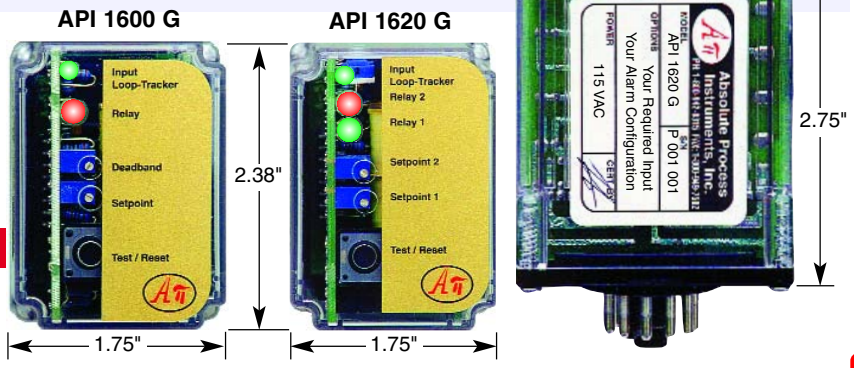
AC Input Alarm Trips with Field Adjustable Setpoints

API 1600 G
API 1620 G

Input: ***0-50 mVAC to 0-300 VAC, 0-1 mAAC to 0-900 mAAC***

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

- ***Precision Internal AC/DC Converter***
- ***Field Adjustable Setpoints***
- ***High Capacity 7 Amp Relay Contacts***
- ***Input LoopTracker® & Alarm Status LEDs***
- ***Alarm Test/Reset Pushbutton***



Applications

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

Specifications

Input Range

Factory Configured—Please specify input range

	Minimum	Maximum
Voltage:	0-50 mVAC	0-300 VAC
Current:	0-1 mAAC	0-900 mAAC

System voltages must not exceed socket voltage rating
Current shunts available for input ranges up to 20 amps

Input Impedance (Voltage)

200 kΩ minimum

Input Voltage Burden (Current)

1.0 V_{RMS} maximum

Input Protection, Common Mode

750 VDC or 750 VAC_p

LoopTracker

Variable brightness LED indicates input level and status

Relay Output

Factory Configured—See Options for other relay configurations

API 1600 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 1620 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.

Alarm Setpoint

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

Deadband

API 1600 G 1.0 to 100% of span, 12 turn potentiometer
API 1620 G Fixed at 1% of span, standard
API 1620 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 1600G 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

LIFETIME WARRANTY

Free Factory Input & Output Calibration!

AC Input

Description and Features

The **API 1600 G** and **API 1620 G** are factory configured for either an AC 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 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 1600 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 1620 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 1600 G	AC input, DPDT HI alarm, normal action, non-latching,115 VAC
API 1600 G5A	Up to 5 amp AC input with socket and 25 W shunt, DPDT, HI alarm, normal action, non-latching, 115 VAC
API 1600 G20A	Up to 20 amp AC input with socket and 50 W shunt, DPDT HI alarm, normal action, non-latching, 115 VAC
API 1620 G	AC input, 2 SPDT, HI/LO, normal action, non-latching, 115 VAC
API 1620 G5A	Up to 5 amp AC input with socket and 25 W shunt, 2 SPDT relays, HI/LO, normal action, non-latching, 115 VAC
API 1620 G20A	Up to 20 amp AC 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 1600 G
HT	Latching alarm with pushbutton reset, API 1600 G only
HP	Latching alarm with power-off reset, API 1600 G only
A	Adjustable deadbands for 1620 G
HH	High/High trip for 1620 G instead of High/Low
LL	Low/Low trip for 1620 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

See Current Sensors section for Current Transformers

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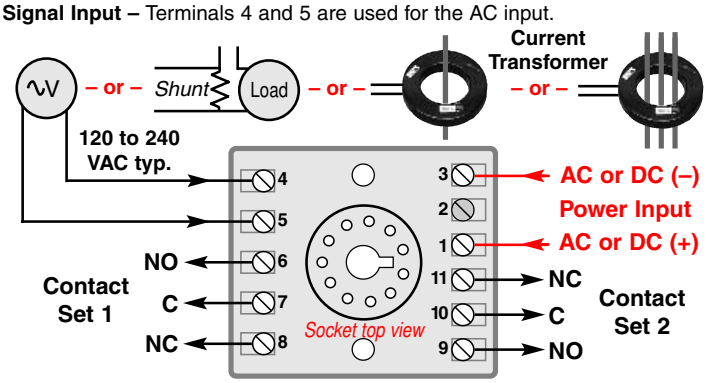
AC Input

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. Socket voltage rating must be observed!

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 – Terminals 4 and 5 are used for the AC input.



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 1600 G has a pair of relays, these relays will energize and de-energize in unison. The API 1620 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 1620 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.

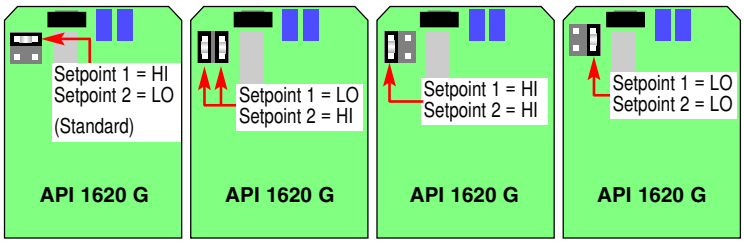
Deadband Control – The API 1600 G deadband potentiometer allows the alarm trip and reset window to be adjusted symmetrically about the setpoint from 1 to 100% of the span.

The deadband is fixed at 1% of span on the API 1620 G. The API 1620 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 1620 G Alarm Configuration – The alarm configuration of the API 1620 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.



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 1600 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.

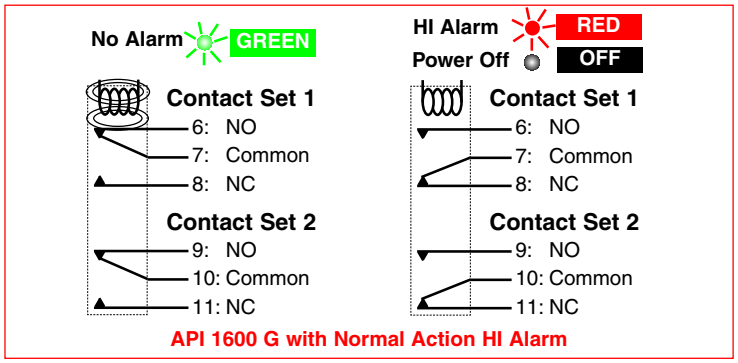
Bi-Color Alarm LED – Provides a visual indication of the alarm status. In all configurations, a GREEN LED indicates a non-alarm condition and a RED LED indicates an alarm condition.

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.

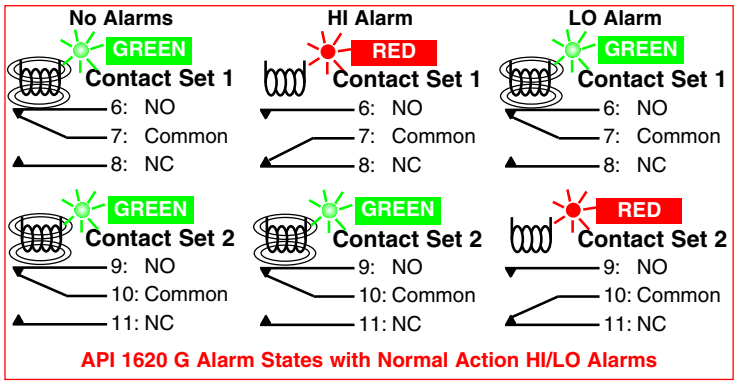
If reverse acting mode is selected (non-failsafe), the relay coil is de-energized in a non-alarm condition and energized in an alarm condition. The alarm will activate when the input signal exceeds the setpoint (HI alarm) or falls below the setpoint (LO alarm), then will automatically reset when the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

API 1600 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 1600 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 1600 G with Normal Action HI Alarm



API 1620 G Alarm States with Normal Action HI/LO Alarms

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

Monitoring Critical Heater Operation

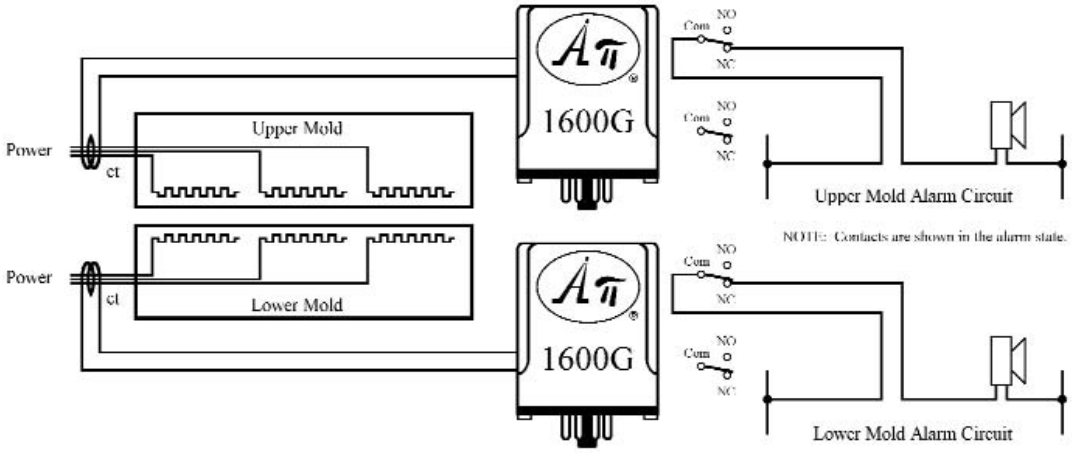
PROBLEM

There is a multi-heater mold where constant temperature is critical to the quality of a product. If a single heater in the mold goes down, the operator must know as soon as possible and shut the mold down to prevent scrap.

SOLUTION

The **API 1600 G** AC Input Single Alarm Trip module will accept a mAAC input from a current transformer (CT) and provide a contact closure when the detected current falls below a preset level. For example if the output from the CT is 60 mAAC when all three heaters are on, you would adjust the setpoint for 55 mA. Should one of the heaters fail the total current would fall approximately 20 mA causing an alarm indication and allowing the operator to shut down the system. By using a separate alarm for the upper and lower portions of the mold, the troubleshooting time for the repair crew is reduced. Scrap is also reduced by detecting and correcting the problem before a large amount of defective product is produced.

NOTE: During the normal ON/OFF cycle of the temperature controller the low current alarm will cycle with the heater. When the alarm fails to reset as the heaters are turned back on or if an alarm indication occurs during the "heat" cycle one or more of the heaters have failed.



AC Input

Frequently Asked Questions

What is Deadband?

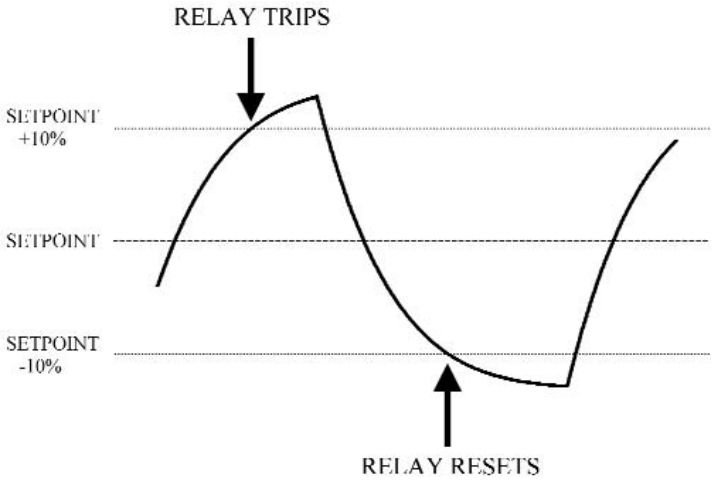
DEFINITION

Deadband is the range through which an input can be varied without initiating an observable response. Deadband is usually expressed in percent of span.

EXAMPLE

A 20% total deadband is applied to the setpoint of a monitored parameter. The relay will trip and reset to its untripped state as indicated in the following graph.

20% TOTAL DEADBAND





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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.

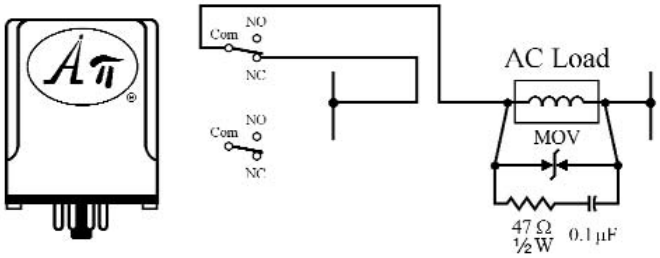


Figure 1: AC inductive loads.

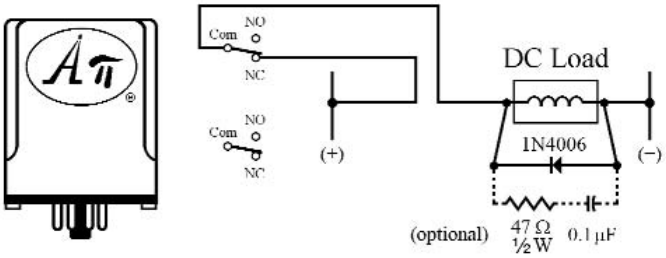
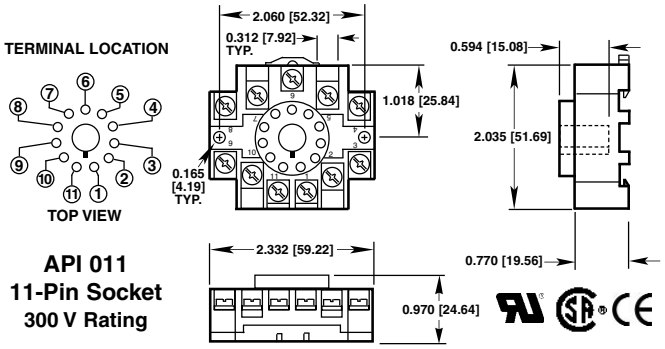
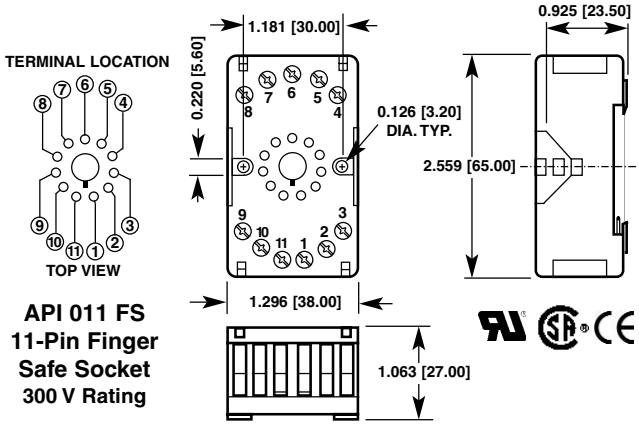


Figure 2: DC inductive loads.

API 011 and API 011 FS Sockets

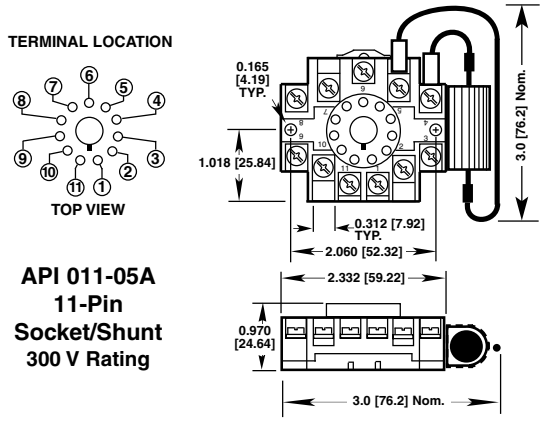


API 011
11-Pin Socket
300 V Rating

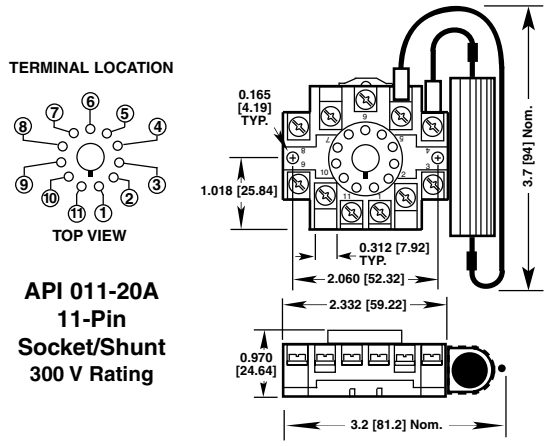


API 011 FS
11-Pin Finger Safe Socket
300 V Rating

API 011-05A and API 011-20A Sockets with Shunts



API 011-05A
11-Pin Socket/Shunt
300 V Rating



API 011-20A
11-Pin Socket/Shunt
300 V Rating



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AC to DC Isolator & Transmitter

API 6010 G

Input: ***0-50 mVAC to 0-300 VAC, 0-1 mAAC to 900 mAAC***

Output: ***0-1 V to ±10 VDC or 0-1 mA to 4-20 mA Isolated***

- ***Precision Internal AC/DC Converter***
- ***Input and Output LoopTracker® LEDs***
- ***Full 2000 V Input/Output/Power Isolation***
- ***Functional Test Pushbutton***

Applications

- **Convert AC Signals to DC Process Signal**
- **Monitor For Abnormal Voltage Drops**
- **Detect Overloads, Monitor AC Tach Signals**

Specifications

Input Range

Factory Configured—Please specify input range

	Minimum	Maximum
Voltage:	50 mVAC	300 VAC
Current:	1 mAAC	900 mAAC

System voltages must not exceed socket voltage rating
See 6010 G 5A & 6010 G 20A data sheet for higher current inputs

Input Impedance (Voltage)

200 kΩ minimum

Input Voltage Burden (Current)

1.0 V_{RMS} maximum

Input Protection, Common Mode

750 VDC or 750 VAC_p

LoopTracker

Variable brightness LEDs indicate input/output loop level and status

Output Range

Factory Configured—Please specify output range

	Minimum	Maximum	Load Factor
Voltage:	0-1 VDC	0-10 VDC	
Bipolar Voltage:	±1 VDC	±10 VDC	
Current (20 V compliance):	0-1 mADC	0-20 mADC	1000 Ω at 20 mA

Consult factory for other ranges

Output Zero and Span

Multiturn potentiometers to compensate for load and lead variations
±15% of span adjustment range typical

Output Linearity

Better than ±0.1% of span

Output Ripple and Noise

Less than 10 mV_{RMS} at 40 Hz and above

Functional Test Button

Sets output to test level when pressed.
Potentiometer factory set to approx. 50% of span, adjustable 0-100% of span

Response Time

150 milliseconds typical

Isolation

2000 V_{RMS} minimum
Full isolation: power to input, power to output, input to output

Ambient Temperature Range

–10°C to +60°C operating

Temperature Stability

Better than ±0.02% of span per °C

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



LIFETIME WARRANTY

Free Factory Input & Output Calibration!

c UL us

Description and Features

The **API 6010 G** accepts an AC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input. Typical applications include monitoring line voltage or current (either directly or with a CT) for speed control, preventive maintenance, load shedding, etc.

The full 3-way (input, output, power) isolation makes this module useful for ground loop elimination or noise pickup reduction. The **API 6010 G** is factory configured to customer requirements. Consult the factory for assistance with special ranges.

API exclusive features include two ***LoopTracker*** LEDs and a **Functional Test Pushbutton**. The LoopTracker LEDs (Green for input, Red for output) vary in intensity with changes in the process input and output signals. Monitoring the state of these LEDs can provide a quick visual picture of your process loop at all times.

The functional test pushbutton provides a fixed output (independent of the input) when held depressed. The test output level can be field-adjusted via a multiturn potentiometer. Both the LoopTracker LEDs and functional test pushbutton greatly aid in saving time during initial startup and/or troubleshooting.

The **API 6010 G** plugs into an industry standard 8-pin octal socket sold separately. Sockets **API 008** and finger-safe **API 008 FS** allow either DIN rail or panel mounting.

Models & Options

Factory Configured—Please specify input/output ranges and options

API 6010 G	AC to DC isolated transmitter, 115 VAC

Options—Add to end of model number

A230	Powered by 230 VAC, 50/60 Hz
D	Powered by 9-30 VDC
HC	High current output, >20 mA to 50 mADC
EXTSUP	Open collector output when a “sinking” output is required
U	Conformal coating for moisture resistance

Accessories—Order as separate line item

API 008	8-pin socket
API 008 FS	8-pin finger-safe socket
API TK36	DIN rail, 35 mm W x 39" L, aluminum
CT	See Current Sensor data sheets for current transformers

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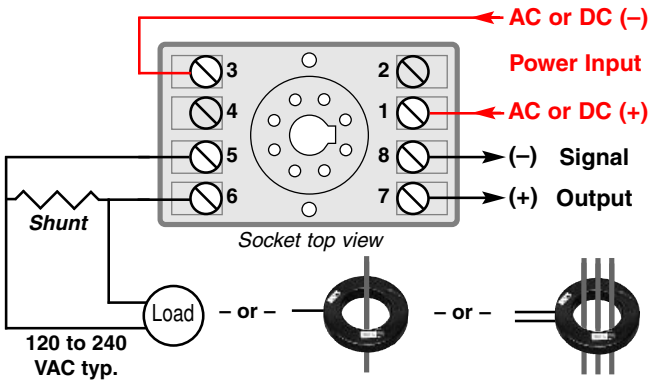
AC Input

ELECTRICAL CONNECTIONS

WARNING! All wiring must be performed by qualified personnel only. This module uses an industry-standard 8-pin socket. Order API 008 or finger-safe API 008 FS socket. Input voltages must not exceed socket voltage rating.

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.

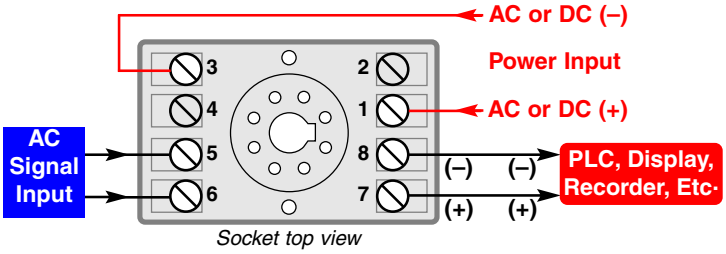
Signal Input – The AC signal input is applied to terminal 5 and terminal 6. The module is factory configured for the input range listed on the module label. Input voltages must not exceed socket voltage rating.



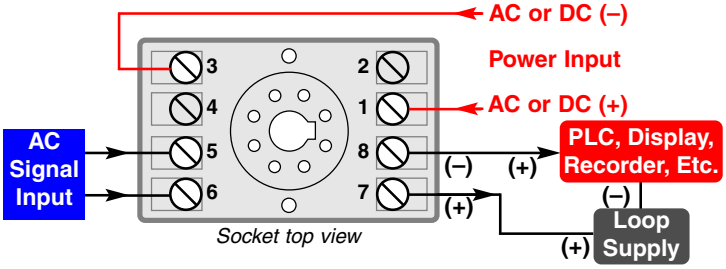
Typical wiring using a direct voltage or current transformer input
Order 2RL, 5RL, 7RL, 8RL series current transformers separately

Signal Output Terminals – Polarity must be observed when connecting the signal output to the load. The positive connection (+) is connected to terminal 7 and the negative (–) is connected to terminal 8. The module provides power to the output current loop.

When a current output is ordered, it provides power to the output current loop (sourcing). If an unpowered (sinking) current output is required, order the API 6010 G EXTSUP with open collector output.



API 6010 G typical output wiring



Typical output wiring with EXTSUP option

CALIBRATION

Input and output ranges are pre-configured at the factory as specified on your order. Top-mounted, Zero and Span potentiometers can be used should fine-tuning be necessary. Custom ranges may require factory modification.

1. Apply power to the module and allow a minimum 20 minute warm up time.
2. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer for the exact minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum. This will produce the corresponding minimum output signal.
4. Set the input at maximum, and adjust the Span pot for the exact maximum output desired. The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal.
5. Repeat adjustments for maximum accuracy.

TEST SWITCH

The Test pushbutton may be set to provide the desired output when depressed. This will drive the device on the output side of the loop (a panel meter, chart recorder, etc.) with a known good signal that can be used as a system diagnostic aid during initial start-up or during troubleshooting. It can be adjusted to vary the output signal from 0 to 100% of the calibrated output range. When released, the output will return to normal.

Turn the multi-turn Test Range potentiometer while holding the Test Switch depressed until the desired output test level is reached.

OPERATION

Depending upon the configuration required, the API 6010 G input is either amplified or attenuated, then filtered and processed by a precision full-wave rectification circuit. The resulting signal is passed thru a low pass active filter that provides a DC voltage representing the average value of the input. The module is calibrated assuming a sinusoidal input. This DC voltage is passed through an optical isolation circuit to the output stage where it is converted to the DC voltage or current required in the application.

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, this may indicate a problem with module power or signal input wiring.

RED *LoopTracker* Output LED – Provides a visual indication that the output signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum. For current outputs, the RED LED will only light if the output loop current path is complete. For either current or voltage outputs, failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module power or signal output wiring.

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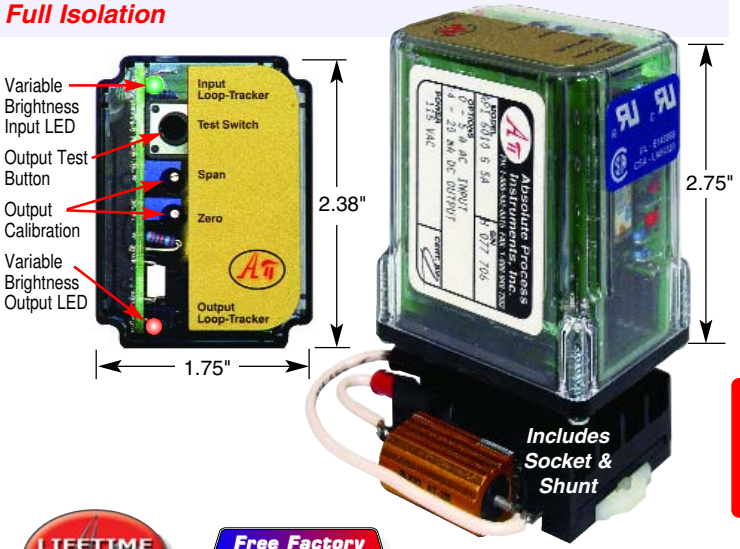
High Current AC to DC Isolator Transmitters

API 6010 G 5A
API 6010 G 20A

Input: ***0-0.9 AAC to 0-5 AAC, 0-5 AAC to 0-20 AAC***
Output: ***0-1 V to ±10 VDC or 0-1 mA to 4-20 mA***

Includes Socket & Shunt
Full Isolation

- ***Precision Internal AC/DC Converter***
- ***Input and Output LoopTracker® LEDs***
- ***Full 2000 V Input/Output/Power Isolation***
- ***Functional Test Pushbutton***







Applications

- **Convert AC Signals to DC Process Signal**
- **Monitor For Abnormal Voltage Drops**
- **Detect Overloads, Monitor AC Tach Signals**

Specifications

Input Ranges

Factory Configured—Please specify input range
See API 6010 G data sheet for lower current inputs
Consult factory for special ranges

	Minimum	Maximum
API 6010 G 5A	0-900 mAAC	0-5 AAC
API 6010 G 20A	0-5 AAC	0-20 AAC

System voltages must not exceed socket voltage rating

Input Impedance

0.1 Ω minimum external shunt

Input Voltage Burden (Current)

1.0 V_{RMS} maximum

Input Protection, Common Mode

750 VDC or 750 VAC_p

LoopTracker

Variable brightness LEDs indicate input/output loop level and status

Output Range

Factory Configured—Please specify output range

	Minimum	Maximum	Load Factor
Voltage:	0-1 VDC	0-10 VDC	
Bipolar Voltage:	±1 VDC	±10 VDC	
Current (20 V compliance):	0-1 mADC	0-20 mADC	1000 Ω at 20 mA

Consult factory for special ranges

Output Zero and Span

Multiturn potentiometers to compensate for load and lead variations
±15% of span adjustment range typical

Output Linearity, Ripple, and Noise

Better than ±0.1% of span linearity
Less than 10 mV_{RMS} ripple and noise

Functional Test Button

Sets output to test level when pressed.
Factory set to approximately 50% of span

Response Time

150 milliseconds typical

Isolation

2000 V_{RMS} minimum
Full isolation: power to input, power to output, input to output

Ambient Temperature Range

–10°C to +60°C operating

Temperature Stability

Better than ±0.02% of span per °C

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 6010 G 5A** and **API 6010 G 20A** accept an AC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input. Typical applications include monitoring line voltage or current (either directly or with a CT) for speed control, preventive maintenance, load shedding, etc.

The full 3-way (input, output, power) isolation makes this module useful for ground loop elimination or noise pickup reduction. Models are factory configured to customer requirements. Consult the factory for special ranges.

The **API 6010 G 5A** and **API 6010 G 20A** include an **API 008-5A** or **API 008-20A** socket/current shunt assembly and can be factory configured for virtually any AC current input range from 0-900 mAAC to 0-20 AAC. The socket/current shunt assemblies allow either DIN rail or panel mounting.

API exclusive features include two ***LoopTracker®*** LEDs and a **Functional Test Pushbutton**. The LoopTracker LEDs (Green for input, Red for output) vary in intensity with changes in the process input and output signals. Monitoring the state of these LEDs can provide a quick visual picture of your process loop at all times. The functional test pushbutton provides a fixed output (independent of the input) when held depressed. The test output level can be field-adjusted via a multiturn potentiometer. Both the LoopTracker LEDs and functional test pushbutton greatly aid in saving time during initial startup and/or troubleshooting.

Models & Options

Factory Configured—Please specify input/output ranges and options

API 6010 G 5A	5 AAC to DC transmitter, isolated, 115 VAC
API 6010 G 20A	20 AAC to DC transmitter, isolated, 115 VAC

Options—Add to end of model number

A230	Powered by 230 VAC, 50/60 Hz
D	Powered by 9-30 VDC
HC	High current output, >20 mA to 50 mADC
EXTSUP	Open collector output when a “sinking” output is required
U	Conformal coating for moisture resistance

Accessories—Order as separate line item

API TK36	DIN rail, 35 mm W x 39" L, aluminum
CT	See Current Sensor data sheets for current transformers

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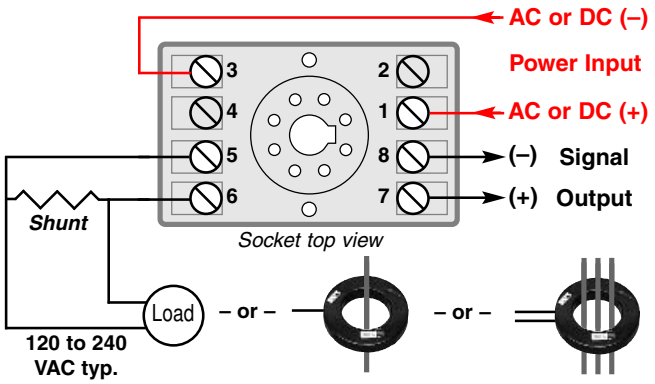
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AC Input

ELECTRICAL CONNECTIONS

WARNING! All wiring must be performed by qualified personnel only. This module includes and 8-pin socket and shunt. Input voltages must not exceed socket voltage rating.

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.

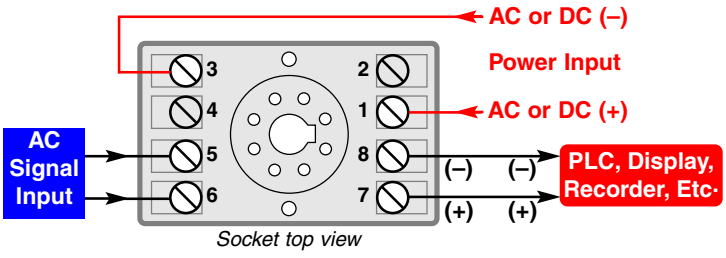


Typical wiring using a direct voltage or current transformer input
Order 2RL, 5RL, 7RL, 8RL series current transformers separately

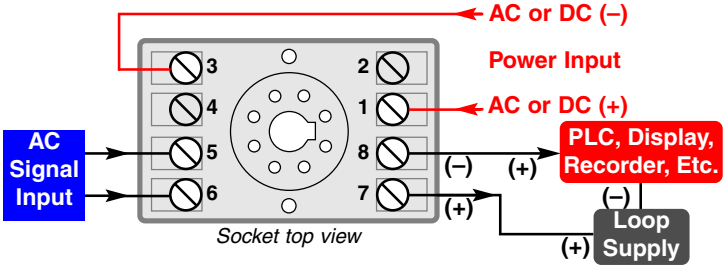
Signal Input – The AC signal input is applied to terminal 5 and terminal 6. These modules are factory configured for the input range listed on the module label. Input voltages must not exceed socket voltage rating.

Signal Output Terminals – Polarity must be observed when connecting the signal output to the load. The positive connection (+) is connected to terminal 7 and the negative (–) is connected to terminal 8. The module provides power to the output current loop.

When a current output is ordered, it provides power to the output current loop (sourcing). If an unpowered (sinking) current output is required, order the API 6010 G EXTSUP with open collector output.



API 6010 G 5A and 20A typical output wiring



Typical output wiring with EXTSUP option

CALIBRATION

Input and output ranges are pre-configured at the factory as specified on your order. Top-mounted, Zero and Span potentiometers can be used should fine-tuning be necessary. Custom ranges may require factory modification.

1. Apply power to the module and allow a minimum 20 minute warm up time.
2. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer for the exact minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum. This will produce the corresponding minimum output signal.
4. Set the input at maximum, and adjust the Span pot for the exact maximum output desired. The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal.
5. Repeat adjustments for maximum accuracy.

TEST SWITCH

The Test pushbutton may be set to provide the desired output when depressed. This will drive the device on the output side of the loop (a panel meter, chart recorder, etc.) with a known good signal that can be used as a system diagnostic aid during initial start-up or during troubleshooting. It can be adjusted to vary the output signal from 0 to 100% of the calibrated output range. When released, the output will return to normal.

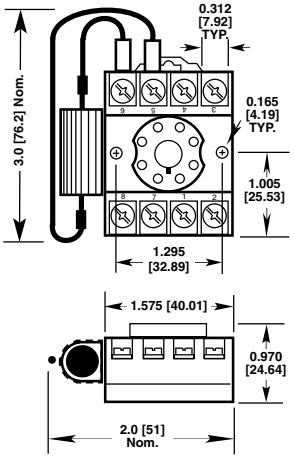
Turn the multi-turn Test Range potentiometer while holding the Test Switch depressed until the desired output test level is reached.

OPERATION

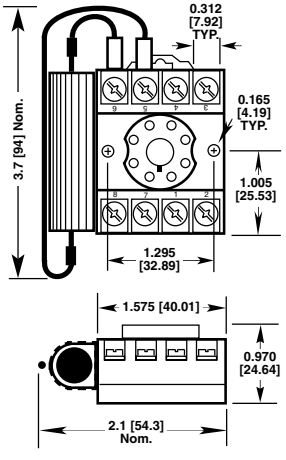
Depending upon the configuration required, the input is either amplified or attenuated, then filtered and processed by a precision full-wave rectification circuit. The resulting signal is passed thru a low pass active filter that provides a DC voltage representing the average value of the input. The module is calibrated assuming a sinusoidal input. This DC voltage is passed through an optical isolation circuit to the output stage where it is converted to the DC voltage or current required in the application.

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, this may indicate a problem with module power or signal input wiring.

RED *LoopTracker* Output LED – Provides a visual indication that the output signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum. For current outputs, the RED LED will only light if the output loop current path is complete. For either current or voltage outputs, failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module power or signal output wiring.



API 008-5A
8-Pin Socket/Shunt
600 V Rating



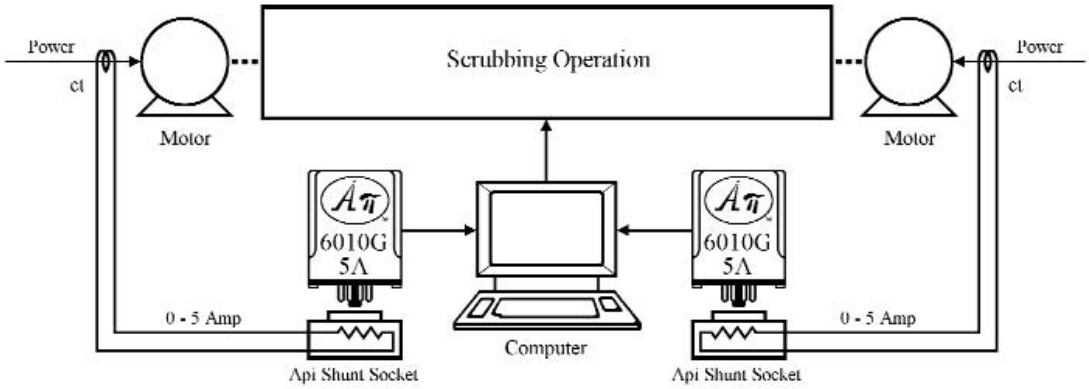
API 008-20A
8-Pin Socket/Shunt
600 V Rating

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

Monitoring the Speed of Scrubbers

PROBLEM
Material is fed to a pair of scrubbers rotating at 3600 RPM. If the speed of the scrubbers decreases due to overloading, the material is not adequately cleaned.

SOLUTION
As loading on a motor increases its speed will decrease and its electrical current draw will increase. The amount of current drawn by the motor can be monitored and used as an indication of motor speed.

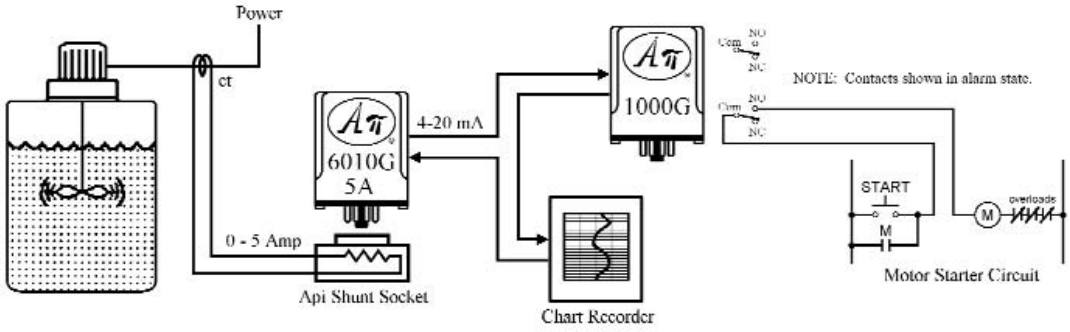


Current transformers are installed on the electrical lines supplying the motors. Each current transformer is connected to an **API 6010 G 5A** isolated AC to DC Transmitter, which consists of a socket with a built-in shunt, and a plug-in module. This arrangement prevents damage to the current transformer if the plug-in module is removed from the socket without powering down the scrubbers. The DC output from each **API 6010 G 5A** is connected to a computer and can be used for monitoring scrubber speed or for controlling the feed rate of material to the scrubbers for most efficient operation. The 2000 VRMS optical isolation protects against unwanted ground loops and electrical interference.

Motor Current Monitor and Overcurrent Shutdown

PROBLEM
Monitor and record mixer motor current and provide overcurrent 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

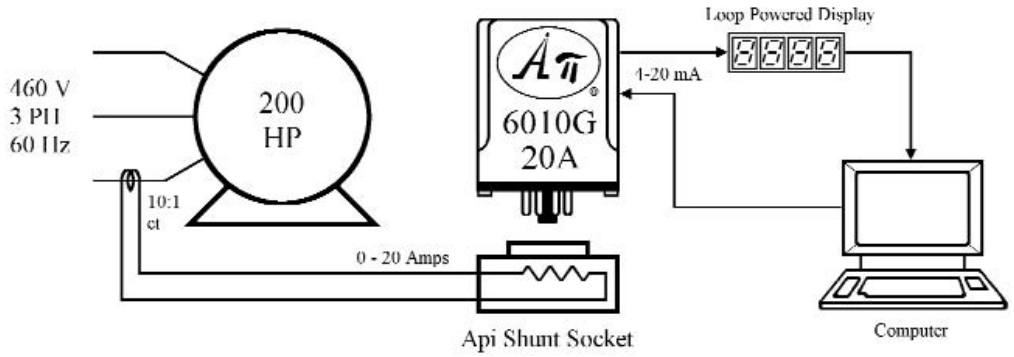
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Monitor and Display AC Motor Load

PROBLEM
The load on a motor is to be monitored by a computer and displayed locally as a percent of full load current. The motor is rated 200 horsepower, and operates at 460 volts, 3-phase, with a full load current of 200 amps.

SOLUTION
Install a suitable current transformer (CT) with a 10:1 ratio on one of the legs of the input power to the motor, and connect the CT output to an Api Shunt Socket with an **API 6010 G 20A** AC to DC Transmitter.

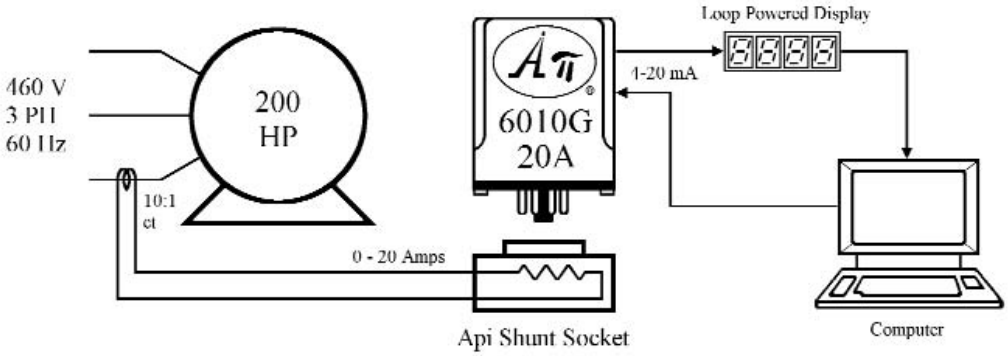


Use the 4-20 mA output of the **API 6010 G 20A** to drive a loop powered local display and the computer input. Scale the loop powered display for an indication of 100% at 200 amps motor load. The 2000 VRMS optical isolation protects against unexpected ground loops and electrical interference commonly found in industrial applications.

Monitoring Computer and Process Status

PROBLEM
A critical process is monitored by a computer which is powered independently. If power is lost to either the process or the computer, or if the computer locks up, an alarm is to be activated.

SOLUTION
The computer is programmed to produce an output of 100 Hz at its analog output port. This output will not be present when power to the computer is lost or when the program locks up for any reason.



Use the 4-20 mA output of the **API 6010 G 20A** to drive a loop powered local display and the computer input. Scale the loop powered display for an indication of 100% at 200 amps motor load. The 2000 V_{RMS} optical isolation protects against unexpected ground loops and electrical interference commonly found in industrial applications.

AC Current Transformers

1.05" ID x 2.46" OD x 1.05" W

Part #	Ratio
AL-500	50:5
AL-600	60:5
AL-750	75:5
AL-800	80:5
AL-101	100:5
AL-1250	125:5
AL-151	150:5
AL-201	200:5
AL-251	250:5
AL-301	300:5

2.50" ID x 4.58" OD x 1.10" W

Part #	Ratio
7RL-101	100:5
7RL-151	150:5
7RL-201	200:5
7RL-251	250:5
7RL-301	300:5
7RL-401	400:5
7RL-501	500:5
7RL-601	600:5
7RL-751	750:5
7RL-801	800:5
7RL-102	1000:5
7RL-122	1200:5
7RL-152	1500:5
7RL-162	1600:5

1.56" ID x 3.56" OD X 1.10" W

Part #	Ratio
5RL-500	50:5
5RL-750	75:5
5RL-101	100:5
5RL-151	150:5
5RL-201	200:5
5RL-251	250:5
5RL-301	300:5
5RL-401	400:5
5RL-501	500:5
5RL-601	600:5
5RL-751	750:5
5RL-801	800:5
5RL-102	1000:5
5RL-122	1200:5

3.25" ID x 5.73" OD X 1.15" W

Part #	Ratio
8RL-201	200:5
8RL-251	250:5
8RL-301	300:5
8RL-401	400:5
8RL-501	500:5
8RL-601	600:5
8RL-751	750:5
8RL-801	800:5
8RL-102	1000:5
8RL-122	1200:5
8RL-152	1500:5

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

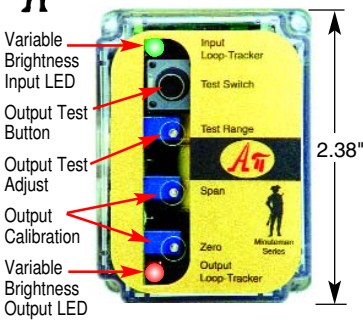
AC to DC Isolator/Transmitter
Field Rangeable

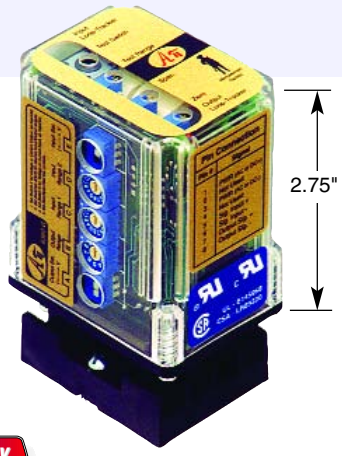
API 6380 G

Input: ***0-50 mV to 0-250 VAC, 0-5 mA to 200 mAAC***
Output: ***0-1 VDC to ±10 VDC or 0-2 mA to 0-25 mADC***

- ***Non-Interactive Zero/Span Controls***
- ***Set-Up via Rotary Switches & Easy-to-Use Tables***
- ***Internal Jumper for Reverse Output***
- ***Full 2000 V Isolation Input/Output/Power***
- ***Input and Output LoopTracker® LEDs***
- ***Functional Test Pushbutton***

Wide Ranging I/O
One Minute Setup!





LIFETIME WARRANTY

Free Factory Input & Output Calibration!

c UL us

Applications

- **Convert AC Signals to DC Process Signals**
- **Min./Max. Ripple Monitoring**

Specifications

Input Ranges

System voltages must not exceed socket voltage rating

	Minimum	Maximum
Voltage:	0 to 50 mVAC	0 to 250 VAC
Current:	0 to 4 mAAC	0 to 200 mAAC

Current inputs greater than 200 mAAC require external shunt resistor option **5A** or **20A**
Consult factory for assistance with ranges

Input Impedance

With 0-4 volt input:	1 MΩ minimum
With > 4 volt input:	220 kΩ minimum
Current input:	10 Ω

Input Frequency

40 Hz to 1000 Hz sinusoidal input

Input Loop Power Supply

18 VDC nom., unregulated, 25 mADC, max. ripple, less than 1.5 V_{p-p}

LoopTracker

Variable brightness LEDs indicate input/output loop level and status

Output Ranges

	Minimum	Maximum	Load Factor
Voltage:	0-1 VDC	0-10 VDC	
Bipolar Voltage:	±1 VDC	±10 VDC	
Current (20 V compliance):	0-2 mADC	0-25 mADC	1000 Ω at 20 mA

Consult factory for other ranges

Output Logic

Standard: Normal acting. Internal jumper for output reversal.

Output Linearity

Better than ±0.1% of span

Output Zero and Span

Multiturn potentiometers to compensate for load and lead variations
±15% of span adjustment range typical

Functional Test Button

Sets output to test level when pressed. Potentiometer factory set to approximately 50% of span, adjustable 0-100% of span

Response Time (0-90%)

200 milliseconds typical

Isolation

2000 V_{RMS} minimum
Full isolation: power to input, power to output, input to output

Ambient Temperature Range and Temperature Stability

–10°C to +60°C operating ambient
Better than ±0.02% of span per °C 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 6380 G** accepts an AC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input. Accuracy is maintained over a wide frequency range for maximum flexibility. The **API 6380 G** is commonly used to monitor line voltage or current (either direct or with the use of a CT) for speed control, preventive maintenance, load shedding, etc. For non-sinusoidal inputs, refer to the true RMS model **API 6380 G S**. The full 3-way (input, output, power) isolation makes this module useful for ground loop elimination, common mode signal rejection or noise pickup reduction.

20 input and 16 output ranges can be field-configured via external rotary and slide switches. Popular ranges are listed on the module label. Consult the factory for assistance with special ranges. For current inputs greater than 200 mAAC a current shunt is required. Specify option **5A** for inputs from to 5 AAC and option **20A** for inputs between 5 AAC and 20 AAC. Use of unapproved sockets or current shunts may void the module warranty.

API exclusive features include two ***LoopTracker*** LEDs and a **Functional Test Pushbutton**. The LoopTracker LEDs (Green for input, Red for output) vary in intensity with changes in the process input and output signals. Monitoring the state of these LEDs can provide a quick visual picture of your process loop at all times. The functional test pushbutton provides a fixed output (independent of the input) when held depressed. The test output level can be field-adjusted via a multiturn potentiometer.

Both the LoopTracker LEDs and functional test pushbutton greatly aid in saving time during initial startup and/or troubleshooting. The bunt-in 18 VDC unregulated loop excitation power supply can be used to power passive input devices.

The **API 6380 G** plugs into an industry standard 8-pin octal socket sold separately. Sockets **API 008** and finger-safe **API 008 FS** allow either DIN rail or panel mounting.

Models & Options

API 6380 G	Field rangeable AC to DC isolated transmitter, 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
5A	Up to 5 amp AC input with socket and 25 W shunt
20A	Up to 20 amp AC input with socket and 50 W shunt
HV	High voltage input to 600 VAC
U	Conformal coating for moisture resistance

Accessories—Order as separate line item

API 008	8-pin socket
API 008 FS	8-pin finger-safe socket
API TK36	DIN rail, 35 mm W x 39" L, aluminum
CT	See Current Sensor data sheets for current transformers

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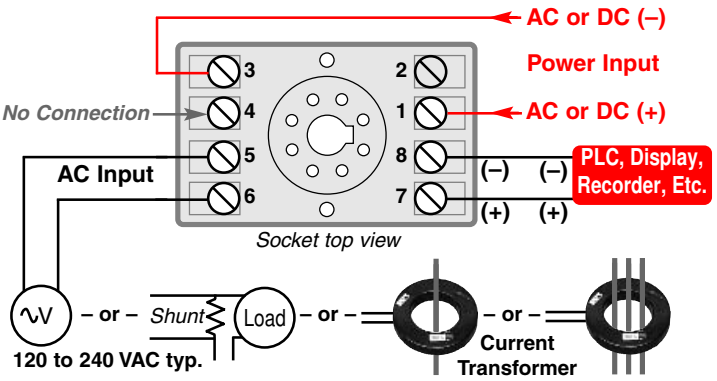
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ELECTRICAL CONNECTIONS

WARNING! All wiring must be performed by qualified personnel only. This module requires an industry-standard 8-pin socket. Order API 008 or finger-safe API 008 FS socket separately. Input voltages must not exceed socket voltage rating.

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 – Connect the AC signal input to terminals 5 and 6. Maximum voltage input is 250 VAC. Maximum current input is 200 mAAC. Higher current inputs require the use of the optional 5 A or 20 A current shunt.



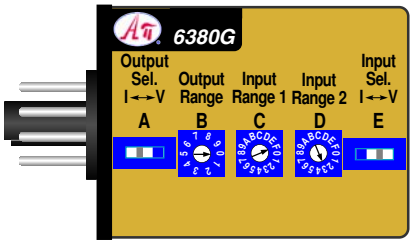
Using a direct voltage or current transformer input
*Order **2RL**, **5RL**, **7RL**, **8RL** series current transformers separately*

18 V Supply – A passive input device can be powered by the 18 Volt DC power supply at terminal 4 (+) and terminal 5 (–) although it is typically not used for an AC input. It is very important to consult the manufacturer of your specific sensor to determine its compatibility and proper wiring.

Signal Output Terminals – Polarity must be observed when connecting the signal output to the load. The positive connection (+) is connected to terminal 7 and the negative (–) is connected to terminal 8. The API 6380 G provides power to the output loop.

RANGE SELECTION

Three rotary switches and two slide switches located on the side of the module are used to select input and output ranges. Most popular ranges are listed on the module labels. See www.api-usa.com or contact factory for special ranges.



1. Set the **OUTPUT SELECT** slide switch to current (**I**) or voltage (**V**) depending on output type.
2. Set the **INPUT SELECT** slide switch to current (**I**) or voltage (**V**) depending on output type. The input selector switch determines the input impedance for the module, typically 50 Ω for current inputs and 1 MΩ or greater for voltage inputs.
3. From the table, find the rotary switch combination that matches your input and output ranges.
4. Set the three rotary switches **B**, **C**, and **D** to the values found in the table.
5. The Zero, Span and Test Range potentiometers can now be adjusted for the desired output range.

Depending on the rotary switch settings, the input is filtered, either amplified or attenuated as required, then passed through an optical isolation circuit to the output stage.

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

CALIBRATION

Input & Output Ranges – Ranges are pre-set at the factory as specified on your order. Top-mounted, Zero and Span potentiometers can be used should fine-tuning be necessary. Custom ranges may require factory modification.

1. Apply power to the module and allow a minimum 20 minute warm up time.
2. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer for the exact minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum. This will produce the corresponding minimum output signal.
4. Set the input at maximum, and adjust the Span pot for the exact maximum output desired. The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal.
5. Repeat adjustments for maximum accuracy.

Test Range Adjust – Turn the multi-turn Test Range potentiometer while holding the Test button depressed until the desired output test level is reached. It can be adjusted to vary the output signal from 0 to 100% of the output range.

OPERATION

The API 6380 G Input selector switch determines the input impedance for the module, typically 10 Ω for current inputs, 1 MΩ minimum for voltage inputs from 0-4 VAC, and 220 kΩ minimum for voltage inputs greater than 4 VAC.

Depending on the rotary switch settings, the input is either amplified or attenuated as required, then filtered and processed by a precision full-wave rectification circuit. The result is passed thru a low pass active filter that provides a DC voltage representing the average value of the input. This DC voltage is passed through an optical isolation circuit to the output stage.

The rotary switch settings and Output selector switch determine the exact DC voltage or current output available.

Test Button – Drives a device on the output side of the loop (a panel meter, chart recorder, etc.) with a known good signal that can be used as a system diagnostic aid during initial start-up or during troubleshooting. When released, the output will return to normal.

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, this may indicate a problem with module power or signal input wiring.

RED *LoopTracker* output LED – Provides a visual indication that the output signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum. For current outputs, the RED LED will only light if the output loop current path is complete. For either current or voltage outputs, failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module power or signal output wiring.

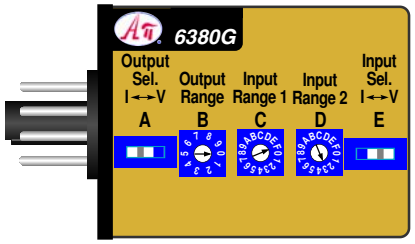
		INPUT RANGES										
		Switch E to "V"								Switch E to "I"		
	Rotary Switches →	0-50 mV	0-100 mV	0-500 mV	0-5 V	0-20 V	0-125 V	0-200 V	0-250 V	0-10 mA	0-100 mA	0-200 mA
		BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD
OUTPUT RANGES Switch A to "V"	0-1 V	0A2	022	002	0E2	0F2	049	052	0D9	022	092	012
	0-2 V	8A2	822	802	8E2	8F2	849	852	8D9	822	892	812
	0-4 V	1A2	122	102	1E2	1F2	149	152	1D9	122	192	112
	1-5 V	6A2	622	602	6E2	6F2	649	652	6D9	622	692	612
	0-5 V	9A2	922	902	9E2	9F2	949	952	9D9	922	992	912
	0-10 V	3A2	322	302	3E2	3F2	349	352	3D9	322	392	312
	±5 V	4A2	422	402	4E2	4F2	449	452	4D9	422	492	412
	±10 V	5A2	522	502	5E2	5F2	549	552	5D9	522	592	512
Switch A to "I"	4-20 mA	7A2	722	702	7E2	7F2	749	752	7D9	722	792	712
	0-20 mA	3A2	322	302	3E2	3F2	349	352	3D9	322	392	312

RANGE SELECTION

Three rotary switches and two slide switches located on the side of the module are used to select input and output ranges. Popular ranges are listed on the module labels. See table below for a complete listing or contact factory for special ranges.

1. Set the **OUTPUT SELECT** slide switch to current (**I**) or voltage (**V**) depending on output type.
2. Set the **INPUT SELECT** slide switch to current (**I**) or voltage (**V**) depending on output type. The input selector switch determines the input impedance for the module, typically 50 Ω for current inputs and 1 MΩ or greater for voltage inputs.
3. From the table, find the rotary switch combination that matches your input and output ranges.
4. Set the three rotary switches **B**, **C**, and **D** to the values found in the table.
5. The Zero, Span and Test Range potentiometers can now be adjusted for the desired output range.

Depending on the rotary switch settings, the input is filtered, either amplified or attenuated as required, then passed through an optical isolation circuit to the output stage.



AC Input

API 6380 G INPUT RANGES

OUTPUT RANGES	Rotary Switches →	Switch E to "V"															Switch E to "I"				
		0-50 mV	0-100 mV	0-200 mV	0-500 mV	0-1 V	0-2 V	0-5 V	0-10 V	0-20 V	0-50 V	0-100 V	0-125 V	0-175 V	0-200 V	0-250 V	0-5 mA	0-10 mA	0-50 mA	0-100 mA	0-200 mA
		BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD
Switch A to "V"	0-1 V	0A2	022	0B2	002	092	012	0E2	062	0F2	042	0D2	049	054	052	0D9	0A2	022	002	092	012
	0-2 V	8A2	822	8B2	802	892	812	8E2	862	8F2	842	8D2	849	854	852	8D9	8A2	822	802	892	812
	0-4 V	1A2	122	1B2	102	192	112	1E2	162	1F2	142	1D2	149	154	152	1D9	1A2	122	102	192	112
	1-5 V	6A2	622	6B2	602	692	612	6E2	662	6F2	642	6D2	649	654	652	6D9	6A2	622	602	692	612
	0-5 V	9A2	922	9B2	902	992	912	9E2	962	9F2	942	9D2	949	954	952	9D9	9A2	922	902	992	912
	0-8 V	2A2	222	2B2	202	292	212	2E2	262	2F2	242	2D2	249	254	252	2D9	2A2	222	202	292	212
	2-10 V	7A2	722	7B2	702	792	712	7E2	762	7F2	742	7D2	749	754	752	7D9	7A2	722	702	792	712
	0-10 V	3A2	322	3B2	302	392	312	3E2	362	3F2	342	3D2	349	354	352	3D9	3A2	322	302	392	312
	±5 V	4A2	422	4B2	402	492	412	4E2	462	4F2	442	4D2	449	454	452	4D9	4A2	422	402	492	412
	±10 V	5A2	522	5B2	502	592	512	5E2	562	5F2	542	5D2	549	554	552	5D9	5A2	522	502	592	512
Switch A to "I"	0-2 mA	0A2	022	0B2	002	092	012	0E2	062	0F2	042	0D2	049	054	052	0D9	0A2	022	002	092	012
	2-10 mA	6A2	622	6B2	602	692	612	6E2	662	6F2	642	6D2	649	654	652	6D9	6A2	622	602	692	612
	0-10 mA	9A2	922	9B2	902	992	912	9E2	962	9F2	942	9D2	949	954	952	9D9	9A2	922	902	992	912
	0-16 mA	2A2	222	2B2	202	292	212	2E2	262	2F2	242	2D2	249	254	252	2D9	2A2	222	202	292	212
	4-20 mA	7A2	722	7B2	702	792	712	7E2	762	7F2	742	7D2	749	754	752	7D9	7A2	722	702	792	712
	0-20 mA	3A2	322	3B2	302	392	312	3E2	362	3F2	342	3D2	349	354	352	3D9	3A2	322	302	392	312



FREE APPLICATION ASSISTANCE
Call Customer Service
800-794-5883

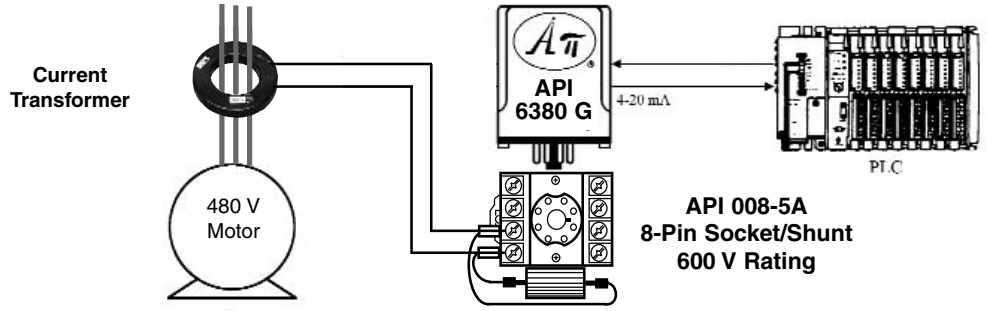
MOD-TRONIC INSTRUMENTS LIMITED
1 Delta Park Blvd #12
Brampton, ON L6T 5G1
905-457-6322 or 800-794-5883
www.mod-tronic.com

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Monitoring a Current Transformer

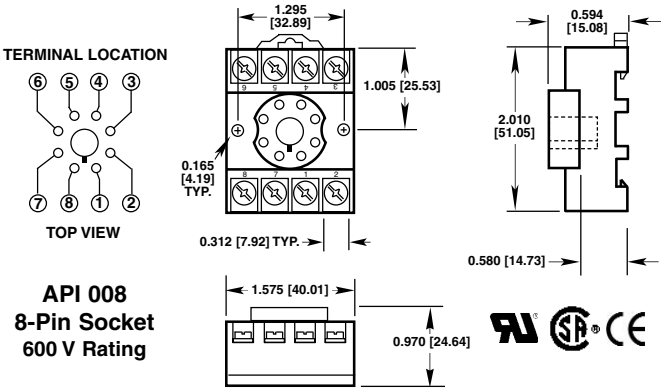
PROBLEM
A current transformer (CT) has an output of 0 to 5 amps depending on the motor current. The readings need to be monitored by a PLC that accepts a 4-20 mA input.

SOLUTION
Use an **API 6380 G 5A** isolated DC to DC transmitter with the optional 5 Amp current shunt to convert the 0-5 A signal to 4-20 mA. The module switches are set so that 0 A = 4 mA and 5 A = 20 mA.

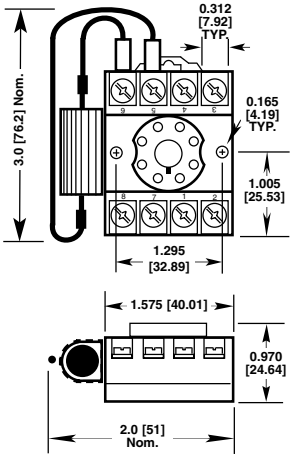


API 008-5A
8-Pin Socket/Shunt
600 V Rating

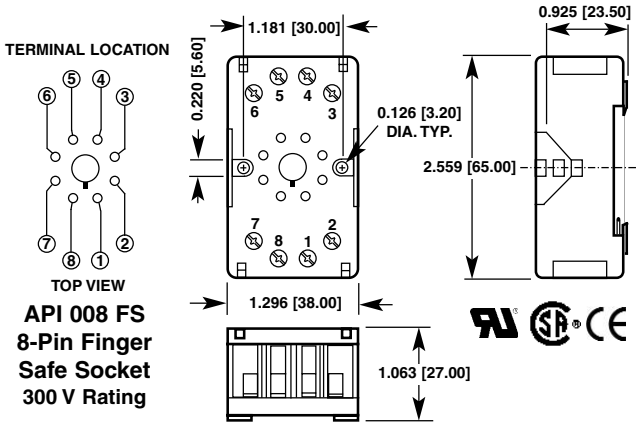
API Sockets and Shunts



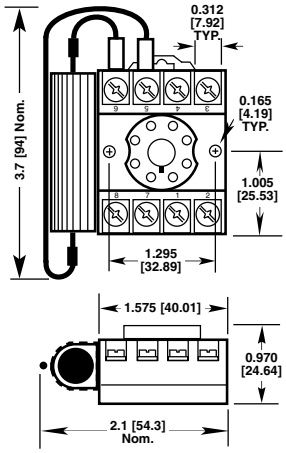
API 008
8-Pin Socket
600 V Rating



API 008-5A
8-Pin Socket/Shunt
600 V Rating



API 008 FS
8-Pin Finger
Safe Socket
300 V Rating



API 008-20A
8-Pin Socket/Shunt
600 V Rating



FREE APPLICATION ASSISTANCE
Call API 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.

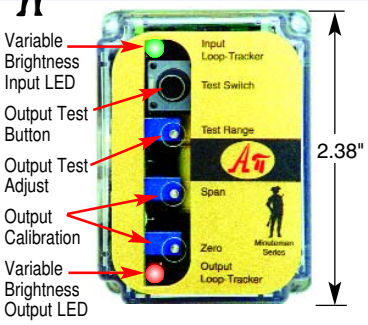
AC to DC Isolator/Transmitter
Field Rangeable, True RMS

API 6380 G S

Input: ***0-50 mVAC to 0-250 VAC, 0-5 mAAC to 200 mAAC***
Output: ***0-1 VDC to ±10 VDC or 0-2 mADC to 0-25 mADC***

Wide Ranging I/O
One Minute Setup!

- ***Accepts Non-Sinusoidal Inputs***
- ***Non-Interactive Zero/Span Controls***
- ***Set-Up via Rotary Switches & Easy-to-Use Tables***
- ***Internal Jumper for Reverse Output***
- ***Full 2000 V Isolation Input/Output/Power***
- ***Input and Output LoopTracker® LEDs***
- ***Functional Test Pushbutton***





Socket Sold Separately

LIFETIME WARRANTY

Free Factory Input & Output Calibration!

Applications

- **Convert AC Signals to DC Process Signals**
- **Min./Max. Ripple Monitoring**

Specifications

Input Ranges

System voltages must not exceed socket voltage rating

	Minimum	Maximum
Voltage:	0 to 50 mVAC	0 to 250 VAC
Current:	0 to 4 mAAC	0 to 200 mAAC

Current inputs greater than 200 mAAC require external shunt resistor option **5A** or **20A**
Consult factory for assistance with ranges

Input Impedance

With 0-4 volt input:	1 MΩ minimum
With > 4 volt input:	220 kΩ minimum
Current input:	10 Ω

Input Frequency

40 Hz to 1000 Hz sinusoidal input

LoopTracker

Variable brightness LEDs indicate input/output loop level and status

Output Ranges

	Minimum	Maximum	Load Factor
Voltage:	0-1 VDC	0-10 VDC	
Bipolar Voltage:	±1 VDC	±10 VDC	
Current (20 V compliance):	0-2 mADC	0-25 mADC	1000 Ω at 20 mA

Consult factory for other ranges

Output Logic

Standard: Normal acting. Internal jumper for output reversal.

Output Linearity

Better than ±0.1% of span

Output Zero and Span

Multiturn potentiometers to compensate for load and lead variations
±15% of span adjustment range typical

Functional Test Button

Sets output to test level when pressed. Potentiometer factory set to approximately 50% of span, adjustable 0-100% of span

Response Time (0-90%)

200 milliseconds typical

Isolation

2000 V_{RMS} minimum
Full isolation: power to input, power to output, input to output

Ambient Temperature Range and Temperature Stability

–10°C to +60°C operating ambient
Better than ±0.02% of span per °C 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 6380 G S** accepts non-sinusoidal AC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input. Accuracy is maintained via true RMS measurement techniques over a wide frequency range for maximum flexibility.

The **API 6380 G S** is commonly used to monitor line voltage or current (either direct or with the use of a CT) for speed control, preventive maintenance, load shedding, etc. The full 3-way (input, output, power) isolation makes this module useful for ground loop elimination, common mode signal rejection or noise pick-up reduction.

20 input and 16 output ranges can be field-configured via external rotary and slide switches. Popular ranges are listed on the module label. Consult the factory for assistance with special ranges. For current inputs greater than 200 mAAC a current shunt is required. Specify option **5A** for inputs from to 5 AAC and option **20A** for inputs between 5 AAC and 20 AAC. Use of unapproved sockets or current shunts may void the module warranty.

API exclusive features include two ***LoopTracker*** LEDs and a **Functional Test Pushbutton**. The LoopTracker LEDs (Green for input, Red for output) vary in intensity with changes in the process input and output signals. Monitoring the state of these LEDs can provide a quick visual picture of your process loop at all times.

The functional test pushbutton provides a fixed output (independent of the input) when held depressed. The test output level can be field-adjusted via a multiturn potentiometer. Both the LoopTracker LEDs and functional test pushbutton greatly aid in saving time during initial startup and/or troubleshooting.

The **API 6380 G S** plugs into an industry standard 8-pin octal socket sold separately. Sockets **API 008** and finger-safe **API 008 FS** allow either DIN rail or panel mounting.

Models & Options

API 6380 G S	Field rangeable true RMS AC to DC isolated transmitter, 115 VAC

Options—Add to end of model number

A230	Powered by 230 VAC, 50/60 Hz
D	Powered by 9-30 VDC
5A	Up to 5 amp AC input with socket and 25 W shunt
20A	Up to 20 amp AC input with socket and 50 W shunt
HV	High voltage input to 600 VAC
U	Conformal coating for moisture resistance

Accessories—Order as separate line item

API 008	8-pin socket
API 008 FS	8-pin finger-safe socket
API TK36	DIN rail, 35 mm W x 39" L, aluminum
CT	See Current Sensor data sheets for current transformers

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

AC Input

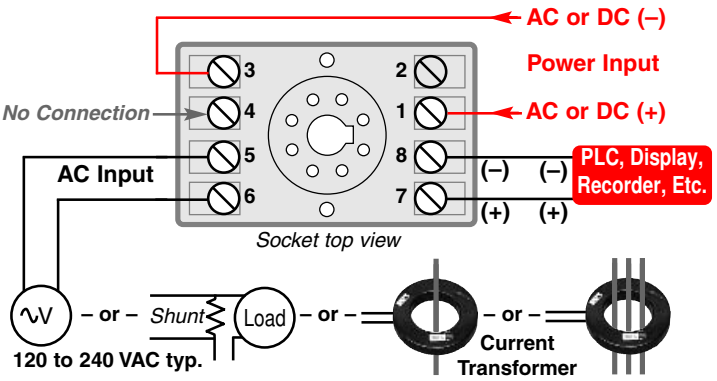
AC Input

ELECTRICAL CONNECTIONS

WARNING! All wiring must be performed by qualified personnel only. This module requires an industry-standard 8-pin socket. Order API 008 or finger-safe API 008 FS socket separately. Input voltages must not exceed socket voltage rating.

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 – Connect the AC signal input to terminals 5 and 6. Maximum voltage input is 250 VAC. Maximum current input is 200 mAAC. Higher current inputs require the use of the optional 5 A or 20 A current shunt.



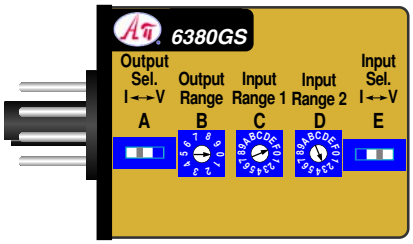
Using a direct voltage or current transformer input
*Order **2RL**, **5RL**, **7RL**, **8RL** series current transformers separately*

18 V Supply – A passive input device can be powered by the 18 Volt DC power supply at terminal 4 (+) and terminal 5 (–) although it is typically not used for an AC input. It is very important to consult the manufacturer of your specific sensor to determine its compatibility and proper wiring.

Signal Output Terminals – Polarity must be observed when connecting the signal output to the load. The positive connection (+) is connected to terminal 7 and the negative (–) is connected to terminal 8. The API 6380 G S provides power to the output loop.

RANGE SELECTION

Three rotary switches and two slide switches located on the side of the module are used to select input and output ranges. Most popular ranges are listed on the module labels. See www.api-usa.com or contact factory for special ranges.



1. Set the **OUTPUT SELECT** slide switch to current (**I**) or voltage (**V**) depending on output type.
2. Set the **INPUT SELECT** slide switch to current (**I**) or voltage (**V**) depending on output type. The input selector switch determines the input impedance for the module, typically 50 Ω for current inputs and 1 MΩ or greater for voltage inputs.
3. From the table, find the rotary switch combination that matches your input and output ranges.
4. Set the three rotary switches **B**, **C**, and **D** to the values found in the table.
5. The Zero, Span and Test Range potentiometers can now be adjusted for the desired output range.

Depending on the rotary switch settings, the input is filtered, either amplified or attenuated as required, then passed through an optical isolation circuit to the output stage.

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

CALIBRATION

Input & Output Ranges – Ranges are pre-set at the factory as specified on your order. Top-mounted, Zero and Span potentiometers can be used should fine-tuning be necessary. Custom ranges may require factory modification.

1. Apply power to the module and allow a minimum 20 minute warm up time.
2. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer for the exact minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum. This will produce the corresponding minimum output signal.
4. Set the input at maximum, and adjust the Span pot for the exact maximum output desired. The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal.
5. Repeat adjustments for maximum accuracy.

Test Range Adjust – Turn the multi-turn Test Range potentiometer while holding the Test button depressed until the desired output test level is reached. It can be adjusted to vary the output signal from 0 to 100% of the output range.

OPERATION

The API 6380 G S Input selector switch determines the input impedance for the module, typically 10 Ω for current inputs, 1 MΩ minimum for voltage inputs from 0-4 VAC, and 220 kΩ minimum for voltage inputs greater than 4 VAC.

Depending on the rotary switch settings, the input is either amplified or attenuated as required, then filtered and processed by a precision full-wave rectification circuit. The result is passed thru a low pass active filter that provides a DC voltage representing the average value of the input. This DC voltage is passed through an optical isolation circuit to the output stage.

The rotary switch settings and Output selector switch determine the exact DC voltage or current output available.

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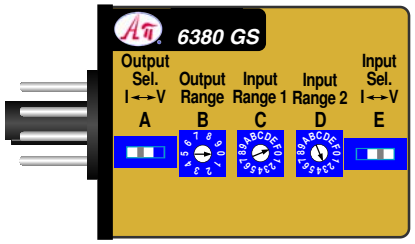
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		Switch E to "V"								Switch E to "I"		
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		BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD
OUTPUT RANGES Switch A to "V"	0-1 V	0A2	022	002	0E2	0F2	049	052	0D9	022	092	012
	0-2 V	8A2	822	802	8E2	8F2	849	852	8D9	822	892	812
	0-4 V	1A2	122	102	1E2	1F2	149	152	1D9	122	192	112
	1-5 V	6A2	622	602	6E2	6F2	649	652	6D9	622	692	612
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	0-10 V	3A2	322	302	3E2	3F2	349	352	3D9	322	392	312
	±5 V	4A2	422	402	4E2	4F2	449	452	4D9	422	492	412
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AC Input

OUTPUT RANGES		API 6380 G S INPUT RANGES																				
			Switch E to "V"															Switch E to "I"				
	Rotary Switches →		0-50 mV	0-100 mV	0-200 mV	0-500 mV	0-1 V	0-2 V	0-5 V	0-10 V	0-20 V	0-50 V	0-100 V	0-125 V	0-175 V	0-200 V	0-250 V	0-5 mA	0-10 mA	0-50 mA	0-100 mA	0-200 mA
			BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD
OUTPUT RANGES	Switch A to "V"	0-1 V	0A2	022	0B2	002	092	012	0E2	062	0F2	042	0D2	049	054	052	0D9	0A2	022	002	092	012
		0-2 V	8A2	822	8B2	802	892	812	8E2	862	8F2	842	8D2	849	854	852	8D9	8A2	822	802	892	812
		0-4 V	1A2	122	1B2	102	192	112	1E2	162	1F2	142	1D2	149	154	152	1D9	1A2	122	102	192	112
		1-5 V	6A2	622	6B2	602	692	612	6E2	662	6F2	642	6D2	649	654	652	6D9	6A2	622	602	692	612
		0-5 V	9A2	922	9B2	902	992	912	9E2	962	9F2	942	9D2	949	954	952	9D9	9A2	922	902	992	912
		0-8 V	2A2	222	2B2	202	292	212	2E2	262	2F2	242	2D2	249	254	252	2D9	2A2	222	202	292	212
		2-10 V	7A2	722	7B2	702	792	712	7E2	762	7F2	742	7D2	749	754	752	7D9	7A2	722	702	792	712
		0-10 V	3A2	322	3B2	302	392	312	3E2	362	3F2	342	3D2	349	354	352	3D9	3A2	322	302	392	312
		±5 V	4A2	422	4B2	402	492	412	4E2	462	4F2	442	4D2	449	454	452	4D9	4A2	422	402	492	412
		±10 V	5A2	522	5B2	502	592	512	5E2	562	5F2	542	5D2	549	554	552	5D9	5A2	522	502	592	512
	Switch A to "I"	0-2 mA	0A2	022	0B2	002	092	012	0E2	062	0F2	042	0D2	049	054	052	0D9	0A2	022	002	092	012
		2-10 mA	6A2	622	6B2	602	692	612	6E2	662	6F2	642	6D2	649	654	652	6D9	6A2	622	602	692	612
		0-10 mA	9A2	922	9B2	902	992	912	9E2	962	9F2	942	9D2	949	954	952	9D9	9A2	922	902	992	912
		0-16 mA	2A2	222	2B2	202	292	212	2E2	262	2F2	242	2D2	249	254	252	2D9	2A2	222	202	292	212
		4-20 mA	7A2	722	7B2	702	792	712	7E2	762	7F2	742	7D2	749	754	752	7D9	7A2	722	702	792	712
		0-20 mA	3A2	322	3B2	302	392	312	3E2	362	3F2	342	3D2	349	354	352	3D9	3A2	322	302	392	312



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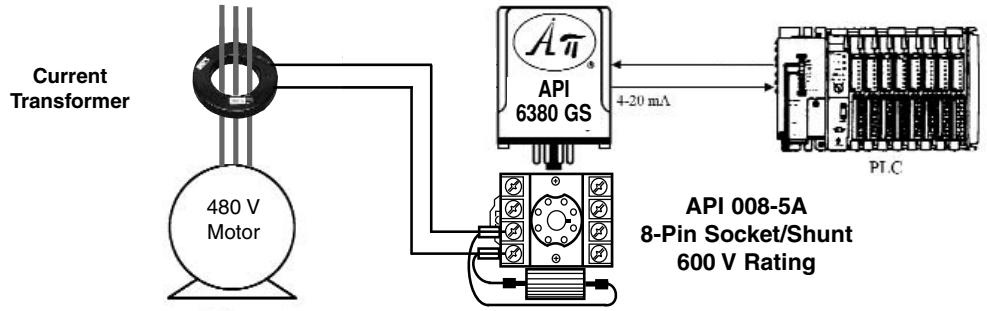
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Monitoring a Current Transformer

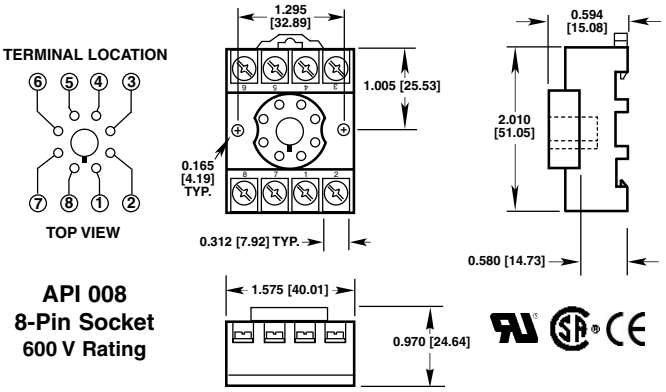
PROBLEM
A current transformer (CT) has an output of 0 to 5 amps depending on the motor current. The 480 V waveforms may be distorted. The readings need to be monitored by a PLC that accepts a 4-20 mA input.

SOLUTION
Use an **API 6380 G S 5A** true RMS isolated DC to DC transmitter with the optional 5 Amp current shunt to convert the 0-5 A signal to 4-20 mA. The module switches are set so that 0 A = 4 mA and 5 A = 20 mA.

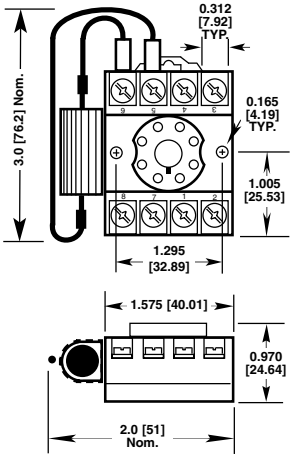


API 008-5A
8-Pin Socket/Shunt
600 V Rating

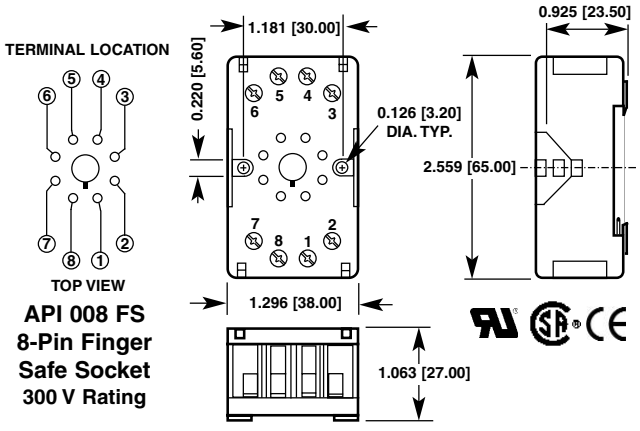
API Sockets and Shunts



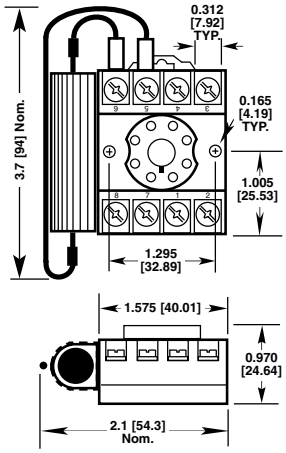
API 008
8-Pin Socket
600 V Rating



API 008-5A
8-Pin Socket/Shunt
600 V Rating



API 008 FS
8-Pin Finger Safe Socket
300 V Rating



API 008-20A
8-Pin Socket/Shunt
600 V Rating



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