

**Input:** 0-100 Hz to 0-30 kHz

**Output:** 0-1 V to 0-10 VDC,  $\pm 5$  VDC,  $\pm 10$  VDC, 0-2 mA to 20 mADC

- 1 Minute Setup for 30 Input & 16 Output Ranges
- External Switches & Tables for Range Selection
- Plug In Design for Faster Installation
- Full 2000 V Input/Output/Power Isolation
- Input and Output LoopTracker® LEDs
- Output Test Button
- Built-In Loop Power Supply for Output

## Applications

- Monitor and Control Motor or Line Speed
- Convert Speed and Frequency Signals

## Frequency Input Ranges

0-100 Hz to 0-30 kHz  
30 switch selectable input ranges  
Minimum pulse width 5  $\mu$ sec

## Input Impedance

10 k $\Omega$  nominal (maximum sensitivity)  
100 k $\Omega$  nominal (minimum sensitivity)

## Input Sensitivity/Hysteresis

Single-turn potentiometer for sensitivity adjustment  
Maximum sensitivity:  $\pm 25$  mV typical  
Minimum sensitivity:  $\pm 2.5$  V typical

## Input Amplitude Range

100 mV to 150 V<sub>RMS</sub>  
Any waveform with minimum 100 mV amplitude change

## Sensor Power Supply

18 VDC  $\pm 10\%$ , unregulated, 25 mADC, max. ripple, <1.5 V<sub>p-p</sub>  
May be used to power sensor

## LoopTracker

Variable brightness LEDs indicate I/O loop level and status

## DC Output Ranges

Switch selectable, field rangeable  
Voltage: 0-1 VDC to 0-10 VDC, 10 mA max  
Bipolar voltage:  $\pm 1$  VDC to  $\pm 10$  VDC  
Current: 0-2 mADC to 0-25 mADC  
20 V compliance, 1000  $\Omega$  at 20 mA

## Output Calibration

Multi-turn potentiometer  $\pm 15\%$  of zero adjustment range typ.  
Multi-turn potentiometer  $\pm 10\%$  of span adjustment range typ.

## Output Loop Power Supply

20 VDC nominal, regulated, 25 mADC, max. ripple <10 mV<sub>RMS</sub>

## Output Test

Button sets output to test level when pressed  
Potentiometer adjustable 0-100% of span

## Output Ripple and Noise

Less than 10 mV<sub>RMS</sub>

## Linearity

Better than  $\pm 0.8\%$  of span  
Better than  $\pm 0.2\%$  repeatability

## Ambient Temperature Range and Stability

-10°C to +60°C operating ambient  
Better than  $\pm 0.02\%$  of span per °C stability

## Isolation

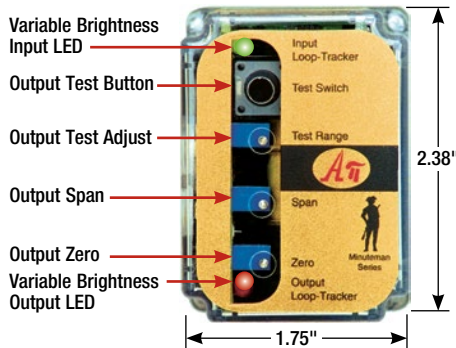
2000 V<sub>RMS</sub> minimum  
Full isolation: power to input, power to output, input to output

## Installation Environment

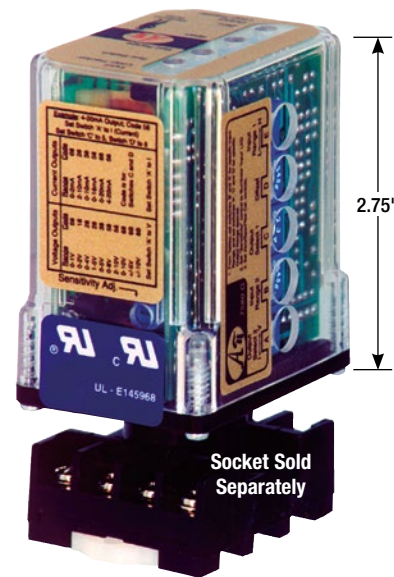
IP 40, requires installation in panel or enclosure  
Use with API 008 or API 008 FS socket  
Socket mounts to 35 mm DIN rail or can be surface mounted  
UL 508C pollution degree 2 environments or better

## Power

Standard: 115 VAC  $\pm 10\%$ , 50/60 Hz, 2.5 W max.  
A230 option: 230 VAC  $\pm 10\%$ , 50/60 Hz, 2.5 W max.  
P option: 85-265 VAC 50/60 Hz, 60-300 VDC 2.5 W typ.  
D option: 9-30 VDC, 2.5 W typical



Quick Link  
[api-usa.com/7580](http://api-usa.com/7580)



Hot Swappable  
Plug-In Design

**UL**  
E145968  
115 VAC, 230 VAC  
models

## Description

The API 7580 G accepts a frequency input and provides an optically isolated DC voltage or current output that is linearly related to the input.

The API 7580 G input and output can be field-configured via external rotary and slide switches. Common ranges are on the module label. Many additional combinations are possible. Consult the factory for assistance with special ranges.

Common applications include frequency to DC conversions from frequency output type devices such as rotary encoders, magnetic pick-ups, proximity sensors, variable speed drives, and flow meters. Also a PLC pulse rate can be programmed to vary and converted to an analog signal by the API 7580 G.

An 18 VDC power supply is provided to power the sensor input, if required.

Full 3-way isolation (input, output, power) makes this module useful for ground loop elimination, common mode signal rejection or noise pickup reduction.

## Output Loop Supply

A built-in 20 VDC power supply provides loop excitation for a milliamp current output.



## LoopTracker

API exclusive features include two LoopTracker LEDs (green for input, red for output) that vary in intensity with changes in the process input and output signals. These provide a quick visual picture of your process loop at all times and can greatly aid in saving time during initial startup and/or troubleshooting.

## Output Test

An API exclusive feature includes the test button to provide a fixed output (independent of the input) when held depressed. The test output level is potentiometer adjustable from 0 to 100% of output span.

The output test button greatly aids in saving time during initial startup and/or troubleshooting.

Model	Input	Output	Power
API 7580 G	Field configurable 0-100 Hz to 0-30 kHz	Field configurable voltage or milliamp ranges	115 VAC 
API 7580 G A230			230 VAC 
API 7580 G P			85-265 VAC or 60-300 VDC
API 7580 G D			9-30 VDC

## Option—add to end of model number

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 CLP1 Module hold-down spring for high vibration or mobile applications



## Precautions

**WARNING!** All wiring must be performed by a qualified electrician or instrumentation engineer. See diagram for terminal designations and wiring examples. Consult factory for assistance.

**WARNING!** Avoid shock hazards! Turn signal input, output, and power off before connecting or disconnecting wiring, or removing or installing module.

## Précautions

**ATTENTION!** Tout le câblage doit être effectué par un électricien ou ingénieur en instrumentation qualifié. Voir le diagramme pour désignations des bornes et des exemples de câblage. Consulter l'usine pour assistance.

**ATTENTION!** Éviter les risques de choc! Fermez le signal d'entrée, le signal de sortie et l'alimentation électrique avant de connecter ou de déconnecter le câblage, ou de retirer ou d'installer le module.

API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. See [api-usa.com](http://api-usa.com) for latest product information. Consult factory for your specific requirements.

**WARNING:** This product can expose you to chemicals including lead and nickel, which are known to the State of California to cause cancer or birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## Electrical Connections

Polarity must be observed for input and output wiring connections. If the input and/or output do not function, check switch settings and wiring polarity.

## Socket and Mounting

Install module in a protective panel or enclosure. Allow space around module for air flow. Use API 008 or API 008 FS socket. See specifications for maximum allowable socket voltages. The socket clips to a standard 35 mm DIN rail or can be mounted to a flat surface.

## Output Wiring

Polarity must be observed when connecting the signal output to the load. See the wiring diagrams. The API 7580 G output provides power to drive a current loop.

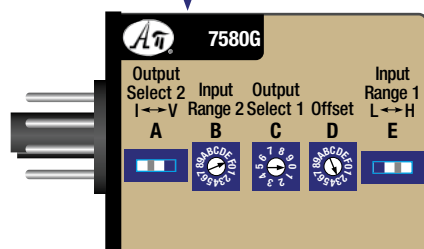
## I/O Range Switch Settings

Select ranges before installation. Ranges are listed below and the module side label lists common ranges. See the model serial number label for module options, or if a custom range was specified.

Three rotary switches and two slide switches located on the side of the module are used to select input and output ranges. For ranges that fall between the listed ranges use the next highest setting and trim the output signal with the zero and span potentiometers.

Frequency Input				Voltage Output			
Hz	B E	kHz	B E	Range	A	C	D
0-100 Hz	1 L	0-2 kHz	1 H	0-1 V	V	0	8
0-200 Hz	2 L	0-4 kHz	2 H	0-2 V	V	1	8
0-300 Hz	3 L	0-6 kHz	3 H	0-4 V	V	2	8
0-400 Hz	4 L	0-8 kHz	4 H	0-5 V	V	2	6
0-500 Hz	5 L	0-10 kHz	5 H	0-5 V	V	3	8
0-600 Hz	6 L	0-12 kHz	6 H	0-8 V	V	5	8
0-700 Hz	7 L	0-14 kHz	7 H	2-10 V	V	5	6
0-800 Hz	8 L	0-16 kHz	8 H	0-10 V	V	6	8
0-900 Hz	9 L	0-18 kHz	9 H	±5 V	V	6	8
0-1000 Hz	A L	0-20 kHz	A H	±10 V	V	8	8
0-1100 Hz	B L	0-22 kHz	B H	Current Output			
0-1200 Hz	C L	0-24 kHz	C H	Range	A	C	D
0-1300 Hz	D L	0-26 kHz	D H	0-2 mA	I	0	8
0-1400 Hz	E L	0-28 kHz	E H	2-10 mA	I	2	6
0-1500 Hz	F L	0-30 kHz	F H	0-10 mA	I	3	8
				0-16 mA	I	5	8
				0-20 mA	I	6	8
				4-20 mA	I	5	6

Sensitivity Adjustment Potentiometer



Sensor Type	Signal +	Sensor Power	Signal Com.
2 wire or Namur with external power	5	4	n/a
2 wire self generating (VR)	5	n/a	6
3 wire PNP current sourcing output	5	4	6
3 wire NPN current sinking output	5	4	6

## Input Wiring

The API 7580 G is compatible with most types of sensors as long as the waveform produces a minimum 100 mV amplitude change and a minimum 5 microsecond pulse width.

An 18 VDC supply is available to power the sensor if required. Always refer to the sensor manufacturer's data sheet to determine supply voltage compatibility and proper wiring.

## Sensor Load

The signal input of the API 7580 G is capacitively coupled to prevent any DC in the input. Some sensors, typically those without an internal load resistor, require a resistive load in order to function.

The resistor value may be specified by the sensor manufacturer as the "minimum resistive load" or calculated from the sensor manufacturer's specified "load current range".

The 18 VDC power supply is capable of providing 25 mA. A load current range of 3 mA to 25 mA would typically use a 6 kΩ to 720 Ω resistor.

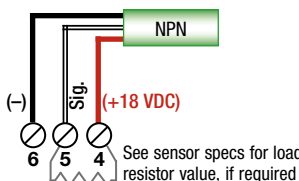
NPN sensors may require an external resistor across sensor signal and sensor power. See sensor manufacturer's specifications.

PNP sensors may require an external resistor across sensor signal and sensor ground. See sensor manufacturer's specifications.

## Three wire NPN

Typical wire colors

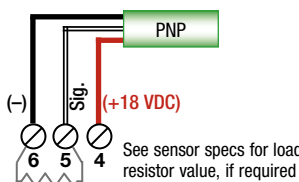
- 5 Signal, Black or White
- 4 Power (+18 VDC) Brown or Red
- 6 Common (-), Blue or Black



## Three wire PNP

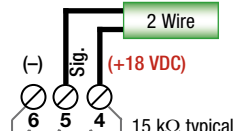
Typical wire colors

- 5 Signal, Black or White
- 4 Power (+18 VDC) Brown or Red
- 6 Common (-), Blue or Black



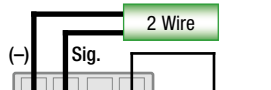
## Two wire powered

- 5 Signal
  - 4 Power (+18 VDC)
- Some sensors may require a bleed resistor to common.



## Two wire self-generating

- 5 Signal (+)
- 6 Common (-)

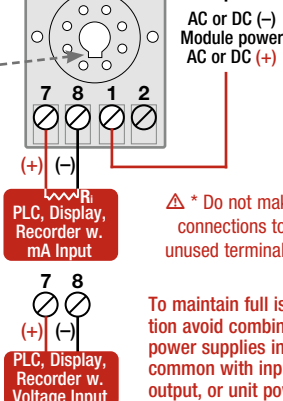


Socket top view

Key down when panel mounting

Sourcing mA output  
20 V loop power

Voltage output



## Module Power

Check model/serial number label for module operating voltage to make sure it matches available power.

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.

## Output Calibration

Input and output ranges, if specified on your order, are factory pre-configured (at 24°C ±1°C). Top-mounted Zero and Span potentiometers are used to calibrate the output to compensate for load and lead variations.

Note: Perform the following calibration procedure any time switch settings are changed.

1. Apply power to the module and allow a minimum 20 minute warm up time. An accurate frequency calibration source such as a signal generator may be required for calibration.
2. Provide an input to the module equal to the minimum input required for the application. In the most cases the minimum input signal will be 0 Hz.
3. Using an accurate measurement device for 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. For example: 4 mA for a 4-20 mA output or -10 V for a ±10V output.
4. Set the frequency to the maximum input required for the application. This is generally done using a signal generator.
5. Using an accurate measurement device for the output, 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 to 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.
6. Repeat adjustments for maximum accuracy.

## Sensitivity Adjustment

This multi-turn potentiometer provides an adjustable threshold level that the incoming signal must overcome before an output can be produced. This is used to limit noise and minimize false input signals that may cause erroneous readings.

When fully clockwise (maximum sensitivity), the input threshold is typically ±25 mV. In the fully counterclockwise position (minimum sensitivity), the input threshold is typically ±2.5 volts.

## Output Test Function

When the Test button is depressed it will drive the output with a known good signal that can be used as a diagnostic aid during initial start-up or troubleshooting. When released, the output will return to normal.

Turn the multi-turn Test Range potentiometer while holding the Test button depressed until the desired output test level is reached. It can be adjusted to vary the output signal from 0 to 100% of the output range.

## Operation

The API 7580 G accepts a frequency input and provides an optically isolated DC voltage or current output that is linearly related to the input. The frequency input is capacitively coupled (to remove any DC component at the input) to a comparator whose threshold is determined by the setting of the sensitivity control. The output from the comparator passes through an optocoupler to the output stage.

The green LoopTracker® input LED provides a visual indication that a signal is being sensed by the input circuitry of the module. The LED illuminates when the input is sufficiently large to trigger the input comparator depending on the input sensitivity adjustment.

It also indicates the input signal range by changing in intensity as the frequency changes from minimum to maximum. If the LED fails to illuminate, or change in intensity as the frequency changes, it may indicate a problem with module power, or signal input wiring. It may be difficult to see the LEDs under bright lighting conditions.

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.