PACSystems™ RX3i

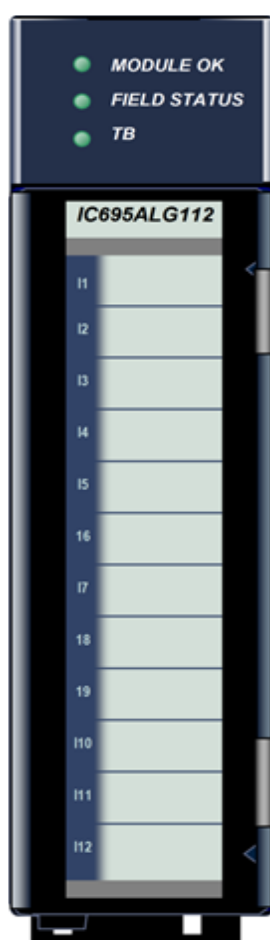## ISOLATED ANALOGUE INPUT MODULE
(IC695ALG106 & IC695ALG112)

EMERSON

Product Description

Isolated Analog Voltage/Current Input module IC695ALG106 provides 6 isolated input channels.

Isolated Analog Voltage/Current Input module IC695ALG112, shown at right, provides 12 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

These modules must be installed in an RX3i Universal Backplane. The modules require the use of one front-mounted terminal block (ordered separately). Terminal blocks are available in the following different styles:

- Box-style (IC694TBB032),
- Extended Box-style (IC694TBB132),
- Spring-style (IC694TBS032), and
- Extended Spring-style (IC694TBS132).

Extended terminal blocks provide the extra shroud depth needed for shielded wiring. See GFK-2314, PACSystems RX3i System Manual, for more information about terminal blocks.

Note: *Terminal blocks for this module must be ordered separately.*

Module Features

- Completely software-configurable, no module jumpers to set
- On-board error-checking
- Open-circuit detection for all voltage and for 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
- Configurable interrupts for channel alarms and faults
- Terminal Block insertion or removal detection
- Hot-swappable— module may be inserted into or removed from a powered backplane.
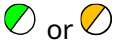
Specifications

Specification	Description
Input Ranges	Current: 0 to 20mA, 4 to 20mA, +/- 20mA Voltage: +/- 10V, 0 to 10V, +/- 5V, 0 to 5V, 1 to 5V

Power Requirements
(from the backplane)
	ALG106: 230 mA maximum @ 5.0V +5% / -2.5%,
	          300 mA maximum @ 3.3V +5% / -3%
	ALG112 490 mA maximum @ 5.0V +5% / - 2.5%,
	          310 mA maximum @ 3.3V +5% / - 3%

Power Dissipation within Module	IC695ALG106: 2.97 watts maximum; with 20mA inputs on all 6 channels IC695ALG112: 4.89 watts maximum with 20mA inputs on all 12 channels
Thermal Derating	No derating
Resolution	16 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, 250Hz, 1000Hz
Input Impedance	>500 Kohm voltage inputs
Current Input Resistance	250 ohms +/- 1%
Open Circuit Detection time	1 second maximum
Overvoltage	+/-35 VDC continuous, maximum
Overcurrent	+/-35mA continuous, maximum

Normal Mode Noise Rejection (dB)		*At 50Hz*	*At 60Hz*
	8 Hz filter	90	75
	12 Hz filter	75	80
	16 Hz filter	35	75

| Specification	Description
Common Mode Noise Rejection	100dB minimum @ 50/60 Hz with 8 Hz filter 100dB minimum @ 50/60 Hz with 12 Hz filter
Channel-Channel DC Crosstalk	-70 dB minimum
Isolation Voltage terminal block to backplane/chassis and channel to channel	I-coupler, transformer isolated 250 VAC continuous/1500 VAC for 1 minute
Analog Step Change Response	The analog input will settle to 0.1% of its final value within 1.7mS for a step change on the input pins of the module. (Any digital filtering is in addition to this time.)
Digital Filtering Settling Time (milliseconds)	The settling time depends on the configured filter time. 8 Hz Filter: 127 mS 12 Hz Filter: 67 mS 16 Hz Filter: 56 mS 40 Hz Filter: 21 mS 250 Hz Filter: 3.1 mS 1000 Hz Filter: 0 mS (no digital filtering; analog front-end filter only)

| Specification	Description
Analog Module Scan Time (milliseconds)	The modules provide a new sample every 1mS, regardless of the digital filtering selected. See **Digital Filtering Settling Time** for the amount of time required to have settled data.
Calibrated Accuracy	0.1% of range at 25°C 0.2% of range over entire temperature span In the presence of severe RF interference (IC 801-3, 10V/M), accuracy may be degraded by 2.0% of range.
Calibration Interval	12 months typical to meet accuracy specifications over time. Offset can be applied as a periodic calibration adjustment.

Indicator Light Emitting Diodes (LEDs)

MODULE OK — indicates the module's ability to perform normal operations.

🟢	Green, ON	Module OK and configured
or	Green or Amber, slow flashing	Module OK but not configured.
	Green, quick flashing	Error
⚪	OFF	Not OK: no backplane power present or module is defective

FIELD STATUS — indicates the status of the module's field connections.

🟢	Green, ON	No faults on any enabled channel, and Terminal Block is present
🟠	Amber, ON	Fault on at least one channel
⚪	OFF	Terminal block not present or not fully seated

TB — indicates the status of the module's connection to its terminal block.

🟢	Green, ON	Terminal block present
🔴	Red, ON	Terminal block not present or not fully seated
⚪	OFF	No backplane power to module

Channel Diagnostic Data

The module can be configured to report channel diagnostics status data to the CPU. The CPU stores this data at the module's configured *Diagnostic Reference Address*. Use of this feature is optional. For details on module configuration, refer to the *PACSystems RX3i System Manual*, GFK-2314.

The diagnostics data for each channel occupies 2 words whether the channel is used or not:

Bit	Value	Function
D0	0	Low alarm not Exceeded
	1	Low alarm Fault
D1	0	High Alarm not Exceeded
	1	High Alarm Exceeded
D2	0	Not Under Range
	1	Under Range
D3	0	Not Over Range
	1	Over Range
D4	0	No Open Wire
	1	Open Wire
D5	0	No Short Circuit
	1	Short Circuit
D6	0	Spare. Always set to zero
	1	Invalid value.
D7	0	No extended diagnostic Information
	1	See extended diagnostic Information in bits D8-D15.
D8-D15	—	Extended diagnostic Information (refer to GFK-2314)

Hardware Installation

Pre-installation Check

Upon receiving your RX3i equipment, carefully inspect all shipping containers for damage. If any part of the system is damaged, notify the carrier immediately. The damaged shipping container should be saved as evidence for inspection by the carrier.

As the consignee, it is your responsibility to register a claim with the carrier for damage incurred during shipment. Emerson will fully cooperate with you, however, should such action be necessary.

After unpacking the RX3i equipment, record all serial numbers. Serial numbers are required if you should need to contact Customer Care during the warranty period. All shipping containers and all packing material should be saved should it be necessary to transport or ship any part of the system.

Verify that all components of the system have been received and that they agree with your order. If the system received does not agree with your order, contact Customer Care.

Installation Location

This product is intended for use with the RX3i control system. Its components are considered open equipment (having live electrical parts that may be accessible to users) and must be installed in an ultimate enclosure that is manufactured to provide safety. As a minimum, the enclosure shall provide a degree of protection against solid objects as small as 12mm (e.g. fingers). This equates to a NEMA/UL Type 1 enclosure or an IP20 rating (IEC60529) providing at least a pollution degree 2 environment. For details about installing RX3i rack systems, refer to GFK-2314.

For complete installation information, please refer to RX3i and Series 90-30 Installation and Maintenance Requirements document, GFK-2975.
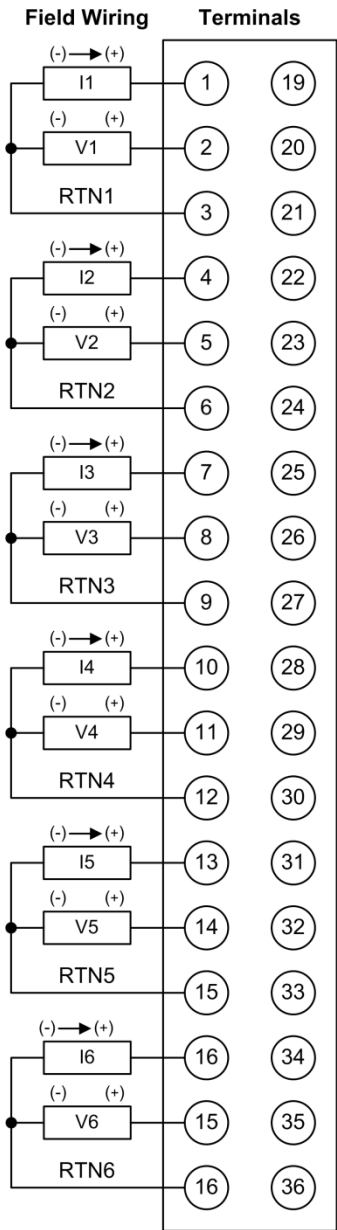
Field Wiring

The following tables list wiring connections for the IC695ALG106 and ALG112 modules.

Note: *There are no shield terminals on these modules. For shielding, tie cable shields to the ground bar along the bottom of the backplane. M3 tapped holes are provided in the ground bar for this purpose.*

IC695ALG106

Figure 1: Field Wiring

Terminal	Connection	Connection	Terminal
1	CH 1 Current In	No Connection	19
2	CH 1 Voltage In	No Connection	20
3	CH 1 RTN	No Connection	21
4	CH 2 Current In	No Connection	22
5	CH 2 Voltage In	No Connection	23
6	CH 2 RTN	No Connection	24
7	CH 3 Current In	No Connection	25
8	CH 3 Voltage In	No Connection	26
9	CH 3 RTN	No Connection	27
10	CH 4 Current In	No Connection	28
11	CH 4 Voltage In	No Connection	29
12	CH 4 RTN	No Connection	30
13	CH 5 Current In	No Connection	31
14	CH 5 Voltage In	No Connection	32
15	CH 5 RTN	No Connection	33
16	CH 6 Current In	No Connection	34
17	CH 6 Voltage In	No Connection	35
18	CH 6 RTN	No Connection	36

IC695ALG112

Figure 2: Field Wiring
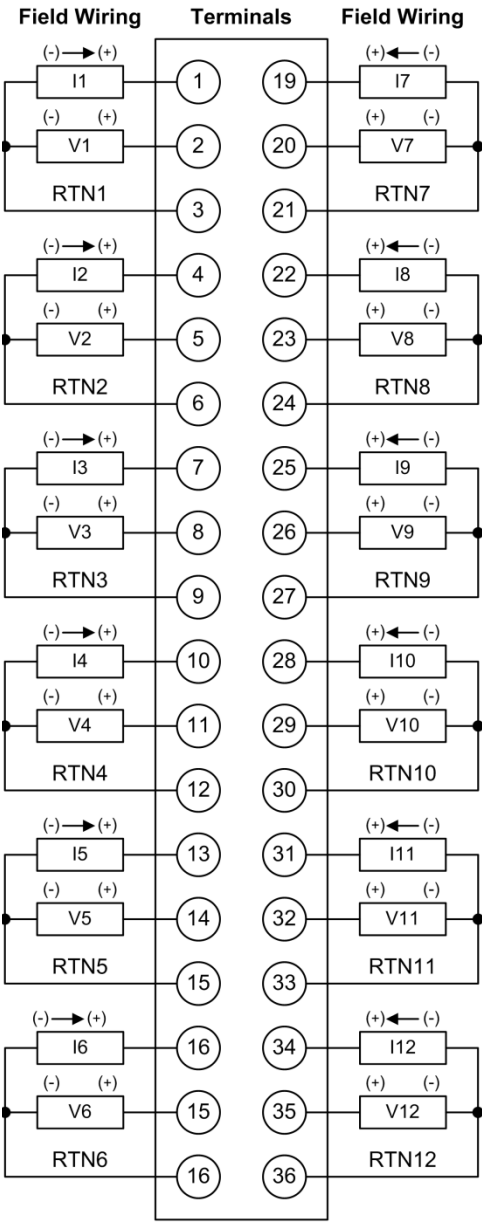
Terminal	Connection	Connection	Terminal
1	CH 1 Current In	CH 7 Current In	19
2	CH 1 Voltage In	CH 7 Voltage In	20
3	CH 1 RTN	CH 7 RTN	21
4	CH 2 Current In	CH 8 Current In	22
5	CH 2 Voltage In	CH 8 Voltage In	23
6	CH 2 RTN	CH 8 RTN	24
7	CH 3 Current In	CH 9 Current In	25
8	CH 3 Voltage In	CH 9 Voltage In	26
9	CH 3 RTN	CH 9 RTN	27
10	CH 4 Current In	CH 10 Current In	28
11	CH 4 Voltage In	CH 10 Voltage In	29
12	CH 4 RTN	CH 10 RTN	30
13	CH 5 Current In	CH 11 Current In	31
14	CH 5 Voltage In	CH 11 Voltage In	32
15	CH 5 RTN	CH 11 RTN	33
16	CH 6 Current In	CH 12 Current In	34
17	CH 6 Voltage In	CH 12 Voltage In	35
18	CH 6 RTN	CH 12 RTN	36

Additional Information

PACSystems RX3i User Manuals

PACSystems RX3i and RX7i CPU Reference Manual, GFK-2222
PACSystems RX3i System Manual, GFK-2314
User manuals, product updates and other information sources are available on our Support website, https://www.emerson.com/Industrial-Automation-Controls/support under Controllers and IO, RX3i Controllers.

Release History

Version	Firmware Revision	Date	Description
IC695ALG106-HC	2.01	Aug 2022	Product labels have been updated to show compliance with new certifications. For updated certifications, please refer to https://emerson-mas.force.com/communities/en_US/Article/Certifications-and-Agency-Approvals-Landing-Page
IC695ALG112CA-HB IC695ALG112-HB	2.00		
IC695ALG106-GC	2.01	Sept 2019	Following Emerson's acquisition of this product, changes have been made to apply appropriate branding and registration of the product with required certification agencies. No changes to material, process, form, fit or functionality.
IC695ALG112-GB IC695ALG112CA-GB	2.00		
IC695ALG106-FC	2.01	Sept 2017	FW update to correct PCI ID value reported to allow use of the ALG106 in remote PNS001 controlled racks.
IC695ALG106-FB IC695ALG112-FB	2.00	July 2017	New hardware and firmware to address component obsolescence and to obtain EU RoHS compliance
IC695ALG106-EA IC695ALG112-EA	1.00	Nov 2013	Hardware design updated to address component obsolescence. No change in functionality, performance, or compatibility. Product labeling and documentation of backplane power consumption revised as a result of UL testing.
IC695ALG106-DA IC695ALG112-DA	1.00	Sept 2010	Label change only. No change in functionality, performance or compatibility.
IC695ALG106-CA IC695ALG112-CA	1.00	July 2009	Modified the terminal block detector switch to increase the size of the switch lever. The increased size of the switch lever allows additional tolerance to assure contact with the terminal block actuator.
IC695ALG106-BA IC695ALG112-BA	1.00	June 2009	UL approval
IC695ALG106-AA IC695ALG112-AA	1.00	Oct 2007	Initial Release

Firmware Upgrades

The IC695ALG112 contains the initial factory installed v2.00 release.

The IC695ALG106 contains the factory installed v2.01 updated release.

Field upgrades can only be performed on revision FB or later using the version 2.0x upgrade kits listed below. Previous modules (revision -EA and earlier) **cannot** be updated to become revision FB products.

Upgrade Kits

IC695ALG106/ IC695ALG106CA: 41G2452-FW01-000-A1 = Updates IC695ALG106 to FW v2.01

IC695ALG112/ IC695ALG112CA: 41G2453-FW01-000-A0 = Initial release of FW v2.00

New Features in This Release

Manufacturing change. No change to fit, form, nor function.

Issues Resolved in This Release

N/A

Functional Compatibility

Subject	Minimum Version Required
Programmer version requirements	PAC Machine Edition Logic Developer 6.50 and above
RX3i CPU version requirements	PACSystems RX3i CPU Release 6.50 and above

Restrictions and Open Issues

IC695ALG106-FB (v2.00) will not configure if installed in an RX3i remote PNS001 rack. A fault will be reported that an incorrect module was found.

Operational Notes

- For under range, open wire, and over range input voltages in excess of +10.5V, the input data will be clipped to the Low Limit value.

- For over range conditions not exceeding +10.5V, the input data will be clipped to the High Limit value.

- For an open wire condition or if input voltage exceeds +10.5V, the Open Wire channel diagnostic data status bit will be set and the Over Range diagnostic data status bit will NOT be set.

- When the terminal block is removed the data reported is the same as an open wire condition. Additionally, the Terminal Block Present bit is cleared in the Module Status Data reference area.

- These modules have separate enable/disable options for Diagnostic Reporting and Interrupts. Normally, disabling a diagnostic (such as Low/High Alarm or Over/Under range) in the configuration means that its diagnostic bit is never set. However, if interrupts are enabled for a condition and that interrupt occurs, the diagnostic bit for that condition is also set during the same controller logic scan. The next PLC input scan always clears this interrupt status bit back to 0, because Diagnostic Reporting has it disabled.

- FW v2.00 and later will not show open-wire faults for 0-20mA and +/- 20mA ranges, even when the PME option on "Setting Channel Faults w/o Terminal Block" is enabled and the terminal block is removed. The open circuit fault is only supported on the 4-20mA range. This is different from previous revision modules (FW v1.xx) which incorrectly did report an open circuit fault for these ranges.

General Contact Information

Home link: http://www.emerson.com/industrial-automation-controls
Knowledge Base: https://www.emerson.com/industrial-automation-controls/support

Technical Support

Americas
Phone: 1-888-565-4155
                1-434-214-8532 (If toll-free option is unavailable)

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                Technical Support: support.mas@emerson.com

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                +39-0362-228-5555 (from Italy - if toll-free 800 option is unavailable or dialing from a mobile telephone)
                Customer Care (Quotes/Orders/Returns): customercare.emea.mas@emerson.com
                Technical Support: support.mas.emea@emerson.com

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Phone: +86-400-842-8599
                +65-6955-9413 (All other Countries)

                Customer Care (Quotes/Orders/Returns): customercare.cn.mas@emerson.com
                Technical Support: support.mas.apac@emerson.com

Any escalation request should be sent to: mas.sfdcescalation@emerson.com

Note: If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

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