AC to DC Transmitters, Isolated, Field Rangable

**APD 6380**

**Input:** True RMS 0-40 mVAC to 0-300 VAC, 0-4 mAAC to 0-200 mAAC

**Output:** 0-1 V to 0-10 VDC, ±5 VDC, ±10 VDC, ±2 mA to 20 mAADC

- 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 Supply for Sink/Source Output

### 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

#### AC Input Ranges
Field selectable ranges via switch settings
- Voltage: 0-40 mVAC to 0-300 VAC
- Current: 0-4 mAAC to 0-200 mAAC
- Measurements are true RMS

#### Input Impedance
- Voltage (0-4 VAC): 1 MΩ minimum
- Voltage (>4 VAC): 220 kΩ minimum
- Current: 10 Ω typical

#### Input Frequency
40 Hz to 1000 Hz sinusoidal

#### Common Mode Rejection
120 dB minimum

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

#### DC Output Ranges
Field selectable ranges via switch settings
- Bipolar voltage: ±1 VDC to ±10 VDC
- Current: 0-2 mAADC to 0-20 mAADC
- 20 V compliance, 1000 Ω at 20 mA

#### Output Calibration
- Output offset: +100% in 15% increments
- ±15% of span adjustment range typical
- Output Loop Power Supply
- Max. ripple, less than 10 mVACs
- May be selectively wired for sinking or sourcing mA output

#### Output Test
Front momentary button sets output to test level
- Potentiometer adjustable 0-100% of span

#### Output Ripple and Noise
Less than 10 mVACs 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
200 milliseconds typical (0-90%)

#### Isolation
1200 Vrms minimum

#### Full isolation: power to input, power to output, input to output

#### Power
- 85-265 VAC or 60-300 VDC, 2 W maximum
- D versions: 9-30 VDC or 10-32 VAC 50/60 Hz, 2 W maximum

#### 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

#### Description
The APD 6380 accepts an AC 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.

#### Sink/Source Output Versatility
For maximum versatility a milliamp output can be selectively wired for sinking or sourcing. This allows the APD 6380 milliamp output to connect to a powered or unpowered current loop. The 20 VDC output loop supply can be used to power a passive mA device if required.

#### 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.

### How to Order
All models are field rangeable

**APD 6380 D**
- Field configurable—specify range if factory is to set switches
- Connect mA Output for Sink or Source

**APD 6380**
- Field configurable—specify range if factory is to set switches

**Power**
- 85-265 VAC or 60-300 VDC
- 9-30 VDC or 10-32 VAC

### Order D versions for operation on low voltage power

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>APD 6380</td>
<td>Field configurable—specify range if factory is to set switches</td>
<td>Field configurable—specify range if factory is to set switches</td>
<td>85-265 VAC or 60-300 VDC</td>
</tr>
<tr>
<td>APD 6380 D</td>
<td></td>
<td></td>
<td>9-30 VDC or 10-32 VAC</td>
</tr>
</tbody>
</table>

### Options—add to end of model number
- M01: Output reversal, such as 20-4 mA output
- U: Conformal coating for moisture resistance

### Accessories—order as separate line item
- API BP4: Spare removable 4 terminal plug, black
### Precautions

**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.

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 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.

### Specifications

Connect the AC signal input to terminals 9 and 11 as shown at module does not function, check switch settings and wiring. Polarity must be observed for output wiring connections. If the module does not function, check switch settings and wiring.

### Electrical Connections

Connect the AC signal input to terminals 9 and 11 as shown at module does not function, check switch settings and wiring. Polarity must be observed for output wiring connections. If the module does not function, check switch settings and wiring.

### Precautions

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

**ATTENTION!** Eviter 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.

### Ranges

See tables below and on next page for switch settings. For ranges not listed here or for ranges that fall between the listed ranges see api-usa.com/APD6380 and download apd6380orange.pdf for the complete range table.

### Inputs

<table>
<thead>
<tr>
<th>Switches</th>
<th>AB</th>
<th>ABCD</th>
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<tbody>
<tr>
<td>0-1 V</td>
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<td>0-2 V</td>
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<td>0-4 V</td>
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<td>1-5 V</td>
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<td>0-8 V</td>
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<tr>
<td>2-10 V</td>
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<tr>
<td>10-20 V</td>
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</tbody>
</table>

### Outputs

<table>
<thead>
<tr>
<th>Output</th>
<th>0-1 V</th>
<th>0-2 V</th>
<th>0-4 V</th>
<th>1-5 V</th>
<th>0-8 V</th>
<th>2-10 V</th>
<th>10-20 V</th>
<th>0-16 mA</th>
<th>0-20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.4 mV</td>
<td>V406</td>
<td>V407</td>
<td>V408</td>
<td>V409</td>
<td>V410</td>
<td>V411</td>
<td>V412</td>
<td>V413</td>
<td>V414</td>
</tr>
<tr>
<td>0-0.5 mV</td>
<td>V420</td>
<td>V421</td>
<td>V422</td>
<td>V423</td>
<td>V424</td>
<td>V425</td>
<td>V426</td>
<td>V427</td>
<td>V428</td>
</tr>
<tr>
<td>0-0.7 mV</td>
<td>V430</td>
<td>V431</td>
<td>V432</td>
<td>V433</td>
<td>V434</td>
<td>V435</td>
<td>V436</td>
<td>V437</td>
<td>V438</td>
</tr>
<tr>
<td>0-1 mV</td>
<td>V450</td>
<td>V451</td>
<td>V452</td>
<td>V453</td>
<td>V454</td>
<td>V455</td>
<td>V456</td>
<td>V457</td>
<td>V458</td>
</tr>
<tr>
<td>0-1.5 mV</td>
<td>V470</td>
<td>V471</td>
<td>V472</td>
<td>V473</td>
<td>V474</td>
<td>V475</td>
<td>V476</td>
<td>V477</td>
<td>V478</td>
</tr>
<tr>
<td>0-2 mV</td>
<td>V490</td>
<td>V491</td>
<td>V492</td>
<td>V493</td>
<td>V494</td>
<td>V495</td>
<td>V496</td>
<td>V497</td>
<td>V498</td>
</tr>
</tbody>
</table>

### Input and Output Values

<table>
<thead>
<tr>
<th>Type of Input Device</th>
<th>Terminal</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor or transmitter with an AC voltage or milliamp output</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>
### Voltage Input Range Selection

See table below (voltage inputs) and on the next page (current inputs) to select I/O ranges for your application. It is generally easier to select ranges before installation.

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

It may also be possible to use the next highest setting and trim the output signal with the zero and span potentiometers.

**Switch A:** Set to “V” for voltage input  
**Switch B:** Input range  
**Switch C:** Input range  
**Switch D:** Output range  
**Switch E:** Set to “V” for voltage output or “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.

### Current Input Range Selection

See table below to select I/O ranges when using a current input. 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.

The module side label lists common ranges.

It may also be possible to use the next highest setting and trim the output signal with the zero and span potentiometers.

**Switch A:** Set to “I” for current input  
**Switch B:** Input range  
**Switch C:** Input range  
**Switch D:** Output range  
**Switch E:** Set to “I” for voltage output or “I” for current output

### 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 2 as shown in the wiring diagram.

### 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 LOOP voltage may be 8-24 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 as shown in the wiring diagram.

### Type of Device for Output

<table>
<thead>
<tr>
<th>Type of Device for Output</th>
<th>+ Terminal</th>
<th>- Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring/recording device accepts a voltage input.</td>
<td>3 (−)</td>
<td>4 (+) switch E set to “V”</td>
</tr>
<tr>
<td>Measuring/recording device accepts a mA (current) input and the input is unpowered or passive. APD module provides the loop power.</td>
<td>3 (−)</td>
<td>4 (+20 V) switch E set to “I”</td>
</tr>
<tr>
<td>Measuring/recording device accepts a mA (current) input and provides power to the current loop.</td>
<td>2 (−)</td>
<td>3 (+) switch E set to “I”</td>
</tr>
</tbody>
</table>

### 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 12.

### 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

### Voltage

<table>
<thead>
<tr>
<th>Voltage Output</th>
<th>Loop Power Source</th>
<th>mA Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch E set to “V”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### mA Device

<table>
<thead>
<tr>
<th>mA Device</th>
<th>Loop Power Source</th>
<th>mA Device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

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

### ADP 6380 AC to DC Isolated Transmitter

- Cu 60/75°C conductors 14 AWG max.
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.

Calibration
Front-mounted Zero and Span potentiometers are used to calibrate the output to compensate for load and lead variations.

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. The Zero control should only be adjusted when the input signal is at its minimum. This will 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 input at maximum and 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. Example: for 4-20 mA output, the Span control will provide adjustment for the 20 mA or high end of the signal.
5. Repeat adjustments for maximum accuracy.

Operation
The APD 6380 accepts an AC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input.

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
Avoid shock hazards! Turn signal input, output, and power off before removing module.
1. Push up on bottom back of 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.

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.

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.

1. Push up on bottom back of 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.