

# Potentiometer to DC Transmitter, Isolated

API 4008 G



**Input:** 100 Ω to 1 MΩ Potentiometers  
**Output:** 0-1 V to ±10 VDC or 0-2 mA to 4-20 mA

**Wide Ranging I/O**  
**One Minute Setup!**



- Accepts Wide Range of Potentiometers
- Set-up via External Rotary Switches
- Easy-to-use Setup Tables
- Selectable Voltage or Current Outputs
- 2000 VRMS Isolation Input/Output/Power
- 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 Input Range

Minimum value: 0-100 Ω  
 Maximum value: 0-1.0 MΩ

Consult factory for other ranges and configurations  
 System voltages must not exceed socket voltage rating

### Input Impedance

10 MΩ minimum

### LoopTracker

Variable brightness LEDs indicate input/output loop level and status

### Output Ranges

|                            |            |            |
|----------------------------|------------|------------|
| See table on other side    | Minimum    | Maximum    |
| Voltage (±10 mA max.):     | 0 to 1 VDC | ±10 VDC    |
| Current (20 V compliance): | 0 to 2 mA  | 0 to 20 mA |

Consult factory for special ranges

### 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

### Output Ripple and Noise

Less than 10 mVRMS

### 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

### Common Mode Rejection

100 dB minimum

### Isolation

Full isolation to 2000 VRMS minimum  
 Power to input, power to output, input to output

### Ambient Temperature Range

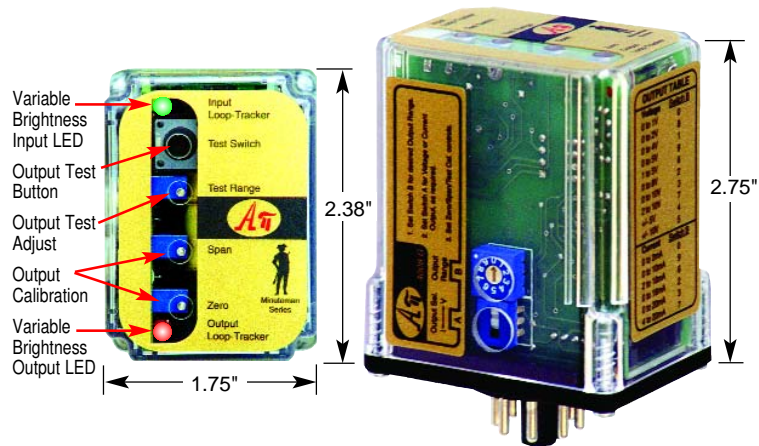
-10°C to +60°C operating

### Temperature Stability

Better than ±0.02% of span per °C

### Power

Standard: 115 VAC ±10%, 50/60 Hz, 2.5 W max.  
**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 4008 G** accepts a potentiometer (slidewire) input and provides an optically isolated DC voltage or current output that is linearly related to the potentiometer position. The **API 4008 G** accepts a resistance input from position, displacement or rotational devices and converts it to a conventional output signal.

The **API 4008 G** will accept any potentiometer with a value of 0 to 100 Ω through 0 to 1 MΩ without 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 pot are available. Consult factory for assistance.

The **API 4008 G** output can be field-configured without opening the case, via external rotary and slide switches. 10 DC voltage or 8 DC current ranges can be selected from the table on the module. Other output ranges are available. The full 3-way (input, output, power) isolation makes this module useful for ground loop elimination, common mode signal rejection or noise pickup reduction.

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 test output level can be field-adjusted via a multiturn potentiometer.

Both the LoopTracker LEDs and functional test pushbutton greatly aid in saving time during initial startup and/or troubleshooting. The built-in 18 VDC unregulated loop excitation power supply can be used to power passive input devices.

The **API 4008 G** plugs into an industry standard 8-pin octal socket sold sepa-

**API 4008 G** Field rangeable potentiometer to DC transmitter, 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
- 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

Potentiometer



## 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.

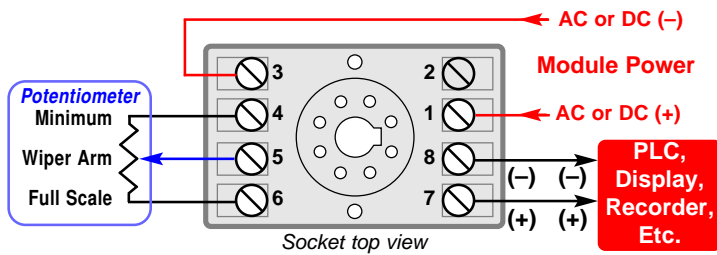
For DC powered modules, polarity **MUST** be observed. Positive (+) is wired to terminal 1 and negative (-) is wired to terminal 3.

**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.



API 4008 G typical output wiring

## RANGE SELECTION

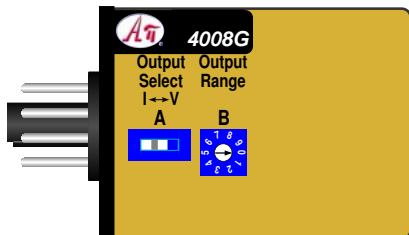
One slide switch and one rotary switch located on the side of the module are used to select the output range. Popular ranges are listed on the module label and below. See [www.api-usa.com](http://www.api-usa.com) or contact factory for special ranges.

API 4008 G OUTPUT SWITCHES

| API 4008 G OUTPUT SWITCHES |          |                     |          |
|----------------------------|----------|---------------------|----------|
| Slide Switch A to V        |          | Slide Switch A to I |          |
| Voltage Output             | Switch B | Current Output      | Switch B |
| 0-1 VDC                    | 0        | 0-2 mA              | 0        |
| 0-2 VDC                    | 8        | 0-4 mA              | 8        |
| 0-4 VDC                    | 1        | 0-8 mA              | 1        |
| 0-5 VDC                    | 9        | 0-10 mA             | 9        |
| 0-8 VDC                    | 2        | 0-16 mA             | 2        |
| 0-10 VDC                   | 3        | 0-20 mA             | 3        |
| 1-5 VDC                    | 6        | 2-10 mA             | 6        |
| 2-10 VDC                   | 7        | 4-20 mA             | 7        |
| ±5 VDC                     | 4        |                     |          |
| ±10 VDC                    | 5        |                     |          |

1. Set the **OUTPUT SELECT** slide switch **A** to current (I) or voltage (V) depending on output type.
2. From the table, find the rotary switch setting that matches your output range.
3. Set rotary switch **B** to the value found in the table.
4. The Zero, Span and Test Range potentiometers can now be adjusted for the desired output range.

Depending on the rotary switch settings, the input is filtered, either amplified or attenuated as required, then passed through an optical isolation circuit to the output stage.



## CALIBRATION

The API 4008 G comes from the factory calibrated to your specifications. Field calibration of the output 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.

1. Apply power to the module and allow a minimum 20 minute warm up time.
2. Set the input potentiometer to its minimum value to provide an input to the module equal to the minimum input required for the application.
3. Connect an accurate measurement device to the module output. Adjust the module's 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 potentiometer at its maximum, and then adjust the module's 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 4008 G utilizes a stable 1 VDC source to excite the potentiometer. This voltage is stabilized against the potentiometer resistance value variations over the entire operating range.

The resulting potentiometer wiper voltage is amplified and passed through an optical coupler to the output stage where it is scaled to the desired output range.

Output voltage/current switch **A** and output range rotary switch **B** determine the exact DC voltage or current output available.

**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.

**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.