DATAFORTH®

2024 Catalog SCM5B Products

Isolated Analog Signal Conditioning Products

High-Voltage Attenuator System



Instrument Class®

Industrial Electronics

Celebrating

40 YEARS

Instrument Class®

INNOVATION

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The Company

"Our passion at Dataforth Corporation is designing, manufacturing, and marketing the best possible data acquisition and control, signal conditioning, and data communication products. Our mission is to set new standards of product quality, performance, and customer service." **Dataforth Corporation**, with 40 years of experience, is a worldwide leader in *Instrument Class*® **Industrial Electronics –** rugged, high-performance data acquisition and control, signal conditioning, and data communication products that play a vital role in maintaining the integrity of industrial automation, data acquisition, and quality assurance systems. Our products directly connect to most industrial sensors and protect valuable measurement and control signals and equipment from the dangerous and degrading effects of noise, transient power surges, internal ground loops, and other hazards.

Global Service and Support

Dataforth spans the globe with more than 50 International Distributors and US Representative Companies. Our customers benefit from a team of over 130 sales people highly trained in the application of precision products for industrial markets. In addition, we have a team of application engineers at our Tucson factory ready to solve any in-depth application questions, and we maintain ample inventory that allows small-quantity orders to be shipped from stock.

Research and Development Team

A professional staff of engineering and marketing personnel identify and develop products to satisfy our customers' most stringent requirements. Dataforth's design department specializes in innovative analog and isolation circuit development, high-performance mixed signal design, and software development, to ensure that our customers receive the highest performance products at an affordable price.

Automated Manufacturing and Test

Our products are manufactured in the USA on our state-of-the-art SMT systems to optimize time-to-ship and control costs. All products are tested multiple times, and many undergo a 48-hour burn-in at elevated temperatures to ensure performance and reliability.

Quality Control

Dataforth operates under the ISO9001:2015 quality management system. Since our products are used in critical industrial data acquisition, control, and test and measurement applications, we strive to produce the highest quality, premier performance products available on the market. Zero defects and complete customer satisfaction are our goals. To further strengthen our commitment to quality, Dataforth secures certifications such as UL, CSA, ATEX, and CE.

www.dataforth.com

Our website presents visitors with an intuitive, informative layout that quickly leads them to their areas of interest. A parametric search engine efficiently locates products by model number or functional description, and the ability to quickly access pricing information and place online orders. Fully detailed product data sheets and application and tech notes are available for download. Visitors can also view new product release data, sign up to receive our newsletters, get answers to technical questions, and quickly locate Distributors and Sales Representatives worldwide.

The Future

We fully understand that our ongoing success depends on satisfying our customers' requirements. Building upon our position as marketplace leader, Dataforth continues to seek out the most cost-effective emerging technologies in design and manufacturing in order to provide the highest performance quality products at an affordable price. By intelligently observing and responding to changing market needs, we ensure continuation of our critical customer partnerships.

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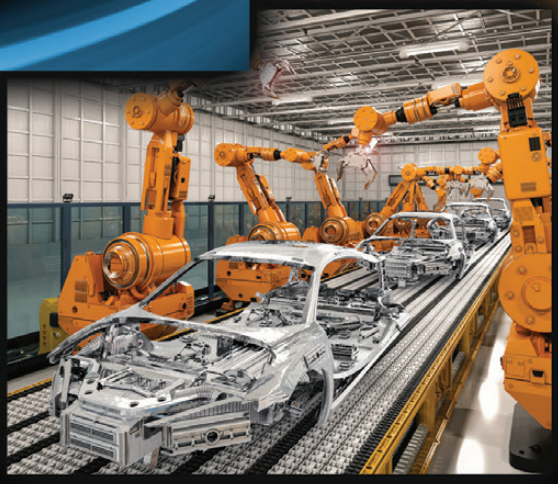
Dataforth

- 2000+ Products for Industrial Data Acquisition and Control, Signal Conditioning, and Data Communications
- Energy Monitoring
- 40 Years of Experience
- Better than 6σ Reliability
- Products Manufactured and Designed in the USA per RoHS III Directive (EU) 2015/863
- Quality Management System is ISO9001:2015 Registered

For Product Information, Certifications, System Builders, and Online Ordering, go to: **www.dataforth.com**

Additional Resources

- Application Notes
- Tech Notes
- Press and Product Releases



Our Track Record Proves We are Dedicated to Your Success!

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SCM5B Isolated Analog Signal Conditioning Modules

True 3-way Isolation, 5V Supply Voltage, Unparalleled Performance

20 family groups of 300+ different modules: a wide selection of input and output functions

Each SCM5B module provides a single channel of isolated analog input or output. Input modules interface to all types of industrial sensors. Analog inputs include voltage and current in narrow and wide bandwidths, thermocouple, RTD, accelerometer, potentiometer, strain gauge, frequency, and 2-wire and 3-wire, as well as 4-wire transmitter. Output modules accept a high-level analog voltage signal from a host system and provide process current or voltage output to field devices.

SCM5B Key Features

- ±0.03% Accuracy (typ)
- ±0.005% Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power Supply Voltage (30mA (typ))
- 4- to 6-pole Low-pass Filtering
- Low Output Noise
- –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 III Directive 2015/863



SCM7B Isolated Process Control Signal Conditioning Modules

2-way Isolation, 14-35VDC Supply Voltage, Industrial Performance

15 family groups of 200+ different modules: a compact, low-cost solution for industrial data acquisition and process control applications

Each SCM7B module provides a single channel of isolated analog input or output. Various input modules accept analog voltage or current signals from all types of field sensors and sources; they provide high-level analog outputs suitable for use in a process control system. Output modules accept high-level analog voltage signals from a process control system and provide current or voltage output to a field device.



SCM7B Key Features

- ±0.03% Accuracy (typ)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation and 120Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 14-35VDC Wide Supply Voltage
- 5-pole Low-pass Filtering
- Low Output Noise
- –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 III Directive 2015/863

The SCM5B, SCM7B product lines include a complete selection of backpanels, DIN-rail mounting options, cables, racks, power supplies, and other accessory items.

Custom SCM5B, SCM7B modules are available: consult factory for minimum quantity and pricing details on custom input ranges, output ranges, bandwidth, and other key parameters.

SensorLex® 8B Isolated Analog Signal Conditioning Modules

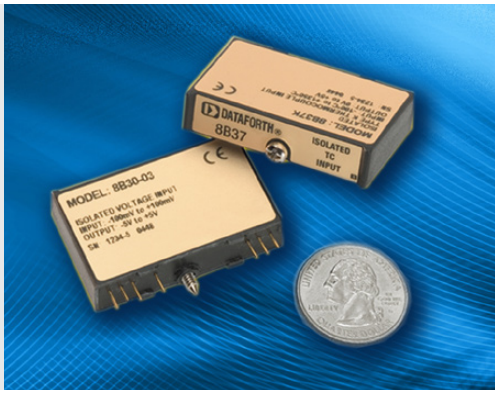
Miniature Size, 2-way Isolation, 5V Supply Voltage, *Instrument Class*® Performance

19 family groups of 130+ modules: an optimal solution for monitoring real-world process signals and providing high-level signals for data acquisition

Developed in response to customer requests for a smaller, isolated signal conditioner, SensorLex 8B modules are housed in a miniature package that is ideal for embedded and portable applications. All 8B modules are fully functional and provide *Instrument Class* analog voltage output. They interface to a wide variety of voltage, current, temperature, position, frequency, and strain measuring devices.

8B SensorLex Key Features

- ±0.05% Accuracy (typ)
- ±0.02% Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power Supply Voltage (30mA (typ))
- 3- to 5-pole Low-pass Filtering
- Low Output Noise
- –40°C to +85°C Operating Temperature
- UL/cUL Listed (Class I, Division 2, Groups A, B, C, D)
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863



SCMD Isolated Digital I/O Modules

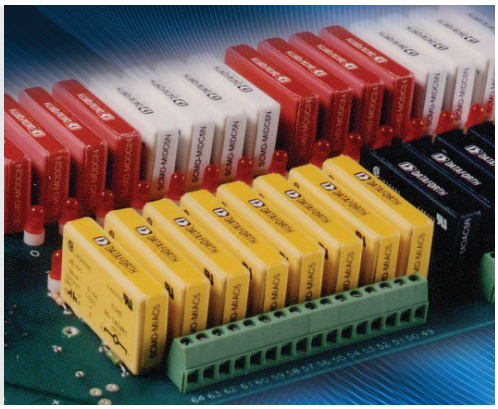
Miniature Digital I/O Modules with 4kV Isolation

A rugged, protective isolation barrier, effective to 4kV, between the field and computer system

SCMD miniature digital I/O modules are solid-state devices that send “On” and “Off” electrical signals to and from a computer. Input modules convert AC or DC voltages to DC logic signals and send them to the computer system. Output modules work in the opposite direction, switching either AC or DC circuits On or Off in response to logic-level voltage commands from the computer.

Key SCMD Features

- 4000Vrms Optical Isolation
- Industry Standard Packaging
- Input Modules Incorporate Input Filtering for Transient-free Switching
- Complete Selection of Backpanels and Accessories
- Optional Low-noise, Fast-switching Models
- UL Listed, CSA Certified, CE Compliant
- Manufactured per RoHS III Directive 2015/863



The SensorLex 8B and SCMD product lines include a complete selection of backpanels, DIN-rail mounting options, cables, racks, power supplies, and other accessory items.

Custom SensorLex 8B modules are available: consult factory for minimum quantity and pricing details on custom input ranges, output ranges, bandwidth, and other key parameters.

DSCA High-Performance, DIN-rail Mount, Isolated Signal Conditioners

True 3-way Isolation, High Accuracy, *Instrument Class*® Performance

16 family groups of 375+ different modules: a wide selection of input and output functions

Each *Instrument Class* DSCA module provides a single channel of isolated analog input or output for use in data acquisition, test and measurement, and control system applications.

DSCA Key Features

- ±0.03% Accuracy (typ)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 15-30VDC Wide Supply Range
- Industry Standard Outputs of 0-10V, ±10V, 0-20mA, or 4-20mA
- 4- to 6-pole Low-pass Filtering
- Low Output Noise
- –40°C to +80°C Operating Temperature
- Plug-in Terminal Blocks Simplify Wiring
- UL/cUL Listed (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863



SCM9B Isolated Analog Signal Conditioning Modules

Isolated, Intelligent Signal Conditioning Products

11 family groups of 200+ different modules: a wide selection of input and output functions

High-quality 9B modules provide cost-effective protection and conditioning for a wide range of distributed data acquisition and control applications including but not limited to process monitoring and control, remote data logging, product testing, and motion and motor speed control.

Dataforth's extensive line includes fixed and programmable sensor-to-computer and computer-to-analog output interface modules, RS-232/RS-485 converters, RS-485 repeaters, and applications software. Accessories include a complete selection of backpanels, DIN-rail mounting options, interface cables, mounting racks, power supplies, and other accessory items.

SCM9B Key Features

SCM9B Sensor-to-Computer Modules

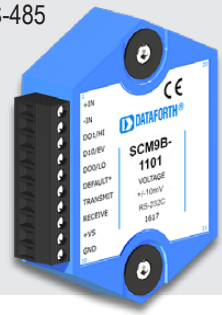
- 500Vrms Input Isolation
- Programmable Scaling and Linearization
- ASCII Command/Response Protocol
- 15-bit Measurement Resolution
- Continuous Self-calibration
- Analog Readback
- DIN-rail Mountable D100 Series

SCM9B Computer-to-Analog Output Modules

- 0-1V, ±1V, 0-5V, ±5V, 0-10V, ±10V, 0-20mA, 4-20mA Output Ranges
- 500Vrms Output Isolation
- 12-bit Output Resolution
- Programmable 0.01V/s (mA/s) to 10,000V/s (mA/s) Output Slopes
- Analog Readback
- Data Scaling

SCM9B Converters and Repeaters

- Transparent to Host
- Optically Isolated Bidirectional Data Flows
- Automatic Internal RS-485 Bus Supervision
- DIN-rail Mountable D192 Model



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

DSCL Industrial Loop Isolators and Transmitters

Passive, Active, Programmable 4-20mA Loop Products

Loop and universal AC/DC-powered isolators and transmitters in DIN-rail, component, and head-mount packages

This family includes basic loop-powered isolators, wide-range AC/DC-powered isolators and transmitters, and fixed-gain or hardware- and software-configurable models. They accept voltage, current, thermocouple, and RTD-input signals and provide high-level analog outputs for data acquisition, test and measurement, and control system applications.

Key DSCL Features

- Full Family of Loop Isolators and Transmitters
- Signal-powered Passive Loop Isolator Models
- Wide Range 24-60V or 85-230V AC/DC Powered Models
- Jumper and Software Configurable Models
- 4000Vrms Isolation
- PCB, DIN-rail, Panel Mount, or Instrument Head Mounting
- Multiple Channels per Package Available
- No Recalibration or Maintenance Required
- Fault Detection of Input Signal Available
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

Compact 6.2mm Signal Converters

- Ideal for Applications in Limited Space
- Dip-switch Configuration
- 3 Power Supply Options
- 3.67” x 0.24” x 4.04” (93.1mm x 6.2mm x 102.5mm) casing
- 1.6 oz (45g) Per Module



DSCP User-Programmable Transmitters

Passive, Active, Programmable 4-20mA Loop Products

Loop and universal AC/DC-powered isolators and transmitters in DIN-rail, component, and head-mount packages

This family includes basic loop-powered isolators, wide-range AC/DC-powered isolators and transmitters, and fixed-gain or hardware and software configurable models. They accept voltage, current, thermocouple, and RTD-input signals and provide high-level analog outputs for data acquisition, test and measurement, and control system applications. The compact 6.2mm DSCP dip-switch configurable signal converters are ideal when space is limited.

Key DSCP Features

- Full Family of Loop Isolators and Transmitters
- Signal-powered Passive Loop Isolator Models
- Wide Range 24-60V or 85-230V AC/DC Powered Models
- Jumper and Software Configurable Models
- 4000Vrms Isolation
- PCB, DIN-rail, Panel Mount, or Instrument Head Mounting
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Compact 6.2mm Signal Converters

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- 1.6 oz (45g) Per Module



DSCT Loop-Powered Isolated Two-wire Transmitters

Instrument Class® Performance in a Low-Cost DIN-rail Mount Package

7 family groups of 45+ transmitter models: economical connections between sensors and control rooms

DSCT 2-wire transmitters condition and send analog signals from sensors located in the field to monitoring and control equipment—usually computers—located thousands of feet away in central control areas. The transmitters accept a wide range of inputs, including millivolt, volt, milliamp, thermocouple, RTD, potentiometer, and slide wire. They operate on power from a 2-wire signal loop and modulate the supply current to represent the input signal within a 4-20mA range.

Key DSCT Features

- ±0.03% Accuracy (typ)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 10.8-60V Wide Loop Supply Voltage
- 5-pole Low-pass Filtering
- –40°C to +80°C Operating Temperature
- Mounts on DIN-rail EN 50022, 35x7.5 or 35x15
- CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- CE Compliant
- Manufactured per RoHS III Directive 2015/863



DCP and LDM Industrial Data Communication Products

Line Drivers and Converters for RS-232, RS-422, and RS-485 Systems

9 family groups of 40+ transmitter models: economical connections between sensors and control rooms

Industrial LANs and data communication systems stretch over long distances, inside and outside, with signals exposed to electrical transients, noise, ground loops, power surges, and lightning. Our heavy duty products “harden” and protect these systems.

Key Data Communication Features

- Protects Equipment from Damage due to Power Surges, Transients, Lightning
- 1500Vrms Isolation with Optocouplers and Power DC-to-DC Converter (3000Vp, 1 min)
- Extends RS-232 Communication Distances without Expensive Low-capacitance Cabling
- Connects RS-232 Devices to RS-422 and RS-485 Devices
- Data Rates to 115.2kbps
- Distances to 12 Miles (20km)
- 2- or 4-wire Simplex/Duplex Connection
- CE Compliant
- Manufactured per RoHS III Directive 2015/863



SCM5B isoLynx® SLX200 Data Acquisition System

Fast, Intelligent, Modular, Fully Isolated

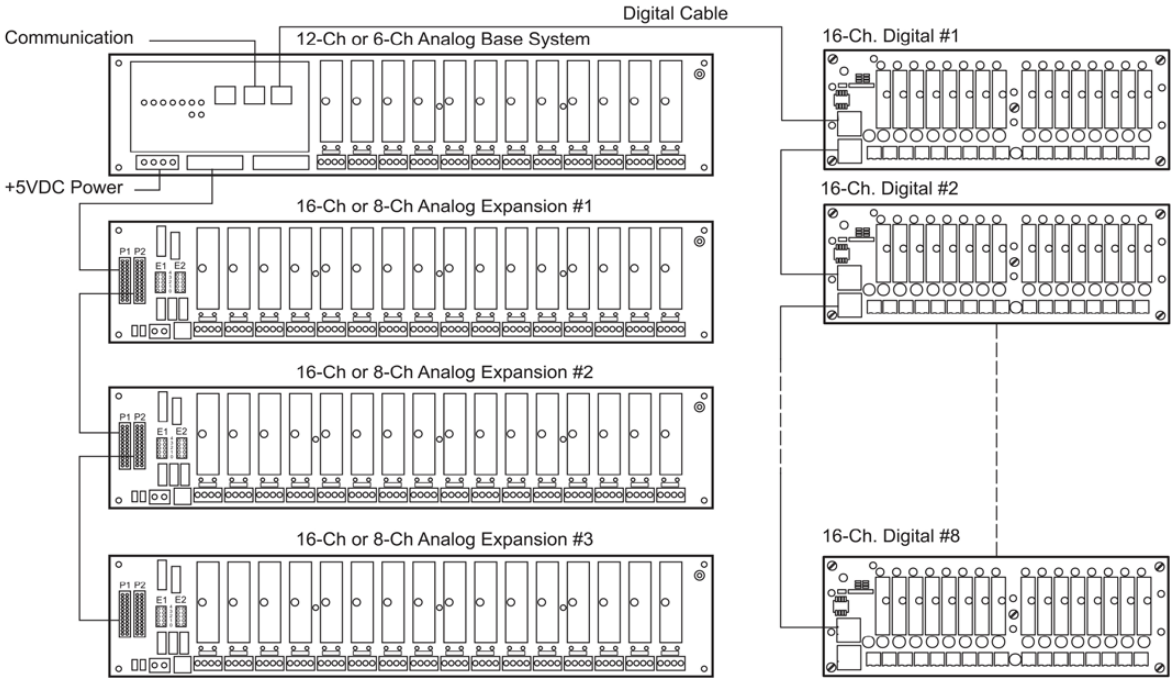
Implements industry-standard Modbus® RTU and TCP protocols, enabling communication with existing third-party software drivers and HMI/SCADA packages

Fully certified by Modbus-IDA and OPC compatible, the SCM5B isoLynx SLX200 provides superior reliability, accuracy, and isolation for a wide range of rugged industrial applications. The system offers maximum flexibility of analog and digital I/O selection; the modular design combines a 6- or 12-channel I/O Controller base system and optional 8- or 16-channel expansion backplanes, which can be panel or DIN-rail mounted. One I/O controller unit can operate up to 60 channels of differential analog I/O and 128 channels of digital I/O, using Dataforth's SCM5B analog and SCMD digital modules. All I/O is channel-to-channel and input-to-output isolated.

SCM5B isoLynx SLX200 Key Features

- Modbus RTU Support on RS-232 and RS-485
- Modbus TCP Support (optional)
- 1500Vrms Input-to-Output and Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Dual Ethernet for Redundancy
- System Expansion to 60 Analog Channels and 128 Discrete Channels
- All I/O Mix and Match Isolated
- Fast 16-Bit A/D, D/A
- Best I/O Selection with 250+ Different I/O Modules
- Drop-in Data Acquisition for Existing Installations
- Two Analog Scan Modes
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- CE Compliant
- Manufactured per RoHS III Directive 2015/863





SCM5B isoLynx SLX200 System Example

8B isoLynx® SLX300 Data Acquisition System

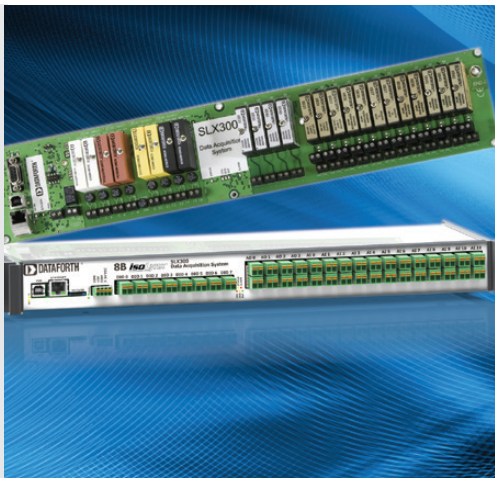
Flexible, Compact, Modular, Reliable

Configure with up to 12 isolated analog-input channels, 4 isolated analog-output channels, and 8 isolated digital I/O channels

Building on the proven reliability and outstanding performance of the SCM5B isoLynx SLX200 and miniature-sized SensorLex® 8B isolated signal conditioning modules, the 8B isoLynx SLX300 is a compact, low-cost solution for wide ranging rugged industrial applications. The system enables the mix and match of analog and digital I/Os at sustained rates of up to 3.0kS/s (100kS/s burst) and supports Modbus® RTU and TCP protocols. The SLX300 also offers 7 advanced special functions and 4 alarm states. The system can be panel or DIN-rail mounted.

8B isoLynx SLX300 Key Features

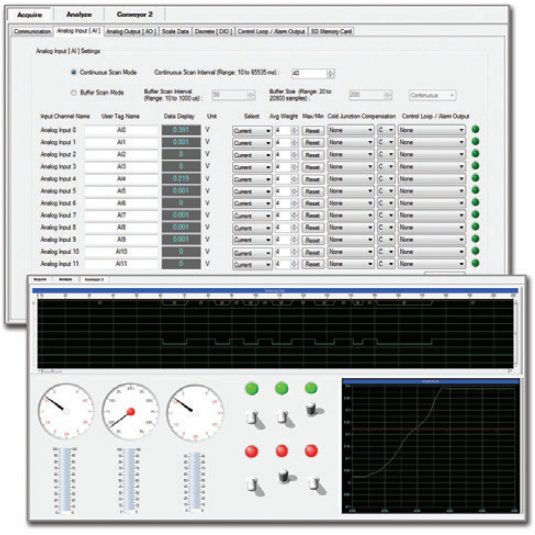
- Modbus RTU and TCP Support
- 1500Vrms Input-to-Output and Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Wide I/O Selection
  - – Analog – 19 product families, 130+ models
  - – Digital – 6 product families, 20+ models
- Mix and Match Analog and Digital I/O
- Advanced Features Including Alarms, Counters, Timers, PWMs, and more
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- UL/cUL Listed (Class I, Division 2, Groups A, B, C, D)
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863



ReDAQ® Shape Software for SLX300

Out-of-the-box DAQ software for the 8B isoLynx SLX300 data acquisition system

ReDAQ Shape software for SLX300 provides the easiest and most efficient development tool to create, save, and open graphical user interface projects for test, process, data collection and data analysis applications. Built-in functions in the software are pre-configured and can be used without setup; just three easy steps are required to create data acquisition and control projects.



ReDAQ Shape for SLX300 Key Features

- 64 High-quality Toolbox Tools
- 3 Easy Steps to Create Data Acquisition and Control Projects
- Pre-configured Built-in Software Functions
- Supports Any Graphical File Format
- Integrated, Across-the-Board Applicability
- Most Effective Way to Set Up and Configure 8B isoLynx SLX300

Functions:

- – Continuous and Burst Scan Modes for 12 Analog Input and 4 Analog Output Channels
- – Automatically Scales Data from Counts to Engineering Units
- – 8 Discrete I/O with 7 Special Functions Pulse/Frequency Counter, Pulse/Frequency Counter with De-Bounce, Waveform Measurement, Time Between Events, Frequency Generator, PWM Generator, One-shot Pulse Generator
- – Customer User Tag Name for Any Input and Output
- – Cold Junction Compensation and Linearization for Thermocouple-input Modules
- – Control Loop and Alarm Output
- – Three-function Timer (Count-down, 24hr/ay, Day/Time) with 10 Programmable Events

MAQ®20 Industrial Data Acquisition and Control System

High Performance, Powerful, Flexible, Industrial, Rugged Design

The industry's lowest cost-per-channel Data Acquisition and Control System offering, integral PID loop control, ±0.035% system accuracy; ideal for test and measurement, factory, process, and machine automation, military and aerospace, power and energy, environmental monitoring, and oil and gas applications

Encompassing more than 35 years of design excellence and quality in the industrial test and measurement and control industry, the MAQ20 family consists of DIN-rail mounted, programmable, multi-channel, rugged industrial signal conditioning input and output modules and communication modules. Each I/O module has a 1500Vrms isolation barrier between field-side and system-side wiring, and many models offer per-channel isolation. The MAQ20 is supported by both ReDAQ® Shape software for MAQ20 and your own ModBus® compatible data acquisition/test and measurement software.

MAQ20 Key Features

- Industry's Lowest Cost per Channel
- ±0.035% Accuracy (typ)
- 1500Vrms Channel-to-Bus Isolation
- Up to 240Vrms, Continuous Field I/O Protection
- ANSI/IEEE C37.90.1 Transient Protection
- Graphical Control Software
  - ReDAQ Shape for MAQ20 Software
  - Customer own ModBus® compatible DAQ Software
- Advanced Features Including Integral PID Control, Alarms, Counters, Timers, PWMs
- 7-34VDC Wide-range Input Power
- –40°C to +85°C Industrial Operating Temperature
- Heavy Industrial CE Compliant
- UL/cUL Listed (Class I, Division 2, Groups A, B, C, D)
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

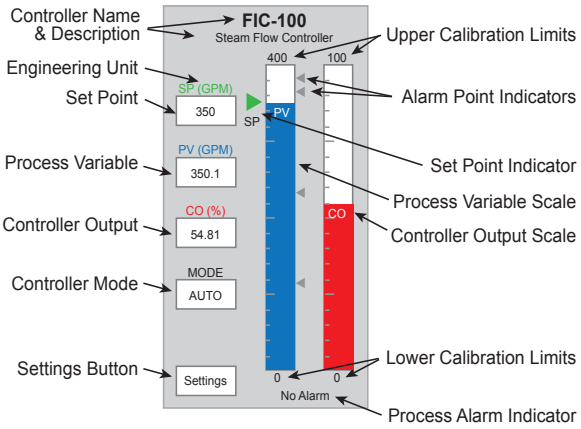


PID Loop Control

This highly effective controller operates in ReDAQ Shape for MAQ20 software

With ReDAQ Shape software, the MAQ20 Data Acquisition System runs in real time and provides up to 8 loops of PID control; faceplates within the software enable an engineer or operator to interact with the MAQ20 Data Acquisition System. Typical PID applications include steam, water, and chemical flow control; tank level control, heat-exchanger/reactor temperature control, and pressure control.

Key PID Controller Features... with ReDAQ Shape Software



PID Faceplate in ReDAQ Shape Software

- Separate Panels for Setting Basic, Advanced, and Alarm Items
- Noninteracting and Parallel PID Control Algorithms
- Proportional and Derivative Modes Can Act on Error or Process Variable
- Gap Control
- Built-in Process Variable Filtering
- Bumpless Transfer
- Change Tuning Settings Easily
- Process Variable Set Point Tracking
- Limit Controller Output Range
- Anti-reset Windup
- Four Process Alarms
- Full-featured Faceplate for Numeric and Visual Feedback
- Integrated Auto Tuner

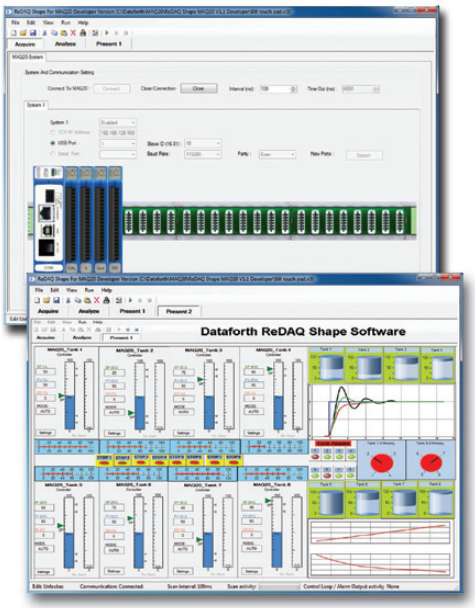
ReDAQ® Shape Software for MAQ®20

Ideal for data acquisition, monitoring and control; enables users to easily interact with the Dataforth MAQ20 Data Acquisition System

ReDAQ Shape software for MAQ20 is an easy and efficient development tool as well as an effective way to configure and customize MAQ20 functions for specific application requirements. Faceplates within the software enable an engineer or operator to interact with the MAQ20 Data Acquisition System and its features, for example PID Loop Control.

ReDAQ Shape for MAQ20 Key Features

- 3 Easy Steps to Create Customized Presentation Panels
- No Setup or Configuration Required to Acquire and Analyze Data
- Faceplates for PID Loop Control
- 65 High-quality Toolbox Tools
- Supports Any Graphical File Format
- Integrated, Across-the-board Applicability
- Most Efficient Way to Configure and Run MAQ20 Systems:
  - Continuous Acquisition and Burst Scan Modes
  - Automatically Scales Data from Counts to Engineering Units
  - Discrete I/O Offers 7 Special Functions: Pulse/Frequency Counter, Pulse/Frequency Counter with De-Bounce, Waveform Measurement, Time Between Events, Frequency Generator, PWM Generator, One-Shot Pulse Generator
  - Assign Tag Names for Any Input and Output
  - Configure Control Loops and Alarm Outputs
  - Three Function Timer (Count-Down, 24hr/Day, Day/Time) with 10 Programmable Events



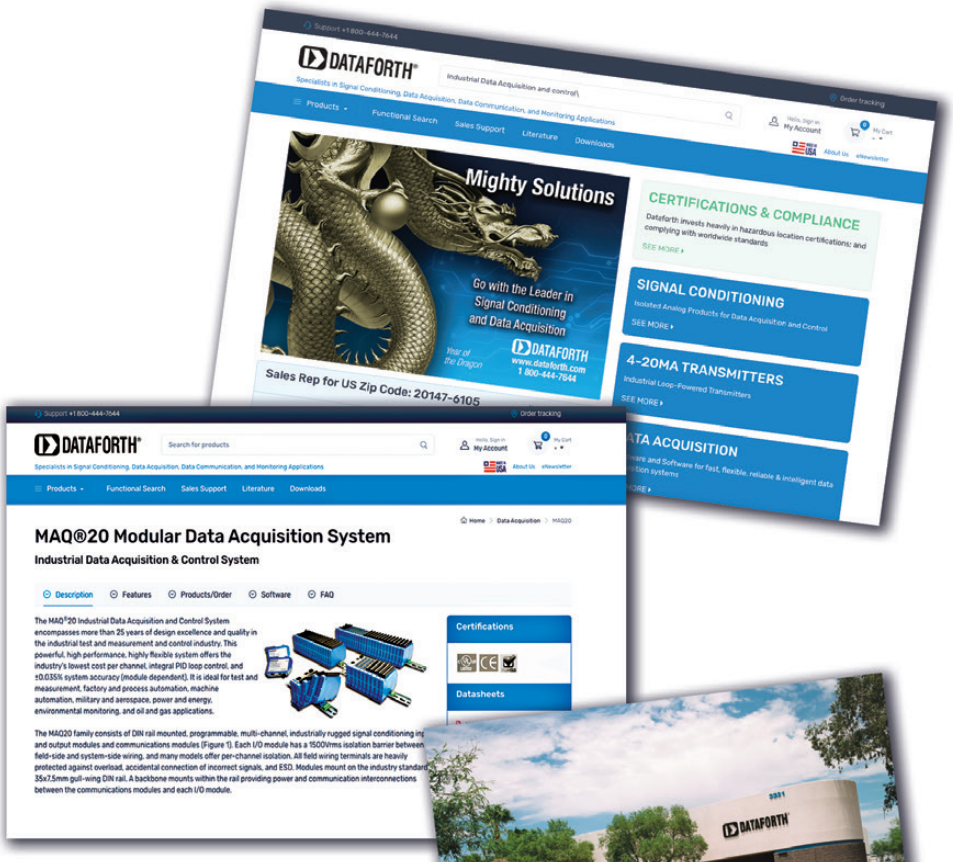
The Dataforth System Builder

Dataforth's System Builder is an innovative, interactive online tool that allows you to create your own system, module by module. Based on your stated requirements and parameters, suggestions are automatically given on which products to choose to build the most effective system. Pricing information is continuously updated, thereby enabling you to obtain the best system for your needs at the most cost-effective price.

Visit Dataforth's Website: dataforth.com

Dataforth's website is an easy-to-use, comprehensive source for sales, products, and applications information. The site includes:

- Fast, accurate parametric search capabilities for all Dataforth industrial signal conditioning, data acquisition, and data communication products
- Online product quote and purchase
- Online product data sheets, application notes, and user manuals
- Direct applications assistance, sales, and customer service help lines readily available
- Latest news on company operations and new products
- Comprehensive signal conditioning, data acquisition, and control tutorials
- Worldwide corporate and sales contact information





Online Help
Online Ordering
Data Sheets
Application Notes
Product Information



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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	120Vrms 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% (typ)	0.03% (typ)	0.05% (typ)	0.02% (typ)
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)x(w)x(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

Characteristic	DSCA	DSCT	DSCL	DSCP
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)	4-20mA, 0-20mA	(4)
Output Range to System	0-10VDC, ±10VDC, 0-1mA, 4-20mA, 0-20mA	4-20mA	4-20mA, 0-20mA, V, and 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% (typ)	0.03% (typ)	0.05% to 0.1% (typ)	0.1% (typ)
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 24-230VDC/VAC
Dimensions (h)x(w)x(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
(5) V, I, RTD, TC, Potentiometer

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High-accuracy Energy Monitoring Module

Module	PWRM10-01	PWRM20-01
Phase Voltage Range	85-265VAC	85-525VAC
Phase Frequency	50/60Hz Input	
Electrical System		
	Single-phase (2-wire)	
Voltage Measurement	Two-phase (3-wire)	
(Direct Connection or VT)	Three-phase Wye or Delta (3-wire)	
	Three-phase Wye or Delta (4-wire)	
Current Measurement	Shunt, Ct, Rogowski Coil	
Measured Parameters and Accuracy		
RMS Voltage	±0.1% of Full-scale Range	
RMS Current	±0.1% of Full-scale Range	
Active Power	±0.2%	
Apparent Power	±0.2%	
Reactive Power	±0.2%	
Power Factor	±0.2%	
Frequency Range	45-65Hz	
Active Energy	±0.25%	
Apparent Energy	±0.25%	
Fundamental Active and Reactive Energy	±0.25%	
Phase Angles	±0.1%	
Line Periods	±0.1%	
Measurement Bandwidth		
RMS Voltage and Current (–3dB)		
Total Active Energy (–3dB)	3.3kHz	
Fundamental Reactive Energy (–3dB)	3.3kHz	
Harmonic (–3dB)	3.3kHz (2.8kHz No Attenuation Pass Band)	
Temperature Drift	±100ppm°C	
Events	Over-voltage, Over-current, Sag	
Security	Password to Access Control	
Data Logging	Configurable, Automatic Download and Storage	
Connectivity	Ethernet, TCP/IP	
Mounting	DIN-rail	
Dimensions (h)x(w)x(d)	4.01" x 0.89" x 5.04" (102mm x 22.6mm x 128mm)	

Data Acquisition (DAQ) System - MAQ20

Components - Communication - MAQ20-COM2, -COM4	
Standard Industrial Buses	Ethernet, RS-232, RS-485
USB Software Interfaces	Modbus TPC/IP or RTU
Components - Analog Input - MAQ20-MVDN, -VDN, -VSN, -IDN, -ISN, -FREQ, -BRDG1, -JTC, -KTC, -RSTC, -TTC, -RTD31, -RTD41, -ISOI1, -ISOMV1, ISOV2, -ISOV2, -ISOV3, -ISOV4, -ISOV5	
Channel Count	Up To 16 Channels, Independently Configurable
Voltage and Current Inputs	8 Differential or 16 Single-ended
Thermocouple	8-channel Measurement, 5 Thermocouple Types
RTD Inputs	2-, 3-wire Sensors, Including 6 RTD Types and Potentiometers
Strain Gauge Input	Connect to Full-Bridge Sensors, Narrow/Wide BW Filtering
Frequency Input	Zero Crossing and TTL Signals of 500Hz-100kHz Frequencies
Components - Analog Output - MAQ20-VO, -IO	
Voltage and Current Outputs	Up to 8 Channels of 300vrms Ch-to-Ch Isolated Output
Components - Discrete Input/Output - MAQ20-DIV20, -DIVC20, -DIOL, -DIOH, -DODC20SK, -DORLY20	
Channel Count	5 Input/5 Output Channels per Module
Inputs	3-60VDC Input; or, 90-280VAC/VDS at 3A
Outputs	3-60VDC Output; or, 24-280VAC at 3A
Overall System Specifications	
Accuracy	±0.035% (typ)
Voltage and Current Outputs	Up to 8 Channels of 300Vrms Ch-to-Ch Isolated Output
Field I/O Protection	Up to 240Vrms, Continuous
Transient Protection	ANSI/IEEE C.37.90.1
Wide-range Input Power	7-34VDC
ReDAQ Shape Software	Up to 8 PID Loops
Operating Temperature	–40°C to +85°C
Advanced PID Control	Alarms, Counters, Timers
Operating Temperature	–40°C to +85°C

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High-voltage Attenuator Modules - SCMHVAS-Mxxxx

Module	SCMHVAS-Mxxx
Input Range	±100V_{PEAK} to ±2000V_{PEAK} (70VAC to 1414VAC)
Input Voltage (max)	±2000V_{PEAK}
Input Resistance	>10MΩ
Accuracy	±0.03%
Stability	±50ppm/ºC
Output Range	±1V
Output Resistance	<100kΩ
Mechanical Dimensions	2.13" x 1.705" x 0.605"
(h)x(w)x(d)	(54.1mm x 43.3mm x 15.4mm)
Environmental	
Operating Temp. Range	–40ºC to +85ºC
Storage Temp. Range	–40ºC to +85ºC
Relative Humidity	0 to 95% Noncondensing

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

See Discontinued Devices at the End of the Document.

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SCM5B

Isolated SCM5B Analog Signal Conditioning Products



SCM5B Modules

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

SCM5B Analog Modules

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

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

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

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

Custom Signal Conditioning

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

FEATURES

- ±0.03% Accuracy (typ)
- ±0.005% Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power Supply Voltage (30mA (typ))
- 4- to 6-pole Low-pass Filtering
- Up to 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±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 III Directive 2015/863

BENEFITS

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

APPLICATIONS

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

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SCM5B Selection Guide

†OUTPUT RANGES AVAILABLE

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

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

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

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

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

ISOLATED TRUE RMS INPUT MODULES

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

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

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

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

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

POTENTIOMETER-INPUT MODULES, 4Hz BW

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

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

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

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

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

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

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

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SCM5B Selection Guide (Continued)

†OUTPUT RANGES AVAILABLE

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

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

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

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

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

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

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

2-WIRE TRANSMITTER-INTERFACE MODULES, 100Hz BW

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

GENERAL PURPOSE INPUT MODULES, DC EXCITATION

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

FREQUENCY INPUT MODULES

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

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

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

Gain, bandwidth, and excitation are switch-programmable

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

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

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

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SCM5B Selection Guide (Continued)

VOLTAGE ATTENUATOR SYSTEM

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

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

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

† OUTPUT RANGES AVAILABLE

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

‡THERMOCOUPLE ALLOY COMBINATIONS

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

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

**RTD STANDARDS

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

ACCESSORIES

MODEL DESCRIPTION

BACKPANELS

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

MOUNTING RACK

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

DIN-MOUNTING HARDWARE and BOARD

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

INTERFACE CABLES

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

CJCs, JUMPERS, RESISTORS

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

POWER SUPPLIES

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

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SCM5B30/31

Analog Voltage-input Modules, Narrow Bandwidth

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±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, ±5%.

A special input circuit on the SCM5B30 and SCM5B31 modules provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

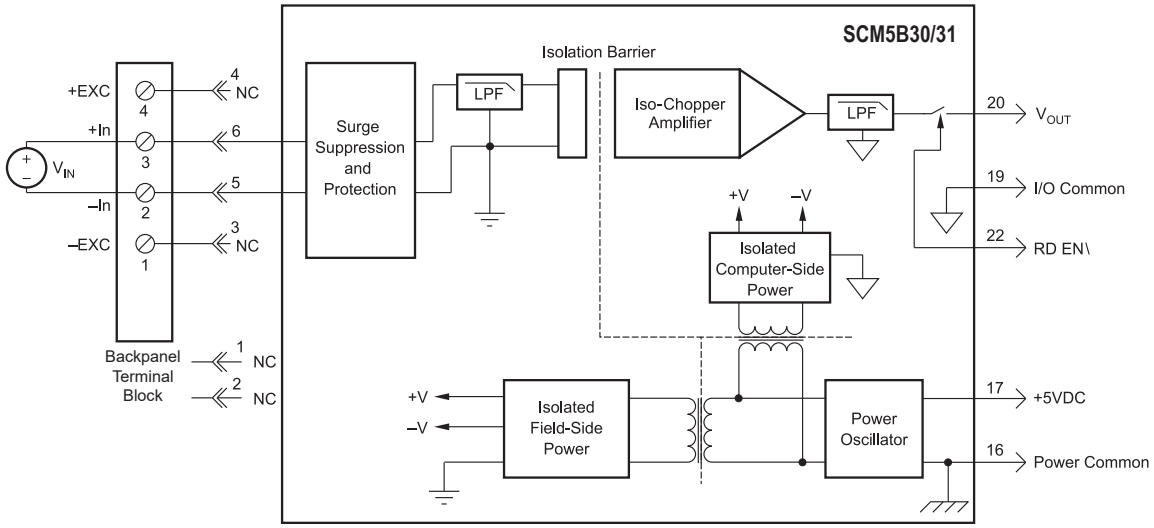
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- ±0.03% Accuracy
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.005% Linearity
- ±1µV/°C Drift
- CSA C/US Certified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

BENEFITS

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

APPLICATIONS

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



SCM5B30/31 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

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

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.
(3) Same as SCM5B31-01 with 50MΩ input resistance.

Ordering Information

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

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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 below). 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 module family is designed with a completely isolated computer side circuit which can be floated to ±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, ±5%.

A special input circuit on the SCM5B32 modules provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

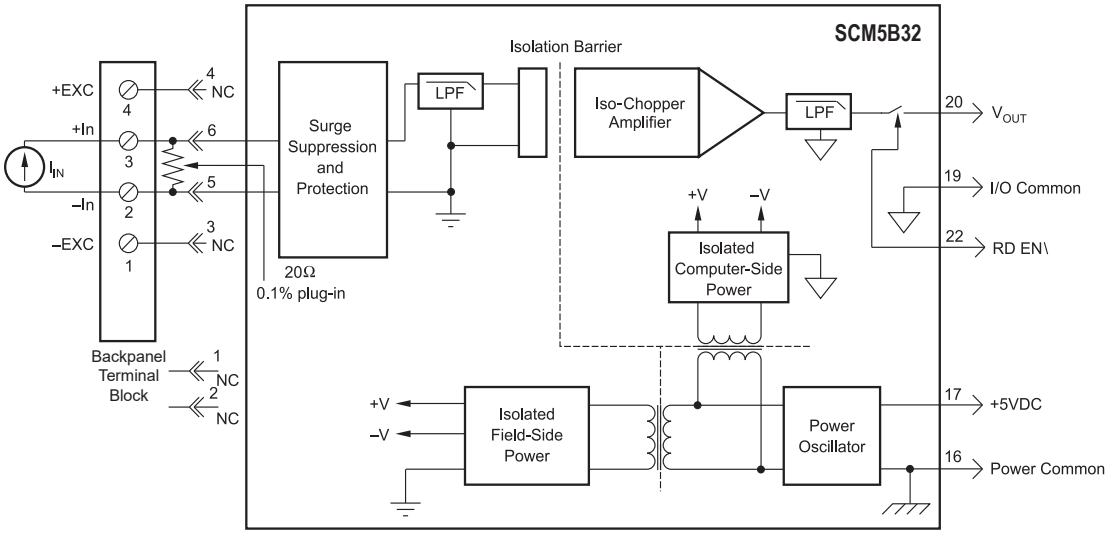
- Accepts Milliamp Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- ±0.03% Accuracy
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.005% Linearity
- CSA C/US Certified
- CE and ATEX Compliant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

BENEFITS

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

APPLICATIONS

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



SCM5B32 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B32
Input Range	0-20mA or 4-20mA
Input Resistor	
Value	20.00Ω
Accuracy	±0.1%
Stability	±10ppm/°C
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)	±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	±1µA/% RTI(2)
Mechanical Dimensions (h)x(w)x(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 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	4-20mA	0V to +5V
SCM5B32-01D	4-20mA	0V to +10V
SCM5B32-02	0-20mA	0V to +5V
SCM5B32-02D	0-20mA	0V to +10V

Refer to SCM5B392 specifications for additional current input models.

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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 below).

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±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, ±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

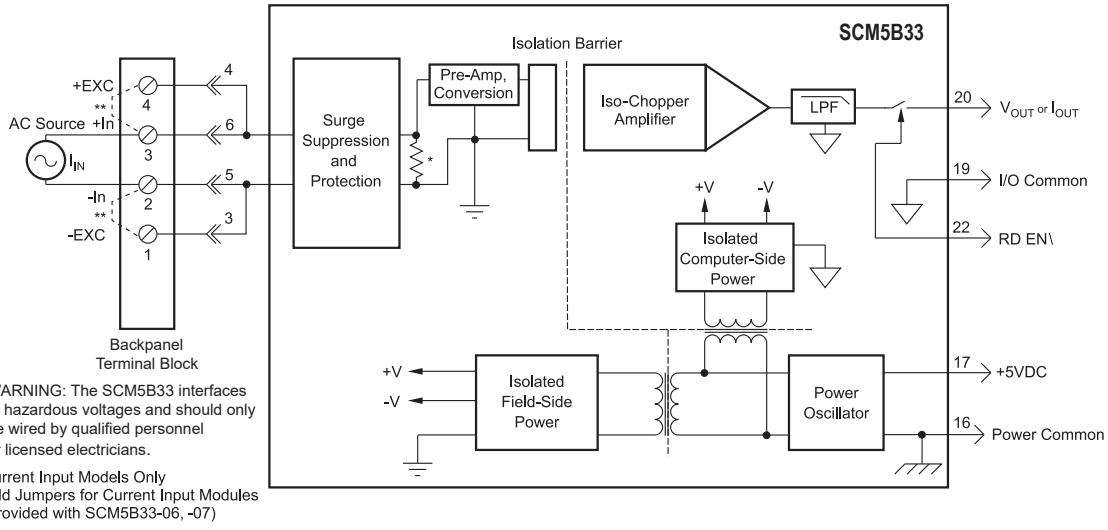
- Interfaces RMS Voltage (0-300V) or RMS Current (0-5A)
- Designed for Standard Operation with Frequencies of 45Hz to 1000Hz (Extended Range to 20kHz)
- Compatible with Standard Current and Potential Transformers
- Industry Standard Outputs: 0-1mA, 0-20mA, 4-20mA, 0-5V or 0-10VDC
- ±0.25% Factory Calibrated Accuracy (Accuracy Class 0.2)
- 1500Vrms, Continuous Transformer Isolation
- Input Overload Protected to 480V (max) (Peak AC and DC) or 10Arms, Continuous
- ANSI/IEEE C37.90.1 Transient Protection
- CSA C/US Certified
- CE Compliant
- ATEX Compliant (all models except SCM5B33-04x, -05x)
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



SCM5B33 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

Typical* at T_A = +25°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	1MΩ 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	
50/60 Hz	±0.25% Span
45Hz to 1kHz	±0.25% Reading Additional Error
1kHz to 20kHz	±0.75% Reading Additional Error
Non-Sinusoid	
Crest Factor = 1 to 2	±0.05% Reading Additional Error
Crest Factor = 2 to 3	±0.15% Reading Additional Error
Crest Factor = 3 to 4	±0.30% Reading Additional Error
Crest Factor = 4 to 5	±0.40% Reading Additional Error
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 (max)	(Loop Voltage - 4.2V) / (Loop Current)
Supply Voltage	+5VDC ±5%
Current	120mA
Sensitivity	±200ppm/%
Mechanical Dimensions (h)x(w)x(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

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-1mA
SCM5B33-02B	0V to 1V	0mA-1mA
SCM5B33-03B	0V to 10V	0mA-1mA
SCM5B33-04B	0V to 150V	0mA-1mA
SCM5B33-05B	0V to 300V	0mA-1mA
SCM5B33-06B	0A to 1A	0mA-1mA
SCM5B33-07B	0A to 5A	0mA-1mA
SCM5B33-01C	0mV to 100mV	4-20mA
SCM5B33-02C	0V to 1V	4-20mA
SCM5B33-03C	0V to 10V	4-20mA
SCM5B33-04C	0V to 150V	4-20mA
SCM5B33-05C	0V to 300V	4-20mA
SCM5B33-06C	0A to 1A	4-20mA
SCM5B33-07C	0A to 5A	4-20mA
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	0-20mA
SCM5B33-02E	0V to 1V	0-20mA
SCM5B33-03E	0V to 10V	0-20mA
SCM5B33-04E	0V to 150V	0-20mA
SCM5B33-05E	0V to 300V	0-20mA
SCM5B33-06E	0A to 1A	0-20mA
SCM5B33-07E	0A to 5A	0-20mA

NOTES:
*Contact factory 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 $\sqrt{2500}$ / (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.
(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 thru -07) or 1.00% accuracy error (-01). Accuracy includes linearity, hysteresis and repeatability but not source or external shunt inaccuracy (if used).

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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 below). 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 module family is designed with a completely isolated computer-side circuit which can be floated to ±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 100Ω Pt and 120Ω Ni, and 1.0mA for 10Ω 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, ±5%.

A special input circuit on the SCM5B34 modules provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

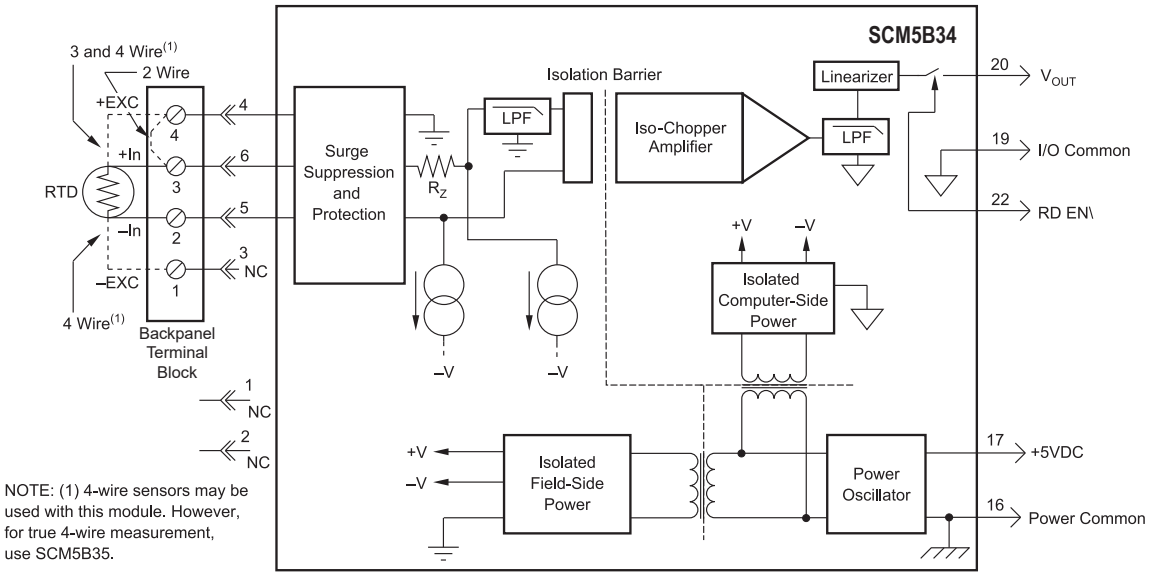
- Interfaces to 100Ω Platinum, 10Ω Copper, or 120Ω Nickel RTDs
- Linearizes RTD Signal
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B34 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

Typical* at T_A = +25°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	
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	±0.02°C/Ω(1)
10Ω Cu	±0.2°C/Ω(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	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	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)x(w)x(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

Ordering Information

Model	Input Range	Output Range	Accuracy(2)
100Ω Pt **			
SCM5B34-01	–100°C to +100°C	0V to +5V	±0.12°C
SCM5B34-01D	(–148°F to +212°F)	0V to +10V	
SCM5B34-02	0°C to +100°C	0V to +5V	±0.06°C
SCM5B34-02D	(+32°F to +212°F)	0V to +10V	
SCM5B34-03	0°C to +200°C	0V to +5V	±0.12°C
SCM5B34-03D	(+32°F to +392°F)	0V to +10V	
SCM5B34-04	0°C to +600°C	0V to +5V	±0.36°C
SCM5B34-04D	(+32°F to +1112°F)	0V to +10V	
SCM5B34-05	–100°C to +200°C	0V to +5V	±0.18°C
SCM5B34-05D	(–148°F to +392°F)	0V to +10V	
10Ω Cu **	0°C to +120°C		
SCM5B34C-01	(10Ω at 0°C)	0V to +5V	±0.23°C
SCM5B34C-01D	(+32°F to +248°F)	0V to +10V	
	0°C to +120°C		
SCM5B34C-02	(10Ω at 25°C)	0V to +5V	±0.23°C
SCM5B34C-02D	(+32°F to +248°F)	0V to +10V	
SCM5B34C-03	0°C to +160°C	0V to +5V	±0.32°C
SCM5B34C-03D	(10Ω at 0°C)	0V to +10V	
	(+32°F to +320°F)		
120Ω Ni **			
SCM5B34N-01(3)	0°C to +300°C	0V to +5V	±0.23°C
SCM5B34N-01D	(+32°F to +572°F)	0V to +10V	

**RTD Standards

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

NOTES :
*Contact factory 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.

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SCM5B35

Linearized 4-wire RTD-input Modules

DESCRIPTION

The high-accuracy SCM5B35 4-wire RTD-input module offers a significant advantage over 3-wire measurement techniques (Figure below). 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 4-wire does not.

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 ±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 module provides RTD excitation 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 100Ω Pt and 120Ω Ni and 1.0mA for 10Ω Cu) which minimizes RTD self-heating.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles are on the field side of the isolation barrier, and four poles 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 to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

FEATURES

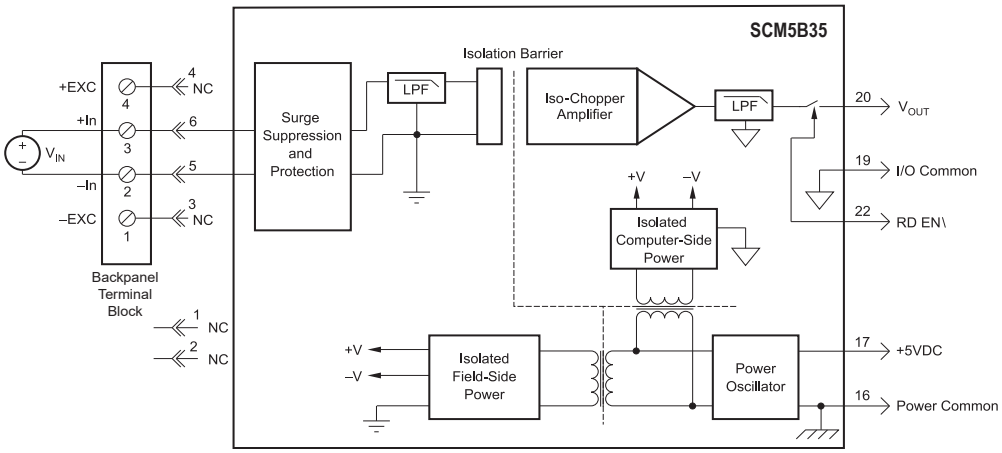
- Interfaces to 100Ω Platinum, 10Ω Copper, or 120Ω Nickel-RTDs
- True 4-wire Input
- Linearizes RTD Signal
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B35 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

Typical* 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)x(w)x(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

Ordering Information

Model	Input Range	Output Range	Accuracy(2)
100Ω Pt **			
SCM5B35-01	–100°C to +100°C	0V to +5V	±0.12°C
SCM5B35-01D	(–148°F to +212°F)	0V to +10V	
SCM5B35-02	0°C to +100°C	0V to +5V	±0.06°C
SCM5B35-02D	(+32°F to +212°F)	0V to +10V	
SCM5B35-03	0°C to +200°C	0V to +5V	±0.12°C
SCM5B35-03D	(+32°F to +392°F)	0V to +10V	
SCM5B35-04	0°C to +600°C	0V to +5V	±0.36°C
SCM5B35-04D	(+32°F to +1112°F)	0V to +10V	
SCM5B35-05	–100°C to +200°C	0V to +5V	±0.18°C
SCM5B35-05D	(-148°F to +392°F)	0V to +10V	
10Ω Cu **	0°C to +120°C		
SCM5B35C-01	(10Ω at 0°C)	0V to +5V	±0.23°C
SCM5B35C-01D	(+32°F to +248°F)	0V to +10V	
SCM5B35C-02	0°C to +120°C	0V to +5V	±0.23°C
SCM5B35C-02D	(10Ω at 25°C)	0V to +10V	
	(+32°F to +248°F)		
SCM5B35C-03	0°C to +160°C	0V to +5V	±0.32°C
SCM5B35C-03D	(10Ω at 0°C)	0V to +10V	
	(+32°F to +320°F)		
120Ω Ni **			
SCM5B35N-01 (3)	0°C to +300°C	0V to +5V	±0.23°C
SCM5B35N-01D	(+32°F to +572°F)	0V to +10V	

**RTD Standards

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

NOTES :
*Contact factory 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.

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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 below). 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 module family is designed with a completely isolated computer-side circuit which can be floated to ± 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, ±5%.

A special input circuit on the SCM5B36 module provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

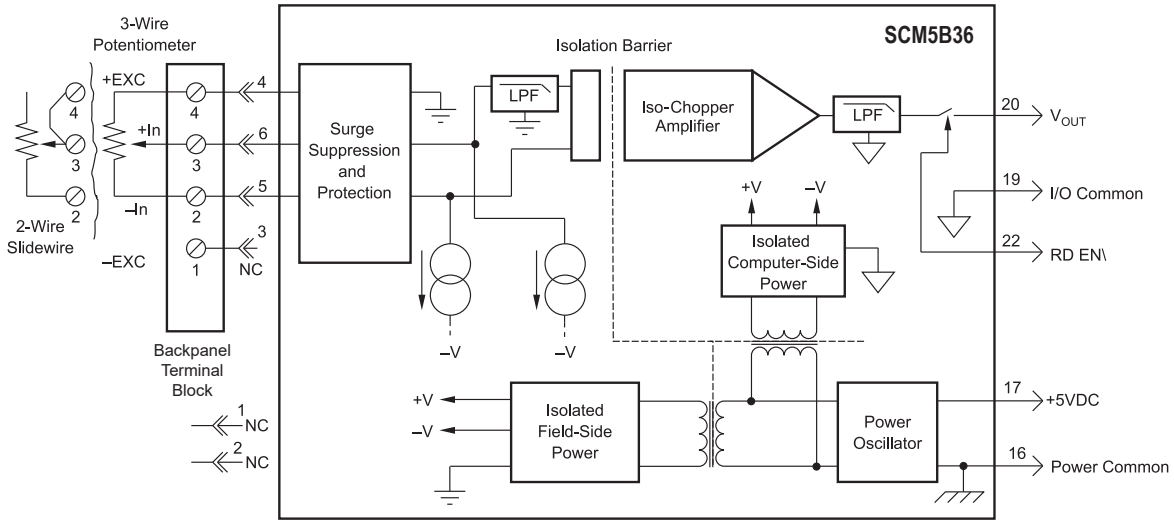
- Interfaces to Potentiometers up to 10,000Ω
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



SCM5B36 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B36
Input Range	0 to 10kΩ
Input Resistance	
Normal	50MΩ
Power Off	40kΩ
Overload	40kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
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	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	160dB
NMR	95dB at 60Hz, 90dB at 50Hz
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)x(w)x(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 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	0V to +5V
SCM5B36-01D	0 to 100Ω	0V to +10V
SCM5B36-02	0 to 500Ω	0V to +5V
SCM5B36-02D	0 to 500Ω	0V to +10V
SCM5B36-03	0 to 1kΩ	0V to +5V
SCM5B36-03D	0 to 1kΩ	0V to +10V
SCM5B36-04	0 to 10kΩ	0V to +5V
SCM5B36-04D	0 to 10kΩ	0V to +10V

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±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 47MΩ resistor, ±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, ±5%.

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

FEATURES

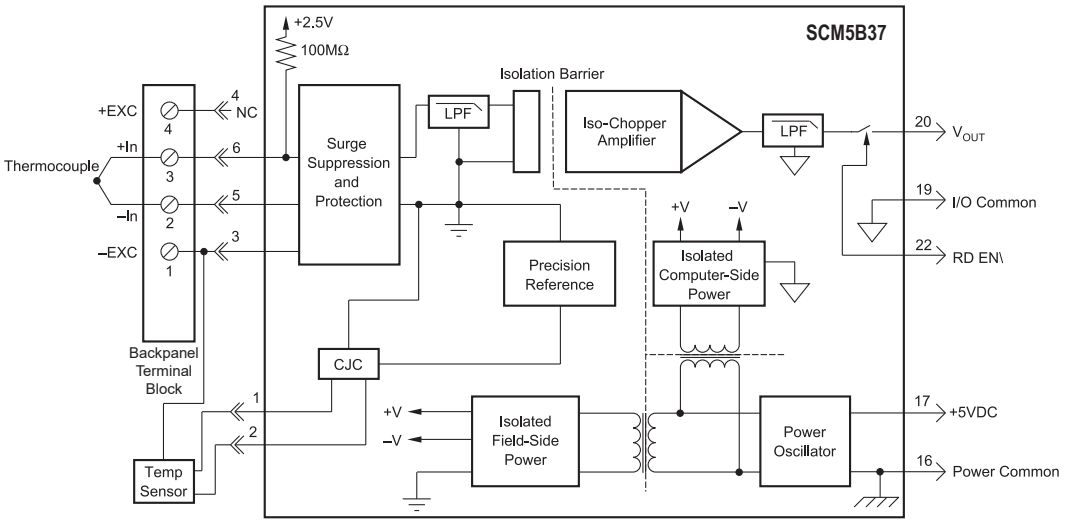
- Interfaces to Types J, K, T, E, R, S, C, N and B Thermocouples
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- ±0.03% Accuracy
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.005% Linearity
- ±1µV/°C Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



SCM5B37 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B37
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	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	6µs at C_{LOAD} = 0 to 2000pF
(to ±1mV of V_{OUT})	
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	2.28" x 2.26" x 0.60"
(h)x(w)x(d)	(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 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	Type‡ TC	Input Range	Output Range	Accuracy(1)	
SCM5B37J	J	–100°C to +760°C	0V to +5V	±0.03%	±0.26°C
SCM5B37JD		(–148°F to +1400°F)	0V to +10V		
SCM5B37K	K	–100°C to +1350°C	0V to +5V	±0.03%	±0.44°C
SCM5B37KD		(–148°F to +2462°F)	0V to +10V		
SCM5B37T	T	–100°C to +400°C	0V to +5V	±0.03%	±0.15°C
SCM5B37TD		(–148°F to +752°F)	0V to +10V		
SCM5B37E	E	0°C to +900°C	0V to +5V	±0.03%	±0.27°C
SCM5B37ED		(+32°F to +1652°F)	0V to +10V		
SCM5B37R	R	0°C to +1750°C	0V to +5V	±0.03%	±0.53°C
SCM5B37RD		(+32°F to +3182°F)	0V to +10V		
SCM5B37S	S	0°C to +1750°C	0V to +5V	±0.03%	±0.53°C
SCM5B37SD		(+32°F to +3182°F)	0V to +10V		
SCM5B37B	B	0°C to +1800°C	0V to +5V	±0.03%	±0.54°C
SCM5B37BD		(+32°F to +3272°F)	0V to +10V		
SCM5B37C	C	+350°C to +1300°C	0V to +5V	±0.03%	±0.29°C
SCM5B37CD		(+662°F to +2372°F)	0V to +10V		
SCM5B37N	N	–100°C to +1300°C	0V to +5V	±0.03%	±0.42°C
SCM5B37ND		(–148°F to +2372°F)	0V to +10V		

‡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

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SCM5B38

Strain Gauge Input Modules, Wide Bandwidth

DESCRIPTION

Each SCM5B38 strain gauge input module provides a single channel of strain gauge input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure below). 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 module family is designed with a completely isolated computer-side circuit which can be floated to ±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 10kΩ. A matched pair of bridge-completion resistors (to ±1mV at +10V excitation) allows use of low-cost half-bridge or quarter-bridge transducers (Figures 1, 2, 3). The 10kHz bandwidth allows measurement of high-speed processes such as vibration analysis.

Strain gauge 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 ±20mV, ±30mV or ±100mV full-scale input range producing ±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 using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

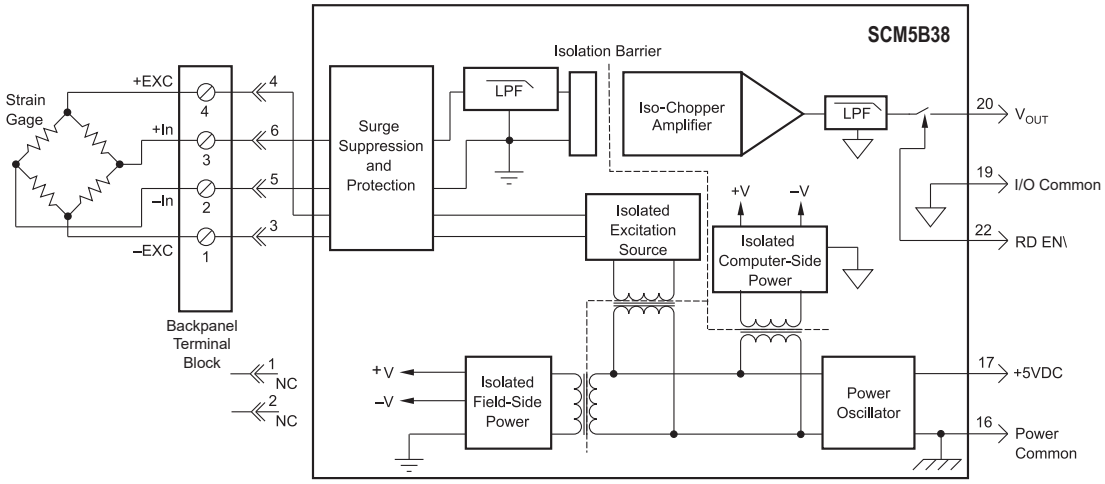
- Interfaces to 100Ω thru 10kΩ, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gauges
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- Fully Isolated Excitation Supply
- 100dB CMR
- 10kHz Signal Bandwidth
- ±0.03% Accuracy
- ±0.01% Linearity
- ±1µV/°C Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



SCM5B38 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	Full Bridge SCM5B38-01,-02,-05,-06,-07	Half Bridge SCM5B38-03,-04
Input Range	±10mV to ±100mV	±10mV to ±100mV
Input Bias Current	±0.3nA	±0.3nA
Input Resistance		
Normal	50MΩ	50MΩ
Power Off	40kΩ	40kΩ
Overload	40kΩ	40kΩ
Signal Input Protection		
Continuous	240Vrms (max)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Excitation Output (-02, -04, -05, -07)	+10V ±3mV	+10V ±3mV
Load Resistance	300Ω to 10kΩ	300Ω to 10kΩ
Excitation Output (-01, -03, -06)	+3.333V ±2mV	+3.333V ±2mV
Load Resistance	100Ω to 10kΩ	100Ω to 10kΩ
Excitation Load Regulation	±5ppm/mA	±5ppm/mA
Excitation Stability	±15ppm/°C	±15ppm/°C
Half-Bridge Voltage Level (-04)	NA	+5V ±1mV
Half-Bridge Voltage Level (-03)	NA	+1.667V ±1mV
Isolated Excitation Protection		
Continuous	240Vrms (max)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output		
Continuous	1500Vrms (max)	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	100dB	100dB
NMR (–3dB at 10kHz)	120dB per Decade Above 10kHz	120dB per Decade Above 10kHz
Accuracy[2]	±0.03% Span	±0.03% Span
Linearity	±0.01% Span	±0.01% Span
Stability		
Input Offset	±1µV/°C	±1µV/°C
Output Offset	±40µV/°C	±40µV/°C
Gain	±25ppm of Reading/°C	±25ppm of Reading/°C
Noise		
Input, 0.1 to 10Hz	0.4µVrms	2µVrms
Output, 100kHz	10mVp-p	10mVp-p
Bandwidth, –3dB	10kHz	10kHz
Rise Time, 10 to 90% Span	35µs	35µs
Settling Time, to 0.1%	250µs	250µs
Output Range	See Ordering Information	See Ordering Information
Output Resistance	50Ω	50Ω
Output Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Output Selection Time (to ±1mV of V_{OUT})	6µs at C_{LOAD} = 0 to 2000pF	6µs at C_{LOAD} = 0 to 2000pF
Output Current Limit	±8mA	±8mA
Output Enable Control		
Max Logic "0"	+0.8V	+0.8V
Min Logic "1"	+2.4V	+2.4V
Max Logic "1"	+36V	+36V
Input Current "0,1"	0.5µA	0.5µA
Power Supply Voltage	+5VDC ±5%	*+5VDC ±5%
Power Supply Current	170mA Full Exc. Load, 70mA No Exc. Load	170mA Full Exc. Load, 70mA No Exc. Load
Power Supply Sensitivity	±2µV/% RTI[3]	±2µV/% RTI[3]
Mechanical Dimensions (h)x(w)x(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
(1) Strain element. (2) Includes linearity, hysteresis and repeatability. (3) RTI = Referenced to input.
*Contact factory for maximum values.

Ordering Information

Model (10kHz)	Input Type Bridge	Input Range	Excitation	Sens.	Output Range
SCM5B38-01 SCM5B38-01D	Full	–10mV to +10mV	+3.333V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-02 SCM5B38-02D	Full	–30mV to +30mV	+10.0V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-03 SCM5B38-03D	Half	–10mV to +10mV	+3.333V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-04 SCM5B38-04D	Half	–30mV to +30mV	+10.0V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-05 SCM5B38-05D	Full	–20mV to +20mV	+10.0V	2mV/V	–5V to +5V –10V to +10V
SCM5B38-06 SCM5B38-06D	Full	– 33.3mV to +33.3mV	+3.333V	10mV/V	–5V to +5V –10V to +10V
SCM5B38-07 SCM5B38-07D	Full	–100mV to +100mV	+10.0V	10mV/V	–5V to +5V –10V to +10V

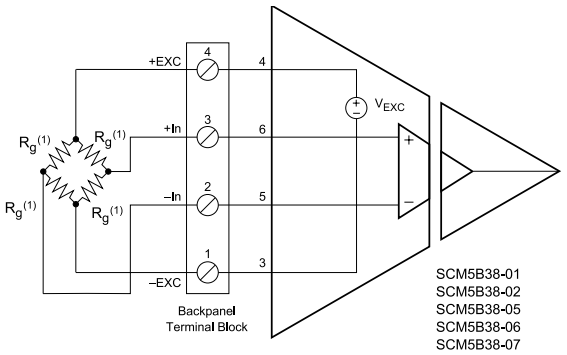


Figure 1: Full-Bridge Connection

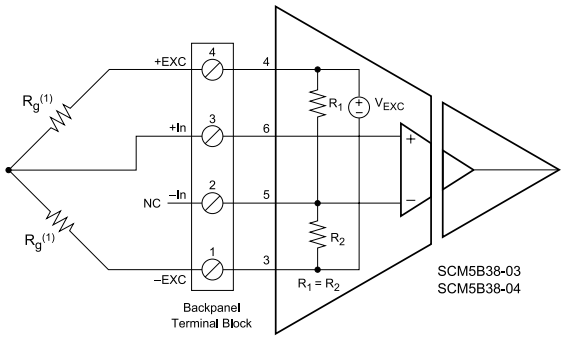


Figure 2: Half-Bridge Connection

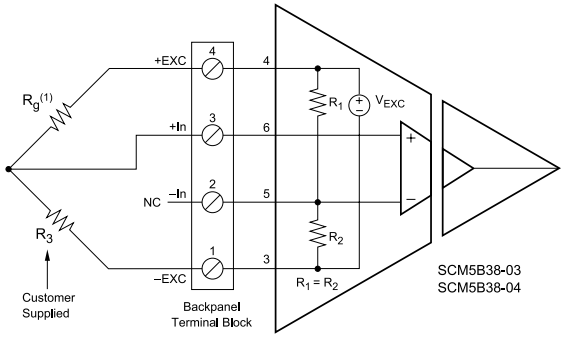


Figure 3: Quarter-Bridge Connection

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SCM5B38

Strain Gauge Input Modules, Narrow Bandwidth

DESCRIPTION

Each SCM5B38 strain gauge input module provides a single channel of strain gauge input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure below). 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 module family is designed with a completely isolated computer-side circuit which can be floated to ±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 10kΩ. A matched pair of bridge-completion resistors (to ±1mV at +10V excitation) allows use of low-cost half-bridge or quarter-bridge transducers (Figures 1, 2, 3).

Strain gauge 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 ±20mV, ±30mV or ±100mV full scale input range producing ±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, ±5%.

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

FEATURES

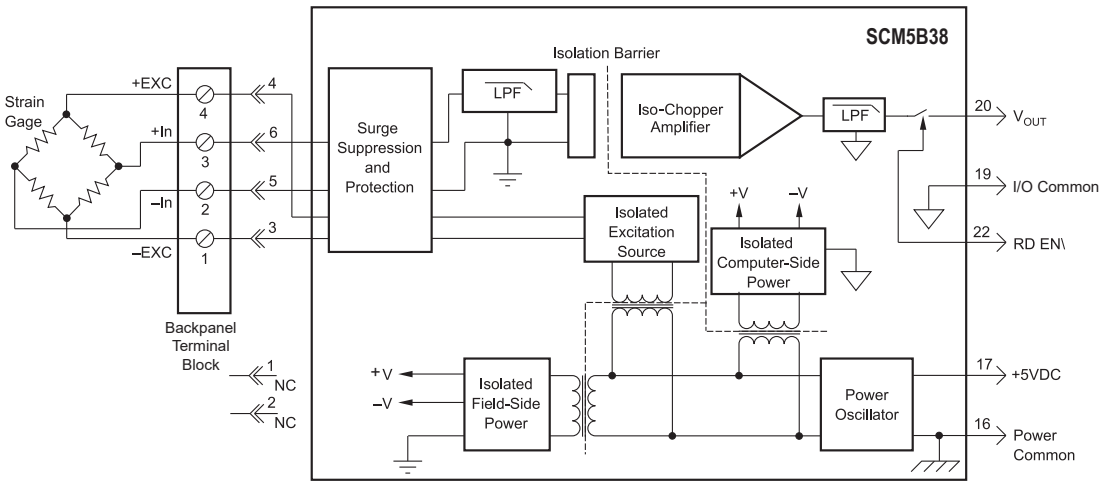
- Interfaces to 100Ω thru 10kΩ, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gauges
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- Fully Isolated Excitation Supply
- 160dB CMR
- 4Hz Signal Bandwidth
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- ±1µV/°C Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



SCM5B38 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

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

NOTES:
*Contact factory for maximum values.
(1) Strain element.
(2) Includes linearity, hysteresis and repeatability.
(3) RTI = Referenced to input.

Ordering Information

Model	Input Type Bridge	Input Range	Excitation	Sens.	Output Range
SCM5B38-31 SCM5B38-31D	Full	–10mV to +10mV	+3.333V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-32 SCM5B38-32D	Full	–30mV to +30mV	+10.0V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-33 SCM5B38-33D	Half	–10mV to +10mV	+3.333V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-34 SCM5B38-34D	Half	–30mV to +30mV	+10.0V	3mV/V	–5V to +5V –10V to +10V
SCM5B38-35 SCM5B38-35D	Full	–20mV to +20mV	+10.0V	2mV/V	–5V to +5V –10V to +10V
SCM5B38-36 SCM5B38-36D	Full	– 33.3mV to +33.3mV	+3.333V	10mV/V	–5V to +5V –10V to +10V
SCM5B38-37 SCM5B38-37D	Full	–100mV to +100mV	+10.0V	10mV/V	–5V to +5V –10V to +10V

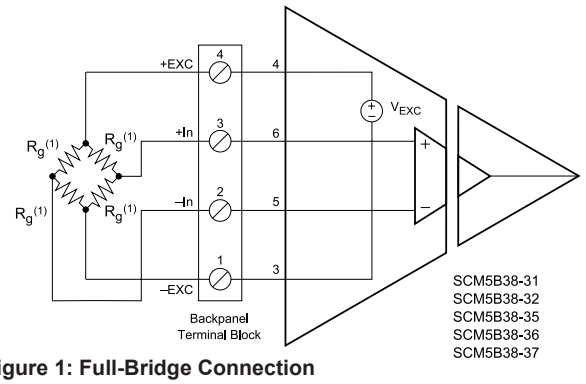


Figure 1: Full-Bridge Connection

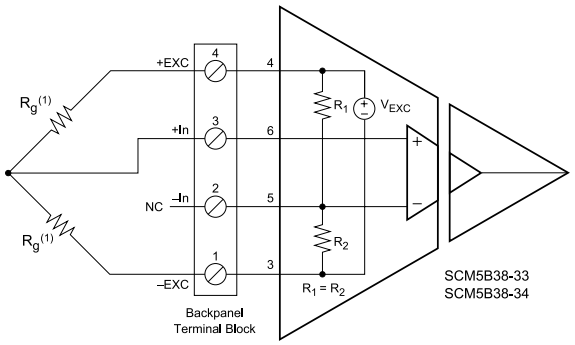


Figure 2: Half-Bridge Connection

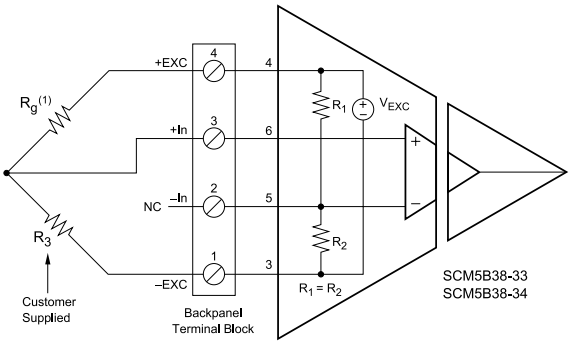


Figure 3: Quarter-Bridge Connection

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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 below).

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 ±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

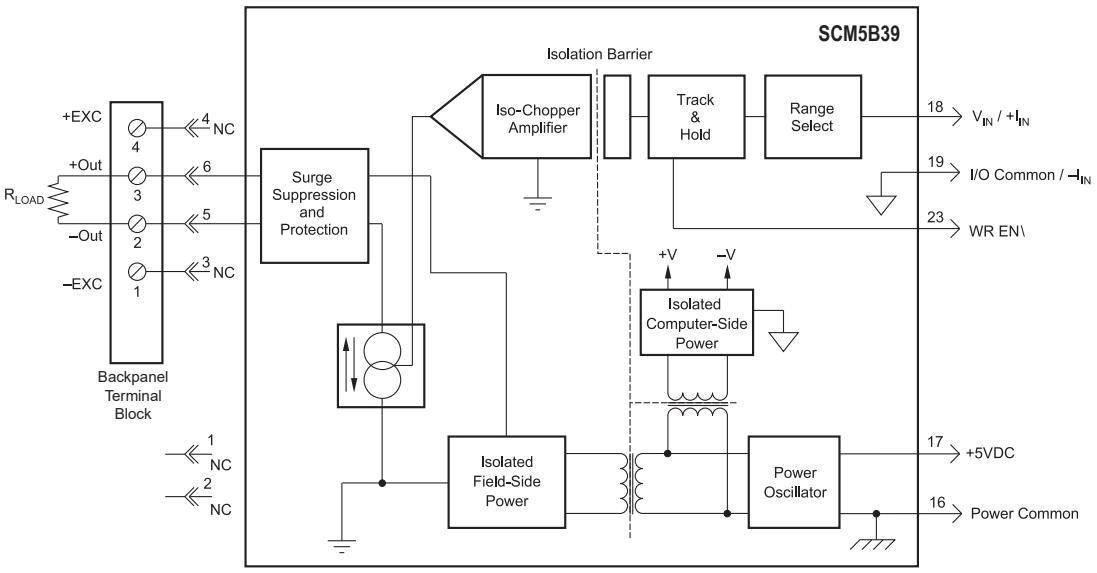
- Accepts High-level Voltage or Process Current Input
- Unipolar or Bipolar Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protected to 240VAC, Continuous
- 110dB CMR
- 400Hz Signal Bandwidth
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B39 Block Diagram For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

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

NOTES:
*Contact factory for maximum values.
(1) See Product Description for further details.

Ordering Information

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

Refer to SCM5B392 specifications for additional current-output models.

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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 below).

The voltage-input module connects to the servo- or motor-controller voltage output and provides an isolated 4-20mA 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 4-20mA 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

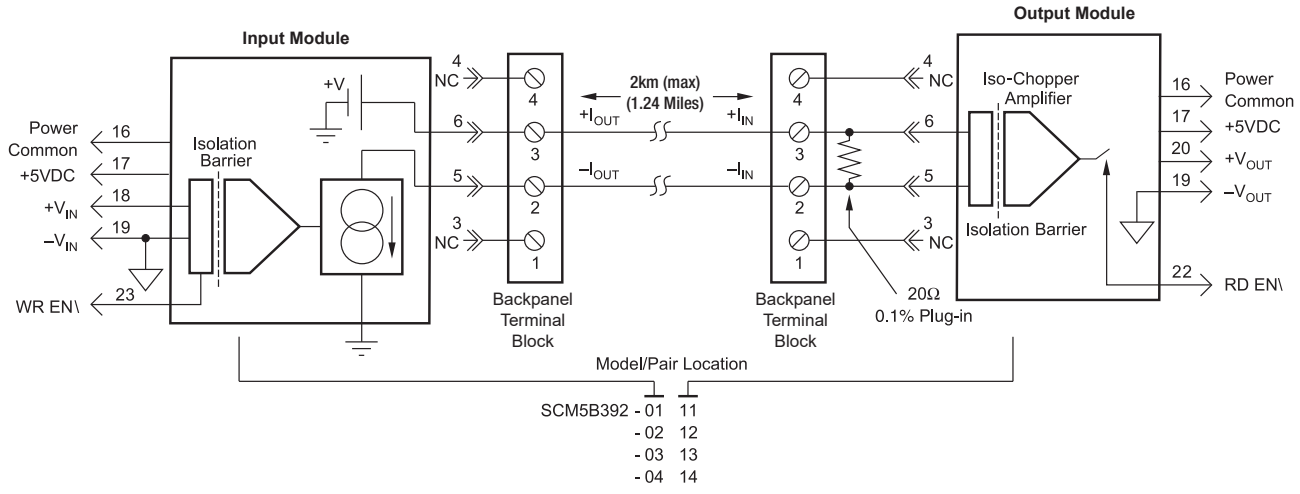
- Extends the Distance and Isolates Servo/Motor Controller Signals
- Provides Isolated Current Loop Interface Between Controller and Motor or Actuator
- Accepts High-level Voltage Inputs up to ±10V
- Provides High-level Voltage Outputs up to ±10V
- 1500Vrms Transformer Isolation (3000Vrms Total Loop)
- ANSI/IEEE C37.90.1 Transient Protection
- Current Loop is Protected to 240VAC Continuous
- 1kHz Signal Bandwidth
- 100dB CMR
- ±0.06% Total Loop Accuracy
- ±0.01% Total Loop Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B392 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B392-01,-02,-03,-04 (Input)	SCM5B392-11,-12,-13,-14 (Output)
Input Range	See Ordering Information	4-20mA
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	4-20mA	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_{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	1500Vrms (max), Output to Input
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	100dB	100dB
NMR (–3dB at 1KHz)	80dB per Decade Above 1kHz	120dB per Decade Above 1kHz
Accuracy	±0.03% Span	±0.03% Span
Linearity	±0.005% Span	±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	+0.8V
Min Logic "1"	+2.4V	+2.4V
Max Logic "1"	+36V	+36V
Input Current "0"	0.5µA	0.5µA
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	170mA	30mA
Power Supply Sensitivity	±0.5µA/% (typ)	±1µA/% RTI(1)
Mechanical Dimensions (h)x(w)x(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)
Environmental		
Operating Temp. Range	–40°C to +85°C	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory for maximum values.
(1) RTI = Referenced to input.

Ordering Information (for single modules)

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

Ordering Information (for module pairs)

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

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SCM5B40/41

Analog Voltage-input Modules, Wide Bandwidth

DESCRIPTION

Each SCM5B40 and SCM5B41 wide-bandwidth, voltage-input module provides a single channel of analog-input which is amplified, isolated, and converted to a high-level analog voltage output (Figure below). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±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, ±5%.

A special input circuit on the SCM5B40 and SCM5B41 modules provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

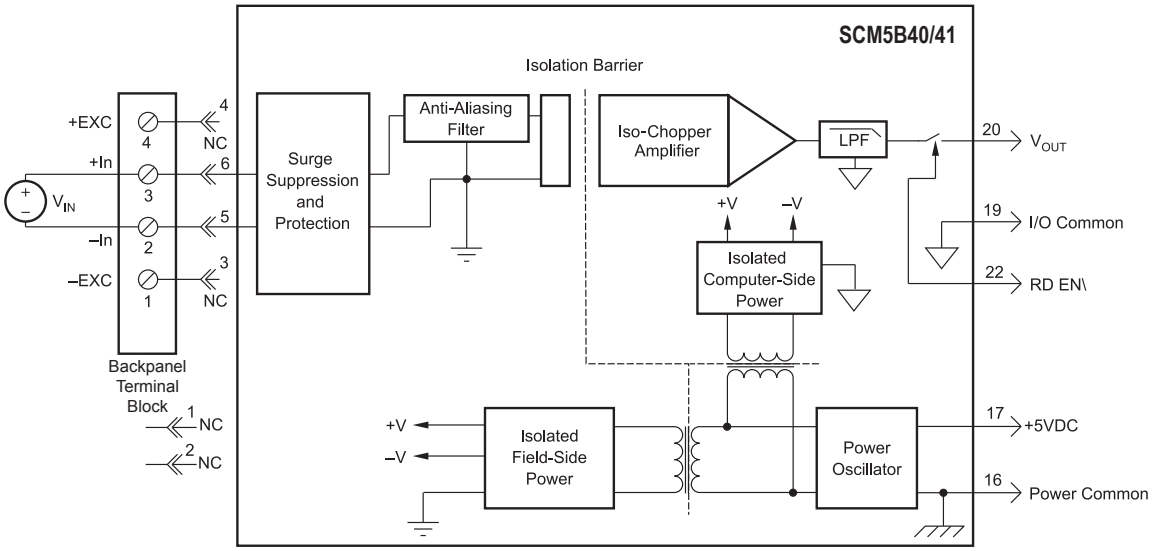
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 100dB CMR
- 10kHz Signal Bandwidth
- ±0.03% Accuracy
- ±0.01% Linearity
- ±1µV/°C Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B40/41 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B40	SCM5B41
Input Range	±10mV to ±1V	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	200MΩ	650kΩ (-01 thru -04) 2MΩ (-05 thru -10)
Power Off	40kΩ	650kΩ (-01 thru -04) 2MΩ (-05 thru -10)
Overload	40kΩ	650kΩ (-01 thru -04) 2MΩ (-05 thru -10)
Input Protection		
Continuous	240Vrms (max)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output		
Continuous	1500Vrms (max)	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	100dB	100dB
NMR (–3dB at 10kHz)	120dB per Decade Above 10kHz	120dB per Decade Above 10kHz
Accuracy(1)	±0.03% Span	±0.03% Span
Linearity	±0.01% Span	±0.01% Span
Stability		
Input Offset	±1µV/°C	±20µV/°C
Output Offset	±40µV/°C	±40µV/°C
Gain	±25ppm/°C	±50ppm/°C
Noise		
Input, 0.1 to 10Hz	0.4µVrms	2µVrms
Output, 100kHz	10mVp-p	10mVp-p
Bandwidth, –3dB	10kHz	10kHz
Rise Time, 10 to 90% Span	35µs	35µs
Settling Time, to 0.1%	250µs	250µs
Output Range	See Ordering Information	See Ordering Information
Output Resistance	50Ω	50Ω
Output Protection	Continuous Short-to Ground	Continuous Short-to-Ground
Output Selection Time	6µs at C_{LOAD} = 0 to -000pF	6µs at C_{LOAD} = 0 to 2000pF
(to ±1mV of V_{OUT})		
Output Current Limit	±8mA	±8mA
Output Enable Control		
Max Logic “0”	+0.8V	+0.8V
Min Logic “1”	+2.4V	+2.4V
Max Logic “1”	+36V	+36V
Input Current “0,1”	0.5µA	0.5µA
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	30mA	30mA
Power Supply Sensitivity	±2µV/% RTI(2)	±200µV/% RTI(2)
Mechanical Dimensions	2.28” x 2.26” x 0.60”	2.28” x 2.26” x 0.60”
(h)x(w)x(d)	(58mm x 57mm x 15mm)	(58mm x 57mm x 15mm)
Environmental		
Operating Temp. Range	–40°C to +85°C	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD,EFT	Performance B	Performance B

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.
(3) Same as SCM5B41-01 with 200MΩ input resistance.

Ordering Information

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

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SCM5B42

2-wire Transmitter Interface Modules

DESCRIPTION

Each SCM5B42 2-wire transmitter interface module provides a single channel which accepts a 4-20mA process current input and provides a standard +1 to +5V or +2 to +10V output signal (Figure below). 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 4-20mA.

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 module family is designed with a completely isolated computer-side circuit which can be floated to ±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

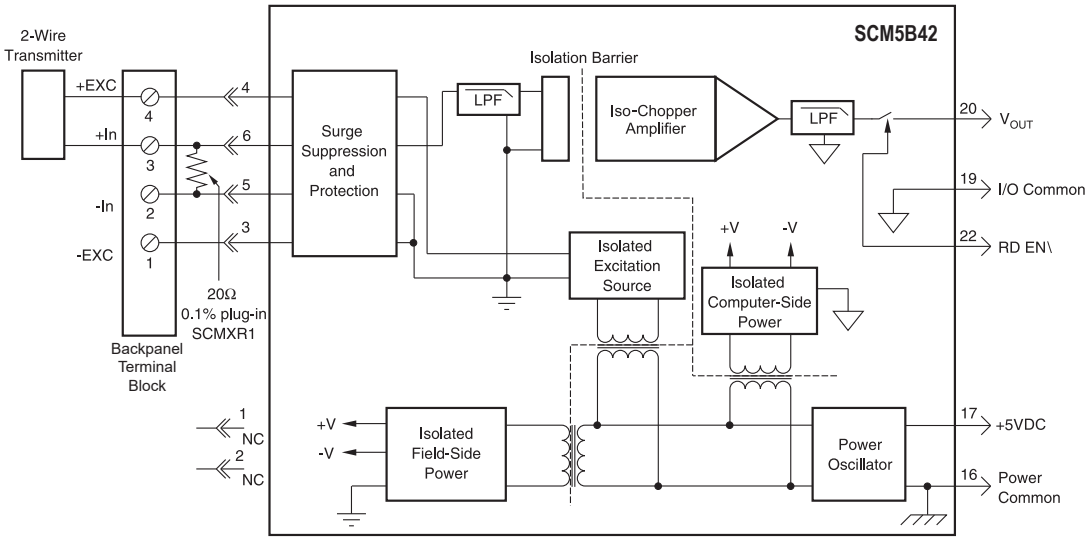
- Isolated +20VDC Current Loop Supply
- Provides Isolation for Non-isolated 2-wire Transmitters
- High-level Voltage Output +1V to +5V or +2V to +10V
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 100dB CMR
- 100Hz Signal Bandwidth
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B42 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B42
Input Range	4-20mA
Input Resistor	
Value	20.00Ω
Accuracy	±0.1%
Stability	±10ppm/°C
Loop Supply Voltage	Nominal 20V at 4-20mA
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_{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 100mA at Transmitter Load of 4mA
Power Supply Sensitivity	±10µV/% RTI(2)
Mechanical Dimensions (h)x(w)x(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 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	4-20mA	+1V to +5V
SCM5B42-02	4-20mA	+2V to +10V

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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 below). 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 module family is designed with a completely isolated computer-side circuit which can be floated to ±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 ±1V to ±10V, producing ±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, ±5%.

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

FEATURES

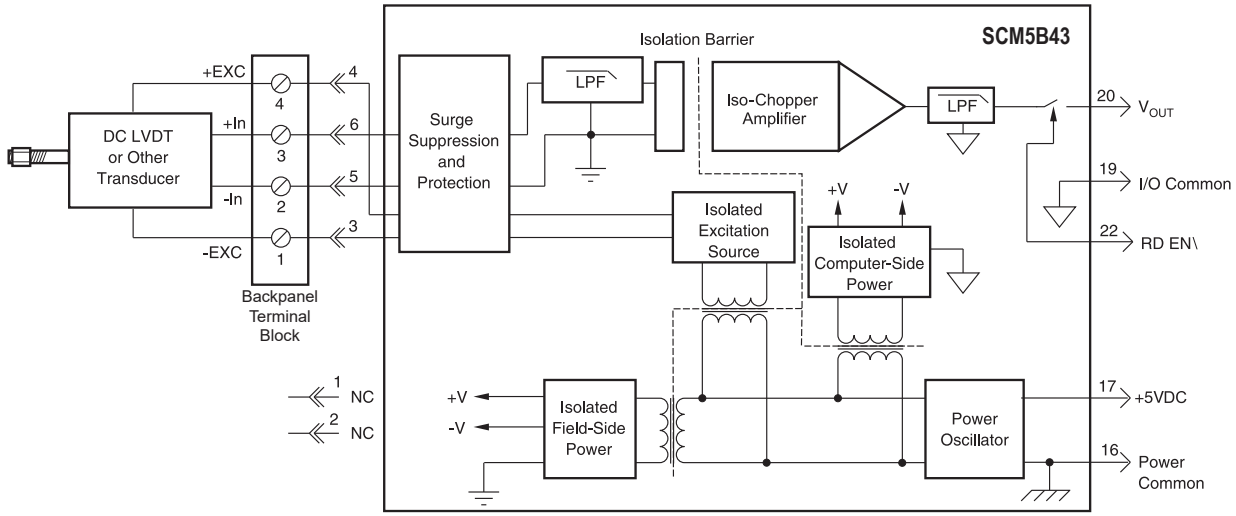
- Interfaces to DC Displacement Transducers and Other Devices Requiring a Stable DC Supply
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- Fully Isolated Excitation Supply
- 100dB CMR
- 1kHz Signal Bandwidth
- ±0.03% Accuracy
- ±0.005% Linearity
- ±20µV/°C Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B43 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B43
Input Range	±1V to ±10V
Input Bias Current	±0.05nA
Input Resistance	
Normal	2MΩ (min)
Power Off	2MΩ (min)
Overload	2MΩ (min)
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1 (formerly IEEE-472)
Excitation Voltage, V_{EXC}	+10.0VDC ±2mV
Excitation Current	40mA (max)
Excitation Load Regulation	±5ppm/mA
Excitation Stability	±15ppm/°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)	±0.03% Span
Linearity	±0.005% Span
Stability	
Input Offset	±20µV/°C
Output Offset	±40µV/°C
Gain	±50ppm/°C
Noise	
Input, 0.1 to 10Hz	0.4µVrms
Output, 100kHz	5mVp-p
Bandwidth, –3dB	1kHz
Response Time (to 90% final value)	750µs
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short-to-Ground
Output Selection Time (to ±1mV of V_{OUT})	6.0µs 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	200mA at Full Exc. Load, 100mA at No Exc. Load
Power Supply Sensitivity	±200µV/% RTI(2)
Mechanical Dimensions (h)x(w)x(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

Ordering Information

Model	Input Range	Output Range
SCM5B43-01	±1V	–5V to +5V
SCM5B43-01D		–10V to +10V
SCM5B43-02	±2V	–5V to +5V
SCM5B43-02D		–10V to +10V
SCM5B43-03	±3V	–5V to +5V
SCM5B43-03D		–10V to +10V
SCM5B43-04	±4V	–5V to +5V
SCM5B43-04D		–10V to +10V
SCM5B43-05	±5V	–5V to +5V
SCM5B43-05D		–10V to +10V
SCM5B43-06	±6V	–5V to +5V
SCM5B43-06D		–10V to +10V
SCM5B43-07	±7V	–5V to +5V
SCM5B43-07D		–10V to +10V
SCM5B43-08	±8V	–5V to +5V
SCM5B43-08D		–10V to +10V
SCM5B43-09	±9V	–5V to +5V
SCM5B43-09D		–10V to +10V
SCM5B43-10	±10V	–5V to +5V
SCM5B43-10D		–10V to +10V

NOTES:
*Contact factory for maximum values.
(1) Includes excitation error, linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

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

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 module family is designed with a completely isolated computer-side circuit which can be floated to ±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

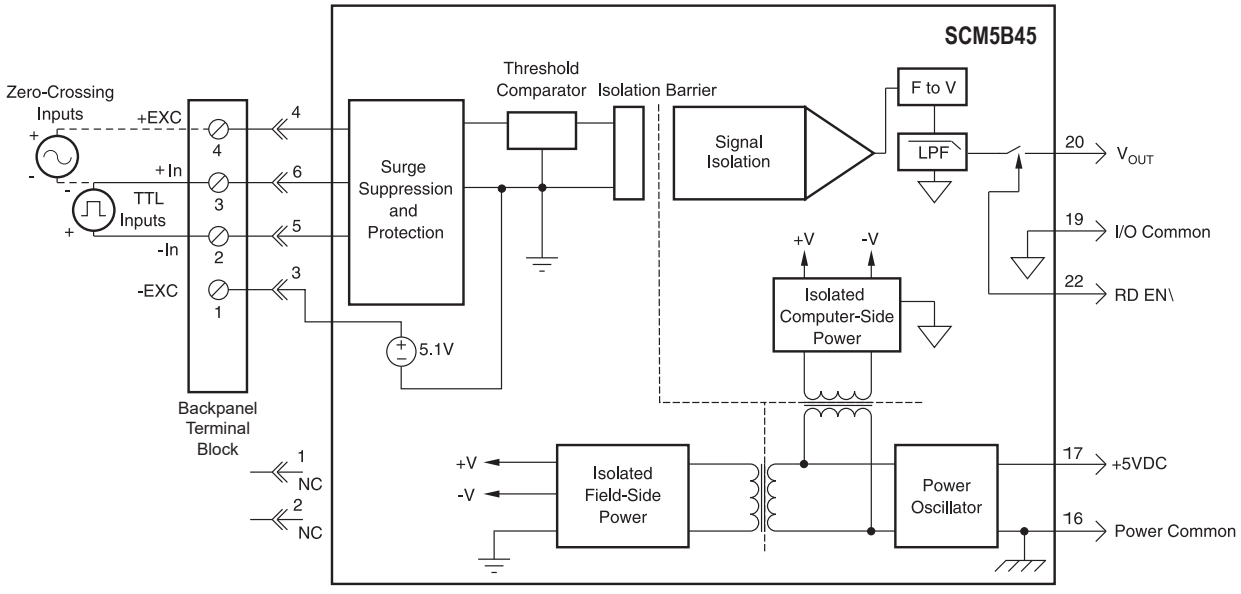
- Accepts Frequency Inputs of 0 to 100kHz
- Provides High-level Voltage Outputs
- TTL or Zero Crossing Signal Inputs
- 1500 Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 120dB CMR
- Input Protected to 240VAC, Continuous
- ±0.05% Accuracy
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B45 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

Typical* 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	
Zero Crossing	±20mV (±400mV on -2x models)
TTL	1.5V
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	6µs at C_{LOAD} = 0 to 2000pF
(to ±1mV of V_{OUT})	
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	2.28" x 2.26" x 0.60"
(h)x(w)x(d)	(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 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 SCM5B45-01D	0Hz to 500Hz	0V to +5V 0V to +10V	±20mV
SCM5B45-02 SCM5B45-02D	0Hz to 1kHz	0V to +5V 0V to +10V	±20mV
SCM5B45-03 SCM5B45-03D	0Hz to 3kHz	0V to +5V 0V to +10V	±20mV
SCM5B45-04 SCM5B45-04D	0Hz to 5kHz	0V to +5V 0V to +10V	±20mV
SCM5B45-05 SCM5B45-05D	0Hz to 10kHz	0V to +5V 0V to +10V	±20mV
SCM5B45-06 SCM5B45-06D	0Hz to 25kHz	0V to +5V 0V to +10V	±20mV
SCM5B45-07 SCM5B45-07D	0Hz to 50kHz	0V to +5V 0V to +10V	±20mV
SCM5B45-08 SCM5B45-08D	0Hz to 100kHz	0V to +5V 0V to +10V	±20mV
SCM5B45-21 SCM5B45-21D	0Hz to 500Hz	0V to +5V 0V to +10V	±400mV
SCM5B45-22 SCM5B45-22D	0Hz to 1kHz	0V to +5V 0V to +10V	±400mV
SCM5B45-23 SCM5B45-23D	0Hz to 3kHz	0V to +5V 0V to +10V	±400mV
SCM5B45-24 SCM5B45-24D	0Hz to 5kHz	0V to +5V 0V to +10V	±400mV
SCM5B45-25 SCM5B45-25D	0Hz to 10kHz	0V to +5V 0V to +10V	±400mV
SCM5B45-26 SCM5B45-26D	0Hz to 25kHz	0V to +5V 0V to +10V	±400mV
SCM5B45-27 SCM5B45-27D	0Hz to 50kHz	0V to +5V 0V to +10V	±400mV
SCM5B45-28 SCM5B45-28D	0Hz to 100kHz	0V to +5V 0V to +10V	±400mV

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

The SCM5B module family is designed with a completely isolated computer side circuit which can be floated to ±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 47MΩ resistor, ±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, ±5%.

A special input circuit on the SCM5B47 modules provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

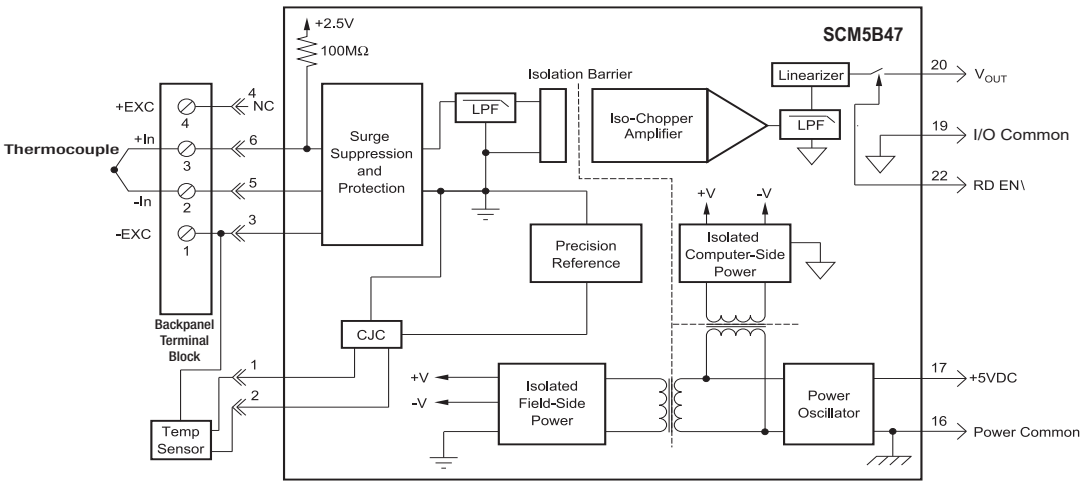
- Interfaces to Types J, K, T, E, R, S, N, and B Thermocouples
- Linearizes Thermocouple Signal
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±1µV/°C Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B47 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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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(1)	See Ordering Information
Stability	
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	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	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)x(w)x(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 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 SCM5B47J-01D	J	0°C to +760°C (+32°F to +1400°F)	0V to +5V 0V to +10V	±0.08%	±0.61°C
SCM5B47J-02 SCM5B47J-02D	J	–100°C to +300°C (–148°F to +572°F)	0V to +5V 0V to +10V	±0.08%	±0.32°C
SCM5B47J-03 SCM5B47J-03D	J	0°C to +500°C (+32°F to 932°F)	0V to +5V 0V to +10V	±0.07%	±0.36°C
SCM5B47K-04 SCM5B47K-04D	K	0°C to +1000°C (+32°F to +1832°F)	0V to +5V 0V to +10V	±0.08%	±0.80°C
SCM5B47K-05 SCM5B47K-05D	K	0°C to +500°C (+32°F to +932°F)	0V to +5V 0V to +10V	±0.08%	±0.38°C
SCM5B47T-06 SCM5B47T-06D	T	–100°C to +400°C (–148°F to +752°F)	0V to +5V 0V to +10V	±0.16%	±0.80°C
SCM5B47T-07 SCM5B47T-07D	T	0°C to +200°C (+32°F to +392°F)	0V to +5V 0V to +10V	±0.16%	±0.32°C
SCM5B47E-08 SCM5B47E-08D	E	0°C to +1000°C (+32°F to +1832°F)	0V to +5V 0V to +10V	±0.10%	±1.0°C
SCM5B47R-09 SCM5B47R-09D	R	+500°C to +1750°C (+932°F to +3182°F)	0V to +5V 0V to +10V	±0.10%	±1.3°C
SCM5B47S-10 SCM5B47S-10D	S	+500°C to +1750°C (+932°F to +3182°F)	0V to +5V 0V to +10V	±0.10%	±1.3°C
SCM5B47B-11 SCM5B47B-11D	B	+500°C to +1800°C (+932°F to +3272°F)	0V to +5V 0V to +10V	±0.15%	±2.0°C
SCM5B47J-12 SCM5B47J-12D	J	–100°C to +760°C (–148°F to +1400°F)	0V to +5V 0V to +10V	±0.08%	±0.70°C
SCM5B47K-13 SCM5B47K-13D	K	–100°C to +1350°C (–148°F to +2462°F)	0V to +5V 0V to +10V	±0.10%	±1.5°C
SCM5B47K-14 SCM5B47K-14D	K	0°C to +1200°C (+32°F to +2192°F)	0V to +5V 0V to +10V	±0.08%	±0.96°C
SCM5B47N-15 SCM5B47N-15D	N	–100°C to +1300°C (–148°F to +2372°F)	0V to +5V 0V to +10V	±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

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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 below). The excitation current, signal gain, and high-pass and low-pass filter cutoff frequencies are field-configurable through a set of slide switches.

Six-pole signal filtering in the SCM5B48 results 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 ±10V output. The required supply level is +5VDC, ±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.

FEATURES

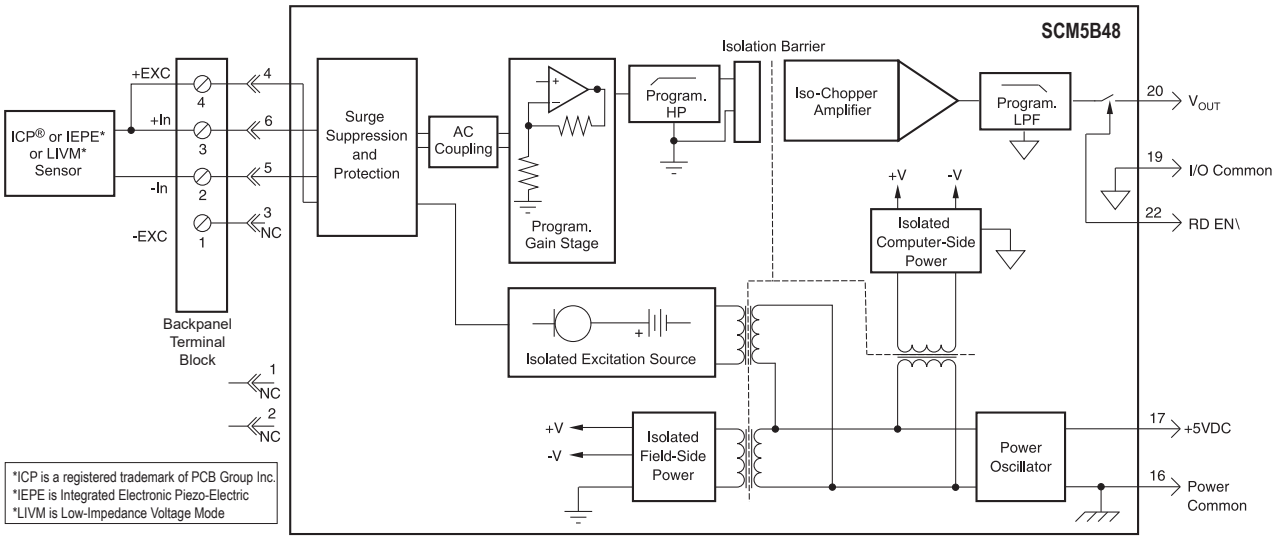
- Interfaces to ICP®*, or IEPE*, or LIVM* Sensors
- ±5V or ±10V Output Range
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 240Vrms, Continuous, Input Protection
- 1, 10, and 100 Programmable Gain
- 2.5, 5, 10, and 20kHz Programmable LP Filter
- 0.2 and 10Hz Programmable HP Filter
- 4mA or 9mA Programmable Current Excitation
- 100dB CMR
- ±0.2% Accuracy
- ±0.01% Linearity
- Low Drift with Ambient Temperature
- –40°C to +85°C Operating Temperature Range
- CSA C/US Certified; CE Compliant
- ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

- Automotive
- Vibration Measurement
- Machine Health
- Position Sensing
- Production/Process Equipment
- Industrial Sensing



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SCM5B48 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

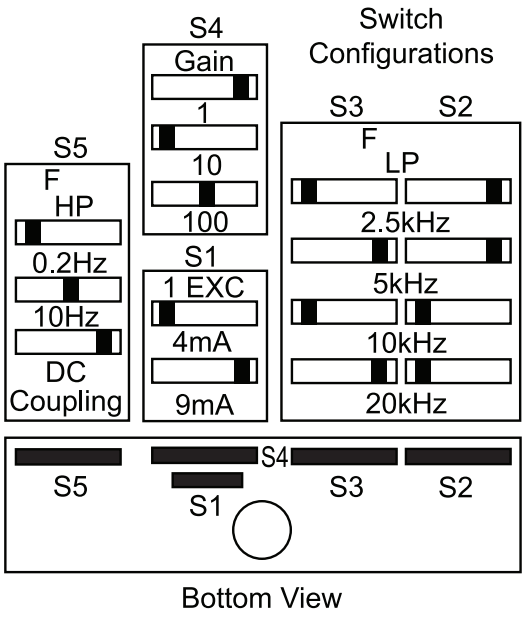
Typical* at T_A = +25°C and +5VDC Power

Module	SCM5B48
Input Type	Accelerometer
Range(1)	±10V
Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Excitation	
Constant Current(2)	4mA or 9mA, ±10%
Compliance Voltage	24V ±10%
Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output Range	See Ordering Information
Resistance	50Ω
Protection	Continuous Short-to-Ground
Gain	
Programmable(2)	1, 10, 100
CMR (50/60Hz)	100dB
Accuracy(3)	±0.2% Span
Linearity	±0.01% Span
Stability	
Offset	±25ppm/°C
Gain	±100ppm/°C
Output Noise, Gain=1, BW=20kHz	200µVrms
Low Pass Filter	
Type	Bessel
Programmable(2)	2.5kHz, 5kHz, 10kHz, 20kHz
High Pass Filter	
Programmable(2)	DC, 0.2Hz, 10Hz
CMV (Input to Output)	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
NMR	100db per Decade Above Cutoff Frequency
Power Supply Voltage	+5VDC ±5%
Power Supply Current	110mA (typ) (9mA Excitation) 70mA (typ) (4mA Excitation)
Power Supply Sensitivity	±600µV/% RTI (4)
Mechanical Dimensions (h)x(w)x(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

NOTES:
*Contact factory 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.
(4) RTI = Referenced to input.

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)



SCM5B48 Back Label

SECTION 1 - SCM5B

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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 below).

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 ±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

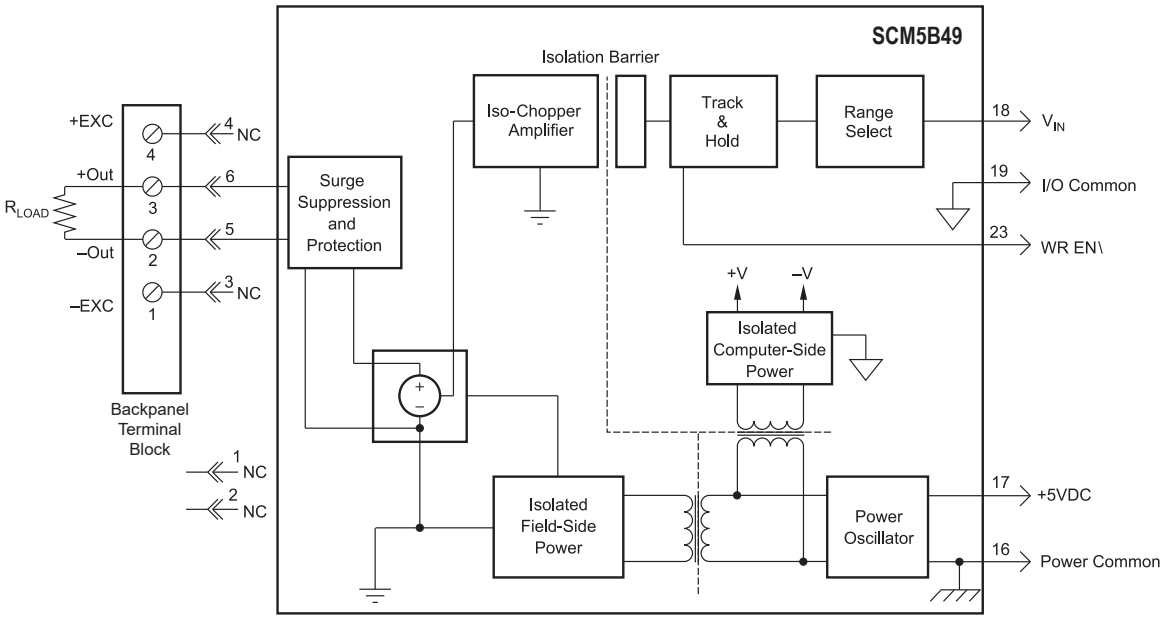
- Accepts High-level Voltage Inputs to ±10V
- Provides High-level Voltage Outputs to ±10V
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 5 Poles of Filtering
- 110dB CMR
- 400Hz Signal Bandwidth
- ±0.03% Accuracy
- ±0.015% Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

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

APPLICATIONS

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



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SCM5B49 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

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Specifications

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

Module	SCM5B49
Input Voltage Range	±5V, 0 to +5V, ±10V, 0 to +10V
Input Voltage (max)	±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, 100kHz bandwidth	2mVp-p
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	280mA Full Load, 135mA No Load
Power Supply Sensitivity	±12.5ppm/%
Mechanical Dimensions (h)x(w)x(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 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

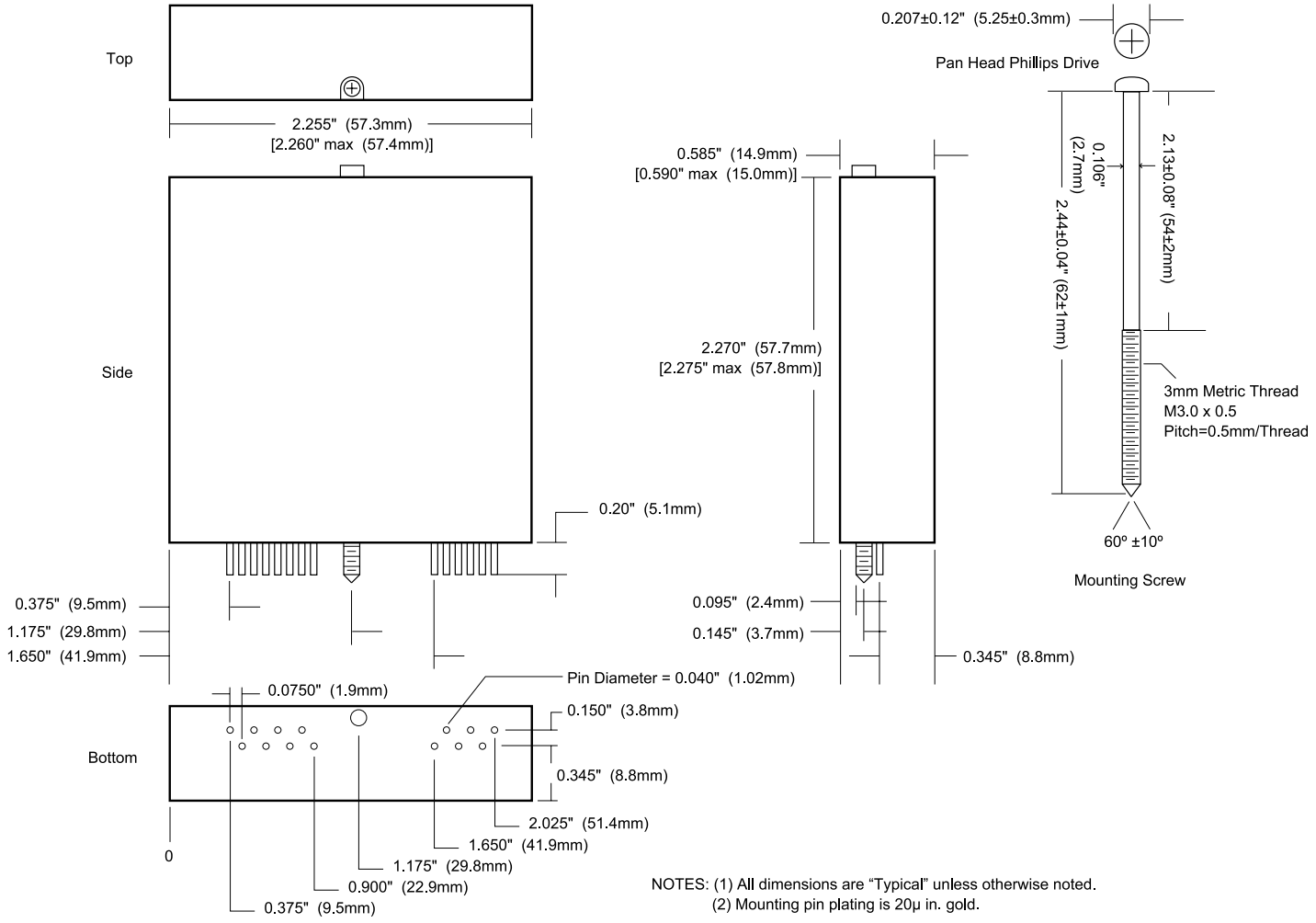
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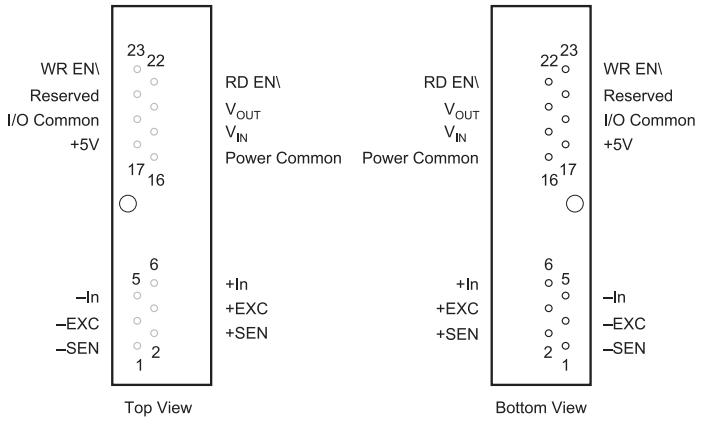
SCM5B

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.



NOTES: (1) All dimensions are "Typical" unless otherwise noted.
(2) Mounting pin plating is 20µ in. gold.



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Accessories for SCM5B Analog Modules

SCMPB01/SCMPB01-x

16-position Analog I/O Backpanel, Non-multiplexed

DESCRIPTION

The SCMPB01 16-channel backpanel (Figure 1, below) 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, below, 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)

FEATURES

- 16-position Backpanels (1-(SCMPB03), 2-(SCMPB04), and 8-(SCMPB05)-position Also Available)
- 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
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Easy Installation
- 16 Non-addressable Channels
- Continuous "ON" for High-speed (ADC) Simultaneous Data Acquisition
- Two-level Isolation Available

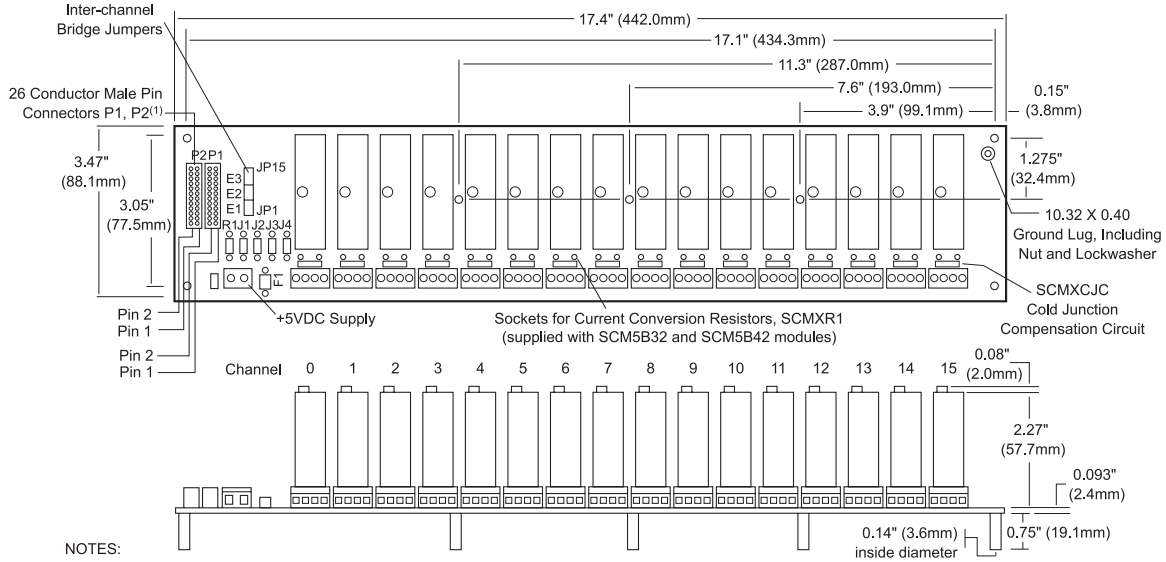
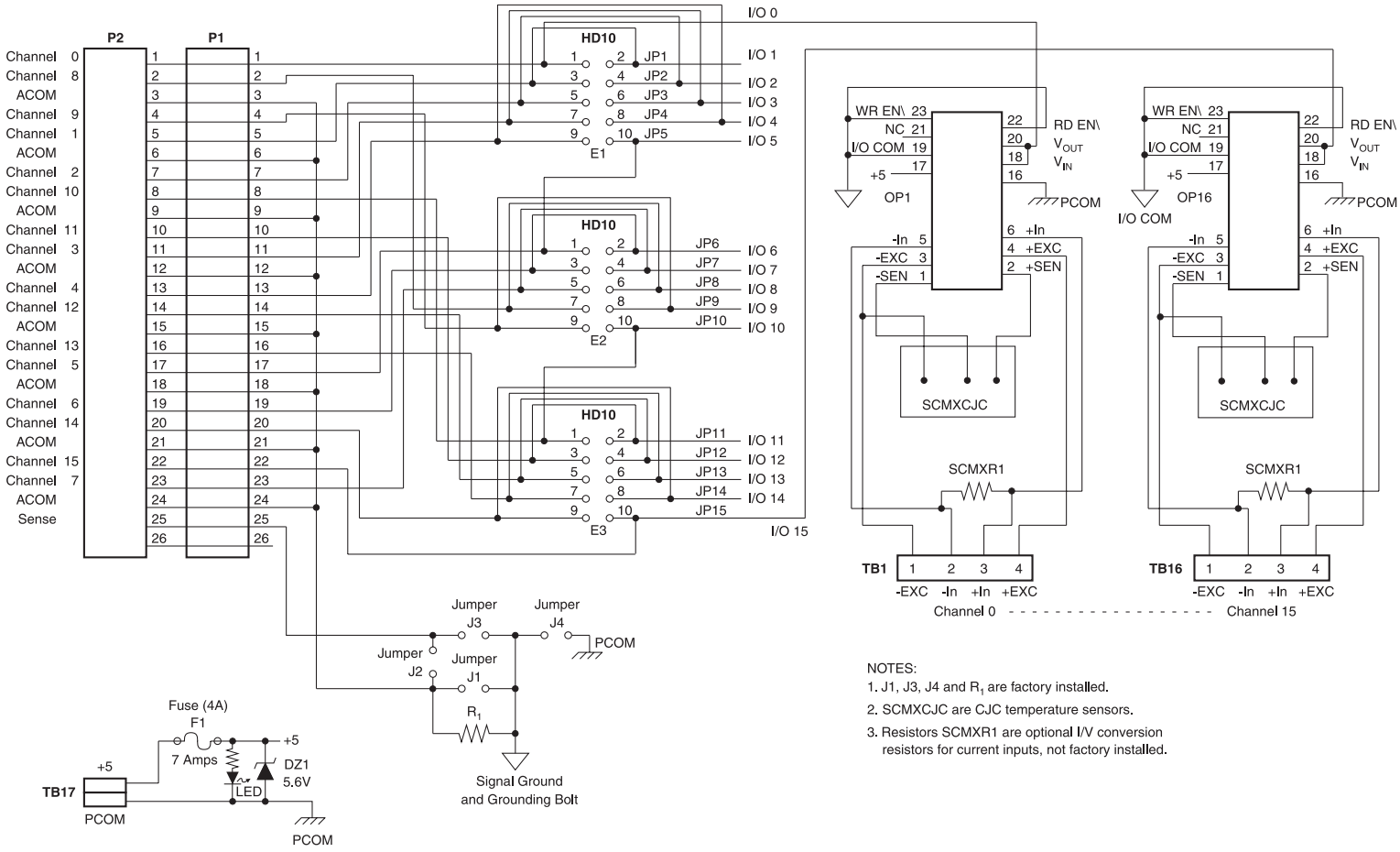


Figure 1: SCMPB01 Analog I/O Backpanel

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NOTES:
1. J1, J3, J4 and R_1 are factory installed.
2. SCMXCJC are CJC temperature sensors.
3. Resistors SCMXR1 are optional I/V conversion resistors for current inputs, not factory installed.

Figure 2: SCMPB01 Schematic

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Electrical

P1 and P2 Connectors

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 Channels 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.

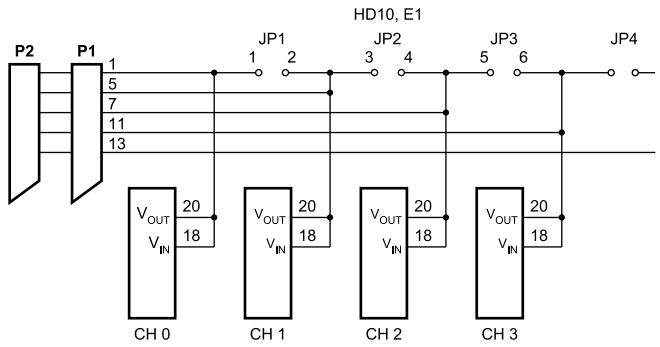


Figure 3: SCMPB01 Adjacent Channel Jumpers

Power

The SCMPB01/SCMPB01-x backpanel requires external +5VDC ±5% power. The chassis-mounted SCMXPRE-003 or SCMXPRT-003 power supplies have adequate capacity to power any combination of modules.

Fusing

The SCMPB01/SCMPB01-x backpanel power is fuse protected through F1. This is a Littelfuse type 252007, 7A 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/SCMPB01-x 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/SCMPB01-x ground potential.

Ordering Information

Part Number	Description
SCMPB01	16-channel backpanel with standoffs for mounting.
SCMPB01-1	16-channel backpanel with standoffs for mounting but without cold junction compensation circuits. 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 SCMXBExx 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 CMPB01/SCMPB01-x or SCMPB05/SCMPB05-x 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/SCMPB01-x 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.

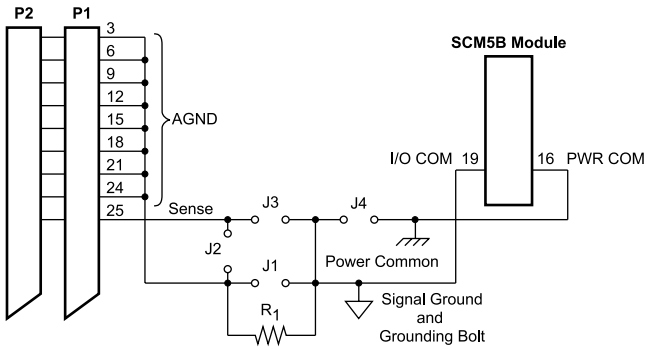


Figure 4: SCMPB01/SCMPB01-x Grounding Diagram

If the connection of power common and AGND shield wires exists 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 10kΩ; 100Ω 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.

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SCMPB02/SCMPB02-x

16-position Analog I/O Backpanel, Multiplexed

DESCRIPTION

The SCMPB02/SCMPB02-x 16-channel backpanel (Figure 1, below 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/SCMPB02-x 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 2, for schematic). Field connections are terminated with four screw terminals at each module site. Up to four SCMPB02/SCMPB02-x backpanels may be daisy-chained. Use SCMXCA004-XX cable for daisy-chaining and connecting to host computer.

FEATURES

- 16-position Backpanels (1-(SCMPB03), 2-(SCMPB04), and 8-(SCMPB05) Position also Available)
- Panel or DIN-rail Mounting Options
- 19-inch Mounting Rack For Backpanels
- Multiplexed and Non-multiplexed Backpanels
- With/without Cold Junction Compensation
- Interface Cables
- Module Evaluation Board
- Cable-to-Screw-Terminal Interface Board
- Power Supplies
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Easy Installation
- Accepts any Combination of SCM5B Modules
- 2 Analog Busses: Analog Input and Analog Output
  - Switch-controlled Outputs on the Input Modules;
    Track-and-Hold Inputs on the Output Modules.

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
Input Current I_I - “0” I_I - “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

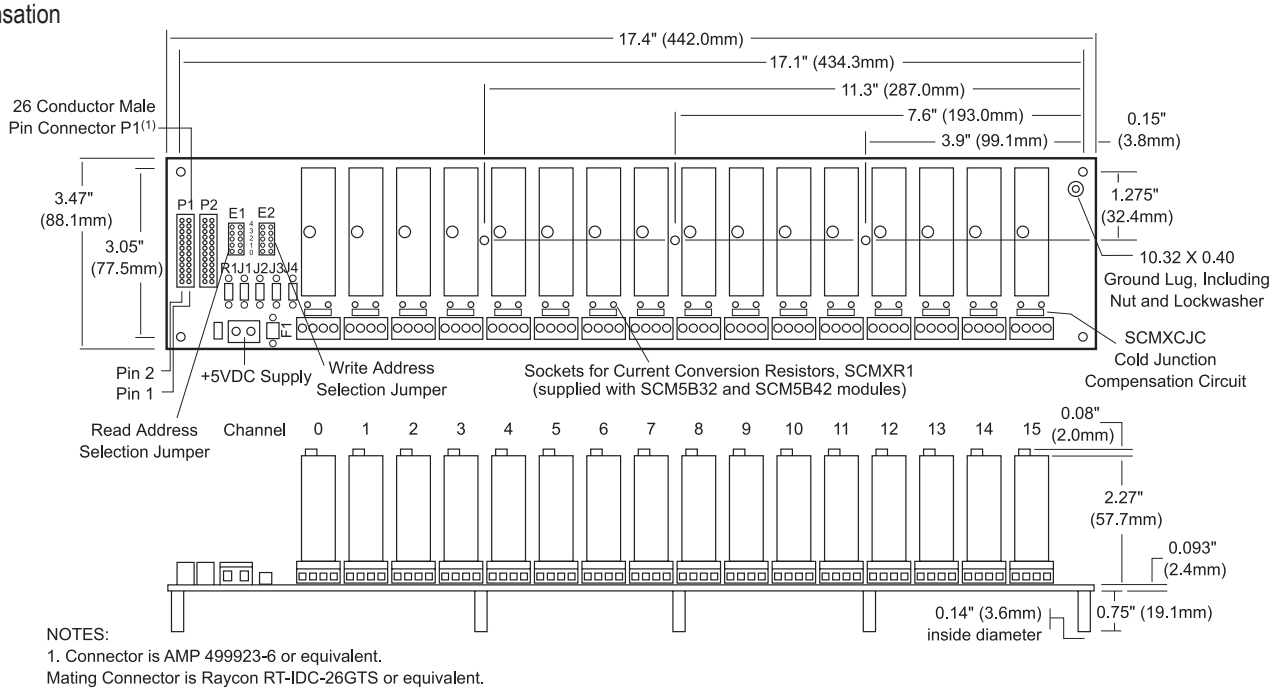
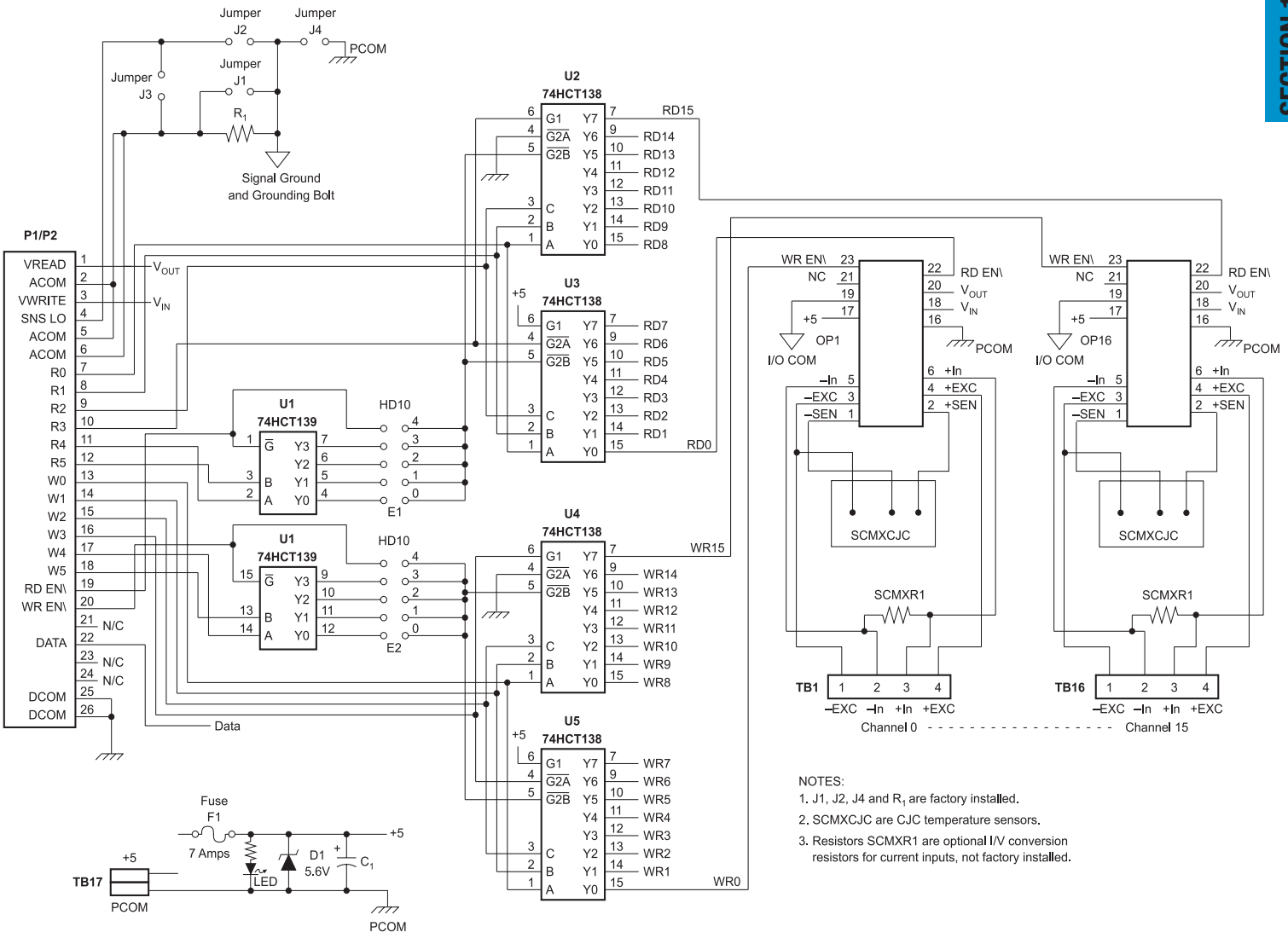


Figure 1: SCMPB02 Analog I/O Backpanel

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NOTES:
1. J1, J2, J4 and R_1 are factory installed.
2. SCMXCJC are CJC temperature sensors.
3. Resistors SCMXR1 are optional I/V conversion resistors for current inputs, not factory installed.

Figure 2: SCMPB02/SCMPB02-x Schematic

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Electrical

P1 and P2 Connectors

The 26-pin P1 and P2 connectors provide the signal interface between the SCMPB02/SCMPB02-x 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\ are used for input modules, and W0 thru W5 and WR EN\ are used for output modules.

Address Selection

The SCMPB02/SCMPB02-x 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/SCMPB02-x 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/SCMPB02-x backpanels in this expanded configuration, use interconnect cable SCMXCA004-XX.

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

Power

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

Fusing

The SCMPB02/SCMPB02-x backpanel power is fuse protected through F1. This is a Littelfuse type 252007, 7A 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 3 details the optional ground jumper configuration available on the SCMPB02/SCMPB02-x 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/SCMPB02-x 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 SCMBExx 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/SCMPB02-x 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 exists in the host measurement system, a resistive connection between SIG COM and the backpanel signal ground can be made via R_1. R_1 can be as large as 10kΩ, 100Ω is a recommended value. Jumper J3 can be used to connect the SNS LO 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 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.

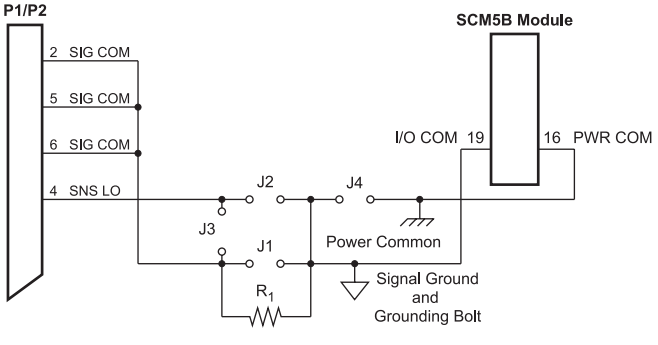


Figure 3: SCMPB02/SCMPB02-x Grounding Diagram

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SCMPB03/SCMPB03-x and SCMPB04/SCMPB04-x

DESCRIPTION

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

See Figures 1 and 2 for wiring diagrams, Figure 4 for schematic.

The following accessories are required for mounting one SCMPB03/04 panel (Figure 3):

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 with 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 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)

FEATURES

- Single-channel–SCMPB03, Dual-channel–SCMPB04 Backpanels
- Panel or DIN-rail Mounting Options
- With/without Cold Junction Compensation–SCMPB04
- Interface Cables
- Module Evaluation Board
- Cable-to-Screw-Terminal Interface Board
- Power Supplies
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Easy Installation
- Optimized for DIN-rail Use

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.)***

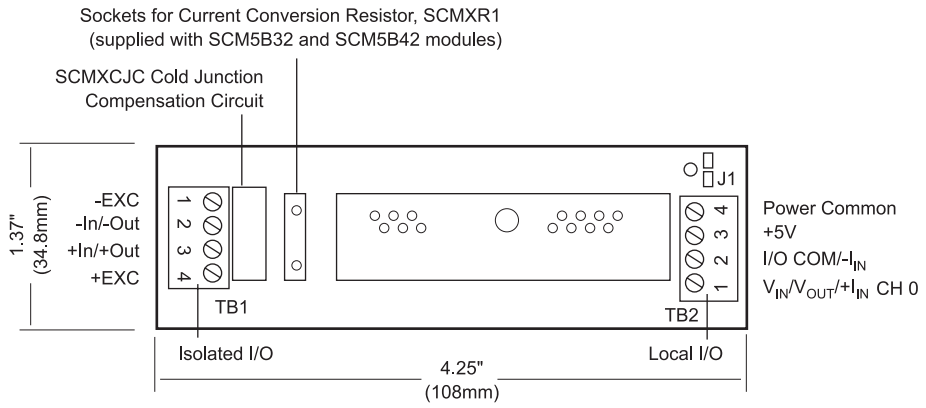


Figure 1: SCMPB03/SCMPB03-x Analog I/O Backpanel

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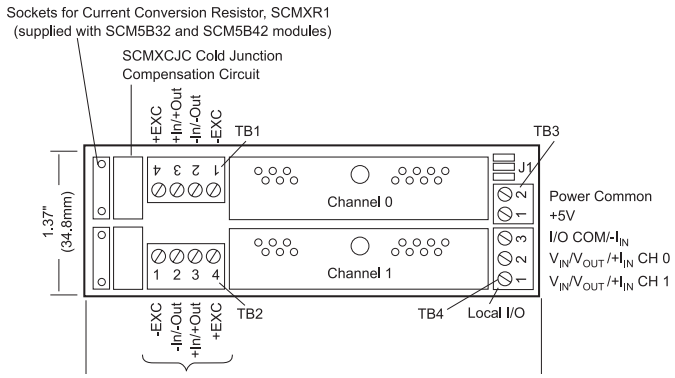


Figure 2: SCMPB04/SCMPB04-x Analog I/O Backpanel

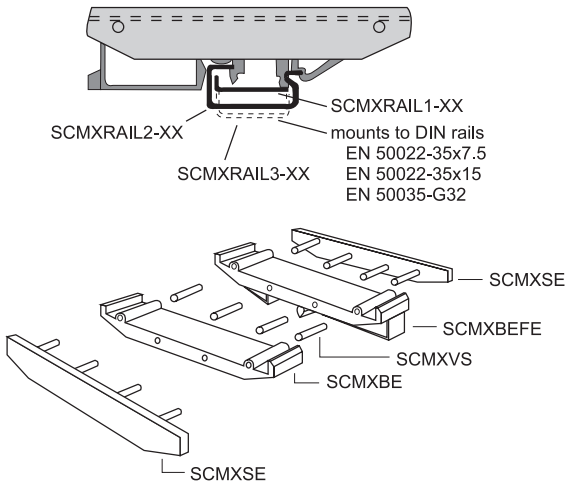
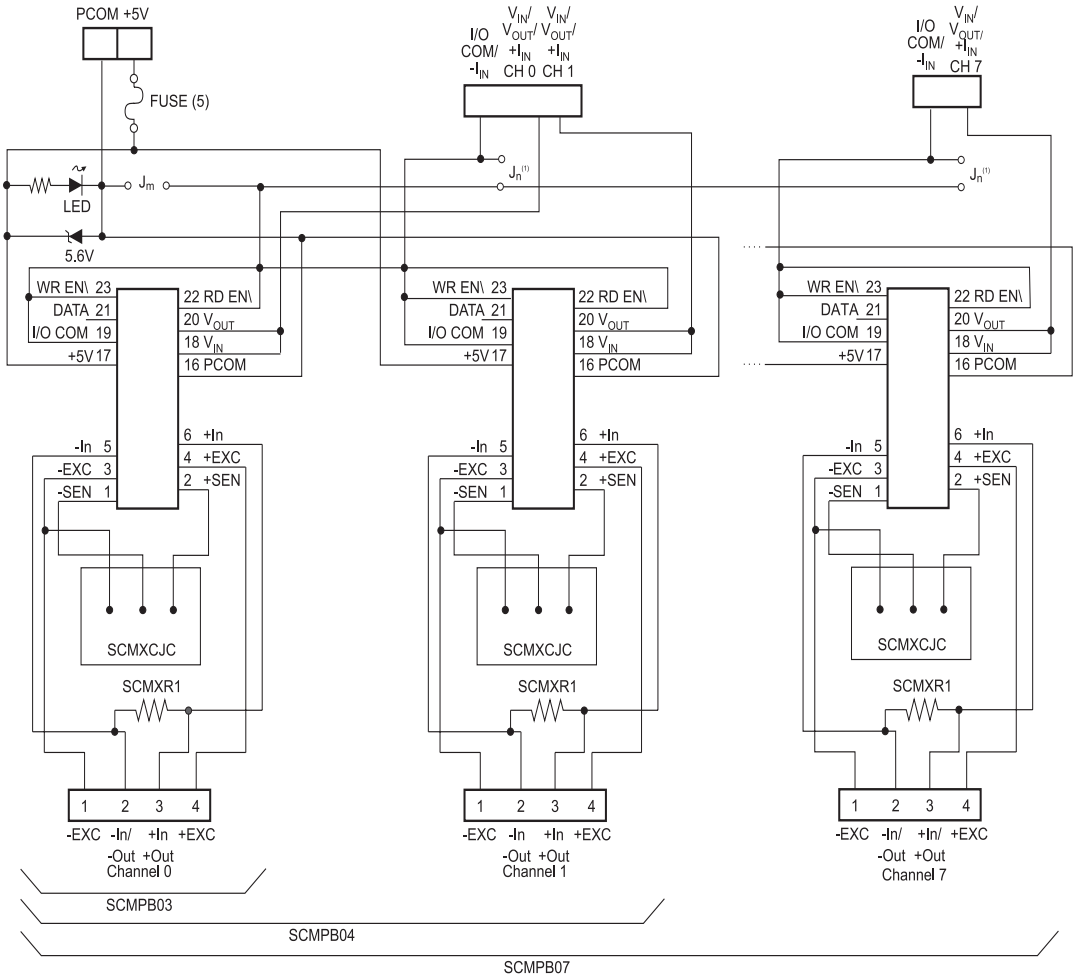


Figure 3: DIN-rail Mounting Elements



NOTES:
1. Jumpers Jn are on SCMPB07 only. Factory installed.
2. Jumper Jm 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.

Figure 4: SCMPB03/SCMPB03-x/SCMPB04/SCMPB04-x/SCMPB07/SCMPB07-x Schematic

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SCMPB05/SCMPB05-x

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

DESCRIPTION

The SCMPB05/SCMPB05-x backpanel (Figure 1, below) 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/SCMPB05-x 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 1 and 2).

Jumpers on the SCMPB05/SCMPB05-x 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 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.

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 1-54 for an example.

Refer to page 1-47 for additional notes on the P1 and P2 connectors, power requirements, fusing and grounding issues.

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)

FEATURES

- 8-channel Backpanels
- Panel or DIN-rail Mounting Options
- 19-inch Mounting Rack for Backpanels
- With/without Cold Junction Compensation
- Non-Multiplexed
- Interface Cables
- Module Evaluation Board
- Cable-to-Screw-Terminal Interface Board
- Power Supplies
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Easy Installation
- Optimized for DIN-rail Use
- Accepts Any Combination of SCM5B Modules
- Continuous "ON" for High-speed (ADC) Simultaneous Data Acquisition
- Inter-channel Bridge Jumpers Permit Two-level Isolation

Ordering Information

Part Number	Description
SCMPB05	8-channel backpanel with standoffs for mounting. **No mounting hardware included.**
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. **No mounting hardware included.**
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.)***

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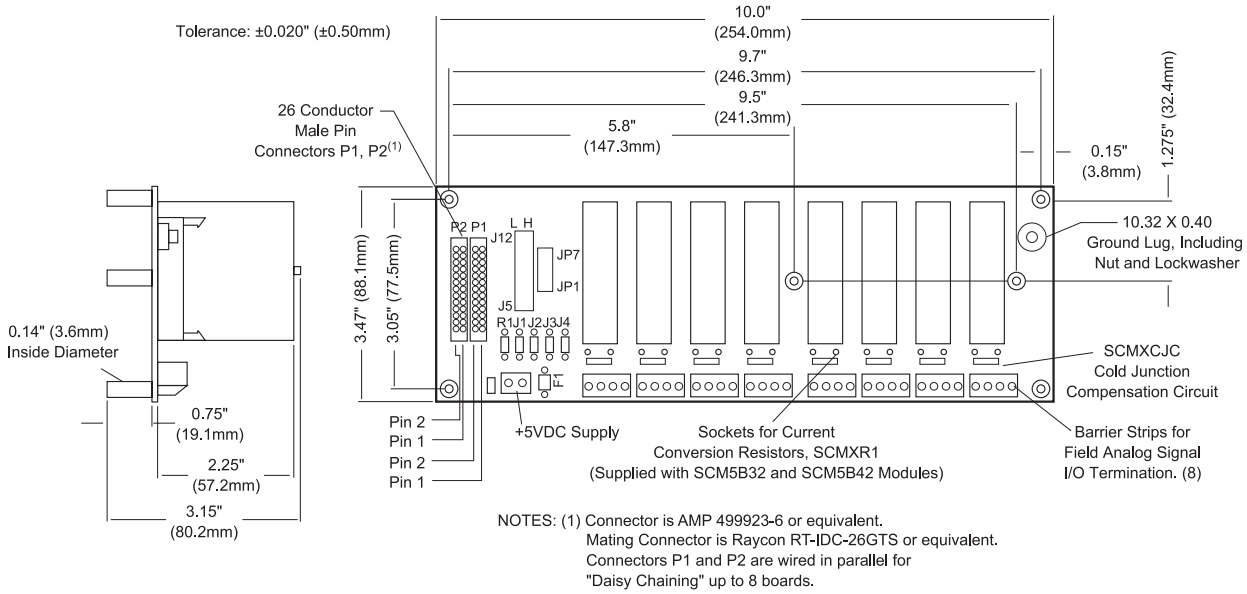
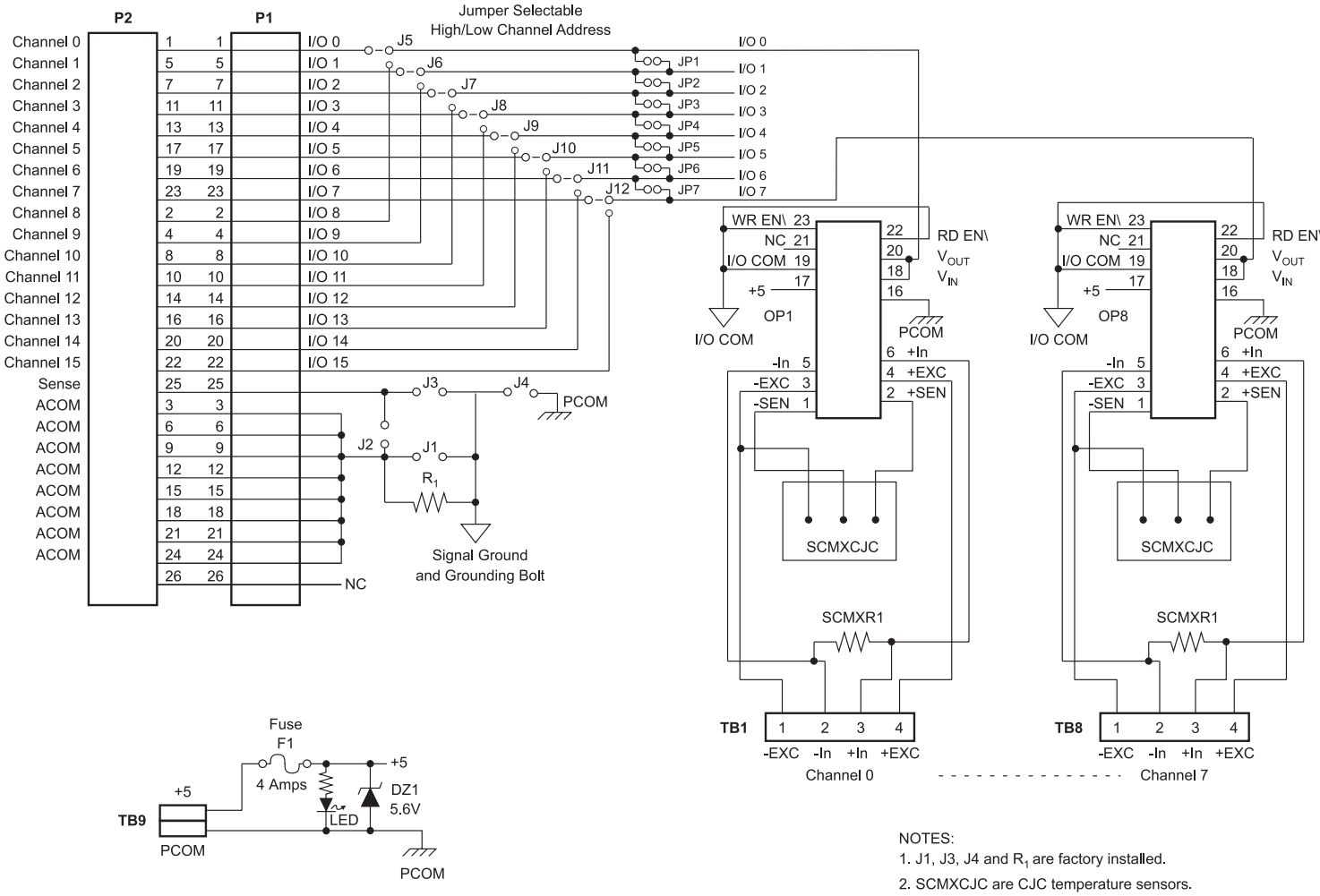


Figure 1: SCMPB05/SCMPB05-x Analog I/O Backpanel



NOTES:
1. J1, J3, J4 and R_1 are factory installed.
2. SCMXCJC are CJC temperature sensors.
3. Resistors SCMXR1 are optional I/V conversion resistors for current inputs, not factory installed.

Figure 2: SCMPB05/SCMPB05-x Schematic

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SCMPB06/SCMPB06-x

8-position Analog I/O Backpanel, Multiplexed

DESCRIPTION

The SCMPB06/SCMPB06-x backpanel (Figure 1) can accept up to eight SCM5B modules in any combination. It can be mounted on the SCMXRK-002 19-inch metal rack The SCMPB06/SCMPB06-x 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 2 for schematic). Field connections are terminated with four screw terminals at each module site Up to eight SCMPB06/SCMPB06-x backpanels may be daisy-chained. Use SCMXCA004-XX cable for daisy-chaining and connecting to host computer.

Jumpers on the SCMPB06/SCMPB06-x 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/SCMPB06-x 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/SCMPB06-x 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, *Analog Selection Jumpers*, page 1-57, shows the correlation of jumper position to address range. Refer to page 1-50 for additional notes on the P1 and P4 connectors, power requirements, fusing, and grounding issues.

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

FEATURES

- 8-channel Backpanels
- Panel or DIN-rail Mounting Options
- 19-inch Mounting Rack for Backpanels
- With/without Cold Junction Compensation
- Multiplexed
- Interface Cables
- Module Evaluation Board
- Cable-to-Screw-Terminal Interface Board
- Power Supplies
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Easy Installation
- 2 Analog Busses: Analog Input and Analog Output
  - Switch-controlled Outputs on the Input Modules;
    Track-and-Hold Inputs on the Output Modules.
- Jumpers Permit User-selection of Low (i.e. channels 0-7) or High (i.e. channels 8-15) Addresses

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
Input Current I_I - “0” I_I - “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

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Ordering Information

Part Number	Description
SCMPB06	8-channel backpanel with standoffs for mounting. **No mounting hardware included.**
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. **No mounting hardware included.**
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.)***

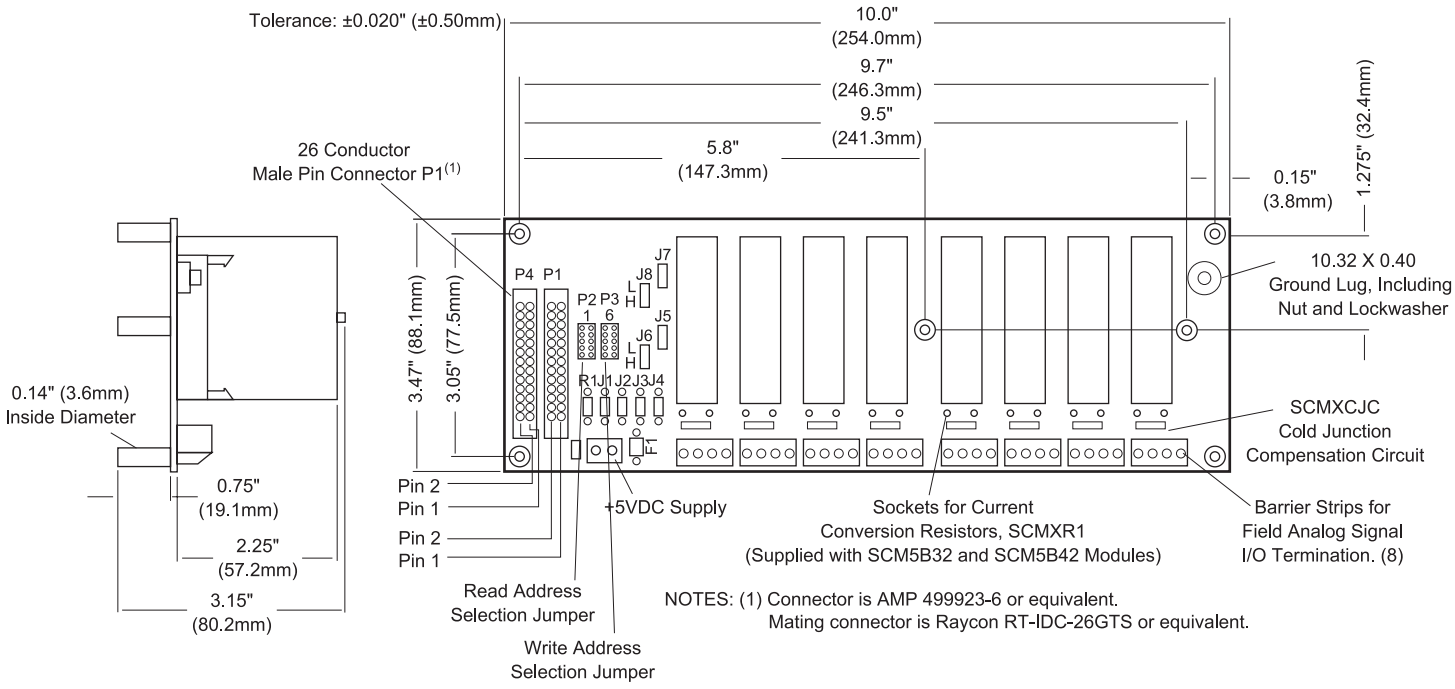


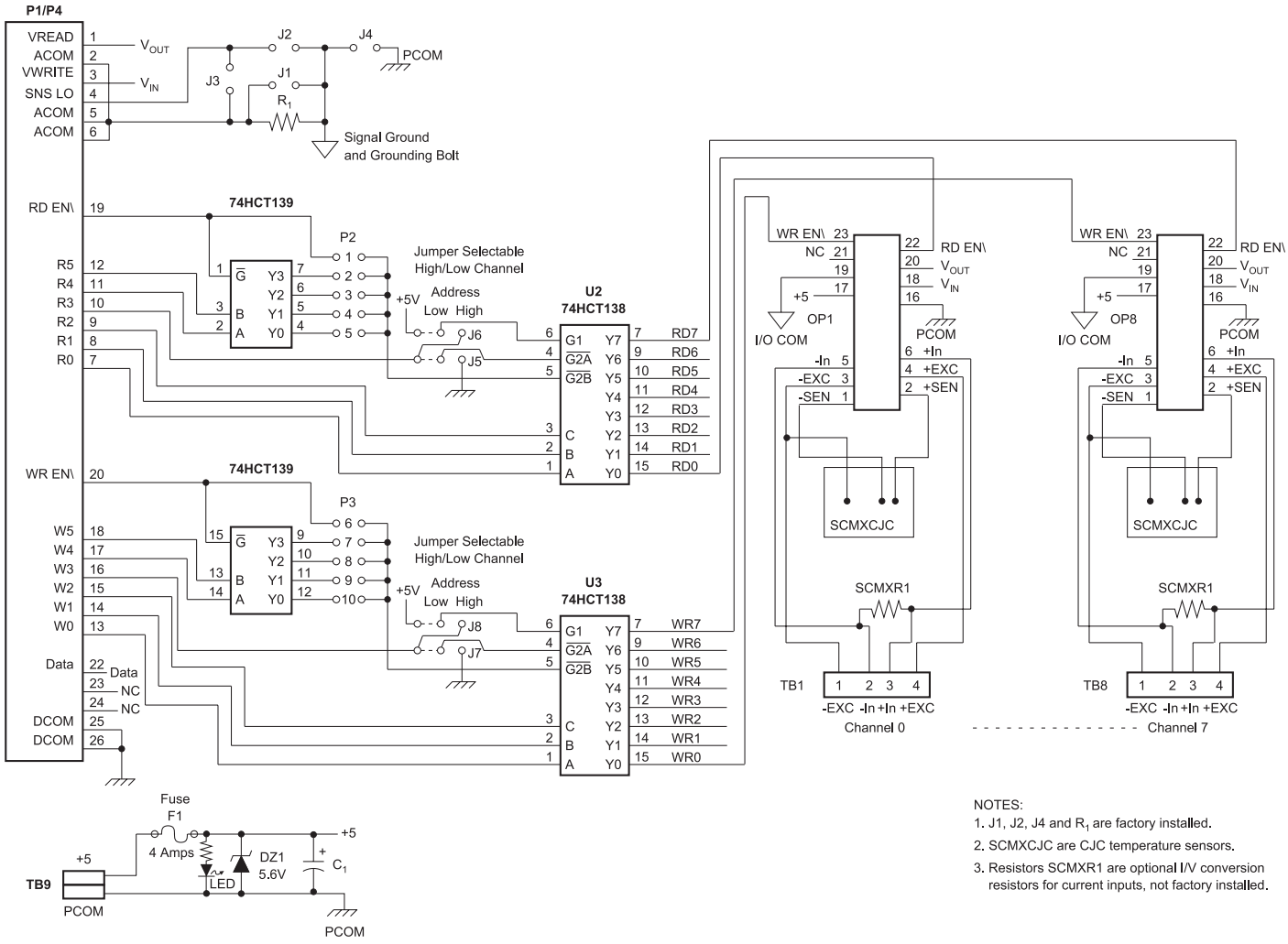
Figure 1: SCMPB06/SCMPB06-x Analog I/O Backpanel

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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



NOTES:
1. J1, J2, J4 and R_1 are factory installed.
2. SCMXCJC are CJC temperature sensors.
3. Resistors SCMXR1 are optional I/V conversion resistors for current inputs, not factory installed.

Figure 2: SCMPB06/SCMPB06-x Schematic

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SCMPB07/SCMPB07-x

8-position Backpanel, High-Density, Non-Multiplexed

DESCRIPTION

The SCMPB07/SCMPB07-x 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 10inches (254mm) for the SCMPB05/SCMPB05-x and SCMPB06/SCMPB06-x 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 1).

See Figure 4 on page 1-52 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 1-52, Figure 3):

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

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)

FEATURES

- 8-channel Backpanels
- Panel or DIN-rail Mounting Options
- With/without Cold Junction Compensation
- Non-Multiplexed
- Interface Cables
- Module Evaluation Board
- Cable-to-Screw-Terminal Interface Board
- Power Supplies
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Easy Installation
- Accepts any Combination of SCM5B Modules
- High-Density Board – Overall Width is 5.5" vs 10"
- Each Channel Provides 4 High-density Screw Terminals for Field Connections and 2 High-density Screw Terminals for Host System Connection

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. **No mounting hardware included**
SCMPB07-2	8-channel backpanel with DIN-rail mounting hardware. ***(Shipped fully assembled.)***
SCMPB07-3	8-channel backpanel without cold junction compensation circuits and with DIN-rail mounting hardware. ***(Shipped fully assembled.)***

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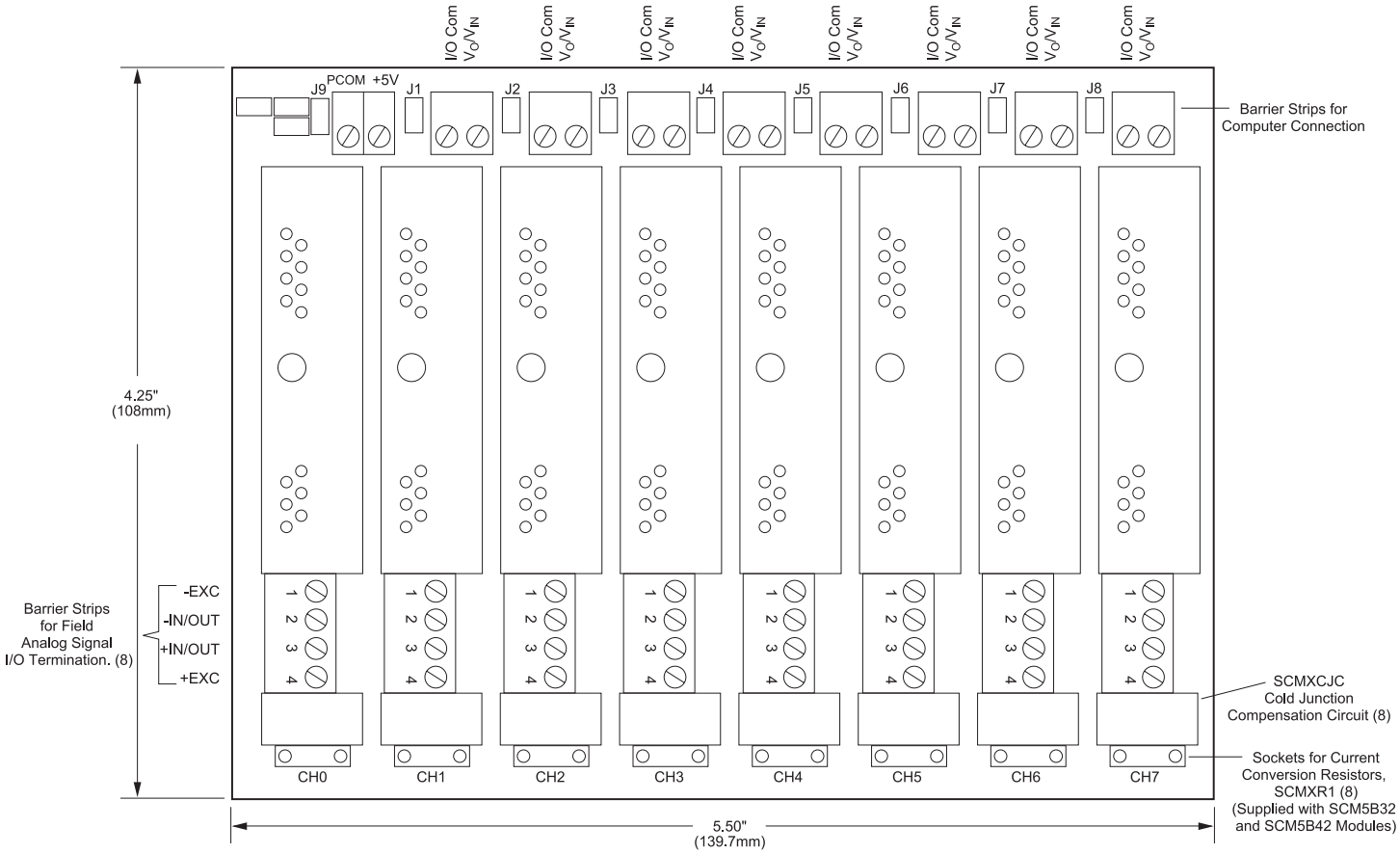


Figure 1: SCMPB07/SCMPB07-x Analog I/O Backpanel

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SCMXEV

Analog Module Evaluation Board

DESCRIPTION

The SCMXEV is a single-channel board with a test socket for SCM5B module evaluation (Figure 1). 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 2 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/SCMPB03-x and SCMPB04/SCMPB04-x page 1-51, Figure 3):

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.

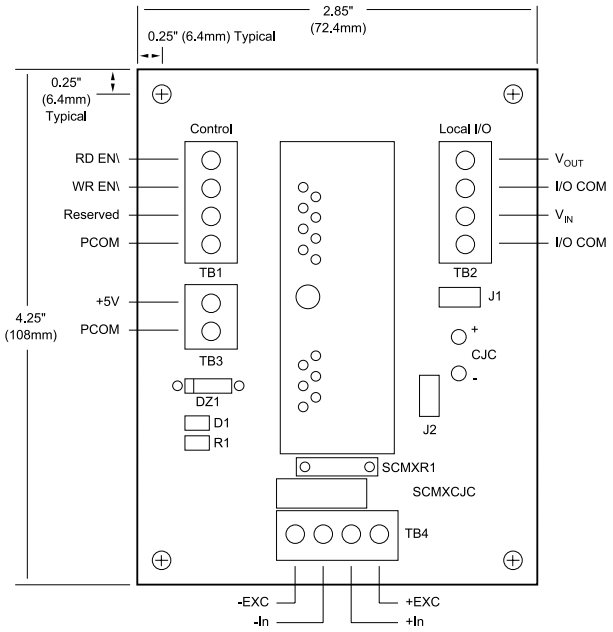
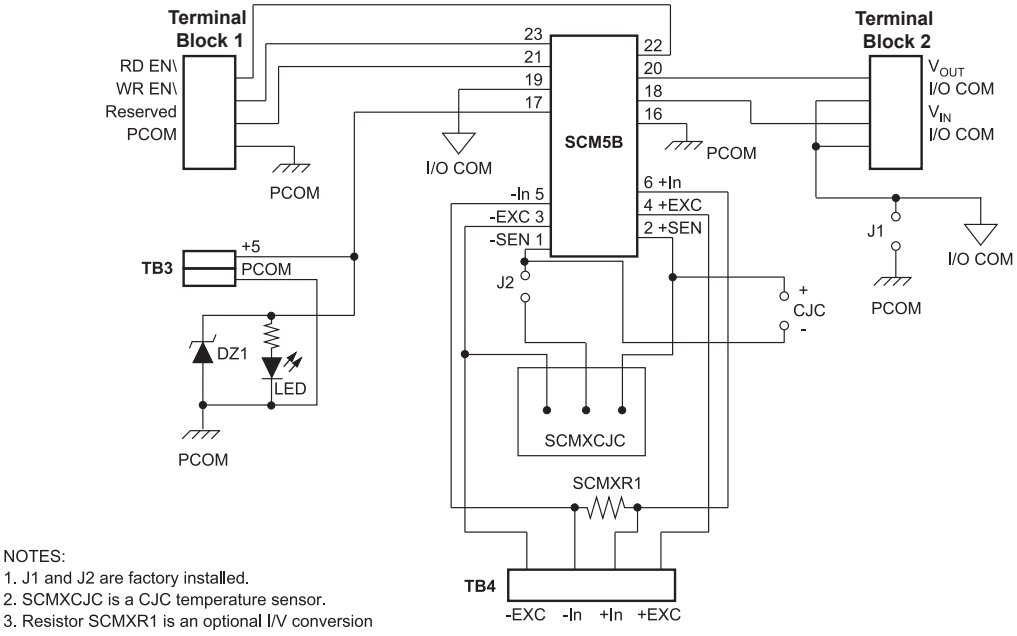


Figure 1: SCMXEV Evaluation Board Dimensions and Pin Layout

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.



NOTES:
1. J1 and J2 are factory installed.
2. SCMXCJC is a CJC temperature sensor.
3. Resistor SCMXR1 is an optional I/V conversion resistor for current inputs, not factory installed.

Figure 2: SCMXEV Evaluation Board Schematic

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SCMXCA004-01, - 02

Interface Cable

DESCRIPTION

The SCMXCA004-XX is the system interface cable for the SCMPB01/02/05/06 backpanels. This is a 26-connector 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 1).

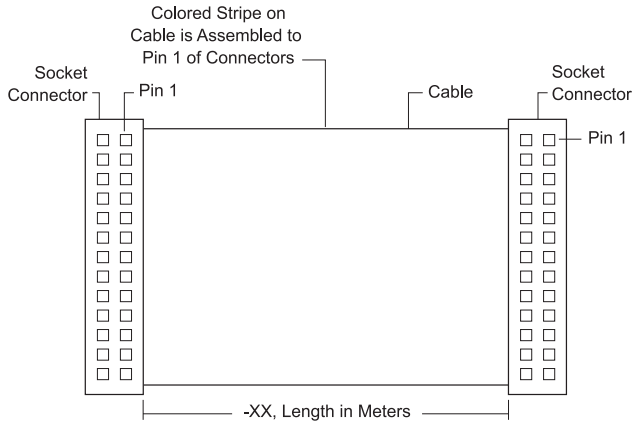


Figure 1: SCMXCA004-XX System Interface Cable

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 2 for dimensions).

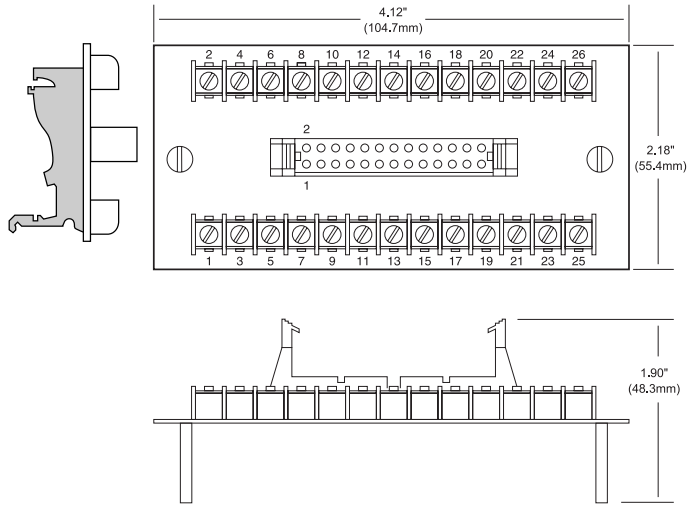


Figure 2: SCMXIF Universal Interface Board Dimensions

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 3 for dimensions).

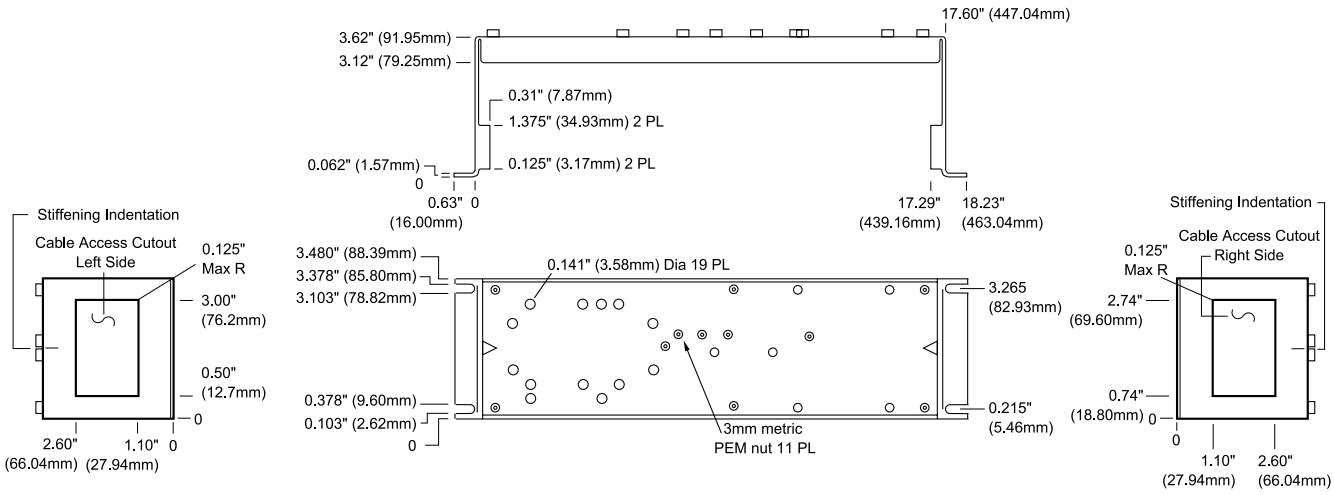


Figure 3: SCMXRK-002 Analog Rack Dimensions

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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 ±10V input and provides up to ±10V output.

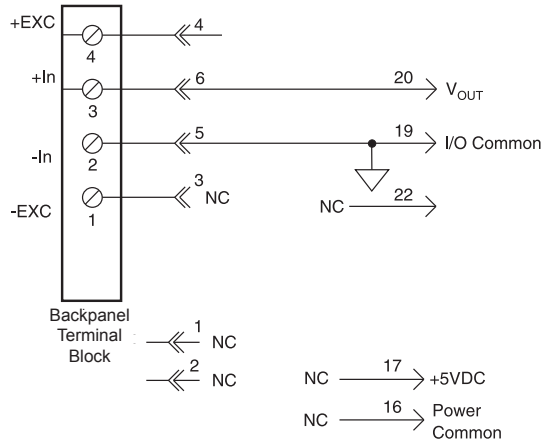


Figure 1: SCM5BPT Pass-thru Module Functional Diagram

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 ±10V input and provides up to ±10V output. Resettable fuses and over voltage protection circuitry protect computer-side electronics.

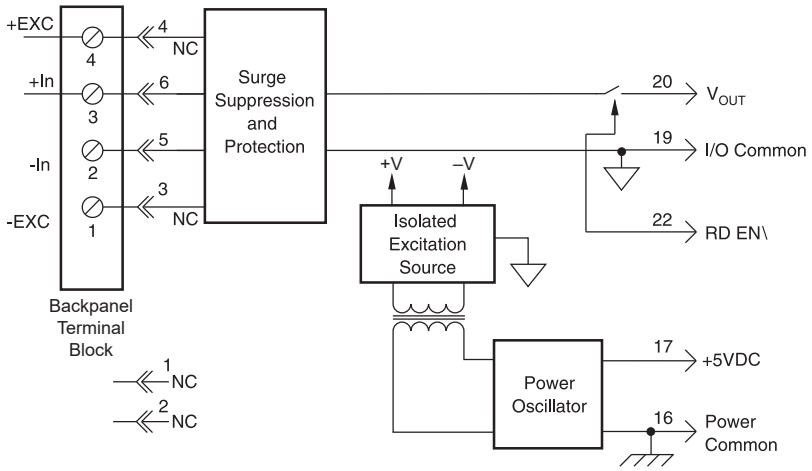


Figure 2: SCM5BPT-1367 Pass-thru Module with Switch Functional Diagram

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 3). When interfaced to an SCM5B37 or SCM5B47 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	±0.25°C
	+5°C to +45°C	±0.5°C
	–40°C to +85°C	±1.25°C

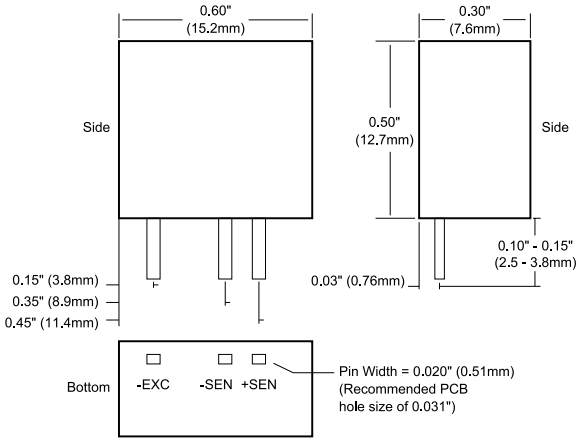


Figure 3: SCMXCJC Physical Dimensions and Pin Layout

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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.

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.

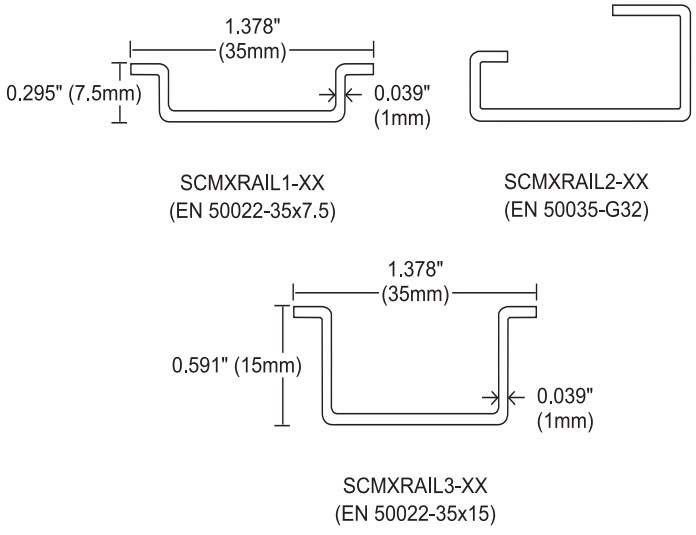


Figure 1: DIN-rail Styles

Ordering Information

Part Number	Description
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)

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.

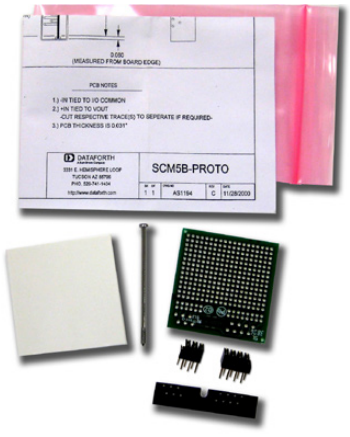


Figure 2: SCM5B-PROTO Breadboard Kit.

SCMXR1

Current Conversion Resistor

DESCRIPTION

A precision 20Ω, 0.1%, 10ppm/°C resistor used with the SCM5B32 current-input module or SCM5B42 two-wire transmitter interface module. 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.

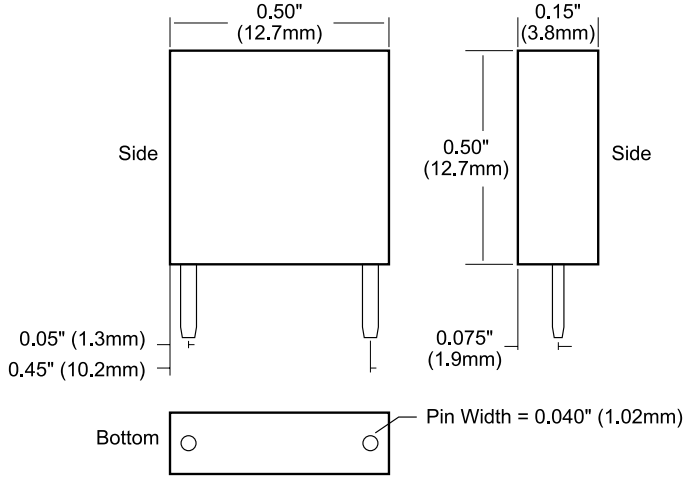


Figure 3: SCMXR1 Physical Dimensions

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SCMXPRT-001/-001D, SCMXPRE-001/-001D

Power Supplies

DESCRIPTION

The SCMXPRT-001/-001D and SCMXPRE-001/-001D 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.

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

NOTES:
*Contact factory for maximum values.
Supplies are UL recognized, File No. E65890.

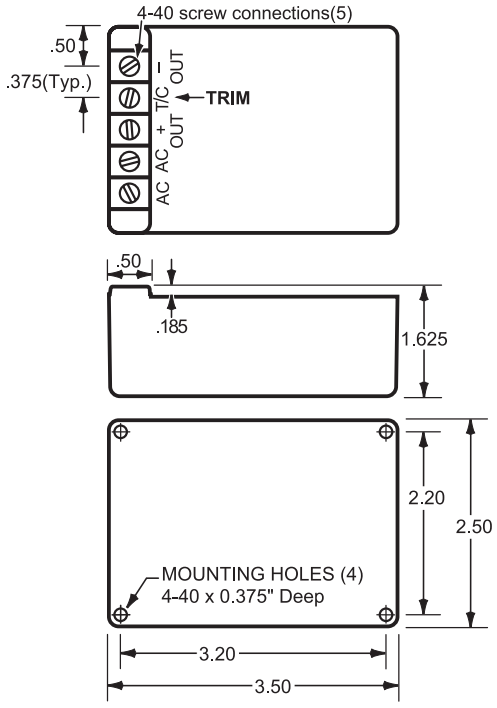


Figure 1: SCMXPRT-001/D and SCMXPRE-001/D Physical Dimensions

SCMXPRT-003, SCMXPRE-003

Power Supplies

DESCRIPTION

The SCMXPRT-003 and SCMXPRE-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-003 and SCMXPRE-003 power supplies.

Specifications Typical* at T_A = +25°C

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

NOTES:
*Contact factory 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).

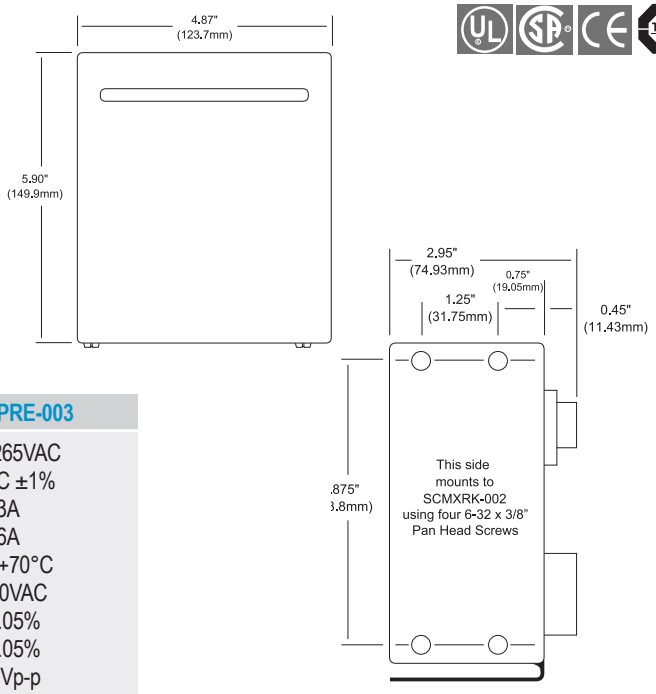


Figure 2: SCMXPRT-003/SCMXPRE-003 Physical Dimensions

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PWR-4505

25W Single-output, Industrial, DIN-rail, Switching Power Supply

Specifications

Typical* at T_A = +25°C

Module	PWR-4505
Input Frequency Input Current Inrush Current Efficiency	85 to 264VAC, 120 to 370VDC 47 to 63Hz 1.5A/115VAC, 0.75A/230VAC Cold Start 30A/115VAC, 60A/230VAC 72%
Output Voltage and Current Rating Temperature Coefficient Ripple Voltage	5V, 5A ±0.03%/°C 100mVp-p
Overload Protection Over Voltage Protection Over Temperature Protection	105 to 150% Rated Output Power 5.75 to 6.75V 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 Storage Temperature Relative Humidity	–10°C to +50°C –20°C to +85°C 10 to 95%
Mechanical Dimensions (h)x(w)x(d)	3.66" x 3.07" x 2.24" (93mm x 78mm x 57mm)
Terminal Screw	M3

NOTES:
* Contact factory for maximum values.

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 and 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

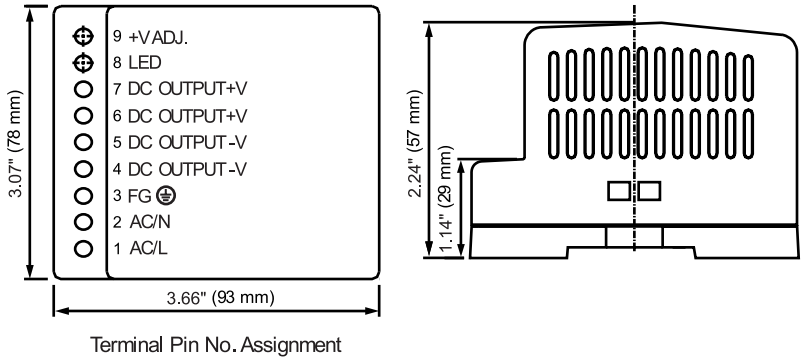


Figure 1: PWR-4505 Physical Dimensions

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SCMHVAS

RoHS III COMPLIANT 2015/863 CE

High-voltage Attenuator System

DESCRIPTION

The SCMHVAS (Signal Conditioning Modular High-voltage Attenuator System) is an analog signal conditioning system designed to safely monitor and accurately measure voltage potentials up to 1414VAC (4000Vp-p). These high-potential voltages are typically found in industrial applications such as induction heaters, electric-motor drive controllers, and measurement of battery stacks. The system reduces the input signal to a level suitable for interface to data acquisition systems, while at the same time providing filtering characteristics and 1500Vrms isolation (Figure 1).

For each channel of analog input, an attenuator module, SCMHVAS-Mxxxx, 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 ±0.06%.

Input signal connections to the SCMHVAS-Mxxxx attenuator module are made using integrated terminal blocks for robust system assembly. For safety purposes, the terminal blocks are inside the shell and can only be accessed from the top. There are no exposed high-voltage points on the SCMHVAS-Mxxxx series modules, SCM5B30-07 or SCM5B40-07 module, or the mounting backpanel.

The SCMHVAS 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 channels' 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 and Application Note AN502 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. The SCMVAS-PB8 and SCMVAS-PB16 backpanels are forward compatible and can accommodate both the original SCMVAS-Mxxx modules and the SCMHVAS-Mxxxx modules.

FEATURES

- Accepts High-voltage Signals up to 1414VAC (4000Vp-p)
- 5V or 10V Output for A/D Systems
- 1500Vrms Transformer Isolation
- True 3-way Isolation
- Up to 160dB CMR
- ±0.06% Accuracy
- Panel or DIN-rail Mounting Options
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

- Analog Signal Conditioning
- Analog Signal Isolation
- Analog Signal Filtering
- High-voltage AC/DC Measurement
- Industrial Process Control
- Test and Measurement

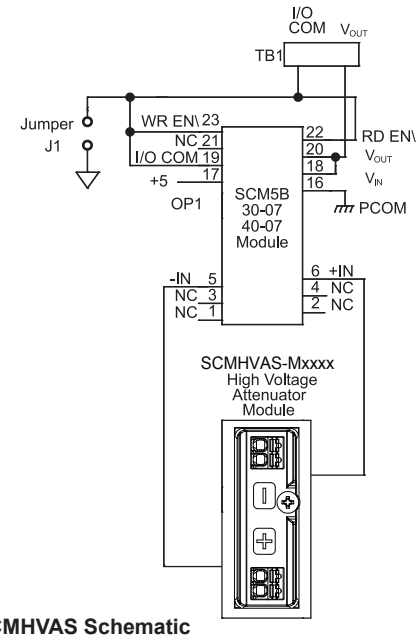


Figure 1: SCMHVAS Schematic

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SCM5B30-07, SCM5B40-07

Isolated Analog Voltage Input Modules

Specifications

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

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

Ordering Information

Model	Description
SCM5B30-07	V Isolation Module, ±5V Output, 4Hz Bandwidth
SCM5B40-07	V Isolation Module, ±5V Output, 10kHz Bandwidth
SCM5B30-07D	V Isolation Module, ±10V Output, 4Hz Bandwidth
SCM5B40-07D	V Isolation Module, ±10V Output, 10kHz Bandwidth

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

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SCMHVAS-Mxxxx

RoHS III COMPLIANT 2015/863 CE

High-voltage Attenuator Modules

Specifications

Typical* at T_A = +25°C

Module	SCMHVAS-Mxxxx
Input Range Input Voltage Range (max) Input Resistance	±100Vpeak to ±2,000Vpeak (70VAC to 1414VAC) ±2,000Vpeak >10MΩ
Accuracy Stability	±0.03% ±50ppm/°C
Output Range Output Resistance	±1V <100kΩ
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing

*Contact factory for maximum values.

Ordering Information

Model	Description	Input Range with V Isolation Module
SCMHVAS-M0100	Attenuator Module	±100V Input (70VAC)
SCMHVAS-M0200	Attenuator Module	±200V Input (141VAC)
SCMHVAS-M0300	Attenuator Module	±300V Input (212VAC)
SCMHVAS-M0400	Attenuator Module	±400V Input (282VAC)
SCMHVAS-M0500	Attenuator Module	±500V Input (353VAC)
SCMHVAS-M0600	Attenuator Module	±600V Input (424VAC)
SCMHVAS-M0700	Attenuator Module	±700V Input (495VAC)
SCMHVAS-M0800	Attenuator Module	±800V Input (566VAC)
SCMHVAS-M0900	Attenuator Module	±900V Input (636VAC)
SCMHVAS-M1000	Attenuator Module	±1000V Input (707VAC)
SCMHVAS-M1500	Attenuator Module	±1500V Input (1060VAC)
SCMHVAS-M2000	Attenuator Module	±2000V Input (1414VAC)
SCMHVAS-MPT	Attenuator Module, Pass-Thru 1-to-1	

Accessories

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

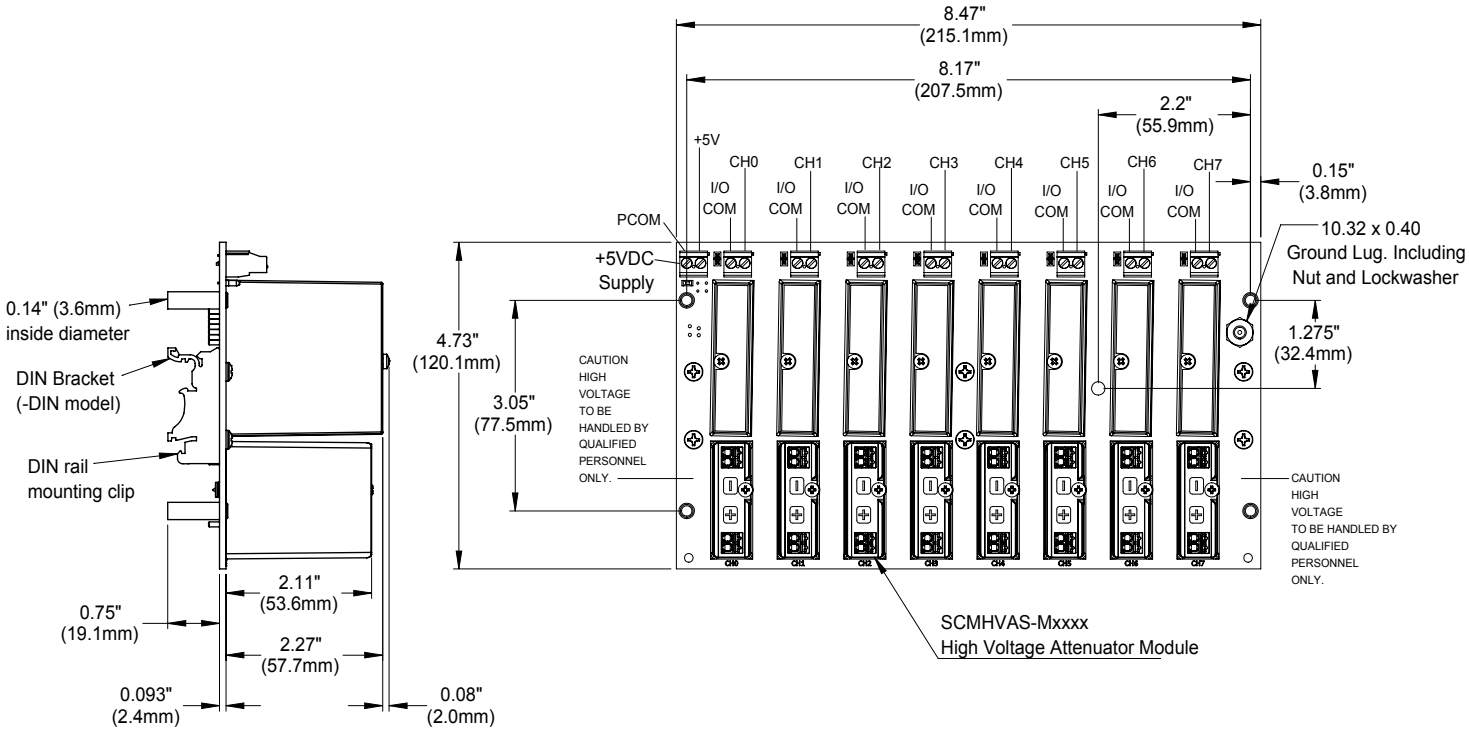


Figure 2: SCMVAS-PB8 and SCMVAS-PB8D Analog I/O Backpanel

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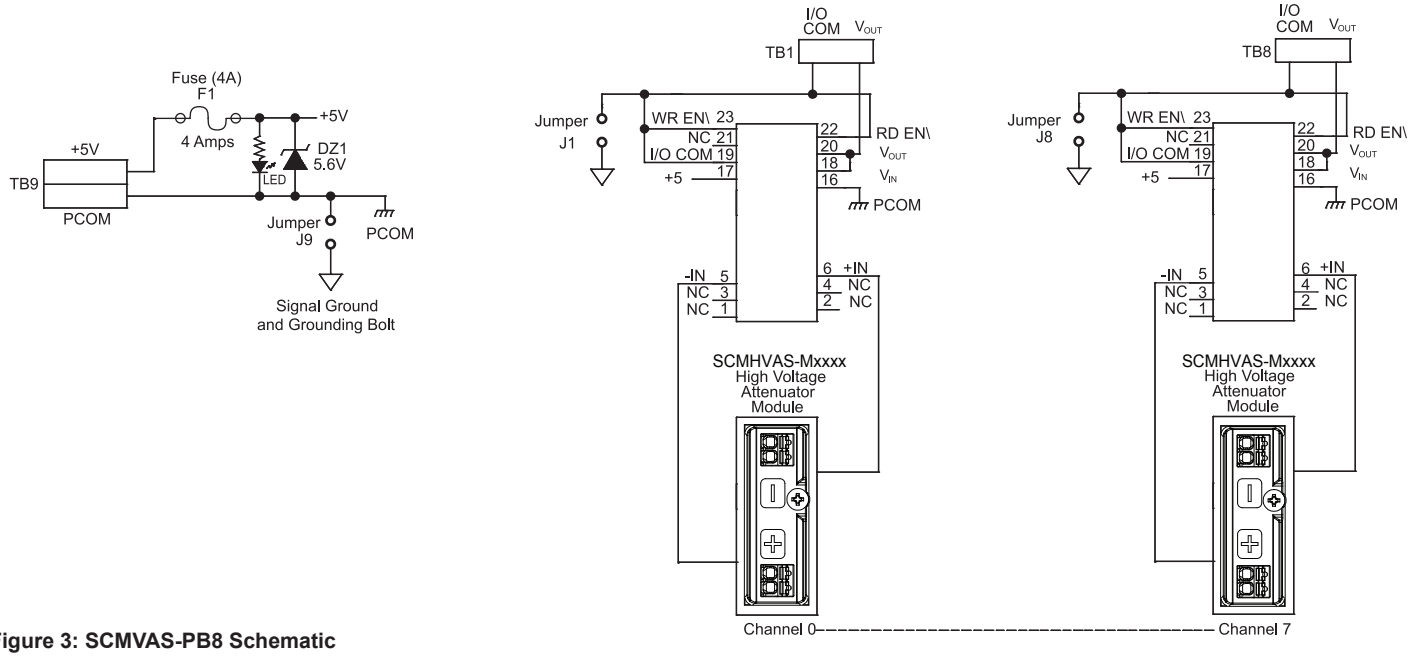
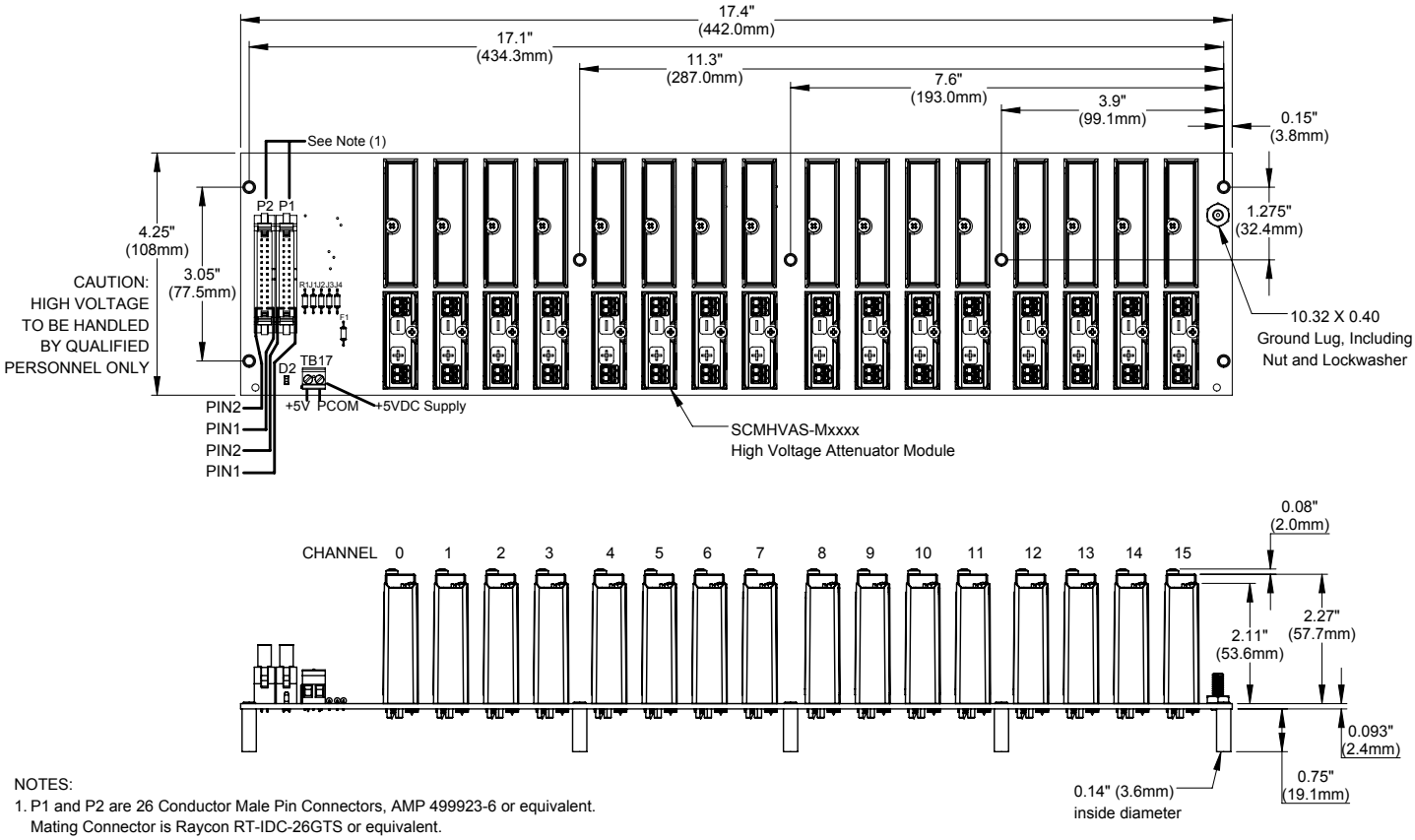


Figure 3: SCMVAS-PB8 Schematic



NOTES:
1. P1 and P2 are 26 Conductor Male Pin Connectors, AMP 499923-6 or equivalent.
   Mating Connector is Raycon RT-IDC-26GTS or equivalent.

Figure 4: SCMVAS-PB16 Analog I/O Backpanel

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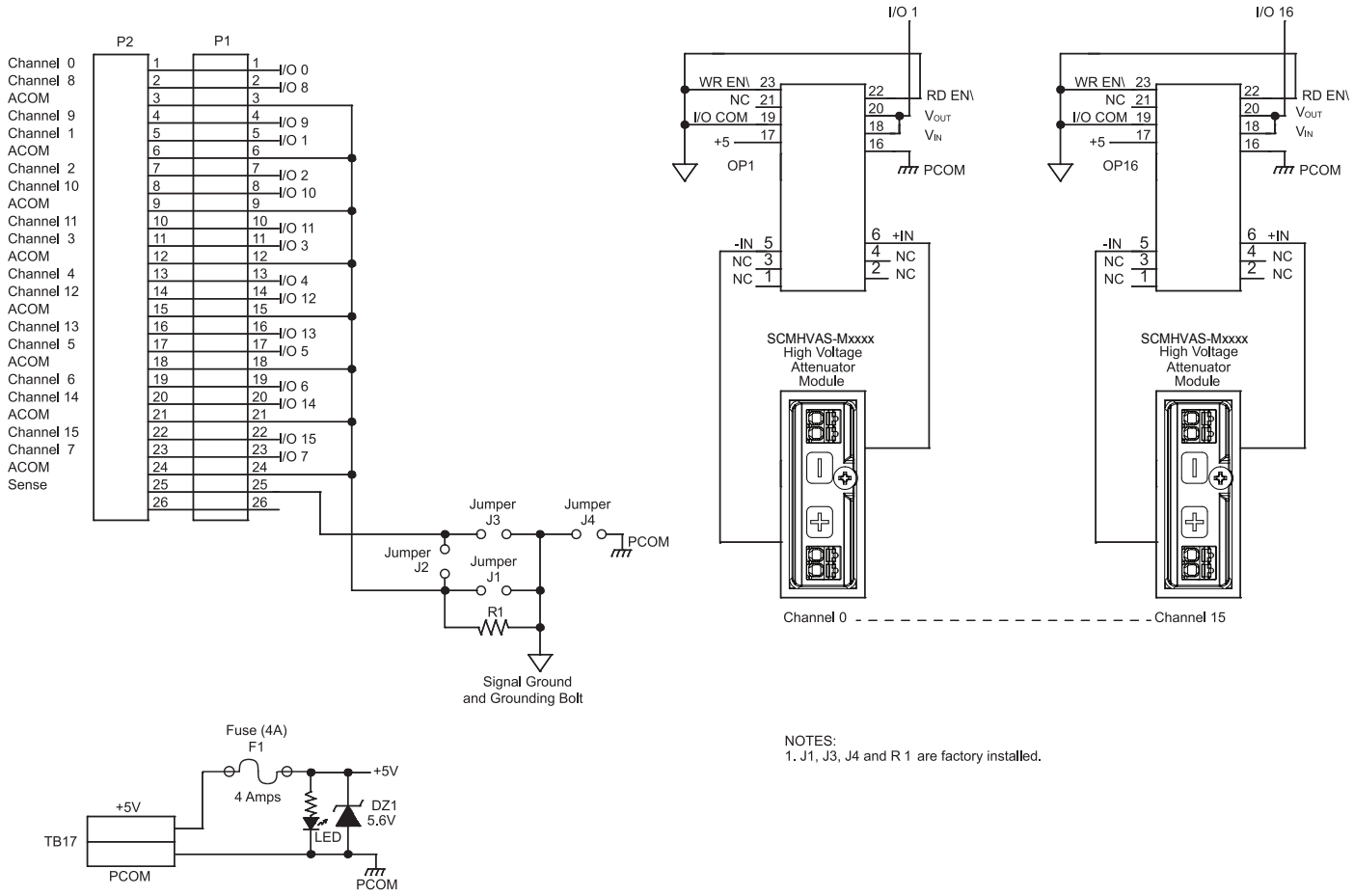


Figure 5: SCMVAS-PB16 Schematic

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Downloads

Corporate Brochure
Full-Line Product Catalog
SCM5B/SCMHVAS Attenuator System Catalog
SCM7B Catalog
8B Catalog
DSCA Catalog
SCM9B/SCMD Catalog
MAQ®20 DAQ System Catalog
isoLYNX DAQ Systems Catalog
Loop Isolators and Transmitters Catalog
Data Communications Catalog
IoT Energy Monitoring Catalog

Press Releases

- Dataforth Introduces Next Generation High-Voltage Attenuator System
- Latest ISO 9001:2015 Quality Standards
- Dataforth's DSCA High-Performance DIN Modules Receive Latest ATEX Certification
- Dataforth's DSCT Two-wire Transmitter Modules Receive ATEX Certification

See all PRESS RELEASES

Application Notes

ENGINEERING BASICS

- Measuring RMS Values of Voltage and Current (AN101)
- IC Op Amp Errors: What Are They and How Bad Can They Be (AN102)
- Common-Mode Voltage (AN103)
- 4-20mA Transmitters (AN104)
- Practical Thermocouple Temperature Measurements (AN107)
- When Good Grounds Go Bad (AN108)
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- 3-phase AC Calculations Revisited (AN110)
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- Phase Angles and Time Delays (AN113)
- Accuracy versus Resolution (AN114)
- Sampling Law (AN115)
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- Basic Bridge Circuits (AN117)
- Strain Gauge Signal Conditioner (AN118)
- Six Sigma: What? Why? How? (AN119)
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SCM5B MODULES

- Thermocouple Voltage-to-Temperature Conversion Method (AN501)
- SCM5B Ground Connections and Host System Interfaces (AN502)
- SCM5B Failure Rate Calculation and Prediction (AN503)
- Interpreting Drift Specifications (AN504)
- Hardware Linearization of Non-Linear Signals (AN505)
- ANSI/IEEE C37.90.1-1989 Transient Specification (AN506)
- Shield Grounding (AN507)
- Protecting Signal Lines Against EMI (AN508)
- SCM5B43 - DC LVDT Input Module (AN509)

SCM7B MODULES

- SCM7B Thermocouple Modules and CJC (AN701)
- SCM7B Frequency and Time Response (AN702)
- Failure Rate Calculation and Prediction (AN704)

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- DSCA Calibration Procedure (AN801)
- DSCA, SCM5B, SCM7B and 8B Failure Rate Calculation and Prediction (AN802)

LDM485, RS-485 DEVICES

- SCM9B/LDM422/LDM485 RS-485 Connection (AN201)
- LDM485-to-LDM485 to Other RS-485 Devices Configuration (AN202)

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- MAQ20 PID Control in a Home Heating Application (AN902)

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Tech Notes

- Active, Analog, Elliptic Filter
- Eddy Current - Skin, and Proximity Effects
- Could We Actually Achieve "Warp Speed"?
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- Faraday's Law of Induction
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- When to Use Closed-Loop Control Instead of Open-Loop Control
- Aliasing, Anti-Aliasing - What is That Anyway?
- Made in the USA
- MAQ20 Data Acquisition System Features
- Advanced CJC Method
- MAQ20-BRDG1, Strain Gauge Bridge Module
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- ISO9001
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- Hazardous Locations in North America
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- Hysteresis Specifications
- Miniature Electronics... 8B Modules
- A Question from Dataforth's President
- Unbalanced Voltages Increase Cost
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- Galvanic Isolation
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- It's All About Isolation and Protection
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- Signal Conditioner with Power Supply
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- 3-phase AC Calculations Revisited
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- Easy Recalibration Procedure
- System Throughput
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- Signal Conditioning Article
- Measured vs Combinational Error
- Power Supply Sensitivity
- Filtering Noise
- Filtering in Signal Conditioning Modules
- Resistor Thermal Noise
- Sampling Law
- Signal Conditioners - Buy vs Build
- Confident Strain-Gauge Measurements
- Advanced CJC Method Used in Dataforth Thermocouples Significantly Improves Accuracy

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DISCONTINUED DEVICES - Isolator Products

Affected Devices	Replacement Devices	Affected Devices	Replacement Devices
DSCL22-01	None Available	DSCL24-11-1648	None Available
DSCL22-11	None Available	DSCL24-11-1675	None Available
DSCL22-21	None Available	DSCL24-11-1676	None Available
DSCL23-01	None Available	DSCL24-12-1540	None Available
DSCL23-02	None Available	DSCL24-12-1552	None Available
DSCL24-01	DSCP81-01	DSCL24-12-1553	None Available
DSCL24-02	DSCP81-02	DSCA24-12-1559	None Available
DSCL24-11	None Available	DSCL24-12-1617	None Available
DSCL24-12	None Available	DSCL24-12-1618	None Available
DSCL24-11-1575	None Available	DSCL24-12-1626	None Available

DISCONTINUED DEVICES - Backpanels

Affected Devices	Replacement Devices
SCMD-PB4RD	NONE
SCMD-JM8	Use To Depletion No Available Replacement
SCMD-PB8	SCMD-PB4, SCMD-PB16SM, SCMD-PB24SM
SCMD-PB8H	SCMD-PB4D, SCMD-PB16SMD, SCMD-PB24SMD
SCMD-PB8SM	SCMD-PB4, SCMD-PB16SM, SCMD-PB24SM
SCMD-PB8SMD	SCMD-PB4D, SCMD-PB16SMD, SCMD-PB24SMD
SCMD-PB16	SCMD-PB4, SCMD-PB16SM, SCMD-PB24SM
SCMD-PB16H	SCMD-PB4D, SCMD-PB16SMD, SCMD-PB24SMD

DISCONTINUED DEVICES - Power Supply

Affected Devices	Replacement Devices
PWR-4504	Use To Depletion No Available Replacement

DISCONTINUED DEVICES

Affected Devices	Replacement Devices
SLX200-20	None Available
SLX200-30	None Available
SLX200-21	None Available
SLX200-31	None Available
SLX200-20D	None Available
SLX200-30D	None Available
SLX200-21D	None Available
SLX200-31D	None Available

DISCONTINUED DEVICES - Sensor-to-Computer Products

Affected Devices	Replacement Devices	Affected Devices	Replacement Devices
SCM9B-1212	None Available	SCM9B-2562	None Available
SCM9B-1551	None Available	SCM9B-2611	None Available
SCM9B-1552	None Available	SCM9B-2612	None Available
SCM9B-1561	None Available	SCM9B-2641	None Available
SCM9B-1611	None Available	SCM9B-2642	None Available
SCM9B-1641	None Available	SCM9B-3161	None Available
SCM9B-2151	None Available	SCM9B-3162	None Available
SCM9B-2212	None Available	SCM9B-4121	None Available
SCM9B-2221	None Available	SCM9B-4131	None Available
SCM9B-2222	None Available	SCM9B-4162	None Available
SCM9B-2231	None Available	SCM9B-5311	None Available
SCM9B-2232	None Available	SCM9B-5331	None Available
SCM9B-2241	None Available	SCM9B-5341	None Available
SCM9B-2531	None Available	SCM9B-5342	None Available
SCM9B-2542	None Available	SCM9B-D132	None Available

DISCONTINUED DEVICES - Line Drivers and Converters

Affected Devices	Replacement Devices
LDM30-PE	None Available
LDM30-SE	None Available
LDM70-P	None Available
LDM70-PE	None Available
LDM70-PT	None Available
LDM70-SE	None Available
LDM80-S-025	None Available
LDM85-P	None Available
LDM85-PE	None Available
LDM85-PE-025	None Available
LDM85-S	None Available
LDM85-S-025	None Available
LDM85-SE-025	None Available
LDM85-ST	None Available
LDM422-PE	None Available
LDM422-SE	None Available
LDM485-PT	None Available
LDM485-ST	None Available
LDM485-PT-025	None Available
LDM485-SE	None Available

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https://www.dataforth.com/terms-and-conditions-sale

Application Support

Dataforth provides timely, high-quality product support. Call +**1-800-444-7644 TOLL-FREE**

Returns/Repair Policy

All warranty and repair requests should be directed to the Dataforth Customer Service Department at +1-520-741-1404. If a product return is required, visit dataforth.com, choose Sales Support on the blue bar and you will see the link to "Obtain an RMA". Fill out the online Return Materials Authorization (RMA) form. Be ready to provide the following information:

1. Complete product model number.
2. Product serial number.
3. Name, address, and telephone number of person returning product.
4. Special repair instructions or reason for return.
5. Purchase order number for out-of-warranty repairs.

The product should be carefully packaged, making sure the RMA number appears on the outside of the package, and shipped prepaid to:

Dataforth Corporation
ATTN: RMA Coordinator
6230 S. Country Club
Tucson, AZ 85706 USA

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WORLD HEADQUARTERS

Dataforth Corporation
3331 E. Hemisphere Loop
Tucson, AZ 85706 USA
Toll Free: +1-800-444-7644
Tel: +1-520-741-1404
Fax: +1-520-741-0762
Email: sales@dataforth.com
www.dataforth.com

All Dataforth Products Manufactured per RoHS III Directive EU 2015/863

The Dataforth Quality Management System is ISO9001:2015 Registered



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