MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GENERAL ELECTRIC

IC693ALG392

ANALOG CURRENT VOLTAGE OUTPUT MODULE

Used with the applicable Series 90-30 configuration.

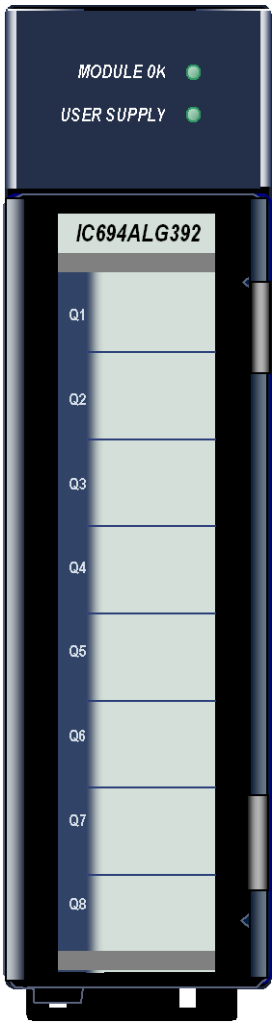
REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: GE Intelligent Platforms GFK-2557C, ALG392 analog output modules

GFK-2557C
May 2012



The PACSystems* ***8-Channel Analog Current/Voltage Output*** module, ALG392, provides up to eight single-ended output channels with current loop outputs and/or voltage outputs. Each output channel can be set up using the configuration software for any of these ranges:

- 0 to +10 volts (unipolar)
- -10 to +10 volts (bipolar)
- 0 to 20 milliamps
- 4 to 20 milliamps

Each channel is capable of converting 15 to 16 bits (depending on the range selected) of binary data to an analog output. All eight channels are updated every 8 milliseconds.

In current modes, the module reports an Open Wire fault to the CPU for each channel. The module can go to a known last state when system power is interrupted. As long as external power is applied to the module, each output will maintain its last value or reset to zero, as configured.

This module can be installed in any I/O slot of an RX3i or Series 90-30 system.

Isolated +24 VDC Power

The module must receive its 24 VDC power from an external source, which must be connected directly to the module's terminal block.

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Specifications: ALG392

Number of Output Channels	1 to 8 selectable, single–ended
Output Current Range	4 to 20 mA and 0 to 20 mA
Output Voltage Range	0 to 10 V and –10 V to +10 V
Calibration	Factory calibrated to .625 µA for 0 to 20 mA; 0.5 µA for 4 to 20 mA; and .3125 mV for voltage (per count)
User Supply Voltage (nominal)	+24 VDC, from user supplied voltage source
External Supply Voltage Range	20 VDC to 30 VDC
Power Supply Rejection Ratio (PSRR)	
Current	5 µA/V (typical), 10 µA/V (maximum)
Voltage	25 mV/V (typical), 50 mV/V (maximum)
External Power Supply Voltage Ripple	10% (maximum)
Internal Supply Voltage	+5 VDC from PLC backplane
Update Rate	8 milliseconds (approximate, all eight channels) Determined by I/O scan time, application dependent.
Resolution:	**4 to 20mA:** 0.5 µA (1 LSB = 0.5 µA)
	0 to 20mA: 0.625 µA (1 LSB = 0.625 µA)
	0 to 10V: 0.3125 mV (1 LSB = 0.3125 mV)
	-10 to +10V: 0.3125 mV (1 LSB = 0.3125 mV)
Absolute Accuracy: [1]	
Current Mode	+/-0.1% of full scale @ 25°C (77°F), typical +/-0.25% of full scale @ 25°C (77°F), maximum +/-0.5% of full scale over operating temperature range (maximum)
Voltage Mode	+/-0.25% of full scale @ 25°C (77°F), typical +/-0.5% of full scale @ 25°C (77°F), maximum +/-1.0% of full scale over operating temperature range (maximum)
Maximum Compliance Voltage	V_{USER} –3 V (minimum) to V_{USER} (maximum)
User Load (current mode)	0 to 850 Ω (minimum at V_{USER} = 20 V, maximum 1350 Ω at V_{USER} = 30 V) (Load less than 800 Ω is temperature dependent.)
Output Load Capacitance (current mode)	2000 pF (maximum)
Output Load Inductance (current mode)	1 H
Output Loading (voltage mode)	5 mA (2 K Ohms minimum resistance)
Output load Capacitance	(1 µF maximum capacitance)
Isolation, Field to Backplane (optical) and to frame ground	250 VAC continuous; 1500 VDC for 1 minute
Power Consumption	110 mA from +5 VDC PLC backplane supply
	315 mA from +24 VDC user supply

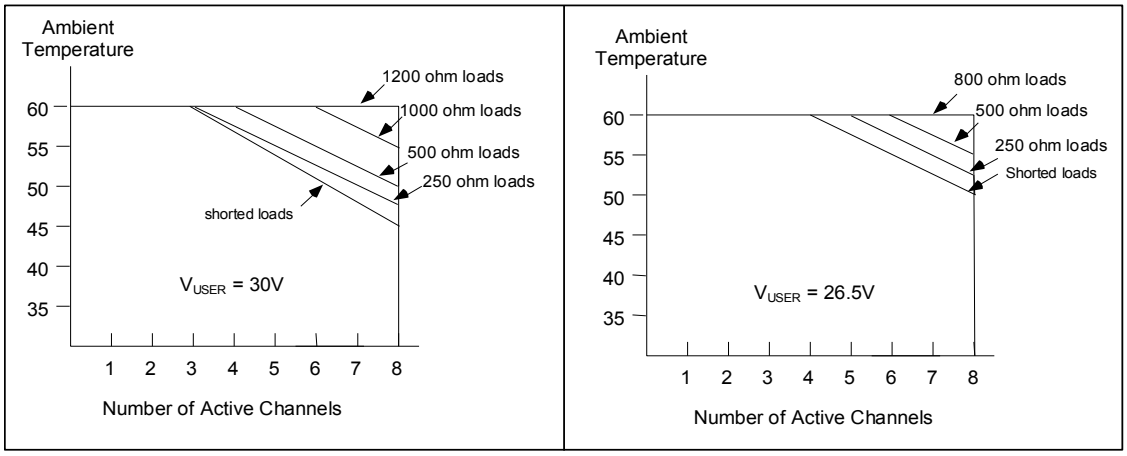
[1] In the presence of severe RF interference, accuracy may be degraded to ±1% full scale (FS) for current outputs and ±3% FS for voltage outputs.

Refer to the *PACSystems RX3i Systems Manual*, GFK-2314, for product standards and general specifications. In order to meet the levels for RF Susceptibility specified in Appendix A of the *PACSystems RX3i System Manual,* when this module is present, the system must be mounted in a metal enclosure.

Derating Curves: ALG392

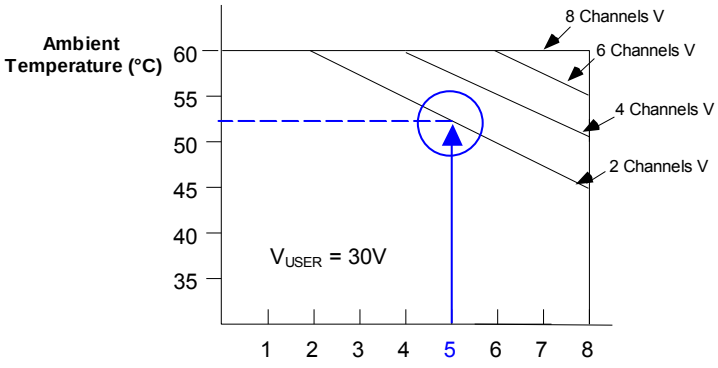
For maximum performance and module life, the module should be operated at maximum load resistance to offload heat. Module thermal deratings depend on the voltage level and the use of current and voltage outputs. The first two charts below show the maximum surrounding air temperature for current-only modules at 30 VDC and at 26.5 VDC.

Current Outputs Only



Mixed Current and Voltage Outputs

In the example shown below, voltage channels have 2 KOhm loads and current channels have shorted loads. To determine the maximum operating temperature for mixed current and voltage outputs, select the line in the chart below that corresponds to the number of voltage channels being used. For example, a module uses 2 voltage channels and 3 current channels. The total channels are 5, and the maximum operating temperature is approximately 52.5°C:



Active Channels Current and Voltage Mixed

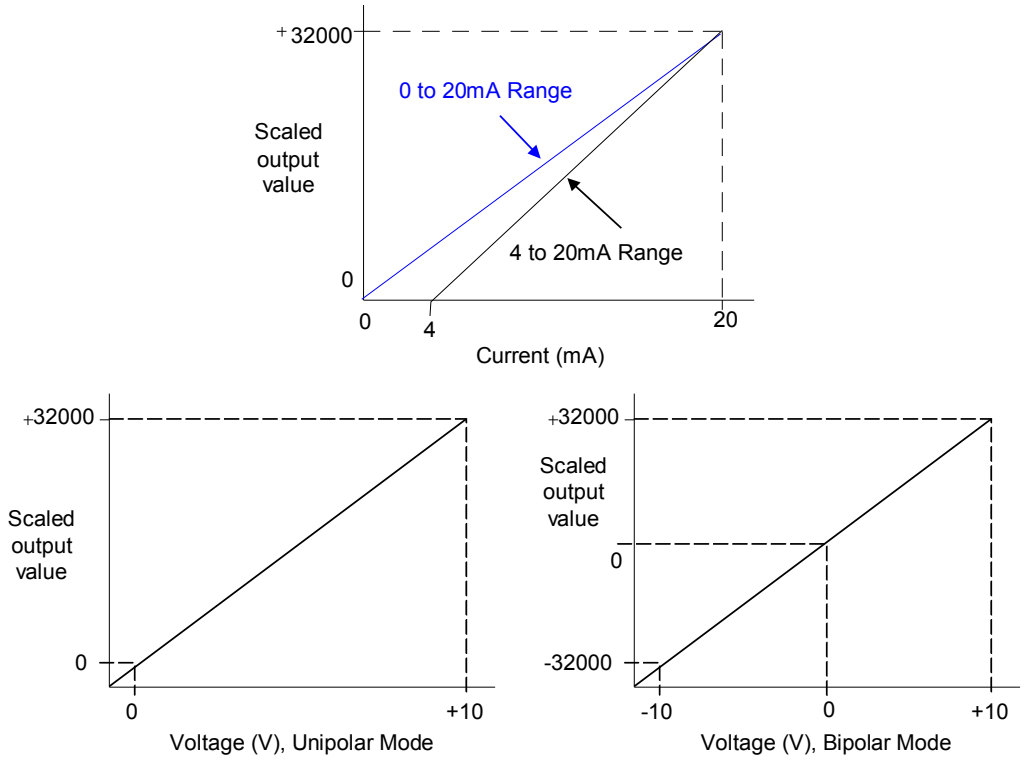
Current and Voltage Ranges and Resolution

In the 4 to 20mA range, the module scans output data from the PLC so that 4mA corresponds to a count of 0, and 20mA corresponds to a count of 32000. In the 0 to 20mA range, user data is scaled so that 0 mA corresponds to a count of 0 and 20mA corresponds to 32000. In 0 to 20mA mode, a value up to 32767 provides a maximum output of approximately 20.5mA. In current mode, the module also reports an open loop fault to the PLC.

For voltage operation in the default unipolar mode (0 to +10 volts), data is scaled so that 0 volts corresponds to a count of 0 and +10 volts corresponds to a count of 32000. In this mode, a value up to 32767 creates an overrange output of approximately 10.24 volts.

In the -10 to +10 volt range, data is scaled so that -10 volts corresponds to a count of -32000 and +10 volts corresponds to a count of +32000. In this range, output values from -32767 to +32767 result in an overrange of approximately -10.24 volts to +10.24 volts.

Scaling for both current and voltage ranges is shown below.

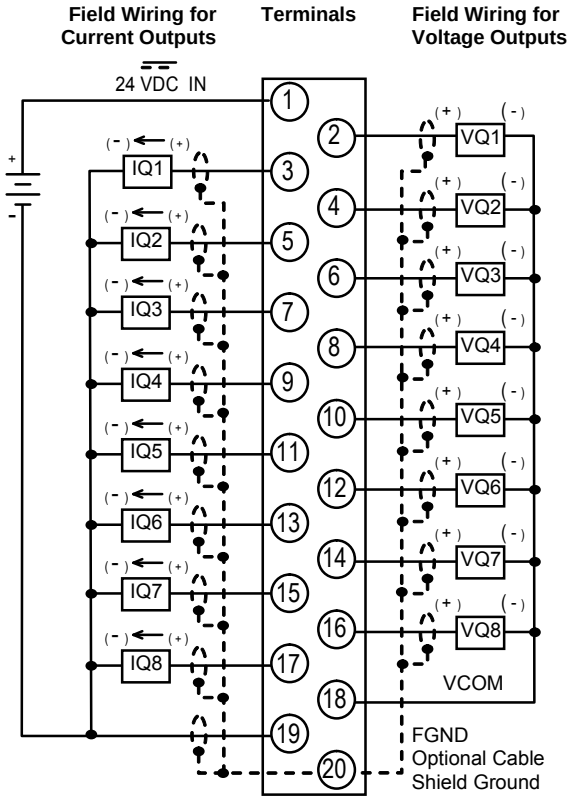


The resolution per bit depends on the channel's configured range:

4 to 20 mA:	0.5 µA
0 to 20 mA:	0.625 µA
0 to 10 V:	0.3125 mV
-10 to +10 V:	0.3125 mV

Field Wiring: ALG392

Terminal	*Signal Definition*
1	User Supplied +24 VDC Input
2	Channel 1 Voltage Output
3	Channel 1 Current Output
4	Channel 2 Voltage Output
5	Channel 2 Current output
6	Channel 3 Voltage Output
7	Channel 3 Current output
8	Channel 4 Voltage Output
9	Channel 4 Current output
10	Channel 5 Voltage Output
11	Channel 5 Current output
12	Channel 6 Voltage Output
13	Channel 6 Current output
14	Channel 7 Voltage Output
15	Channel 7 Current output
16	Channel 8 Voltage Output
17	Channel 8 Current output
18	Voltage Common
19	Current Common/User +24 VDC Return
20	Frame ground connection for cable shields



The diagram above shows connections for current and voltage outputs. Each channel can be configured to operate as a voltage output or a current output - not both simultaneously.

LEDs

The **Module OK** LED indicates module status. The **User Supply** LED indicates whether the external +24 VDC power supply is present and is above the minimum level. Both LEDs are powered from the +5 VDC backplane power bus.

LED	*Indicates*	
OK	ON:	Module OK and configured Flashing: Module OK but not configured
	OFF:	Module is defective or no +5V backplane power present
USER OK	ON:	External power supply present
	OFF:	No user power