

SCM5B

Isolated SCM5B Analog Signal Conditioning Products



SCM5B Modules

Dataforth Corporation offers cost-effective, isolated industrial signal conditioning modules. The SCM5B analog modules are form, fit, and functional equivalents to similar products from other manufacturers. The product line includes a complete selection of backpanel options, interface cables, racks, fuses, jumpers, power supplies, and other accessory items.

SCM5B Analog Modules

Each SCM5B module provides a single channel of isolated analog input or output. Input modules interface to all types of external sensors. The modules filter, isolate, amplify, and convert the input signal to a high-level analog voltage output. The output modules accept a high-level analog voltage signal from a host system, then buffer, isolate, and amplify before providing a process current or voltage output to field devices. Over 250 different SCM5B modules are available encompassing a wide selection of isolated analog input and output functions. Analog inputs include voltage and current in narrow and wide bandwidths, thermocouple, RTD, accelerometer, potentiometer, strain gauge, frequency and 2-wire transmitter. Custom I/O ranges are also available. All modules are CSA C/US certified for safe operation in Class I, Division 2, Groups A, B, C, and D hazardous environments. They are also CE and ATEX compliant.

Accessories include addressable and non-addressable single, dual, 8- and 16- channel backpanels which include on-board temperature sensors and cold junction thermocouple compensation, power supplies, mounting racks, interface cables, and evaluation boards.

Dataforth SCM5B modules offer several advantages when compared with competitive parts.

- **50 times better** noise rejection by using a **6-pole filter** with 95dB NMR, versus a 3-pole filter with 60dB NMR
- Lower output noise
- True 3-way isolation
- **20dB better** CMR of noise spikes than competing models

Custom Signal Conditioning

Custom modules are available: consult factory for minimum quantity and pricing details on custom input ranges, output ranges, bandwidth, and other key parameters.

FEATURES

- $\pm 0.03\%$ Accuracy (typ)
- $\pm 0.005\%$ Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power Supply Voltage (30mA (typ))
- 4- to 6-pole Low-pass Filtering
- Up to 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 1\mu\text{V}/^\circ\text{C}$ Drift
- Output Noise as Low as 150 μVrms
- -40°C to $+85^\circ\text{C}$ Operating Temperature
- CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Protects User Equipment from Lightning and Heavy Equipment Power-line Voltage
- Reduces 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
- Reduces EMC Concerns

APPLICATIONS

- Analog Signal Conditioning
- Analog Signal Isolation
- Analog Signal Filtering
- Industrial Process Control
- Test and Measurement
- System and Signal Monitoring
- Temperature Measurement
- Torque Measurement
- Civil Engineering
- Geotechnical Monitoring

SCM5B Selection Guide
† OUTPUT RANGES AVAILABLE

Output Range	Part No. Suffix	Example
1. -5V to +5V	NONE	SCM5B30-01
2. -10V to +10V	D	SCM5B30-01D
3. 0V to +5V	NONE	SCM5B30-04
4. 0V to +10V	D	SCM5B30-04D
5. 4-20mA	C	SCM5B33-01C
6. 0-20mA	E	SCM5B33-01E
7. 0mA-1mA	B	SCM5B33-01B

ANALOG VOLTAGE-INPUT MODULES, NARROW BANDWIDTH, 4Hz BW

MODEL	INPUT RANGE	OUTPUT RANGE†
SCM5B30-01	±10mV	1, 2
SCM5B30-02	±50mV	1, 2
SCM5B30-03	±100mV	1, 2
SCM5B30-04	±10mV	3, 4
SCM5B30-05	±50mV	3, 4
SCM5B30-06	±100mV	3, 4
SCM5B30-07	±1V	1, 2 High Input Z
SCM5B31-01	±1V	1, 2
SCM5B31-02	±5V	1, 2
SCM5B31-03	±10V	1, 2
SCM5B31-04	±1V	3, 4
SCM5B31-05	±5V	3, 4
SCM5B31-06	±10V	3, 4
SCM5B31-07	±20V	1, 2
SCM5B31-08	±20V	3, 4
SCM5B31-09	±40V	1, 2
SCM5B31-10	±40V	3, 4

ANALOG CURRENT-INPUT MODULES, 4Hz AND 1kHz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE†	BW
SCM5B32-01	4-20mA	3, 4	4Hz
SCM5B32-02	0-20mA	3, 4	4Hz
SCM5B392-11	4-20mA	0 to +5V	1kHz
SCM5B392-12	4-20mA	±5V	1kHz
SCM5B392-13	4-20mA	0 to +10V	1kHz
SCM5B392-14	4-20mA	±10V	1kHz

ISOLATED TRUE RMS INPUT MODULES

MODEL	INPUT (rms)	OUTPUT RANGE (dc)†
SCM5B33-01	0-100mV	3, 4, 5, 6, 7
SCM5B33-02	0-1V	3, 4, 5, 6, 7
SCM5B33-03	0-10V	3, 4, 5, 6, 7
SCM5B33-04	0-150V	3, 4, 5, 6, 7
SCM5B33-05	0-300V	3, 4, 5, 6, 7
SCM5B33-06	0-1A	3, 4, 5, 6, 7
SCM5B33-07	0-5A	3, 4, 5, 6, 7

LINEARIZED 2- OR 3-WIRE RTD-INPUT MODULES, 0 to +5V OUTPUT†, 4Hz BW

MODEL	TYPE**	INPUT RANGE	OUTPUT RANGE†
SCM5B34-01	100Ω Pt	-100°C to +100°C (-148°F to +212°F)	3, 4
SCM5B34-02	100Ω Pt	0°C to +100°C (+32°F to +212°F)	3, 4
SCM5B34-03	100Ω Pt	0°C to +200°C (+32°F to +392°F)	3, 4
SCM5B34-04	100Ω Pt	0°C to +600°C (+32°F to +1112°F)	3, 4
SCM5B34-05	100Ω Pt	-100°C to +200°C (-148°F to +392°F)	3, 4
SCM5B34C-01	10Ω Cu at 0°C	0°C to +120°C (+32°F to +248°F)	3, 4
SCM5B34C-02	10Ω Cu at 25°C	0°C to +120°C (+32°F to +248°F)	3, 4
SCM5B34C-03	10Ω Cu at 0°C	0°C to +160°C (+32°F to +320°F)	3, 4
SCM5B34N-01	120Ω Ni	0°C to +300°C (+32°F to +572°F)	3, 4

LINEARIZED 4-WIRE RTD-INPUT MODULES, 0 to +5V OUTPUT†, 4Hz BW

MODEL	TYPE**	INPUT RANGE	OUTPUT RANGE†
SCM5B35-01	100Ω Pt	-100°C to +100°C (-148°F to +212°F)	3, 4
SCM5B35-02	100Ω Pt	0°C to +100°C (+32°F to +212°F)	3, 4
SCM5B35-03	100Ω Pt	0°C to +200°C (+32°F to +392°F)	3, 4
SCM5B35-04	100Ω Pt	0°C to +600°C (+32°F to +1112°F)	3, 4
SCM5B35-05	100Ω Pt	-100°C to +200°C (-148°F to +392°F)	3, 4
SCM5B35C-01	10Ω Cu at 0°C	0°C to +120°C (+32°F to +248°F)	3, 4
SCM5B35C-02	10Ω Cu at 25°C	0°C to +120°C (+32°F to +248°F)	3, 4
SCM5B35C-03	10Ω Cu at 0°C	0°C to +160°C (+32°F to +320°F)	3, 4
SCM5B35N-01	120Ω Ni	0°C to +300°C (+32°F to +572°F)	3, 4

POTENTIOMETER-INPUT MODULES, 4Hz BW

MODEL	INPUT RANGE	OUTPUT RANGE†
SCM5B36-01	0 to 100Ω	3, 4
SCM5B36-02	0 to 500Ω	3, 4
SCM5B36-03	0 to 1kΩ	3, 4
SCM5B36-04	0 to 10kΩ	3, 4

THERMOCOUPLE-INPUT MODULES, 0 to +5V OUTPUT†, 4Hz BW

MODEL	TYPE‡	INPUT RANGE	OUTPUT RANGE†
SCM5B37J	J	-100°C to +760°C (-148°F to +1400°F)	3, 4
SCM5B37K	K	-100°C to +1350°C (-148°F to +2462°F)	3, 4
SCM5B37T	T	-100°C to +400°C (-148°F to +752°F)	3, 4
SCM5B37E	E	0°C to +900°C (+32°F to +1652°F)	3, 4
SCM5B37R	R	0°C to +1750°C (+32°F to +3182°F)	3, 4
SCM5B37S	S	0°C to +1750°C (+32°F to +3182°F)	3, 4
SCM5B37B	B	0°C to +1800°C (+32°F to +3272°F)	3, 4
SCM5B37C	C	+350°C to +1300°C (+662°F to +2372°F)	3, 4
SCM5B37N	N	-100°C to +1300°C (-148°F to +2372°F)	3, 4

STRAIN GAUGE INPUT MODULES WIDE BANDWIDTH, 5V OUTPUT†, 10kHz BW

MODEL	INPUT	EXCITATION	OUTPUT RANGE†
SCM5B38-01	±10mV Full Bridge Input, (3mV/V)	+3.333V	1, 2
SCM5B38-02	±30mV Full Bridge Input, (3mV/V)	+10.000V	1, 2
SCM5B38-03	±10mV Half Bridge Input, (3mV/V)	+3.333V	1, 2
SCM5B38-04	±30mV Half Bridge Input, (3mV/V)	+10.000V	1, 2
SCM5B38-05	±20mV Full Bridge Input, (2mV/V)	+10.000V	1, 2
SCM5B38-06	±33.3mV Full Bridge Input, (10mV/V)	+3.333V	1, 2
SCM5B38-07	±100mV Full Bridge Input, (10mV/V)	+10.000V	1, 2

STRAIN GAUGE INPUT MODULES NARROW BANDWIDTH, ±5V OUTPUT†, 4kHz BW

MODEL	INPUT	EXCITATION	OUTPUT RANGE†
SCM5B38-31	±10mV Full Bridge Input, (3mV/V)	+3.333V	1, 2
SCM5B38-32	±30mV Full Bridge Input, (3mV/V)	+10.000V	1, 2
SCM5B38-33	±10mV Half Bridge Input, (3mV/V)	+3.333V	1, 2
SCM5B38-34	±30mV Half Bridge Input, (3mV/V)	+10.000V	1, 2
SCM5B38-35	±20mV Full Bridge Input, (2mV/V)	+10.000V	1, 2
SCM5B38-36	±33.3mV Full Bridge Input, (10mV/V)	+3.333V	1, 2
SCM5B38-37	±100mV Full Bridge Input, (10mV/V)	+10.000V	1, 2

SCM5B Selection Guide (Continued)
† OUTPUT RANGES AVAILABLE

Output Range	Part No. Suffix	Example
1. -5V to +5V	NONE	SCM5B30-01
2. -10V to +10V	D	SCM5B30-01D
3. 0V to +5V	NONE	SCM5B30-04
4. 0V to +10V	D	SCM5B30-04D
5. 4-20mA	C	SCM5B33-01C
6. 0-20mA	E	SCM5B33-01E
7. 0mA-1mA	B	SCM5B33-01B

GENERAL PURPOSE INPUT MODULES, DC EXCITATION

MODEL	MAXIMUM INPUT	OUTPUT RANGE†
SCM5B43-01	±1V	1, 2
SCM5B43-02	±2V	1, 2
SCM5B43-03	±3V	1, 2
SCM5B43-04	±4V	1, 2
SCM5B43-05	±5V	1, 2
SCM5B43-06	±6V	1, 2
SCM5B43-07	±7V	1, 2
SCM5B43-08	±8V	1, 2
SCM5B43-09	±9V	1, 2
SCM5B43-10	±10V	1, 2

ANALOG CURRENT-OUTPUT MODULES, 400Hz AND 1kHz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE	BW
SCM5B39-01	0 to +5V	4-20mA	400Hz
SCM5B39-02	±5V	4-20mA	400Hz
SCM5B39-03	0 to +5V	0-20mA	400Hz
SCM5B39-04	±5V	0-20mA	400Hz
SCM5B39-05	0-20mA	0-20mA	400Hz
SCM5B39-07	±10V	±20mA	275Hz
SCM5B392-01	0 to +5V	4-20mA	1kHz
SCM5B392-02	±5V	4-20mA	1kHz
SCM5B392-03	0 to +10V	4-20mA	1kHz
SCM5B392-04	±10V	4-20mA	1kHz

FREQUENCY INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE†	
±20mV HYST.	±400mV HYST.		
SCM5B45-01	SCM5B45-21	0 to 500Hz	3, 4
SCM5B45-02	SCM5B45-22	0 to 1kHz	3, 4
SCM5B45-03	SCM5B45-23	0 to 3kHz	3, 4
SCM5B45-04	SCM5B45-24	0 to 5kHz	3, 4
SCM5B45-05	SCM5B45-25	0 to 10kHz	3, 4
SCM5B45-06	SCM5B45-26	0 to 25kHz	3, 4
SCM5B45-07	SCM5B45-27	0 to 50kHz	3, 4
SCM5B45-08	SCM5B45-28	0 to 100kHz	3, 4

MATCHED-PAIR SERVO/MOTOR CONTROLLER DRIVERS, 1kHz BW

MODEL	INPUT RANGE	INTERFACE	OUTPUT RANGE
SCM5B392-0111	0 to +5V	4-20mA	0 to +5V
SCM5B392-0212	±5V	4-20mA	±5V
SCM5B392-0313	0 to +10V	4-20mA	0 to +10V
SCM5B392-0414	±10V	4-20mA	±10V

LINEARIZED THERMOCOUPLE-INPUT MODULES, 0 to +5V OUTPUT†, 4Hz BW

MODEL	TYPE†	INPUT RANGE	OUTPUT RANGE†
SCM5B47J-01	J	0°C to +760°C (+32°F to +1400°F)	3, 4
SCM5B47J-02	J	-100°C to +300°C (-148°F to +572°F)	3, 4
SCM5B47J-03	J	0°C to +500°C (+32°F to +932°F)	3, 4
SCM5B47K-04	K	0°C to +1000°C (+32°F to +1832°F)	3, 4
SCM5B47K-05	K	0°C to +500°C (+32°F to +932°F)	3, 4
SCM5B47T-06	T	-100°C to +400°C (-148°F to +752°F)	3, 4
SCM5B47T-07	T	0°C to +200°C (+32°F to +392°F)	3, 4
SCM5B47E-08	E	0°C to +1000°C (+32°F to +1832°F)	3, 4
SCM5B47R-09	R	+500°C to +1750°C (+932°F to +3182°F)	3, 4
SCM5B47S-10	S	+500°C to +1750°C (+932°F to +3182°F)	3, 4
SCM5B47B-11	B	+500°C to +1800°C (+932°F to +3272°F)	3, 4
SCM5B47J-12	J	-100°C to +760°C (-148°F to +1400°F)	3, 4
SCM5B47K-13	K	-100°C to +1350°C (-148°F to +2462°F)	3, 4
SCM5B47K-14	K	0°C to +1200°C (+32°F to +2192°F)	3, 4
SCM5B47N-15	N	-100°C to +1300°C (-148°F to +2372°F)	3, 4

ANALOG VOLTAGE-INPUT MODULES, WIDE BANDWIDTH, 10kHz BW

MODEL	INPUT RANGE	OUTPUT RANGE†
SCM5B40-01	±10mV	1, 2
SCM5B40-02	±50mV	1, 2
SCM5B40-03	±100mV	1, 2
SCM5B40-04	±10mV	3, 4
SCM5B40-05	±50mV	3, 4
SCM5B40-06	±100mV	3, 4
SCM5B40-07	±1V	1, 2 High Input Z
SCM5B41-01	±1V	1, 2
SCM5B41-02	±5V	1, 2
SCM5B41-03	±10V	1, 2
SCM5B41-04	±1V	3, 4
SCM5B41-05	±5V	3, 4
SCM5B41-06	±10V	3, 4
SCM5B41-07	±20V	1, 2
SCM5B41-08	±20V	3, 4
SCM5B41-09	±40V	1, 2
SCM5B41-10	±40V	3, 4

ACCELEROMETER-INPUT MODULES, 2.5kHz to 20kHz BW

Gain, bandwidth, and excitation are switch-programmable

MODEL	INPUT RANGE	OUTPUT RANGE
SCM5B48-01	±10V (max)	±10V
SCM5B48-02	±10V (max)	±5V

VOLTAGE OUTPUT-MODULES, 50mA DRIVE CAPACITY, 400 Hz BW

MODEL	INPUT RANGE	OUTPUT RANGE
SCM5B49-01	0 to +5V	±5V
SCM5B49-02	±5V	±5V
SCM5B49-03	±5V	0 to +5V
SCM5B49-04	0 to +10V	±10V
SCM5B49-05	±10V	±10V
SCM5B49-06	±10V	0 to +10V
SCM5B49-07	±5V	±10V

2-WIRE TRANSMITTER-INTERFACE MODULES, 100Hz BW

MODEL	INPUT RANGE	OUTPUT RANGE
SCM5B42-01	4-20mA	+1 to +5V
SCM5B42-02	4-20mA	+2 to +10V

SCM5B Selection Guide (Continued)
VOLTAGE ATTENUATOR SYSTEM

The SCM5B is a two-module system - see data sheet for selection of second module.

MODEL	INPUT RANGE	OUTPUT RANGE
SCMHVAS-M100	±100V (70VAC (max))	±1V
SCMHVAS-M200	±200V (141VAC (max))	±1V
SCMHVAS-M300	±300V (212VAC (max))	±1V
SCMHVAS-M400	±400V (282VAC (max))	±1V
SCMHVAS-M500	±500V (353VAC (max))	±1V
SCMHVAS-M600	±600V (424VAC (max))	±1V
SCMHVAS-M700	±700V (495VAC (max))	±1V
SCMHVAS-M800	±800V (1414VAC (max))	±1V
SCMHVAS-M900	±900V (636VAC (max))	±1V
SCMHVAS-M1000	±1000V (707VAC (max))	±1V
SCMHVAS-M1500	±1500V (1060VAC (max))	±1V
SCMHVAS-M2000	±2000V (1414VAC (max))	±1V
SCMHVAS-MPT	Attenuator Module, Pass-Thru 1-to-1	

MODEL	DESCRIPTION
SCMVAS-PB8	Backpanel, 8-channel
SCMVAS-PB8D	Backpanel, 8-channel, DIN-rail Mount
SCMVAS-PB16	Backpanel, 16-channel
SCMVAS-PB16D	Backpanel, 16-channel, DIN-rail Mount

† OUTPUT RANGES AVAILABLE

Output Range	Part No. Suffix	Example
1. -5V to +5V	NONE	SCM5B30-01
2. -10V to +10V	D	SCM5B30-01D
3. 0V to +5V	NONE	SCM5B30-04
4. 0V to +10V	D	SCM5B30-04D
5. 4-20mA	C	SCM5B33-01C
6. 0-20mA	E	SCM5B33-01E
7. 0mA-1mA	B	SCM5B33-01B

***THERMOCOUPLE ALLOY COMBINATIONS**

Standards: DIN IEC 584, ANSI MC96-1-82, JIS C 1602-1981

Type	Material
J	Iron vs. Copper-Nickel
K	Nickel-Chromium vs. Nickel-Aluminum
T	Copper vs. Copper-Nickel
E	Nickel-Chromium vs. Copper-Nickel
R	Platinum-13% Rhodium vs. Platinum
S	Platinum-10% Rhodium vs. Platinum
B	Platinum-30% Rhodium vs. Platinum-6% Rhodium
C	Tungsten-5% Rhenium vs. Tungsten-26% Rhenium
N	Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicon- 0.1% Magnesium

****RTD STANDARDS**

Type	Alpha Coefficient	DIN	JIS	IEC
100Ω Pt	0.00385			
120Ω Ni	0.00672	DIN 43760	JIS C 1604-1989	IEC 751
10Ω Cu	0.004274			

ACCESSORIES
MODEL DESCRIPTION
BACKPANELS

SCMPB01 Non-multiplexed, 16-channel backpanel for SCM5B
 SCMPB01-1 Non-multiplexed, 16-channel backpanel, no CJC
 SCMPB01-2 SCMPB01 with DIN-rail mounting option
 SCMPB01-3 SCMPB01-1 with DIN-rail mounting option
 SCMPB02 Multiplexed, 16-channel backpanel
 SCMPB02-1 Multiplexed, 16-channel backpanel, no CJC
 SCMPB02-2 SCMPB02 with DIN-rail mounting option
 SCMPB02-3 SCMPB02-1 with DIN-rail mounting option
 SCMPB03 Single channel backpanel *Mounting hardware not included*
 SCMPB03-2 SCMPB03 with DIN-rail mounting hardware
 SCMPB04 Dual-channel backpanel *Mounting hardware not included*
 SCMPB04-1 Dual-channel backpanel, DIN-rail mount, no CJC
 SCMPB04-2 SCMPB04 with DIN-rail mounting hardware
 SCMPB04-3 SCMPB04-1 with DIN-rail mounting hardware
 SCMPB05 Non-multiplexed, 8-channel backpanel
 SCMPB05-1 Non-multiplexed, 8-channel backpanel, no CJC
 SCMPB05-2 SCMPB05 with DIN-rail mounting option
 SCMPB05-3 SCMPB05-1 with DIN-rail mounting option
 SCMPB06 Multiplexed, 8-channel backpanel
 SCMPB06-1 Multiplexed, 8-channel backpanel, no CJC
 SCMPB06-2 SCMPB06 with DIN-rail mounting option
 SCMPB06-3 SCMPB06-1 with DIN-rail mounting option
 SCMPB07 8-channel high-density backpanel
 SCMPB07-1 SCMPB07, no CJC
 SCMPB07-2 SCMPB07, DIN-rail mount
 SCMPB07-3 SCMPB07, no CJC, DIN-rail mount

MOUNTING RACK

SCMXRK-002 19-inch metal rack for mounting analog backpanels

DIN-MOUNTING HARDWARE and BOARD

SCMXIF-DIN Universal Interface Board
 SCMXBEFE Base element with snap foot
 SCMXBE Base element without snap foot
 SCMXSE Side element
 SCMXVS Connection pins
 SCMXRAIL1-XX DIN EN50022-35x7.5 (slotted steel), length -XX in meters
 SCMXRAIL2-XX DIN EN50035-G32 (slotted steel), length -XX in meters
 SCMXRAIL3-XX DIN EN50022-35x15 (slotted steel), length -XX in meters

INTERFACE CABLES

SCMXCA004-01,-02 System interface cable for both analog backpanels
 SCMXIF Ribbon cable to screw terminal interface board

CJCs, JUMPERS, RESISTORS

SCMXCJC Encapsulated cold junction compensation circuit
 SCMXJP-003 Package of 10 jumpers
 SCMXR1 Precision 20Ω resistor for SCM5B32 and SCM5B42

POWER SUPPLIES

SCMXPRT-001 Power supply, 1A, 5VDC, 120VAC U.S.
 SCMXPRT-001D SCMXPRT-001 with DIN-rail mounting option
 SCMXPRE-001 Power supply, 1A, 5VDC, 220VAC European
 SCMXPRE-001D SCMXPRE-001 with DIN-rail mounting option
 SCMXPRT-003 Power supply, 3A, 5VDC, 120VAC U.S.
 SCMXPRE-003 Power supply, 3A, 5VDC, 220VAC European
 SCM5B EVALUATION BOARD
 SCM5B-EVAL Single-channel SCM5B evaluation board
 SCM5B-PROTO Breadboard kit
 SCM5BPT Non-isolated signal pass thru module