AC Input Alarm Trips, Factory Ranged, Isolated

Input: 0-50 mVAC to 0-300 VAC, 0-1 mAAC to 0-1000 mAAC
Output: Two 8 Amp SPDT Relays

- Factory Set Input Range
- Removable Plugs for Faster Installation
- Input LoopTracker® and Alarm Status LEDs
- Full 1200 V Isolation
- Alarm Test, Optional Reset Button

AC Input Range
Factory configured, please specify input type and range
Consult factory for special ranges
Voltage: 0-50 mVAC to 0-300 VAC
Current: 0-1 mAAC to 0-1000 mAAC
Measurements are true RMS

Input Impedance (Voltage Input)
220 kΩ minimum
Input Voltage Burden (Current Input)
1.0 Vrms maximum
Input Frequency
40 Hz to 1000 Hz sinusoidal

Isolation
Power to input isolation: 1200 V
Common mode protection: 750 VAC or 750 VDC

LoopTracker
Variable brightness LED indicates input level and status

APD 1600 Relay Output
Single setpoint dual SPDT Form C contact sets
Standard: HI alarm, non-latching, normal acting
Options: LO alarm, latching, reverse acting

APD 1620 Relay Output
2 independent setpoint SPDT Form C contact sets
Standard: HI/LO alarm, non-latching, normal acting
Options: HI/LO, HI/Hi, LO/Hi alarms, latching, reverse acting

APD 1630 Relay Output
2 independent setpoint SPDT Form C contact sets
Standard: Band alarm (both alarms trip if outside LO and HI trip points), non-latching, normal acting
Options: Inverse band alarm, 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

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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 1% of span over operating temperature range
Better than 0.02% of span per °C

Appendix A

Applications
- Process Limit Backup Alarm
- Over, Under, Out-of-Range Voltage or Current Alarm
- Heater Break, Conveyor Jam Alarm

APD 1600, APD 1620, APD 1630

APD 1630 discontinued

APD 1620

APD 1630

APD 1600

Two 8 Amp SPDT Alarm Relays

Alarm Test Function

Input LoopTracker LED

Alarm Status LED

Adjustable Deadband and Setpoint

Custom Input Ranges

Universal Power

Dimensions
0.89” W x 4.62” H x 4.81” D
Height includes connectors

Mount vertically to a 35 mm DIN rail

For use in Pollution Degree 2 Environment

IP 40, requires installation in panel or enclosure

Housing and Connectors

IP 40, requires installation in panel or enclosure

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

Alarm Options—add to end of model number

L APD 1600 with LO trip. Alarm trips on decreasing signal.

HH APD 1620 with Hi/Hi trip. Alarms trip at their respective trip points on increasing signal.

LL APD 1620 with LO/LO trip. Alarm trips at their respective trip points on decreasing signal.

LH APD 1620 with LO/Hi trip. Alarm 1 trips on decreasing signal. Alarm 2 trips on increasing signal.

IB APD 1630 with Inverse Band alarm. Both alarms trip if signal is between LO and HI trip points.

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L APD 1600 with LO trip. Alarm trips on decreasing signal.

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IB APD 1630 with Inverse Band alarm. Both alarms trip if signal is between LO and HI trip points.

APD 1600

APD 1600 D

APD 1600 D

APD 1600 D

APD 1600 D

APD 1620

APD 1620 D

APD 1630

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Installation and Setup

APD 1600, APD 1620, APD 1630

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! Eviter 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.

Input

The input range is factory configured. See the model/serial number label for module information, input type, input range and options. Inputs are connected as shown in the wiring diagrams below.

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 HI): 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.

Band Alarm: Both alarm relays change state when the input is outside either deadband trip point.

Inverse Band Alarm (IB): The alarm relay changes state when the input is inside neither deadband trip 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.

Remote Test Switch

See wiring diagrams below 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 1600 operates two sets of relays in unison with a single setpoint. The dual SPDT contact sets are in a Form C configuration.

The APD 1620 operates two sets of relays independently, each with its own setpoint. The dual SPDT contact sets are in a Form C configuration.

The APD 1630 operates two sets of relays, each with its own setpoint in a band alarm configuration. 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.

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 range is factory calibrated and does not require adjustment.

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

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 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.

Sinking mA Input or Voltage Input

Current or Voltage Device

Cu 60/75°C conductors 14 AWG max.

API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. Consult factory for your specific requirements.