

SCIM5B38

Strain Gage Input Modules, Narrow Bandwidth

Description

SCIM5B38 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 (Figure 1). This signal output is logic switch controlled, which allows these modules to share a common analog bus. No external multiplexers are required.

The SCIM5B modules are designed with a completely isolated output side circuit which can be floated to more than $\pm 50V$ from Power Common, pin 16. No connection is required between I/O Common and Power Common for proper operation of the output switch. The output switch can be turned on continuously by simply shorting pins 22,19.

The SCIM5B38 can interface to full-bridge or half-bridge transducers with a nominal resistance of 100Ω to $10K\Omega$. A matched pair of bridge-completion resistors (to $\pm 1mV$ at $+10V$ excitation) allows use of low cost half-bridge or quarter-bridge transducers (Figures 2, 3, 4).

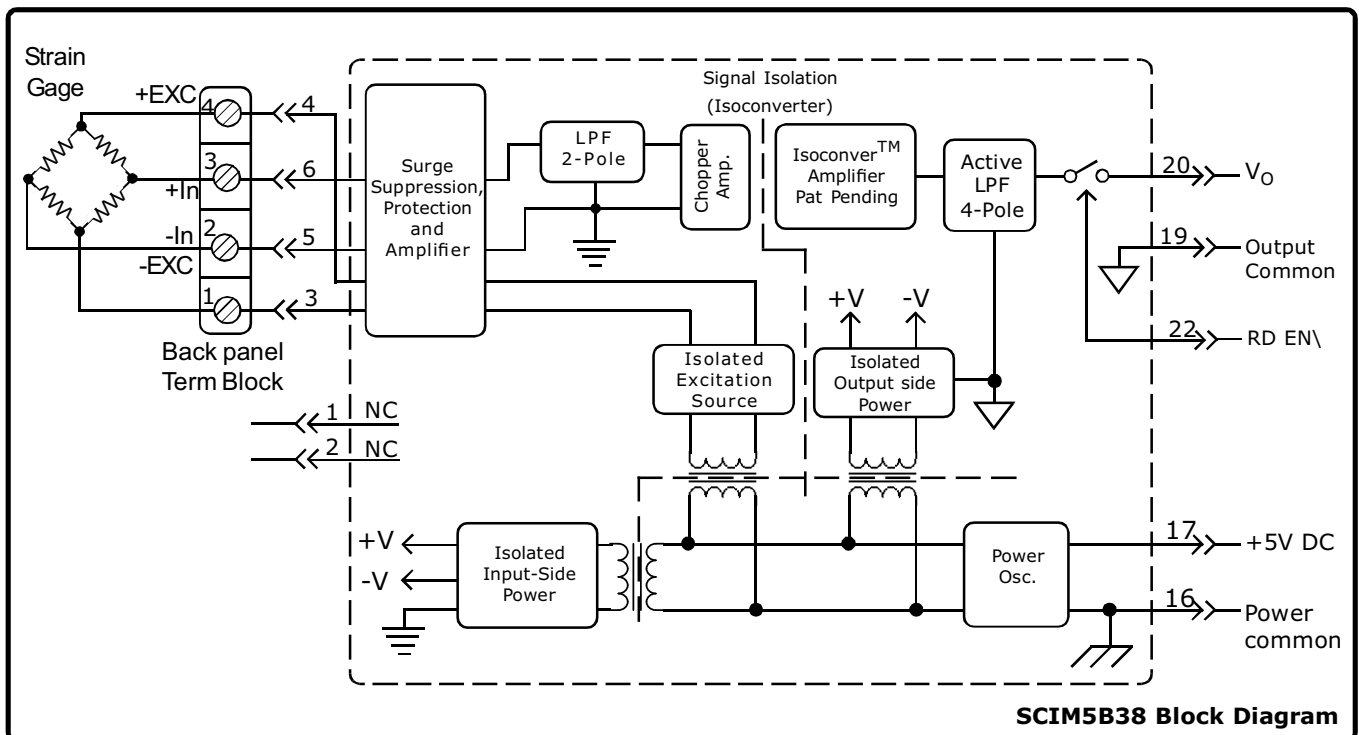
Strain Gage excitation is provided from the module by a very stable $10V$ or $3.333V$ source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature offers significant flexibility in real world applications. Full scale sensitivities of $2mV/V$, $3mV/V$ or $10mV/V$ are offered as standard. With $10V$ excitation, this results in $\pm 20mV$ or $\pm 100mV$ full scale input range producing $\pm 5V$ full scale output.

After the initial field-side filtering, the input signal is chopped by a proprietary converter circuit. Isolation is provided by transformer coupling which eliminates common mode spikes or surges. The module is powered from $+5V$ DC, $\pm 5\%$ converter

A Special input protection circuitry on the SCIM5B38 module protects the input circuit and excitation supply against accidental high-line voltage up to $250V$ AC

Features

- 100Ω Thru $10K\Omega$, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gages Input
- Standard Output of either 0 to $10V/+10V$, 0 to $5V$, 1 to $5V$.
- $1.5KV$ Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- $250V$ AC Continuous Protected on Input
- $160dB$ CMR
- Fully isolated excitation supply
- $4Hz$ Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.01\%$ Linearity
- $\pm 1\mu V/^\circ C$ Drift
- CSA , CE and ATEX Compliant
- Mixes and Matches with all SCIM5B Types on Backpanel



SCIM5B38 Block Diagram

Specifications Typical at $T_A=+25^{\circ}\text{C}$ and +5V Power supply

Module	Full Bridge SCIM5B38-31,-32, -35,-36,-37	Half Bridge SCIM5B38 -33,-34
Input		
Range	$\pm 10\text{mV}$ to $\pm 100\text{mV}$	*
Bias Current	$\pm 0.5\text{nA}$	*
Resistance		*
Normal	50M Ω	*
Power off	40K Ω	*
Overload	40K Ω	*
Protection		
Continuous	240V rms max.	*
Transient	ANSI/IEEE C37.90.1	*
Excitation Output (-32,-34,-35,-37)	+10V $\pm 3\text{mV}$	*
Load Resistance	300 Ω to 10K Ω	*
Excitation Output (-31,-33,-36)	+3.333V, $\pm 2\text{mV}$	*
Load Resistance	100 Ω to 10K Ω	*
Excitation Load regulation	$\pm 5\text{ppm}/\text{mA}$	*
Excitation Stability	$\pm 15\text{ppm}/^{\circ}\text{C}$	*
Half Bridge Voltage Level (-34)	N A	+5V $\pm 1\text{mV}$
Half Bridge Voltage Level (-33)	N A	+1.667V $\pm 1\text{mV}$
Isolated Excitation Protection		
Continuous	240V rms max.	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50 or 60Hz)	160dB	*
NMR	95dB at 60Hz, 90dB at 50Hz	*
Accuracy ⁽²⁾	$\pm 0.03\%$ Span	*
Nonlinearity	$\pm 0.01\%$ Span	*
Stability		
Input Offset	$\pm 1\mu\text{V}/^{\circ}\text{C}$	*
Output Offset	$\pm 20\mu\text{V}/^{\circ}\text{C}$	*
Gain	$\pm 25\text{ppm}$ of Reading $^{\circ}\text{C}$	*
Noise		
Input, 0.1 to 10Hz	0.2 μV rms	1 μV rms
Output, 100KHz	200 μV rms	*
Bandwidth - 3dB	4Hz	*
Response Time, 90% Span	200mS	*
Output		
Range	See Ordering Information	*
Resistance	50 Ω	*
Protection	Continuous Short to Ground	*
Selection Time (to $\pm 1\text{mV}$ of V_{OUT})	6 μs at $C_{\text{load}} = 0$ to 2000pF	*
Current Limit	$\pm 8\text{mA}$	*
Output Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+3.6V	*
Input Current "0,1"	0.5 μA	*
Power supply voltage	+5V DC $\pm 5\%$	*
Power supply Current	170mA Full Exc. Load 70mA No Exc. Load	*
Power supply Sensitivity	$\pm 2\mu\text{V}/\%$ RTI ⁽³⁾	*
Mechanical Dimensions (H) (W) (D)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	-40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$	*
ATEX Group II, Cat, 3	-20 $^{\circ}\text{C}$ to +40 $^{\circ}\text{C}$	*
Storage Temp. Range	-40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A $\pm 0.5\%$ Span Error Performance B	*
ESD,EFT,Surge,Voltage Dips		*

Notes:
 * Same as 38 -31, -32, -35, -36, -37 modules.
 (1). Strain element.
 (2). Includes nonlinearity, hysteresis and repeatability.
 (3). Referenced to input.

Ordering Information

Model	Input Bridge Type	Input Range	Excitation	Sens.	Output Range ^y
SCIM5B38-31	Full	-10mV to +10mV	+3.333V	3mV/V	1,2,3,4,8
SCIM5B38-32	Full	-30mV to +30mV	+10.0V	3mV/V	1,2,3,4,8
SCIM5B38-33	half	-10mV to +10mV	+3.333V	3mV/V	1,2,3,4,8
SCIM5B38-34	half	-30mV to +30mV	+10.0V	3mV/V	1,2,3,4,8
SCIM5B38-35	Full	-20mV to +20mV	+10.0V	2mV/V	1,2,3,4,8
SCIM5B38-36	Full	-33.3mV to +33.3mV	+3.333V	10mV/V	1,2,3,4,8
SCIM5B38-37	Full	-100mV to +100mV	+10.0V	10mV/V	1,2,3,4,8

Output Ranges Available

Output Range	Part No. Suffix	Example
1. -5V to +5V	Z	SCIM5B38-31Z
2. -10V to +10V	X	SCIM5B38-31X
3. 0V to +5V	NONE	SCIM5B38-31
4. 0V to +10V	D	SCIM5B38-31D
8. 1V to +5V	Y	SCIM5B38-31Y

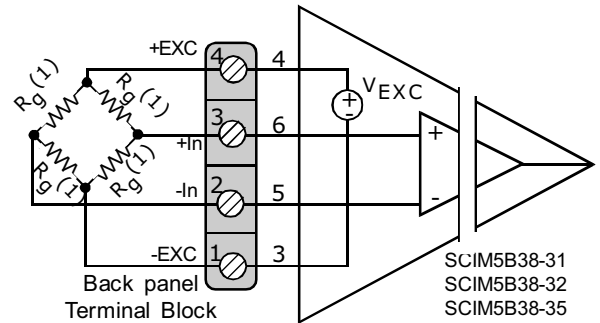


Figure 2: Full Bridge Connection

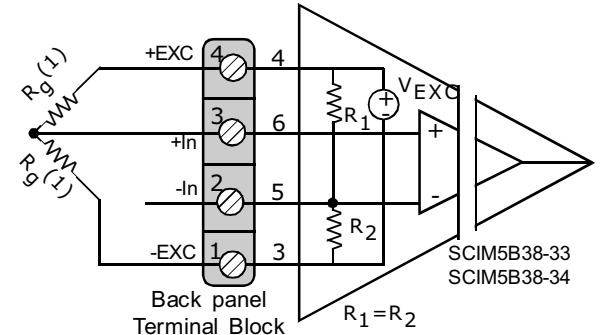


Figure 3: Half Bridge Connection

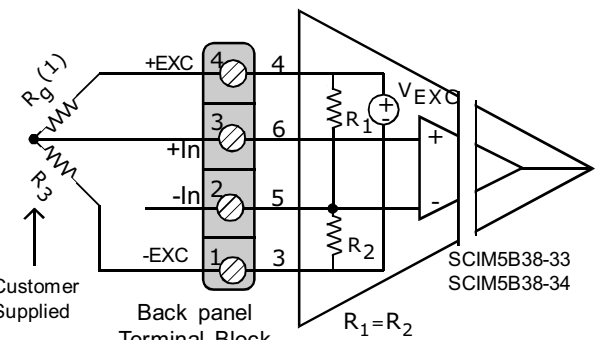


Figure 4: Quarter Bridge Connection