Analog Input Module, 8 / 4 Channel Voltage / Current: IC695ALG608
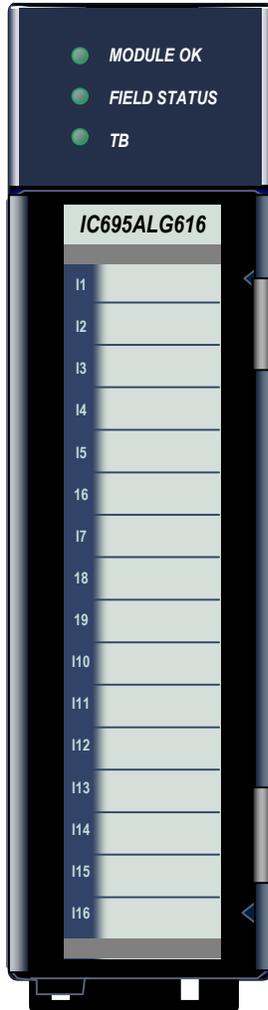## *Analog Input Module,16 / 8 Channel Voltage / Current: IC695ALG616*

- MODULE OK
- FIELD STATUS
- TB

IC695ALG616

I1
I2
I3
I4
I5
I6
I7
I8
I9
I10
I11
I12
I13
I14
I15
I16

Non-Isolated Differential Analog Voltage/Current Input module IC695ALG608 provides 8 single-ended or 4 differential input channels. **Non-Isolated Differential Analog Voltage/Current Input** module IC695ALG616, shown at left, provides 16 single-ended or 8 differential input channels. Analog input channels can be configured for these ranges:

- ▪ Current: 0 to 20mA, 4 to 20mA, +/- 20mA
- ▪ Voltage: +/- 10V, 0 to 10V, +/- 5V, 0 to 5V, 1 to 5V.

This module can be used with a Box-style (IC694TBB032), Extended Box-style (IC694TBB132), Spring-style (IC694TBS032), or Extended Spring-style (IC694TBS132) terminal Block. Extended terminal blocks provide the extra shroud depth needed for shielded wiring. See chapter 15 for more information about Terminal Blocks. Terminal Blocks are ordered separately.

These modules must be located in an RX3i Universal Backplane. They require an RX3i CPU with firmware version 3.0 or later. Machine Edition Version 5.0 SP3 Logic Developer-PLC or later must be used for configuration.

Module Features

- ▪ Completely software-configurable, no module jumpers to set
- ▪ Full autocalibration
- ▪ On-board error-checking
- ▪ Open-circuit detection for all voltage and 4-20mA inputs
- ▪ Configurable scaling and offsets per channel
- ▪ High alarm, low alarm, high-high alarm, low-low alarm detection and reporting selectable per channel
- ▪ Module fault reporting
- ▪ Supports diagnostic point fault contacts in the logic program
- ▪ Flash memory for future upgrades
- ▪ Positive and negative Rate of Change Alarms
- ▪ Autocalibration at startup
- ▪ Configurable interrupts for channel alarms and faults
- ▪ Terminal Block insertion or removal detection

Specifications: IC695ALG608 and IC695ALG616

Input Ranges	Current: 0 to 20mA, 4 to 20mA, +/- 20mA
	Voltage: +/- 10V, 0 to 10V, +/- 5V, 0 to 5V, 1 to 5V
Backplane Power Requirements	ALG608: 330 mA maximum @ 5.0V +5% / -2.5%, 600 mA maximum @ 3.3V +5% / -3%
	ALG616: 450 mA maximum @ 5.0V +5% / - 2.5%, 600 mA maximum @ 3.3V +5% / - 3%
CPU Version	PACSustems RX3i CPU firmware version 3.0 and later
Programmer Version	Machine Edition version 5.0 SP3 and later
Power Dissipation within Module	IC695ALG608: 4.83 watts maximum IC695ALG616: 6.48 watts maximum
Thermal Derating	None
Resolution	24 bit ADC converted to Floating Point or Integer
Input Data Format	Configurable as floating point IEEE 32 bit or 16-bit integer in a 32-bit field
Filter Options	8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz
Module Scan Time (in milliseconds)	The module scan can consist of up to four acquisition cycles. Each cycle includes a specific set of channels, as described in the section "Channel Scanning". Total Scan Time depends on the number of acquisition cycles in the scan, and the configured filter option.

Configured Filter	*Number of Acquisition Cycles in the Scan*			
	1	*2*	*3*	*4*
8 Hz filter	121	241	362	482
12 Hz filter	81	161	242	322
16 Hz filter	61	121	182	242
40 Hz filter	21	41	62	82
200 Hz filter	5	9	14	18
500 Hz filter, filtering and rate detection disabled	3	5	7	9
500 Hz filter, all options enabled	3	6	9	12

Input Impedance	>100 Kohm voltage inputs
Current Input Resistance	249 ohms +/- 1%
Open Circuit Detection time	1 second maximum

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Specifications: IC695ALG608 and IC695ALG616, continued

Overvoltage	+/-60 VDC continuous, maximum		
Overcurrent	+/-28mA continuous, maximum		
Normal Mode Noise Rejection in dB		*At 50Hz*	*At 60Hz*
	8 Hz filter	103	97
	12 Hz filter	94	89
	16 Hz filter	39	65
	40 Hz filter	4	7
	200 Hz filter	0.1	0.2
	500 Hz	0.0	0.0
Common Mode Noise Rejection	120dB minimum @ 50/60 Hz with 8 Hz filter 110dB minimum @ 50/60 Hz with 12 Hz filter		
Channel-Channel DC Crosstalk	-80 dB minimum (single ended mode) -80 dB minimum (differential mode, grounded common) -60 dB minimum (differential mode, floating common)		
Calibrated Accuracy* @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter	+/- 5V, + /- 10V, +/- 20 mA: 0.05% of range. 0 to 10V, 0 to 5V, 1 to 5V, 0 to 20 mA: 0.1% of range. 4 to 20 mA: 0.125% of range		
Calibrated Accuracy* @ 0°C – 60°C with 8 Hz, 12 Hz and 16 Hz filter	0 to 10V, 0 to 5V, 1 to 5V, 0.2% of range.0 to 20 mA: 0.25% of range. 4 to 20 mA: 0.3125% of range. +/- 5V, +/- 10V: 0.1% +/- 20 mA: 0.125% of range		
Calibration Interval	12 months typical to meet accuracy specifications over time. Offset can be applied as a periodic calibration adjustment.		
Isolation Voltage terminal block to backplane/chassis	Opto-isolated, transformer isolated 250 VAC continuous/1500 VAC for 1 minute		

* In the presence of severe RF interference (IC 801-3, 10V/M), accuracy may be degraded by +/- 1.5% of range.

Refer to Appendix A for product standards and general specifications.

LEDs

The **Module OK** LED indicates module status. The **Field Status** LED indicates the presence of a fault on at least one channel or a terminal block error. The TB (Terminal Block) LED indicates the presence or absence of the terminal block. LEDs are powered by the backplane power bus.

LED	*Indicates*
Module OK	ON Green: Module OK and configured. Slow Flashing Green or Amber: Module OK but not configured. Quick Flashing Green: Error. OFF: Module is defective or no backplane power present
Field Status	ON Green No faults on any enabled channel, and Terminal Block is present. ON Yellow: Fault on at least one channel. OFF: Terminal block not present or not fully seated.
TB	ON Red: Terminal block not present or not fully seated. ON Green: Terminal block is present. OFF: No backplane power to module.

Configuration Parameters: IC695ALG608 and IC695ALG616

Module Parameters		
Parameter	**Default**	**Description**
Channel Value Reference Address	%AIxxxxx	Starting address for the module's input data. This defaults to the next available %AI block.
Channel Value Reference Length	ALG608: 16 ALG616: 32	The number of words used for the module's input data. This parameter cannot be changed.
Diagnostic Reference Address	%Ixxxxx	Starting address for the channel diagnostics status data.
Diagnostic Reference Length	0	The number of bit reference bits required for the Channel Diagnostics data. When set to 0, Channel Diagnostics is disabled. To enable Channel Diagnostics mapping, change this to a non-zero value.
Module Status Reference Address	%Ixxxxx	Starting address for the module's status data.
Module Status Reference Length	0	The number of bits (0 to 32) required for the Module Status data. When set to 0, mapping of Module Status data is disabled. To enable Module Status data mapping, change this to a non-zero value.
I/O Scan Set	1	The scan set 1 – 32 to be assigned by the RX3i CPU.

Inputs Default	Force Off	In the event of module failure or removal, this parameter specifies the state of all Channel Value References for the module.
		   Force Off = Channel Values clear to 0.
		   Hold Last State = Channels hold their last state.

Inputs Default w/o Terminal Block	Enabled	Enabled / Disabled: Controls whether inputs will be set to their defaults if the Terminal Block is removed.
Channel Faults w/o Terminal Block	Disabled	Enabled / Disabled: Controls whether channel faults and configured alarm responses are generated after Terminal Block removal. If Disabled, channel faults and alarms are suppressed when the Terminal Block is removed. This setting does not affect module faults including the Terminal Block loss/add fault generation.
Analog Input Mode	Single-ended Input Mode	Single-ended / Differential: This selection must match the input wiring to the module.
A/D Filter Frequency	40Hz	Low pass A/D hardware filter setting for all inputs: 8, 12, 16, 40, 200, or 500Hz. Frequencies below the filter setting are not filtered by hardware.
Range Type	Disabled	Voltage/Current, Disabled
Range (Not for Range Type Disabled)	-10V to +10V	Voltage/current: -10V to +10V, 0V to +10V, 0 V to +5V, 1V to +5V, -5V to +5V, -20mA to +20mA, 4 to 20 mA, 0 to 20 mA

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Channel Parameters		
Parameter	**Default**	**Description**
Channel Value Format	32-bit Floating Point	16-bit integer or 32-bit floating point
High Scale Value (Eng Units)	The defaults for the 4 Scaling parameters depend on the configured Range Type and Range. Each Range and Range Type have a different set of defaults.	Note: Scaling is disabled if both High Scale Eng. Units equals High Scale A/D Units and Low Scale Eng. Units equals Low Scale A/D Units. Default is High A/D Limit of selected range type.
Low Scale Value (Eng Units)		Default is Low A/D Limit of selected range type. Must be lower than the high scaling value.
High Scale Value (A/D Units)		Default is High A/D Limit of selected range type. Must be greater than the low scaling value.
Low Scale Value (A/D Units)		Default is Low A/D Limit of selected range type.

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Input Scaling

By default, the module converts a voltage or current input over the entire span of its configured Range into a floating point value for the CPU. For example, if the Range of a channel is 4 to 20mA, the module reports channel input values from 4.000 to 20.000. By modifying one or more of the four channel scaling parameters (Low/High Scale Value parameters) from their defaults, the scaled Engineering Unit range can be changed for a specific application. Scaling can provide inputs to the PLC that are already converted to their physical meaning, or convert input values into a range that is easier for the application to interpret. Scaling is always linear and inverse scaling is possible. All alarm values apply to the scaled Engineering Units value, not to the A/D input value.

The scaling parameters only set up the linear relationship between two sets of corresponding values. They do not have to be the limits of the input.