

DI-5B38 Strain Gage Input Modules, Narrow and Wide Bandwidth

FEATURES

- Interfaces to 100Ω through 10kΩ, Full-, Half-, or Quarter-Bridge Strain Gages
- High Level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1-1989 Transient Protection
- Input Protected to 240VAC Continuous
- Fully Isolated Excitation Supply
- 160dB (narrow) or 100dB (wide) CMR
- 4Hz (narrow) or 10kHz (wide) Signal Bandwidth
- ±0.08% Accuracy
- ±0.02% Linearity
- ±1μV/°C Drift
- CSA Certified
- Mix and Match DI-5B Types

DESCRIPTION

Each DI-5B38 Strain Gage input module provides a single channel of Strain Gage input which is filtered, isolated, amplified, and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers. The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

The DI-5B38 can interface to full- or half-bridge transducers with a nominal resistance of 100Ω to 10kΩ. A matched pair of bridge-completion resistors (to ±1mV at +10V excitation) allows use of low cost half- or quarter-bridge transducers. On wide bandwidth modules, the 10kHz bandwidth allows measurement of high speed processes such as vibration analysis.

Strain Gage excitation is provided from the module by a very stable 10V or 3.333V source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. Full scale sensitivities of 2mV/V, 3mV/V or 10mV/V are offered. With 10V excitation, this results in a ±20mV, ±30mV or ±100mV full scale input range.

On wide bandwidth modules, the input signal is processed through a preamplifier on the field side of the isolation barrier. This preamplifier has a gain-bandwidth product of 5MHz and is bandwidth limited to 10kHz. On all modules, after initial field side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

Special input circuits on the DI-5B38 module provide protection of the signal inputs and the isolated excitation supply up to 240VAC.

SPECIFICATIONS

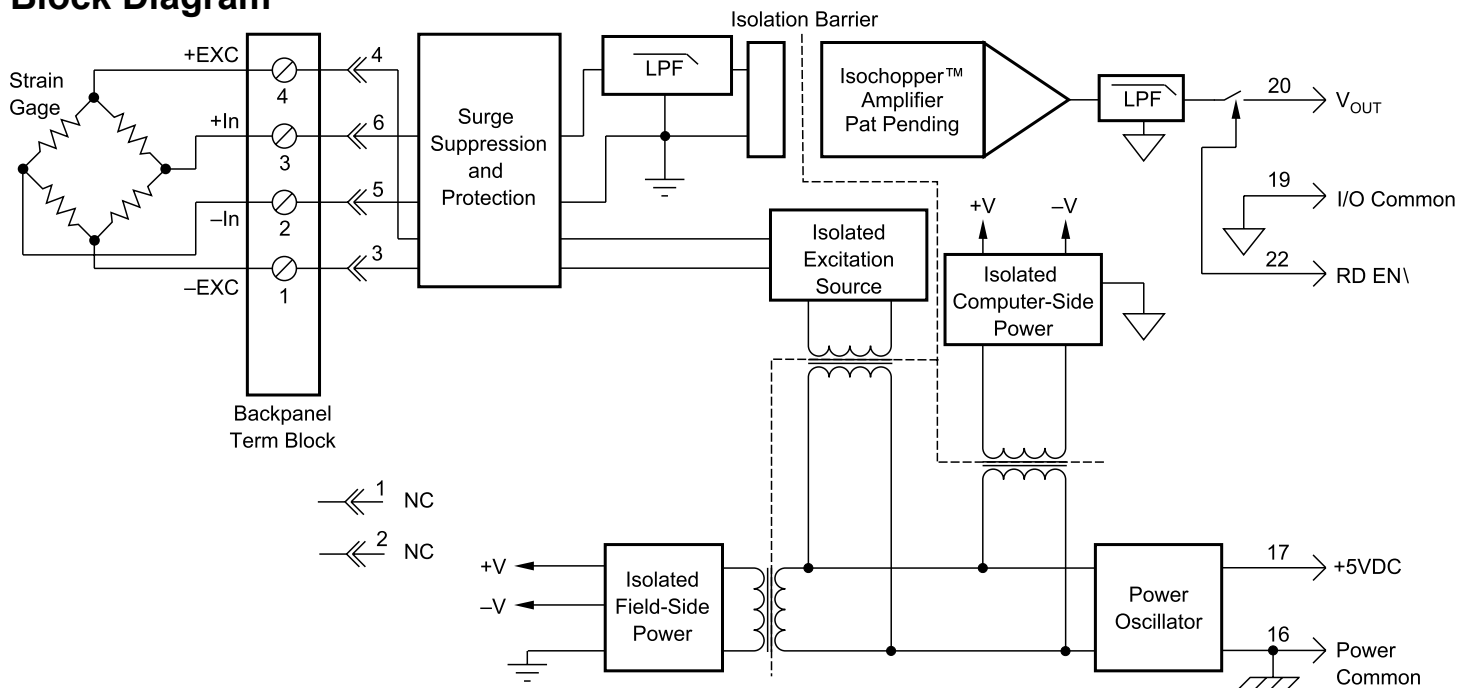
Typical at T_A = +25°C and +5V Power

	Narrow (4Hz) Bandwidth	Wide (10kHz) Bandwidth
Input Range	±10mV to ±30mV	
Input Bias Current	±0.5nA	
Input Resistance: Normal Power Off Overload	50MΩ 40kΩ 40kΩ	
Signal Input Protection Continuous Transient	240Vrms max ANSI/IEEE C37.90.1-1989	
Excitation Output	+10V ±3mV (-32, -34, -35, -37, -02, -04, -05, -07) +3.333V ±2mV (-31, -33, -36, -01, -03, -06)	
Excitation Load Regulation	±5ppm/mA	
Excitation Stability	±15ppm/°C	
Half Bridge Voltage Level	+5V ±1mV (-34 and -04) +1.667V ±1mV (-33 and -03)	
Isolated Excitation Protection Continuous Transient	240Vrms max ANSI/IEEE C37.90.1-1989	
CMV, Input to Output Continuous Transient	1500Vrms max ANSI/IEEE C37.90.1-1989	
CMR (50 or 60Hz)	160dB	100dB
NMR (-3dB at 10kHz)	95dB at 60Hz, 90dB at 50Hz	120dB per decade above 10kHz
Accuracy*	±0.08% Span ±10μV RTI	
Nonlinearity	±0.02% Span	
Stability: Input Offset Output Offset Gain	±1μV/°C ±20μV/°C ±25ppm of Reading/°C	±1μV/°C ±40μV/°C ±25ppm of Reading/°C
Noise: Input 0.1 to 10Hz Output, 100kHz	0.2μVrms (Half Bridge: 1μVrms) 200μVrms	0.4μVrms (Half Bridge: 2μVrms) 10mVp-p
Bandwidth, -3dB	4Hz	10kHz
Response Time, 90% Span	0.2s	
Rise Time, 10 to 90% span		35μs
Settling Time, to 0.1%		250μs
Output Range	±5V	
Output Resistance	50Ω	
Output Protection	Continuous Short to Ground	
Output Selection Time (to ±1mV of V _{Out})	6μs at C _{load} = 0 to 2000pF	
Output Current Limit	±14mA max	±20mA max
Output Enable Control Max Logic "0" Min Logic "1" Max Logic "1" Input Current, "0,1"	+0.8V +2.4V +36V 0.5μA	
Power Supply Voltage	+5VDC ±5%	
Power Supply Current	170mA Full, 70mA No Load	
Power Supply Sensitivity	±2μV/% RTI*	
Mechanical Dimensions	2.28" × 2.26" × 0.60" (58mm × 57mm × 15mm)	
Operating Temp. Storage Temp. Relative Humidity RFI Susceptibility	-40°C to +85°C -40°C to +85°C 0 to 95% Noncondensing ±0.5% Span Error at 400MHz, 5W, 3ft	

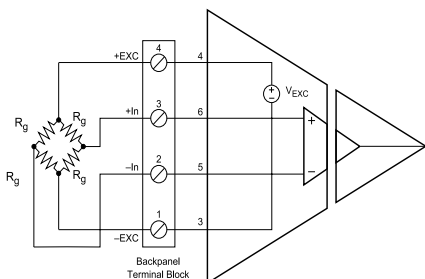
*Includes nonlinearity, hysteresis and repeatability; RTI=Referenced to input.

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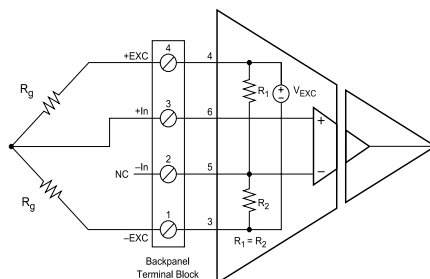
Block Diagram



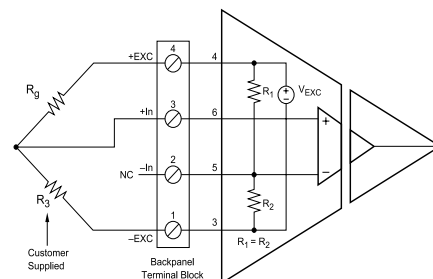
Full Bridge Connection



Half Bridge Connection



Quarter Bridge Connection



Ordering Information

Model Number	Input Bridge Type	Input Range	Excitation	Output Range
DI-5B38-31 and DI-5B38-01	Full Bridge	100Ω to 10kΩ	3.333V @ 3mV/V Sensitivity	±5V
DI-5B38-32 and DI-5B38-02	Full Bridge	300Ω to 10kΩ	10.0V @ 3mV/V Sensitivity	±5V
DI-5B38-33 and DI-5B38-03	Half Bridge	100Ω to 10kΩ	3.333V @ 3mV/V Sensitivity	±5V
DI-5B38-34 and DI-5B38-04	Half Bridge	300Ω to 10kΩ	10.0V @ 3mV/V Sensitivity	±5V
DI-5B38-35 and DI-5B38-05	Full Bridge	300Ω to 10kΩ	10.0V @ 2mV/V Sensitivity	±5V
DI-5B38-36 and DI-5B38-06	Full Bridge	100Ω to 10kΩ	3.333V @ 10mV/V Sensitivity	±5V
DI-5B38-37 and DI-5B38-07	Full Bridge	300Ω to 10kΩ	10.0V @ 10mV/V Sensitivity	±5V

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