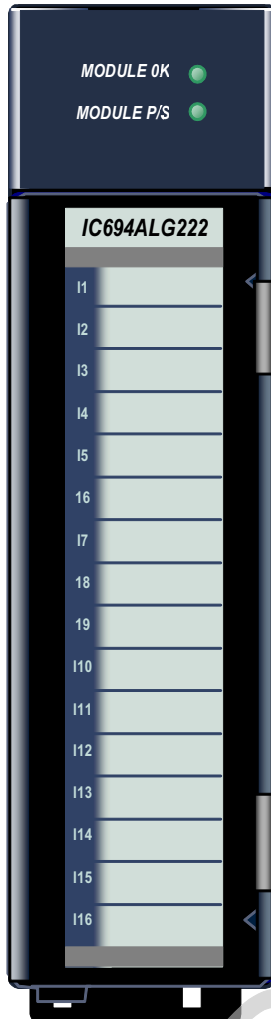


## Analog Input Module, 16 / 8 Channel Voltage: IC694ALG222



The **16-Channel Analog Voltage Input** module, IC694ALG222, provides 16 single-ended or eight differential input channels.

Each channel can be configured using the configuration software for either of two input ranges:

- 0 to 10 V (unipolar), default
- -10 to +10 V (bipolar)

High and Low alarm limits can be configured for both ranges.

This module can be installed in any I/O slot of an RX3i system.

### **Isolated +24 VDC Power**

If the module is located in an RX3i Universal Backplane, an external source of Isolated +24 VDC is required to provide power for the module. The external source must be connected via the TB1 connector on the left side of the backplane.

If this module is located in an Expansion Backplane, the backplane's power supply provides the Isolated +24 VDC for the module.

### **LEDs**

The **MODULE OK** LED provides module status information on powerup:

- **ON:** status is OK, module configured
- **OFF:** no backplane power or software not running (watchdog timer timed out)
- **Continuous rapid flashing:** configuration data not received from CPU
- **Slow flashes, then OFF:** failed power-up diagnostics or encountered code execution error

The **Module P/S** LED indicates that the module's internally-generated +5 VDC supply is above a minimum designated level.

**Specifications: IC694ALG222**

<b>Number of Channels</b>	1 to 16 selectable, single-ended 1 to 8 selectable, differential
<b>Input Current Ranges</b>	0 V to +10 V (unipolar) or -10 V to +10 V (bipolar); selectable each channel
<b>Calibration</b>	Factory calibrated to: 2.5 mV per count on 0 V to +10 V (unipolar) range 5 mV per count on -10 to +10 V (bipolar) range
<b>Update Rate</b>	6 milliseconds (all 16 single-ended channels) 3 milliseconds (all 8 differential channels)
<b>Resolution at 0V to +10V</b>	2.5 mV (1 LSB = 2.5 mV)
<b>Resolution at -10V to +10V</b>	5 mV (1 LSB = 5 mV)
<b>Absolute Accuracy *</b>	+/-10.25% of full scale @ 25°C (77°F) +/-0.5% of full scale over specified operating temperature range
<b>Linearity</b>	< 1 LSB
<b>Isolation, Field to Backplane (optical) and to frame ground</b>	250 VAC continuous; 1500 VAC for 1 minute
<b>Common Mode Voltage (Differential)</b>	*/-11 V (bipolar range) **
<b>Cross-Channel Rejection</b>	> 80dB from DC to 1 kHz
<b>Input Impedance</b>	>500K Ohms (single-ended mode) >1 MegaOhms (differential mode)
<b>Input Filter Response</b>	41 Hz (single-ended mode) 82 Hz (differential mode)
<b>Internal Power Consumption</b>	112 mA (maximum) from the backplane +5 VDC bus 41 mA (maximum) from the backplane isolated +24 VDC supply

Refer to Appendix A for product standards and general specifications.

\* In the presence of severe RF interference (IEC 801-3, 10V/m), accuracy may be degraded to +/-5% FS.

\*\*The summation of the differential input, common-mode voltage, and noise must not exceed +/-11 volts when referenced to COM.

## Configuration: IC694ALG222

Configurable parameters for module IC694ALG222 are described below.

<b>Parameter</b>	<b>Choices</b>	<b>Description</b>
<i>Active Channels</i>	1 to 16 for Single-ended mode, or 1 to 8 for Differential mode	The number of channels to be scanned. Channels are scanned in sequential, contiguous order.
<i>Mode</i>	Single-ended (default), or Differential	In Single-ended mode, there are 16 inputs referenced to a single common. In Differential mode, each of the 8 inputs has its own signal and common.
<i>Reference Address for Input Data</i>		The memory location for input data from the module. Each channel provides 16 bits of analog input data to the PLC CPU.
<i>Reference Address for Status Data</i>		The memory location for where status information from the module starts.
<i>Length</i>	8, 16, 24, 32, 40	The number of status bits reported to the PLC. Bits 1 – 8 provide basic module diagnostics. Bits 9 – 24 contain channel 1 – 8 high alarm and low alarm status. Bits 25 – 40 contain channel 9 – 16 high alarm and low alarm status. Data formats are shown in this section.
<i>Range</i>	0 to 10 V (default) or -10 to 10 V	In the 0 to 10 V default range, input voltage values from 0 to 10 V report 0 to 32,000 integer values to the CPU. In the -10 to 10 V range, input voltage values from -10 to 10 V report -32000 to 32,000 integer values to the CPU.
<i>Alarm Low</i>	0 to 10 V Range = 0 to 32760 -10 to 10 V Range = -32767 to 32752	Each channel can be assigned a low alarm limit alarm. Values entered without a sign are assumed to be positive. Be sure the alarm low values are appropriate for the selected range.
<i>Alarm High</i>	0 to 10 V Range = 0 to 32760 -10 to 10 V Range = -32767 to 32752	Each channel can also be assigned a high alarm limit. Values entered without a sign are assumed to be positive. Be sure the alarm high values are appropriate for the selected range.
<i>I/O Scan Set</i>	Default = 1	Assign the module to one of the I/O Scan Sets defined in the CPU configuration.

**Data Format: IC694ALG222**

The 12-bit resolution module analog input data is stored in the PLC CPU in 16-bit 2's complement format in the unipolar range as shown below.

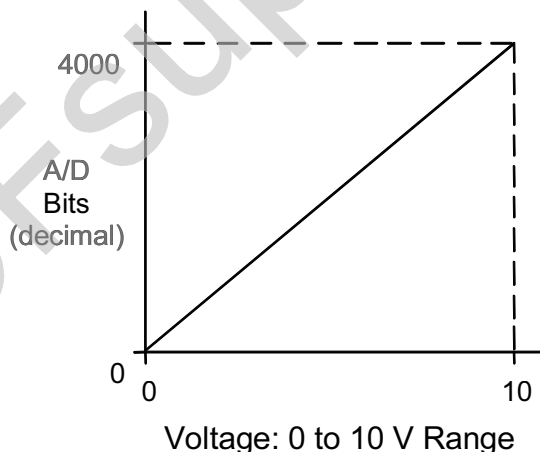
MSB												LSB			
X	11	10	9	8	7	6	5	4	3	2	1	0	X	X	X

**Input Scaling**

The default input mode and range is single-ended, unipolar. In 0 to 10V mode, input data is scaled so that 0 volts corresponds to a count of 0 and 10 volts corresponds to a count of +32000.

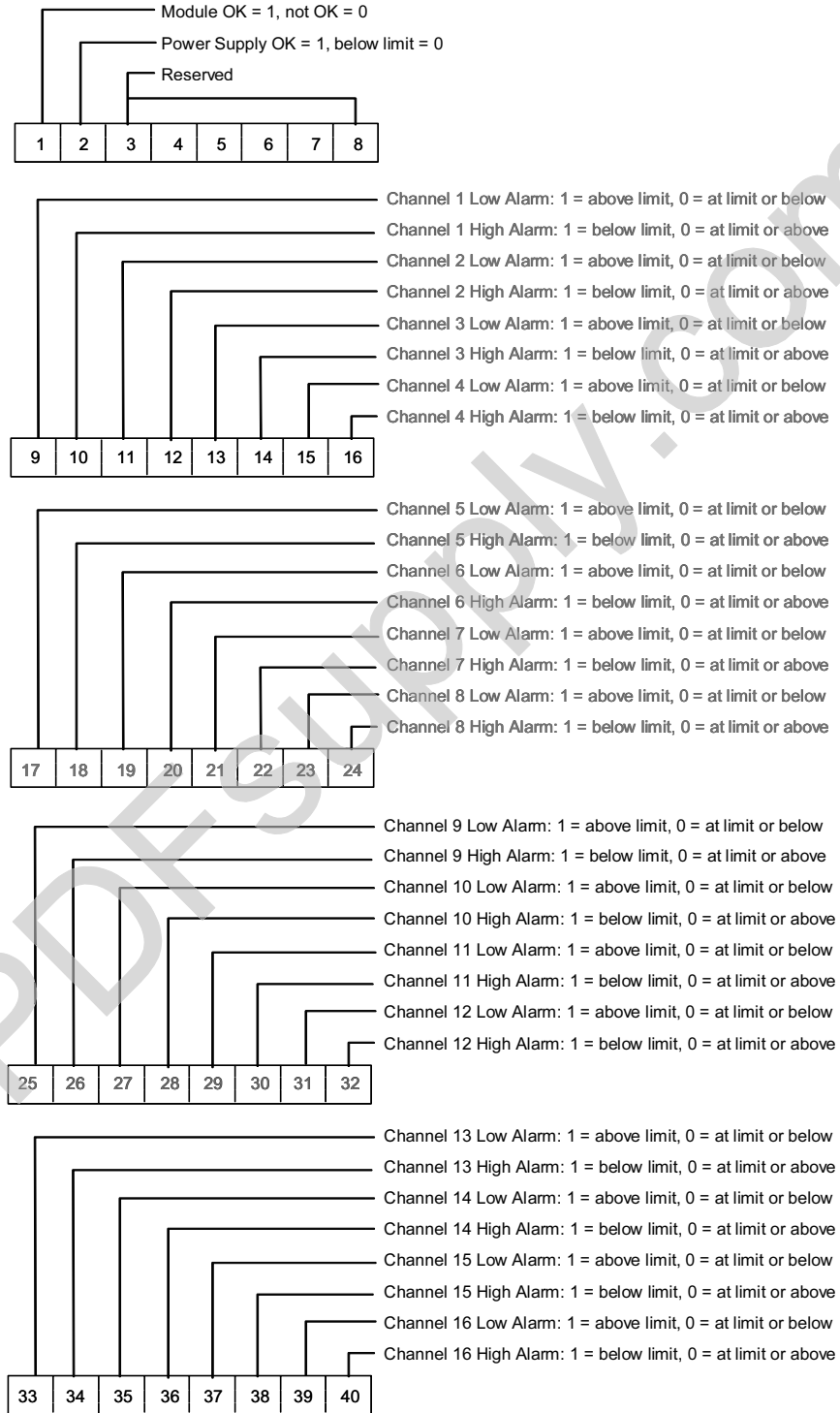
The bipolar range and mode can be selected by changing the module's configuration parameters. In bipolar mode, -10 V corresponds to a count of -32000, 0 V corresponds to a count of 0, and +10 V corresponds to a count of +32000.

Factory calibration adjusts the analog value per bit (resolution) to a multiple of full scale (2.5 mV per bit for unipolar; 5 mV per bit for bipolar). The data is then scaled with the 4000 counts over the analog range. The data is scaled as shown below.



### Status Data: IC694ALG222

Analog Module IC694ALG222 can be configured to return 8, 16, 24, 32, or 40 status bits to the PLC CPU. This status data provides the following information about module operation:



### Field Wiring: IC694ALG222

Terminal	Single-ended Mode	Differential Mode
1, 2		not used
3	Channel 1	Channel 1 +
4	Channel 2	Channel 1 -
5	Channel 3	Channel 2 +
6	Channel 4	Channel 2 -
7	Channel 5	Channel 3 +
8	Channel 6	Channel 3 -
9	Channel 7	Channel 4 +
10	Channel 8	Channel 4 -
11	Channel 9	Channel 5 +
12	Channel 10	Channel 5 -
13	Channel 11	Channel 6 +
14	Channel 12	Channel 6 -
15	Channel 13	Channel 7 +
16	Channel 14	Channel 7 -
17	Channel 15	Channel 8 +
18	Channel 16	Channel 8 -
19	Common	Common
20	Ground	Ground

Connections are shown below for 16-channel single-ended mode and 8-channel differential mode. Single-ended mode is the module's default operating mode. Differential mode must be set up by configuration.

