

**Input:** 0-50 mV to ±10 VDC, 0-1 mA to 4-20 mA  
**Output:** 0-1 Hz to 0-30 kHz MOSFET or TTL

- 24 Selectable Inputs and 30 Selectable Outputs
- Setup via Rotary Switches and Easy-to-use Tables
- 1200 V Full Isolation Input/Output/Power
- Adjustable Low Frequency Cutout
- Input and Output LoopTracker® LEDs
- Functional Test Push Button

**Applications**

- Analog to Frequency for Totalizers and Counters
- Use With APD 7580 for Remote Monitoring

**DC Input Ranges**

Voltage: 0-50 mVDC to ±10 VDC  
 Current: 0-1 mADC to 0-20 mADC, 4-20 mA

**Input Impedance**

Voltage: 1 MΩ minimum  
 Current: 50 Ω typical

**Input Loop Power Supply**

13 VDC nominal, regulated, 25 mADC, max. ripple <10 mV<sub>p-p</sub>  
 May be selectively wired for sinking or sourcing mA input

**LoopTracker**

Variable brightness LEDs indicate I/O loop level and status

**Frequency Output Ranges**

Switch selectable	Minimum	Maximum	Increments
Low range:	0-100 Hz	0-1500 Hz	100 Hz
High range:	0-2 kHz	0-30 kHz	2 kHz

**Frequency Output Ranges, SS Version**

Switch selectable	Minimum	Maximum	Increments
SS low range:	0-1 Hz	0-15 Hz	1 Hz
SS high range:	0-20 Hz	0-300 Hz	20 Hz

**Output Waveform and Logic**

Square wave, 50% duty cycle  
 Normal acting, output increases with increasing input  
 R option: Reverse acting output

**Output Drivers**

MOSFET output: open drain, 24 VDC maximum  
 Isink 50 mA maximum  
 Von 0.6 V maximum at 50 mA Isink  
 TTL output: Jumper terminals 1 and 2  
 TTL voltage: 1 to 12 V<sub>p-p</sub> depending on load

**Cutout Controls**

Low cutout: Disables output if input is below low cutout level, potentiometer adj. 2% to 25% of range  
 High cutout: Disables output above 120% of output span  
 Red output LED blinks if either cutout level is near trip point

**Output Calibration**

Multi-turn non-interactive zero and span potentiometers  
 Zero: ±15% of selected span typical  
 Span: -50 to +20% of selected span typical

**Output Test/Override**

Front momentary button or external contact closure sets output to test level. Potentiometer adjustable 0-100% of span.

**Linearity**

Better than ±0.4% of span

**Ambient Temperature Range and Stability**

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

**Response Time**

70 milliseconds typ., consult factory for faster response times

**Isolation**

1200 VRMS minimum  
 Full isolation: power to input, power to output, input to output

**Housing and Connectors**

IP 40, requires installation in panel or enclosure  
 For use in Pollution Degree 2 Environment  
 Mount vertically to a 35 mm DIN rail  
 Four 4-terminal removable connectors, 14 AWG max wire size



**Power**

85-265 VAC, 50/60 Hz or 60-300 VDC, 2.5 W maximum  
 D versions: 9-30 VDC or 10-32 VAC 50/60 Hz, 2.5 W max.

**Dimensions**

0.89" W x 4.62" H x 4.81" D  
 22.5 mm W x 117 mm H x 122 mm D  
 Height includes connectors

**Description**

The APD 7500 accepts a DC voltage or current input and provides an optically isolated frequency output that is directly proportional to the input. Common applications include pulse counting or totalizing of DC process signals from devices such as flow transmitters, analog signal transmission over long distances, or analog inputs into PLCs. The full 3-way (input, output, power) isolation makes this module useful for ground loop elimination, common mode signal rejection or noise pickup reduction.

A low frequency cutout potentiometer can be adjusted to disable the output when the input falls below a pre-determined level. The APD 7500 can be field-configured via external rotary and slide switches. Common ranges are on the module label, however, virtually unlimited combinations are possible.

The APD 7500 has an open drain MOSFET (open collector) output which requires a user supplied external power supply and pull-up resistor allowing the module to be interfaced with a wide variety of devices. To convert the output to a powered TTL output, simply jumper terminals 1 and 2.

Model	Input	Output	Power
APD 7500	Field rangeable voltage or milliamps	Field rangeable 0-100 Hz to 0-30 kHz	85-265 VAC or 60-300 VDC
APD 7500 D			9-30 VDC or 10-32 VAC
APD 7500 SS	Field rangeable voltage or milliamps	Field rangeable 0-1 Hz to 0-300 Hz	85-265 VAC or 60-300 VDC
APD 7500 SS D			9-30 VDC or 10-32 VAC

**Options—add to end of model number**

- R Input/output reversal
- U Conformal coating for moisture resistance

**Sink/Source Versatility**

For maximum versatility the input can be selectively wired for sinking (unpowered) or sourcing (powered) milliamp output. The 13 VDC loop excitation supply can be used to power a milliamp current loop if required. The input can also be wired for an externally powered loop.

**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 the output span.

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

**Accessory—order as separate line item**

- API BP4 Spare removable 4 terminal plug, black

## 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 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)

## Input Range Selection

Slide switch **A** and rotary switches **B** and **C** and on the side of the module select the input and output ranges. It is easier to set the switches before wiring and installation.

- Set slide switch **A** to current "I" or voltage "V" depending on input type. This switch determines the input impedance, typically 50 Ω for current inputs and 1 MΩ or greater for voltage.
- From the table, find the rotary switch settings that match your input range and set Input **B** and Offset **C**.

mV Input	ABC	Volt Input	ABC	mA Input	ABC
0-50 mV	<b>V80</b>	0-1 V	<b>V10</b>	0-1 mA	<b>IA0</b>
0-100 mV	<b>V90</b>	0-2 V	<b>V40</b>	0-2 mA	<b>I00</b>
0-200 mV	<b>VC0</b>	0-2.5 V	<b>V20</b>	0-4 mA	<b>I10</b>
0-250 mV	<b>VA0</b>	0-4 V	<b>V50</b>	0-8 mA	<b>I40</b>
0-400 mV	<b>VD0</b>	1-5 V	<b>V59</b>	2-10 mA	<b>I49</b>
0-500 mV	<b>V00</b>	0-5 V	<b>V30</b>	0-10 mA	<b>I20</b>
		0-10 V	<b>V60</b>	0-16 mA	<b>I50</b>
		±5 V	<b>V63</b>	4-20 mA	<b>I59</b>
		±10 V	<b>V73</b>	0-20 mA	<b>I30</b>

## Output Range Selection

- From the table, find your frequency output range and set slide switch **E** to "HI" or "LO" to match your frequency output range.
- From the table, find your frequency range and set rotary switch **D** to match your frequency output range.

APD 7500 Output				APD 7500 SS Output			
LO range	DE	HI range	DE	LO range	DE	HI range	DE
0-100 Hz	<b>1L</b>	0-2 kHz	<b>1H</b>	0-1 Hz	<b>1L</b>	0-20 Hz	<b>1H</b>
0-200 Hz	<b>2L</b>	0-4 kHz	<b>2H</b>	0-2 Hz	<b>2L</b>	0-40 Hz	<b>2H</b>
0-300 Hz	<b>3L</b>	0-6 kHz	<b>3H</b>	0-3 Hz	<b>3L</b>	0-60 Hz	<b>3H</b>
0-400 Hz	<b>4L</b>	0-8 kHz	<b>4H</b>	0-4 Hz	<b>4L</b>	0-80 Hz	<b>4H</b>
0-500 Hz	<b>5L</b>	0-10 kHz	<b>5H</b>	0-5 Hz	<b>5L</b>	0-100 Hz	<b>5H</b>
0-600 Hz	<b>6L</b>	0-12 kHz	<b>6H</b>	0-6 Hz	<b>6L</b>	0-120 Hz	<b>6H</b>
0-700 Hz	<b>7L</b>	0-14 kHz	<b>7H</b>	0-7 Hz	<b>7L</b>	0-140 Hz	<b>7H</b>
0-800 Hz	<b>8L</b>	0-16 kHz	<b>8H</b>	0-8 Hz	<b>8L</b>	0-160 Hz	<b>8H</b>
0-900 Hz	<b>9L</b>	0-18 kHz	<b>9H</b>	0-9 Hz	<b>9L</b>	0-180 Hz	<b>9H</b>
0-1000 Hz	<b>AL</b>	0-20 kHz	<b>AH</b>	0-10 Hz	<b>AL</b>	0-200 Hz	<b>AH</b>
0-1100 Hz	<b>BL</b>	0-22 kHz	<b>BH</b>	0-11 Hz	<b>BL</b>	0-220 Hz	<b>BH</b>
0-1200 Hz	<b>CL</b>	0-24 kHz	<b>CH</b>	0-12 Hz	<b>CL</b>	0-240 Hz	<b>CH</b>
0-1300 Hz	<b>DL</b>	0-26 kHz	<b>DH</b>	0-13 Hz	<b>DL</b>	0-260 Hz	<b>DH</b>
0-1400 Hz	<b>EL</b>	0-28 kHz	<b>EH</b>	0-14 Hz	<b>EL</b>	0-280 Hz	<b>EH</b>
0-1500 Hz	<b>FL</b>	0-30 kHz	<b>FH</b>	0-15 Hz	<b>FL</b>	0-300 Hz	<b>FH</b>

## Input

See the table below and wiring diagrams at right.

The APD 7500 input can be wired to provide power to drive a current loop. Determine if your device provides power to the current loop or if the loop must be powered by the APD module.

Use a multi-meter to check for voltage at your device's output terminals. Typical voltage may be 9-24 VDC if it provides power to the loop.

Type of Device for Input	Input -	Input +
mA (current) input: Switch A set to "I". Input device is powered by its own supply (3 or 4 wire transmitter) or an external loop power supply.	<b>9 (-)</b>	<b>11 (+)</b>
mA (current) input: Switch A set to "I". Input device is unpowered or passive. APD module provides the loop power.	<b>11 (-)</b>	<b>10 (+13 V)</b>
Voltage input: Switch A set to "V".	<b>9 (-)</b>	<b>11 (+)</b>

## Output

See the wiring diagrams. Two types of outputs are available, MOSFET open collector or TTL.

The open drain MOSFET (open collector) output requires a user-supplied external power supply and pull-up resistor unless your input device is compatible with this type of output. The module output signal is protected to a maximum of 24 V.

For a powered TTL output, jumper terminals 1 and 2. This output uses an internal power supply and an internal pull up resistor. The output amplitude can vary from 1 to 12 VDC depending on the input impedance of your device. Maximum current drive capability is 10 mA.

## Module Power

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

When using DC power, either polarity is acceptable, but for consistency with similar products, positive (+) can be wired to terminal 13 and negative (-) can be wired to terminal 16.

## Mounting to a DIN Rail

Install module vertically on a 35 mm DIN rail in a protective enclosure away from heat sources. Do not block air flow. Allow 1" (25 mm) above and below housing vents for air circulation.

- Tilt front of module downward and position against DIN rail.
- Clip lower mount to bottom edge of DIN rail.
- Push front of module upward until upper mount snaps into place.

## Removal

- Push up on the bottom back of the module.
- Tilt front of module downward to release upper mount from top edge of DIN rail.
- The module can now be removed from the DIN rail.

## Output Calibration

Front-mounted zero and span potentiometers can be used to fine-tune the output. Note: Perform the following calibration procedure any time switch settings are changed.

- Apply power to the module and allow a min. 20 minute warm up time.
- Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
- Using an accurate frequency 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. This will produce the corresponding minimum output signal of 0 Hz.
- 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.
- Repeat adjustments for maximum accuracy.

## Cutout Control

This multi-turn potentiometer provides a low threshold adjustment. It disables output when input falls below a preset level. The low cutout potentiometer is adjustable from 2% to 25% of input range. The input signal must overcome this setting to produce an output from the unit.

A high cutout is factory set to 120% of the selected output span. If the output signal is greater than 120% of span, the output will shut off until it returns below the upper cutout level.

The red output LoopTracker blinks when signal is near either cutout level.

## 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. Additionally external contacts across terminals 5 and 6 can be used as a remote test function or manual over ride.

The Test Cal. potentiometer is factory set to approximately 50% output. It can be adjusted to set the test output from 0 to 100% of the output span. Press and hold the Test button and adjust the Test Cal. potentiometer for the desired output level.

## Operation

The APD 7500 accepts a DC voltage or current input and provides an optically isolated frequency output that is linearly related to the input. The frequency output is a 50% duty cycle square wave.

The variable brightness green LoopTracker® input LED provides a visual indication of the input level. It changes in intensity as the input changes from minimum to maximum. If the LED fails to illuminate, or change in intensity as the input changes, it may indicate a problem with module power, or signal input wiring. Note that it may be difficult to see the LEDs under bright lighting conditions.

The red LoopTracker output LED provides a visual indication that the output frequency signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum.

The red output LED will blink when the output is near the cutout level.

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. If the input and/or output do not function, check switch settings, power supplies, and wiring polarity.

