

15.1 RTD Input 8-Channel Isolated Module IC695ALG508

The **RTD Input** module, IC695ALG508, provides eight isolated differential RTD input channels. Each channel can be individually configured for:

RTD Inputs:	50, 100, 200, 500, and 1000 Ω Pt 385
	50, 100, 200, 500, and 1000 Ω Pt 391.6
	100, 200, 500, and 1000 Ω Ni 618
	120 Ω Ni 672
	604 Ω NiFe 518
	10, 50 and 100 Ω Cu 426
Resistance Inputs:	250, 500, 1000, 2000, 3000, and 4000 Ω

15.1.1 Features

- Completely software-configurable, no module jumpers to set
- RTD Linearization based on ITS-90
- 32-bit IEEE floating-point or 16-bit integer (in 32-bit field) input data format selectable per channel
- Temperature units selectable in $^{\circ}\text{C}$ and $^{\circ}\text{F}$
- User Scaling
- Programmable notch filter from 2.3Hz to 28Hz per channel
- Under range/Over range alarm detection and reporting by channel
- Alarm dead band for high alarm, low alarm, high-high alarm, and low-low alarm by channel
- Wire-off (open circuit) condition support for all inputs.
- Module fault status reporting (Watchdog, Ram Fail, Flash Fail)
- Module identity and status reporting including LED status indicators
- Support for 2, 3, or 4-wire RTD types for each channel.
- For Resistance inputs, fixed 2-wire measurement mode.
- Periodic Lead Resistance compensation measurement update enable/disable control for 3-wire RTDs. When enabled, Module will switch to measure the lead resistance once every 100 samples, and will use this value for the next 100 samples.

- RTD user offset support for all channels
- Terminal Block detection switch.
- Module must be located in an RX3i Universal Backplane.
- Module supports insertion into and removal from an RX3i Universal Backplane which is under power. Refer to *Hot Insertion and Removal*.

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. Terminal Blocks are ordered separately.

Figure 371:
IC695ALG508



15.1.3 LEDs: ALG508

Module **OK** LED indicates module status. The **Field Status** LED indicates whether the external +24 Vdc power supply is present and is above the minimum level and whether or not faults are present. All LEDs are powered from the backplane power bus.

LED	Indication	Meaning
Module OK	Off	Module is defective or no backplane power present
	Solid Green	Module OK and configured
	Blinking Green, rapidly	Module performing power-up sequence
	Blinking Green or Amber, slowly	Module OK but not configured.
Field Status	ON Green	No faults on any enabled channel, Terminal Block is present, and field power is present.
	ON Amber and TB Green	Terminal Block is installed, fault on at least one channel, or field power is not present.
	ON Amber and TB Red	Terminal Block not fully removed, field power still detected.
	OFF and TB Red	Terminal block not present and no field power is detected.
TB	ON Red	Terminal block not present or not fully seated. Refer to above.
	ON Green	Terminal block is present. Refer to above.
	OFF	No backplane power to module.

15.1.4 Specifications: ALG508

Specification	Description		
Number of Channels	8		
Measuring method selectable per channel	RTD/resistance: up to 4 k Ω		
RTD input types	50, 100, 200, 500, and 1000 Ω Platinum 385 (IEC751 1983, Amend 2 1995; JISC 1604 1997) 50, 100, 200, 500, and 1000 Ω Platinum 391.6 (JISC 1604: 1981) 100, 200, 500, and 1000 Ω Nickel 618 (DIN 43760 Sept. 1987) 120 Ω Nickel 672 (MINCO Application Aid #18, 5/90 Type Ni) 10, 50, and 100 Ω Copper 426 (SAMA RC21-4-1966) 604 Ω Nickel-Iron 518		
Resistance Input Types	0-260, 0-525, 0-1050, 0-2100, 0-3150, 0-4200 Ω		
Maximum RTD Lead Resistance	25 Ω each side, for a total of 50 Ω .		
RTD and Resistance Input Types	Input Type	Resistance Range Supported (Ω)	Excitation Current
	Resistance	0-260, 0-525	0.717 mA
		0-1050, 0-2100, 0-3150, 0-4200	0.238 mA
	Platinum 385	50	1.175 mA
		100	0.717 mA
		200, 500, 1000	0.238 mA
	Platinum 391.6	50	1.175 mA
		100, 200	0.717 mA
		500, 1000	0.238mA
	Nickel 672	120	0.717 mA
	Nickel 618	100,200	0.717 mA
		500,1000	0.238 mA
Nickel-Iron 518	604	0.238 mA	
Copper 426	10	1.654 mA	
	50, 100	1.175 mA	
RTD Ranges	RTD Type	Low temp ($^{\circ}\text{C}$)	High temp ($^{\circ}\text{C}$)
	Copper 426	-100.0	+260.0
	Nickel 618	-100.0	+260.0
	Nickel 672	-80.0	+260.0
	Nickel-Iron 518	-100.0	+200.0
	Platinum 385	-200.0	+850.0
	Platinum 391.6	-200.0	+630.0
Temperature accuracy for inputs from 4-wire RTDs over temperature span (2.3, 4, and 4.7 Hz filters). This data does do not include the RTD sensor accuracy, which must be included when determining the overall system performance.	RTD Type	+25$^{\circ}\text{C}$	0 to +60$^{\circ}\text{C}$
	50 Ω Platinum 385	$\pm 1.0^{\circ}\text{C}$	$\pm 1.7^{\circ}\text{C}$
	100 Ω Platinum 385	$\pm 0.7^{\circ}\text{C}$	$\pm 1.2^{\circ}\text{C}$
	200 Ω Platinum 385	$\pm 0.6^{\circ}\text{C}$	$\pm 1.0^{\circ}\text{C}$
	500 Ω Platinum 385	$\pm 0.5^{\circ}\text{C}$	$\pm 0.9^{\circ}\text{C}$
	1000 Ω Platinum 385	$\pm 0.5^{\circ}\text{C}$	$\pm 0.9^{\circ}\text{C}$
	100 Ω Platinum 391.6	$\pm 0.6^{\circ}\text{C}$	$\pm 1.1^{\circ}\text{C}$
	200 Ω Platinum 391.6	$\pm 0.5^{\circ}\text{C}$	$\pm 0.9^{\circ}\text{C}$

Specification	Description		
<p>Three-wire RTDs have similar accuracies, but depend on the lead resistances being balanced.</p> <p>For 2-wire RTDs, the lead resistance of the RTD contributes to the temperature error.</p> <p>All tolerances double when 24 or 28 Hz filters are used</p>	500 Ω Platinum 391.6	±0.4°C	±0.8°C
	1000 Ω Platinum 391.6	±0.4°C	±0.8°C
	Nickel 672	±0.3°C	±0.5°C
	Nickel 618	±0.3°C	±0.5°C
	Nickel-Iron 518	±0.4°C	±0.7°C
	10 Ω Copper 426	±1.0°C	±2.4°C
	50 Ω Copper 426	±0.8°C	±1.9°C
	100 Ω Copper 426	±0.8°C	±1.9°C
<p>Temperature accuracy for Resistance inputs</p>	Resistance	+25°C	0 to +60°C
	250 Ω	±0.25 Ω	±0.35 Ω
	500 Ω	±0.3 Ω	±0.45 Ω
	1000 Ω	±0.5 Ω	±0.8 Ω
	2000 Ω	±0.9 Ω	±1.5 Ω
	3000 Ω	±1.3 Ω	±2.2 Ω
	4000 Ω	±1.7 Ω	±2.9 Ω
Measurement Units	Degrees C or F, or Ω		
Repeatability	0.05% of span at a constant temperature over a 30-second period (0.1% for 10 Ω copper, 28 Hz filter)		
Diagnostics reported to the controller	User configurable for Over Range, Under Range, High and Low Alarm, High-high and Low-low alarm, Open Circuit Detection, Positive and Negative Rate of change alarm		
Service Requests	Report module firmware revision		
Hot-Swap	Supports removal and replacement under power		
Calibration	Module should be field calibrated via the configuration software.		
Channel-to-channel crosstalk	70 dB minimum at 120 mS update rate for all channels		
Common Mode Rejection	2.3 Hz filter, 50/60 Hz:	100 dB for 4-wire,	
		90 dB for 2- and 3-wire	
	4 Hz filter, 50/60 Hz:	100 dB	
	4.7 Hz filter, 50/60 Hz:	100 dB	
	24 Hz, 28 Hz filter 50/60 Hz:	80 dB	
Default or Hold Last State	For each of fault and disabled modes, the configuration will specify either to default a channel input to 0 or hold the last state of the input		
Fault Reporting	The configuration can enable or disable fault reporting for either of under or over range alarm, open circuit, and rate of change alarm.		
Rate of change	For each channel, the configuration can enable/disable and specify a positive and negative rate of change alarms.		
Channel Value Format	16-bit integer (in a 32-bit field) or 32-bit real number data for each channel.		
Power Consumption	ALG508-CA and earlier: 3.3 Vdc: 400 mA; 5.0 Vdc: 200 mA		
	ALG508-DB and later: 3.3 Vdc: 315 mA; 5.0 Vdc: 120 mA		
Excitation Current	0.238mA-1.654 mA, depending on the input range.		
Power Dissipation	2.5 W max		
Isolation Voltage (Field to Backplane and Channel to Channel)	250 Vac Continuous		
	1500 Vac 1 minute		
	2550 Vdc 1 second		

Specification		Description	
Normal Mode Noise Rejection		2.3 Hz filter, 50 Hz:	67 dB
		2.3 Hz filter, 60 Hz:	67 dB
		4.0 Hz filter, 50 Hz:	80 dB
		4.7 Hz filter, 60 Hz:	80 dB
		24 Hz filter, 50 Hz:	25 dB
		28 Hz filter, 60 Hz:	25 dB
Filter Settings, Update Times, Rejection, and Resolution	Filter Frequency (-3 dB frequency)	Update Time (ms)	Normal Mode Rejection at 50/60 Hz
	2.3 Hz	120 (130 max)	67 dB at 50/60 Hz
	4.0 Hz	70 (80 max)	80 dB at 50 Hz
	4.7 Hz	60 (70 max)	80 dB at 60 Hz
	24.0 Hz	20 (30 max)	25 dB at 50 Hz
	28.0 Hz	15 (25 max)	25 dB at 60 Hz