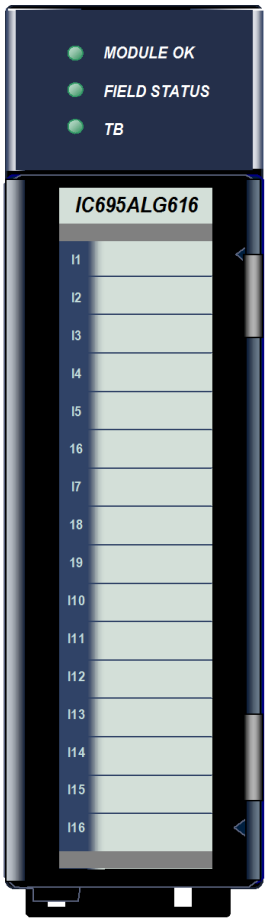
IMPORTANT PRODUCT INFORMATION

GFK-2372W

Mar 2023

PACSystems™ RX3i

NON-ISOLATED ANALOGUE INPUT MODULES WITH HART COMMUNICATION (IC695ALG626, IC695ALG628) NON-ISOLATED ANALOGUE INPUT MODULES (IC695ALG608 & IC695ALG616)



EMERSON™

Product Description

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.

Specifications

Specification	Description		
Input Ranges	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA 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; IC695ALG616: 4.25 W maximum IC695ALG626: 4.50 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 a 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		
Normal Mode Noise Rejection 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 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)		
Isolation Voltage terminal block to backplane/chassis	Opto-isolated, transformer isolated 250 VAC continuous/1500 VAC for 1 minute		

<table>
<tr><th>Specification</th><th>Description</th></tr>
<tr><td>Analog Module Scan Time (in milliseconds)

Configured Filter</td><td>The module scan for analog signals can consist of up to four acquisition cycles. Each cycle includes a specific set of channels. Total Scan Time depends on the number of acquisition cycles in the scan, the configured filter option, and whether channels are analog or HART.</td></tr>
<tr><td>8 Hz filter
12 Hz filter
16 Hz filter
40 Hz filter
200 Hz filter
500 Hz filter
[with filtering and rate detection disabled]
Configured Filter</td><td>
<table>
<tr><td colspan="8">Number of Acquisition Cycles in the Scan (IC695ALG608/616/626/628- Ex and earlier)</td></tr>
<tr><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td></tr>
<tr><td>Analog</td><td>HART</td><td>Analog</td><td>HART</td><td>Analog</td><td>HART</td><td>Analog</td><td>HART</td></tr>
<tr><td>121</td><td>128</td><td>241</td><td>254</td><td>362</td><td>380</td><td>482</td><td>506</td></tr>
<tr><td>81</td><td>88</td><td>161</td><td>174</td><td>242</td><td>260</td><td>322</td><td>346</td></tr>
<tr><td>61</td><td>68</td><td>121</td><td>134</td><td>182</td><td>200</td><td>242</td><td>266</td></tr>
<tr><td>21</td><td>28</td><td>41</td><td>54</td><td>62</td><td>80</td><td>82</td><td>106</td></tr>
<tr><td>5</td><td>12</td><td>9</td><td>22</td><td>14</td><td>32</td><td>18</td><td>42</td></tr>
<tr><td>3</td><td>N/A</td><td>5
[6]</td><td>N/A</td><td>7
[9]</td><td>N/A</td><td>9
[12]</td><td>N/A</td></tr>
</table>
</td></tr>
<tr><td>8 Hz filter
12 Hz filter
16 Hz filter
40 Hz filter
200 Hz filter
500 Hz filter
[with filtering and rate detection disabled]</td><td>
<table>
<tr><td colspan="8">Number of Acquisition Cycles in the Scan (C695ALG608/616/626/628- Fx and later)</td></tr>
<tr><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td></tr>
<tr><td>Analog</td><td>HART</td><td>Analog</td><td>HART</td><td>Analog</td><td>HART</td><td>Analog</td><td>HART</td></tr>
<tr><td>122</td><td>124</td><td>247</td><td>248</td><td>367</td><td>375</td><td>494</td><td>500</td></tr>
<tr><td>82</td><td>85</td><td>164</td><td>169</td><td>247</td><td>255</td><td>329</td><td>337</td></tr>
<tr><td>62</td><td>65</td><td>127</td><td>130</td><td>188</td><td>191</td><td>252</td><td>258</td></tr>
<tr><td>25</td><td>26</td><td>50</td><td>50</td><td>76</td><td>72</td><td>100</td><td>93</td></tr>
<tr><td>6</td><td>12</td><td>12</td><td>17</td><td>19</td><td>24</td><td>26</td><td>32</td></tr>
<tr><td>3</td><td>N/A</td><td>7
[6]</td><td>N/A</td><td>11
[9]</td><td>N/A</td><td>15
[12]</td><td>N/A</td></tr>
</table>
</td></tr>
<tr><td>HART Data Scan Time (in seconds)</td><td>The HART data scan can consist of up to four acquisition cycles (similar but asynchronous to the analog scan time). Each cycle includes a specific set of channels. Total HART scan time depends on the number of channels enabled for HART within a specific set of channels, the number of retries, enabling/disabling of slot variables, and the use and configuration settings of pass-thru commands.
<table>
<tr><td>Channels in Group Enabled for HART:</td><td>Each HART Data channel updates every:</td></tr>
<tr><td>One</td><td>0.7 seconds (typical)</td></tr>
<tr><td>Two</td><td>1.9 seconds (typical)</td></tr>
<tr><td>Three</td><td>3.0 seconds (typical)</td></tr>
<tr><td>Four</td><td>4.0 seconds (typical)</td></tr>
</table>
</td></tr>
</table>

Specification	Description
Calibrated Accuracy In the presence of severe RF interference (IC 801-3, 10V/M), accuracy may be degraded by ±1.5% of the range.	From 13°C – 33°C: ±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.
	From 0°C – 60°C: 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.
Calibration Interval	12 months is typical to meet accuracy specifications over time. Offset can be applied as a periodic calibration adjustment.

Installation Location

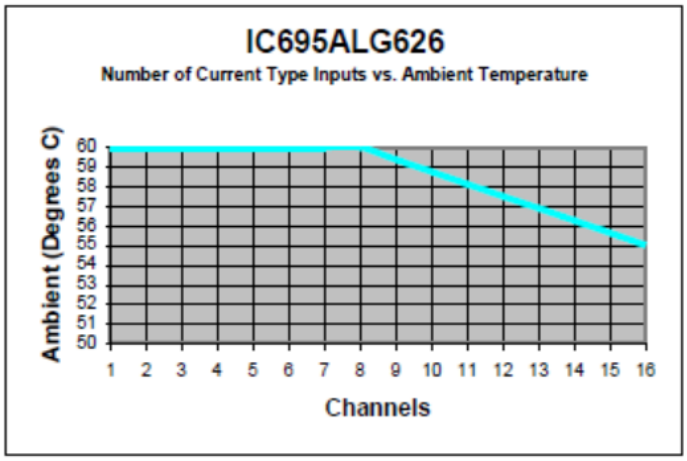
This product is intended for use with the RX3i system. Its components are considered open equipment (having live electrical parts that may be accessible to users) and must be installed in an ultimate enclosure that is manufactured to provide safety. At a minimum, the enclosure shall provide a degree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

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

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.

Figure 1: Thermal Derating



LED STATUS

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	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 the module

Field Wiring, Single-Ended Mode

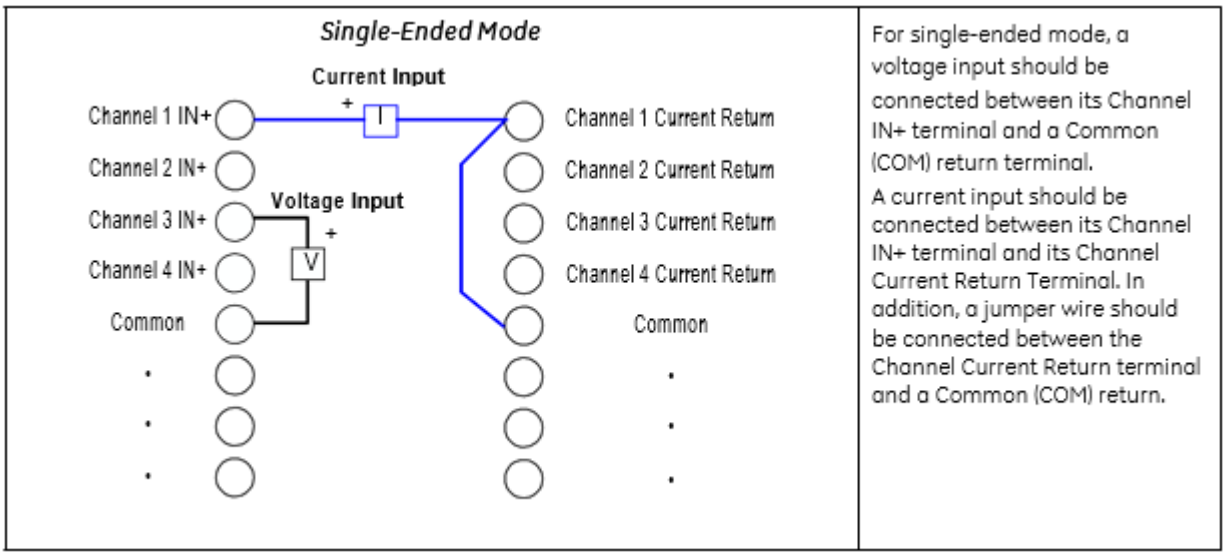
The table below lists wiring connections for Non-Isolated Analog Input Modules in Single-ended mode. Single-ended mode is the configured default operating mode.

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 internally, so any common terminal can be used for the negative lead of the external power supply.

Figure 2: Field Wiring - Single End Mode



Field Wiring, Differential Mode

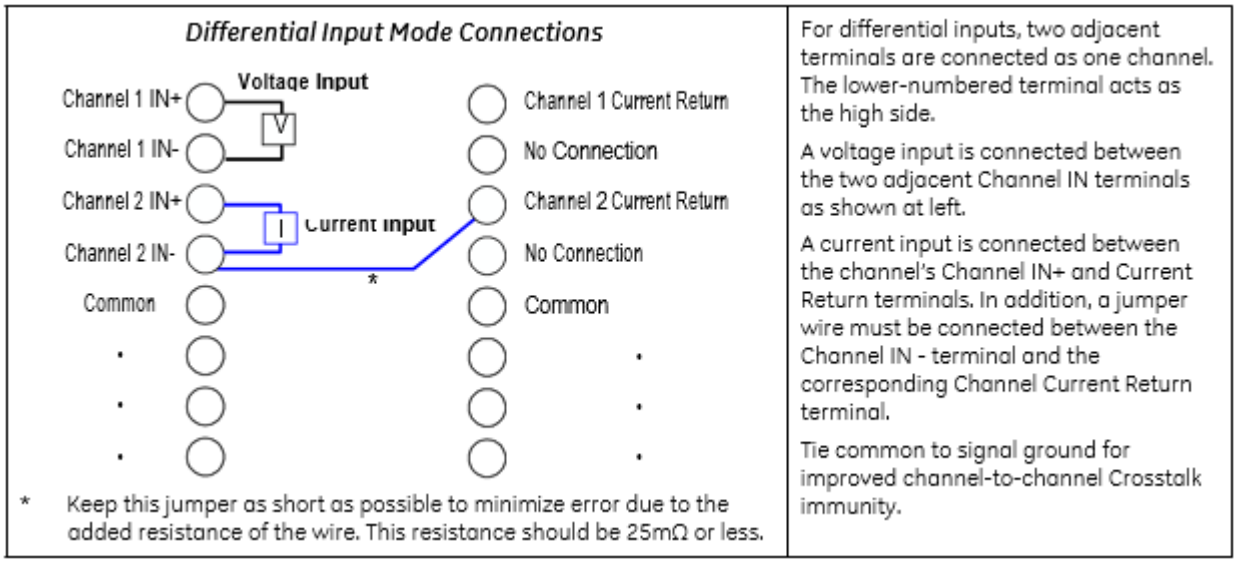
The table below lists wiring connections for Non-Isolated Analog Input Modules configured for Differential mode.

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 (IRTN2)		21
4	Channel 2 IN-		No Connection		22
5	Common		Common		23
6	Channel 3 IN+		Channel 3 Current Return (IRTN3)		24
7	Channel 3 IN-		No Connection		25
8	Channel 4 IN+		Channel 4 Current Return (IRTN4)		26
9	Channel 4 IN-		No Connection		27
10	No Connection	Channel 5 IN+	No Connection	Channel 5 Current Return (IRTN5)	28
11	No Connection	Channel 5 IN-	No Connection		29
12	No Connection	Channel 6 IN+	No Connection	Channel 6 Current Return (IRTN6)	30
13	No Connection	Channel 6 IN-	No Connection Channel 12 Current Return (IRTN12)		31
14	Common		Common		32
15	No Connection	Channel 7 IN+	No Connection	Channel 13 Current Return (IRTN7)	33
16	No Connection	Channel 7 IN-	No Connection		34
17	No Connection	Channel 8 IN+	No Connection	Channel 15 Current Return (IRTN8)	35
18	No Connection	Channel 8 IN-	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 internally, so any common terminal can be used for the negative lead of the external power supply.

Figure 3: Field Wiring - Differential Mode



Release History

Module Version	Date	Firmware Revision	Description
IC695ALG626-LJ (with HART) IC695ALG626CA-LJ (with HART)	Mar 2023	2.13	Resolves issues listed in "Problems Resolved with this Release".
IC695ALG608-LG IC695ALG608CA-LG IC695ALG616-MG IC695ALG616CA-MG IC695ALG626-LG IC695ALG626CA- LG IC695ALG626- LG IC695ALG628CA- LG	Aug 2022	2.11	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
IC695ALG608-KG IC695ALG608CA-KG IC695ALG616-LG IC695ALG616CA-LG IC695ALG626-KG IC695ALG626CA-KG IC695ALG628-KG IC695ALG628CA-KG	Jul 2020	2.11	This change addresses component obsolescence with a new FW to support a drop-in replacement serial flash device. There are no changes to form, fit or function.

Module Version	Date	Firmware Revision	Description
IC695ALG608-KF IC695ALG608CA-KF IC695ALG616-LF IC695ALG616CA-LF IC695ALG626-KF IC695ALG626CA-KF IC695ALG628-KF IC695ALG628CA-KF	May 2019	2.10	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 the material, process, form, fit, or functionality.
IC695ALG608-JF IC695ALG608CA-JF IC695ALG616-KF IC695ALG616CA-KF IC695ALG626-JF IC695ALG626CA-JF IC695ALG628-JF IC695ALG628CA-JF	May 2019	2.10	Hardware update that improves manufacturability robustness. Nochange to form, fit, or functionality.
IC695ALG608-HF IC695ALG608CA-HF IC695ALG616-JF IC695ALG616CA-JF IC695ALG626-HF IC695ALG626CA-HF IC695ALG628-HF IC695ALG628CA-HF	Nov 2017	2.10	Corrects a condition where alarm faults and interrupts may not trigger and adds the v2.09 fix into the ALG608, ALG616, and ALG628 modules. Also corrects an FW upgrade issue on the ALG616.
IC695ALG626-HE IC695ALG626CA-HE	Oct 2017	2.09	The -HC/-HD version modules would occasionally report all '0' data back to the CPU due to a bug in its PCI interface logic. This has been corrected in ALG626-HE v2.09. in the v2.09 FW release for the ALG626.
IC695ALG608-HD IC695ALG608CA-HD IC695ALG616-HD IC695ALG616CA-HD IC695ALG626-HD IC695ALG626CA-HD IC695ALG628-HD IC695ALG628CA-HD	Dec 2016	2.08	Provided resolution to issues introduced in firmware version 2.00 (- FB): • Point fault not set on open wire detect • [F] and [NF] contacts operate incorrectly • [HA] and [LA] contacts operate incorrectly on new HW platform ALG628 & ALG626 • [HA] and [LA] contacts operate incorrectly on new HW platform ALG608 & ALG616
IC695ALG608-HC IC695ALG608CA-HC IC695ALG626-HC IC695ALG626CA-HC IC695ALG628-HC IC695ALG628CA-HC	Dec 2014	2.06	IC695ALG626-FB, IC695ALG628-FB, IC695ALG608-FB (and later) provide the wrong device ID to RX3i PNS (IC695PNS001) and IC695CEP001 modules causing a configuration mismatch.

Module Version	Date	Firmware Revision	Description
IC695ALG608-GB IC695ALG608CA-GB IC695ALG616-GB IC695ALG616CA-GB IC695ALG626-GB IC695ALG626CA-GB IC695ALG628-GB IC695ALG628CA-GB	Jun 2014	2.00	Updated hardware to address a power-up issue in systems using more than three modules in a single backplane.
IC695ALG608-FB IC695ALG608CA-FB IC695ALG616-FB IC695ALG616CA-FB IC695ALG626-FB IC695ALG626CA-FB IC695ALG628-FB IC695ALG628CA-FB	Oct 2013	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 the over-voltage condition occurs to be more consistent with even channels. • Added support for determining module serial number and date of manufacture via PAC Machine Edition connection.
IC695ALG608-EA IC695ALG608CA-EA IC695ALG616-EA IC695ALG616CA-EA IC695ALG626-EA IC695ALG626CA-EA IC695ALG628-EA IC695ALG628CA-EA	Jul 2010	1.01	Label change only. No change in functionality, performance, or compatibility.
IC695ALG608-DA IC695ALG608CA-DA IC695ALG616-DA IC695ALG616CA-DA IC695ALG626-DA IC695ALG626CA-DA IC695ALG628-DA IC695ALG628CA-DA	May 2009	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 IC695ALG608CA-CA IC695ALG616-CA IC695ALG616CA-CA IC695ALG626-CA IC695ALG626CA-CA IC695ALG628-CA IC695ALG628CA-CA	Jul 2008	1.01	Updated Hardware

Module Version	Date	Firmware Revision	Description
IC695ALG608-BA IC695ALG608CA-BA IC695ALG616-BA IC695ALG616CA-BA IC695ALG626-BA IC695ALG626CA-BA IC695ALG628-BA IC695ALG628CA-BA	Oct 2006	1.01	Updated Hardware
IC695ALG608-AA IC695ALG608CA-AA IC695ALG616-AA IC695ALG616CA-AA IC695ALG626-AA IC695ALG626CA-AA IC695ALG628-AA IC695ALG628CA-AA	Oct 2006	1.01	Initial Release

Important Product Information for this Release

Updates

Firmware version 2.13 is released to manufacturing for full production and as a web upgrade kit.

This release resolves issues listed in “Problems Resolved with this Release”.

Only IC695ALG626 modules are field upgradable to this firmware release using the upgrade kit listed below. The upgrade is available via download from the Emerson support website listed at the end of this document.

Upgrade Kit Part Number: 41G1880-FW01-000-A4

File Name: 41G1880-FW01-000-A4.zip

Download: Follow the support links at the end of this document.

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
2.10 and later	IC695ALG608-HC, IC695ALG616-JF, IC695ALG626-HC, IC695ALG628-HC
2.06 and 2.08	IC695ALG608-HC, IC695ALG616-GB, IC695ALG626-HC, IC695ALG628-HC
2.00	IC695ALG608-FB, IC695ALG616-FB, IC695ALG626-FB, IC695ALG628-FB
1.01	IC695ALG608-EA, IC695ALG616-EA, IC695ALG626-EA, IC695ALG628-EA and earlier

Problems Resolved with this Release

Subject	ID Code	Description
HART multiplexer rediscover activation causes loss of I/O module fault	DE4338 00558815 01908299 01921636	Using the Rediscover functionality of the PACSystems HART Multiplexer Configuration Tool can cause HART Pass Through enabled I/O modules in the system to be lost and require a power cycle to recover. Failure modes included the module becoming unresponsive, entering a blink code, or going lights out.

Known Restrictions and Open Issues for Modules IC695ALG608, IC695ALG616, IC695ALG628, and IC695ALG626

1. Problem: The module should generate a Loss of Terminal Block fault if its terminal block is not present or not properly locked when the module is hot-inserted and power-cycled. When the module is operating with its first configuration, it generates the Loss of Terminal Block fault properly. However, after the module is reconfigured, it does not.

   Recommendation: To restore the operation of this fault message you can:

   A. Clear the hardware configuration from the Controller memory, then download a new configuration. B. Power cycle the Controller without a battery and configure the module.

2. Problem: Using an SVC_REQ 24 to reset an ALG608, ALG616, ALG626 or ALG628 module causes the module to lose its configuration and become inoperable.

   Recommendations: To restore the configuration and resume module operation, reset or power cycle the module.

   To prevent problems, use SVC_REQ 24 only as a one-shot and wait at least 5 seconds between re-execution of an SVC_REQ 24 reset request to the same module.

3. The IC695ALG628 and IC695ALG626 modules do not support the Honeywell STT 3000 Smart Temperature Transmitter.

4. Problem: The IC695ALG628 and IC695ALG626 modules do not fully support HART slot code units and slot code assignments. If slot codes are enabled and the HART device is disconnected/reconnected, or the module is hot-swapped or power cycled, PAC Machine Edition will report Slot Code Units and Slot Code Assignments as zero.

   To restore correct reporting of slot code units and slot code assignments, store the module configuration twice.

5. Problem: On IC695ALG628 and IC695ALG626, HART dynamic variable units; PMPV Units, SV Units, TV Units, and FV Units are not updated following HART device reconnect or module hot-swap/power cycle. The units are properly updated after a configuration is stored in PAC Machine Edition or when HART data changes and the HART device signals the data change.

Operating Notes

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 scan. The next Controller input scan always clears this interrupt status bit back to 0, because Diagnostic Reporting has it disabled.

Error Bit States for firmware revisions 1.01 and earlier

On Analog Input module versions –EA and earlier, odd channels respond differently than even channels when configured as voltage inputs, and an over voltage condition occurs. When an odd-numbered channel (1, 3, 5, 7, 9, 11, 13, or 15) is configured as a voltage input (±10V, 0V to +10V, 0V to +5V, ±5V, 1V to +5V) and the voltage applied to any of the odd-numbered channels exceeds 10.7V, the reference value incorrectly indicates the maximum negative engineering units value configured for that channel. Furthermore, the diagnostic bits for the odd-numbered channels behave differently as detailed in tables 1 and 2 below.

Note: *This condition does not occur on odd-numbered channels configured as current inputs or on any even-numbered channels.*

Table 1: Diagnostic Bit Values for Channel Input Voltage 10.0V to 10.7V: Revision EA & Earlier

Error bit States for input voltage over 10.0 volts but less than 10.7 volts							
Channel	**High-High Alarm**	**Low-Low Alarm**	**Open Wire**	**Over Range**	**Under Range**	**High Alarm**	**Low Alarm**
Odd-numbered Channels	1	0	0	1	0	1	0
Even-numbered Channels	1	0	0	1	0	1	0

Table 2: Diagnostic Bit Values for Channel Input Voltage above 10.7V: Revision EA & Earlier

Error bit States for input voltage 10.7 volts and above							
Channel	**High-High Alarm**	**Low-Low Alarm**	**Open Wire**	**Over Range**	**Under Range**	**High Alarm**	**Low Alarm**
Odd-numbered Channels	0	1	1	0	1	0	1
Even-numbered Channels	1	0	0	1	0	1	0

Recommendation

If the application is at risk of exceeding 10.7V on an odd-numbered channel configured as voltage input, you should perform any combination of the following:

1. Put measures in place to prevent the input voltage from exceeding 10.7V.

2. Implement logic to detect a negative value of max engineering units on any odd-numbered channel configured for voltage inputs. This max negative value should be interpreted as either the channel is at a maximum negative voltage or the voltage has exceeded 10.7V.

Error Bit States for firmware revisions 2.00 and all later revisions

For IC695ALG616-FB and later, IC695ALG608-FB and later, IC695ALG626-FB and later, and IC695ALG628-FB and later: the operation of these diagnostics bits has been modified to be more consistent between odd-numbered and even-numbered channels. The diagnostic bit operation for these module revisions is detailed in tables 3 and 4 below:

Table 3: Diagnostic Bit Values for Channel Input Voltage 10.0V to 10.7V: Revisions FB and Later

Error bit States for input voltage over 10.0 volts but less than 10.7 volts							
Channel	**High-High Alarm**	**Low-Low Alarm**	**Open Wire**	**Over Range**	**Under Range**	**High Alarm**	**Low Alarm**
Odd-numbered Channels	1	0	0	1	0	1	0
Even-numbered Channels	1	0	0	1	0	1	0

Table 4: Diagnostic Bit Values for Channel Input Voltage above 10.7V: Revisions FB and Later

Error bit States for input voltage 10.7 volts and above							
Channel	**High-High**	**Low-Low**	**Open Wire**	**Over Range**	**Under Range**	**High Alarm**	**Low Alarm**
Odd-numbered Channels	1	0	1	1	0	1	0
Even-numbered Channels	1	0	0	1	0	1	0

Open Wire Faults on Even-Numbered Channels on all revisions

When an even-numbered channel (2, 4, 6, 8, 10, 12, 14, or 16) is configured as a voltage input (±10V, 0V to +10V, 0V to +5V, ±5V, 1V to +5V) and the voltage applied to any of the even-numbered channels falls below -12.7V, an open wire fault may be logged for that channel.

Notes on Open Wire State on all Channels

During an open wire condition, the channels are in a floating, high impedance state. It has been observed that if an open wire fault has been cleared for a channel that is still in an open wire state, the open wire fault may be triggered again due to switching artifacts from other channels. Noise on the line may also trigger this as well. This is normal behavior and can be resolved by disabling the channel that is no longer used, or resolving the open wire condition to a no-fault state.

Open Wire Faults on Even-Numbered Channels for IC695ALG626 and IC695ALG628

When an even-numbered channel (2, 4, 6, 8, 10, 12, 14, or 16) is configured as a voltage input (±10V, 0V to +10V, 0V to +5V, ±5V, 1V to +5V), the open circuit detect time increases from 1 second or less to 6 seconds. Odd-numbered channels on the HART modules and all channels on the non-HART modules maintain the specified open circuit detection time of 1 second or less.

Notes on HART Final Assembly Number byte ordering for IC695ALG626 and IC695ALG628

The final assembly number is returned from a HART device using HART command 16. The final assembly number is returned from a HART device as four bytes. The bytes are combined to form a number with byte 3 always being zero. The order seen in PAC Machine Edition for the reported final assembly number is byte 3, 0, 1, and 2.

HART Noise Sensitivity

For IC695ALG626-FB and later and IC695ALG628-FB and later: noise sensitivity testing was conducted in accordance with the guidelines defined in HART Communication Foundation Document Number: HCF_TEST-2Rev. 2.2. Noise sensitivity test conditions are valid for low impedance devices provided that the carrier current is maintained within the 4-20 mA range.

HART Pass-Thru

For IC695ALG626-FB and later and IC695ALG628-FB and later: if a COMMREQ to read primary variables is issued using a task ID other than “1”, the result will return with a valid response instead of the expected “ERROR 0x003 Invalid command” response.

HART Modules Open Circuit Detect

For IC695ALG626 (all revisions) and IC695ALG628 (all revisions): open circuits are not detected for even channels configured for single-ended current mode if the current return is tied to the common pin.

For IC695ALG626 (all revisions) and IC695ALG628 (all revisions): open circuit detection time for even-numbered channels may take up to 4 seconds in single-ended mode. Odd-numbered channels take up to 1 second.

HART Modules Channel Faults

For IC695ALG626 (all revisions) and IC695ALG628 (all revisions): additional high and high-high alarms may be triggered for channels 1, 5, 9, or 13 (the first channel in each multiplexed group) when dropping the channel input from an over-range condition. Additionally, the affected channels may experience high channel readings if open circuited and voltages over 6V are present on other channels within their multiplexed group.

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)

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

Europe

Phone: +800-4444-8001
+420-225-379-328 (If toll-free option is unavailable)
+39-0362-228-5555 (from Italy - if the 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

Asia

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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