

Input: 100 Ω to 10,000 Ω Bridges, 5 mV to 2000 mV, 1-10 VDC Excitation
Output: Two 8 Amp SPDT Relays

Quick Link: api-usa.com/1500

- Factory Set Input Range and Excitation
- Adjustable Setpoint and Deadband Potentiometers
- Input LoopTracker® and Alarm Status LEDs
- Full 1200 V Isolation
- Alarm Test, Optional Reset Button

Applications

- Load Cell Weighing Systems and Scales
- Strain Gauge Pressure Sensors and Transducers
- Tanks, Scales, Extruder Melt Pressure, Crane Loads

Strain Gauge Input Range

Factory configured, specify sensor mV/V rating and mV range
 Minimum sensor rating: 5 mV
 Maximum sensor rating: 2000 mV
 Millivolt range is determined by the sensitivity of the sensor (mV/V) and the excitation voltage applied.
 mV/V sensitivity X excitation voltage = total mV range

Input Impedance

1 MΩ minimum

Isolation

Power to input isolation: 1200 V
 Common mode protection: 600 VAC_p or 600 VDC

Excitation Voltage

Factory configured, please specify excitation voltage
 Refer to the sensor manufacturer's recommendations.
 Excitation: 1 to 10 VDC, 30 mA max.
 Fine adjustment: Approximately ±0.25 VDC
 Stability: ±0.01% per °C
 Designed for one 350 Ω (or greater) sensor

LoopTracker

Variable brightness LED indicates input loop level and status

APD 1500 Relay Output

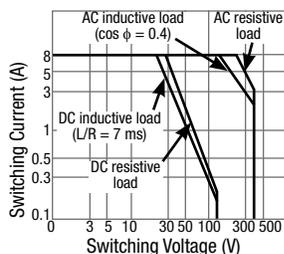
Dual SPDT Form C contact sets operating in unison
 1 setpoint adjustment, 1 deadband adjustment
 Standard: HI alarm, non-latching, normal acting
 Options: LO alarm, latching, reverse acting

APD 1520 Relay Output

2 independent SPDT Form C contact sets
 2 setpoint adjustments, 2 deadband adjustments
 Factory configured alarm
 Standard: HI/LO alarm, non-latching, normal acting
 Options: LO/LO, HI/HI, LO/HI alarms, band alarms, latching, reverse acting

Relay Contact Ratings

8 A max @ 240 VAC resistive load
 External contact protection such as an RC snubber is recommended for inductive loads



Setpoint

12 turn potentiometer adjustable from 0 to 100% of span

Deadband

12 turn potentiometer adjustable from 1 to 100% of span

Response Time

70 milliseconds typical

Output Test/Reset Button

Front button or external contact closure toggles relays to opposite state when pressed.
 Resets relay if latching relay option is ordered.

Ambient Temperature Range and Stability

-10°C to +60°C operating ambient
 Better than 0.02% of span per °C



See Wiring Diagrams on Next Page



File E145968
 85-265 VAC, 60-300 VDC
 model only

Applications Link
api-usa.com/apps

Free Factory I/O Setup!



Dimensions

0.89" W x 4.62" H x 4.81" D
 (22.5 x 117 x 122 mm)
 Height includes connectors

Housing and Connectors

IP 40, requires installation in panel or enclosure
 For use in Pollution Degree 2 Environment
 Mount vertically to a 35 mm DIN rail
 Four 4-terminal removable connectors, 14 AWG max wire size

Power

85-265 VAC, 50/60 Hz or 60-300 VDC, 2 W maximum
 D versions: 9-30 VDC or 10-32 VAC 50/60 Hz, 2 W maximum

| Model | Input | Standard Alarm Configuration | Power |
|------------|--|---|--------------------------|
| APD 1500 | Factory ranged, specify sensor mV/V rating, mV range, excitation voltage | Single setpoint dual SPDT relays HI alarm, non-latching, normal acting | 85-265 VAC or 60-300 VDC |
| APD 1500 D | | | 9-30 VDC or 10-32 VAC |
| APD 1520 | | 2 setpoints, 2 SPDT relays HI/LO alarms, non-latching, normal acting | 85-265 VAC or 60-300 VDC |
| APD 1520 D | 9-30 VDC or 10-32 VAC | | |

Alarm Options—add to end of model number

- L** APD 1500 with LO trip. Alarm trips on decreasing signal.
- HH** APD 1520 with HI/HI trip. Alarms trip at their respective trip points on increasing signal.
- LL** APD 1520 with LO/LO trip. Alarms trip at their respective trip points on decreasing signal.
- LH** APD 1520 with LO/HI trip. Alarm 1 trips on decreasing signal. Alarm 2 trips on increasing signal.
- BA** APD 1520 with band alarm. Alarm trips if signal is outside LO and HI trip points.

Description

The APD 1500 and APD 1520 accept a strain gauge, bridge, or load cell input and provide a visual alarm indication and alarm relay contact outputs.

The input is factory configured to a specific excitation voltage and millivolt input range. The input can be configured as zero-based (i.e., 0 to 20 mV), bipolar (i.e., -30 to +30 mV) for push-pull applications, or offset (i.e., 5 to 33 mV) to electronically compensate for deadweights (tare).

The alarm types are factory configured. Front-accessible potentiometers are used to adjust alarm setpoint and deadband.

LoopTracker and Alarm Status LEDs

API exclusive features include a LoopTracker LED that varies in intensity with changes in the process input signal.

A red/green bicolor alarm status LED (two on the APD 1520) visually indicate alarm status. These LEDs provide a quick visual picture of your process at all times.

Output Test / Unlatch

The API exclusive Output Test button can be used to verify the alarm and system operation and also provides the additional function of unlatching the alarm when the latching option has been ordered. This feature can be remotely operated.

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

IBA APD 1520 with inverse band alarm. Alarms trip if signal is between LO and HI trip points.

HT Latching alarm with push button reset

HP Latching alarm with power-off reset. Module power must be turned off to reset alarms

RA Reverse-acting alarms. Relay coils energized in an alarm condition. No alarm condition with module power off.

U Conformal coating for moisture resistance

Accessory—order as separate line item

API BP4 Spare removable 4 terminal plug, black

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 désignations des bornes et des exemples de câblage. Consulter l'usine pour assistance.

ATTENTION! Éviter 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.

Electrical Connections

See wiring diagrams. If the module does not function, check all wiring.

* Do not make any connections to unused terminals or use them as wiring junctions for external devices. This may cause permanent damage to the module!

Input

See the model/serial number label for sensor mV/V rating and/or mV range, excitation voltage and options. The input is factory pre-configured (at 24°C ±1°C) and does not require adjustment.

The input is connected as shown in the wiring diagrams.

Refer to strain gauge manufacturer's data sheet for wire color-coding. Polarity must be observed when connecting inputs. **CAUTION:** Never short the excitation terminals together. This will cause internal damage to the module.

After installation and after all connections are made, the excitation fine adjust potentiometer may be used to precisely trim the excitation voltage approximately ±0.25 VDC.

Alarm Types

Note that the deadband is symmetrical about the setpoint; relay trip and reset points will both change if either the setpoint or deadband are changed.

High Alarm (default, H, or HH): The alarm relay changes state when the input signal exceeds the deadband trip point. The relay resets when the input signal drops below the deadband reset point. For a high alarm, the trip point is above the reset point.

Low Alarm (L or LL): The alarm relay changes state when the input signal goes below the deadband trip point. The relay resets when the input signal exceeds the deadband reset point. For a low alarm the trip point is below the reset point.

HT: Latching alarm with push button reset

HP: Latching alarm with power-off reset. Module power must be turned off to reset alarms

R: Reverse-acting alarms. Relay coils energized in an alarm condition. No alarm condition with module power off.

Relay Output Terminals

See wiring diagrams for connections. APD modules do not provide power to the relay contacts. Inductive loads (motors, solenoids, contactors, etc.) will greatly shorten relay contact life unless an appropriate RC snubber is installed.

The APD 1500 operates two sets of relays in unison with a single setpoint. The dual SPDT contact sets are in a Form C configuration.

The APD 1520 operates two sets of relays independently, each with its own setpoint. The dual SPDT contact sets are in a Form C configuration.

Module Power

Check model/serial number label for module operating voltage to make sure it matches available power.

When using DC power, either polarity is acceptable, but for consistency with similar API products, positive (+) can be wired to terminal 13 and negative (-) can be wired to terminal 16.

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 downward and position against DIN rail.
2. Clip lower mount to bottom edge of DIN rail.
3. Push front of module upward until upper mount snaps into place.

Removal

1. Push up on the bottom back of the 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.

Setpoint and Deadband Adjustments

Relay operation is factory configured. See model/serial number label for relay configurations.

The Setpoint potentiometer allows the operator to adjust the level at which the alarm is activated. This control is adjustable from 0 to 100% of the input range.

The Deadband potentiometer allows the alarm trip and reset window to be adjusted symmetrically about the setpoint from 1 to 100% of the span. This allows the operator to fine tune the point at which the alarm trips and resets. The deadband is typically used to prevent chattering of the relays or false trips when the process signal is unstable or changes rapidly.

To calibrate the alarm section, set the deadband control to the minimum (counterclockwise). The deadband will be 1.0% of input span in this case.

Set the signal source to the desired trip point.

Adjust the setpoint control to the point at which the relay changes state from a non-alarm to an alarm condition.

Turn the deadband potentiometer clockwise for a larger amount of deadband. The deadband is symmetrical about the setpoint; both transition points will change as deadband is increased.

Relay set and reset points will both change if the setpoint or deadband are changed. Alternately set the setpoint and deadband until the desired trip and reset points are set.

Output Test Function

When the front test button is depressed it will drive the relays to their opposite state. A customer-supplied switch connected to terminals 4 and 8 can also be used to toggle the relays. When released, the relays will return to their prior states.

This can be used as a diagnostic aid during initial start-up or troubleshooting, or as a manual over-ride function. The Test button also resets the relays on models with the HT option.

Operation

The green LoopTracker® input LED provides a visual indication that a signal is being sensed by the input circuitry of the module. It also indicates the input signal strength by changing in intensity as the process changes from minimum to maximum.

If the 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.

The bicolor alarm LED provides a visual indication of the alarm status. In all configurations, a green LED indicates a non-alarm condition and a red LED indicates an alarm condition.

In the normal mode of operation, the relay coil is energized in a non-alarm condition and de-energized in an alarm condition. This will create an alarm condition if the module loses power. For a normal acting, non-latching configuration, the alarm will activate when the input signal exceeds the setpoint (HI alarm) or falls below the setpoint (LO alarm), then will automatically reset when the alarm condition no longer exists.

For a reverse acting alarm, the relay coil is de-energized in a non-alarm condition and energized in an alarm condition. The alarm activates when the input signal exceeds the setpoint (HI alarm) or falls below the setpoint (LO alarm), then automatically resets when the alarm condition no longer exists.

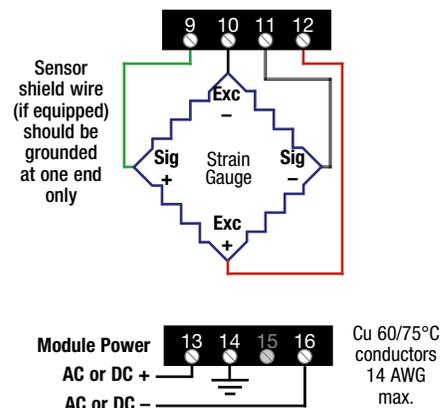
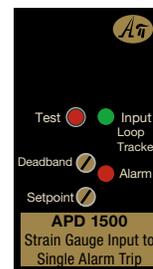
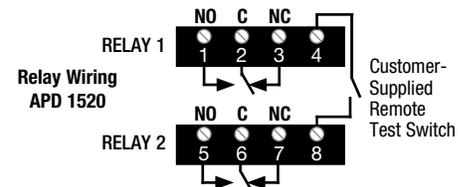
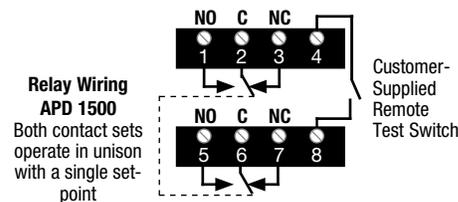
For models with the latching relay option, it will be necessary to push the Test button or remove power from the module to reset the alarm, depending on the type of latching option. The alarm will only reset if the alarm condition no longer exists.



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

⚠ * Do not make connections to unused terminals!

To maintain full isolation avoid combining power supplies in common with input, output, or unit power.



⚠ * Do not make connections to unused terminals!