



Input: 100 Ω to 1 MΩ Potentiometers
Output: 0-1 V to ±10 VDC or 0-1 mA to 4-20 mA

- Accepts Wide Range of Potentiometer Types
- Voltage or Currents Outputs
- Input and Output LoopTracker® LEDs
- Functional Test Pushbutton

Applications

- Over, Under, Out-of-Range Position Monitoring
- Remote Control of Positioning Devices
- Simplify Control of Potentiometer Outputs

Specifications

Potentiometer Range

Minimum: 0-100 Ω
 Maximum: 0-1.0 MΩ

Full travel of the potentiometer is required
 Consult factory for other ranges and configurations
 System voltages must not exceed socket voltage rating

Input Impedance

100 Ω thru 1.0 MΩ

LoopTracker

Variable brightness LEDs indicate input/output loop level and status

Output Range

Factory Configured—Please specify output range

	Minimum	Maximum	Load Factor
Voltage:	0-1 VDC	0-10 VDC	
Bipolar Voltage:	±1 VDC	±10 VDC	
Current (20 V compliance):	0-1 mA	0-20 mA	1000 Ω at 20 mA

Output Zero and Span

Multiturn potentiometers to compensate for load and lead variations
 ±15% of span adjustment range typical

Output Linearity

Better than ±0.1% of span

Common Mode Rejection

100 dB minimum

Output Ripple and Noise

Less than 10 mV_{RMS}

Functional Test Button

Sets output to test level when pressed
 Potentiometer factory set to approximately 50% of span
 Adjustable 0-100% of span

Response Time

70 milliseconds typical

Isolation

Full isolation to 2000 V_{RMS} min., power to input, power to output, input to output

Ambient Temperature Range

-10°C to +60°C operating

Temperature Stability

Better than ±0.02% of span per °C

Power

Standard: 115 VAC ±10%, 50/60 Hz, 2.5 W max. (std.)
P option: 80-265 VAC or 48-300 VDC, 50/60 Hz, 2.5 W typical
A230 option: 230 VAC ±10%, 50/60 Hz, 2.5 W max.
D option: 9-30 VDC, 2.5 W typical



Description and Features

The **API 4003 G I** accepts a potentiometer (slidewire) input and provides a DC voltage or current output that is linearly related to the potentiometer position. This module accepts resistance inputs from position, displacement or rotational sensors and converts them to conventional output signals.

The **API 4003 G I** is optically isolated from input, output, and power making it the preferred choice in applications requiring ground loop elimination, common mode signal rejection or noise pickup reduction.

The **API 4003 G I** requires factory configuration to a specific DC voltage or current output and power. Inputs from any potentiometer with a value of 0 to 100 Ω through 0 to 1 MΩ are accepted without requiring recalibration and without affecting accuracy as long as 100% of the potentiometer range is used. Models with offsets and/or input ranges other than 0 to 100% of the potentiometer are available. Consult factory for assistance.

API exclusive features include two **LoopTracker** LEDs and a **Functional Test Pushbutton**. The LoopTracker LEDs (Green for input, Red for output) vary in intensity with changes in the process input and output signals. Monitoring the state of these LEDs can provide a quick visual picture of your process loop at all times. The functional test pushbutton provides a fixed output (independent of the input) when held depressed. The output test level is adjustable 0-100% of span. Both the LoopTracker LEDs and functional test pushbutton greatly aid in saving time during initial startup and/or troubleshooting.

The **API 4003 G I** plugs into an industry standard 8-pin octal socket sold separately. Sockets **API 008** and finger-safe **API 008 FS** allow either DIN rail or panel mounting.

Models & Options

Factory Configured—Please specify output range, and options.
 Consult factory for offset inputs using <100% of the potentiometer range.

API 4003 G I Potentiometer to DC transmitter, isolated, 115 VAC

Options—Add to end of model number

P Powered by 80-265 VAC or 48-300 VDC, 50/60 Hz

A230 Powered by 230 VAC, 50/60 Hz

D Powered by 9-30 VDC

EXTSUP Open collector output when a "sinking" output is required for an external loop supply

U Conformal coating for moisture resistance

Accessories—Order as separate line item

API 008 8-pin socket

API 008 FS 8-pin finger-safe socket

API TK36 DIN rail, 35 mm W x 39" L, aluminum

DuoPak NEED 2 I/O CHANNELS? SEE PAGE 19



ELECTRICAL CONNECTIONS

WARNING! All wiring must be performed by qualified personnel only. This module requires an industry-standard 8-pin socket. Order API 008 or finger-safe API 008 FS socket.

Power Input Terminals – The white label on the side of the API module will indicate the power requirements. AC power is connected to terminals 1 and 3.

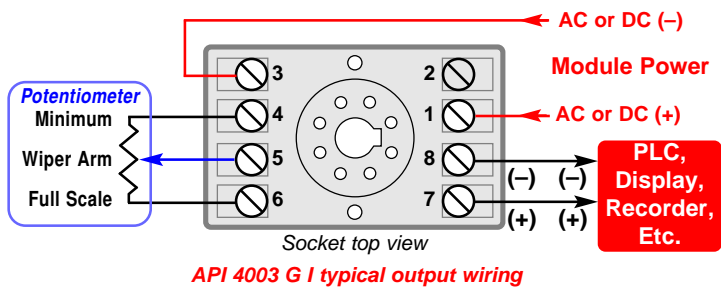
For DC powered modules, polarity **MUST** be observed. Positive (+) is wired to terminal 1 and negative (–) is wired to terminal 3.

Potentiometer Input – The connections are made to the 8-pin socket. You may wish to check the potentiometer with an ohmmeter before connecting since device wiring may vary.

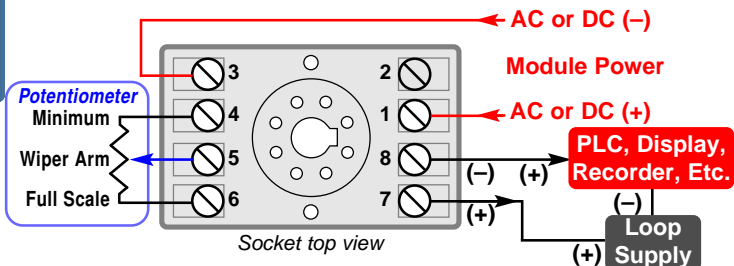
The 0 ohm side of the potentiometer is connected to terminal 4. The potentiometer wiper arm is connected to terminal 5. The full-scale side of the potentiometer is connected to terminal 6.

Signal Output Terminals – Polarity must be observed when connecting the signal output to the load. The positive connection (+) is connected to terminal 7 and the negative (–) is connected to terminal 8.

Note that with current outputs the module provides power to the output loop unless option **EXTSUP** was ordered for a sinking output requirement.



Potentiometer



CALIBRATION

The API 4003 G I comes from the factory calibrated to your specifications. Field calibration is typically not required, however, Zero and Span potentiometers are available to fine-tune the module output to compensate for applications where, for mechanical reasons, the potentiometer cannot be set exactly to 0 Ω and/or 100% of travel. Input ranges that use only a part of the potentiometer range may require factory modification. Consult the factory for assistance with your specific application.

The API 4003 G I outputs are factory configured to your exact requirements. The output range is listed on module label. The top-mounted, Zero and Span potentiometers can be used to fine-tune the output if necessary.

1. Apply power to the module and allow a minimum 20 minute warm up time.
2. Using an accurate resistance calibration device, provide an input to the module equal to the minimum input required for the application.
3. Connect an accurate measurement device to the output. Adjust the Zero potentiometer for the exact minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum to produce the corresponding minimum output signal. Example: for a 4-20 mA output signal, the Zero control will allow adjustment of the 4 mA or low end of the signal.
4. Set the input at maximum, and then adjust the Span pot for the exact maximum output desired. The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal. Example: for 4-20 mA output signal, the Span control will provide adjustment for the 20 mA or high end of the signal.
5. Repeat adjustments for maximum accuracy.

TEST BUTTON & TEST RANGE

The Test pushbutton may be set to provide the desired output when depressed. This will drive the device on the output side of the loop (a panel meter, chart recorder, etc.) with a known good signal that can be used as a system diagnostic aid during initial start-up or during troubleshooting. It can be adjusted to vary the output signal from 0 to 100% of the calibrated output range. When released, the output will return to normal.

Turn the multi-turn Test Range potentiometer while holding the Test Switch depressed until the desired output test level is reached.

Example: If you are isolating a 4-20 mA current loop, when the pushbutton is held depressed, the output from the module will be a constant signal between 4 and 20 mA depending on the setting of the Test Range adjustment pot.

OPERATION

The API 4003 G I is factory configured to your exact requirements. The input circuitry in both models provides a constant-voltage excitation source to the potentiometer. This excitation voltage is stabilized against potentiometer value variations over the entire operating range.

The potentiometer signal first passes through an optical isolator, then is passed to the output stage where it is scaled to the desired output range.

GREEN LoopTracker® Input LED – Provides a visual indication that a signal is being sensed by the input circuitry of the module. It also indicates the input signal strength by changing in intensity as the process changes from minimum to maximum. If the LED fails to illuminate, or fails to change in intensity as the process changes, this may indicate a problem with module power or signal input wiring.

The RED LoopTracker Output LED – Provides a visual indication that the output signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum. For current outputs, the RED LED will only light if the output loop current path is complete. For either current or voltage outputs, failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module power or signal output wiring.

API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. Consult factory for your specific requirements.