Input: One 350 Ω Sensor, 1 mV to 2000 mV, 4-10 VDC Excitation
Output: 0-1 V to ±10 V or 0-1 mA to 4-20 mA, Isolated

- Factory Set for Your Specified Range
- Full 3-Way Input/Output/Power Isolation
- Interface Excitation Power Supply
- DC Voltage or Current Output
- Simple Plug-In Design for Faster Installation
- Input and Output LoopTracker® LEDs
- Input Test or Calibration Resistor Options

**Applications**
- Load Cell Weighing Systems and Scales
- Strain Gauge Pressure Sensors and Transducers
- Tanks, Scales, Extruder Melt Pressure, Crane Loads

### Strain Gauge Input Range
- Factory configured, please specify sensor mV/V and mV range
- Minimum sensor range: 1 mV
- Maximum sensor range: 2000 mV
- Millivolt output range is determined by the sensitivity of the sensor (mV/V) and the excitation voltage applied.
- mV/V sensitivity X excitation voltage = total mV range

**Input Impedance**
- 1 MΩ minimum

**Common Mode Rejection**
- 100 dB minimum

**Calibration Resistor Options**
- M01 option: Toggle switch with calibration resistor inside module. Specify resistor value.
- M02 option: Toggle switch for external (load cell) calibration resistor.

**Excitation Voltage**
- Factory configured, please specify excitation voltage
- Maximum output: 10 VDC maximum at 30 mA
- Internal adjustment: 4 to 10 VDC
- Stability: ±0.01% per °C
- Designed for one 350 Ω (or greater) sensor

**LoopTracker**
- Variable brightness LEDs for input/output loop level and status

**DC Output Range**
- Factory configured, please specify output range
- Voltage (10 mA max.): 0-1 VDC to 0-10 VDC
- Bipolar voltage (+10 mA max.): ±1 VDC to ±10 VDC
- Current: 0-1 mA to 0-20 mA
- Compliance, drive at 20 mA: 20 V, 1000 Ω drive

**Output Calibration**
- Multi-turn zero and span potentiometers
- ±15% of span adjustment range typical

**Output Test**
- Sets output to test level when pressed
- Adjustable 0-100% of span
- Not available with M01 or M02 options

**Output Ripple and Noise**
- Less than 10 mVrms

**Linearity**
- Better than ±0.1% of span

**Ambient Temperature Range and Stability**
- –10°C to +60°C operating ambient
- Better than ±0.02% of span per °C stability

**Response Time**
- 70 milliseconds (142 Hz) typical
- Contact factory for other response times
- Option DF: 10 milliseconds (100 Hz) response time typical

**Isolation**
- 1200 Vrms min.
- Full isolation: power to input, power to output, input to output

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

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**Strain Gauge/Bridge/Load Cell/Pressure Transducer to DC Transmitters, Factory Ranged**

**Model** | **Input** | **Output** | **Power**
---|---|---|---
API 4051 GI | Factory ranged specify | Factory ranged specify | 115 VAC
API 4051 GI A230 | mV/V and excitation voltage | voltage or milliamp range | 230 VAC
API 4051 GI P | | | 85-265 VAC or 60-300 VDC
API 4051 GI D | | | 9-30 VDC

**Options**
- **M01**
  - Switch with built-in calibration resistor.
  - Specify resistor value.
- **M02**
  - Switch for external calibration resistor
- DF
  - 10 millisecond response time, or consult factory.
  - DF option will cause output noise levels greater than standard specifications.
- **U**
  - Conformal coating for moisture resistance

**Accessories**
- **API 011**
  - 11-pin socket, DIN rail or surface mount
- **API 011 FS**
  - 11-pin finger-safe socket, DIN rail or surface mount
- **API CLP1**
  - Module hold-down spring for high vibration or mobile applications

**API 011 FS allow either DIN rail or panel mounting.**
Precautions
WARNING! All wiring must be performed by a qualified electrician or instrumentation engineer. See diagram for terminal designations and wiring examples. Consult factory for assistance.
WARNING! Avoid shock hazards! Turn signal input, output, and power off before connecting or disconnecting wiring, or removing or installing module.

Précautions
ATTENTION! Tout le câblage doit être effectué par un électricien ou ingénieur en instrumentation qualifié. Voir le diagramme pour désignations des bornes et des exemples de câblage. Consulter l’usine pour assistance.
ATTENTION! Éviter les risques de choc! Fermez le signal d’entrée, le signal de sortie et l’alimentation électrique avant de connecter ou de déconnecter le câblage, ou de retirer ou d’installer le module.

API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. See api-usa.com for latest product information. Consult factory for your specific requirements.

WARNING: This product can expose you to chemicals including lead and nickel, which are known to the State of California to cause cancer or birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Calibration, Models with Option M01 or M02
The M01 option uses a switch and a calibration resistor inside the API module. Ensure that the correct resistance value was specified. The M02 option uses a switch for the transducer’s internal calibration resistor. The transducer’s calibration resistor wires are connected to terminals 5 and 6 on the API 4051 G socket. The sensor manufacturer should provide the percentage of full-scale transducer output when using the calibration resistor.

1. Power the module and allow a minimum 20 minute warm up time.
2. Using an accurate voltmeter across terminals 7 and 8, adjust the excitation voltage fine adjust potentiometer to the required voltage.
3. Provide an input to the module equal to zero or the minimum input required for the application.
4. Using an accurate measurement device for the module output, adjust the Zero potentiometer for the exact minimum output signal desired. The Zero control should only be adjusted when the input signal is at its minimum. The zero pot may also be adjusted for a zero reading on the output display instrumentation, e.g. control system or process indicator. Adjusting the zero pot this way eliminates calibration errors in the display instrumentation.
5. Set the Test toggle switch to the Test position. The calibration resistor is switched into the circuit to unbalance the bridge.
6. Adjust the span pot for an 80% FS output or 80% reading on the process indicator, or per the manufacturer’s percentage of FS output.
7. Return the Test switch to the opposite position and readjust the zero pot if necessary. The calibration procedure should be repeated to achieve the desired accuracy over the selected range.

Output Test Function
Note that models with the M01 or M02 option do not have a TEST function. With this option the Test switch operates the calibration resistor and the Test Cal. potentiometer is non-functional.

The output test potentiometer is factory set to provide approximately 50% output. When the test button is depressed it will drive the output with a known good signal that can be used as a diagnostic aid during initial start-up or troubleshooting. When released, the output will return to normal.

The Test Cal. potentiometer can be used to set the test output to the desired level. It is adjustable from 0 to 100% of the output span. Press and hold the Test button and adjust the Test Cal. potentiometer for the desired output level.

Operation
Strain gauges and load cells are normally passive devices that are commonly referred to as bridges due to their four-resistor Wheatstone bridge configuration. These sensors require a precise excitation source to produce an output that is directly proportional to the load or pressure that is applied to the sensor.

The exact output of the sensor (measured in millivolts) is determined by the sensitivity of the sensor (mV/V) and the excitation voltage applied. The API 4051 G provides the excitation voltage to the sensors and receives the resulting millivolt signal in return. This input signal is filtered and amplified, then offset, if required, and passed to the output stage. Depending on the output configuration ordered, a DC voltage or current output is generated.

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 level 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.

Diagnostic Voltage Measurements
Using a meter with at least 10 megohm input impedance, measure the voltage coming from the strain gauge at the locations shown. Sensitivity is measured in mV/V.

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