

PRODUCT CATALOG

ABB Ability™ Symphony® Plus



SD Series I/O modules



PI01

PI01

The PI01 pulse input module processes eight pulsed field inputs. Each channel is optically isolated and accepts an input voltage of 24 VDC.

The PI01 operates in four different modes depending on the function code configuration: period, frequency, totalize and duration.

The PI01 can be used with HBS01-FPH, HBS01-FPN, HBS01-EPD, VBS01-FPH, VBS01-FPH, or VBS01-EPD base.

Technical data	
Power requirements	24 VDC +12%, -10% at 59 mA typical, 66 mA max.
Pulse input channels	8 independently configured channels
• Voltage	24 VDC
• Totalize	0 to 16,777,215 (24-bit)
• Frequency	0.5 Hz to 100 kHz
• Period	10 microseconds to 30 seconds
Ambient temperature	-40 °C to 70 °C (-40 °F to 158 °F). Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2
Service port	1 RS232C port in mini-USB form factor



SD Series Redundant I/O

RAI02

The RAI02 redundant analog input module processes up to 16 high level analog field inputs for a Symphony Plus controller. The controller uses function code 221 (I/O Device Definition) to configure the module, and function code 222 (Analog In/Channel) to configure and access each module input channel. Each channel can be individually programmed for current or voltage inputs.

The RAI02 can be used with HBR01-FPH, HBR01-EPD, VBR01-FPH, or VBR01-EPD base.

Property	Characteristic/value
Power requirements (logic power)	
• Operating voltage	24 VDC + 12%, -10%
• Current	100 mA typical
Power requirement (Analog IO power)	
• Operating voltage	24 VDC ±10%
• Current	20 mA/channel
Number of channel	16 independently configured channels
Analog inputs	
• Current	4 to 20 mA
• Voltage	1 to 5 VDC
HART function	NOTE: HART function only works under current mode
• Number of HART modem	1 modem per module
• Number of HART Secondary Variables	Up to 4 per channel, up to 24 per module
• HART Secondary variable update rate	2.5 seconds typical, 8 seconds maximum
Resistive load	
• Current mode (system powered)	Up to 750 Ω
Input impedance	
• Current mode	Up to 340 Ω
• Voltage mode	≥ 250 kΩ
Resolution	12 bits
Conversion update rate	200 msec for all channels
Ambient temperature	-40 °C to 70 °C (-40 °F to 158 °F). Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2

SD Series I/O modules

RAI04

The RAI04 redundant analog input module processes up to 16 thermocouple or millivolt field inputs for a Symphony Plus controller. The controller uses function code 221 (I/O Device Definition) to configure the module, and function code 222 (Analog In/Channel) to configure and access each module input channel. Each channel can be individually programmed for input types E, J, K, R, S, T, B, L, N, U, Chinese E, and Chinese S.

The RAI04 can be used with HBR01-CJC or VBR01-CJC base.

Property	Characteristic/value
Power requirements (logic power)	
• Operating voltage	24 VDC + 12%, -10%
• Current	65 mA typical, 73 mA maximum
Number of channel	16 independently configured channels
Thermocouple	Thermocouple type E, J, K, R, S, T, B, L, N (14 A WG), N (28 A WG), U, Chinese E, Chinese S
Millivolt	0 to 100 mV -100 to +100 mV
Thermocouple cold junction compensation	User configurable Embedded RTD inside module base, or External RTD input to TB3 on module base, or Application input from control logic
Input impedance	≥ 1 MΩ
A/D conversion	4 A/D converters, each with 4 input channels
Resolution	16 bits
Conversion update rate	300 msec for all channels
Ambient temperature	-40 °C to 70 °C (-40 °F to 158 °F). Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2

SD Series I/O modules

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RAO02

The RAO02 redundant analog output module processes up to 16 high level analog control outputs for a Symphony Plus controller. The controller uses function code 221 (I/O Device Definition) to configure the module, and function code 223 (Analog Out/Channel) to configure each module output channel. Each channel can be individually programmed for current or voltage outputs.

The RAO02 can be used with HBR01-EPD or VBR01-EPD base.

Property	Characteristic/value
Power requirements (logic power)	
• Operating voltage	24 VDC + 12%, -10%
• Current	100 mA typical
Power requirement (Analog IO power)	
• Operating voltage	24 VDC ±10%
• Current	16 mA typical (22 mA maximum) + 20 mA/channel
Number of channel	16 independently configured channels
Analog outputs	
• Current	4 to 20 mA
• Voltage	1 to 5 VDC
HART function	NOTE: HART function only works under current mode
• Number of HART modem	1 modem per module
• Number of HART Secondary Variables	Up to 4 per channel, up to 24 per module
• HART Secondary variable update rate	2.5 seconds typical, 8 seconds maximum
Output load	
• Current mode	0 - 750 Ω
• Voltage mode	22 KΩ to 1 MΩ
D/A conversion	1 D/A converter for each output channel
Resolution	12 bits
Ambient temperature	-40 °C to 70 °C (-40 °F to 158 °F). Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2

RDI01

The RDI01 redundant digital input module processes up to 16 low voltage digital field inputs for a Symphony Plus controller. The controller utilizes function codes 221 (I/O Device Definition) to configure the module, and 224 (Digital In/Channel) to configure and access the module input channels. Each channel is optically isolated, and accepts input voltage of 24 VDC or 48 VDC.

The RDI01 can be used with HBR01-FPH, HBR01-FPN, HBR01-EPD, VBR01-FPH, VBR01-FPH, or VBR01-EPD base.

SD Series I/O modules

RDIO2

The RDIO2 redundant digital input module processes up to 16 high voltage digital field inputs for a Symphony Plus controller. The controller utilizes function codes 221 (I/O Device Definition) to configure the module, and 224 (Digital In/Channel) to configure and access the module input channels. Each channel is optically isolated, and accepts input voltage of 125 VDC or 120 VAC.

The RDIO2 can be used with HBR01-FPH, HBR01-FPN, HBR01-EPD, VBR01-FPH, VBR01-FPH, or VBR01-EPD base.

Property	Characteristic/value
Power requirements (logic power)	
• Operating voltage	24 VDC + 12%, -10%
• Current	RDIO1: 65 mA typical, 73 mA maximum RDIO2: 59 mA typical, 66 mA maximum
Number of channel	16 independently configured channels
Voltage	(±10%)
• RDIO1	24 VDC 48 VDC
• RDIO2	125 VDC 120 VAC
Current (typical) per channel	
• RDIO1	3.3 mA 6.8 mA
• RDIO2	3.0 mA 4.5 mA
Current (maximum) per channel	
• RDIO1	3.6 mA 7.2 mA
• RDIO2	3.3 mA 5.0 mA
Ambient temperature	-40 °C to 70 °C (-40 °F to 158 °F). Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2

RDO01

The RDO01 redundant digital output module processes up to 16 digital open-collector control outputs for a Symphony Plus controller. The controller utilizes function codes 221 (I/O Device Definition) to configure the module, and 225 (Digital Out/ Channel) to configure and drive the module output channels. Each channel is optically isolated, and can switch up to 250 mA @ 24 VDC or 48 VDC.

The RDO01 can be used with HBR01-FPH, HBR01-FPN, HBR01-EPD, VBR01-FPH, VBR01-FPH, or VBR01-EPD base.

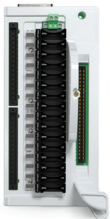
Property	Characteristic/value
Power requirements (logic power)	
• Operating voltage	24 VDC +12%, -10%
• Current	65 mA typical, 73 mA maximum
Power requirement (IO power)	
• Operating voltage	24 VDC ±10% 48 VDC ±10%
• Current	250 mA/channel
Number of channel	16 independently configured channels
Digital outputs	Open-collectors
• Load voltage and rating current	24/48 VDC at 250 mA maximum
• Off leakage current	50 µA at 70°C (158°F) maximum
• On voltage drop	2 V at 70°C (158°F) maximum
Ambient temperature	-40 °C to 70 °C (-40 °F to 158 °F). Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2

SD Series I/O modules – Mounting bases

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HBS01-XXX and VBS01-XXX



VBS01-SFP

SD Series I/O horizontal mounting bases for single module

HBS01-FPH	Horizontal row mounting base for single modules. Provides power for field devices (switch HOT). TB3 is a 5 A fused terminal block for field power input. Can be used with AI01, DI01, DI02, PI01
HBS01-FPN	Horizontal row mounting base for single modules. Provides power for field devices (switch NEUTRAL). TB3 is a 5 A fused terminal block for field power input. Can be used with DI01, DI02, DO01, PI01
HBS01-EPD	Horizontal row mount base for single modules. Externally powered from field device, system powered for analog output (AO). Can be used with AI01, AO01, DI01, DI02, DO01, PI01
HBS01-CJC	Horizontal row mount base for single modules. Embedded RTD for cold junction compensation. Can be used with AI03 and AI04
HBS02-EPD	Horizontal row mount base for single module, externally powered from the field device, high current up to 3A for use with DO05, 2x8 signal terminals, requires 2x16-pin 5mm pluggable connector.

SD Series I/O vertical mounting bases for single module

VBS01-FPH	Vertical column mount base for single module, system provides power for field device (switch hot), 2x8 signal terminals, 5A fused terminal block for field power input, requires 2x16-pin 5mm pluggable connector. Use with AI01, AI02, DI01, DI02, DI03, DI04, DO01, DO02, PI01
VBS01-FPN	Vertical column mount base for single module, system provides power for field device (switch Neutral), 2x8 signal terminals, 5A fused terminal block for field power input, requires 2x16-pin 5mm pluggable connector. Use with DI01, DI02, DI03, DI04, DO01, DO02, PI01
VBS01-EPD	Vertical column mount base for single module, externally powered from the field device, system powered for AO, 2x8 signal terminals, requires 2x16-pin 5mm pluggable connector. Use with AI01, AI02, AI05, AO01, AO02, AO05, DI01, DI02, DI03, DI04, DO01, DO02, PI01, AD01, AD02
VBS01-CJC	Vertical column mount base for single module, 2x8 signal terminals, embedded RTD for cold junction compensation, requires 2x16-pin 5mm pluggable connector. Use with AI03 or AI04
VBS01-SFP	Vertical column mount base for single module provides the ability to select I/O field power option (EPD-LV, EPD-HV, FPH-LV, FPH-HV, FPN-LV and FPN-HV) on a channel-by-channel basis. Base includes individual channel short circuit protection (fuse), blown fuse indication, channel disconnect, and signal power selection. Use with AI01, AI02, AI05, AO01, AO02, AD01, AD02, DI01, DI02, DI03, DI04, DO01, DO02 and PI01.
VBS02-EPD	Vertical column mount base for single module, externally powered from the field device, high current up to 3A for use with DO05, 2x8 signal terminals, requires 2x16-pin 5mm pluggable connector

SD Series I/O horizontal mounting bases for redundant modules

HBR01-EPD	Horizontal row mount base for redundant modules, external field powered devices. System powered for AO, 2x8 signal terminals, requires 2x16-pin 5mm pluggable connector. Use with RAI02, RAO02, RDI01, RDI02, RDO01
HBR01-FPH	Horizontal row mount base for redundant modules. System provides power for field device (switch hot), 2x8 signal terminals, 5A fused terminal block for field power input, requires 2x16-pin 5mm pluggable connector. Use with RAI02, RDI01, RDI02, RDO01
HBR01-FPN	Horizontal row mount base for redundant modules. System provides power for field device (switch Neutral), 2x8 signal terminals, 5A fused terminal block for field power input, requires 2x16-pin 5mm pluggable connector. Use with RDI01, RDI02, RDO01
HBR01-CJC	Horizontal row mount base for redundant module, 2x8 signal terminals, Embedded RTD for cold junction compensation, requires 2x16-pin 5mm pluggable connector. Use with RAI04

SD Series I/O modules – Mounting bases

SD Series I/O vertical mounting bases for redundant modules	
VBR01-EPD	Vertical column mount base for redundant modules, external field powered devices. System powered for AO, 2x8 signal terminals, requires 2x16-pin 5mm pluggable connector. Use with RAI02, RAO02, RDI01, RDI02, RDO01
VBR01-FPH	Vertical column mount base for redundant modules. System provides power for field device (switch hot), 2x8 signal terminals, 5A fused terminal block for field power input, requires 2x16-pin 5mm pluggable connector. Use with RAI02, RDI01, RDI02, RDO01
VBR01-FPN	Vertical column mount base for redundant modules. System provides power for field device (switch Neutral), 2x8 signal terminals, 5A fused terminal block for field power input, requires 2x16-pin 5mm pluggable connector. Use with RDI01, RDI02, RDO01
VBR01-CJC	Vertical column mount base for redundant module, 2x8 signal terminals, embedded RTD for cold junction compensation, requires 2x16-pin 5mm pluggable connector. Use with RAI04
SD Series I/O horizontal mounting bases for single compact module	
cHBS01-EPD	Horizontal row mount base for compact single module, externally powered from the field device, system powered for AO, 8 signal terminals, requires 16-pin 5mm pluggable connector. Use with cAI01, cAO01
cHBS01-FPH	Horizontal row mount base for compact single module, system provides power for field device (switch hot), 8 signal terminals, 5A fused terminal block for field power input, requires 16-pin 5mm pluggable connector. Use with cAI01
cHBS01-CJC	Horizontal row mount base for compact single module, 2x8 signal terminals, embedded RTD for cold junction compensation, requires 16-pin 5mm pluggable connector. Use with cAI04
SD Series I/O vertical mounting bases for single compact module	
cVBS01-EPD	Vertical column mount base for compact single module, externally powered from the field device, system powered for AO, 8 signal terminals, requires 16-pin 5mm pluggable connector. Use with cAI01, cAO01
cVBS01-FPH	Vertical column mount base for compact single module, system provides power for field device (switch hot), 8 signal terminals, 5A fused terminal block for field power input, requires 16-pin 5mm pluggable connector. Use with cAI01
cVBS01-CJC	Vertical column mount base for compact single module, 8 signal terminals, Embedded RTD for cold junction compensation, requires 16-pin 5mm pluggable connector. Use with cAI04