**Input:** Most Thermocouple Types
**Output:** One 8 Amp DPDT Relay or Two 8 Amp SPDT Relays

- *Automatic Cold Junction Compensation*
- *Field Adjustable Setpoints*
- *Plug-In Design for Fast Installation*
- *Input LoopTracker® and Alarm Status LEDs*
- *Alarm Test, Optional Reset Button*

## Applications

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

### Thermocouple Input
Factory configured, please specify thermocouple type and temperature range in °F or °C

Thermocouple: J, K, T, E, R, S, most other types available
Note: 100°F (55°C) is the recommended minimum span
Consult factory if a smaller span is required

### Cold Junction Compensation
Automatic for specified thermocouple

### T/C Burnout Protection
Upscale burnout protection standard
**B** option: Downscale burnout protection

### T/C Current
Less than 1.0 µA, including burnout sense

### LoopTracker
Variable brightness LED indicates input level and status

### API 1200 G Relay Output
Two SPDT form C contact sets operating in unison as one DPDT contact set
One setpoint, 12 turn potentiometer, 0-100% of span
Factory configured alarm type
Standard: HI alarm, non-latching, normal acting
Options: LO alarm, latching, reverse acting

### API 1220 G Relay Output
Two independent SPDT form C contact sets
Two setpoints, two 12 turn potentiometers, 0-100% of span
Factory configured alarm action
Internal jumpers for HI/LO, LO/LO, HI/HI, LO/HI
Standard: HI/LO alarm, non-latching, normal acting
Options: LO/LO, HI/HI, LO/HI alarms, latching, reverse acting

### Relay Contact Rating
8 A @ 240 VAC resistive load or 30 VDC resistive load
5 A @ 240 VAC inductive load (cos $\phi$ = 0.4)
3.5 A @ 30 VDC inductive load (L/R = 7ms)
See graph on other side for relay load ratings
Caution: Do not exceed socket voltage rating
Use an RC snubber for inductive loads

### Deadband
Alarm trip/reset window are symmetrical about the setpoint
**API 1200 G** 1.0 to 100% of span, 12 turn potentiometer
**API 1220 G** Fixed at 1% of span, standard
**API 1220 G A** Adjustable deadbands, 1.0 to 100% of span, 1 turn potentiometer for each setpoint

### Output Test/Reset Button
Toggles relay(s) to opposite state when pressed
Resets latching relay with **HT** option, available on 1200 G only

### Response Time
70 milliseconds typical

### Ambient Temperature Range and Stability
−10°C to +60°C operating ambient
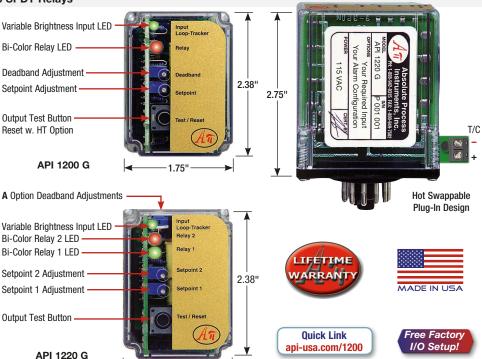Better than 0.02% of span per °C stability

### Housing and Sockets
IP 40, requires installation in panel or enclosure
API 011 or API 011 FS socket
Socket mounts to 35 mm DIN rail or can be surface mounted

### Power
Standard: 115 VAC ±10%, 50/60 Hz, 2.5 W max.
P option: 85-265 VAC 50/60 Hz, 60-300 VDC, 2.5 W typ.
A230 option: 230 VAC ±10%, 50/60 Hz, 2.5 W max.
D option: 9-30 VDC, 2.5 W typical



Variable Brightness Input LED
Bi-Color Relay LED
Deadband Adjustment
Setpoint Adjustment
Output Test Button
Reset w. HT Option
2.38"
1.75"

**API 1200 G**

**A** Option Deadband Adjustments
Variable Brightness Input LED
Bi-Color Relay 2 LED
Bi-Color Relay 1 LED
Setpoint 2 Adjustment
Setpoint 1 Adjustment
Output Test Button
2.38"
1.75"

**API 1220 G**

2.75"
T/C −
+

**Hot Swappable Plug-In Design**

LIFETIME WARRANTY
MADE IN USA

**Quick Link**
api-usa.com/1200

*Free Factory I/O Setup!*

### Description
The API 1200 G and API 1220 G are factory configured for a thermocouple input and provide alarm contact outputs. Heavy duty relay contacts allow the module to directly control high capacity loads.

The API 1200 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 or reverse acting. Top-accessible potentiometers are used to adjust the alarm setpoint and deadband.

The API 1220 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 or reverse acting. Top-accessible potentiometers are used to adjust each alarm setpoint. Deadband is fixed at 1% of span. Adjustable deadbands are optional.

### LoopTracker and Alarm Status LEDs
API exclusive features include a LoopTracker LED that varies in intensity with changes in the thermocouple input signal.

A red/green bi-color alarm status LED (two on the API 1220 G) visually indicate alarm status. These LEDs provide a quick visual picture of your process at all times.

### Output Test/Unlatch
API's exclusive functional test button can be used to verify the alarm and system operation. The output test button greatly aids in saving time during initial startup and/or troubleshooting.

The HT latching option provides the additional function of unlatching the alarm when the reset button is pressed. The alarm will reset if the alarm condition not longer exists.

| Model | Input | Standard Alarm Configuration | Power |
|---|---|---|---|
| API 1200 G | Factory ranged, specify thermocouple type temperature range °F or °C | Single setpoint one DPDT relay HI alarm, non-latching, normal acting | 115 VAC |
| API 1200 G A230 | | | 230 VAC |
| API 1200 G P | | | 85-265 VAC or 60-300 VDC |
| API 1200 G D | | | 9-30 VDC |
| API 1220 G | Factory ranged, specify thermocouple type temperature range °F or °C | 2 setpoints, 2 SPDT relays HI/LO alarms, non-latching, normal acting | 115 VAC |
| API 1220 G A230 | | | 230 VAC |
| API 1220 G P | | | 85-265 VAC or 60-300 VDC |
| API 1220 G D | | | 9-30 VDC |

### Options—add to end of model number
**L** 1200 G with LO trip. Alarm trips on decreasing signal.
**HT** 1200 G latching alarm with push button reset
**HP** 1200 G latching alarm with power-off reset. Module power must be turned off to reset alarms
**HH** 1220 G with HI/HI trip. Alarms trip at their respective trip points on increasing signal.
**LL** 1220 G with LO/LO trip. Alarms trip at their respective trip points on decreasing signal.
**A** 1220 G with adjustable deadbands
**B** Downscale burnout protection
**R** Reverse-acting alarms. Relay coils energized in an alarm condition. No alarm condition with module power off.
**U** Conformal coating for moisture resistance

### Accessories—order as a separate line item
**API 011** 11-pin socket, DIN rail or surface mount
**API 011 FS** 11-pin finger safe socket, DIN rail or surface mount
**API CLP1** Module hold-down spring for high vibration or mobile applications

**API 011 FS**
300 V Rating

**API 011**
300 V Rating

**API CLP1**

### 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.
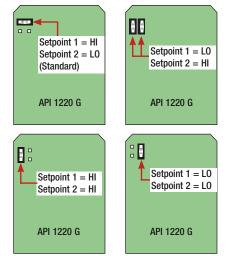
### Alarm Configuration

API 1200 G relay operation is factory configured. The default configuration is HI alarm normal acting. See model/serial number label for non-standard relay configuration options.

API 1220 G relay operation is factory configured, but 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. See diagram at right.
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.

Setpoint 1 = HI
Setpoint 2 = LO
(Standard)

API 1220 G

Setpoint 1 = LO
Setpoint 2 = HI

API 1220 G

Setpoint 1 = HI
Setpoint 2 = HI

API 1220 G

Setpoint 1 = LO
Setpoint 2 = LO

API 1220 G

**API 1220 G Internal Alarm Configuration Jumpers**

### Socket and Mounting

The module installation requires a protective panel or enclosure. Use API 011 or finger-safe API 011 FS socket. See specifications for maximum allowable socket voltages. Note that some relay sockets may have lower voltage ratings. The socket clips to a standard 35 mm DIN rail or can be attached to a flat surface using the two mounting holes.
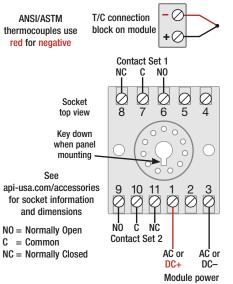
### Input

The input is factory configured. See the model/serial number label for input type, range, and options.

The thermocouple connection is made to the block on the side of the module. Polarity must be observed. ANSI/ASTM thermocouples use red for negative. IEC thermocouples use white for negative. Other countries may use other color coding.

### Relay Output

See wiring diagram for connections. The module does 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.

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ANSI/ASTM thermocouples use red for negative

T/C connection block on module

– +

Socket top view

Contact Set 1
NC  C  NO

8  7  6  5  4

Key down when panel mounting

See api-usa.com/accessories for socket information and dimensions

9  10  11  1  2  3

NO  C  NC
Contact Set 2

NO = Normally Open
C  = Common
NC = Normally Closed

AC or DC+    AC or DC–
Module power

### Module Power

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

When using DC power, polarity must be observed. The positive (+) must be wired to terminal 1 and negative (–) must be wired to terminal 3.

### Setpoint

This multi-turn potentiometer (one for each setpoint on the API 1220 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

The API 1200 G deadband potentiometer allows the alarm trip/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 1220 G. The API 1220 G A with adjustable deadband option allows deadbands to be adjusted symmetrically about each setpoint from 1 to 100% of the span.

Deadband 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.

### Adjustments

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.

Alternately set the setpoint and deadband until the desired trip/reset points are set.

### Output Test Function

The functional test button toggles the alarm status independent of the input when depressed. It verifies the alarm and system operation. When released, the relays will return to their prior states. This can be used as a diagnostic aid during initial start-up or troubleshooting.

The API 1200 G with the HT latching alarm option, the test button provides the additional function of unlatching the alarm relays provide the alarm condition no longer exists.

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### 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.

NOTE: Although the API 1200 G has a pair of relays, these relays will energize and de-energize in unison.

The API 1220 G will accommodate independent relay operations.

### 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 unless the module has a latching relay option. 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 unless the module has a latching relay option. For a low alarm, the trip point is below the reset point.

### HT Option (API 1200 G Only)

The module has a latching alarm with a push button reset. The Test button or powering the module off can be used to reset the alarm provided the alarm condition no longer exists.
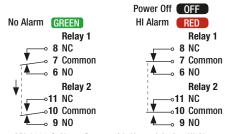
### HP Option (API 1200 G Only)

The module has a latching alarm with a power-off reset. Module power must be turned off to reset alarms. The alarm will reset provided the alarm condition no longer exists.
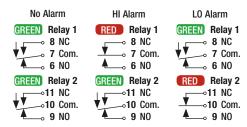
### Normal Acting Alarms (Standard)

Normal acting alarms energize the relay coils in a non-alarm condition and de-energize them in an alarm condition. This will create an alarm condition if the module loses power.
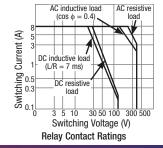
### Reverse Acting Alarms (R Option)

Reverse-acting alarms energize the relay coils in an alarm condition and de-energize them in a non-alarm condition. There is no alarm condition with module power off.

No Alarm  GREEN          Power Off  OFF
                          HI Alarm  RED

Relay 1                   Relay 1
8 NC                      8 NC
7 Common                  7 Common
6 NO                      6 NO

Relay 2                   Relay 2
11 NC                     11 NC
10 Common                 10 Common
9 NO                      9 NO

**API 1200 G Alarm States with Normal Action HI Alarm**

No Alarm          HI Alarm          LO Alarm

GREEN Relay 1     RED Relay 1       GREEN Relay 1
8 NC              8 NC              8 NC
7 Com.            7 Com.            7 Com.
6 NO              6 NO              6 NO

GREEN Relay 2     GREEN Relay 2     RED Relay 2
11 NC             11 NC             11 NC
10 Com.           10 Com.           10 Com.
9 NO              9 NO              9 NO

**API 1220 G Alarm States with Normal Action HI/LO Alarms**

AC inductive load (cos φ = 0.4)    AC resistive load

DC inductive load (L/R = 7 ms)

DC resistive load

Switching Current (A)

Switching Voltage (V)

**Relay Contact Ratings**

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