Duopak® Two Channel Signal Converter/Isolator/Transmitter

**Channel 1: Potentiometer to DC**

- 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 Position and AC Voltage or Current
- Convert/Isolate Dual Output Transmitters

**Channel 1 Potentiometer Input Range**

Use any 3 wire full-travel potentiometer

1 VDC excitation provided to potentiometer

Consult factory for other ranges and configurations

- Minimum range: 0-100 Ω
- Maximum range: 0-1 MΩ
- Input impedance: 100 Ω to 1 MΩ minimum
- Input comm. mode rejection: 100 dB minimum

**Channel 2 AC Input Range**

Factory configured, please specify input type and range

- Voltage: 0-50 mVAC to 0-300 VAC
- Current: 0-1 mAAC to 0-1000 mAAC

**Output Characteristics**

- ±15% of span adjustment range typical
- Measurement type: True RMS
- Frequency: 40 Hz to 1000 Hz sinusoidal
- Voltage input impedance: 220 kΩ minimum
- Current input voltage burden: 1.0 Vmax maximum

**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: 0-1 VDC to 0-10 VDC, 10 mA max up to 20 VDC with M19, M29, M39
- Bipolar voltage: ±1 VDC to ±10 VDC
- Current: 0-1 mA to 0-25 mADC, 4-20 mA DC
- ±20 V compliance, 1000 VDC maximum

**Output Power Supplies**

20 VDC nominal, regulated, 25 mA DC 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**

Mount vertically to a 35 mm DIN rail

For use in Pollution Degree 2 Environment

IP 40 housing, requires installation inside an enclosure

- Temperature: -10°C to +60°C operating ambient
- Relative Humidity: 15% to 90% (non-condensing)

**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

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**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—for separate line item
  - BP4 Spare removable 4 terminal plug, black

**Applications**

- Monitor Position and AC Voltage or Current
- Convert/Isolate Dual Output Transmitters

**Description**

The APD 2036 Duopak accepts one potentiometer input and one AC voltage or current input and provides two optically isolated DC voltage or current outputs that are linearly related to the inputs.

The input ranges and the output ranges for each channel are independent and can be specified as required. This provides an economical two channel solution in one device.

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.

**Output Sink/Source Versatility**

Standard on the APD 2036 are 20 VDC loop excitation supplies for each output channel. These power supplies can be selectively wired for sinking or sourcing allowing use with any combination of powered or unpowered milliamp I/O devices.

**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.

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 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 output test greatly aids in saving time during initial startup and/or troubleshooting.

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**Dimensions**

1.78” W x 4.62” H x 4.81” D

45 mm W x 117 mm H x 122 mm D

Height includes connectors

**Made in the USA**

**Universal Power**

**LIFETIME WARRANTY**

**Height includes connectors**

**See Wiring Diagrams on Next Page**

**Width includes connectors**

**Depth includes connectors**

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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 descriptions des bornes et des exemples de câblage. Consultez l’usine pour assistance.
ATTENTION! Évitez 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 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

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.

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

1. Flip 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. Flip 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
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 or 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 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 2036 accepts one potentiometer input and one AC voltage or current input and provides two optically isolated DC voltage or current outputs that are linearly related to the inputs. 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 with increasing output current or a manual override. See wiring diagram at right.

Cu 60/75°C conductors 14 AWG max.

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

AC Input 1

17 Full Scale
18 Minimum
19 Wiper Arm

*May be switched for reverse output

AC Input 2

+15 VDC, 25 mA sensor power available at terminal 22

To maintain full isolation avoid combining power supplies in common with inputs, outputs, or unit power.

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