



Isolated Loop Current Sensor

P/N IS-10 .386" aperture

Features:

- ⌚ Linear Sensing Bipolar DC and AC current
- ⌚ Durable water resistant enclosure
- ⌚ Potentiometer adjustable gain and offset
- ⌚ +/- 130 Amps
- ⌚ Isolated (sensing wire passes thru opening)
- ⌚ Bandwidth 20khz response time 15usec
- ⌚ Single supply +5volt operation (4.5v to 5.5v operating range)
- ⌚ Low power consumption ~8mA

Applications:

- ⌚ Measuring high currents without loss
- ⌚ Over Current protection
- ⌚ Motor current control

Specifications

Parameter	IS-10	
Operating Voltage	4.5V to 5.5v	Calibrated at 5.000v
Power Supply Current	8 mA typical	
Measurement Range	+/- 130 Amps Max	
Over Current Response Time	~20us	
Bandwidth	20khz	
DC Offset (with no applied field current)	5mv typical	Adjustable with internal potentiometer
Sensitivity	10mv/Amp to 45 mv/Amp	Adjustable with internal potentiometer
Output Center Voltage	½ Supply	Adjustable
Inductance	~50nh	
Gain Temperature Drift -10C to 70C	low	
Offset Temperature Drift -10C to 70C	low	
Hysteresis Offset (After 100Amp Pulse)	.5 amps	100Amp pulse
Linearity	~2%	
Output Swing	.3v to 4.7v with 5 volt power supply	
Chopping Noise	Depends on Sensitivity	Will increase with gain
Maximum Load	1k ohms	Buffered output
Aperture	.386"	9.80mm
Height	.416"	10.6mm
Length	1.65"	41.9mm
Width	1.05"	26.7 mm
Wire	Stranded 22-24 AWG	

Input/Output Pins:

Pin	Name	Function
1(top)	Vc	DC power supply input voltage (5v) (red)
2	Gnd	Unit ground input (black)
4	Out	Analog output (~2.5v nominal) (white)

Description

The devicecraft adjustable current sensor useful for many current sensing applications. The device consists of a special core, current sensor, power line filter, variable gain, offset potentiometer, enclosure, and output buffer.

The device is set to have a center voltage of one half the supply voltage, the potentiometer allows for adjustment of the offset and gain. Depending on the direction of current the output voltage will rise or fall with increasing current. To reverse the polarity pass the wire through the in opposite direction.

The device has a wide gain adjustment range. Adjusting the current will require a known current or a current regulated power supply. The offset is adjusted by during off or removing the measurement wire and adjusting the offset potentiometer.

The device can also be made more sensitive by passing the sense wire though the loop multiple times. The output voltage will be linear multiple with the number of turns.

Sensing AC and DC Current

The current sensor is capable of sensing both AC and DC currents. When sensing AC currents the output voltage will also be AC floating on $\frac{1}{2}$ the power supply rail. The RMS AC current can be calculated by sampling the signal and converting to a DC value proportional to the AC RMS reading. The sensed AC voltage may also be AC coupled with a series capacitor/resistor to ground and connected to a RMS to DC converter or peak detector. The output of the unit can be directly measured with a ADC. Measuring the rms AC voltage with a ADC may require taking many samples, subtracting the offset, squaring and adding up the squares, performing a final squareroot then dividing by the number of samples. The final number may then need to be scaled.

When sensing AC current the output may be phase shifted or non sinusoidal. Inductive loads, such as motors, and power supplies using peak rectification will produce a phase shifted or distorted sine wave. The sensed current waveform along with the AC voltage can be used to accurately calculated the power factor.

Some digital multimeters have math and offset functions which will allow direct measurement display on the meter. A rotary switch or relays can be used to select between multiple units. An accurate 5v power supply is still required.

Power Supply

The power supply for powering the unit must be stable. The offset is rated for $\frac{1}{2}$ the power supply voltage. Any noise or ripple on the power supply will be reflected in the output.

The unit is calibrate with an accurate 5.000v power supply. If a 5.200 volt power supply is used the offset voltage will be 2.600v rather than 2.500 volts.

Mounting

The can be left floating, epoxied or screwed to a fixture. Mounting tabs allow mounting in two directions. The power and signal wires should not be allowed to be placed under stress.

