

**Input:** 0-10 mV to 0-130 VDC, ±5 mVDC to ±65 VDC, 0-200 µA to 0-50 mADC (Sink or Source)  
**Output:** 0-1 V to 0-10 VDC, ±5 VDC, ±10 VDC, 0-2 mA to 4-20 mA (Sink or Source)

Quick Link: [api-usa.com/4380](http://api-usa.com/4380)

- One Minute Setup for Hundreds of I/O Ranges
- External Switches & Tables for Range Selection
- Removable Plugs for Faster Installation
- Full 1200 V Input/Output/Power Isolation
- Input and Output LoopTracker® LEDs
- Output Test Button
- Built-In Loop Power Supplies for Sink/Source I/O

**Applications**

- Convert, Boost, and Rescale Process Signals
- Isolate Single-Ended (Common Ground) PLC Inputs
- Interface Process Signals with Panel Meters, PLCs, Recorders, Data Acquisition, DCS, & SCADA Systems

**DC Input Ranges**

Field selectable ranges and offsets via switch settings  
 Voltage: 0-10 mVDC to 0-130 VDC  
 Bipolar voltage: ±5 mVDC to ±65 VDC  
 Current: 0-200 µADC to 0-50 mADC  
 Input offset: ±100% in 15% increments

**Input Impedance (Voltage)**

Voltage: 1 MΩ minimum  
 Current: 50 Ω typical  
 Voltage burden: 1 VDC at 20 mA current input

**Common Mode Rejection**

100 dB minimum

**Input Loop Power Supply**

15 VDC ±10%, regulated, 25 mADC  
 May be selectively wired for sinking or sourcing mA input

**LoopTracker**

Variable brightness LEDs indicate I/O loop level and status

**DC Output Ranges**

Field selectable ranges and offsets via switch settings  
 Voltage (10 mA max): 0-1 VDC to 0-10 VDC  
 Bipolar voltage: ±5 VDC or ±10 VDC  
 Current: 0-2 mADC to 0-20 mADC, 4-20 mADC  
 20 V compliance, 1000 Ω at 20 mA

**Output Calibration**

Multi-turn zero and span potentiometers  
 ±15% of span adjustment range typical

**Output Loop Power Supply**

20 VDC nominal, regulated, 25 mADC, <10 mVRMS max. ripple  
 May be selectively wired for sinking or sourcing mA output

**Output Test/Override**

Front button sets output to test level when pressed or via external contact closure  
 Potentiometer adjustable 0-100% of span

**Output Ripple and Noise**

Less than 10 mVRMS ripple and noise

**Linearity**

Better than ±0.1% 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 typical  
 1 millisecond typical with DF option

**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 W maximum  
 D versions: 9-30 VDC or 10-32 VAC 50/60 Hz, 2 W maximum



Applications Link  
[api-usa.com/apps](http://api-usa.com/apps)

Free Factory I/O Setup!



**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 4380 accepts a DC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input.

Typical applications include signal isolation, conversion, boosting or a combination of the three. Full 3-way isolation (input, output, power) makes this module useful for ground loop elimination, common mode signal rejection or noise pickup reduction.

**I/O Sink/Source Versatility**

Standard on the APD 4380 is a 15 VDC loop excitation supply for the input and a 20 VDC loop excitation supply for the output. These power supplies can be used to power passive mA devices if required.

For maximum versatility the input and output can each be selectively wired for sinking or sourcing. This allows the APD 4380 to work with any combination of powered or unpowered mA inputs and powered or unpowered mA outputs.

**How to Order**

**All models are field rangeable. Please specify**  
 Model APD 4380  
 Order APD 4380 D for operation on low voltage power  
 Options as required

**I/O can be pre-set to your specifications. Please provide**  
 Input range  
 Output range

Model	Input	Output	Power
APD 4380	Field configurable—specify range if	Field configurable—specify range if	85-265 VAC 60-300 VDC
APD 4380 D	factory is to set switches	factory is to set switches	9-30 VDC or 10-32 VAC

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

- M01** Input/output reversal, such as 4-20 mA input to 20-4 mA output
- DF** Fast response time, consult factory. DF option will cause output noise levels to be greater than standard specifications.
- U** Conformal coating for moisture resistance

**Accessory—order as separate line item**

- API BP4** Spare removable 4 terminal plug, black



Connect Sink or Source mA Output 1 2 3 4  
 Adjustable Output Offset 5 6 7 8  
 Output LoopTracker LED  
 Adjustable Output Test/Override Function  
 Zero and Span for Output  
 Input LoopTracker LED  
 Hundreds of Range Selections  
 Connect Sink or Source mA Input 9 10 11 12  
 Universal Power 13 14 15 16

Removable Plugs

See Wiring Diagrams on Next Page

## 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)

## Range Selection

See the tables on the next two pages to select I/O ranges for your application. The module side label also lists common ranges. It is generally easier to select ranges before installation.

See the model/serial number label for module information, options, or if a custom range was specified.

For ranges that fall between the listed ranges use the next highest setting and trim the output signal with the zero and span potentiometers.

- Switches A and B: Input range
- Switch C: Input offset
- Switch D: Output range
- Switch E: Set to "V" for voltage output or set to "I" for current output

Note that when using a current shunt input, it measures a mV drop across a fixed resistance, typically 50 mV, 75 mV or 100 mV. The correct input setting would be the appropriate mV range for the shunt.

## 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.

### Voltage Output

Set switch **E** to "V" for a voltage output.

If your receiving device (such as a PLC or a display) uses a voltage input, use terminals 3 and 4.

### Current Output

Set switch **E** to "I" for a current output.

Determine if your receiving device (such as a PLC or a display) provides power to the current loop or if the loop must be powered by the APD module. Typical voltage may be 9-24 VDC at your device's input terminals if it provides power to the loop.

If your device does not power the current loop, the APD can provide power using terminals 3 and 4.

If it provides power to the loop or an external supply provides power to the loop, use terminals 2 and 3.

Type of Device for Output	- Terminal	+ Terminal
Measuring/recording device accepts a voltage input.	3 (-)	4 (+) switch E set to "V"
Measuring/recording device accepts a mA (current) input and the input is unpowered or passive. APD module provides the loop power.	3 (-)	4 (+20 V) switch E set to "I"
Measuring/recording device accepts a mA (current) input and provides power to the current loop.	2 (-)	3 (+) switch E set to "I"

## Current Input

Determine if your transmitter provides power to the current loop or if the loop must be powered by the APD module. Typical voltage may be 9-24 VDC at your transmitter's output terminals if it provides power to the loop.

If your transmitter or an external supply provides power to the loop, use terminals 9 and 11 as shown below right.

If your transmitter does not power the current loop, the APD can provide power using terminals 10 and 11 as shown far right.

## Voltage Input

If your transmitter provides a voltage output, use terminals 9 and 11 as shown at right.

Type of Input Device	- Terminal	+ Terminal
Sensor or transmitter with a voltage output.	9 (-)	11 (+)
Transmitter with a mA (current) output that provides power to the current loop. Typically a 3 or 4-wire device.	9 (-)	11 (+)
Transmitter with mA (current) output that is unpowered. Typically a 2-wire device. APD module provides loop power.	11 (-)	10 (+15 V)

## 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 API products, positive (+) can be wired to terminal 13 and negative (-) can be wired to terminal 16.

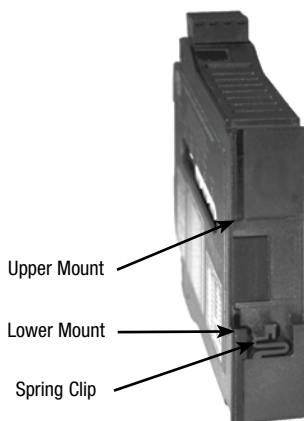
## Installation Location

The housing clips to a standard 35 mm DIN rail. The housing is IP40 rated and should be mounted inside a panel or enclosure.

## 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.

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



## Removal

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

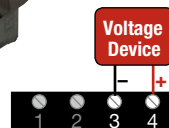


To avoid damage to the module, do not make any connections to unused terminals

Wire terminal torque  
0.5 to 0.6 Nm or  
4.4 to 5.3 in-lbs

### Voltage Output

Switch E set to "V"

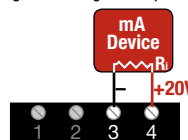


mA output: determine if receiving device has a passive or powered input. The module can be wired for a sinking or sourcing mA output.

### Current Sourcing Output

Switch E set to "I"

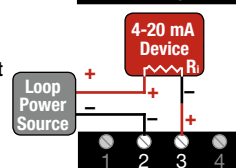
Module powers mA output loop



### Current Sinking Output

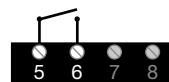
switch E set to "I"

Module mA output is unpowered



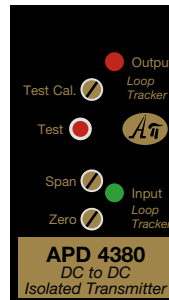
### External Contact

for Test Function



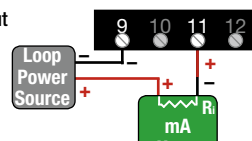
To maintain full isolation avoid combining power supplies in common with input, output, or unit power.

### Voltage Input



### Current Sinking Input

Module mA input is unpowered

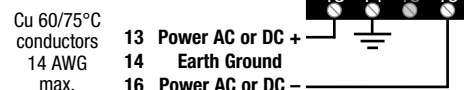


### Current Sourcing Input

Module powers mA input loop



mA input: determine if transmitter has a passive or powered output. The module can be wired for a sinking or sourcing mA input.

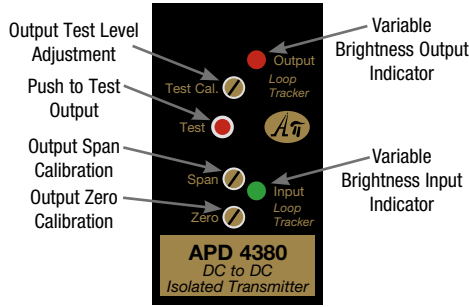


Calibration

Front-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.
2. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer for the exact minimum output desired.
4. Set the input at maximum and adjust the Span pot for the exact maximum output desired.
5. Repeat adjustments for maximum accuracy.



Operation

The APD 4380 accepts a DC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input.

The 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.

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.

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.

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.

Table with columns for Output, Switches, and 20 input ranges (0-1V to 0-130V). Each row contains 20 specific output values corresponding to the input range and switch settings.

See next page for Bipolar Voltage and Current (mA) Input Switch Settings

