DATAFORTH®

2024 Catalog
SCM9B Products
Isolated, Intelligent Signal Conditioning

SCMD Products
Isolated, Digital I/O Series



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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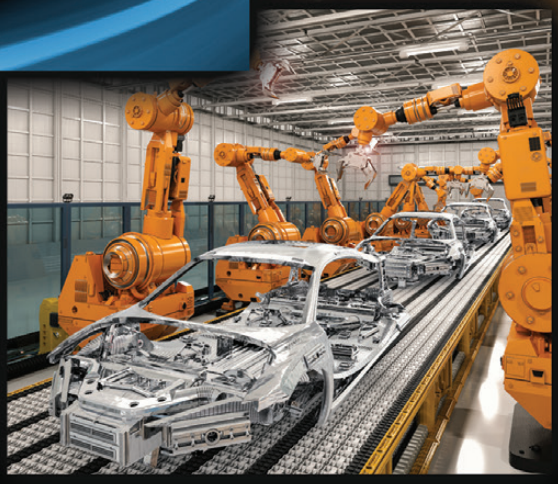
Dataforth

- 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

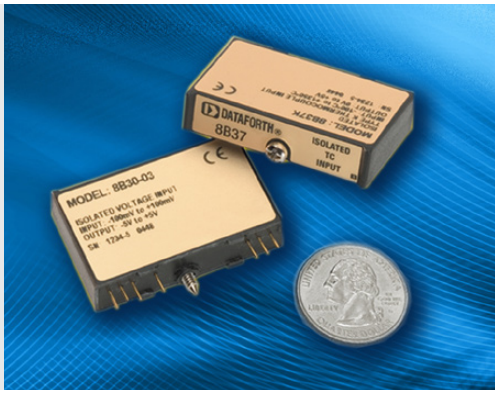
Miniature Size, 2-way Isolation, 5V Supply Voltage, *Instrument Class*® Performance

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

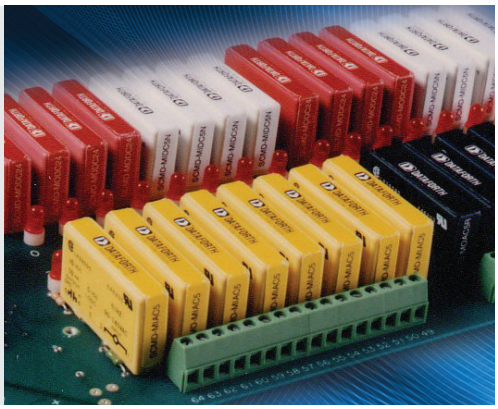
Miniature Digital I/O Modules with 4kV Isolation

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

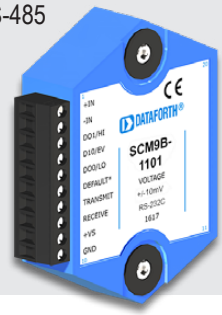
- 500Vrms Input Isolation
- Programmable Scaling and Linearization
- ASCII Command/Response Protocol
- 15-bit Measurement Resolution
- Continuous Self-calibration
- Analog Readback
- DIN-rail Mountable D100 Series

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
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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

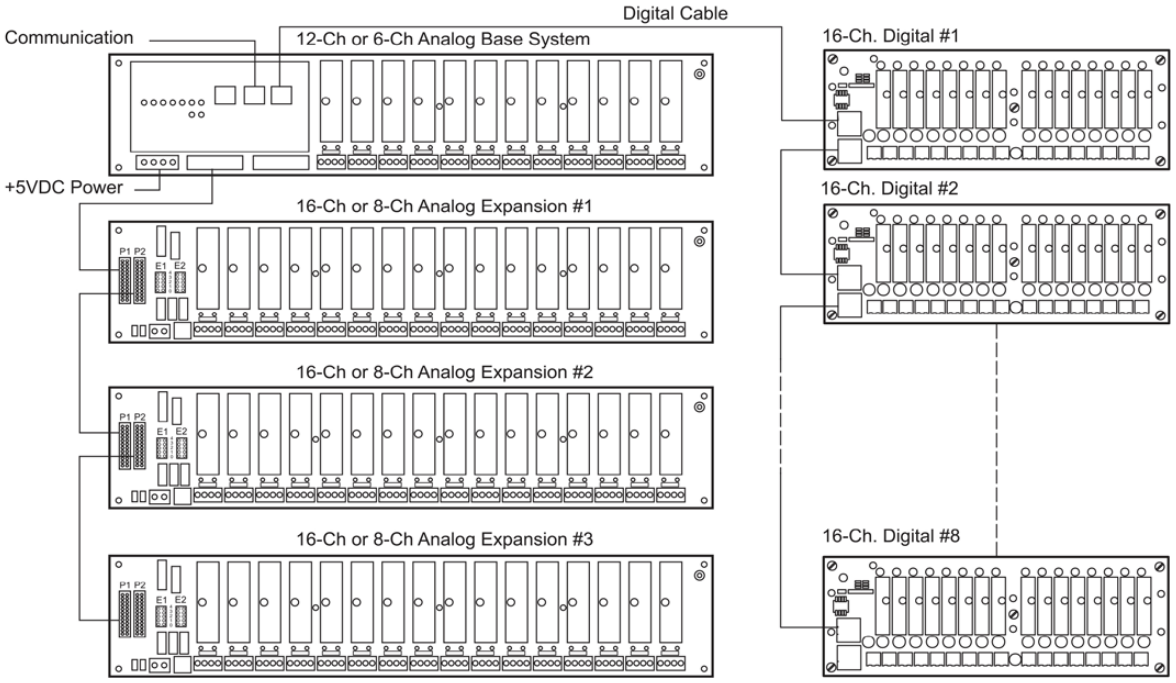
Implements industry-standard Modbus® RTU and TCP protocols, enabling communication with existing third-party software drivers and HMI/SCADA packages

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

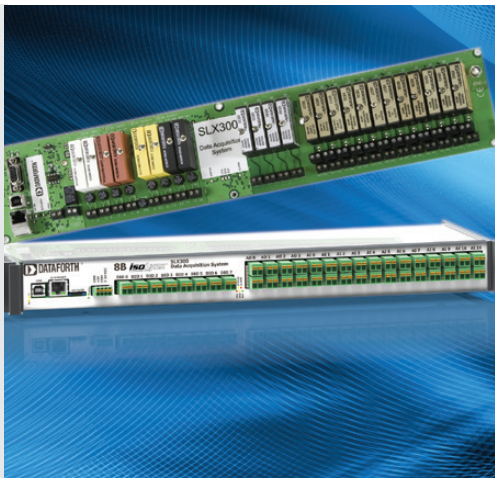
Flexible, Compact, Modular, Reliable

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

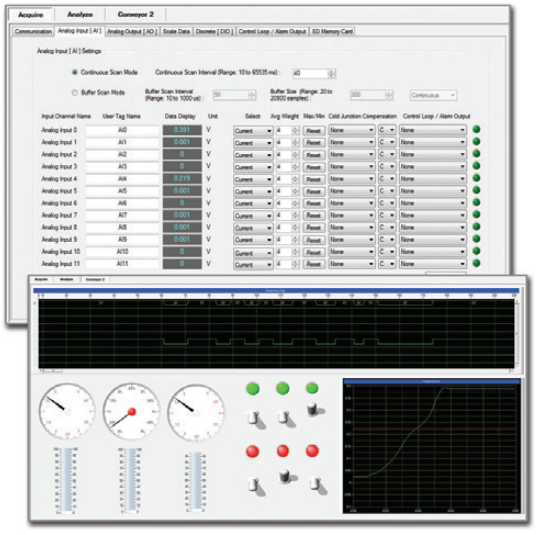
- Modbus RTU and TCP Support
- 1500Vrms Input-to-Output and Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Wide I/O Selection
  - – Analog – 19 product families, 130+ models
  - – Digital – 6 product families, 20+ models
- Mix and Match Analog and Digital I/O
- Advanced Features Including 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

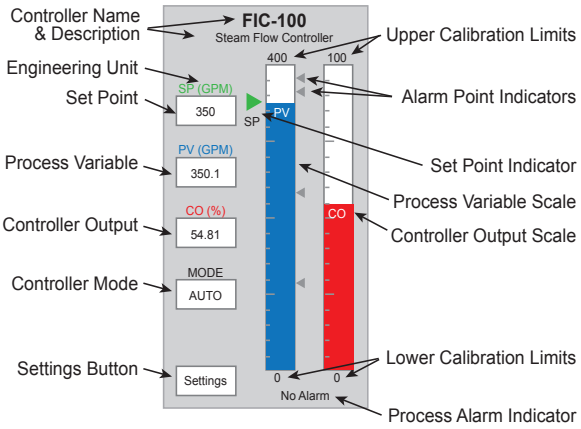


PID Loop Control

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

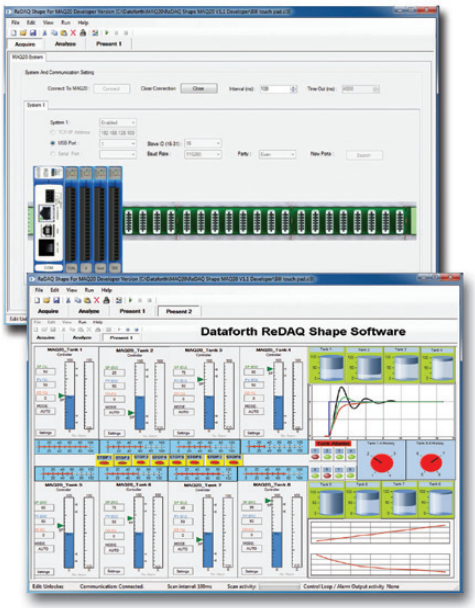
ReDAQ® Shape Software for MAQ®20

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



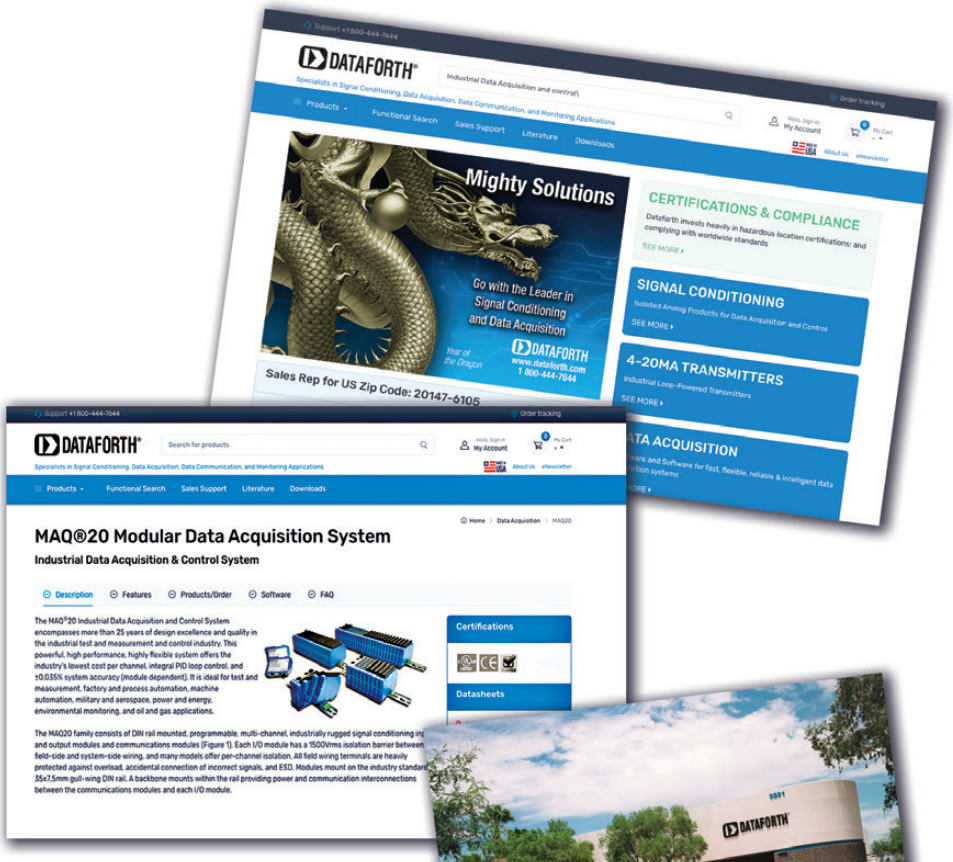
The Dataforth System Builder

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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SCM9B

Isolated, Intelligent Signal Conditioning Products

DESCRIPTION

SCM9B Modules

Dataforth offers high-quality SCM9B products providing cost-effective protection and conditioning for a wide range of valuable industrial control signals and systems. Our 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 associated backplanes, accessories, and applications software. All products are European EMC Directive Compliant.

SCM9B-1000/2000/5000/D100

Sensor-to-computer Modules

These isolated modules provide complete sensor/RS-232C or /RS-485 interfaces with 15-bit measurement resolution. They accept a variety of voltage, current, thermocouple, RTD/thermistor, strain gauge, timer/frequency, and multichannel digital inputs/outputs. “2000” Series modules include additional programmable features such as ASCII output scaling to desired engineering units and linearization using straight-line segment approximation. “5000” Series modules provide four analog input channels. D100 Series modules are DIN-rail mountable.

SCM9B-3000/4000

Computer-to-Analog Output Modules

These are complete, isolated interfaces designed for remote installation and communications with host computers via standard RS-232C and RS-485 serial ports. They offer 12-bit resolution in a range of analog output voltages and currents. “4000” series modules have fully programmable output slopes, true analog readback, and data scaling.

SCM9B-A1000/2000/D192

Converters and Repeaters

These products convert RS-232C communications signal levels to the correct RS-485 signal requirements, and may also be configured as repeaters to extend communications bus lengths. They are optically isolated, require no external control signals, and are completely transparent to host software.

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

SCM9B Converters and Repeaters

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

All SCM9B Modules

- CE Compliant

BENEFITS

- Easily Construct Modular Data Acquisition System with High Flexibility
- Easy to Use Mix and Match System

APPLICATIONS

- Process Monitoring and Control
- Remote Data Logging to any Host Computer
- Product Testing
- Direct Connection to Modems

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SCM9B Selection Guide

SCM9B-1000/2000 SENSOR-TO-COMPUTER PRODUCTS
("2000" Series products have user-programmable features)

MODEL	INPUT RANGE	OUTPUT
Voltage Inputs		
SCM9B-1101/2101	±10mV	RS-232C
SCM9B-1102/2102	±10mV	RS-485
SCM9B-1111/2111	±100mV	RS-232C
SCM9B-1112/2112	±100mV	RS-485
SCM9B-1121/2121	±1V	RS-232C
SCM9B-1122/2122	±1V	RS-485
SCM9B-1131/2131	±5V	RS-232C
SCM9B-1132/2132	±5V	RS-485
SCM9B-1141/2141	±10V	RS-232C
SCM9B-1142/2142	±10V	RS-485
SCM9B-1151/2151	±100V	RS-232C
SCM9B-1152/2152	±100V	RS-485
Current Inputs		
SCM9B-1211/2211	±10mA	RS-232C
SCM9B-1212/2212	±10mA	RS-485
SCM9B-1221/2221	±1mA	RS-232C
SCM9B-1222/2222	±1mA	RS-485
SCM9B-1231/2231	±100mA	RS-232C
SCM9B-1232/2232	±100mA	RS-485
SCM9B-1241/2241	±1A	RS-232C
SCM9B-1242/2242	±1A	RS-485
SCM9B-1251/2251	4-20mA	RS-232C
SCM9B-1252/2252	4-20mA	RS-485
Thermocouple-inputs		
SCM9B-1311	J Thermocouple	RS-232C
SCM9B-1312	J Thermocouple	RS-485
SCM9B-1321	K Thermocouple	RS-232C
SCM9B-1322	K Thermocouple	RS-485
SCM9B-1331	T Thermocouple	RS-232C
SCM9B-1332	T Thermocouple	RS-485
SCM9B-1341	E Thermocouple	RS-232C
SCM9B-1342	E Thermocouple	RS-485
SCM9B-1351	R Thermocouple	RS-232C
SCM9B-1352	R Thermocouple	RS-485
SCM9B-1361	S Thermocouple	RS-232C
SCM9B-1362	S Thermocouple	RS-485
SCM9B-1371	B Thermocouple	RS-232C
SCM9B-1372	B Thermocouple	RS-485
SCM9B-1381	C Thermocouple	RS-232C
SCM9B-1382	C Thermocouple	RS-485
RTD-inputs		
SCM9B-1411	.00385 RTD	RS-232C
SCM9B-1412	.00385 RTD	RS-485
SCM9B-1421	.00392 RTD	RS-232C
SCM9B-1422	.00392 RTD	RS-485
SCM9B-1431	.00388 RTD	RS-232C
SCM9B-1432	.00388 RTD	RS-485
SCM9B-1451	2252Ω Thermistor	RS-232C
SCM9B-1452	2252Ω Thermistor	RS-485
SCM9B-1461	TD Thermistor	RS-232C
SCM9B-1462	TD Thermistor	RS-485

MODEL	INPUT RANGE	OUTPUT
Strain Gauge Inputs		
SCM9B-1511/2511	±30mV Bridge, 5V Excitation	RS-232C
SCM9B-1512/2512	±30mV Bridge, 5V Excitation	RS-485
SCM9B-1521/2521	±30mV Bridge, 10V Excitation	RS-232C
SCM9B-1522/2522	±30mV Bridge, 10V Excitation	RS-485
SCM9B-1531/2531	±100mV Bridge, 5V Excitation	RS-232C
SCM9B-1532/2532	±100mV Bridge, 5V Excitation	RS-485
SCM9B-1541/2541	±100mV Bridge, 10V Excitation	RS-232C
SCM9B-1542/2542	±100mV Bridge, 10V Excitation	RS-485
SCM9B-1551/2551	1-6V Bridge, 8V Excitation	RS-232C
SCM9B-1552/2552	1-6V Bridge, 8V Excitation	RS-485
SCM9B-1561/2561	1-6V Bridge, 10V Excitation	RS-232C
SCM9B-1562/2562	1-6V Bridge, 10V Excitation	RS-485
Timer/Frequency-inputs		
SCM9B-1601/2601	Frequency	RS-232C
SCM9B-1602/2602	Frequency	RS-485
SCM9B-1611/2611	Time	RS-232C
SCM9B-1612/2612	Timer	RS-485
SCM9B-1621	Event Counter	RS-232C
SCM9B-1622	Event Counter	RS-485
SCM9B-1631/2631	Accumulator, Frequency	RS-232C
SCM9B-1632/2632	Accumulator, Frequency	RS-485
SCM9B-1641/2641	Accumulator, Timer	RS-232C
SCM9B-1642/2642	Accumulator, Timer	RS-485

MODEL	DIGITAL INPUT	DIGITAL OUTPUT	RS OUTPUT
Digital Inputs/Outputs			
SCM9B-1701	7	8	RS-232C
SCM9B-1702	7	8	RS-485
SCM9B-1711	15 and/or	15	RS-232C
SCM9B-1712	15 and/or	15	RS-485

SCM9B-5000 FOUR CHANNEL SENSOR-TO-COMPUTER PRODUCTS

MODEL	INPUT RANGE	OUTPUT
Voltage Inputs		
SCM9B-5111	±100mV	RS-232C
SCM9B-5112	±100mV	RS-485
SCM9B-5121	±1V	RS-232C
SCM9B-5122	±1V	RS-485
SCM9B-5131	±5V	RS-232C
SCM9B-5132	±5V	RS-485
SCM9B-5141	±10V	RS-232C
SCM9B-5142	±10V	RS-485
SCM9B-5151	±100V	RS-232C
SCM9B-5152	±100V	RS-485
Current Inputs		
SCM9B-5251	4-20mA	RS-232C
SCM9B-5252	4-20mA	RS-485
Thermocouple-inputs		
SCM9B-5311	J Thermocouple	RS-232C
SCM9B-5312	J Thermocouple	RS-485
SCM9B-5321	K Thermocouple	RS-232C
SCM9B-5322	K Thermocouple	RS-485
SCM9B-5331	T Thermocouple	RS-232C
SCM9B-5332	T Thermocouple	RS-485
SCM9B-5341	E Thermocouple	RS-232C
SCM9B-5342	E Thermocouple	RS-485
Thermistor inputs		
SCM9B-5451	2252Ω Thermistor	RS-232C
SCM9B-5452	2252Ω Thermistor	RS-485

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SCM9B Selection Guide (Continued)

SCM9B-D100 DIN-RAIL MOUNT SENSOR-TO-COMPUTER MODULES

MODEL	INPUT RANGE	OUTPUT
Voltage Inputs		
SCM9B-D110	±10mV	RS-485
SCM9B-D111	±100mV	RS-485
SCM9B-D112	±1V	RS-485
SCM9B-D113	±5V	RS-485
SCM9B-D114	±10V	RS-485
SCM9B-D115	±100V	RS-485
Current Inputs		
SCM9B-D125	4-20mA	RS-485
Thermocouple-inputs		
SCM9B-D131	J Thermocouple	RS-485
SCM9B-D132	K Thermocouple	RS-485
SCM9B-D133	T Thermocouple	RS-485
SCM9B-D134	E Thermocouple	RS-485
SCM9B-D135	R Thermocouple	RS-485
SCM9B-D136	S Thermocouple	RS-485
SCM9B-D137	B Thermocouple	RS-485
SCM9B-D138	C Thermocouple	RS-485
RTD/Thermistor Inputs		
SCM9B-D141	.00385 RTD	RS-485
SCM9B-D142	.00392 RTD	RS-485
SCM9B-D143	.00388 RTD	RS-485
SCM9B-D145	2252Ω Thermistor	RS-485
SCM9B-D146	TD Thermistor	RS-485
Timer/Frequency-inputs		
SCM9B-D161	Frequency	RS-485

MODEL	DIGITAL INPUTS	DIGITAL OUTPUTS	RS OUTPUT
Digital Input/Outputs			
SCM9B-D171	6	0	RS-485
SCM9B-D172	0	6	RS-485

SCM9B Reliability Data

Failure rate calculations for the SCM9B modules are derived from the MIL-HDBK-217E specification. The stress-analysis method is used at naval sheltered environments, 40°C temperature, and quality level of B-2. Our specified humidity level is 95% RH noncondensing.

MODEL	FAILURES/106 HRS	MTBF (HRS)
SCM9B-1xxx/2xxx/3xxx/4xxx/5xxx	9.52	105,000
SCM9B-17xx	8.16	123,000

SCM9B-3000/4000 COMPUTER-TO-ANALOG OUTPUT PRODUCTS
("4000" Series products have user-programmable features)

MODEL	OUTPUT RANGE	INPUT
Voltage-output		
SCM9B-3121/4121	±1V	RS-232C
SCM9B-3122/4122	±1V	RS-485
SCM9B-3131/4131	±5V	RS-232C
SCM9B-3132/4132	±5V	RS-485
SCM9B-3141/4141	±10V	RS-232C
SCM9B-3142/4142	±10V	RS-485
SCM9B-3161/4161	0 to 1V	RS-232C
SCM9B-3162/4162	0 to 1V	RS-485
SCM9B-3171/4171	0 to 5V	RS-232C
SCM9B-3172/4172	0 to 5V	RS-485
SCM9B-3181/4181	0 to 10V	RS-232C
SCM9B-3182/4182	0 to 10V	RS-485

MODEL	OUTPUT RANGE	INPUT
Current Output		
SCM9B-3251/4251	0 to 20mA	RS-232C
SCM9B-3252/4252	0 to 20mA	RS-485
SCM9B-3261/4261	4-20mA	RS-232C
SCM9B-3262/4262	4-20mA	RS-485

SCM9B-A1000/A2000 CONVERTERS/REPEATERS

MODEL	DESCRIPTION
SCM9B-A1000-115	RS-232C/RS-485 Converter/Repeater, 115VAC
SCM9B-A1000-230	RS-232C/RS-485 Converter/Repeater, 230VAC
SCM9B-A2000	RS-232C/RS-485 Converter/Repeater, +10 to +30VDC

SCM9B-D192 DIN-RAIL MOUNT RS-485 REPEATER

MODEL	DESCRIPTION
SCM9B-D192	RS-485 Repeater

SCM9B-H1700 DIGITAL I/O BOARDS

MODEL	DESCRIPTION
SCM9B-H1750	24 Digital Inputs/Outputs
SCM9B-H1770	64 Digital Inputs/Outputs
SCM9B-HCA1	4 Ribbon Connector Assembly

ACCESSORIES AND SOFTWARE

MODEL	DESCRIPTION
SCM9B-PB08	8-channel Backpanel
SCM9B-PB14	14-channel Backpanel
SCM9B-S300	Utility Software
MA-1001	User's Manual, SCM9B-1000
MA-1002	User's Manual, SCM9B-2000
MA-1003	User's Manual, SCM9B-3000/4000
MA-1004	User's Manual, SCM9B-1700
MA-1005	User's Manual, SCM9B-A1000/A2000
MA-1011	User's Manual, SCM9B-5000
MA-1013	User's Manual, SCM9B Modbus® Protocol
MA-1014	User's Manual, SCM9B-D100

For SCM9B data sheets, go to:
www.dataforth.com/SCM9b-signal-conditioner
and click on SCM9B Analog-to-Serial Isolated Modules.

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SCM9B-1000/2000

Sensor-to-computer Modules

DESCRIPTION

The SCM9B-1000/2000 Sensor-to-computer Modules are a family of complete solutions designed for data acquisition systems based on personal computers and other processor-based equipment with standard serial I/O ports. The modules convert analog input signals to engineering units and transmit in ASCII format to any host with standard RS-485 or RS-232C ports. These modules can measure temperature, pressure, voltage, current and various types of digital signals. The modules provide direct connection to a wide variety of sensors and perform all signal conditioning, scaling, linearization and conversion to engineering units. Each module also provides digital I/O lines for controlling devices through solid state relays or TTL signals. These digital I/O lines along with built-in limit setting capability provide alarm and control outputs.

The modules contain no pots or switches to be set. Features such as address, data rate, parity, alarms, echo, etc. are selectable using simple commands over the communications port—without requiring access to the module. The selections are stored in nonvolatile EEPROM which maintains data even after power is removed.

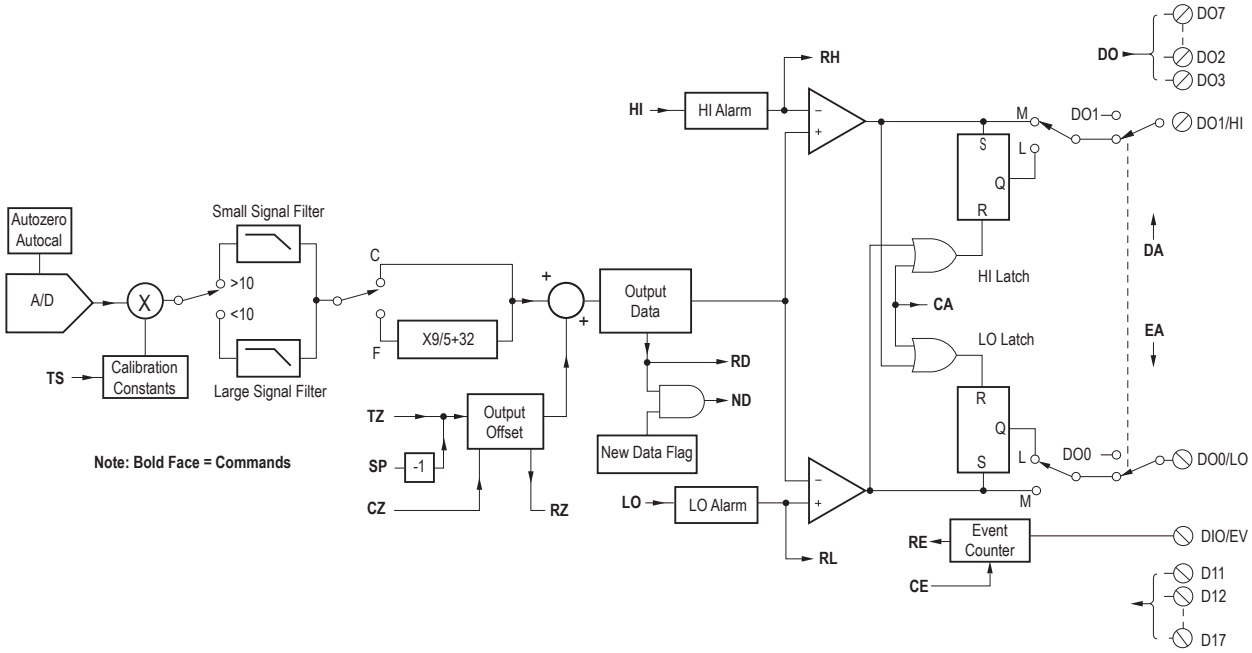
The 2000 Series is an enhanced version of the 1000 Series of sensor interfaces. The 2000 Series allows the user to scale the output data in any desired engineering units. The 2000 Series also provides the ability to program nonlinear transfer functions. This feature may be used to linearize nonstandard sensors or to provide outputs in engineering units which are nonlinear functions of the input.

FEATURES

- Complete Sensor to RS-485 or RS-232C Interface
- ASCII Format Command/ Response Protocol
- 500Vrms Analog Input Isolation
- 15-bit Measurement Resolution
- Continuous Self-calibration; No Adjustments of Any Kind
- Programmable Digital Filter
- Digital Limit Setting and Alarm Capability
- Digital Inputs and Outputs Connect to Solid State Relays
- Events Counter to 10 Million
- Requires +10V to +30VDC Unregulated Supply
- Transient Suppression on RS-485 Communications Lines
- Screw Terminal Plug Connectors Supplied
- CE Compliant

PROGRAMMABLE FEATURES (2000 SERIES)

- Provides Intelligent Features Not Found in the 1000 Series
- ASCII Output Scaled to Desired Engineering Units
- User Programmable Nonlinear Transfer Function
- Straight-line Segment Approximation: up to 24 Segments



SCM9B-1000/2000 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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Specifications Typical at +25°C and nominal power supply unless otherwise noted.

Analog
- Single-channel analog input
- Maximum CMV, input-to-output at 60Hz: 500Vrms
- Leakage current, input-to-output at 115Vrms, 60Hz: <2µArms
- 15-bit measurement resolution
- 8 conversions per second
- Autozero & autocalibration—no adjustment pots

Digital
- 8-bit CMOS microcomputer
- Digital scaling, linearization and calibration
- Nonvolatile memory eliminates pots and switches

Digital Filtering
- Small and large signal with user-selectable time constants from 0 to 16 seconds

Events Counter
- Up to 10 million positive transitions at 60Hz (max), filtered for switch debounce

Digital Inputs
- Voltage levels: ±30V without damage
- Switching levels: High, 3.5V (min), Low, 1.0V (max)
- Internal pull-up resistors for direct switch input

Digital Outputs
- Open collector to 30V, 30mA (max) load

Alarm Outputs
- HI/LO limit checking by comparing input values to down-loaded HI/LO limit values stored in memory.
- Alarms: latching (stays on if input returns to within limits) or momentary (turns off if input returns to within limits)

Communications
- Communications in ASCII via RS-232C, RS-485 ports
- Selectable data rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400bps
- NRZ asynchronous data format; 1 start bit, 7 data bits, 1 parity bit, and 1 stop bit
- Parity: odd, even, none
- User-selectable channel address
- ASCII format command/response protocol
- Up to 124 multidrop modules per host serial port
- Communications distance up to 10,000 feet (RS-485)
- Transient suppression on RS-485 communications lines
- Communications error checking via checksum
- Can be used with "dumb terminal"
- Scan up to 250 channels per second
- All communications setups stored in EEPROM

Power
- Requirements: Unregulated +10V to +30VDC, 0.75W (max) (1500/2500, 2.0W (max))
- Internal switching regulator
- Protected against power supply reversals

Environmental
- Temperature Range: Operating –25°C to +70°C
  Storage –25°C to +85°C
- Relative Humidity: 0 to 95% Noncondensing

1100/2100 Voltage Input Modules
- Voltage ranges: ±10mV, ±100mV, ±1V, ±5V, ±10V, ±100VDC
- Resolution: 0.01% of FS (4 digits)
- Accuracy: ±0.02% of FS (max)
- Common-mode rejection: 100dB at 50/60Hz
- Zero drift: ±1 count max (autozero)
- Span tempco: ±50ppm/°C (max)
- Input burnout protection to 250VAC
- Input impedance: ≤ ±1V input = 100MΩ (min)
  ≥ ±5V input = 1MΩ (min)
- 1 Digital input/Event counter, 2 Digital outputs

1200/2200 Current Input Modules
- Current ranges: ±1mA, ±10mA, ±100mA, ±1A, 4-20m ADC
- Resolution: 0.01% of FS (4 digits), 0.04% of FS (4-20mA)
- Accuracy: ±0.02% of FS, 0.04% of FS (4-20mA)
- Common mode rejection: 100dB at 50/60Hz
- Zero drift: ±1 count (max) (autozero)
- Span tempco: ±50ppm/°C (max) (±1A = ±80 ppm/°C (max))
- Voltage drop: ±0.1V (max)
- 1 Digital input/Event counter, 2 Digital outputs.

1300 Thermocouple Input Modules
- Thermocouple types: J, K, T, E, R, S, B, C (factory set)
- Ranges: J = –200°C to +760°C B = 0°C to +1820°C
  K = –150°C to +1250°C S = 0°C to +1750°C
  T = –200°C to +400°C R = 0°C to +1750°C
  E = –100°C to +1000°C C = 0°C to +2315°C
- Resolution: ±1°
- Overall Accuracy (error from all sources) from 0 to +40°C ambient:
  ±1.0 °C (max) (J, K, T, E)
  ±2.5 °C (max) (R, S, B, C)(300°C to FS)
- Common mode rejection: 100dB at 50/60Hz
- Input impedance: 100MΩ (min)
- Lead resistance effect: <20µV per 350Ω
- Open thermocouple indication
- Input burnout protection to 250VAC
- User selectable °C or °F
- Overrange indication
- Automatic cold junction compensation and linearization
- 2 Digital inputs, Event counter, 3 Digital outputs

1400 RTD Input Modules
- RTD types: α = 0.00385, 0.00392, 100Ω at 0°C,
  0.00388, 100Ω at 25°C
- Ranges: 0.00385 = –200°C to +850°C
  0.00392 = –200°C to +600°C
  0.00388 = –100°C to +125°C
- Resolution: 0.1°
- Accuracy: ±0.3°C
- Common mode rejection: 100dB at 50/60Hz
- Input connections: 2, 3, or 4 wire
- Excitation current: 0.25mA
- Lead resistance effect: 3 wire - 2.5°C per Ω of imbalance.
  4 wire - negligible
- Max lead resistance: 50Ω
- Input protection to 120VAC
- Automatic linearization and lead compensation
- User selectable °C or °F
- 1 Digital output

1450 Thermistor Input Modules
- Thermistor types: 2252Ω at 25°C, TD Series
- Ranges: 2252Ω = –0°C to +100°C
  TD = –40°C to +150°C
- Resolution: 2252Ω = 0.01°C or F
  TD = 0.1°C or F
- Accuracy: 2252Ω = ±0.1°C
  TD = ±0.2°C
- Common mode rejection: 100dB at 50/60Hz
- Input protection to 30VDC
- User selectable °C or °F
- 1 Digital input/ Event counter, 2 Digital outputs

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Specifications Typical at +25°C and nominal power supply unless otherwise noted

1500/2500 Strain Gage Input Modules

- Voltage Ranges: ±30mV, ±100mV, 1-6VDC
- Resolution: <10µV (mV Span)
  0.02% of FS (V Span)
- Accuracy: ±0.05% of FS (max)
- Common mode rejection: 100dB at 50/60Hz
- Offset Control: Full input range
- Excitation Voltage: 5V, 8V, 10VDC, 60mA (max)
- Input burnout protection to 30V, any pin
- Zero drift: ±1µV/°C (max)
- Span tempco: ±50ppm/°C (max)
- 1 Digital output

1600/2600 Timer and Frequency Input Modules

- Input impedance: 1MΩ
- Switching level: Selectable +1.7V to +2.5V
- Hysteresis: Adjustable 10mV-1.0V
- Input protection: 250VAC
- 1 Digital input/event counter

Frequency Input

- Range: 1Hz to 20kHz
- Resolution: 0.005% of reading + 0.01Hz
- Accuracy: ±0.01% of reading ±0.01Hz
- Tempco: ±20ppm/°C

Timer Input

- Range: 100µs to 30s
- Resolution: 0.005% of reading +10µs
- Accuracy: ±0.01% of reading ±10µs
- Tempco: ±20ppm/°C

Event Counter Input

- Input Bandwidth: 60Hz (optional 20kHz (max))
  SCM9B-1621–20kHz for 20kHz model
  SCM9B-1622–20kHz for 20kHz model
- Up to 10 million positive transitions.

1621/1622 Event Counter Input

- TTL compatible: <1V = 0
  >3.5V = 1
  ±30V (max) no damage
  Triggers on rising edge

Accumulator Input

- Input Frequency Range: 1Hz to 10kHz
- Input Timer Range: 100µs to 30s
- Pulse Count: Up to 10 million positive transitions
- Resolution: 0.005% of reading +0.01Hz (frequency)
  0.005% of reading +10µs (timer)
- Accuracy: ±0.01% of frequency reading ±0.01Hz
  ±0.01% of timer reading ±10µs
- Tempco: ±20ppm/°C

1700 Digital Input/Output Modules

1711, 1712: 15 digital input/output bits

- User can define any bit as an input or an output
- Input voltage levels: 0-30V without damage
- Input switching levels: High, 3.5V (min), Low, 1.0V (max)
- Outputs: Open collector to 30V, 100mA (max) load
- Vsat: 1.0V (max) at 100mA
- Single bit or parallel I/O addressing

1701, 1702: 7 Digital Inputs and 8 Digital Outputs

- Input voltage levels: ±30V without damage
- Input switching levels: High, 3.5V (min), Low,1.0V (max)
- Outputs: open collector to 30V, 30mA (max) load
- Vsat: 0.2V (max) at 30mA
- Internal pull up resistors for direct switch input
- Inputs/Outputs are read/set in parallel

Specifications are subject to change without notice.

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Ordering Information – SCM9B-1100-2100 Voltage Inputs

Part Number	Input Range	Output Range	Bandwidth	Mechanical Format
SCM9B-1101	±10mV	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-1102	±10mV	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-1111	±100mV	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-1112	±100mV	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-1121	±1V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-1122	±1V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-1131	±5V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-1132	±5V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-1141	±10V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-1142	±10V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-1151	±100V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-1152	±100V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-2101	±10mV	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-2102	±10mV	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-2111	±100mV	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-2112	±100mV	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-2121	±1V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-2122	±1V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-2131	±5V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-2132	±5V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-2141	±10V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-2142	±10V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-2152	±100V	RS-485	Programmable	Plug-In or Hockey Puck

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Ordering Information – SCM9B-1200-2200 Current Inputs

Part Number	Input Range	Output Range	Mechanical Format
SCM9B-1211	±10mA	RS-232C	Plug-In or Hockey Puck
SCM9B-1221	±1mA	RS-232C	Plug-In or Hockey Puck
SCM9B-1222	±1mA	RS-485	Plug-In or Hockey Puck
SCM9B-1231	±100mA	RS-232C	Plug-In or Hockey Puck
SCM9B-1232	±100mA	RS-485	Plug-In or Hockey Puck
SCM9B-1241	±1A	RS-232C	Plug-In or Hockey Puck
SCM9B-1242	±1A	RS-485	Plug-In or Hockey Puck
SCM9B-1251	4-20mA	RS-232C	Plug-In or Hockey Puck
SCM9B-1252	4-20mA	RS-485	Plug-In or Hockey Puck
SCM9B-2211	±10mA	RS-232C	Plug-In or Hockey Puck
SCM9B-2242	±1A	RS-485	Plug-In or Hockey Puck
SCM9B-2251	4-20mA	RS-232C	Plug-In or Hockey Puck
SCM9B-2252	4-20mA	RS-485	Plug-In or Hockey Puck

Ordering Information – SCM9B-1300 Thermocouple Inputs

Part Number	Thermocouple Type	Output Range	Input Temperature Range	Mechanical Format
SCM9B-1311	J	RS-232C	–200°C to 760°C	Plug-In or Hockey Puck
SCM9B-1312	J	RS-485	–200°C to 760°C	Plug-In or Hockey Puck
SCM9B-1321	K	RS-232C	–150°C to 1250°C	Plug-In or Hockey Puck
SCM9B-1322	K	RS-485	–150°C to 1250°C	Plug-In or Hockey Puck
SCM9B-1331	T	RS-232C	–200°C to 400°C	Plug-In or Hockey Puck
SCM9B-1332	T	RS-485	–200°C to 400°C	Plug-In or Hockey Puck
SCM9B-1341	E	RS-232C	–100°C to 1000°C	Plug-In or Hockey Puck
SCM9B-1342	E	RS-485	–100°C to 1000°C	Plug-In or Hockey Puck
SCM9B-1351	R	RS-232C	0°C to 1750°C	Plug-In or Hockey Puck
SCM9B-1352	R	RS-485	0°C to 1750°C	Plug-In or Hockey Puck
SCM9B-1361	S	RS-232C	0°C to 1750°C	Plug-In or Hockey Puck
SCM9B-1362	S	RS-485	0°C to 1750°C	Plug-In or Hockey Puck
SCM9B-1371	B	RS-232C	0°C to 1820°C	Plug-In or Hockey Puck
SCM9B-1372	B	RS-485	0°C to 1820°C	Plug-In or Hockey Puck
SCM9B-1381	C	RS-232C	0°C to 2315°C	Plug-In or Hockey Puck
SCM9B-1382	C	RS-485	0°C to 2315°C	Plug-In or Hockey Puck

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Ordering Information – SCM9B-1400 RTD Inputs

Part Number	Input Configuration	RTD Type	Input Range	Output Range	Mechanical Format
SCM9B-1411	2 & 3 Wire, 4 Wire	100Ω at 0°C alpha = 0.00385	–200°C to 850°C	RS-232C	Plug-In or Hockey Puck
SCM9B-1412	2 & 3 Wire, 4 Wire	100Ω at 0°C alpha = 0.00385	–200°C to 850°C	RS-485	Plug-In or Hockey Puck
SCM9B-1421	2 & 3 Wire, 4 Wire	100Ω at 0°C alpha = 0.00392	–200°C to 600°C	RS-232C	Plug-In or Hockey Puck
SCM9B-1422	2 & 3 Wire, 4 Wire	100Ω at 0°C alpha = 0.00392	–200°C to 600°C	RS-485	Plug-In or Hockey Puck
SCM9B-1431	2 & 3 Wire, 4 Wire	100Ω at 25°C alpha = 0.00388	–100°C to 125°C	RS-232C	Plug-In or Hockey Puck
SCM9B-1432	2 & 3 Wire, 4 Wire	100Ω at 25°C alpha = 0.00388	–100°C to 125°C	RS-485	Plug-In or Hockey Puck

Ordering Information – SCM9B-1400 Thermistor Inputs

Part Number	Type	Output	Input Temp. Range	Resolution	Mechanical Format
SCM9B-1411	2252Ω at 25°C	RS-232C	0°C to 100°C	0.01°C or °F	Plug-In or Hockey Puck
SCM9B-1412	2252Ω at 25°C	RS-485	0°C to 100°C	0.01°C or° F	Plug-In or Hockey Puck
SCM9B-1421	TD Series	RS-232C	–40°C to 150°C	0.1°C or °F	Plug-In or Hockey Puck
SCM9B-1422	TD Series	RS-485	–40°C to 150°C	0.1°C or °F	Plug-In or Hockey Puck

Ordering Information – SCM9B-1500-2500 Strain Gage Inputs

Part Number	Excitation Voltage	Sensitivity	Input Configuration	Input Range	Output Range
SCM9B-1511	5.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-232C
SCM9B-1512	5.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-485
SCM9B-1521	10.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-232C
SCM9B-1522	10.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-485
SCM9B-1531	5.0V	3mV/V to 600mV/V	Full Bridge	±100mV	RS-232C
SCM9B-1532	5.0V	3mV/V to 600mV/V	Full Bridge	±100mV	RS-485
SCM9B-1541	10.0V	3mV/V to 600mV/V	Full Bridge	±100mV	RS-232C
SCM9B-1542	10.0V	3mV/V to 600mV/V	Full Bridge	±100mV	RS-485
SCM9B-1562	10.0V	3mV/V to 600mV/V	Full Bridge	+1 to +6V	RS-485
SCM9B-2511	5.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-232C
SCM9B-2512	5.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-485
SCM9B-2521	10.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-232C
SCM9B-2522	10.0V	3mV/V to 600mV/V	Full Bridge	±30mV	RS-485
SCM9B-2532	5.0V	3mV/V to 600mV/V	Full Bridge	±100mV	RS-485
SCM9B-2541	10.0V	3mV/V to 600mV/V	Full Bridge	±100mV	RS-232C
SCM9B-2551	8.0V	3mV/V to 600mV/V	Full Bridge	+1 to +6V	RS-232C
SCM9B-2552	8.0V	3mV/V to 600mV/V	Full Bridge	+1 to +6V	RS-485
SCM9B-2561	10.0V	3mV/V to 600mV/V	Full Bridge	+1 to +6V	RS-232C

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Ordering Information – 1600-2600 Time/Frequency-inputs

Part Number	Input Range	Output Range	Bandwidth	Mechanical Format
SCM9B-1601	0 to 60Hz	RS-232C	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-1602	0 to 60Hz	RS-485	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-1612	100µs to 30s	RS-485	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-1621	0 to 60Hz	RS-232C	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-1622	0 to 60Hz	RS-485	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-1631	1 to 10kHz	RS-232C	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-1632	1 to 10kHz	RS-485	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-1642	100µs to 30s	RS-485	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-2601	0 to 60Hz	RS-232C	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-2602	0 to 60Hz	RS-485	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-2631	1 to 10kHz	RS-232C	Adjustable 10mV - 1V	Plug-In or Hockey Puck
SCM9B-2632	1 to 10kHz	RS-485	Adjustable 10mV - 1V	Plug-In or Hockey Puck

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SCM9B-5000

4-channel Sensor-to-computer Modules

DESCRIPTION

The SCM9B-5000 4-channel Sensor-to-computer Modules are a family of complete solutions designed for data acquisition systems based on personal computers and other processor-based equipment with standard serial I/O ports. The modules convert four analog input signals to engineering units and transmit in ASCII format to any host with standard RS-485 or RS-232C ports. These modules can measure temperature, voltage, and current. The modules provide direct connection to a wide variety of sensors and perform all signal conditioning, scaling, linearization, and conversion to engineering units.

Each channel of the SCM9B-5000 Series can be independently programmed by the user for zero, span, and filter, to scale linear input signals such as millivolts and milliamps to desired engineering units such as pounds or percent of full scale.

The SCM9B-5000 modules are easy to use. With these modules, anyone familiar with a personal computer can construct a data acquisition system. This modular approach to data acquisition is extremely flexible, easy to use, and cost effective. Data is acquired on a per channel basis so you only buy as many channels as you need. The modules can be mixed and matched to fit the application. They can be placed remote from the host and from each other.

The modules contain no pots or switches to be set. Features such as address, data rate, parity, echo, and scaling are selectable using simple commands over the communications port—without requiring access to the module. The selections are stored in nonvolatile EEPROM which maintains data even after power is removed.

The 5000 series is completely hardware- and software-compatible with the 1000, 2000, 3000 and 4000 series and may be mixed in any combination.

All modules are supplied with removable screw-terminal connectors and captive mounting hardware. The connectors allow system expansion, reconfiguration or repair without disturbing field wiring.

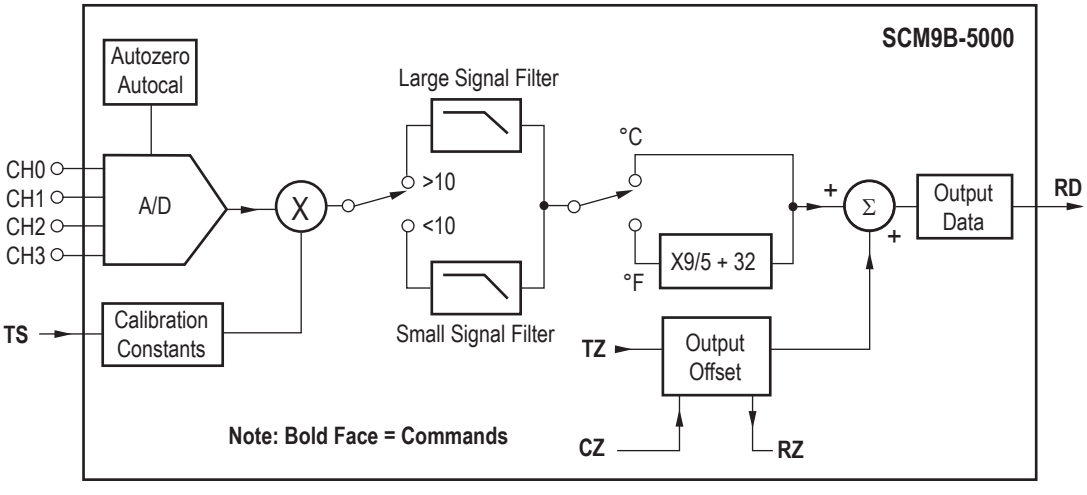
Although software is not required, utility software (S1000) is available.

FEATURES

- Four Analog Input Channels
- Complete Sensor to RS-485 or RS-232 Interface
- ASCII Format Command/ Response Protocol
- 500Vrms Analog Input Isolation
- 15-bit Measurement Resolution
- Continuous Self-calibration; No Adjustments of Any Kind
- Programmable Digital Filter
- Requires +10V to +30VDC Unregulated Supply
- Transient Suppression on RS-485 Communications Lines
- Screw Terminal Plug Connectors Supplied
- Mix and Match with Single-channel Units on Same Backpanel
- CE Compliant

APPLICATIONS

- Process Monitoring and Control
- Remote Data Logging to any Host Computer
- Product Testing
- Direct Connection to Modems



SCM9B-5000 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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Specifications Typical at +25°C and nominal power supply unless otherwise noted.

Analog
- Four-channel analog input
- Maximum CMV, input to output at 60Hz: 500Vrms
- Leakage I, input to output at 115Vrms, 60Hz: <2µArms
- 15-bit measurement resolution
- 8 conversions per second
- Common-mode rejection: 100dB at 50/60Hz
- Autozero and autocalibration—no adjustment pots

Digital
- 8-bit CMOS microcomputer
- Digital scaling, linearization and calibration
- Nonvolatile memory eliminates pots and switches
- Small and large signal digital filtering with user selectable time constants

Communications
- Communications in ASCII via RS-232C, RS-485 ports
- Selectable data rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600,115200bps
- NRZ asynchronous data format; 1 start bit, 7 data bits, 1 parity bit, and 1 stop bit
- Parity: odd, even, none
- User-selectable channel address
- ASCII format command/response protocol
- Up to 3721 multidrop modules per host serial port
- Communications distance up to 4,000 feet (RS-485)
- Transient suppression on RS-485 communications lines
- Communications error checking via checksum
- Scan up to 250 channels per second
- All communications setups stored in EEPROM

Power
- Requirements: Unregulated +10V to +30VDC, 0.75W (max)
- Protected against power supply reversals

Environmental
- Temperature Range: Operating –25°C to +70°C
  Storage –25°C to +85°C
- Relative Humidity:0 to 95% Noncondensing

Mechanical
- Dimensions: See Dimension drawing
- Case: ABS with captive mounting hardware
- Connectors: Screw terminal barrier plug (supplied)
  Replace with Phoenix MSTB 1.5/10ST 5.08 or equivalent

5100 Voltage Inputs
- Voltages: ±100mV, ±1V, ±5V, ±10V, ±100VDC
- Resolution: 0.01% of FS (4 digits)
- Accuracy: ±0.02% of FS (max)
- Zero drift: ±1 count max (autozero)
- Span tempco: ±50ppm/°C (max)
- Input burnout protection to 250VAC
- Input impedance: ≤±1V input = 100MΩ (min)
  ≥±5V input = 1MΩ (min)

5200 Current Input
- Current: 4-20mADC
- Resolution: 0.04% of FS
- Accuracy: 0.04% of FS
- Zero drift: ±1 count max (autozero)
- Span tempco: ±50ppm/°C (max)
- Voltage drop: 1.0V (max)

5300 Thermocouple Inputs
- Thermocouple types: J, K, T, E (factory set)
- Ranges: J = –200°C to +760°C
  T = –200°C to +400°C
  K = –150°C to +1250°C
  E = –100°C to +1000°C
- Resolution: ±1°
- Overall Accuracy (error from all sources) from 0 to +40°C ambient: ±1.0°C
- Input impedance: 100MΩ (min)
- Lead resistance effect: <20µV per 350Ω
- Open thermocouple and overrange indication
- Input burnout protection to 250VAC
- User-selectable °C or °F
- Automatic cold junction compensation and linearization.

5450 Thermistor Inputs
- Thermistor types: 2252Ω at 25°C
- Range: 0°C to +100°C
- Resolution: 0.01°C or F
- Accuracy: ±0.1°C
- Input protection to 30VDC
- User selectable °C or °F

Specifications are subject to change without notice.

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Ordering Information – SCM9B-5100 Voltage Inputs

Part Number	Input Range	Output Range	Bandwidth	Mechanical Format
SCM9B-5111	±100mV	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-5112	±100mV	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-5121	±1V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-5122	±1V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-5131	±5V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-5132	±5V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-5141	±10V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-5142	±10V	RS-485	Programmable	Plug-In or Hockey Puck
SCM9B-5151	±100V	RS-232C	Programmable	Plug-In or Hockey Puck
SCM9B-5152	±100V	RS-485	Programmable	Plug-In or Hockey Puck

Ordering Information – SCM9B-5200 Current Inputs

Part Number	Input Range	Output Range	Bandwidth
SCM9B-5251	4-20mA	RS-232C	Plug-In or Hockey Puck
SCM9B-5252	4-20mA	RS-485	Plug-In or Hockey Puck

Ordering Information – 5300 Thermocouple Inputs

Part Number	Thermocouple Type	Output Range	Input Temperature Range	Mechanical Format
SCM9B-5312	J	RS-485	–200°C to 760°C	Plug-In or Hockey Puck
SCM9B-5321	K	RS-232C	–150°C to 1250°C	Plug-In or Hockey Puck
SCM9B-5322	K	RS-485	–150°C to 1250°C	Plug-In or Hockey Puck
SCM9B-5332	T	RS-485	–200°C to 760°C	Plug-In or Hockey Puck

Ordering Information – 5400-Thermistor

Part Number	Type	Output Range	Input Range	Resolution	Mechanical Format
SCM9B-5451	2252Ω at 25°C	RS-232C	0°C to 100°C	0.01°C or °F	Plug-In or Hockey Puck
SCM9B-5452	2252Ω at 25°C	RS-485	0°C to 100°C	0.01°C or °F	Plug-In or Hockey Puck

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SCM9B-D13x

CE

DIN-rail Mount Sensor-to-computer Thermocouple-input Module

DESCRIPTION

The SCM9B-D100 sensor-to-computer modules are a family of data acquisition modules that convert analog input signals to digital data and transmit via RS-485 to a controller which may be a computer or other processor-based equipment. The modules can measure temperature, pressure, voltage, current, digital input or digital output signals. The modules provide direct connection to a wide variety of sensors and perform all signal conditioning, scaling, linearization and conversion to either linearized ASCII data values or Modbus RTU data values.

Features such as address, data rate, parity, echo, etc., are selectable using simple commands over the RS-485 port. The selections are stored in nonvolatile EEPROM which maintains data even after power is removed.

Data is acquired on a per channel basis so you only buy as many channels as you need. The modules can be mixed and matched to fit your application. They can be placed remote from the host and from each other. You can string up to 247 modules on a twisted pair of wires by using RS-485 with repeaters.

All modules are supplied with screw terminal plug connectors. The connectors allow system expansion, reconfiguration or repair without disturbing field wiring.

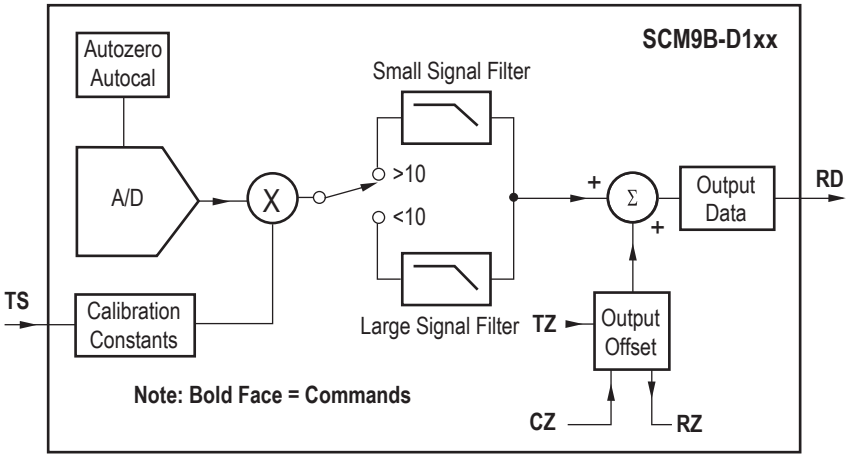
Utility software is available from Dataforth to make the D100 easier to learn and use. The software is provided at no charge on request with a purchase order and is not copy protected.

FEATURES

- Complete Sensor to RS-485 Interface
- 500Vrms Analog Input Isolation
- 15-bit Measurement Resolution
- Continuous Self-calibration; No Adjustments of Any Kind
- Programmable Digital Filter
- Requires +5VDC Supply
- Transient Suppression on RS-485 Communications Lines
- Screw Terminal Plug Connectors Supplied
- CE Compliant

Specifications

Module	SCM9B-D134
Thermocouple Type	E
Output Range	RS-485
Input Temperature Range	–100 to 1000°C
Mechanical Format	DIN-rail
Isolation Voltage	500Vrms
Isolation Type	Transformer/Optical 2-way
Accuracy	±1°C (max)
Supply Voltage	+5VDC ±5%
Input Voltage Withstand	250VAC
Gain/Offset Adjust	Autozero, Autocal
Module Bandwidth	N/A
NMR (60 Hz) Rejection	N/A
External I-to-V Resistor	N/A
Output Control	RS-485
Output Resistance	N/A
Dimensions	3.40 x 3.30 x 1.00 Inches
Interface	10 Pos Term Block
Customization	No
Weight	103 Grams (3.63 ounces)



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SCM9B-D134 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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Theory of Operation

Each Dataforth module is a complete single-channel data acquisition system. Each unit contains an analog signal conditioning circuit optimized for a specific input type. Sensor signals are converted to digital data with a microprocessor-controlled integrating A/D converter. Offset and gain errors in the analog circuitry are continuously monitored and corrected using microprocessor techniques. The D100 converts the digital signal data and stores the resultant data in a memory buffer. The modules continuously convert data at the rate of 8 conversions per second and store the latest result in the buffer.

Host procesors may request data by sending a query to the module. The D100 will instantly respond by communicating the memory buffer data back to the host processor. Up to 247 modules may be linked to a single RS-485 port. Each module on a serial line is identified by a unique user-programmable address. This addressing technique allow modules to be interrogated in any order.

Digital Inputs/Outputs

D170 digital input/output modules contain open-collector transistor switches that may be controlled by the host processors. These switches may be used to control solid-state relays which in turn may control heaters, pumps, and other power equipment. The digital input may be read by the host processor and used to sense the state of remote digital signals. They are ideal for sensing the state of limit or safety switches.

Digital Filter

The D100 analog input modules include two unique programmable, single-pole digital filters. The filter is used to smooth analog data in noisy environments. Separate time constraints may be specified for small and large signal changes. Typically, a large time constant is specified for small signal changes to filter out noise and provide stable output readings. A smaller time constant may be chosen for large signal changes to provide fast response to such changes.

Command Set

The D100 series uses the Modbus RTU or the Dataforth ASCII protocol for communication.

The Modbus RTU binary protocol uses a master-slave technique, in which only the master device can initiate transactions. The slave devices respond by supplying the requested data to the master or by taking the action requested in the query. The master can address any slave device. The returned messages are considered response messages. The supported master codes are:

Modbus RTU Function and Descriptions

01	Read Coil Status (Digital Inputs)
04	Read Input Register (Analog Inputs)
05	Force Single Coil (One Digital Input)
06	Preset Single Register (Dataforth/RTU Protocol)
15	Force Multiple Coils (Multiple Digital Output)

The Dataforth ASCII protocol is a comment and response protocol using ASCII characters for easy troubleshooting and interpretation of data values.

D100 Series ASCII Command Set

Command and Definition		Typical Command Message ($ prompt)	Typical Response Message
DI	Digital input	$1DI	*0003
DO	Digital Output	$1DOFF	*
RD	Read Data	$1RD	*+00072.00
RS	Read Setup	$1RS	*31070142
RSU	Read Setup	$1RSU	*31070142
RZ	Read Zero	$1RZ	*+00000.00
WE	Write Enable	$1WE	*
Write Protect Commands			
CZ	Clear Zero	$1CZ	*
RR	Remote Reset	$1RR	*
SU	Setup Module	$1SU31070142	*
TS	Trim Span	$1TS+00600.00	*
TZ	Reim Zero	$1TZ+00000.00	*

Setup

The D100 series are initiated at the factory using the Dataforth ASCII protocol. This allows setup and configuration, including the Modbus device address, to be easily performed using the Dataforth setup software or a dumb terminal. Each D100 module must be properly configured before installation into a Modbus system.

Utility Software

Complimentary Utility Software is included with each purchase order. The software simplifies configuration of all user-selectable options such as device address, data range, and filtering constraints.

Process Control Software

Modbus RTU protocol is supported by virtually all commercial process control software.

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Specifications

Typical at T_A =+25°C and nominal power supply unless otherwise noted.

Analog
- Single channel analog input
- Maximum CMV, input to output at 60Hz: 500Vrms
- Leakage current, input to output at 115Vrms, 60Hz: <2µA rms
- 15-bit measurement resolution
- 8 conversions per second
- Autozero & autocalibration—no adjustment pots

Digital
- 8-bit CMOS microcomputer
- Digital scaling, linearization and calibration
- Nonvolatile memory eliminates pots and switches

Digital Filtering
- Small and large signal with user-selectable time constants from 0 to 16 seconds

Communications
- Communications in MODBUS-RTU via RS-485 ports
- Selectable data rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400bps
- NRZ asynchronous data format; 1 start bit, 8 data bits, 1 parity bit and 1 stop bit
- Parity: odd, even, none
- User selectable channel address
- Up to 247 multidrop modules per host serial port
- Communications distance up to 4,000 feet (RS-485)
- Transient suppression on RS-485 communications lines
- All communications setups stored in EEPROM

Power
- Requirements:Regulated +5VDC, 0.75W (max) (DIN-150, 2.0W (max))
- Protected against power supply reversals.

Environmental
- Temperature Range: Operating –25°C to +70°C
  Storage –25°C to +85°C
- Relative Humidity: 0 to 95% Noncondensing

D11x Voltage Inputs
- Voltages: ±10mV, ±100mV, ±1V, ±5V, ±10V, ±100VDC
- Resolution: 0.01% of FS (4 digits)
- Accuracy: ±0.02% of FS (max)
- Common mode rejection: 100dB at 50/60Hz
- Zero drift: ±1 count max (autozero)
- Span tempco: ±50ppm/°C (max)
- Input burnout protection to 250VAC
- Input impedance: ≤ ±1V input = 100MΩ (min)
  ≥±5V input = 1MΩ (min)

D125 Current Inputs
- Currents: 4-20mADC
- Resolution: 0.04% of FS
- Accuracy: 0.04% of FS
- Common mode rejection: 100dB at 50/60Hz
- Zero drift: ±1 count (max) (autozero)
- Span tempco: ±50ppm/°C (max)
- Voltage drop: ±0.1V (max)

D13x Thermocouple Inputs
- Thermocouple types: J, K, T, E, R, S, B, C (factory set)
- Ranges: J = –200°C to +760°C B = 0°C to +1820°C
  K = –150°C to +1250°C S = 0°C to +1750°C
  T = –200°C to +400°C R = 0°C to +1750°C
  E = –100°C to +1000°C C = 0°C to +2315°C
- Resolution: ±1°
- Overall Accuracy (error from all sources) from 0 to +40°C Ambient: ±1.0 °C (max) (J, K, T, E)
  ±2.5 °C (max) (R, S, B, C)(300°C to FS)
- Common-mode rejection: 100dB at 50/60Hz
- Input impedance: 100MΩ (min)
- Lead resistance effect: <20µV per 350Ω
- Open thermocouple indication
- Input burnout protection to 250VAC
- Overrange indication

D14x RTD Inputs
- RTD types: α = 0.00385, 0.00392,100Ω at 0°C, 0.00388, 100Ω at 25°C
- Ranges: 0.00385 = –200°C to +850°C
  0.00392 = –200°C to +600°C
  0.00388 = –100°C to +125°C
- Accuracy: ±0.3°C
- Common-mode rejection: 100dB at 50/60Hz
- Input connections: 2-, 3-, or 4-wire
- Excitation current: 0.25mA
- Lead resistance effect: 3 wire - 2.5°C perΩ of imbalance
  4 wire - negligible
- Max lead resistance: 50Ω
- Input burnout protection to 120VAC
- Automatic linearization and lead compensation

D145 Thermistor Inputs
- Thermistor types: 2252Ω at 25°C, TD Series
- Ranges: 2252Ω = 0°C to +100°C
  TD = –40°C to +150°C
- Resolution: 2252Ω = 0.01°C or °F
  TD = 0.1°C or °F
- Accuracy: 2252Ω = ±0.1°C
  TD = ±0.2°C
- Common-mode rejection: 100dB at 50/60Hz
- Input burnout protection to 30VDC

D15x Bridge Inputs
- Voltage ranges: ±30mV, ±100mV
- Resolution:10µV (mV Spans)
  0.02% of FS (V Span)
- Accuracy: ±0.05% of FS (max)
- Common-mode rejection: 100dB at 50/60Hz
- Input burnout protection to 30VDC
- Offset control: Full input range
- Excitation voltage: 5V, 10VDC, 50mA (max)
- Zero drift: ±1µV/°C (max)
- Span tempco: ±50ppm/°C (max)

D161 Frequency Inputs
- Range: 1Hz to 20kHz
- Resolution: 0.005% of reading +0.01Hz
- Accuracy: ±0.01% of reading ±0.01Hz
- Tempco: ±20ppm/°C
- Input impedance: 1MΩ
- Switching level: selectable 0V, +2.5V
- Hysteresis: adjustable 10mV-1.0V
- Input burnout protection: 250VAC

D17x Digital Inputs/Outputs
- 6 digital inputs or 6 digital outputs
- Input voltage levels: ±30V without damage
- Input switching levels: High, 3.5V (min), low,1.0V (max)
- Outputs: open collector to 30V, 100mA (max) load
- Vsat: 1.0V (max) at 100mA
- Inputs/Outputs are read/set in parallel
- Isolated from power supply ground

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Ordering Information – SCM9B-D13x

Part Number	Input Range	Output Range	Mechanical Format
Voltage Inputs			
SCM9B-D110	±10mV	RS-485	DIN-rail
SCM9B-D111	±100mV	RS-485	DIN-rail
SCM9B-D112	±1V	RS-485	DIN-rail
SCM9B-D113	±5V	RS-485	DIN-rail
SCM9B-D114	±10V	RS-485	DIN-rail
SCM9B-D115	±100V	RS-485	DIN-rail
Current Inputs			
SCM9B-D125	4-20mA	RS-485	DIN-rail
Thermocouple-inputs			
SCM9B-D131	J Thermocouple	RS-485	DIN-rail
SCM9B-D132	K Thermocouple	RS-485	DIN-rail
SCM9B-D133	T Thermocouple	RS-485	DIN-rail
SCM9B-D134	E Thermocouple	RS-485	DIN-rail
SCM9B-D135	R Thermocouple	RS-485	DIN-rail
SCM9B-D136	S Thermocouple	RS-485	DIN-rail
SCM9B-D137	B Thermocouple	RS-485	DIN-rail
SCM9B-D138	C Thermocouple	RS-485	DIN-rail
RTD/Thermistor Inputs			
SCM9B-D141	0.00385 RTD	RS-485	DIN-rail
SCM9B-D142	0.00392 RTD	RS-485	DIN-rail
SCM9B-D143	0.00388 RTD	RS-485	DIN-rail
SCM9B-D145	2252Ω Thermistor	RS-485	DIN-rail
SCM9B-D146	TD Thermistor	RS-485	DIN-rail
Timer/Frequency-inputs			
SCM9B-D161	Frequency	RS-485	DIN-rail

Part Number	Digital Input	Digital Output	RS Output	Mechanical Format
Digital Input/Outputs				
SCM9B-D171	6	0	RS-485	DIN-rail
SCM9B-D172	0	6	RS-485	DIN-rail

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SCM9B-3000/4000

Computer-to-Analog Output Modules

DESCRIPTION

The SCM9B-3000/4000 series are complete computer-to-analog output interfaces. They are designed to be mounted remotely from a host computer and communicate, in ASCII, with standard RS-232 and RS-485 serial ports. Simple ASCII commands are used to control a 12-bit DAC (Digital-to-Analog Converter) which is scaled to provide commonly used current and voltage ranges. An 8-bit CMOS microprocessor provides an intelligent interface between the host and the DAC. The 3000/4000 are compatible with the 1000/2000 input modules and may be mixed in any order.

The modules are easy to use. You do not need engineering experience in complicated data acquisition hardware. This modular approach to data acquisition is extremely flexible, easy to use and cost effective. The modules can be mixed and matched to fit the application. They can be placed remote from the host and from each other. You can string up to 124 modules on one set of wires.

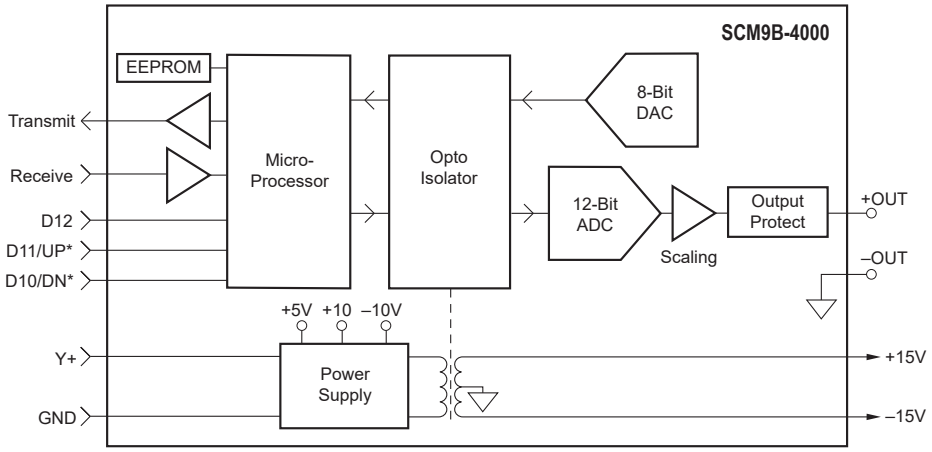
Although software is not required, utility software (SCM9B-S1000) is available online to make the 3000/4000 easier to learn and use. S1000 software is provided at no charge on request with a purchase order and is not copy protected.

FEATURES

- Analog Output Ranges: 0-1V, ±1V, 0-5V, ±5V, 0-10V, ±10V, 0-20mA, 4-20mA
- Communicates in ASCII with RS-232 or RS-485 Serial Ports
- Programmable High/Low Output Limits
- 500Vrms Output Isolation
- 12-bit Output Resolution
- Scaling in Engineering Units
- Data Rates: 300 to 38,400bps
- Nonvolatile Digital Calibration
- Output Protection: 240VAC (Current Output) ±30V (Voltage-outputs)
- Direct Connection to 'Dumb' Terminals or Modems
- Requires +10 to +30VDC Unregulated Supply
- May be Located up to 10,000 Feet from Host (RS-485)
- Addressable: up to 124 Units per Serial Port
- "Bumpless" Manual Control Inputs
- CE Compliant

Specifications

Module	SCM9B-3000/4000
Input Range	RS-232C
Output Range	0-1V, ±1V, 0-5V, ±5V, 0-10V, ±10V, 0-20mA, 4-20mA
Mechanical Format	Plug-In or Hockey Puck
Isolation Voltage	500Vrms
Isolation Type	Transformer/Optical 2-way
Accuracy	±0.1% of FS (max)
Supply Voltage	+10 to +30VDC
Output Voltage Withstand	N/A
Gain/Offset Adjust	Autozero, Autocal
Module Bandwidth	Programmable
NMR (60 Hz) Rejection	N/A
External I-to-V Resistor	N/A
Output Control	RS-232
Output Resistance	N/A
Dimensions	3.60 x 2.45 x 1.10 Inches
Interface	10 Pos Term Block
Customization	No
Weight	103 Grams (3.63 ounces)



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SCM9B-3000/4000 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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Specifications

Typical at +25°C and nominal power supply unless otherwise noted.

Analog Output
- Single-channel analog output
  - Voltage: 0-1V, ±1V, 0-5V, ±5V, 0-10V, ±10V
    - Maximum output current: 5mA
  - Current: 0-20mA, 4-20mA
    - Compliance voltage: 12V
- Output isolation: 500Vrms.
- 12-bit output resolution.
- Accuracy (Integral & Differential Linearity): 0.1% FSR (max)
- Zero drift: ±30µV/°C (Voltage Output (max))
  - ±0.2µA/°C (Current Output (max))
- Span tempco: ±25ppm/°C (max)
- 1000 conversions per second
- Settling time to 0.1% FS: 300µs (typ) (1ms max)
- Output change manual mode (–FS to +FS): 5s
- Programmable output slope (4000): 0.01V/s (mA/s) to 10,000V/s (mA/s)
- Current output voltage compliance: 12V
- Voltage output drive: 5mA (min), 10mA (max)

Analog Output Readback (4000)
- 8-bit analog-to-digital converter
- Accuracy over temperature (–25 to +70°C): 2.0% FS (max)

Digital
- 8-bit CMOS microcomputer
- Digital scaling and calibration stored in nonvolatile memory
- Programmable High/Low output limits
- Programmable data scaling (4000)
- Programmable starting value (4000)
- Programmable watchdog timer provides orderly shutdown in the event of host failure (4000)

Digital Inputs
- Three digital inputs per module
- Voltage levels: ±30V without damage
- Switching levels: High, 3.5V (min), Low, 1.0V (max)
- Internal pull-up resistors for direct switch input

Communications
- Communications in ASCII via RS-232C, RS-485 ports
- Selectable data rates: 300, 600, 1200, 2400, 4800, 9600,19200, 38400bps
- NRZ asynchronous data format; 1 start bit, 7 data bits, 1 parity bit, and 1 stop bit
- Parity: odd, even, none
- User selectable channel address
- ASCII format command/response protocol
- Up to 124 multidrop modules/host communications port
- Communications distance up to 10,000 feet (RS-485)
- Can be used with “dumb” terminal
- All communications setups (address, data rate, parity) stored in nonvolatile memory using EEPROM.
- Checksum can be added to any command or response

Power
- Requirements: Unregulated +10V to +30VDC, 0.75W (max) (Voltage Output), 1.0W (max) (Current Output)
- Internal switching regulator
- Protected against power supply reversals

Mechanical
- Dimensions: See dimension drawing
- Case: ABS with captive mounting hardware
- Connectors: Screw terminal barrier plug (supplied)
  Replace with Phoenix MSTB 1.5/10 ST 5.08 or equivalent

Environmental
- Temperature Range: Operating –25°C to +70°C
  Storage –25°C to +85°C
- Relative Humidity: 0 to 95% Noncondensing

Specifications are subject to change without notice.

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Ordering Information – SCM9B-3000/4000

Part Number	Input Range	Output Range	Mechanical Format
SCM9B-3121	RS-232C	±1V	Plug-In or Hockey Puck
SCM9B-3122	RS-485	±1V	Plug-In or Hockey Puck
SCM9B-3131	RS-232C	±5V	Plug-In or Hockey Puck
SCM9B-3132	RS-485	±5V	Plug-In or Hockey Puck
SCM9B-3141	RS-232C	±10V	Plug-In or Hockey Puck
SCM9B-3142	RS-485	±10V	Plug-In or Hockey Puck
SCM9B-3171	RS-232C	0 to +5V	Plug-In or Hockey Puck
SCM9B-3172	RS-485	0 to +5V	Plug-In or Hockey Puck
SCM9B-3181	RS-232C	0 to +10V	Plug-In or Hockey Puck
SCM9B-3182	RS-485	0 to +10V	Plug-In or Hockey Puck
SCM9B-3251	RS-232C	0-20mA	Plug-In or Hockey Puck
SCM9B-3252	RS-485	0-20mA	Plug-In or Hockey Puck
SCM9B-3261	RS-232C	4-20mA	Plug-In or Hockey Puck
SCM9B-3262	RS-485	4-20mA	Plug-In or Hockey Puck
SCM9B-4122	RS-485	±1V	Plug-In or Hockey Puck
SCM9B-4132	RS-485	±5V	Plug-In or Hockey Puck
SCM9B-4141	RS-232C	±10V	Plug-In or Hockey Puck
SCM9B-4142	RS-485	±10V	Plug-In or Hockey Puck
SCM9B-4161	RS-232C	0 to +1V	Plug-In or Hockey Puck
SCM9B-4171	RS-232C	0 to +5V	Plug-In or Hockey Puck
SCM9B-4172	RS-485	0 to +5V	Plug-In or Hockey Puck
SCM9B-4181	RS-232C	0 to +10V	Plug-In or Hockey Puck
SCM9B-4182	RS-485	0 to +10V	Plug-In or Hockey Puck
SCM9B-4251	RS-232C	0-20mA	Plug-In or Hockey Puck
SCM9B-4252	RS-485	0-20mA	Plug-In or Hockey Puck
SCM9B-4261	RS-232C	4-20mA	Plug-In or Hockey Puck
SCM9B-4262	RS-485	4-20mA	Plug-In or Hockey Puck

Discontinued Products

Part Number	Input Range	Output Range	Bandwidth
SCM9B-3161	RS-232C	0 to +1V	Plug-In or Hockey Puck
SCM9B-3162	RS-485	0 to +1V	Plug-In or Hockey Puck
SCM9B-4121	RS-232C	±1V	Plug-In or Hockey Puck
SCM9B-4131	RS-232C	±5V	Plug-In or Hockey Puck
SCM9B-4162	RS-485	0 to +1V	Plug-In or Hockey Puck

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SCM9B-A1000/A2000

RS-232C/RS-485 Converter/Repeater, 115VAC

DESCRIPTION

The A1000 and A2000 series converter boxes convert RS-232 communication signal levels to the correct electrical signals required by RS-485. The RS-485 communications standard is recommended when many SCM9B modules, or other addressable devices, must be connected to a host computer over long distances. The A1000 and A2000 converters allow communications bus lengths up to 4,000 feet and data rates up to 115kbps using one twisted pair of wires.

The RS-485 standard allows for bidirectional data on the same pair of wires. Therefore, some means of arbitrating the data direction is required. The A1000 and A2000 automatically control the bus direction without external handshaking signals from the host. Host software written for half-duplex RS-232 may be used without modification, RS-485 bus control is completely transparent to the user.

The A1000 and A2000 can also operate as repeaters for RS-485. Repeaters are required to extend communications bus lengths or to allow more than 32 RS-485 devices to be connected to a communications bus. A repeater simply reamplifies, or boosts, existing RS-485 signals transmitted over long distances.

FEATURES

- Completely Transparent to Host Software
- No External Flow Control Signals Required
- Optically-Isolated Bidirectional Data Flow
- Standard Data Rates: 300 to 115kbps
- Automatic Internal RS-485 Bus Supervision
- Networking up to 4,000 Feet
- CE Compliant

Specifications

Communications
- Max common-mode voltage: 1500Vrms, 1 minute duration
- Data rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200bps

Environmental
- Temperature range (operating and storage): –25°C to +70°C
- Relative humidity: 0 to 95% Noncondensing

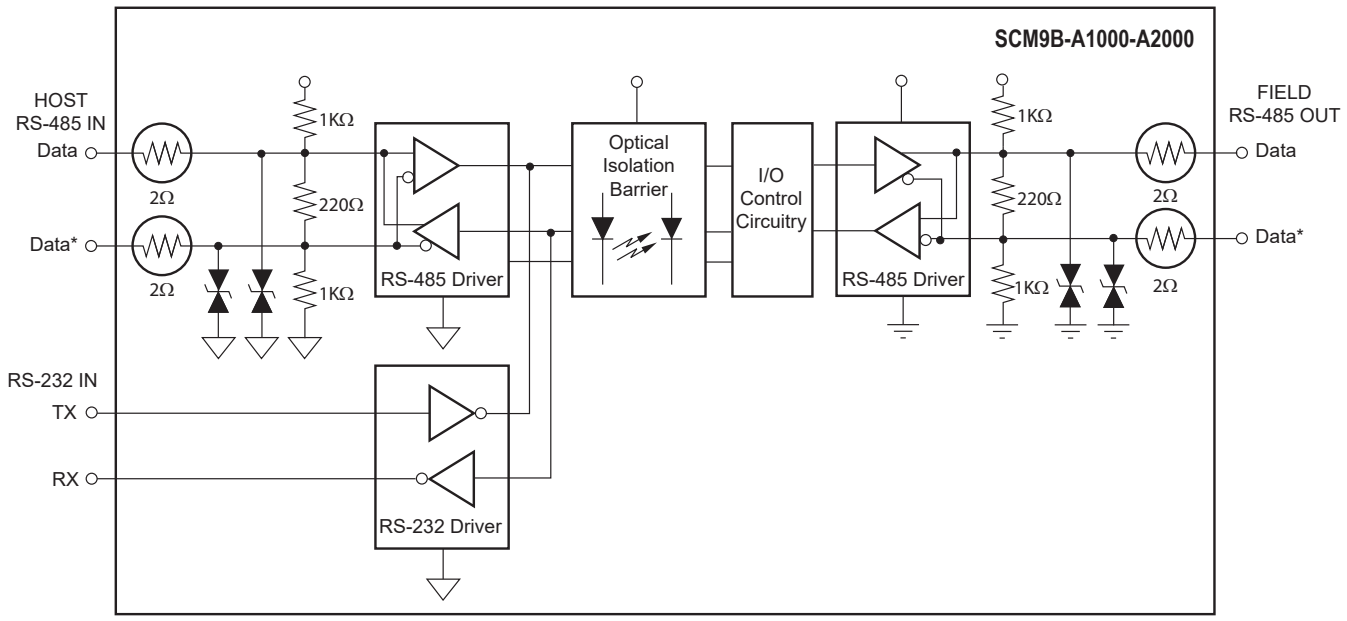
A1000 Power Specifications
- Power requirements: 115VAC (order SCM9B-A1000-115) or 230VAC (order SCM9B-A1000-230) ±10%, 50-60Hz
- Power consumption: 30W full load
- Power supply output: +24VDC at 1A

A2000 Power Specifications
- Power requirements: +10 to +30VDC unregulated
- Power consumption (at +15VDC): Max current w/RS-485 output short, 100mA
- Idle current w/LEDs off, less than 10mA

Mechanical and Dimensions
- Case: Impact resistant ABS
- Weight: 2.8lbs. (A1000), 1.0lb. (A2000)
- Dimensions: 8.08"W X 2.50"H X 6.25"D (A1000)
  7.06"W X 1.53"H X 5.30"D (A2000)

Ordering Information

Model	Description
SCM9B-A1000-115	RS-232C/RS-485 Converter/Repeater, 115VAC
SCM9B-A1000-230	RS-232C/RS-485 Converter/Repeater, 230VAC
SCM9B-A2000	RS-232C/RS-485 Converter/Repeater, +10 to +30VDC



SCM9B-A1000/A2000 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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SCM9B-D192

DIN-rail Mount RS-485 Repeater

DESCRIPTION

The SCM9B-D192 RS-485 repeater reamplifies, or boosts, existing RS-485 signals transmitted over long distances. Repeaters are required to extend communications bus lengths or to allow more than 32 RS-485 devices to be connected to a communications bus.

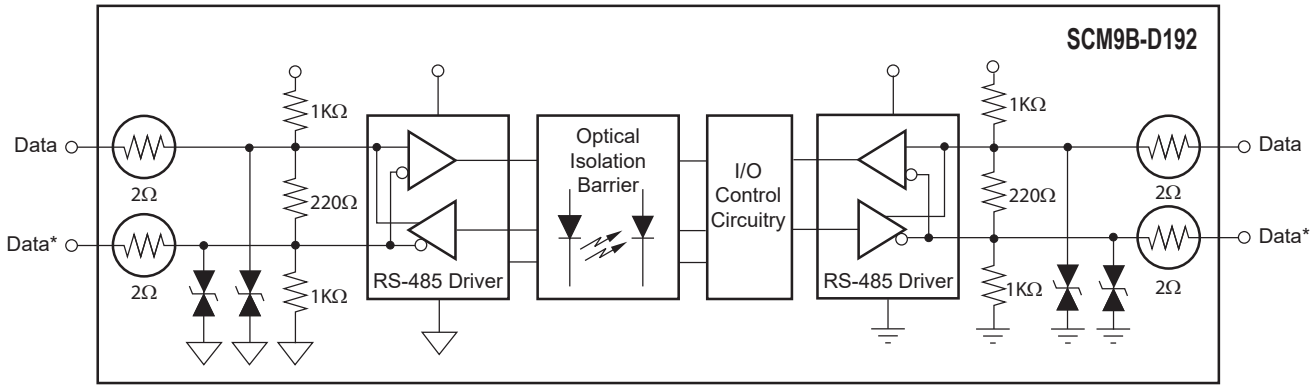
The SCM9B-D192 operates on +5VDC power supply input voltage.

FEATURES

- Completely Transparent to Host Software
- No External Flow Control Signals Required
- Optically-Isolated Bidirectional Data Flow
- Standard Baud Rates: 300 to 115K Baud
- Automatic Internal RS-485 Bus Supervision
- Networking up to 4,000 Feet
- Transient Suppression on RS-485 Data Lines
- Internal Jumper Selectable Termination Resistors
- CE Compliant

APPLICATIONS

- Long-distance Communications



SCM9B-D192 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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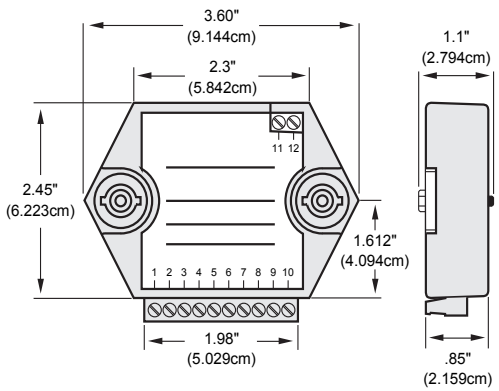
SCM9B Series

Mechanical Dimensions

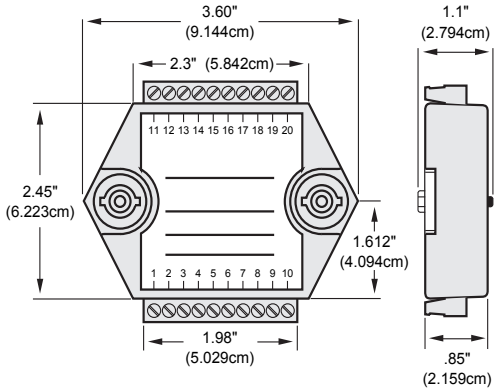
Mechanical and Dimensions-SCM9B-1000/2000/3000/4000/5000

Case: ABS with captive mounting hardware.
Connectors: Screw terminal barrier plug (supplied).
Replace with Phoenix MSTB 1.5/10 ST 5.08 or equivalent.

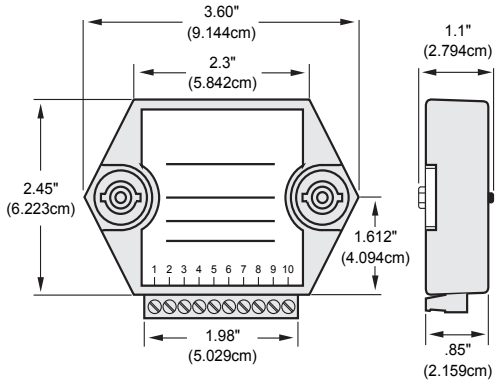
1300 Series



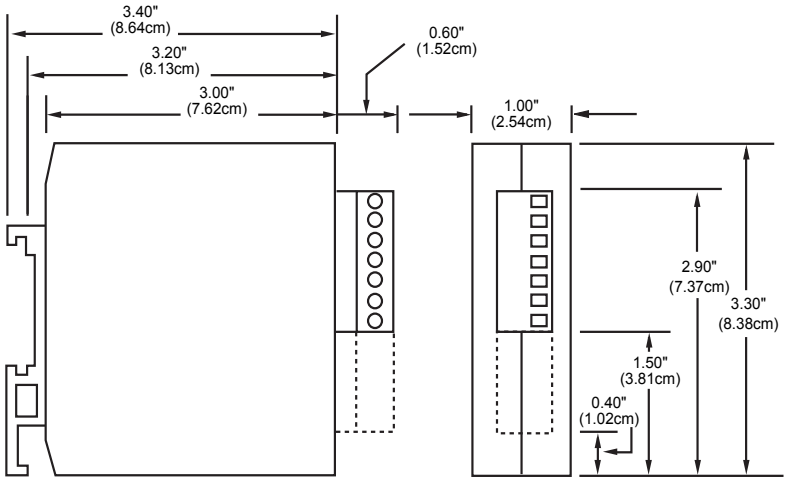
1700 Series



1000/2000/3000/4000/5000 Series



NOTE: Spacing for mounting screws
= 2.700" (6.858 cm). Screw threads are 6 X 32.



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SCM9B-PB08/PB14 Series Accessories

8- and 14-channel Mounting Backplanes

DESCRIPTION

The SCM9B-PB08 and PB14 are 8- and 14-channel, respectively, mounting backplanes (Figure below). The backplanes accept any RS-485 analog input or analog output modules and are designed to be mounted in standard 19 inch racks. RS-485 modules are used because RS-485 is the preferred communications standard for high-channel count applications. Although analog modules are used it must be noted that every module has some digital I/O capability. Therefore the combination of modules with the backplanes make a cost effective, high density remote analog and digital data acquisition system.

The backplanes reduce wiring costs by providing all common connections on the backplane. Each backplane includes screw terminals for all inputs, outputs, power connections and communications signals. The backplanes also include swagged thru-hole standoffs for mounting, a hold-down bar, and holes for an RS-485 termination resistor.

Ordering Information – SCM9B-PB08/PB14

Part Number	Description
SCM9B-PB08	8-channel Backpanel

SCM9B-H1750/H1770

24- and 64-channel Digital I/O Boards

DESCRIPTION

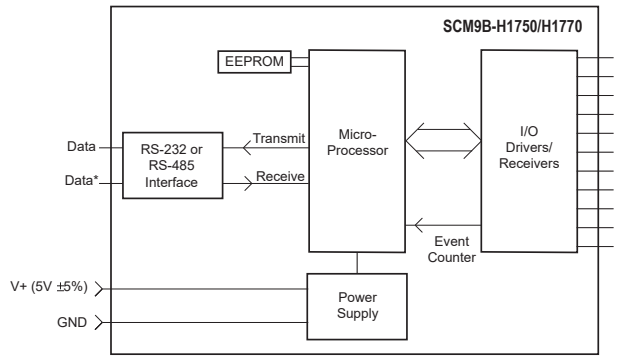
The SCM9B-H1750/H1770 digital I/O interface is designed to expand the remote I/O capability of the SCM9B-1700 series of modules. Commands are communicated over RS-232 or RS-485 links from any standard serial I/O port of computers or modems. The command set for the H1700 series boards is identical to the 1700 series modules.

The H1750 is designed to interface directly to either a 16- or 24-channel industry-standard solid-state relay rack (Dataforth part numbers SCMD-PB16 or SCMD-PB24). The H1770 will connect to a maximum of four 16-channel racks (SCMD-PB16). As with the SCM9B modules, up to 124 boards can be multidropped using RS-485 communications and SCM9B-A1000 repeaters.

The I/O channels may be configured to be inputs or outputs in any combination designated by the user. The input/output configuration may be changed at any time through the communications port. The I/O assignments are saved in nonvolatile memory and are automatically loaded when the unit is powered up. All boards are supplied with screw terminal plugs or ribbon connectors and captive mounting hardware.

FEATURES

- Computer Monitoring and Control of Standard Digital I/O Modules via RS-232 or RS-485
- Digital Inputs and Outputs Interface with Solid-state Relays to Sense AC and DC Voltages
- Controls Digital Inputs and Outputs Individually
- User Can Define Any Bit as Input or Output
- 24- and 64-channel Versions
- Expands up to 7936 Digital I/O Channels (124 Multidropped 64-channel Boards)
- Read or Set 7936 Inputs or Outputs in Less Than 1s
- Mounts in 19 inch Racks
- Compatible with All SCM9B Products
- Same Command Set as 1700 Series Modules
- CE Compliant



Ordering Information – SCM9B-H1750/H1770

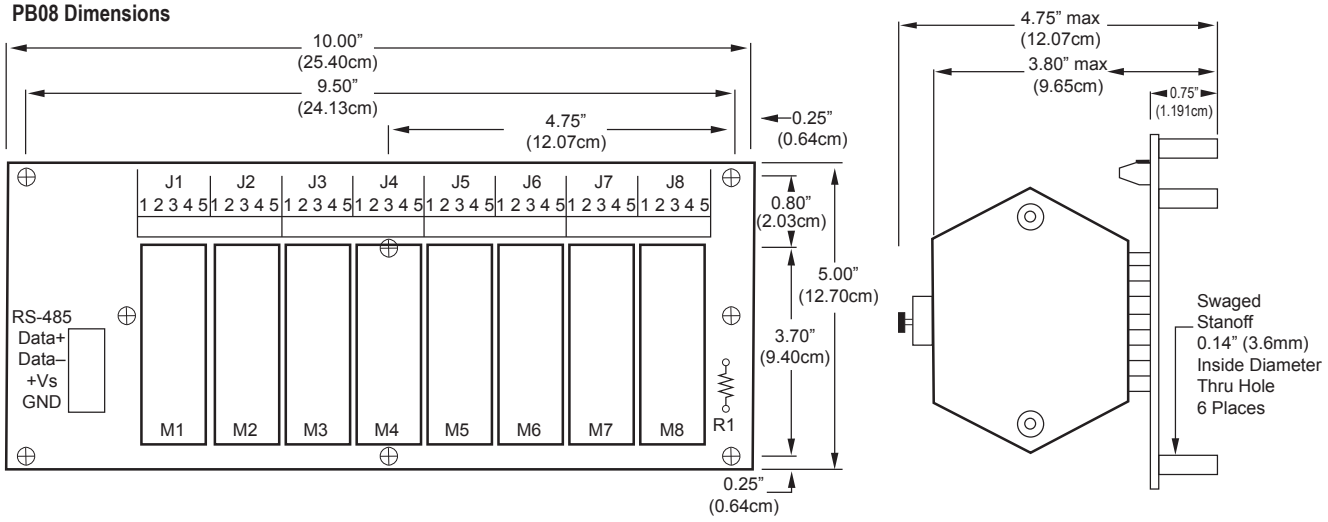
Part Number	Description
SCM9B-1701	7 inputs/8 outputs, RS-232C Output
SCM9B-1702	7 inputs/8 outputs, RS-485 Output
SCM9B-1711	15 inputs or outputs, RS-232C Output
SCM9B-1712	15 inputs or outputs, RS-485 Output
SCM9B-H1750	24 inputs or outputs, user selected RS-232C or RS-485 Output
SCM9B-H1770	64 inputs or outputs, user selected RS-232C or RS-485 Output

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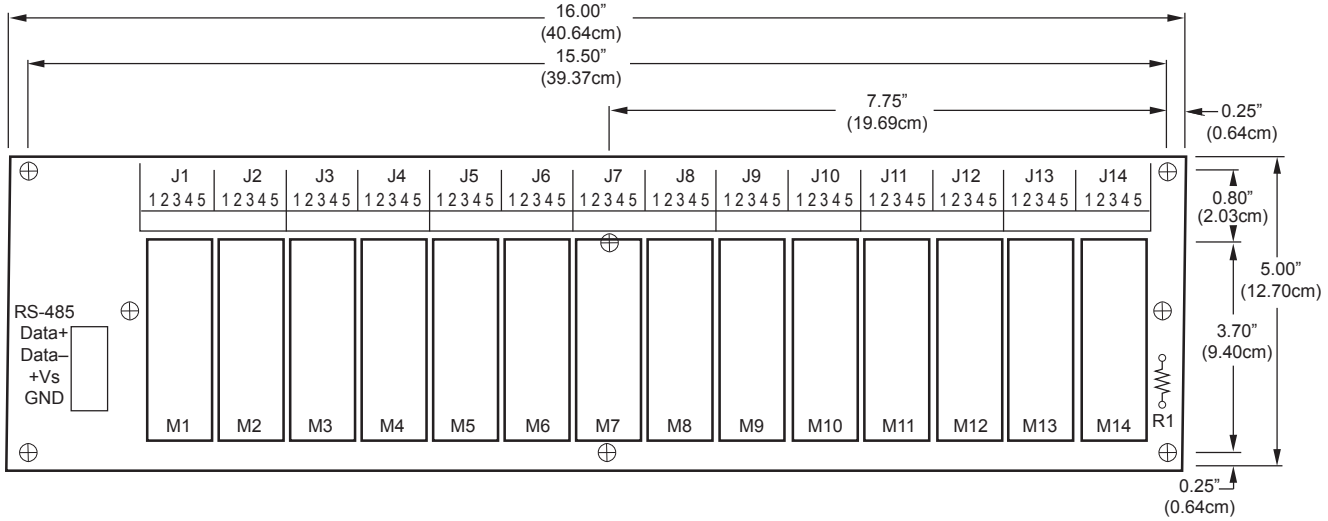
SCM9B-H1750/H1770 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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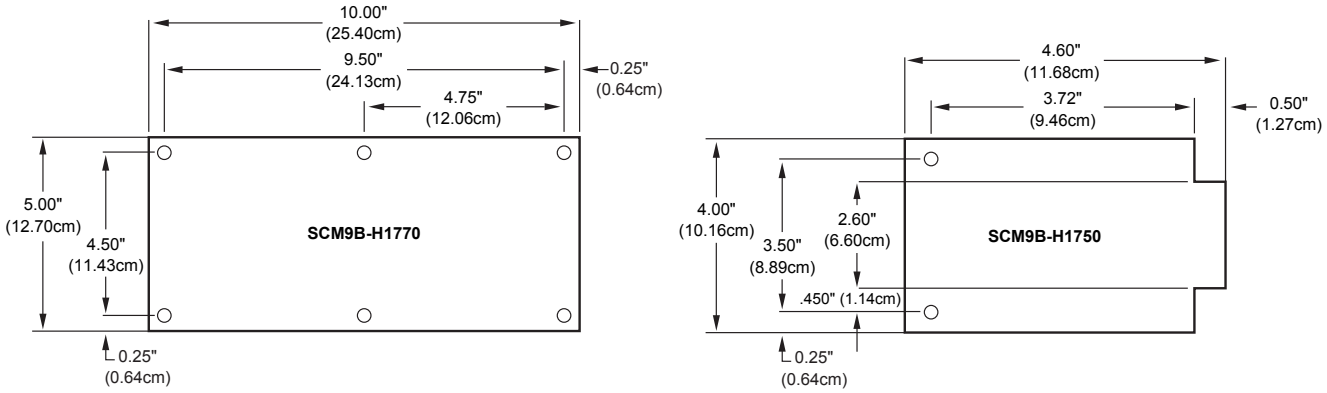
PB08 Dimensions



PB14 Dimensions



SCM9B-PB08/PB14 Backplane Dimensions



SCM9B-H1750 and SCM9B-H1770 Module Dimensions

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SCMD

Isolated SCMD Digital I/O Modules

Dataforth offers a broad line of digital input and output modules and accessories providing safe, reliable interfacing to industrial measurement and control applications. When installed near individual field loads, our SCMD series I/O modules create a rugged protective isolation barrier, effective to 4kV, between the field and computer system. Use of these modules can also reduce field wiring costs while establishing an economical, manageable approach for system expansion and repair.

The SCMD Series

SCMD miniature digital I/O modules are solid-state devices which send "ON" and "OFF" electrical signals to and from a computer. The input modules, depending on the type selected, 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. SCMD modules are available in "miniature" versions of four basic types: AC input, DC input, AC output, and DC output.

- **SCMD–MIAC and –MIDC** miniature input modules are used for sensing "ON" and "OFF" AC or DC voltage levels in the ranges 10-60VAC, 90-140VAC, and 180-280VAC and 3.3-32VDC and 10-60VDC. Models with low noise, fast switching, and other special features are also available.
- **SCMD–MOAC and –MODC** are miniature output modules accepting 5VDC or 24VDC inputs and providing several different output ranges, including 12/24 to 140/280VAC and 0/3/5 to 50/60/200VDC. Fast switching, and other special options are also available.
- **SCMD–MORO and –MORC** are miniature relay output modules used for switching AC and DC loads up to 125Vrms or 100VDC at maximum 30WDC or 62.5VA.

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
- RoHS III Directive (EU) 2015/863

APPLICATIONS

Input Modules Interface to:

- Proximity Switches
- Limit Switches
- Photoelectric Switches
- TTL Devices
- Pushbuttons

Output Modules for Switching AC and DC Loads:

- Relays
- Solenoids
- Motor Starters
- Indicator Lamps

SCMD Selection Guide

DIGITAL INPUT MODULES, MINIATURE

MODEL	INPUT RANGE	SUPPLY VOLTAGE
SCMD-MIAC5	90 to 140VAC/DC	5V
SCMD-MIAC5A	180 to 280VAC/DC	5V
SCMD-MIAC5E	10 to 60VAC/DC	5V
SCMD-MIAC24	90 to 140VAC/DC	24V
SCMD-MIAC24A	180 to 280VAC/DC	24V
SCMD-MIDC5	3.3 to 32VDC	5V
SCMD-MIDC5F	3.3 to 32VDC	5V
SCMD-MIDC5N	10 to 60VDC	5V
SCMD-MIDC24	3.3 to 32VDC	24V

DIGITAL OUTPUT & RELAY OUTPUT MODULES, MINIATURE

MODEL	OUTPUT RANGE	SUPPLY VOLTAGE
SCMD-MOAC5	12 to 140VAC	5V
SCMD-MOAC5A	24 to 280VAC	5V
SCMD-MOAC5B	24 to 280VAC	5V
SCMD-MOAC24	12 to 140VAC	24V
SCMD-MOAC24A	24 to 280VAC	24V
SCMD-MODC5	3.0 to 60VDC	5V
SCMD-MODC5A	5.0 to 200VDC	5V
SCMD-MODC5ML	1.0 to 50VDC	5V
SCMD-MODC24	3.0 to 60VDC	24V
SCMD-MORO5	100/125 VDC/Vrms	5V
SCMD-MORC5	100/125 VDC/Vrms	5V
SCMD-MORO24	100/125 VDC/Vrms	24V
SCMD-MORC24	100/125 VDC/Vrms	24V

DIGITAL I/O MODULE ACCESSORIES

MODEL	DESCRIPTION
SCMD-PB4/D	4-ch Backpanel, Full Size & Miniature / DIN Mount
SCMD-PB4R/D	4-ch Backpanel, Full Size & Miniature, Output Only / DIN Mount
SCMD-PB8SM/D	8-ch Backpanel, Miniature / DIN Mount
SCMD-PB16SM/D	16-ch Backpanel, Miniature / DIN Mount
SCMD-PB16TSM/D	16-ch Backpanel, Miniature, Screw Term I/O / DIN Mount
SCMD-PB24SM/D	24-ch Backpanel, Miniature / DIN Mount
SCMD-JM8	Board Jumper, Miniature

Digital Input Modules - Model No. Suffixes Identifying Optional Features

Suffix	Feature
A	High-voltage Versions (280VAC for AC Modules)
E	Low-voltage 10VAC-input for AC Modules
F	Fast-switching Version of DC Modules
N	Enhanced Noise-immunity Version of DC Modules

Digital Output Modules - Model No. Suffixes Identifying Optional Features

Suffix	Feature
A	High-voltage Versions (280VAC for AC Modules, 200VDC for DC Modules)
B	High-voltage Versions (280VAC for AC Modules) with Low-leakage Output Current
ML	FET-output Version of DC Module, 5.0A, 50VDC

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SCMD-MIAC/MIDC

Miniature Digital-input Modules

DESCRIPTION

SCMD digital-input modules provide highly reliable and safe interfaces to harsh industrial measurement and control applications. With SCMD modules installed near individual field signals, a reliable isolation barrier is provided between the field wiring and the computer system. Other benefits include reduction of field wiring costs and the establishment of a cost-effective and manageable method for system expansion and repair.

The SCMD-MIAC digital-input modules are used for sensing ON/OFF AC or DC voltage levels in the ranges of 18-36, 90-140 and 180-280VAC or VDC, respectively. They are protected from damage due to high-voltage transients on the input signal.

The SCMD-MIDC digital-input modules provide DC voltage sensing at the lower ranges of 3.3 to 32VDC and 10 to 60VDC.

High-voltage, low-voltage, fast-switching, and low-noise options are available, designated by suffixes “A”, “E”, “F”, and “N”, respectively.

Five backpanels are available for mounting SCMD-M digital input modules.

Digital Input Modules - Model No. Suffixes Identifying Optional Features

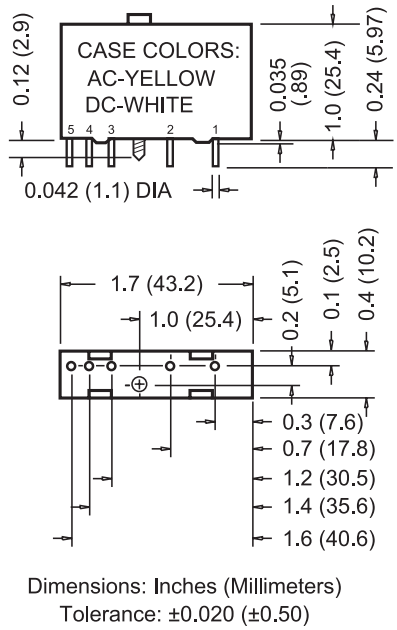
Suffix	Feature
A	High-voltage Versions (280VAC for AC Modules)
E	Low-voltage 10VAC-input for AC Modules
F	Fast-switching Version of DC Modules
N	Enhanced Noise-immunity Version of DC Modules

FEATURES

- Plug into Backpanels for Miniature- or Full-sized Modules
- AC-inputs for 24V, 120V, 240V
- DC-inputs for 3.3 to 32V, 10 to 60V
- 4000Vrms Optical Isolation
- Open-collector Output
- Industry-standard Pinout and Footprint
- Operating Temperature –30°C to +80°C
- UL Listed, CSA Certified, CE Compliant
- RoHS III Directive (EU) 2015/863

Ordering Information

Model	Input Range	Supply Voltage
SCMD-MIAC5	90 to 140VAC/DC	5V
SCMD-MIAC5A	180 to 280VAC/DC	5V
SCMD-MIAC5E	10 to 60VAC/DC	5V
SCMD-MIAC24	90 to 140VAC/DC	24V
SCMD-MIAC24A	180 to 280VAC/DC	24V
SCMD-MIDC5	3.3 to 32VDC	5V
SCMD-MIDC5F	3.3 to 32VDC	5V
SCMD-MIDC5N	10 to 60VDC	5V
SCMD-MIDC24	3.3 to 32VDC	24V



SCMD-MIAC/MIDC Physical Dimensions

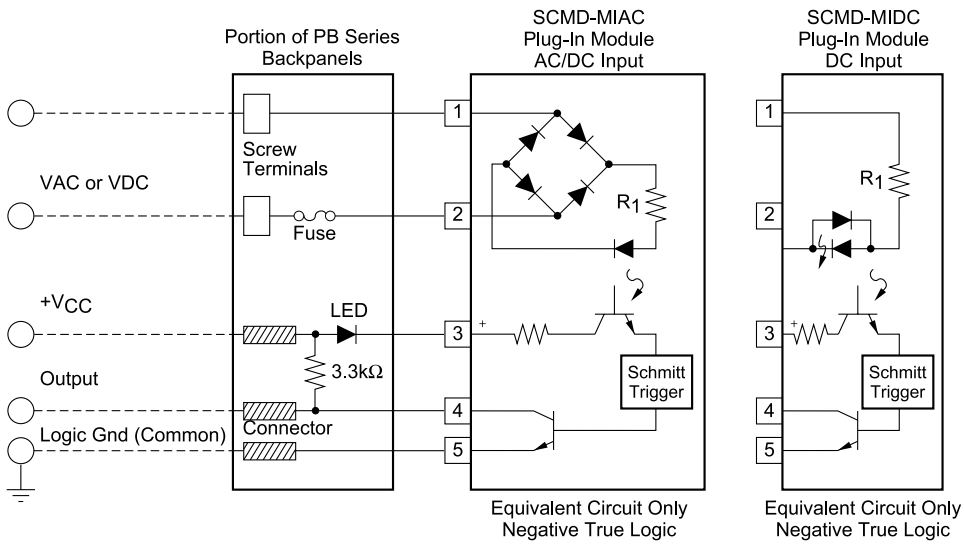


Figure 2: SCMD-MIAC/MIDC Circuit Diagrams

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SCMD-MOAC/MODC

Miniature Digital-output Modules

DESCRIPTION

The SCMD digital-output modules are used for switching AC and DC loads such as relays, solenoids, motor starters, or indicator lamps. All models provide up to 4000Vrms of optical isolation between the field device and the control logic. The AC-output modules incorporate zero-voltage switching and an RC-snubber circuit which allows switching heavy inductive loads. Functionality is denoted by case color—AC modules are black, and DC modules are red.

Six backpanels are available for mounting SCMD-M digital-output modules.

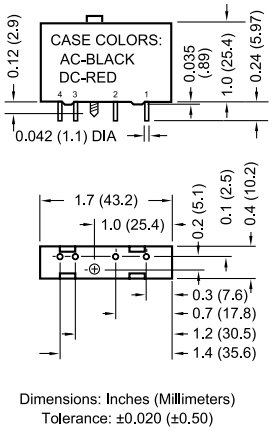


Figure 1: SCMD-MOAC/MODC Physical Dimensions

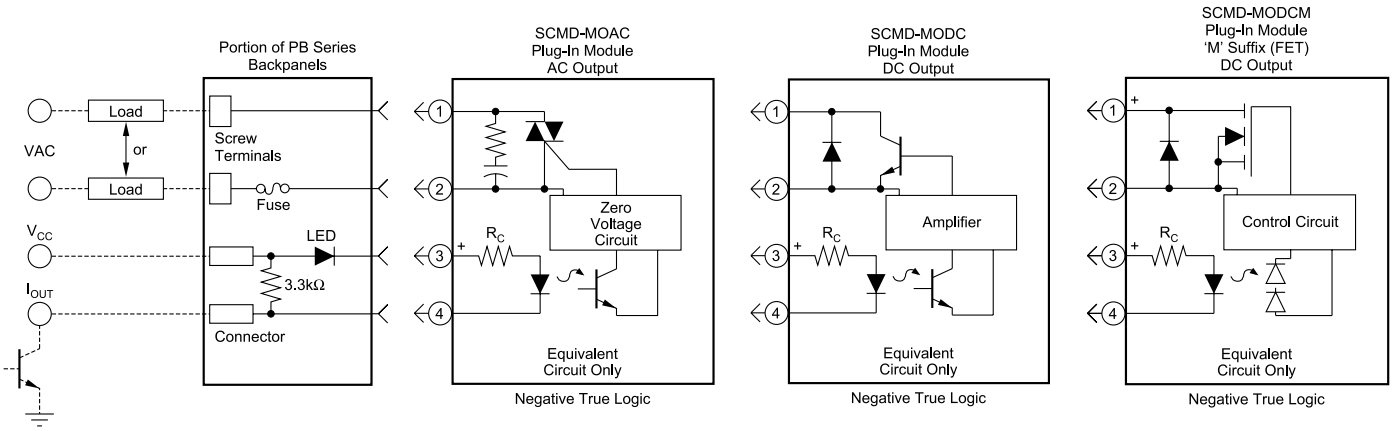
Digital Output Modules - Model No. Suffixes Identifying Optional Features	
Suffix	**Feature**
A	High-voltage Versions (280VAC for AC Modules, 200VDC for DC Modules)
B	High-voltage Versions (280VAC for AC Modules) with Low-leakage Output Current
ML	FET-output Version of DC Module, 5.0A, 50VDC

FEATURES

- AC Modules have High-current Thyristor with 100A Surge Capability
- Zero or Random Turn-on Available in AC Modules
- Plug into Backpanels for Miniature or Full-sized Modules
- 4000Vrms Optical Isolation (except ML suffix)
- 1500Vrms Optical Isolation (with ML suffix)
- Industry-standard Pinout and Footprint
- 3.5A AC Modules Provide Extra Switching Capability
- 5.0A DC Modules Available
- Operating Temperature –30°C to +80°C
- UL Listed, CSA Certified, CE Compliant
- RoHS III Directive (EU) 2015/863

Ordering Information

Model	Output Range	Supply Voltage
SCMD-MOAC5	12 to 140VAC	5V
SCMD-MOAC5A	24 to 280VAC	5V
SCMD-MOAC5B	24 to 280VAC	5V
SCMD-MOAC24	12 to 140VAC	24V
SCMD-MOAC24A	24 to 280VAC	24V
SCMD-MODC5	3.0 to 60VDC	5V
SCMD-MODC5A	5.0 to 200VDC	5V
SCMD-MODC5ML	0 to 50VDC	5V
SCMD-MODC24	3.0 to 60VDC	24V



SCMD-MOAC/MODC Circuit Diagrams

SECTION 5 - SCMD

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SCMD-MORO/MORC

Miniature Digital-relay Output Modules

DESCRIPTION

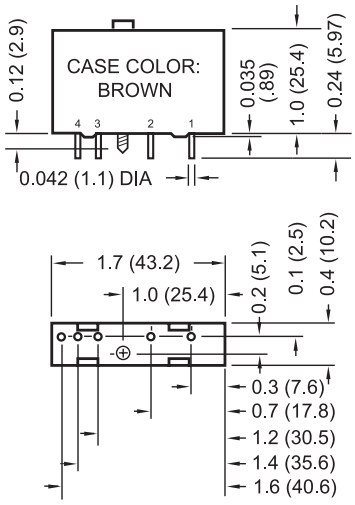
The SCMD digital-relay output modules are used for switching AC and DC loads such as resistors in and out of circuits, transistors, SCRs for switching inductive loads, indicator lamps, and low-level heaters. All models provide up to 1000Vrms of optical isolation between the field device and the control logic. Functionality is denoted by case color—relay modules are brown.

The -MOROxx models have a normally open contact and the -MORCxx models have a normally closed contact.

Six backpanels are available for mounting SCMD-M relay-output modules.

FEATURES

- Resistive Load Only
- Max On-state Current 1A, 30WDC, 62.5VA
- Max Turn-on Time 2ms
- Max Turn-off Time 1ms
- 1000Vrms Isolation
- Plug into Backpanels for Miniature or Full-sized Modules
- Industry-standard Pinout and Footprint
- Operating Temperature –30°C to +80°C
- UL Listed, CSA Certified, CE Compliant
- RoHS III Directive (EU) 2015/863

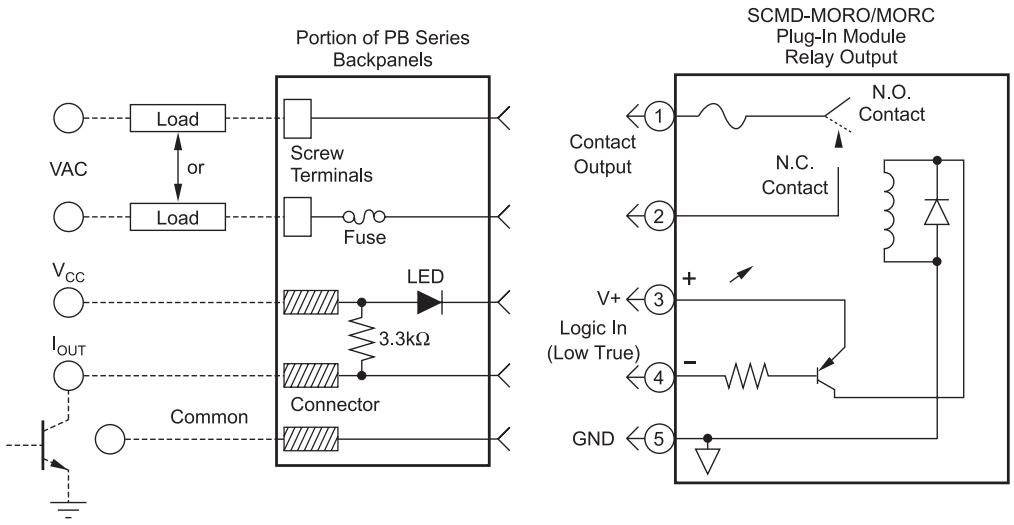


Dimensions: Inches (Millimeters)
Tolerance: ±0.020 (±0.50)

SCMD-MORO/MORC Physical Dimensions

Ordering Information

Model	Output Range	Supply Voltage	Contact
SCMD-MORO-5	100/125 VDC/Vrms	5V	Normally Open
SCMD-MORC-5	100/125 VDC/Vrms	5V	Normally Closed
SCMD-MORO-24	100/125 VDC/Vrms	24V	Normally Open
SCMD-MORC-24	100/125 VDC/Vrms	24V	Normally Closed



SCMD-MORO/MORC Circuit Diagrams

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SCMD Accessories

Digital I/O Module Backpanels

Ordering Information

Model	Description
SCMD-PB4	4-ch Backpanel, Full Size and Miniature
SCMD-PB4R	4-ch Backpanel, Full Size and Miniature, Output Only
SCMD-PB16SM	16-ch Backpanel, 50-trace I/O Male Card Edge
SCMD-PB16TSM	16-ch Backpanel, Screw Terminal Input and Output
SCMD-PB24SM	24-ch Backpanel, 50-trace I/O Male Card Edge
SCMD-PB4D	4-ch Backpanel, Full Size and Miniature, DIN-rail Mount
SCMD-PB16SMD	16-ch Backpanel, 50-trace I/O Male Card Edge, DIN-rail Mount
SCMD-PB16TSMD	16-ch Backpanel, Screw Terminal Input and Output, DIN-rail Mount
SCMD-PB24SMD	24-ch Backpanel, 50-trace I/O Male Card Edge, DIN-rail Mount

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

Jumpers (Connect common terminals on backpanels.)

Model	Description
SCMD-JM8	Miniature, 8-position (Last Time Buy)

Connectors

Mating Connector for 50-trace I/O Male Card Edge

Part Number	Manufacturer
66317-150	FCI-Berg
3415-0001	3M

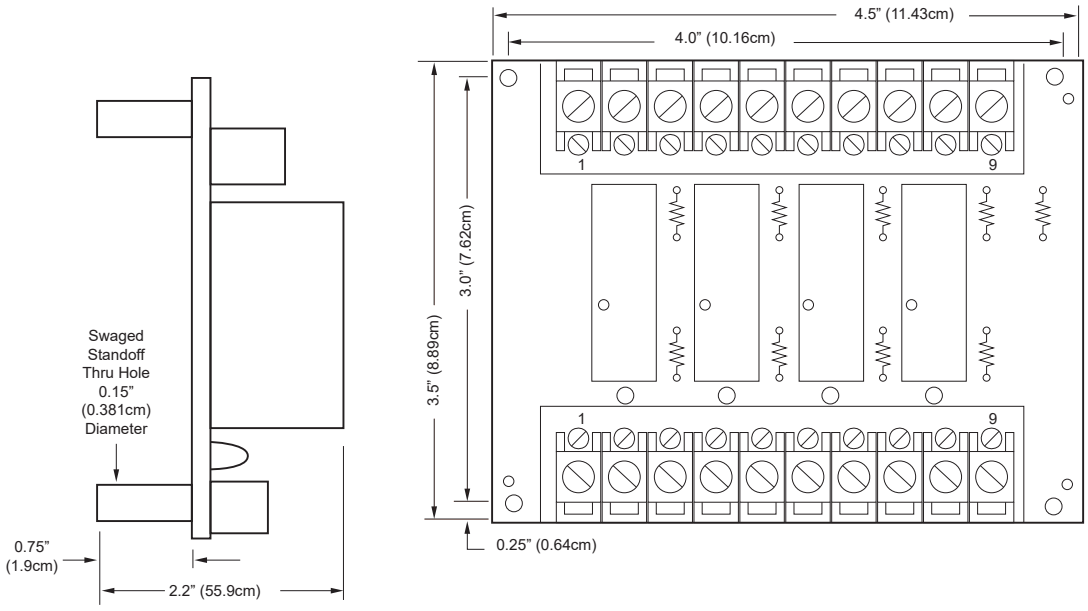
FEATURES

- Plug-compatible Logic Connections on 8-, 16-, and 24-Position Backpanels, Screw Terminal Barrier Block for Logic Connections on 4-Position Backpanels
- Screw Terminal Barrier Block for Load Connections
- Resident Pull-Up Resistors
- 5A Field-Replaceable Fuses (Littelfuse #251005 or Equivalent)
- LEDs Indicate Logic Status
- All Even-Numbered Logic Connections are Logic Ground
- Input and Output Modules Accepted Interchangeably
- Operate with 5V or 24V Logic Supplies
- Plastic Captive-Screw Retaining System for All Modules
- PB4, PB4R, PB8SM, PB16SM, PB16TSM, and PB24SM, UL Listed, CSA Certified and CE Compliant
- RoHS III Directive (EU) 2015/863

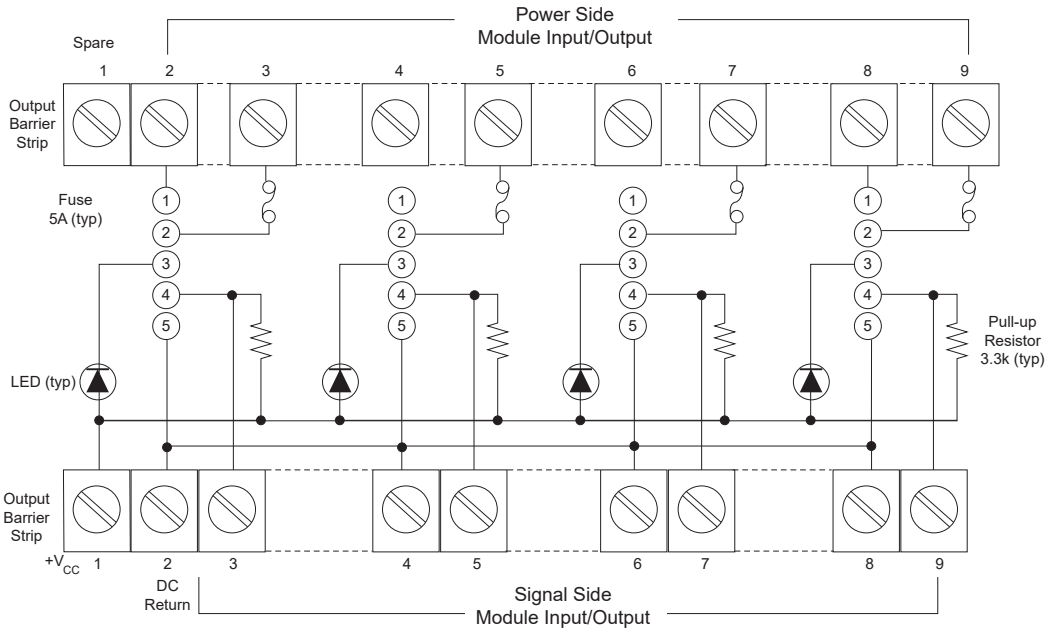
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SCMD-PB4



Mounting Dimensions

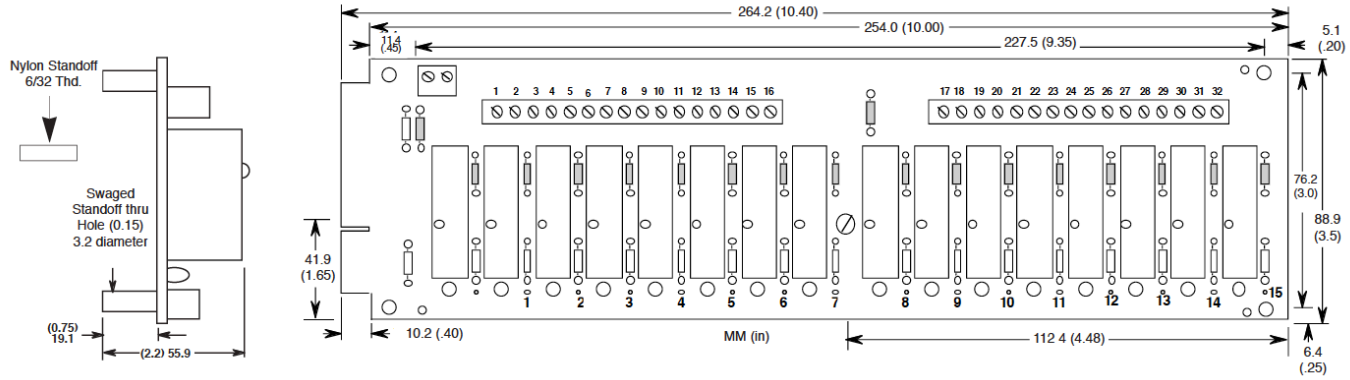


Schematic Diagram

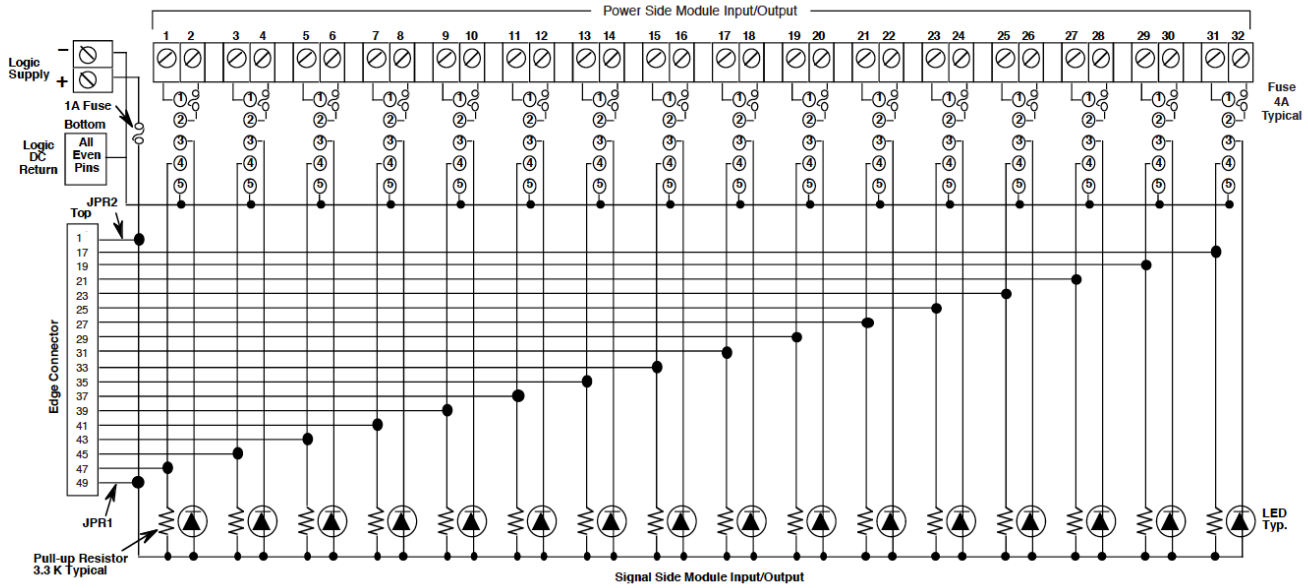
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SCMD-PB16SM



Mounting Dimensions

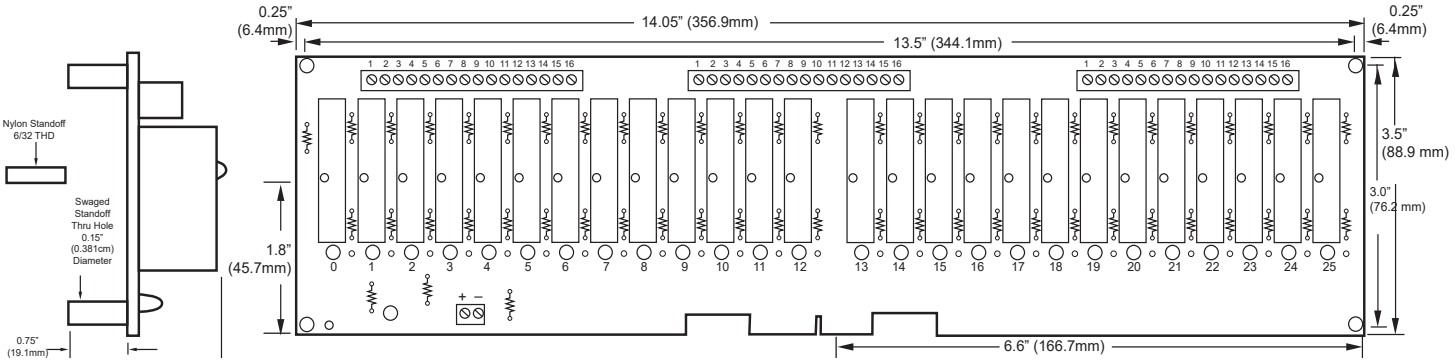


Schematic Diagram

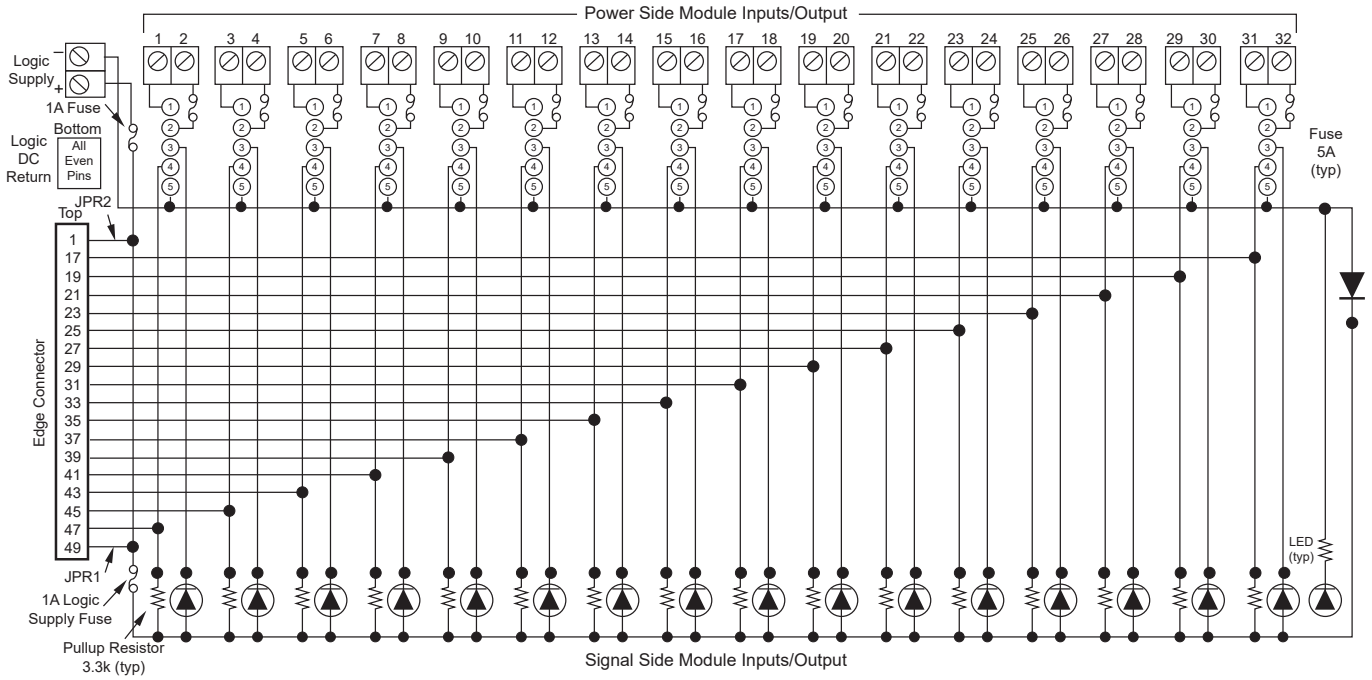
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SCMD-PB24SM



Mounting Dimensions



Schematic Diagram

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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)
- Single Phase AC Measurements Revisited (AN109)
- 3-Phase AC Calculations Revisited (AN110)
- Current Modules Measure Power Factor (AN111)
- Filtering in Signal Conditioning Modules, SCMs (AN112)
- 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)
- Wind Turbines Today (AN120)
- Low-Pass Filter Rise Time vs Bandwidth (AN121)
- Introduction to PID Control (AN122)
- Tuning Control Loops for Fast Response (AN123)
- Tuning Control Loops with the IMC Tuning Method (AN124)
- Tuning Level Control Loops (AN125)
- Tuning Surge Tank Level Control Loop (AN126)
- Op Amp Errors, Another View (AN127)
- RMS Revisited (AN128)
- Harmonics and Utility Costs (AN129)

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)

DSCA MODULES

- 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)

MAQ®20 MODULES

- Cross Point Switch Using MAQ20-DORLY Module (AN901)
- 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"?
- What is This Crest Factor Thing?
- Coulomb's Law
- Faraday's Law of Induction
- Power Supply Isolation
- 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
- 3-Year Warranty
- ISO9001
- Hazardous Locations in the European Union - ATEX Directive
- Hazardous Locations in North America
- Certifications
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- Configurable 5B Module
- Hysteresis Specifications
- Miniature Electronics... 8B Modules
- A Question from Dataforth's President
- Unbalanced Voltages Increase Cost
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- Normal Mode Rejection, NMR
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- Uncertainty Principle
- 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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- Surge Withstand Capability
- Easy Recalibration Procedure
- System Throughput
- Sampling Rates and THE LAW
- 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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To view the current Dataforth Corporation Warranty, please click on the link below for the Dataforth Standard Terms and Conditions of Sale Applying to Products Sold by Dataforth Corporation. The Warranty in its entirety is Section 3. Please check this link periodically for updates.

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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