

Input: 2, 3, or 4 Wire RTD or Thermistor
Output: Two 8 Amp DPST Relays

New Microprocessor-Based Versions

Quick Link: api-usa.com/1400

- Factory Set Input Type and Temperature Range
- Adjustable Trip and Reset Potentiometers
- Input LoopTracker® and Alarm Status LEDs
- Full 1200 V Isolation
- Alarm Test, Optional Latching Reset Button
- RTD Leadwire Compensation

Applications

- Process Limit Alarm
- Monitor, Heaters, Refrigerators, Ovens
- Process Signal Over or Under Alarms

RTD or Thermistor Input, Factory Configured

Specify temperature range in °F or °C and sensor type
 Minimum span: 100°F (55°C) or consult factory

RTD types: Specify type listed below and if 2, 3, or 4 wire
 For others provide resistance at 0°C and curve
 100 Ω 0.00385 DIN
 100 Ω 0.003916
 100 Ω 0.00392
 10 Ω Cu
 1000 Ω Ni-Fe
 120 Ω Ni
 RTD leadwire compensation: < ±0.05% of span per 1 Ω change in leadwire resistance

Thermistors: Specify type listed below. For other sensor types provide temperature-resistance chart.
 44004/44033 2.252 kΩ at 25°C
 44005/44030 3.000 kΩ at 25°C
 44007/44034 5.000 kΩ at 25°C
 44006/44031 10.00 kΩ at 25°C
 44008/44032 30.00 kΩ at 25°C
 YSI 400 2.252 kΩ at 25°C
 Spectrum 1003k 1 kΩ

Isolation

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

LoopTracker

Variable brightness LED indicates input level and status

APD 1401 Relay Output

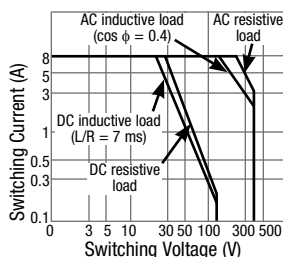
Single setpoint dual DPST contact sets, field configurable
 2 Form A (NO) and 2 Form B (NC) contact sets (8 terminals)
 May be field wired for Form C operation
 One set point, 12 turn potentiometer, 0-100% of span
 One reset point, 12 turn potentiometer, 0-100% of span
 Factory configured alarm
 Standard: HI alarm, non-latching, normal acting

APD 1421, APD 1431 Relay Output

2 independent setpoint DPST contact sets, field configurable
 SP 1: Form A (NO) and Form B (NC) contacts (4 terminals)
 SP 2: Form A (NO) and Form B (NC) contacts (4 terminals)
 May be field wired for Form C operation
 Two set points, two 12 turn potentiometers, 0-100% span
 Two reset points, two 12 turn potentiometers, 0-100% span
 Factory configured alarm
 APD 1220: HI/LO alarm, non-latching, normal acting
 APD 1230: Band alarm (both alarms trip if outside LO and HI trip points), non-latching, normal acting

Relay Contact Ratings

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

**Response Time**

300 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

Two 8 Amp DPST
Alarm RelaysAlarm Test
FunctionInput Loop-
Tracker LED

Alarm Status LED

Adjustable
Trip and Reset
PointsCustom Input
RangesUniversal
Power9 10 11 12
13 14 15 16

Applications Link
api-usa.com/apps

Free Factory
 I/O Setup!

Ambient Temperature Range and Stability

-10°C to +60°C operating ambient
 Better than 0.04% of span per °C

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 1401	Factory ranged, specify sensor type °F or °C temperature range Options if required	HI alarm, single setpoint, dual DPST relays non-latching, normal acting	85-265 VAC or 60-300 VDC
APD 1401 D			9-30 VDC or 10-32 VAC
APD 1421		HI/LO alarms, 2 setpoints, 2 DPST relays non-latching, normal acting	85-265 VAC or 60-300 VDC
APD 1421 D			9-30 VDC or 10-32 VAC
APD 1431		Band alarm, 2 setpoints, 2 DPST relays non-latching, normal acting	85-265 VAC or 60-300 VDC
APD 1431 D			9-30 VDC or 10-32 VAC

Options—add to end of model number

- L** APD 1401 with LO trip. Alarm trips on decreasing signal.
- HH** APD 1421 with HI/HI trip. Alarms trip at their respective trip points on increasing signal.
- LL** APD 1421 with LO/LO trip. Alarms trip at their respective trip points on decreasing signal.
- LH** APD 1421 with LO/HI trip. Alarm 1 trips on decreasing signal. Alarm 2 trips on increasing signal.
- IB** APD 1431 with Inverse Band alarm. Both 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

R 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

See Wiring
Diagrams on
Next Page

**Description**

The APD 14x1 series accepts an RTD or thermistor temperature input and provide a visual alarm indication and alarm relay contact outputs.

The input type, range, and alarm types are factory configured. The input can be configured for most RTDs or thermistors.

Front-accessible potentiometers are used to adjust alarm trip and reset point(s).

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 1420) 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.

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

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

Electrical Connections

See wiring diagrams. Observe input connections. If the output does not function, check all wiring and polarity.

* 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

The sensor type and input range is factory pre-configured (at 24°C ±1°C) and do not require adjustment. See the model/serial number label for sensor type, temperature range and options. The temperature sensor input is connected as shown in the wiring diagrams.

Alarm Types

High Alarm (default, H, or HH): The alarm relay changes state when the temperature exceeds the trip point. The relay resets when the temperature drops below the 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 temperature goes below the trip point. The relay resets when the temperature exceeds the 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 1401 operates two sets of relays in unison with a single setpoint. The dual DPST contact sets are in a Form C configuration.

The APD 1421 and APD 1431 operate two sets of relays independently, each with its own setpoint. The dual DPST 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 clip the lower mount with spring clips to the bottom edge of DIN rail.
2. Push front of module upward until upper mount snaps into place.

Removal From a DIN Rail

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.

Relay Operation

Relay operation is factory configured. See model/serial number label for relay configuration option codes.

Set Point

This multi-turn potentiometer (one for each alarm on the APD 1421 and APD 1431) 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.

Reset Point

This multi-turn potentiometer (one for each alarm on the APD 1421 and APD 1431) allows the operator to adjust the level at which the alarm resets. This control is adjustable from 0 to 100% of the input range.

Sufficient deadband (difference between trip and reset point) should be used to prevent chattering of the relays or false trips when the process signal is unstable or changes rapidly.

Adjustments

Set the signal source to a reference that represents the desired set point.

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

Set the signal source to a reference that represents the desired reset point.

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

Operate the signal source through the set and reset points to confirm desired operation and adjust if necessary.

For the APD 1421 and APD 1431, repeat the above procedure for the second alarm.

Output Test Function

When the front test button is depressed it will drive the relays to their opposite state. 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.

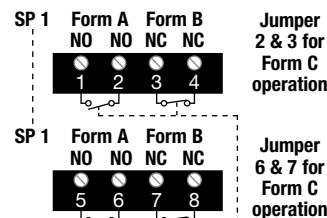
For models with the latching relay option, it will be necessary to push the Test button or remove power from the module to reset the alarm, depending on the type of latching option. The alarm will only reset if the alarm condition no longer exists.



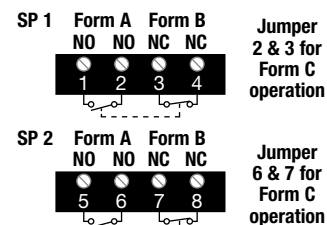
Wire terminal torque
0.5 Nm to 0.6 Nm
(4.4 to 5.3 in-lbs)

△ * Do not make connections to unused terminals!

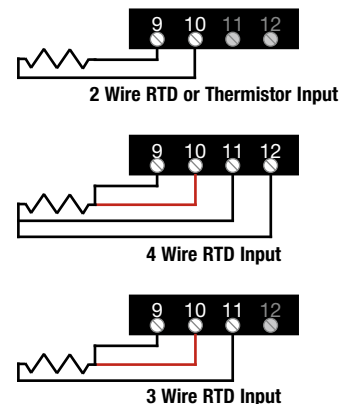
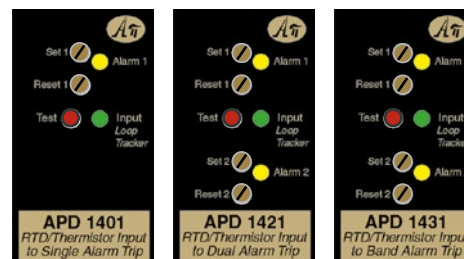
To maintain full isolation avoid combining power supplies in common with input, output, or unit power.



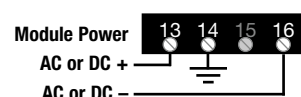
Relay Wiring APD 1401



Relay Wiring APD 1421, 1431



△ * Do not make connections to unused terminals!



Cu 60/75°C
conductors
14 AWG
max.