Frequency to DC Transmitters, Isolated, Field Rangable

API 7580 G

Input: 0-100 Hz to 0-30 kHz
Output: 0-1 V to 0-10 VDC, ±5 VDC, ±10 VDC, 0-2 mA to 20 mA

- 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 usec

Input Impedance
10 kΩ nominal (maximum sensitivity)
100 kΩ nominal (minimum sensitivity)

Input Sensitivity/Hysteresis
Single-turn potentiometer for sensitivity adjustment
Maximum sensitivity: ±25 mV typical
Minimum sensitivity: ±2.5 mV typical

Input Amplitude Range
100 mV to 150 Vrms
Any waveform with minimum 100 mV amplitude change

Sensor Power Supply
18 VDC ±10%, unregulated, 25 mA max. ripple, <1.5 Vp-p
May be used to power sensor

LoopTracker
Variable brightness LEDs indicate I/O loop level and status

DC Output Ranges
Switch selectable, field rangable
Voltage: 0-1 VDC to 0-10 VDC, 10 mA max
Bipolar voltage: ±1 VDC to ±10 VDC
Current: ±0.2 mA to ±25 mA
20 V compliance, 1000 Ω at 20 mA

Output Calibration
Multi-turn potentiometer ±15% of zero adjustment range typ.
Multi-turn potentiometer ±10% of span adjustment range typ.

Output Loop Power Supply
20 VDC nominal, regulated, 25 mA max. ripple <10 mVrms

Output LED
Variable brightness LEDs indicate I/O loop level and status

Output Zero
Variable Brightness

Output Test Button
Variable Brightness

Output Test Adjust
Output Test

Variable Brightness LEDs indicate I/O loop level and status

Output Ripple and Noise
Less than 10 mVrms

Linearity
Better than ±0.8% of span
Better than ±0.2% repeatability

Ambient Temperature Range and Stability
−10°C to +60°C operating ambient
Better than ±0.02% of span per °C stability

Isolation
2000 Vrms 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 ±10%, 50/60 Hz, 2.5 W max.
A230 option: 230 VAC ±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

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-save socket
- API CLP1: Module hold-down spring for high vibration or mobile applications

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.

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>API 7580 G</td>
<td>Field configurable 1-00 Hz to 0-30 kHz</td>
<td>Field configurable voltage or milliamp ranges</td>
<td>115 VAC: 85-265 VAC or 60-300 VDC 9-30 VDC</td>
</tr>
<tr>
<td>API 7580 G A230</td>
<td></td>
<td></td>
<td>230 VAC: 85-265 VAC or 60-300 VDC 9-30 VDC</td>
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<tr>
<td>API 7580 G P</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>API 7580 G D</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Made in USA

115 VAC, 230 VAC models

Socket Sold Separately

Hot Swappable
Plug-In Design

Absolute Process Instruments
1220 American Way Libertyville, IL 60048
Phone: 800-942-0315 Fax: 940-7502
api-usa.com © 02-20
Installation and Setup

**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.

**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 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.

<table>
<thead>
<tr>
<th>Frequency Input</th>
<th>Voltage Output</th>
<th>Sensitivity Adjustment Potentiometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hz</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>0-100 Hz</td>
<td>0-1 V to 10 V</td>
<td></td>
</tr>
<tr>
<td>0-300 Hz</td>
<td>0-2 V to 5 V</td>
<td></td>
</tr>
<tr>
<td>0-600 Hz</td>
<td>0-4 V to 10 V</td>
<td></td>
</tr>
<tr>
<td>0-900 Hz</td>
<td>0-8 V to 10 V</td>
<td></td>
</tr>
<tr>
<td>0-1000 Hz</td>
<td>0-10 V</td>
<td></td>
</tr>
<tr>
<td>0-1100 Hz</td>
<td>0-12 V</td>
<td></td>
</tr>
<tr>
<td>0-1200 Hz</td>
<td>0-14 V</td>
<td></td>
</tr>
<tr>
<td>0-1300 Hz</td>
<td>0-16 V</td>
<td></td>
</tr>
<tr>
<td>0-1400 Hz</td>
<td>0-20 V</td>
<td></td>
</tr>
<tr>
<td>0-1500 Hz</td>
<td>0-25 V</td>
<td></td>
</tr>
</tbody>
</table>

**Sensing mA output**

20 V loop power

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**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 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.

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**Sensor Type**

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Signal (V)</th>
<th>Sensor Power (mA)</th>
<th>Signal (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 wire or Namur with external power</td>
<td>5</td>
<td>4</td>
<td>±10 V</td>
</tr>
<tr>
<td>2 wire self generating (VR)</td>
<td>5</td>
<td>±10 mA</td>
<td>±10 V</td>
</tr>
<tr>
<td>3 wire PNP current sourcing output</td>
<td>5</td>
<td>4</td>
<td>±10 V</td>
</tr>
<tr>
<td>3 wire NPN current sinking output</td>
<td>5</td>
<td>4</td>
<td>±10 V</td>
</tr>
</tbody>
</table>

**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 kΩ 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
- Common (+), Black or Blue

**Three wire PNP**

Typical wire colors:

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

**Two wire power signal**

Typical wire colors:

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

**Two wire self-generating**

Typical wire colors:

- 5 Signal (+)
- Common (+)

**Socket top view**

Key down when panel mounting

**Sourcing mA output**

20 V loop power

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**PLC/Computer**

PLC, Computer, Recorder w. mA Input

**Voltage output**

To maintain full isolation avoid combining power supplies in common with input, output, or unit power.

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**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