

ISOLATED DC to DC Transmitter with Square Root Extraction **API 4440 G**

Specifications

DC Input Ranges

DC Voltage: 50mV to 200V
DC Current: 1mA to 50mA

Input Impedance

Voltage: 50K ohm min.
Current: 50 ohm nominal

Output Capability

(Voltage) +/- 10VDC, +/- 10mA max.
(Current) 20mADC, 20V compliance

Response Time

70mSec typical
Faster responses available by special order

Accuracy

Better than 0.25% of span

Temperature Stability

Better than .03% of Span per degree C

Zero/Span Control Range

+/- 15% typical

Functional Test Pushbutton

Adjustable from 0 to 100% of Span

Output Ripple and Noise

Less than 0.2% of span

Ambient Temperature Range (Operating)

-10 to +60 degree C

Isolation

2000VAC RMS min.

Common Mode Voltage/Rejection

Greater than 100dB at 500VAC 60Hz

External Power

+18VDC @ 25mA, unregulated, for external
loop-powered devices

Power

Standard: 115VAC +/-10%, 50/60Hz, 2.5W max.
Optional: 230VAC +/-10%, 50/60Hz, 2.5W max.
* 12VAC +/-10%, 50/60Hz, 2.5W max.
* 24VAC +/-10%, 50/60Hz, 2.5W max.
* 12VDC +/-5%, 125mA max.
* 24VDC +/-5%, 65mA max.

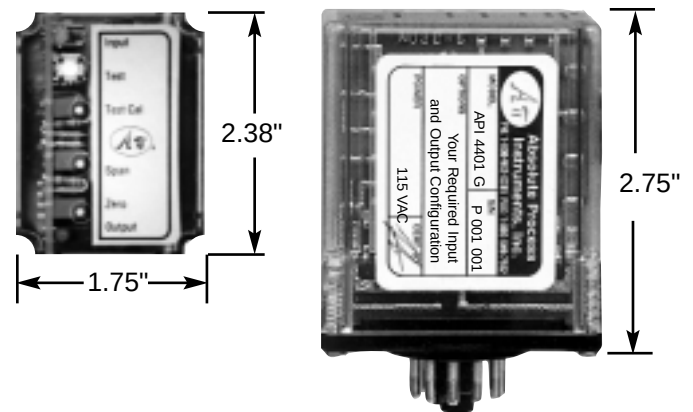
FUNCTIONAL DESCRIPTION

The Api 4440 G Plug-In accepts a DC voltage or current input and provides a DC voltage or current output proportional to the square root of the input. Common applications include linearization of flow sensing elements such as differential pressure cells, pitot tubes, target flowmeters, etc. The Api 4440 G can be factory-configured and calibrated for most popular input and output ranges. Api Exclusive Features include Input/Output LoopTracker LED's and the Functional Test Pushbutton, which provides

FEATURES

- Converts a ΔP Signal to Linear Flow
- Full Input/Output/Power Isolation
- Voltage or Current Inputs/Outputs
- Input/Output LoopTracker™ LED's
- Functional Test Pushbutton
- LIFETIME WARRANTY

CASE DIMENSIONS



a fixed output (independent of the input) when held depressed. Zero, Span, and Test Output levels can be set by top-accessible multiturn potentiometers. Other features include an 8-pin standard plug-in base; 3-piece modular construction, and various module power options in addition to 115VAC; PLUS Api's Lifetime Warranty.

OPERATION

The Api 4440 filters and converts the DC input into a standard internal range. A precision integrated circuit extracts the square root of this signal. This square-rooted signal is passed thru a linear optocoupler circuit which uses no pulse width modulators, transformers or capacitors to produce unwanted coupling or noise into the output. This square-rooted, isolated signal is then trimmed by the user's zero and span controls for fine adjustment before being passed to the output stage, which is internally configured for voltage or current output, and the gain is scaled to the specific range required.

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In the square root calculation, the Api 4440 G function is based on "percentage math"; that is, the output in percent of span is the square root of the percent of the input span. For example, a module using 4-20mA Input/Output, the output Algorithm is:

$$[\sqrt{\text{Input\%} \times \text{Output Range Span}}] + \text{Output Range Base} = \text{Module Output Value}$$

Input Value	% Input Span	$[\sqrt{\% \text{ Input Span}} \times \text{Output Span}]$	+ Output Base	= Output Value
4mA	.00	.000	16mA	4.0mA
8mA	.25	.500	16mA	12.0mA
12mA	.50	.707	16mA	15.3mA
16mA	.75	.866	16mA	17.8mA
20mA	1.00	1.000	16mA	20.0mA

When pressed, the Functional Test pushbutton substitutes an internally-generated reference signal in place of the input. The Test Cal control can be adjusted to any output level from 0 to 100 % of span, to facilitate troubleshooting or testing.

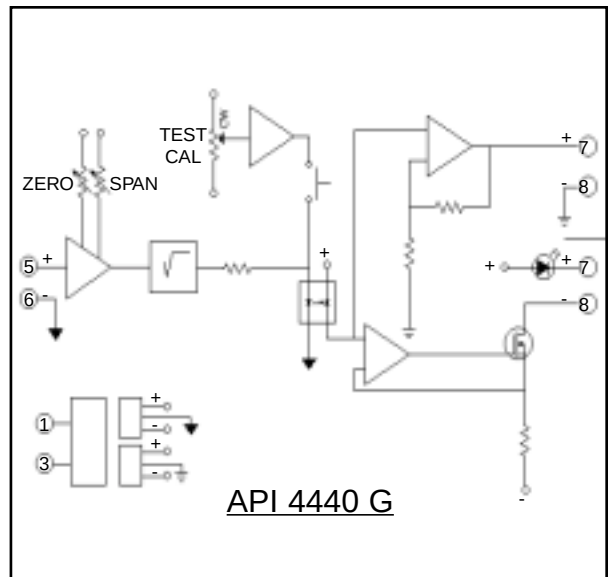
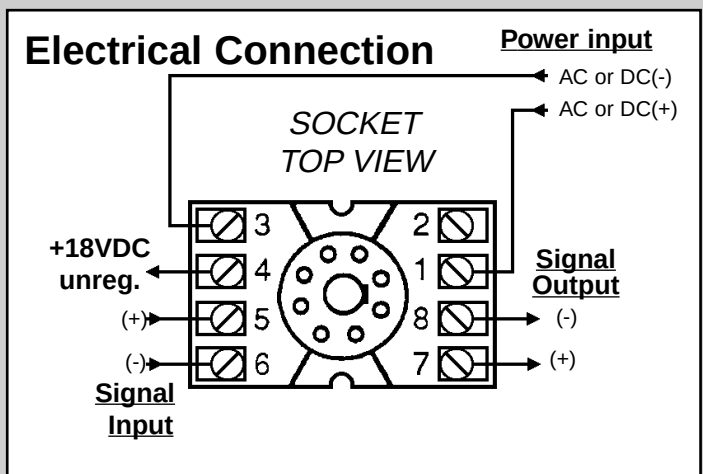


Chart of Common Ranges				
Any One of These Inputs		Can Be Converted To	Any One of These Outputs	
Voltage			Voltage	
0 to 100mV	0 to 50V		0 to 1V	
0 to 200mV	0 to 100V		0 to 5V	
0 to 500mV	+/- 100mV		1 to 5V	
0 to 1V	+/- 200mV		0 to 10V	
0 to 2V	+/- 500mV		+/- 5v	
0 to 5V	+/- 1V		+/- 10V	
1 to 5V	+/- 2V			
0 to 10V	+/- 5V			
0 to 20V	+/- 10V			
Current		Current		
0 to 1mA	0 to 100mA	0 to 20mA		
0 to 10mA	0 to 200mA	4 to 20mA		
0 to 20mA	0 to 500mA			
4 to 20mA	0 to 1A			
10 to 50mA				

The API 4440 G can convert many other Range Combinations. Consult factory for your specific Range needs.



low end of the input range and adjust the module's "zero" control for the specified 0% (low end) output. In some applications, it may be better to adjust the "zero" control at a slightly elevated input level (5 to 10% of input span, for the corresponding square-root value at the output) rather than zero, to avoid calibrating on the very large input slope near zero. Then, set the input simulator to the high end of the input range and adjust the module "span" control for the specified "high" (100%) output level. The zero and span controls normally have little interaction. Finally, the Test Cal control may be set to provide the desired output when the Test Pushbutton is held depressed.

API maintains a constant effort to upgrade and improve its products; therefore, specifications are subject to change without notice.

CALIBRATION

The Api 4440 G is shipped from the factory calibrated to your input/output specifications. Recalibration of the Api 4440 G will require an accurate simulation source of DC voltage or current for the range of interest, plus an accurate DC digital voltmeter, for best results. To calibrate, connect a DC calibrator to the module input, and an accurate DC voltmeter (or milliammeter, as required) to the module output. Because of the steep slope of the square root function near zero, calibration at the low end is important to accuracy. Set the input simulator to the

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