GE IC695ALG608-HC

8-Channel Analog Input Module



GE IC695ALG608-HC is a PACSystems RX3i analog input module for acquiring voltage and current measurements from field instruments. Its non-isolated input arrangement can be configured as eight single-ended channels or four differential channels to suit the required measurement circuits. Per-channel scaling and offsets convert the acquired values for use in the control application, while configurable limit alarms, rate-of-change alarms and open-circuit detection support signal supervision. The complete -HC identity identifies the documented hardware/firmware release; HART communication is a feature of other models in the same manual, not of the ALG608.

Technical Specifications

Product Identity	
Platform	PACSystems RX3i
Complete revision	IC695ALG608-HC
Functional Configuration	
Product function	Non-isolated analog input module
Input channels	8 single-ended or 4 differential
A/D converter	24 bit
Data format	32-bit floating point or 16-bit integer in a 32-bit field
HART	Not supported by ALG608
Backplane	RX3i Universal Backplane
Terminal block	IC694TBB032 / TBB132 / TBS032 / TBS132; selected separately
Performance & Power	
Current ranges	0-20 mA; 4-20 mA; ±20 mA
Voltage ranges	±10 V; 0-10 V; ±5 V; 0-5 V; 1-5 V
Environment	
Hazardous-location restrictions	Units marked for Class I, Division 2, Groups A–D are suitable for those locations or nonhazardous areas. In hazardous areas, isolate power before replacement or wiring.

Selected original manufacturer material follows on pages 3–8.

Compatibility & Selection Guide

System and software compatibility. IC695ALG608-HC uses an RX3i Universal Backplane and a separately selected high-density terminal block. GFK-2372K lists programmer version 5.0 SP3 or newer and RX3i CPU firmware 3.00 or newer for ALG608. The -HC release addresses the earlier device-identification mismatch with IC695PNS001 and IC695CEP001; verify the complete revision when replacing an older unit.

Wiring & Installation Reference

Backplane and terminal block

1. Confirm the base Use an RX3i Universal Backplane and an approved high-density terminal block.

2. Match the channel mode Verify signal type, configured range and single-ended/differential arrangement before landing wires.

3. Verify the configuration Check the full -HC code, CPU/programmer compatibility and controller diagnostics after configuration.

Installation precautions

Follow the manufacturer installation and hazardous-location conditions before insertion, removal or wiring.

Channels are non-isolated from one another; do not infer individual channel isolation from the backplane isolation rating.

View single-ended wiring (PDF) — page 6 · View differential wiring (PDF) — page 7

Non-Isolated Analog Input Modules with HART Communications

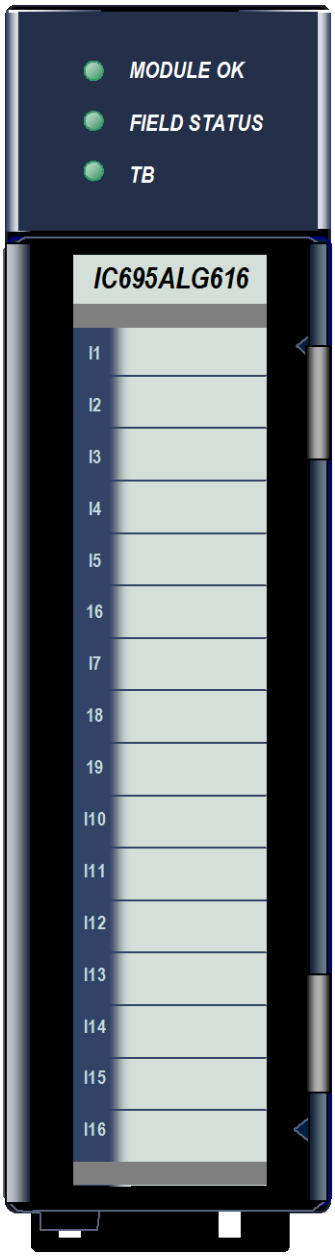
IC695ALG626, IC695ALG628

Non-Isolated Analog Input Modules

IC695ALG608, IC695ALG616

GFK-2372K

December 2014



Non-Isolated Differential Analog Current/Voltage Input module IC695ALG608 and *Non-Isolated Differential Analog Current/Voltage Input* module IC695ALG628 provide eight single-ended or four differential input channels. IC695ALG628 also features HART version 5.0 communications capability on each channel.

Non-Isolated Differential Analog Current/Voltage Input module IC695ALG616, shown at left, and *Non-Isolated Differential Analog Current/Voltage Input* module IC695ALG626 provide sixteen single-ended or eight differential input channels. IC695ALG626 also features HART version 5.0 communications capability on each channel.

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

On modules IC695ALG626 and ALG628, channels that will use HART communications must be configured for the 4–20mA range.

These modules must be located in an RX3i Universal Backplane. They can be installed or removed while power is applied to the system (hot swapped.)

These modules 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. Refer to the *PACSystems RX3i System Manual*, GFK-2314 revision B or later for more information about Terminal Blocks. Terminal Blocks are ordered separately.

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
- HART Version 5.0 communications on modules IC695ALG626 and IC695ALG628.

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Specifications

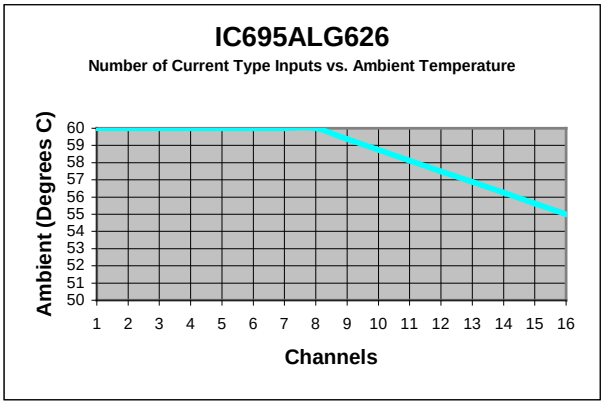
Input Ranges	Current: 0 to 20mA, 4 to 20mA, ±20mA Voltage: ±10V, 0 to 10V, ±5V, 0 to 5V, 1 to 5V			
Backplane Power Requirements	ALG608: 200 mA maximum @ 5.0V +5% / -2.5%, 200 mA maximum @ 3.3V +5% / -3% ALG616: 350 mA maximum @ 5.0V +5% / - 2.5%, 200 mA maximum @ 3.3V +5% / - 3% ALG626: 400 mA maximum @ 5.0V +5% / - 2.5%, 200 mA maximum @ 3.3V +5% / - 3% ALG628: 260 mA maximum @ 5.0V +5% / - 2.5%, 200 mA maximum @ 3.3V +5% / - 3%			
Power Dissipation within Module	IC695ALG608: 2.58 W maximum; IC695ALG626: 4.50 W maximum;		IC695ALG616: 4.25 W maximum IC695ALG628: 2.83 W maximum	
Thermal Derating	IC695ALG608 and ALG616: no derating IC695ALG628: no derating Module IC695ALG626 has no thermal derating in voltage mode. For thermal derating for module IC695ALG626 in current mode, refer to page 4.			
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			
HART Communications	Version 5.0 HART protocol supported on modules IC695ALG626 and IC695ALG628.			
Input Impedance	100 kΩ voltage inputs			
Current Input Resistance	249 Ω ±1%			
Open Circuit Detection time	1 second maximum			
Overvoltage	±60 VDC continuous, maximum			
Overcurrent	±28mA continuous, maximum			
ormal Mode oise Re ection in dB		*At 50Hz*	*At 60Hz*	
	8 Hz filter	85	85	
	12 Hz filter	85	85	
	16 Hz filter	35	62	
	40 Hz filter	3	6	
	200 Hz filter	0	0	
	500 Hz	0	0	
Common Mode oise Re ection	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)			
Isolation Voltage terminal block to backplane/chassis	Opto-isolated, transformer isolated 250 VAC continuous/1500 VAC for 1 minute			

Installation in Hazardous Areas

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS AREAS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS AREAS ONLY
- WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;
- WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS AREAS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND
- WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

Thermal Derating

For module IC695ALG626 in current mode, the number of inputs that can be on at the same time depends on the ambient temperature as shown below.



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 from the backplane power bus.

LED	*State*	*Indicates*
Module OK	ON Green	Module OK and configured
	Green or Amber, blinking slowly	Error
	Green, blinking rapidly	Module OK but not configured
	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

Field Wiring, Single-Ended Mode

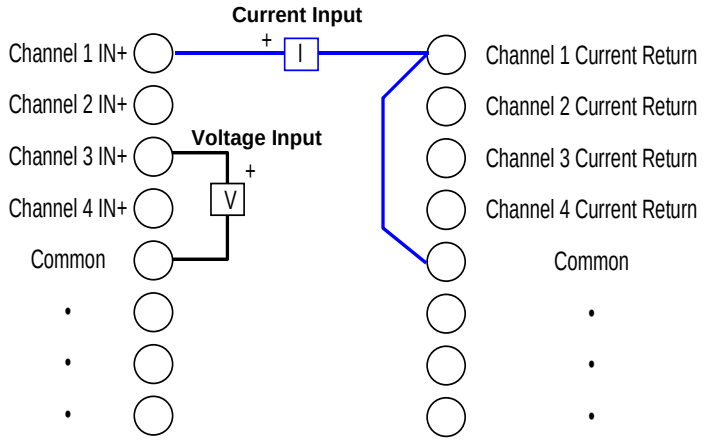
The table below lists wiring connections for Non-Isolated Analog Input Modules in Single-ended mode. Single-ended mode is the configured default operating mode.

Terminal	*8-Channel Modules*	*16-Channel Modules*	*8-Channel Modules*	*16-Channel Modules*	*Terminal*
1	Channel 1 IN+		Channel 1 Current Return (IRTN1)		19
2	Channel 2 IN+		Channel 2 Current Return (IRTN2)		20
3	Channel 3 IN+		Channel 3 Current Return (IRTN3)		21
4	Channel 4 IN+		Channel 4 Current Return (IRTN4)		22
5	Common		Common		23
6	Channel 5 IN+		Channel 5 Current Return (IRTN5)		24
7	Channel 6 IN+		Channel 6 Current Return (IRTN6)		25
8	Channel 7 IN+		Channel 7 Current Return (IRTN7)		26
9	Channel 8 IN+		Channel 8 Current Return (IRTN8)		27
10	No Connection	Channel 9 IN+	No Connection	Channel 9 Current Return (IRTN9)	28
11	No Connection	Channel 10 IN+	No Connection	Channel 10 Current Return (IRTN10)	29
12	No Connection	Channel 11 IN+	No Connection	Channel 11 Current Return (IRTN11)	30
13	No Connection	Channel 12 IN+	No Connection	Channel 12 Current Return (IRTN12)	31
14	Common		Common		32
15	No Connection	Channel 13 IN+	No Connection	Channel 13 Current Return (IRTN13)	33
16	No Connection	Channel 14 IN+	No Connection	Channel 14 Current Return (IRTN14)	34
17	No Connection	Channel 15 IN+	No Connection	Channel 15 Current Return (IRTN15)	35
18	No Connection	Channel 16 IN+	No Connection	Channel 16 Current Return (IRTN16)	36

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.

All the common terminals are connected together internally, so any common terminal can be used for the negative lead of the external power supply.

Single-Ended Mode



For single-ended mode, a voltage input should be connected between its Channel IN+ terminal and a Common (COM) return terminal.

A current input should be connected between its Channel IN+ terminal and its Channel Current Return Terminal. In addition, a jumper wire should be connected between the Channel Current Return terminal and a Common (COM) return.

Field Wiring, Differential Mode

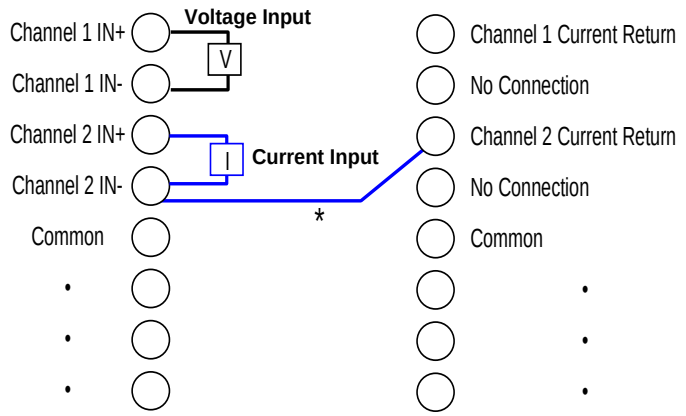
The table below lists wiring connections for Non-Isolated Analog Input Modules configured for Differential mode.

Terminal	8-Channel Modules	16-Channel Modules	8-Channel Modules	16-Channel Modules	Terminal
1	Channel 1 IN+		Channel 1 Current Return (IRTN1)		19
2	Channel 1 IN -		No Connection		20
3	Channel 2 IN+		Channel 2 Current Return (IRTN3)		21
4	Channel 2 IN -		No Connection		22
5	Common		Common		23
6	Channel 3 IN+		Channel 3 Current Return (IRTN5)		24
7	Channel 3 IN-		No Connection		25
8	Channel 4 IN+		Channel 4 Current Return (IRTN7)		26
9	Channel 4 IN-		No Connection		27
10	No Connection	Channel 5 IN+	No Connection	Channel 5 Current Return (IRTN9)	28
11	No Connection	Channel 5 IN-	No Connection	No Connection	29
12	No Connection	Channel 6 IN+	No Connection	Channel 6 Current Return (IRTN11)	30
13	No Connection	Channel 6 IN-	No Connection	No Connection	31
14	Common		Common		32
15	No Connection	Channel 7 IN+	No Connection	Channel 7 Current Return (IRTN13)	33
16	No Connection	Channel 7 IN-	No Connection	No Connection	34
17	No Connection	Channel 8 IN+	No Connection	Channel 8 Current Return (IRTN15)	35
18	No Connection	Channel 8 IN-	No Connection	No Connection	36

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.

All the common terminals are connected together internally, so any common terminal can be used for the negative lead of the external power supply.

Differential Input Mode Connections



* Keep this jumper as short as possible to minimize error due to the added resistance of the wire. This resistance should be 25mΩ or less.

For differential inputs, two adjacent terminals are connected as one channel. The lower-numbered terminal acts as the high side.

A voltage input is connected between the two adjacent Channel IN terminals as shown at left.

A current input is connected between the channel's Channel IN+ and Current Return terminals. In addition, a jumper wire must be connected between the Channel IN - terminal and the corresponding Channel Current Return terminal.

Tie common to signal ground for improved channel-to-channel Crosstalk immunity.

Two door cards are provided with the module: one shows connections for single-ended mode and the other shows connections for differential mode. Insert the card that matches the wiring that will be used.

Release History

Version	*Firmware Revision*	*Description*
IC695ALG608-HC, IC695ALG626-HC, IC695ALG628-HC	2.06	IC695ALG626-FB, IC695ALG628-FB, IC695ALG608-FB (and later) provides the wrong device ID to RX3i PNS (IC695PNS001) and IC695CEP001 modules causing a configuration mismatch.
IC695ALG608-GB, IC695ALG616-GB, IC695ALG626-GB, IC695ALG628-GB	2.00	▪ Updated hardware to address a power-up issue in systems using more than three modules in a single backplane.
IC695ALG608-FB, IC695ALG616-FB, IC695ALG626-FB, IC695ALG628-FB	2.00	▪ Changed processor due to obsolescence. ▪ Modified the 16-bit Integer input value Software Filtering to improve accuracy ▪ Modified error bit handling on odd channels when over voltage condition occurs to be more consistent with even channels. ▪ Added support for determining module serial number and date of manufacture via Proficy* Machine Edition connection.
IC695ALG608-EA, IC695ALG616-EA, IC695ALG626-EA, IC695ALG628-EA	1.01	Label change only. No change in functionality, performance or compatibility.
IC695ALG608-DA, IC695ALG616-DA, IC695ALG626-DA, IC695ALG628-DA	1.01	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.
IC695ALG608-CA, IC695ALG616-CA, IC695ALG626-CA, IC695ALG628-CA	1.01	Updated Hardware
IC695ALG608-BA, IC695ALG616-BA, IC695ALG626-BA, IC695ALG628-BA	1.01	Updated Hardware
IC695ALG608-AA, IC695ALG616-AA, IC695ALG626-AA, IC695ALG628-AA	1.01	Initial Release

Important Product Information for this Release

Updates

Earlier versions of the ALG608, ALG616, ALG626 and ALG628 modules cannot be upgraded in the field to this firmware revision.

Compatibility

Programming Software and CPU Firmware Versions

Requirement	*IC695ALG608 and IC695ALG616*	*IC695ALG626 and IC695ALG628*
Programmer version	5.0 SP3 or newer	5.5 or newer
RX3i CPU version	3.00 or newer	3.50 or newer

Hardware and Firmware Versions

Firmware Version	*Required Hardware Version*
2.00 and later	IC695ALG608-FB, IC695ALG616-FB, IC695ALG626-FB, IC695ALG628-FB and later
1.01	IC695ALG608-EA, IC695ALG616-EA, IC695ALG626-EA, IC695ALG628-EA and earlier