Two Independent Channels with Full Isolation
Zero and Span for Each Output
Input and Output LoopTracker LEDs
Output Test/Manual Override for Each Channel
Built-In I/O Power Supplies

Applications
- Monitor a DC Signal and Position
- Convert/Isolate Dual Output Transmitters

Channel 1 DC Input Range
Factory configured, please specify input type and range
- Voltage: 0-10 mA DC to 0-100 VDC
- Bipolar voltage: ±50 mVDC to ±10 VDC
- Current: 0-1 mA DC to 0-50 mA DC, 4-20 mA DC
- Voltage input impedance: 200 kΩ minimum
- Current input impedance: 50 Ω typical
- Input comm. mode rejection: 120 dB minimum
- Current input voltage burden: 1.25 VDC max. at 20 mA
- Input loop power supply: 15 VDC, ±10%, regulated, 25 mA DC, may be connected for sinking or sourcing mA input

LoopTracker
Variable brightness LEDs indicate I/O levels for each channel

Channel 1 and Channel 2 Output Ranges
Factory configured, please specify for each output channel
- Voltage: 1/VAC excitation provided to potentiometer
- Consult factory for other ranges and configurations
- Minimum range: 0-100 Ω
- Maximum range: 0-1 MΩ
- Input impedance: 1000 Ω to 1 MΩ minimum
- Input comm. mode rejection: 100 dB minimum

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

Output Characteristics
- Linearity: ±0.1% of span
- Temperature stability: Better than 0.04% span/°C
- Output ripple and noise: Less than 10 mV RMS

Isolation
Full 5-way, 1200 Vrms minimum

Response Time
70 milliseconds nominal

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

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

Installation Environment
Mount vertically to a 35 mm DIN rail
- Use in Pollution Degree 2 Environment
- IP 40 housing, requires installation inside an enclosure with −10°C to +60°C operating ambient

Connectors
Eight 4-terminal removable connectors, 14 AWG max wire size

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

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
- Accessory—order as separate line item
- API BP4 Spare removable 4 terminal plug, black

APD 2003 D
Introduces Dual Channel Signal Conversion, Isolation, and Transmission in One Device
- For use in Pollution Degree 2 Environment
- Mount vertically to a 35 mm DIN rail
- Height includes connectors
- Dimensions 1.78” W x 4.62” H x 4.81” D
- 85-265 VAC, 50-60 Hz, 60-300 VDC model only

LoopTracker
API exclusive features include four LoopTracker LEDs (green for each input, red for each output) that vary in intensity with changes in the process input and output signals.

Output Test
An API exclusive feature includes 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 test output greatly aids in saving time during initial startup and troubleshooting.

APD 2003 A

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

1. Lift 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.

- Apply power to the module and allow a minimum 30 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 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 range. 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 or high end of the signal.
- 5. Repeat adjustments for both output channels for maximum accuracy.

Outdoor 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.

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 2003 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 indicate 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 from maximum to minimum, it may be difficult to see the LEDs under bright lighting conditions.

Green 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.

Precautions
WARNING! All wiring must be performed by a qualified electrician or instrument service technician. 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.

Electrical Connections
Polarity must be observed for signal wiring connections. If the input and/or output do not function, check wiring and polarity.

Each product is factory configured to your exact input and output ranges as indicated on the serial number label.

Outputs
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.

Usage and Application
APD maintains a constant effort to upgrade and improve its products. 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.

Device for Output Channel 1
Terminal
Measuring/recording device accepts a voltage input.
3 (+) 4 (+)
Measuring/recording device has an unpowered or passive mA input. APD module provides the loop power.
3 (+) 4 (+20 V)
Measuring/recording device has a mA input and powers the current loop.
2 (+) 3 (+)

Device for Output Channel 2
Terminal
Measuring/recording device accepts a voltage input.
7 (-) 8 (+)
Measuring/recording device has an unpowered or passive mA input. APD module provides the loop power.
7 (-) 8 (+20 V)
Measuring/recording device has a mA input and powers the current loop.
6 (-) 7 (+)

Input, 1, 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.

DC Input Channel 1
Terminal
Sensor or transmitter with voltage output.
17 (-) 19 (+)
mA output transmitter that powers the current loop. Typically a 3 or 4-wire device.
17 (-) 19 (+)
Transmitter with an unpowered mA output. Typically a 2-wire device. APD module provides loop power.
19 (-) 18 (+15 V)

Input 2, Potentiometer
The potentiometers can be connected to all three signal input terminals as shown. 0-100% of the potentiometer range must be used. A stable 1 VDC source to excite the potentiometer. Voltage drop is measured across the potentiometer, thus allow any full-range potentiometer to be used.

Potentiometer Input Channel 2
Terminal
Full scale or high side of potentiometer
21 (+1 VDC)
Zero or low end of potentiometer
22 (-)
Potentiometer wiper arm
23

Module Power Terminals
Check model serial number label for module operating voltage to make sure it matches available power. The power supplies are fused 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.

Seating: Left to Right
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