

Strain Gage Input Modules, Narrow Bandwidth

FEATURES

- INTERFACES TO 100Ω THRU 10kΩ, FULL-BRIDGE, HALF-BRIDGE, 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 CMR
- 4Hz SIGNAL BANDWIDTH
- ± 0.08% ACCURACY
- ± 0.02% LINEARITY
- ± 1μV/°C DRIFT
- MIX AND MATCH SCM5B TYPES ON BACKPANEL
- CSA CERTIFIED, FM APPROVED, CE COMPLIANT

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 ±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 10kΩ. A matched pair of bridge-completion resistors (to ±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 ±20mV, ±30mV or ±100mV full scale input range producing ±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, ±5%.

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

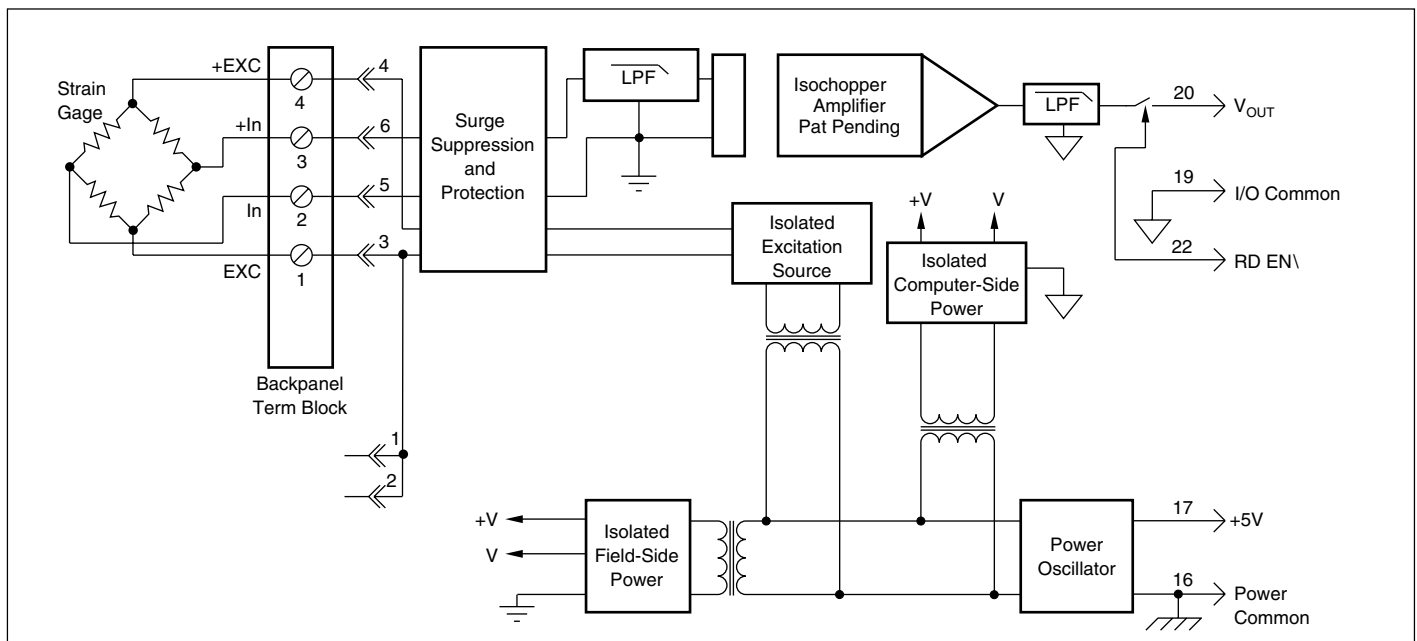


FIGURE 1. SCM5B38 Block Diagram.

SPECIFICATIONS Typical at $T_A = +25^\circ\text{C}$ and +5V power.

| Module | Full Bridge SCM5B38-31, -32, -35, -36, -37 | Half Bridge SCM5B38-33, -34 |
|---|---|---------------------------------|
| Input Range | $\pm 10\text{mV}$ to $\pm 100\text{mV}$ | * |
| Input Bias Current | $\pm 0.5\text{nA}$ | * |
| Input Resistance | | |
| Normal | $50\text{M}\Omega$ | * |
| Power Off | $40\text{k}\Omega$ | * |
| Overload | $40\text{k}\Omega$ | * |
| Signal Input Protection | | |
| Continuous | 240Vrms max | * |
| Transient | ANSI/IEEE C37.90.1-1989 | * |
| Excitation Output (-32, -34, -35, -37) | $+10\text{V} \pm 3\text{mV}$ | * |
| Excitation Output (-31, -33, -36) | $+3.333\text{V} \pm 2\text{mV}$ | * |
| Excitation Load Regulation | $\pm 5\text{ppm}/\text{mA}$ | * |
| Excitation Stability | $\pm 15\text{ppm}/^\circ\text{C}$ | * |
| Half Bridge Voltage Level (-34) | NA | $+5\text{V} \pm 1\text{mV}$ |
| Half Bridge Voltage Level (-33) | NA | $+1.667\text{V} \pm 1\text{mV}$ |
| Isolated Excitation Protection | | |
| Continuous | 240Vrms max | * |
| Transient | ANSI/IEEE C37.90.1-1989 | * |
| CMV, Input to Output | | |
| Continuous | 1500Vrms max | * |
| Transient | ANSI/IEEE C37.90.1-1989 | * |
| CMR (50 or 60Hz) | 160dB | * |
| NMR | 95dB at 60Hz, 90dB at 50Hz | * |
| Accuracy ⁽²⁾ | $\pm 0.08\%$ Span $\pm 10\mu\text{V}$ RTI ⁽³⁾ | * |
| Nonlinearity | $\pm 0.02\%$ 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 | $0.2\mu\text{Vrms}$ | $1\mu\text{Vrms}$ |
| Output, 100kHz | $200\mu\text{Vrms}$ | * |
| Bandwidth, -3dB | 4Hz | * |
| Response Time, 90% span | 0.2s | * |
| Output Range | $\pm 5\text{V}$ | * |
| Output Resistance | 50Ω | * |
| Output Protection | Continuous Short to Ground | * |
| Output Selection Time (to $\pm 1\text{mV}$ of V_{OUT}) | $6\mu\text{s}$ at $C_{\text{load}} = 0$ to 2000pF | * |
| Output Current Limit | $\pm 8\text{mA}$ | * |
| Output Enable Control | | |
| Max Logic "0" | $+0.8\text{V}$ | * |
| Min Logic "1" | $+2.4\text{V}$ | * |
| Max Logic "1" | $+36\text{V}$ | * |
| Input Current, "0,1" | $0.5\mu\text{A}$ | * |
| Power Supply Voltage | $+5\text{VDC} \pm 5\%$ | * |
| Power Supply Current | 170mA Full Exc. Load, 70mA No Exc. Load | * |
| Power Supply Sensitivity | $\pm 2\mu\text{V}/\%$ RTI ⁽³⁾ | * |
| Mechanical Dimensions | $2.28" \times 2.26" \times 0.60"$ ($58\text{mm} \times 57\text{mm} \times 15\text{mm}$) | * |
| Environmental | | |
| Operating Temperature Range | -40°C to $+85^\circ\text{C}$ | * |
| Storage Temperature Range | -40°C to $+85^\circ\text{C}$ | * |
| Relative Humidity | 0 to 95% Noncondensing | * |
| Emissions | EN50081-1, ISM Group 1, Class A (Radiated, Conducted) | * |
| Immunity | EN50082-1, ISM Group 1, Class A (ESD, RF, EFT) | * |

FIGURE 2. Full Bridge Connection.

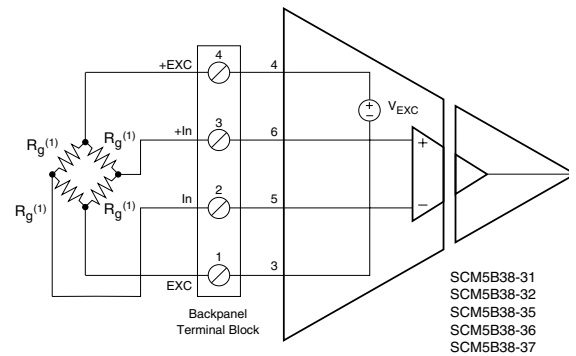


FIGURE 3. Half Bridge Connection.

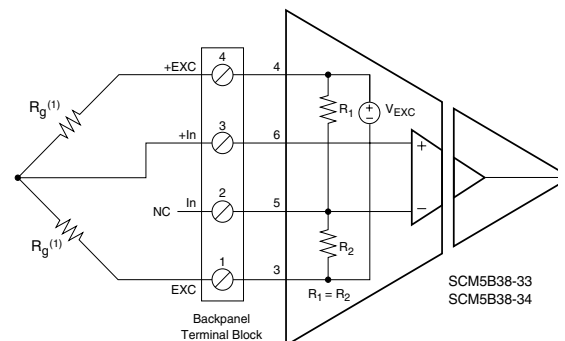
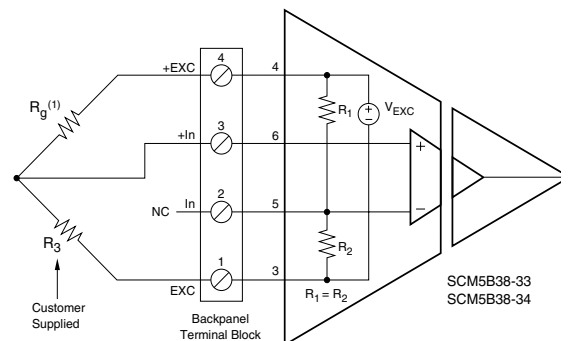


FIGURE 4. Quarter Bridge Connection.



* Same as -31, -32, -35, -36, -37 modules.

NOTES: (1) Strain element. (2) Includes excitation error, nonlinearity, hysteresis and repeatability. (3) Referenced to input.

| MODEL | INPUT BRIDGE TYPE | INPUT RANGE | EXCITATION | OUTPUT RANGE |
|------------|-------------------|-----------------------------------|---|------------------------------|
| SCM5B38-31 | Full Bridge | 100Ω to $10\text{k}\Omega$ | 3.333V at $3\text{mV}/\text{V}$ Sensitivity | -5V to $+5\text{V}$ |
| SCM5B38-32 | Full Bridge | 300Ω to $10\text{k}\Omega$ | 10.0V at $3\text{mV}/\text{V}$ Sensitivity | -5V to $+5\text{V}$ |
| SCM5B38-33 | Half Bridge | 100Ω to $10\text{k}\Omega$ | 3.333V at $3\text{mV}/\text{V}$ Sensitivity | -5V to $+5\text{V}$ |
| SCM5B38-34 | Half Bridge | 300Ω to $10\text{k}\Omega$ | 10.0V at $3\text{mV}/\text{V}$ Sensitivity | -5V to $+5\text{V}$ |
| SCM5B38-35 | Full Bridge | 300Ω to $10\text{k}\Omega$ | 10.0V at $2\text{mV}/\text{V}$ Sensitivity | -5V to $+5\text{V}$ |
| SCM5B38-36 | Full Bridge | 100Ω to $10\text{k}\Omega$ | 3.333V at $10\text{mV}/\text{V}$ Sensitivity | -5V to $+5\text{V}$ |
| SCM5B38-37 | Full Bridge | 300Ω to $10\text{k}\Omega$ | 10.0V at $10\text{mV}/\text{V}$ Sensitivity | -5V to $+5\text{V}$ |

ORDERING INFORMATION