Two Independent Channels with Full Isolation

- Zero and Span Potentiometers for Each Output
- Input and Output LoopTracker™ LEDs
- Output Test/Manual Override for Each Channel
- Built-In I/O Power Supplies

Applications
- Monitor Two DC Signals
- Convert/Isolate Dual Output Transmitters

Channel 1 DC Input Range
- Factory configured, please specify input type and range
  - Voltage: 0-10 mVDC to 0-100 VDC
  - Bipolar voltage: ±50 mVDC to ±10 VDC
  - Current: 0-1 mAADC to 0-50 mAADC
- Voltage input impedance: 200 Ω typical
- Input com. mode rejection: 120 dB minimum
- Current input voltage burden: 1.25 VDC max. at 20 mA

Channel 2 DC Input Range
- Factory configured, please specify input type and range
  - Voltage: 0-10 mAADC to ±10 AADC
  - Bipolar voltage: ±1 VDC to ±10 VDC
  - Current: 0-1 mAADC to 0-20 mAADC
- Voltage input impedance: 200 Ω typical
- Input com. mode rejection: 120 dB minimum
- Current input voltage burden: 1.25 VDC max. at 20 mA

Channel 1 and Channel 2 Output Ranges
- Factory configured, please specify for each output channel
  - Voltage: 0-1 VDC to ±10 VDC
- Bipolar voltage: ±50 mVDC to ±10 VDC
- Current: 0-1 mAADC to 0-50 mAADC
- Voltage input impedance: 50 Ω typical
- Input com. mode rejection: 120 dB minimum
- Current input voltage burden: 1.25 VDC max. at 20 mA

Output Power Supplies
- Full 5-way, 20 V compliance, 1000 Ω at 20 mA

Output Calibration
- Multi-turn zero and span potentiometers for each output channel ±15% of span adjustment range typical

Output Ripple and Noise
- Less than 10 mVrms

Linearity
- Better than ±0.1% of span

Ambient Temperature Range and Stability
- –10°C to +60°C operating ambient
- Better than ±0.04% of span per °C stability

Isolation
- Full 5-way, 1200 Vrms minimum

Response Time
- 70 milliseconds nominal

Output Loop Power Supplies
- 20 VDC nominal, regulated, 25 mAADC for each output channel
- May be selectively wired for sinking or sourcing mA output

Output Test
- Front buttons set each output to test level when pressed
- Each test level potentiometer adjustable 0-100% of span

Installation Environment
- IP 40, requires installation in panel or enclosure with adequate ventilation
- For use in Pollution Degree 2 Environment
- Mount vertically (as shown in picture) to a 35 mm DIN rail allowing minimum 1" (25 mm) above and below housing vents for air circulation

Power
- 85-265 VAC, 50/60 Hz or 60-300 VDC, 6 W maximum
- D versions: 9-30 VDC or 10-32 VAC 50/60 Hz, 6 W maximum

How to Order
- Models are factory ranged. See I/O ranges above left.
- Ranges and options for each channel must be specified on order
- Channel 1 input range
- Channel 2 input range
- Channel 1 output range
- Channel 2 output range

Dimensions and Connectors
- 1.78” W x 4.62” H x 4.81” D
- 45 mm W x 117 mm H x 122 mm D
- Eight 4-terminal removable connectors, 14 AWG max wire size

LoopTracker
- Variable brightness LEDs indicate I/O levels for each channel
- I/O Sink/Source versatility
- Typical applications include signal conversion, isolation, and redundancy (i.e. to prevent failure of the entire loop if one device fails), or a combination of these.
- Each input signal is filtered, amplified, and then passed through an opto-coupler to the output stages. Full 5-way isolation (input 1, input 2, output 1, output 2, power) make this module useful for ground loop elimination, common mode signal rejection, and noise pickup reduction.

LoopTracker
- LED for Each Channel
- Adjustable Output Test Function for Each Channel
- Zero and Span for Each Channel

Output LoopTracker
- LED for Each Channel
- Connect Sink or Source mA Input for Each Channel

LoopTracker
- API exclusive feature includes four LoopTracker LEDs (green for each input, red for each 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 troubleshooting.

Output Test
- An API exclusive feature include output test buttons for each channel to provide a fixed output (independent of the input) when held depressed.
- Terminals are also provided to operate the test functions remotely for each channel. This also allows use as a remote manual override to provide a temporary fixed output if desired.
- The test output level for each channel is potentiometer adjustable from 0 to 100% of the output span. The output test greatly aids in saving time during initial startup and/or troubleshooting.

Options and Accessories
- Options—add to end of model number
- R1 Channel 1 I/O reversal (i.e. 20-4 mA out)
- R2 Channel 2 I/O reversal (i.e. 20-4 mA out)
- R3 Channel 1 and channel 2 I/O reversal
- M19 Channel 1 high voltage output >10 V up to 20 V
- M29 Channel 2 high voltage output >10 V up to 20 V
- M39 Channel 1 and channel 2 high voltage output
- U Conformal coating for moisture resistance

Accessories—order as separate line item
- API BP4 Spare removable 4 terminal plug, black
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 down and position the lower spring clips against the bottom edge of DIN rail.
2. Push front of module upward until upper mount snaps into place.

Removal
Avoid shock hazards! Turn signal input, output, and power off.
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.

Calibration
Input and output ranges are factory pre-configured (at 24°C ±1°C). Front-mounted Zero and Span potentiometers for each channel can be used to compensate for load and lead variations.

1. Apply power to the module and allow a minimum 30 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 ±10 V output.
4. 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. Example: for 4-20 mA output, the Span control will provide adjustment for the 20 mA high end of the signal.
5. Repeat adjustments for both output channels for maximum accuracy.

Output Test Function
When the Test button is depressed it will drive the output with a known good signal which can be used as a diagnostic aid during initial start-up or troubleshooting. When released, the output will return to normal.

Each Test Cal. potentiometer is factory set to approximately 50% output. Each 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 corresponding Test Cal. potentiometer for the desired output level.

They may optionally be externally wired for remote test operation or a manual override. See wiring diagram at right.

Operation
The APD 2000 accepts two independent DC voltage or current inputs and provides two independent and optically isolated DC voltage or current outputs that are linearly related to each input.

Green LoopTracker® input LEDs provide a visual indication that each signal is being sensed by the input circuitry of the module. They also indicates the input signal strength by changing in intensity as the process changes from minimum to maximum. If an LED fails to illuminate, or fails to change in intensity as the process changes, check the module power or signal input wiring. Note that it may be difficult to see the LEDs under bright lighting conditions.

Two red LoopTracker output LEDs provide a visual indication that the output signals are functioning. They become brighter as the input and each corresponding output change from minimum to maximum.

For a current output 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.

For milliamp ranges determine if your devices provide power to the loop. Typically a 2-wire device. APD Transmitter with an unpowered mA input. Measuring/recording device has a mA input and powers the current loop. Typically a 3 or 4-wire device.

Sensor or transmitter with voltage output. Measuring/recording device accepts a voltage input.

INPUTS, DC
For milliamp ranges determine if your devices provide 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 terminals if it provides power to the loop. See note about terminating an unused mA output channel.

Device for Output Channel 1

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<td>Measuring/recording device accepts a voltage input.</td>
<td>3 (-)</td>
<td>4 (+)</td>
</tr>
<tr>
<td>Measuring/recording device has an unpowered or passive mA input. APD module provides the loop power.</td>
<td>3 (-)</td>
<td>4 (+20 V)</td>
</tr>
<tr>
<td>Measuring/recording device has a mA input and powers the current loop.</td>
<td>2 (-)</td>
<td>3 (+)</td>
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Device for Output Channel 2

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<tr>
<td>Measuring/recording device accepts a voltage input.</td>
<td>7 (-)</td>
<td>8 (+)</td>
</tr>
<tr>
<td>Measuring/recording device has an unpowered or passive mA input. APD module provides the loop power.</td>
<td>7 (-)</td>
<td>8 (+20 V)</td>
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<td>Transmitter with a mA output that powers the current loop. Typically a 3 or 4-wire device.</td>
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Module Power Terminals
Check model/serial number label for module operating voltage to make sure it matches available power. The power supplies are fuse protected and the unit may be returned to API for fuse replacement.

When using DC power, either polarity is acceptable, but for consistency, wire positive (+) to terminal 25 and negative (–) to terminal 28.

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