DC Input Alarm Trips with Adjustable Setpoints

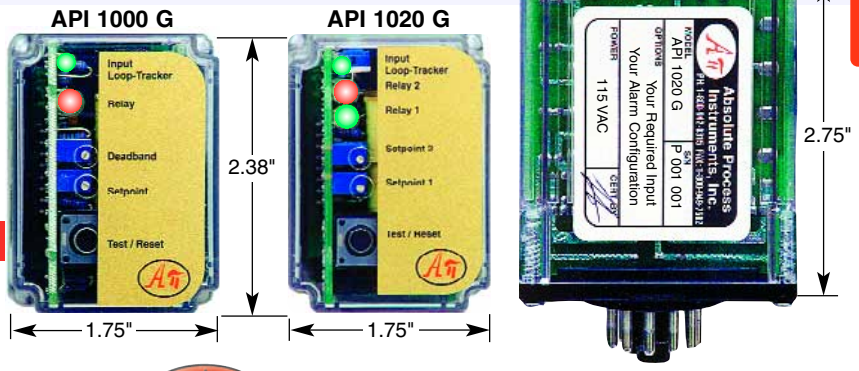
API 1000 G
API 1020 G

DC Input

Input: ***0-100 mV to 0-300 VDC, 0-1 mA to 900 mADC***

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

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



Applications

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

Specifications

Input Range

Factory Configured—Please specify input range
System voltages should not exceed socket voltage rating
Typical inputs: 4-20 mA, 0-5 V, 1-5 V, 0-10 V, 0-150 VDC

	Minimum	Maximum
Voltage:	0-100 mVDC	0-300 VDC
Current:	0-1 mADC	0-900 mADC
5A Shunt:	0-1 ADC	0-5 ADC
20A Shunt:	0-5 ADC	0-20 ADC

Input Voltage Burden (Current)

1.25 VDC maximum

Input Protection, Common Mode

750 VDC or 750 VAC_p

LoopTracker

Variable brightness LED indicates input loop level and status

Relay Output

Factory Configured—See Options for other relay configurations

API 1000 G One DPDT contact
HI alarm, normal action (failsafe), non-latching standard
7 A @ 240 VAC resistive load
3.5 A @ 240 VAC inductive load

API 1020 G Two SPDT contacts
HI/LO, normal action (failsafe), non-latching standard
7 A @ 240 VAC resistive load
3.5 A @ 240 VAC inductive load

CAUTION: Socket voltage rating 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 1000 G 1.0 to 100% of span, 12 turn potentiometer. Alarm trip and reset window are adjusted symmetrically about the setpoint.
API 1020 G Fixed at 1% of span, standard
API 1020 GA 1.0 to 100% of span, 1 turn potentiometer

Functional Test/Reset Button

Toggles relay(s) to opposite state when pressed
Resets latching relay with **HT** option, available on 1000 G only

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

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

LIFETIME WARRANTY

Free Factory Input & Output Calibration!

c UL us

Description and Features

The **API 1000 G** and **API 1020 G** are factory configured for either a DC voltage or current input and provide alarm contact outputs. 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 1000 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 1020 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 1000 G	DC input, DPDT HI alarm, normal action, non-latching,115 VAC
API 1000 G5A	Up to 5 amp DC input with socket and 25 W shunt, DPDT, HI alarm, normal action, non-latching, 115 VAC
API 1000 G20A	Up to 20 amp DC input with socket and 50 W shunt, DPDT HI alarm, normal action, non-latching, 115 VAC
API 1020 G	DC input, 2 SPDT, HI/LO, normal action, non-latching, 115 VAC
API 1020 G5A	Up to 5 amp DC input with socket and 25 W shunt, 2 SPDT relays, HI/LO, normal action, non-latching, 115 VAC
API 1020 G20A	Up to 20 amp DC input with socket and 50 W shunt, 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 1000 G
HT	Latching alarm with pushbutton reset, API 1000 G only
HP	Latching alarm with power-off reset, API 1000 G only
A	Adjustable deadbands for 1020 G
HH	High/High trip for 1020 G instead of High/Low
LL	Low/Low trip for 1020 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

API 1000 G
API 1020 G

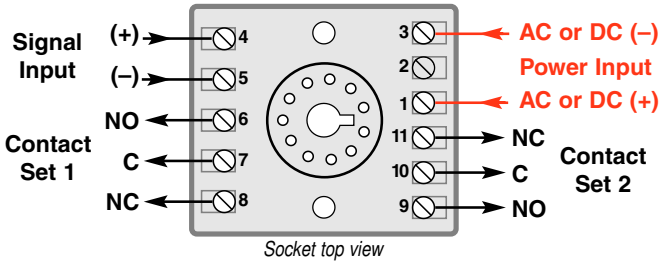
Installation and Setup

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 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 1000G has a pair of relays, these relays will energize and de-energize in unison. The API 1020G 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 1020 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.

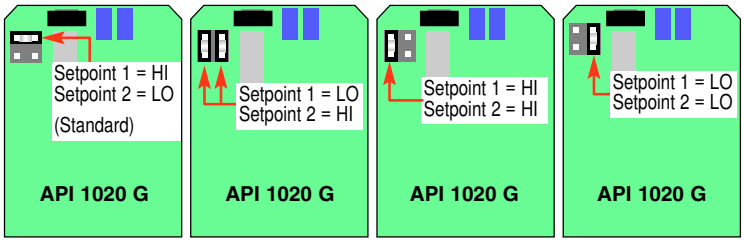
Deadband Control – The API 1000 G deadband potentiometer allows the alarm trip and reset window to be adjusted symmetrically about the setpoint from 1 to 100% of the span.

The deadband is fixed at 1% of span on the API 1020 G. The API 1020 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 1020 G Alarm Configuration – The alarm configuration of the API 1020 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 SWITCH & TEST RANGE

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 1000 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.

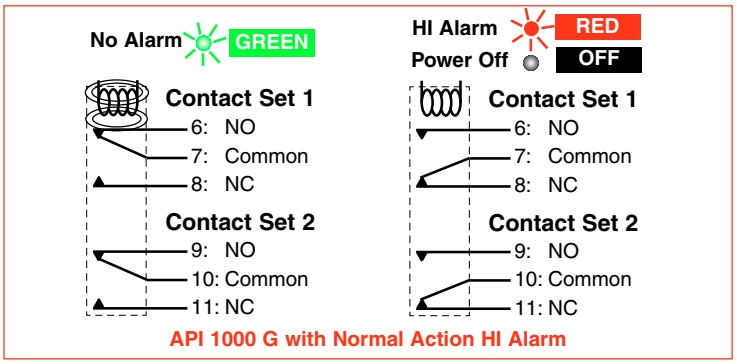
The bi-color alarm LED provides a visual indication of the alarm status. In all configurations, a GREEN LED indicates a non-alarm condition and a RED LED indicates an alarm condition.

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.

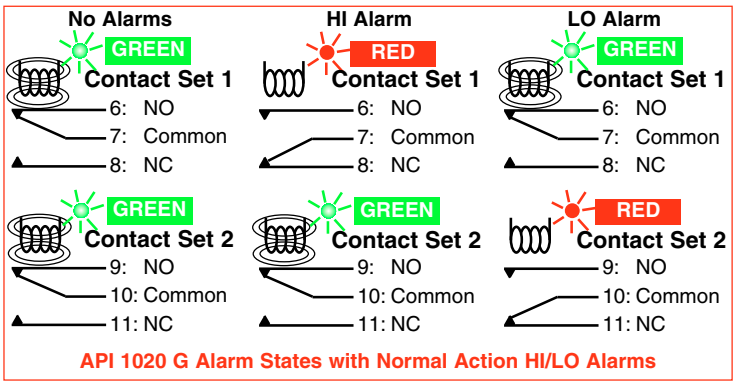
If reverse acting mode is selected (non-failsafe), the relay coil is de-energized in a non-alarm condition and energized in an alarm condition. The alarm will activate when the input signal exceeds the setpoint (HI alarm) or falls below the setpoint (LO alarm), then will automatically reset when the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

API 1000 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 1000 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 1000 G with Normal Action HI Alarm



API 1020 G Alarm States with Normal Action HI/LO Alarms

Monitoring Bi-Directional Flow

PROBLEM

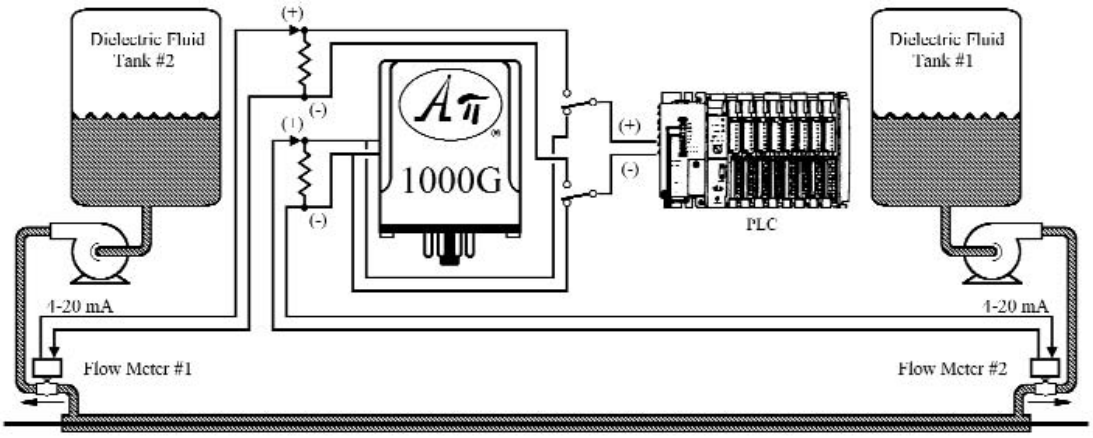
Dielectric fluid is continuously pumped through the jacket of an underground electric cable. There is a holding tank and a pump at each end of the cable and the fluid is pumped from one tank to the other and back again.

A programmable logic controller with one analog input must monitor the flow at the downstream end of the cable as a leak detection system to satisfy regulatory requirements.

SOLUTION

A flow meter with a 4-20 mA output is installed at each end of the cable. Flow Meter #1 measures the flow when the fluid is being pumped from Dielectric Fluid Tank #1, and Flow Meter #2 measures the flow when the fluid is being pumped from Dielectric Fluid Tank #2.

An **API 1000 G** DC Input Single Alarm Trip module monitors the flow at Flow Meter #2 to select which flow meter is connected to the input of the PLC.



When there is flow at Flow Meter #2, it is selected for the PLC. When there is no flow at Flow Meter #2, Flow Meter #1 is selected for the PLC. Thus, regardless of the direction, the PLC can monitor for a low flow condition that may be caused by leakage.

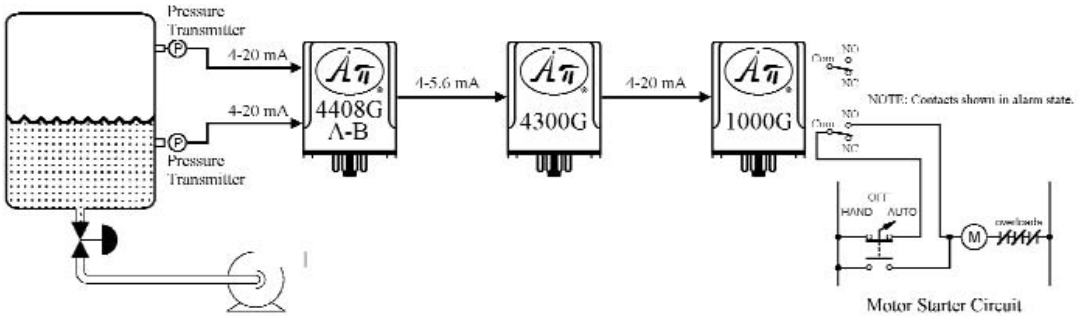
Phase Separator Water Level Control

PROBLEM

A phase separator is equipped with 2 pressure sensors, one located above the water level and one below. During operation, the maximum pressure differential is 10%. It is necessary to maintain the water level so that there is a 1% pressure differential between the sensors.

SOLUTION

Use an **API 4408 G** A-B Math Function module to obtain the pressure differential between the transmitters. With a pressure differential of 0-10%, the output of the **API 4408 G** will be 4-5.6 mA. Expand the 4-5.6 mA signal to 4-20 mA with an **API 4300 G** Isolated DC to DC Transmitter module for better resolution and control.



Use the output of the **API 4300G** to drive an **API 1000 G** DC Input Single Alarm Trip module to provide a relay contact closure to operate a water removal pump. Adjust the setpoint of the **API 1000 G** to maintain the differential pressure at 1%. The second set of isolated relay output contacts can be wired to an annunciator panel or other monitoring system as desired. The standard heavy-duty relay contacts are rated 7A @ 240VAC (resistive) and can directly control most devices.



FREE APPLICATION ASSISTANCE
Call Customer Service
800-794-5883

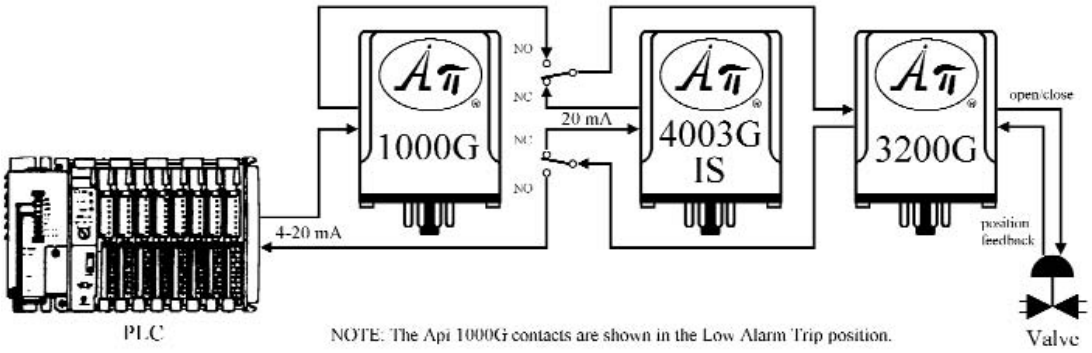
MOD-TRONIC INSTRUMENTS LIMITED
1 Delta Park Blvd #12
Brampton, ON L6T 5G1
905-457-6322 or 800-794-5883
www.mod-tronic.com

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

Fail Safe Valve Control

PROBLEM
For safety reasons an automated normally closed valve used in a coal mining operation must go to the full open position if the control signal from the programmable logic controller (PLC) is lost.

SOLUTION
The valve is controlled by an **API 3200 G** Valve/Actuator Positioner/Controller module. The input to the **API 3200 G** comes through an **API 1000 G** DC Input Single Alarm Trip module, which selects either the PLC output or a constant 20 mA output from an **API 4003 GIS** DC Special Transmitter module.

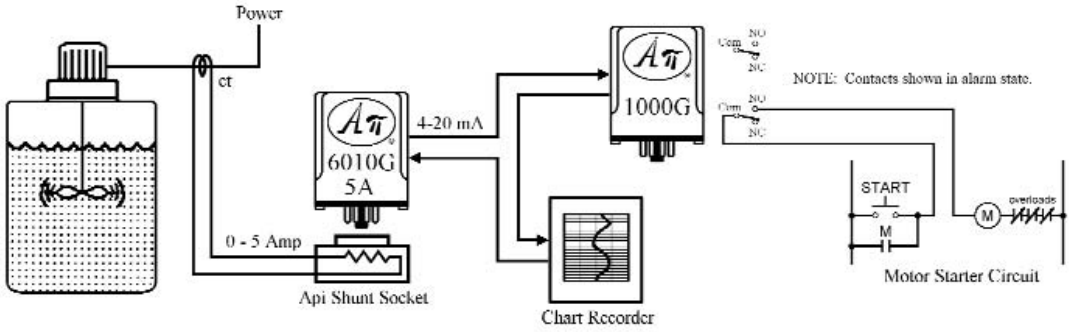


If the signal from the PLC drops below 4 mA, the **API 1000 G** will trip to a low alarm state, and select the 20 mA signal for the **API 3200 G**, thus commanding the valve to open fully. When the signal from the PLC is 4 mA or greater, the **API 1000 G** selects the PLC output signal for the **API 3200 G**, thus controlling valve position as normal.

Motor Current Monitor and Overcurrent Shutdown

PROBLEM
Monitor and record mixer motor current and provide over current shutdown.

SOLUTION
Install a properly sized current transformer in the power line feeding the motor to provide a 0-5 Amp signal for an **API 6010 G 5A** AC to DC Transmitter module. Use the 4-20 mADC output to drive an **API 1000 G** DC Input Single Alarm Trip module and a chart recorder. Use one set of relay contacts of the **API 1000 G** in the motor starter circuit to shut down the motor if the current exceeds the setpoint.



The other set of relay contacts may be wired to an annunciator or an alarm horn if so desired. The dual SPDT contacts are isolated and are rated 7A @ 240VAC resistive, making them capable of driving most loads directly.



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