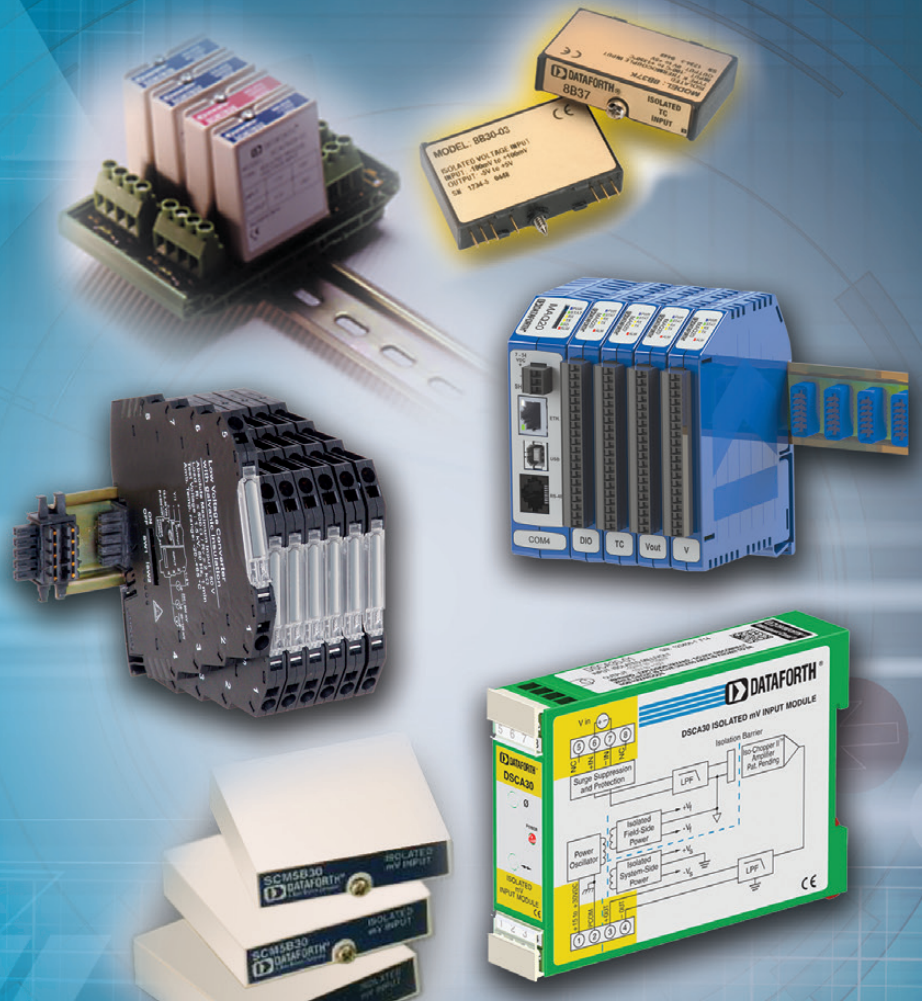
DATAFORTH®

2024 Full-line Catalog

Instrument Class®

Industrial Electronics



Data Acquisition & Control

Signal Conditioning

Data Communications

Celebrating 40 YEARS

Instrument Class® INNOVATION

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ISOLATED ANALOG SIGNAL CONDITIONING PRODUCTS

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The Company

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

Global Service and Support

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

Research and Development Team

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

Automated Manufacturing and Test

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

Quality Control

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

www.dataforth.com

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

The Future

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

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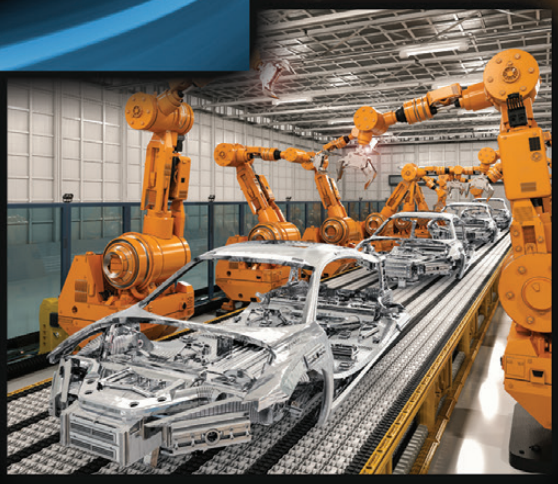
Dataforth

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

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

Additional Resources

- Application Notes
- Tech Notes
- Press and Product Releases



Our Track Record Proves We are Dedicated to Your Success!

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SCM5B Isolated Analog Signal Conditioning Modules

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

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

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

SCM5B Key Features

- ±0.03% Accuracy (typ)
- ±0.005% Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power Supply Voltage (30mA (typ))
- 4- to 6-Pole Low-pass Filtering
- Low Output Noise
- –40°C to +85°C Operating Temperature
- CSA C/US Certified, (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863



SCM7B Isolated Process Control Signal Conditioning Modules

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

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

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



SCM7B Key Features

- ±0.03% Accuracy (typ)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation and 120Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 14-35VDC Wide Supply Voltage
- 5-Pole Low-pass Filtering
- Low Output Noise
- –40°C to +85°C Operating Temperature
- CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

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

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

SensorLex® 8B Isolated Analog Signal Conditioning Modules

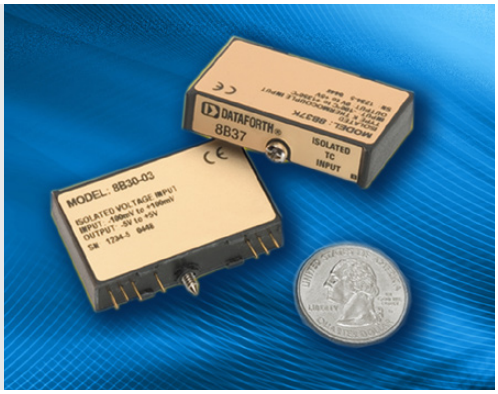
Miniature Size, 2-way Isolation, 5V Supply Voltage, *Instrument Class*® Performance

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

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

8B SensorLex Key Features

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



SCMD Isolated Digital I/O Modules

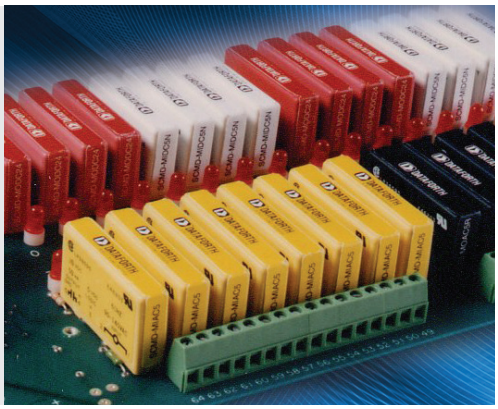
Miniature Digital I/O Modules with 4kV Isolation

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

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

Key SCMD Features

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



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

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

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

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

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

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

DSCA Key Features

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



SCM9B Isolated Analog Signal Conditioning Modules

Isolated, Intelligent Signal Conditioning Products

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

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

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

SCM9B Key Features

SCM9B Sensor-to-Computer Modules

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

SCM9B Computer-to-Analog Output Modules

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

SCM9B Converters and Repeaters

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



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

DSCL Industrial Loop Isolators and Transmitters

Passive, Active, Programmable 4-20mA Loop Products

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

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

Key DSCL Features

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

Compact 6.2mm Signal Converters

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



DSCP User-Programmable Transmitters

Passive, Active, Programmable 4-20mA Loop Products

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

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

Key DSCP Features

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



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

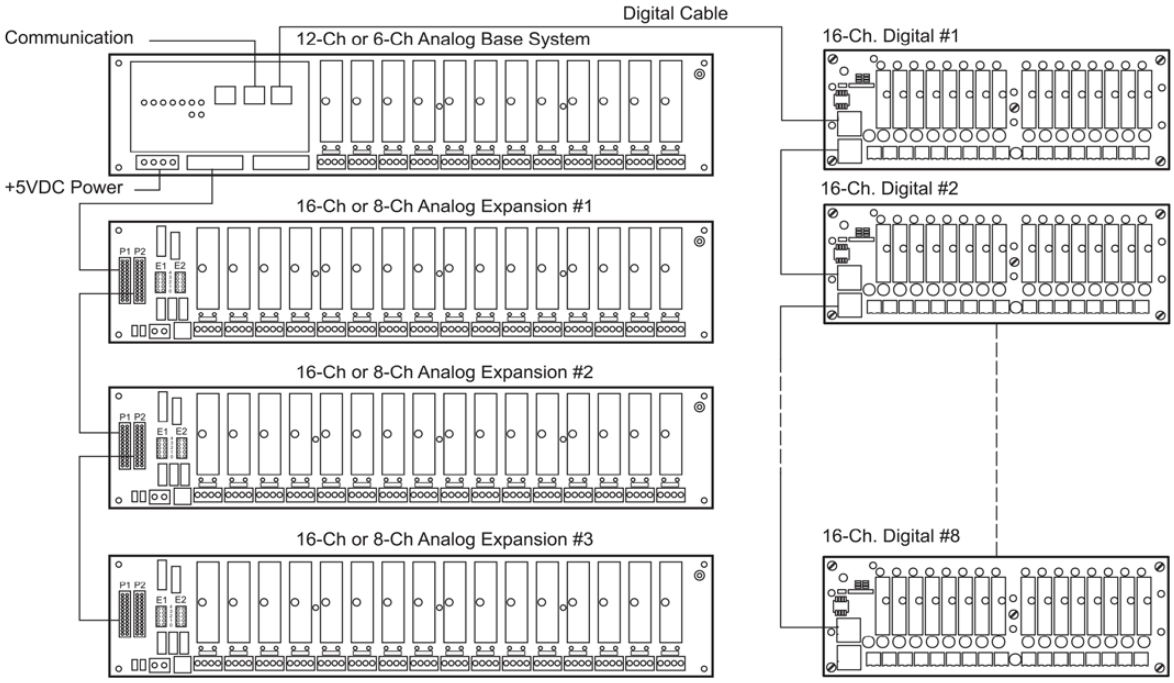
Implements industry-standard Modbus® RTU and TCP protocols, enabling communication with existing third-party software drivers and HMI/SCADA packages

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

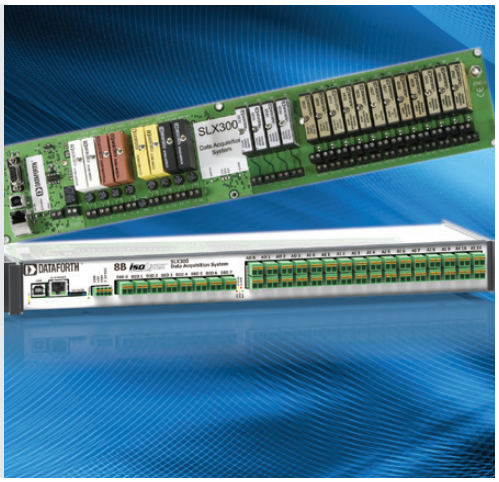
Flexible, Compact, Modular, Reliable

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

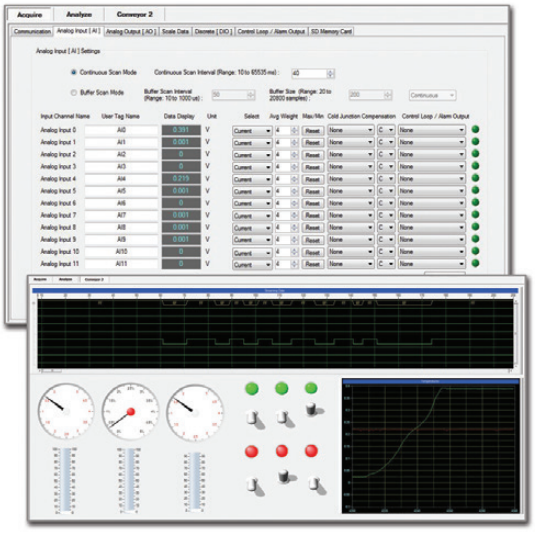
- Modbus RTU and TCP Support
- 1500Vrms Input-to-Output and Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Wide I/O Selection
  - – Analog – 19 product families, 130+ models
  - – Digital – 6 product families, 20+ models
- Mix and Match Analog and Digital I/O
- Advanced Features Including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

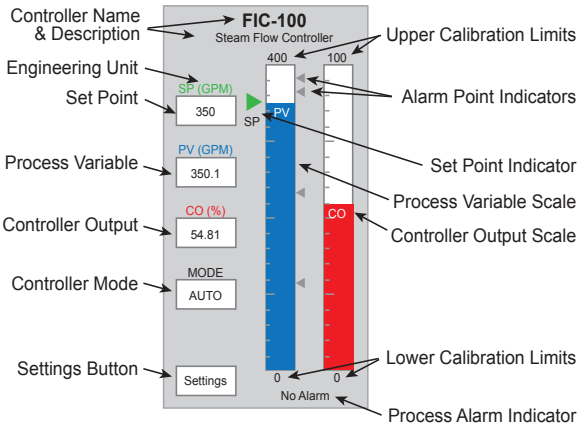


PID Loop Control

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

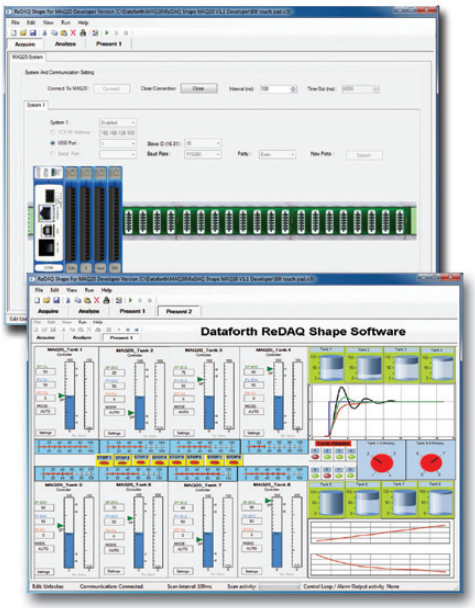
ReDAQ® Shape Software for MAQ®20

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



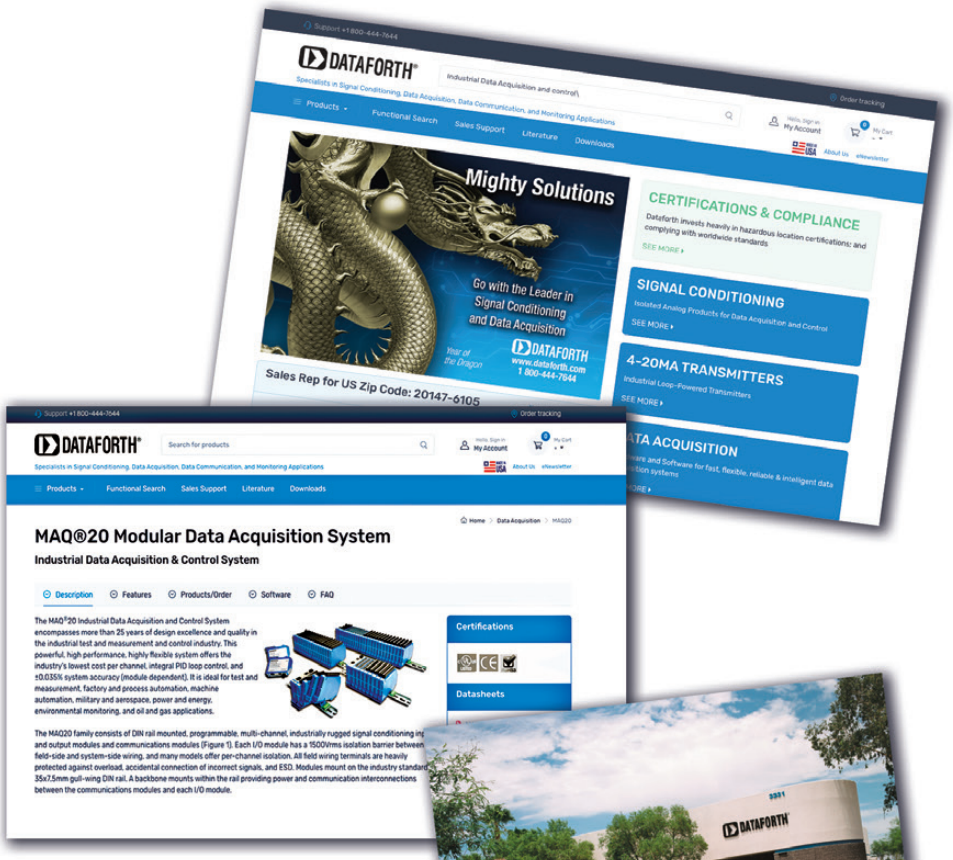
The Dataforth System Builder

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

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.

DATAFORTH®

2024 Catalog SCM5B Products

Isolated Analog Signal Conditioning Products

High-Voltage Attenuator System



Instrument Class®

Industrial Electronics

Celebrating

40 YEARS

Instrument Class®

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Discontinued Parts

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SCM5B, SCM7B, 8B, SCM9B

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

DIN-rail, Head-mount Products - DSCA, DSCT, DSCL, DSCP

Characteristic	DSCA	DSCT	DSCL	DSCP
Mechanical Format	DIN-rail Mount	DIN-rail Mount	DIN-rail, Component, Panel	DIN-rail, Head Mount
Isolation: Voltage type	1500Vrms Transformer 3-way	1500Vrms Transformer 3-way	500Vrms to 4000Vrms Transformer/Optical	Non/1500Vrms/2300Vrms Transformer/Optical 3-way
CMR	160dB	160dB	70-110dB	Consult Data Sheet
NMR (60Hz) Rejection	85dB (3Hz Modules)	85dB (3Hz XMTRs)	20dB/Decade	SW or Dip-switch Config
Bandwidth	3Hz to 3kHz	3Hz	5Hz to 750Hz	SW or Dip-switch Config
Filter	6-pole	6-pole	2-pole	SW or Dip-switch Config
Input Voltage Withstand	240Vrms	240Vrms	N/A	N/A
Input Signals	(1)	(5)	4-20mA, 0-20mA	(4)
Output Range to System	0-10VDC, ±10VDC, 0-1mA, 4-20mA, 0-20mA	4-20mA	4-20mA, 0-20mA, V, and Selectable	SW or Dip-switch Config
Output Range to Field	4-20mA, 0-20mA, ± 20mA, ±10VDC, 0-10VDC	N/A	N/A	N/A
Gain/Offset Adjust	±5%	±10%	±10% on Some Models	Software Configurable
Accuracy	0.03% (typ)	0.03% (typ)	0.05% to 0.1% (typ)	0.1% (typ)
Output Control	Always Enabled	Always Enabled	Always Enabled	Always Enabled
Supply Voltage	15-30VDC (+24V Nom) at 25-80mA	10.8-100VDC Loop at 4-20mA	24VDC Loop at 4-20mA	24VDC Loop, or 24-230VDC/VAC
Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)	Consult Data Sheet	Consult Data Sheet
Interface	8-pos Term Block	6-pos Term Block	Terminal Block	Terminal Block
Customization	Yes	Yes	No	SW or Dip-switch Config

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

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High-accuracy Energy Monitoring Module

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

Data Acquisition (DAQ) System - MAQ20

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

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High-voltage Attenuator Modules - SCMHVAS-Mxxxx

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

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

See Discontinued Devices at the End of the Document.

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SCM5B

Isolated SCM5B Analog Signal Conditioning Products



SCM5B Modules

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

SCM5B Analog Modules

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

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

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

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

Custom Signal Conditioning

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

FEATURES

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

BENEFITS

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

APPLICATIONS

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

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SCM5B Selection Guide

†OUTPUT RANGES AVAILABLE

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

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

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

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

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

ISOLATED TRUE RMS INPUT MODULES

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

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

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

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

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

POTENTIOMETER-INPUT MODULES, 4Hz BW

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

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

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

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

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

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

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

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SCM5B Selection Guide (Continued)

†OUTPUT RANGES AVAILABLE

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

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

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

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

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

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

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

2-WIRE TRANSMITTER-INTERFACE MODULES, 100Hz BW

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

GENERAL PURPOSE INPUT MODULES, DC EXCITATION

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

FREQUENCY INPUT MODULES

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

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

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

ACCELEROMETER-INPUT MODULES, 2.5kHz to 20kHz BW

Gain, bandwidth, and excitation are switch-programmable

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

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

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

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SCM5B Selection Guide (Continued)

VOLTAGE ATTENUATOR SYSTEM

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

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

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

† OUTPUT RANGES AVAILABLE

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

‡THERMOCOUPLE ALLOY COMBINATIONS

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

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

**RTD STANDARDS

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

ACCESSORIES

MODEL	DESCRIPTION

BACKPANELS

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

MOUNTING RACK

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

DIN-MOUNTING HARDWARE and BOARD

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

INTERFACE CABLES

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

CJCs, JUMPERS, RESISTORS

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

POWER SUPPLIES

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

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SCM5B30/31

Analog Voltage-input Modules, Narrow Bandwidth

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

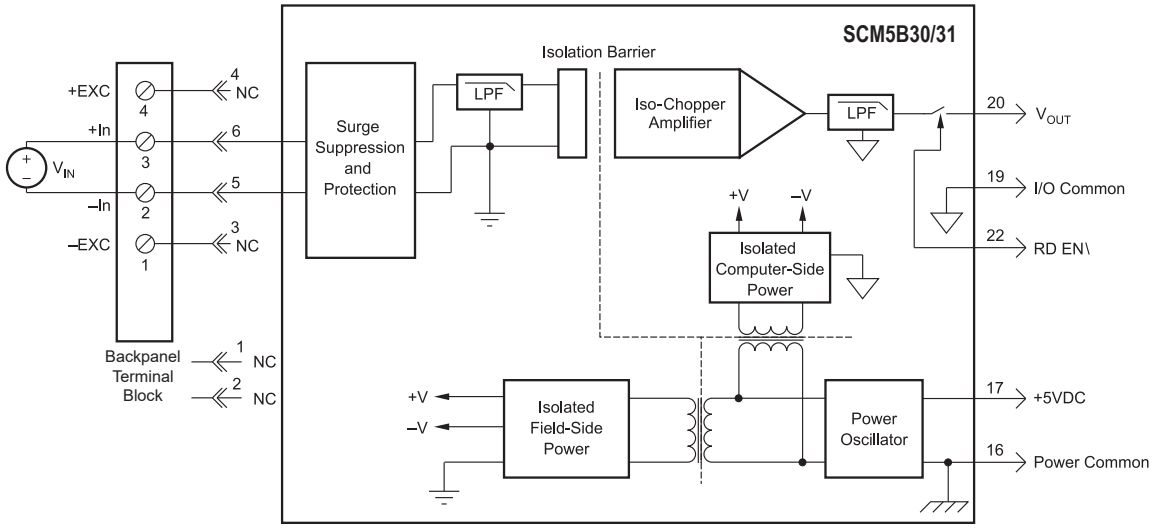
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- ±0.03% Accuracy
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.005% Linearity
- ±1µV/°C Drift
- CSA C/US Certified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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information

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

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SCM5B32

Analog Current-input Modules

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-enable pin, to I/O Common, pin 19.

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

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

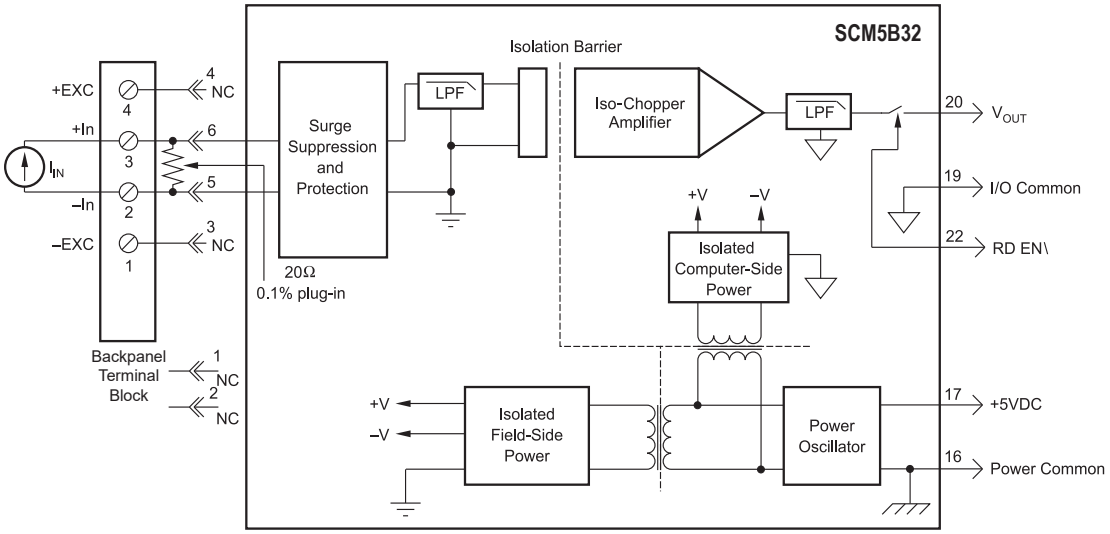
- Accepts Milliamp Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- ±0.03% Accuracy
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.005% Linearity
- CSA C/US Certified
- CE and ATEX Compliant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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability. Does not include SCMXR1 accuracy.
(2) RTI = Referenced to input.

Ordering Information

Model	Input Range	Output Range
SCM5B32-01	4-20mA	0V to +5V
SCM5B32-01D	4-20mA	0V to +10V
SCM5B32-02	0-20mA	0V to +5V
SCM5B32-02D	0-20mA	0V to +10V

Refer to SCM5B392 specifications for additional current input models.

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SCM5B33

Isolated True RMS Input Modules

DESCRIPTION

Each SCM5B33 True RMS input module provides a single channel of AC input which is converted to its True RMS DC value, filtered, isolated, amplified, and converted to a standard process voltage or current output (Figure below).

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

The field voltage or current input signal is processed through a pre-amplifier and RMS converter on the field side of the isolation barrier. The converted DC signal is then chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The computer-side circuitry reconstructs, filters and converts the signal to industry-standard outputs. Modules are powered from +5VDC, ±5%.

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

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

FEATURES

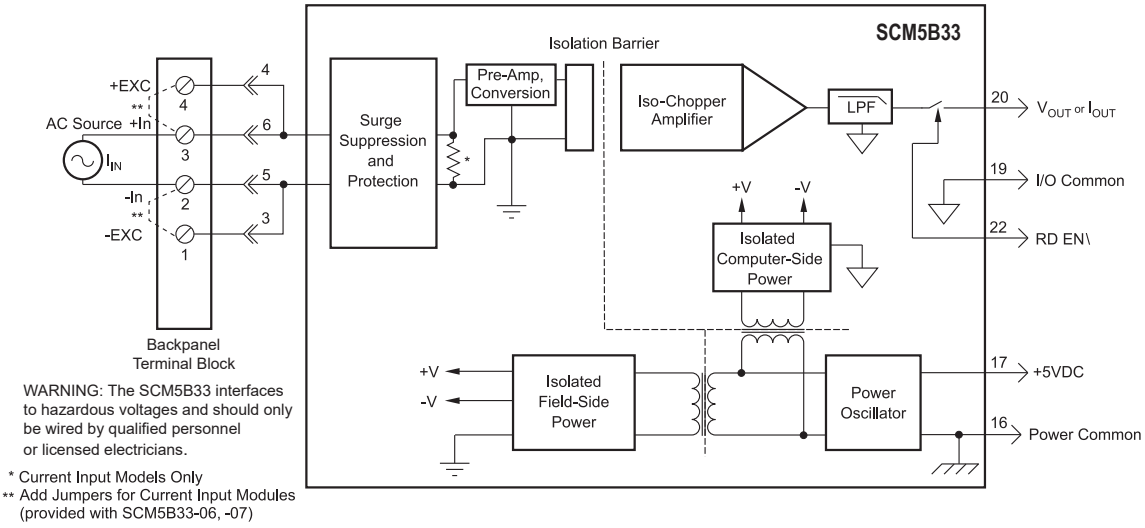
- Interfaces RMS Voltage (0-300V) or RMS Current (0-5A)
- Designed for Standard Operation with Frequencies of 45Hz to 1000Hz (Extended Range to 20kHz)
- Compatible with Standard Current and Potential Transformers
- Industry Standard Outputs: 0-1mA, 0-20mA, 4-20mA, 0-5V or 0-10VDC
- ±0.25% Factory Calibrated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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

Ordering Information

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

NOTES:
*Contact factory for maximum values.

(1) SCM5B33 and SCMPB01, -02, -03, -04, -05, -06, -07, XEV rating only. Backpanels obtained from other sources may have lower ratings.
(2) For 1 to 25 seconds the max allowable transient current rating is √ 2500 / (event time). For less than 1 second, ANSI/IEEE C37.90.1 applies with a 0.05Ω load. For greater than 25 seconds, the 10A rms continuous rating applies.
(3) At standard 60Hz factory calibration. Consult factory for calibration at other frequencies.
(4) For 0-10% Span measurements, add 0.25% accuracy error (-02 thru -07) or 1.00% accuracy error (-01). Accuracy includes linearity, hysteresis and repeatability but not source or external shunt inaccuracy (if used).

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SCM5B34

Linearized 2- or 3-wire RTD-input Modules

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

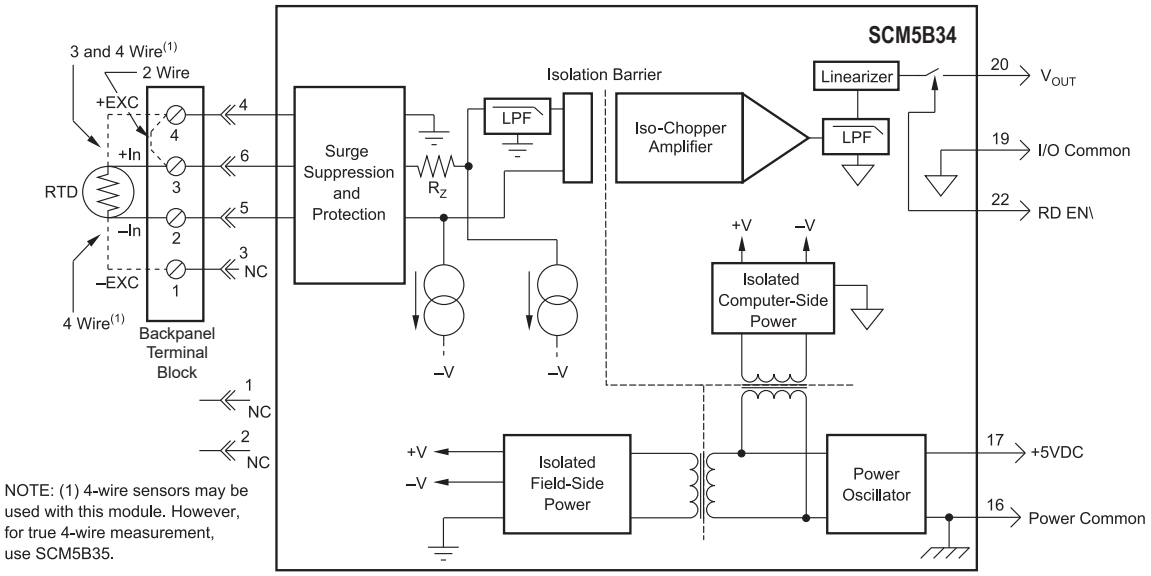
- Interfaces to 100Ω Platinum, 10Ω Copper, or 120Ω Nickel RTDs
- Linearizes RTD Signal
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- CSA C/US Certified
- CE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

BENEFITS

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

APPLICATIONS

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



NOTE: (1) 4-wire sensors may be used with this module. However, for true 4-wire measurement, use SCM5B35.

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

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Specifications

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

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

Ordering Information

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

**RTD Standards

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

NOTES :
*Contact factory for maximum values.
(1) "Ω" refers to the resistance in one lead.
(2) Includes conformity, hysteresis and repeatability.
(3) Conformity error is ±0.05% Span for SCM5B34N-01.

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SCM5B35

Linearized 4-wire RTD-input Modules

DESCRIPTION

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

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

The SCM5B modules are designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles are on the field side of the isolation barrier, and four poles are on the computer side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

FEATURES

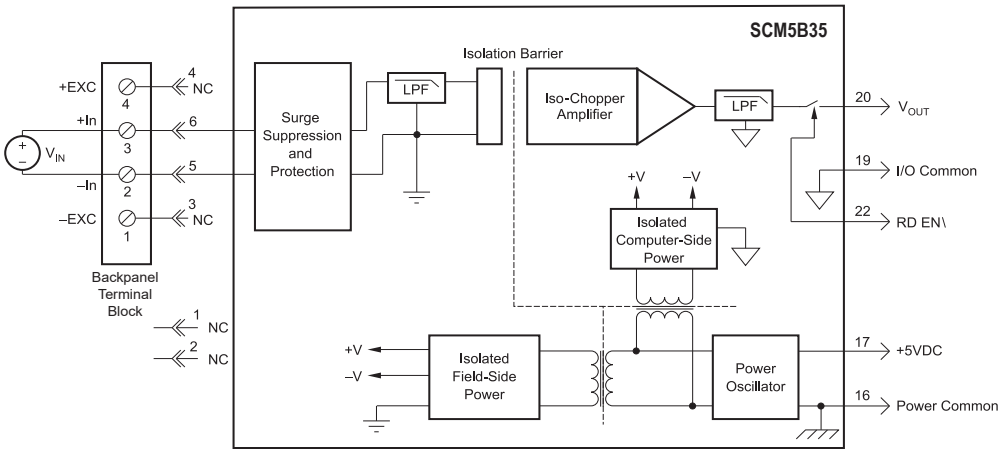
- Interfaces to 100Ω Platinum, 10Ω Copper, or 120Ω Nickel-RTDs
- True 4-wire Input
- Linearizes RTD Signal
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- CSA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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

Ordering Information

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

**RTD Standards

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

NOTES :
*Contact factory for maximum values.
(1) "Ω" refers to the resistance in one lead.
(2) Includes conformity, hysteresis and repeatability.
(3) Conformity error is ±0.05% Span for SCM5B35N-01.

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SCM5B36

Potentiometer-input Modules

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ± 50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are in the output stage. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

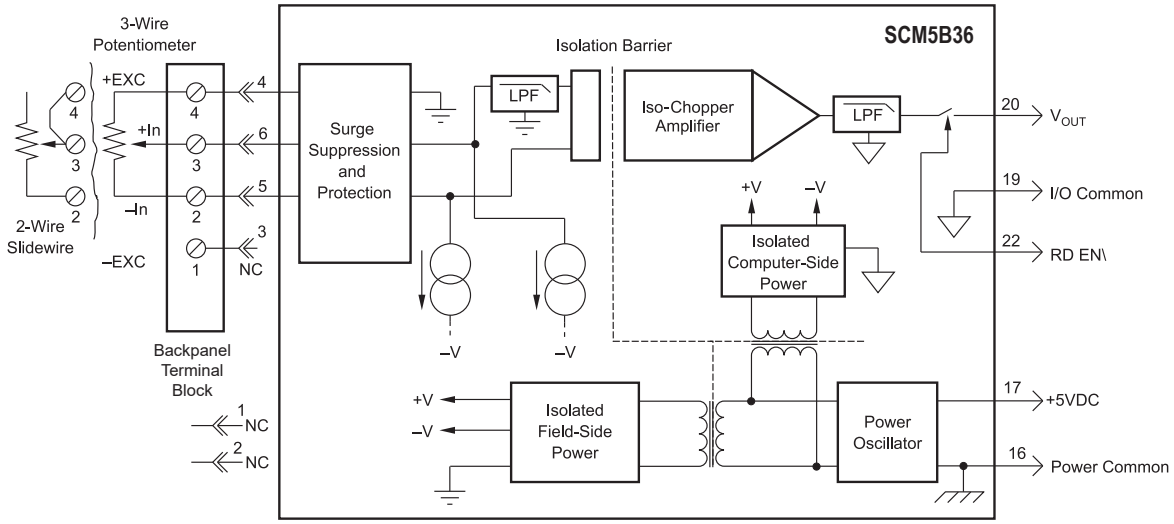
- Interfaces to Potentiometers up to 10,000Ω
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified
- CE and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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information

Model	Input Range	Output Range
SCM5B36-01	0 to 100Ω	0V to +5V
SCM5B36-01D	0 to 100Ω	0V to +10V
SCM5B36-02	0 to 500Ω	0V to +5V
SCM5B36-02D	0 to 500Ω	0V to +10V
SCM5B36-03	0 to 1kΩ	0V to +5V
SCM5B36-03D	0 to 1kΩ	0V to +10V
SCM5B36-04	0 to 10kΩ	0V to +5V
SCM5B36-04D	0 to 10kΩ	0V to +10V

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SCM5B37

Non-linearized Thermocouple-input Modules

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

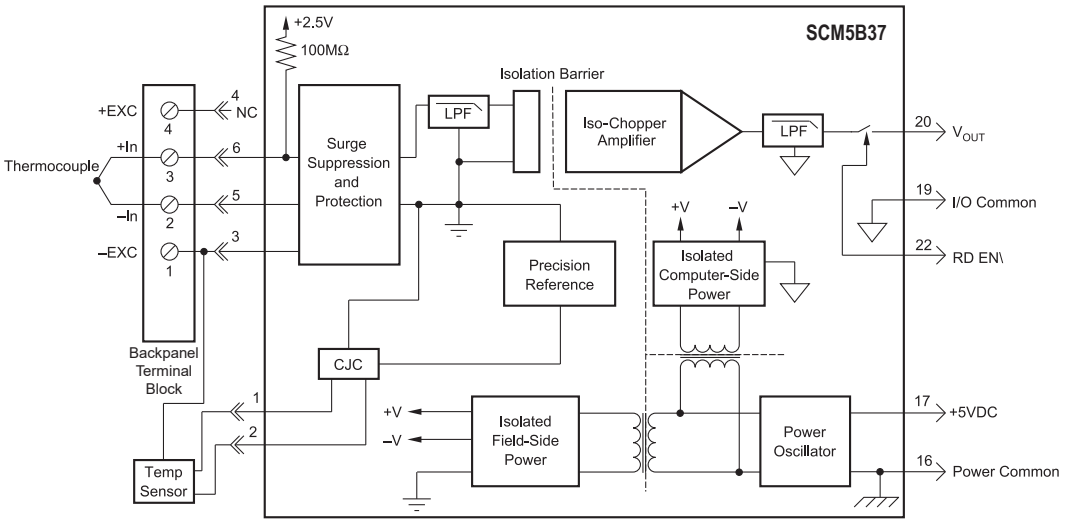
- Interfaces to Types J, K, T, E, R, S, C, N and B Thermocouples
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- ±0.03% Accuracy
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.005% Linearity
- ±1µV/°C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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability. Does not include CJC accuracy.
(2)This is equivalent to °C as follows: Type J 0.020 °C/°C, Types K, T 0.025°C/°C, Type E 0.016°C/°C, Types R, S 0.168°C/°C, Type N 0.037°C/°C, Type C, 0.072°C/°C.
(3) RTI = Referenced to input.

Ordering Information

Model	Type‡ TC	Input Range	Output Range	Accuracy(1)	
SCM5B37J	J	–100°C to +760°C	0V to +5V	±0.03%	±0.26°C
SCM5B37JD		(–148°F to +1400°F)	0V to +10V		
SCM5B37K	K	–100°C to +1350°C	0V to +5V	±0.03%	±0.44°C
SCM5B37KD		(–148°F to +2462°F)	0V to +10V		
SCM5B37T	T	–100°C to +400°C	0V to +5V	±0.03%	±0.15°C
SCM5B37TD		(–148°F to +752°F)	0V to +10V		
SCM5B37E	E	0°C to +900°C	0V to +5V	±0.03%	±0.27°C
SCM5B37ED		(+32°F to +1652°F)	0V to +10V		
SCM5B37R	R	0°C to +1750°C	0V to +5V	±0.03%	±0.53°C
SCM5B37RD		(+32°F to +3182°F)	0V to +10V		
SCM5B37S	S	0°C to +1750°C	0V to +5V	±0.03%	±0.53°C
SCM5B37SD		(+32°F to +3182°F)	0V to +10V		
SCM5B37B	B	0°C to +1800°C	0V to +5V	±0.03%	±0.54°C
SCM5B37BD		(+32°F to +3272°F)	0V to +10V		
SCM5B37C	C	+350°C to +1300°C	0V to +5V	±0.03%	±0.29°C
SCM5B37CD		(+662°F to +2372°F)	0V to +10V		
SCM5B37N	N	–100°C to +1300°C	0V to +5V	±0.03%	±0.42°C
SCM5B37ND		(–148°F to +2372°F)	0V to +10V		

‡Thermocouple Alloy Combinations

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

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

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SCM5B38

Strain Gauge Input Modules, Wide Bandwidth

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

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

The input signal is processed through a wide-bandwidth pre-amplifier on the field side of the isolation barrier. After amplification, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

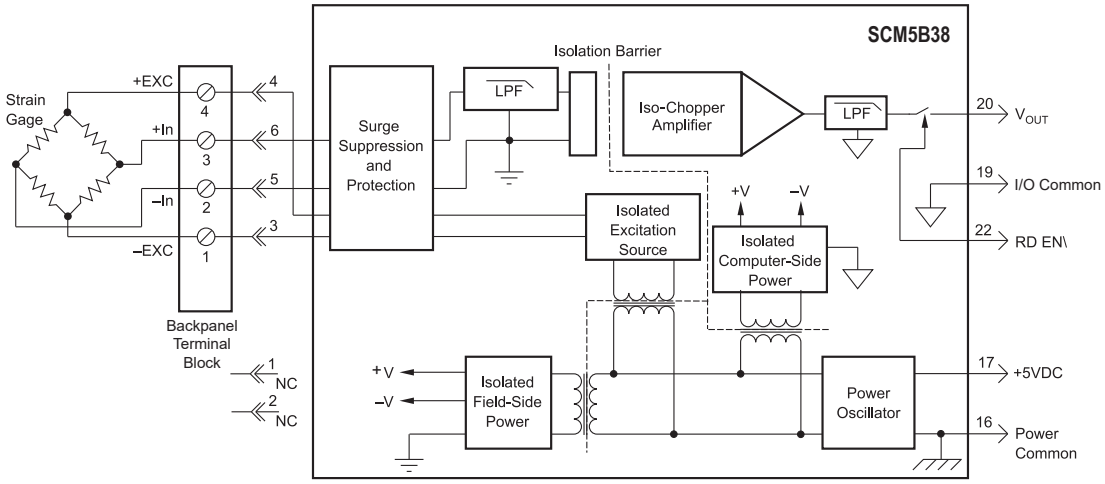
- Interfaces to 100Ω thru 10kΩ, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gauges
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- Fully Isolated Excitation Supply
- 100dB CMR
- 10kHz Signal Bandwidth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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information

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

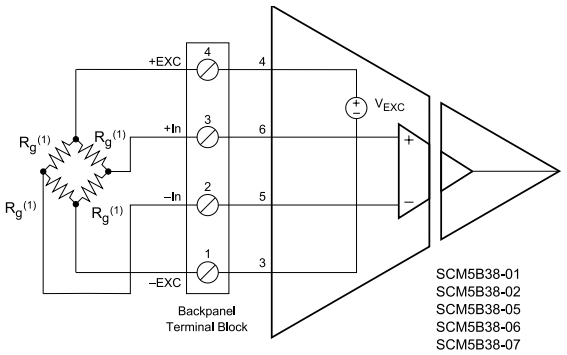


Figure 1: Full-Bridge Connection

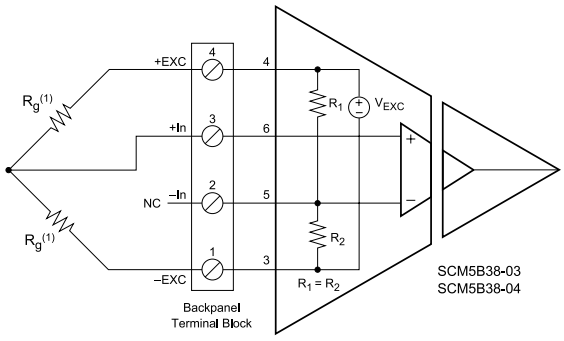


Figure 2: Half-Bridge Connection

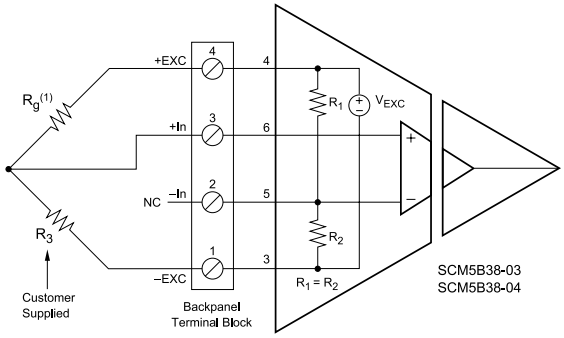


Figure 3: Quarter-Bridge Connection

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SCM5B38

Strain Gauge Input Modules, Narrow Bandwidth

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

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

After initial field-side filtering the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

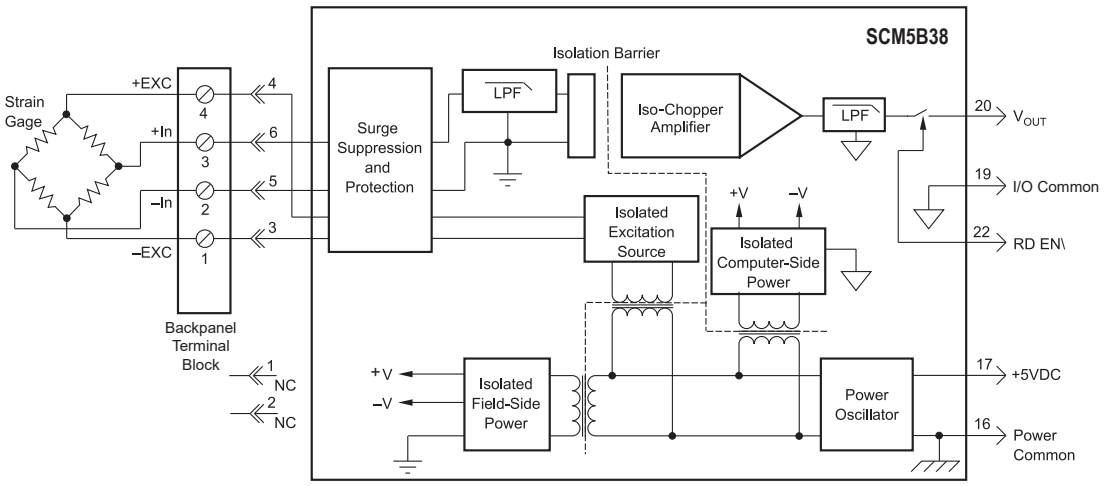
- Interfaces to 100Ω thru 10kΩ, Full-Bridge, Half-Bridge, or Quarter-Bridge Strain Gauges
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- Fully Isolated Excitation Supply
- 160dB CMR
- 4Hz Signal Bandwidth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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information

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

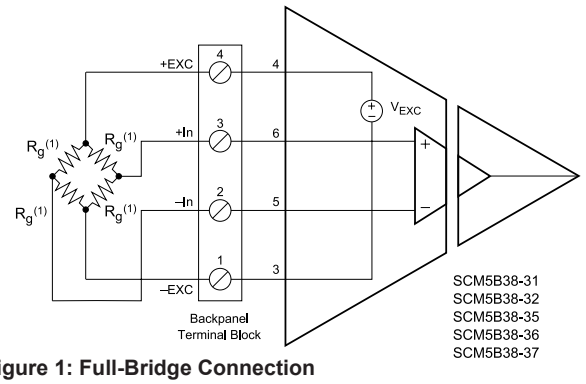


Figure 1: Full-Bridge Connection

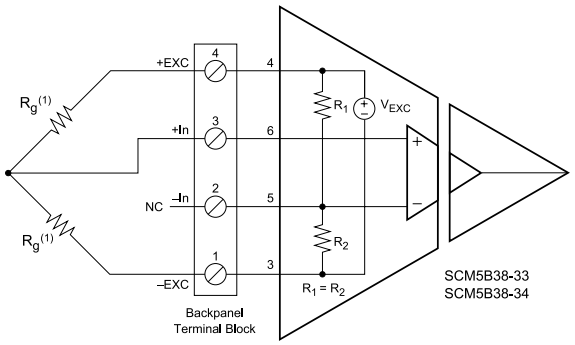


Figure 2: Half-Bridge Connection

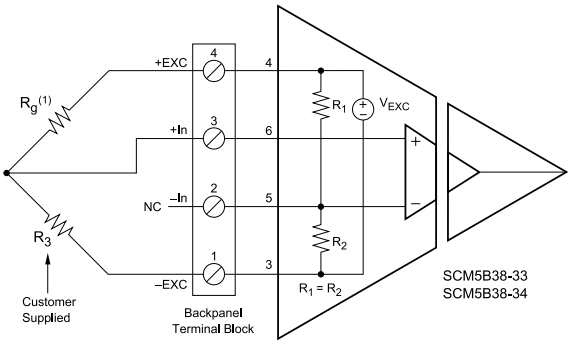


Figure 3: Quarter-Bridge Connection

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SCM5B39

Current-output Modules

DESCRIPTION

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

Setting of the track or hold mode is controlled by the logic state of WR EN\, module pin 23. When pin 23 is low, the track mode is enabled. If pin 23 is high, the hold mode is enabled. The module is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the track and hold circuit. For a low state, simply connect pin 23, the Write-Enable pin, to I/O Common, pin 19.

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

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

FEATURES

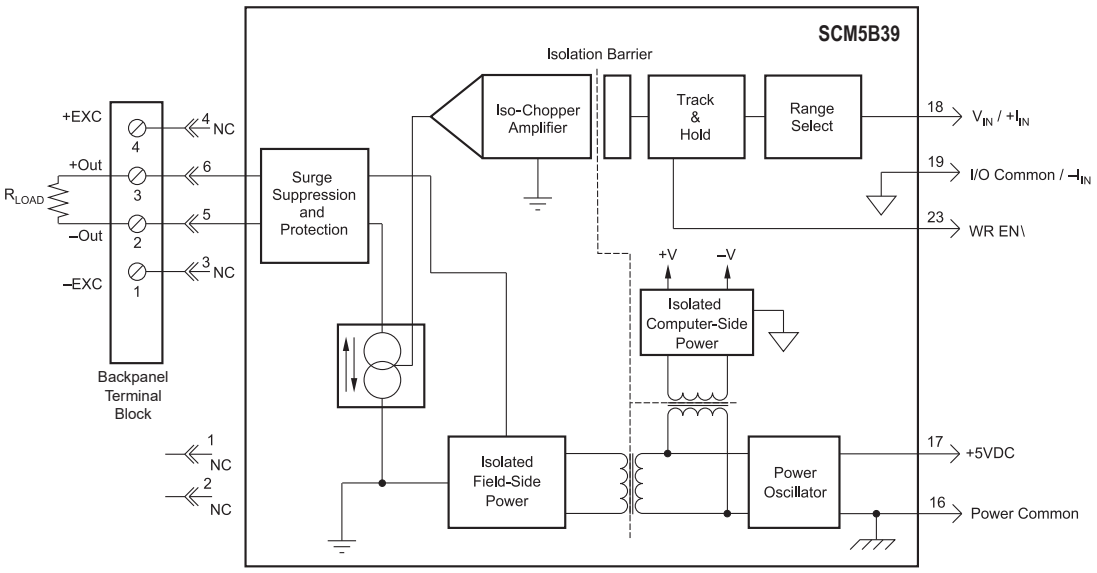
- Accepts High-level Voltage or Process Current Input
- Unipolar or Bipolar Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protected to 240VAC, Continuous
- 110dB CMR
- 400Hz Signal Bandwidth
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information

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

Refer to SCM5B392 specifications for additional current-output models.

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SCM5B392

Matched-pair Servo/Motor Controller Modules

DESCRIPTION

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

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

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

FEATURES

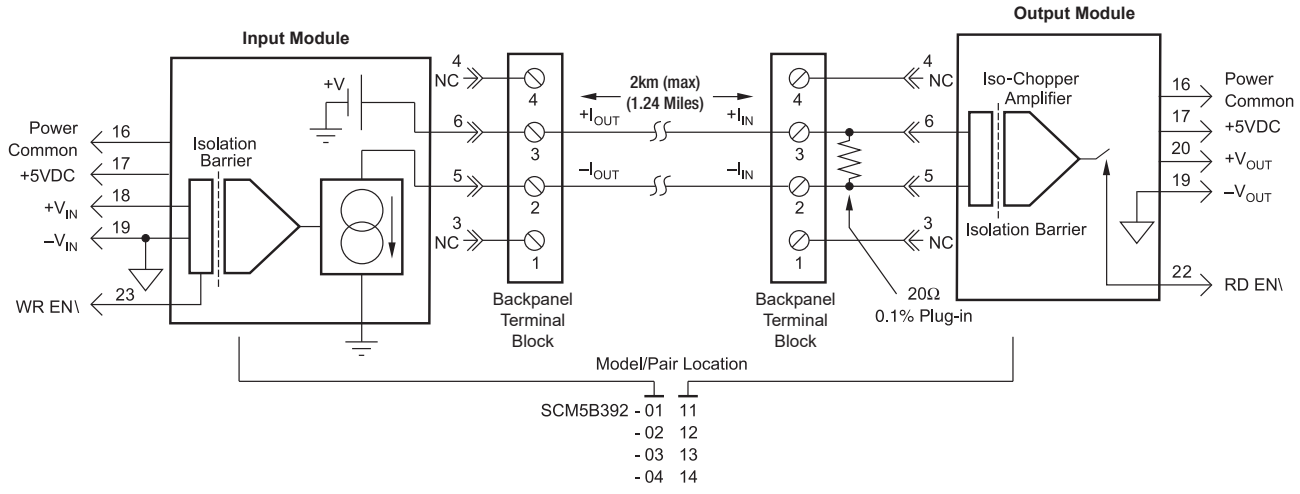
- Extends the Distance and Isolates Servo/Motor Controller Signals
- Provides Isolated Current Loop Interface Between Controller and Motor or Actuator
- Accepts High-level Voltage Inputs up to ±10V
- Provides High-level Voltage Outputs up to ±10V
- 1500Vrms Transformer Isolation (3000Vrms Total Loop)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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information (for single modules)

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

Ordering Information (for module pairs)

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

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SCM5B40/41

Analog Voltage-input Modules, Wide Bandwidth

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

The input signal is processed through a wide bandwidth pre-amplifier on the field side of the isolation barrier. After amplification, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

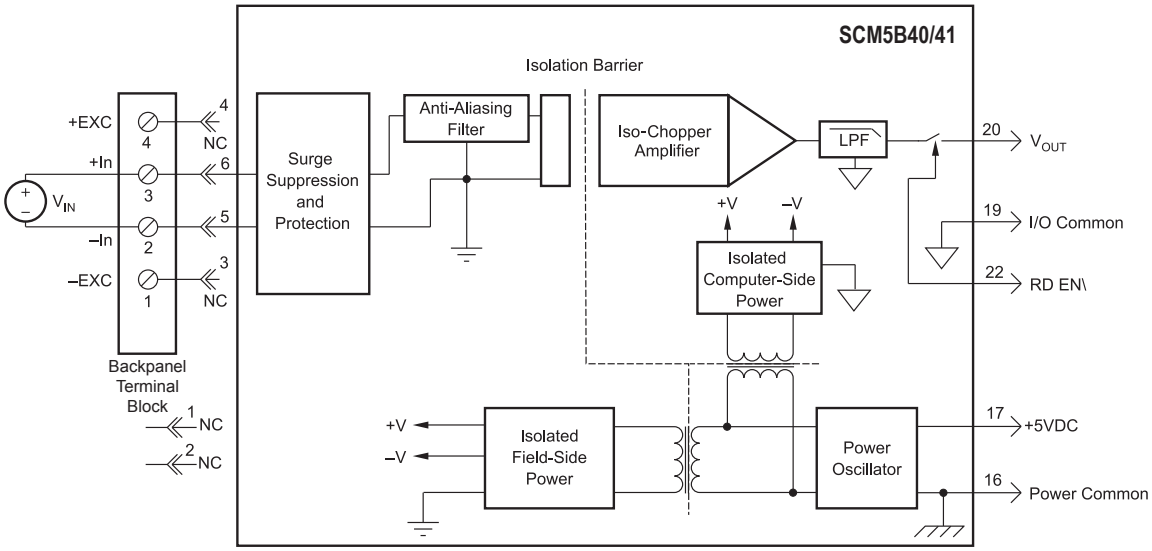
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 100dB CMR
- 10kHz Signal Bandwidth
- ±0.03% Accuracy
- ±0.01% Linearity
- ±1µV/°C Drift
- CSA C/US Certified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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information

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

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SCM5B42

2-wire Transmitter Interface Modules

DESCRIPTION

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

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

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

FEATURES

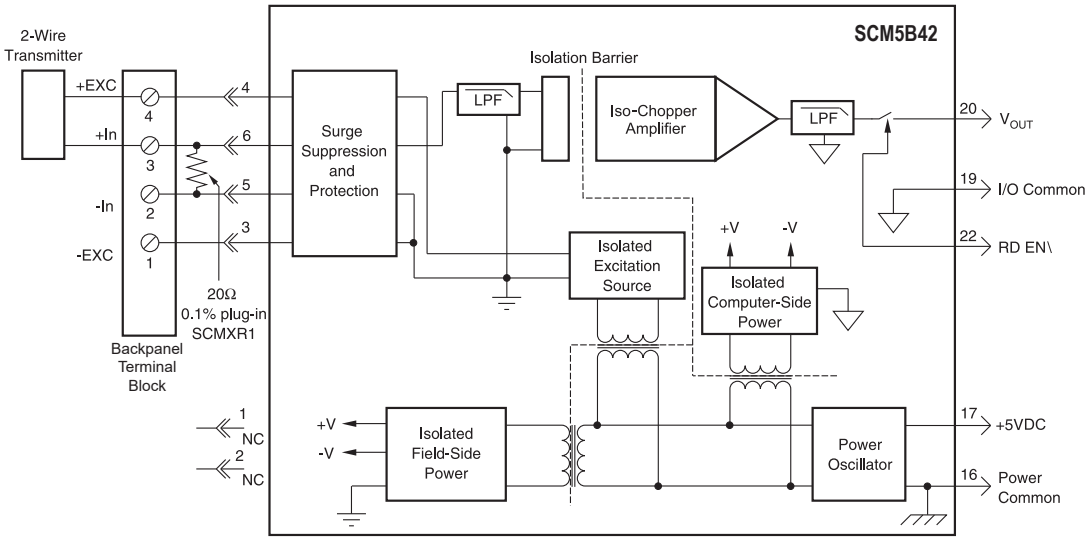
- Isolated +20VDC Current Loop Supply
- Provides Isolation for Non-isolated 2-wire Transmitters
- High-level Voltage Output +1V to +5V or +2V to +10V
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 100dB CMR
- 100Hz Signal Bandwidth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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability. Does not include SCMXR1 accuracy.
(2) RTI = Referenced to input.

Ordering Information

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

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SCM5B43

General-purpose Input Modules with DC Excitation

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

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

The input signal is processed through a pre-amplifier on the field side of the isolation barrier. This pre-amplifier has a gain-bandwidth product of 5MHz and is bandwidth limited to 1kHz. After amplification, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

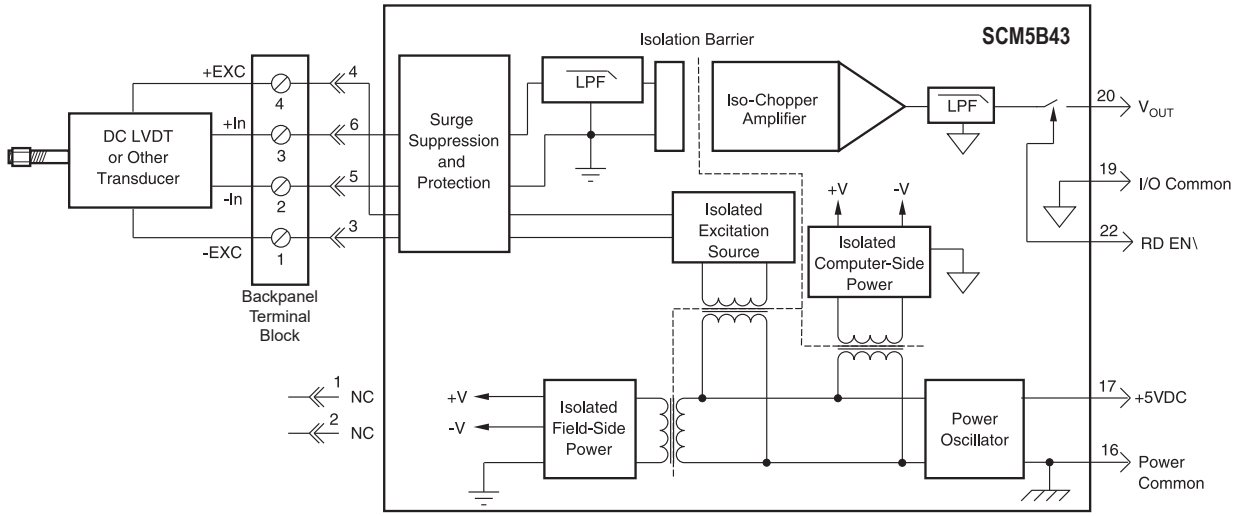
- Interfaces to DC Displacement Transducers and Other Devices Requiring a Stable DC Supply
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- Fully Isolated Excitation Supply
- 100dB CMR
- 1kHz Signal Bandwidth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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

Ordering Information

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

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

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SCM5B45

Frequency Input Modules

DESCRIPTION

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

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

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

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

FEATURES

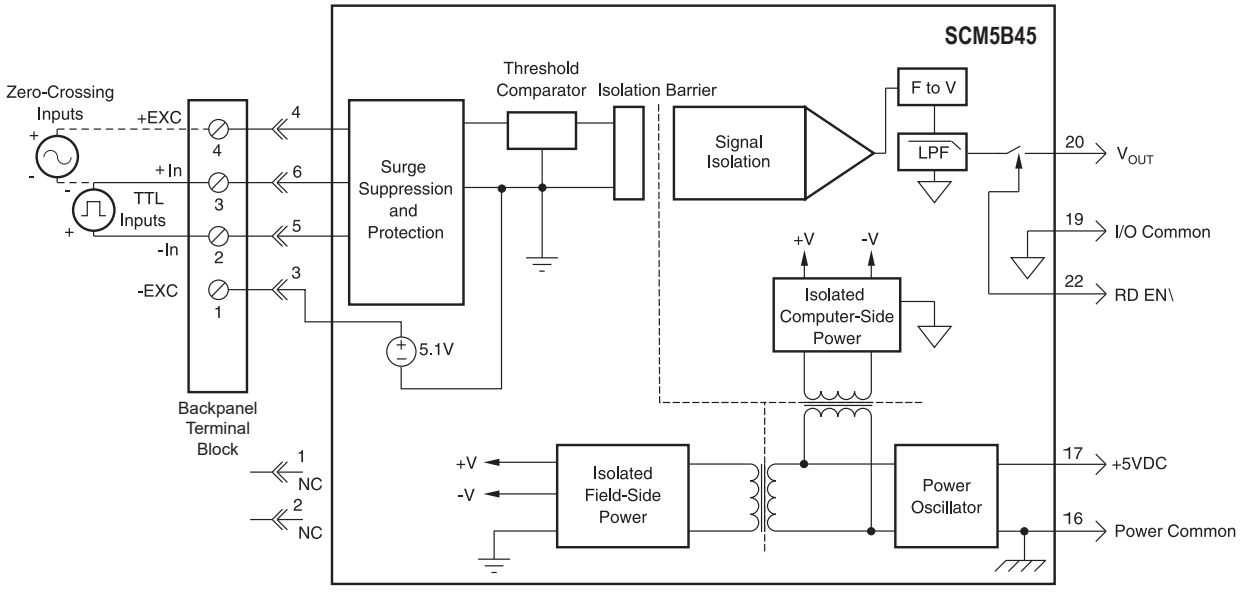
- Accepts Frequency Inputs of 0 to 100kHz
- Provides High-level Voltage Outputs
- TTL or Zero Crossing Signal Inputs
- 1500 Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 120dB CMR
- Input Protected to 240VAC, Continuous
- ±0.05% Accuracy
- CSA C/US Certified
- CE and ATEX Compliant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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

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

Ordering Information

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

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SCM5B47

Linearized Thermocouple-input Modules

DESCRIPTION

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

The SCM5B module family is designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

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

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

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

FEATURES

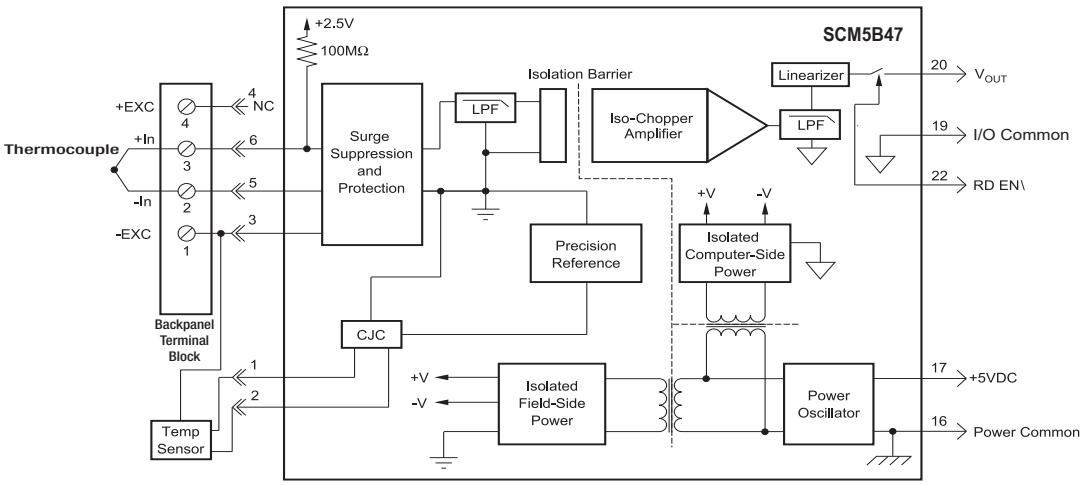
- Interfaces to Types J, K, T, E, R, S, N, and B Thermocouples
- Linearizes Thermocouple Signal
- High-level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±1µV/°C Drift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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

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

NOTES:
*Contact factory for maximum values.
(1) Includes conformity, hysteresis and repeatability. Does not include CJC accuracy.
(2) This is equivalent to °C as follows: Type J 0.020 °C/°C, Types K, T 0.025°C/°C, Type E 0.016°C/°C, Types R, S 0.168°C/°C, Type N 0.037°C/°C, Type C 0.072°C/°C.
(3) RTI = Referenced to input.

Ordering Information

Model	TC Type‡	Input Range	Output Range	Accuracy(1)	
SCM5B47J-01 SCM5B47J-01D	J	0°C to +760°C (+32°F to +1400°F)	0V to +5V 0V to +10V	±0.08%	±0.61°C
SCM5B47J-02 SCM5B47J-02D	J	–100°C to +300°C (–148°F to +572°F)	0V to +5V 0V to +10V	±0.08%	±0.32°C
SCM5B47J-03 SCM5B47J-03D	J	0°C to +500°C (+32°F to 932°F)	0V to +5V 0V to +10V	±0.07%	±0.36°C
SCM5B47K-04 SCM5B47K-04D	K	0°C to +1000°C (+32°F to +1832°F)	0V to +5V 0V to +10V	±0.08%	±0.80°C
SCM5B47K-05 SCM5B47K-05D	K	0°C to +500°C (+32°F to +932°F)	0V to +5V 0V to +10V	±0.08%	±0.38°C
SCM5B47T-06 SCM5B47T-06D	T	–100°C to +400°C (–148°F to +752°F)	0V to +5V 0V to +10V	±0.16%	±0.80°C
SCM5B47T-07 SCM5B47T-07D	T	0°C to +200°C (+32°F to +392°F)	0V to +5V 0V to +10V	±0.16%	±0.32°C
SCM5B47E-08 SCM5B47E-08D	E	0°C to +1000°C (+32°F to +1832°F)	0V to +5V 0V to +10V	±0.10%	±1.0°C
SCM5B47R-09 SCM5B47R-09D	R	+500°C to +1750°C (+932°F to +3182°F)	0V to +5V 0V to +10V	±0.10%	±1.3°C
SCM5B47S-10 SCM5B47S-10D	S	+500°C to +1750°C (+932°F to +3182°F)	0V to +5V 0V to +10V	±0.10%	±1.3°C
SCM5B47B-11 SCM5B47B-11D	B	+500°C to +1800°C (+932°F to +3272°F)	0V to +5V 0V to +10V	±0.15%	±2.0°C
SCM5B47J-12 SCM5B47J-12D	J	–100°C to +760°C (–148°F to +1400°F)	0V to +5V 0V to +10V	±0.08%	±0.70°C
SCM5B47K-13 SCM5B47K-13D	K	–100°C to +1350°C (–148°F to +2462°F)	0V to +5V 0V to +10V	±0.10%	±1.5°C
SCM5B47K-14 SCM5B47K-14D	K	0°C to +1200°C (+32°F to +2192°F)	0V to +5V 0V to +10V	±0.08%	±0.96°C
SCM5B47N-15 SCM5B47N-15D	N	–100°C to +1300°C (–148°F to +2372°F)	0V to +5V 0V to +10V	±0.08%	±1.15°C

‡Thermocouple Alloy Combinations

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

Type	Material
J	Iron vs. Copper-nickel
K	Nickel-chromium vs. Nickel-aluminum
T	Copper vs. Copper-nickel
E	Nickel-chromium vs. Copper-nickel
R	Platinum-13% Rhodium vs. Platinum
S	Platinum-10% Rhodium vs. Platinum
B	Platinum-30% Rhodium vs. Platinum-6% Rhodium
N	Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicon- 0.1% Magnesium

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SCM5B48

Accelerometer-input Module

DESCRIPTION

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

Six-pole signal filtering in the SCM5B48 results in greater than 100dB of normal-mode rejection for signal frequencies above the cutoff frequency. One pole of filtering is on the field side of the isolation barrier for anti-aliasing purposes and the remaining five-pole programmable Bessel filter is located on the system side. High-pass filtering is achieved through a second-order passive filter, located on the field side. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

The SCM5B48 offers the option of setting the constant current source for sensor excitation to common values of 4mA or 9mA with a compliance voltage of 24VDC. Programmable gains of 1, 10, and 100 are selectable and the module offers a ±10V output. The required supply level is +5VDC, ±5%.

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

FEATURES

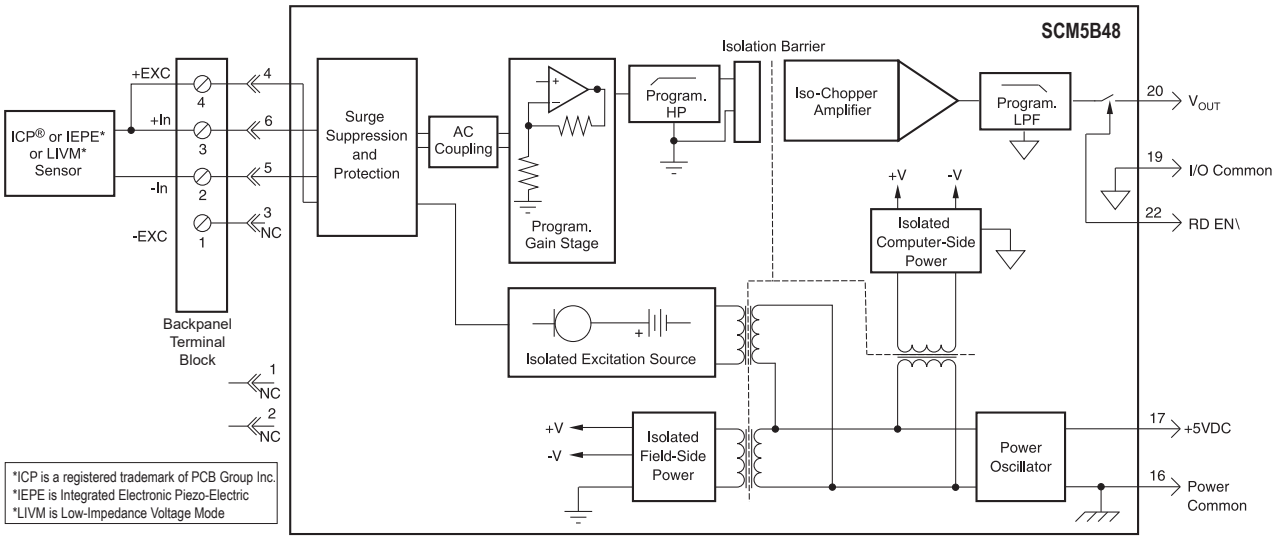
- Interfaces to ICP®*, or IEPE*, or LIVM* Sensors
- ±5V or ±10V Output Range
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 240Vrms, Continuous, Input Protection
- 1, 10, and 100 Programmable Gain
- 2.5, 5, 10, and 20kHz Programmable LP Filter
- 0.2 and 10Hz Programmable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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

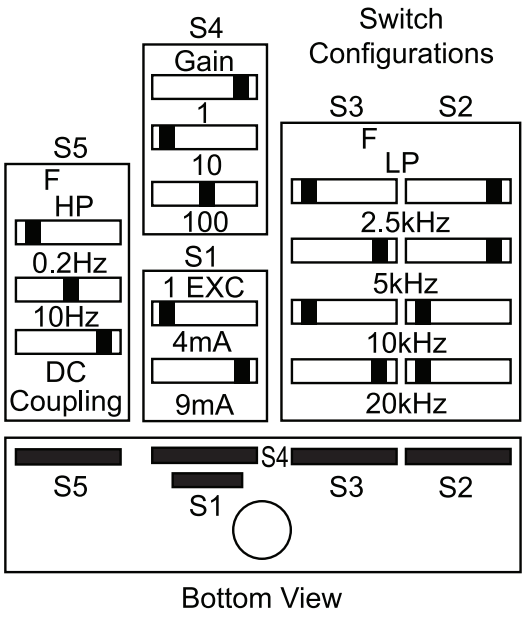
Typical* at T_A = +25°C and +5VDC Power

Module	SCM5B48
Input Type	Accelerometer
Range(1)	±10V
Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Excitation	
Constant Current(2)	4mA or 9mA, ±10%
Compliance Voltage	24V ±10%
Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output Range	See Ordering Information
Resistance	50Ω
Protection	Continuous Short-to-Ground
Gain	
Programmable(2)	1, 10, 100
CMR (50/60Hz)	100dB
Accuracy(3)	±0.2% Span
Linearity	±0.01% Span
Stability	
Offset	±25ppm/°C
Gain	±100ppm/°C
Output Noise, Gain=1, BW=20kHz	200µVrms
Low Pass Filter	
Type	Bessel
Programmable(2)	2.5kHz, 5kHz, 10kHz, 20kHz
High Pass Filter	
Programmable(2)	DC, 0.2Hz, 10Hz
CMV (Input to Output)	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
NMR	100db per Decade Above Cutoff Frequency
Power Supply Voltage	+5VDC ±5%
Power Supply Current	110mA (typ) (9mA Excitation) 70mA (typ) (4mA Excitation)
Power Supply Sensitivity	±600µV/% RTI(4)
Mechanical Dimensions (h)x(w)x(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C

NOTES:
*Contact factory for maximum values.
(1) AC peak for AC coupling. For DC coupling input range (AC + DC): 0 to +10V.
(2) Programmable using slide switches on the bottom of the module.
(3) Includes linearity, repeatability and hysteresis.
(4) RTI = Referenced to input.

Ordering Information

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



SCM5B48 Back Label

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SCM5B49

Voltage-output Modules

DESCRIPTION

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

Setting of the track or hold mode is controlled by the logic state of WR EN\, module pin 23. When pin 23 is low, the track mode is enabled. If pin 23 is high, the hold mode is enabled. The module is designed with a completely isolated computer-side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the track and hold circuit. For a low state, simply connect pin 23, the Write-Enable pin, to I/O Common, pin 19.

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

FEATURES

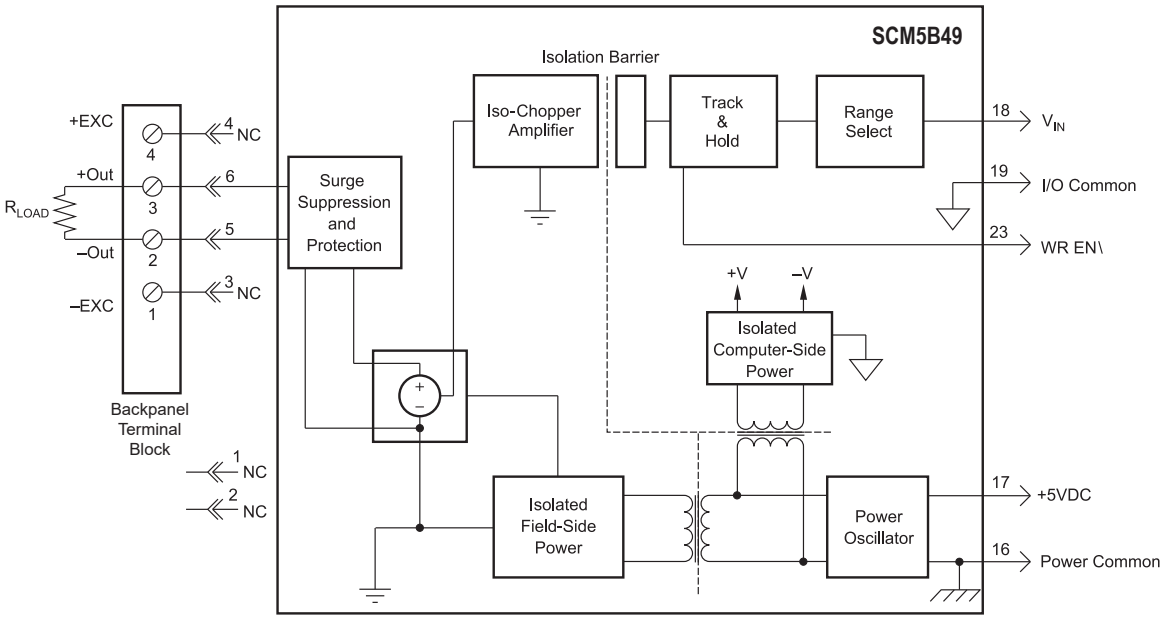
- Accepts High-level Voltage Inputs to ±10V
- Provides High-level Voltage Outputs to ±10V
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 5 Poles of Filtering
- 110dB CMR
- 400Hz Signal Bandwidth
- ±0.03% Accuracy
- ±0.015% Linearity
- CSA C/US Certified
- CE and ATEX Compliant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

BENEFITS

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

APPLICATIONS

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



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

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Specifications

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

Module	SCM5B49
Input Voltage Range	±5V, 0 to +5V, ±10V, 0 to +10V
Input Voltage (max)	±36V (no damage)
Input Resistance	50MΩ
Output Voltage Range	±5V, 0 to +5V, ±10V, 0 to +10V
Over Range Capability	5% at 10V Output
Output Drive	50mA (max)
Output Resistance	0.5Ω
Output I Under Fault, (max)	75mA
Output Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Input	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	110dB
NMR (–3dB at 400Hz)	80dB per Decade Above 400Hz
Accuracy(1)	±0.03% Span (0-5mA Load)
Linearity	±0.015% Span
Stability	
Zero	±25ppm/°C
Span	±20ppm/°C
Noise	
Output Ripple, 100kHz bandwidth	2mVp-p
Bandwidth, –3dB	400Hz
Response Time, 90% Span	1.25ms
Sample and Hold	
Output Droop Rate	0.2% Span/s
Acquisition Time	50µs
Track-and-Hold Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0"	0.5µA
Power Supply Voltage	+5VDC ±5%
Power Supply Current	280mA Full Load, 135mA No Load
Power Supply Sensitivity	±12.5ppm/%
Mechanical Dimensions (h)x(w)x(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

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

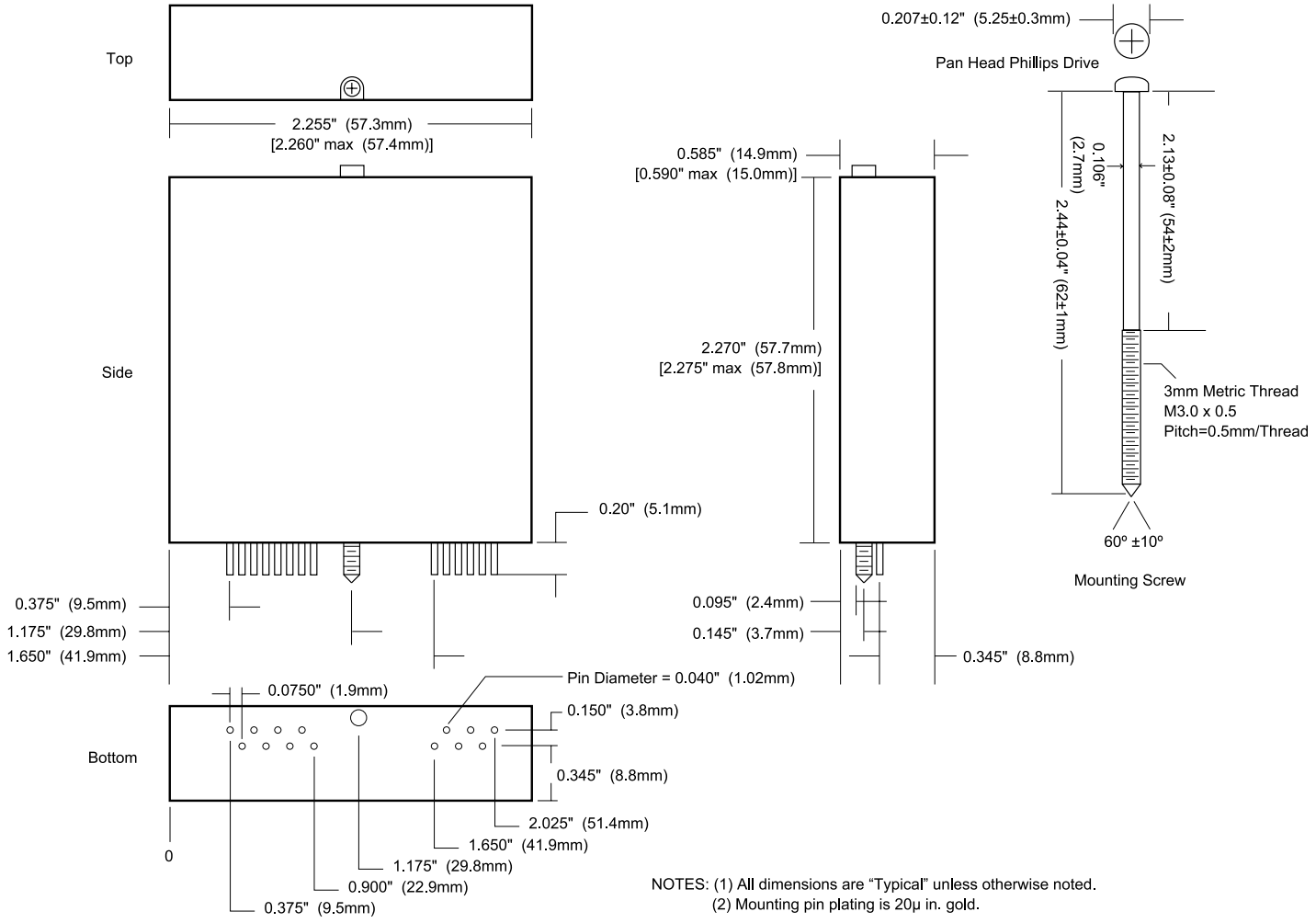
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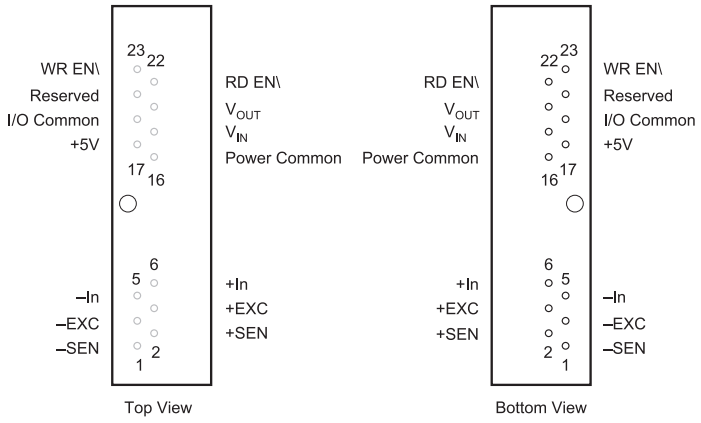
SCM5B

Module Dimensions and Pinouts

The following mechanical drawing is useful if designing circuit boards to mount the SCM5B modules. Many sockets are available which accept the mounting pins. As an example, AMP Inc. provides a socket with part number 50865-5. The captive nut for the 3mm mounting screw can be obtained from PEM (Penn Engineering and Manufacturing), part number KFS2-M3.



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



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Accessories for SCM5B Analog Modules

SCMPB01/SCMPB01-x

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

DESCRIPTION

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

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector: Field System	 High-Density Screw Clamp, 14 AWG (max) 26-pin, Male Header Connector
Isolation: Input-to-Output Channel-to-Channel	 1500Vrms, Continuous, (max) 1500Vrms, Continuous, (max)

FEATURES

- 16-position Backpanels (1-(SCMPB03), 2-(SCMPB04), and 8-(SCMPB05)-position Also Available)
- Panel or DIN-rail Mounting Options
- 19-inch Mounting Rack for Backpanels
- Multiplexed and Non-Multiplexed Backpanels
- Interface Cables
- Module Evaluation Board
- Cable-to-Screw-Terminal Interface Board
- Power Supplies
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

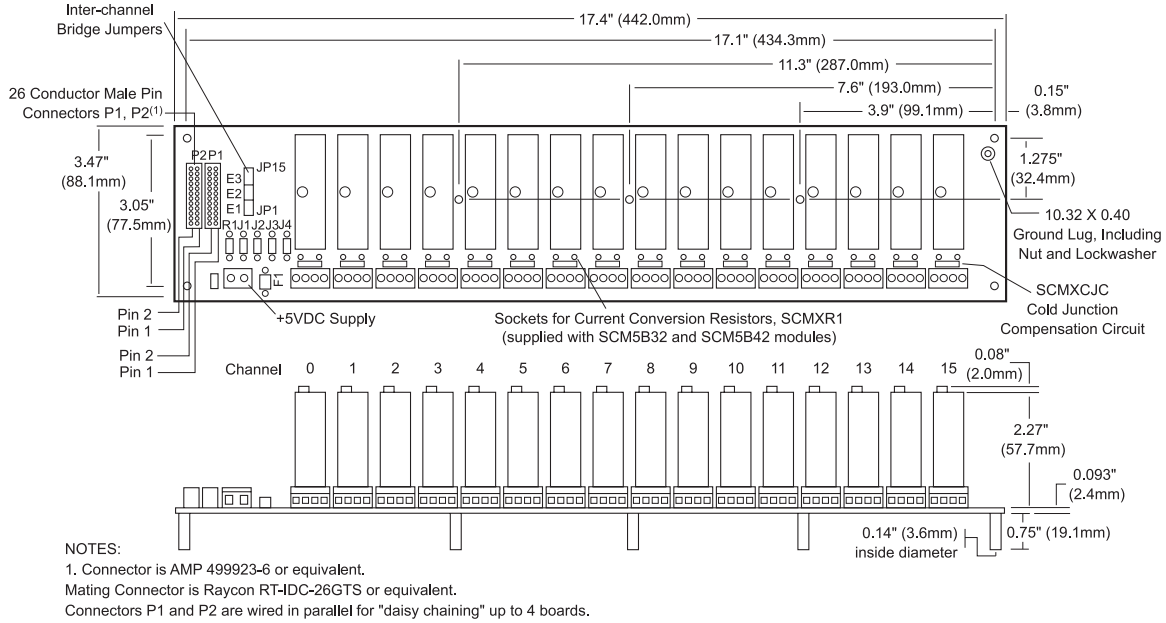
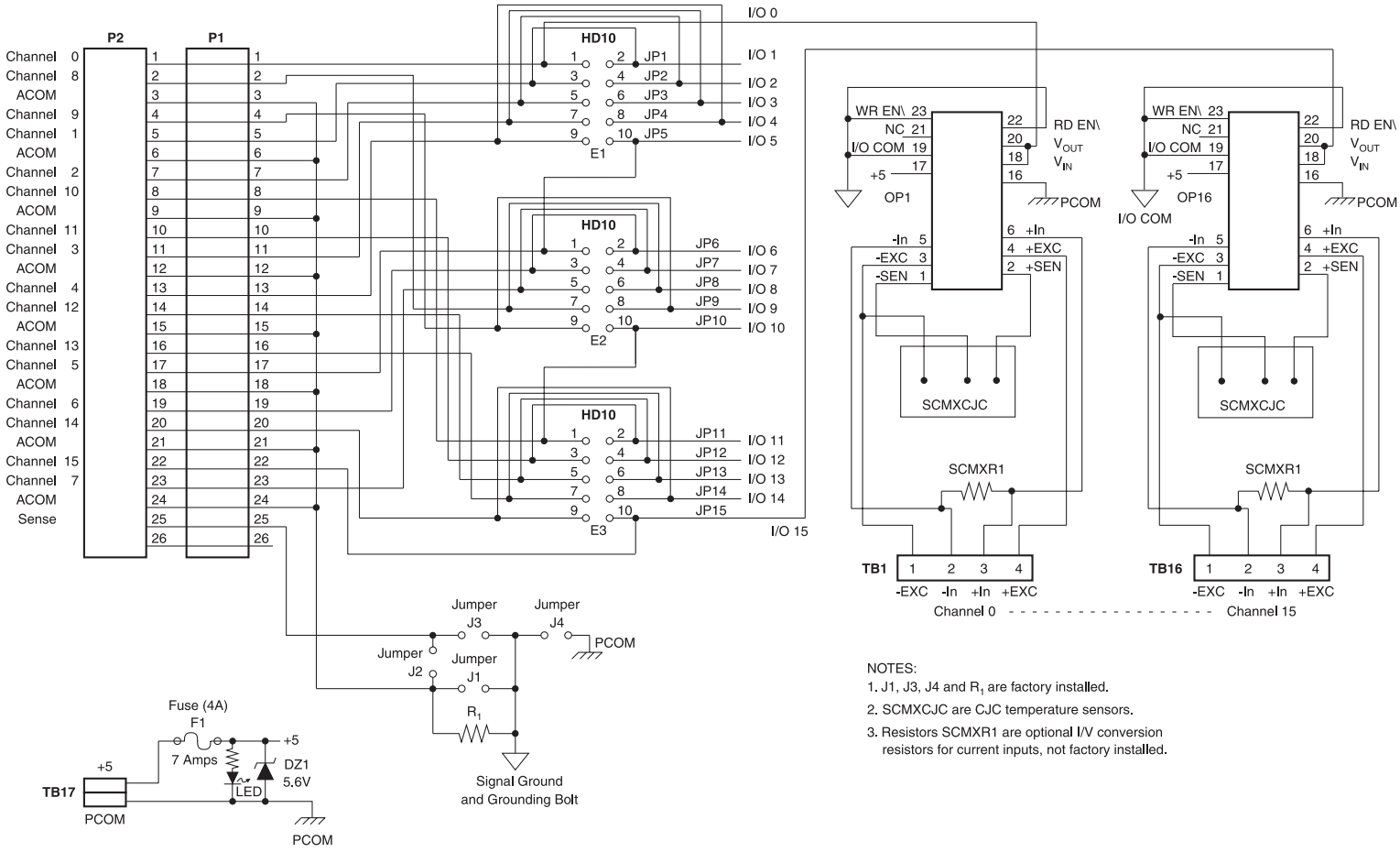


Figure 1: SCMPB01 Analog I/O Backpanel

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

Figure 2: SCMPB01 Schematic

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Electrical

P1 and P2 Connectors

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

Adjacent Channel Jumpers

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

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

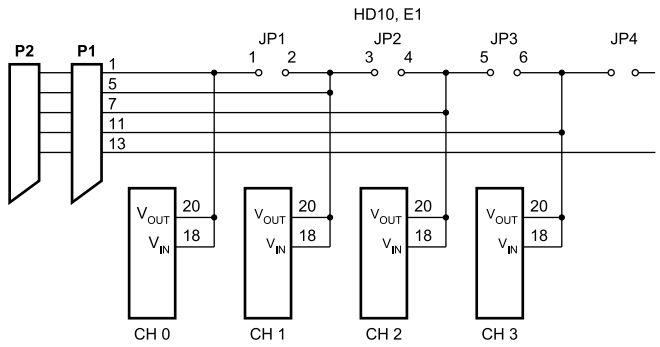


Figure 3: SCMPB01 Adjacent Channel Jumpers

Power

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

Fusing

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

Grounding

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

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

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

Ordering Information

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

For proper operation of the output switch or track-and-hold circuit when using the CMPB01/SCMPB01-x or SCMPB05/SCMPB05-x backpanels, a current path must exist between the host control logic power common and module I/O Common (module pin 19). This path can be established on the SCMPB01/SCMPB01-x via jumper J4. If this connection exists elsewhere in the system, jumper J4 should be removed since possible ground loops could exist. Other connections of power ground and signal ground usually occur at the A/D or D/A converter of the host measurement system. More information on grounding can be found in Application Note AN502.

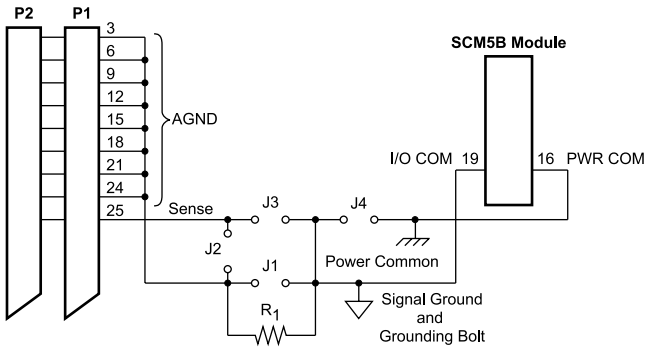


Figure 4: SCMPB01/SCMPB01-x Grounding Diagram

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

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

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SCMPB02/SCMPB02-x

16-position Analog I/O Backpanel, Multiplexed

DESCRIPTION

The SCMPB02/SCMPB02-x 16-channel backpanel (Figure 1, below can accept any of the SCM5B analog modules in any mixture. It can be mounted on the SCMXRK-002 19-inch metal rack. The SCMPB02/SCMPB02-x has two analog buses; one for analog input and one for analog output. This two-bus configuration takes advantage of the switch-controlled outputs on the input modules and the track-and-hold inputs on the output modules. A temperature sensor is mounted on each channel to provide cold junction compensation for thermocouple-input modules (see Figure 2, for schematic). Field connections are terminated with four screw terminals at each module site. Up to four SCMPB02/SCMPB02-x backpanels may be daisy-chained. Use SCMXCA004-XX cable for daisy-chaining and connecting to host computer.

FEATURES

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

BENEFITS

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

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector Field System	 High-density Screw Clamp, 14 AWG (max) 26-pin, Male Header Connector
Isolation Input-to-Output Channel-to-Channel	 1500Vrms, Continuous (max) 1500Vrms, Continuous (max)
Address Input Logic Levels Max Logic “0” Min Logic “1”	 0.8V 2.0V
Input Current I_I - “0” I_I - “1”	 0.1µA (max) at 25°C 1.0µA (max) –25°C to +85°C
RD EN\ or WR EN\ Signal Delay from Connector P1 to Channels 1-16 Standalone (address 0-15) Expanded (address 16-63)	 51ns at 25°C 64ns at –25°C to +85°C 100ns at 25°C 126ns at –25°C to +85°C

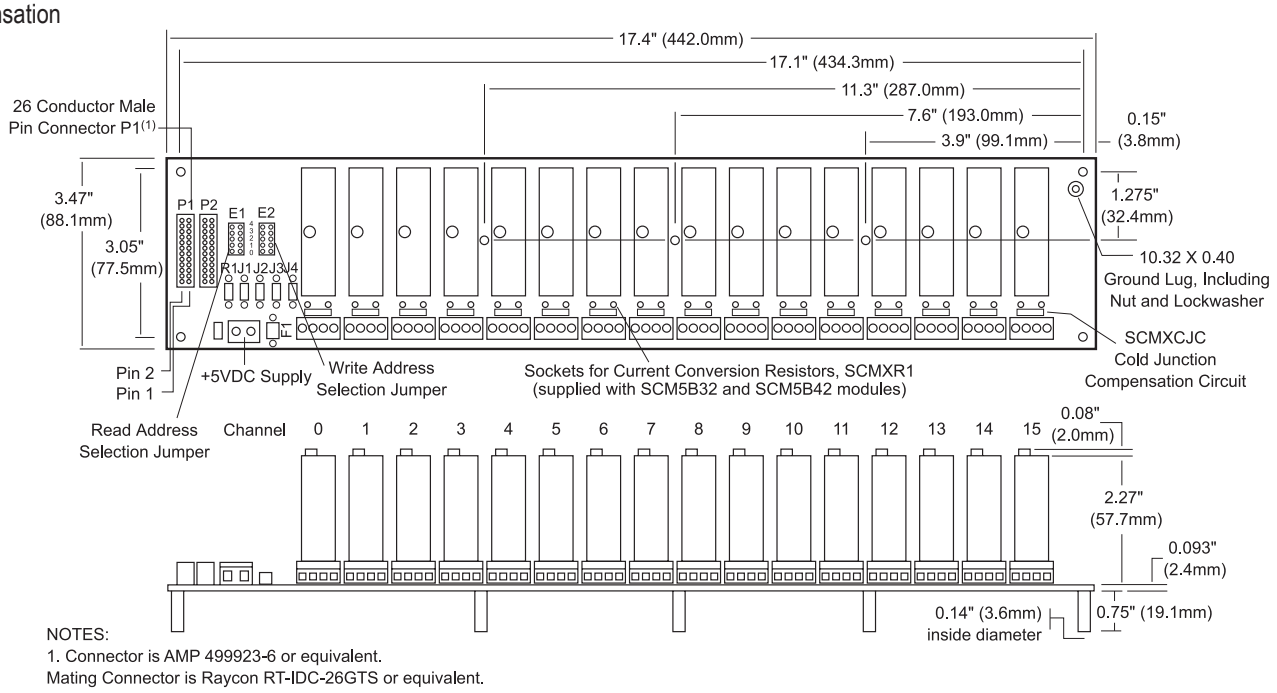
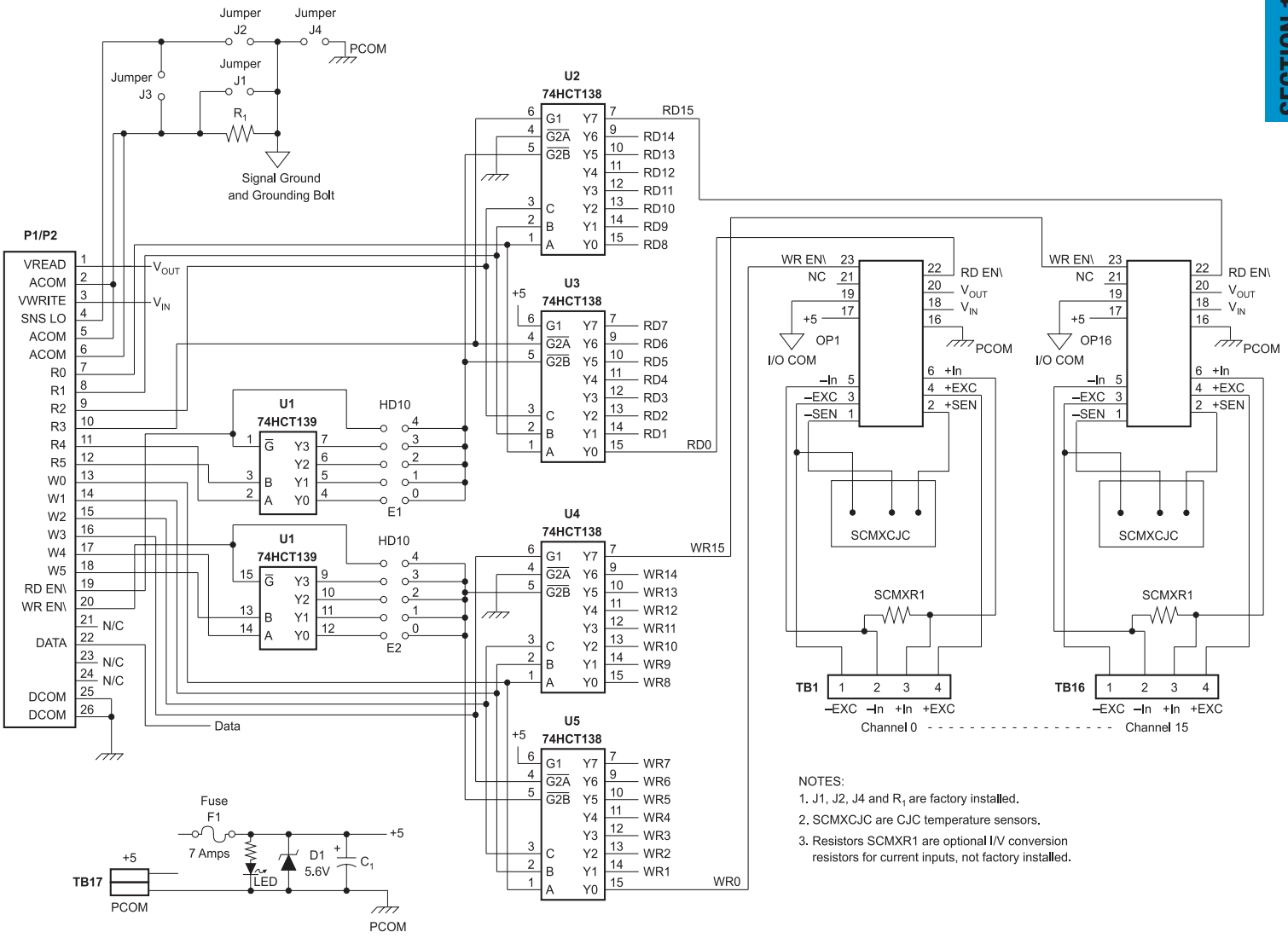


Figure 1: SCMPB02 Analog I/O Backpanel

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

Figure 2: SCMPB02/SCMPB02-x Schematic

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Electrical

P1 and P2 Connectors

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

Address Selection

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

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

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

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

Power

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

Fusing

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

Grounding

Figure 3 details the optional ground jumper configuration available on the SCMPB02/SCMPB02-x backpanel. Jumpers J1, J2, and J4 are factory installed.

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

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

Ordering Information

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

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

If the connection of power common and SIG COM shield wires exists in the host measurement system, a resistive connection between SIG COM and the backpanel signal ground can be made via R_1. R_1 can be as large as 10kΩ, 100Ω is a recommended value. Jumper J3 can be used to connect the SNS LO line to R_1 when this ground configuration is used.

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

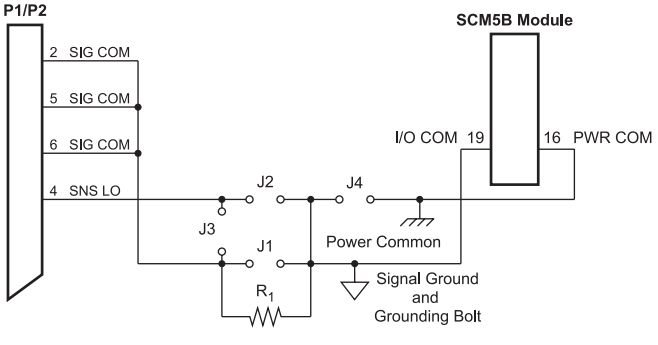


Figure 3: SCMPB02/SCMPB02-x Grounding Diagram

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SCMPB03/SCMPB03-x and SCMPB04/SCMPB04-x

DESCRIPTION

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

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

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

Qty	Model	Description
1	SCMXBEFE	Base Element with Snap Foot
2	SCMXSE	Side Element

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

Qty	Model	Description
2	SCMXBEFE	Base Element with Snap Foot
2	SCMXSE	Side Element
(# panels)-2	SCMXBE	Base Element with Snap Foot
(4 x (# panels))-4	SCMXVS	Connection Pins

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

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

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector: Field System	 High-Density Screw Clamp, 14 AWG (max) High-Density Screw Clamp, 14 AWG (max)
Isolation: Input-to-Output Channel-to-Channel	 1500Vrms, Continuous (max) 1500Vrms, Continuous (max)

FEATURES

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

BENEFITS

- Easy Installation
- Optimized for DIN-rail Use

Ordering Information

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

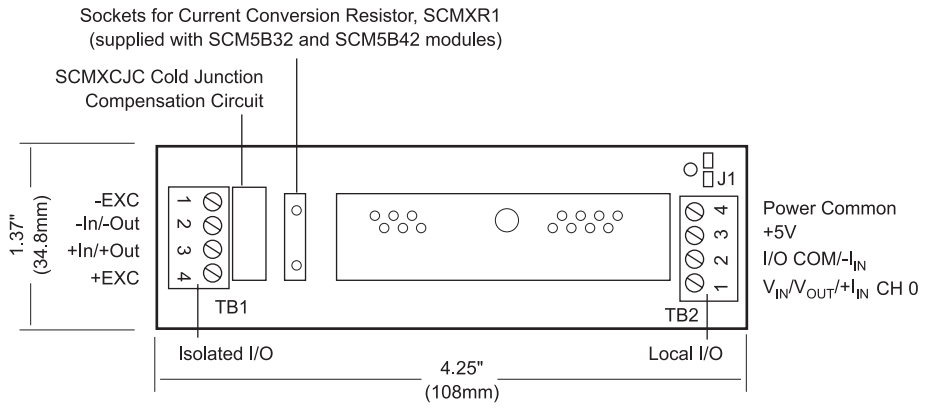


Figure 1: SCMPB03/SCMPB03-x Analog I/O Backpanel

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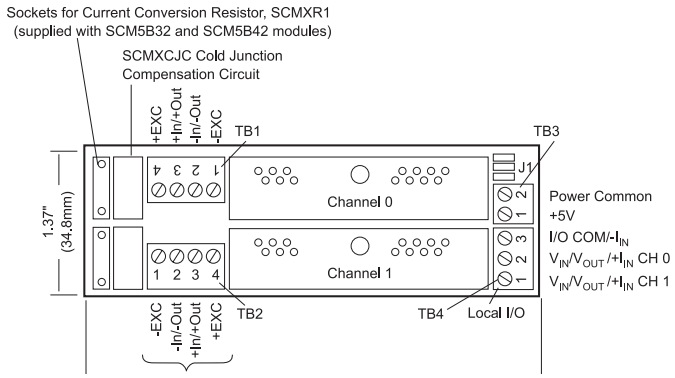


Figure 2: SCMPB04/SCMPB04-x Analog I/O Backpanel

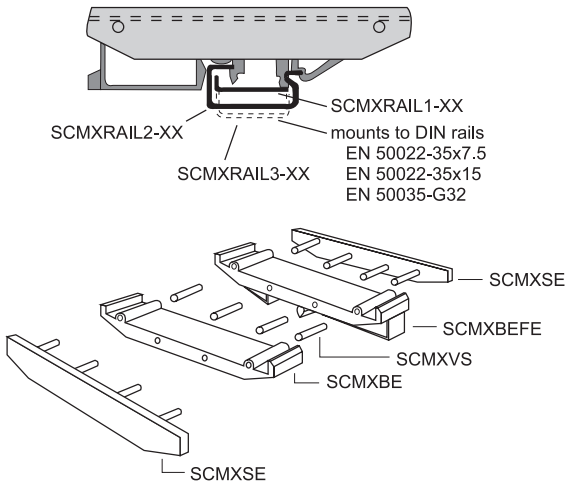
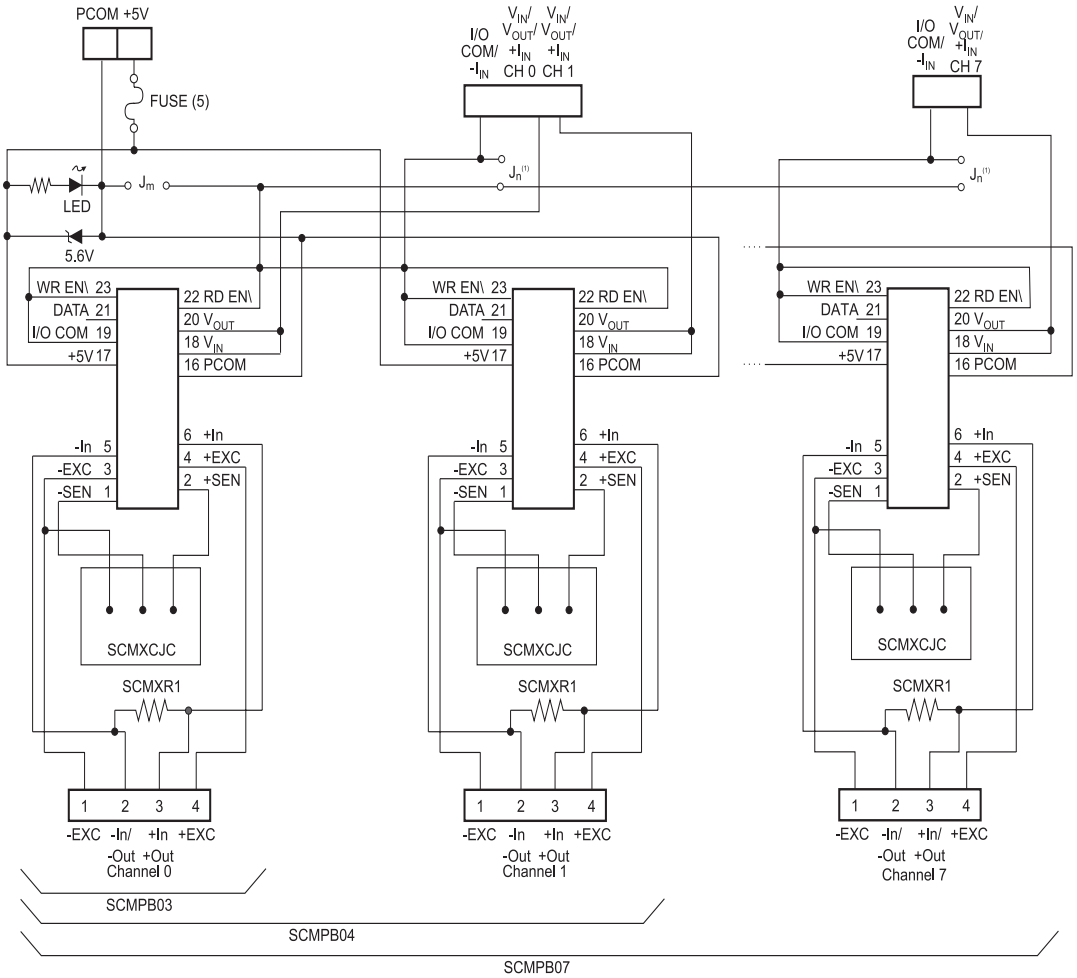


Figure 3: DIN-rail Mounting Elements



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

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

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SCMPB05/SCMPB05-x

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

DESCRIPTION

The SCMPB05/SCMPB05-x backpanel (Figure 1, below) can accept up to eight SCM5B analog input and/or output modules in any combination. It can be mounted on the SCMXRK-002 19-inch metal rack. A separate analog signal path is provided for each channel and each channel's signal is accessible at redundant 26-pin connectors. The module output switch is continuously "on" when using this backpanel and all eight module outputs are simultaneously accessible to high-speed data acquisition (ADC) boards.

On-board jumpers permit paralleling two SCMPB05/SCMPB05-x boards to form a SCMPB01 equivalent. An additional set of inter-channel bridge jumpers permits connecting an input module's output to an output module's input, providing two levels of isolation (Figures 1 and 2).

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

A temperature sensor mounted on each channel provides cold junction compensation for thermocouple-input modules (see Figure 2 for schematic). Field connections are terminated with four screw terminals at each module site. Use system interface cable SCMXCA004-XX for connection to the host system.

Electrical

Address Selection

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

Adjacent Channel Jumper

Adjacent channels may be connected together to provide an isolated output signal from an isolated input module, providing two levels of 1500V isolation. This capability is provided with the seven jumpers labeled JP1-JP7. See page 1-54 for an example.

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

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector: Field System	 High-Density Screw Clamp, 14 AWG (max) 26-pin, Male Header Connector
Isolation: Input-to-Output Channel-to-Channel	 1500Vrms, Continuous (max) 1500Vrms, Continuous (max)

FEATURES

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

BENEFITS

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

Ordering Information

Part Number	Description
SCMPB05	8-channel backpanel with standoffs for mounting. **No mounting hardware included.**
SCMPB05-1	8-channel backpanel without cold junction compensation circuits and standoffs for mounting. Use when cost savings is desired and thermocouple-input modules SCM5B37 and SCM5B47 will not be used. **No mounting hardware included.**
SCMPB05-2	8-channel backpanel with DIN-rail mounting option. The backpanel is mounted on a plate which is captured by the SCMXBExx DIN-rail mounting elements. ***(Shipped fully assembled.)***
SCMPB05-3	8-channel backpanel without cold junction compensation circuits and with DIN-rail mounting option. ***(Shipped fully assembled.)***

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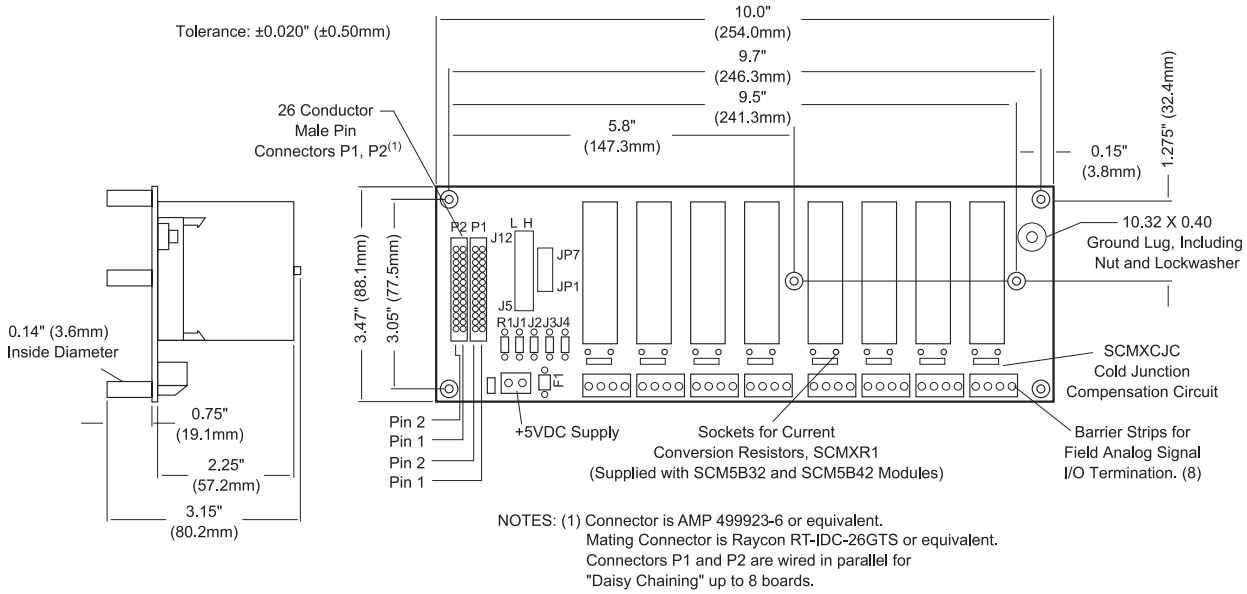
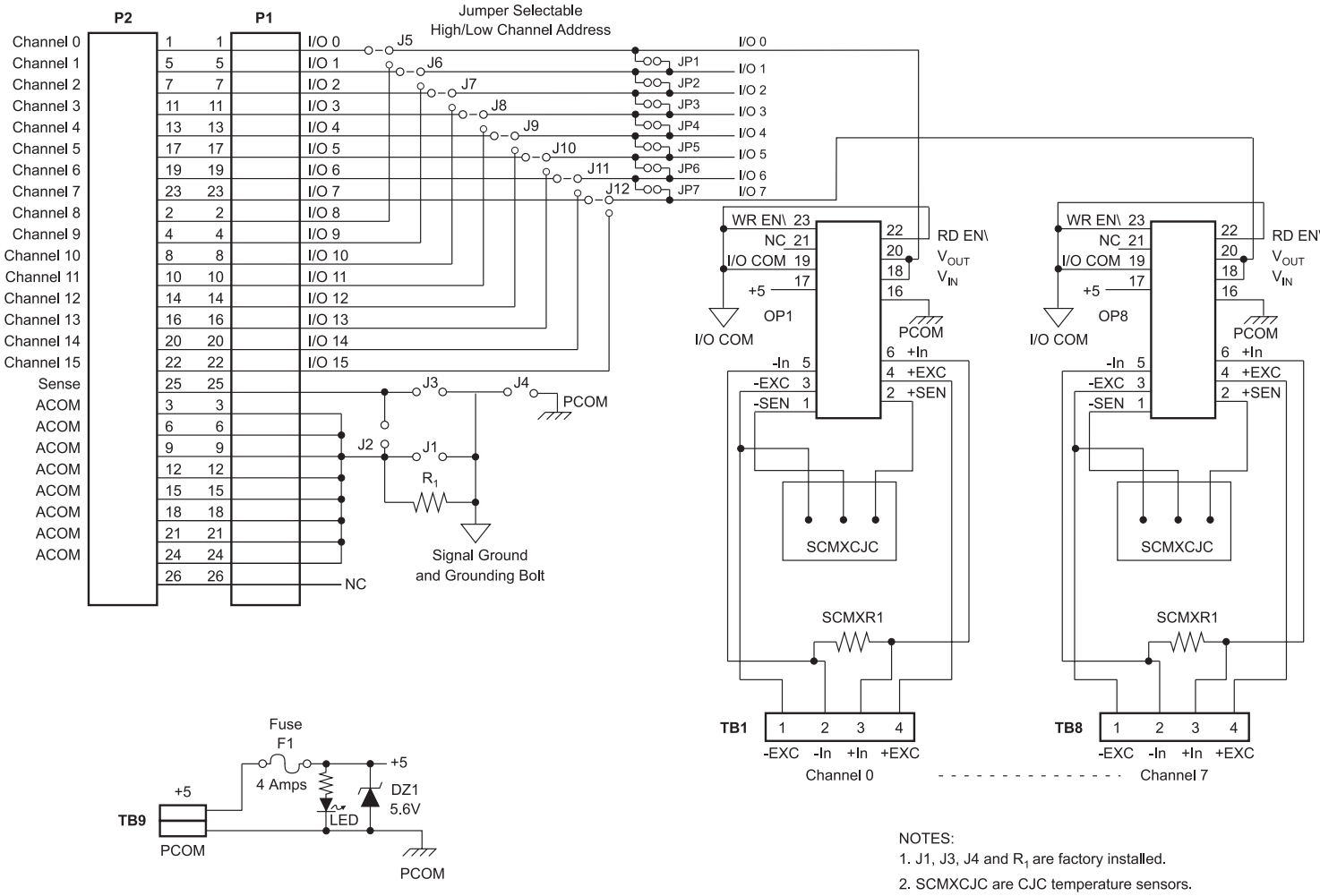


Figure 1: SCMPB05/SCMPB05-x Analog I/O Backpanel



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

Figure 2: SCMPB05/SCMPB05-x Schematic

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SCMPB06/SCMPB06-x

8-position Analog I/O Backpanel, Multiplexed

DESCRIPTION

The SCMPB06/SCMPB06-x backpanel (Figure 1) can accept up to eight SCM5B modules in any combination. It can be mounted on the SCMXRK-002 19-inch metal rack The SCMPB06/SCMPB06-x has two analog buses; one for analog input and one for analog output. This two-bus configuration takes advantage of the switch controlled outputs on the input modules and the track-and-hold inputs on the output modules. A temperature sensor is mounted on each channel to provide cold junction compensation for thermocouple-input modules (see Figure 2 for schematic). Field connections are terminated with four screw terminals at each module site Up to eight SCMPB06/SCMPB06-x backpanels may be daisy-chained. Use SCMXCA004-XX cable for daisy-chaining and connecting to host computer.

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

Electrical

Address Selection

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

The SCMPB06/SCMPB06-x backpanel has address decoding circuitry to allow multiplexing any combination of up to 8 input or output modules. Capability is also provided in the address decode circuitry to expand the system to 64 channels (eight SCMPB06/SCMPB06-x backpanels) of multiplexed input or output. Jumpers select which set of 16 addresses are assigned to a particular backpanel. The Read Address group assigns a set of 16 addresses for input modules, and the Write Address group assigns a set of 16 addresses for output modules. The table, *Analog Selection Jumpers*, page 1-57, shows the correlation of jumper position to address range. Refer to page 1-50 for additional notes on the P1 and P4 connectors, power requirements, fusing, and grounding issues.

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

FEATURES

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

BENEFITS

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

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector Field System	 High-Density Screw Clamp, 14 AWG (max) 26-pin, Male Header Connector
Isolation Input-to-Output Channel-to-Channel	 1500Vrms, Continuous (max) 1500Vrms, Continuous (max)
Address Input Logic Levels Max Logic “0” Min Logic “1”	 0.8V 2.0V
Input Current I_I - “0” I_I - “1”	 0.1µA (max) at +25°C 1.0µA (max) –25°C to +85°C
RD EN\ or WR EN\ Signal Delay From Connector P1 to Channels 0-7 Standalone (address 0-7) Expanded (address 8-63)	 51ns at +25°C, 64ns at –25°C to +85°C 100ns at +25°C, 126ns at –25°C to +85°C

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Ordering Information

Part Number	Description
SCMPB06	8-channel backpanel with standoffs for mounting. **No mounting hardware included.**
SCMPB06-1	8-channel backpanel without cold junction compensation circuits and standoffs for mounting. Use when cost savings is desired and thermocouple-input modules SCM5B37 and SCM5B47 will not be used. **No mounting hardware included.**
SCMPB06-2	8-channel backpanel with din-rail mounting option. The backpanel is mounted on a plate which is captured by the SCMXBExx DIN-rail mounting elements. ***(Shipped fully assembled.)***
SCMPB06-3	8-channel backpanel without cold junction compensation circuits and with DIN-rail mounting option. ***(Shipped fully assembled.)***

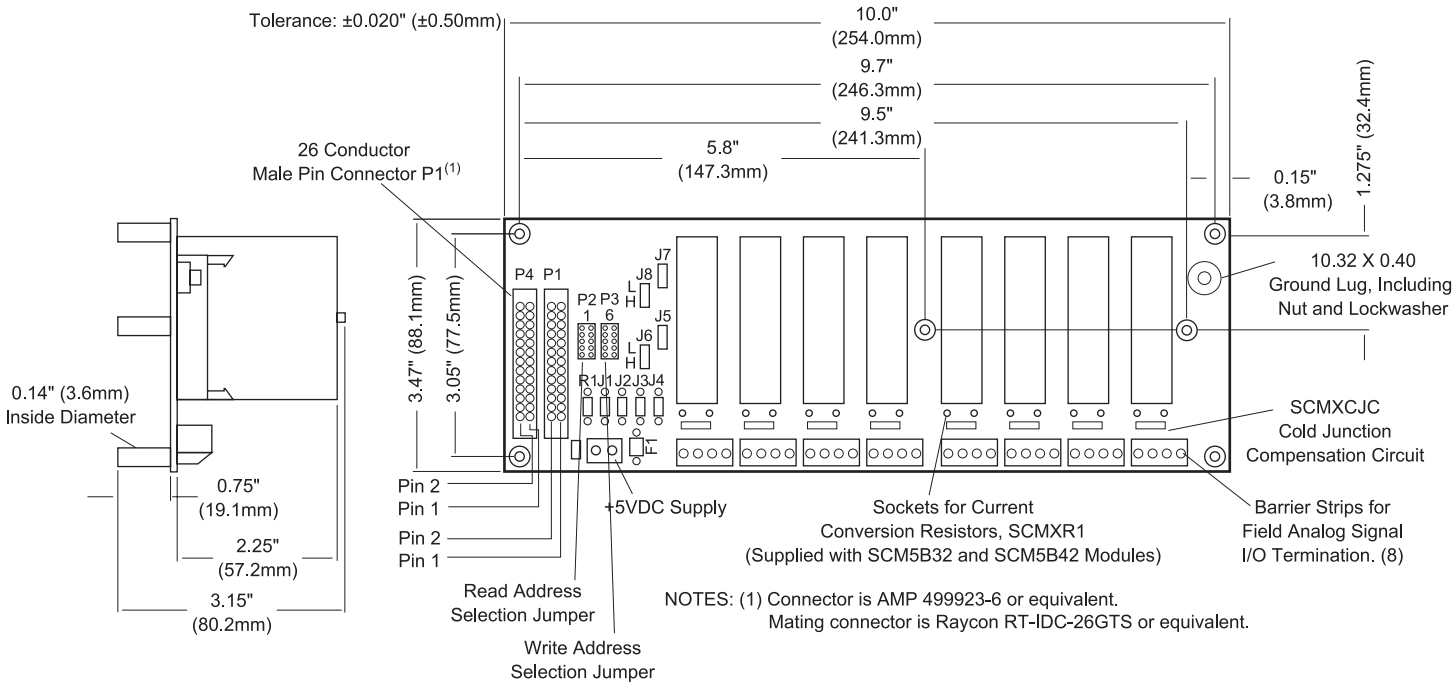


Figure 1: SCMPB06/SCMPB06-x Analog I/O Backpanel

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Address Selection Jumpers

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

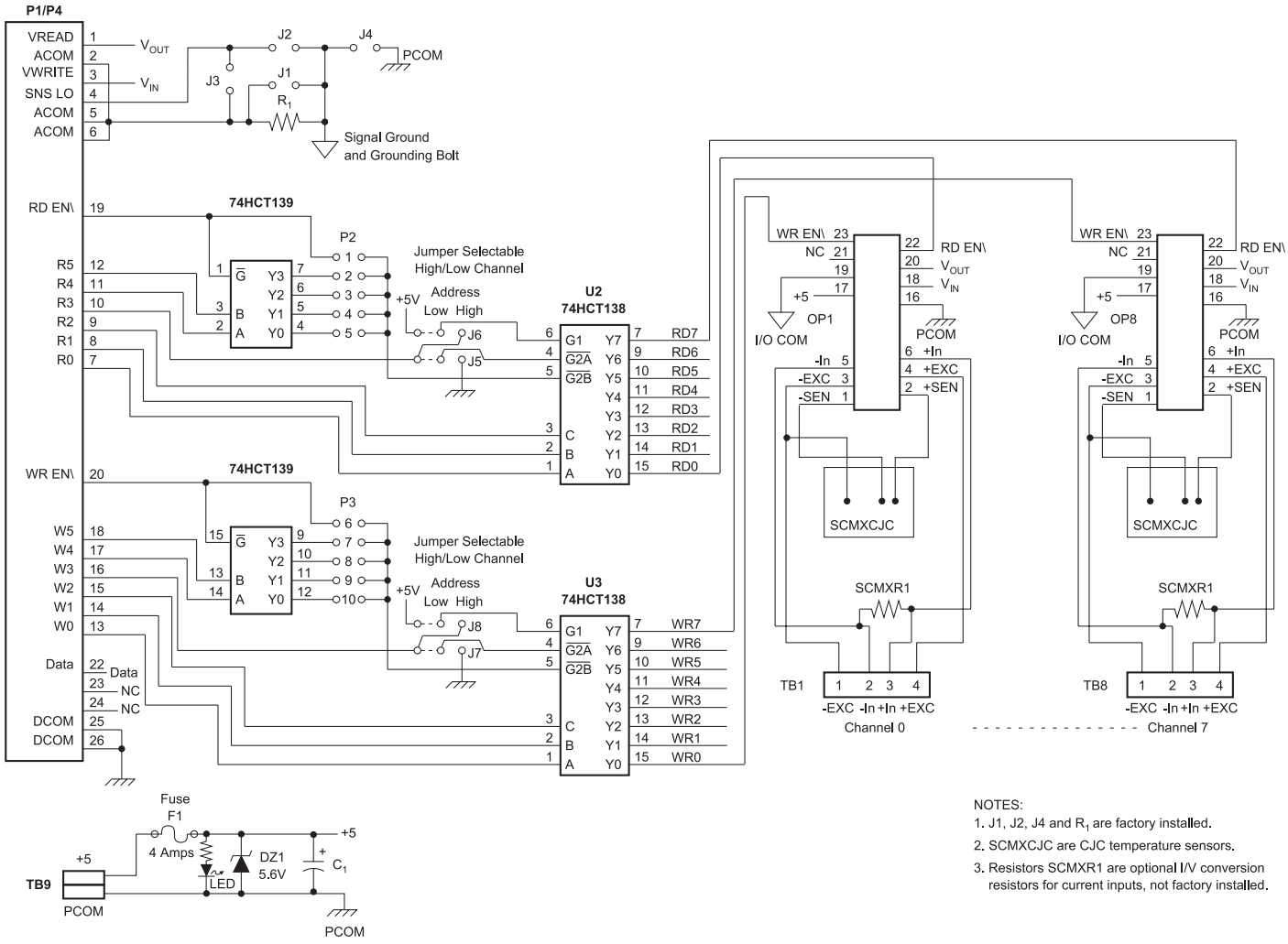


Figure 2: SCMPB06/SCMPB06-x Schematic

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SCMPB07/SCMPB07-x

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

DESCRIPTION

The SCMPB07/SCMPB07-x 8-channel high-density backpanel can accept any of the SCM5B analog modules in any mixture. Its overall width is 5.5 inches (139.7mm) versus 10inches (254mm) for the SCMPB05/SCMPB05-x and SCMPB06/SCMPB06-x 8-channel backpanels. Separate analog signal paths are provided for each channel. Each channel provides four high-density screw terminals for field connections and two high-density screw terminals for host system connection. It also provides a jumper on each channel to optionally connect or isolate each module's I/O common from other channel's I/O common and/or power common (Figure 1).

See Figure 4 on page 1-52 for schematic.

SCMPB07 and SCMPB07-1 can be upgraded to DIN-rail mounting. The following accessories are required for mounting one SCMPB07 or one SCMPB07-1 backpanel (for a visual example, reference SCMPB03/SCMPB04 page 1-52, Figure 3):

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

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector Field System	 High-Density Screw Clamp, 14 AWG (max) High-Density Screw Clamp, 14 AWG (max)
Isolation Input-to-Output Channel-to-Channel	 1500Vrms, Continuous (max) 1500Vrms, Continuous (max)

FEATURES

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

BENEFITS

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

Ordering Information

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

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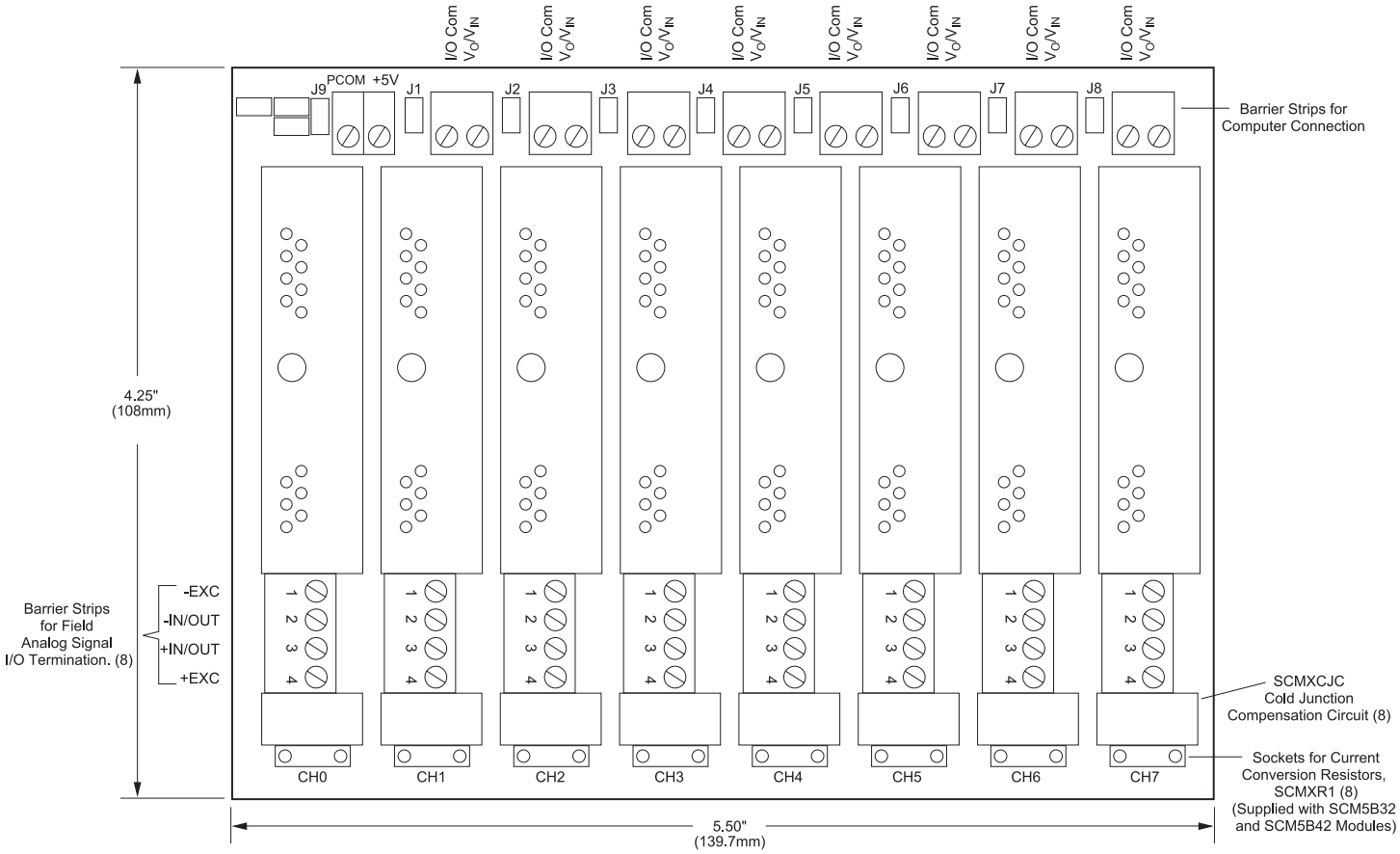


Figure 1: SCMPB07/SCMPB07-x Analog I/O Backpanel

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SCMXEV

Analog Module Evaluation Board

DESCRIPTION

The SCMXEV is a single-channel board with a test socket for SCM5B module evaluation (Figure 1). All signal input/output, control, and power connections are connected to terminal blocks for ease of user access. A cold junction temperature sensor circuit is included for evaluation of thermocouple modules (see Figure 2 for schematic).

The SCMXEV is mechanically compatible with DIN-rail mounting. The following accessories are required for mounting one SCMXEV board (for a visual example, reference SCMPB03/SCMPB03-x and SCMPB04/SCMPB04-x page 1-51, Figure 3):

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

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

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

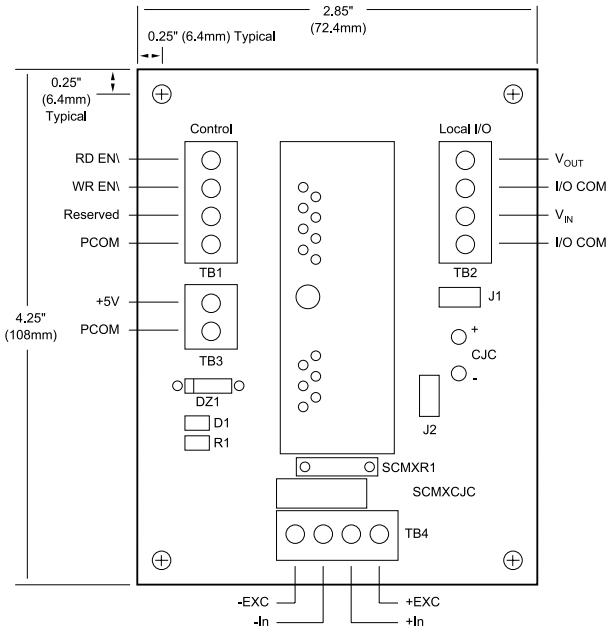
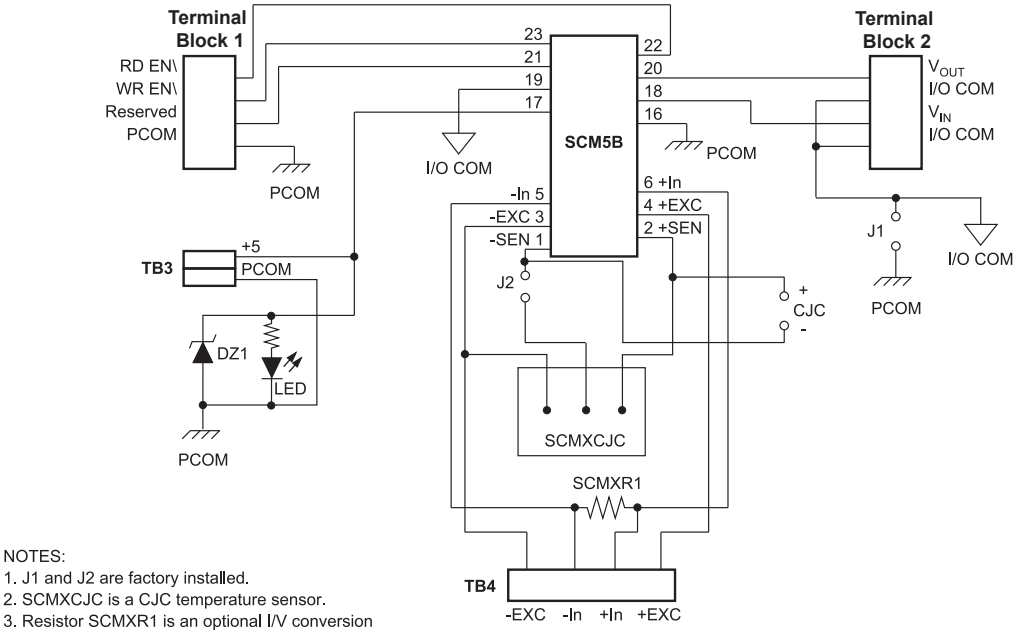


Figure 1: SCMXEV Evaluation Board Dimensions and Pin Layout

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



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

Figure 2: SCMXEV Evaluation Board Schematic

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SCMXCA004-01, - 02

Interface Cable

DESCRIPTION

The SCMXCA004-XX is the system interface cable for the SCMPB01/02/05/06 backpanels. This is a 26-connector ribbon cable with a mass-terminated socket connector installed on each end. It can be ordered in lengths of 1m and 2m; -xx denotes required length in meters (see Figure 1).

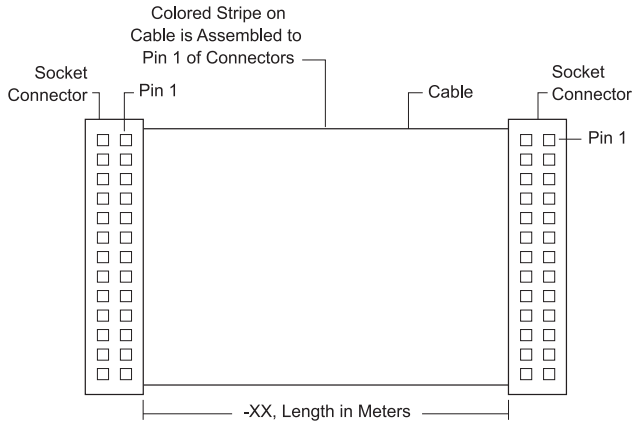


Figure 1: SCMXCA004-XX System Interface Cable

SCMXIF (-DIN)

Universal Interface Board

DESCRIPTION

The SCMXIF is a universal interface board which converts a 26-pin ribbon cable input to 26 screw terminals for discrete wire. It can be mounted on the back of the SCMXRK-002 mounting rack (SCMXIF) or on a DIN-rail (SCMXIF-DIN). Required mounting hardware is included. Use SCMXCA004-XX cable (see Figure 2 for dimensions).

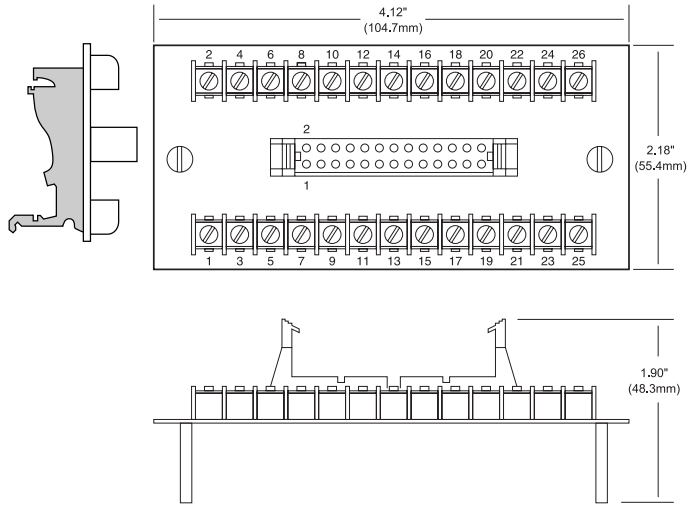


Figure 2: SCMXIF Universal Interface Board Dimensions

SCMXRK-002

19-inch Metal Mounting Rack

DESCRIPTION

The SCMXRK-002 is a 19-inch metal rack for mounting the SCMPB01/02/05/06, SCM7BP04/08/16, SCMVAS-PB8/16 and isoLynx® SLX200-xx backpanels. It also provides capability to mount the SCMXPRT-001, SCMXPRE-001, SCMXPRT-003 or SCMXPRE-003 power supplies, and the SCMXIF interface board (see Figure 3 for dimensions).

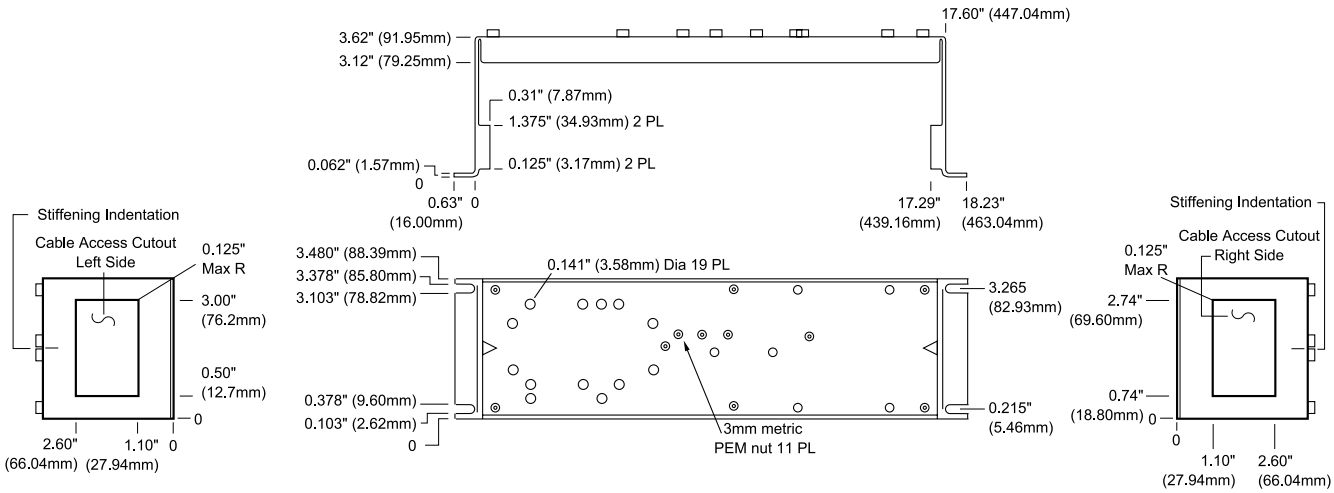


Figure 3: SCMXRK-002 Analog Rack Dimensions

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SCM5BPT

Pass-thru Module

DESCRIPTION

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

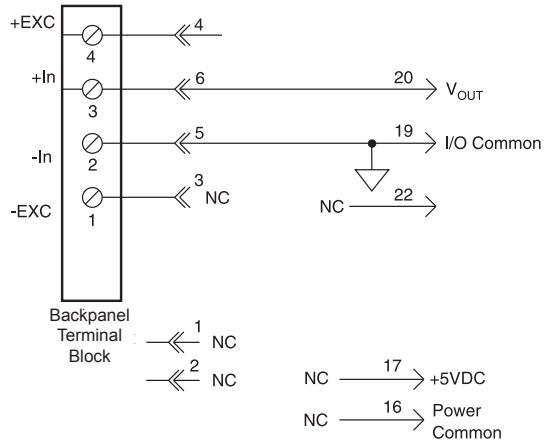


Figure 1: SCM5BPT Pass-thru Module Functional Diagram

SCM5BPT-1367

Pass-thru Module with Switch

DESCRIPTION

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

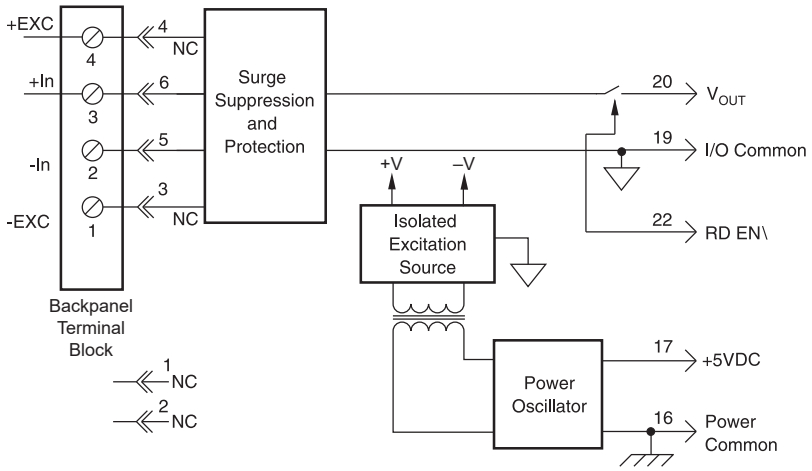


Figure 2: SCM5BPT-1367 Pass-thru Module with Switch Functional Diagram

SCMXCJC

Encapsulated Cold Junction Compensation

DESCRIPTION

The SCMXCJC is the identical circuit used on the SCMPB01/02/03/04/05/06/07 backpanels except it is packaged as a component for use in customer-designed mounting boards (Figure 3). When interfaced to an SCM5B37 or SCM5B47 module the transfer function of the voltage across the +SEN and –SEN pins is V_{CJC} = 0.510 – 0.0025 (T – 25)V.

Specifications

Accuracy	+25°C	±0.25°C
	+5°C to +45°C	±0.5°C
	–40°C to +85°C	±1.25°C

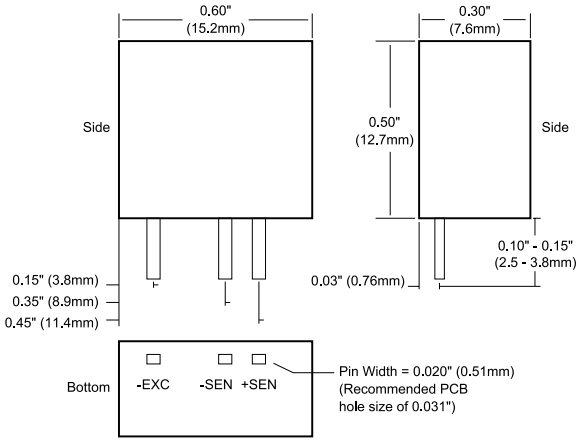


Figure 3: SCMXCJC Physical Dimensions and Pin Layout

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SCMXJP-003

Jumper Strap

DESCRIPTION

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

SCMXRAIL1-XX, SCMXRAIL2-XX, SCMXRAIL3-XX

DIN-rail

DESCRIPTION

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

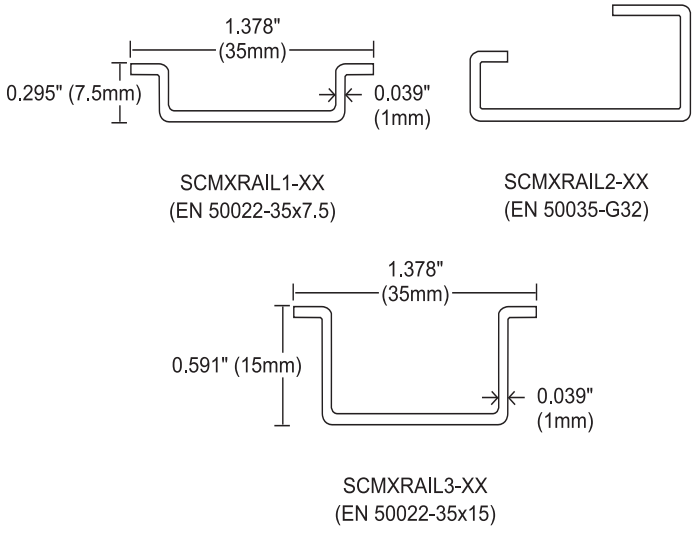


Figure 1: DIN-rail Styles

Ordering Information

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

SCM5B-PROTO

Breadboard Kit

DESCRIPTION

The SCM5B-PROTO breadboard kit was designed to allow users to incorporate their own module functions using an SCM5B format. The kit includes a pc board designed for breadboard circuits, a module case, header, and mounting screw. Contact the factory for additional information.

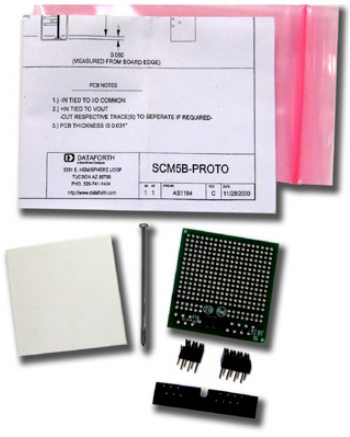


Figure 2: SCM5B-PROTO Breadboard Kit.

SCMXR1

Current Conversion Resistor

DESCRIPTION

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

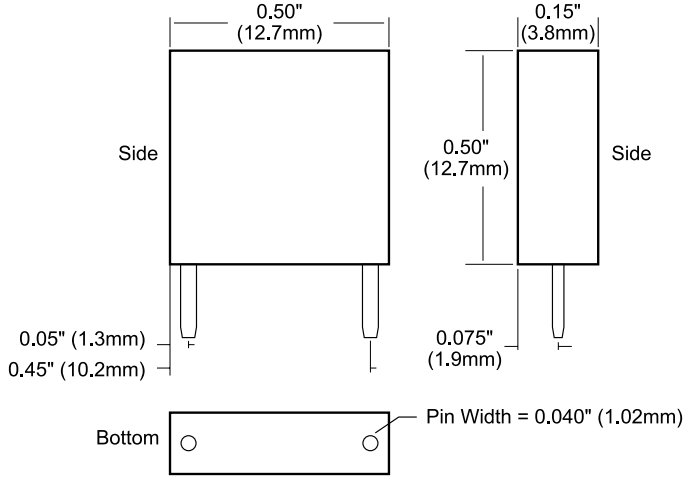


Figure 3: SCMXR1 Physical Dimensions

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

Power Supplies

DESCRIPTION

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

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

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

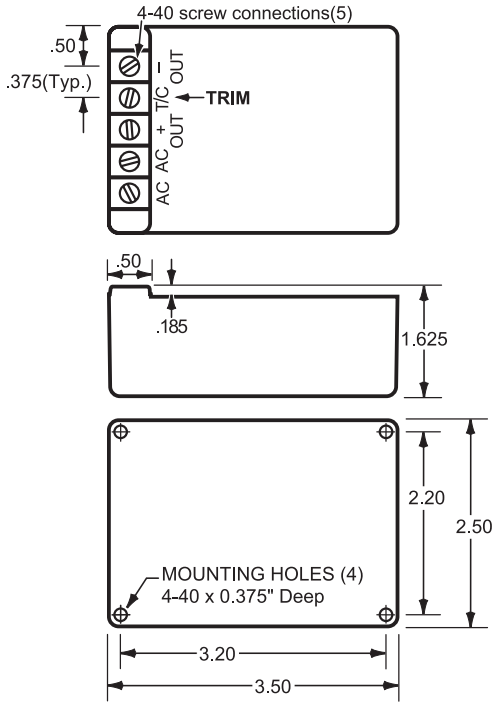


Figure 1: SCMXPRT-001/D and SCMXPRE-001/D Physical Dimensions

SCMXPRT-003, SCMXPRE-003

Power Supplies

DESCRIPTION

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

Specifications Typical* at T_A = +25°C

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

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

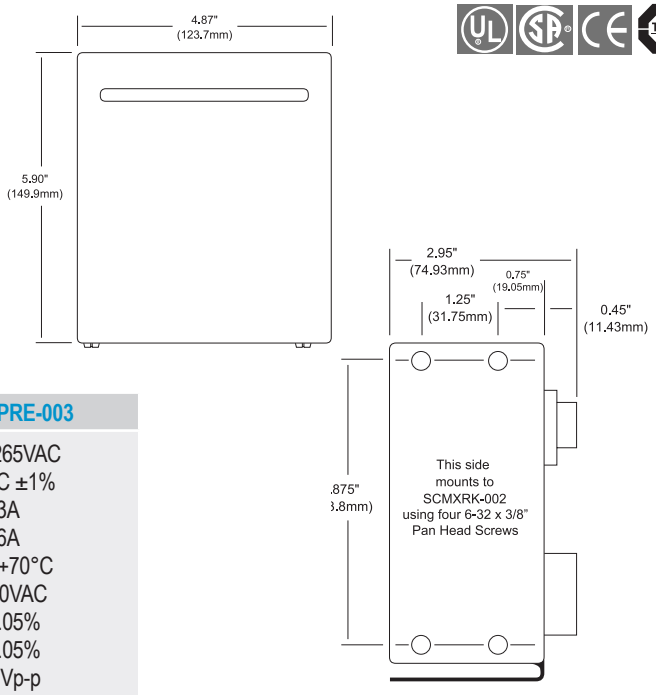


Figure 2: SCMXPRT-003/SCMXPRE-003 Physical Dimensions

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PWR-4505

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

Specifications Typical* at T_A = +25°C

Module	PWR-4505
Input Frequency Input Current Inrush Current Efficiency	85 to 264VAC, 120 to 370VDC 47 to 63Hz 1.5A/115VAC, 0.75A/230VAC Cold Start 30A/115VAC, 60A/230VAC 72%
Output Voltage and Current Rating Temperature Coefficient Ripple Voltage	5V, 5A ±0.03%/°C 100mVp-p
Overload Protection Over Voltage Protection Over Temperature Protection	105 to 150% Rated Output Power 5.75 to 6.75V 135°C Detect on Heatsink of Power Transistor
Dielectric Strength	Between Input and Output Terminals: 3kV, 1 Minute Between Input and FG: 1.5kV, 1 Minute Between Output and FG: 0.5kV, 1 Minute
Insulation Resistance	Between Input and Output Terminals/Input and FG/Output and FG: 100MΩ/500VDC
Operating Temperature Storage Temperature Relative Humidity	–10°C to +50°C –20°C to +85°C 10 to 95%
Mechanical Dimensions (h)x(w)x(d)	3.66" x 3.07" x 2.24" (93mm x 78mm x 57mm)
Terminal Screw	M3

NOTES:
* Contact factory for maximum values.

FEATURES

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

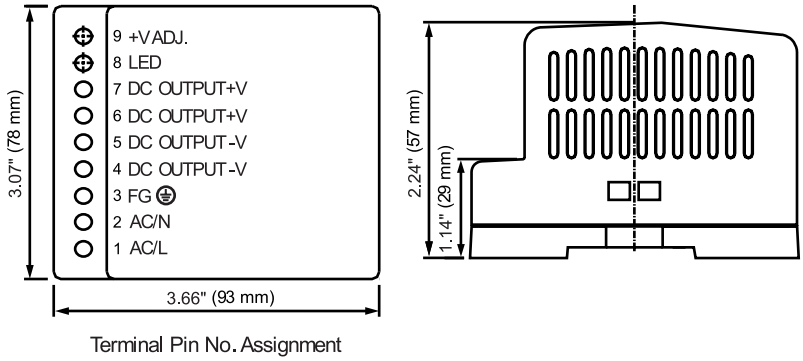


Figure 1: PWR-4505 Physical Dimensions

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SCMHVAS

RoHS III COMPLIANT 2015/863 CE

High-voltage Attenuator System

DESCRIPTION

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

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

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

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

FEATURES

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

BENEFITS

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

APPLICATIONS

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

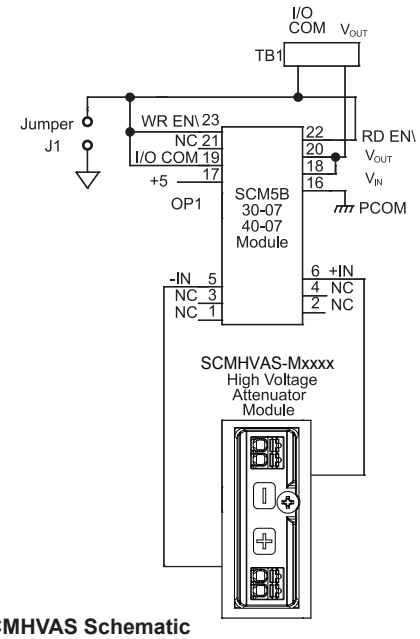


Figure 1: SCMHVAS Schematic

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SCM5B30-07, SCM5B40-07

Isolated Analog Voltage Input Modules

Specifications

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

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

Ordering Information

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

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

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SCMHVAS-Mxxxx

RoHS III COMPLIANT 2015/863 CE

High-voltage Attenuator Modules

Specifications

Typical* at T_A = +25°C

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

*Contact factory for maximum values.

Ordering Information

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

Accessories

Model	Description
SCMVAS-PB8	Backpanel, 8-Channel
SCMVAS-PB8D	Backpanel, 8-Channel, DIN-rail Mount
SCMVAS-PB16	Backpanel, 16-Channel
SCMVAS-PB16D	Backpanel, 16-Channel, DIN-rail Mount

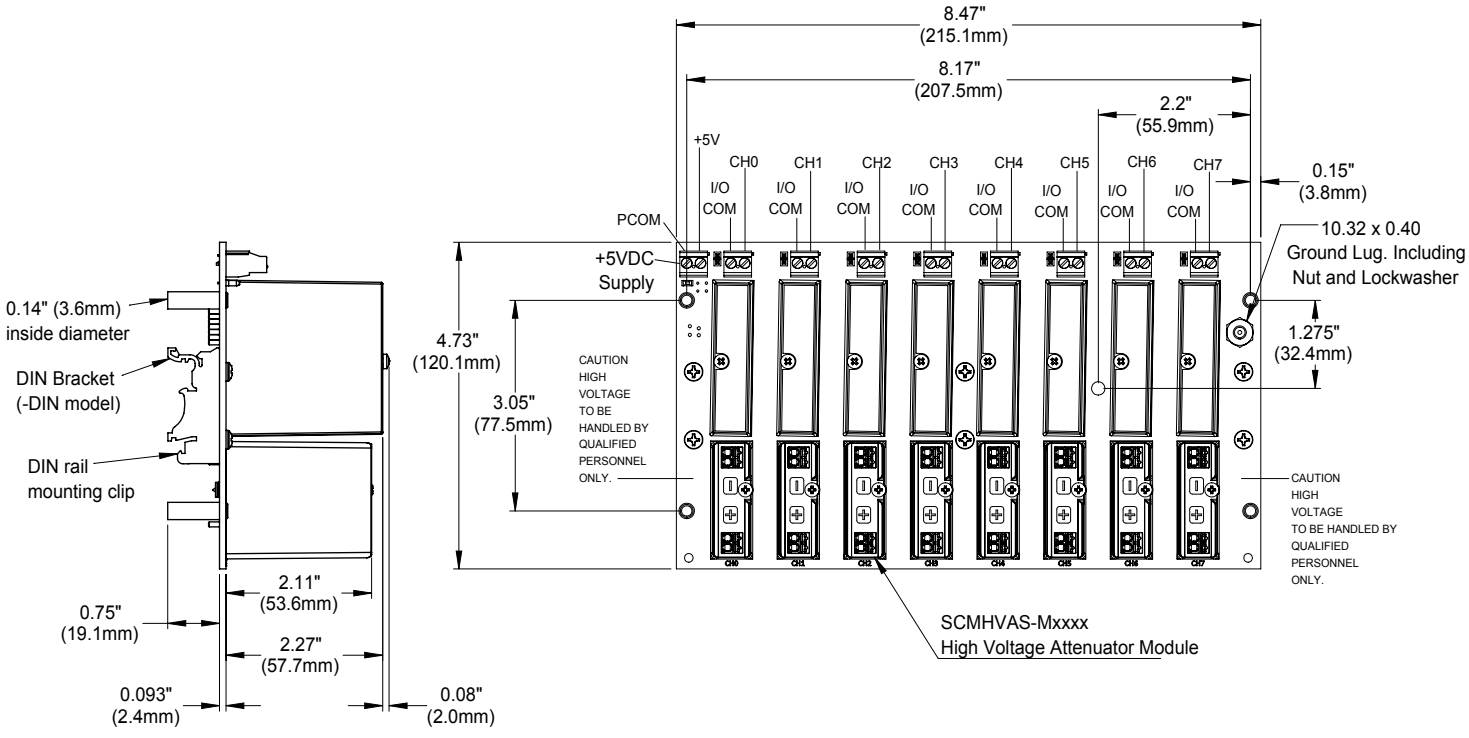


Figure 2: SCMVAS-PB8 and SCMVAS-PB8D Analog I/O Backpanel

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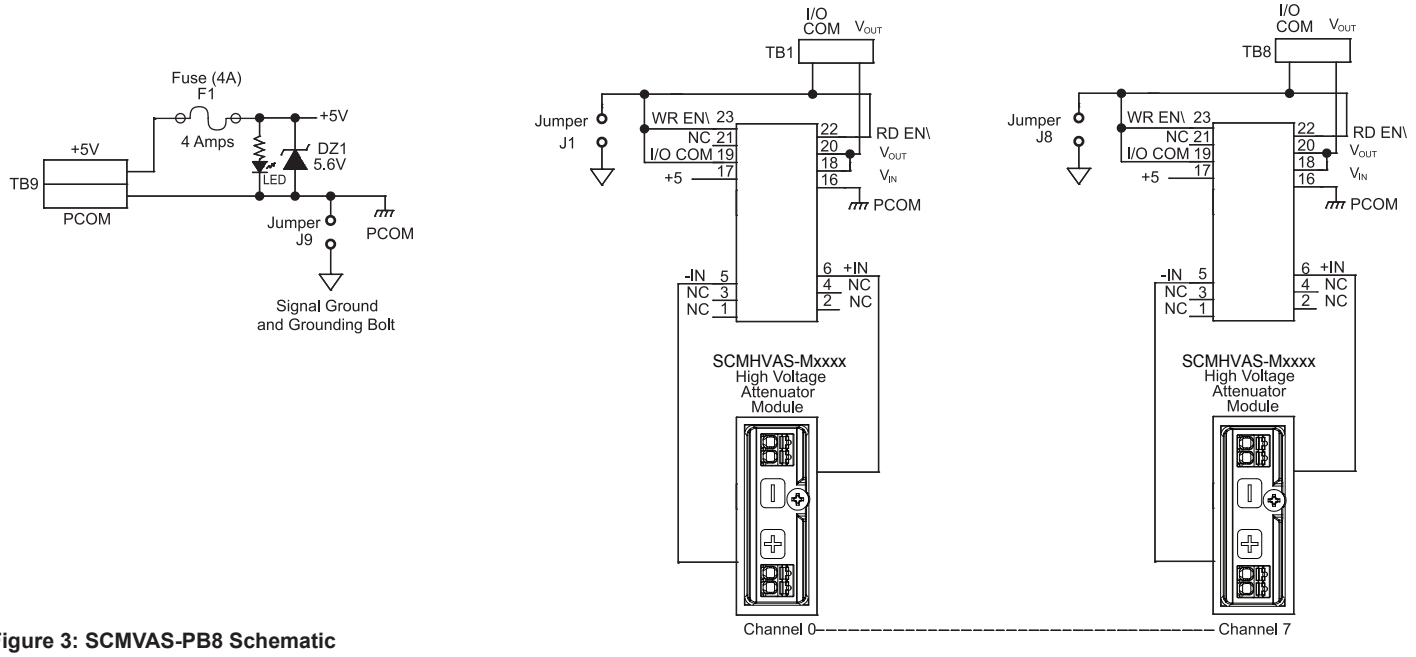
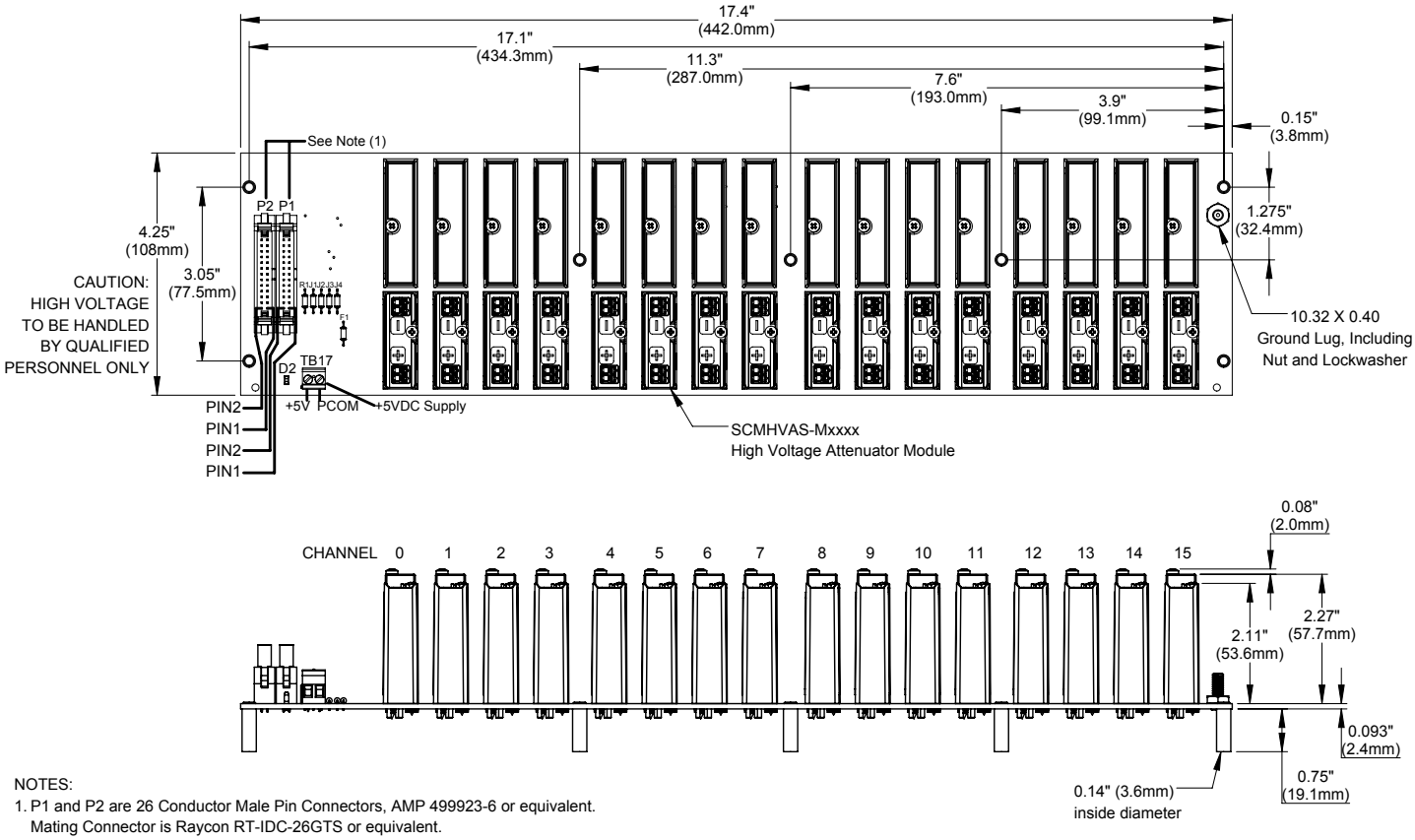


Figure 3: SCMVAS-PB8 Schematic

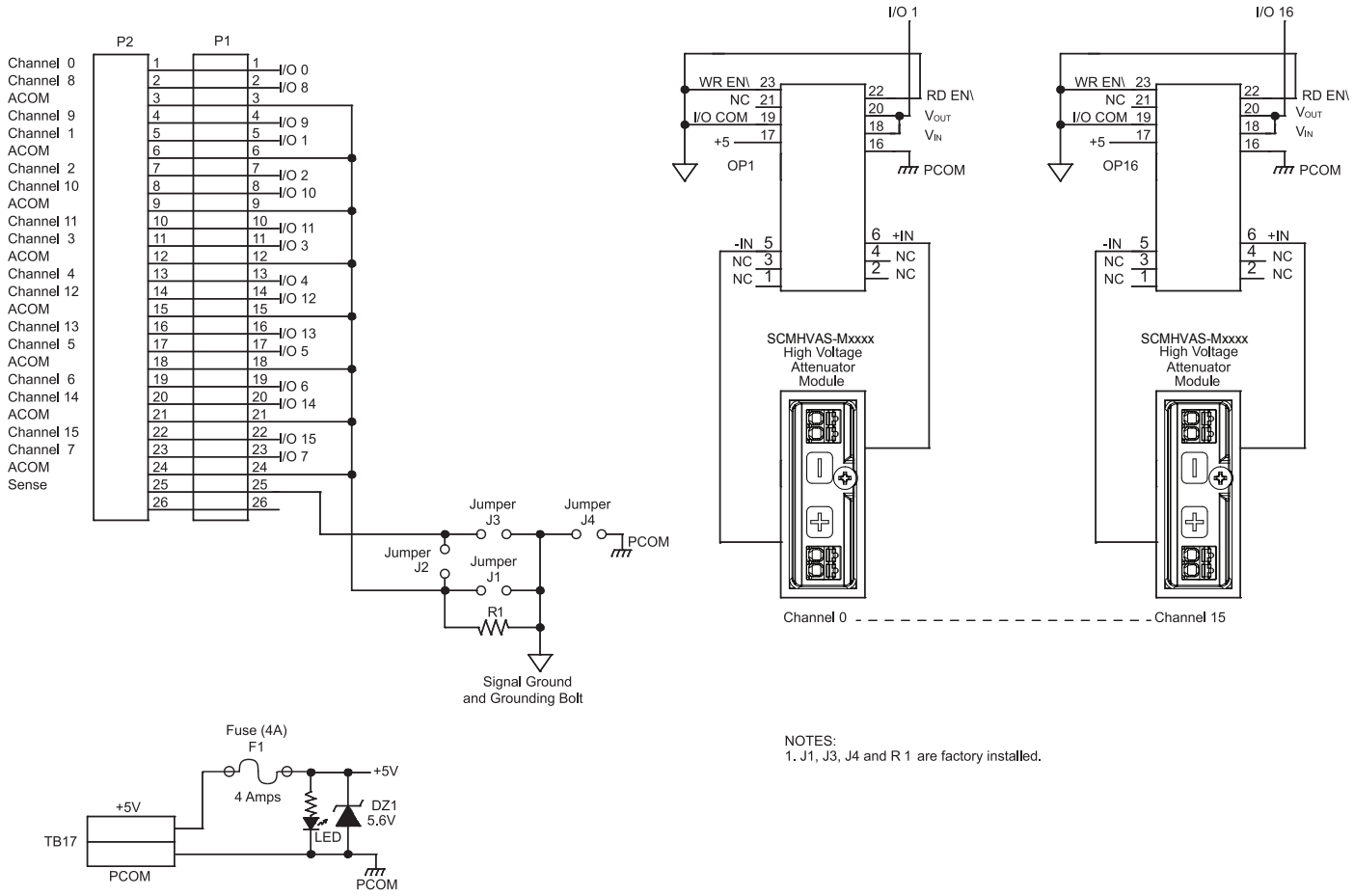


NOTES:
1. P1 and P2 are 26 Conductor Male Pin Connectors, AMP 499923-6 or equivalent.
   Mating Connector is Raycon RT-IDC-26GTS or equivalent.

Figure 4: SCMVAS-PB16 Analog I/O Backpanel

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NOTES:
1. J1, J3, J4 and R 1 are factory installed.

Figure 5: SCMVAS-PB16 Schematic

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DATAFORTH®

2024 Catalog
SCM7B Products

Isolated Process Control
Signal Conditioning Products



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Online Technical Library
Discontinued Parts

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)	

See Discontinued Devices at the End of the Document.

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

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/°C
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	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing

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

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SCM7B

Isolated Process Control Signal Conditioning Products



SCM7B Modules

SCM7B Isolated Process Control Signal Conditioning modules include a complete selection of backpanels, DIN-rail mounting accessories, interface cables, and rack mounting hardware. 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, filter, isolate, amplify, linearize, and convert these input signals to 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, then buffer, isolate, filter, and amplify before providing a current or voltage output to a field device.

Custom Signal Conditioning

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

FEATURES

- ±0.03% Accuracy (typ)
- ±0.01% 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 Peak and RMS Noise
- Low Drift Input Circuitry for Long-term Stability
- Up to 160dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- –40°C to +85°C Operating Temperature
- Backpanels Allow Use of Industry-standard Digital I/O, Solid-State Relay Modules
- DIN-rail Mounting
- CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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

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SCM7B Selection Guide

†OUTPUT RANGES AVAILABLE

Output Range	Part No. Suffix	Example
+1 to +5V	NONE	SCM7B30-01
0 to +5V	A	SCM7B30-01A
0 to +10V	D	SCM7B30-01D

‡THERMOCOUPLE ALLOY COMBINATIONS
STANDARDS: DIN IEC 584, ANSI MC96-1-82, JIS C 1602-1981

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

ISOLATED VOLTAGE-INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B21	±10V	±10V
SCM7B30-01	0 to +10mV	†
SCM7B30-02	0 to +100mV	†
SCM7B30-03	0 to +1V	†
SCM7B30-05	+1 to +5V	†
SCM7B30-06	±10mV	†
SCM7B30-07	±100mV	†
SCM7B30-08	±1V	†
SCM7B31-01	0 to +10V	†
SCM7B31-02	±5V	†
SCM7B31-03	±10V	†
SCM7B31-04	0 to +5V	†
SCM7B31-05	0 to +20V	†
SCM7B31-06	±20V	†
SCM7B31-07	0 to +50V	†
SCM7B31-08	±50V	†

ISOLATED BIPOLAR VOLTAGE-OUTPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B22	±10V	±10V of Span

ISOLATED PROCESS CURRENT-INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B32-01	4-20mA	†
SCM7B32-02	0-20mA	†

ISOLATED PROCESS VOLTAGE-INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B33-01	+1 to +5V	†
SCM7B33-02	0 to +5V	†

ISOLATED LINEARIZED 100Ω Pt RTD-INPUTS MODULES**

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B34-01	–100°C to +100°C (–148°F to +212°F)	†
SCM7B34-02	0°C to +100°C (+32°F to +212°F)	†
SCM7B34-03	0°C to +200°C (+32°F to +392°F)	†
SCM7B34-04	0°C to +600°C (+32°F to +1112°F)	†
SCM7B34-05	–50°C to +350°C (–58°F to +662°F)	†

ISOLATED LINEARIZED 120Ω Ni RTD-INPUTS MODULES**

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B34N-01	0°C to +300°C (+32°F to +572°F)	†
SCM7B34N-02	0°C to +200°C (+32°F to +392°F)	†

ISOLATED 2-WIRE XMTR INTERFACE MODULES WITH LOOP POWER

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B35-01	4-20mA	†
SCM7B35-02	4-20mA	+2V to +10V

ISOLATED POTENTIOMETER-INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B36-01	0 to 100Ω	†
SCM7B36-02	0 to 200Ω	†
SCM7B36-03	0 to 500Ω	†
SCM7B36-04	0 to 1kΩ	†
SCM7B36-05	0 to 5kΩ	†
SCM7B36-06	0 to 10kΩ	†

ISOLATED THERMOCOUPLE-INPUT MODULES

MODEL	TYPE‡	INPUT RANGE	OUTPUT RANGE
SCM7B37J-01	J	–100°C to +760°C (–148°F to +1400°F)	†
SCM7B37J-10	J	0°C to +200°C (+32°F to +392°F)	†
SCM7B37J-11	J	0°C to +400°C (+32°F to +752°F)	†
SCM7B37J-12	J	0°C to +600°C (+32°F to +1112°F)	†
SCM7B37J-13	J	+300°C to +600°C (+572°F to +1112°F)	†
SCM7B37K-02	K	–100°C to +1350°C (–148°F to +2462°F)	†
SCM7B37K-20	K	0°C to +300°C (+32°F to +572°F)	†
SCM7B37K-21	K	0°C to +600°C (+32°F to +1112°F)	†
SCM7B37K-22	K	0°C to +1200°C (+32°F to +2192°F)	†
SCM7B37K-23	K	+600°C to +1200°C (+1112°F to +2192°F)	†
SCM7B37T-03	T	–100°C to +400°C (–148°F to +752°F)	†
SCM7B37E-04	E	0°C to +900°C (+32°F to +1652°F)	†
SCM7B37R-05	R	0°C to +1750°C (+32°F to +3182°F)	†
SCM7B37S-06	S	0°C to +1750°C (+32°F to +3182°F)	†
SCM7B37B-07	B	0°C to +1800°C (+32°F to +3272°F)	†

ISOLATED PROCESS CURRENT-OUTPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B39-01	+1V to +5V	4-20mA
SCM7B39-02	0 to +10V	0-20mA
SCM7B39-03	0 to +10V	4-20mA
SCM7B39-04	4-20mA	4-20mA

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SCM7B Selection Guide (Continued)

ISOLATED VOLTAGE-INPUT MODULES, WIDE BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B40-02	0 to +100mV	†
SCM7B40-03	0 to +1V	†
SCM7B40-07	±100mV	†
SCM7B40-08	±1V	†
SCM7B41-01	0 to +10V	†
SCM7B41-02	±5V	†
SCM7B41-03	±10V	†
SCM7B41-04	0 to +5V	†
SCM7B41-05	0 to +20V	†
SCM7B41-06	0 to +40V	†

ISOLATED LINEARIZED THERMOCOUPLE-INPUT MODULES

MODEL	TYPE‡	INPUT RANGE	OUTPUT RANGE
SCM7B47J-01	J	0°C to +760°C (+32°F to +1400°F)	†
SCM7B47J-02	J	–100°C to +300°C (–148°F to +572°F)	†
SCM7B47K-03	K	0°C to +1300°C (+32°F to +2372°F)	†
SCM7B47K-04	K	0°C to +600°C (+32°F to +1112°F)	†
SCM7B47T-05	T	0°C to +400°C (+32°F to +752°F)	†
SCM7B47T-06	T	–100°C to +200°C (–148°F to +392°F)	†
SCM7B47E-07	E	0°C to +900°C (+32°F to +1652°F)	†
SCM7B47R-08	R	+500°C to +1750°C (+932°F to +3182°F)	†
SCM7B47S-09	S	+700°C to +1750°C (+1292°F to +3182°F)	†
SCM7B47B-10	B	+800°C to +1800°C (+1472°F to +3272°F)	†
SCM7B47N-11	N	+200°C to +1300°C (+392°F to +2372°F)	†

†OUTPUT RANGES AVAILABLE

Output Range	Part No. Suffix	Example
+1 to +5V	NONE	SCM7B30-01
0 to +5V	A	SCM7B30-01A
0 to +10V	D	SCM7B30-01D

‡THERMOCOUPLE ALLOY COMBINATIONS

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

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

**RTD STANDARDS

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

ACCESSORIES

MODEL	DESCRIPTION
SCM7BXEV	1-channel Evaluation Backpanel
SCM7BP01	1-channel Backpanel
SCM7BP02	2-channel Backpanel
SCM7BP01-DIN	SCM7BP01 with DIN-rail Mounting Option
SCM7BP02-DIN	SCM7BP02 with DIN-rail Mounting Option
SCMXBEFE	DIN Base Element with Snap Foot
SCMXBE	DIN Base Element with Snap Foot
SCMXSE	DIN Side Elements
SCMXVS	DIN Connection Pins
SCMXRAIL1-XX	DIN EN 50022-35x7.5 (Slotted Steel), Length -XX in Meters
SCMXRAIL2-XX	DIN EN 50035-G32 (Slotted Steel), Length -XX in Meters
SCMXRAIL3-XX	DIN EN 50022-35x15 (Slotted Steel), Length -XX in Meters
SCM7BP04	4-channel Backpanel
SCM7BP04-DIN	SCM7BP04 with DIN-rail Mounting Option
SCM7BP08	8-channel Backpanel
SCM7BP08-DIN	SCM7BP08 with DIN-rail Mounting Option
SCM7BP16	16-channel Backpanel
SCM7BP16-DIN	SCM7BP16 with DIN-rail Mounting Option
SCMXRK-002	19" Rack for Mounting Backplanes
SCM7BXCA01	6" System Adapter Cable (DB25F to 26M)
SCM7BXCA02	3' System Adapter Cable (DB25F to DB25F)
SCMXCA004-XX	xx-Meter System Interface Cable (26F to 26F)
SCMXCA006-XX	System Interface Cable for Backpanels
8BXIF	DB25 to Screw Terminal Interface Board
SCM7BXR1	250Ω Current Conversion Resistor
SCM7BPT	Non-isolated Signal Pass thru Module
SCM7B-PROTO	Breadboard Kit

POWER SUPPLIES

PWR-PS5R7W	Power Supply, 24V, 0.3A, 100-240VAC-input
PWR-PS5R15W	Power Supply, 24V, 0.65A, 100-240VAC-input
PWR-PS5R30W	Power Supply, 24V, 1.3A, 100-240VAC-input
PWR-PS5R60W	Power Supply, 24V, 2.5A, 100-240VAC-input
PWR-PS5R120W	Power Supply, 24V, 5.0A, 100-240VAC-input

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SCM7B21/30/31

Isolated Analog Voltage-input Modules

DESCRIPTION

Each SCM7B21/30/31 voltage input module accepts one channel of analog voltage input which is filtered, isolated, amplified, and converted to a high-level analog voltage for output to the process control system.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Modules accept a wide 14 - 35VDC power supply range (+24VDC nominal).Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the -DIN backpanels.

FEATURES

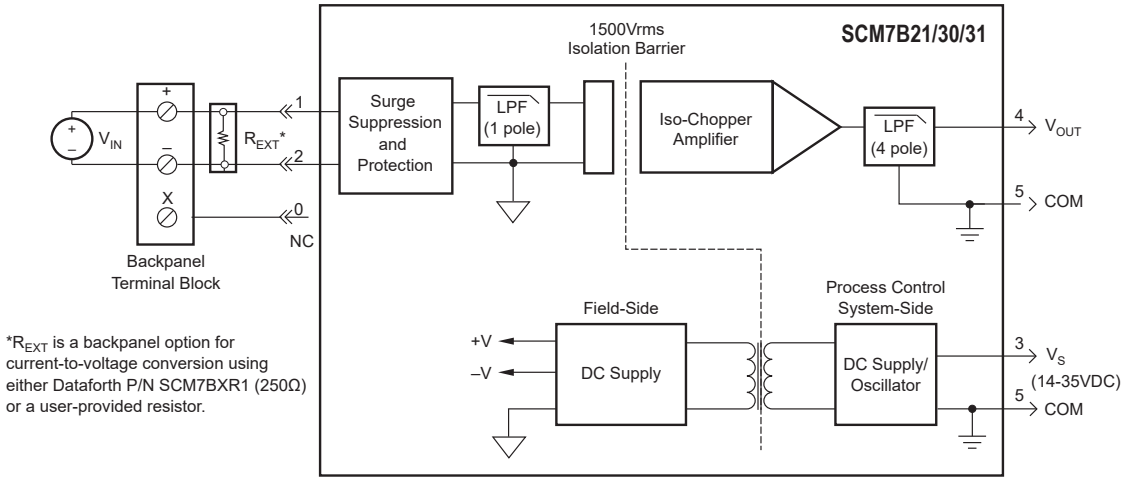
- Accepts Millivolt and Voltage Level Signals
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ), ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 500µVp-p (5MHz), 250µVrms (100kHz)
- Up to 160dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



*R_{EXT} is a backpanel option for current-to-voltage conversion using either Dataforth P/N SCM7BXR1 (250Ω) or a user-provided resistor.

SCM7B21/30/31 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = + 25°C and +24VDC

Module	SCM7B21	SCM7B30	SCM7B31
Input			
Signal Range	±10V	See Table**	See Table**
Bias Current	±0.1nA	±0.5nA	±0.05nA
Resistance			
Normal	2MΩ (min)	50MΩ	500kΩ (min)
Power Off	2MΩ (min)	30kΩ (min)	500kΩ (min)
Overload	2MΩ (min)	30kΩ (min)	500kΩ (min)
Protection			
Continuous	120Vrms (max)	120Vrms (max)	120Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output			
Signal Range(1)	±10V	†	†
Effective Available Power(1)	10mW	40mW	40mW
Resistance	<1Ω	<1Ω	<1Ω
Protection	Continuous Short-to-Ground	Continuous Short-to-Ground	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA	±12V, ±14mA	±12V, ±14mA
CMV (Input-to-Output)			
Continuous	1500Vrms	1500Vrms	1500Vrms
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	100dB	160dB	120dB
Accuracy(2)	±0.03% Span (typ)	±0.03% Span (typ)	±0.03% Span (typ)
	±0.1% Span (max)	±0.1% Span (max)	±0.1% Span (max)
Linearity(3)	±0.01% Span (typ)	±0.01% Span (typ)	±0.01% Span (typ)
	±0.02% Span (max)	±0.02% Span (max)	±0.02% Span (max)
Stability (–40°C to +85°C)			
Gain	±55ppm/°C	±35ppm/°C	±55ppm/°C
Input Offset	N/A(4)	±0.5µV/°C	±5µV/°C
Zero Suppression	N/A	±0.005%(V_Z)(5)/°C	±0.005%(V_Z)(5)/°C
Output Offset	±0.001% Span/°C	±0.002% Span/°C	±0.002% Span/°C
Noise			
Peak at 5MHz B/W	1mV	500µV	500µV
RMS at 10Hz to 100kHz B/W	250µV	250µV	250µV
Peak at 0.1Hz to10Hz B/W	1µV RTI(6)	1µV RTI(6)	1µV RTI(6)
Frequency and Time Response			
Bandwidth, –3dB	300Hz	3Hz	3Hz
NMR (50/60Hz)	80dB per Decade above 300Hz	80/85dB	80/85dB
Step Response, 90% Span	1.5ms	165ms	165ms
Supply Voltage	14 - 35VDC	14 - 35VDC	14 - 35VDC
Current(1)	16mA	12mA	12mA
Sensitivity	±0.0002%/%V_S	±0.0001%/%V_S	±0.0001%/%V_S
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental			
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the Output Effective Available Power that guarantees output range, accuracy, and linearity specifications.
(2) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(3) Linearity is calculated using the best-fit straight line method.
(4) Input offset term included in output offset specification.
(5) V_Z is the nominal input voltage that results in a 0V output.
(6) RTI = Referenced to Input.
(7) SCM7B21 is available only as ±10V output.

**Ordering Information

Model	Input Range
SCM7B21(7)	±10V
SCM7B30-01	0 to +10mV
SCM7B30-02	0 to +100mV
SCM7B30-03	0 to +1V
SCM7B30-05	+1V to +5V
SCM7B30-06	±10mV
SCM7B30-07	±100mV
SCM7B30-08	±1V
SCM7B31-01	0 to +10V
SCM7B31-02	±5V
SCM7B31-03	±10V
SCM7B31-04	0 to +5V
SCM7B31-05	0 to +20V
SCM7B31-06	±20V
SCM7B31-07	0 to +50V
SCM7B31-08	±50V

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B30-01
0 to +5V	A	SCM7B30-01A
0 to +10V	D	SCM7B30-01D

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SCM7B22

Isolated Bipolar Voltage-output Modules

DESCRIPTION

SCM7B22 voltage-output modules accept input signals in the ±10V range from the process control system. The signal is isolated, buffered, and filtered to provide a unity gain field voltage output.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the process control system side of the isolation barrier; four are on the field side.

After the initial process control system-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The signal is then reconstructed and filtered for field-side output.

Modules accept a wide 19-29VDC power supply range (+24VDC nominal). Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

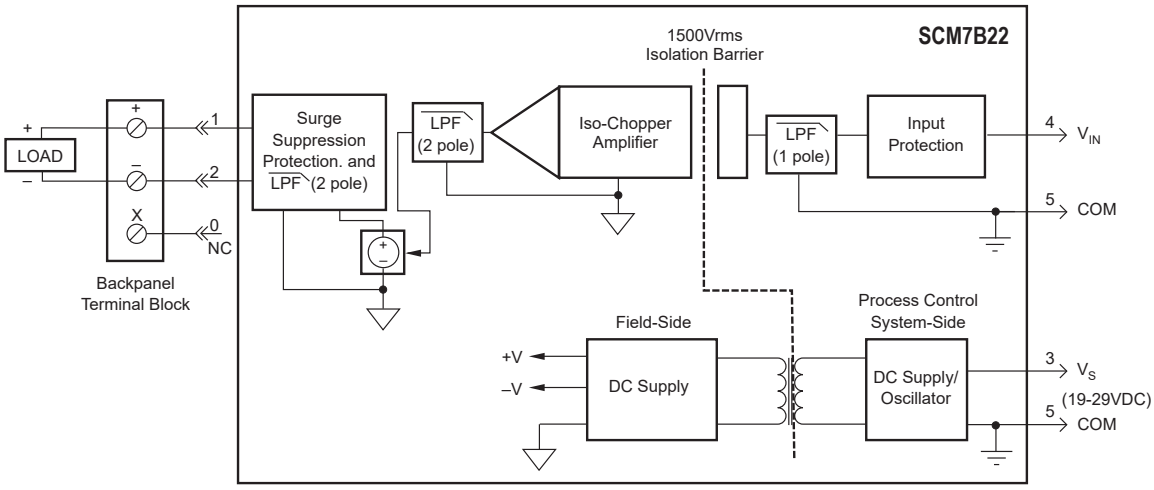
- Accepts High-level Input to ±10V
- Provides High-level Output to ±10V
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ), ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protected to 120Vrms, Continuous
- Input Protected to ±35VDC
- Noise, 2mVp-p (5MHz), 1mVrms (100kHz)
- 100dB CMRR
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



SCM7B22 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B22
Output	
Signal Range	±10V
Drive Capability	±20mA
Resistance	<1Ω
Protection	
Continuous	120Vrms
Transient	ANSI/IEEE C37.90.1
Voltage/Current Limit	±12.5V, ±40mA
Input	
Signal Range	±10V
Bias Current	±0.5nA
Resistance	2MΩ (min)
Protection	±35VDC (no damage)
CMV (Input-to-Output)	
Continuous	1500Vrms
Transient	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	100dB
Accuracy(1)	±0.03% Span (typ) ±0.1% Span (max)
Linearity(2)	±0.01% Span (typ) ±0.02% Span (max)
Stability (–40°C to +85°C)	
Gain	±35ppm/°C
Output Offset	±0.001% Span/°C
Noise	
Peak at 5MHz B/W	2mV
RMS at 10Hz to 100kHz B/W	1mV
Peak at 0.1Hz to 10Hz B/W	10µV RTI(3)
Frequency and Time Response	
Bandwidth, –3dB	400Hz
NMR (–3dB at 400Hz)	100dB per Decade above 400Hz
Step Response, 90% Span	1ms
Supply Voltage	19-29VDC
Current	16mA
Sensitivity	±0.0001%/%V_S
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(2) Linearity is calculated using the best-fit straight line method.
(3) RTI = Referenced to Input.

Ordering Information

Model	Input Range	Output Range
SCM7B22	±10V	±10V

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SCM7B32/33

Isolated Process Current/Voltage-input Modules

DESCRIPTION

The SCM7B32 current-input modules accept input signals in the 4-20mA or 0-20mA ranges from the field and provide a high-level output to the process control system (Figure below). Current-to-voltage conversion occurs internal to the module, which is factory calibrated to ensure the highest accuracy.

SCM7B33 voltage-input modules accept input signals in the +1V to +5V or 0 to +5V ranges from the field and provide a high-level output to the process control system. As an alternative, the SCM7B33 can be used with an external 250Ω resistor (Dataforth SCM7BXR1 or equivalent), to accept input signals in the 4-20mA or 0-20mA ranges. Using the external sense resistor allows the module to be removed without disrupting the current loop. All SCM7B33s are shipped with a SCM7BXR1 resistor.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

After the initial field-side filtering (conversion-SCM7B32 only), the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Modules accept a wide 14-35VDC power supply range (+24VDC nominal). Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high-channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

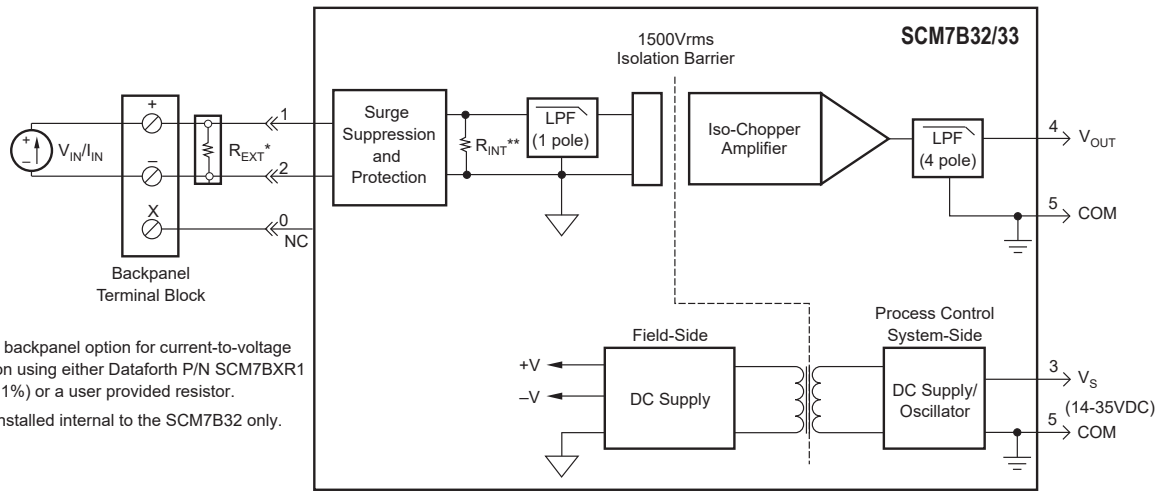
- Accepts Current or Voltage Input
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ), ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 500µVp-p (5MHz), 300µVrms (100kHz)
- 105dB CMRR
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



*R_{EXT} is a backpanel option for current-to-voltage conversion using either Dataforth P/N SCM7BXR1 (250Ω, 0.1%) or a user provided resistor.

**R_{INT} is installed internal to the SCM7B32 only.

SCM7B32/33 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = + 25°C and +24VDC

Module	SCM7B32	SCM7B33
Input		
Signal Range	4-20mA, 0-20mA	+1V to +5V, 0 to +5V
Bias Current	N/A	±0.1nA
Resistance		
Normal	<100Ω	2MΩ
Power Off	<100Ω	2MΩ
Overload	30kΩ	2MΩ
Protection		
Continuous	120Vrms (max)	120Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output		
Signal Range(1)	†	†
Effective Available Power(1)	40mW	40mW
Resistance	<1Ω	<1Ω
Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA	±12V, ±14mA
CMV (Input-to-Output)		
Continuous	1500Vrms	1500Vrms
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	105dB	105dB
Accuracy(2)	±0.03% Span (typ) ±0.1% Span (max)	±0.03% Span (typ) ±0.1% Span (max)
Linearity(3)	±0.01% Span (typ) ±0.02% Span (max)	±0.01% Span (typ) ±0.02% Span (max)
Stability (–40°C to +85°C)		
Gain	±35ppm/°C	±35ppm/°C
Input Offset	N/A(4)	N/A(4)
Output Offset	±0.003% Span/°C	±0.003% Span/°C
Noise		
Peak at 5MHz B/W	500µV	500µV
RMS at 10Hz to 100kHz B/W	300µV	300µV
Peak at 0.1Hz to 10Hz B/W	1µV RTI(5)	1µV RTI(5)*
Frequency and Time Response		
Bandwidth, –3dB	100Hz	100Hz
NMR (–3dB at 100Hz)	80dB per Decade Above 100Hz	80dB per Decade Above 100Hz
Step Response, 90% Span	5ms	5ms
Supply Voltage	14 - 35VDC	14 - 35VDC
Current(1)	12mA	12mA
Sensitivity	±0.0001%/%V_S	±0.0001%/%V_S
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the output Effective Available Power that guarantees output range, accuracy, and linearity specifications.
(2) Accuracy includes the effects of repeatability, hysteresis, and linearity. For SCM7B33, does not include SCM7BXR1 accuracy.
(3) Linearity is calculated using the best-fit straight line method.
(4) Input offset term included in output offset specification.
(5) RTI = Referenced to Input.

Ordering Information

Model	Input Range
SCM7B32-01	4-20mA
SCM7B32-02	0-20mA
SCM7B33-01	+1V to +5V
SCM7B33-02	0 to +5V

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B32-01
0 to +5V	A	SCM7B32-01A
0 to +10V	D	SCM7B32-01D

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SCM7B34/34N

Isolated Linearized 2- or 3-wire RTD-input Modules

DESCRIPTION

Each SCM7B34/34N RTD-input module accepts a single channel of 100Ω Platinum (α = 0.00385) or 120Ω Nickel (α = 0.00672) RTD input and produces an input voltage in response to a low-level current excitation. The input signal is filtered, isolated, amplified, linearized, and converted to a high-level analog voltage for output to the process control system.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

In response to the low-level current excitation signal, the RTD Input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Linearization is achieved by creating a non-linear transfer function through the module itself. This non-linear transfer function is configured at the factory and is designed to be equal and opposite to the specific RTD non-linearity. Lead compensation is achieved by matching two current paths thus canceling the effects of lead resistance.

Modules accept a wide 14-35VDC power supply range (+24VDC nominal). Their compact packages (2.13”x1.705”x0.605”) save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the -DIN backpanels.

FEATURES

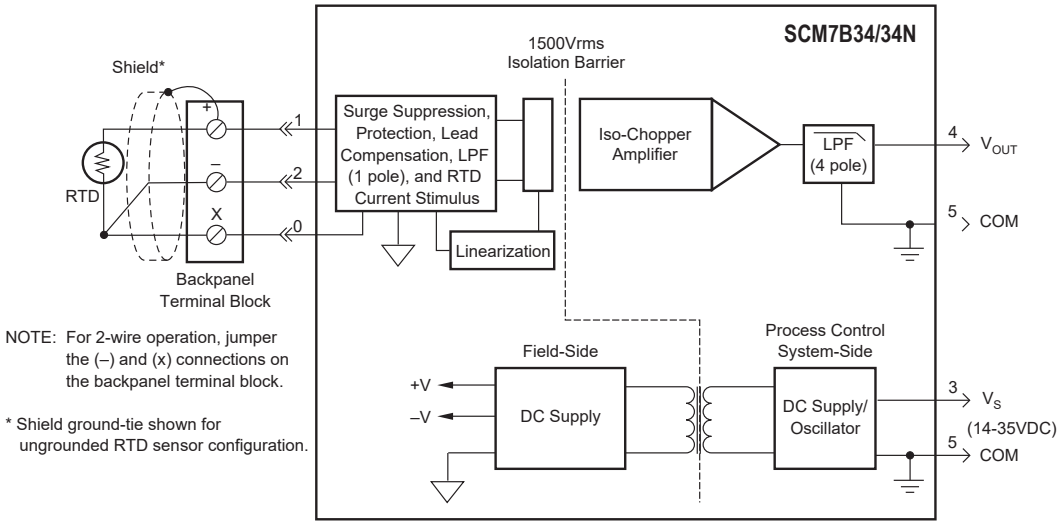
- Interfaces to 100Ω Platinum or 120Ω Nickel RTDs
- Provides 250µA RTD Excitation Current
- Linearizes RTD Signal Response
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.05% to ±0.15% of Span (typ)
- Nonconformity, ±0.025% to ±0.07% of Span (typ)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 500µVp-p (5MHz), 250µVrms (100kHz)
- 160dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Breaks Ground Loops
- Protects User Equipment from Lightning and Heavy Equipment Power-line Voltage
- Small Form-factor for High-density Applications
- Reduces EMC Concerns
- Reduces Electrical Noise in Measured Signals
- Signal Filtering in Noisy Environments

APPLICATIONS

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



NOTE: For 2-wire operation, jumper the (–) and (x) connections on the backpanel terminal block.

* Shield ground-tie shown for ungrounded RTD sensor configuration.

SCM7B34/34N Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B34	SCM7B34N
Input		
Signal Range	100Ω Pt RTD See Ordering Information	120Ω Ni RTD See Ordering Information
Protection		
Continuous	120Vrms (max)	120Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Sensor Excitation Current(1) Lead Resistance Effect	≈250µA ±0.02°C/Ω (max)	≈250µA ±0.02°C/Ω (max)
Output		
Signal Range(2)	†	†
Effective Available Power(2)	40mW	40mW
Resistance	<1Ω	<1Ω
Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA	±12V, ±14mA
CMV (Input-to-Output)		
Continuous	1500Vrms	1500Vrms
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	160dB	160dB
Accuracy(3)	See Ordering Information	See Ordering Information
Nonconformity(4)	See Ordering Information	See Ordering Information
Stability (–40°C to +85°C)		
Gain	±60ppm/°C	±60ppm/°C
Input Offset	±1µV/°C	±1µV/°C
Zero Suppression	±0.002%(R_Z/R_{SPAN})(5)/°C	±0.002%(R_Z/R_{SPAN})(5)/°C
Output Offset	±0.002% Span/°C	±0.002% Span/°C
Noise		
Peak at 5MHz B/W	500µV	500µV
RMS at 10Hz to 100kHz B/W	250µV	250µV
Peak at 0.1Hz to 10Hz B/W	1µV RTI(6)	1µV RTI(6)
Open Input Response		
'+' Lead	Upscale	Upscale
'–' Lead	Non-deterministic	Non-deterministic
'x' Lead	Downscale	Downscale
Open Input Detection Time	<5s	<5s
Frequency and Time Response		
Bandwidth, –3dB	3Hz	3Hz
NMR (50/60Hz)	80/85dB	80/85dB
Step Response, 90% Span	250ms	250ms
Supply Voltage	14 - 35VDC	14 - 35VDC
Current(2)	12mA	12mA
Sensitivity	±0.0001%/%V_S	±0.0001%/%V_S
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Sensor excitation current is model dependent.
(2) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the output Effective Available Power that guarantees output range, accuracy, and conformity specifications.
(3) Accuracy includes the effects of repeatability, hysteresis, and conformity.
(4) Nonconformity is calculated using the best-fit straight line method.
(5) R_Z is the value of the RTD resistance at the lowest measurement point. R_{SPAN} is the change in resistance over the measurement span.
(6) RTI = Referenced to Input.

Ordering Information

Model‡	Input Range	Accuracy(2) (typ)	Accuracy(2) (max)	Nonconformity(3) (typ)	Nonconformity(3) (max)
100Ω Pt **					
SCM7B34-01	–100°C to +100°C (–148°F to +212°F)	±0.075% (0.15°C)	±0.15% (0.30°C)	±0.025% (0.05°C)	±0.05% (0.10°C)
SCM7B34-02	0°C to +100°C (+32°F to +212°F)	±0.10% (0.10°C)	±0.2% (0.20°C)	±0.025% (0.025°C)	±0.05% (0.05°C)
SCM7B34-03	0°C to +200°C (+32°F to +392°F)	±0.075% (0.15°C)	±0.15% (0.30°C)	±0.025% (0.05°C)	±0.05% (0.10°C)
SCM7B34-04	0°C to +600°C (+32°F to +1112°F)	±0.05% (0.30°C)	±0.1% (0.60°C)	±0.025% (0.15°C)	±0.05% (0.30°C)
SCM7B34-05	–50°C to +350°C (–58°F to +662°F)	±0.05% (0.20°C)	±0.1% (0.40°C)	±0.025% (0.1°C)	±0.05% (0.20°C)
120Ω Ni **					
SCM7B34N-01	0°C to +300°C (+32°F to +572°F)	±0.15% (0.45°C)	±0.3% (0.90°C)	±0.06% (0.18°C)	±0.12% (0.36°C)
SCM7B34N-02	0°C to +200°C (+32°F to +392°F)	±0.15% (0.30°C)	±0.3% (0.60°C)	±0.07% (0.14°C)	±0.14% (0.28°C)

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B34-01
0 to +5V	A	SCM7B34-01A
0 to +10V	D	SCM7B34-01D

**RTD Standards

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

SECTION 2 - SCM7B

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SCM7B35

Isolated 2-wire Transmitter-interface Modules with Loop Power

DESCRIPTION

SCM7B35 current-input modules accept input signals in the 4-20mA range from the field and provide a high-level voltage output to the process control system. Current-to-voltage conversion occurs internal to the module, which is factory calibrated to ensure the highest accuracy.

Loop power is provided by the module, enabling a 2-wire transmitter to be directly connected without the need for a separate DC power supply for the 2-wire transmitter.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Modules accept a wide 18-35VDC power supply range (+24VDC nominal). Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

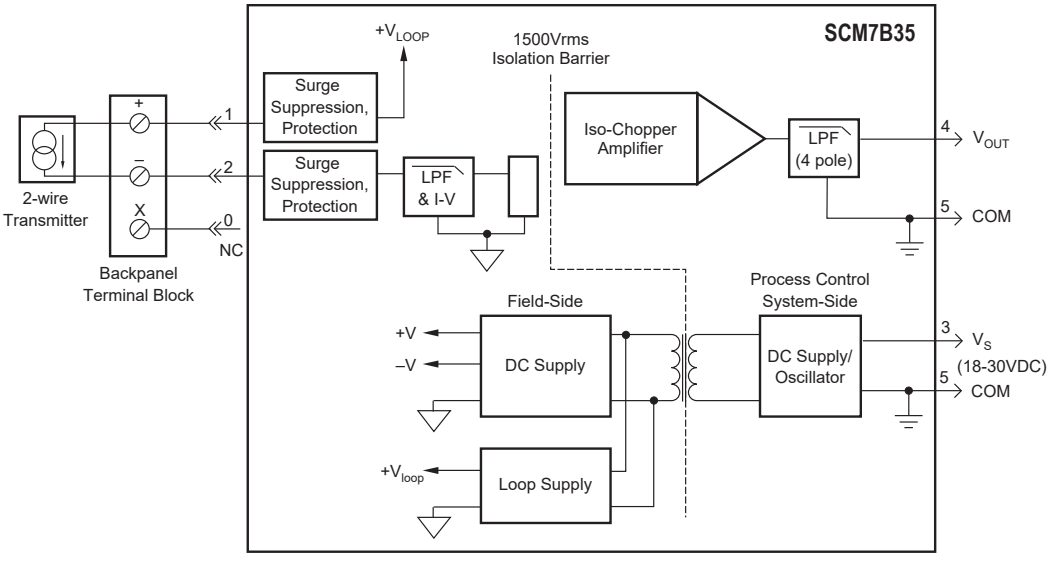
- 2-wire Transmitter Interface
- Accepts 4-20mA Signals
- Provides an Isolated +24VDC Supply to Power the Loop
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ) ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- 120Vrms Input Protection
- 105dB CMRR
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



SCM7B35 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B35
Input	
Signal Range	4-20mA
Protection	
Continuous	120Vrms (max)
Transient	ANSI/IEEE C37.90.1
Loop Voltage(1)	+24VDC
Output	
Signal Range(2)	See Ordering Information
Effective Available Power(2)	40mW
Resistance	<1Ω
Protection	Continuous Short-to-Ground
Voltage/Current Limit	±16V, ±14mA
CMV (Input-to-Output)	
Continuous	1500Vrms
Transient	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	105dB
Accuracy(3)	±0.03% Span (typ) ±0.1% Span (max)
Linearity(4)	±0.01% Span (typ) ±0.02% Span (max)
Stability (–40°C to +85°C)	
Gain	±40ppm/°C
Input Offset	N/A(5)
Output Offset	±0.003% Span/°C
Noise	
Peak at 5MHz B/W	5mV
RMS at 10Hz to 100kHz B/W	500µV
Peak at 0.1Hz to 10Hz B/W	3µV RTI(6)
Frequency and Time Response	
Bandwidth, –3dB	100Hz
NMR (–3dB at 100Hz)	80dB per Decade above 100Hz
Step Response, 90% Span	5ms
Supply Voltage	18 to 30VDC
Current(2)	56mA
Sensitivity	±0.0002%/%V_S
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 Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) +24V will be supplied to the loop for an open-loop condition. Approximately +22V to +16V will be supplied for a corresponding 4mA-to-20mA input. Loop voltage is independent of supply voltage.
(2) Output Range and Supply Current specifications are based on minimum output-load resistance. Minimum output-load resistance is calculated by V_{OUT}^2/P_E, where P_E is the Output Effective Available Power that guarantees output range, accuracy, and linearity specifications.
(3) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(4) Linearity is calculated using the best-fit straight line method.
(5) Input offset term included in output offset specification.
(6) RTI = Referenced to Input.

Ordering Information

Model	Input Range	Output Range
SCM7B35-01	4-20mA	+1V to +5V
SCM7B35-01A	4-20mA	0 to +5V
SCM7B35-01D	4-20mA	0 to +10V
SCM7B35-02	4-20mA	+2V to +10V

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SCM7B36

Isolated Potentiometer-input Modules

DESCRIPTION

Each SCM7B36 Potentiometer-input module provides a single channel of resistance input which is filtered, isolated, amplified, and converted to a high-level analog voltage output.

The SCM7B36 module interfaces to slidewires and potentiometers in both two-wire or three-wire configuration and incorporates a five-pole filtering approach to maximize both time and frequency response by taking advantage of both (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side. In the 3-wire configuration, lead resistance compensation is provided if the resistance of the "x" lead is closely equivalent to that of the "+" lead. Internal to the module, measurement error due to lead resistance is canceled.

In response to the low-level current excitation, and after initial field-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Six standard input resistance ranges are offered, from 100Ω to 10kΩ, with three output ranges available: 0-5V, 1-5V, and 0-10V. Modules accept a wide 14-35VDC power supply range (+24VDC nominal). Their compact packages (2.13" x 1.705" x 0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

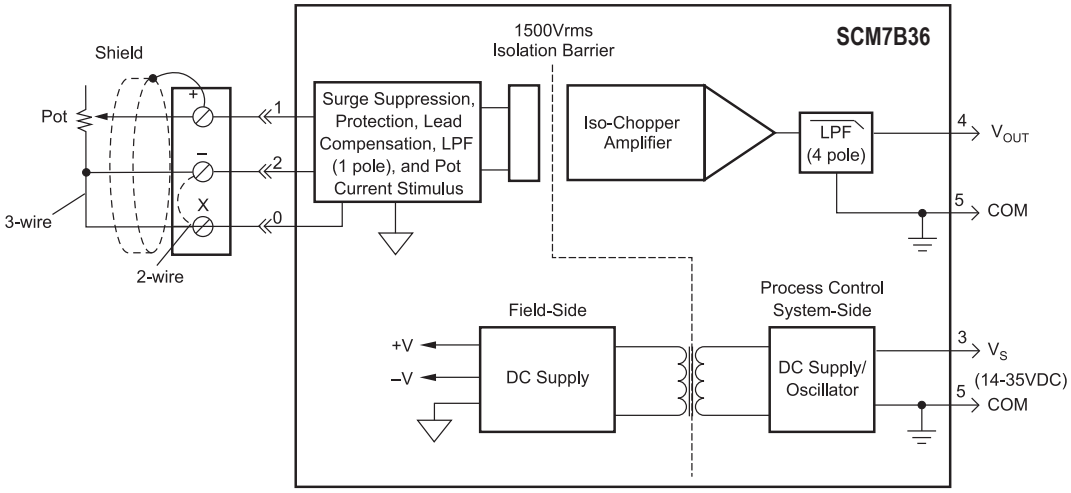
- 2-wire Transmitter Interface
- Accepts 4-20mA Signals
- Provides an Isolated +24VDC Supply to Power the Loop
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ) ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- 120Vrms Input Protection
- 105dB CMRR
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



SCM7B36 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B36
Input Range	(See Ordering Information)
Protection	
Continuous	120Vrms (max)
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	65µA (10kΩ) to 260µA (100Ω)
Lead Resistance Effect (3-wire)(1)	
-01 thru -04	: ±0.005Ω/
-05	: ±0.02Ω/Ω
-06	: ±0.04Ω/Ω
Output Range(2)	
(See Output Range)	†
Effective Available Power(2)	40mW
Resistance	< 1Ω
Protection	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA
CMV (Input to Output)	
Continuous	1500Vrms
Transient	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	120dB
Accuracy(3)	±0.03% Span (typ)
	±0.1% Span (max)
Linearity(4)	±0.01% Span (typ)
	±0.02% Span (max)
Stability (–40°C to +85°C)	
Input Offset	±0.01Ω/°C
Output Offset	±30µV/°C
Gain	±60ppm/°C
Noise Peak at 5MHz B/W	1mV
RMS at 10Hz to 100kHz B/W	250µV
Peak at 0.1Hz to 10Hz B/W	1µV RTI(5)
Open Input Response	
'+' Lead	Upscale
'–' Lead	Non-deterministic
'x' Lead	Downscale
Open Input Detection Time	<5s
Frequency and Time Response	
Bandwidth, –3dB	3Hz
NMR (50/60Hz)	80/85dB
Step Response, 0 to 90%	250ms
Supply Voltage	14-35VDC
Current(2)	12mA
Sensitivity	±0.0001%/%V_S
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 Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Lead resistance effect is given for the condition of not having the NTC thermistor installed in the backpanel. As a general rule, as long as the lead resistance of the (+) lead matches the parallel combination of the thermistor and lead resistance in the (X) lead, the given specifications apply.
(2) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the output Effective Available Power that guarantees output range and accuracy specifications.
(3) Accuracy includes the effects of repeatability, hysteresis, and linearity, but does not include sensor accuracy.
(4) Linearity is calculated using the best-fit straight line method.
(5) RTI = Referenced to Input.

Ordering Information

Model	Input Range
SCM7B36-01	0 to 100Ω
SCM7B36-02	0 to 200Ω
SCM7B36-03	0 to 500Ω
SCM7B36-04	0 to 1kΩ
SCM7B36-05	0 to 5kΩ
SCM7B36-06	0 to 10kΩ

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B36-01
0 to +5V	A	SCM7B36-01A
0 to +10V	D	SCM7B36-01D

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SCM7B37

Non-linearized Isolated Thermocouple-input Modules

DESCRIPTION

SCM7B37 non-linearized modules accept a single channel of input from Type J, K, T, E, R, S, or B thermocouples. The signal is filtered, isolated, amplified, and converted to a high-level analog voltage for output to the process control system.

Cold junction compensation (CJC) is performed using an NTC thermistor (see "Additional SCM7B Part Numbers" section for P/N and AN701 for further information) externally mounted under the field-side terminal block on the backpanel. Open thermocouple detection is upscale using a 30nA current source in the input circuitry.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Modules accept a wide 14-35VDC power supply range (+24VDC nominal). Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

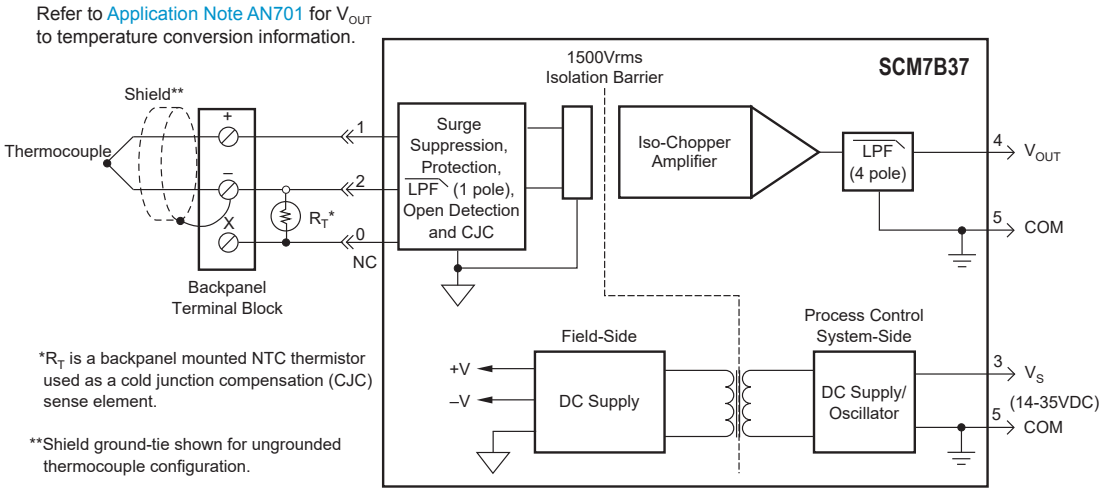
- Interfaces to Type J, K, T, E, R, S, and B Thermocouples
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ) ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 500µVp-p (5MHz), 250µVrms (100kHz)
- 160dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



SCM7B37 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B37
Input	
Signal Range	Thermocouple(1) (See Ordering Information)
Bias Current	–30nA
Resistance	
Normal	50MΩ
Power Off	30kΩ (min)
Overload	30kΩ (min)
Protection	
Continuous	120Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output	
Signal Range(2)	†
Effective Available Power(2)	40mW
Resistance	<1Ω
Protection	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA
CMV (Input-to-Output)	
Continuous	1500Vrms
Transient	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	160dB
Accuracy(3)	±0.03% Span (typ) ±0.1% Span (max)
Linearity(4)	See Ordering Information
Stability (–40°C to +85°C)	
Gain	±35ppm/°C
Input Offset	±0.5µV/°C
Zero Suppression	±0.005%(V_z)(5)/°C
Output Offset	±0.002% Span/°C
Noise	
Peak at 5MHz B/W	500µV
RMS at 10Hz to 100kHz B/W	250µV
Peak at 0.1Hz to 10Hz B/W	1µV RTI(6)
CJC Accuracy(7), +5°C to +45°C ambient	±0.25°C typ, ±1°C (max)
Open Input Response	Upscale
Open Input Detection Time	<10s
Frequency and Time Response	
Bandwidth, –3dB	3Hz
NMR (50/60Hz)	80/85dB
Step Response, 90% Span	165ms
Supply Voltage	14 - 35VDC
Current(2)	12mA
Sensitivity	±0.0001%/%V_8
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Thermocouple characteristics per NIST monograph 175, ITS-90.
(2) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the output Effective Available Power that guarantees output range, accuracy, and linearity specifications.
(3) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(4) Linearity is calculated using the best-fit straight line method.
(5) V_Z is the nominal input voltage that results in a 0V output.
(6) RTI = Referenced to Input
(7) The CJC sensor accuracy should be added to the module accuracy and thermocouple accuracy to compute the overall measurement accuracy.

Ordering Information

Model‡	Input Range	Accuracy(3) (typ)	Accuracy(3) (max)	Linearity(4) (typ)	Linearity(4) (max)
SCM7B37J-01	100°C to +760°C (–148°F to +1400°F)	±0.03% (0.26°C)	±0.1% (0.86°C)	±0.01% (0.09°C)	±0.02% (0.17°C)
SCM7B37J-10	0°C to +200°C (+32°F to +392°F)	±0.03% (0.06°C)	±0.1% (0.20°C)	±0.01% (0.02°C)	±0.02% (0.04°C)
SCM7B37J-11	0°C to +400°C (+32°F to +752°F)	±0.03% (0.12°C)	±0.1% (0.40°C)	±0.01% (0.04°C)	±0.02% (0.08°C)
SCM7B37J-12	0°C to +600°C (+32°F to +1112°F)	±0.03% (0.18°C)	±0.1% (0.60°C)	±0.01% (0.06°C)	±0.02% (0.12°C)
SCM7B37J-13	300°C to +600°C (572°F to +1112°F)	±0.03% (0.09°C)	±0.1% (0.30°C)	±0.01% (0.03°C)	±0.02% (0.24°C)
SCM7B37K-02	–100°C to +1350°C (–148°F to +2462°F)	±0.03% (0.44°C)	±0.1% (1.45°C)	±0.01% (0.15°C)	±0.02% (0.29°C)
SCM7B37K-20	0°C to +300°C (+32°F to +572°F)	±0.03% (0.09°C)	±0.1% (0.30°C)	±0.01% (0.03°C)	±0.02% (0.06°C)
SCM7B37K-21	0°C to +600°C (+32°F to +1112°F)	±0.03% (0.18°C)	±0.1% (0.60°C)	±0.01% (0.06°C)	±0.02% (0.12°C)
SCM7B37K-22	0°C to +1200°C (+32°F to +2192°F)	±0.03% (0.36°C)	±0.1% (1.20°C)	±0.01% (0.12°C)	±0.02% (0.24°C)
SCM7B37K-23	600°C to +1200°C (+1112°F to +2192°F)	±0.03% (0.18°C)	±0.1% (0.60°C)	±0.01% (0.06°C)	±0.02% (0.12°C)
SCM7B37T-03	–100°C to +400°C (–148°F to +752°F)	±0.03% (0.15°C)	±0.1% (0.50°C)	±0.01% (0.05°C)	±0.02% (0.10°C)
SCM7B37E-04	0°C to +900°C (+32°F to +1652°F)	±0.03% (0.27°C)	±0.1% (0.90°C)	±0.01% (0.09°C)	±0.02% (0.18°C)
SCM7B37R-05	0°C to +1750°C (+32°F to +3182°F)	±0.03% (0.53°C)	±0.1% (1.75°C)	±0.01% (0.18°C)	±0.02% (0.35°C)
SCM7B37S-06	0°C to +1750°C (+32°F to +3182°F)	±0.03% (0.53°C)	±0.1% (1.75°C)	±0.01% (0.18°C)	±0.02% (0.35°C)
SCM7B37B-07	0°C to +1800°C (+32°F to +3272°F)	±0.03% (0.54°C)	±0.1% (1.80°C)	±0.01% (0.18°C)	±0.02% (0.36°C)

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B37J-01
0 to +5V	A	SCM7B37J-01A
0 to +10V	D	SCM7B37J-01D

‡Thermocouple Alloy Combinations

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

Type	Material
J	Iron vs. Copper-nickel
K	Nickel-chromium vs. Nickel-aluminum
T	Copper vs. Copper-nickel
E	Nickel-chromium vs. Copper-nickel
R	Platinum-13% Rhodium vs. Platinum
S	Platinum-10% Rhodium vs. Platinum
B	Platinum-30% Rhodium vs. Platinum-6% Rhodium

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SCM7B39

Isolated Process Current Output Modules

DESCRIPTION

SCM7B39 process current modules accept high-level signals from the process control system and provide either 0-20mA or 4-20mA current to the field.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the process control system side of the isolation barrier, and the other four poles are on the field side.

After the initial process control system side filtering, the signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The signal is then reconstructed, filtered, and converted to a process current for output to the field.

Modules accept a wide 18-35VDC power supply range (+24VDC nominal). Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

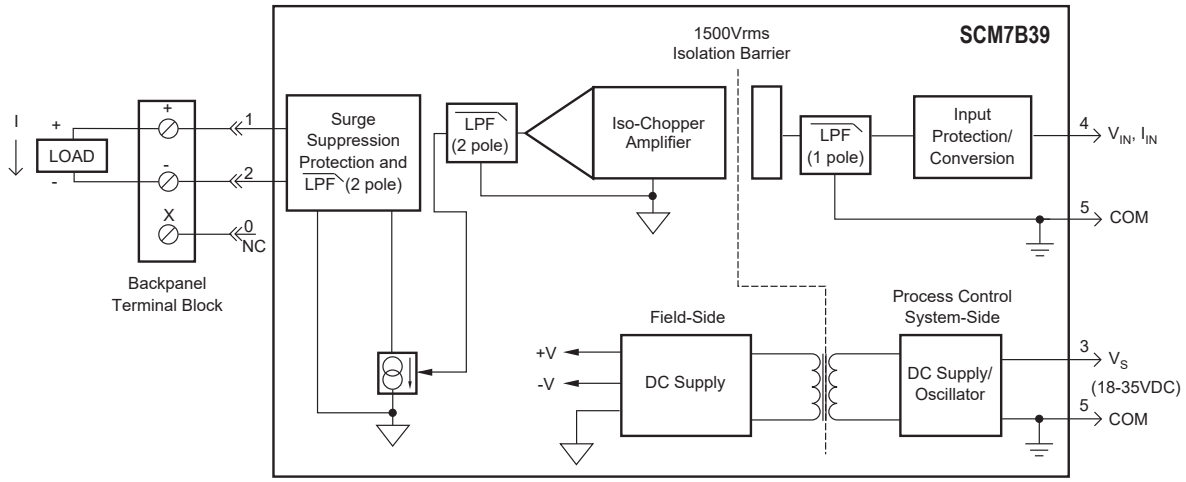
- Accepts High-level Voltage Input
- Provides 0-20mA or 4-20mA Current Output
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ) ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protected to 120Vrms, Continuous
- Noise, 46µAp-p (5MHz), 4µArms (100kHz)
- 110dB CMRR
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



SCM7B39 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B39-01,-02,-03	SCM7B39-04
Output		
Signal Range(1)	4-20mA, 0-20mA	4-20mA
Effective Available Power(1)	320mW	320mW
Protection		
Continuous	120Vrms (max)	120Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Current Limit	32mA	32mA
Input		
Signal Range	1 to +5V, 0 to +10V	4-20mA
Bias Current	±1nA	N/A
Resistance		
Normal	10MΩ	270Ω
Power Off	30kΩ (min)	>20kΩ
Overload	30kΩ (min)	N/A
Protection	±35Vpeak (no damage)	±7.5V peak
Compliance	N/A	35VDC (max)
CMV (Input-to-Output)		
Continuous	1500Vrms	1500Vrms
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	110dB	110dB
Accuracy(2)	±0.03% Span (typ) ±0.1% Span (max)	±0.03% Span (typ) ±0.1% Span (max)
Linearity(3)	±0.01% Span (typ) ±0.02% Span (max)	±0.01% Span (typ) ±0.02% Span (max)
Stability (–40°C to +85°C)		
Gain	±25ppm/°C	±50ppm/°C
Output Offset	±0.0035% Span/°C	±0.0045% Span/°C
Noise		
Peak at 5MHz B/W	46µA	46µA
RMS at 10Hz to 100kHz B/W	4µA	4µA
Peak at 0.1Hz to 10Hz B/W	42nA	42nA
Frequency and Time Response		
Bandwidth, –3dB	100Hz	100Hz
NMR (–3dB at 100Hz)	80dB per Decade Above 100Hz	80dB per Decade Above 100Hz
Step Response, 90% Span	5ms	5ms
Supply Voltage	18 to 35VDC	18 to 35VDC
Current(1)	56mA	56mA
Sensitivity	±0.0003%/%V_S	±0.0003%/%V_S
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Output Range and Supply Current specifications are based on maximum output load resistance. Maximum output load resistance is calculated by P_E/I_{OUT}^2 where P_E is the Output Effective Available Power that guarantees output range, accuracy, and linearity specifications. Output effective available power is independent of supply voltage.
(2) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(3) Linearity is calculated using the best-fit straight line method.

Ordering Information

Model	Input Range	Output Range
SCM7B39-01	+1 to +5V	4-20mA
SCM7B39-02	0 to +10V	0-20mA
SCM7B39-03	0 to +10V	4-20mA
SCM7B39-04	4-20mA	4-20mA

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SCM7B40/41

Isolated Analog Voltage-input Modules, Wide Bandwidth

DESCRIPTION

Each SCM7B40/41 voltage-input module accepts one channel of analog voltage input which is filtered, isolated, amplified, and converted to a high-level analog voltage for output to the process control system .

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Modules accept a wide 14-35VDC power supply range (+24VDC nominal). Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

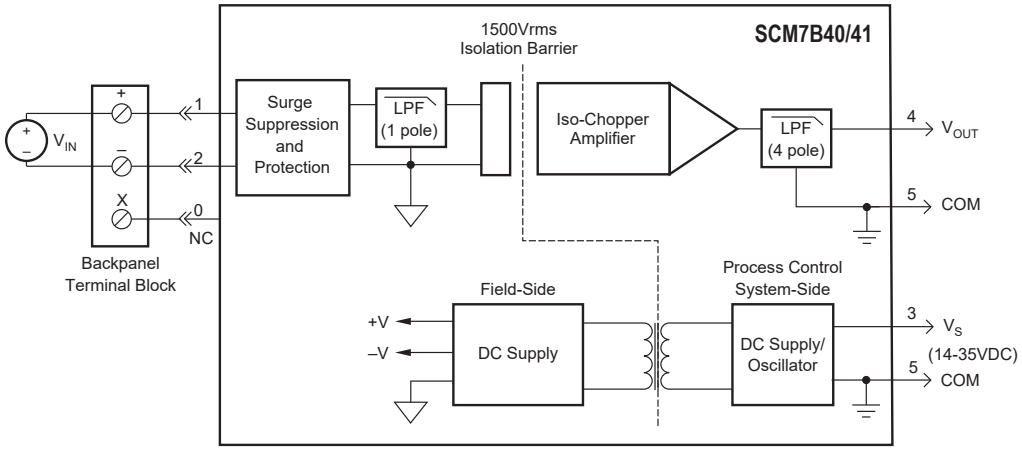
- Accepts Millivolt or Voltage Inputs
- Provides High-level Voltage-outputs
- 10kHz Bandwidth
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ) ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 2mVp-p (5MHz), 1mVrms (100kHz)
- Up to 110dB CMRR
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



SCM7B40/41 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B40	SCM7B41
Input		
Signal Range	–1V to +1V	–10V to +40V
Bias Current	±1nA	±0.1nA
Resistance		
Normal	50MΩ	500kΩ (min)
Power Off	30kΩ (min)	500kΩ (min)
Overload	30kΩ (min)	500kΩ (min)
Protection		
Continuous	120Vrms (max)	120Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output		
Signal Range(1)	†	†
Effective Available Power(1)	40mW	40mW
Resistance	<1Ω	<1Ω
Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA	±12V, ±14mA
CMV (Input-to-Output)		
Continuous	1500Vrms	1500Vrms
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	110dB	110dB
Accuracy(2)	±0.03% Span (typ) ±0.1% Span (max)	±0.03% Span (typ) ±0.1% Span (max)
Linearity(3)	±0.01% Span (typ) ±0.02% Span (max)	±0.01% Span (typ) ±0.02% Span (max)
Stability (–40°C to +85°C)		
Gain	±35ppm/°C	±55ppm/°C
Input Offset	±0.5µV/°C	±5µV/°C
Zero Suppression	±0.005%(V_z)(4)/°C	±0.005%(V_z)(4)/°C
Output Offset	±0.002% Span/°C	±0.002% Span/°C
Noise		
Peak at 5MHz B/W	2mV	2mV
RMS at 10Hz to 100kHz B/W	1mV	1mV
Peak at 0.1Hz to10Hz B/W	1µV RTI(5)	1µV RTI(5)
Frequency and Time Response		
Bandwidth, –3dB	10kHz	10kHz
NMR	80dB per Decade above10kHz	80dB per Decade above10kHz
Step Response, 90% Span	50µs	50µs
Supply Voltage	14 - 35VDC	14 - 35VDC
Current(1)	12mA	12mA
Sensitivity	±0.0001%/%V_S	±0.0001%/%V_S
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the Output Effective Available Power that guarantees output range, accuracy, and linearity specifications.
(2) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(3) Linearity is calculated using the best-fit straight line method.
(4) V_z is the nominal input voltage that results in a 0V output.
(5) RTI = Referenced to Input.

Ordering Information

Model	Input Range
SCM7B40-02	0 to +100mV
SCM7B40-03	0 to +1V
SCM7B40-07	±100mV
SCM7B40-08	±1V
SCM7B41-01	0 to +10V
SCM7B41-02	±5V
SCM7B41-03	10V
SCM7B41-04	0 to +5V
SCM7B41-05	0 to +20V
SCM7B41-06	0 to +40V

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B40-02
0 to +5V	A	SCM7B40-02A
0 to +10V	D	SCM7B40-02D

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SCM7B47

Isolated Linearized Thermocouple-input Modules

DESCRIPTION

SCM7B47 modules accept a single channel of input from Type J, K, T, E, R, S, B, or N thermocouples. The signal is filtered, isolated, amplified, linearized, and converted to a high-level analog voltage for output to the process control system.

Linearization is achieved by creating a non-linear transfer function through the module itself; refer to Application Note AN505. This non-linear transfer function is configured at the factory and is designed to be equal and opposite to the thermocouple non-linearity.

Cold junction compensation (CJC) is performed using an NTC thermistor (see "Additional SCM7B Part Numbers" section for P/N and Application Note AN701 for further information) externally mounted under the field-side terminal block on the backpanel (Figure below). Open thermocouple detection is upscale using a 30nA current source in the input circuitry.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Modules accept a wide 14-35VDC power supply range (+24VDC nominal). Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the DIN backpanels.

FEATURES

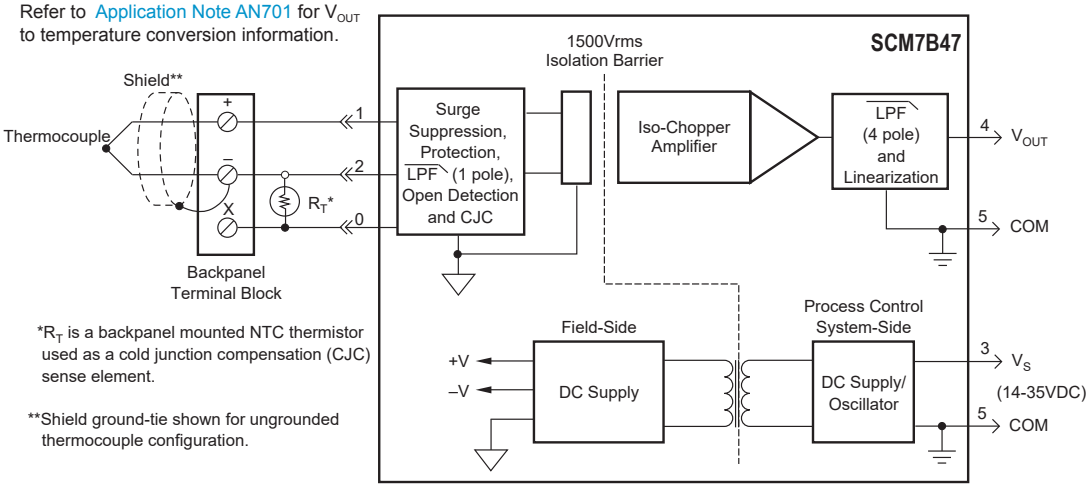
- Interfaces to Type J, K, T, E, R, S, B, and N Thermocouples
- Linearizes Thermocouple Signals
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.06% to ±0.16% of Span (typ)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- 1mVp-p (5MHz), 500µVrms (100kHz) Noise
- 160dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Small Form-factor for High-density Applications
- Protects User Equipment from Lightning and Heavy Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair
- Signal Filtering in Noisy Environments
- Provides Isolation of External Sensors
- Breaks Ground Loops
- Reduces EMC Concerns

APPLICATIONS

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



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SCM7B47 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = +25°C and +24VDC

Module	SCM7B47
Input	
Signal Range	Thermocouple(1) (See Ordering Information)
Current	–30nA
Resistance	
Normal	50MΩ
Power Off	30kΩ (min)
Overload	30kΩ (min)
Protection	
Continuous	120Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output	
Signal Range(2)	†
Effective Available Power(2)	40mW
Resistance	<1Ω
Protection	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA
CMV (Input-to-Output)	
Continuous	1500Vrms
Transient	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	160dB
Accuracy(3)	(See Ordering Information)
Stability (–40°C to +85°C)	
Gain	±40ppm/°C
Input Offset	±0.5µV/°C
Zero Suppression	±0.005%(V_Z)(4)/°C
Output Offset	±0.002% Span/°C
Noise	
Peak at 5MHz B/W	1mV
RMS at 10Hz to 100kHz B/W	500µV
Peak at 0.1Hz to 10Hz B/W	1µV RTI(5)
CJC Accuracy(6), +5°C to +45°C ambient	±0.25°C Typ, ±1°C (max)
Open Input Response	Upscale
Open Input Detection Time	<10s
Frequency and Time Response	
Bandwidth, –3dB	3Hz
NMR (50/60Hz)	80/85dB
Step Response, 90% Span	165ms
Supply Voltage	14 - 35VDC
Current(2)	16mA
Sensitivity	±0.0001%/%V_8
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Thermocouple characteristics per NIST monograph 175, ITS-90.
(2) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the output Effective Available Power that guarantees output range, accuracy, and linearity specifications.
(3) Accuracy includes the effects of repeatability, hysteresis, and conformity.
(4) V_Z is the nominal input voltage that results in a 0V output.
(5) RTI = Referenced to Input.
(6)The CJC sensor accuracy should be added to the module accuracy and thermocouple accuracy to compute overall measurement accuracy.

Ordering Information

Model‡	Input Range	Accuracy(3)(5) (typ)	Accuracy(3)(5) (max)
SCM7B47J-01	0°C to +760°C (+32°F to +1400°F)	±0.11% Span (0.84°C)	±0.32% Span (3.43°C)
SCM7B47J-02	–100°C to +300°C (–148°F to +572°F)	±0.10% Span (0.40°C)	±0.30% Span (1.20°C)
SCM7B47K-03	0°C to +1300°C (+32°F to +2372°F)	±0.11% Span (1.43°C)	±0.32% Span (4.16°C)
SCM7B47K-04	0°C to +600°C (+32°F to +1112°F)	±0.06% Span (0.36°C)	±0.18% Span (1.08°C)
SCM7B47T-05	0°C to +400°C (+32°F to +752°F)	±0.13% Span (0.52°C)	±0.38% Span (1.52°C)
SCM7B47T-06	–100°C to +200°C (–148°F to +392°F)	±0.16% Span (0.48°C)	±0.47% Span (1.41°C)
SCM7B47E-07	0°C to +900°C (+32°F to +1652°F)	±0.11% Span (0.99°C)	±0.34% Span (3.06°C)
SCM7B47R-08	+500°C to +1750°C (+932°F to +3182°F)	±0.10% Span (1.25°C)	±0.30% Span (3.75°C)
SCM7B47S-09	+700°C to +1750°C (+1292°F to +3182°F)	±0.08% Span (0.84°C)	±0.25% Span (2.63°C)
SCM7B47B-10	+800°C to +1800°C (+1472°F to +3272°F)	±0.12% Span (1.20°C)	±0.35% Span (3.50°C)
SCM7B47N-11	+200°C to +1300°C (+392°F to +2372°F)	±0.09% Span (0.99°C)	±0.27% Span (2.97°C)

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1 to +5V	NONE	SCM7B47J-01
0 to +5V	A	SCM7B47J-01A
0 to +10V	D	SCM7B47J-01D

‡Thermocouple Alloy Combinations

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

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

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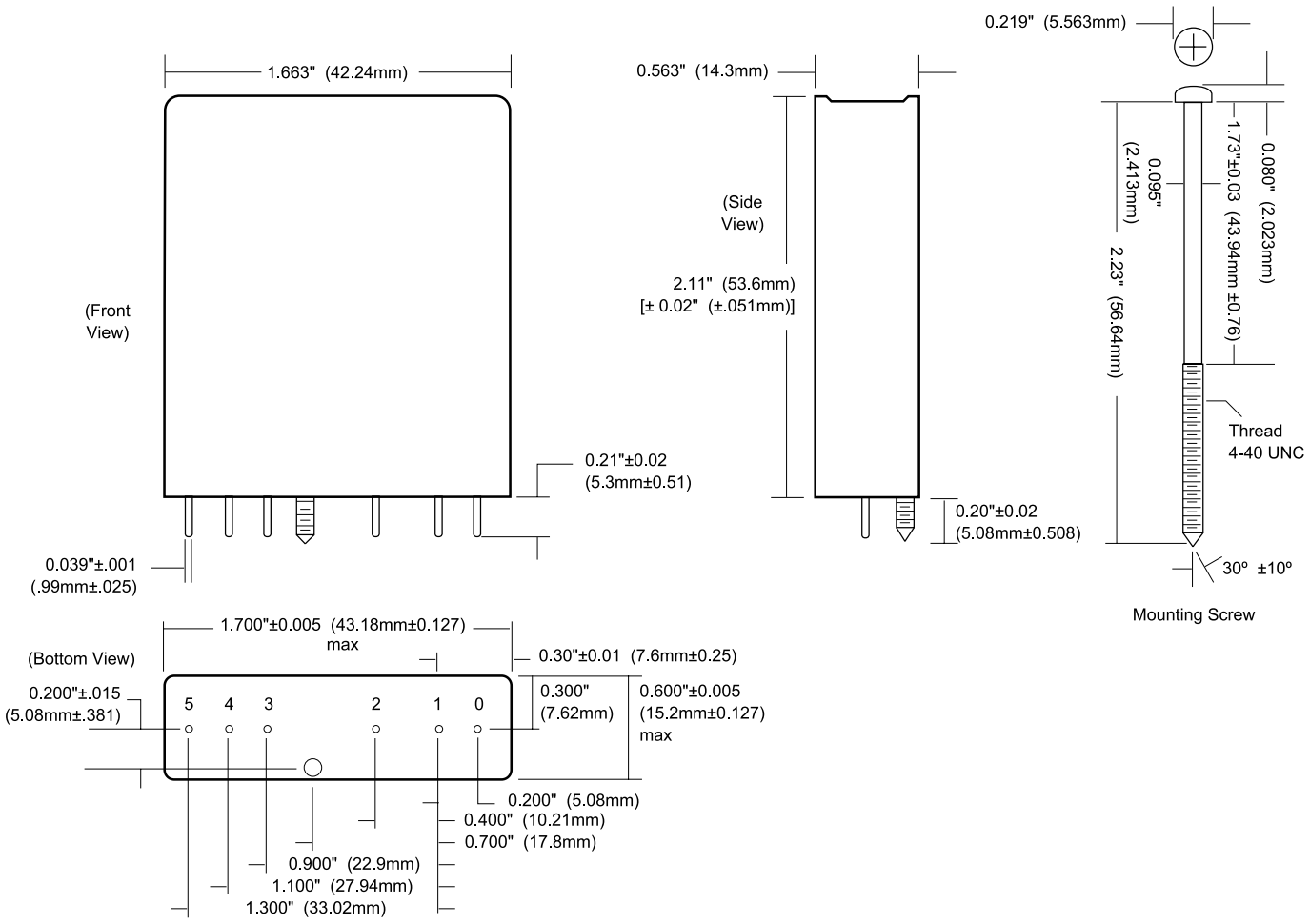
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SCM7B

Module Dimensions and Pinouts

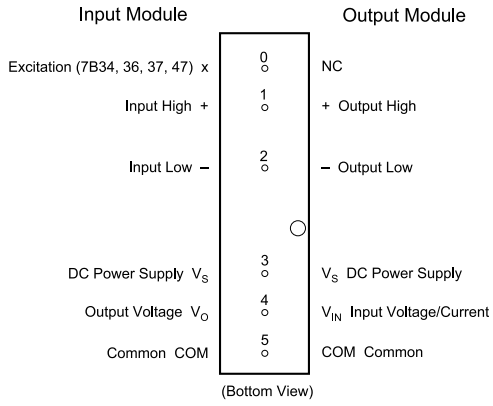
The following mechanical drawing is useful if designing circuit boards to mount the SCM7B modules. Many sockets are available which accept the mounting pins. As an example, AMP Inc. provides a socket with part number 50865-5.

The captive nut for the 4-40 mounting screw can be obtained from PEM (Penn Engineering and Manufacturing), part number KFS2-440.



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

SCM7B Module Dimensions



SCM7B Pinouts

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Accessories for SCM7B Analog Modules

SCM7BXEV

Single-channel, Module-evaluation Backpanel

DESCRIPTION

The SCM7BXEV (Figures 1 and 2) is a single-channel backpanel that can accept any of the SCM7B analog modules. It is meant to be used primarily for module evaluation. Unlike multiple-channel backpanels, the single high-level system output (or input) signal is routed to all channel pins on the system interface DB25 connector. The backpanel contains four standoffs to allow mounting, using a #6 or smaller screw.

System Side - Power

Using the "V+" supply input, the power supply voltage can be as little as +14VDC. If +15VDC is available, it is recommended that the supply be connected between the "V+A" or "V+B" connections and "COM"; this will protect the module against accidental supply reversal. Using both these connections with two power supplies enables redundant operation. It is also recommended that a diode transient absorber be installed to reduce power supply transient events from degrading system performance. An "accessory" location, between the supply and common lines, is provided for this purpose. The backpanel is fused at 1/4 Amp for module protection.

System Side - Signal

The SCM7BXEV uses either the SCM7BXCA01 (DB25-to-26-pin adapter cable) and SCMXCA004-XX (26-pin-to-26-pin interface cable), or the SCM7BXCA02 (DB25 to DB25 interface cable), depending on system requirements.

Field Side - Signal

On the field side, a temperature sensor is mounted underneath the field side terminal block to provide cold junction compensation for thermocouple modules, and a current-to-voltage conversion resistor (P/N SCM7BXR1) socketing location is provided (supplied with SCM7B33 modules). Field connections are terminated with three screw terminals.

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector: Field System	 High-density Screw Clamp, 10-24 AWG DB25 (male) with 4-40 Screw Locks and High-density Screw Clamp, 10-24 AWG

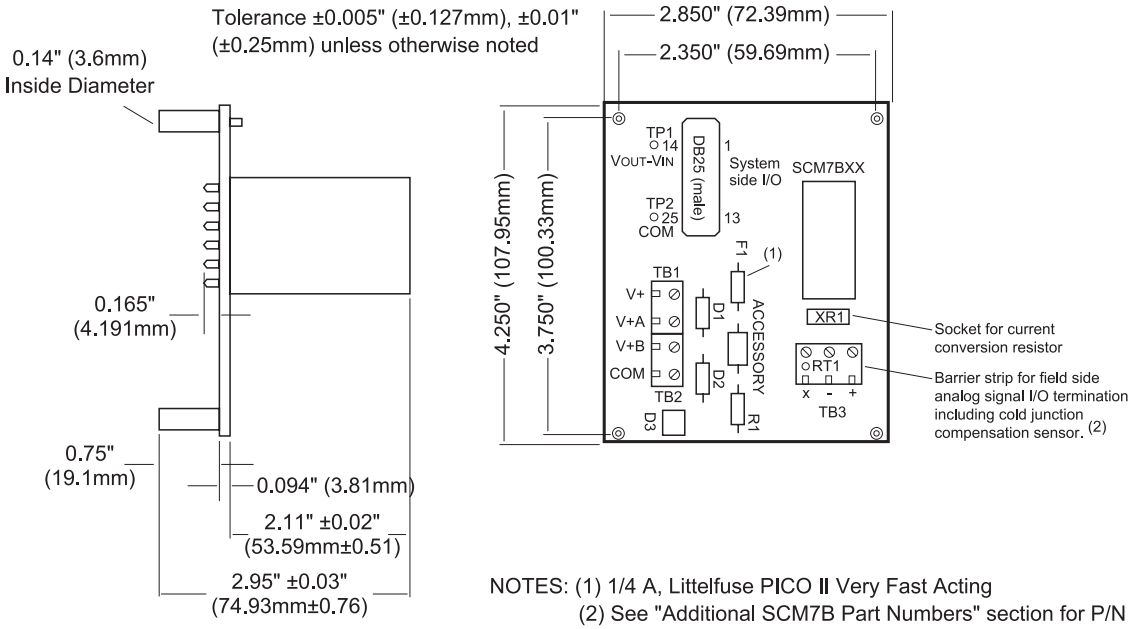


Figure 1: SCM7BXEV Dimensions

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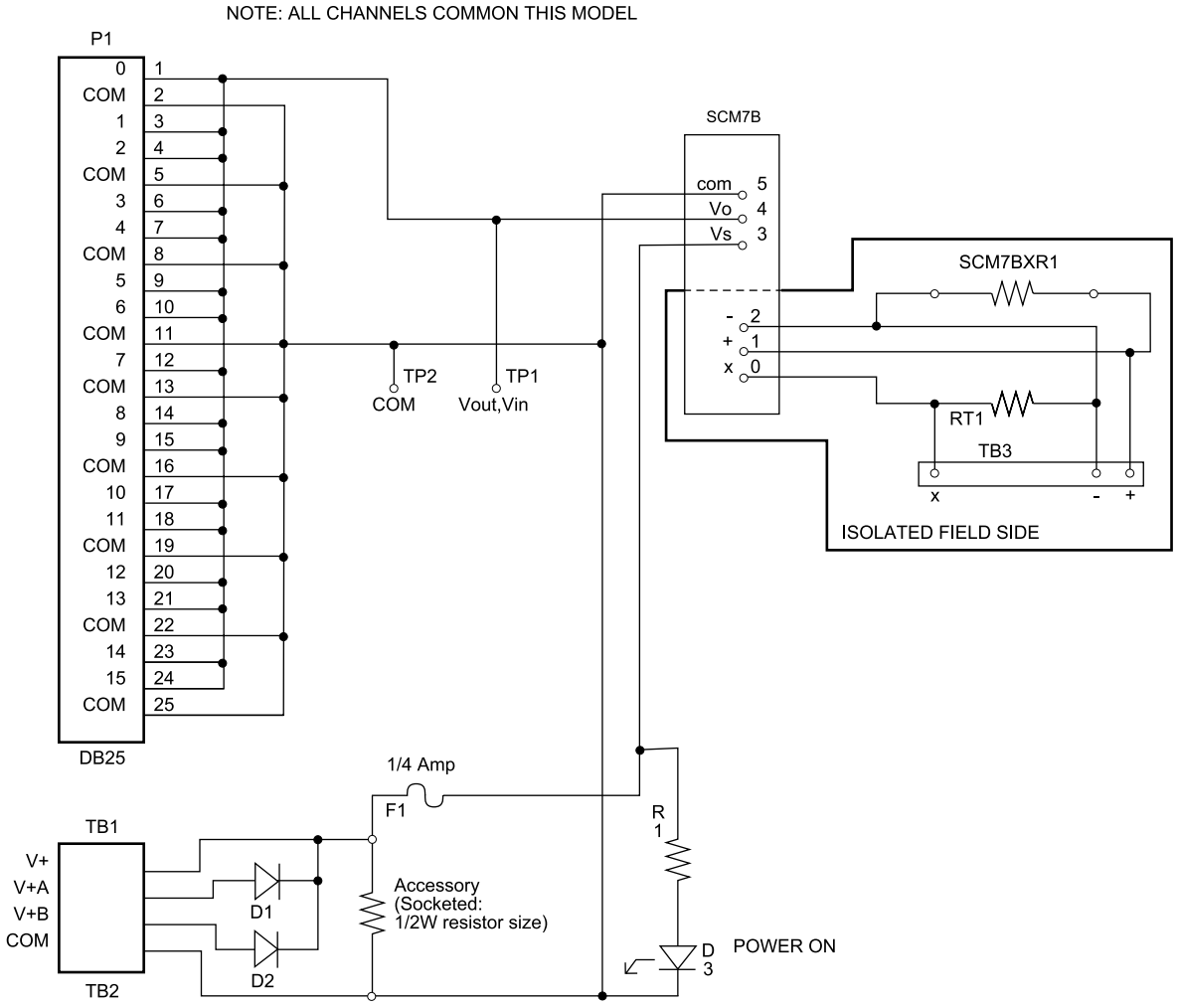


Figure 2: SCM7BXEV Schematic Diagram

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SCM7BP01/ SCM7BP02

1- and 2-channel Backpanels

DESCRIPTION

The SCM7BP01 (Figure 1) and SCM7BP02 (Figure 2) are 1- and 2-channel backpanels. Unlike other backpanels available, both the system and field side sides have screw terminal connectors able to accept discrete wire (10-24AWG). The backpanels can be ordered with standoffs to allow mounting, using a #6 or smaller screw, or with DIN-rail mounting hardware.

System Side - Power

Both backpanels accept 14-35VDC between "V+" and "COM" using a screw terminal (10-24AWG) block. No reverse supply diodes are provided with this model, but both are fused at 1/4 Amp (01) or 1/2 Amp (02) for module protection.

Field Side - Signal

On the field side, a temperature sensor is mounted underneath the field-side terminal block to provide cold junction compensation for thermocouple modules, and a current-to-voltage conversion resistor (P/N SCM7BXR1) socket location is provided (supplied with SCM7B33 modules).

FEATURES

- 1- and 2-channel Backpanels
- Panel or DIN-rail Mounting Options
- Interface Cables
- Cable-to-screw-terminal Interface Board
- Power Supplies

BENEFITS

- Easy Installation
- 1500Vrms, Continuous Isolation (max)
- Both System- and Field-side sides have Screw Terminal Connectors Able to Accept Discrete wire (10-24 AWG)

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector: Field System	 High-density Screw Clamp, 10-24 AWG High-density Screw Clamp, 10-24 AWG
Isolation: Input-to-Output Channel-to-Channel	 1500Vrms, Continuous (max) 1500Vrms, Continuous (max)

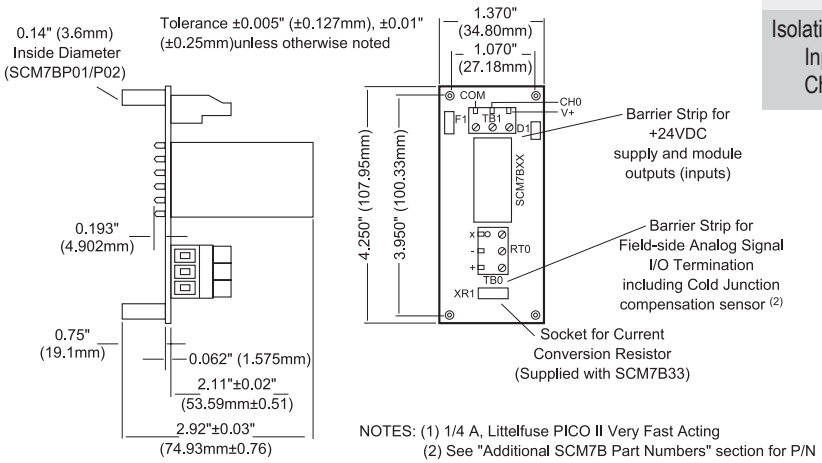
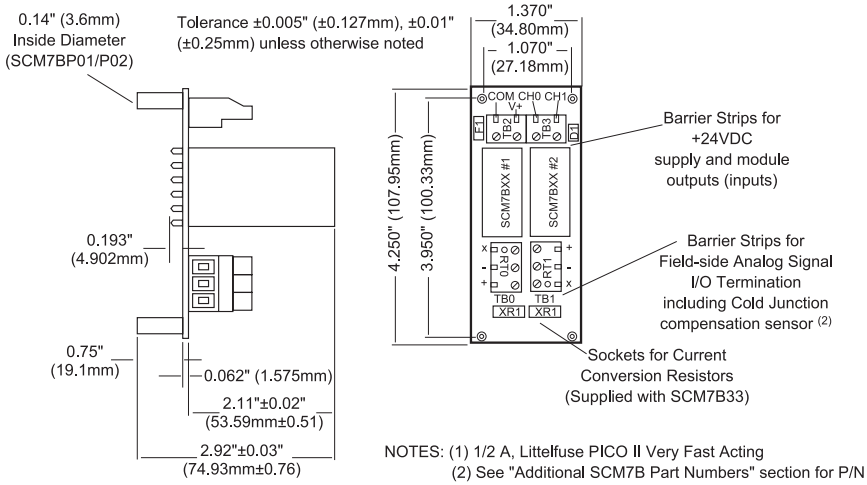


Figure 1: SCM7BP01 Dimensions



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Figure 2: SCM7BP02 Dimensions

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SCM7BP01-DIN/SCM7BP02-DIN

Panels and DIN-rail Mounting Accessories

DESCRIPTION

The SCM7BP01 and SCM7BP02 are single- and dual-channel mounting panels for the SCM7B modules. Both have options for standoffs or DIN-rail mounting.

The following accessories are required for DIN-rail mounting one SCM7BP01 or SCM7BP02 panel (Figure 1):

Qty	Model	Description
1	SCMXBEFE	Base Element with Snap Foot
2	SCMXSE	Side Element

The following accessories are required for DIN-rail mounting two or more SCM7BP01-4 or SCM7BP02-4 panels:

Qty	Model	Description
2	SCMXBEFE	Base Element with Snap Foot
2	SCMXSE	Side Element
(# panels) - 2	SCMXBE	Base Element without Snap Foot
(4 x (# panels))-4	SCMXVS	Connection Pins

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

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

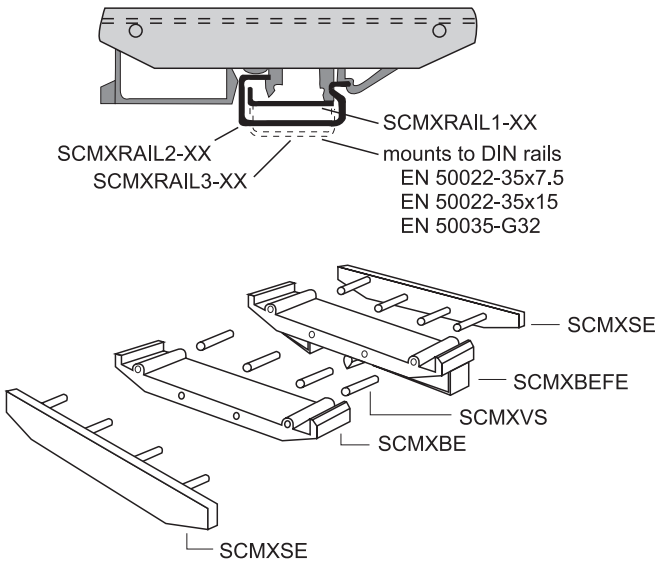


Figure 1: DIN-rail Mounting Elements

Ordering Information

Part Number	Description
SCM7BP01	Single-channel Backpanel with Standoffs for Mounting.
SCM7BP01-4	Single-channel Backpanel. No Mounting Hardware Included.
SCM7BP01-DIN	Single-channel Backpanel with Din-rail Mounting Hardware. *(Shipped Fully Assembled)*.
SCM7BP02	Dual-channel Backpanel with Standoffs for Mounting.
SCM7BP02-4	Dual-channel Backpanel. No Mounting Hardware Included.
SCM7BP02-DIN	Dual-channel Backpanel with Din-rail Mounting Hardware. *(Shipped Fully Assembled)*.

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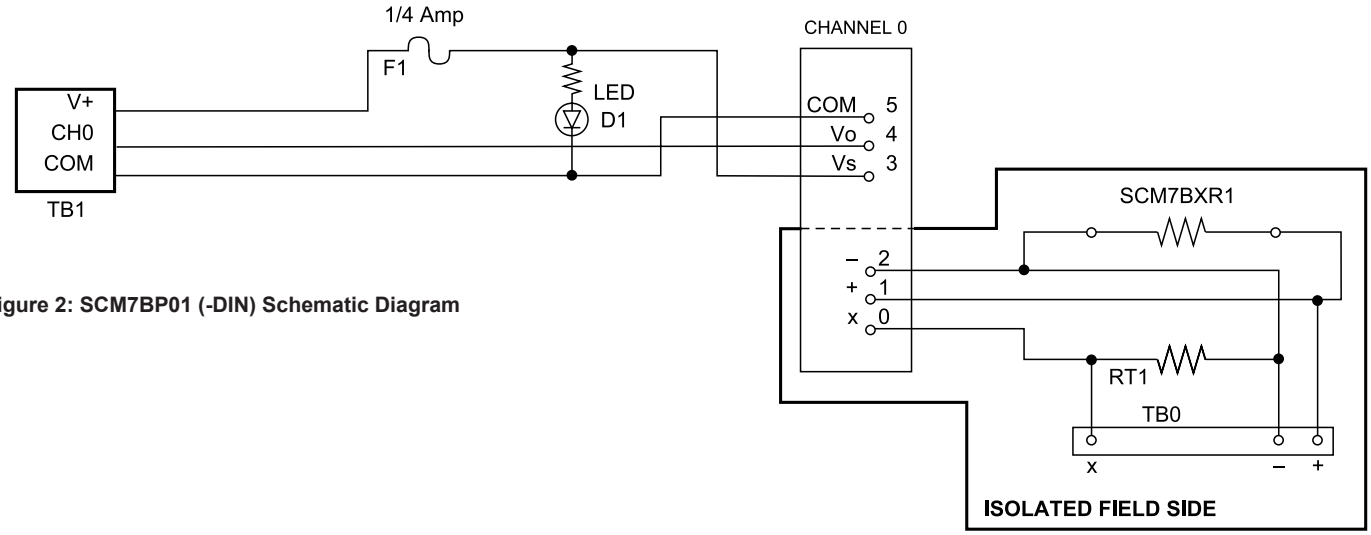


Figure 2: SCM7BP01 (-DIN) Schematic Diagram

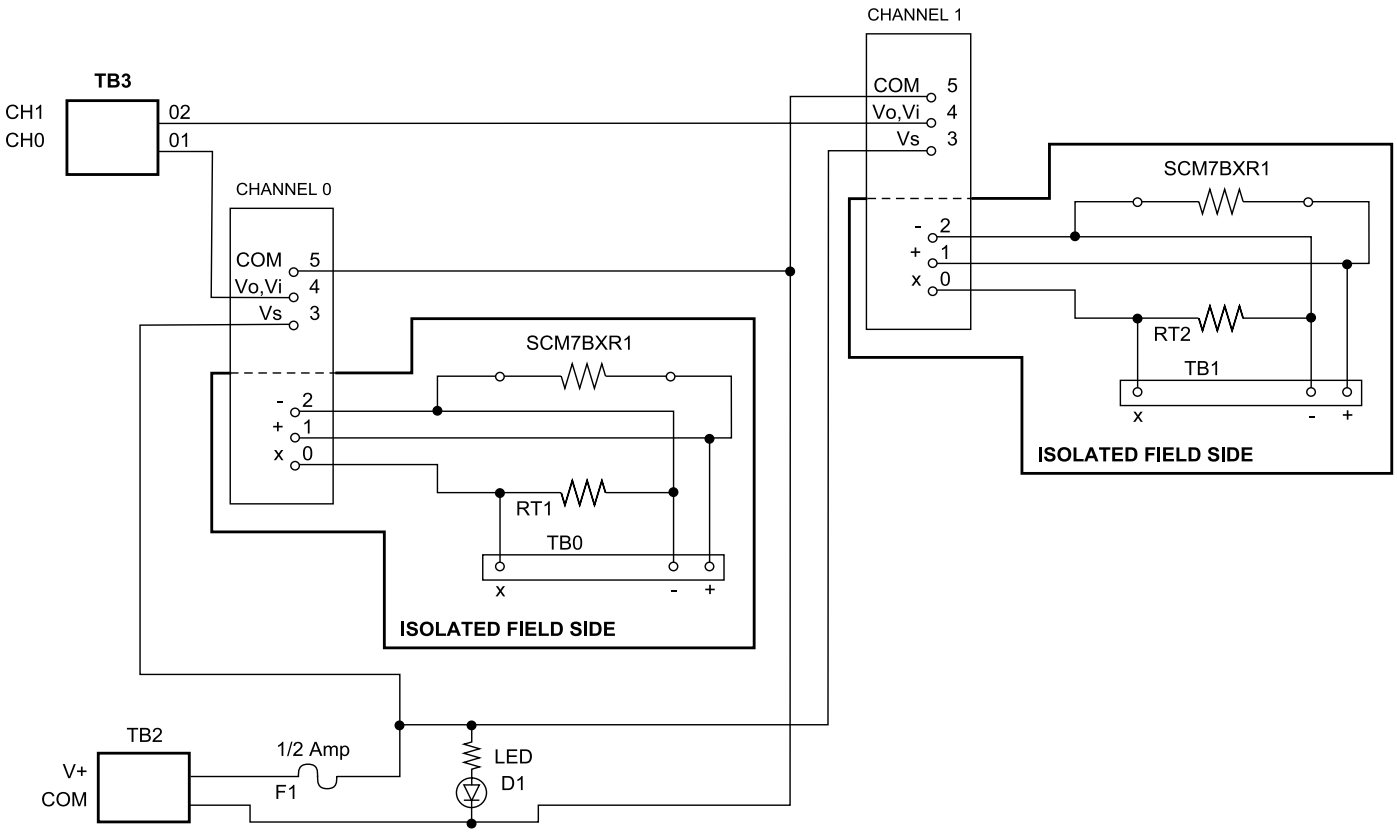


Figure 3: SCM7BP02 (-DIN) Schematic Diagram

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SCM7BP04(-DIN)/SCM7BP08(-DIN)/SCM7BP16(-DIN)

4-, 8-, and 16-channel Backpanels

DESCRIPTION

The SCM7BP04, SCM7BP08, and SCM7BP16 (see Figures 1-4) are 4, 8, & 16 channel backpanels that can accept any of the SCM7B analog modules. All three of these backpanels can either be rack mounted using Dataforth's 19-inch rack P/N SCMXRK-002 (using the provided 3mm screws), or directly mounted to a surface using #6 or smaller screws. The SCM7BP04-DIN, SCM7BP08-DIN, and SCM7BP16-DIN are identical to the SCM7BP04, SCM7BP08, and SCM7BP16, but with DIN-rail mounting clips attached instead of standoffs. These brackets allow the backpanels to be mounted on either EN 50022-35 x 7.5 (35 x 15) or EN 50035-G32 type DIN-rails.

System Side - Power

Using the "V+" power supply input, the power supply voltage can be as little as +14VDC. If +15VDC is available, it is recommended that the supply be connected between the "V+A" or "V+B" connections and "COM"; this will protect the modules against accidental supply reversal. Using both these connections with two power supplies enables redundant power supply operation. It is also recommended that a diode transient absorber be installed to reduce power supply transient events from degrading system performance. An "accessory" location, between the supply and common lines, is provided for this purpose. A system side grounding #10-32 stud is also provided for use if desired. All backpanels are fused according to channel count, allowing 1/4 Amp per channel.

System Side - Signal

Two system interface DB25 connectors are used, to enable using both input and output modules simultaneously, or to route the signal from an input module backplane to an output module backplane. These backpanels use either the SCM7BXCA01 (DB25-to-26-pin adapter cable) and SCMXCA004-XX (26-pin-to-26-pin interface cable), or the SCM7BXCA02 (DB25-to-DB25 interface cable), depending on system requirements.

Field Side - Signal

On the field-side, a temperature sensor is mounted underneath the field-side terminal block to provide cold junction compensation for Thermocouple-input modules. A current-to-voltage conversion resistor (P/N SCM7BXR1, supplied with SCM7B33 modules) socket is provided for each channel. Field connections are terminated with three screw terminals at each module site.

FEATURES

- 4-, 8-, 16-channel Backpanels
- Rack or DIN-rail Mounting Options
- All Backpanels Fused, Allowing 1/4 Amp per Channel
- Interface Cables
- Power Supplies

BENEFITS

- Easy Installation
- System Side Grounding Option Provided
- System Side – Power: Redundant Power Supply Operation Possible
- System Side – Signal: Two DB25 System Interface Connectors Available
- Field Side – Signal: Temp Sensor Provides CJC for Thermocouple Input Modules

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector Field System	 High-density Screw Clamp, 10-24 AWG 2 DB25 (male) Connectors with 4-40 Screw Locks
Isolation Input-to-Output Channel-to-Channel	 1500Vrms, Continuous (max) 1500Vrms, Continuous (max)

Ordering Information

Part Number	Description
SCM7BP04	4-channel Backpanel with Standoffs for Mounting.
SCM7BP04-DIN	4-channel Backpanel with Din-rail Mounting Clips. *(Shipped Fully Assembled).*
SCM7BP08	8-channel Backpanel with Standoffs for Mounting.
SCM7BP08-DIN	8-channel Backpanel with Din-rail Mounting Clips. *(Shipped Fully Assembled).*
SCM7BP16	16-channel Backpanel with Standoffs for Mounting.
SCM7BP16-DIN	16-channel Backpanel with Din-rail Mounting Clips. *(Shipped Fully Assembled).*

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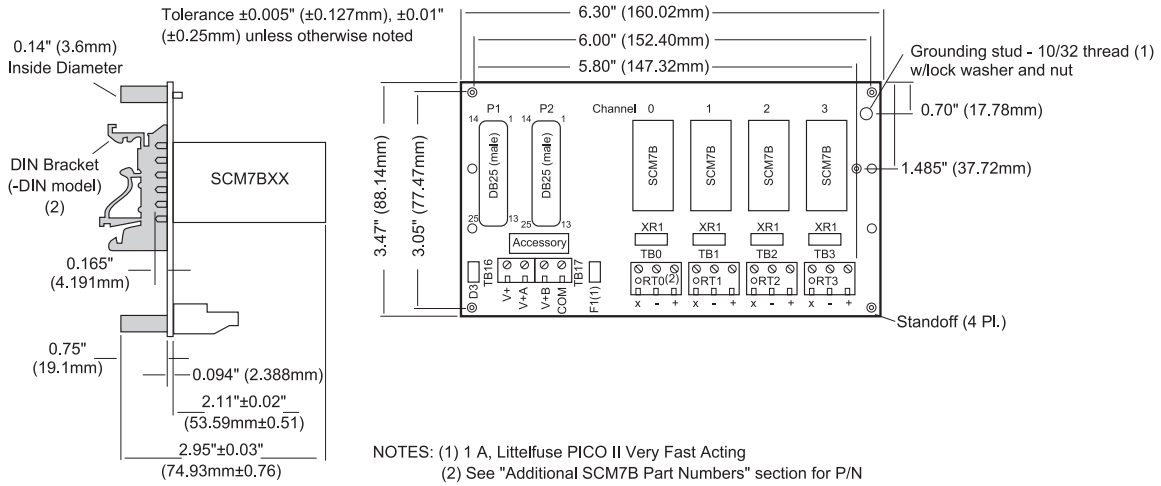


Figure 1: SCM7BP04(-DIN) Dimensions

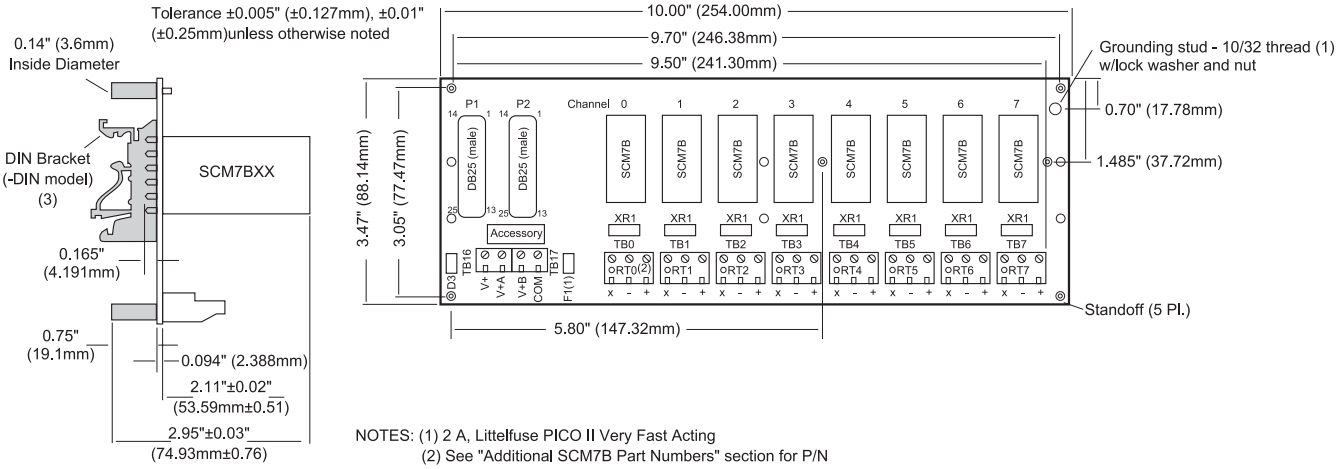


Figure 2: SCM7BP08(-DIN) Dimensions

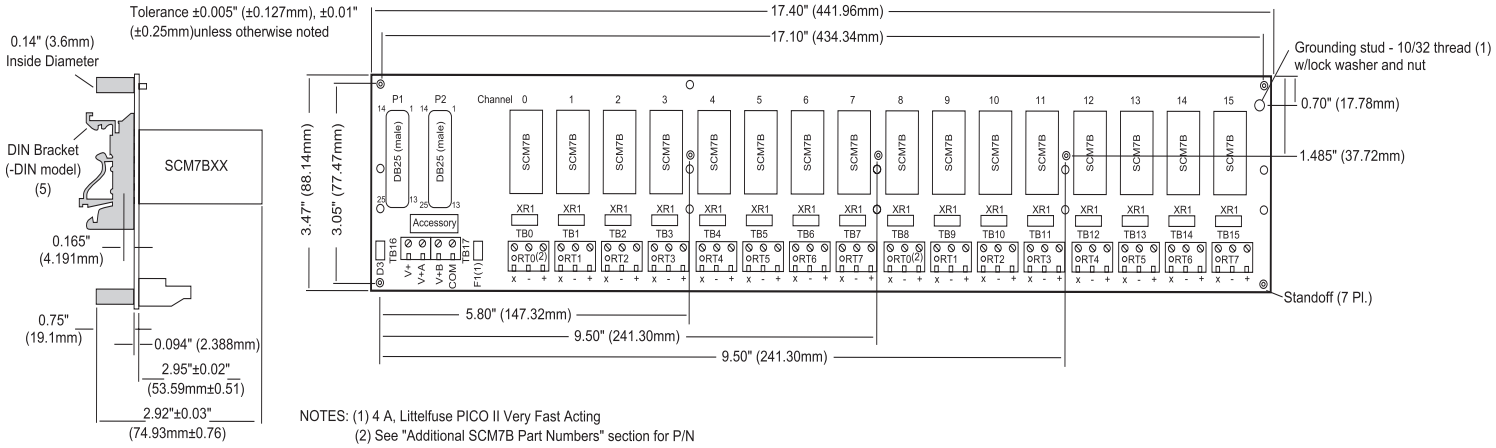


Figure 3: SCM7BP16(-DIN) Dimensions

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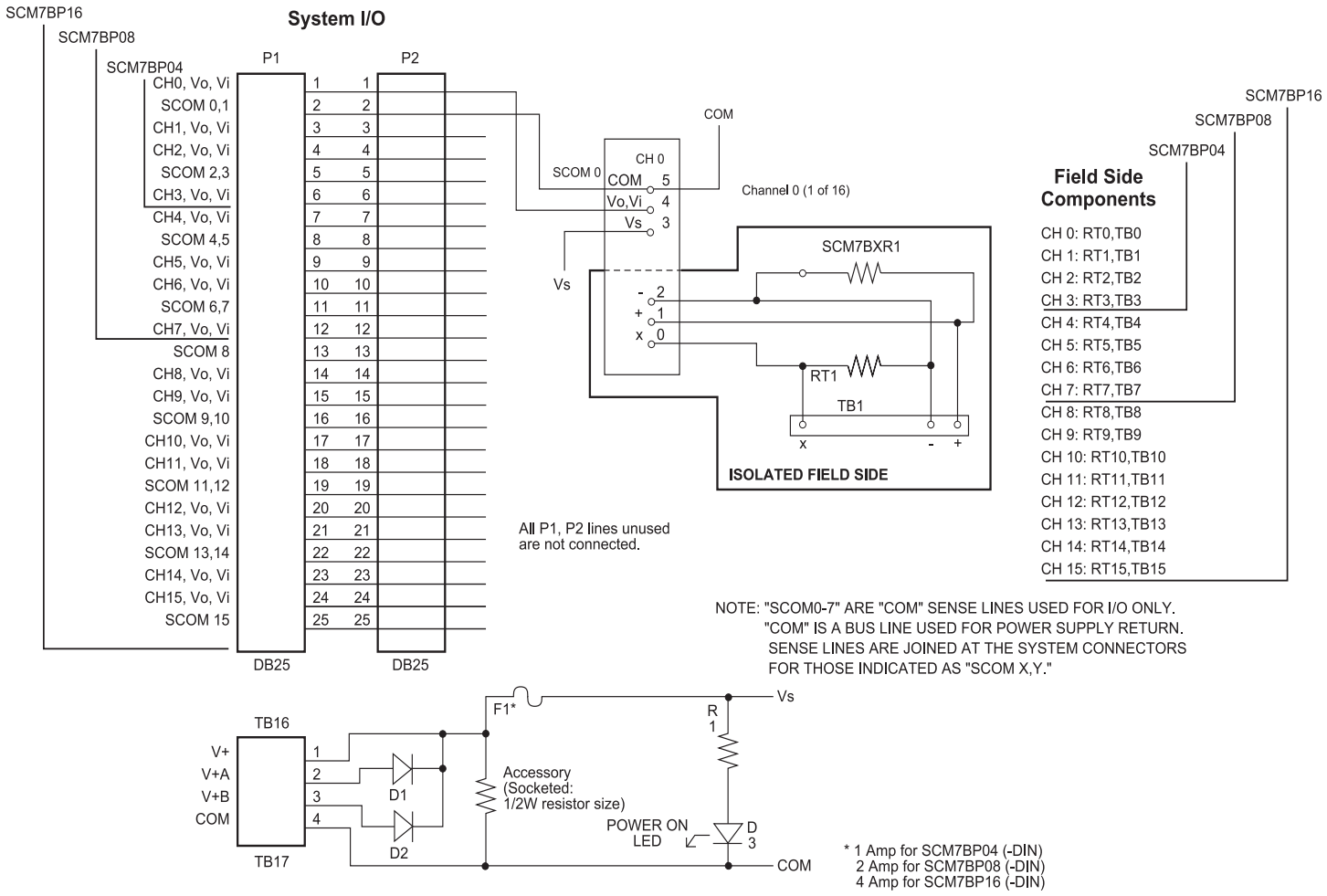


Figure 4: SCM7BP04/08/16(-DIN) Schematic Diagram

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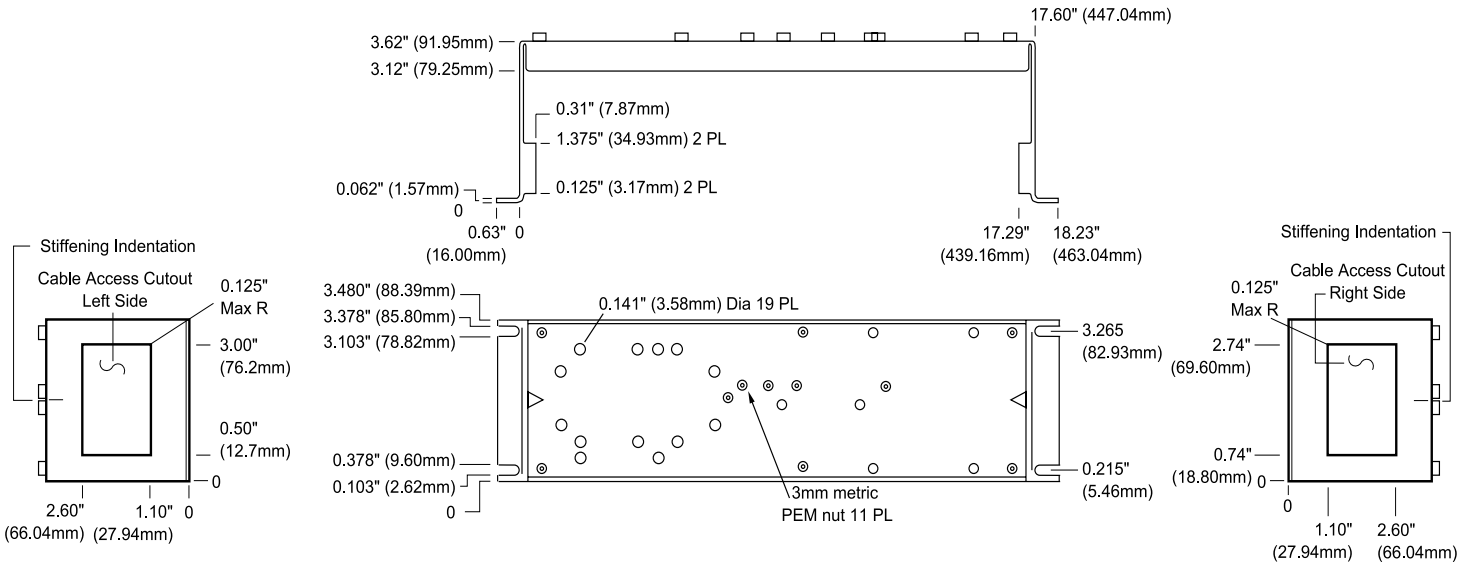
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SCMXRK-002

19-inch Metal Mounting Rack

DESCRIPTION

The SCMXRK-002 is a 19-inch metal rack for mounting the SCM7BP04/08/16, SCMPB01/02/05/06, SCMVAS-PB8/PB16, and isoLynx® SLX200-xx backpanels. It also provides capability to mount a system power supply and the universal interface board, P/N SCMXIF. (See Figure for dimensions).



SCMXRK-002 Analog Rack Dimensions

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SCMXCA006-01, -02, -07

Interface Cables

DESCRIPTION

SCMXCA006-XX

System interface cable for the SCM7BP04/08/16 backpanels. This is a DB25 Male/Female cable assembly. It can be ordered in lengths of 1m, 2m, and 7m.



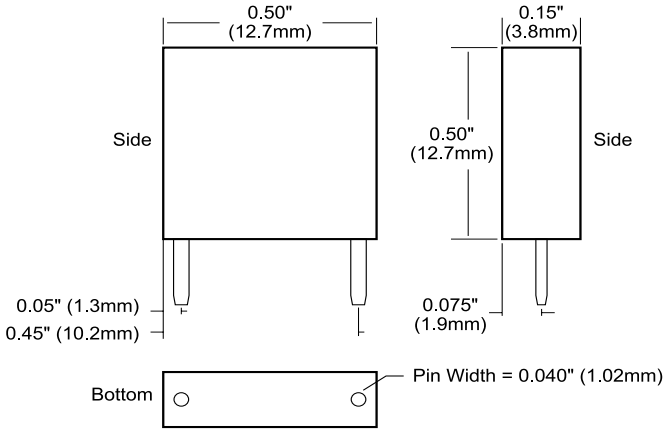
SCMXCA006-XX System Interface Cable

SCM7BXR1

Current-to-Voltage Conversion Resistor

DESCRIPTION

The SCM7BXR1 current-to-voltage conversion resistor (250Ω, 0.1%, 10ppm) is used with the SCM7B33 voltage input modules. Sockets are provided on all backpanels to allow installation of this resistor. Other values are available; consult the factory for ordering details and specifications.



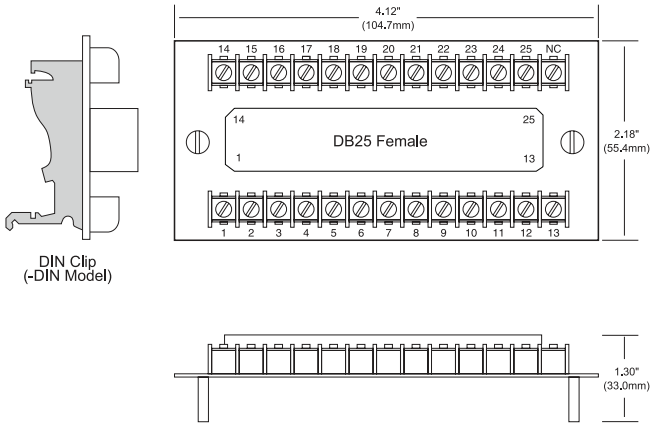
SCM7BXR1 Dimensions

8BXIF (-DIN)

Universal Interface Board

DESCRIPTION

The 8BXIF is a universal interface board which converts a DB25 cable input to 25 screw terminals for discrete wire. It can be mounted on the back of the SCMXRK-002 mounting rack (8BXIF) or on a DIN-rail (8BXIF-DIN). Required mounting hardware is included. Use SCMXCA006-XX cable (see Figure for dimensions).



8BXIF Universal Interface Board Dimensions

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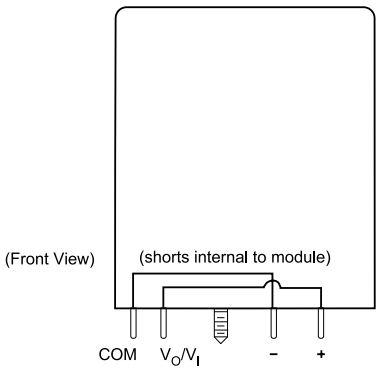
SCM7BPT

RoHS III COMPLIANT 2015/863 c SP® us

Non-isolated Pass Thru Module

DESCRIPTION

The SCM7BPT is a non-isolated signal pass-through module which shorts together the signal inputs-to-outputs.



SCM7BPT Module

SCM7B-PROTO

Breadboard Kit

DESCRIPTION

The SCM7B-PROTO breadboard kit was designed to allow users to incorporate their own module functions using an SCM7B format. The kit includes a pc board designed for breadboard circuits, a module case, header and mounting screw. Contact the factory for additional information.

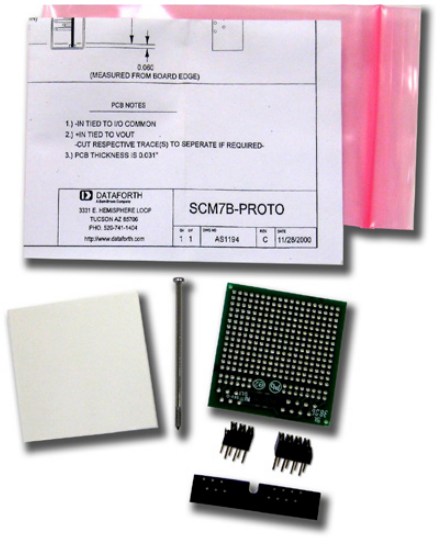


Figure 2: SCM7B-PROTO Breadboard Kit.

Additional Part Numbers of Interest

The following is a list of parts that are available for use with your SCM7B system, or for fabrication of your own backpanel, along with manufacturer's part number. Dataforth makes no claim as to availability and/or quality of parts purchased from vendors other than Dataforth.

Part Description	Part Number	Manufacturer
CJC Thermistor	100K6A1 DC95G104W	Betatherm Corp. Thermometrics
Diode Transient Absorber	SA series	General Semiconductor
Sockets for SCM7B pins	50865-5	Amp Incorporated
Module Retaining Screw Captive Nut, 4-40 Thread	KFS2-440	PEM Engineering
Grounding Stud, 0.625", 10-32 Thread	KFH 10-32-10	PEM Engineering
Axial Fuse	PICO II series	Littelfuse
2-position Termination Block	MKDS5/2-6,35	Phoenix Contact, Inc.
3-position Termination Block	MKDS5/3-6,35	Phoenix Contact, Inc.
DB25 (male) PCB Connector	745078-3	AMP Incorporated
DB25 (female) Ribbon Connector (for Custom Cables)	745078-5	AMP Incorporated
0.062" PCB Standoff	647A-5015-19	Concord
0.094" PCB Standoff	647A-5023-19	Concord

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DATAFORTH®

2024 Catalog
SensorLex® 8B Products

Isolated Miniature
Signal Conditioning Products

Instrument Class®

Industrial Electronics



Celebrating 40 YEARS

Instrument Class®
INNOVATION

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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.

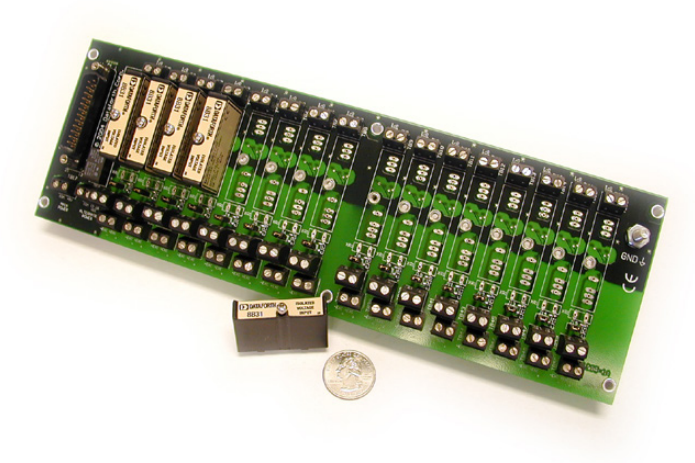
See Discontinued Devices at the End of the Document.

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8B

SensorLex® 8B Isolated Analog Signal Conditioners



8B Modules

Dataforth's SensorLex® 8B line of isolated analog signal conditioners includes 20 family groups with a total of 135 models that interface to a wide variety of voltage, current, temperature, position, frequency, and strain measuring devices. Housed in a package only one-fifth the size of competing products, the 8B modules offer fully functional *Instrument Class*® performance with superior specifications such as ±0.05% accuracy, ±0.02% linearity, 5-pole filtering, 1500Vrms isolation, low output noise and much more.

Custom Signal Conditioning

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

FEATURES

- ±0.05% Accuracy (typ)
- ±0.02% Linearity
- 1500Vrms Transformer Isolation and up to 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power (30mA typ)
- 5-Pole Low-pass Filtering
- Up to 120dB CMR
- 70dB NMR at 60Hz
- –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

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair
- Hot Swappable
- Calibration traceable to NIST standards
- Smallest Package Size Available
- Custom Modules Available

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments

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8B Selection Guide

‡THERMOCOUPLE ALLOY COMBINATIONS
STANDARDS: DIN IEC 584, ANSI MC96-1-82, JIS C 1602-1981

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

****RTD STANDARDS**

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

VOLTAGE INPUT MODULES, 3Hz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
8B30-01	±10mV	±5V
8B30-02	±50mV	±5V
8B30-03	±100mV	±5V
8B30-04	±10mV	0 to +5V
8B30-05	±50mV	0 to +5V
8B30-06	±100mV	0 to +5V
8B31-01	±1V	±5V
8B31-02	±5V	±5V
8B31-03	±10V	±5V
8B31-04	±1V	0 to +5V
8B31-05	±5V	0 to +5V
8B31-06	±10V	0 to +5V
8B31-07	±20V	±5V
8B31-08	±20V	0 to +5V
8B31-09	±40V	±5V
8B31-10	±40V	0 to +5V
8B31-12	±60V	±5V
8B31-1	±60V	0 to +5V

CURRENT INPUT MODULES, 3Hz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
8B32-01	4-20mA	0 to +5V
8B32-02	0-20mA	0 to +5V

ISOLATED TRUE RMS INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
8B33-01	0 to +100mV	0 to +5V
8B33-02	0 to +1V	0 to +5V
8B33-03	0 to +10V	0 to +5V
8B33-04	0 to +150V	0 to +5V
8B33-05	0 to +300V	0 to +5V
8B33-06	0 to +1A	0 to +5V

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

MODEL	TYPE	INPUT RANGE
8B34-01	100Ω Pt	–100°C to +100°C (–148°F to +212°F)
8B34-02	100Ω Pt	0°C to +100°C (+32°F to +212°F)
8B34-03	100Ω Pt	0°C to +200°C (+32°F to +392°F)
8B34-04	100Ω Pt	0°C to +600°C (+32°F to +1112°F)

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

MODEL	TYPE	INPUT RANGE
8B35-01	100Ω Pt	–100°C to +100°C (–148°F to +212°F)
8B35-02	100Ω Pt	0°C to +100°C (+32°F to +212°F)
8B35-03	100Ω Pt	0°C to +200°C (+32°F to +392°F)
8B35-04	100Ω Pt	0°C to +600°C (+32°F to +1112°F)

POTENTIOMETER-INPUT MODULES, 0 to +5V OUTPUT, 3Hz BW

MODEL	INPUT RANGE	OUTPUT RANGE
8B36-01	0 to 100Ω	0 to +5V
8B36-02	0 to 500Ω	0 to +5V
8B36-03	0 to 1kΩ	0 to +5V
8B36-04	0 to 10kΩ	0 to +5V

THERMOCOUPLE-INPUT MODULES, 0 to +5V OUTPUT, 3Hz BW

MODEL	TYPE	INPUT RANGE
8B37	J	–100°C to +760°C (–148°F to +1400°F)
8B37	K	–100°C to +1350°C (–148°F to +2462°F)
8B37	T	–100°C to +400°C (–148°F to +752°F)
8B37	R	0°C to +1750°C (+32°F to +3182°F)
8B37	S	0°C to +1750°C (+32°F to +3182°F)

STRAIN GAUGE INPUT MODULES

MODEL	INPUT RANGE	EXCITATION VOLTAGE	SENS	OUTPUT RANGE	BW
8B38-01	±10mV	+3.333V	3mV/V	±5V	8kHz
8B38-02	±30mV	+10.0V	3mV/V	±5V	8kHz
8B38-05	±20mV	+10.0V	2mV/V	±5V	8kHz
8B38-06	±10mV	+3.333V	3mV/V	0 to +5V	8kHz
8B38-07	±30mV	+10.0V	3mV/V	0 to +5V	8kHz
8B38-08	±20mV	+10.0V	2mV/V	0 to +5V	8kHz
8B38-31	±10mV	+3.333V	3mV/V	±5V	3Hz
8B38-32	±30mV	+10.0V	3mV/V	±5V	3Hz
8B38-35	±20mV	+10.0V	2mV/V	±5V	3Hz
8B38-36	±10mV	+3.333V	3mV/V	0 to +5V	3Hz
8B38-37	±30mV	+10.0V	3mV/V	0 to +5V	3Hz
8B38-38	±20mV	+10.0V	2mV/V	0 to +5V	3Hz

CURRENT OUTPUT MODULES, 100Hz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
8B39-01	0 to +5V	4-20mA
8B39-02	±5V	4-20mA
8B39-03	0 to +5V	0-20mA
8B39-04	±5V	0-20mA
8B39-07	±5V	±20mA

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8B Selection Guide (Continued)

VOLTAGE INPUT MODULES, 1kHz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
8B40-01	±10mV	±5V
8B40-02	±50mV	±5V
8B40-03	±100mV	±5V
8B40-04	±10mV	0 to +5V
8B40-05	±50mV	0 to +5V
8B40-06	±100mV	0 to +5V
8B41-01	±1V	±5V
8B41-02	±5V	±5V
8B41-03	±10V	±5V
8B41-04	±1V	0 to +5V
8B41-05	±5V	0 to +5V
8B41-06	±10V	0 to +5V
8B41-07	±20V	±5V
8B41-08	±20V	0 to +5V
8B41-09	±40V	±5V
8B41-10	±40V	0 to +5V
8B41-12	±60V	±5V
8B41-13	±60V	0 to +5V

2-WIRE TRANSMITTER INTERFACE MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
8B42-01	4-20mA	0 to +5V
8B42-02	4-20mA	+1 to +5V

DC LVDT INPUT MODULES, 1kHz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
8B43-01	±1V	±5V
8B43-02	±2V	±5V
8B43-03	±3V	±5V
8B43-04	±4V	±5V
8B43-05	±5V	±5V
8B43-11	±1V	0 to +5V
8B43-12	±2V	0 to +5V
8B43-13	±3V	0 to +5V
8B43-14	±4V	0 to +5V
8B43-15	±5V	0 to +5V

FREQUENCY INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
8B45-01	0 to 500Hz	0 to +5V
8B45-02	0 to 1kHz	0 to +5V
8B45-03	0 to 2.5kHz	0 to +5V
8B45-04	0 to 5kHz	0 to +5V
8B45-05	0 to 10kHz	0 to +5V
8B45-06	0 to 25kHz	0 to +5V
8B45-07	0 to 50kHz	0 to +5V
8B45-08	0 to 100kHz	0 to +5V

LINEARIZED THERMOCOUPLE-INPUT MODULES, 0 to +5V OUTPUT, 3Hz BW

MODEL	TYPE	INPUT RANGE
8B47J-01	J	0°C to +760°C (+32°F to +1400°F)
8B47J-02	J	–100°C to +300°C (–148°F to +572°F)
8B47J-03	J	0°C to +500°C (+32°F to +932°F)
8B47J-12	J	–100°C to +760°C (–148°F to +1400°F)
8B47K-04	K	0°C to +1000°C (+32°F to +1832°F)
8B47K-05	K	0°C to +500°C (+32°F to +932°F)
8B47K-13	K	–100°C to +1350°C (–148°F to +2462°F)
8B47K-14	K	0°C to +1200°C (+32°F to +2192°F)
8B47T-06	T	–100°C to +400°C (–148°F to +752°F)
8B47T-07	T	0°C to +200°C (+32°F to +392°F)

VOLTAGE OUTPUT MODULES, 100Hz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
8B49-01	0 to +5V	±5V
8B49-02	±5V	±5V
8B49-03	±5V	0 to +5V
8B49-04	0 to +10V	±10V
8B49-05	±10V	±10V
8B49-06	±10V	0 to +10V
8B49-07	±5V	±10V

VOLTAGE INPUT MODULES, 20kHz BANDWIDTH

MODEL	INPUT RANGE	OUTPUT RANGE
8B50-01	±20mV	±5V
8B50-02	±50mV	±5V
8B50-03	±100mV	±5V
8B50-04	±20mV	0 to +5V
8B50-05	±50mV	0 to +5V
8B50-06	±100mV	0 to +5V
8B51-01	±1V	±5V
8B51-02	±5V	±5V
8B51-03	±10V	±5V
8B51-04	±1V	0 to +5V
8B51-05	±5V	0 to +5V
8B51-06	±10V	0 to +5V
8B51-07	±20V	±5V
8B51-08	±20V	0 to +5V
8B51-09	±40V	±5V
8B51-10	±40V	0 to +5V
8B51-12	±60V	±5V
8B51-13	±60V	0 to +5V

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8B Selection Guide (Continued)

ACCESSORIES

MODEL	DESCRIPTION
8BP01	Single Channel DIN-rail Mount Carrier
8BP02	Standard 2-channel Backpanel
8BP02-1	8BP02 without Cold Junction Compensation Sensor
8BP02-2	8BP02 with DIN-rail Mounting Option
8BP02-3	8BP02-1 with DIN-rail Mounting Option
8BP04	Standard 4-channel Backpanel
8BP04-1	8BP04 without Cold Junction Compensation Sensor
8BP04-2	8BP04 with DIN-rail Mounting Option
8BP04-3	8BP04-1 with DIN-rail Mounting Option
8BP08	Standard 8-channel Backpanel
8BP08-1	8BP08 without Cold Junction Compensation Sensor
8BP08-2	8BP08 with DIN-rail Mounting Option
8BP08-3	8BP08-1 with DIN-rail Mounting Option
8BP16	Standard 16-channel Backpanel
8BP16-1	8BP16 without Cold Junction Compensation Sensor
8BP16-2	8BP16 with DIN-rail Mounting Option
8BP16-3	8BP16-1 with DIN-rail Mounting Option
8BPWR-2	Power Supply Module
SCMXPRT-001	Power Supply, 1A, 5VDC, 120VAC
SCMXPRE-001	Power Supply, 1A, 5VDC, 220VAC
SCMXPRT-003	Power Supply, 3A, 5VDC, 120VAC
SCMXPRE-003	Power Supply, 3A, 5VDC, 220VAC
PWR-4505	Power Supply, 5A, 5VDC, 85-264VAC
SCMXCA006-xx	System Interface Cable for Backpanels
8BXIF	DB25 to Screw Terminal Interface Board
8BXCJC	Cold Junction Compensation Sensor
8BPT	Non-isolated Signal Pass thru Module
8B-PROTO	Breadboard Kit
SCMXRK-002	19-inch Metal Rack for Mounting Backpanels
SCMXRAIL1-XX	DIN EN50022-35x7.5 (slotted steel), Length -XX in Meters
SCMXRAIL2-XX	DIN EN50035-G32 (slotted steel), Length -XX in Meters
SCMXRAIL3-XX	DIN EN50022-35x15 (slotted steel), Length -XX in Meters

‡THERMOCOUPLE ALLOY COMBINATIONS

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

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

****RTD STANDARDS**

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

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B30/31

Voltage-input Modules, Narrow Bandwidth

DESCRIPTION

The 8B30/31 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B30 or 8B31 module isolates, filters, and amplifies a voltage input signal and provides an analog voltage output (Figure below).

Signal filtering is accomplished with a 5-pole filter optimized for time and frequency response which provides 70dB of normal-mode rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other four are on the system side.

A special input circuit on the 8B30 and 8B31 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

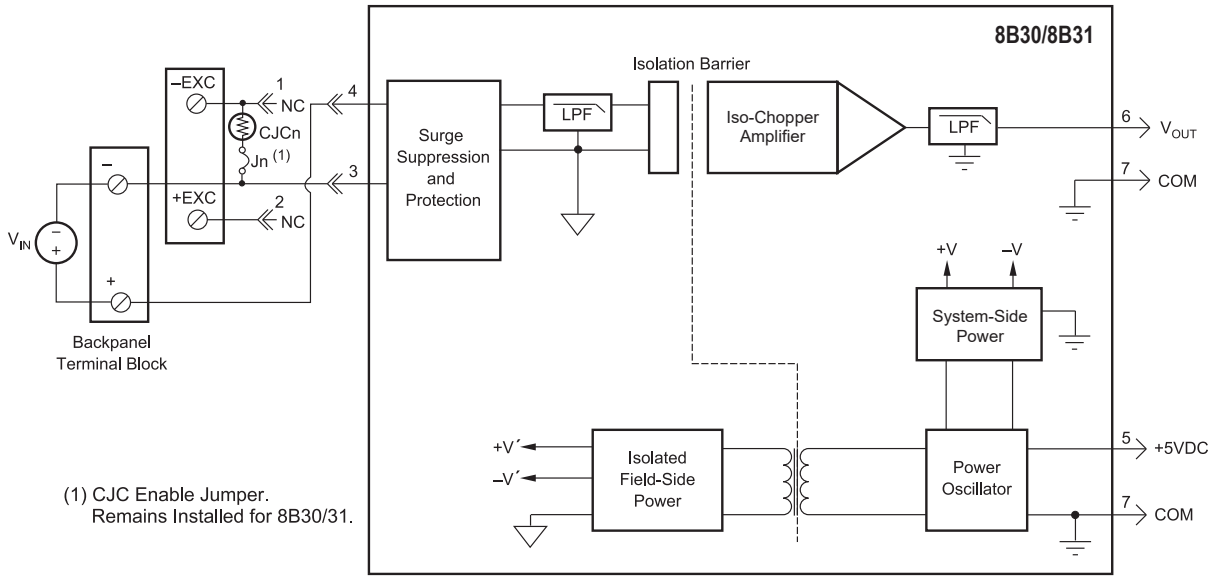
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B30/31.

8B30/31 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B30	8B31
Input Range	±10mV to ±100mV	±1V to ±60V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (min)
Power Off	100kΩ	500kΩ (min)
Overload	100kΩ	500kΩ (min)
Input Protection		
Continuous(1)	240VAC	240VAC
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output	1500Vrms (max)	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	120dB	120dB
NMR	70dB at 60Hz	70dB at 60Hz
Accuracy(2)	±0.05% Span	±0.05% Span
Linearity	±0.02% Span	±0.02% Span
Stability		
Offset	±10ppm/°C	±10ppm/°C
Gain	±50ppm/°C	±75ppm/°C
Noise		
Output, 100kHz	250µVrms	250µVrms
Bandwidth, –3dB	3Hz	3Hz
Response Time, 90% Span	160ms	160ms
Output Range	See Ordering Information	See Ordering Information
Output Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	25mA	25mA
Power Supply Sensitivity	±75ppm/%	±75ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental		
Operating Temp. Range	–40°C to +85°C	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD,EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
2) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B30-01	–10mV to +10mV	–5V to +5V
8B30-02	–50mV to +50mV	–5V to +5V
8B30-03	–100mV to +100mV	–5V to +5V
8B30-04	–10mV to +10mV	0V to +5V
8B30-05	–50mV to +50mV	0V to +5V
8B30-06	–100mV to +100mV	0V to +5V
8B31-01	–1V to +1V	–5V to +5V
8B31-02	–5V to +5V	–5V to +5V
8B31-03	–10V to +10V	–5V to +5V
8B31-04	–1V to +1V	0V to +5V
8B31-05	–5V to +5V	0V to +5V
8B31-06	–10V to +10V	0V to +5V
8B31-07	–20V to +20V	–5V to +5V
8B31-08	–20V to +20V	0V to +5V
8B31-09	–40V to +40V	–5V to +5V
8B31-10	–40V to +40V	0V to +5V
8B31-12	–60V to +60V	–5V to +5V
8B31-13	–60V to +60V	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B32

Current Input Modules

DESCRIPTION

The 8B32 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B32 module isolates, filters, and amplifies a process current input signal and provides an analog voltage output (Figure below).

Current-to-voltage conversion is accomplished internal to the module to ensure high accuracy.

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 70dB of normal-mode rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the 8B32 module provides protection against accidental connection of power-line voltages up to 40VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

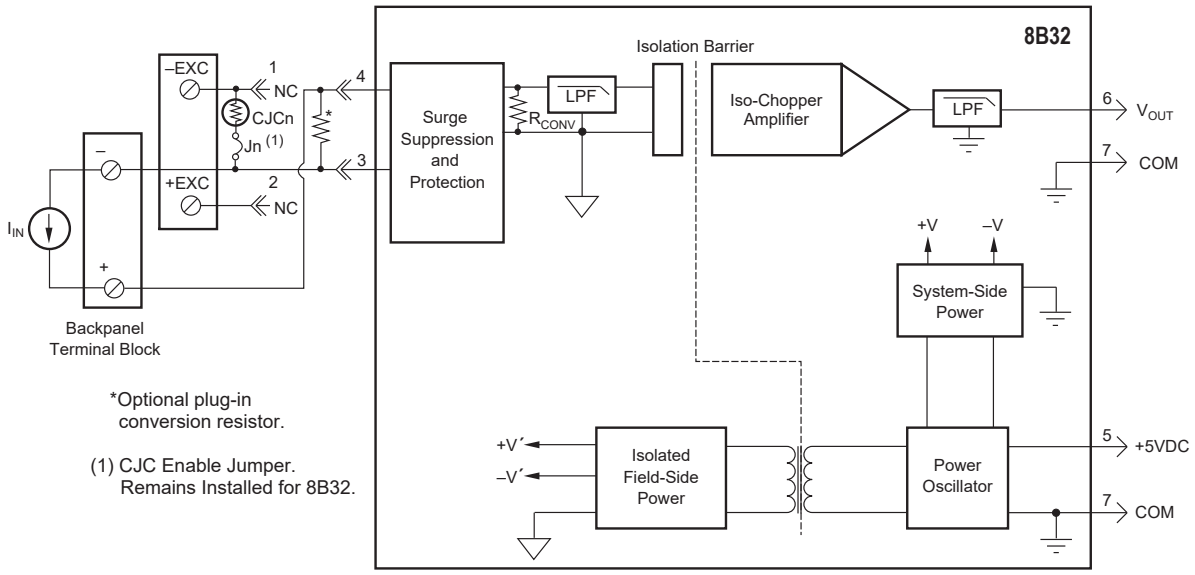
- Accepts Milliamp Level Signals
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 40VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



*Optional plug-in conversion resistor.

(1) CJC Enable Jumper. Remains Installed for 8B32.

8B32 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B32
Input Range	0-20mA or 4-20mA
Input Resistance	
Normal	<50Ω
Power Off	<50Ω
Input Protection	
Continuous	40VAC
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	120dB
NMR	70dB at 60Hz
Accuracy(1)	±0.05% Span
Linearity	±0.02% Span
Stability	
Offset	±25ppm/°C
Gain	±50ppm/°C
Noise	
Output, 100kHz	250µVrms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	150ms
Output Range	0V to +5V
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±75ppm/%
Mechanical Dimensions	1.11" x 1.65" x 0.40"
(h)x(w)x(d)	(28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B32-01	4-20mA	0V to +5V
8B32-02	0-20mA	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B33

Isolated True RMS Input Modules

DESCRIPTION

Each 8B33 True RMS input module provides a single channel of AC input which is converted to its True RMS DC value, filtered, isolated, amplified, and converted to a standard process voltage output (Figure below).

The field voltage or current input signal is processed through a pre-amplifier and RMS converter on the field side of the isolation barrier. The converted DC signal is then chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The computer-side circuitry reconstructs, filters, and converts the signal to an industry-standard output of 0 to 5VDC.

Special input circuits provide protection against accidental connection of power-line voltages up to 350VAC and against transient events defined by ANSI/IEEE C37.90.1.

FEATURES

- Interfaces to RMS Voltage (0-300V) or RMS Current (0-1A)
- Designed for Standard Operation with Frequencies of 45Hz to 1000Hz (Extended Range to 10kHz)
- Compatible with Standard Current and Potential Transformers
- 0 to 5VDC Industry-standard Output
- ±0.25% Factory-calibrated Accuracy
- 1500Vrms Transformer Isolation
- Input Overload Protected to 350Vrms (max) (Peak AC and DC) or 2Arms Continuous
- 120dB CMR
- ANSI/IEEE C37.90.1 Transient Protection
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

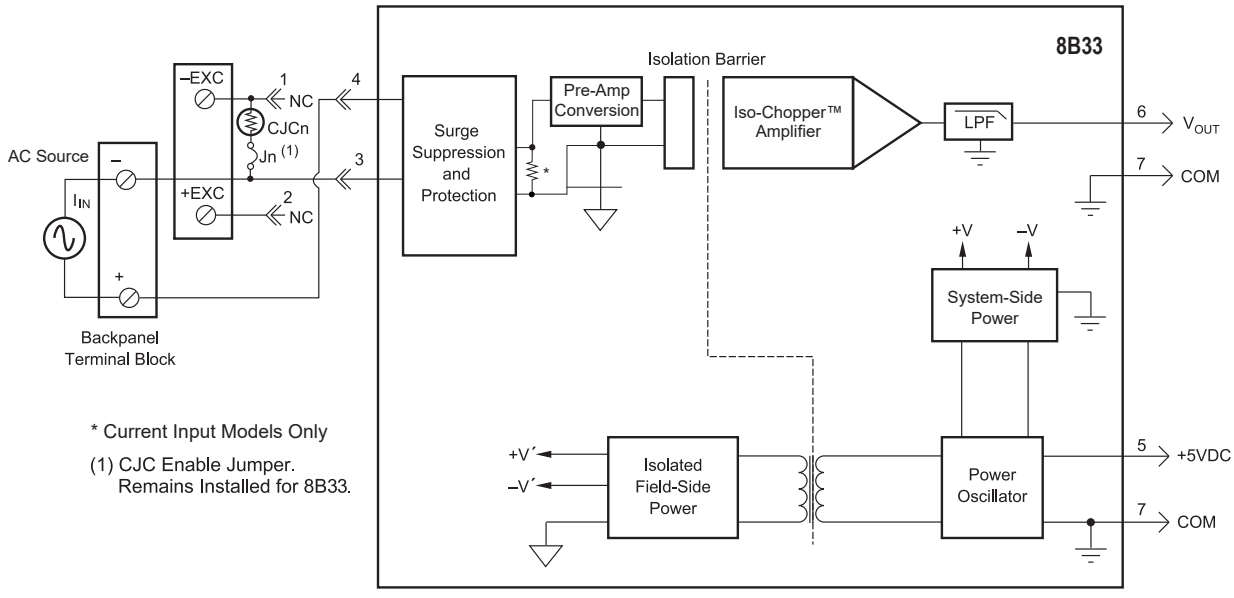
BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments

WARNING: The SensorLex 8B33 interfaces to hazardous voltages and should only be wired by qualified personnel or licensed electricians.



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8B33 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B33
Input	
Signal Range	100mV to 300Vrms, 0 to 1Arms
Standard Frequency Range	45Hz to 1000Hz
Extended Frequency Range	1kHz to 10kHz
Impedance	499KΩ (–01, –02) 1MΩ (–03, –04, –05) 0.05Ω (–06)
Coupling	AC
Protection (1)	
Continuous (–01 thru –05)	350Vrms
Continuous (–06)	2Arms
Transient (–01 thru –05)	ANSI/IEEE C37.90.1
Transient (–06)	See Note 2
Output	
Signal Range	0V to 5V
Voltage Limit	±9V
Protection	Continuous Short-to-Ground
Ripple and Noise	0.0375% Span rms
Accuracy (5-100% Span)(3) (4)	
Sinusoid	
50/60Hz	±0.25% Span
45Hz to 1kHz	±0.625% Span
1kHz to 10kHz	±1.375% Span, ±3.25% Span(-06)
Non-Sinusoid	
Crest Factor = 1	±0.25% Span
Crest Factor = 2	±0.325% Span
Crest Factor = 3	±0.475% Span
Crest Factor = 4	±0.7% Span
Vs. Temperature	±100ppm/°C
Isolation (Common Mode)	
Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50Hz to 60Hz)	120dB
Response Time, 90% Span	<120ms
Supply Voltage	+5VDC ±5%
Current	30mA
Sensitivity	±200ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 90% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT, Surge, Voltage Dips	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 8B33 and 8BP01, 8BP02, 8BP04, 8BP08, 8BP16, XEV rating only. Backpanels obtained from other sources may have lower ratings.
(2) For 1 to 25 seconds the max allowable transient current rating is $\sqrt{2500/(\text{event time})}$. For less than 1 second, ANSI/IEEE C37.90.1 applies with a 0.05 Ω load. For greater than 25 seconds, the 2Arms continuous rating applies.
(3) At standard 60Hz factory calibration. Consult factory for calibration at other frequencies.
(4) For 0-5% Span measurements add 1% accuracy error (-02, -03, -04, -05) or 1.5% accuracy error (-01, -06). Accuracy error includes linearity, hysteresis, and repeatability but not source or external shunt inaccuracy (if used).

Ordering Information

Model	Input Range	Output Range
8B33-01	0mV to 100mV	0V to +5V
8B33-02	0V to 1V	0V to +5V
8B33-03	0V to 10V	0V to +5V
8B33-04	0V to 150V	0V to +5V
8B33-05	0V to 300V	0V to +5V
8B33-06	0A to 1A	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B34

Linearized 2- or 3-wire RTD-input Modules

DESCRIPTION

The 8B32 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B34 input module isolates, filters, amplifies, and linearizes a single channel of temperature input from an RTD and provides an analog voltage output (Figure below).

RTD excitation is provided from the module using two matched current sources. When using a 3-wire connection, this method allows equal currents to flow through the sensor leads, canceling the effects of lead resistances. The excitation currents are small (0.25mA) which minimizes self-heating of the RTD.

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 70dB of normal-mode rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the 8B34 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

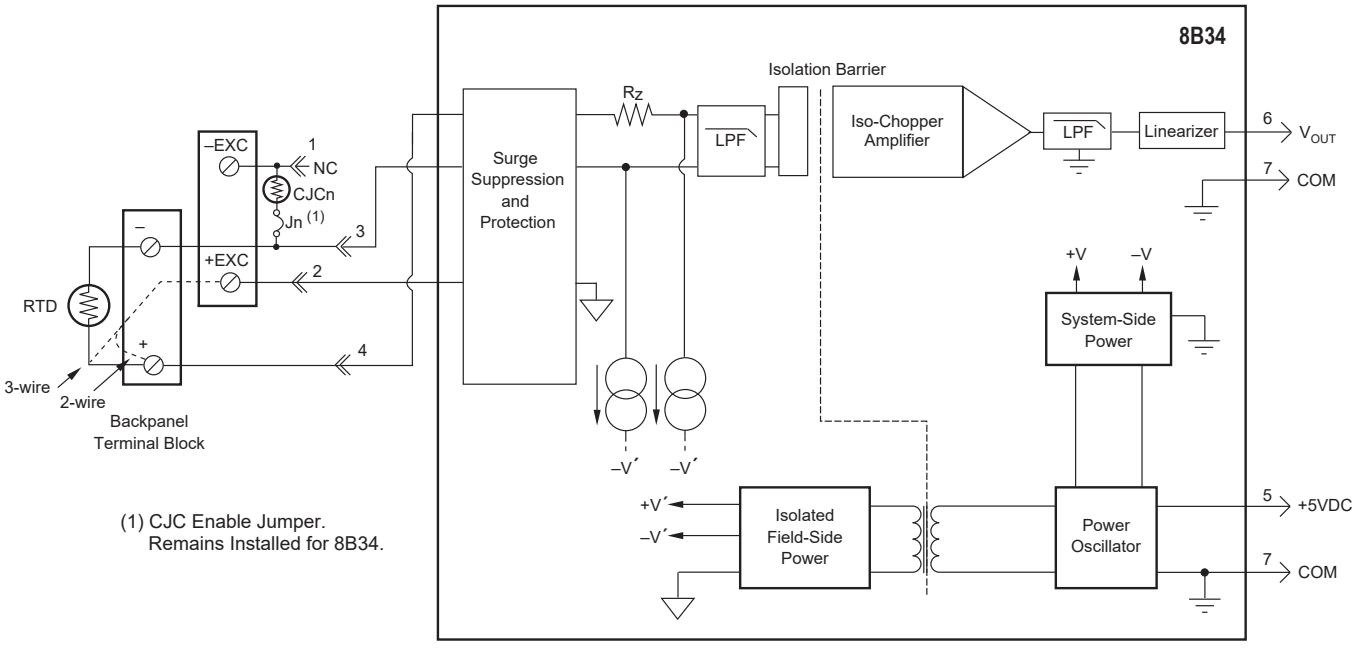
- Interfaces to 100Ω Platinum RTDs
- Linearizes RTD Signal
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B34.

8B34 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B34
Input Range Limits	–200°C to +850°C (100Ω Pt)
Input Resistance	
Normal	50MΩ
Power Off	200kΩ
Overload	200kΩ
Input Protection	
Continuous(1)	240VAC
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	0.25mA
Lead Resistance Effect	±0.02°C/Ω(2)
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	120dB
NMR	70dB at 60Hz
Accuracy	See Ordering Information
Stability	
Offset	±20ppm/°C
Gain	±50ppm/°C
Noise	
Output, 100kHz	200µVrms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	150ms
Output Range	See Ordering Information
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Open Input Response	Downscale
Open Input Detection Time	1s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	25mA
Power Supply Sensitivity	±75ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) "Ω" refers to the resistance in one lead.
(3) Includes conformity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range	Accuracy(3)
100Ω Pt **			
8B34-01	–100°C to +100°C (–148°F to +212°F)	0V to +5V	±0.20°C
8B34-02	0°C to +100°C (+32°F to +212°F)	0V to +5V	±0.10°C
8B34-03	0°C to +200°C (+32°F to +392°F)	0V to +5V	±0.20°C
8B34-04	0°C to +600°C (+32°F to +1112°F)	0V to +5V	±0.45°C

**RTD Standards

Type	Alpha Coefficient	DIN	JIS	IEC
100Ω Pt	0.00385	DIN 43760	JIS C 1604-1989	IEC 751

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B35

Linearized 4-wire RTD-input Modules

DESCRIPTION

The 8B35 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B35 input module isolates, filters, amplifies, and linearizes a single channel of temperature input from an RTD and provides an analog voltage output (Figure below).

RTD excitation is provided from the module using a precision current source. Excitation current does not flow in the input signal leads, which allows RTD measurements to be made independently of lead resistance. The excitation currents are small (0.25mA) which minimizes self-heating of the RTD.

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 70dB of normal-mode rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the 8B35 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

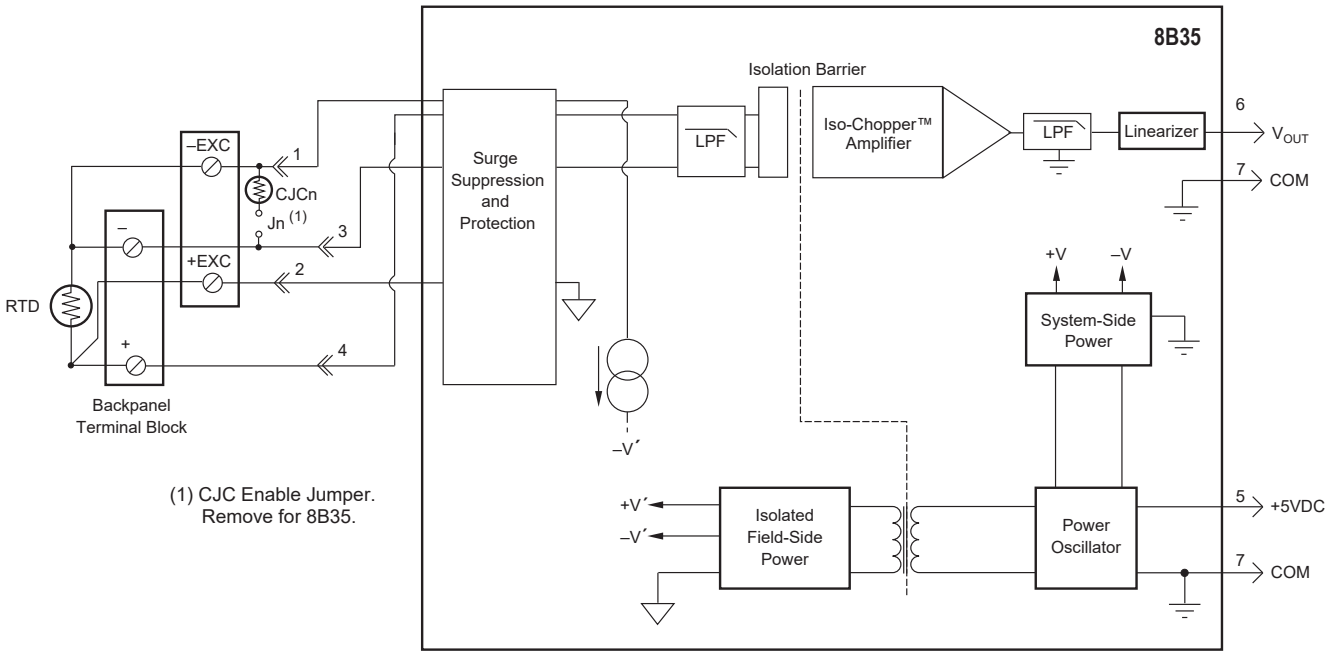
- Interfaces to 100Ω Platinum RTDs
- True 4-wire Input
- Linearizes RTD Signal
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remove for 8B35.

8B35 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B35
Input Range Limits	–200°C to +850°C (100Ω Pt)
Input Resistance	
Normal	50MΩ
Power Off	200kΩ
Overload	200kΩ
Input Protection	
Continuous(1)	240VAC
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	0.25mA
Lead Resistance Effect	±0.005°C/Ω(2)
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	120dB
NMR	70dB at 60Hz
Accuracy	See Ordering Information
Stability	
Offset	±20ppm/°C
Gain	±50ppm/°C
Noise	
Output, 100kHz	200µVrms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	150ms
Output Range	See Ordering Information
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Open Input Response	
+EXC, –EXC Lead	Downscale, 1s
–IN Lead	Downscale, 40s
+IN Lead	Upscale, 40s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	25mA
Power Supply Sensitivity	±75ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) "Ω" refers to the resistance in one lead.
(3) Includes conformity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range	Accuracy(3)
100Ω Pt **			
8B35-01	–100°C to +100°C (–148°F to +212°F)	0V to +5V	±0.20°C
8B35-02	0°C to +100°C (+32°F to +212°F)	0V to +5V	±0.10°C
8B35-03	0°C to +200°C (+32°F to +392°F)	0V to +5V	±0.20°C
8B35-04	0°C to +600°C (+32°F to +1112°F)	0V to +5V	±0.45°C

**RTD Standards

Type	Alpha Coefficient	DIN	JIS	IEC
100Ω Pt	0.00385	DIN 43760	JIS C 1604-1989	IEC 751

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B36

Potentiometer-input Modules

DESCRIPTION

The 8B36 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B36 input module isolates, filters, and amplifies a single channel of Potentiometer-input and provides an analog voltage output (Figure below).

Excitation for the potentiometer is provided by using two matched current sources. When using a 3-wire connection, this method allows equal currents to flow through the sensor leads, canceling the effects of lead resistances. The excitation currents are small (equal to or less than 0.25mA) which minimizes self-heating of the potentiometer.

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 70dB of normal-mode rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the 8B36 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

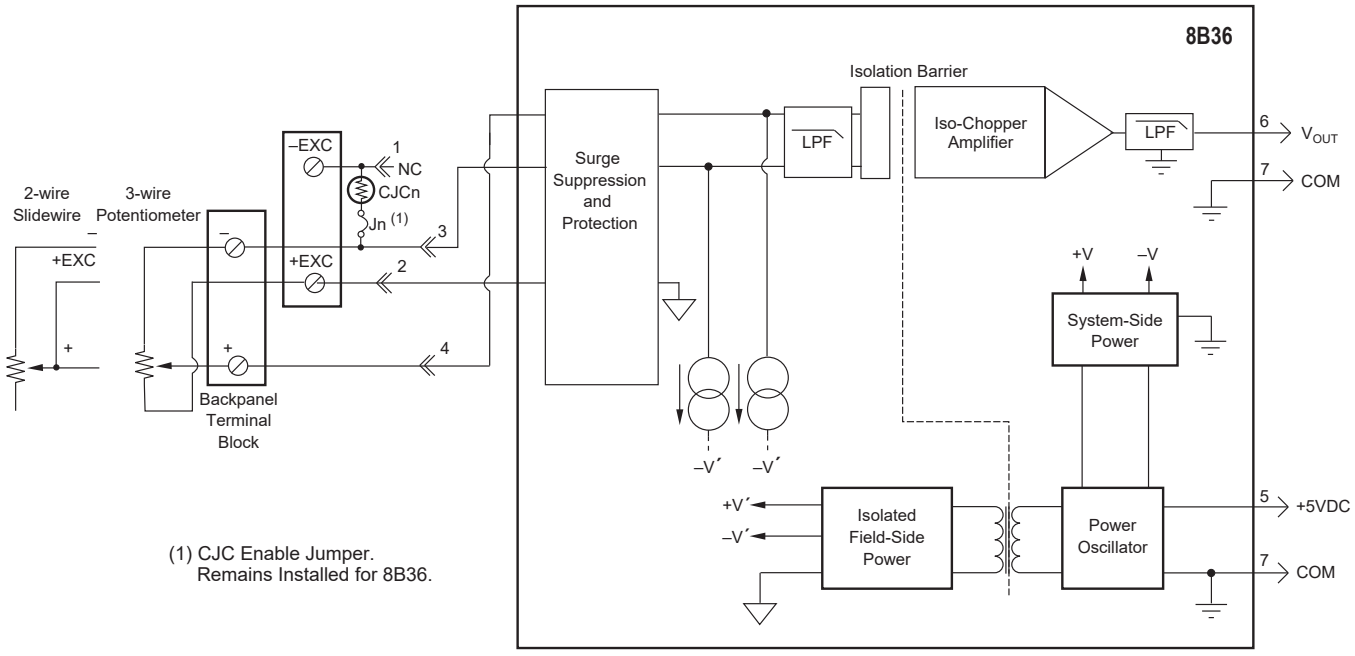
- Interfaces to Potentiometers up to 10,000Ω
- High-level Voltage Output
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B36.

8B36 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B36
Input Range	0 to 10kΩ
Input Resistance	
Normal	50MΩ
Power Off	200kΩ
Overload	200kΩ
Input Protection	
Continuous(1)	240VAC
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	0.25mA; 100Ω, 500Ω, 1kΩ Sensor 0.10mA; 10kΩ Sensor
Lead Resistance Effect	±0.01Ω/Ω; 100Ω, 500Ω, 1kΩ Sensor ±0.02Ω/Ω; 10kΩ Sensor
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	120dB
NMR	70dB at 60Hz
Accuracy(2)	±0.05% Span
Linearity	±0.02% Span
Stability	
Offset	±20ppm/°C
Gain	±50ppm/°C
Noise	
Output, 100kHz	200µVrms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	150ms
Output Range	0V to +5V
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Open Input Response	Downscale
Open Input Detection Time	1s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	25mA
Power Supply Sensitivity	±75ppm/%
Mechanical Dimensions	1.11" x 1.65" x 0.40"
(h)x(w)x(d)	(28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B36-01	0 to 100Ω	0V to +5V
8B36-02	0 to 500Ω	0V to +5V
8B36-03	0 to 1kΩ	0V to +5V
8B36-04	0 to 10kΩ	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B37

Non-linearized Thermocouple-input Modules

DESCRIPTION

The 8B37 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B37 nonlinearized module isolates, filters, and amplifies a single channel of temperature input from a Thermocouple-input signal and provides an analog voltage output (Figure below).

The 8B37 can interface to industry-standard thermocouple types J, K, T, R, and S and has an output signal of 0 to +5V. Each module is cold junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the mounting backpanel. Upscale open thermocouple detect is provided by an internal pull-up resistor.

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 70dB of normal-mode rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the 8B37 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

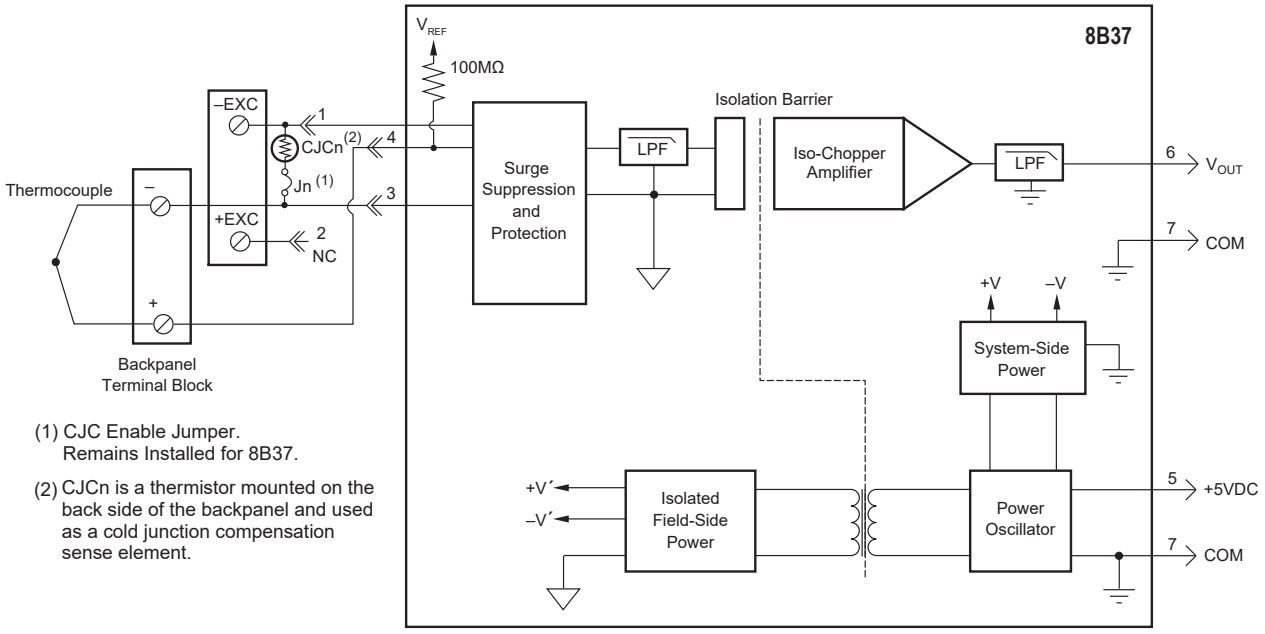
- Interfaces to Types J, K, T, R, and S Thermocouples
- High-level Voltage Output
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- Accurate CJC –40°C to +85°C
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B37.

(2) CJCn is a thermistor mounted on the back side of the backpanel and used as a cold junction compensation sense element.

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8B37 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B37
Input Range	See Ordering Information
Input Bias Current	–25nA
Input Resistance	
Normal	50MΩ
Power Off	200kΩ
Overload	200kΩ
Input Protection	
Continuous(1)	240VAC
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	120dB
NMR	70dB at 60Hz
Accuracy	See Ordering Information
Linearity	±0.02% Span
Stability	
Offset	±20ppm/°C
Gain	±50ppm/°C
Noise	
Output, 100kHz	250µVrms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	150ms
Output Range	0V to +5V
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Cold Junction Compensation	
Accuracy, 25°C	±0.5°C
Accuracy, –40°C to +85°C (J,K,T)	±1.5°C
Accuracy, –20°C to +65°C (R,S)	±3.0°C
Accuracy, –40°C to +85°C (R,S)	±5.0°C
Open Input Response	Upscale
Open Input Detection Time	<10s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±75ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes linearity, hysteresis, and repeatability. Does not include CJC accuracy.

Ordering Information

Model	TC Type‡	Input Range	Output Range	Accuracy(2)	
8B37J	J	–100°C to +760°C (–148°F to +1400°F)	0V to +5V	±0.05%	±0.43°C
8B37K	K	–100°C to +1350°C (–148°F to +2462°F)	0V to +5V	±0.05%	±0.73°C
8B37T	T	–100°C to +400°C (–148°F to +752°F)	0V to +5V	±0.05%	±0.25°C
8B37R	R	0°C to +1750°C (+32°F to +3182°F)	0V to +5V	±0.05%	±0.88°C
8B37S	S	0°C to +1750°C (+32°F to +3182°F)	0V to +5V	±0.05%	±0.88°C

‡Thermocouple Alloy Combinations

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

Type	Material
J	Iron vs. Copper-nickel
K	Nickel-chromium vs. Nickel-aluminum
T	Copper vs. Copper-nickel
R	Platinum-13% Rhodium vs. Platinum
S	Platinum-10% Rhodium vs. Platinum

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.

3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B38

Strain Gauge Input Modules, Wide and Narrow Bandwidth

DESCRIPTION

The 8B38 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B38 module isolates, filters, and amplifies a full-bridge strain gauge input signal and provides an analog voltage output (Figure below).

The 8B38 can interface to transducers with a nominal resistance of 100Ω to 2kΩ. Bridge excitation is provided from the module with a stable 10.00V or 3.33V source. Full scale sensitivities of 2mV/V and 3mV/V are offered as standard.

Signal filtering is accomplished with a 5-pole filter optimized for time and frequency response which provides 100dB per decade of normal-mode rejection above the filter cutoff frequency. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other four are on the system side.

A special input circuit on the 8B38 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

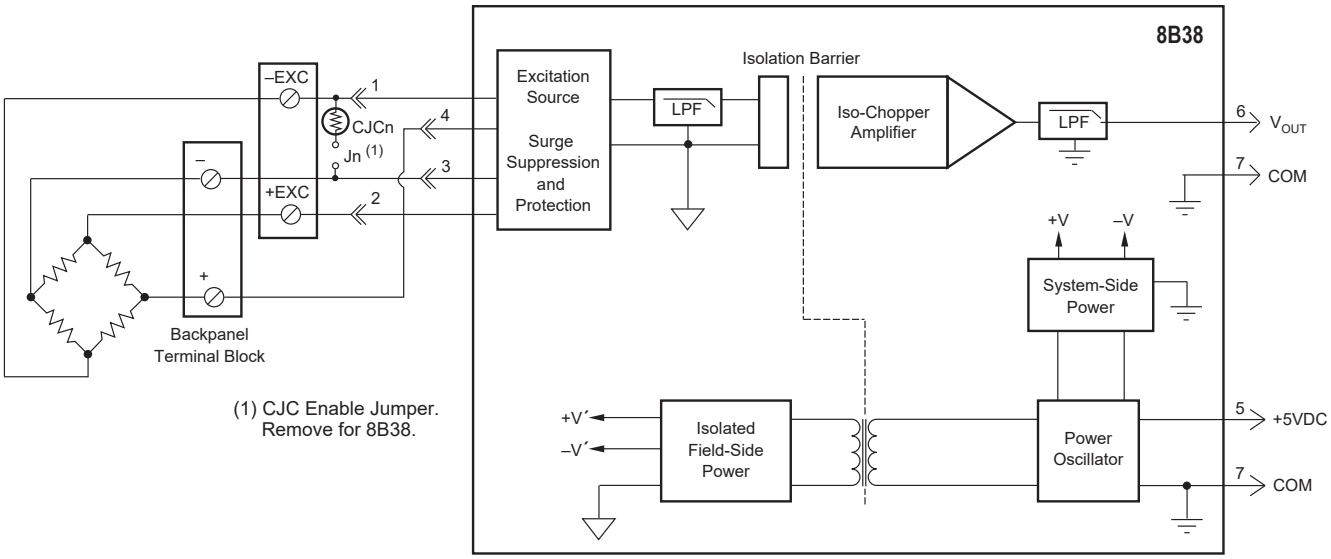
- Interfaces to 100Ω through 2kΩ Full-bridge Strain Gauges
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 100dB CMR
- 3Hz or 8kHz Signal Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remove for 8B38.

8B38 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B38-0x	8B38-3x
Input Range	±10mV to ±30mV	±10mV to ±30mV
Input Bias Current	±0.5nA	±0.5nA
Input Resistance		
Normal	50MΩ	50MΩ
Power Off	100kΩ	100kΩ
Overload	100kΩ	100kΩ
Input Protection		
Continuous(1)	240VAC	240VAC
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Excitation Output (-x1)	+3.333V ±2mV	+3.333V ±2mV
Load Resistance	100Ω to 2kΩ	100Ω to 2kΩ
Excitation Output (-x2,-x5)	+10V ±5mV	+10V ±5mV
Load Resistance	300Ω to 2kΩ	300Ω to 2kΩ
Excitation Load Regulation	15ppm/mA	15ppm/mA
Excitation Stability	50ppm/°C	50ppm/°C
Excitation Protection	120VAC	120VAC
CMV, Input to Output	1500Vrms (max)	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	100dB	100dB
NMR	100dB per Decade Above 8kHz	70dB at 60Hz
Accuracy(2)	±0.05% Span	±0.05% Span
Linearity	±0.02% Span	±0.02% Span
Stability		
Offset	±25ppm/°C	±25ppm/°C
Gain	±100ppm/°C	±75ppm/°C
Noise		
Output, 100kHz	1500µVrms	200µVrms
Bandwidth, –3dB	8kHz	3Hz
Response Time, 90% Span	70µs	160ms
Output Range	±5V	±5V
Output Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	110mA No Exc. Load 150mA Full Exc. Load	110mA No Exc. Load 150mA Full Exc. Load
Power Supply Sensitivity	±75ppm/%	±75ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Band-width	Input Range	Exc.	Sens.	Output Range
8B38-01	8kHz	–10mV to +10mV	+3.333V	3mV/V	–5V to +5V
8B38-02	8kHz	–30mV to +30mV	+10.0V	3mV/V	–5V to +5V
8B38-05	8kHz	–20mV to +20mV	+10.0V	2mV/V	–5V to +5V
8B38-06	8kHz	–10mV to +10mV	+3.333V	3mV/V	0V to +5V
8B38-07	8kHz	–30mV to +30mV	+10.0V	3mV/V	0V to +5V
8B38-08	8kHz	–20mV to +20mV	+10.0V	2mV/V	0V to +5V
8B38-31	3Hz	–10mV to +10mV	+3.333V	3mV/V	–5V to +5V
8B38-32	3Hz	–30mV to +30mV	+10.0V	3mV/V	–5V to +5V
8B38-35	3Hz	–20mV to +20mV	+10.0V	2mV/V	–5V to +5V
8B38-36	3Hz	–10mV to +10mV	+3.333V	3mV/V	0V to +5V
8B38-37	3Hz	–30mV to +30mV	+10.0V	3mV/V	0V to +5V
8B38-38	3Hz	–20mV to +20mV	+10.0V	2mV/V	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B39

Current Output Modules

DESCRIPTION

The 8B39 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B39 module accepts an input signal from a non-isolated source, then isolates, filters, and converts the signal to an analog process current output (Figure below).

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 60dB per decade of normal-mode rejection above 100Hz. One pole of this filter is on the system side and the other two are on the isolated field side.

A special output circuit in the 8B39 module provides protection against accidental connection of power-line voltages up to 40VAC continuous. Clamp circuits on the I/O and power terminals protect against harmful transients.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

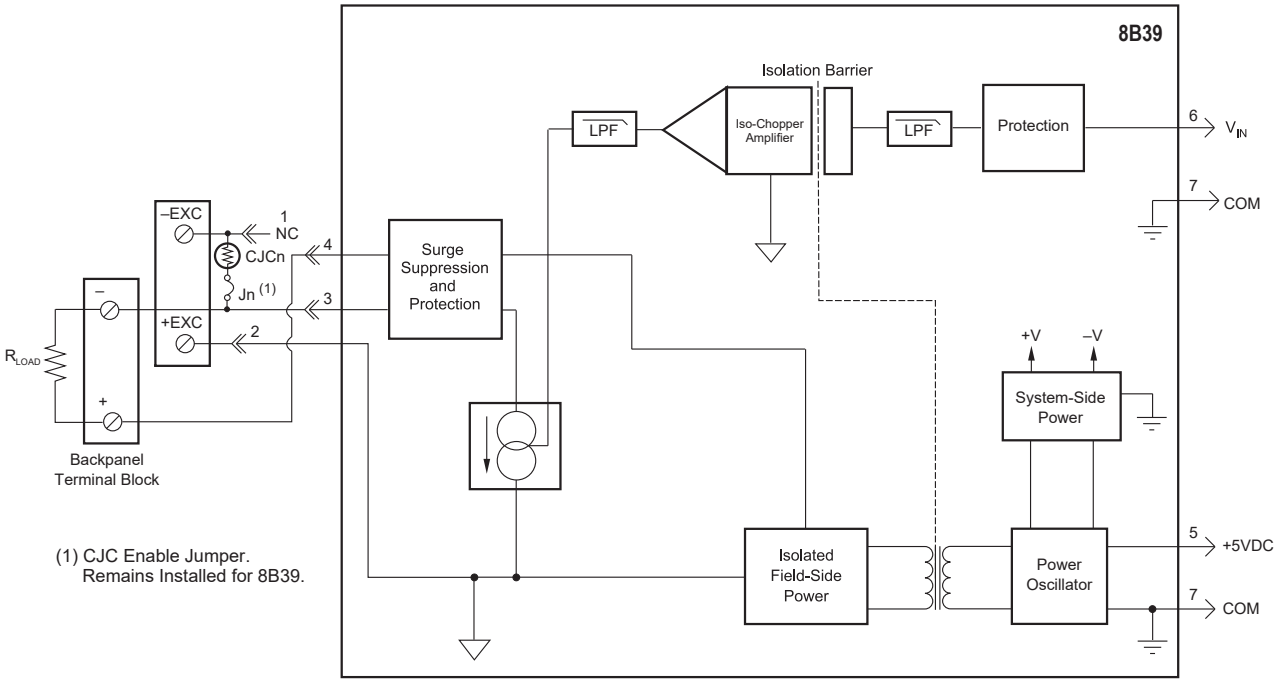
- Accepts High-level Voltage or Process Current Input
- Process Current Output
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protection to 40VAC Continuous
- 110dB CMR
- 100Hz Signal Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



8B39 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B39-01,-02,-03,-04	8B39-07
Input Voltage Range	±5V or 0V to +5V	±5V
Input Voltage Maximum	±20V (no damage)	±20V (no damage)
Input Resistance	50MΩ	50MΩ
Output Current Range	0-20mA or 4-20mA	±20mA
Over Range Capability	10%	10%
Output Compliance Voltage		
(Open Circuit)	15VDC	±12VDC
Load Resistance Range	0 to 500Ω	0 to 400Ω
Output I Under Fault, max	26mA	±26mA
Output Protection		
Continuous	40VAC	40VAC
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Output to Input	1500Vrms (max)	1500Vrms (max)
Transient, Output to Input	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	110dB	110dB
NMR (–3dB at 100Hz)	60dB per Decade Above 100Hz	60dB per Decade Above 100Hz
Accuracy(1)	±0.05% Span	±0.05% Span
Linearity	±0.02% Span	±0.02% Span
Stability		
Offset	±10ppm/°C	±10ppm/°C
Gain	±50ppm/°C	±100ppm/°C
Noise		
Output, 100kHz	2µArms	2µArms
Bandwidth, –3dB	100Hz	100Hz
Rise Time, 10 to 90% Span	5ms	5ms
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	100mA	100mA
Power Supply Sensitivity	±100ppm/%	±100ppm/%
Mechanical Dimensions	1.11" x 1.65" x 0.40"	1.11" x 1.65" x 0.40"
(h)x(w)x(d)	(28.1mm x 41.9mm x 10.2mm)	(28.1mm x 41.9mm x 10.2mm)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B39-01	0V to +5V	4-20mA
8B39-02	–5V to +5V	4-20mA
8B39-03	0V to +5V	0-20mA
8B39-04	–5V to +5V	0-20mA
8B39-07	–5V to +5V	±20mA

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B40/41

Voltage Input Modules, 1kHz Bandwidth

DESCRIPTION

8B40/41 modules are an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B40 or 8B41 module isolates, filters, and amplifies a voltage input signal and provides an analog voltage output (Figure below).

Signal filtering is accomplished with a 5-pole filter optimized for time and frequency response which provides 100dB per decade of normal-mode rejection above 1kHz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other four are on the system side.

A special input circuit on the 8B40 and 8B41 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

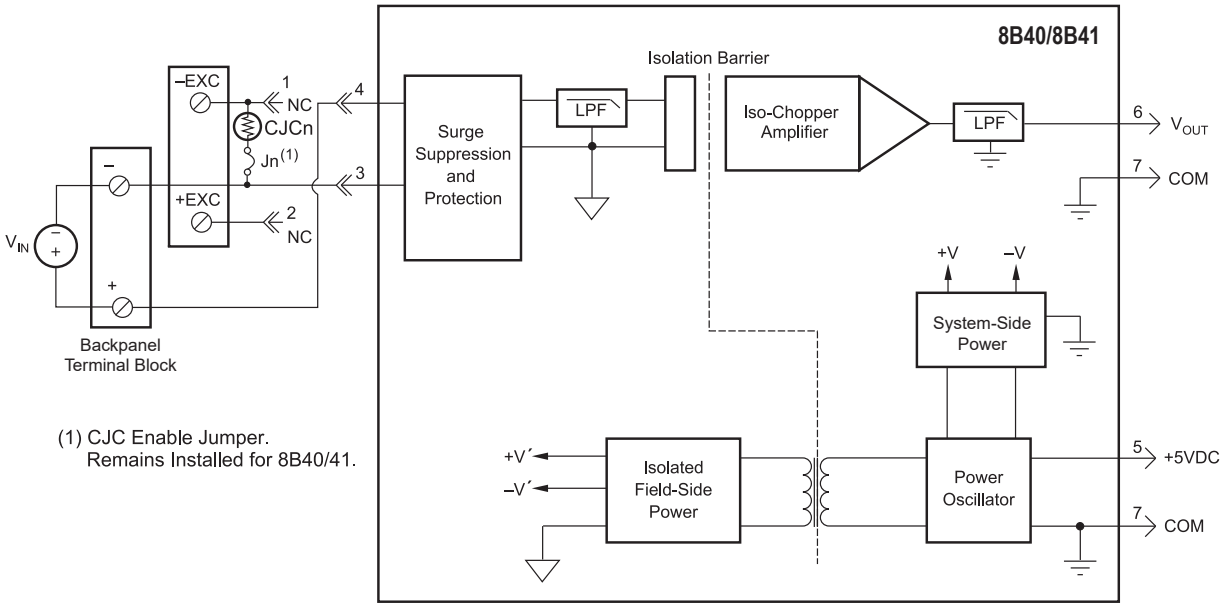
- Accepts Millivolt and Voltage Level Signals
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 100dB CMR
- 1kHz Signal Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper.
Remains Installed for 8B40/41.

8B40/41 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B40	8B41
Input Range	±10mV to ±100mV	±1V to ±60V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (min)
Power Off	100kΩ	500kΩ (min)
Overload	100kΩ	500kΩ (min)
Input Protection		
Continuous(1)	240VAC	240VAC
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output	1500Vrms (max)	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	100dB	100dB
NMR (-3dB at 1kHz)	100dB per Decade Above 1kHz	100dB per Decade Above 1kHz
Accuracy(2)	±0.05% Span	±0.05% Span
Linearity	±0.02% Span	±0.02% Span
Stability		
Offset	±10ppm/°C	±10ppm/°C
Gain	±50ppm/°C	±75ppm/°C
Noise		
Output, 100kHz	500µVrms	500µVrms
Bandwidth, –3dB	1kHz	1kHz
Response Time, 90% Span	550µs	550µs
Output Range	See Ordering Information	See Ordering Information
Output Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	25mA	25mA
Power Supply Sensitivity	±75ppm/%	±75ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental		
Operating Temp. Range	–40°C to +85°C	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B40-01	–10mV to +10mV	–5V to +5V
8B40-02	–50mV to +50mV	–5V to +5V
8B40-03	–100mV to +100mV	–5V to +5V
8B40-04	–10mV to +10mV	0 to +5V
8B40-05	–50mV to +50mV	0 to +5V
8B40-06	–100mV to +100mV	0 to +5V
8B41-01	–1V to +1V	–5V to +5V
8B41-02	–5V to +5V	–5V to +5V
8B41-03	–10V to +10V	–5V to +5V
8B41-04	–1V to +1V	0V to +5V
8B41-05	–5V to +5V	0V to +5V
8B41-06	–10V to +10V	0V to +5V
8B41-07	–20V to +20V	–5V to +5V
8B41-08	–20V to +20V	0V to +5V
8B41-09	–40V to +40V	–5V to +5V
8B41-10	–40V to +40V	0V to +5V
8B41-12	–60V to +60V	–5V to +5V
8B41-13	–60V to +60V	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B42

2-wire Transmitter-interface Modules

DESCRIPTION

The 8B42 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B42 module provides power to a current transmitter, then isolates, filters, and amplifies the resulting process current input signal and provides an analog voltage output (Figure below).

Current-to-voltage conversion is accomplished internal to the module to ensure high accuracy.

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 60dB per decade of normal-mode rejection above 100Hz.

A special input circuit on the 8B42 module provides protection against accidental connection of power-line voltages up to 40VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

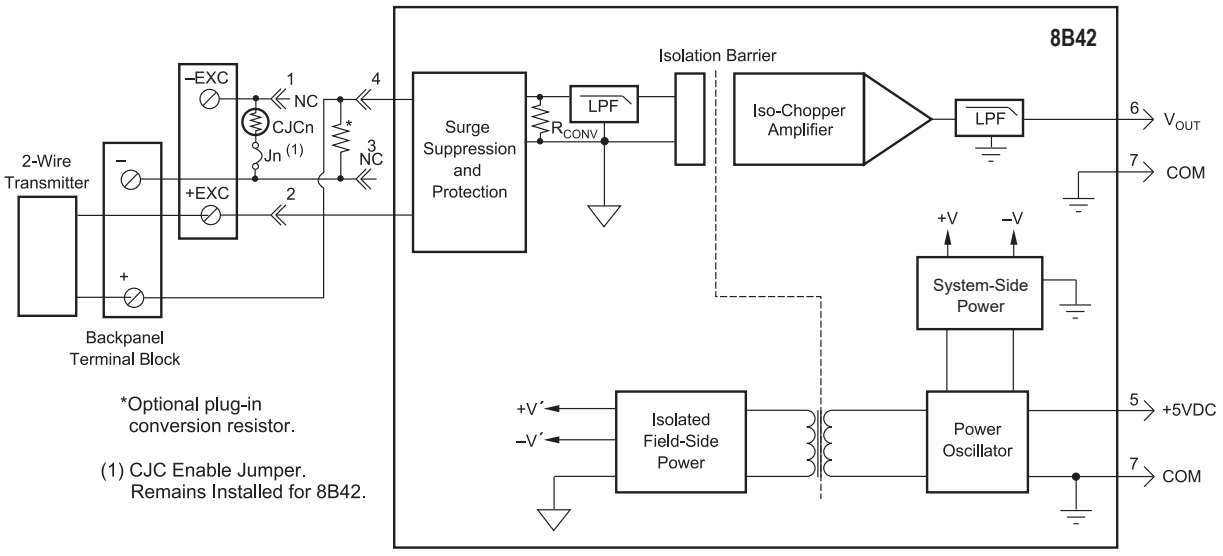
- +12VDC Loop Supply
- Provides Isolation for Non-isolated 2-wire Transmitters
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 40VAC Continuous
- 100dB CMR
- 100Hz Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



8B42 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B42
Input Range	4-20mA
Input Resistance	
Normal	35Ω
Power Off	35Ω
Input Protection	
Continuous	40VAC
Transient	ANSI/IEEE C37.90.1
Loop Supply Voltage	12VDC
Loop Supply Protection	40VAC
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	100dB
NMR	60dB per Decade Above 100Hz
Accuracy(1)	±0.05% Span
Linearity	±0.02% Span
Stability	
Offset	±25ppm/°C
Gain	±75ppm/°C
Noise	
Output, 100kHz	500µVrms
Bandwidth, –3dB	100Hz
Response Time, 90% Span	5ms
Output Range	0V to +5V
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%
Power Supply Current	140mA
Power Supply Sensitivity	±200ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B42-01	4-20mA	0V to +5V
8B42-02	4-20mA	+1V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May ImpairSuitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B43

DC LVDT Input Modules

DESCRIPTION

The 8B43 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B43 module isolates, filters, and amplifies a voltage input signal and provides an analog voltage output (Figure below).

The 8B43 can interface to transducers that will operate on a 10V excitation voltage and up to 30mA excitation current.

Signal filtering is accomplished with a 5-pole filter optimized for time and frequency response which provides 100dB per decade of normal-mode rejection above 1kHz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other four are on the system side.

A special input circuit on the 8B43 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

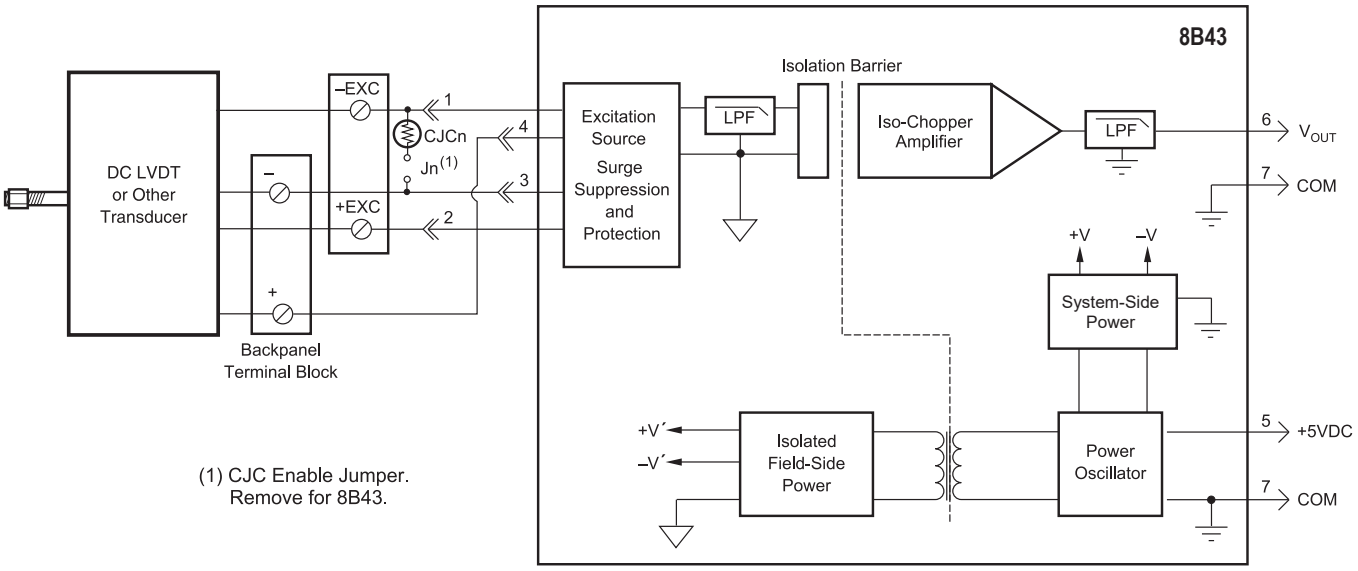
- Interfaces to DC Linear Voltage Displacement Transducers
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 100dB CMR
- 1kHz Signal Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remove for 8B43.

8B43 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B43
Input Range	±1V to ±5V
Input Bias Current	±0.05nA
Input Resistance	
Normal	2MΩ (min)
Power Off	2MΩ (min)
Overload	2MΩ (min)
Input Protection	
Continuous(1)	240VAC
Transient	ANSI/IEEE C37.90.1
Excitation	
Voltage	+10V ±5mV
Current	5mA (min), 30mA (max)
Load Regulation	15ppm/mA
Stability	50ppm/°C
Protection	120VAC
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	100dB
NMR (–3dB at 1kHz)	100dB per Decade Above 1kHz
Accuracy(2)	±0.05% Span
Linearity	±0.02% Span
Stability	
Offset	±25ppm/°C
Gain	±100ppm/°C
Noise	
Output, 100kHz	500µVrms
Bandwidth, –3dB	1kHz
Response Time, 90% Span	550µs
Output Range	See Ordering Information
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%
Power Supply Current	160mA Full Exc. Load
Power Supply Sensitivity	±100ppm/%
Mechanical Dimensions	1.11" x 1.65" x 0.40"
(h)x(w)x(d)	(28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B43-01	–1V to +1V	–5V to +5V
8B43-02	–2V to +2V	–5V to +5V
8B43-03	–3V to +3V	–5V to +5V
8B43-04	–4V to +4V	–5V to +5V
8B43-05	–5V to +5V	–5V to +5V
8B43-11	–1V to +1V	0V to +5V
8B43-12	–2V to +2V	0V to +5V
8B43-13	–3V to +3V	0V to +5V
8B43-14	–4V to +4V	0V to +5V
8B43-15	–5V to +5V	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May ImpairSuitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B45

Frequency Input Modules

DESCRIPTION

The 8B45 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B45 module isolates and conditions a frequency input signal and provides an analog voltage output (Figure below).

The frequency input signal can be either a TTL level or zero crossing with as little as ±100mV amplitude. Input circuitry for each signal type has built-in hysteresis to prevent spurious noise from corrupting the module output. TTL signals are applied to the + and – terminals while zero crossing signals are applied to the +EXC and – terminals. Reference the block diagram below.

A 5V excitation is available for use with magnetic pick-up or contact closure type sensors. The excitation is available on the –EXC terminal with return on the – terminal.

A special input circuit on the 8B45 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by optical coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

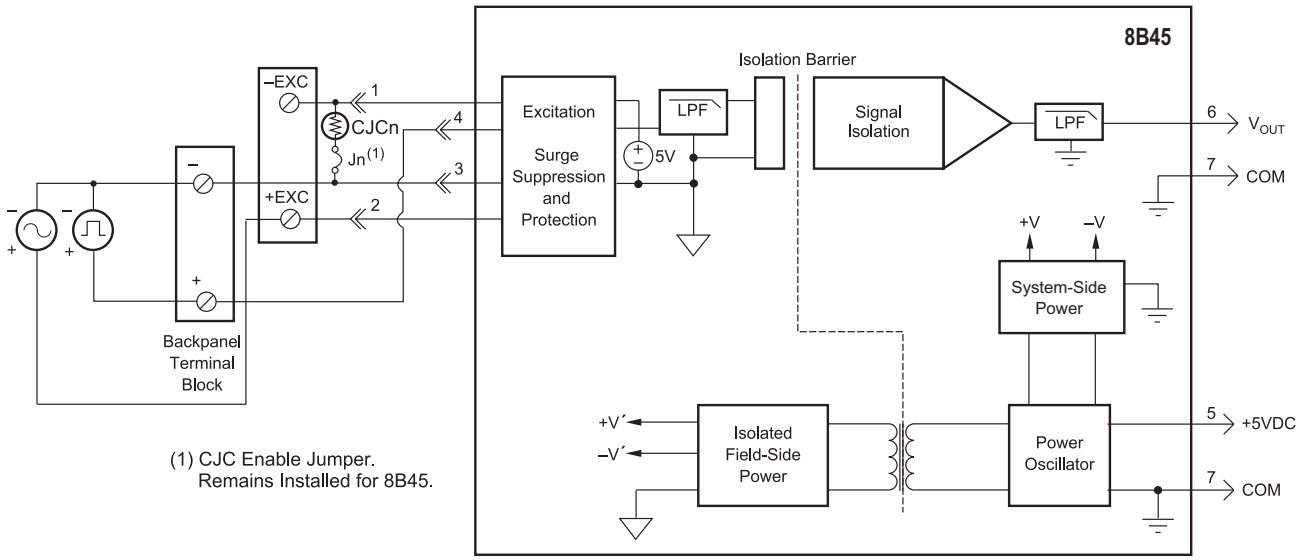
- Accepts Frequency Input Signals 0 to 100kHz
- TTL or Zero-crossing Signal Inputs
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 100dB CMR
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B45.

8B45 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B45
Input Range	0Hz to 100kHz
Input Threshold	Zero Crossing
Minimum Input	100mVp-p
Maximum Input	350Vp-p TTL, 170Vp-p Zero Crossing
Minimum Pulse Width	4µs
TTL Input Low	0.8V (max)
TTL Input High	2.4V (min)
Input Hysteresis	
Zero Crossing	±50mV
TTL	1.5V
Input Resistance	
Normal	68kΩ
Power Off	68kΩ
Overload	68kΩ
Input Protection	
Continuous(1)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Excitation	+5V at 8mA (max)
CMV, Input to Output	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	100dB
Accuracy(2)	±0.05% Span
Linearity	±0.02% Span
Stability	
Offset	±25ppm/°C
Gain	±100ppm/°C
Noise	
Output Ripple	<10mVp-p at Input >2% Span
Response Time (0 to 90%)	
8B45-01, -02, -03	160ms, 80ms, 35ms
8B45-04, -05, -06	16ms, 8.5ms, 3.4ms
8B45-07, -08	1.6ms, 0.8ms
Output Range	0 to +5V
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%
Power Supply Current	45mA
Power Supply Sensitivity	±75ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range	Output Range
8B45-01	0Hz to 500Hz	0V to +5V
8B45-02	0Hz to 1kHz	0V to +5V
8B45-03	0Hz to 2.5kHz	0V to +5V
8B45-04	0Hz to 5kHz	0V to +5V
8B45-05	0Hz to 10kHz	0V to +5V
8B45-06	0Hz to 25kHz	0V to +5V
8B45-07	0Hz to 50kHz	0V to +5V
8B45-08	0Hz to 100kHz	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2) WARNING - Explosion Hazard - Substitution of Any Components May ImpairSuitability for Class I, Division 2.

3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B47

Linearized Thermocouple-input Modules

DESCRIPTION

The 8B47 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B47 module isolates, filters, amplifies, and linearizes a single channel of temperature input from a thermocouple and provides an analog voltage output (Figure below).

Linearization is accomplished using a four breakpoint piecewise linear approximation.

The 8B47 can interface to industry standard thermocouple types J, K, and T and has an output signal of 0 to +5V. Each module is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the mounting backpanel. Upscale open thermocouple detect is provided by an internal pull-up resistor.

Signal filtering is accomplished with a 3-pole filter optimized for time and frequency response which provides 70dB of normal-mode rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the 8B47 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

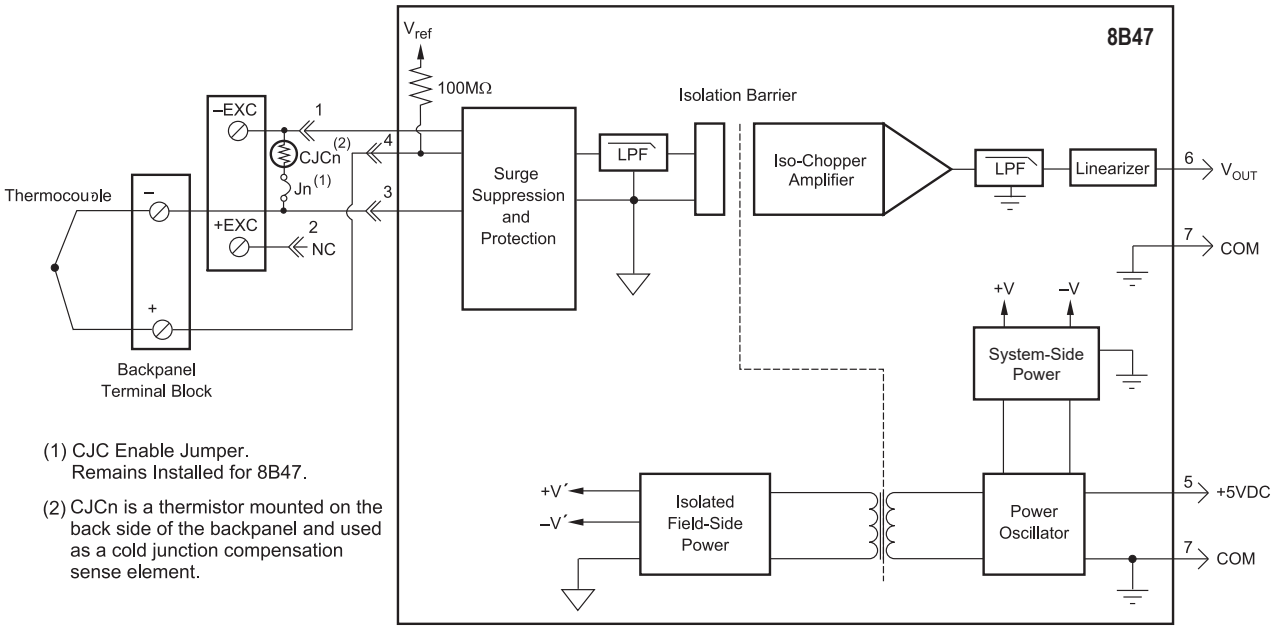
- Interfaces to Types J, K, and T Thermocouples
- Linearizes Thermocouple Signal
- High-level Voltage Outputs
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- Low Drift with Ambient Temperature
- Accurate CJC –40°C to +85°C
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B47.

(2) CJCn is a thermistor mounted on the back side of the backpanel and used as a cold junction compensation sense element.

8B47 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B47
Input Range	–0.1V to +0.5V
Input Bias Current	–25nA
Input Resistance	
Normal	50MΩ
Power Off	200kΩ
Overload	200kΩ
Input Protection	
Continuous(1)	240VAC
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	120dB
NMR	70dB at 60Hz
Accuracy	See Ordering Information
Stability	
Offset	±20ppm/°C
Gain	±75ppm/°C
Noise	
Output, 100kHz	250µVrms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	150ms
Output Range	0V to +5V
Output Protection	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1
Cold Junction Compensation	
Accuracy, 25°C	±0.5°C
Accuracy, –40°C to +85°C	±1.5°C
Open Input Response	Upscale
Open Input Detection Time	<10s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±100ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes conformity, hysteresis, and repeatability. Does not include CJC accuracy.

Ordering Information

Model	TC Type‡	Input Range	Output Range	Accuracy(2)	
8B47J-01	J	0°C to +760°C (+32°F to +1400°F)	0V to +5V	±0.10%	±0.76°C
8B47J-02	J	–100°C to +300°C (–148°F to +572°F)	0V to +5V	±0.20%	±0.80°C
8B47J-03	J	0°C to +500°C (+32°F to +932°F)	0V to +5V	±0.20%	±1.00°C
8B47J-12	J	–100°C to +760°C (–148°F to +1400°F)	0V to +5V	±0.20%	±1.72°C
8B47K-04	K	0°C to +1000°C (+32°F to +1832°F)	0V to +5V	±0.15%	±1.50°C
8B47K-05	K	0°C to +500°C (+32°F to +932°F)	0V to +5V	±0.15%	±0.75°C
8B47K-13	K	–100°C to +1350°C (–148°F to +2462°F)	0V to +5V	±0.15%	±2.18°C
8B47K-14	K	0°C to +1200°C (+32°F to +2192°F)	0V to +5V	±0.15%	±1.80°C
8B47T-06	T	–100°C to +400°C (–148°F to +752°F)	0V to +5V	±0.20%	±1.00°C
8B47T-07	T	0°C to +200°C (+32°F to +392°F)	0V to +5V	±0.20%	±0.40°C

‡Thermocouple Alloy Combinations

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

Type	Material
J	Iron vs. Copper-nickel
K	Nickel-chromium vs. Nickel-aluminum
T	Copper vs. Copper-nickel

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2) WARNING - Explosion Hazard - Substitution of Any Components May ImpairSuitability for Class I, Division 2.

3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B49

Voltage-output Modules

DESCRIPTION

The 8B49 module family is an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B49 module accepts an input signal from a non-isolated source, then isolates, filters and converts the signal to a high-level process voltage output (Figure below).

Signal filtering is accomplished with a 4-pole filter optimized for time and frequency response which provides 80dB per decade of normal-mode rejection above 100Hz. One pole of this filter is on the system side and the other three are on the isolated field side.

A special output circuit in the 8B49 module provides protection against accidental connection of power-line voltages up to 40VAC continuous. Clamp circuits on the I/O and power terminals protect against harmful transients.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

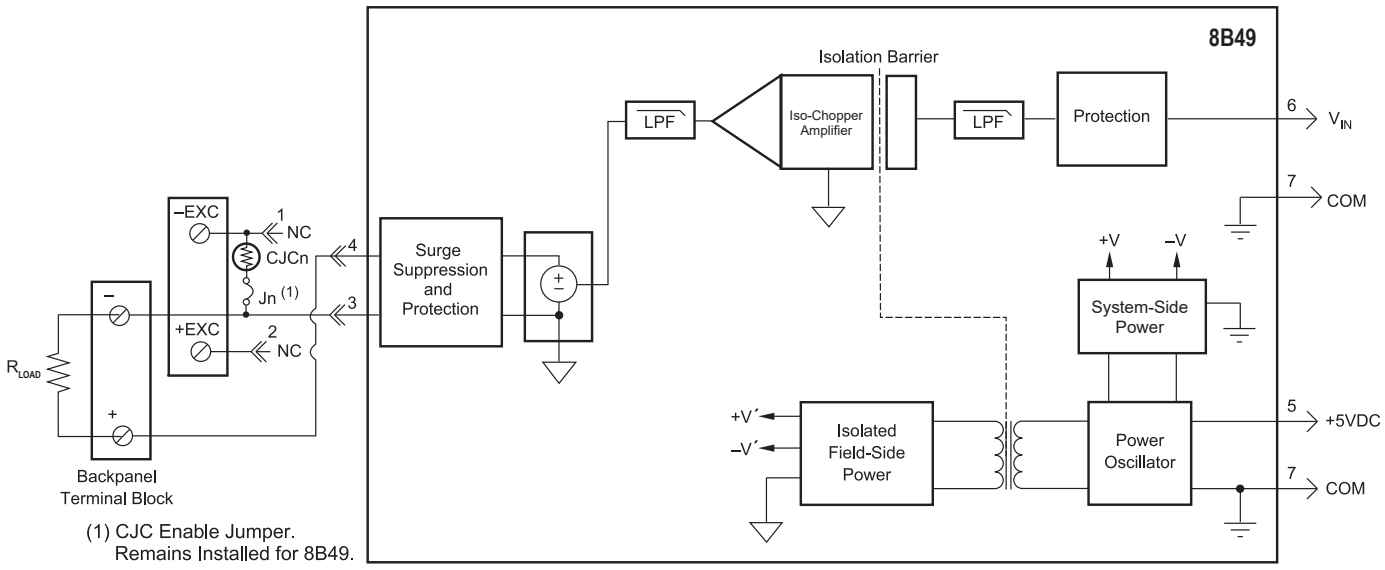
- Accepts High-level Voltage
- Isolated Process Voltage Output
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protection to 40VAC Continuous
- 110dB CMR
- 100Hz Signal Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B49.

8B49 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B49
Input Voltage Range	±5V, 0 to +5V, ±10V, 0 to +10V
Input Voltage Maximum	±20V (no damage)
Input Resistance	≥1MΩ
Output Voltage Range	±5V, 0 to +5V, ±10V, 0 to +10V
Over Range Capability	5% at 10V output
Output Drive	±20mA (max)
Output I Under Fault, max	30mA
Output Protection	
Continuous	40VAC (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output-Input	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	110dB
NMR (–3dB at 100Hz)	80dB per Decade Above 100Hz
Accuracy(1)	±0.05% Span (0 to 10mA Load) ±0.075% Span (10 to 20mA Load)
Linearity	±0.02% Span
Stability	
Offset	±10ppm/°C
Gain	±50ppm/°C
Noise	
Output, 100kHz	800µVrms
Bandwidth, –3dB	100Hz
Response Time, 90% Span	5ms
Power Supply Voltage	+5VDC ±5%
Power Supply Current	100mA Full Load, 30mA No Load
Power Supply Sensitivity	±100ppm/%
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B49-01	0V to +5V	–5V to +5V
8B49-02	–5V to +5V	–5V to +5V
8B49-03	–5V to +5V	0V to +5V
8B49-04	0V to +10V	–10V to +10V
8B49-05	–10V to +10V	–10V to +10V
8B49-06	–10V to +10V	0V to +10V
8B49-07	–5V to +5V	–10V to +10V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2) WARNING - Explosion Hazard - Substitution of Any Components May ImpairSuitability for Class I, Division 2.

3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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8B50/51

Voltage-input Modules, 20kHz Bandwidth

DESCRIPTION

8B50/51 modules are an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B50 or 8B51 module isolates, filters, and amplifies a voltage input signal and provides an analog voltage output (Figure below).

Signal filtering is accomplished with a 5-pole filter optimized for time and frequency response which provides 100dB per decade of normal-mode rejection above 20kHz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other four are on the system side.

A special input circuit on the 8B50 and 8B51 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

FEATURES

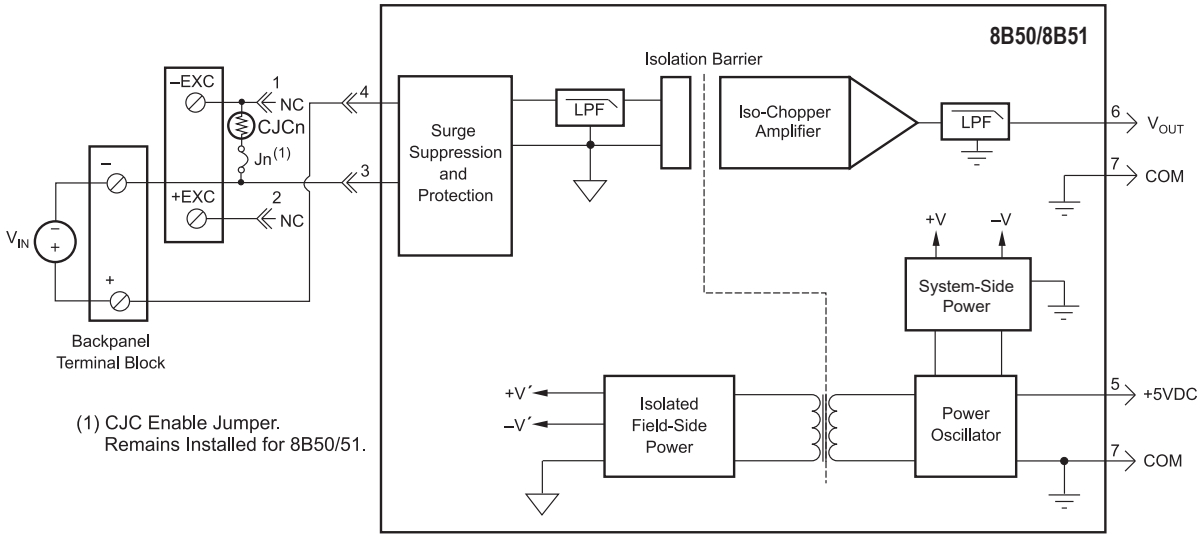
- Accepts High-level Voltage
- Isolated Process Voltage Output
- 1500Vrms Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Output Protection to 40VAC Continuous
- 110dB CMR
- 100Hz Signal Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- UL/cUL Listed
- CE Compliant
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863
- Mix and Match Module Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Industrial Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments



(1) CJC Enable Jumper. Remains Installed for 8B50/51.

8B50/51 Block Diagram - For Module Dimensions and Pinouts, See Page 3-40

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Specifications

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

Module	8B50	8B51
Input Range	±20mV to ±100mV	±1V to ±60V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (min)
Power Off	100kΩ	500kΩ (min)
Overload	100kΩ	500kΩ (min)
Input Protection		
Continuous(1)	240VAC	240VAC
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output	1500Vrms (max)	1500Vrms (max)
Transient, Input to Output	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	100dB	100dB
NMR (–3dB at 20kHz)	100dB per Decade Above 20kHz	100dB per Decade Above 20kHz
Accuracy(2)	±0.05% Span	±0.05% Span
Linearity	±0.02% Span	±0.02% Span
Stability		
Offset	±10ppm/°C	±10ppm/°C
Gain	±50ppm/°C	±75ppm/°C
Noise		
Output, 100kHz	500µVrms	500µVrms
Bandwidth, –3dB	20kHz (15kHz, 50-01)	20kHz (15kHz, 50-01)
Rise Time, 10 to 90% Span	25µs	25µs
Output Range	See Ordering Information	See Ordering Information
Output Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Power Supply Voltage	+5VDC ±5%	+5VDC ±5%
Power Supply Current	25mA	25mA
Power Supply Sensitivity	±75ppm/%	±75ppm/%
Mechanical Dimensions	1.11" x 1.65" x 0.40"	1.11" x 1.65" x 0.40"
(h)x(w)x(d)	(28.1mm x 41.9mm x 10.2mm)	(28.1mm x 41.9mm x 10.2mm)
Environmental		
Operating Temp. Range	–40°C to +85°C	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240VAC between +Input terminal and –Input, +EXC, or –EXC terminals.
120VAC between –Input and +EXC or –EXC terminals.
120VAC between +EXC and –EXC terminals.
(2) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range
8B50-01	–20mV to +20mV	–5V to +5V
8B50-02	–50mV to +50mV	–5V to +5V
8B50-03	–100mV to +100mV	–5V to +5V
8B50-04	–20mV to +20mV	0 to +5V
8B50-05	–50mV to +50mV	0 to +5V
8B50-06	–100mV to +100mV	0 to +5V
8B51-01	–1V to +1V	–5V to +5V
8B51-02	–5V to +5V	–5V to +5V
8B51-03	–10V to +10V	–5V to +5V
8B51-04	–1V to +1V	0V to +5V
8B51-05	–5V to +5V	0V to +5V
8B51-06	–10V to +10V	0V to +5V
8B51-07	–20V to +20V	–5V to +5V
8B51-08	–20V to +20V	0V to +5V
8B51-09	–40V to +40V	–5V to +5V
8B51-10	–40V to +40V	0V to +5V
8B51-12	–60V to +60V	–5V to +5V
8B51-13	–60V to +60V	0V to +5V

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

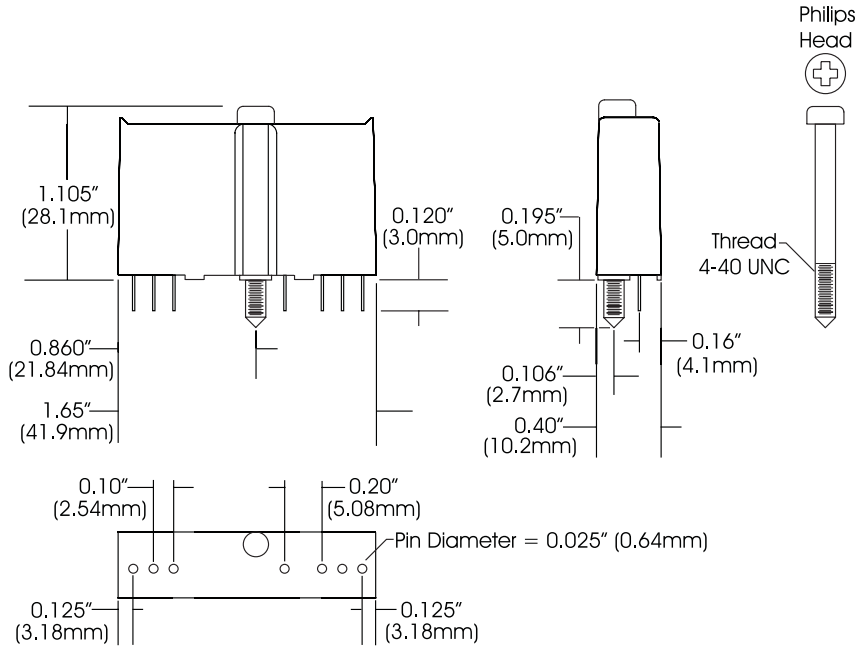
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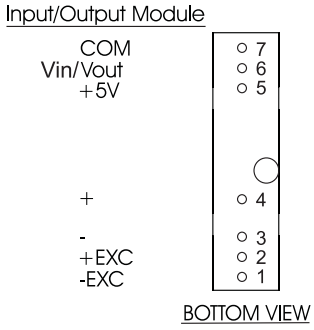
8B

Module Dimensions and Pinouts

The following mechanical drawing is useful when designing circuit boards to mount the 8B modules. Many sockets are available which accept the mounting pins. As an example, Mill-Max provides a socket with part number 0660. The captive nut for the 4-40 mounting screw can be obtained from PEM (Penn Engineering and Manufacturing), part number KFS2-440.



NOTE:
All dimensions are "Typical" unless otherwise noted.



8B Module Package Drawing Dimensions Typical

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Accessories for 8B Analog Modules

8BP01

Single-channel, DIN-rail Mount Carrier

DESCRIPTION

The 8BP01 provides simple mounting and I/O connections for any of the 8B signal conditioners. 8BP01-205 and 8BP01-305 models accept 5V power and provide it to the module. 8BP01-224 and 8BP01-324 models accept wide range 7-34VDC power and provide 5V power to the module through an on-board power converter. The 8B carrier can be mounted on any standard DIN-rail (EN 50022-35 and EN 50035-G32). The 8BP01 measures only 2.32" x 3.54" x 0.65" (59mm x 90mm x 16.5mm), making it ideal for use in high-density installations (see Figure). It has a flammability rating of UL94 V-0.

Specifications

Typical* at T_A = +25°C and +5VDC power
Typical* at T_A = +25°C and +24VDC power

Module	8BP01-205, -305	8BP01-224, -324
Input Voltage Range	4.85 to 5.2VDC	7 to 34VDC
Over-Voltage Protection	6V TVS, 1A Fuse, OV Detection	36V TVS, 1A Fuse, OV Detection
Over-Voltage Shutdown Voltage	5.6V (max)	35.5V (max)
Under-Voltage Turn-on	–	6.5V (min)
Reverse Voltage Protection	1A Fuse	1A Fuse
Output Voltage Regulation	–	5VDC ±1%
Power Indicator	Green LED	Green LED
Output Voltage Temp. Coeff.	±200ppm/°C	±200ppm/°C
Output Current	250mA (max) (–40°C to +85°C)	250mA (max) (–40°C to +85°C)
Output Current Limit	–	0.8A, Auto Recovery
Line Regulation	–	±0.25%
Load Regulation	–	±0.5%
Efficiency	–	75%
Output Ripple	–	<50mVpk-pk
Mechanical Dimensions (h)x(w)x(d)	2.32" x 3.54" x 0.65" 59mm x 90mm x 16.5mm	2.32" x 3.54" x 0.65" 59mm x 90mm x 16.5mm

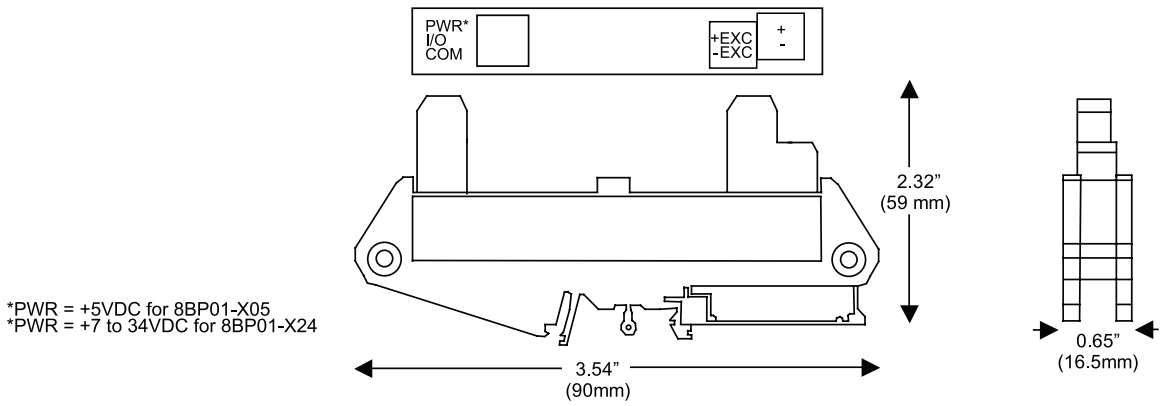
NOTES: *Contact factory or your local Dataforth sales office for maximum values.

Ordering Information

Part Number	Description
8BP01-205	5V Power, No CJC
8BP01-305	5V Power, CJC
8BP01-224	24V Power, No CJC
8BP01-324	24V Power, CJC

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.
2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.
3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.



*PWR = +5VDC for 8BP01-X05
*PWR = +7 to 34VDC for 8BP01-X24

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8BP02, 8BP04, 8BP08, 8BP16

2-, 4-, 8-, and 16-position Analog I/O Backpanels

DESCRIPTION

The 8BP02, 04, 08, and 16 backpanels can accept any of the 8B analog I/O modules in any mixture and can be mounted on the SCMXRK-002 19-inch metal rack. Analog I/O signal channels provide each module with its own analog bus. All module outputs are simultaneously accessible to high-speed data acquisition (ADC) boards. A temperature sensor is mounted on each channel to provide cold junction compensation for Thermocouple-input modules (see Figure 1. for schematic). Field connections are terminated with four screw terminals at each module site. Use system interface cable SCMXCA006-XX for connection to the host system.

Specifications

Operating Temperature Relative Humidity	–40°C to +85°C 95% Noncondensing
Interface Connector: Field System	 High-density Screw Clamp, 16 AWG (max) High-density Screw Clamp, 16 AWG (max)
Isolation: Input-to-Output Channel-to-channel	 1500Vrms Continuous (max) 1500Vrms Continuous (max)

FEATURES

- 2-, 4-, 8-, 16-position Analog I/O Backpanels
- 19-inch Mounting Rack for Backpanels
- DIN-rail Mounting Option
- Mix and Match 8B Modules on Same Backpanel
- Interface Cables
- Module Evaluation Board
- Cable-to-screw-terminal Interface Board

BENEFITS

- Easy Installation
- All Channels Provide Module with Its Own Analog Bus
- All Outputs Simultaneously Accessible to High-speed Data Acquisition (ADC) boards
- Optional Temperature Sensor Provided for Each Channel
- 2 Power Supply Options:
  - +5VDC ±5%
  - Wide Range 7-34VDC

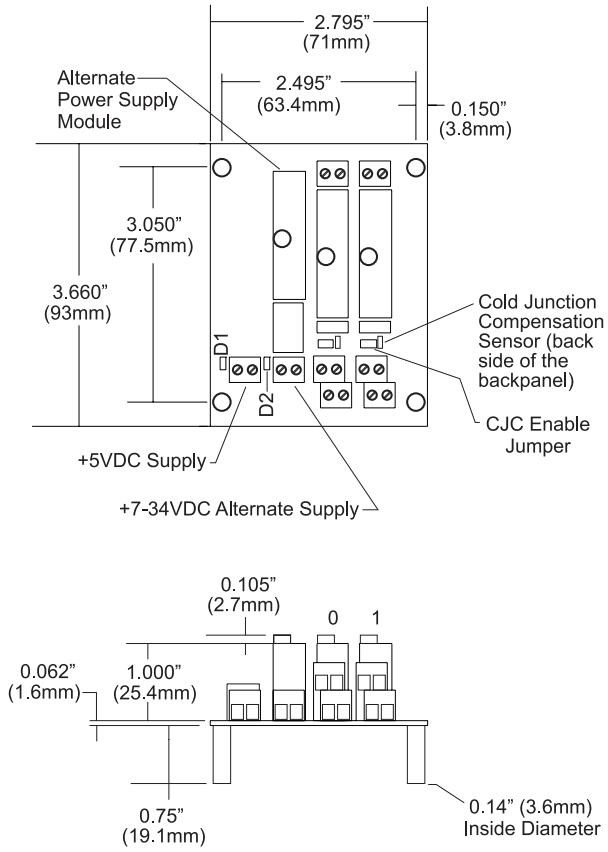


Figure 1: 8BP02 Analog I/O Backpanel

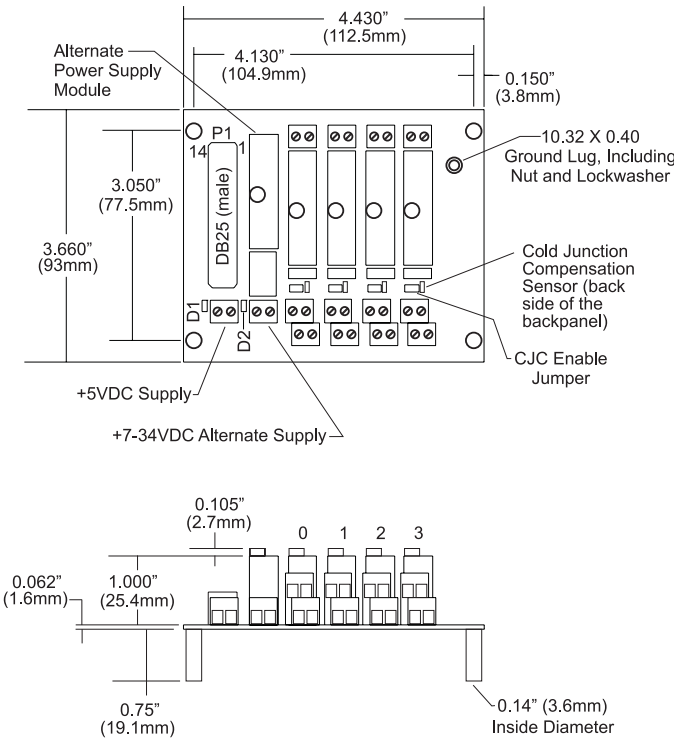


Figure 2: 8BP04 Analog I/O Backpanel

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Electrical

Power

The 8B backpanels have two power supply options. A +5VDC ±5% supply can be connected to the '+5V Supply' terminal block, or alternatively, a wide ranging 7-34VDC supply can be connected to the 'Alternate Supply' terminal block. In the latter case, the 8BPWR-2 module must be installed on the backpanel. The backpanel contains circuitry which automatically switches between the supplies such that only one at a time provides power to the modules. When power connections are made to both terminal blocks simultaneously, the 7-34VDC supply takes precedence over the +5VDC supply.

Fusing

Backpanel power is fuse-protected through F1 and F2. Zener diodes D3 and D4 provide extra protection from overvoltage and supply reversal.

Grounding

For full protection against large electrical disturbances on the field-side of the 8B modules, a #10-32 ground stud is provided on the backpanel. An electrical connection between this ground stud and the system ground should be provided with a large-gauge wire of the shortest possible length.

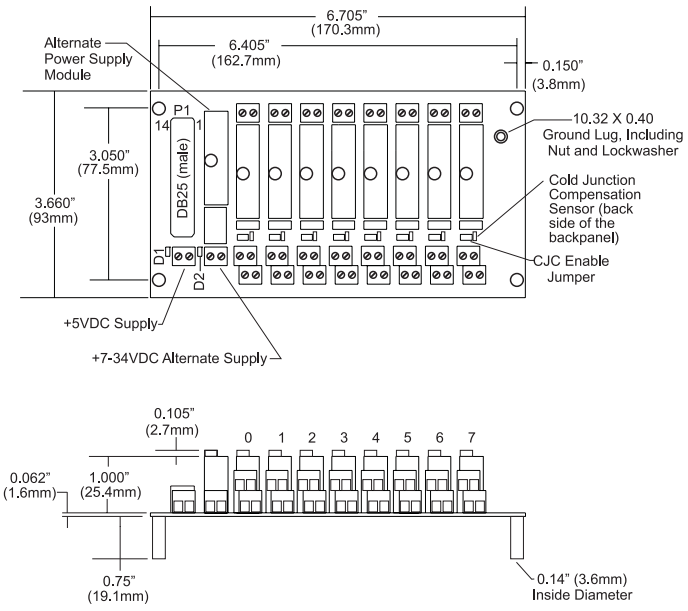


Figure 4: 8BP08 Analog I/O Backpanel

Ordering Information

Part Number	Description
8BP02	Standard 2-channel Backpanel with Standoffs for Mounting.
8BP02-1	8BP02 without Cold Junction Compensation Sensor. Use When Cost Savings are Desired and Thermocouple-input Modules 8B37 and 8B47 will Not be Used.
8BP02-2	8BP02 with DIN-rail Mounting Option. The Backpanel Is Captured by DIN-rail Mounting Elements and is Shipped Fully Assembled.
8BP02-3	8BP02-1 with DIN-rail Mounting Option.
8BP04	Standard 4-channel Backpanel with Standoffs for Mounting.
8BP04-1	8BP04 without Cold Junction Compensation Sensor. Use When Cost Savings are Desired and Thermocouple-input Modules 8B37 and 8B47 will Not be Used.
8BP04-2	8BP04 with DIN-rail Mounting Option. The Backpanel is Captured by DIN-rail Mounting Elements and is Shipped Fully Assembled.
8BP04-3	8BP04-1 with Din-rail Mounting Option.
8BP08	Standard 8-channel Backpanel with Standoffs for Mounting.
8BP08-1	8BP08 without Cold Junction Compensation Sensor. Use When Cost Savings are Desired and Thermocouple-input Modules 8B37 and 8B47 will Not be Used.
8BP08-2	8BP08 with DIN-rail Mounting Option. The Backpanel is Captured by DIN-rail Mounting Elements and is Shipped Fully Assembled.
8BP08-3	8BP08-1 with DIN-rail Mounting Option.
8BP16	Standard 16-channel Backpanel with Standoffs for Mounting.
8BP16-1	8BP16 without Cold Junction Compensation Sensor. Use When Cost Savings are Desired and Thermocouple-input Modules 8B37 and 8B47 will Not be Used.
8BP16-2	8BP16 with DIN-rail Mounting Option. The Backpanel is Captured by DIN-rail Mounting Elements and is Shipped Fully Assembled.
8BP16-3	8BP16-1 with DIN-rail Mounting Option.

Installation Notes

1) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2) WARNING - Explosion Hazard - Substitution of Any Components May Impair Suitability for Class I, Division 2.

3) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

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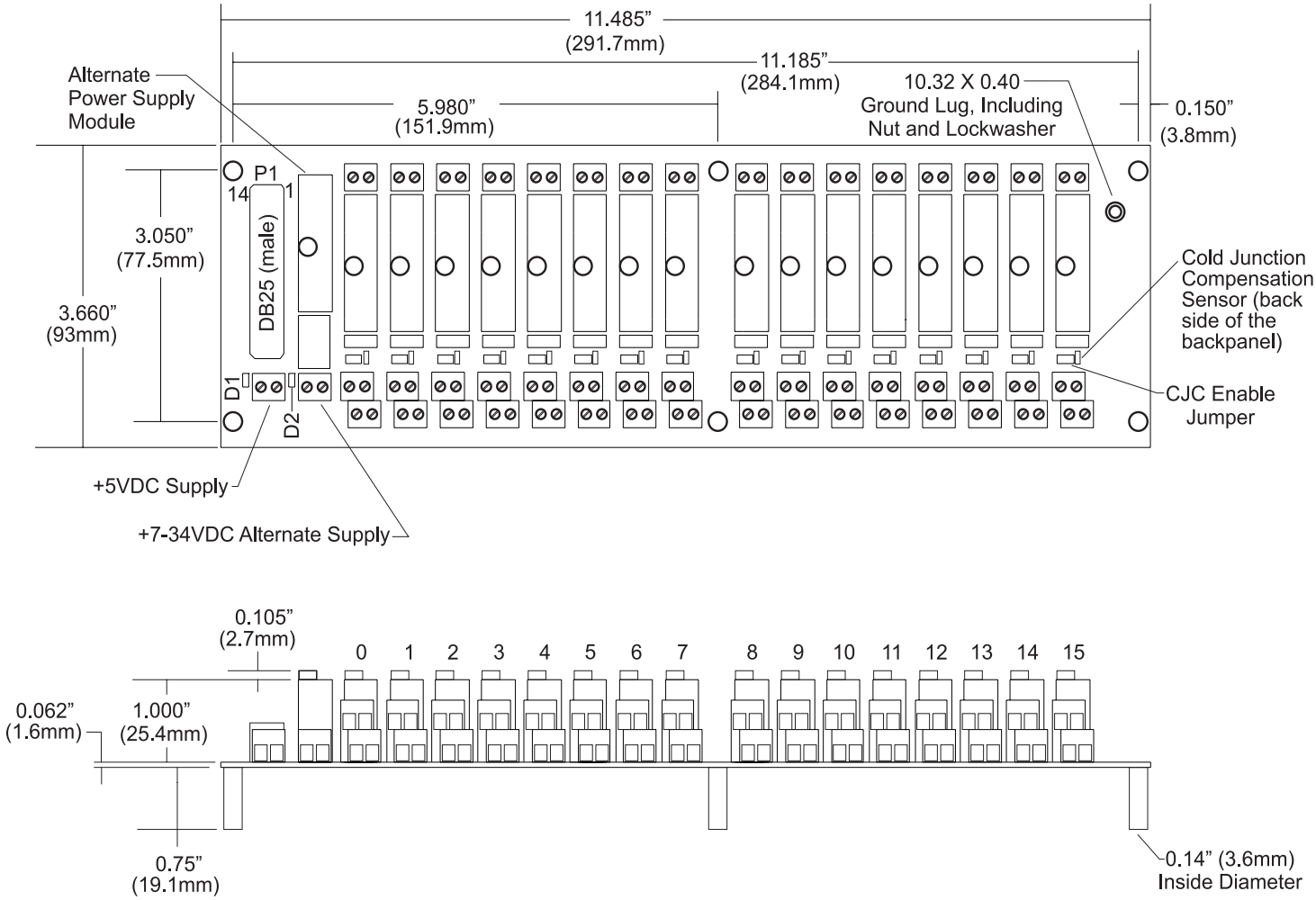
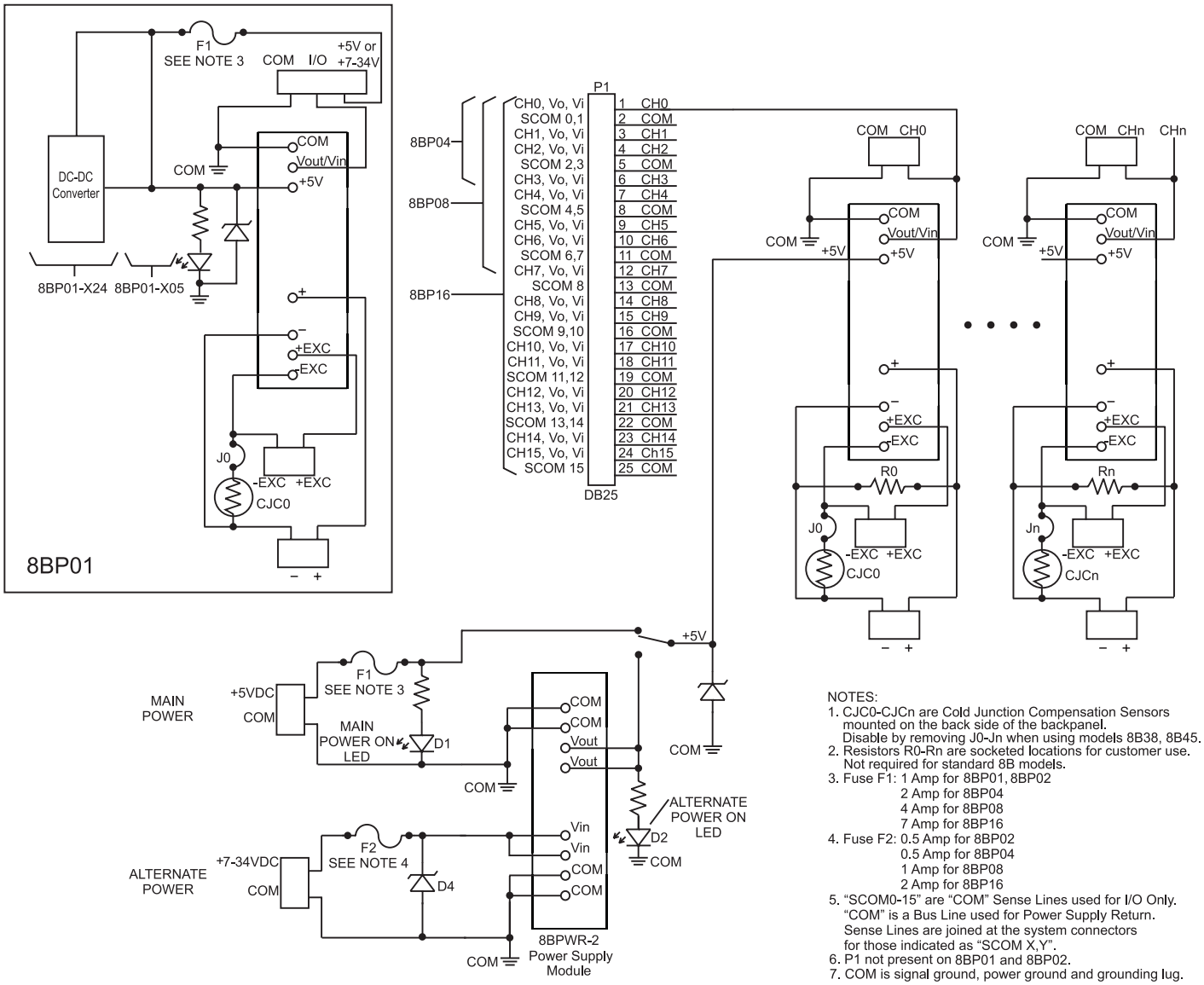


Figure 4: 8BP16 Analog I/O Backpanel

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NOTES:
1. CJC0-CJCn are Cold Junction Compensation Sensors mounted on the back side of the backpanel. Disable by removing J0-Jn when using models 8B38, 8B45.
2. Resistors R0-Rn are socketed locations for customer use. Not required for standard 8B models.
3. Fuse F1: 1 Amp for 8BP01, 8BP02
   2 Amp for 8BP04
   4 Amp for 8BP08
   7 Amp for 8BP16
4. Fuse F2: 0.5 Amp for 8BP02
   0.5 Amp for 8BP04
   1 Amp for 8BP08
   2 Amp for 8BP16
5. "SCOM0-15" are "COM" Sense Lines used for I/O Only. "COM" is a Bus Line used for Power Supply Return. Sense Lines are joined at the system connectors for those indicated as "SCOM X,Y".
6. P1 not present on 8BP01 and 8BP02.
7. COM is signal ground, power ground and grounding lug.

Figure 5: 8BP01/8BP02/8BP04/8BP08/8BP16 Schematic

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8BPWR-2

Power Supply Module

DESCRIPTION

The 8BPWR-2 encapsulated power supply has a wide-ranging 7-34VDC input-voltage range and provides 5VDC output suitable for all 8B modules. It is designed to mount on the 8B backpanels. The compact size and low weight are ideal for high-density applications (see Figure 1).

Specifications Typical* at T_A = +25°C and +24VDC power

Module	8BPWR-2
Input Voltage Range	7-34VDC
Overvoltage Protection	None (Provided On Backpanel)
Reverse Voltage Protection	None (Provided On Backpanel)
Output Voltage	5VDC ±1%
Output Voltage Temp. Coeff.	±200ppm/°C
Output Current	3A (–40°C to +65°C) 2A (85°C)
Output Current Limit	4A, Auto Recovery
Line Regulation	±0.20%
Load Regulation	±0.30%
Efficiency	85%
Output Ripple	50mVp-p
Mechanical Dimensions (h)x(w)x(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)

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

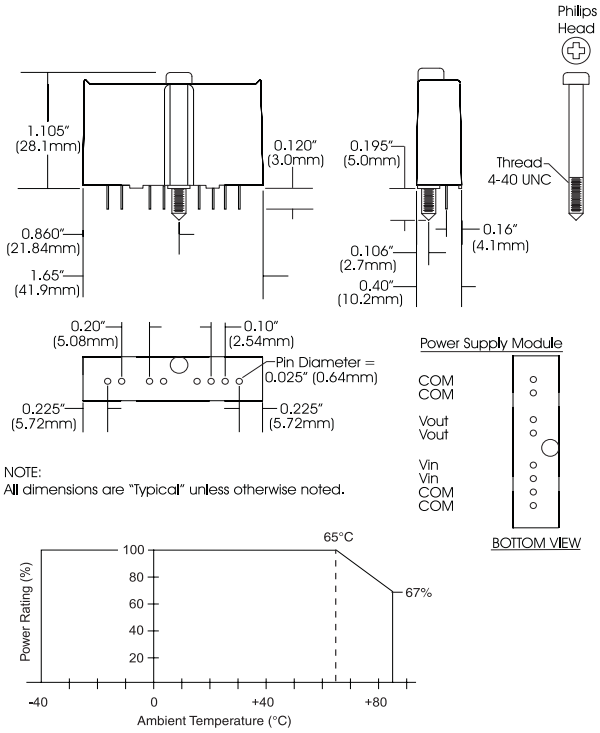


Figure 1: 8BPWR-2 Power Supply Module

SCMXPRT-001/D, SCMXPRE-001/D

Power Supplies

DESCRIPTION

The SCMXPRT-001/D and SCMXPRE-001/D encapsulated power supplies are available in 120VAC or 220VAC input voltage ranges and provide 5VDC outputs suitable for all 8B modules. They are designed to mount on the SCMXRK-002 metal rack (see Figure 1) or DIN-rail EN 50022-35x7.5 (D versions). The supplies are UL-recognized. Their compact size and low weight are ideal for high-density applications (see Figure 2).

Specifications Typical* at T_A = +25°C

Module	SCMXPRT-001/D	SCMXPRE-001/D
Input Voltage Range, 47Hz to 420Hz	105-125VAC	210-250VAC
Output Voltage	5VDC	5VDC
Output Current, +50°C	1A	1A
Operating Temperature	–20°C to +71°C	–20°C to +71°C
Line Regulation	±0.05%	±0.05%
Load Regulation	±0.25%	±0.25%
Output Ripple, max	1mVrms	1mVrms
Weight	1.25 lbs (567g)	1.25 lbs (567g)

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
Supplies are UL recognized, File No. E45344.

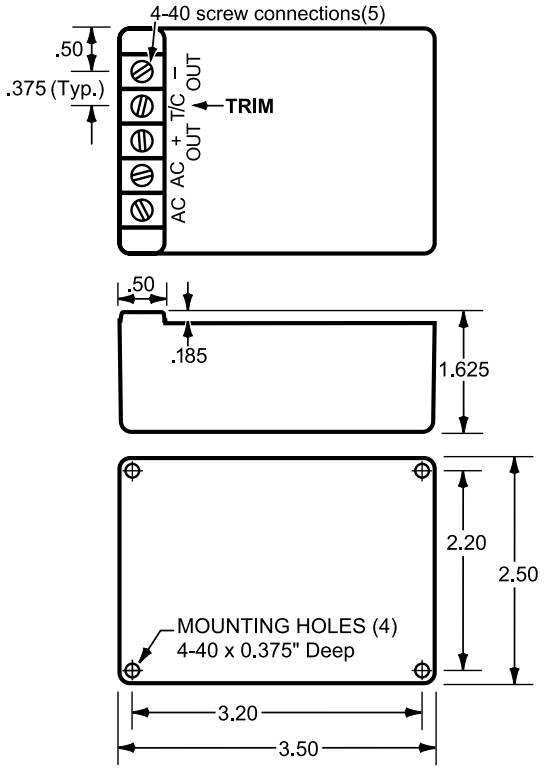


Figure 2: SCMXPRT-001/D and SCMXPRE-001/D Physical Dimensions

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SCMXPRT-003, SCMXPRE-003

Power Supplies

DESCRIPTION

The SCMXPRT/E-003 linear power supplies are available in 120VAC or 220VAC input. They have sufficient output current capacity to supply any combination of 8B modules. The SCMXRK-002 metal rack provides mounting capability for the SCMXPRT/E-003 power supplies (see Figure 3).

Specifications Typical* at T_A = +25°C

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

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

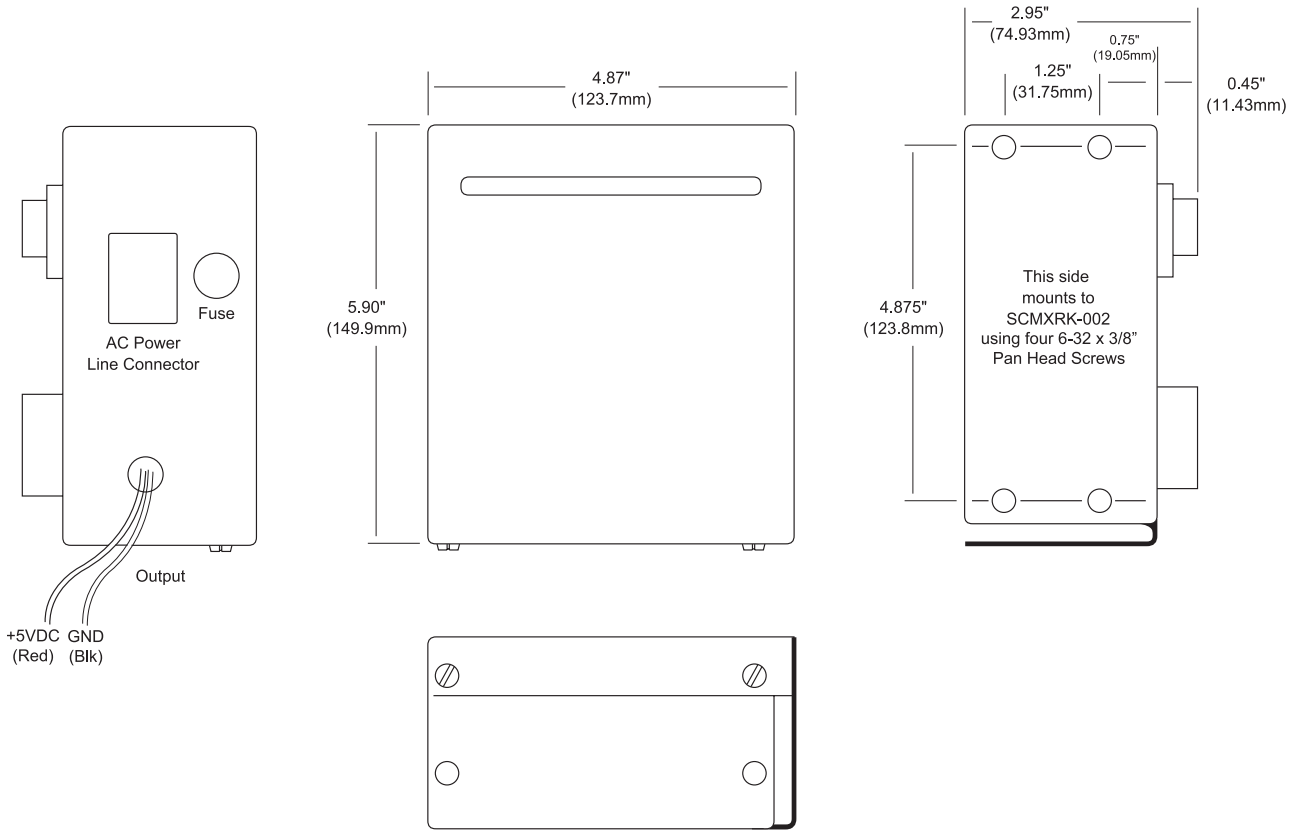


Figure 3: SCMXPRT-003/E-003 Physical Dimensions

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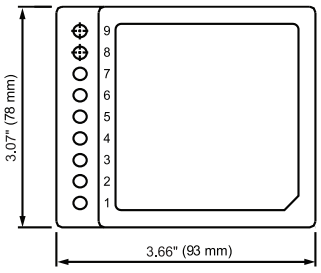
PWR-4505

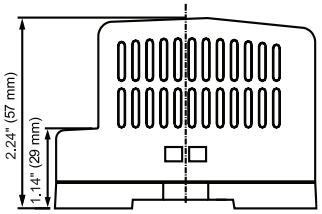
25W, Single-output, Industrial, DIN-rail, Switching Power Supply

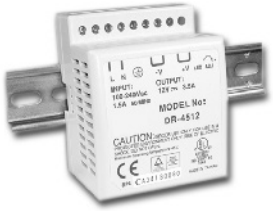
Specifications Typical* at T_A = +25°C

Module	PWR-4505
Input Frequency Input Current Inrush Current Efficiency	85 to 264VAC, 120 to 370VDC 47 to 63Hz 1.5A/115VAC, 0.75A/230VAC Cold start 30A/115VAC, 60A/230VAC 72%
Output Voltage & Current Rating Temperature Coefficient Ripple Voltage	5V, 5A ±0.03%/°C 100mVp-p
Overload Protection Over Voltage Protection Over Temperature Protection	105 To 150% Rated Output Power 5.75 To 6.75v 135°C Detect on Heatsink of Power Transistor
Dielectric Strength	Between Input and Output Terminals: 3kv, 1 Minute Between Input and Fg: 1.5kv, 1 Minute Between Output and Fg: 0.5kv, 1 Minute
Insulation Resistance	Between Input and Output Terminals/Input and Fg/Output and Fg: 100mω/500VDC
Operating Temperature Storage Temperature Relative Humidity	–10°C to +50°C –20°C to +85°C 10-95%
Mechanical Dimensions (l)x(w)x(h)	3.66" x 3.07" x 2.24" (93mm x 78mm x 57mm)
Terminal Screw	M3

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







Terminal Pin No. Assignment

Pin No.	Assignment	Pin No.	Assignment
1	AC/L	6,7	DC OUTPUT+V
2	AC/N	8	LED
3	FG ⏚	9	+VADJ.
4,5	DC OUTPUT-V		

FEATURES

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

BENEFITS

- Small and Lightweight
- Performance Matching Dataforth Signal Conditioning Module Requirements
- Wide Input Voltage Range
- More Efficient Than A Linear Power Supply
- Convenient System Expansion and Repair

APPLICATIONS

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Designed for Industrial Plant Environments
- High-vibration Environments
- Dataforth Signal Conditioning Modules

Figure 4: PWR-4505 Physical Dimensions

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SCMXCA006-01, -02, -07

Interface Cables

DESCRIPTION

The SCMXCA006-xx is a system interface cable for the 8BP04/08/16 backpanels. This interface cable is a DB25 Male/Female cable assembly. It can be ordered in lengths of 1m, 2m, and 7m (see Figure 5).

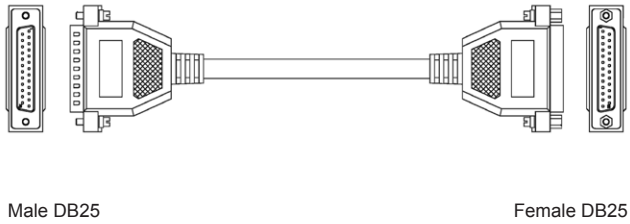


Figure 5: SCMXCA006-XX System Interface Cable

8BXIF (-DIN)

Universal Interface Board

DESCRIPTION

The 8BXIF is a universal interface board which converts a DB25 cable input to 25 screw terminals for discrete wire. It can be mounted on the back of the SCMXRK-002 mounting rack (8BXIF) or on a DIN-rail (8BXIF-DIN). Required mounting hardware is included. Use SCMXCA006-XX cable (see Figure 6 for dimensions).

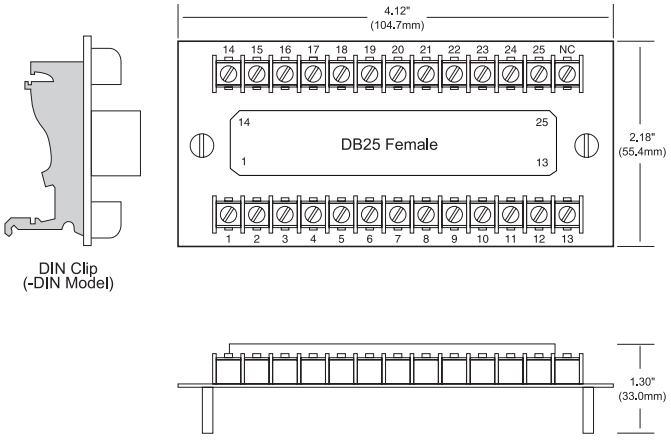


Figure 6: 8BXIF Universal Interface Board Dimensions

SCMXRK-002

19-inch Metal Mounting Rack

DESCRIPTION

The SCMXRK-002 is a 19-inch metal rack for mounting the 8BP04/08/16 backpanels and the 8BXIF interface board (see Figure 7 for dimensions).

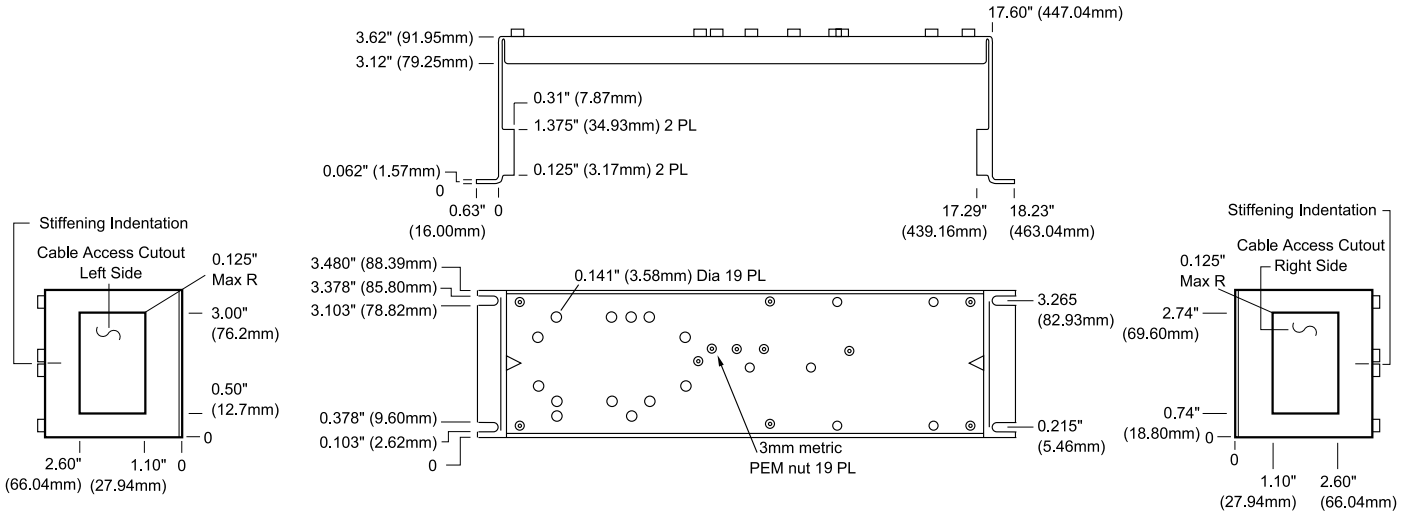


Figure 7: SCMXRK-002 Metal Rack Dimensions

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SCMXRAIL1-XX, SCMXRAIL2-XX, SCMXRAIL3-XX

DIN-rail

RoHS III COMPLIANT 2015/863 CE

DESCRIPTION

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

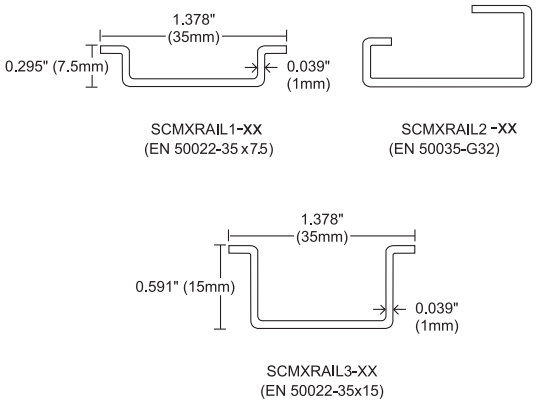


Figure 8: DIN-rail Styles

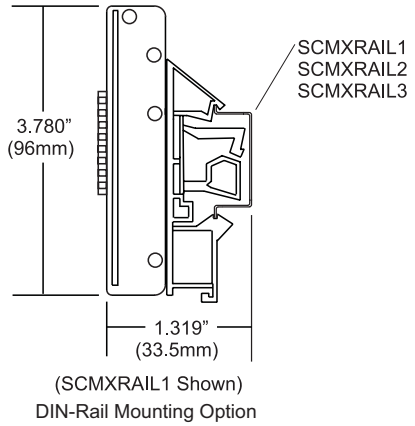


Figure 9: 8BPxx-2, 8BPxx-3 Backpanel DIN-rail Mounting Option

Ordering Information

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

8B-PROTO

Breadboard Kit

RoHS III COMPLIANT 2015/863 CE

DESCRIPTION

The 8B-PROTO breadboard kit was designed to allow users to incorporate their own module functions using an 8B format. The kit includes a PC board with pins designed for breadboard circuits, a module case, header and mounting screw. Contact the factory for additional information.

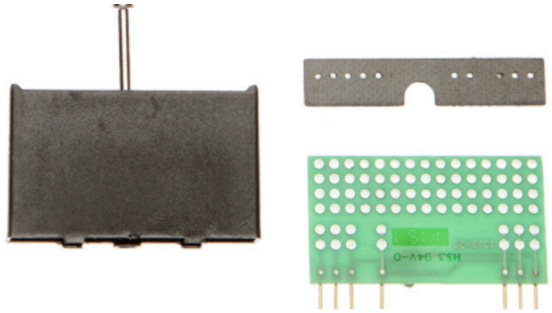


Figure 10: 8B-PROTO Breadboard Kit

8BXCJC

Cold Junction Compensation Sensor

RoHS III COMPLIANT 2015/863 CE

DESCRIPTION

Packaged for use in customer-designed mounting boards. This part has an initial tolerance of ±0.25% and comes in a standard 1206 resistor format.

8BPT

Pass thru Module

RoHS III COMPLIANT 2015/863 CE

DESCRIPTION

The 8BPT is a pass-through module used to establish a direct connection between an input signal and the 8B series backplane analog bus. It has unity gain and no isolation. It accepts up to ±10V input and provides up to ±10V output.

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DATAFORTH®

2024 Catalog DSCA

High-performance, DIN, Isolated, Analog Signal Conditioners



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INNOVATION

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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	120 or 250Vrms
Input Signals	(1)	(2)	(1)	(3)
Output Range to System	0-5VDC, 0-10VDC, ±5VDC, ±10VDC, 0-1mA, 0-20mA, 4-20mA	1-5VDC, 0-5VDC, 0-10VDC, ±10VDC	0-5VDC, ±5VDC	RS-232 or RS-485
Output Range to Field	4-20mA, 0-20mA, ±20mA, ±5VDC, ±10VDC, 0-5VDC, 0-10VDC	±10VDC, 4-20mA, 0-20mA	4-20mA, 0-20mA, ±20mA, ±5VDC, ±10VDC, 0-5VDC, 0-10VDC	4-20mA, 0-20mA, 0-1VDC, ±1VDC, 0-5VDC, ±5VDC, 0-10VDC, ±10VDC
Gain/Offset Adjust	Fixed	Fixed	Fixed	Auto Zero, Auto Cal
Accuracy	0.03% 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, & 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 & Reactive Energy	±0.25%	
Phase Angles	±0.1%	
Line Periods	±0.1%	
Measurement Bandwidth		
RMS Voltage & 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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DSCA

High-performance, DIN-mountable, Isolated Analog Signal Conditioners



DESCRIPTION

Each *Instrument-Class*® DSCA module provides a single channel of isolated analog input or output. Input modules accept analog voltage or current signals from all types of field sensors and sources, and filter, isolate, amplify, linearize, and convert these input signals to high-level analog outputs suitable for use in data acquisition, test and measurement, and control system applications. Output modules accept high-level analog voltage signals from a system, then buffer, isolate, filter, and amplify them before providing a current or voltage output to a field device.

FEATURES

- Accepts Millivolt and Voltage Level Signals
- Industry-standard Output of 0 to +10V, ±10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 160dB CMR
- 85dB NMR at 60Hz, 80dB NMR at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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

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DSCA Selection Guide

†OUTPUT RANGES AVAILABLE

Output Range	Part No. Suffix	Example
1. –10V to +10V	None	DSCA30-01
2. 0V to +10V	None	DSCA30-04
3. 4-20mA	C	DSCA30-01C
4. 0-20mA	E	DSCA30-04E
5. 0 to +5V	A	DSCA33-01A
6. 0 to 1mA	B	DSCA33-01B

ANALOG VOLTAGE INPUT MODULES, 3Hz BW

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA30-01	–10mV to +10mV	1
DSCA30-02	–50mV to +50mV	1
DSCA30-03	–100mV to +100mV	1
DSCA30-04	–10mV to +10mV	2, 3, 4
DSCA30-05	–50mV to +50mV	2, 3, 4
DSCA30-06	–100mV to +100mV	2, 3, 4
DSCA30-07	0 to +10mV	2, 3, 4
DSCA30-08	0 to +50mV	2, 3, 4
DSCA30-09	0 to +100mV	2, 3, 4
DSCA31-01	–1V to +1V	1
DSCA31-02	–5V to +5V	1
DSCA31-03	–10V to +10V	1
DSCA31-04	–1V to +1V	2, 3, 4
DSCA31-05	–5V to +5V	2, 3, 4
DSCA31-06	–10V to +10V	2, 3, 4
DSCA31-07	–20V to +20V	1
DSCA31-08	–20V to +20V	2, 3, 4
DSCA31-09	–40V to +40V	1
DSCA31-10	–40V to +40V	2, 3, 4
DSCA31-11	0 to +1V	2, 3, 4
DSCA31-12	0 to +5V	2, 3, 4
DSCA31-13	0 to +10V	2, 3, 4
DSCA31-14	0 to +20V	2, 3, 4
DSCA31-15	0 to +40V	2, 3, 4

ANALOG CURRENT INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA32-01	4-20mA	2, 3, 4
DSCA32-02	0-20mA	2, 3, 4
DSCA32-03	±20mA	1

ISOLATED TRUE RMS INPUT MODULES

MODEL	INPUT RANGE (rms)	OUTPUT RANGE (dc)†
DSCA33-01	0 to 100mV	2, 3, 4, 5, 6
DSCA33-02	0 to 1V	2, 3, 4, 5, 6
DSCA33-03	0 to 10V	2, 3, 4, 5, 6
DSCA33-04	0 to 150V	2, 3, 4, 5, 6
DSCA33-05	0 to 300V	2, 3, 4, 5, 6
DSCA33-06	0 to 1A	2, 3, 4, 5, 6
DSCA33-07	0 to 5A	2, 3, 4, 5, 6

LINEARIZED 2- or 3-WIRE RTD-INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE†
100Ω Pt **		
DSCA34-01	–100°C to +100°C (–148°F to +212°F)	2, 3, 4
DSCA34-02	0°C to +100°C (+32°F to +212°F)	2, 3, 4
DSCA34-03	0°C to +200°C (+32°F to +392°F)	2, 3, 4
DSCA34-04	0°C to +600°C (+32°F to +1112°F)	2, 3, 4
DSCA34-05	–50°C to +350°C (–58°F to +662°F)	2, 3, 4
120Ω Ni **		
DSCA34N-01	0°C to +300°C (+32°F to +572°F)	2, 3, 4

POTENTIOMETER-INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA36-01	100Ω	2, 3, 4
DSCA36-02	500Ω	2, 3, 4
DSCA36-03	1kΩ	2, 3, 4
DSCA36-04	10kΩ	2, 3, 4

THERMOCOUPLE-INPUT MODULES

MODEL	TYPE‡	INPUT RANGE	OUTPUT RANGE†
DSCA37J-01	J	–100°C to +760°C (–148°F to +1400°F)	2, 3, 4
DSCA37K-02	K	–100°C to +1350°C (–148°F to +2462°F)	2, 3, 4
DSCA37T-03	T	–100°C to +400°C (–148°F to +752°F)	2, 3, 4
DSCA37E-04	E	0°C to +900°C (+32°F to +1652°F)	2, 3, 4
DSCA37R-05	R	0°C to +1750°C (+32°F to +3182°F)	2, 3, 4
DSCA37S-06	S	0°C to +1750°C (+32°F to +3182°F)	2, 3, 4
DSCA37B-07	B	0°C to +1800°C (+32°F to +3272°F)	2, 3, 4
DSCA37N-08	N	–100°C to +1300°C (–148°F to +2372°F)	2, 3, 4

STRAIN GAUGE INPUT MODULES

MODEL	INPUT	EXCITATION	OUTPUT RANGE†
DSCA38-01	±10mV Full Bridge Input, (3mV/V)	+3.333V	1
DSCA38-02	±30mV Full Bridge Input, (3mV/V)	+10.0V	1
DSCA38-03	±10mV Half Bridge Input, (3mV/V)	+3.333V	1
DSCA38-04	±30mV Half Bridge Input, (3mV/V)	+10.0V	1
DSCA38-05	±20mV Full Bridge Input, (2mV/V)	+10.0V	1
DSCA38-06	±33.3mV Full Bridge Input, (10mV/V)	+3.333V	1
DSCA38-07	±100mV Full Bridge Input, (10mV/V)	+10.0V	1
DSCA38-08	±10mV Full Bridge Input, (3mV/V)	+3.333V	2, 3, 4
DSCA38-09	±30mV Full Bridge Input, (3mV/V)	+10.0V	2, 3, 4
DSCA38-10	±10mV Half Bridge Input, (3mV/V)	+3.333V	2, 3, 4
DSCA38-11	±30mV Half Bridge Input, (3mV/V)	+10.0V	2, 3, 4
DSCA38-12	±20mV Full Bridge Input, (2mV/V)	+10.0V	2, 3, 4
DSCA38-13	±33.3mV Full Bridge Input, (10mV/V)	+3.333V	2, 3, 4
DSCA38-14	±100mV Full Bridge Input, (10mV/V)	+10.0V	2, 3, 4
DSCA38-15	0 to +10mV Full Bridge Input, (3mV/V)	+3.333V	2, 3, 4
DSCA38-16	0 to +30mV Full Bridge Input, (3mV/V)	+10.0V	2, 3, 4
DSCA38-17	0 to +10mV Half Bridge Input, (3mV/V)	+3.333V	2, 3, 4
DSCA38-18	0 to +30mV Half Bridge Input, (3mV/V)	+10.0V	2, 3, 4
DSCA38-19	0 to +20mV Full Bridge Input, (2mV/V)	+10.0V	2, 3, 4
DSCA38-20	0 to +33.3mV Full Bridge Input, (10mV/V)	+3.333V	2, 3, 4
DSCA38-21	0 to +100mV Full Bridge Input, (10mV/V)	+10.0V	2, 3, 4

CURRENT OUTPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
DSCA39-01	0V to +10V	4-20mA
DSCA39-02	–10V to +10V	4-20mA
DSCA39-03	0V to +10V	4-20mA
DSCA39-04	–10V to +10V	4-20mA
DSCA39-05	0mA to 20mA	4-20mA
DSCA39-07	–10V to +10V	4-20mA

ANALOG VOLTAGE INPUT MODULES, 3kHz BW

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA40-01	–10mV to +10mV	1
DSCA40-02	–50mV to +50mV	1
DSCA40-03	–100mV to +100mV	1
DSCA40-04	–10mV to +10mV	2, 3, 4
DSCA40-05	–50mV to +50mV	2, 3, 4
DSCA40-06	–100mV to +100mV	2, 3, 4
DSCA40-07	0 to +10mV	2, 3, 4
DSCA40-08	0 to + 50mV	2, 3, 4
DSCA40-09	0 to +100mV	2, 3, 4

SECTION 4 - DSCA

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DSCA Selection Guide (Continued)

†OUTPUT RANGES AVAILABLE

Output Range	Part No. Suffix	Example
1. –10V to +10V	None	DSCA30-01
2. 0V to +10V	None	DSCA30-04
3. 4-20mA	C	DSCA30-01C
4. 0-20mA	E	DSCA30-04E
5. 0 to +5V	A	DSCA33-01A
6. 0 to 1mA	B	DSCA33-01B

ANALOG VOLTAGE INPUT MODULES, 3kHz BW

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA41-01	–1V to +1V	1
DSCA41-02	–5V to +5V	1
DSCA41-03	–10V to +10V	1
DSCA41-04	–1V to +1V	2, 3, 4
DSCA41-05	–5V to +5V	2, 3, 4
DSCA41-06	–10V to +10V	2, 3, 4
DSCA41-07	–20V to +20V	1
DSCA41-08	–20V to +20V	2, 3, 4
DSCA41-09	–40V to +40V	1
DSCA41-10	–40V to +40V	2, 3, 4
DSCA41-11	0 to +1V	2, 3, 4
DSCA41-12	0 to +5 V	2, 3, 4
DSCA41-13	0 to +10V	2, 3, 4
DSCA41-14	0 to +20V	2, 3, 4
DSCA41-15	0 to +40V	2, 3, 4

2-WIRE TRANSMITTER INTERFACE MODULES

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA42-01	4-20mA	2, 3, 4
DSCA42-02	4-20mA	2V to +10V

GENERAL-PURPOSE INPUT MODULES, DC EXCITATION

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA43-01	–1V to +1V	1
DSCA43-02	–2V to +2V	1
DSCA43-03	–3V to +3V	1
DSCA43-04	–4V to +4V	1
DSCA43-05	–5V to +5V	1
DSCA43-06	–6V to +6V	1
DSCA43-07	–7V to +7V	1
DSCA43-08	–8V to +8V	1
DSCA43-09	–9V to +9V	1
DSCA43-10	–10V to +10V	1
DSCA43-11	–1V to +1V	2, 3, 4
DSCA43-12	–2V to +2V	2, 3, 4
DSCA43-13	–3V to +3V	2, 3, 4
DSCA43-14	–4V to +4V	2, 3, 4
DSCA43-15	–5V to +5V	2, 3, 4
DSCA43-16	–6V to +6V	2, 3, 4
DSCA43-17	–7V to +7V	2, 3, 4
DSCA43-18	–8V to +8V	2, 3, 4
DSCA43-19	–9V to +9V	2, 3, 4
DSCA43-20	–10V to +10V	2, 3, 4

FREQUENCY INPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA45-01	0 to 500Hz	2, 3, 4
DSCA45-02	0 to 1kHz	2, 3, 4
DSCA45-03	0 to 2.5kHz	2, 3, 4
DSCA45-04	0 to 5kHz	2, 3, 4
DSCA45-05	0 to 10kHz	2, 3, 4
DSCA45-06	0 to 25kHz	2, 3, 4
DSCA45-07	0 to 50kHz	2, 3, 4
DSCA45-08	0 to 100kHz	2, 3, 4

LINEARIZED THERMOCOUPLE-INPUT MODULES

MODEL	TYPE‡	INPUT RANGE	OUTPUT RANGE‡
DSCA47J-01	J	0°C to +760°C (+32°F to +1400°F)	2, 3, 4
DSCA47J-02	J	–100°C to +300°C (–148°F to +572°F)	2, 3, 4
DSCA47J-03	J	0°C to +500°C (+32°F to +932°F)	2, 3, 4
DSCA47K-04	K	0°C to +1000°C (+32°F to +1832°F)	2, 3, 4
DSCA47K-05	K	0°C to +500°C (+32°F to +932°F)	2, 3, 4
DSCA47K-13	K	–100°C to +1350°C (–148°F to +2462°F)	2, 3, 4
DSCA47K-14	K	0°C to +1200°C (+32°F to +2192°F)	2, 3, 4
DSCA47T-06	T	–100°C to +400°C (–148°F to +752°F)	2, 3, 4
DSCA47T-07	T	0°C to +200°C (+32°F to +392°F)	2, 3, 4
DSCA47E-08	E	0°C to +1000°C (+32°F to +1832°F)	2, 3, 4
DSCA47R-09	R	+500°C to +1750°C (+932°F to +3182°F)	2, 3, 4
DSCA47S-10	S	+500°C to +1750°C (+932°F to +3182°F)	2, 3, 4
DSCA47B-11	B	+500°C to +1800°C (+932°F to +3272°F)	2, 3, 4
DSCA47N-15	N	–100°C to +1300°C (–148°F to +2372°F)	2, 3, 4

VOLTAGE OUTPUT MODULES

MODEL	INPUT RANGE	OUTPUT RANGE
DSCA49-04	0Vto +10V	–10V to +10V
DSCA49-05	–10Vto +10V	–10V to +10V
DSCA49-06	–10Vto +10V	0V to +10V

ACCESSORIES

SCMXRAIL1-XX	DIN EN 50022-35 x 7.5 (Slotted Steel), Length -xx, in Meters
SCMXRAIL3-XX	DIN EN 50022-35 x 15 (Slotted Steel), Length -xx, in Meters

POWER SUPPLIES

PWR-PS5R7W	Power Supply, 24V, 0.3A, 100-240VAC Input
PWR-PS5R15W	Power Supply, 24V, 0.65A, 100-240VAC Input
PWR-PS5R30W	Power Supply, 24V, 1.3A, 100-240VAC Input
PWR-PS5R60W	Power Supply, 24V, 2.5A, 100-240VAC Input
PWR-PS5R120W	Power Supply, 24V, 5.0A, 100-240VAC Input

‡THERMOCOUPLE ALLOY COMBINATIONS

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

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

**RTD STANDARDS

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

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA30/31

Analog Voltage-input Signal Conditioners, Narrow Bandwidth

DESCRIPTION

Each DSCA30/31 voltage-input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

Module output is either voltage or current. For current-output models a dedicated loop supply is provided at Terminal 3 (+OUT) with loop return located at Terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

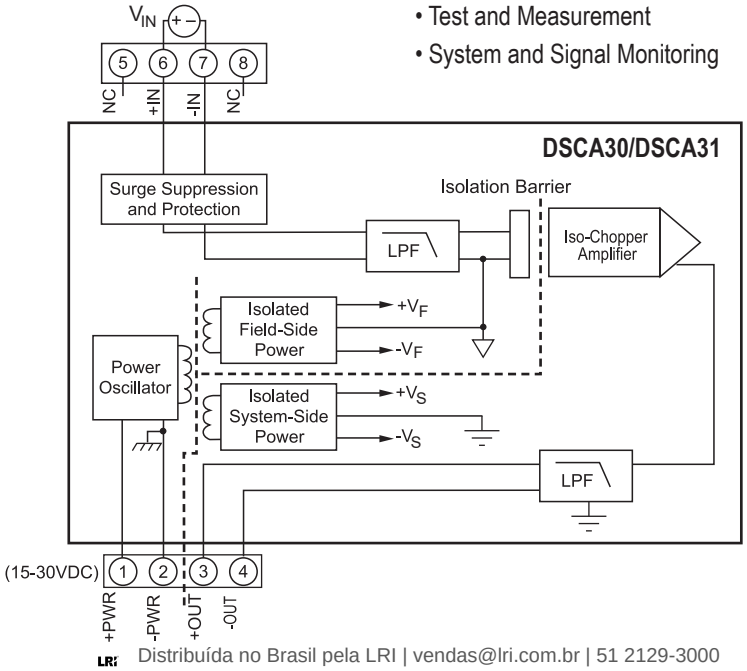
- Accepts Millivolt and Voltage Level Signals
- Industry-standard Output of 0 to +10V, ±10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 160dB CMR
- 85dB NMR at 60Hz, 80dB NMR at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA30/DSCA31 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA30	DSCA31
Input Range	±10mV to ±100mV	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (min)
Power Off	65kΩ	500kΩ (min)
Overload	65kΩ	500kΩ (min)
Input Protection		
Continuous	240Vrms (max)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output Range	See Ordering Information	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection		
Short to Ground	Continuous	Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power		
Continuous	1500Vrms (max)	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Output to Power		
Continuous	50VDC (max)	50VDC (max)
CMR (50Hz or 60Hz)	160dB	160dB
Accuracy(1)	±0.03% Span	±0.03% Span
Linearity	±0.01% Span	±0.01% Span
Adjustability	±5% Zero and Span	±5% Zero and Span
Stability		
Input Offset	±0.5µV/°C	±5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Zero Suppression	±50ppm(V_z)(2)/°C	±50ppm(V_z)(2)/°C
Gain	±35ppm/°C	±55ppm/°C
Output Noise, 100kHz BW	250µVrms (V_{OUT}), 1µArms (I_{OUT})	250µVrms (V_{OUT}), 1µArms (I_{OUT})
Bandwidth, –3dB	3Hz	3Hz
NMR	85dB at 60Hz, 80dB at 50Hz	85dB at 60Hz, 80dB at 50Hz
Response Time, 90% Span	165ms	165ms
Power Supply		
Voltage	15 to 30VDC	15 to 30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%	±0.0001%/%
Protection		
Reverse Polarity	Continuous	Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Mechanical 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)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental		
Operating Temp. Range	–40°C to +80°C	–40°C to +80°C
Storage Temp. Range	–40°C to +80°C	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD,EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.
(2) V_z is the nominal input voltage that results in 0V or 0mA output.

Ordering Information

Model	Input Range	Output Range†
DSCA30-01	–10mV to +10mV	1
DSCA30-02	–50mV to +50mV	1
DSCA30-03	–100mV to +100mV	1
DSCA30-04	–10mV to +10mV	2, 3, 4
DSCA30-05	–50mV to +50mV	2, 3, 4
DSCA30-06	–100mV to +100mV	2, 3, 4
DSCA30-07	0 to +10mV	2, 3, 4
DSCA30-08	0 to +50mV	2, 3, 4
DSCA30-09	0 to +100mV	2, 3, 4
DSCA31-01	–1V to +1V	1
DSCA31-02	–5V to +5V	1
DSCA31-03	–10V to +10V	1
DSCA31-04	–1V to +1V	2, 3, 4
DSCA31-05	–5V to +5V	2, 3, 4
DSCA31-06	–10V to +10V	2, 3, 4
DSCA31-07	–20V to +20V	1
DSCA31-08	–20V to +20V	2, 3, 4
DSCA31-09	–40V to +40V	1
DSCA31-10	–40V to +40V	2, 3, 4
DSCA31-11	0 to +1V	2, 3, 4
DSCA31-12	0 to +5V	2, 3, 4
DSCA31-13	0 to +10V	2, 3, 4
DSCA31-14	0 to +20V	2, 3, 4
DSCA31-15	0 to +40V	2, 3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	DSCA30-01
2. 0V to +10V	NONE	DSCA30-04
3. 4-20mA	C	DSCA30-04C
4. 0-20mA	E	DSCA30-04E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA32

Analog Current-input Signal Conditioners

DESCRIPTION

Each DSCA32 current-input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter which is optimized for step response. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

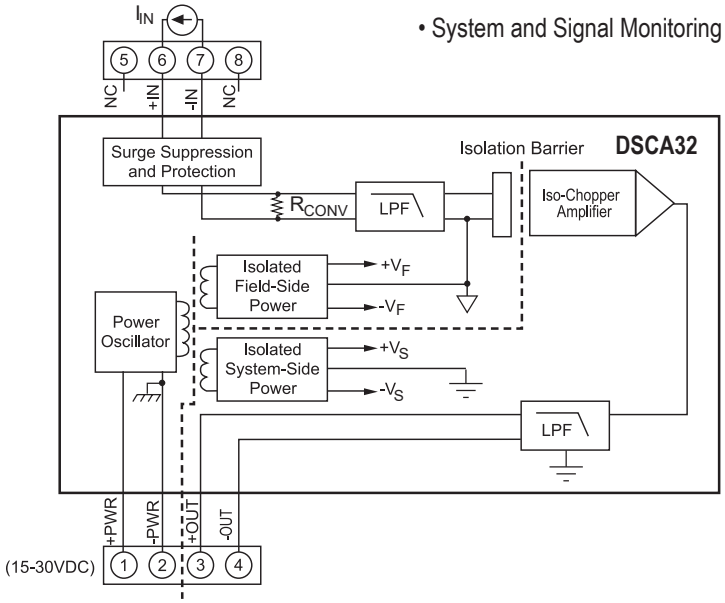
- Accepts mA Level Signals
- Industry-standard Output of 0 to +10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 105dB CMR
- 5-Pole Filtering
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA32 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA32
Input Range	0-20mA, 4-20mA, ±20mA
Input Resistance	
Normal	<100Ω
Power Off	<100Ω
Overload	65kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	105dB
Accuracy(1)	±0.03% Span
Linearity	±0.01% Span
Adjustability	±5% Zero and Span
Stability	
Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±40ppm/°C
Output Noise, 100kHz Bandwidth	300µVrms (V_{OUT}), 1µArms (I_{OUT})
Bandwidth, –3dB	100Hz
NMR (–3dB at 100Hz)	100dB per Decade above 100Hz
Response Time, 90% Span	5ms
Power Supply	
Voltage	15-30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA32-01	4-20mA	2, 3, 4
DSCA32-02	0-20mA	2, 3, 4
DSCA32-03	±20mA	1

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	None	DSCA32-03
2. 0V to +10V	None	DSCA32-01
3. 4-20mA	C	DSCA32-01C
4. 0-20mA	E	DSCA32-02E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA33

Isolated True RMS Input Signal Conditioners

DESCRIPTION

Each DSCA33 True RMS input module provides a single channel of AC input which is converted to its True RMS DC value, filtered, isolated, amplified, and converted to standard process voltage or current output (Figure below).

The field-voltage or current-input signal is processed through an AC coupled pre-amplifier and RMS converter on the field side of the isolation barrier. The converted DC signal is then filtered and chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common-mode spikes and surges. The computer-side circuitry reconstructs, filters, and converts the signal to industry-standard outputs.

Module output is either voltage or current. For current-output models, a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of power-line voltages up to 480VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are pluggable terminal blocks for ease of system assembly and reconfiguration.

DSCA33 modules have excellent stability over time and do not require recalibration, however, both zero and span settings are adjustable to accommodate situations where fine tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

Due to circuit limitations, DSCA33-04x and -05x are not ATEX compliant.

FEATURES

- Interfaces RMS Voltage (0 – 300V) or RMS Current (0 – 5A)
- Designed for Standard Operation with Frequencies of 45Hz to 1000Hz (Extended Range Operation to 20kHz)
- Compatible with Standard Current and Potential Transformers
- Industry Standard Output of 0 to 1mA, 0-20mA, or 4-20mA, 0 to +5V, or 0 to +10V
- ±0.25% Factory Calibrated Accuracy (Accuracy Class 0.2)
- ±5% Adjustable Zero and Span
- 1500Vrms Transformer Isolation
- Input Overload Protected to 480V (Peak AC and DC) or 10Arms Continuous
- 100dB CMR
- ANSI/IEEE C37.90.1 Transient Protection
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed and CE Compliant
- ATEX Compliant (all models except DSCA33-04x, -05x)
- Manufactured per RoHS III Directive 2015/863

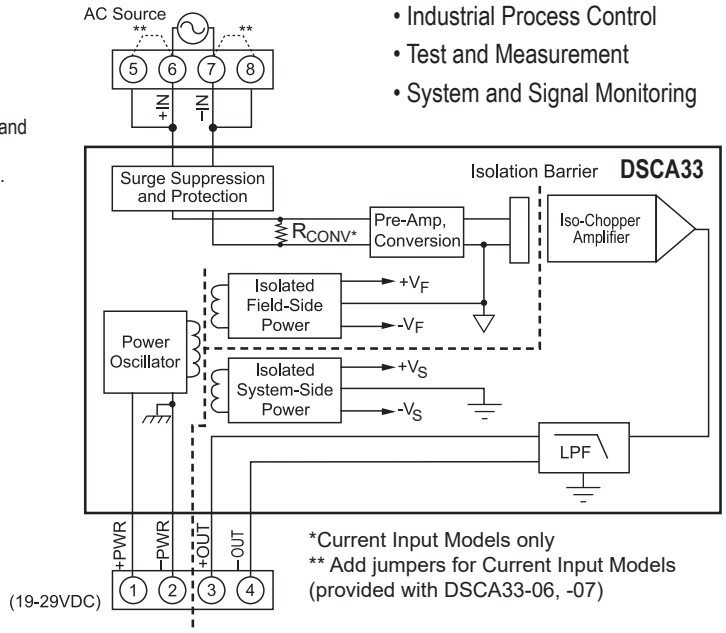
BENEFITS

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

APPLICATIONS

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

WARNING: The DSCA33 interfaces to hazardous voltages and should only be wired by qualified personnel or licensed electricians.



*Current Input Models only
** Add jumpers for Current Input Models (provided with DSCA33-06, -07)

DSCA33 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA33
Input	
Signal Range	0mV to 300Vrms, 0 to 5Arms
Standard Frequency Range	45Hz to 1000Hz
Extended Frequency Range	1kHz to 20kHz
Impedance	499KΩ // <100pF (-01 thru -05), 0.10Ω (-06), 0.025Ω (-07)
Coupling	AC
Protection	
Continuous (-01 thru -05)	350Vrms
Continuous (-06 thru -07)	5Arms (-06), 10Arms (-07) (max)
Transient (-01 thru -05)	ANSI/IEEE C37.90.1
Transient (-06 thru -07)	See Note 1
Output	
Signal Range	See Ordering Information
Adjustability	±5% Zero & Span
Load Resistance	10kΩ (max) (0-1mA Models), 600Ω (max) (0/4-20mA Models)
Current Limit	1.4mA (0-1mA Models), 30mA (0/4-20mA models), 8mA (0-5/10V Models)
Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
Ripple and Noise	<0.025% Span rms
Accuracy (10-100% Span)(2) (3)	
Sinusoid	
50/60Hz	±0.25% Span
45Hz-1kHz	±0.25% Reading Additional Error
1kHz-20kHz	±0.75% Reading Additional Error
Non-Sinusoid	
Crest Factor = 1 to 2	±0.05% Reading Additional Error
Crest Factor = 2 to 3	±0.15% Reading Additional Error
Crest Factor = 3 to 4	±0.30% Reading Additional Error
Crest Factor = 4 to 5	±0.40% Reading Additional Error
Vs. Temperature	±100ppm/°C
Isolation (Common Mode)	
Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output to Power	
Continuous	50VDC (max)
Response Time (0 to 99%)	<400ms
CMR (50 or 60Hz)	100dB
Power Supply	
Voltage	19 to 29VDC
Current	45mA (V_{OUT}), 65mA (I_{OUT})
Sensitivity	±0.0002%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
HazLoc ATEX	All models except DSCA33-04x, -05x
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.83% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) For 1 to 25 seconds the max allowable transient current rating is √ 2500 / (event time). For less than 1 second, ANSI/IEEE C37.90.1 applies with a 0.05Ω load. For greater than 25 seconds, the 10A (max) continuous rating applies.
(2) For 0-10% Span measurements, add 0.25% accuracy error (-02 thru -07) or 1.00% accuracy error (-01). Accuracy includes linearity, hysteresis, and repeatability but not source or external shunt inaccuracy (if used).
(3) At standard 60Hz factory calibration (90Hz for -01, -06). Consult factory for calibration at other frequencies.

Ordering Information

Model	Input (rms)†	Output (DC)†
DSCA33-01	0mV to 100mV	2, 3, 4, 5, 6
DSCA33-02	0V to 1V	2, 3, 4, 5, 6
DSCA33-03	0V to 10V	2, 3, 4, 5, 6
DSCA33-04	0V to 150V	2, 3, 4, 5, 6
DSCA33-05	0V to 300V	2, 3, 4, 5, 6
DSCA33-06	0A to 1A	2, 3, 4, 5, 6
DSCA33-07	0A to 5A	2, 3, 4, 5, 6

†Modules can be ordered with other input/output ranges.
Consult factory for ordering details and specifications

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	N/A	N/A
2. 0V to +10V	NONE	DSCA33-01
3. 4-20mA	C	DSCA33-01C
4. 0-20mA	E	DSCA33-01E
5. 0 to +5V	A	DSCA33-01A
6. 0 to 1mA	B	DSCA33-01B

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA34

Linearized 2- or 3-wire RTD-input Signal Conditioners

DESCRIPTION

Each DSCA34 RTD-input module provides a single channel of RTD input which is filtered, isolated, amplified, linearized, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An antialiasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

RTD excitation is provided from the module using a precision current source. Lead compensation is achieved by matching two current paths which cancels the effects of lead resistance. The excitation current is small (approx. 0.25mA) which minimizes self-heating of the RTD.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of powerline voltages up to 240VAC and against transient events as defined by ANSI/ IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease-of-system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration, however, zero and span settings are adjustable up to ±3% to accommodate; situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

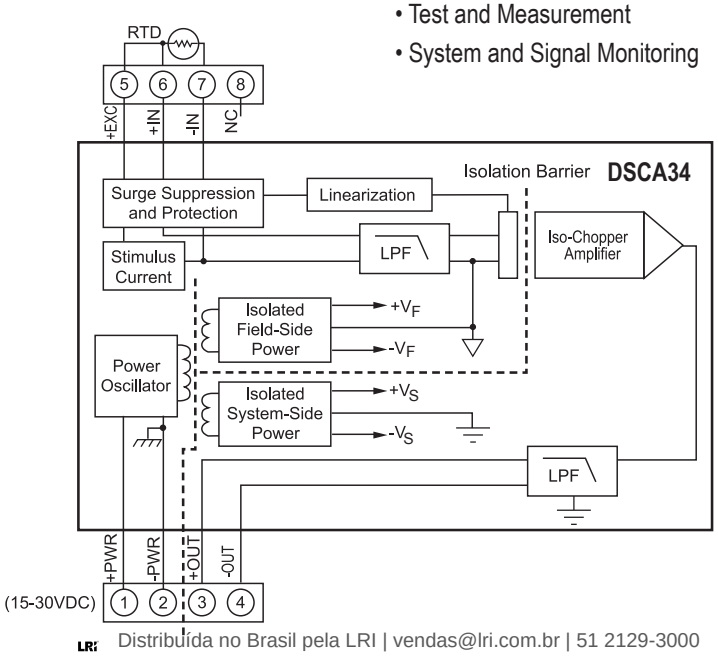
- Interfaces to 100Ω Platinum or 120Ω Nickel RTDs
- Linearizes RTD Signal
- Industry-standard Output of 0 to +10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 160dB CMR
- 85dB NMR at 60Hz, 80dB NMR at 50Hz
- ±0.08% Accuracy
- ±0.025% Conformity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



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DSCA34 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA34
Input Range Limits	–200°C to +850°C (100Ω Pt) –80°C to +320°C (120Ω Ni)
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	≈ 250µA
Lead Resistance Effect	±0.02°C/Ω
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	160dB
Accuracy	See Ordering Information
Conformity	±0.025% (100Ω Pt) ±0.07% (120Ω Ni)
Adjustability	±3% Zero and Span
Stability	
Input Offset	±1µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±60ppm/°C
Output Noise, 100kHz Bandwidth	250µVrms (V_{OUT}), 1µArms (I_{OUT})
Bandwidth, –3dB	3Hz
NMR	85dB at 60Hz, 80dB at 50Hz
Response Time, 90% Span	165ms
Open Input Response	
+IN	Upscale
–IN	Non-deterministic
+EXC	Downscale
Power Supply	
Voltage	15 to 30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range†	Accuracy(1)	
100Ω Pt				
DSCA34-01	–100°C to +100°C (–148°F to +212°F)	2, 3, 4	±0.08%	±0.16°C
DSCA34-02	0°C to +100°C (+32°F to +212°F)	2, 3, 4	±0.10%	±0.10°C
DSCA34-03	0°C to +200°C (+32°F to +392°F)	2, 3, 4	±0.08%	±0.16°C
DSCA34-04	0°C to +600°C (+32°F to +1112°F)	2, 3, 4	±0.05%	±0.30°C
DSCA34-05	–50°C to +350°C (–58°F to +662°F)	2, 3, 4	±0.05%	±0.20°C
120Ω Ni				
DSCA34N-01	0°C to +300°C (+32°F to +572°F)	2, 3, 4	±0.15%	±0.45°C

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	N/A
2. 0V to +10V	NONE	DSCA34-01
3. 4-20mA	C	DSCA34-01C
4. 0-20mA	E	DSCA34-01E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

RTD Standards

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

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA36

Potentiometer-input Signal Conditioners

DESCRIPTION

Each DSCA36 potentiometer-input module provides a single channel of potentiometer-input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Potentiometer excitation is provided from the module using a precision current source. Lead compensation is achieved by matching two current paths which cancels the effects of lead resistance. The excitation current is small (approx. 0.25mA) which minimizes self-heating of the sensor.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of powerline voltages up to 240VAC and against transient events as defined by ANSI/ IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

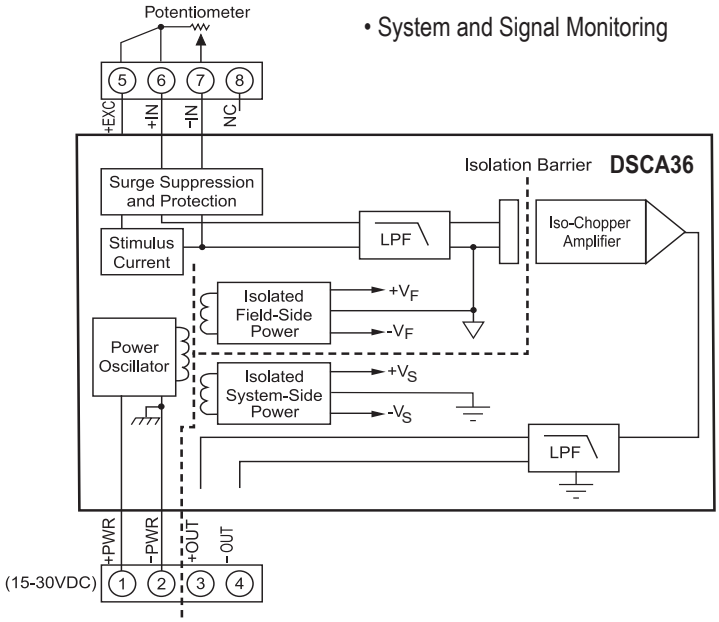
- Interfaces to Potentiometers up to 10kΩ
- Industry-standard Output of 0 to +10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 160dB CMR
- 85dB NMR at 60Hz, 80dB NMR at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA36 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA36
Input Range Limits	0Ω to 10kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	260µA; 100Ω, 500Ω, 1kΩ Sensor 65µA; 10kΩ Sensor
Lead Resistance Effect	±0.01Ω/Ω; 100Ω, 500Ω, 1kΩ Sensor ±0.02Ω/Ω; 10kΩ Sensor
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA(I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	160dB
Accuracy(1)	±0.03%
Conformity	±0.01%
Adjustability	±5% Zero and Span
Stability	
Input Offset	±0.004Ω/°C; 100Ω, 500Ω, 1kΩ Sensor ±0.01Ω/°C; 10kΩ Sensor
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±60ppm/°C
Output Noise, 100kHz Bandwidth	250µVrms (V_{OUT}), 1µArms (I_{OUT})
Bandwidth, –3dB	3Hz
NMR	85dB at 60Hz, 80dB at 50Hz
Response Time, 90% Span	165ms
Open Input Response	
+IN	Upscale
–IN	Non-deterministic
+EXC	Downscale
Power Supply	
Voltage	15 to 30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA36-01	0 to 100Ω	2, 3, 4
DSCA36-02	0 to 500Ω	2, 3, 4
DSCA36-03	0 to 1kΩ	2, 3, 4
DSCA36-04	0 to 10kΩ	2, 3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	N/A
2. 0V to +10V	NONE	DSCA36-01
3. 4-20mA	C	DSCA36-01C
4. 0-20mA	E	DSCA36-01E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA37

Non-linearized Thermocouple-input Signal Conditioners

DESCRIPTION

Each DSCA37 non-linearized thermocouple-input module provides a single channel of thermocouple-input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

The DSCA37 can interface to eight industry-standard thermocouple types: J, K, T, E, R, S, B and N. Each module has cold-junction compensation to correct for parasitic thermocouples formed by the thermocouple wire and input screw terminals on the module. Upscale open thermocouple detection is provide by internal circuitry. Downscale indication can be implemented by installing a 47MΩ, ±20% resistor between screw terminals 6 and 8 on the input terminal block.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

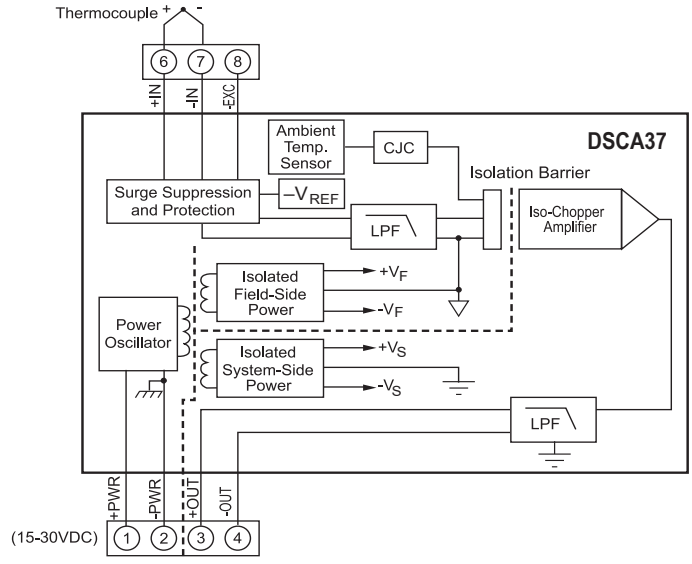
- Interfaces to Types J, K, T, E, R, S, B, and N Thermocouples
- Industry-standard Output of 0 to +10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 160dB CMR
- 85dB NMR at 60Hz, 80dB NMR at 50Hz
- ±0.05% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA37 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA37
Input Range	Standard Thermocouple Temperature Limits as per NIST Monograph 175, ITS-90
Input Bias Current	–30nA
Input Resistance	
Normal	50MΩ
Power Off	65kΩ
Overload	65kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Cold Junction Compensation	
Accuracy, +5°C to +45°C	±0.5°C
Accuracy, –40°C to +80°C	±1.25°C
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	160dB
Accuracy(1)	See Ordering Information
Linearity	±0.01% Span
Adjustability	±5% Zero and Span
Stability	
Input Offset	±0.5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±35ppm/°C
Output Noise, 100kHz Bandwidth	250µVrms (V_{OUT}), 1µArms (I_{OUT})
Bandwidth, –3dB	3Hz
NMR	85dB at 60Hz, 80dB at 50Hz
Response Time, 90% Span	165ms
Open Input Response	Upscale
Open Input Detection Time	<5s
Power Supply	
Voltage	15-30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis, repeatability, and CJC error.

Ordering Information

Model	TC Type	Input Range	Output Range†	Accuracy[1]	
DSCA37J-01	J	–100°C to +760°C (–148°F to +1400°F)	2, 3, 4	±0.05%	±0.43°C
DSCA37K-02	K	–100°C to +1350°C (–148°F to +2462°F)	2, 3, 4	±0.05%	±0.73°C
DSCA37T-03	T	–100°C to +400°C (–148°F to +752°F)	2, 3, 4	±0.05%	±0.25°C
DSCA37E-04	E	0°C to +900°C (+32°F to +1652°F)	2, 3, 4	±0.05%	±0.45°C
DSCA37R-05	R	0°C to +1750°C (+32°F to +3182°F)	2, 3, 4	±0.05%	±0.88°C
DSCA37S-06	S	0°C to +1750°C (+32°F to +3182°F)	2, 3, 4	±0.05%	±0.88°C
DSCA37B-07	B	0°C to +1800°C (+32°F to +3272°F)	2, 3, 4	±0.05%	±0.90°C
DSCA37N-08	N	–100°C to +1300°C (–148°F to +2372°F)	2, 3, 4	±0.05%	±0.70°C

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	N/A
2. 0V to +10V	NONE	DSCA37J-01
3. 4-20mA	C	DSCA37J-01C
4. 0-20mA	E	DSCA37J-01E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

Thermocouple Alloy Combinations

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

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

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA38

Strain Gauge Input Signal Conditioners

DESCRIPTION

Each DSCA38 strain gauge input module provides a single channel of strain gauge input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure 1). Signal filtering is accomplished with a five-pole filter which is optimized for step response. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

The DSCA38 can interface to transducers with a nominal resistance of 100Ω to 10kΩ. Strain gauge excitation is provided from the module by a stable 10V or 3.333V source. This source is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature enables the module to be interfaced to other sensors requiring excitation.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide signal input and excitation protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The zero adjustment can be used to offset bridge imbalances. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

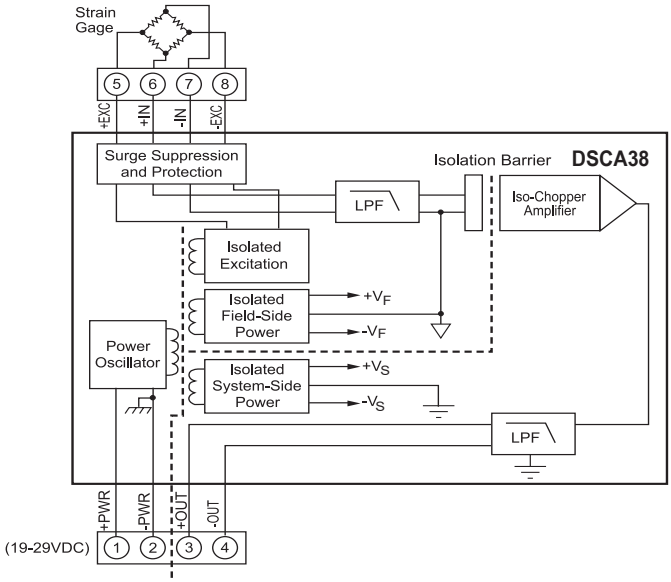
- Interfaces to 100Ω through 10kΩ Strain Gauges
- Industry-standard Output of ±10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 100dB CMR
- Fully Isolated Excitation Supply
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA38 Block Diagram For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA38
Input Range	±10mV to ±100mV
Input Bias Current	±0.5nA
Input Resistance	
Normal	50MΩ
Power Off	65kΩ
Overload	65kΩ
Signal Input Protection	
Continuous	240Vrms (max) (Full Bridge) 120Vrms (max) (Half Bridge)
Transient	ANSI/IEEE C37.90.1
Excitation	
Output	10V ±0.03% or 3.33V ±0.03%
Half Bridge Output Level	Excitation Output/2 ±0.03%
Load Resistance (10V)	300Ω to 10kΩ
Load Resistance (3.33V)	100Ω to 10kΩ
Load Regulation	±5ppm/mA
Stability	±15ppm/°C
Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	100dB
Accuracy(1)	±0.03% Span
Linearity	±0.01% Span
Adjustability	±5% Zero and Span
Stability	
Input Offset	±1µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±55ppm/°C
Output Noise, 100kHz Bandwidth	750µVrms (V_{OUT}), 3µArms (I_{OUT})
Bandwidth, –3dB	3kHz
NMR	100dB per Decade above 3kHz
Response Time, 90% Span	170µs
Power Supply	
Voltage	19 to 29VDC
Current	60mA (V_{OUT}), 80mA (I_{OUT})
Sensitivity	±0.0002%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability. (2) Strain Element.

Ordering Information

Model	Type Bridge Input	Input Range	Excitation	Sens.	Output Range†
DSCA38-01	Full	–10mV to +10mV	+3.333V	3mV/V	1
DSCA38-02	Full	–30mV to +30mV	+10.0V	3mV/V	1
DSCA38-03	Half	–10mV to +10mV	+3.333V	3mV/V	1
DSCA38-04	Half	–30mV to +30mV	+10.0V	3mV/V	1
DSCA38-05	Full	–20mV to +20mV	+10.0V	2mV/V	1
DSCA38-06	Full	–33.3mV to +33.3mV	+3.333V	10mV/V	1
DSCA38-07	Full	–100mV to +100mV	+10.0V	10mV/V	1
DSCA38-08	Full	–10mV to +10mV	+3.333V	3mV/V	2, 3, 4
DSCA38-09	Full	–30mV to +30mV	+10.0V	3mV/V	2, 3, 4
DSCA38-10	Half	–10mV to +10mV	+3.333V	3mV/V	2, 3, 4
DSCA38-11	Half	–30mV to +30mV	+10.0V	3mV/V	2, 3, 4
DSCA38-12	Full	–20mV to +20mV	+10.0V	2mV/V	2, 3, 4
DSCA38-13	Full	–33.3mV to +33.3mV	+3.333V	10mV/V	2, 3, 4
DSCA38-14	Full	–100mV to +100mV	+10.0V	10mV/V	2, 3, 4
DSCA38-15	Full	0 to +10mV	+3.333V	3mV/V	2, 3, 4
DSCA38-16	Full	0 to +30mV	+10.0V	3mV/V	2, 3, 4
DSCA38-17	Half	0 to +10mV	+3.333V	3mV/V	2, 3, 4
DSCA38-18	Half	0 to +30mV	+10.0V	3mV/V	2, 3, 4
DSCA38-19	Full	0 to +20mV	+10.0V	2mV/V	2, 3, 4
DSCA38-20	Full	0 to +33.3mV	+3.333V	10mV/V	2, 3, 4
DSCA38-21	Full	0 to +100mV	+10.0V	10mV/V	2, 3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	DSCA38-01
2. 0V to +10V	NONE	DSCA38-08
3. 4-20mA	C	DSCA38-08C
4. 0-20mA	E	DSCA38-08E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

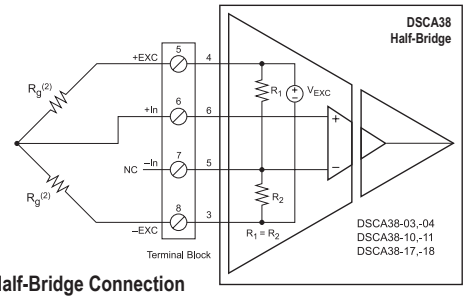


Figure 1: Half-Bridge Connection

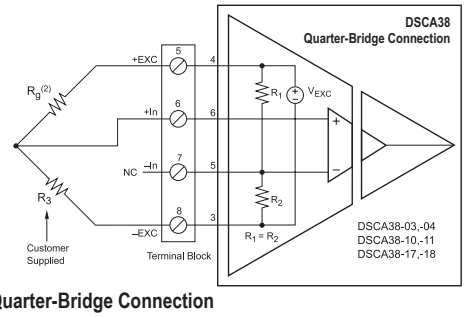


Figure 2: Quarter-Bridge Connection

Installation Notes:
1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B, C, D, or Non-hazardous Locations Only.
2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.
3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.
4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA39

Current-output Signal Conditioners

DESCRIPTION

Each DSCA39 current-output module provides a single channel of analog output. The input signal is buffered, isolated, filtered, and converted to a unipolar or bipolar current output (Figure below). Signal filtering is accomplished with a five-pole filter which provides 100dB per decade of attenuation above 1kHz. An anti-aliasing pole is located on the system side of the isolation barrier, and the other four poles are on the field side. After the initial system-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common- mode spikes or surges.

Special output circuits provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal input and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

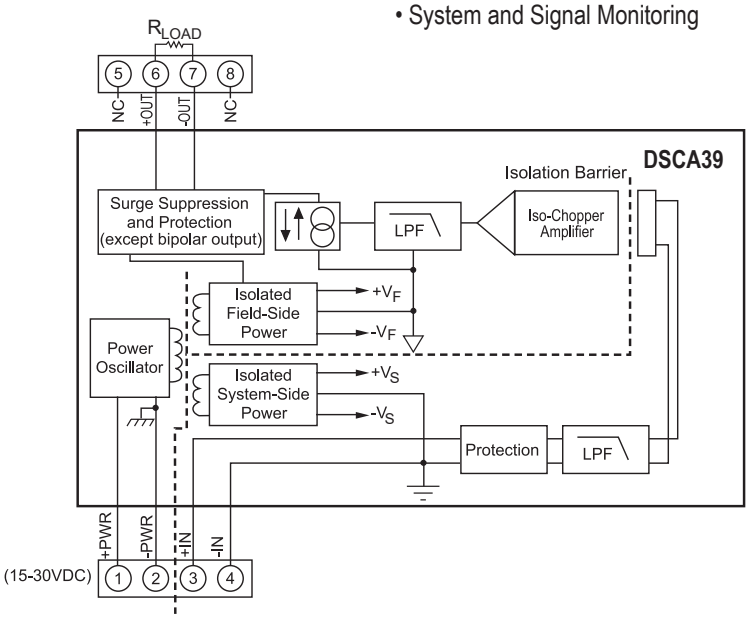
- Accepts High-level Voltage Input
- Provides 4-20mA, 0-20mA, or ±20mA Output
- ANSI/IEEE C37.90.1 Transient Protection
- 1500Vrms Transformer Isolation
- ±0.03% Accuracy
- ±0.01% Linearity
- Output Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 100dB CMR
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA39 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA39-01, -02, -03, -04	DSCA39-05	DSCA39-07
Output Range	4-20mA or 0-20mA	0-20mA	±20mA
Over Range Capability	10%	10%	5%
Output Compliance Voltage (Open Circuit)	22VDC	22VDC	±15VDC
Load Resistance Range	0 to 750Ω	0 to 750Ω	0 to 500Ω
Output Protection			
Continuous	240Vrms (max)	240Vrms (max)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Input Range	±10V or 0V to +10V	0-20mA	±10V
Input Resistance			
Normal	2MΩ	<100Ω	<100Ω
Power Off	2MΩ	<100Ω	<100Ω
Overload	2MΩ	65kΩ	65kΩ
Input Protection			
Continuous	±35V (max)	75mA	±35V (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Output to Input, Output to Power			
Continuous	1500Vrms (max)	1500Vrms (max)	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Power			
Continuous	50VDC (max)	50VDC (max)	50VDC (max)
CMR (50Hz or 60Hz)	110dB	110dB	110dB
Accuracy(1)	±0.03% Span	±0.03% Span	±0.05%
Linearity	±0.01% Span	±0.01% Span	±0.01% Span
Adjustability	±5% Zero and Span	±5% Zero and Span	±5% Zero and Span
Stability			
Offset	±20ppm/°C	±20ppm/°C	±20ppm/°C
Gain	±40ppm/°C	±50ppm/°C	±40ppm/°C
Output Noise, 100kHz Bandwidth	4µArms	4µArms	4µArms
Bandwidth, –3dB	1kHz	1kHz	1kHz
NMR	100dB per Decade Above 1kHz	100dB per Decade Above 1kHz	100dB per Decade Above 1kHz
Response Time, 90% Span	475µs	475µs	475µs
Power Supply			
Voltage	15 to 30VDC	15 to 30VDC	19 to 29VDC
Current	65mA	65mA	65mA
Sensitivity	±0.0003%/%	±0.0003%/%	±0.0003%/%
Protection			
Reverse Polarity	Continuous	Continuous	Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Mechanical 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)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 35x7.5 or 35x15 Rail	DIN EN 50022 35x7.5 or 35x15 Rail	DIN EN 50022 35x7.5 or 35x15 Rail
Environmental			
Operating Temperature Range	–40°C to +80°C	–40°C to +80°C	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C	–40°C to +80°C	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA39-01	0V to +10V	4-20mA
DSCA39-02	–10V to +10V	4-20mA
DSCA39-03	0V to +10V	0-20mA
DSCA39-04	–10V to +10V	0-20mA
DSCA39-05	0mA to 20mA	0-20mA
DSCA39-07	–10V to +10V	±20mA

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	N/A
2. 0V to +10V	NONE	N/A
3. 4-20mA	C	DSCA39-01C
4. 0-20mA	E	DSCA39-01C
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A
7. ±20mA	NONE	DSCA39-07

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA40/41

Analog Voltage-input Signal Conditioners, Wide Bandwidth

DESCRIPTION

Each DSCA40/41 voltage-input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter. An antialiasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of powerline voltages up to 240VAC and against transient events as defined by ANSI/ IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration, however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

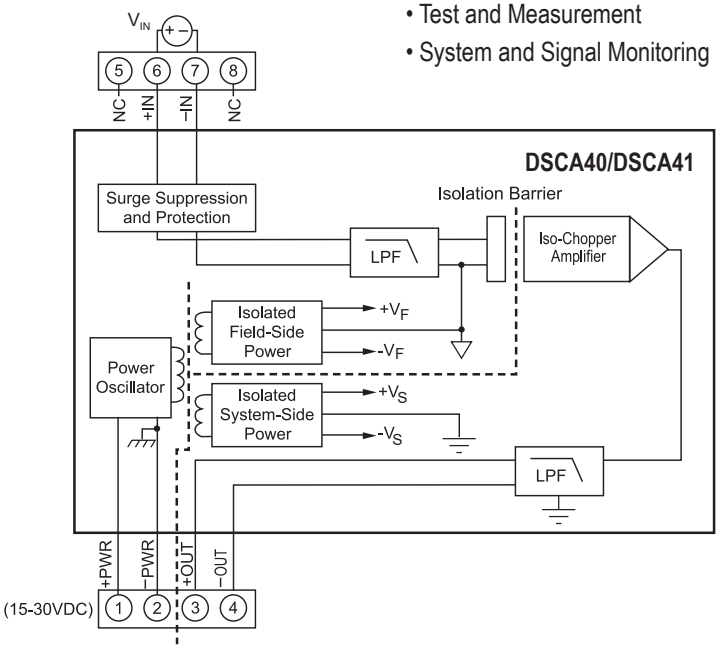
- Accepts mV and Voltage-level Signals
- Industry-standard Output of 0 to +10V, ±10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 100dB CMR
- 3kHz Signal Bandwidth
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA40/DSCA41 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA40	DSCA41
Input Range	+10mV to +100mV	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (min)
Power Off	65kΩ	500kΩ (min)
Overload	65kΩ	500kΩ (min)
Input Protection		
Continuous	240Vrms (max)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output Range	See Ordering Information	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection		
Short to Ground	Continuous	Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power		
Continuous	1500Vrms (max)	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Output to Power		
Continuous	50VDC (max)	50VDC (max)
CMR (50Hz or 60Hz)	100dB	100dB
Accuracy(1)	±0.03% Span	±0.03% Span
Linearity	±0.01% Span	±0.01% Span
Adjustability	±5% Zero and Span	±5% Zero and Span
Stability		
Input Offset	±0.5µV/°C	±5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Zero Suppression	±50ppm(V_z)(2)/°C	±50ppm(V_z)(2)/°C
Gain	±35ppm/°C	±55ppm/°C
Output Noise, 100kHz Bandwidth	500µVrms (V_{OUT}), 2µArms (I_{OUT})	500µVrms (V_{OUT}), 2µArms (I_{OUT})
Bandwidth, –3dB	3kHz	3kHz
NMR	100dB per Decade Above 3kHz	100dB per Decade Above 3kHz
Response Time, 90% Span	170µs	170µs
Power Supply		
Voltage	15-30VDC	15-30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%	±0.0001%/%
Protection		
Reverse Polarity	Continuous	Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Mechanical 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)
Mounting	DIN EN 50022 -35x7.5 or -35x15 Rail	DIN EN 50022 -35x7.5 or -35x15 Rail
Environmental		
Operating Temperature Range	–40°C to +80°C	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C	–40°C to +80°C
Relative Humidity	0to 95% Noncondensing	0to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.
(2) V_z is the nominal input voltage that results in 0V or 0mA output.

Ordering Information

Model	Input Range	Output Range†
DSCA40-01	–10mV to +10mV	1
DSCA40-02	–50mV to +50mV	1
DSCA40-03	–100mV to +100mV	1
DSCA40-04	–10mV to +10mV	2, 3, 4
DSCA40-05	–50mV to +50mV	2, 3, 4
DSCA40-06	–100mV to +100mV	2, 3, 4
DSCA40-07	0 to +10mV	2, 3, 4
DSCA40-08	0 to +50mV	2, 3, 4
DSCA40-09	0 to +100mV	2, 3, 4
DSCA41-01	–1V to +1V	1
DSCA41-02	–5V to +5V	1
DSCA41-03	–10V to +10V	1
DSCA41-04	–1V to +1V	2, 3, 4
DSCA41-05	–5V to +5V	2, 3, 4
DSCA41-06	–10V to +10V	2, 3, 4
DSCA41-07	–20V to +20V	1
DSCA41-08	–20V to +20V	2, 3, 4
DSCA41-09	–40V to +40V	1
DSCA41-10	–40V to +40V	2, 3, 4
DSCA41-11	0 to +1V	2, 3, 4
DSCA41-12	0 to +5V	2, 3, 4
DSCA41-13	0 to +10V	2, 3, 4
DSCA41-14	0 to +20V	2, 3, 4
DSCA41-15	0 to +40V	2, 3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	DSCA40-01
2. 0V to +10V	NONE	DSCA40-04
3. 4-20mA	C	DSCA40-04C
4. 0-20mA	E	DSCA40-04E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA42

2-wire Transmitter-interface Signal Conditioners with Loop Power

DESCRIPTION

Each DSCA42 2-wire transmitter-interface module provides a single channel of 4-20mA process current input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure below). An isolated 24V power supply is provided to power the 2-wire transmitter. Signal filtering is accomplished with a five-pole filter which is optimized for step response. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of powerline voltages up to 240VAC and against transient events as defined by ANSI/ IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

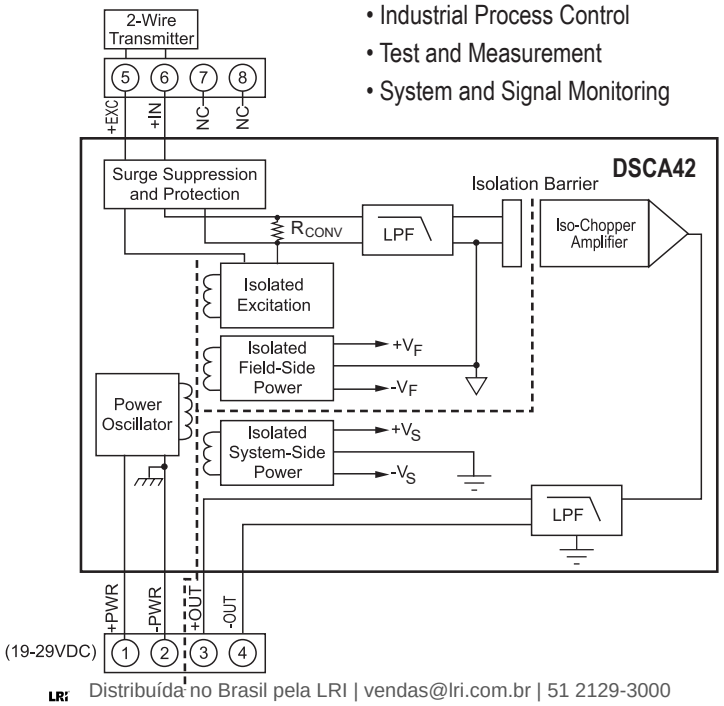
- Accepts Process Loop Signals
- Industry-standard Output of 0 to +10V, 2 to +10V, 0-20mA, or 4-20mA
- Provides Isolated Loop Excitation
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 105dB CMR
- 5-Pole Filtering
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



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DSCA42 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA42
Input Range	4-20mA
Input Resistance	
Normal	<100Ω
Power Off	<100Ω
Overload	65kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Loop Supply Voltage	+20VDC
Isolated Excitation Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	105dB
Accuracy(1)	±0.03% Span
Linearity	±0.01% Span
Adjustability	±5% Zero and Span
Stability	
Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±40ppm/°C
Output Noise, 100kHz Bandwidth	300µVrms (V_{OUT}), 1.5µArms (I_{OUT})
Bandwidth, –3dB	100Hz
NMR (–3dB at 100Hz)	100dB per Decade above 100Hz
Response Time, 90% Span	5ms
Power Supply	
Voltage	19 to 29VDC
Current	60mA (V_{OUT}), 80mA (I_{OUT})
Sensitivity	±0.0002%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions	2.95" x 0.89" x 4.13"
(h)x(w)x(d)	(75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA42-01	4-20mA	2
DSCA42-02	4-20mA	1
DSCA42-01C	4-20mA	3
DSCA42-01E	4-20mA	4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. 2V to +10V	NONE	DSCA42-02
2. 0V to +10V	NONE	DSCA42-01
3. 4-20mA	C	DSCA-42-01C
4. 0-20mA	E	DSCA42-01E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA43

General-purpose Input Signal Conditioners, with DC Excitation

DESCRIPTION

Each DSCA43 general-purpose input module provides a single channel of transducer input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter which is optimized for step response. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Transducer excitation is provided from the module by a stable 10V source. This source is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature enables the module to be interfaced to a wide variety of sensors requiring excitation.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide signal input and excitation protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

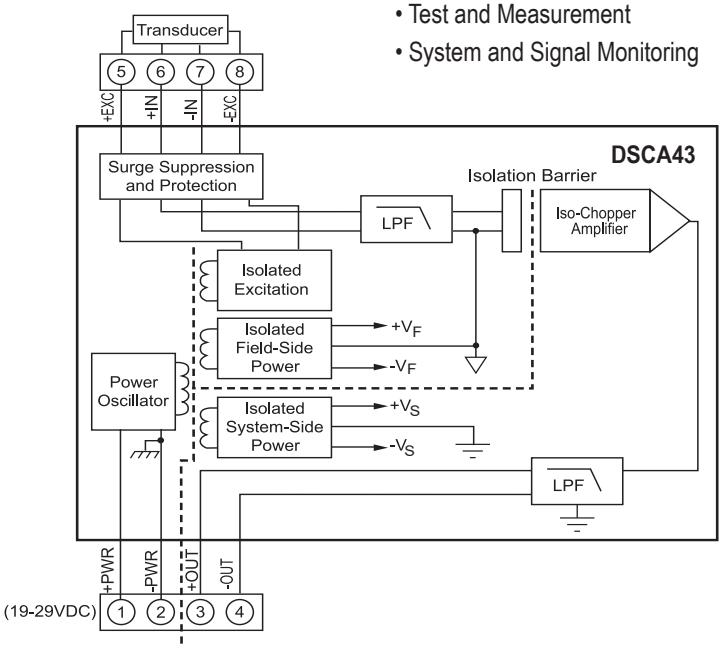
- Interfaces to Transducers and Other Devices Requiring a Stable, Isolated DC Supply
- Industry-standard Output of 0 to +10V, ±10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 100dB CMR
- Fully Isolated Excitation Supply
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA43 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA43
Input Range	±1V to ±10V
Input Bias Current	±0.05nA
Input Resistance	
Normal	>500kΩ
Power Off	>500kΩ
Overload	>500kΩ
Signal Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Excitation	
Output Voltage (–EXC to +EXC)	10V ± 0.03%
Output Current	40mA (max)
Load Regulation	±5ppm/mA
Stability	±15ppm/°C
Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	100dB
Accuracy(1)	±0.03% Span
Linearity	±0.01% Span
Adjustability	±5% Zero and Span
Stability	
Input Offset	±5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±55ppm/°C
Output Noise, 100kHz Bandwidth	500µVrms (V_{OUT}), 2µArms (I_{OUT})
Bandwidth, –3dB	3kHz
NMR	100dB per Decade Above 3kHz
Response Time, 90% Span	170µs
Power Supply	
Voltage	19 to 29VDC
Current	60mA (V_{OUT}), 80mA (I_{OUT})
Sensitivity	+0.0002%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA43-01	–1V to +1V	1
DSCA43-02	–2V to +2V	1
DSCA43-03	–3V to +3V	1
DSCA43-04	–4V to +4V	1
DSCA43-05	–5V to +5V	1
DSCA43-06	–6V to +6V	1
DSCA43-07	–7V to +7V	1
DSCA43-08	–8V to +8V	1
DSCA43-09	–9V to +9V	1
DSCA43-10	–10V to +10V	1
DSCA43-11	–1V to +1V	2, 3, 4
DSCA43-12	–2V to +2V	2, 3, 4
DSCA43-13	–3V to +3V	2, 3, 4
DSCA43-14	–4V to +4V	2, 3, 4
DSCA43-15	–5V to +5V	2, 3, 4
DSCA43-16	–6V to +6V	2, 3, 4
DSCA43-17	–7V to +7V	2, 3, 4
DSCA43-18	–8V to +8V	2, 3, 4
DSCA43-19	–9V to +9V	2, 3, 4
DSCA43-20	–10V to +10V	2, 3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	DSCA43-01
2. 0V to +10V	NONE	DSCA43-11
3. 4-20mA	C	DSCA43-11C
4. 0-20mA	E	DSCA43-11E
5. 0 to +5V	A	N/A
6. 0-1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA45

Frequency-input Signal Conditioners

DESCRIPTION

Each DSCA45 frequency-input module provides a single channel of frequency input which is isolated and converted to a standard analog voltage or current output (Figure below).

The frequency input signal can be a TTL level or zero-crossing signal. Terminal 7 (–IN) on the field-side terminal block is the "common" or ground connection for input signals. A TTL signal is connected from terminal 6 (+IN) to terminal 7 (–IN), while a zero-crossing signal is connected from terminal 5 (+EXC) to terminal 7 (–IN). Input circuitry for each of the signal types has hysteresis built in. An input signal must cross entirely through the hysteresis region in order to trigger the threshold comparator.

A +5.1V excitation is available for use with magnetic pick-up or contact-closure type sensors. The excitation is available on terminal 8 (–EXC) with return at terminal 7 (–IN).

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of powerline voltages up to 240VAC and against transient events as defined by ANSI/ IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are pluggable terminal blocks for ease of system assembly and reconfiguration.

DSCA45 modules have excellent stability over time and do not require recalibration; however, both zero and span settings are adjustable to accommodate situations where fine tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

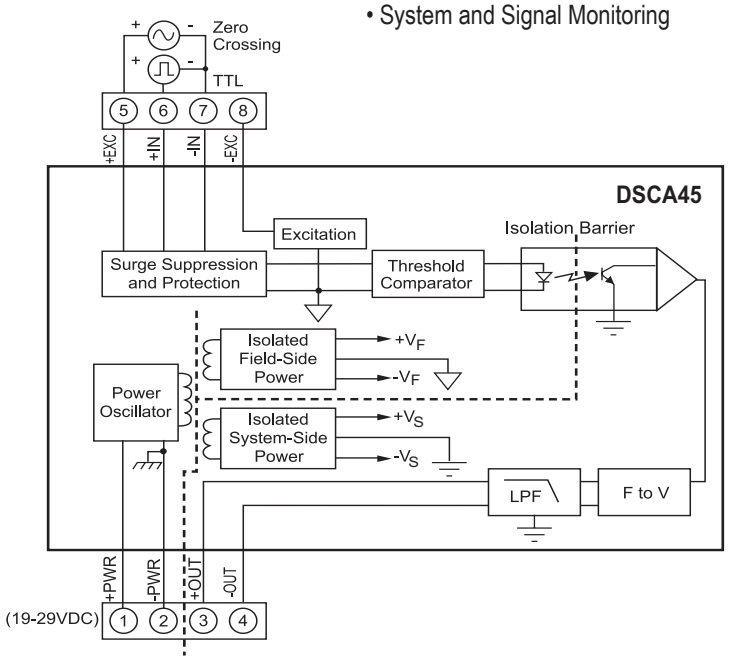
- Accepts Frequency Inputs of 0 to 100kHz
- Industry-standard Output of 0 to +10V, 0-20mA, or 4-20mA
- ±0.05% Factory-calibrated Accuracy
- Adjustable Zero (±5%) and Span (±5%)
- 1500Vrms Transformer Isolation
- Input Overload Protected to 240VAC Continuous
- 120dB CMR
- ANSI/IEEE C37.90.1 Transient Protection
- Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA45 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA45
Input	
Range	0 to 100kHz (max)
Threshold	Zero Crossing
Minimum Input	60mVp-p
Maximum Input	350Vp-p
Minimum Pulse Width	4µs
TTL Input Low	0.8V (max)
TTL Input High	2.4V (min)
Hysteresis	
Zero Crossing	40mV
TTL	1.5V
Resistance	100kΩ
Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output Range	See Ordering Information
Adjustability	±5% Zero & Span
Load Resistance (I_{OUT})	600Ω (max)
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
Ripple	<0.20% Span at input >2% Span
Accuracy(1)	±0.05% Span
vs. Temperature	±40ppm/°C (Zero & Span)
Linearity	±0.02% Span
Isolation (Common Mode)	
Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
Output to Power	
Continuous	50VDC (max)
Rejection (50-60Hz Common Mode)	120dB
Response Time (0 to 90%)	
DSCA45-01, -02, -03	310ms, 175ms, 50ms
DSCA45-04, -05, -06	30ms, 30ms, 15ms
DSCA45-07, -08	15ms, 1.5ms
Field Excitation	+5.1V ±5% at 8mA (max)
Power Supply	
Voltage	19 to 29VDC
Current	60mA (V_{OUT}), 80mA (I_{OUT})
Sensitivity	±0.0002%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temp. Range	–40°C to +80°C
Storage Temp. Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA45-01	0Hz to 500Hz	2, 3, 4
DSCA45-02	0kHz to 1kHz	2, 3, 4
DSCA45-03	0kHz to 2.5kHz	2, 3, 4
DSCA45-04	0kHz to 5kHz	2, 3, 4
DSCA45-05	0kHz to 10kHz	2, 3, 4
DSCA45-06	0kHz to 25kHz	2, 3, 4
DSCA45-07	0kHz to 50kHz	2, 3, 4
DSCA45-08	0kHz to 100kHz	2, 3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	N/A
2. 0V to +10V	NONE	DSCA45-01
3. 4-20mA	C	DSCA45-01C
4. 0-20mA	E	DSCA45-01E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA47

Linearized Thermocouple-input Signal Conditioners

DESCRIPTION

Each DSCA47 thermocouple-input module provides a single channel of thermocouple-input which is filtered, isolated, amplified, linearized, and converted to a high-level voltage output (Figure below). Signal filtering is accomplished with a five-pole filter which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

The DSCA47 can interface to eight industry standard thermocouple types: J, K, T, E, R, S, B and N. Each module has cold junction compensation to correct for parasitic thermocouples formed by the thermocouple wire and input screw terminals on the module. Upscale open thermocouple detection is provided by internal circuitry. Downscale indication can be implemented by installing a 47MΩ, ±20% resistor between screw terminals 6 and 8 on the input terminal block.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (–OUT). The system-side load may be either floating or grounded.

Special input circuits provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/ IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±3% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

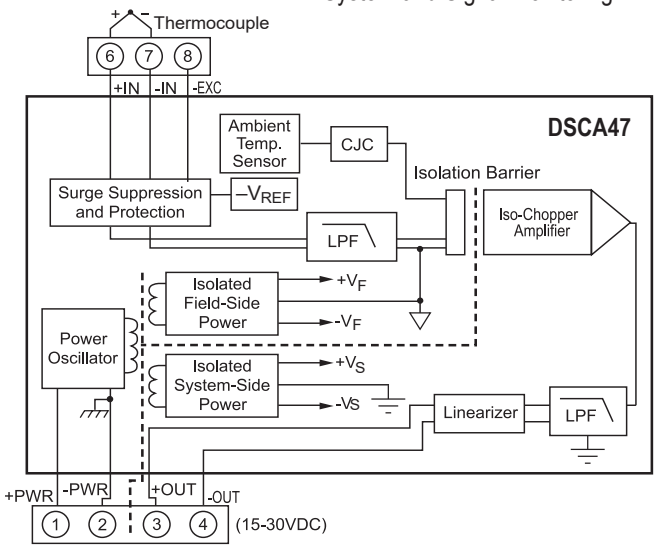
- Interfaces to Types J, K, T, E, R, S, B, and N Thermocouples
- Linearizes Thermocouple Signal
- Industry-standard Output of 0 to +10V, 0-20mA, or 4-20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.08% Accuracy
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA47 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

SECTION 4 - DSCA

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA47
Input Range	Standard Thermocouple Temperature Limits as Per Nist Monograph 175, ITS-90
Input Bias Current	–30nA
Input Resistance	
Normal	50MΩ
Power Off	65kΩ
Overload	65kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Cold Junction Compensation	
Accuracy, +5°C to +45°C	±0.5°C
Accuracy, –40°C to +80°C	±1.25°C
Output Range	See Ordering Information
Load Resistance (I_{OUT})	600Ω
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	160dB
Accuracy	See Ordering Information Below
Adjustability	±3% Zero and Span
Stability	
Input Offset	±0.5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Gain	±40ppm/°C
Output Noise, 100kHz Bandwidth	250µVrms (V_{OUT}), 1µArms (I_{OUT})
Bandwidth, –3dB	3Hz
NMR	95dB at 60Hz, 85dB at 50Hz
Response Time, 90% Span	165ms
Open Input Response	Upscale
Open Input Detection Time	<5s
Power Supply	
Voltage	15 to 30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis, repeatability, and CJC error.

Installation Notes:
1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B, C, D, or Non-hazardous Locations Only.
2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.
3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.
4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A (max).

Ordering Information

Model	TC Type‡	Input Range	Output Range†	Accuracy(1)	
DSCA47J-01	J	0°C to +760°C (+32°F to +1400°F)	2, 3, 4	±0.08%	±0.61°C
DSCA47J-02	J	–100°C to +300°C (–148°F to +572°F)	2, 3, 4	±0.08%	±0.32°C
DSCA47J-03	J	0°C to +500°C (+32°F to +932°F)	2, 3, 4	±0.07%	±0.35°C
DSCA47K-04	K	0°C to +1000°C (+32°F to +1832°F)	2, 3, 4	±0.08%	±0.80°C
DSCA47K-05	K	0°C to +500°C (+32°F to +932°F)	2, 3, 4	±0.08%	±0.40°C
DSCA47K-13	K	–100°C to +1350°C (–148°F to +2462°F)	2, 3, 4	±0.08%	±1.16°C
DSCA47K-14	K	0°C to +1200°C (+32°F to +2192°F)	2, 3, 4	±0.08%	±0.96°C
DSCA47T-06	T	–100°C to +400°C (–148°F to +752°F)	2, 3, 4	±0.16%	±0.80°C
DSCA47T-07	T	0°C to +200°C (+32°F to +392°F)	2, 3, 4	±0.13%	±0.26°C
DSCA47E-08	E	0°C to +1000°C (+32°F to +1832°F)	2, 3, 4	±0.10%	±1.00°C
DSCA47R-09	R	+500°C to +1750°C (+932°F to +3182°F)	2, 3, 4	±0.10%	±1.25°C
DSCA47S-10	S	+500°C to +1750°C (+932°F to +3182°F)	2, 3, 4	±0.10%	±1.25°C
DSCA47B-11	B	+500°C to +1800°C (+932°F to +3272°F)	2, 3, 4	±0.15%	±1.95°C
DSCA47N-15	N	–100°C to +1300°C (–148°F to +2372°F)	2, 3, 4	±0.08%	±1.12°C

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	N/A
2. 0V to +10V	NONE	DSCA47J-01
3. 4-20mA	C	DSCA47J-01C
4. 0-20mA	E	DSCA47J-01E
5. 0 to +5V	A	N/A
6. 0 to 1mA	B	N/A

‡Thermocouple Alloy Combinations

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

Type	Material
J	Iron vs. Copper-nickel
K	Nickel-chromium vs. Nickel-aluminum
T	Copper vs. Copper-nickel
E	Nickel-chromium vs. Copper-nickel
R	Platinum-13% Rhodium vs. Platinum
S	Platinum-10% Rhodium vs. Platinum
B	Platinum-30% Rhodium vs. Platinum-6% Rhodium
N	Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicon- 0.1% Magnesium

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DSCA49

Voltage-output Signal Conditioners

DESCRIPTION

Each DSCA49 voltage-output module provides a single channel of analog output. The input signal is buffered, isolated, filtered, and converted to a voltage output (Figure below). Signal filtering, is accomplished with a five-pole filter which provides 100dB per decade of attenuation above 1kHz. An anti-aliasing pole is located on the system side of the isolation barrier, and the other four poles are on the field side. After the initial system-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Special output circuits provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal input and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

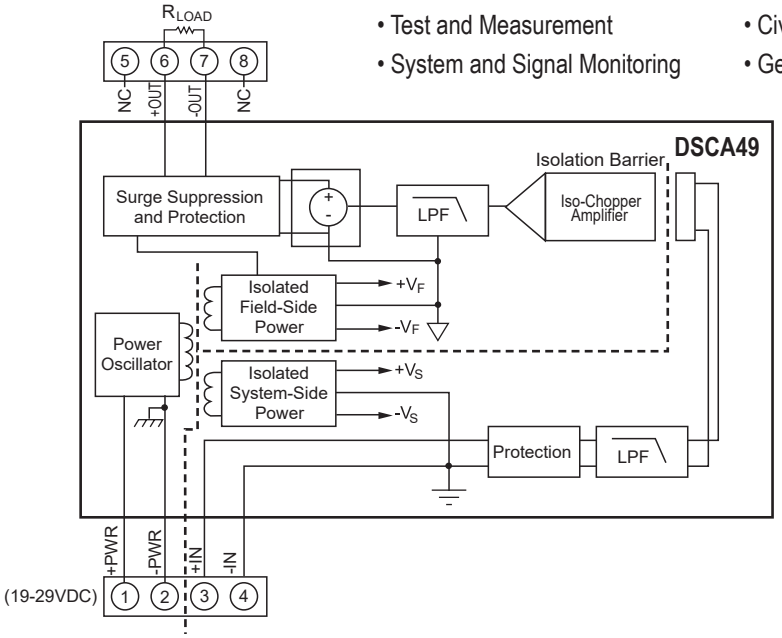
- Accepts High-level Voltage Input
- Provides High-level Voltage Outputs to ±10V at 50mA
- ANSI/IEEE C37.90.1
- 1500Vrms Transformer Isolation
- ±0.05% Accuracy
- ±0.02% Linearity
- Output Protected to 240VAC Continuous
- True 3-way Isolation
- Wide Supply Voltage Range
- 110dB CMR
- Easily Mounts on Standard DIN-rail
- UL/cUL Listed
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

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

APPLICATIONS

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



DSCA49 Block Diagram - For Module Dimensions and Pinouts, See Page 4-35

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Specifications

Typical* at T_A = +25°C and +24VDC Supply Voltage

Module	DSCA49-04, -05, -06
Output Range	0 to +10V or –10 to +10V
Over Range Capability	5%
Output Drive	±50mA (max)
Output Resistance	0.5Ω
Output Current Limit	75mA
Output Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Input Range	0V to +10V or –10V to +10V
Input Resistance	
Normal	50MΩ
Power Off	65kΩ
Overload	65kΩ
Input Protection	
Continuous	±35V (max)
Transient	ANSI/IEEE C37.90.1
CMV, Output to Input, Output to Power	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Input to Power	
Continuous	50VDC (max)
CMR (50Hz or 60Hz)	110dB
Accuracy(1)	±0.05% Span
Linearity	±0.02% Span
Adjustability	±5% Zero and Span
Stability	
Zero	±20ppm/°C
Span	±40ppm/°C
Output Noise, 100kHz Bandwidth	2mVrms
Bandwidth, –3dB	1kHz
NMR	100dB per Decade Above 1kHz
Response Time, 90% Span	425µs
Power Supply	
Voltage	19 to 29VDC
Current	80mA
Sensitivity	±0.0003%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)x(w)x(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 rail
Environmental	
Operating Temperature Range	–40°C to +80°C
ATEX Group II, Category 3	–40°C to +75°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA49-04	0V to +10V	1
DSCA49-05	–10V to +10V	1
DSCA49-06	–10V to +10V	2

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	N/A
2. 0V to +10V	NONE	DSCA49-04
3. 4-20mA	C	DSCA49-06
4. 0-20mA	E	N/A
5. 0 to +5V	A	N/A
6. 0-1mA	B	N/A

Installation Notes:

1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B,C, D, or Non-hazardous Locations Only.

2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.

3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or the Area is Known to be Non-hazardous.

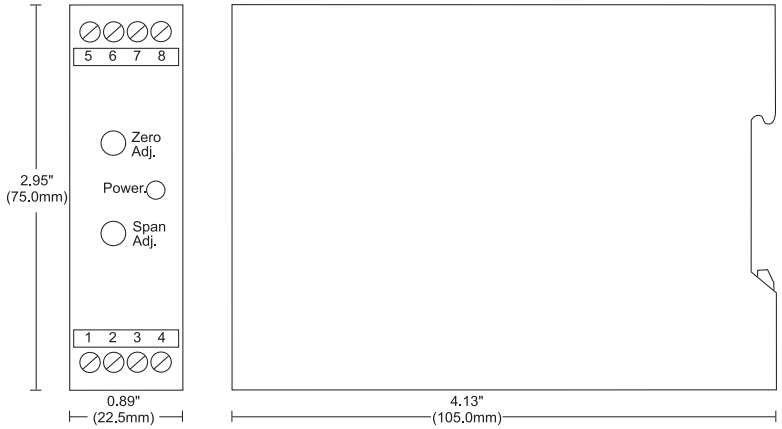
4.) The Power to These Devices Shall Be Limited by an Over-current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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DSCA

Module Dimensions



NOTES:
1) Pluggable terminal blocks accept wire sizes AWG 22-12. Strip wire insulation 0.27 in. (7mm) prior to insertion in terminal block.
2) DSCA modules can be mounted to DIN rails shown in Accessories section.

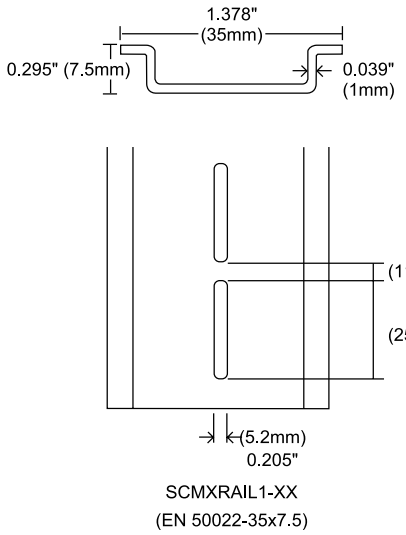
Accessories for DSCA Analog Modules

SCMXRAIL1-XX / SCMXRAIL3-XX

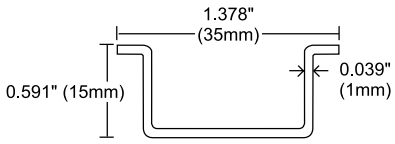
DIN-rail

DESCRIPTION

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



SCMXRAIL1-XX
(EN 50022-35x7.5)



SCMXRAIL3-XX
(EN 50022-35x15)

Ordering Information

Part Number	Description
SCMXRAIL1	DIN-rail, Gull-wing, (slotted steel), 35mm x 7.5mm, 1mm thick
SCMXRAIL1-01	DIN-rail EN 50022-35 x 7.5 (slotted steel), 1 meter length
SCMXRAIL1-02	DIN-rail EN 50022-35 x 7.5 (slotted steel), 2 meter length
SCMXRAIL3	DIN-rail, Gull-wing, (slotted steel), 35mm x 15mm, 1mm thick
SCMXRAIL3-01	DIN-rail EN 50022-35 x 15 (slotted steel), 1 meter length
SCMXRAIL3-02	DIN-rail EN 50022-35 x 15 (slotted steel), 2 meter length

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PWR-PS5RxW Series

Switching Power Supplies

DESCRIPTION

Dataforth's PWR-PS5RxW series sets new standards for switching power supply technology. Combining rugged, compact enclosures, incorporating all international standards and approvals, and offering customers a broad selection of inputs and outputs, the PWR-PS5RxW series makes your power supply choice a simple one. The PWR-PS5RxW series is UL/cUL and TUV Approved, CE Compliant, and UL 508 Listed. Models are available with output ratings from 7.5W to 120W with 24VDC output voltages. Customers may choose from a wide range of input voltages (85 to 264VAC, and 100 to 370VDC compatible), making the PWR-PS5RxW series an unbeatable package of versatility.

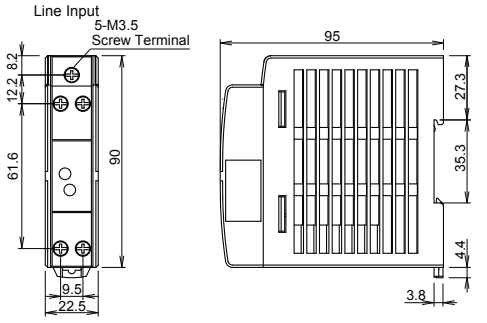
FEATURES

- Universal AC Input (85 to 264VAC)
- DC-compatible Input (100 to 370VDC)
- Unique Spring-up Terminals
- DIN-rail or Panel Mount
- Five Different Output Capacities: 7.5W to 120W
- UL/cUL, and TUV Approvals
- CE Compliant, UL 508 Listed
- Certified to EN60950-1
- IP20 Protection (EN60529)
- Compliant with EMC Directive EN61204-3
- Manufactured per RoHS III Directive 2015/863

Specifications PWR-PS5RxW Series

Typical at T_A = +25°C

Model	PWR-PS5R7W	PWR-PS5R15W	PWR-PS5R30W	PWR-PS5R60W	PWR-PS5R120W
Input	100 to 240VAC Nominal; 85 to 264VAC, 100 to 370VDC Compatible				
Frequency	50/60Hz				
Input Current	0.18A at 100V 0.10A at 200V	0.35A at 100V 0.19A at 200V	0.70A at 100V 0.30A at 200V	1.30A at 100V 0.80A at 200V	1.40A at 100V 0.70A at 200V
Output Voltage and Current Ratings	24V, 0.3A	24V, 0.65A	24V, 1.3A	24V, 2.5A	24V, 5.0A
Temperature Change	0.05%				
Ripple Voltage	1% p-p (max) (including noise)				
Overcurrent Protection	105% (min)				
Dielectric Strength	Between Input and Output Terminals: 3,000VAC, 1 Minute Between Input Terminals and Housing: 2,000VAC, 1 Minute Between Output Terminal and Housing: 500VAC, 1 Minute				
Insulation Resistance	Between Input and Output Terminals/Input Terminal and Housing: 100MΩ (min) (500VDC)				
Operating Temperature	–25°C to +75°C		–25°C to +70°C		–25°C to +65°C
Storage Temperature	–25°C to +75°C				
Operating Humidity	20 to 90% RH (avoid condensation)				
Dimensions (h)x(w)x(d)	2.95" x 1.77" x 2.76" (75mm x 45mm x 70mm)	3.54" x 0.89" x 3.74" (90mm x 22.5mm x 95mm)		3.74" x 1.42" x 4.25" (95mm x 36mm x 108mm)	4.53" x 1.81" x 4.76" (115mm x 46mm x 121mm)
Terminal Screw	M3.5 Phillips Screws In Spring-up Terminals				



PWR-PS5R15W, PWR-PS5R30W Physical Dimensions
(Consult factory for other model drawings)

Ordering Information

Model	Power	Output
PWR-PS5R7W	7.5W	24VDC/0.3A
PWR-PS5R15W	15W	24VDC/0.65A
PWR-PS5R30W	30W	24VDC/1.3A
PWR-PS5R60W	60W	24VDC/2.5A
PWR-PS5R120W	120W	24VDC/5.0A

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Isolated, Intelligent Signal Conditioning

SCMD Products
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Online Technical Library
Discontinued Parts

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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.

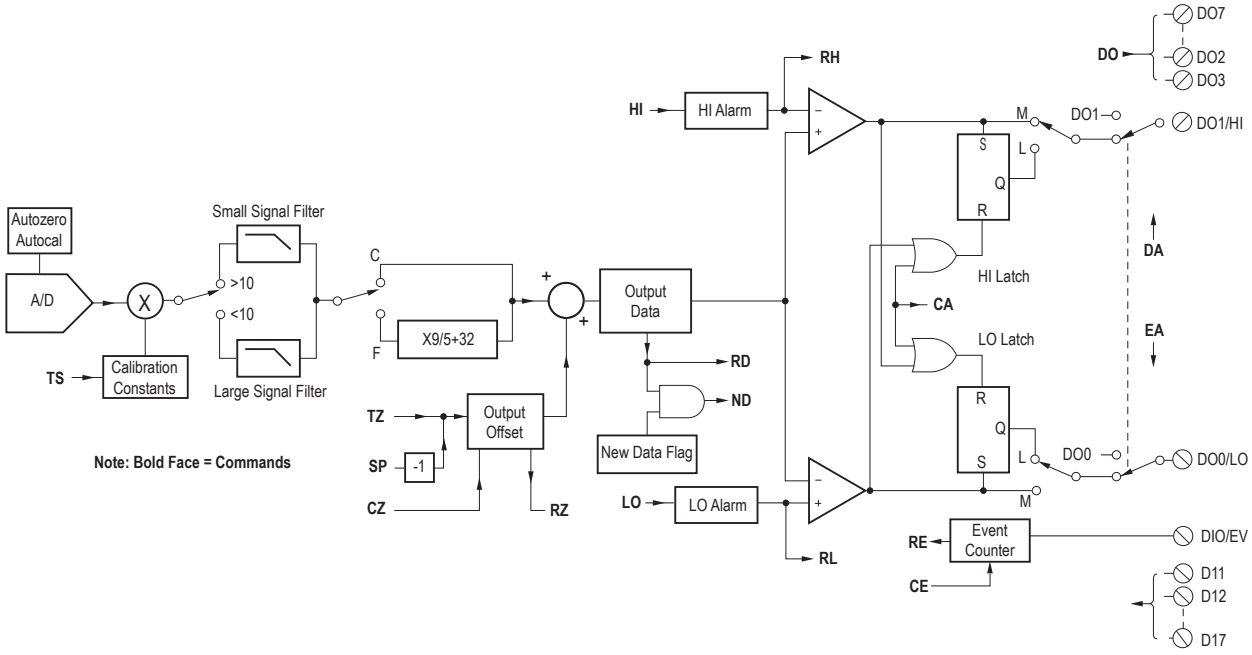
The 2000 Series is an enhanced version of the 1000 Series of sensor interfaces. The 2000 Series allows the user to scale the output data in any desired engineering units. The 2000 Series also provides the ability to program nonlinear transfer functions. This feature may be used to linearize nonstandard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

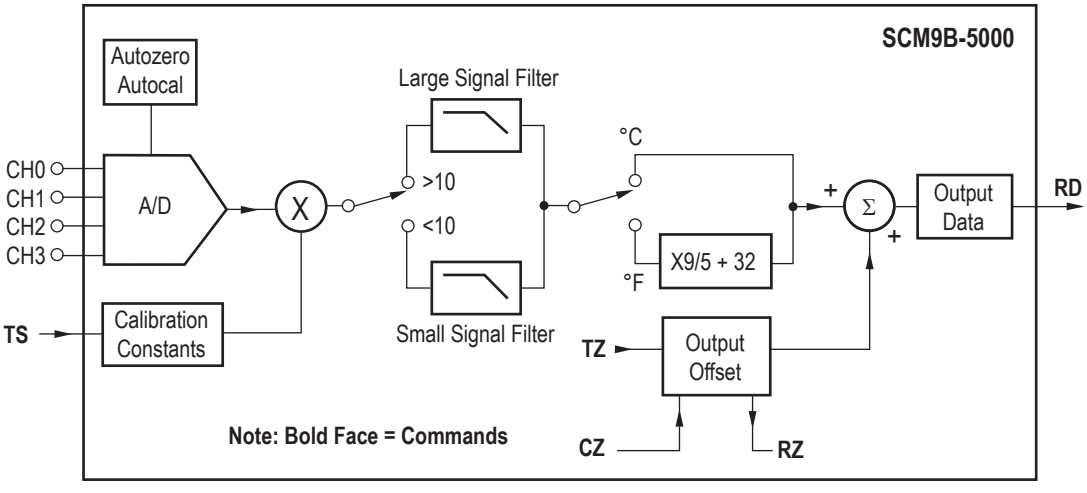
Although software is not required, utility software (S1000) is available.

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.

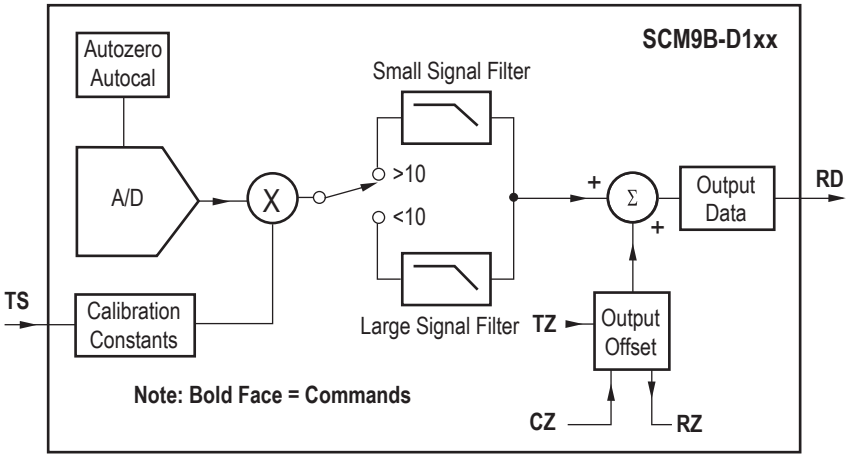
Utility software is available from Dataforth to make the D100 easier to learn and use. The software is provided at no charge on request with a purchase order and is not copy protected.

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°CB = 0°C to +1820°C
  K = –150°C to +1250°CS = 0°C to +1750°C
  T = –200°C to +400°CR = 0°C to +1750°C
  E = –100°C to +1000°CC = 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.

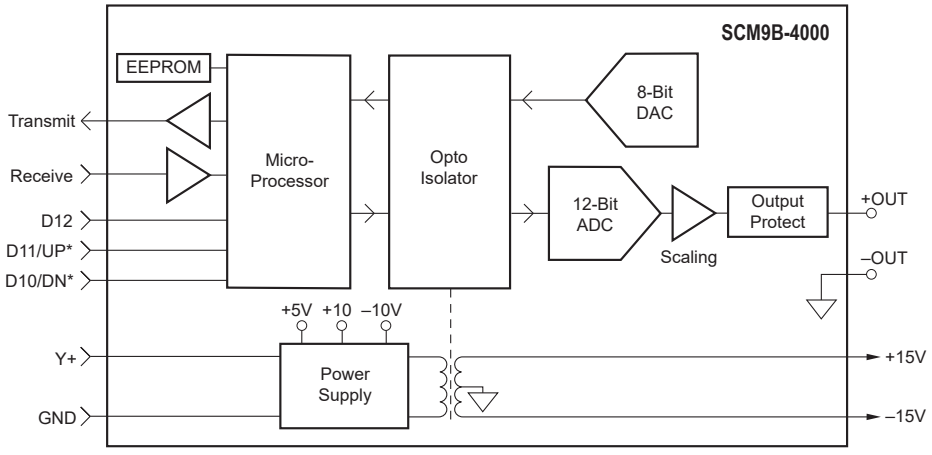
Although software is not required, utility software (SCM9B-S1000) is available online to make the 3000/4000 easier to learn and use. S1000 software is provided at no charge on request with a purchase order and is not copy protected.

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

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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

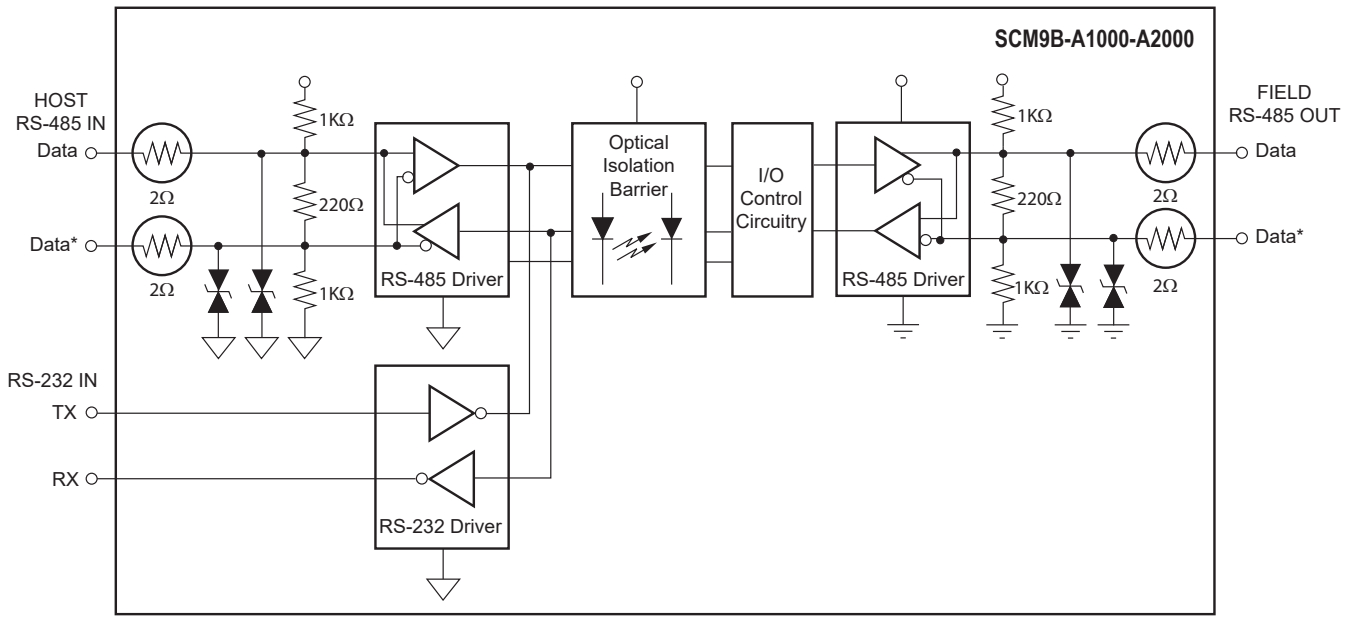
A1000 Power Specifications
- Power requirements: 115VAC (order SCM9B-A1000-115) or 230VAC (order SCM9B-A1000-230) ±10%, 50-60Hz
- Power consumption: 30W full load
- Power supply output: +24VDC at 1A

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.

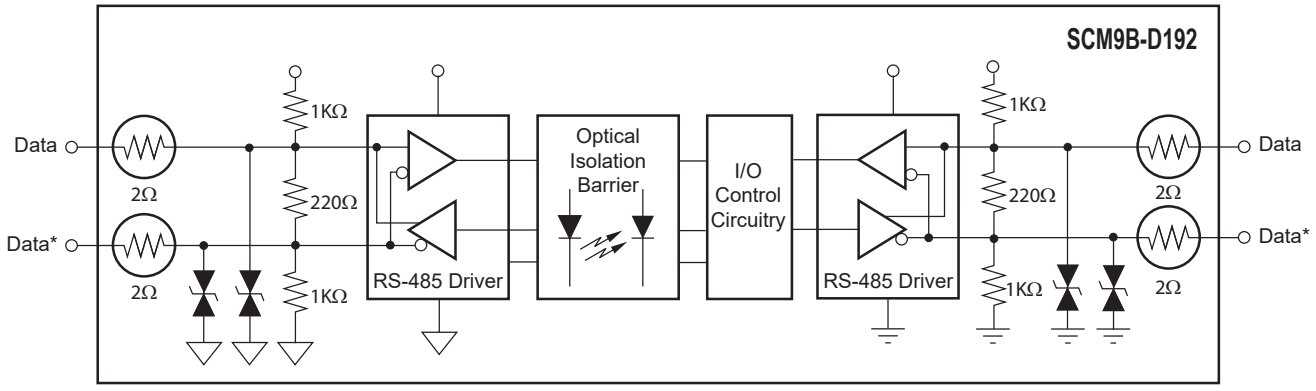
The SCM9B-D192 operates on +5VDC power supply input voltage.

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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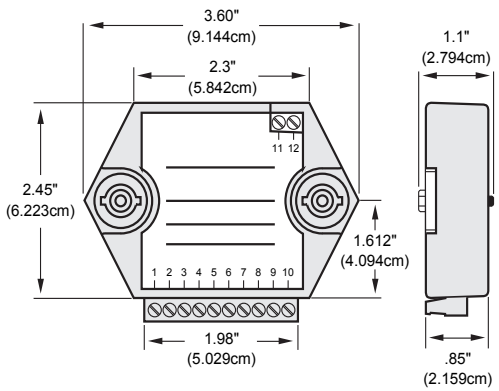
SCM9B Series

Mechanical Dimensions

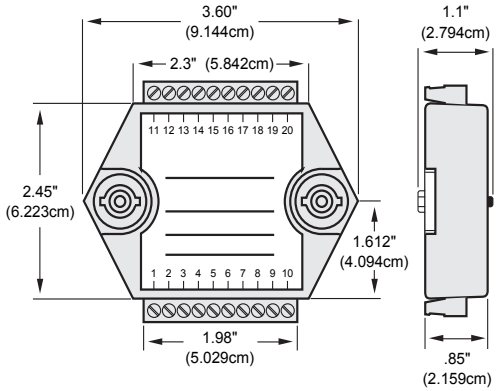
Mechanical and Dimensions-SCM9B-1000/2000/3000/4000/5000

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

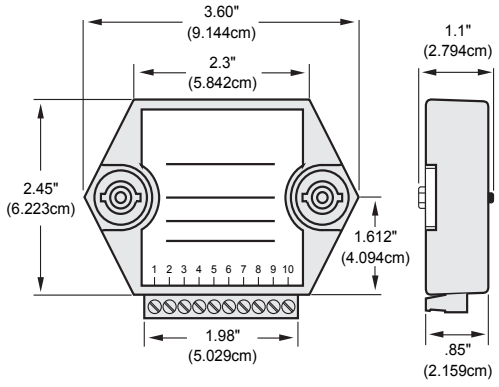
1300 Series



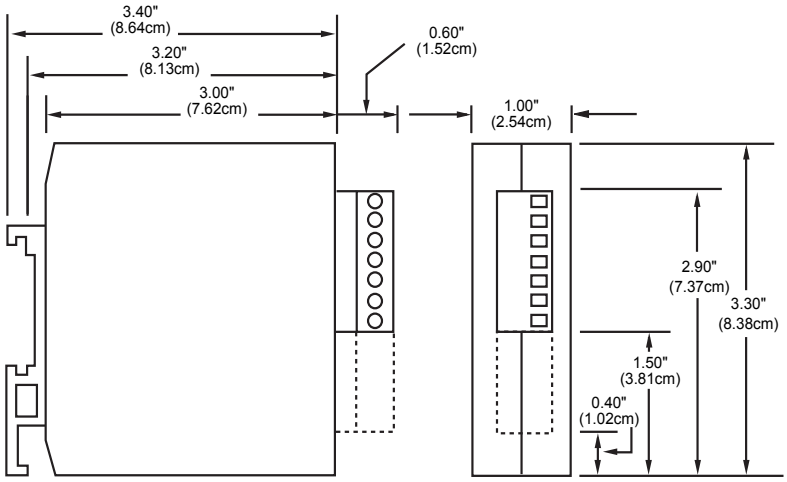
1700 Series



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

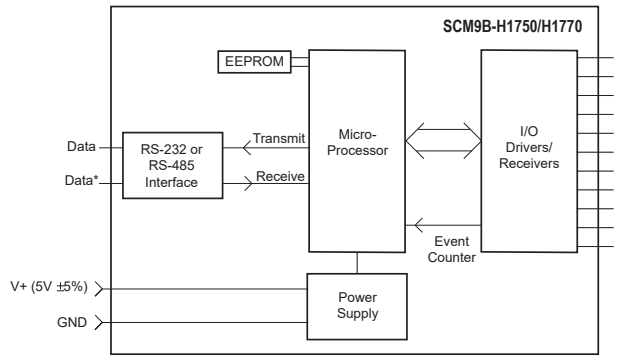
The SCM9B-H1750/H1770 digital I/O interface is designed to expand the remote I/O capability of the SCM9B-1700 series of modules. Commands are communicated over RS-232 or RS-485 links from any standard serial I/O port of computers or modems. The command set for the H1700 series boards is identical to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

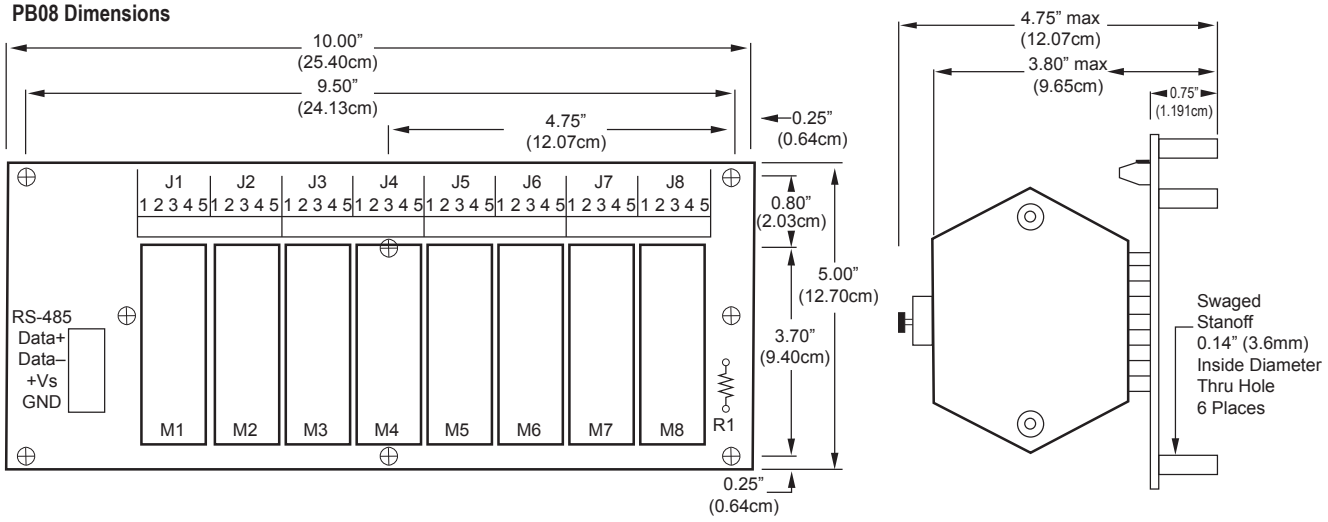
Part Number	Description
SCM9B-1701	7 inputs/8 outputs, RS-232C Output
SCM9B-1702	7 inputs/8 outputs, RS-485 Output
SCM9B-1711	15 inputs or outputs, RS-232C Output
SCM9B-1712	15 inputs or outputs, RS-485 Output
SCM9B-H1750	24 inputs or outputs, user selected RS-232C or RS-485 Output
SCM9B-H1770	64 inputs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

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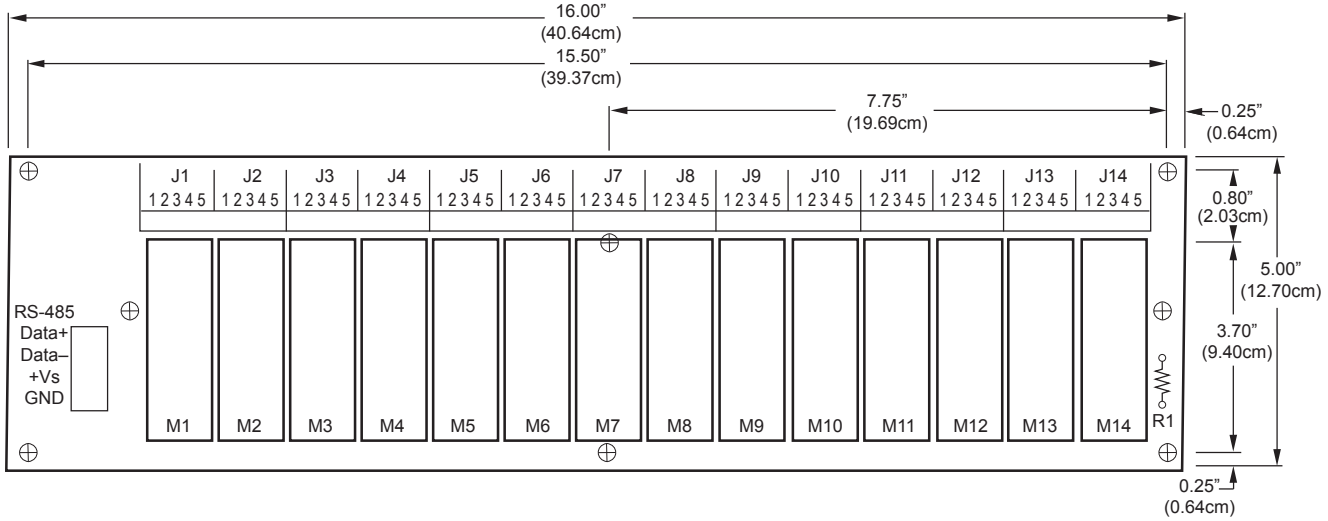
SCM9B-H1750/H1770 Block Diagram - For Module Dimensions and Pinouts, See Page 5-26

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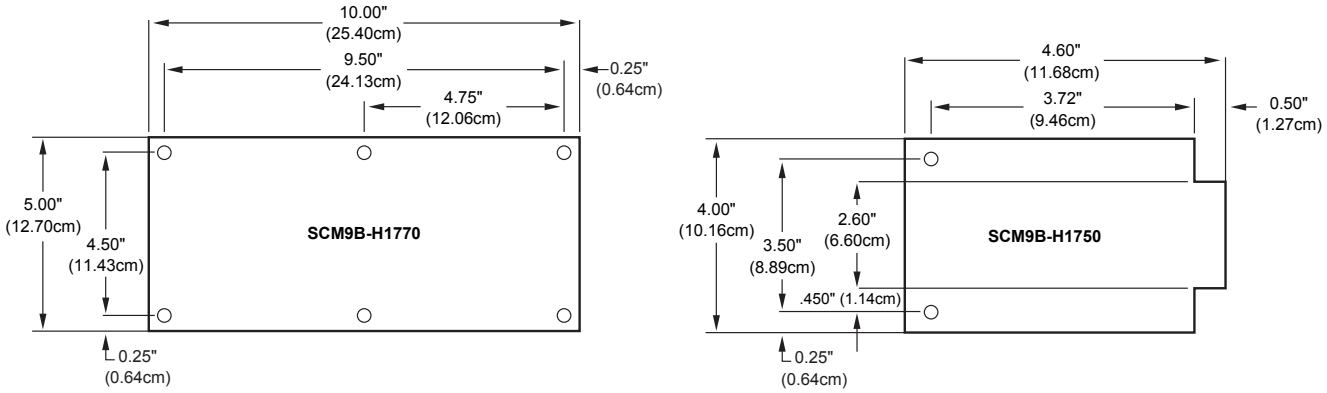
PB08 Dimensions



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

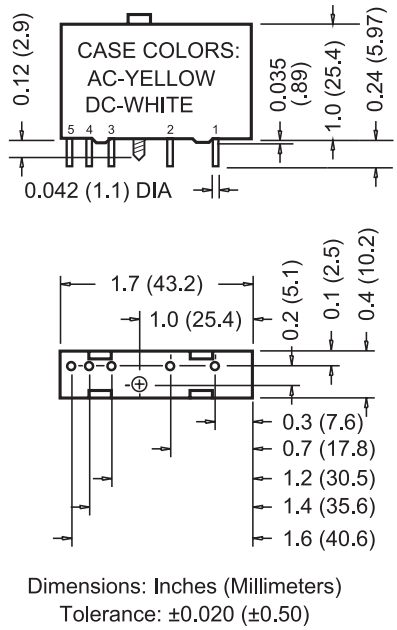
Suffix	Feature
A	High-voltage Versions (280VAC for AC Modules)
E	Low-voltage 10VAC-input for AC Modules
F	Fast-switching Version of DC Modules
N	Enhanced Noise-immunity Version of DC Modules

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

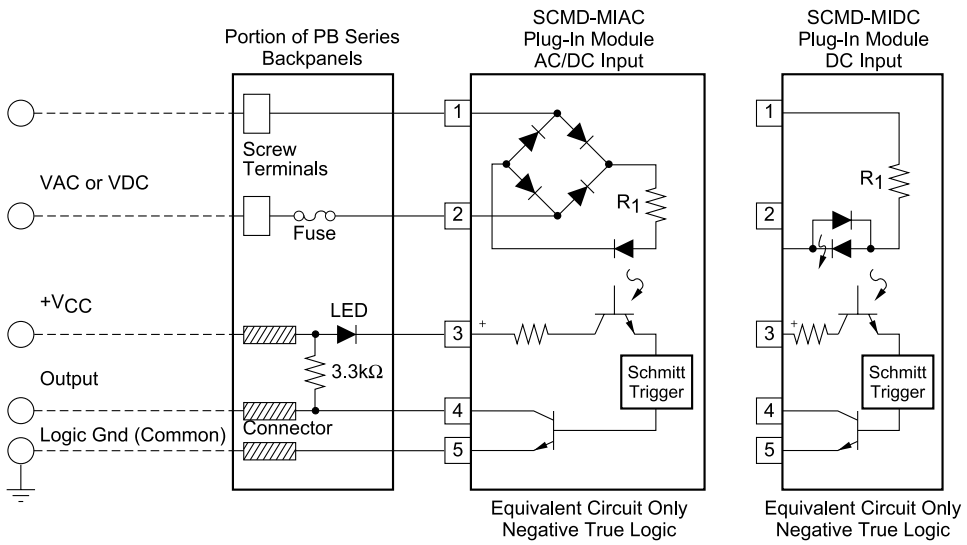


Figure 2: SCMD-MIAC/MIDC Circuit Diagrams

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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.

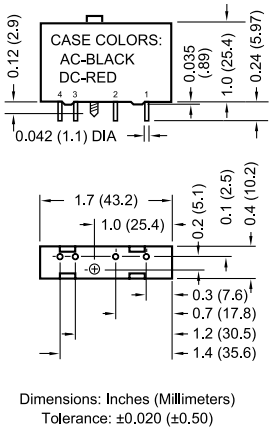


Figure 1: SCMD-MOAC/MODC Physical Dimensions

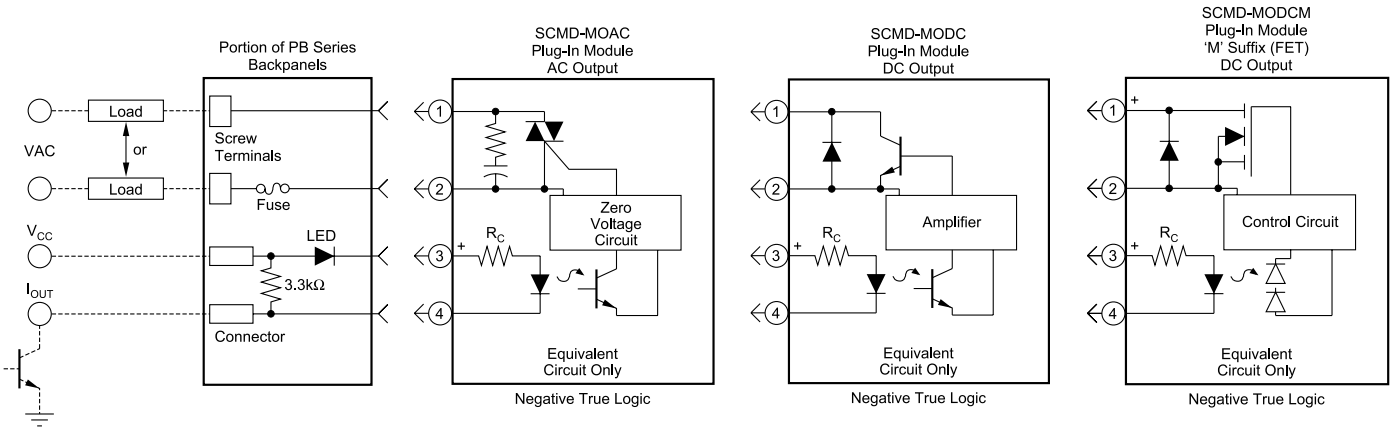
Digital Output Modules - Model No. Suffixes Identifying Optional Features	
Suffix	**Feature**
A	High-voltage Versions (280VAC for AC Modules, 200VDC for DC Modules)
B	High-voltage Versions (280VAC for AC Modules) with Low-leakage Output Current
ML	FET-output Version of DC Module, 5.0A, 50VDC

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

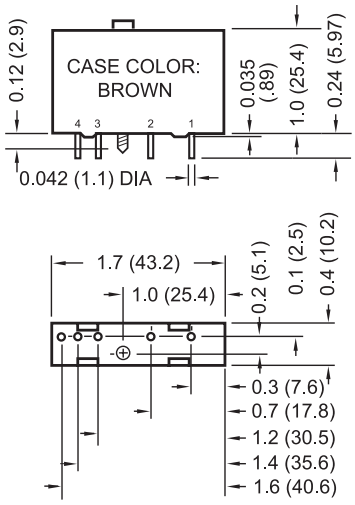
The SCMD digital-relay output modules are used for switching AC and DC loads such as resistors in and out of circuits, transistors, SCRs for switching inductive loads, indicator lamps, and low-level heaters. All models provide up to 1000Vrms of optical isolation between the field device and the control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

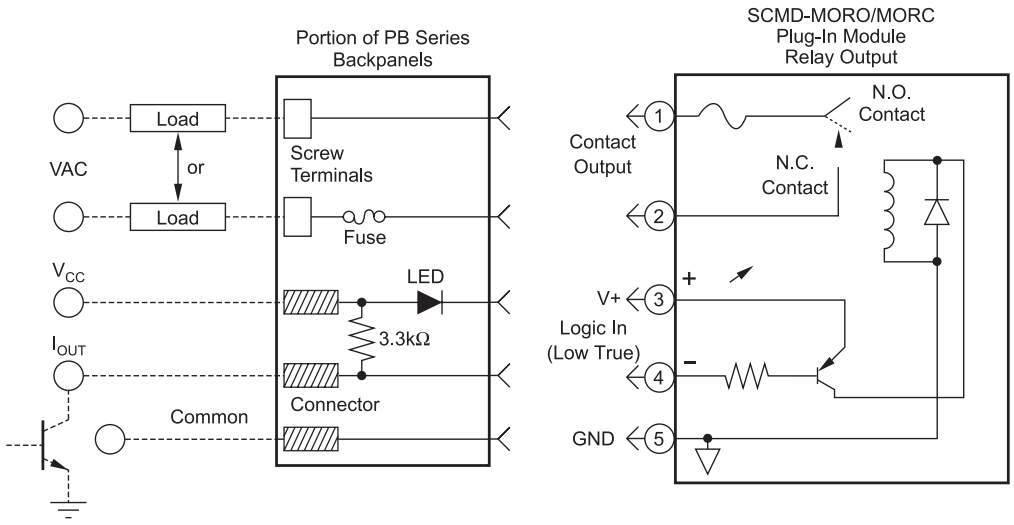


Dimensions: Inches (Millimeters)
Tolerance: ±0.020 (±0.50)

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

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

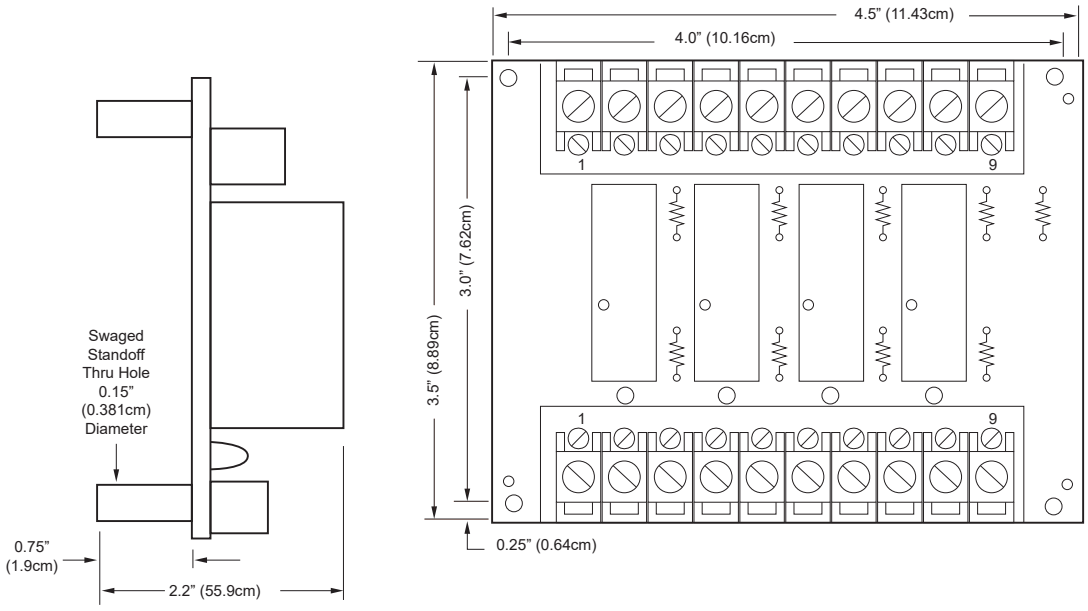
FEATURES

- 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

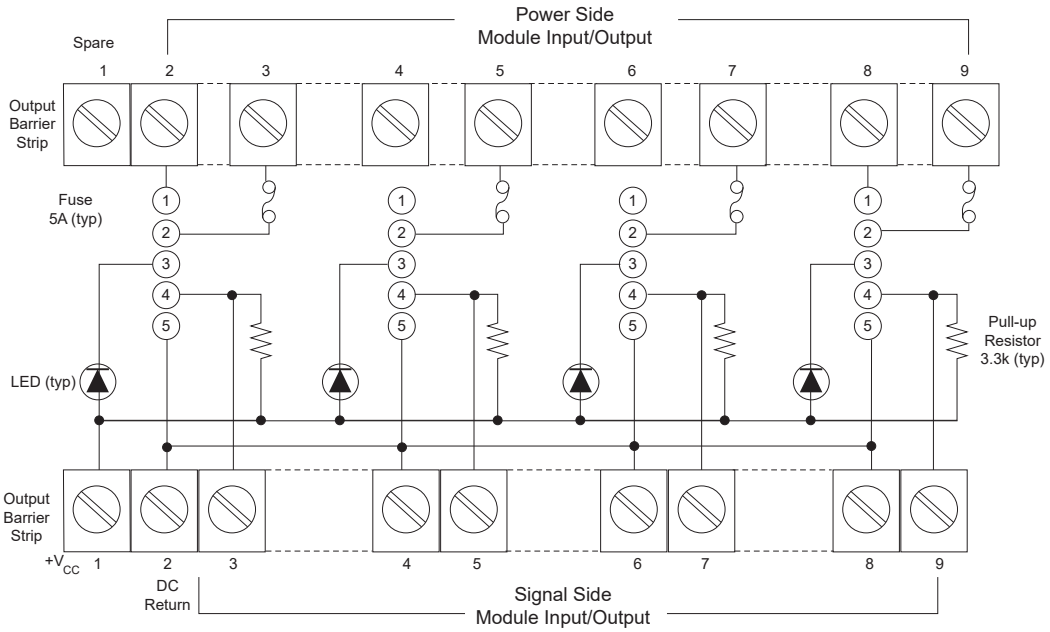
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SCMD-PB4



Mounting Dimensions

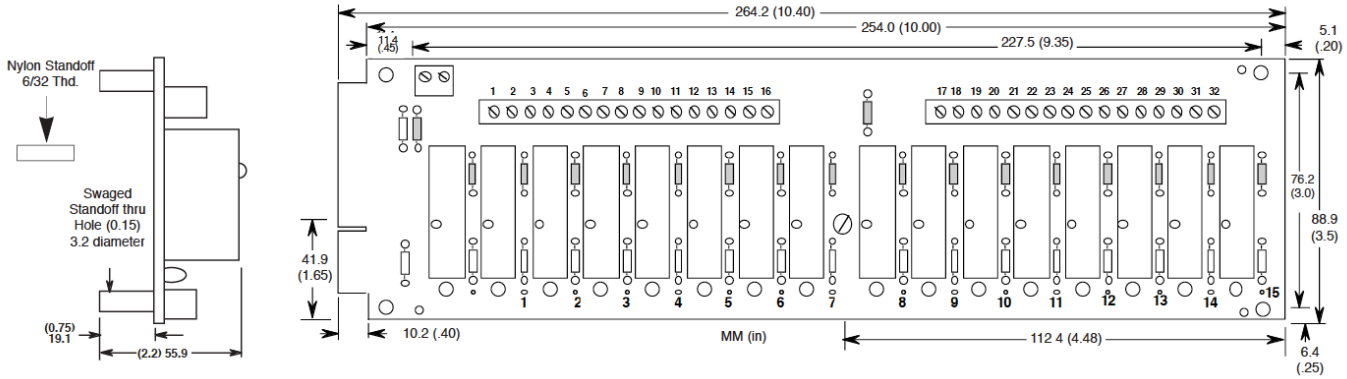


Schematic Diagram

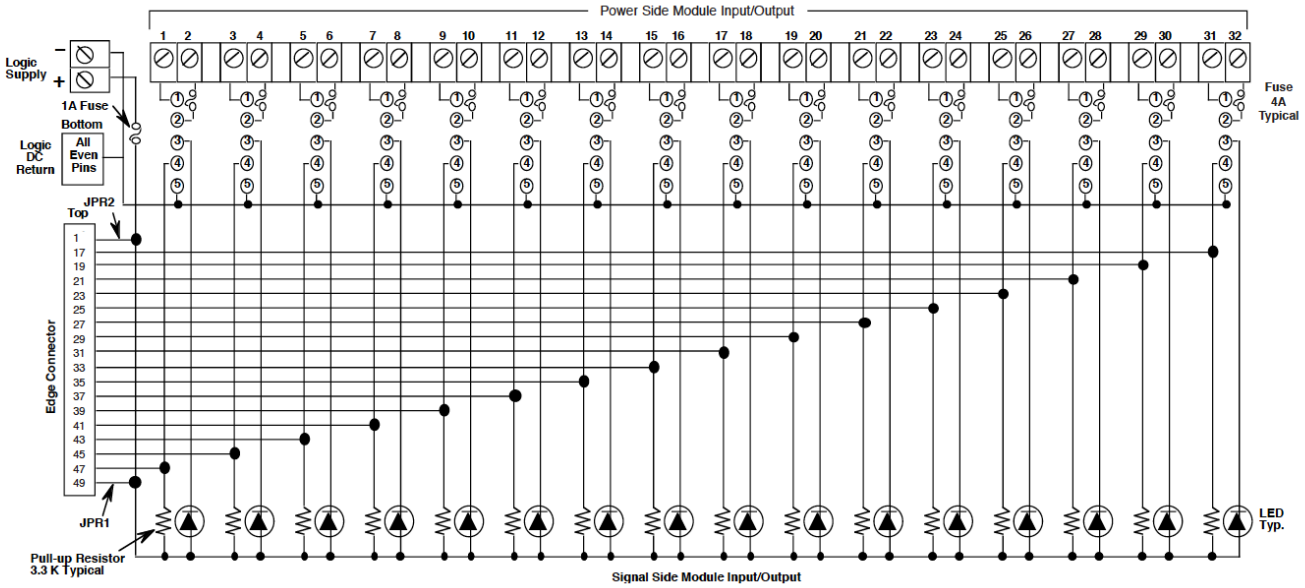
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SCMD-PB16SM



Mounting Dimensions

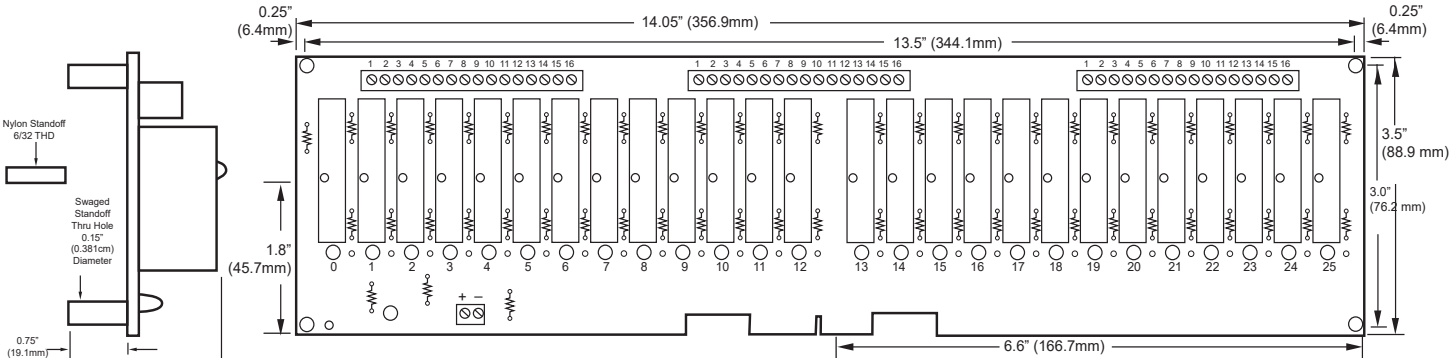


Schematic Diagram

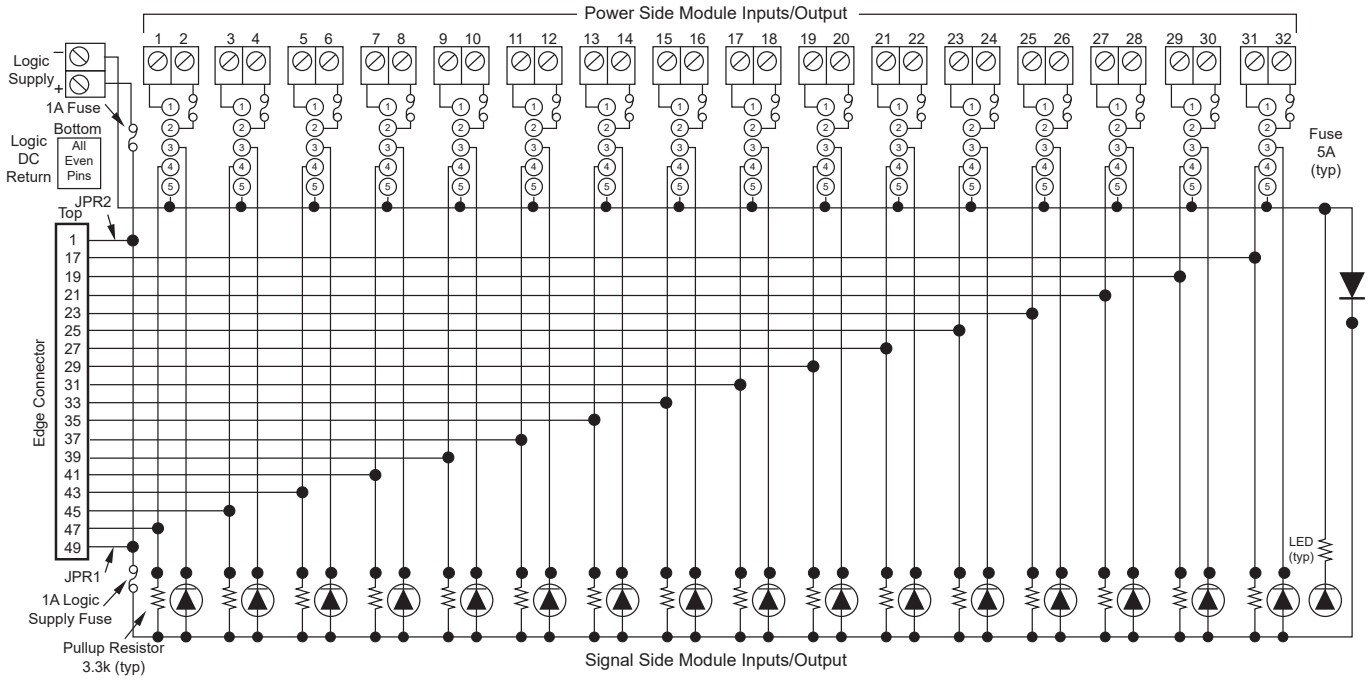
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SCMD-PB24SM



Mounting Dimensions



Schematic Diagram

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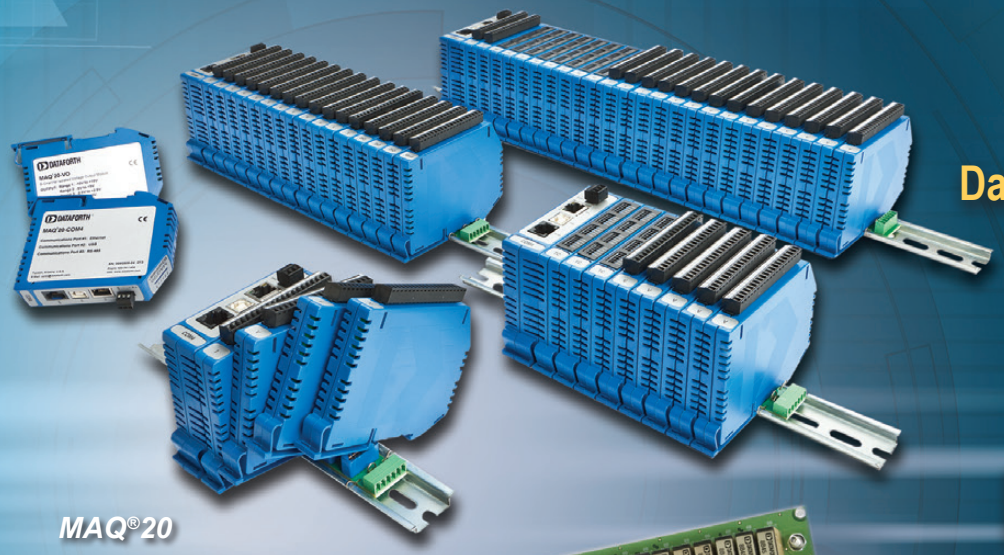
DATAFORTH®

2024 Catalog
MAQ®20
SLX200
SLX300

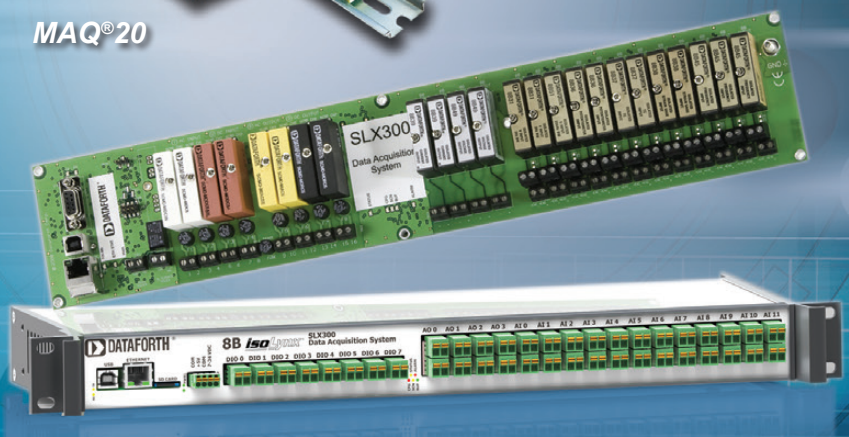
Data Acquisition Systems

Instrument Class®

Industrial Electronics



MAQ®20



SLX300

Celebrating

40 YEARS

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INNOVATION

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Discontinued Parts

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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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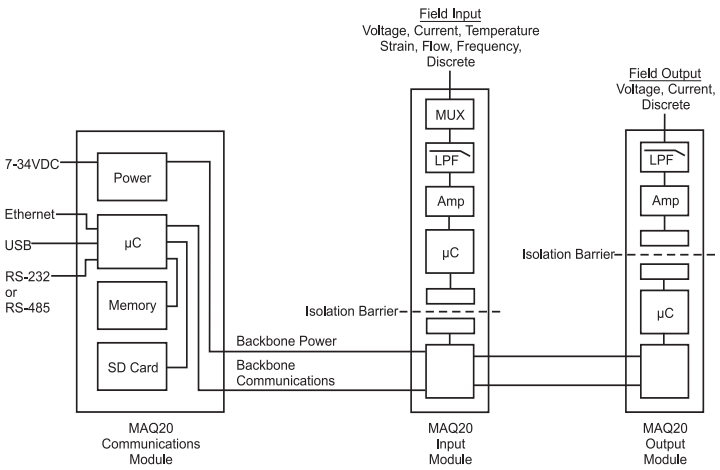
MAQ®20

Industrial Data Acquisition and Control System



DESCRIPTION

The MAQ®20 Industrial Data Acquisition and Control System encompasses more than 30 years of design excellence and quality in the industrial test and measurement, and process control industry. This powerful, high-performance, highly flexible system offers the industry's most affordable price per channel, integral PID loop control, and ±0.035% system accuracy (module dependent). It is ideal for test and measurement, factory and process automation, machine automation, military and aerospace, power and energy, environmental monitoring, and oil and gas applications. The MAQ20 family consists of DIN-rail mounted, programmable, multi-channel, industrially rugged, signal conditioning input and output modules and communications modules (Figure 1). Each I/O module has a 1500Vrms isolation barrier between field-side and system-side wiring, and many models offer per-channel isolation. All field wiring terminals are heavily protected against overload, accidental connection of incorrect signals, and ESD. Modules mount on the industry-standard 35x7.5mm gull-wing DIN-rail. A backbone mounts within the rail providing power and communication interconnections between the communications modules and each I/O module.



MAQ20 System Block Diagram

FEATURES

- Industry's Most Affordable Price 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
- Direct Connection to Internet Option
- Graphical Control Software
  - ReDAQ® Shape for MAQ20 Software
- Advanced Features Including Integral PID Control, Alarms, Counters, Timers, PWMs, and more
  - Up to 8 PID Loops with ReDAQ Shape Software
  - Formulas, Data Logger, TEDS, PID
- Wide Range 7-34VDC-input Power
- –40°C to +85°C Industrial Operating Temperature
- System is a Modbus® Server and Can Operate Remotely without Local PC
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low-cost per Channel
- Modular IoT enabled, ready to use
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

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The Modules: Compact, Flexible, and Powerful

One MAQ®20 communications module can interface to up to 24 I/O modules to construct a system with a maximum of 384 channels that fits within a standard 19" instrumentation rack. Processors within each module make this distributed system extremely powerful.

- **Communications Modules:** Ethernet, RS-232, RS-485, and USB with host application software interfacing to the system using Modbus® TCP or Modbus RTU protocol.

- **Analog Input Modules:** Interface to a wide range of standard industrial sensors and equipment and offers up to 16 channels of input, each of which can be independently configured; signal ranges are user-selectable and offered in differential and per-channel isolated single-ended configurations.

- **Process Voltage and Process: Current-input Modules:** Offer 8-channel differential input or 16-channel single-ended input for precise measurement of voltage and current signals; all channels are individually configurable for range, alarm limits, and averaging.

- **Thermocouple-input Modules:** Offer 8 differential-input channels, all of which are individually configurable for range, alarm limits, and averaging. Separate models are offered for interfacing to Type J, Type K, Type T, and Types R and S sensors.

- **RTD and Potentiometer-input Modules:** Interface to 2-wire, 3-wire, and 4-wire sensors including five RTD types and potentiometers. Modules offer five or six channels, each configurable for sensor, range, alarm limits, and averaging.

- **Strain-gauge Input Module:** Connects to full-, half-, and quarter-bridge sensors and offers four channels; each channel is configurable for range, alarm limits, averaging, bandwidth, excitation, and gain. Additional features are autozero, shunt cal, and 6-wire connection.

- **Frequency-input Module:** Accepts zero-crossing and TTL signals with frequencies from 1Hz to 1MHz plus State Change and provides a DC stimulus for contact sensors. This module has eight channels, each configurable for range and alarm limits.

- **Isolated Process Voltage and Process Current-input Modules:** Offer 8 isolated-input channels with multiple ranges and high-resolution conversion for precise measurement of voltage and current signals; channels are individually configurable for range, alarm limits, averaging, and high-speed burst scan.



Figure 1: Communications Module with I/O Modules

- **Analog Output Modules: Process Voltage and Process Current-output Modules:** Drive valves, perform other crucial process operations, and provide up to eight channels of output which can be independently configured.

- **Discrete Input/Output Modules:** Provide multiple channels of isolated AC/DC input and AC/DC output per module and offer advanced special functions as well as alarm capability. Twenty-channel input and 20-channel output models offer low per-channel cost.

- **High-density Input Modules with or without Compliance Voltage:** Offer 20 input channels. One module interfaces to 10-120VDC/VAC signals; the other model has a 24VDC compliance voltage source on each channel for interfacing to relay contacts, solid state switches, or other devices requiring excitation.

- **High-density Isolated Output Module:** Provides 20 output channels that can switch up to 60VDC signals and sink up to 3A of current. Channels can be switched individually or in blocks and have user-configurable default output states.

- **Discrete-Relay-output Module:** Provides 20 isolated SPST latching relay output channels with contact state readback that can switch between 2A at 30V and 0.4A at 150V. Relays can be controlled individually or in blocks and have user-configurable default states.

The **System Backbone** resides within the DIN-rail used for module mounting and provides power to and interface between the communications module and the I/O modules. Modules mount on industry-standard 35x7.5mm gull-wing DIN-rails.

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Outstanding Functionality

The MAQ®20 system can operate remotely without host PC intervention. It can also operate as a standalone data logger. Additional features include:

- Up to 4GB of logged data can be transferred via FTP during real-time acquisition
- System firmware automatically registers installation and removal of I/O modules
- Load share power supply modules enable system expansion, standby and redundant power
- Hot swappable I/O modules with field-side pluggable terminal blocks on most models
- Sophisticated packaging allows high-density mounting in 3U increments
- I/O modules can be mounted remotely from the communications module

Output modules are programmable for user-defined waveforms. Discrete I/O modules offer seven high-level functions including pulse/frequency counter, pulse/frequency counter with de-bounce, waveform measurement, time between events, frequency generator, PWM generator, and one-shot pulse generator.

System power is connected to the communications module, which in turn powers the I/O modules. For systems with power supply requirements greater than those the communications module provides, the MAQ20-PWR3 load share power supply module can provide additional power. When a MAQ20 I/O module is inserted into a system, module registration occurs automatically, data acquisition starts, and data is stored locally in the module. The system is based on a Modbus-com® compatible memory map, which ensures easy access to acquired data, configuration settings, and alarm limits. Information is stored in consistent locations from module to module for ease of use and system design.

Software

- ReDAQ® Shape Graphical HMI Design & Runtime Solution

The MAQ20 system comes with free configuration software. In addition, other software solutions may also be used such as LabVIEW™, VIs, C API, Python API, and OPC Server.

Leading-Edge PID Loop Control

The MAQ20 provides PID loop control with ReDAQ Shape software for MAQ20. With ReDAQ Shape, the powerful Dataforth MAQ20 communications module is capable of autonomously running up to 8 PID control loops; faceplates within the software enable an engineer or operator to configure the many features of loop control and monitor processes. Additional advanced features include formulas, data logging, TEDS, and scripting. Typical PID applications include steam, water, and chemical flow control; tank level control; heat-exchanger / reactor temperature control, and pressure control.

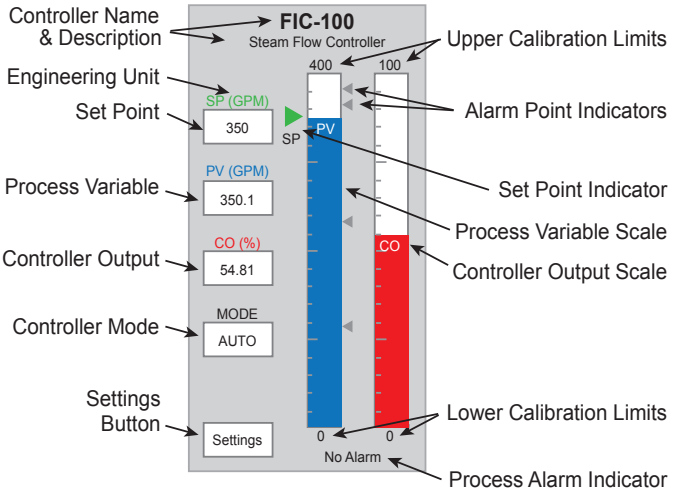


Figure 3: PID Faceplate in ReDAQ Shape Software

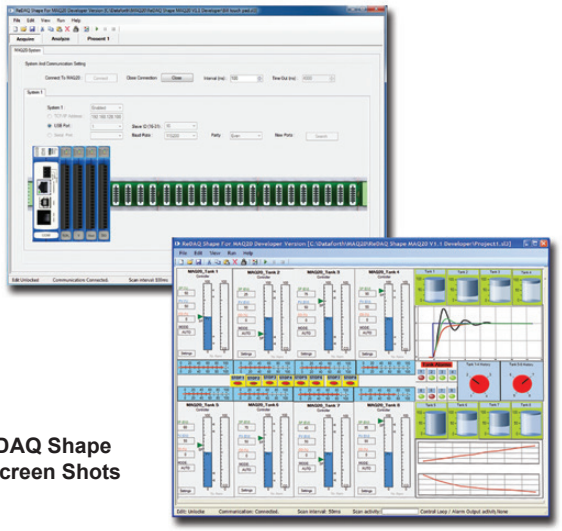


Figure 2: ReDAQ Shape for MAQ20 Screen Shots

Like all Dataforth products, the MAQ20 system provides exceptional isolation, protection, accuracy, and reliability. All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly found in heavy industrial environments.

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MAQ®20 Data Acquisition System Selection Guide

COMMUNICATIONS MODULES

MODEL	DESCRIPTION
MAQ20-COM2	Communications Module; Ethernet, USB, RS-232
MAQ20-COM4	Communications Module, Ethernet; USB, RS-485

VOLTAGE & CURRENT ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-MVDN	Analog Input Module; mV, 8-ch, Differential
MAQ20-VSN	Analog Input Module; V, 16-ch, Single Ended
MAQ20-VDN	Analog Input Module; V, 8-ch, Differential
MAQ20-ISN	Analog Input Module; mA, 16-ch, Single Ended
MAQ20-IDN	Analog Input Module; mA, 8-ch, Differential

ISOLATED VOLTAGE & CURRENT ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-ISOMV1	Isolated Analog Voltage-input Module, 8-ch, ±100mV
MAQ20-ISOV1	Isolated Analog Voltage-input Module, 8-ch, ±1V
MAQ20-ISOV2	Isolated Analog Voltage-input Module, 8-ch, ±10V
MAQ20-ISOV3	Isolated Analog Voltage-input Module, 8-ch, ±20V
MAQ20-ISOV4	Isolated Analog Voltage-input Module, 8-ch, ±40V
MAQ20-ISOV5	Isolated Analog Voltage-input Module, 8-ch, ±60V
MAQ20-ISOI1	Isolated Analog Current-input Module, 8-ch, ±20mA

THERMOCOUPLE ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-JTC	Analog Input Module; Type J Thermocouple, 8-ch
MAQ20-KTC	Analog Input Module; Type K Thermocouple, 8-ch
MAQ20-TTC	Analog Input Module; Type T Thermocouple, 8-ch
MAQ20-RSTC	Analog Input Module; Type R and Type S Thermocouple, 8-ch

RTD AND POTENTIOMETER ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-RTD31	Analog Input Module; RTD/Potentiometer, 3-wire, Type Pt and Ni, 6-ch
MAQ20-RTD41	Analog Input Module; RTD, 4-wire, Type Pt and Ni, 5-ch

STRAIN GAUGE ANALOG INPUT MODULE

MODEL	DESCRIPTION
MAQ20-BRDG1	Analog Input Module; Bridge/Strain-gauge, 4-ch

FREQUENCY ANALOG INPUT MODULE

MODEL	DESCRIPTION
MAQ20-FREQ	Analog Input Module; Frequency, 8-ch

VOLTAGE & CURRENT ANALOG OUTPUT MODULES

MODEL	DESCRIPTION
MAQ20-VO	Analog Output Module; Voltage, 8-ch
MAQ20-IO	Analog Output Module; Current mA, 8-ch

DISCRETE INPUT / OUTPUT MODULES

MODEL	DESCRIPTION
MAQ20-DIOL	Discrete Input/Output Module; 3-60VDC In, 3-60VDC Out, 5-ch In, 5-ch Out
MAQ20-DIOH	Discrete Input/Output Module; 90-280VAC/VDC In, 24-280VAC Out, 4-ch In, 4-ch Out

DISCRETE HIGH-DENSITY INPUT MODULES WITH OR WITHOUT COMPLIANCE VOLTAGE

MODEL	DESCRIPTION
MAQ20-DIV20	Discrete Input Module; 10-32VDC In, 20-ch
MAQ20-DIVC20	Discrete Input Module; 10-24VDC In, 24VDC Compliance, 20-ch

DISCRETE HIGH-DENSITY OUTPUT MODULE

MODEL	DESCRIPTION
MAQ20-DODC20SK	Discrete Output Module; 10-60VDC Out, 20-ch

DISCRETE RELAY OUTPUT MODULE

MODEL	DESCRIPTION
MAQ20-DORLY20	Relay-output Module; 2A at 30V, 0.4A at 150V, 20-ch SPST

LOAD SHARE POWER SUPPLY MODULE

MODEL	DESCRIPTION
MAQ20-PWR3	Load Share Power Supply Module

SYSTEM BACKBONES

MODEL	DESCRIPTION
MAQ20-BKPL4	DIN-rail Backbone; Accepting 1 COM Module plus 4 I/O Modules
MAQ20-BKPL8	DIN-rail Backbone; Accepting 1 COM Module plus 8 I/O Modules
MAQ20-BKPL16	DIN-rail Backbone; Accepting 1 COM Module plus 16 I/O Modules
MAQ20-BKPL24	DIN-rail Backbone; Accepting 1 COM Module plus 24 I/O Modules

SOFTWARE

MODEL	DESCRIPTION
MAQ20-940	ReDAQ® Shape Software for MAQ20 – Developer Version
MAQ20-941	ReDAQ Shape Software for MAQ20 – User Version

POWER SUPPLIES

PWR-PS5R7W	Power Supply, 24V, 0.3A, 100-240VAC-input
PWR-PS5R15W	Power Supply, 24V, 0.65A, 100-240VAC-input
PWR-PS5R30W	Power Supply, 24V, 1.3A, 100-240VAC-input
PWR-PS5R60W	Power Supply, 24V, 2.5A, 100-240VAC-input
PWR-PS5R120W	Power Supply, 24V, 5.0A, 100-240VAC-input

ACCESSORIES

BACKBONE EXPANSION CABLES

MODEL	DESCRIPTION
MAQ20-XCA01	Backbone Expansion Cable; 1 meter (39.4")
MAQ20-XCA02	Backbone Expansion Cable; 2 meter (78.7")

CABLES TO INTERFACE 8B BACKPANELS TO MAQ20-VSN MODULE

MODEL	DESCRIPTION
MAQ20-5B26-0.3	IDC26-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-5B26-0.6	IDC26-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-5B26-01	IDC26-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-8B25-0.3	DB25-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-8B25-0.6	DB25-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-8B25-01	DB25-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-XTB03	MAQ20 Terminal Block, 3 Positions
MAQ20-XTB20	MAQ20 Terminal Block, 20 Positions

USB AND ETHERNET CABLES AND ADAPTERS

MODEL	DESCRIPTION
SLX141-01, -02, -07	Ethernet Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX141-X01, -X02, -X07	Ethernet Crossover Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX142, 143	RJ45 to DB9 Adapters
SLX144	RJ45 RS-485 Multidrop Adapter
SLX146-02, -07	Null Modem Serial Cable, Female DB-9 to Female DB-9; 2m (78.7"), 7m (275.6")
SLX147-01, -02, -05	USB Cable, Type A to Type B; 1m (39.4"), 2m (78.7"), 5m (196.9")
SLX148-4	4GB Micro SD Card and USB Adapter

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Communications Modules

Provide Connection, Power, Interface

DESCRIPTION

The MAQ®20 communications module is offered in two models and provides the connection between a host computer and a MAQ20 Data Acquisition System. MAQ20-COM4 communicates using Ethernet, USB, or RS-485; MAQ20-COM2 uses Ethernet, USB, or RS-232. Ethernet communications use the Modbus® TCP protocol and USB communications are based on the Modbus RTU protocol, which RS-485 and RS-232 communications also use. Serial communications over RS-485 can be either 2-wire or 4-wire.

When using the Ethernet interface, up to four simultaneous socket connections are supported. Serial communications over RS-232 or RS-485 can be run at baud rates as fast as 921.6kbps.

A very useful feature of the MAQ20 system is the capability to store acquired data locally for later analysis. This is provided by the easily accessible and removable 4GB micro-SD memory card that is in the MAQ20-COMx module and can be used to log data acquired from all input modules.

Each MAQ20-COMx module can interface to up to 24 I/O modules in any combination, allowing high channel counts and great lexibility in system configuration.

To power the system, a 7-34VDC power source is connected to the communications module. Regulated and protected supplies within the module then provide power both to the internal circuits and to all I/O modules in the system. When many high power I/O modules are used in a system, MAQ20-PWR3 load share power supply modules can be installed in standard I/O module slots to provide the necessary additional power.

To ensure robustness, the communications interface-to-bus isolation is 50VDC and power input terminals are protected against overvoltage, transient, and reverse connections.

At a minimum, a MAQ20 Data Acquisition System must have a communications module, a backbone, and one I/O module.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

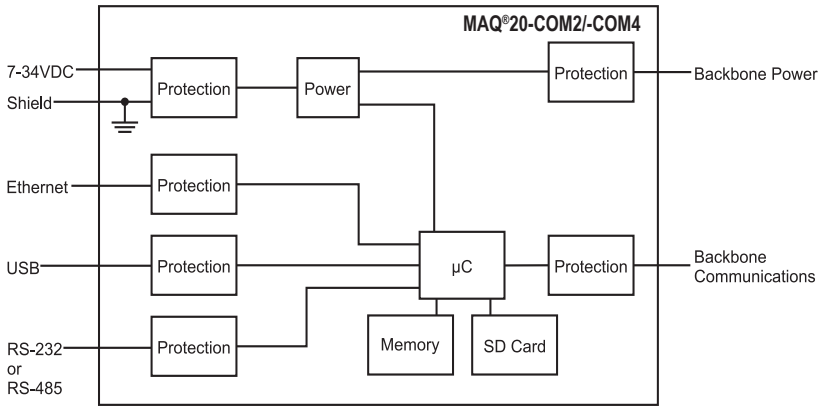
- Connect Host Computer and MAQ20 System
- Communicate Using Ethernet, USB, RS-485 or RS-232
- Up to 4 Simultaneous Socket Connections with Ethernet
- Baud Rates to 921.6kbps with RS-232/RS-485
- Follow Modbus® TCP or RTU Protocols
- Store Acquired Data Locally
- Interface to up to 24 I/O Modules
- 50VDC Comm. Interface-to-Bus Isolation
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular IoT Enabled, Ready-to-Use
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20 Communications Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-COM4 MAQ20-COM2	Ethernet, USB, RS-485 Ethernet, USB, RS-232
Communications Ethernet USB RS-485 RS-232	 10/100 Base-T (1000 Base-T Compatible) RJ-45, Modbus® TCP USB 2.0, Type B, Proprietary Modbus Over USB 2-wire or 4-wire, up to 921.6kbps, Up to 4000 ft, RJ-45, Modbus RTU Up to 921.6kbps, RJ-45, Modbus RTU
CMV Power-to-Bus Communication Port-to-Bus Transient	 50VDC 50VDC ANSI/IEEE C37.90.1
Power Supply Input Power Power to Bus Power Conversion Efficiency Quiescent Current	 7-34VDC at 2A (max) 5VDC at 3A (max) 76% 100mA
Dimensions (h)x(w)x(d)	 4.51" x 1.11" x 3.26" (114.6mm x 28.2mm x 82.8mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

Power Input Terminal Block Position (top to bottom)	Input Connections	
1	7 - 34 VDC	+
2	7 - 34 VDC	–
3		SHIELD

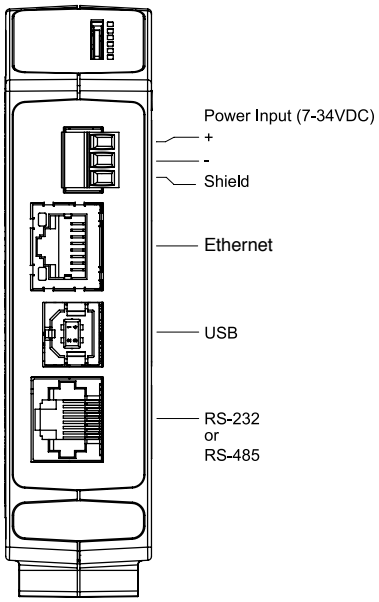
For input connections and full details on module operation, refer to:
MA1040 – MAQ20 Communications Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-COM4	Ethernet, USB, RS-485
MAQ20-COM2	Ethernet, USB, RS-232



Communications Module



Communications Module Input Connections

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Analog Input Modules: Process Voltage & Process Current

Interface to Volt, Millivolt, and Milliamp Sensors and Equipment

DESCRIPTION

MAQ®20 voltage and current analog input modules interface to a wide range of volt, millivolt, and milliamp sensors and equipment used in industrial and test and measurement applications. They offer 8-channel differential input or 16-channel single-ended input for precise measurement of voltage and current signals. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe operation. Hardware low-pass filtering in each channel provides rejection of 50Hz and 60Hz line frequencies. Field I/O connections are made through a pluggable terminal block with four positions provided for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, thereby preserving data integrity.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the sampling rate of enabled channels.

Input ranges are selectable on a per-channel basis. The MAQ20-MVDN, -VDN, and -VSN modules have five user-selectable input ranges; the MAQ20-IDN and -ISN modules have two. Over-range and under-range up to 2% beyond the specified input values is allowed, and accuracy is guaranteed to full scale.

Cables to interface 8B backpanels to the MAQ20-VSN module are available; the 8B modules and backpanel assembly provide 1500Vrms channel-to-channel isolation.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

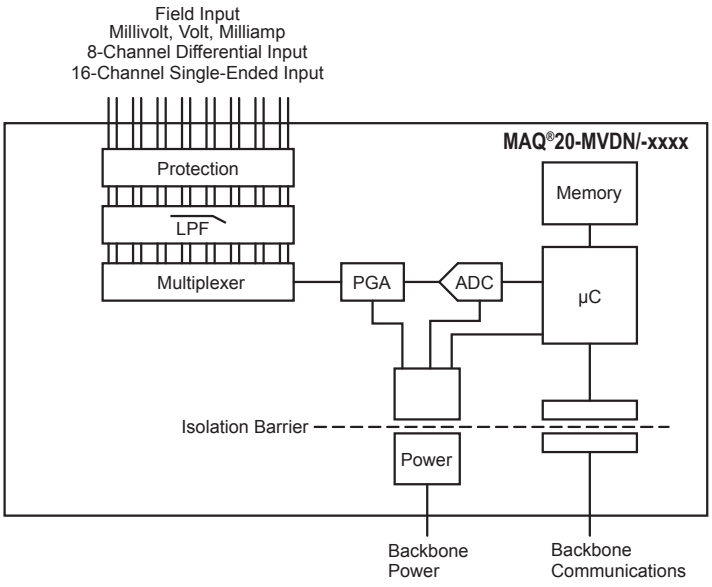
- Interface to Volt, Millivolt, Milliamp Sensors and Equipment
- 8-channel Differential or 16-channel Single-Ended Input
- All Channels Individually Configurable for Range, Alarms, Averaging
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 240Vrms Continuous Overload
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20 Voltage-input and Current-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-MVDN	8-channel, mV, Differential Input ±50mV, ±100mV, ±250mV, ±1.0V (Default), ±2.0V
MAQ20-VDN	8-channel, Volt, Differential Input ±5V (Default), ±10V, ±20V, ±40V, ±60V
MAQ20-VSN	16-channel, Volt, Single-Ended Input ±5V (Default), ±10V, ±20V, ±40V, ±60V
MAQ20-IDN	8-channel, mA, Differential Input 0-20mA (Default), 4-20mA
MAQ20-ISN	16-channel, mA, Single-Ended Input 0-20mA (Default), 4-20mA
Per Channel Setup	Individually Configurable for Range, Alarms, Averaging
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	±28V Peak (-VDN), ±3V Peak (-MVDN, -IDN), 0V (-VSN, -ISN)
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	30dB at 50/60Hz
Accuracy(1)	±0.035% Span
Linearity / Conformity	±0.02% Span
Resolution	0.012% Span
Stability	
Zero	±15ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	3Hz
Scan Rate	200 Ch/s
Alarms	High / High-High / Low / Low-Low
Power Supply Current	30mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858, ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis and repeatability.

For input connections and full details on module operation, refer to:
MA1041 – MAQ20 mV-V-mA Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-MVDN	Analog Input Module; mV, 8-ch, Differential
MAQ20-VDN	Analog Input Module; V, 8-ch, Differential
MAQ20-VSN	Analog Input Module; V, 16-ch, Single Ended
MAQ20-IDN	Analog Input Module; mA, 8-ch, Differential
MAQ20-ISN	Analog Input Module; mA, 16-ch, Single Ended

Cables to Interface 8B Backpanels to MAQ20-VSN Module

Model	Description
MAQ20-8B25-0.3	DB25-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-8B25-0.6	DB25-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-8B25-01	DB25-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-5B26-0.3	IDC26-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-5B26-0.6	IDC26-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-5B26-01	IDC26-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long

Terminal Block Position (top to bottom)	MAQ20-MVDN, MAQ20-VDN and MAQ20-IDN Input Connections	MAQ20-VSN and MAQ20-ISN Input Connections
1	CH0 +IN	CH0 +IN
2	CH0 –IN	CH1 +IN
3	SHIELD	CH0, CH1, CH2, CH3 –IN, SHIELD
4	CH1 +IN	CH2 +IN
5	CH1 –IN	CH3 +IN
6	CH2 +IN	CH4 +IN
7	CH2 –IN	CH5 +IN
8	SHIELD	CH4, CH5, CH6, CH7 –IN, SHIELD
9	CH3 +IN	CH6 +IN
10	CH3 –IN	CH7 +IN
11	CH4 +IN	CH8 +IN
12	CH4 –IN	CH9 +IN
13	SHIELD	CH8, CH9, CH10, CH11 –IN, SHIELD
14	CH5 +IN	CH10 +IN
15	CH5 –IN	CH11 +IN
16	CH6 +IN	CH12 +IN
17	CH6 –IN	CH13 +IN
18	SHIELD	CH12, CH13, CH14, CH15 –IN, SHIELD
19	CH7 +IN	CH14 +IN
20	CH7 –IN	CH15 +IN

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Analog Input Modules: Process Voltage & Process Current

Isolated Channel-to-channel, High-resolution Conversion, Wide Bandwidth

DESCRIPTION

The MAQ®20-ISOMV1 and MAQ20-ISOVx voltage input modules and MAQ20-ISO1 current input module offer 8 isolated input channels with multiple signal ranges and high-resolution conversion for precise measurement of a wide range of analog voltage and current signals. All channels are individually configurable for range, alarm limits, averaging, and high-speed burst scan to match the most demanding applications. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Signal bandwidth is 1kHz for voltage input and 1kHz for current input. The burst scan mode allows up to 5kS/s per channel to be captured simultaneously. Field I/O connections are made through a pluggable terminal block with four positions provided for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors. In addition, the MAQ20-ISOMV1, -ISOVx, and -ISOI1 modules have 300Vrms continuous channel-to-channel isolation. Overloaded channels do not adversely affect other channels in the module, thereby preserving data integrity.

Signal ranges for the voltage input modules are from ±100mV to ±60V, and for the current input module, 0 to 20mA.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

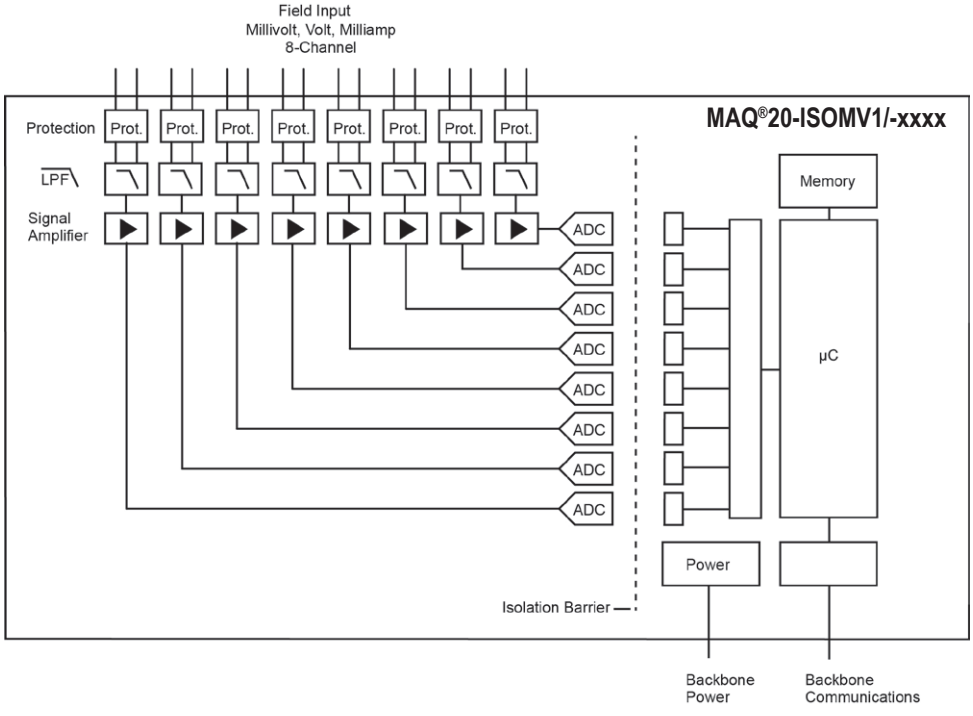
- 8 Isolated Input Channels with Multiple Ranges and High Resolution Conversion
- Precise Measurement of Wide Range of Analog Voltage and Current Signals
- Channels Individually Configurable for Range, Alarm Limits, Averaging, and High-speed Burst Scan Mode
- 1500Vrms Input-to-Bus Isolation
- 300Vrms Ch-to-Ch Isolation
- Each Channel Protected up to 240Vrms Continuous Overload
- Overloaded Channels Do Not Adversely Affect Other Channels
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-ISOMV1/-ISOVx/-ISO1 Modules Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-ISOMV1 MAQ20-ISOV1 MAQ20-ISOV2 MAQ20-ISOV3 MAQ20-ISOV4 MAQ20-ISOV5 MAQ20-ISOI1	0 to +100mV, ±100mV (Default) 0 to +1V, ±1V (Default) 0 to +10V, ±10V (Default) 0 to +20V, ±20V (Default) 0 to +40V, ±40V (Default) 0 to +60V, ±60V (Default) 0-20mA (Default), 4-20mA, ±20mA
Per Channel Setup	Individually Configurable for Range, Alarms, Averaging, Burst Scan
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	300Vrms, 425V_{PEAK}
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	20dB/decade
Accuracy(1)	±0.035% Span
Linearity / Conformity	±0.02% Span
Resolution	0.0015% Span
Stability	
Zero	15ppm/°C
Span	35ppm/°C
Bandwidth	1kHz Voltage-input, 1kHz Current-input
Scan Rate	
Continuous	500 Ch/s net, 65 Ch/s at 8-ch Simultaneous
Burst	5kS/s per Channel
Alarms	High / High-High / Low / Low-Low
Open Input Response	
mV Input	Upscale
Detection Time	<5s
Power Supply Current	270mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" ((83.1mm x 114.6mm x 15.3mm))
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity/conformity, hysteresis and repeatability.

For input connections and full details on module operation, refer to:
MA1062 – MAQ20 Ch-ch Isolated mV-V-mA Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-ISOMV1	Isolated Analog Voltage-input Module, 8-ch, ±100mV
MAQ20-ISOV1	Isolated Analog Voltage-input Module, 8-ch, ±1V
MAQ20-ISOV2	Isolated Analog Voltage-input Module, 8-ch, ±10V
MAQ20-ISOV3	Isolated Analog Voltage-input Module, 8-ch, ±20V
MAQ20-ISOV4	Isolated Analog Voltage-input Module, 8-ch, ±40V
MAQ20-ISOV5	Isolated Analog Voltage-input Module, 8-ch, ±60V
MAQ20-ISOI1	Isolated Analog Current-input Module; 8-ch, ±20mA

Terminal Block Position (Top to Bottom)	Input Connections
1	CH0 +IN
2	CH0 –IN
3	SHIELD
4	CH1 +IN
5	CH1 –IN
6	CH2 +IN
7	CH2 –IN
8	SHIELD
9	CH3 +IN
10	CH3 –IN
11	CH4 +IN
12	CH4 –IN
13	SHIELD
14	CH5 +IN
15	CH5 –IN
16	CH6 +IN
17	CH6 –IN
18	SHIELD
19	CH7 +IN
20	CH7 –IN

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Analog Input Modules: Thermocouple

Interface to Types J, K, T, R and S Thermocouples

DESCRIPTION

The MAQ®20 thermocouple analog input modules have 8 differential input channels. Separate models are offered for interfacing to Type J, Type K, Type T, and Types R and S thermocouples. Cold-junction Compensation uses four internal sensors resulting in industry-leading measurement accuracy in any system configuration and over the entire system operating temperature range. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. High, Low, High-High, and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe operation. Hardware low-pass filtering in each channel provides rejection of 50Hz and 60Hz line frequencies. Field I/O connections are made through spring cage terminal blocks with four positions provided for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 150Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, thereby preserving data integrity.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the sampling rate of enabled channels.

Input ranges are selectable on a per-channel basis. The MAQ20-JTC, -KTC, -TTC and -RSTC modules have two to four user-selectable input ranges, depending on the model. Over-range and under-range up to 2% beyond the specified input values is allowed. Sensor linearization is performed in the module, and accuracy is guaranteed to full scale.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

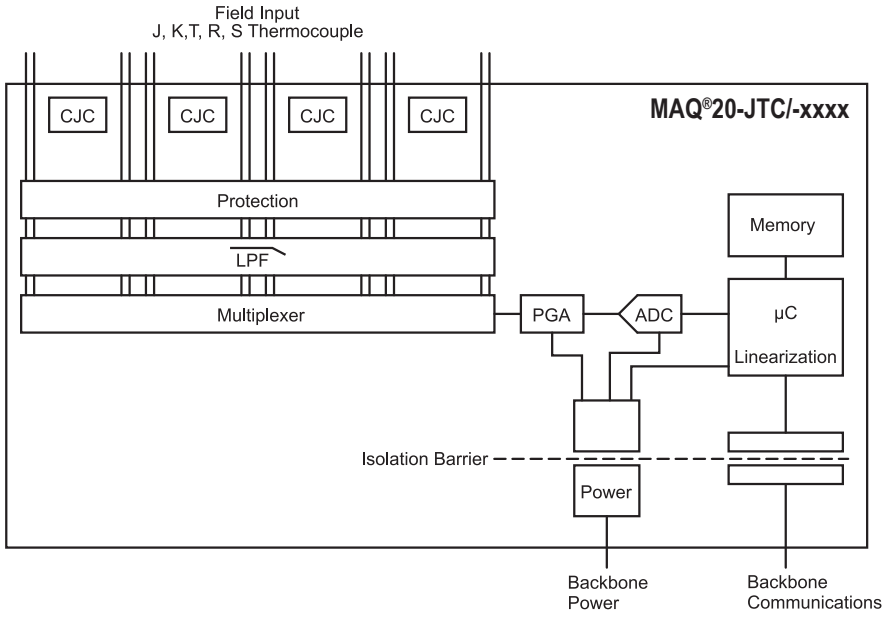
- 8 Differential-Input Channels
- Interface to Types J, K, T , R and S Thermocouples
- All Channels Individually Configurable for Range, Alarms, Averaging
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 150Vrms Continuous Overload
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20 Thermocouple-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-JTC	8-ch., Type JTC, Differential Input –100°C to +760°C (Default) –100°C to +393°C, –100°C to +199°C
MAQ20-KTC	8-ch., Type KTC, Differential Input –100°C to +1350°C (Default) –100°C to +651°C, –100°C to +332°C
MAQ20-TTC	8-channel, Type TTC, Differential Input –100°C to +400°C (Default), –100°C to +220°C
MAQ20-RSTC	8-channel, Type RTC and Type STC, Differential Input Type R: 0°C to +1750°C (Default), 0°C to +990°C Type S: 0°C to +1750°C, 0°C to +970°C
Per Channel Setup	Individually Configurable for Range, Alarms, Averaging
Input Protection	
Continuous	150Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	$\pm 3V_{PEAK}$
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	26dB at 50/60Hz
Accuracy(1)	±0.06% Span
Conformity	±0.035% Span
Cold-junction Compensation	±0.25°C at +25°C, ±1.0°C at –40°C to +85°C
Resolution	0.020% Span
Stability	
Zero	±15ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	3Hz
Scan Rate	200 Ch/s
Alarms	High/ High-High / Low / Low-Low
Open Input Response	Downscale, <5s, Flag Set
Power Supply Current	30mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis and repeatability. Does not include CJC accuracy.

For input connections and full details on module operation, refer to:
MA1047 – MAQ20 Thermocouple-input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-JTC	Analog Input Module; Type J Thermocouple, 8-ch
MAQ20-KTC	Analog Input Module; Type K Thermocouple, 8-ch
MAQ20-TTC	Analog Input Module; Type T Thermocouple, 8-ch
MAQ20-RSTC	Analog Input Module; Type R and Type S Thermocouple, 8-ch

Terminal Block Position (top to bottom)	MAQ20-xTC Input Connections
1	CH0 +IN
2	CH0 –IN
3	SHIELD
4	CH1 +IN
5	CH1 –IN
6	CH2 +IN
7	CH2 –IN
8	SHIELD
9	CH3 +IN
10	CH3 –IN
11	CH4 +IN
12	CH4 –IN
13	SHIELD
14	CH5 +IN
15	CH5 –IN
16	CH6 +IN
17	CH6 –IN
18	SHIELD
19	CH7 +IN
20	CH7 –IN

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Analog Input Modules: RTD and Potentiometer

Interface to 2-wire, 3-wire, and 4-wire Sensors

DESCRIPTION

Two MAQ®20 resistance input modules are offered. One interfaces to 2-wire and 3-wire sensors and has 6 input channels (MAQ20-RTD31); the other interfaces to 4-wire sensors and has 5 input channels (MAQ20-RTD41). The 2-wire/3-wire module interfaces to 3 types of sensors: 100Ω Pt and 120Ω Ni RTDs, and potentiometers up to 5kΩ; the 4-wire module interfaces to 100Ω Pt and 120Ω Ni RTDs. Precision, low-magnitude current sources are used to minimize sensor self-heating and cancel lead resistance errors when using 3-wire sensors. All channels are individually configurable for sensor, range, alarm limits, and averaging to match the most demanding applications. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Hardware low-pass filtering in each channel provides rejection of 50 and 60Hz line frequencies. Field I/O connections are made through a pluggable terminal block with positions designated for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, which preserves data integrity.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the sampling rate of enabled channels.

Input sensors and input ranges are selectable on a per-channel basis. One to three ranges are available depending on the input sensor. Over-range and under-range up to 2% beyond the specified input values is allowed. Sensor linearization is performed in the module, and accuracy is guaranteed to full scale.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

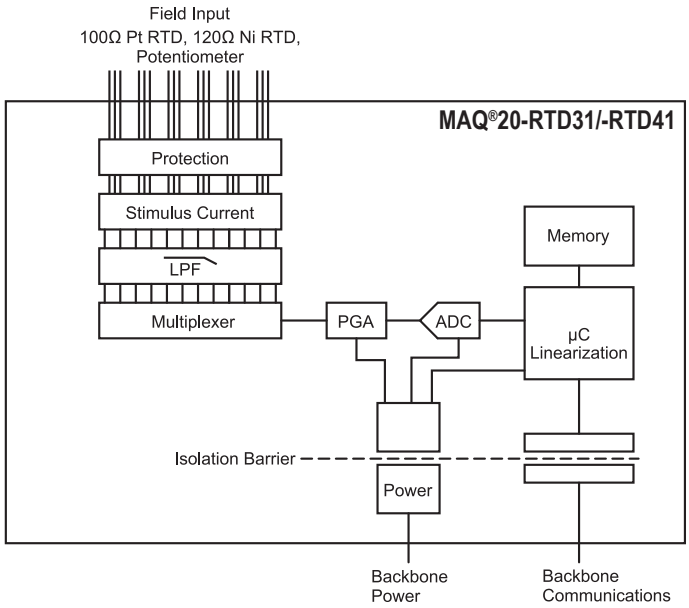
- 6 Input Channels for 2-wire or 3-wire Sensors
- 5 Input Channels for 4-wire Sensors
- Interface to Pt100, Ni120 RTDs, and Potentiometers up to 5kΩ
- All Channels Individually Configurable for Sensor, Range, Alarms, Averaging
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 240Vrms Continuous Overload
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-RTD31/-RTD41 RTD and Potentiometer-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-RTD31	6-channel, 2-wire or 3-wire Pt100, Ni120, Potentiometer-input 100Ω Pt α = 0.00385; –200°C to +850°C (Default) 100Ω Pt100 α = 0.00385; –200°C to +200°C Pt100 α = 0.00385; –100°C to +100°C Ni120 α = 0.00672; –80°C to +300°C Potentiometer 0Ω to 5kΩ
MAQ20-RTD41	5-channel, 4-wire Pt100, Ni120 100Ω Pt α = 0.00385; –200°C to +850°C (Default) 100Ω Pt100 α = 0.00385; –200°C to +200°C Pt100 α = 0.00385; –100°C to +100°C Ni120 α = 0.00672; –80°C to +300°C
Per Channel Setup	Individually Configurable for Range, Alarms, Averaging
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	$\pm 3V_{PEAK}$
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	20dB at 50/60Hz
Accuracy(1)	±0.06% Span
Conformity	±0.035% Span
Resolution	0.012% Span
Stability	
Zero	±50ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	3Hz
Scan Rate	200 Ch/s
Alarms	High / High-High / Low / Low-Low
Open Input Response	Upscale or Downscale, <5s, Flag Set
Power Supply Current	35mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis and repeatability.

For input connections and full details on module operation, refer to:
MA1044 – MAQ20 RTD-Potentiometer Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-RTD31	Analog Input Module; RTD/Potentiometer, 2-wire or 3-wire, Type Pt and Ni, 6-ch
MAQ20-RTD41	Analog Input Module; RTD, 4-wire, Type Pt and Ni, 5-ch

Terminal Block Position (top to bottom)	MAQ20-RTDx1 Input Connections
1	CH0 +EXC/SHIELD
2	CH0 +IN
3	CH0 –IN
4	CH1 +EXC/SHIELD
5	CH1+IN
6	CH1 –IN
7	CH2 +EXC/SHIELD
8	CH2 +IN
9	CH2 –IN
10	NC
11	NC
12	CH3 +EXC/SHIELD
13	CH3 +IN
14	CH3 –IN
15	CH4 +EXC/SHIELD
16	CH4 +IN
17	CH4 –IN
18	CH5 +EXC/SHIELD
19	CH5 +IN
20	CH5 –IN

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Analog Input Module: Strain-gauge

Interface to Full-, Half-, and Quarter-bridge Sensors

DESCRIPTION

The MAQ®20-BRDG1 strain gauge input module offers 4 input channels and can interface to full-, half-, and quarter-bridge sensors using 4-wire or 6-wire connections. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. In addition, sampling rate, resolution, bandwidth, excitation voltage, and choice of shunt calibration resistors are user-settable parameters. Input signals are sampled simultaneously and burst mode can be used to capture fast events. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Hardware low-pass filtering in each channel provides rejection of unwanted frequencies. Field I/O connections are made through spring cage terminal blocks with positions designated for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 30Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, which preserves data integrity.

Input ranges are selectable on a per-channel basis. Four ranges are available. Over-range and under-range up to 2% beyond the specified input values is allowed, and accuracy is guaranteed to full scale.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

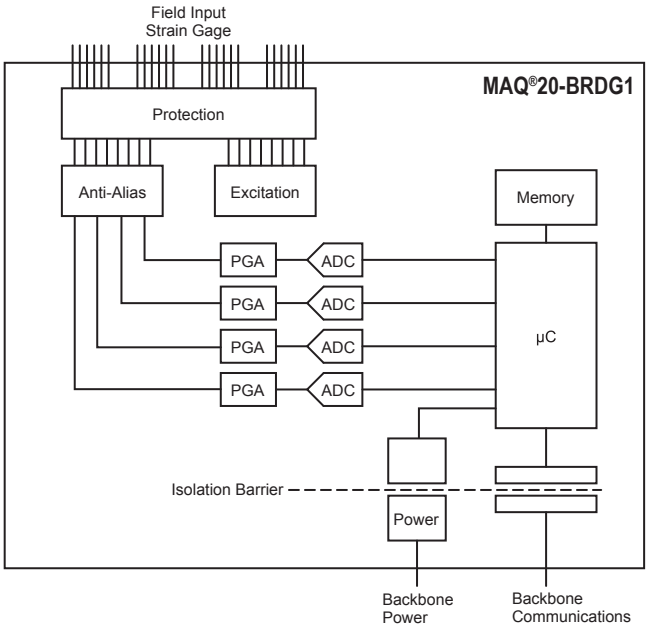
- 4 Input Channels for 4-wire or 6-wire Sensors
- Bridge Resistance 100Ω to 1kΩ
- Interface to Full, Half and Quarter (with external bridge completion) Sensors
- All Channels Individually Configurable for Range, Alarms, Averaging
- 24-bit Resolution
- Programmable Sampling Rate and Resolution
- Simultaneous Sampling of Input, Bandwidth Signals
- Burst Mode for Capturing Fast Events
- Programmable Excitation, Shunt Calibration, Remote Sense
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 30Vrms Continuous Overload
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-BRDG1 Strain-gauge Input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-BRDG1	Full, Half, Quarter Bridge 4-wire or 6-wire Connection
Number of Channels Per Channel Setup	4 Individually Configurable for Range, Alarms, Averaging
Input Range Input Protection Continuous Transient Excitation Voltage Bridge Resistance Shunt Calibration	±100mV, 0.8mV/V to 40mV/V Sensitivity 30Vrms (max) ANSI/IEEE C37.90.1 2.5V, 3.333V, 5.0V, 10.0V 100Ω to 1kΩ 60kΩ, 100kΩ, 200kΩ, External
Excitation Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient CMR NMR	 30Vrms (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute $\pm 3V_{PEAK}$ ANSI/IEEE C37.90.1 100dB at 50/60Hz 60dB/Decade
Accuracy(1) Linearity Resolution ADC Resolution Stability Zero Span	±0.03% Span ±0.01% Span 0.0005% to 0.005% Span 24-bit 50ppm/°C 75ppm/°C
Bandwidth Scales with Sample Rate Sampling Rate, Simultaneous Alarms Power Supply Current	 Programmable to 17kHz 1ks/s to 32ks/s Burst High / High-High / Low / Low-Low 400mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A ±0.5% Span Error Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis and repeatability.

For input connections and full details on module operation, refer to:
MA1046 – MAQ20 Strain-gauge Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-BRDG1	Analog Input Module; Bridge/Strain-gauge, 4-ch

Sensor Connection	Terminal	Terminal	Sensor Connection
CH0			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH1			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH2			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH3			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL

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Analog Input Module: Frequency

Measure Frequencies to 1MHz

DESCRIPTION

The MAQ®20-FREQ frequency input module offers 8 input channels for measuring frequencies up to 1MHz. All channels are individually configurable for range and alarm limits to match the most demanding applications. Four controllable outputs can be used for sensor excitation or as 5V logic compatible outputs. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Field I/O connections are made through a pluggable terminal block with positions designated for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the system sampling rate of enabled channels.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

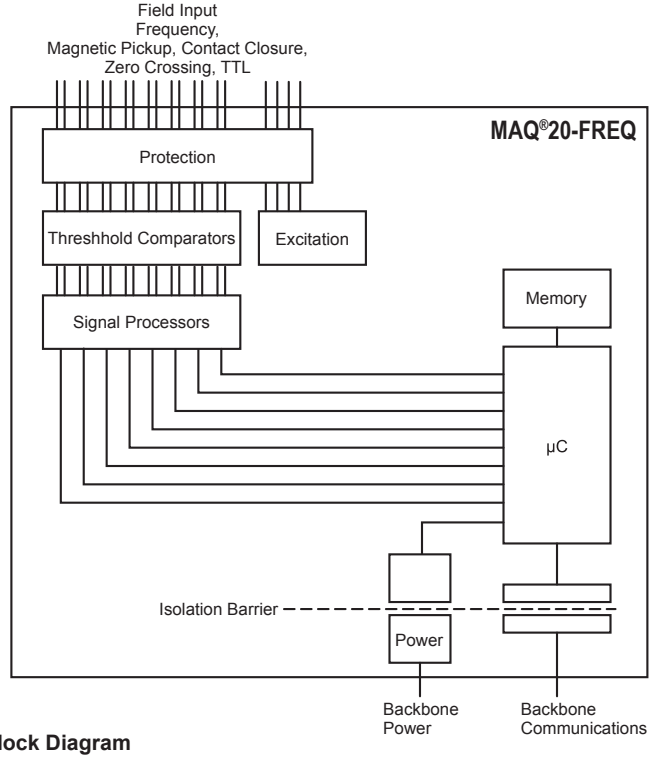
- 8 Input Channels
- 50mV Sensitivity
- 1Hz to 1MHz plus State Change Frequency Range
- DC + Signal ≤300Vrms Operating Range
- All Channels Individually Configurable for Range and Alarms
- 4 Excitation Sources to Power Sensors or Provide 5V Logic Compatible Output
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 240Vrms
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-FREQ Frequency-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-FREQ	8-channel, Frequency-input, 1Hz to 1MHz, Plus State Change Detect
Input Signal	50mV Sensitivity Operating Range: DC + Signal 300Vrms
Excitation	Four 5V Sources at 8mA each Use for Sensor Excitation or 5V Logic Compatible Output
Per Channel Setup	Individually Configurable for Range, Alarms
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	0V
Transient	ANSI/IEEE C37.90.1
Resolution and Accuracy	32 Bits
Clock Accuracy	±0.003%
Clock Accuracy Over Temp	±0.01%, –40°C to +85°C
Scan Rate	1000 Ch/s
Alarms	High / High-High / Low / Low-Low
Power Supply Current	400mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1048 – MAQ20 Frequency-input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-FREQ	Analog Input Module; Frequency, 8-ch

Terminal Block Position (top to bottom)	MAQ20-FREQ I/O Connections
1	CH0 +IN
2	CH0 –IN
3	CH1 +IN
4	CH1 –IN
5	EXC0 / OUT0
6	CH2 +IN
7	CH2 –IN
8	CH3 +IN
9	CH3 –IN
10	EXC1 / OUT1
11	CH4 +IN
12	CH4 –IN
13	CH5 +IN
14	CH5 –IN
15	EXC2 / OUT2
16	CH6 +IN
17	CH6 –IN
18	CH7 +IN
19	CH7 –IN
20	EXC3 / OUT3

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Analog Output Modules: Process Voltage and Process Current

8 Isolated Voltage or Current-outputs

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DESCRIPTION

The MAQ®20 voltage output module, MAQ20-VO, and current output module, MAQ20-IO, offer 8 isolated voltage or current outputs. All channels are individually configurable for range and programmable output to match the most demanding applications. High-level-per-channel isolation gives the module unmatched ruggedness and flexibility while default outputs provide essential functionality for fail-safe systems. User-defined waveform outputs allow application-specific sophisticated, autonomous control. Field output connections are made through a pluggable terminal block which simplifies wiring during system setup and reconfiguration.

Input-to-bus isolation is a robust 1500Vrms and channel-to-channel isolation is 300Vrms. In addition, each channel is protected up to 40Vrms continuous overload in case of inadvertent wiring errors.

Channels in a module can be selectively enabled for output. All channels are enabled by default; however, non-used channels can be disabled to increase the refresh rate of enabled channels.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

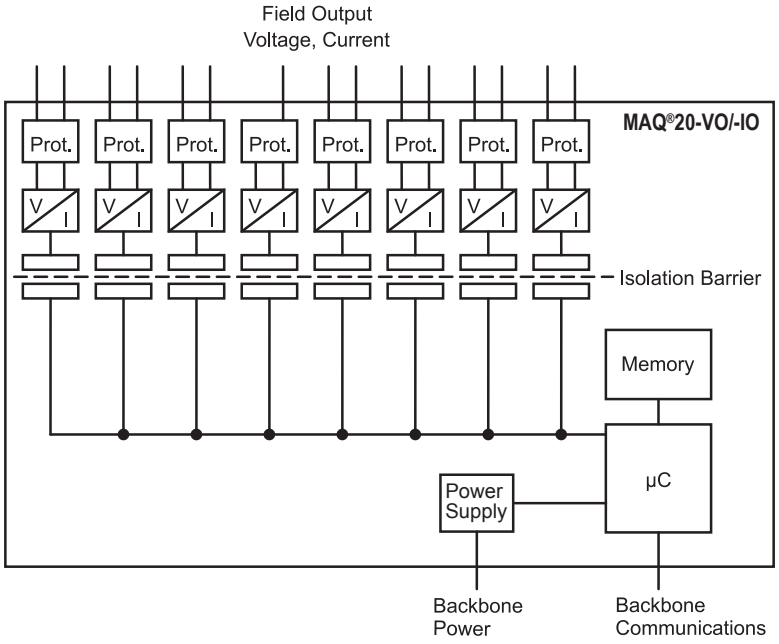
- 8 Isolated Output Channels
- Voltage or Current-output
- All Channels Individually Configurable for Range and Programmable Output
- User-defined Default Output and Output Waveform
- 1500Vrms Input-to-Bus Isolation
- 300Vrms Channel-to-Channel Isolation
- Each Channel Protected up to 40Vrms Continuous Overload
- Selective Enabling of Module Channels for Refresh
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-IO and MAQ20-VO Voltage & Current-output Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-VO	8 Isolated Channel Voltage-output 0-2.5V, 0-5V, 0-10V, ±2.5V, ±5V, ±10V (Default)
MAQ20-IO	8 Isolated Channel Current-output 0-20mA (Default), 4-20mA
Per Channel Setup	Individually Configurable for Range, Default Output, Waveform
MAQ20-VO	
Output Drive (Max Load)	10mA (1000Ω at 10V)
Over-range	10.5V
MAQ20-IO	
Compliance	15VDC
Load Range	0-600Ω
Over-range	21.5mA
Current Limit	26mA
Output Protection	
Continuous	40Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	300Vrms
Transient	ANSI/IEEE C37.90.1
CMR	75dB at 50/60Hz
Accuracy(1)	±0.040% Span
Linearity / Conformity	±0.030% Span
Resolution	0.024% Span
Stability	
Zero	±25ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	100Hz
Update Rate	1600 Ch/s
Power Supply Current	
MAQ20-VO	270mA at No-Load, 480mA at Full-Load
MAQ20-IO	210mA at No-Load, 650mA at Full-Load
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Description
MAQ20-VO	Analog Output Module; Voltage, 8-ch
MAQ20-IO	Analog Output Module; Current mA, 8-ch

Terminal Block Position (top to bottom)	MAQ20-VO & MAQ20-IO Output Connections
1	CH0 +OUT
2	CH0 –OUT
3	CH1 +OUT
4	CH1 –OUT
5	SHIELD
6	CH2 +OUT
7	CH2 –OUT
8	CH3 +OUT
9	CH3 –OUT
10	SHIELD
11	CH4 +OUT
12	CH4 –OUT
13	CH5 +OUT
14	CH5 –OUT
15	SHIELD
16	CH6 +OUT
17	CH6 –OUT
18	CH7 +OUT
19	CH7 –OUT
20	SHIELD

For input connections and full details on module operation, refer to:
MA1042 – MAQ20 Voltage and Current-output Module Hardware User Manual

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Discrete Input / Output Modules

5 Input Channels and 5 Output Channels (MAQ®20-DIOL)
4 Input Channels and 4 Output Channels (MAQ®20-DIOH)

DESCRIPTION

The MAQ20-DIOL discrete input/output module has 5 isolated discrete input channels and 5 isolated discrete output channels. Input channels accept 3-60VDC signals and output channels switch 3-60VDC signals at up to 3A load.

The MAQ20-DIOH discrete input/output module has 4 isolated discrete inputs and 4 isolated discrete outputs. Input channels accept 90-280VAC/VDC signals and output channels switch 24-280VAC signals at up to 3A AC load. **NOTE: -DIOH output channels switch AC loads only.**

Discrete output channels have user-configurable default output states which are set up on power up or module reset. In addition to performing standard discrete I/O, the channels can be configured to perform seven special functions: Pulse/Frequency Counter, Pulse/Frequency Counter with De-bounce, Waveform Measurement, Time Between Events, Frequency Generator, Pulse Width Modulation (PWM) Generator, and One-Shot Pulse Generator. Up to four special functions can run simultaneously. High, Low, High-High, and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Field I/O connections are made through a pluggable terminal block.

Input-to-bus isolation is a robust 1500Vrms and channel-to-channel isolation is 300Vrms. Each individual channel has continuous overload and reverse connection protection in case of inadvertent wiring errors.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

- Rugged Isolation and Protection for Industrial Control
- User-defined Default Output and Output Waveform
- 7 High-performance Special Functions
- 1500Vrms Input-to-Bus Isolation
- 300Vrms Channel-to-Channel Isolation
- Continuous Overload and Reverse Protection
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

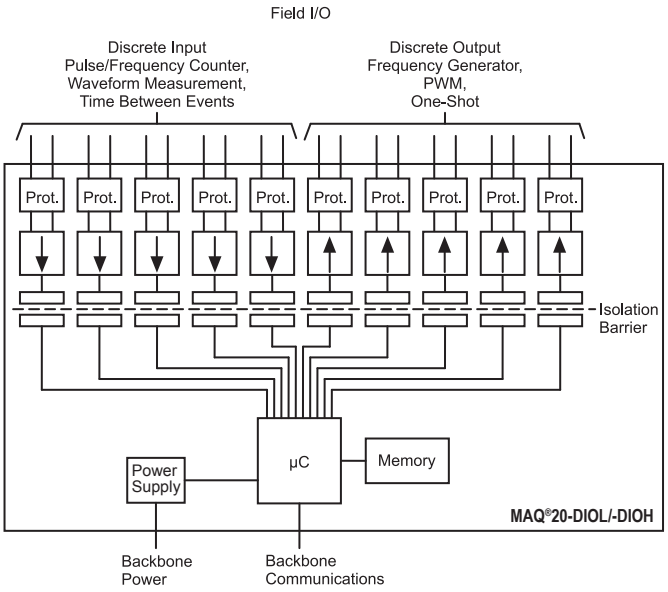
BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

IMPORTANT: The DIOH module can only switch AC loads, not DC. The output switch is AC only with zero-crossing detection.



MAQ20-DIOL/-DIOH Discrete Input/Output Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-DIOL	5 Isolated Channel Discrete Input, 3-60VDC 5 Isolated Channel Discrete Output, 3-60VDC
MAQ20-DIOH	4 Isolated Channel Discrete Input, 90-280VAC/VDC 4 Isolated Channel Discrete Output, 24-280VAC
Per Channel Setup	Individually Configurable for Range, Default Output, Waveform
Input Protection	
Continuous, -DIOL	70VDC (max), Reverse Polarity Protected
Continuous, -DIOH	350VAC/VDC (max)
Transient	ANSI/IEEE C37.90.1
Output Protection	
Continuous, -DIOL	70VDC (max), Reverse Polarity Protected
Continuous, -DIOH	350VAC/VDC (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	300Vrms, 425VDC
Transient	ANSI/IEEE C37.90.1
Output Load (Combined load, all channels)(1)	
MAQ20-DIOL	
T_A= +25°C, Freq = 0 to 1500Hz, Duty Cycle = 5-100%	3A (2A if Adjacent Module T_{CASE}>50°C)
T_A= +85°C, Freq = 0 to 500Hz, Duty Cycle = 5-100%	2A (1A if Adjacent Module T_{CASE}>50°C)
MAQ20-DIOH	
T_A= +25°C, Freq = 0 to 1500Hz	3Arms
T_A= +85°C, Freq = 0 to 500Hz	3Arms
Switching Characteristics	
MAQ20-DIOL	
Input Channel Turn-on/ Turn-off Time	25µs / 55µs
Output Channel Turn-on/ Turn-off Time	20µs / 40µs
MAQ20-DIOH	
Input Channel Turn-on/ Turn-off Time	20ms / 30ms (VAC), 1ms / 1ms (VDC)
Output Channel Response Time	0.5 Cycle
I/O Special Functions (**MAQ20-DIOL**)	
Pulse/Frequency Counter**	Freq to 10kHz, Count to 10M**, RPM to 65k
Pulse/Frequency Counter w/De-bounce	Freq to 3kHz, Count to 10M
Waveform Measurement	Freq to 500Hz, # Periods, Pulse Width, Period, Duty Cycle
Time Between Events**	Min**, Max**, Avg**, Selectable Timebase**
Frequency Generator	Up to 700Hz
PWM Generator	200µs (min) Period, Selectable Timebase
One-Shot Pulse Generator	100µs (min) Programmable Pre- and Post-Delay
Scan/Update Rate	3500 Ch/s
Alarms (**MAQ20-DIOL**)	High / High-High / Low / Low-Low
Power Supply Current	30mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)

Specifications (continued)

Module	Description
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
**Also applicable to MAQ20-DIOH
(1) See manual for detailed calculations of load ratings based on ambient temperature, multiple channels, and adjacent modules.

Ordering Information

Model	Description
MAQ20-DIOL	Discrete Input/Output Module; 3 to 60VDC In, 3 to 60VDC Out, 5-ch In, 5-ch Out
MAQ20-DIOH	Discrete Input/Output Module; 90 to 280VAC/VDC In, 24 to 280VAC Out, 4-ch In, 4-ch Out

Terminal Block Position (top to bottom)	MAQ20-DIOL Field Connections	MAQ20-DIOH Field Connections
1	DO CH0 +OUT	DO CH0 +OUT
2	DO CH0 –OUT	DO CH0 –OUT
3	DO CH1 +OUT	DO CH1 +OUT
4	DO CH1 –OUT	DO CH1 –OUT
5	DO CH2 +OUT	DO CH2 +OUT
6	DO CH2 –OUT	DO CH2 –OUT
7	DO CH3 +OUT	DO CH3 +OUT
8	DO CH3 –OUT	DO CH3 –OUT
9	DO CH4 +OUT	NC
10	DO CH4 –OUT	NC
11	DI CH0 +IN	NC
12	DI CH0 –IN	NC
13	DI CH1 +IN	DI CH0 +IN
14	DI CH1 –IN	DI CH0 –IN
15	DI CH2 +IN	DI CH1 +IN
16	DI CH2 –IN	DI CH1 –IN
17	DI CH3 +IN	DI CH2 +IN
18	DI CH3 –IN	DI CH2 –IN
19	DI CH4 +IN	DI CH3 +IN
20	DI CH4 –IN	DI CH3 –IN

For input connections and full details on module operation, refer to:
DIOL – MA1043 Discrete Input-Output Module Hardware User Manual

For input connections and full details on module operation, refer to:
DIOH – MA1058 Discrete Input-Output Module Hardware User Manual

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Discrete Input Modules: High Density Voltage

20 Input Channels with or without Compliance Voltage

DESCRIPTION

The MAQ®20-DIV20 and MAQ20-DIVC20 are two versions of the same module, offering 20 discrete input channels. The MAQ20-DIV20 interfaces to 10-120VDC/VAC signals. The MAQ20-DIVC20 interfaces to 10-24VDC signals and has a 24VDC compliance voltage source on each channel for interfacing to relay contacts, solid state switches, or other devices that require an excitation. Discrete input states can be read individually or as a block. Logic polarity can be user defined as standard or inverted. The field inputs are designed for harsh industrial environments and have fast switching times. Pulses as narrow as 200µs can be measured. Field input connections are made through high-density spring-cage terminal blocks.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 150Vrms continuous overload in case of inadvertent wiring errors.

The high channel count within the narrow module package gives exceptional functionality while preserving valuable mounting space. The high density minimizes cost per channel resulting in economical monitoring solutions.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

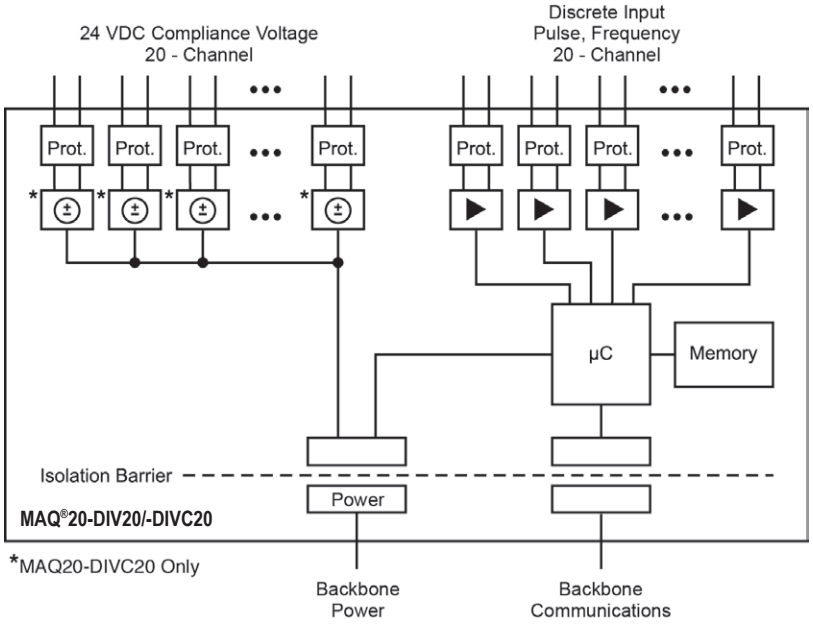
- 20 Discrete Input Channels
- Interfaces to 10-120VDC/VAC Signals (MAQ20-DIV20)
- 24VDC Compliance Voltage for Interface to Relay Contacts, Solid State Switches and Other Devices Requiring Excitation (MAQ20-DIVC20)
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 150Vrms Continuous Overload
- User-defined Logic Polarity
- Fast Switching Times
- Field Input Connections Use Spring Cage Terminal Blocks
- Most Affordable Price per Channel
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



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MAQ20-DIV20/-DIVC20 Discrete Input Voltage Modules Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-DIV20 MAQ20-DIVC20	10-120VDC/VAC-input, 24VDC Nominal 10-24VDC-input, 24VDC Compliance Voltage per Channel
Number of Channels Input Resistance	20 77kΩ
Switching Characteristics Turn-on/Turn-off Time Switching Threshold, Turn-on/Turn-off	 50µs / 50µs 9.0V / 5.5V
Input Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient	 150Vrms (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute 0V ANSI/IEEE C37.90.1
Input Functions Logic Selection Block Read	 Standard / Inverted 20 Channel
Scan/Update Rate Power Supply Current	1300 Ch/s Net, 65 Ch/s at 20-ch Simultaneous 50mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" ((83.1mm x 114.6mm x 15.3mm))
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1059 – MAQ20-DIV20/-DIVC20 Discrete Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-DIV20	Analog Input Module; Discrete Input Voltage, 20-ch
MAQ20-DIVC20	Analog Input Module; Discrete Input 24VDC Compliance Voltage, 20-ch

Field Connection (MAQ20-DIV20/ -DIVC20)	Terminal	Terminal	Field Connection (MAQ20-DIV20)	Field Connection (MAQ20-DIVC20)
CH0 +IN	1	2	CH0 –IN	CH0 VC*
CH1 +IN	3	4	CH1 –IN	CH1 VC*
CH2 +IN	5	6	CH2 –IN	CH2 VC*
CH3 +IN	7	8	CH3 –IN	CH3 VC*
CH4 +IN	9	10	CH4 –IN	CH4 VC*
CH5 +IN	11	12	CH5 –IN	CH5 VC*
CH6 +IN	13	14	CH6 –IN	CH6 VC*
CH7 +IN	15	16	CH7 –IN	CH7 VC*
CH8 +IN	17	18	CH8 –IN	CH8 VC*
CH9 +IN	19	20	CH9 –IN	CH9 VC*
CH10 +IN	21	22	CH10 –IN	CH10 VC*
CH11 +IN	23	24	CH11 –IN	CH11 VC*
CH12 +IN	25	26	CH12 –IN	CH12 VC*
CH13 +IN	27	28	CH13 –IN	CH13 VC*
CH14 +IN	29	30	CH14 –IN	CH14 VC*
CH15 +IN	31	32	CH15 –IN	CH15 VC*
CH16 +IN	33	34	CH16 –IN	CH16 VC*
CH17 +IN	35	36	CH17 –IN	CH17 VC*
CH18 +IN	37	38	CH18 –IN	CH18 VC*
CH19 +IN	39	40	CH19 –IN	CH19 VC*

NOTES: *VC = $V_{COMPLIANCE}$

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Discrete Output Module: High Density, Isolated

20 Output Channels with User-configurable Default Output States

DESCRIPTION

The MAQ®20-DODC20SK module has 20 isolated discrete output channels that can switch up to 60VDC signals and sink up to 3A of current. Channels can be switched individually or in block format. User-configurable default output states which are set upon power up or module reset ensure fail-safe operation for critical applications. Logic polarity can be user defined as standard or inverted. The isolated field outputs are designed for harsh industrial environments and have fast switching times. Field output connections are made through high-density spring cage terminal blocks.

Output-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 60VDC continuous overload in case of inadvertent wiring errors. 150Vrms channel-to-channel isolation gives the module the ability to control equipment with or without common signal grounds or different pieces of equipment with multiple reference potentials.

The high channel count within the narrow module package gives exceptional functionality while preserving valuable mounting space. The high density minimizes cost per channel resulting in economical control solutions.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

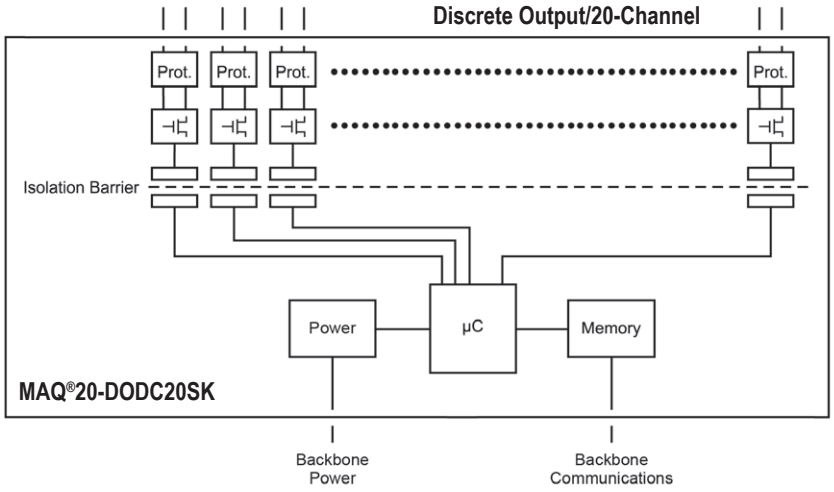
- 20 Isolated Discrete Output Channels with User-configurable Default Output States
- Channels Switch up to 60VDC Signals and Sink up to 3A Current
- Channels Switched Individually or in Blocks
- 1500Vrms Output-to-Bus Isolation
- 150Vrms Channel-to-Channel Isolation
- Each Channel Protected up to 60VDC Continuous Overload
- User-defined Logic Polarity
- Fast Switching Times
- Field Output Connections Use Spring Cage Terminal Blocks
- Most Affordable Price per Channel
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-DODC20SK Discrete Output Voltage Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC system power

Module	Description
MAQ20-DODC20SK	10-60VDC-output at 3A (max) per Channel
Number of Channels Output Configuration	20 Open Drain MOSFET
Switching Characteristics Turn-on/Turn-off Time Output Load (Combined load, all channels) T_A = +25°C T_A = +85°C	 1ms /1ms 30A 10A
Output Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient	 60VDC (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute 150Vrms, 212 V_{PEAK} ANSI/IEEE C37.90.1
Output Functions Logic Selection Block Write Default Relay State on Power Up/Reset	 Standard / Inverted 20 Channel User-configurable
Update Rate Power Supply Current	1300 Ch/s net, 65 Ch/s at 20-ch Simultaneous 30mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" (83.1mm x 114.6mm x 15.3mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

Ordering Information

Model	Description
MAQ20-DODC20SK	Discrete Output Module; Up to 60VDC Signals, 3A Current, 20-ch

Field Connection (MAQ20–DODC20SK)	Terminal	Terminal	Field Connection (MAQ20–DODC20SK)
CH0 +OUT	1	2	CH0 –OUT
CH1 +OUT	3	4	CH1 –OUT
CH2 +OUT	5	6	CH2 –OUT
CH3 +OUT	7	8	CH3 –OUT
CH4 +OUT	9	10	CH4 –OUT
CH5 +OUT	11	12	CH5 –OUT
CH6 +OUT	13	14	CH6 –OUT
CH7 +OUT	15	16	CH7 –OUT
CH8 +OUT	17	18	CH8 –OUT
CH9 +OUT	19	20	CH9 –OUT
CH10 +OUT	21	22	CH10 –OUT
CH11 +OUT	23	24	CH11 –OUT
CH12 +OUT	25	26	CH12 –OUT
CH13 +OUT	27	28	CH13 –OUT
CH14 +OUT	29	30	CH14 –OUT
CH15 +OUT	31	32	CH15 –OUT
CH16 +OUT	33	34	CH16 –OUT
CH17 +OUT	35	36	CH17 –OUT
CH18 +OUT	37	38	CH18 –OUT
CH19 +OUT	39	40	CH19 –OUT

For input connections and full details on module operation, refer to:
MAQ20-DODC20SK Discrete Output Module Hardware User Manual

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Discrete Output Module: Relay

Isolated SPST Latching Relay-output Channels

DESCRIPTION

The MAQ®20-DORLY20 module has 20 isolated SPST latching relay output channels that can switch between 2A at 30V and 0.4A at 150V. Each channel has contact state readback to verify the physical output state. Relays can be controlled individually or in blocks and have user configurable default output states which are set upon power up, power loss, and module reset to ensure fail-safe operation for critical applications. Relay state control can be user defined as standard or inverted logic. The isolated field outputs are designed for harsh industrial environments and have fast switching times. Advanced output functions SPDT, DPDT, 4x5 Crosspoint Matrix, 8-channel Differential Multiplexer, 20:1 Multiplexer and Null Mode are configured with external field terminal block wiring and controlled by module commands. Field output connections are made through high-density spring cage terminal blocks. Reserve power is stored and used for predictable shutdown to user-defined relay states upon loss of module power.

Output-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 150Vrms continuous overload in case of inadvertent wiring errors. 150Vrms channel-to-channel isolation gives the module the ability to control equipment with or without common signal grounds or different pieces of equipment with multiple reference potentials.

The high channel count within the narrow module package gives exceptional functionality while preserving valuable mounting space. The high density minimizes cost per channel resulting in economical control solutions.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

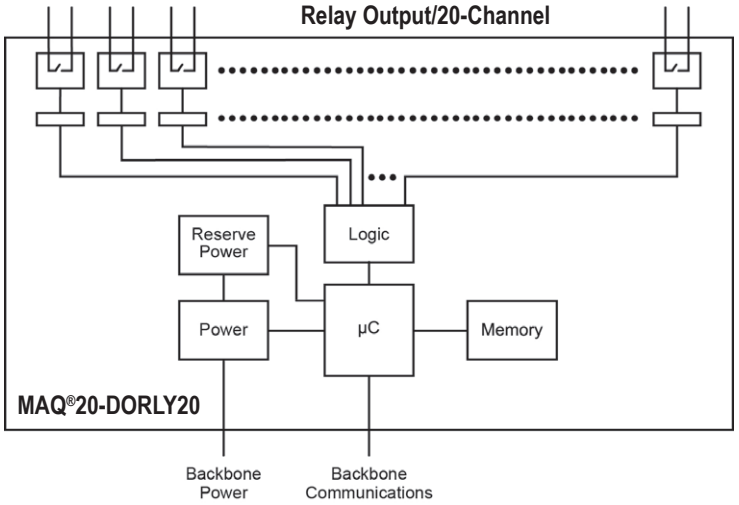
- 20 Isolated SPST Latching Relay-output Channels
- Channels Switch Between 2A at 30V and 0.4A at 150V
- Contact State Readback on Each Channel
- Relays Controlled Individually or in Blocks
- User-configurable Default States
- 1500Vrms Channel-to-Bus Isolation
- 150Vrms Channel-to-Channel Isolation
- Advanced Output Functions
- User-defined Logic Polarity
- Fast Switching Times
- Field Output Connections Use Spring Cage Terminal Blocks
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-DORLY20 Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-DORLY20	60W per Channel (2A at 30V to 0.4A at 150V)
Number of Channels Output Configuration	20 SPST Latching Relay with Contact State Readback
Switching Characteristics Turn-on/Turn-off Time Output Load T_A = +25°C T_A = +85°C	 1ms / 1ms 60W per channel (max) (2A at 30V to 0.4A at 150V) 40W per channel (max) (1.3A at 30V to 0.27A at 150V)
Output Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient	 ±150V_{PEAK} (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute 150Vrms, 212 V_{PEAK} ANSI/IEEE C37.90.1
Standard Output Functions Logic Selection Block Write Default Relay State on Power Up Default Relay State on Power Loss Default Relay State on Reset Advanced Output Functions Configure with External Wiring	 Standard / Inverted 20 Channel User-configurable User-configurable User-configurable SPDT, DPDT, 4x5 Crosspoint Matrix, 8-channel Differential Multiplexer, 20:1 Multiplexer, Null Mode
Update Rate Power Supply Current	1300 Ch/s net, 65 Ch/s at 20-ch Simultaneous 30mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" (83.1mm x 114.6mm x 15.3mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A ±0.5% Span Error Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

Ordering Information

Model	Description
MAQ20-DORLY20	Discrete Output Module; Isolated SPST Latching Relay Channels

Field Connection	Terminal	Terminal	Field Connection
CH0 POLE	1	2	CH0 THROW
CH1 POLE	3	4	CH1 THROW
CH2 POLE	5	6	CH2 THROW
CH3 POLE	7	8	CH3 THROW
CH4 POLE	9	10	CH4 THROW
CH5 POLE	11	12	CH5 THROW
CH6 POLE	13	14	CH6 THROW
CH7 POLE	15	16	CH7 THROW
CH8 POLE	17	18	CH8 THROW
CH9 POLE	19	20	CH9 THROW
CH10 POLE	21	22	CH10 THROW
CH11 POLE	23	24	CH11 THROW
CH12 POLE	25	26	CH12 THROW
CH13 POLE	27	28	CH13 THROW
CH14 POLE	29	30	CH14 THROW
CH15 POLE	31	32	CH15 THROW
CH16 POLE	33	34	CH16 THROW
CH17 POLE	35	36	CH17 THROW
CH18 POLE	37	38	CH18 THROW
CH19 POLE	39	40	CH19 THROW

For input connections and full details on module operation, refer to:
MA1063 – MAQ20-DORLY20 Discrete Relay Output Module Hardware User Manual

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System Backbones

Distributed Power and Communications

DESCRIPTION

The MAQ®20 system backbone resides within the DIN-rail used for module mounting and provides power to and interface between the communications module and the I/O modules. Standard backbones provide for one communication module and 4, 8, 16, or 24 I/O modules. The longest backbone, which accommodates 24 I/O modules, fits in an industry standard 19" rack. Each backbone utilizes a pluggable connector system on each end such that varying system channel counts can be configured using the standard backbones. As a result of this pluggable system, the main part of a system, including the communications module, can be installed in one location while other sets of I/O modules installed in remote locations connect to the main system through a wire harness.

Modules mount on industry-standard 35x7.5mm gull-wing DIN-rails.

Once a system is established with a system backbone and a communications module, system configuration is accomplished by applying power and installing the I/O modules. These are hot swappable and true 'plug and run'. When an I/O module is plugged into any backbone position, the communications module automatically recognizes that it has been added to the system, registers it in the system configuration record, and makes it immediately available in the host software for use in data acquisition and control, and test and measurement applications. Similarly, when a module is removed from any backbone position, the communications module recognizes that it has been unplugged, removes it from the system configuration, and disables it in the software.

FEATURES

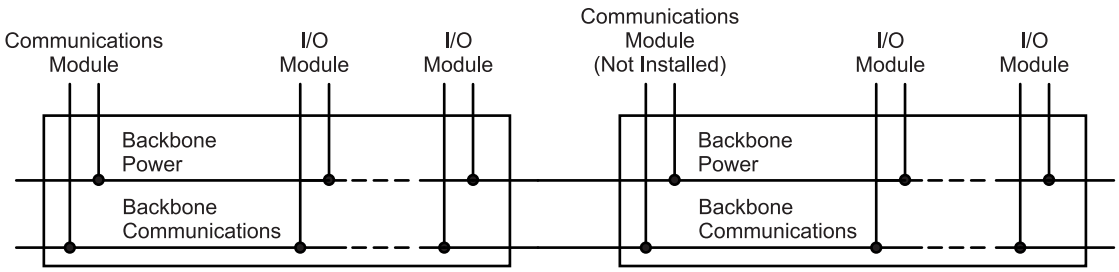
- Compact Mounting in DIN-rail Channel
- Distributed Power and Communications
- 4-, 8-, 16- and 24-position Models
- Simplify System Wiring
- Expandable for Local or Distributed Installation
- Prevent Reverse Installation
- Long-Life, Durable, Vibration Resistant Contacts
- Modules are Hot Swappable and True "Plug and Run"
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



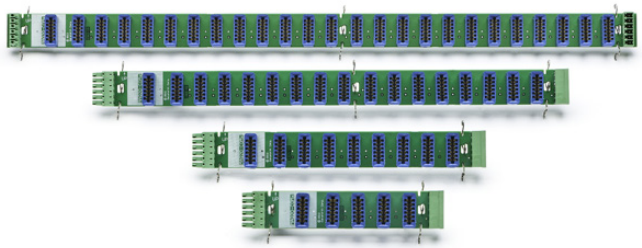
MAQ20 Backbone Block Diagram

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Specifications

Module	Description
MAQ20-BKPL4	DIN-rail Backbone, Accepting 1 COM Module plus 4 I/O Modules
MAQ20-BKPL8	DIN-rail Backbone, Accepting 1 COM Module plus 8 I/O Modules
MAQ20-BKPL16	DIN-rail Backbone, Accepting 1 COM Module plus 16 I/O Modules
MAQ20-BKPL24	DIN-rail Backbone, Accepting 1 COM Module plus 24 I/O Modules
Expansion and Distributed Installation	
Mechanical	Male/Female pluggable terminal blocks at each end of the backbone allow direct interconnection or remote installation using the accessory expansion cable.
Expansion Distance	100ft (30m) (max)
Mounting	
Physical	Spring clips hold the backbone in the DIN-rail. When modules are installed, the backbone is secured to the DIN-rail.
Reverse Protection	Mechanical interface prevents reverse module installation.
Electrical	
Circuitry	Passive
Inter-Module Communications	RS-485
Dimensions (h)x(w)x(d)	
MAQ20-BKPL4	5.05” x 0.94” (127.1mm x 3.9mm)
MAQ20-BKPL8	7.53” x 0.94” (191.1mm x 3.9mm)
MAQ20-BKPL16	12.63” x 0.94” (320.9mm x 3.9mm)
MAQ20-BKPL24	17.41” x 0.94” (442.1mm x 3.9mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

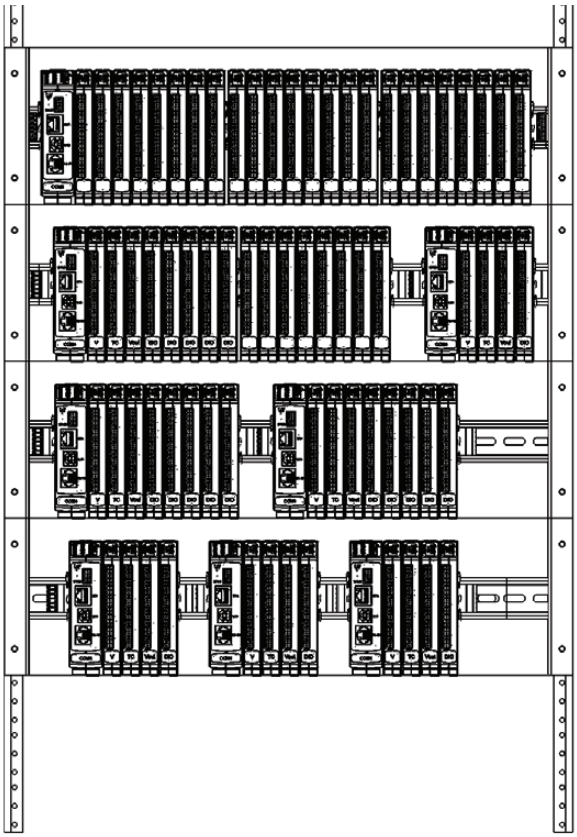


MAQ20 Backbones for 4-, 8-, 16-, and 24-I/O Modules

For input connections and full details on module operation, refer to:
MA1040 – MAQ20 Communications Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-BKPL4	DIN-rail Backbone; Accepting 1 COM Module Plus 4 I/O Modules
MAQ20-BKPL8	DIN-rail Backbone; Accepting 1 COM Module Plus 8 I/O Modules
MAQ20-BKPL16	DIN-rail Backbone; Accepting 1 COM Module Plus 16 I/O Modules
MAQ20-BKPL24	DIN-rail Backbone; Accepting 1 COM Module Plus 24 I/O Modules



Flexible Backbone System Allows Configuration with Communications Module and 4-, 8-, 16-, and 24-I/O Modules in 19” Rack Space

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MAQ20-940/-941

ReDAQ® Shape for MAQ®20

DESCRIPTION

Dataforth offers ReDAQ Shape software for MAQ20 as an easy and efficient development tool for use with the MAQ20 Industrial Data Acquisition and Control System. This software enables users to create, save, and open graphical user interface projects for test, process, data collection, and data analysis applications. Built-in functions in the Acquire and Analyze panels are pre-configured and can be used as is. Just three easy steps are required to create data acquisition and control projects in the Presentation panel using 65 high-quality tools and powerful MAQ20 functions.

ReDAQ Shape for MAQ20 is ideal for data acquisition, monitoring and control applications. It enables users to easily interact with the Dataforth PID loop controller, which the user accesses through faceplates within the software.

The ReDAQ Shape software also provides an effective way to configure and customize MAQ20 functions for specific application requirements. The toolbox tools are easily moved, re-sized, cut, copied, pasted, and deleted. The main screen of ReDAQ Shape shows a representation of the system inclusive of the communications module and any installed I/O modules. This graphic is updated as I/O modules are added to or removed from the system. Modules can be given unique identifiers, and I/O module channels can be assigned tag names to represent process variables they control.

Based on programming tools incorporated from Microsoft Visual Studio® and National Instruments Measurement Studio®, ReDAQ Shape software for MAQ20 has a very short user-learning curve and offers integrated, across-the-board applicability for data acquisition and control applications. It requires only a one-time low-cost license fee.

Link to ReDAQ software.

FEATURES

- 3 Easy Steps to Create Customized Applications
- No Setup or Configuration Required to Acquire and Analyze Data
- Faceplates for PID Loop Control
- 65 Toolbox Tools Simplify Project Creation
- 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

BENEFITS

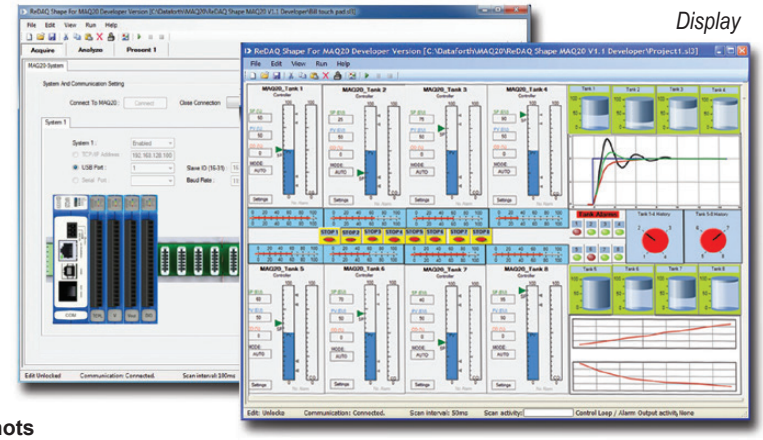
- Free Versions Available
- Enables Easy and Fast Setup of MAQ20 Systems
- Intuitive Graphic Interface
- One Time Purchase, No Upgrade Fees
- User Version Allows for Safe Operation (No Changes to Program Possible)

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

Configure

Display



ReDAQ Shape Software Screen Shots

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PID Control Using MAQ®20-COMx Modules and ReDAQ® Shape for MAQ20 Software

DESCRIPTION

The powerful Dataforth MAQ20 communications module is capable of autonomously running up to 8 PID control loops; faceplates within ReDAQ Shape software enable the user to configure the many features of loop control and monitor processes.

With proportional and derivative modes that can act on error or a process variable, the controller can eliminate process bumps from set point changes. Gap control provides improved loop stability near the set point while retaining high-response speed. The ability to change tuning settings without disturbing the process when the controller is in automatic mode, and the option to track the set points of process variables during manual operation, are both key features that enable smooth operation in both manual and automatic modes.

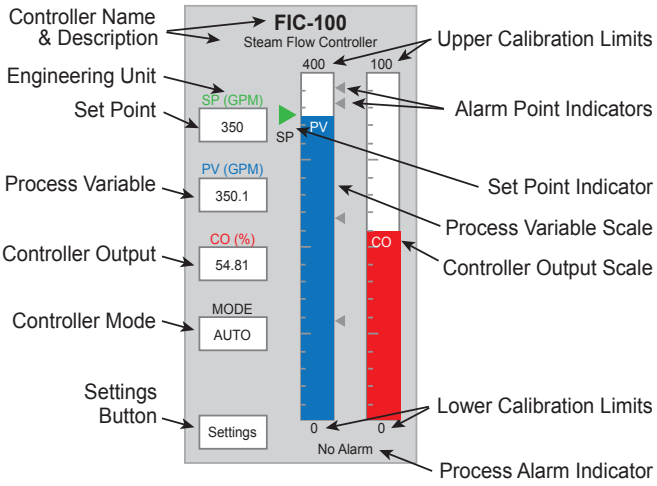
To ensure sensitive equipment is well protected, the controller's output range can be limited. The anti-reset windup feature both minimizes overshoot and improves stability after output saturation conditions.

The integrated Auto-Tuner simplifies the complex task of control loop tuning with separate methods for integrating and self-regulating loops.

Typical PID Control Applications

- Steam, water, and chemical flow control
- Tank level control
- Heat-exchanger / reactor temperature control
- Pressure control

Many types of processes in a wide variety of applications can be managed using the Dataforth PID controller in the MAQ20 system. Its high level of performance and broad range of features are paralleled only by much larger state-of-the-art distributed control systems.



PID Faceplate in ReDAQ Shape Software

FEATURES

- Separate Panels for Setting Basic, Advanced, and Alarm Items
- Noninteracting and Parallel PID Control Algorithms
- Up to 8 Loops of PID Control
- Controller Runs in Real Time
- Controller Accessed through Faceplates
- Proportional and Derivative Modes can Act on Error or Process Variable
- Gap Control
- Built-in Process Variable Filtering
- Bumpless Manual-automatic Control-mode Transfer
- Change Tuning Settings Easily in Automatic Mode
- Optional Process Variable Set Point Tracking in Manual Mode
- Limit Controller Output Range
- Anti-reset Windup
- Four Process Alarms
- Full-featured Faceplate for Numeric and Visual Feedback
- Integrated Auto-Tuner

BENEFITS

- Easy-use
- Simplifies Complex Task of Control-loop Tuning
- Build-in Features Improve Stability and Help Protect Sensitive Equipment
- Quick Setup

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

Ordering Information

Model	Description
MAQ20-940	ReDAQ Shape Software for MAQ20 Developer Version
MAQ20-941	ReDAQ Shape Software for MAQ20 User Version

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Accessories

Expansion Cables and Load Share Power Supply Module

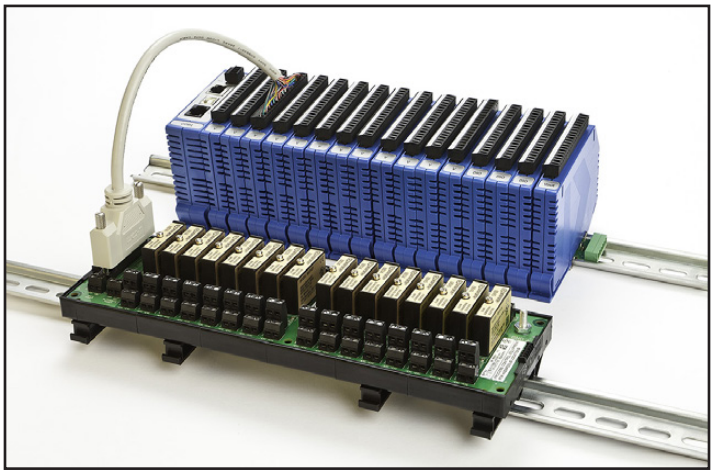
DESCRIPTION

Accessories for the MAQ®20 Industrial Data Acquisition and Control System include backbone expansion cables and a load-share power supply module for systems that have power supply requirements greater than those the communications module provides.

Also available are cables to interface 8B backpanels to the MAQ20-VSN module, and USB and Ethernet cables and adapters.

A MAQ20 Demonstration Suitcase with process simulator is offered to sales channels.

The five PWR-PS5RxW power supplies used by the MAQ20 are the same as those used by DSCA signal conditioners.



Cable Interfacing 8B Backpanel to MAQ20-VSN Module



8B Backpanel Interface Cable

Ordering Information

Backbone Expansion Cables

Model	Description
MAQ20-XCA-01	Backbone Expansion Cable; 1 meter (39.4")
MAQ20-XCA-02	Backbone Expansion Cable; 2 meter (78.7")

Load-share Power Supply Module

Model	Description
MAQ20-PWR3	Load-share Power Supply Module

Cables to Interface 8B and 5B Backpanels to MAQ20-VSN Module

Model	Description
MAQ20-8B25-0.3	DB25-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-8B25-0.6	DB25-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-8B25-01	DB25-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-5B26-0.3	IDC26-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-5B26-0.6	IDC26-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-5B26-01	IDC26-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long

USB and Ethernet Cables and Adapters

Model	Description
MAQ20-XTB03	MAQ20 Terminal Block, 3 Positions
MAQ20-XTB20	MAQ20 Terminal Block, 20 Positions
SLX141-01, -02, -07	Ethernet Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX141-X01, -X02, -X07	Ethernet Crossover Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX142, 143	RJ45-to-DB9 Adapters
SLX144	RJ45 RS-485 Multidrop Adapter
SLX146-02, -07	Null Modem Serial Cable, Female DB-9 to Female DB-9; 2m (78.7"), 7m (275.6")
SLX147-01, -02, -05	USB Cable, Type A to Type B; 1m (39.4"), 2m (78.7"), 5m (196.9")
SLX148-4	4GB Micro SD Card and USB Adapter

PWR-PS5RxW Power Supplies

Model	PWR-PS5R7W	PWR-PS5R15W	PWR-PS5R30W	PWR-PS5R60W	PWR-PS5R120W
Input	100 to 240VAC Nominal; 85 to 264VAC, 100 to 370VDC Compatible				
Output Voltage & Current Ratings	24V, 0.3A	24V, 0.65A	24V, 1.3A	24V, 2.5A	24V, 5.0A
Power	7.5W	15W	30W	60W	120W
Dimensions (h)x(w)x(d)	2.95" x1.77" x 2.76" (75mm x 45mm x 70mm)	3.54" x 0.89" x 3.74" (90mm x 22.5mm x 95mm)	3.54" x 0.89" x 3.74" (90mm x 22.5mm x 95mm)	3.74" x 1.42" x 4.25" (95mm x 36mm x 108mm)	4.53" x 1.81" x 4.76" (115mm x 46mm x 121mm)

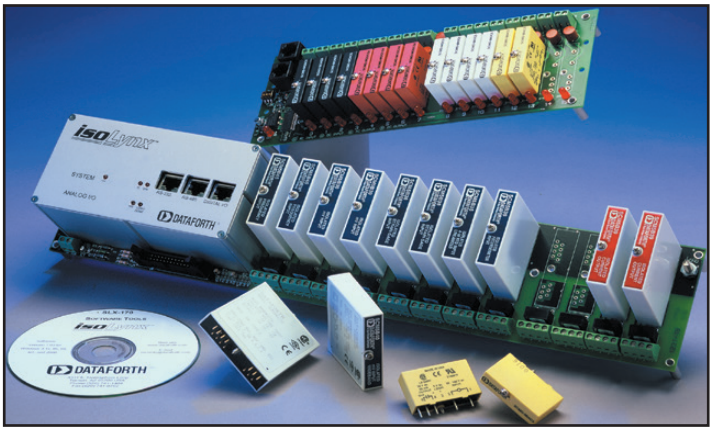
NOTE:
For complete PWR-PS5RxW Power Supplies specifications, see Power Supply Recommendations.

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5B isoLynx®

SLX200 Data Acquisition System



DESCRIPTION

The SCM5B isoLynx® SLX200 is a fast, intelligent, fully isolated data acquisition system providing superior reliability, accuracy, and isolation for a wide range of rugged industrial applications. It offers maximum flexibility of analog and digital I/O selection at competitive prices for a broad range of factory automation, process control, test and measurement, machine control, and data acquisition applications. The isoLynx SLX200 implements the industry standard Modbus® RTU and TCP protocols, thereby enabling communication with a wide variety of existing third-party software drivers and HMI/SCADA packages. It is fully certified by Modbus-IDA and compatible with OPC.

All I/O Channel-to-Channel Isolated

The flexible, modular design combines a 6- or 12-channel I/O Controller-base system and optional 8- or 16-channel expansion backplanes, which can be either panel or DIN-rail mounted (see Figure 1).

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. The Controller contains a powerful high-speed microcontroller, A/D and D/A subsystem, communication interface, data storage memory, and status LEDs. The A/D system is built around a 16-bit, successive approximation converter and can convert a maximum 60-channel configuration in 17ms. The D/A converter is also a 16-bit device and can write a maximum 60-channel configuration in 33ms.

Industry's Widest I/O Selection

By selecting from over 250 standard and custom single-channel SCM5B analog I/O modules, the isoLynx SLX200 can interface to a broad spectrum of analog signals, including millivolt, volt, milliamp, amp, linearized and non-linearized thermocouple, RTD, potentiometer, slidewire, strain gauge, AC to True RMS output, frequency, 2-wire transmitter, and transducers requiring DC excitation. Analog output modules are available which provide a wide selection of current or voltage output ranges. Industry standard miniature digital I/O modules are used for digital AC/DC input and output requirements. Users can mix and match most I/O module types on a per-channel basis, thus reducing wasted I/O channels and saving costs.

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
- 16-bit A/D, D/A
- Up to 6-Pole Analog Input Filtering
- ±0.012% Base System Accuracy, No Modules
- ±0.005% Base System Linearity, No Modules
- ±0.03% Module Accuracy
- ±0.005% Module Linearity
- Best I/O Selection: 250+ Different I/O Modules
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- All Analog I/O Modules Certified to CSA C/US, CE, and ATEX Requirements
- SLX200 & SLX101 CE Compliant
- SLX200 CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- Manufactured per RoHS III Directive 2015/863

Interface to digital signals is provided by the dedicated SLX101 digital I/O backpanel. This intelligent backpanel is designed to interface to the SLX200 but can also be used stand-alone for digital I/O-only systems.

The operation and storage temperature range for the SCM5B isoLynx SLX200 is –40°C to +85°C; the relative humidity is 0 to 95% noncondensing. Power requirement is +5VDC, 2.5W base system with no modules installed. The SLX200 and SLX101 are CE Compliant. SLX200 is CSA C/US Certified for Class I, Division 2 Hazardous Locations.

Flexible Communications and Configuration

The SCM5B isoLynx SLX200 communicates on RS-232/RS-485 serial links up to 115.2kbps or 10Mb/s Ethernet. Up to 32 systems can be multidropped on the RS-485 serial link and up to 4 sockets are supported on Ethernet. Optional Ethernet communication boards are available; these can be factory installed or field upgradeable.

The communication protocol is Modbus RTU for RS-232/RS-485 or Modbus TCP for Ethernet. Modbus is an open, industry-standard protocol that defines how devices on a network or bus communicate with each other. Full certification of the SCM5B isoLynx SLX200 by Modbus-IDA ensures the device can be integrated into existing Modbus networks, and most common Modbus function codes are supported. The system is also OPC compatible.

As device configuration is performed using standard Modbus function codes, any third-party software application that supports the Modbus RTU and/or Modbus TCP protocol can be used to configure the device. Configuration parameters are stored in non-volatile memory, so configuration only has to happen once. Free configuration software is provided to ensure configuration is easy and intuitive (see Figure 2 and Figure 3).

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Powerful Firmware Features

The SCM5B isoLynx SLX200 hosts many powerful firmware features. Two analog scan modes are supported: one for general-purpose signal monitoring with running average, maximum, and minimum values available for each analog input; the other with user-configurable scan parameters such as scan list, scan rate, and scan count, used to obtain data with highly accurate time correlation between samples. Configurable default output values ensure output signals get set at safe values when unexpected power outages or brownouts occur. Power-on self-test results can be obtained visually by glancing at a status LED or programatically by reading the appropriate register on the device. A section of memory is set aside for general-purpose user data, some of which is stored in non-volatile memory.

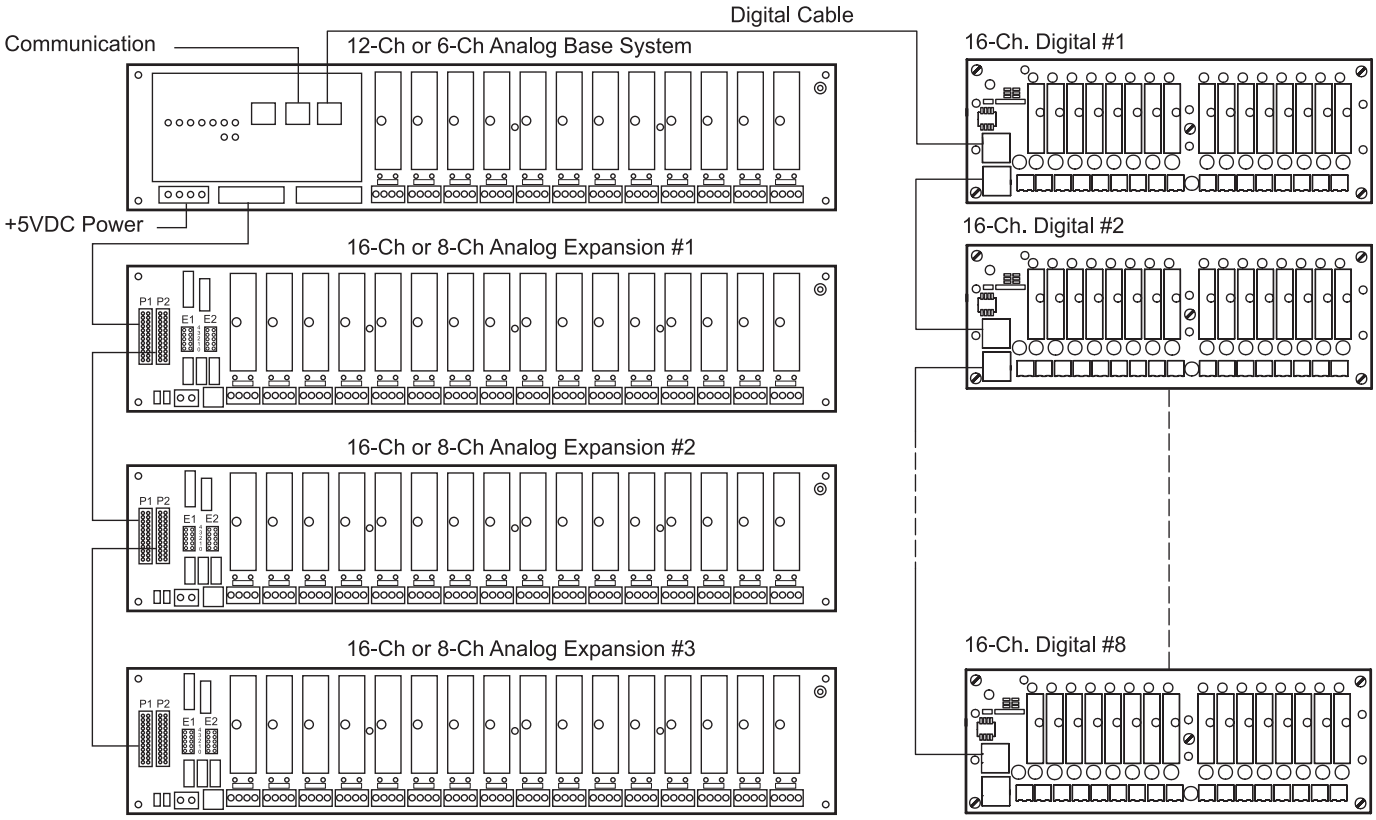


Figure 1: SCM5B isoLynx SLX200 Block Diagram - For Dimensions and Pinouts, See Page 6-39

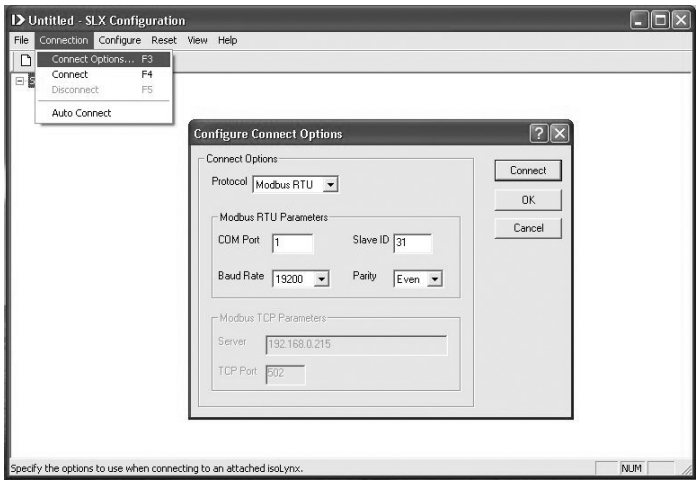


Figure 2: Configuration Utility - Communications Setup

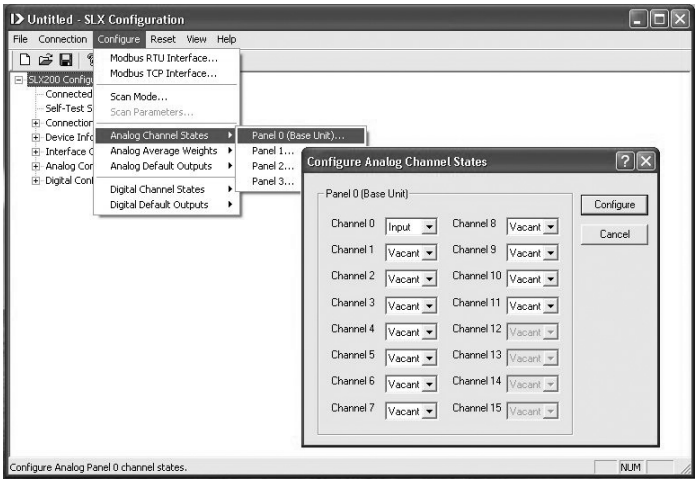


Figure 3: Configuration Utility - Analog Channel Setup

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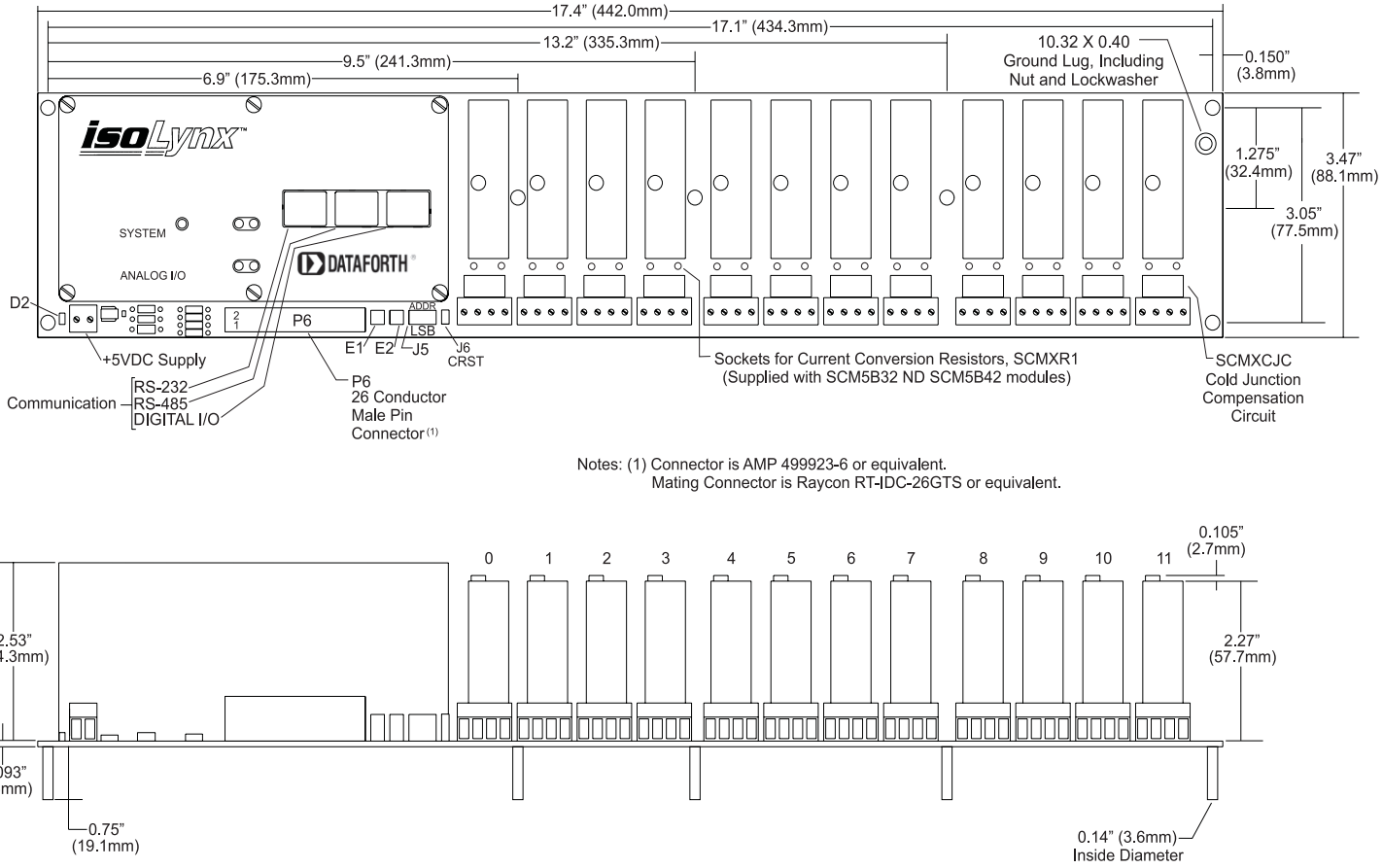


Figure 4: SLX200-xx 12-channel Base System

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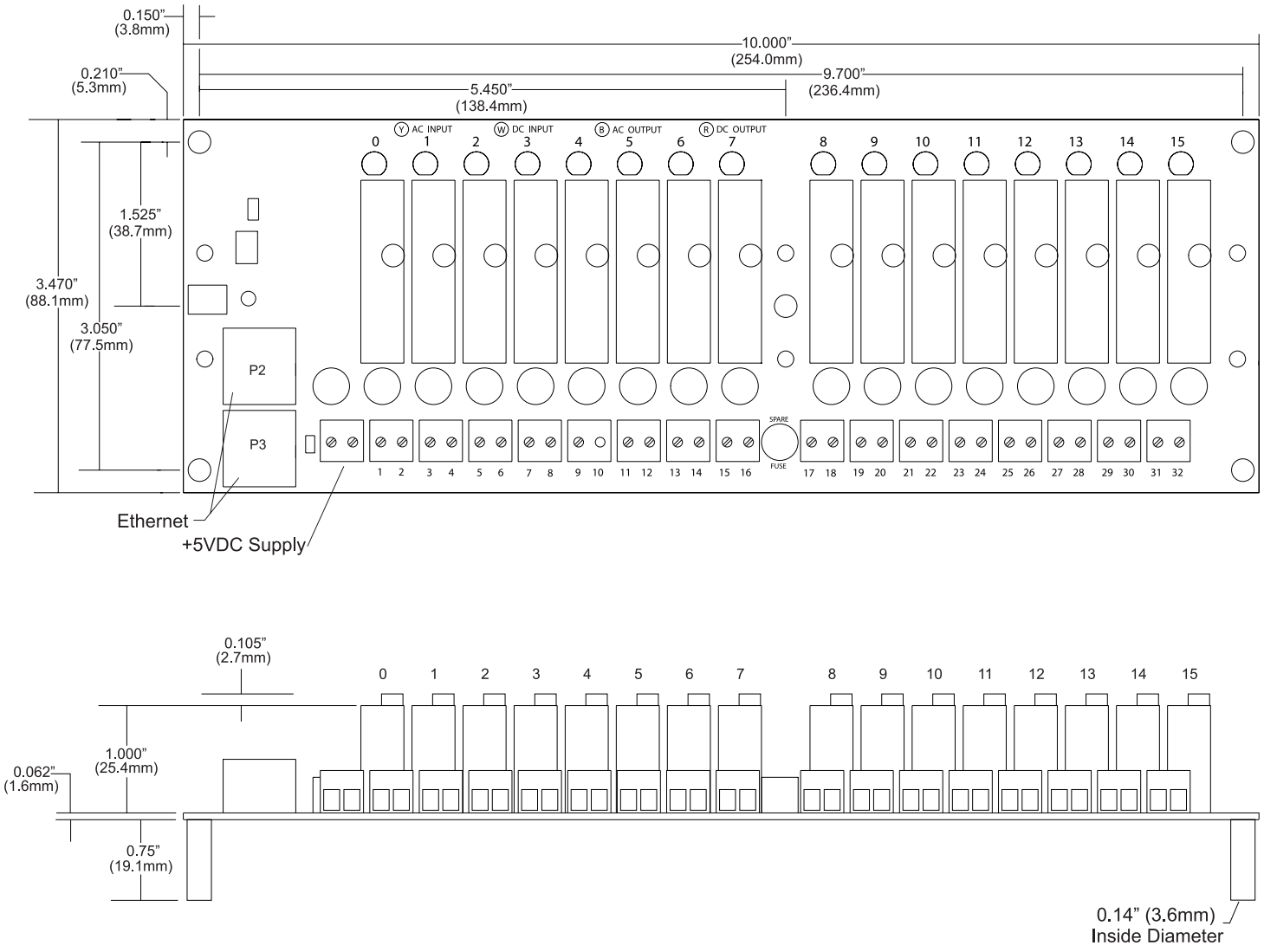


Figure 5: SLX101 Digital I/O Backpanel

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Specifications

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

5B isoLynx® SLX200 Analog I/O Base Unit	
General System	
Protocol	Modbus® RTU or TCP, OPC Server Compatible
I/O Capability	One 6-ch or 12-ch Backpanel Minimum; Expandable to 60-ch Analog I/O, 128-ch Digital I/O
Software Tools	Free Configuration Utility, Win32 DLL, LabVIEW™ VI Library
Digital System	
Microcontroller	High-performance RISC
Status LEDs	+5V, System Status, TD/RD (Serial), LNK/ACK (Ethernet)
Failsafe Features	Watchdog Timer and Brownout Detection - Reset to User Defined Configuration
Communication Interface	
Serial I/O	Separate RJ-45 Modular Phone Jacks for RS-232 and RS-485 115.2kbps (max)
Port for SLX101 Digital I/O Panel	RJ-45 Modular Phone Jack, 2-wire RS-485
RS-485	2-wire or 4-wire, 4000 Feet (max) Distance, 32 (max) Multidrops, Non-isolated
	To Isolate, Extend, or Convert RS-232 or RS-485, Use Dataforth LDM and DCP Data Communication Products
Ethernet	RJ-45 Modular Phone Jack, 10Base-T
	Default IP Address 192.168.0.215, Keep-alive Timeout 7200s
Analog I/O	
Channels	Mix and Match I/O Types on a Per Channel Basis(1)
	Maximum 60-ch Differential I/O of SCM5B Modules
	Input Modules Must Have System Output of ±5V or 0 to +5V (±10V or 0 to +10V cannot be used)
Calibration	NIST Traceable Test and Calibration Sheets Ship with Modules
System Accuracy	Analog Input ±0.024%(2), Analog Output ±0.006%(2)
Field Connector	High-density Screw Clamp, 14 AWG (max), 0.5N-M Torque
System Connector	26-pin, Male Header Connector
Ground Network Jumpers	Factory Default R1 100Ω; J1-J4: J1, J2, and J4 Installed; J3 Not Installed. See Hardware User Manual for Recommended Grounding Practices.
A/D Converter	16-bit, ±10V Input, 14-bit (min) Accuracy
	Resolution vs. Input Range: 16-bit at ±10V, 15-bit at ±5V, 14-bit at 0 to +5V
D/A Converter	16-bit, ±10V Output
Isolation	1500Vrms Ch-to-ch or Ch-to-Internal Bus
Input Protection	240VAC Continuous, ESD
Throughput, Analog Input	8ms for 16 Ch (~2000 ch/s) at 115.2kbps Modbus RTU
	17ms for 60 Ch (~3600 ch/s) at 115.2kbps Modbus RTU
Throughput, Analog Output	13ms for 16 Ch (~1230 ch/s) at 115.2kbps Modbus RTU
	33ms for 60 Ch (~1850 ch/s) at 115.2kbps Modbus RTU
Expansion Panels	SCMPB02 (16-ch, can use up to 3), SCMPB06 (8-ch, can use up to 6)
Power Supply Requirements	
SLX200-1xx	+5VDC ±5% at 500mA, No Modules Installed
SLX200-2xx	+5VDC ±5% at 700mA, No Modules Installed
SLX200-3xx	+5VDC ±5% at 900mA, No Modules Installed
Dimensions (l)x(w)x(h)	
SLX200-xx, 12-ch	17.4" x 3.47" x 3.30" (442.0mm x 88.1mm x 83.8mm)
SLX200-xxAx, 6-ch	11.8" x 3.47" x 3.30" (300.7mm x 88.1mm x 83.8mm)
Mounting Options	Panel Mount or DIN-rail Mount
Environmental	
Operating Temp. Range	–40°C to +85°C (–40°C to +70°C for SLX200-2xx,-3xx)
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	
CE Compliant	
CSA, FM	Class I, Division 2, Groups A, B, C, D Hazardous Locations
Modbus	IDA Conformance Tested

5B isoLynx® SLX101 Digital I/O Backpanel	
General System	
Protocol	Modbus RTU or TCP, OPC Server Compatible Through SLX200. Proprietary as Stand-alone.
I/O Capability	One 16-ch Backpanel Minimum. Expandable to 128-ch Digital I/O.
Digital System	
Microcontroller	High-performance RISC
Status LEDs	+5V, System Status, Channel State
Failsafe Features	Watchdog Timer & Brownout Detection - Reset to User-defined Configuration
Communication Interface	
Serial I/O	Two Rj-45 Modular Phone Jacks for Daisy-chain Connection
RS-485 2W	115.2kbps (max) 4000 Feet (max) Distance, 32 (max) Multidrops, Non-isolated
Digital I/O	
Channels	Mix and Match I/O Types on a Per-channel Basis
Field Connector	High-density Screw Clamp, 14 AWG (max), 0.5N-M Torque
Isolation	1000 Vrms Ch-to-ch or Ch-to-Internal Bus
Throughput	8ms for 16 Ch (~2000 ch/s) at 115.2kbps Modbus RTU
	27ms for 128 Ch (~4740 ch/s) at 115.2kbps Modbus RTU
Power Supply Requirements	+5VDC ±5% at 40mA, No Modules Installed
Dimensions (l)x(w)x(h)	10.0" x 3.47" x 1.95" (254.0mm x 88.1mm x 49.5mm)
Mounting Options	Panel Mount or DIN-rail Mount
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Non-condensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	
CE Compliant	
CSA, FM	Not Covered Under the SLX200 Certifications. Must Qualify Separately Based on Source of I/O Modules.

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Modules with system output of ±10V or 0-10V cannot be used in the SLX200 systems. This includes SCM5Bxx-xxD, SCM5B392-13, -14, SCM5B42-02, and SCM5B48-01.
(2) 10V span for analog input, 20V span for analog output. Does not include SCM5B module accuracy.

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Ordering Information

Model	Description
SLX200-10[1]	12-ch, RS-232/485, Panel Mount
SLX200-11[1]	12-ch, RS-232/485, No CJC[2], Panel Mount
SLX200-10D[1]	12-ch, RS-232/485, DIN-rail Mount
SLX200-11A[1]	6-ch, Base Unit, µC and A/D Bds, RS-232/485, No CJC, Panel, Modbus
SLX200-11AD[1]	6-ch, Base Unit, µC and A/D Bds, RS-232/485, No CJC, DIN, Modbus
SLX200-11D[1]	12-ch, RS-232/485, No CJC[2], DIN-rail Mount (For 6-ch. Base Unit, See Note[1])
SLX101	Backpanel Digital: 16-ch
SLX101-D	Backpanel Digital: 16-ch, DIN-rail Mount
SLX141-01,-02,-07	Ethernet and Serial Cable Options
SLX141-X01,-X02,-X07	Ethernet Crossover Cable Options
SLX142,143	RJ45 to DB9 Adapters
SLX144	RJ45 RS-485 Multidrop Adapter
SLX145	Fuse 4A, Package of 5
SLX270[3]	Software Tools and User Manuals
SLX280[3]	Software and Hardware User Manuals
SCMPB02	Backpanel Analog: 16-ch
SCMPB02-1	Backpanel Analog: 16-ch, No CJC[3]
SCMPB02-2	Backpanel Analog: 16-ch, DIN-rail Mount
SCMPB02-3	Backpanel Analog: 16 Ch, No CJC[3], DIN-rail Mount
SCMPB06	Backpanel Analog: 8-ch
SCMPB06-1	Backpanel Analog: 8-ch, No CJC[3]
SCMPB06-2	Backpanel Analog: 8-ch, DIN-rail Mount
SCMPB06-3	Backpanel Analog: 8-ch, No CJC[3], DIN-rail Mount
SCMXRK-002	Accessory: 19-inch Rack Analog Backpanels
SCM5B30/31[4]	Analog Voltage-input Modules
SCM5B32[4]	Analog Current-input Modules
SCM5B33[4]	Isolated True RMS Input Modules
SCM5B34[4]	Linearized 2- or 3-wire RTD-input Modules
SCM5B35[4]	Linearized 4-wire RTD-input Modules
SCM5B36[4]	Potentiometer-input Modules
SCM5B37[4]	Thermocouple-input Modules
SCM5B38[4]	Strain-gauge Input Modules
SCM5B39	Current-output Modules
SCM5B392[4]	Matched-pair Servo/Motor Controller Modules
SCM5B40/41[4]	Analog Voltage-input Modules, Wide Bandwidth
SCM5B42[4]	2-wire Transmitter Interface Modules
SCM5B43[4]	General-purpose Input Modules, with DC Exc.
SCM5B45[4]	Frequency-input Modules
SCM5B47[4]	Linearized Thermocouple-input Modules
SCM5B49	Voltage-output Modules
SCMD-MIAC5x	Miniature Digital AC-input Modules
SCMD-MIDC5x	Miniature Digital DC-input Modules
SCMD-MOAC5x	Miniature Digital AC-output Modules
SCMD-MODC5x	Miniature Digital DC-output Modules
SCMD-MORx5	Miniature Relay-output Modules
SCMXCA004-xx	System Interface Cable for Both Analog Backpanels
SCMXPRT-001	Power supply, 1A, 5VDC, 120VAC US
SCMXPRE-001	Power supply, 1A, 5VDC, 220VAC European
SCMXPRT-003	Power supply, 3A, 5VDC, 120VAC US
SCMXPRE-003	Power supply, 3A, 5VDC, 220VAC European

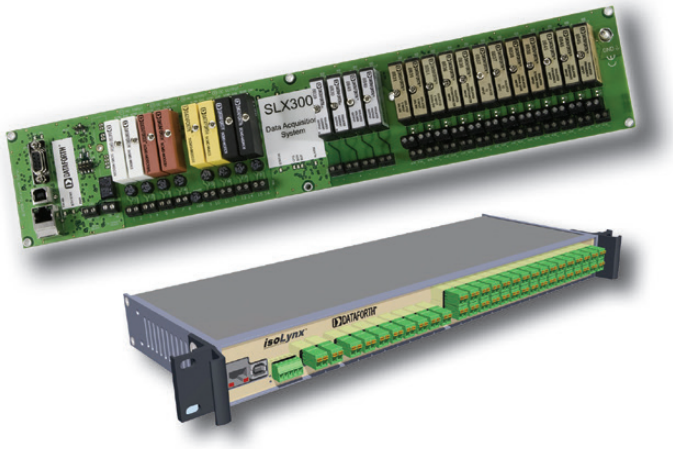
NOTES:
(1) SLX200 suffix changes to -xxA or -xxAD for 6-ch base unit.
(2) Cold-junction Compensation. Required for SCM5B37 and SCM5B47.
(3) Downloadable from website.
(4) Modules with system output of ±10V or 0-10V cannot be used in the SLX200 systems.
This includes SCM5Bxx-xxD, SCM5B392-13, -14, SCM5B42-02, and SCM5B48-01.

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8B isoLynx® Systems

SLX300 Data Acquisition System



FEATURES

- Modbus® RTU and TCP Support
- 1500Vrms Input-to-Output & Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Wide I/O Selection:
  - Analog - 20 Families, 89 Models
  - Digital - 5 Families, 14 Models
- Mix and Match Analog & Digital I/O
- Advanced Features Including Alarms, Counters, Timers, PWMs, and More
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- C-UL-US Listed (Class I, Division 2, Groups A, B, C, D)
- CE Compliant
- ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

DESCRIPTION

Dataforth's 8B isoLynx® SLX300 data acquisition system builds on the proven reliability and outstanding performance of the SCM5B isoLynx® SLX200 DAQ system and miniature-sized SensorLex® 8B isolated signal conditioning modules to provide a compact, low-cost solution for wide ranging, rugged industrial applications. Like the SLX200, the SLX300 ensures superior reliability, accuracy, and isolation. Through the use of pluggable modules, the SLX300 offers maximum flexibility of analog and digital channel configuration for factory automation, process control, test and measurement, machine control, and data acquisition applications. The isoLynx SLX300 uses industry-standard Modbus® RTU and TCP protocols, thus enabling communication with a wide range of existing third-party software tools and HMI/SCADA packages.

Fast I/O Channel-to-Channel Isolated

Using Dataforth's SensorLex 8B analog modules and SCMD digital modules, the flexible, modular SLX300 design can be configured with up to twelve channels of isolated analog input, four channels of isolated analog output, and eight channels of isolated digital I/O (Figure 3). The isolation rating is 1500Vrms from input to output and from channel to channel. The system can be powered by +5VDC or a wide range 7 to 34VDC using the 8BPWR-2 module, and it can be either panel or DIN-rail mounted. Multiple powerful, high-speed microcontrollers and high-performance data converters at the heart of the system enable mix and match analog and digital I/O at sustained rates of up to 3.0kS/s. In addition, a burst mode of operation is provided for analog input that allows sampling up to 100kS/s on analog input channels.

Industry's Widest I/O Selection

The isoLynx SLX300 can be configured for any application by selecting from over 89 analog I/O modules and 14 digital I/O modules. These module selections enable monitoring of common industrial signals including millivolt, volt, milliamp, amp, linearized and non-linearized thermocouple, 3- and 4-wire RTD, potentiometer, slidewire, strain gauge, AC-to-True RMS output, frequency, 2-wire transmitter, and DC LVDT. Analog output modules provide isolated high-level voltage and current options. Industry-standard digital I/O solid-state relay modules provide AC/DC input and output monitoring and control. Both analog and digital output channels can be configured as alarm outputs. The ability to mix and match module types on a per-channel basis ensures maximum system flexibility. Operation and storage temperature for the isoLynx SLX300, as well as for all analog and digital I/O modules used in the most extreme environments, is –40ºC to +85ºC; the relative humidity range is 0 to 95% noncondensing. The SLX300 system is C-UL-US Listed, CE Compliant, and designed for operation in Class I, Division 2 Hazardous Locations.

Powerful Functionality

The SLX300 has many features and special-purpose functions specifically for data acquisition and control. Current sampled data from analog input channels is stored to a 192k sample buffer. Data is available as minimum, maximum, and average readings with selectable averaging weight. A burst mode of operation allows up to 100kS/s sampling rate on analog input channels and also provides a waveform generator function using the analog output channels. Continuous scan mode scans up to 16 input channels, and burst sampling mode can be set up with a 48-entry scan list to specify scan sequence, scan rate, and scan count. In addition to performing standard digital I/O, the eight digital I/O channels can be configured to perform seven different special functions: pulse/frequency counter, pulse/frequency counter with de-bounce, waveform measurement, time between events, frequency generator, pulse width modulation (PWM) generator, and one-shot generator. The SLX300 also allows four alarm states – high, high-high, low, and low-low – to be set on the analog input and digital I/O special function channels with alarm output mapped to a user-selectable analog or digital output channel.

Configurable analog and digital default output values ensure output signals are set to safe values upon system startup or when unexpected power outages or brownouts occur. System status and mode LEDs constantly display communication activity, mode of operation, and alarm status.

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Flexible Communications and Configuration

The isoLynx SLX300 interfaces to a host system through a choice of communication links. RS-232 or RS-485 serial links operate from 2.4kbps to 921.6kbps, use true fail-safe transceivers, and have software-controlled termination networks, eliminating the need for dip switches. A USB Virtual Communications Port provides a common connection to computers and a 10/100 Base-T Ethernet connection is also available. Up to 32 systems can be multi-dropped on the RS-485 serial link and up to 4 sockets are supported on Ethernet.

The Modbus® RTU protocol used on serial and USB interfaces, and the Modbus TCP protocol used on the Ethernet interface are open, industry standard protocols that define how devices on a network communicate with each other. This ensures that the system can be integrated seamlessly onto existing Modbus networks using common Modbus function codes.

Free configuration software is provided for quick and easy system setup (see Figure 1 and Figure 2). Channel I/O setup, communication, default output, and other parameters are stored in non-volatile memory. A LabVIEW™ VI library enables fast application development using industry-standard tools. The SLX300 system can be either panel or DIN-rail mounted. It is also available in a rack-mounted or bench-top 1U enclosure.

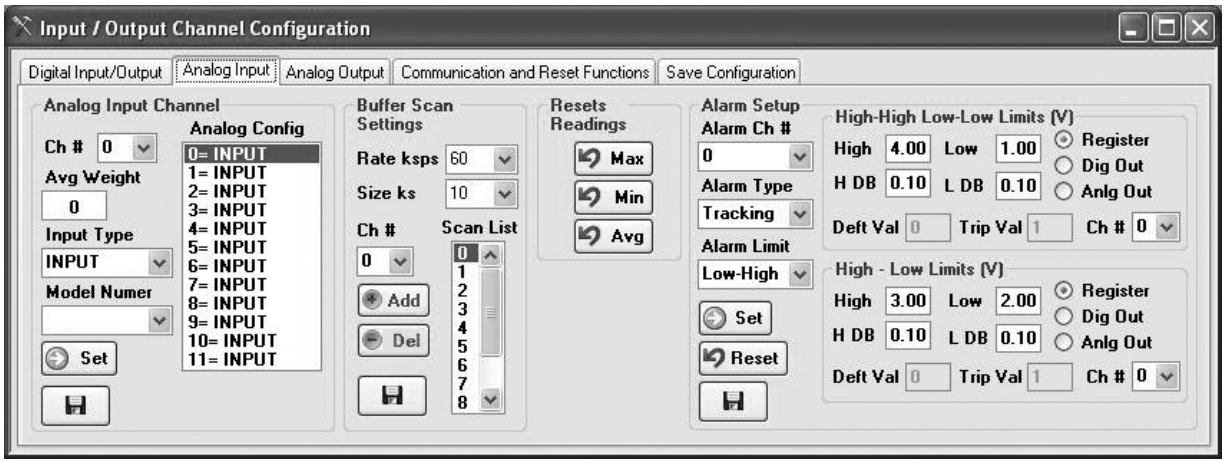
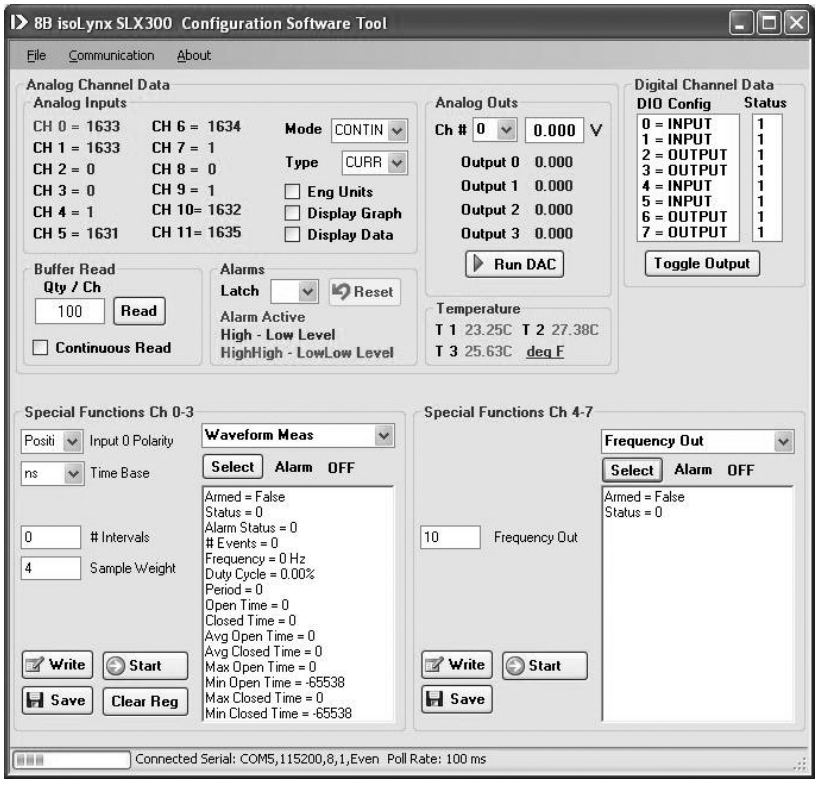


Figure 1: Configuration Tool - System Setup



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Figure 2: Configuration Tool - Channel Monitoring and Data Display

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Specifications

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

8B isoLynx® SLX300	
Analog Input	
Channel Count	12
Module Type	Mix and Match-input Types on a Per-channel Basis 8B30/31/32/33/34/35/36/37/ 38/40/41/42/43/45/47/50/51/PT All Models with 0-5V Output
Accuracy(1)	±0.07%
Resolution	±0.024%
Cold-junction Compensation	
Accuracy, +25ºC	±0.5ºC
Accuracy, –40ºC to +85ºC	±1.5ºC
Input Protection	240VAC Continuous, ESD per EN61000-6-2
Isolation (Input-to-Output and Ch-to-ch)	1500Vrms (max)
Throughput(2)	3.0kS/s (max) Continuous, 100ks/s (max) Burst(3), Programmable
Sampling Buffer	192k Sample, 384k Bytes
Scan List	Up to 48 Entries in Any Order
Averaging	Selectable Weight
Alarm	Program High/High-High/Low/Low-Low Per Channel
Alarm Response	Programmable Analog Out, Digital Out
Analog Output	
Channel Count	4
Module Type	Mix and Match-output Types on a Per-channel Basis 8B39/49 All Models with 0-5V Input
Accuracy(1)	±0.07%
Resolution	±0.024%
Output Protection	40VAC (max), ESD per EN61000-6-2
Isolation (Output-to-Input and Ch-to-ch)	1500Vrms (max)
Throughput(2)	1.0ks/s (max) Continuous 4.0ks/s (max) Burst, Programmable
Programmable Waveform	16k Samples Per Channel
Digital I/O	
Channel Count	8
Module Type	Mix and Match-I/O Types on a Per-channel Basis SCMD-MIAC5x, SCMD-MIDC5x SCMD-MOAC5x, SCMD-MODC5x SCMD-MORx5, SCMD-PT
Isolation (Input-to-Output and Ch-to-ch)	1500Vrms (max)
Throughput(2)	2.0ks/s (max) Continuous

8B isoLynx® SLX300 (continued)	
Digital I/O Special Functions	
Pulse/Frequency Counter	Frequency to 80kHz, Count to 10M, RPM to 65k
Pulse/Frequency Counter with De-bounce	Frequency to 50Hz, Count to 10M
Waveform Measurement	Frequency to 15kHz, # Periods, Pulse Width, Period, Duty Cycle
Time Between Events	Min, Max, Avg, Selectable Timebase
Frequency Generator	Up to 100kHz
PWM Generator	Selectable Timebase
One-Shot Generator	20µs (min) Pulse, Programmable Pre- and Post-delay
Alarm	Program High/High-High/Low/Low-Low per function
Alarm Response	Programmable Digital Out
Communications	
RS-232	2.4kbps to 921.6kbps, DB-9 Connector
RS-485	2.4kbps to 921.6kbps, Pluggable Screw Terminal Connector
USB	USB-to-Serial Bridge (Virtual Communications Port), Type B
Ethernet	10/100 Base-T, Static IP, RJ-45 Connector
Protocol	
RS-232, RS-485, USB	Modbus® RTU
Ethernet	Modbus TCP
Software Tools	Free Configuration Software Tool
Power	
+5VDC	270mA(4)
7-34VDC (8BPWR-2 Required)	320mA(4)
Physical	
Dimensions (l)(w)(h)	
Panel Mount	16.24" x 3.47" x 1.92" (413mm x 88mm x 49mm)
DIN-rail Mount	16.24" x 3.47" x 2.00" (413mm x 88mm x 51mm)
Bench-Top 1U Enclosure	16.73" x 6.0" x 1.72" (424.9mm x 152.4mm x 43.7mm)
Mounting	Panel or DIN-rail Rack-Mounted or Bench-Top 1U Enclosure
Environmental	
Operating Temp. Range	–40ºC to +85ºC
Storage Temp. Range	–40ºC to +85ºC
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity, EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) System accuracy does not include module accuracy or SLX300 CJC accuracy. SLX300 CJC accuracy replaces CJC accuracy in 8B37/47 module datasheets. Reference module datasheets for further details.
(2) Throughput varies with system configuration.
(3) Burst Mode Scan rate is reduced when CJC, linearization, averaging, and/or alarm functions are enabled.
(4) Does not include module power consumption. Reference module datasheets for further details.

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Ordering Information

Model	Description
SLX300-10(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, Panel Mount
SLX300-20(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, Panel Mount
SLX300-30(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP), Panel Mount
SLX300-40(S)*	12-ch AI, 4-ch AO, 8-ch DIO, Ethernet, Panel Mount
SLX300-10D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, DIN-rail Mount
SLX300-20D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, DIN-rail Mount
SLX300-30D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP), DIN-rail Mount
SLX300-40D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, Ethernet, DIN-rail Mount
SLX300-10U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, SD Card, 1U Box
SLX300-20U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, SD Card, 1U Box
SLX300-50U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP) & Ethernet, SD Card, 1U Box
SLX146-02, -07	Null Modem Serial Cable, Female DB-9 to Female DB-9; 2m, 7m
SLX147-01, -02, -05	USB Cable, Type A to Type B; 1m, 2m, 5m
SLX370(1)	Software Tools, Config Sample, LabVIEW™ VI
SLX380(1)	Quick Start Guide, Hardware Manual, Software Manual
SLX141-01, -02, -07	Ethernet Cable, 1m, 2m, 7m
SLX141-X01, -X02, -X07	Ethernet Crossover Cable, 1m, 2m, 7m
SCMXRK-002	19" Metal Rack for Mounting Backpanels
SCMXRAIL1-XX	DIN EN50022-35x7.5 (Slotted Steel), Length -XX in meters
SCMXRAIL3-XX	DIN EN50022-35x15 (Slotted Steel), Length -XX in meters
8B30-04, -05, -06	mV Input-modules, 3Hz BW
8B31-04, -05, -06, -08, -10, -13	Voltage-input Modules, 3Hz BW
8B32-01, -02	Current-input Modules, 3Hz BW
8B34-01, -02, -03, -04	2- and 3-wire RTD-input Modules, 3Hz BW
8B35-01, -02, -03, -04	4-wire RTD-input Modules, 3Hz BW
8B36-01, -02, -03, -04	Potentiometer-input Modules, 3Hz BW
8B37J, K, T, R, S	Thermocouple-input Modules, Non-linearized, 3Hz BW

Model	Description
8B38-06, -07, -08	Strain-gauge Input Modules, 3kHz BW
8B38-36, -37, -38	Strain-gauge Input Modules, 3Hz BW
8B39-01, -03	Current-output Modules, 100Hz BW
8B40-04, -05, -06	mV-input Modules, 1kHz BW
8B41-04, -05, -06, -08, -10, -13	Voltage-input Modules, 1kHz BW
8B42-01, -02	2-wire Transmitter-input Modules, 100Hz BW
8B43-11 through -15	DC LVDT-input Modules, 1kHz BW
8B45-01 through -08	Frequency-input Modules
8B47J-xx, K-xx, T-xx	Thermocouple-input Modules, Linearized, 3Hz BW
8B49-01, -02	Voltage-output Modules, 100Hz BW
8B50-04, -05, -06	mV-input Modules, 20kHz BW
8B51-04, -05, -06, -08, -10, -13	Voltage-input Modules, 20kHz BW
8BPT	Non-isolated Signal Pass Thru Module
8BPWR-2	Power Supply Module, 7-34VDC-input
SCMD-MIAC5x	Miniature Digital AC-input Modules
SCMD-MIDC5x	Miniature Digital DC-input Modules
SCMD-MOAC5x	Miniature Digital AC-output Modules
SCMD-MODC5x	Miniature Digital DC-output Modules
SCMD-MORx5	Miniature Relay-output Modules
SCMD-PT	Miniature Pass-thru Module
SCMXPRT-001	Power Supply, 5VDC, 1A, 120VAC-input
SCMXPRE-001	Power Supply, 5VDC, 1A, 220VAC-input
SCMXPRT-003	Power Supply, 5VDC, 3A, 120VAC-input
SCMXPRE-003	Power Supply, 5VDC, 3A, 220VAC-input
PWR-4505	Power Supply, 5VDC, 5A, 85-264VAC-input
PWR-PS5R15W	Power Supply, 24VDC, 0.65A, 100-240VAC-input
PWR-PS5R30W	Power Supply, 24VDC, 1.3A, 100-240VAC-input
PWR-PS5R60W	Power Supply, 24VDC, 2.5A, 100-240VAC-input
PWR-PS5R120W	Power Supply, 24VDC, 5.0A, 100-240VAC-input

NOTES: *Add an 'S' suffix to any SLX300 system part number to order the system bundled with ReDAQ® Shape software. (1) Downloadable from website.
LabVIEW™ VI is a trademark of National Instruments.

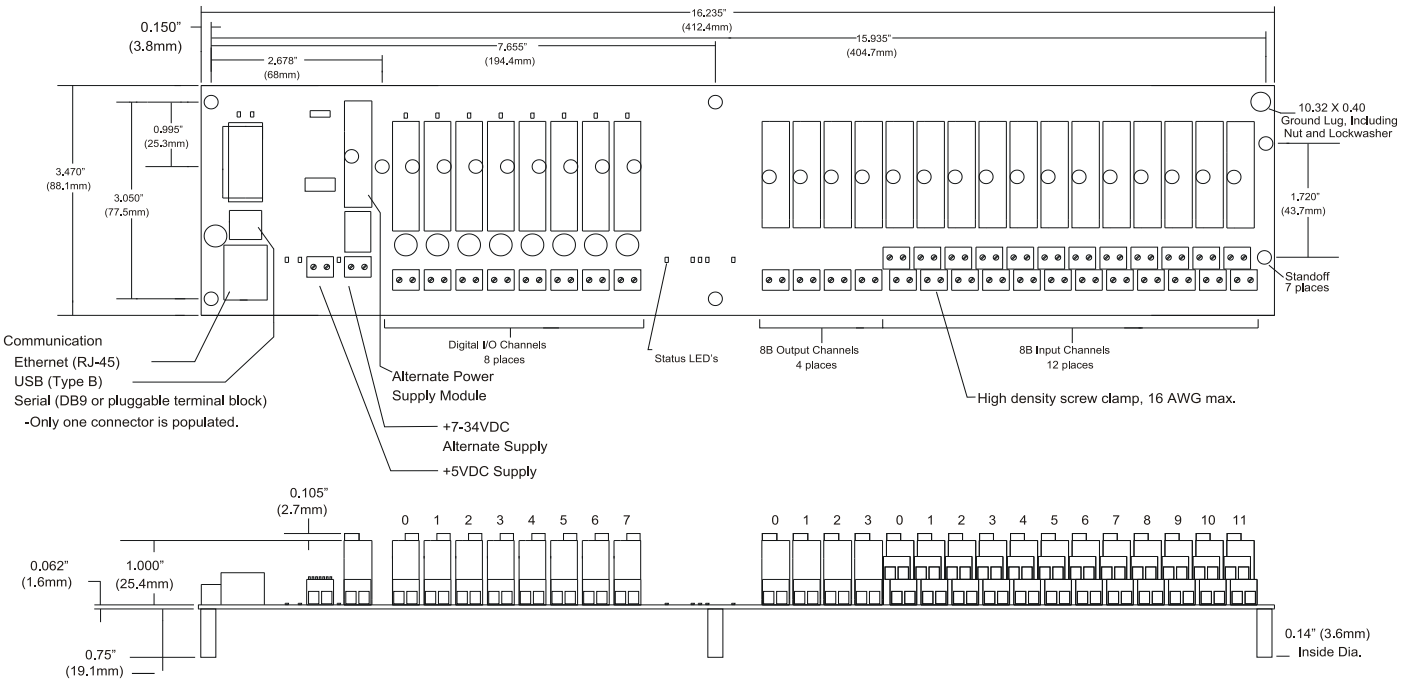


Figure 3: 8B isoLynx SLX300 Block Diagram

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SLX930

ReDAQ® Shape Software for 8B isoLynx® SLX300

DESCRIPTION

ReDAQ Shape, Dataforth's out-of-the-box DAQ software for the 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 Acquire and Analyze panels are pre-configured and can be used without setup. Just three easy steps are required to create data acquisition and control projects using 18 high-quality tools and powerful isoLynx® SLX300 functions. These projects are developed and executed in the software's Presentation panel.

The ReDAQ Shape tools include:

- Button
- Picture Box
- Text Box
- Group Box
- Label
- LED
- Switch
- Numeric Edit
- Thermometer
- Slide
- Tank
- Gauge
- Meter
- Knob
- Chart Recorder
- Oscilloscope
- XY Plot
- Discrete Waveform Graph

ReDAQ Shape also provides the most effective way to configure and customize SLX300 functions for specific application requirements. The toolbox tools are easily moved, re-sized, cut, copied, pasted, and deleted. They also support any graphical file format so presentations made with other software can be loaded into ReDAQ Shape.

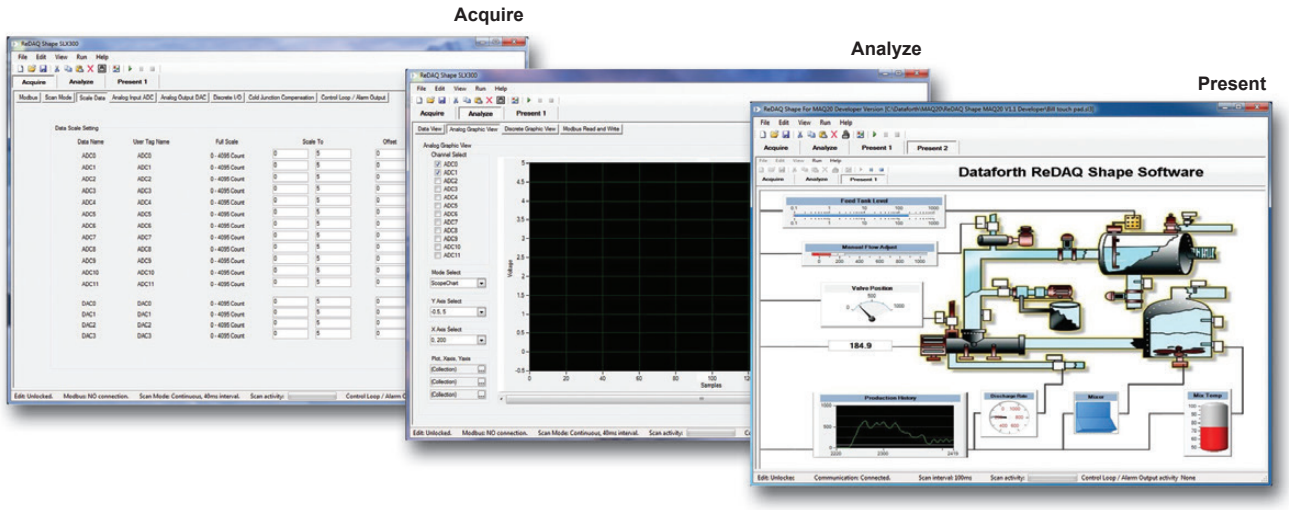
In contrast to other graphical software environments, ReDAQ Shape software for SLX300 has a very short user-learning curve. It is based on programming tools incorporated from Microsoft Visual Studio® and National Instruments Measurement Studio®, ensuring its ease-of-use and integrated, across-the-board applicability for data acquisition and control applications.

FEATURES

- 3 Easy Steps to Create Customized Presentation Panels
- No Setup or Configuration Required in Acquire and Analyze Panels
- 18 High-quality Toolbox Tools
- 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/day, day/time) with 10 programmable events

Ordering Information

Model	Description
SLX930	ReDAQ Shape Software for SLX300



ReDAQ Shape for SLX300 Screen Shots

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DATAFORTH®

2024 Catalog
DSCL/DSCP Products
Loop Isolators and
Transmitters

DSCT Products
DIN-rail Mount,
Two-wire Transmitters



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Online Technical Library
Discontinued Parts

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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DSCL and DSCP

Industrial Loop Isolators and Transmitters

DESCRIPTION

Dataforth's DSCL and DSCP series of products is a complete family of loop and universal AC/DC powered isolators and transmitters in component, DIN and head-mount packages. They include basic loop-powered isolators, wide-range AC/DC powered isolators and transmitters, and fixed-gain or hardware and software configurable models. Depending on the model, they accept a wide range of voltage, current, thermocouple, or RTD-input signals then filter, isolate, amplify, linearize, and convert these signals to high-level analog outputs suitable for use in data acquisition, test and measurement, and control system applications. They protect valuable measurement and control signals as well as connected equipment from the dangerous and degrading effects of noise, transient power surges, internal ground loops, and other hazards present in industrial environments.



FEATURES

- Full Family of Loop Isolators and Transmitters
- Signal-powered Passive Loop Isolator Models
- Wide Range 24V to 60V or 85V to 230V AC/DC Powered Models
- Jumper and Software Configurable Models
- 6.2mm Dip-switch Configurable Models
- 4000Vrms Isolation
- Multiple Channels per Package Available
- PCB, DIN-rail, Panel, and Instrument Head Mounting Options
- No Recalibration or Maintenance Required
- Fault Detection of Input Signal Available
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

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Loop Isolators and Transmitters Selection Guide

Characteristic	DSCL20	DSCL21
Channels per Module	1	1
Mechanical Format	Component	DIN
Isolation Voltage Type	500Vrms Signal and Power	500Vrms Signal and Power
Input Range from Field	0/4-20mA	0/4-20mA
Output Range to System	0/4-20mA	mA or V
Output Split to 2 Channels	—	—
Accuracy	<±0.1%	<±0.1%
Bandwidth	750Hz	750Hz
Load Range Current Voltage	0-600Ω —	0-600Ω >5MΩ
Power Supply	Passive	Passive
Dimensions (h x w x d)	0.8 x 0.4 x 1.6 in	2.9 x 0.5 x 1.9 in
Operating Temp Range	–20°C to +65°C	–20°C to +65°C

Configurable Transmitters Selection Guide

Characteristic	DSCP20	DSCP55	DSCP61	DSCP62	DSCP63	DSCP64	DSCP65	DSCP81
Channels per Module	1	1	1	1	1	1	1	1
Mechanical Format	DIN	DIN	DIN	DIN	DIN	DIN	DIN	DIN
Isolation Voltage Type	Non-Isolated —	1500Vrms Signal	1500Vrms Signal	1500Vrms Signal	1500Vrms Signal	1500Vrms Signal	1500Vrms Signal	2300Vrms 3-Way
Input Range from Field	Configurable	mV, V, mA, TC, RTD	RTD	TC	mA or V	mA or V for 2WTX	mV	Configurable
Output Range to System	Configurable	mA	mA or V	mA or V	mA or V	mA or V	mA or V	Configurable
Accuracy	<±0.2%	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%	<±0.2%
Bandwidth	Configurable	1Hz	1Hz	1Hz	1Hz	1Hz	1Hz	Configurable
Load Range Current Voltage	0-900Ω —	500Ω 1kΩ	500Ω 2kΩ	500Ω 2kΩ	500Ω 2kΩ	500Ω 2kΩ	500Ω 2kΩ	0-600Ω >2kΩ
Power Supply	Loop Power	Passive/DC Pwr	19.2-30VDC	19.2-30VDC	19.2-30VDC	19.2-30VDC	19.2-30VDC	Univ AC/DC Pwr
Dimensions (h x w x d)	2.4 x 0.7 x 2.7 in	3.67 x 0.24 x 4.04 in	3.67 x 0.24 x 4.04 in	3.67 x 0.24 x 4.04 in	3.67 x 0.24 x 4.04 in	3.67 x 0.24 x 4.04 in	3.67 x 0.24 x 4.04 in	2.7 x 0.7 x 4.5 in
Operating Temp Range	–25°C to +80°C	–20°C to +65°C	–20°C to +65°C	–20°C to +65°C	–20°C to +65°C	–20°C to +65°C	–20°C to +65°C	–25°C to +55°C

Accessory

Model	Description
DSCP70	Power Supply Connection Module for DIN-rail Power Bus

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DSCL20

Loop-powered Isolators —"Component Module"

DESCRIPTION

The DSCL20 loop-powered isolator provides a single channel of analog signal protection by electrically isolating its input from output for any DC process signal in the range of 0-20mA (or 4-20mA). The DSCL20 operates passively, obtaining its power from the transmitted signal (see Figure 1).

The input signal is chopped by a proprietary DC chopper circuit, isolation is provided by transformer coupling, a proprietary technique is used to suppress transmission of common-mode spikes or surges, and the output signal from the secondary of the transformer is reconstructed to the original input signal.

FEATURES

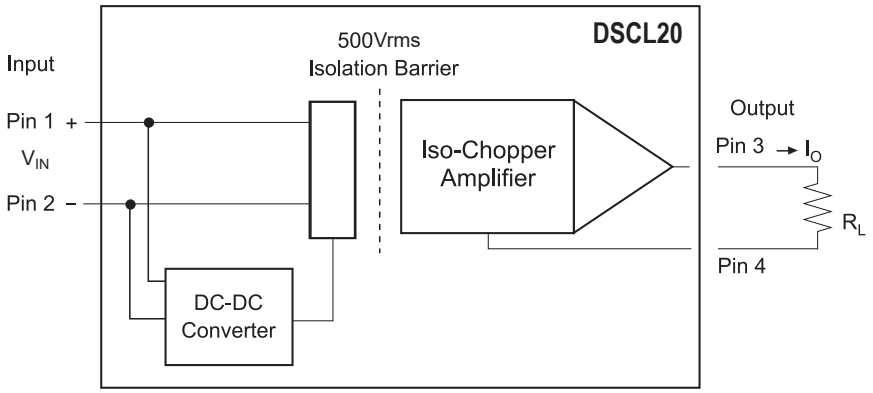
- No Power Supply Required, Signal Powered from 0-20mA (or 4-20mA) Input
- Simplified Wiring, Easy-to-Install Plug-In Accessories
- Small OEM Modular Package Ideal for PCB Mounting
- I/O Packaging for Vertical or Horizontal Mounting
- 500Vrms Transformer Isolation
- Prevents Ground-loop Problems
- Prevents the Transfer of Interference Voltages and Currents
- High Accuracy Over Full Span
- CE Compliant

BENEFITS

- No Recalibration or Maintenance Required
- Multiple Mounting Options
- No Extra Power Supply Required, Powered From 0-20mA or 4-20mA Signal

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems
- Current Repeater
- Resistive Load Drives
- Medical, Industrial, etc. Needing Electrical Isolation for Safety



The compliance voltage or loop voltage must not exceed 17V, as this may damage the module.

DSCL20 Block Diagram - For Module Dimensions and Pinouts, See Page 7-7

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Specifications

Typical* at T_A = +25°C

Module	DSCL20
Input Range	0-20mA, 4-20mA
Input Current	50mA (max) at 18V (max)
CMV Input to Output	500Vrms, 1 Minute
Accuracy (at 100Ω Load)(1)	±0.05% Span (typ)
	±0.1% Span (max)
Linearity	Included in Accuracy
Stability	<50ppm/°C
Overshoot	<20µA ((typ) 5µA)
Compliance Voltage(2) (V_{IN})	17V (max)
Voltage Drop	<2V (for 500Ω Load)
Output Range	0-20mA, 4-20mA
Limit Upper Range	30mA
Bandwidth, –3dB	750Hz
CMR (50Hz or 60Hz)	90dB
NMR	20dB per Decade Above 750Hz
Response Time	1ms, to 90% Span
Load-resistance Range	0-600Ω
Output Noise	<20mV Peak-to-Peak (typ <5mV)
Environmental	Weight Approximately 1.5g
Housing Material	Lexan 940 (UL 94 V-O)
Shock Test	50g (10 Shocks, 3 Axis)
Operating Temp. Range	–20°C to +65°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 75% Noncondensing
Emissions	EN50081-2 (Radiated, Conducted)
Immunity	EN50082-2 (ESD, RF, EFT)

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Additional error <0.2% at 500Ω load
(2) $V_{IN} = I_O R_L$ + <2V

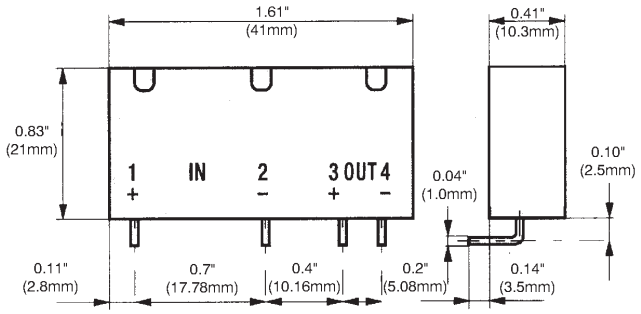


Figure 1: DSCL20-01 (Bent Pins)

Ordering Information

Model	Input Range	Output Range	Package
DSCL20-01	0-20mA (4-20mA)	0-20mA (4-20mA)	Bent Pins
DSCL20-02	0-20mA (4-20mA)	0-20mA (4-20mA)	Straight Pins

Accessory

Model	Description
DSCX-01	Socket for DSCL20-02

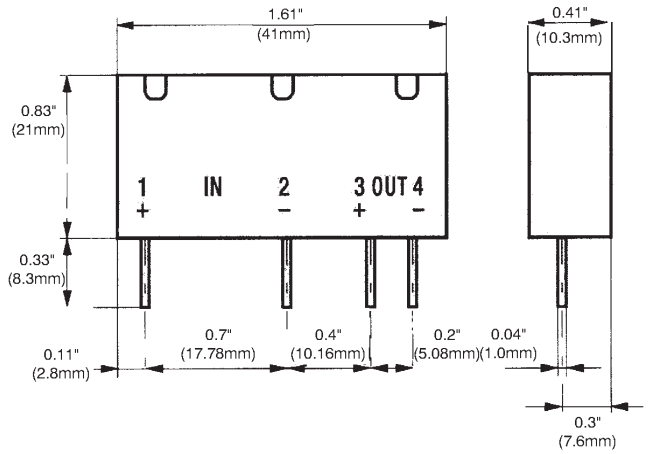


Figure 2: DSCL20-02 (Straight Pins)

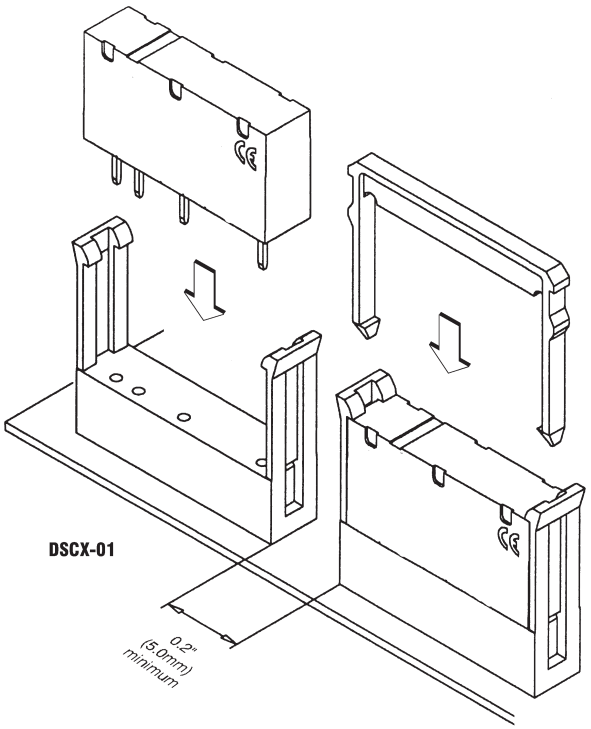


Figure 3: DSCX-01 Socket and Hold-down Accessory for DSCL20-02 (Straight Pin Modules)

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DSCL21

Loop-powered Isolator - DIN-mount

DESCRIPTION

The DSCL21 loop-powered isolator provides a single channel of analog signal protection by electrically isolating its input from output for any DC process signal in the range of 0-20mA (or 4-20mA). The DSCL21 operates passively, obtaining its power from the transmitted signal (see Figure).

The input signal is chopped by a proprietary DC chopper circuit, isolation is provided by transformer coupling, a proprietary technique is used to suppress transmission of common-mode spikes or surges, the output signal from the secondary of the transformer is reconstructed to the original input signal.

FEATURES

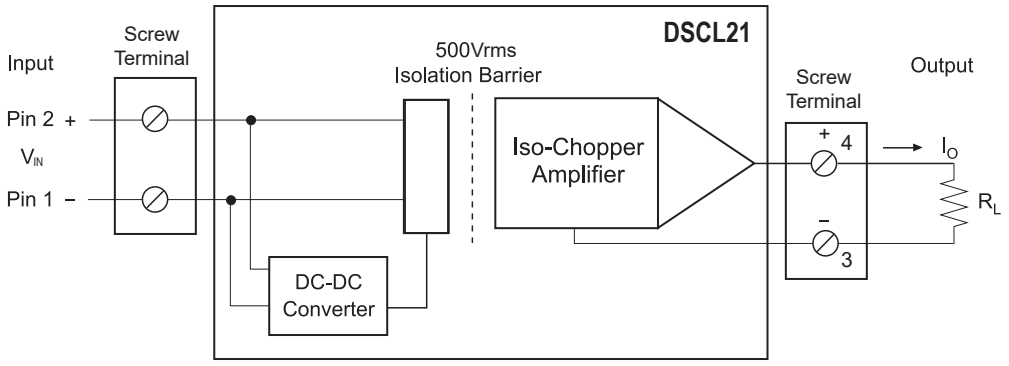
- No Power Supply Required, Signal Powered from 0-20mA (or 4-20mA) Input
- Simplified Wiring for Fast Installation
- Narrow 12.5mm DIN Package for High-density Mounting
- 500Vrms Transformer Isolation
- Prevents Ground-loop Problems
- Prevents the Transfer of Interference Voltages and Currents
- High Accuracy Over Full Span
- CE Compliant

BENEFITS

- No Recalibration or Maintenance Required
- Multiple Mounting Options
- No Extra Power Supply Required, Powered From 0-20mA or 4-20mA Signal

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems
- Current Repeater
- Resistive Load Drives
- Medical, Industrial, etc. Needing Electrical Isolation for Safety



The compliance voltage or loop voltage must not exceed 17V, as this may damage the module.

DSCL21 Block Diagram - **For Module Dimensions and Pinouts, See Page 7-7**

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Specifications

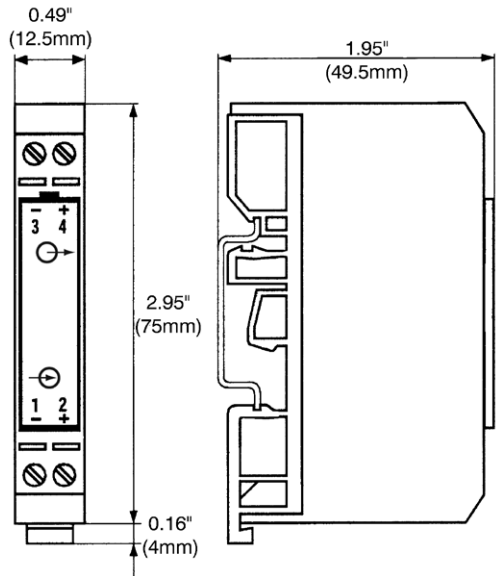
Typical* at T_A = +25°C; Load R = 100Ω (I_{OUT}), ≥5MΩ(V_{OUT})

Module	DSCL21-01
Input Range	0-20mA, 4-20mA
Input Current	50mA (max) at 18V (max)
CMV Input to Output	500Vrms, 1 Minute
Accuracy (at 100Ω Load)(1)	±0.1% Span (typ)
	±0.2% Span (max)
Linearity	Included in Accuracy
Stability	<50ppm/°C
Overshoot	<20µA (5µA typ)
Compliance Voltage(2) (V_{IN})	17V (max)
Voltage drop	<2V (for 500Ω Load)
Output Range	0-20mA, 4-20mA
Limit Upper Range	30mA
Bandwidth, –3dB	750Hz
CMR (50Hz or 60Hz)	90dB
NMR	20dB per Decade Above 750Hz
Response Time	1ms, to 90% Span
Load Resistance Range	0-600Ω
Output Noise	<20mV (<5mV typ)
Environmental	Weight Approximately 35g
Housing Material	Lexan 940 (UL 94 V-O)
Shock Test	50g (10 Shocks, 3 Axis)
Operating Temp. Range	–20°C to +65°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 75% Noncondensing
Emissions	EN50081-2 (Radiated, Conducted)
Immunity	EN50082-2 (ESD, RF, EFT)

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Additional error <0.2% at 500Ω load (I_{OUT})
(2) $V_{IN} = I_O R_L$ + <2V

Ordering Information

Model	Input Range	Output Range
DSCL21-01	0-20mA (4-20mA)	0-20mA (4-20mA)



DSCL21 Dimensions

Dimensional and Wiring Information

The DSCL21 DIN-mount package accepts EN50022 (35 x 7.5) and EN50035 (G32) type rails; Dataforth SCMXRAIL1-xx or SCMXRAIL2-xx. Multiple DSCL21 modules may be mounted next to each other without affecting input or output signals.

Screw terminals with wire protection clamps sized for 0.2 to 4mm^2 solid or 0.2 to 2.5mm^2 stranded wires. The DSCL21 may be mounted in any position. The DSCL21 requires no maintenance.

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DSCP20

Programmable 2-wire Temperature Transmitters, DIN-mount

DESCRIPTION

The DSCP20 2-wire transmitter is designed for measuring temperature using thermocouples or RTDs (Figure below). The input type, measurement range, and other features are software configurable. A PC, the DSCX-887 and DSCX-416 interface cables, and the DSCX-895 configuration software are required to configure the transmitter. Communication is serial RS-232C.

The DSCP20 can interface to 12 industry-standard thermocouple types: J, K, T, E, R, S, B, N, L, U, C, and D. Cold junction compensation is selectable as either internal or external. Three RTD types, Pt 100, Ni 100, and Cu 50* can be interfaced in a 2-, 3- or 4-wire connection. All inputs are linearized using up to 23 points of interpolation, and total errors are less than ±0.2%.

Other configurable features include: zero point and input range adjustment, output response for open or short-circuit sensor or cable failure, normal or inverted output, ripple suppression for 50Hz or 60Hz, and output time response. The DSCX-895 configuration software allows query, print-out and saving of configuration settings, display of input measurement value, and display of interpolation table points.

*Call factory for Cu RTD information.

FEATURES

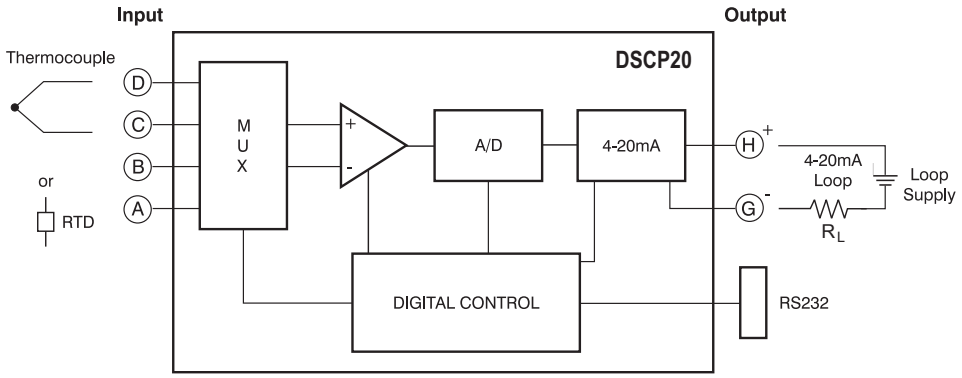
- Low-cost Non-isolated 4-20mA Transmitter
- No Power Supply Required, Powered from Output Loop Current
- Interfaces to All Standard Thermocouples and RTDs
- Software-configurable Input Type and Range
- Open and Short-circuit Input Detection
- Configurable with or without Output Loop Power Connected
- Mounts on Standard DIN-rail
- –25°C to +80°C Operating Temperature
- CE Compliant

BENEFITS

- Improved Signal Integrity Over Long Distances
- Shielded Twisted-pair Wiring Provides Higher EMI Resistance
- Improved Accuracy
- Less Expensive Wiring
- Simplified Maintenance
- Retrofit/Upgrade Flexibility

APPLICATIONS

- Automotive
- Industrial Equipment
- Calibration and Instrumentation
- HVAC
- Power and Utilities
- Lab and Testing Applications



DSCP20 Block Diagram

The following grounding condition must be observed when programming the instrument.

If one of the power supply or input wires is grounded to earth, a PC without an earth connection must be used when programming (e.g. a laptop running on batteries).

Under no circumstances should a PC be used running from a power supply with an earth connection, as this will damage the module.

Thermocouple Type and Material

Type	Material	Type	Material
B	Pt30Rh-Pt6Rh	R	Pt13Rh-Pt
E	NiCr-CuNi	S	Pt10Rh-Pt
J	Fe-CuNi	T	Cu-CuNi
K	NiCr-Ni	U	Cu-CuNi
L	Fe-CuNi	C	W5 Re/W26 Re
N	NiCrSi-NiSi	D	W3 Re/W25 Re

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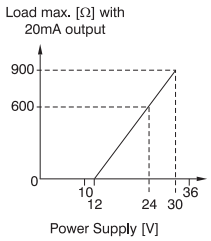
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Specifications

Typical* at T_A = +25°C, 24VDC Loop Supply Voltage, R_L = 250Ω; PT100, 3-wire, 0-600°C

Module	DSCP20
Input Range, Thermocouple Thermocouple Types: B,E,J,K,N,R,S,T,L,U,C,D Cold Junction Compensation Internal External Input Resistance	Reference Table 1 Incorporated Pt 100 0 to 60°C, Configurable >10MΩ
Input Range, RTD RTD Types: Pt 100, Ni 100 RTD Excitation Current Input Resistance Lead Resistance	Reference Table 1 ≤0.20mA >10MΩ ≤30Ω per Lead
Output Range Output Noise Loop Supply Voltage Reverse Supply Protection Load Resistance Output Response for Input Failure Output Time Response	4-20mA or Inverse 20-4mA <1% p-p 12-30VDC Continuous See Note 1 Configurable to Hold Value of Output Immediately Prior to Input Failure, or Value Between 4 and 21.6mA Configurable, see Table 2
Accuracy(2)	±0.1% Span (typ), ±0.2% Span (max)†
Linearity	±0.03% Span (typ), ±0.1% Span (max)
Stability	≤±(0.015%+0.015°C)/°C
Mechanical Dimensions (h)(w)(d)	2.44" x 0.67" x 2.56" (62mm x 17mm x 65mm)
Mounting	DIN EN 50022-35x7.5 or EN 50035-G32
Housing Material	Polyamide, Flammability Class V2 According to UL 94
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity Emissions Immunity	 –25°C to +80°C –40°C to +80°C 0 to 75% Noncondensing EN50081-2 (Radiated, Conducted) EN50082-2 (ESD, RF, EFT)

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Load Resistance: $R_L(\max) = \frac{\text{Loop Supply (V)} - 12V}{I_{OUTPUT}(\max)}$



(2) Includes hysteresis, conformity and repeatability at reference conditions. Does not include CJC error.
(3) Shipped as PT 100 for 3-wire connection, 0 to 600°C range, 4-20mA output, open circuit detect = 21.6mA output.
(4) Downloadable from website.
(5) Many different ranges may be programmed as long as the min/max limits are observed. For minimum range examples, a K type thermocouple could be programmed for +30°C to +78.5°C, or +100°C to +149°C, or +900°C to +995°C, and so on.

Table 1: Input Range-Thermocouple and RTD

Measured Variables	Measuring Ranges Limits	Span (min)	Span (max)
RTD: 2-, 3-, or 4-wire Pt 100, Standard IEC 60 751 Ni 100, Standard DIN 43 760	 –200 to +850°C –60 to +250°C	 50°C 50°C	 850°C 250°C
Thermocouple Type B, E, J, K, N, R, S, T; Standard IEC 60 584-1 Type L and U; Standard DIN 43 710 Type C: W5 Re/W26 Re, Type D: W3 Re/W25 Re; Standard ASTM E 988-90	 According to Type	 2mV(5)	 80mV(5)

Table 2: Output Response Times

Measuring Mode	Open Sensor Circuit	Short-Circuit	Possible Response Times [s]						
TC int. comp.	active	–	1.5	2.5	3.5	6.5	11	20.5	40
TC int. comp.	off	–	1.5	2.5	3.5	6.5	13.5	24.5	49.5
TC ext. comp.	active	–	1.5	2.5	3.5	6.5	11	20.5	40
TC ext. comp.	off	–	1.5	2.5	4	6.5	13.5	24.5	48.5
RTD 2L	active	–	2	2.5	3	5	9.5	17.5	33.5
RTD 3L, 4L	active	active	2	2.5	4	6.5	11.5	21	40.5
RTD 2L, 3L, 4L	off	off	1.5	2.5	3.5	7.5	14	26.5	50.5

†Additional Errors

Low Measuring Range Resistance Thermometer (<200°C Span) Thermocouples (<500°C Span)	 ±0.015% Span (typ), ±0.05% Span (max) ±0.015% Span (typ), ±0.05% Span (max)
High Initial Value Factor: Error:	±0.0002 (typ), ±0.0005 (max) (Factor)*(Initial Value/Span)*100 [%]
Influence of Lead Resistance	±0.01% per Ω
Internal Cold Junction Compensation	±(0.5°C/Span)*(100) [%]

Ordering Information

Model	Input Range/Description	Output Range
DSCP20 (Basic Configuration)(3)	Configurable RTD or Thermocouple, User Programmed	4-20mA, or Inverted

Accessories

Model	Description
DSCX-887	PC-interface Cable
DSCX-416	Module-interface Cable
DSCX-895(4)	Configuration Software

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Table 3: Temperature Measuring Ranges

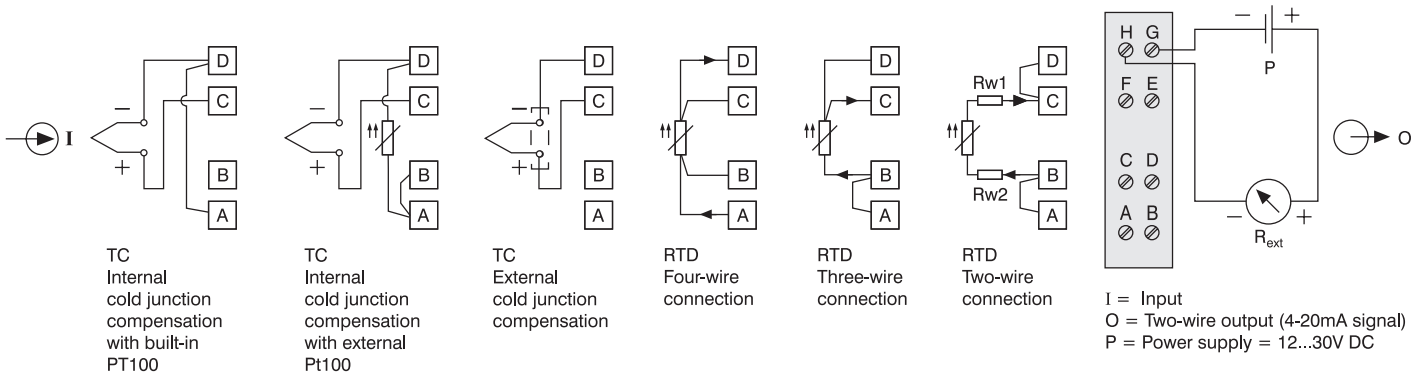
Measuring Range Examples	Resistance Thermometers (1)		Thermocouples (2)											
[°C]	Pt100	Ni100	B	E	J	K	L	N	R	S	T	U	C(3)	D(4)
0...40	X			X	X		X							
0...50	X	X		X	X	X	X				X	X		
0...60	X	X		X	X	X	X				X	X		
0...80	X	X		X	X	X	X	X			X	X		
0...100	X	X		X	X	X	X	X			X	X		
0...120	X	X		X	X	X	X	X			X	X		
0...150	X	X		X	X	X	X	X			X	X	X	
0...200	X	X		X	X	X	X	X			X	X	X	X
0...250	X	X		X	X	X	X	X			X	X	X	X
0...300	X			X	X	X	X	X	X	X	X	X	X	X
0...400	X			X	X	X	X	X	X	X	X	X	X	X
0...500	X			X	X	X	X	X	X	X		X	X	X
0...600	X			X	X	X	X	X	X	X		X	X	X
0...800	X		X	X	X	X	X	X	X	X			X	X
0...900			X	X	X	X	X	X	X	X			X	X
0...1000			X	X	X	X		X	X	X			X	X
0...1200			X		X	X		X	X	X			X	X
0...1500			X						X	X			X	X
0...1600			X						X	X			X	X
0... 1800			X										X	X
0... 2000													X	X
50...150	X	X		X	X	X	X	X			X	X		
100...300	X			X	X	X	X	X			X	X	X	X
200...500	X			X	X	X	X	X	X	X		X	X	X
300...600	X			X	X	X	X	X	X	X		X	X	X
600...900			X	X	X	X	X	X	X	X			X	X
600...1000			X	X	X	X		X	X	X			X	X
900...1200			X		X	X		X	X	X			X	X
600...1600			X						X	X			X	X
600...1800			X										X	X
–10...40	X	X		X	X	X	X					X		
–30...60	X	X		X	X	X	X	X			X	X		
Measuring Range Limits [°C]	–200 to 850	–60 to 250	0 to 1820	–270 to 1000	–210 to 1200	–270 to 1372	–200 to 900	–270 to 1300	–50 to 1769	–50 to 1769	–270 to 400	–200 to 600	0 to 2315	0 to 2315

NOTES:
(1) Minimum span is 15Ω when the end value(3) is less than or equal to 400Ω. Minimum span is 150Ω when the end value(3) is greater than 400Ω and not exceeding 4000Ω. The ratio of the min value to the span must be less than or equal to 10. For two-wire connections, the end value is made up of the measured end value (Ω) plus the total resistance of the leads.
(2) Range of span is 2mV (min) to 80mV (max). The ratio of the min value to the span must be less than or equal to 10.
(3) W5 Re W26 Re (ASTM E 988-90)
(4) W3 Re W25 Re (ASTM E 988-90)

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Electrical Connections



TC Internal cold junction compensation with built-in PT100

TC Internal cold junction compensation with external Pt100

TC External cold junction compensation

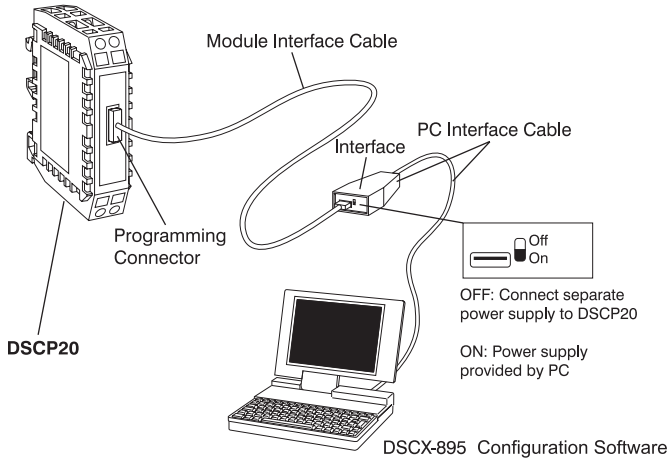
RTD Four-wire connection

RTD Three-wire connection

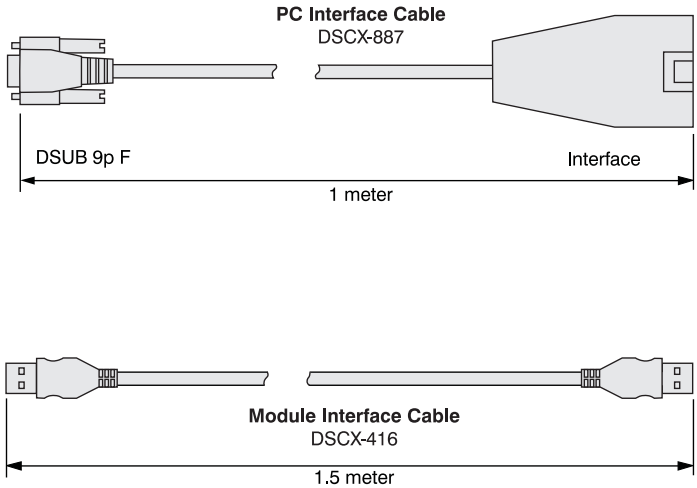
RTD Two-wire connection

I = Input
O = Two-wire output (4-20mA signal)
P = Power supply = 12...30V DC

Accessories and Spare Parts

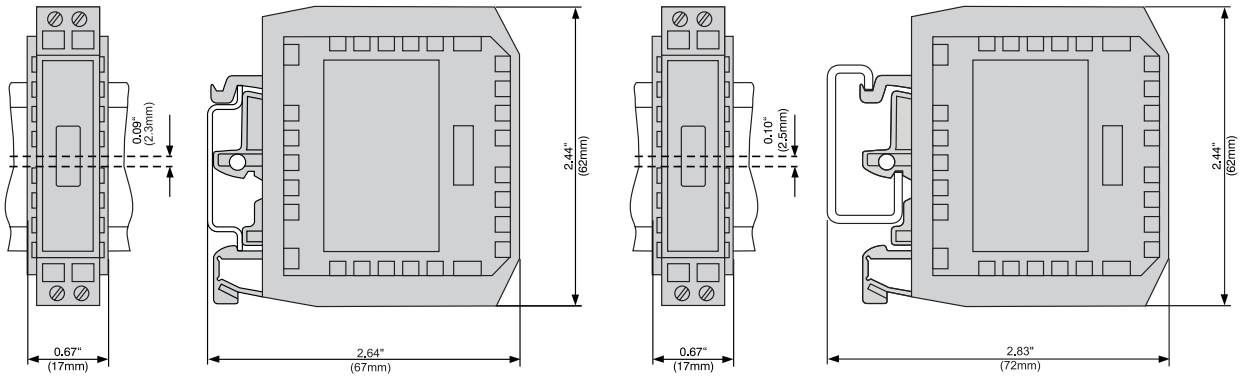


Example of the set-up for programming a DSCP20 without the power supply. For this case, the switch on the interface must be set to "ON". The DSCX-895 configuration software is downloadable from the website.



Dimensions

Dimensions: inches (millimeters)



DSCP20 Clipped onto a Top-hat Rail EN 50-022-35 x 7.5

DSCP20 Clipped onto a Rail "G" EN 50-035-G32

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DSCP55

Pt100, Ni100/Loop-powered Converter

DESCRIPTION

The DSCP55 RTD loop-powered converter provides a single channel of RTD-input which is amplified, linearized, and converted to a high-level 4-20mA or 20-4mA output. Inputs may be connected by 2-, 3-, or 4-wires and measurement range may be configured by dip-switch.



FEATURES

- Input: Pt100 (–200°C to + 650°C) Ni100 (–60°C to + 250°C)
- Output Current: 4-20mA or 20-4mA
- Spring-cage Clamp Connection
- 16-bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-switch
- Compact 6.2mm DIN Housing
- CE Compliant

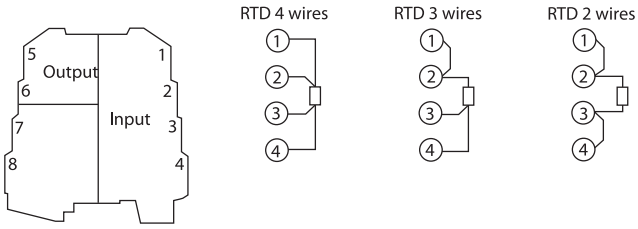
BENEFITS

- No Additional Power Supply Required
- Easy Wiring
- Lower Cost
- Hazardous Area Approvals

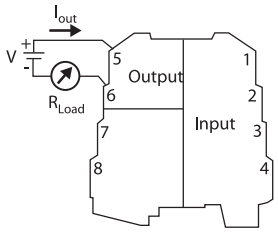
APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems
- Current Repeater
- Resistive Load Drives
- Medical, Industrial, etc. Needing Electrical Isolation for Safety

Input



Output and Power Supply



DSCP55 Electrical Connections

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Power

Module	DSCP55
Input (selectable)	
Pt100 Probe EN 60751	Accepts 2-, 3-, or 4-wire RTDs Sensor Current: 750µA Cable Resistance: 25Ω (max) per Wire Measurement Range: – 200°C to +650°C (settable) Span: 20°C (min)
Ni100 Probe	Accepts 2-, 3-, or 4-wire RTDs Sensor Current: 750µA Cable Resistance: 25Ω (max) per Wire Measurement Range: –60°C to +250°C (settable) Span: 20°C (min)
Accuracy	±0.1% (max)
Thermal Drift	<100ppm/°K
A/D Conversion	16-bit
Response Time, 90% Span (selectable)	<220ms (without filter), <620ms (with filter)
Isolation	No
Dip-switch Configuration	Sets Input and Output Ranges, Sensor Type, Filter and Faults
Status Indicators (LED)	Internal Fault, Configuration Error, Connection Fault
Output (selectable)	
Current	4-20mA or 20-4mA Load resistance: 1200Ω (max)
Current Output Maximum	30mA
Fault Output	102.5% or 105% of Full-scale Value in Case of Over-range
Hot Swapping	Yes
Loop Supply Voltage	5-30VDC
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal Housing for Mounting on 35mm DIN 46277
Connections	Spring-cage Clamp
Weight	1.6 ounces (45g)
Environmental	
Operating Temp. Range	–20°C to +65°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 90%, Noncondensing
IP Protection	IP20
Emissions	EN61000-6-4
Immunity	EN61000-6-2

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

Ordering Information

Model	Description
DSCP55	Pt100, Ni100 Loop-powered Converter

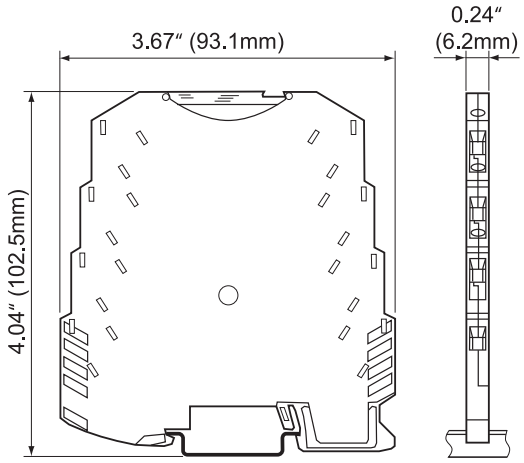


Figure 1: Dimensional Drawing

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DSCP61

Pt100-to-DC Current/Voltage Converter

DESCRIPTION

The DSCP61 RTD Pt100 converter provides a single channel of RTD-input which is amplified, linearized, and converted to a high-level current or voltage output. Inputs may be connected by 2-, 3-, or 4-wires and measurement range may be configured by dip-switch to cover a range of –150°C to +650°C. Power can be applied directly to the converter's terminals or through a DIN-rail mounted bus connector accessory, eliminating the need to wire power to each individual converter.



FEATURES

- Input: Pt100 (2, 3, 4 wires, –150°C to +650°C)
- Output Current: 0-20mA, 4-20mA, 20mA-0, 20-4mA
- Output Voltage: 0-5VDC, 1-5VDC, 0-10VDC, 10-0VDC
- 1500Vrms Galvanic Isolation, 3-way
- 19.2-30VDC Power
- Spring-cage Clamp Connection
- 14-bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-switch
- Compact 6.2mm DIN Housing
- CE Compliant

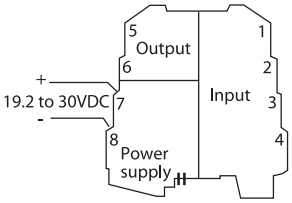
BENEFITS

- Stable Output
- Fast Response
- Small, Slim Packaging Saves Space and Cost
- Flame-retardant Shell

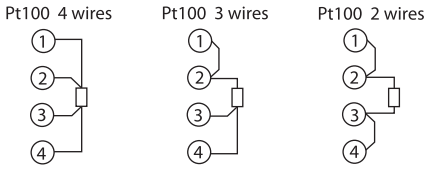
APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems

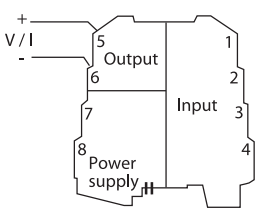
Power Supply



Input



Output



DSCP61 Electrical Connections

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Power

Module	DSCP61
Input (selectable) Pt100 Probe EN 60751	 Accepts 2-, 3-, or 4-wire RTDs Sensor Current: <900µA Cable Resistance: 20Ω per wire (max) Measurement Range: –150°C to +650°C (settable) Span: 50°C (min) Input Voltage: 32VDC (max)
Accuracy Thermal Drift A/D Conversion Processing Response Time, 90% Span (selectable) Isolation Dip-switch Configuration Status Indicators (LED)	±0.1% (max) <100ppm/°K 14-bit Floating Point 32-bit <50ms (without filter), <200ms (with filter) 1500Vrms (1 minute), 3-way Sets Input and Output Ranges, Sensor Type, Filter and Faults Internal Fault, Configuration Error, Connection Fault
Output (selectable) Current Current Output Maximum Fault Output Voltage	 0-20mA, 4-20mA, 20mA-0 or 20-4mA Load Resistance: 500Ω (max) 25mA 102.5% or 105% of Full-scale Value in Case of Over-range 0-5VDC, 1-5VDC, 0-10VDC or 10-0VDC Load Resistance: 2kΩ (min)
Power Supply Power Consumption Hot Swapping	19.2 to 30VDC 500mW (21mA at 24VDC) Yes
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal Housing for Mounting on 35mm DIN 46277
Connections	Spring-cage Clamp
Weight	1.8 ounces (50g)
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity IP Protection Emissions Immunity	 –20°C to +65°C –40°C to +85°C 0 to 90%, Noncondensing IP20 EN61000-6-4 EN61000-6-2

Ordering Information

Model	Description
DSCP61	Pt100-to-DC Current/Voltage Converter

Accessories

Model	Description
DSCX-02	DIN-rail Expandable Power-bus Connector
DSCP70	Power Supply Connection Module

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

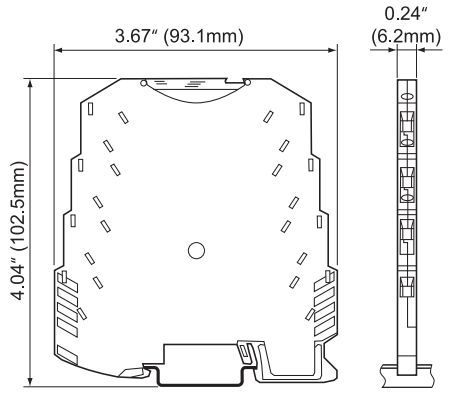
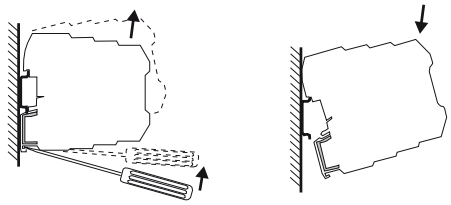
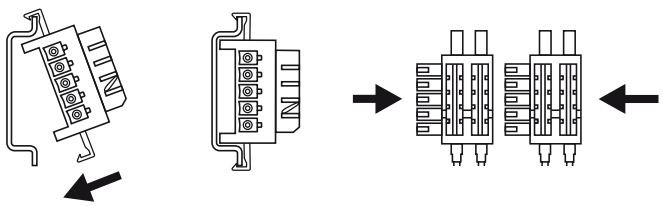


Figure 1: Dimensional Drawing

Inserting/Extracting Module on DIN Guide



Expandable Power-bus Connector



Spring-cage Clamp Connection

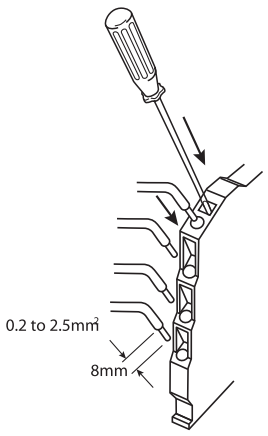


Figure 2: Module Installation

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DSCP62

Thermocouple-to-DC Current/Voltage Converter with Relay Output

DESCRIPTION

The DSCP62 thermocouple converter provides a single channel of thermocouple-input which is amplified, linearized, and converted to a high-level current or voltage output. Thermocouple type, measurement range, filter, output type and range, and fault indication may be configured by dip-switch. An auxiliary relay output is provided to generate an alarm or act as a thermostat. Power can be applied directly to the converter's terminals or through a DIN-rail mounted bus connector accessory, eliminating the need to wire power to each individual converter.



FEATURES

- Input: Thermocouple types J, K, E, N, S, R, B, T
- Output Current: 0-20mA, 4-20mA, 20mA-0, 20-4mA
- Output Voltage: 0-5VDC, 1-5VDC, 0-10VDC, 10-0VDC
- Auxiliary Relay for Alarm or Control
- 1500Vrms Galvanic Isolation, 3-way
- 19.2-30VDC Power
- Spring-cage Clamp Connection
- 14-bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-switch
- Compact 6.2mm DIN Housing
- CE Compliant

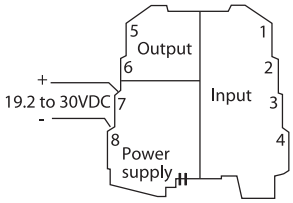
BENEFITS

- Robust Interference-free Signal
- Enables Use of Copper Extension Cable in Place of More Expensive Solutions

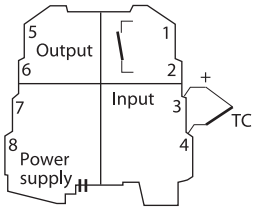
APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems

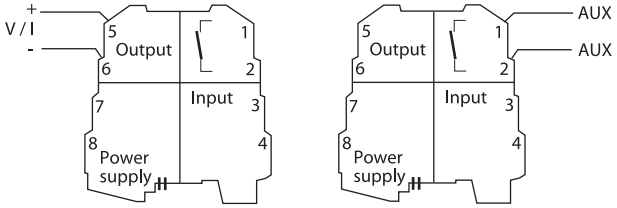
Power Supply



Input



Ouput



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DSCP62 Electrical Connections

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Power

Module	DSCP62
Input (selectable) Thermocouple Type EN 60584-1 Input Impedance	 J, K, E, N, S, R, B, T Measurement Range: Depends on Thermocouple Type and Dip-switch Setting Span: 100°C (min) 10MΩ
Accuracy Cold Junction Error Thermal Drift A/D Conversion Processing Response Time, 90% Span (selectable) CMRR Isolation Dip-switch Configuration Status Indicators (LED)	±0.1% (max) 1.5°C (max) <120ppm/°K 14-bit Floating Point 32-bit <25ms (without filter), <55ms (with filter) >135dB, Referred to Power Supply Side 1500Vrms (1 minute), 3-way Sets Input and Output Ranges, Sensor Type, Filter and Faults Internal Fault, Configuration Error, Connection Fault
Output (selectable) Current Current Output Protection Fault Output Voltage Auxiliary Relay Output	 0-20mA, 4-20mA, 20mA-0 or 20-4mA Load Resistance: 500Ω (max) 25mA (max) 102.5% or 105% of Full-scale Value in Case of Over-range 0-5VDC, 1-5VDC, 0-10VDC or 10-0VDC Load Resistance: 2kΩ (min) Rated 60mA (max) at 24VAC
Power Supply Power Consumption Hot Swapping	19.2-30VDC <600mW (24mA at 24VDC) Yes
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal Housing for Mounting on 35mm DIN 46277
Connections	Spring-cage Clamp
Weight	1.6 ounces (46g)
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity IP Protection Emissions Immunity	 –20°C to +65°C –40°C to +85°C 0 to 90%, Noncondensing IP20 EN61000-6-4 EN61000-6-2

Ordering Information

Model	Description
DSCP62	Thermocouple Converter

Accessories

Model	Description
DSCX-02	DIN-rail Expandable Power-bus Connector
DSCP70	Power Supply Connection Module

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

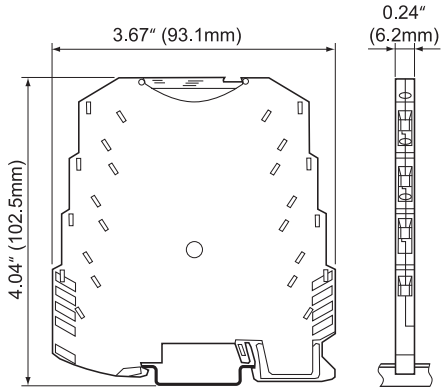
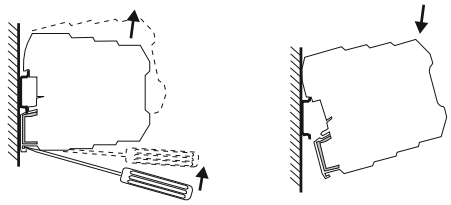
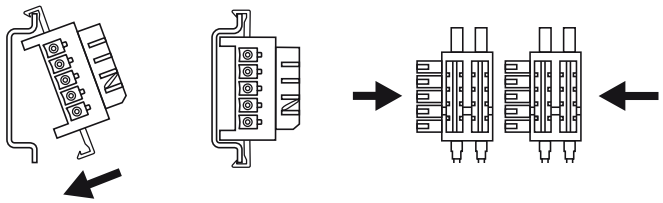


Figure 1: Dimensional Drawing

Inserting/Extracting Module on DIN Guide



Expandable Power-bus Connector



Spring-cage Clamp Connection

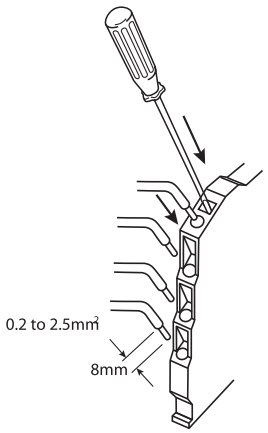


Figure 2: Module Installation

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DSCP63

DC Voltage/Current Converter

DESCRIPTION

The DSCP63 voltage/current converter provides a single channel of voltage or current input which is converted to a voltage or current output. It is designed for industrial standard voltage or current signals. Input/output range, filter, fault indication, square root function, and other functions may be configured by dip-switch. Power can be applied directly to the converter's terminals or through a DIN-rail mounted bus connector accessory, eliminating the need to wire power to each individual converter.



FEATURES

- Input Voltage: 0-5VDC, 0-10VDC, 0-15VDC, 0-30VDC, 1-5VDC, 2-10VDC
- Input Current: 0-20mA, 4-20mA
- Output Voltage: 0-5VDC, 0-10VDC, 1-5VDC, 2-10VDC
- Output Current: 0-20mA, 4-20mA, 20mA-0, 20-4mA
- 1500Vrms Galvanic Isolation, 3-way
- 19.2-30VDC Power
- Spring-cage Clamp Connection
- 14-bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-switch
- Compact 6.2mm DIN Housing
- CE Compliant

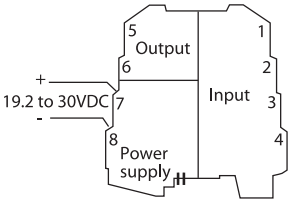
BENEFITS

- High-efficiency Energy Conversion
- Helps to Improve Device Energy Utilization

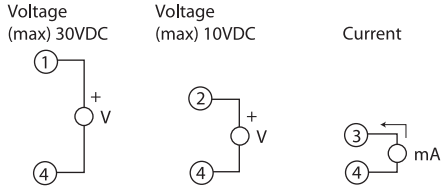
APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems

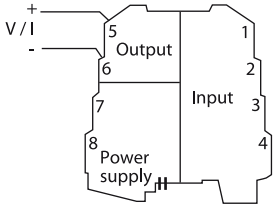
Power Supply



Input



Output



DSCP63 Electrical Connections

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Power

Module	DSCP63
Input (selectable) Voltage (max 50VDC) Voltage (max 30VDC) Current (max 24mA)	 0-15VDC, 0-30VDC (Input R = 325kΩ) 0-5VDC, 1-5VDC, 0-10VDC, 2-10VDC (Input R = 110kΩ) 0-20mA, 4-20mA (Input R = 35Ω)
Accuracy Thermal Drift A/D Conversion Processing Response Time, 90% Span, (selectable) Isolation Dip-switch Configuration Status Indicators (LED)	±0.1% (max) <120ppm/°K 14-bit Floating Point 32-bit <35ms (without filter), <74ms (with filter) 1500Vrms (1 minute), 3-way Sets Input and Output Ranges, Filter and Faults Internal Fault, Configuration Error, Connection Fault
Output (selectable) Current Current Output Maximum Fault Output Voltage	 0-20mA, 4-20mA, 20mA-0 or 20-4mA Load Resistance: 500Ω (max) 25mA 102.5% or 105% of Full-scale Value in Case of Over-range 0-5VDC, 1-5VDC, 0-10VDC or 2-10VDC Load Resistance: 2kΩ (min)
Power Supply Power Consumption Hot Swapping	19.2-30VDC <600mW (22mA at 24VDC) Yes
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal Housing for Mounting on 35mm DIN 46277
Connections	Spring-cage Clamp
Weight	1.8 ounces (50g)
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity IP Protection Emissions Immunity	 –20°C to +65°C –40°C to +85°C 0 to 90%, Noncondensing IP20 EN61000-6-4 EN61000-6-2

Ordering Information

Model	Description
DSCP63	DC Voltage/Current Converter

Accessories

Model	Description
DSCX-02	DIN-rail Expandable Power-bus Connector
DSCP70	Power Supply Connection Module

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

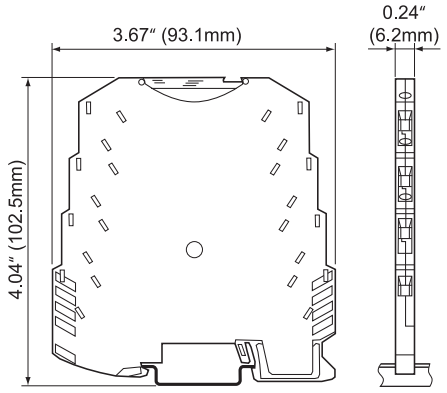
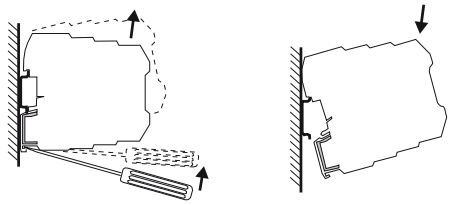
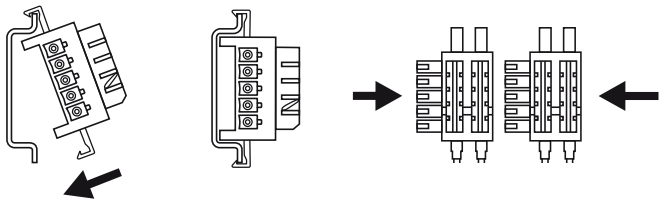


Figure 1: Dimensional Drawing

Inserting/Extracting Module on DIN Guide



Expandable Power-bus Connector



Spring-cage Clamp Connection

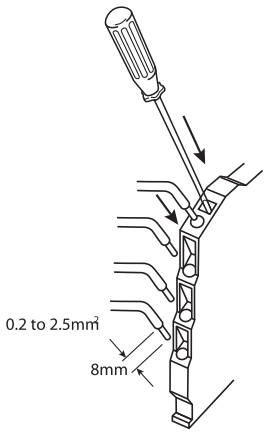


Figure 2: Module Installation

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DSCP64

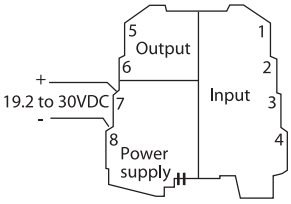
DC Voltage/Current Converter with Transducer Power Supply

DESCRIPTION

The DSCP64 voltage/current converter provides a single channel of voltage or current input which is converted to a current or voltage output. An auxiliary power supply is provided for powering the input transducer/sensor. It is designed for Industry-standard voltage or current signals. Input/output range, filter, fault indication, square root function, and other functions may be configured by dip-switch. Power can be applied directly to the converter's terminals or through a DIN-rail-mounted bus connector accessory, eliminating the need to wire power to each individual converter.

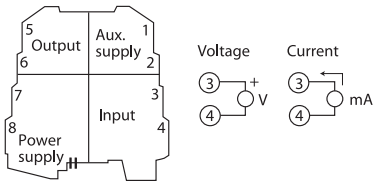


Power Supply

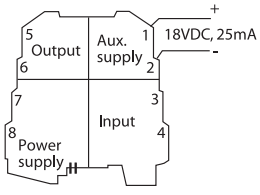


Input

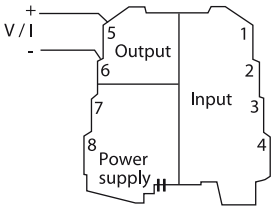
Voltage and Current (passive)



Current (active)



Output



DSCP64 Electrical Connections

FEATURES

- Input Voltage: 0-5VDC, 0-10VDC, 0-15VDC, 0-30VDC, 1-5VDC, 2-10VDC
- Input Current: 0-20mA, 4-20mA
- Output Voltage: 0-5VDC, 0-10VDC, 1-5VDC, 2-10VDC
- Output Current: 0-20mA, 4-20mA, 20mA-0, 20-4mA
- 1500Vrms Galvanic Isolation, 4-way
- 19.2-30VDC Power
- Spring-cage Clamp Connection
- 14-bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-switch
- Compact 6.2mm DIN Housing
- CE Compliant

BENEFITS

- High-efficiency Energy Conversion
- Helps to Improve Device Energy Utilization

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Power

Module	DSCP64
Input (selectable) Voltage Current	 0-5VDC, 1-5VDC, 0-10VDC, 2-10VDC (Input R = 110kΩ) 0-20mA, 4-20mA (Input R = 35Ω)
Accuracy Thermal Drift A/D Conversion Processing Response Time, 90% Span, (selectable) Isolation Dip-switch Configuration Status Indicators (LED)	±0.1% (max) <120ppm/°K 14-bit Floating Point 32-bit <35ms (without filter), <74ms (with filter) 1500Vrms (1 minute), 3-way Sets Input and Output Ranges, Filter and Faults Internal Fault, Configuration Error, Connection Fault
Output (selectable) Current Current Output Maximum Fault Output Voltage Auxiliary Power Supply	 0-20mA, 4-20mA, 20mA-0 or 20-4mA Load Resistance: 500Ω (max) 25mA 102.5% or 105% of Full-scale Value in Case of Over-range 0-5VDC, 1-5VDC, 0-10VDC or 2-10VDC Load Resistance: 2kΩ (min) 17VDC-21VDC, 0 to 25mA
Power Supply Power Consumption Hot Swapping	19.2-30VDC 23mA (max) at 24VDC with Output at 20mA and Auxiliary Supply Not Used 45mA (max) at 24VDC with Output at 21mA and Auxiliary Supply at 21mA Yes
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal Housing for Mounting on 35mm DIN 46277
Connections	Spring-cage Clamp
Weight	1.6 ounces (46g)
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity IP Protection Emissions Immunity	 –20°C to +65°C –40°C to +85°C 0 to 90%, Noncondensing IP20 EN61000-6-4 EN61000-6-2

Ordering Information

Model	Description
DSCP64	DC Voltage/Current Converter

Accessories

Model	Description
DSCX-02	DIN-rail Expandable Power-bus Connector
DSCP70	Power Supply Connection Module

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

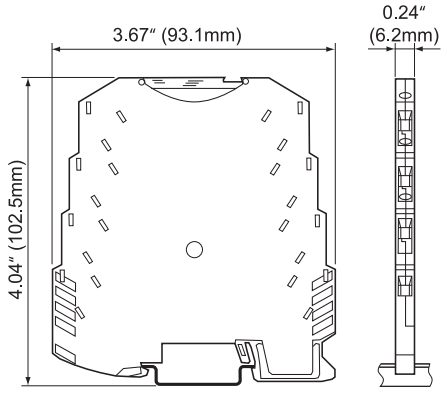
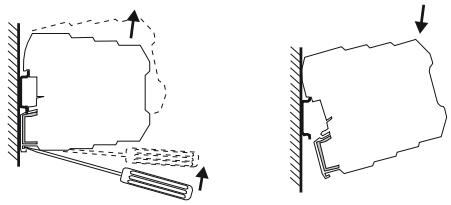
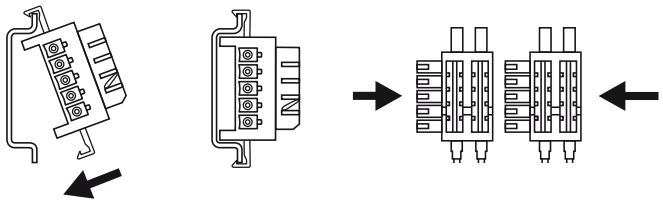


Figure 1: Dimensional Drawing

Inserting/Extracting Module on DIN Guide



Expandable Power-bus Connector



Spring-cage Clamp Connection

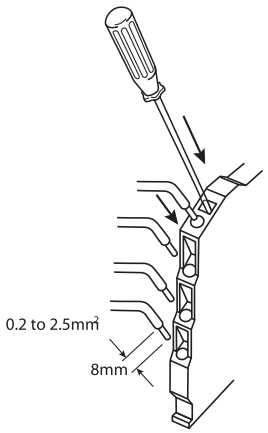


Figure 2: Module Installation

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DSCP65

DC Low Voltage Converter

DESCRIPTION

The DSCP65 low voltage converter provides a single channel of low-voltage input which is converted to a current or voltage output. It is designed for industrial-standard voltage or current signals. Input/output range, filter, fault indication, and other functions may be configured by dip-switch. Power can be applied directly to the converter's terminals or through a DIN-rail-mounted bus connector accessory, eliminating the need to wire power to each individual converter.



FEATURES

- Input Voltage: 25mV to 2VDC in 15 Settable Steps
- Output Voltage: 0-5VDC, 0-10VDC, 1-5VDC, 2-10VDC
- Output Current: 0-20mA, 4-20mA, 20mA-0, 20-4mA
- 1500Vrms Galvanic Isolation, 3-way
- 19.2-30VDC Power
- Spring-cage Clamp Connection
- 14-bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-switch
- Compact 6.2mm DIN Housing
- CE Compliant

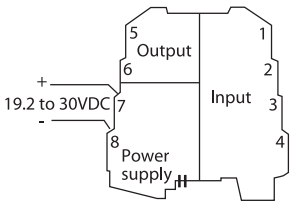
BENEFITS

- High Efficiency and Performance
- Reduced Power Loss During Conversion

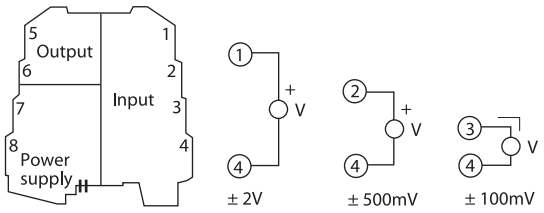
APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems

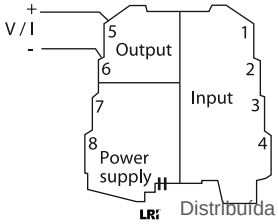
Power Supply



Input



Output



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DSCP65 Electrical Connections

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Power

Module	DSCP65
Input (selectable)	
Voltage (Terminals 3 and 4)	25, 50, 60, 75, 80, or 100mV (Input R = 50kΩ)
Voltage (Terminals 2 and 4)	120, 150, 200, 250, 300, 400, or 500mV (Input R = 250kΩ)
Voltage (Terminals 1 and 4)	1000 or 2000mV (Input R = 1MΩ)
Maximum Input Voltage	±50VDC
Accuracy	±0.1% (max)
Thermal Drift	<120ppm/°K
A/D Conversion	14-bit
Processing	Floating Point 32-bit
Response Time, 90% Span (selectable)	<23ms (without filter), <51ms (with filter)
CMRR	>160dB
Isolation	1500Vrms (1 minute), 3-way
Dip-switch Configuration	Sets Input and Output Ranges, Filter and Faults
Status Indicators (LED)	Internal Fault, Configuration Error, Connection Fault
Output (selectable)	
Current	0-20mA, 4-20mA, 20mA-0 or 20-4mA Load Resistance: 500Ω (max)
Current Output Maximum	25mA
Fault Output	102.5% or 105% of Full-scale Value in Case of Over-range
Voltage	0-5VDC, 1-5VDC, 0-10VDC or 2-10VDC Load Resistance: 2kΩ (min)
Voltage Output Maximum	12.5VDC
Power Supply	19.2-30VDC
Power Consumption	<600mW (22mA at 24VDC)
Hot Swapping	Yes
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal Housing for Mounting on 35mm DIN 46277
Connections	Spring-cage Clamp
Weight	1.6 ounces (46g)
Environmental	
Operating Temp. Range	–20°C to +65°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 90%, Noncondensing
IP Protection	IP20
Emissions	EN61000-6-4
Immunity	EN61000-6-2

Ordering Information

Model	Description
DSCP65	DC Low Voltage Converter

Accessories

Model	Description
DSCX-02	DIN-rail Expandable Power-bus Connector
DSCP70	Power Supply Connection Module

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

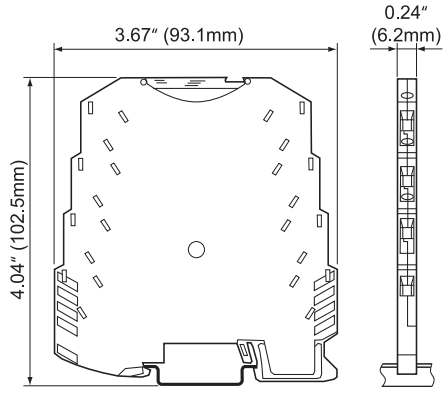
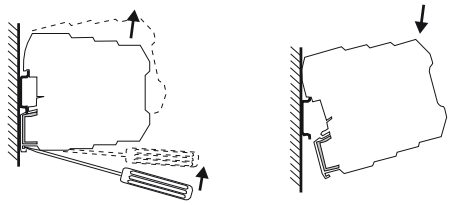
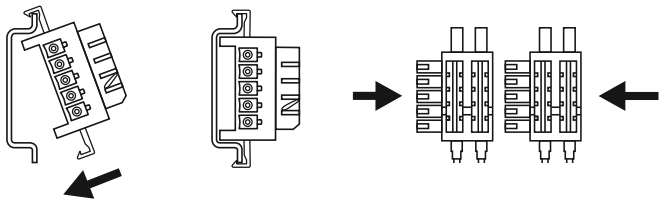


Figure 1: Dimensional Drawing

Inserting/Extracting Module on DIN Guide



Expandable Power-bus Connector



Spring-cage Clamp Connection

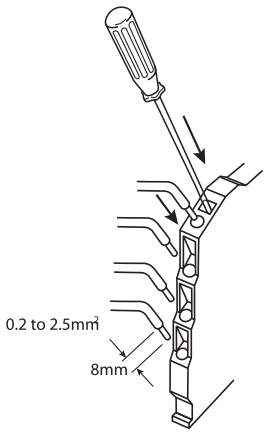


Figure 2: Module Installation

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DSCP70

Power Supply Connection Module for DIN-rail Power Bus

DESCRIPTION

The DSCP70 power supply connection module permits the delivery of power to DSCP6x modules through DIN-rail-mounted power-bus connectors. An external power supply, or supplies for redundant operation, are connected to the terminals of the DSCP70. The DSCP70 then routes the power to the DIN-rail power-bus, provides protection against power supply reversal, provides LED status indication of correct power, inverted power connection and presence of AC, and provides over-voltage protection.



FEATURES

- Delivers Power to DSCP6x Modules via DIN-rail
- Two Independent Inputs Allow Redundant Power
- LED Indication of Power Supply Presence
- LED Indication of Reversed Power Connection
- 19.2-30VDC Power
- Spring-cage Clamp Connection
- Compact 6.2mm DIN Housing
- CE Compliant

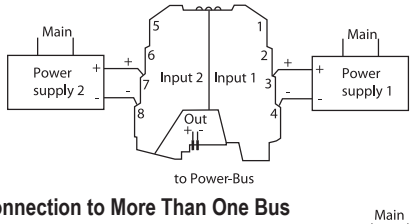
BENEFITS

- Protection Against Power Reversals
- DIN-rail Flexibility

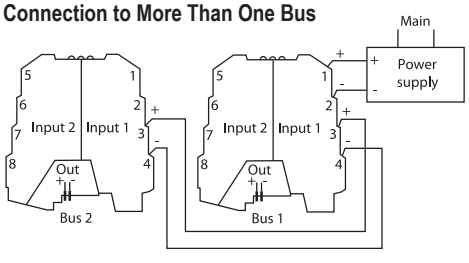
APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems

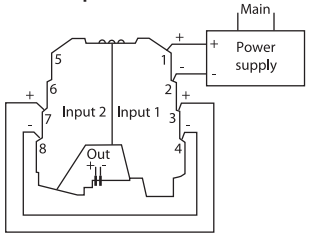
Example of Connection with Redundant Power Supply



Example of Connection to More Than One Bus



Example of Connection with Inputs Connected in Parallel: 2A Output



DSCP70 Electrical Connections

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Power

Module	DSCP70
Input Voltage Current Capacity Protection	 19.2-30VDC 4A Maximum per Terminal Each Positive Input Must Have an External Fuse
Output Internal Voltage Drop Current Capacity Filter Power Consumption	 300mV One Input = 1.6A Parallel Inputs 1 and 2 = 2A Differential Mode: 4.7mH and two 470nF per Input 5mA per Input (max)
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal Housing for Mounting on 35mm DIN 46277
Connections	Spring-cage Clamp
Weight	1.6 ounces (46g)
Environmental Operating Temp. Range Storage Temp. Range Relative Humidity IP Protection Emissions Immunity	 –20°C to +65°C –40°C to +85°C 0 to 90%, Noncondensing IP20 EN61000-6-4 EN61000-6-2

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

Ordering Information

Model	Description
DSCP70	Power Supply Connection Module

Accessories

Model	Description
DSCX-02	DIN-rail Expandable Power-bus Connector

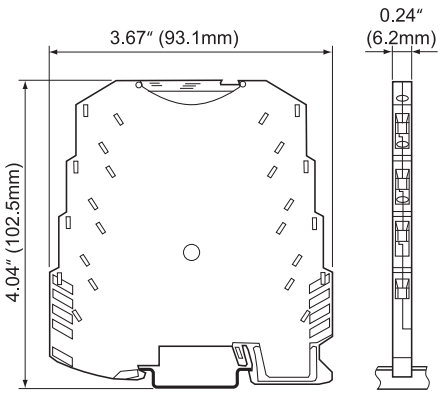
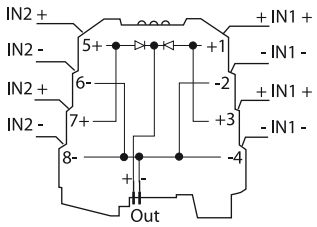
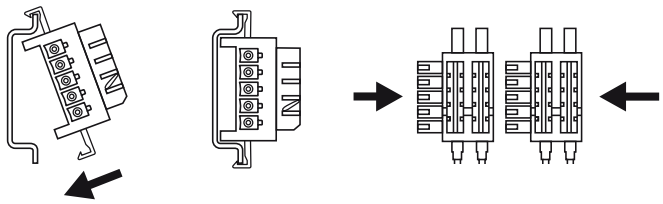


Figure 1: Dimensional Drawing

Internal Wiring



Expandable Power-bus Connector



Spring-cage Clamp Connection

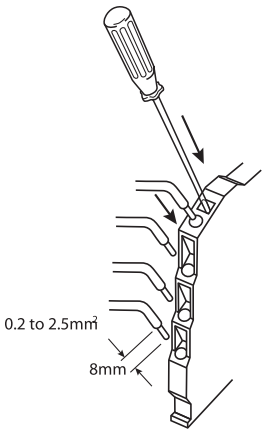


Figure 2: Module Installation

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DSCP81

Configurable Voltage/Current Input Signal Conditioners, DIN-mount

DESCRIPTION

The isolated DSCP81 signal conditioner is designed for measuring voltages up to ±1000VDC and currents up to ±100mA. The input type, measurement range, and other features are software configurable. A PC with RS-232C serial port, the DSCX-787 and DSCX-587 interface cables, and the DSCX-557 configuration software are required to program the DSCP81.

The DSCP81 can interface to either a current or voltage input and provide a current or voltage output (Figure 1). The input filter characteristics, input and output ranges, input signal linearization, signal inversion, and optional alarm relay output are all software configurable by the user. The input signal may be linearized using up to 50 points of interpolation. Optionally, the user may specify all configurable parameters.

Two models are available offering wide-range power supply connection: 24 to 60VDC/AC, and 85 to 230VDC/AC. The DSCX-557 configuration software allows query, print-out and saving of configuration settings, display of input measurement value, and display of interpolation table points.

FEATURES

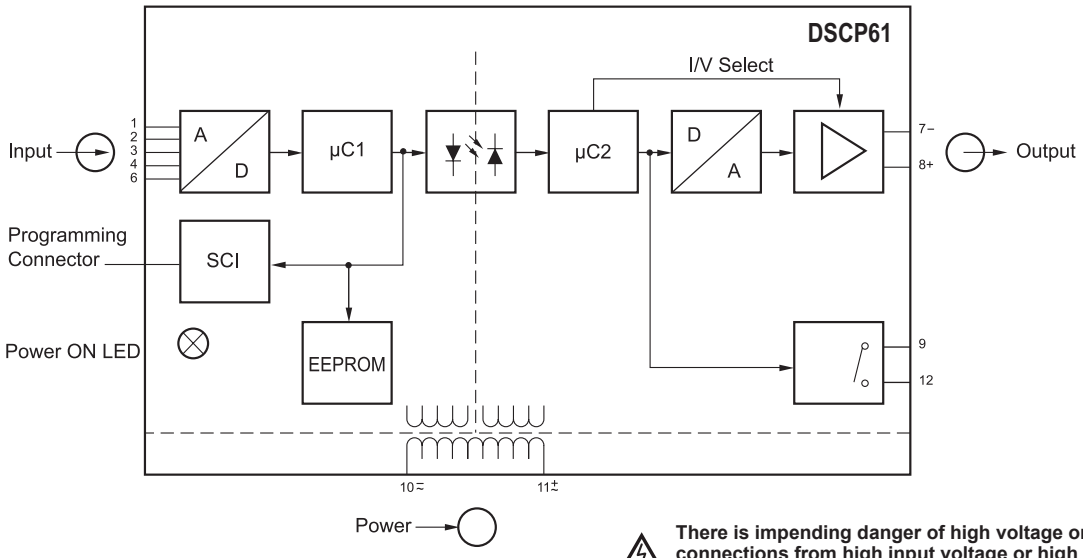
- Interfaces to Voltages up to ±1000VDC and Currents up to ±100mA
- Software Configurable Input Type and Range
- Software Configurable Filter
- 3700Vrms Transformer Isolation
- Supply Voltage of 24-60VDC/AC or 85-230VDC/AC
- Alarm Relay Output
- Mounts on Standard DIN-rail
- –25ºC to +55ºC Operating Temperature
- CE Compliant

BENEFITS

- Provides Isolation Between Inputs and Outputs
- Reduces Noise
- Prevents Ground Loops
- High Degree of Accuracy

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems



DSCP81 Block Diagram

There is impending danger of high voltage on any DSCP81 connections from high input voltage or high power supply voltage.

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Specifications Typical* at T_A = +25°C and 24VDC or 230VAC ±10% Supply Voltage

Module	DSCP81
Input Range, Voltage	–1000VDC to +1000VDC (max) Configurable
Input Resistance	1MΩ (V_{IN}≤±1.7V), 540kΩ (V_{IN}>±1.7V to ≤±100V), 5.5MΩ (V_{IN}>±100V to ±1000V)
Input Range, Current	–100mA to +100mA (max) Configurable
Input Resistance	1kΩ (I_{IN} = –1.5mA to +1.5mA), 15.4Ω (I_{IN} = –100mA to +100mA)
Output Range, Voltage	–10V to +10V (max) Configurable
V Limit Under Overload	Approx. ±11V
Short Circuit Current	≤60mA
External Resistance	R_{EXT} (min) (kΩ)≥V_{EV}/10mA Note: V_{EV} = Output Voltage End Value
Output Range, Current	–20mA to +20mA (max) Configurable
Output Load Voltage	12V
Current Limit Under Overload	Approx. ±22mA
Open-Circuit Voltage	<16V
External Resistance	R_{EXT} (max) (kΩ) = 12V/I_{ev} Note: I_{EV} = Output Current End Value
Output Ripple (Voltage or Current)	<0.5% p-p
CMV, Input to Output & Relay	3700Vrms, 1 minute
CMV, Power Supply to Input & Output	3700Vrms, 1 minute
CMV, Power Supply to Relay	2300Vrms, 1 minute
CMV, Output to Relay	2300Vrms, 1 minute
Mains Ripple Suppression	Configurable to 50 or 60Hz
Input Filter	Configurable, see Table 1
Accuracy(1)	±0.1% Span (typ), ±0.2% Span (max)
Output Stability	100ppm/°C
Linearization	Configurable; Linear, Custom, $x^{1/2}$, $x^{3/2}$, $x^{5/2}$
Alarm Relay	SPST Isolated Contact
Material	Gold Flashed Silver Alloy
Contact Rating	AC: ≤2A at 250V (500VA), DC:≤2A at 125V (60W)
Mode of Action	Configurable; Alarm and Power Loss (see Table 2 Feature 6)
Trip Point Type	Configurable; Inactive, Low, High (see Table 2 Feature 7)
Trip Point Setting	Configurable, –10 to 110% Input Span (see Table 2 Feature 7)
Trip Point Hysteresis	Configurable, 0 to 100% Input Span (see Table 2 Feature 7)
Energize/De-energize Delay	Configurable, 0.01 to 1000s (see Table 2 Feature 8)
Visible Alarm	Front Panel Green LED flashes "ON"
Power Supply	
Voltage	24-60VDC/AC or 85-230VDC/AC; 45 to 400Hz AC
Tolerance	DC –15% to +33%, AC ±15%
Power Consumption	DC ≤1.2W, AC ≤2.5VA
Mechanical Dimensions (h)(w)(d)	2.72" x 0.69" x 4.49" (69.2mm x 17.5mm x 114mm)
Housing Material	Lexan 940, Flammability Class V-0 According to UL 94
Mounting	DIN EN 50022 -35x7.5 or -35x15
Environmental	
Operating Temperature Range	–25°C to +55°C
Storage Temperature Range	–40°C to +70°C
Relative Humidity	0 to 75% Noncondensing
Emissions	EN50081-2 (Radiated, Conducted)
Immunity	EN50082-2 (ESD, RF, EFT)

Table 1: Configurable Input Filter Settings

Response Time (63%) [s] 50Hz	Response Time (63%) [s] 60Hz	Response Time(4) (99%) [s] 50Hz	Response Time(4) (99%) [s] 60Hz
0.04	0.03	0.08	0.07
0.06	0.05	0.17	0.14
0.10	0.08	0.36	0.30
0.18	0.15	0.72	0.60
0.34	0.28	1.5	1.2
0.66	0.55	3.0	2.5
1.3	1.1	6.0	5.0
2.6	2.2	12	10
5.1	4.3	24	20
10.3	8.6	48	40
20.5	17	94	80
41	34	190	160
82	68	380	315
160	140	750	630
330	270	1500	1260

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity and repeatability errors at reference conditions.
(2) Shipped as 4-20mA input, 4-20mA output, linearization = linear, input filter = 80ms, ripple suppression = 60Hz, alarm function = inactive.
(3) Downloadable from website.
(4) Configuration software allows selection of the (99%) values.

Ordering Information

Model	Input Range/Description	Output Range
DSCP81-01 (Standard Configuration(2))	User Configurable V or I Input, 24 to 60VDC/AC Power	User Configurable V or I Output
DSCP81-02 (Standard Configuration(2))	User Configurable V or I Input, 85 to 230VDC/AC Power	User Configurable V or I Output

Accessories

Model	Description
DSCX-787	PC-interface Cable
DSCX-587	Module-interface Cable
DSCX-557(3)	Configuration Software

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Figure 1: Switching Function by Trip Point Type

Alarm Relay Features[1]	
Trip Point Type	Configurable as Low or High or Inactive
Trip Point Adjustment	Configurable Between –10 and 110%[2]
Hysteresis	Configurable Between >0 and 100%[2]
Energize/De-energize Delays	Configurable Between 0 and 1000s
Relay Contact Position	Configurable
Front Panel Display	Green Led "On" Flashes When the Limit Value is Exceeded

NOTES:
(1) Refer to Table 2 for connections
(2) In relation to the analog input span

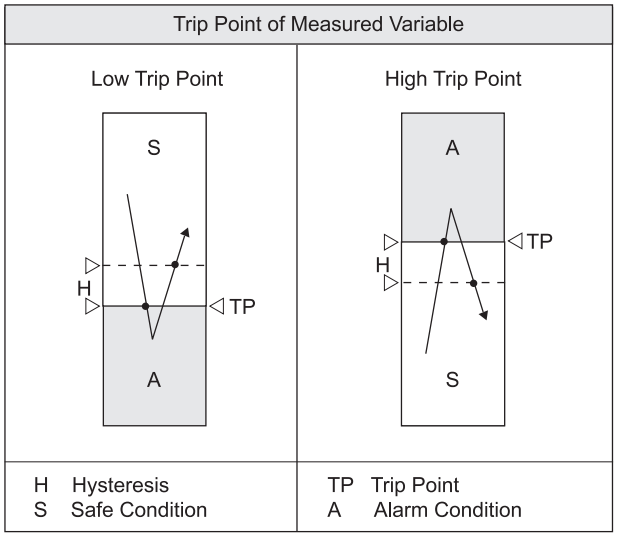


Table 2: Input Range and Associated Connection Diagram

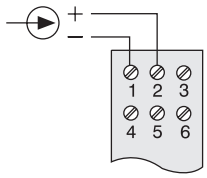
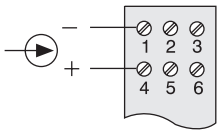
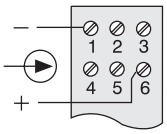
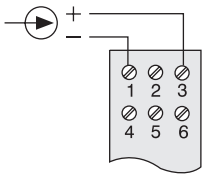
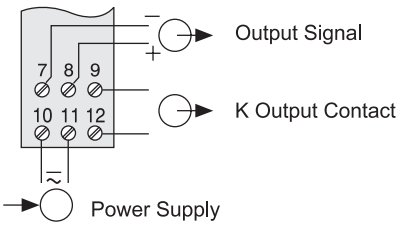
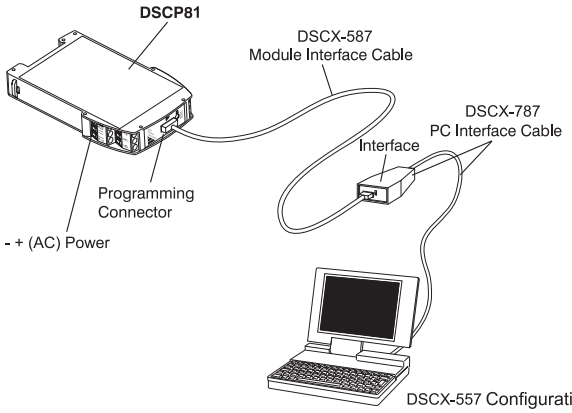
Measuring Mode/Application	DC Voltage			DC Current
Measuring Range Limits	≤ ± 1.7V	> ± 1.7 to ≤ ± 100V	> ± 100 to ± 1000V	≤ ± 100 mA
= Input Signal				
= Output Signal K = Output Contact = Power Supply				

Figure 2: Configuring the DSCP81



A PC, DSCX-787 PC interface cable, DSCX-587 module interface cable, and DSCX-557 configuration software are required to program the DSCP81. Power must be connected to the DSCP81 for configuration. The DSCX-557 configuration software is downloadable from the website.

IMPORTANT!

1. DO NOT connect the DSCX-587 module interface cable to the DSCP81 programming connector when >253V is applied to the DSCP81 input.

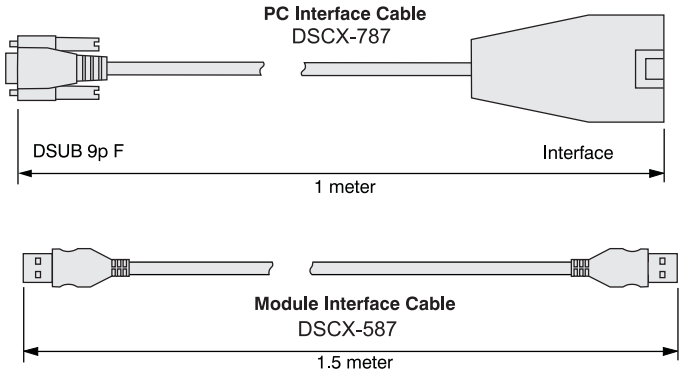
2. The DSCX-587 module interface cable must first be connected to the DSCX-787 cable before it is connected to the DSCP81.

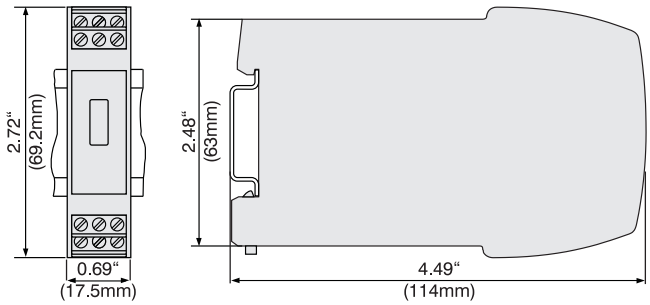
3. The programming connector on the DSCP81 is DC connected to the DSCP81 input circuit. **DO NOT** touch any metal parts of the plug or socket if an input voltage >24V is connected to the DSCP81.

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Figure 3: Product Dimensions





DSCP81 Clipped onto a Top-Hat Rail (35 x 15mm or 35 x 17mm, acc. to EN 50022).

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DSCT

Isolated DIN-rail Mount 2-wire Transmitters



Instrument Class® Performance

"Best In Class" accuracy, linearity, stability, and noise specifications. Outstanding protection and isolation performance for input, output and power connections. Capable of operating on the widest of loop supply power and over the broadest operating temperature range!

DESCRIPTION

Dataforth's DSCT series of loop-powered 2-wire transmitters consists of seven family groups with a total of 48 transmitter models that interface to a wide variety of voltage, current, temperature and position measuring devices. As one of Dataforth's *Instrument Class* products, the DSCT family provides superior specifications such as ±0.03% accuracy, 5-pole filtering, 1500Vrms continuous isolation, low output noise, and much more.

The DSCT 2-wire transmitter conditions and sends 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 DSCT accepts a wide range of inputs, including millivolt, volt, milliamp, thermocouple, RTD, potentiometer, and slide wire. It operates on power from a 2-wire signal loop and modulates the supply current to represent the input signal within a 4-20mA range.

Two-wire transmission loops are a very economical method for connecting sensors to distant control rooms. Since the DSCT operates from the signal loop current, no additional expensive power and wiring are required. Only low-cost, twisted-pair wiring is needed.

FEATURES

- ±0.03% Accuracy (typ)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation and 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- Wide Loop Supply Voltage, 10.8V to 60V
- 5-pole Low-pass Filtering
- Up to 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Protected Against Reverse Connection of Loop Voltage
- –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

BENEFITS

- Easy to Use
- Low-cost Solution
- Does Not Require External Power
- High Reliability in Hazardous Area
- Simple Field Wiring

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems

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DSCT Selection Guide

ANALOG VOLTAGE INPUT TRANSMITTERS

MODEL	INPUT RANGE	MODEL	INPUT RANGE
DSCT30-01	±10mV	DSCT31-01	±1V
DSCT30-02	±50mV	DSCT31-02	±5V
DSCT30-03	±100mV	DSCT31-03	±10V
DSCT30-04	0 - 10mV	DSCT31-04	0 - 1V
DSCT30-05	0 - 50mV	DSCT31-05	0 - 5V
DSCT30-06	0 - 100mV	DSCT31-06	0 - 10V
		DSCT31-07	±20V
		DSCT31-08	0 - 20V

ANALOG CURRENT INPUT TRANSMITTERS

MODEL	INPUT RANGE
DSCT32-01	4-20mA
DSCT32-02	0-20mA

LINEARIZED 2- OR 3-WIRE RTD-INPUT TRANSMITTERS

MODEL	TYPE**	INPUT RANGE
DSCT34-01	100ΩPt	–100°C to +100°C (–148°F to +212°F)
DSCT34-02	100ΩPt	0°C to +100°C (+32°F to +212°F)
DSCT34-03	100ΩPt	0°C to +200°C (+32°F to +392°F)
DSCT34-04	100ΩPt	0°C to +600°C (+32°F to +1112°F)
DSCT34-05	100ΩPt	0°C to +400°C (+32°F to +752°F)
DSCT34N-01	120ΩNi	0°C to +300°C (+32°F to +572°F)

POTENTIOMETER-INPUT TRANSMITTERS

MODEL	INPUT RANGE
DSCT36-01	0 to 100Ω
DSCT36-02	0 to 500Ω
DSCT36-03	0 to 1kΩ
DSCT36-04	0 to 10kΩ

THERMOCOUPLE-INPUT TRANSMITTERS

MODEL	TYPE‡	INPUT RANGE
DSCT37J-01	J	–100°C to +760°C (–148°F to +1400°F)
DSCT37K-02	K	–100°C to +1350°C (–148°F to +2462°F)
DSCT37T-03	T	–100°C to +400°C (–148°F to +752°F)
DSCT37E-04	E	0°C to +900°C (+32°F to +1652°F)
DSCT37R-05	R	0°C to +1750°C (+32°F to +3182°F)
DSCT37S-06	S	0°C to +1750°C (+32°F to +3182°F)
DSCT37B-07	B	0°C to +1800°C (+32°F to +3272°F)
DSCT37N-08	N	–100°C to +1300°C (–148°F to +2372°F)

LINEARIZED THERMOCOUPLE-INPUT TRANSMITTERS

MODEL	TYPE‡	INPUT RANGE
DSCT47J-01	J	0°C to +760°C (+32°F to +1400°F)
DSCT47J-02	J	–100°C to +300°C (–148°F to +572°F)
DSCT47J-03	J	0°C to +500°C (+32°F to +932°F)
DSCT47K-04	K	0°C to +1000°C (+32°F to +1832°F)
DSCT47K-05	K	0°C to +500°C (+32°F to +932°F)
DSCT47K-13	K	–100°C to +1350°C (–148°F to +2462°F)
DSCT47K-14	K	0°C to +1200°C (+32°F to +2192°F)
DSCT47T-06	T	–100°C to +400°C (–148°F to +752°F)
DSCT47T-07	T	0°C to +200°C (+32°F to +392°F)
DSCT47E-08	E	0°C to +1000°C (+32°F to +1832°F)
DSCT47R-09	R	+500°C to +1750°C (+932°F to +3182°F)
DSCT47S-10	S	+500°C to +1750°C (+932°F to +3182°F)
DSCT47B-11	B	+500°C to +1800°C (+932°F to +3272°F)
DSCT47N-15	N	–100°C to +1300°C (–148°F to +2372°F)

ACCESSORIES

MODEL	DESCRIPTION
SCMXRAIL1-XX	DIN EN50022-35x7.5 (Slotted Steel), Length -XX Meters
SCMXRAIL3-XX	DIN EN50022-35x15 (Slotted Steel), Length -XX Meters

POWER SUPPLIES

PWR-PS5R7W	Power Supply, 24V, 0.3A, 100-240VAC Input
PWR-PS5R15W	Power Supply, 24V, 0.65A, 100-240VAC Input

‡THERMOCOUPLE ALLOY COMBINATIONS

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

**RTD STANDARDS

Type	Alpha Coefficient	DIN	JIS
100Ω Pt 120Ω Ni	0.00385 0.00672	DIN 43760	JIS C 1604-1989

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DSCT30/31

Analog Voltage-input Transmitters

DESCRIPTION

Each DSCT30 and DSCT31 voltage-input transmitter provides a single channel of analog input which is filtered, isolated, amplified, and converted to a process current output (Figure below). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Special input and output circuits on the DSCT30 and DSCT31 transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±10% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

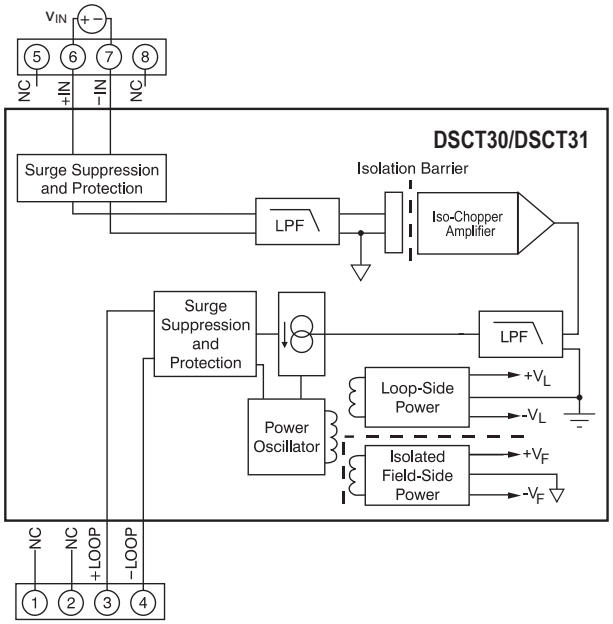
- Accepts Millivolt and Voltage Level Signals
- Process Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input and Output Protected to 240VAC Continuous
- Up to 60V Loop Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- CSA C/US Certified
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- High-density Signals Provide Improved Accuracy
- Protects Against Accidental Connection of Power Line Voltages
- Screw Terminal Provide Secure Connections
- More Accurate Representation of Change in Physical Phenomena

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems



DSCT30/31 Block Diagram - For Module Dimensions and Pinouts, See Page 7-47

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Voltage

Module	DSCT30	DSCT31
Input Range	±10mV to ±100mV	±1V to ±20V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	2MΩ
Power Off	66kΩ	2MΩ
Overload	66kΩ	2MΩ
Input Protection		
Continuous	240Vrms (max)	240Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output		
Continuous	1500Vrms (max)	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	160dB	160dB
NMR	85dB at 60Hz, 80dB at 50Hz	85dB at 60Hz, 80dB at 50Hz
Adjustability	±10% Zero and Span	±10% Zero and Span
Accuracy(1)	±0.03%	±0.03%
Conformity	±0.01%	±0.01%
Stability		
Offset	±20ppm/°C	±20ppm/°C
Gain	±80ppm/°C	±80ppm/°C
Noise		
Output, 100kHz	3µArms	3µArms
Bandwidth, –3dB	3Hz	3Hz
Response Time, 90% Span	165ms	165ms
Output Range	4-20mA	4-20mA
Output Limits		
Under-range	2.8mA	2.8mA
Over-range	29mA	29mA
Output Protection		
Reverse Polarity	Continuous	Continuous
Over-voltage	240Vrms Continuous	240Vrms Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Loop Supply Voltage	10.8V to 60V	10.8V to 60V
Loop Supply Sensitivity	±0.0005%/V	±0.0005%/V
Turn-on Delay	400ms	400ms
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 Rail	DIN EN 50022 -35x7.5 or -35x15 Rail
Environmental		
Operating Temperature	–40°C to +80°C	–40°C to +80°C
Storage Temperature	–40°C to +80°C	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range
DSCT30-01	–10mV to +10mV
DSCT30-02	–50mV to +50mV
DSCT30-03	–100mV to +100mV
DSCT30-04	0mV to +10mV
DSCT30-05	0mV to +50mV
DSCT30-06	0mV to +100mV
DSCT31-01	–1V to +1V
DSCT31-02	–5V to +5V
DSCT31-03	–10V to +10V
DSCT31-04	0V to +1V
DSCT31-05	0V to +5V
DSCT31-06	0V to +10V
DSCT31-07	–20V to +20V
DSCT31-08	0V to +20V

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DSCT32

Analog Current-input Transmitters

DESCRIPTION

Each DSCT32 current-input transmitter provides a single channel of analog input which is filtered, isolated, amplified, and converted to a process current output (Figure below). Signal filtering is accomplished with a five-pole filter, which provides 80dB per decade of normal-mode rejection above 100Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Special input and output circuits on the DSCT32 transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±10% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

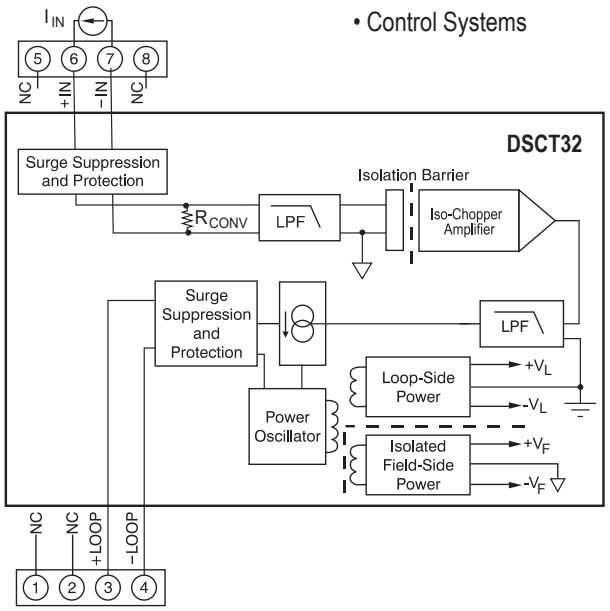
- Accepts Milliamp Level Signals
- Process Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input and Output Protected to 240VAC Continuous
- Up to 60V Loop Voltage
- 105dB CMR
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- CSA C/US Certified
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Simple-to-Use and Configure
- Uses Less Wiring and Fewer Connectors
- Best Choice for Long-Distance Transmission
- No Calibration Needed
- Zero and Span Settings Adjustable
- Protects Against Accidental Connection of Power Line Voltages
- Screw Terminal Provide Secure Connections

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems



DSCT32 Block Diagram - For Module Dimensions and Pinouts, See Page 7-47

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Specifications Typical* at T_A = +25°C and +24VDC Loop Voltage

Module	DSCT32
Input Range	0-20mA or 4-20mA
Current Conversion Resistor	50.00Ω
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	105dB
NMR (–3dB at 100Hz)	80dB/decade Above 100Hz
Adjustability	±10% Zero and Span
Accuracy(1)	±0.03%
Conformity	±0.01%
Stability	
Offset	±30ppm/°C
Gain	±90ppm/°C
Noise	
Output, 100kHz	3µArms
Bandwidth, –3dB	100Hz
Response Time, 90% Span	5ms
Output Range	4-20mA
Output Limits	
Under-range	2.8mA
Over-range	29mA
Output Protection	
Reverse Polarity	Continuous
Over-voltage	240Vrms Continuous
Transient	ANSI/IEEE C37.90.1
Loop Supply Voltage	10.8V to 60V
Loop Supply Sensitivity	±0.0005%/V
Turn-on Delay	400ms
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature	–40°C to +80°C
Storage Temperature	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range
DSCT32-01	4-20mA
DSCT32-02	0-20mA

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DSCT34

Linearized 2- or 3-wire RTD-input Transmitters

DESCRIPTION

Each DSCT34 RTD-input transmitter provides a single channel of RTD-input which is filtered, isolated, amplified, linearized, and converted to a process current output (Figure below). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

RTD excitation is provided from the transmitter using a precision current source. The excitation currents are very small (0.26mA max for 100Ω Pt and 120Ω Ni) which minimizes self-heating of the RTD. Linearization is achieved by creating a non-linear transfer function through the module itself. This non-linear transfer function is configured at the factory and is designed to be equal and opposite to the specific RTD non-linearity. Lead compensation is achieved by matching two current paths thus canceling the effects of lead resistance.

The specifications listed are for a 3-wire connection. A 2-wire connection of the RTD to the module is also possible and is achieved by adding a jumper between pin 5 (+EXC) and pin 6 (+IN) on the terminal block and connecting the RTD leads between pin 6 (+IN) and pin 7 (–IN). The 2-wire connection nullifies the lead resistance compensation feature of the module.

Special input and output circuits on the DSCT34 transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±3% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

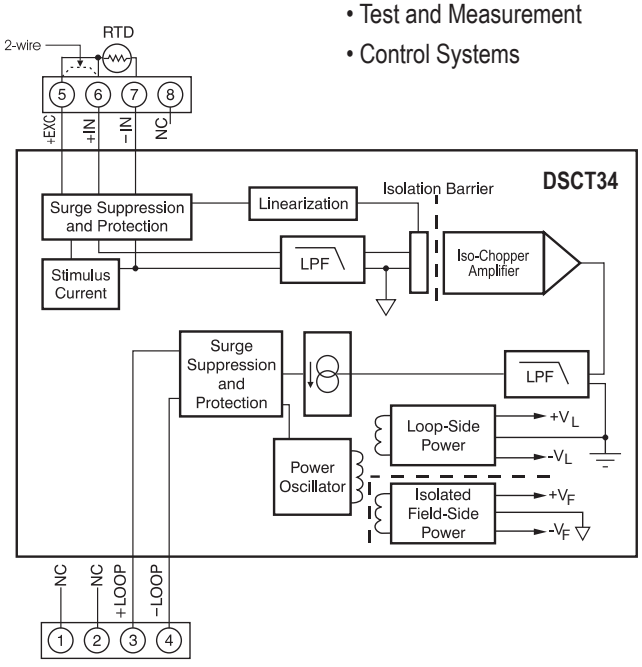
- Interfaces to 100Ω Platinum or 120Ω Nickel RTDs
- Linearizes RTD Signal
- Process Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input and Output Protected to 240VAC Continuous
- Up to 60V Loop Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.1% Accuracy
- ±0.025% Conformity
- Easily Mounts on Standard DIN-rail
- CSA C/US Certified
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Accurate
- Stable Outputs
- High Repeatability

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems



DSCT34 Block Diagram - For Module Dimensions and Pinouts, See Page 7-47

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Voltage

Module	DSCT34
Input Range	–200°C to +850°C (100Ω Pt) –80°C to +320°C (120Ω Ni)
Input Resistance	
Normal	50MΩ
Power Off	66kΩ
Overload	66kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	160dB
NMR	85dB at 60Hz, 80dB at 50Hz
Adjustability	±3% Zero and Span
Accuracy	See Ordering Information
Conformity	±0.025%
Stability	
Offset	±50ppm/°C
Gain	±100ppm/°C
Sensor Excitation Current	0.260mA
Lead Resistance Effect	±0.02°C/Ω
Noise	
Output, 100kHz	3µArms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	165ms
Output Range	4-20mA
Output Limits	
Under-range	3mA
Over-range	29mA
Output Protection	
Reverse Polarity	Continuous
Over-voltage	240Vrms Continuous
Transient	ANSI/IEEE C37.90.1
Loop Supply Voltage	10.8V to 60V
Loop Supply Sensitivity	±0.0005%/V
Turn-on Delay	400ms
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature	–40°C to +80°C
Storage Temperature	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis, and repeatability.

Ordering Information

Model	Input Range	Accuracy(1)	
100Ω Pt **			
DSCT34-01	–100°C to +100°C (–148°F to +212°F)	±0.1%	±0.2°C
DSCT34-02	0°C to +100°C (+32°F to +212°F)	±0.1%	±0.1°C
DSCT34-03	0°C to +200°C (+32°F to +392°F)	±0.1%	±0.2°C
DSCT34-04	0°C to +600°C (+32°F to +1112°F)	±0.1%	±0.6°C
DSCT34-05	0°C to +400°C (+32°F to +752°F)	±0.1%	±0.4°C
120Ω Ni **			
DSCT34N-01	0°C to +300°C (+32°F to +572°F)	±0.1%	±0.3°C

**RTD Standards

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

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DSCT36

Potentiometer-input Transmitters

DESCRIPTION

Each DSCT36 potentiometer-input transmitter provides a single channel of potentiometer-input which is filtered, isolated, amplified, and converted to a process current output (Figure below). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Potentiometer excitation is provided from the transmitter using a precision current source. The excitation current is small (less than 0.26mA) which minimizes self-heating of the potentiometer. Lead compensation is achieved by matching two current paths which cancels the effects of lead resistance.

Special input and output circuits on the DSCT36 transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Signal and loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration; however, zero and span settings are adjustable up to ±10% to accommodate situations where fine-tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

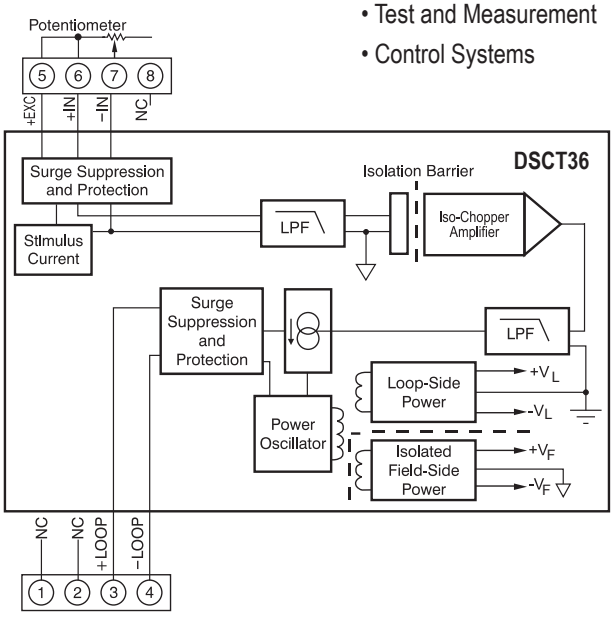
- Interfaces to Potentiometers up to 10kΩ
- Process Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input and Output Protected to 240VAC Continuous
- Up to 60V Loop Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- CSA C/US Certified
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Easily Integrated into a Variety of Applications
- Provide Continuous Analog Control
- Allows for Precise Adjustments

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems



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DSCT36 Block Diagram - For Module Dimensions and Pinouts, See Page 7-47

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Voltage

Module	DSCT36
Input Range	0Ω to 10kΩ
Input Resistance	
Normal	50MΩ
Power Off	66kΩ
Overload	66kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	160dB
NMR	85dB at 60Hz, 80dB at 50Hz
Adjustability	±10% Zero and Span
Accuracy(1)	±0.03%
Conformity	±0.01%
Stability	
Offset	±50ppm/°C
Gain	±100ppm/°C
Sensor Excitation Current	0.26mA; 100Ω, 500Ω Sensor 0.13mA; 1kΩ Sensor 0.065mA; 10kΩ Sensor
Lead Resistance Effect	±0.01Ω/Ω; 100Ω, 500Ω, 1kΩ Sensor ±0.02Ω/Ω; 10kΩ Sensor
Noise	
Output, 100kHz	3µArms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	165ms
Output Range	4-20mA
Output Limits	
Under-range	3mA
Over-range	29mA
Output Protection	
Reverse Polarity	Continuous
Over-voltage	240Vrms Continuous
Transient	ANSI/IEEE C37.90.1
Loop Supply Voltage	10.8V to 60V
Loop Supply Sensitivity	±0.0005%/V
Turn-on Delay	400ms
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental	
Operating Temperature	–40°C to +80°C
Storage Temperature	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis, and repeatability.

Ordering Information

Model	Input Range
DSCT36-01	0 to 100Ω
DSCT36-02	0 to 500Ω
DSCT36-03	0 to 1kΩ
DSCT36-04	0 to 10kΩ

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DSCT37

Non-linearized Thermocouple-input Transmitters

DESCRIPTION

Each DSCT37 non-linearized thermocouple-input transmitter provides a single channel of Thermocouple-input which is filtered, isolated, amplified, and converted to a process current output (Figure below). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

The DSCT37 can interface to eight industry-standard thermocouple types: J, K, T, E, R, S, B and N. Each transmitter is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the transmitter. Upscale open thermocouple detection is provided by circuitry. Downscale indication can be implemented by installing a 47MΩ, ±20% resistor between screw terminals 6 (+IN) and 8 (–EXC) on the input terminal block.

Special input and output circuits on the DSCT37 transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration. Transmitter zero and span settings are adjustable up to ±10%. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

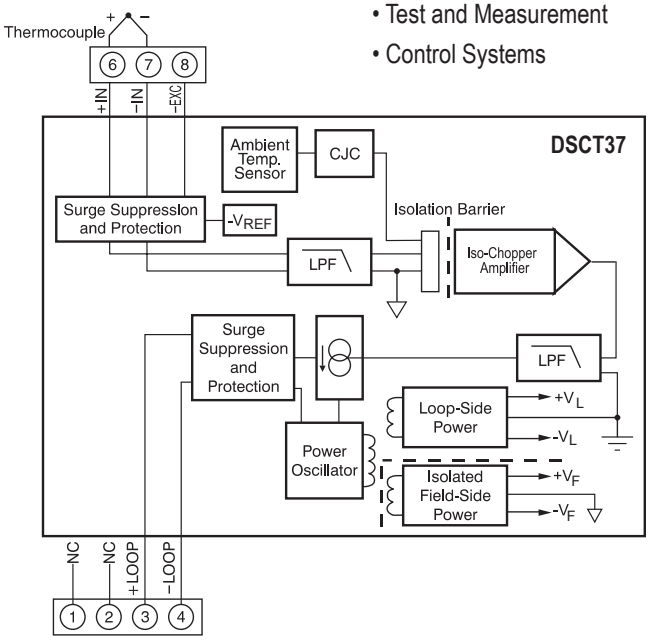
- Interfaces to Types J, K, T, E, R, S, B, and N Thermocouples
- Process Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input and Output Protected to 240VAC Continuous
- Up to 60V Loop Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.05% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN-rail
- CSA C/US Certified
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Enables Advanced Diagnostics
- Greater Noise Resistance Over Long Distances
- Output Signals Can Be Utilized by Many Standard Devices

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems



DSCT37 Block Diagram - For Module Dimensions and Pinouts, See Page 7-47

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Voltage

Module	DSCT37
Input Range	Standard Thermocouple Temperature Limits as per Nist Monograph 175, ITS-90
Input Bias Current	–25nA
Input Resistance	
Normal	50MΩ
Power Off	66kΩ
Overload	66kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	160dB
NMR	85dB at 60Hz, 80dB at 50Hz
Adjustability	±10% Zero and Span
Accuracy	See Ordering Information
Stability	
Offset	±40ppm/°C
Gain	±60ppm/°C
Cold Junction Compensation	
Accuracy, +25°C	±0.25°C
Accuracy, 0°C to +50°C	±0.50°C
Accuracy, –40°C to +80°C	±1.25°C
Open Input Response	Upscale
Open Input Detection Time	<5s
Noise	
Output, 100kHz	3µArms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	165ms
Output Range	4-20mA
Output Limits	
Under-range	2.8mA
Over-range	29mA
Output Protection	
Reverse Polarity	Continuous
Over-voltage	240Vrms Continuous
Transient	ANSI/IEEE C37.90.1
Loop Supply Voltage	10.8V to 60V
Loop Supply Sensitivity	±0.0005%/V
Turn-on Delay	400ms
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 Rail
Environmental	
Operating Temperature	–40°C to +80°C
Storage Temperature	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis, repeatability, and CJC error.

Ordering Information

Model	TC Type‡	Input Range	Accuracy(1)	
DSCT37J-01	J	–100°C to +760°C (–148°F to +1400°F)	±0.05%	±0.43°C
DSCT37K-02	K	–100°C to +1350°C (–148°F to +2462°F)	±0.05%	±0.73°C
DSCT37T-03	T	–100°C to +400°C (–148°F to +752°F)	±0.05%	±0.25°C
DSCT37E-04	E	0°C to +900°C (+32°F to +1652°F)	±0.05%	±0.45°C
DSCT37R-05	R	0°C to +1750°C (+32°F to +3182°F)	±0.05%	±0.88°C
DSCT37S-06	S	0°C to +1750°C (+32°F to +3182°F)	±0.05%	±0.88°C
DSCT37B-07	B	0°C to +1800°C (+32°F to +3272°F)	±0.05%	±0.90°C
DSCT37N-08	N	–100°C to +1300°C (–148°F to +2372°F)	±0.05%	±0.70°C

‡Thermocouple Alloy Combinations

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

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

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DSCT47

Linearized Thermocouple-input Transmitters

DESCRIPTION

Each DSCT47 thermocouple-input transmitter provides a single channel of Thermocouple-input which is filtered, isolated, amplified, linearized, and converted to a process current output (Figure below). Signal filtering is accomplished with a five-pole filter, which provides 85dB of normal-mode rejection at 60Hz and 80dB at 50Hz. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four are on the process loop side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges.

Linearization is achieved by creating a non-linear transfer function through the module itself. This non-linear transfer function is configured at the factory and is designed to be equal and opposite to the thermocouple non-linearity.

The DSCT47 can interface to eight industry-standard thermocouple types: J, K, T, E, R, S, B and N. Each transmitter is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the transmitter. Upscale open thermocouple detection is provided by circuitry. Downscale indication can be implemented by installing a 47MΩ, ±20% resistor between screw terminals 6 (+IN) and 8 (–EXC) on the input terminal block.

Special input and output circuits on the DSCT47 transmitters provide protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Loop power lines are secured to the module using screw terminals, which are in pluggable terminal blocks for ease of system assembly and reconfiguration. Transmitter zero and span settings are adjustable up to ±3%. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

FEATURES

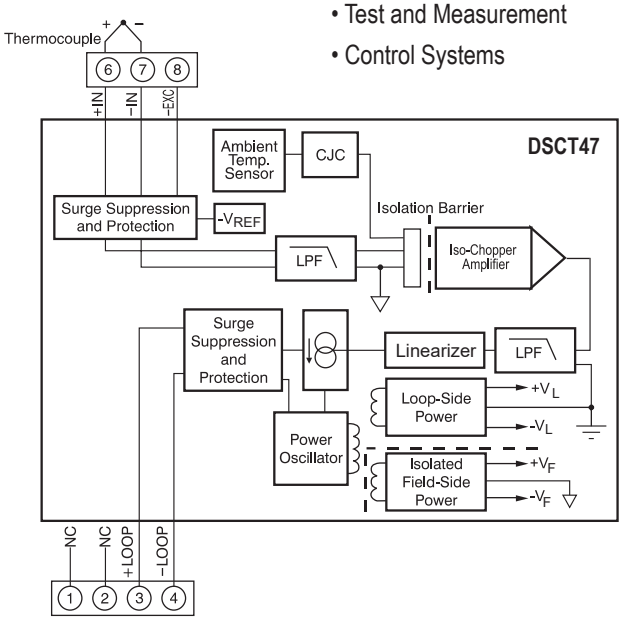
- Interfaces to Types J, K, T, E, R, S, B, and N Thermocouples
- Linearizes Thermocouple Signal
- Process Current Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input and Output Protected to 240VAC Continuous
- Up to 60V Loop Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.10% Accuracy
- Easily Mounts on Standard DIN-rail
- CSA C/US Certified
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Enables Advanced Diagnostics
- Greater Noise Resistance over Long Distances
- Output Signals Can Be Utilized by Many Standard Devices

APPLICATIONS

- Data Acquisition
- Test and Measurement
- Control Systems



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DSCT47 Block Diagram - For Module Dimensions and Pinouts, See Page 7-47

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Specifications

Typical* at T_A = +25°C and +24VDC Loop Voltage

Module	DSCT47
Input Range	Standard Thermocouple Temperature Limits as per Nist Monograph 175, ITS-90
Input Bias Current	–25nA
Input Resistance	
Normal	50MΩ
Power Off	66kΩ
Overload	66kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50Hz or 60Hz)	160dB
NMR	85dB at 60Hz, 80dB at 50Hz
Adjustability	±3% Zero and Span
Accuracy	See Ordering Information
Stability	
Offset	±60ppm/°C
Gain	±80ppm/°C
Cold Junction Compensation	
Accuracy, +25°C	±0.25°C
Accuracy, 0°C to +50°C	±0.50°C
Accuracy, –40°C to +80°C	±1.25°C
Open Input Response	Upscale
Open Input Detection Time	<5s
Noise	
Output, 100kHz	3µArms
Bandwidth, –3dB	3Hz
Response Time, 90% Span	165ms
Output Range	4-20mA
Output Limits	
Under-range	2.8mA
Over-range	29mA
Output Protection	
Reverse Polarity	Continuous
Over-voltage	240Vrms Continuous
Transient	ANSI/IEEE C37.90.1
Loop Supply Voltage	10.8V to 60V
Loop Supply Sensitivity	±0.0005%/V
Turn-on Delay	400ms
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 Rail
Environmental	
Operating Temperature	–40°C to +80°C
Storage Temperature	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis, repeatability, and CJC error.

Ordering Information

Model	TC Type‡	Input Range	Accuracy(1)	
DSCT47J-01	J	0°C to +760°C (+32°F to +1400°F)	±0.1% span	±0.76°C
DSCT47J-02	J	–100°C to +300°C (–148°F to +572°F)	±0.1% span	±0.40°C
DSCT47J-03	J	0°C to +500°C (+32°F to +932°F)	±0.1% span	±0.50°C
DSCT47K-04	K	0°C to +1000°C (+32°F to +1832°F)	±0.1% span	±1.00°C
DSCT47K-05	K	0°C to +500°C (+32°F to +932°F)	±0.1% span	±0.50°C
DSCT47K-13	K	–100°C to +1350°C (–148°F to +2462°F)	±0.1% span	±1.45°C
DSCT47K-14	K	0°C to +1200°C (32°F to +2192°F)	±0.1% span	±1.20°C
DSCT47T-06	T	–100°C to +400°C (–148°F to +752°F)	±0.1% span	±0.50°C
DSCT47T-07	T	0°C to +200°C (+32°F to +392°F)	±0.1% span	±0.20°C
DSCT47E-08	E	0°C to +1000°C (+32°F to +1832°F)	±0.1% span	±1.00°C
DSCT47R-09	R	+500°C to +1750°C (+932°F to +3182°F)	±0.1% span	±1.25°C
DSCT47S-10	S	+500°C to +1750°C (+932°F to +3182°F)	±0.1% span	±1.25°C
DSCT47B-11	B	+500°C to +1800°C (+932°F to +3272°F)	±0.1% span	±1.30°C
DSCT47N-15	N	–100°C to +1300°C (–148°F to +2372°F)	±0.1% span	±1.40°C

‡Thermocouple Alloy Combinations

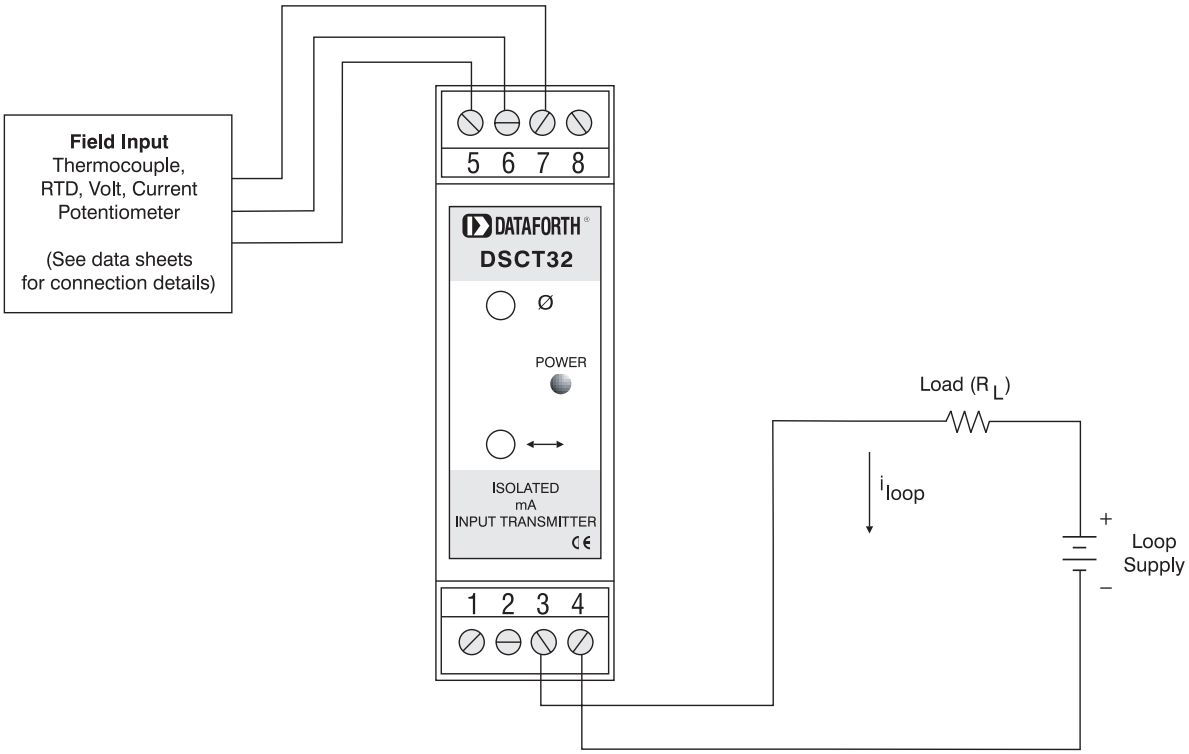
Standards: DIN IEC 584, ANSI MC96-1-82, JIS C 1602-1981

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

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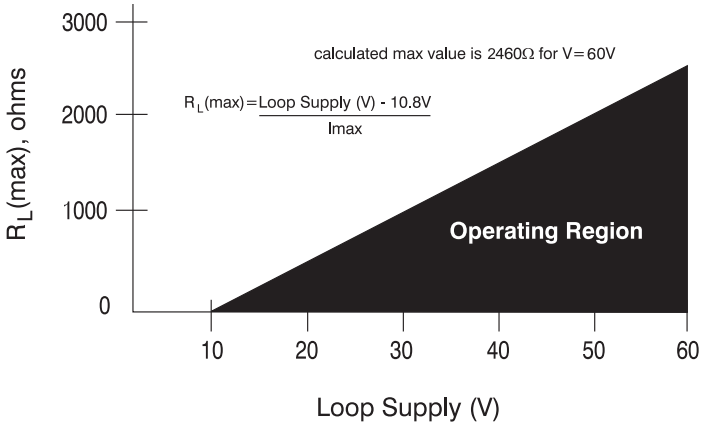
DSCT Wiring Diagram



DSCT Loop Drive Capability

The DSCT transmitter's wide range of loop supply voltage (10.8V-60V) makes it a versatile device which can be used in most any current loop. The maximum loop resistance is determined by subtracting the transmitter's minimum loop supply voltage from the total loop supply voltage and dividing the result by the maximum loop current (see graph).

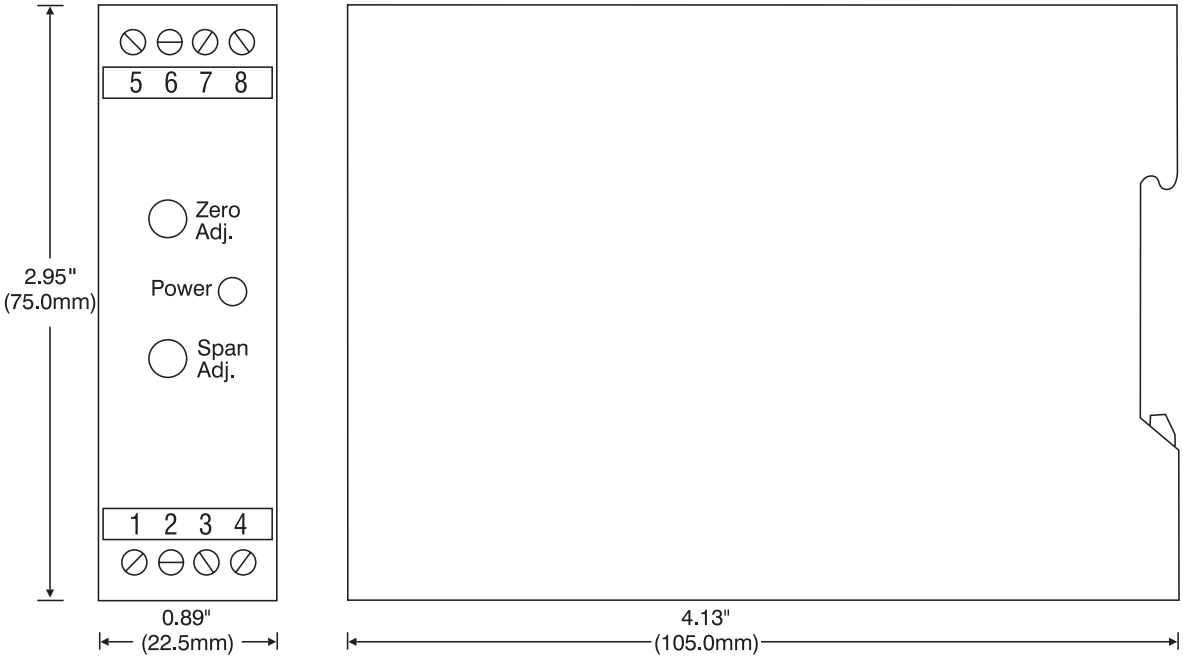
The low loop supply voltage of 10.8V allows the DSCT to be used in applications with low output power supplies, and the high loop supply voltage of 60V allows use in applications with long-distance current loops.



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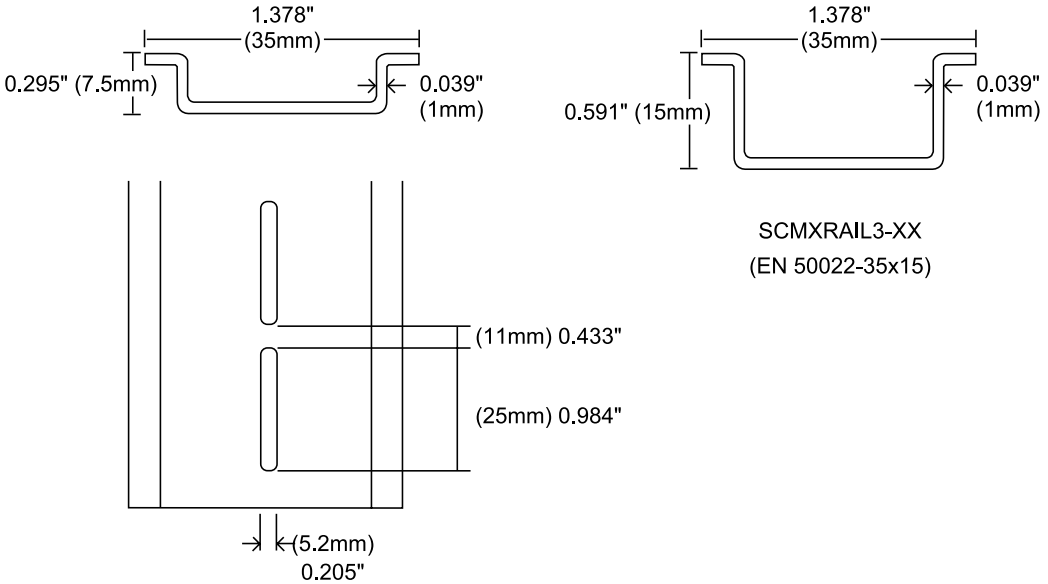
DSCT Module Dimensions



NOTES:

1) Pluggable terminal blocks accept wire sizes AWG 22-12. Strip wire insulation 0.27 in. (7mm) prior to insertion in terminal block.
2) DSCA modules can be mounted to DIN rails shown in Accessories section.

Accessories for DSCT Analog Modules



SCMXRAIL3-XX
(EN 50022-35x15)

SCMXRAIL1-XX
(EN 50022-35x7.5)

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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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Data Communication Products

RoHS III COMPLIANT 2015/863 | DIN Rail MOUNT | CE

Protecting Valuable Industrial LANS and Data Communication Systems

DESCRIPTION

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. Commercial communications equipment often is not designed for use in these environments, which can lead to unreliable signal quality, damage to expensive peripherals, computers, and other online equipment, and production downtime. Our heavy-duty products "harden" and protect these systems, and can extend communications for many miles without expensive low-capacitance cabling.

Our LDM Series line drivers and converters protect host computers and equipment and extend the distances over which computers, terminals, and other devices can communicate within hazardous industrial and institutional environments – up to 12 miles using wire pairs and current loop protocols, or two miles with fiber optic data links for total electrical isolation.

Our DCP485 DIN-rail RS-232 to RS-485 converter/line driver provides 1500Vrms continuous isolation and data transfer up to 115.2kbps with automatic RS-485 line control while powered from +10 to +30VDC.

FEATURES

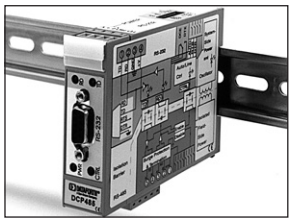
- 1500Vrms Isolation with Optocouplers and Power DC-to-DC Converter (3000Vp, 1 min)
- Industrial Temperature Range
- DTE/DC Selection Switches, Diagnostic LEDs
- Rugged, Compact Industrial Packaging, Choice of Host Connectors
- Data Rates to 115.2kbps
- Distances to 12 Miles (20km)
- Multidrop, Handshake Functions
- 2- or 4-wire, Simplex/Duplex Connection
- Full Line of Power and Connector Accessories
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

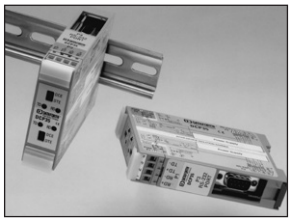
BENEFITS

- Protects Equipment from Damage Due to Power Surges, Transients, Lightning; Breaks Ground Loops
- Extends RS-232 Communication Distances without Expensive Low-capacitance Cabling
- Connects RS-232 Devices to RS-422 and RS-485 Devices

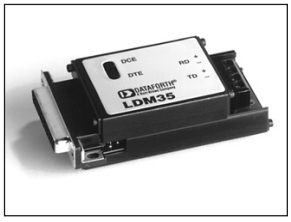
APPLICATIONS

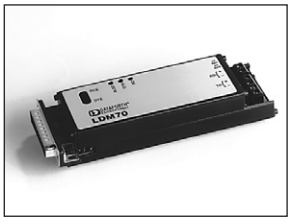
- Factory Automation and Control
- Building Automation
- Industrial Data Communication
- High-speed Data Communications

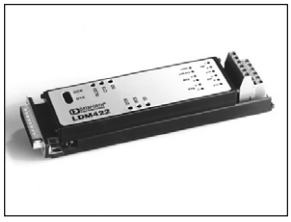

DCP485

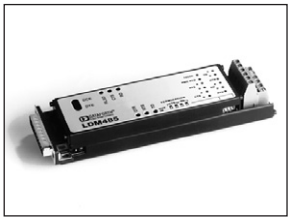

DCP35


LDM30


LDM35

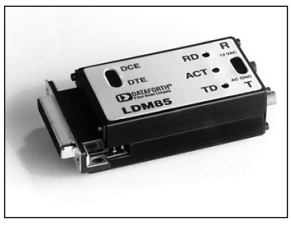

LDM70


LDM422

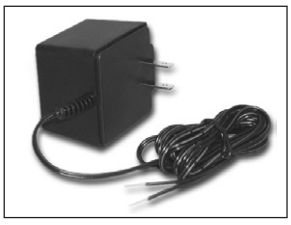

LDM485



LDM80



LDM85


PT3

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Data Communications Selection Guide

Line Drivers and Converters

Model	Max Bit Rate vs Distance	Max Distance vs Bit Rate	Field				Isolation	Host		Power	Notes
			Signal	Mode	# Wires	Connectors		Interface	Connector		
DCP35	19.2k (0.5mi) (0.8km)	12.0 mi (300) 11.3 km	Electrical Current Loop	Simplex, Full-duplex	2 4	Screw Terminals	Comm[2]	RS-232	Male/ Female DB-9	Port Signals	Port-signal Powered
DCP485	115.2k (.8mi) (1.3 km)	7 mi (2.4k) 11.3 km	Electrical RS-485 Differential Voltage	Simplex Half/ Full-duplex	2 2 4	Screw Terminals	Comm[2]/ Power[3]	RS-232	Fe/Male DB-9/ Screw Terms	Ext.[6]	DIN-rail Mounting Auto RS-485 Line Control
LDM30	57.6k (.5 mi) (0.8 km)	12 mi (1.2k) 19.3 km	Electrical Current Loop	Simplex Full-duplex	2 4	Screw Terms Mod Phone Jack	Comm[2]	RS-232	Male/ Female DB-25	Ext.[1]	Low Cost
LDM35	19.2k (.5 mi) (0.8 km)	12 mi (0.3k) 19.3 km	Electrical Current Loop	Simplex Full-duplex	2 4	Screw Terms Mod Phone Jack	Comm[2]	RS-232	Male/ Female DB-25	Port Signals	Port-signal Powered
LDM70	57.6k (.5 mi) (0.8 km)	12 mi (1.2k) 19.3 km	Electrical Current Loop	Simplex Full-duplex	2 4	Screw Terms Mod Phone Jack	Comm[2]/ Power[3]	RS-232	Male/ Female DB-25	Ext.[1]	Full Isolation, DTR/RLSD Handshake
LDM422	19.2k (1 mi) (1.6 km)	7 mi (1.2k) 11.3 km	Electrical RS-422 Differential Voltage	Simplex Half/ Full-duplex	2 2 4	Screw Terminals	Comm[2]/ Power[3]	RS-232	Male/ Female DB-25	Ext.[1]	Multidrop Capable RTS/CTS Handshake or 2nd Data Channel
LDM485	57.6k (.5 mi) (.8 km)	8 mi (2.4k) 12.9 km	Electrical RS-485 Differential Voltage	Simplex Half/ Full-duplex	2 2 4	Screw Terminals	Comm[2]/ Power[3]	RS-232	Male/ Female DB-25	Ext.[1]	Multidrop Capable RTS/CTS Handshake or 2nd Data Channel
LDM80	19.2k (2.2mi) (3.5 km)	2.2 mi (19.2k) 3.5 km	Optical	Simplex Full-duplex	1 Fiber 2 Fibers	SMA (905) ST	Total[4]	RS-232	Male/ Female DB-25	Port Signals	Total Electrical Isolation, Intrinsic Safety
LDM85	5M[5] (1.2 mi) (2 km)	1.2 mi (5M) 2 km	Optical	Simplex Full-duplex	1 Fiber 2 Fibers	SMA (905) ST	Total[4]	RS-232 RS-422/ RS-423 TTL	Male/ Female DB-25	Ext.[1]	Multipoint Optical Loop, Total Electrical Isolation

Accessories

Model	Description
Power Supply	DIN-rail Mount, 85-264VAC, 47-63Hz In
PWR-PS5R7W	24VDC, 0.3A Out
PWR-PS5R15W	24VDC, 0.65A Out
PWR-PS5R30W	24VDC, 1.3A Out
PWR-PS5R60W	24VDC, 2.5A Out
PWR-PS5R120W	24VDC, 5.0A Out

NOTES:
(1) Externally powered LDMs may be powered with wall transformer (supplied) or through pins 9 and 10 on host interface.
(2) Comm isolation provides an optical barrier on receive circuits and/or transmit circuits plus ANSI/IEEE C37.90.1 surge protection.
(3) Power isolation by DC/DC converter to field circuits.
(4) Fiber optic units provide total electrical isolation.
(5) Max data rate for LDM85 is 2.5Mbps NRZ TTL and 100Kbps RS-232/422.
(6) Externally powered +10V to +30VDC.

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DCP485

RoHS III COMPLIANT 2015/863 | DIN Rail MOUNT | CE

Fully-isolated DIN-rail RS-232 to RS-485 Converters/Line Drivers

DESCRIPTION

The DCP485 is a compact RS-232 to RS-485 converter which features a complete electrical isolation barrier and heavy-duty electrical surge protectors. These devices feature a DIN-rail mountable enclosure for application to a junction box, a panel, a relay rack, the sides of computer equipment, or anywhere a DIN-rail can be mounted. Isolation is provided by optical couplers and a transformer isolated DC-to-DC converter. The RS-232 connection is through male or female EIA 9-pin D-sub connectors, or a 3-wire RS-232 connection can be made through convenient pluggable screw terminals. The RS-485 connections are made through convenient pluggable, solderless screw terminals.

The DCP485 series is designed for full-duplex operation over two-wire pairs. Outputs are tri-state, allowing multidropping of up to 32 units over one pair. Data rates are DC to 115.2k bits per second. Four diagnostic LED indicators are provided for installation guidance and system troubleshooting. The RS-232 interface includes Request To Send (RTS) and Data Terminal Ready (DTR) either of which can be used via DIP switches to enable the RS-485 transmitter. Alternately, the DCP485 offers automatic line switching in which the RS-485 transmitter is enabled automatically by each character sent on the RS-232 Transmit Data (TD) line. Additionally, the RS-485 transmitter and receiver may be independently enabled continuously or under RS-232 control. A convenient null modem switch is provided for the data lines. Also, line termination switches independently connect line termination and line bias resistors to the RS-485 lines. The units are powered from wide-range voltages of +10 to +30VDC through pluggable solderless screw terminals.

FEATURES

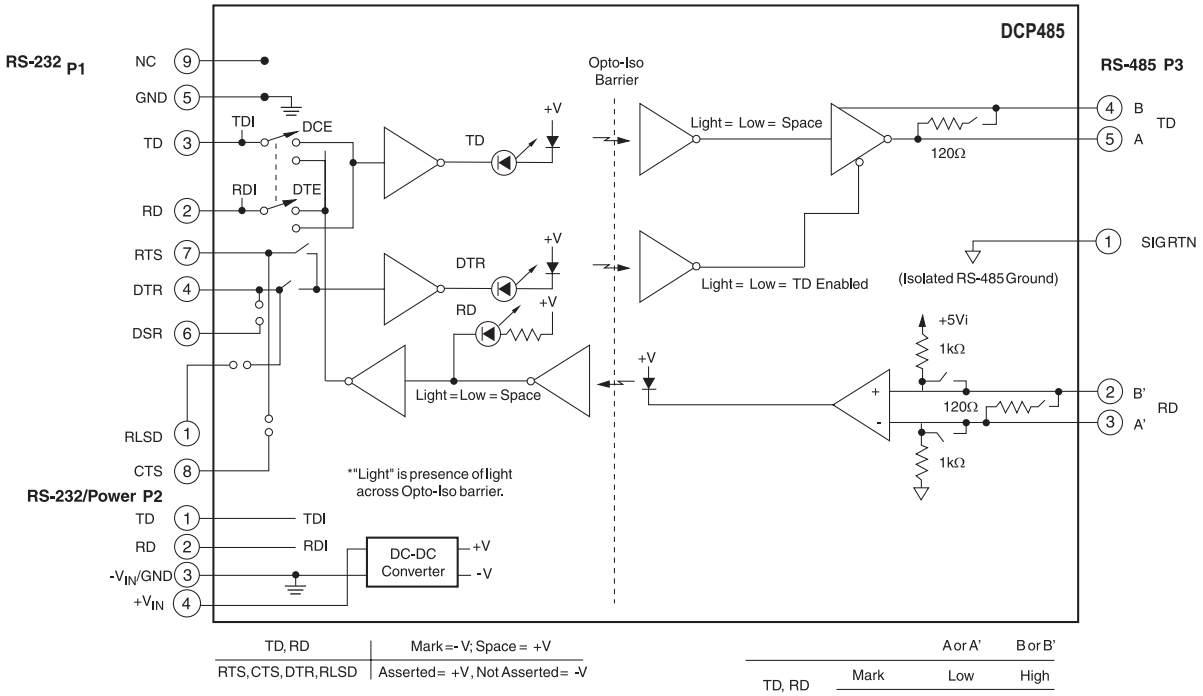
- Complete Isolation with Optical Couplers and Transformer-coupled DC-to-DC Converter
- Industrial Surge Protection Devices and 15kV ESD Protected RS-232 Inherent
- Four LED Diagnostic Indicators
- 38.4kbps at 1 Mile (1.6km), 115.2kbps at 0.8 Mile (1.3km)
- RTS, DTR, or Auto RS-485 Transmitter Control
- Tri-state Outputs for Multidrop Applications, up to 32 Devices
- Selection of Connectors
- Wide Operating Temperature Range
- Pluggable Solderless Screw Terminal Field Connections
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- Utility Meters
- Industrial, Process, and Building Automation



DCP485 Block Diagram

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RS-232 P1 Pin Descriptions		
Pin 1	RLSD (DCD)	Receive Line Signal Detect (Data Carrier Detect)
Pin 2	RD	Receive Data
Pin 3	TD	Transmit Data
Pin 4	DTR	Data Terminal Ready
Pin 5	SG	Signal Ground
Pin 6	DSR	Data Set Ready
Pin 7	RTS	Request To Send
Pin 8	CTS	Clear To Send
Pin 9	NC	Not Connected

RS-232/POWER P2 Pin Descriptions		
Pin 4	TD	Transmit Data
Pin 3	RD	Read Data
Pin 2	GND	Ground (also Signal Ground)
Pin 1	+V	+10 to +30VDC

RS-485 P3 Pin Descriptions		
Pin 5	TD A	Transmit Data A
Pin 4	TD B	Transmit Data B
Pin 3	RD A'	Receive Data A'
Pin 2	RD B'	Receive Data B'
Pin 1	RTN	Return, Isolated

Specifications

Typical* at T_A = +25°C

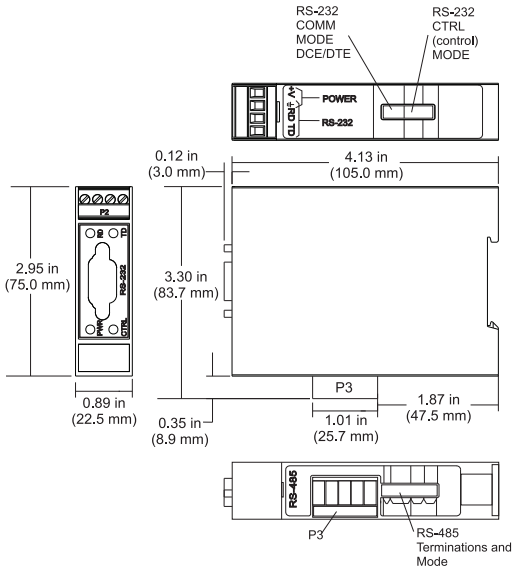
Model	DCP485
Bit Rate (bps) bps vs Distance Distance(miles) Distance(km)	0-115.2kbps 115.2k 57.6k 38.4k 19.2k 9.6k 4.8k 2.4k-0 0.8 0.9 1.0 2.0 3.0 4.0 7.0 1.3 1.5 1.6 3.2 4.8 6.4 11.3
Wire Capacitance Max Multidrop Units	Equal to 25pf Per Foot and Up to 32 Multidrop Units 32
Common-mode Isolation Differential Mode Surge Protection (9 devices)	Surge: 3000Vp, 1 (min) Continuous: 1500Vrms (DC Input and RS-232 Inputs and Outputs) ANSI/IEEE C37.90.1 (all RS-485 Inputs and Outputs)
Modes	Asynchronous 4-wire Full-duplex, 2-wire Half-duplex, 2-wire Simplex
Channel Lines(1) Control Lines(1)	TD, RD RTS, DTR
Null Modem Switch	1 (Reverses RS-232 Pins 2 and 3)
RS-485 Output Drive RS-485 Input Impedance	28mA (max) Output 12kΩ (min) Input
Power	+10 to +30 VDC at 150mA (max)
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity Altitude	 –40°C to +60°C –40°C to +70°C 0 to 95% Noncondensing to 15000 ft (4574 m)
Dimensions (h)x(w)x(d)	4.3" x 3.3" x 0.89" (109mm x 84mm x 22.5mm)
Weight	4.6 oz (130g)
MTTF(2)	>100,000 Hrs

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, RTS = Request To Send, DTR = Data Terminal Ready.
(2) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

Model	Description
DCP485-P DCP485-S	Male RS-232 Connector Female RS-232 Connector

Model	Description
Power Supply PWR-PS5R7W	DIN-rail Mount 85-264VAC, 47-63Hz In 24VDC, 0.3A Out



DCP485 Dimensions

SECTION 8 - Data Comm

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DCP35

DIN-rail Signal-powered RS-232 Line Drivers

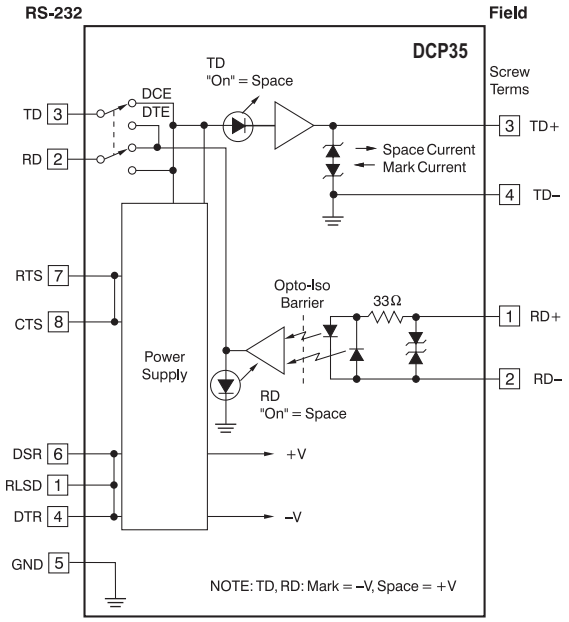
DESCRIPTION

The DCP35 series of products is designed to allow RS-232 devices to be inter-connected over distances sufficient to cover any industrial or institutional complex of buildings. These line drivers feature a DIN-rail mountable enclosure for application to a junction box, a panel, a relay rack, the sides of computer equipment, or anywhere a DIN-rail can be mounted.

The DCP35 series does not require a power supply for operation. The use of low-power circuits and a sensitive optically isolated receiver allows the devices to derive all necessary power from the RS-232 data and control signals. They are designed for full-duplex, asynchronous operation over two, DC-continuous, non-loaded, twisted-wire pairs. Two-wire simplex operation may be accomplished over one twisted-wire pair. The line driver circuits — and, consequently, the host device — are protected from electrical transients due to lightning strikes or operation of heavy industrial equipment.

Each device features a convenient DCE (Data Communication Equipment) to DTE (Data Terminal Equipment) switch which reverses pins 2 and 3 of the RS-232 connector. For installation and system troubleshooting each unit has diagnostic Light Emitting Diodes (LEDs) on the transmit and receive lines.

The RS-232 connector may be ordered as a male or female 9-pin connector. Field connection is made through pluggable solderless screw terminals.



DCP35 Block Diagram

FEATURES

- Signal-powered: No Power Source Required
- Optical Isolation: Breaks Ground Loops
- Heavy-duty Surge Protectors: Prevents Lightning Damage
- LED Diagnostic Indicators: Simplifies Installation and System Troubleshooting
- 19.2kbps to 0.5 Mile (0.8km), 9.6kbps to 2.0 Miles (3.2km), 1.2kbps to 7.0 Miles (11.3km)
- Four-wire Full-duplex, Two-wire Simplex
- Pluggable Solderless Screw Terminal Field Connections
- Null Modem Switch
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- Industrial Data Communication
- Factory Automation and Control
- Building Automation

RS-232 Pin Descriptions				Field Pin Descriptions		
Pin 1	RLSD	[8]	Receive Line Signal Detect	Screw Terms		
Pin 2	RD	[3]	Receive Data	Pin 1	RD+	Receive Data +
Pin 3	TD	[2]	Transmit Data	Pin 2	RD–	Receive Data –
Pin 4	DTR	[20]	Data Terminal Ready	Pin 3	TD+	Transmit Data +
Pin 5	SG	[7]	Signal Ground	Pin 4	TD–	Transmit Data –
Pin 6	DSR	[6]	Data Set Ready			
Pin 7	RTS	[4]	Request To Send			
Pin 8	CTS	[5]	Clear To Send			

Pin Numbers Given are for the 9-pin Connector with the 25-pin Equivalent in [ ].

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Specifications

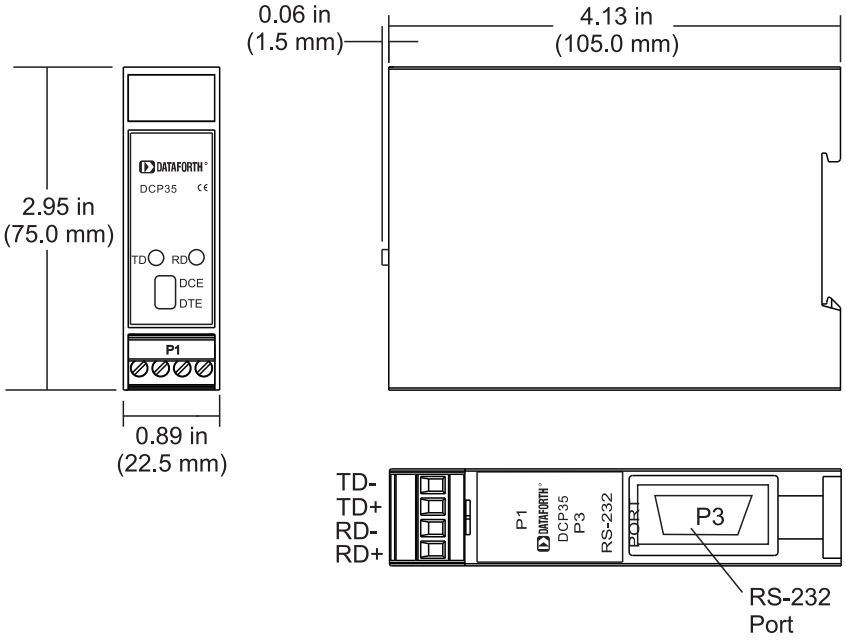
Typical* at T_A = +25°C

Model	DCP35
Bit Rate (bps) bps vs Distance Distance (miles) Distance (km)	0-19.2kbps 19.2k 9.6k 4.8k 2.4k 1.2k-0 0.5 2.0 3.0 5.0 7.0 0.8 3.2 4.8 8.1 11.3
Common-mode Isolation Differential-mode Surge Protection (3 devices)	Surge: 500Vp, 1 min. Continuous: 300Vrms ANSI/IEEE C37.90.1
Modes	Asynchronous 4-wire Full-duplex, 2-wire Simplex
Channel Lines(1) Control Lines(1)	TD, RD RTS, CTS, DTR, DSR, RLSD(DCD)
Null Modem Switch	1 (Reverses RS-232 Pins 2 and 3)
Power RS-232 Data RS-232 Control Signals	RS-232 Data and Control Signals ±5V to ±15V, 3.0mA to 10.0mA ±6V to ±15V, 3.0mA to 10.0mA
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity	 0°C to +70°C –10°C to +85°C 0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	4.2" x 3.3" x 0.89" (107mm x 84mm x 22.5mm)
Weight	4.2 oz (119g)
MTTF(2)	>150,000 hrs

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, RTS = Request To Send, CTS = Clear To Send, DTR = Data Terminal Ready, DSR = Data Set Ready, RLSD = Received Line Signal Detect (DCD = Data Carrier Detect).
(2) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

Model	9-pin Connector	Termination
DCP35-P	1-ch Male	Screw Terminals
DCP35-S	1-ch Female	Screw Terminals



DCP35 Dimensions

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LDM30

RoHS III COMPLIANT 2015/863 CE

General-purpose RS-232 Line Drivers

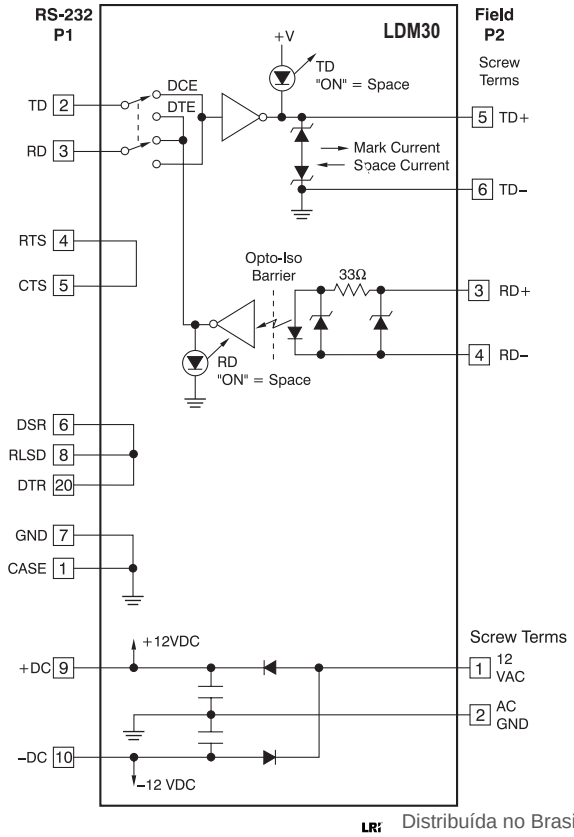
DESCRIPTION

The LDM30 series of products is designed to allow video display terminals (VDTs) and other RS-232 devices to be connected over distances sufficient to cover any industrial or institutional complex of buildings. These line drivers feature a rugged aluminum enclosure small enough to mount on the back panel of VDT units, saving valuable desk and floor space.

The LDM30 series is designed for full-duplex, asynchronous operation over two, DC-continuity, non-loaded, twisted-wire pairs. Through special high-speed optically-coupled circuits they may communicate at data rates up to 57,600bps. A self-powered model and a host-powered model are available. The self-powered unit uses 12VAC from a wall-mounted transformer while the host-powered unit takes ±DC power from pins 9 and 10 of the RS-232 connector. The line driver circuits — and, consequently, the host device — are protected from electrical transients due to lightning strikes or operation of heavy industrial equipment.

Each device features a convenient Data-communication Equipment (DCE) to Data-Terminal Equipment (DTE) switch which reverses pins 2 and 3 of the RS-232 connector. For installation and troubleshooting, each unit has diagnostic Light-Emitting Diodes (LEDs) on the transmit and receive lines.

The RS-232 connector may be ordered as a male or female 25-pin connector. Field connection is made through a modern, solderless, screw-termination assembly.



LDM30 Block Diagram

FEATURES

- DC to 57,600bps
- Optical Isolation
- Surge Protectors
- LED Diagnostic Indicators
- Operation to 3 Miles (5km) at 9600bps,
  1 Mile (1.7km) at 19,200bps,
  0.5 Miles (0.8km) at 57,600bps
- Four-wire Full-duplex, Two-wire Simplex
- Self-powered or Host-powered
- Selection of Connectors
- Wide Operating Temperature Range, 0 to +70°C
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- Industrial Building Complex Communications
- Wired Networking
- Data Centers

RS-232 P1 Pin Descriptions				Field P2 Pin Description
				Screw Terms
Pin 1	CASE		Ground	Pin 1 12VAC
Pin 2	TD	[3]	Transmit Data	Pin 2 AC GND
Pin 3	RD	[2]	Receive Data	Pin 3 RD+
Pin 4	RTS	[7]	Req. To Send	Pin 4 RD–
Pin 5	CTS	[8]	Clear To Send	Pin 5 TD+
Pin 6	DSR	[6]	Data Set Ready	Pin 6 TD–
Pin 7	GND	[5]	Signal Ground	
Pin 8	RLSD	[1]	Receive Line Signal Detect	RD+ = Receive Data +
Pin 9	+DC		Positive DC Supply Input	RD– = Receive Data –
Pin 10	–DC		Negative DC Supply Input	TD+ = Transmit Data +
Pin 20	DTR	[4]	Data Terminal Ready	TD– = Transmit Data –
Pin Numbers Given are for the 25-pin Connector with the 9-pin Equivalent in [ ].				

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Specifications

Typical* at T_A = +25°C

Model	LDM30
Bit Rate (bps)	0-57.6k
bps vs Distance	57.6k 38.4k 19.2k 9.6k 4.8k 2.4k 1.2k-0
Distance(miles)	0.5 0.75 1.0 3.0 5.0 7.0 12.0
Distance(km)	0.8 1.21 1.6 4.8 8.1 11.3 19.3
Common-Mode Isolation	Surge: 500Vp, 1 minute
	Continuous: 300Vrms
Differential-Mode Surge Protection (3 devices)	ANSI/IEEE C37.90.1
Modes	Asynchronous 4-wire Full-duplex, 2-wire Simplex
Channel Lines(1)	TD, RD
Control Lines(1)	RTS, CTS, DTR, DSR, RLSD
Power	
AC operation(2)	12VAC at 92mA
DC operation	±9VDC to ±15VDC, 35mA
Environmental:	
Operating Temperature Range	0°C to +70°C
Storage Temperature Range	–10°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	3.6" x 2.1" x 1" (91.4mm x 53.3mm x 25.4mm)
Weight	3.5 oz (100g) (max)
PT3	11.0 oz (312g) (max)
MTTF(3)	>150,000 hrs

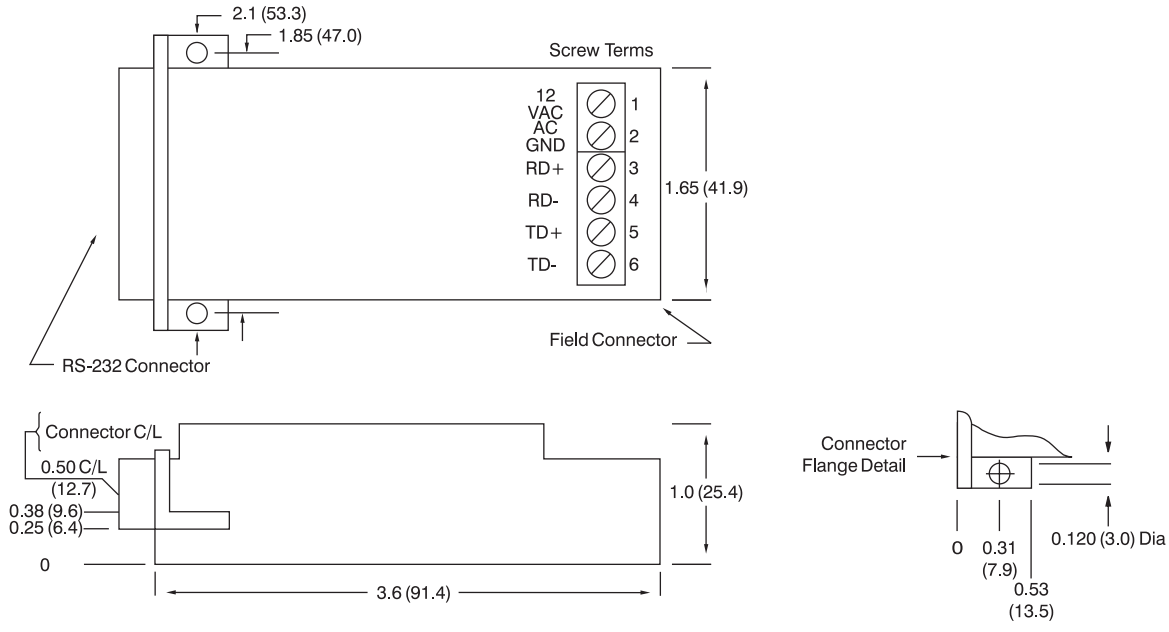
NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, RTS = Request To Send, CTS = Clear To Send, DTR = Data Terminal Ready, DSR = Data Set Ready, RLSD = Received Line Signal Detect.
(2) 120VAC and 220VAC power transformers are available.
(3) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

Model	Type	Power	Termination
LDM30-P*	Male	Host-Powered	Screw Termination
LDM30-S*	Female	Host-Powered	Screw Termination
LDM30-PT*	Male	U.S. Transformer	Screw Termination
LDM30-ST*	Female	US. Transformer	Screw Termination

*Last Time Buy

Model	Description
PT3	U.S. Style Wall Mount Transformer, 120VAC



Dimensions: Inches (Millimeters)

LDM30 Dimensions

SECTION 8 - Data Comm

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LDM35

RoHS III COMPLIANT 2015/863 CE

Signal-powered RS-232 Line Drivers

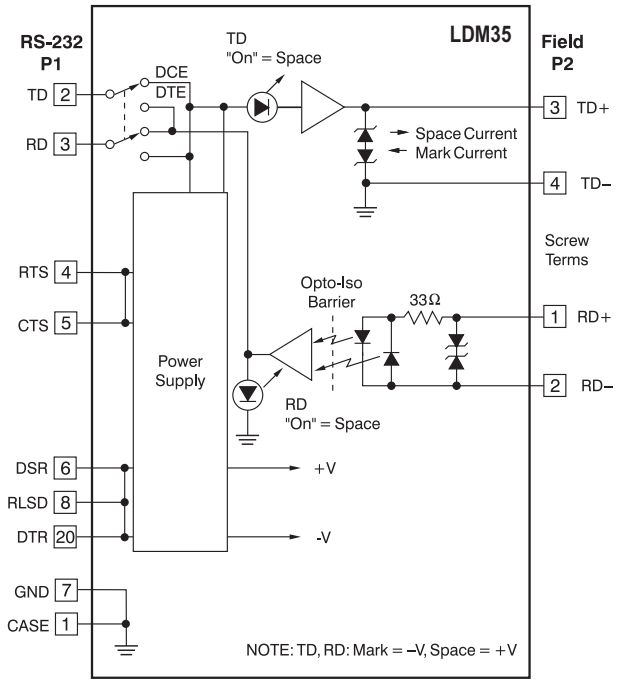
DESCRIPTION

The LDM35 series of products is designed to allow video display terminals (VDTs) and other RS-232 devices to be connected over distances sufficient to cover any industrial or institutional complex of buildings. These line drivers feature a rugged enclosure small enough to mount on the back panel of VDT units, saving valuable desk and floor space.

The LDM35 series does not require a power supply for operation. The use of low-power circuits and a sensitive optical receiver allows the devices to derive all necessary power from the RS-232 data and control signal. They are designed for full-duplex, asynchronous operation over two, DC-continuity, non-loaded, twisted-wire pairs. Two-wire simplex operation may be accomplished over two wires. The line driver circuits — and, consequently, the host device — are protected from electrical transients due to lightning strikes or operation of heavy industrial equipment.

Each device features a convenient Data-communication Equipment (DCE) to Data-Terminal Equipment (DTE) switch which reverses pins 2 and 3 of the RS-232 connector. For installation and troubleshooting, each unit has diagnostic Light-Emitting Diodes (LEDs) on the transmit and receive lines.

The RS-232 connector may be ordered as a male or female 25-pin connector. Field connection is made through a modern, solderless, screw-termination assembly.



LDM35 Block Diagram

FEATURES

- Signal-powered: No Power Source Required
- Optical Isolation: Breaks Ground Loops
- Heavy-duty Surge Protectors: Prevents Lightning Damage
- LED Diagnostic Indicators: Simplifies Installation and System Troubleshooting
- Operation to 2 Miles (3.3km) at 9600bps, 0.5 Miles (0.8km) at 19,200bps, 7 Miles (11.7km) at 1200bps
- Four-wire Full-duplex, Two-wire Simplex
- Selection of Connectors
- Wide Operating Temperature Range, 0°C to +70°C
- Null Modem Switch
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- Industrial Building Complex Communications
- Wired Networking
- Data Centers

RS-232 P1 Pin Descriptions				Field P2 Pin Description
				Screw Terms
Pin 1	CASE	Ground		Pin 1 RD+
Pin 2	TD	[3]	Transmit Data	Pin 2 RD–
Pin 3	RD	[2]	Receive Data	Pin 3 TD+
Pin 4	RTS	[7]	Req. To Send	Pin 4 TD–
Pin 5	CTS	[8]	Clear To Send	
Pin 6	DSR	[6]	Data Set Ready	RD+ = Receive Data +
Pin 7	GND	[5]	Signal Ground	RD– = Receive Data –
Pin 8	RLSD	[1]	Receive Line Signal Detect	TD+ = Transmit Data +
				TD– = Transmit Data –
Pin 20	DTR	[4]	Data Terminal Ready	

Pin Numbers Given are for the 25-pin Connector with the 9-pin Equivalent in [ ].

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Specifications

Typical* at T_A = +25°C

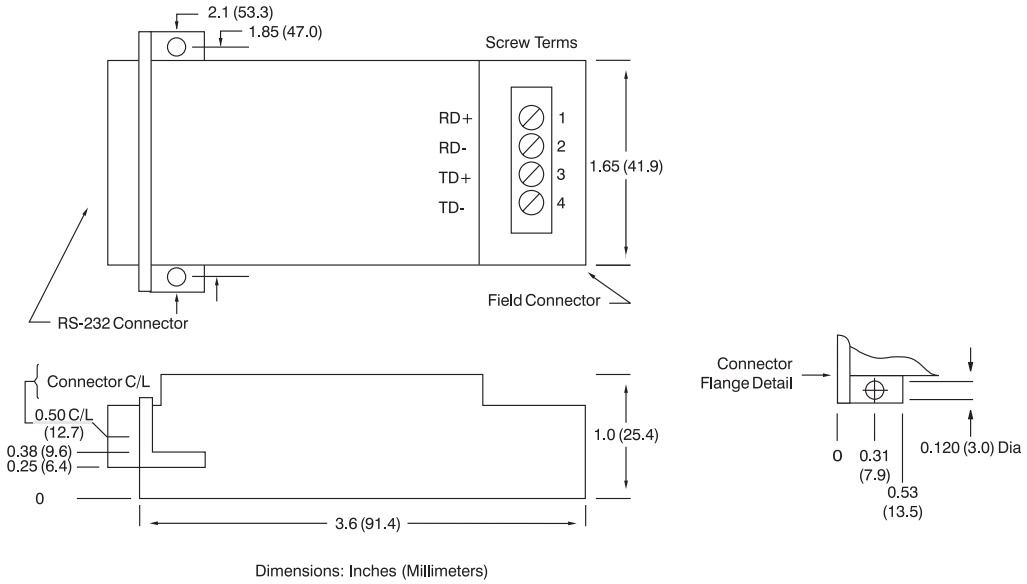
Model	LDM35
Bit Rate (bps) bps vs Distance Distance(miles) Distance(km)	0-19.2k 19.2k 9.6k 4.8k 2.4k 1.2k-0 0.5 2.0 3.0 5.0 7.0 0.8 3.2 4.8 8.1 11.3
Common-mode Isolation Differential-mode Surge Protection (3 devices)	Surge: 500Vp, 1 Minute Continuous: 300Vrms ANSI/IEEE C37.90.1
Modes	Asynchronous 4-wire Full-duplex, 2-wire Simplex
Channel Lines(1) Control Lines(1)	TD, RD RTS, CTS, DTR, DSR, RLSD
Power RS-232 Data RS-232 Control Signals	RS-232 Data and Control Signals ±5V to ±15V, 3.0mA to 10.0mA ±6V to ±15V, 3.0mA to 10.0mA
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity	 0°C to +70°C –10°C to +85°C 0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	3.6" x 2.1" x 1" (91.4mm x 53.3mm x 25.4mm)
Weight	3.2 oz (91g) (max)
MTTF(2)	>150,000 Hrs

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, RTS = Request To Send, CTS = Clear To Send, DTR = Data Terminal Ready, DSR = Data Set Ready, RLSD = Received Line Signal Detect.
(2) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

Model	25-pin Connector	Termination
LDM35-P*	Male	Screw Terminals
LDM35-S*	Female	Screw Terminals

*Last Time Buy



Dimensions: Inches (Millimeters)

LDM35 Dimensions

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LDM70

RoHS III COMPLIANT 2015/863 CE

Fully-isolated RS-232 Line Drivers

DESCRIPTION

The LDM70 series of products is designed to allow video display terminals (VDTs) and other RS-232 devices to be connected over distances sufficient to cover any industrial or institutional complex of buildings. These line drivers feature a rugged aluminum enclosure small enough to mount on the back panel of VDT units, saving valuable desk and floor space.

The LDM70 series is designed for full-duplex, asynchronous operation over two DC-continuity, non-loaded, twisted-wire pairs. Through special high-speed optically coupled circuits, they may communicate at data rates up to 57,600 bits per second. A handshake operation is implemented over the same two-wire pairs. A self-powered model and a host-powered model are available. The self-powered unit uses 12VAC from a wall-mounted transformer, while the host-powered unit takes ±DC power from pins 9 and 10 of the RS-232 connector. The line driver circuits — and consequently, the host device — are protected from electrical transients due to lightning strikes or operation of heavy industrial equipment.

Each device features a convenient Data-communication Equipment (DCE) to Data-Terminal Equipment (DTE) switch which reverses pins 2 and 3 of the RS-232 connector. For installation and troubleshooting, each unit has diagnostic Light-Emitting Diodes (LEDs) on the transmit and receive lines. In addition, LEDs indicate valid carrier detect and data terminal ready.

The RS-232 connector may be ordered as a male or female 25-pin connector. Field connection is made through a solderless screw-termination assembly.

FEATURES

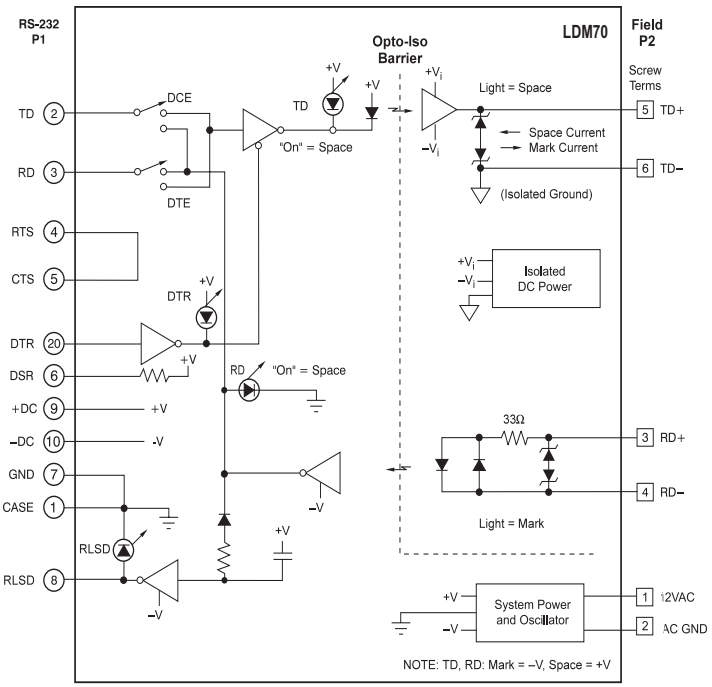
- DC to 57,600bps
- Complete Isolation with Optical Couplers and Power DC-to-DC Converter
- Data Terminal Ready, Carrier Detect Handshake without Extra Wires
- Four LED Diagnostic Indicators
- Four-wire Full-duplex, Two-wire Simplex
- Self-powered or Host-powered
- Wide Operating Temperature Range, 0 to +70°C
- Surge Protectors
- Operation to 3 Miles (5km) at 9600bps, 1 Mile (1.7km) at 19,200bps, 0.5 Miles (0.8km) at 57,600bps
- Selection of Connectors
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- Industrial Building Complex Communications
- Wired Networking
- Data Centers



LDM70 Block Diagram

RS-232 P1 Pin Descriptions				Field P2 Pin Description
				Screw Terms
Pin 1	CASE	Ground		Pin 1 12VAC
Pin 2	TD	[3]	Transmit Data	Pin 2 AC GND
Pin 3	RD	[2]	Receive Data	Pin 3 RD+
Pin 4	RTS	[7]	Req. To Send	Pin 4 RD–
Pin 5	CTS	[8]	Clear To Send	Pin 5 TD+
Pin 6	DSR	[6]	Data Set Ready	Pin 6 TD–
Pin 7	GND	[5]	Signal Ground	
Pin 8	RLSD	[1]	Receive Line Signal Detect	RD+ = Receive Data +
Pin 9	+DC		Positive DC Supply Input	RD– = Receive Data –
Pin 10	–DC		Negative DC Supply Input	TD+ = Transmit Data +
Pin 20	DTR	[4]	Data Terminal Ready	TD– = Transmit Data –
Pin Numbers Given are for the 25-pin Connector with the 9-pin Equivalent in [ ].				

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Specifications

Typical* at T_A = +25°C

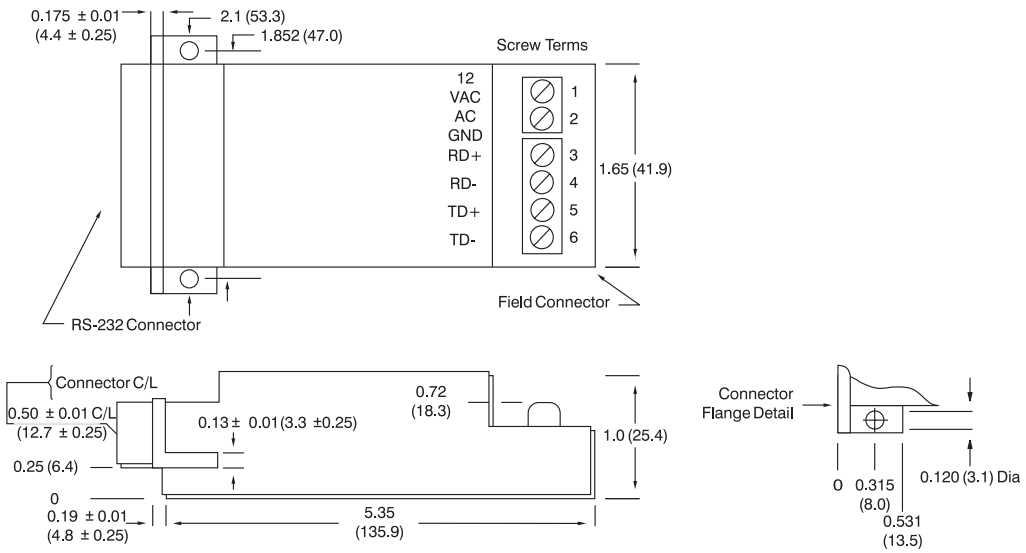
Model	LDM70
Bit Rate (bps) bps vs Distance Distance(miles) Distance(km)	0-57.6k 57.6k 38.4k 19.2k 9.6k 4.8k 2.4k 1.2k-0 0.5 0.75 1.0 3.0 5.0 7.0 12.0 0.8 1.21 1.6 4.8 8.1 12.9 19.3
Common-Mode Isolation Differential-Mode Surge Protection (3 devices)	Surge: 1500Vp, 1 Minute Continuous: 1000Vrms ANSI/IEEE C37.90.1
Modes	Asynchronous 4-wire Duplex, 2-wire Simplex
Channel Lines(1) Control Lines(1)	TD, RD DTR, RLSD
Power AC operation(2) DC operation	 12VAC at 120mA ±9VDC to ±15VDC, 45mA
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity	 0°C to +70°C –40°C to +85°C 0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	5.7" x 2.1" x 1" (144.8mm x 53.3mm x 25.4mm)
Weight PT3	5.5 oz (156g) (max) 11.0 oz (312g) (max)
MTTF(3)	>100,000 Hrs

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, DTR = Data Terminal Ready, RLSD = Received Line Signal Detect.
(2) 120VAC and 220VAC power transformers are available.
(3) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

Model	Type	Power	Termination
LDM70-S LDM70-ST	Female Female	Host-powered U.S. Transformer	Screw Termination Screw Termination

Model	Description
PT3	U.S. Style Wall Mount Transformer, 120VAC



Dimensions: Inches (Millimeters)

LDM70 Dimensions

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LDM422

RoHS III COMPLIANT 2015/863 CE

Fully-isolated RS-232/RS-422 Converters

DESCRIPTION

The LDM422 is a compact RS-232 to RS-422 converter which features a complete electrical isolation barrier and heavy-duty electrical surge protectors. These devices feature a rugged aluminum enclosure small enough to mount on the back panel of typical computer equipment, saving valuable desk and floor space. Isolation is provided by optical couplers and a DC-to-DC converter. The RS-232 connection is through male or female EIA 25-pin connectors. The RS422 connections are made through convenient solderless screw terminals.

The LDM422 series is designed for full-duplex operation over two-wire pairs. Outputs are tri-state, allowing multidropping of up to 32 units. Hardware handshake is available over two separate wire pairs. Data rates are 75 to 19,200 bits per second. Six diagnostic LED indicators are provided (see Figure 1) for installation guidance and system troubleshooting. The RS-232 interface supports Request To Send, Clear To Send, Data Set Ready, Received Line Signal Detect, and Data Terminal Ready. A convenient null modem switch is provided for the data lines. The RS-422 interface supports Request To Send and Clear To Send on separate wire pairs. The LDM422 may be used to convert two sets of send and receive channels by using RTS and CTS circuits as the second data channels. Data rates are the same. The units use 12VAC from a wall-mounted transformer or ±12VDC to pins 9 (+) and 10 (–) of the RS-232 connector.

FEATURES

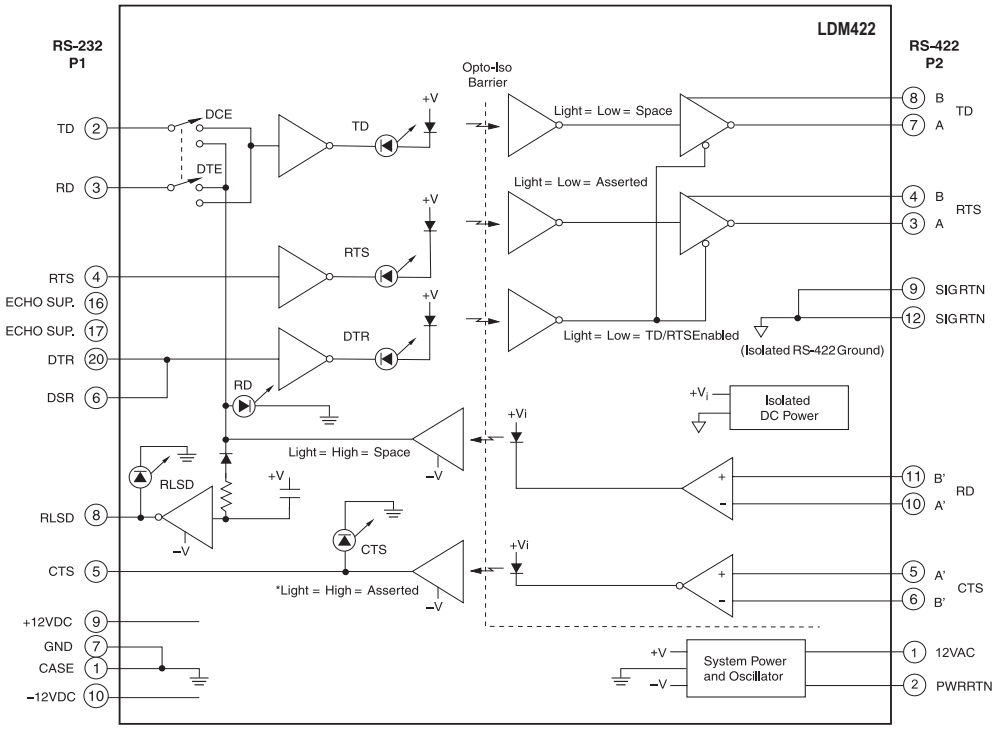
- Complete Isolation with Optical Couplers and Power DC-to-DC Converter
- Industrial Surge Protection Devices
- Six LED Diagnostic Indicators
- DC to 19,200bps at 6000 Feet (1800m), 9600bps at 3 Miles (5km)
- Request-to-send, Clear-to-send Handshake
- Tri-state Outputs for Multidrop Applications
- Selection of Connectors
- Wide Operating Temperature Range
- Solderless Screw Terminal Field Connections
- CE Compliant
- Self-powered or Host-powered
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- Factory Automation and Control
- HVAC Systems
- Building Automation



LDM422 Block Diagram

		A or A'	B or B'
TD, RD	Mark	Low	High
	Space	High	Low
RTS, CTS	Asserted	High	Low
	Not Asserted	Low	High

NOTE: Open or Tri-State on RD inputs produces same logic condition as 'MARK input. Open or Tri-State on CTS inputs produces same logic condition as 'Asserted input.

*"Light" is presence of light across Opto-Iso barrier.

TD, RD	Mark = –V; Space =
RTS, CTS, DTR, RLSD	Asserted = +V, Not Asserted = –V

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Specifications

Typical* at T_A = +25°C

Model	LDM422
Bit Rate (bps) bps vs Distance Distance(miles) Distance(km)	0-19.2k 19.2k 9.6k 4.8k 2.4k 1.2k-0 1.14 3.0 4.0 5.0 7.0 1.8 4.8 6.4 8.1 11.3
Maximum Multidrop Units	32. Reduced Distances May be Required When as Many as 32 Units are Multidropped. No Restrictions Apply for Distances of 1 Mile (1.7 Km) or Less.
Common-Mode Isolation Differential-Mode Surge Protection (9 devices)	Surge: 1500Vp, 1 Minute Continuous: 1000Vrms (AC input) ANSI/IEEE C37.90.1 (All RS-422 Inputs and Outputs)
Modes	Asynchronous 4-wire Duplex, 2-wire Half-duplex, 2-wire Simplex
Channel Lines(1) Control Lines(1)	TD, RD, RTS, CTS RTS, CTS, DTR, DSR, RLSD
Null Modem Switch	1 (Reverses RS-232 Pins 2 and 3)
RS-422 Output Drive RS-422 Input Impedance	20mA (Min) Output 6kΩ (Min) Input
Power AC operation(2) DC operation	 12VAC, ±10%, 10W Screw Terms 1 and 2 +11.5VDC to +17.0VDC at 400mA on Pin 9 –11.5VDC to –17.0VDC at 400mA on Pin 10
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity	 0°C to +70°C –40°C to +85°C 0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	6.6" x 2.1" x 1.28" (167.6mm x 53.3mm x 32.5mm)
Weight PT3	7 oz (198g) (max) 11.0 oz (312g) (max)
MTTF(3)	>100,000 Hrs

NOTES :
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, RTS = Request To Send, CTS = Clear To Send, DTR = Data Terminal Ready, DSR = Data Set Ready, RLSD = Received Line Signal Detect.
(2) 120VAC and 220VAC power transformers are available.
(3) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

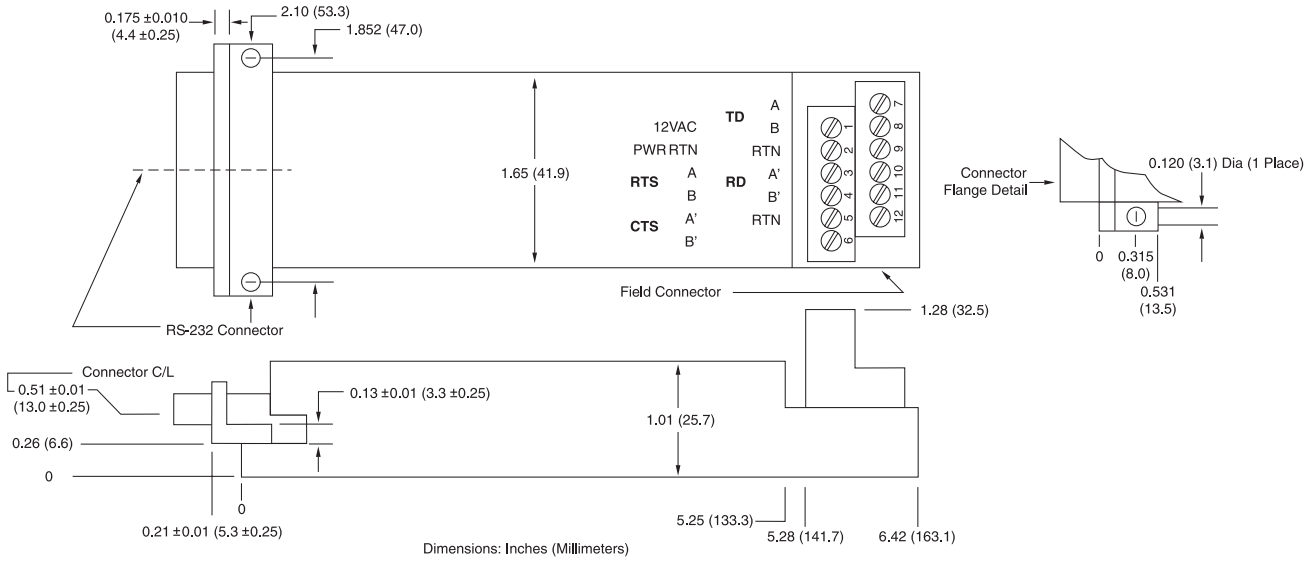
Model	Description
LDM422-P	Male RS-232 Connector
LDM422-S	Female RS-232 Connector
LDM422-PT	Male RS-232 Connector and U.S. Power Transformer
LDM422-ST*	Female RS-232 Connector and U.S. Power Transformer

*Last Time Buy

Model	Description
PT3	U.S. Style Wall Mount Transformer, 120VAC

RS-232 P1 Pin Descriptions				RS-422 P2 Pin Desc.
Pin 1	CASE		Ground	Pin 1 12VAC
Pin 2	TD	[3]	Transmit Data	Pin 2 PWR RTN
Pin 3	RD	[2]	Receive Data	Pin 3 RTS A
Pin 4	RTS	[7]	Request To Send	Pin 4 RTS B
Pin 5	CTS	[8]	Clear To Send	Pin 5 CTS A'
Pin 6	DSR	[6]	Data Set Ready (Connected to Data Terminal Ready)	Pin 6 CTS B'
Pin 7	GND	[5]	Signal Ground	Pin 7 TD A
Pin 8	RLSD	[1]	Receive Line Signal Detect	Pin 8 TD B
Pin 9	+12VDC		Positive DC Supply Input	Pin 9 SIG RTN
Pin 10	–12VDC		Negative DC Supply Input	Pin 10 RD A'
Pin 16	Echo Sup		Echo Suppression (tie to pin 17 to enable)	Pin 11 RD B'
Pin 17	Echo Sup		Echo Suppression (tie to pin 16 to enable)	Pin 12 SIG RTN
Pin 20	DTR	[4]	Data Terminal Ready (Connected to Data Set Ready)	

Pin Numbers Given are for the 25-pin Connector with the 9-pin Equivalent in [ ].



LDM422 Dimensions

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LDM485

RoHS III COMPLIANT 2015/863 CE

Fully-isolated RS-232/485 Converters

DESCRIPTION

The LDM485 is a compact RS-232 to RS-485 converter which features a complete electrical isolation barrier and heavy-duty electrical-surge protectors. These devices feature a rugged aluminum enclosure small enough to mount on the back panel of typical computer equipment, saving valuable desk and floor space. Isolation is provided by optical couplers and a DC-to-DC converter. The RS-232 connection is through male or female EIA 25-pin connectors. The RS-485 connections are made through convenient solderless screw terminals.

The LDM485 series is designed for full-duplex operation over two-wire pairs. Outputs are tri-state, allowing multidropping of up to 64 units. Hardware handshake is available over two separate wire pairs. Data rates are DC to 57.6k bits per second. Six diagnostic LED indicators are provided (see Figure below) for installation guidance and system troubleshooting. The RS-232 interface supports Request To Send, Clear To Send, Data Set Ready, Received Line Signal Detect, and Data Terminal Ready. A convenient null modem switch is provided for the data lines. Also, a line termination switch connects a line termination resistor and line bias resistors to the RS-485 receive lines. The RS-485 interface supports Request To Send and Clear To Send on separate wire pairs. The LDM485 may be used to convert two sets of send and receive channels by using RTS and CTS circuits as the second data channels. Data rates are the same. The units use 12VAC from a wall-mounted transformer to screw terminals 1 and 2 on the RS-485 connector. Alternately, they can use ±12VDC to pins 9 (+) and 10 (–) of the RS-232 connector.

FEATURES

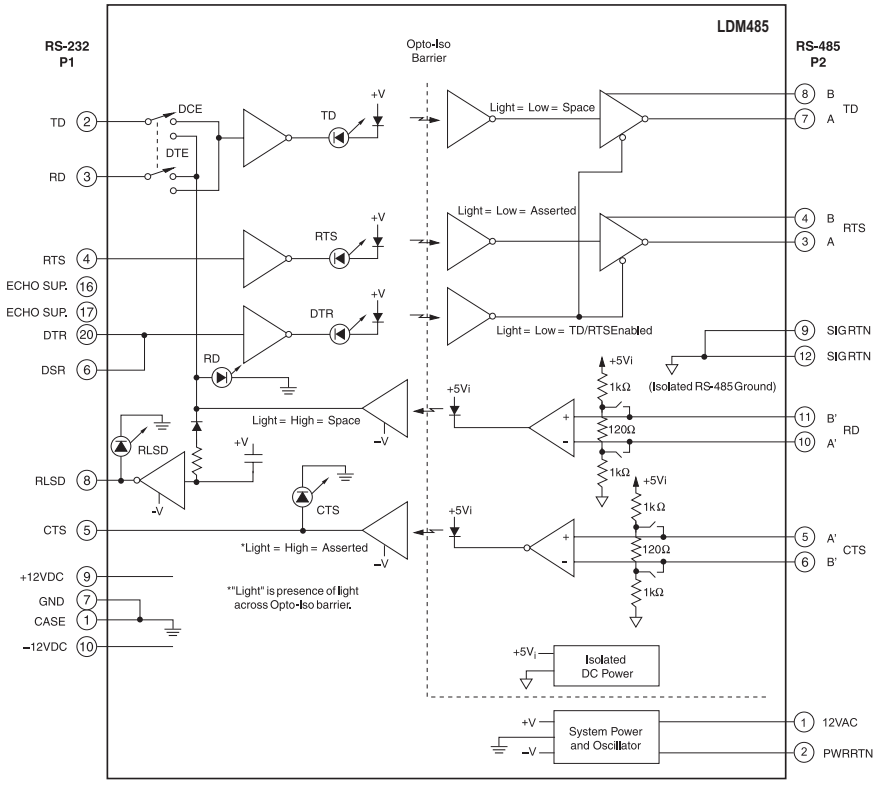
- Complete Isolation with Optical Couplers and Power DC-to-DC Converter
- Industrial Surge Protection Devices
- Six LED Diagnostic Indicators
- 19.2kbps at 3 Miles (5km), 57.6kbps at 0.5 Miles (0.8 km)
- Request-to-send, Clear-to-send Handshake
- Tri-state Outputs for Multidrop Applications, Up to 64 Devices
- Selection of Connectors
- Wide Operating Temperature Range
- Solderless Screw Terminal Field Connections
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- Factory Automation and Control
- HVAC Systems
- Building Automation



LDM485 Block Diagram

		A or A'	B or B'
TD, RD	Mark	Low	High
	Space	High	Low
	Asserted	High	Low
RTS, CTS	Not Asserted	Low	High

NOTE: Open or Tri-State on RD inputs produces a Mark state, and on CTS inputs produces an Asserted state.

TD, RD	Mark = –V; Space = +V
RTS, CTS, DTR, RLSD	Asserted = +V, Not Asserted = –V

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Specifications

Typical* at T_A = +25°C

Model	LDM485
Bit Rate (bps) bps vs Distance Distance(miles)(1) Distance(km)	0-57.6k 57.6k 38.4k 19.2k 9.6k 4.8k 1.2k-0 0.5 1.0 3.0 4.0 5.0 8.0 0.8 1.6 4.8 6.4 8.1 12.9
Wire Capacitance Maximum Multidrop Units	Equal to 25pf Per Foot and Up to 32 Multidrop Units 64
Common-Mode Isolation Differential-Mode Surge Protection (9 devices)	Surge: 1500Vp, 1 Minute Continuous: 1000Vrms (AC input) ANSI/IEEE C37.90.1 (All RS-485 Inputs and Outputs)
Modes	Asynchronous 4-wire Duplex, 2-wire Half-duplex, 2-wire Simplex
Channel Lines(2) Control Lines(2)	TD, RD, RTS, CTS RTS, CTS, DTR, DSR, RLSD
Null Modem Switch	1 (Reverses RS-232 Pins 2 and 3)
RS-485 Output Drive RS-485 Input Impedance	60mA (max) Output 12kΩ (min) Input
Power AC operation(3) DC operation	 12VAC, ±10%, 10W Screw Terms 1 & 2 +11.5VDC to +17.0VDC at 500mA on Pin 9 –11.5VDC to –17.0VDC at 100mA on Pin 10
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity	 0°C to +70°C –40°C to +85°C 0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	6.6" x 2.1" x 1.28" (167.6mm x 53.3mm x 32.5mm)
Weight PT3	7 oz (198g) (max) 11.0 oz (312g) (max)
MTTF(4)	>100,000 Hrs

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Distances reduced if multidropping more than 32 units; by 30% for 33-48 units; 50% for 49-64.
(2) TD = Transmit Data, RD = Receive Data, RTS = Request To Send, CTS = Clear To Send, DTR = Data Terminal Ready, DSR = Data Set Ready, RLSD = Received Line Signal Detect.
(3) 120VAC and 220VAC power transformers are available.
(4) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

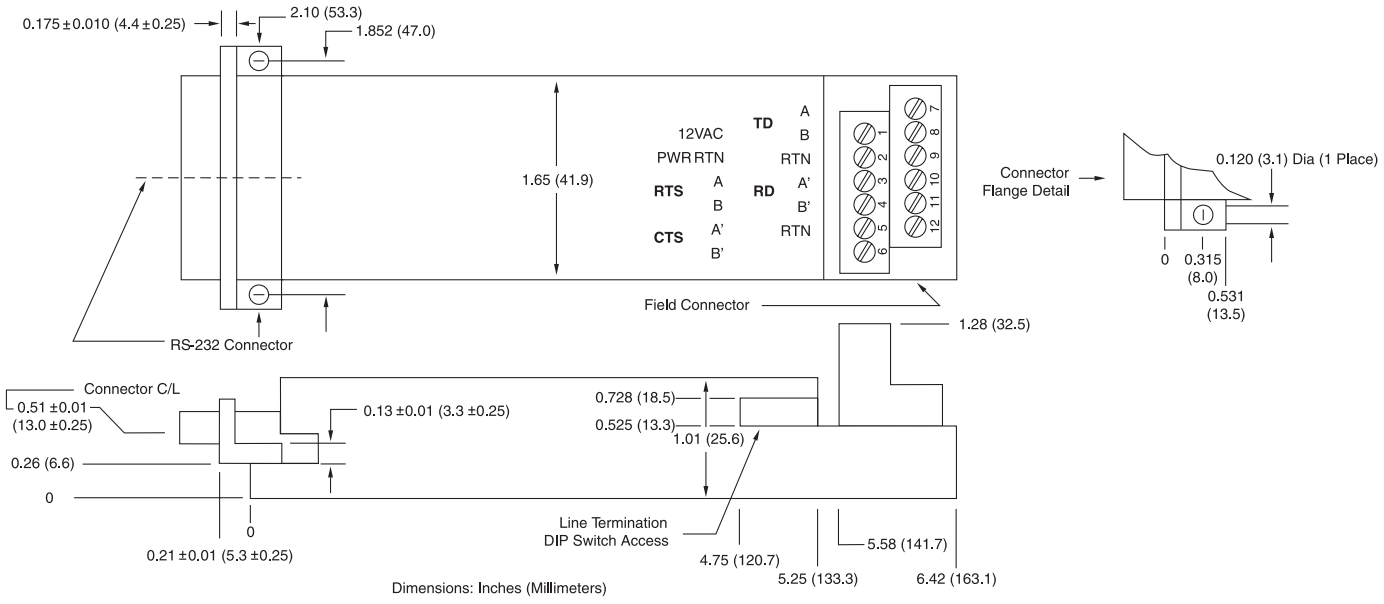
Model	Description
LDM485-P* LDM485-S LDM485-PE	Male RS-232 Connector Female RS-232 Connector Male RS-232 Connector, European Power Transformer

*Last Time Buy

Model	Description
PT3	U.S. Style Wall Mount Transformer, 120VAC

RS-232 Pin Descriptions				RS-485 P2 Pin Desc.	
Pin 1	CASE		Ground	Pin 1	12VAC
Pin 2	TD	[3]	Transmit Data	Pin 2	PWR RTN
Pin 3	RD	[2]	Receive Data	Pin 3	RTS A
Pin 4	RTS	[7]	Request To Send	Pin 4	RTS B
Pin 5	CTS	[8]	Clear To Send	Pin 5	CTS A'
Pin 6	DSR	[6]	Data Set Ready (Connected to Data Terminal Ready)	Pin 6	CTS B'
				Pin 7	TD A
				Pin 8	TD B
Pin 7	GND	[5]	Signal Ground	Pin 9	SIG RTN
Pin 8	RLSD	[1]	Receive Line Signal Detect	Pin 10	RD A'
Pin 9	+12VDC		Positive DC Supply Input	Pin 11	RD B'
Pin 10	–12VDC		Negative DC Supply Input	Pin 12	SIG RTN
Pin 16	Echo Sup		Echo Suppression (tie to pin 17 to enable)		
Pin 17	Echo Sup		Echo Suppression (tie to pin 16 to enable)		
Pin 20	DTR	[4]	Data Terminal Ready (Connected to Data Set Ready)		

Pin Numbers Given are for the 25-pin Connector with the 9-pin Equivalent in [ ].



LDM485 Dimensions

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LDM80

RoHS III COMPLIANT 2015/863 CE

Signal-powered Fiber Optic Converters

DESCRIPTION

The LDM80 is a small, inexpensive fiber optic transmitter/receiver completely powered by the host RS-232 port. The enclosure for the LDM80 is a conductive shell which greatly reduces RF radiation and susceptibility. The rugged metal enclosure is small enough to mount on the back panel of typical computer equipment saving valuable desk and floor space. A pair of these units allows most RS-232C cable links to be replaced and extended with a duplex fiber optic cable. The normal 50-foot (15m) RS-232 limit may be extended to 2.2 miles (3.5 km). Fiber optic data communications provide complete EMI/RFI rejection, isolation, elimination of ground loops, and reduced error rates. Data security is enhanced by almost nonexistent electromagnetic emissions. The RS-232 connection is through male or female EIA 25-pin connectors. The fiber optic connection is through ST connectors.

The LDM80 is equivalent to a 3-wire, full-duplex, RS-232 circuit. Handshake signals are locally connected as in Figure 1. Indicating LEDs come on during a “SPACE” on transmit or receive data. A TD/RD reversing DIP switch is provided for connection to DTE (Data Terminal Equipment) or DCE (Data Communication Equipment) ports.

FEATURES

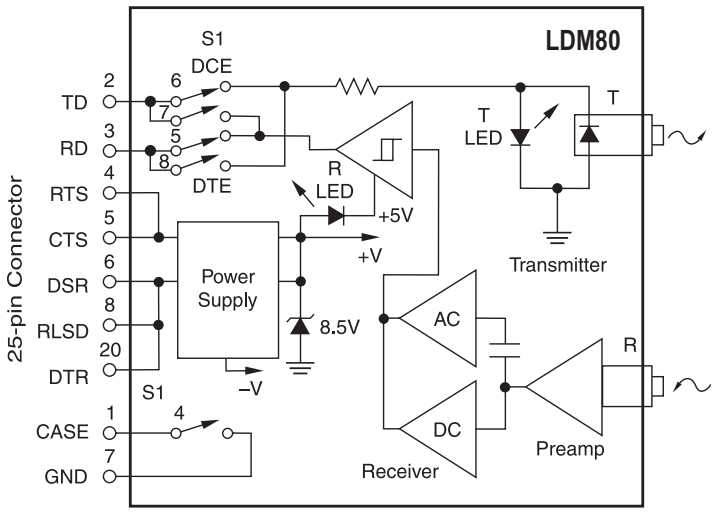
- Data Rates to 19.2kbps at 2.2 Miles (3.5km)
- 17dB Optical Link Power Budget
- Powered by RS-232 Host Port Signals
- Full-duplex Asynchronous Operation
- Indicating LEDs
- DCE/DTE Switch
- Designed for FCC Class A Requirements
- Complies with FCC Class A Requirements
- Pinned or Socketed RS-232 Connectors
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- High-speed Data Communications
- Industrial Data Communication



LDM80 Block Diagram

Pin Descriptions				Fiber Optic
Pin 1	CASE Ground			T / R
Pin 2	TD	[3]	Transmit Data	
Pin 3	RD	[2]	Receive Data	
Pin 4	RTS	[7]	Request To Send	
Pin 5	CTS	[8]	Clear To Send	
Pin 6	DSR	[6]	Data Set Ready	
Pin 7	SIG GND	[5]	Signal Ground	
Pin 8	RLSD	[1]	Receive Line Signal Detect	
Pin 20	DTR	[4]	Data Terminal Ready	

Pin Numbers Given are for the 25-pin Connector with the 9-pin Equivalent in [ ].

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Specifications

Typical* at T_A = +25°C

Model	LDM80
Bit Rate (bps)	0-19.2k
Distance Over Bit Rate Range	
Fiber Core Diameter (µm)	Max Cable Length / Loss Budget (dB)
100.0 (glass)	2.2 mi (3.5) (km) / 17
50.0 (glass)	1.6 (2.6) / 9
62.5 (glass)	1.2 (1.9) / 11
85.0 (glass)	2.2 (3.5) / 16
200.0 (glass)	2.2 (3.5) / 23
1000.0 (plastic)	98 feet 30 (meters) / 32
Modes	Asynchronous 2-fiber Full-duplex, 1-fiber Simplex
Channel Lines(1)	TD, RD
Control Lines(1)	RTS, CTS, DTR, DSR, RLSD
Optical Transmitter	850 nm Wavelength
Output from 1m Cable	–26dB (typ) –27dB (min) –18dB (max)
Optical Receiver Power Input for 4µs Pulse Distortion	–44dB (min)
Optical Connectors	ST Compatible
RS-232 Output Voltage with 3kΩ Load	+5V Logic 0, –5V Logic 1
DCE/DTE Switch	1
Diagnostic LEDs	2
Power	
Port Power	+5.0 to +8.5VDC, No Current Limit, 5mA
and/or DC Operation	>+8.5 VDC, 10mA Current Limit
Environmental:	
Operating Temperature Range	–20°C to +70°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	3.57" x 2.1" x 0.74" (90.7mm x 53.3mm x 18.8mm)
Weight	4.2 oz (119g) (max)
MTTF(2)	>100,000 Hrs

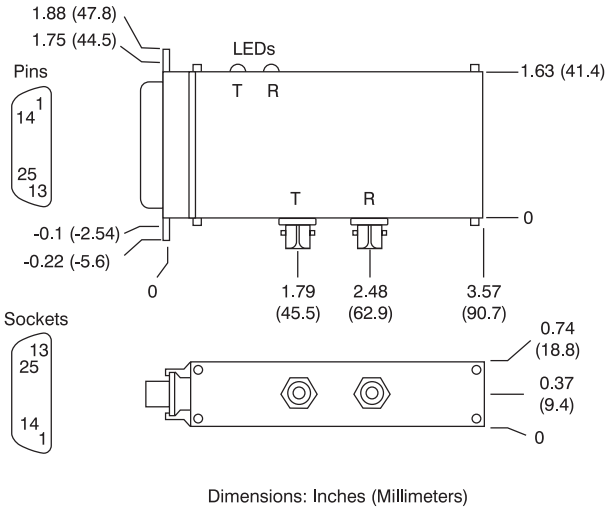
NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, RTS = Request To Send, CTS = Clear To Send, DTR = Data Terminal Ready, DSR = Data Set Ready, RLSD = Received Line Signal Detect.
(2) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).

Ordering Information

Model	Description
LDM80-P-025*	Pinned RS-232 Connector, St-fiber Optic Connector

*Last Time Buy

WARNING! *Modern PC ports may not have enough power to power the LDM80 sufficiently for reliable data communications. The user may have to bring in external power through RTS (pin 4), CTS (pin 5), DSR (pin 6), RLSD (pin 8), or DTR (pin 20) and GND (pin 7). The power needs to be at least +5VDC at 5mA for the receive circuits. Also, the Transmit Data port line (pin 2) should be able to provide at least ±5VDC at 5mA minimum.*



Dimensions: Inches (Millimeters)

LDM80 Dimensions

SECTION 8 - Data Comm

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LDM85

Fiber Optic Converters

RoHS III COMPLIANT 2015/863 CE

DESCRIPTION

The LDM85 is a small, inexpensive fiber optic transmitter/receiver. It features a complete RS-232/422/423 port as well as high-speed TTL data transmit and receive. It is capable of data rates from DC to 5Mbps. A pair of these units allows most RS-232C cable links to be replaced and extended with a duplex fiber optic cable. The normal 50-foot RS-232 limit may be extended to 1.2 miles (2 km). Fiber optic data communications provide complete EMI/RFI rejection, isolation, elimination of ground loops, and reduced error rates. Data security is enhanced by almost nonexistent electromagnetic emissions. A unique multipoint capability allows local area networks to be formed with the isolation and data security of a fiber optic data highway.

The LDM85 is packaged in a rugged aluminum enclosure small enough to mount on the back panel of typical computer equipment, saving valuable desk and floor space. The RS-232 connection is through male or female EIA 25-pin connectors. The fiber optic connection is either through SMA (905) or ST connectors. Additional features include a TD/RD reversing switch for connection to DTE (Data Terminal Equipment) or DCE (Data Communication Equipment) ports, three diagnostic LED indicators, and locally connected handshake lines. The TTL port combined with the RS-232 port may be interfaced to RS-422/423 ports in 4-wire point-to-point mode only.

FEATURES

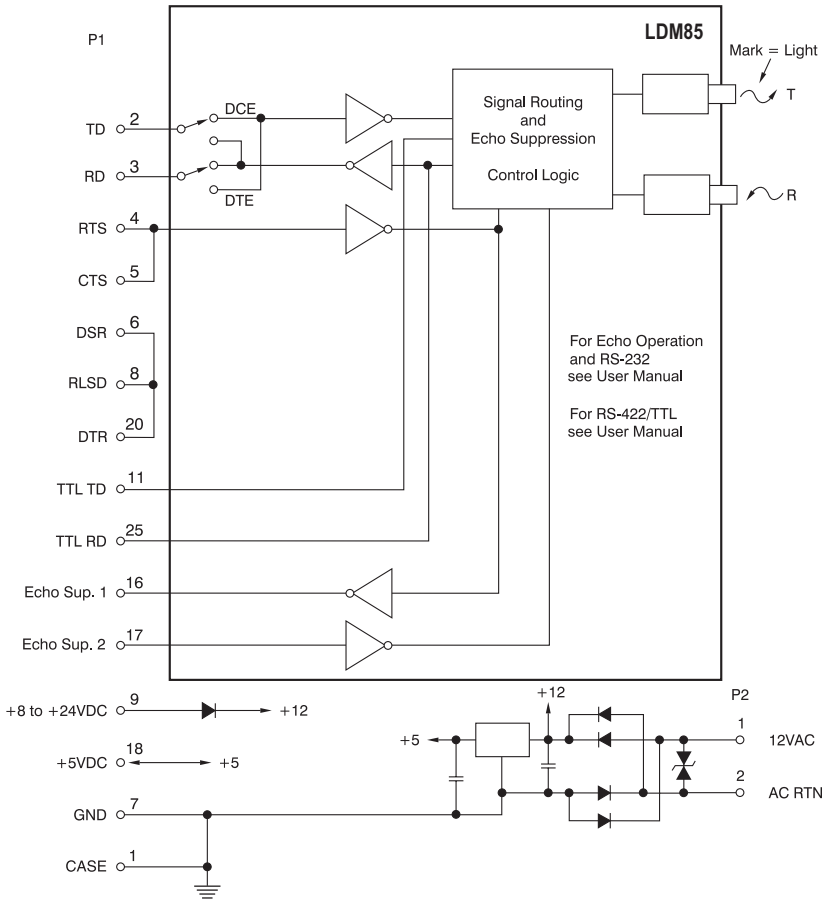
- Data Rates to 5Mbps
- RS-232, RS-422, TTL System Interfaces
- Multipoint Capability
- LED Indicators
- DCE/DTE Switch
- Small Size
- Low Cost
- SMA- or ST-compatible Optic Connectors
- 120/220VAC, +5VDC or 8 to 20VAC/DC Power
- CE Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Extends Communication Distances
- Protects Sensitive Communication Ports
- Wide Power Supply Range

APPLICATIONS

- High-speed Data Communications
- Industrial Data Communication



LDM85 Block Diagram

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Specifications

Typical* at T_A = +25°C

Model	LDM85
Bit Rate Range TTL Bit Rate Range RS-232/422/423 Distance (miles) Distance (km)	0 – 5M, 0 – 2.5M NRZ 0 – 100k Up to 1.05 Depending on Cable Up to 1.75 Depending on Cable
Modes	Asynchronous 2-fiber Full-duplex, 1-fiber Simplex
Channel Lines(1) Control Lines(1)	TD, RD, TTL TD, TTL RD RTS, CTS, DTR, DSR, RLSD
Optical Transmitter Numerical Aperture Optical Port Diameter Optical Receiver Equivalent Numerical Aperture Optical Port Diameter Optical Connectors	820nm Wavelength –11.5dBm Typical Output from 1m Cable, –16dBm Minimum Output (–40°C to +85°C) 0.49 290mm –25dBm to –12dBm Dynamic Range for Logic 1, –24dBm Minimum Input Logic 1 (–40°C to +85°C), –40dBm Maximum Input Logic 0 0.50 400µm ST, SMA (905)
Power Budget	7dB (–40°C to +85°C), 9dB (–20°C to +55°C)
DCE/DTE Switch	1
Diagnostic LEDs	3
Power AC Operation(2) DC Operation	 120VAC or 220VAC (3W Wall Transformer) or 10VAC to 20VAC (3W Transformer Rating) +8VDC to +24VDC at 130mA or +5VDC ±0.25VDC at 130mA
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing
Dimensions (h)x(w)x(d)	3.75" x 2.1" x 1" (95.3mm x 53.3mm x 25.4mm)
Weight PT3	3.7 oz (105g) (max) 11.0 oz (312g)
MTTF(3)	>120,000 Hrs

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) TD = Transmit Data, RD = Receive Data, TTL TD and TTL RD are DCE referenced TTL signals, RTS = Request To Send, CTS = Clear To Send, DTR = Data Terminal Ready, DSR = Data Set Ready, RLSD = Received Line Signal Detect.
(2) 120VAC and 220VAC power transformers are available.
(3) Ground-benign environmental conditions (no salt atmosphere, <50°C ambient temperature).
(4) For fiber optic connector, order part numbers: LDM-P-025, LDM85-PT-025, or LDM85-ST-025.

Ordering Information

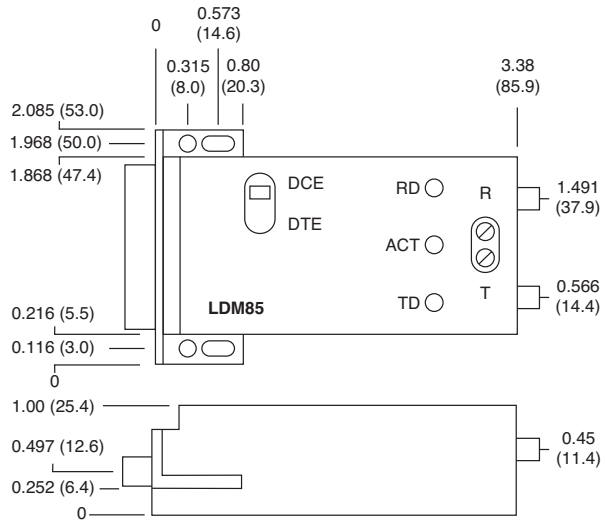
Model	Description
LDM85-PT*	Pinned RS-232 Connector, U.S. Wall Transformer, 120VAC
LDM85-P-025(4)	Fiber Optic Converter
LDM85-PT-025(4)	Fiber Optic Converter
LDM85-SE	Socketed RS-232 Connector, European Wall Transformer, 220VAC
LDM85-ST-025(4)	Socketed ST Fiber Optic Connector, U.S Wall Transformer, 120VAC

*Last Time Buy

Model	Description
PT3	U.S. Style Wall Mount Transformer, 120VAC

P1 Pin Descriptions				P2 Pin Descriptions
Pin 1	CASE		Ground	Pin 1 12VAC
Pin 2	TD	[3]	Transmit Data	Pin 2 AC RTN (GND)
Pin 3	RD	[2]	Receive Data	
Pin 4	RTS	[7]	Request To Send	
Pin 5	CTS	[8]	Clear To Send	
Pin 6	DSR	[6]	Data Set Ready	
Pin 7	GND	[5]	Signal Ground	
Pin 8	RLSD	[1]	Receive Line Signal Detect	
Pin 9	+VDC		+8 to +24 VDC Power In	
Pin 11	TTL TD		TTL TD Inverse of TD	**Fiber Optic**
Pin 16	Echo Sup 1		Echo Suppress Control Out	
Pin 17	Echo Sup 2		Echo Suppress Control In	T
Pin 18	+5VDC		+5VDC Power In, Pull Up Power Out	
Pin 20	DTR	[4]	Data Terminal Ready	R
Pin 25	TTL RD		TTL RD Inverse of RD	

Pin Numbers Given are for the 25-pin Connector with the 9-pin Equivalent in [ ].



Dimensions: Inches (Millimeters)

LDM85 Dimensions

SECTION 8 - Data Comm

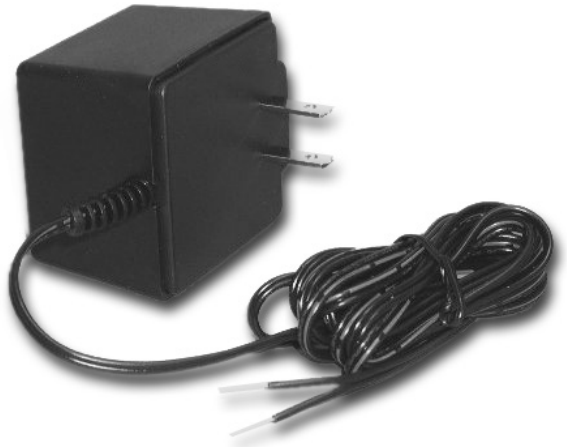
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PT3

RoHS III COMPLIANT 2015/863 CE

US-style Wall-mount Transformer



PT3 Power Supply

Specifications

Typical* at T_A = +25°C

Model	PT3
Electrical Specifications Input Output	120VAC, 60Hz, 18W 12VAC, 1000mA, 12.0VA
Output Cable Length	6.0 ft (1.83m) (min)
Dimensions (h)x(w)x(d)	2.21" x 2.14" x 1.65" (56.1mm x 54.4mm x 41.9mm)
Weight	11.0 oz (312g)

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

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PWRM10-01 9-4
High-accuracy, Rugged, *Instrument Class*, 85 – 525VAC, 50/60Hz Input:
PWRM20-01 9-7

Online Technical Library
Discontinued Parts

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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PWRM10-01: IoT Energy Monitoring Module

High-accuracy, Rugged, *Instrument Class*®, Energy Monitoring Module

DESCRIPTION

The PWRM10-01 energy monitoring module is an IoT universal, high-accuracy, compact, self-powered, electrical energy measurement device that interfaces to three-phase and single-phase systems. Specifically designed for industrial and commercial heavy-duty new and retrofit applications, the module provides a wide range of highly accurate power and energy measurement values over an operating temperature range of –40°C to +85°C.

The DIN-rail mounted enclosures have pluggable terminal blocks for connecting to phase voltages and phase currents which simplifies setup and maintenance, and the small format requires little space in control cabinets. The PWRM10-01 module interfaces to phase voltages of 85–265VAC, 50/60Hz, and is self-powered from any of the lines. Higher voltages can be interfaced to with the use of voltage transformers (VT) and appropriate scaling factors in the module.

Phase current inputs have an industry-standard range of 0.333VAC full-scale. An external shunt, current transformer, or Rogowski Coil is required to measure currents directly or non-contact.

The PWRM10-01 module measures and reports a wide range of electrical energy parameters.

Real-time data from the module is accessed via an Ethernet TCP/IP port using the HTTP API and a standard web browser on a host computer, smartphone, or tablet. Data logging is user-configurable and once parameters and ranges are selected, the data is automatically downloaded and stored.

FEATURES

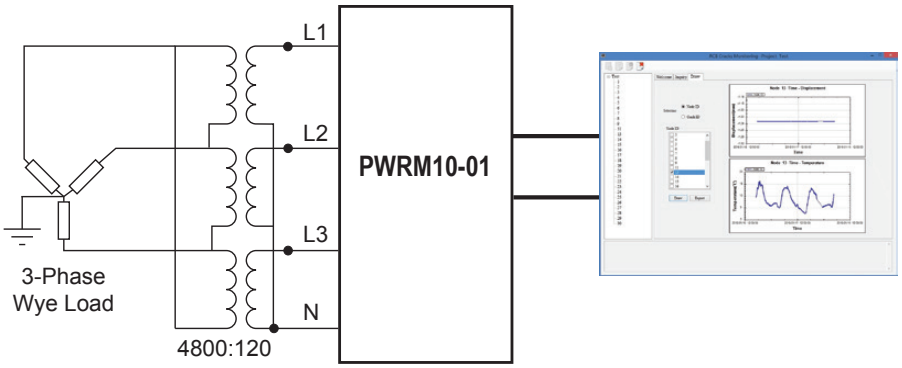
- RMS Voltages and Currents
- Phase Angles
- Line Periods
- Instantaneous Total Active Power
- Instantaneous Total Apparent Power
- Fundamental Active Power
- Power Factors
- Total Active Energy
- Fundamental Active Energy
- Fundamental Reactive Energy
- Total Apparent Energy
- Harmonics
- Power Quality
  - Over-voltage
  - Over-current
  - Sag

BENEFITS

- Power Quality Measurement
- Energy Consumption Monitoring
- Machine Health Monitoring
- Powerful Data Analysis
- User-friendly and Feature-rich IoT Module
- Withstands Harsh Environments
- High-level Noise Immunity

APPLICATIONS

- Energy Metering Systems
- Power Quality Monitoring
- Solar Monitoring
- Process Monitoring
- Health of Machine
- Predictive Maintenance
- Retrofit Applications in Energy Distribution and Industry



A PT with secondary Line-to-Neutal voltage of 120VAC and a step-down ratio of 4800:120 = 40 is used to connect the PWRM10-01 or PWRM20-01 to a utility voltage of 4800VAC. 120VAC is compatible with both modules.

Example shown, for more connectivity options, see PWRM User Manual MA1068

PWRM10-01 Block Diagram

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Electrical Specifications Typical* at T_A = +25°C

Module	PWRM10-01
Phase Voltage Range	85-265VAC
Phase Frequency	50/60Hz Input
Dimensions (h)(w)(d)	4.01" x 0.89" x 5.04" (102mm x 22.6mm x 128mm)
Material	Polyamide
Mounting	DIN-rail
Weight	0.3lb (0.14kg)
Electrical System	
Voltage Measurement (Direct Connection or VT)	Single-phase (2-wire) Two-phase (3-wire) Three-phase Wye (3-wire) Three-phase Delta (3-wire) Three-phase Wye (4-wire) Three-phase Delta (4-wire)
Current Measurement	Shunt, CT, or 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 & Reactive Energy	±0.25% ±0.1%
Phase Angles	±0.1%
Line Periods	
Measurement Bandwidth	
RMS Voltage and Current (–3dB)	3.3kHz
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 for Access Control
Data Logging	
	Configurable; Automatic Download and Storage
Communications Interface	
Connectivity Type	Ethernet, TCP/IP
IP Configuration	DHCP, Static IP
Port	Selectable (Default 80)
Number of Simultaneous Connections	6
Protocol	HTTP API
Power Supply	
Source	Self-powered from Any Line
Wide Range Power Supply	85-265VAC
Power Consumption	1.7W
Frequency	50 / 60Hz
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95%, Non-Condensing
Compliance and Conformity	
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ± 2% Span Error
ESD, EFT	Performance B
Certifications & Approvals	Heavy Industrial CE

NOTES:
* Contact factory for maximum values.

ATTENTION

Read, understand, and follow all instructions in the Quick Start Guide and Hardware User Manual, including all warnings, cautions, and precautions before installing and using.

PWRM10-01 module literature and software is available for download from the PWRM10-01 Software & User Download Center.

MA1069 PWRM10-01 & PWRM20-01 Quick Start Guide

MA1068 PWRM10-01 & PWRM20-01 Hardware User Manual

MA1067 PWRM10-01 & PWRM20-01 HTTP API User Manual

Ordering Information

Model	Description
PWRM10-01	85-265VAC, 50/60Hz Input

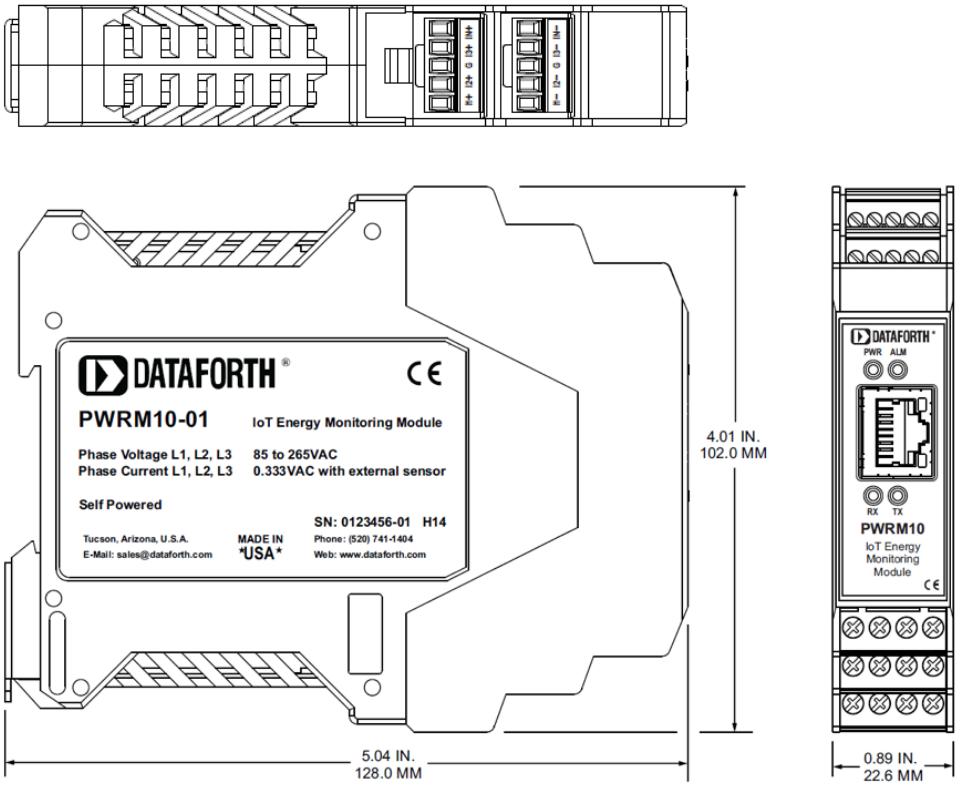
CAUTION – RISK OF ELECTRICAL SHOCK

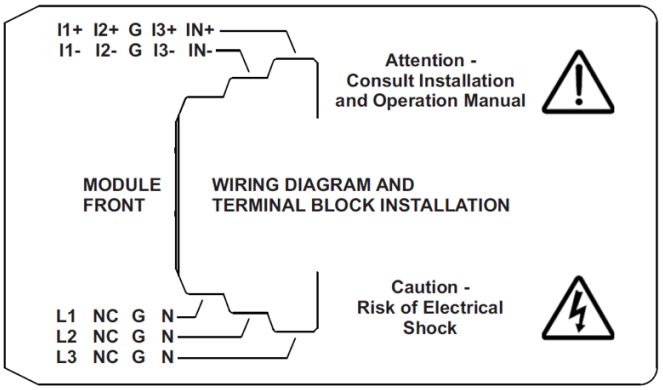
When installing and operating the PWRM10-01 module, there is a potential for shock hazard from dangerous high-voltage. Ensure systems are de-energized before installing or removing the terminal blocks.

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Module Dimensions and Pinouts





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PWRM20-01: IoT Energy Monitoring Module

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The DIN-rail mounted enclosures have pluggable terminal blocks for connecting to phase voltages and phase currents which simplifies setup and maintenance, and the small format requires little space in control cabinets. The PWRM20-01 module interfaces to phase voltages of 85–525VAC, 50/60Hz, and is self-powered from any of the lines. Higher voltages can be interfaced to with the use of voltage transformers (VT) and appropriate scaling factors in the module.

Phase current inputs have an industry-standard range of 0.333VAC full-scale. An external shunt, current transformer, or Rogowski Coil is required to measure currents directly or non-contact.

The PWRM20-01 module measures and reports a wide range of electrical energy parameters.

Real-time data from the module is accessed via an Ethernet TCP/IP port using the HTTP API and a standard web browser on a host computer, smartphone, or tablet. Data logging is user-configurable and once parameters and ranges are selected, the data is automatically downloaded and stored.

FEATURES

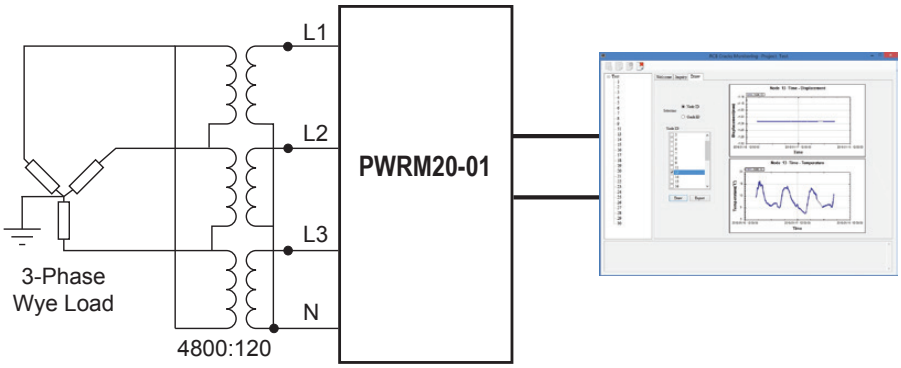
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- Phase Angles
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  - Over-voltage
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  - Sag

BENEFITS

- Power Quality Measurement
- Energy Consumption Monitoring
- Machine Health Monitoring
- Powerful Data Analysis
- User-friendly and Feature-rich IoT Module
- Withstands Harsh Environments
- High-level Noise Immunity

APPLICATIONS

- Energy Metering Systems
- Power Quality Monitoring
- Solar Monitoring
- Process Monitoring
- Health of Machine
- Predictive Maintenance
- Retrofit Applications in Energy Distribution and Industry



A PT with secondary Line-to-Neutal voltage of 120VAC and a step-down ratio of 4800:120 = 40 is used to connect the PWRM10-01 or PWRM20-01 to a utility voltage of 4800VAC. 120VAC is compatible with both modules.

Example shown, for more connectivity options, see PWRM User Manual MA1068

PWRM20-01 Block Diagram

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Electrical Specifications Typical* at T_A = +25°C

Module	PWRM20-01
Phase Voltage Range	85-525VAC
Phase Frequency	50/60Hz Input
Dimensions (h)(w)(d)	4.24" x 0.89" x 4.48" (107.7mm x 22.6mm x 113.7mm)
Material	Polyamide
Mounting	DIN-rail
Weight	0.4lb (0.18kg)
Electrical System	
Voltage Measurement (Direct Connection or VT)	Single-phase (2-wire) Two-phase (3-wire) Three-phase Wye (3-wire) Three-phase Delta (3-wire) Three-phase Wye (4-wire) Three-phase Delta (4-wire)
Current Measurement	Shunt, CT, or 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)	3.3kHz
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 for Access Control
Data Logging	
	Configurable; Automatic Download and Storage
Communications Interface	
Connectivity Type	Ethernet, TCP/IP
IP Configuration	DHCP, Static IP
Port	Selectable (Default 80)
Number of Simultaneous Connections	6
Protocol	HTTP API
Power Supply	
Source	Self-powered from Any Line
Wide Range Power Supply	85-525VAC
Power Consumption	1.7W
Frequency	50 / 60Hz
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95%, Non-Condensing
Compliance and Conformity	
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ± 2% Span Error
ESD, EFT	Performance B
Certifications & Approvals	Heavy Industrial CE

NOTES:
* Contact factory for maximum values.

ATTENTION

Read, understand, and follow all instructions in the Quick Start Guide and Hardware User Manual, including all warnings, cautions, and precautions before installing and using.

PWRM20-01 module literature and software is available for download from the PWRM10-01 Software & User Download Center.

MA1069 PWRM10-01 & PWRM20-01 Quick Start Guide

MA1068 PWRM10-01 & PWRM20-01 Hardware User Manual

MA1067 PWRM10-01 & PWRM20-01 HTTP API User Manual

Ordering Information

Model	Description
PWRM20-01	85-525VAC, 50/60Hz Input

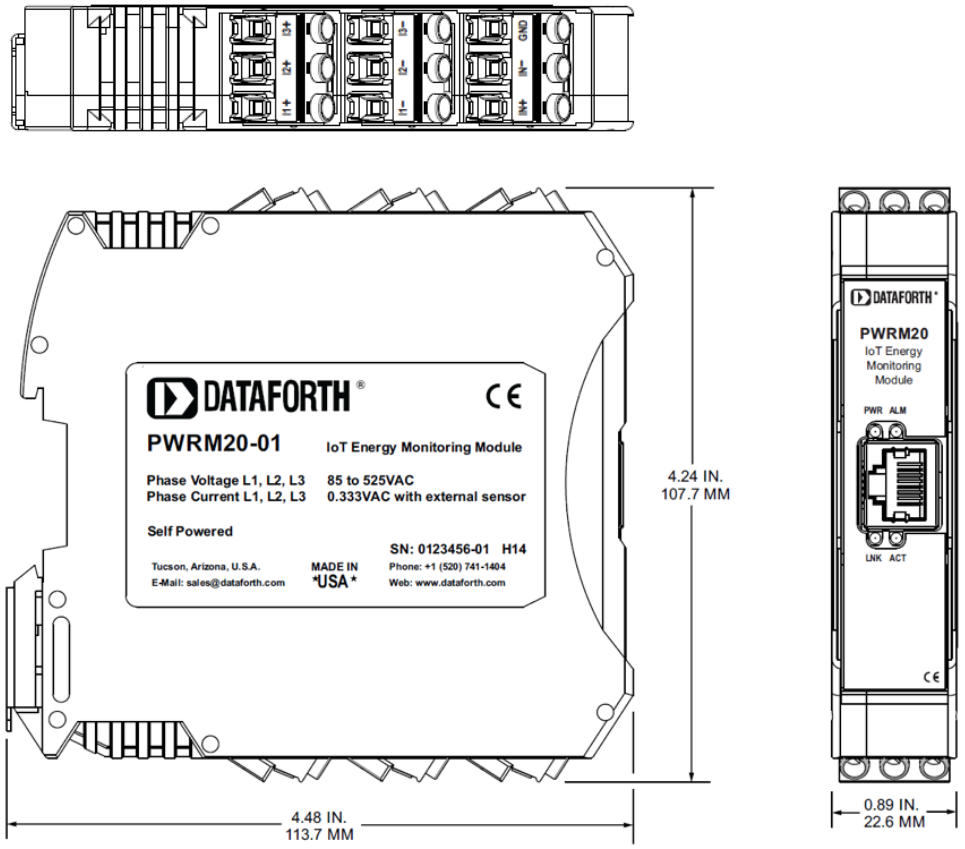
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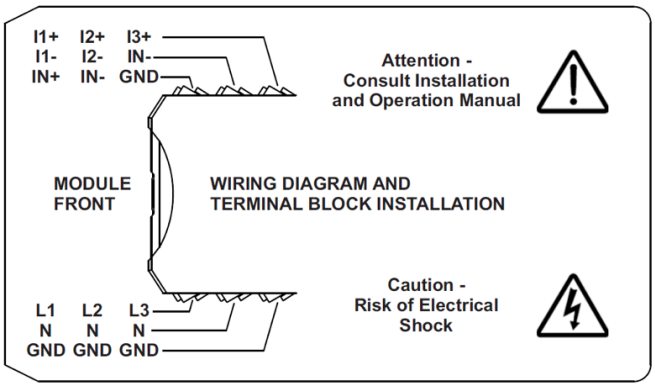
When installing and operating the PWRM20-01 module, there is a potential for shock hazard from dangerous high-voltage. Ensure systems are de-energized before installing or removing the terminal blocks.

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Module Dimensions and Pinouts





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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)
- Why Use Isolated Signal Conditioners? (AN116)
- 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
- Why Should Sensors Be Isolated
- Signal Conditioning and Alias Filters
- Low-Pass Filter Rise Time vs Bandwidth
- Strain Gauge Signal Conditioners
- Why Isolate Analog Signals?
- RTD Tutorial
- Six Sigma - What? Why? How?
- Windmill Applications
- Introduction to Thermocouples
- RTD, Resistance Temperature Detector
- Shielding and Grounding
- 5B for Piezo-Electric Accelerometers
- Configurable 5B Module
- Hysteresis Specifications
- Miniature Electronics... 8B Modules
- A Question from Dataforth's President
- Unbalanced Voltages Increase Cost
- Dataforth Test Reports
- Normal Mode Rejection, NMR
- Bridge Circuit Measurements
- Signal-to-Noise Ratio, SNR
- Accuracy versus Resolution
- Filtering - Phase Angles and Time Delays
- Uncertainty Principle
- Galvanic Isolation
- Quick Reference for RS-323, -422, -423, -485
- It's All About Isolation and Protection
- Serial Data
- Signal Conditioner with Power Supply
- Isolated I/O to Serial Data
- Loop Isolators
- Test Reports
- Measuring True RMS
- 2-wire, 4-20mA Applications
- System Accessories
- Why True RMS?
- Analog-to-Serial
- Transient Protection
- Signal Conditioner Life
- Common-Mode Voltage
- Thermocouples
- 5B or 7B
- DIN or 5B/7B Option
- Signal Conditioning Tutorial
- Programmable Signal Conditioning
- When Good Grounds Go Bad
- Input Resistance
- Drift Specs
- Failure Rates
- Industrial Date Acquisition
- Single Phase Revisited
- 3-Phase AC Calculations Revisited
- Using Ethernet for Data Acquisition
- Linearity and Conformity
- Reproducibility - Repeatability
- 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

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-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 - 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

DATAFORTH®

High Performance Industrial Signal Conditioning, Data Acquisition & Control, and Data Communication Products Since 1984

DATAFORTH WARRANTY

Applying to Products Sold by Dataforth Corporation

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

The Dataforth Quality Management System is ISO9001:2015 Registered



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