

SCM5B38

Strain Gage Input Modules, Narrow Bandwidth



Description

Each SCM5B38 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 voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to $\pm 50V$ 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 SCM5B38 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 $\pm 20mV$, $\pm 30mV$ or $\pm 100mV$ full scale input range producing $\pm 5V$ full scale output.

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 $+5VDC$, $\pm 5\%$.

Features

- Interfaces to 100Ω Thru $10k\Omega$, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gages
- High-Level Voltage Output
- $1500V_{rms}$ Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to $240VAC$ Continuous
- Fully Isolated Excitation Supply
- $160dB$ CMR
- $95dB$ NMR at $60Hz$, $90dB$ at $50Hz$
- $4Hz$ Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.01\%$ Linearity
- $\pm 1\mu V/^\circ C$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

Special input circuits on the SCM5B38 module provide protection of the signal inputs and the isolated excitation supply up to $240VAC$.

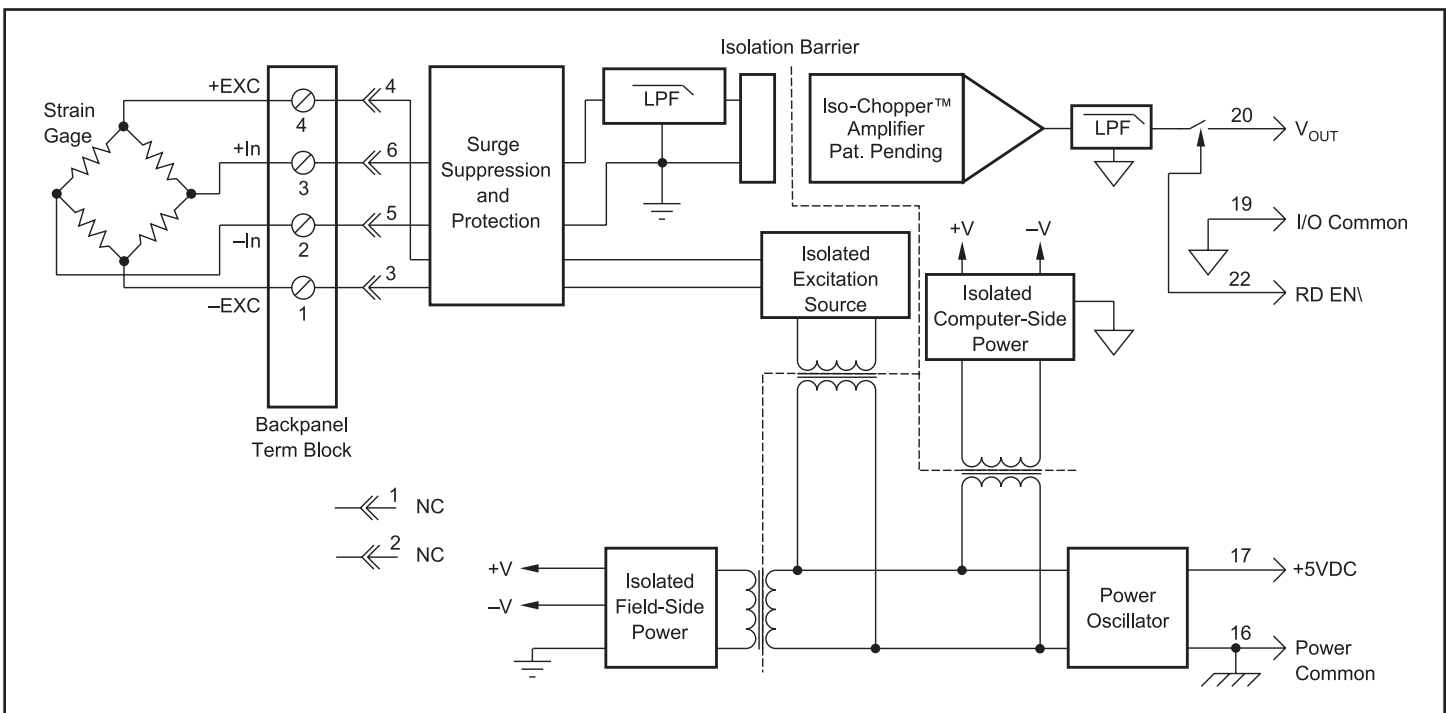


Figure 1: SCM5B38 Block Diagram

Specifications Typical* at T_A = +25°C and +5VDC power

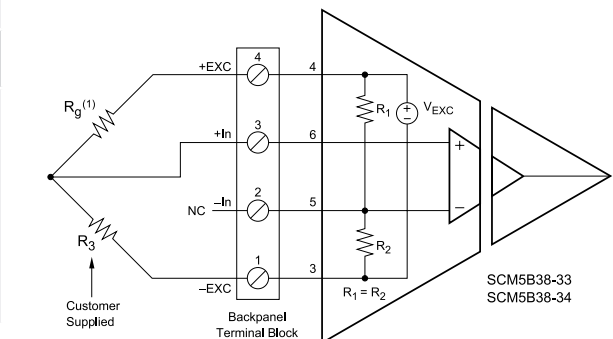
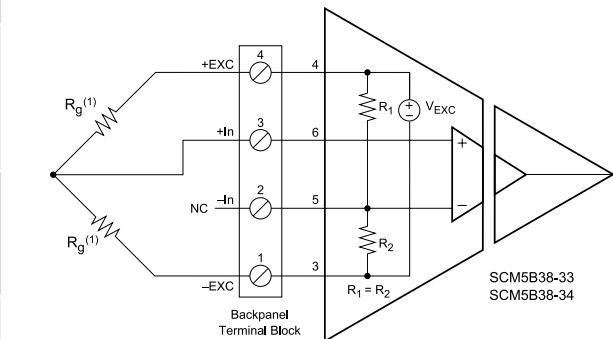
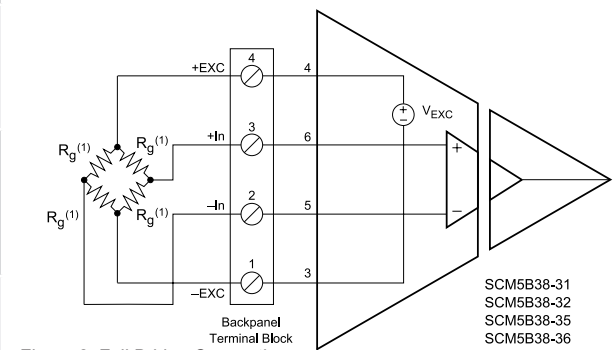
Module	Full Bridge SCM5B38-31,-32,-35,-36,-37	Half Bridge SCM5B38-33,-34
Input Range	±10mV to ±100mV	±10mV to ±100mV
Input Bias Current	±0.5nA	±0.5nA
Input Resistance		
Normal	50MΩ	50MΩ
Power Off	40kΩ	40kΩ
Overload	40kΩ	40kΩ
Signal Input Protection		
Continuous	240Vrms max	240Vrms max
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Excitation Output (-32, -34, -35, -37)	+10V ±3mV	+10V ±3mV
Load Resistance	300Ω to 10kΩ	300Ω to 10kΩ
Excitation Output (-31, -33, -36)	+3.333V ±2mV	+3.333V ±2mV
Load Resistance	100Ω to 10kΩ	100Ω to 10kΩ
Excitation Load Regulation	±5ppm/mA	±5ppm/mA
Excitation Stability	±15ppm/°C	±15ppm/°C
Half Bridge Voltage Level (-34)	NA	+5V ±1mV
Half Bridge Voltage Level (-33)	NA	+1.667V ±1mV
Isolated Excitation Protection		
Continuous	240Vrms max	240Vrms max
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output		
Continuous	1500Vrms max	1500Vrms max
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	160dB	160dB
NMR	95dB at 60Hz, 90dB at 50Hz	95dB at 60Hz, 90dB at 50Hz
Accuracy ⁽²⁾	±0.03% Span	±0.03% Span
Linearity	±0.01% Span	±0.01% Span
Stability		
Input Offset	±1μV/°C	±1μV/°C
Output Offset	±20μV/°C	±20μV/°C
Gain	±25ppm of Reading/°C	±25ppm of Reading/°C
Noise		
Input, 0.1 to 10Hz	0.2μVrms	1μVrms
Output, 100kHz	200μVrms	200μVrms
Bandwidth, -3dB	4Hz	4Hz
Response Time, 90% Span	0.2s	0.2s
Output Range	See Ordering Information	See Ordering Information
Output Resistance	50Ω	50Ω
Output Protection	Continuous Short to Ground	Continuous Short to Ground
Output Selection Time (to ±1mV of V _{OUT})	6μs at C _{load} = 0 to 2000pF	6μs at C _{load} = 0 to 2000pF
Output Current Limit	±8mA	±8mA
Output Enable Control		
Max Logic "0"	+0.8V	+0.8V
Min Logic "1"	+2.4V	+2.4V
Max Logic "1"	+36V	+36V
Input Current "0,1"	0.5μA	0.5μA
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	170mA Full Exc. Load, 70mA No Exc. Load	170mA Full Exc. Load, 70mA No Exc. Load
Power Supply Sensitivity	±2μV/% RTI ⁽³⁾	±2μV/% RTI ⁽³⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental		
Operating Temperature Range	-40°C to +85°C	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span	Performance A ±0.5% Span
ESD, EFT	Error Performance B	Error Performance B

Ordering Information

Model	Type Bridge Input	Input Range	Excitation	Sens.	Output Range [†]
SCM5B38-31	Full	-10mV to +10mV	+3.333V	3mV/V	1, 2
SCM5B38-32	Full	-30mV to +30mV	+10.0V	3mV/V	1, 2
SCM5B38-33	Half	-10mV to +10mV	+3.333V	3mV/V	1, 2
SCM5B38-34	Half	-30mV to +30mV	+10.0V	3mV/V	1, 2
SCM5B38-35	Full	-20mV to +20mV	+10.0V	2mV/V	1, 2
SCM5B38-36	Full	-33.3mV to +33.3mV	+3.333V	10mV/V	1, 2
SCM5B38-37	Full	-100mV to +100mV	+10.0V	10mV/V	1, 2

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. -5V to +5V	NONE	SCM5B38-31
2. -10V to +10V	D	SCM5B38-31D



NOTES:
 *Contact factory or your local Dataforth sales office for maximum values.
 (1) Strain element.
 (2) Includes linearity, hysteresis and repeatability.
 (3) RTI = Referenced to input.