

4-20 mA Loop Powered Isolators

Input: 4-20 mA, One or Two Channels
Output: 4-20 mA, One or Two Channels

- Single or Twin Pack Fully Isolated Transmitters
- High Output Drive
- Low Input Voltage Burden
- Output LoopTracker® LED
- Functional Test Switch
- Simple Plug-In Design

Applications

- Isolate 4-20 mA Process Signals
- Isolate Two Loops With One API LPI-2
- Eliminate Ground Loops, Reduce Noise Effects

4-20 mA Input

API LPI-1: One channel: 4 to 20 mADC
 API LPI-2 Channel 1: 4 to 20 mADC
 Channel 2: 4 to 20 mADC

Input Voltage Burden

Approximately 9 VDC at 20 mA
 See graph on back

Common Mode Rejection

Negligible output effect for 50/60 Hz common mode signals

LoopTracker

Continuous visual indication of output loop current
 LED brightness varies with current level over 4-20 mA range

4-20 mA Output

API LPI-1 One channel: 4 to 20 mADC
 API LPI-2 Channel 1: 4 to 20 mADC
 Channel 2: 4 to 20 mADC

Output Drive Capability

Up to 1000 Ω with 20 V compliance at 20 mA at 30 VDC or approximately 750 Ω at 24 VDC depending on the supply voltage of the input loop.
 See graph on back.

Change in Load Effect

Less than ±0.08% of span for load changes from 0 Ω to 1000 Ω

Output Calibration

Multi-turn zero and span potentiometers for output
 ±10% of span adjustment range typical

Calibration Reference Level

4.0 mA ±0.10 mA
 Requires a minimum of 4 mA input current

Output Test Switch

Momentary contact switch with spring-loaded return
 Sets output to calibration reference level of 4 mA to allow testing of module circuits and output loop

Accuracy

±0.1% of span (includes adjustment resolution and linearity)

Response Time

60 milliseconds typical

Isolation

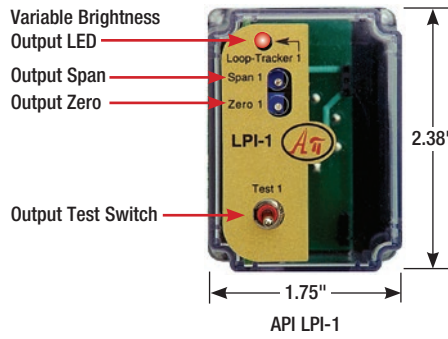
API LPI-1: 1200 VRMS minimum, input to output
 API LPI-2: 1200 VRMS minimum, input to output, channel to channel

Ambient Temperature Range and Stability

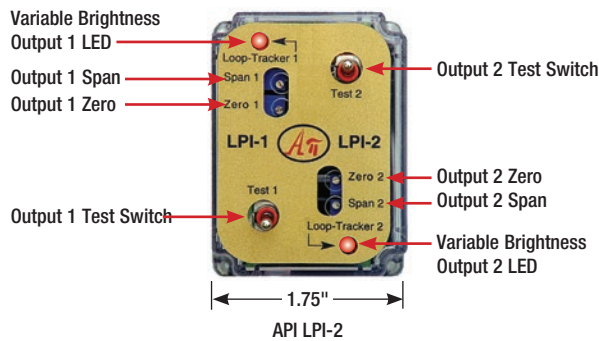
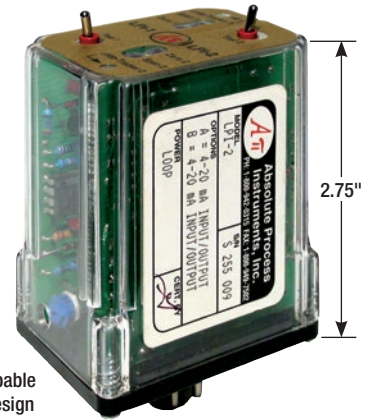
-10°C to +60°C operating ambient
 Better than ±0.2% of span per °C stability

Housing and Sockets

IP 40, requires installation in panel or enclosure
 API 008 or API 008 FS socket
 Socket mounts to 35 mm DIN rail or can be surface mounted



Hot Swappable Plug-In Design



Quick Link
api-usa.com/loop

Description

The API LPI-1 is a single channel loop-powered isolator that accepts a 4-20 mADC input and provides a linear and isolated output current proportional to the input.

The API LPI-2 contains two completely independent and identical channels in the same housing. When calculating power usage and reviewing specifications, consider each channel separately.

The API LPI-1 and each channel of the API LPI-2 function as two-wire transmitters that derive their operating power from the input loop eliminating the need for external power supplies and additional power wiring.

Due to the unique design, the calibration and linearity of each channel is unaffected by output load changes from 0 to 1000 Ω.

The API LPI-1 and API LPI-2 provide a cost effective, drop-in solution for eliminating the ground loops and noise problems commonly found in process loops.

LoopTracker

An API exclusive feature includes a LoopTracker LED that varies in intensity with changes in the process input signal. The LED will extinguish if either the input or output loops should open. The API LPI-2 has one LoopTracker LED for each channel.

This provides a quick visual picture of your process loop at all times and can greatly aid in saving time during initial startup and/or troubleshooting.

Output Test

The spring return functional test switch substitutes a stable 4.0 mADC signal into the input loop to allow easy calibration or system testing without the need for external calibrators or wiring modifications.

Installation

The LPI-1 and LPI-2 plug into an industry standard 8-pin octal socket sold separately. Sockets API 008 and finger-safe API 008 FS allow either DIN rail or panel mounting.

The plug-in design, isolation, and robust electronics allows the module to be quickly hot-swapped without removing the I/O signals.

Model	Input	Output	Power
API LPI-1	4-20 mA	4-20 mA	4-20 mA loop
API LPI-2	2 independent 4-20 mA channels	2 independent 4-20 mA channels	4-20 mA loop

Option—add to end of model number

U Conformal coating for moisture resistance

Accessories—order as separate line item

- API 008** 8-pin socket
- API 008 FS** 8-pin finger-safe socket
- API CLP1** Module hold-down spring for high vibration or mobile applications



API 008 FS
300 V Rating



API 008
600 V Rating



API CLP1

Electrical Connections

WARNING! Turn signal input, output, and power supplies off before connecting or disconnecting wiring.

This module requires API 008 or finger-safe API 008 FS socket. See wiring diagrams. All wiring must be performed by a qualified electrician or instrumentation engineer. Consult factory for assistance.

Signal Input Terminals

Polarity must be observed when connecting the signal input. If the input does not function, check wiring and polarity.

The LPI input sinks current. Your transmitter or an external loop power supply must provide power to the LPI input.

Signal Output Terminals

Polarity must be observed for output wiring connections. If the output does not function, check wiring and polarity.

Note that the module provides power to the output loop from the input loop.

API LPI-1 Input

Terminal 5 negative (-)
Terminal 6 positive (+)

API LPI-2 Loop 1 Input

Terminal 5 negative (-)
Terminal 6 positive (+)

API LPI-2 Loop 2 Input

Terminal 8 negative (-)
Terminal 7 positive (+)

API LPI-1 Output

Terminal 3 negative (-)
Terminal 4 positive (+)

API LPI-2 Loop 1 Output

Terminal 3 negative (-)
Terminal 4 positive (+)

API LPI-2 Loop 2 Output

Terminal 2 negative (-)
Terminal 1 positive (+)

Calibration

The API LPI-1 and API LPI-2 are factory calibrated and should not require recalibration in the field for loads of 0-1000 Ω.

On the API LPI-2, each channel is totally independent from the other and each input is isolated from its corresponding output.

Should recalibration (fine-tuning) be desired, independent Zero and Span controls (one set for each channel of the API LPI-2) are accessible through the top of the unit to adjust the module's output.

1. Wire unit as shown, apply power to the input and output loops, and allow a minimum 20 minute warm up time.
2. Using an accurate calibration source, provide a 4 mA input to module.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer to 4 mA. The Zero control should only be adjusted when the input signal is at its minimum. This will produce a 4 mA output signal.
4. Using an accurate calibration source, provide 20 mA input to module.
5. Using an accurate measurement device for the output, adjust the Span potentiometer to 20 mA. The Span control should only be adjusted when the input signal is at its maximum. This will produce a 20 mA output signal.
6. Repeat adjustments for the second channel on the API LPI-2.

Output Test Function

The Test switch may be used to drive the device on the output side of the loop (a panel meter, chart recorder, etc.) with a known good signal which can be used as a system diagnostic aid during initial start-up or during troubleshooting.

This test signal is factory set to 4 mA. When the switch is released, the output will return to normal.

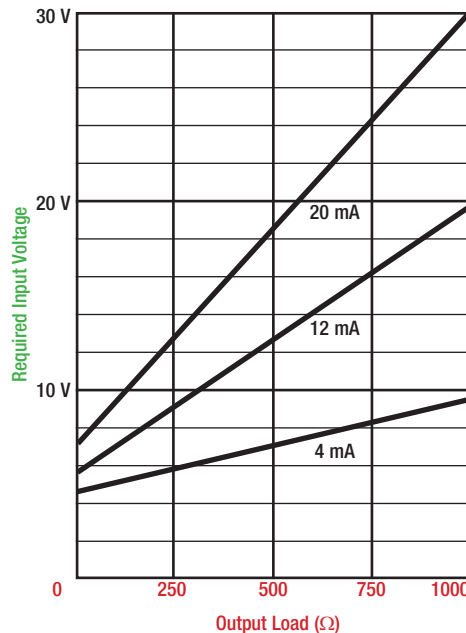
Operation

The API LPI-1 and API LPI-2 are passive devices that draw a small amount of power from the input loop to operate their isolation circuitry.

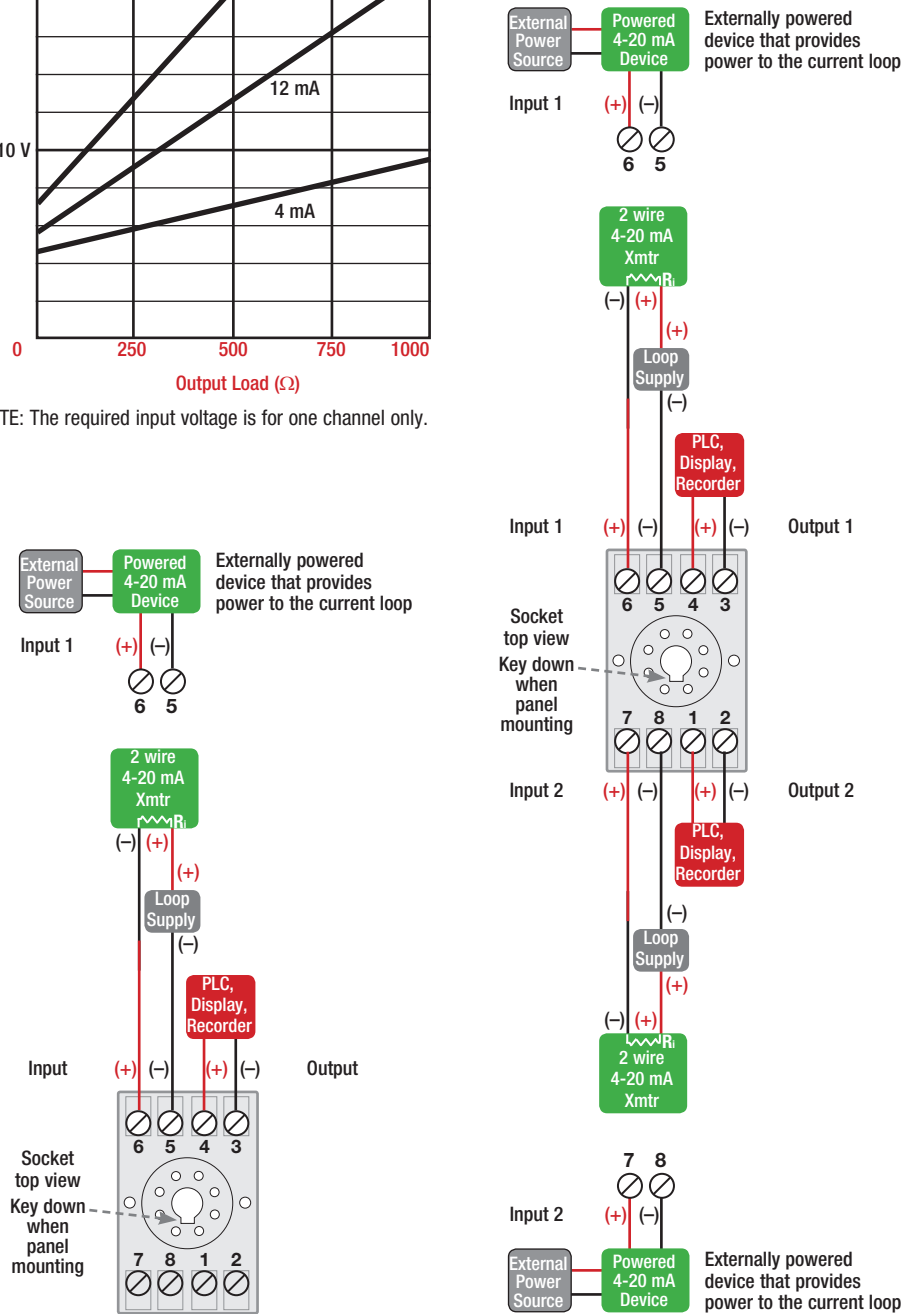
The red LoopTracker output LED provides a visual indication that the output signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum.

The red LED will only light if the output loop current path is complete. Failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module input or output wiring. Note that it may be difficult to see the LED under bright lighting conditions.

Input Voltage Burden Chart



NOTE: The required input voltage is for one channel only.



API LPI-1 typical wiring

API LPI-2 typical wiring

API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. Contact factory for assistance and see api-usa.com for latest datasheet version.