

# SCM5B33



## Isolated True RMS Input Modules

### Description

Each SCM5B33 True RMS input module provides a single channel of AC input which is converted to its True RMS DC value, filtered, isolated, amplified, and converted to a standard process voltage or current output (Figure 1).

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 field voltage or current input signal is processed through a pre-amplifier and RMS converter on the field side of the isolation barrier. The converted DC signal is then chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The computer side circuitry reconstructs, filters and converts the signal to industry standard outputs. Modules are powered from +5VDC,  $\pm 5\%$ .

For current output models, an external loop supply is required having a compliance voltage of 14 to 48VDC. The loop supply connection, with series load, is between Pin 20 (+) and Pin 19 (-).

### ► Features

- Interfaces RMS Voltage (0 – 300V) or RMS Current (0 – 5A)
- Designed for Standard Operation with Frequencies of 45Hz to 1000Hz (Extended Range to 20kHz)
- Compatible with Standard Current and Potential Transformers
- Industry Standard Output of either 0-1mA, 0-20mA, 4-20mA, 0-5V or 0-10VDC
- $\pm 0.25\%$  Factory Calibrated Accuracy (Accuracy Class 0.2)
- 1500Vrms Continuous Transformer Isolation
- Input Overload Protected to 480V Max (Peak AC & DC) or 10A RMS Continuous
- ANSI/IEEE C37.90.1-1989 Transient Protection
- Regulatory Compliance (Pending)

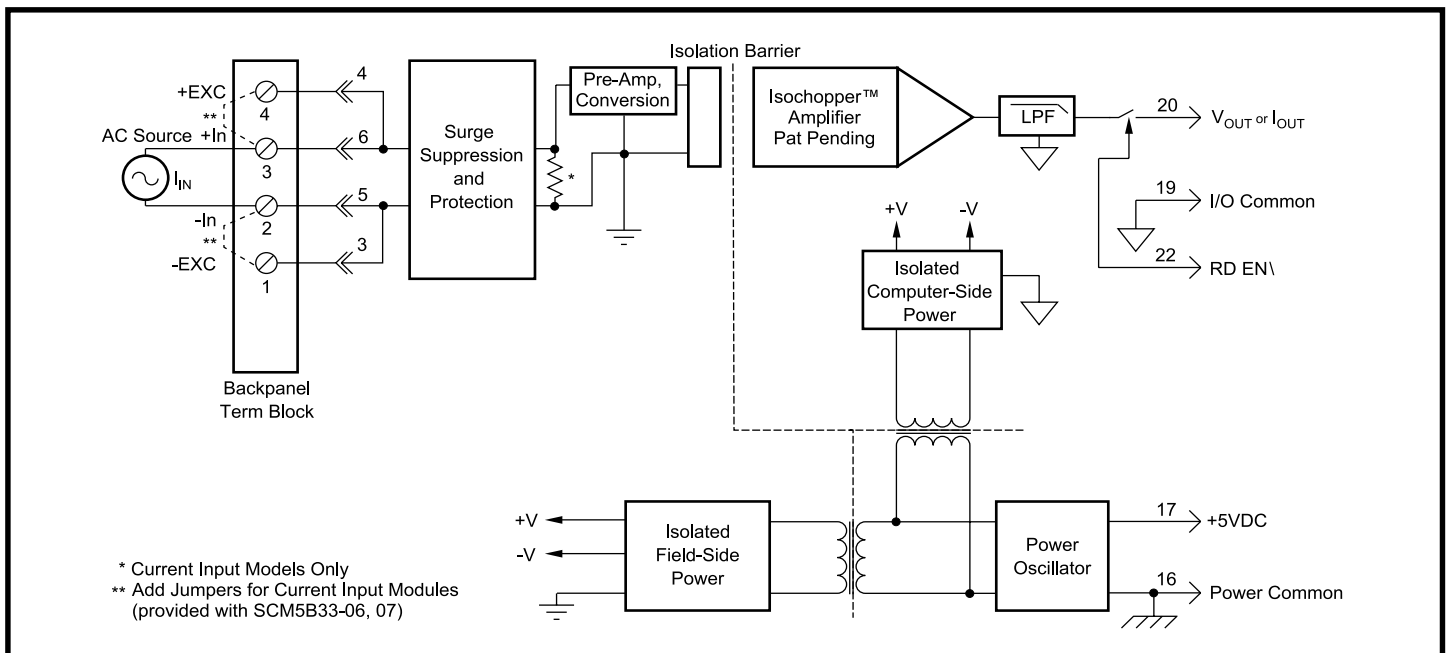


Figure 1: SCM5B33 Block Diagram

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

Module	SCM5B33
<b>Input</b> Signal Range Standard Frequency Range Extended Frequency Range Impedance  Coupling Protection <sup>(1)</sup> Continuous (-01 thru -05) Continuous (-06 thru -07) Transient (-01 thru -05) Transient (-06 thru -07)	100mV to 300Vrms, 0 to 5Arms 45Hz to 1000Hz 1kHz to 20kHz 1 M $\Omega$ $\pm$ 1% shunted by 100pF (-01 thru -05), 0.10 $\Omega$ (-06), 0.025 $\Omega$ (-07) AC 300Vrms 10Arms ANSI/IEEE C37.90.1-1989 See note 2
<b>Output</b> Signal Range Current Limit  Voltage Limit Resistance Protection Ripple and Noise (100kHz)	0-5V or 0-10V or 0-1mA or 0-20mA or 4-20mA 1.4mA (0-1mA models), 30mA (0/4-20mA models), 8mA (0-5, 0-10V models) $\pm$ 18V (0-5, 0-10V models) 50 $\Omega$ (0-5, 0-10V models) Continuous Short to Ground 0.025% Span rms
<b>Accuracy<sup>(3)(4)</sup></b> Sine 50/60 Hz 45Hz to 1kHz 1kHz to 20kHz Non-Sine Crest Factor = 1 to 2 Crest Factor = 2 to 3 Crest Factor = 3 to 4 Crest Factor = 4 to 5 Vs. Temperature	$\pm$ 0.25% Span $\pm$ 0.25% Reading Additional Factor $\pm$ 0.75% Reading Additional Factor  $\pm$ 0.05% Reading Additional Error $\pm$ 0.15% Reading Additional Error $\pm$ 0.30% Reading Additional Error $\pm$ 0.40% Reading Additional Error $\pm$ 100ppm/ $^\circ\text{C}$
<b>Isolation (Common Mode)</b> Input to Output, Input to Power Continuous Transient Output to Power Continuous	1500Vrms max ANSI/IEEE C37.90.1-1989  50VDC max
Rejection (50-60Hz Common Mode)	100dB
Response Time (0 to 99%)	<400ms
<b>Output Enable Control</b> Selection Time Voltage Max Logic "0" Min/Max Logic "1" Current, "0,1"	6.0 $\mu\text{S}$ at $C_{\text{LOAD}} = 0$ to 2000pF  +0.8V +2.4V/+36V 0.5 $\mu\text{A}$
Loop Voltage Load Resistance (maximum)	+2.5VDC min, +26VDC max, -40 $^\circ\text{C}$ to +85 $^\circ\text{C}$ (Loop Voltage - 2.5) / (Loop Current)
Supply Voltage Current Sensitivity	+5VDC $\pm$ 5% 120mA $\pm$ 200ppm/%
<b>Environmental</b> Operating Temp. Range Storage Temp. Range Relative Humidity Emissions Immunity Dimensions (h)(w)(d)	-40 $^\circ\text{C}$ to +85 $^\circ\text{C}$ -40 $^\circ\text{C}$ to +85 $^\circ\text{C}$ 0 to 95% Noncondensing EN50081-1, ISM Group 1, Class A (Radiated, Conducted) EN50082-1, ISM Group 1, Class A (ESD, RF, EFT) 2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)

**NOTES:**

- (1) SCM5B33 and SCMPB01, 02, 03, 04, 05, 06, 07, XEV rating only. Backpanels obtained from other sources may have lower ratings.
- (2) For 1 to 25 seconds the max allowable transient current rating is  $\sqrt{2500}$  / (event time). For less than 1 second, ANSI/IEEE C-37.90.1-1989 applies with a 0.05 $\Omega$  load. For greater than 25 seconds, the 10A rms continuous rating applies.
- (3) At standard 60Hz factory calibration. Consult factory for calibration at other frequencies.
- (4) For 10-100% rated span. Add an additional 0.25% error for 0-10% Span measurements. Accuracy includes nonlinearity, hysteresis and repeatability but not source or external shunt inaccuracy (if used).

**Ordering Information**

Model	Input (rms) <sup>†</sup>	Output (DC) <sup>†</sup>
SCM5B33-01	0-100mV	0-5V
SCM5B33-02	0-1V	0-5V
SCM5B33-03	0-10V	0-5V
SCM5B33-04	0-150V	0-5V
SCM5B33-05	0-300V	0-5V
SCM5B33-06	0-1A	0-5V
SCM5B33-07	0-5A	0-5V
SCM5B33-01B	0-100mV	0-1mA
SCM5B33-02B	0-1V	0-1mA
SCM5B33-03B	0-10V	0-1mA
SCM5B33-04B	0-150V	0-1mA
SCM5B33-05B	0-300V	0-1mA
SCM5B33-06B	0-1A	0-1mA
SCM5B33-07B	0-5A	0-1mA
SCM5B33-01C	0-100mV	4-20mA
SCM5B33-02C	0-1V	4-20mA
SCM5B33-03C	0-10V	4-20mA
SCM5B33-04C	0-150V	4-20mA
SCM5B33-05C	0-300V	4-20mA
SCM5B33-06C	0-1A	4-20mA
SCM5B33-07C	0-5A	4-20mA
SCM5B33-01D	0-100mV	0-10V
SCM5B33-02D	0-1V	0-10V
SCM5B33-03D	0-10V	0-10V
SCM5B33-04D	0-150V	0-10V
SCM5B33-05D	0-300V	0-10V
SCM5B33-06D	0-1A	0-10V
SCM5B33-07D	0-5A	0-10V
SCM5B33-01E	0-100mV	0-20mA
SCM5B33-02E	0-1V	0-20mA
SCM5B33-03E	0-10V	0-20mA
SCM5B33-04E	0-150V	0-20mA
SCM5B33-05E	0-300V	0-20mA
SCM5B33-06E	0-1A	0-20mA
SCM5B33-07E	0-5A	0-20mA

<sup>†</sup>Modules can be ordered with other input/output ranges. Consult factory for ordering details and specifications.