Duopak® Two Channel Signal Converter/Isolator/Transmitter, Factory Ranged

Channel 1: Bridge/Strain Gauge/Load Cell to DC

- Two independent channels with full isolation
- Zero and span for each output
- Input and output loop tracker LEDs
- Output test/manual override for each channel
- Built-in I/O power supplies

Applications
- Monitor strain or pressure and an AC signal
- Convert/isolate dual output transmitters

Channel 1 Bridge Input Range
Factory configured, specify sensor mV/V and mV range
Sensor range: 0–1 mV to 0–2000 mV
Millivolt output range is determined by the sensitivity of the sensor (mV/V) and the excitation voltage applied.

Channel 1 Excitation Voltage
Range: 4 to 10 VDC factory set, specify adjustment
Maximum output: 10 VDC maximum at 30 mA
Stability: ±0.01% per °C
Designed for one 350 Q (or greater) sensor

Channel 2 AC Input Range
Factory configured, specify input type and range
Voltage: 50–265 VAC, 60–300 VDC
Current: 0–1 mA AC to 0–1000 mA
Measurement type: True RMS
Frequency: 40 Hz to 1000 Hz sinusoidal
Voltage input impedance: 220 kΩ minimum
Current input voltage burden: 1.0 Vrms maximum

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

Channel 1 and Channel 2 Output Ranges
Factory configured, 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 DC to 0–25 mA DC, 4–20 mA DC
20 V DC compliance, 1000 Q at 20 mA

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 mVrms

Isolation
Full 5-way, 1200 Vrms minimum

Response Time
70 milliseconds minimum

Output Loop 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

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

Channel 2: AC to DC

Sink or Source mA Output for Each Channel
Adjustable output test function for each channel
Zero and span for each channel
Input loop tracker LED for each channel

Custom I/O Ranges
Built-in excitation voltage for strain gauge input

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

Description
The APD 2056 Duopak accepts one strain gauge 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 2056 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.

How to Order
Models are factory ranged. See I/O ranges above left.
Ranges and options for each channel must be specified on order

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
APL BF4 Spare removable 4 terminal plug, black

Part Number
Model | Description | Power
--- | --- | ---
APD 2056 | Duopak 2 channel Strain DC, AC-DC converter/isolator/transmitter | 85–265 VAC, 50/60 Hz or 60–300 VDC
APD 2056 D | | 9–30 VDC or 10–32 VAC

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 troubleshooting.

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Absolute Process Instruments
1220 American Way Libertyville, IL 60048
Phone: 800-942-0315 Fax: 800-949-7502

api-usa.com/2000
**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 voltmeter on terminals 18 and 20 adjust the excitation voltage fine adjustment potentiometer to the strain gauge manufacturer’s recommended value.
3. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
4. 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.
5. 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.
6. Repeat adjustments for both 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 2056 accepts one strain gauge 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 indicate the input signal strength by changing in intensity as the process changes from maximum to minimum. If an LED fails to illuminate, or fails to change in intensity as the process changes may indicate a problem with the module power or signal output wiring. Note that it may be difficult to see the LEDs under bright lighting conditions.

### Electrical Connections

- **Polarity must be observed for signal wiring connections.**
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