



► Plug-In Panel Products - SCM5B, SCM7B, 8B, SCM9B

Characteristic	SCM5B	SCM7B	8B	SCM9B
Mechanical Format	Modular plug-in-board	Modular plug-in-board	Modular plug-in-board	Plug-in or hockey puck
Isolation: Voltage Type	1500Vrms Transformer 3-way	1500Vrms Transformer 2-way	1500Vrms Transformer 2-way	500Vrms Transformer/Optical 2-way
CMR	160dB	110dB	100dB	100dB
NMR (60Hz) Rejection	95dB (4Hz modules)	85dB (3Hz modules)	70dB	Software configurable
Bandwidth	4Hz to 10kHz	3Hz to 10kHz	3Hz to 20kHz	Software configurable
Filter	6-pole	5-pole	3- to 5-pole	Digital
Input Voltage Withstand	240Vrms	120Vrms	240Vrms	120 or 250Vrms
Input Signals	(1)	(2)	(1)	(3)
Output Range to System	0-5VDC, 0-10VDC, ±5VDC, ±10VDC, 0-1mA, 0-20mA, 4-20mA	1-5VDC, 0-5VDC, 0-10VDC, ±10VDC	0-5VDC, ±5VDC	RS-232 or RS-485
Output Range to Field	4-20mA, 0-20mA, ±20mA, ±5VDC, ±10VDC, 0-5VDC, 0-10VDC	±10VDC, 4-20mA, 0-20mA	4-20mA, 0-20mA, ±20mA, ±5VDC, ±10VDC, 0-5VDC, 0-10VDC	4-20mA, 0-20mA, 0-1VDC, ±1VDC, 0-5VDC, ±5VDC, 0-10VDC, ±10VDC
Gain/Offset Adjust	Fixed	Fixed	Fixed	Auto zero, auto cal
Accuracy	0.03% Typical	0.03% Typical	0.05% Typical	0.02% Typical
Output Control	Enable/Disable	Always enabled	Always enabled	RS-232 or RS-485
Supply Voltage	+5VDC ±5% at 30-350mA	14-35VDC (+24V Nom) at 12-70mA	+5VDC ±5% at 25-225mA	12-30VDC at 0.75W max
Dimensions (h)(w)(d)	2.28" x 2.26" x 0.6" 58mm x 57mm x 15mm	2.13" x 1.7" x 0.6" 54.1mm x 43.3mm x 15.4mm	1.11" x 1.65" x 0.4" 28.1mm x 41.9mm x 10.2mm	3.60" x 2.45" x 1.10" 91.4mm x 62.2mm x 27.9mm
Interface	14-pin	5- or 6-pin	5-, 6- or 7-pin	10- or 20-pos term block
Customization	yes	yes	yes	no

► Din Rail, Head Mount Products - DSCA, DSCT, DSCL, DSCP, SCTP

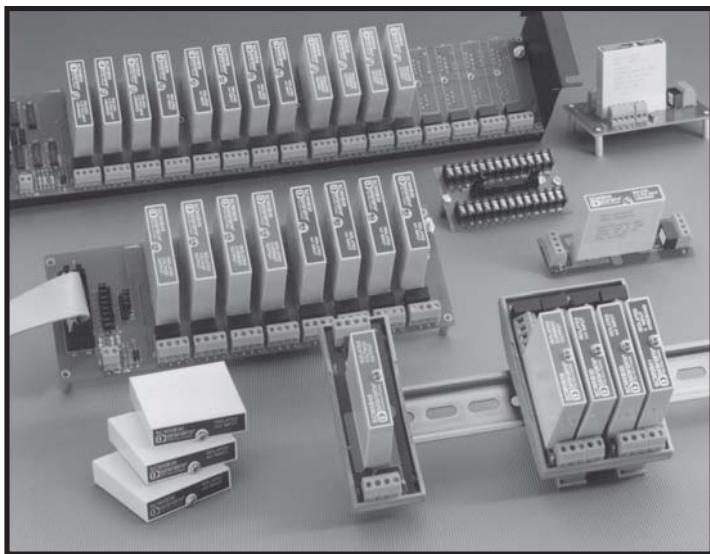
Characteristic	DSCA	DSCT	DSCL	DSCP/SCTP
Mechanical Format	DIN rail mount	DIN rail mount	DIN rail, component, panel	DIN rail, head mount
Isolation: Voltage Type	1500Vrms Transformer 3-way	1500Vrms Transformer 3-way	500Vrms to 4000Vrms Transformer/optical	Non/1500Vrms/2300Vrms Transformer/optical 3-way
CMR	160dB	160dB	70-110dB	Consult data sheet
NMR (60Hz) Rejection	85dB (3Hz modules)	85dB (3Hz XMTRs)	20dB/decade	SW or dip-switch config
Bandwidth	3Hz to 3kHz	3Hz	5Hz to 750Hz	SW or dip-switch config
Filter	6-pole	6-pole	2-pole	SW or dip-switch config
Input Voltage Withstand	240Vrms	240Vrms	N/A	N/A
Input Signals	(1)	(5)	0/4-20mA	(4)
Output Range to System	0-10VDC, ±10VDC, 0-1mA 4-20mA, 0-20mA	4-20mA	0/4-20mA, V, & selectable	SW or dip-switch config
Output Range to Field	4-20mA, 0-20mA, ±20mA, ±10VDC, 0-10VDC	N/A	N/A	N/A
Gain/Offset Adjust	±5%	±10%	±10% on some models	Software configurable
Accuracy	0.03% Typical	0.03% Typical	0.05% to 0.1% Typical	0.1% Typical
Output Control	Always enabled	Always enabled	Always enabled	Always enabled
Supply Voltage	15-30VDC (+24V Nom) at 25-80mA	10.8-100VDC loop at 4-20mA	24VDC loop at 4-20mA	24VDC loop, or 24 to 230VDC/VAC
Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" 75mm x 22.5mm x 105mm	2.95" x 0.89" x 4.13" 75mm x 22.5mm x 105mm	Consult data sheet	Consult data sheet
Interface	8-pos term block	6-pos term block	Terminal block	Terminal block
Customization	yes	yes	no	SW or dip-switch config

NOTES:

(1) V, I, RTD, TC, Potentiometer, Strain, True rms, 2-wire, Frequency
(2) V, I, RTD, TC, Potentiometer, 2-wire(3) V, I, RTD, TC, Frequency, Digital I/O
(4) V, I, RTD, TC

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.

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

► Features

- ±0.03% Accuracy (Typical)
- ±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
- ±1µV°C Drift
- Output Noise as Low as 150µVrms
- -40°C to +85°C Operating Temperature
- CSA C/US Certified
(Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS Directive 2002/95/EC

► 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

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)

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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)

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MODEL	INPUT	EXCITATION	OUTPUT RANGE [†]
SCM5B38-01	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) Page 28

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 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

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°)	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 SCMVAS is a two module system - see data sheet for selection of second module.

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

► **SCM5B Selection Guide (Continued)**

ACCESSORIES Starts on Page 48

<u>MODEL</u>	<u>DESCRIPTION</u>
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.
SCMPB03-1	Mounting hardware not included.
SCMPB03-2	SCMPB03 with DIN rail mounting hardware.
SCMPB04	Dual channel backpanel.
SCMPB04-1	Mounting hardware not included.
SCMPB04-2	Dual channel backpanel, DIN rail mount, no CJC.
SCMPB04-3	SCMPB04 with DIN rail mounting hardware.
SCMXBEFE	SCMPB04-1 with DIN rail mounting hardware.
SCMXBE	Base element with snap foot.
SCMXSE	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.
SCMXFS-003	Package of 10, 4A fuses.
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

<u>TYPE</u>	<u>MATERIAL</u>
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

<u>TYPE</u>	<u>ALPHA COEFFICIENT</u>	<u>DIN</u>	<u>JIS</u>	<u>IEC</u>
100Ω Pt	0.00385	DIN 43760	JIS C 1604-1989	IEC 751
120Ω Ni	0.00672			
10Ω CU	0.004274			

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 1). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

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.

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
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 0.03\%$ Accuracy
- $\pm 0.005\%$ Linearity
- $\pm 1\mu V^\circ C$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

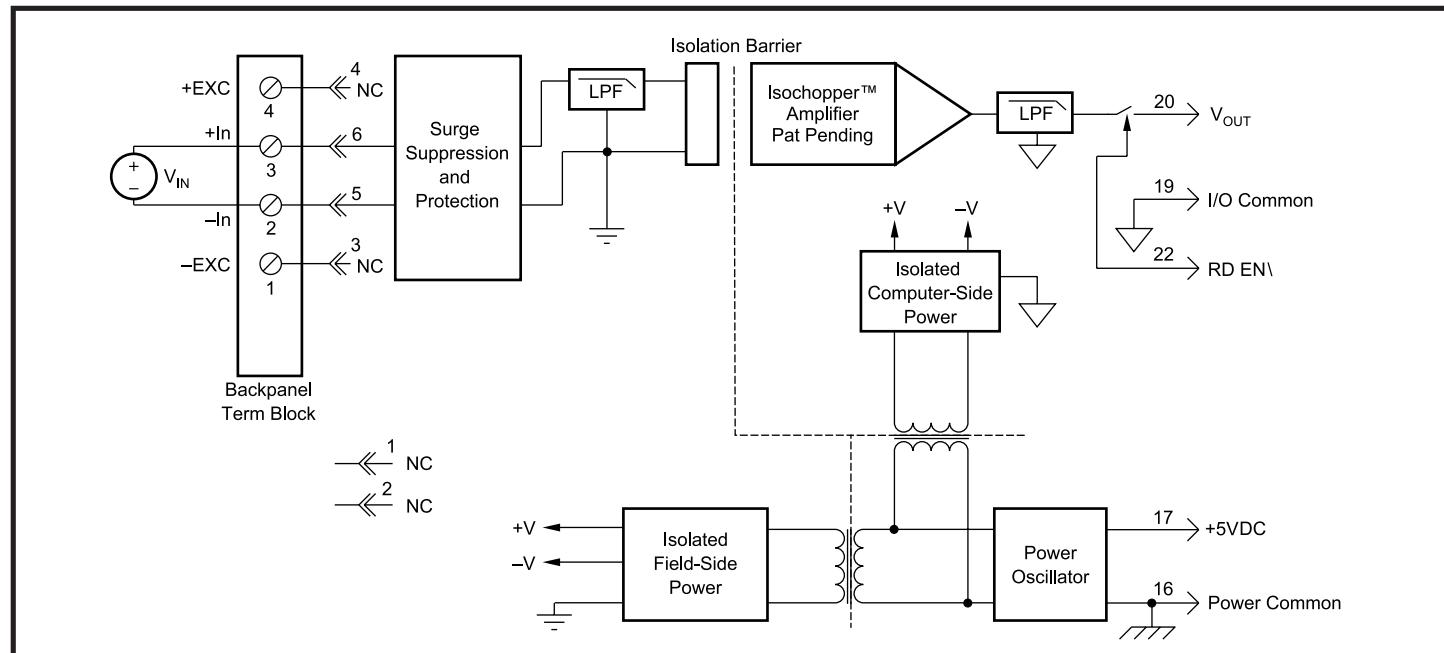


Figure 1: SCM5B30/31 Block Diagram

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

Module	SCM5B30	SCM5B31
Input Range	$\pm 10\text{mV}$ to $\pm 1\text{V}$	$\pm 1\text{V}$ to $\pm 40\text{V}$
Input Bias Current	$\pm 0.5\text{nA}$	$\pm 0.05\text{nA}$
Input Resistance		
Normal	50Ω	$650\text{k}\Omega$ (-01 thru -06) $2\text{M}\Omega$ (-07 thru -10)
Power Off	$40\text{k}\Omega$	$650\text{k}\Omega$ (-01 thru -06) $2\text{M}\Omega$ (-07 thru -10)
Overload	$40\text{k}\Omega$	$650\text{k}\Omega$ (-01 thru -06) $2\text{M}\Omega$ (-07 thru -10)
Input Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	160dB	*
NMR	95dB at 60Hz, 90dB at 50Hz	*
Accuracy ⁽¹⁾	$\pm 0.03\%$ Span	*
Linearity	$\pm 0.005\%$ Span	*
Stability		
Input Offset	$\pm 1\mu\text{V}/^\circ\text{C}$	$\pm 20\mu\text{V}/^\circ\text{C}$
Output Offset	$\pm 20\mu\text{V}/^\circ\text{C}$	*
Gain	$\pm 25\text{ppm}/^\circ\text{C}$	$\pm 50\text{ppm}/^\circ\text{C}$
Noise		
Input, 0.1 to 10Hz	$0.2\mu\text{Vrms}$	$2\mu\text{Vrms}$
Output, 100kHz	$200\mu\text{Vrms}$	*
Bandwidth, -3dB	4Hz	*
Response Time, 90% Span	0.2s	*
Output Range	See Ordering Information	*
Output Resistance	50Ω	*
Output Protection	Continuous Short to Ground	*
Output Selection Time (to $\pm 1\text{mV}$ of V_{OUT})	$6\mu\text{s}$ at $C_{\text{load}} = 0$ to 2000pF	*
Output Current Limit	$\pm 8\text{mA}$	*
Output Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current "0,1"	0.5 μA	*
Power Supply Voltage	+5VDC $\pm 5\%$	*
Power Supply Current	30mA	*
Power Supply Sensitivity	$\pm 2\mu\text{V}/\%$ RTI ⁽²⁾	$\pm 200\mu\text{V}/\%$ RTI ⁽²⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	-40°C to +85°C	*
Storage Temp. Range	-40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A $\pm 0.5\%$ Span Error	*
ESD,EFT	Performance B	*

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

* Same specification as SCM5B30.

(1) Includes linearity, hysteresis and repeatability.

(2) RTI = Referenced to input.

(3) Same as SCM5B31-01 with 50Ω input resistance.**Ordering Information**

Model	Input Range	Output Range [†]
SCM5B30-01	-10mV to +10mV	1, 2
SCM5B30-02	-50mV to +50mV	1, 2
SCM5B30-03	-100mV to +100mV	1, 2
SCM5B30-04	-10mV to +10mV	3, 4
SCM5B30-05	-50mV to +50mV	3, 4
SCM5B30-06	-100mV to +100mV	3, 4
SCM5B30-07 ⁽³⁾	-1V to +1V	1, 2
SCM5B31-01	-1V to +1V	1, 2
SCM5B31-02	-5V to +5V	1, 2
SCM5B31-03	-10V to +10V	1, 2
SCM5B31-04	-1V to +1V	3, 4
SCM5B31-05	-5V to +5V	3, 4
SCM5B31-06	-10V to +10V	3, 4
SCM5B31-07	-20V to +20V	1, 2
SCM5B31-08	-20V to +20V	3, 4
SCM5B31-09	-40V to +40V	1, 2
SCM5B31-10	-40V to +40V	3, 4

†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

SCM5B32

Analog Current Input Modules

Description

Each SCM5B32 current input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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.

A precision 20Ω current conversion resistor is supplied with the SCM5B32 module. Sockets are provided on the SCMPB01/02/03/04/05/06/07 backpanels to allow installation of this resistor. Extra resistors are available under part number SCMXR1.

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 SCM5B32 modules provides protection against accidental connection of power-line voltages up to 240VAC.

► Features

- Accepts Milliamp Level Signals
- High-Level Voltage Outputs
- 1500VRMS Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 0.03\%$ Accuracy
- $\pm 0.005\%$ Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

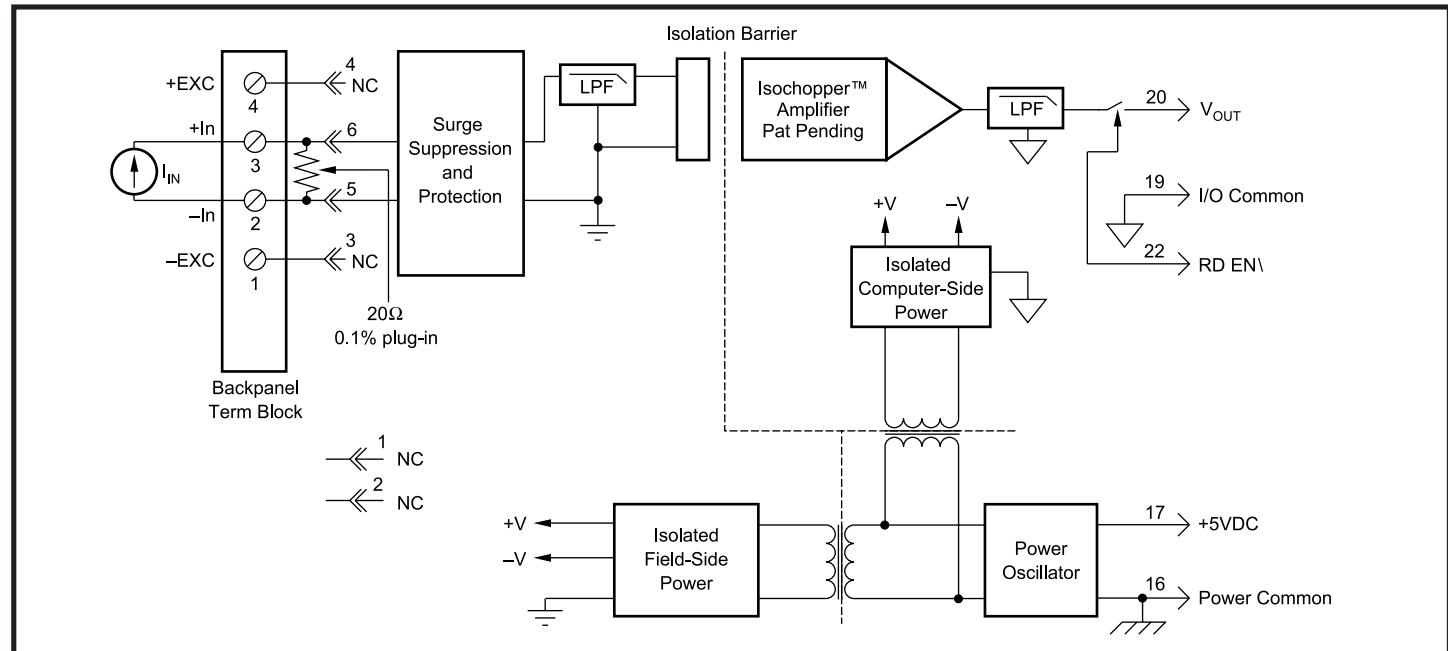


Figure 1: SCM5B32 Block Diagram

Specifications Typical^{*} at T_A=+25°C and +5VDC power

Module	SCM5B32
Input Range	0mA to 20mA or 4mA to 20mA
Input Resistor Value	20.00Ω
Accuracy	±0.1%
Stability	±10ppm/°C
Input Protection	240VRms max
Continuous	ANSI/IEEE C37.90.1
Transient	
CMV, Input to Output	1500VRms max
Continuous	ANSI/IEEE C37.90.1
Transient	160dB
CMR (50Hz or 60Hz)	95dB at 60Hz, 90dB at 50Hz
NMR	
Accuracy ⁽¹⁾	±0.03% Span
Linearity	±0.005% Span
Stability	
Input Offset	±50nA/°C
Output Offset	±20μV/°C
Gain	±25ppm/°C
Noise	
Input, 0.1Hz to 10Hz	10nArms
Output, 100kHz	200μVRms
Bandwidth, -3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to ±1mV of V _{OUT})	6μs at C _{load} = 0 to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5μA
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±20μV/% RTI ⁽²⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability. Does not include SCMXR1 accuracy.

(2) RTI = Referenced to input.

Ordering Information

Model	Input Range	Output Range [†]
SCM5B32-01	4mA to 20mA	3, 4
SCM5B32-02	0mA to 20mA	3, 4

Refer to SCM5B392 specifications, p. 27, for additional current input models.

[†]Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B32-01
4. 0V to +10V	D	SCM5B32-01D

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, in addition to the 5VDC module power, an external loop supply of 4.2V to 26V is required. The loop supply connection, with series load, is between Pin 20 (+) and Pin 19 (-).

Due to circuit limitations, SCM5B33-04x and -05x are not ATEX compliant.

► 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 Transient Protection
- CSA C/US Certified
- CE Compliant
- ATEX Compliant (all models except SCM5B33-04x, -05x)
- Mix and Match SCM5B Types on Backpanel

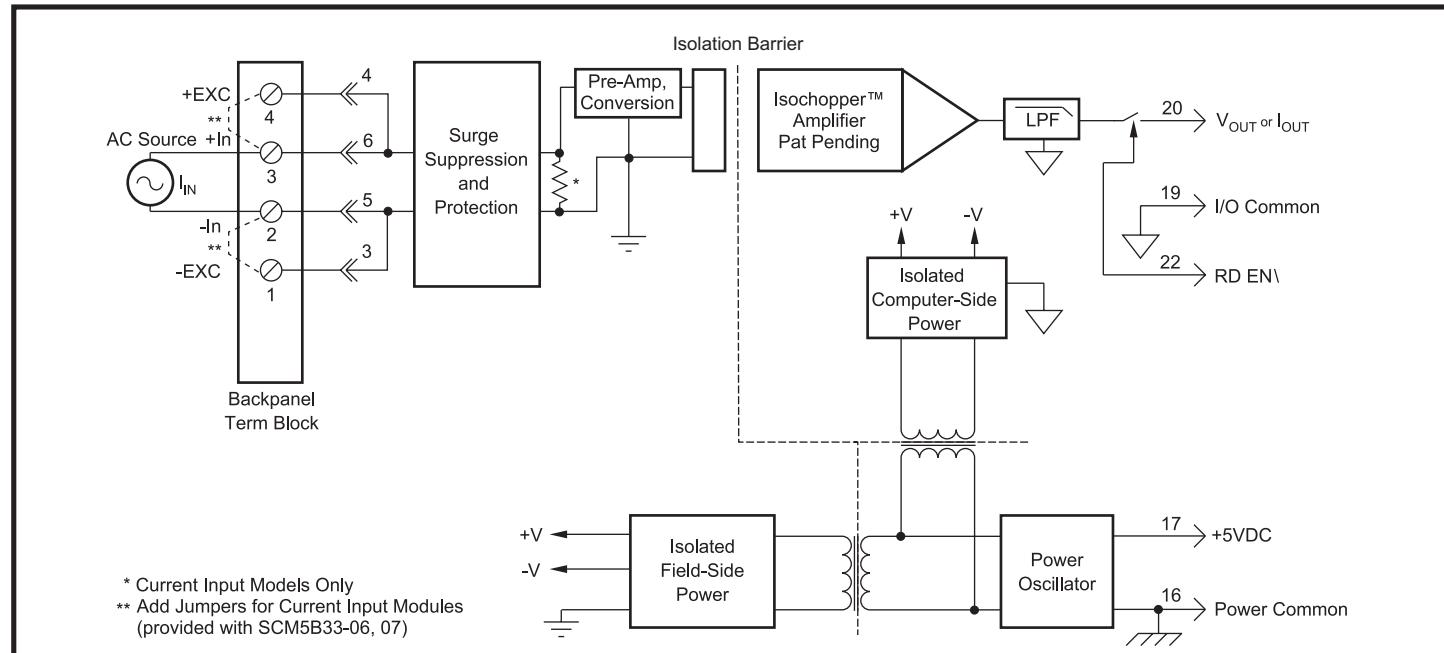


Figure 1: SCM5B33 Block Diagram

SpecificationsTypical* at $T_A=+25^\circ\text{C}$ and +5VDC power

Module	SCM5B33
Input	
Signal Range	100mV to 300Vrms, 0 to 5Arms
Standard Frequency Range	45Hz to 1000Hz
Extended Frequency Range	1kHz to 20kHz
Impedance	1 MΩ shunted by 100pF (-01 thru -05), 0.10Ω (-06), 0.025Ω (-07)
Coupling	AC
Protection ⁽¹⁾	
Continuous (-01 thru -05)	350Vrms
Continuous (-06 thru -07)	10Arms
Transient (-01 thru -05)	ANSI/IEEE C37.90.1
Transient (-06 thru -07)	See note 2
Output	
Signal Range	0-5V or 0-10V or 0-1mA or 0-20mA or 4-20mA
Current Limit	1.4mA (0-1mA models), 30mA (0/4-20mA models), 8mA (0.5, 0-10V models)
Voltage Limit	±18V (0.5, 0-10V models)
Resistance	50Ω (0.5, 0-10V models)
Protection	Continuous Short to Ground
Ripple and Noise (100kHz)	0.025% Span rms
Accuracy (10-100% Span) ⁽³⁾⁽⁴⁾	
Sinusoid	±0.25% Span
50/60 Hz	±0.25% Reading Additional Error
45Hz to 1kHz	±0.75% Reading Additional Error
1kHz to 20kHz	
Non-Sinusoid	±0.05% Reading Additional Error
Crest Factor = 1 to 2	±0.15% Reading Additional Error
Crest Factor = 2 to 3	±0.30% Reading Additional Error
Crest Factor = 3 to 4	±0.40% Reading Additional Error
Crest Factor = 4 to 5	
Vs. Temperature	±100ppm/°C
Isolation (Common Mode)	
Input to Output, Input to Power	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1
Output to Power	
Continuous	50VDC max
Rejection (50-60Hz Common Mode)	100dB
Response Time (0 to 99%)	<400ms
Output Enable Control	
Selection Time	6.0µS at $C_{LOAD} = 0$ to 2000pF
Max Logic "0"	+0.8V
Min/Max Logic "1"	+2.4V/+36V
Current "0,1"	0.5µA
Loop Voltage	+4.2VDC min, +26VDC max, -40°C to +85°C
Load Resistance (maximum)	(Loop Voltage - 4.2) / (Loop Current)
Supply Voltage	+5VDC ±5%
Current	120mA
Sensitivity	±200ppm/%
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
HazLoc ATEX	All models except SCM5B33-04x, -05x
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(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 $\sqrt{2500} / (\text{event time})$. For less than 1 second, ANSI/IEEE C37.90.1 applies with a 0.05Ω load. For greater than 25 seconds, the 10A rms continuous rating applies.**Ordering Information**

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

[†] Modules can be ordered with other input/output ranges. Consult factory for ordering details and specifications.**Output Ranges Available**

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

(3) At standard 60Hz factory calibration. Consult factory for calibration at other frequencies.

(4) For 0-10% Span measurements, add 0.25% accuracy error (-02 through -07) or 1.00% accuracy error (-01). Accuracy includes linearity, hysteresis and repeatability but not source or external shunt inaccuracy (if used).

SCM5B34

Linearized 2- or 3-Wire RTD Input Modules

Description

Each SCM5B34 RTD input module provides a single channel of RTD input which is filtered, isolated, amplified, linearized, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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.

RTD excitation is provided from the module by two matched current sources. When using a three-wire RTD, this method allows an equal current to flow in each RTD lead, which cancels the effects of lead resistances. The excitation currents are very small (0.25mA for 100 Ω Pt and 120 Ω Ni, and 1.0mA for 10 Ω Cu) which minimizes self-heating of the RTD.

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 SCM5B34 modules provides protection against accidental connection of power-line voltages up to 240VAC.

► Features

- Interfaces to 100 Ω Platinum, 10 Ω Copper, or 120 Ω Nickel RTDs
- Linearizes RTD Signal
- High-Level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

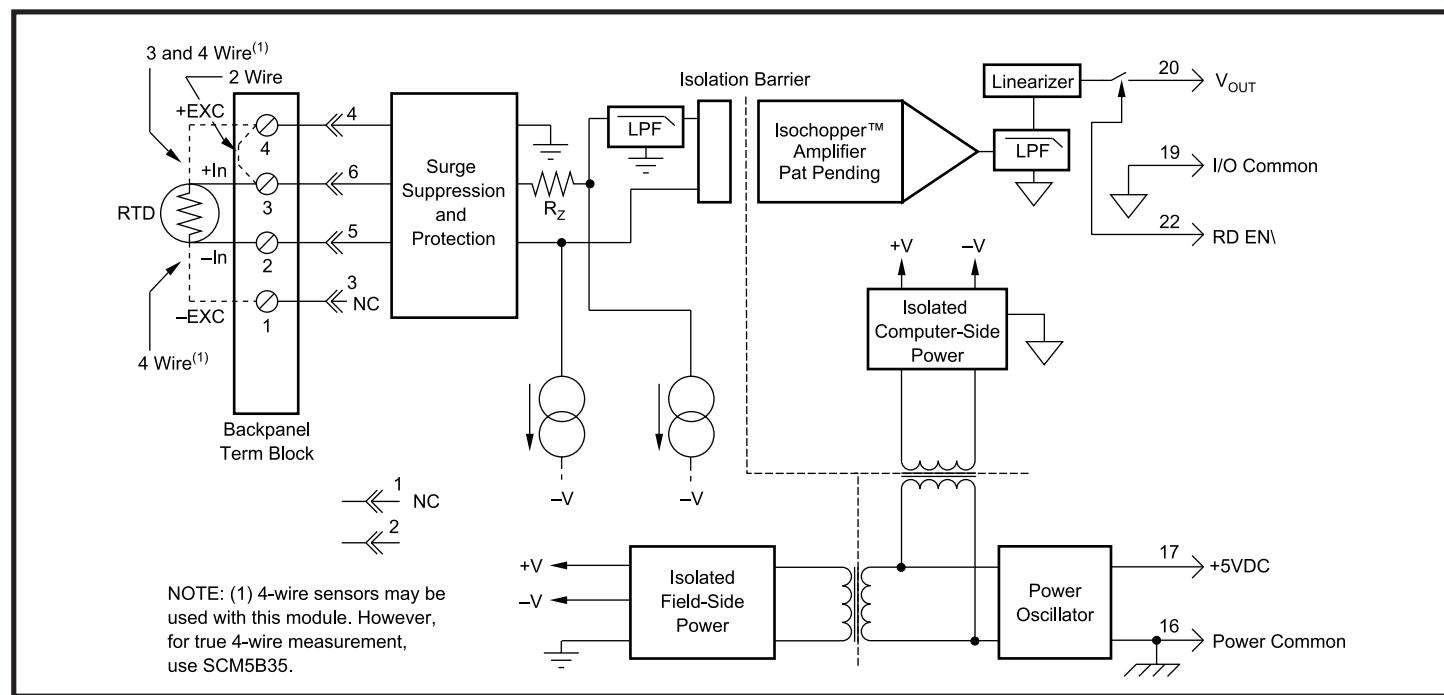


Figure 1: SCM5B34 Block Diagram

SpecificationsTypical* at $T_A=+25^\circ\text{C}$ and +5VDC power

Module	SCM5B34
Input Range Limits	-200°C to +850°C (100Ω Pt) -80°C to +320°C (120Ω Ni) -100°C to +260°C (10Ω Cu)
Input Resistance	
Normal	50MΩ
Power Off	40kΩ
Overload	40kΩ
Input Protection	240Vrms max ANSI/IEEE C37.90.1
Sensor Excitation Current	
100Ω Pt, 120Ω Ni	0.25mA
10Ω Cu	1.0mA
Lead Resistance Effect	
100Ω Pt, 120Ω Ni	±0.02°C/Ω ⁽¹⁾
10Ω Cu	±0.2°C/Ω ⁽¹⁾
CMV, Input to Output	
Continuous	1500Vrms max ANSI/IEEE C37.90.1
Transient	160dB
CMR (50 or 60Hz)	95dB at 60Hz, 90dB at 50Hz
NMR	
Accuracy	See Ordering Information
Conformity Error ⁽³⁾	±0.025% Span
Stability	
Input Offset	±0.01°C/C
Output Offset	±20µV/C
Gain	±35ppm of Reading/C
Noise	
Input, 0.1 to 10Hz	0.2µVRms
Output, 100kHz	200µVRms
Bandwidth, -3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to ±1mV of V_{OUT})	6µs at $C_{\text{load}} = 0$ to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Open Input Response	Downscale
Open Input Detection Time	3s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	
100Ω Pt, 120Ω Ni	0.2°C/V
10Ω Cu	0.5°C/V
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1 Class A
Radiated, Conducted	ISM, Group 1
Immunity EN61000-6-2	Performance A ±0.5% Span Error
RF	Performance B
ESD, EFT	

Ordering Information

Model	Input Range	Output Range [†]	Accuracy ⁽²⁾
100Ω Pt ** SCM5B34-01	-100°C to +100°C (-148°F to +212°F)	3, 4	±0.12°C
SCM5B34-02	0°C to +100°C (+32°F to +212°F)	3, 4	±0.06°C
SCM5B34-03	0°C to +200°C (+32°F to +392°F)	3, 4	±0.12°C
SCM5B34-04	0°C to +600°C (+32°F to +1112°F)	3, 4	±0.36°C
SCM5B34-05	-100°C to +200°C (-148°F to +392°F)	3, 4	±0.18°C
10Ω Cu ** SCM5B34C-01	0°C to +120°C (10Ω at 0°C) (+32°F to +248°F)	3, 4	±0.23°C
SCM5B34C-02	0°C to +120°C (10Ω at 25°C) (+32°F to +248°F)	3, 4	±0.23°C
SCM5B34C-03	0°C to +160°C (10Ω at 0°C) (+32°F to +320°F)	3, 4	±0.32°C
120Ω Ni ** SCM5B34N-01	0°C to +300°C (+32°F to +572°F)	3, 4	±0.23°C

**** 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			

†Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B34-01
4. 0V to +10V	D	SCM5B34-01D

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) "Ω" refers to the resistance in one lead.

(2) Includes conformity, hysteresis and repeatability.

(3) Conformity error is ±0.05% Span for SCM5B34N-01.

SCM5B35

Linearized 4-Wire RTD Input Modules

Description

In RTD temperature measurement applications requiring a very high level of accuracy, the SCM5B35 4-Wire RTD input module offers a significant advantage over 3-wire measurement techniques (Figure 1). The SCM5B35 measures only the voltage dropped across the RTD and almost completely ignores the resistance or length of the RTD lead wires. The SCM5B34 3-Wire RTD module provides lead resistance compensation, but requires equal lead resistances, while the SCM5B35 does not require matched lead resistances.

Each SCM5B35 RTD input module provides a single channel of RTD input which is filtered, isolated, amplified, linearized, and converted to a high-level analog voltage output. This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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.

RTD excitation is provided from the module by a precision current source. The excitation current is available on two leads which are separate from the two input signal measuring leads. The excitation current does not flow in the input signal leads, which allows RTD measurement to be totally independent of lead resistance. The excitation current is very small (0.25mA for 100 Ω Pt and 120 Ω Ni and 1.0 mA for 10 Ω Cu) which minimizes self-heating of the RTD.

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

► Features

- Interfaces to 100 Ω Platinum, 10 Ω Copper, or 120 Ω Nickel RTDs
- True 4-Wire Input
- Linearizes RTD Signal
- High-Level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

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 SCM5B35 modules provides protection against accidental connection of power-line voltages up to 240VAC.

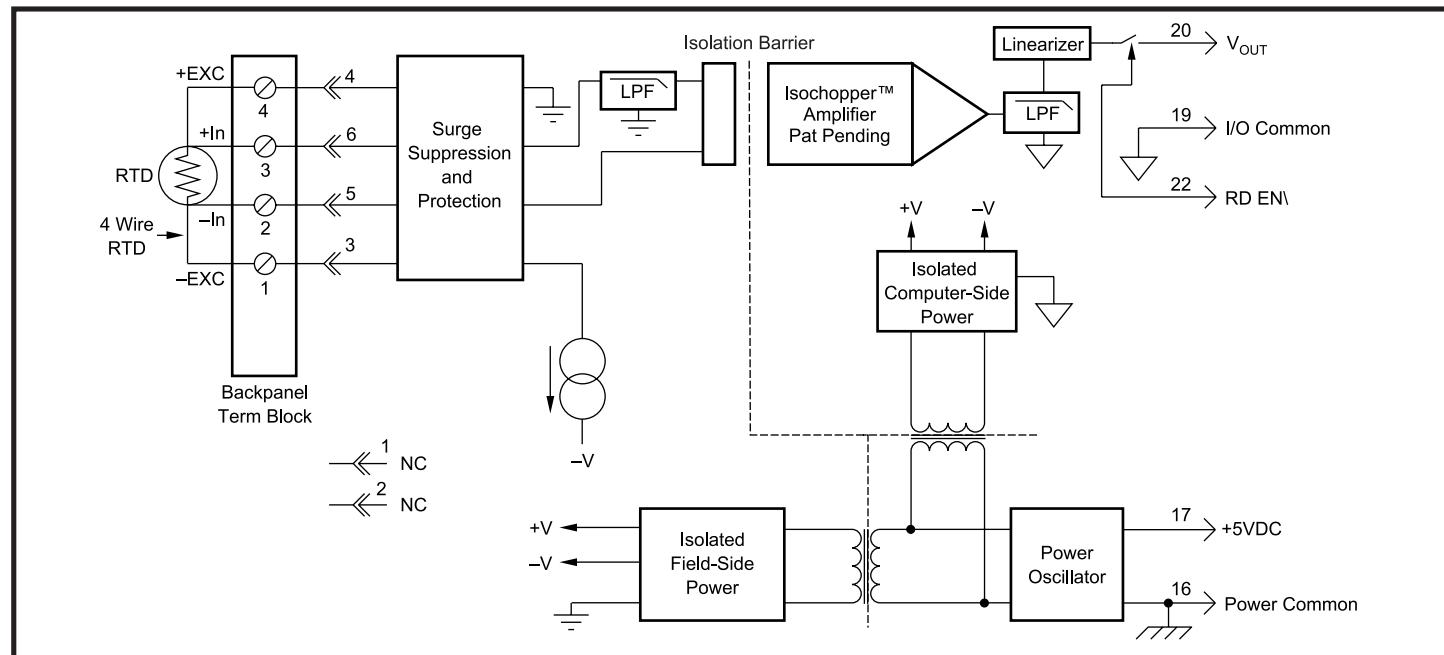


Figure 1: SCM5B35 Block Diagram

SpecificationsTypical^(*) at T_A=+25°C and +5VDC power

Module	SCM5B35
Input Range Limits	-200°C to +850°C (100Ω Pt) -80°C to +320°C (120Ω Ni) -100°C to +260°C (10Ω Cu)
Input Resistance	
Normal	50MΩ
Power Off	40kΩ
Overload	40kΩ
Input Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	
100Ω Pt, 120Ω Ni	0.25mA
10Ω Cu	1.0mA
Lead Resistance Effect	
100Ω Pt, 120Ω Ni	±0.0005°C/Ω ⁽¹⁾
10Ω Cu	±0.005°C/Ω ⁽¹⁾
CMV, Input to Output	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	160dB
NMR	95dB at 60Hz, 90dB at 50Hz
Accuracy	See Ordering Information
Conformity Error ⁽³⁾	±0.025% Span
Stability	
Input Offset	±0.01°C/C
Output Offset	±20µV/C
Gain	±35ppm of Reading/°C
Noise	
Input, 0.1 to 10Hz	0.2µVrms
Output, 100kHz	200µVrms
Bandwidth, -3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to ±1mV of V _{OUT})	6µs at C _{load} = 0 to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Open Input Response	
Lead 1,4	Downscale
Lead 2,3	Non-deterministic
Open Input Detection Time	3s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	
100Ω Pt, 120Ω Ni	±0.2°C/V
10Ω Cu	±0.5°C/V
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) "Ω" refers to the resistance in one lead.

(2) Includes conformity, hysteresis and repeatability.

(3) Conformity error is ±0.05% Span for SCM5B35N-01.

Ordering Information

Model	Input Range	Output Range [†]	Accuracy ⁽²⁾
100Ω Pt ** SCM5B35-01	-100°C to +100°C (-148°F to +212°F)	3, 4	±0.12°C
SCM5B35-02	0°C to +100°C (+32°F to +212°F)	3, 4	±0.06°C
SCM5B35-03	0°C to +200°C (+32°F to +392°F)	3, 4	±0.12°C
SCM5B35-04	0°C to +600°C (+32°F to +1112°F)	3, 4	±0.36°C
SCM5B35-05	-100°C to +200°C (-148°F to +392°F)	3, 4	±0.18°C
10Ω Cu ** SCM5B35C-01	0°C to +120°C (10Ω at 0°C) (+32°F to +248°F)	3, 4	±0.23°C
SCM5B35C-02	0°C to +120°C (10Ω at 25°C) (+32°F to +248°F)	3, 4	±0.23°C
SCM5B35C-03	0°C to +160°C (10Ω at 0°C) (+32°F to +320°F)	3, 4	±0.32°C
120Ω Ni ** SCM5B35N-01	0°C to +300°C (+32°F to +572°F)	3, 4	±0.23°C

SCM5B

****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			

†Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B35-01
4. 0V to +10V	D	SCM5B35-01D

SCM5B36

Potentiometer Input Modules

Description

Each SCM5B36 Potentiometer input module provides a single channel of potentiometer input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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.

Excitation for the potentiometer is provided from the module by two matched current sources. When using a three-wire potentiometer, this method allows cancellation of the effects of lead resistances. The excitation currents are very small (less than 1.0mA) which minimizes self-heating of the potentiometer.

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 in the output stage. 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 SCM5B36 module provides protection against accidental connection of power-line voltages up to 240VAC.

► Features

- Interfaces to Potentiometers up to 10,000 Ω
- High-Level Voltage Output
- 1500VRms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 0.03\%$ Accuracy
- $\pm 0.005\%$ Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

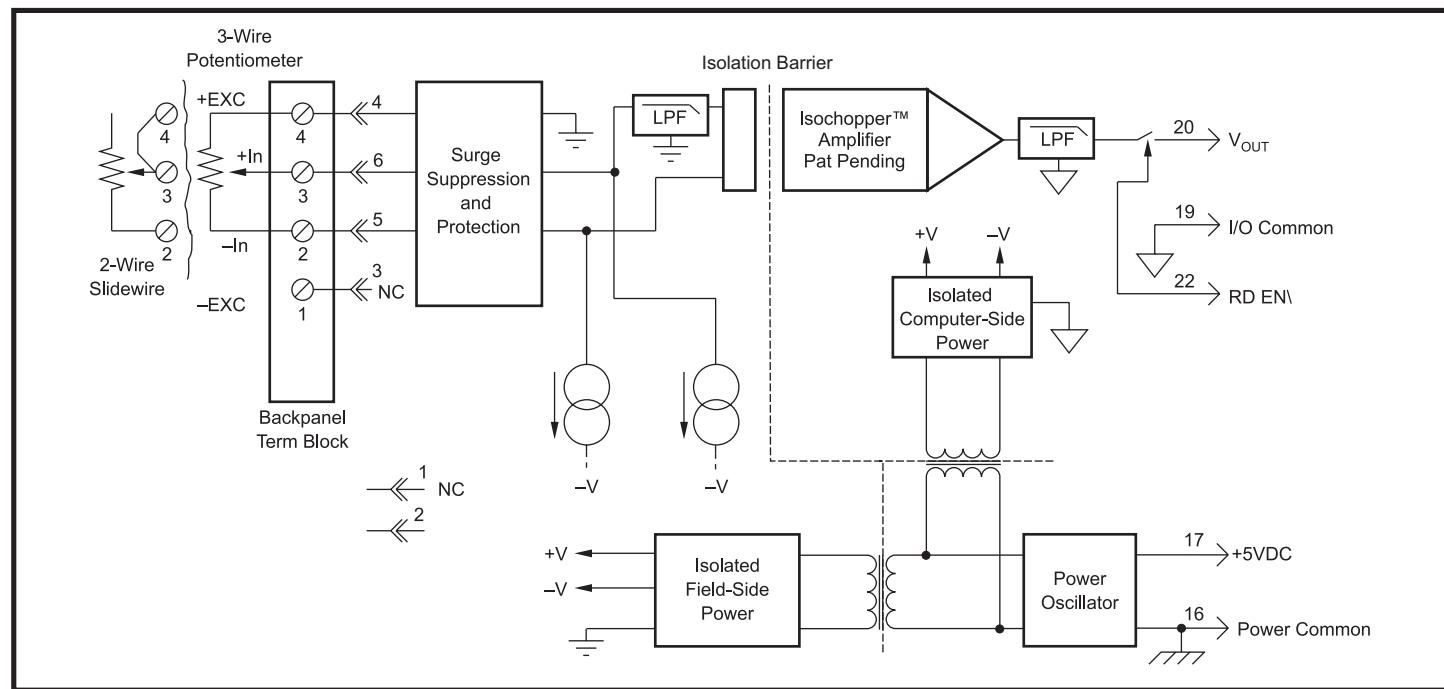


Figure 1: SCM5B36 Block Diagram

SpecificationsTypical⁽¹⁾ at T_A=+25°C and +5VDC power

Module	SCM5B36
Input Range	0 to 10kΩ
Input Resistance	50MΩ
Normal	40kΩ
Power Off	40kΩ
Overload	40kΩ
Input Protection	240VRms max ANSI/IEEE C37.90.1
Continuous	
Transient	
Sensor Excitation Current	0.25mA; 100Ω, 500Ω, 1kΩ Sensor 0.10mA; 10kΩ Sensor
Lead Resistance Effect	±0.01Ω/Ω; 100Ω, 500Ω, 1kΩ Sensor ±0.02Ω/Ω; 10kΩ Sensor
CMV, Input to Output	1500VRms max
Continuous	ANSI/IEEE C37.90.1
Transient	160dB
CMR (50 or 60Hz)	95dB at 60Hz, 90dB at 50Hz
NMR	
Accuracy ⁽¹⁾	±0.03% Span
Linearity	±0.005% Span
Stability	
Input Offset	±0.004Ω/°C; 100Ω, 500Ω, 1kΩ sensor ±0.010Ω/°C; 10kΩ sensor
Output Offset	±20µV/°C
Gain	±50ppm of Reading/°C
Noise	
Input, 0.1 to 10Hz	0.2µVRms
Output, 100kHz	200µVRms
Bandwidth, -3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to ±1mV of V _{OUT})	6µs at C _{load} = 0 to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Open Input Response	Downscale
Open Input Detection Time	3s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	+2µV/% RTI ⁽²⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability.

(2) RTI = Referenced to input.

Ordering Information

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

[†]Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B36-01
4. 0V to +10V	D	SCM5B36-01D

SCM5B37

Non-Linearized Thermocouple Input Modules

Description

Each SCM5B37 non-linearized thermocouple input module provides a single channel of thermocouple input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

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 SCM5B37 can interface to nine industry standard thermocouple types: J, K, T, E, R, S, C, N, and B. Its corresponding output signal operates over a 0V to +5V range. Each module is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the mounting backpanel. Upscale open thermocouple detect is provided by an internal pull-up resistor. Downscale indication can be implemented by installing an external $47\text{M}\Omega$ resistor, $\pm 20\%$ tolerance, between screw terminals 1 and 3 on the SCMPB01/02/03/04/05/06/07 backpanels.

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, $\pm 5\%$.

► Features

- Interfaces to Types J, K, T, E, R, S, C, N and B Thermocouples
- High-Level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 0.03\%$ Accuracy
- $\pm 0.005\%$ Linearity
- $\pm 1\mu\text{V}/^\circ\text{C}$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

A special input circuit on the SCM5B37 modules provides protection against accidental connection of power-line voltages up to 240VAC.

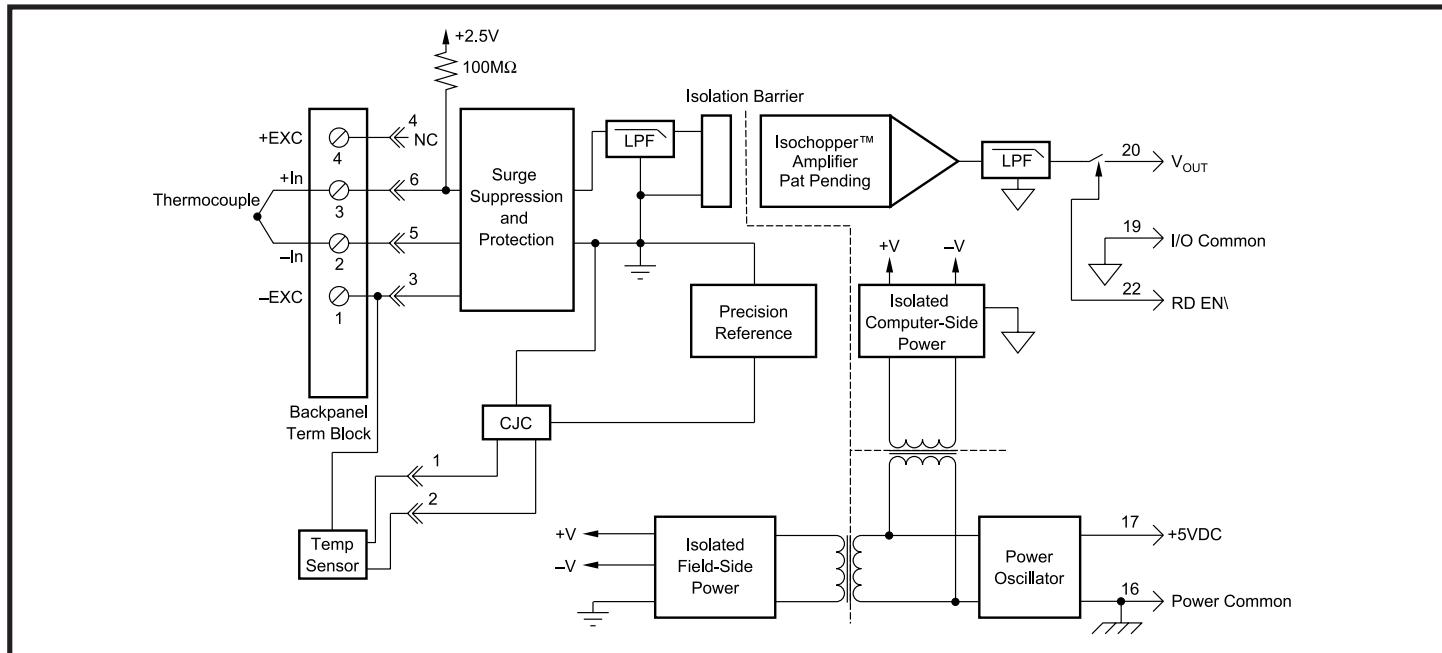


Figure 1: SCM5B37 Block Diagram

Specifications	
	Typical ⁽¹⁾ at $T_A=+25^\circ\text{C}$ and +5VDC power
Module	SCM5B37
Input Range	-0.1V to +0.5V
Input Bias Current	-25nA
Input Resistance	50MΩ
Normal	50MΩ
Power Off	40kΩ
Overload	40kΩ
Input Protection	240VRms max
Continuous	ANSI/IEEE C37.90.1
Transient	
CMV, Input to Output	1500VRms max
Continuous	ANSI/IEEE C37.90.1
Transient	
CMR (50Hz or 60Hz)	160dB
NMR	95dB at 60Hz, 90dB at 50Hz
Accuracy	See Ordering Information
Linearity	±0.005% Span
Stability	
Input Offset	±1µV/°C ⁽²⁾
Output Offset	±20µV/°C
Gain	±25ppm/°C
Noise	
Input, 0.1 to 10Hz	0.2µVRms
Output, 100kHz	200µVRms
Bandwidth, -3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to ±1mV of V_{OUT})	6µs at $C_{\text{load}} = 0$ to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Open Input Response	Upscale
Open Input Detection Time	<10s
Cold Junction Compensation	
Accuracy, 25°C	±0.25°C
Accuracy, +5°C to +45°C	±0.5°C
Accuracy, -40°C to +85°C	±1.25°C
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±2µV/% RTI ⁽³⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability. Does not include CJC accuracy.

(2) This is equivalent to °C as follows: Type J 0.020 °C/°C, Types K, T 0.025°C/°C,

Type E 0.016°C/°C, Types R, S 0.168°C/°C, Type N 0.037°C/°C, Type C, 0.072°C/°C.

(3) RTI = Referenced to input.

Ordering Information

Model	TC Type [†]	Input Range	Output Range [†]	Accuracy ⁽¹⁾	
SCM5B37J	J	-100°C to +760°C (-148°F to +1400°F)	3, 4	±0.03%	±0.26°C
SCM5B37K	K	-100°C to +1350°C (-148°F to +2462°F)	3, 4	±0.03%	±0.44°C
SCM5B37T	T	-100°C to +400°C (-148°F to +752°F)	3, 4	±0.03%	±0.15°C
SCM5B37E	E	0°C to +900°C (+32°F to +1652°F)	3, 4	±0.03%	±0.27°C
SCM5B37R	R	0°C to +1750°C (+32°F to +3182°F)	3, 4	±0.03%	±0.53°C
SCM5B37S	S	0°C to +1750°C (+32°F to +3182°F)	3, 4	±0.03%	±0.53°C
SCM5B37B	B	0°C to +1800°C (+32°F to +3272°F)	3, 4	±0.03%	±0.54°C
SCM5B37C	C	+350°C to +1300°C (+662°F to +2372°F)	3, 4	±0.03%	±0.29°C
SCM5B37N	N	-100°C to +1300°C (-148°F to +2372°F)	3, 4	±0.03%	±0.42°C

[†] 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

[†] Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B37J
4. 0V to +10V	D	SCM5B37JD

SCM5B38

Strain Gage Input Modules, Narrow Bandwidth

Description

Each SCM5B38 Strain Gage input module provides a single channel of strain gage input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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 SCM5B38 can interface to full-bridge or half-bridge transducers with a nominal resistance of 100Ω to $10k\Omega$. A matched pair of bridge-completion resistors (to $\pm 1mV$ at $+10V$ excitation) allows use of low cost half-bridge or quarter-bridge transducers (Figures 2, 3, 4).

Strain gage excitation is provided from the module by a very stable $10V$ or $3.333V$ source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature offers significant flexibility in real world applications. Full scale sensitivities of $2mV/V$, $3mV/V$ or $10mV/V$ are offered as standard. With $10V$ excitation, this results in $\pm 20mV$, $\pm 30mV$ or $\pm 100mV$ full scale input range producing $\pm 5V$ full scale output.

After 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 $+5VDC$, $\pm 5\%$.

► Features

- Interfaces to 100Ω Thru $10k\Omega$, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gages
- High-Level Voltage Output
- $1500Vrms$ Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to $240VAC$ Continuous
- Fully Isolated Excitation Supply
- $160dB$ CMR
- $95dB$ NMR at $60Hz$, $90dB$ at $50Hz$
- $4Hz$ Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.01\%$ Linearity
- $\pm 1\mu V/\text{ }^{\circ}C$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

Special input circuits on the SCM5B38 module provide protection of the signal inputs and the isolated excitation supply up to $240VAC$.

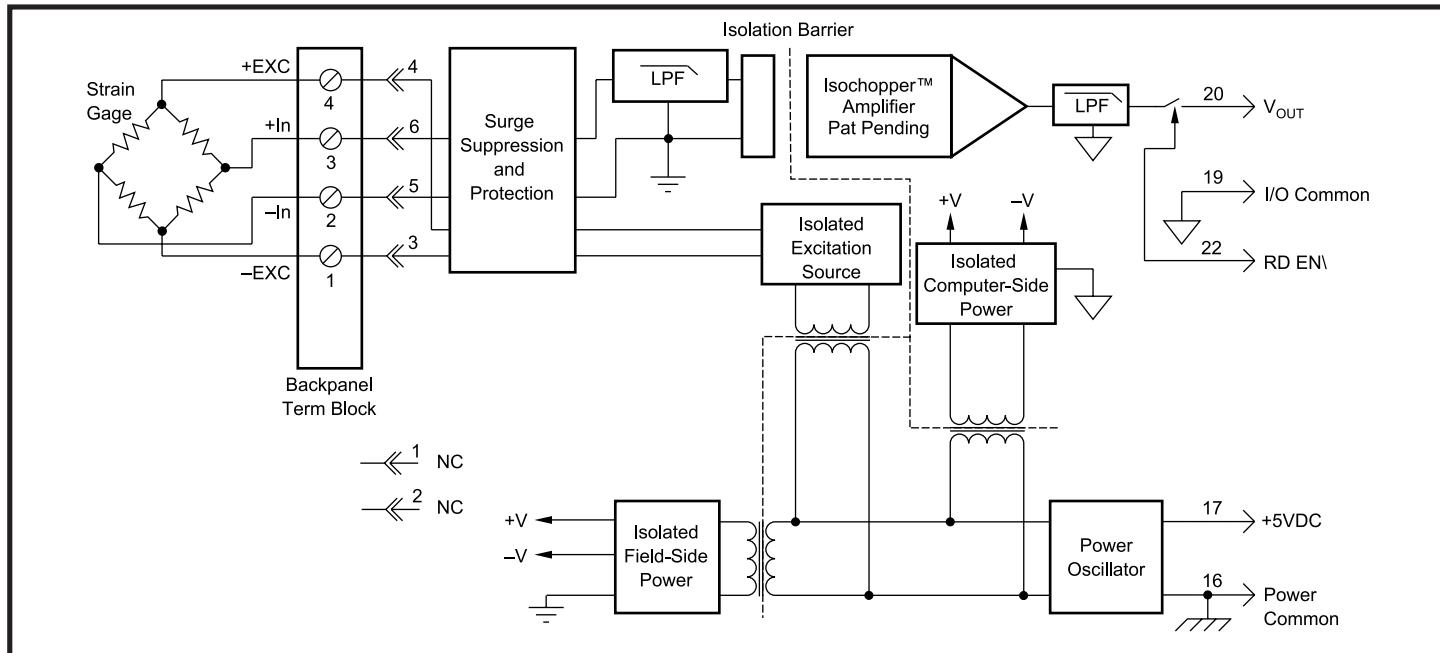


Figure 1: SCM5B38 Block Diagram

Specifications

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

Module	Full Bridge SCM5B38-31, -32, -35, -36, -37	Half Bridge SCM5B38-33, -34
Input Range	$\pm 10\text{mV}$ to $\pm 100\text{mV}$	*
Input Bias Current	$\pm 0.5\text{nA}$	*
Input Resistance		
Normal	50M Ω	*
Power Off	40k Ω	*
Overload	40k Ω	*
Signal Input Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
Excitation Output (-32, -34, -35, -37)	$+10\text{V} \pm 3\text{mV}$	*
Load Resistance	300 Ω to 10k Ω	*
Excitation Output (-31, -33, -36)	$+3.333\text{V} \pm 2\text{mV}$	*
Load Resistance	100 Ω to 10k Ω	*
Excitation Load Regulation	$\pm 5\text{ppm}/\text{mA}$	*
Excitation Stability	$\pm 15\text{ppm}/^\circ\text{C}$	*
Half Bridge Voltage Level (-34)	NA	$+5\text{V} \pm 1\text{mV}$
Half Bridge Voltage Level (-33)	NA	$+1.667\text{V} \pm 1\text{mV}$
Isolated Excitation Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50 or 60Hz)	160dB	*
NMR	95dB at 60Hz, 90dB at 50Hz	*
Accuracy ⁽²⁾	$\pm 0.03\%$ Span	*
Linearity	$\pm 0.01\%$ Span	*
Stability		
Input Offset	$\pm 1\mu\text{V}/^\circ\text{C}$	*
Output Offset	$\pm 20\mu\text{V}/^\circ\text{C}$	*
Gain	$\pm 25\text{ppm}$ of Reading/ $^\circ\text{C}$	*
Noise		
Input, 0.1 to 10Hz	0.2 μVRms	
Output, 100kHz	200 μVRms	1 μVRms
*	*	*
Bandwidth, -3dB	4Hz	*
Response Time, 90% Span	0.2s	*
Output Range	See Ordering Information	*
Output Resistance	50 Ω	*
Output Protection	Continuous Short to Ground	*
Output Selection Time (to $\pm 1\text{mV}$ of V_{OUT})	6 μs at $C_{\text{load}} = 0$ to 2000pF	*
Output Current Limit	$\pm 8\text{mA}$	*
Output Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current "0,1"	0.5 μA	*
Power Supply Voltage	+5VDC $\pm 5\%$	*
Power Supply Current	170mA Full Exc.Load, 70mA No Exc. Load	*
Power Supply Sensitivity	$\pm 2\mu\text{V}/\%$ RTI ⁽³⁾	*
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temperature Range	-40 $^\circ\text{C}$ to +85 $^\circ\text{C}$	*
Storage Temperature Range	-40 $^\circ\text{C}$ to +85 $^\circ\text{C}$	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A $\pm 0.5\%$ Span Error	*
ESD, EFT	Performance B	*

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.
* Same as -31, -32, -35, -36, -37 modules.

Ordering Information

Model	Input Bridge Type	Input Range	Excitation	Sens.	Output Range [†]
SCM5B38-31	Full	-10mV to +10mV	+3.333V	3mV/V	1, 2
SCM5B38-32	Full	-30mV to +30mV	+10.0V	3mV/V	1, 2
SCM5B38-33	Half	-10mV to +10mV	+3.333V	3mV/V	1, 2
SCM5B38-34	Half	-30mV to +30mV	+10.0V	3mV/V	1, 2
SCM5B38-35	Full	-20mV to +20mV	+10.0V	2mV/V	1, 2
SCM5B38-36	Full	-33.3mV to +33.3mV	+3.333V	10mV/V	1, 2
SCM5B38-37	Full	-100mV to +100mV	+10.0V	10mV/V	1, 2

SCM5B

*Output Ranges Available

Output Range	Part No. Suffix	Example
1. -5V to +5V	NONE	SCM5B38-31
2. -10V to +10V	D	SCM5B38-31D

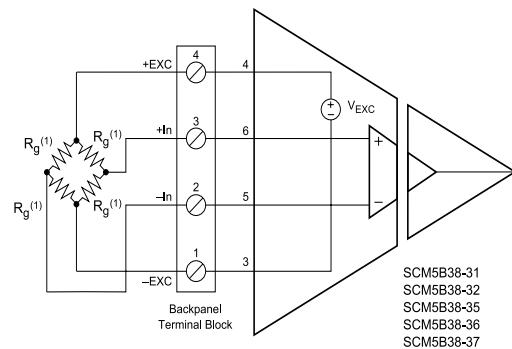


Figure 2: Full Bridge Connection

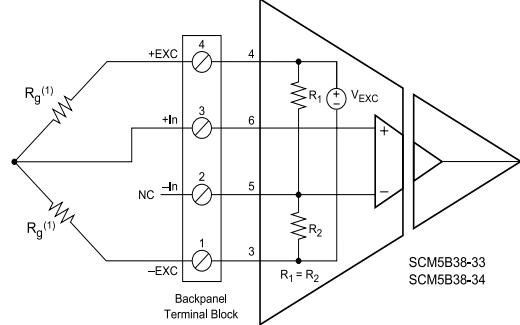


Figure 3: Half Bridge Connection

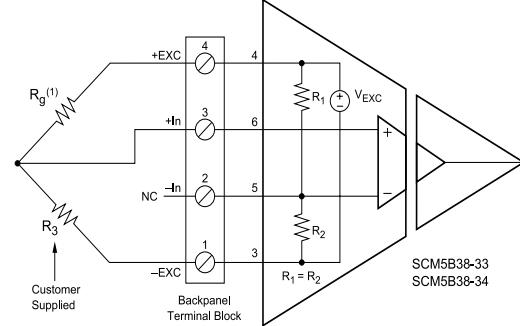


Figure 4: Quarter Bridge Connection

SCM5B38

Strain Gage Input Modules, Wide Bandwidth

Description

Each SCM5B38 Strain Gage input module provides a single channel of strain gage input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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 SCM5B38 can interface to full-bridge or half-bridge transducers with a nominal resistance of 100Ω to $10k\Omega$. A matched pair of bridge-completion resistors (to $\pm 1mV$ at $+10V$ excitation) allows use of low cost half-bridge or quarter-bridge transducers (Figures 2, 3, 4). The 10kHz bandwidth allows measurement of high speed processes such as vibration analysis.

Strain gage excitation is provided from the module by a very stable 10V or 3.333V source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature offers significant flexibility in real world applications. Full scale sensitivities of $2mV/V$, $3mV/V$ or $10mV/V$ are offered as standard. With 10V excitation, this results in $\pm 20mV$, $\pm 30mV$ or $\pm 100mV$ full scale input range producing $\pm 5V$ full scale output.

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

► Features

- Interfaces to 100Ω Thru $10k\Omega$, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gages
- High-Level Voltage Output
- $1500Vrms$ Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- Fully Isolated Excitation Supply
- 100dB CMR
- 10kHz Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.01\%$ Linearity
- $\pm 1\mu V/\text{ }^{\circ}\text{C}$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from $+5VDC$, $\pm 5\%$.

Special input circuits on the SCM5B38 module provide protection of the signal inputs and the isolated excitation supply up to 240VAC.

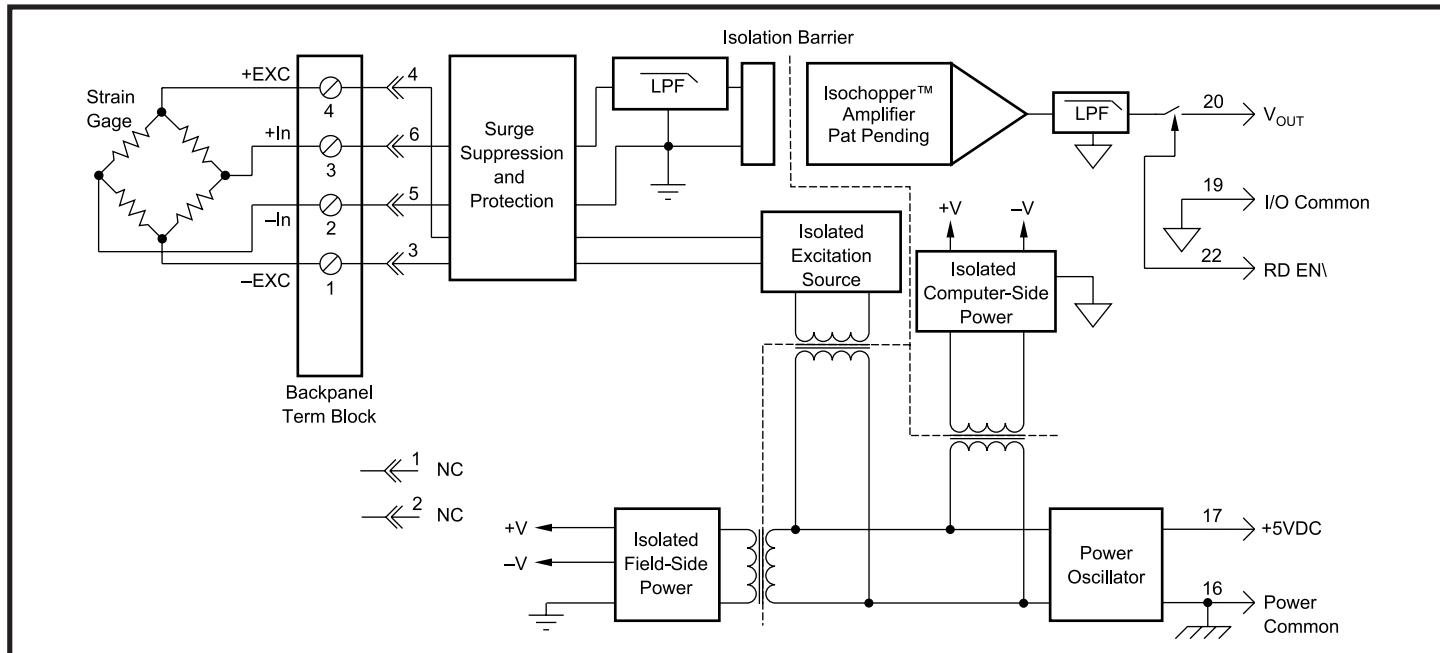


Figure 1: SCM5B38 Block Diagram

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

Module	Full Bridge SCM5B38-01,-02,-05,-06,-07	Half Bridge SCM5B38-03,-04
Input Range	$\pm 10\text{mV}$ to $\pm 100\text{mV}$	*
Input Bias Current	$\pm 0.3\text{nA}$	*
Input Resistance		
Normal	50 Ω	*
Power Off	40k Ω	*
Overload	40k Ω	*
Signal Input Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
Excitation Output (-02, -04, -05, -07)	$+10\text{mV} \pm 3\text{mV}$	*
Load Resistance	300 Ω to 10k Ω	*
Excitation Output (-01, -03, -06)	$+3.33\text{V} \pm 2\text{mV}$	*
Load Resistance	100 Ω to 10k Ω	*
Excitation Load Regulation	$\pm 5\text{ppm}/\text{mA}$	*
Excitation Stability	$\pm 15\text{ppm}/^\circ\text{C}$	*
Half Bridge Voltage Level (-04)	NA	$+5\text{V} \pm 1\text{mV}$
Half Bridge Voltage Level (-03)	NA	$+1.667\text{V} \pm 1\text{mV}$
Isolated Excitation Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50 or 60Hz)	100dB	*
NMR (-3dB at 10kHz)	120dB per Decade above 10kHz	*
Accuracy ⁽²⁾	$\pm 0.03\%$ Span	*
Linearity	$\pm 0.01\%$ Span	*
Stability		
Input Offset	$\pm 1\mu\text{V}/^\circ\text{C}$	*
Output Offset	$\pm 40\mu\text{V}/^\circ\text{C}$	*
Gain	$\pm 25\text{ppm}$ of Reading/ $^\circ\text{C}$	*
Noise		
Input, 0.1 to 10Hz	0.4 μV rms	
Output, 100kHz	10mVp-p	2 μV rms
*	*	*
Bandwidth, -3dB	10kHz	*
Rise Time, 10 to 90% Span	35 μs	*
Settling Time, to 0.1%	250 μs	*
Output Range	See Ordering Information	*
Output Resistance	50 Ω	*
Output Protection	Continuous Short to Ground	*
Output Selection Time	6 μs at $C_{\text{load}} = 0$ to 2000pF	*
(to $\pm 1\text{mV}$ of V_{OUT})		
Output Current Limit	$\pm 8\text{mA}$	*
Output Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current "0,1"	0.5 μA	*
Power Supply Voltage	+5VDC $\pm 5\%$	*
Power Supply Current	170mA Full Exc. Load, 70mA No Exc. Load	*
Power Supply Sensitivity	$\pm 2\mu\text{V}/\%$ RTI ⁽³⁾	*
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temperature Range	-40 $^\circ\text{C}$ to +85 $^\circ\text{C}$	*
Storage Temperature Range	-40 $^\circ\text{C}$ to +85 $^\circ\text{C}$	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A $\pm 0.5\%$ Span Error	*
ESD, EFT	Performance B	*

* Contact factory or your local Dataforth sales office for maximum values.

Ordering Information

Model (10kHz)	Input Bridge Type	Input Range	Excitation	Sens.	Output Range [†]
SCM5B38-01	Full	-10mV to +10mV	+3.333V	3mV/V	1, 2
SCM5B38-02	Full	-30mV to +30mV	+10.0V	3mV/V	1, 2
SCM5B38-03	Half	-10mV to +10mV	+3.333V	3mV/V	1, 2
SCM5B38-04	Half	-30mV to +30mV	+10.0V	3mV/V	1, 2
SCM5B38-05	Full	-20mV to +20mV	+10.0V	2mV/V	1, 2
SCM5B38-06	Full	-33.3mV to +33.3mV	+3.333V	10mV/V	1, 2
SCM5B38-07	Full	-100mV to +100mV	+10.0V	10mV/V	1, 2

SCM5B

[†]Output Ranges Available

Output Range	Part No. Suffix	Example
1. -5V to +5V	NONE	SCM5B38-01
2. -10V to +10V	D	SCM5B38-01D

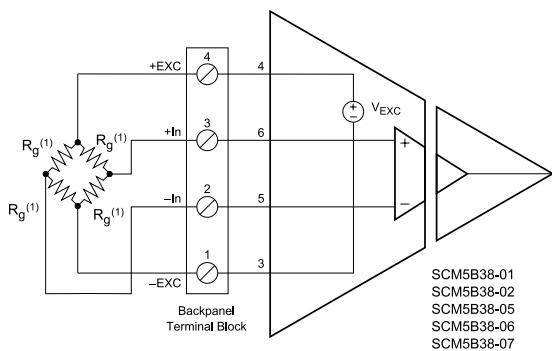


Figure 2: Full Bridge Connection

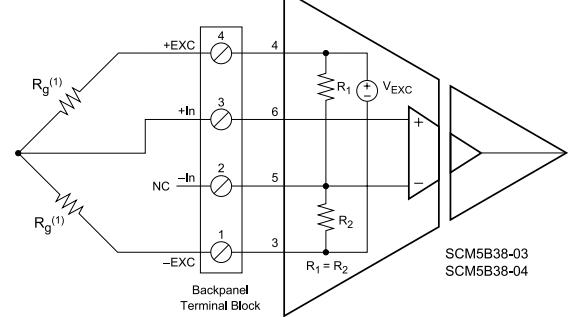


Figure 3: Half Bridge Connection

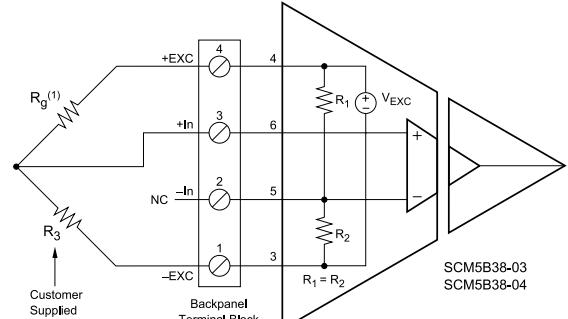


Figure 4: Quarter Bridge Connection

NOTES:

* Same as -01, -02, -05, -06, -07 modules.

(1) Strain element. (2) Includes linearity, hysteresis and repeatability. (3) RTI = Referenced to input.

SCM5B39

Current Output Modules

Description

Each SCM5B39 current output module provides a single channel of analog output. The track-and-hold circuit in the input stage can be operated in a hold mode where one DAC can supply many output modules, or a track mode where one DAC is dedicated to each module. In addition to the track-and-hold circuit, each module provides signal buffering, isolation, filtering, and conversion to a high-level current output (Figure 1).

Setting of the track or hold mode is controlled by the logic state of WR EN\, module pin 23. When pin 23 is low, the track mode is enabled. If pin 23 is high, the hold mode is enabled. The module 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 track and hold circuit. For a low state, simply connect pin 23, the Write-Enable pin, to I/O Common, pin 19.

The SCMPB02 and SCMPB06 backpanels allow host computer control of the WR EN\ control line, which allows multiplexing of one host DAC to up to 64 SCM5B39 output modules. During power-up, the output remains at 0mA for 100ms on all models except the SCM5B39-07, which allows the track-and-hold circuit to be initialized.

A special circuit in the output stage of the module provides protection against accidental connection of power-line voltages up to 240VAC on all models.

► Features

- Accepts High-Level Voltage or Process Current Input
- Unipolar or Bipolar Current Output
- 1500VRms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protected to 240VAC Continuous
- 110dB CMR
- 400Hz Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.005\%$ Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

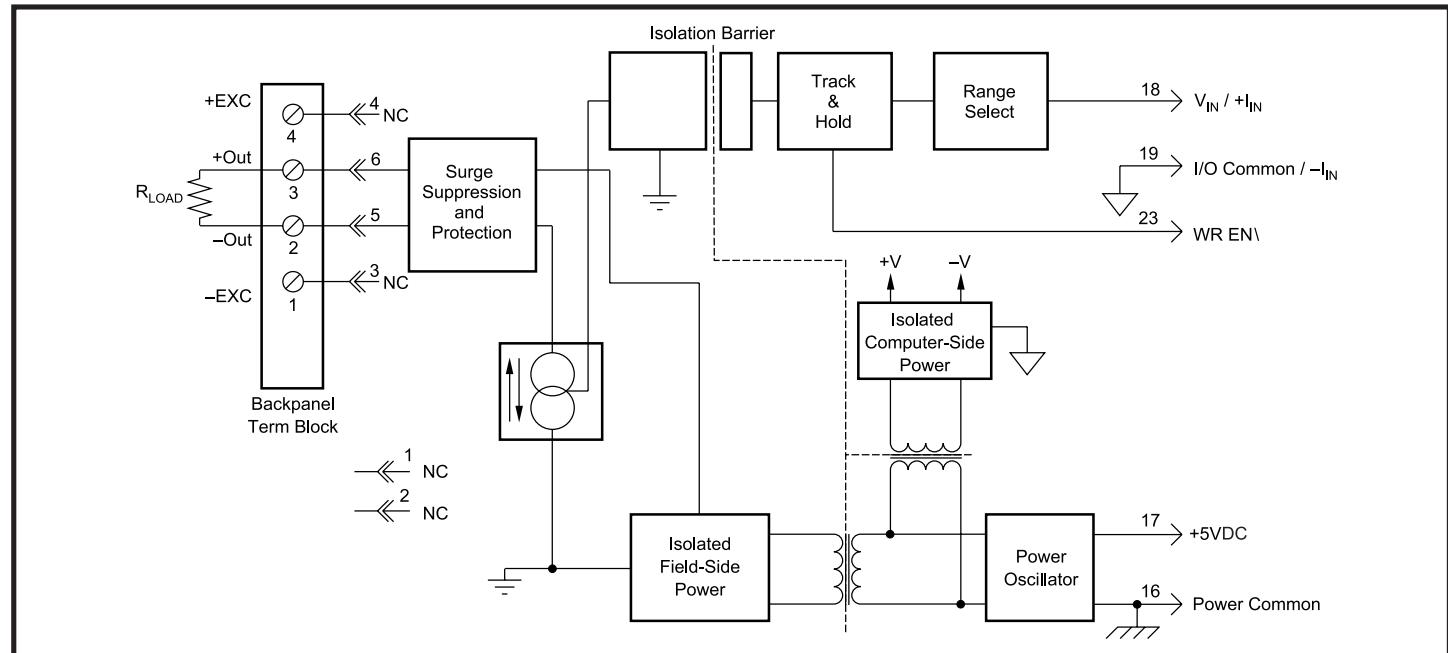


Figure 1: SCM5B39 Block Diagram

SpecificationsTypical* at $T_A=+25^\circ\text{C}$ and +5VDC power

Module	Unipolar Output Current SCM5B39-01,-02,-03,-04,-05	Bipolar Output Current SCM5B39-07
Input Voltage Range	± 5 or 0V to +5V	± 10 V
Input Current Range (-05)	0 to 20mA	N/A
Input Voltage Maximum	± 36 V (no damage)	*
Input Current, Maximum (-05)	75mA (no damage)	N/A
Input Resistance	50 Ω	2M Ω
Input Resistance (-05)	250 Ω	N/A
Output Current Range	0 to 20mA or 4 to 20mA	± 20 mA
Power-Up Delay ⁽¹⁾	100ms	N/A
Current Out	0mA	N/A
Over Range Capability	10%	*
Output Compliance Voltage (Open Circuit)	22VDC	± 15 VDC
Load Resistance Range	0 to 650 Ω	0 to 450 Ω
(0 to 750 Ω for Power Supply Voltage greater than 4.95VDC)		(0 to 500 Ω for Power Supply Voltage greater than 4.95VDC)
Output I Under Fault, max	26mA	*
Output Protection		*
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Output to Input		*
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	110dB	*
NMR (-3dB)	80dB per Decade above 400Hz	80dB per Decade above 275Hz
Accuracy	$\pm 0.03\%$ Span	$\pm 0.05\%$ Span
Linearity	$\pm 0.005\%$ Span	$\pm 0.03\%$ Span
Stability		
Offset	$\pm 0.5\mu\text{A}/^\circ\text{C}$	*
Gain	$\pm 20\text{ppm}/^\circ\text{C}$	$\pm 40\text{ppm}/^\circ\text{C}$
Noise		
Output Ripple, 100kHz	10 $\mu\text{Ap-p}$	*
Bandwidth, -3dB	400Hz	275Hz
Rise Time, 10 to 90% Span	1.0ms	1.2ms
Sample and Hold		
Output Droop Rate	40 $\mu\text{A/s}$	*
Acquisition Time	50 μs	*
Track-and-Hold Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current "0"	0.5 μA	*
Power Supply Voltage	+5VDC $\pm 5\%$	*
Power Supply Current	170mA	130mA
Power Supply Sensitivity	$\pm 0.5\mu\text{A}/\%$ typ	*
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	-40°C to +85°C	*
Storage Temp. Range	-40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A $\pm 0.5\%$ Span Error	*
ESD, EFT	Performance B	*

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

* Same as -01, -02, -03, -04, -05 modules.

(1) See Product Description for further details.

Ordering Information

Model	Input Range	Output Range	Bandwidth
SCM5B39-01	0V to +5V	4mA to 20mA	400Hz
SCM5B39-02	-5V to +5V	4mA to 20mA	400Hz
SCM5B39-03	0V to +5V	0mA to 20mA	400Hz
SCM5B39-04	-5V to +5V	0mA to 20mA	400Hz
SCM5B39-05	0mA to 20mA	0mA to 20mA	400Hz
SCM5B39-07	-10V to +10V	-20mA to +20mA	275Hz

Refer to SCM5B392 specifications, p.27, for additional current output models.

SCM5B392

Matched-Pair Servo/Motor Controller Modules

Description

The SCM5B392 servo/motor controller module set is designed to solve the problem of extending a servo or motor controller signal a long distance with the possibility for noise pickup and/or contacting hazardous voltages. Each SCM5B392 module set is made up of two modules: a voltage input/current output module and a current input/voltage output module (Figure 1).

The voltage input module connects to the servo or motor controller voltage output and provides an isolated 4 to 20mA output which connects to the input of the current input module. The current input module isolates and provides an output voltage identical to that of the servo or motor controller. Thus the original control signal has been isolated (twice) and extended via a 4 to 20mA current loop.

Several mounting options are available for the SCM5B392 module set. If a large number of channels are required, the SCMPB01 16 channel backpanel and SCMPB05 8 channel backpanel are available. Smaller channel numbers can be accommodated with the SCMPB03 single channel mounting panel and SCMPB04 dual channel mounting panel. These can be mounted on a DIN rail.

► Features

- Extends the Distance and Isolates Servo/Motor Controller Signals
- Provides Isolated Current Loop Interface Between Controller and Motor or Actuator
- Accepts High-Level Voltage Inputs up to $\pm 10V$
- Provides High-Level Voltage Outputs up to $\pm 10V$
- 1500Vrms Transformer Isolation (3000Vrms Total Loop)
- ANSI/IEEE C37.90.1 Transient Protection
- Current Loop is Protected to 240VAC Continuous
- 1kHz Signal Bandwidth
- 100dB CMR
- $\pm 0.06\%$ Total Loop Accuracy
- $\pm 0.01\%$ Total Loop Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

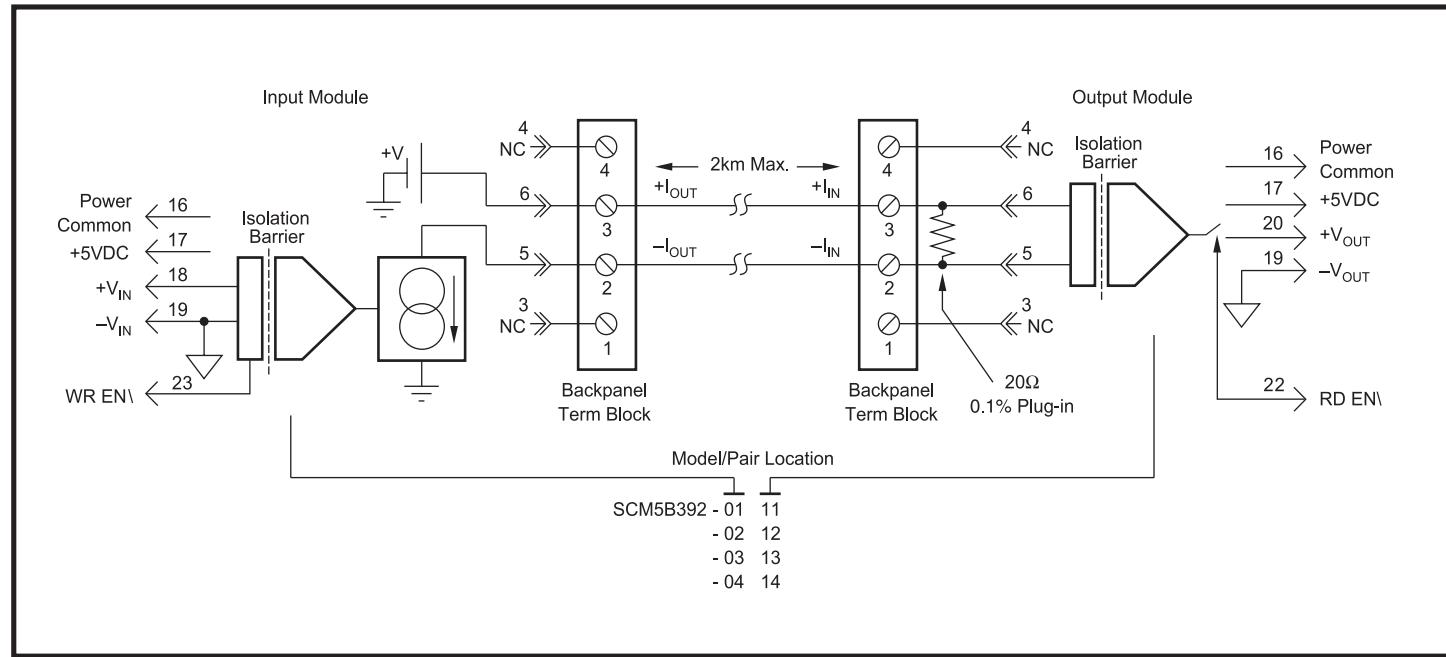


Figure 1: SCM5B392 Block Diagram

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

Module	SCM5B392-01,-02,-03,-04 (Input)	SCM5B392-11,-12,-13,-14 (Output)
Input Range	See Ordering Information	4mA to 20mA
Input Resistance	50MΩ (-01,-02) 2MΩ (-03,-04)	20Ω
Accuracy	N/A	±0.1%
Stability	N/A	±10ppm/°C
Input Protection		
Continuous	±36V (no damage)	240Vrms max
Transient	N/A	ANSI/IEEE C37.90.1
Output Range	4mA to 20mA	See Ordering Information
Over Range Capability	10%	N/A
Output Compliance Voltage (Open Circuit)	22VDC	N/A
Loop Resistance Range	0 to 600Ω (0 to 700Ω for Power Supply Voltage greater than 4.95VDC)	N/A
Output Resistance	N/A	50Ω
Output Selection Time (to ±1mV of V_{OUT})	N/A	6μs at $C_{\text{load}} = 0$ to 2000pF
Output Current Limit	26mA	+8mA
Output Protection		
Continuous	240Vrms max	Short to Ground
Transient	ANSI/IEEE C37.90.1	N/A
CMV		
Continuous	1500Vrms max, output to input	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	100dB	*
NMR (-3dB at 1kHz)	80dB per Decade above 1kHz	120dB per Decade above 1kHz
Accuracy	±0.03% Span	*
Linearity	±0.005% Span	*
Stability		
Offset	±0.5μA/°C	±50μV/°C
Gain	±20ppm/°C	±25ppm/°C
Noise		
Output, 100kHz	10μAp-p	200μVrms
Bandwidth, -3dB	1kHz	1kHz
Rise Time, 10 to 90% Span	340μs	750μs
Sample and Hold		
Output Droop Rate	40μA/s	N/A
Acquisition Time	50μs	N/A
Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current "0"	0.5μA	*
Power Supply Voltage	+5VDC ±5%	*
Power Supply Current	170mA	30mA
Power Supply Sensitivity	±0.5μA/% typ	±20μV/% RTI
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	-40°C to +85°C	*
Storage Temp. Range	-40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A ±0.5% Span Error	*
ESD, EFT	Performance B	*

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

* Same as -01, -02, -03, -04 modules.

Ordering Information (for module pairs)

Model	Input Range	Interface	Output Range
SCM5B392-0111	0V to +5V	4mA to 20mA	0V to +5V
SCM5B392-0212	-5V to +5V	4mA to 20mA	-5V to +5V
SCM5B392-0313	0V to +10V	4mA to 20mA	0V to +10V
SCM5B392-0414	-10V to +10V	4mA to 20mA	-10V to +10V

Ordering Information (for single modules)

Model	Input Range	Output Range	Bandwidth
SCM5B392-01	0V to +5V	4mA to 20mA	1kHz
SCM5B392-02	-5V to +5V	4mA to 20mA	1kHz
SCM5B392-03	0V to +10V	4mA to 20mA	1kHz
SCM5B392-04	-10V to +10V	4mA to 20mA	1kHz
SCM5B392-11	4mA to 20mA	0V to +5V	1kHz
SCM5B392-12	4mA to 20mA	-5V to +5V	1kHz
SCM5B392-13	4mA to 20mA	0V to +10V	1kHz
SCM5B392-14	4mA to 20mA	-10V to +10V	1kHz

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 1). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

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 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
- $\pm 1\mu V/\text{°C}$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

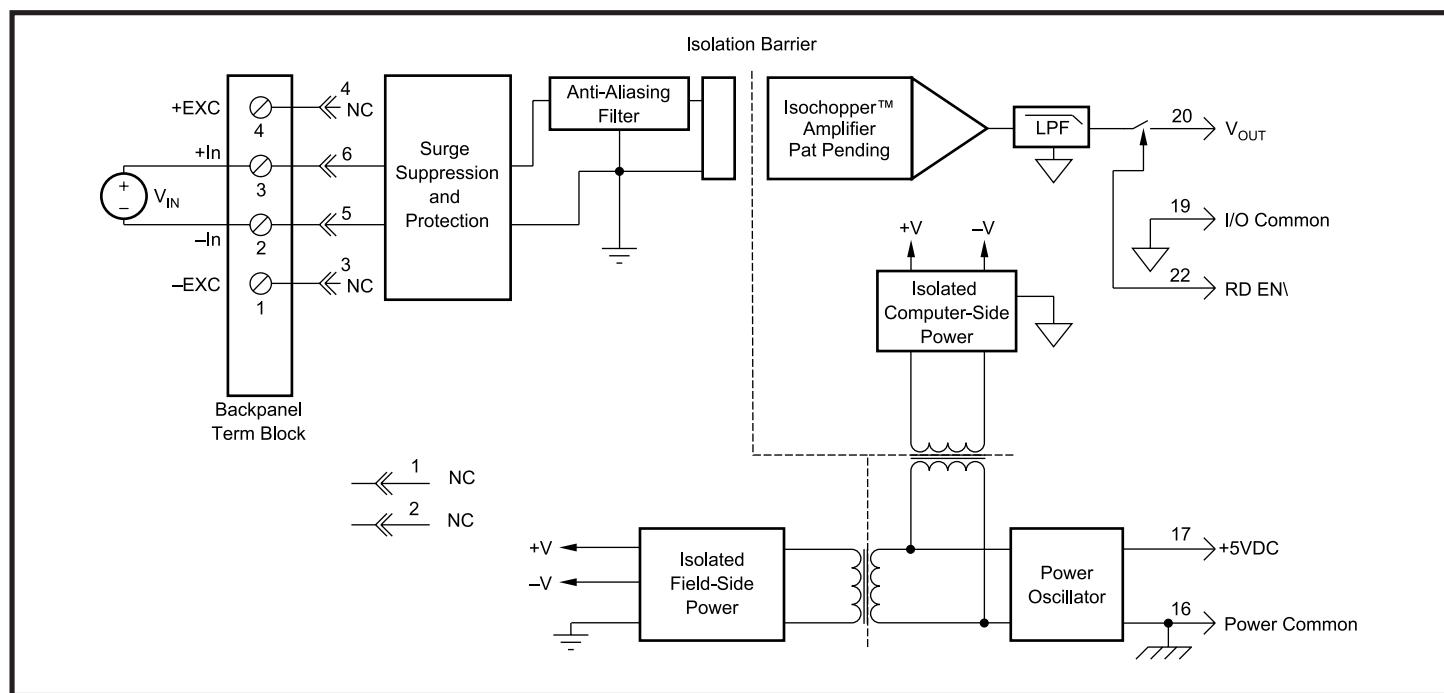


Figure 1: SCM5B40/41 Block Diagram

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

Module	SCM5B40	SCM5B41
Input Range	$\pm 10\text{mV}$ to $\pm 1\text{V}$	$\pm 1\text{V}$ to $\pm 40\text{V}$
Input Bias Current	$\pm 0.5\text{nA}$	$\pm 0.05\text{nA}$
Input Resistance		
Normal	$200\text{M}\Omega$	$650\text{k}\Omega$ (-01 thru -04) $2\text{M}\Omega$ (-05 thru -10)
Power Off	$40\text{k}\Omega$	$650\text{k}\Omega$ (-01 thru -04) $2\text{M}\Omega$ (-05 thru -10)
Overload	$40\text{k}\Omega$	$650\text{k}\Omega$ (-01 thru -04) $2\text{M}\Omega$ (-05 thru -10)
Input Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	100dB	*
NMR (-3dB at 10kHz)	120dB per Decade above 10kHz	*
Accuracy ⁽¹⁾	$\pm 0.03\%$ Span	*
Linearity	$\pm 0.01\%$ Span	*
Stability		
Input Offset	$\pm 1\mu\text{V}/^\circ\text{C}$	$\pm 20\mu\text{V}/^\circ\text{C}$
Output Offset	$\pm 40\mu\text{V}/^\circ\text{C}$	*
Gain	$\pm 25\text{ppm}/^\circ\text{C}$	$\pm 50\text{ppm}/^\circ\text{C}$
Noise		
Input, 0.1 to 10Hz	$0.4\mu\text{Vrms}$	$2\mu\text{Vrms}$
Output, 100kHz	10mVp-p	*
Bandwidth, -3dB	10kHz	*
Rise Time, 10 to 90% Span	$35\mu\text{s}$	*
Settling Time, to 0.1%	$250\mu\text{s}$	*
Output Range	See Ordering Information	*
Output Resistance	50Ω	*
Output Protection	Continuous Short to Ground	*
Output Selection Time (to $\pm 1\text{mV}$ of V_{OUT})	$6\mu\text{s}$ at $C_{\text{load}} = 0$ to 2000pF	*
Output Current Limit	$\pm 8\text{mA}$	*
Output Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current "0,1"	$0.5\mu\text{A}$	*
Power Supply Voltage	$+5\text{VDC} \pm 5\%$	*
Power Supply Current	30mA	*
Power Supply Sensitivity	$\pm 2\mu\text{V}/\%$ RTI ⁽²⁾	$\pm 200\mu\text{V}/\%$ RTI ⁽²⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	-40°C to $+85^\circ\text{C}$	*
Storage Temp. Range	-40°C to $+85^\circ\text{C}$	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A $\pm 0.5\%$ Span Error	*
ESD,EFT	Performance B	*

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

* Same specification as SCM5B40.

(1) Includes linearity, hysteresis and repeatability.

(2) RTI = Referenced to input.

(3) Same as SCM5B41-01 with $50\text{M}\Omega$ input resistance.**Ordering Information**

Model	Input Range	Output Range [†]
SCM5B40-01	-10mV to $+10\text{mV}$	1, 2
SCM5B40-02	-50mV to $+50\text{mV}$	1, 2
SCM5B40-03	-100mV to $+100\text{mV}$	1, 2
SCM5B40-04	-10mV to $+10\text{mV}$	3, 4
SCM5B40-05	-50mV to $+50\text{mV}$	3, 4
SCM5B40-06	-100mV to $+100\text{mV}$	3, 4
SCM5B40-07 ⁽³⁾	-1V to $+1\text{V}$	1, 2
SCM5B41-01	-1V to $+1\text{V}$	1, 2
SCM5B41-02	-5V to $+5\text{V}$	1, 2
SCM5B41-03	-10V to $+10\text{V}$	1, 2
SCM5B41-04	-1V to $+1\text{V}$	3, 4
SCM5B41-05	-5V to $+5\text{V}$	3, 4
SCM5B41-06	-10V to $+10\text{V}$	3, 4
SCM5B41-07	-20V to $+20\text{V}$	1, 2
SCM5B41-08	-20V to $+20\text{V}$	3, 4
SCM5B41-09	-40V to $+40\text{V}$	1, 2
SCM5B41-10	-40V to $+40\text{V}$	3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. -5V to $+5\text{V}$	NONE	SCM5B40-01
2. -10V to $+10\text{V}$	D	SCM5B40-01D
3. 0V to $+5\text{V}$	NONE	SCM5B40-04
4. 0V to $+10\text{V}$	D	SCM5B40-04D

SCM5B42

2-Wire Transmitter Interface Modules

Description

Each SCM5B42 2-wire transmitter interface module provides a single channel which accepts a 4 to 20mA process current input and provides a standard +1 to +5V or +2 to +10V output signal (Figure 1). An isolated +20VDC regulated power supply is provided to power the current transmitter. This allows a 2-wire loop powered transmitter to be directly connected to the SCM5B42 without requiring an external power supply. The regulated supply will provide a nominal +20VDC at a loop current of 4mA to 20mA.

The SCM5B42 will provide a 1500V isolation barrier for non-isolated 2-wire field transmitters. It can also be used when additional isolation is required between an isolated 2-wire transmitter and the input stage of the control room computer.

The voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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.

A precision 20Ω current conversion resistor is supplied with the module. Sockets are provided on the SCMPB01/02/03/04/05/06/07 backpanels to allow installation of this resistor. Extra resistors are available under part number SCMXR1. All field inputs are fully protected from accidental connection of power-line voltages up to 240VAC. The module has a 3dB bandwidth of 100Hz. Signal filtering is accomplished with a six-pole filter, with two poles on the field side of the isolation barrier, and the other four on the computer side.

► Features

- Isolated +20VDC Current Loop Supply
- Provides Isolation for Non-Isolated 2-Wire Transmitters
- High-Level Voltage Output +1V to +5V or +2V to +10V
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 100dB CMR
- 100Hz Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.005\%$ Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

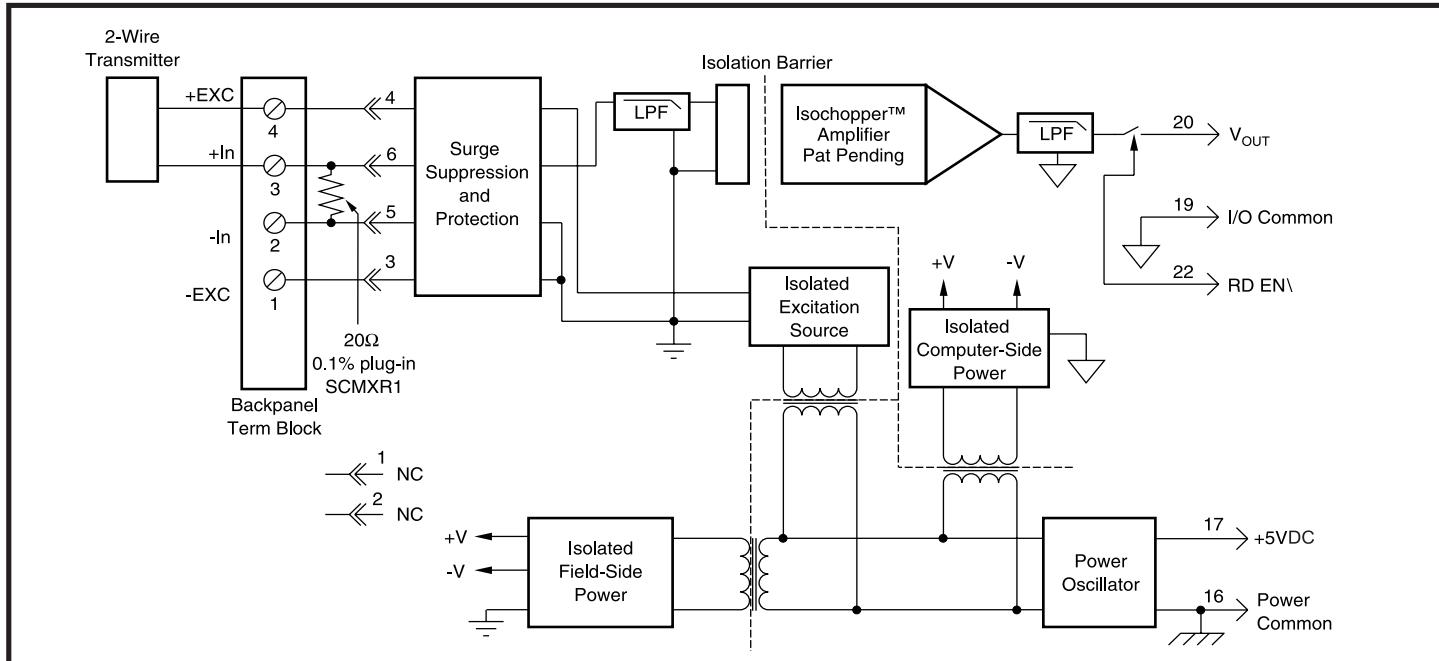


Figure 1: SCM5B42 Block Diagram

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

Module	SCM5B42
Input Range	4mA to 20mA
Input Resistor Value	20.00Ω
Accuracy	±0.1%
Stability	±10ppm/°C
Loop Supply Voltage	Nominal 20V at 4mA to 20mA
Isolated Excitation Protection Continuous	240VRms max
Transient	ANSI/IEEE C37.90.1
Input Protection Continuous	240VRms max
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output Continuous	1500VRms max
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	100dB
NMR (-3dB at 100Hz)	120dB per Decade Above 100Hz
Accuracy ⁽¹⁾	±0.03% Span
Linearity	±0.005% Span
Stability	
Input Offset	±1µV/°C
Output Offset	±40µV/°C
Gain	±25ppm/°C of Reading
Noise	
Input, 0.1 to 10Hz	10nArms
Output, 100kHz	500µVRms
Bandwidth, -3dB	100Hz
Response Time, 90% Span	4mS
Output Range	+1V to +5V or +2V to +10V
Output Resistance	50Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to ±1mV of V_{OUT})	6µs at $C_{\text{load}} = 0$ to 2000pF
Output Current Limit	+8mA
Output Enable Control Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Power Supply Voltage	+5VDC ±5%
Power Supply Current	180mA at Transmitter Load of 20mA
Power Supply Sensitivity	100mA at Transmitter Load of 4mA ±10µV/% RTI ⁽²⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental Operating Temp. Range	-40°C to +85°C
Storage Temp. Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability. Does not include SCMXR1 accuracy.

(2) RTI = Referenced to input.

Ordering Information

Model	Input Range	Output Range
SCM5B42-01	4mA to 20mA	+1V to +5V
SCM5B42-02	4mA to 20mA	+2V to +10V

SCM5B43

General Purpose Input Modules, with DC Excitation

Description

Each SCM5B43 general purpose input module provides a single channel of transducer input which is filtered, isolated, scaled, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

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 SCM5B43 can interface to devices which require a precision 10VDC excitation supply. The 1kHz bandwidth significantly reduces ripple and noise inherent in these devices.

Transducer excitation is provided from the module by a very stable 10V source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature offers significant flexibility in real world applications. Ten full scale input ranges are provided, from $\pm 1V$ to $\pm 10V$, producing $\pm 5V$ full scale output.

The input signal is processed through a pre-amplifier on the field side of the isolation barrier. This pre-amplifier has a gain-bandwidth product of 5MHz and is bandwidth limited to 1kHz. 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, $\pm 5\%$.

Special input circuits on the SCM5B43 module provide protection of the signal inputs and the isolated excitation supply up to 240VAC.

► Features

- Interfaces to DC Displacement Transducers and Other Devices Requiring a Stable DC Supply
- High-Level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- Fully Isolated Excitation Supply
- 100dB CMR
- 1kHz Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.005\%$ Linearity
- $\pm 20\mu V/\text{ }^{\circ}\text{C}$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

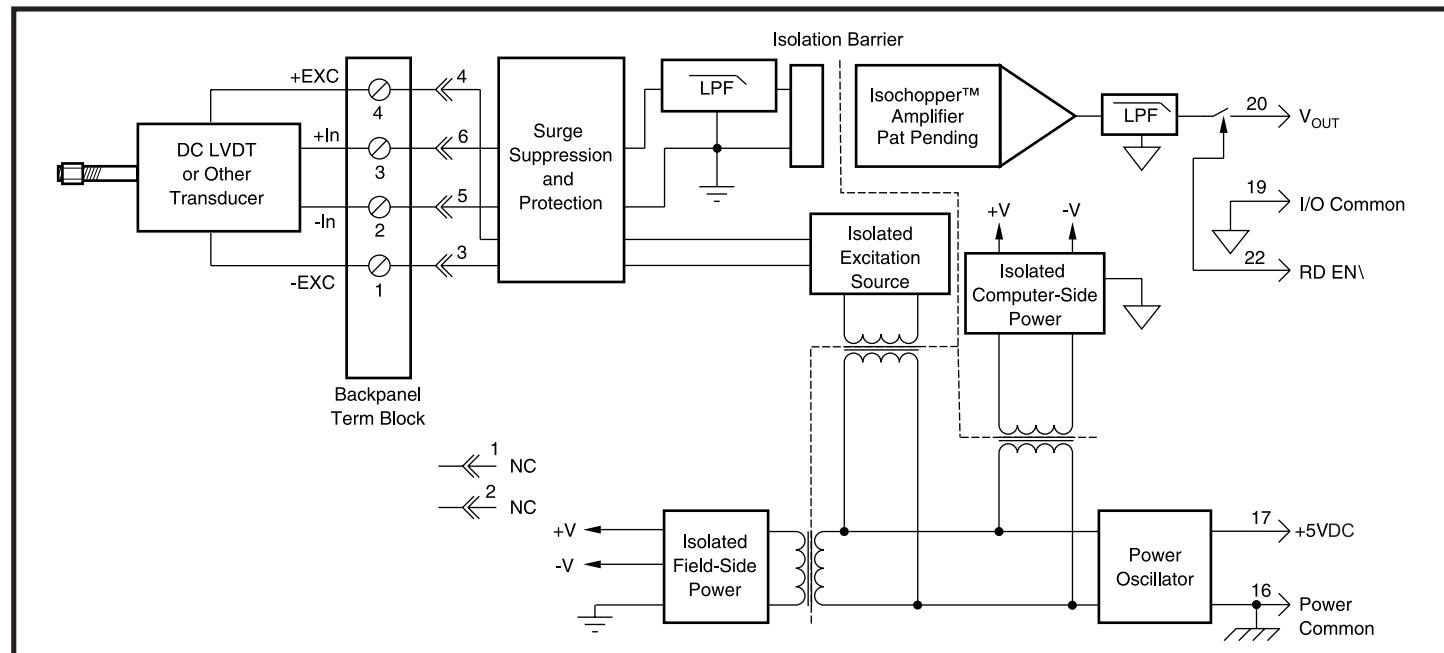


Figure 1: SCM5B43 Block Diagram

SpecificationsTypical* at $T_A=+25^\circ\text{C}$ and +5VDC power

Module	SCM5B43
Input Range	$\pm 1\text{V}$ to $\pm 10\text{V}$
Input Bias Current	$\pm 0.05\text{nA}$
Input Resistance	
Normal	$2\text{M}\Omega$ (minimum)
Power Off	$2\text{M}\Omega$ (minimum)
Overload	$2\text{M}\Omega$ (minimum)
Input Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1 (formerly IEEE-472)
Excitation Voltage, V_{EXC}	+10.0VDC $\pm 2\text{mV}$
Excitation Current	40mA (maximum)
Excitation Load Regulation	$\pm 5\text{ppm}/\text{mA}$
Excitation Stability	$\pm 15\text{ppm}/^\circ\text{C}$
Isolated Excitation Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1 (formerly IEEE-472)
CMV, Input to Output	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1 (formerly IEEE-472)
CMR (50 or 60Hz)	100dB
NMR (-3dB at 1kHz)	120dB per Decade Above 1kHz
Accuracy ⁽¹⁾	$\pm 0.03\%$ Span,
Linearity	$\pm 0.005\%$ Span
Stability	
Input Offset	$\pm 20\mu\text{V}/^\circ\text{C}$
Output Offset	$\pm 40\mu\text{V}/^\circ\text{C}$
Gain	$\pm 50\text{ppm}/^\circ\text{C}$
Noise	
Input, 0.1 to 10Hz	0.4 μV rms
Output, 100kHz	5mVp-p
Bandwidth, -3dB	1kHz
Response Time (to 90% final value)	750 μs
Output Range	See Ordering Information
Output Resistance	50 Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to $\pm 1\text{mV}$ of V_{OUT})	6.0 μs at $C_{\text{load}} = 0$ to 2000pF
Output Current Limit	$\pm 8\text{mA}$
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5 μA
Power Supply Voltage	+5VDC $\pm 5\%$
Power Supply Current	200mA at Full Exc. Load, 100mA at No Exc. Load
Power Supply Sensitivity	$\pm 200\mu\text{V}/\%$ RTI ⁽²⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temp. Range	-40 $^\circ\text{C}$ to +85 $^\circ\text{C}$
Storage Temp. Range	-40 $^\circ\text{C}$ to +85 $^\circ\text{C}$
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A $\pm 0.5\%$ Span Error
ESD,EFT	Performance B

Ordering Information

Model	Maximum Input	Output Range [†]
SCM5B43-01	$\pm 1\text{V}$	1, 2
SCM5B43-02	$\pm 2\text{V}$	1, 2
SCM5B43-03	$\pm 3\text{V}$	1, 2
SCM5B43-04	$\pm 4\text{V}$	1, 2
SCM5B43-05	$\pm 5\text{V}$	1, 2
SCM5B43-06	$\pm 6\text{V}$	1, 2
SCM5B43-07	$\pm 7\text{V}$	1, 2
SCM5B43-08	$\pm 8\text{V}$	1, 2
SCM5B43-09	$\pm 9\text{V}$	1, 2
SCM5B43-10	$\pm 10\text{V}$	1, 2

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. -5V to +5V	NONE	SCM5B43-01
2. -10V to +10V	D	SCM5B43-01D

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes excitation error, linearity, hysteresis and repeatability.

(2) RTI = Referenced to input.

SCM5B45

Frequency Input Modules

Description

Each SCM5B45 frequency input module provides a single channel of frequency input which is isolated and converted to a high-level analog voltage output. This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers (Figure 1).

The frequency input signal can be a TTL level signal or a zero-crossing signal. Terminal 3 on the field-side terminal block is the "common" or ground connection for input signals. A TTL signal is connected from terminal 2 to terminal 3, while a zero-crossing signal is connected from terminal 4 to terminal 3. Input circuitry for each of the signal types has hysteresis built in. An input signal must cross entirely through the hysteresis region in order to trigger the threshold comparator.

A 5.1V excitation is available for use with magnetic pick-up or contact-closure type sensors. The excitation is available on pin 1 and the excitation common is pin 3.

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.

A special circuit in the input stage of the module provides protection against accidental connection of power-line voltages up to 240VAC.

► Features

- Accepts Frequency Inputs of 0 to 100kHz
- Provides High-Level Voltage Outputs
- TTL or Zero Crossing Signal Inputs
- 1500 Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 120dB CMR
- $\pm 0.05\%$ Accuracy
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

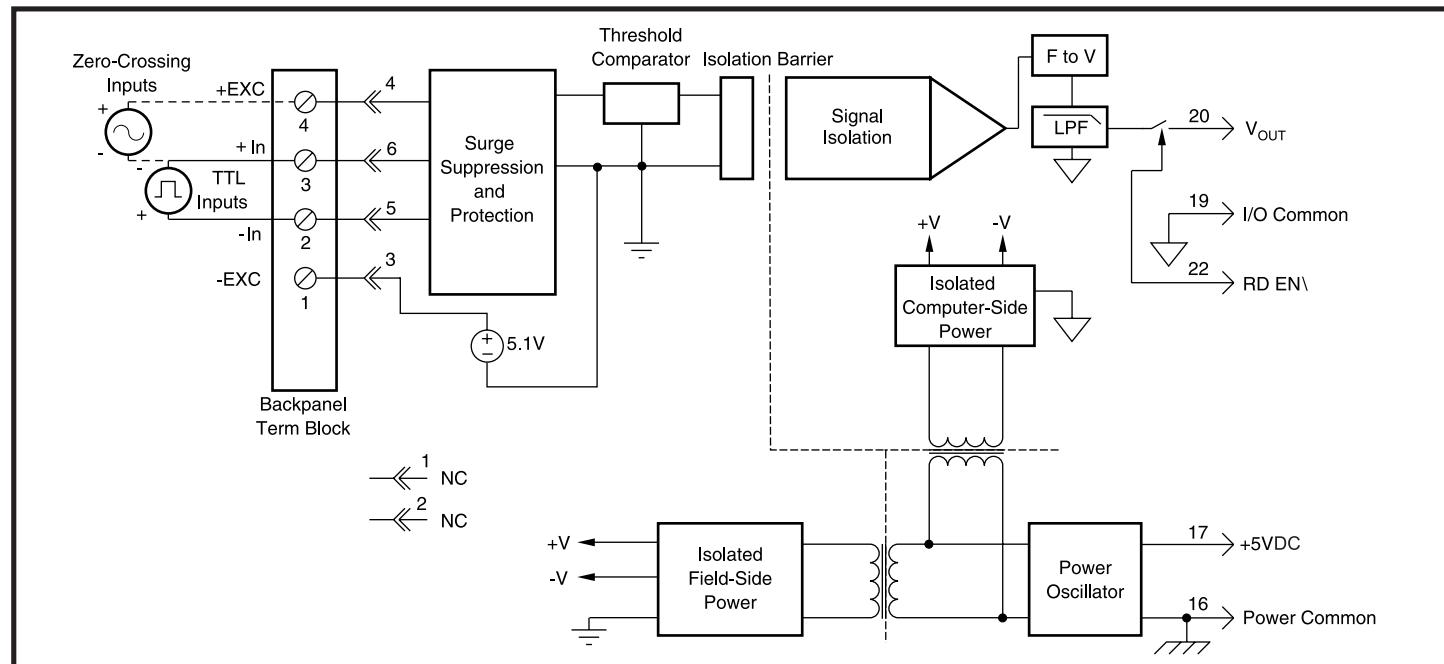


Figure 1: SCM5B45 Block Diagram

SpecificationsTypical^(*) at T_A=+25°C and +5VDC power

Module	SCM5B45
Input Range	0Hz to 100kHz
Input Threshold	Zero Crossing
Minimum Input	60mVp-p
Maximum Input	350Vp-p
Minimum Pulse Width	4µs
TTL Input Low	0.8V max
TTL Input High	2.4V min
Input Hysteresis	±20mV (±400mV on -2x models)
Zero Crossing	1.5V
TTL	
Input Resistance	
Normal	100kΩ
Power Off	100kΩ
Overload	100kΩ
Input Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1
Excitation	+5.1V at 8mA max
CMV, Input to Output	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	120dB
Accuracy ⁽¹⁾	±0.05% Span
Linearity	±0.02% Span
Stability	
Offset	±8ppm/°C
Gain	±40ppm/°C
Noise	
Output Ripple	<10mVp-p at Input >2% span
Response Time (0 to 90%)	
SCM5B45-01, -02, -21, -22	300ms
SCM5B45-03, -23	170ms
SCM5B45-04, -05, -24, -25	90ms
SCM5B45-06, -07, -08, -26, -27, -28	20ms
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short to Ground
Output Selection Time (to ±1mV of V _{OUT})	6µs at C _{load} = 0 to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Power Supply Voltage	+5VDC ±5%
Power Supply Current	110mA
Power Supply Sensitivity	±150µV/% RTO ⁽²⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability.

(2) RTO = Referenced to output.

Ordering Information

Model	Input Range	Output Range [†]	Zero Crossing Hysteresis
SCM5B45-01	0Hz to 500Hz	3, 4	±20mV
SCM5B45-02	0Hz to 1kHz	3, 4	±20mV
SCM5B45-03	0Hz to 3kHz	3, 4	±20mV
SCM5B45-04	0Hz to 5kHz	3, 4	±20mV
SCM5B45-05	0Hz to 10kHz	3, 4	±20mV
SCM5B45-06	0Hz to 25kHz	3, 4	±20mV
SCM5B45-07	0Hz to 50kHz	3, 4	±20mV
SCM5B45-08	0Hz to 100kHz	3, 4	±20mV
SCM5B45-21	0Hz to 500Hz	3, 4	±400mV
SCM5B45-22	0Hz to 1kHz	3, 4	±400mV
SCM5B45-23	0Hz to 3kHz	3, 4	±400mV
SCM5B45-24	0Hz to 5kHz	3, 4	±400mV
SCM5B45-25	0Hz to 10kHz	3, 4	±400mV
SCM5B45-26	0Hz to 25kHz	3, 4	±400mV
SCM5B45-27	0Hz to 50kHz	3, 4	±400mV
SCM5B45-28	0Hz to 100kHz	3, 4	±400mV

†Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B45-01
4. 0V to +10V	D	SCM5B45-01D

SCM5B47

Linearized Thermocouple Input Modules

Description

Each SCM5B47 thermocouple input module provides a single channel of thermocouple input which is filtered, isolated, amplified, linearized and converted to a high-level analog voltage output (Figure 1). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

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 SCM5B47 can interface to eight industry standard thermocouple types: J, K, T, E, R, S, N, and B. Its corresponding output signal operates over a 0V to +5V range. Each module is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the mounting backpanel. Upscale open thermocouple detect is provided by an internal pull-up resistor. Downscale indication can be implemented by installing an external $47\text{M}\Omega$ resistor, $\pm 20\%$ tolerance, between screw terminals 1 and 3 on the SCMPB01/02/03/04/05/06/07 backpanels.

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

► Features

- Interfaces to Types J, K, T, E, R, S, N and B Thermocouples
- Linearizes Thermocouple Signal
- High-Level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- $\pm 1\mu\text{V}/^\circ\text{C}$ Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

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 SCM5B47 modules provides protection against accidental connection of power-line voltages up to 240VAC.

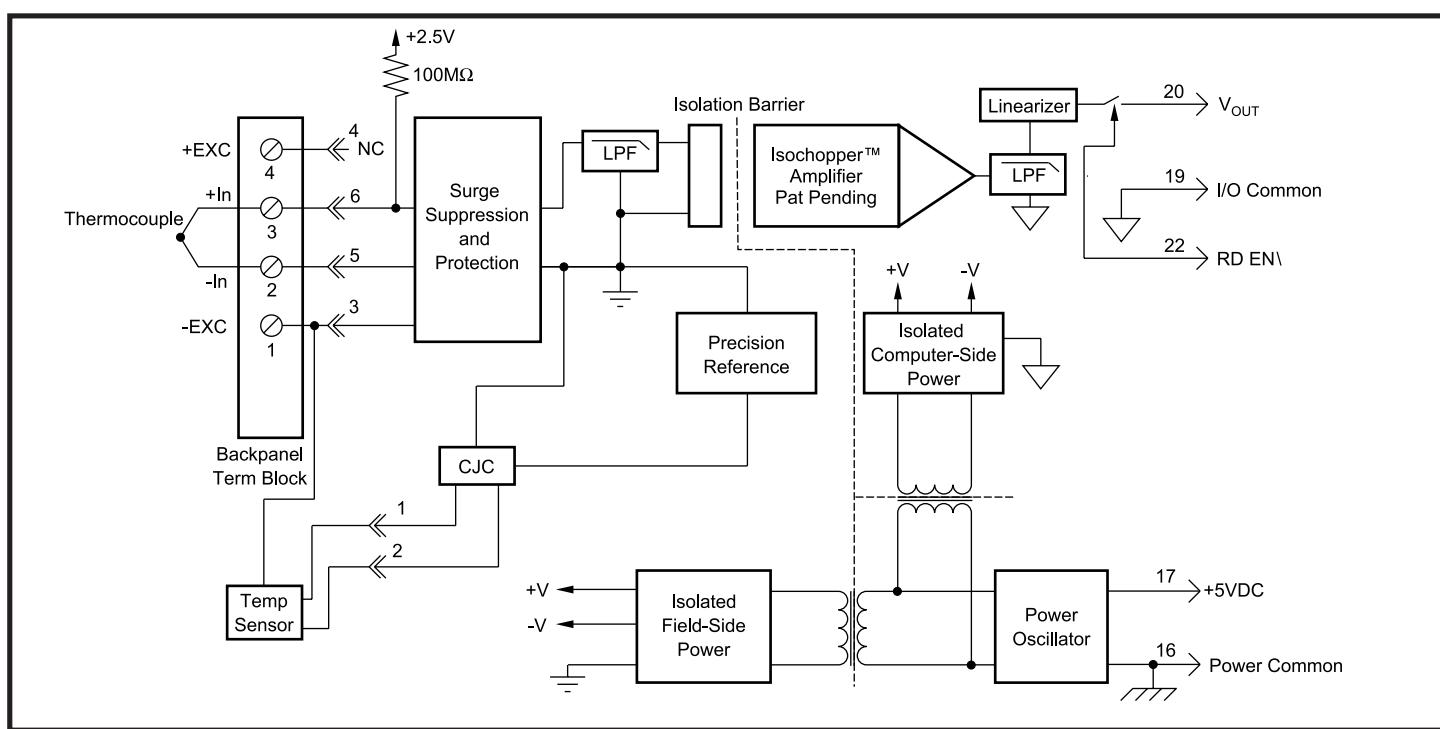


Figure 1: SCM5B47 Block Diagram

Specifications Typical^(*) at T_A=+25°C and +5VDC power

Module	SCM5B47
Input Range	-0.1V to +0.5V
Input Bias Current	-25nA
Input Resistance	
Normal	50MΩ
Power Off	40kΩ
Overload	40kΩ
Input Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	160dB
NMR	95dB at 60Hz, 90dB at 50Hz
Accuracy	
Stability	See Ordering Information
Input Offset	±1µV/°C ⁽²⁾
Output Offset	±20µV/°C
Gain	±25ppm/°C
Noise	
Input, 0.1 to 10Hz	0.2µVrms
Output, 100kHz	300µVp-p, 150µVrms
Bandwidth, -3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	
Output Resistance	See Ordering Information
Output Protection	50Ω
Output Selection Time	Continuous Short to Ground
(to ±1mV of V _{OUT})	6µs at C _{load} = 0 to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Open Input Response	Upscale
Open Input Detection Time	<10s
Cold Junction Compensation	
Accuracy, 25°C	±0.25°C
Accuracy, +5°C to +45°C	±0.5°C
Accuracy, -40°C to +85°C	±1.25°C
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±2µV/% RTI ⁽³⁾
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes conformity, hysteresis and repeatability. Does not include CJC accuracy.

(2) This is equivalent to °C as follows: Type J 0.020 °C/°C, Types K, T 0.025°C/°C,

Type E 0.016°C/°C, Types R, S 0.168°C/°C, Type N 0.037°C/°C, Type C 0.072°C/°C.

(3) RTI = Referenced to input.

Ordering Information

Model	TC Type [†]	Input Range	Output Range [†]	Accuracy ⁽¹⁾	
SCM5B47J-01	J	0°C to +760°C (+32°F to +1400°F)	3, 4	±0.08%	±0.61°C
SCM5B47J-02	J	-100°C to +300°C (-148°F to +572°F)	3, 4	±0.08%	±0.32°C
SCM5B47J-03	J	0°C to +500°C (+32°F to 932°F)	3, 4	±0.07%	±0.36°C
SCM5B47K-04	K	0°C to +1000°C (+32°F to +1832°F)	3, 4	±0.08%	±0.80°C
SCM5B47K-05	K	0°C to +500°C (+32°F to +932°F)	3, 4	±0.08%	±0.38°C
SCM5B47T-06	T	-100°C to +400°C (-148°F to +752°F)	3, 4	±0.16%	±0.80°C
SCM5B47T-07	T	0°C to +200°C (+32°F to +392°F)	3, 4	±0.16%	±0.32°C
SCM5B47E-08	E	0°C to +1000°C (+32°F to +1832°F)	3, 4	±0.10%	±1.0°C
SCM5B47R-09	R	+500°C to +1750°C (+932°F to +3182°F)	3, 4	±0.10%	±1.3°C
SCM5B47S-10	S	+500°C to +1750°C (+932°F to +3182°F)	3, 4	±0.10%	±1.3°C
SCM5B47B-11	B	+500°C to +1800°C (+932°F to +3272°F)	3, 4	±0.15%	±2.0°C
SCM5B47J-12	J	-100°C to +760°C (-148°F to +1400°F)	3, 4	±0.08%	±0.70°C
SCM5B47K-13	K	-100°C to +1350°C (-148°F to +2462°F)	3, 4	±0.10%	±1.5°C
SCM5B47K-14	K	0°C to +1200°C (+32°F to +2192°F)	3, 4	±0.08%	±0.96°C
SCM5B47N-15	N	-100°C to +1300°C (-148°F to +2372°F)	3, 4	±0.08%	±1.15°C

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
N	Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicon- 0.1% Magnesium

Output Ranges Available

Output Range	Part No. Suffix	Example
3. 0V to +5V	NONE	SCM5B47J-01
4. 0V to +10V	D	SCM5B47J-01D

SCM5B48

Accelerometer Input Module

Description

The SCM5B48 provides excitation to piezoelectric sensors with built-in microelectronic amplifiers, commonly known as ICP®* or IEPE* or LIVM* sensors. The module provides a constant current excitation to the sensor, then isolates, filters, and amplifies the sensor output, yielding a high-level analog voltage output (Figure 1). The excitation current, signal gain, and filter high-pass and low-pass cutoff frequencies are field-configurable through a set of slide switches.

Six poles of signal filtering in the SCM5B48 module result in greater than 100dB of normal-mode rejection for signal frequencies above the cutoff frequency. One pole of filtering is on the field side of the isolation barrier for anti-aliasing purposes and the remaining five-pole programmable Bessel filter is located on the system side. High-pass filtering is achieved through a second order passive filter, located on the field side. 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 SCM5B48 offers the option of setting the constant current source for sensor excitation to common values of 4mA or 9mA with a compliance voltage of 24VDC. Programmable gains of 1, 10 and 100 are selectable and the module offers a ± 10 V output. The required supply level is +5VDC, $\pm 5\%$.

To ensure protection of expensive data acquisition equipment, the SCM5B48 module signal inputs and sensor excitation outputs are protected against accidental connection of voltages up to 240Vrms.

*ICP is a registered trademark of PCB Group Inc.

*IEPE is Integrated Electronic Piezo-Electric

*LIVM is Low Impedance Voltage Mode

► Features

- Interfaces to ICP®* or IEPE* or LIVM* Sensors
- ± 5 V or ± 10 V Output Range
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240Vrms Continuous
- 1, 10, and 100 Programmable Gain
- 2.5, 5, 10, and 20kHz Programmable LP Filter
- 0.2 and 10Hz Programmable HP Filter
- 4mA or 9mA Programmable Current Excitation
- 100dB CMR
- $\pm 0.2\%$ Accuracy
- $\pm 0.01\%$ Linearity
- Low Drift with Ambient Temperature
- -40°C to $+85^\circ\text{C}$ Operating Temperature Range
- CSA C/US Certified
- CE Compliant
- ATEX Compliance Pending
- Mix and Match SCM5B Types on Backpanel

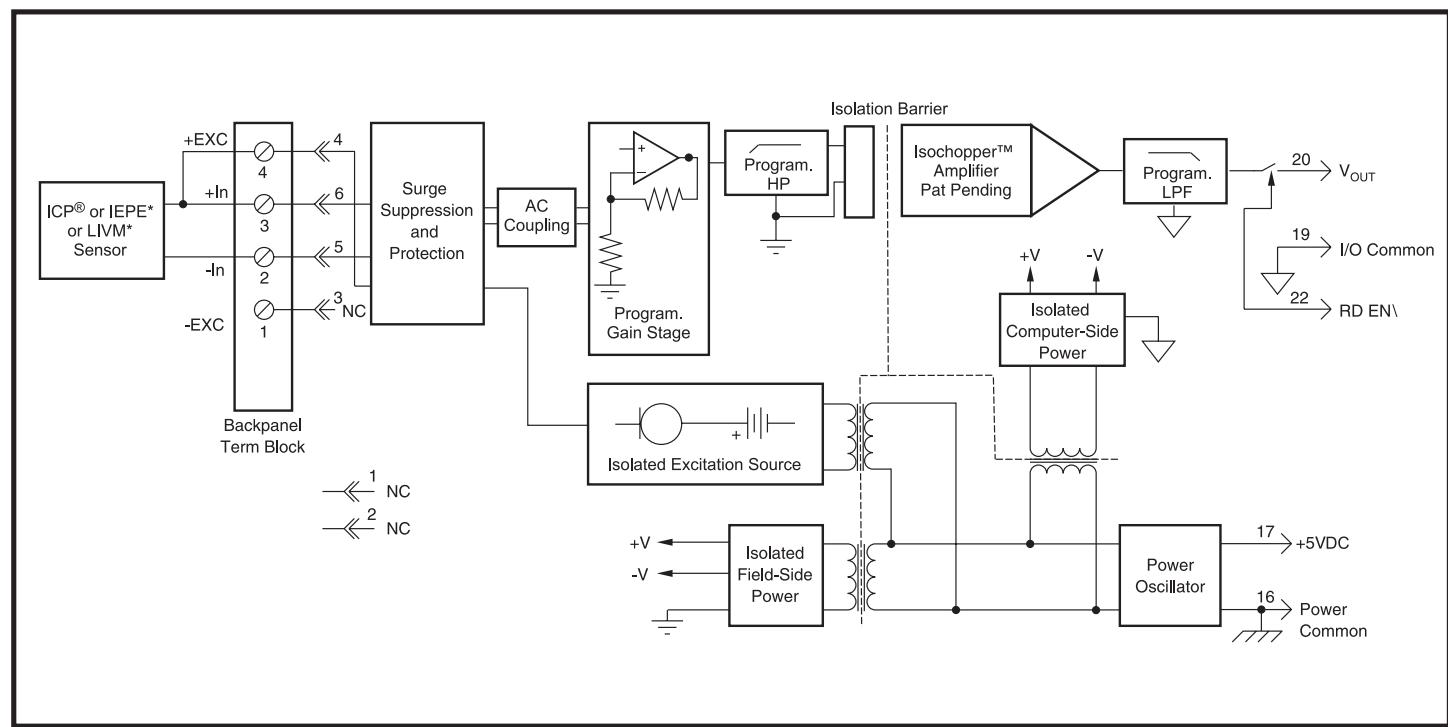


Figure 1: SCM5B48 Block Diagram

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

Module	SCM5B48
Input Type Range ⁽¹⁾ Protection Continuous Transient	Accelerometer $\pm 10\text{V}$ 240Vrms max ANSI/IEEE C37.90.1
Excitation Constant Current ⁽²⁾ Compliance Voltage Protection Continuous Transient	4mA or 9mA, $\pm 10\%$ $24\text{V} \pm 10\%$ 240Vrms max ANSI/IEEE C37.90.1
Output Range Resistance Protection	See Ordering Information 50Ω Continuous Short to Ground
Gain Programmable ⁽²⁾	1, 10, 100
CMR (50/60Hz) Accuracy ⁽³⁾ Linearity Stability Offset Gain Output Noise, Gain=1, BW=20kHz Low Pass Filter Type Programmable ⁽²⁾ High Pass Filter Programmable ⁽²⁾ CMV (Input to Output) Continuous Transient NMR	100dB $\pm 0.2\%$ Span $\pm 0.01\%$ Span $\pm 25\text{ppm}/^\circ\text{C}$ $\pm 100\text{ppm}/^\circ\text{C}$ 200 μV rms Bessel 2.5kHz, 5kHz, 10kHz, 20kHz DC, 0.2Hz, 10Hz 1500Vrms max ANSI/IEEE C37.90.1 100db per Decade above cutoff frequency
Supply Voltage Current	+5VDC $\pm 5\%$ 110mA typical (9mA excitation) 70mA typical (4mA excitation)
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)
Environmental Operating Temperature Range Storage Temperature Range	-40°C to +85°C -40°C to +85°C

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) AC peak for AC coupling. For DC coupling input range (AC + DC): 0 to +10V.

(2) Programmable using slide switches on the bottom of the module.

(3) Includes linearity, repeatability and hysteresis.

Ordering Information

Model	Input Range ⁽¹⁾	Output Range	Bandwidth
SCM5B48-01	-10V to +10V	-10V to +10V	2.5kHz to 20kHz ⁽²⁾
SCM5B48-02	-10V to +10V	-5V to +5V	2.5kHz to 20kHz ⁽²⁾

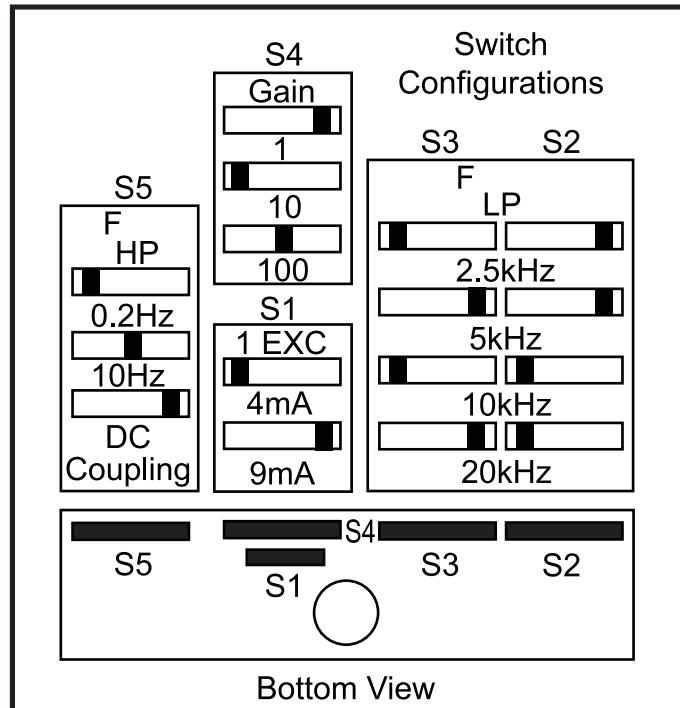


Figure 2: SCM5B48 Side Label

SCM5B49

Voltage Output Modules

Description

Each SCM5B49 voltage output module provides a single channel of analog output. The track-and-hold circuit in the input stage can be operated in a hold mode where one DAC can supply many output modules, or a track mode where one DAC is dedicated to each module. In addition to the track-and-hold circuit, each module provides signal buffering, isolation, filtering, and conversion to a high-level voltage output (Figure 1).

Setting of the track or hold mode is controlled by the logic state of WR EN\, module pin 23. When pin 23 is low, the track mode is enabled. If pin 23 is high, the hold mode is enabled. The module 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 track and hold circuit. For a low state, simply connect pin 23, the Write-Enable pin, to I/O Common, pin 19.

The SCMPB02 and SCMPB06 backpanels allow host computer control of the WR EN\ control line, which allows multiplexing of one host DAC to up to 64 SCM5B49 output modules.

► Features

- Accepts High-Level Voltage Inputs to $\pm 10V$
- Provides High-Level Voltage Outputs to $\pm 10V$
- 1500 Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 5 Poles of Filtering
- 110dB CMR
- 400Hz Signal Bandwidth
- $\pm 0.03\%$ Accuracy
- $\pm 0.015\%$ Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

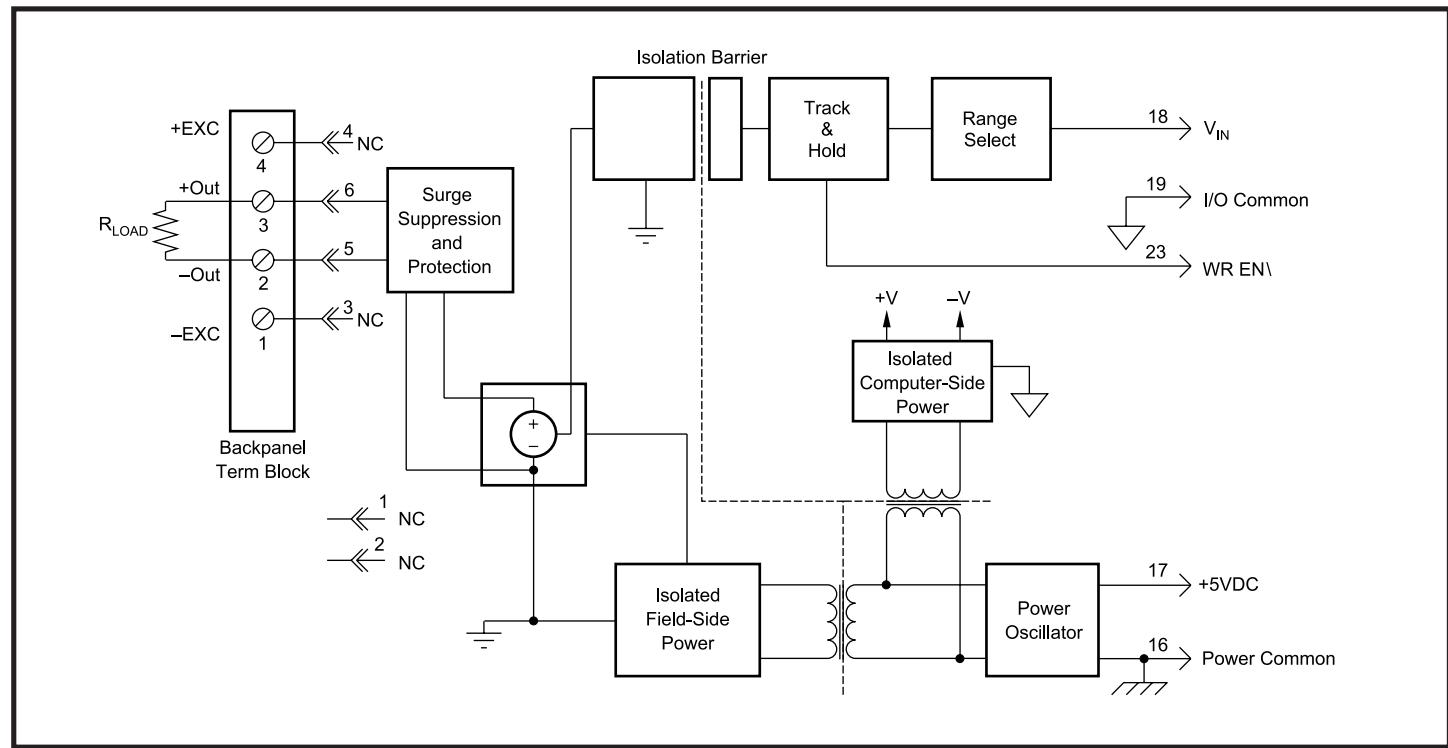


Figure 1: SCM5B49 Block Diagram

SpecificationsTypical^(*) at T_A=+25°C and +5VDC power

Module	SCM5B49
Input Voltage Range	±5V, 0 to +5V, ±10V, 0 to +10V
Input Voltage Maximum	±36V (no damage)
Input Resistance	50MΩ
Output Voltage Range	±5V, 0 to +5V, ±10V, 0 to +10V
Over Range Capability	5% at 10V output
Output Drive	50mA max
Output Resistance	0.5Ω
Output I Under Fault, Max	75mA
Output Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1
CMV, Output to Input	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	110dB
NMR (-3dB at 400Hz)	80dB per Decade Above 400Hz
Accuracy ⁽¹⁾	±0.03% Span (0-5mA Load)
Linearity	±0.015% Span
Stability	
Zero	±25ppm/°C
Span	±20ppm/°C
Noise	
Output Ripple,	2mVp-p
100kHz bandwidth	
Bandwidth, -3dB	400Hz
Response Time, 90% Span	1.25ms
Sample and Hold	
Output Droop Rate	0.2% Span/s
Acquisition Time	50µs
Track-and-Hold Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0"	0.5µA
Power Supply Voltage	+5VDC ±5%
Power Supply Current	350mA Full Load, 135mA no load
Power Supply Sensitivity	±12.5ppm/%
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability.

Ordering Information

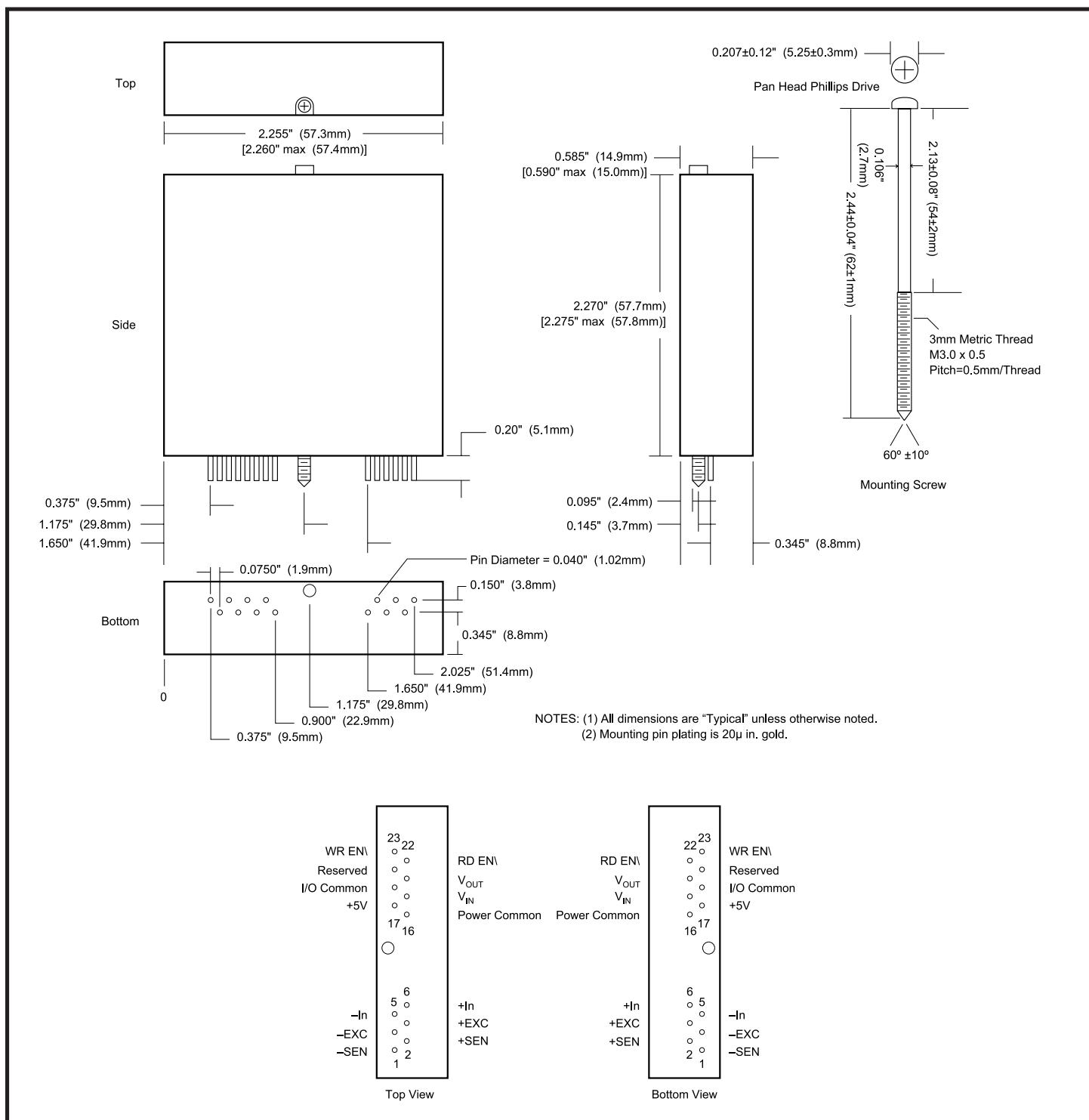
Model	Input Range	Output Range
SCM5B49-01	0V to +5V	-5V to +5V
SCM5B49-02	-5V to +5V	-5V to +5V
SCM5B49-03	-5V to +5V	0V to +5V
SCM5B49-04	0V to +10V	-10V to +10V
SCM5B49-05	-10V to +10V	-10V to +10V
SCM5B49-06	-10V to +10V	0V to +10V
SCM5B49-07	-5V to +5V	-10V to +10V

SCM5B

Module Dimensions and Pinouts

The following mechanical drawing is useful if designing circuit boards to mount the SCM5B modules. Many sockets are available which accept the mounting pins. As an example, AMP Inc. provides a socket with part

number 50865-5. The captive nut for the 3mm mounting screw can be obtained from PEM (Penn Engineering and Manufacturing), part number KFS2-M3.



SCMVAS

Voltage Attenuator System

Description

The SCMVAS (Signal Conditioning Modular Voltage Attenuator System) is an analog signal conditioning system designed to safely monitor and accurately measure voltage potentials up to 495VAC (1400V peak-to-peak). These high-level voltages are typically found in industrial applications such as induction heaters or electric-motor drive controllers. The system reduces the input signal to a level suitable for interface to data acquisition systems, while at the same time providing various filter characteristics and 1500Vrms isolation (Figure 1).

For each channel of analog input, an attenuator module, SCMVAS-Mnnn, pre-conditions the signal which is then filtered, isolated, and converted to a high-level voltage output using an SCM5B30-07 or SCM5B40-07 module. The SCM5B40-07 module with a 10kHz bandwidth is recommended for common 50/60Hz signals low in harmonics where the user is interested in measuring only AC voltage. The SCM5B30-07 module is used for low frequency AC signals below 4Hz. The attenuator and signal conditioning modules have excellent stability over time and do not require recalibration. Overall system accuracy is $\pm 0.06\%$.

Input signal connections to the SCMVAS-Mnnn attenuator module are made using a pluggable terminal block for ease of system assembly and reconfiguration. For safety purposes, the terminal block has a cover over the screws and there are no other exposed high-voltage points on the SCMVAS-Mnnn series modules, SCM5B30-07 or SCM5B40-07 module, or the mounting backpanel.

The SCMVAS system has two specially designed backpanels for mounting the attenuator and signal conditioning modules. The SCMVAS-PB8 high density, 8-channel backpanel (Figures 2, 3) can be panel mounted or DIN rail mounted and provides the conditioned output signal on screw terminal blocks. Jumpers are provided on each channel to optionally connect or isolate each module's I/O Common from other channel's I/O Common and/or Power Common. The SCMVAS-PB16 (Figures 4, 5) has 16 channels of analog I/O simultaneously available to high-speed data acquisition (ADC) boards through a 26-conductor ribbon cable. Refer to the SCMPB01 Data Sheet in this catalog and Application Note AN502 at www.dataforth.com for recommended ground connections and host system interfaces. Both the SCMVAS-PB8 and SCMVAS-PB16 backpanels can be mounted on the SCMXRK-002 19-inch metal rack.

► Features

- Accepts High Voltage Signals up to 495VAC (1400V Peak-to-Peak)
- 5 or 10 Volt Output for A/D Systems
- 1500Vrms Transformer Isolation
- True 3-Way Isolation
- Up to 160dB CMR
- $\pm 0.06\%$ Accuracy
- Panel or DIN Rail Mounting Options
- CSA Certified
- CE Compliant
- ATEX Compliant (all models except SCMVAS-M400, -M500, -M600, -M650)

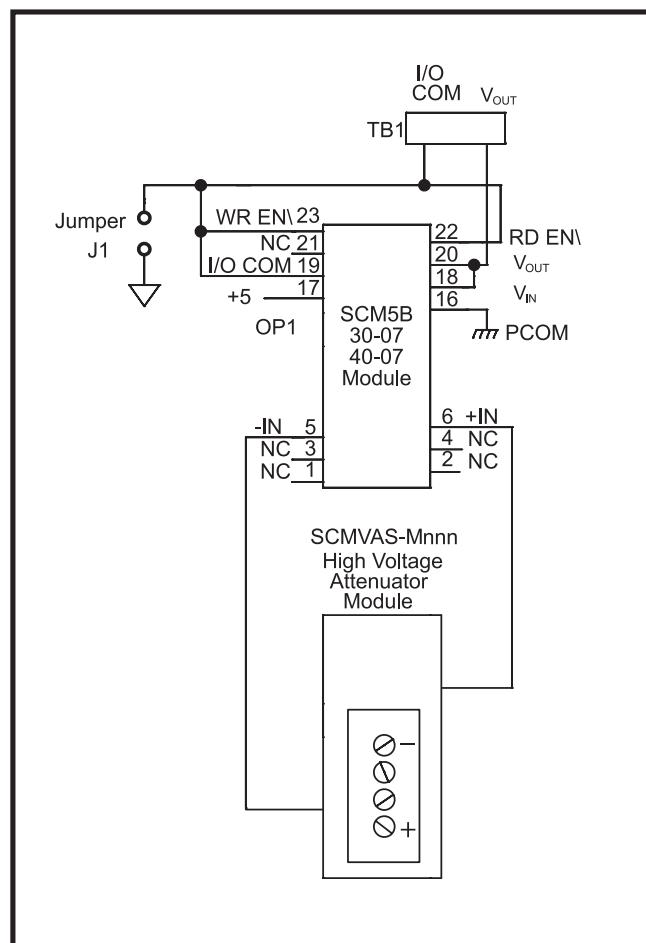


Figure 1: SCMVAS Schematic

SCM5B30/40-07

Isolated Analog Voltage Input Modules

Specifications

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

Module	SCM5B30-07	SCM5B40-07
Input Range	-1.0V to +1.0V	*
Input Bias Current	$\pm 0.5\text{nA}$	*
Input Resistance		
Normal	50M Ω	200M Ω
Power Off	40k Ω	*
Overload	40k Ω	*
Input Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50 or 60Hz)	160dB	
NMR	95dB at 50Hz, 90dB at 60Hz	100dB 120dB per Decade above 10kHz
Accuracy ⁽¹⁾	$\pm 0.03\%$ Span	*
Linearity	$\pm 0.005\%$ Span	$\pm 0.01\%$ Span
Stability		
Input Offset	$\pm 20\mu\text{V}/^\circ\text{C}$	*
Output Offset	$\pm 20\mu\text{V}/^\circ\text{C}$	*
Gain	$\pm 50\text{ppm}/^\circ\text{C}$	*
Noise		
Input, DC to 10Hz	2 μVrms	*
Output, 100kHz	200 μVrms	2mVp-p
Bandwidth, -3dB	4Hz	10kHz
Response Time (to 90% final value)	0.2s	35 μs
Output Range	-5V to +5V (-10V to +10V, D model versions)	*
Output Resistance	50 Ω	*
Output Protection	Continuous short to ground	*
Output Selection Time (to $\pm 1\text{mV}$ of Vout)	6.0 μs at $C_{\text{load}} = 0$ to 2000pF	*
Output Current Limit	$\pm 8\text{mA}$	*
Output Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current "0,1"	0.5 μA	*
Power Supply Voltage	+5VDC $\pm 5\%$	*
Power Supply Current	30mA	*
Power Supply Sensitivity	$\pm 200\mu\text{V}/\%$ RTI ⁽²⁾	*
Mechanical Dimensions	2.28"x 2.26"x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	-40°C to +85°C	*
Storage Temp. Range	-40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A $\pm 0.5\%$ Span Error	*
ESD,EFT	Performance B	*

Ordering Information

Model	Description
SCM5B30-07	V Isolation Module, $\pm 5\text{V}$ Output, 4Hz Bandwidth
SCM5B40-07	V Isolation Module, $\pm 5\text{V}$ Output, 10kHz Bandwidth
SCM5B30-07D	V Isolation Module, $\pm 10\text{V}$ Output, 4Hz Bandwidth
SCM5B40-07D	V Isolation Module, $\pm 10\text{V}$ Output, 10kHz Bandwidth

NOTES:

*Contact factory or your local Dataforth sales office for maximum values.

(1) Includes linearity, hysteresis and repeatability.

(2) RTI = Referenced to input.



SCMVAS-Mnnn

High Voltage Attenuator Modules

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

Module	SCMVAS-Mnnn
Input Range Input Voltage Maximum Input Resistance	$\pm 100\text{V}_{\text{peak}}$ to $\pm 700\text{V}_{\text{peak}}$ (70VAC to 495VAC) $\pm 750\text{V}_{\text{peak}}$ $10\text{M}\Omega$
Accuracy Stability	$\pm 0.03\%$ $\pm 50\text{ppm}/^\circ\text{C}$
Output Range Output Resistance	$\pm 1\text{V}$ $<100\text{k}\Omega$
Mechanical Dimensions	1.70" x 1.98" x 0.69" (44mm x 51mm x 18mm)
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity HazLoc CSA ATEX	-40°C to +85°C -40°C to +85°C 0 to 95% noncondensing All models except SCMVAS-M700 All models except SCMVAS-M400, -M500, -M600, -M650, -M700

* Contact factory or your local Dataforth sales office for maximum values.

Ordering Information

Model	Description	Input Range with V Isolation Module
SCMVAS-M100	Attenuator Module	$\pm 100\text{V}$ Input (70VAC)
SCMVAS-M200	Attenuator Module	$\pm 200\text{V}$ Input (141VAC)
SCMVAS-M300	Attenuator Module	$\pm 300\text{V}$ Input (212VAC)
SCMVAS-M400	Attenuator Module	$\pm 400\text{V}$ Input (282VAC)
SCMVAS-M500	Attenuator Module	$\pm 500\text{V}$ Input (353VAC)
SCMVAS-M600	Attenuator Module	$\pm 600\text{V}$ Input (424VAC)
SCMVAS-M650	Attenuator Module	$\pm 650\text{V}$ Input (460VAC)
SCMVAS-M700	Attenuator Module	$\pm 700\text{V}$ Input (495VAC)
SCMVAS-MPT	Attenuator Module, Pass-Thru 1-to-1	

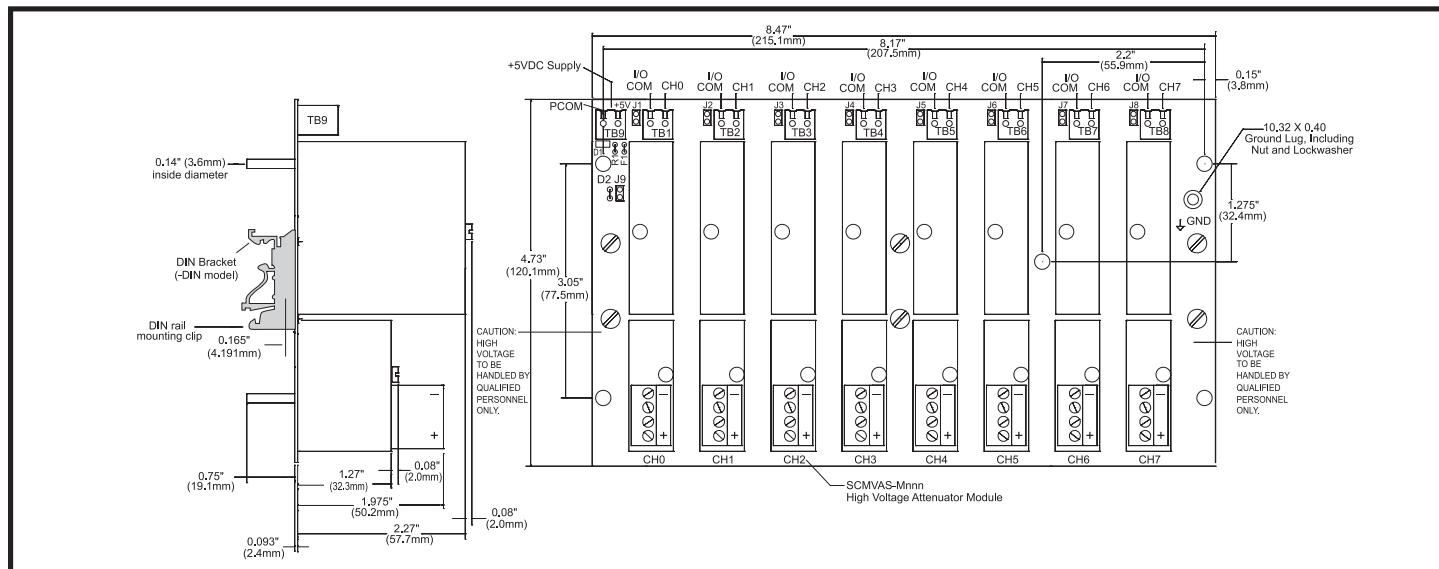


Figure 2: SCMVAS-PB8 Analog I/O Backpanel

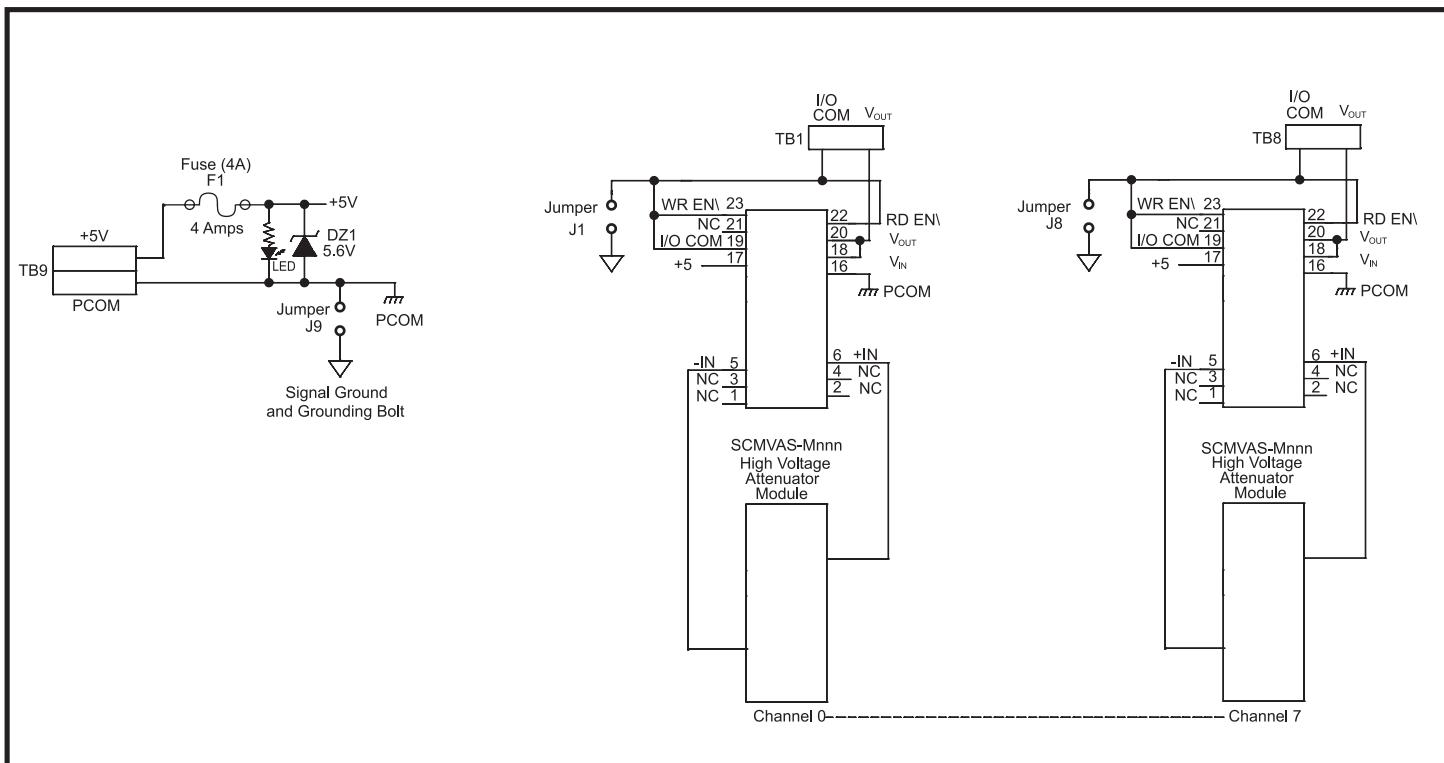


Figure 3: SCMVAS-PB8 Schematic

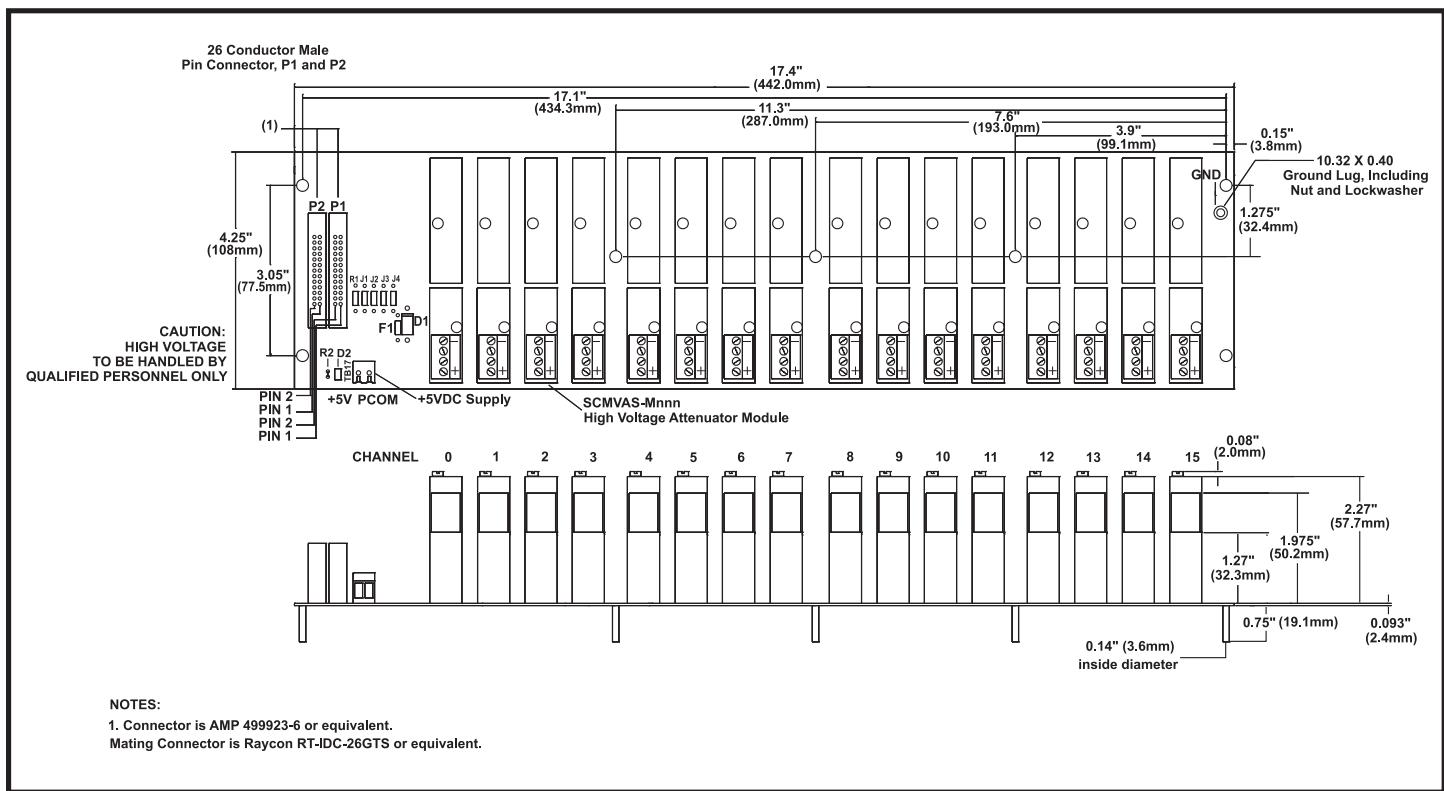


Figure 4: SCMVAS-PB16 Analog I/O Backpanel

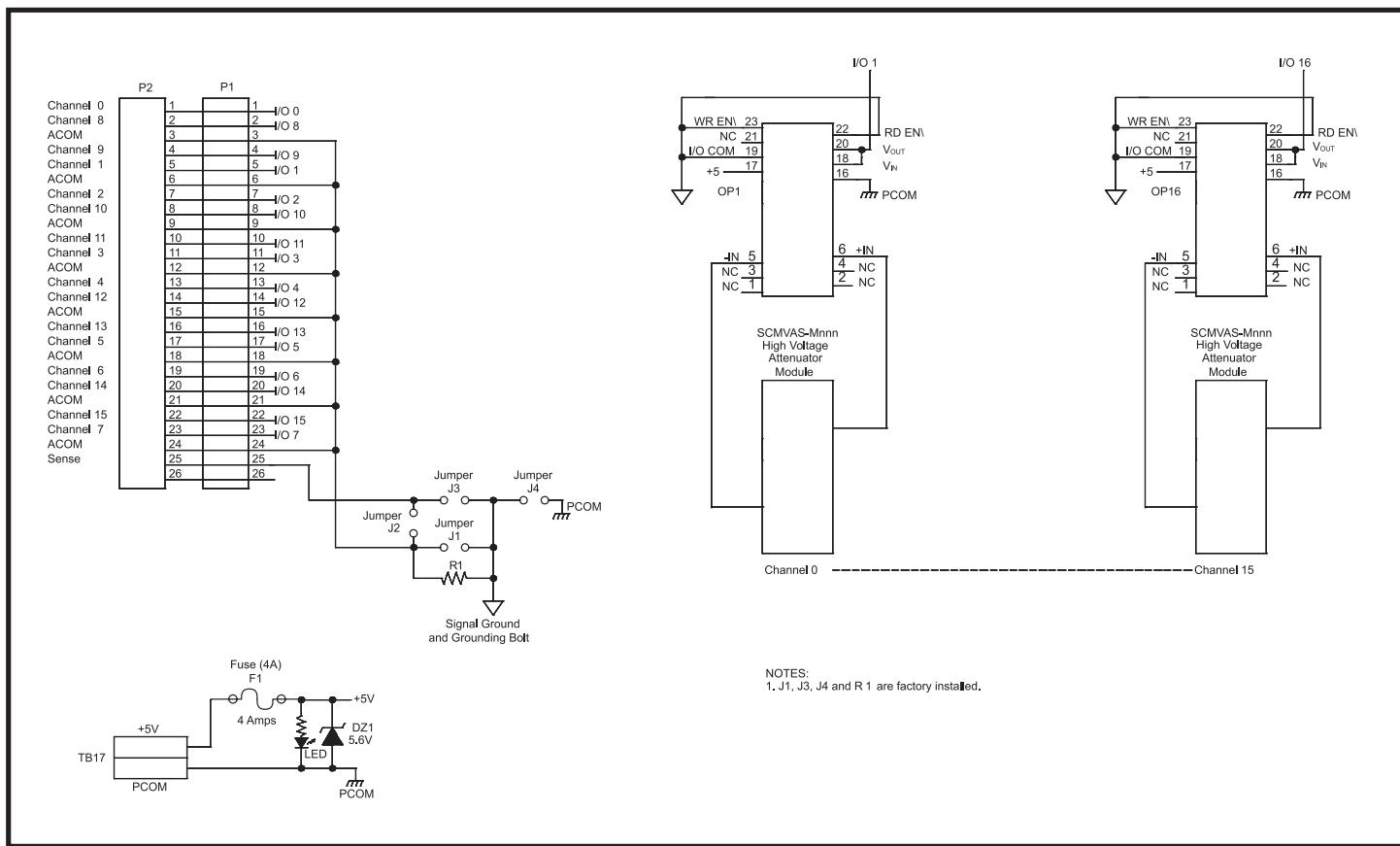


Figure 5: SCMVAS-PB16 Schematic

► Accessories for SCM5B Analog Modules

► Features

- 1-, 2-, 8-, 16-Position Backpanels
- Panel or DIN Rail Mounting Options
- 19-Inch Mounting Rack For Backpanels
- Multiplexed and Non-Multiplexed Backpanels
- Interface Cables
- Module Evaluation Board
- Cable-to-Screw-Terminal Interface Board
- Power Supplies

SCMPB01

16-Position Analog I/O Backpanel,
Non-Multiplexed

Description

The SCMPB01 16-channel backpanel (Figure 1) can accept any of the SCM5B analog modules in any mixture. It can be mounted on the SCMXRK-002 19-inch metal rack. The SCMPB01 has 16 non-addressable analog I/O signal channels which provides each module with its own analog bus. The module output switch is continuously "on" when using this backpanel and all sixteen module outputs are simultaneously accessible to high-speed data acquisition (ADC) boards. A set of inter-channel bridge jumpers permits connecting an input module's output to an output module's input, providing two levels of isolation. A temperature sensor is mounted on each channel to provide cold junction compensation for thermocouple input modules (see Figure 2 for schematic). Field connections are terminated with four screw terminals at each module site. Use system interface cable SCMXCA004-XX for connection to the host system.



Specifications

Operating Temperature Relative Humidity	-40°C to +85°C 95% Noncondensing
Interface Connector: Field System	high density screw clamp, 14 AWG max 26-pin, male header connector
Isolation: Input-to-Output Channel-to-Channel	1500Vrms continuous, max 1500Vrms continuous, max

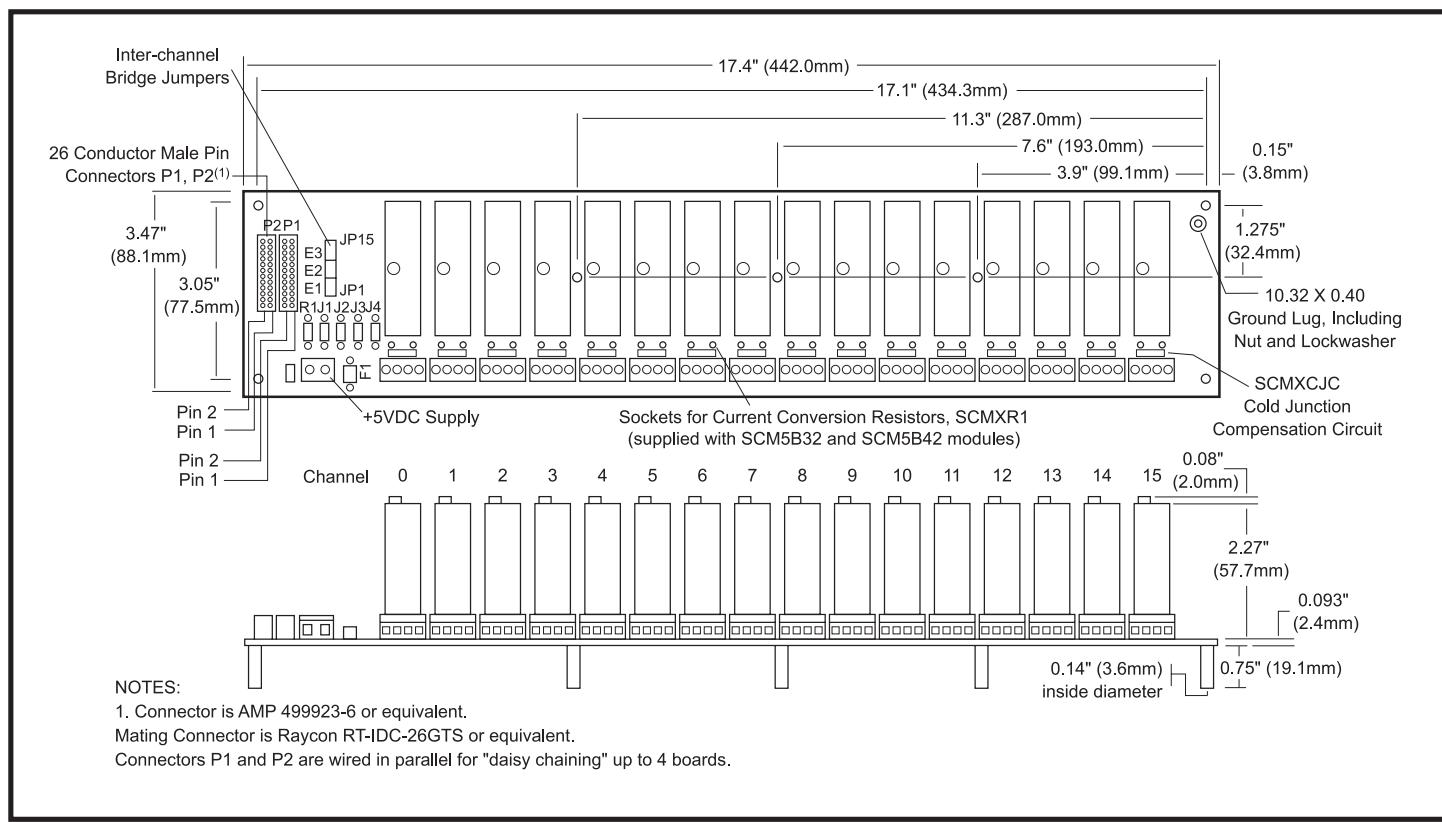
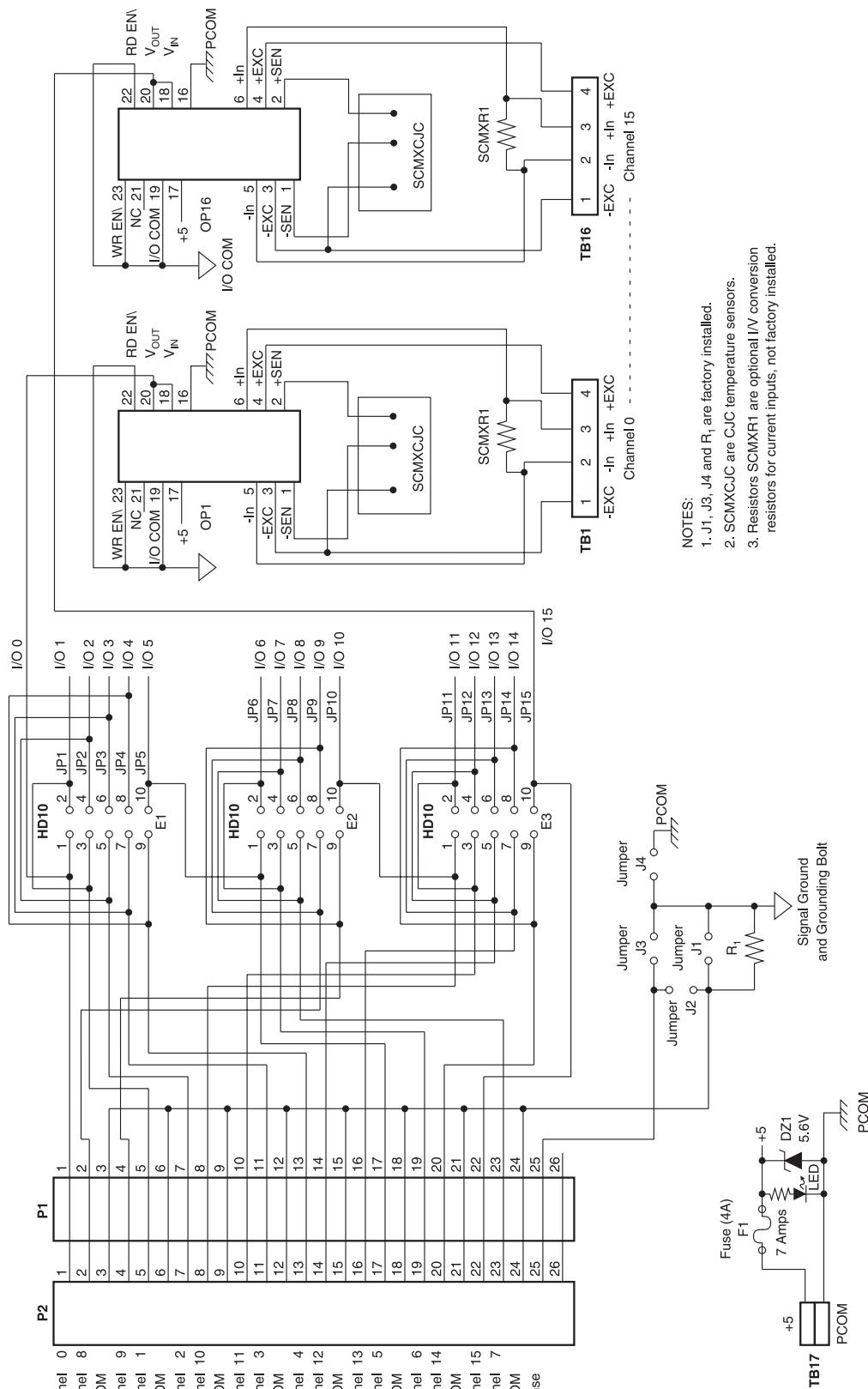


Figure 1: SCMPB01 Analog I/O Backpanel



- NOTES:
 1. J1, J3, J4 and R₁ are factory installed.
 2. SCMXJC/C are CJC temperature sensors.
 3. Resistors SCMXR1 are optional I/V conversion resistors for current inputs, not factory installed.

Figure 2: SCMPB01 Schematic

Electrical

P1 and P2 Connector

Connection to the host system is made at connectors P1 and P2. These connectors are electrically equivalent. Two connectors are provided to allow both analog input and analog output from host systems having individual input and output connectors.

Adjacent Channel Jumpers

Adjacent channels may be connected together to provide an isolated output signal from an isolated input module, providing two levels of 1500V isolation. This capability is provided with the 15 jumpers labeled JP1 through JP15 on headers E1, E2, and E3. A simplified drawing of the SCMPB01 schematic for Channel 1 through 4 is shown in Figure 3.

Example: Assume an SCM5B30 input module is installed in Channel 0 position and an SCM5B39 output module is installed in Channel 1 position. If JP1 is installed, the output of Channel 0 is connected to the input of Channel 1, which provides two levels of 1500V isolation.

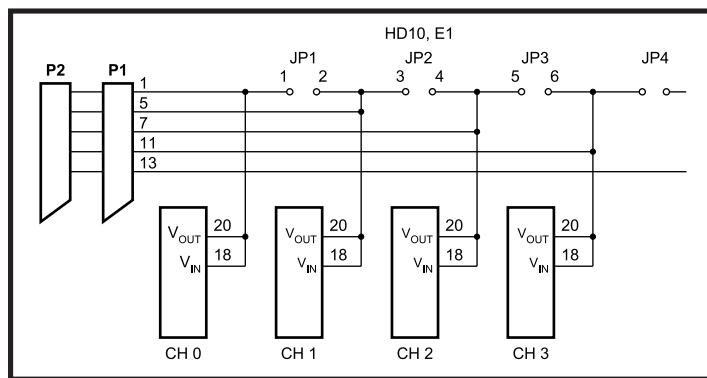


Figure 3: SCMPB01 Adjacent Channel Jumpers

Power

The SCMPB01 backpanel requires external +5VDC $\pm 5\%$ power. The chassis mounted SCMPXPRE-003 or SCMPXPR-003 power supplies have adequate capacity to power any combination of modules.

Fusing

The SCMPB01 backpanel power is fuse protected through F1. This is a Littelfuse type 252007, 7 amp fuse. Zener diode DZ1 provides extra protection by clamping the input power voltage to +5.6V. If the input supply voltage connection is reversed, this zener diode will be forward biased and fuse F1 will be blown.

Grounding

Figure 4 details the optional ground jumper configuration available on the SCMPB01 backpanel. Jumpers J1, J3, and J4 are factory installed.

Jumper J1 connects the AGND shield wires (pins 3, 6, 9, 12, 15, 18, 21, and 24) to the backpanel signal ground. This provides a ground connection between the host system and backpanel. Jumper J1 is required if output modules (SCM5B39, SCM5B49) are used, or if there is no high impedance sense input (input low of a differential or pseudo-differential system) on the host measurement system.

Jumper J3 connects the SENSE line (pin 25) to the backpanel signal ground. If the host system has the capability, this allows measuring the SCMPB01 ground potential.

Ordering Information

Part Number	Description
SCMPB01	16-channel backpanel with standoffs for mounting.
SCMPB01-1	16-channel backpanel without cold junction compensation circuits and standoffs for mounting. Use when cost savings is desired and thermocouple input modules SCM5B37 and SCM5B47 will not be used.
SCMPB01-2	16-channel backpanel with DIN rail mounting option. The backpanel is mounted on a plate which is captured by the SCMPXBEx DIN rail mounting elements. Shipped fully assembled.
SCMPB01-3	16-channel backpanel without cold junction compensation circuits and with DIN rail mounting option. Shipped fully assembled.

For proper operation of the output switch or track-and-hold circuit when using the SCMPB01/05 backpanels, a current path must exist between the host control logic power common and module I/O Common (module pin 19). This path can be established on the SCMPB01 via jumper J4. If this connection exists elsewhere in the system, jumper J4 should be removed since possible ground loops could exist. Other connections of power ground and signal ground usually occur at the A/D or D/A converter of the host measurement system. More information on grounding can be found in Application Note AN502.

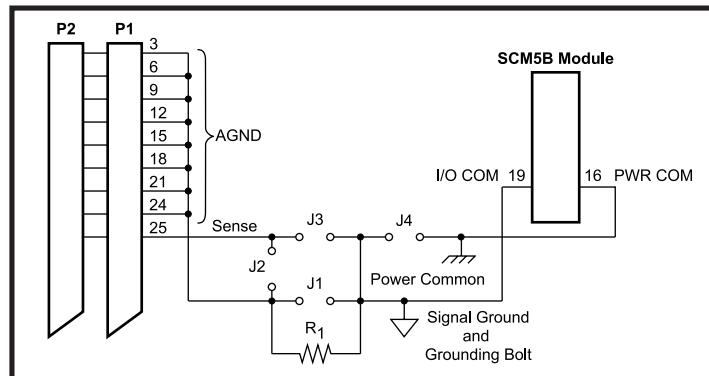


Figure 4: SCMPB01 Grounding Diagram

If the connection of power common and AGND shield wires exist in the host measurement system, an optional resistive connection between AGND and the backpanel signal ground can be made via R_1 . R_1 can be as large as 10K ohms; 100 ohms is a recommended value. Jumper J2 can be used to connect the SENSE line to R_1 when this ground configuration is used.

For full protection against large electrical disturbances on the field-side of the SCM5B modules, a #10-32 ground stud is provided on the backpanel. An electrical connection between this ground stud and system ground should be provided with a large gauge wire of the shortest possible length. When this connection is made, a possible ground loop could result through the AGND shield wires and backpanel signal ground. If the application involves only input modules and a differential input is used by the host measurement system, J1 should be removed. Remember that J1 is required if output modules are used or if the host system does not have differential inputs.

SCMPB02

16-Position Analog I/O Backpanel, Multiplexed

Description

The SCMPB02 16-channel backpanel (Figure 5) can accept any of the SCM5B analog modules in any mixture. It can be mounted on the SCMXRK-002 19-inch metal rack. The SCMPB02 has two analog buses; one for analog input and one for analog output. This two-bus configuration takes advantage of the switch controlled outputs on the input modules and the track-and-hold inputs on the output modules. A temperature sensor is mounted on each channel to provide cold junction compensation for thermocouple input modules (see Figure 6 for schematic). Field connections are terminated with four screw terminals at each module site. Up to four SCMPB02 backpanels may be daisy-chained. Use SCMXCA004-XX cable for daisy chaining and connecting to host computer.

Specifications

Operating Temperature Relative Humidity	-40°C to +85°C 95% Noncondensing
Interface Connector: Field System	high density screw clamp, 14 AWG max 26-pin, male header connector
Isolation: Input-to-Output Channel-to-Channel	1500Vrms continuous, max 1500Vrms continuous, max
Address Input Logic Levels: Max Logic "0" Min Logic "1"	0.8V 2.0V
I _i Input Current, "0" or "1"	0.1μA max at 25°C 1.0μA max -25°C to +85°C
RD EN\ or WR EN\ Signal Delay from Connector P1 to Channels 1-16 Standalone (address 0-15) Expanded (address 16-63)	51ns at 25°C 64ns at -25°C to +85°C 100ns at 25°C 126ns at -25°C to +85°C

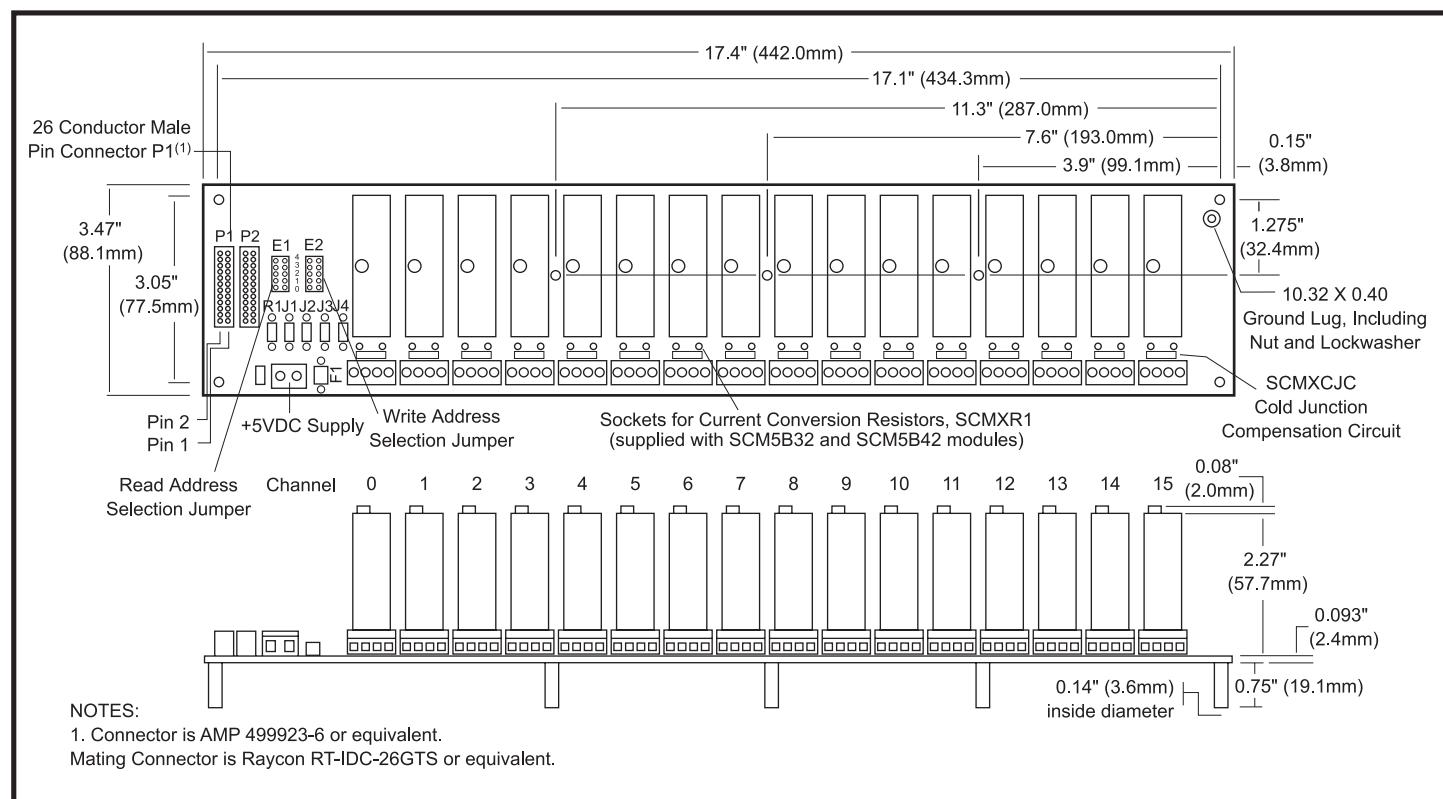


Figure 5: SCMPB02 Analog I/O Backpanel

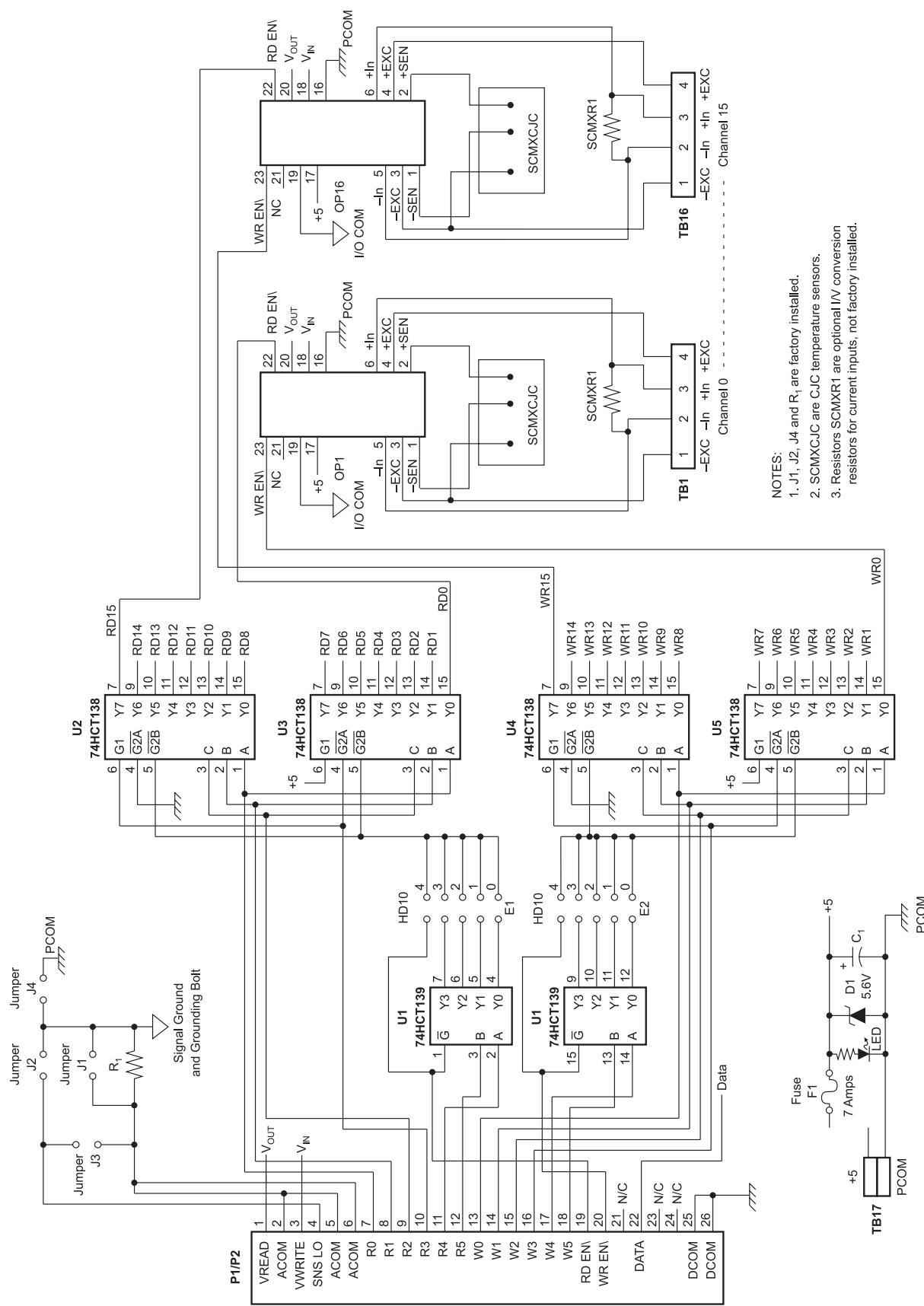


Figure 6: SCMPB02 Schematic

Electrical

P1 Connector

The 26 pin P1 and P2 connectors provide the signal interface between the SCMPB02 backpanel and the host measurement system. Two separate analog bus connections are provided; one for analog input signals and one for analog output signals. Two sets of six address lines and an enable pin allow input and output modules to be independently multiplexed onto their respective analog signal bus. R0 thru R5 and RD EN_I are used for input modules, and W0 thru W5 and WR EN_I are used for output modules.

Address Selection

The SCMPB02 backpanel has address decoding circuitry to allow multiplexing any combination of up to 16 input or output modules. Capability is also provided in the address decode circuitry to expand the system to 64 channels (four SCMPB02 backpanels) of multiplexed input or output. Jumpers on HD10 header, E1 and E2 group, select which set of 16 addresses are assigned to a particular backpanel. The E1 group assigns a set of 16 addresses for input modules, and the E2 group assigns a set of 16 addresses for output modules. The table below shows the correlation of jumper position to address range.

E1 Jumper Pos	E2 Jumper Pos	Address Range/Mode
4	4	0-15, STAND ALONE
3	3	48-63, EXPANDED
2	2	32-47, EXPANDED
1	1	16-31, EXPANDED
0	0	0-15, EXPANDED

To connect multiple SCMPB02 backpanels in this expanded configuration, use interconnect cable SCMXCA004-XX.

Modules with system output of $\pm 10V$ or 0-10V cannot be mixed with modules with system output of $\pm 5V$ or 0-5V within a given system.

Power

The SCMPB02 backpanel requires external +5VDC $\pm 5\%$ power. The chassis mounted SCMXPRE-003 or SCMXPRT-003 power supplies have adequate capacity to power any combination of modules.

Fusing

The SCMPB02 backpanel power is fuse protected through F1. This is a Littelfuse type 252007, 7 amp fuse. Zener diode DZ1 provides extra protection by clamping the input power voltage to +5.6V. If the input supply voltage connection is reversed, this zener diode will be forward biased and fuse F1 will be blown.

Grounding

Figure 7 below details the optional ground jumper configuration available on the SCMPB02 backpanel. Jumpers J1, J2, and J4 are factory installed.

Jumper J1 connects the SIG COM shield wires (pins 2, 5, and 6) to the backpanel signal ground. This provides a ground connection between the host system and backpanel. Jumper J1 is required if output modules (SCM5B39, SCM5B49) are used, or if there is no high impedance sense input (input low of a differential or pseudo-differential system) on the host measurement system.

Jumper J2 connects the SNS LO line (pin 4) to the backpanel signal ground. If the host system has the capability, this allows measuring the SCMPB02 ground potential.

Ordering Information

Part Number	Description
SCMPB02	16-channel backpanel with standoffs for mounting.
SCMPB02-1	16-channel backpanel without cold junction compensation circuits and standoffs for mounting. Use when cost savings is desired and thermocouple input modules SCM5B37 and SCM5B47 will not be used.
SCMPB02-2	16-channel backpanel with DIN rail mounting option. The backpanel is mounted on a plate which is captured by the SCMXBEx DIN rail mounting elements. Shipped fully assembled.
SCMPB02-3	16-channel backpanel without cold junction compensation circuits and with DIN rail mounting option. Shipped fully assembled.

For proper operation of the output switch or track-and-hold circuit when using the SCMPB02/06 backpanels, a current path must exist between the host control logic power common and module I/O Common (module pin 19). This path can be established on the SCMPB02 via jumper J4. If this connection exists elsewhere in the system, jumper J4 should be removed since possible ground loops could exist. Other connections of power ground and signal ground usually occur at the A/D or D/A converter of the host measurement system. More information on grounding can be found in Application Note AN502.

If the connection of power common and SIG COM shield wires exist in the host measurement system, a resistive connection between SIG COM and the backpanel signal ground can be made via R₁. R₁ can be as large as 10K ohms; 100 ohms is a recommended value. Jumper J3 can be used to connect the SNS LO line to R₁ when this ground configuration is used.

For full protection against large electrical disturbances on the field-side of the SCM5B modules, a #10-32 ground stud is provided on the backpanel. An electrical connection between this ground stud and system ground should be provided with a large gauge wire of the shortest possible length. When this connection is made, a possible ground loop could result through the SIG COM shield wires and backpanel signal ground. If the application involves only input modules and a differential input is used by the host measurement system, J1 should be removed. Remember that J1 is required if output modules are used or if the host system does not have differential inputs.

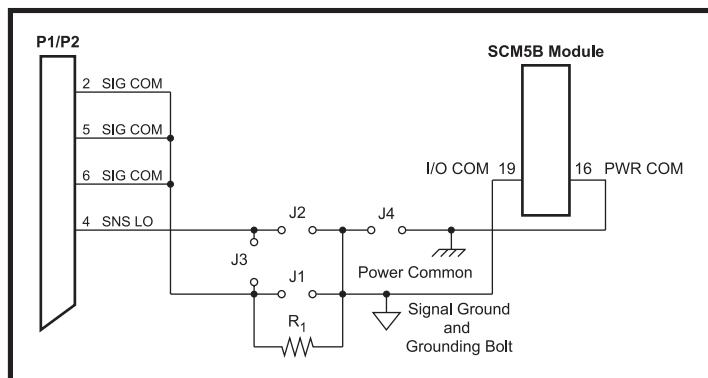


Figure 7: SCMPB02 Grounding Diagram

SCMPB03/SCMPB04

One/Two Position Analog I/O Backpanels

Description

The SCMPB03 and SCMPB04 are single and dual channel mounting panels for the SCM5B modules. Both are intended for DIN rail mounting.

See Figures 9 and 10 for wiring diagrams, Figure 11 for schematic.

The following accessories are required for mounting one SCMPB03/04 panel (Figure 8):

Qty	Model	Description
1	SCMXBEFE	Base element with snap foot
2	SCMXSE	Side element

The following accessories are required for mounting two or more SCMPB03/04 panels:

Qty	Model	Description
2	SCMXBEFE	Base element with snap foot
2	SCMXSE	Side element
(# panels)-2	SCMXBE	Base element without snap foot
(4 x (# panels))-4	SCMXVS	Connection pins

The following DIN rail styles are available. Specify length in meters (-XX)

SCMXRAIL1-XX	DIN EN 50022-35x7.5 (slotted steel)
SCMXRAIL2-XX	DIN EN 50035-G32 (slotted steel)
SCMXRAIL3-XX	DIN EN 50022-35x15 (slotted steel)

Specifications

Operating Temperature	-40°C to +85°C
Relative Humidity	95% Noncondensing
Interface Connector:	high density screw clamp, 14 AWG max
Field System	high density screw clamp, 14 AWG max
Isolation:	1500Vrms continuous, max
Input-to-Output	1500Vrms continuous, max
Channel-to-Channel	

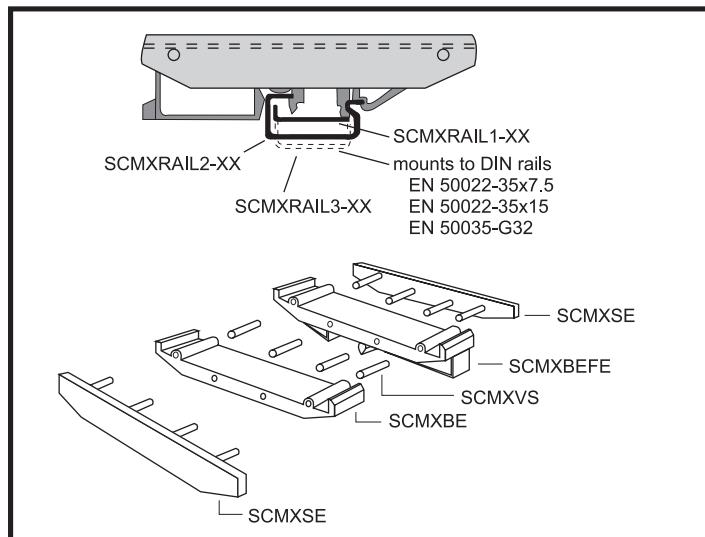


Figure 8: DIN Rail Mounting Elements

Ordering Information

Part Number	Description
SCMPB03	Single channel backpanel. No mounting hardware included.
SCMPB03-2	Single channel backpanel with DIN rail mounting hardware. Shipped fully assembled.
SCMPB04	Dual channel backpanel. No mounting hardware included.
SCMPB04-1	Dual channel backpanel without cold junction compensation circuits. Use when cost savings is desired and thermocouple input modules SCM5B37 and SCMPB47 will not be used. No mounting hardware included.
SCMPB04-2	Dual channel backpanel with DIN rail mounting hardware. Shipped fully assembled.
SCMPB04-3	Dual channel backpanel without cold junction compensation circuits and with DIN rail mounting hardware. Shipped fully assembled.

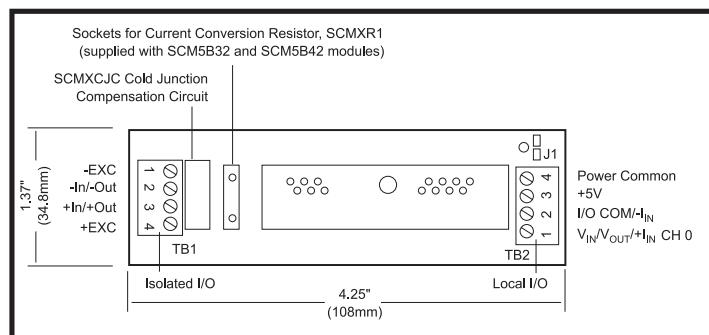


Figure 9: SCMPB03 Analog I/O Backpanel

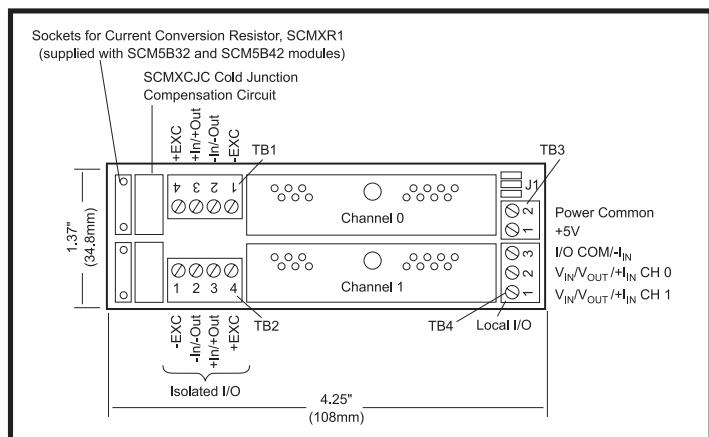


Figure 10: SCMPB04 Analog I/O Backpanel

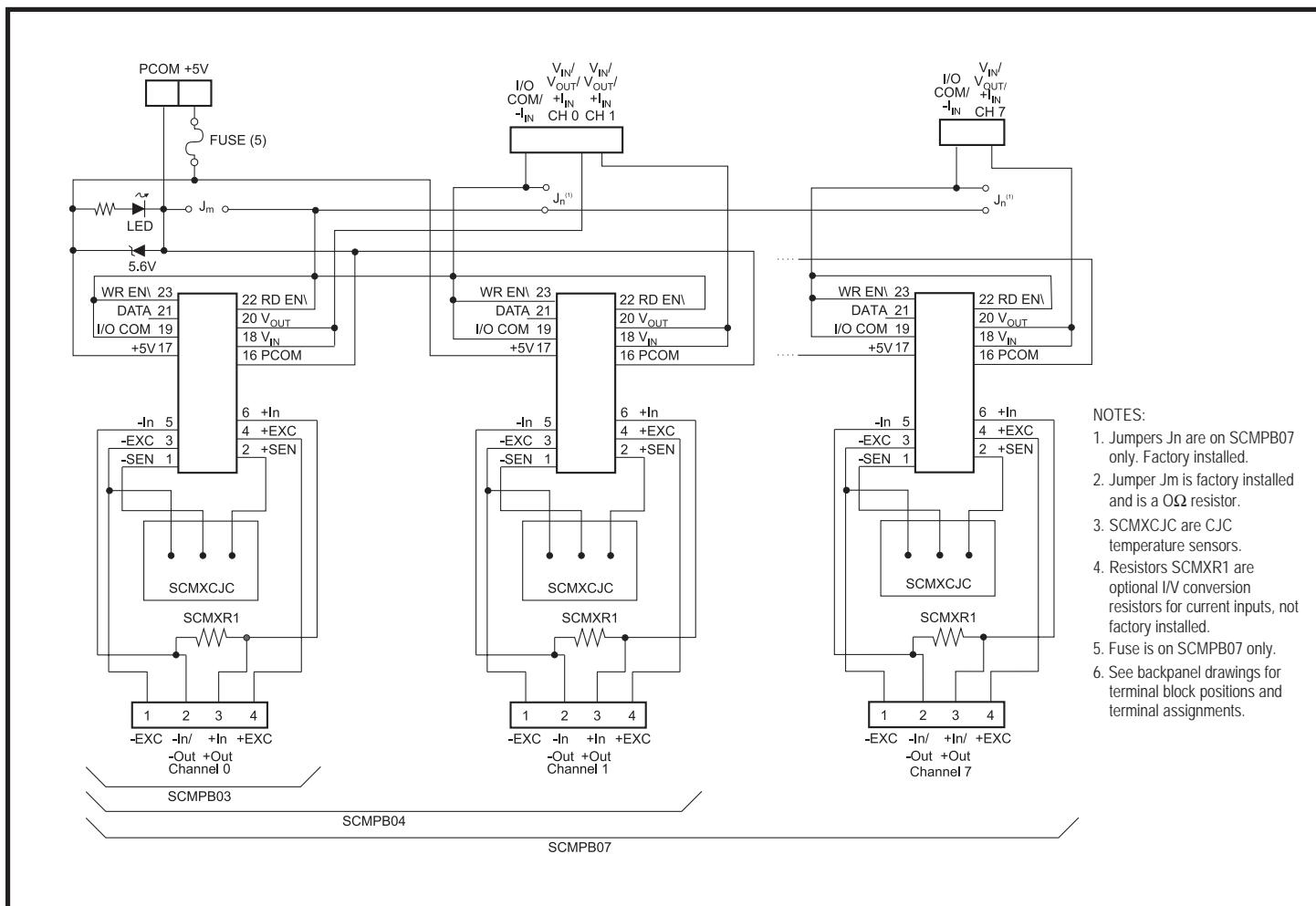


Figure 11: SCMPB03/SCMPB04/SCMPB07 Schematic

- NOTES:**
1. Jumpers J_n are on SCMPB07 only. Factory installed.
 2. Jumper J_m is factory installed and is a 0Ω resistor.
 3. SCMXCJC are CJC temperature sensors.
 4. Resistors SCMXR1 are optional I/V conversion resistors for current inputs, not factory installed.
 5. Fuse is on SCMPB07 only.
 6. See backpanel drawings for terminal block positions and terminal assignments.

SCMPB05

8-Position Analog I/O Backpanel, Non-Multiplexed

Description

The SCMPB05 backpanel (Figure 12) can accept up to eight SCM5B analog input and/or output modules in any combination. It can be mounted on the SCMXRK-002 19-inch metal rack. A separate analog signal path is provided for each channel and each channel's signal is accessible at redundant 26-pin connectors. The module output switch is continuously "on" when using this backpanel and all eight module outputs are simultaneously accessible to high-speed data acquisition (ADC) boards.

On-board jumpers permit paralleling two SCMPB05 boards to form a SCMPB01 equivalent. An additional set of inter-channel bridge jumpers permits connecting an input module's output to an output module's input, providing two levels of isolation (Figures 12, 13).

Jumpers on the SCMPB05 permit user selection of low (i.e. channels 0-7) or high (i.e. channels 8-15) addresses.

A temperature sensor mounted on each channel provides cold junction compensation for thermocouple input modules (see Fig. 13 for schematic). Field connections are terminated with four screw terminals at each module site. Use system interface cable SCMXCA004-XX for connection to the host system.

Specifications

Operating Temperature	-40°C to +85°C
Relative Humidity	95% Noncondensing
Interface Connector: Field System	high density screw clamp, 14 AWG max 26-pin, male header connector
Isolation: Input-to-Output Channel-to-Channel	1500Vrms continuous, max 1500Vrms continuous, max

Ordering Information

Part Number	Description
SCMPB05	8-channel backpanel with standoffs for mounting.
SCMPB05-1	8-channel backpanel without cold junction compensation circuits and standoffs for mounting. Use when cost savings is desired and thermocouple input modules SCM5B37 and SCM5B47 will not be used.
SCMPB05-2	8-channel backpanel with DIN rail mounting option. The backpanel is mounted on a plate which is captured by the SCMXBExx DIN rail mounting elements. Shipped fully assembled.
SCMPB05-3	8-channel backpanel without cold junction compensation circuits and with DIN rail mounting option. Shipped fully assembled.

Electrical

Address Selection

Module addresses may be selected as low (channels 0-7) or high (channels 8-15) using the sets of 3 pins labeled J5 through J12. Place a jumper over the two pins closest to the ribbon cable connectors, P1 and P2, to select a low address (factory configuration) or over the two pins furthest from the ribbon cable connectors, P1 and P2, to select a high address.

Adjacent Channel Jumper

Adjacent channels may be connected together to provide an isolated output signal from an isolated input module, providing two levels of 1500V isolation. This capability is provided with the seven jumpers labeled JP1-JP7. See page 57 for an example.

Refer to page 50 for additional notes on the P1 and P2 connectors, power requirements, fusing and grounding issues.

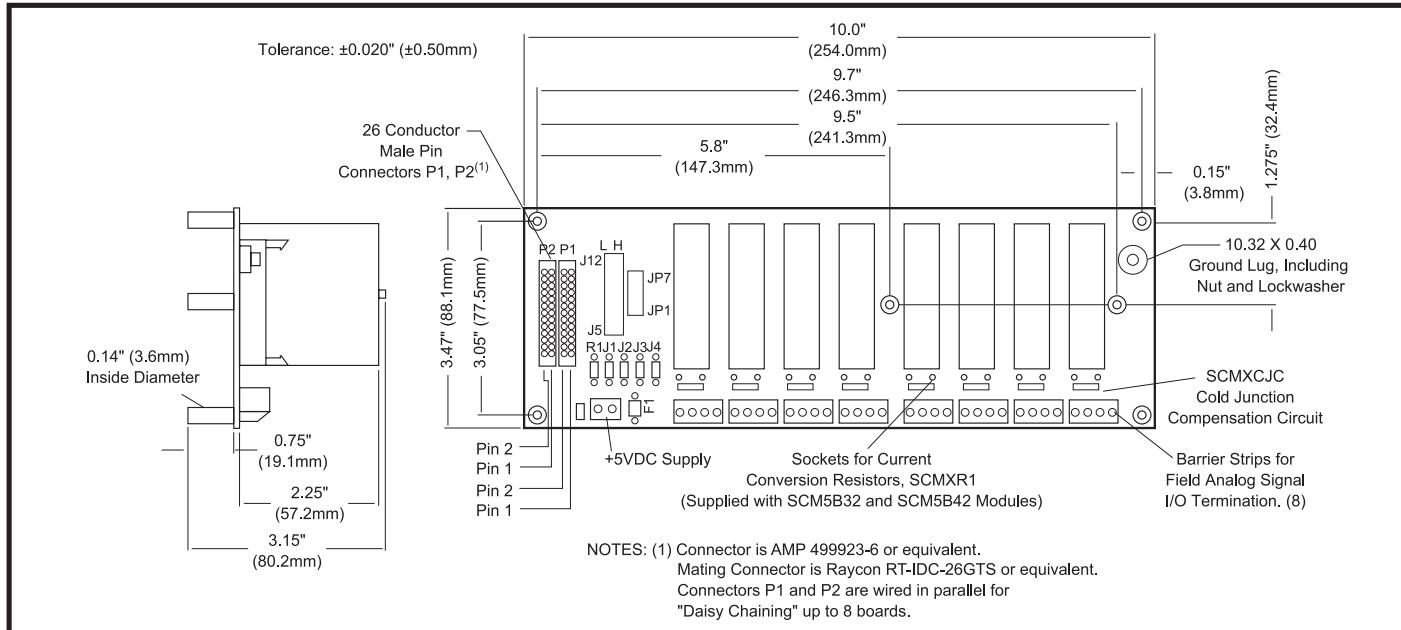


Figure 12: SCMPB05 Analog I/O Backpanel

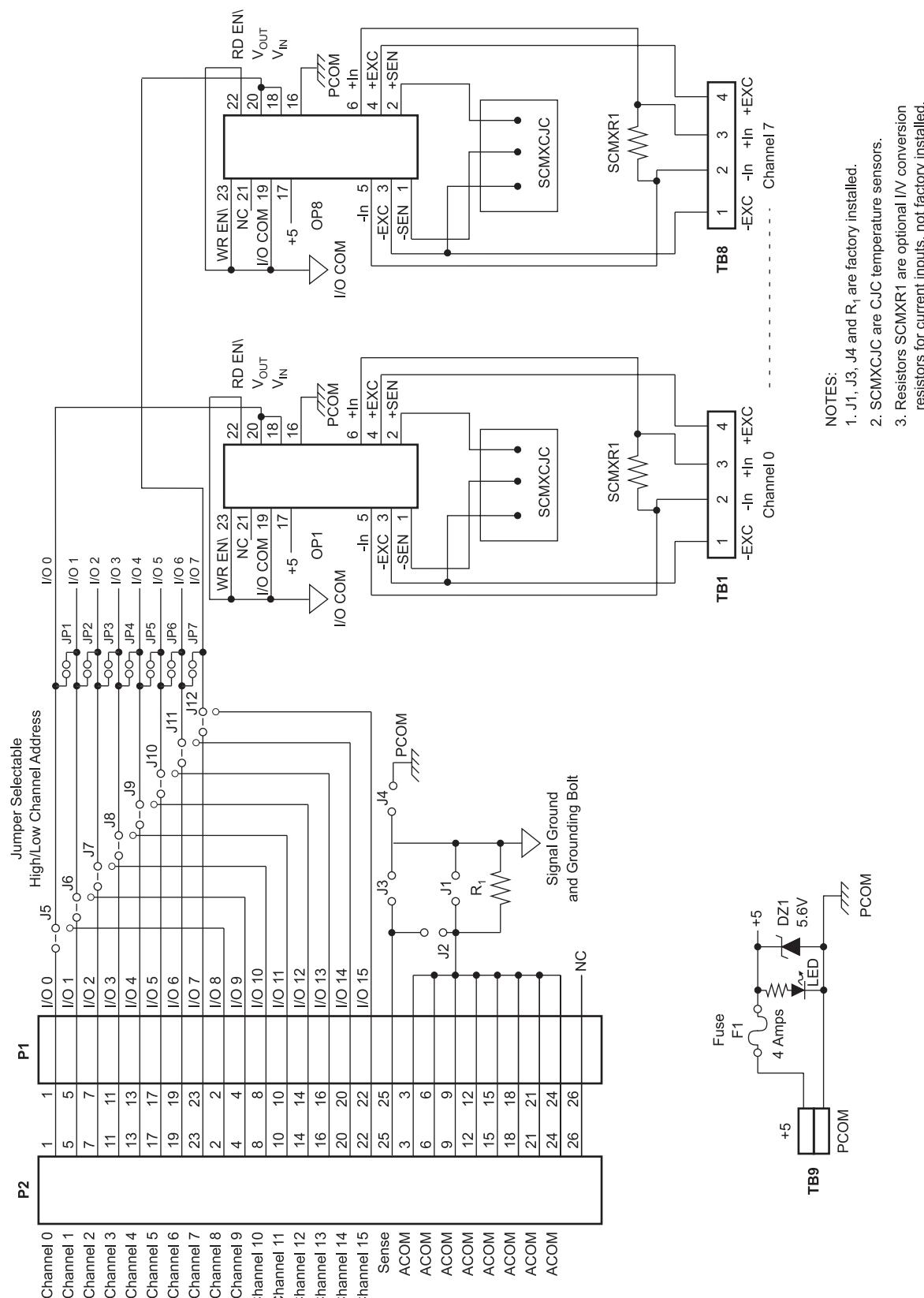


Figure 13: SCMPB05 Schematic

SCMPB06

8-Position Analog I/O Backpanel, Multiplexed

Description

The SCMPB06 backpanel (Figure 14) can accept up to eight SCM5B modules in any combination. It can be mounted on the SCMXRK-002 19-inch metal rack. The SCMPB06 has two analog buses; one for analog input and one for analog output. This two-bus configuration takes advantage of the switch controlled outputs on the input modules and the track-and-hold inputs on the output modules. A temperature sensor is mounted on each channel to provide cold junction compensation for thermocouple input modules (see Figure 15 for schematic). Field connections are terminated with four screw terminals at each module site. Up to eight SCMPB06 backpanels may be daisy-chained. Use SCMXCA004-XX cable for daisy chaining and connecting to host computer.

Jumpers on the SCMPB06 permit user selection of low (i.e. channels 0-7) or high (i.e. channels 8-15) addresses.

Electrical

Address Selection

Module read and write addresses may be selected as low (channels 0-7) or high (channels 8-15) using the four sets of 3 position jumpers labeled J5 through J8. Place a jumper over the two pins furthest from the field I/O termination blocks on all four sets to select a low address (factory configuration) or over the two pins closest to the field I/O termination blocks on all four sets to select a high address.

The SCMPB06 backpanel has address decoding circuitry to allow multiplexing any combination of up to 8 input or output modules. Capability is also provided in the address decode circuitry to expand the system to 64 channels (eight SCMPB06 backpanels) of multiplexed input or output. Jumpers select which set of 16 addresses are assigned to a particular backpanel. The Read Address group assigns a set of 16 addresses for input modules, and the Write Address group assigns a set of 16 addresses for output modules. The table on the next page shows the correlation of jumper position to address range. Refer to page 53 for additional notes on the P1 and P4 connectors, power requirements, fusing, and grounding issues.

Modules with system output of $\pm 10V$ or 0-10V cannot be mixed with modules with system output of $\pm 5V$ or 0-5V within a given system.

Ordering Information

Part Number	Description
SCMPB06	8-channel backpanel with standoffs for mounting.
SCMPB06-1	8-channel backpanel without cold junction compensation circuits and standoffs for mounting. Use when cost savings is desired and thermocouple input modules SCM5B37 and SCM5B47 will not be used.
SCMPB06-2	8-channel backpanel with DIN rail mounting option. The backpanel is mounted on a plate which is captured by the SCMXBExx DIN rail mounting elements. Shipped fully assembled.
SCMPB06-3	8-channel backpanel without cold junction compensation circuits and with DIN rail mounting option. Shipped fully assembled.

Specifications

Operating Temperature Relative Humidity	-40°C to +85°C 95% Noncondensing
Interface Connector: Field System	high density screw clamp, 14 AWG max 26-pin, male header connector
Isolation: Input-to-Output Channel-to-Channel	1500Vrms continuous, max 1500Vrms continuous, max
Address Input Logic Levels: Max Logic "0" Min Logic "1"	0.8V 2.0V
I _o Input Current, "0" or "1"	0.1μA max at 25°C 1.0μA max -25°C to +85°C
RD EN\ or WR EN\ Signal Delay from Connector P1 to Channels 0-7 Standalone (address 0-7) Expanded (address 8-63)	51ns at 25°C, 64ns at -25°C to +85°C 100ns at 25°C, 126ns at -25°C to +85°C

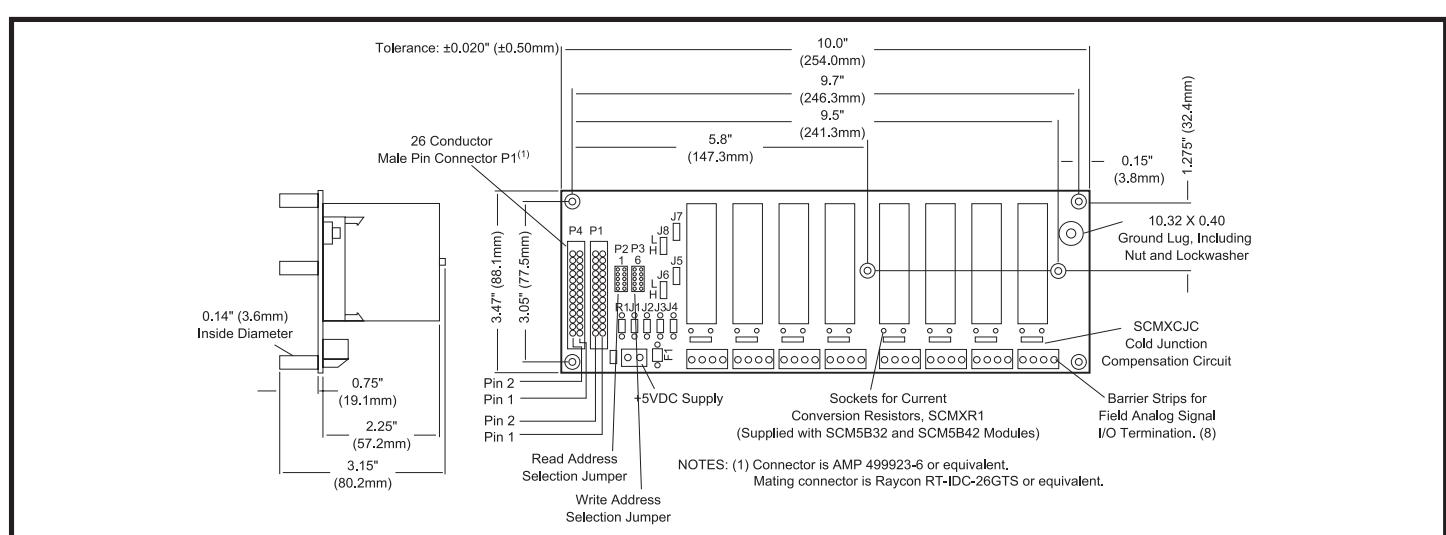


Figure 14: SCMPB06 Analog I/O Backpanel

Address Selection Jumpers

Read Address Jumper (P2)	Write Address Jumper (P3)	High/Low Channel Address (J5,J6,J7,J8)	Address Range
1	6	L	0-7 Stand Alone
1	6	H	8-15 Stand Alone
2	7	L	48-55 Expanded
2	7	H	56-63 Expanded
3	8	L	32-39 Expanded
3	8	H	40-47 Expanded
4	9	L	16-23 Expanded
4	9	H	24-31 Expanded
5	10	L	0-7 Expanded
5	10	H	8-15 Expanded

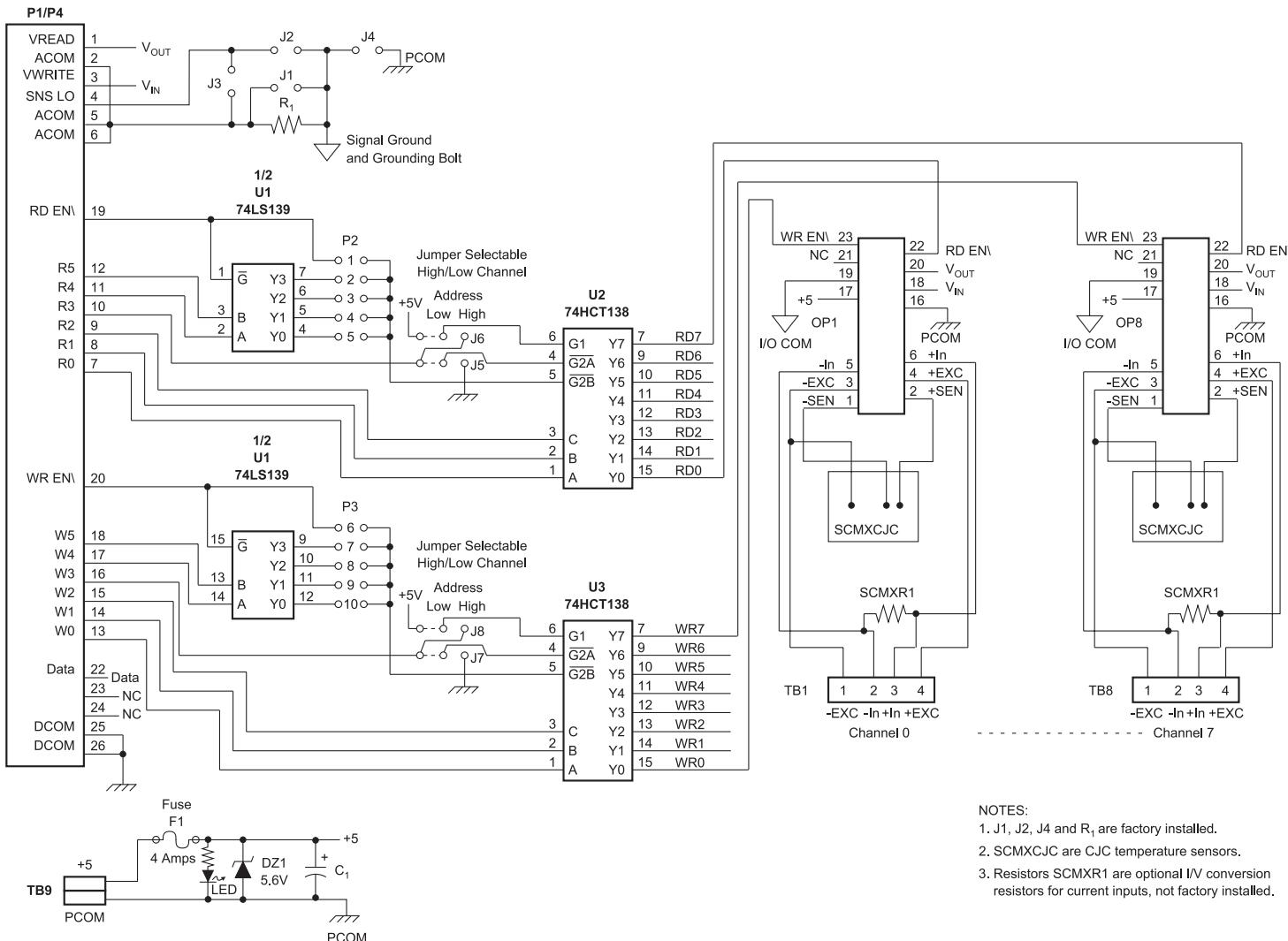


Figure 15: SCMPB06 Schematic

NOTES:

1. J1, J2, J4 and R₁ are factory installed.
2. SCMXCJC are CJC temperature sensors.
3. Resistors SCMXR1 are optional I/V conversion resistors for current inputs, not factory installed.

SCMPB07

8-Position Backpanel, High Density

Description

The SCMPB07 8-channel high-density backpanel can accept any of the SCM5B analog modules in any mixture. Its overall width is 5.5 inches (139.7mm) versus 10 inches (254mm) for the SCMPB05 and SCMPB06 8-channel backpanels. Separate analog signal paths are provided for each channel. Each channel provides four high-density screw terminals for field connections and two high-density screw terminals for host system connection. It also provides a jumper on each channel to optionally connect or isolate each module's I/O common from other channel's I/O common and/or power common (Figure 16).

See Figure 11 on page 55 for schematic.

SCMPB07 and SCMPB07-1 can be upgraded to DIN rail mounting. The following accessories are required for mounting one SCMPB07 or one SCMPB07-1 backpanel (for a visual example, reference SCMPB03/SCMPB04 page 54, Figure 8):

Qty	Model	Description
2	SCMXBEFE	Base element with snap foot
2	SCMXSE	Side element
2	SCMXBE	Base element without snap foot
12	SCMXVS	Connection pins

Ordering Information

Part Number	Description
SCMPB07	8-channel backpanel. No mounting hardware included.
SCMPB07-1	8-channel backpanel without cold junction compensation circuits. Use when cost savings is desired and thermocouple input modules SCM5B37 and SCMPB47 will not be used.
SCMPB07-2 Shipped	8-channel backpanel with DIN rail mounting hardware. Fully assembled.
SCMPB07-3	8-channel backpanel without cold junction compensation circuits and with DIN rail mounting hardware. Shipped fully assembled.

Specifications

Operating Temperature Relative Humidity	-40°C to +85°C 95% Noncondensing
Interface Connector: Field System	high density screw clamp, 14 AWG max high density screw clamp, 14 AWG max
Isolation: Input-to-Output Channel-to-Channel	1500Vrms continuous, max 1500Vrms continuous, max

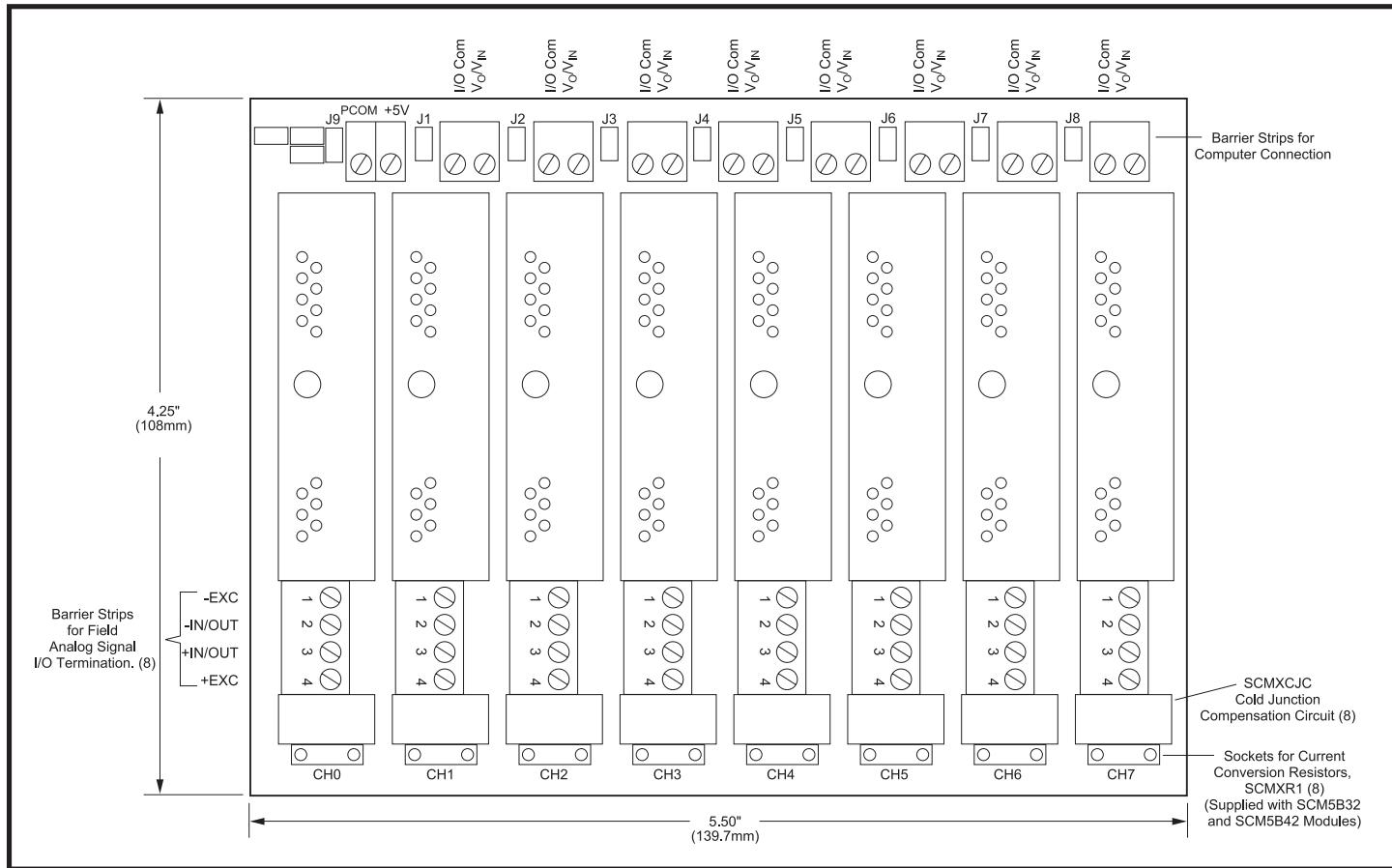


Figure 16: SCMPB07 Analog I/O Backpanel

SCMXEV

Analog Module Evaluation Board

Description

The SCMXEV is a single channel board with a test socket for SCM5B module evaluation (Figure 17). All signal input/output, control, and power connections are connected to terminal blocks for ease of user access. A cold junction temperature sensor circuit is included for evaluation of thermocouple modules (see Figure 18 for schematic).

The SCMXEV is mechanically compatible with DIN rail mounting. The following accessories are required for mounting one SCMXEV board (for a visual example, reference SCMPB03/SCMPB04 page 54, Figure 8):

Qty	Model	Description
2	SCMXBEFE	Base element with snap foot
2	SCMXSE	Side element
4	SCMXVS	Connection pins

Two jumpers are provided for customer use. The first, J1, provides a current path between +5V Power Common (module pin 16) and I/O Common (module pin 19). A path must exist between the host control logic power common and module I/O Common for proper operation of the module output switch or track-and-hold circuit. If this connection exists elsewhere in the system, jumper J1 should be removed since possible ground loops could exist. Other connections of power ground and signal ground usually occur at the A/D or D/A converter of the host measurement system.

Jumper J2 is used in the cold junction compensation circuit. If it is installed, the compensation circuit is enabled and will provide the proper compensation voltage to correct for the thermoelectric effect at the +In and –In screw terminals.

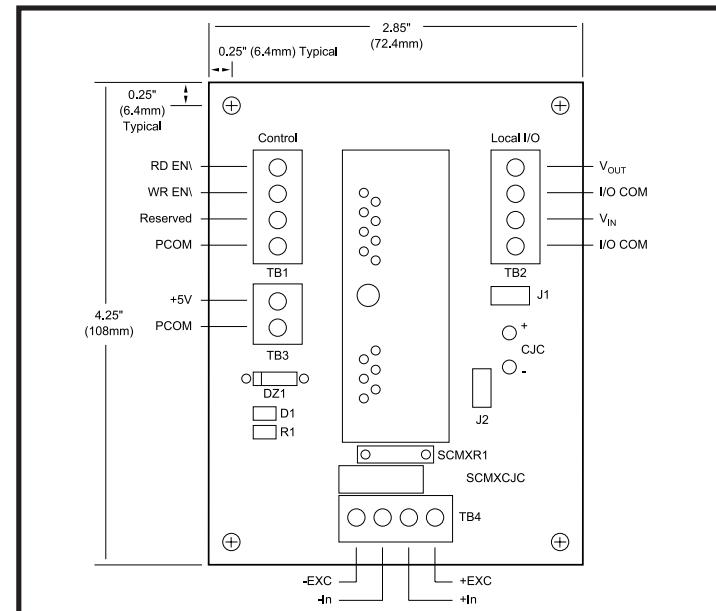


Figure 17: SCMXEV Evaluation Board Dimensions and Pin Layout

If an external simulation voltage is desired for cold junction compensation, J2 should be removed. The external voltage is applied at the sockets labeled CJC+ and CJC-. An external voltage of 510.0mV corresponds to an ambient temperature of +25 °C. The transfer function of the onboard compensation circuit is $V_{CJC} = 0.510 - 0.0025(T-25)V$.

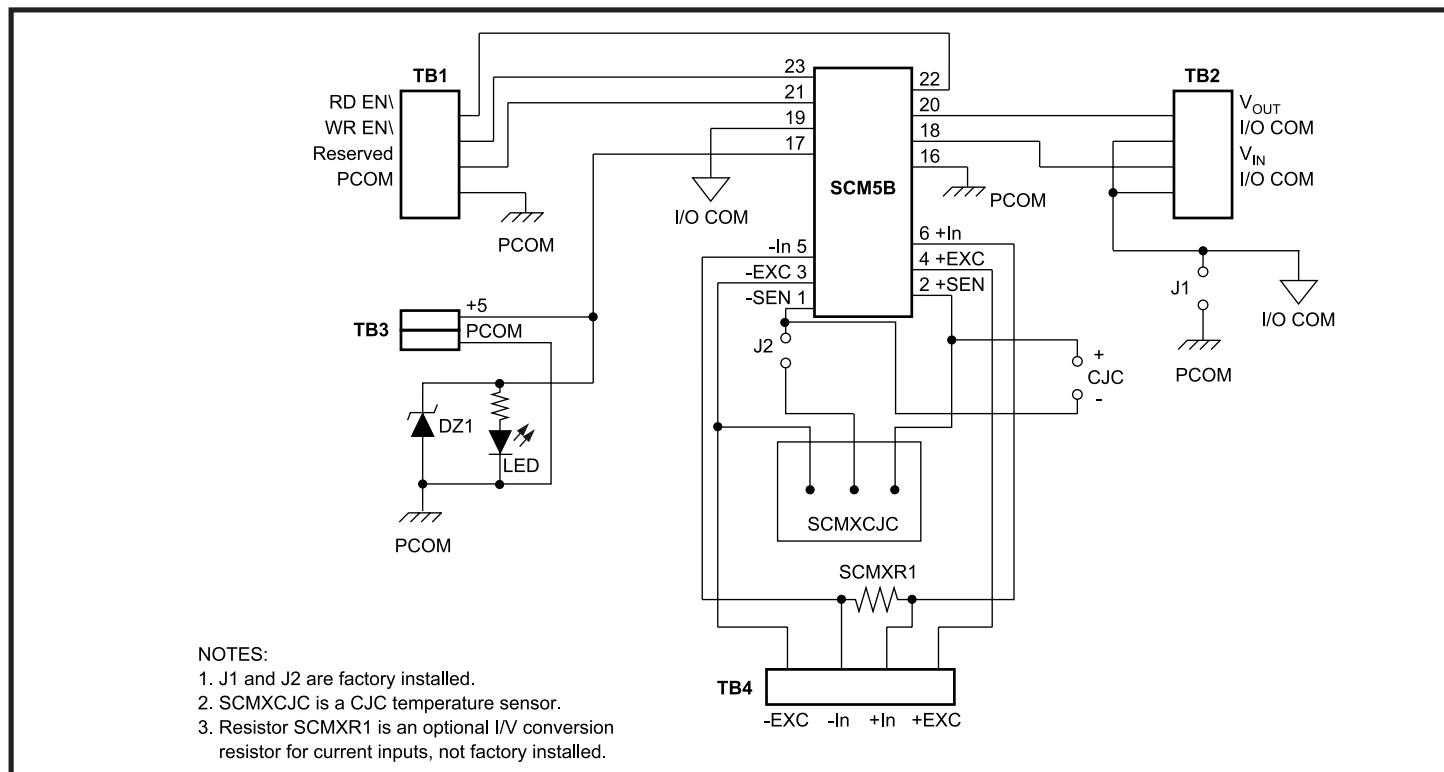


Figure 18: SCMXEV Evaluation Board Schematic

SCMXCA004-01, - 02

Interface Cable

Description

SCMXCA004-XX

System interface cable for the SCMPB01/02/05/06 backpanels. This is a 26 conductor ribbon cable with a mass-terminated socket connector installed on each end. It can be ordered in lengths of 1m and 2m; -xx denotes required length in meters (see Figure 19).

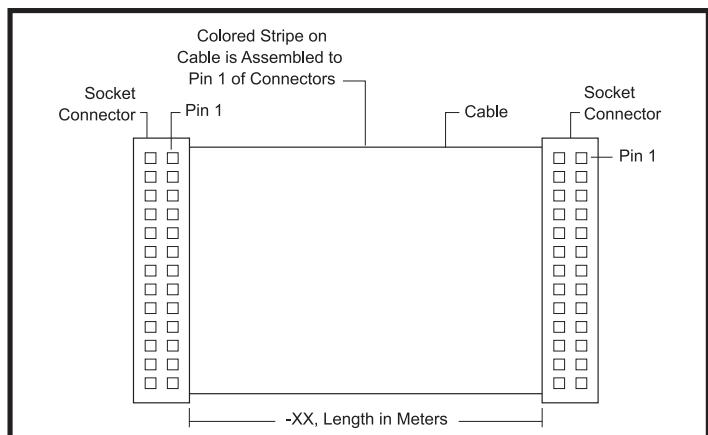


Figure 19: SCMXCA004-XX System Interface Cable

SCMXIF (-DIN)

Universal Interface Board

Description

The SCMXIF is a universal interface board which converts a 26-pin ribbon cable input to 26 screw terminals for discrete wire. It can be mounted on the back of the SCMXRK-002 mounting rack (SCMXIF) or on a DIN rail (SCMXIF-DIN). Required mounting hardware is included. Use SCMXCA004-XX cable (see Figure 20 for dimensions).

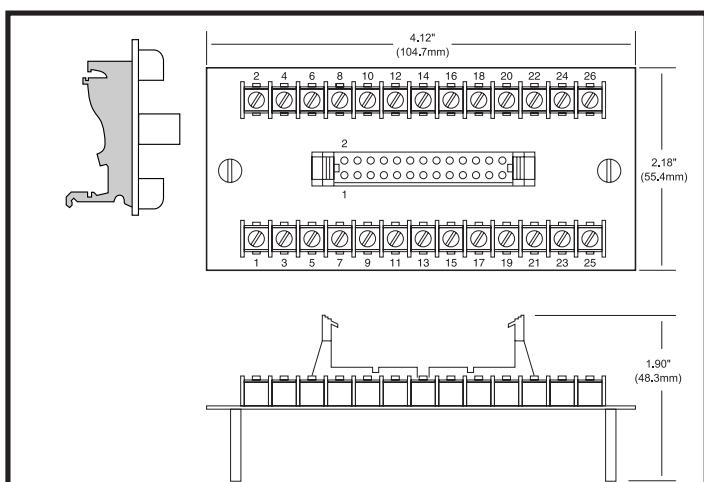


Figure 20: SCMXIF Universal Interface Board Dimensions

SCMXRK-002

19-Inch Metal Mounting Rack

Description

The SCMXRK-002 is a 19-inch metal rack for mounting the SCMPB01/02/05/06, SCM7BP04/08/16, SCMVAS-PB8/16 and isoLynx® SLX200-xx backpanels. It also provides capability to mount the SCMXPRT-001, SCMXPRE-001, SCMXPRT-003 or SCMXPRE-003 power supplies, and the SCMXIF interface board (see Figure 21 for dimensions).

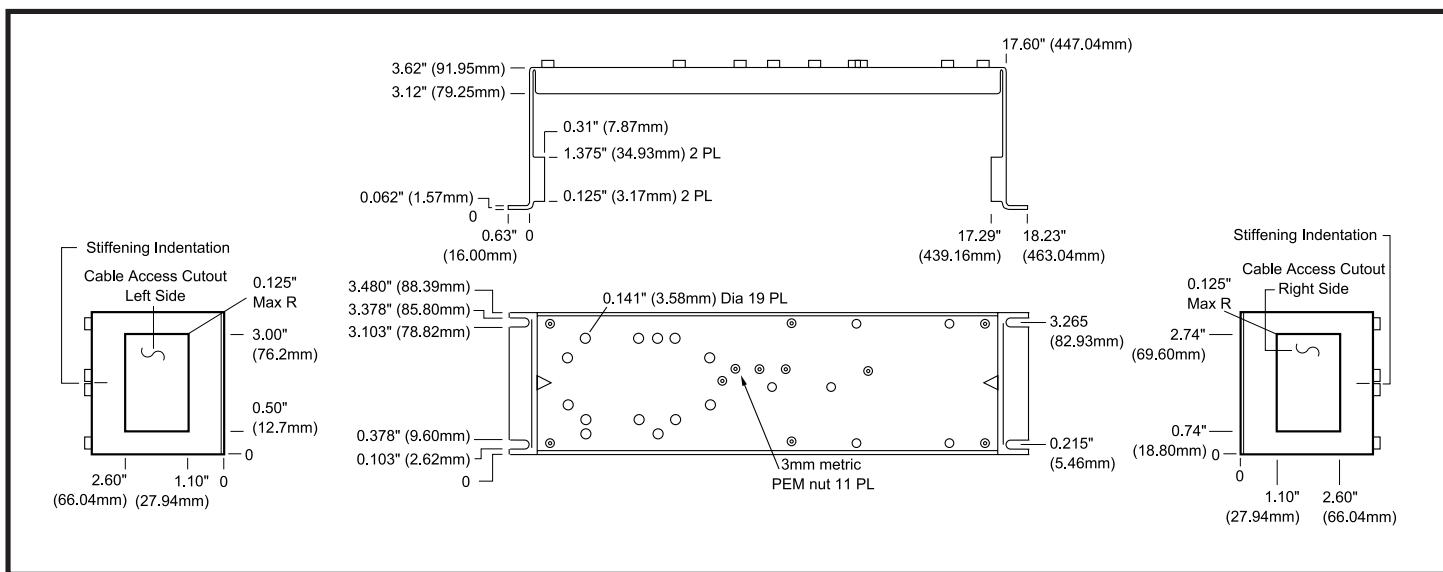


Figure 21: SCMXRK-002 Analog Rack Dimensions

SCMXCJC

Encapsulated Cold Junction Compensation

Description

The SCMXCJC is the identical circuit used on the SCMPB01/02/03/04/05/06/07 backpanels except it is packaged as a component for use in customer designed mounting boards (Figure 22). When interfaced to an SCM5B37 or 47 module the transfer function of the voltage across the +SEN and -SEN pins is $V_{CJC} = 0.510 - 0.0025(T - 25)V$.

Specifications

Accuracy	+25°C +5°C to +45°C -40°C to +85°C	$\pm 0.25^\circ C$ $\pm 0.5^\circ C$ $\pm 1.25^\circ C$
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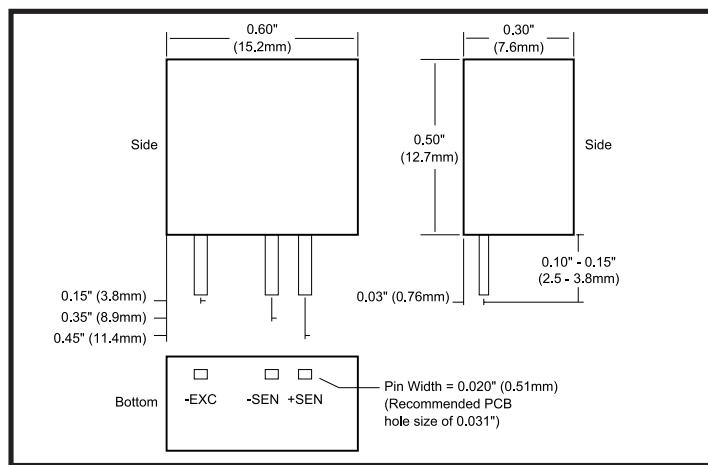


Figure 22: SCMXCJC Physical Dimensions and Pin Layout

SCM5BPT

Pass Thru Module

Description

The SCM5BPT is a pass-through module used to establish a direct connection between an input signal and the SCM5B series backplane analog bus. It has unity gain and no isolation. It accepts up to $\pm 10V$ input and provides up to $\pm 10V$ output.

SCM5BPT-1367

Pass Thru Module with Switch

Description

The SCM5BPT-1367 is a pass-through module used to establish a direct connection between an input signal and the SCM5B series backplane analog bus. It has unity gain, no isolation, and a logic controlled output switch which allows sharing of a common analog bus with other SCM5B modules. It accepts up to $\pm 10V$ input and provides up to $\pm 10V$ output. Resettable fuses and overvoltage protection circuitry protect computer-side electronics.

SCMXJP-003

Jumper Strap

Description

Package of 10 jumpers for connecting adjacent input/output modules on the SCMPB01 backpanel. This connection is made if it is desired to direct the output of any input module to the input of an adjacent output module. The jumpers can also be used for configuring I/O addresses on the SCMPB02 backpanel.

SCMXFS-003, -004

Fuse

Description

Package of 10 fuses for use on the SCMPBxx backpanels. This is a series fuse in the five volt power line. It provides protection against inadvertent reverse connection of five volt power or overvoltage.

SCMXR1

Current Conversion Resistor

Description

A precision 20Ω , 0.1%, 10ppm/ $^\circ C$ resistor used with the SCM5B32 current input module or SCM5B42 two-wire transmitter interface module (Figure 23). Sockets are provided on the SCMPB01/02/03/04/05/06/07 and SCMXEV backpanels to allow installation of this resistor. One SCMXR1 is shipped with each SCM5B32 or SCM5B42 module.

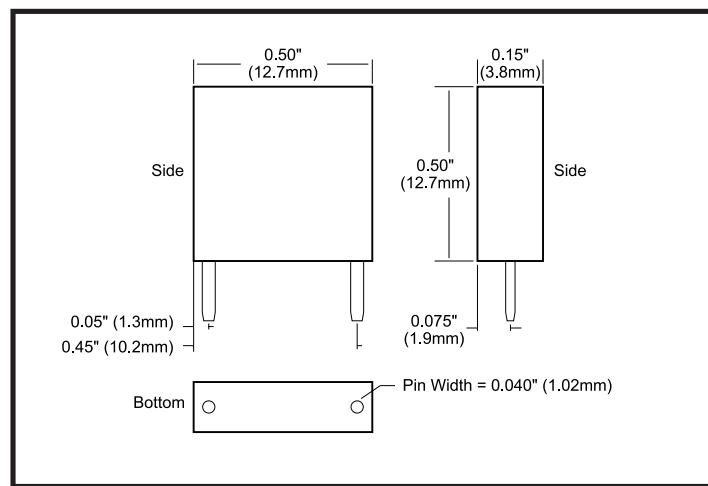


Figure 23: SCMXR1 Physical Dimensions

Ordering Information

Part Number	Description
SCMXFS-003	4A fuse. Use for SCMPB05/06/07, SCMVAS-PB8, -PB16.
SCMXFS-004	7A fuse. Use for SCMPB01/02.

SCM5B-PROTO

Breadboard Kit

Description

The SCM5B-PROTO breadboard kit was designed to allow users to incorporate their own module functions using an SCM5B format. The kit includes a pc board

designed for breadboard circuits, a module case, header and mounting screw. Contact the factory for additional information.

SCMXRAIL1-XX, SCMXRAIL2-XX, SCMXRAIL3-XX

DIN Rail

Description

Three styles of DIN rail are available. Specify length (-xx) in meters when ordering, -01 for 1 meter or -02 for 2 meter.

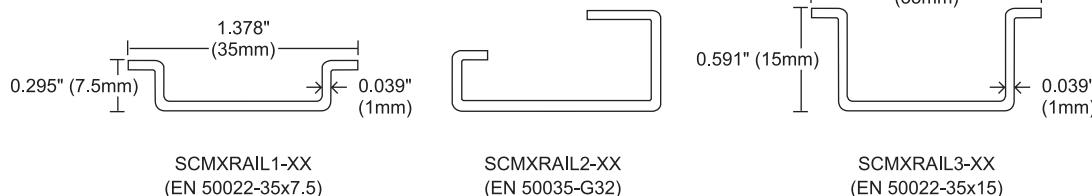


Figure 24: DIN Rail Styles

SCMXPRT-001/D, SCMXPRE-001/D

Power Supplies

Description

The SCMXPRT-001/D and SCMXPRE-001/D encapsulated power supplies are available in 120VAC or 220VAC input voltage ranges and provide 5VDC outputs suitable for all SCM5B modules. They are designed to mount on the SCMXRK-002 metal rack or DIN rail EN 50022-35x7.5 (D versions). The supplies are UL-recognized. Their compact size and low weight are ideal for high-density applications (see Figure 25).

Specifications

Typical* at $T_A=+25^\circ\text{C}$

Module	SCMXPRT-001/D	SCMXPRE-001/D
Input Voltage Range, 47Hz to 63Hz	105-125VAC	200-240VAC
Output Voltage	5VDC 1A	5VDC 1A
Output Current, +50°C	(derate 2.5%/°C above +50°C) -25°C to +71°C 2500Vrms	-25°C to +71°C 2500Vrms
Operating Temperature		
Dielectric Withstand V (Input to Ground)		
Line Regulation	±0.05%	±0.05%
Load Regulation	±0.15%	±0.15%
Output Ripple, max	2mVrms	2mVrms
Oversupply Protection	6.2V	6.2V
Weight	1.25 lbs (567g)	1.25 lbs (567g)

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.
Supplies are UL recognized, File No. E65890.

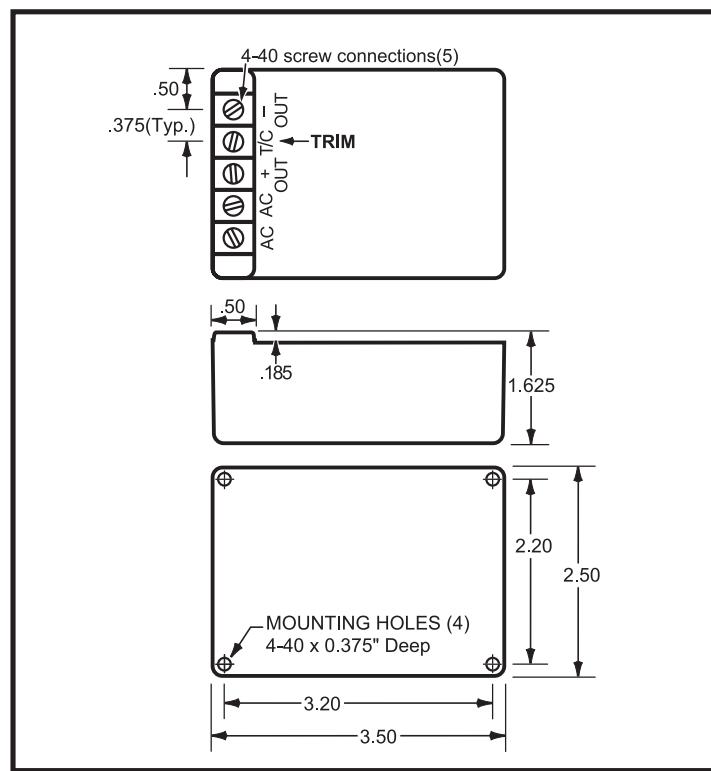


Figure 25: SCMXPRT-001/D and SCMXPRE-001/D Physical Dimensions

SCMXPRT-003, SCMXPRE-003

Power Supplies

Description

The SCMXPRT/E-003 Linear Power Supplies are available in 120VAC or 220VAC input. They have sufficient output current capacity to supply any combination of SCM5B modules. The SCMXRK-002 metal rack provides mounting capability for the SCMXPRT/E-003 power supplies (see Figure 26).

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

Module	SCMXPRT-003	SCMXPRE-003
Input Voltage Range, 47Hz to 63Hz	104-132VAC	207-265VAC
Output Voltage	5VDC $\pm 1\%$	5VDC $\pm 1\%$
Output Current (at $+70^\circ\text{C}$)	3A	3A
Output Current (at $+50^\circ\text{C}$)	6A	6A
Operating Temp	0 to $+70^\circ\text{C}$	0 to $+70^\circ\text{C}$
Dielectric Withstand Voltage (input to ground)	3750VAC	3750VAC
Line Regulation (10% line change)	$\pm 0.05\%$	$\pm 0.05\%$
Load Regulation (50% load change)	$\pm 0.05\%$	$\pm 0.05\%$
Output Ripple (max)	5mVp-p	5mVp-p
Oversupply Protection (factory set)	6.2V $\pm 0.4\text{V}$	6.2V $\pm 0.4\text{V}$

NOTES: * Contact factory or your local Dataforth sales office for maximum values.
Both supplies are tested and certified by TUV to VDE 0806 and IEC 380. They are UL recognized (File Number E55974) and CSA Certified (CSA File Number LR38879).

PWR-4505

25W Single Output Industrial DIN Rail Switching Power Supply

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

Input Frequency	85 to 264VAC, 120 to 370VDC 47 to 63Hz
Input Current	1.5A/115VAC, 0.75A/230VAC
Inrush Current	Cold start 30A/115VAC, 60A/230VAC
Efficiency	72%
Output Voltage & Current Rating	5V, 5A
Temperature Coefficient	$\pm 0.03\%/\text{^oC}$
Ripple Voltage	100mVp-p
Overload Protection	105 to 150% rated output power
Over Voltage Protection	5.75 to 6.75V
Over Temperature Protection	135°C detect on heatsink of power transistor
Dielectric Strength	Between input and output terminals: 3kV, 1 minute Between input and FG: 1.5kV, 1 minute Between output and FG: 0.5kV, 1 minute
Insulation Resistance	Between input and output terminals/input and FG/output and FG: 100MΩ/500VDC
Operating Temperature	-10°C to $+50^\circ\text{C}$
Storage Temperature	-20°C to $+85^\circ\text{C}$
Relative Humidity	10 to 95%
Mechanical Dimensions (l)(w)(h)	3.66" x 3.07" x 2.24" (93mm x 78mm x 57mm)
Terminal Screw	M3

NOTES:

* Contact factory or your local Dataforth sales office for maximum values.

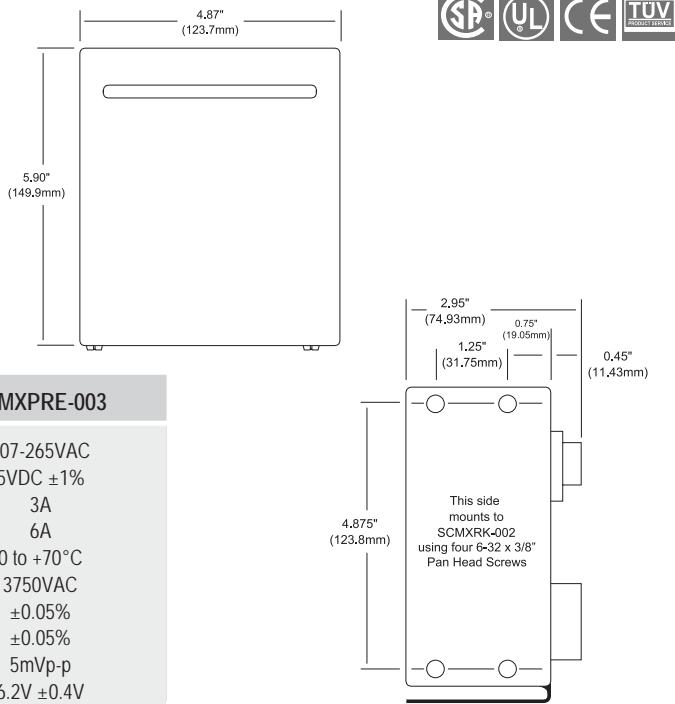
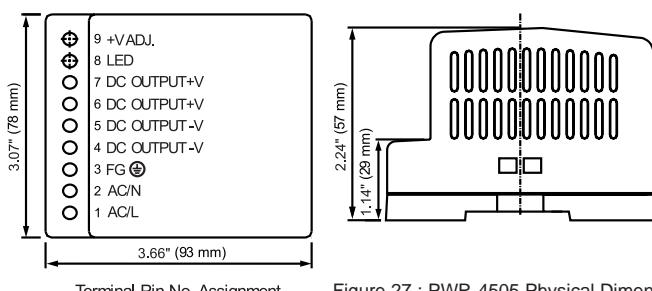


Figure 26: SCMXPRT-003/SCMXPRE-003 Physical Dimensions

**► Features**

- Universal AC Input (85 to 264VAC)
- DC Compatible Input (120 to 370VDC)
- Protections: Short Circuit, Overload, Over Voltage, Over Temperature
- Mounts on DIN Rail TS-35/7.5 & 15
- Approvals: UL, CUL, TUV, CB, CE
- CE Compliant, UL 508 Listed
- TUV EN60950-1 Approved
- Compliant with EMC Directive EN50082-2
- LED Indicator for Power On



Terminal Pin No. Assignment

Figure 27 : PWR-4505 Physical Dimensions