

# SCM5B36

## Potentiometer Input Modules



### Description

Each SCM5B36 Potentiometer input module provides a single channel of Potentiometer 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.

Excitation for the potentiometer is provided from the module by two matched current sources. When using a three-wire potentiometer, this method allows cancellation of the effects of lead resistances. The excitation currents are very small (less than 1.0mA) which minimizes self-heating of the potentiometer.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode-rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are in the output stage. After the 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,  $\pm 5\%$ .

A special input circuit on the SCM5B36 module provides protection against accidental connection of power-line voltages up to 240VAC.

### ► Features

- Interfaces to Potentiometers up to  $10,000\Omega$
- High Level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 0.03\%$  Accuracy
- $\pm 0.005\%$  Linearity
- CSA Certified, FM Approved, CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

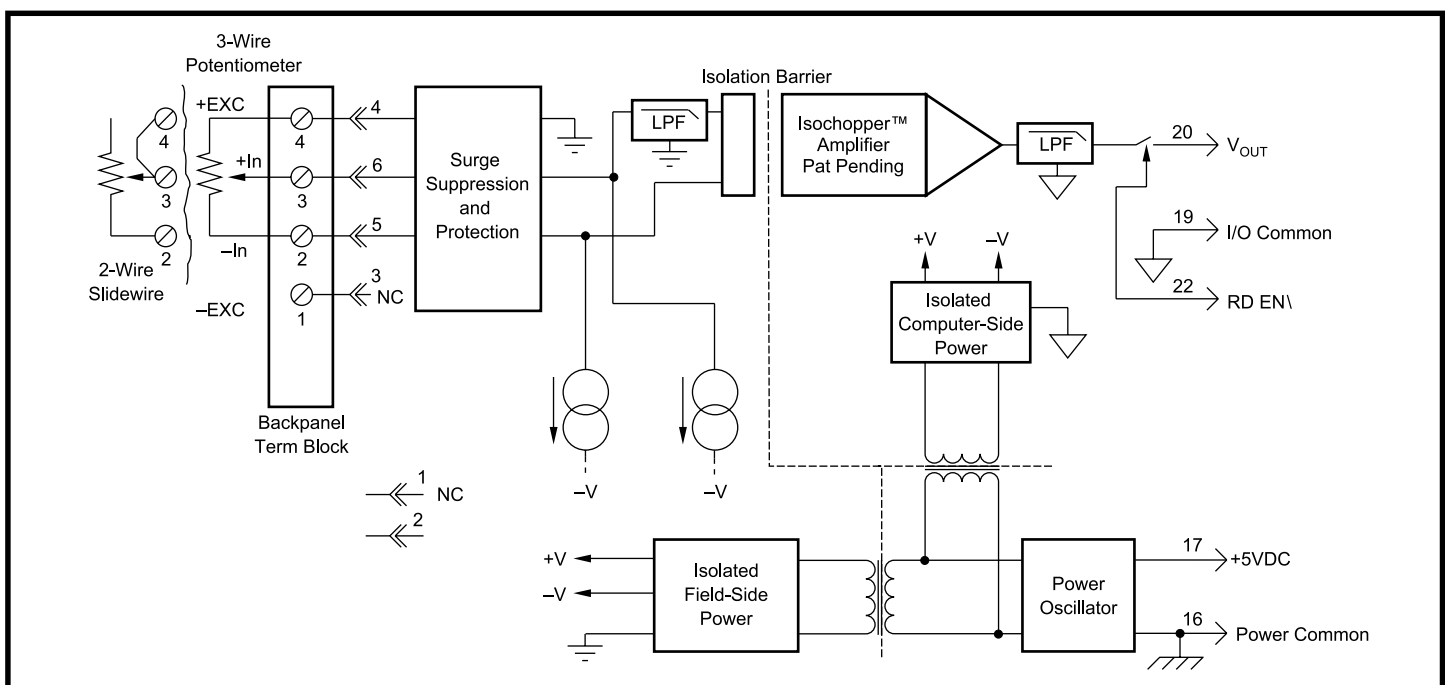


Figure 1: SCM5B36 Block Diagram

## Specifications

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

Module	SCM5B36
Input Range	0 to 10k $\Omega$
Input Resistance	
Normal	50M $\Omega$
Power Off	40k $\Omega$
Overload	40k $\Omega$
Input Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	0.25mA; 100 $\Omega$ , 500 $\Omega$ , 1k $\Omega$ Sensor
Lead Resistance Effect	0.10mA; 10k $\Omega$ Sensor $\pm 0.01\Omega/\Omega$ ; 100 $\Omega$ , 500 $\Omega$ , 1k $\Omega$ Sensor $\pm 0.02\Omega/\Omega$ ; 10k $\Omega$ Sensor
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 <sup>(1)</sup>	$\pm 0.03\%$ Span
Nonlinearity	$\pm 0.005\%$ Span
Stability	
Input Offset	$\pm 0.004\Omega/^{\circ}\text{C}$ ; 100 $\Omega$ , 500 $\Omega$ , 1k $\Omega$ sensor $\pm 0.010\Omega/^{\circ}\text{C}$ ; 10k $\Omega$ sensor
Output Offset	$\pm 20\mu\text{V}/^{\circ}\text{C}$
Gain	$\pm 50\text{ppm}$ of Reading/ $^{\circ}\text{C}$
Noise	
Input, 0.1 to 10Hz	0.2 $\mu\text{Vrms}$
Output, 100kHz	200 $\mu\text{Vrms}$
Bandwidth, -3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	See Ordering Information
Output Resistance	50 $\Omega$
Output Protection	Continuous Short to Ground
Output Selection Time (to $\pm 1\text{mV}$ of $V_{\text{OUT}}$ )	6 $\mu\text{s}$ at $C_{\text{load}} = 0$ to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5 $\mu\text{A}$
Open Input Response	Downscale
Open Input Detection Time	3s
Power Supply Voltage	+5VDC $\pm 5\%$
Power Supply Current	30mA
Power Supply Sensitivity	$\pm 2\mu\text{V}/\%$ RTI <sup>(2)</sup>
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, Category 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
ESD, EFT, Surge, Voltage Dips	Performance B

### NOTES:

(1) Includes nonlinearity, hysteresis and repeatability.

(2) Referenced to input.

## Ordering Information

Model	Input Range	Output Range†
SCM5B36-01	0 to 100 $\Omega$	3, 4
SCM5B36-02	0 to 500 $\Omega$	3, 4
SCM5B36-03	0 to 1k $\Omega$	3, 4
SCM5B36-04	0 to 10k $\Omega$	3, 4

### †Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B36-01
4. 0V to +10V	D	SCM5B36-01D