from encoder. (differential) Z-Channel position data from encoder. (differential) Positioning finish signal from servo driver (COIN) Home limit switch input Common for Digital Inputs Jog Forward Jog Reverse Feedrate Override Estop Drive OK/Ready Outputs: Clockwise Pulse (Pulse) (differential) Counter Clockwise Pulse (Direction) (differential)
Portable Memory Module Support	Yes	Yes
I/O Bus Data Assignement	Module requires 8 words in and 8 words out. The module appears as two expansion units. A maximum of two motion modules allowed per controller. If one motion module is in system, 2 additional discrete or analog expansions can be used.	Module requires 8 words in and 8 words out. The module appears as two expansion units. A maximum of two motion modules allowed per controller. If one motion module is in system, 2 additional discrete or analog expansions can be used.
Dimensions (WxHxD) mm	150x90x76	150x90x76

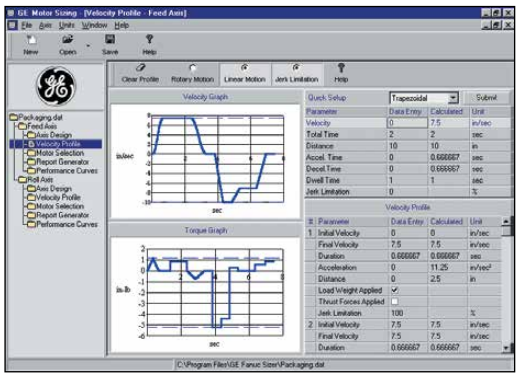
Servo Motor Sizing Software

The GE Sizer is a powerful motor selection program to assist in the selection of GE servo solutions for a broad range of user defined applications. GE Sizer is one of the most advanced motor selection programs available, providing users the flexibility to quickly define and analyze many possible system configurations in order to determine the optimum solution. Advanced features include:



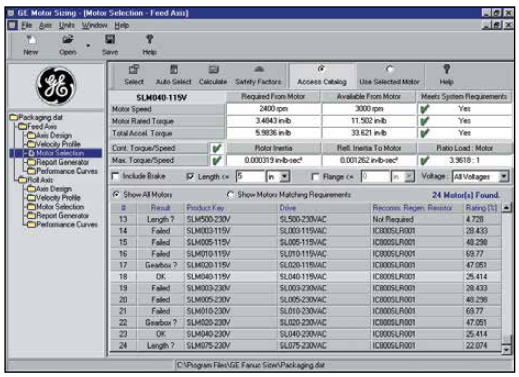
The Axis Design screen (above) is first used to define the system mechanics using graphical icons with fill-in-the-blank data tables.

- Graphical design of system mechanics and motion profiles
- Multiple axes can be analyzed and saved in one file with user defined axes names
- Flexible user defined units of measure
- Inclined loads in increments of 1 degree with user defined counterbalancing
- Graphical display of selected motor torque/speed curve with superimposed loading
- Comprehensive on-line and printed report can be exported to an MS-Word template that can be customized by the user



The Velocity Profile screen (above) is then used to define the motion profile for each axis and supports the following features:

- Quick Set-up for simple triangular or trapezoidal velocity profiles or a free form tool to define complex, multi-speed profiles
- Jerk limited or linear acceleration may be defined for each accel/decel segment
- Thrust load and application load may be defined for each motion segment allowing complex machine cycles to be quickly analyzed
- Enter or view profile data in either linear or rotary units
- Toggle jerk limiting on/off with convenient toolbar button to quickly assess impact on required peak motor torque



The Motor Selection screen (above) is used to search the database of GE motors for the optimum solution. The selection screen includes:

- Automatic selection and ranking of viable GE servo motor solutions
- User defined safety factors for torque margin, load/motor inertia ratio, etc.
- Regeneration resistor calculations automatically recommend GE resistor kit part number
- User defined motor selection criteria includes voltage, motor length and diameter, brake, inertia ratio and torque safety margin

The GE Sizer software can make short work of choosing and documenting the best GE motor solution for your motion applications. The intuitive graphical interface makes it easy to use for a novice without sacrificing the flexibility or features demanded by more experienced users.

Mark* VIeS Safety Management System 5.3
Controller Set 5.7
Discrete Input Module 5.8
Discrete Contact Output Module 5.10
Analog I/O Module 5.11
HART Enabled Analog I/O Module 5.12
Thermocouple Input Module 5.13
IONet Switch 5.14
System Power Monitoring & Distribution 5.16
Codes, Standards and Environment 5.17
Software Tools 5.18
Example Burner Management System 5.19

PAC8000 SafetyNet 5.20
SafetyNet Controller 5.23
PAC8000 Process Controllers 5.26
Workbench for SafetyNet 5.29
SafetyNet IO Modules 5.31
PAC8000 Process I/O 5.33
Discrete Input/Output Modules 5.35
Analog Input Modules 5.36
Analog Output Modules 5.43
Discrete Input Modules 5.46
Discrete Output Modules 5.51
Pulse Input Modules 5.54
Pulse/Quadrature Input Modules 5.57
Discrete HDC I/O Module 5.59
Analog Input HDC Module 5.60
Addressable Smoke and Heat Detector I/O Module . 5.61
Bus Interface Modules 5.62
Carriers and Cables 5.64
Field Terminals 5.74
PLC Adapter for Eight 6-Amp Relays 5.80
Power Supplies 5.81
System Power Supply 5.82
Bussed Field Power Supply 5.83
IS Module Power Supply 5.84
Node Services Power Supply Monitor 5.86

VersaSafe
Functional Safety Modules 5.88

Proficy Process System
Proficy Process Systems Overview 5.89
Product Selection Guide 5.92

RSTi-EP I/O
Safe Feed Input Modules 5.93

In today's world of brilliant machines, operators require high-performance automation solutions that connect their machines, data, and people while ensuring the safety and integrity of their control systems and operational infrastructure.





The fault-tolerant, IEC 61508 SIL 3 capable Mark VIeS control system reflects GE's experience of three-plus decades, four generations, and over 10,000 installed Triple Modular Redundant (TMR) systems in mission critical applications. It is a proven, robust and reliable safety system for:

- Emergency shutdown
- Fire and gas protection
- Turbo machinery control
- Critical process control
- Burner and boiler protection

Redundancy is a key feature in safety control system design that can enable online repair without interrupting the process. The unique Ethernet backbone of the Mark VIeS system enables each segment of the system to be configured with different levels of redundancy.

- Controllers: Simplex, Dual, or TMR
- IONet: Simplex, Dual, or TMR
- I/O Modules: Simplex or TMR

This provides the safety control engineer unparalleled flexibility to meet the SIL requirements for each application in the most cost effective manner. Example Simplex, Dual, and TMR system configurations are shown in following pages.

When analyzing a Safety Instrumented Function (SIF) with the exSILentia tools, functional safety standards IEC 61508 and IEC 61511 define three distinct categories of equipment:

- Sensors
- Logic solver
- Final element

The failure rate information for Mark VIeS components are incorporated into the logic solver portion of the exida safety equipment database, exSILentia.

Mark VIeS Triple Modular Redundant (TMR) Control Modes

TMR 2oo3 SIL 3 high/low demand for de-energize-to-trip
TMR 2oo3 SIL 2 low demand for energize-to-trip

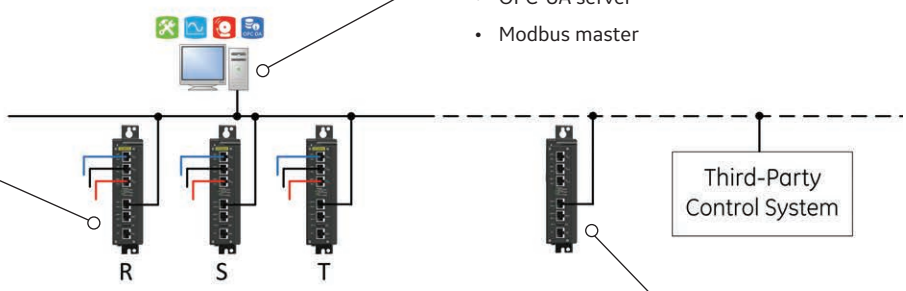
TMR Controllers

Three Mark VIeS controllers work as a set synchronizing data every frame (sweep). Each controller receives inputs on all three I/O networks, and sends output commands on a designated I/O network.

Computer-Based Gateway

Computer-based communication interface, options:

- OPC-DA server
- OPC-UA server
- Modbus master



TMR I/O Network

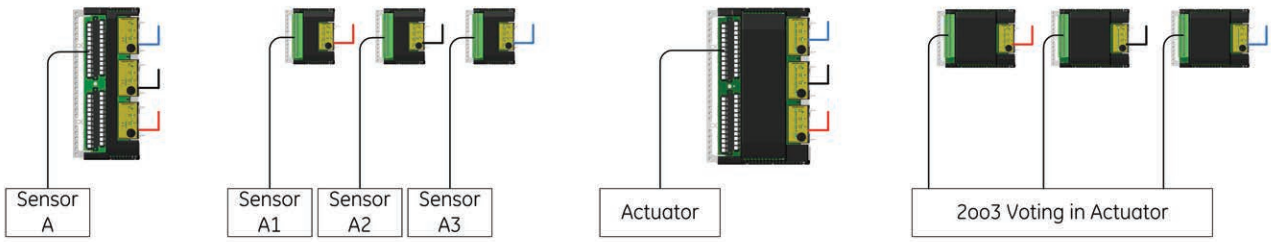
Ethernet-based TMR I/O network supports both centralized and distributed I/O modules.



Embedded Controller Gateway

Embedded controller for communication interface, options:

- OPC-UA server
- Modbus slave



TMR Fanned Input

Single discrete/analog sensor is fanned through a common terminal board to three independent input packs, 2oo3 voting is done in the controller set.

TMR Dedicated Input

Three redundant discrete/analog sensors are wired to three independent input modules, 2oo3 voting is done in the controller set.

TMR Outputs Voted on Terminal Board

The three I/O packs receive output commands from their associated controller. The common terminal board then performs 2oo3 voting on the outputs and controls the discrete actuator.

TMR Outputs Voted in Actuator

Three independent output modules receive the output command from their associated controller, then command the actuator, 2oo3 voting is done in the actuator.

TMR Notes

- Degradation sequence: [2oo3] > [1oo2] > [Fail Safe]
- 2oo3 is 2-out-of-3

Mark VIeS Dual Control Modes

Dual 1oo2 SIL 3 high/low demand for de-energize-to-trip
Dual 2oo2 SIL 2 low demand for energize and de-energize-to-trip

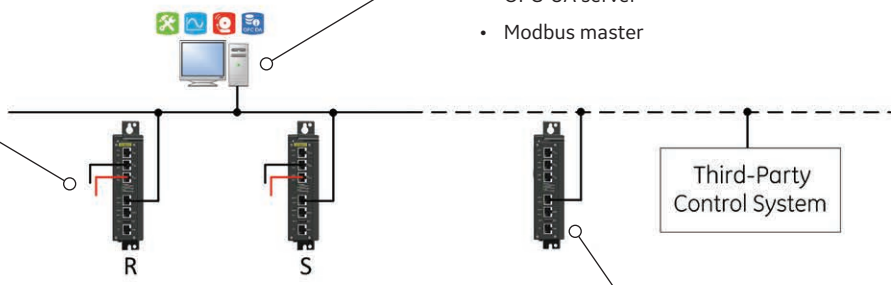
Dual Controllers

Dual Mark VIeS controllers work as a controller set synchronizing data every frame (sweep). Each controller receives inputs on both I/O networks, and sends output commands on designated I/O network.

Computer-Based Gateway

Computer-based communication interface, options:

- OPC-DA server
- OPC-UA server
- Modbus master



Dual I/O Network

Ethernet-based dual I/O network supports both centralized and distributed I/O modules.



Embedded Controller Gateway

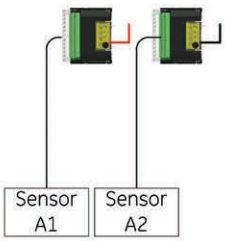
Embedded controller for communication interface, options:

- OPC-UA server
- Modbus slave



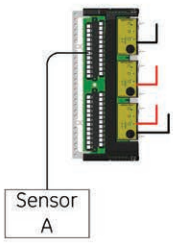
Single Sensor

Single sensor wired to a single input module with dual I/O network to controller set.



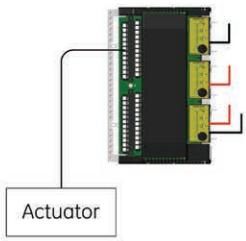
Dual Sensor

Dual sensors wired to independent input modules with independent I/O networks to controller set.



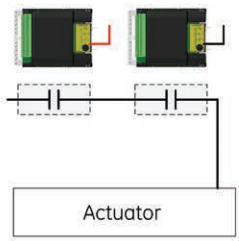
TMR Fanned Input

Single sensor is fanned through a common terminal board to three independent input packs, 2oo3 voting done in the controller set.



TMR Outputs Voted on Terminal Board

The three output packs receive an output command from the designated controller. The common terminal board then performs 2oo3 voting and controls the actuator.



1oo2 De-energize to Trip in Output Modules

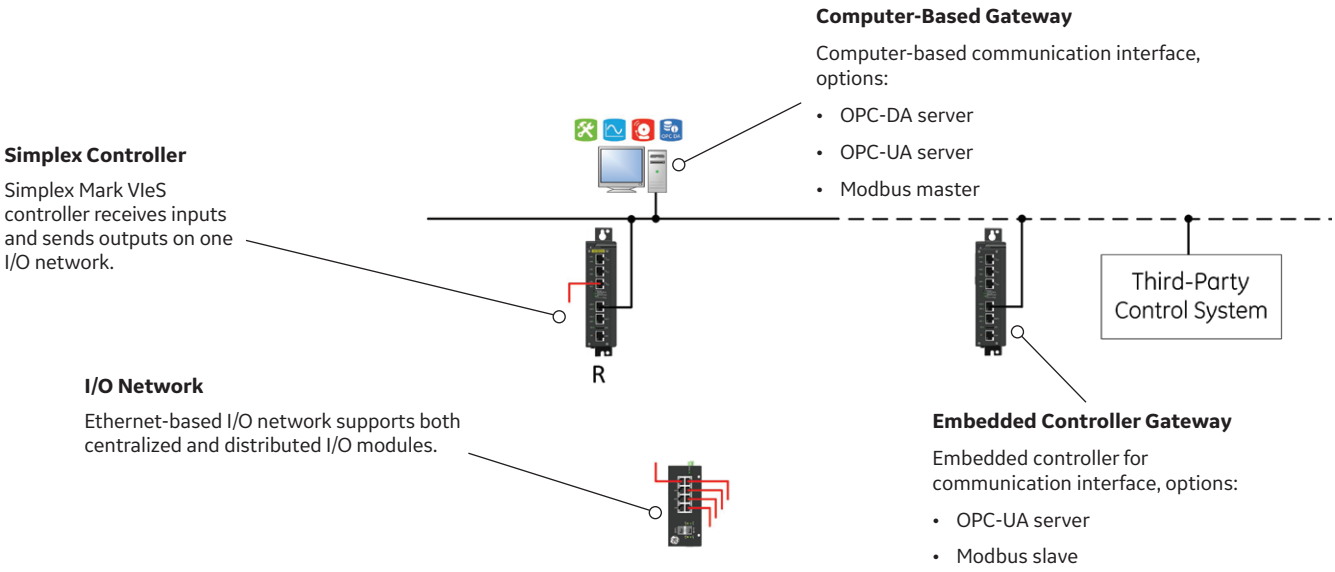
Two independent output modules receive the output command from the designated controller. The combination of the two creates a 1oo2 de-energize to trip function across the two modules.

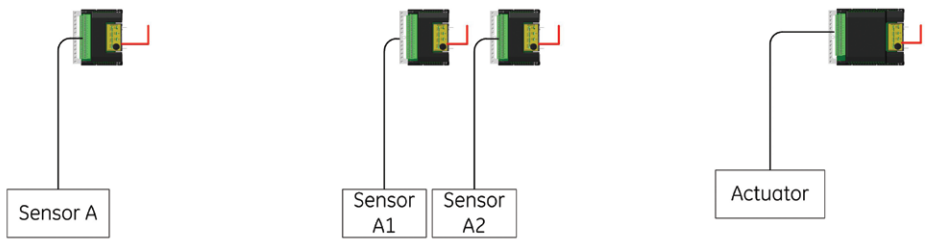
Dual Notes

- 1oo2 is 1-out-of-2; 2oo2 is 2-out-of-2

Simplex Control Mode

Simplex 1oo1 SIL 2 low demand for de-energize to trip





Single Sensor

Single sensor wired to a single input module with a simplex I/O network to the controller.

Dual Sensor

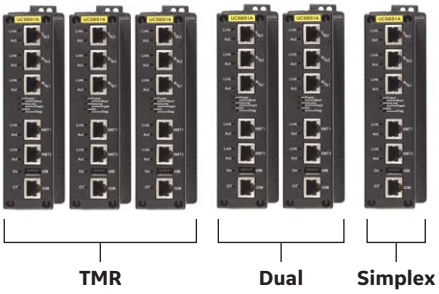
Dual sensors wired to independent input modules with a simplex I/O network to the controller.

Simplex Output

One output pack receives an output command from the controller.

Simplex Notes

- 1oo1 is 1-out-of-1



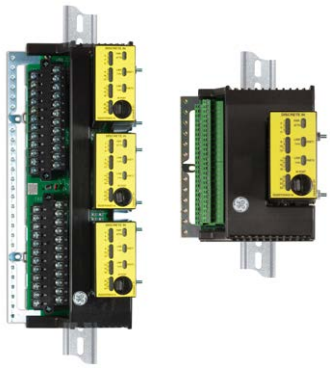
Controller Set

The controller set (UCSBS1A):

- Executes the control logic for the application
- Communicates with the I/O packs each frame
- Interfaces with the ToolboxST* application for configuration
- Interfaces with other supervisory applications through Ethernet

It can be configured in a Simplex, Dual, or Triple Modular Redundant (TMR) arrangement, based on the availability requirements for the system. In Dual and TMR configurations, synchronization of data between controllers is automatically configured and performed each frame.

	IS420UCSBS1A
Product Name	**Mark VIeS Controller (UCSB)**
Lifecycle Status	Active
Module Name	Unit Controller
Redundancy	Simplex, Dual, or Triple Modular Redundant (TMR)
Control Logic Execution (frame rate)	40 ms, 80 ms, 160 ms (synchronization across controllers included in frame rate for dual and TMR configurations)
Real-Time Clock	Includes Network Time Protocol synchronization function
Dynamic Variable Back-Up	Configuration option for each variable in system
Type of Memory Storage	256 MB DDR2 SDRAM with error correcting code (ECC), Flash-backed SRAM, NAND Flash 2 GB
Processor	600 MHz Intel EP80579
DC Power Consumption	18-32 VDC, 16.2 Watts @ 28 VDC
DC Power Connector	Micro MATE-N-Lok receptacle (AMP 1445022-3),
Primary Ethernet Interface (1 port)	CP/IP based protocol for: - Communication with ToolboxST application - Alarm related HMI data - EGD communication with WorkstationST based OPC-DA server and GE PAC systems
IONet Ethernet Interface (3 ports)	Real-time frame rate communication uses UDP based EGD protocol Configuration data uses TCP/IP based protocol
COM Port	RJ-45 connector, uses a standard 4-pair UTP cable joined with a computer null modem connector
USB Port	Initial IP address configuration, and enables backup and restore function of configuration data
Configuration Tool Support	ToolboxST application
Programming Languages Supported	Function Block Diagram (FBD), Relay Ladder Diagram (RLD)
Dimensions (H x W x D) cm (in)	3.2cm x 0.8cm x 2.5cm (8.0" x 1.9" x 6.3")
Construction - Weight	Cast aluminum - 0.9 Kg (32 oz)
Health	Visual status LEDs: Power, Boot, Online, Flash, Diagnostics
Ambient Operational Temperature Range	-30 to 65°C (-22 to 149°F)
Storage Temperature Range	-40 to 85°C (-40 to 185°F)
Relative Humidity	5% to 95%, non-condensing
Mounting	Rear mount
Spare Part	IS420UCSBS1A
Example System Capability	15 I/O modules, 102 instruction blocks, 80 ms frame rate, 91% system idle time



TMR Simplex

Discrete Input Module

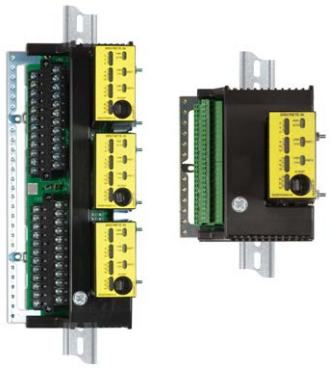
The Discrete Input module (YDIA I/O pack and terminal board) provides an interface between the discrete process sensors (24 DI) and control logic.

The module is available in both a Simplex and Triple Modular Redundant (TMR) form, based on the availability requirements for the system. In a TMR configuration, the controller performs 2-out-of-3 voting on the discrete inputs.

	IS230SCISH1A	IS230TCISH6C	IS230SCISH2A
Product Name	**Mark VIeS 24 VDC DI Mdl, Simplex**	**Mark VIeS 24 VDC DI Mdl, TMR**	**Mark VIeS 48 VDC DI Mdl, Simplex**
Lifecycle Status	Active	Active	Active
Redundancy	Simplex	TMR	Simplex
Number of Channels	24 channels per module (24 I)	24 channels per module (24 I)	24 channels per module (24 I)
Input Voltage	True at ≥ 60% of wetting voltage supplied to terminal board False at ≤ 40% of wetting voltage supplied to terminal board	True at ≥ 60% of wetting voltage supplied to terminal board False at ≤ 40% of wetting voltage supplied to terminal board	True at ≥ 60% of wetting voltage supplied to terminal board False at ≤ 40% of wetting voltage supplied to terminal board
Field Wiring Terminal Block	2-piece box style	2-piece barrier style	2-piece box style
Field Wiring	Up to 12 AWG ($3.31\ mm^2$)	Up to 12 AWG ($3.31\ mm^2$)	Up to 12 AWG ($3.31\ mm^2$)
I/O Scan Time	Configured frame rate in controller set determines scan rate for control, 1,000 Hz scan rate for sequence of events monitoring	Configured frame rate in controller set determines scan rate for control, 1,000 Hz scan rate for sequence of events monitoring	Configured frame rate in controller set determines scan rate for control, 1,000 Hz scan rate for sequence of events monitoring
Diagnostic Fault Detection	Power-up self test Loss of contact input voltage Non-responding contact input in test mode Incorrect terminal board	Power-up self test Loss of contact input voltage Non-responding contact input in test mode Incorrect terminal board	Power-up self test Loss of contact input voltage Non-responding contact input in test mode Incorrect terminal board
I/O Pack DC Power Consumption	18-32 VDC, 6.2 Watts @ 28 VDC	18-32 VDC, 6.2 Watts @ 28 VDC	18-32 VDC, 6.2 Watts @ 28 VDC
I/O Pack DC Power Connector	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)
Contact Wetting Voltage	Terminal boards provide wetting voltage function for input circuits, voltage is based on terminal board selected	Terminal boards provide wetting voltage function for input circuits, voltage is based on terminal board selected	Terminal boards provide wetting voltage function for input circuits, voltage is based on terminal board selected
Contact Wetting TB Connnector	MATE-N-Lok receptacle (AMP 350766-1)	MATE-N-Lok receptacle (AMP 350766-1)	MATE-N-Lok receptacle (AMP 350766-1)
I/O Pack Dimensions (H x W x D) cm (in)	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")
I/O Pack Construction	Aluminum case	Aluminum case	Aluminum case
I/O Pack Health	Visual status LEDs, circuit health variables available to control logic	Visual status LEDs, circuit health variables available to control logic	Visual status LEDs, circuit health variables available to control logic
Terminal Board Dimensions (H x W) cm (in)	15.9cm x 10.2cm (6.3" x 4.0")	33.0cm x 10.2cm (13.0" x 4.0")	15.9cm x 10.2cm (6.3" x 4.0")
Ambient Operational Temperature Range	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)
Storage Temperature Range	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
Mounting	DIN-rail	DIN-rail	DIN-rail
I/O Pack Spare Part Number	IS220YDIAS1A	IS220YDIAS1A	IS220YDIAS1A

Notes

- 2oo3 is 2-out-of-3



TMR Simplex

Discrete Input Module

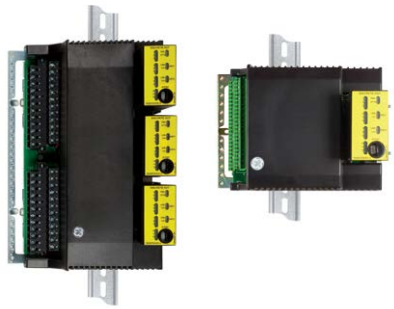
The Discrete Input module (YDIA I/O pack and terminal board) provides an interface between the discrete process sensors (24 DI) and control logic.

The module is available in both a Simplex and Triple Modular Redundant (TMR) form, based on the availability requirements for the system. In a TMR configuration, the controller performs 2-out-of-3 voting on the discrete inputs.

	IS230TCISH9C	IS230SCISH3A	IS230TCISH3C
Product Name	**Mark VIeS 48 VDC DI Mdl, TMR**	**Mark VIeS 125 VDC DI Mdl, Simplex**	**Mark VIeS 125 VDC DI Mdl, TMR**
Lifecycle Status	Active	Active	Active
Redundancy	TMR	Simplex	TMR
Number of Channels	24 channels per module (24 I)	24 channels per module (24 I)	24 channels per module (24 I)
Input Voltage	True at ≥ 60% of wetting voltage supplied to terminal board False at ≤ 40% of wetting voltage supplied to terminal board	True at ≥ 60% of wetting voltage supplied to terminal board False at ≤ 40% of wetting voltage supplied to terminal board	True at ≥ 60% of wetting voltage supplied to terminal board False at ≤ 40% of wetting voltage supplied to terminal board
Field Wiring Terminal Block	2-piece barrier style	2-piece box style	2-piece barrier style
Field Wiring	Up to 12 AWG (3.31 mm^2)	Up to 12 AWG (3.31 mm^2)	Up to 12 AWG (3.31 mm^2)
I/O Scan Time	Configured frame rate in controller set determines scan rate for control, 1,000 Hz scan rate for sequence of events monitoring	Configured frame rate in controller set determines scan rate for control, 1,000 Hz scan rate for sequence of events monitoring	Configured frame rate in controller set determines scan rate for control, 1,000 Hz scan rate for sequence of events monitoring
Diagnostic Fault Detection	Power-up self test Loss of contact input voltage Non-responding contact input in test mode Incorrect terminal board	Power-up self test Loss of contact input voltage Non-responding contact input in test mode Incorrect terminal board	Power-up self test Loss of contact input voltage Non-responding contact input in test mode Incorrect terminal board
I/O Pack DC Power Consumption	18-32 VDC, 6.2 Watts @ 28 VDC	18-32 VDC, 6.2 Watts @ 28 VDC	18-32 VDC, 6.2 Watts @ 28 VDC
I/O Pack DC Power Connector	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)
Contact Wetting Voltage	Terminal boards provide wetting voltage function for input circuits, voltage is based on terminal board selected	Terminal boards provide wetting voltage function for input circuits, voltage is based on terminal board selected	Terminal boards provide wetting voltage function for input circuits, voltage is based on terminal board selected
Contact Wetting TB Connnector	MATE-N-Lok receptacle (AMP 350766-1)	MATE-N-Lok receptacle (AMP 350766-1)	MATE-N-Lok receptacle (AMP 350766-1)
I/O Pack Dimensions (H x W x D) cm (in)	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")
I/O Pack Construction	Aluminum case	Aluminum case	Aluminum case
I/O Pack Health	Visual status LEDs, circuit health variables available to control logic	Visual status LEDs, circuit health variables available to control logic	Visual status LEDs, circuit health variables available to control logic
Terminal Board Dimensions (H x W) cm (in)	33.0cm x 10.2cm (13.0" x 4.0")	15.9cm x 10.2cm (6.3" x 4.0")	33.0cm x 10.2cm (13.0" x 4.0")
Ambient Operational Temperature Range	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)
Storage Temperature Range	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
Mounting	DIN-rail	DIN-rail	DIN-rail
I/O Pack Spare Part Number	IS220YDIAS1A	IS220YDIAS1A	IS220YDIAS1A

Notes

- 2oo3 is 2-out-of-3



TMR Simplex

Discrete Contact Output Module

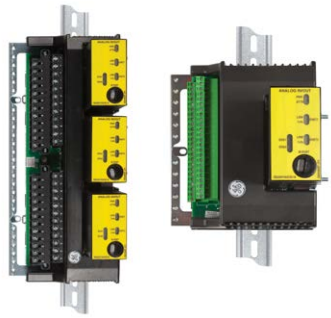
The contact output module (YDOA I/O pack and terminal board) provides an interface between control logic the discrete process actuators (12 DQ).

The module is available in both a Simplex and Triple Modular Redundant (TMR) form, based on the availability requirements for the system. In a TMR configuration, the terminal block performs 2-out-of-3 voting on the discrete outputs.

	IS230SRLSH1A	IS230TRLSH2B	IS230TRLSH1F	IS230TRLSH2F
Product Name	**Mark VIeS Form C Cntct DQ Mdl, Simplex**	**Mark VIeS Form C Cntct DQ Mdl, TMR**	**Mark VIeS Form A Cntct DQ Mdl, TMR**	**Mark VIeS Form B Cntct DQ Mdl, TMR**
Lifecycle Status	Active	Active	Active	Active
Redundancy - Terminal Board	Simplex Form C - 12 Ch SRLYS2A	TMR / Simplex Form C - 12 Ch TRLYS1B	TMR Voted Form A TRLYS1F	TMR Voted Form B TRLYS2F
Number of Channels	12	12	12	12
Output Voltage	24-125 VDC, or 115/230 VAC	24-125 VDC, or 115/230 VAC	24-125 VDC, or 115/230 VAC	24-125 VDC, or 115/230 VAC
Maximum Load Current	0.6 A @ 125 VDC 1.2 A @ 48 VDC 3.15 A @ 24 VDC 3.15 A @ 120/240 VAC	0.6 A @ 125 VDC 3.0 A @ 24 VDC 3.0 A @ 115/230 VAC, 50/60 Hz 6 A @ 115 VAC for relay 12	0.5 A resistive @ 100/125 VDC 5.0 A resistive @ 24 VDC 5.0 A resistive @ 115 VAC	0.5 A resistive @ 100/125 VDC 5.0 A resistive @ 24 VDC 5.0 A resistive @ 115 VAC
Form of Outputs	Ch 1-12, dry contact	Ch 1-6, optional output power (terminal block) Ch 7-12, dry contact	Ch 1-12, dry contact	Ch 1-12, dry contact
Field Wiring Terminal Block	2-piece box style	2-piece barrier style	2-piece barrier style	2-piece barrier style
Field Wiring	Up to 12 AWG (3.31 mm^2)	Up to 12 AWG (3.31 mm^2)	Up to 12 AWG (3.31 mm^2)	Up to 12 AWG (3.31 mm^2)
I/O Pack Response Time	From IONet command received to transition of relay typically 6 ms	From IONet command received to transition of relay typically 6 ms	From IONet command received to transition of relay typically 6 ms	From IONet command received to transition of relay typically 6 ms
Sequence of Events (SOE) Function	Each output can be configured to report operation in the SOE function	Each output can be configured to report operation in the SOE function	Each output can be configured to report operation in the SOE function	Each output can be configured to report operation in the SOE function
Diagnostic Fault Detection	Power-up self test Continuous monitoring of internal power supplies Check of match between terminal board and I/O pack Comparison of commanded state of each output and feedback on terminal board Terminal board diagnostics based on type	Power-up self test Continuous monitoring of internal power supplies Check of match between terminal board and I/O pack Comparison of commanded state of each output and feedback on terminal board Terminal board diagnostics based on type	Power-up self test Continuous monitoring of internal power supplies Check of match between terminal board and I/O pack Comparison of commanded state of each output and feedback on terminal board Terminal board diagnostics based on type	Power-up self test Continuous monitoring of internal power supplies Check of match between terminal board and I/O pack Comparison of commanded state of each output and feedback on terminal board Terminal board diagnostics based on type
I/O Pack DC Power Consumption	18-32 VDC, 4.2 Watts @ 28 VDC	18-32 VDC, 4.2 Watts @ 28 VDC	18-32 VDC, 4.2 Watts @ 28 VDC	18-32 VDC, 4.2 Watts @ 28 VDC
I/O Pack DC Power Connector	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)
I/O Pack Dimensions (H x W x D) cm (in)	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")
I/O Pack Construction	Aluminum case	Aluminum case	Aluminum case	Aluminum case
I/O Pack Health	Visual status LEDs, circuit health variables available to control logic	Visual status LEDs, circuit health variables available to control logic	Visual status LEDs, circuit health variables available to control logic	Visual status LEDs, circuit health variables available to control logic
Terminal Board Dimensions (H x W) cm (in)	15.9cm x 17.8cm (6.3" x 7.0")	33.0cm x 17.8cm (13.0" x 7.0")	33.0cm x 17.8cm (13.0" x 7.0")	33.0cm x 17.8cm (13.0" x 7.0")
Ambient Operational Temperature Range	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)
Storage Temperature Range	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
Mounting	DIN-rail	DIN-rail	DIN-rail	DIN-rail
I/O Pack Spare Part Number	IS220YDOAS1A	IS220YDOAS1A	IS220YDOAS1A	IS220YDOAS1A

Notes

- 2oo3 is 2-out-of-3



TMR Simplex

Analog I/O Module

The Analog I/O module (YAIC I/O pack and terminal board) provides an interface between the process analog sensors/actuators (10 AI, 2 AQ) and control logic.

The module is available in both a Simplex and Triple Modular Redundant (TMR) form, based on the availability requirements for the system. In a TMR configuration, the controller performs 2-out-of-3 voting on the analog inputs and the terminal board selects the median signal from the three I/O packs.

	IS230SAISH1A	IS230TAISH2C
Product Name	**Mark VIeS Analog I/O Mdl, Simplex**	**Mark VIeS Analog I/O Mdl, TMR**
Lifecycle Status	Active	Active
Redundancy	Simplex - Analog I/O	TMR - Analog I/O
Number of Channels	12 channels per module (10 AI, 2 AQ)	12 channels per module (10 AI, 2 AQ)
AI Span	AI 1-8: 1 - 5 VDC, ±5 VDC, ±10 VDC, 0-20 mA AI 9-10: 0-20 mA, ±1 mA	AI 1-8: 1 - 5 VDC, ±5 VDC, ±10 VDC, 0-20 mA AI 9-10: 0-20 mA, ±1 mA
AI Converter Resolution	16-bit A/D Converter	16-bit A/D Converter
I/O Scan Time	5 ms	5 ms
AI Accuracy	0.1% of full scale over the full operating temperature range.	0.1% of full scale over the full operating temperature range.
AI Noise Suppression	Hardware filter with single pole down break at 500 rad/s Software filter using a two pole low pass filter is configurable for: 0.75, 1.5 Hz, 3 Hz, 6 Hz, 12 Hz	Hardware filter with single pole down break at 500 rad/s Software filter using a two pole low pass filter is configurable for: 0.75, 1.5 Hz, 3 Hz, 6 Hz, 12 Hz
AI Common Mode Rejection	AC CMR 60 dB at 60 Hz, with up to ±5 V common mode voltage DC CMR 80 dB with -5 to +7 peak V common mode voltage	AC CMR 60 dB at 60 Hz, with up to ±5 V common mode voltage DC CMR 80 dB with -5 to +7 peak V common mode voltage
AI Common Mode Voltage Range	±5 V (±2 V CMR for the ±10 V inputs)	±5 V (±2 V CMR for the ±10 V inputs)
Field Wiring Terminal Block	2-piece box style	2-piece barrier style
Field Wiring	Up to 12 AWG (3.31 mm^2)	Up to 12 AWG (3.31 mm^2)
AQ Converter	14-bit D/A converter with 0.5% accuracy	14-bit D/A converter with 0.5% accuracy
AQ Load	800 Ohms for 4-20 mA output	800 Ohms for 4-20 mA output
Diagnostic Fault Detection	A power-up self-test Continuous monitoring of the internal power supplies Check of match between terminal board and I/O pack Hardware limit checking based on configurable high and low levels for 4-20 mA inputs Health of the digital to analog output converter circuits Health of analog output suicide relay is continuously monitored	A power-up self-test Continuous monitoring of the internal power supplies Check of match between terminal board and I/O pack Hardware limit checking based on configurable high and low levels for 4-20 mA inputs Health of the digital to analog output converter circuits Health of analog output suicide relay is continuously monitored
I/O Pack DC Power Consumption	18-32 VDC, 9.7 Watts Maximum @ 28 VDC	18-32 VDC, 9.7 Watts Maximum @ 28 VDC
I/O Pack DC Power Connector	Micro MATE-N-Lok receptacle (AMP 1445022-3)	Micro MATE-N-Lok receptacle (AMP 1445022-3)
I/O Pack Dimensions (H x W x D) cm (in)	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")
I/O Pack Construction	Aluminum case	Aluminum case
I/O Pack Health	Visual status LEDs, AI and AQ circuit health variables available to control logic	Visual status LEDs, AI and AQ circuit health variables available to control logic
Terminal Board Power Consumption	5.6 Watts	5.6 Watts
Terminal Board Dimensions (H x W) cm (in)	15.9cm x 10.2cm (6.3" x 4.0")	33.0cm x 10.2cm (13.0" x 4.0")
Ambient Operational Temperature Range	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)
Storage Temperature Range	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
Mounting	DIN-rail	DIN-rail
I/O Pack Spare Part Number	IS220YAICS1A	IS220YAICS1A

Notes

- 2oo3 is 2-out-of-3

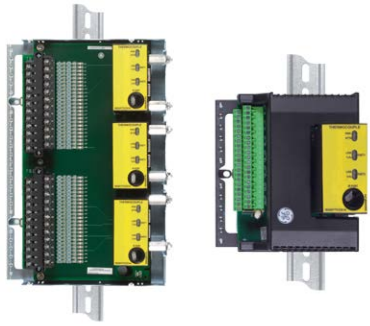


HART Enabled Analog I/O Module

The Highway Addressable Remote Transducer (HART) Enabled Analog I/O module (YHRA I/O pack and terminal board) provides an interface between the process analog sensors/ actuators (10 AI, 2 AQ) and control logic. Additionally, 4-20 mA input or output circuit can relay HART messages between a HART enabled field device and an Asset Management system.

At the I/O module level it operates in Simplex, however it can interface with either a Simplex, Dual, or Triple Modular Redundant (TMR) controller set.

	IS230SHRSH1A
Product Name	**Mark VIeS HART Enabled Analog I/O Mdl, Simplex**
Lifecycle Status	Active
Module Name	HART Enabled Analog I/O, Simplex
I/O Circuit Redundancy	Simplex at I/O level, can interoperate with TMR controllers
Number of Channels	12 channels per module (10 AI, 2 AQ)
AI Span	AI 1-8: 1 - 5 VDC, ±5 VDC, ±10 VDC, 0-20 mA AI 9-10: 0-20 mA, ±1 mA
Field Wiring Terminal Block	2-piece box style
Field Wiring	Up to 12 AWG (3.31 mm^2)
AI Converter Resolution	16-bit A/D Converter
I/O Scan Time	5 ms
AI Accuracy	0.1% of full scale over the full operating temperature range.
AI Noise Suppression	Hardware filter with single pole down break at 500 rad/s Software filter using a two pole low pass filter is configurable for: 0.75, 1.5 Hz, 3 Hz, 6 Hz, 12 Hz
AI Common Mode Rejection	AC CMR 60 dB at 60 Hz, with up to ±5 V common mode voltage DC CMR 80 dB with -5 to +7 peak V common mode voltage
AI Common Mode Voltage Range	±5 V (±2 V CMR for the ±10 V inputs)
AQ Converter	14-bit D/A converter with 0.5% accuracy
AQ Load	800 Ohms for 4-20 mA output
Diagnostic Fault Detection	A power-up self-test Continuous monitoring of the internal power supplies Check of match between terminal board and I/O pack Hardware limit checking based on configurable high and low levels for 4-20 mA inputs Health of the digital to analog output converter circuits Health of analog output suicide relay is continuously monitored
DC Power Consumption	18-32 VDC, 7.2 Watts @ 28 VDC
I/O Pack Dimensions (H x W x D) cm (in)	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")
I/O Pack Construction	Aluminum case
I/O Pack Health	Visual status LEDs, AI and AQ circuit health variables available to control logic
Terminal Board Dimensions (H x W) cm (in)	15.9cm x 17.8cm (6.3" x 7.0")
Terminal Board Power Consumption	5.6 Watts
Ambient Operational Temperature Range	-30 to 65°C (-22 to 149°F)
Storage Temperature Range	-40 to 85°C (-40 to 185°F)
Mounting	DIN-rail
I/O Pack Spare Part Number	IS220YHRAS1A



TMR Simplex

Thermocouple Input Module

The Thermocouple Input module (YTCC I/O pack and terminal board) provides an interface between the process thermocouples (12 AI) and control logic.

The module is available in both a Simplex and Triple Modular Redundant (TMR) form, based on the availability requirements for the system. In a TMR configuration, the controller performs 2-out-of-3 voting on the inputs.

	IS230STCSH1A	IS230TTCSH3B
Product Number	**Mark VIeS Thermocouple Input Mdl, Simplex**	**Mark VIeS Thermocouple Input Mdl, TMR**
Lifecycle Status	Active	Active
Redundancy	Simplex - T/C Input	TMR - T/C Input
Number of Channels	12 channels per module (12 AI)	12 channels per module (12 AI)
Thermocouple Types	E, J, K, S, T thermocouples, and mV inputs	E, J, K, S, T thermocouples, and mV inputs
Field Wiring Terminal Block	2-piece box style	2-piece barrier style
Field Wiring	Up to 12 AWG (3.31 mm^2)	Up to 12 AWG (3.31 mm^2)
Span	-8 mV to +45 mV	-8 mV to +45 mV
Converter Resolution	16-bit A/D Converter	16-bit A/D Converter
Cold Junction Compensation	Reference junction temperature measured in each module TMR board has three cold junction references	Reference junction temperature measured in each module TMR board has three cold junction references
Cold Junction Temperature Accuracy	1.1°C (2°F)	1.1°C (2°F)
Conformity (max software) Error	0.14°C (0.25°F)	0.14°C (0.25°F)
Measurement Accuracy	53 microvolt (excluding cold junction reading). Example: For type K, at 1000°F, including cold junction contribution, RSS error= 3°F	53 microvolt (excluding cold junction reading). Example: For type K, at 1000°F, including cold junction contribution, RSS error= 3°F
Common Mode Rejection	AC CMR 110 dB 50/60 Hz, for balanced impedance input. Both hardware and firmware filtering	AC CMR 110 dB 50/60 Hz, for balanced impedance input. Both hardware and firmware filtering
Common Mode Voltage	±5 volts	±5 volts
Normal Mode Rejection	Rejection of 250 mV rms at 50/60 Hz, ±5%, Both hardware and firmware filtering provides a total of 80 dB NMRR	Rejection of 250 mV rms at 50/60 Hz, ±5%, Both hardware and firmware filtering provides a total of 80 dB NMRR
Scan Time	All inputs are sampled at up to 120 times per second per input	All inputs are sampled at up to 120 times per second per input
Fault Detection	High/low (hardware) limit check High/low system (software) limit check Monitor readings from TCs, CJs, calibration voltages, and calibration zero readings	High/low (hardware) limit check High/low system (software) limit check Monitor readings from TCs, CJs, calibration voltages, and calibration zero readings
DC Power Consumption	18-32 VDC, 4.2 Watts @ 28 VDC	18-32 VDC, 4.2 Watts @ 28 VDC
I/O Pack Dimensions (H x W x D) cm (in)	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")	8.3cm x 4.2cm x 12.1cm (3.3" x 1.7" x 4.8")
I/O Pack Construction	Aluminum case	Aluminum case
I/O Pack Health	Visual status LEDs, AI circuit health variables available to control logic	Visual status LEDs, AI circuit health variables available to control logic
Terminal Board Dimensions (H x W) cm (in)	15.9cm x 10.2cm (6.3" x 4.0")	33.0cm x 17.8cm (13.0" x 7.0")
Ambient Operational Temperature Range	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)
Storage Temperature Range	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
Mounting	DIN-rail	DIN-rail
I/O Pack Spare Part Number	IS220YTCCS1A	IS220YTCCS1A

Notes

- 2oo3 is 2-out-of-3





IONet Switch

GE's product line of industrial Ethernet 10/100 switches (ESWx) is designed specifically to meet the needs of real-time industrial control solutions. To meet the requirements for speed and functionality, the following features are provided:

- 802.3, 802.3u, and 802.3x compatibility
- 10/100 base copper with auto negotiation
- Full/half duplex auto-negotiation
- 100 Mbps FX uplink port
- HP-MDIX auto sensing
- LEDs for Link Presence, Activity and Duplex, and Speed per port (each LED has two colors)
- Minimum 256 KB buffer with 4K media access control (MAC) addresses

	IS420ESWAH3A	IS420ESWBH3A	IS420ESWAH1A
Product Name	**Mark VIe IONet Switch, 8-port 10/100 copper**	**Mark VIe IONet Switch, 16-port 10/100 copper**	**Mark VIe IONet Switch, 8-port 10/100 copper, 1-port 100 fiber**
Lifecycle Status	Active	Active	Active
Mounting	The switch enclosure can be panel mounted (switch mounts to rear wall of panel with bracket) or DIN-rail mounted. DIN-rail mounting meets vibration and shock specifications. User connections are freely accessible with both mounting types.	The switch enclosure can be panel mounted (switch mounts to rear wall of panel with bracket) or DIN-rail mounted. DIN-rail mounting meets vibration and shock specifications. User connections are freely accessible with both mounting types.	The switch enclosure can be panel mounted (switch mounts to rear wall of panel with bracket) or DIN-rail mounted. DIN-rail mounting meets vibration and shock specifications. User connections are freely accessible with both mounting types.
Dimensions (H x W x D) cm (in)	5.6cm x 14.0cm x 8.6cm (2.2" x 5.5" x 3.4")	5.6cm x 18.8cm x 8.6cm (2.2" x 7.4" x 3.4")	5.6cm x 14.0cm x 8.6cm (2.2" x 5.5" x 3.4")
Incoming Power Connection	Supports two redundant diode-OR'd power supply inputs of 18 to 36 VDC	Supports two redundant diode-OR'd power supply inputs of 18 to 36 VDC	Supports two redundant diode-OR'd power supply inputs of 18 to 36 VDC
Cooling	Convection cooled when mounted vertically or horizontally	Convection cooled when mounted vertically or horizontally	Convection cooled when mounted vertically or horizontally
Ambient Temperature Range	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)
Absolute Maximum Current	< 1.0 A	< 1.0 A	< 1.0 A
Copper Cables	Category 5e cable with 8P8C (RJ-45) modular connectors	Category 5e cable with 8P8C (RJ-45) modular connectors	Category 5e cable with 8P8C (RJ-45) modular connectors
DC Power	7.7 Watts @ 28 VDC, 2-piece terminal block	7.7 Watts @ 28 VDC, 2-piece terminal block	7.7 Watts @ 28 VDC, 2-piece terminal block



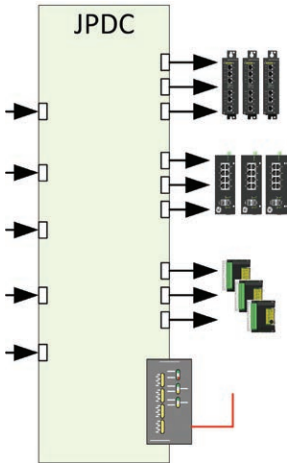


IONet Switch

GE's product line of industrial Ethernet 10/100 switches (ESWx) is designed specifically to meet the needs of real-time industrial control solutions. To meet the requirements for speed and functionality, the following features are provided:

- 802.3, 802.3u, and 802.3x compatibility
- 10/100 base copper with auto negotiation
- Full/half duplex auto-negotiation
- 100 Mbps FX uplink port
- HP-MDIX auto sensing
- LEDs for Link Presence, Activity and Duplex, and Speed per port (each LED has two colors)
- Minimum 256 KB buffer with 4K media access control (MAC) addresses

	IS420ESWAH2A	IS420ESWBH1A	IS420ESWBH2A
Product Name	**Mark VIe IONet Switch, 8-port 10/100 copper, 2-port 100 fiber**	**Mark VIe IONet Switch, 16-port 10/100 copper, 1-port 100 fiber**	**Mark VIe IONet Switch, 16-port 10/100 copper, 2-port 100 fiber**
Lifecycle Status	Active	Active	Active
Mounting	The switch enclosure can be panel mounted (switch mounts to rear wall of panel with bracket) or DIN-rail mounted. DIN-rail mounting meets vibration and shock specifications. User connections are freely accessible with both mounting types.	The switch enclosure can be panel mounted (switch mounts to rear wall of panel with bracket) or DIN-rail mounted. DIN-rail mounting meets vibration and shock specifications. User connections are freely accessible with both mounting types.	The switch enclosure can be panel mounted (switch mounts to rear wall of panel with bracket) or DIN-rail mounted. DIN-rail mounting meets vibration and shock specifications. User connections are freely accessible with both mounting types.
Dimensions (H x W x D) cm (in)	5.6cm x 14.0cm x 8.6cm (2.2" x 5.5" x 3.4")	5.6cm x 18.8cm x 8.6cm (2.2" x 7.4" x 3.4")	5.6cm x 18.8cm x 8.6cm (2.2" x 7.4" x 3.4")
Incoming Power Connection	Supports two redundant diode-OR'd power supply inputs of 18 to 36 VDC	Supports two redundant diode-OR'd power supply inputs of 18 to 36 VDC	Supports two redundant diode-OR'd power supply inputs of 18 to 36 VDC
Cooling	Convection cooled when mounted vertically or horizontally	Convection cooled when mounted vertically or horizontally	Convection cooled when mounted vertically or horizontally
Ambient Temperature Range	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)	-30 to 65°C (-22 to 149°F)
Absolute Maximum Current	< 1.0 A	< 1.0 A	< 1.0 A
Copper Cables	Category 5e cable with 8P8C (RJ-45) modular connectors	Category 5e cable with 8P8C (RJ-45) modular connectors	Category 5e cable with 8P8C (RJ-45) modular connectors
DC Power	7.7 Watts @ 28 VDC, 2-piece terminal block	7.7 Watts @ 28 VDC, 2-piece terminal block	7.7 Watts @ 28 VDC, 2-piece terminal block



System Power Monitoring & Distribution

The JPDC power distribution module with PPDA I/O pack provides a power monitoring and distribution function in small system configurations. A set of Mate-N-Lok connectors with associated fusing are provided for the distribution of DC/AC power sources to the Mark VIeS system components and field devices.

The PPDA I/O pack is tied into one or two IONets, providing variable feedback to the controller on the health of each power source and fuse status.

	IS220PPDAH1A, IS2020JPDCG01
Product Name	**Mark VIeS Small System Power Monitoring & Distribution Module (JPDC)**
Lifecycle Status	Active
28 VDC Power Distribution for System Components	28 VDC input for R channel components (JR), 9-pin Mate-N-Lok connector 28 VDC input for S channel components (JS), 9-pin Mate-N-Lok connector 28 VDC input for T channel components (JT), 9-pin Mate-N-Lok connector TMR controller power feeds (JCR, JCS, JCT), 2-pin Mate-N-Lok connector TMR IONet switch power feeds (JRS, JSS, JTS), 2-pin Mate-N-Lok connector I/O pack power feeds (JR1-10, JS1-8, JT1-8), 2-pin mini-Mate-N-Lok connector 5-screw terminal board (TP1) for daisy chaining power distribution boards Branch circuit power feeds to JPDL and JPDP (JP1, J2)
AC Power Input for Field Devices (Sensors and Actuators)	100-250 VAC input (JAC), 12.5 amps rms max, 3-pin Mate-N-Lok connector Fuse (10 A) protected output with manual toggle switch (JAC1), 3-pin Mate-N-Lok connector Fuse (10 A) protected output with no manual switch (JAC2), 3-pin Mate-N-Lok connector
125 VDC Power Monitoring & Distribution	125 VDC battery inputs (JD1, JD2), 4-pin Mate-N-Lok connector, 20 A maximum 125 VDC DC power supply (DACA) input (JZ2), 12-pin Mate-N-Lok connector, 10 A maximum 125 VDC outputs (J1R, J1S, J1T) for 125 VDC / 28 VDC external power supplies to feed JPDC with 28 VDC power, 2-pin Mate-N-Lok connector 125 VDC outputs (J7A, J7B, J7C) for feed to power actuators, 10 A fuse protected, 2-pin Mate-N-Lok connector 125 VDC outputs (J8A, J8B, J8C) for feed to power sensors, 3.15 A fuse protected, 2-pin Mate-N-Lok connector
PPDA Status LEDs	28 VDC bus for R, S, and T channel components in regulation 28 VDC source for R, S, and T channel OK 125 VDC battery OK 125 VDC bus feeds OK AC input 1, 2 OK Fault LED, application driven
PPDA Variables	PPDA fault (L3DIAG) I/O Link OK 28 VDC supply OK 28 VDC bus for R, S, and T channel components in regulation 28 VDC source for R, S, and T channel OK 125 VDC battery OK AC input 1, 2 OK Status on each fuse group, qty. 8 variables
I/O Pack Spare Part Number	IS220PPDAH1A

Codes, Standards and Environment

Industry Codes and Standards

IEC 61508 : 2010 Parts 1-7
EN50402:2005+A1:2008 Logic Solver

CAN/CSA-C22.2 No. 61010-1-12
UL Std. No. 61010-1 (3rd Edition)
EN 61010-1 (3rd edition)

Achilles Level 1 certification, controller security

Temperature Considerations

Mark VIeS electronics can be I/O packaged in a variety of different configurations and designed for different environmental conditions. Proper thermal considerations for active electronics with heat sensitive components must be considered for electronics I/O packaging. For internal enclosed design considerations, all components have an ambient temperature rating of -30 to 65°C (-22 to 149 °F). The allowable temperature change without condensation is ±15°C (59 °F) per hour. It is recommended that the environment be maintained at levels less than the maximum rating of the equipment to maximize product life expectancy.

I/O packaging the equipment and selecting an appropriate enclosure to maintain the desired temperature is a function of the following:

- Internal heat dissipation from the assemblies
- Outside ambient temperature
- Cooling system (if used)

Humidity

The ambient humidity range is 5 to 95% non-condensing. This exceeds EN50178.

Elevation

Equipment elevation is related to the equivalent ambient air pressure:

- Normal operation: 0 to 1000 m (0 to 3280.8 ft, 101.3 to 89.8 kPa)
- Extended operation: 1000 to 3050 m (3280.8 to 10006.5 ft, 89.8 to 69.7 kPa)
- Shipping: 4600 m (15091.8 ft, 57.2 kPa) maximum



Software Tools

There are several Windows® based software tools associated with the Mark VIeS system. A summary of the more frequently used applications is provided below.



The ToolboxST application features include:

- System component (controllers, I/O packs, WorkstationST) layout and configuration
- Configure, edit, and view real-time controller application code
- Ethernet Global Data (EGD) editor
- Component diagnostics
- Password protection



The Trender application is used to capture both real-time and historical data for display in graphical form. Several forms of data collection are supported for a wide range of resolution. Trigger configured data collections are also supported.



The Alarm View application displays and manages live and historical alarm and event information. Alarm and event information is displayed in tabular form with advanced filtering and sorting capabilities. Common functions provided around the process alarms/events include:

- Acknowledging Alarms
- Locking Alarms
- Silencing Alarms
- Sequence of Events (SOE)
- Component Diagnostic Alarms



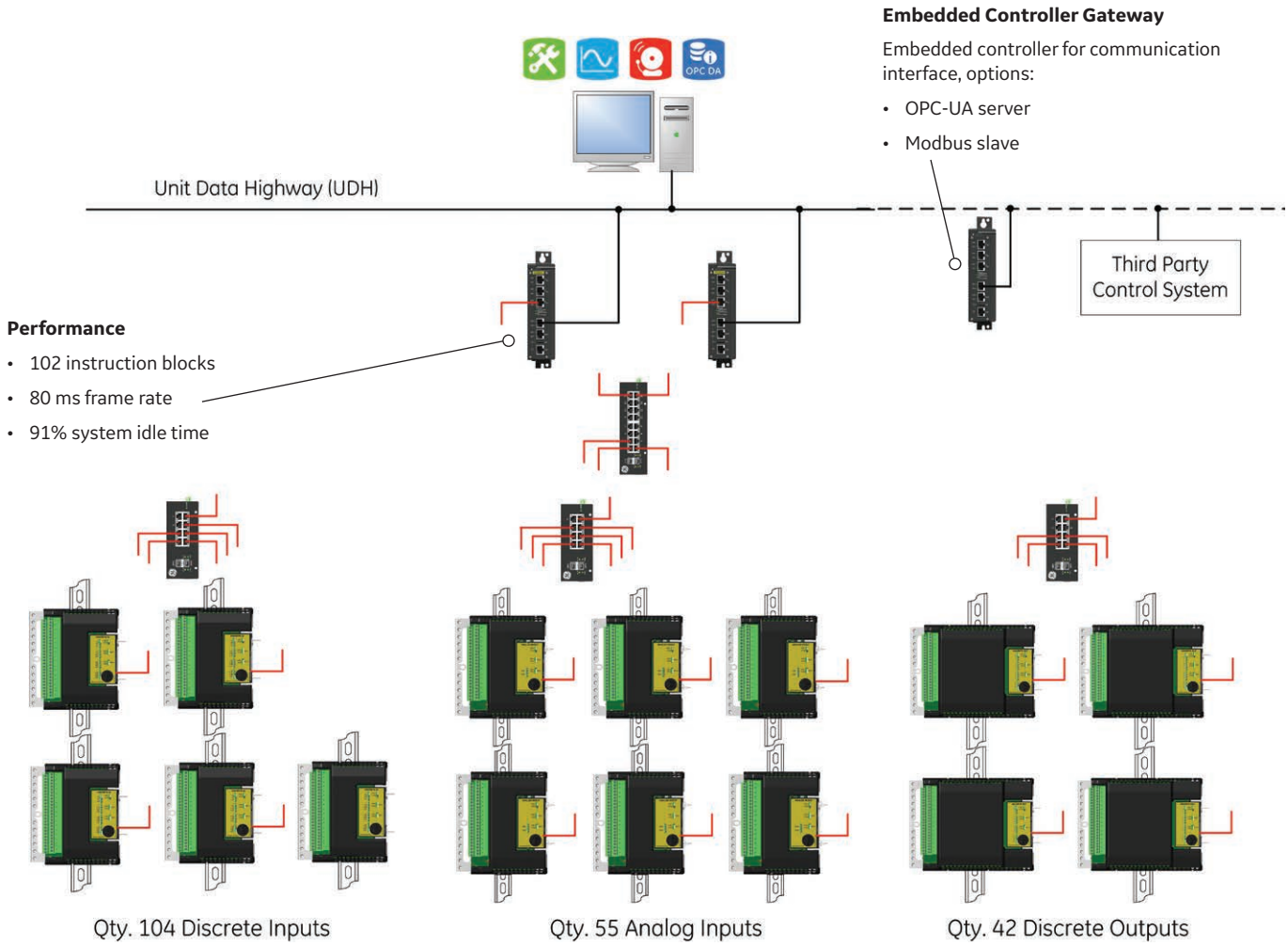
The WorkstationST OPC-DA server provides a common interface between the safety system and other control systems. The OPC-DA server conforms to the 2.0 data access standards. The OPC standard defines two software roles, OPC clients and OPC servers. In general, clients are consumers of automation information and servers are producers of the same information.



The Control System Health (CSH) system collects diagnostic data on various hardware/software components and makes it available in a combination of three ways:

- Control System Health Viewer application where the user can navigate to a component or critical application and view health status
- Alarm View application includes a complete set of control system component diagnostic alarms in addition to the process alarms
- Alarm View application includes a complete set of control system component diagnostic alarms

Example Burner Management System



Mark VIeS Bill of Material

Cat. No.	Qty	Item
IS420UCSBS1A	2	Mark VIeS Controller
IS230SCISH1A	5	Discrete Input Module – 24 VDC
IS230SAISH1A	6	Analog I/O Module
IS230SRLSH1A	4	Contact Output Module
IS420ESWAH3A	3	IONet Switch – 8 port
IS420ESWBH3A	1	IONet Switch –16 port

Notes

1. 28 VDC power for I/O packs and controller require Micro MATE-N-Lok receptacle (AMP 1445022-3)
2. IONet cabling (CAT5 E-Net cables) identified in red.
3. Third-party control system interfaces supported include:
   - OPC-DA server via WorkstationST
   - OPC-UA server via WorkstationST
   - Modbus master via WorkstationST
   - Modbus master via embedded controller

PAC8000 SafetyNet System

The PAC8000 SafetyNet System is a Programmable Electronic Safety System, certified according to IEC 61508 as suitable for use in safety related applications up to Safety Integrity Level 2. The system is suitable for use in emergency shutdown, fire & gas and burner management applications.

New additions to the family

The PAC8000 SafetyNet System uses the same basic structure as the PAC8000 controllers, but in addition incorporates specifically developed components. These are:

- SafetyNet Controllers (8851-LC-MT)
- Dedicated Controller Carriers for Earth Leakage Fault Detection (8751- CA-NS)
- SafetyNet IO Modules -Analog Input with HART (8810-HI-TX) and Discrete IO (8811-IO-DC)
- Workbench software tools for use with the SafetyNet System (8841-LCMT)

- **Open communications**

  PAC8000 products are open. SafetyNet nodes communicate with one another, with standard PAC8000 nodes, historian and asset management packages and with HMI packages over a fault tolerant Ethernet LAN, running at up to 100 Mbit/s.

- **Peer-to-peer communication**

  SafetyNet Controllers can communicate with one another via Ethernet using SafetyNet P2P, which has been certified as suitable for use in SIL 2 applications. Robust checks and controls on access and data corruption ensure the safety of communication and allow safety functions for which the inputs and outputs are widely separated for easy implementation– both in terms of the software programming and in the hardware design.

- **Mixing safe and standard**

  Standard IO Modules can be mounted on SafetyNet Nodes– together with SafetyNet IO Modules– without affecting the node's functional safety performance. Only standard applications can read data from standard Modules, but both standard and SafetyNet applications are allowed to write to standard modules. This flexibility can simplify hardware design, where the physical constraints of the particular locality demand such an approach.

- **Serial interfaces**

  The Open approach extends to Modbus serial interface products, which can be connected to any node (SafetyNet or standard) by an RS485 connection. As with data from standard IO Modules, this data can be read by standard Controllers, but not by SafetyNet Controllers. Both standard and SafetyNet Controllers can write to such devices.

continued next page



SafetyNet Controller page 5.23
Process Controllers page 5.26
Workbench for SafetyNet page 5.29
SafetyNet IO Modules page 5.31
Carriers and Cables page 5.64
Field Terminals page 5.74
Power Supplies page 5.81

- **Comprehensive programming Tools**

  The SafetyNet System is programmed using the Workbench software package in common with the PAC8000 Process Control Products. In addition to providing the options of programming the required safety function in one of three IEC 61131-3 languages (Ladder Diagram, Function Block Diagram and Structured Text), the package also provides many useful tools to assist in testing and commissioning.

- **Restricted access**

  Access to modify safety-related parameters within the configuration and application program must be restricted to authorized personnel. The SafetyNet system provides a number of layers and methods of providing this protection. Only users with “Safety Responsibility” can access the safety-related aspects of the Workbench. Only computers that the SafetyNet Controller identifies as “trusted hosts” can download new parameters. A download can only take place when an “over-ride keyswitch” is set to the required position. And, if required, each SafetyNet Controller can be protected by its own password– without which access to the safety parameters is denied.

- **Maintaining field instruments**

  Maintenance over-rides can be implemented from operator workstations in full compliance with the guidelines from TUV. Users define, as part of the safety application, the actions to be taken to maintain a particular instrument and the SafetyNet System then implements these pre-defined actions.

- **HART capability**

  The SafetyNet System allows full access to HART field devices for Emerson’s AMS maintenance software. (The first release of SafetyNet will not have full HART capability; contact GE for further information).

- **Earth leakage detection**

  Earth leakage fault detection may be implemented using the 8751-CA-NS Controller Carrier in conjunction with an input channel from an 8811-IODC Discrete I/O Module. If ELFD is not required, SafetyNet Controllers can be mounted on 8750-CA-NS Controller Carriers.

- **On-line changes**

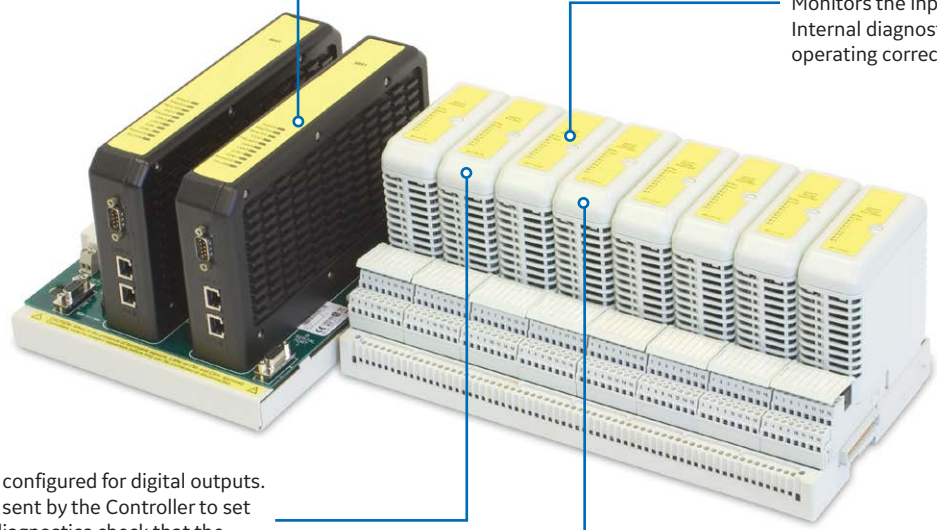
  Where allowed by local practices and following adequate testing and approval, new safety programs and configuration can be downloaded online and in real time. In some situations, this may be possible without interrupting the operation of the safety function.

Publication Reference Chart

GFA-1779	PAC8000 2/x Series Modular I/O
GFA-1769	PAC8000 Carriers and Field Terminals

SafetyNet Controller - Runs the safety application program and carries out diagnostics checks to ensure it is operating correctly. If a fault is detected, it will shut itself down.

SafetyNet Module configured for digital inputs. Monitors the inputs and also checks for line faults. Internal diagnostics check that the module is operating correctly.



SafetyNet Module configured for digital outputs. Obeys commands sent by the Controller to set outputs. Internal diagnostics check that the module is working correctly. If a fault is detected, the Module will set outputs to their safe state of de-energized.

SafetyNet Analog Input Module monitors the inputs and carries out internal diagnostics to check that the module is operating correctly.

Harsh and Hazardous Environments

The SafetyNet System is as rugged as the other PAC8000 Controller and 8000 Process I/O Components: -40°C to +70°C operating ambient temperature; Zone 2 or Class 1 Division 2 hazardous area mounting; G3 corrosion resistance; and enhanced shock and vibration capability. The system will operate in the PAC8000 extreme environments found in process industries, allowing remote mounting and a truly distributed architecture in even the most demanding situations.

Event Logging and Sequence of Events Recording

The SafetyNet System has the same Event Logging and Sequence of Events (SOE) recording capability as the PAC8000 Controllers. Data received from SafetyNet Modules is timestamped by the SafetyNet Controller with a resolution of better than 200ms (this is dependent on the execution cycle; small nodes will deliver better resolution). Data from dedicated (non- SIL) SOE modules is time-stamped with a resolution of less than 0.25ms between different channels of the same SOE module and less than 1ms between channels from different SOE modules. The SafetyNet Controller can record up to 8000 events before its event data buffer begins to be overwritten by new data.

Reduced cabling and termination costs

In common with the PAC8000 Controllers, the SafetyNet System offers users the opportunity to significantly reduce their spending on wiring and termination costs. Moving control and safety hardware out of the control room and on to the plant gives significant savings. The Field Terminal design allows users to avoid unnecessary spending on marshalling cabinets, cross wiring and marshalling terminals. Integral tagging and fusing further simplifies cabinet design and installation.

SafetyNet Controller

The 8851-LC-MT SafetyNet Controller stores and runs the SafetyNet application program which is downloaded from the Workbench. It manages a number of communication paths: with the IO Modules mounted on the local node via the internal Railbus; with other entities on the Ethernet LAN (other PAC8000 nodes, PCs running the Workbench programming tools, HMI, historian packages and asset management tools) and with remote mounted serial devices. The SafetyNet Controller also manages the implementation of the redundancy strategy either as master or standby.

- **Certification**

  The SafetyNet Controller is certified for use in safety-related applications up to and including SIL 2. The SafetyNet Controller achieves this Safety Integrity Level with a 1oo1D architecture (i.e. it operates in "simplex" mode, with correct operation ensured by comprehensive internal diagnostics). In such applications the SafetyNet Controller is used in conjunction with the 8811-IO-DC SafetyNet Digital Input/Output Module and the 8810-HI-TX SafetyNet Analog Input Module with HART†. The SafetyNet Controller is mounted on its dedicated Carrier 8751-CA-NS.

- **Safe by design**

  The SafetyNet Controller has been designed specifically for safety-related applications and is certified on the basis of the excellence of its design. It does not depend for its certification on "proven in use" data.

- **Diagnostics**

  If the SafetyNet Controller's internal diagnostics detect a fault that would prevent the SafetyNet System from carrying out its safety function, then it will initiate a controlled shutdown. A controlled shutdown has two objectives– firstly, to ensure that the SafetyNet System enters its failsafe mode; and secondly, to record sufficient data to allow the reason for the shutdown to be determined. If a SafetyNet Controller enters a controlled shutdown, then all communication with IO Modules is stopped and, when the programmed time delay for each IO module has elapsed, they will enter their safe states.

- **System size**

  The SafetyNet Controller can interface with up to 64 locally mounted, 8-channel IO Modules - giving a total capacity of over 500 channels per node. The Ethernet LAN is capable of supporting over 200 nodes, giving a maximum theoretical capacity of over 100,000 channels!

- **HART pass-through**

  SafetyNet Controllers can be configured to allow transparent access to the process variables and status information provided by HART field instruments. HART data cannot be used within the SafetyNet application (as, for example, it does not employ sufficiently rigorous data error detection algorithms), but communication with such devices can be achieved by using a "passthrough" command which does not involve, nor interfere with, the safety application. (The first release of SafetyNet will not have full HART capability, contact GE for further information).

continued next page

†First release of SafetyNet will not have full HART capability.

- **Live maintenance**

  Once the Ethernet LANs are isolated, SafetyNet Controllers can be removed and replaced—with the local power supplies still connected–even in Division 1, Class 2 or Zone 2 hazardous areas.

- **Redundant Controllers**

  SafetyNet Controllers can be used in a master - standby redundant configuration to improve the availability of the safety function, but this is not required for safety. Redundancy is implemented by simply inserting the new Controller into the free slot on the Controller Carrier. The SafetyNet system will automatically upload the required SafetyNet application to the new Controller and initiate the redundancy algorithms. Switching between redundant Controllers on detection of a fault is automatic and bumpless.

  The standby Controller continually performs the same processing, on the same data and at the same time as the Master and the results are routinely cross-checked. This ensures that the Standby is always ready to take over control from the Master. The redundancy strategy employed is known as “rendezvous redundancy”. The “Change State” button on the Controller Carrier is used to switch a master to being the standby in a redundant pair, to switch a standby offline and to instruct an offline standby Controller to synchronise itself with the Controller and to enter standby. If a SafetyNet Controller has entered the “Failsafe” state, it can be brought out of this state by use of the “Change State” button.

- **Serial communications**

  Each SafetyNet Controller provides two serial ports, one of which is physically connected via the Controller Carrier, the other directly on the Controller itself. The two ports can be configured to be entirely independent, or can be made to work redundantly, either as redundant connections to the same serial link or as redundant connections to redundant links. When redundant ports of a single Controller are configured as Modbus masters, redundancy issues are handled automatically by the SafetyNet Controller deciding when to switch to the standby port, alarming failures in the standby. When redundant ports of a single Controller are configured as Modbus slaves and multi-dropped on a single serial link, the SafetyNet Controller will again manage the redundancy (deciding which port responds to the Modbus master and alarming a fault in the standby port). When redundant Controllers are used, this adds additional availability to the arrangements above. It is not possible to use the ports on the standby Controller as additional serial connections.

Publication Reference Chart

GFA-1779	PAC8000 2/x Series Modular I/O
GFA-1769	PAC8000 Carriers and Field Terminals

SafetyNet Controller

SafeyNet Controller features:

- Certified for use in SIL 2 safety applications, according to IEC 61508
- Comprehensive internal diagnostics provide basis for safety architecture 1oo1D
- Optional redundancy with bumpless transfer for increased availability
- Dual redundant high speed fault tolerant Ethernet LAN
- Two connections to serial devices
- On-line configuration and re-configuration
- Communicates with up to 64 I/O modules
- Communicates on peer-to-peer basis with other SafetyNet and standard Controllers
- Can write to standard output modules without compromising safety function
- Live maintainable and hot-swappable - even in Class 1, Div 2 or Zone 2 hazardous areas
- HART pass-through of process and status variables
- Event logging up to 8000 events
- 12Vdc Controller power required from 8913-PS-AC

	8851-LC-MT
Product Name	**SafetyNet Controller**
Lifecycle Status	Active
LAN Interface	
Transmission Medium	100BaseTX or 10BaseT Ethernet
Transmission Protocol	SafetyNet P2P†
Transmission Rates	10 - 100 Mbits/s
LAN Connector Type (x2)	RJ 45 (8-pin)
LAN Isolation (dielectric withstand)	1500 V
Action on Software Malfunction	Halt CPU / Reset CPU
Serial Interfaces (COM 1 & COM 2)	
Transmission Rates	1.2 – 115.2 kbits/s (async.)
Transmission Standard	RS485 half-duplex
COM 1 Connector (on carrier)	9-pin D-type connector (F)
COM 2 Connector (on controller)	9-pin D-type connector (M)
Hazardous Area Specification	
Protection Technique	EEx nL IIC T4
Location (FM and CSA)	Class 1, Div.2, Grps A,B,C,D T4
Power Supplies	
Controller Power Voltage	12 VDC (from 8913-PS-AC)
Controller Power Supply	0.4A (typical), 0.5A (max.)
System Power Supply	15mA (max.)
Mechanical	
Module Dimensions (W x L x H) mm	69 x 232 x 138
Weight (approx.) kg	1.35

†SafetyNet P2P is a modified form of Modbus™ certified as suitable for use in SIL 2 safety related applications that require peer-to-peer communication.

PAC8000 Process Controllers

PAC8000 delivers full-specification performance in a broad range of harsh process environment conditions; extreme temperatures, humidity or corrosives and conditions subject to shock and vibration. In ATEX environments, PAC8000 also excels. All components can be installed and maintained in Zone 2/Division 2 hazardous areas. The I/O includes modules that can be connected directly to Intrinsically Safe (Exi) or Increased Safety (Exe) field wiring. PAC8000 provides comprehensive diagnostic data on controllers, Bus Interface Modules (BIM), I/O modules, field wiring and field instruments, allowing users to respond to issues quickly and effectively.

PAC8000 Controllers are used in conventional distributed control architectures, with the I/O modules connected directly to the Controllers. The same I/O modules may be used in remote IO architectures.

Benefits of PAC8000 Controllers

- **Controller Options**

  PAC8000 Controllers include a Process Controller featuring DCS style function block programming, a Logic Controller with 61131-style PLC programming, and a Hybrid Controller that provides the capabilities of both. An RTU Controller is also available, providing DNP3 communication. The SIL 2 SafetyNet Controller is also part of the PAC8000 family.

- **I/O Modules**

  A broad range of PAC8000 I/O modules are available to meet the needs of different applications. All modules provide comprehensive diagnostic information. Analog and discrete output modules are typically 8-channel, with 8-, 16- or 32-channel discrete input modules. Up to 64 modules can be mounted on each node.

- **Environmental and Hazardous Area Operation**

  PAC8000 can go where other products cannot. They can be field mounted and will operate under the following conditions:

  - -40°C to +70°C operating range
  - ISA Level G3 corrosive atmospheres
  - 30g shock and 5g vibration
  - Class I, Division 2 and Zone 2 hazardous areas, with I/O field wiring including intrinsically safe (Exi) and increased safety (Exe) options.

continued next page



- **Controller Redundancy**

  Application availability is improved with Controller redundancy, which is implemented by simply mounting a second controller on the carrier. No configuration is required; the new controller automatically becomes the standby when a button on the Controller Carrier is pressed. Rendezvous redundancy is employed to guarantee bump-less transfer of control from the master to the standby.

- **Network Redundancy**

  Network redundancy helps assure uninterrupted communications. PAC8000 Controllers each have two fault-tolerant Ethernet ports to provide redundant communication LANs. If a fault occurs in one LAN pathway, communication is automatically re-routed.

- **Peer-to-Peer Communications**

  PAC8000 Controllers communicate directly with each other and share data on a peer-to-peer basis without having to route data through a centralized database or server. Contact GE or information regarding large installations that feature more than 12 redundant PAC8000 nodes (or 24 simplex nodes).

- **HART Support**

  PAC8000 Controllers can pass HART data from smart field devices to asset management software applications, allowing remote configuration and access to field instrument diagnostic information. PAC8000 Controllers can also acquire HART data for use in the process control application.

- **Engineering Tools**

  The Workbench provides an integrated project development environment coupled with development modules and tools and a comprehensive set of diagnostic utilities. Different versions of the Workbench work with each Controller.

- **Ease of Use**

  A range of features are provided to simplify the day-to-day operation of a Process Automation System:

  - Controllers feature numerous LEDs to assist with fault finding.
  - Controllers report failed power supplies when used in conjunction with PAC8000 AC power supplies and the 8410-NS-PS nodes services module.
  - On replacing an IO module, the Controller will automatically bring it online if it recognizes the type as being correct.
  - Online download of new application programs is possible with simplex controllers, and online download of new firmware is often possible with redundant controllers.
  - PAC8000 controllers feature an RS485 serial connection for Modbus RTU communication (a second serial connection can be made on the Controller Carrier).
  - When used with the dedicated AC Power Supplies, PAC8000 nodes can be configured to “warm start” after power failure – the power supplies provide sufficient hold up time for the controller to store all necessary live data and to re-commence control from the point the power was lost, when it is restored.

- **Event Recording**

  Controllers can record up to 8000 events in internal memory. Data read from dedicated SOE modules are time stamped by the module. All other data is time stamped by the Controller, and the accuracy of the time stamp is then dependent on the execution cycle. The records must be read from the internal memory by a suitable historian package before the event buffer is filled and over-written by new data.

- **Power Supplies**

  12 V controller power must be connected to each controller, in addition to the 12 V system power connected to the controller carrier. This can be supplied by the AC power supply, 8913-PS-AC, or the DC power supply, BQ2320-9R-EX.

Publication Reference Chart

INM8521	Hybrid, Process, Logic & EBIM
INM8900	Power Supplies



PAC8000 Process Controllers

The PAC8000 Controllers include a Process Controller featuring distributed control system (DCS)-style function block programming; a Logic Controller featuring 61131-style programmable logic controller (PLC) programming; and a Hybrid Controller that provides both programming styles in the same unit. A SIL 2 SafetyNet Controller and an RTU Controller are also available, which provides DNP3 communication for the PAC8000 family.

The 8521-EB-MT Bus Interface Module, for remote I/O applications, shares the same hardware as the controllers listed below. It can be upgraded from a bus interface module to a full controller by firmware download, which is especially useful in ongoing legacy system replacement.

	8521-LC-MT	8521-PC-MT	8521-HC-MT	8521-RT-DE
Product Name	**Logic Controller**	**Process Controller**	**Hybrid Controller**	**RTU Controller**
Lifecycle Status	Active	Active	Active	Active
Programming Languages	IEC 61131 languages: Ladder Diagram (LD) Structured Text (ST) Instruction List (IL) Sequential Function Chart (SFC) Function Block Diagram (FBD) And Flow Chart	Function Block Programming	Combines programming languages of Logic and Hybrid Controllers in a single unit	IEC 61131 languages: Ladder Diagram (LD) Structured Text (ST) Instruction List (IL) Sequential Function Chart (SFC) Function Block Diagram (FBD) And Flow Chart
LAN Communication Protocol	Modbus TCP/IP	Modbus TCP/IP	Modbus TCP/IP	DNP3
Number of Controllers per LAN	24 (24 nodes with simplex controllers or 12 with redundant controllers) - with maximum IO modules. For larger systems, contact GE.	24 (24 nodes with simplex controllers or 12 with redundant controllers) - with maximum IO modules. For larger systems, contact GE.	24 (24 nodes with simplex controllers or 12 with redundant controllers) - with maximum IO modules. For larger systems, contact GE.	24 (24 nodes with simplex controllers or 12 with redundant controllers) - with maximum IO modules. For larger systems, contact GE.
Number of Modules per Controller	64	64	64	64
LAN Connections	2 RJ45 Connectors per Controller	2 RJ45 Connectors per Controller	2 RJ45 Connectors per Controller	2 RJ45 Connectors per Controller
LAN Transmission Medium	100Base TX or 10BaseT Ethernet	100Base TX or 10BaseT Ethernet	100Base TX or 10BaseT Ethernet	100Base TX or 10BaseT Ethernet
LAN Transmission Speed	10 – 100 Mb/s	10 – 100 Mb/s	10 – 100 Mb/s	10 – 100 Mb/s
LAN Isolation	1500 V dielectric withstand	1500 V dielectric withstand	1500 V dielectric withstand	1500 V dielectric withstand
Serial Connections	One male 9-pin D-type on each Controller (second female connector on Carrier)	One male 9-pin D-type on each Controller (second female connector on Carrier)	One male 9-pin D-type on each Controller (second female connector on Carrier)	One male 9-pin D-type on each Controller (second female connector on Carrier)
Serial Transmission Medium	RS485 half-duplex	RS485 half-duplex	RS485 half-duplex	RS485 half-duplex
Serial Transmission Speed	1.2 – 115 kb/s	1.2 – 115 kb/s	1.2 – 115 kb/s	1.2 – 115 kb/s
Controller Power	Direct connection to Controller: 12 VDC (10.9 – 12.6), 0.4 A typical, 0.5 A max	Direct connection to Controller: 12 VDC (10.9 – 12.6), 0.4 A typical, 0.5 A max	Direct connection to Controller: 12 VDC (10.9 – 12.6), 0.4 A typical, 0.5 A max	Direct connection to Controller: 12 VDC (10.9 – 12.6), 0.4 A typical, 0.5 A max
System Power Consumption	15 mA (max)	15 mA (max)	15 mA (max)	15 mA (max)
Dimensions (W x H x D) in mm	232 x 69 x 138	232 x 69 x 138	232 x 69 x 138	232 x 69 x 138
Weight (kg)	1.35	1.35	1.35	1.35

Workbench for SafetyNet

The PAC8000 Workbench is the engineering and documentation tool for the PAC8000 Controllers and SafetyNet Systems. The Workbench is used to perform the following tasks:

- Configure IO channel and module parameters
- Configure controller and network parameters
- Input and manage the IO tag database
- Engineer and document the control or safety application
- Generate wizards to simplify HMI design
- Simulate and test control and safety applications
- Generate reports to assist in Factory and Site Acceptance Testing

- **SafetyNet Workbench**

  The SafetyNet Workbench (8841-LC-MT) has all the features of the standard Workbench, but additionally includes the special tools required for safety applications.

- **Safety Programming Languages**

  The Workbench provides three IEC61131 programming languages that can be used to write safety-related application programs:

  – Ladder logic (LD)

  – Function Block Diagram (FBD)

  – Structured Text (ST)

- **Configuration Mode and Safety Responsibility**

  Changes to safety-related parameters are carried out with the SafetyNet Controller in “Configuration Mode”. Access to this mode is restricted to personnel with “Safety Responsibility” and its use is constrained by a number of further layers of protection for downloading parameters to SafetyNet Controllers. The SafetyNet system defines 6 password protected levels of access authority – with only the 3 highest levels being granted “Safety Responsibility”.

- **Trusted Hosts**

  To prevent access to SafetyNet Controllers by non-approved instances of the Workbench, remote Modbus devices, asset management packages and HMI, only those that the SafetyNet Controller identifies as “Trusted Hosts” can download new parameters. Each Trusted Host is recognized by its IP and MAC addresses (remote Modbus devices are recognized by the serial port to which they are connected). For each Trusted Host a number of other restrictions can be defined:

  – Modbus write not allowed

  – Workbench write not allowed

  – HART pass-through not allowed

- **Key Switch Protection**

  When a SafetyNet Controller is added to the Workbench the user is given the option of selecting a tag to act as a “Key Switch”. This can be used by an Operator to lock the SafetyNet System so that Configuration Mode cannot be entered without their awareness or permission. The Key Switch can be a physical switch, driven from an HMI screen or it can be an output from the SafetyNet application.

continued next page

- **Controller Passwords**

  When a SafetyNet Controller is added to the Workbench the user is given the option to use a Controller Password. If this option is selected, it is subsequently impossible to enter Configuration Mode without the Controller Password.

- **On-line Download**

  Users with safety responsibility can download new parameters to a SafetyNet Controller, from a Trusted Host, to a Controller whose Key Switch is set to permit new downloads and where the particular SafetyNet Controller's Password is known. New parameter download is carried out as a background task over a number of cycles to ensure that the fault reaction and response times are not compromised. Once download is complete and the new parameters have passed the checking and security tests, the new parameters will be automatically adopted. Where redundant SafetyNet Controllers are used, the stand-by Controller will also be automatically updated. Note: on-line download should only be used where there are adequate procedures for approving the changes that have been made and testing them prior to download.

- **Static Analysis Tool**

  Any safety-related application program must be developed by suitably qualified personnel and must be subject to careful scrutiny to ensure safety, but the Workbench provides an additional safety test. The Static Analysis Tool checks for illegal constructs within the safety program prior to download.

- **Differences Utility**

  Once a new SafetyNet application is successfully compiled, it can be downloaded to a SafetyNet Controller. On download, two text reports are generated: a Download Report and a Master Tag Xref. These can be used for comparison with other downloads using the Differences Utility.

- **Download Backup**

  A time stamped backup of each safety application is automatically created following a successful download. Changes between versions can be viewed and backups can be used either as a start point for developing new safety applications or to restore an earlier version.

- **Change Control Log**

  The Workbench maintains a Change Control Log that records, for example when:

  - IO Modules are added, deleted or moved
  - Tags are added to, removed from, or moved within an IO Module
  - IO Configuration parameters are saved
  - Controller IP addresses or node numbers are entered or modified
  - External node numbers are entered or modified
  - Serial communications parameters are entered or modified
  - A successful download is made
  - A Strategy is removed
  - The Controller password is changed

Publication Reference Chart

GFA-1779	PAC8000 2/x Series Modular I/O
GFA-1769	PAC8000 Carriers and Field Terminals

SafetyNet IO Modules

SafetyNet IO Modules interface to safety system field wiring via Field Terminals. The IO Modules and the Field Terminals mount on Carriers that provide mechanical support, but also connect the internal communication bus and power supply connections to the Modules. The IO Modules are certified as suitable for use in SIL 2 safety-related applications.

- **Certification**

  The SafetyNet IO Modules are certified for use in safety-related applications up to and including SIL 2. The SafetyNet System achieves this certification with a 1oo1D architecture. The SafetyNet IO Modules have been designed specifically for safety-related applications and are certified on the basis of the excellence of their design. The certification does not depend on "proven in use" data.

- **Diagnostics**

  The IO Modules perform comprehensive internal diagnostic tests as an essential part of ensuring that the IO can carry out the required safety function. If the SafetyNet IO Module's internal diagnostics detect a fault that would prevent the SafetyNet System from carrying out its safety function, then it will initiate a controlled shutdown. A controlled shutdown has two objectives – firstly, to ensure that the IO Module enters its failsafe mode; and secondly, to record sufficient data to allow the reason for the shutdown to be determined. If a SafetyNet Module enters a controlled shutdown, then all IO channels are deactivated: input channels are not scanned; and output channels are de-energized.

- **Bussed Field Power**

  The Bussed Field Power (BFP) connectors on the rear of IO Module Carriers provide the power connections for field instruments wired to the IO Modules. For the SafetyNet System, BFP must be 24 VDC and supplied by MTL's 8914-PS-AC units. These power supplies may be used in redundant pairs, if required.

- **Live Maintenance**

  SafetyNet IO Modules can be removed and replaced in a Class 1, Division 2 or Zone 2 hazardous area - once the relevant Bussed Field Power (BFP) connection has been isolated using an appropriate hazardous area switch (such as the MTL951). Removing and replacing the Modules does not interrupt the operation of the other parts of the node. If a Module is replaced by another Module of identically the same type, then no intervention is required for the System to begin operating normally once the Bussed Field Power is restored.

- **Line Fault Monitoring**

  In addition to the comprehensive internal diagnostics the SafetyNet IO Modules can monitor field wiring for line faults.

continued next page



Discrete Input/Output Modules:

24VDC non-isolated 8811-IO-DC page 5.35

Analog Input Modules:

8-channel, 4–20 mA with HART® 8201–HI–TX page 5.36
8-channel, 4–20 mA with HART® 8201–HI–IS page 5.37
8-channel, 0-10V/potentiometer input 8230–AI–IS page 5.38
8-channel, Thermocouple and mV 8205–TI–IS page 5.39
8-channel, RTD and Ω 8206–TI–IS page 5.40
8-channel, 4–20 mA with HART® 8202–HO–IS page 5.41

Analog Output Modules:

8-channel, 4–20 mA 8204–HO–IS page 5.44

Discrete Input Modules:

16-channel, Switch/proximity detector 8220-DI-IS page 5.46

Discrete Output Modules:

4-channel, 4 Solenoid driver, IIC gas groups 8215–DO–IS page 5.51

Pulse Input Modules:

2-channel, pulse input 8223–PI–IS page 5.54

- **Event Logging**

  Data from SafetyNet IO Modules can be time stamped and stored by the SafetyNet Controller before being downloaded to the PAC8000 SOE Data Retrieval Client or a 3rd party historian package. SafetyNet IO Module data is time stamped with a resolution of better than 200ms.

- **Failsafe Mode**

  IO Modules will enter Failsafe Mode from the Running State either due to loss of communications with the Controller or because the module has received an instruction from the Controller to enter the Failsafe State. In this state:

  - The Red Fault LED is lit
  - The IO Module is flagged as unhealthy to the Controller
  - All Railbus Write requests are rejected, except instructions to Reset or to exit the Failsafe State
  - Inputs and HART data are read
  - Outputs are de-energized
  - Background diagnostics continue and if a failure is detected, the module will enter Controlled Shutdown

- **Controlled Shutdown**

  A Controlled Shutdown is carried out if a fault is detected in the Module. In this state it can communicate the reason for shutdown.

- **LEDs**

  A number of LEDs are provided on each IO Module to provide visual indication of the status of the Module, its channels and its power supply.

- **Module 'Fault' LED (red)**
  - On - Failsafe
  - Off - Normal operation Flashing (equal:mark space ratio) – Cold start in process, will flash until communication is established with SafetyNet Controller.
  - Blinking (On for a short period, then On for a longer period – morse code 'a') – Fault state after controlled shutdown
- **Module 'Power' LED (green)**
  - On - Power OK
  - Off - BFP or Railbus Power Failure
- **Module 'Channel' LED's (yellow)**
  - See Individual Module Specifications.

Publication Reference Chart

GFA-1779	PAC8000 2/x Series Modular I/O
GFA-1769	PAC8000 Carriers and Field Terminals

PAC8000 Process I/O

PAC8000 delivers full-specification performance in harsh process environment conditions; extreme temperatures, humidity or corrosives and conditions subject to shock and vibration. In ATEX environments, PAC8000 also excels. All components can be mounted and maintained in Zone 2/Division 2 hazardous areas. The I/O includes types that can be connected directly to Intrinsically Safe (Exi) or Increased Safety (Exe) field wiring. PAC8000 provides comprehensive diagnostic data on Controllers, Bus Interface Modules, I/O Modules, field wiring and field instruments, allowing users to respond to issues quickly and effectively.

PAC8000 I/O can be used in conjunction with intelligent Controllers on architectures which require distributed control (Refer to Section 2 Conventional Control Systems). Alternatively, where remote I/O is required, the node can use a Bus Interface Module (BIM) or a network scanner. A range of BIMs are available for connection to remote hosts using different protocols. PROFINET, Modbus RTU, PROFIBUS DP and Modbus TCP/IP.

Benefits of PAC8000 I/O

- **Bus Interface Modules**

  For architectures that require remote or distributed I/O, PAC8000 uses Bus Interface Modules (BIMs) to act as a network interface or scanner. Some BIMs can be used redundantly, mounted on the same BIM carrier to increase availability. BIMs that can only be used in simplex mode can work with the 8510-NS-MO Node Services Module, which stores the relevant parameters, so that insertion of a new replacement triggers automatic configuration of the unit and the node.

- **I/O Modules**

  A broad range of PAC8000 I/O modules are available to meet the needs of different applications. All modules provide comprehensive diagnostic information. Analog and discrete output modules are typically 8-channel, with 8-, 16- or 32-channel discrete input modules. The maximum number of I/O Modules that can be mounted on a node depends on the BIM type – either 24 (PROFIBUS DP types), 32 (Modbus RTU type) or 64 (Modbus TCP/IP type) modules can be mounted on each node. Modules that mount in zone 2 and can accept field wiring to zone 2 are known as PAC8000 2/2 modules. Modules which mount in zone 2 and are compatible with intrinsically safe field wiring are known as PAC8000 2/1 modules.

- **Environmental and Hazardous Area Operation**

  PAC8000 can go where other products cannot. They can be field mounted and will operate under the following conditions:

  - -40°C to +70°C ambient temperature
  - ISA Level G3 corrosive atmospheres
  - 30g shock and 5g vibration
  - Class I, Division 2 and Zone 2 hazardous areas, with I/O field wiring including intrinsically safe (Exi) and increased safety (Exe) options.

PROFINET Bus Interface Modules page 5.xx
Traditional Bus Interface Modules page 5.xx
BIM Carriers page 5.xx
2/2 4-20 mA Analog Input Modules page 5.xx
2/2 Temperature, Voltage and Universal Analog Input Modules page 5.xx
2/2 4-20 mA Analog Output Modules page 5.xx
2/2 DC Discrete Input Modules pages 5.xx-5.xx
2/2 AC Discrete Input Modules page 5.xx
2/2 DC Discrete Output Modules page 5.xx
2/2 AC Discrete Output Modules page 5.1xx
2/2 Pulse/Quadrature Input Module page 5.xx
2/2 DC Discrete HDC I/O Module page 5.xx
2/2 4-20 mA Analog Input HDC Module page 5.xx
2/2 Addressable Smoke and Heat Detector I/O Module page 5.xx
2/2 I/O Module Carriers page 5.xx
2/2 Carrier Extenders page 5.xx
2/2 Carrier Extender Cables page 5.xx
2/1 Analog Input Module page 5.xx
2/1 Temperature and Voltage Analog Input Modules page 5.xx
2/1 4-20 mA Analog Output Modules page 5.xx
2/1 Discrete Input Module page 5.xx
2/1 DC Discrete Output Module page 5.xx
2/1 Pulse/Quadrature Input Module page 5.xx
2/1 I/O Module Carriers page 5.xx
Railbus Isolator page 5.xx
Railbus Isolator Carrier page 5.xx
IS Power Supply page 5.xx
IS Power Supply Carrier page 5.xx
AC System and Controller Power Supply page 5.xx
DC System and Controller Power Supply page 5.xx
AC Bussed Field Power Supply page 5.xx

Publication Reference Chart

GFK2839	PAC8000 PNS Manual
INM8100	8000 I/O - 2/2 I/O modules with SafetyNet
INM8200	8000 I/O - 2/x I/O modules
INM8502	8000 I/O - Profibus-DP BIM
INM8505	8000 I/O – Modbus BIM
INM8510	8510 – Node Services Module
INM8512	8512 - HART Interface Module

- **LAN Redundancy**

  Different LAN Redundancy options are available from the different BIMs. PROFINET BIMs support a ring architecture (PROFINET's "Media Redundancy Protocol", or MRP), the Ethernet BIM supports redundant, fault tolerant Ethernet and the Modbus RTU BIM can operate two LANs in a number of different ways based on its configuration. The 8507-BI-DP BIM can provide redundant LANs when redundant BIMs are installed.

- **HART Pass-through**

  All PAC8000 BIMs are designed to work with HART field instruments when combined with appropriate HART-capable Analog I/O Modules. This allows remote asset management packages to communicate directly with HART field instruments. The PROFINET BIM due for initial release will have this feature in 2013, and the 8505-BI-MB Modbus BIM requires the use of the 8512-IF-HA HART Interface Module to enable HART pass-through.

- **HART Acquisition**

  PAC8000 HART I/O Modules can directly address smart instruments and provide HART process and status information directly to the host. This enables the implementation of a number of advanced techniques such as live re-calibration of the 4-20 mA loop by continually comparing it to the original digitized measurement from the transmitter.

- **Upgrading Legacy System Installations**

  The Modbus TCP/IP Ethernet BIM shares the same hardware as the PAC8000 Intelligent Controllers. It can be upgraded from a BIM to a Controller by a simple firmware download. This feature is particularly useful in legacy system upgrades, by following a process such as:

  – The PAC8000 Ethernet BIM and I/O is used to gradually replace failed legacy system I/O, acting as new remote I/O to the legacy host – connected by either Modbus TCP/IP over Ethernet, or Modbus RTU over an RS485 serial link.

  – Many legacy control rooms have little free space, so users can take advantage of the PAC8000's harsh and hazardous environmental performance to mount the new I/O remotely on the plant, close to the field instruments, freeing up space in the control room.

  – Once the entire legacy I/O has been replaced, the legacy host can be removed and the control capability of the Ethernet BIMs enabled to instigate distributed control on a new platform, with no legacy issues.

- **Ease of Use**

  A range of features provide simplified day-to-day operation of a process automation system:

  – Only field wiring is connected to field terminals – field power is connected to the carrier's terminals, simplifying field wiring tasks and I/O module replacement.

  – I/O modules feature LEDs to assist with fault finding in I/O modules and field wiring.

  – Field terminals and I/O modules are keyed to each other. It is impossible to make an unsafe combination of terminals and modules, or inadvertently replace a failed module with an incorrect replacement.

  – When replacing an I/O module, the Controller or Bus Interface Module will automatically bring it online if it recognizes the type as correct.

  – Online download of new application programs is possible with simplex Controllers, and online download of new firmware is often possible with redundant Controllers.

- **Power Supplies**

  12 V System Power must be connected to each node. This can be supplied by the AC Power Supply 8913-PS-AC or the DC Power Supply BQ2320-9R-EX. The Ethernet BIM also requires its own 12 V Controller Power connection. Using 12 V for the internal communication bus allows live module removal from the Carriers, even in zone 2 hazardous areas. Different 2/2 I/O Modules require different Bussed Field Power Supplies. This power supply is connected to the node via connectors on the back of the I/O Carrier, and is routed through the I/O module to the field wiring. It will normally be necessary to isolate this supply before removing the module. As the name suggests, Bussed Field Power can be bussed along the back of the I/O Carrier to simplify connection of the various supply voltages a node may need. All the power for 2/1 modules is supplied through the Carrier, with System Power being provided by the dedicated IS Power Supply 8920-PS-DC.

- **Addressing of I/O modules**

  Modules are addressed in terms of their position, or slot, on the Carrier. As a result, a module can be removed and replaced by another of the same type and the system will resume operation, including the new module, automatically. And since all configuration data is stored in non-volatile memory, the configuration is retained even during a power cycle and without the need for internal batteries.

- **Sequence of Event Recording**

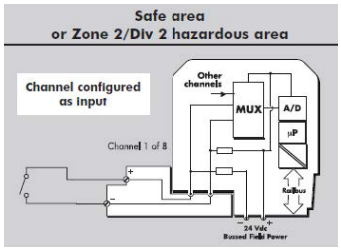
  The 8127-DI-SE module can time stamp input changes for Sequence of Events recording. This function is supported on PAC8000 Controllers and Ethernet BIMs.

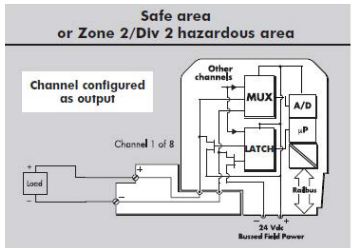
- **Integrated Control and Safety**

  The majority of PAC8000 I/O Modules can be mounted on SafetyNet SIL 2 functional safety nodes, together with SafetyNet I/O Modules and Controllers, to implement Integrated Control and Safety Systems. (Modules 8129-IO-DC and 8133-HI-TX are not supported by SafetyNet).

- **Engineering Tools**

  The configuration tool that is required by each of the different BIM types is given in the comparison tables.



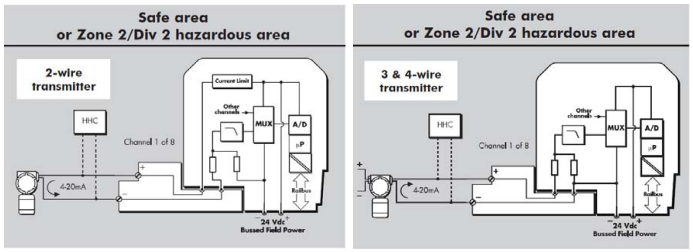


SafetyNet Discrete Input/Output Module

SafetyNet Discrete Input/Output Module features:

- 8 inputs - any combination of inputs and outputs
- Certified for use in SIL 2 safety applications
- Non-arcing inputs and outputs
- Output channels rated up to 2A continuous
- Inputs for dry contact switches
- 24Vdc Bussed Field Power required from 8914-PS-AC

	8811-IO-DC
Product Name	**24Vdc, Non-isolated Discrete Input/Output Module**
Lifecycle Status	Active
Number of Channels (independently configured as inputs or outputs)	8
Inputs	
ON/OFF Threshold Current	0.9mA (typ.)
O/C Voltage	24 VDC (typ.) - depends on BFP Supply
Wetting Current	1.2mA (typ.)
Minimum Pulse Width Detected	5ms
Max Input Frequency in Pulse Counting Mode (no debounce)	30Hz
Isolation (any channel to Railbus)	250 VAC
Outputs	
Maximum Output Current per Channel	2A
Maximum Output Current per Module - Continuous	6A
Maximum Output Current per Module - Non-continuous (<10 seconds)	8A
Input Configurable Parameters	
Filter Time Interval	0 to 8s (in 1ms steps)
Earth Leakage Detection Channel	ON/OFF
Latch Inputs	enable /disable
Latch Polarity	latch on high/latch on low
Pulse Counting	up transition/down transition/disable
Line Fault Detection	none/open circuit/open & short circuit
Output Configurable Parameters	
Output Type	pulse/discrete/pattern
Pulse Width	1ms to 60s
Line Fault Detection†	open line & short circuit detect /disable
Resistance Measurement Accuracy	
For Normally De-energized Output Open and Short-circuit Detection.	
With forward biased test current	±(3.4%+5.3ohm) for line resistance δ 220ohm greater of: ±7% or ±(3.1%+27∧) for line resistance >220∧, <1kohm
With reverse biased test current	greater of: ±7% or ±(3.1%+430ohm)
Response Time	
Input Signal Change to Availability on Railbus	5ms (max.)
Railbus Command to Output Change	1ms (max.)
Hazardous Area Specification	
Protection Technique	EEx nA nL IIC T4
Location (FM and CSA)	Class 1, Div.2, Grps A,B,C,D T4
Power Supplies	
System Power Supply	50mA (typ.), 70mA (max.)
Bussed Field Power Supply	
All Channels Configured as Inputs	50mA (max)
Any Channels Configured as Output Currents	50mA + output load
Module key code	B6
Module Width (mm)	42
Weight (g)	210



SafetyNet Analog Input Module

SafetyNet Analog Input Module features:

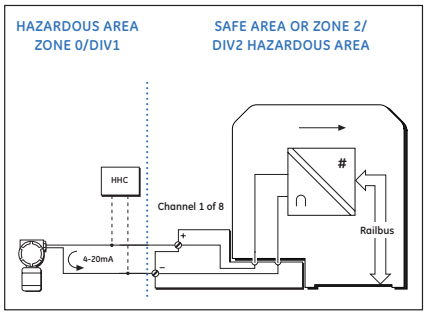
- 8 single ended 4-20mA input channels
- Certified for use in SIL 2 safety applications
- Non-incendive field circuits
- 2-, 3- or 4-wire transmitters
- HART pass-through, acquisition and status reporting†
- 24 VDC Bussed Field Power required from 8914-PSAC

	8810-HI-TX
Product Name	**4-20 mA Analog Input Module with HART**
Lifecycle Status	Active
Inputs	
Number of Channels	8, single-ended
Nominal Signal Range (span)	4 to 20mA
Full Signal Range	0.25 to 24mA
Line Fault Detection:	
Short Circuit Current	> 23.5mA
Open Circuit Current	< 0.5mA
Output Voltage (@ 20mA)	10.2V (min.)
Output Current	28mA (max.)
Accuracy (at 25°C)	± 0.1% of span
Temperature Coefficient	38 ppm/C
Resolution	16 bits
Repeatability	0.05% of span
Data format	16-bit unsigned (0-25mA = 0-65,535)
HART data format	IEEE754 floating point
Isolation (any channel to Railbus)	250 VAC RMS
Isolation (between channels)	none
Configurable Parameters	
Alarms	high, high-high, low and low-low
Alarm Deadband (hysteresis)	user defined value
Input Filter Time Constant	user defined value
Input Dead Zone	user defined value
Drive on Fault State	disabled /upscale /downscale
HART Variable and Status Reporting	enable /disable
Response Time	
Signal Change to Availability on Railbus:	
4– 20 mA Mode	25ms (max.)
HART Mode	0.75s per channel
Hazardous Area Specification	
Protection Technique	EEx nA [nL] IIC T4
Location (FM and CSA‡)	ss 1, Div.2, Grps A,B,C,D T4
FM Non-incendive Field Wiring Parameters (each channel)	Voc = 28.7V; Isc = 33mA
Gas Groups A, B	Ca = 0.17µF; La = 11mH
Gas Group C	Ca = 0.51µF; La = 33mH
Gas Group D	Ca = 1.36µF; La = 88mH
Power Supplies	
System Power Supply	50mA (typical), 70mA (max.)
Bussed Field Power Supply	350mA (2-wire TX max.), 110mA (4-wire TX max.)
Module Key Code	A1
Module Width (mm)	42
Weight (g)	200

For recommended and compatible Field Terminals, see Field Terminal - Specification and Selection Guide.

†The first release of SafetyNet will not have full HART capability, contact GE for further information.

‡CSA with non-incendive field terminal, subject to conditions in CSA certificate.)



8-channel Analog Input

8-channel Analog Input, 4-20 mA with HART features:

- 8 single-ended input channels
- Intrinsically safe field circuits
- Conventional 4–20 mA
- HART pass-through
- HART variable and status reporting
- For 2-wire transmitters
- In-built power supply

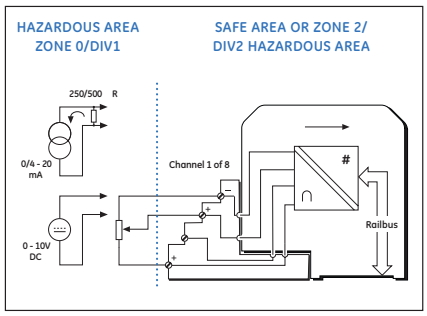
	8201-HI-IS
Product Name	**8-channel Analog Input, 4-20 mA with HART**
Lifecycle Status	Active
Inputs	
Number of Channels	8
Nominal Signal Range (span)	4 to 20 mA
Full Signal Range	0.5 to 22 mA
Line Fault Detection	Short circuit current – >21.5 mA; Open circuit current – <0.5 mA
Voltage to Transmitter @ 20mA	15 V (min.)
Accuracy (@25 °C)	± 20 µA
Resolution	16 bits
Temperature Stability	(-40 °C to +70 °C) – ± 0.006% of span per °C
Isolation	Any channel to Railbus – 60 VAC Between channels in same module – None
Configurable Parameters	
Alarms	High, high-high, low, low-low
Alarm Deadband (hysteresis)	User defined value
Input Filter Time Constant	User defined value
Input Dead Zone	User defined value
Drive on Failsafe	User defined value
Channel Status	Active / Inactive
HART Comms	Enable / Disable
Response Time	
Analog Signal Change to Availability on Railbus	4–20 mA mode – 33 ms (max.) HART mode – 0.75 s per channel
Safety	
Field Wiring Protection	[EEx ia] IIC
Safety Description (each channel)	U_o = 28 V, I_o = 93 mA, P_o = 0.65 W
FM Entity Parameters	$V_{oc} \leq 28$ VDC, $I_{sc} \leq 93$ mA, $C_a \leq 0.14$ µF, $L_a \leq 4.38$ mH
Power Supplies	
IS Railbus (12V) Current (all channels @ 22 mA)	600 mA (typ.)
Power Dissipation Within Module	4.2 W (max.)
Module Key Code	A1
Module width (mm)	42
Weight (g)	260
Field Terminals – Field Wiring Type	
Intrinsically Safe Standard	8621-FT-IS
Intrinsically Safe Loop Disconnect	8622-FT-IS

PAC8000 2/2 4-20 mA Analog Input Modules

2/2 4–20 mA Analog Input modules measure the current in a 4–20 mA field instrument loop and report the value read on each channel. The 4-20 mA analog input modules have eight channels. When the current is measured outside the 4-20 mA range, the module detects this and reports open and short circuit line faults.

Analog input modules "with HART" can obtain information from HART instruments of protocol revision 5.0 or later. Each channel can communicate with a single HART instrument. HART universal command 3 is used to access data on up to 4 dynamic variables and status from each instrument. This provides more process information to the control system from each device. Compensating for A/D and D/A errors and comparing the value reported by the module with the original measurement taken by the field instrument can result in greater accuracy. In addition, HART pass-through may be used for device configuration, calibration and advanced diagnostics by remote asset management packages.

	8101-HI-TX	8103-AI-TX
Product Name	**8-channel AI, 4-20 mA with HART**	**8-channel AI, 4-20 mA**
Lifecycle Status	Active	Active
Module Type	Analog Input	Analog Input
Range	4 to 20 mA	4 to 20 mA
Bussed Field Power	24 VDC ±10% 300 mA (2-wire), 60 mA (4-wire)	24 VDC ±10% 300 mA (2-wire), 60 mA (4-wire)
Transmitter Type	2 or 4 wire	2 or 4 wire
Full Signal Range	1-23 mA	1-23 mA
Output Current	32 mA max.	32 mA max.
Failsafe Mode	Low, high or hold last value	Low, high or hold last value
LED Indicators	Power, Fault 8 x Channel Status	Power, Fault 8 x Channel Status
Alarms	Hi Hi, Hi, Lo, Lo Lo	Hi Hi, Hi, Lo, Lo Lo
Alarm Deadband	User-Defined	User-Defined
Line Fault Detection	Open (<0.5 mA) Short (>23.5 mA)	Open (<0.5 mA) Short (>23.5 mA)
Resolution	16-bit unsigned	16-bit unsigned
Accuracy (% of span)	±0.1%	±0.1%
Repeatability	0.05% of span	0.05% of span
Response Time	27 ms max. (mA mode) 0.75 s per channel (Hart mode)	27 ms max.
Channel to Channel Isolation	No	No
Dead Zone	User-Defined; Zero Default	User-Defined; Zero Default
HART Data	IEEE754 floating point	N/A
Filtering	Configurable	Configurable
Field Circuits	Non-incendive	Non-incendive
System Power (12 V)	100 mA typ., 150 mA max.	100 mA typ., 150 mA max.
Module Key Code	A1	A1
Module Width (mm)	42	42
Module Weight (g)	200	200
Compatible Field Terminals		
General Purpose Wiring	8602-FT-ST (2-wire) 8604-FT-FU (2-wire) 8615-FT-FU (4-wire)	8602-FT-ST (2-wire) 8604-FT-FU (2-wire) 8615-FT-FU (4-wire)
Non-incendive Wiring	8601-FT-ST (2-wire) 8603-FT-FU (2-wire) 8615-FT-4W (4-wire)	8601-FT-ST (2-wire) 8603-FT-FU (2-wire) 8615-FT-4W (4-wire)
Common PAC8000 Specifications	See Section xx for System Specifications	See Section xx for System Specifications

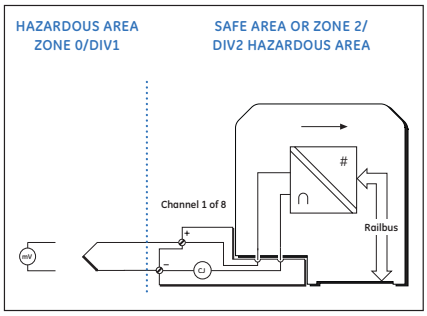


8-channel Analog Input

8-channel Analog Input, 0-10V/potentiometer input features:

- 8 single-ended input channels
- Intrinsically safe field circuits
- Conventional 4–20 mA
- HART pass-through
- HART variable and status reporting
- For 2-wire transmitters
- In-built power supply

	8230-AI-IS
Product Name	**8-channel Analog Input, 0-10V/potentiometer input**
Lifecycle Status	Active
Inputs	
Number of Channels	8, single-ended
0 –10V Input Characteristics	Nominal signal range (span) – 0 to 10 V Full signal range – 0 to +11 V Resolution – 16 bits Input impedance – >100 kΩ Under-range indication – -100 mV
Potentiometer Input Characteristics	Nominal signal range (span) – 0 to 100% of travel Potentiometer resistance – 100Ω to 10 kΩ Excitation voltage (nom.) – 10 V (from 2.2 kΩ source) Resolution (≥1kΩ potentiometer) – 14 bits Resolution (100Ω potentiometer) – 11 bits
Accuracy (at 25 °C)	± 0.1% of span
Isolation	Any channel to Railbus – 100 VAC Between channels – None
Configurable Parameters	
Input Type (per channel)	Voltage / Potentiometer
Alarms	High and low
Alarm Deadband (hysteresis)	User defined value
Input Filter Time Constant	User defined value
Input Dead Zone	User defined value
Drive on Open Circuit	Disabled / upscale / downscale
Channel Status	Active / Inactive
Lead Compensation	User defined value
Response Time	
Signal Change to Availability on Railbus	33 ms (max.)
Open Circuit Line Fault Detection Time	≤ 5 s
Safety	
Field Wiring Protection	[EExia] IIC
Safety Description (each channel non linear output)	$U_o \leq 15.75$ V, $I_o \leq 20$ mA, $P_o \leq 0.315$ W
FM Entity Parameters	$V_{oc} = 15.75$ V, $I_{sc} = 20$ mA, $C_a = 0.22$ µF, $L_a = 5$ mH
Power Supplies	
IS Railbus (12V) current	Typical – 200 mA Max with voltage/current inputs – 250 mA Max. with 100Ω potentiometer inputs – 350 mA
Power Dissipation Within Module	Max with voltage/current inputs – 3 W Max. with 100Ω potentiometer inputs – 4.2 W
Module Key Code	C4
Module Width (mm)	42
Weight (g)	200
Field Terminals – Field Wiring Type	
Intrinsically Safe, Standard	8623-FT-IS



8-channel Analog Input

8-channel Analog Input, Thermocouple and mV features:

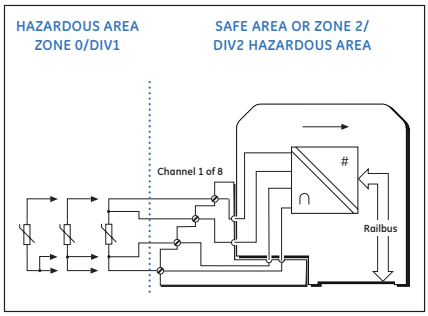
- 8 input channels
- Intrinsically safe field circuits
- Thermocouple and mV
- Cold junction compensation (internal or remote)
- Built-in thermocouple linearization
- Channels independently configurable
- Open-circuit field wiring detection

	8205-TI-IS
Product Name	**8-channel Analog Input, Thermocouple and mV**
Lifecycle Status	Active
Inputs	
Number of Channels	8
THC Inputs	B,E,J,K,N,R,S or T to EN 60584-1: 1995; W3 and W5 to ASTM E 988-96 Russian K and Russian L to rOCT 3044-84 User definable linearization table, Note 1
Temperature Drift	< ± 0.003% of span/°C
Cold Junction Compensation Error†	< ± 1°C (– 40 to + 70°C)
Accuracy (% of Span)	
Ambient Temperature	mV inputs: THC inputs:
25° C	± 0.05% ± 0.05%
+10 to +40° C	± 0.08% ± 0.1%
-40 to +70° C	± 0.18% ± 0.3%
Resolution	16 bits
Common Mode Rejection	>87 dB @ 50/60 Hz
Series Mode Rejection	>50 dB @ 50/60 Hz
Common Mode Voltage Between Channels	± 5 V (max.)
Absolute Maximum Input Voltage	± 30 V
Isolation (any channel to Railbus)	60 V peak
Configurable Parameters	
Sensor Type	User selectable
Alarms	High and low
Input Dead Zone	User defined value
Selectable Input Filtering	Off / 2 reading avgerage / running avgerage
Drive on Open Circuit Fault	Disabled / upscale / downscale
Channel Status	Active / Inactive
Cold Junction Compensation	Enable / disable / channel number
Response Time	
Analog Signal Change to Availability on Railbus	600 ms (max.)
Safety	
Field Wiring Protection	[EEx ia] IIC
Safety Description (each channel)	Channels 1, 2, 3, 4, 7 and 8, wired as separate IS circuits – U_o = 16.4 V, I_o = 79 mA, P_o = 0.33 W Channels 5 and 6, wired as separate IS circuits – U_o = 1 V, I_o = 1.1 mA, P_o = 0.3 mW (Input terminals are equivalent to non-energy storing apparatus)
FM Entity Parameters	Channels 1, 2, 3, 4, 7 and 8, wired as separate IS circuits – V_{oc} = 16.4 V, I_{sc} = 63.7 mA, P_o = 131mW Channels 5 and 6, wired as separate IS circuits – U_o = 1 V, I_o = 1 mA, P_o = 0.25 mW
Power Supplies	
IS Railbus (12V) Current	120 mA (max.)
Power Dissipation Within Module	1.5 W (max.)
Module Key Code	C1
Module Width (mm)	42
Weight (g)	245
Field Terminals – Field Wiring Type	
Intrinsically Safe THC	8625-FT-IS

Notes:

Consult GE for support in BIM/configurator.

†Cold junction compensation located in recommended field terminal.



8-channel Analog Input

8-channel Analog Input, RTD and Ω features:

- 8 input channels
- Intrinsically safe field circuits
- RTD and Ω
- 2-, 3- and 4-wire RTD format
- Channels independently configurable
- Channels are o/c failure independent

	8206-TI-IS
Product Name	**8-channel Analog Input, RTD and Ω**
Lifecycle Status	Active
Inputs	
Number of Channels	8
RTD Inputs	(2-, 3- or 4-wire) Pt100, Pt500 to BS EN60751: 1996 Ni120 to DIN 43 760: 1985 jPt100 to JIS C1604: 1981 User definable linearization table, note 1
Input type	Range
Pt100, Pt500	-200 to +850° C
jPt100	-200 to +650° C
Ni120	-60 to +250° C
Resistance Input	
Excitation current	Range
211 mA	0 to 110 Ω
211 mA	0 to 280 Ω
211 mA	0 to 470 Ω
48 mA	0 to 2000 Ω
Accuracy (% of span), see note 2	
Ambient Temperature	RTD & Ω inputs
25° C	± 0.05%
+10 to +40° C	± 0.1%
-40 to +70° C	± 0.2%
Cable Resistance per Loop	50 W (max)
RTD Excitation Current	211 µA (nom.)
Compliance Voltage of Current Source	6.8 V
Resolution	16 bits
Series Mode Rejection	>50 dB @ 50/60 Hz
Isolation (any channel to Railbus)	60 V peak
Configurable Parameters	
Sensor Type	User selectable
Alarms	High and low
Input Dead Zone	User defined value
Selectable Input Filtering	Off / 2 reading average / running average
Drive on Open Circuit Fault	Disabled / upscale / downscale
Channel Status	Active / Inactive
Offset (2-wire RTD mode)	User defined value
Response Time – Signal Change to Availability on Railbus	600 ms (max.)
Safety	
Field Wiring Protection	[EEx ia] IIC
Safety Description (all channels combined)	U_o = 16.4 V, I_o = 217 mA, P_o = 0.9 W
FM Entity Parameters	V_{oc} = 16.4 VDC , I_{sc} = 350 mA, P_o = 718 mW
Power Supplies	
IS Railbus (12V) Current	120 mA (max.)
Power Dissipation Within Module	1.5 W (max.)
Field Terminals – Field Wiring Type	
Intrinsically Safe Standard	8626-FT-IS
Module Key Code	C3
Module Width (mm)	42
Weight (g)	245

Notes:

Consult GE for support in BIM/configurator.

For Pt500 and 0 to 2000 Ω ranges a deviation of 0 to + 0.1% of reading is to be added for channel 1 or any channel preceded by a lower resistance range.

PAC8000 2/2 Temperature, Voltage and Universal Analog Input Modules

These modules provide digitized data and status information of analog measurements from thermocouples, mV sources, RTDs and resistance sources. The Universal Module can also be configured for 4-20 mA and Voltage input operation.

Cold junction compensation for thermocouple applications is provided by means of a sensor in the dedicated field terminal.

RTD modules provide channels for monitoring input signals from RTD or resistance sources. The RTD can be 2-, 3- or 4-wire type.

Only the recommended field terminals can be used with these modules.

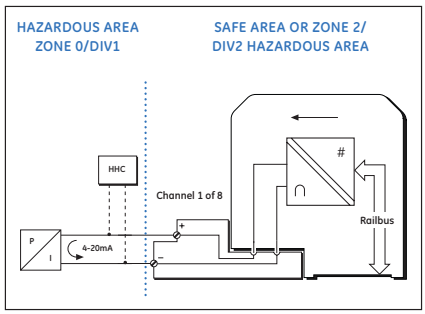
	8105-TI-TC	8106-TI-RT	8119-VI-05	8132-AI-UN
Product Name	**4-channel THC/mV Input**	**4-channel RTD or Resistance Input**	**8-channel Voltage Input**	**8-channel Universal AI**
Lifecycle Status	Active	Active	Active	Active
Module Type	Analog Input	Analog Input	Voltage Input	Analog Input
Range	Thermocouple / 0 to +120 mV	RTD (0-500 ohm)	0.19 to 5.64 VDC	4 to 20 mA/THC/RTD/Voltage
Bussed Field Power	N/A	N/A	24 VDC ±10%, 60 mA	24 VDC ±10%, 300 mA (4-20 mA with excitation), 125 mA (All other configurations)
Transmitter Type	N/A	2, 3 or 4 wire	N/A	2 or 4 wire
Sensor Type	B, E, J, K, N, R, S, T, W3, W5 Russian K, L mV (0 to +120 mV)	Pt100 to BS1904/DIN43760/ IEC 75Ni120; jPt100 to JIS C1604: 1989	1-5 VDC	THC: B, E, J, K, N, R, S, T, W3, W5, Russian K, Russian L, RTD (2 or 3 wire): Pt100, jPt100, Pt200, Pt500, Ni120, Cu10, Volt: ±120 mV, 0-1 V, 0-5 V, 1-5 V, 0-10 V, ±10 V
Output Current	N/A	RTD Excitation Current: 200 µA (nom.)	User-Defined Active/Inactive	25 mA max.
LED Indicators	Power, Fault, 4 x Channel Status	Power, Fault, 4 x Channel Status	Power, Fault, 8 x Channel Status	Power, Fault, 8 x Channel Status
Alarms	High/Low	High/Low	High, High-High, Low, Low-Low	High-High, High, Low, Low-Low
Alarm Deadband	Fixed at 1%	Fixed at 1%		User-Defined
Action on Line Fault Detection	Off, Drive Upscale or Drive Downscale	Off or Drive Upscale	Off, Drive Upscale or Drive Downscale	O/C Detection <1 sec
Resolution	15-bit plus sign	15-bit plus sign	16-bits	15-bit (mA) 14-bit (THC, RTD, Volt and Resistance)
Accuracy (% of span)	25°C ±0.05%, +10 to 40°C ±0.1% -40 to 70°C ±0.3%	25°C ±0.05%, +10 to 40°C ±0.1% -40 to 70°C ±0.2%	±0.1% of span ±0.05% of span repeatability	10°C to 40°C – ±0.1% to 0.3% (depends on input type) -40°C to 70°C – ± 0.2% to 0.5% (depends on input type)
Repeatability			0.05% of span	0.05% of span
Response Time*	120 ms min. 420 ms max.	180 ms min. 840 ms max.	27 ms	11 ms min. (reduced resolution) 505 ms max.
Channel to Channel Isolation	None	None	None	250 VAC rms
Input Dead Zone	User-Defined; Zero Default	User-Defined; Zero Default	User-Defined; Zero Default	User-Defined; Zero Default
HART Data	N/A	N/A	N/A	N/A
Filtering	Off, 2-Reading Avg. Running Avg.	Off, 2-Reading Avg. Running Avg.	User Selectable Filter and Sample Rates	User Selectable Filter and Sample Rates
Field Circuits	Non-incendive	Non-incendive	Non-incendive	Non-incendive
System Power (12 V)	150 mA typ., 200 mA max.	150 mA typ., 200 mA max.	100 mA typ., 150 mA max.	60 mA typ., 100 mA max.
Module Key Code	C1	C3	A1	A1
Module Width (mm)	42	42	42	42
Module Weight (g)	200	200	200	230
Compatible Field Terminals				
General Purpose Wiring	8605-FT-TC	8606-FT-RT	8615-FT-4W	
Non-incendive Wiring	8605-FT-TC	8606-FT-RT	8615-FT-4W	
Common PAC8000 Specifications	See Section xx for System Specifications	See Section xx for System Specifications	See Section xx for System Specifications	See Section xx for System Specifications

*Depends on filter and sample time configuration.

PAC8000 2/2 4-20 mA Analog Output Modules

PAC8000 4-20 mA Analog Output modules feature eight channels, with or without HART capability. The HART module can obtain information from HART instruments of protocol revision 5.0 or later. Each channel can communicate with a single HART instrument. HART Universal Command 3 can be used to gather up to four dynamic HART process variables together with status information.

	8102-HO-IP	8104-AO-IP
Product Name	**8-channel AO, 4-20 mA with HART**	**8-channel AO, 4-20 mA**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output
Range	4 to 20 mA	4 to 20 mA
Bussed Field Power	24 VDC ±10% 300 mA max.	24 VDC ±10% 300 mA max.
Sample Rate	20 ms	20 ms
Full Signal Range	1 to 23 mA	1 to 23 mA
Channel State	User-Defined Active/Inactive	User-Defined Active/Inactive
LED Indicators	Power, Fault 8 x Channel Status	Power, Fault 8 x Channel Status
Open Loop Detection	0.7 ±0.25 mA for 1 sec	0.7 ±0.25 mA for 1 sec
HART Data	Pass through and acquisition	N/A
Resolution	12 bits stored as 16-bit unsigned	12 bits stored as 16-bit unsigned
Accuracy (Over Temp. Range)	±0.25% of span	±0.25% of span
Response Time	25 ms max. (mA mode) 0.75 s per channel (Hart mode)	25 ms max.
Channel to Channel Isolation	No	No
Channel to Railbus Isolation	100 VAC	100 VAC
Field Circuits	Non-incendive	Non-incendive
System Power (12 V)	100 mA typ. 150 mA max.	100 mA typ. 150 mA max.
Module Key Code	A4	A4
Module Width (mm)	42	42
Module Weight (g)	200	200
Compatible Field Terminals		
General Purpose Wiring	8602-FT-ST 8604-FT-FU	8602-FT-ST 8604-FT-FU
Non-incendive Wiring	8601-FT-ST 8603-FT-FU	8601-FT-ST 8603-FT-FU
Common PAC8000 Specifications	See Section xx for System Specifications	See Section xx for System Specifications

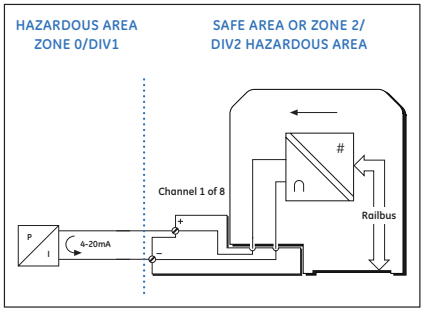


8-channel Analog Output

8-channel Analog Ouput, 4–20 mA with HART features:

- 8 single-ended output channels
- Intrinsically safe field circuits
- 4–20 mA for I/P converters
- Open-circuit field wiring detection
- HART pass-through
- HART variable and status reporting

	8202-HO-IS
Product Name	**8-channel Analog Output, 4–20 mA with HART**
Lifecycle Status	Active
Outputs	
Number of Channels	8
Nominal Signal Range (span)	4 to 20 mA
Full Signal Range	1 to 22 mA
Voltage to Load	13 V min. @ 20 mA
Load Resistance	0 to 650 Ω max.
Accuracy (@ 25°C)	± 20 µA
Temperature Stability	(-40°C to + 70 °C) – ± 0.006% of span per °C
Resolution	12 bits
Open Circuit Detection Threshold	> 685 Ω (typ.) (also detects loads greater than driveable range)
Isolation	Any channel to Railbus – 60 VAC Between channels – None
Configurable Parameters	
Output Initialization State	Predefined value
Drive on "Fail-safe"	Upscale / downscale / last value
Channel Status	Active / Inactive
HART Variable and Status Reporting	Enable / Disable
Response Time	
Railbus Command to Output Change	4-20 mA mode – 20 ms (typ.) – 80 ms* (max.) HART mode – 1 s per channel
Safety – Location of Module	
Field Wiring Protection	[EEx ia] IIC
Safety Description (each channel)	V_o = 24.6 V, I_o = 93 mA, P_o = 0.57 W
FM Entity Parameters	$V_{oc} \leq$ 24.6 VDC, $I_{sc} \leq$ 93 mA $C_a \leq$ 0.42 µF, $L_a \leq$ 4.2 mH
Power Supplies	
IS Railbus (12V) Current	All channels @ 22 mA into 650 Ω load – 630 mA
Power Dissipation Within Module	4.1 W (max.)
Module Key Code	A4
Module Width (mm)	42
Weight (g)	265
Field Terminals – Field Wiring Type	
Intrinsically Safe Standard	8621-FT-IS
Intrinsically Safe Loop Disconnect	8622-FT-IS

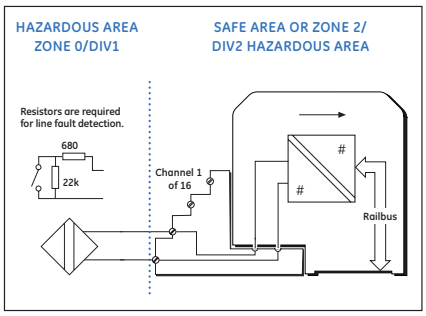


8-channel Analog Output

8-channel Analog Output, 4–20 mA features:

- 8 single-ended output channels
- Intrinsically safe
- Conventional 4–20 mA
- Open-circuit field wiring detection

	8204-HO-IS
Product Name	**8-channel Analog Output, 4–20 mA**
Lifecycle Status	Active
Outputs	
Number of channels	8
Nominal Signal Range (span)	-4 to 20 mA
Full Signal Range	1 to 22 mA
Voltage to Load	13 V min. @ 20 mA
Load Resistance	450 Ω max.
Accuracy (@ 25°C)	± 20 µA
Temperature Stability	(-40°C to +70 °C) – ± 0.006% of span per °C
Resolution	12 bits
Open Circuit Detection Threshold	0.7 mA ± 0.2 mA
Isolation	Any channel to Railbus – 60 VAC Between channels – None
Configurable Parameters	
Output Initialization State	Predefined value
Drive on "Fail-safe"	Upscale / downscale / last value
Channel Status	Active / Inactive
Safety	
Field Wiring Protection	[EEx ia] IIC
Safety Description	V_o = 24.6 V, I_o = 93 mA, P_o = 0.57 W
Power Supplies	
IS Railbus (12V) Current	All channels @ 22 mA into 530 Ω load – 630 mA
Power Dissipation Within Module	3.8 W (max.)
Module Key Code	A4
Module Width (mm)	42
Weight (g)	245
Field Terminals – Field Wiring Type	
Intrinsically Safe Standard	8621-FT-IS
Intrinsically Safe Loop Disconnect	8622-FT-IS



16-channel Discrete Input

16-channel Discrete Input, Switch/proximity detector features:

- 16 single-ended input channels
- Intrinsically safe field circuits
- Simple apparatus, dry contacts or IS proximity detectors
- Open and short-circuit field wiring detection

	8220-DI-IS
Product Name	**16-channel Discrete Input, Switch/proximity detector**
Lifecycle Status	Active
Inputs	
Number of Channels	16
OFF Current	<1.2 mA
ON Current	>2.1 mA
Switching Hysteresis	200 µA (nom.)
Applicable Specifications	NAMUR, DIN19234
Voltage Applied to Sensor	7.0 to 9.0 V from 1 kΩ ±10%
Output (wetting) Current	@ 100Ω line impedance >6 mA
Line Fault Detection	Short circuit <100 Ω Open circuit >90 kΩ
Maximum Input Frequency in Pulse Counting Mode	20 Hz
Minimum Pulse Width Detected	45 ms
Configurable Parameters	
Selectable Input Filter	Fast, slow or user defined (User defined permits 0 to 512 ms values in 3ms steps)
Latch Inputs	Enable / Disable
Latch Polarity	Latch on high / latch on low
Pulse Counting	Enable / Disable
Line Fault Detection	Enable / Disable
Response Time	
Field Event to Availability on Railbus	6 ms (max.)
Safety	
Field Wiring Protection	[EEx ia] IIC
Safety Description (each channel)	U_o = 10.5 V, I_o = 14 mA, P_o = 0.04 W
FM Entity Parameters	$V_{oc} \leq$ 10.5 VDC, $I_{sc} \leq$ 14 mA $C_a \leq$ 2.67 µF, $L_a \leq$ 176 mH
Isolation	Any channel to Railbus – 60 VAC (channels arranged in two groups of eight, with returns commoned within each group)
Power Supplies	
IS Railbus (12V) Current	(16-channel mode) – 350 mA (max.) (8-channel mode) – 285 mA (max.)
Module Key Code	B1
Module Width (mm)	42
Weight (g)	170
Field Terminals – Field Wiring Type	
Intrinsically Safe, 16-channel	8623-FT-IS
Intrinsically Safe, 8-channel Loop Disconnect	8624-FT-IS

PAC8000 2/2 DC Discrete Input Modules

PAC8000 2/2 DC Discrete Input Modules can accept up to 8, 16 or 32 discrete inputs, depending on module type. Inputs can be from dry contacts, NAMUR standard proximity detectors or switched voltages. The source voltage for the field wiring can be provided through the module (sourcing) or from an independent field supply (sinking). In operation, the input voltage is compared against a threshold voltage to create a 'true' or 'false' condition. A pulse counter is also included, which can count the number of input pulses for each of the channels.

The 8127-DI-SE module is capable of carrying out time stamping of input changes for sequence of events recording.

	8109-DI-DC	8110-DI-DC	8121-DI-DC
Product Name	**8-channel DI, 24 VDC, isolated, sinking**	**8-channel DI, 24 VDC, non-isolated, sourcing**	**16-channel DI, 24 VDC, non-isolated, sourcing**
Lifecycle Status	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input
Maximum Voltage	-25 V to +30 VDC	As per Bussed Field Power	As per Bussed Field Power
Latch	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low
Pulse Counting	Enable/Disable	Enable/Disable	Enable/Disable
LED Indicators	Power Fault 8 x Channel Status	Power Fault 8 x Channel Status	Power Fault 16 x Channel Status
Line Fault Detection	No	No	No
Filtering	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps
Input OFF	<3.2 VDC	<0.69 mA	<0.3 mA
Input ON	>11 VDC	>2.24 mA	>1.2 mA
Wetting Current	6.3 mA typ.	5 mA typ.	2.8 mA typ.
Minimum Pulse Width	3 ms	3 ms	5 ms
Maximum Switching Frequency	200 Hz	200 Hz	100 Hz
Response Time (max.)			
Channel to Channel Isolation		None	None
Channel to Railbus Isolation	250 VAC	250 VAC	250 VAC
Bussed Field Power Required	N/A	40 mA, 18-30 VDC	60 mA, 18-30 VDC
Field Circuits	Non-incendive	Non-incendive	Non-incendive
System Power (12 V)	35 mA typ., 55 mA max.	35 mA typ., 55 mA max.	90 mA typ., 135 mA max.
Module Key Code	B2	B1	E1
Module Width (mm)	42	42	42
Module Weight (g)	170	170	210
Compatible Field Terminals			
General Purpose Wiring	8602-FT-ST 8604-FT-FU	8602-FT-ST 8604-FT-FU	8617-FT-NI
Non-incendive Wiring	8610-FT-NA 8611-FT-FU	8601-FT-ST 8603-FT-FU	8617-FT-NI
Common PAC8000 Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications

PAC8000 2/1 Discrete Input Module

The PAC8000 Intrinsically Safe Discrete Input Module can interface to 16 channels of switch or proximity detector inputs. Open and short circuit line fault detection are provided for all input types. The inputs can be configured to latch or to be pulse counting – up to a frequency of 20 Hz with a minimum pulse width of 45 ms.

	8121-DI-DC
Product Name	**16-channel Intrinsically Safe DI Switch/ proximity Detector Discrete Input**
Lifecycle Status	Active
Module Type	Discrete Input
Latch	User-Defined: Enable/Disable High/Low
Pulse Counting	Enable/Disable
LED Indicators	Power, Fault 16 x Channel Status
Line Fault Detection	Short circuit <100 Ω Open circuit >90 kΩ
Input OFF	<1.2 mA
Input ON	>2.1 mA
Wetting Current	>6 mA
Minimum Pulse Width	6 ms
Maximum Pulse Frequency	20 Hz
Response Time (max.)	
Channel to Channel Isolation	None
Channel to Railbus Isolation	60 VAC (channels arranged in two groups of 8, with returns commoned within each group)
Field Circuits	[EEx ia] IIC
System Power (12 V)	350 mA max. (16-ch mode) 285 mA max. (8-ch mode)
Module Key Code	B1
Module Width (mm)	42
Module Weight (g)	170
Compatible Field Terminals	8623-FT-IS 8624-FT-IS
Common PAC8000 Specifications	See Section 14 for System Specifications

PAC8000 2/2 DC Discrete Input Modules

PAC8000 2/2 DC Discrete Input Modules can accept up to 8, 16 or 32 discrete inputs, depending on module type. Inputs can be from dry contacts, NAMUR standard proximity detectors or switched voltages. The source voltage for the field wiring can be provided through the module (sourcing) or from an independent field supply (sinking). In operation, the input voltage is compared against a threshold voltage to create a 'true' or 'false' condition. A pulse counter is also included, which can count the number of input pulses for each of the channels.

The 8127-DI-SE module is capable of carrying out time stamping of input changes for sequence of events recording.

	8122-DI-DC	8125-DI-DC	8127-DI-SE
Product Name	**16-channel 24 VDC, isolated, sinking**	**32-channel DI, 24 VDC non-isolated, sourcing**	**32-channel SOE DI 24 VDC non-isolated, sourcing**
Lifecycle Status	Active	Active	Active
Module Type	Discrete Input	Discrete Input	SOE Input
Maximum Voltage	-25 V to +30 VDC	As per Bussed Field Power	0 to 12 VDC
Latch	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low
Pulse Counting	Enable/Disable	Enable/Disable	Enable/Disable
LED Indicators	Power Fault 16 x Channel Status	Power Fault 32 x Channel Status	Power Fault 32 x Channel Status
Line Fault Detection	No	Short circuit <100 Ω, Open circuit <50 µA	Short circuit <100 Ω, Open circuit <50 µA
Filtering	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps
Input OFF	<3.4 VDC	<1.2 mA	<1.2 mA
Input ON	>11 VDC	>2.1 mA	>2.1 mA
Wetting Current	2.8 mA typ.	8.6 mA typ.	8.6 mA typ.
Minimum Pulse Width	5 ms	250 µs	250 µs
Maximum Switching Frequency	100 Hz	500 Hz	500 Hz
Response Time (max.)			
Channel to Channel Isolation	150 V peak	None	None
Channel to Railbus Isolation	250 VAC	250 VAC	250 VAC
Bussed Field Power Required	N/A	190 mA, 18-30 VDC	190 mA, 18-30 VDC
Field Circuits	Non-incendive	Non-arcing	Non-incendive
System Power (12 V)	90 mA typ., 135 mA max.	<50 mA	<50 mA
Module Key Code	E2	B3	B3
Module Width (mm)	42	42	42
Module Weight (g)	210	185	185
Compatible Field Terminals			
General Purpose Wiring	8617-FT-NI	8617-FT-NI 8619-FT-MT*	8617-FT-NI 8619-FT-MT*
Non-incendive Wiring	8617-FT-NI	8617-FT-NI 8619-FT-MT*	8617-FT-NI 8619-FT-MT*
Common PAC8000 Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications

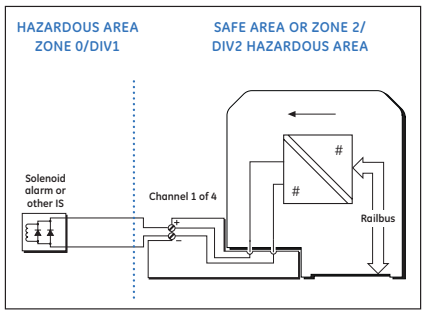
* When using 8619-FT-MT mass termination assembly, channel current should be externally limited to 250 mA. Ensure both ribbon cables are in place.

When used with a PAC8000 Controller or the Ethernet BIM, the 8127-DI-SE can perform time stamping on input data to within 0.25 ms (max.) between two channels within the same module, 0.5 ms (max.) for channels on different modules on the same node and 5 ms (typ.) for channels on different nodes (the latter depending mainly on the accuracy of the Network Time Reference employed). The module can store up to 480 events. The execution cycle of the node must be such that the event store does not overflow between consecutive reads of the module by the Controller. The maximum recording rate for the SOE module is 64k events / second. SOE functions are not supported on serial BIMs (8502-BI-DP, 8505-BI-MB, 8507-BI-DP) or the PROFINET BIMs (8515-BI-PN, 8516-BI-PN).

PAC8000 2/2 AC Discrete Input Modules

AC Discrete Input modules can accept up to 8 or 16 inputs, depending on module type. The source voltage for field switching can be provided through the module (sourcing modules) or from an independent field supply (sinking modules). In operation, the input voltage is compared against a threshold voltage to create a 'true' or 'false' condition. A pulse counter is also included which can count the number of input pulses for each of the channels.

	8111-DI-AC	8112-DI-AC	8113-DI-AC	8114-DI-AC	8140-DI-AC
Product Name	**8-channel DI, 115 VAC, isolated, sinking**	**8-channel DI, 115 VAC, non-isolated, sourcing**	**8-channel 230 VAC, isolated, sinking**	**8-channel DI, 230 VAC, non-isolated, sourcing**	**16-channel DI, 115 VAC, isolated, sinking**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Latch	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low	User-Defined: Enable/Disable High/Low
Pulse Counting	Enable/Disable	Enable/Disable	Enable/Disable	Enable/Disable	Enable/Disable
Pulse Counting Maximum Frequency					
Pulse Counting Minimum Pulse Width					
LED Indicators	Power Fault 8 x Channel Status	Power Fault 8 x Channel Status	Power Fault 8 x Channel Status	Power Fault 8 x Channel Status	Power Fault 16 x Channel Status
Line Fault Detection	No	No	No	No	No
Filtering	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps	Fast (22 ms), Slow (258 ms) or User Defined: 2 to 512 ms in 2 ms steps
Input OFF	<34 VAC	<0.56 mA	<68 VAC	<0.28 mA	<34 VAC
Input ON	>84 VAC	>1.4 mA	>168 VAC	>0.71 mA	>84 VAC
Wetting Current	2 mA nominal	2 mA nominal	1 mA nominal	1 mA nominal	1.9 mA nominal
Maximum Input Voltage	130 VAC	As Bussed Field Power	265 VAC	As Bussed Field Power	
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Response Time (max.)	33 ms	33 ms	33 ms	33 ms	33 ms
Channel to Channel Isolation		No		No	275 VAC max. between 4-ch blocks
Channel to Railbus Isolation					275 VAC max.
Bussed Field Power Required	No		No		No
Field Circuits	Non-arcing	Non-arcing	Non-arcing	Non-arcing	Non-arcing
Railbus Current (12 V)	40 mA typ., 60 mA max.	40 mA typ., 60 mA max.	40 mA typ., 60 mA max.	40 mA typ., 60 mA max.	110 mA typ.
Module Key Code	E4	E1	E5	E2	E3
Module Width (mm)	42	42	42	42	42
Module Weight (g)	170	170	170	170	170
Compatible Field Terminals					
General Purpose Wiring	8602-FT-ST 8604-FT-FU	8604-FT-FU 8602-FT-ST	8602-FT-ST 8604-FT-FU	8604-FT-FU 8602-FT-ST	8612-FT-NA
Non-incendive Wiring	8610-FT-NA 8611-FT-FU	8611-FT-FU 8610-FT-NA	8610-FT-NA 8611-FT-FU	8611-FT-FU 8610-FT-NA	8612-FT-NA
Common PAC8000 Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications



4-channel Discrete Output

4-channel Discrete Output, 4 Solenoid driver, IIC gas groups features:

- 4 single-ended output channels
- Intrinsically safe field circuits
- Solenoid valves and alarms or LED indicators
- Line-fault detection

	8215-DO-IS
Product Name	**4-channel Discrete Output, 4 Solenoid driver, IIC gas groups**
Lifecycle Status	Active
Outputs	
Number of Channels	4
Minimum Output Voltage	Open circuit – 22 V 45 mA load – 11 V
Maximum Output Voltage	25 V
Current Limit per Channel	45 mA (min.)
Output Supply Ripple	<0.5% of output (pk. to pk.)
Line Fault Detection	Short circuit – <15 Ω Open circuit – >13 kΩ
Isolation	Any channel to Railbus – 60 VAC Between channels – None
Configurable Parameters	
Output Initialization State	High / low
Output State on "Fail-safe"	High / low / last value
Channel Status	Active / Inactive
Operation Mode	Static / dynamic
Output	Discrete / momentary pulse / continuous pulse
Pulse Width	2 ms to 130 s
Duty Cycle	2 ms to 130 s (0.01% to 99.99%)
Line Fault Detection	Enable / Disable
Response Time	
Railbus Command to Output Change	10 ms (typ.)
Safety	
Field Wiring Protection	[EEx ia] IIC
Safety Description (each channel)	V_o = 25 V, I_o = 110 mA, P_o = 0.69 W
FM Entity Parameters	$V_{oc} \leq$ 25 VDC, $I_{sc} \leq$ 110 mA $C_a \leq$ 0.19 µF, $L_a \leq$ 3.15 mH
Power Supplies	
IS Railbus (12V) Current	560 mA (max.)
Power Dissipation Within Module	3.7 W (max.)
Module Key Code	B5
Module Width (mm)	42
Weight (g)	220
Field Terminals – Field Wiring Type	
Intrinsically Safe Standard	8621-FT-IS
Intrinsically Safe Loop Disconnect	8622-FT-IS

PAC8000 2/2 DC Discrete Output Modules

DC discrete output modules can provide 8 or 16 discrete channels, depending upon module type. The output voltage for the sourcing types is determined by the Bussed Field Power connected to the I/O Carrier. (Note – each BFP connection provides the field power to two adjacent I/O modules). All modules feature solid state relay outputs for reliability – with 8-channel modules switching 1 A per channel continuous and 16-channel modules switching 0.5 A continuous. Higher currents can be switched for short periods of time, with the limit of 16 A per module. 8-channel modules can be used with the field terminals that include fused disconnects to simplify panel design.

	8115-DO-DC	8117-DO-DC	8142-DO-DC
Product Name	**8-channel DO, 2-60 VDC, non-isolated, sourcing**	**8-channel DO, 2-60 VDC, isolated, sinking**	**8-channel DO, 24 VDC, non-isolated, sourcing**
Lifecycle Status	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output
Output Voltage	2 to 60 VDC	2 to 60 VDC	12 to 42 VDC
Output Modes	Discrete / Momentary or Continuous Pulsed	Discrete / Momentary or Continuous Pulsed	Discrete / Momentary or Continuous Pulsed
LED Indicators	Power, Fault 8 x Channel Status	Power, Fault 8 x Channel Status	Power, Fault 8 x Channel Status
Line Fault Detection	No	No	No
Pulse Width	2 ms to 130 s	2 ms to 130 s	500 ms to 60 s
ON Voltage Drop	0.25 V max.	0.25 V max.	<0.25 V @ 0.5 A/channel <0.75 V @ 6 A module total
OFF Leakage Current	1 mA max.	1 mA max.	1 mA max.
Switched Current (per channel)	1 A Continuous$^{\Delta}$ 4 A for <100 ms 6 A for <20 ms	1 A Continuous 4 A for <100 ms 6 A for <20 ms	0.5 A max. per channel 6 A max. per module
Min. Load Current per Channel	N/A	N/A	N/A
Response	1 ms	3 ms	2 ms
Bussed Field Power Required	2 to 60 VDC	No	12 to 42 VDC, 6 A max.
Field Circuits	Non-arcing	Non-arcing	Non-arcing
System Power (12 V)	75 mA typ., 125 mA max.	45 mA typ., 70 mA max.	80 mA typ., 125 mA max.
Module Key Code	B6	B5	B4
Module Width (mm)	42	42	42
Module Weight (g)	200	200	220
Compatible Field Terminals			
General Purpose Wiring	8604-FT-FU 8602-FT-ST 8611-FT-FT 8610-FT-NA	8604-FT-FU 8602-FT-ST 8611-FT-FT 8610-FT-NA	8612-FT-NA 8619-FT-MT* 8612-FT-NA
Non-incendive Wiring			
Common PAC8000 Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications

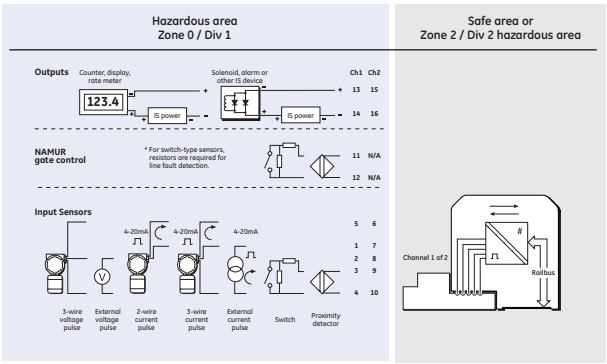
$^{\Delta}$ Note the 8129-IO-DC module can supply 2 A continuous at 24 VDC, if higher current capacity is required than can be supplied by the 8115-DO-DC.

* When using 8619-FT-MT mass termination assembly, channel current should be externally limited to 250 mA. Ensure both ribbon cables are in place.

PAC8000 2/2 AC Discrete Output Modules

AC Discrete Output modules can provide up to 8 outputs, sourcing or sinking, depending upon module type. The output voltage for the sourcing type is determined by the Bussed Field Power connected to the I/O Carrier. (Note – each BFP connection provides the field power to two adjacent I/O modules). Both modules feature solid state relay outputs for reliability – switching 1 A per channel continuous, (3 A maximum continuous for each module). Higher currents can be switched for short periods of time. Fused field terminals can be used to simplify panel design.

	8116-DO-AC	8118-DO-AC
Product Name	**8-channel DO, 20-265 VAC, non-isolated, sourcing**	**8-channel DO, 20-265 VAC, isolated, sinking**
Lifecycle Status	Active	Active
Module Type	Discrete Output	Discrete Output
Output Voltage	20 to 265 VAC 50/60 Hz	20 to 265 VAC 50/60 Hz
LED Indicators	Power, Fault 8 x Channel Status	Power, Fault 8 x Channel Status
Pulse Width	2 ms to 130 s	2 ms to 130 s
ON Voltage Drop	<1.2 V	<1.2 V
OFF Leakage Current	<4 mA	<4 mA
Switched Current (per channel)	1 A Continuous 5 A for <100 ms 20 A for <20 ms	1 A Continuous 5 A for <100 ms 20 A for <20 ms
Min. Load Current per Channel	11 mA @ 115 VAC 5 mA @ 230 VAC	11 mA @ 115 VAC 5 mA @ 230 VAC
Response Time	2 ms + 11/42 cycle of mains frequency	2 ms + 11/42 cycle of mains frequency
Bussed Field Power Required	20 to 265 VAC	No
Field Circuits	Non-arcing	Non-arcing
Railbus Current (12 V)	75 mA typ., 125 mA max.	75 mA typ., 125 mA max.
Module Key Code	F1	F4
Module Width (mm)	42	42
Module Weight (g)	220	220
Compatible Field Terminals		
General Purpose Wiring	8604-FT-FU 8602-FT-ST	8604-FT-FU 8602-FT-ST
Non-incendive Wiring	8611-FT-ST 8610-FT-NA	8611-FT-ST 8610-FT-NA
Common PAC8000 Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications



Pulse Input Module

Pulse Input Module, 2-channel pulse input features:

- 2 input channels with power supplies or single quadrature input
- 1 Hz to 50 kHz signal capability
- Frequency and acceleration measurement
- 2 alarm/repeater retransmitted output channels
- 2- and 3-wire pulse transmitter format
- Pulse counting (with gate control)
- Channels independently configurable
- Open circuit, short circuit and missing pulse detection

	8223-PI-IS
Product Name	**Pulse Input Module, 2-channel pulse input**
Lifecycle Status	Active
Pulse/Frequency	
Number of Channels	2
Frequency Range	50 kHz In quadrature mode – 12.5 kHz
Accuracy (25°C)	± 0.05% of span
Temperature Stability	0.005% / °C
Control Gate (for gating Channel 1 only)	
Switching Thresholds	1.2 mA / 2.1 mA
Input Impedance	1 kΩ
Supply Voltage	8.1 V (nom.) at 8 mA
Sensor Input Characteristics	
Namur 1	
Switching Thresholds	1.2 mA / 2.1 mA
Input Impedance	1 kΩ
Supply Voltage	8.1 V (nom.) at 8 mA
Current	
Input Signal	20 mA (max.)
Threshold	Configurable in 8 levels
Input Impedance	25 Ω
Open Circuit Current	<0.5 mA
Short Circuit Current	>21.5 mA
Voltage	
Input Signal	0 - 24 VDC (50 V max.)
Threshold	Configurable in 8 levels
Input Impedance	>10 kΩ
Switching Hysteresis	100 mV
Switch	
Input Voltage Range	0 – 10 VDC
Outputs: The outputs are open-collector type for separately powered IS devices such as LED clusters, annunciators or solenoids	
Number of Channels	2
OFF State Voltage	30 V (max)
OFF State Leakage Current	10µA (max)
ON State Voltage Drop	<1.0V @ 50 mA
ON State Current	100 mA
Retransmission Bandwidth	1 2000 Hz
Configurable Parameters	
Inputs	
Channel	Enable / Disable
Sensor type	NAMUR prox. type (select low / high speed) Current pulse input Voltage pulse input Switch input

table continued on next page

Frequency Ranges	0.1, 0.3, 0.5, 1, 3, 5, 10, 30, 50, 100† kHz
Sample Period	20 ms to 200 s
Quadrature	Enable / Disable
Threshold Level	User defined values
Triggering	Rising edge / falling edge
Filtering	Off, 1, 5, 20, 100 kHz
Alarms	Frequency / acceleration
Alarm Limits	High / low
Alarm Deadband (hysteresis)	User defined value
Line Fault Detect	Enable / Disable
Channel Status	Active / Inactive
Counter	Enable / Disable
Counting Direction	Count up / Count down
Discrete Output	
Function selection	Disabled High / low alarm Acceleration alarm Counter preset value reached Quadrature output (channel 1 only) Scaled retransmission (channel 1 only)
Retransmission Scaling (K factor channel 1 only)	1 – 25
Control Gate Input	
Counter (channel 1)	Start (count) / pause
Dynamic Data (Read only)	
Process Values	
Frequency	16 bit unsigned
Count	32 bit signed
Acceleration	16 bit signed
Status Values	
Frequency / acceleration alarms	High / low missing pulse detect
Line fault detect	Open / short circuit
Quadrature direction	1 = clockwise, 2 = anti-clockwise
Counter alarms	Preset value reached
Control Data (Write only)	
Counter Preset Value	32 bit signed Load preset value = 0 to disable
Counter Commands	Start / stop / reset (Note: Channel 1 counter can also be controlled by control gate input: 1 = start (count), 0 = pause
Isolation	
Any Channel to Railbus	60 VAC
Between Input Channels	None (common 0V connection)
Between Output Channels	30 VAC
Response Times	
Signal Change to Availability on Railbus	25 ms (max.)
Power Supplies	
Railbus Current (both channels @22 mA)	300 mA (max.)
Power Dissipation (both channels @22 mA)	2.8 W (max.) No load – 2.0 W (max.)
Module Key Code	F2
Module Width (mm)	42
Weight (g)	260
Safety	
Field Wiring Protection	[EEx ia] IIC ([EEx ia] IIB with BEI Optical Encoder)
The following figures are for Gas Groups A/B (IIC) unless otherwise stated.	
24V TX Supplies (Ch1 & Ch2)	U_o = 27.4 V, I_o = 93.2 mA, P_o = 639 m C_o = 0.087 µF, L_o = 4.2 mH
Current Inputs (Ch1 & Ch2)	U_o = ± 1.1 V, I_o = 53 mA, P_o = 15 mW Ui = 1.1 V, Ii = 50 mA C_o = 1000 µF, L_o = 13.1 mH
Voltage Inputs (Ch1 & Ch2)	
NAMUR Inputs (Ch1 & Ch2)	

table continued on next page

Notes:

†While measurements can be made in the upper half of this range, the stated accuracy applies only to frequencies up to 50kHz.

NAMUR Gate Input (Ch1)	U_o = 9.6 V, I_o = 25 mA, P_o = 57 mW Ui = 18.2 V, Pi = 333 mW C_o = 3.6 µF, L_o = 56.6 mH
Discrete Outputs (Ch1 & Ch2)	Ui = 30 V, Pi = 333 mW
All Circuits Combined Within One Channel	U_o = 28.5 V, I_o = 93.2 mA (or 169mA at 13.4V), P_o = 639 mW, C_o = 0.078 µF, L_o = 1.28 mH
FM Entity Parameters	
24V TX Supplies (Ch1 & Ch2)	U_o = 27.4 V, I_o = 93.2 mA, P_o = 639 mW C_a = 0.08 µF, L_a = 4.1 mH
24V TX Supplies (Ch1 & Ch2 connected together)	Gas Groups C,E (IIB): U_o = 27.4 V, I_o = 186.4 mA, P_o = 1.28 W C_a = 0.67 µF, L_a = 4.3 mH
Current Inputs (Ch1 & Ch2)	U_o = 1.2 V, I_o = 57.4 mA, P_o = 17.2 mW C_a = 1000 µF, $_{La}$ = 10.6 mH
3-wire Current Inputs (Ch1 & Ch2)	Gas Groups C,E (IIB): U_o = 27.4 V, I_o = 150.6 mA, P_o = 656 mW C_a = 0.67 µF, L_a = 6.4 mH
Voltage Inputs (Ch1 & Ch2)	U_o = 9.56 V, I_o = 1.0 mA, P_o = 2.39 mW C_a = 3.7 µF, L_a = 1000 mH
3-wire Voltage Inputs (Ch1 & Ch2)	U_o = 27.4 V, I_o = 93.2 mA, P_o = 642 mW C_a = 0.08 µF, L_a = 4.0 mH
NAMUR Inputs (Ch1 & Ch2)	
NAMUR Gate Input (Ch1)	Uo = 9.56 V, Io = 11.1 mA, Po = 26.4 mW Ca = 3.7 µF, La = 263 mH
Discrete Outputs (Ch1 & Ch2)	Ui = 30 V, Ii = 100 mA Ci = 0 µF, Li = 0 mH
Field Terminals – Field Wiring	
Intrinsically Safe, Standard	8621-FT-IS

Terminal Assignments

Terminal	Description	
1	Current input	Channel #1
2	Voltage input	
3	NAMUR input	
4	Common	
5	Power supply +ve	
6	Power supply + ve	Channel #2
7	Current input	
8	Voltage input	
9	NAMUR input	
10	Common	
11	NAMUR gate/control input	Channel #1
12	Common	
13	Output +ve	
14	Output -ve	
15	Output +ve	Channel #2
16	Output –ve	

PAC8000 2/2 Pulse/Quadrature Input Module

The PAC8000 Pulse/Quadrature Input Module is a 2-channel device, when used for simple pulse inputs, and a single channel device when used for quadrature pulse measurement with suitable encoders. In pulse mode the module can count pulses at up to 50kHz, in quadrature mode up to 12.5kHz. The unit can measure pulse counts, pulse frequency or rate of acceleration.

Pulse input channels can be configured independently to interface to 2- or 3-wire 4-20 mA transmitters, voltage or current sources and switches or proximity detectors. Thresholds for pulse counting can be configured by the user, depending on the field instrument type. When using dry contacts, if suitable resistors are incorporated in to the field wiring loop, the unit can detect open and short circuit line faults. Additional terminals are provided for re-transmission of the detected inputs (up to 2kHz) and to allow an input to "gate" (start/stop) the Channel 1 pulse counter.

	8123-PI-QU
Product Name	**Pulse/Quadrature Input**
Lifecycle Status	Active
Module Type	Pulse Input
Number of Channels	2 pulse counting inputs, 1 gate input, 2 re-transmission outputs
Max. Pulse Frequency	50kHz, 12.5kHz quadrature
Sensor Type	NAMUR Proximity Current Pulse, Voltage Pulse, Switch
LED Indicators	Power, Fault, 2 x Pulse Input Status 2 x Output Channel Status
Alarms	User-Defined: Preset Counter Value, Low/High Frequency Low/High Acceleration, Missing Pulse, Line Fault
Counter Type	Up/Down
Counter Resolution	32 bit
Counter Control Data	Start/stop/set/reset/preset
NAMUR Input Data	Thresholds 1.2 mA/2.1 mA Input impedance 1 kΩ, Supply voltage 8.1 V
Current Source Input Data	Input current 4-20 mA Thresholds 8 configurable levels, Input impedance 250 Ω
Voltage Source Input Data	Input voltage 0–24 VDC Thresholds 8 configurable levels, Input impedance >10 kΩ
Gate Input Data	Thresholds 1.2 mA/2.1 mA Input impedance 1 kΩ, Supply voltage 8.1 V
Output Channel Data	Sinking output, On state current 100 mA Off state leakage 10 µA max. On state voltage drop <1 V at 50 mA
Response Time	25 ms max.
Bussed Field Power Required	24 VDC ±10%
Field Circuits	Non-incendive
System Power (12 V)	50 mA typ., 70 mA max.
Module Key Code	F2
Module Width (mm)	42
Module Weight (g)	260
Compatible Field Terminals **General Purpose Wiring** **Non-incendive Wiring**	 8602-FT-ST 8601-FT-ST
Common PAC8000 Specifications	See Section 14 for System Specifications

PAC8000 2/1 Pulse/Quadrature Input Module

The PAC8000 Intrinsically Safe Pulse/Quadrature Input Module is a 2-channel device when used for simple pulse inputs, and a single channel device when used for quadrature pulse measurement with suitable encoders. In pulse mode the module can count pulses at up to 50kHz, in quadrature mode up to 12.5kHz. The unit can measure pulse counts, pulse frequency or rate of acceleration.

Pulse input channels can be configured independently to interface to 2- or 3-wire 4-20 mA transmitters, voltage or current sources and switches or proximity detectors. Thresholds for pulse counting can be configured by the user, depending on the field instrument type. When using dry contacts, if suitable resistors are incorporated in to the field wiring loop, the unit can detect open and short circuit line faults. Additional terminals are provided for re-transmission of the detected inputs (up to 2kHz) and to allow an input to "gate" (start/stop) the Channel 1 pulse counter.

	8123-PI-QU
Product Name	**Pulse/Quadrature Input**
Lifecycle Status	Active
Module Type	Pulse Input
Number of Channels	2 pulse counting inputs, 1 gate input, 2 re-transmission outputs
Max. Pulse Frequency	50 kHz, 12.5 kHz quadrature
Sensor Type	NAMUR Proximity, Current Pulse, Voltage Pulse, Switch
LED Indicators	Power, Fault, 2 x Pulse Input Status 2 x Output Channel Status
Alarms	User-Defined: Preset Counter Value, Low/High Frequency, Low/High Acceleration, Missing Pulse, Line Fault
Counter Type	Up/Down
Counter Resolution	32 bit
Counter Control Data	Start/stop/set/reset/preset
NAMUR Input Data	Thresholds 1.2 mA/2.1 mA Input impedance 1 kΩ Supply voltage 8.1 V
Current Source Input Data	Input current 4-20 mA Thresholds 8 configurable levels Input impedance >250 Ω
Voltage Source Input Data	Input voltage 0–24 VDC Thresholds 8 configurable levels Input impedance >10 kΩ
Gate Input Data	Thresholds 1.2 mA/2.1 mA Input impedance 1 kΩ, Supply voltage 8.1 V
Output Channel Data	Sinking output On state current 100 mA Off state leakage 10 µA max. On state voltage drop <1 V at 50 mA
Response Time	25 ms max.
Field Circuits	[EEx ia] IIC
System Power (12 V)	300 mA max. (both channels @ 22 mA)
Module Key Code	F2
Module Width (mm)	42
Module Weight (g)	260
Compatible Field Terminals	8621-FT-IS
Common PAC8000 Specifications	See Section 14 for System Specifications

PAC8000 2/2 DC Discrete HDC I/O Module

The PAC8000 Discrete HDC module is derived from the equivalent SafetyNet SIL 2 module – and features the same high level of internal and automatic Diagnostic Coverage (hence, HDC). The ability of the unit to detect and report its own internal faults ensures that, when used in redundant I/O applications, the Controller or host is provided with the data necessary to determine when operation should be switched to the standby module. The diagnostics also allow the host to be confident that the standby module has not developed a fault prior to being switched in as the new master.

The 8129-IO-DC has 8-channels which can be individually configured to be inputs or outputs. Outputs can switch up to 2 A per channel continuously and can also be configured to be pulse output.

	8129-IO-DC
Product Name	**8-channel DI/DO, 24 VDC non-isolated, sourcing with High Diagnostic Coverage**
Lifecycle Status	Active
Module Type	Discrete Input/Output Pulse Output
Input On / Off Threshold	0.9 mA typ.
Input Wetting Current	1.2 mA typ.
Input Minimum Pulse Width Detected	5 ms
Input Maximum Frequency in Pulse Counting Mode	30 Hz
Input Latching	User-Defined: Enable/Disable, Latch on High/Low
Pulse Counting	Up transition / Down transition / Disable
LED Indicators	Power, Fault 8 x Channel Status
Line Fault Detection	None, Open Circuit, Open and Short Circuit*
Input Filtering	0 to 8 s in 1 ms steps
Output Current	2 A per channel, 6 A per module (cont.) 8 A per module (<10s)
Output Minimum Pulse Width	1 ms to 60 s (pulse out)
Output Pulse Types	Pulse / Discrete / User selectable patterns
Frequency	30 Hz
Response Time	5 ms max. (inputs), 1 ms max. (outputs)
Channel to Channel Isolation	No
Channel to Railbus Isolation	250 VAC
Bussed Field Power Required	18-30 VDC, 50 mA (all inputs) 50 mA + output load (any outputs)
Field Circuits	Non-arcing
System Power (12 V)	50 mA typ., 70 mA max.
Bussed Field Power Input	24 VDC ±10%
Module Key Code	B6
Module Width (mm)	42
Module Weight (g)	210
Common PAC8000 Specifications	See Section 14 for System Specifications

* Only for inputs and normally de-energized outputs, not for normally energized outputs

PAC8000 2/2 4-20 mA Analog Input HDC Module

The PAC8000 4-20 mA Analog Input HDC module is derived from the equivalent SafetyNet SIL 2 module and features the same high level of internal and automatic Diagnostic Coverage (hence, HDC). The ability of the unit to detect and report its own internal faults ensures that, when used in redundant I/O applications, the Controller or host is provided with the data necessary to determine when operation should be switched to the standby module. The diagnostics also allow the host to be confident that the standby module has not developed a fault prior to being switched in as the new master.

Standard PAC8000 I/O Modules (such as the 4-20 mA Analog Output type) can be used with the Redundant Switching Module, but they do not carry the same level of internal diagnostic coverage as the HDC modules. The host would only switch to the standby module when line faults are detected or if the module enters failsafe as a result of a major internal fault.

The 8133-HI-TX has 8-channels for interfacing to conventional 4-20 mA circuits and supports both HART pass-through and acquisition.

	8133-HI-TX
Product Name	**8-channel, 4-20 mA AI with HART and High Diagnostic Coverage**
Lifecycle Status	Active
Module Type	Analog Input
Range	4 to 20 mA
Bussed Field Power Input	24 VDC ±10%, 300 mA (2-wire), 110 mA (4-wire)
Transmitter Type	2 or 4 wire
Sample Rate per Channel	27 ms
Full Signal Range	0.25-24 mA
Output Current	28 mA max.
Failsafe Mode	Low, high or hold last value
LED Indicators	Power, Fault, 8 x Channel Status
Alarms	Hi Hi, Hi, Lo, Lo Lo
Line Fault Detection	Open circuit <0.5 mA, Short circuit >23.5 mA
Resolution	16-bit unsigned
Accuracy (% of span)	±0.1%
Repeatability	0.05% of span
Response Time	25 ms max. (mA mode), 0.75 s per channel (Hart mode)
Channel to Channel Isolation	No
Dead Zone	User-Defined; Zero Default
HART Data	IEEE754 floating point
Filtering	Configurable
System Power (12 V)	50 mA typ., 70 mA max.
Module Key Code	A1
Module Width (mm)	42
Module Weight (g)	200
Compatible Field Terminals **General Purpose Wiring** **Non-incendive Wiring**	
Common PAC8000 Specifications	See Section 14 for System Specifications

PAC8000 2/2 Addressable Smoke and Heat Detector I/O Module

The PAC8000 Addressable Smoke and Heat Detector Module interfaces to devices that communicate Apollo Discovery protocol. Each module can manage a ring of devices – with both ends of the ring connected to a single module.

Up to 126 Apollo XP and Discovery devices (detectors, sounders, beacons and actuators) can interface to a single 8139-SH-DC module and each PAC8000 Node can support up to 10 8139-SH-DC modules. Intrinsically safe Apollo instruments are supported via Apollo protocol converters and isolators.

If required, like other standard modules, the 8139-SH-DC module can be mounted on SafetyNet Controller nodes to work alongside SIL 2 rated 4-20 mA point-to-point fire and gas detectors.

	8139-SH-DC
Product Name	**Addressable Smoke and Heat Detector Module**
Lifecycle Status	Active
Protocol Supported	Apollo Discovery for XP and Discovery detectors
Number of Devices	126
LED Indicators	Power, Fault Request, Status Poll IN, Poll OUT
Poll Time Per Device	Device not in alarm 45 ms typ. Device in alarm 135 ms typ.
Minimum Poll Time	600 ms
Channel to Railbus Isolation	250 VAC
Bussed Field Power Required	750 mA, 30 VDC max.
Field Circuits	Non-arcing
Railbus Current (12 V)	<100 mA
Module Key Code	C2
Module Width (mm)	42
Module Weight (g)	185
Compatible Field Terminals	
General Purpose Wiring	8610-FT-NA 8611-FT-FU
Non-incendive Wiring	8610-FT-NA 8611-FT-FU
Common PAC8000 Specifications	See Section 14 for System Specifications



PAC8000 PROFINET Bus Interface Modules

Newly Released PAC8000 PROFINET BIMs allow connection of PAC8000 I/O to remote hosts via PROFINET.

	8515-BI-PN	8516-BI-PN
Product Name	**PROFINET BIM – RJ45 copper connection**	**PROFINET BIM – Fiber Optic connection**
Lifecycle Status	Active*	Active*
Number of I/O Modules	14	14
Protocol Supported	PROFINET	PROFINET
BIM Redundancy	No (Yes from 2013)	No (Yes from 2013)
Baud Rate	10-100Mbaud	10-100Mbaud
LAN Redundancy	Ring	Ring
LAN Connector Type	RJ45	Fiber Optic
Maximum Bus Length	2 – 2,000 m (Full Duplex)	2 – 2,000 m (Full Duplex)
Data Frame Size (bytes)	N/A	N/A
Input Data (max.)	N/A	N/A
Output Data (max.)	N/A	N/A
Message Response Time		
LED Indicators	11	11
Address Setting	One (1) IP and Three (3) MAC	One (1) IP and Three (3) MAC
Configuration Tool	Machine Edition V7.5	Machine Edition V7.5
HART Data	Process Variables and Status (released in 2013)	Process Variables and Status (released in 2013)
Bus Isolation		
System Power (12 V)	4.5 Watts (5.5 Wats Max)	6.0 Watts (7.2 Watts Max)
Dimensions (L x W x H)	160.3mm (6.3") x 128.3mm (5.1") x 47.8mm (1.9")	160.3mm (6.3") x 128.3mm (5.1") x 47.8mm (1.9")
Module Weight (g)		
BIM Carrier	8752-CA-NS	8752-CA-NS
Common PAC8000 Specifications	See Section xx for System Specifications	See Section xx for System Specifications

*PROFINET BIMs will only support a select and growing number of I/O Modules. Please contact GE before quoting.

Currently supports modules:

8103-AI-TX	8117-DO-DC	8116-DO-AC
8104-AO-IP	8111-DI-AC	8118-DO-AC
8109-DI-DC	8112-DI-AC	8119-VI-05
8115-DO-DC	8113-DI-AC	
8110-DI-DC	8114-DI-AC	

PAC8000 Traditional Bus Interface Modules

When used as remote I/O, PAC8000 nodes use a Bus Interface Module (BIM) to communicate with the host controller via a local area network (LAN). Different BIMs can be chosen to operate with specific LAN protocols. BIMs are supplied in a number of different package styles according to their function, and each mounts on a dedicated BIM Carrier.

	8502-BI-DP	8505-BI-MB	8507-BI-DP	8521-EB-MT
Product Name	**PROFIBUS DP BIM**	**Modbus BIM**	**PROFIBUS DP BIM**	**Ethernet BIM**
Lifecycle Status	Active	Active	Active	Active
Number of I/O Modules	24	32	24	64
Protocol Supported	PROFIBUS-DP V1 (EN 50170)	Modbus RTU (Revision G)	PROFIBUS-DP V1 (EN 50170)	Modbus TCP/IP
BIM Redundancy	No	No	Yes	Yes
Baud Rate	9.6kb to 6 Mbaud	1.2 to 115.2 kbaud	9.6kb to 12 Mbaud	10- 100 Mbaud
LAN Redundancy	No	Yes	No	Yes
LAN Connector Type	RS-485	RS485/422	RS-485	RJ45
Maximum Bus Length	100 meters to 1.2Km depending on baud rate	15 meters	100 meters to 1.2Km depending on baud rate	
Data Frame Size (bytes)	Config. up to 244	N/A	Config. up to 480	N/A
Input Data (max.)	244 bytes	N/A	240 bytes	N/A
Output Data (max.)	244 bytes	N/A	480 bytes	N/A
Message Response Time		<4 ms		
LED Indicators	Power Fault Comm LAN A Config Railbus	Power Fault LAN A and LAN B Config Railbus	Power Master Healthy Fault Failsafe Red Comm Railbus Link LAN PROFIBUS	Power Master Healthy Fault Failsafe LAN A LAN B COM 1 COM 2 Safe Mode I/O Com
Address Setting	Software (by I/O Configurator) Switch (by 8510-NS–MO)	Software (by I/O Configurator) Switch (by 8510-NS–MO)	Hardware setting on carrier	Software (eBIM Workbench)
Configuration Tool	GSD File or I/O Configurator 8455–SW-CF	I/O Configurator 8455–SW-CF	GSD File or I/O Configurator 8455–SW-CF	Workbench 8459-EB-MT
HART Data	Process Variables and Status	Process Variables and Status	Process Variables and Status (from Q4 2012)	Process Variables and Status
Bus Isolation	500 V	500 V	500 V	1500 V
System Power (12 V)	420 mA typ. 520 mA max.	260 mA typ. 300 mA max.	420 mA typ. 520 mA max.	15 mA (12 V Controller Power 400 mA typ. 500 mA max.)
Module Width (mm)	63	63	42	69
Module Weight (g)	350	320	500	1350
BIM Carrier	8715-CA-BI 8718-CA-NS	8715-CA-BI 8718-CA-NS	8701-CA-BI	8750-CA-NS
Common PAC8000 Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications

Note: If a PROFIBUS BIM is configured over the PROFIBUS using the GSD file, a reduced set of configuration parameters is available. If the 8455-SW-CF is used, more comprehensive options are available. The instruction manual for the BIM explains the configuration options.
Modbus and PROFIBUS-DP BIMs do not support the following modules: 8129-IO-DC, 8132-AI-UN, 8133-HI-TX, 8139-SH-DC, 8140-DO-AC, and 8142-DO-DC.

PAC8000 BIM Carriers

Each BIM must be mounted on an appropriate BIM Carrier.

	8715-CA-BI	8718-CA-NS	8701-CA-BI	8752-CA-NS
Product Name	**BIM Carrier**	**BIM and Node Services Carrier**	**BIM Carrier**	**Node Service Carrier**
Lifecycle Status	Active	Active	Active	Active
Carrier Mounting Modules	8502-BI-DP (PROFIBUS-DP) 8505-BI-MB (Modbus)	8502-BI-DP (PROFIBUS-DP) 8505-BI-MB (Modbus) 8510-MO-NS (Node Services)	2 x 8507-BI-DP (PROFIBUS) (Also features slots for 2 x 8910-PS-DC power which are discontinued)	Combination of 1 or 2 8515-BI-PN or 8516-BI-PN PROFINET Scanners
Carrier Connectors	2 x 9-pin, D-sub (female) RS485/422	2 x 9-pin, D-sub (female) RS485/422	2 x 9-pin, D-sub (female) RS485/422	2 x 9-pin, D-sub (female) RS485/422
System Power Requirement*	12.0 VDC ±5%	12.0 VDC ±5%	12.0 VDC ±5%	12.0 VDC ±5%
Mounting	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel
Dimensions (W x D x H) in mm	93 x 170 x 35	178 x 170 x 68	178 x 170 x 68	170 x 168 x 60
Weight (g)	420	450	450	450
Common PAC8000 Specifications	See Section xx for System Specification	See Section xx for System Specifications	See Section xx for System Specifications	See Section xx for System Specifications

* Recommended power supplies: BQ2320-9R-EX for 24 VDC systems and 8913-PS-AC for mains systems meet all hazardous area and environmental requirements.

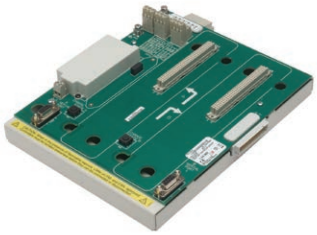
For information on a Carrier for 8521-EB-MT Ethernet BIM, see 8750-CA-NS in Controller Carriers section.



ELFD Controller Carrier

The ELFD Controller Carrier provides a mounting platform for up to two SafetyNet Controllers (8851-LC-MT). It can also accommodate a Power Supply Monitor module (8410-NS-PS) which can monitor the health of up to two 8913-PS-AC, four 8914-PS-AC power supplies and the 12V supply to Intrinsically Safe Modules (when these are used). For each Controller there is a serial port connector and a manually operated ""Change State" button. The Carrier also provides terminals that are used when earth leakage fault detection is required.

	8751-CA-NS
Product Name	**ELFD Controller Carrier - Terminals for earth leakage fault detection**
Lifecycle Status	Active
Carrier Mounting Modules	
SafetyNet Controller (x2)	8851-LC-MT
Power Supply Monitor Module	8410-NS-PS
Electrical Connections	
Railbus Connector	male out
Serial Port Connectors	9-pin, D-type (female) (x2)
Power Fail Connections	screw terminals (x7 pairs)
Ground Connection	M4 screw terminal (x1)
BFP0V Connection	M4 screw terminal (x1)
Earth Leakage Fault Detection Connections	screw terminals (1 pair)
System Power connections (Note: this does not provide power to the SafetyNet Controllers)	6-Pin (male)
Dimensions (W x D) mm	200 x 253 (footprint)
Height (mm)	28 (top of circuit board) 55 (overall)
Weight (kg)	1.43 (approx.)
Mounting Methods	flat panel (4 fixings)
User Controls	Two "change state" buttons, one for each SafetyNet Controller, are provided on the carrier. The state change depends upon the controller state before the button is pressed. See below for effects.
Master	Change to standby if current standby is healthy
Standby	Change to offline state
Backup	Re-synchronize and return to standby



PAC8000 Controller Carriers

The Controller Carrier provides a mounting platform for up to two Controllers. It can also accommodate a Power Supply Monitor module (8410-NS-PS), which can monitor up to seven system power supplies in the node and alert the Controller to failures. The “powerfail” signals are brought to the module via a screw terminal block at the rear of the carrier. There is a serial port connection and two manually operated “change state” buttons on the Carrier, one for each Controller, which are used to bring a new standby online, to switch the master and standby or to bring a controller out of failsafe state.

Controller Carriers must be surface mounted.

	8750-CA-NS
Product Name	**Controller Carrier**
Lifecycle Status	Active
Serial Port Connectors	9-pin, D, sub-miniature, female (x2)
Carrier Mounting Modules	8521-xx-xx (Controller) (x2) 8410-NS-PS (Power Supply Monitor)
System Power Requirement*	12.0 VDC ±5%
Weight (kg)	1.43
Mounting	Flat Panel
Dimensions (W x H x D) in mm	200 x 68 x 253

* Recommended power supplies: BQ2320-9R-EX for 24 VDC systems and 8913-PS-AC for mains systems that meet all hazardous area and environmental requirements.

PAC8000 2/2 I/O Module Carriers

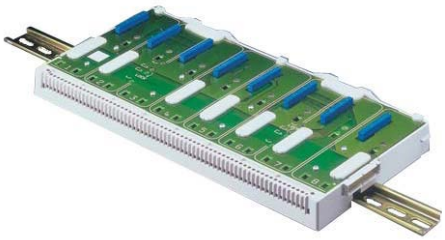
These module carriers are designed for 2/2 modules and are for either 32- or 64-module addressing. If 64-slot addressing is required for a node, these carrier types must be used exclusively as they cannot be mixed with 32-slot address carriers. A range of extender carriers and cables allow for flexibility in cabinet design. Carriers can be mounted on T- or G-section DIN-rail or directly to a flat surface, and may be joined end-to-end to extend the size of an installation.

Bussed Field Power (BFP) is connected to the I/O Module Carrier for modules that require this. Each BFP connection supplies two adjacent module slots, so these modules must use the same BFP supply. Terminals are provided on the Carrier to terminate cable screens and shields.

Field terminals are “clicked” in to place on the Carrier, then are trapped in place by inserting the I/O Module and secured by the module’s screw.

I/O Module Carriers have no active components, so have very high reliability.

	8707-CA-08	8710-CA-04
Product Name	**8 Module Carrier**	**4 Module Carrier**
Lifecycle Status	Active	Active
Module Addressing	1-32	1-32
Railbus Connectors	Female In Male Out	Female In Male Out
Weight (g)	680	350
Mounting	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel
Dimensions (W x D x H) in mm	342 x 170 x 22	178 x 170 x 22
Common PAC8000 Specifications	See Section 14 for System Specifications	See Section 14 for System Specifications



Module Carrier

The 8-module carrier with extended addressing features:

- 64-slot address bus
- Accepts up to eight SafetyNet and/or standard I/O modules
- DIN-rail or panel mounting
- Carries control signals and data on Railbus
- Distributes System Power to modules
- Distributes Bussed Field Power to modules
- Isolated earthing bar for cable screens/shields

	8709-CA-08
Product Name	**8-module Carrier - extended addressing**
Lifecycle Status	Active
Electrical Connections	
Railbus Connectors	female in, male out
Cable Screens/shield Connections	M4 screw terminals (x34)
Bussed Field Power Supply Connectors	8-pin male (x2) - The two 8-pin connectors provided at the top rear of the carrier connect power supplies for 'field power'. These supplies are routed through I/O modules that require power for their field circuits.
Dimensions (W x D x H) mm	342 x 170 x 22
Weight (g)	680
Mounting Methods	Flat panel or DIN rail
DIN-rail types	'Top hat' 35 x 7.5mm rail or 35 x 15mm rail to EN 50022 G-section rail to EN 50035

Bussed Field Power Connector

Terminal	Function
1	I/O modules 1 & 2
2	–ve (or Neutral)
3	I/O modules 1 & 2
4	+ve (or Live)
5	I/O modules 3 & 4
6	+ve (or Live)
7	I/O modules 3 & 4
8	–ve (or Neutral)

Connector and Table

The table above gives the connection details for modules 1 to 4. The second connector provides identical connections for modules 5 to 8.

Notes:
For applications with up to 4 IO Modules, it is possible to use the 4-module Carrier (8710-CA-04).

PAC8000 2/1 I/O Module Carriers

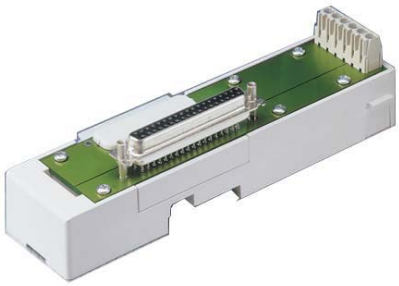
These module carriers are designed for 2/1 modules with Intrinsically Safe field wiring and are for either 32- or 64-module addressing. If 64-slot addressing is required for a node, these carrier types must be used exclusively as they cannot be mixed with 32-slot address carriers. A range of extender carriers and cables allow for flexibility in cabinet design. Carriers can be mounted on T- or G-section DIN-rail or directly to a flat surface, and may be joined end-to-end to extend the size of an installation. Terminals are provided on the Carrier to terminate cable shields and screens.

Field terminals are “clicked” in to place on the Carrier, then are trapped in place by inserting the I/O Module and secured in place by the module’s screw.

I/O Module Carriers have no active components, so have very high reliability.

2/1 modules do not employ Bussed Field Power as the 2/2 modules do. They draw all their field power requirements from the System Power supply. The current drawn from the System Power Supply is typically much higher on the 2/1 side of the node than on the 2/2 side. System Power from the 2/2 side of the node does not pass through the Railbus Isolator, but is provided by one or more 8920-PS-DC IS Power Supplies mounted on the 2/1 side of the Railbus Isolator.

	8727-CA-08	8729-CA-08	8720-CA-04
Product Name	**8 Module Carrier**	**8 Module Carrier**	**4 Module Carrier**
Lifecycle Status	Active	Active	Active
Module Addressing	1-32	1-64	1-32
Railbus Connectors	Female In Male Out	Female In Male Out	Female In Male Out
Weight (g)	680	680	350
Mounting	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel
Dimensions (W x D x H) in mm	342 x 170 x 22	342 x 170 x 22	178 x 170 x 22
Common PAC8000 Specifications	See Section xx for System Specifications	See Section xx for System Specifications	See Section xx for System Specifications



Carrier Extender

Carrier Extender features:

- Ensures Railbus and power supply continuity
- Pairs (left & right hand) link separate carrier runs
- Sub-D connectors linked via multi-way cable
- Multi-pin connector to carrier
- Maximum of 3 extender pairs per node
- 32- and 64-slot address capable

	8020-CE-RH	8021-CE-LH
Product Name	**Carrier Extender, Right-hand**	**Carrier Extender, Left-hand**
Lifecycle Status	Active	Active
Electrical Connections		
Railbus Carrier Connector	female in	male out
Extender Cable Connector	Sub-D, 37-pin female	Sub-D, 37-pin female
System Power Cable Connections†	screw terminal (x6)	screw terminal (x6)
System Power Cable Conductor Size	2.5mm^2 (max.)	2.5mm^2 (max.)
Dimensions (W x D x H) mm	42 x 168 x 37	42 x 168 x 37
Weight (g)	135	135
Mounting Method	integral DIN-rail fixings	integral DIN-rail fixings
DIN Rail Types	'Top hat', 35 x 7.5mm or 35 x 15mm to EN 50022 G-section, to EN 50035	'Top hat', 35 x 7.5mm or 35 x 15mm to EN 50022 G-section, to EN 50035

Notes:
†The six terminals for the System Power connections must be made in addition to connecting the Extender cable. The Terminals on the left- and right- hand extenders indicate which connections need to be made for System Power (HVCC + and HVCC -) and an internal ground connection (SGND).

Carrier Extender Cable

Carrier Extender Cable features:

- Railbus data extender cables
- Three lengths - 0.35, 0.85 and 1.2 m
- Sub-D cable connectors

Carrier Extender Cables

Part Number	Length	Description	Lifecycle Status
8001-CC-35	0.35 m	Sub-D, 37-pin male (X2) connectors	Active
8002-CC-85	0.85 m	Sub-D, 37-pin male (X2) connectors	Active
8003-CC-12	1.2 m	Sub-D, 37-pin male (X2) connectors	Active

IS Carrier Extender Cables

IS Carrier Extender Cables feature:

- Railbus data & power extender cables
- For IS field wiring installations
- Three lengths – 0.35, 0.85 and 1.2 m
- Sub-D cable connectors
- 32- and 64-slot address capable

Specifications

Hazardous Area Approvals	Class 1, Div 2, Groups A, B, C, D T4 hazardous location or Zone 2, IIC T4 hazardous area
Data Extender Cable Connectors	Sub-D, 50 pin male
Power Extender Cable Connectors	6-pin
Operating Temperature	-40°C to +70°C
Storage Temperature	-40°C to +85°C
Relative Humidity	5 to 95% RH (non-condensing)

Data Cables

Part Number	Description	Lifecycle Status
8011-CC-35	IS Carrier Extension Cable, 0.35m	Active
8012-CC-85	IS Carrier Extension Cable, 0.85m	Active
8013-CC-12	IS Carrier Extension Cable, 1.2m	Active

Power Cables

Part Number	Description	Lifecycle Status
8016-CC-35	IS Power Extension Cable, 0.35m	Active
8017-CC-85	IS Power Extension Cable, 0.85m	Active
8018-CC-12	IS Power Extension Cable, 1.2m	Active

Cable Sets

Part Number	Description	Lifecycle Status
8032-CC-35	IS Carrier Extension Cable, 0.35m	Active
8033-CC-85	IS Carrier Extension Cable, 0.85m	Active
8034-CC-12	IS Carrier Extension Cable, 1.2m	Active

PAC8000 Railbus Isolator

The PAC8000 Railbus Isolator is required when using any 2/1 modules in a node. The unit provides galvanic isolation between those modules interfacing to Intrinsic Safe field wiring on the 2/1 side of the isolator and those with conventional wiring on the 2/2 side. The unit mounts on its dedicated Railbus Isolator Carrier 8725-CA-RB.
Note: System Power is not passed from one side of the Railbus Isolator to the other, so System Power on the 2/1 side must be supplied by IS System Power Supplies.

	8922-RB-IS
Product Name	**Railbus Isolator**
Lifecycle Status	Active
Module Addressing	1-32 or 1-64
Railbus Connectors	Female In Male Out
System Power (12 V)*	2/2 side 50 mA max. 2/1 side 60 mA max.
Weight (g)	345
Mounting	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel
Dimensions (W x D x H) in mm	42 x 160 x 110
Common PAC8000 Specifications	See Section xx for System Specifications

*Note: DC power for the Railbus Isolator is required from both 2/2 and 2/1 sides of the node.

PAC8000 Railbus Isolator Carrier

The Railbus Isolator Carrier is used, together with the 8922-RB-IS Railbus Isolator, to isolate the 2/2 modules from the 2/1 modules. The carrier can be used with either 32- or 64-module addressing. It can be mounted on T- or G-section DIN-rail or directly to a flat surface, and may be joined end-to-end with I/O Module Carriers.

	8725-CA-RB
Product Name	**Railbus Isolator Carrier**
Lifecycle Status	Active
Module Addressing	1-32 or 1-64
Railbus Connectors	Female In Male Out
Weight (g)	680
Mounting	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel
Dimensions (W x D x H) in mm	342 x 170 x 22
Common PAC8000 Specifications	See Section xx for System Specifications

Field Terminals

Field terminals are removable units for terminating wiring from field instruments. Each IO Module combines with a Field Terminal to which the wiring from field instrumentation is connected. Recommended and compatible Field Terminal types are given in the Field Terminal Specification and Selection Guide. They can be selected to optionally include loop disconnection and fusing – eliminating the need for additional terminals and wiring between the Field Terminal and the instrumentation. By wiring directly to the Field Terminal, there is no need for additional terminals or wiring.

- **8-channel Field Terminals**

  SafetyNet IO Modules use standard 8000 Process I/O 8-channel Field Terminals. Depending on the application, the Field Terminals may be for general purpose, non-arcing or non-incendive field wiring, may incorporate fused disconnects and may be for 2-, 3- or 4-wire transmitters.

- **Fused disconnect**

  The fused disconnect Field Terminals incorporate a 2A fuse that can be partially withdrawn from the Field Terminal to act as a loop disconnect.

- **Tag strip**

  Each Field Terminal is supplied with an integral tag strip, which is hinged to provide access to the wiring terminals and the fuse disconnects.

- **Field Terminal clicks on to Carrier**

  The Field Terminal is easily removed from the Carrier – it is held in place by a sprung latch that can be released without the need for tools. This simplifies connection of the field wiring. The Field Terminal is secured in place by the insertion of the IO Module.

- **Wiring to Field Terminals**

  SafetyNet IO Modules all use 8-channel Field Terminals, to which wiring with a cross section of up to 2.5mm^2 can be connected. Each termination point is clearly numbered to simplify recognition of each terminal. The two rows of terminals are offset to allow access to the lower row when wiring is in place.

- **Keying**

  Rotary keys in the Field Terminal are adjustable to allow insertion of certain modules. Modules that would cause field wiring to be unsafe (in respect of hazardous areas) cannot be inserted. The four types of Field Terminal can be identified from the diagram below.

Publication Reference Chart

GFA-1779	PAC8000 2/x Series Modular I/O
GFA-1769	PAC8000 Carriers and Field Terminals

General Purpose Field Wiring Terminals page 5.75

Standard Field Terminals page 5.76

44-pin Mass Termination Assembly page 5.77

Switch/proximity Detector Wiring Panel page 5.78

Mass Termination Field Terminal & High Current Relay Output page 5.79

PLC Adapter for Eight 6-Amp Relays page 5.80

Field Terminals

- Standard, fused and loop-disconnect
- Tag strip fitted to all Field Terminals

Specifications

Rated Voltage	250 VAC
Maximum Current per I/O Channel	3A
Fuse Rating (where fitted)	2A
Conductor Size	0.14–2.5mm^2
Dimensions - approx (including tagging strip)	42 (w) x 88 (d) x 39.5 (h)mm
Weights (typical - including tagging strip)	
Unfused Type	78g
Fused Type	86g

General Purpose Field Wiring Terminals

Part Number	Description	Lifecycle Status
8602-FT-ST	Standard	Active
8604-FT-FU	Standard fused	Active
8615-FT-4W	4-wire transmitter	Active

Zone 2/Div2 Field Wiring Applications

Part Number	Description	Lifecycle Status
8601-FT-NI	Non-incendive	Active
8603-FT-FU	Non-incendive fused	Active
8610-FT-NA	Non-arcing standard	Active
8611-FT-FU	Non-arcing fused	Active
8615-FT-4W	4-wire transmitter	Active

Additional Components

Part Number	Description	Lifecycle Status
8401-FU-2A	2A Fuse pack (10/pack)	Active
8405-LK-ZE	Loop-disconnect links pack (10/pack)	Active

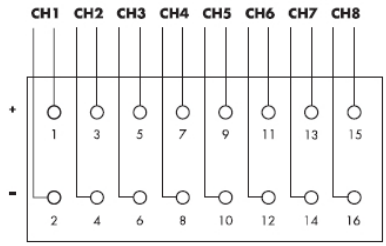
Field Terminal Selection

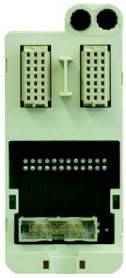
Field terminal	8810-HI-TX	8811-IO-DC
8601-FT-NI	R (2-wire TX)	
8602-FT-FU	C	
8603-FT-FU	C	
8604-FT-FU	C	C
8610-FT-NA		R
8611-FT-FU		C
8615-FT-4W	R (3 & 4-wire TX)	

R – Recommended, C – Compatible

Connection Diagram

The connection diagram applies to all Field Terminals used with SafetyNet IO Modules.





Standard Field Terminals

Standard Field Terminals features:

- 16-pin mass termination assembly
- 16-pin IDC connector termination
- IDC alternative for most screw terminal types
- Use with 8115-DO-DC for high-current relay adapters
- Provides a choice of field wiring terminations
- Clip-on protective cover

	8618-FT-MT
Product Name	**Standard Field Terminals**
Lifecycle Status	Active
Hazardous Area Approvals	
Field Terminal Location	Zone 2, IIC, T4 hazardous area or Class 1, Div 2, Groups A–D, T4 hazardous location
I/O Field Wiring Location	Zone 2, IIC, T4 hazardous area or Class 1, Div 2, Groups A–D, T4 hazardous location
Rated Voltage	50 VAC
Maximum Current per I/O Channel	50 VAC
Material	Modified Poly-Phenylene Oxide
Dimensions – approx (W x D x H) mm	42 x 95 x 42[†]
Weight (g)	44

[†]With protective cover fitted

Cable Options

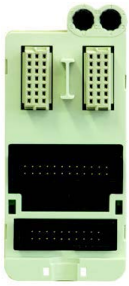
16-way cables, terminated with 16-pin IDC connectors at each end

Part Number	Description	Lifecycle Status
8081-FC-10	1 meter cable	Active
8082-FC-20	2 meter cable	Active
8083-FC-30	3 meter cable	Active

See also Technical Support Note TSN112 for details of using this product with high-current relays.

Notes:

1. This field terminal cannot be used with the following I/O module types:
   - 8105-TI-TC, 8106-TI-RT – Special functionality required e.g. CJC
   - 8121-DI-DC, 8122-DI-DC
   - 8125-DI-DC, 8127-DI-SE
2. AC modules cannot be used with this field terminal because of the 50 VAC voltage rating.



Field Terminals

44-pin Mass Termination Assembly features:

- 32 channel connection
- Use with 8121/8122 and 8125/8127
- Use with 8650-FT-PX field terminal
- Provides a choice of field wiring terminations
- Clip-on protective cover

	8619-FT-MT
Product Name	**44-pin mass termination assembly**
Lifecycle Status	Active
Hazardous Area Approvals	
Field Terminal Location	Zone 2, IIC, T4 hazardous area or Class 1, Div 2, Groups A–D, T4 hazardous location
I/O Field Wiring Location	Zone 2, IIC, T4 hazardous area or Class 1, Div 2, Groups A–D, T4 hazardous location
Rated Voltage	50 VAC
Maximum Current per I/O Channel	0.75A
Material	Modified Poly-Phenylene Oxide
Dimensions – approx (W x D x H) mm	42 x 95 x 42[†]
Weight (g)	48

[†]With protective cover fitted

Cable Options

20- + 24-way cable sets, terminated with IDC connectors at each end to connect the 8619-FT-MT to the 8650-FT-PX wiring panel.

Part Number	Description	Lifecycle Status
8085-FC-10	1 meter cable	Active
8086-FC-20	2 meter cable	Active
8087-FC-30	3 meter cable	Active

Notes:
1. 0V pins are all linked only when the module is fitted.
2. Channels 27, 28 and 32 are common to both J1 and J2
n/c = no connection



Field Terminals

Switch/proximity Detector Wiring Panel features:

- Simplified 32-channel field wiring connection
- Multipin connectors to 8619-FT-MT field terminal
- Screw terminals for field wiring
- DIN-rail mounting

	8650-FT-PX
Product Name	**Switch/proximity detector wiring panel**
Lifecycle Status	Active
Hazardous Area Approvals	
Location	Zone 2, IIC, T4 hazardous area or Class 1, Div 2, Groups A–D, T4 hazardous location
System Connectors	20-pin & 24-pin
Field Terminals	Rising cage-clamp screw terminals
Conductor Size	0.14–2.5 mm^2
Rated Voltage	50 VAC
Maximum Current per I/O Channel	0.75A
Ground Terminals	2 x M4
DIN Rail Mounting	'T' section to EN 50022 'G' section to EN 50035
Weight (g)	390

Cable Options

20- + 24-way cable sets to connect with the 8619-FT-MT.

Part Number	Description	Lifecycle Status
8085-FC-10	1 meter length set	Active
8086-FC-20	2 meter length set	Active
8087-FC-30	3 meter length set	Active

Mass Termination Field Terminal and High Current Relay Output

Features:

- Mass Termination Connectors save wiring time to High Current Relay Assemblies
- Quick Connect Cable Adapter for 6 Amp or 10 Amp relay outputs
- Easy installation, relay comes complete and ready to snap on to DIN Rail
- Each relay includes replaceable relay and the DIN Rail Mounting Assembly
- Adapter connects 8 relays together in a single package.

- **High Current Output Capability**

  For discrete field devices that require more than the maximum specified current, a standard mass termination field terminal is available with a 16-pin connection to allow a direct cable connection to an external panel. Relay output options are available to provide up to 10A per channel. This option greatly simplifies field wiring. High current output capability beyond the discrete output modules' specified 1 Amp per channel is provided with a mass termination assembly and a direct cable interface to 6 or 10 Amp relays.

- **Cable**

  The direct connect cable comes in standard lengths of 1m and 2m. It converts the 16 pin output of an 8115 Discrete Output module to a 14 pin interface that connects directly to the relays. Additional lengths are available if required.

- **Adapters**

  There are two different size adapters, one for 6 Amp relays and a second, larger one for 10 Amp relays. These adapters provide a direct connection to the relays from the mass termination block, assuring a quick installation for higher output power.

	8918-FT-MT
Product Name	**Mass Termination Field Terminal and High Current Relay Output**
Lifecycle Status	Active
Maximum Current	1 Amp per Channel (6 Amps per Module) 1 Amp per Cable (16 Pin)
Voltage Rating	30 VDC Between Non-Connected signals
Max Cable Length	4 meters
Key Position	Set the Key to match the Discrete Output Module being Used, For Example : A1
Hazardous Area	FM Approved Class I, Div 2, Groups A, B, C & D
Approvals	Atex 3 G IIC T4 UL US and Canada

PLC Adapter for Eight 6-Amp Relays

Cable from the Mass termination unit plugs directly into the adapter which connects directly to the 8 relays, providing both a cost savings and space savings over conventional wiring approaches. Adapters are available for both the 6 Amp and 10 Amp relays. Choose the right output for your needs based on required current, available panel size and your budget.

Specifications

Dimensions

PLC-V8L w/ 8 10A relays	112mm(W) x 80.3mm(H) x 91.25mm(D) 4.4 in. (W) X 3.16 in. (H) X 3.59 in. (D)
PLC-V8 w/ 8 6A relays	49.6mm(W) X 80.3mm(H) X 91.25mm(D) 19.6 in. (W) X 3.16 in. (H) X 3.59 in. (D)

	REL-MR-24DC/21-HC	REL-MR-24DC/21
Product Name	**Relay for 10 Amp**	**Relay for 6 Amp**
Lifecycle Status	Active	Active
Input Data - Coil Side		
Nominal Input Voltage	24 VDC	24 VDC
Typical Input Current	17mA	7mA
Typical Response Time	7ms	5ms
Typical Release Time	3ms	2.5ms
Coil resistance at 20C	1440 Ohms +/-10%	3390 Ohms +/-10%
Output Data		
Contact Type	Single Contact, 1 PDT	Single Contact, 1 PDT
Contact Material	AgNI	AgSnO
Max Switching Voltage	250 VAC/DC	250 VAC/DC
Min Switching Voltage	12 VAC/DC	12 VAC/DC
Continuous Current	10 Amps	6 Amps
Max Inrush Current	30A (300ms)	N/A
Min Switching Current	100 mA	10 mA
Max Pwr Rating, Ohmic Load	250VAC, 4000VA	250VAC, 1500 VA
Min Switching Power	1.2W	120 mW
Hazardous Area Approvals	FM Approved Class I, Div 2, Groups A, B, C & D Atex 3 G IIC T4 UL US and Canada	FM Approved Class I, Div 2, Groups A, B, C & D Atex 3 G IIC T4 UL US and Canada

The relays are shipped complete in the DIN Rail mounting package and are ready to snap onto the DIN Rail. 8 relays are jumpered together with the adapter providing an integrated cable assembly and an easy installation. The relays are modules that can be replaced in the DIN Rail package. The 10 Amp relays use a Plug-in Bridge to Jumper Field Power. This jumper option allows the full 10 Amps per relay continuous output at 250 VAC when used with the 10 Amp mechanical relay.

Phoenix Miniature Series Relays

16-way cables, terminated with 16-pin IDC connectors at each end, are available for the 8618-FT-MT.

Part Number	Model Number	Description
2967620	PLC-RSC-24DC/21-HC	10 Amp Mechanical Relay 14mm (8 required)
2967002	PLC-OSC-24DC/24DC/2	3 Amp Solid State Relay (8 required)
2966171	PLC-RSC-24DC/21	6 Amp Mechanical Relay 6.2mm (8 Required)
2299660	PLC-V8L/FLK 14/OUT	Large 8 Relay Cable Adapter (10 Amp)
2295554	PLC-V8/FLK 14/OUT	8 Relay Cable Adapter (6 Amp)
2300575	FLK 16/14/DV OUT/100	1m 16 to 14 position cable
2300588	FLK 16/14/DV OUT/200	2m 16 to 14 position cable
2967691	FBST 14-PLC BK	Plug-in Bridge 2 Position for 14mm PLC

Power Supplies

In order to meet the relevant safety requirements, the power supplies are specifically designed for use with PAC8000 SafetyNet and are used to power the SafetyNet Controller and IO Modules. The 8913-PS-AC power supply must be used to supply the 12 VDC for the SafetyNet Controller and System Power, and the 8914-PS-AC power supply must be used for the 24 VDC Bussed Field Power supply to the SafetyNet IO Modules.

- **Redundancy**

  Redundancy is implemented by "pairing" each power supply with a second power supply. If the optional Nodes Services Power Supply Monitor (8410-NS-PS) is used, then this can detect if there has been a failure in any one of up to six 8913-PS-AC/ 8914-PSAC power supplies and the 2/1 power supplies for nodes including Intrinsically Safe IO – and will then report that such a failure has occurred.

- **Wide range of input voltages**

  The 8913-PS-AC and 8914-PS-AC power supplies accept AC input voltages in the range 85 - 264 VAC.

- **Hazardous area mounting**

  Each power supply can be mounted in Class 1, Division 2 or Zone 2 hazardous areas.

- **Operating ambient temperature**

  When mounted with the optimum orientation for cooling, the power supplies will provide their full rated output in operating ambient temperatures of +70°C (provided the input range is in excess of 125 VAC).



System Power Supply page 5.82
Bussed Field Power Supply page 5.83
IS Module Power Supply page 5.84
Node Services Power Supply Monitor page 5.86
DC System and Controller Power Supply page 5.87

Publication Reference Chart

GFA-1779	PAC8000 2/x Series Modular I/O
GFA-1769	PAC8000 Carriers and Field Terminals



Power Supply - System Power

Power Supply features:

- 12 VDC @ 5A System and Controller power
- 24 VDC @ 5A for powering local instrumentation
- 85 – 264 VAC input voltage
- Zone 2/Div 2 hazardous area mounting
- 12V output supports load sharing for redundancy†

	8913-PS-AC
Product Name	**Power Supply - System Power**
Lifecycle Status	Active
AC Input Connections	screw terminals (x3)
DC Output Connections	screw terminals (x8)
Power Fail Signal Connection	screw terminal (x1)
Input Voltage	85–264 VAC
Input Frequency	47–65Hz
Power Efficiency	Up to 87 %
Input Protection	internal (6.3A) slow-blow fuse and VDR
DC24V Output Voltage	24.7 VDC ± 10%
DC12V Output Voltage	11.95 VDC ± 5%
DC24V Output Current	5A (nominal)
DC12V Output Current	5A (nominal)
Input-output Isolation	2800 VDC
Hold-up Time (at full rated load)	15ms (typ.)
Thermal Protection.	reduced output power
Supply Health Indicator	LED
Threshold to Trigger "Power-fail" Signal - DC12V Output Only	11.33V (max.), 10.30V (min.)
Power-fail Signal Output (open collector)	
Power Supply "OK"	Low impedance to –ve of DC12V output
Power Supply "failure"	High impedance to –ve of DC12V output
Hazardous Area Specifications	EEx nA II T4 Class 1, Div.2, Grps A,B,C,D T4 Class 1, Div.2, Grps A,B,C,D T3C
Dimensions (W x H x D) mm	103 x 138 x 113.6
Mounting Methods	35 mm x 7.5 mm T-section DIN rail
Weight (g)	750
Approvals	EN 61204: 1995 Low-voltage power supply devices, d.c. output - Performance characteristics and safety requirements EN 60950-1: 2002 Safety of information technology equipment EN 61326: 1997 + A1: 1998 + A2: 2001 Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A equipment) EN50021: 1999 Electrical apparatus for potentially explosive atmospheres - Type of protection “n”



Power Supply - Bussed Field Power

Power Supply features:

- 24 VDC @ 10A for Bussed Field Power
- 85 – 264 VAC input voltage
- Zone 2/Div 2 mounting
- Supports load sharing for redundancy

	8914-PS-AC
Product Name	**Power Supply - Bussed Field Power**
Lifecycle Status	Active
AC Input Connections	screw terminals (x3)
DC Output Connections	screw terminals (x8)
Power Fail Signal Connection	screw terminal (x1)
Input Voltage	85–264 VAC
Input Frequency	47–65Hz
Power Efficiency	Up to 87 %
Input Protection	internal (6.3A) slow-blow fuse and VDR
Output	24 VDC ± 10%
Output Current	10A (nominal)
Input-output Isolation	2800 VDC
Hold-up Time (at full rated load)	15ms (typ.)
Thermal Protection	reduced output power
Supply Health Indicator	LED
Threshold to Trigger "Power-fail" Signal	23.3V (max.), 22.0V (min.)
Power-fail Signal Output (open collector)	
Power Supply "OK"	low impedance to ground
Power Supply "failure"	high impedance to ground
Hazardous Area Specifications	EEx nA II T4 Class 1, Div.2, Grps A,B,C,D T4 Class 1, Div.2, Grps A,B,C,D T3C
Dimensions (W x H x D) mm	103 x 138 x 113.6
Mounting Methods	35 mm x 7.5 mm T-section DIN rail
Weight (g)	750
Approvals	EN 61204: 1995 Low-voltage power supply devices, d.c. output - Performance characteristics and safety requirements EN 60950-1: 2002 Safety of information technology equipment EN 61326: 1997 + A1: 1998 + A2: 2001 Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A equipment) EN50021: 1999 Electrical apparatus for potentially explosive atmospheres - Type of protection “n”

Power Supplies - IS Module Power Supply

IS Module Power Supply features:

- Power for 2/1 (IS) modules
- 12 VDC output
- 24 VDC (nominal) input
- 5 A capacity
- Supports load sharing for redundancy

	8920-PS-DC
Product Name	**IS Module Power Supply**
Lifecycle Status	Active
Hazardous Area Approvals	
Location of Power Supply	Safe area or Class 1, Div 2, Group A, B, C, D Zone 2, IIC T4
Output	Galvanically isolated; Voltage clamped; Un = 18 V
Applicable Standards	Factory Mutual Research Co., Class No. 3611 for Class I, Division 2, Groups A, B, C, D hazardous locations; Factory Mutual Research Co., Class No. 3610 for Class I, II, III, Division 1, Groups A - G hazardous locations (IS circuits); EN 50020:1994 Electrical apparatus for potentially explosive atmospheres, intrinsic safety "i"; EC Directive 94/9/EC (ATEX)
EMC compliance	To EN 50081-2 and EN 50082-2; generic emission/immunity standards; EN 61000-3-2:1995 EN 61000-3-3:1995
Electrical Safety	EN 61010-1:1993 and Amendment A2:1995; and EN 61131-2:1994
Output Voltage	12 VDC ± 5%
Output Current	5 A
Input/Output Isolation	250 VAC rms(tested at 1500 VAC rms)
Input Voltage	18.5–36 VDC
Efficiency (at full load)	
18.5 V input at 4.1 A	76%
24 V input at 3.3 A	78%
36 V input at 2.1 A	76.50%
Input Connection	2-part screw terminal, each duplicated
Cable Size	2.5 mm^2 (max.)
Operating Temperature (no forced ventilation)	
60% of Full Load	– 40°C to + 70°C
Optimum Orientation (full load)	– 40°C to + 55°C
Worst Case Orientation	– 40°C to + 50°C
Storage	– 40°C to + 85°C
Relative Humidity	5 to 95% RH (non-condensing)
Vibration	2 g @ 10-100 Hz to BS EN 60068-2-6 and BS 2011- part 2.1
Shock	10 g, 11 ms pulse width, to BS EN60068-2-27
MTBF @ 50°C external ambient	80,000 hrs
Ingress Protection	IP20 to IEC 529/BS EN 60529 (tested on power supply carrier with all supply connectors in place)
Corrosive Atmospheres	To withstand gaseous corrosion level G3 as defined by ISA Standard SP71.04:1995, when protected by a suitable field enclosure.
Dimensions (approx.) (W x H x D) mm	84 x 110 x 160
Carrier Mounting	type 8724-CA-PS
Weight (g)	1290

IS Power Supply Carrier

IS Power Supply Carrier is used, together with the 8920-PS-DC IS Power Supply to provide 12 V System Power for 2/1 I/O Modules. The Carriers must only be used on the 2/1 side of the Railbus Isolator. The carrier can be used with either 32- or 64-module addressing. It can be mounted on T- or G-section DIN-rail or directly to a flat surface, and may be joined end-to-end with IS I/O Module Carriers.

	8724-CA-PS
Product Name	**IS Power Supply Module Carrier**
Lifecycle Status	Active
Number of Modules	1
Module Connection	Plug-In
Module Addressing	Usable with 32- or 64-address systems
Carrier Mounting Module	8920-PS-DC
Railbus Connectors	Female Out Male In
Weight (g)	195
Mounting	DIN-rail (T): 7.5 x 35 mm DIN-rail (T): 15 x 35 mm DIN-rail (G) Flat Panel
Dimensions (W x D x H) in mm	93 x 168 x 35
Common PAC8000 Specifications	See Section xx for System Specifications

Node Services Power Supply Monitor

Node Services Power Supply Monitor features:

- Power supply status monitoring for 8913-PS-AC and 8914-PS-AC power supplies
- Indicates supply failures to SafetyNet Controller
- Monitors up to two 8913-PS-AC, four 8914-PS-AC power supplies and the 2/1 supply for nodes including IS IO modules
- Zone 2/Div 2 hazardous area mounting
- Mounts on 8571-CA-NS Carrier

The Power Supply Monitor can monitor the health of supplies powering a SafetyNet node and signal the Controller in the event of any one of them failing. It can also monitor the status of 8920-PS-DC supplies powering intrinsically safe I/O modules. Where power supply redundancy is employed, the module enables failed power supplies to be identified and replaced without interference to the process.

	8410-NS-PS
Product Name	**Node Services Power Supply Monitor**
Lifecycle Status	Active
LED Indicator	Yes
Hazardous Area Specification	
Protection Technique	EEx nL IIC T4
Location (FM and CSA)	Class 1, Div.2, Grps A,B,C,D T4
System Power Supply	5mA (typ.), 10mA (max.)
Mounting Method	(captive x2) screw fixing
Weight (approx.) (g)	75
Dimensions (H x W x D) mm	89 x 15.8 x 104



DC System and Controller Power Supply

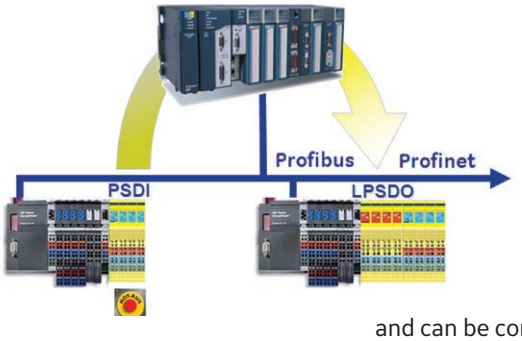
The BQ2320-9R-EX accepts a 24 VDC input and provides two 12 V outputs for PAC8000 system and controller power. The outputs may be combined to provide two independent 12 V outputs, a 24 V output or a 12 V and 24 V output. When used to supply a single 12 V output, the unit can provide up to 8 A – more than is required by a maximally loaded PAC8000 node.

The BQ power supply can be rack-mounted or surface mounted using the accessory pack BQ2320-ACC, which also includes a mating connector.

The BQ power supply is not compatible with the 8410-NS-PS module.

	BQ2320-9R-EX
Product Name	**System, Controller and SafetyNet Power Supply**
Lifecycle Status	Active
Input Voltage (DC)	14.4 - 36 VDC
Output 1	11.94 – 12.06 VDC
Output 2	11.88 – 12.12 VDC

Functional Safety Modules



VersaSafe is a SIL3 TUV certified safety solution, well integrated in the PACSystems RX3i platform.

VersaSafe technology offers RX3i users, in particular machine OEMs, a scalable and cost efficient SIL 3 safety solution, without need of an additional, complex safety PLC and safety network. Users can add the exact number of safe I/O modules required, with the ability to expand to more than 100 safe I/Os. Even if the application requires a low number of safe I/O, VersaSafe still offers a cost efficient solution.

The safety I/O is distributed via VersaPoint PROFIBUS NIU or PROFINET RT NIU, and can be combined with any standard I/O on the same network.

Well integrated into the RX3i system, VersaSafe is easy to use. Since the RX3i is the single point of connection, both safe and standard I/O can be combined in the same logic program. Integration into the RX3i also enables significant cost reduction because the status of all safe I/Os is directly available in the standard application logic without the need to hard wire. The safety programming tool provides a safe function block library so standard machine safety applications can be realized with configuration instead of complex programming.

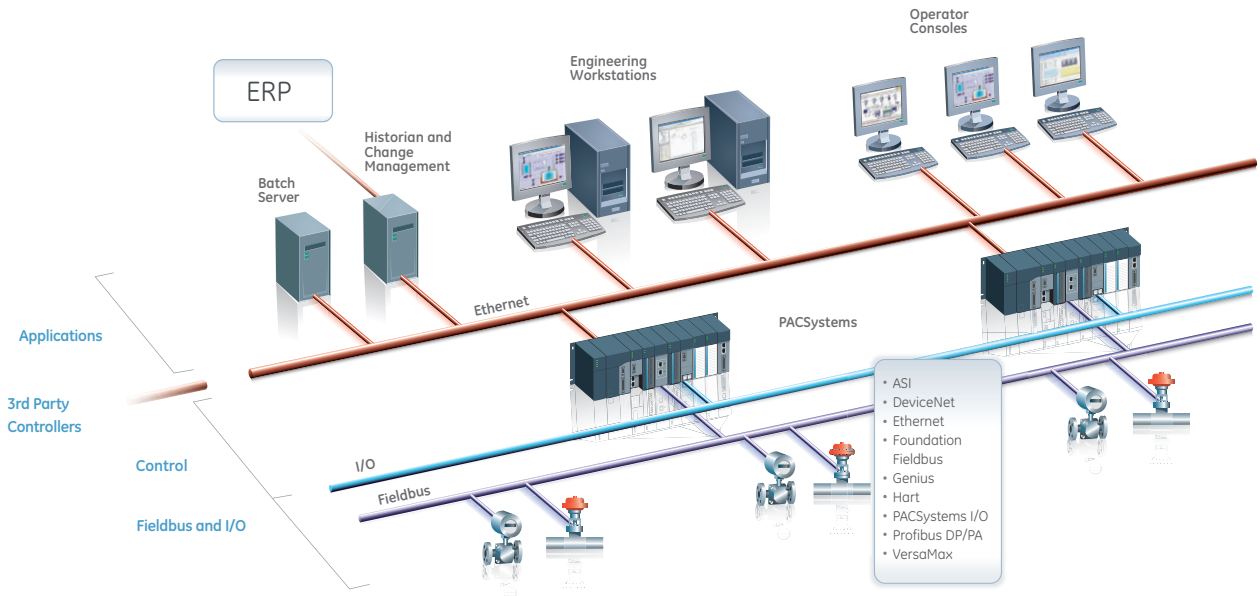
	IC220SDL543	IC220SDL544	IC220SDL953	IC220SDL963	IC220SDL753	IC220SDL752	IC220SDL840
Product Name	**Safe Input, 24 VDC Positive Logic**	**Safe Input, 24 VDC Positive Logic**	**Safety Logic Module (V2), Safe Output, 24 VDC Positive Logic**	**Enhanced Safety Logic Module (V3), Safe Output, 24 VDC Positive Logic**	**Safe Output, 24 VDC Positive Logic 2 A**	**Safe Output, 24 VDC Sink/ Source**	**Safe Output, Relay 4A, 4PT, with 2 contacts each**
Lifecycle Status	Active	Active	Active	Active	Active	Active	Active
Voltage	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	0 - 30 VDC	24V and 230V
Applications	Safe Input	Safe Input	Safe Logic Output	Enh. Safe Logic Output	Safe Output	Safe Output	Safe Relay Output
Number of Points SIL2 / CAT3	8	16	8	8	8	4	4
Number of Points SIL3 / CAT4	4	8	4	4	4	2	2
Clock Outputs	2	2	-	-	-	-	2
Diagnostic Inputs	-	-	-	-	-	-	2
Diagnostic Bits	-	-	32 Bits In 32 Bits Out	32 Bits In 32 Bits Out	-	-	-
Max. Safety Level SIL / IEC61508	3	3	3	3	3	3	3
Max. Safety Level SILC / IEC62061	3	3	3	3	3	3	3
Max. Safety Level PL / ISO 13849-1	e	e	e	e	e	e	e
Max. Safety Level Category / CAT	4	4	4	4	4	4	4

Starter Kits

Part Number	Description	Lifecycle Status
IC220KITPNS001	VersaSafe PROFINET Distributed Safety Evaluation Kit. PROFINET RT Slave built-in switch, eight 24 VDC positive standard inputs module, eight 24 VDC standard outputs modules, eight 24 VDC safe inputs module, eight 24 VDC safe outputs modules	Active

Proficy Process Systems Overview

Proficy Process Systems is a state-of-the-art, scalable, fully-integrated system for process automation and control. It provides the hardware and software needed for a complete process control system. Whether your business has continuous or batch oriented process control needs, Proficy Process Systems will deliver results. Based on contemporary, yet well proven technologies, Proficy Process Systems combines the power of traditional DCS systems with the flexibility, freedom and affordability of a PLC-based approach.



The Proficy Process Systems architecture is designed to provide a modular and expandable system to meet your most demanding process control needs. Proficy Process Systems can uniquely range from a small, one-machine architecture to a large, multi-machine architecture. This approach means you can start small and expand your system over time, at your pace. The system consists of several layers.

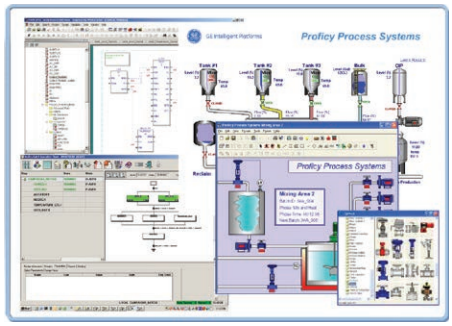
Proficy Process Systems allows the user to open multiple Machine Edition sessions on one PC and then connect each session to a controller simultaneously. This allows the user to view multiple, operating application programs at the same time, from a single PC.

Applications Layer

The Applications Layer contains the software that powers the information capabilities of Proficy Process Systems, featuring:

Engineering Workstation

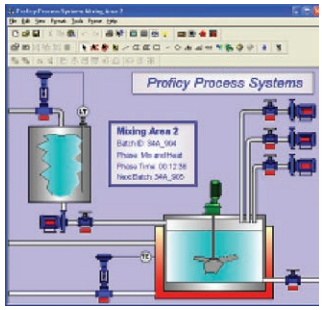
This is where you design, create, and maintain your system's configuration. With an advanced Logic Developer, you can create your control strategies in Function Blocks, Ladder Logic, or Structured Text for the PACSystems controllers.



Engineering Workstation

Operator Console

This is where your operators monitor and control the process. Choose between our two industry leading HMI/SCADA visualization technologies for your system – CIMPLICITY* or iFIX*. The consoles communicate with the PACSystems controllers through our Global Namespace.



Operator Console

Historian

The Historian is designed specifically for handling process data. It provides high performance storage and retrieval with sub-second collection and millisecond time-stamping.

Change Management

Change Management provides version control for your process control strategies, including audit trail capabilities.

Batch Execution

Batch Execution is the perfect option for batch-oriented processes. With advanced batch management, formulation management, batch direct, and tight linkage with our Batch Analysis option, you can optimize campaigns and batch runs.

ERP Connectivity

GE has closed the gap between automation and information with our Proficy Production Management software products and ERP connector. Now you can link your control system to your business systems to truly drive operational excellence in your business.

Controllers

The PACSystems RX7i and RX3i give Proficy Process Systems its flexibility, featuring a common engine which allows you to take programs that are created in one controller and easily move them to another.

Proficy Process Systems also features Control Memory Exchange, a breakthrough technology incorporated from GE's Embedded Systems Business. Through high-speed fiber optics, Control Memory Exchange allows data in one controller to be exchanged and shared with another controller at over a 2 giga baud rate. This allows you to synchronize controllers for distributed control, or reflect the memory state of one controller to another for redundant operations.



PACSystems RX7i



PACSystems RX3i

Fieldbus and I/O

GE has always taken an open approach with our products and technologies. We provide our customers with the best possible technology and give them the freedom to work with the devices and instruments of their choice.

Proficy Process Systems continues with that tradition. We understand that when it comes to process control, there are several choices for Fieldbuses. That's why we chose an Open Fieldbus approach to our system which supports the major Fieldbuses including:

- PROFINET RT Slave
- Foundation Fieldbus
- PROFIBUS™
- Hart
- AS-I Interface
- Ethernet

We also provide you with a comprehensive portfolio of I/O, allowing you to choose the right strategy to meet your needs. Through OPC, native drivers, and by teaming with companies that specialize in Fieldbus and I/O connectivity, we can satisfy your connectivity needs – putting you in control of your Fieldbus strategy.

Product Selection Guide

Proficy Process Systems Products

Proficy Process Systems

Description	Part Number	Lifecycle Status	Includes			
			Engineering Workstation	Operator Console	Historian	Change Management
Proficy Process Systems with iFIX and GlobalCare						
Proficy Process Systems - iFIX - 500 I/O	IC647PSF050	Active	1	1	500 Tag	1
Proficy Process Systems - iFIX - 1000 I/O	IC647PSF100	Active	1	1	1000 Tag	1
Proficy Process Systems - iFIX - 2000 I/O	IC647PSF200	Active	1	1	2000 Tag	1
Proficy Process Systems - iFIX - 3000 I/O	IC647PSF300	Active	1	1	3000 Tag	1
Proficy Process Systems - iFIX - 5000 I/O	IC647PSF500	Active	1	1	5000 Tag	1
Proficy Process Systems - iFIX - 5000+ I/O	IC647PSF000	Active	1	1	5000+ Tag	1
Proficy Process Systems with CIMPLICITY and Global Care						
Proficy Process Systems - CIMPLICITY - 500 I/O	IC647PSC050	Active	1	1	500 Tag	1
Proficy Process Systems - CIMPLICITY - 1000 I/O	IC647PSC100	Active	1	1	1000 Tag	1
Proficy Process Systems - CIMPLICITY - 2000 I/O	IC647PSC200	Active	1	1	2000 Tag	1
Proficy Process Systems - CIMPLICITY - 3000 I/O	IC647PSC300	Active	1	1	3000 Tag	1
Proficy Process Systems - CIMPLICITY - 5000 I/O	IC647PSC500	Active	1	1	5000 Tag	1
Proficy Process Systems - CIMPLICITY - 5000+ I/O	IC647PSC000	Active	1	1	5000+ Tag	1

Product Options

Used to add additional users to your system beyond those included with the base packages above

Description	Part Number	Lifecycle Status
Additional Engineering Workstation - iFIX	IC647PPSEWF	Active
Additional Engineering Workstation - CIMPLICITY	IC647PPSEWC	Active
Additional Operator Console - iFIX	IC647PPSOCF	Active
Additional Operator Console - CIMPLICITY	IC647PPSOCC	Active
Proficy Process Systems EGD OPC Server	IC647PPSOPC	Active

Complementary Products

These products can be used to expand the capabilities of your Process Systems

Change Management

Description	Part Number	Lifecycle Status
Change Management 1 user	IC646PCM001	Mature
Change Management 5 users	IC646PCM005	Mature
Change Management 10 users	IC646PCM010	Mature
Change Management 25 users	IC646PCM025	Mature
Change Management Scheduler	IC646PCMSCH	Mature

Batch

Description	Part Number
Batch Server Small	IC647BSS000
Batch Server Medium	IC647BSM000
Batch Server Large	IC647BSL000
Batch Developer	IC647BSD000
Batch Client	IC647BSC999

Notes on Licensing

- All Process Systems Licenses are based on Hardware Keys
- System architecture (number of nodes and types) is required at time of order to ensure correct license key manufacture



Safe Feed Input Modules

GE provides 3 varients of RSTi-EP safe feed modules EP 1901: one safe input, EP 1902: two safe inputs and EP 1922: two safe inputs, with delayed disconnection, which are intended for connecting safety-related equipment.

	EP-1901	EP-1902	EP-1922
Product Name	**1 Safe Feed-Input, 24 VDC**	**2 Safe Feed-Inputs, 24 VDC**	**2 Safe Feed-Inputs, 24 VDC, Programmable Delay**
Lifecycle Status	Active	Active	Active
Module Type	Safe Feed Input	Safe Feed Input	Safe Feed Input
System Bus Transfer Rate	48 Mbps	48 Mbps	48 Mbps
Achievable Safety Level	SIL3 (IEC 61508), SIL CL3 (IEC 62061), PLe and Cat. 4 (DIN EN ISO 13849-1), regarding the entire safety chain	SIL3 (IEC 61508), SIL CL3 (IEC 62061), PLe and Cat. 4 (DIN EN ISO 13849-1), regarding the entire safety chain	SIL3 (IEC 61508), SIL CL3 (IEC 62061), PLe and Cat. 4 (DIN EN ISO 13849-1), regarding the entire safety chain
DC (Diagnostic Coverage)	96.64%	96.64%	96.64%
MTTFd (Mean Time To Failure dangerous)	> 100 years	> 100 years	> 100 years
PFH (Probability of Failure per Hour)	6.27 x 10^{-9} 1/h	6.27 x 10^{-9} 1/h	6.27 x 10^{-9} 1/h
SSF (Safe Failure Fraction)	98.58%	98.58%	98.58%
HFT (Hardware Fault Tolerance)	1	1	1
Safety Inputs	1 x 2 channel	2 x 2 channel	2 x 2 channel
Inputs for Start Function	2 (manual start and autostart)	2 (manual start and autostart)	2 (manual start and autostart)
Input Type	Type 3 as per IEC 61131-2	Type 3 as per IEC 61131-2	Type 3 as per IEC 61131-2
Safety Output (OSSD)	1	1	1
Output Current	8 A (not for capacitive load)	8 A (not for capacitive load)	8 A (not for capacitive load)
Overload Protection	Excess temperature proof and overload-proof, short circuit proof with external fuse	Excess temperature proof and overload-proof, short circuit proof with external fuse	Excess temperature proof and overload-proof, short circuit proof with external fuse
Turn-off Time	< 20 ms	< 20 ms	< 20 ms
Turn-on Time	< 2 s	< 2 s	< 2 s
Output SS1	N/A	N/A	1
Output Current	N/A	N/A	0.5 A, overload behavior as per IEC 61131-2
Overload Protection	N/A	N/A	Over-temperature, Overload and Short Circuit protection with external fuse
Auxiliary Outputs	2 x 2	3 x 2	3 x 2
Output Current	max. 10 A (only to support the inputs dedicated inputs)	max. 10 A (only to support the inputs dedicated inputs)	max. 10 A (only to support the inputs dedicated inputs)
Module Diagnosis	Yes	Yes	Yes
Individual Channel Diagnosis	Yes	Yes	Yes
Supply Voltage	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus	20.4V – 28.8V via system bus
External Pre-fusing	mandatory: super fast, max. 8 A	mandatory: super fast, max. 8 A	mandatory: super fast, max. 8 A
Reverse Battery Protection	Yes	Yes	Yes
Current consumption (I_{IN} in the power segment of the fieldbus network adapter), typ.	8 mA	8 mA	8 mA
Current consumption (I_{IN} in the respective power segment)	45 mA	45 mA	45 mA
Operating Temperature	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)	-20°C to +60°C (-4 °F to +140 °F)
Storage Temperature	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)	-40°C to +85°C (-40 °F to +185 °F)
Humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Dimensions (H x W x D) in (mm)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)	4.72 x 0.45 x 2.99 (120 x 11.5 x 76)
Weight oz. (g)	2.82 (80)	2.89 (82)	2.96 (84)

Machine Edition 6.3

Overview 6.3

Machine Edition Components 6.3

Logic Developer-PLC: A Superior Set of PLC Programming Tools 6.4

Product Selection Guide 6.5

Machine Edition Licensing 6.7

ControlST Software 6.8

Overview 6.8

Overview

At GE, we understand that real-time information is the enabler of the e-business world and the foundation for fast and effective supply-chain execution. In order to help companies realize the full benefits of e-business, we are helping them adapt to a new manufacturing model that utilizes Web-based integration to free the flow of real-time data throughout the enterprise. By combining the best selection of software productivity tools with the latest communication and networking technologies, GE's software family provides solutions that make it easier for you to integrate your systems and empower your people.

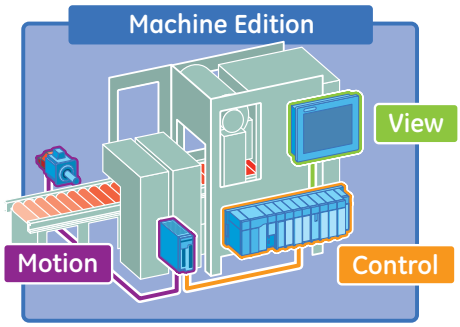
From the machine, to the cell, to the plant floor, and throughout the enterprise, Machine Edition's interactive set of software business tools provides real-time collaboration between customers, manufacturers, and suppliers.

Machine Edition

GE's Machine Edition is a universal development environment for all your operator interface, motion and control applications. Machine Edition provides a common user interface, drag-and-drop editing, and support for the many editing components required for a project.

Enabling fast, powerful, object-oriented programming, Machine Edition takes full advantage of industry-standard technologies like XML, COM/DCOM, OPC and ActiveX®. Machine Edition also includes Web-enabled functions like a built-in Web server that delivers real-time data and diagnostics to anyone in the enterprise.

All components and applications within Machine Edition share a single workspace and tool set. A standardized user interface results in a reduced learning curve, and the integration of new applications does not involve learning additional paradigms. This, coupled with an efficient, user-friendly design makes Machine Edition the perfect choice for HMI, motion, PLC, and PC-based control.



In addition to sharing common editing tools, all Machine Edition components share common objects across applications, including logic, scripts, graphical panels, and data structures. Once a variable is created, it can be reused in other components of the project. User Defined Data Types allows you to create custom data structures that represent real world equipment and objects. It significantly reduces application development time and increases productivity.

By combining the best of traditional programming and graphics applications with powerful open industry-standard technologies, Machine Edition provides a smooth migration path to the latest development tools.

Machine Edition Components:

View

An HMI specifically designed for the full range of machine-level operator interface/HMI applications. Includes support for the following Runtime options:

- QuickPanel+
- QuickPanel View (Windows® CE-based)
- QuickPanel
- Windows 2000/XP/NT/7

Logic Developer-PC

PC Control software combines ease of use and functionality for fast application development. Includes support for the following Runtime options:

- QuickPanel+
- QuickPanel Control (Windows® CE-based)
- Windows 2000/XP/NT/7

Logic Developer-PLC

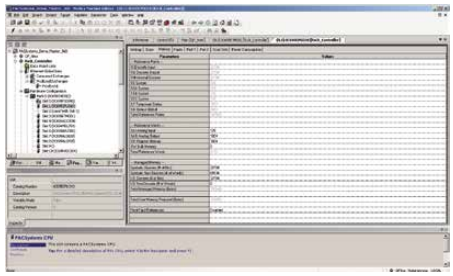
Programs and configures all GE PLCs, PACSystems Controllers and Remote I/O

- Available in Professional, Standard, and Nano/Micro versions

Logic Developer-PLC: A Superior Set of PLC Programming Tools

Fully Integrated Development System

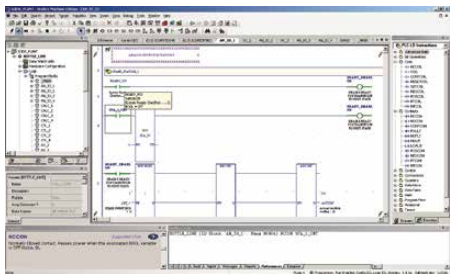
Machine Edition's development system provides an easy-to-learn interface for its components. Logic Developer-PLC automatically shares editing and configuration tools with other components when they are installed, creating an integrated, drag-and-drop workspace that makes developing applications simple. Just drag a PLC variable to an HMI animation panel to link them. Work on all parts of your automation system simultaneously, without switching between programs!

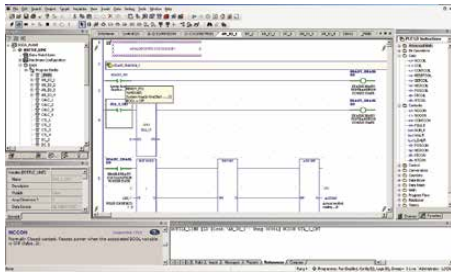


Configure: Supports the full array of GE PLCs, PACSystems controllers and remote I/O

Toolchest Offers Object Oriented Reusability and Pre-defined Tools

Build applications rapidly with pre-configured objects from the Toolchest, a storage system for objects including their associated logic or HMI elements and data structures. Drag your own work to the Toolchest for easy reuse—logic, scripting, graphical objects—anything you want to save and reuse.

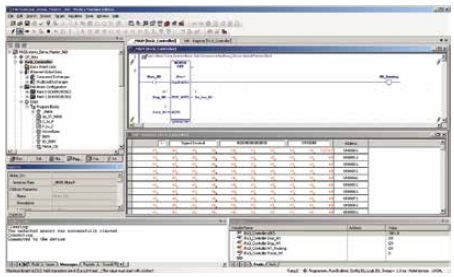




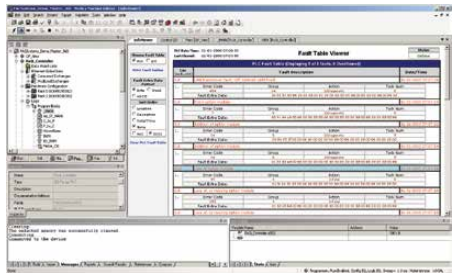
Program: Full set of programming languages, including Ladder Diagram, Function Block Diagram, Structured Text, and C Blocks

Configure

Logic Developer-PLC supports the full range of GE PLCs, PACSystems controllers, Remote I/O, RSTi I/O and Versa Safe I/O products including the Series 90-30, PACSystems RX3i, RX7i, and RXi, VersaMax, and VersaMax Nano/Micro PLCs. Configuration support is also provided for a wide range of field busses such as PROFINET, Ethernet Global Data (EGD), Genius, DeviceNet™, ModBus TCP, and PROFIBUS™.



Commission: Complete set of on-line development tools for monitoring and adjusting the application without stopping the process



Maintain: Diagnostic tools such as On-Line Fault Tables for pinpointing and diagnosing issues with your system

Program

Logic Developer-PLC provides a full set of programming languages for you to develop your PLC applications. Ladder Diagram (LD), Function Block Diagram (FBD), Structured Text (ST), and C Block programming languages are all supported by Logic Developer-PLC. Leverage the productivity advantages of Application Building Blocks by creating User Defined Function Blocks for your PACSystems controllers.

Commission

Logic Developer-PLC provides a complete set of on-line tools to aid in commissioning your PLC application. Tools such as Run Mode Store (RMS) of Logic, Online Test Mode and Word-for-Word Change of Logic allow you to tune the application in real-time without stopping the process. Data monitoring tools such as Data Watches and Reference View Tables allow you to create custom data monitor tables and provide a window into your PLC application execution.

Use the PACSystems Online LD Compare to visually inspect the differences between the Ladder Diagram Logic in the Controller and in your Project, on a rung-by-rung basis.

Maintain

Logic Developer-PLC provides a complete set of tools to aid in maintaining your PLC applications. Diagnostic tools such as On-line Fault Tables and Forced Variables Report provide you with the ability to diagnose issues and problems that may have occurred with your system.

Machine Edition allows the user to open multiple Machine Edition sessions on one PC and then connect each session to a controller simultaneously. This allows the user to view multiple, operating application programs at the same time, from a single PC.

Product Selection Guide

Product Suites

Machine Edition Product Suites	Supported Platforms/Features														Key			
Bundles of commonly used Machine Edition components. Advantages include lower cost, easier to authorize, and easier to maintain as one serial number covers the whole suite.	VersaMax Nano/Micro	VersaMax and Series 90-30	Series 90-70/PACSystems RX3i/RX7i/ RXi	QuickPanel+	QuickPanel	QuickPanel View (Basic/Intermediate)	QuickPanel View (Loaded)	ViewStation	QuickPanel Control	ControlStation	View Development 2000, XP	8000 Point R/T for View 2000, XP, NT	Motion Developer	Software Authorization	Hardware Key	Single License	Unlimited Seat Site License
Machine Edition Lite Development Suite	•			•	•	•							•	•		IC646MBL001	IC646MBLS99
Machine Edition Lite Development Suite with hardware key	•			•	•	•									•	IC647MBL001	-
Machine Edition Traditional Development Suite	•	•		•	•	•							•	•		IC646MBT001	IC646MBTS99
Machine Edition Traditional Development Suite with hardware key	•	•		•	•	•									•	IC647MBT001	-
Machine Edition Standard Development Suite	•	•		•	•	•	•	•	•	•			•	•		IC646MBS001	IC646MBSS99
Machine Edition Standard Development Suite with hardware key	•	•		•	•	•	•	•	•	•			•		•	IC647MBS001	-
Machine Edition Professional Development Suite	•	•	•	•	•	•	•	•	•	•	•		•	•		IC646MBP001	IC646MBPS99
Machine Edition Professional Development Suite with hardware key	•	•	•	•	•	•	•	•	•	•	•		•		•	IC647MBP001	-
Machine Edition Professional Development Suite with Runtimes	•	•	•	•	•	•	•	•	•	•	•	•	•	•		IC646MBW001	-

Control Products

PLC-Based Control	Supported PLC Platforms						Key			
Development licenses work on a hierarchical basis.	Remote I/O Config. Tools	VersaMax Nano/Micro	VersaMax	Series 90-30	Series 90-70	PACSystems RX3i/RX7i/RXi	Software Authorization	Hardware Key	Single License	Unlimited Seat Site License
Logic Developer PLC Configuration	•						•		IC646MPC001	-
Logic Developer PLC Nano/Micro	•	•					•		IC646MPM001	-
Logic Developer PLC Nano/Micro with hardware key	•	•						•	IC647MPM001	-
Logic Developer PLC Standard	•	•	•	•			•		IC646MPS001	IC646MPSS99
Logic Developer PLC Standard with hardware key	•	•	•	•				•	IC647MPS001	-
Logic Developer PLC Professional	•	•	•	•	•	•	•		IC646MPP001	IC646MPPS99
Logic Developer PLC Professional with hardware key	•	•	•	•	•	•		•	IC647MPP001	-
Logic Developer State Professional†	•	•	•	•	•	•	•		IC646MSP001	-

†State Logic licenses also provide basic configuration and programming capability for the indicated PLC platforms. Note that State Logic can only be mixed with other types of Logic (Ladder and C) for the Series 90-70. Note that State Logic only runs on the Series 90-30 and Series 90-70 controller.

To bundle Logic Developer PLC software with corresponding programming cable, change the “001” suffix to “101”. For example, change IC646MPP001 to IC646MPP101 to include the cable.

PLC-Based Control Programming Cables:

IC690ACC901 Series 90 serial cable

IC200CBL002 NIU Configuration cable

IC200CBL500 VersaMax Nano/Micro Programming Cable (RS-232 9 PIN TO RJ-45)

Product Selection Guide

OI/HMI Products

QuickPanel View & Control Platforms

Development software for QuickPanel, QuickPanel View & QuickPanel Control solutions. Runtime licenses are included in the hardware purchase.

	Supported Platforms/Features								Key			
	QuickPanel+	QuickPanel	QuickPanel View (Basic/Intermediate)	QuickPanel View (Loaded)	ViewStation CE	QuickPanel Control	ControlStation	Remote I/O Config Tools	Software Authorization	Hardware Key	Single License	Unlimited Seat Site License
View for QuickPanel	•	•	•						•		IC646MQP001	IC646MQPS99
View for QuickPanel with hardware key	•	•	•							•	IC647MQP001	-
View (CE) Standard Edition	•	•	•	•	•				•		IC646VSCEMK	IC646MVSS99
View (CE) Standard Edition with hardware key	•	•	•	•	•					•	IC647VSCEMK	-
QuickPanel Control (CE) Development Software	•	•	•	•	•	•	•	•	•		IC646CSCEMK	IC646MOSS99
QuickPanel Control (CE) Development Software with hardware key	•	•	•	•	•	•	•	•		•	IC647CSCEMK	-

View & Control PC-Based Platforms

Packages available as View runtime only, View development and runtime, View & Logic Developer PC runtime only, View & Logic Developer PC development.

	Supported Platforms/Features											Key						
	QuickPanel+	QuickPanel	QuickPanel View (Basic/Intermediate)	QuickPanel View (Loaded)	ViewStation CE	QuickPanel Control	ControlStation	Remote I/O Config Tools	Windows® 2000, XP, NT, 7	Development	Runtime	Software Authorization	Hardware Key	75 Point	150 Point	300 Point	700 Point	1500 Point	8000 Point
View Runtime									•		•	•		IC646MRA075	IC646MRA150	IC646MRA300	IC646MRA700	IC646MRA159	IC646MRA000
View Runtime with hardware key									•		•		•	IC647MRA075	IC647MRA150	IC647MRA300	IC647MRA700	IC647MRA159	IC647MRA000
View Development & Runtime	•	•	•	•	•				•	•	•	•		IC646MDA075	IC646MDA150	IC646MDA300	IC646MDA700	IC646MDA159	IC646MDA000
View Development & Runtime w/hardware key	•	•	•	•	•				•	•	•		•	IC647MDA075	IC647MDA150	IC647MDA300	IC647MDA700	IC647MDA159	IC647MDA000
View & Logic Developer PC Runtime								•	•		•	•		IC646MRC075	-	-	-	-	IC646MRC000
View & Logic Developer PC Runtime w/hardware key								•	•		•		•	IC647MRC075	-	-	-	-	IC647MRC000
View & Logic Developer PC Development (no-runtime)	•	•	•	•	•	•	•	•	•	•		•		-	-	-	-	-	IC646MOP001
View & Logic Developer PC Development (no-runtime) w/hardware key	•	•	•	•	•	•	•	•	•	•			•	-	-	-	-	-	IC647MOP001
View OPC Driver License with software key								•		•	•		-	-	-	-	-	IC646MVD000	-
View OPC Driver License with hardware key								•		•		•	-	-	-	-	-	IC647MVD000	-

Demo Products

Machine Edition Demo Software

Demo Disks in cardboard mailer - 10 Pack	IC646MED010
Machine Edition Installation and Supplemental CD Pack - Single Set	IC646MCD001

Machine Edition Licensing	MeXXMBL001	MeXXMBP001	MexxCSCEMK	MExxMDAxxx	MexxMOP001	MExxMRAxxx	MexxMRCxxx	MExxMVD000
	Lite Developer Suite	Professional Development Suite	QP Control Development	View Dev & Runtime	View & LDPC Dev - No Runtime	View Runtime	View & LDPC Runtime	OPC Driver
PAC (3i, 7i, i)		•						
9030/9070		•						
Nano Micro	•	•						
VersaMax	•[3]	•						
RIO VersaMax	•	•	•		•			
RIO 9030	•	•	•		•			
RIO PAC		•						
PPS Blocks		•[1]						
PPS Targets[2]								
QP (Classic)	•	•	•	•	•			
QP Control	•	•	•	•	•			
QP View Loaded	•	•	•	•	•			
QP View Intermediate/Mono	•	•	•	•	•			
QP+	•	•	•	•	•			
View Only		•		•	•			
LDPC & View		•			•			

[1]PPS Blocks can be used with the professional development suite effective as of 8.6 SIM 5.

[2]PPS Targets are ordered from the PPS Section with an applicable HMI.

[3]Versamax CPUs can be used with the Lite Developer Suite as of PME 8.6 SIM 6.

Control, Monitoring, and Protection Software Suite

GE's advanced ControlST software suite provides the foundation for the Mark* VIe Control System in a wide range of applications, including thermal, nuclear, oil and gas, wind, solar, and hydroelectric power. These diverse applications include the control, monitoring, and protection of everything from turbine-generators to entire plants.

Combining the best attributes of rotating machinery control with balance-of-plant control, the ControlST software suite offers flexible tools with a common time-coherent dataset to simplify operation and reduce lifecycle cost. In addition, it supports the latest model-based control technology derived from GE's thermodynamic design models to deliver the performance, operability, and reliability needed in today's connected world.

ControlST integrates vital data throughout the plant, including data from external systems that would otherwise be unavailable, and presents it in a meaningful context, reducing system costs. Armed with the right information at the right time, engineers can more effectively analyze process trends and adjust control software, operators can more quickly respond to alarms and operational disruptions, and maintenance teams can pinpoint problem areas, react proactively, and keep processes online.

The ControlST software suite includes several high-performance tools:

- WorkstationST* HMI and Historian management software
- ToolboxST* configuration and diagnostic software
- CIMPLICITY* graphics tools
- other packages for efficient plant-wide communications, monitoring, and asset management

Rugged COM Express Modules 7.3

bCOM6-L1200 Rugged COM Express Module. 7.4

bCOM6-P1100 Rugged COM Express Module 7.5

bCOM6-L1400 Rugged COM Express Module. 7.6

bCOM6-L1700 Rugged COM Express Module. 7.7

mCOM10-L1500 Mini COM Express Module. 7.8

MX05 Type 6, COM Express Evaluation Carrier in Mini-ITX Form Factor 7.9

Rugged COM Express Modules

GE COM Express modules are designed for OEMs developing computing platforms for equipment targeted at industrial or harsh environments, and for whom reducing the overall design cycle and lowering validation costs are of key importance.

GE's rugged COM Express modules offer outstanding reliability in a broad range of performance-per-watt options.

Our rugged processing solutions deliver leading edge performance, provide low total cost of ownership, offer flexible options, and are backed by GE's commitment to customer success.

Best-in-class performance and reliability

GE understands that processors deployed in harsh environments need to not only deliver excellent performance in relation to their power consumption, but also to deliver optimum reliability in the most adverse of operating environments. Our COM Express products are engineered specifically to meet those needs.

Onboard components are specifically selected for their reliability in demanding conditions. Unlike solutions designed for benign environments, our processor and memory are soldered to the board for maximum resistance to shock and vibration.

Extended mechanical construction protects the module, which is designed for optional conformal coating for even greater resistance to moisture, dust, chemicals, and temperature extremes.

As such, GE is uniquely positioned to enable our customers to meet the exacting requirements of critical infrastructure applications.

We are equally committed to ensuring that our customers can leverage the unique benefits of the COM Express architecture by designing modules in line with the newest processor architectures, providing a simple, cost-effective upgrade path.

Longer lifecycles and lower product costs

The COM Express architecture separates the processor and carrier card, extending the useful life of the subsystem by allowing a cost-effective upgrade of the processor alone. The long-term cost of ownership is reduced while ensuring that performance keeps pace with changing needs.

Commitment to customer satisfaction

Today's organizations are operating lean, engineering resources are scarce, and time-to-market is critical. Therefore, GE complements the performance and practical benefits of our COM Express modules with leading domain expertise and a focus on exceptional customer service. To help you get to market faster and lower your development costs, GE can assist you with in-house carrier design work, or build a custom carrier specifically for you.

Product Name	mCOM10-L1500	bCOM6-L1200	bCOM6-L1400	bCOM6-P1100	bCOM6-L1700
Performance	Mini format, Mid-level, power saving	Mid-level performance	High-performance	Power saving	Mid to High-performance
Select for:	Applications or upgrades with mid-level performance and high graphics requirements	Applications with mid-level performance and low-power consumption requirements	Applications with multiple graphic functions that require high performance	Real-time embedded computing applications that require low power consumption and the best performance/power ratio	Applications with mid to high-level performance needs coupled with high graphics performance
Processor	AMD Embedded G-Series SOC	VIA Eden or Nano processor	Intel® Core™ i7 processor	Freescale PowerPC 1022/1013 processor	AMD RSOC dual and Quad Core at 3.3 and 2.2 GHz
Cores/Frequency	4 Core 1.5 GHz 2 Core 1 GHz	1-2 Cores/800 MHz 1.3 GHz	2-4 Cores/1.7 GHz 2.5 GHz	1-22 Cores/800 MHz 1.2 GHz	4x x86 cores @ 3.6 GHz (max)/ 2.7 GHz (base) 8x GPUs @ 686 MHz (max)/ 600 MHz (base) 2x x86 cores @ 3.0 GHz (max)/ 2.2 GHz (base) 3x GPUs @ 533 MHz (max)/ 464 MHz (base)
Memory	Up to 4GB DDR3, soldered ECC	Up to 8GB DDR3, soldered, non-ECC	Up to 8GB DDR3, soldered, ECC	Up to 4GB DDR3, soldered, ECC	Up to 16GB DDR3, soldered, ECC

Publication Reference Chart

GFA-1871	bCOM6-L1200 Datasheet www.ge-ip.com/account/download/13158/3622
GFA-1916	bCOM6-L1400 Datasheet www.ge-ip.com/account/download/13246/3649
GFA-2055	bCOM6-L1700 Datasheet www.ge-ip.com/account/download/xxxx/xxxx

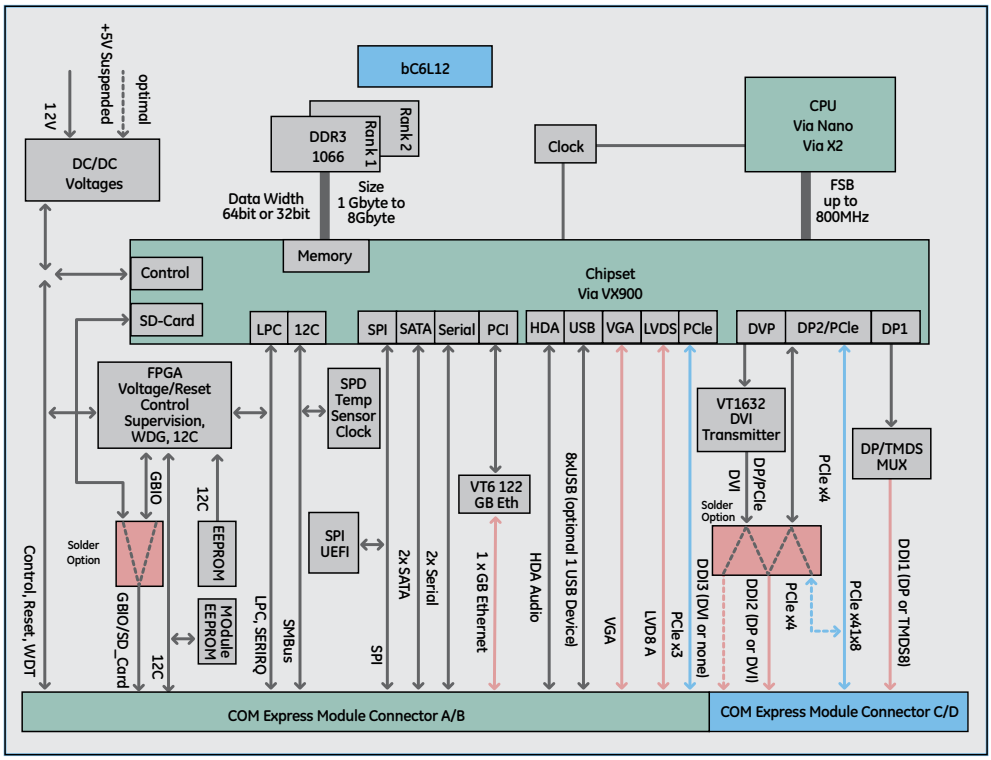


bCOM6-L1200 Rugged COM Express Module

GE's bCOM6-L1200 is a rugged, Type 6 COM Express module designed for harsh environments, offering ultimate durability and varying levels of performance-per-watt. The bCOM6-L1200 offers a balanced combination of low power requirements and performance.

	BC6L12G6A20HA	BC6L126DZ2ZHF
Product Name	**bCOM6-L1200**	**bCOM6-L1200**
Lifecycle Status	Active	Active
Form Factor	Type 6	Type 6
Processor	VIA Nano dual Core 1.2+GHz CPU	VIA Nano dual Core 1.2+GHz CPU
Memory	4GB non-ECC, soldered	4GB on non-ECC, soldered
Heat Sink	Heat Spreader	Heat Spreader
Operation Temperature	Standard	Extended Temp

Ordering Notes: Alternate memory and heat sink configurations possible
Conformal coating available





bCOM6-P1100 Rugged COM Express Module

GE's bCOM6-P1100 COM Express module takes advantage of the PowerPC QorIQ processor to deliver embedded real-time computing for harsh environments. It offers ultimate durability, high performance, and low power consumption.

The bCOM6-P1100 is well suited for OEMs designing real-time embedded computing platforms into equipment for industrial or harsh environments. This durable COM Express solution delivers high performance coupled with low power consumption, and reduces the overall design cycle and lowers validation costs.

	BC6P11E2020HF	BC6P11F2020HF
Product Name	**bCOM6-P1100**	**bCOM6-P1100**
Lifecycle Status	Active	Active
Form Factor	Type 6	Type 6
Processor	P1022 1067MHz, no SEC	P1022 1067MHz, with SEC
Memory	4GB ECC, soldered	4GB ECC, soldered
Heat Sink	Heat Spreader	Heat Spreader
Operation Temperature	Extended Temp	Extended Temp

Ordering Notes: Alternate memory and heat sink configurations possible
Conformal coating available



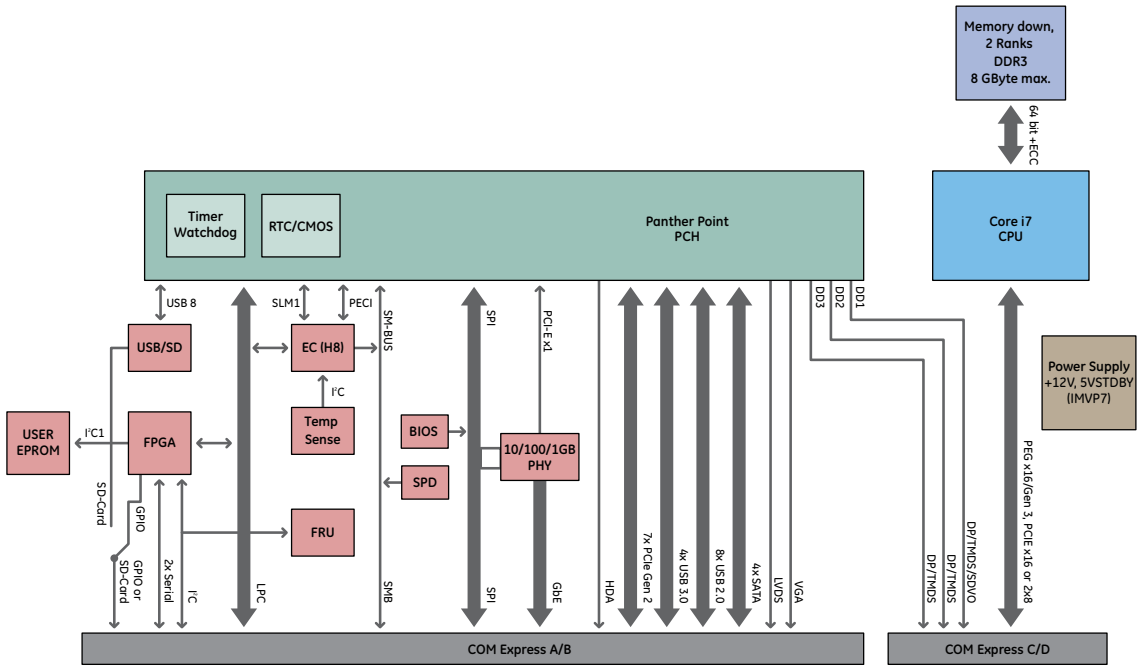
bCOM6-L1400 Rugged COM Express Module

GE's bCOM6-L1400 COM Express module takes advantage of the significantly enhanced video processing, turbo-boost acceleration and power management capabilities of the latest generation Intel® Core™ i7 processor. As such, the bCOM6-L1400 is ideally suited for a wide variety of commercial, industrial, transportation and defense applications in a broad range of embedded computing environments. This durable COM Express solution reduces overall design cycle and validation costs to lower total cost of ownership.

Select this module for applications with multiple graphic functions or high-end computing needs.

	BC6L14C6Z2ZHF	BC6L146DZ2ZHF	BC6L146EZ2ZHF
Product Name	**bCOM6-L1400**	**bCOM6-L1400**	**bCOM6-L1400**
Lifecycle Status	Active	Active	Active
Form Factor	Type 6	Type 6	Type 6
Processor	1.7GHz ULV dual core	2.5GHz dual core	2.1GHz quad core
Memory	4GB ECC, soldered	4GB ECC, soldered	4GB ECC, soldered
Heat Sink	Heat Spreader	Heat Spreader	Heat Spreader
Operation Temperature	Extended Temp	Extended Temp	Extended Temp

Ordering Notes: Alternate memory and heat sink configurations possible
Conformal coating available





bCOM6-L1700 Rugged COM Express Module

GE's bCOM6-L1700 COM Express module takes advantage of the significantly enhanced video processing, turbo-boost acceleration and power management capabilities of AMD embedded R-Series processors. It is ideally suited for a wide variety of commercial, industrial, transportation and defense applications in a broad range of embedded computing environments.

The bCOM6-L1700 module offers the high-level performance and durability needed for applications that operate in harsh environments. The processor and memory are soldered to the board for maximum resistance to shock and vibration. Extended mechanical construction protects the module, which is designed for optional conformal coating for even greater resistance to moisture, dust, chemicals, and temperature extremes.

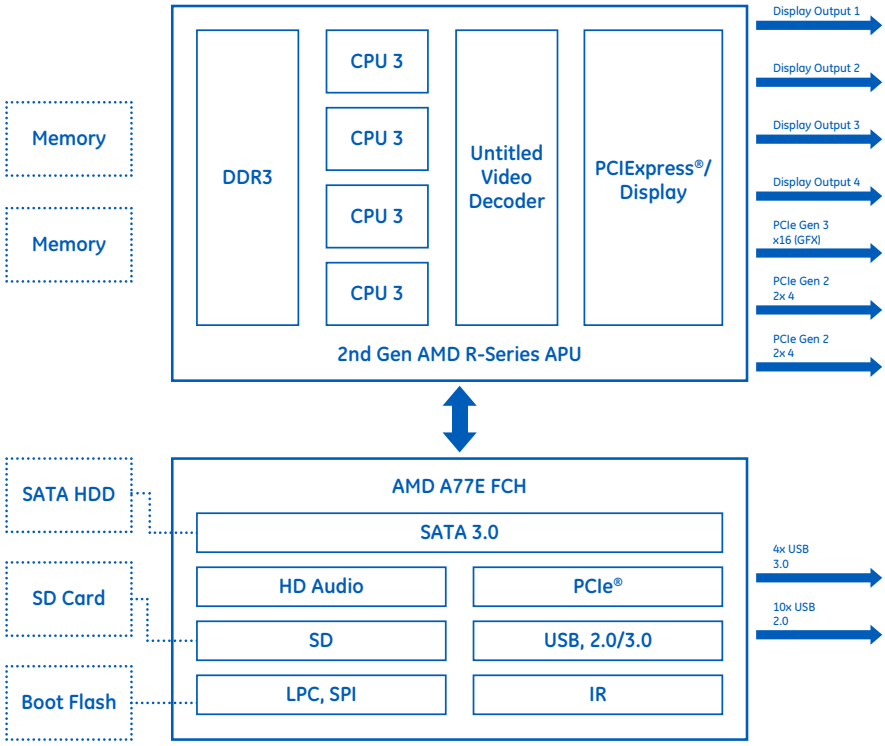
Select this module for applications with multiple graphic functions or high-end computing needs.

	BC6L17-XXXXXXX
Product Name	**bCOM6-L1700**
Lifecycle Status	Active
Form Factor	Type 6
Processor	AMD embedded second generation R-Series APU
Memory	16GB of DDR3, ECC soldered
Heat Sink	Heat Spreader
Operation Temperature	Extended Temp

Ordering Notes: Alternate memory and heat sink configurations possible
Conformal coating available

Accessories

Part Number	Description	Lifecycle Status
CEC05	Standard bCOM6-L1700 COM Express carrier without COM Express module	Active





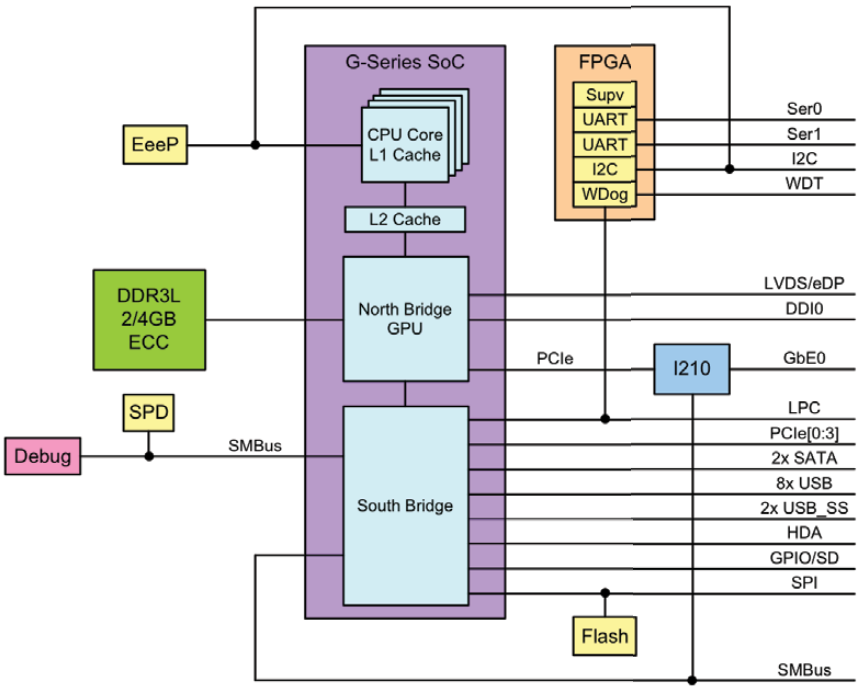
mCOM10-L1500 Mini COM Express Module

The mCOM10-L1500 COM Express module is the miniature form-factor solution in GE's COM Express portfolio, and offers the high-level performance and ultimate durability needed for applications that operate in harsh environments. It is ideal for applications requiring a small form factor and low power consumption on a type 10 COM Express platform, and fully uses the capabilities of the next-generation multicore AMD G-Series SOC processors.

The processor and memory are soldered to the board for maximum resistance to shock and vibration. Extended mechanical construction protects the module, which is designed for optional conformal coating to provide additional resistance to moisture, dust, chemicals, and temperature extremes.

	mC10L15EXXXX	mC10L15EXXXX
Product Name	**mCOM10-L1500**	**mCOM10-L1500**
Lifecycle Status	Active	Active
Form Factor	Type 10	Type 10
Processor	AMD Embedded G-Series SOC/4 Core 15W TDP	AMD Embedded G-Series SOC/2 Core 9W TDP
Memory	4GB of DDR3, ECC soldered	4GB of DDR3, ECC soldered
Heat Sink	Heat Spreader	Heat Spreader
Operation Temperature	Standard Temp	Extended Temp

Ordering Notes: Conformal coating available





MX05 Type 6, COM Express evaluation carrier in Mini-ITX form factor

GE's MX05 delivers the high levels of performance and durability needed for critical infrastructure applications that operate in small and portable applications.

It is ideal for low power consumption, small form factor applications found in medical and industrial automation settings.

The MX05 offers the flexibility to use a housing with a standard ATX window cut-out and maintain EMI compatibility by use of rear I/O shield, or the option to either build a front panel or use a rear I/O shield, which simplifies housing design.

Because the processor module is separate from the I/O on the carrier board, GE's COM Express based modular SBCs deliver fast, easy upgradability while minimizing cost and disruption to underlying systems.

	MX05Z0AH00A
Product Name	**MX05 Type 6 COM Express evaluation carrier**
Lifecycle Status	Active
Form Factor	Type 6
Processor	COM Express module dependent; Support for all GE COM Express module families and variants
Memory	COM Express module dependent
SD Card	Up to 32 GB
Ethernet	2x Gigabit Ethernet on rear panel
USB Interface	4x USB 3.0; 4x USB 2.0; 2x USB 2.0 (pin header on carrier board)
Serial Interface	1x RS-232 port; Independent 16-byte FIFO supporting baud rates up to 115 kbaud
Graphics	PCI Express x16 Graphics (PEG) slot; 2x Display Port 1.2
Power Requirement	ATX power supply
Operation Temperature	Standard Temp

Integrated Control System Services Overview..... 8.3

Lifecycle Services 8.4

Design & Implementation Services 8.4

Migration Services.....8.5

Asset Management Services.....8.7

A Foundation for Success

Partnering with the customer to understand challenges and project goals is GE's top priority in every system implementation. GE's extensive involvement in engineering and execution not only ensures that installation is carried out safely and efficiently but also that support is available throughout every phase of the system life cycle, from design and implementation to asset management and long-term services.

GE provides a complete range of services including design and implementation, lifecycle services, migration services, and asset management.

The GE services team can accommodate all types of project requirements including supplying equipment, engineered packages, and implementation of fully engineered solutions.

Partnering with the customer to understand system goals and define project scope is GE's top priority in every system implementation. GE's extensive involvement in engineering and project execution ensure that system installations are implemented safely and efficiently. In addition, GE can support customers long-term with full system life-cycle support post-installation.

The GE services team is ready to help you gain the operational and process visibility needed for increased asset uptime and improved profitability. GE control solutions work seamlessly across a broad range of systems including plant automation, distributed control systems (DCS), and process safety.



Lifecycle Services

By providing extensive engineering support and by utilizing remote enabled services, a customized services package from GE maximizes the solution lifecycle while keeping downtime to a minimum. Goal-based and scalable, each lifecycle service package comes bundled with your initial system installation.

Optimize process performance and reduce risk by relying on rapid global response from regionally-based service experts. With savings realized through improved efficiency, downtime mitigation and tighter process control, a GE services package more than pays for itself throughout the system lifecycle.

- Fully engineered solutions
- Spare parts
- HMI/network parts
- HMI & UI upgrades
- Network upgrades
- Maintenance services
- System health checks and tuning
- Emergency services
- Annual controls health check (3 days/year)



Design & Implementation Services

GE has been designing control systems for more than 100 years and has been providing integrated plant controls for a broad range of applications for nearly two decades. GE DCS and Safety systems are well suited to increasing demand for improved plant-level performance and operator efficiency. The modular architecture of GE's Mark VIe control system mitigates many common industry challenges by allowing for mission-critical turbine control within the same environment as an open plant control. The single platform enables comprehensive, integrated automation for improved performance and reliability. Additionally, GE DCS and ESD control components are rated for hazardous environments, scalable with geographically distributed IO, and modular for incremental upgrades.

DCS

GE's distributed control system solution includes end-to-end components from SCADA and control to starters and excitor systems. The backplane-free architecture of GE's MarkVIe solution means the system can be easily modified throughout the life of the asset, reducing lifecycle costs. GE offers complete lifecycle execution in line with customer readiness.

Process Safety

GE's Mark VIeS safety solution is a complete, flexible, and reliable engineered process safety system with enhanced cyber security for critical processes such as plant emergency shutdown, burner management, critical process control, fire and gas detection, and turbomachinery safety. GE's highly experienced functional safety experts will design, implement, and support your



entire safety system—including hardware, software, and application engineering—to help you meet the unique safety requirements for your process. GE understands the importance of seamless integration between your safety and process control systems. By seamlessly connecting safety functionality to existing processes, we simplify implementation considerably and reduce overall operating costs of your integrated control system.

GE's engineering expertise and knowledge of international functional safety standards help ensure the successful design, implementation, and support of your specific safety system project.

- Control system hardware design
- System configuration
- Application code and HMI graphics implementation
- Achieved SIL verification reports for the entire safety loop
- Integration with basic process control and DCS systems
- Integration into the customer's functional safety lifecycle
- Safety requirement specification review
- Site commissioning support services
- Factory acceptance testing
- Alarm management support
- 3rd party device integration
- Network installation and upgrades



Plant Automation Applications

GE knows that keeping your system online is critical to staying in control and not only reduces risks to personnel and assets, but mitigates the costs associated with unexpected downtime events.

GE offers a complete portfolio of advanced control solutions to meet all your production operation requirements including increasing system uptime and reducing the common challenges associated with system lifecycle. Hot-swappable components enable the system to stay online during service, eliminating the need for suspension of operations due to component maintenance.

GE's highly experienced controls system engineers will work with you to design, implement, and support automation requirements to help you meet required production metrics.

- Scalable solution designs
- Installation services
- Customization and configuration for machine builders
- Modular design with options for pre-installed applications
- Preconfigured hardware and options for ready-to-run SCADA and Historian
- Control system expansions and modifications
- Software updates/upgrades and bug fixes

Migration Services

An estimated $65 billion of process automation systems are at or near the end of their lifecycles. Most of them have been running for more than 20 years. Decades-old components don't last forever. That's why GE has created a comprehensive migration plan that is fast and efficient.

The GE services team can provide a complete, customized migration recommendation for your operation. We act as part of your team, to plan, initiate and implement installation with as little disruption as possible. An automation system migration usually takes as little as three hours, often while keeping your operations up and running.

As one of the biggest equipment manufacturers in the world, GE has addressed the challenges of an aging infrastructure and an aging workforce head-on, with revolutionary control systems that are easier to operate, understand and configure. If you're looking to overcome obstacles created by your obsolete control system, such as limited parts availability, increased downtime, and increased regulation, look no further than solutions from GE.





If you're relying on obsolete machines and refurbished parts to keep your systems up and running, it's time to start putting together a migration plan.

The Right Tools For the Job

Automated conversion

GE has created migration tools like Application code translator that were designed specifically to provide a rapid, granular overview of system architecture and allow for a rapid transition to new technology.

Predefined migration strategies

There is no better team to help you upgrade your GE components than the GE services team. We have proven migration paths that help you move forward quickly and efficiently.

Minimal wiring changes

Moving legacy wiring is an intuitive process when you choose a GE solution.

Pre-engineered gateways

Migrate at your own pace. GE has created gateways that allow for phased migrations.

Achilles security

GE's next-generation control systems are achilles certified, and provide greater peace of mind in today's cybercentric industrial environments.

Experience

If you're migrating from legacy control and I/O, look no further than the GE migration services team to provide expert guidance as you step into today's technology.



From assessment to implementation, the GE services team can fully assist you with system hardware upgrades.

Future-Proof your System for Greater Flexibility

Leverage the power of the Industrial Internet and benefit from higher speed, higher performance and much greater efficiency in managing distributed assets. GE can provide tighter process control through faster components, simple plug-and-play connections and precision, network-based data management tools that are built to stand the test of time.

The Benefits of GE Technology Today and Tomorrow

- Full scalability: Entry level to high performance solutions
- OEM customization and configuration
- Modular design with options for pre-installed applications
- High performance for uninterrupted data transmission
- Lower total cost of ownership, less components to install/maintain
- Ready to run SCADA and Historian
- Achilles tested
- Higher performance in harsh conditions
- Modular design for an unchanging footprint



A Trusted Partner

Connecting machine level data with networked sensors and software is critical to keeping pace with rapid growth and maintaining your competitive edge. The GE services team can help you can gain the operational and process visibility needed to improve your bottom line.

Asset Management Services

GE is the leader in predictive diagnostics and analytics. With more than 10,000 preempted events, GE customers in industries worldwide are realizing an increase in profitability through cloud-based asset management.

Your ability to understand, control, and protect your entire operation is key to deriving its greatest operating value, pulling every possible bit of efficiency, reliability, and availability from your assets. GE's intuitive control systems give you that power. GE can help you to implement application code that helps you to manage your plant using predefined metrics or choose a cloud-based option and let GE's team of asset management experts automate the process for you.

Transmission and collection of alerts can be triggered by predefined thresholds and time-sensitive data trends such as temperature, speed, pressure, and flow readings.



- Comprehensive process-optimization and predictive monitoring services
- Powerful predictive analytics software
- Immediate notifications of critical issues, with diagnostics and prioritizations
- Options for machine builders to provide preventative monitoring and remote maintenance as services
- Regular web-based reporting
- Incident tracking
- Flexible advisory services, as needed

VersaMax Nano and Micro 9.3
Nano PLCs 9.5
Micro PLCs 9.6
Discrete Expansion Selection Guide 9.14
Discrete Expansion Units 9.15
Analog Expansion Selection Guide 9.21
Analog Expansion Units 9.22
DataPanels Operator Interfaces 9.25
Communications Options 9.26
Portable Program Download Device (PPDD) 9.28
Accessories; Power Supplies; Cables 9.30
Starter Kits 9.31
Configuration Guidelines; Typical Applications 9.32

Durus 9.34
AC Models 9.35
DC Models 9.37
Discrete Expansion Units 9.41
Analog Expansion Units 9.42
Communications Options 9.43
Software 9.44
Accessories; Starter Kits 9.45
Configuration Guidelines; Typical Applications 9.46

Series 90-30 ..... 9.47
CPUs 9.48
Baseplates 9.51
Power Supplies 9.52
Discrete I/O Modules (Input) 9.54
Analog I/O Modules (Input) 9.57
Discrete I/O Modules (Output) 9.59
Analog I/O Modules (Output) 9.64
Millivolt I/O Modules 9.66
RTD I/O Modules 9.67
Strain Gage I/O Modules 9.68
Temperature Control Modules 9.69
Thermocouple I/O Modules 9.70
Network and Distributed I/O Systems 9.72
Serial Communications Modules 9.75
Power Measurement Modules 9.76
Pneumatic Module 9.77
Programmable Coprocessor Modules 9.78
Motion Modules 9.79
Remote Expansion Modules 9.81
Accessories; Cables; Terminal Blocks 9.82
Configuration Guidelines; Typical Applications 9.84

PACSystems RX7i Specialty Controller 9.85
CPUs 9.86
Racks 9.88
Power Supplies 9.89
I/O Interface Modules 9.90
Communications Modules 9.91
Accessories and Cables 9.92

Genius Block I/O 9.93
AC Discrete I/O Modules 9.94
DC Discrete I/O Modules 9.95
Analog Input Modules 9.97
Analog Output Modules 9.98
Analog Mixed Modules 9.99
RTD and Thermocouple Modules 9.100
High Speed Counter 9.101
PowerTRAC Monitoring Module 9.102
Accessories, Cables, Hand Held Monitor 9.103
Configuration Guidelines; Typical Applications 9.104

VersaMax Nano and Micro Controllers

Don't let size fool you. Although they are easy on valuable panel space, the VersaMax Nano and Micro PLCs are big on features. For high-volume applications where cost and fast processor speeds are an issue, the VersaMax Nano is the PLC of choice. For additional functionality, the modular VersaMax Micro offers the features and the flexibility to match application needs in such industries as food processing, chemicals, packaging, water and wastewater, construction equipment and plastics.

For tight spaces, the VersaMax Nano PLC is the perfect solution. Thanks to its all-in-one construction, installation is a breeze. All you have to do is snap it onto a DIN-rail or screw it into a panel. With the VersaMax Nano, you save on initial as well as life cycle costs.

The small-footprint VersaMax Micro PLC offers the flexibility of modular design and a variety of built-in features, including up to 64 I/O points (expandable to 170 I/O points), fast cycle times, a robust instruction set and extensive memory that multiplies your programming options.

Machine Edition

Machine Edition is an advanced software environment for the development and maintenance of machine level automation. Visualization, motion control, and execution logic are developed with a single programmer.

Publication Reference Chart

GFK-1645	VersaMax Micro PLCs and Nano PLCs User's Manual
IC690CDU002	InfoLink for PLC CD-ROM



Nano PLCs, page 9.5



Micro PLCs, pages 9.6-9.13



Expansion Units, pages 9.14-9.24



DataPanels Operator Interfaces, page 9.25



Communications Options, pages 9.26-9.27



Portable Program Download Device (PPDD), pages 9.28-9.29

Accessories, pages 9.30-9.31

Configuration Guidelines, pages 9.32-9.33

VersaMax Nano and Micro Selection Guide

Features	Nano 10	Micro 14	Micro 23	Micro 28	Micro 20	Micro 40	Micro 64
Built-in Discrete I/O	6 in/ 4out	8 in/ 6 out	13 in/10 out	16 in/12 out	12 in/8 out	24 in/16 out	40 in/24 out
Built-in Analog I/O	1 on some models	none	2 in/ 1 out	none	none	none	none
I/O Expansion Units	none	Up to 4 units	Up to 4 units	Up to 4 units	Up to 4 units	Up to 4 units	Up to 4 units
Logic Memory (Words)	2K	9K	9K	9K	24K	24K	24K
Data Storage (Words)	256	256	2K	2K	32K	32K	32K
Scan Time (msec/K)	1.3 msec	1.1 msec	1.1 msec	1.1 msec	1.1 msec	1.1 msec	1.1 msec
Battery Backed RAM	Super Cap only	Super Cap only	Yes and Super Cap	Yes and Super Cap	Yes and Super Cap	Yes and Super Cap	Yes and Super Cap
Real Time Clock	none	none	Yes, Included	Yes, Included	Yes, Included	Yes, Included	Yes, Included
Ports Available	1 RS-232	1 RS-232	1 RS-232 and 1 RS-485	1 RS-232 and 1 RS-485	1 RS-232 and second port optional RS-232, RS-485, USB or Ethernet	1 RS-232 and second port optional RS-232, RS-485, USB or Ethernet	1 RS-232 and second port optional RS-232, RS-485, USB or Ethernet
Ethernet Option	Yes, VersaMax SE	Yes, VersaMax SE	Yes, VersaMax SE	Yes, VersaMax SE	Yes on second port	Yes on second port	Yes on second port
High Speed Counter	Up to 4 at 10Khz (16 bit)	Up to 4 at 10Khz (16 bit)	Up to 4 at 10Khz (16 bit)	Up to 4 at 10Khz (16 bit)	Up to 4 at 100Khz (32 bit)	Up to 4 at 100Khz (32 bit)	Up to 4 at 100Khz (32 bit)
Pulse Train/PWM	Up to 4 at 5Khz (16 bit)	Up to 4 at 5Khz (16 bit)	Up to 4 at 5Khz (16 bit)	Up to 4 at 5Khz (16 bit)	Up to 4 at 65Khz (32 bit)	Up to 4 at 65Khz (32 bit)	Up to 4 at 65Khz (32 bit)
Motion Commands	N/A	N/A	N/A	N/A	Find Home, Go Home, Jog, Ramp, Blended Move (4 Consecutive Moves)	Find Home, Go Home, Jog, Ramp, Blended Move (4 Consecutive Moves)	Find Home, Go Home, Jog, Ramp, Blended Move (4 Consecutive Moves)
Write Register Values to Internal Flash	No	Yes	Yes	Yes	Yes	Yes	Yes
On Line Program Support	No	No	No	No	Yes with Firmware 3.9 & Hardware revision B	Yes with Firmware 3.9	Yes with Firmware 3.9

Powerful Instruction Set

Bit Operation Functions

- Logic AND, Logic OR
- Exclusive OR, Logical Invert
- Shift Right/Left
- Rotate Right/Left
- Bit Test/Set/Clear
- Masked Compare
- Bit Position
- Bit Sequencer

Control Functions

- Do I/O
- Call
- End
- Subroutines
- Comments
- Master Control Relay
- Service Request
- PID

Table Functions

- Array Move
- Search

Data Move Functions

- Move
- Block Move
- Block Clear
- Shift Register
- Communications Request
  - Motion Moves
  - High Speed Counter
  - Serial Read/Write
  - Modbus Master

Conversion Functions

- BCD- 4
- Signed Integer
- Double Precision Signed Integer
- Real
- Real to Word
- Truncate Real Number

Math and Numerical Functions

- +, -, x, /
- Modulo division
- Scaling
- Square Root
- Trigonometric Functions
- Logarithmic/Exponential
- Convert Radians

Relation Functions

- Equal
- Not Equal
- Greater Than
- Less Than
- Greater or Equal
- Less or Equal
- Range

Relay Functions

- Contacts, Coils
- Fault and No Fault Contacts
- Alarm Contacts

Timer and Counters

- Time-tick Contacts
- On-delay Stopwatch timer
- On-delay timer
- Off-delay timer
- Up Counter
- Down Counter



Nano 10 PLCs

The palm-sized VersaMax Nano PLC is highly compact, with an all-in-one construction that saves panel space. Installation is a breeze: simply snap it onto a DIN-rail or mount it on a panel. Because it gives you more capabilities in a smaller, less expensive package, the Nano PLC is ideal for high-volume applications that require low cost, compact size, and fast processor speeds. The Nano decreases your life-cycle costs as well, with easy installation and long-term reliability.

	IC200NAL110	IC200NAL211	IC200NDD010	IC200NDD101	IC200NDR001	IC200NDR010
Product Name	**10 point (6) 12 VDC In, (1) Analog Voltage In, (4) Relay Out, 12 VDC Powered**	**10 point (6) 24 VDC In, (1) Analog Voltage In, (4) Relay Out, 24 VDC Powered**	**10 point (6) 12 VDC In, (4) 12 VDC Out, 12 VDC Powered**	**10 point (6) 24 VDC In, (4) 24 VDC Out, 24 VDC Powered**	**10 point (6) 24 VDC In, (4) Relay Out, 24 VDC Powered**	**10 point (6) 12 VDC In, (4) Relay Out, 12 VDC Powered**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature	Mature
Number of Discrete Inputs/ Outputs	6 In / 4 Out (Non Expandable)	6 In / 4 Out (Non Expandable)	6 In / 4 Out (Non Expandable)	6 In / 4 Out (Non Expandable)	6 In / 4 Out (Non Expandable)	6 In / 4 Out (Non Expandable)
Number of Analog Inputs/ Outputs	1 In	1 In	N/A	N/A	N/A	N/A
Physical I/O Maximum	10	10	10	10	10	10
User Program Logic Memory (Words)	2 K	2 K	2 K	2 K	2 K	2 K
Registers (Words)	256	256	256	256	256	256
Analog Pots for Data Adjustment	Yes, 2	Yes, 2	Yes, 2	Yes, 2	Yes, 2	Yes, 2
Serial Port Connector Type	RJ-45 (RS-232)	RJ-45 (RS-232)	RJ-45 (RS-232)	RJ-45 (RS-232)	RJ-45 (RS-232)	RJ-45 (RS-232)
Protocols	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write
Power Voltage	12 VDC	24 VDC	12 VDC	24 VDC	24 VDC	12 VDC
Input Power Supply Rating	3 watts internal	3 watts internal	3 watts internal	3 watts internal	3 watts internal	3 watts internal
Input Device Voltage	12 VDC	24 VDC	12 VDC	24 VDC	24 VDC	12 VDC
Maximum Type A and B Counters	2 Type A and 1 Type B @ 10Khz (16 bit)	2 Type A and 1 Type B @ 10Khz (16 bit)	2 Type A and 1 Type B @ 10Khz (16 bit)	2 Type A and 1 Type B @ 10Khz (16 bit)	2 Type A and 1 Type B @ 10Khz (16 bit)	2 Type A and 1 Type B @ 10Khz (16 bit)
Analog Input Ranges	0 to 10 VDC (8 bit)	0 to 10 VDC (8 bit)	N/A	N/A	N/A	N/A
Output Control Voltage	Relay Out	Relay Out	12 VDC	24 VDC	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	2 Amps at 5 VDC and 240 VAC	2 Amps at 5 VDC and 240 VAC	N/A	N/A	2 Amps at 5 VDC and 240 VAC	2 Amps at 5 VDC and 240 VAC
Maximum Number of PWM/Pulse Outputs	0	0	3 @ 5Khz (16 bit)	3 @ 5Khz (16 bit)	0	0
Dimensions (W x H x D) mm	75 x 80 x 47	75 x 80 x 47	75 x 80 x 47	75 x 80 x 47	75 x 80 x 47	75 x 80 x 47
Operating Temperature	0°C to +55°C	0°C to +55°C	0°C to +55°C	0°C to +55°C	0°C to +55°C	0°C to +55°C
Programming Software	VersaPro 2.0 or greater, Machine Edition Logic Developer	VersaPro 2.0 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer
Portable Memory Module Support	No	No	No	No	No	No



Micro 14 PLCs

The Micro 14 PLC is big on features; from up to 14 I/O built-in (expandable to 126 I/O) points to fast cycle times, robust instruction set, and generous memory to allow more flexible programming. And it's all packaged in a sturdy modular design for easy access and long-term durability. This all-in-one PLC gives you everything you need to control a wide variety of applications.

	IC200UAA003	IC200UAR014	IC200UDD104	IC200UDD112
Product Name	**14 point (8) 120 VAC In, (6) 120 VAC Out, 120/240 VAC Powered**	**14 point, (8) 120 VAC In, (6) Relay Out, 120/240 VAC Powered**	**14 point (8) 24 VDC In, (6) 12/24 VDC Out, (2) @ 1.0 A, (4) @ 0.5 A, 24 VDC Powered**	**14 point (8) 12 VDC In, (6) 12 VDC Out, 0.7 A, 12 VDC Powered**
Lifecycle Status	Active	Active	Active	Active
Number of Discrete Inputs/Outputs	8 In / 6 Out (Supports 4 Expansion Units)	8 In / 6 Out (Supports 4 Expansion Units)	8 In / 6 Out (Supports 4 Expansion Units)	8 In / 6 Out (Supports 4 Expansion Units)
Number of Analog Inputs/Outputs	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	126	126	126	126
User Program Logic Memory (Words)	9 K	9 K	9 K	9 K
Registers (Words)	256	256	256	256
Analog Pots for Data Adjustment	Yes, 2	Yes, 2	Yes, 2	Yes, 2
Serial Port Connector Type	RJ-45 (RS-232)	RJ-45 (RS-232)	RJ-45 (RS-232)	RJ-45 (RS-232)
Protocols	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write
Power Voltage	120/240 VAC	120/240 VAC	24 VDC	12 VDC
Input Power Supply Rating	11 VA	11 VA	4 Watts	3 Watts
24 VDC User Power for Sensors	N/A	200 mA	200 mA	200 mA
Input Device Voltage	120 VAC	120 VAC	24 VDC	12 VDC
Maximum Type A and B Counters	N/A	N/A	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)
Output Control Voltage	120 VAC	N/A	24 VDC	12 VDC
Relay Maximum Resistive Load Rating	N/A	6 @ 2 Amps at 24 VDC and 240 VAC; 2 @10 Amps at 24 VDC and 240 VAC	N/A	N/A
Maximum Number of PWM/Pulse Outputs	N/A	N/A	4 @ 5Khz (16 bit)	4 @ 5Khz (16 bit)
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76
Programming Software	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer
Portable Memory Module Support	No	No	No	No



Micro 14 PLCs

The Micro 14 PLC is big on features; from up to 14 I/O built-in (expandable to 126 I/O) points to fast cycle times, robust instruction set, and generous memory to allow more flexible programming. And it's all packaged in a sturdy modular design for easy access and long-term durability. This all-in-one PLC gives you everything you need to control a wide variety of applications.

	IC200UDR001	IC200UDR002	IC200UDR003
Product Name	**14 point (8) 24 VDC In, (6) Relay Out, 120/240 VAC Powered**	**14 point (8) 24 VDC In, (6) Relay Out, 24 VDC Powered**	**14 point (8) 12 VDC In, (6) Relay Out, 12 VDC Powered**
Lifecycle Status	Active	Active	Active
Number of Discrete Inputs/Outputs	8 In / 6 Out (Supports 4 Expansion Units)	8 In / 6 Out (Supports 4 Expansion Units)	8 In / 6 Out (Supports 4 Expansion Units)
Number of Analog Inputs/Outputs	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	126	126	126
User Program Logic Memory (Words)	9 K	9 K	9 K
Registers (Words)	256	256	256
Analog Pots for Data Adjustment	Yes, 2	Yes, 2	Yes, 2
Serial Port Connector Type	RJ-45 (RS-232)	RJ-45 (RS-232)	RJ-45 (RS-232)
Protocols	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write	SNP, SNP X (Breakless) RTU Slave (2 and 4 wire RTU Slave). Serial Read and Write
Power Voltage	120/240 VAC	24 VDC	12 VDC
Input Power Supply Rating	13 VA	4 Watts	3 Watts
24 VDC User Power for Sensors	200 mA	200 mA	200 mA
Input Device Voltage	24 VDC	24 VDC	12 VDC
Maximum Type A and B Counters	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)
Output Control Voltage	Relay Out	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC
Maximum Number of PWM/Pulse Outputs	0	0	0
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76
Programming Software	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer
Portable Memory Module Support	No	No	No



Micro 23 PLCs

The Micro 23 PLC is big on features with 23 discrete I/O and two analog inputs and one analog output built-in (expandable to 135 I/O) points. The Micro 23 executes fast cycle times, robust instruction set, and generous memory to allow more flexible programming. And it's all packaged in a sturdy modular design for easy access and long-term durability.

	IC200UAL004	IC200UAL005	IC200UAL006
Product Name	**23 point; (13) 12 VDC In, (10) Relay Out, (2) Analog In and (1) Analog Out, 12 VDC Powered.**	**23 point; (13) 24 VDC In, (9) Relay Out, (1) 24 VDC Out, (2) Analog In and (1) Analog Out, 24 VDC Powered.**	**23 point; (13) 24 VDC In, (9) Relay Out, (1) 24 VDC Out, (2) Analog In and (1) Analog Out, 120/240 VAC Powered.**
Lifecycle Status	Active	Active	Active
Number of Discrete Inputs/Outputs	13 In / 10 Out (Supports 4 Expansion Units)	13 In / 10 Out (Supports 4 Expansion Units)	13 In / 10 Out (Supports 4 Expansion Units)
Number of Analog Inputs/Outputs	2 analog in / 1 analog out built-in and supports up to 4 analog expansion units (16 analog in/ 8 analog out)	2 analog in / 1 analog out built-in and supports up to 4 analog expansion units (16 analog in/ 8 analog out)	2 analog in / 1 analog out built-in and supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	135	135	135
User Program Logic Memory (Words)	9 K	9 K	9 K
Registers (Words)	2 K	2 K	2 K
Analog Pots for Data Adjustment	Yes, 2	Yes, 2	Yes, 2
Serial Port Connector Type	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)
Protocols	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write
Power Voltage	12 VDC	24 VDC	120/240 VAC
Input Power Supply Rating	8 Watts	8 Watts	34 VA
24 VDC User Power for Sensors	200 mA	200 mA	200 mA
Input Device Voltage	12 VDC	24 VDC	24 VDC
Maximum Type A and B Counters	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)
Analog Input Ranges	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit Resolution	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit Resolution	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit Resolution
Output Control Voltage	Relay Out	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC
Maximum Number of PWM/Pulse Outputs	N/A	1 @ 5Khz (16 bit)	1 @ 5Khz (16 bit)
Analog Output Ranges	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit Resolution	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit Resolution	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit Resolution
Dimensions (W x H x D) mm	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76
Programming Software	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer
Portable Memory Module Support	No	No	No



Micro 28 PLC

The Micro 28 PLC is big on features with the built-in 28 I/O (expandable to 140 I/O) points to fast cycle times, two built-in serial ports, robust instruction set, and generous memory to allow more flexible programming. And it's all packaged in a sturdy modular design for easy access and long-term durability. This all-in-one PLC gives you everything you need to control a wide variety of applications.

	IC200UAA007	IC200UAR028	IC200UDD110	IC200UDD120
Product Name	**28 point; (16) 120 VAC In, (12) 120 VAC Out, 120/240 VAC Powered.**	**28 point, (16) 120 VAC In, (12) Relay Out, 120/240 VAC Powered.**	**28 point; (16) 24 VDC In, (12) 24 VDC Out (6) @ 1.0 A, (6) @ 0.5 A, 24 VDC Powered.**	**28 point; (16) 24 VDC In, (12) 24 VDC Out (6) @ 1.0 A, (6) @ 0.5 A, 24 VDC Powered.**
Lifecycle Status	Active	Active	Active	Active
Number of Discrete Inputs/Outputs	16 In / 12 Out (Supports 4 Expansion Units)	16 In / 12 Out (Supports 4 Expansion Units)	16 In / 12 Out (Supports 4 Expansion Units)	16 In / 12 Out (Supports 4 Expansion Units)
Number of Analog Inputs/Outputs	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	140	140	140	140
User Program Logic Memory (Words)	9 K	9 K	9 K	9 K
Registers (Words)	2 K	2 K	2 K	2 K
Analog Pots for Data Adjustment	Yes, 2	Yes, 2	Yes, 2	Yes, 2
Serial Port Connector Type	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)
Protocols	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write
Power Voltage	120/240 VAC	120/240 VAC	24 VDC	24 VDC
Input Power Supply Rating	16 VA	16 VA	5 Watts	5 Watts
24 VDC User Power for Sensors	N/A	200 mA	200 mA	200 mA
Input Device Voltage	120 VAC	120 VAC	24 VDC	24 VDC
Maximum Type A and B Counters	N/A	N/A	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)
Output Control Voltage	120 VAC	Relay Out	24 VDC	24 VDC ESCP, Self Healing, No External Fusing Required
Relay Maximum Resistive Load Rating	N/A	10 @ 2 Amps at 24 VDC and 240 VAC; 2 @ 10 Amps at 24 VDC and 240 VAC	N/A	N/A
Maximum Number of PWM/Pulse Outputs	N/A	N/A	4 @ 5Khz (16 bit)	4 @ 5Khz (16 bit)
Dimensions (W x H x D) mm	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76
Programming Software	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer
Portable Memory Module Support	No	No	No	No



Micro 28 PLC

The Micro 28 PLC is big on features with the built-in 28 I/O (expandable to 140 I/O) points to fast cycle times, two built-in serial ports, robust instruction set, and generous memory to allow more flexible programming. And it's all packaged in a sturdy modular design for easy access and long-term durability. This all-in-one PLC gives you everything you need to control a wide variety of applications.

	IC200UDD212	IC200UDR005	IC200UDR006	IC200UDR228	IC200UDR010
Product Name	**28 point (16) 12 VDC In, (12) 12 VDC Out, 0.7A, 12 VDC Powered**	**28 point (16) 24 VDC In, (11) Relay Out, (1) 24 VDC Out, 120/240 VAC Powered**	**28 point (16) 12 VDC In, (12) Relay Out, 12 VDC Powered**	**28 point (16) 24 VDC In, (11) Relay Out, (1) 24 VDC OUT, 12/24 VDC Powered**	**28 point (16) 24 VDC In, (11) Relay Out, (1) 24 VDC OUT, 24 VDC Powered**
Lifecycle Status	Active	Active	Active	Active	Active
Number of Discrete Inputs/Outputs	16 In / 12 Out (Supports 4 Expansion Units)	16 In / 12 Out (Supports 4 Expansion Units	16 In / 12 Out (Supports 4 Expansion Units	16 In / 12 Out (Supports 4 Expansion Units	16 In / 12 Out (Supports 4 Expansion Units
Number of Analog Inputs/Outputs	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	140	140	140	140	140
User Program Logic Memory (Words)	9 K	9 K	9 K	9 K	9 K
Registers (Words)	2 K	2 K	2 K	2 K	2 K
Analog Pots for Data Adjustment	Yes, 2	Yes, 2	Yes, 2	Yes, 2	Yes, 2
Serial Port Connector Type	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)	RJ-45 (RS-232) port 1 and DB-15 (RS-485 on port 2)
Protocols	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write	Port 1, SNP, SNP X (Breakless); Port 2, SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write
Power Voltage	12 VDC	120/240 VAC	12 VDC	12/24 VDC	24 VDC
Input Power Supply Rating	8 Watts	26 VA	8 Watts	8 Watts	8 Watts
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	140 mA	200 mA
Input Device Voltage	12 VDC	24 VDC	12 VDC	24 VDC	24 VDC
Maximum Type A and B Counters	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)	4 Type A and 1 Type B @ 10Khz (16 bit)
Output Control Voltage	12 VDC	Relay Out	Relay Out	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	N/A	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC
Maximum Number of PWM/Pulse Outputs	4 @ 5Khz (32 bit)	1 @ 5Khz (16 bit)	1 @ 5Khz (16 bit)	1 @ 5Khz (16 bit)	1 @ 5Khz (16 bit)
Dimensions (W x H x D) mm	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76
Programming Software	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	VersaPro 1.1 or greater, Machine Edition Logic Developer	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	VersaPro 1.1 or greater, Machine Edition Logic Developer
Portable Memory Module Support	No	No	No	No	



Micro 20 PLC

The Micro 20 PLC is big on features, expandable to 132 I/O points to fast cycle times, robust instruction set, and generous memory to allow more flexible programming. The optional second port provides you with the option of an additional RS-232 port, RS-485, USB, or Ethernet. The serial expansion ports come with two analog input channels. A user-friendly memory module is available to easily download changes to the controller without the need of a PC. And it's all packaged in a sturdy modular design for easy access and long-term durability. This all-in-one PLC gives you everything you need to control a wide variety of applications.

	IC200UDD020	IC200UDD220	IC200UDR120	IC200UDR020
Product Name	**Micro 20; (12) 24 VDC In, (8) 24 VDC Source Out 0.7 amps with ESCP protection, 24 VDC Powered**	**Micro 20; (12) 24 VDC In, (8) 24 VDC Sink Out, 24 VDC Powered**	**Micro 20; (12) 24 VDC In, (8) Relay Out 2.0 amps, 120/240VAC Powered**	**Micro 20; (12) 24 VDC In, (8) Relay Out 2.0 amps, 24VDC Powered**
Lifecycle Status	Active	Active	Active	Active
Number of Discrete Inputs/Outputs	12 In / 8 Out (Supports 4 Expansion Units)	12 In / 8 Out (Supports 4 Expansion Units)	12 In / 8 Out (Supports 4 Expansion Units)	12 In / 8 Out (Supports 4 Expansion Units)
Number of Analog Inputs/Outputs	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	132	132	132	132
User Program Logic Memory (Words)	24 K	24 K	24 K	24 K
Registers (Words)	32 K	32 K	32 K	32 K
Analog Pots for Data Adjustment	No	No	No	No
Serial Port Connector Type	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)
Protocols	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave 2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave 2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave 2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave 2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling
Power Voltage	24 VDC	24 VDC	120/240 VAC	24 VDC
Input Power Supply Rating	10 Watts	10 Watts	35 VA	10 Watts
24 VDC User Power for Sensors	435 mA	435 mA	435 mA	435 mA
Input Device Voltage	24 VDC	24 VDC	24 VDC	24 VDC
Maximum Type A and B Counters	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)
Output Control Voltage	24 VDC ESCP; Self Healing; No External Fusing Required	24 VDC Sink	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	N/A	N/A	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC
Maximum Number of PWM/Pulse Outputs	4 @ 65Khz (32 bit)	4 @ 65Khz (32 bit)	N/A	N/A
Dimensions (W x H x D) mm	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76
Programming Software	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix
Portable Memory Module Support	Yes	Yes	Yes	Yes

Micro 40 PLC



The Micro 40 PLC is big on features, expandable to 152 I/O points to fast cycle times, robust instruction set, and generous memory to allow more flexible programming. The optional second port provides you with the option of an additional RS-232 port, RS-485, USB, or Ethernet. The serial expansion ports come with two analog input channels. A user-friendly memory module is available to easily download changes to the controller without the need of a PC. And it's all packaged in a sturdy modular design for easy access and long-term durability. This all-in-one PLC gives you everything you need to control a wide variety of applications.

	IC200UDD040	IC200UDD240	IC200UDR140	IC200UDR040	IC200UDR440
Product Name	**Micro 40; (24) 24 VDC In, (16) 24 VDC Source Out, 0.7 amps with ESCP protection, 24 VDC Powered**	**Micro 40; (24) 24 VDC In, (16) 24 VDC Sink Out, 24 VDC Powered**	**Micro 40; (24) 24 VDC In, (16) Relay Out 2.0 amps, 120/240 VAC Powered**	**Micro 40; (24) 24 VDC In, (16) Relay Out 2.0 amps, 24 VDC Powered**	**Micro 40; (24) 24 VDC In, (16) Relay Out 2.0 amps 12/24 VDC Powered**
Lifecycle Status	Active	Active	Active	Active	Active
Number of Discrete Inputs/ Outputs	24 In / 16 Out (Supports 4 Expansion Units)	24 In / 16 Out (Supports 4 Expansion Units)	24 In / 16 Out (Supports 4 Expansion Units)	24 In / 16 Out (Supports 4 Expansion Units)	24 In / 16 Out (Supports 4 Expansion Units)
Number of Analog Inputs/Outputs	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	152	152	152	152	152
User Program Logic Memory (Words)	24 K	24 K	24 K	24 K	24 K
Registers (Words)	32 K	32 K	32 K	32 K	32 K
Analog Pots for Data Adjustment	No	No	No	No	No
Serial Port Connector Type	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100Mbit)
Protocols	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling
Power Voltage	24 VDC	24 VDC	120/240 VAC	24 VDC	12/24 VDC
Input Power Supply Rating	10 Watts	10 Watts	35 VA	10 Watts	10 Watts
24 VDC User Power for Sensors	435 mA	435 mA	435 mA	435 mA	120 mA
Input Device Voltage	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Maximum Type A and B Counters	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)
Output Control Voltage	24 VDC ESCP; Self Healing; No External Fusing Required	24 VDC Sink	Relay Out	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	N/A	N/A	2 Amps at 24 VDC and 240 VA	2 Amps at 24 VDC and 240 VA	2 Amps at 24 VDC and 240 VA
Maximum Number of PWM/Pulse Outputs	4 @ 65Khz (32 bit)	4 @ 65Khz (32 bit)	N/A	N/A	N/A
Dimensions (W x H x D) mm	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76
Programming Software	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix
Portable Memory Module Support	Yes	Yes	Yes	Yes	Yes



Micro 64 PLC

The Micro 64 PLC is big on features, expandable to 176 I/O points to fast cycle times, robust instruction set, and generous memory to allow more flexible programming. The optional second port provides you with the option of an additional RS-232 port, RS-485, USB, or Ethernet. The serial expansion ports come with two analog input channels. A user-friendly memory module is available to easily download changes to the controller without the need of a PC. And it's all packaged in a sturdy modular design for easy access and long-term durability. This all-in-one PLC gives you everything you need to control a wide variety of applications.

	IC200UDD064	IC200UDD164	IC200UDR164	IC200UDR064
Product Name	**Micro 64; (40) 24 VDC In, (24) 24 VDC Source Out 0.7 amps with ESCP protection, 24 VDC Powered.**	**Micro 64; (40) 24 VDC In, (24) 24 VDC Sink Out 0.7 amps, 24 VDC Powered.**	**Micro 64; (40) 24 VDC In, (24) Relay Out 2.0 amps, 120/240 VAC Powered.**	**Micro 64; (40) 24 VDC In, (24) Relay Out 2.0 amps, 24 VDC Powered.**
Lifecycle Status	Active	Active	Active	Active
Number of Discrete Inputs/Outputs	40 In / 24 Out (Supports 4 Expansion Units)	40 In / 24 Out (Supports 4 Expansion Units)	40 In / 24 Out (Supports 4 Expansion Units)	40 In / 24 Out (Supports 4 Expansion Units)
Number of Analog Inputs/Outputs	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)	Supports up to 4 analog expansion units (16 analog in/ 8 analog out)
Physical I/O Maximum	176	176	176	176
User Program Logic Memory (Words)	24K	24K	24 K	24 K
Registers (Words)	32 K	32 K	32 K	32 K
Analog Pots for Data Adjustment	No	No	No	No
Serial Port Connector Type	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100 Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100 Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100 Mbit)	RJ-45 (RS-232) port 1 and optional port 2 DB-15 (RS-485) or RJ-45 (RS-232) or USB or RJ-45 (Ethernet 10/100 Mbit)
Protocols	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless), RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless),RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling	Both Ports: SNP, SNP X (Breakless),RTU Master and Slave (2 and 4 wire RTU Slave), SNP Master, Serial Read and Write; Ethernet SRTP, Modbus TCP (server) and Tunneling
Power Voltage	24 VDC	24 VDC	120/240 VAC	24 VDC
Input Power Supply Rating	10 Watts	10 Watts	35 VA	10 Watts
24 VDC User Power for Sensors	435 mA	435 mA	435 mA	435 mA
Input Device Voltage	24 VDC	24 VDC	24 VDC	24 VDC
Maximum Type A and B Counters	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)	4 Type A and 1 Type B @ 100Khz (32 bit)
Output Control Voltage	24 VDC ESCP, Self Healing, No External Fusing Required	24 VDC Sink	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	N/A	N/A	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC
Maximum Number of PWM/Pulse Outputs	4 @ 65Khz (32 bit)	4 @ 65Khz (32 bit)	N/A	N/A
Dimensions (W x H x D) mm	190 x 90 x 76	190 x 90 x 76	190 x 90 x 76	190 x 90 x 76
Programming Software	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix
Portable Memory Module Support	Yes	Yes	Yes	Yes

Discrete Expansion Selection Guide

Model	Module Input Power	12 VDC Inputs	12 VDC Outputs	24 VDC Inputs	120 VAC Input	24 VDC Outputs Source	24 VDC Outputs with ESCP	24 VDC Sink Outputs	120 VAC Output	Relay Outputs, 2 Amps	Relay Outputs, 5 Amps	Relay Outputs 10 Amps
IC200UEI08	24 VDC			8 Inputs								
IC200UEI016	24 VDC			16 Inputs								
IC200UEO008	24 VDC						8 Outputs					
IC200UEO016	24 VDC						16 Outputs					
IC200UEO108	24 VDC							8 Outputs				
IC200UEO116	24 VDC							16 Outputs				
IC200UER508	24 VDC										8 Outputs	
IC200UER008	24 VDC									8 Outputs		
IC200UER016	24 VDC									16 Outputs		
IC200UEC008	24 VDC			4 Inputs/ 4 Source Outputs			4 Inputs/ 4 Source Outputs					
IC200UEC108	24 VDC			4 Inputs/ 4 Sink Outputs				4 Inputs/ 4 Sink Outputs				
IC200UEC208	24 VDC			4 Inputs/ 4 Relay Outputs						4 Inputs/ 4 Relay Outputs		
IC200UEX015	12 VDC	8 Inputs/ 6 12 VDC Outputs	8 Inputs/ 6 12 VDC Outputs									
IC200UEX013	12 VDC	8 Inputs/ 6 Relay Outputs								8 Inputs/ 6 Relay Outputs		
IC200UEX014	24 VDC			8 Inputs/ 6 24 VDC Outputs		8 Inputs/ 6 24 VDC Outputs						
IC200UEX122	24 VDC			8 Inputs/ 6 24 VDC Outputs with ESCP			8 Inputs/ 6 24 VDC Outputs with ESCP					
IC200UEX012	24 VDC			8 Inputs/ 6 Relay Outputs						8 Inputs/ 6 Relay Outputs		
IC200UEX011	120/ 240 VAC			8 Inputs/ 6 Relay Outputs						8 Inputs/ 6 Relay Outputs		
IC200UEX009	120/ 240 VAC				8 Inputs/ 6 Relay Outputs (4 @ 2 amps and 2 @ 10 amps)					8 Inputs/ 6 Relay Outputs (4 @ 2 amps and 2 @ 10 amps)		8 Inputs/ 6 Relay Outputs (4 @ 2 amps and 2 @ 10 amps)
IC200UEX010	120/ 240 VAC				8 Inputs/ 6 AC Outputs				8 Inputs/ 6 AC Outputs			
IC200UEX215	12 VDC	16 Inputs/ 12 12 VDC Outputs	16 Inputs/ 12 12 VDC Outputs									
IC200UEX213	12 VDC	16 Inputs/ 12 Relay Outputs								8 Inputs/ 6 Relay Outputs		
IC200UEX214	24 VDC			16 Inputs/ 12 24 VDC Outputs		16 Inputs/ 12 24 VDC Outputs						
IC200UEX222	24 VDC			16 Inputs/ 12 24 VDC Outputs with ESCP			16 Inputs/ 12 24 VDC Outputs with ESCP					
IC200UEX212	24 VDC			16 Inputs/ 12 Relay Outputs						16 Inputs/ 12 Relay Outputs		
IC200UEX211	120/ 240 VAC			16 Inputs/ 12 Relay Outputs						16 Inputs/ 12 Relay Outputs		
IC200UEX209	120/ 240 VAC				16 Inputs/ 12 Relay Outputs (10 @ 2 amps and 2 @ 10 amps)					16 Inputs/ 12 Relay Outputs (10 @ 2 amps and 2 @ 10 amps)		16 Inputs/ 12 Relay Outputs (10 @ 2 amps and 2 @ 10 amps)
IC200UEX210	120/ 240 VAC				16 Inputs/ 12 AC Outputs				16 Inputs/ 12 AC Outputs			
IC200UEX264*	24 VDC			40 Inputs/ 24 24 VDC Outputs			40 Inputs/ 24 24 VDC Outputs					
IC200UEX364*	24 VDC			40 Inputs/ 24 24 VDC Outputs		40 Inputs/ 24 24 VDC Outputs						
IC200UEX064*	24 VDC			40 Inputs/ 24 Relay Outputs						40 Inputs/ 24 Relay Outputs		
IC200UEX164*	120/ 240 VAC			40 Inputs/ 24 Relay Outputs						40 Inputs/ 24 Relay Outputs		

*Micro 20, 40 and 64 support only.



Discrete Expansion Units

The VersaMax Micro's modular design provides you with remarkable flexibility in a compact control. The versatile Micro PLC can support up to four Expansion Units of any mix of discrete or analog.

	IC200UEI008	IC200UEI016	IC200UEO008	IC200UEO016	IC200UEO108	IC200UEO116
Product Name	**8 point (8) 24 VDC In, 24 VDC Powered**	**16 point (16) 24 VDC In, 24 VDC Powered**	**8 point (8) 24 VDC Output with ESCP Protection, 24 VDC Powered**	**16 point (16) 24 VDC Output with ESCP Protection, 24 VDC Powered**	**8 point (8) 24 VDC Sink Output, 24 VDC Powered**	**16 point (16) 24 VDC Sink Output, 24 VDC Powered**
Lifecycle Status	Active	Active	Active	Active	Active	Active
Micro Type Restrictions	N/A	N/A	N/A	N/A	N/A	N/A
Number of Discrete Inputs/Outputs	8 In	16 In	8 Out	16 Out	8 Out	16 Out
Power Voltage	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Input Power Supply Rating	4 Watts	4 Watts	4 Watts	4 Watts	4 Watts	4 Watts
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Input Device Voltage	24 VDC	24 VDC	N/A	N/A	N/A	N/A
Output Control Voltage	N/A	N/A	24 VDC ESCP, Self Healing, No External Fusing Required	24 VDC ESCP, Self Healing, No External Fusing Required	24 VDC Sink	24 VDC Sink
Relay Maximum Resistive Load Rating	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76



Discrete Expansion Units

The VersaMax Micro's modular design provides you with remarkable flexibility in a compact control. The versatile Micro PLC can support up to four Expansion Units of any mix of discrete or analog.

	IC200UER508	IC200UER008	IC200UER016	IC200UEC008	IC200UEC108	IC200UEC208
Product Name	**8 point (8) 5 Amp Relay Out, 24 VDC Power Supply (not UL approved)**	**8 point (8) 2 Amp Relay Out, 24 VDC Power Supply**	**16 point (16) Relay Out, 24 VDC Power Supply**	**8 point (4) 24 VDC In, (4) 24 VDC Out with ESCP Protection, 24 VDC Power Supply**	**8 point (4) 24 VDC In, (4) 24 VDC Sink Out, 24 VDC Power Supply**	**8 point (4) 24 VDC In, (4) Relay Out, 24 VDC Power Supply**
Lifecycle Status	Active	Active	Active	Active	Active	Active
Micro Type Restrictions	None	None	None	None	None	None
Number of Discrete Inputs/Outputs	8 Out	8 Out	16 Out	4 In / 4 Out	4 In / 4 Out	4 In / 4 Out
Power Voltage	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Input Power Supply Rating	4 Watts	4 Watts	4 Watts	4 Watts	4 Watts	4 Watts
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Input Device Voltage	N/A	N/A	N/A	24 VDC	24 VDC	24 VDC
Output Control Voltage	Relay Out	Relay Out	Relay Out	24 VDC ESCP, Self Healing, No External Fusing Required	24 VDC Sink	Relay Out
Relay Maximum Resistive Load Rating	5 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	N/A	N/A	2 Amps at 24 VDC and 240 VAC
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76



Discrete Expansion Units

The VersaMax Micro's modular design provides you with remarkable flexibility in a compact control. The versatile Micro PLC can support up to four Expansion Units of any mix of discrete or analog.

	IC200UEX015	IC200UEX013	IC200UEX014	IC200UEX122	IC200UEX012	IC200UEX011
Product Name	**14 point (8) 12 VDC In, (6) 12 VDC Out, 12 VDC Powered**	**14 point (8) 12 VDC In, (6) Relay Out, 12 VDC Powered**	**14 point (8) 24 VDC In, (6) 24 VDC Out, 24 VDC Powered**	**14 point (8) 24 VDC In, (6) 24 VDC Out with ESCP, 24 VDC Powered**	**14 point (8) 24 VDC In, (6) Relay Out, 24 VDC Powered**	**14 point (8) 24 VDC In, (6) Relay Out, 120/240 VAC Powered**
Lifecycle Status	Active	Active	Active	Active	Active	Active
Micro Type Restrictions	N/A	N/A	N/A	N/A	N/A	N/A
Number of Discrete Inputs/Outputs	8 In / 6 Out	8 In / 6 Out	8 In / 6 Out	8 In / 6 Out	8 In / 6 Out	8 In / 6 Out
Power Voltage	12 VDC	12 VDC	24 VDC	24 VDC	24 VDC	120/240 VAC
Input Power Supply Rating	4 Watts	4 Watts	4 Watts	4 Watts	4 Watts	13 VA
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Input Device Voltage	12 VDC	12 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Output Control Voltage	12 VDC	Relay Out	24 VDC	24 VDC ESCP, Self Healing, No External Fusing Required	Relay Out	Relay Out
Relay Maximum Resistive Load Rating	N/A	2 Amps at 24 VDC and 240 VAC	N/A	N/A	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76



Discrete Expansion Units

The VersaMax Micro's modular design provides you with remarkable flexibility in a compact control. The versatile Micro PLC can support up to four Expansion Units of any mix of discrete or analog.

	IC200UEX009	IC200UEX010	IC200UEX215	IC200UEX213	IC200UEX214
Product Name	**14 point (8) 120 VAC In, (6) Relay Out (2 outputs at 10 amp and 4 outputs at 2 amp), 120/240 VAC Powered**	**14 point (8) 120 VAC In, (6) 120 VAC Out, 120/240 VAC Powered**	**28 point (16) 12 VDC In, (12) 12 VDC Out, 12 VDC Powered**	**28 point (16) 12 VDC In, (12) Relay Out, 12 VDC Powered**	**28 point (16) 24 VDC In, (12) 24 VDC Out, 24 VDC Powered**
Lifecycle Status	Active	Active	Active	Active	Active
Micro Type Restrictions	N/A	N/A	N/A	N/A	N/A
Number of Discrete Inputs/Outputs	8 In / 6 Out	8 In / 6 Out	16 In / 12 Out	16 In / 12 Out	16 In / 12 Out
Power Voltage	120/240 VAC	120/240 VAC	12 VDC	12 VDC	24 VDC
Input Power Supply Rating	11 VA	11 VA	8 Watts	8 Watts	5 Watts
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	200 mA	200 mA
Input Device Voltage	120 VAC	120 VAC	12 VDC	12 VDC	24 VDC
Output Control Voltage	Relay Out (2 at 10 Amps and 4 at 2 Amps)	120 VAC	12 VDC	Relay Out	24 VDC
Relay Maximum Resistive Load Rating	2 Amps at 24 VDC and 240 VAC; 10 Amp at 24 VDC and 240 VAC	N/A	N/A	2 Amps at 24 VDC and 240 VAC	N/A
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76



Discrete Expansion Units

The VersaMax Micro's modular design provides you with remarkable flexibility in a compact control. The versatile Micro PLC can support up to four Expansion Units of any mix of discrete or analog.

	IC200UEX222	IC200UEX212	IC200UEX211	IC200UEX209	IC200UEX210
Product Name	**28 point (16) 24 VDC In, (12) 24 VDC Out with ESCP, 24 VDC Powered**	**28 point (16) 24 VDC In, (12) Relay Out, 24 VDC Powered**	**28 point (16) 24 VDC In, (12) Relay Out, 120/240 VAC Powered**	**28 point (16) 120 VAC In, (12) Relay Out (2 outputs at 10 amp and 10 outputs at 2 amp), 120/240 VAC Powered**	**28 point (16) 24 VDC In, (12) 120 VAC Out, 120/240 VAC Powered**
Lifecycle Status	Active	Active	Active	Active	Active
Micro Type Restrictions	N/A	N/A	N/A	N/A	N/A
Number of Discrete Inputs/Outputs	16 In / 12 Out	16 In / 12 Out	16 In / 12 Out	16 In / 12 Out	16 In / 12 Out
Power Voltage	24 VDC	24 VDC	120/240 VAC	120/240 VAC	120/240 VAC
Input Power Supply Rating	5 Watts	8 Watts	26 VA	16 VA	16 VA
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	200 mA	200 mA
Input Device Voltage	24 VDC	24 VDC	24 VDC	120 VAC	120 VAC
Output Control Voltage	24 VDC ESCP, Self Healing, No External Fusing Required	Relay Out	Relay Out	Relay Out (2 at 10 Amps and 10 at 2 Amps)	120 VAC
Relay Maximum Resistive Load Rating	N/A	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC; 10 Amps at 24 VDC and 240 VAC	N/A
Dimensions (W x H x D) mm	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76	150 x 90 x 76



Discrete Expansion Units

The VersaMax Micro's modular design provides you with remarkable flexibility in a compact control. The versatile Micro PLC can support up to four Expansion Units of any mix of discrete or analog.

	IC200UEX064	IC200UEX164	IC200UEX264	IC200UEX364
Product Name	**64 point (40) 24 VDC In, (24) Relay Out, 24 VDC Powered**	**64 point (40) 24 VDC In, (24) Relay Out, 120/240 VAC Powered**	**64 point (40) 24 VDC In, (24) 24 VDC Source Out, 24 VDC Powered**	**64 point (40) 24 VDC In, (24) 24 VDC Sink Out, 24 VDC Powered**
Lifecycle Status	Active	Active	Active	Active
Micro Type Restrictions	Micro 20, 40, 64 Support Only	Micro 20, 40, 64 Support Only	Micro 20, 40, 64 Support Only	Micro 20, 40, 64 Support Only
Number of Discrete Inputs/Outputs	40 In / 24 Out	40 In / 24 Out	40 In / 24 Out	40 In / 24 Out
Power Voltage	24 VDC	120/240 VAC	24 VDC	24 VDC
Input Power Supply Rating	10 Watts	35 VA	10 Watts	10 Watts
24 VDC User Power for Sensors	435 mA	435 mA	435 mA	435 mA
Input Device Voltage	24 VDC	24 VDC	24 VDC	24 VDC
Output Control Voltage	Relay Out	Relay Out	24 VDC Sourced	24 VDC Sink
Relay Maximum Resistive Load Rating	2 Amps at 24 VDC and 240 VAC	2 Amps at 24 VDC and 240 VAC	N/A	N/A
Dimensions (W x H x D) mm	190 x 90 x 76	190 x 90 x 76	190 x 90 x 76	190 x 90 x 76

Analog Expansion Selection Guide

Model	Module Input Power	Input Range 0 to 10V -10V to +10V 0 to 20 mA 4 to 20 mA	Input Range RTD Pt 100	Input Range RTD Pt 100 Input Range Thermocouple Type K, J, E, S, T, B, N	Input Range millivolt ±50mV ±100mV	Output Range 0-10 VDC 0-20 mA
IC200UEX616	12 VDC	4 in / 2 out				4 in / 2 out
IC200UEX624	24 VDC	4 in				
IC200UEX626	24 VDC	4 in / 2 out				4 in / 2 out
IC200UEX636	120/240 VAC	4 in / 2 out				4 in / 2 out
IC200UEX724	24 VDC		4 in			
IC200UEX726	24 VDC		4 in / 2 out			4 in / 2 out
IC200UEX734	120/240 VAC		4 in			
IC200UEX736	120/240 VAC		4 in / 2 out			4 in / 2 out
IC200UEX824	24 VDC			4 in	4 in	
IC200UEX826	24 VDC			4 in / 2 out	4 in / 2 out	4 in / 2 out



Analog Expansion Units

The VersaMax Micro analog I/O is versatile and the Micro PLC can support up to four Analog Expansion Units, allowing you to expand up to 16 inputs and 8 outputs.

	IC200UEX624	IC200UEX616	IC200UEX626	IC200UEX636
Product Name	**4 Analog I/O Channels 0 to 10 VDC, 4 to 20 mA, 24 VDC Powered**	**6 Analog I/O Channels (4) 0 to 10 VDC, ±10 VDC, 4 to 20 mA, 0 to 20 mA In, (2) 0 to 10 VDC, 4 to 20 mA, 0 to 20 mA Out, 12 VDC Powered**	**6 Analog I/O Channels (4) 0 to 10 VDC, ±10 VDC, 4 to 20 mA, 0 to 20 mA In, (2) 0 to 10 VDC, 4 to 20 mA, 0 to 20 mA Out, 24 VDC Powered**	**6 Analog I/O Channels (4) 0 to 10 VDC, ±10 VDC, 4 to 20 mA, 0 to 20 mA In, (2) 0 to 10 VDC, 4 to 20 mA, 0 to 20 mA Out, 120/240 VAC Powered**
Lifecycle Status	Active	Active	Active	Active
Micro Type Restrictions	N/A	N/A	N/A	N/A
Number of Analog Inputs/Outputs	4 Channels In, Voltage or Current	4 Channels In / 2 Channels Out, Voltage or Current	4 Channels In / 2 Channels Out, Voltage or Current	4 Channels In / 2 Channels Out, Voltage or Current
Power Voltage	24 VDC	12 VDC	24 VDC	120/240 VAC
Input Power Supply Rating	3 Watts	2.25 Watts	3 Watts	15 VA
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	200 mA
Analog Input Ranges	0-10V (10.23V Max); 0-±10V (±10.23V Max); 0-20 mA (20.47 mA Max); 4-20 mA; 12 bit resolution.	0-10V (10.23V Max); 0-±10V (±10.23V Max); 0-20 mA (20.47 mA Max); 4-20 mA; 12 bit resolution.	0-10V (10.23V Max); 0-±10V (±10.23V Max); 0-20 mA (20.47 mA Max); 4-20 mA; 12 bit resolution.	0-10V (10.23V Max); 0-±10V (±10.23V Max); 0-20 mA (20.47 mA Max); 4-20 mA; 12 bit resolution.
Analog Output Ranges	N/A	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit resolution.	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit resolution.	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit resolution.
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76



Analog Expansion Units

The VersaMax Micro analog I/O is versatile and the Micro PLC can support up to four Analog Expansion Units, allowing you to expand up to 16 inputs and 8 outputs.

	IC200UEX724	IC200UEX734	IC200UEX726	IC200UEX736
Product Name	**4 RTD PT 100 Channels IN, 120/240 VAC Powered**	**4 RTD PT 100 Channels IN, 24 VDC Powered**	**4 RTD PT 100 Channels IN, 2 Analog Channels OUT 0 to 10 VDC, 4 to 20 mA, 0 to 20 mA Out, 24 VDC Powered**	**4 RTD PT 100 Channels IN, 2 Analog Channels OUT 0 to 10 VDC, 4 to 20 mA, 0 to 20 mA Out, 120/240 VAC Powered**
Lifecycle Status	Active	Active	Active	Active
Micro Type Restrictions	16 bit supported on Mircro 20, 40, 64 only	16 bit supported on Mircro 20, 40, 64 only	16 bit supported on Mircro 20, 40, 64 only	16 bit supported on Mircro 20, 40, 64 only
Number of Analog Inputs/Outputs	4 Channels RTD In	4 Channels RTD In	4 Channels RTD In / 2 Channels Out, Voltage or Current	4 Channels RTD In / 2 Channels Out, Voltage or Current
Power Voltage	24 VDC	120/240 VAC	24 VDC	120/240 VAC
Input Power Supply Rating	3 Watts	15 VA	3 Watts	15 VA
24 VDC User Power for Sensors	200 mA	200 mA	200 mA	200 mA
Analog Input Ranges	2- and 3-wire types, PT 100; 16 bit	2- and 3-wire types, PT 100; 16 bit	2- and 3-wire types, PT 100; 16 bit	2- and 3-wire types, PT 100; 16 bit
Analog Output Ranges	N/A	N/A	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit resolution.	0 to 10 VDC (10.24V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit resolution.
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76	95 x 90 x 76



Analog Expansion Units

The VersaMax Micro analog I/O is versatile and the Micro PLC can support up to four Analog Expansion Units, allowing you to expand up to 16 inputs and 8 outputs.

	IC200UEX824	IC200UEX826
Product Name	**4 Thermocouple or mV Input Channels, 24 VDC Powered**	**4 Thermocouple or mV Input Channels and 2 Analog Output Channels, 24 VDC Powered**
Lifecycle Status	Active	Active
Micro Type Restrictions	16 bit supported on Micro 20, 40, 64 only	16 bit supported on Micro 20, 40, 64 only
Number of Analog Inputs/Outputs	4 Channels Thermocouple In or ±50mV or ±100mV, 24 VDC Power Supply	4 Channels Thermocouple In or ±50mV or ±100mV and 2 channel analog outputs, 24 VDC Power Supply
Power Voltage	24 VDC	24 VDC
Input Power Supply Rating	3 Watts	3 Watts
24 VDC User Power for Sensors	200 mA	200 mA
Analog Input Ranges	Type K, J, E, S, T, B, N, ±50mV, ±100mV; 12 bit (16 bit 4th QTR 2009)	Type K, J, E, S, T, B, N, ±50mV, ±100mV; 12 bit (16 bit 4th QTR 2009)
Analog Output Ranges	N/A	0 to 10 VDC (10.24 V max.) 0 to 20 mA (20.5 mA max.) 4 to 20 mA (20.5 mA max.); 12 bit resolution.
Dimensions (W x H x D) mm	95 x 90 x 76	95 x 90 x 76


IC200DTX200


IC200DTX450


IC200DTX850


IC200DTX650

DataPanels Operator Interfaces

GE VersaMax DataPanels are ideal for a broad range of applications ranging from simple timer/counter/register access to full text message display with numeric keypad. All VersaMax DataPanels are preprogrammed to connect quickly to a VersaMax Micro or Nano PLC without user configuration.

	IC200DTX200	IC200DTX450	IC200DTX650	IC200DTX850
Product Name	**Operator Interface for changing timer/counter/ register values. 2x16 character LCD backlight display and 6 operation keys. No stored messaging, PLC stores messages. Requires IC200CBL550 cable or equivalent. Operates on 5 VDC @ 100 mA from Micro or Nano.**	**Operator Interface with up to 200 stored messages. 2x16 character LCD backlight display and 6 function keys. Requires IC200CBL555 or equivalent. Operates on external 24 VDC @ 40 mA.**	**Operator Interface with up to 200 stored messages. 4x16 character LCD backlight display and 8 function keys. Requires IC200CBL555 cable or equivalent. Operates on external 24 VDC @ 80 mA.**	**Operator Interface with up to 200 stored messages. 4x20 character LCD backlight display, 8 function keys and numeric keypad. Requires IC200CBL555 cable or equivalent. Operates on external 24 VDC @ 50 mA.**
Lifecycle Status	Active	Active	Active	Active
Characters Per Line	16	16	16	20
Function Keys	0	6	8	8
Numeric Keypad	0	0	0	Yes
Memory Size (Number of Messages)	Messages stored in PLC	200 stored in operator interface	200 stored in operator interface	200 stored in operator interface
DataPanel Dimensions (W x H x D) mm	108 x 60 x 27	108 x 60 x 45	96 x 96 x 44	182 x 101 x 37
Number of Lines	2	2	4	4
Display Type	LCD Display with Backlight	LCD Display with Backlight	LCD Display with Backlight	LCD Display with Backlight
Operating Temperature	0°C to +50°C	0°C to +50°C	0°C to +50°C	0°C to +50°C
NEMA Rating	NEMA 4	NEMA 4	NEMA 4	NEMA 4
Programming Software	None required	DataDesigner (IC752DDZ000)	DataDesigner (IC752DDZ000)	DataDesigner (IC752DDZ000)



Micro 20, Micro 40 and Micro 64 Port 2 Communication Options

The VersaMax Micro 20, Micro 40 and Micro 64 Port 2 is modular by design and enables the user to select a wide range of communications options. The user can select RS-232, RS-485, Ethernet or USB. The RS-232 and RS-485 also come with two analog input channels (0 to 10 VDC, 10 bit). Port 2 also supports Memory Module Board that enables the user to download logic and settings without a PC.

	IC200UEM001	IC200USB001	IC200USB002	IC200UUB001
Product Name	**Ethernet module**	**RS-232 option board with (2) 0 -10 VDC analog in**	**RS-485 option board with (2) 0 -10 VDC analog in**	**USB option board (no analog option)**
Lifecycle Status	Active	Active	Active	Active
Micro Type Restrictions	Micro 20, 40, 64 Support Only	Micro 20, 40, 64 Support Only	Micro 20, 40, 64 Support Only	Micro 20, 40, 64 Support Only
Connection Type	10/100Mbits port supporting RJ45 connection	RS-232 (RJ-45)	RS-485 (RJ-45)	USB (Slave Only) version 2.0, Straight B type
Protocol Supported	SRTP and Modbus TCP (server)	SNP, SNP Master, SNP X, Modbus Master, Modbus Slave, Serial Read and Write	SNP, SNP Master, SNP X, Modbus Master, Modbus Slave, Serial Read and Write	SNP, SNP X, Modbus Slave, Serial Read
Analog Support on Communications Module	No Analog Support	Two Analog Inputs. 0 to 10 VDC (10 bits)	Two Analog Inputs. 0 to 10 VDC (10 bits)	No Analog Support
Memory Module Board Support	Yes	Yes	Yes	Yes
Programming Support	Yes, SRTP only	Yes	Yes	Yes
Programming Software	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix	Machine Edition Logic Developer 5.0, Service Pack 3, Hotfix



Ethernet Communication Option

The VersaMax SE enables the VersaMax Micro and Nano to easily be connected to an Ethernet LAN via the VersaMax SE. The user can easily down load, upload and monitor VersaMax Micro and Nano controllers.

	IC200SET001
Product Name	**Ethernet to Serial Network Module**
Lifecycle Status	Active
Ethernet Port	10/100Mbits port supporting RJ45 connection
Serial Port	One RS-232 and one RS-485 port (up to 16 devices supported)
Communications Configurations	Communication configurations include Ethernet SRTP to SNP or Modbus TCP to Modbus Slave
Power Voltage	12/24 VDC
Dimensions (W x H x D) mm	36 x 90 x 60
Programming Software	VersaPro 2.0 or greater, Machine Edition Logic Developer
Mounting	35 mm DIN-rail or Panel Mount
Power Supply Voltage Range	12/24 VDC

Portable Program Download Device (PPDD)



The Portable Program Download Device enables the user to easily upload and download VersaMax Micro 23/28 configuration and logic from/to a USB Memory Stick. Portable Program Download Device (PPDD) will support commercial memory stick devices using USB connection. The purpose of the PPDD is to allow users to store and download their logic applications and configuration to GE VersaMax Micro 23/28 PLCs without the need of a PC. The PPDD plugs into the 15 pin RS-485 port on the VersaMax Micro 23/28 CPU base power supply. The RS-485 port provides the power for the PPDD. VersaMax Micro 23/28 logic and configuration files can be zipped and easily emailed to remote locations for VersaMax Micro 23/28 downloads.

There are many advantages of the PPDD such as:

- No PC required to backup applications or download applications
- No expensive travel to perform field upgrades, just email the file to the remote location
- Compatible with commercial off the shelf USB Memory Sticks
- The PPDD can be panel mounted, DIN-rail mounted or hand held
- Supports diagnostics to ensure that the CPU is compatible with the application
- OEM Password Protection supported
- Simple to operate, LEDs to show activity, error and status. Push button to start download and selector switch for direction of download, to the PLC or to the memory stick.
- Designed for the industrial environment UL and CE (not Class 1 Div 2 approved)
  PPDD features:
- Slide switch for direction of data storage
- Status and Diagnostic LEDs

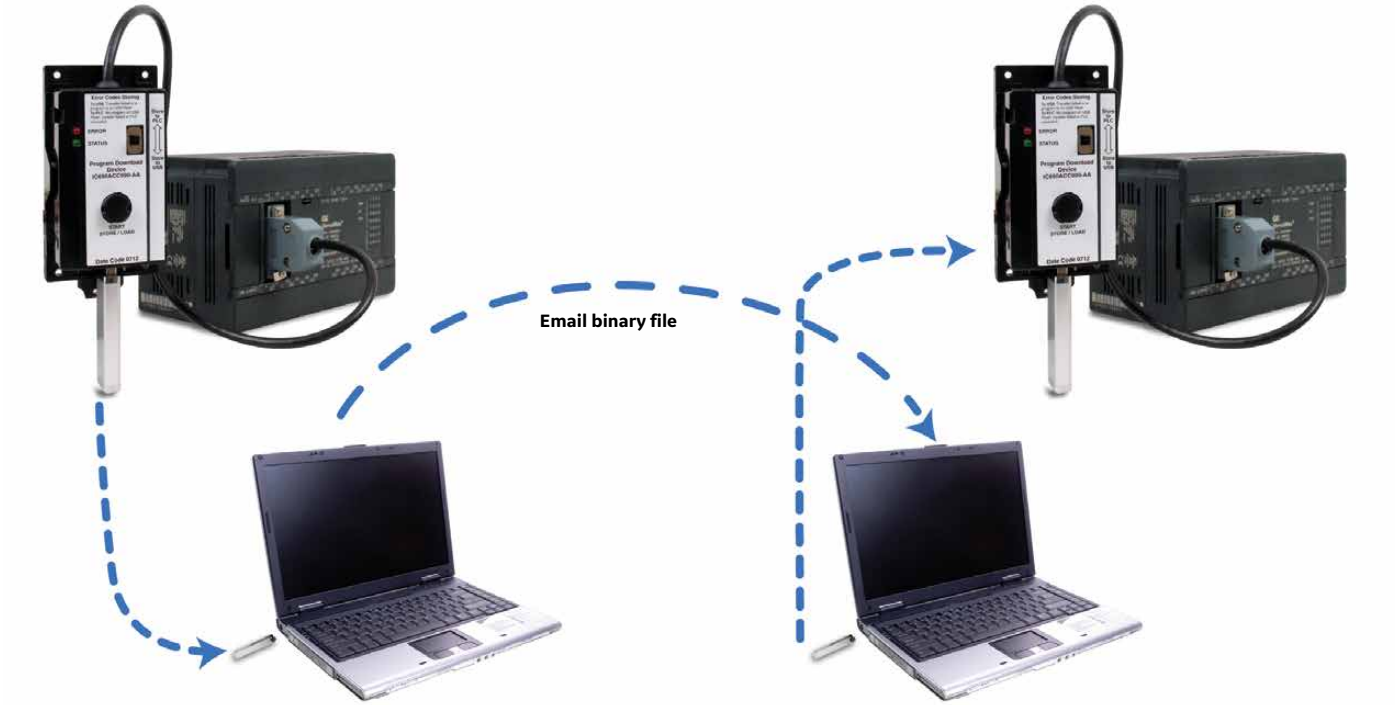
LEDs Status

	Error (Red)	Status (Green)
LED On Steady	On when there isn't a Memory Stick attached	On after button has been pushed and name in PLC matches and when download is complete
LED Flashing Fast Flash (500msec on 500msec off) Slow Flash (1 sec on 1 sec off)	Flashing when CPU doesn't match or Memory Stick doesn't have the proper file\ Flashing if Verify fails	Slow Flash During Download Fast Flash when CPU type matches but name in PLC doesn't match
LED Off	Off during normal conditions with no errors	Off prior to button being pushed for download

The Portable Program Download Device is simple to use. The example below demonstrates the four easy steps of downloading an application and emailing it to a remote location for application upgrade.

Step 1.
Slide PPDD selector toward USB memory stick. Press PPDD download button. The PPDD will store/verify the VersaMax Micro application and configuration onto the USB memory stick.

Step 4.
Place the USB memory stick in the PPDD, slide selector toward controller. Press PPDD download button. The PPDD will stop the CPU and download/verify file. The CPU can be placed in the Run mode via the key switch or cycling power.



Step 2.
Remove the memory stick from the PPDD and connect it to your PC. Copy the binary file from the memory stick to your PC and email to remote location.

Step 3.
Remote location takes the binary file that is in the email and stores it on a USB memory stick.

Portable Program Download Device

Part Number	Description
IC690ACC990	Portable Program Download Device. Supports standard USB memory devices to store and load VersaMax Micro 23/28 PLC applications without the need of a PC.

Accessories

Part Number	Description	Lifecycle Status
IC200ACC402	Spare Removable Terminal Strips, 10 per pack. (Micro 14, Micro 23 and Micro 28 and all expansion units)	Active
IC200ACC403	Battery for Micro 23 and Micro 28 for data retention (5.2 months minimum @ 70°C and 32.4 months minimum @ 20°C)	Active
IC200ACC404	Spare parts kit. Two terminal strips and four plastic doors and four covers for Micro 14, Micro 23 and Micro 28.	Active
IC200ACC414	Long Term Battery for Micro 23, Micro 28 and Micro 64 (19 months minimum @ 70°C and 121 months minimum @ 20°C)	Active
IC200ACC415	RS-232 to RS-485 Converter requires IC200CBL500 or equivalent.	Active
IC200ACC451	Simulator for VersaMax Micro 14, Micro 23 and Micro 28. (8 Inputs)	Active
IC200UMB001	Flash Memory Board for program download and compatible with Micro 64 (128Kbytes)	Active

External Power Supplies

Part Number	Description	Lifecycle Status
IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply	Active
IC690PWR124	24 VDC, 10 Amp Output Power and 120/230 VAC Input Power Power Supply	Active

Programming and Trouble Shooting Tools

Part Number	Description	Lifecycle Status
IC646MPM101	Proficy Logic Developer - PLC Nano/Micro, Programming Cable (No Upgrades included)	Active
IC752DDZ000	VersaMax DP Operator Interface DataDesigner editor	Active

Cables

(0.1 meter cable, IC200CBL501, is included in every expansion base package)

Part Number	Description	Lifecycle Status
IC200CBL500	Programming cable (RJ-45 to DB-9 pin) RS-232. 3 Meters.	Active
IC200CBL501	I/O Expansion cable, 0.1 meter long (Qty 5)	Active
IC200CBL505	I/O Expansion cable, 0.5 meter long	Active
IC200CBL510	I/O Expansion cable, 1 meter long	Active

Starter Kits

Part Number	Description	Lifecycle Status
IC200TBX010	Tool box, Nano 10 and software. Includes (IC200NDR001) 24 VDC In/Relay Out, 24 VDC powered (requires an external 24 VDC Supply) with software, manuals and cables (IC646MPH101)	Active
IC200TBX110	Tool box, Nano 10, operator interface and software. Includes (IC200NDR001) 24 VDC In/Relay Out, 24 VDC powered (requires an external 24 VDC Supply), VersaMax DataPanel DP45 with programming software and cables, (IC640VPS00, IC752DDZ000, IC200CBL555)	Active
IC200TBX210	Tool box, Nano 10, Ethernet interface and software. Includes (IC200NDR001) 24 VDC In/Relay Out, 24 VDC powered (requires an external 24 VDC Supply), VersaMax SE (IC200SET001) with all software, cables (IC646MPH101) and manuals.	Active
IC200TBX014	Tool box, Micro 14 and software. Includes (IC200UDR001) 24 VDC In/Relay Out, AC Power Supply with software, manuals and cables (IC646MPH101)	Active
IC200TBX114	Tool box, Micro 14, operator interface and software. Includes (IC200UDR001) 24 VDC In/Relay Out, AC Power Supply, VersaMax DataPanel DP45 with programming software and cables, (IC640VPS00, IC752DDZ000, IC200CBL555)	Active
IC200TBX214	Tool box, Micro 14, Ethernet interface and software. Includes (IC200UDR001) 24 VDC In/Relay Out, requires 120 VAC power, VersaMax SE (IC200SET001) with all software, cables (IC646MPH101) and manuals.	Active
IC200TBX023	Tool box, Micro 23 and software. Includes (IC200UAL006) DC In/Relay Out, 2 analog In, 1 analog out, AC Power Supply with software, manuals and cables (IC646MPH101)	Active
IC200TBX123	Tool box, Micro 23, operator interface and software. Includes (IC200UAL006) 24 VDC In/Relay Out, 2 Analog In/1 Analog out, AC P/S, VersaMax DataPanel DP45 with programming software and cables, (IC640VPS00, IC752DDZ000, IC200CBL555)	Active
IC200TBX223	Tool box, Micro 23, Ethernet interface and software. Includes (IC200UAL006) 24 VDC In/Relay Out, requires 120 VAC Power, VersaMax SE (IC200SET001) with all software, cables (IC646MPH101) and manuals.	Active
IC200TBX028	Tool box, Micro 28 and software. Includes (IC200UDR005) 24 VDC In/Relay Out, AC Power Supply with software, manuals and cables (IC646MPH101)	Active
IC200TBX128	Tool box, Micro 28, operator interface and software. Includes (IC200UDR005) 24 VDC In/Relay Out, AC P/S, VersaMax DataPanel DP45 with programming software and cables, (IC640VPS00, IC752DDZ000, IC200CBL555)	Active
IC200TBX228	Tool box, Micro 28, Ethernet interface and software. Includes (IC200UDR005) 24 VDC In/Relay Out, requires 120 VAC Power, VersaMax SE (IC200SET001) with all software, cables (IC646MPH101) and manuals.	Active
IC200TBX020	Tool box, Micro 20 and software. Includes (IC200UDD020) 24VDC In/24VDC Out, DC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with software, manuals and cables (IC646MPM101)	Active
IC200TBX120	Tool box, Micro 20 and software. Includes (IC200UDR120) 24VDC In/Relay Out, AC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with software, manuals and cables (IC646MPM101)	Active
IC200TBX220	Tool box, Micro 20, operator interface and software. Includes (IC200UDD020) 24VDC In/24VDC Out, DC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with VersaMax DataPanel DP45 with programming software and cables, (IC646MPM101, IC752DDZ000, IC200CBL555)	Active
IC200TBX320	Tool box, Micro 20, operator interface and software. Includes (IC200UDR120) 24VDC In/Relay Out, AC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with VersaMax DataPanel DP45 with Logic Developer programming software and cables, (IC646MPM101, IC752DDZ000, IC200CBL555)	Active
IC200TBX520	Tool box, Micro 20, QuickPanel color touch screen and software. Includes (IC200UDR164) 24VDC In/Relay Out, AC Power Supply, (IC200UEM001) Ethernet option board, QuickPanel Display (IC754VSI06STD) with software, manuals and cables (BC646MBL001)	Active
IC200TBX040	Tool box, Micro 40 and software. Includes (IC200UDD040) 24VDC In/24VDC Out, DC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with software, manuals and cables (IC646MPM101)	Active
IC200TBX140	Tool box, Micro 40 and software. Includes (IC200UDR140) 24VDC In/Relay Out, AC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with software, manuals and cables (IC646MPM101)	Active
IC200TBX240	Tool box, Micro 40, operator interface and software. Includes (IC200UDD040) 24VDC In/24VDC Out, DC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with VersaMax DataPanel DP45 with programming software and cables, (IC646MPM101, IC752DDZ000, IC200CBL555)	Active
IC200TBX340	Tool box, Micro 40, operator interface and software. Includes (IC200UDR140) 24VDC In/Relay Out, AC Power Supply,(IC200USB001) RS-232 option board with (2) 0 -10VDC analog in with VersaMax DataPanel DP45 with Logic Developer programming software and cables, (IC646MPM101, IC752DDZ000, IC200CBL555)	Active
IC200TBX540	Tool box, Micro 40, QuickPanel color touch screen and software. Includes (IC200UDR140) 24VDC In/Relay Out, AC Power Supply, (IC200UEM001) Ethernet option board, QuickPanel Display (IC754VSI06STD) with software, manuals and cables (BC646MBL001)	Active
IC200TBX064	Tool box, Micro 64 and software. Includes (IC200UDD064) 24 VDC In/24 VDC Out, DC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10 VDC analog in with software, manuals and cables (IC646MPM101)	Active
IC200TBX164	Tool box, Micro 64 and software. Includes (IC200UDR164) 24 VDC In/Relay Out, AC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10 VDC analog in with software, manuals and cables (IC646MPM101)	Active
IC200TBX264	Tool box, Micro 64, operator interface and software. Includes (IC200UDD064) 24 VDC In/24 VDC Out, DC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10 VDC analog in with VersaMax DataPanel DP45 with programming software and cables, (IC646MPM101, IC752DDZ000, IC200CBL555)	Active
IC200TBX364	Tool box, Micro 64, operator interface and software. Includes (IC200UDR164) 24 VDC In/Relay Out, AC Power Supply, (IC200USB001) RS-232 option board with (2) 0 -10 VDC analog in with VersaMax DataPanel DP45 with Logic Developer programming software and cables, (IC646MPM101, IC752DDZ000, IC200CBL555)	Active
IC200TBX564	Tool box, Micro 64, QuickPanel color touch screen and software. Includes (IC200UDR164) 24 VDC In/Relay Out, AC Power Supply, (IC200UEM001) Ethernet option board, QuickPanel Display (IC754VSI06STD) with software, manuals and cables (BC646MBL001)	Active

Configuration Guidelines

Examples of Typical Application

Configuration for Nano 10 (Applications needing less than 6 (24 VDC) inputs and 4 relay outputs)

	Qty	Part Number	Description
	1	IC200NDR001	10 point (6) 24 VDC In, (4) Relay Out, 24 VDC Powered
	1	BC646MPM101	Proficy Logic Developer - PLC Nano/Micro, Programming Cable included and GlobalCare Complete (Upgrades included for 15 months of upgrades)
Options to consider			
	1	IC200ACC450	Simulator for VersaMax Nano 10. (6 Inputs)
	1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply

Configuration for Micro 14 (Example Application needing 12 (24 VDC) discrete inputs, 6 relay outputs and 3 Analog inputs with 24 VDC power)

	Qty	Part Number	Description
	1	IC200UDR002	14 point (8) 24 VDC In, (6) Relay Out, 24 VDC Powered
	1	IC200UEI008	8 point 24 VDC In, 24 VDC Powered
	1	IC200UEX626	6 Analog I/O Channels (4) 0 to 10 VDC, ±10 VDC, 4 to 20 mA, 0 to 20 mA In, (2) 0 to 10 VDC, 4 to 20 mA, 0 to 20 mA Out, 24 VDC Powered
	1	BC646MPM101	Proficy Logic Developer - PLC Nano/Micro, Programming Cable included and GlobalCare Complete (Upgrades included for 15 months of upgrades)
Options to consider			
	1	IC200UDR010	28 point (16) 24 VDC In, (12) Relay Out, 24 VDC Powered - advantage is two serial ports, Real Time clock and more data memory.
	1	IC200ACC451	Simulator for VersaMax Micro 14, Micro 23 and Micro 28. (8 Inputs)
	1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
	1	IC200DTX650	Operator Interface with up to 200 stored messages. 4x16 character LCD backlight display and 8 function keys. Requires IC200CBL550 cable or equivalent. Operates on external 24 VDC @ 80 mA.

Configuration for Micro 28 (Example Application needing 22 (24 VDC) discrete inputs, 16 outputs [Ten Relay and Six 24 VDC], 2 RTD inputs, 1 Analog output using AC power. Also requires Display with keypad)

	Qty	Part Number	Description
	1	IC200UDR005	28 point; (16) 24 VDC In, (11) Relay Out, (1) 24 VDC Out, 120/240 VAC Powered.
	1	IC200ACC403	Battery for Micro 23 and Micro 28 for data retention
	1	IC200UEX014	14 point (8) 24 VDC In, (6) 24 VDC Out, 24 VDC Powered
	1	IC200UEX736	4 RTD PT 100 Channels IN, 2 Analog Channels OUT 0 to 10 VDC, 4 to 20 mA, 0 to 20 mA Out, 120/240 VAC Powered
	1	BC646MPM101	Proficy Logic Developer - PLC Nano/Micro, Programming Cable included and GlobalCare Complete (Upgrades included for 15 months of upgrades)
	1	IC200DTX850	Operator Interface with up to 200 stored messages. 4x20 character LCD backlight display, 8 function keys and numeric keypad. Requires IC200CBL550 cable or equivalent. Operates on external 24 VDC @ 50 mA.
	1	IC752DDZ000	VersaMax DP Operator Interface DataDesigner editor
Options to consider			**0**
	1	IC200ACC451	Simulator for VersaMax Micro 14, Micro 23 and Micro 28. (8 Inputs)
	1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply

Configuration for Micro 644 (Example Application needing 45 (24 VDC) discrete inputs, 32 outputs (Twelve Relay and Twenty 24 VDC), 2 Servo motors. Application also requires Color Touch Graphic Display

	Qty	Part Number	Description
	1	IC200UDD064	Micro 64; (40) 24 VDC In, (24) 24 VDC Source Out 0.7 amps with ESCP protection, 24 VDC Power Supply.
	1	IC200ACC414	Long Term Battery for Micro 23, Micro 28 and Micro 64
	1	IC200UEX211	28 point (16) 24 VDC In, (12) Relay Out, 120/240 VAC Power Supply
	1	IC200UEM001	Ethernet Module
	1	IC200UMM002	2 Axis Motion Module
	1	IC800VMM10LBKSE25	VersaMotion 1000 Watt Motor with brake
	1	IC800VMA102	Servo Amplifier, 1000 Watts, 220 VAC
	1	IC800VMCB1030	Brake and Power Cable for 1000 Watt Servo Motor and brake, 3 meters
	1	IC800VMCE1030	Encoder Cable for 1000 Watt and greater, 3 meters
	1	IC800VMTBC005	I/O terminal block and cable .5 meters
	1	IC800VMCS030	Communications cable and servo driver to PC, 3 meters
	1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch
	1	BC646MBL001	Machine Edition Lite Development Suite with Proficy GlobalCare Complete. Includes View Development for QuickPanel and LD-PLC Nano/Micro with 15 months of Proficy GlobalCare which is renewable on an annual basis.
	1	IC200CBL500	Programming cable (RJ-45 to DB-9 pin) RS-232. 3 Meters.
Options to consider			
	1	IC200UMB001	Flash Memory Board for program download and compatible with Micro 64 (128Kbytes)
	1	IC690PWR124	24 VDC, 10 Amp Output Power and 120/230 VAC Input Power Power Supply

Durus Controllers

The Durus PLUS Controllers are loaded with features such as easy to use built-in display/keypad, high current outputs, and multiple communication options and very affordable. They can be programmed using both the built-in display and keypad or with the Durus Controllers programming software. The Durus PLUS Controllers are ideal for applications that require some logic, a few timers/counters and real-time clock control.

They provide added features such as math, PID and data move functionality. The Durus Plus Controllers are designed for simple control applications such as light control, gate control, HVAC, pump control and much more.

Key Features:

- Isolated 8 Amp Relay Outputs, analog in and out and temperature monitoring
- Support for Ethernet, Modbus Slave, PROFIBUS Slave and DeviceNet Slave
- Durus Controllers Software enables the user to fully simulate applications without the hardware
- Memory Module enables easy program downloads without a PC
- Software is free for downloading from the Web
- LCD Backlit display for easy viewing in all environments

AC Models pages 9.35-9.36

DC Models pages 9.37-9.40

Discrete Expansion Units page 9.41

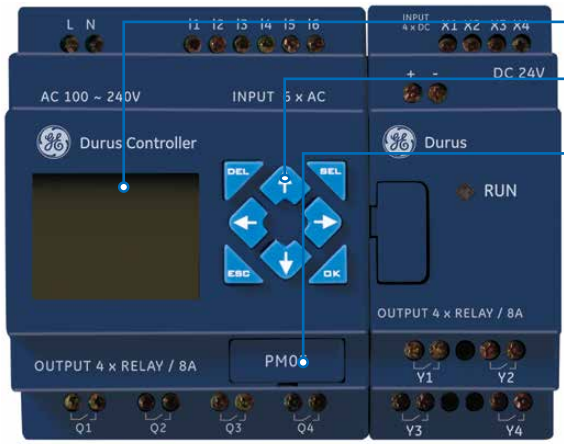
Analog Expansion Unit page 9.42

Communications Options page 9.43

Software page 9.44

Accessories page 9.45

Configuration Guidelines page 9.46



Backlit LCD Display

Keypad

Socket for memory module or communications interface cable

Optional Expansion (Up to 3 discrete and 1 analog expansion units)

Durus Controllers Selection Guide

Features	Durus PLUS -10 and -12	Durus PLUS -20
Built-in Discrete I/O	6 in/4 out	12 in/8 out (AC powered models) 8 in/8 out (DC powered models)
Maximum Discrete I/O	18 in/16 out	24 in/20 out
Built-in Analog I/O	2 on DC powered models	4 on DC powered models
I/O Expansion Units	Maximum of eight expansion bases are supported. • Up to 3 Discrete I/O modules • 1 Analog input module • 1 Temperature input module (RTD) • Up to 2 Analog output modules • 1 Communications module	
Logic Memory	300 Lines (4 cells wide per rung) or 260 Function Blocks	
Programming Language	Ladder or Function Block Diagram (FBD)	
Execution Speed	10ms/cycle	
LCD Display	4 line x16 character LCD backlit display	
Maximum Text Displays	31	
Display Languages	English, French, German, Spanish, Portuguese, Chinese, Italian	
Address Assignments	Up to 32 discrete inputs and 146 outputs; 8 analog inputs, 4 RTD inputs and 4 analog outputs; 240 registers (16 bit signed or unsigned)	
Coils	63 Auxiliary M, 63 Auxiliary N Coils and 31 HMI Coils	
Real Time Clock	Up to 15 uses (250 FBD)	
Number of Timers	Up to 31; 0.01seconds to 9999 minutes (250 FBD)	
Number of Counters	Up to 31; 0 to 999999 counts (250 FBD)	
Math Functions	Up to 31: Add, Subtract (250 FBD); Up to 31 Multiply, Divide (250 FBD)	
PID	Up to 15: PI and PID (30 FBD)	
Data Multiplexer	Up to 15: Four registers deep (250 FBD)	
Analog Ramp Control	Up to 15: Multiple steps supported (30 FBD)	
Comparator Instruction	Up to 31; Supports <= or >= for Timers, Counters or Analog (250 FBD)	
High Speed Input Frequency	1kHz	
PWM Output Frequency	0.5kHz (1msec On, 1msec Off)	
Modbus Master Built-in	No	Yes on selective models
Modbus Slave Support Built-in	No	
Modbus Slave Support	Yes (built-in on certain models and available for all controllers that support expansion (Modbus Slave expansion module)	
PROFIBUS Slave Support	Yes	
DeviceNet Slave Support	Yes	
Agency Approvals	CE, C-UL, UL	
Temperature Range	0°C to 55°C	



AC Models

The AC versions of the Durus Controllers come with 10 points (6 discrete inputs and 4 discrete outputs) or 20 points (12 discrete inputs and 8 discrete outputs). The units are available with or without display and keypad and with or without expansion. Up to 3 discrete and 1 analog expansion units can be added for either additional I/O. One communication module can be added.

	IC210DAR012	IC210DAR010	IC210BAR010	IC210NAR010
Product Name	**10 point (8) 24 VAC Inputs, (4) Isolated Relay Out (8 Amps), 24 VAC input power, supports expansion and display/keypad**	**10 point (6) AC Inputs, (4) Isolated Relay Out (8 Amps), AC input power, supports expansion and display/keypad**	**10 point (6) AC Inputs, (4) Isolated Relay Out (8 Amps), AC input power, supports expansion and no display/keypad**	**10 point (6) AC Inputs, (4) Isolated Relay Out (8 Amps), AC input power, no expansion, no plastic case and no display/keypad**
Lifecycle Status	Mature	Mature	Mature	Mature
Number of Discrete Inputs/Outputs	8 In/ 4 Out	6 In/ 4 Out	6 In/ 4 Out	6 In/ 4 Out
Number of Analog Inputs/Outputs	None built in, 4 with Analog Expansion	None built in, 4 with Analog Expansion	None built in, 4 with Analog Expansion	None
Physical I/O Maximum	34 I/O	34 I/O	34 I/O	34 I/O
Support Expansion	Yes	Yes	Yes	No
LCD Display and Keypad	Yes (4 lines x 12 characters)	Yes (4 lines x 12 characters)	No	No
User Program Logic Memory	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks
Protocols Supported	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	None
Input Power Voltage	24 VAC	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC; 85 to 240 VDC
Power Supply Power Consumption	90 mAmps	90 mAmps	90 mAmps	90 mAmps
Input Device Voltage	24 VAC	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC
Output Control Voltage	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)
Dimensions (W x H x D) mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm



AC Models

The AC versions of the Durus Controllers come with 10 points (6 discrete inputs and 4 discrete outputs) or 20 points (12 discrete inputs and 8 discrete outputs). The units are available with or without display and keypad and with or without expansion. Up to 3 discrete and 1 analog expansion units can be added for either additional I/O. One communication module can be added.

	IC210DAR020	IC210BAR020	IC210NAR020
Product Name	**20 point (12) AC Inputs, (8) Isolated Relay Out (8 Amps), AC input power, supports expansion and display/keypad**	**20 point (12) AC Inputs, (8) Isolated Relay Out (8 Amps), AC input power, supports expansion and no display/keypad**	**20 point (12) AC Inputs, (8) Isolated Relay Out (8 Amps), AC input power, no expansion and no display/keypad**
Lifecycle Status	Mature	Mature	Mature
Number of Discrete Inputs/Outputs	12 In/ 8 Out	12 In/ 8 Out	12 In/ 8 Out
Number of Analog Inputs/Outputs	None built in, 4 with Analog Expansion	None built in, 4 with Analog Expansion	None
Physical I/O Maximum	44 I/O	44 I/O	44 I/O
Support Expansion	Yes	Yes	No
LCD Display and Keypad	Yes (4 lines x 12 characters)	No	No
User Program Logic Memory	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks
Protocols Supported	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	None
Input Power Voltage	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC; 85 to 240 VDC
Power Supply Power Consumption	150 mAmps	150 mAmps	150 mAmps
Input Device Voltage	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC; 85 to 240 VDC	85 to 240 VAC; 85 to 240 VDC
Output Control Voltage	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)
Dimensions (W x H x D) mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm



DC Models

The DC versions of the Durus Controllers come in either 12 point (6 discrete inputs, 2 analog and 4 discrete outputs) or 20 point (12 discrete inputs [analog inputs can be configured as either discrete inputs or analog inputs], 4 analog inputs and 8 discrete outputs). The units also support high speed inputs and PWM outputs. The units are available with or without display and keypad and with or without expansion. Up to 3 discrete and 1 analog expansion units can be added for either additional I/O. One communication module can be added.

	IC210DDR112	IC210DDR012	IC210BDR012	IC210NDR012
Product Name	**10 point (6) 12 VDC Inputs, (2) analog inputs*, (4) Isolated Relay Out (8 Amps), 12 VDC input power, supports expansion and display/keypad**	**10 point (6) 24 VDC Inputs, (2) analog inputs*, (4) Isolated, Relay Out (8 Amps), 24 VDC input power, supports expansion and display/keypad**	**10 point (6) 24 VDC Inputs, (2) analog inputs*, (4) Isolated, Relay Out (8 Amps), 24 VDC input power, supports expansion and display/keypad**	**10 point (6) 24 VDC Inputs, (2) analog inputs*, (4) Isolated, Relay Out (8 Amps), 24 VDC input power, no expansion, no plastic case and no display/keypad**
Lifecycle Status	Mature	Mature	Mature	Mature
Number of Discrete Inputs/Outputs	6* In/ 4 Out	6* In/ 4 Out	6* In/ 4 Out	6* In/ 4 Out
Number of Analog Inputs/Outputs	2 built in, 4 additional with Analog Expansion	2 built in, 4 additional with Analog Expansion	2 built in, 4 additional with Analog Expansion	2 built in
Physical I/O Maximum	36 I/O	36 I/O	36 I/O	36 I/O
Support Expansion	Yes	Yes	Yes	No
LCD Display and Keypad	Yes (4 lines x 12 characters)	Yes (4 lines x 12 characters)	No	No
User Program Logic Memory	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks
Protocols Supported	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	None
Input Power Voltage	12 VDC	24 VDC	24 VDC	24 VDC
Power Supply Power Consumption	90 mAmps	90 mAmps	90 mAmps	90 mAmps
Input Device Voltage	12 VDC	24 VDC	24 VDC	24 VDC
High Speed Frequency	1KHz	1KHz	1KHz	1KHz
Output Control Voltage	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)
PWM Maximum Output Frequency	N/A	N/A	N/A	N/A
Analog Resolution	10 bits	10 bits	10 bits	10 bits
Analog Input Range	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC
Analog Input Used as Digital Input	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC
Dimensions (W x H x D) mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm

*Analog inputs can be configured as DC input points.



DC Models

The DC versions of the Durus Controllers come in either 12 point (6 discrete inputs, 2 analog and 4 discrete outputs) or 20 point (12 discrete inputs [analog inputs can be configured as either discrete inputs or analog inputs], 4 analog inputs and 8 discrete outputs). The units also support high speed inputs and PWM outputs. The units are available with or without display and keypad and with or without expansion. Up to 3 discrete and 1 analog expansion units can be added for either additional I/O. One communication module can be added.

	IC210DDD012	IC210BDD012	IC210NDD012	IC210MDR124
Product Name	**10 point (6) 24 VDC Inputs, (4) 24 VDC Out (Transistor 0.5 Amp), (2) analog inputs*, 24 VDC input power, supports expansion and display/keypad**	**10 point (6) 24 VDC Inputs, (4) 24 VDC Out (Transistor 0.5 Amp), (2) analog inputs*, 24 VDC input power, supports expansion, no display/keypad**	**10 point (6) 24 VDC Inputs, (4) 24 VDC Out (Transistor 0.5 Amp), (2) analog inputs*, 24 VDC input power, no expansion, no plastic case and no display/keypad**	**20 point with Modbus Slave communications built-in (8) 12 VDC Inputs, (4) analog inputs*, (8) Isolated Relay Out (8 Amps), 12 VDC input power, supports expansion and display/keypad**
Lifecycle Status	Mature	Mature	Mature	Mature
Number of Discrete Inputs/Outputs	6* In/ 4 Out	6* In/ 4 Out	6* In/ 4 Out	8* In/ 8 Out
Number of Analog Inputs/Outputs	2 built in, 4 additional with Analog Expansion	2 built in, 4 additional with Analog Expansion	2 built in	4 built in, 4 with Analog Expansion
Physical I/O Maximum	36 I/O	36 I/O	36 I/O	44 I/O
Support Expansion	Yes	Yes	No	Yes
LCD Display and Keypad	Yes (4 lines x 12 characters)	No	No	Yes (4 lines x 12 characters)
User Program Logic Memory	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks
Protocols Supported	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	None	Modbus Slave built in, and Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules
Input Power Voltage	24 VDC	24 VDC	24 VDC	12 VDC
Power Supply Power Consumption	90 mAmps	90 mAmps	90 mAmps	90 mAmps
Input Device Voltage	24 VDC	24 VDC	24 VDC	12 VDC
High Speed Frequency	1KHz	1KHz	1KHz	1KHz
Output Control Voltage	24 VDC Transistors	24 VDC Transistors	24 VDC Transistors	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)
PWM Maximum Output Frequency	0.5K (1ms ON/ 1ms OFF)	100 Hz	100 Hz	N/A
Analog Resolution	10 bits	10 bits	10 bits	10 bits
Analog Input Range	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC
Analog Input Used as Digital Input	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC
Dimensions (W x H x D) mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm	72 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm

*Analog inputs can be configured as DC input points.



DC Models

The DC versions of the Durus Controllers come in either 12 point (6 discrete inputs, 2 analog and 4 discrete outputs) or 20 point (12 discrete inputs [analog inputs can be configured as either discrete inputs or analog inputs], 4 analog inputs and 8 discrete outputs). The units also support high speed inputs and PWM outputs. The units are available with or without display and keypad and with or without expansion. Up to 3 discrete and 1 analog expansion units can be added for either additional I/O. One communication module can be added.

	IC210DDR024	IC210BDR024	IC210NDR024	IC210DDD024
Product Name	**20 point (8) 24 VDC Inputs, (4) analog inputs*, (8) Isolated Relay Out (8 Amps), 24 VDC input power, supports expansion and display/keypad**	**20 point (8) 24 VDC Inputs, (4) analog inputs*, (8) Isolated Relay Out (8 Amps), 24 VDC input power, supports expansion, no display/keypad**	**20 point (8) 24 VDC Inputs, (4) analog inputs*, (8) Isolated Relay Out (8 Amps), 24 VDC input power, no expansion, no plastic case and no display/keypad**	**20 point (4) 24 VDC Inputs, (8) 24 VDC Out (Transistor 0.5 Amp), (4) analog inputs*, 24 VDC input power, supports expansion and display/keypad**
Lifecycle Status	Mature	Mature	Mature	Mature
Number of Discrete Inputs/Outputs	8* In/ 8 Out	8* In/ 8 Out	8* In/ 8 Out	8* In/ 8 Out
Number of Analog Inputs/Outputs	4 built in, 4 with Analog Expansion	4 built in, 4 with Analog Expansion	4 built in	4 built in, 4 with Analog Expansion
Physical I/O Maximum	44 I/O	44 I/O	44 I/O	44 I/O
Support Expansion	Yes	Yes	No	Yes
LCD Display and Keypad	Yes (4 lines x 12 characters)	No	No	Yes (4 lines x 12 characters)
User Program Logic Memory	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks
Protocols Supported	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	None	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules
Input Power Voltage	24 VDC	24 VDC	24 VDC	24 VDC
Power Supply Power Consumption	90 mAmps	90 mAmps	90 mAmps	90 mAmps
Input Device Voltage	24 VDC	24 VDC	24 VDC	24 VDC
High Speed Frequency	1KHz	1KHz	1KHz	1KHz
Output Control Voltage	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	24 VDC Transistors
PWM Maximum Output Frequency	N/A	N/A	N/A	100 Hz
Analog Resolution	10 bits	10 bits	10 bits	10 bits
Analog Input Range	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC
Analog Input Used as Digital Input	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC
Dimensions (W x H x D) mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm

* Analog inputs can be configured as DC input points.



DC Models

The DC versions of the Durus Controllers come in either 12 point (6 discrete inputs, 2 analog and 4 discrete outputs) or 20 point (12 discrete inputs [analog inputs can be configured as either discrete inputs or analog inputs], 4 analog inputs and 8 discrete outputs). The units also support high speed inputs and PWM outputs. The units are available with or without display and keypad and with or without expansion. Up to 3 discrete and 1 analog expansion units can be added for either additional I/O. One communication module can be added.

	IC210BDD024	IC210NDD024	IC210MDR024	IC210MDD024
Product Name	**20 point (8) 24 VDC Inputs, (8) 24 VDC Out (Transistor 0.5 Amp), (4) analog inputs*, 24 VDC input power, supports expansion, no display/keypad**	**20 point (8) 24 VDC Inputs, (8) 24 VDC Out (Transistor 0.5 Amp), (4) analog inputs*, 24 VDC input power, no expansion, no plastic case and no display/keypad**	**20 point with Modbus Slave communications built-in (8) 24 VDC Inputs, (4) analog inputs*, (8) Isolated Relay Out (8 Amps), 24 VDC input power, supports expansion and display/keypad**	**20 point Modbus Slave communications built-in (8) 24 VDC Inputs, (8) 24 VDC Out (Transistor 0.5 Amp), (4) analog inputs*, 24 VDC input power, supports expansion and display/keypad**
Lifecycle Status	Mature	Mature	Mature	Mature
Number of Discrete Inputs/Outputs	8* In/ 8 Out	8* In/ 8 Out	8* In/ 8 Out	8* In/ 8 Out
Number of Analog Inputs/Outputs	4 built in, 4 with Analog Expansion	4 built in	4 built in, 4 with Analog Expansion	4 built in, 4 with Analog Expansion
Physical I/O Maximum	44 I/O	44 I/O	44 I/O	44 I/O
Support Expansion	Yes	No	Yes	Yes
LCD Display and Keypad	No	No	Yes (4 lines x 12 characters)	Yes (4 lines x 12 characters)
User Program Logic Memory	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks	200 Rungs and 99 Blocks
Protocols Supported	Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	None	Modbus Slave built in, and Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules	Modbus Slave built in, and Modbus Slave, DeviceNet Slave, PROFIBUS Slave expansion modules
Input Power Voltage	24 VDC	24 VDC	24 VDC	24 VDC
Power Supply Power Consumption	90 mAmps	90 mAmps	90 mAmps	90 mAmps
Input Device Voltage	24 VDC	24 VDC	24 VDC	24 VDC
High Speed Frequency	1KHz	1KHz	1KHz	1KHz
Output Control Voltage	24 VDC Transistors	24 VDC Transistors	250 VAC / 30 VDC Relay Outputs, 8A Resistive Load (Isolated)	24 VDC Transistors
PWM Maximum Output Frequency	100 Hz	100 Hz	N/A	100 Hz
Analog Resolution	10 bits	10 bits	10 bits	10 bits
Analog Input Range	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC	0 to 10 VDC
Analog Input Used as Digital Input	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC	Input Current: 0.63 mA @ 24 VDC Input ON Current: 0.161 mA @ 9.8 VDC Input OFF Current: 0.085 mA @ 5 VDC
Dimensions (W x H x D) mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm	126 mm x 90 mm x 58 mm

* Analog inputs can be configured as DC input points.



Discrete Expansion Units

The Durus Controllers support a maximum of 7 I/O expansion modules and 1 communications module. The expansion supports a maximum of 3 discrete modules, 1 analog input module, 1 temperature input module (RTD), and 2 analog output expansion units.

	IC210EAR008	IC210EAR208	IC210EDR008	IC210EDD008
Product Name	**8 point discrete expansion (4) AC Inputs, (4) Isolated Relay Out (8 Amps), AC input power**	**8 point discrete expansion (4) 24 VAC Inputs, (4) Isolated Relay Out (8 Amps), AC input power**	**8 point discrete expansion (4) 24 VDC Inputs, (4) Isolated Relay Output (8 Amps), 24 VDC input power**	**8 point discrete expansion (4) 24 VDC Inputs, (4) 24 VDC Out (Transistor 0.5 Amp), 24 VDC input power**
Lifecycle Status	Mature	Mature	Mature	Mature
Number of Discrete Inputs/Outputs	4 In/ 4 Out	4 In/ 4 Out	4 In/ 4 Out	4 In/ 4 Out
Input Power Voltage	85 to 240 VAC; 85 to 240 VDC	24 VAC	24 VDC	24 VDC
Power Supply Power Consumption	90 mAmps	90 mAmps	90 mAmps	90 mAmps
Input Device Voltage	85 to 240 VAC; 85 to 240 VDC	24 VAC	24 VDC	24 VDC
Dimensions (W x H x D) mm	38 mm x 90 mm x 58 mm	38 mm x 90 mm x 58 mm	38 mm x 90 mm x 58 mm	38 mm x 90 mm x 58 mm



Analog Expansion Unit

The Durus Controllers support a maximum of 7 I/O expansion modules and 1 communications module. The total expansion supports 3 discrete modules, 1 analog input module, 1 temperature input module (RTD), and 2 analog output expansion units.

	IC210EAI004	IC210EPT004	IC210EAO002
Product Name	**4 point analog expansion (4) analog inputs (voltage and current, 12 bit), 12/24 VDC input power Only one analog expansion supported on the Durus Controller**	**4 channel PT 100, 12bit, PT100 (-100°~600°). Maximum of temperature modules supported on the Durus Controller.**	**2 channel analog out expansion (0 – 10VDC or 0 – 20 mA). Maximum of 2 analog output modules supported on the Durus Controller.**
Lifecycle Status	Mature	Mature	Mature
Number of Channels	4	4	
Input Type			
Output Type			
Analog Input Range	0 to 10 VDC; 0 to 20 mA		
Analog Output Range			0 to 10 VDC 0 to 20 mA
Resolution	12 bits	0.1C	10mV for Voltage 40 micro Amps for Current
Analog Output Register Range			10mV for Voltage 40 micro Amps for Current
Temperature Range	-100 to 600C		
Dimensions (W x H x D) mm	38 mm x 90 mm x 58 mm	38 mm x 90 mm x 58 mm	38 mm x 90 mm x 58 mm



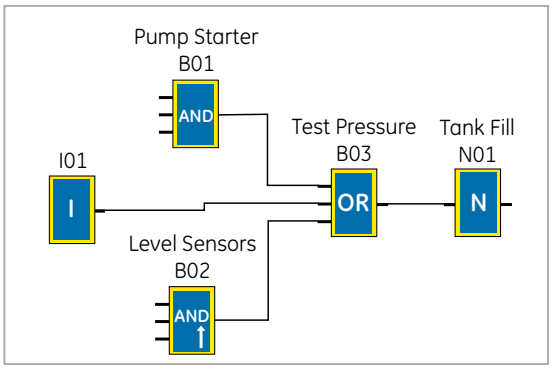
Communications Options

The Durus Controllers support one communication expansion unit. There are three communication options available—Modbus Slave, PROFIBUS Slave and DeviceNet Slave.

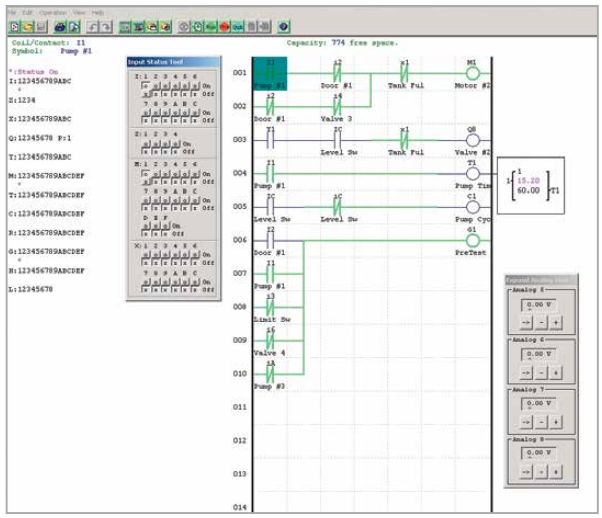
	IC210EMS001	IC210EPS001	IC210EDS001
Product Name	**Modbus RTU slave communications expansion module, 24 VDC power source**	**PROFIBUS-DP slave communications expansion module, 24 VDC power source**	**DeviceNet slave communications expansion module, 24 VDC power source**
Lifecycle Status	Mature	Mature	Mature
Protocol Supported	Modbus Slave	PROFIBUS-DP Slave V0	DeviceNet Group 2 Only Slave Device
Network Data Rate	4800, 9600, 19200, 38400, 57600	9.6K to 12 Meg	125K, 250K, 500 K
Connector Type			
Dimensions (W x H x D) mm	38 mm x 90 mm x 58 mm	38 mm x 90 mm x 58 mm	38 mm x 90 mm x 58 mm

Software

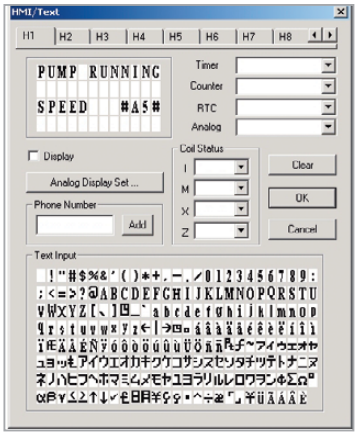
Full featured Durus Software (IC646DUR001) enables you to develop your application in ladder logic or Function Block Diagram programming. The Durus Software also comes with a powerful simulation tool that enables you to easily simulate your application and mimic the keystrokes on the built-in operator keypad.



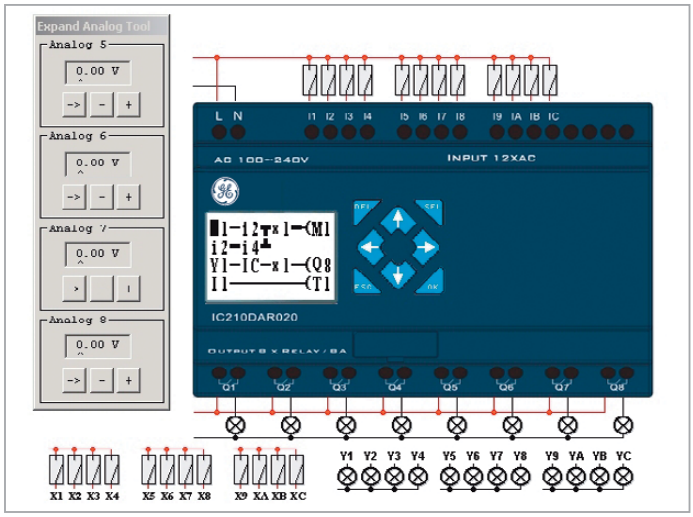
Function Block Diagram



Ladder Logic



I/O Addressing



Easy-to-Use Application Development Simulation on the PC.

User can simulate your entire application without powering up a Durus Controller.

Accessories and Cables

Part Number	Description	Lifecycle Status
IC210TMP001	Durus Controllers FLASH Memory Pack that enables user to download application and upload application to Durus Controller	Mature
IC210CBL001	Durus Controller to PC RS-232 Serial Cable	Mature
IC210CBL002	Durus Controller to PDA Transfer Cable	Mature

Programming and Trouble Shooting Tools

Part Number	Description	Lifecycle Status
IC646DUR101	Durus Controllers Program and Simulation Software and PC to Controller RS-232 Cable (IC646DUR001 and IC210CBL001)	Mature

Starter Kits

Part Number	Description	Lifecycle Status
IC210TBX010	IC210DAR010 10 point Durus controller. AC Power Source, 6 AC in/4out (Relay 8 Amp), Expandable, with LCD/Keypad. Kit includes programming software and cable. (IC646DUR101)	Mature
IC210TBX012	IC210DDR012 12 point Durus controller. 24 VDC Power Source, (6) 24 VDC in /(4) out (Relay 8 Amp), (2) analog inputs, Expandable, with LCD/Keypad. Kit includes programming software and cable. (IC646DUR101)	Mature
IC210TBX020	IC210DAR020 20 point Durus controller. AC Power Source, (12) AC in/8 out (Relay, 8 Amp), Expandable, with LCD/Keypad. Kit includes programming software and cable. (IC646DUR101)	Mature
IC210TBX024	IC210DDR024 20 point Durus-20 controller. 24 point 24 VDC Power Source, (8) 24 VDC in/8 out (Relay, 8 Amp), (4) analog inputs, Expandable, with LCD/Keypad. Kit includes programming software and cable. (IC646DUR101)	Mature
IC210TBX124	IC210MDR024 20 point Durus-20 controller. 24 VDC Power Source, (8) 24 VDC in/8 out (Relay, 8 Amp), (4) analog inputs, Expandable, with LCD/Keypad. Support Modbus Slave on port. Kit includes programming software and cable. (IC646DUR101)	Mature

Examples of Typical Application using a Series 90-30

Configuration for Durus Controller 10 (Applications needing less than 6 (120/240 VAC) inputs and 4 relay outputs)

Qty	Part Number	Description
1	IC210DAR010	AC Power Source, 6 AC in/4 out (Relay 8 Amp), Expandable, with LCD/Keypad

Options to consider

1	IC646DUR101	Durus Controllers Program and Simulation Software and PC to Controller RS-232 Cable (IC646DUR001 and IC210CBL001)
1	IC210TMP001	Durus Controllers FLASH Memory Pack that enables user to download application and upload application to Durus Controllers
1	IC210EMS001	Modbus RTU slave communications expansion module, 24 VDC power source
1	IC200DTX450	Operator Interface with up to 200 stored messages. 2 x 16 character LCD backlight display and 6 function keys. (Requires 24 VDC power supply)

Configuration for Durus Controller 10 (Example Application needing 16 (24 VDC) discrete inputs, 12 relay outputs and 8 Analog inputs with 24 VDC power and Modbus communications. Modbus communications will connect to Operator Interface that requires 4 x 20 line display and numeric keypad)

Qty	Part Number	Description
1	IC210MDR024	24 VDC Power Source, (12) 24 VDC in/8 out (Relay, 8 Amp), (4) analog inputs, Expandable, with LCD/Keypad. Support Modbus Slave on port.
2	IC210EDR008	24 VDC Power Source, (4) 24 VDC in/(4) out (Relay, 8 Amp)
1	IC210EAI004	24 VDC power source, 10 bit, 4 Analog input
1	IC200DTX850	Operator Interface with up to 200 stored messages. 4 x 20 character LCD backlight display, 8 function keys and numeric keypad.

Options to consider

1	IC646DUR101	Durus Controllers Program and Simulation Software and PC to Controller RS-232 Cable (IC646DUR001 and IC210CBL001)
1	IC210TMP001	Durus Controllers FLASH Memory Pack that enables user to download application and upload application to Durus Controllers

Application requiring six 24 VDC inputs, eight AC inputs, thirteen relay outputs, no display required and PROFIBUS networking.

Qty	Part Number	Description
1	IC210BAR020	AC Power Source, (12) AC in/8 out (Relay, 8 Amp), Expandable, with without LCD/Keypad
2	IC210EDR008	24 VDC Power Source, (4) 24 VDC in/(4) out (Relay, 8 Amp)
1	IC210EPS001	PROFIBUS-DP slave communications expansion module, 24 VDC power source

Options to consider

1	IC646DUR101	Durus Controllers Program and Simulation Software and PC to Controller RS-232 Cable (IC646DUR001 and IC210CBL001)
1	IC210TMP001	Durus Controllers FLASH Memory Pack that enables user to download application and upload application to Durus Controllers

Series 90-30 PLCs

The Series 90-30 PLCs are a family of controllers, I/O systems and specialty modules designed to meet the demand for versatile industrial solutions. With a single overall control architecture and modular design, the Series 90-30 is trusted worldwide in such applications as high speed packaging, material handling, complex motion control, water treatment, continuous emissions monitoring, mining, food processing, elevator control, injection molding, and many more.

One reason for the versatility of the Series 90-30 is the large variety of discrete and analog I/O modules (over 100 modules), as well as specialty modules, that are available. In addition, GE offers a wide range of high-level communication options, from a simple serial connection to a high-speed Ethernet interface and a number of bus modules.

Machine Edition

Machine Edition is an advanced software environment for the development and maintenance of machine level automation. Visualization, motion control, and execution logic are developed with a single programmer.



CPUs pages 9.48-9.50

Baseplates page 9.51

Power Supplies pages 9.52-9.53

Serial Communications Modules page 9.75

Accessories pages 9.82-9.83

Configuration Guidelines page 9.84

Networks and Distributed I/O Systems pages 9.72-9.74

Specialty Modules pages 9.66-9.71

Analog I/O Modules (input) pages 9.57-9.58

Analog I/O Modules (output) pages 9.64-9.65

Discrete I/O Modules (input) pages 9.54-9.56

Discrete I/O Modules (output) pages 9.59-9.63

Power Measurement Modules page 9.76

Pneumatic Module page 9.77

Motion Modules pages 9.79-9.80

Expansion Modules page 9.81

Publication Reference Chart

GFK-0255	Series 90 Programmable Coprocessor Module & Support Software User's Manual
GFK-0293	Series 90-30 High Speed Counter User's Manual
GFK-0356	Series 90-30 PLC Installation and Hardware Manual
GFK-0412	Series 90-30 Genius Communications Module User's Manual
GFK-0467	Series 90-30/20/Micro PLC CPU Instruction Set Reference Manual
GFK-0529	Series 90 PLC SNP Communications User's Manual
GFK-0582	Series 90 PLC Serial Communications Driver User's Manual
GFK-0585	Series 90 PLC SNP Communications Driver User's Manual
GFK-0631	Series 90-30 I/O Link Slave Interface User's Manual
GFK-0664	Series 90-30 Axis Positioning Module (Power Mate-APM) Programmer's Manual
GFK-0695	Series 90-30 Enhanced Genius Communications Module User's Manual
GFK-0712	Series 90 Digital Event Recorder User's Manual
GFK-0726	State Logic Processor for Series 90-30 PLC User's Guide
GFK-0771	C Programmer's Toolkit for Series 90 PCMs User's Manual
GFK-0772	PCM C Function Library Reference Manual
GFK-0781	Power Mate APM for Series 90-30 PLC Follower Mode User's Manual
GFK-0814	C Programmer's Toolkit for Series 90 PCM Quick Reference Guide
GFK-0823	Series 90-30 I/O Link Master Module User's Manual
GFK-0828	Series 90-30 Diagnostic System User's Guide
GFK-0840	Power Mate APM for Series 90-30 PLC Standard Mode User's Manual
GFK-0854	Series 90 Sequential Function Chart Programming Language User's Manual
GFK-0898	Series 90-30 PLC I/O Module Specifications Manual
GFK-1028	Series 90-30 I/O Processor Module User's Manual
GFK-1034	Series 90-30 Genius Bus Controller User's Manual
GFK-1037	Series 90-30 FIP Remote I/O Scanner User's Manual
GFK-1056	Series 90-30 State Logic Control System User's Manual
GFK-1084	TCP/IP Ethernet Communications for the Series 90-30 PLC User's Manual
GFK-1179	Installation Requirements for Conformance to Standards
GFK-1186	TCP/IP Ethernet Communications for the Series 90 PLC Station Manager Manual
GFK-1213	Series 90-30 FIP Bus Controller User's Manual
GFK-1256	Power Mate for Series 90-30 User's Manual
GFK-1322	Series 90-30 PLC LonWorks Bus Interface Module User's Manual
GFK-1411	Series 90-30 System Manual for Windows® Users
GFK-1464	Motion Mate DSM302 for Series 90-30 PLCs User's Manual
GFK-1466	Temperature Control Module for the Series 90-30 PLC User's Manual
GFK-1541	TCP/IP Ethernet Communications for the Series 90 PLC User's Manual
GFK-1734	Power Transducer for the Series 90-30 PLC User's Manual
GFK-1868	Machine Edition Getting Started Guide
GFK-2121	Series 90-30 PROFIBUS Modules User's Manual
GFS-062	Series 90-30 Quick Reference Guide for Maintenance
GFZ-0085	Series 90-30 Troubleshooting Pocket Guide
IC690CDU002	InfoLink for PLC CD-ROM



CPUs

For entry-level applications with low I/O counts, the CPU is embedded into the backplane, making all slots available for I/O. These modules are compatible with advanced modules such as Ethernet, various bus modules, and control. Mid-range CPU models are modular and come in various memory sizes, performance capability and increased functionality such as overrides, battery-backed clock and Programmable Coprocessor module support. The high-performance CPUs are based on the latest 386EX processor for fast computation and high throughput. They can handle up to 4,096 I/O and start at 32K of memory and are programmable in a number of standard languages.

	IC693CPU311	IC693CPU313	IC693CPU323	IC693CPU350	IC693CPU360
Product Name	**5-slot Baseplate (Model 311)**	**5-slot Baseplate (Model 313)**	**10-slot Baseplate (Model 323)**	**CPU (Model 350)**	**CPU (Model 360)**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Module Type	I/O Base with built-in CPU	I/O Base with built-in CPU	I/O Base with built-in CPU	CPU Module	CPU Module
Boolean Execution Speed (ms/K)	18	0.6	0.6	0.22	0.22
User Logic Memory (K bytes)	6	12	12	74	240
Real Time Clock	No	No	No	Yes	Yes
I/O Discrete Points	160	160	320	4096	4096
I/O Analog Points	64 In / 32 Out	64 In / 32 Out	64 In / 32 Out	2048 In / 512 Out	2048 In / 512 Out
Type of Memory Storage	RAM, EPROM, EEPROM	RAM, EPROM, EEPROM	RAM, EPROM, EEPROM	RAM, Flash	RAM, Flash
Processor Speed (MHz)	N/A	N/A	N/A	N/A	N/A
Built-in Communication Ports	One RS-485 port on power supply. Supports SNP	One RS-485 port on power supply. Supports SNP	One RS-485 port on power supply. Supports SNP	One RS-485 port on power supply. Supports SNP	One RS-485 port on power supply. Supports SNP
Total Number of Racks	1 (CPU built in)	1 (CPU built in)	1 (CPU built in)	8	8
Communications Option Modules	Serial-SNP and RTU, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP	Serial-SNP and RTU, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP	Serial-SNP and RTU, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP
Field Busses/Device Networks	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN
Software Programming Support	Logicmaster (DOS), VersaPro (Windows), Logic Developer -Machine Edition	Logicmaster (DOS), VersaPro (Windows), Logic Developer -Machine Edition	Logicmaster (DOS), VersaPro (Windows), Logic Developer -Machine Edition	Logicmaster (DOS), VersaPro (Windows), Logic Developer -Machine Edition	Logicmaster (DOS), VersaPro (Windows), Logic Developer -Machine Edition
Internal Power Used	410 mA @ 5 VDC	430 mA @ 5 VDC	430 mA @ 5 VDC	670 mA @ 5 VDC	670 mA @ 5 VDC



CPUs

For entry-level applications with low I/O counts, the CPU is embedded into the backplane, making all slots available for I/O. These modules are compatible with advanced modules such as Ethernet, various bus modules, and control. Mid-range CPU models are modular and come in various memory sizes, performance capability and increased functionality such as overrides, battery-backed clock and Programmable Coprocessor module support. The high-performance CPUs are based on the latest 386EX processor for fast computation and high throughput. They can handle up to 4,096 I/O and start at 32K of memory and are programmable in a number of standard languages.

	IC693CPU363	IC693CPU366	IC693CPU367
Product Name	**CPU (Model 363)**	**CPU (Model 366 with built-in PROFIBUS Master)**	**CPU (Model 367 with built-in PROFIBUS Slave)**
Lifecycle Status	Mature	Mature	Mature
Module Type	CPU Module	CPU Module	CPU Module
Boolean Execution Speed (ms/K)	0.22	0.22	0.22
User Logic Memory (K bytes)	240	240	240
Real Time Clock	Yes	Yes	Yes
I/O Discrete Points	4096	4096	4096
I/O Analog Points	2048 In / 512 Out	2048 In / 512 Out	2048 In / 512 Out
Type of Memory Storage	RAM, Flash	RAM, Flash	RAM, Flash
Processor Speed (MHz)	N/A	N/A	N/A
Built-in Communication Ports	Three total. One RS-485 port on power supply, one RS-232 and one RS-485 port on CPU. Supports SNP, RTU Master and Slave, Serial Read and Write	One PROFIBUS DP Slave port and RS-485 port on power supply. Supports SNP.	One PROFIBUS DP Master, Class 1 V0 port and RS-485 port on power supply. Supports SNP.
Total Number of Racks	8	8	8
Communications Option Modules	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP
Field Busses/Device Networks	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN
Software Programming Support	Logicmaster (DOS), VersaPro (Windows), Logic Developer - Machine Edition	Logic Developer - Machine Edition	Logic Developer -Machine Edition
Internal Power Used	890 mA @ 5 VDC	940 mA @ 5 VDC	940 mA @ 5 VDC



CPUs

For entry-level applications with low I/O counts, the CPU is embedded into the backplane, making all slots available for I/O. These modules are compatible with advanced modules such as Ethernet, various bus modules, and control. Mid-range CPU models are modular and come in various memory sizes, performance capability and increased functionality such as overrides, battery-backed clock and Programmable Coprocessor module support. The high-performance CPUs are based on the latest 386EX processor for fast computation and high throughput. They can handle up to 4,096 I/O and start at 32K of memory and are programmable in a number of standard languages.

	IC693CPU370	IC693CPU372	IC693CPU374 PLUS
Product Name	**CPU (Model 370). Requires High Capacity Power Supply**	**CPU (Model 372 with built-in 10/100 Mbps Ethernet and WEB Enabled). Requires High Capacity Power Supply**	**CPU (Model 374 PLUS with built-in 10/100 Mbps Ethernet and Web Enabled). Requires High Capacity Power Supply**
Lifecycle Status	Mature	Mature	Mature
Module Type	CPU Module	CPU Module	CPU Module
Boolean Execution Speed (ms/K)	0.15	0.15	0.15
User Logic Memory (K bytes)	240	120	240
Real Time Clock	Yes	Yes	Yes
I/O Discrete Points	4096	4096	4096
I/O Analog Points	2048 In / 512 Out	2048 In / 512 Out	2048 In / 512 Out
Type of Memory Storage	RAM, Flash	RAM, Flash	RAM, Flash
Processor Speed (MHz)	133Mhz	133Mhz	133Mhz
Built-in Communication Ports	One RS-485 port on power supply. Supports SNP	One RS-485 port on power supply. Supports SNP and two Ethernet ports; (one IP address) on CPU, 10/100 Mbps built-in switch, SRTP - channels (Producer and Consumer); EGD, Modbus TCP Client/Server and Web Diagnostics Support	One RS-485 port on power supply. Supports SNP and two Ethernet ports; (one IP address) on CPU, 10/100 Mbps built-in switch, SRTP - channels (Producer and Consumer); EGD, Modbus TCP Client/Server and Web Diagnostics Support
Total Number of Racks	8	8	8
Communications Option Modules	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP Client/Server	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP Client/Server	Serial-SNP, SNPX, RTU and CCM, LAN-Genius, Ethernet SRTP and Ethernet Modbus TCP Client/Server
Field Busses/Device Networks	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN	Ethernet, Genius, PROFIBUS-DP, DeviceNet, Interbus-S, CsCAN
Software Programming Support	Logic Developer - Machine Edition	Logic Developer - Machine Edition	Logic Developer -Machine Edition
Internal Power Used	1.4 Amps @ 5 VDC	1.4 Amps @ 5 VDC	1.4 Amps @ 5 VDC



Baseplates

Series 90-30 baseplates are available in 5- and 10-slot configurations to the meet the needs of your application. You can choose expansion or remote baseplates for multi-rack systems, covering distances of up to 700 feet from the CPU. GE offers standard length cables for easy installation and provides wiring information for custom applications.

	IC693CHS391	IC693CHS392	IC693CHS393	IC693CHS397	IC693CHS398	IC693CHS399
Product Name	**10-slot CPU Baseplate (Model 331 and above)**	**10-slot Expansion Baseplate (Model 331 and above)**	**10-slot Remote Baseplate (Model 331 and above)**	**5-slot CPU Baseplate (Model 331 and above)**	**5-slot Expansion Baseplate (Model 331 and above)**	**5-slot Remote Baseplate (Model 331 and above)**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature	Mature
Module Type	CPU I/O Base	Expansion I/O Base	Expansion I/O Base	CPU I/O Base	Expansion I/O Base	Expansion I/O Base
Baseplate Option	Main (With CPU Slot)	Expansion	Expansion	Main (With CPU Slot)	Expansion	Expansion
Distance	N/A	Up to 50 feet	Up to 700 feet	N/A	Up to 50 feet	Up to 700 feet
Number of Slots	10	10	10	5	5	5
Dimension (W x H x D) in. (mm)	17.44 x 5.12 x 5.59 (443 x 130 x 142)	17.44 x 5.12 x 5.59 (443 x 130 x 142)	17.44 x 5.12 x 5.59 (443 x 130 x 142)	10.43 x 5.12 x 5.59 (245 x 130 x 142)	10.43 x 5.12 x 5.59 (245 x 130 x 142)	10.43 x 5.12 x 5.59 (245 x 130 x 142)
Internal Power Used	420 mA @ 5 VDC	150 mA @ 5 VDC	460 mA @ 5 VDC	270 mA @ 5 VDC	170 mA @ 5 VDC	480 mA @ 5 VDC



Power Supplies

The Series 90-30 power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. Series 90-30 power supplies are tied into the performance of the CPU for simplex, fail-safe, and fault tolerance. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features.

	IC693PWR321	IC693PWR330	IC693PWR331	IC693PWR332
Product Name	**Power Supply, 120/240 VAC, 125 VDC**	**Power Supply, 120/240 VAC, 125 VDC**	**Power Supply, 24 VDC**	**Power Supply, 12 VDC**
Lifecycle Status	Mature	Mature	Mature	Mature
Module Type	Power Supply	Power Supply	Power Supply	Power Supply
Power Source	100-240 VAC or 125 VDC	100-240 VAC or 125 VDC	24 VDC	12 VDC
High Capacity	No	Yes	Yes	Yes
Output Source	30 watts total; 15 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
Number of Redundant Power Supplies Supported	N/A	N/A	N/A	N/A
Cable Length to Redundant Power Supply Adapter	N/A	N/A	N/A	N/A



Power Supplies

The Series 90-30 power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. Series 90-30 power supplies are tied into the performance of the CPU for simplex, fail-safe, and fault tolerance. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features.

	IC693PWR328
Product Name	**Power Supply, 48 VDC**
Lifecycle Status	Mature
Module Type	Power Supply
Power Source	48 VDC
High Capacity	No
Output Source	30 watts total; 15 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
Number of Redundant Power Supplies Supported	N/A
Cable Length to Redundant Power Supply Adapter	N/A



Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693ACC300	IC693MDL230	IC693MDL250	IC693MDL231	IC693MDL240
Product Name	**DC Voltage Input Simulator, 8/16 Points**	**AC Voltage Input Module, 120 VAC Isolated, 8 Point Input**	**AC Voltage Input Module, 120 VAC Isolated, 16 Point Input**	**AC Voltage Input Module, 240 VAC Isolated, 8 Point Input**	**AC Voltage Input Module, 120 VAC, 16 Point Input**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Module Type	Input Simulator	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Power Type	DC	AC	AC	AC	AC
Input Voltage Range	N/A	0-132 VAC	0-132 VAC	0-264 VAC	0-132 VAC
Input Current (mA)	N/A	14.5	14.5	15	12
Number of points	16	8	16	8	16
Response Time (ms)	20 on/30 off	30 on/45 off	30 on/45 off	30 on/45 off	30 on/45 off
Trigger Voltage	N/A	74-132	74-132	148-264	74-132
Points per Common	16	1	1	1	16
Connector Type	Toggle Switches	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	120 mA @ 5 VDC	60 mA @ 5 VDC	60 mA @ 5 VDC	60 mA @ 5 VDC	90 mA @ 5 VDC



Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693MDL260	IC693MDL241	IC693MDL632	IC693MDL634	IC693MDL645
Product Name	**AC Voltage Input Module, 120 VAC, 32 Point Input**	**AC/DC Voltage Input Module, 24 VAC/VDC**	**DC Voltage Input Module, 125 VDC Pos/Neg Logic, 8 Point Input**	**DC Voltage Input Module, 24 VDC Pos/Neg Logic, 8 Point Input**	**DC Voltage Input Module, 24 VDC Pos/Neg Logic, 16 Point Input**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Power Type	AC	Mixed	DC	DC	DC
Input Voltage Range	0-132 VAC	0-30 VDC	0-150 VDC	0-30 VDC	0-30 VDC
Input Current (mA)	12	7	4.5	7	7
Number of points	32	16	8	8	16
Response Time (ms)	30 on/45 off	12 on/28 off	7 on/7 off	7 on/7 off	7 on/7 off
Trigger Voltage	74-132	11.5-30	90-150	11.5-30	11.5-30
Points per Common	32	16	4	8	16
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	90 mA @ 5 VDC	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated	40 mA @ 5 VDC	45 mA @ 5 VDC; 62 mA @ 24 VDC Isolated	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated



Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693MDL646	IC693MDL648	IC693MDL654	IC693MDL655	IC693MDL660
Product Name	**DC Voltage Input Module, 24 VDC Pos/Neg Logic, FAST, 16 Point Input**	**DC Voltage Input Module, 48 VDC Pos/Neg Logic, FAST, 16 Point Input**	**DC Voltage Input Module, 5/12 VDC (TTL) Pos/Neg Logic, 32 Point Input**	**DC Voltage Input Module, 24 VDC Pos/Neg Logic, 32 Point Input**	**DC Voltage Input Module, 24 VDC Pos/Neg Logic, 32 Point Input**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Power Type	DC	DC	DC	DC	DC
Input Voltage Range	0-30 VDC	0-60 VDC	0-15 VDC	0-30 VDC	0-30 VDC
Input Current (mA)	7	4.2	3.0 @ 5 V, 8.5 @ 12 V	7	7
Number of points	16	16	32	32	32
Response Time (ms)	1 on/1 off	1 on/1 off	1 on/1 off	2 on/2 off	0.5ms, 1.0ms, 2.0ms, 5ms, 10ms, 50ms and 100ms, selectable per module. On and off.
Trigger Voltage	11.5-30	34 - 60	4.2-15	11.5-30	11.5-30
Points per Common	16	16	8	8	8
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Fujitsu Connector	Fujitsu Connector	IC694TBBx32 or IC694TBSx32. Sold Separately.
Internal Power Used	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated	5 VDC - 195 mA @ 5 VDC; 12 VDC - 440 mA @ 5 VDC	195 mA @ 5 VDC	300 mA @ 5 VDC



Analog I/O Modules (Input)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC693ALG220	IC693ALG221	IC693ALG222	IC693ALG223
Product Name	**Analog Input, Voltage, 4 Channel**	**Analog Input, Current, 4 Channel**	**Analog Input, Voltage, High Density (16 Channel)**	**Analog Input, Current, High Density (16 Channel)**
Lifecycle Status	Mature	Mature	Mature	Mature
Module Type	Analog Input	Analog Input	Analog Input	Analog Input
Isolation	1500 volts RMS field to logic side	1500 volts RMS field to logic side	1500 volts RMS field to logic side	1500 volts RMS field to logic side
Range	-10 V to +10 V	4-20 mA, 0-20 mA	-10 V to +10 V, 0 to 10 V	0-20 mA, 4-20 mA
Number of Channels	4	4	16	16
Update Rate	4 ms all channels	2 ms all channels	13 ms all channels	13 ms all channels
Resolution	12 bit; 5 mV/20 µA/bit	12 bit; 0-20 mA, 5 µA/bit; 4-20 mA, 4 µA/bit	12 bit; ±10 V, 5 mV/20 µA/bit; 0-10 V, 5 mV/20 µA/bit	12 bit; 0-20 mA, 5 µA/bit; 4-20 mA, 4 µA/bit; 4-20 mA Enhanced, 5µA/bit
Accuracy	±10 mV/40 µA at 25°C (77°F)	0.1 % full scale	0.25% at 25°C (77°F)	0.25% at 25°C (77°F)
Input Impedance	>9 Megohms	250 ohms	250 ohms	250 ohms
Input Filter Response	17 Hz	325 Hz	200 Hz	200 Hz
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	27 mA @ 5 VDC; 98 mA 24 VDC Isolated	25 mA @ 5 VDC; 100 mA @ 24 VDC Isolated	112 mA @ 5 VDC; 4150 mA -User Supplied 24 VDC	120 mA @ 5 VDC; 65 mA-User Supplied 24 VDC



Analog I/O Modules (Input)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	HE693ADC410	HE693ADC420
Product Name	**Isolated Analog Input Module, Voltage, 1500 VAC, Isolation**	**Isolated Analog Input Module, Current, 1500 VAC, Isolation**
Lifecycle Status	Mature	Mature
Module Type	Analog Input	Analog Input
Range	±10 V	4-20 mA, ±20 mA
Number of Channels	4	4
Channel-to-Channel Isolation	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Input Impedance	1 Megohm	100 ohms
A/D Type, Resolution	Integrating, 18 bits	Integrating, 18 bits
Useable Resolution	13 bits plus sign	13 bits plus sign
I/O Required	4 %AI, 4 %AQ, 16 %I	8 %AI, 8 %AQ, 16 %I
Sample Rate	45 channels/second	45 channels/second
Analog Filtering	1 KHz, 3 pole Bessel	1 KHz, 3 pole Bessel
Digital Filtering	1-128 samples/update	1-128 samples/update
Maximum Error	.05% full scale	.05% full scale
Common Mode Range	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Common Mode Rejection	>100 dB	>100 dB
Power Consumption at Steady State, Maximum	0.7 W @ 5 V, 1.2 W @ 24 V	0.7 W @ 5 V, 1.2 W @ 24 V
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	140 mA @ 5 VDC ; 50 mA @ 24 VDC Relay	140 mA @ 5 VDC; 50 mA @ 24 VDC Relay



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693MDL330	IC693MDL340	IC693MDL390	IC693MDL350	IC693MDL730
Product Name	**AC Voltage Output Module, 120/240 VAC, 1 A, 8 Point Output**	**AC Voltage Output Module, 120 VAC, 0.5 A, 16 Point Output**	**AC Voltage Output Module, 120/240 VAC Isolated, 2 A, 5 Point Output**	**AC Voltage Output Module, 120 VAC Isolated, 2 A, 16 Point Output**	**DC Voltage Output Module, 12/24 VDC Positive Logic, 2 A, 8 Point Output**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Power Type	AC	AC	AC	AC	DC
Output Voltage Range	85-264 VAC	85-132 VAC	85-264 VAC	74-264 VAC	12-24 VDC
Number of Points	8	16	5	16	8
Isolation	N/A	N/A	Yes	Yes	N/A
Load Current per Point	1.0 A	0.5 A	2.0 A	Per Point 2A max. @ 30°C & 1A max. @ 60°C (Linear derating)	2.0 A
Response Time (ms)	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off	2 on/2 off
Output Type	Triac	Triac	Triac	Triac	Transistor
Polarity	N/A	N/A	N/A	N/A	Positive
Points per Common	4	4	1	1	8
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	160 mA @ 5 VDC	315 mA @ 5 VDC	110 mA @ 5 VDC	110 mA @ 5 VDC	55 mA @ 5 VDC



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693MDL731	IC693MDL732	IC693MDL733	IC693MDL734	IC693MDL740	IC693MDL741
Product Name	**DC Voltage Output Module, 12/24 VDC Negative Logic, 2 A, 8 Point Output**	**DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5 A, 8 Point Output**	**DC Voltage Output Module, 12/24 VDC Negative Logic, 0.5 A, 8 Point Output**	**DC Voltage Output Module, 125 VDC Pos/Neg Logic, 6 Point Output**	**DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5 A, 16 Point Output**	**DC Voltage Output Module, 12/24 VDC Negative Logic, 0.5 A, 16 Point Output**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature	Mature
Power Type	DC	DC	DC	DC	DC	DC
Output Voltage Range	12-24 VDC	12-24 VDC	12-24 VDC	11-150 VDC	12-24 VDC	12-24 VDC
Number of Points	8	8	8	6	16	16
Isolation	N/A	N/A	N/A	N/A	N/A	N/A
Load Current per Point	2.0 A	0.5 A	0.5 A	1.0 A	0.5 A	0.5 A
Response Time (ms)	2 on/2 off	2 on/2 off	2 on/2 off	7 on/5 off	2 on/2 off	2 on/2 off
Output Type	Transistor	Transistor	Transistor	Transistor	Transistor	Transistor
Polarity	Negative	Positive	Negative	Positive/Negative	Positive	Negative
Points per Common	8	8	8	1	8	8
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	55 mA @ 5 VDC	50 mA @ 5 VDC	55 mA @ 5 VDC	90 mA @ 5 VDC	110 mA @ 5 VDC	110 mA @ 5 VDC



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693MDL742	IC693MDL748	IC693MDL752	IC693MDL758	IC693MDL753	IC693MDL754
Product Name	**DC Voltage Output Module, 12/24 VDC Positive Logic ESCP, 1 A, 16 Point Output**	**DC Voltage Output Module, 48/24 VDC Positive Logic, 0.5 A, 8 Point Output**	**DC Voltage Output Module, 5/24 VDC (TTL) Negative Logic, 0.5 A, 32 Point Output**	**DC Voltage Output Module, 12/24 VDC Positive Logic with ESCP (Self Healing) per group, 0.5 A, 32 Point Output (Two groups of 16)**	**DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5 A, 32 Point Output**	**DC Voltage Output Module, 12/24 VDC Positive Logic, 0.75 A, with ESCP protection, 32 Point Output**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature	Mature
Power Type	DC	DC	DC	DC	DC	DC
Output Voltage Range	12-24 VDC	24-48 VDC	5, 12-24 VDC	12-24 VDC	12-24 VDC	12-24 VDC
Number of Points	16	8	32	32	32	32
Isolation	N/A	N/A	N/A	N/A	N/A	N/A
Load Current per Point	1.0 A	0.5 A	0.5 A	0.5 A	0.5 A	0.75 A with ESCP protection
Response Time (ms)	2 on/2 off	2 on/2 off	0.5 on/0.5 off	0.5 on/0.5 off	0.5 on/0.5 off	0.5 on/0.5 off
Output Type	Transistor	Transistor	Transistor	Transistor	Transistor	Transistor
Polarity	Positive	Positive	Negative	Positive	Positive	Positive
Points per Common	8	8	8	16	8	16
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Fujitsu Connector	IC694TBBx32 or IC694TBSx32. Sold Separately.	Fujitsu Connector	IC694TBBx32 or IC694TBSx32. Sold Separately.
Internal Power Used	130 mA @ 5 VDC	110 mA @ 5 VDC	260 mA @ 5 VDC	250 mA @ 5 VDC	260 mA @ 5 VDC	300 mA @ 5 VDC



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693MDL930	IC693MDL916	IC693MDL931	IC693MDL940	IC693MAR590
Product Name	**AC/DC Voltage Output Module, Relay, N.O., 4 A Isolated, 8 Point Output**	**AC/DC Voltage Output Module, Relay, N.O., 4 A Isolated, 16 Point Output**	**AC/DC Voltage Output Module, Relay, N.C. and Form C, 8 A Isolated, 8 Point Out**	**AC/DC Voltage Output Module, Relay, N.O., 2 A, 16 Point Output**	**AC/DC Voltage I/O Module, AC In/Relay Out N.O.**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Power Type	Mixed	Mixed	Mixed	Mixed	Mixed
Output Voltage Range	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	5 – 125 VDC, 5/24/125 VDC nominal 5 – 250 VAC (47 to 63 Hz), 120-240 VAC nominal	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	5-250 VAC/5-30 VDC
Number of Points	8	16	8	16	8
Isolation	Yes	Yes	Yes	N/A	N/A
Load Current per Point	4.0 A	4.0 A	8.0 A	2.0 A	2.0 A
Response Time (ms)	15 on/15 off	10ms maximum (At nominal voltage excluding contact bounce)	15 on/15 off	15 on/15 off	30 on/45 off
Output Type	Relay	Relay	Relay	Relay	Relay
Polarity	N/A	N/A	N/A	N/A	N/A
Points per Common	1	1	1	4	8
Connector Type	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	6 mA @ 5 VDC; 70 mA @ 24 VDC Relay	300 mA @ 5 VDC from backplane maximum	6 mA @ 5 VDC; 110 mA @ 24 VDC Relay	7 mA @ 5 VDC; 135 mA @ 24 VDC Relay	80 mA @ 5 VDC; 70 mA @ 24 VDC Relay



Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC693MDR390	HE693RLY100	HE693RLY110
Product Name	**AC/DC Voltage Output Module, 24 VDC Input, Relay Output, 8 In/8 Out**	**DC Voltage Output Module, AC In/Relay Out (isolated)**	**DC Voltage Output Module, AC In/Relay Out (fused)**
Lifecycle Status	Mature	Mature	Mature
Power Type	Mixed	Mixed	Mixed
Output Voltage Range	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	12-120 VAC, 12-30 VDC	12-120 VAC, 12-30 VDC
Number of Points	8	8	8
Isolation	N/A	Yes	No
Load Current per Point	2.0 A	8.0 A	8.0 A
Response Time (ms)	1 on/1 off	11 on/11 off	11 on/11 off
Output Type	Relay	Relay	Relay
Polarity	N/A	N/A	N/A
Points per Common	8	1	1
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	80 mA @ 5 VDC; 70 mA @ 24 VDC Relay	180 mA @ 5 VDC; 200 mA @ 24 VDC Relay	180 mA @ 5 VDC; 200 mA @ 24 VDC Relay



Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC693ALG390	IC693ALG391	IC693ALG392	IC693ALG442
Product Name	**Analog Output, Voltage, 2 Channel**	**Analog Output, Current/Voltage, 2 Channel**	**Analog Current/Voltage Output, 8 Channel**	**Analog Current/Voltage Combination 4 Channel In/2 Channel Out**
Lifecycle Status	Mature	Mature	Mature	Mature
Module Type	Analog Output	Analog Output	Analog Output	Analog Input/Output
Isolation	1500 volts RMS field to logic side	1500 volts RMS field to logic side	1500 volts RMS field to logic side	1500 volts RMS field to logic side
Range	-10 V to +10 V, 4-20 mA	1-5 V and 0-5 V, 0-20 mA, 4-20 mA	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA
Number of Channels	2	2	8	4 in/2 out
Channel-to-Channel Isolation	N/A	N/A	N/A	N/A
Diagnostics	N/A	N/A	Open Wire	N/A
Update Rate	5 ms all channels	5 ms all channels	8 ms all channels	8 ms all channels In / 4 ms all channels Out
Resolution	12 bit; 2.5 mV/bit	12 bit; 0-20 mA, 5µA/bit	16 bit; 0.312 mV/bit	(Input)12 bit; 0 V to 10 V, 2.5 mV/bit; -10 V to +10 V, 5 mV/bit; 0-20 mA, 4-20 mA 5µA/bit (Output) 16 bit; 0.312 mV/bit; 4-20 mA 0.5 µA/bit; 0-20 mA 0.625 µA/bit
Accuracy	±5 mV at 25°C (77°F)	0-20 mA, ±8 µA at 25°C (77°F); 0-20 mA, 4-20 mA ±0.1% at 25°C (77°F)	0-20 mA, 4-20 mA ±0.1% at 25°C (77°F); 0-10 V, -10F + 10 V ±0.25 at 25°C (77°F)	(Input) 0.25 % at 25°C (77°F) (Output) 0-20 mA, 4-20 mA ±0.1% at 25°C (77°F)
Maximum Output Load	5 mA (2 K ohms)	5 mA (2 K ohms)	5 mA (2 K ohms)	5 mA (2 K ohms); 850 ohms
Output Load Capacitance	2000 pF	2000 pF, Inductance 1H	2000 pF, Inductance 1H	2000 pF, Inductance 1H
Power Consumption at Steady State, Maximum	N/A	N/A	N/A	N/A
User Supplied Loop Voltage	N/A	N/A	N/A	N/A
Maximum Load (ohms)	N/A	N/A	N/A	N/A
Maximum Linearity Error	N/A	N/A	N/A	N/A
Common Mode Isolation	N/A	N/A	N/A	N/A
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	32 mA @ 5 VDC; 120 mA @ 24 VDC Isolated	30 mA @ 5 VDC; 215 mA 24 VDC Isolated	110 mA @ 5 VDC; 315 mA -User Supplied 24 VDC	95 mA @ 5 VDC; 129 mA 24 VDC Isolated



Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	HE693DAC410	HE693DAC420
Product Name	**Isolated Analog Output Module, Voltage**	**Isolated Analog Output Module, Current**
Lifecycle Status	Mature	Mature
Module Type	Analog Output	Analog Output
Isolation	N/A	N/A
Range	±10 V	4-20 mA or 0-20 mA
Number of Channels	4	4
Channel-to-Channel Isolation	1500 VAC (RMS),±2000 VDC	1500 VAC (RMS),±2000 VDC
Diagnostics	N/A	N/A
Update Rate	N/A	N/A
Resolution	13 bits plus sign, 1.2 5mV	13 bits plus sign, 2.0 µA (4-20 mA); 2.5 µA (±20 mA)
Accuracy	N/A	N/A
Maximum Output Load	N/A	N/A
Output Load Capacitance	N/A	N/A
Power Consumption at Steady State, Maximum	0.75 W @ 5 V; 3.6 W @ 24 V	0.75 W @ 5 V; 3.6 W @ 24 V
User Supplied Loop Voltage	N/A	2-32 VDC
Maximum Load (ohms)	>/= 2 Kohms	</= 1.1 Kohms @ 24 V loop voltage
Maximum Linearity Error	0.02% full scale	0.02% full scale
Common Mode Isolation	1500 VAC (RMS),±2000 VDC	1500 VAC (RMS), ±2000 VDC
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	500 mA @ 5 VDC; 150 mA @ 24 VDC Relay	150 mA @ 5 VDC; 110 mA @ 24 VDC Relay



Millivolt I/O Modules

The Millivolt Input Modules allow millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	HE693ADC409
Product Name	**Analog I/O Module, Millivolt Input**
Lifecycle Status	Mature
Module Type	Millivolt Input
Input Voltage Range	±25 mV, ±50 mV and ±100 mV
Number of Channels	4
Resolution	3 µV, 6µV, 9µV (respectively)
Accuracy	±0.5%
Input Impedance	>20 Mohms
A/D Conversion Type	Integrating
A/D Conversion Time	35 Channels/second
Strain Gages Supported	Bridged (load cells)
Maximum Normal Voltage Input	100 mV
Maximum Voltage Input	±35 V
Connector Type	Terminal Block (20 screws), included with module.
Internal Power Used	100 mA @ 5 VDC



RTD I/O Modules

The RTD Input Modules provide six RTD inputs that allow the direct connection of 3-wire RTD temperature sensors without using external signal processing (transducers, transmitters, etc.). All analog and digital processing of the RTD signal is performed on the module.

	HE693RTD600	HE693RTD601	HE693RTD660
Product Name	**RTD Input Module, Low Resolution**	**RTD Input Module, High Resolution**	**RTD Input Module, Isolated**
Lifecycle Status	Mature	Mature	Mature
Module Type	RTD Input	RTD Input	RTD Input
Number of Channels	6	6	6
RTD Types Supported	3-wire, Pt-100E, Pt-100C, Pt-100Z, Pt-1000, Cu-10, Cu-50, PT-100, Cu-53, Cu-100, Ni-120, TD5R, TD5R, Pt-90 (MIL-7990)	3-wire, Pt-100E, Pt-100C, Pt-100Z, Pt-1000, Cu-10, Cu-50, PT-100, Cu-53, Cu-100, Ni-120, TD5R, TD5R, Pt-90 (MIL-7990)	3 wire, Pt-100E, Pt-100C, Ni-120, Cu-10, Pt-1000, TD5R Si
Channel-to-Channel Isolation	N/A	N/A	5 VAC
Notch Filter	N/A	N/A	None
Resolution	0.5°C or 0.5°F	0.125°C , 0.1°C, or 0.1°F	0.05°C, 0.05°F, 0.1°C, 0.1°F, 0.5°C or 0.5°F
Accuracy	±0.5°C, typical	±0.5°C, typical	±0.3°C
Input Impedance	>1000 Megohms	>1000 Megohms	>1000 Megohms
Fault Protection	Zener Diode Clamp	Zener Diode Clamp	Suppression Diode
Update Time	50 Channels/second	50 Channels/second	50 Channels/second
A/D Conversion Type	18 bit, integrating	18 bit, integrating	18 bit, integrating
Average RTD Current, Pt-100	330 microamps	330 microamps	330 microamps
Channel-to-Channel Tracking	0.1°C	0.1°C	0.1°C
Channel-to-Bus Isolation	N/A	N/A	1500 VAC
RTD Short	N/A	N/A	Indefinite without damage
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	70 mA @ 5 VDC	70 mA @ 5 VDC	200 mA @ 5 VDC



Strain Gage I/O Modules

The Millivolt Input Modules allow millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	HE693STG883	HE693STG884
Product Name	**Analog I/O Module, Strain Gage**	**Analog I/O Module, Strain Gage**
Lifecycle Status	Mature	Mature
Module Type	Strain Gage Input	Strain Gage Input
Input Voltage Range	±20 mV, ±25 mV and ±30mV	±25 mV, ±50 mV and ±100mV
Number of Channels	8	8
Resolution	0.6 µV, 0.8 µV, 0.9 µV (respectively)	0.8 µV, 1.6 µV, 3.2 µV (respectively)
Accuracy	±0.3%	±0.3 %
Input Impedance	>1000 Mohms	>1000 Mohms
A/D Conversion Type	Integrating	Integrating
A/D Conversion Time	35 Channels/second	35 Channels/second
Strain Gages Supported	Bridged (load cells)	Bridged (load cells)
Maximum Normal Voltage Input	100 mV	100 mV
Maximum Voltage Input	±35 V	±35 V
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	60 mA @ 5 VDC; 30 mA @ 24 VDC Relay	60 mA @ 5 VDC; 30 mA @ 24 VDC Relay



Temperature Control Modules

The Temperature Control Module (TCM), is a high performance control module providing eight channels of thermocouple input and eight channels of control output in a single Series 90-30 module. Each channel can operate in closed or open loop mode relieving the PLC of providing the temperature control functions. The module also supports Autotuning.

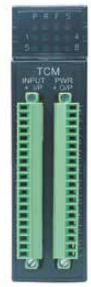
	IC693TCM302	IC693TCM303
Product Name	**Temperature Control Module, (8) T/C, (1) RTD and (8) 24 VDC Output**	**Temperature Control Module, Extended Range, 8 T/C, 1RTD and 8 24 VDC Output**
Lifecycle Status	Mature	Mature
Module Type	Thermocouple Input	Thermocouple Input
Thermocouples	8 channels (Type J, K or L); J=0-450°C; K=0 -600°C; L=0-450°C; 1 internal/external compensation channel, 12-bits or 0.2°C resolution, 100 ms/ channel update, ±1°C accuracy with automatic calibration	8 channels (Type J, K or L); J=0-600°C; K=0 -1050°C; L=0-600°C; 1 internal/external compensation channel, 12-bits or 0.2°C resolution, 100 ms/ channel update, ±1°C accuracy with automatic calibration
RTD Input	1 channel with Open/Short Circuit Detection; Type: Pt-100 (µ=0.00392) for temperature compensation	1 channel with Open/Short Circuit Detection; Type: Pt-100 (µ=0.00392) for temperature compensation
Temperature Range	J=0-600°C, K=0-1050°C, L=0-600°C	J=0-450°C, K=0-600°C, L=0-450°C
Output Voltage Range	18 to 30 volts DC	18 to 30 volts DC
Load Current per point	100 mA maximum sourcing	100 mA maximum sourcing
Number of Channels	8 T/C In / 8 DC Out	8 T/C In / 8 DC Out
Diagnostics	Open thermocouple and reverse connection detection capability; Detection and indication of out-of-tolerance temperature readings	Open thermocouple and reverse connection detection capability; Detection and indication of out-of-tolerance temperature readings
Connector Type	Two 20 pin connectors (screw type)	Two 20 pin connectors (screw type)
Internal Power Used	150 mA @ 5 VDC	150 mA @ 5 VDC



Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	HE693THM166	HE693THM409	HE693THM449
Product Name	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module**
Lifecycle Status	Mature	Mature	Mature
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input
Range	J, K, N, T, E, R, S, B, C, X	J, K, N, T, E, R, S	J, K, N, T, E, R, S
Number of Channels	16	4	4
Channel-to-Channel Isolation	N/A	N/A	N/A
Notch Filter	N/A	N/A	N/A
Open Circuit Alarm	Yes	No	Yes
Resolution	0.5°C or 0.5°F	0.5°C or 0.5°F	0.5°C or 0.5°F
Accuracy	±0.5°C, typical (J,K,N,T)	±0.5°C, typical (J,K,N,T)	±0.5°C, typical (J,K,N,T)
A/D Conversion Type	Integrating	Integrating	Integrating
A/D Conversion Time	40 Channels/second	40 Channels/second	40 Channels/second
Open Circuit Detection	Yes	Yes	Yes
Setpoint Alarm	N/A	N/A	N/A
Diagnostics	Open Circuit Detection	Open Circuit Detection	Open Circuit Detection
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	80 mA @ 5 VDC; 30 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay



Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	HE693THM809	HE693THM884	HE693THM888	HE693THM889
Product Name	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module (Enhanced)**	**Analog I/O Thermocouple Input Module (Enhanced)**	**Analog I/O Thermocouple Input Module**
Lifecycle Status	Mature	Mature	Mature	Mature
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input	Thermocouple Input
Range	J, K, N, T, E, R, S	J, K, N, T, E, R, S, B, C	J, K, N, T, E, R, S, B, C	J, K, N, T, E, R, S
Number of Channels	8	8	8	8
Channel-to-Channel Isolation	N/A	N/A	N/A	N/A
Notch Filter	N/A	None	60 Hz	N/A
Open Circuit Alarm	No	Yes	Yes	Yes
Resolution	0.5°C or 0.5°F	N/A	N/A	0.5°C or 0.5°F
Accuracy	±0.5°C, typical (J,K,N,T)	N/A	N/A	±0.5°C, typical (J,K,N,T)
A/D Conversion Type	Integrating	N/A	N/A	Integrating
A/D Conversion Time	40 Channels/second	N/A	N/A	40 Channels/second
Open Circuit Detection	Yes	Yes	Yes	Yes
Setpoint Alarm	N/A	Yes	Yes	N/A
Diagnostics	Open Circuit Detection	Open Circuit Detection and Alarms	Open Circuit Detection and Alarms	Open Circuit Detection
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay	100 mA @ 5 VDC; 60 mA @ 24 VDC Relay	100 mA @ 5 VDC; 60 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay



Networks and Distributed I/O Systems

The Series 90-30 features a variety of communications options for distributed control and/or I/O. Choose from Ethernet EGD, PROFIBUS-DP, Genius, DeviceNet, Interbus-S, Series 90 Protocol (SNP) and RTU modules. These communication modules are easy to install and quick to configure.

	IC693PBM200	IC693PBS201	IC693BEM331
Product Name	**Communications Module, PROFIBUS-DP Module (Master)**	**Communications Module, PROFIBUS-DP Module (Slave)**	**Series 90-30 I/O Bus Module, Genius Bus Controller**
Lifecycle Status	Mature	Mature	Mature
Module Type	PROFIBUS-DP Master	PROFIBUS-DP Slave	Genius Bus Controller
Protocol Support	PROFIBUS DP	PROFIBUS DP	Genius
Entity Type	Master	Slave	Master
Bus Speed	12Mbaud	12Mbaud	153.6Kbaud
Network Distance	Baud Rate Dependent. Supports all standard data rates (9.6 kBit/s, 19.2 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s and 12 MBit/s)	Baud Rate Dependent. Supports all standard data rates (9.6 kBit/s, 19.2 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s and 12 MBit/s)	7500 feet (2286 meters) at 38.4 Kbaud; 4500 feet (1371 meters) at 76.8 Kbaud; 3500 feet (1066 meters) at 153.6 Kbaud extended; 2000 feet (609 meters) at 153.6 Kbaud standard. Maximum length at each baud rate also depends on cable type.
Bus Diagnostics	Supported	Supported	Supported
Number of Drops Supported	125 Slaves	One	32
Message Size	244 bytes of input and 244 bytes of output for each slave. Not to exceed 3584 bytes input and 3584 bytes outputs total for the system.	244 bytes of input and 244 bytes of output	255 bytes
Internal Power Used	450 @ 5 VDC	450 @ 5 VDC	300 mA @ 5 VDC



Networks and Distributed I/O Systems

The Series 90-30 features a variety of communications options for distributed control and/or I/O. Choose from Ethernet EGD, PROFIBUS-DP, Genius, DeviceNet, Interbus-S, Series 90 Protocol (SNP) and RTU modules. These communication modules are easy to install and quick to configure.

	IC693DNM200	IC693DNS201	IC693CMM302
Product Name	**Series 90-30 Communications Module, DeviceNet, Master**	**Series 90-30 Communications Module, DeviceNet, Slave**	**Series 90-30 Enhanced Genius Communications Module**
Lifecycle Status	Mature	Mature	Mature
Module Type	DeviceNet Master	DeviceNet Slave	Genius Peer to Peer
Protocol Support	DeviceNet	DeviceNet	N/A
Entity Type	Master	Slave	Peer-to-Peer
Bus Speed	500Kbaud	500Kbaud	153.6Kbaud
Network Distance	500Kbaud 100 meters to 125Kbaud 500 meters. Maximum length at each baud rate also depends on cable type.	500Kbaud 100 meters to 125Kbaud 500 meters. Maximum length at each baud rate also depends on cable type.	7500 feet (2286 meters) at 38.4 Kbaud; 4500 feet (1371 meters) at 76.8 Kbaud; 3500 feet (1066 meters) at 153.6 Kbaud extended; 2000 feet (609 meters) at 153.6 Kbaud standard. Maximum length at each baud rate also depends on cable type.
Bus Diagnostics	Supported	Supported	N/A
Number of Drops Supported	64	N/A	N/A
Message Size	3972 bytes Input and 3972 bytes Output	255 bytes In and 255 bytes Out	N/A
Internal Power Used	450 @ 5 VDC	450 @ 5 VDC	300 mA @ 5 VDC



Networks and Distributed I/O Systems

The Series 90-30 features a variety of communications options for distributed control and/or I/O. Choose from Ethernet EGD, PROFIBUS-DP, Genius, DeviceNet, Interbus-S, Series 90 Protocol (SNP) and RTU modules. These communication modules are easy to install and quick to configure.

	IC693BEM320	IC693BEM321
Product Name	**Series 90-30 Communication, I/O Link Interface Module (Slave)**	**Series 90-30 Communication, I/O Link Interface Module (Master)**
Lifecycle Status	Mature	Mature
Module Type	I/O Link	I/O Link
Protocol Support	N/A	N/A
Entity Type	Slave	Master
Bus Speed	1.5 mHz	1.5 mHz
Network Distance	10 meters (33 feet) RS-485; 200 meters (660 feet)	10 meters (33 feet) RS-485; 200 meters (660 feet)
Bus Diagnostics	N/A	N/A
Number of Drops Supported	N/A	N/A
Message Size	N/A	N/A
Internal Power Used	205 mA @ 5 VDC	415 mA @ 5 VDC



Serial Communications Modules

The Series 90-30 features a variety of communications options for distributed control and/or I/O. Choose from Ethernet EGD, PROFIBUS-DP, Genius, DeviceNet, Interbus-S, Series 90 Protocol (SNP) and RTU modules. These communication modules are easy to install and quick to configure.

	HE693SNP900
Product Name	**Communications Module, SNP Slave Module from Horner Electric**
Lifecycle Status	Mature
Module Type	SNP Module
Protocol Support	SNP Slave
Communication Ports	RS-232, RS-232/485
Backplane Compatibility	No Restrictions
Internal Power Used	250 mA @ 5 VDC



Power Measurement Modules

The Power Transducer Module (PTM) and Power Synchronization and Measurement (PSM) module measure and calculate critical data for control of electrical power systems and synchronization of power grids. Both the PTM and PSM connect to user supplied current and potential transformers, which translate power grid signals to proportionate, low-level signals for measurement and analysis. The PTM module is not intended to provide a protective relay function or be used for energy billing purposes. The PSM module provides ANSI protective relay calculations and revenue grade monitoring for a complete genset, paralleling switchgear or infrastructure management solution. Both the PTM and PSM consist of a processing module that plugs into the PLC backplane, an interface module for field wiring connections, and cables to interconnect the two modules. The PTM and PSM can be used with Wye or Delta type three-phase power or with single-phase power systems.

	IC693PTM101
Product Name	**Power Transducer Module Processing Module interface board (a panel mounted circuit board). This board interfaces between the Power Transducer module and the input transformers (current and potential), 1.0 meter Interface cable that connects the module to the Interface board.**
Lifecycle Status	Mature
Module Type	Power Transducer Modules
Input Voltage Range	10-120 VAC (nominal)
Power Measurement Configurations	Grids Circuits 1 0 0 up to 4
Current Input Range	0 to 7.5 Amps RMS (5 A RMS nominal)
Frequency Range	35 Hz to 70 Hz
Output Rating	N/A
Number of Outputs	0
Data	Data availability • Data calculation rate: 20ms @ 50 Hz, 16.67ms @ 60 Hz • Data latency: 15ms @ 50 Hz, 16.67ms @ 60 Hz Measured Data • RMS voltage of phase A, B, and C (in Volts x 10) • RMS currents of phase A, B, C, and Neutral (in Amperes x 1000) for each grid • DC component of measured RMS voltages (in Volts x 10) • Frequency of phase A grid 1 (in Hz x 100) • Phase angle between phase A grid 1 and phase A grid 2 (in degrees x 10) Power and Energy Data • Active and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR) • Active and reactive total energy consumption in Watt-Seconds and Volt-Amperes-Reactive-Seconds (updated once per second), re-settable by the user • Total power factor • Average real and reactive power consumption (sliding 15 minute window updated once per second)
Status and Diagnostics	• Module Heartbeat (indicates module health) • Utility Phase A voltage present • Phase polarity valid • Voltage measurements valid • Current measurements valid
Internal Power Used	400 mA @ 5 VDC



Pneumatic Module

This IC693MDL760 output module provides eleven pneumatic outputs and five 24 VDC sourcing outputs. For each pneumatic output, the module contains an internal 3-way solenoid-actuated valve and an associated output fitting, which is located on the front panel. When an output is turned ON, its internal valve connects a user supplied pressure source (100 psi maximum) to the output fitting. The pressure source is connected to the fitting on the bottom of the module. When the output is turned OFF, the valve's output port is vented to atmosphere inside the module. Solenoid power is supplied from an external 24 VDC source to the "DC Outputs" connector on the front panel.

	IC693MDL760
Product Name	**Series 90-30 Solenoid Module**
Lifecycle Status	Mature
Number of Points	(11) Pneumatic Outputs (5) 24 VDC Outputs
Pneumatic Outputs	11
Supply Pressure	100 PSI
Pressure Drop	25 psi max.@ 0.25 scfm
External Solenoid Power	21.6-26.4 VDC, 24 VDC nominal
ON Response Time/Off Response Time	12 ms max. ON 12 ms max. OFF
Solenoid Inrush Current	33 mA/valve @ 24 VDC
Solenoid Holding Current	13 mA/valve @ 24 VDC
Output Fitting	Threaded for 10-32 adapter, 1/16" hose barb provided
Supply Fitting	Threaded for 10-32 adapter, 1/8" hose barb provided
Load Current per Point	0.5 A @ 30 VDC per point, 2.0 A total for all five points
Response Time (ms)	0.5 on/0.5 off
Output Type	Transistor
Polarity	Positive
Internal Power Used	75 mA from 5 VDC bus (solenoid LEDs are powered from external power source)



Programmable Coprocessor Modules

GE Series 90-30's feature a wide range of Specialty Modules to meet all of your application needs. From temperature controls, high-speed counters, I/O processors, coprocessors, to PID auto-tuning modules, these Specialty Modules are designed to meet the demand for versatile industrial solutions.

	HE693ASC900
Product Name	**Horner ASCII Basic Module**
Lifecycle Status	Mature
Module Type	Co-Processor ASCII Basic Module
Programming Languages	BASIC
Program Storage	64K EEPROM
Communication Ports	RS-232, RS-232/485
Backplane Compatibility	No Restrictions
Internal Power Used	375 mA @ 5 VDC



Motion Modules (High Speed Counting)

Motion control integrated into the Series 90-30 fosters high performance point-to-point applications. GE Motion Control modules can be flexibly applied to a variety of digital, analog, and stepper motion applications.

	IC693APU300	IC693APU305
Product Name	**Series 90-30 High Speed Counter**	**Series 90-30 I/O Processor Module**
Lifecycle Status	Mature	Mature
Module Type	High Speed Counter	I/O Processor Module
Count Rate	High Frequency - 80 kHz; Low Frequency - 20 Hz	30 khz (Absolute Encoder) 200 khz (A Quad B Encoder)
Input/Output Type	Positive Logic	N/A
Off State Leakage Current	10 µA per point	10 µA per point
Output Protection	3 Amp Fuse for all points	5 A Fuse for all points
Counter Operation	Type A - Up or Down-Independent Pulse-4 counters; Type B - Both Directions-A QUAD B Encoder Inputs-2 Counters; Type C - Difference Between 2 changing values-A QUAD B Encoder Inputs -1 Counter	N/A
Input Filters (Selectable)	High Frequency Filter - 2.5 µS; Low Frequency Filter - 12.5 ms	N/A
Selectable On/Off Output Presets	Each Counter has 2 present points, On and Off	N/A
Counters per Timebase	Each counter stores the number of counts that have occurred in a specified time. A timebase value measurement from 1 ms to 65535 ms is configurable.	N/A
Strobe Register	Each counter has one or more strobe registers that capture the current accumulator value when a strobe input transition in the direction selected during the last configuration of the module.	N/A
Local Fast Inputs	(12) 5 VDC or 10 to 30 VDC	(12) 8.0 VDC (non–TTL), 1.5 VDC (TTL)
Local Fast Outputs	(4) 10 to 30 VDC @ 500 mA maximum 4.75 to 6 VDC @ 20 mA maximum	Continuous Output Current (10–30 VDC supply) 1.0 A (each output 1–4) 0.5 A (each output 5°V8)
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	250 mA @ 5 VDC	360 mA @ 5 VDC



Motion Modules (Servo Control)

Motion control integrated into the Series 90-30 fosters high performance point-to-point applications. GE Motion Control modules can be flexibly applied to a variety of digital, analog, and stepper motion applications.

	IC693DSM324	IC693DSM314
Product Name	**Series 90-30 Digital Servo Module, 4-Axis**	**Series 90-30 Digital Servo Module, 4-Axis (Fiber Optic Interface to Amplifiers)**
Lifecycle Status	Mature	Mature
Module Type	Servo Module	Servo Module
Drive	Beta i Series Digital Servos	Beta i Series Digital and Analog Servos
Drive Interface	Fiber Optic, Up to 100 meters between Amplifiers with total length of 400 meters.	Digital for Alpha and Beta Series. ±10V velocity or torque command for analog
Axes	4 Digital	2 Digital and 1 analog or 4 analog
Encoder Support	Incremental Master (1Mhz)	Incremental Master (1Mhz)
Axis Configuration	Parallel or Cascade	Parallel or Cascade
User Memory	15 KBytes	15 KBytes
Analog Inputs	2	4 - In Digital Mode 8 - In Analog Mode
Analog Outputs	2	4 - In Digital Mode 0 - In Analog Mode
Local Fast Inputs	12 (24 V), 8 (5 V)	12 (24 V), 8 (5 V)
Local Fast Outputs	4 SSR Outputs (24 VDC, 125 mA)	4 SSR Outputs (24 VDC, 125 mA)
Connector Type	(1) 36 pin (5 VDC) (1) 24 pin (24 VDC)	(4) 36 pin
Internal Power Used	1360 mA @ 5 VDC	1300 mA @ 5 VDC



Remote Expansion Modules

The Ethernet distributed I/O interface (Ethernet Interface Unit), is a high performance Ethernet network interface module. The ENIU enables users to connect Series 90-30 I/O remotely over Ethernet to a master controller. The ENIU provides the power of Single Point of Connect. You can connect anywhere on the I/O network and monitor, configure, and troubleshoot any ENIU. The master controller is also accessible over the same network to program, troubleshoot and configure. The ENIU features a built-in Ethernet switch with two 10/100Mbit ports (RJ-45) allowing the user to daisy chain to the next ENIU. The ENIU automatically senses the cable type, eliminating the need for a crossover cable. The ENIU supports one IP address. Redundancy is provided as a standard feature with the ENIU.

	IC693NIU004
Product Name	**Ethernet Remote I/O Expansion (Slave)**
Lifecycle Status	Mature
Module Type	Ethernet Remote I/O Interface Module
I/O Discrete Points	2048 Inputs/2048 Outputs maximum
I/O Analog Points	1264 Inputs and 512 Outputs maximum
User Logic Memory	N/A
Network Data Rate	10/100Mbit ports (RJ-45)
Entity Type	Slave
Network Distance	Media Dependent
Bus Diagnostics	Supported
Number of Drops Supported	Network Dependent. Each Ethernet NIU can also support up to 7 additional local I/O racks (IC693CHSxxx)
Internal Power Used	N/A

Accessories

Part Number	Description	Lifecycle Status
IC694TBB032	High Density 32 Point Terminal Block Box Style	Mature
IC694TBB132	High Density 32 Point Terminal Block Box Style with Extended Shroud for Large Wiring Bundles	Mature
IC694TBS032	High Density 32 Point Terminal Block Spring Style	Mature
IC694TBS132	High Density 32 Point Terminal Block Spring Style with Extended Shroud for Large Wiring Bundles	Mature
IC694TBC032	High Density 32 Point Terminal Block Connector Style (Fujitsu) with test points	Mature
IC690ACC901	Mini-Converter Kit with cable (RS-485/RS-232)	Mature
IC690ACC903	RS-485 Port Isolator	Mature
IC690CDR002	User Manuals, InfoLink CD-ROM Documentation, single-user license	Mature
IC693ACC301	Replacement Battery, CPU and PCM (qty 2)	Mature
IC693ACC302	High capacity battery pack. The new Auxiliary Battery Pack (IC693ACC302) will enable Series 90-30 (except CPU374) to go up to 75 months (shelf life of 10 years) of RAM memory backup w/no power and the CPU374 backup for 15 months	Mature
IC693ACC307	I/O Bus Terminator Plug	Mature
IC693ACC308	Rack Adaptor Bracket, Series 90-30 10 Slot to 19" (Front Mount)	Mature
IC693ACC310	Filler Module, Blank Slot	Mature
IC693ACC311	Twenty Point Terminal Blocks (qty 6)	Mature
IC200ACC003	EZ Store Device, CPU374 program download without the need of a PC.	Mature
IC693ACC319	Spare Plastic Cases Parts Kit (I/O, CPU, PCM)	Mature
IC693MLX000	Spare Series 90-30 I/O Modules Label Kit (various quantities)	Mature

Terminal Block Quick Connect

	Terminal Block Quick Connect (TBQC) for selected I/O modules enables the user to easily connect interposing terminal blocks. The TBQC consists of an I/O faceplate adapter that includes a 24 pin Fujitsu male connector (the faceplate replaces the 20 screw terminal connector on front of I/O module, not compatible with the high density 36 screw terminals), cable and interposing terminal block.

TBQC I/O Module Face Plate Adapter

Part Number	Description	Lifecycle Status
IC693ACC334	I/O module face plate adapter for 20 screw type I/O modules. Faceplate provides a 24 pin male Fujitsu connector.	Mature

TBQC Interposing Terminal Block

Part Number	Description	Lifecycle Status
IC693ACC329	Interposing terminal block base for IC693MDL645, IC693MDL646, and IC693MDL240. The base can also be used with any 20 point terminal discrete or analog modules not listed.	Mature
IC693ACC332	Interposing terminal block base for IC693MDL940	Mature
IC693ACC333	Interposing terminal block base for IC693MDL340	Mature
IC693ACC337	Interposing terminal block base for IC693MDL654/655/752/753	Mature

TBQC Cables

Part Number	Description	Lifecycle Status
IC693CBL327	Cable, Left Side, One - 24 Pin 90 Degree Connector, 3 Meter. Cable has a connector on only one end and open on the other. Cable used with TBQC I/O Face Plate Adapter or Fujitsu style I/O modules.	Mature
IC693CBL328	Cable, Right Side, One - 24 Pin 90 Degree Connector, 3 Meter. Cable has a connector on only one end and open on the other. Cable used with TBQC I/O Face Plate Adapter or Fujitsu style I/O modules.	Mature
IC693CBL329	Cable, Left Side, One - 24 Pin 90 Degree Connector, 1 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Mature
IC693CBL330	Cable, Right Side, One - 24 Pin 90 Degree Connector, 1 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Mature
IC693CBL331	Cable, Left Side, One - 24 Pin 90 Degree Connector, 2 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Mature
IC693CBL332	Cable, Right Side, One - 24 Pin 90 Degree Connector, 2 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Mature
IC693CBL333	Cable, Left Side, One - 24 Pin 90 Degree Connector, 0.5 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Mature
IC693CBL334	Cable, Right Side, One - 24 Pin 90 Degree Connector, 0.5 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Mature

High Density Terminal Block Quick Connect

The High Density TBQC is simple to use — just attach the connector terminal block to the I/O module, snap the remote terminal base on the DIN-rail and attach the cable. Installation is accomplished in seconds versus up to an hour of cutting, stripping and wiring 36 individual wires. The High Density TBQC is compatible with IC695ALGxxx, IC69xMDL660 and IC694MDL664 modules only. Discrete output modules not supported.

HDTBQC I/O Module Face Plate Adapter

Part Number	Description	Lifecycle Status
IC694TBC032	High-density, 36-point, terminal block with cable connector. IC695ALGxxx, IC69xMDL660 and IC694MDL664 modules only. Discrete output modules not supported.	Mature

HDTBQC Interposing Terminal Block

Part Number	Description	Lifecycle Status
IC694RTB032	High-density remote base, 36-point, with shield ground lug and removable terminal blocks. IC695ALGxxx, IC69xMDL660 and IC694MDL664 modules only. Discrete output modules not supported.	Mature

HDTBQC Interface Cables

Part Number	Description	Lifecycle Status
IC694CBL005	Shielded 0.5 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Mature
IC694CBL010	Shielded 1.0 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Mature
IC694CBL030	Shielded 3.0 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Mature
IC694CBL130	Shielded 3.0 meter cable with termination on one end that connects to the IC694TBC032 terminal block. The other end of the cable is non-terminated wires.	Mature

External Power Supplies

Part Number	Description	Lifecycle Status
IC690PWR024	Field Power Supply 24 VDC 5 Amps	Mature
IC690PWR124	Field Power Supply 24 VDC 10 Amps	Mature

Rack to Rack Expansion Cables

Part Number	Description	Lifecycle Status
IC693CBL300	Cable, I/O Base Expansion, 1 Meter, Shielded	Mature
IC693CBL301	Cable, I/O Base Expansion, 2 Meters, Shielded	Mature
IC693CBL302	Cable, I/O Base Expansion, 15 Meters, Shielded with built-in terminator	Mature
IC693CBL312	Cable, I/O Base Expansion, 0.15 Meter, Shielded	Mature
IC693CBL313	Cable, I/O Base Expansion, 8 Meters, Shielded	Mature
IC693ACC307	I/O Bus Terminator Plug	Mature

Configuration Guidelines

When configuring a Series 90-30 the following guidelines should be considered

1. High density IC693 I/O modules require a terminal block assembly. IC694TBSxxx (spring clamp termination) or IC694TBBxxx (box style termination) are required.
2. If the CPU is powered down frequently a high capacity battery should be considered. (IC693ACC302)
3. Add up the power consumption to ensure enough power supply capacity.

Examples of Typical Application

Configuration for Controller (Example application requiring (120) 24 VDC inputs and (80) Relay outputs AC power supply)

Power Supply Current Required (mA)	Qty	Part Number	Description
670 mA @ 5 VDC	1	IC693CPU350	CPU with 32K of memory
	1	IC693PWR321	120/240 VAC, 125 VDC Power Supply, 3 Amps @ 5 VDC; 0.625 @ 24 VDC relay and 0.833 @ 24 VDC isolated
420 mA @ 5 VDC	1	IC693CHS391	10 Slot CPU Base
1200 mA @ 5 V	4	IC693MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
35 mA @ 5 V; 110 mA @ 24 VDC Relay	5	IC693MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
	4	IC694TBB032	Terminal Block, Box Style
	1	BC646MPS001	Logic Developer - PLC Standard - w/Programming Cable
Total current from power supply required:	**2325 mA @ 5 V; 110 mA @ 24 VDC Relay.**		
Options to consider			
1.4 Amps @ 5 VDC	1	IC693CPU374	CPU with built-in Ethernet 10/100Mbits and Web support
	1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
	1	IC693ACC302	Long term battery for CPU
	1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch Operator Interface

Configuration for Controller (100) 24 VDC inputs, (50) 24 VDC Outputs with ESCP protection, (20) Relay outputs, (12) 4 to 20 mA Analog Inputs, (12) 4 to 20 mA Analog Outputs and 24 VDC power supply. Also requires PROFIBUS Master and Ethernet communications.

Power Supply Current Required	Qty	Part Number	Description
1.4 Amps @ 5 VDC	1	IC693CPU374	CPU with built-in Ethernet 10/100 Mbits and Web support
	2	IC693PWR331	24 VDC Power Supply, current available 6 Amps @ 5 VDC; 0.625 Amps @ 24 VDC relay; 0.833 @ 24 VDC isolated
420 mA @ 5 VDC	1	IC693CHS391	10 Slot CPU Base
1200 mA @ 5 VDC	4	IC693MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
600 mA @ 5 VDC	2	IC693MDL754	Discrete Output Module, 24 VDC Output with ESCP, 32 points (Requires terminal block)
35 mA @ 5 VDC; 110 mA @ 24 VDC Relay	2	IC693MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
120 mA @ 5 VDC; 65 mA-User Supplied 24 VDC	1	IC693ALG223	Analog Input, 16 channels, current. (Terminal block included).
220 mA @ 5 VDC; 630 mA-User Supplied 24 VDC	2	IC693ALG392	Analog Output module, supports voltage and current, 8 channels (Terminal block included).
450 mA @ 5 VDC	1	IC693PBM200	PROFIBUS Master module, supports V0
150 mA @ 5VDC	1	IC693CHS392	10 slot I/O expansion rack
	1	IC693CBL312	Rack Expansion Cable, 0.15 meters
	1	IC693ACC307	I/O Bus Terminator Plug
	6	IC694TBB032	Terminal Block, Box Style
	1	BC646MPS001	Logic Developer - PLC Standard - w/Programming Cable

In the above configuration, all of the modules cannot go into one base. Therefore the I/O modules are divided into two bases.

Options to consider			
	1	IC200ACC003	EZ Store Device, CPU374 program download without the need of a PC.
	1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
	1	IC693ACC302	Long term battery for CPU
	1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch Operator Interface

PACSystems RX7i Controllers

Built on a standard embedded open architecture, the PACSystems RX7i is the first member of the groundbreaking PACSystems family of programmable controllers (PACs). The RX7i features a single control engine and universal programming environment to provide application portability across multiple hardware platforms. Designed to address mid- to high-end applications for OEMs, integrators, and end users, the RX7i is ideally suited for integrated solutions that require open architecture, large memory, distributed I/O and high performance.

The RX7i Features

- Pentium® CPUs for your every need, from Celeron 300mHz to M Class 1.8 Ghz
- VME64 architecture supporting new and older VME embedded technology with fast through put of large amounts of data.
- 10/100 Ethernet built into the CPU, with easy cabling RJ-45 dual ports connected through an auto-sensing switch, so there is no need for additional switches or hubs rack to rack
- Up to 64 MB memory for fast execution, storage of the complete program with all documentation—all in one CPU
- In addition, it provides an outstanding migration path for any Series 90 applications to move to the PACSystems architecture.

Machine Edition

Machine Edition is an advanced software environment for the development and maintenance of machine level automation. Visualization, motion control, and execution logic are developed with a single programmer.



CPUs pages 9.86-9.87

Racks page 9.88

Power Supplies page 9.89

Communications Modules page 9.91

I/O Interface Modules page 9.90

Accessories page 9.92

Publication Reference Chart

GFK-2222	PACSystems CPU Reference Manual
GFK-2223	PACSystems RX7i Installation Manual
GFK-2224	TCP/IP Ethernet Communications for PACSystems
GFK-2225	PACSystems Station Manager User's Manual
GFK-2235	PACSystems RX7i User's Guide to Integration of VME Modules
GFK-2259	C Programmer's Toolkit for PACSystems User's Manual
GFK-2300	PACSystems RX7i Memory Xchange Modules User's Manual
GFK-2308	PACSystems Hot Standby CPU Redundancy User's Guide



CPUs

PACSystems RX7i CPUs feature Intel Celeron and Pentium III processors and offer fast execution, larger memory capacity and upgradability to track future technology growth. RX7i CPUs are available with various memory sizes, performance capabilities and advanced functionalities, such as software configuration of data and program memory. PACSystems CPUs also provide 10K of user RAM along with 10K of non-volatile user flash memory for added protection of your data and programs.

	IC698CPE020†	IC698CRE020†
Product Name	**Central Processing Unit, 700 MHz, Floating Point**	**Redundancy Central Processing Unit, 700 MHz, Floating Point**
Lifecycle Status	Mature	Mature
PACSystems Processor Speed	700 MHz	700 MHz
PACSystems CPU Memory	10 Mbytes of User Logic RAM	10 Mbytes of User Logic RAM
PACSystems User Flash Memory	Yes (10 Mbytes)	Yes (10 Mbytes)
Floating Point Math	Yes	Yes
PACSystems I/O Discrete Points Available	32 Kbits	32 Kbits
Other Memory Allocations	%W: Configurable up to 4 Mbytes, Symbolic: Configurable up to 10 Mbytes	%W: Configurable up to the maximum available user RAM, Symbolic: Configurable up to 10 Mbytes
Embedded Communications	Serial, Ethernet	Serial, Ethernet
Protocols Supported	Modbus RTU Slave, SNP, Serial I/O	Modbus RTU Slave, SNP, Serial I/O
Built-in Ports	2 Serial (RS-232, RS-485) 1 Ethernet (Auto 10/100, RJ45)	2 Serial (RS-232, RS-485) 1 Ethernet (Auto 10/100, RJ45)
Current Required from 5V Bus	4.0 Amps	4.0 Amps

†Requires fan kit.



CPUs

PACSystems RX7i CPUs feature Intel Celeron and Pentium III processors and offer fast execution, larger memory capacity and upgradability to track future technology growth. RX7i CPUs are available with various memory sizes, performance capabilities and advanced functionalities, such as software configuration of data and program memory. PACSystems CPUs also provide 10K of user RAM along with 10K of non-volatile user flash memory for added protection of your data and programs.

	IC698CPE030	IC698CPE040†	IC698CRE030	IC698CRE040†
Product Name	**Pentium M Central Processing Unit, 600 MHz**	**Pentium M Central Processing Unit, 1.8 GHz**	**Pentium M Redundancy Central Processing Unit, 600 MHz**	**Pentium M Redundancy Central Processing Unit, 1.8 GHz**
Lifecycle Status	Mature	Mature	Mature	Mature
PACSystems Processor Speed	600 MHz	1.8 GHz	600 MHz	1.8 GHz
PACSystems CPU Memory	64 Mbytes	64 Mbytes	64 Mbytes	64 Mbytes
PACSystems User Flash Memory	64 Mbytes	64 Mbytes	64 Mbytes	64 Mbytes
Floating Point Math	Yes	Yes	Yes	Yes
PACSystems I/O Discrete Points Available	32 Kbits	32 Kbits	32 Kbits	32 Kbits
Other Memory Allocations	%W: Configurable up to the maximum available user RAM Symbolic: Configurable up to the maximum available user RAM	%W: Configurable up to the maximum available user RAM Symbolic: Configurable up to the maximum available user RAM	%W: Configurable up to the maximum available user RAM Symbolic: Configurable up to the maximum available user RAM	%W: Configurable up to the maximum available user RAM Symbolic: Configurable up to the maximum available user RAM
Embedded Communications	Serial, Ethernet	Serial, Ethernet	Serial, Ethernet	Serial, Ethernet
Protocols Supported	Modbus RTU Slave, SNP, Serial I/O	Modbus RTU Slave, SNP, Serial I/O	Modbus RTU Slave, SNP, Serial I/O	Modbus RTU Slave, SNP, Serial I/O
Built-in Ports	2 Serial (RS-232, RS-485) 1 Ethernet (Auto 10/100, RJ45)	2 Serial (RS-232, RS-485) 1 Ethernet (Auto 10/100, RJ45)	2 Serial (RS-232, RS-485) 1 Ethernet (Auto 10/100, RJ45)	2 Serial (RS-232, RS-485) 1 Ethernet (Auto 10/100, RJ45)
Current Required from 5V Bus	3.2 A	6.8 A	3.2 A	6.8 A
Web Based Data Monitoring	up to 16 web server and FTP connections (combined)	up to 16 web server and FTP connections (combined)	up to 16 web server and FTP connections (combined)	up to 16 web server and FTP connections (combined)

†Requires fan kit.



Racks

PACSystems RX7i Racks set the pace for the latest PLC technology. They are built to support the high-power PACSystems power supplies along with the latest technology in the PACSystems CPUs. The VME64 backplane provides up to four times the bandwidth of existing VME based systems for faster I/O throughput. The VME64 base supports all standard VME modules including I/O and VMIC modules.

	IC698CHS009	IC698CHS017	IC698CHS109	IC698CHS117	IC698CHS217
Product Name	**Standard PACSystems 9-slot Wall (Rear) Mount**	**Standard PACSystems 18-slot Wall (Rear) Mount**	**Standard PACSystems 9-slot Wall (Panel) Mount**	**Standard PACSystems 18-slot Wall (Panel) Mount**	**PACSystems 17-slot Wall (Rear) Mount, Rear I/O Access**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Number of Slots	9 Single Width, 5 Double Width (plus one for power supply)	15 Single Width, 8 Double Width (plus one for power supply)	9 Single Width, 5 Double Width (plus one for power supply)	15 Single Width, 8 Double Width (plus one for power supply)	17 Single Width, 8 Double Width (plus one for power supply)
Mounting Location	Rear (Panel)	Rear (Panel)	Front (Rack)	Front (Rack)	Rear (Panel)
Rack Configurations	RX7i CPU and I/O, VME modules	RX7i CPU and I/O, VME modules	RX7i CPU and I/O, VME modules	RX7i CPU and I/O, VME modules	RX7i CPU and I/O, VME modules (with or without rear access connections)
Rack Slot Size	0.8 inch	0.8 inch	0.8 inch	0.8 inch	0.8 inch
Compatible Power Supplies	RX7i Power Supply (IC698)	RX7i Power Supply (IC698)	RX7i Power Supply (IC698)	RX7i Power Supply (IC698)	RX7i Power Supply (IC698)
Dimensions	11.15"H x 12.6"W x 7.25"D (283 x 320 x 184mm)	11.15" x 19.00" x 7.5"	11.15"H x 12.6"W x 7.25"D (283 x 320 x 184mm)	11.15" x 19.00" x 7.5"	11.15"H x 19"W x 8.875"D (8.97"D with rear I/O cover) (283 x 483 x 225mm) (228mm D with rear I/O cover)



Power Supplies

PACSystems RX7i Power Supply modules simply slide into the PLC rack just like I/O, and they work with any PACSystems CPU. The low capacity power supply delivers up to 100W total output without forced air cooling. The high capacity power supply accommodates applications requiring more power, providing up to 350W total output, and requires forced air cooling, provided by a fan tray mounted on the bottom of the rack. PACSystems power supplies also have built-in protection for autoranging power factor corrections as well as overcurrent, overvoltage, and overtemperature fault conditions.

	IC698PSA100	IC698PSA350	IC698PSD300
Product Name	**PACSystems Power Supply, 100 W**	**PACSystems Power Supply, 350 W**	**PACSystems Power Supply, 300 W**
Lifecycle Status	Mature	Mature	Mature
Power Source	85-264 VAC or 125 VDC	85-264 VAC or 125 VDC	18-30 VDC
Output Source	100 Watts; 5 VDC @ 20 Amps, +12 VDC @ 2 Amps, -12 VDC @ 1 Amp	350 Watts; 5 VDC @ 60 Amps, +12 VDC @ 12 Amps, -12 VDC @ 4 Amps	300 Watts; 5 VDC @ 50 Amps, +12 VDC @ 10 Amps, -12 VDC @ 4 Amps



I/O Interface Modules

PACSystems features a variety of communications options for distributed control and/or I/O, supporting a wide range of communication protocols and configurations. These communication modules are easy to install and quick to configure. Some distributed I/O communications modules allow for numerous remote drops or additional racks, while others provide an interface for GE products up to 7500 feet away from the controller.

	IC697BEM731	IC687BEM731	IC697BEM713	IC697BEM711	IC697BEM733
Product Name	**Genius Bus Controller**	**VME Single Slot Bus Controller**	**Bus Transmitter Module**	**Bus Receiver Module**	**Remote I/O Scanner**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Module Type	Bus Controller	Bus Controller	Bus Transmitter	Bus Receiver Scanner	Remote I/O
Supports Redundancy	Yes	Yes	No	No	Yes
Discrete Points Available	N/A	N/A	N/A	N/A	128 Bytes Per Drop
Programmer Effective Data Rate	N/A	N/A	500 Kbytes/sec	N/A	N/A
Time to Store 16 Kbyte Program	N/A	N/A	20 - 30 Seconds	N/A	N/A
Effective Data Rate	N/A	N/A	500 Kbytes/sec	500 Kbytes/sec	38.4 Kbaud
Total Allowed Distance of Interconnecting Cable	N/A	N/A	50 feet (15 meters)	50 feet (15 meters)	N/A
Maximum Distance from Controller	N/A	N/A	N/A	N/A	7500 feet (2275 meters)
Electrical Isolation	N/A	N/A	Non-isolated differential communication	Non-isolated differential communication	N/A
Built-in Serial Ports	1 (Hand Held Monitor Port)	1 (Hand Held Monitor Port)	2 (Programmer Port, Expansion Port Out)	2 (Expansion Port In, Expansion Port Out)	2 (RS-422 Compatible Serial Port, Hand Held Monitor Port)
Current Required from 5V Bus	1.3 Amps	1.3 Amps	1.4 Amps	0.8 Amp	0.8 Amp



Communications Modules

PACSystems features a variety of communications options for distributed control and/or I/O, supporting a wide range of communication protocols and configurations. These communication modules are easy to install and quick to configure. Some distributed I/O communications modules allow for numerous remote drops or additional racks, while others provide an interface for GE products up to 7500 feet away from the controller.

	IC698RMX016	IC698CMX016	IC698ETM001
Product Name	**Redundancy Memory Xchange Module**	**Control Memory Xchange Module**	**RX7i Standalone Ethernet Module 10/100**
Lifecycle Status	Mature	Mature	Mature
Module Type	Redundancy Communications (High Availability)	Control Memory Xchange	Ethernet Controller
Supports Redundancy	Yes	No	No
Protocols Supported	N/A	N/A	N/A
Effective Data Rate	2.12 gigabaud	2.12 gigabaud	N/A
Electrical Isolation	Non-isolated differential communication	Non-isolated differential communication	N/A
Communications Processor Speed	N/A	N/A	N/A
Simultaneous Communication Speed	N/A	N/A	N/A
Individual Communication Speed	N/A	N/A	N/A
Reflective Memory Available	16 Mbytes	16 Mbytes	N/A
Distance Between Nodes	Up to 300 meters	Up to 300 meters	N/A
Access Time	400 ns (worst-case), 200 ns (best-case)	400 ns (worst-case), 200 ns (best-case)	N/A
Transfer Rate	6.2 Mbyte/s without redundant transfer, 3.2 Mbyte/s with redundant transfer	6.2 Mbyte/s without redundant transfer, 3.2 Mbyte/s with redundant transfer	N/A
Cable Requirements	Connector (LC type, conforms to IEC61754-20) Cable (ST Type Fiber-Optic Multimode; 62.5 Micron core)	Connector (LC type, conforms to IEC61754-20) Cable (ST Type Fiber-Optic Multimode; 62.5 Micron core)	N/A
Built-in Serial Ports	None	None	2 Twisted pair 10 Base T/100 Base TX RJ-45
Current Required from 5V Bus	1.2 Amps	1.2 Amps	N/A

Accessories

Part Number	Description	Lifecycle Status
IC690CDR002	User Manuals, InfoLink CD-ROM Documentation, Single-user License	Mature
IC697ACC621	Short Rack Fan Assembly, 120 VAC	Mature
IC697ACC624	Short Rack Fan Assembly, 240 VAC	Mature
IC697ACC644	Short Rack Fan Assembly, 24 VDC	Mature
IC697ACC721	Rack Fan Assembly, 120 VAC	Mature
IC697ACC724	Rack Fan Assembly, 240 VAC	Mature
IC697ACC736	Cable Shield Clamping Assembly	Mature
IC697ACC744	Rack Fan Assembly, 24 VDC	Mature
IC698ACC701	Replacement Battery	Mature
IC698ACC720	Gasketed Filler Faceplate, Double-width	Mature
IC698ACC735	Gasketed Filler Faceplate, Single-width	Mature

Cables

Part Number	Description	Lifecycle Status
IC200CBL001	Station Manager Cable for Ethernet Interface	Mature
IC600WD002	I/O Expansion Cable, 2 feet (0.6 meters)	Mature
IC600WD005	I/O Expansion Cable, 5 feet (1.5 meters)	Mature
IC600WD010	I/O Expansion Cable, 10 feet (3.0 meters)	Mature
IC600WD025	I/O Expansion Cable, 25 feet (7.5 meters)	Mature
IC600WD050	I/O Expansion Cable, 50 feet (15 meters)	Mature

Genius Distributed I/O

By providing distributed control on the factory floor, Genius I/O systems offer fewer terminations to document, dramatically shorter wiring runs, and simpler, more effective troubleshooting. Genius I/O blocks automatically provide diagnostic information on field wiring, power conditions and loads, as well as the state of the communication network, blocks and circuits. Genius diagnostics sharply reduce the time needed for initial control and debugging.

Genius blocks provide predictable system operation in the event of a CPU, bus interface or network cable failure. When connected in a redundant configuration with two or more CPUs running simultaneously, the Genius blocks will shift automatically to a backup CPU if the main controller fails to communicate.

Genius blocks communicate with the system CPU over the Genius LAN, greatly simplifying system installation, and with network tools such as the hand-held monitor, troubleshooting is a snap. In addition to Genius I/O blocks, VersaMax I/O may also be integrated into a single Genius LAN.

AC Discrete I/O Modules page 9.94

DC Discrete I/O Modules pages 9.95-9.96

Analog Input Modules page 9.97

Analog Output Modules page 9.98

Analog Mixed Modules page 9.99

RTD and Thermocouple Modules page 9.100

High Speed Counter page 9.101

PowerTRAC Monitoring Module page 9.102

Accessories page 9.103

Configuration Guidelines pages 9.104-9.105



Publication Reference Chart

GEK-90486D	I/O Discrete and Analog Blocks
GEK-90486F-1	I/O System and Communications
GFK-0074A	Genius I/O PCIM User's Manual
GFK-0415E	High Speed Counter
GFK-0450D	PowerTRAC
GFK-0881	Single Slot Personal Computer Interface Module (PCIM)
GFK-1179J	Installation Requirements for Conformance to Standards



AC Discrete I/O Modules

Control power for the block is tapped off the input/output device voltages wired to the terminals. No separate block power supply is needed. Configurable features include; Output Pulse Test capability, Selectable Input Filter Time from 10mS to 100mS, Output powerup defaults, Output Hold Last State or default, each circuit has electronic fusing.

	IC660BBD110	IC660BBD101	IC660BBS102	IC660BBS103	IC660BBR100	IC660BBR101
Product Name	**Genius Discrete Input Block, 115 VAC Grouped, 16 Point**	**Genius Discrete I/O Block, 115 VAC Grouped, 8 Point**	**Genius Discrete I/O Block, 115 VAC/125 VDC Isolated, 8 Point**	**Genius Discrete I/O Block, 115 VAC/125 VDC Isolated, 8 Point, w/o Failed Switch Diagnostic**	**Genius Relay Output Block, Grouped, 16 Points, Normally Closed**	**Genius Relay Output Block, Grouped, 1 6 Points, Normally Open**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature	Mature
Network Support	Genius Bus	Genius Bus	Genius Bus	Genius Bus	Genius Bus	Genius Bus
Input Range	93-132 VAC	93-132 VAC	115 VAC / 125 VDC	115 VAC / 125 VDC	N/A	N/A
Output Range	N/A	93-132 VAC	115 VAC / 125 VDC	115 VAC / 125 VDC	5V to 250 VAC or 5V to 220 VDC; Relay Normally–Closed Relays	5V to 250 VAC or 5V to 220 VDC; Relay Normally–Open Relays
Number of Points	16	8	8	8	16	16
Input and Output Response Time - ON/OFF (msec.)	Input 1 msec plus configurable filter 10 to 100mS in 10mS increments	Input 2msec plus configurable filter 10 to 100mS in 10mS increments; Outputs Zero crossing	Input 2msec plus configurable filter 10 to 100mS in 10mS increments; Outputs Zero crossing	Input 2msec plus configurable filter 10 to 100mS in 10mS increments; Outputs Zero crossing	5.0 msec.	5.0 msec.
Input Impedance	11.6K ohms	13K ohms	13K ohms	13K ohms	N/A	N/A
Load Current Per Point	N/A	2 Amp	2.0 Amp	2.0 Amp	2 Amp	2 Amp
Points Per Common	Two groups of 8	One group of 8	Four groups of 2	Four groups of 2	Four groups of 4	Four groups of 4
Protection	N/A	Internal electronic short circuit trip. 100ms long time trip	Internal electronic short circuit trip. 100ms (AC), 10ms (DC) long time trip	Internal electronic short circuit trip. 100ms (AC), 10ms (DC) long time trip	N/A	N/A
Diagnostics	Input Diagnostics: Open Wire, Short Circuit	Input Diagnostics: Open Wire, Overtemperature, Failed Switch Output Diagnositcs: Short Circuit, Overload, No Load, Failed Switch, Overtemperature, Pulse Test	Input Diagnostics: Open Wire, Overtemperature, Loss of I/O Power, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Overtemp., Loss of I/O Power, Failed Switch, Pulse Test	Input Diagnostics: Open Wire, Overtemperature, Loss of I/O Power, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Overtemp., Loss of I/O Power, Failed Switch, Pulse Test	None	None
Operating Voltage	93-132 VAC	93-132 VAC	93-132 VAC / 105-132 VDC	93-132 VAC / 105-132 VDC	93-132 VAC / 185-265 VAC	93-132 VAC / 185-265 VAC
Dimensions (H x W x D)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)



DC Discrete I/O Modules

Genius DC Discrete I/O blocks interface to a wide range of input devices, including both 2–wire and 3–wire electronic proximity switches. Outputs may be low–power control and indicating devices such as relays, contactors, and lamps. These blocks have identical discrete I/O circuits, each easily configured to be an input or an output. Output circuits can be directly connected to input circuits without the use of other components or inversion of logic states. This flexibility provides maximum design and application efficiency. Each circuit contains built–in protection when used as an output, protecting the driver while allowing short–time surges. It also protects against shorted loads caused by wiring errors.

	IC660BBD020	IC660BBD021	IC660BBD022	IC660BBD023	IC660BBD024
Product Name	**Genius Discrete I/O Block, 24/48 VDC Grouped, 16 Point, Source**	**Genius Discrete I/O Block, 24/48 VDC Grouped, 16 Point, Sink**	**Genius Discrete I/O Block, 24 VDC Grouped, 16 Point, Source**	**Genius Discrete I/O Block, 24 VDC Grouped, 16 Point, Sink**	**Genius Discrete I/O Block, 12/24 VDC Grouped, 32 Point, Source**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Network Support	Genius Bus	Genius Bus	Genius Bus	Genius Bus	Genius Bus
Input Range	18-56 VDC (24/48 V)	18-56 VDC (24/48 V)	18-30 VDC (24 V)	18-30 VDC (24 V)	18-30 VDC (24 V)
Sink/Source	Source	Sink	Source	Sink	Source
Output Range	18-56 VDC (24/48 V)	18-56 VDC (24/48 V)	18-30 VDC (24 V)	18-30 VDC (24 V)	18-30 VDC (24 V)
Number of Points	16	16	16	16	32
Input and Output Response Time - ON/OFF (msec.)	Input 1.7 msec plus configurable filter: 5 to 100mS for input; Output 1.0 msec	Input 1.7 msec plus configurable filter: 5 to 100mS for input; Output 1.0 msec	Input 1.7 msec plus configurable filter: 5 to 100mS for input; Output 1.0 msec	Input 1.7 msec plus configurable filter: 5 to 100mS for input; Output 1.0 msec	Input 1.4 msec plus configurable filter: 1 to 100mS for input; Output 0.5 msec
Input Impedance	5.6K ohms (24/48 V), 1.8K ohms (24 V)	5.6K ohms (24/48 V), 1.8K ohms (24 V)	5.6K ohms (24/48 V), 1.8K ohms (24 V)	5.6K ohms (24/48 V), 1.8K ohms (24 V)	3.3 K ohms
Load Current Per Point	2 Amp	2 Amp	2 Amp	2 Amp	0.5 Amp
Points Per Common	One group of 16	One group of 16	One group of 16	One group of 16	One group of 32
Protection	Short circuit level sensor at the switching device	Short circuit level sensor at the switching device	Short circuit level sensor at the switching device	Short circuit level sensor at the switching device	Short circuit level sensor at the switching device
Diagnostics	Input Diagnostics: Open wire, Overtemperature, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Failed Switch, Overtemperature, Pulse Test	Input Diagnostics: Open wire, Overtemperature, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Failed Switch, Overtemperature, Pulse Test	Input Diagnostics: Open wire, Overtemperature, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Failed Switch, Overtemperature, Pulse Test	Input Diagnostics: Open wire, Overtemperature, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Failed Switch, Overtemperature, Pulse Test	Output Diagnostics: Short Circuit, Overload, Failed Switch, Pulse Test
Operating Voltage	18-56 VDC (24/48 V)	18-56 VDC (24/48 V)	18-30 VDC (24 V)	18-30 VDC (24 V)	10-30 VDC
Dimensions (H x W x D)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)



DC Discrete I/O Modules

Genius DC Discrete I/O blocks interface to a wide range of input devices, including both 2–wire and 3–wire electronic proximity switches. Outputs may be low–power control and indicating devices such as relays, contactors, and lamps. These blocks have identical discrete I/O circuits, each easily configured to be an input or an output. Output circuits can be directly connected to input circuits without the use of other components or inversion of logic states. This flexibility provides maximum design and application efficiency. Each circuit contains built–in protection when used as an output, protecting the driver while allowing short–time surges. It also protects against shorted loads caused by wiring errors.

	IC660BBD025	IC660BBS102	IC660BBS103	IC660BBR100	IC660BBR101
Product Name	**Genius Discrete I/O Block, 5/12/24 VDC Grouped, 32 Point, Sink**	**Genius Discrete I/O Block, 115 VAC/125 VDC Isolated, 8 Point**	**Genius Discrete I/O Block, 115 VAC/125 VDC Isolated, 8 Point, w/o Failed Switch Diagnostic**	**Genius Relay Output Block, Grouped, 16 Points, Normally Closed**	**Genius Relay Output Block, Grouped, 16 Points, Normally Open**
Lifecycle Status	Mature	Mature	Mature	Mature	Mature
Network Support	Genius Bus	Genius Bus	Genius Bus	Genius Bus	Genius Bus
Input Range	10-30 VDC (12/24 V), 4.9-5.3 VDC (5 V)	115 VAC / 125 VDC	115 VAC / 125 VDC	N/A	N/A
Sink/Source	Sink	N/A	N/A	N/A	N/A
Output Range	10-30 VDC (12/24 V), 4.9-5.3 VDC (5 V)	115 VAC / 125 VDC	115 VAC / 125 VDC	5V to 250 VAC or 5V to 220 VDC; Relay Normally-Closed Relays	5V to 250 VAC or 5V to 220 VDC; Relay Normally-Open Relays
Number of Points	32	8	8	16	16
Input and Output Response Time - ON/OFF (msec.)	Input 1.4 msec plus configurable filter: 1 to 100mS for input; Output 0.5 msec	Input 2msec plus configurable filter 10 to 100mS in 10mS increments; Outputs Zero crossing	Input 2msec plus configurable filter 0 to 100mS in 10mS increments; Outputs Zero crossing	5.0 msec.	5.0 msec.
Input Impedance	3.3 K ohms	13K ohms	13K ohms	N/A	N/A
Load Current Per Point	0.5 Amp	2.0 Amp	2.0 Amp	2 Amp	2 Amp
Points Per Common	One group of 32	Four groups of 2	Four groups of 2	Four groups of 4	Four groups of 4
Protection	Short circuit level sensor at the switching device	Internal electronic short circuit trip. 100ms (AC), 10ms (DC) long time trip	Internal electronic short circuit trip. 100ms (AC), 10ms (DC) long time trip	N/A	N/A
Diagnostics	Output Diagnostics: Short Circuit, Overload, Failed Switch, Pulse Test	Input Diagnostics: Open Wire, Overtemperature Loss of I/O Power, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Overtemp., Loss of I/O Power, Failed Switch, Pulse Test	Input Diagnostics: Open Wire, Overtemperature, Loss of I/O Power, Failed Switch Output Diagnostics: Short Circuit, Overload, No Load, Overtemp., Loss of I/O Power, Failed Switch, Pulse Test	None	None
Operating Voltage	10-30 VDC (12/24 V), 4.9-5.3 VDC (5 V)	93-132 VAC / 105-132 VDC	93-132 VAC / 105-132 VDC	93-132 VAC / 185-265 VAC	93-132 VAC / 185-265 VAC
Dimensions (H x W x D)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)



Analog Input Modules

Genius Analog Input blocks provide 6 channels of current inputs with powerful diagnostics.

	IC660BBA026	IC660BBA106
Product Name	**Genius Analog Input Block, Current-source, 6 Channels, 24/48 VDC Powered**	**Genius Analog Input Block, Current-source, 6 Channels, 115 VAC/125 VDC Powered**
Lifecycle Status	Mature	Mature
Network Support	Genius Bus	Genius Bus
Input Range	4 mA to 20 mA 0 mA to 25 mA	4 mA to 20 mA 0 mA to 25 mA
Number of Points	6	6
Points Per Common	Channel to Channel Isolation. 6 isolated points	Channel to Channel Isolation. 6 isolated points
Resolution	1 micro Amp	1 micro Amp
Update Rate	16.6mS to 400mS (user selectable)	16.6mS to 400mS (user selectable)
Accuracy	0.1% of full scale reading	0.1% of full scale reading
Diagnostics	Underrange, Overrange, High Alarm, Low Alarm, Open Wire	Underrange, Overrange, High Alarm, Low Alarm, Open Wire
Operating Voltage	18-56 VDC	93-132 VAC / 105-145 VDC
Dimensions (W x H x D)	8.83” (22.44cm) x 3.50” (8.89cm) x 3.94” (10.00cm)	8.83” (22.44cm) x 3.50” (8.89cm) x 3.94” (10.00cm)



Analog Output Modules

Genius Analog Output blocks provide 6 channels of current and voltage outputs with powerful diagnostics.

	IC660BBA025	IC660BBA105
Product Name	**Genius Analog Output Block, Current-source, 6 Channels, 24/48 VDC Powered**	**Genius Analog Output Block, Current-source, 6 Channels, 115 VAC/125 VDC Powered**
Lifecycle Status	Mature	Mature
Network Support	Genius Bus	Genius Bus
Output Range	4 mA to 20 mA 0 mA to 24 mA	4 mA to 20 mA 0 mA to 24 mA
Number of Points	6 Outputs	6 Outputs
Points Per Common	One group of 6	One group of 6
Operating Voltage	18-56 VDC	93-132 VAC / 105-145 VDC
Resolution	6 micro Amp	6 micro Amp
Update Rate	25mS	25mS
Accuracy	0.15% of full-scale reading	0.15% of full-scale reading
Dimensions (W x H x D)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)



Analog Mixed Modules

Genius Analog Mixed blocks provide 4 channels of inputs and 2 channels of outputs. The channels can be configured for current or voltage with powerful diagnostics.

	IC660BBA020	IC660BBA100	IC660BBA024	IC660BBA104
Product Name	**Genius Analog I/O Block, Voltage/Current, 4 Inputs/ 2 Outputs, 24/48 VDC Powered**	**Genius Analog I/O Block, Voltage/Current, 4 Inputs/ 2 Outputs, 115 VAC Powered**	**Genius Analog I/O Block, Current-source, 4 Inputs/ 2 Outputs, 24/48 VDC Powered**	**Genius Analog I/O Block, Current-source, 4 Inputs/ 2 Outputs, 115 VAC/ 125 VDC Powered**
Lifecycle Status	Mature	Mature	Mature	Mature
Network Support	Genius Bus	Genius Bus	Genius Bus	Genius Bus
Number of Points	4 In / 2 Out	4 In / 2 Out	4 In / 2 Out	4 In / 2 Out
Points Per Common	One group of 4 Inputs and one group of 2 Outputs	One group of 4 Inputs and one group of 2 Outputs	One group of 4 Inputs and one group of 2 Outputs	One group of 4 Inputs and one group of 2 Outputs
Input Range	0–10 VDC, 10 VDC, 5 VDC, 0–5 VDC, 4–20 mA (or 1–5 VDC)	0–10 VDC, 10 VDC, 5 VDC, 0–5 VDC, 4–20 mA (or 1–5 VDC)	4 mA to 20 mA	4 mA to 20 mA
Output Range	0–10 VDC, 10 VDC, 5 VDC, 0–5 VDC, 4–20 mA (or 1–5 VDC)	0–10 VDC, 10 VDC, 5 VDC, 0–5 VDC, 4–20 mA (or 1–5 VDC)	4 mA to 20 mA	4 mA to 20 mA
Operating Voltage	18-56 VDC	98-132 VAC	18-56 VDC	93-132 VAC / 105-145 VDC
Resolution	12 bit + sign	12 bit + sign	Input: 1 micro Amp Output: 6 micro Amp	Output: 6 mA
Update Rate	Once every 4mS	Once every 4mS	Input: 16.6mS to 400mS (user selectable) Output: 6mS to 8mS typical	Input: 16.6mS to 400mS (user selectable) Output: 6mS to 8mS typical
Accuracy	Typical: 0.2% of full scale; Maximum: 0.5% of full scale: within 50mV on the 10 volt range, 25mV on the 5 volt range, and 100 mA on the 4 to 20 mA range.	Typical: 0.2% of full scale; Maximum: 0.5% of full scale: within 50mV on the 10 volt range, 25mV on the 5 volt range, and 100 mA on the 4 to 20 mA range.	Input: 0.1% of full scale reading Output: 0.15% of full scale reading	Input: 0.1% of full scale reading Output: 0.15% of full scale reading
Input Filter Response	none, 8, 16, 32, 64, 128, 256, 512, 1024mS	none, 8, 16, 32, 64, 128, 256, 512, 1024mS	16.6mS to 400mS (user selectable)	16.6mS to 400mS (user selectable)
Diagnostics	Input: Underrange, Overrange, High Alarm, Low Alarm, Open Wire Output: Underrange, Overrange	Input: Underrange, Overrange, High Alarm, Low Alarm, Open Wire Output: Underrange, Overrange	Input: Underrange, Overrange, High Alarm, Low Alarm, Open Wire Output: Underrange, Overrange, Feedback error	Input: Underrange, Overrange, High Alarm, Low Alarm, Open Wire, Output: Underrange, Overrange, Feedback error
Dimensions (W x H x D)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)



RTD and Thermocouple Modules

Genius Temperature Sensor blocks support a wide range of temperature sensors. The blocks support powerful diagnostics.

	IC660BBA021	IC660BBA101	IC660BBA023	IC660BBA103
Product Name	**Genius Analog Input Block, RTD, 6 Channel, 24/48 VDC Powered**	**Genius Analog Input Block, RTD, 6 Channel, 115 VAC/125 VDC Powered**	**Genius Analog Input Block, Thermocouple, 6 Channel, 24/48 VDC Powered**	**Genius Analog Input Block, Thermocouple, 6 Channel, 115 VAC/125 VDC Powered**
Lifecycle Status	Mature	Mature	Mature	Mature
Network Support	Genius Bus	Genius Bus	Genius Bus	Genius Bus
Number of Points	6	6	6	6
Points Per Common	3 groups of 2	3 groups of 2	3 groups of 2	3 groups of 2
Input Range	2 and 3 wire Platinum (DIN 43760), Nickel (DIN 43760), Copper, Linear	2 and 3 wire Platinum (DIN 43760), Nickel (DIN 43760), Copper, Linear	J, K, T, E, B, R, S, and N (#14 AWG Nicrosil vs. Nisil) thermocouples	J, K, T, E, B, R, S, and N (#14 AWG Nicrosil vs. Nisil) thermocouples
Operating Voltage	18-56 VDC	93-132 VAC / 105-145 VDC	18-56 VDC	93-132 VAC / 105-145 VDC
Resolution	0.1°C	0.1°C	Less than 0mV error typ., 20mV max.	Less than 0mV error typ., 20mV max.
Update Rate	Once every 400 ms, 800 ms, or 1600 ms	Once every 400 ms, 800 ms, or 1600 ms	2.0 sec (typ.), 3.0 sec (max.)	2.0 sec (typ.), 3.0 sec (max.)
Accuracy	At 25°C - Platinum or Nickel: 0.5°C typical, 1.0°C maximum 10W Copper: 5°C typical, 10°C maximum	At 25°C - Platinum or Nickel: 0.5°C typical, 1.0°C maximum 10W Copper: 5°C typical, 10°C maximum	8 Hz at 25°C	8 Hz at 25°C
Diagnostics	Input shorted, Internal fault, Wiring error, Open wire, Overrange, Underrange, High Alarm, Low Alarm	Input shorted, Internal fault, Wiring error, Open wire, Overrange, Underrange, High Alarm, Low Alarm	Open Wire, Overrange, Underrange, High Alarm, Low Alarm, Internal Fault	Open Wire, Overrange, Underrange, High Alarm, Low Alarm, Internal Fault
Dimensions (W x H x D)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)



High Speed Counter

The Genius I/O High-speed Counter block is a self-contained, configurable I/O module which provides direct processing of rapid pulse signals up to 200kHz.

	IC660BBD120
Product Name	**Genius High Speed Counter Block**
Lifecycle Status	Mature
Network Support	Genius Bus
Input Range	5 VDC to 30 VDC
Count Rate	high-frequency filter selected 200 kHz maximum low-frequency filter selected 40 Hz maximum
Output Range	4.75 VDC to 5.25 VDC
Number of Points	4 Type A or 2 Type B or 1 Type C (12 inputs and 4 outputs)
Input and Output Response Time - ON/OFF (msec.)	high-frequency filter selected 2.5mS minimum low-frequency filter selected 12.5mS minimum
Input Filter Response	High (2.5mS) or low (12.5mS) frequency
Input Impedance	4.0K ohms
Accuracy	0.50% reading + 0.50% full scale
Load Current Per Point	200 mA
Operating Voltage	93-132 VAC / 10-30 VDC
Diagnostics	Outputs: Pulse Test, Failed Switch
Dimensions (W x H x D)	8.83" (22.44cm) x 3.50" (8.89cm) x 3.94" (10.00cm)



PowerTRAC Monitoring Module

The Genius PowerTRAC block is used in many types of power monitoring and industrial applications. The PowerTRAC block monitors current and voltage inputs and stores digitized waveform values for each input. From these values, the block calculates RMS voltage, current, active power, reactive power, KWH, and power factor. The block automatically sends this calculated data to a host PLC or computer approximately twice per second. The same data can be displayed on a Genius Hand-held Monitor, either locally or from any connection point on the bus.

A PowerTRAC block can be used with a wye- or delta-configured three-phase power system or with a single-phase power system. It accepts voltage inputs from one to three potential transformers, and current inputs from up to three line current transformers, plus a neutral current transformer.

	IC660BPM100
Product Name	**Genius I/O PowerTrac Monitoring Block, Accurately measures RMS voltage, current, power, VARs, power factor, watt-hours, and line frequency, even with distorted waveforms.115 VAC/125 VDC Powered**
Lifecycle Status	Mature
Network Support	Genius Bus
Input Range	0 to 120 VAC RMS at 47 to 63 Hz
Number of Points	(1) Three Phase
Calculated Data	Voltage phase A to B Voltage phase B to C Voltage phase C to A Voltage phase A to N (for line-to-neutral potential transformers only) Voltage phase B to N (for line-to-neutral potential transformers only) Voltage phase C to N (for line-to-neutral potential transformers only) Current phase A Current phase B Current phase C Auxiliary CT current Active power phase A Active power phase B Active power phase C Reactive power phase A Reactive power phase B Reactive power phase C Total power factor Total watt-hours/KWH/MWH Fundamental VARS phase A Fundamental VARS phase B Fundamental VARs phase C Fundamental Power Factor Harmonic VARS as % of Volt-Amps phase A Harmonic VARs as % of Volt-Amps phase B Harmonic VARs as % of Volt-Amps phase C Total Harmonic VARs as % of Volt-Amps Line Frequency Temperature Alarm Extended Watt-hours (high) Extended Watt-hours (low)
Accuracy	0.25% reading +0.25% full scale
Operating Voltage	115 VAC/230 VAC (90-265 VAC), 47-63Hz or 125 VDC (100-150 VDC), 35 VA max.
Dimensions (W x H x D)	11.00" (27.94cm) x 5.21" (13.23cm) x 8.06" (20.47)

Accessories and Cables

Part Number	Description	Lifecycle Status
IC660BSM021	Genius Bus Switching Module, 24/48 VDC	Mature
IC660BSM120	Genius Bus Switching Module, 115 VAC/125 VDC	Mature
IC660BLC001	Genius bus Cable w/Connectors Alpha 9823 15 In (Qty 3)	Mature
IC660BLC003	Genius bus Cable w/Connectors Alpha 9823 3 Ft	Mature
IC660BLM506	Bus Terminator 150 Ohm (Qty 4)	Mature
IC660BLM508	Bus Terminator 75 Ohm (Qty 4)	Mature
IC660BLM507	Genius Block Puller	Mature

Hand Held Monitor

Part Number	Description	Lifecycle Status
IC660HHM501	Hand-Held Monitor can be used to configure and trouble shoot Genius blocks. Kit includes Cable and Battery Charger	Mature
IC660BCM501	Hand-Held Monitor Battery Charger	Mature
IC660BPM500	Hand-Held Monitor Battery Pack	Mature

Configuration Guidelines

When configuring a Genius network the following guidelines should be considered

1. Genius LAN is limited to 32 devices. Remember that the Genius Bus Controller reserves one address and if a Hand-Held configurator is used, it also reserves an address.
2. If the application requires redundant networks, a Bus Switching Module is required (IC660BSMxxx).
3. Termination is required at the end of each network (IC660BLM50x)
4. For long distances, beyond 4,500 feet, the number of devices is limited to 16.

Cable Selection

Cable # & Make	Outer Diameter	Terminating Resistor* -10% to +20% 1/2 Watt	Number of Conductors/ AWG	Dielectric Voltage Rating	Ambient Temp Rating	Maximum Length Cable Run, feet/meters at baudrate			
						153.6s	153.6e	76.8	38.4*
(A)9823 (B)9182 (C)4596 (M)M39240	.350 in 8.89mm	150 ohms	2/#22	30V	60°C	2000ft 606m	3500ft 1061m	4500ft 1364m	7500ft 2283m
(B)89182	.322in 8.18mm	150 ohms	2/#22	150V	200°C	2000ft 606m	3500ft 1061m	4500ft 1364m	7500ft 2283m
(B)9841 (M)M3993	.270in 6.86mm	*120 ohms	2/#24	30V	80°C	1000ft 303m	1500ft 455m	2500ft 758m	3500ft 1061m
(A)9818C (B)9207 (M)M4270	.330in 8.38mm	100 ohms	2/#20	300V	80°C	1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A)9109 (B)89207 (C)4798 (M)M44270	.282in 7.16mm	100 ohms	2/#20	150V	200°C	1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A)9818D (B)9815	.330in 8.38mm	100 ohms	2/#20			1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A)9818 (B)9855 (M)M4230	.315in 8.00mm	100 ohms	4 (two pair) #22	150V	60°C	1200ft 364m	1700ft 516m	3000ft 909m	4500ft 1364m
(A)9110 (B)89696 (B)89855 (M)M64230	.274in 6.96mm	100 ohms	4 (two pair) #22	150V	200°C	1200ft 364m	1700ft 516m	3000ft 909m	4500ft 1364m
(A)9814C (B)9463 (M)M4154	0.243 6.17mm	75 ohms	2/#20	150V	60°C	800ft 242m	1500ft 455m	2500ft 758m	3500ft 1061m
(A)5902C (B)9302 (M)M17002	.244in 6.20mm	75 ohms	4 (two pair) #22	300V	80°C	200ft 60m	500ft 152m	1200ft 333m	2500ft 758m

Notes: A=Alpha, B=Belden, C=Consolidated, M=Manhattan, * = Limited to 16 taps at 38.4 Kbaud

Examples of Typical Application

Configuration for Controller (Example application requiring (120) 24 VDC inputs and (80) Relay outputs AC power supply) for local control. System also has five remote cabinets, with each cabinet requiring (64) 24 VDC Inputs, (21) 24 VDC 0.5 Amp, Source Outputs and (2) current inputs and (2) current outputs (24 VDC power source). Maximum distance from control cabinet to the last remote cabinet is 3,500 feet.

Control Cabinet

Backplane Slots Required	Power Supply Current Required (mA)	Qty	Part Number	Description
2	1250 mA @ 3.3 VDC; 1000 mA @ 5 VDC	1	IC695CPU310	CPU with two built-in serial ports
2		1	IC695PSA040	120/240 VAC, 125 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	1	IC695CHS016	16 Slot Universal Base
4	1200 mA @ 5V	4	IC694MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
5	35 mA @ 5V; 110 mA @ 24 VDC Relay	5	IC694MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
		4	IC694TBB032	Terminal Block, Box Style
1	300 mA @ 5 VDC	1	IC694BEM331	Genius Bus Controller (GBC), supports up to 32 devices on a Genius Bus to control remote I/O, Global Data and Datagrams
		1	BC646MPP001	Logic Developer - PLC Professional
14	Total current from power supply required: 2775 mA @ 5V; 1850 @ 3.3V; 110 mA @ 24 VDC Relay. Only one power supplied needed.			

Remote Cabinets (Qty 5)

		15	IC660BBD024	Block 12/24 VDC Source I/O 32 Circuits
		5	IC660BBA020	Block 24/48 VDC Analog 4 Inputs / 2 Outputs
		1	IC660BLM506	Bus Terminator 150 Ohm (Qty 4)

Options to consider

		1	IC660HHM501	Hand-Held Monitor can be used to configure and troubleshoot Genius blocks. Kit includes Cable and Battery Charger
		5	IC660BLM507	Genius Block Puller
	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	1	IC695ETM001	RX3i Ethernet module 10/100 Mbits 2 RJ45 connections one IP address occupies one slot on system base
		6	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
		1	IC693ACC302	RX3i Long term battery for CPU
		1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch Operator Interface

Agency Approvals and Certifications

	Agency Approvals					Marine Certifications			
	C-UL (UL508/61010/60950)	C-UL (Class I Div. II Groups ABCD)	CE Mark	ATEX (Zone 2)	TUV (Functional Safety)	ABS	Lloyds	DNV	BV
RX7i	•	•†	•	•†	•†	•†	•†	•†	•†
RX3i	•	•†	•	•†	•†	•†	•†	•†	•†
Series 90-30	•	•†	•	•†	•†	•†	•†	•†	•†
Series 90-70	•	•†	•	•†	•†	•†	•†	•†	•†
VersaMax Modular	•	•	•	•†	•†	•†	•†	•†	•†
VersaMax Micro and Nano	•	•†	•						
Genius I/0	•	•†	•	•†	•†	•†	•†	•†	•†
VersaPoint I/0	•		•						
VersaMax IP and VersaMax IP Modular	•†	•†	•†						
Durus Controllers	•		•						
QuickPanel+	•	•	•	•†		•†	•†	•†	•†
PACSystems RXi Box IPC	•		•						
PACSystems RXi-EP IPC	•		•						
PACSystems RXi-XP IPC	•		•						
Marine IPC	•		•					•	
RXi XR Transportation IPC	•		•					•	
SCADA Edge IPC	•		•						
RXi Monitor	•		•						
RXiDisplay	•		•						
Wolverine III IPC‡	•	•	•	•					

†Selected modules meet these approvals. Check www.geautomation.com for more information.

‡Intertek Certified

'Pending