



SCM5B

Isolated SCM5B Analog Signal Conditioning Products



Features

- $\pm 0.03\%$ Accuracy (Typical)
- $\pm 0.005\%$ Linearity
- 1500Vrms Transformer Isolation & 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power (30mA Typical)
- 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 II Directive 2011/65/EU

Applications

- Designed for Industrial Plant Environments
- Protects User Equipment from Lightning and Heavy Equipment Power-Line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

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.

Improved 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 gage, 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, while maintaining equivalent price:

- **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.



SCM5B Selection Guide

ANALOG VOLTAGE INPUT MODULES, NARROW BANDWIDTH (4Hz BW) Page 6

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 Pages 8 and 26

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

ISOLATED TRUE RMS INPUT MODULES Page 10

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) Page 12

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°	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) Page 14

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) Page 16

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) Page 18

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 GAGE INPUT MODULES (±5V OUTPUT[†], 4Hz or 10kHz BW) Pages 20 and 22

MODEL	INPUT		EXCITATION	OUTPUT RANGE [†]
	10kHz	4Hz		
SCM5B38-01	-31	±10mV Full Bridge Input, (3mV/V)	+3.333V	1, 2
SCM5B38-02	-32	±30mV Full Bridge Input, (3mV/V)	+10.000V	1, 2
SCM5B38-03	-33	±10mV Half Bridge Input, (3mV/V)	+3.333V	1, 2
SCM5B38-04	-34	±30mV Half Bridge Input, (3mV/V)	+10.000V	1, 2
SCM5B38-05	-35	±20mV Full Bridge Input, (2mV/V)	+10.000V	1, 2
SCM5B38-06	-36	±33.3mV Full Bridge Input, (10mV/V)	+3.333V	1, 2
SCM5B38-07	-37	±100mV Full Bridge Input, (10mV/V)	+10.000V	1, 2

ANALOG CURRENT OUTPUT MODULES, 400Hz AND 1kHz BANDWIDTH Pages 24 and 26

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

SCM5B Selection Guide (Continued)
MATCHED PAIR SERVO/MOTOR CONTROLLER DRIVERS (1kHz BW)

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

ANALOG VOLTAGE INPUT MODULES, WIDE BANDWIDTH (10kHz BW)

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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

2-WIRE TRANSMITTER INTERFACE MODULES (100Hz BW) Page 30

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

GENERAL PURPOSE INPUT MODULES, DC EXCITATION Page 32

MODEL	MAXIMUM INPUT	OUTPUT [†]
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

FREQUENCY INPUT MODULES Page 34

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

LINEARIZED THERMOCOUPLE INPUT MODULES (0 to +5V OUTPUT[†], 4Hz BW)

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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

ACCELEROMETER INPUT MODULES (2.5kHz to 20kHz BW) Page 38

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) Page 40

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

VOLTAGE ATTENUATOR SYSTEM Page 43

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

MODEL	INPUT RANGE	OUTPUT RANGE
SCMAS-M100	±100V (70VAC Max)	±1V
SCMAS-M200	±200V (141VAC Max)	±1V
SCMAS-M300	±300V (212VAC Max)	±1V
SCMAS-M400	±400V (282VAC Max)	±1V
SCMAS-M500	±500V (353VAC Max)	±1V
SCMAS-M600	±600V (424VAC Max)	±1V
SCMAS-M650	±650V (460VAC Max)	±1V
SCMAS-M700	±700V (495VAC Max)	±1V
SCMAS-MPT	1 to 1	

MODEL	DESCRIPTION
SCMAS-PB8	Backpanel, 8-Channel
SCMAS-PB8D	Backpanel, 8-Channel, DIN Rail Mount
SCMAS-PB16	Backpanel, 16-Channel
SCMAS-PB16D	Backpanel, 16-Channel, DIN Rail Mount

SCM5B Selection Guide (Continued)
ACCESSORIES Starts on Page 48

MODEL	DESCRIPTION
SCMPB01	Non-multiplexed, 16-channel backpanel.
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.
SCMXBEFE	Base element with snap foot.
SCMXBE	Base element without snap foot.
SCMXSE	Side element.
SCMXVS	Connection pins.
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.
SCMXEV	Single channel SCM5B evaluation board.
SCMXCA004-01,-02	System interface cable for both analog backpanels.
SCMXRK-002	19-inch metal rack for mounting analog backpanels.
SCMXIF	Ribbon cable to screw terminal interface board.
SCMXIF-DIN	Universal Interface Board.
SCMXCJC	Encapsulated cold junction compensation circuit.
SCM5BPT	Non-isolated signal pass thru module.
SCMXJP-003	Package of 10 jumpers.
SCMXR1	Precision 20Ω resistor for SCM5B32 and SCM5B42.
SCM5B-PROTO	Breadboard Kit.
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.
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.

NOTES:
[†]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 to 20mA	C	SCM5B33-01C
6. 0 to 20mA	E	SCM5B33-01E
7. 0 to 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	DIN 43760	JIS C 1604-1989	IEC 751
120Ω Ni	0.00672			
10Ω CU	0.004274			