MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GE INTELLIGENT PLATFORMS

IC694ALG233

16-CHANNEL CURRENT INPUT MODULE WITH ADVANCED DIAGNOSTICS

Used with the applicable PACSystems RX3i configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: PACSystems RX3i system manual, IC694ALG233 section

9.9 Analog Input Module Advanced Diagnostics 16-Channel Current: IC694ALG233

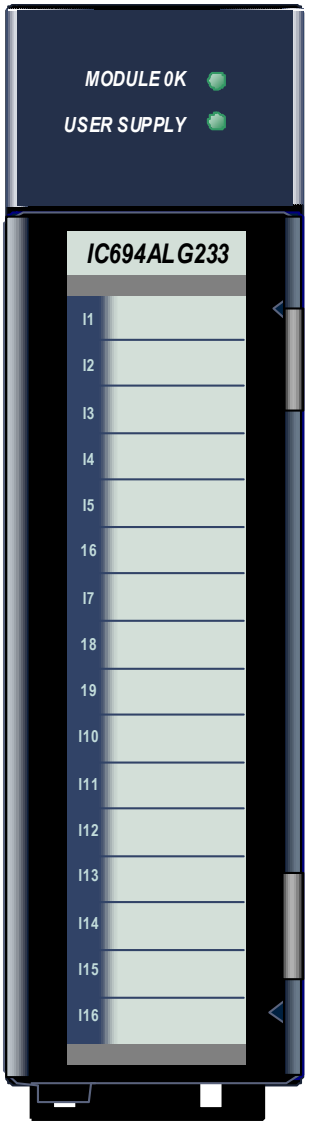


Figure 280: IC694ALG233

The PACSystems RX3i 16-Channel Analog Current Input module, IC694ALG233, provides sixteen single-ended input channels. Each input can be configured using the configuration software for any of three input ranges:

- 4 to 20 mA
- 0 to 20 mA
- 4 to 20 mA Enhanced

High and Low alarm limits are available on all ranges. In the 4 to 20 mA Enhanced range, a low alarm limit can be set up to detect input current from 4 mA to 0 mA, providing open-wire fault detection in 4 to 20 mA Enhanced applications.

The module also reports module status and external power supply status to the CPU using its assigned program reference addresses.

This module can be installed in any I/O slot that has a serial connector in an RX3i system.

9.9.1 Module Power

This module consumes 120 mA from the 5Vdc bus on the RX3i backplane. It also requires 65 mA from a user-supplied +24Vdc supply, which must also supply current for each current loop employed.

9.9.2 Features

- Completely software-configurable, no module jumpers to set
- Open-circuit detection for all inputs in 4 to 20 mA Enhanced Range
- 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
- Positive and negative Rate of Change Alarms
- Display of module serial number, revision and date code in programming software.
- Module supports insertion into and removal from an RX3i Universal Backplane which is under power. Refer to *Hot Insertion and Removal*, Section 2.6.4.1.
- Module supports firmware upgrades using the WinLoader software utility (if the host CPU has a serial port) or using a Web-based tool (if the host CPU has no serial port). Instructions are included with the firmware upgrade kit.[23]

9.9.3 LEDs: ALG233

The **MODULE OK** LED provides module status information as follows:

ON: status is OK, module configured;

OFF: no backplane power or software not running (watchdog timer timed out);

Continuous rapid blinking: configuration data not received from CPU;

Slow blinking, then OFF: failed power-up diagnostics or encountered code execution error.

The **USER SUPPLY** LED indicates that the external 24Vdc supply is within specifications.

9.9.4 Specifications: ALG233

Number of Channels	1 to 16 selectable; single-ended
Input Current Ranges	0 to 20 mA, 4 to 20 mA and 4 to 20 mA Enhanced (selectable per channel)
Calibration	Factory calibrated to: 0.5 µA per count on 4 to 20 mA range 0.625 µA per count on 0 to 20 mA and 4 to 20 mA Enhanced range
Update Rate for All Channels	5 ms
Resolution at 0–20 mA	0.625 µA/bit
Resolution at 4–20 mA	0.5 µA/bit
Resolution at 4–20 mA Enhanced	0.5 µA/bit
Absolute Accuracy[56,57]	±0.25% of full scale at 25°C (77°F) ± 0.5% of full scale over specified operating temperature range
Linearity	< 4 LSB from 4 to 20 mA (4 to 20 mA range) < 4 LSB from 100 µA to 20 mA (0 to 20 mA and 4 to 20 mA Enhanced ranges)
Isolation, Field to Backplane (optical) and to frame ground	250 Vac continuous; 1500 Vac for 1 minute
Common Mode Voltage	0 volts (single-ended channels)
Cross-Channel Rejection	> 70dB from DC to 1kHz
Input Impedance	250Ω
Input Low Pass Filter Response	23 Hz
External Supply Voltage Range	20 to 30 Vdc

[56] In the presence of severe Radiated RF interference (IEC 61000-4-3, 10V/m), accuracy may be degraded to ±5% of full scale.
[57] In the presence of severe Conducted RF interference (IEC 61000-4-6, 10Vrms), accuracy may be degraded to ±0.5% of full scale.

External Supply Voltage Ripple	10%
Power Consumption	120 mA from the +5Vdc bus on the backplane 65 mA from 24Vdc external user power supply (in addition to current loop currents)

For product standards and general specifications, refer to *Appendix A.*

9.9.5 Configuration: ALG233

9.9.5.1 Module Settings: ALG233

Parameter	Choices	Description
Active Channels	1 to 16	The number of channels to be scanned. Channels are scanned in sequential, contiguous order.
Channel Value Reference Address	Valid memory types: %AI (default), %AQ, %R, %W, %G, %M, %T, Symbolic Memory[58]	The starting address in memory for input data from the module.
Channel Value Reference Length	Read-only	Depends on the number of active channels. Each channel provides two words of analog input data to the Controller CPU.
Diagnostic Reference Address	Valid memory types: %I (default), %Q, %AI, %AQ, %R, %W, %G, %M, %T, Symbolic Memory[58]	Starting address for the channel diagnostics data. Used only when Module Level Diagnostic Reporting is enabled.
Diagnostic Reference Length	Read-only	The amount of memory required for the channel diagnostics data. When Module Level Diagnostic Reporting is enabled, 32 bits of diagnostic data are allocated for each active channel.
Module Status Reference Address	Valid memory types: %I (default), %Q, %AI, %AQ, %R, %W, %G, %M, %T, Symbolic Memory[58]	The starting address in memory for status information from the module.
Module Status Reference Length	0, 32	The number of module status bits reported to the CPU. Data format is displayed in the following figure.

[58] Note: To support this feature, *Variable Mode* property should be enabled in Machine Edition.

		When set to 0, status reporting is disabled. To enable status reporting, set this parameter to a value other than 0.
I/O Scan Set	1 through 32	Assigns the module I/O status data to a scan set defined in the CPU configuration. Determines how often the RX3i polls the data
Inputs Default	Force Off (default) or Hold Last State	In the event of module failure or removal, this parameter specifies the state of all Channel Value References for the module. Force Off = Channel Values clear to 0. Hold Last State = Channels hold their last state.
Module Level Diagnostic Reporting	Disabled (default) or Enabled	If enabled, 32 bits of data are allocated for each active channel. Diagnostic Reporting and Fault Reporting can be enabled separately for each channel.

9.9.5.2 Channel Configuration Parameters: ALG233

Parameter	Choices	Description
Range	4-20 mA (default), 0-20 mA, or 4-20 mA + (enhanced)	In the 4-20 mA range, input currents from 4 to 20 mA are reported to the CPU as values from 0 to 32000 units. In the 0 to 20 mA range, input currents from 0 to 20 mA are reported to the CPU as values from 0 to 3200 units. In the 4 to 20 mA enhanced range, currents from 4 to 20 mA are reported to the CPU as values from 0 to 32000 units. Currents below 4 mA are reported as negative values with 0 represented as –8000 units.
Channel Value Format	32-bit Floating-point (default) or 16-bit Integer	32-bit Floating-point: A real value, range 3.40282e+38 through 3.40282e+38 16-bit Integer: The low word of the 32-bit channel data contains the 16-bit integer channel value. The high word contains the sign of the 16-bit integer. If the 16-bit integer result is negative, the upper word in the 32-bit channel data is set to 0xFFFF. If the 16-bit integer result is positive, the upper word is set to 0x0000. When the Channel Value Format parameter is set to 16-bit Integer, 1000 Eng Units are equal to 1.0 A/D Unit.
High Scale Value (Eng Units)	The defaults and ranges for the four scaling parameters depend on the configured Range Type and Channel Value Format.	Scaling is disabled if: High Scale Eng. Units = High Scale A/D Units and Low Scale Eng. Units = Low Scale A/D Units. Default is High A/D Limit of selected range type. When *Channel Value Format* is set to 32-bit Floating-point, range is -3.40282e+38 through 3.40282e+38. For 16-bit Integer, range is -32,768 through +32,767.
Low Scale Value (Eng Units)		
High Scale Value (A/D Units)		
Low Scale Value (A/D Units)		
Positive Rate of Change Limit (Eng Units/Second)	Range: 0.0 (default) through 3.40282e+38	Rate of change in Engineering Units per Second that will trigger a Positive Rate of Change alarm. If set to 0, limit is disabled. Used with “Rate of Change Sampling Rate” parameter.