Potentiometer Input Alarm Trips, Factory Ranged, Isolated — APD 1800, APD 1820

Input: 100 Ω to 1 MΩ Potentiometers
Output: Two 8 Amp SPDT Relays

- *Accepts Most Full-Range Potentiometers*
- *Removable Plugs for Faster Installation*
- *Input LoopTracker® and Alarm Status LEDs*
- *Full 1200 V Isolation*
- *Alarm Test, Optional Reset Button*

Applications

- *Position Alarm*
- *Tank Level Alarm*
- *Position Over or Under Alarms*

Potentiometer Input Ranges
Full travel of the potentiometer is required
3 wire connection required
1 VDC excitation provided to potentiometer

Minimum range: 0-100 Ω
Maximum range: 0-1 MΩ

Input Impedance
1 MΩ minimum

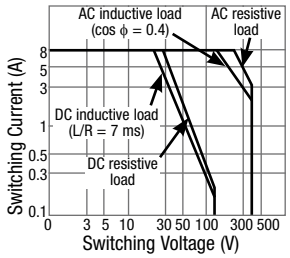
Isolation
1200 V isolation: power to input
600 VAC_p or 600 VDC common mode protection

LoopTracker
Variable brightness LED indicates input loop level and status

APD 1800 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 1820 Relay Output
2 independent SPDT Form C contact sets
2 setpoint adjustments, 2 deadband adjustments
Standard: HI/LO alarm, non-latching, normal acting
Options: LO/LO, HI/HI, LO/HI alarms, latching, reverse acting

Relay Contact Ratings
8 A max @ 240 VAC resistive load
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

MADE IN USA

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

Free Factory I/O Setup!

LIFETIME WARRANTY

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

Description
The APD 1800 and 1820 will accept any potentiometer input and provides a visual alarm indication and alarm relay contact outputs. Any potentiometer with a value of 0-100 Ω through 0-1 MΩ may be used without affecting accuracy.

Consult factory for offsets and/or input ranges other than 0 to 100% of the potentiometer range.

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 bi-color alarm status LED (two on the APD 1820) visually indicate alarm status. These LEDs provide a quick visual picture of your process at all times.

Output Test / Unlatch
API's 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.

Model	Input	Standard Alarm Configuration	Power
APD 1800	Any full-range potentiometer from 0-100 Ohm to 0-1 Mega Ohm	Single setpoint dual SPDT relays HI alarm, non-latching, normal acting	85-265 VAC or 60-300 VDC
APD 1800 D			9-30 VDC or 10-32 VAC
APD 1820		2 setpoints, 2 SPDT relays HI/LO alarms, non-latching, normal acting	85-265 VAC or 60-300 VDC
APD 1820 D			9-30 VDC or 10-32 VAC

Alarm Options—add to end of model number

L APD 1800 with LO trip. Alarm trips on decreasing signal.

HH APD 1820 with HI/HI trip. Alarms trip at their respective trip points on increasing signal.

LL APD 1820 with LO/LO trip. Alarms trip at their respective trip points on decreasing signal.

LH APD 1820 with LO/HI trip. Alarm 1 trips on decreasing signal. Alarm 2 trips on increasing signal.

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.

U Conformal coating for moisture resistance

Spare Connector
API BP4 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.

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

Signal Input Terminals

The potentiometer must be connected to all three signal input terminals as shown in the wiring diagrams. 0-100% of the potentiometer range must be used unless a special range was ordered. A stable 1 VDC source is used to excite the potentiometer.

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 exceeds the deadband trip point. The relay resets when the input 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 goes below the deadband trip point. The relay resets when the input 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 below right 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 1800 operates two sets of relays in unison with a single setpoint. The dual SPDT contact sets are in a Form C configuration.

The APD 1820 operates two sets of relays independently, each with its own setpoint. The dual SPDT contact sets are in a Form C configuration.

Module Power Terminals

Check model/serial number label for module operating voltage to make sure it matches available power. Allow 1" (25 mm) above and below housing vents for air circulation.

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.

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.

Setup and Calibration

The input can accept any full-range potentiometer and does not require adjustment.

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 a reference that represents 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.

If a larger amount of deadband is desired turn the deadband potentiometer clockwise. 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 rest 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 terminal 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 bi-color 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.

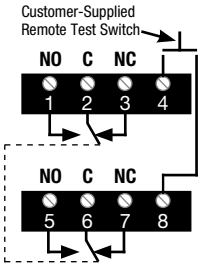
For a reverse acting alarm, the relay coil is de-energized in a non-alarm condition and energized in an alarm condition. The alarm activates when the input signal exceeds the setpoint (HI alarm) or falls below the setpoint (LO alarm), then automatically resets when the alarm condition no longer exists.

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.

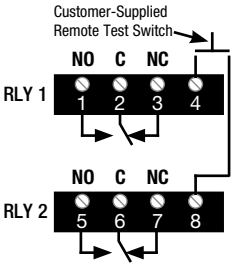
Wire terminal torque 0.5Nm to 0.6Nm (4.4 to 5.3 in-lbs)

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

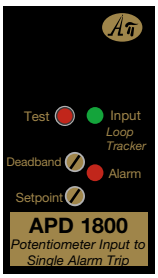
To maintain full isolation avoid combining power supplies in common with input, output, or unit power.

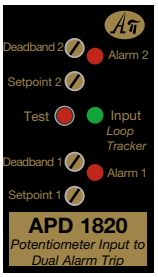


Relay Wiring APD 1800



Relay Wiring APD 1820





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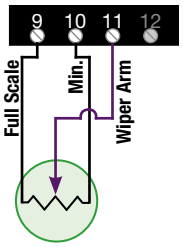

Potentiometer

Cu 60/75°C conductors 14 AWG max.