

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

[Quick Link: api-usa.com/7500](http://api-usa.com/7500)

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



Applications Link
api-usa.com/apps

Free Factory I/O Setup!



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 mA to 4-20 mA

Input Impedance

Voltage: 1 MΩ minimum
 Current: 50 Ω typical

Input Loop Power Supply

13 VDC nominal, regulated, 25 mA, max. ripple <10 mV_{p-p}
 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_{p-p} 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 nominal
 Consult factory for other 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



MOSFET or TTL Output

1 2 3 4

Removable Plugs

Remote Override Capable

5 6 7 8

Adjustable Low Cutout

Adjustable Output Test Function

I/O LoopTracker LEDs

Zero and Span for Output

Connect mA Input for Sink or Source

9 10 11 12

Universal Power

13 14 15 16

See Wiring Diagrams on Next Page

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.

Sink/Source Versatility

For maximum versatility the input can be selectively wired for sinking (unpowered) or sourcing (powered) milliamp output. The 13 VDC current loop 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.

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

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 for latest product information. Consult factory for your specific requirements.

WARNING: This product can expose you to chemicals including nickel, which is 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

Input Range Selection

Slide switch **A** and rotary switches **B** and **C** 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	V80	0-1 V	V10	0-1 mA	IA0
0-100 mV	V90	0-2 V	V40	0-2 mA	I00
0-200 mV	V00	0-2.5 V	V20	0-4 mA	I10
0-250 mV	VA0	0-4 V	V50	0-8 mA	I40
0-400 mV	VD0	1-5 V	V59	2-10 mA	I49
0-500 mV	V00	0-5 V	V30	0-10 mA	I20
		0-10 V	V60	0-16 mA	I50
		±5 V	V63	4-20 mA	I59
		±10 V	V73	0-20 mA	I30

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

Electrical Connections

See wiring diagrams at right. Observe polarity. If the output does not function, check wiring and polarity.

* Do not make any connections to unused terminals or use them as wiring junctions for external devices. This may cause permanent damage to the module!

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.

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.	9 (-)	11 (+)
mA (current) input: Switch A set to "I". Input device is unpowered or passive. APD module provides the loop power.	11 (-)	10 (+13 V)
Voltage input: Switch A set to "V".	9 (-)	11 (+)

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.

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

Input and output ranges, if specified on your order, are factory pre-configured (at 24°C ±1°C).

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.

