G4 ANALOG 4-20 MILLIAMP INPUT MODULE

Features

> Provides a single channel of transformer and optically isolated current-to-digital conversion

> Plugs into an Opto 22 Modular controller or an analog I/O brick and are secured by a captive screw.

> Includes complete electrical channel-to-channel isolation which eliminates any ground loop problems

G4AD3

DESCRIPTION

The G4AD3 module provides a single channel of transformer and optically isolated current-to-digital conversion. The nominal input range is 4 to 20 milliamps with an under/over range capability from less than 3 milliamps to greater than 35 milliamps. One of the unique features is that the isolated loop supply can be provided by the G4AD3. This eliminates the need for the user to provide the loop supply (typically 15-48 V) and also saves the associated wiring, barrier strips, etc. The G4AD3 module also includes complete electrical channel-to-channel isolation which eliminates any ground loop problems. Modules plug into an Opto 22 Modular controller or an analog I/O brick and are secured by a captive screw. The field connections are made to the terminal strip located on the Brick base or controller I/O board.

NOTE: Any system using analog sensors and input modules should be calibrated annually for analog signals. To do so, use OptoControl commands "Calculate and Set Analog Offset" and "Calculate and Set Analog Gain."

Part Numbers

Part	Description
G4AD3	G4 4 To 20 mA Input

MADE IN THE
USA

Specifications

Nominal input range	4 to 20 mA
Module Input Impedance*	414 Ω*
Over/under range	3 to 35 mA
Loop supply	28 VDC nominal
Accuracy**	16 µA**
Response time	Full-scale step change in 3 ms
Resolution	12 bits

Isolation (Transient)
  Input-to-Output
  Input-to-Analog Supply
	4,000 Vms
	4,000 Vms

Ambient Temperature:
  Operating
  Storage
	-30° C to 70° C
	-40° C to 85° C

Agency Approvals	UL, RoHS, CE; UKCA

* This is the equivalent impedance for the G4AD3 at full scale (20mA). The equivalent impedance is calculated by using the following formula:

Equivalent impedance = 249 Ω + 3.3V/0.02A = 414 Ω

The module has an internal resistance of 249 Ω in series with a 3.3V zener diode.

It is not possible to use an ohm-meter to accurately measure the impedance across the field terminals of the G4AD3. This is because ohm-meters typically supply only 1 volt excitation which is not sufficient to cause current to flow through the 3.3V zener diode. Therefore, the ohm-meter will display infinite impedance (i.e. Mega-ohms, or an open circuit).

In certain applications the total loop impedance may exceed the maximum impedance that the loop transmitter can drive to full scale (20mA). This may be the case in applications using intrinsic safety barriers. An alternate approach is to use the 0 to 5 volt G4AD6 (or G4AD6HS) with a 250 Ω precision resistor (Dale type RN is recommended) across the input terminals. This will provide a 1 volt input at 4mA and a 5 volt input at 20mA.
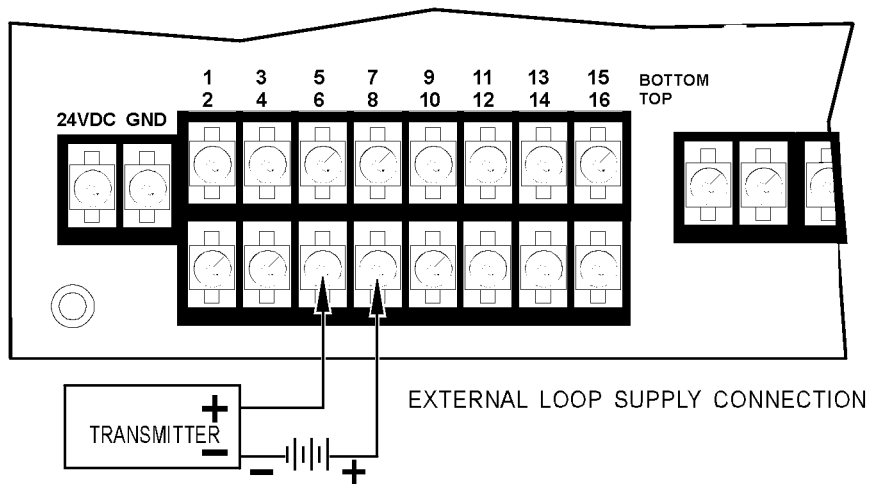
** Accuracy figure requires use of gain and offset commands.

Connections
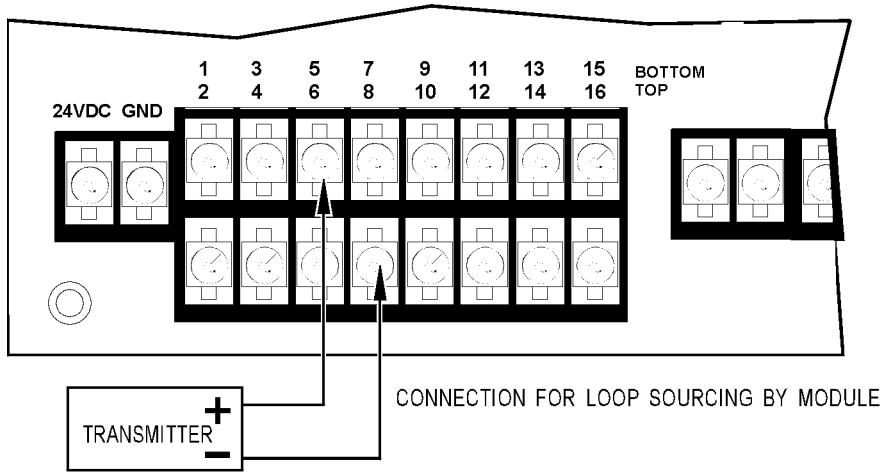
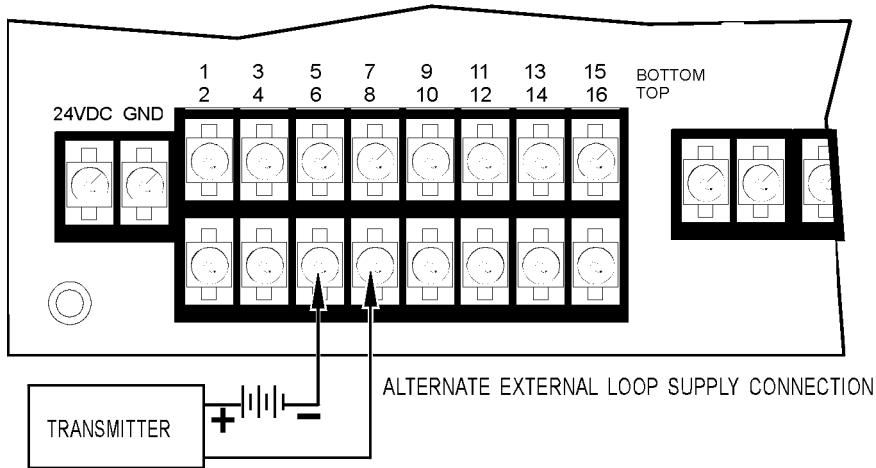NOTE: PICTURE SHOWS CONNECTION FOR MODULE IN POSITION 1.

CONNECTION FOR LOOP SOURCING BY MODULE

NOTE: PICTURE SHOWS CONNECTION FOR MODULE IN POSITION 1.

EXTERNAL LOOP SUPPLY CONNECTION

OPTO 22 • 800-321-6786 • 1-951-695-3000 • www.opto22.com • sales@opto22.com

Connections (continued)

NOTE: PICTURE SHOWS CONNECTION FOR MODULE IN POSITION 1.

ALTERNATE EXTERNAL LOOP SUPPLY CONNECTION

NOTE: PICTURE SHOWS CONNECTION FOR MODULE IN POSITION 0.

CONNECTION FOR SELF-POWERED TRANSMITTER

More about Opto 22
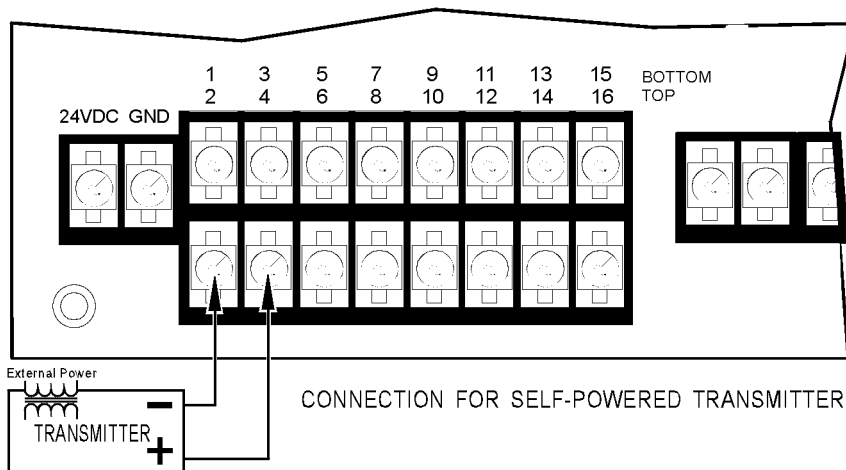
PRODUCTS

Opto 22 develops and manufactures reliable, easy-to-use, open standards-based hardware and software products. Industrial automation, process control, remote monitoring, data acquisition, and industrial internet of things (IIoT) applications worldwide all rely on Opto 22.

groov RIO®

groov RIO edge I/O offers a single, compact, PoE-powered industrial package with web-based configuration and IIoT software built in, support for multiple OT and IT protocols, and security features like a device firewall, data encryption, and user account control.

Standing alone, groov RIO connects to sensors, equipment, and legacy systems, collecting and securely publishing data from field to cloud. Choose a universal I/O model with thousands of possible field I/O configurations, with or without Ignition from Inductive Automation®, or a RIO EMU energy monitoring unit that reports 64 energy data values from 3-phase loads up to 600 VAC, Delta or Wye.

You can even write an IEC 61131-3 compliant control program to run on groov RIO, using CODESYS. You can also use groov RIO with a Modbus/TCP master or as remote I/O for a groov EPIC system.

groov EPIC® System

Opto 22's groov Edge Programmable Industrial Controller (EPIC) system gives you industrially hardened control with a flexible Linux®-based processor with gateway functions, guaranteed-for-life I/O, and software for your automation and IIoT applications.

groov EPIC Processor

The heart of the system is the groov EPIC processor. It handles a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

In addition, the EPIC provides secure data communications among physical assets, control systems, software applications, and online services, both on premises and in the cloud. No industrial PC needed.

Configuring and troubleshooting I/O and networking is easier with the EPIC's integrated high-resolution color touchscreen. Authorized users can manage the system locally on the touchscreen, on a monitor connected via the HDMI or USB ports, or on a PC or mobile device with a web browser.

groov EPIC I/O

groov I/O connects locally to sensors and equipment. Modules have a spring-clamp terminal strip, integrated wireway, swing-away cover, and LEDs indicating module health and discrete channel status. groov I/O is hot swappable, UL Hazardous Locations approved, and ATEX compliant.

groov EPIC Software

The groov EPIC processor comes ready to run the software you need:

- Programming: Choose flowchart-based PAC Control, CODESYS Development System for IEC61131-3 compliant programs, or secure shell access (SSH) to the Linux OS for custom applications
- Node-RED for creating simple IIoT logic flows from pre-built nodes
- Efficient MQTT data communications with string or Sparkplug data formats
- Multiple OPC UA server options
- HMI: groov View to build your own HMI viewable on touchscreen, PCs, and mobile devices; PAC Display for a Windows HMI; Node-RED dashboard UI
- Ignition or Ignition Edge® from Inductive Automation (requires license purchase) with OPC-UA drivers to Allen-Bradley®, Siemens®, and other control systems, and MQTT communications

Older products

From solid state relays, to world-famous G4 and SNAP I/O, to SNAP PAC controllers, older Opto 22 products are still supported and working hard at thousands of installations worldwide. You can count on us for the reliability and service you expect, now and in the future.

QUALITY

Founded in 1974, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California.

Because we test each product twice before it leaves our factory rather than testing a sample of each batch, we can afford to guarantee most solid-state relays and optically isolated I/O modules for life.

FREE PRODUCT SUPPORT

Opto 22's California-based Product Support Group offers free technical support for Opto 22 products from engineers with decades of training and experience. Support is available in English and Spanish by phone or email, Monday–Friday, 7 a.m. to 5 p.m. PST.

Support is always available on our website, including free online training at OptoU, how-to videos, user's guides, the Opto 22 KnowledgeBase, and OptoForums.

PURCHASING OPTO 22 PRODUCTS

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at **800-321-6786** (toll-free in the U.S. and Canada) or **+1-951-695-3000**, or visit our website at www.opto22.com.