RTD or Thermistor Alarm Trips

API 1400 G
API 1420 G

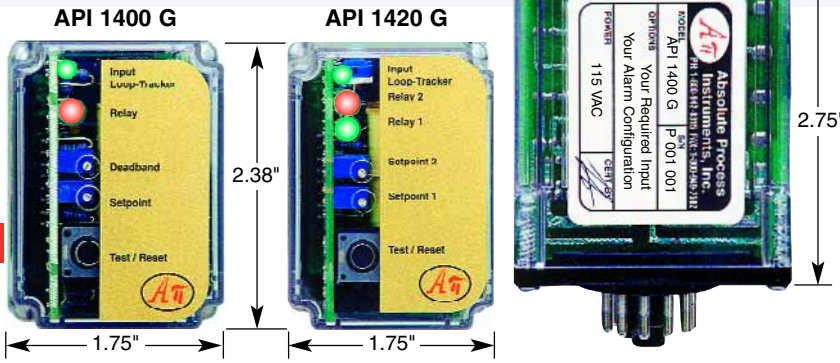
Input: ***Most RTD and Thermistors***

Outputs: ***One DPDT Relay or Two SPDT Relays***

- ***Automatic Leadwire Compensation***
- ***Field Adjustable Setpoints***
- ***High Capacity 7 Amp Relay Contacts***
- ***Input LoopTracker® & Alarm Status LEDs***
- ***Alarm Test/Reset Pushbutton***

Applications

- **Process Limit Backup Alarm**
- **Temperature Alarm**
- **Over, Under, Out-of-Range Alarm**







Specifications

Input

Factory Configured—Please specify the following

RTD: Resistance at 0°C and curve (0.00385 DIN, 0.003916 American, etc.)

Typical RTDs: 10 Ω to 2000 Ω RTDs including 100 Ω DIN, 100 Ω American, 10 Ω Cu, 1000 Ω Ni-Fe, 120 Ω Ni or special

Thermistor: Type (NTC, PTC) and temperature curve data

Temperature Range: in °F or °C. Note: 100°F (55°C) is the recommended minimum span. Consult factory if a smaller span is required.

RTD Excitation Current

10 Ω:	10 mA	100 Ω:	5 mA
1000 Ω:	0.5 mA	2000 Ω:	0.2 mA

Leadwire Compensation

Less than ±0.05% of span per 1 Ω change in leadwire resistance

LoopTracker®

Variable brightness LED indicates input loop level and status

Relay Output

Factory Configured—See Options for other relay configurations

API 1400 G	One DPDT contact set HI alarm, normal action (failsafe), non-latching standard 7 A @ 240 VAC maximum resistive load 3.5 A @ 240 VAC maximum inductive load
API 1420 G	Two SPDT contacts HI/LO, normal action (failsafe), non-latching standard 7 A @ 240 VAC maximum resistive load 3.5 A @ 240 VAC maximum inductive load
CAUTION:	Socket contacts may limit system rating. 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

API 1400 G	1.0 to 100% of span, 12 turn potentiometer
API 1420 G	Fixed at 1% of span
API 1420 GA	1.0 to 100% of span, 1 turn potentiometer

Functional Test/Reset Button

Toggle relay(s) to opposite state when pressed
Resets latching relay on 1400 G with **HT** option

Response Time

70 milliseconds typical

Ambient Temperature Range and Temperature Stability

–10°C to +60°C operating ambient
Better than ±0.02% of span per °C temperature stability

Power

Standard:	115 VAC ±10%, 50/60 Hz, 2.5 W max.
A230 option:	230 VAC ±10%, 50/60 Hz, 2.5 W max.
D option:	9-30 VDC, 2.5 W typical

Description and Features

The **API 1400 G** and **API 1420 G** are factory configured for a RTD or thermistor input and can be set up for virtually all RTD or thermistor types and related temperature spans. Standard features include automatic lead wire compensation for three-wire sensors. Heavy-duty relay contacts allow the module to directly control high capacity loads.

API exclusive features include a ***LoopTracker*** LED which varies in intensity with changes in the process signal, alarm status LEDs for each alarm, and a **Functional Test Pushbutton** to toggle the relays independent of the input.

The **API 1400 G** provides a single setpoint adjustment and DPDT relay contacts. The alarm output can be factory configured for HI or LO operation, non-latching or latching, normal (fail-safe) or reverse (non-fail-safe) acting.

The **API 1420 G** contains two independent setpoints with two SPDT relay contact outputs. The alarm output can be factory configured for HI/HI, HI/LO, LO/HI or LO/LO operation, normal acting (fail-safe) or reverse acting (non-fail-safe).

Models & Options

Factory Configured—Please specify RTD or thermistor type, temperature range in °F or °C, and options

API 1400 G	RTD/thermistor input alarm trip, 1 DPDT relay, HI alarm, normal action (failsafe), non-latching, 115 VAC
API 1420 G	RTD/thermistor input dual alarm trip, 2 SPDT relays, HI/LO, normal action (failsafe), non-latching, 115 VAC

Options—Add to end of model number

A230	Powered by 230 VAC, 50/60 Hz
D	Powered by 9-30 VDC
R	Reverse-acting alarms (non-failsafe)
L	Low trip (on decreasing signal) for 1400 G
HT	Latching alarm with pushbutton reset, API 1400 G only
HP	Latching alarm with power-off reset, API 1400 G only
A	Adjustable deadbands for 1420 G
HH	High/High trip for 1420 G instead of High/Low
LL	Low/Low trip for 1420 G instead of High/Low
U	Conformal coating for moisture resistance

Accessories—Order as a separate line item

API 011	11-pin socket
API 011 FS	11-pin finger safe socket
API TK36	DIN rail, 35 mm W x 39" L, aluminum

MOD-TRONIC INSTRUMENTS LIMITED

1 Delta Park Blvd #12
Brampton, ON L6T 5G1
905-457-6322 or 800-794-5883
www.mod-tronic.com

© Absolute Process Instruments, Inc. 11/04 LoopTracker–Reg TM Absolute Process Instruments, Inc.

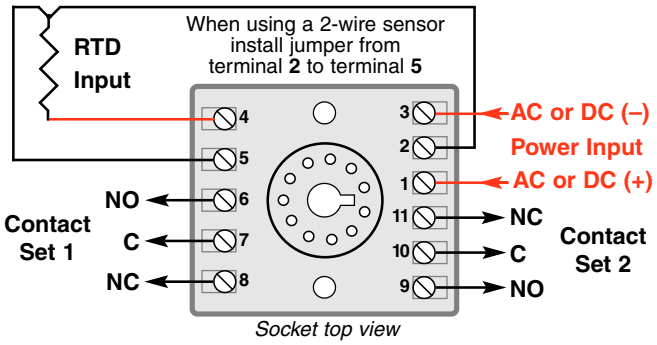
Temperature

ELECTRICAL CONNECTIONS

WARNING! All wiring must be performed by qualified personnel only. This module requires an industry-standard 11-pin socket. Order API 011 or finger-safe API 011 FS socket separately.

Power Input Terminals – The white label on the side of the API module will indicate the power requirements. AC power is connected to terminals 1 and 3. For DC powered modules, polarity **MUST** be observed. Positive (+) is wired to terminal 1 and negative (–) is wired to terminal 3.

Temperature Input – Correct wiring must be observed for 3-wire sensors. With common 3-wire RTDs, the red wire is connected to terminal 4.



Socket top view

Relay Output Terminals – Terminals 6, 7, 8 and 9, 10, 11 provide the appropriate connections for the desired relay operations. (NO = Normally Open, NC = Normally Closed, C = Common). NOTE: Although the API 1400 G has a pair of relays, these relays will energize and de-energize in unison. The API 1420 G will accommodate independent relay operations.

SETUP

The sensor type, temperature range and alarm types are pre-configured at the factory as specified on your order. No input calibration is necessary. Contact factory for custom ranges or modifications.

Setpoint Control – This multi-turn potentiometer (one for each setpoint on the API 1420 G) 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.

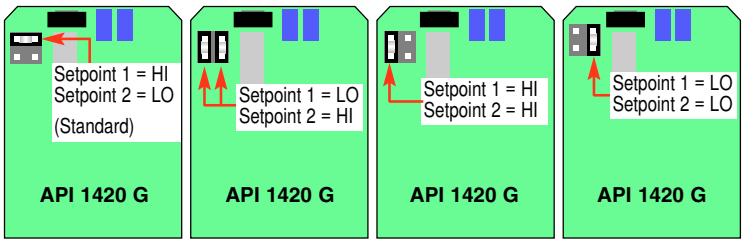
Deadband Control – The API 1400 G deadband potentiometer allows the alarm trip and reset window to be adjusted symmetrically about the setpoint from 1 to 100% of the span.

The deadband is fixed at 1% of span on the API 1420 G. The API 1420 GA with adjustable deadband option allows deadbands to be adjusted symmetrically about each setpoint from 1 to 100% of the span.

Adjustable deadband allows the operator to fine tune the point at which the alarm trips (alarm condition) and resets (non alarm condition). The deadband is typically used to prevent chattering of the relays or false trips when the process signal is unstable or changes rapidly.

API 1420 G Alarm Configuration – The alarm configuration of the API 1420 G is pre-configured at the factory per your order, but if a change is necessary, internal jumpers can be used to modify the alarm type as follows.

1. Unplug the module from the socket.
2. Remove the 4 screws from the module bottom and remove the plastic case.
3. Unplug the circuit board with the test button from the base.
4. Note location of jumper block at top left of circuit board next to test button.
5. Place jumpers as indicated for desired alarm operation. The standard HI/LO setting is with one jumper across the two top pins or with no jumper at all. Never place a jumper across the two bottom pins!
6. Replace board, cover, and screws.



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

TEST BUTTON

The functional test pushbutton toggles the alarm status independent of the input when depressed. It verifies the alarm and system operation and also provides the additional function of unlatching the alarm on the API 1400 GHT with the latching alarm option.

OPERATION

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 to provide a quick visual picture of your process loop at all times. If the LED fails to illuminate, or fails to change in intensity as the process changes, this may indicate a problem with module power or signal input wiring. This features greatly aid in saving time during initial start-up or troubleshooting.

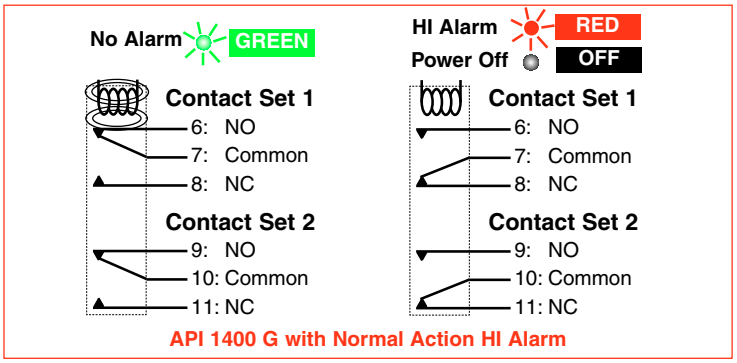
The bi-color alarm LED provides a visual indication of the alarm status. In all configurations, a GREEN LED indicates a non-alarm condition and a RED LED indicates an alarm condition.

Alarm Relays – In the normal mode of operation (failsafe), 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.

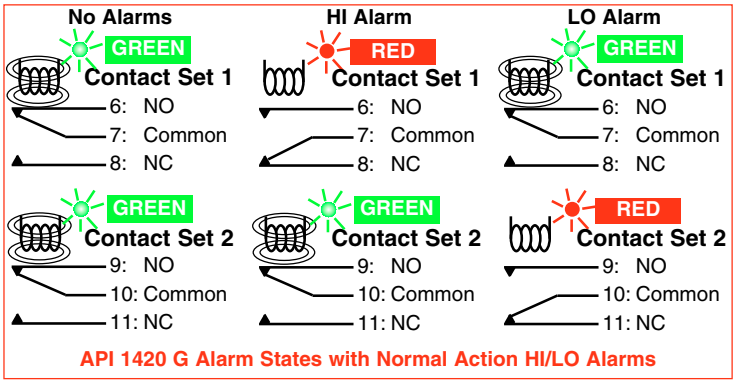
If reverse acting mode is selected (non-failsafe), the relay coil is de-energized in a non-alarm condition and energized in an alarm condition. The alarm will activate when the input signal exceeds the setpoint (HI alarm) or falls below the setpoint (LO alarm), then will automatically reset when the alarm condition no longer exists.

API 1400 GHT Latching Alarm – For units with the **HT** latching alarm option, the Test Switch is also used to reset the alarm relays. The alarm relay contacts will remain in the alarmed condition until the input signal falls below the high alarm setpoint (or above low alarm setpoint, depending on configuration) and the Test/Reset pushbutton has been pressed or power to the unit has been switched off.

API 1400 GHP Latching Alarm – For units with the **HP** latching alarm option, the alarm relay contacts will remain in the alarmed condition until the input signal falls below the high alarm setpoint (or above low alarm setpoint, depending on configuration) and the power to the unit has been switched off.



API 1400 G with Normal Action HI Alarm



API 1420 G Alarm States with Normal Action HI/LO Alarms

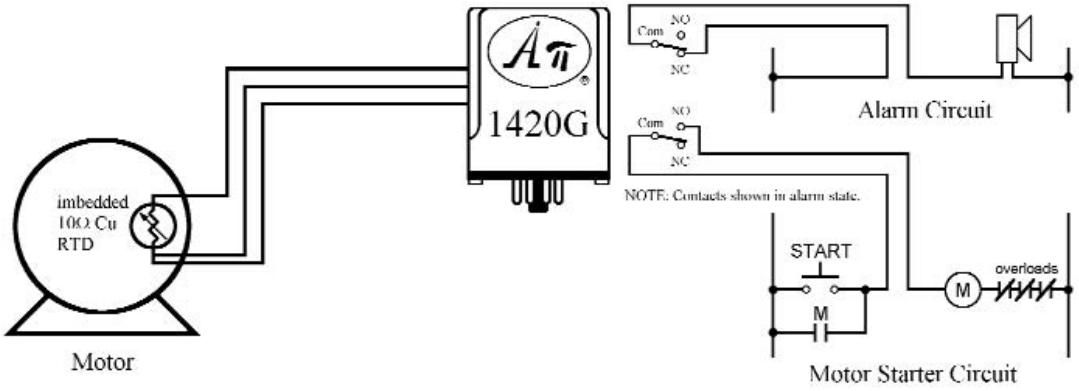
Motor Overheating Alarm and Shutdown

PROBLEM

A motor in a critical process is subject to overload and burnout. An alarm is to be sounded when the motor reaches its rated temperature. The motor is to be shut down if it exceeds its rated temperature by 10 degrees.

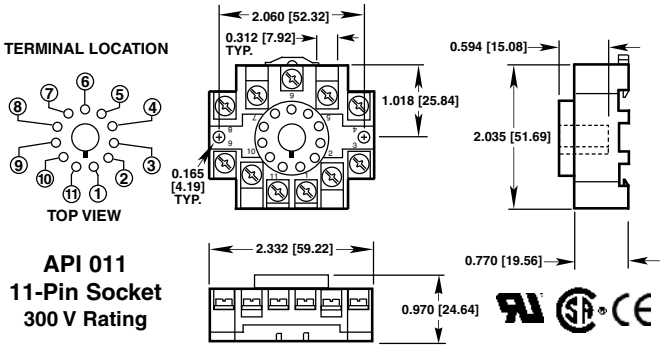
SOLUTION

A 10 ohm copper RTD commonly imbedded in many motors is connected to an **API 1420 G** RTD Input Dual Alarm Trip module which provides two independent setpoints and two independent isolated Form C (NO/NC) relay contacts. One set of these contacts is wired to an alarm or annunciator panel to alert the proper personnel of the overload condition. The other set of contacts is wired in series with the coil of the motor starter and shuts down the motor when tripped.

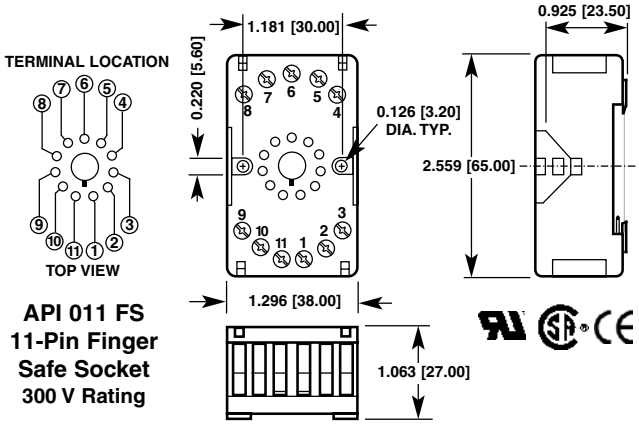


Setpoint 1 is adjusted to the rated temperature, and Setpoint 2 is adjusted to the rated temperature plus 10 degrees. The standard heavy-duty relay contacts are rated 7A @ 240 VAC and can directly control most devices.

API 011 Sockets



API 011
11-Pin Socket
300 V Rating



API 011 FS
11-Pin Finger Safe Socket
300 V Rating



FREE APPLICATION ASSISTANCE
Call Customer Service
800-794-5883

MOD-TRONIC INSTRUMENTS LIMITED
1 Delta Park Blvd #12
Brampton, ON L6T 5G1
905-457-6322 or 800-794-5883
www.mod-tronic.com

© Absolute Process Instruments, Inc. 11/04 LoopTracker–Reg TM Absolute Process Instruments, Inc.

Frequently Asked Questions

1. **Do you recommend placing a fuse at the power input (115 VAC) for protection?**
   It is not required, but if desired, a ½ Amp Fast Blow fuse can be used for each module.

2. **We are using many different types of your signal conditioners and wish to protect the inputs and outputs from short circuits and over voltage. How can we achieve this?**
   Applying a short circuit to any of the signal input terminals will not affect the modules. Exposing the signal input to high voltage will damage the unit but using a zener diode, due to its resistance value, will cause the input range to need recalibrating. Try a Varistor or TransZorb®. Do NOT under any circumstances short circuit the signal output, the unit can be damaged.

3. **Which direction do we turn the deadband potentiometer screw to give the minimum and the maximum deadband?**
   For the minimum amount (1%), turn the potentiometer screw CCW, counter-clockwise. For the maximum amount (100%), turn the potentiometer screw CW, clockwise.

4. **What are the relay contacts rated for in your alarm output modules for a motor load?**
   For inductive loads, our relay contacts are rated for 3.5 Amps Inductive at 250 VAC or 30 VDC.

Relay Protection and EMI Suppression

When using Api alarm module relays to switch inductive loads, maximum relay life and transient EMI suppression is achieved by using external protection. All external protection devices should be placed directly across the load and all leads lengths should be kept to a minimum length.

For AC inductive loads (see Figure 1), place a properly rated MOV across the load in parallel with a series RC snubber. A good RC snubber consists of a 0.1 µF polypropylene capacitor of sufficient voltage and a 47 Ohm ½ Watt carbon film resistor.

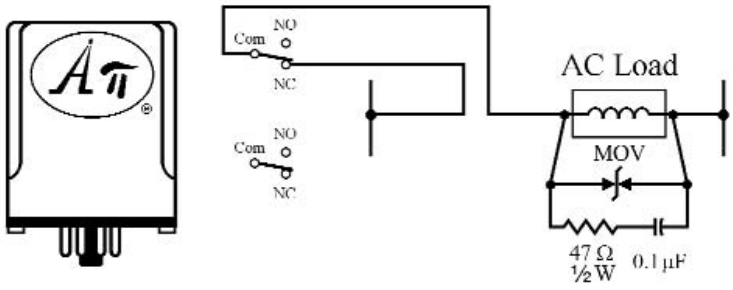


Figure 1: AC inductive loads

For DC inductive loads (see Figure 2), place a diode across the load (1N4006 recommended) being sure to observe proper polarity. Use of an RC snubber is an optional enhancement.

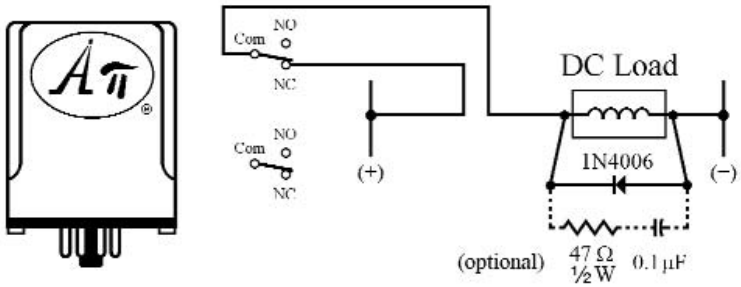


Figure 2: DC inductive loads



FREE APPLICATION ASSISTANCE
Call Customer Service
800-794-5883

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

MOD-TRONIC INSTRUMENTS LIMITED
1 Delta Park Blvd #12
Brampton, ON L6T 5G1
905-457-6322 or 800-794-5883
www.mod-tronic.com