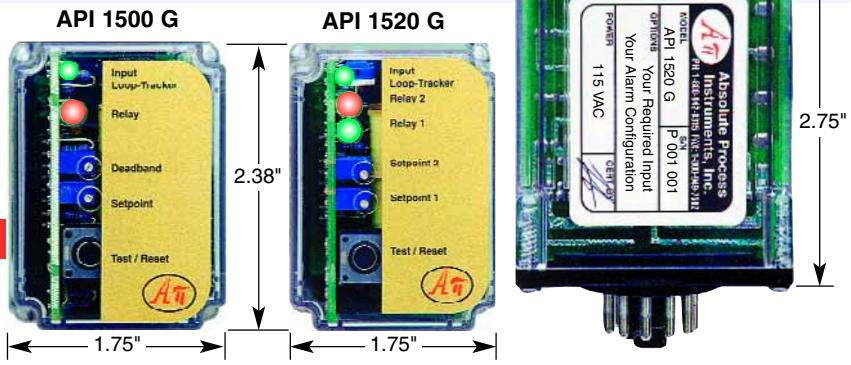
Strain Gauge (Bridge) Input Alarm Trips

API 1500 G
API 1520 G

Input: ***0-5 mVDC to 0-1200 mVDC, 4-10 VDC Excitation***

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

- ***Internal Bridge Excitation Source***
- ***Field Adjustable Setpoints***
- ***High Capacity 7 Amp Relay Contacts***
- ***Input LoopTracker® and Alarm Status LEDs***
- ***Alarm Test/Reset Pushbutton***



Applications

- **Limit Alarm for Load Cell, Pressure Sensors**
- **Hi/Lo Alarm for Weighing, Pressure**
- **Strain Gauge Over, Under, Out-of-Range Alarm**

Specifications

Input Range
Factory Configured—Please specify input range
Minimum: 0-5 mVDC
Maximum: 0-1200 mVDC

350 Ω (or greater) bridge, load cell, pressure transducer, or strain gauge

Input Impedance
1 MΩ minimum

Input Protection, Common Mode
600 VDC or 600 VAC_p

Excitation Voltage
10 VDC maximum at 30 mA
Internal adjustment 4 to 10 VDC

Excitation Stability
±0.01% per °C

LoopTracker
Variable brightness LED indicates input level and status

Relay Output
Factory Configured—See Options for other relay configurations

API 1500 G One SPDT contact
HI alarm, normal action (failsafe), non-latching standard
7 A @ 240 VAC maximum resistive load
3.5 A @ 240 VAC maximum inductive load

API 1520 G One SPDT and One SPST contact
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.

Alarm Setpoint
12 turn potentiometer, field adjustable from 0 to 100% of span

Deadband
API 1500 G 1.0 to 100% of span 12 turn potentiometer
API 1520 G Fixed at 1% of span, standard
API 1520 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 1500 G with **HT** option

Response Time
70 milliseconds typical, faster response times are available

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

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LIFETIME WARRANTY

Free Factory Input & Output Calibration!

Description and Features

The **API 1500 G** and **API 1520 G** provide a stable source of excitation voltage to bridge-type sensors such as load cells, pressure transducers and strain gauges. The resulting signal is received as an input to the module and the module provides alarm contact outputs. Heavy-duty relay contacts allow the module to directly control high capacity loads.

The modules can be factory configured for most 350 Ω (or greater) bridges. Consult the factory for assistance with your specific application.

API exclusive features include a ***LoopTracker*** LED that 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 1500 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 1520 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 input range and options

API 1500 G Strain gauge input alarm trip, 1 SPDT relay, HI alarm, normal action (failsafe), non-latching, w. loop supply, 115 VAC

API 1520 G Strain gauge input alarm trip, 1 SPDT & 1 SPST relay, HI/LO, normal action (failsafe), non-latching, w. loop supply, 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 1500 G
HT	Latching alarm with pushbutton reset, API 1500 G only
HP	Latching alarm with power-off reset, API 1500 G only
A	Adjustable deadbands for 1520 G
HH	High/High trip for 1520 G instead of High/Low
LL	Low/Low trip for 1520 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

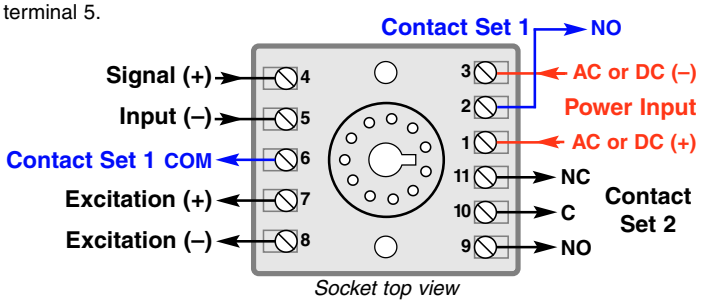
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ELECTRICAL CONNECTIONS

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.

Signal Input – Polarity must be observed when connecting the signal input. The positive connection (+) is applied to terminal 4 and the negative (–) is applied to terminal 5.



Socket top view

Relay Output Terminals – Terminals 2, 6, 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 1500 G has a pair of relays, these relays will energize and de-energize in unison. The API 1520 G will accommodate independent relay operations.

SETUP

The input 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 1520 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.

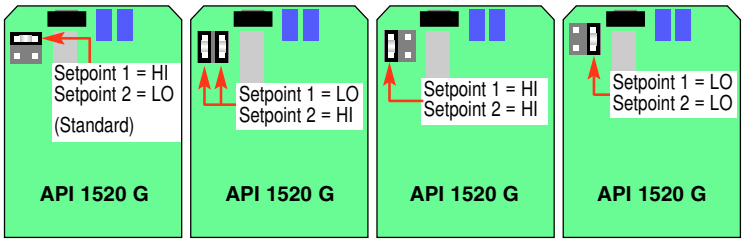
Deadband Control – The API 1500 G deadband potentiometer allows the alarm trip and reset window to be adjusted symmetrically about the setpoint from 1 to 100% of the span.

The deadband is fixed at 1% of span on the API 1520 G. The API 1520 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 1520 G Alarm Configuration – The alarm configuration of the API 1520 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 provides the additional function of unlatching the alarm on the API 1500 G HT 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.

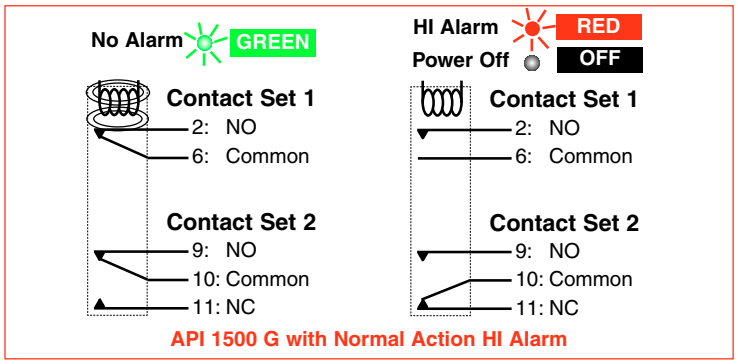
The bi-color alarm LED provides a visual indication of the alarm status. In all configurations, a GREEN LED indicates a non-alarm condition and a RED LED indicates an alarm condition.

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.

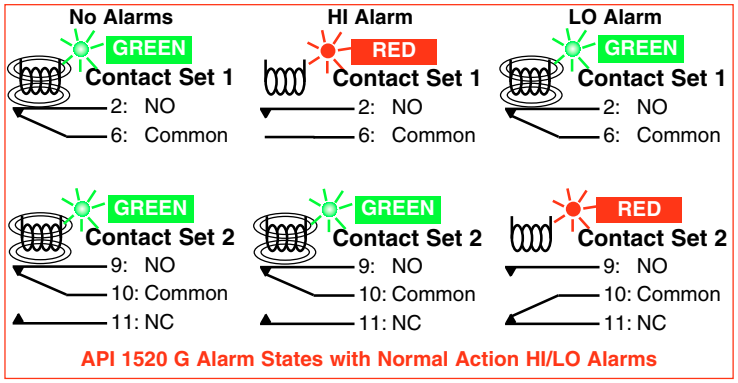
If reverse acting mode is selected (non-failsafe), the relay coil is de-energized in a non-alarm condition and energized in an alarm condition. The alarm will activate when the input signal exceeds the setpoint (HI alarm) or falls below the setpoint (LO alarm), then will automatically reset when the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

API 1500 G HT 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 1500 G HP 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 1500 G with Normal Action HI Alarm



API 1520 G Alarm States with Normal Action HI/LO Alarms

Strain Gauge

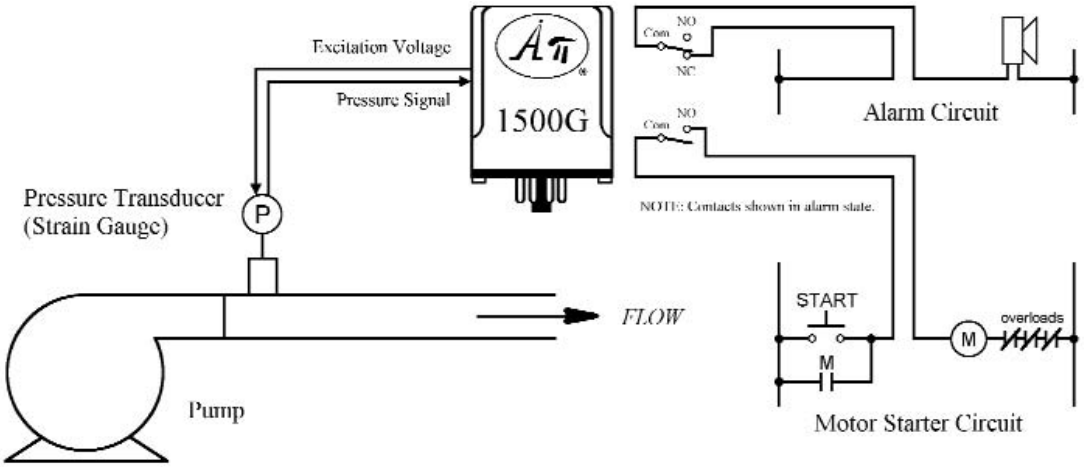
Pumping System High Pressure Alarm and Shutdown

PROBLEM

A pump is supplying liquid to a process which requires the line pressure to be maintained below some maximum value. If the pressure exceeds the preset limit, the pump must be shut down and a remote alarm activated.

SOLUTION

A pressure transducer is installed in the line on the discharge side of the pump. The pressure transducer is connected to an **API 1500 G** Strain Gauge (Bridge) Input Single Alarm Trip module which provides two isolated Form C (NO/NC) relay contacts. One set of these contacts is wired in series with the coil of the pump motor starter and shuts down the pump when tripped. The other set of contacts is wired to a remote alarm or annunciator panel to alert the proper personnel of the over-pressure shutdown. The setpoint is field adjustable from 0-100% of the input span.



The **API 1500 G** provides the stable excitation voltage for the pressure transducer from its built-in excitation supply. The standard heavy-duty relay contacts are rated 7A @ 240 VAC and can directly control most devices.

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.

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.

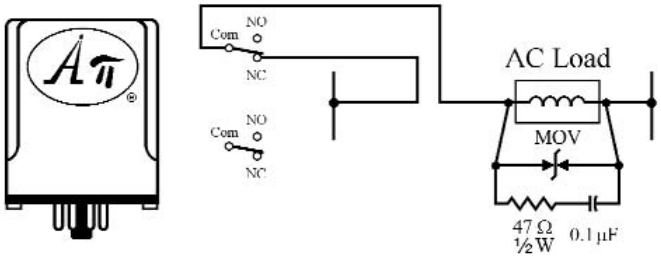


Figure 1: AC inductive loads.

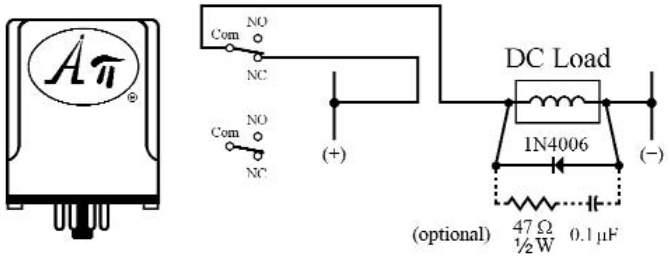


Figure 2: DC inductive loads.



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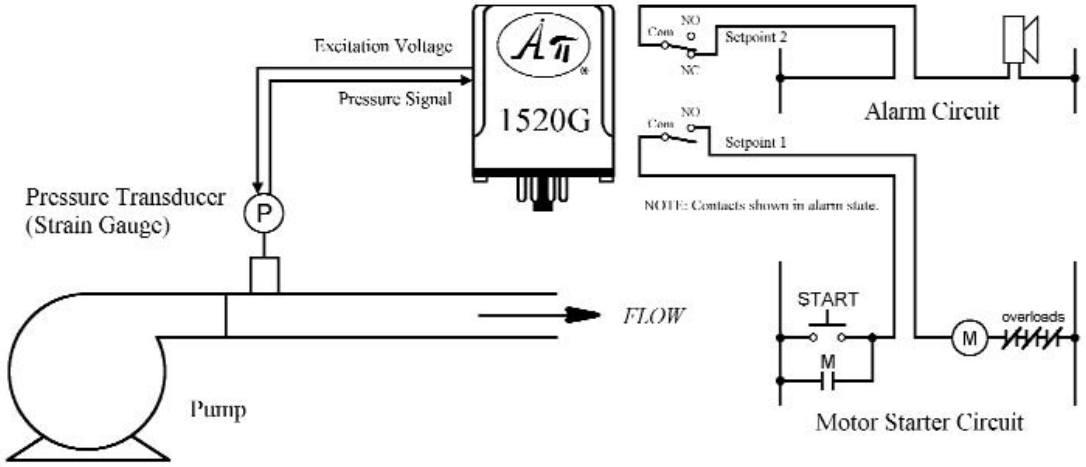
Pumping System High/High Pressure Alarm and Shutdown

PROBLEM

A pump is supplying liquid to a process which requires the line pressure to be maintained below some maximum value. If the pressure exceeds a preset warning limit, an alarm must be activated. If the pressure exceeds a preset shutdown limit, the pump must be stopped.

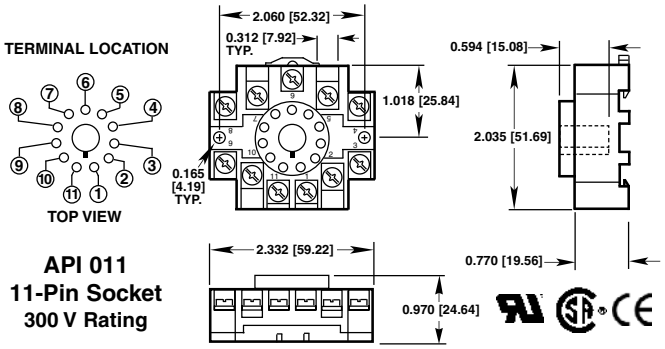
SOLUTION

A pressure transducer is installed in the line on the discharge side of the pump. The pressure transducer is connected to an **API 1520 G** Strain Gauge (Bridge) 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 overpressure condition. The other set of contacts is wired in series with the coil of the pump motor starter and shuts down the pump when tripped.

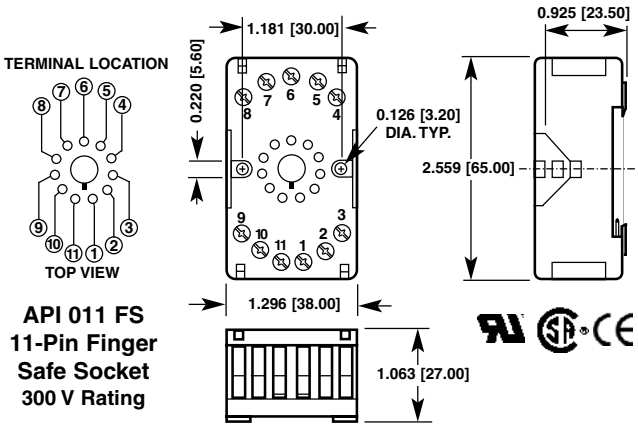


The **API 1520 G** provides the stable excitation voltage for the pressure transducer from its built-in excitation supply. Setpoint 2 is adjusted to the warning pressure limit, and Setpoint 1 is adjusted to the pressure shutdown limit. The standard heavy-duty relay contacts are rated 7A @ 240 VAC and can directly control most devices. Both setpoints are adjustable from 0-100% of the input span.

API 011 and API 011 FS Sockets



API 011
11-Pin Socket
300 V Rating



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



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