

# SCM5B40/41



## Analog Voltage-input Modules, Wide Bandwidth

### DESCRIPTION

Each SCM5B40 and SCM5B41 wide-bandwidth, voltage-input module provides a single channel of analog-input which is amplified, isolated, 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  $\pm 50V$  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 input signal is processed through a wide bandwidth pre-amplifier on the field side of the isolation barrier. After amplification, 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 SCM5B40 and SCM5B41 modules provides protection against accidental connection of power-line voltages up to 240VAC.

### FEATURES

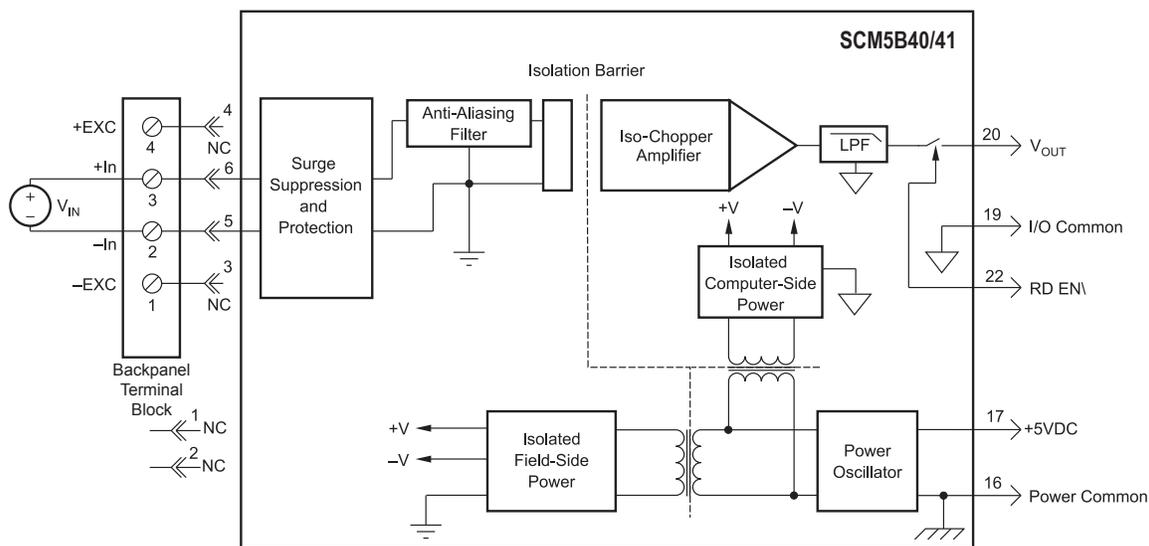
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 100dB CMR
- 10kHz Signal Bandwidth
- $\pm 0.03\%$  Accuracy
- $\pm 0.01\%$  Linearity
- $\pm 1\mu V/^\circ C$  Drift
- CSA C/US Certified
- CE and ATEX Compliant
- 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



SCM5B40/41 Block Diagram - [For Module Dimensions and Pinouts, See Page 1-44](#)

**Specifications** Typical\* at T<sub>A</sub> = +25°C and +5VDC Power

Module	SCM5B40	SCM5B41
Input Range	±10mV to ±1V	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	200MΩ	650kΩ (-01 thru -04) 2MΩ (-05 thru -10)
Power Off	40kΩ	650kΩ (-01 thru -04) 2MΩ (-05 thru -10)
Overload	40kΩ	650kΩ (-01 thru -04) 2MΩ (-05 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)	100dB	100dB
NMR (-3dB at 10kHz)	120dB per Decade Above 10kHz	120dB per Decade Above 10kHz
Accuracy <sup>(1)</sup>	±0.03% Span	±0.03% Span
Linearity	±0.01% Span	±0.01% Span
Stability		
Input Offset	±1μV/°C	±20μV/°C
Output Offset	±40μV/°C	±40μV/°C
Gain	±25ppm/°C	±50ppm/°C
Noise		
Input, 0.1 to 10Hz	0.4μVrms	2μVrms
Output, 100kHz	10mVp-p	10mVp-p
Bandwidth, -3dB	10kHz	10kHz
Rise Time, 10 to 90% Span	35μs	35μs
Settling Time, to 0.1%	250μs	250μs
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 <sub>OUT</sub> )	6μs at C <sub>LOAD</sub> = 0 to -000pF	6μs at C <sub>LOAD</sub> = 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 <sup>(2)</sup>	±200μV/% RTI <sup>(2)</sup>
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 SCM5B41-01 with 200MΩ input resistance.

**Ordering Information**

Model	Input Range	Output Range
SCM5B40-01	-10mV to +10mV	-5V to +5V
SCM5B40-01D	-10mV to +10mV	-10V to +10V
SCM5B40-02	-50mV to +50mV	-5V to +5V
SCM5B40-02D	-50mV to +50mV	-10V to +10V
SCM5B40-03	-100mV to +100mV	-5V to +5V
SCM5B40-03D	-100mV to +100mV	-10V to +10V
SCM5B40-04	-10mV to +10mV	0V to +5V
SCM5B40-04D	-10mV to +10mV	0V to +10V
SCM5B40-05	-50mV to +50mV	0V to +5V
SCM5B40-05D	-50mV to +50mV	0V to +10V
SCM5B40-06	-100mV to +100mV	0V to +5V
SCM5B40-06D	-100mV to +100mV	0V to +10V
SCM5B40-07 <sup>(3)</sup>	-1V to +1V	-5V to +5V
SCM5B40-07D <sup>(3)</sup>	-1V to +1V	-10V to +10V
SCM5B41-01	-1V to +1V	-5V to +5V
SCM5B41-01D	-1V to +1V	-10V to +10V
SCM5B41-02	-5V to +5V	-5V to +5V
SCM5B41-02D	-5V to +5V	-10V to +10V
SCM5B41-03	-10V to +10V	-5V to +5V
SCM5B41-03D	-10V to +10V	-10V to +10V
SCM5B41-04	-1V to +1V	0V to +5V
SCM5B41-04D	-1V to +1V	0V to +10V
SCM5B41-05	-5V to +5V	0V to +5V
SCM5B41-05D	-5V to +5V	0V to +10V
SCM5B41-06	-10V to +10V	0V to +5V
SCM5B41-06D	-10V to +10V	0V to +10V
SCM5B41-07	-20V to +20V	-5V to +5V
SCM5B41-07D	-20V to +20V	-10V to +10V
SCM5B41-08	-20V to +20V	0V to +5V
SCM5B41-08D	-20V to +20V	0V to +10V
SCM5B41-09	-40V to +40V	-5V to +5V
SCM5B41-09D	-40V to +40V	-10V to +10V
SCM5B41-10	-40V to +40V	0V to +5V
SCM5B41-10D	-40V to +40V	0V to +10V