

## DATA SHEET

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Part Number	Description
G4AD3	4 To 20 mA Input

### 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."



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## Specifications

**G4AD3 Specifications**

Nominal input range	4 to 20 mA
Module Input Impedance*	414 $\Omega$ *
Over/under range	3 to 35 mA
Loop supply	28 VDC nominal
Accuracy**	16 $\mu$ A**
Response time	Full-scale step change in 3 ms
Resolution	12 bits
Isolation (Transient) Input-to-output Input-to-analog supply	4,000 V <sub>rms</sub> 4,000 V <sub>rms</sub>
Ambient temperature Operating Storage	-30° C to 70° C -40° C to 85° C

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

$$\text{Equivalent impedance} = 249 \Omega + 3.3\text{V}/0.02\text{A} = 414 \Omega$$

The module has an internal resistance of 249  $\Omega$  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  $\Omega$  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.

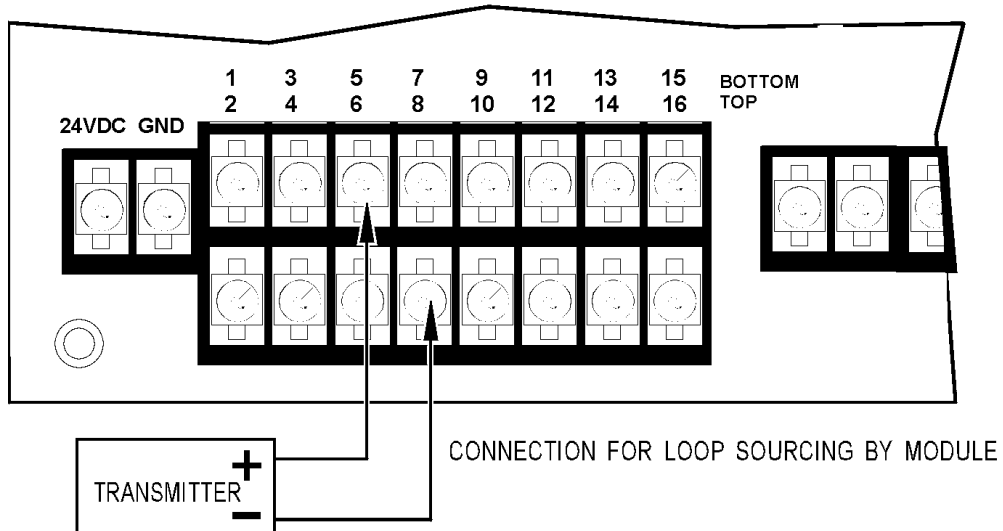
\*\* Accuracy figure requires use of gain and offset commands.

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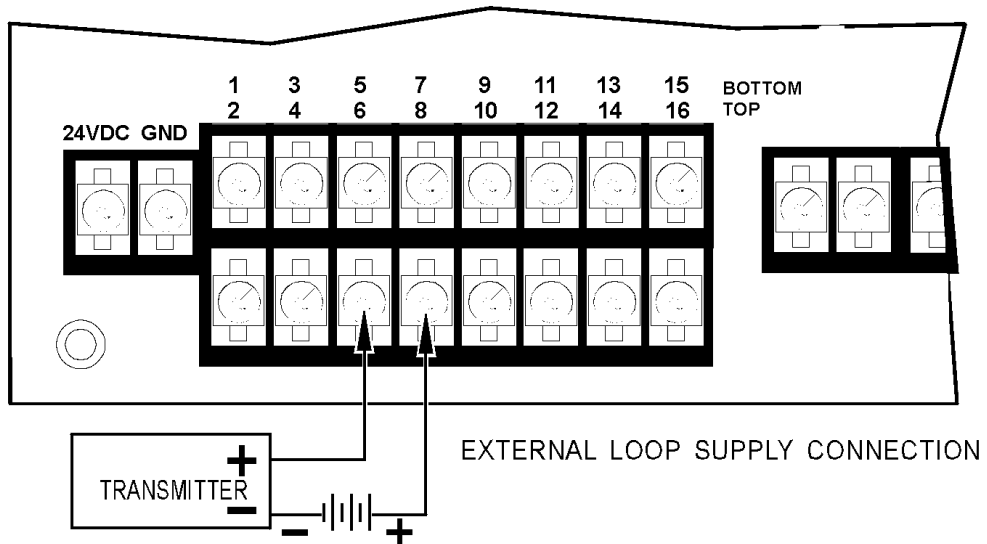
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### Connections G4AD3

NOTE: PICTURE SHOWS CONNECTION FOR MODULE IN POSITION 1.



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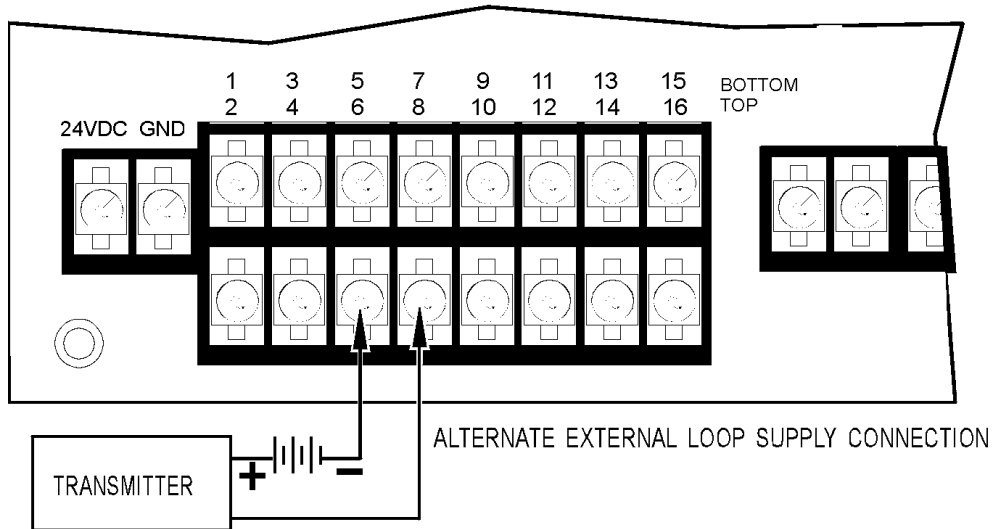


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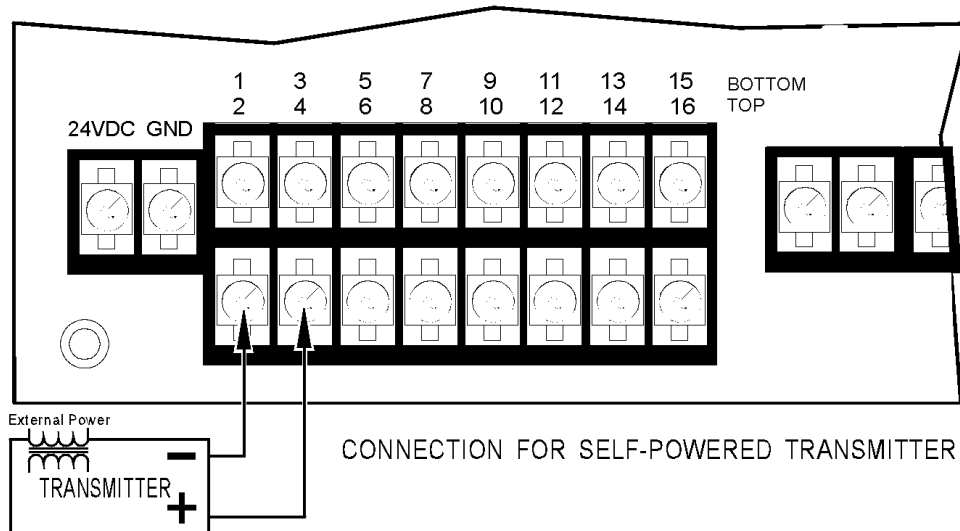
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### Connections (CONT.)

NOTE: PICTURE SHOWS CONNECTION FOR MODULE IN POSITION 1.



NOTE: PICTURE SHOWS CONNECTION FOR MODULE IN POSITION 0.



## Products

Opto 22 produces a broad array of reliable, flexible hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications.

### SNAP Ethernet Systems

Based on the Internet Protocol (IP), SNAP Ethernet systems offer flexibility in their network connectivity and in the software applications they work with. The physical network may be a wired Ethernet network, a cellular wireless network, or a modem. A wide variety of software applications can exchange data with SNAP Ethernet systems, including:

- Opto 22's own ioProject™ suite of control and HMI software
- Manufacturing resource planning (MRP), enterprise management, and other enterprise systems
- Human-machine interfaces (HMIs)
- Databases
- Email systems
- OPC client software
- Custom applications
- Modbus/TCP software and hardware.



SNAP Ethernet system hardware consists of controllers and I/O units. Controllers provide central control and data distribution. I/O units provide local connection to sensors and equipment.

### SNAP OEM Systems

Opto 22 SNAP OEM I/O systems are highly configurable, programmable processors intended for OEMs, IT professionals, and others who need to use custom software with Opto 22 SNAP I/O modules.

Linux® applications running on these systems can read and write to analog, simple digital, and serial I/O points on SNAP I/O modules using easily implemented file-based operations. Applications can be developed using several common development tools and environments, including C or C++, Java, and shell scripts.



### M2M Systems

Machine-to-machine (M2M) systems connect your business computer systems to the machines, devices, and environments you want to monitor, control, or collect data from. M2M systems often use wireless cellular communications to link remote facilities to central systems over the Internet, or to provide monitoring and control capability via a cellular phone.

Opto 22's Nvio™ systems include everything you need for M2M—interface and communications hardware, data service plan, and Web portal—in one easy-to-use package. Visit [nvio.opto22.com](http://nvio.opto22.com) for more information.

### Opto 22 Software

Opto 22's ioProject and FactoryFloor® software suites provide full-featured and cost-effective control, HMI, and OPC software to power your Opto 22 hardware. These software applications help you develop control automation solutions, build easy-to-use operator interfaces, and expand your manufacturing systems' connectivity.



### Quality

In delivering hardware and software solutions for worldwide device management and control, Opto 22 retains the highest commitment to quality. We do no statistical testing; each product is made in the U.S.A. and is tested twice before leaving our 160,000 square-foot manufacturing facility in Temecula, California. That's why we can guarantee solid-state relays and optically-isolated I/O modules *for life*.

### Product Support

Opto 22's Product Support Group offers comprehensive technical support for Opto 22 products. The staff of support engineers represents years of training and experience, and can assist with a variety of project implementation questions. Product support is available in English and Spanish from Monday through Friday, 7 a.m. to 5 p.m. PST.

### Opto 22 Web Sites

- [www.opto22.com](http://www.opto22.com)
- [nvio.opto22.com](http://nvio.opto22.com)
- [www.internetio.com](http://www.internetio.com) (live Internet I/O demo)

### Other Resources

- OptoInfo CDs
- Custom integration and development
- Hands-on customer training classes.



### About Opto 22

Opto 22 manufactures and develops hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's input/output and control systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, and electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel.

Founded in 1974 and with over 85 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability.