

SCM5B30/31

Analog Voltage-input Modules, Narrow Bandwidth



DESCRIPTION

Each SCM5B30 and SCM5B31 voltage input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure below). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to $\pm 50\text{V}$ 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.

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 on the computer side.

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 SCM5B30 and SCM5B31 modules provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

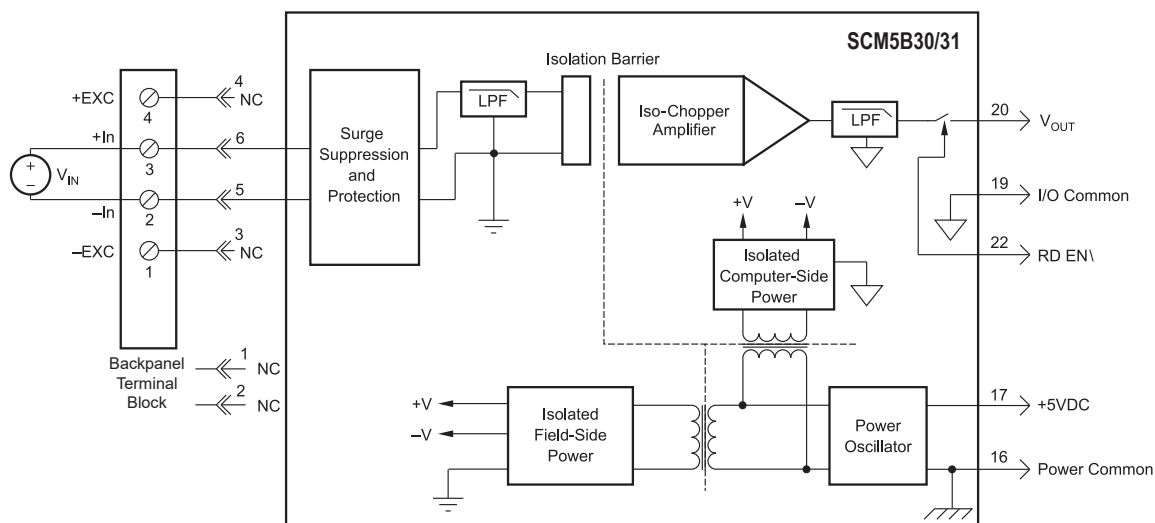
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- $\pm 0.03\%$ Accuracy
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 0.005\%$ Linearity
- $\pm 1\mu\text{V}/^\circ\text{C}$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Heavy Equipment Power-line Voltage
- Reduces EMC Concerns and Electrical Noise in Measured Signals
- Convenient System Expansion and Repair
- Signal Filtering in Noisy Environments
- Simplifies Sensor Interface and Signal Conditioning Design
- Provides Isolation of External Sensors
- Breaks Ground Loops

APPLICATIONS

- Analog Signal Conditioning
- Analog Signal Isolation
- Analog Signal Filtering
- Industrial Process Control
- Test and Measurement
- System and Signal Monitoring



SCM5B30/31 Block Diagram - [For Module Dimensions and Pinouts, See Page 1-44](#)

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

Module	SCM5B30	SCM5B31
Input Range	±10mV to ±1V	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	650kΩ (-01 thru -06) 2MΩ (-07 thru -10)
Power Off	40kΩ	650kΩ (-01 thru -06) 2MΩ (-07 thru -10)
Overload	40kΩ	650kΩ (-01 thru -06) 2MΩ (-07 thru -10)
Input 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 (50Hz or 60Hz)	160dB	160dB
NMR	95dB at 60Hz, 90dB at 50Hz	95dB at 60Hz, 90dB at 50Hz
Accuracy ⁽¹⁾	±0.03% Span	±0.03% Span
Linearity	±0.005% Span	±0.005% Span
Stability		
Input Offset	±1μV/°C	±20μV/°C
Output Offset	±20μV/°C	±20μV/°C
Gain	±25ppm/°C	±50ppm/°C
Noise		
Input, 0.1 to 10Hz	0.2μVrms	2μVrms
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	30mA	30mA
Power Supply Sensitivity	±2μV/% RTI ⁽²⁾	±200μV/% RTI ⁽²⁾
Mechanical Dimensions (h)x(w)x(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 Temp. Range	-40°C to +85°C	-40°C to +85°C
Storage Temp. 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 Error	Performance A ±0.5% Span Error
ESD,EFT	Performance B	Performance B

NOTES:

*Contact factory for maximum values.

(1) Includes linearity, hysteresis and repeatability.

(2) RTI = Referenced to input.

(3) Same as SCM5B31-01 with 50MΩ input resistance.

Ordering Information

Model	Input Range	Output Range
SCM5B30-01	-10mV to +10mV	-5V to +5V
SCM5B30-01D	-10mV to +10mV	-10V to +10V
SCM5B30-02	-50mV to +50mV	-5V to +5V
SCM5B30-02D	-50mV to +50mV	-10V to +10V
SCM5B30-03	-100mV to +100mV	-5V to +5V
SCM5B30-03D	-100mV to +100mV	-10V to +10V
SCM5B30-04	-10mV to +10mV	0V to +5V
SCM5B30-04D	-10mV to +10mV	0V to +10V
SCM5B30-05	-50mV to +50mV	0V to +5V
SCM5B30-05D	-50mV to +50mV	0V to +10V
SCM5B30-06	-100mV to +100mV	0V to +5V
SCM5B30-06D	-100mV to +100mV	0V to +10V
SCM5B30-07 ⁽³⁾	-1V to +1V	-5V to +5V
SCM5B30-07D ⁽³⁾	-1V to +1V	-10V to +10V
SCM5B31-01	-1V to +1V	-5V to +5V
SCM5B31-01D	-1V to +1V	-10V to +10V
SCM5B31-02	-5V to +5V	-5V to +5V
SCM5B31-02D	-5V to +5V	-10V to +10V
SCM5B31-03	-10V to +10V	-5V to +5V
SCM5B31-03D	-10V to +10V	-10V to +10V
SCM5B31-04	-1V to +1V	0V to +5V
SCM5B31-04D	-1V to +1V	0V to +10V
SCM5B31-05	-5V to +5V	0V to +5V
SCM5B31-05D	-5V to +5V	0V to +10V
SCM5B31-06	-10V to +10V	0V to +5V
SCM5B31-06D	-10V to +10V	0V to +10V
SCM5B31-07	-20V to +20V	-5V to +5V
SCM5B31-07D	-20V to +20V	-10V to +10V
SCM5B31-08	-20V to +20V	0V to +5V
SCM5B31-08D	-20V to +20V	0V to +10V
SCM5B31-09	-40V to +40V	-5V to +5V
SCM5B31-09D	-40V to +40V	-10V to +10V
SCM5B31-10	-40V to +40V	0V to +5V
SCM5B31-10D	-40V to +40V	0V to +10V