DuoPak®
Two Channel Signal Converter/Isolator/Transmitter, Factory Ranged
APD 2005

Channel 1: DC 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

Properties

Monitor a DC Signal and Weight or Pressure
Convert/Isolate Dual Output Transmitters
Output Test/Manual Override for Each Channel
Power
Built-In I/O Power Supplies
Two Independent Channels with Full Isolation
Zero and Span for Each Output
9-30 VDC or 10-32 VAC

Applications

- Monitor a DC Signal and Weight or Pressure
- 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 mA DC to 0-50 mA DC, 4-20 mA
Voltage input impedance: 200 kΩ min
Current input impedance: 50 Ω typical
Current input voltage burden: 1.25 VDC max at 20 mA
Input loop power supply: 15 VDC, ±10%, regulated, 25 mA, may be connected for sinking or sourcing mA input
Input comm. mode rejection: 120 dB min

Channel 2 Bridge Input Range
Factory configured, please specify sensor mV/V and mA range
Sensor range: 0-1 mA to 0-2000 mA
Millivolt output range is determined by the sensitivity of the sensor (mV/V) and the excitation voltage applied.
mmV sensitivity X excitation voltage = total mV range
Input impedance: 1 MΩ min
Input common mode rejection: 100 dB min

Channel 2 Excitation Voltage
Range: 4 to 10 VDC factory set, please specify
Adjustment: ±10% from front potentiometer
Maximum output: 10 VDC maximum at 30 mA
Stability: ±0.01% per °C
Designed for one 350 Ω (or greater) sensor

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
Bipolar voltage: ±1 VDC to ±10 VDC
Current: 0-1 mA DC to 0-20 mA DC, 4-20 mA DC
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 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 V RMS 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 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
−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

Usage
Input com. mode rejection: 120 dB minimum

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

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Contact for more information:
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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. 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. Lift 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 22 and 24 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. For example: 4 mA for a 4-20 mA output or –10 V for a ±10 V output.
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. potentiometers 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 2005 accepts one DC voltage or current input and one strain gauge 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 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. 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. Note that it may be difficult to see the LEDs under bright lighting conditions.