
Differential Isolation Amplifier, DC - 20 KHz



Features

- +/- 10 Volt Input and Output Range
- High CMV Isolation: 1500 V rms
- Complete Input and Output Isolation
- Low Nonlinearity: +/- 0.01% max
- Bandwidth: 20 KHz Full-Power (-3 dB)
- Gain Drift: +/- 25 ppm/°C
- High Diff. Input Impedance: 5 GΩ || 12 pf
- Standard BNC Connectors
- Isolated Output Voltage
- All Metal Enclosure

Applications

- Multichannel Data Acquisition
- High Voltage Instrumentation Amplifier
- Current Shunt Measurements
- Process Signal Isolation
- Stress/Strain Measurements
- Environmental Testing
- Automotive Instrumentation

Electrical/Mechanical Specifications...
Performance Characteristics...

General Description

The ISO-20-1V/V is a two-port, wide bandwidth isolation amplifier, providing high accuracy and complete galvanic isolation between input and output. It is specified over the industrial input and output voltage range of +/-10 volts.

The two-port design allows the ISO-20-1V/V to be applied as an input or output isolator in single or multichannel applications. The galvanic isolation feature eliminates ground loops and leakage paths between sensors and instrumentation. It also provides protection from faults and other conditions typical in industrial applications that may damage sensitive instruments and degrade system performance.

The ISO-20-1V/V requires an external +15 VDC regulated power supply or our **PC-15-BP15**, 15 Volt Bi-Polar Power Converter, available separately.

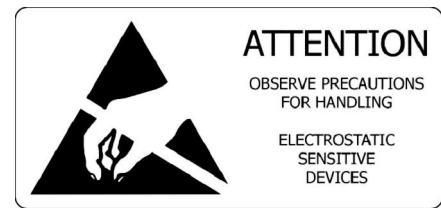
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ELECTRICAL SPECIFICATIONS

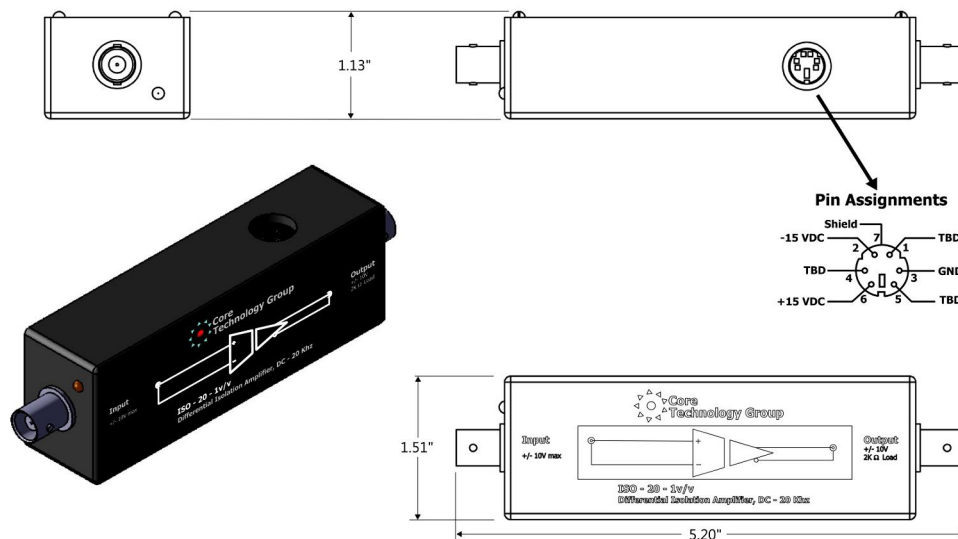
Parameter	Value	Unit
Power supply.....	+15, +/- 5%	VDC
Quiescent Current.....	60	mA
Full load.....	90	mA
Gain.....	1	V/V
Input Range.....	+/- 10	VDC
Frequency Response.....	DC-20 (-3dB)	kHz
Input Impedance.....	> 100	M Ohm
CM Input Capacitance.....	5	pF
Output Voltage Range.....	+/- 10, 2K ohm	VDC
Ripple BW @ 50 kHz.....	< 5	mV pp

MECHANICAL SPECIFICATIONS

Weight..... 5 oz.
 Connectors:
 Power..... PS2/mini
 In/Out..... Isolated BNC
 Enclosure..... Cast Aluminum



ISO-20-1V/V, PRODUCT DRAWING



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TYPICAL PERFORMANCE CHARACTERISTICS

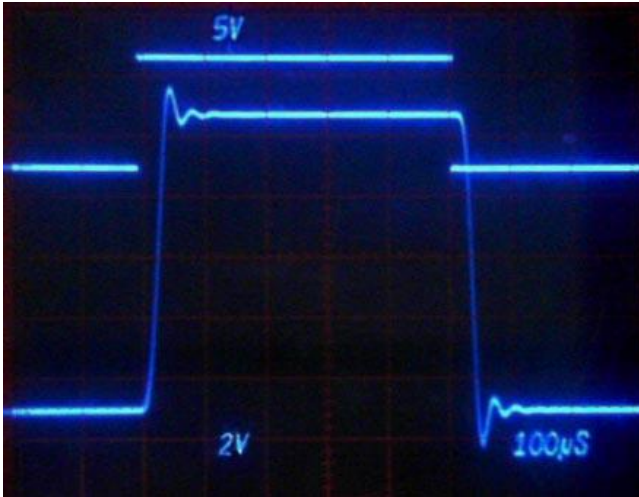


Figure 1. Pulse response and settling time for a +10 volt, 1kHz reference signal.

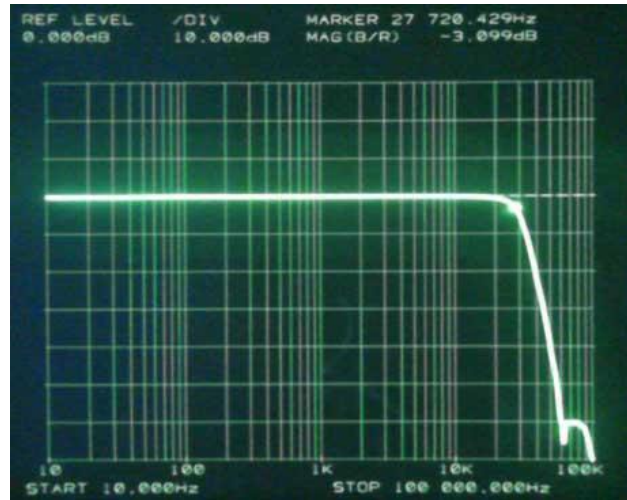


Figure 3. Frequency response from 10Hz to 100kHz. +4dBm (1Vpp) input signal.

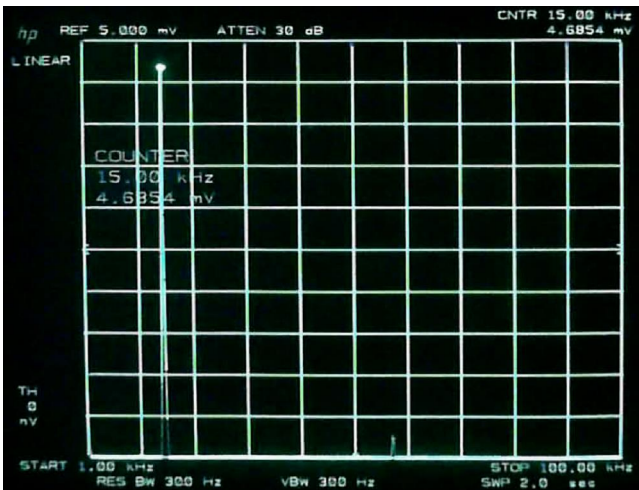


Figure 2. Spectral response to a 4.6 mV, 15 kHz sine wave in comparison to <1mv of ripple noise at about 57kHz.



Figure 4. Frequency response from 10kHz to 100kHz showing gain flatness to 20kHz. +4dBm (1Vpp) input signal.

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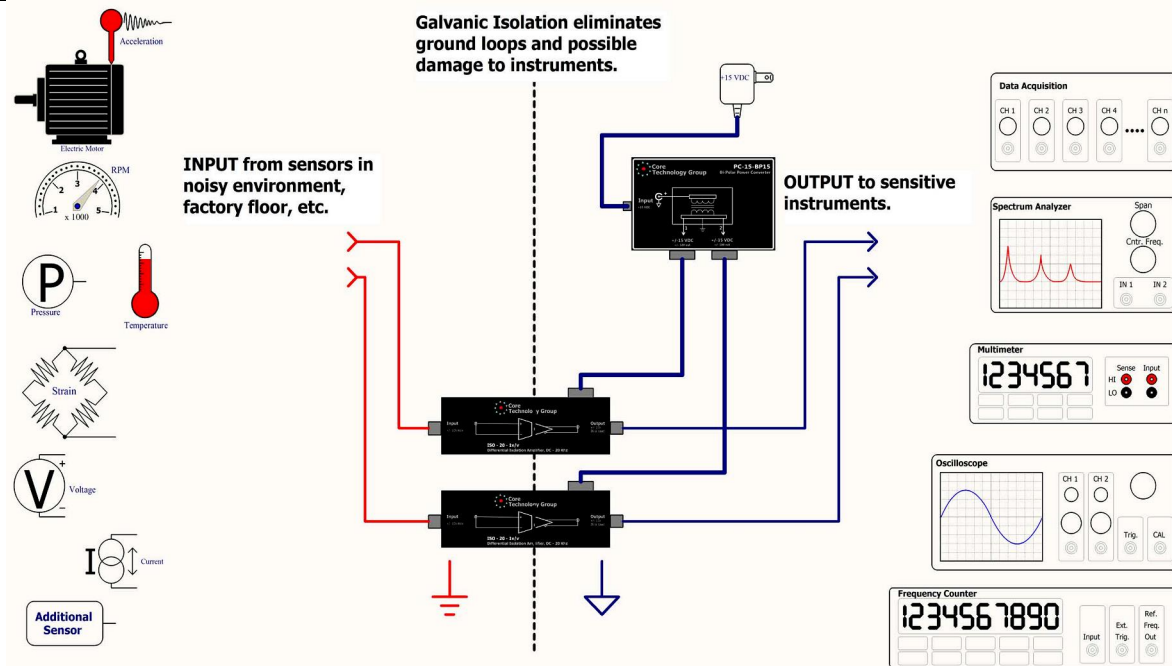


Figure 5. Typical amplifier setup showing various sensor options, isolation barrier and connection to instrumentation.

Basic operation

The ISO-20 isolation amplifier functions as a unity gain (1v/v) mod/demod. An input power stage converts the +15V supply voltage to isolated +/-15V for each of the input and output amplifiers via a 50Khz carrier frequency. The isolated input stage/modulator superimposes the signal onto the carrier. The carrier, along with the signal, is transformer coupled to the demodulator on the output side. From there, the signal is reconstructed, filtered and sent to the output amplifier. The amplifier filters and buffers the output signal, providing +/- 10 volts into a 2Kohm load, with a bandwidth of DC to 20Khz.

Transformer coupling between all stages provides complete input/output isolation, eliminates ground loops, minimizes noise and protects sensitive instrumentation.

Input

The ISO-20 offers unity gain and is very simple to use. The isolated BNC connectors allow standard connections to sensors and instruments, and the power connector is a standard PS2 connector that can be extended and/or modified per application. The PC-15-BP15 Bipolar Power Converter will power two amplifiers and is recommended to get the most from your ISO-20 applications.

The ISO-20 presents a very high input impedance (>>100Megohms) and can handle input signal levels up to +/- 10 volts. Additionally, the input leads or the output leads may be interchanged for signal inversion if desired.

Figure 5 illustrates some applications, ease of use, and flexibility possible with the ISO-20 in the lab or factory floor.

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Applications

The differential input nature of the ISO-20, make it an ideal amplifier to monitor signals virtually anywhere in a system, and complete isolation protects sensitive monitoring instruments. Additionally, the connections to the input of the amplifier can be reversed to invert the polarity of the signal if desired.

load the sensor system, maintaining the integrity of the measurement.

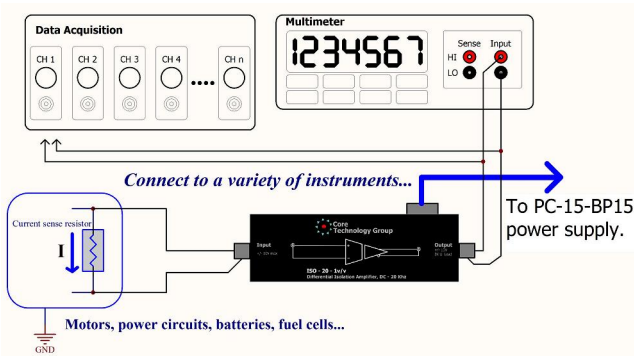


Figure 6. ISO-20 connected as a current sense amplifier.

Figure 6 shows the ISO-20 connected for measuring current. Some current sensing applications include, motors, AC/DC current monitoring, power consumption, fuel cells/batteries and power supply input/output current monitoring.

Figure 7 illustrates the ISO-20 connected to a bridge circuit. Differential inputs to the ISO-20 allow connection and monitoring of load cells, stress and strain gauges. In many cases, the voltage change across these types of sensors are in the millivolt range and the high input impedance of the ISO-20 insures that the amplifier does not

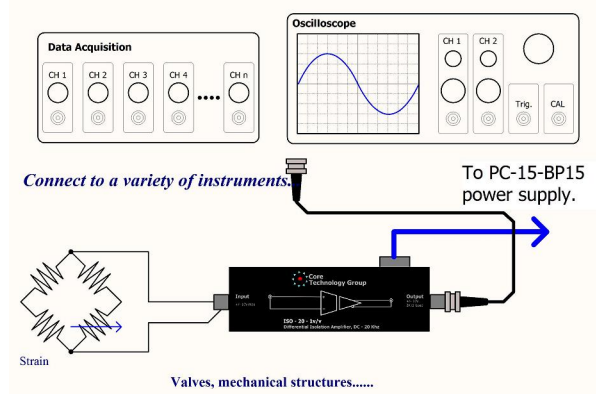


Figure 7. ISO-20 connected to a resistive bridge.

Figure 8 illustrates some possible types of environmental sensors that can be used with the ISO-20. Because environmental testing involves subjecting systems to harsh conditions, the isolation feature of the ISO-20 helps to reduce the effects of noise and ground loops between the sensor devices and the instrumentation.

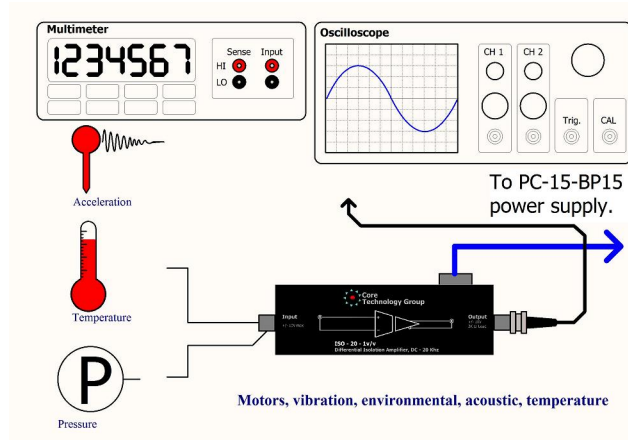


Figure 8. ISO-20 shown with various environmental sensors.

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Figure 9 shows a circuit that can be used to remove any DC offset or, to re-adjust the output of the ISO-20 to a reference level for an analog-to-digital converter. For zero reference circuits, the ISO-20 output is bipolar. Additionally, the output of the ISO-20 can be inverted by simply changing the positive and negative output connections.

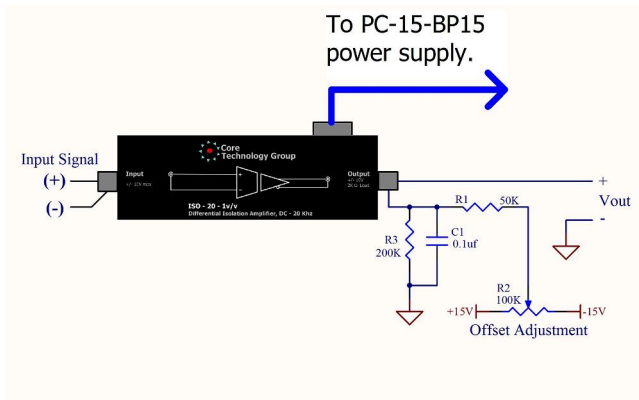


Figure 9. ISO-20 configured with a DC. offset adjustment at the output.