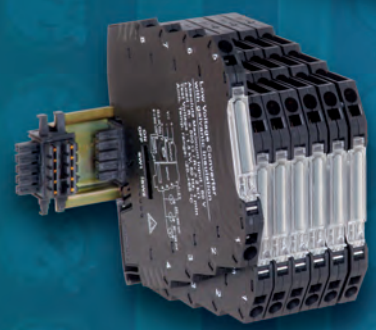

Full-Line Catalog

Instrument Class®

Industrial Electronics

Signal Conditioning
Data Acquisition
Data Communications

DATAFORTH®

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Data Communication Products

The Company

"Our passion at Dataforth Corporation is designing, manufacturing, and marketing the best possible signal conditioning, data acquisition, and data communication products. Our mission is to set new standards of product quality, performance, and customer service." Dataforth Corporation, with more than a quarter century of experience, is the worldwide leader in Instrument Class® Industrial Electronics – rugged, high-performance signal conditioning, data acquisition, 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 present in industrial environments.

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 in our Tucson factory ready to solve any in-depth application questions. Upon receipt of a quote or order, our Customer Service Department provides fast one-day delivery information turnaround. We maintain an 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 is composed of advanced degree engineers specializing in innovative analog and isolation circuit development, ensuring our customers of the highest performance products at the lowest price.

Automated Manufacturing and Test

Automated manufacturing techniques and machines are employed to produce our state-of-the-art SMT designs in optimum time and at minimum cost. All products are tested multiple times in automated test fixtures, and many undergo a 48-hour burn-in at elevated temperatures.

Quality Control

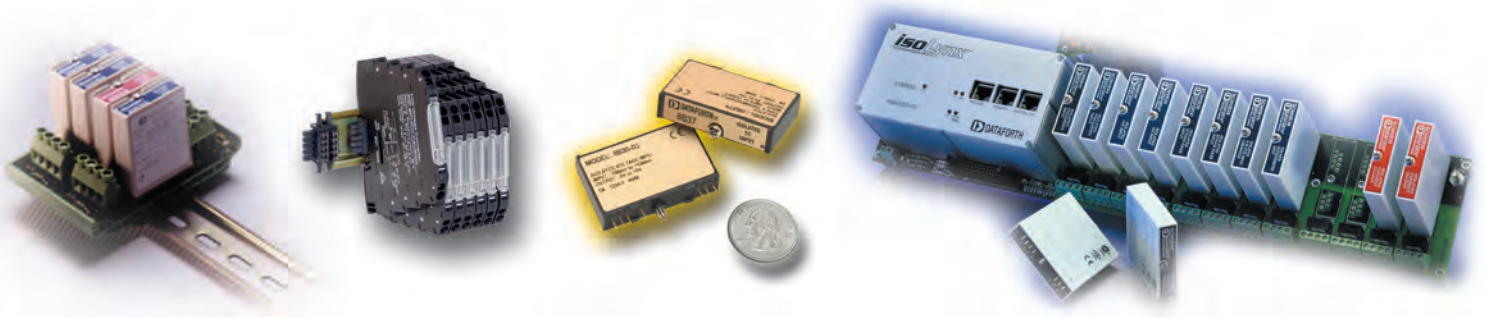
Dataforth operates under an ISO9001:2008 quality management system. Since our products are used in critical industrial data acquisition, control, and test and measurement applications, we strive to produce the highest quality, premier performance products available on the market. Zero defects and complete customer satisfaction are our goals. To further strengthen our commitment to quality, Dataforth secures certifications such as UL, CSA, ATEX, and CE.

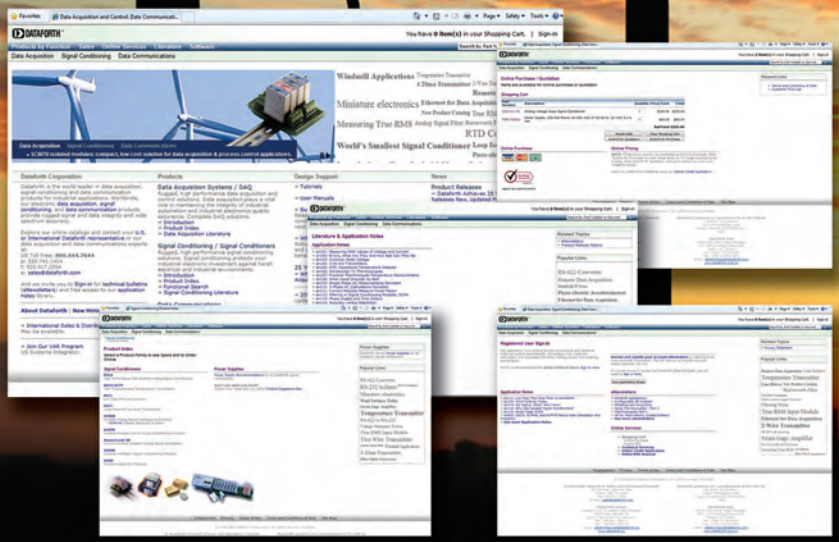
www.dataforth.com

Utilizing the latest web development technology, 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, while an e-commerce section provides pricing information and order entry. Fully detailed product data sheets and application notes are available for download in PDF format. Visitors also can request literature, view new product release data, read our bi-monthly newsletters, get answers to technical questions, and quickly locate Distributors and Sales Representatives.

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 the lowest price. By intelligently observing and responding to constantly changing market forces, we ensure the continuation of our critical customer partnerships.





Visit Dataforth's Full-Service Website: www.dataforth.com

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

- Fast, accurate parametric search capabilities for all Dataforth industrial signal conditioning, data acquisition, and data communication products
- On-line product quote and purchase
- On-line 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 tutorial
- Worldwide corporate and sales contact information
- Literature ordering center

On-Line Help
On-Line Ordering
Data Sheets
Application Notes
Product Information

SCM5B Isolated Analog Signal Conditioning Modules

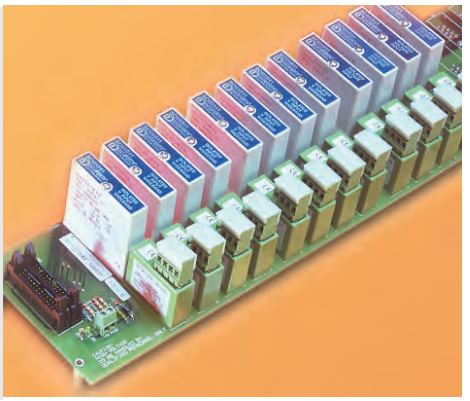
3-Way Isolation, 5 Volt Supply Voltage, “Lab” Performance

19 family groups & 250+ 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 gage, frequency, and 2-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.

Key 5B Features

- ±0.03% Accuracy (Typical)
- ±0.005% Linearity
- 1500Vrms Transformer Isolation & 240Vrms Field-Side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power (30mA Typical)
- 4- to 6-Pole Low-Pass Filtering
- 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 Directive 2002/95/EC



SCM7B Isolated Process Control Signal Conditioning Modules

2-Way Isolation, 24 Volt Supply Voltage, “Industrial” Performance

14 family groups & 202 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.

Key 7B Features

- ±0.03% Accuracy (Typical)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation & 120Vrms Field-Side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- Wide Supply Voltage, 14V to 35VDC
- 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 Directive 2002/95/EC

The SCM5B, SCM7B, SensorLex® 8B, and SCM9B product lines include a complete selection of backpanels, DIN rail mounting options, cables, racks, power supplies, and other accessory items.

Custom SCM5B, SCM7B, SensorLex® 8B, DSCA, and DSCT 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

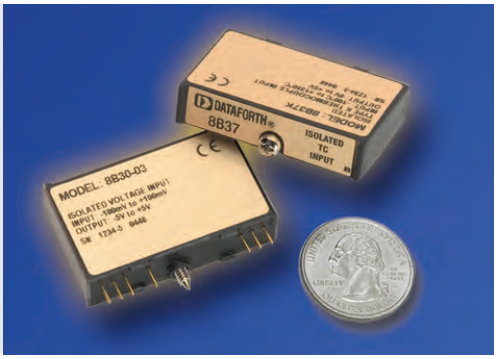
Miniature Size, 2-Way Isolation, 5 Volt Supply Voltage, Instrument Class® Performance

19 family groups & 123 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.

Key 8B Features

- ±0.05% Accuracy (Typical)
- ±0.02% Linearity
- 1500Vrms Transformer Isolation & up to 240Vrms Field-Side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power (30mA Typical)
- 3- to 5-Pole Low-Pass Filtering
- Low Output Noise
- –40°C to +85°C Operating Temperature
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Manufactured per RoHS Directive 2002/95/EC

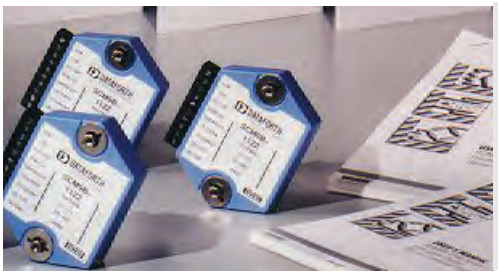


SCM9B Isolated Intelligent Signal Conditioning Modules

Software Configurable Sensor-to-Computer and Computer-to-Analog Output

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. SCM9B modules are an excellent solution for distributed data acquisition applications such as process monitoring and control, remote data logging, product testing, and motion and motor speed control.



Key 9B Features

- 500Vrms Isolation
- Programmable Scaling and Linearization
- ASCII Command/Response Protocol
- 15-Bit Measurement Resolution
- Continuous Self-Calibration
- Analog Readback
- CE Compliant
- Manufactured per RoHS Directive 2002/95/EC

SCMD Isolated Digital I/O Modules

Miniature Digital I/O 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
- UL Listed, CSA Certified, CE Compliant
- Manufactured per RoHS Directive 2002/95/EC

SCM5B isoLynx® SLX200 Data Acquisition System

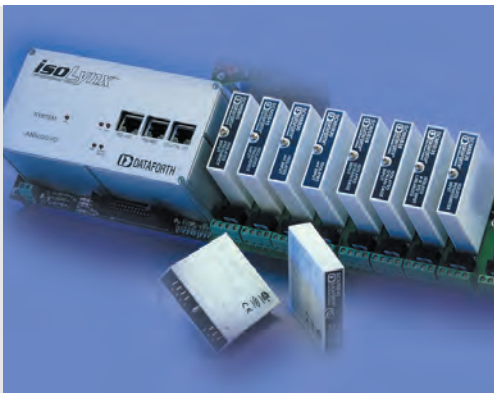
Fast, Intelligent, Modular, Fully Isolated

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 module 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.

Key SCM5B isoLynx® SLX200 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
- Fast 16-Bit A/D, D/A
- Best I/O Selection with 250+ Different I/O Modules
- Supported by ReDAQ® Freedom Software
- OPC Compatible
- –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 Directive 2002/95/EC



ReDAQ® Freedom SLX200 SCADA Software

An effective solution for factory automation, process control, test and measurement, machine control, and data acquisition applications when combined with one or more SCM5B isoLynx® SLX200 data acquisition systems

Key ReDAQ® Freedom Features

ReDAQ® Freedom - Server

- Generates Data Tables and Excel Spreadsheets
- Integrated XML Data Exchange
- Dynamic Calculations Including Mean, Median, Max, Min, Variance, and Standard Deviation
- Built-in Real-time, Lossless Historian
- No User Application Software Required
- Streams Real-time Data for Graphical Displays

ReDAQ® Freedom - Designer

- Generates Real-time and History Graphics:
  - Live Tables - Pie Charts - Mimics
  - Graphs - Histograms
- Evaluates Math Expressions Using: +, -, *, /, ^, %, sqrt, sqr, sin, cos, tan, acos, asin, atan, sinh, cosh, tanh, asinh, acosh, atanh, exp, log, min, max, ceil, floor, abs, neg, rand

Industrial Data Communication Products

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

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 modems "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 115k Baud
- Distances to 12 Miles (20km)
- CE Compliant
- Manufactured per RoHS Directive 2002/95/EC

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 simultaneous analog and digital I/O 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.

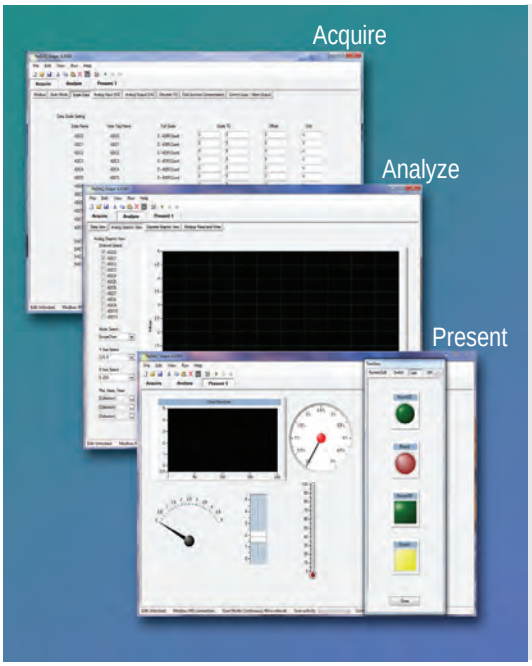
Key 8B isoLynx® SLX300 Features

- Modbus RTU and TCP Support
- 1500Vrms Input-to-Output and Channel-to-Channel Isolation
- 240Vrms Field-Side Protection
- Wide I/O Selection
  - Analog – 15 Product Families, 70 Models
  - Digital – 5 Product Families, 14 Models
- Mix & Match Analog & Digital I/O
- Advanced Features Including Alarms, Counters, Timers, PWMs, and more
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Manufactured per RoHS Directive 2002/95/EC

ReDAQ® Shape SLX300 Software

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

ReDAQ® Shape provides the easiest and most efficient development tool to create, save, and open graphical user interface projects as well as to test, process, and analyze acquired data. Built-in functions in the Acquire and Analyze panels can be used without setup and configuration, and just three steps are required to create customized Presentation panels.



Key ReDAQ® Shape Features

- 18 High Quality Controls
- 3 Easy Steps to Create Customized Presentation Panels
- No Setup or Configuration Required in Acquire and Analyze Panels
- 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

DSCT Loop-Powered Isolated Two-Wire Transmitters

Instrument Class® Performance in a Low Cost DIN Rail Mount Package

7 family groups & 48 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 to 20mA range.

Key DSCT Features

- ±0.03% Accuracy (Typical)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation & 240Vrms Field-Side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- Wide Loop Supply Voltage, 10.8V to 60V
- 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 Directive 2002/95/EC

DSCA High Performance, DIN Rail Mount Isolated Signal Conditioners

True 3-Way Isolation, High Accuracy, Instrument Class® Performance

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.

Key DSCA Features

- ±0.03% Accuracy (Typical)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation & 240Vrms Field-Side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- Wide Supply Voltage, 15V to 30VDC
- Industry Standard Output of 0 to 10V ±10V, 0 to 20mA, or 4 to 20mA
- 4- to 6-Pole Low-Pass Filtering
- Low Output Noise
- –40°C to +80°C Operating Temperature
- Plug-in Terminal Blocks Simplify Wiring
- C-UL-US Listed (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS Directive 2002/95/EC

DSCL, DSCP & SCTP Industrial Loop Isolators and Transmitters

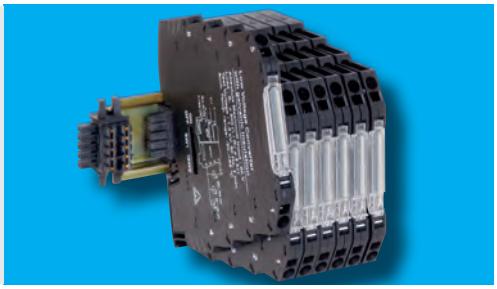
Passive, Active, Programmable 4 to 20mA Loop Products

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

This full 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 new compact 6.2mm DSCP dip-switch configurable signal converters are ideal when space is limited.

Key DSCL, DSCP & SCTP Features

- Signal-Powered Passive Loop Isolator Models
- Jumper and Software Configurable Models
- Wide Range 24V to 60V or 85V to 230V AC/DC-Powered Models
- 4000Vrms Isolation
- Multiple Channels per Package Available
- PCB, DIN Rail, Panel, and Instrument Head Mounting Options
- CE Compliant
- Manufactured per RoHS Directive 2002/95/EC



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

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

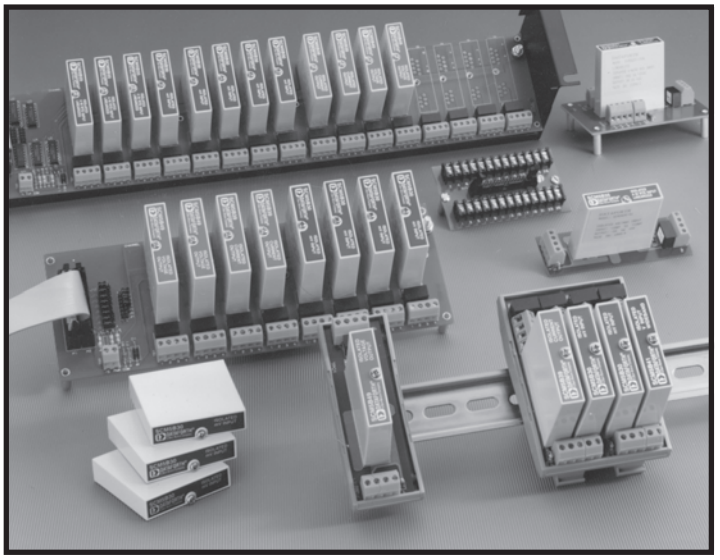
▶ Din Rail, Head Mount Products - DSCA, DSCT, DSCL, DSCP, SCTP

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

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

SCM5B

Isolated SCM5B Analog Signal Conditioning Products



▶Features

- ±0.03% Accuracy (Typical)
- ±0.005% Linearity
- 1500Vrms Transformer Isolation & 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power (30mA Typical)
- 4- to 6-Pole Low-Pass Filtering
- Up to 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±1µV°C Drift
- Output Noise as Low as 150µVrms
- –40°C to +85°C Operating Temperature
- CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS Directive 2002/95/EC

▶Applications

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

SCM5B Modules

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

Improved SCM5B Analog Modules

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

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

Dataforth SCM5B modules offer several advantages when compared with competitive parts, while maintaining equivalent price:

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

Custom Signal Conditioning

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

▶ SCM5B Selection Guide

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

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

ANALOG CURRENT INPUT MODULES, 4Hz AND 1kHz BANDWIDTH Page 8

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

ISOLATED TRUE RMS INPUT MODULES Page 10

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

LINEARIZED 2- OR 3-WIRE RTD INPUT MODULES (0 to +5V OUTPUT†, 4Hz BW) Page 12

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

LINEARIZED 4-WIRE RTD INPUT MODULES (0 to +5V OUTPUT†, 4Hz BW) Page 14

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

POTENTIOMETER INPUT MODULES (4Hz BW) Page 16

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

THERMOCOUPLE INPUT MODULES (0 to +5V OUTPUT†, 4Hz BW) Page 18

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

STRAIN GAGE INPUT MODULES (±5V OUTPUT†, 4Hz or 10kHz BW) Page 20

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

ANALOG CURRENT OUTPUT MODULES, 400Hz AND 1kHz BANDWIDTH Page 24

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

▶ SCM5B Selection Guide (Continued)

MATCHED PAIR SERVO/MOTOR CONTROLLER DRIVERS (1kHz BW)
Page 26

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

ANALOG VOLTAGE INPUT MODULES, WIDE BANDWIDTH (10kHz BW) Page 28

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

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

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

GENERAL PURPOSE INPUT MODULES, DC EXCITATION Page 32

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

FREQUENCY INPUT MODULES Page 34

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

LINEARIZED THERMOCOUPLE INPUT MODULES (0 to +5V OUTPUT†, 4Hz BW)
Page 36

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 MODULE (2.5kHz to 20kHz BW) Page 38

Gain, bandwidth, and excitation are switch-programmable

MODEL	INPUT RANGE	OUTPUT RANGE
SCM5B48-01	±10V max	±10V

VOLTAGE OUTPUT MODULES, 50mA DRIVE CAPACITY (400 Hz BW) Page 40

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

VOLTAGE ATTENUATOR SYSTEM Page 43

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

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

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

▶ SCM5B Selection Guide (Continued)

ACCESSORIES **Starts on Page 48**

MODEL	DESCRIPTION
SCMPB01	Non-multiplexed,16-channel backpanel.
SCMPB01-1	Non-multiplexed, 16-channel backpanel, no CJC.
SCMPB01-2	SCMPB01 with DIN rail mounting option.
SCMPB01-3	SCMPB01-1 with DIN rail mounting option.
SCMPB02	Multiplexed, 16-channel backpanel.
SCMPB02-1	Multiplexed, 16-channel backpanel, no CJC.
SCMPB02-2	SCMPB02 with DIN rail mounting option.
SCMPB02-3	SCMPB02-1 with DIN rail mounting option.
SCMPB03	Single channel backpanel. Mounting hardware not included.
SCMPB03-2	SCMPB03 with DIN rail mounting hardware.
SCMPB04	Dual channel backpanel. Mounting hardware not included.
SCMPB04-1	Dual channel backpanel, DIN rail mount, no CJC.
SCMPB04-2	SCMPB04 with DIN rail mounting hardware.
SCMPB04-3	SCMPB04-1 with DIN rail mounting hardware.
SCMXBEFE	Base element with snap foot.
SCMXBE	Base element without snap foot.
SCMXSE	Side element.
SCMXVS	Connection pins.
SCMPB05	Non-multiplexed, 8-channel backpanel.
SCMPB05-1	Non-multiplexed, 8-channel backpanel, no CJC.
SCMPB05-2	SCMPB05 with DIN rail mounting option.
SCMPB05-3	SCMPB05-1 with DIN rail mounting option.
SCMPB06	Multiplexed, 8-channel backpanel.
SCMPB06-1	Multiplexed, 8-channel backpanel, no CJC.
SCMPB06-2	SCMPB06 with DIN rail mounting option.
SCMPB06-3	SCMPB06-1 with DIN rail mounting option.
SCMPB07	8-channel high-density backpanel.
SCMPB07-1	SCMPB07, no CJC.
SCMPB07-2	SCMPB07, DIN rail mount.
SCMPB07-3	SCMPB07, no CJC, DIN rail mount.
SCMXEV	Single channel SCM5B evaluation board.
SCMXCA004-01,-02	System interface cable for both analog backpanels.
SCMXRK-002	19-inch metal rack for mounting analog backpanels.
SCMXIF	Ribbon cable to screw terminal interface board.
SCMXIF-DIN	Universal Interface Board.
SCMXCJC	Encapsulated cold junction compensation circuit.
SCM5BPT	Non-isolated signal pass thru module.
SCMXJP-003	Package of 10 jumpers.
SCMXFS-003	Package of 10, 4A fuses.
SCMXR1	Precision 20Ω resistor for SCM5B32 and SCM5B42.
SCM5B-PROTO	Breadboard Kit.
SCMXRAIL1-XX	DIN EN50022-35x7.5 (slotted steel), length -XX in meters.
SCMXRAIL2-XX	DIN EN50035-G32 (slotted steel), length -XX in meters.
SCMXRAIL3-XX	DIN EN50022-35x15 (slotted steel), length -XX in meters.
SCMXPRT-001	Power supply, 1A, 5VDC, 120VAC U.S.
SCMXPRT-001D	SCMXPRT-001 with DIN rail mounting option.
SCMXPRE-001	Power supply, 1A, 5VDC, 220VAC European.
SCMXPRE-001D	SCMXPRE-001 with DIN rail mounting option.
SCMXPRT-003	Power supply, 3A, 5VDC, 120VAC U.S.
SCMXPRE-003	Power supply, 3A, 5VDC, 220VAC European.

NOTES:

† OUTPUT RANGES AVAILABLE

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

‡ THERMOCOUPLE ALLOY COMBINATIONS

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

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			

SCM5B30/31

Analog Voltage Input Modules, Narrow Bandwidth

Description

Each SCM5B30 and SCM5B31 voltage input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.03% Accuracy
- ±0.005% Linearity
- ±1µV/°C Drift
- CSA C/US Certified, CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

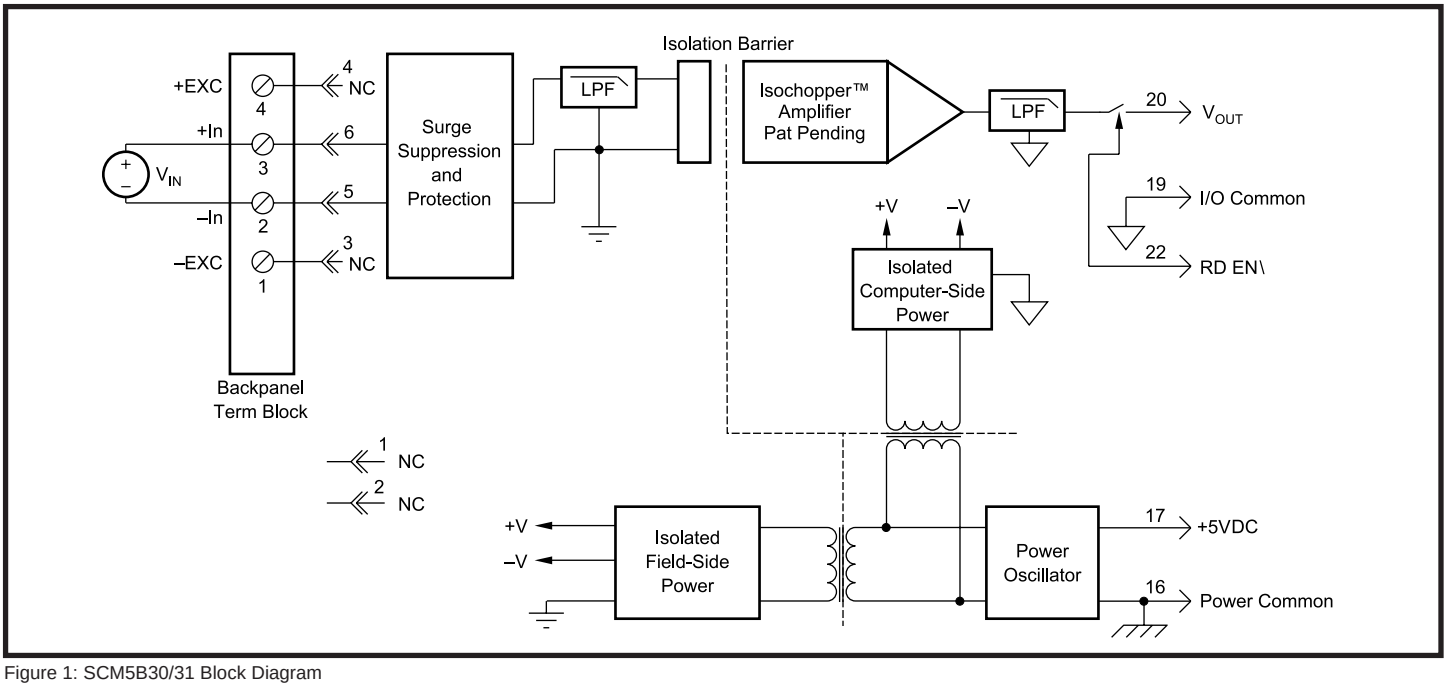


Figure 1: SCM5B30/31 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	SCM5B30	SCM5B31
Input Range	±10mV to ±1V	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	650kΩ (minimum)
Power Off	40kΩ	650kΩ (minimum)
Overload	40kΩ	650kΩ (minimum)
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	±1µV/°C	±20µV/°C
Output Offset	±20µV/°C	*
Gain	±25ppm/°C	±50ppm/°C
Noise		
Input, 0.1 to 10Hz	0.2µVrms	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	*
Power Supply Voltage	+5VDC ±5%	*
Power Supply Current	30mA	*
Power Supply Sensitivity	±2µV/% RTI(2)	±200µV/% RTI(2)
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	–40°C to +85°C	*
Storage Temp. Range	–40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A ±0.5% Span Error	*
ESD,EFT	Performance B	*

NOTES:
* Same specification as SCM5B30.
(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	1, 2
SCM5B30-02	–50mV to +50mV	1, 2
SCM5B30-03	–100mV to +100mV	1, 2
SCM5B30-04	–10mV to +10mV	3, 4
SCM5B30-05	–50mV to +50mV	3, 4
SCM5B30-06	–100mV to +100mV	3, 4
SCM5B30-07(3)	–1V to +1V	1, 2
SCM5B31-01	–1V to +1V	1, 2
SCM5B31-02	–5V to +5V	1, 2
SCM5B31-03	–10V to +10V	1, 2
SCM5B31-04	–1V to +1V	3, 4
SCM5B31-05	–5V to +5V	3, 4
SCM5B31-06	–10V to +10V	3, 4
SCM5B31-07	–20V to +20V	1, 2
SCM5B31-08	–20V to +20V	3, 4
SCM5B31-09	–40V to +40V	1, 2
SCM5B31-10	–40V to +40V	3, 4

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –5V to +5V	NONE	SCM5B30-01
2. –10V to +10V	D	SCM5B30-01D
3. 0V to +5V	NONE	SCM5B30-04
4. 0V to +10V	D	SCM5B30-04D

SCM5B32

Analog Current Input Modules

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified, CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

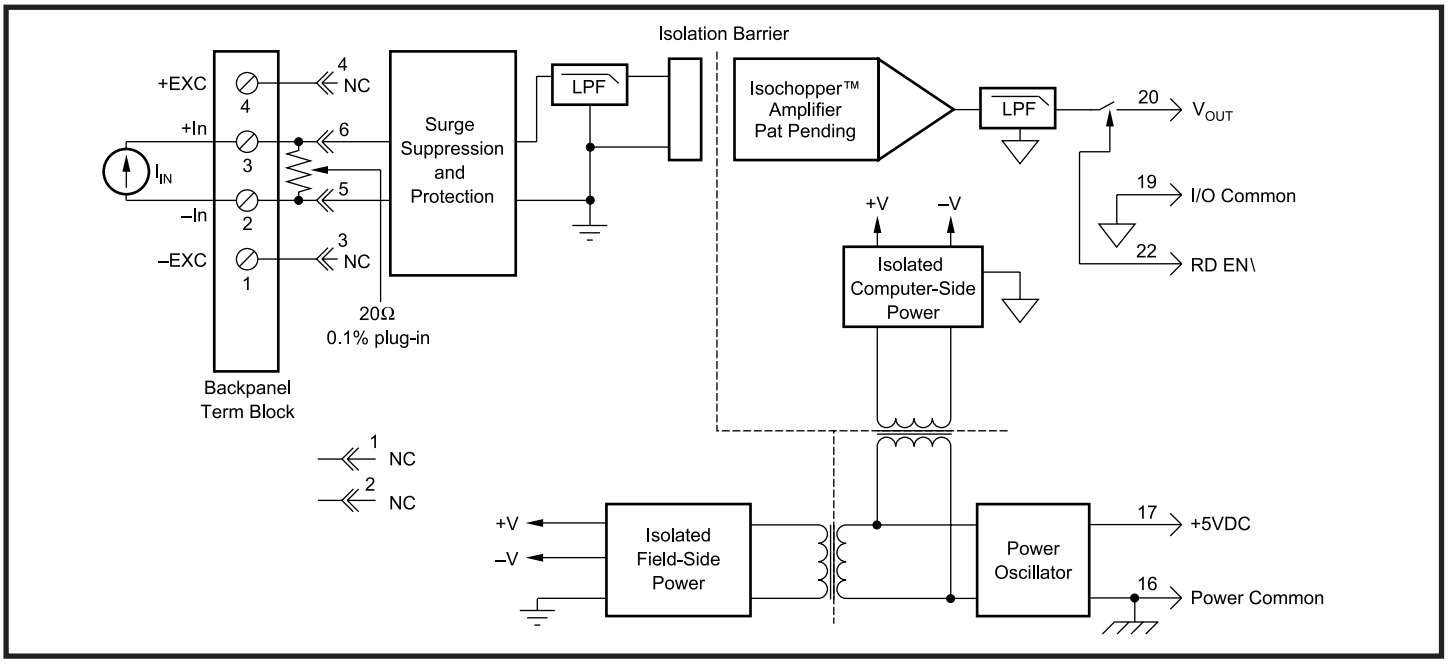


Figure 1: SCM5B32 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	SCM5B32
Input Range	0mA to 20mA or 4mA to 20mA
Input Resistor	
Value	20.00Ω
Accuracy	±0.1%
Stability	±10ppm/°C
Input Protection	
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	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	30mA
Power Supply Sensitivity	±20µV/% RTI(2)
Mechanical Dimensions	2.28" x 2.26" x 0.60"
(h)(w)(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:
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

Ordering Information

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

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

†Output Ranges Available

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

SCM5B33

Isolated True RMS Input Modules

Description

Each SCM5B33 True RMS input module provides a single channel of AC input which is converted to its True RMS DC value, filtered, isolated, amplified, and converted to a standard process voltage or current output (Figure 1).

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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 Output of either 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 & DC) or 10A RMS Continuous
- ANSI/IEEE C37.90.1 Transient Protection
- CSA C/US Certified and CE Compliant
- ATEX Compliant (all models except SCM5B33-04x, -05x)
- Mix and Match SCM5B Types on Backpanel

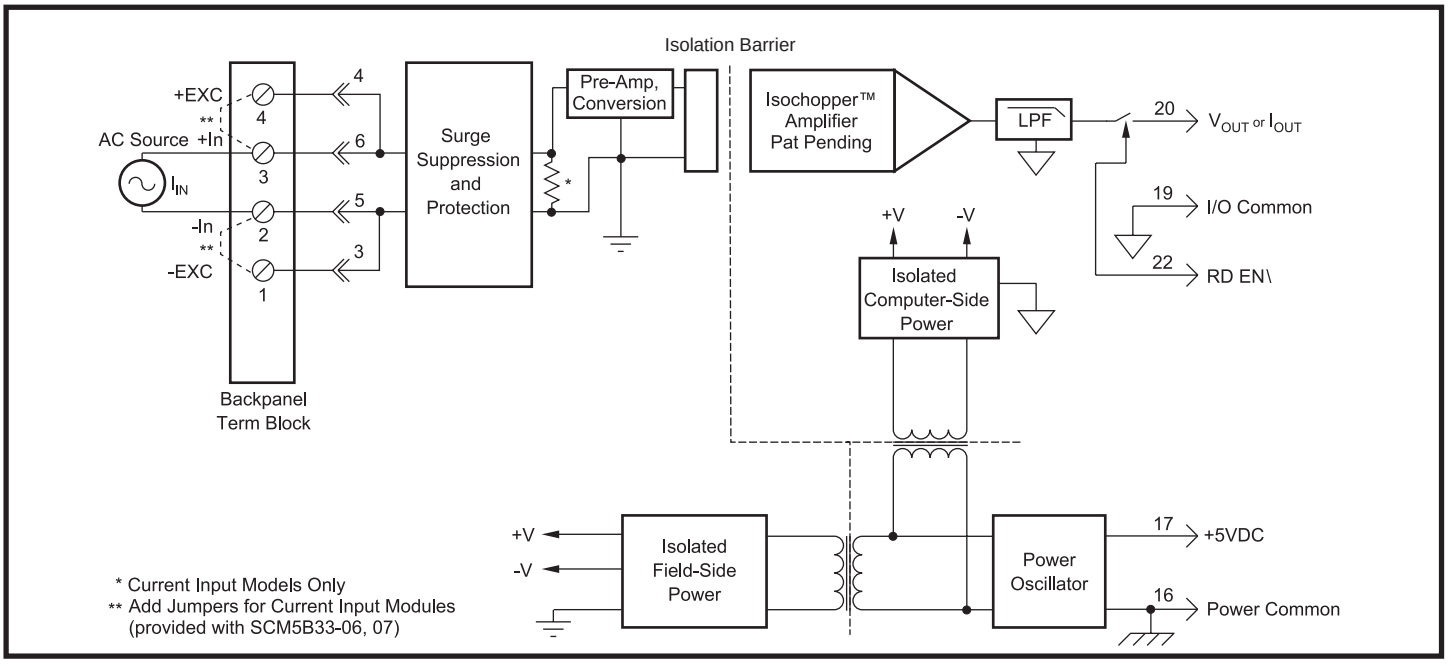


Figure 1: SCM5B33 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	SCM5B33
Input	
Signal Range	100mV to 300Vrms, 0 to 5Arms
Standard Frequency Range	45Hz to 1000Hz
Extended Frequency Range	1kHz to 20kHz
Impedance	1 MΩ shunted by 100pF (-01 thru -05), 0.10Ω (-06), 0.025Ω (-07)
Coupling	AC
Protection(1)	
Continuous (-01 thru -05)	350Vrms
Continuous (-06 thru -07)	10Arms
Transient (-01 thru -05)	ANSI/IEEE C37.90.1
Transient (-06 thru -07)	See note 2
Output	
Signal Range	0-5V or 0-10V or 0-1mA or 0-20mA or 4-20mA
Current Limit	1.4mA (0-1mA models), 30mA (0/4-20mA models), 8mA (0-5, 0-10V models)
Voltage Limit	±18V (0-5, 0-10V models)
Resistance	50Ω (0-5, 0-10V models)
Protection	Continuous Short to Ground
Ripple and Noise (100kHz)	0.025% Span rms
Accuracy (10-100% Span)(3)(4)	
Sinusoid	
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 (maximum)	(Loop Voltage - 4.2) / (Loop Current)
Supply Voltage	+5VDC ±5%
Current	120mA
Sensitivity	±200ppm/%
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
Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)

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

Ordering Information

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

† Modules can be ordered with other input/output ranges. Consult factory for ordering details and specifications.

†Output Ranges Available

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

SCM5B34

Linearized 2- or 3-Wire RTD Input Modules

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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
- Mix and Match SCM5B Types on Backpanel

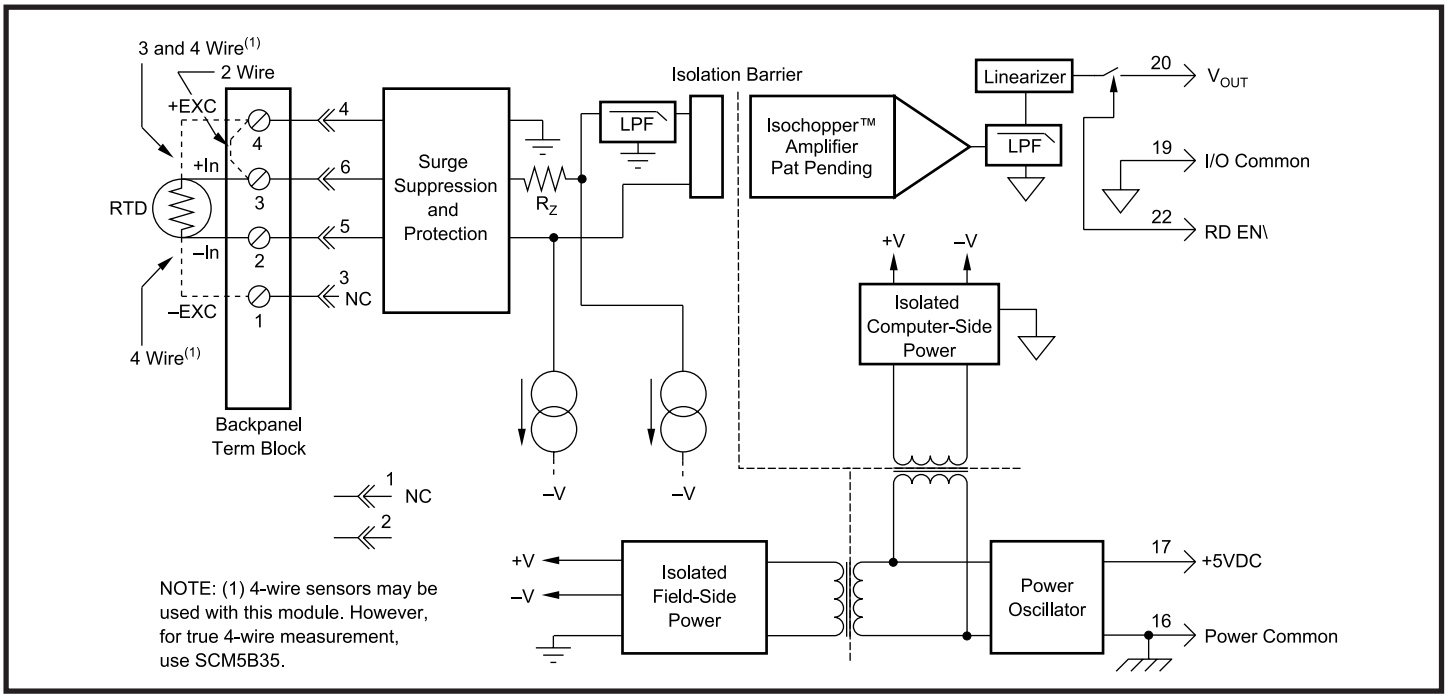


Figure 1: SCM5B34 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

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

Ordering Information

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

**RTD Standards

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

†Output Ranges Available

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

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

SCM5B35

Linearized 4-Wire RTD Input Modules

Description

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

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

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

RTD excitation is provided from the module by a precision current source. The excitation current is available on two leads which are separate from the two input signal measuring leads. The excitation current does not flow in the input signal leads, which allows RTD measurement to be totally independent of lead resistance. The excitation current is very small (0.25mA for 100Ω Pt and 120Ω Ni and 1.0 mA 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 SCM5B35 modules provides protection against accidental connection of power-line voltages up to 240VAC.

▶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
- Mix and Match SCM5B Types on Backpanel

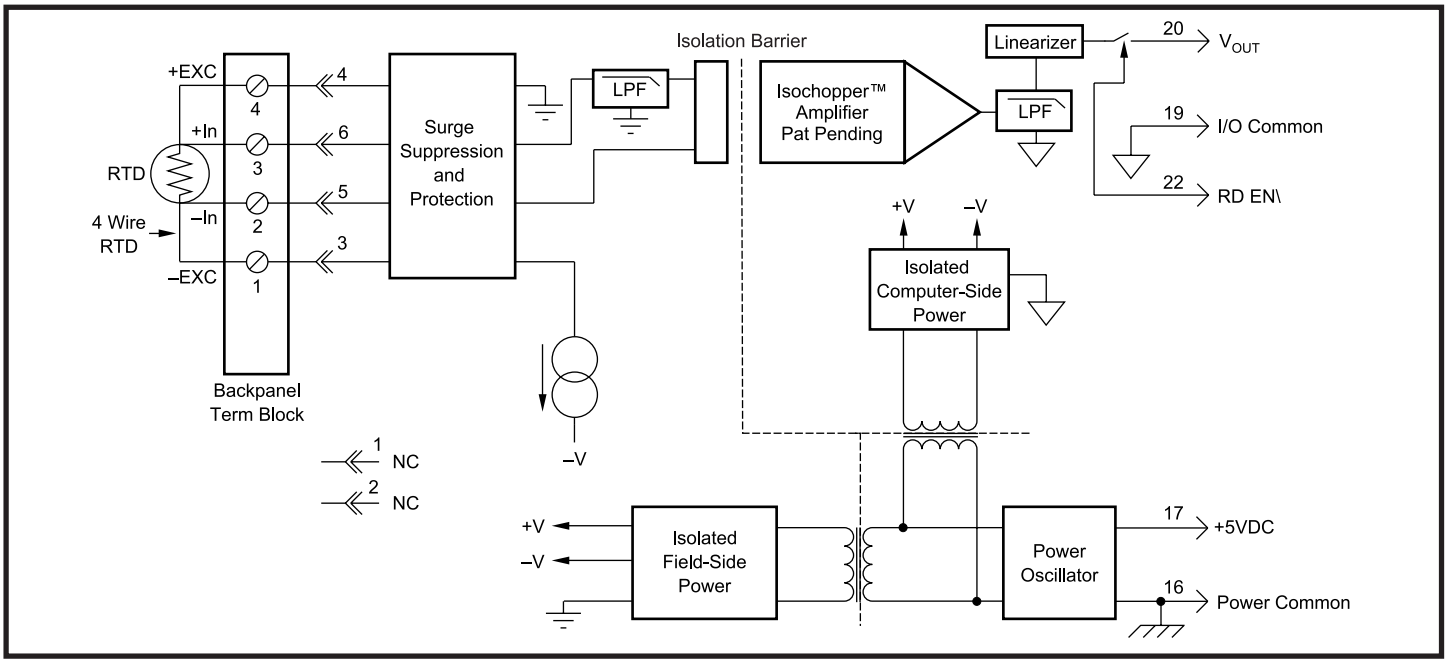


Figure 1: SCM5B35 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

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

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

Ordering Information

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

**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

†Output Ranges Available

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

SCM5B36

Potentiometer Input Modules

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ± 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
- Mix and Match SCM5B Types on Backpanel

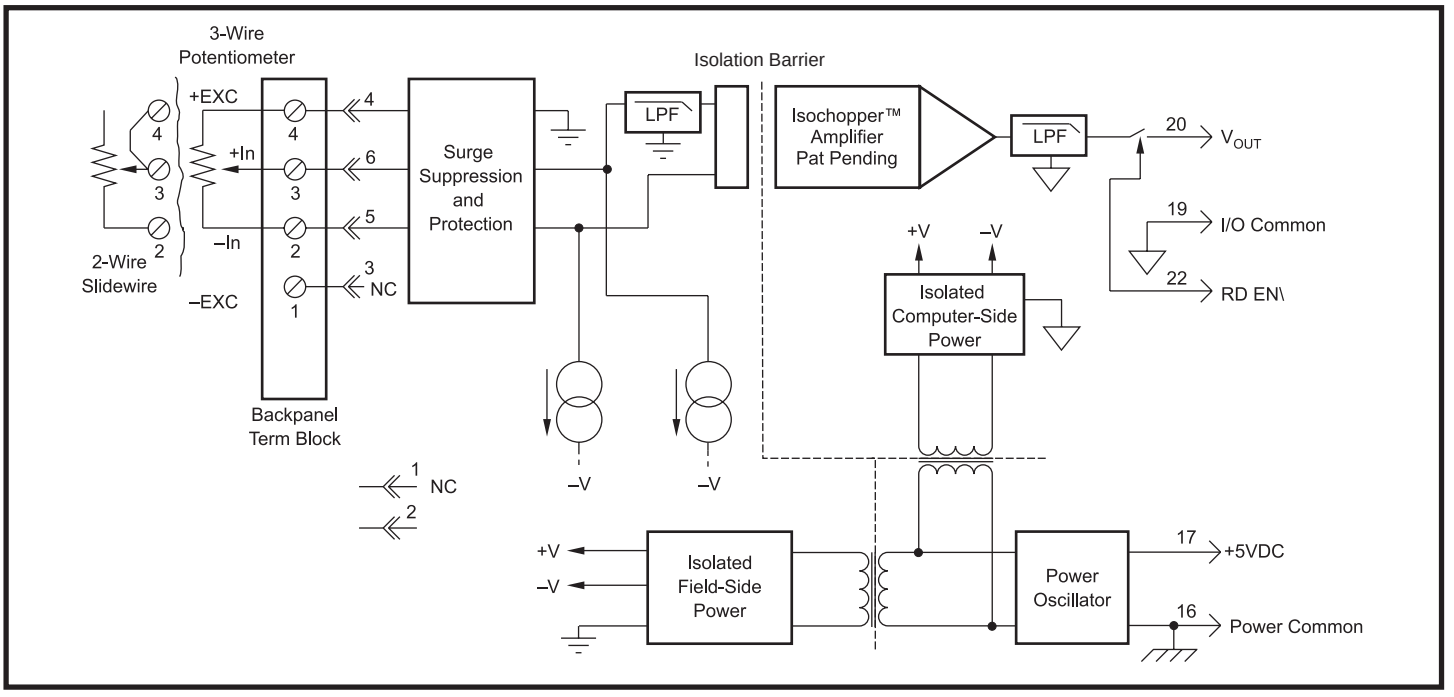


Figure 1: SCM5B36 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

Ordering Information

Model	Input Range	Output Range†
SCM5B36-01	0 to 100Ω	3, 4
SCM5B36-02	0 to 500Ω	3, 4
SCM5B36-03	0 to 1kΩ	3, 4
SCM5B36-04	0 to 10kΩ	3, 4

†Output Ranges Available

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

SCM5B37

Non-Linearized Thermocouple Input Modules

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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%.

▶ Features

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

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

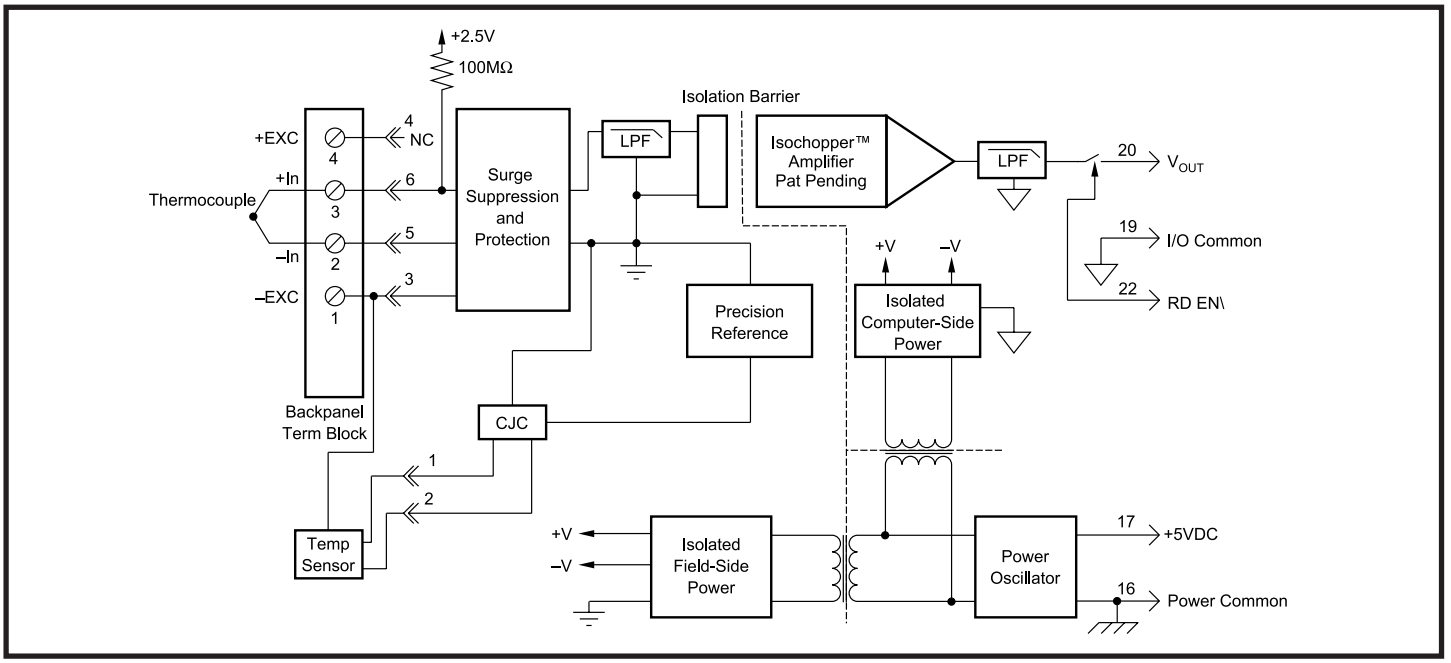


Figure 1: SCM5B37 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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 (to ±1mV of V_{OUT})	6µs at C_{load} = 0 to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Open Input Response	Upscale
Open Input Detection Time	<10s
Cold Junction Compensation	
Accuracy, 25°C	±0.25°C
Accuracy, +5°C to +45°C	±0.5°C
Accuracy, –40°C to +85°C	±1.25°C
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±2µV/% RTI(3)
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (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:
(1) Includes linearity, hysteresis and repeatability. Does not include CJC accuracy.
(2)This is equivalent to °C as follows: Type J 0.020 °C/°C, Types K, T 0.025°C/°C, Type E 0.016°C/°C, Types R, S 0.168°C/°C, Type N 0.037°C/°C, Type C, 0.072°C/°C.
(3) RTI = Referenced to input.

Ordering Information

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

‡ Thermocouple Alloy Combinations

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

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

†Output Ranges Available

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

SCM5B38

Strain Gage Input Modules, Narrow Bandwidth

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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 2, 3, 4).

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

▶ Features

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

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

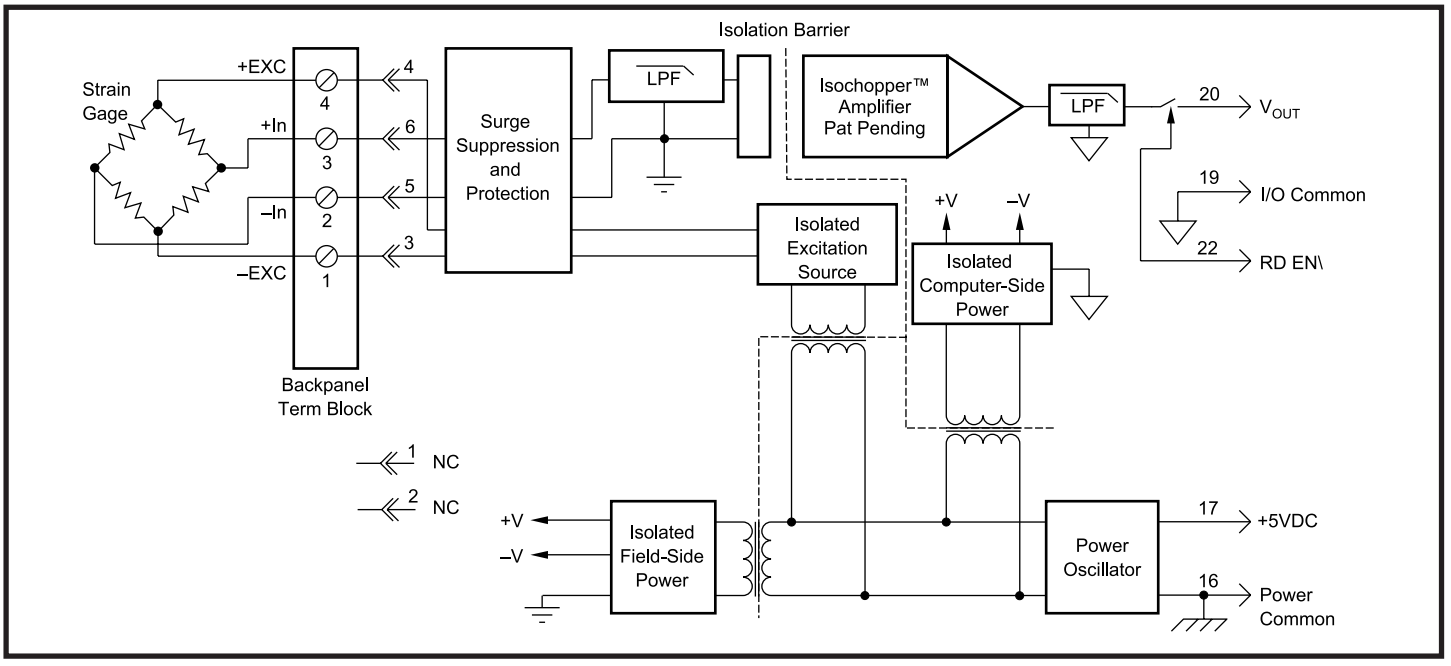


Figure 1: SCM5B38 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	Full Bridge SCM5B38-31,-32,-35,-36,-37	Half Bridge SCM5B38-33,-34
Input Range	±10mV to ±100mV	*
Input Bias Current	±0.5nA	*
Input Resistance		
Normal	50MΩ	*
Power Off	40kΩ	*
Overload	40kΩ	*
Signal Input Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
Excitation Output (-32, -34, -35, -37)	+10V ±3mV	*
Load Resistance	300Ω to 10kΩ	*
Excitation Output (-31, -33, -36)	+3.333V ±2mV	*
Load Resistance	100Ω to 10kΩ	*
Excitation Load Regulation	±5ppm/mA	*
Excitation Stability	±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	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50 or 60Hz)	160dB	*
NMR	95dB at 60Hz, 90dB at 50Hz	*
Accuracy(2)	±0.03% Span	*
Linearity	±0.01% Span	*
Stability		
Input Offset	±1µV/°C	*
Output Offset	±20µV/°C	*
Gain	±25ppm of Reading/°C	*
Noise		
Input, 0.1 to 10Hz	0.2µVrms	1µVrms
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	170mA Full Exc.Load, 70mA No Exc. Load	*
Power Supply Sensitivity	±2µV/% RTI(3)	*
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temperature Range	–40°C to +85°C	*
Storage Temperature Range	–40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A ±0.5% Span Error	*
ESD, EFT	Performance B	*

NOTES:
* Same as -31, -32, -35, -36, -37 modules.

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

Ordering Information

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

†Output Ranges Available

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

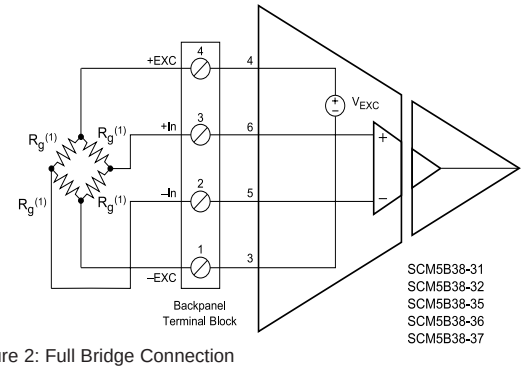


Figure 2: Full Bridge Connection

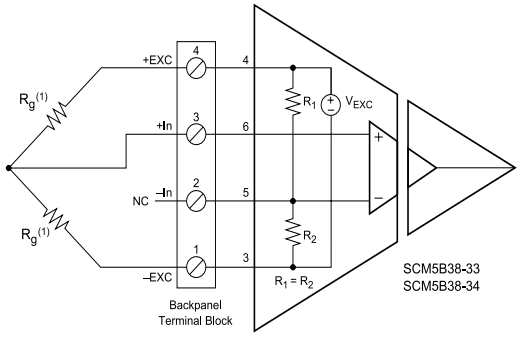


Figure 3: Half Bridge Connection

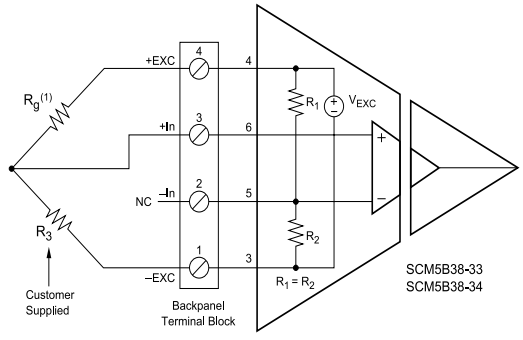


Figure 4: Quarter Bridge Connection

SCM5B38

Strain Gage Input Modules, Wide Bandwidth

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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 2, 3, 4). The 10kHz bandwidth allows measurement of high speed processes such as vibration analysis.

Strain gage excitation is provided from the module by a very stable 10V or 3.333V source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature offers significant flexibility in real world applications. Full scale sensitivities of 2mV/V, 3mV/V or 10mV/V are offered as standard. With 10V excitation, this results in ±20mV, ±30mV or ±100mV full scale input range 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 10kHz. 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 Gages
- High-Level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- Fully Isolated Excitation Supply
- 100dB CMR
- 10kHz Signal Bandwidth
- ±0.03% Accuracy
- ±0.01% Linearity
- ±1µV/°C Drift
- CSA C/US Certified, CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

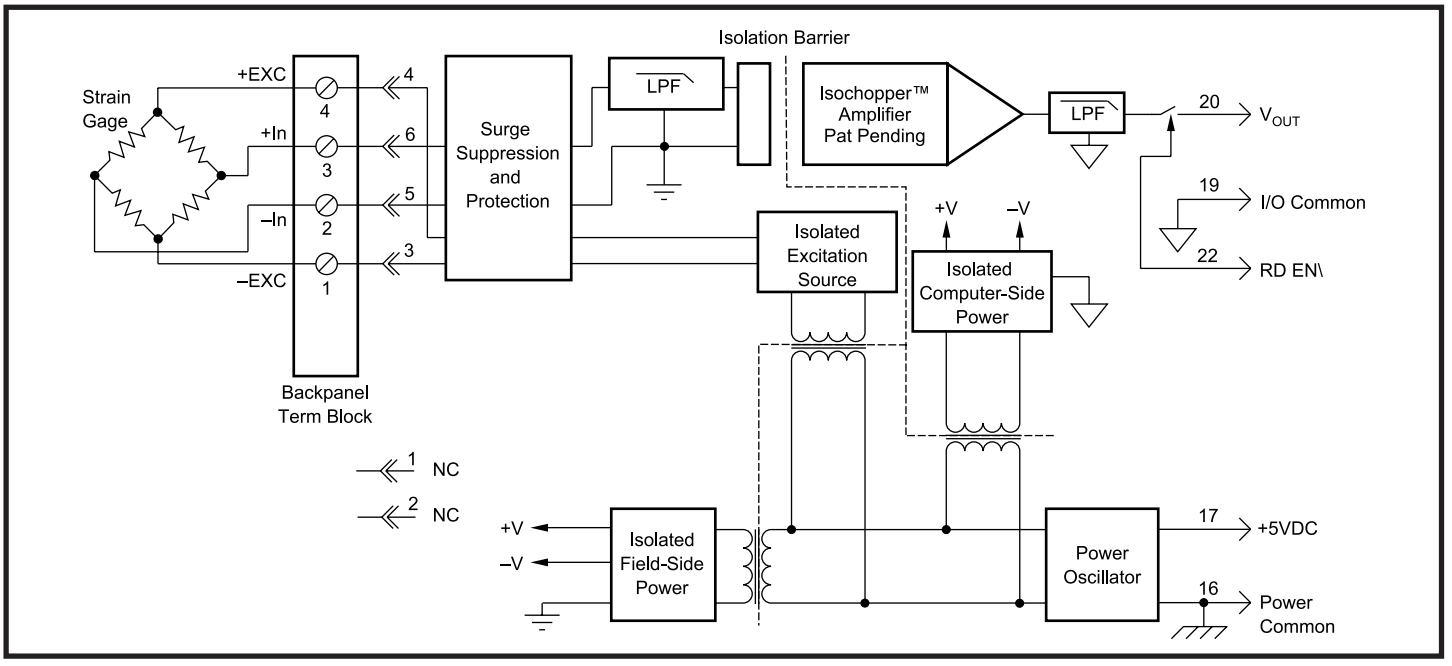


Figure 1: SCM5B38 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

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

Ordering Information

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

†Output Ranges Available

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

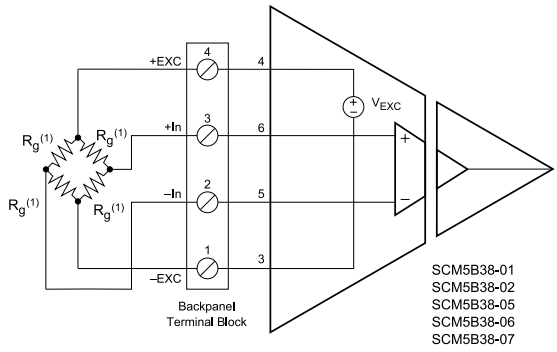


Figure 2: Full Bridge Connection

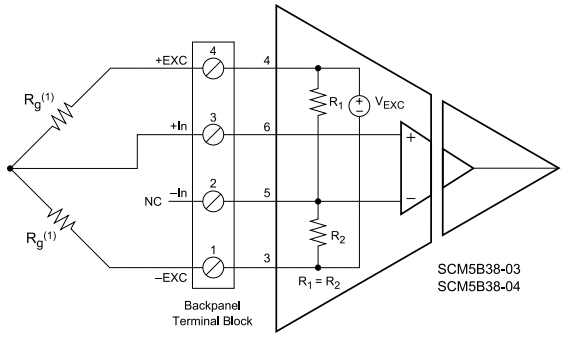


Figure 3: Half Bridge Connection

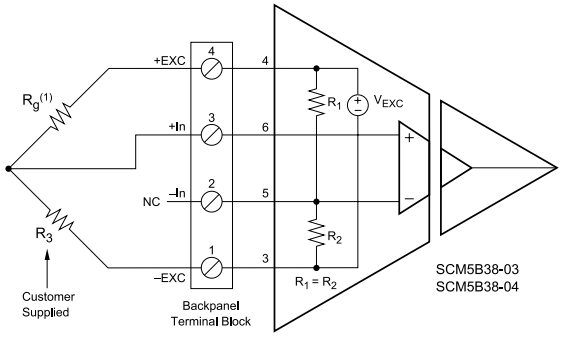


Figure 4: Quarter Bridge Connection

NOTES:
* Same as –01, –02, –05, –06, –07 modules.
(1) Strain element. (2) Includes linearity, hysteresis and repeatability. (3) RTI = Referenced to input.

SCM5B39

Current Output Modules

Description

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

Setting of the track or hold mode is controlled by the logic state of WR EN\, module pin 23. When pin 23 is low, the track mode is enabled. If pin 23 is high, the hold mode is enabled. The module is designed with a completely isolated computer side circuit which can be floated to ±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
- Mix and Match SCM5B Types on Backpanel

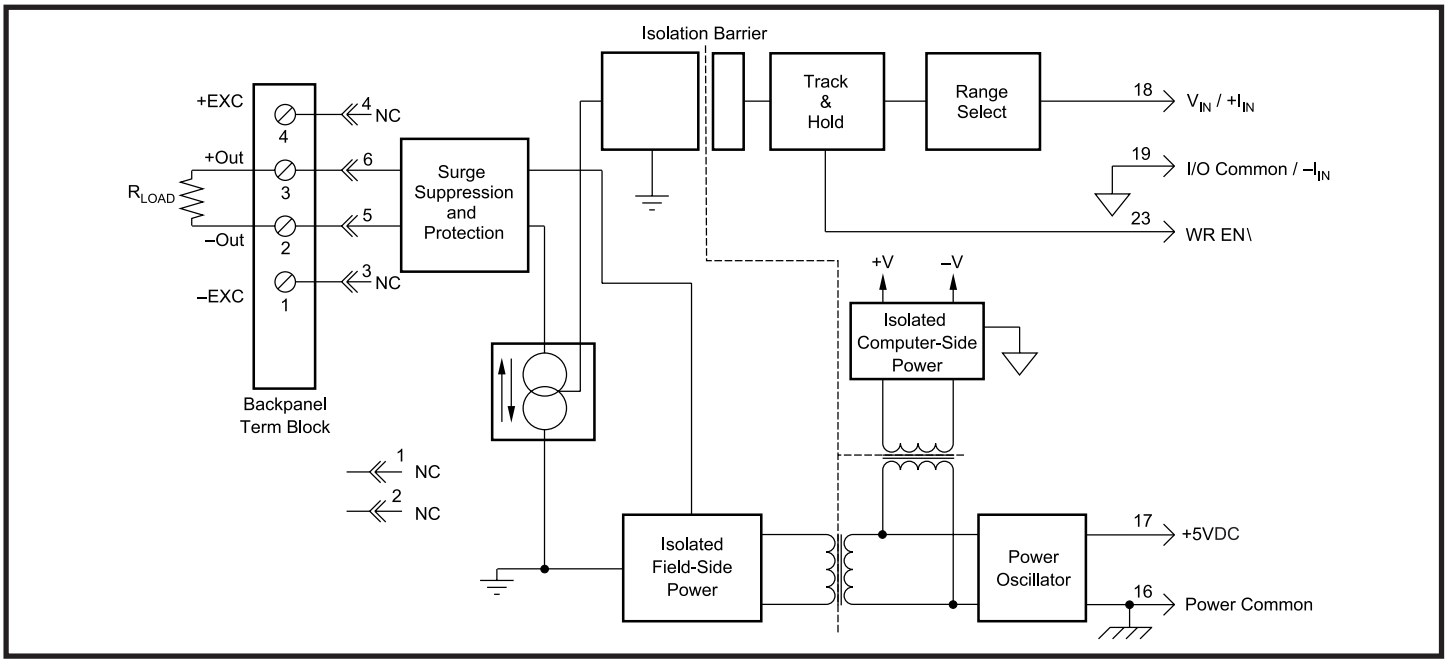


Figure 1: SCM5B39 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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 to 20mA	N/A
Input Voltage Maximum	±36V (no damage)	*
Input Current, Maximum (-05)	75mA (no damage)	N/A
Input Resistance	50MΩ	2MΩ
Input Resistance (-05)	250Ω	N/A
Output Current Range	0 to 20mA or 4 to 20mA	±20mA
Power-Up Delay(1)	100ms	N/A
Current Out	0mA	N/A
Over Range Capability	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	*
Output Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Output to Input		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	110dB	*
NMR (–3dB)	80dB per Decade above 400Hz	80dB per Decade above 275Hz
Accuracy	±0.03% Span	±0.05% Span
Linearity	±0.005% Span	±0.03% Span
Stability		
Offset	±0.5µA/°C	*
Gain	±20ppm/°C	±40ppm/°C
Noise		
Output Ripple, 100kHz	10µAp-p	*
Bandwidth, –3dB	400Hz	275Hz
Rise Time, 10 to 90% Span	1.0ms	1.2ms
Sample and Hold		
Output Droop Rate	40µA/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	170mA	130mA
Power Supply Sensitivity	±0.5µA/% typ	*
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	–40°C to +85°C	*
Storage Temp. Range	–40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A ±0.5% Span Error	*
ESD, EFT	Performance B	*

NOTES:
* Same as -01, -02, -03, -04, -05 modules.
(1) See Product Description for further details.

Ordering Information

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

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

SCM5B392

Matched-Pair Servo/Motor Controller Modules

Description

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

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

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

▶ Features

- Extends the Distance and Isolates Servo/Motor Controller Signals
- Provides Isolated Current Loop Interface Between Controller and Motor or Actuator
- Accepts High-Level Voltage Inputs up to ±10V
- Provides High-Level Voltage Outputs up to ±10V
- 1500VrmsTransformer 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
- Mix and Match SCM5B Types on Backpanel

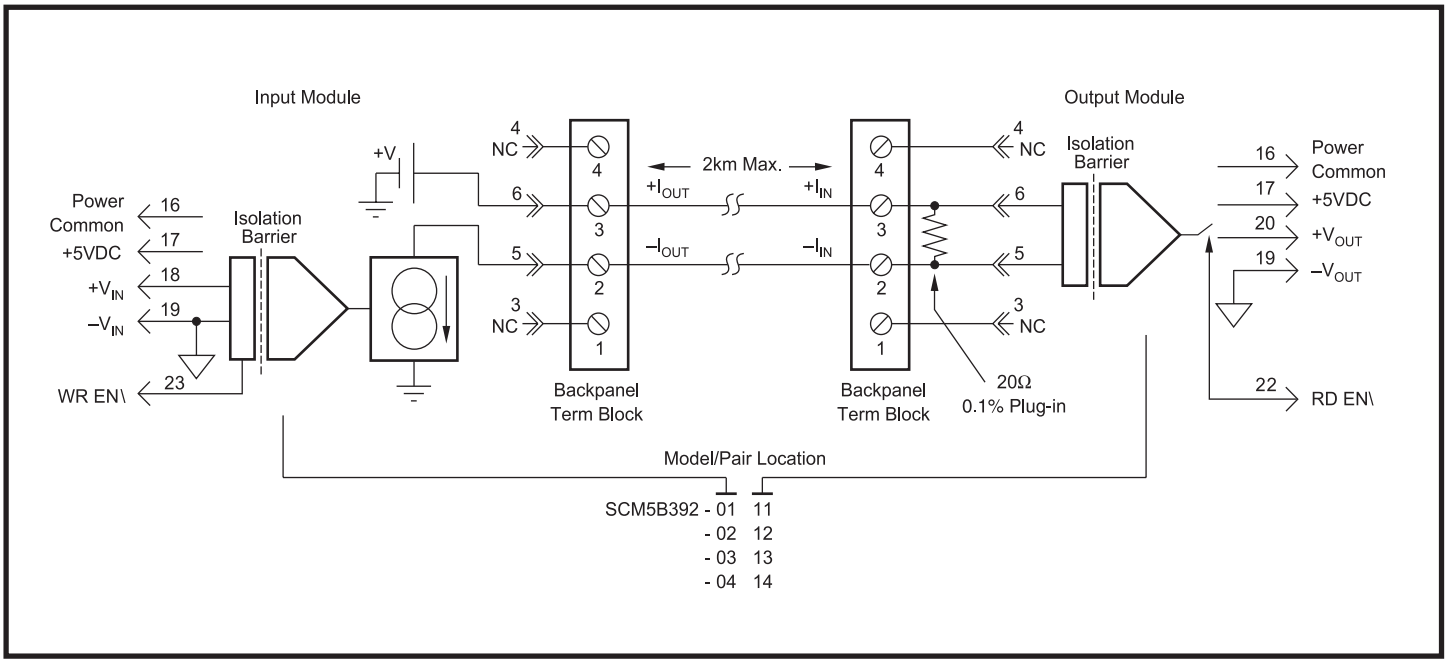


Figure 1: SCM5B392 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

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

Ordering Information (for module pairs)

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

Ordering Information (for single modules)

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

SCM5B40/41

Analog Voltage Input Modules, Wide Bandwidth

Description

Each SCM5B40 and SCM5B41 wide bandwidth voltage input module provides a single channel of analog input which is amplified, isolated, and converted to a high-level analog voltage output (Figure 1). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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 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 10kHz. 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
- Mix and Match SCM5B Types on Backpanel

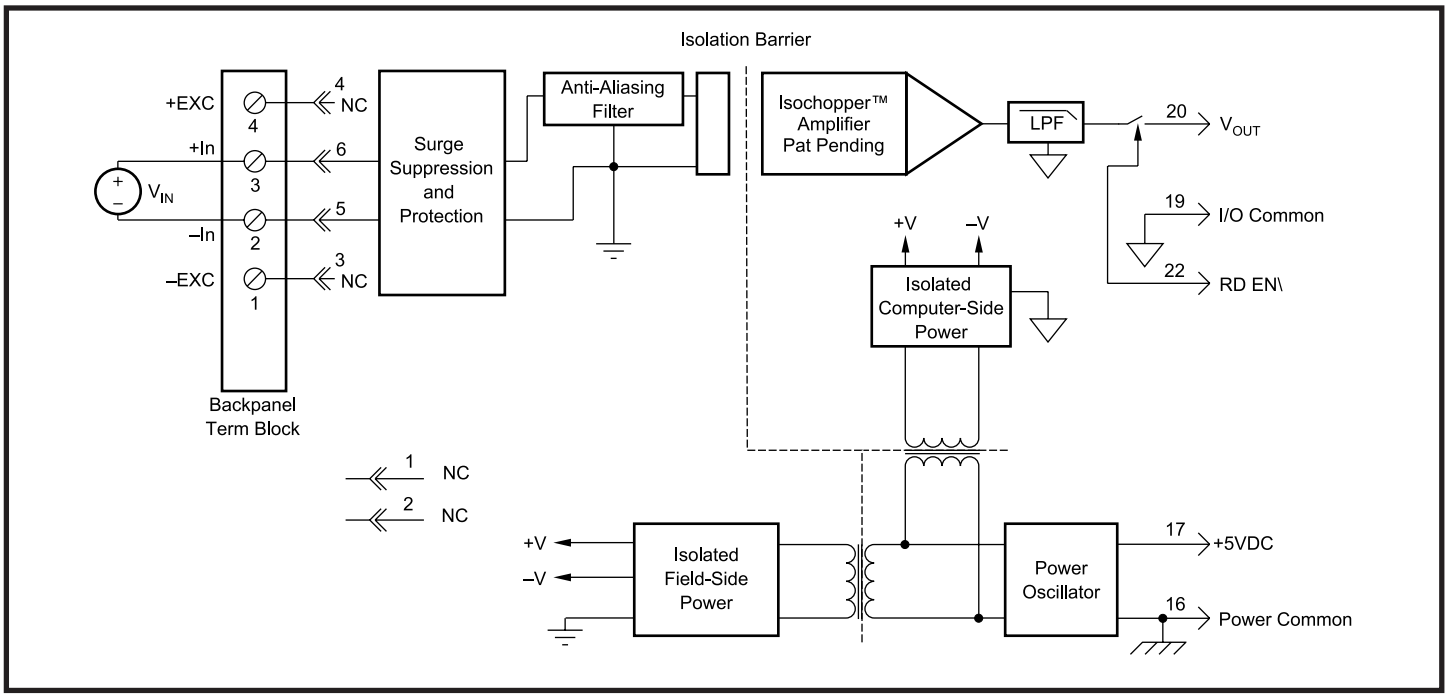


Figure 1: SCM5B40/41 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	SCM5B40	SCM5B41
Input Range	±10mV to ±1V	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	200MΩ	650kΩ (minimum)
Power Off	40kΩ	650kΩ (minimum)
Overload	40kΩ	650kΩ (minimum)
Input Protection		
Continuous	240Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	100dB	*
NMR (–3dB at 10kHz)	120dB per Decade above 10kHz	*
Accuracy(1)	±0.03% Span	*
Linearity	±0.01% Span	*
Stability		
Input Offset	±1µV/°C	±20µV/°C
Output Offset	±40µV/°C	*
Gain	±25ppm/°C	±50ppm/°C
Noise		
Input, 0.1 to 10Hz	0.4µVrms	2µVrms
Output, 100kHz	10mVp-p	*
Bandwidth, –3dB	10kHz	*
Rise Time, 10 to 90% Span	35µs	*
Settling Time, to 0.1%	250µs	*
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	30mA	*
Power Supply Sensitivity	±2µV/% RTI(2)	±200µV/% RTI(2)
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	–40°C to +85°C	*
Storage Temp. Range	–40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A ±0.5% Span Error	*
ESD,EFT	Performance B	*

NOTES:
* Same specification as SCM5B40.
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.
(3) Same as SCM5B41-01 with 50MΩ input resistance.

Ordering Information

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

†Output Ranges Available

Output Range	Part No. Suffix	Example
1. –5V to +5V	NONE	SCM5B40-01
2. –10V to +10V	D	SCM5B40-01D
3. 0V to +5V	NONE	SCM5B40-04
4. 0V to +10V	D	SCM5B40-04D

SCM5B42

2-Wire Transmitter Interface Modules

Description

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

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

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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
- Mix and Match SCM5B Types on Backpanel

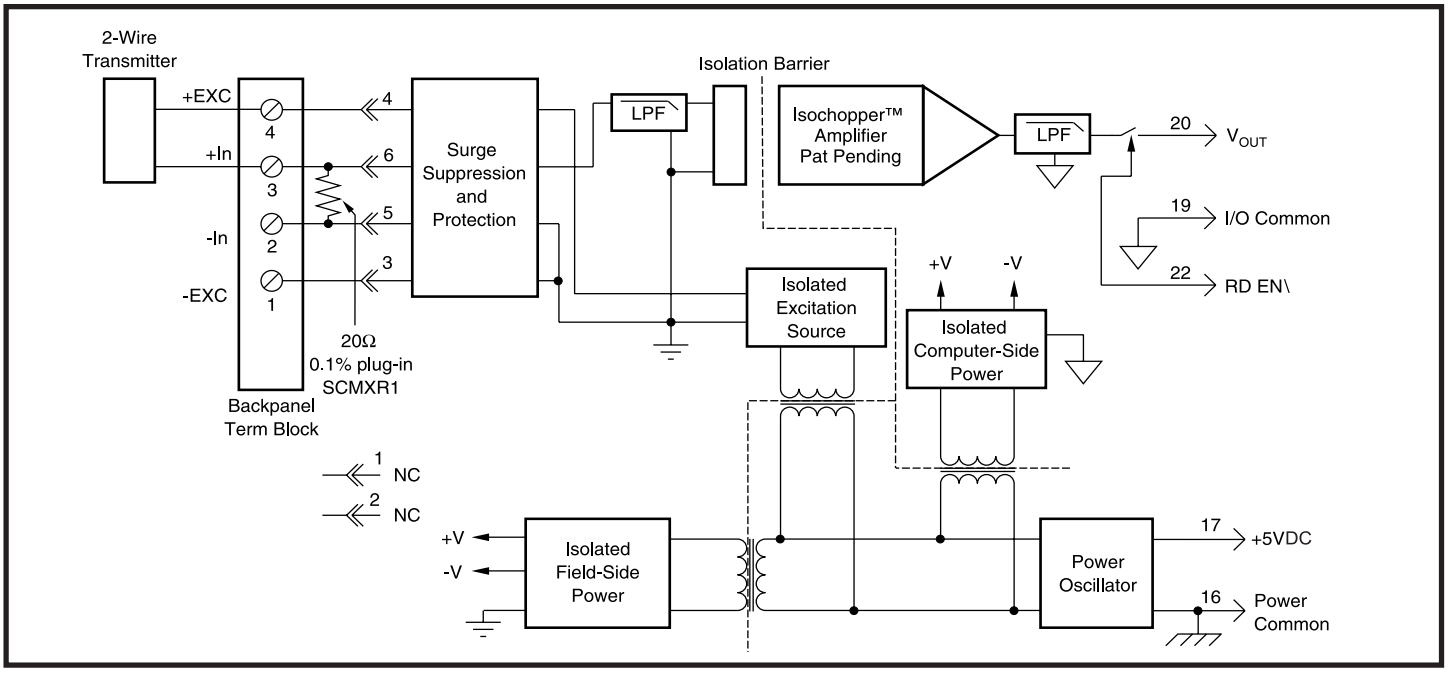


Figure 1: SCM5B42 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

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

NOTES:
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

Ordering Information

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

SCM5B43

General Purpose Input Modules, with DC Excitation

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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
- Mix and Match SCM5B Types on Backpanel

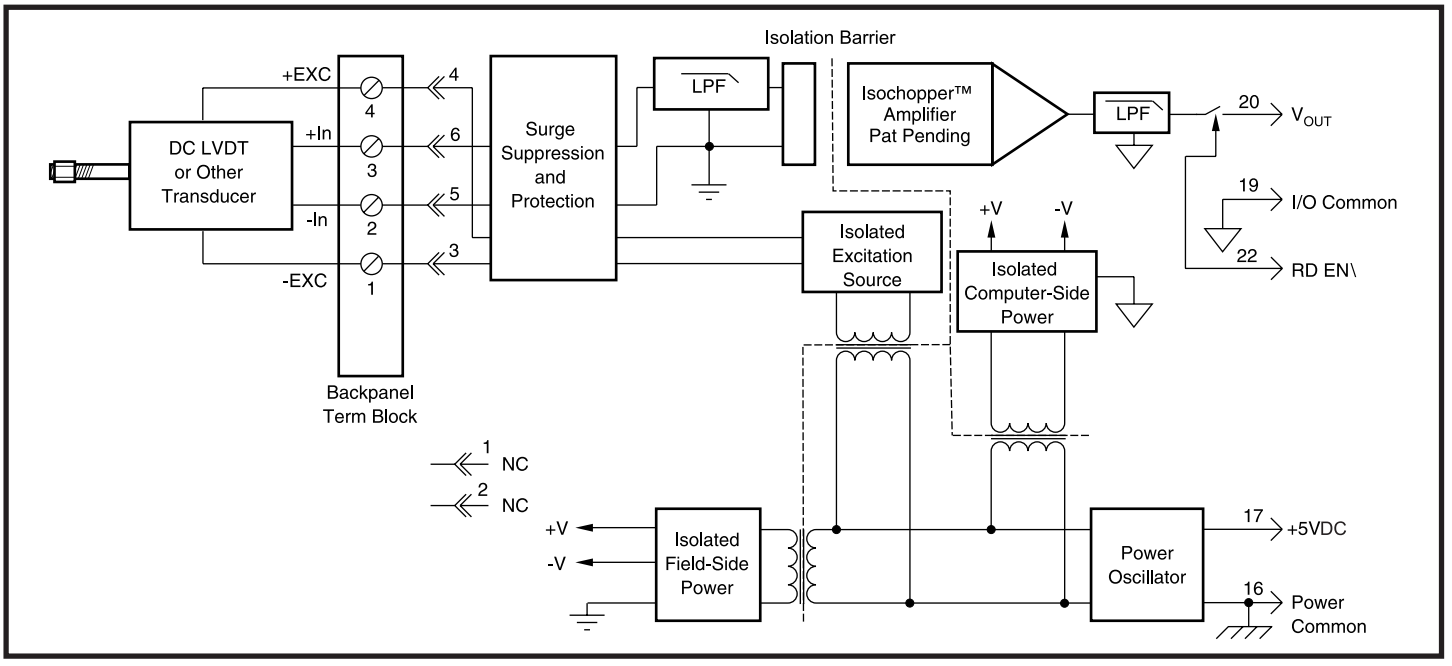


Figure 1: SCM5B43 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	SCM5B43
Input Range	±1V to ±10V
Input Bias Current	±0.05nA
Input Resistance	
Normal	2MΩ (minimum)
Power Off	2MΩ (minimum)
Overload	2MΩ (minimum)
Input Protection	
Continuous	240Vrms max
Transient	ANSI/IEEE C37.90.1 (formerly IEEE-472)
Excitation Voltage, V_{EXC}	+10.0VDC ±2mV
Excitation Current	40mA (maximum)
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)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B

Ordering Information

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

†Output Ranges Available

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

NOTES:
(1) Includes excitation error, linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

SCM5B45

Frequency Input Modules

Description

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

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

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

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

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

▶ Features

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

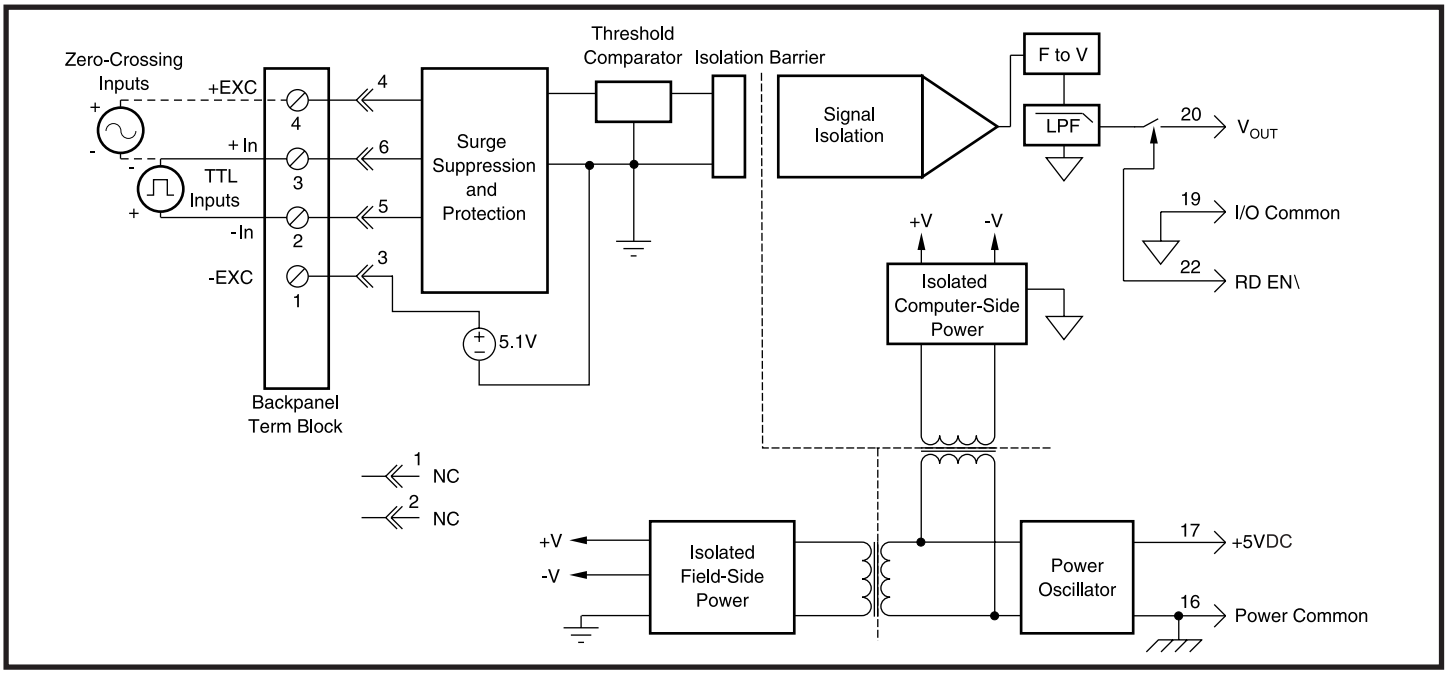


Figure 1: SCM5B45 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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)(w)(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:
(1) Includes linearity, hysteresis and repeatability.
(2) RTO = Referenced to output.

Ordering Information

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

†Output Ranges Available

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

SCM5B47

Linearized Thermocouple Input Modules

Description

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

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±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
- Mix and Match SCM5B Types on Backpanel

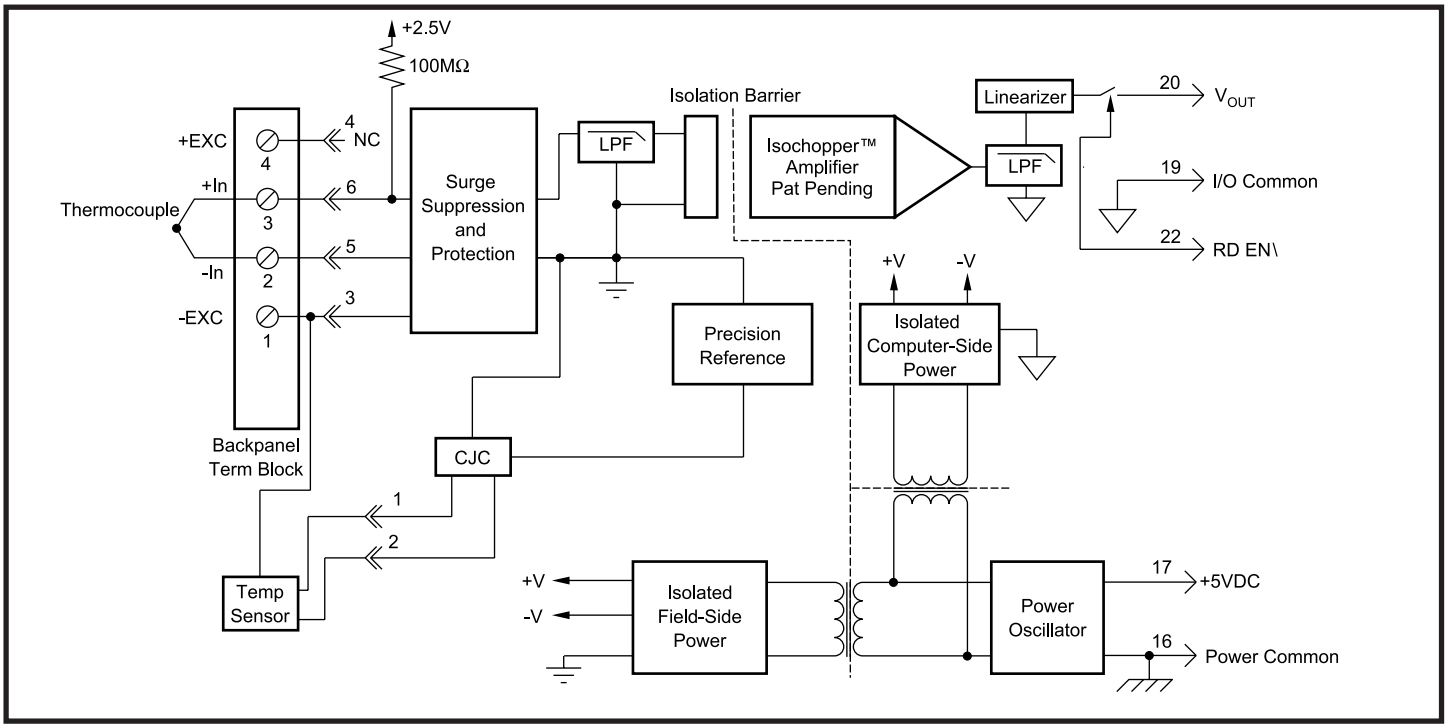


Figure 1: SCM5B47 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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	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)(w)(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

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

Ordering Information

Model	TC Type‡	Input Range	Output Range†	Accuracy(1)	
SCM5B47J-01	J	0°C to +760°C (+32°F to +1400°F)	3, 4	±0.08%	±0.61°C
SCM5B47J-02	J	–100°C to +300°C (–148°F to +572°F)	3, 4	±0.08%	±0.32°C
SCM5B47J-03	J	0°C to +500°C (+32°F to 932°F)	3, 4	±0.07%	±0.36°C
SCM5B47K-04	K	0°C to +1000°C (+32°F to +1832°F)	3, 4	±0.08%	±0.80°C
SCM5B47K-05	K	0°C to +500°C (+32°F to +932°F)	3, 4	±0.08%	±0.38°C
SCM5B47T-06	T	–100°C to +400°C (–148°F to +752°F)	3, 4	±0.16%	±0.80°C
SCM5B47T-07	T	0°C to +200°C (+32°F to +392°F)	3, 4	±0.13%	±0.25°C
SCM5B47E-08	E	0°C to +1000°C (+32°F to +1832°F)	3, 4	±0.10%	±1.0°C
SCM5B47R-09	R	+500°C to +1750°C (+932°F to +3182°F)	3, 4	±0.10%	±1.3°C
SCM5B47S-10	S	+500°C to +1750°C (+932°F to +3182°F)	3, 4	±0.10%	±1.3°C
SCM5B47B-11	B	+500°C to +1800°C (+932°F to +3272°F)	3, 4	±0.15%	±2.0°C
SCM5B47J-12	J	–100°C to +760°C (–148°F to +1400°F)	3, 4	±0.08%	±0.70°C
SCM5B47K-13	K	–100°C to +1350°C (–148°F to +2462°F)	3, 4	±0.08%	±1.20°C
SCM5B47K-14	K	0°C to +1200°C (+32°F to +2192°F)	3, 4	±0.08%	±0.96°C
SCM5B47N-15	N	–100°C to +1300°C (–148°F to +2372°F)	3, 4	±0.08%	±1.15°C

‡ Thermocouple Alloy Combinations

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

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

†Output Ranges Available

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

SCM5B48

Accelerometer Input Module

Description

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

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

The SCM5B48 offers the option of setting the constant current source for sensor excitation to common values of 4mA or 9mA with a compliance voltage of 24VDC. Programmable gains of 1, 10 and 100 are selectable and the module offers a ±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
- ±10V Output Range
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240Vrms Continuous
- 1, 10, and 100 Programmable Gain
- 2.5, 5, 10, and 20kHz Programmable LP Filter
- 0.2 and 10Hz Programmable HP Filter
- 4mA or 9mA Programmable Current Excitation
- 100dB CMR
- ±0.2% Accuracy
- ±0.01% Linearity
- Low Drift with Ambient Temperature
- –40°C to +85°C Operating Temperature Range
- CE Compliant, CSA C/US Certification Pending
- Mix and Match SCM5B Types on Backpanel

*ICP is a registered trademark of PCB Group Inc.
*IEPE is Integrated Electronic Piezo-Electric
*LIVM is Low Impedance Voltage Mode

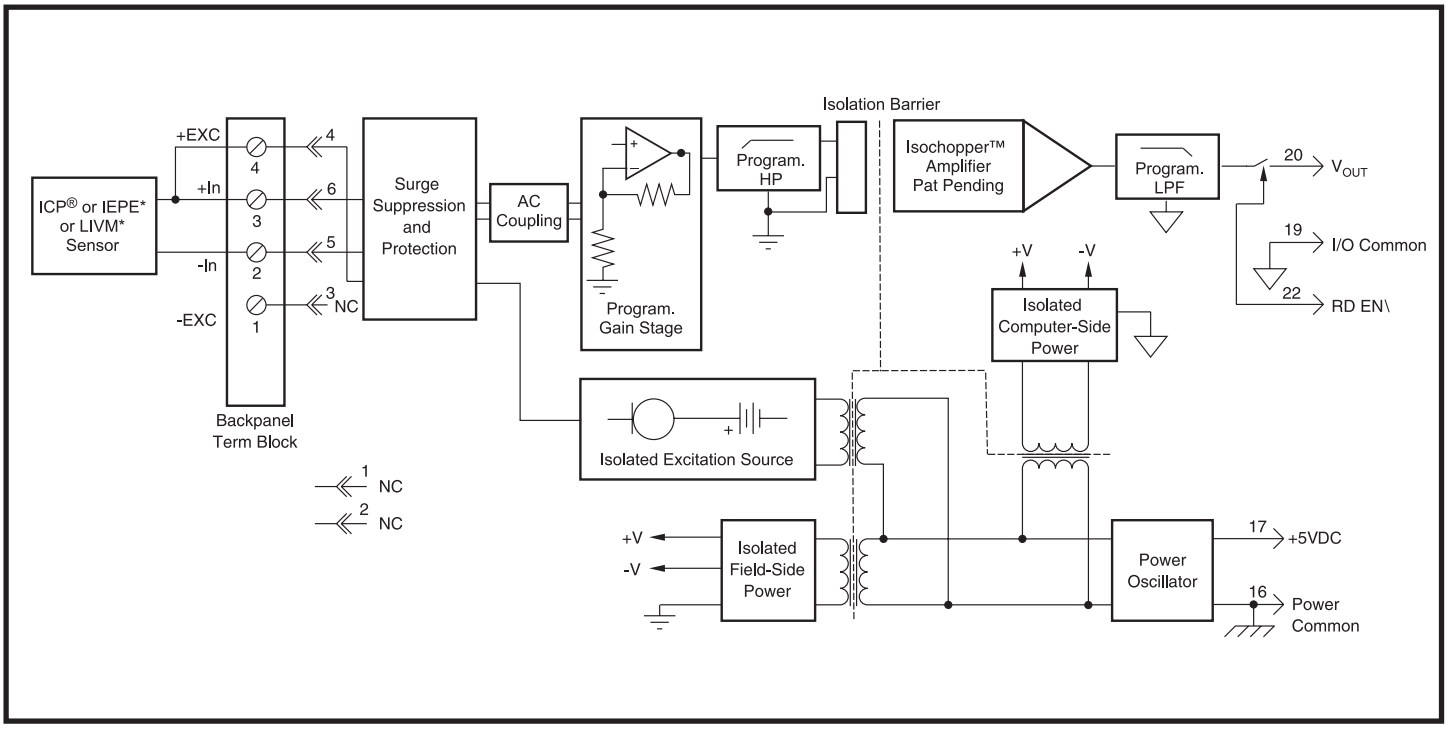


Figure 1: SCM5B48 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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	±10V
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
Supply Voltage	+5VDC ±5%
Current	140mA (9mA excitation) 100mA (4mA excitation)
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.6" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C

NOTES:
(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.

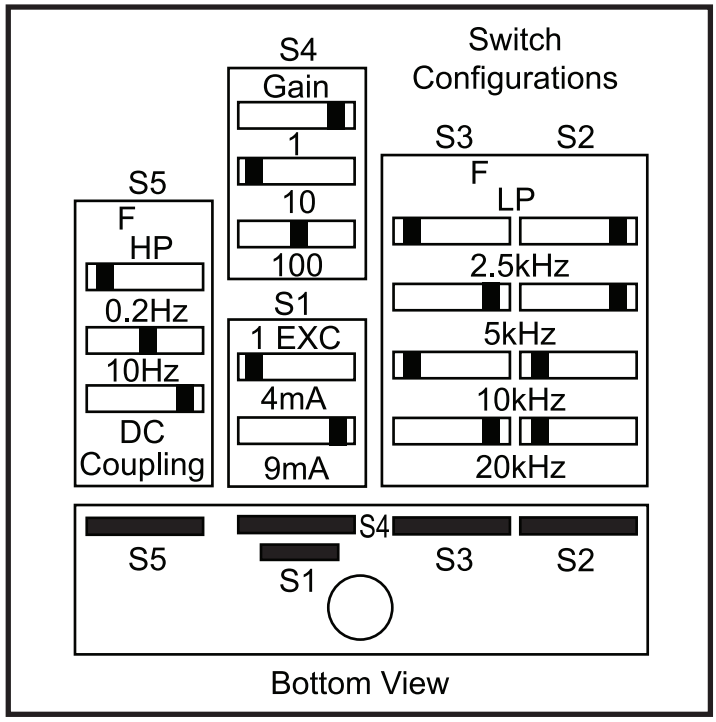


Figure 2: SCM5B48 Side Label

Ordering Information

Model	Input Range	Output Range	Bandwidth	Mechanical Format	Isolation Voltage (Vrms)
SCM5B48-01	±10V max(1)	±10V	2.5kHz to 20kHz(2)	Modular plug-in board	1500

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.

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
- 1500 Vrms 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
- Mix and Match SCM5B Types on Backpanel

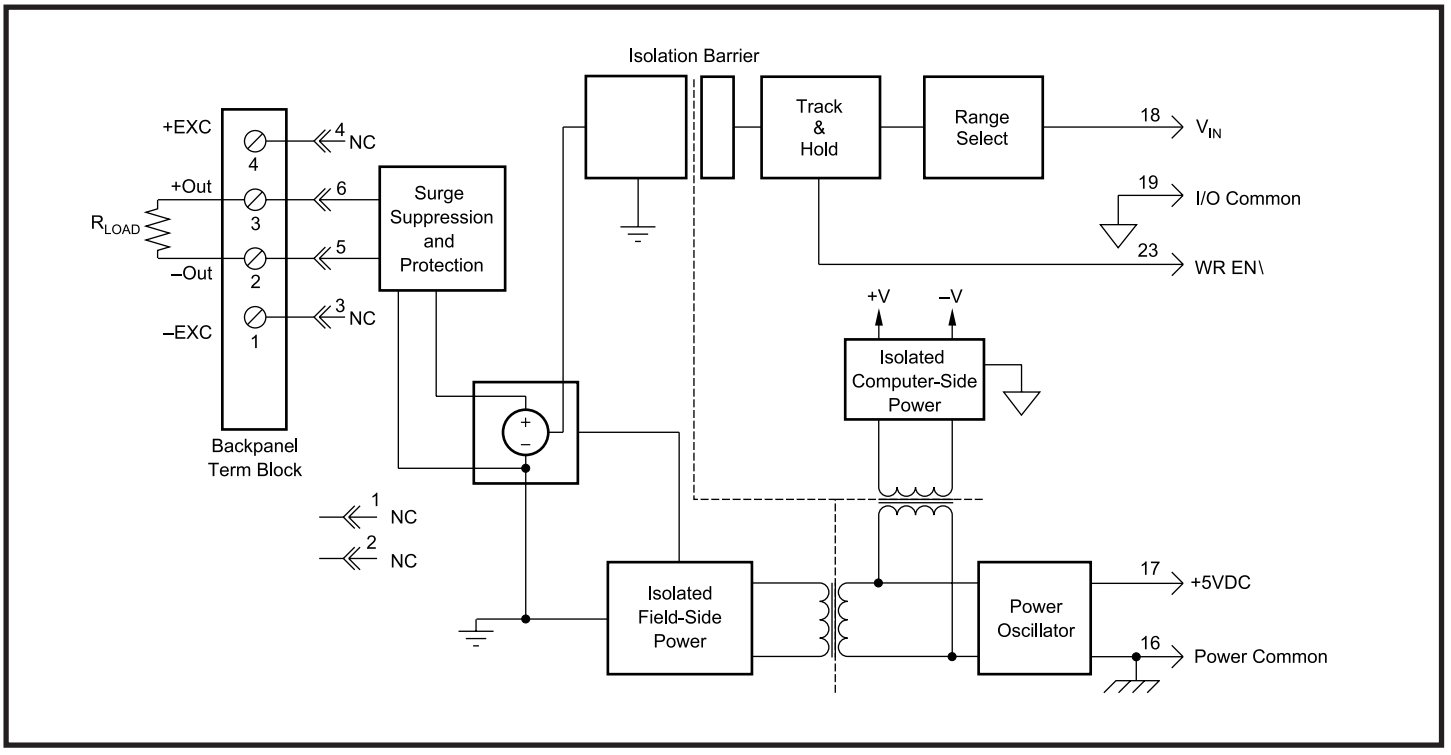


Figure 1: SCM5B49 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

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

NOTES:
(1) Includes linearity, hysteresis and repeatability.

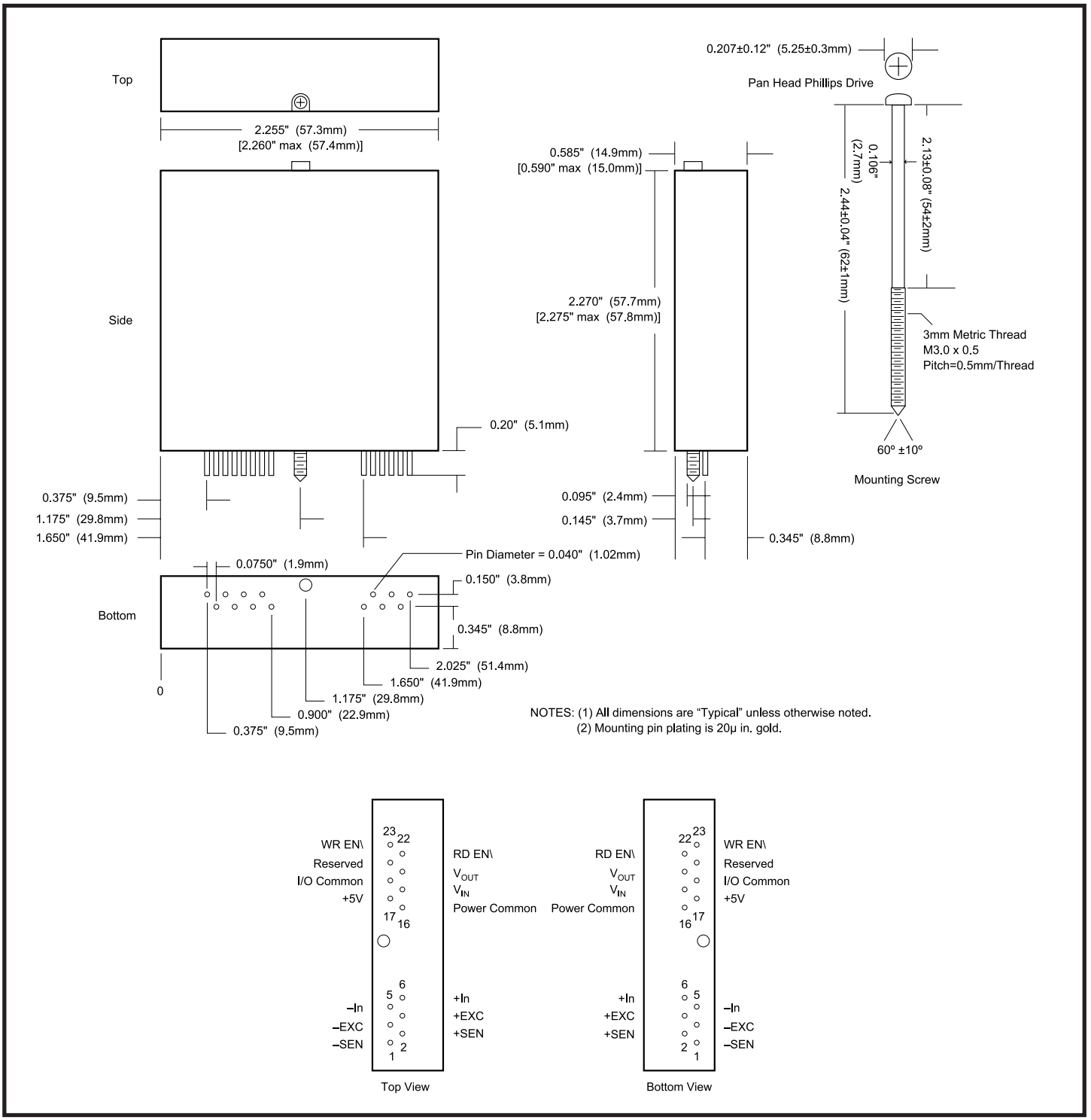
Ordering Information

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

SCM5B

Module Dimensions and Pinouts

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



SCMVAS

Voltage Attenuator System

Description

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

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

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

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

▶ Features

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

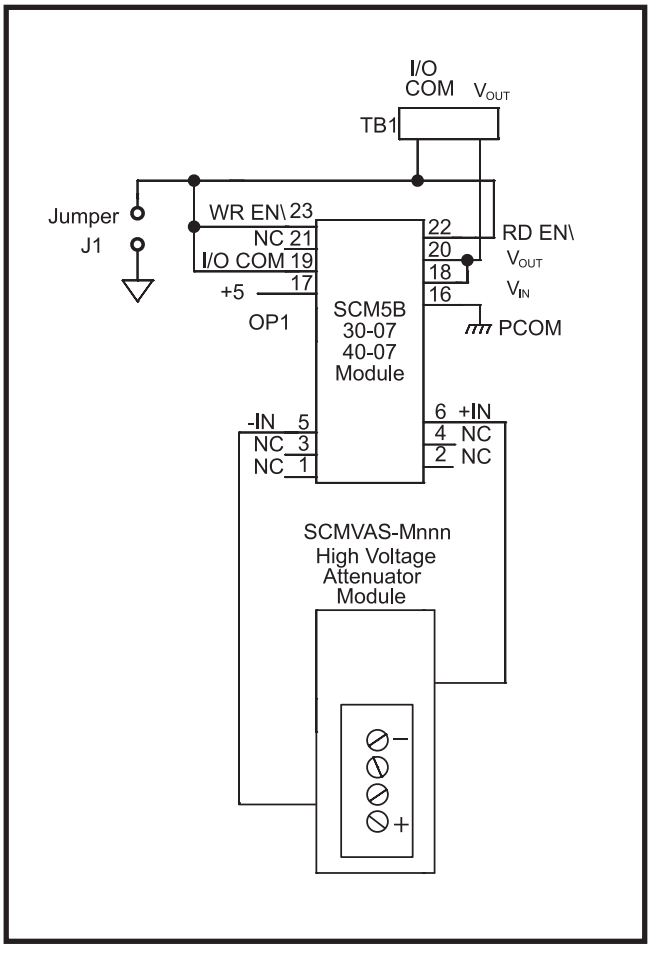


Figure 1: SCMVAS Schematic

SCM5B30/40-07

Isolated Analog Voltage Input Modules

Specifications

Typical at T_A=+25°C and +5V power

Module	SCM5B30-07	SCM5B40-07
Input Range	–1.0V to +1.0V	*
Input Bias Current	±0.5nA	*
Input Resistance		
Normal	50MΩ	200MΩ
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 (50 or 60Hz)	160dB	100dB
NMR	95dB at 50Hz, 90dB at 60Hz	120dB per Decade above 10kHz
Accuracy(1)	±0.03% Span	*
Linearity	±0.005% Span	±0.01% Span
Stability		
Input Offset	±20µV/°C	*
Output Offset	±20µV/°C	*
Gain	±50ppm/°C	*
Noise		
Input, DC to 10Hz	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)	*
Output Resistance	50Ω	*
Output Protection	Continuous short to ground	*
Output Selection Time (to ±1mV of Vout)	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	30mA	*
Power Supply Sensitivity	±200µV/% RTI(2)	*
Mechanical Dimensions	2.28"x 2.26"x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	–40°C to +85°C	*
Storage Temp. Range	–40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions EN61000-6-4	ISM, Group 1	*
Radiated, Conducted	Class A	*
Immunity EN61000-6-2	ISM, Group 1	*
RF	Performance A ±0.5% Span Error	*
ESD,EFT	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:
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

SCMVAS-Mnnn

High Voltage Attenuator Modules

Specifications

Typical at T_A=+25°C

Module	SCMVAS-Mnnn
Input Range	±100Vpeak to ±700Vpeak (70VAC to 495VAC)
Input Voltage Maximum	±750Vpeak
Input Resistance	10MΩ
Accuracy	±0.03%
Stability	±50ppm/°C
Output Range	±1V
Output Resistance	<100kΩ
Mechanical Dimensions	1.70"x 1.98"x 0.69" (44mm x 51mm x 18mm)
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% noncondensing
HazLoc	
CSA	All models except SCMVAS-M700
ATEX	All models except SCMVAS-M400, -M500, -M600, -M650, -M700

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

Ordering Information

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

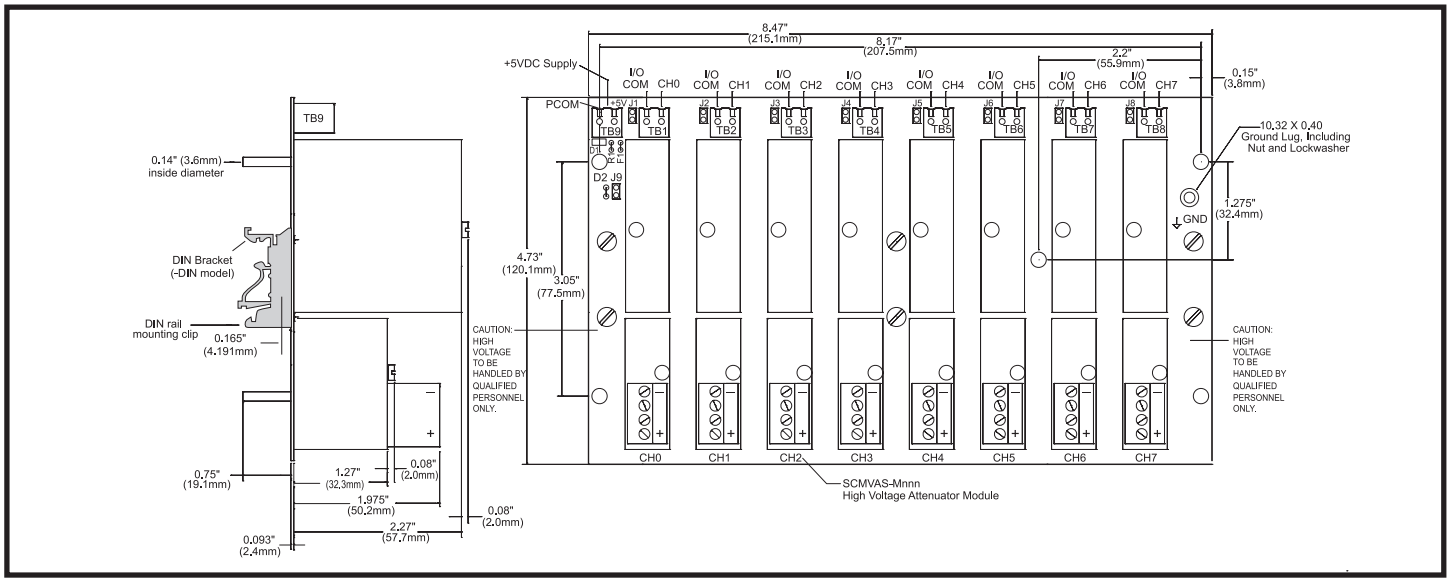


Figure 2: SCMVAS-PB8 Analog I/O Backpanel

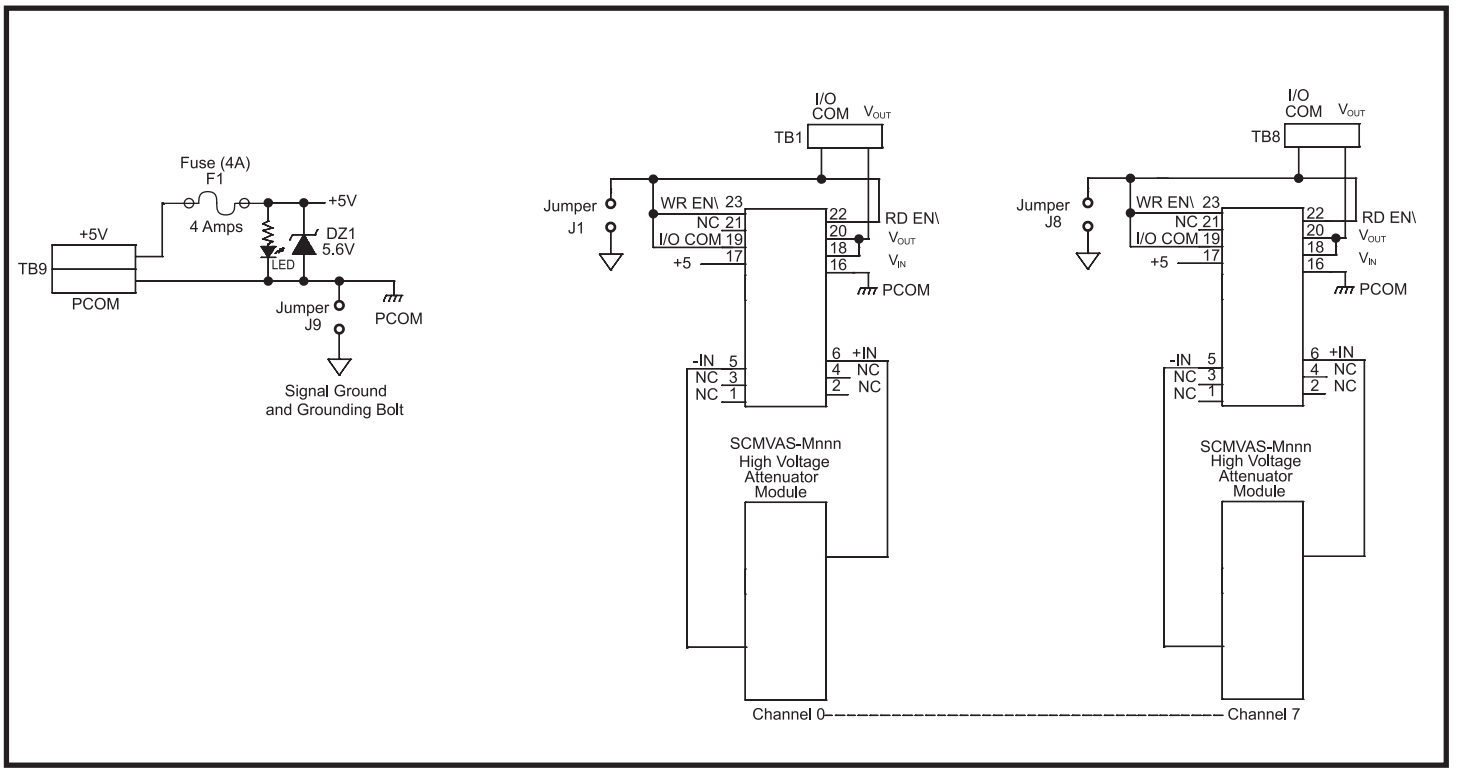


Figure 3: SCMVAS-PB8 Schematic

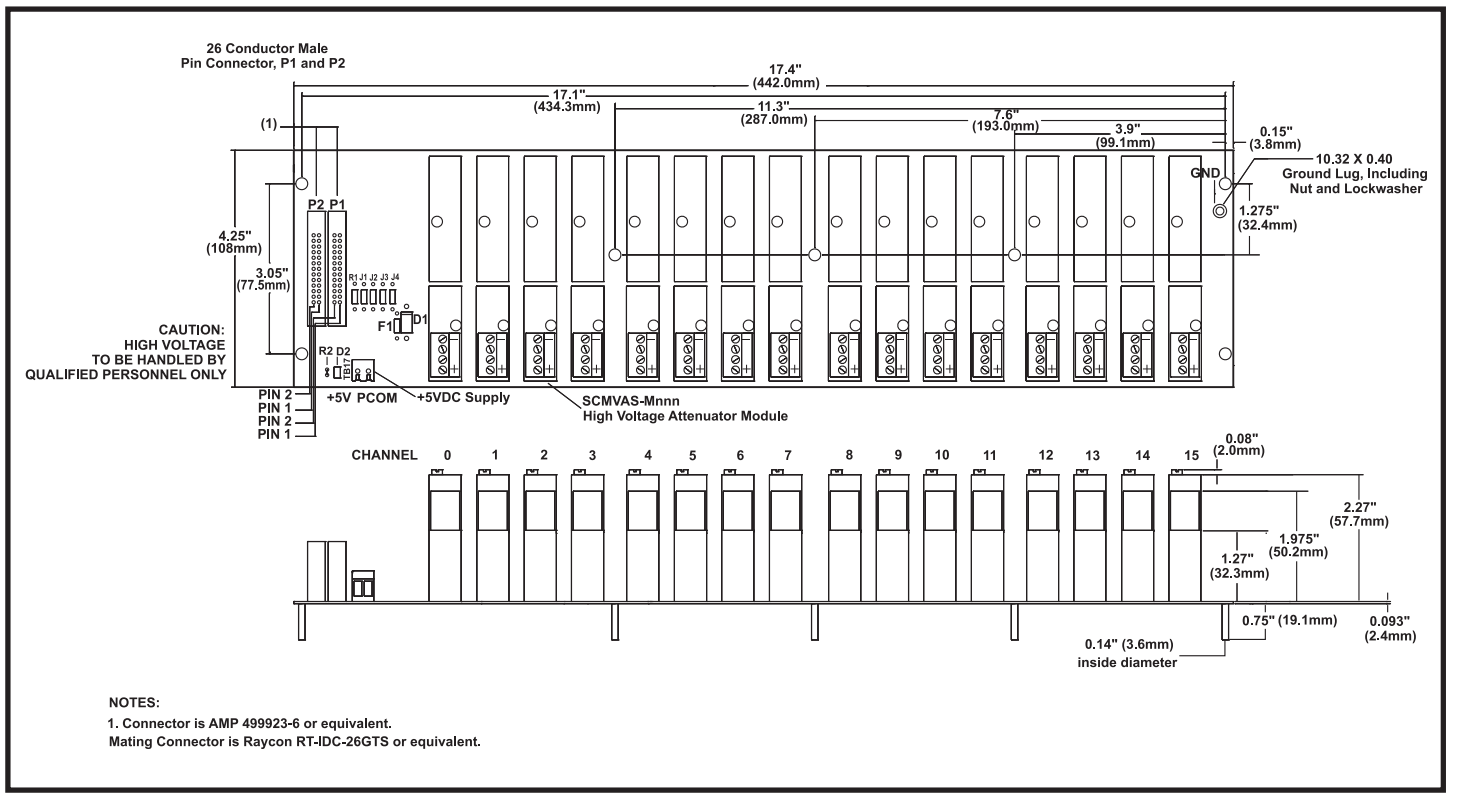


Figure 4: SCMVAS-PB16 Analog I/O Backpanel

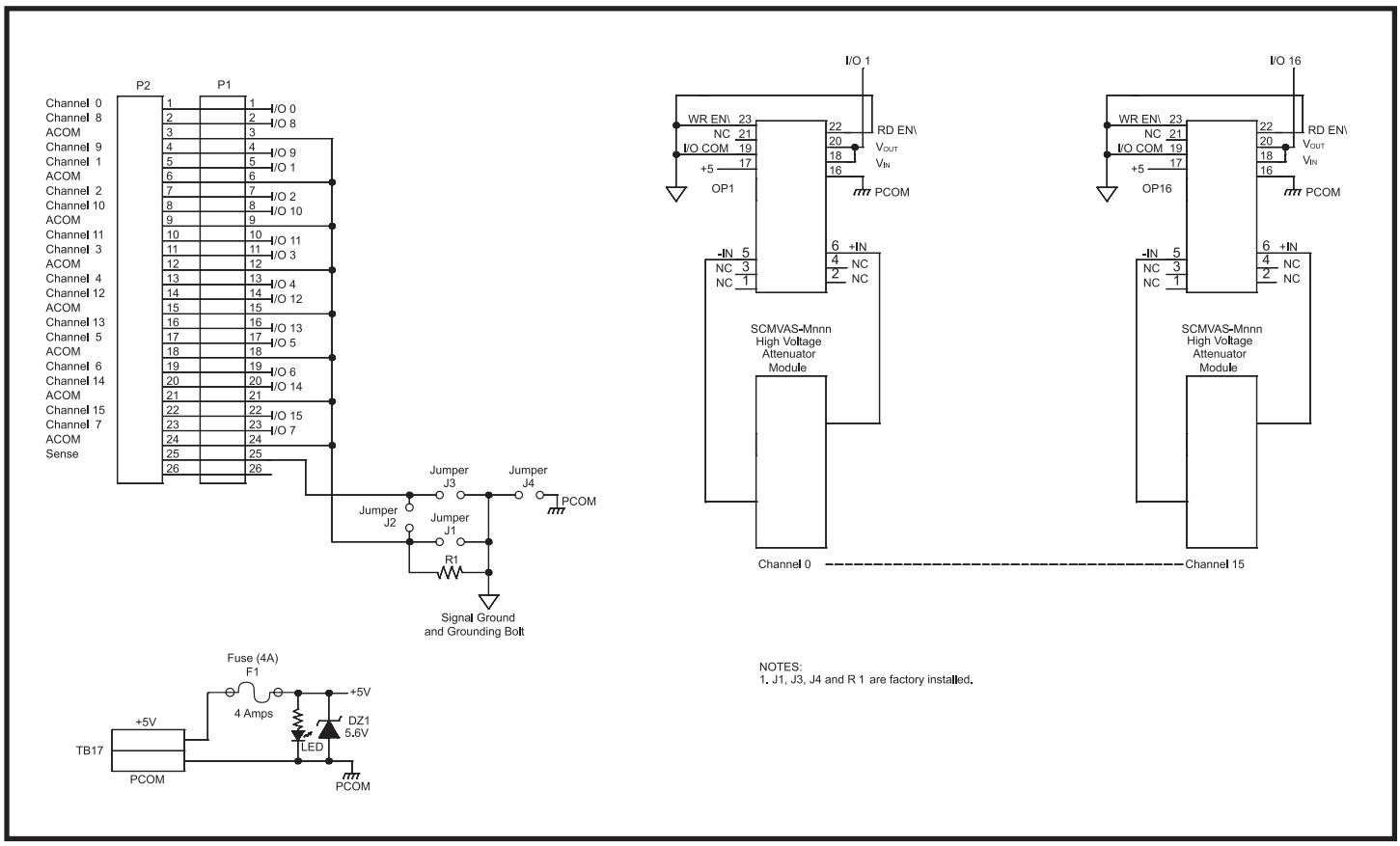


Figure 5: SCMVAS-PB16 Schematic

▶ Accessories for SCM5B Analog Modules

▶ Features

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

SCMPB01

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

Description

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

Specifications

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

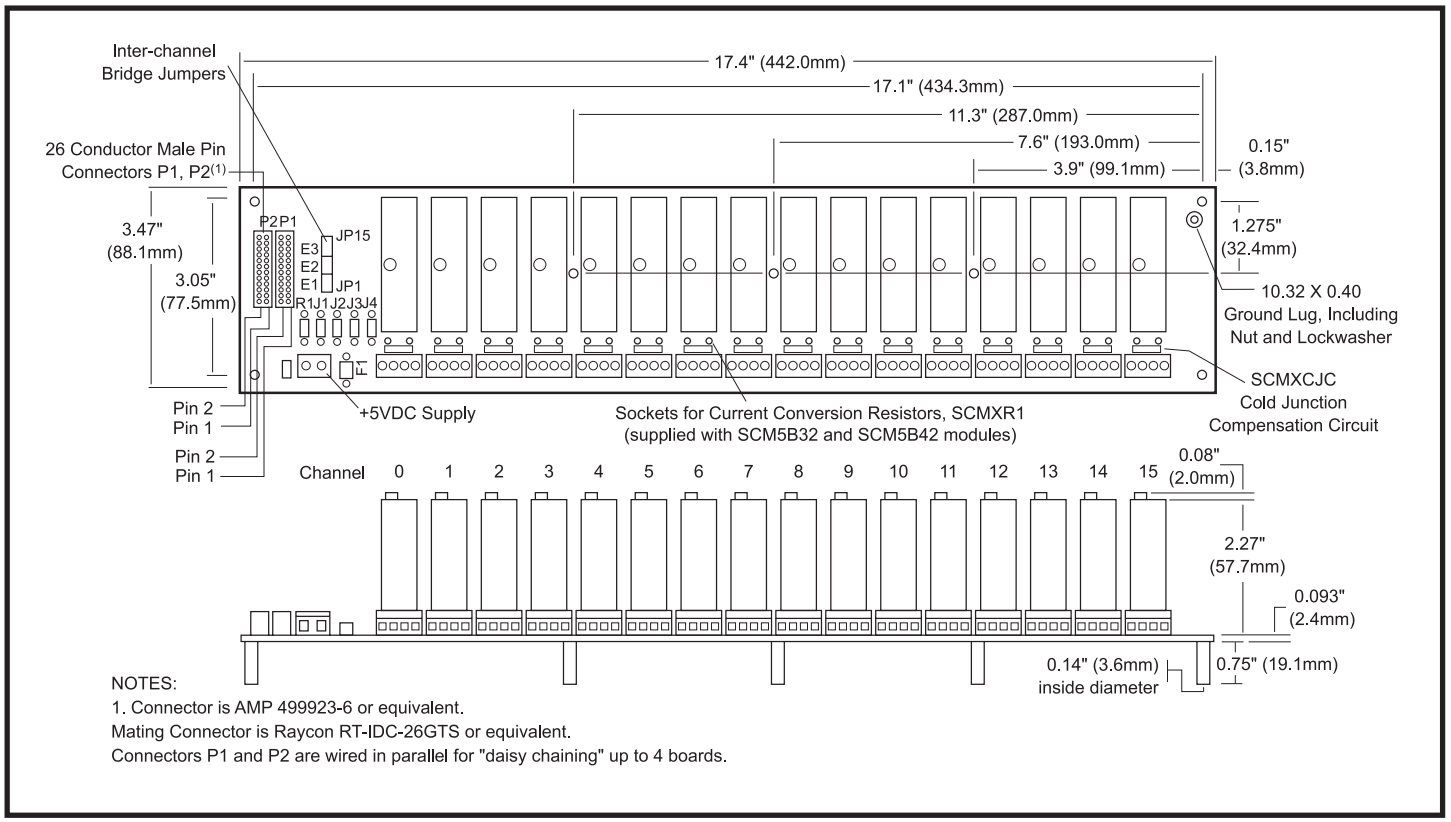


Figure 1: SCMPB01 Analog I/O Backpanel

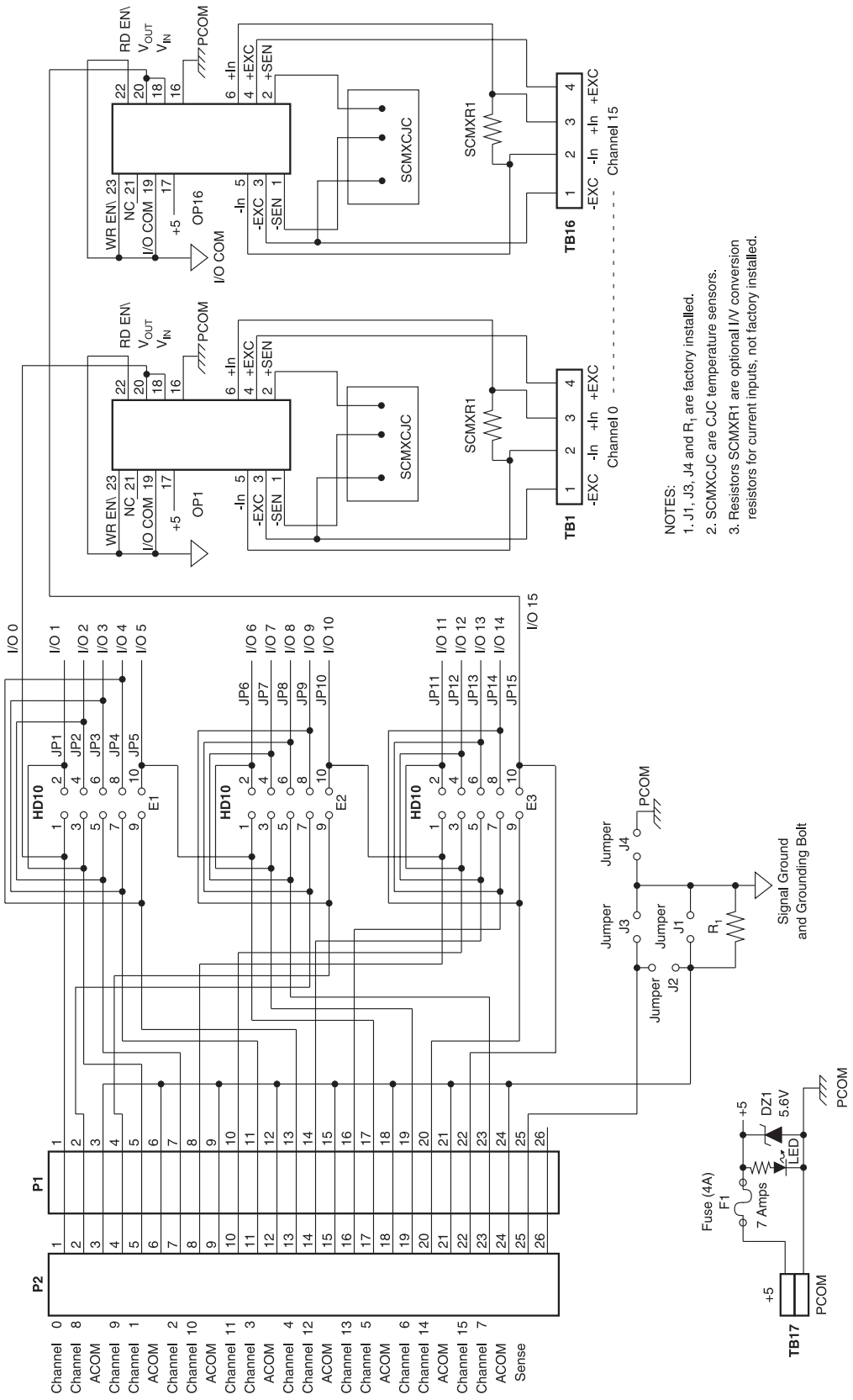


Figure 2: SCMPB01 Schematic

Electrical

P1 and P2 Connector

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

Adjacent Channel Jumpers

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

Example: Assume an SCM5B30 input module is installed in Channel 1 position and an SCM5B39 output module is installed in Channel 2 position. If JP1 is installed, the output of Channel 0 is connected to the input of Channel 1, which provides two levels of 1500V isolation.

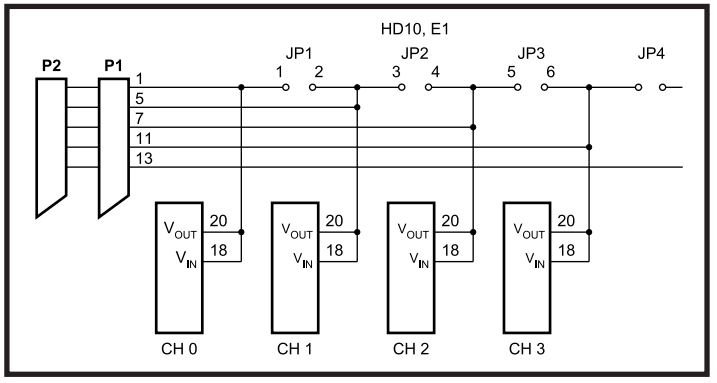


Figure 3: SCMPB01 Adjacent Channel Jumpers

Power

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

Fusing

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

Grounding

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

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

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

Ordering Information

Part Number	Description
SCMPB01	16-channel backpanel with standoffs for mounting.
SCMPB01-1	16-channel backpanel without cold junction compensation circuits and standoffs for mounting. Use when cost savings is desired and thermocouple input modules SCM5B37 and SCM5B47 will not be used.
SCMPB01-2	16-channel backpanel with DIN rail mounting option. The backpanel is mounted on a plate which is captured by the 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 SCMPB01/05 backpanels, a current path must exist between the host control logic power common and module I/O Common (module pin 19). This path can be established on the SCMPB01 via jumper J4. If this connection exists elsewhere in the system, jumper J4 should be removed since possible ground loops could exist. Other connections of power ground and signal ground usually occur at the A/D or D/A converter of the host measurement system. More information on grounding can be found in Application Note AN502.

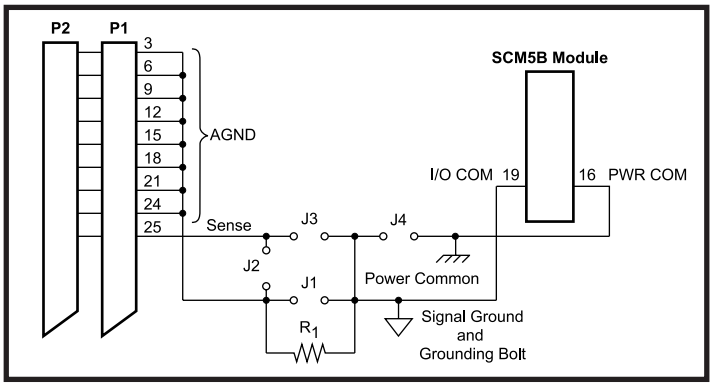


Figure 4: SCMPB01 Grounding Diagram

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

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

SCMPB02

16-Position Analog I/O Backpanel, Multiplexed

Description

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

Specifications

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

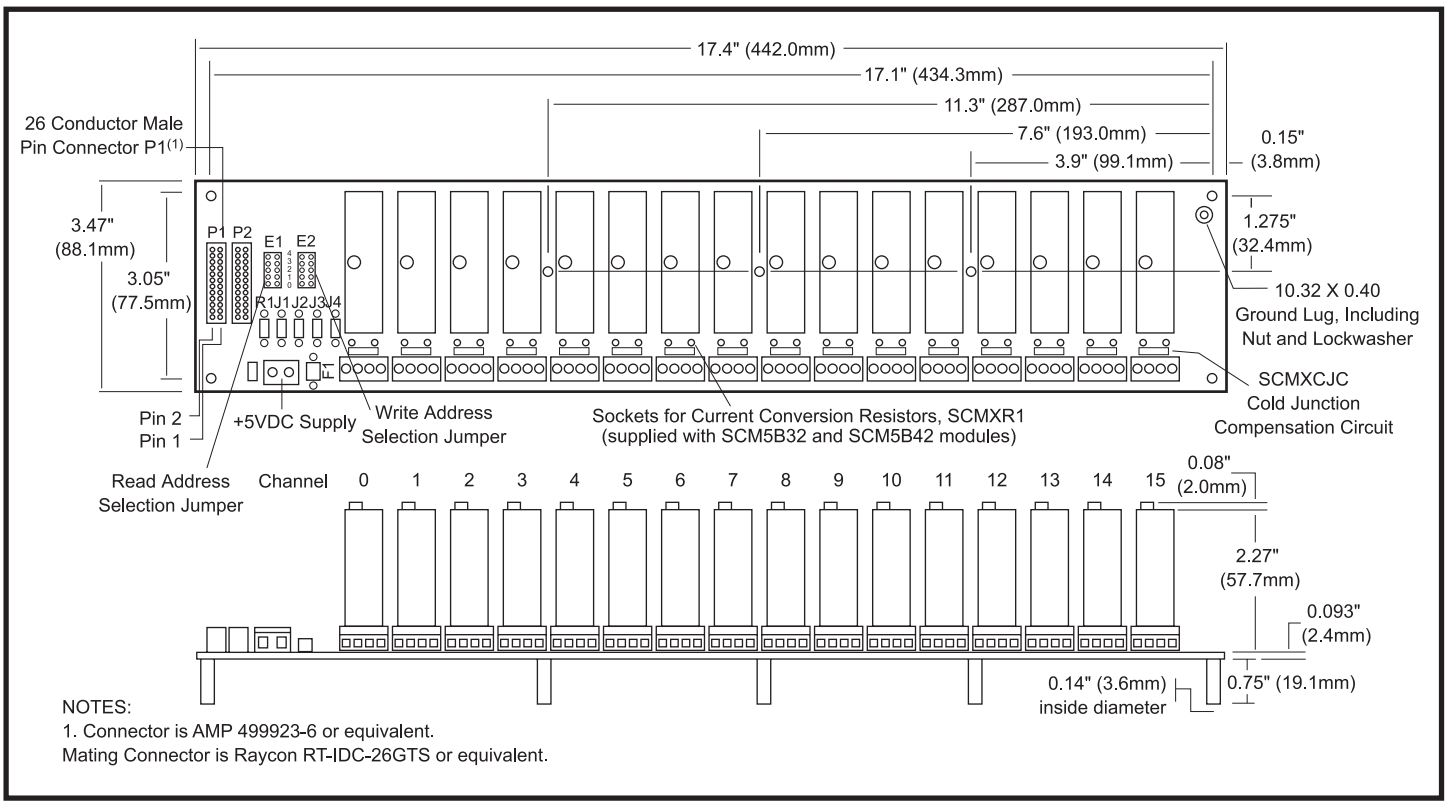


Figure 5: SCMPB02 Analog I/O Backpanel

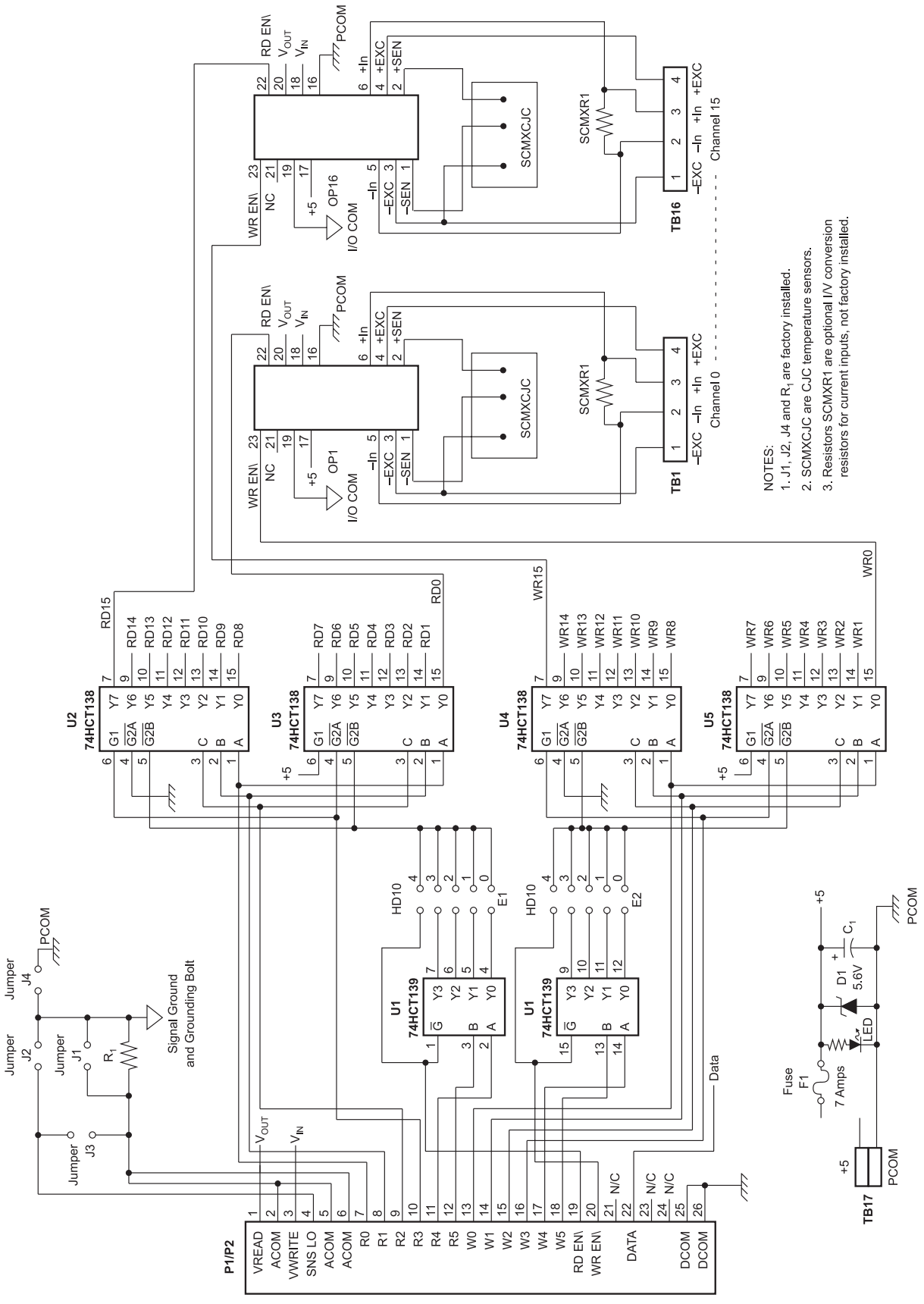


Figure 6: SCMPB02 Schematic

Electrical

P1 Connector

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

Address Selection

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

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

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

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

Power

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

Grounding

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

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

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

Ordering Information

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

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

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

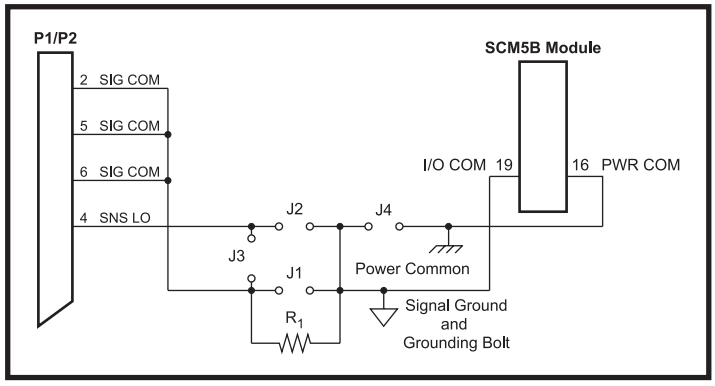


Figure 7: SCMPB02 Grounding Diagram

SCMPB03/SCMPB04

One/Two Position Analog I/O Backpanels

Description

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

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

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

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

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

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

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

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

Specifications

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

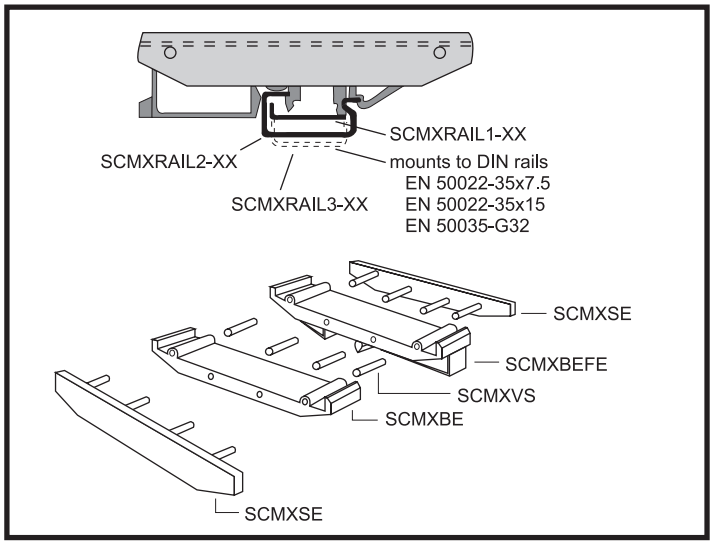


Figure 8: DIN Rail Mounting Elements

Ordering Information

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

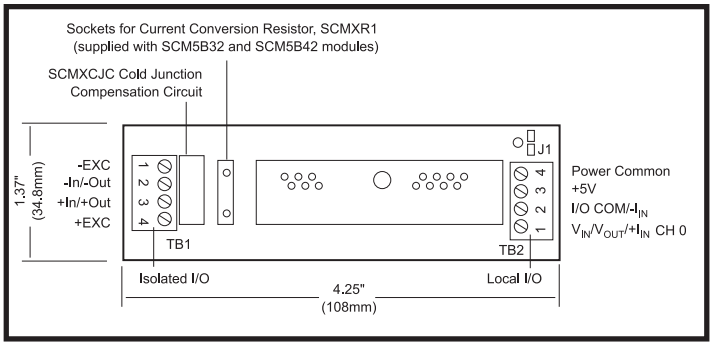


Figure 9: SCMPB03 Analog I/O Backpanel

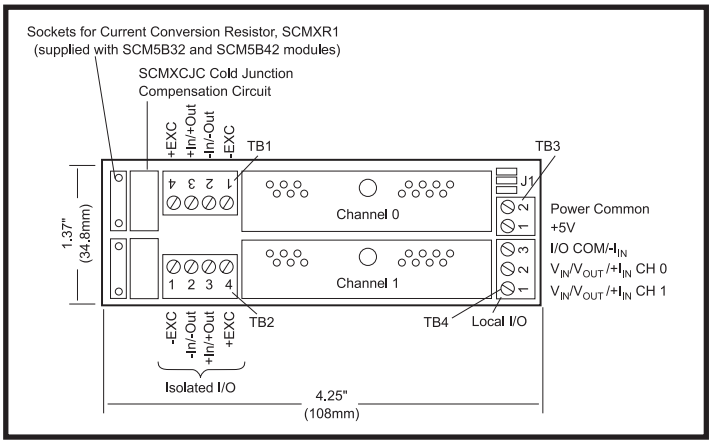
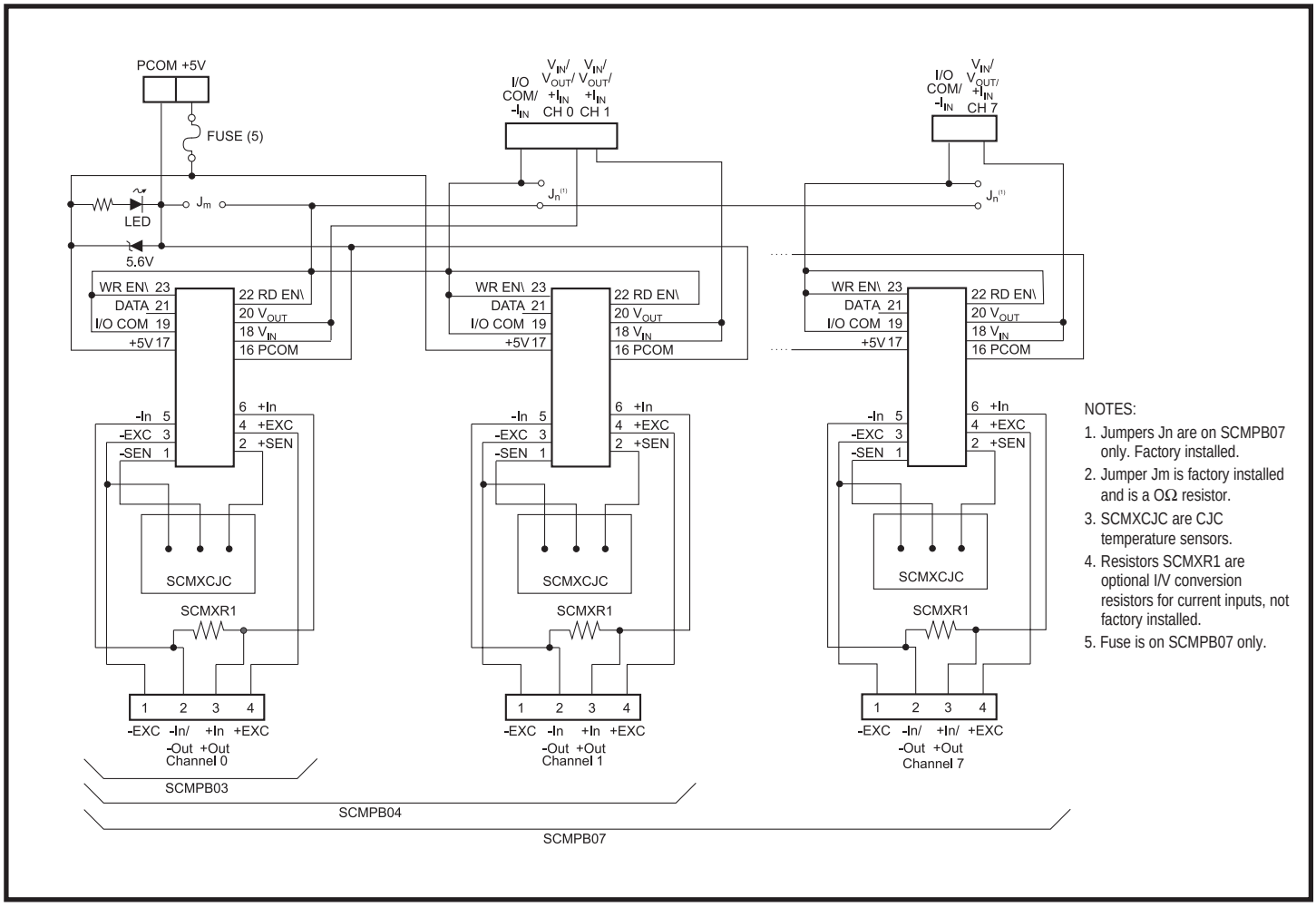


Figure 10: SCMPB04 Analog I/O Backpanel



NOTES:

1. Jumpers Jn are on SCMPB07 only. Factory installed.
2. Jumper Jm is factory installed and is a OΩ 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.

Figure 11: SCMPB03/SCMPB04/SCMPB07 Schematic

SCMPB05

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

Description

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

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

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

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

Specifications

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

Ordering Information

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

Electrical

Address Selection

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

Adjacent Channel Jumper

Adjacent channels may be connected together to provide an isolated output signal from an isolated input module, providing two levels of 1500V isolation. This capability is provided with the seven jumpers labeled JP1–JP7. See page 48 for an example.

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

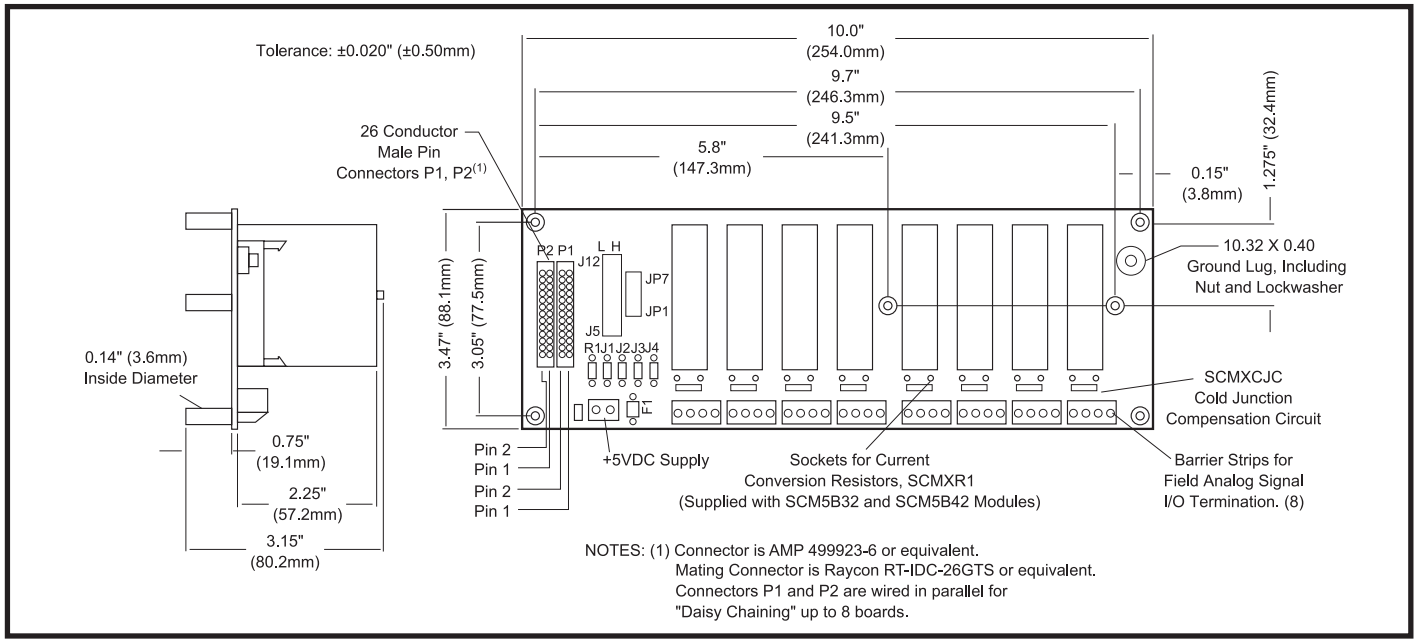


Figure 12: SCMPB05 Analog I/O Backpanel

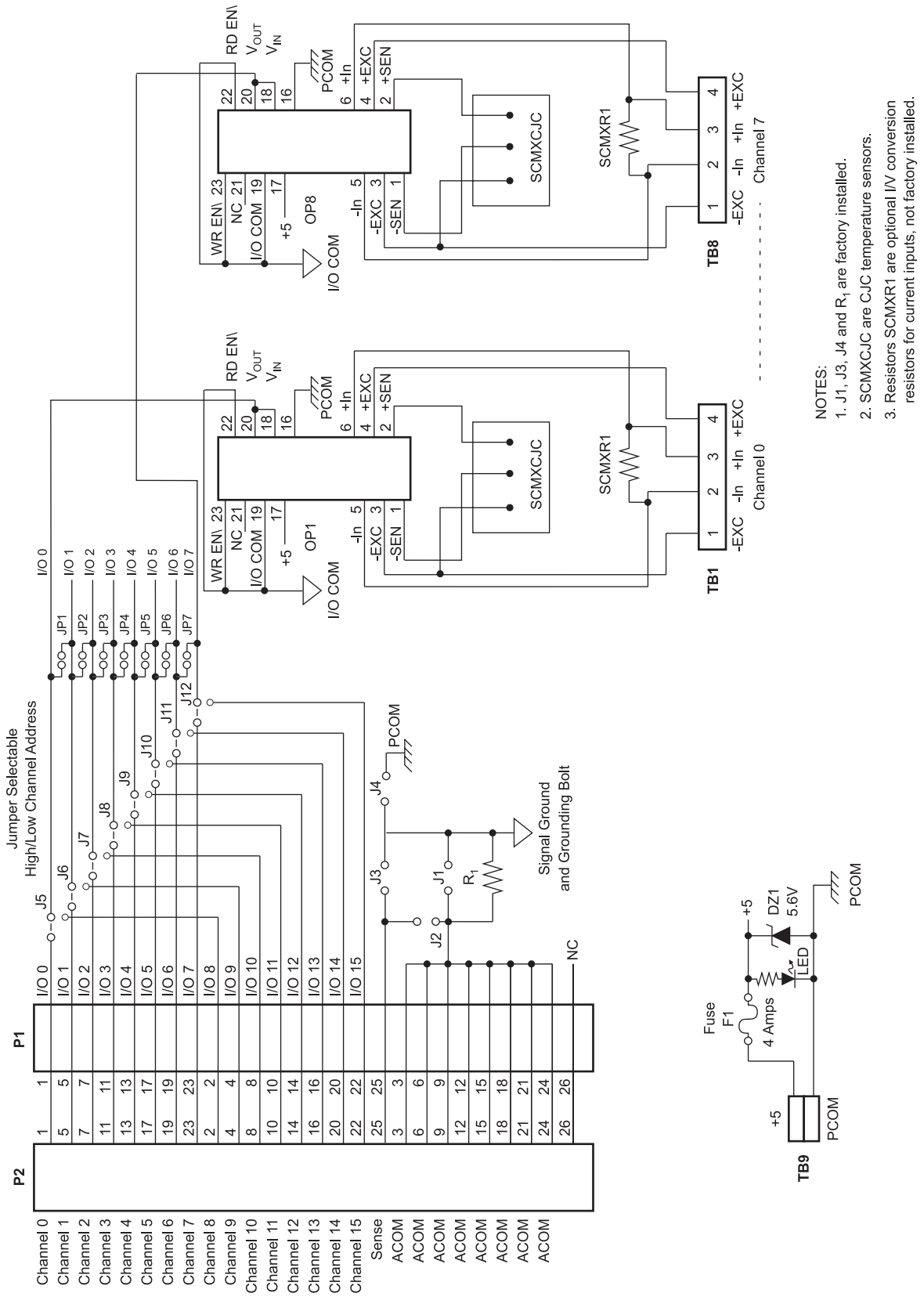


Figure 13: SCMPB05 Schematic

SCMPB06

8-Position Analog I/O Backpanel, Multiplexed

Description

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

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

Electrical

Address Selection

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

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

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

Ordering Information

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

Specifications

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

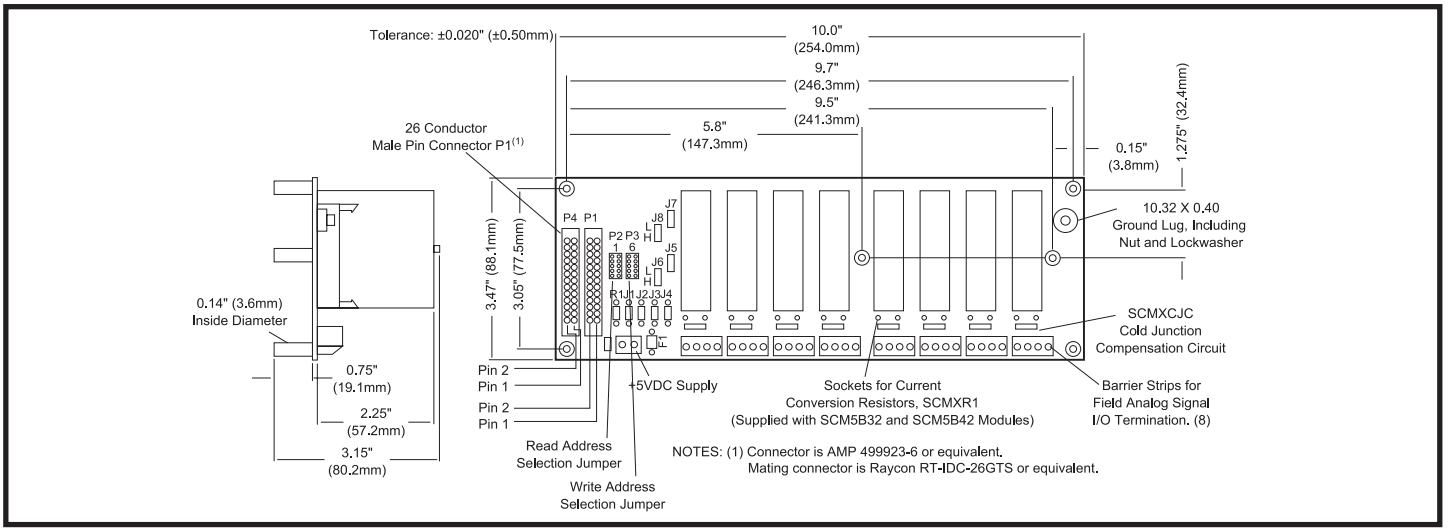
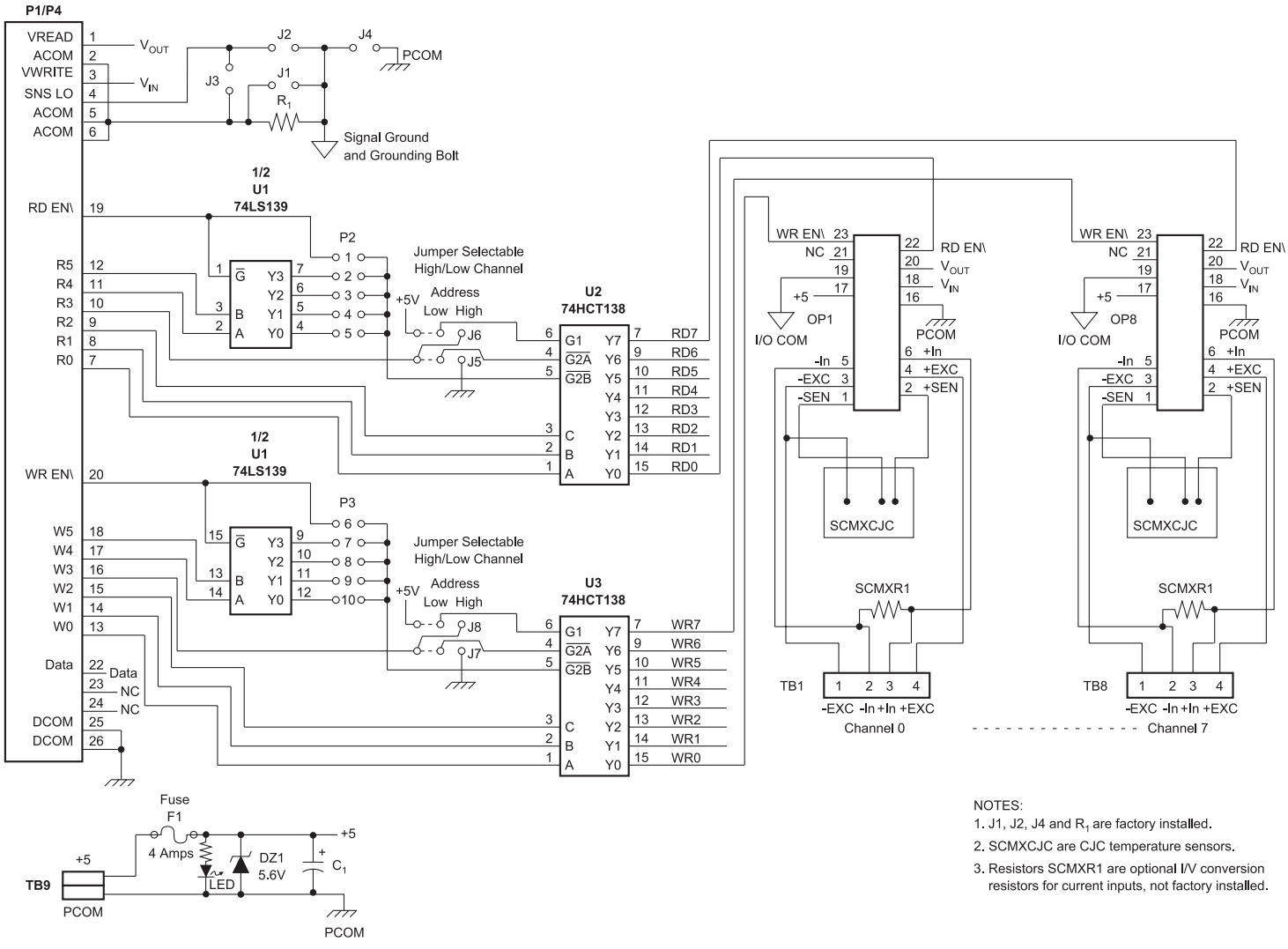


Figure 14: SCMPB06 Analog I/O Backpanel

Address Selection Jumpers

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



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 15: SCMPB06 Schematic

SCMPB07

8-Position Backpanel, High Density

Description

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

See Figure 11 on page 55 for schematic.

Specifications

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

Ordering Information

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

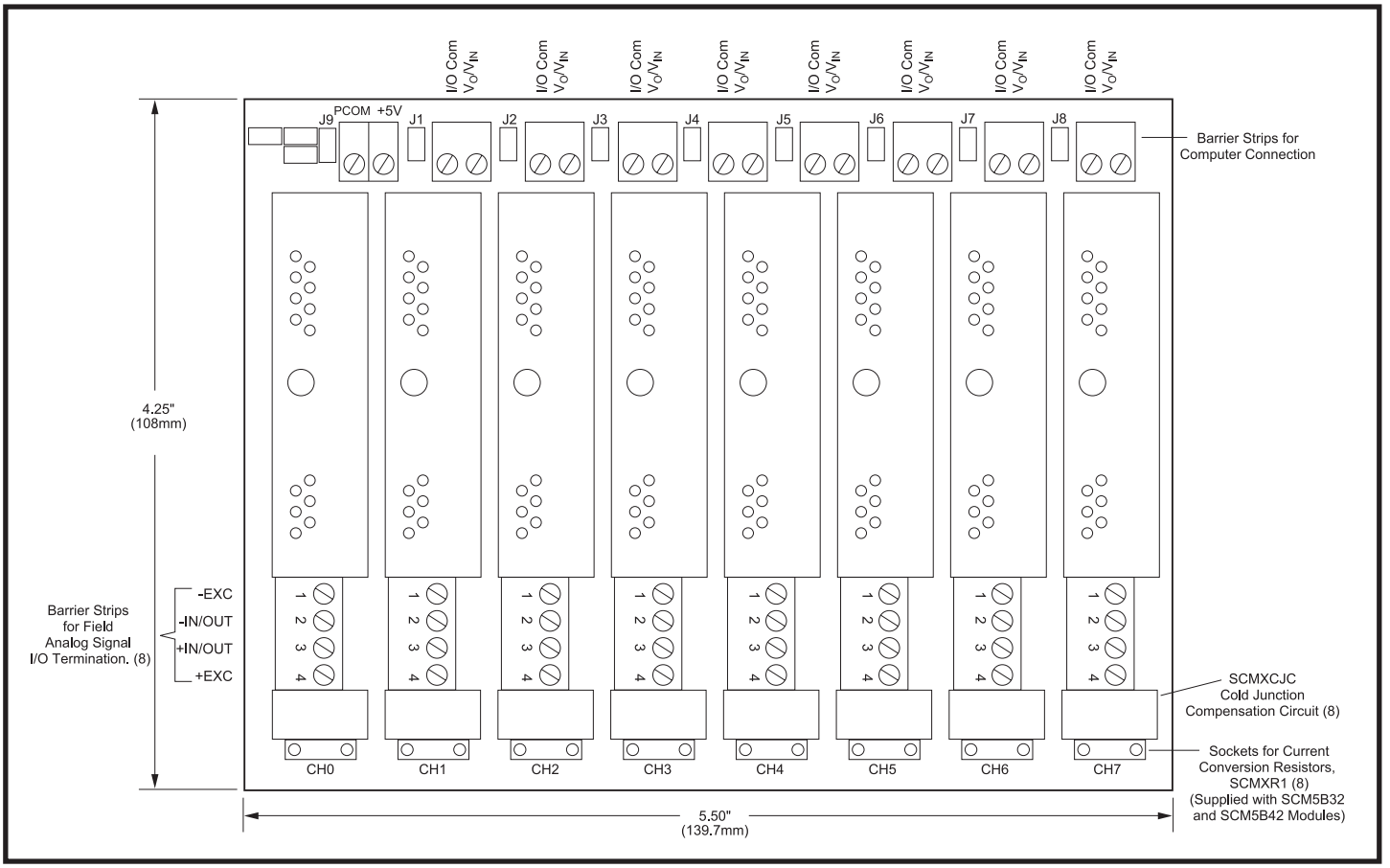


Figure 16: SCMPB07 Analog I/O Backpanel

SCMXEV

Analog Module Evaluation Board

Description

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

The SCMXEV is mechanically compatible with DIN rail mounting. Phoenix brand Universal Module (UM) elements may be used. The following Phoenix parts would be used to mount one SCMXEV.

2, UM-BEFE base elements with snap foot
2, UM-SE side elements
4, UM-VS 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.

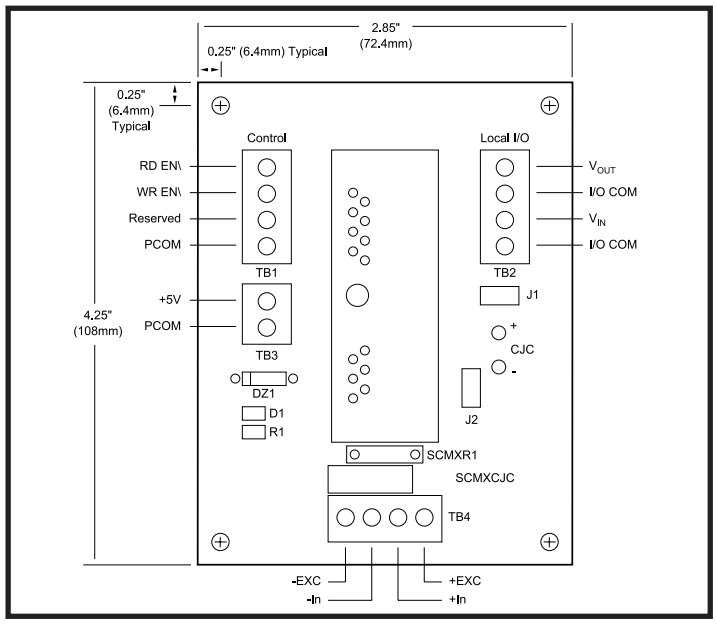


Figure 17: SCMXEV Evaluation Board Dimensions and Pin Layout

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

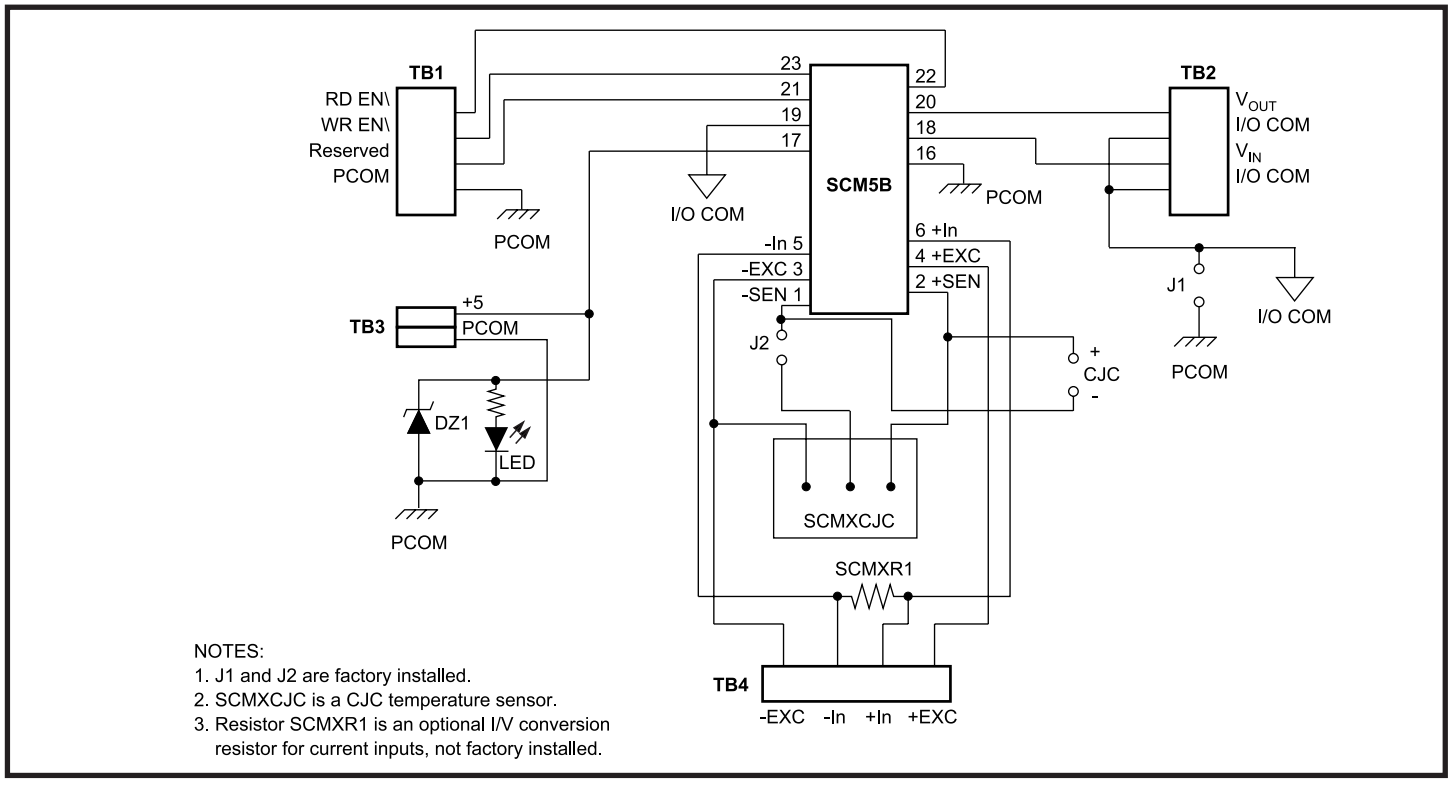


Figure 18: SCMXEV Evaluation Board Schematic

SCMXCA004-01, - 02

Interface Cable

Description

SCMXCA004-XX

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

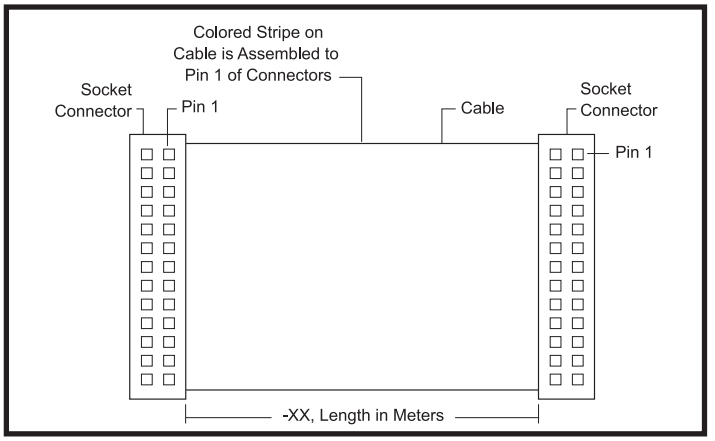


Figure 19: SCMXCA004-XX System Interface Cable

SCMXIF (-DIN)

Universal Interface Board

Description

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

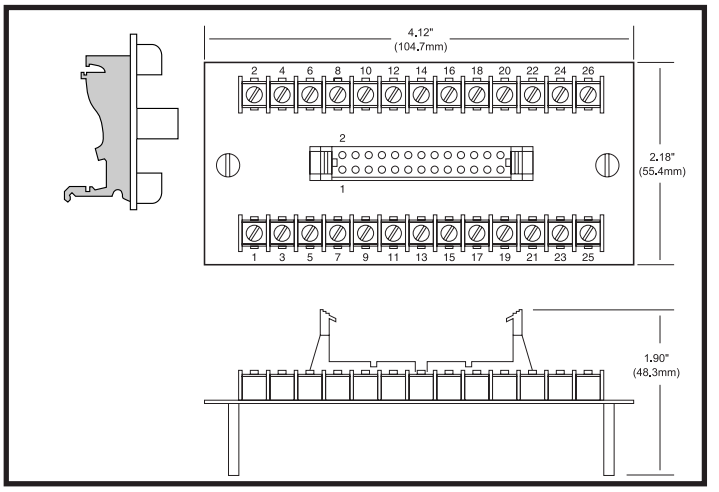


Figure 20: SCMXIF Universal Interface Board Dimensions

SCMXRK-002

19-Inch Metal Mounting Rack

Description

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

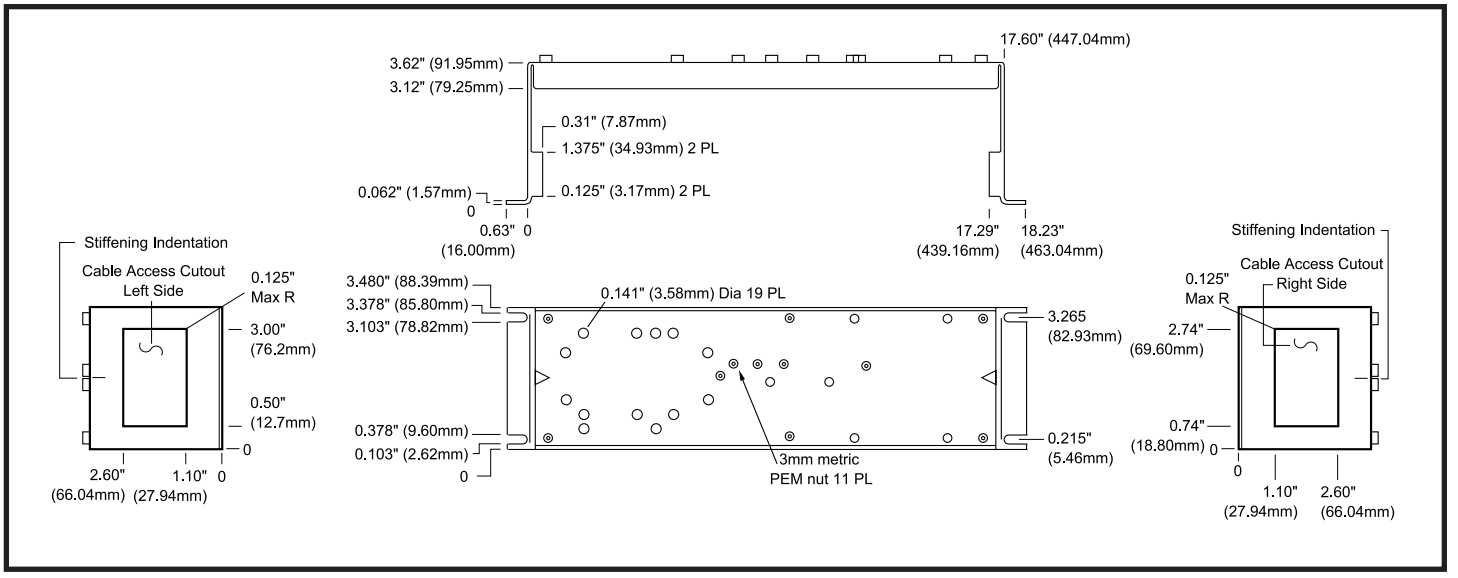


Figure 21: SCMXRK-002 Analog Rack Dimensions

SCMXCJC

Encapsulated Cold Junction Compensation

Description

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

Specifications

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

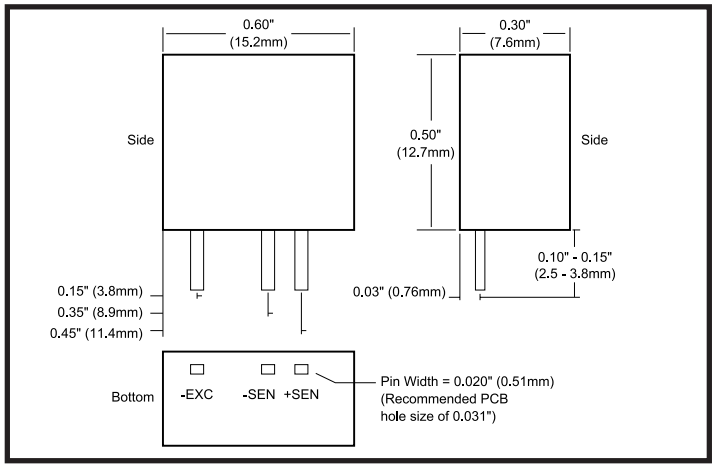


Figure 22: SCMXCJC Physical Dimensions and Pin Layout

SCM5BPT

Pass Thru Module

Description

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

SCM5BPT-1367

Pass Thru Module with Switch

Description

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

SCMXJP-003

Jumper Strap

Description

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

SCMXFS-003, -004

Fuse

Description

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

SCMXR1

Current Conversion Resistor

Description

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

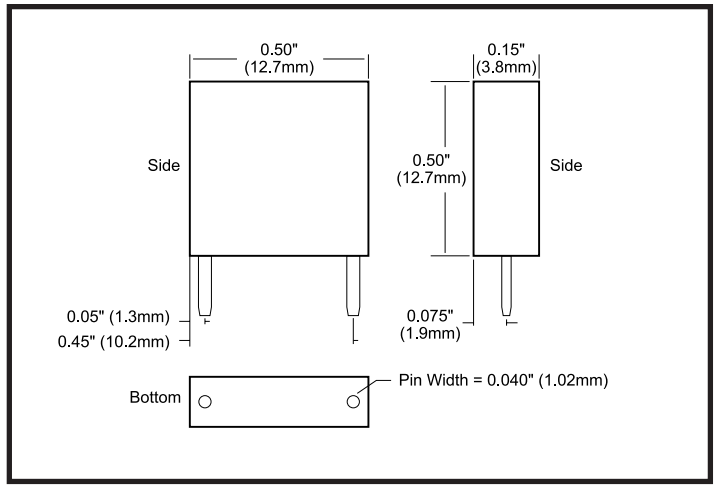


Figure 23: SCMXR1 Physical Dimensions

Ordering Information

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

SCM5B-PROTO

Breadboard Kit

Description

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

SCMXRAIL1-XX, SCMXRAIL2-XX, SCMXRAIL3-XX

DIN Rail

Description

Three styles of DIN RAIL are available, specify length when ordering.

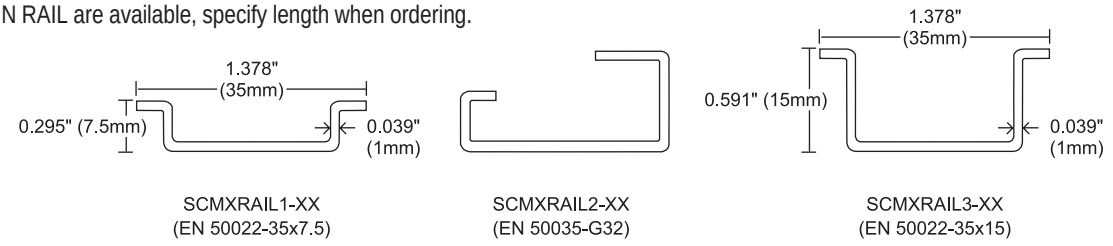


Figure 24: DIN Rail Styles

SCMXPRT-001/D, SCMXPRE-001/D

Power Supplies

Description

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

Specifications

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)

Supplies are UL recognized, File No. E65890.

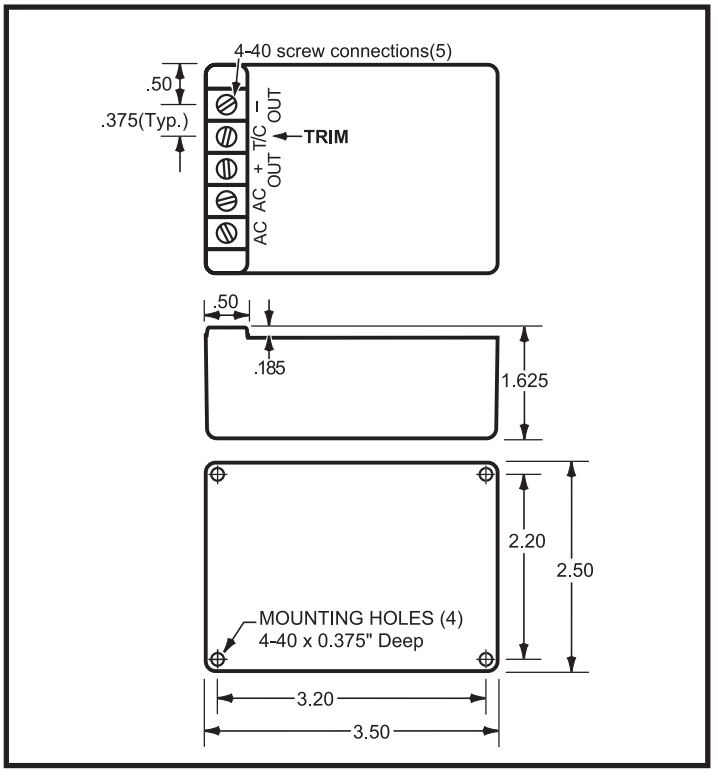


Figure 25: SCMXPRT-001/D and SCMXPRE-001/D Physical Dimensions

SCMXPRT-003, SCMXPRE-003

Power Supplies

Description

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

Specifications

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

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).

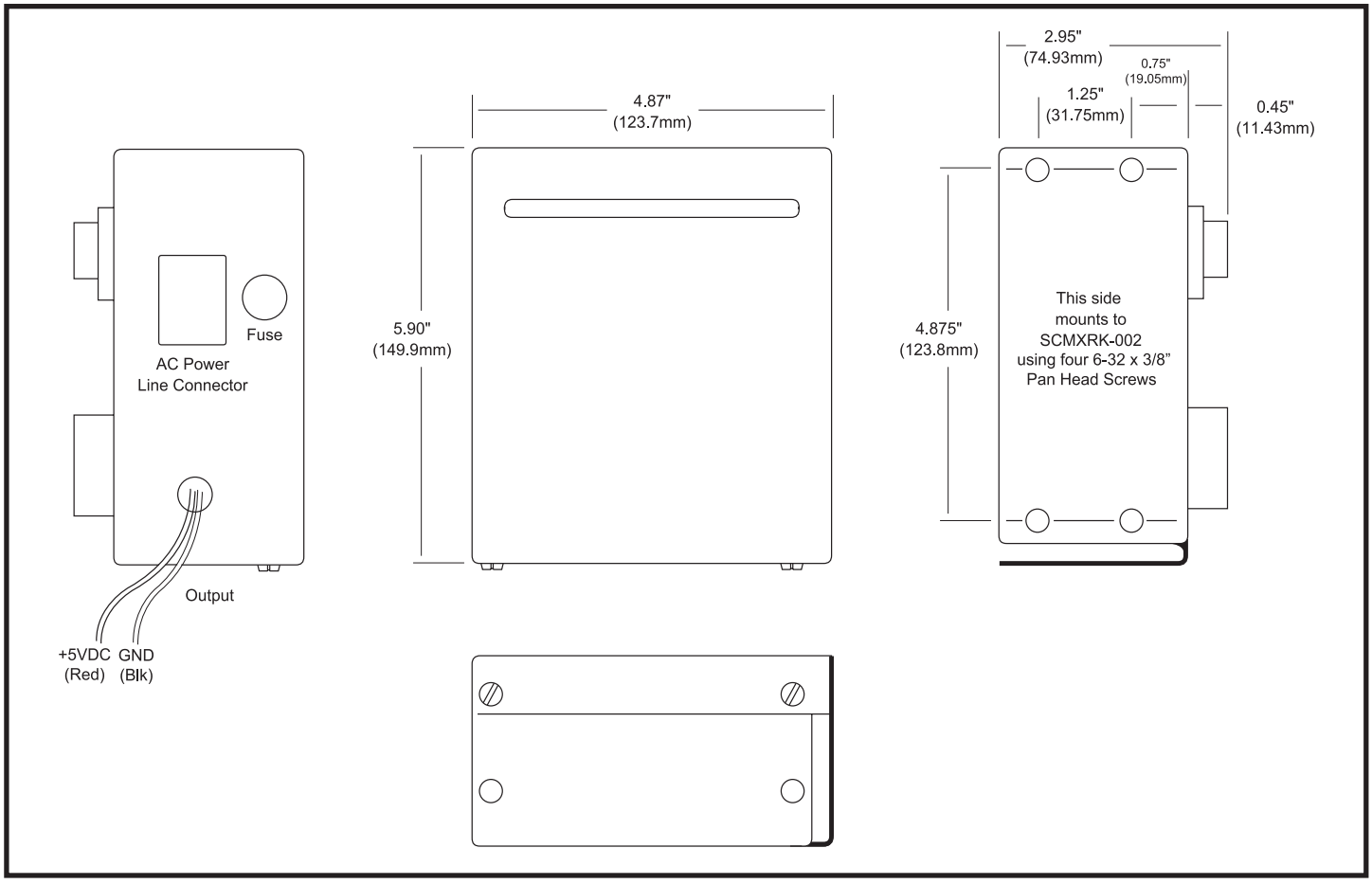
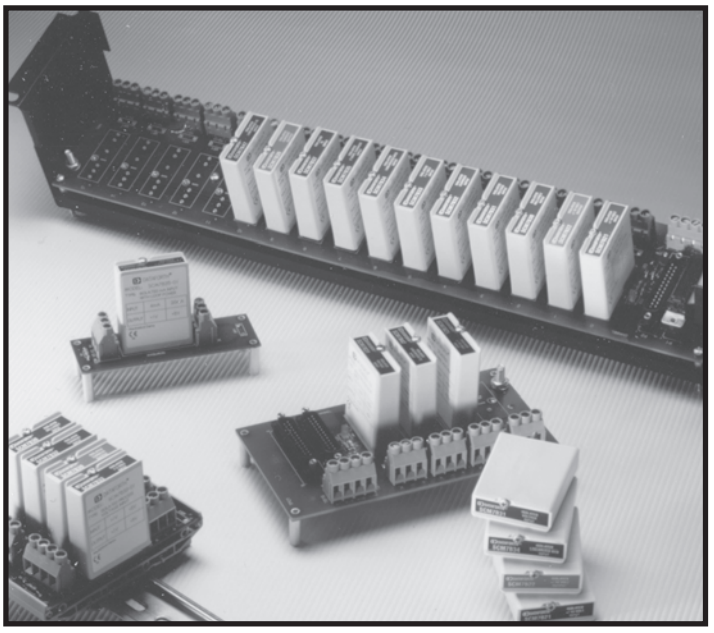


Figure 26: SCMXPRT-003 and SCMXPRE-003 Physical Dimensions

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.

▶ Features

- ±0.03% Accuracy (Typical)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation & 120Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- Wide Supply Voltage, 14 to 35VDC
- 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 Directive 2002/95/EC

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.

▶ SCM7B Selection Guide

ISOLATED VOLTAGE INPUT MODULES Page 68

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 VOLTAGE OUTPUT MODULES Page 70

MODEL	INPUT RANGE	OUTPUT RANGE
SCM7B22	±10V	±10V OF SPAN

ISOLATED PROCESS CURRENT INPUT MODULES Page 72

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

ISOLATED PROCESS VOLTAGE INPUT MODULES Page 72

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

ISOLATED LINEARIZED 100Ω Pt RTD INPUT MODULES ** Page 74

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 INPUT MODULES ** Page 74

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)	†

▶ SCM7B Selection Guide (Continued)

ISOLATED 2-WIRE XMTR INTERFACE MODULES WITH LOOP POWER Page 76

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

ISOLATED POTENTIOMETER INPUT MODULES Page 78

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 Page 80

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 (+32F to +3182°F)	†
SCM7B37S-06	S	0°C to +1750°C (+32F to +3182°F)	†
SCM7B37B-07	B	0°C to +1800°C (+32F to +3272°F)	†

ISOLATED CURRENT OUTPUT MODULES Page 82

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

ISOLATED VOLTAGE INPUT MODULES, WIDE BANDWIDTH Page 84

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 Page 86

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)	†

ACCESSORIES Page 89

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 without 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 interface 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

† 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

POWER SUPPLIES Page 200

PWR-PS5RA	Power Supply, 24V, 0.3A, 100-240VAC Input
PWR-PS5RB	Power Supply, 24V, 0.6A, 100-240VAC Input
PWR-PS5RC	Power Supply, 24V, 1.3A, 100-240VAC Input
PWR-PS5RD	Power Supply, 24V, 2.1A, 100-240VAC Input
PWR-PS5RE	Power Supply, 24V, 4.2A, 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
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			

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" max) 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 Typical, ±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

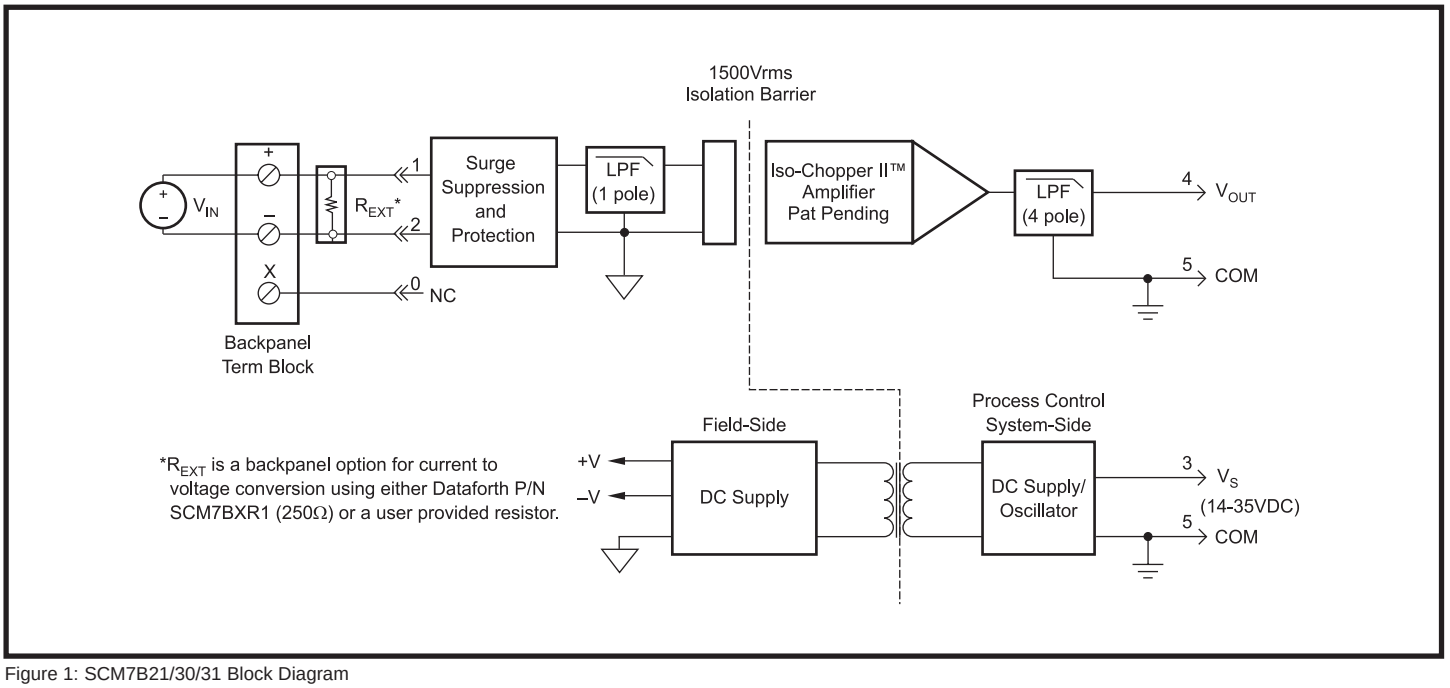


Figure 1: SCM7B21/30/31 Block Diagram

Specifications

Typical at 25°C and +24VDC

Module	SCM7B21	SCM7B30	SCM7B31
Input			
Signal Range	±10V	±10mV to ±1V	±1V to ±10V
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	*	*
Transient	ANSI/IEEE C37.90.1	*	*
Output			
Signal Range(1)	±10V	†	†
Effective Available Power(1)	10mW	40mW	*
Resistance	<1Ω	*	*
Protection	Continuous Short-to-Ground	*	*
Voltage/Current Limit	±12V, ±14mA	*	*
CMV (Input-to-Output)			
Continuous	1500Vrms max	*	*
Transient	ANSI/IEEE C37.90.1	*	*
CMRR (50 or 60Hz)	100dB	160dB	120dB
Accuracy(2)	±0.03% Span typical, ±0.1% Span max	*	*
Linearity(3)	±0.01% Span typical, ±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	*
Output Offset	±0.001% Span/°C	±0.002% Span/°C	*
Noise			
Peak at 5MHz B/W	1mV	500µV	*
RMS at 10Hz to 100kHz B/W	250µV	*	*
Peak at 0.1Hz to10Hz B/W	1µV RTI	*	*
Frequency and Time Response			
Bandwidth, –3dB	300Hz	3Hz	*
NMR (50/60Hz)	80dB/decade >300Hz	80/85dB	*
Step Response, 90% Span	1.5ms	165ms	*
Supply Voltage	14 to 35VDC	*	*
Current(1)	16mA	12mA	*
Sensitivity	±0.0002%/%V_S	±0.0001%/%V_S	*
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max	* *	* *
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:
* Specification same as preceding model.
(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) SCM7B21 is available only as ±10V output.

Ordering Information

Model	Input Range
SCM7B21(6)	±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

†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

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 (Figure 1).

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" max) 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 Typical, ±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

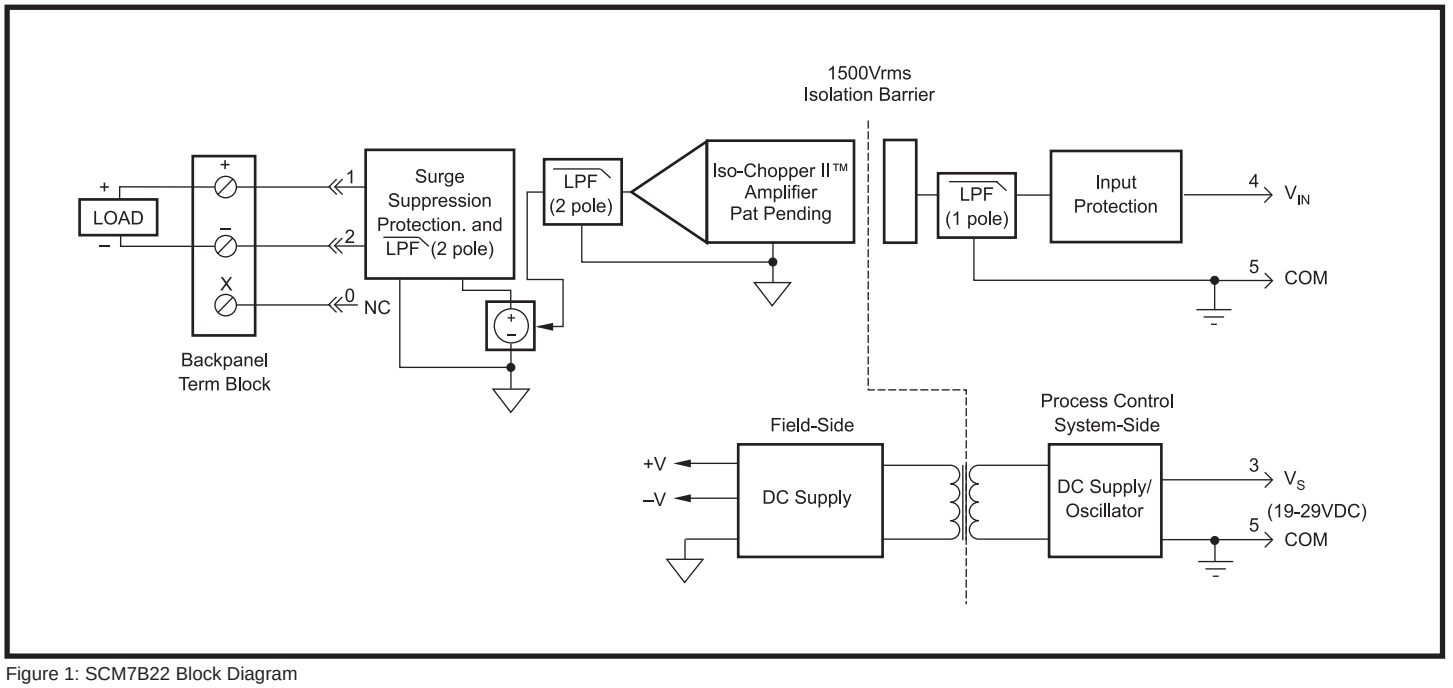


Figure 1: SCM7B22 Block Diagram

Specifications

Typical at 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 typical, ±0.1% Span max
Linearity(2)	±0.01% Span typical, ±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
Frequency and Time Response	
Bandwidth, -3dB	400Hz
NMR (-3dB at 400Hz)	100dB per decade above 400Hz
Step Response, 90% Span	1ms
Supply Voltage	19 to 29VDC
Current	16mA
Sensitivity	±0.0001%/%V_S
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max
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:
(1) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(2) Linearity is calculated using the best-fit straight line method.

Ordering Information

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

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 1). 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" max) 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 Typical, ±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

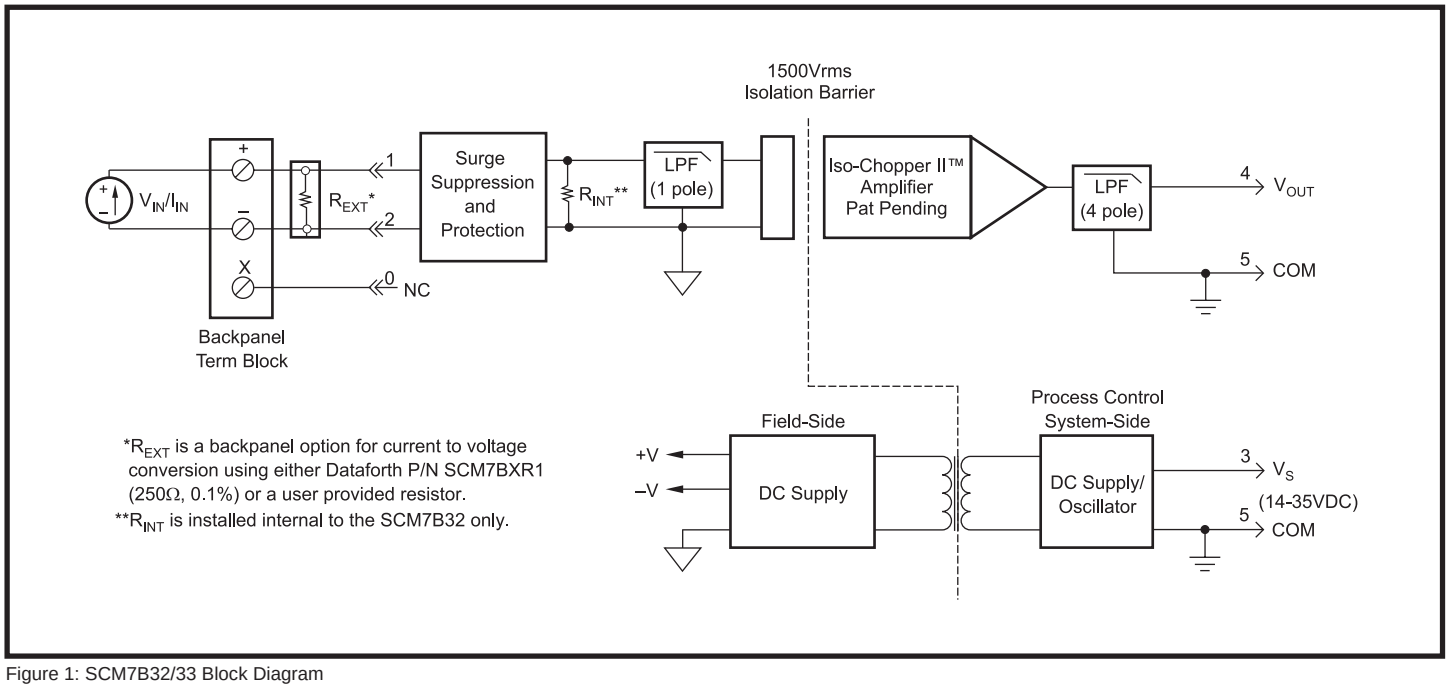


Figure 1: SCM7B32/33 Block Diagram

Specifications

Typical at 25°C and +24VDC

Module	SCM7B32	SCM7B33
Input		
Signal Range	4-20mA, 0-20mA	+1 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	*
Transient	ANSI/IEEE C37.90.1	*
Output		
Signal Range(1)	†	†
Effective Available Power(1)	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)	105dB	*
Accuracy(2)	±0.03% Span typical, ±0.1% Span max	*
Linearity(3)	±0.01% Span typical, ±0.02% Span max	*
Stability (–40°C to +85°C)		
Gain	±35ppm/°C	*
Input Offset	N/A(4)	*
Output Offset	±0.003% Span/°C	*
Noise		
Peak at 5MHz B/W	500µV	*
RMS at 10Hz to 100kHz B/W	300µV	*
Peak at 0.1Hz to 10Hz B/W	1µV RTI	*
Frequency and Time Response		
Bandwidth, –3dB	100Hz	*
NMR (–3dB at 100Hz)	80dB per decade above 100Hz	*
Step Response, 90% Span	5ms	*
Supply Voltage	14 to 35VDC	*
Current(1)	12mA	*
Sensitivity	±0.0001%/%V_S	*
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max	* *
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:
*Specification same as preceding model
(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.

Ordering Information

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

†Output Ranges Available

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

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 (Figure 1).

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 cancelling 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" max) 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 Typical
- Nonconformity, ±0.025% to ±0.07% of Span Typical
- 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

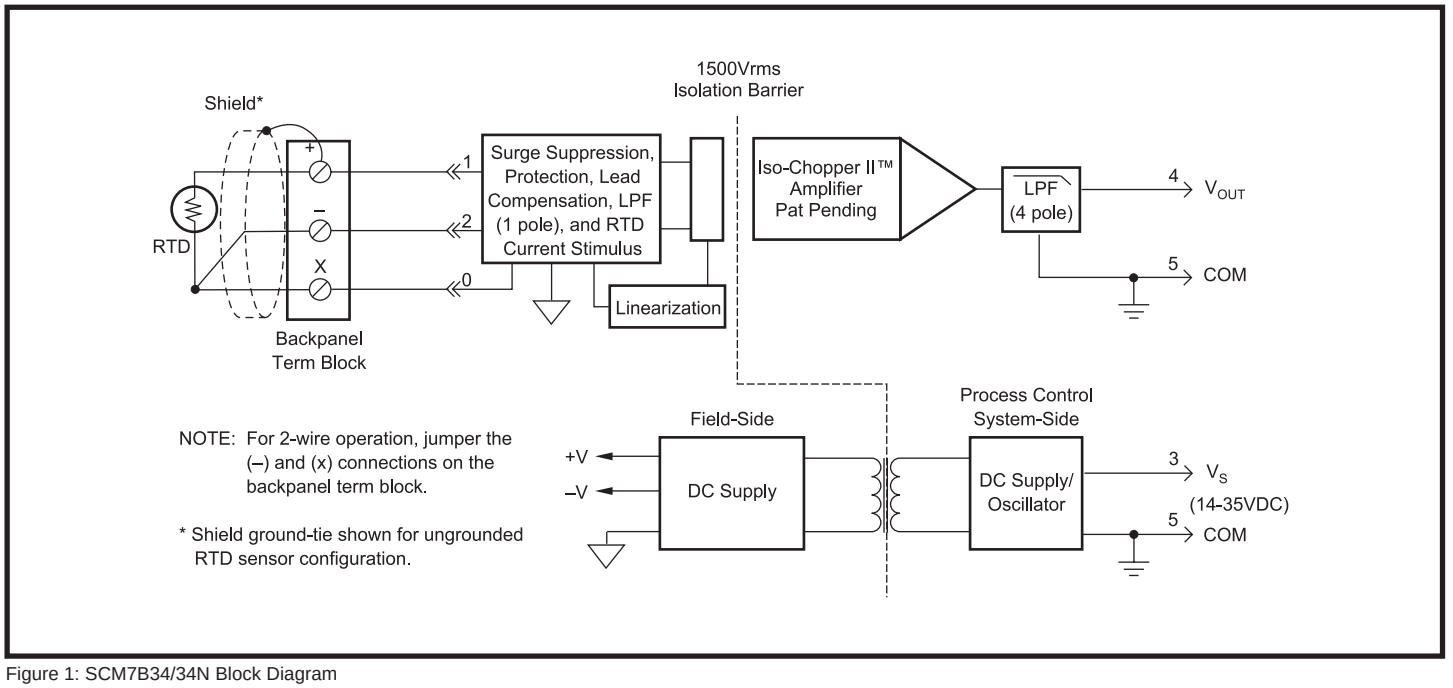


Figure 1: SCM7B34/34N Block Diagram

Specifications

Typical at 25°C and +24VDC

Module	SCM7B34	SCM7B34N
Input		
Signal Range	100Ω Pt RTD See Ordering Information	120Ω Ni RTD *
Protection		
Continuous	120Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
Sensor Excitation Current(1)	≈250µA	*
Lead Resistance Effect	±0.02°C/Ω max	*
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	*
Nonconformity(4)	See Ordering Information	*
Stability (–40°C to +85°C)		
Gain	±60ppm/°C	*
Input Offset	±1µV/°C	*
Zero Suppression	±0.002%(R_Z/R_{SPAN})(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	*
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, 90% Span	250ms	*
Supply Voltage	14 to 35VDC	*
Current(2)	12mA	*
Sensitivity	±0.0001%/%V_S	*
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max	* *
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:
*Specification same as preceding model.
(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.

Ordering Information

Model	Input Range	Accuracy (2) Typical	Accuracy (2) Max	Nonconformity (3) Typical	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
+1 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

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 (Figure 1). 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" max) 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 Typical, ±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

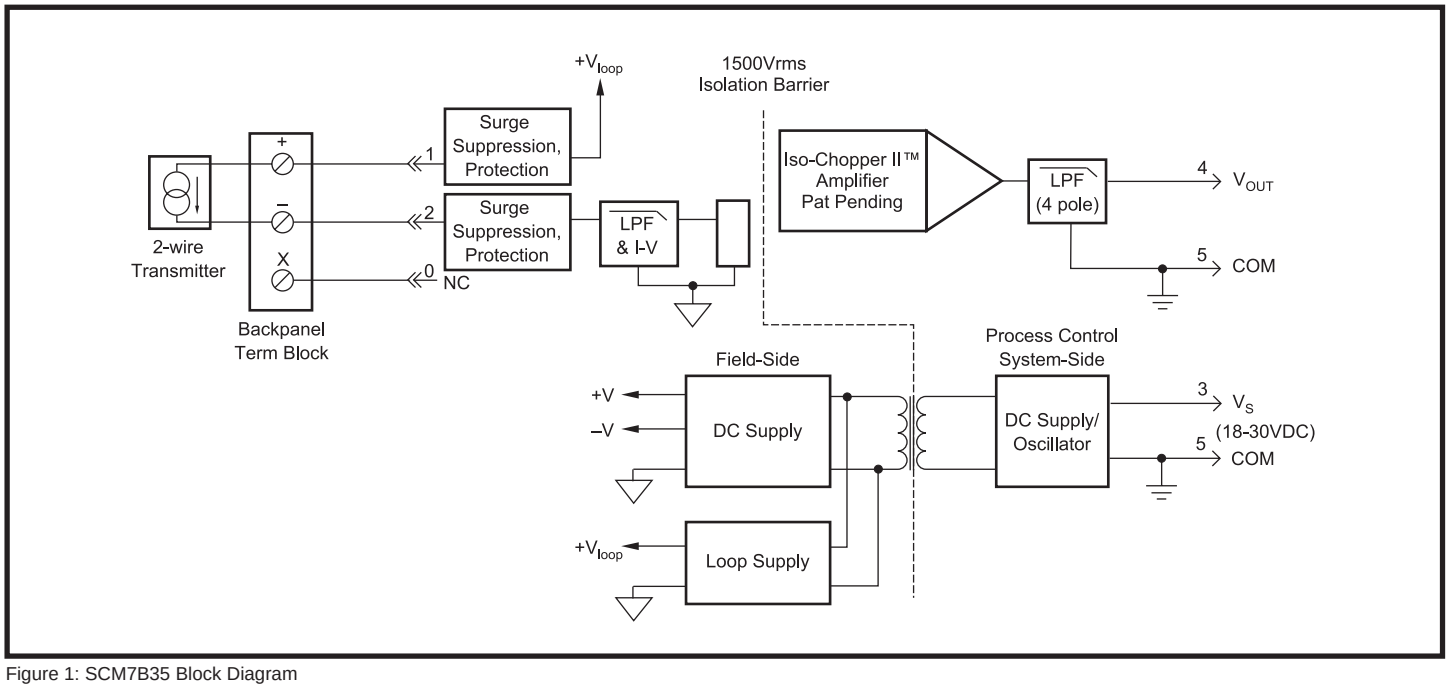


Figure 1: SCM7B35 Block Diagram

Specifications

Typical at 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 typical, ±0.1% Span max
Linearity(4)	±0.01% Span typical, ±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
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 (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max
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:
(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.

Ordering Information

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

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 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" max.) save space and are ideal for high channel density applications. They are designed for easy DIN rail mounting using any of Dataforth's "-DIN" backpanels.

▶ Features

- Industry's First 7B Potentiometer Input Module
- Interfaces 100Ω to 10kΩ Potentiometers
- Provides High-Level Voltage Outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span Typical, ±0.1% Max
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms Continuous
- 120dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Easy DIN Rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant

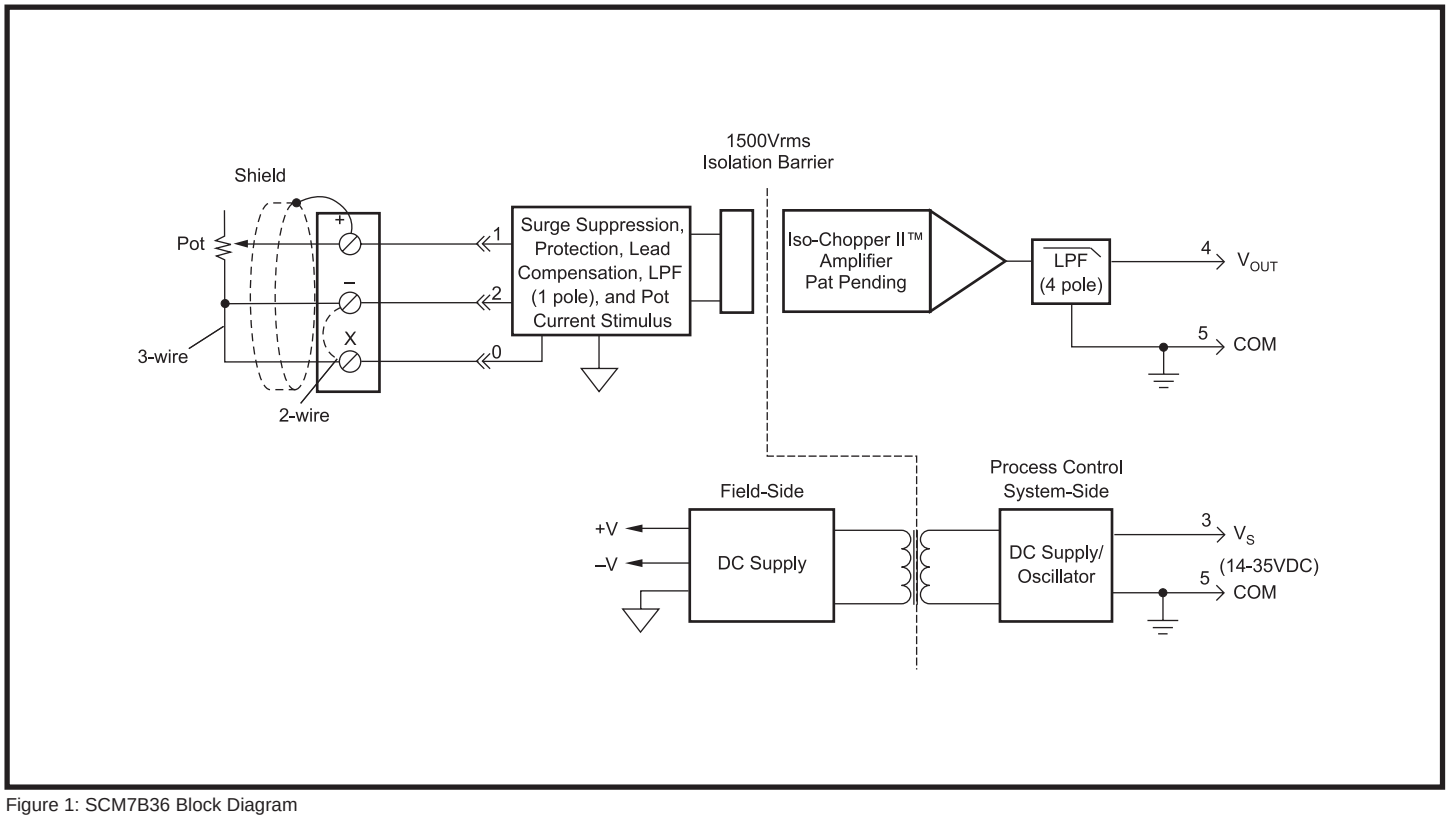


Figure 1: SCM7B36 Block Diagram

Specifications

Typical at 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/Ω -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 typical, ±0.1% Span max
Linearity(4)	±0.01% Span typical, ±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
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
Current²	12mA
Sensitivity	±0.0001%/%V_S
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605", max 54.1mm x 43.3mm x 15.4mm max
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:
(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.

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
+1 to +5V	NONE	SCM7B36-01
0 to +5V	A	SCM7B36-01A
0 to +10V	D	SCM7B36-01D

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 (Figure 1).

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 (Figure 1). 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" max) 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 Typical, ±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

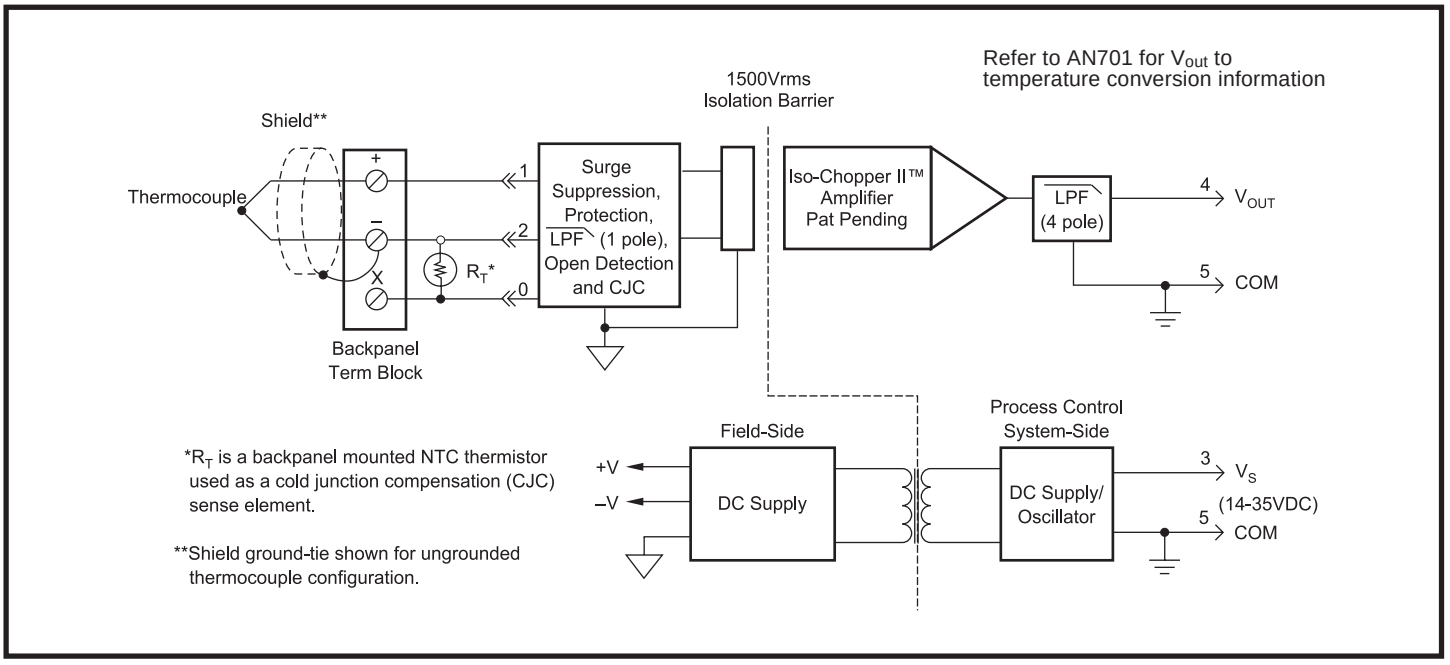


Figure 1: SCM7B37 Block Diagram

Specifications

Typical at 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 typical, ±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
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 to 35VDC
Current(2)	12mA
Sensitivity	±0.0001%/%V_S
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max
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:
(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) 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) Typical	Accuracy(3) Max	Linearity(4) Typical	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
+1 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

SCM7B39

Isolated Process Current Output Modules

Description

SCM7B39 process current modules accept high-level signals from the process control system and provide either 0 to 20mA or 4 to 20mA current to the field (Figure 1).

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" max) 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 4-20mA or 0-20mA Current Output
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span Typical, ±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

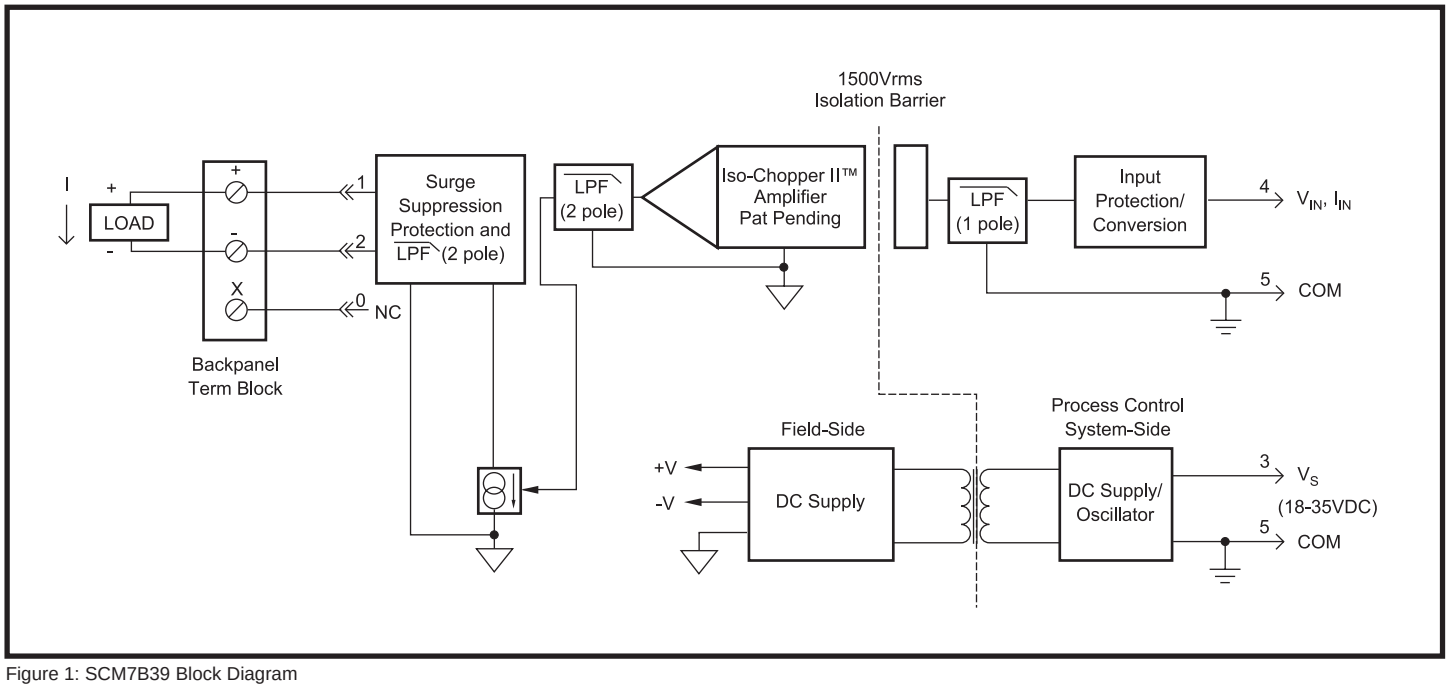


Figure 1: SCM7B39 Block Diagram

Specifications

Typical at 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	*
Protection		
Continuous	120Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
Current Limit	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)	±7.5Vpeak
Compliance	N/A	35VDC max
CMV (Input-to-Output)		
Continuous	1500Vrms	*
Transient	ANSI/IEEE C37.90.1	*
CMRR (50 or 60Hz)	110dB	*
Accuracy(2)	±0.03% Span typical, ±0.1% Span max	*
Linearity(3)	±0.01% Span typical, ±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	*
RMS at 10Hz to 100kHz B/W	4µA	*
Peak at 0.1Hz to 10Hz B/W	42nA	*
Open Output Loop Detection		
Response	N/A	Input Resistance > 20kΩ
Detection Time	N/A	5ms
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 35VDC	*
Current(1)	56mA	*
Sensitivity	±0.0003%/%V_S	*
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max	* *
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:
* Same specification as SCM7B39-01, -02, -03.
(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 to 20mA
SCM7B39-02	0 to +10V	0 to 20mA
SCM7B39-03	0 to +10V	4 to 20mA
SCM7B39-04	4 to 20mA	4 to 20mA

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" max) 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 Typical, ±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

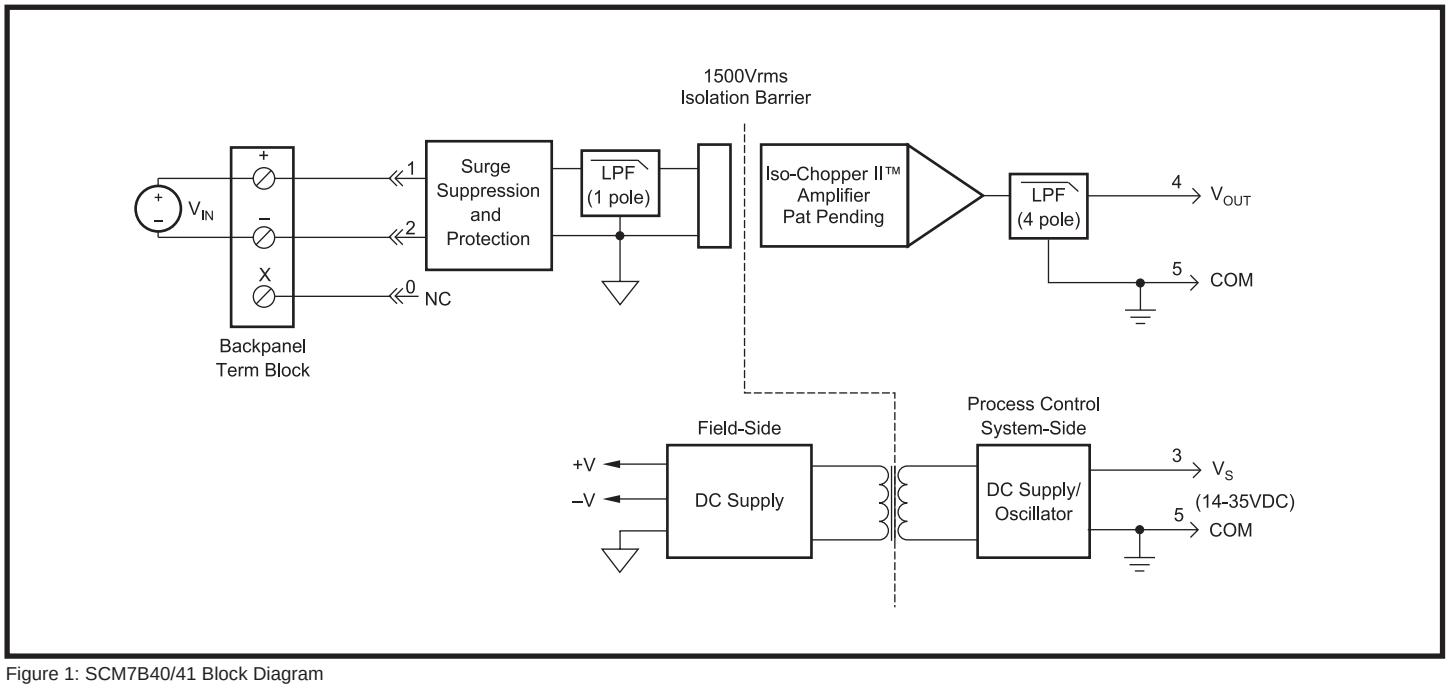


Figure 1: SCM7B40/41 Block Diagram

Specifications

Typical at 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	*
Transient	ANSI/IEEE C37.90.1	*
Output		
Signal Range(1)	†	†
Effective Available Power(1)	40mW	*
Resistance	<1Ω	*
Protection	Continuous Short-to-Ground	*
Voltage/Current Limit	±12V, ±14mA	*
CMV (Input-to-Output)		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1	*
CMRR (50 or 60Hz)	110dB	100dB
Accuracy(2)	±0.03% Span typical, ±0.1% Span max	*
Linearity(3)	±0.01% Span typical, ±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	*
Output Offset	±0.002% Span/°C	*
Noise		
Peak at 5MHz B/W	2mV	*
RMS at 10Hz to 100kHz B/W	1mV	*
Peak at 0.1Hz to10Hz B/W	1µV RTI	*
Frequency and Time Response		
Bandwidth, –3dB	10kHz	*
NMR	80dB/decade >10kHz	*
Step Response, 90% Span	50µs	*
Supply Voltage	14 to 35VDC	*
Current(1)	12mA	*
Sensitivity	±0.0001%/%V_S	*
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max	* *
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:
* Specification same as preceding model.
(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.

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
+1 to +5V	NONE	SCM7B40-02
0 to +5V	A	SCM7B40-02A
0 to +10V	D	SCM7B40-02D

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 (Figure 1).

Linearization is achieved by creating a non-linear transfer function through the module itself; refer to 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 AN701 for further information) externally mounted under the field-side terminal block on the backpanel (Figure 1). 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" max) 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 Typical
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms Continuous
- Noise, 1mVp-p (5MHz), 500µVrms (100kHz)
- 160dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Easy DIN Rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant

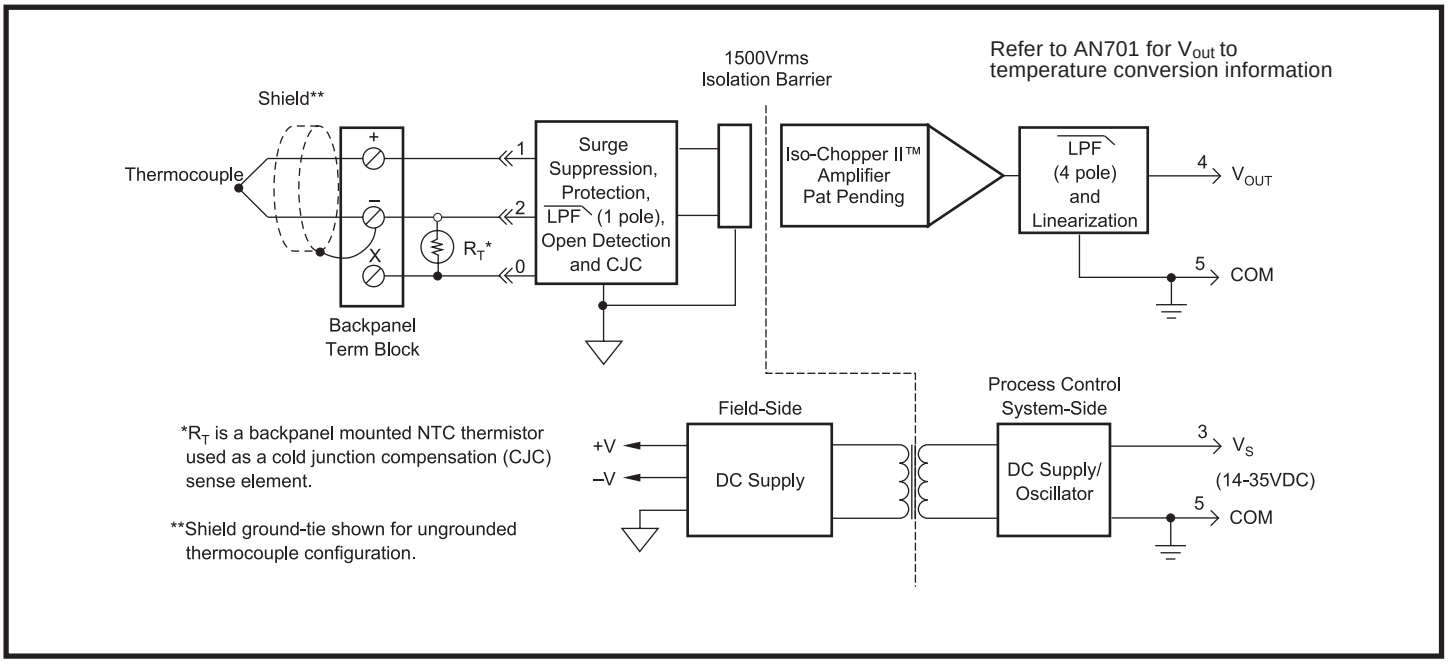


Figure 1: SCM7B47 Block Diagram

Specifications

Typical at 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
CJC Accuracy(5), +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 to 35VDC
Current(2)	16mA
Sensitivity	±0.0001%/%V_S
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max 54.1mm x 43.3mm x 15.4mm max
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:
(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)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) Typical	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
N	Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicon- 0.1% Magnesium

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 KSF2-440.

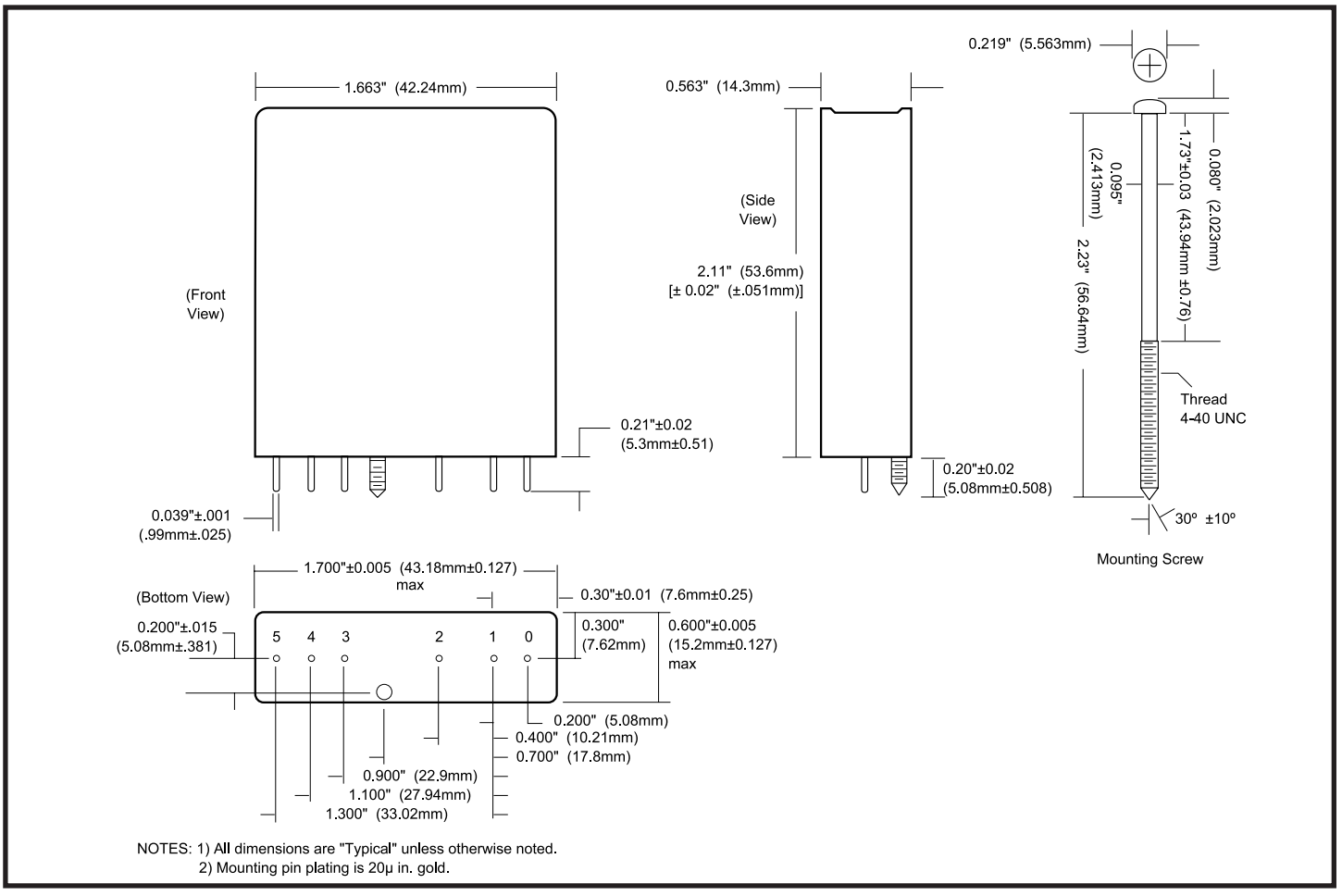


Figure 1: SCM7B Module Dimensions

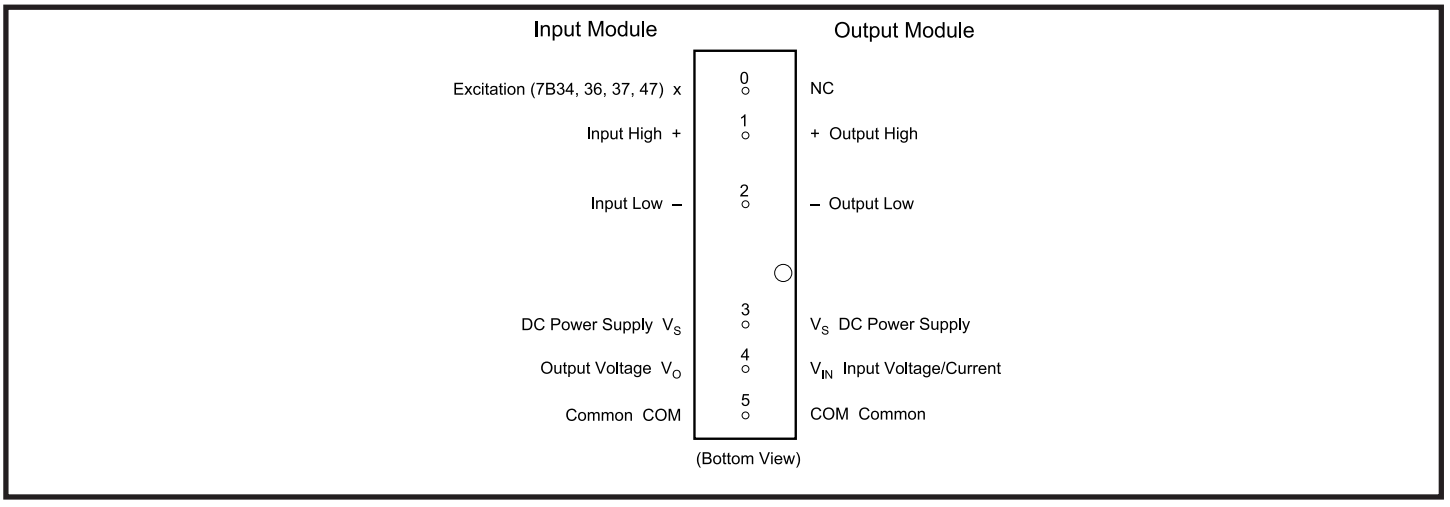


Figure 2: SCM7B Pinouts

▶ Accessories for SCM7B Analog Modules

SCM7BXEV

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	–40°C to +85°C
Relative Humidity	95% Noncondensing
Interface Connector:	
Field	high density screw clamp, 10-24 AWG
System	DB25 (male) with 4-40 screwlocks and high density screw clamp, 10-24 AWG

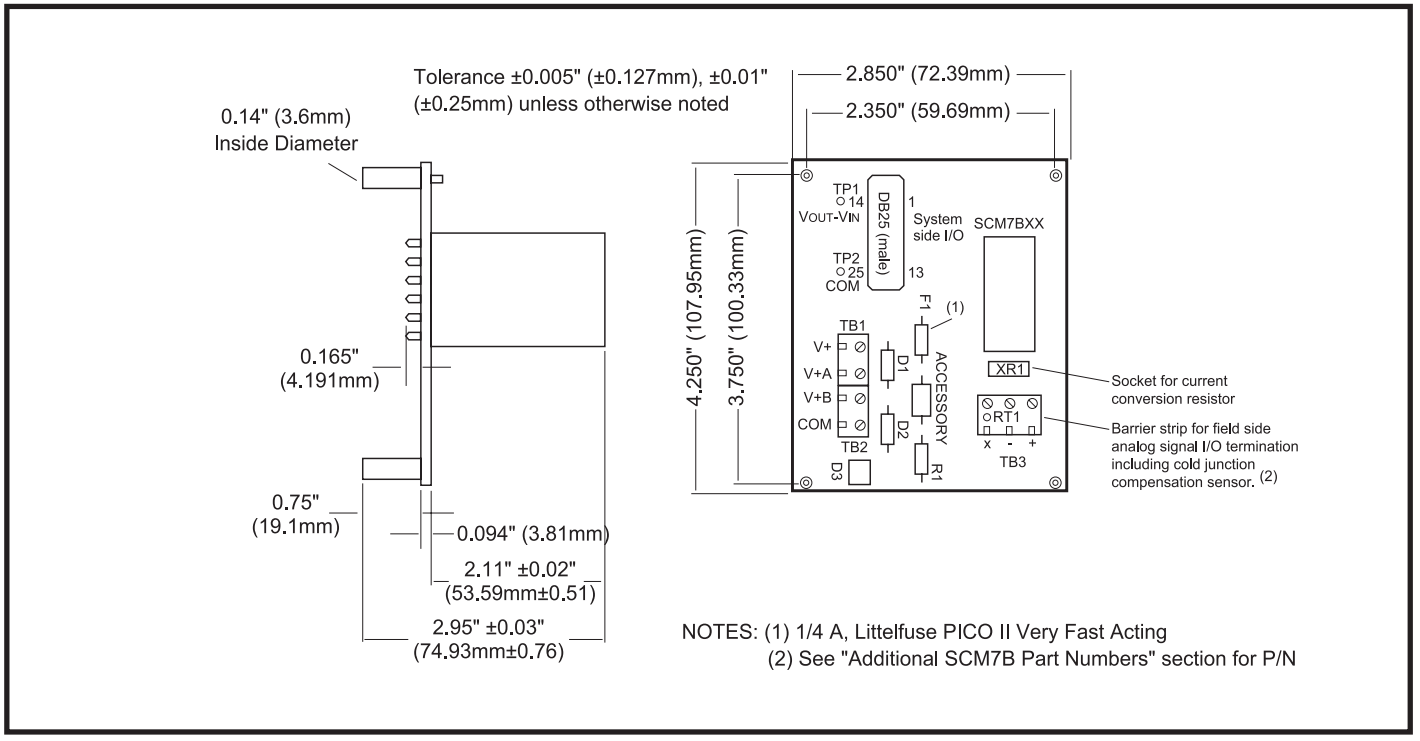


Figure 1: SCM7BXEV Dimensions

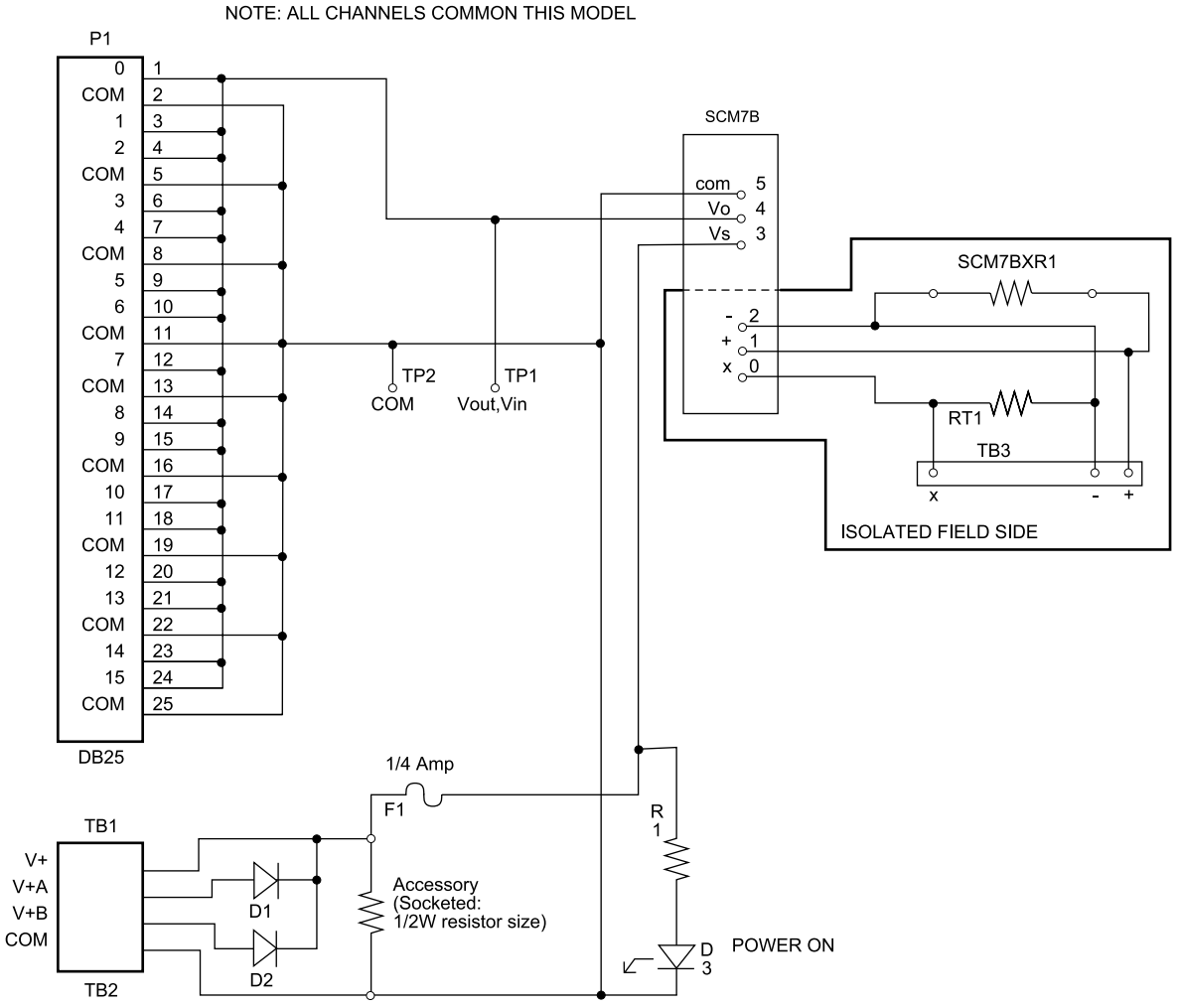


Figure 2: SCM7BXEV Schematic Diagram

SCM7BP01/SCM7BP02

Backpanel

Description

The SCM7BP01 (Figure 3) and SCM7BP02 (Figure 4) 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 (10-24 AWG). 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 (10-24 AWG) 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).

Specifications

Operating Temperature	–40°C to +85°C
Relative Humidity	95% Noncondensing
Interface Connector:	
Field	high density screw clamp, 10-24 AWG
System	high density screw clamp, 10-24 AWG
Isolation:	
Input-to-Output	1500Vrms continuous, max
Channel-to-Channel	1500Vrms continuous, max

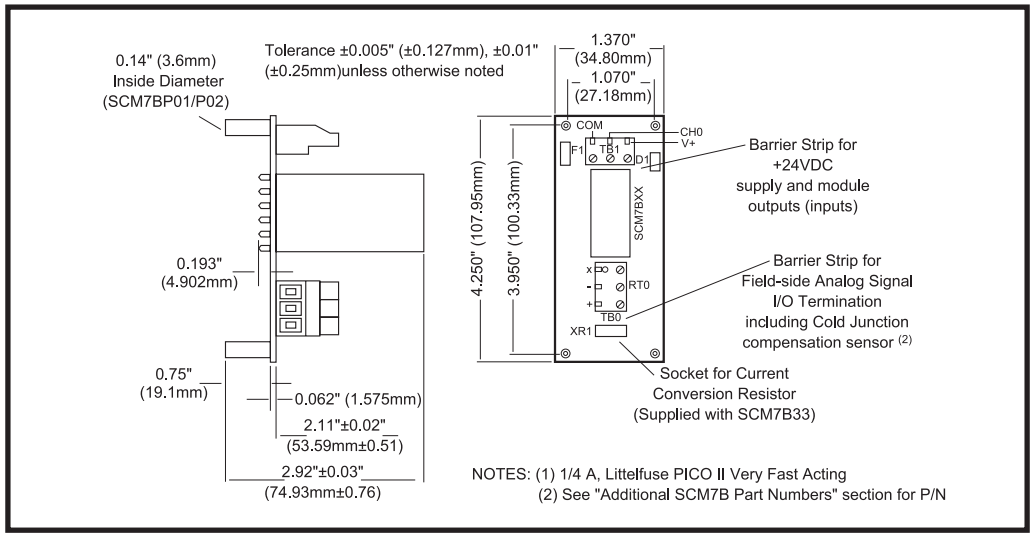


Figure 3: SCM7BP01 Dimensions

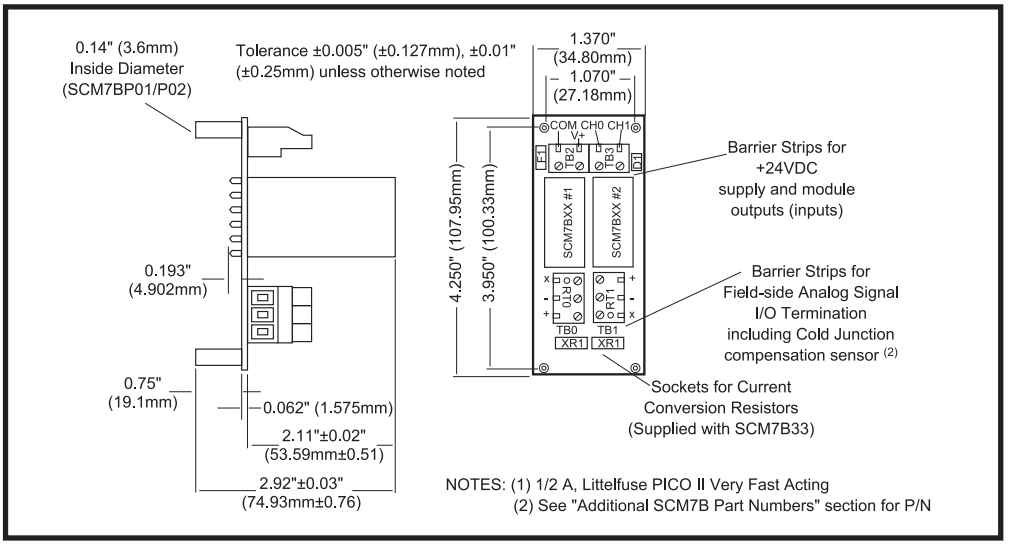


Figure 4: SCM7BP02 Dimensions

SCM7BP01-DIN/SCM7BP02-DIN

Panels & 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 5):

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)

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.

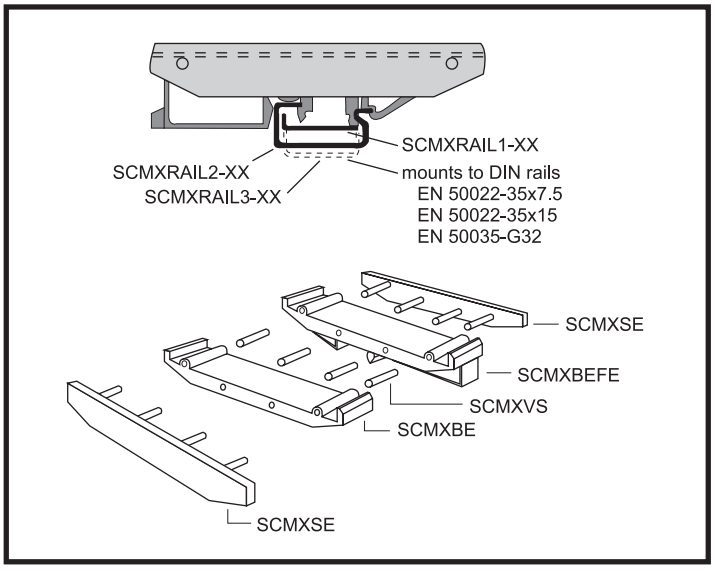


Figure 5: DIN Rail Mounting Elements

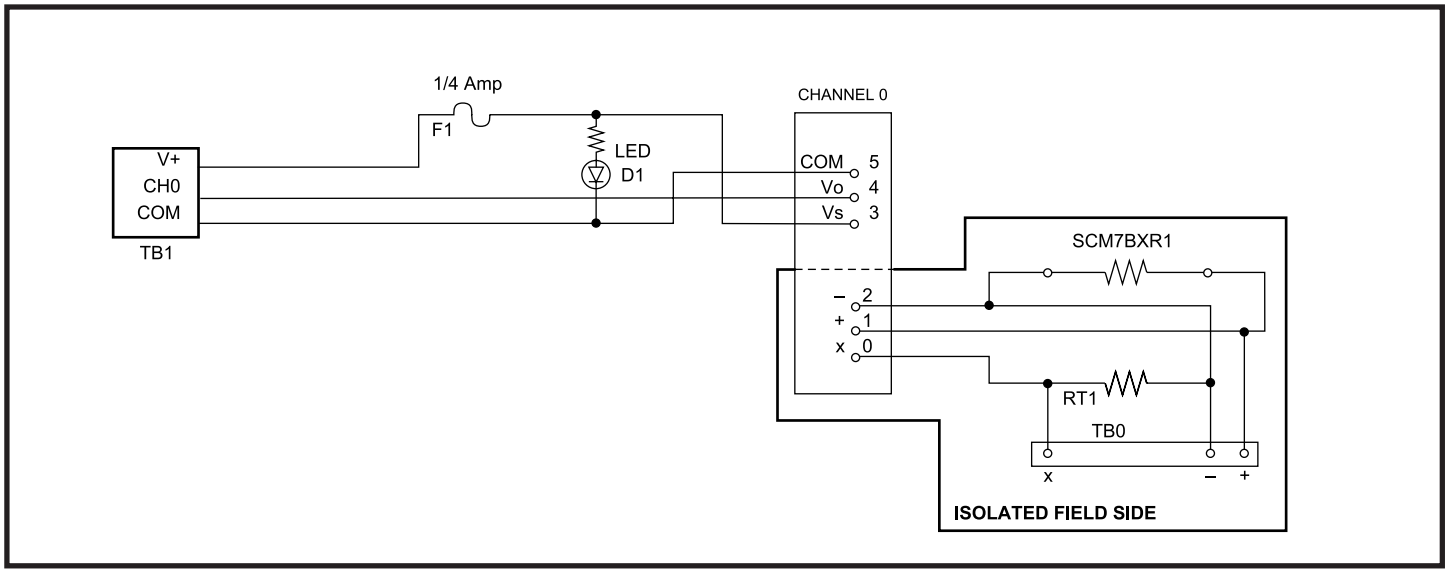


Figure 6: SCM7BP01 (-DIN) Schematic Diagram

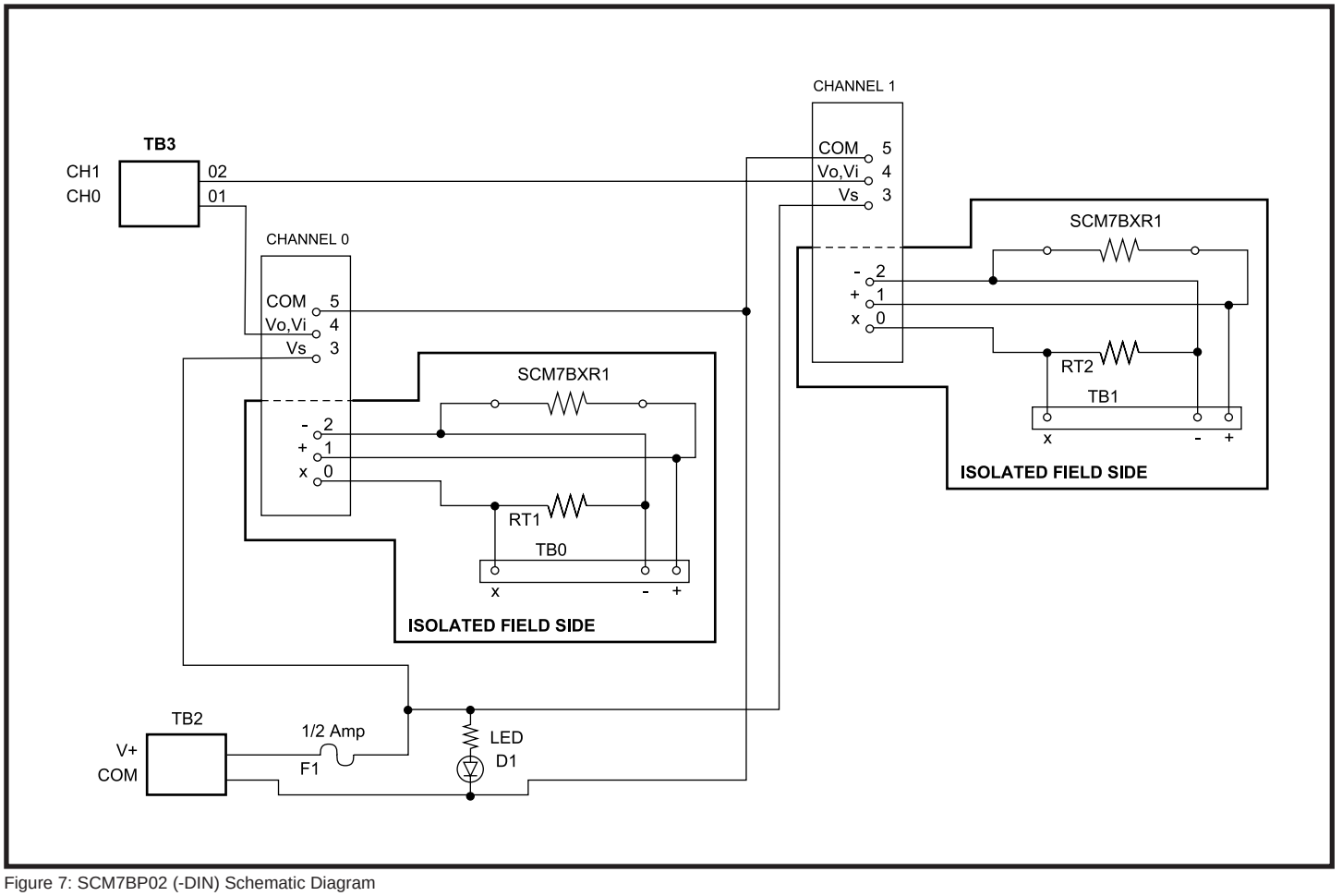


Figure 7: SCM7BP02 (-DIN) Schematic Diagram

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

Backpanels

Description

The SCM7BP04, SCM7BP08, and SCM7BP16 (see Figures 10-13) 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.

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.

Specifications

Operating Temperature	–40°C to +85°C
Relative Humidity	95% Noncondensing
Interface Connector:	
Field	high density screw clamp, 10-24 AWG
System	2 DB25 (male) connectors with 4-40 screwlocks
Isolation:	
Input-to-Output	1500Vrms continuous, max
Channel-to-Channel	1500Vrms continuous, max

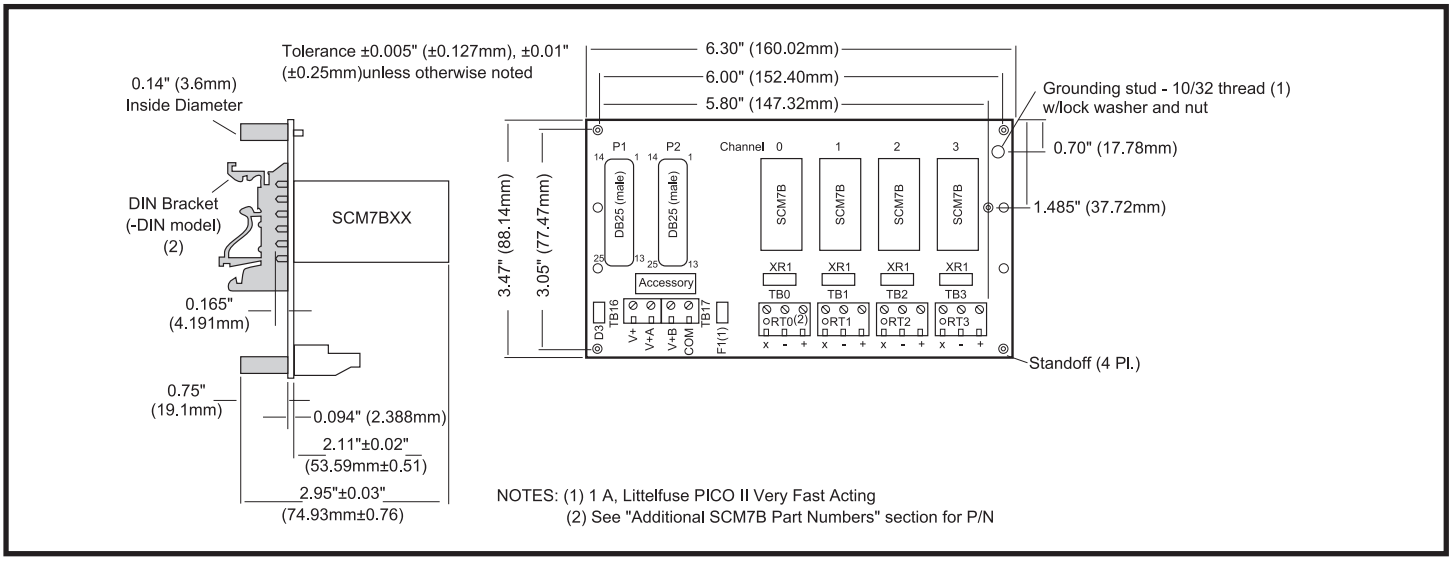


Figure 10: SCM7BP04(-DIN) Dimensions

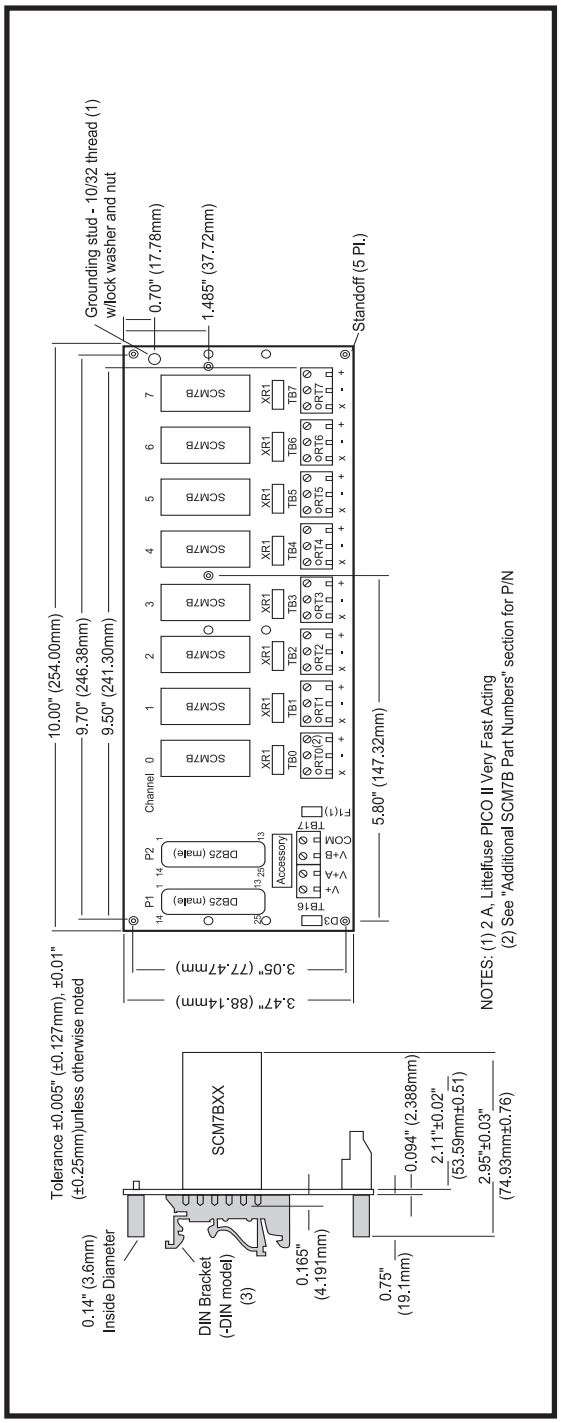


Figure 11: SCM7BP08(-DIN) Dimensions

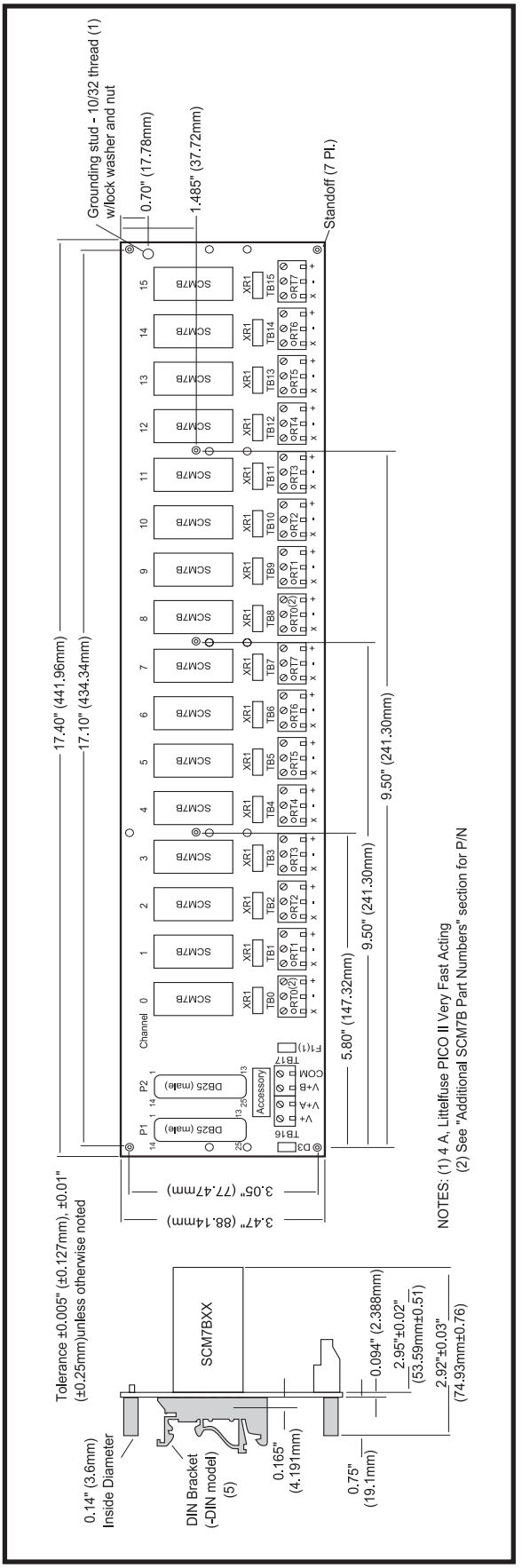


Figure 12: SCM7BP16(-DIN) Dimensions

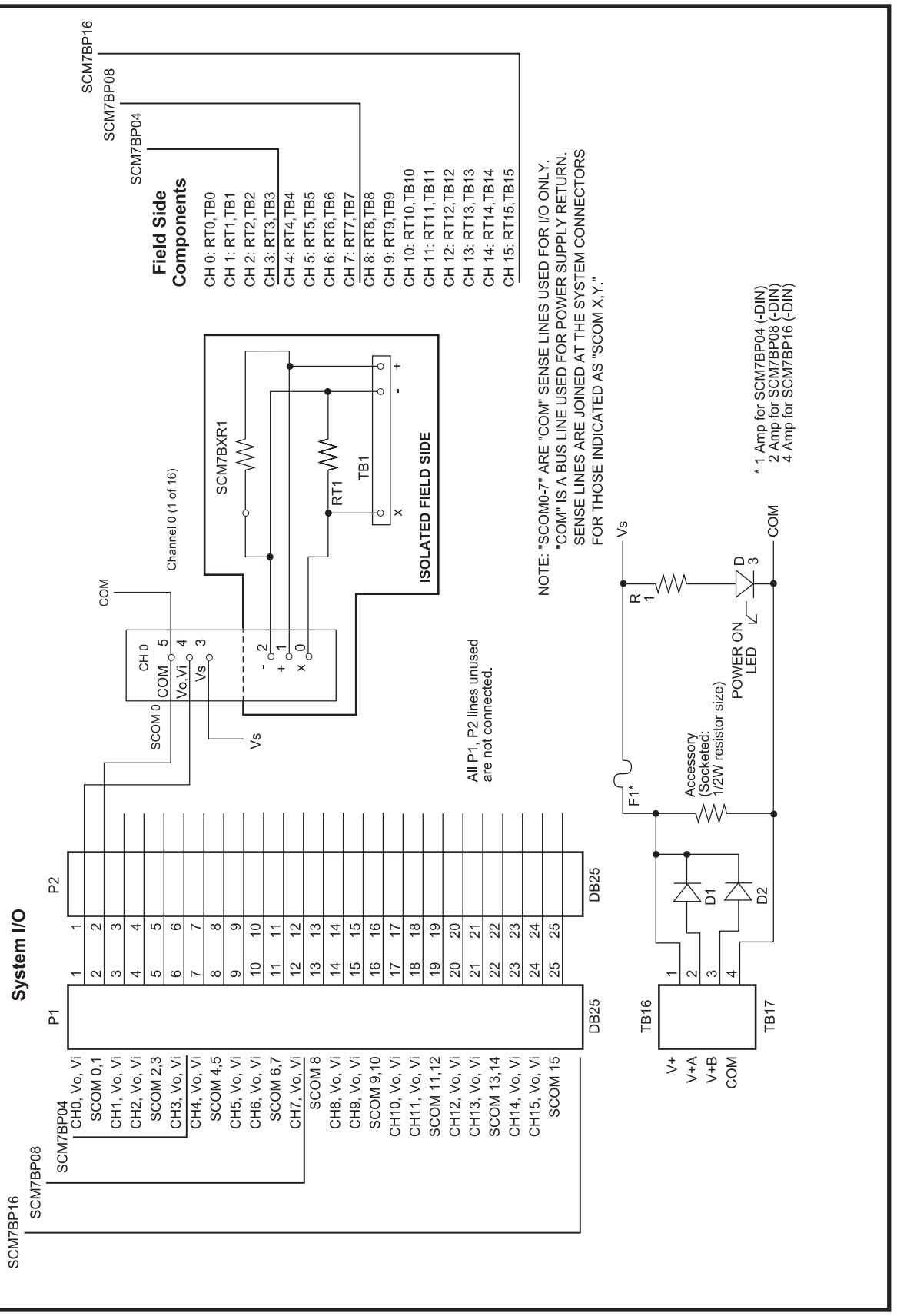


Figure 13: SCM7BP04/08/16(-DIN) Schematic Diagram

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 14 for dimensions.)

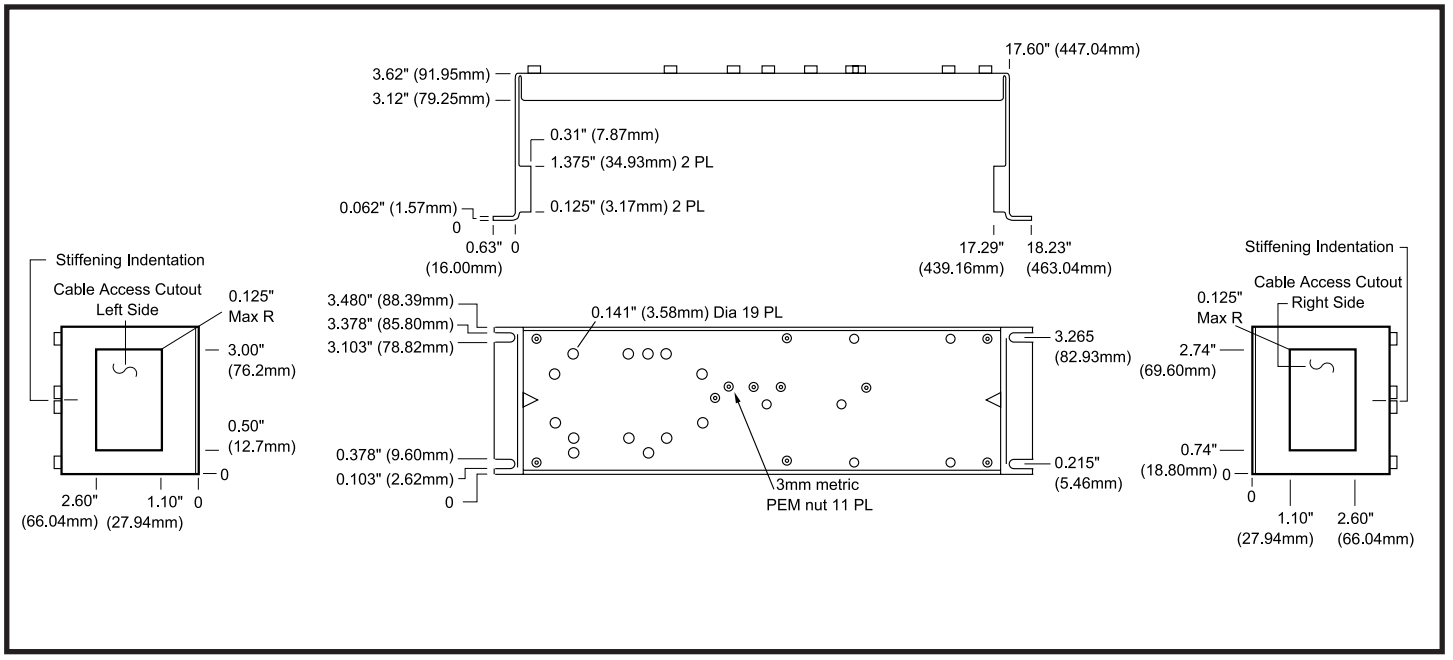


Figure 14: SCMXRK-002 Analog Rack Dimensions

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 (see Figure 18).

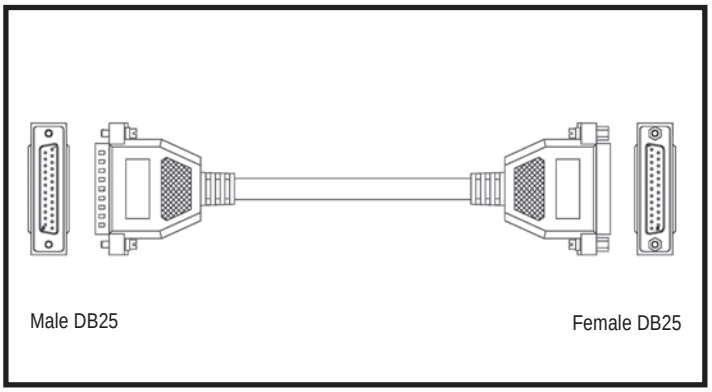


Figure 18: SCMXCA006-XX System Interface Cable

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 19 for dimensions).

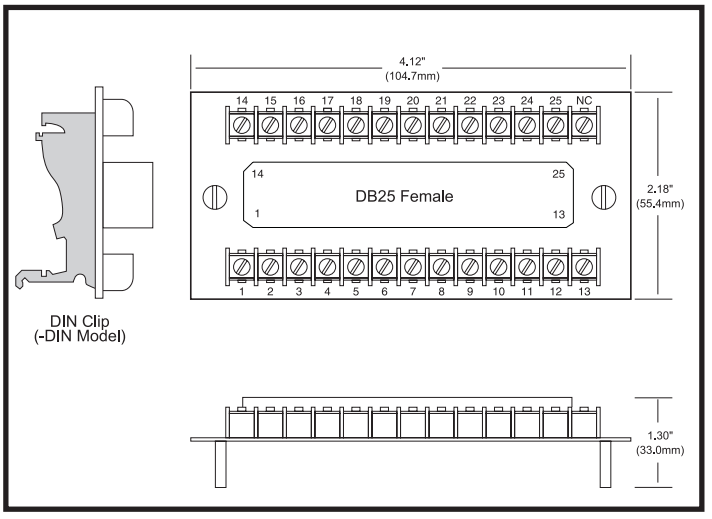


Figure 19: 8BXIF Universal Interface Board Dimensions

SCM7BXR1

Current 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.

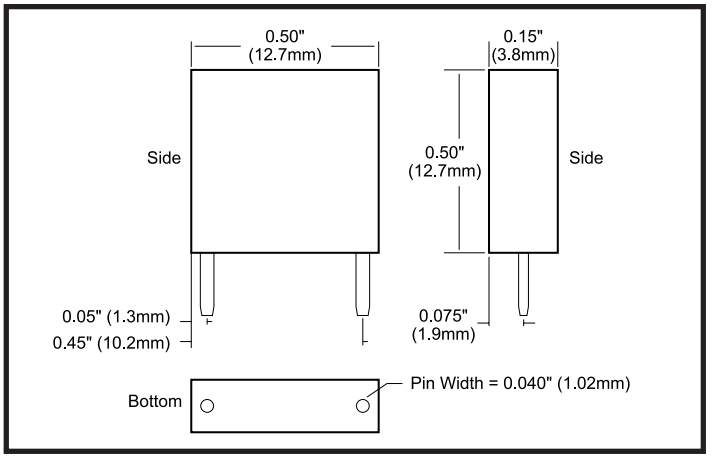


Figure 20: SCM7BXR1 Dimensions

SCM7BPT

Non-Isolated Pass Thru Module

Description

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

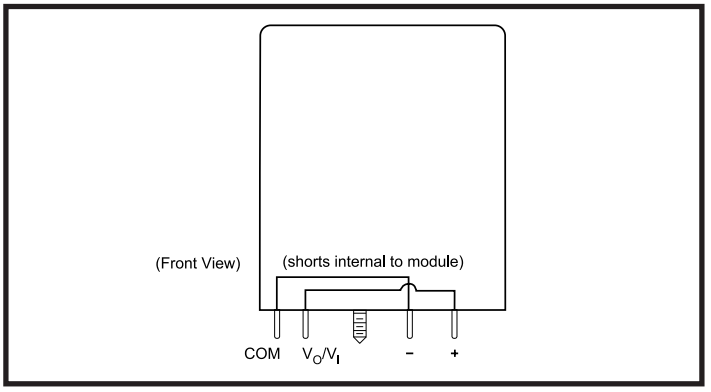


Figure 21: SCM7BPT

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.

Additional Part Numbers of Interest

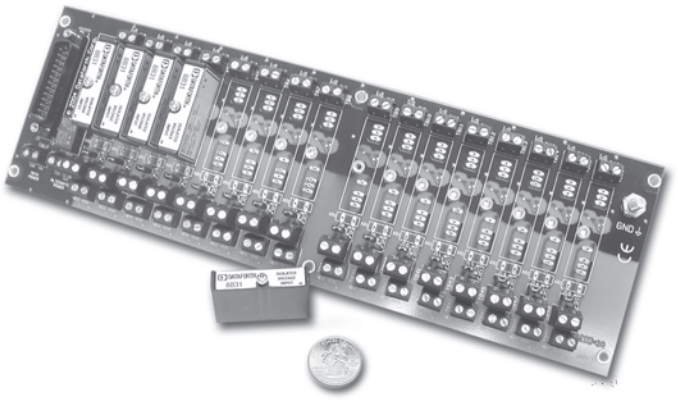
The following is a list of parts that are available for use with your SCM7B system, or for fabrication of your own backpanel, along with manufacturer's part number. Dataforth makes no claim as to availability and/or quality of parts purchased from vendors other than Dataforth.

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	KSF2-440	PEM Engineering
Grounding Stud, 0.625", 10-32 thread	KFH 10-32-10	PEM Engineering

Part Description	Part Number	Manufacturer
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

8B

SensorLex® 8B Isolated Analog Signal Conditioners



8B Modules

Dataforth's new SensorLex® 8B line of isolated analog signal conditioners provides 19 family groups with a total of 123 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 offers 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 (Typical)
- ±0.02% Linearity
- 1500Vrms Transformer Isolation & up to 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- 5V Power (30mA Typical)
- 5-Pole Low-Pass Filtering
- Up to 120dB CMR
- 70dB NMR at 60Hz
- –40°C to +85°C Operating Temperature
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Manufactured per RoHS Directive 2002/95/EC

▶Applications

- Designed for Embedded Applications
  - PC/104 Embedded Solutions
  - Compact PCI Systems
  - VMEbus Systems
  - PXI Systems
- Protects User Equipment from Lightning and Industrial Equipment Power-Line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair

▶ 8B Selection Guide

VOLTAGE INPUT MODULES, 3Hz BANDWIDTH Page 104

MODEL	INPUT RANGE	OUTPUT RANGE
8B30-01	±10mV	±5V
8B30-02	±50mV	±5V
8B30-03	±100mV	±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
8B31-13	±60V	0 to +5V

CURRENT INPUT MODULES, 3Hz Page 106

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

ISOLATED TRUE RMS INPUT MODULES Page 108

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) Page 110

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) Page 112

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) Page 114

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) Page 116

MODEL	TYPE	INPUT RANGE
8B37J	J	–100°C to +760°C (–148°F to +1400°F)
8B37K	K	–100°C to +1350°C (–148°F to +2462°F)
8B37T	T	–100°C to +400°C (–148°F to +752°F)
8B37R	R	0°C to +1750°C (+32°F to +3182°F)
8B37S	S	0°C to +1750°C (+32°F to +3182°F)

STRAIN GAGE INPUT MODULES Page 118

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
8B38-31	±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

CURRENT OUTPUT MODULES, 100Hz BANDWIDTH Page 120

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

VOLTAGE INPUT MODULES, 1kHz BANDWIDTH Page 122

MODEL	INPUT RANGE	OUTPUT RANGE
8B40-01	±10mV	±5V
8B40-02	±50mV	±5V
8B40-03	±100mV	±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

▶8B Selection Guide (Continued)

2-WIRE TRANSMITTER INTERFACE MODULES Page 124

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

VOLTAGE INPUT MODULES, 1kHz BANDWIDTH Page 126

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 Page 128

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) Page 130

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 Page 132

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 Page 134

MODEL	INPUT RANGE	OUTPUT RANGE
8B50-01	±20mV	±5V
8B50-02	±50mV	±5V
8B50-03	±100mV	±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

▶8B Selection Guide (Continued)

ACCESSORIES Starts on Page 137

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
R	Platinum-13% Rhodium vs. Platinum
S	Platinum-10% Rhodium vs. Platinum

****RTD STANDARDS**

TYPE	ALPHA COEFFICIENT	DIN	JIS	IEC
100Ω PT	0.00385	DIN 43760	JIS C 1604-1989	IEC 751
120Ω NI	0.00672			

8B30/31

Voltage Input Modules, Narrow Bandwidth

Description

8B modules are 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.

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 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 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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

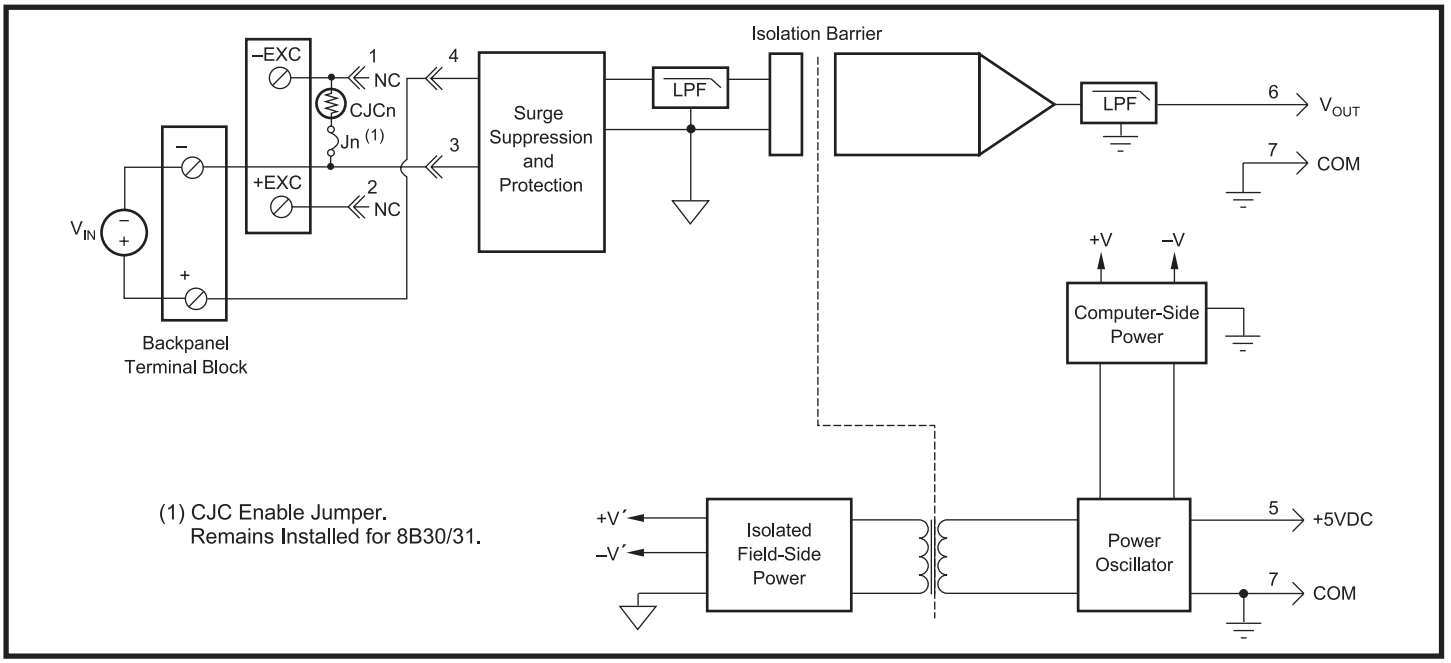


Figure 1: 8B30/31 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B30	8B31
Input Range	±10mV to ±100mV	±1V to ±60V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (minimum)
Power Off	100kΩ	500kΩ (minimum)
Overload	100kΩ	500kΩ (minimum)
Input Protection		
Continuous(1)	240VAC	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(2)	±0.05% Span	*
Linearity	±0.02% Span	*
Stability		
Offset	±10ppm/°C	*
Gain	±50ppm/°C	±75ppm/°C
Noise		
Output, 100kHz	250µVrms	*
Bandwidth, –3dB	3Hz	*
Response Time, 90% Span	160ms	*
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	25mA	*
Power Supply Sensitivity	±75ppm/%	*
Mechanical Dimensions (h)(w)(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:
* Same specification as 8B30.
(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
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

8B32

Current Input Modules

Description

8B modules are 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.

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 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 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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

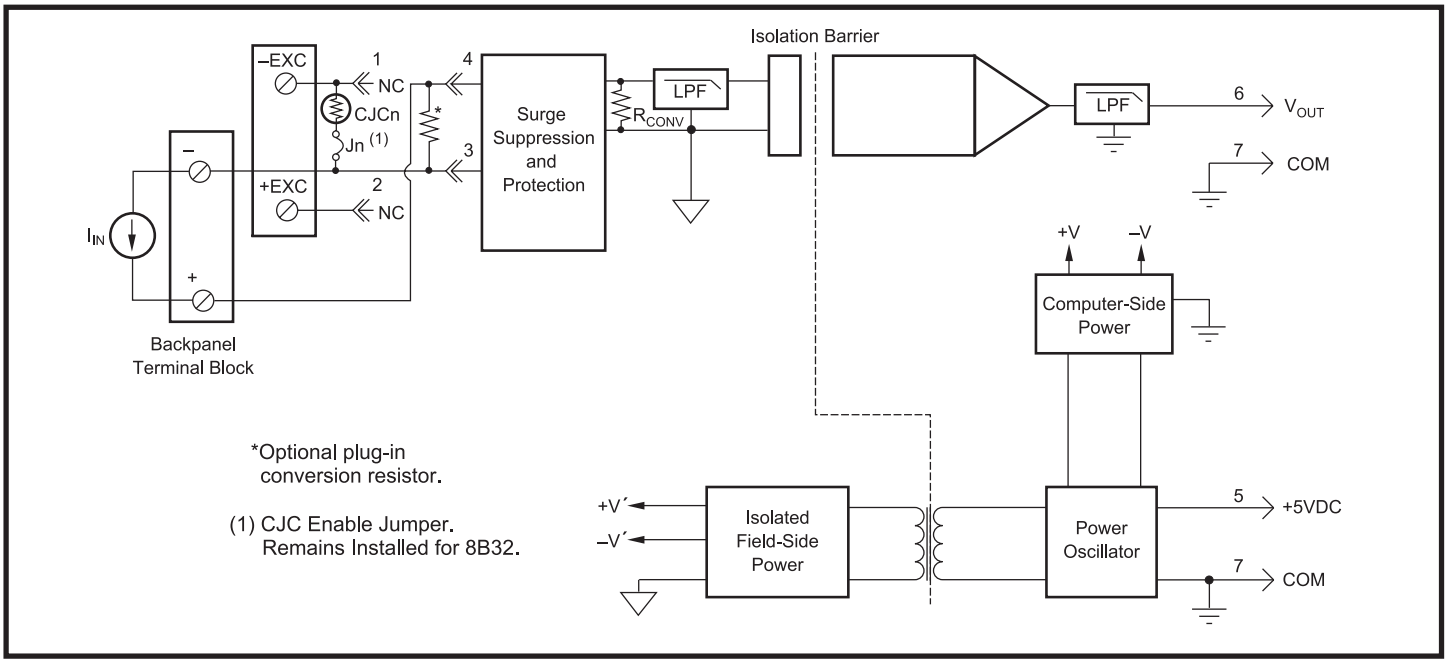


Figure 1: 8B32 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B32
Input Range	0mA to 20mA or 4mA to 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 (h)(w)(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:
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

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

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 1).

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
- Industry Standard Output of 0 to 5VDC
- ±0.25% Factory Calibrated Accuracy
- 1500Vrms Transformer Isolation
- Input Overload Protected to 350Vrms Max (Peak AC & DC) or 2Arms Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- ANSI/IEEE C37.90.1 Transient Protection
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

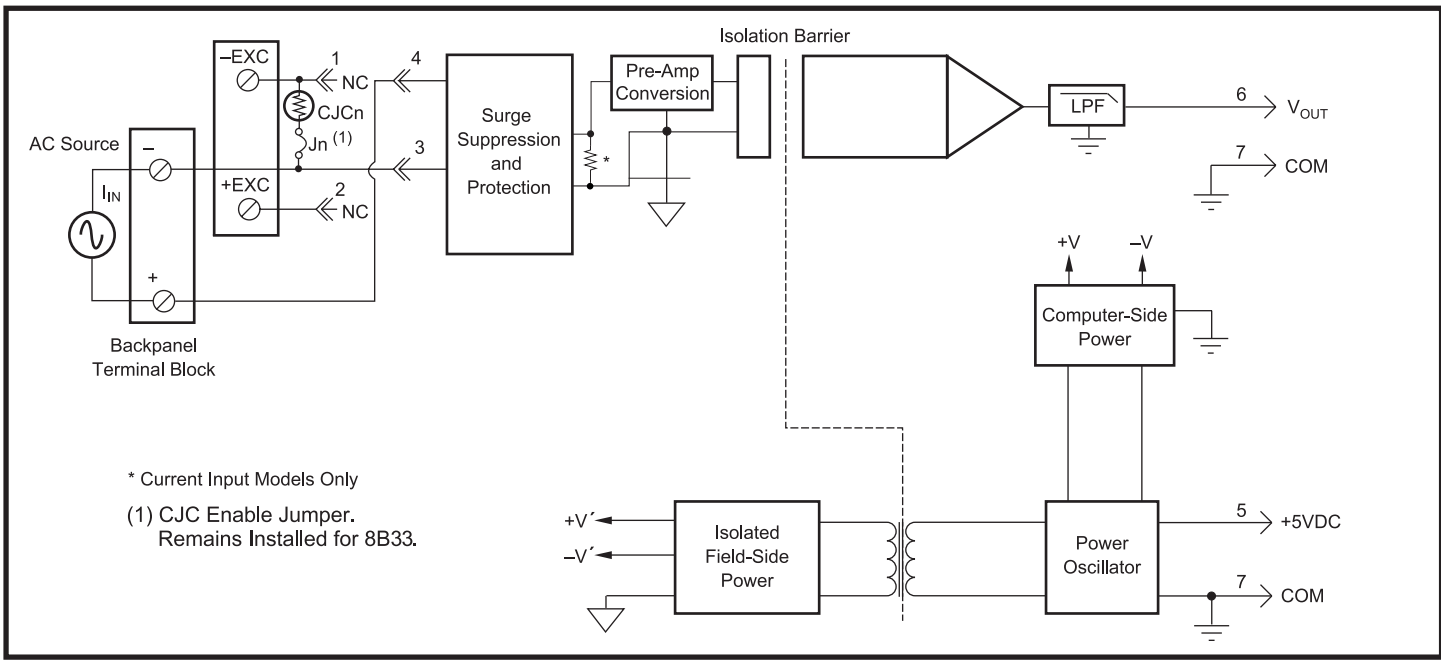


Figure 1: 8B33 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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) .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 (10-100% 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/ºC
Isolation (Common Mode)	
Input to Output, Input to Power	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1
CMR (50Hz to 60Hz)	120dB
NMR	70dB at 60Hz
Response Time, 90% Span	<120mS
Supply Voltage	+5VDC ±5%
Current	30mA
Sensitivity	±200ppm/%
Environmental	
Operating Temperature Range	–40ºC to +85ºC
Storage Temperature Range	–40ºC to +85ºC
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
Dimensions	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)

NOTES:
(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 2 Arms continous 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 through -07) or 1.00% accuracy error (-01). Accuracy 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

8B34

Linearized 2- or 3-Wire RTD Input Modules

Description

8B modules are 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.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

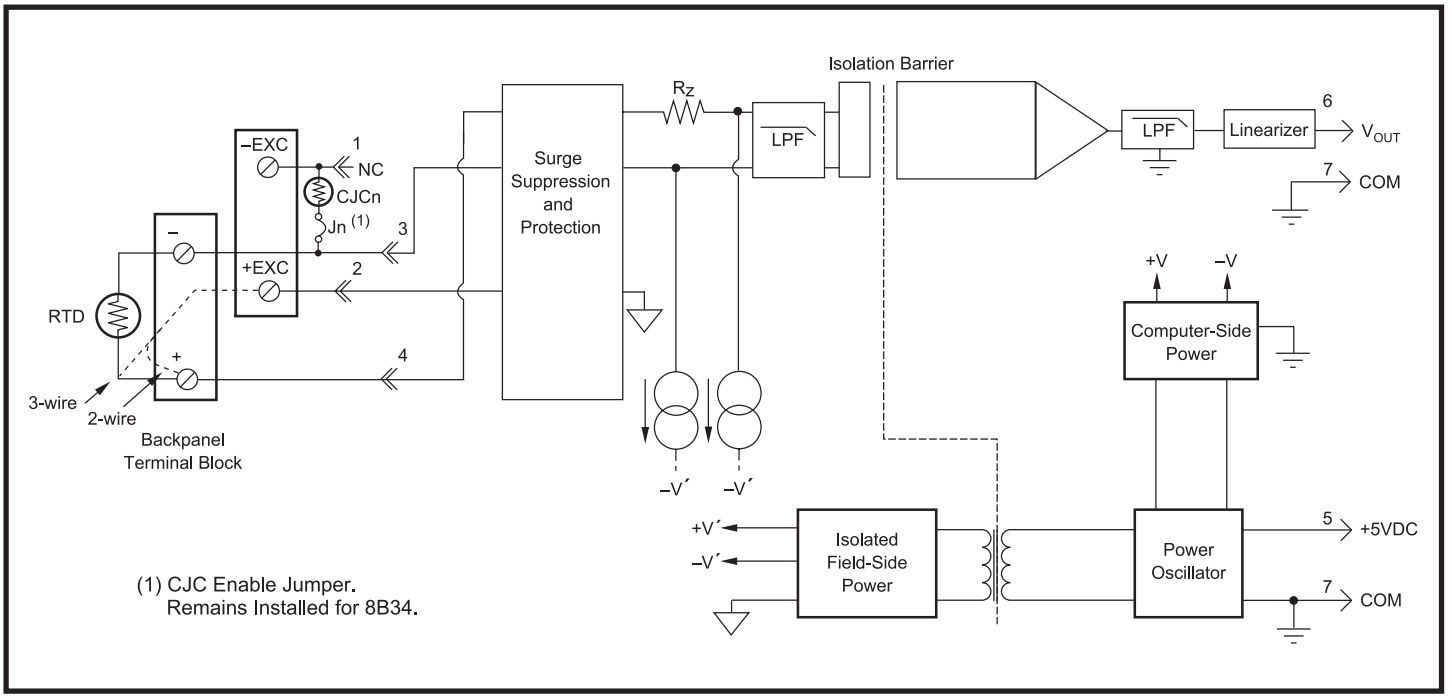


Figure 1: 8B34 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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)(w)(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:
(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

8B35

Linearized 4-Wire RTD Input Modules

Description

8B modules are 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.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

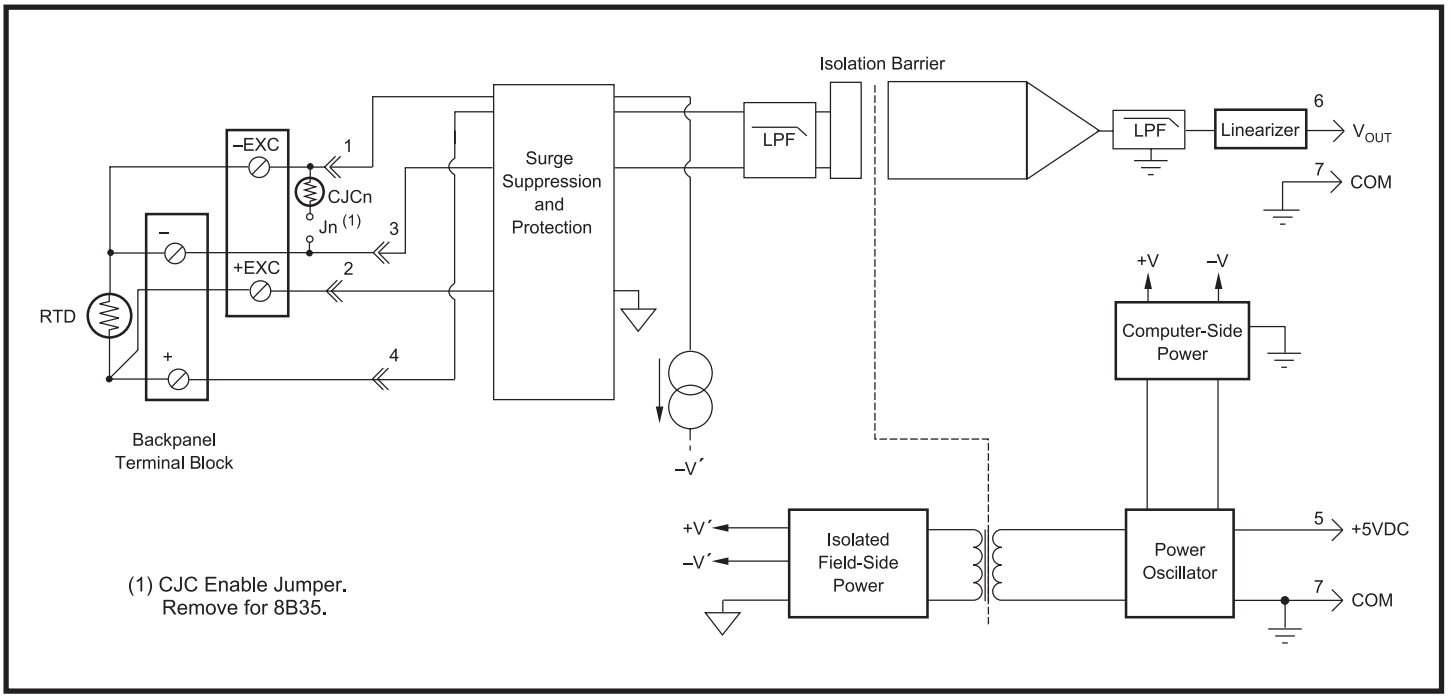


Figure 1: 8B35 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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)(w)(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:
(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

8B36

Potentiometer Input Modules

Description

8B modules are 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.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

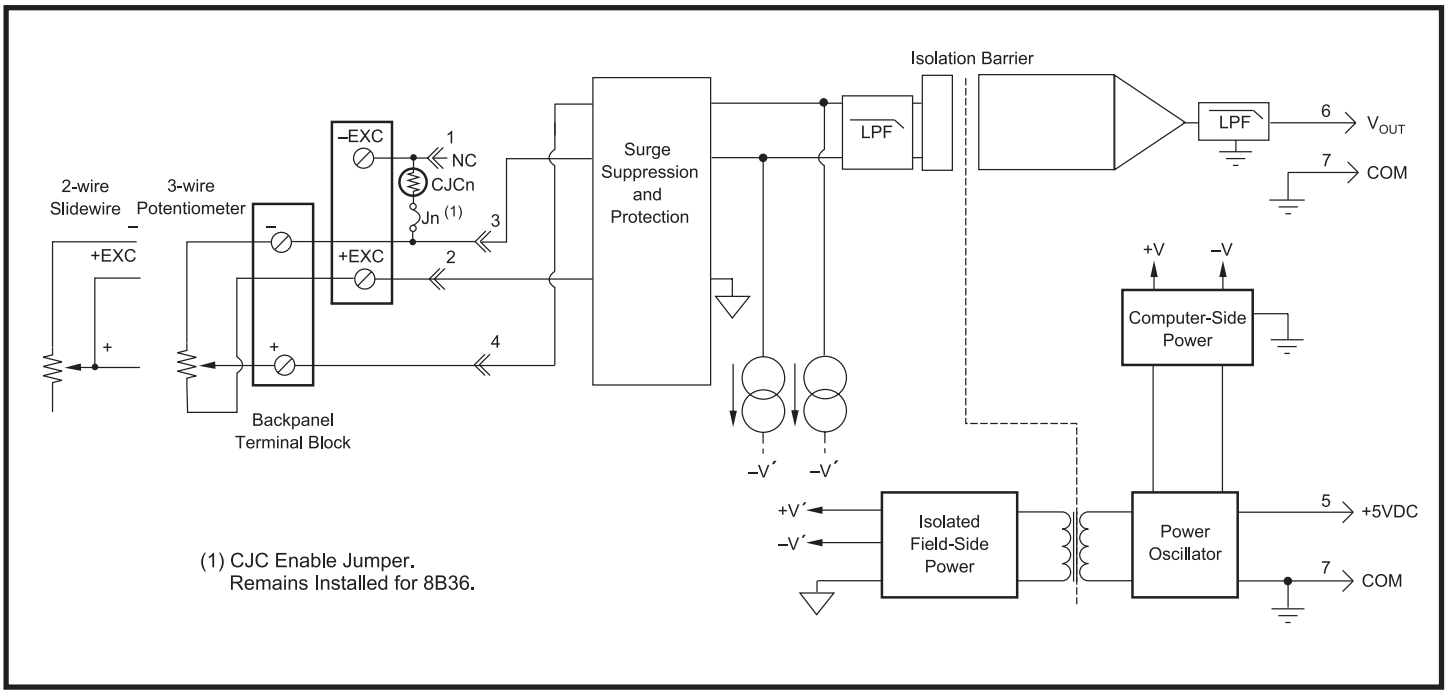


Figure 1: 8B36 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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 (h)(w)(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:
(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

8B37

Non-Linearized Thermocouple Input Modules

Description

8B modules are an optimal solution for monitoring real-world process signals and providing high-level signals to a data acquisition system. Each 8B37 non-linearized module isolates, filters, and amplifies a single channel of temperature input from a thermocouple input signal and provides an analog voltage output.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

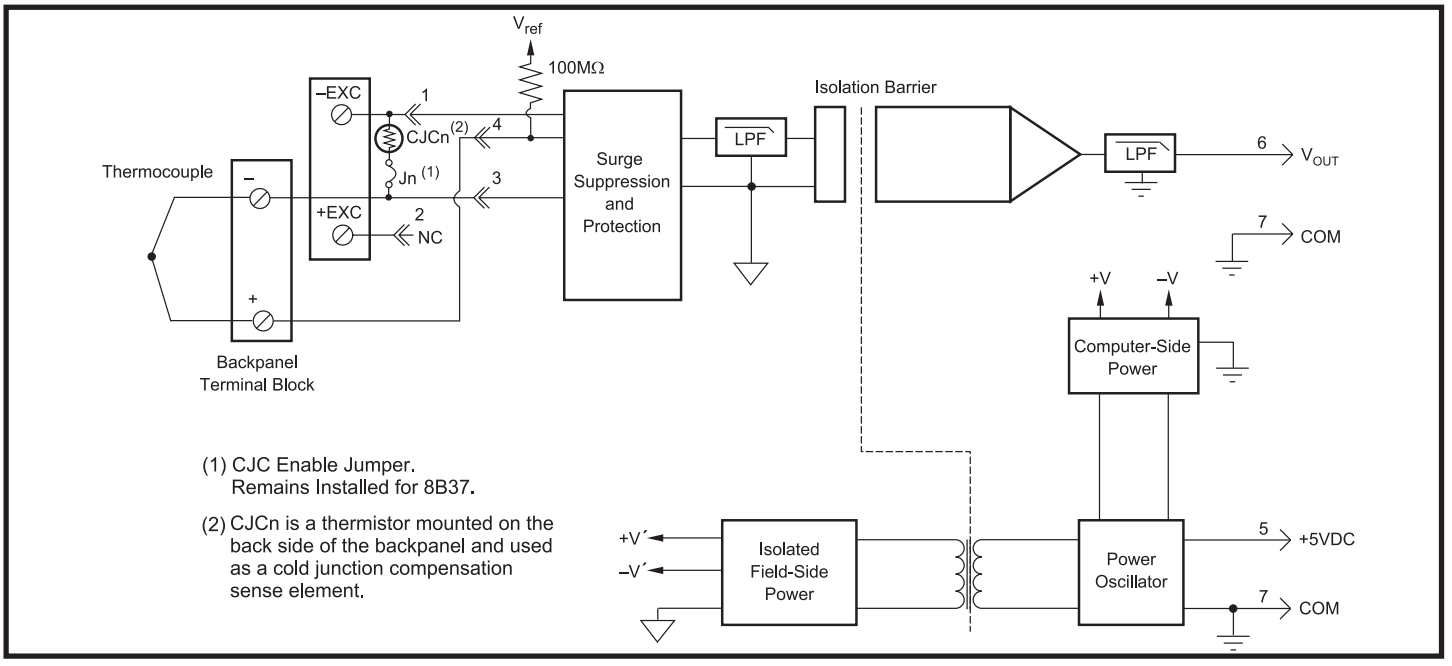


Figure 1: 8B37 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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)(w)(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:
(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

8B38

Strain Gage Input Modules, Wide and Narrow Bandwidth

Description

8B modules are 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 gage input signal and provides an analog voltage output.

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 Gages
- 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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

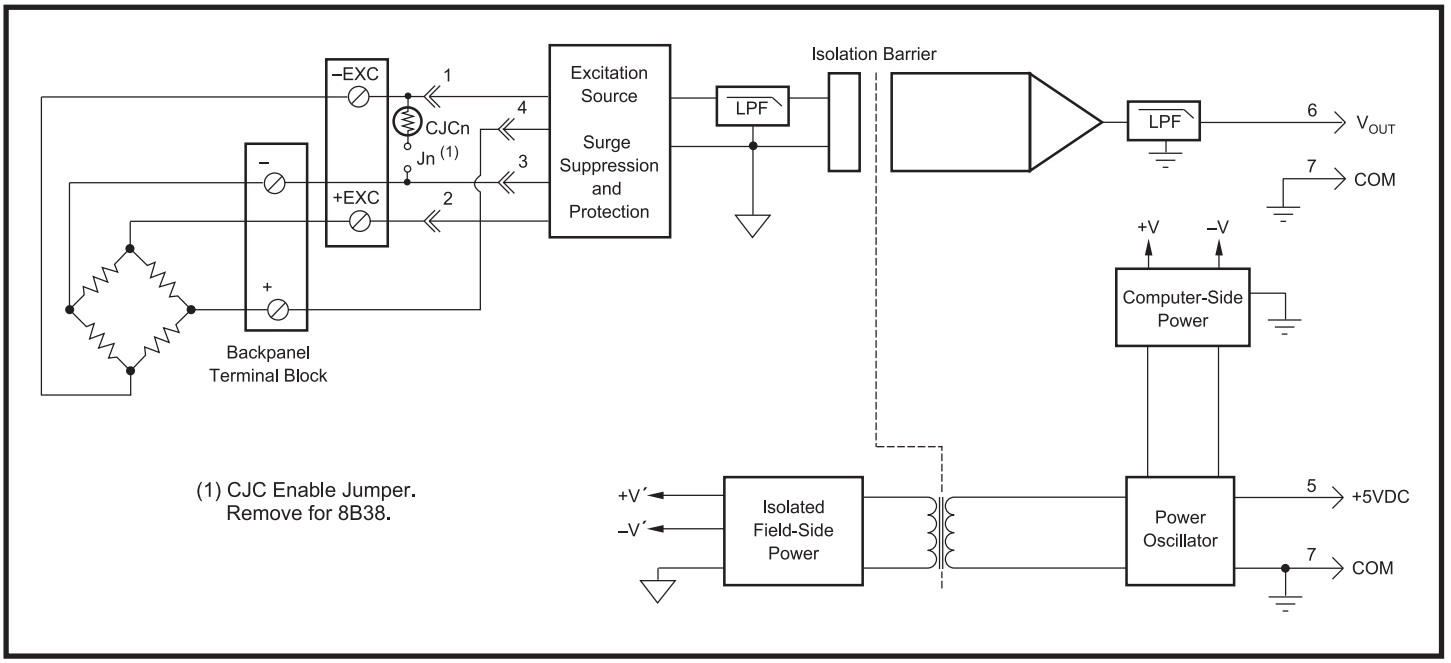


Figure 1: 8B38 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B38-0x	8B38-3x
Input Range	±10mV to ±100mV	*
Input Bias Current	±0.5nA	*
Input Resistance		
Normal	50MΩ	*
Power Off	100kΩ	*
Overload	100kΩ	*
Input Protection		
Continuous(1)	240VAC	*
Transient	ANSI/IEEE C37.90.1	*
Excitation Output (-x1)	+3.333V ±2mV	*
Load Resistance	100Ω to 2kΩ	*
Excitation Output (-x2,-x5)	+10V ±5mV	*
Load Resistance	300Ω to 2kΩ	*
Excitation Load Regulation	15ppm/mA	*
Excitation Stability	50ppm/°C	*
Excitation Protection	120VAC	*
CMV, Input to Output	1500Vrms max	*
Transient, Input to Output	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	100dB	*
NMR	100dB per decade above 8kHz	70dB at 60Hz
Accuracy(2)	±0.05% Span	*
Linearity	±0.02% Span	*
Stability		
Offset	±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	*
Output Protection	Continuous Short to Ground	*
Transient	ANSI/IEEE C37.90.1	*
Power Supply Voltage	+5VDC ±5%	*
Power Supply Current	110mA No Exc. Load	*
	150mA Full Exc. Load	*
Power Supply Sensitivity	±75ppm/%	*
Mechanical Dimensions (h)(w)(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:
* Same specification as 8B38-0x.
(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	Bandwidth	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
8B38-31	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

8B39

Current Output Modules

Description

8B modules are 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.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

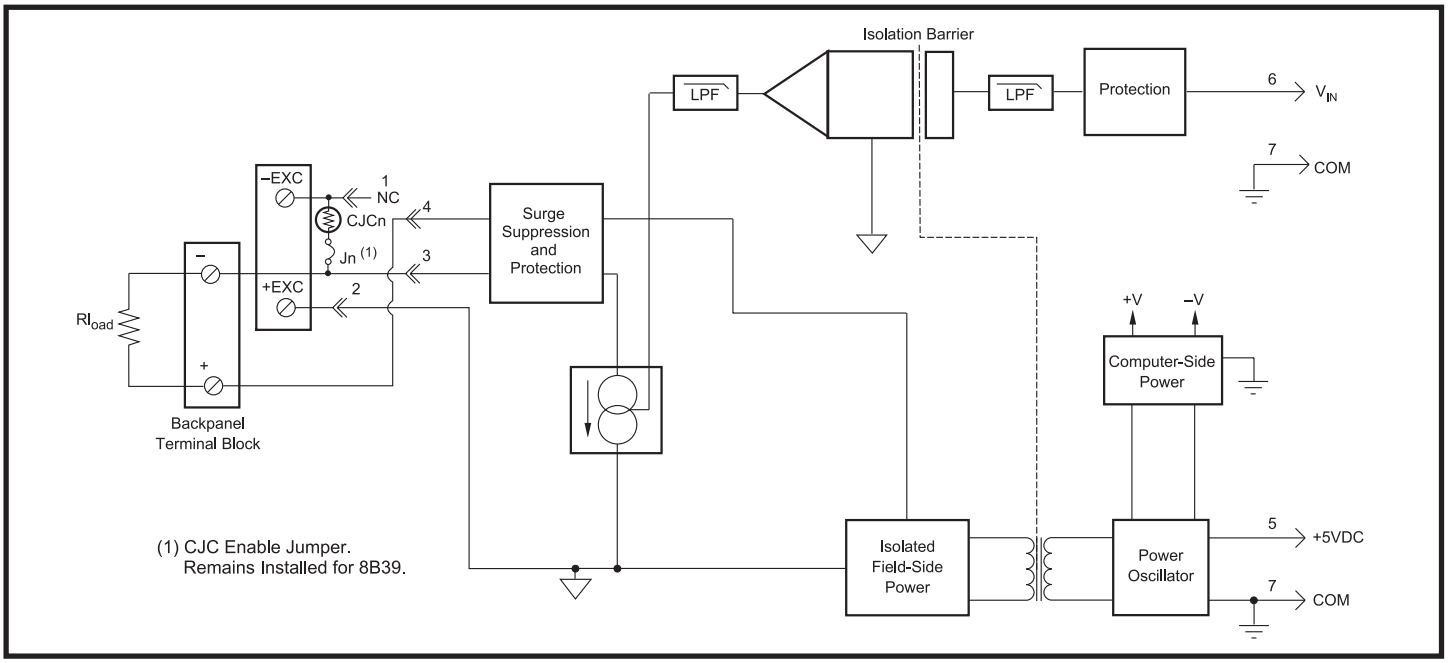


Figure 1: 8B39 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B39-01,-02,-03,-04	8B39-07
Input Voltage Range	±5V or 0V to +5V	±5V
Input Voltage Maximum	±20V (no damage)	*
Input Resistance	50MΩ	*
Output Current Range	0 to 20mA or 4 to 20mA	±20mA
Over Range Capability	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	*
Transient	ANSI/IEEE C37.90.1	*
CMV, Output to Input	1500Vrms max	*
Transient, Output to Input	ANSI/IEEE C37.90.1	*
CMR (50Hz or 60Hz)	110dB	*
NMR (–3dB at 100Hz)	60dB per decade above 100Hz	*
Accuracy(1)	±0.05% Span	*
Linearity	±0.02% Span	*
Stability		
Offset	±10ppm/°C	*
Gain	±50ppm/°C	±100ppm/°C
Noise		
Output, 100kHz	2µArms	*
Bandwidth, –3dB	100Hz	*
Rise Time, 10 to 90% Span	5ms	*
Power Supply Voltage	+5VDC ±5%	*
Power Supply Current	100mA	*
Power Supply Sensitivity	±100ppm/%	*
Mechanical Dimensions	1.11" x 1.65" x 0.40"	*
(h)(w)(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:
* Same specification as -01, -02, -03, -04 models.
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range	Output Range
8B39-01	0V to +5V	4mA to 20mA
8B39-02	–5V to +5V	4mA to 20mA
8B39-03	0V to +5V	0mA to 20mA
8B39-04	–5V to +5V	0mA to 20mA
8B39-07	–5V to +5V	–20mA to +20mA

8B40/41

Voltage Input Modules, 1kHz Bandwidth

Description

8B 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.

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 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 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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

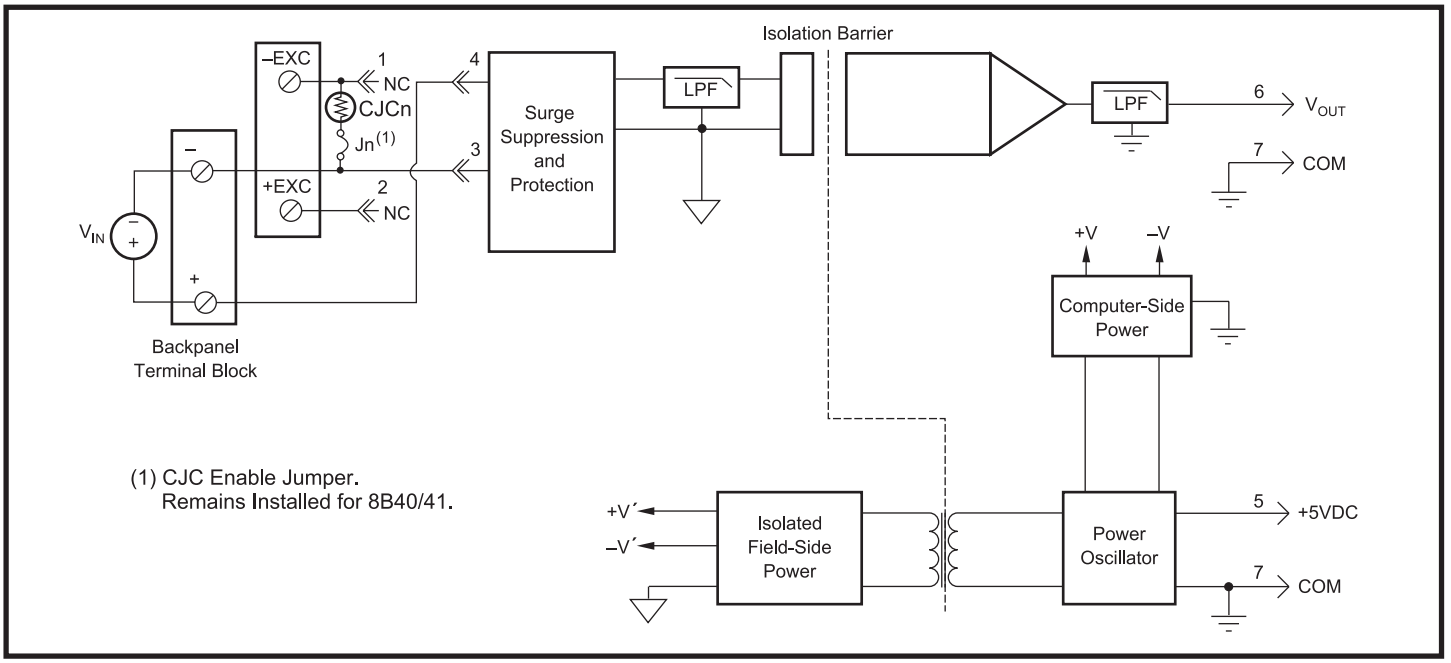


Figure 1: 8B40/41 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B40	8B41
Input Range	±10mV to ±100mV	±1V to ±60V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (minimum)
Power Off	100kΩ	500kΩ (minimum)
Overload	100kΩ	500kΩ (minimum)
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)	100dB	*
NMR (-3dB at 1kHz)	100dB per decade above 1kHz	*
Accuracy(2)	±0.05% Span	*
Linearity	±0.02% Span	*
Stability		
Offset	±10ppm/°C	*
Gain	±50ppm/°C	±75ppm/°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	25mA	*
Power Supply Sensitivity	±75ppm/%	*
Mechanical Dimensions (h)(w)(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:
* Same specification as 8B40.
(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
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

8B42

2-Wire Transmitter Interface Modules

Description

8B modules are 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.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

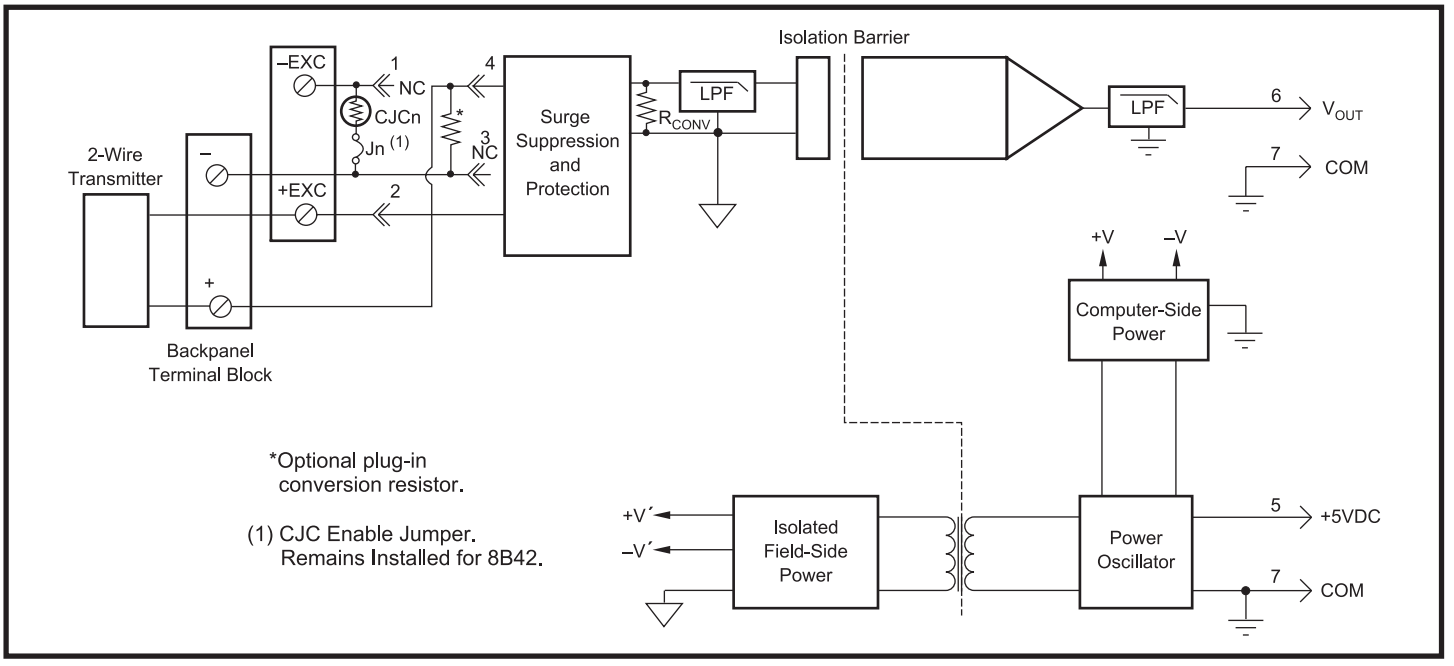


Figure 1: 8B42 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B42
Input Range	4mA to 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)(w)(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:
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range	Output Range
8B42-01	4mA to 20mA	0V to +5V
8B42-02	4mA to 20mA	+1V to +5V

8B43

DC LVDT Input Modules

Description

8B modules are 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.

The 8B43 can interface to transducers that will operate on a 10V excitation voltage and up to 20mA of 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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

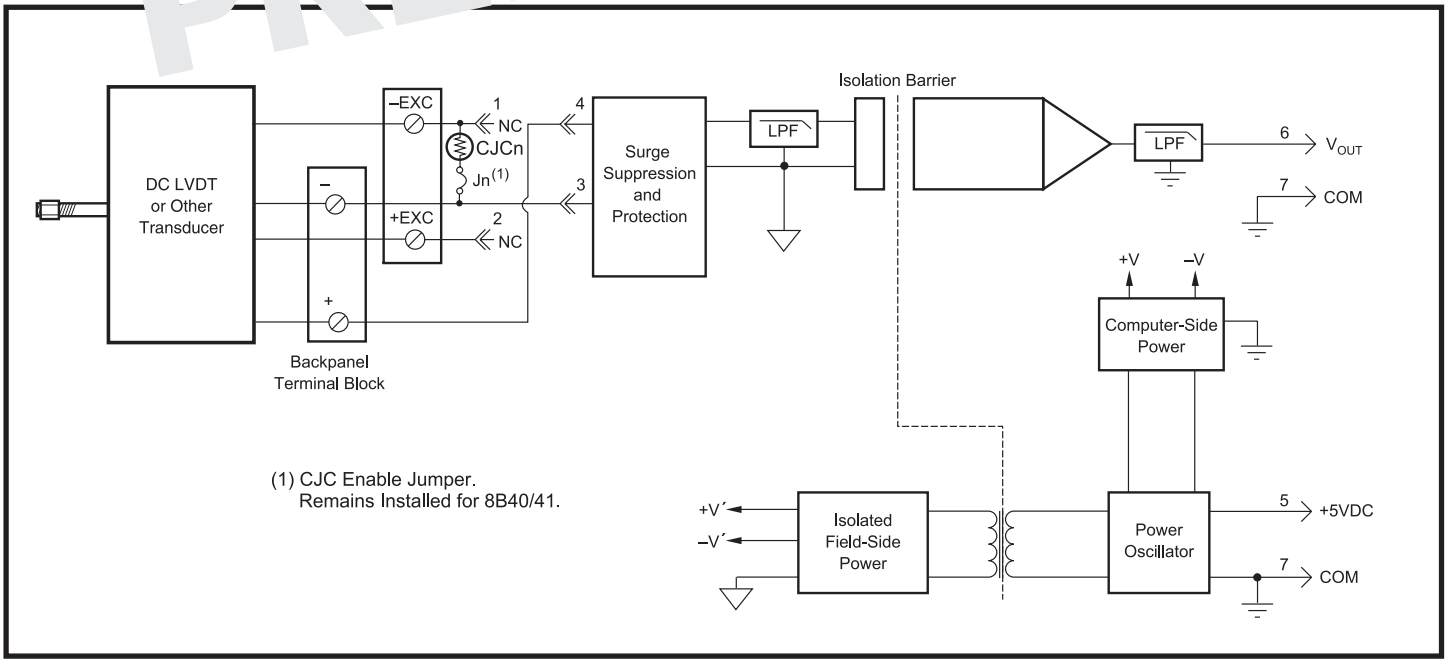


Figure 1: 8B43 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B43
Input Range	±1V to ±5V
Input Bias Current	±0.05nA
Input Resistance	
Normal	2MΩ (minimum)
Power Off	2MΩ (minimum)
Overload	2MΩ (minimum)
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	150mA Full Exc. Load
Power Supply Sensitivity	±100ppm/%
Mechanical Dimensions (h)(w)(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:
(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

8B45

Frequency Input Modules

Description

8B modules are 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.

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
- ±0.10% Accuracy
- ±0.05% Linearity
- Low Drift with Ambient Temperature
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

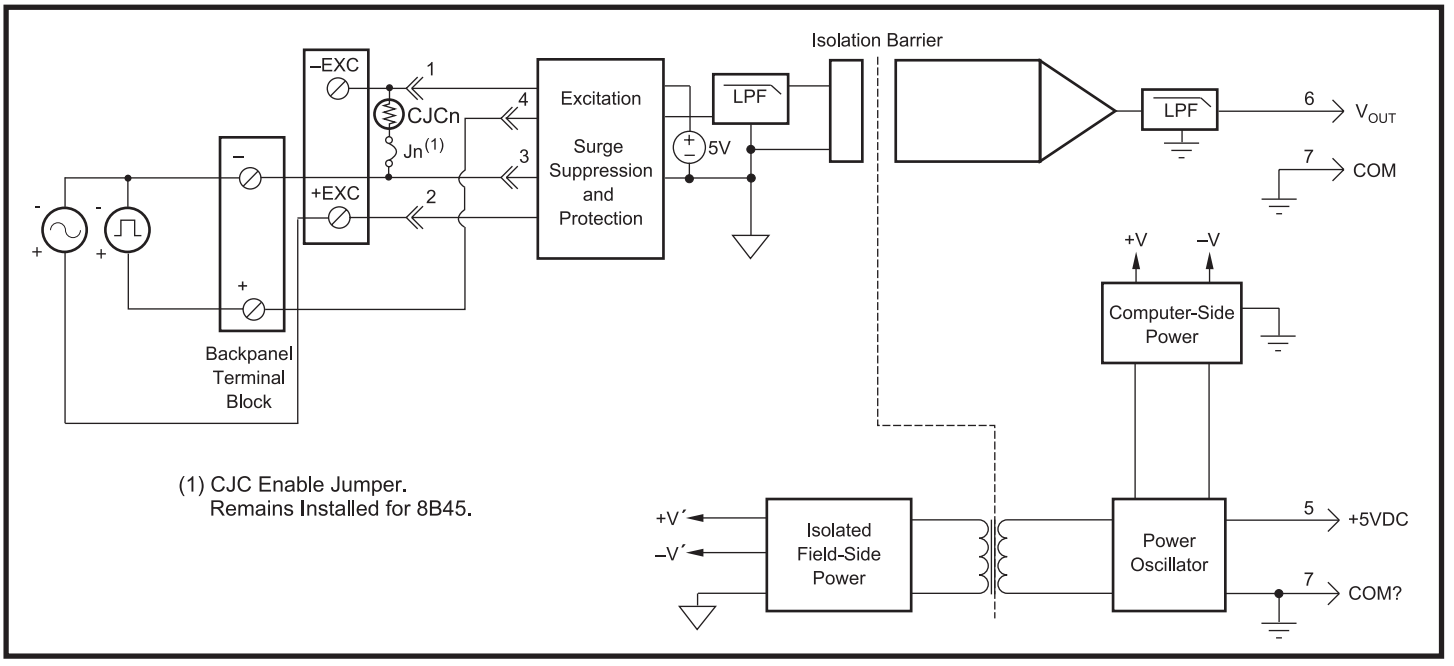


Figure 1: 8B45 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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)(w)(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:
(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

8B47

Linearized Thermocouple Input Modules

Description

8B modules are 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.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

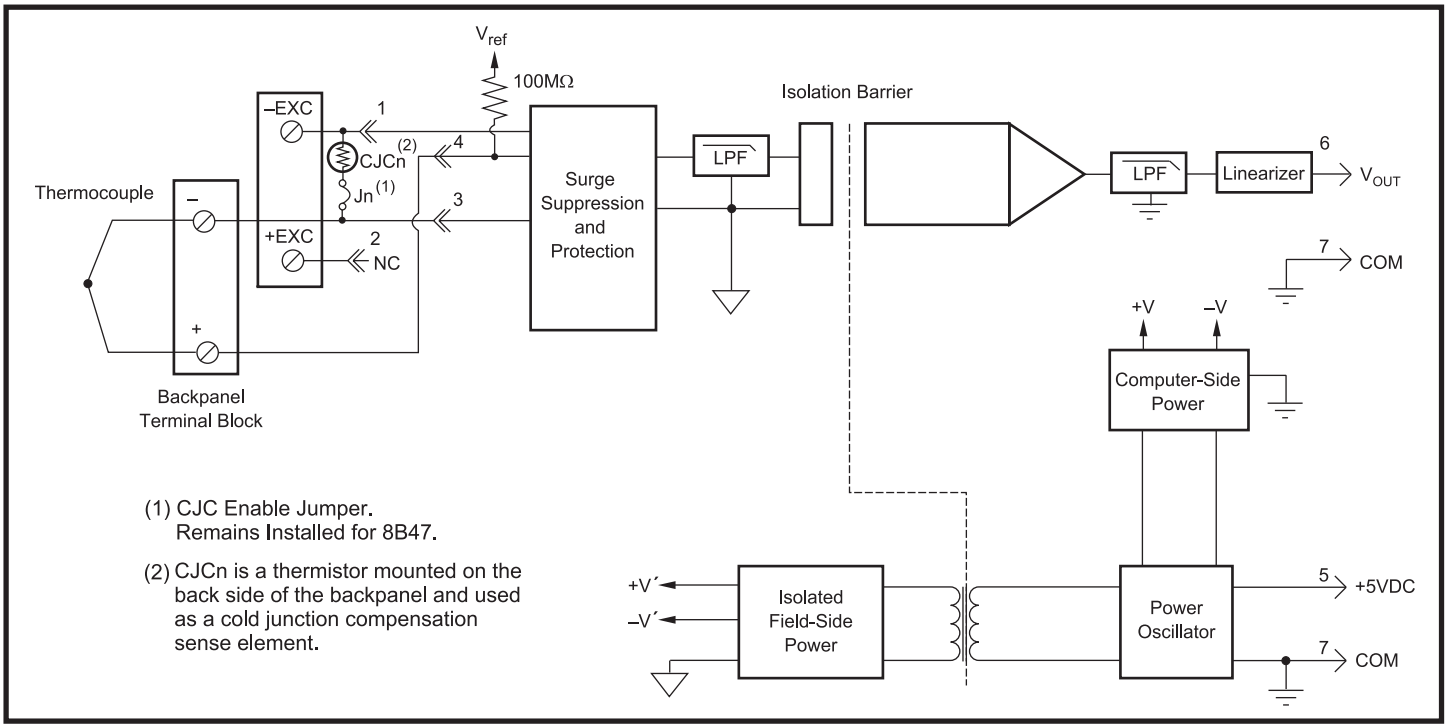


Figure 1: 8B47 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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)(w)(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:
(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%	±1.82°C
8B47J-02	J	–100°C to +300°C (–148°F to +572°F)	0V to +5V	±0.20%	±0.96°C
8B47J-03	J	0°C to +500°C (+32°F to +932°F)	0V to +5V	±0.20%	±1.05°C
8B47J-12	J	–100°C to +760°C (–148°F to +1400°F)	0V to +5V	±0.20%	±2.10°C
8B47K-04	K	0°C to +1000°C (+32°F to +1832°F)	0V to +5V	±0.15%	±2.40°C
8B47K-05	K	0°C to +500°C (+32°F to +932°F)	0V to +5V	±0.15%	±1.05°C
8B47K-13	K	–100°C to +1350°C (–148°F to +2462°F)	0V to +5V	±0.15%	±3.60°C
8B47K-14	K	0°C to +1200°C (+32°F to +2192°F)	0V to +5V	±0.15%	±2.88°C
8B47T-06	T	–100°C to +400°C (–148°F to +752°F)	0V to +5V	±0.20%	±2.40°C
8B47T-07	T	0°C to +200°C (+32°F to +392°F)	0V to +5V	±0.20%	±0.75°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

8B49

Voltage Output Modules

Description

8B modules are 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.

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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

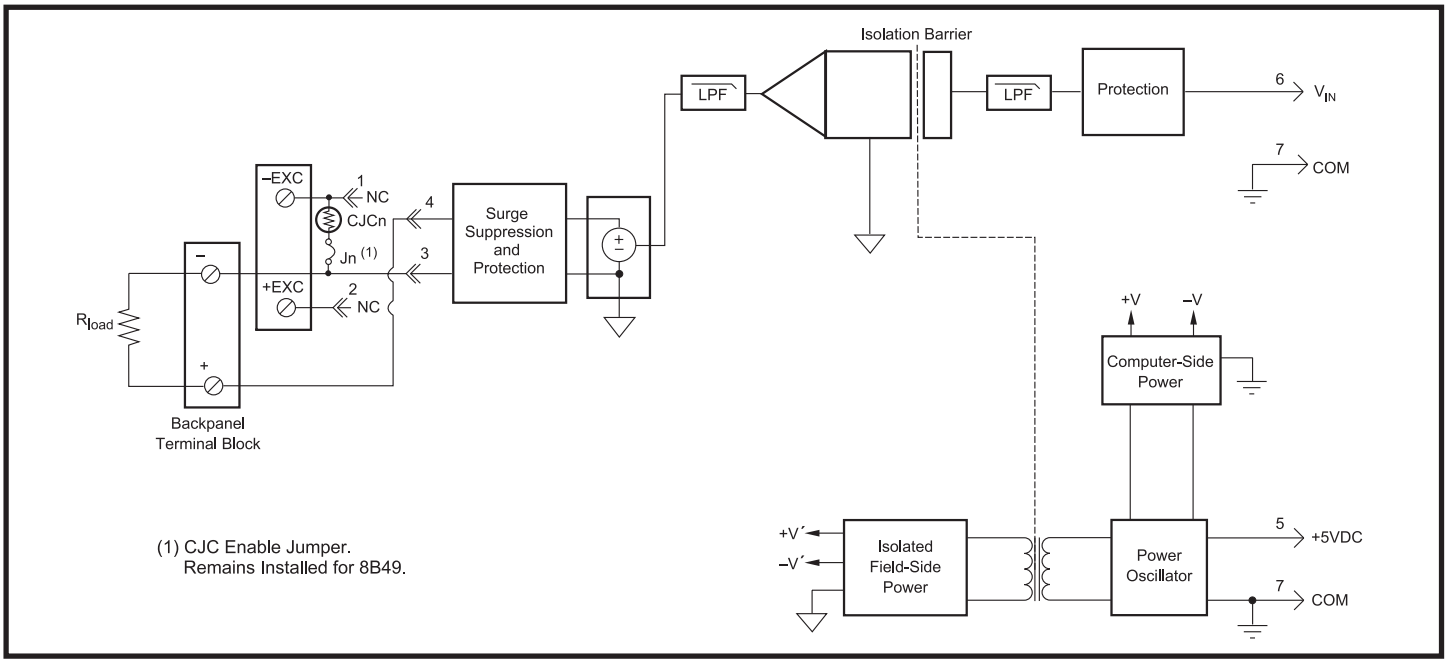


Figure 1: 8B49 Block Diagram

Specifications

Typical at T_A=+25°C and +5V 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 to 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	1.5mVrms
Bandwidth, –3dB	100Hz
Response Time, 90% Span	5ms
Power Supply Voltage	+5VDC ±5%
Power Supply Current	120mA Full Load, 55mA No Load
Power Supply Sensitivity	±100ppm/%
Mechanical Dimensions (h)(w)(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:
(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

8B50/51

Voltage Input Modules, 20kHz Bandwidth

Description

8B 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.

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 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 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
- 20kHz Signal Bandwidth
- ±0.05% Accuracy
- ±0.02% Linearity
- Low Drift with Ambient Temperature
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Mix and Match Module Types on Backpanel

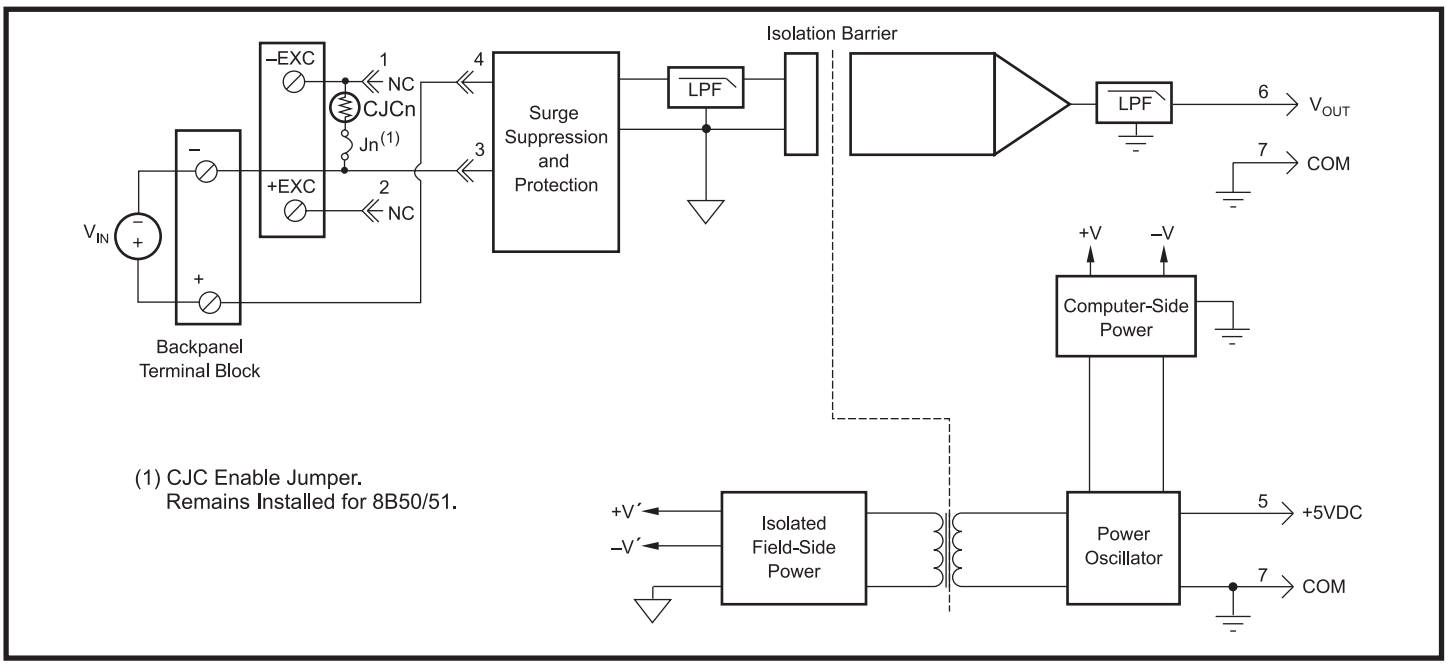


Figure 1: 8B50/51 Block Diagram

Specifications

Typical at T_A=+25°C and +5V power

Module	8B50	8B51
Input Range	±20mV to ±100mV	±1V to ±60V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ (minimum)
Power Off	100kΩ	500kΩ (minimum)
Overload	100kΩ	500kΩ (minimum)
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)	100dB	*
NMR (–3dB at 20kHz)	100dB per decade above 20kHz	*
Accuracy(2)	±0.05% Span	*
Linearity	±0.02% Span	*
Stability		
Offset	±10ppm/°C	*
Gain	±50ppm/°C	±75ppm/°C
Noise		
Output, 100kHz	500µVrms	*
Bandwidth, –3dB	20kHz (15kHz, 50-01)	*
Rise Time, 10 to 90% Span	25µs	*
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	25mA	*
Power Supply Sensitivity	±75ppm/%	*
Mechanical Dimensions (h)(w)(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:
* Same specification as 8B50.
(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.

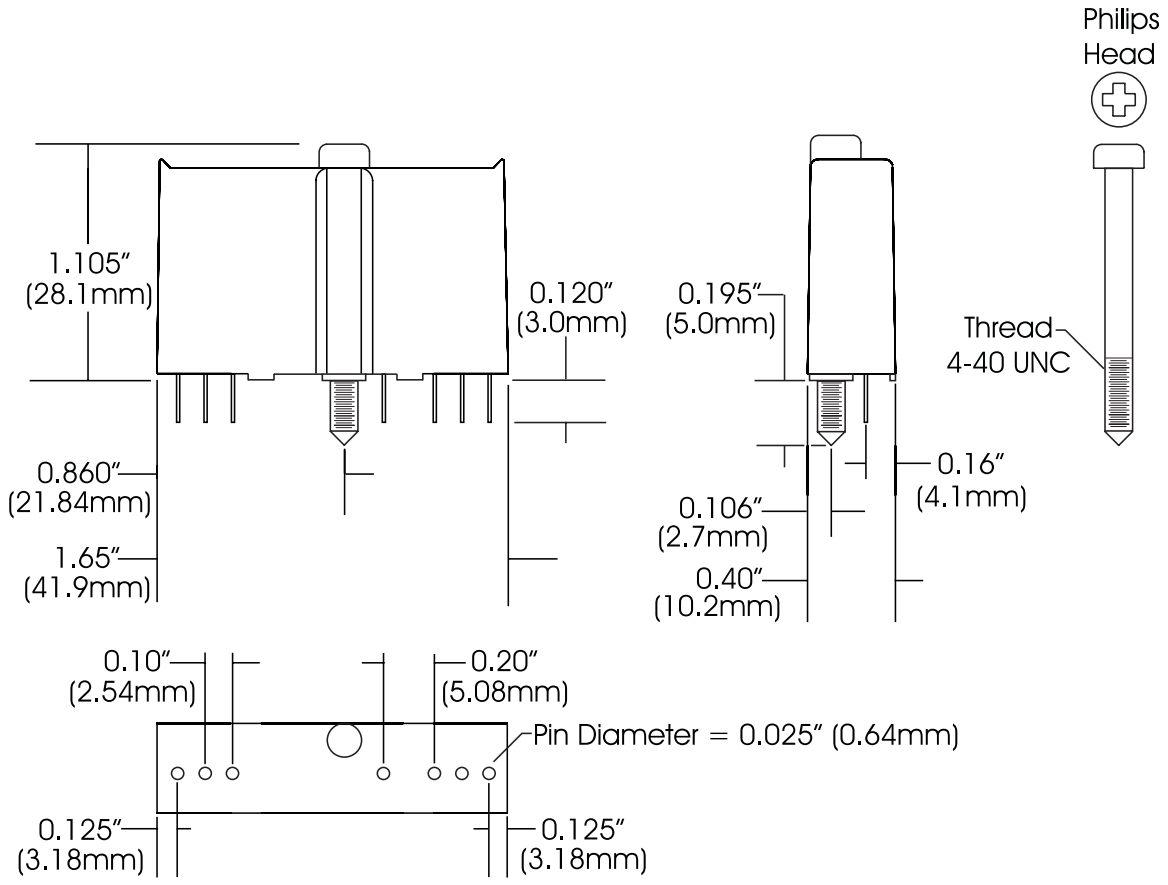
Ordering Information

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
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

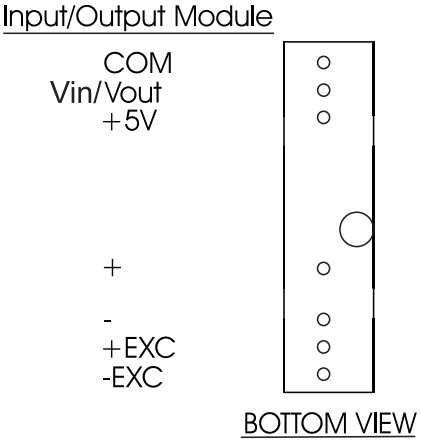
8B

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.



▶ Accessories for 8B Analog Modules

▶ Features

- Single Channel DIN Rail Mounting Accessory
- 2-, 4-, 8-, 16-Position Backpanels
- Panel or DIN Rail Mounting Options
- 19-Inch Mounting Rack for Backpanels
- Interface Cables
- Cable-to-Screw-Terminal Interface Board
- Power Supplies

8BP01

CE

Single Channel DIN Rail Mount Carrier

Description

The 8BP01 is offered as a 5VDC powered (8BP01-X05) or 7 to 34VDC powered (8BP01-X24) single channel DIN rail mount carrier suitable for any 8B signal conditioner. 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 1). It has a flammability rating of UL-94 V-0.

Specifications

Module	8BP01-X05	8BP01-X24
Specifications	Typical at T_A=+25°C and +5V power	Typical at T_A=+25°C and +24V power
Input Voltage Range Over-Voltage Protection Over-Voltage Shutdown Voltage Under-Voltage Turn-on Reverse Voltage Protection	4.85 to 5.2VDC 6V TVS, 1A Fuse, OV detection 5.6V max – 1A Fuse	7 to 34VDC 36V TVS, 1A Fuse, OV detection 35.5V max 6.5V min 1A Fuse
Output Voltage Regulation Power Indicator Output Voltage Temp. Coeff. Output Current	– Green LED ±200ppm/°C 250mA max (–40°C to +85°C)	5VDC ±1% Green LED ±200ppm/°C 250mA max (–40°C to +85°C)
Output Current Limit Line Regulation Load Regulation Efficiency	– – – –	0.8A, Auto Recovery ±0.25% ±0.5% 75%
Output Ripple	–	<50mVpk-pk
Mechanical Dimensions (h)(w)(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)

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

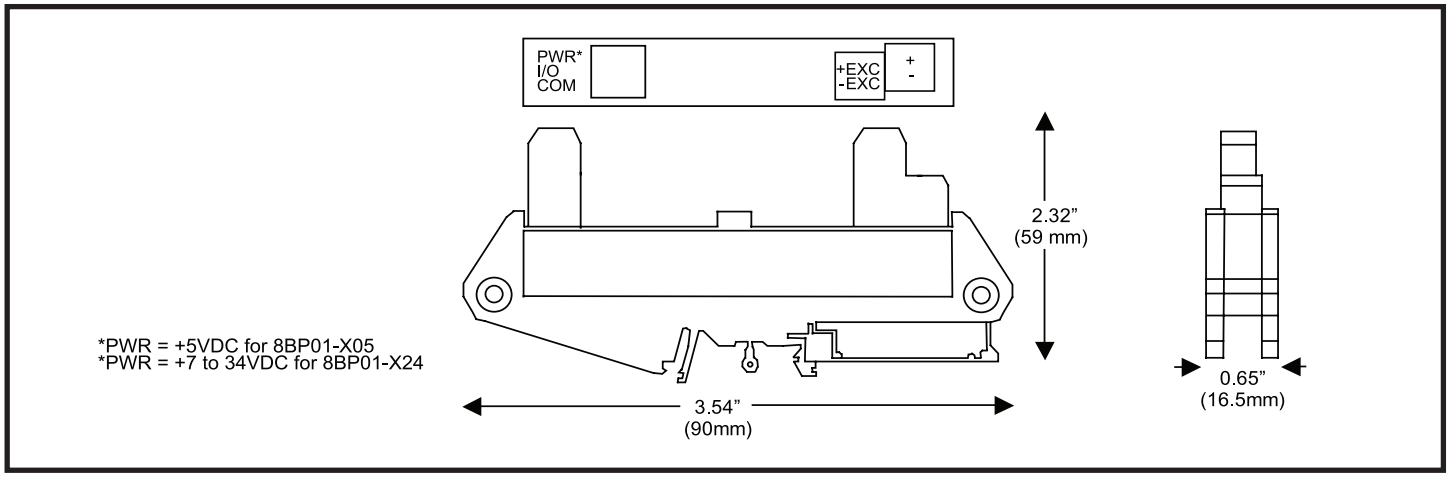


Figure 1: 8BP01 Single Channel DIN Rail Mount Carrier

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 6 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	–40°C to +85°C
Relative Humidity	95% Noncondensing
Interface Connector:	
Field	high density screw clamp, 16 AWG max
System	high density screw clamp, 16 AWG max
Isolation:	
Input-to-Output	1500Vrms continuous, max
Channel-to-Channel	1500Vrms continuous, max

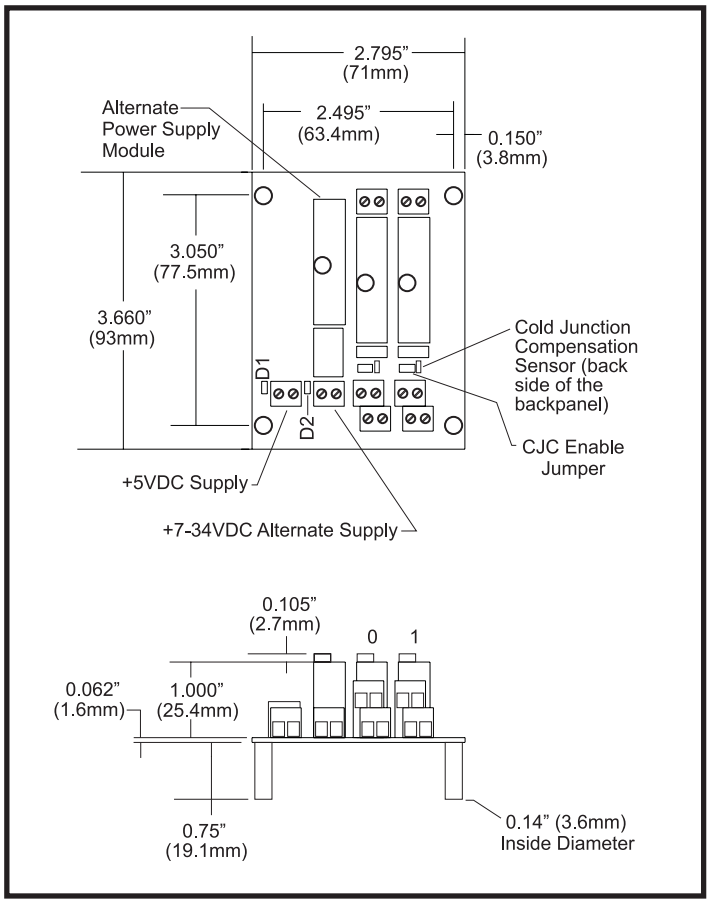


Figure 2: 8BP02 Analog I/O Backpanel

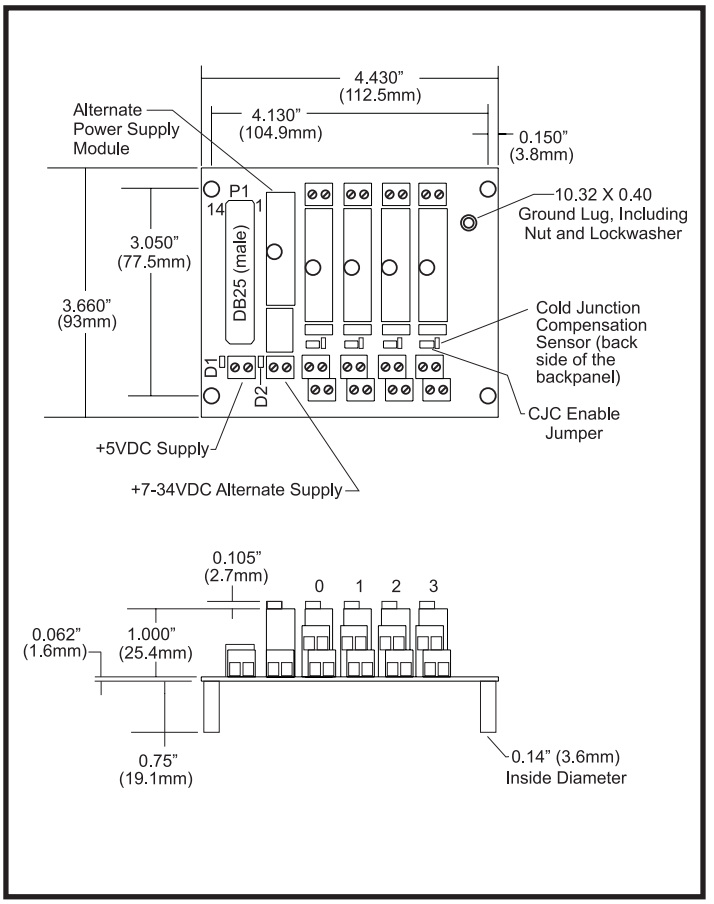


Figure 3: 8BP04 Analog I/O Backpanel

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 gage wire of the shortest possible length.

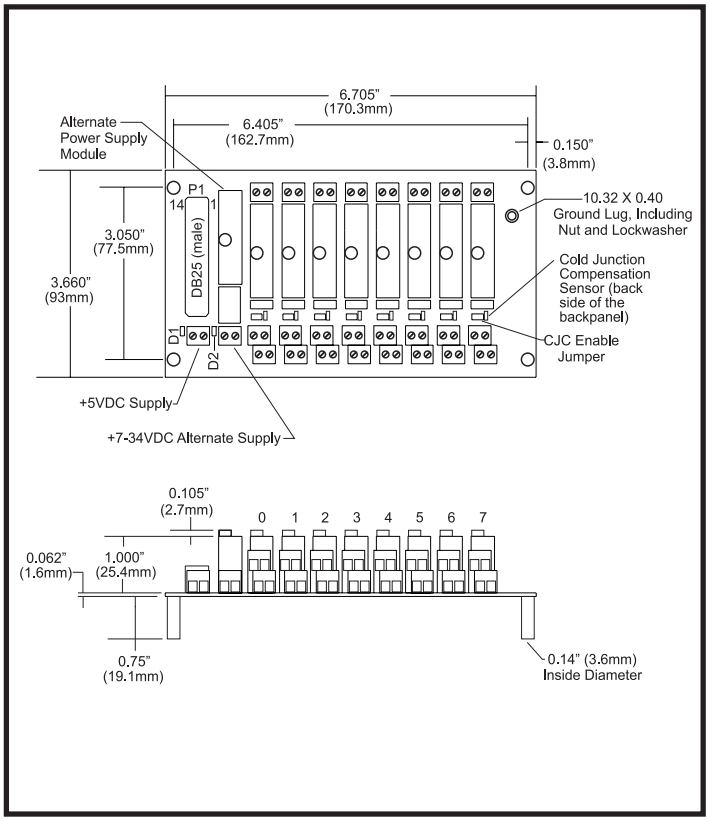


Figure 4: 8BP08 Analog I/O Backpanel

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.

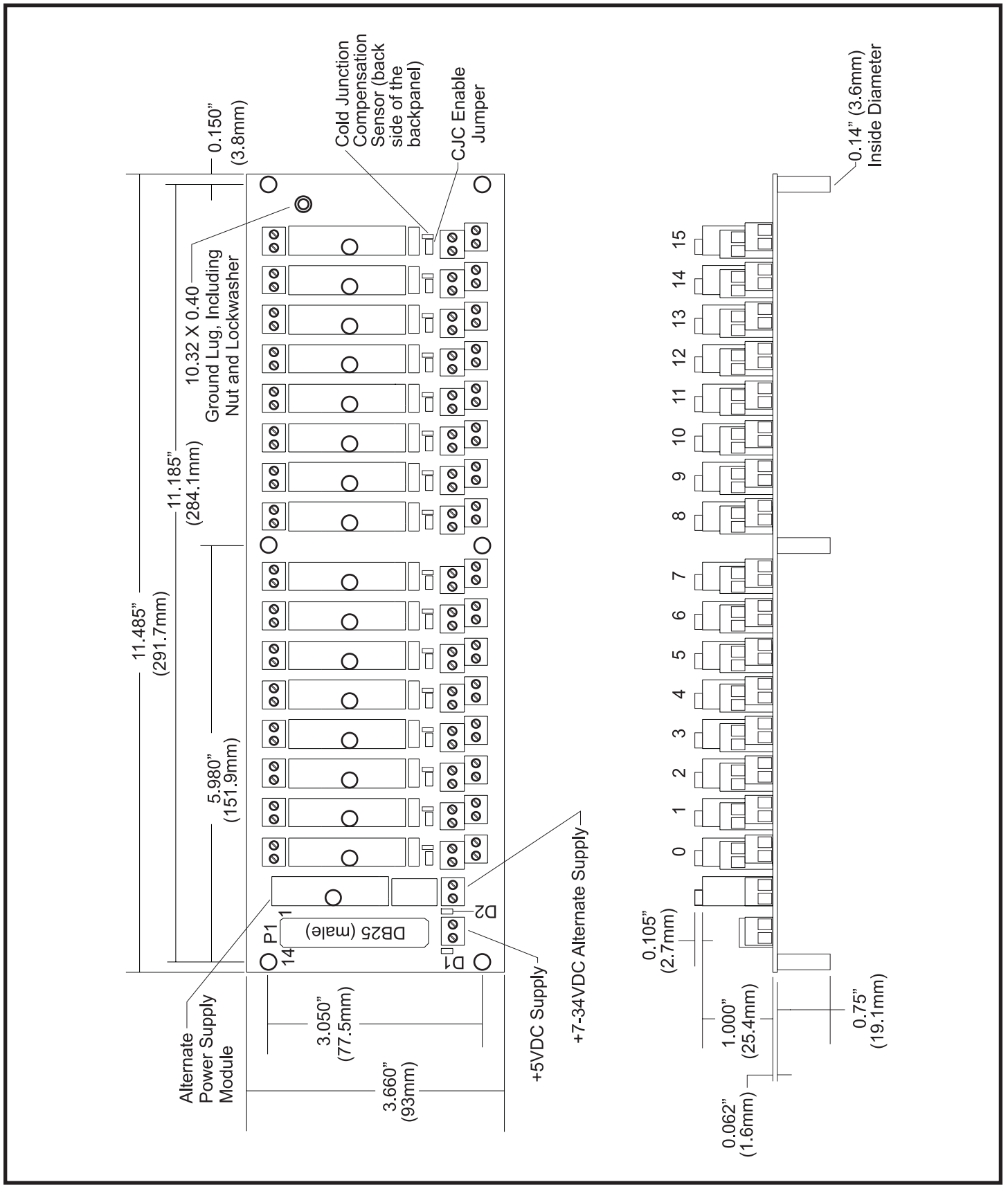


Figure 5: 8BP16 Analog I/O Backpanel

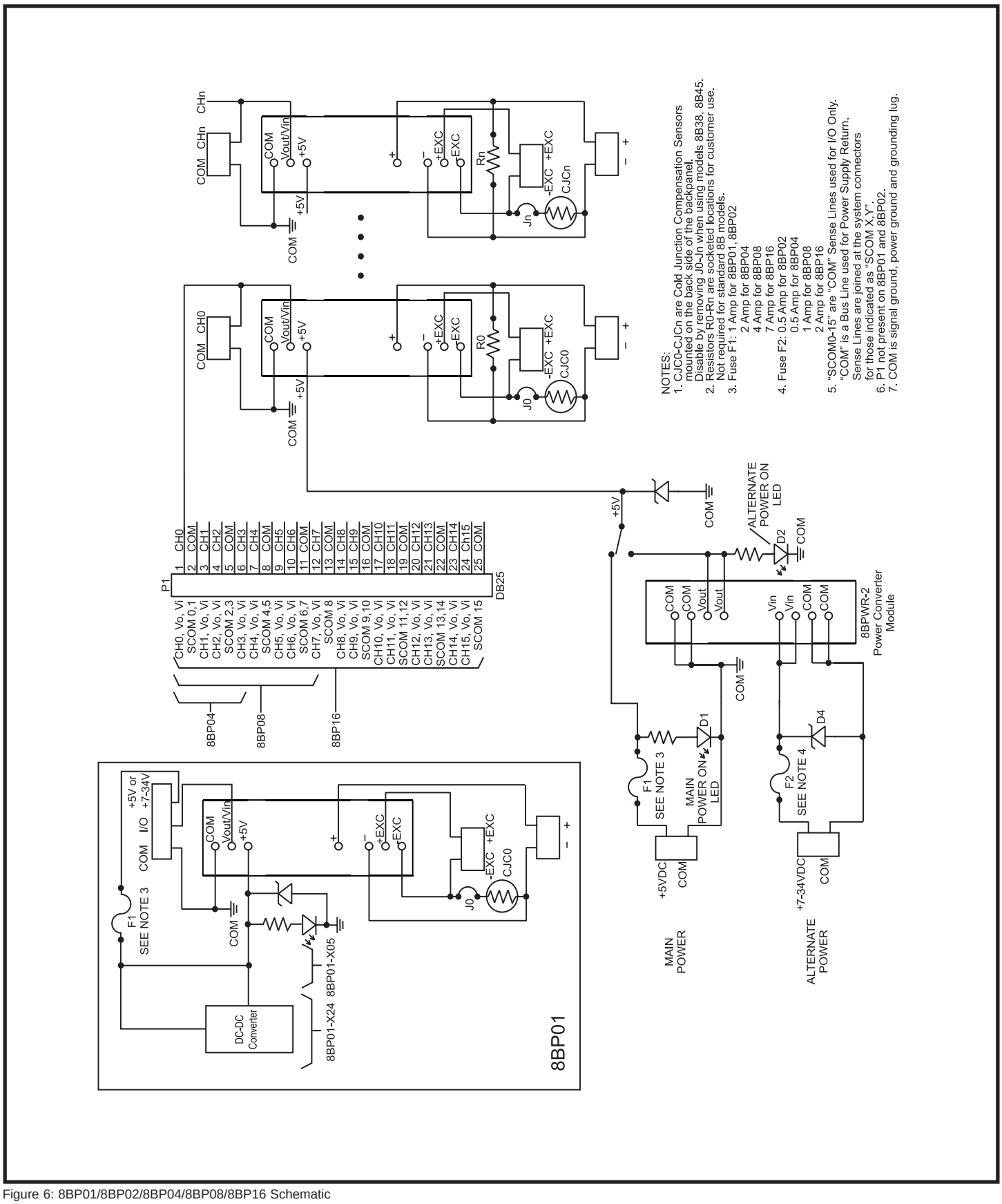


Figure 6: 8BP01/8BP02/8BP04/8BP08/8BP16 Schematic

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 7).

Specifications

Typical at T_A=+25°C and +24V power

Module	8BPWR-2
Input Voltage Range	7 to 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)(w)(d)	1.11" x 1.65" x 0.40" (28.1mm x 41.9mm x 10.2mm)

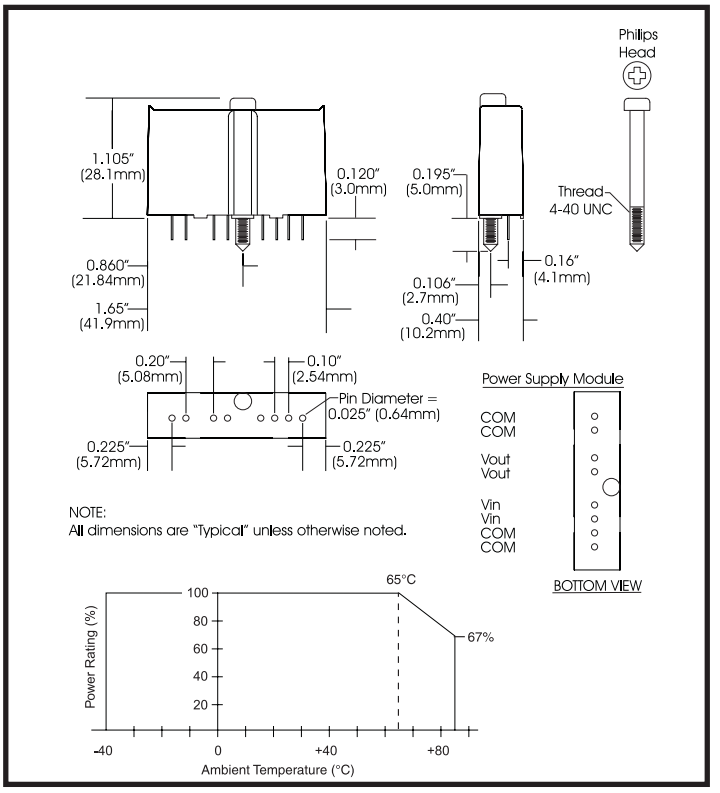


Figure 7: 8BPWR-2 Power Supply Module

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 13) 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 8).

Specifications

Module	SCMXPRT-001/D	SCMXPRE-001/D
Input Voltage Range, 47Hz to 420Hz	105 to 125VAC	210 to 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)

Supplies are UL recognized, File No. E45344.

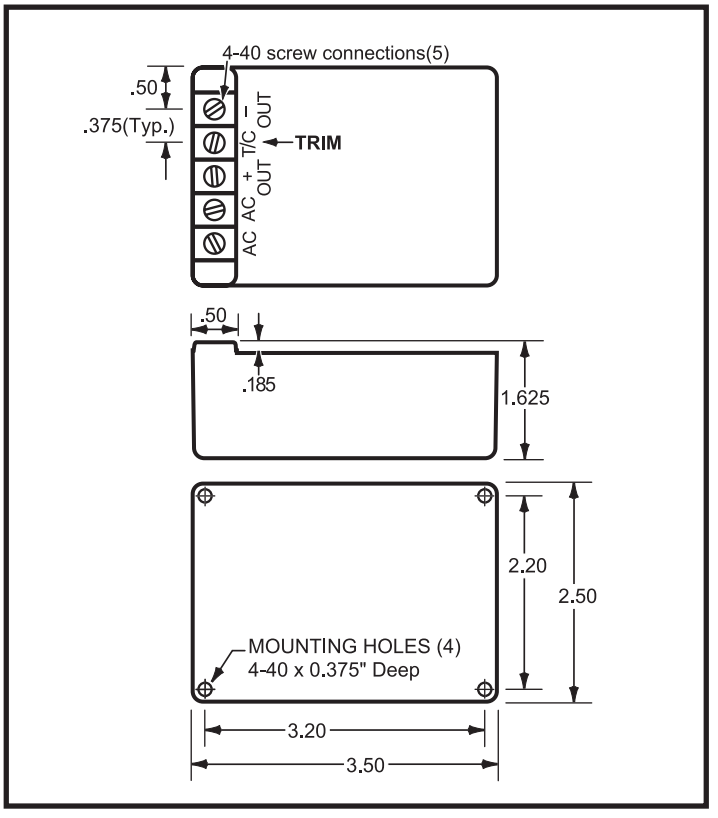


Figure 8: SCMXPRT-001/D and SCMXPRE-001/D Physical Dimensions

SCMXPRT-003, SCMXPRE-003

Power Supplies

Description

The SCMXPRT/E-003 linear power supplies are available in 120VAC or 220VAC input. They have sufficient output current capacity to supply any combination of 8B modules. The SCMXRK-002 metal rack provides mounting capability for the SCMXPRT/E-003 power supplies (see Figure 13).

Specifications

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 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

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.

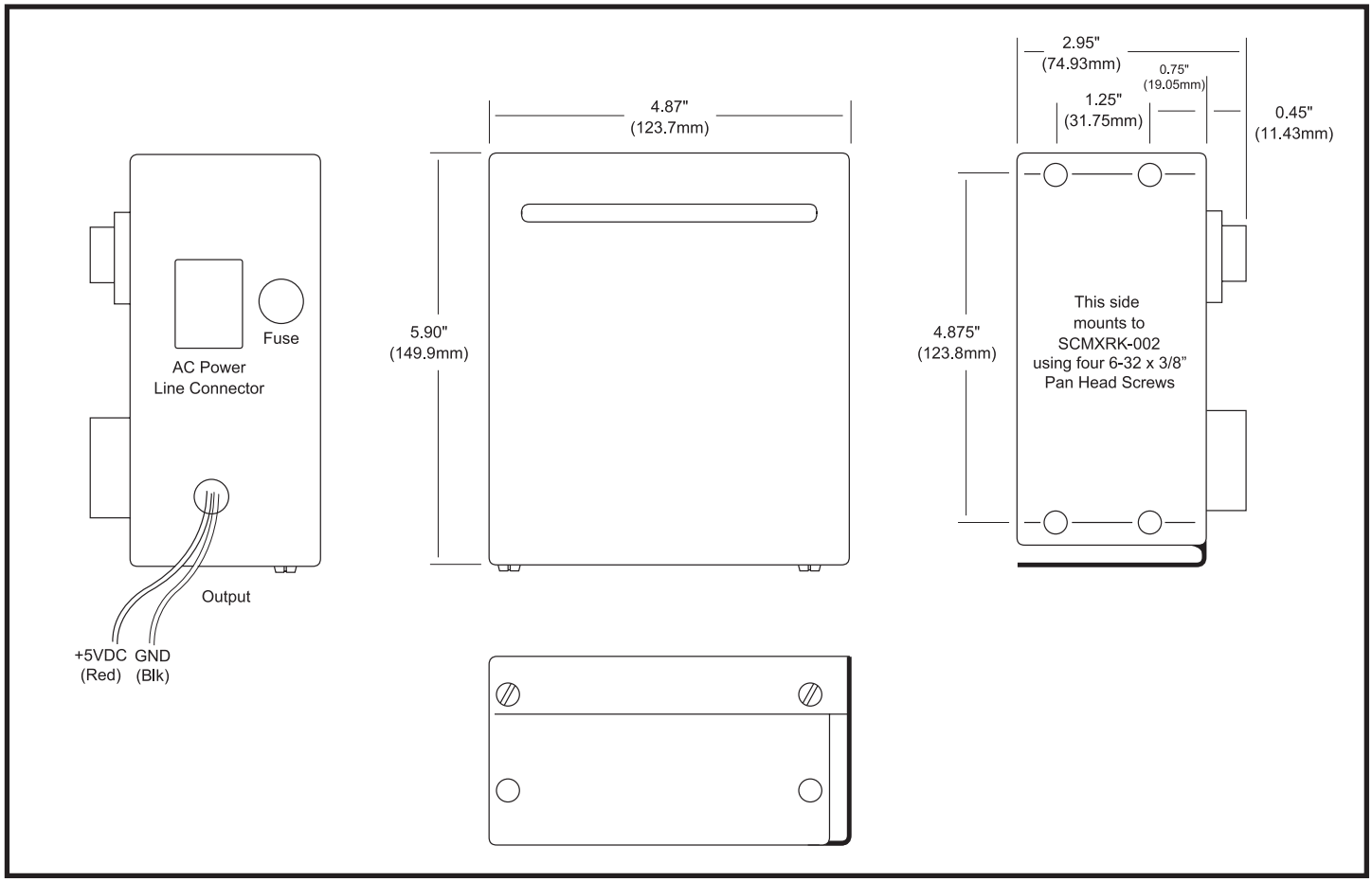


Figure 9: SCMXPRT-003/E-003 Physical Dimensions

PWR-4505

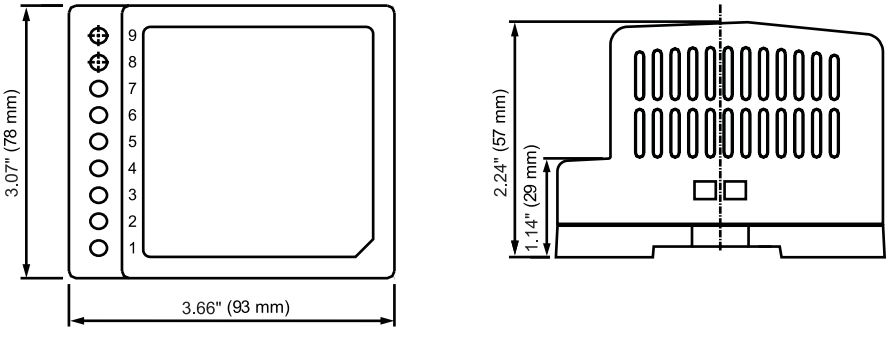
25W Single Output Industrial DIN Rail Switching Power Supply

Specifications

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 to 95%
Mechanical Dimensions (l)(w)(h)	3.66" x 3.07" x 2.24" (93mm x 78mm x 57mm)
Terminal Screw	M3

▶ Features

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



Terminal Pin No. Assignment

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		

Figure 10: PWR-4505 Physical Dimensions

SCMXCA006-01, -02, -07

Interface Cables

Description

SCMXCA006-XX

System interface cable for the 8BP04/08/16 backpanels. This is a DB25 Male/Female cable assembly. It can be ordered in lengths of 1m, 2m, and 7m (see Figure 11).

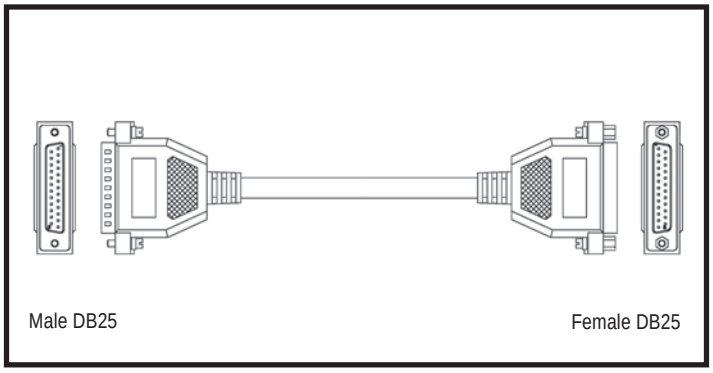


Figure 11: SCMXCA006-XX System Interface Cable

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 12 for dimensions).

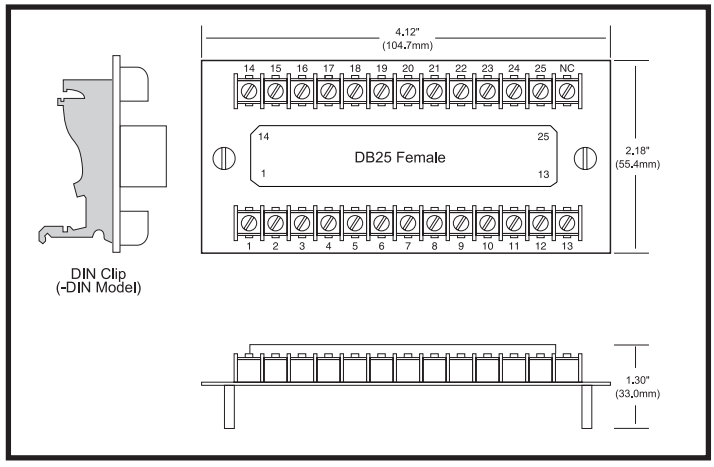


Figure 12: 8BXIF Universal Interface Board Dimensions

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 13 for dimensions).

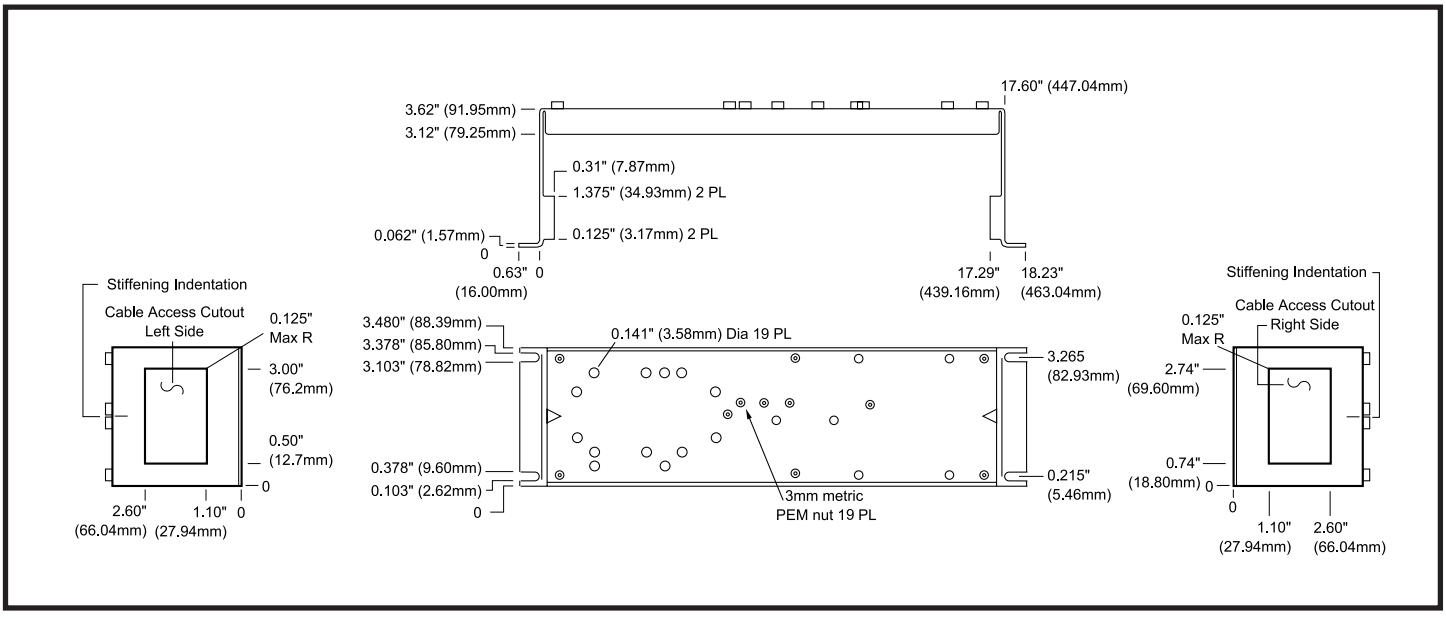


Figure 13: SCMXRK-002 Analog Rack Dimensions

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.

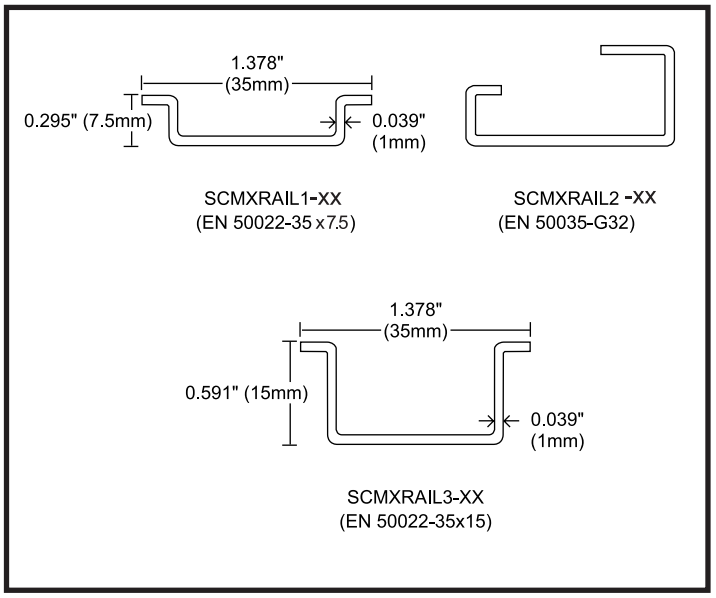


Figure 14: DIN Rail Styles

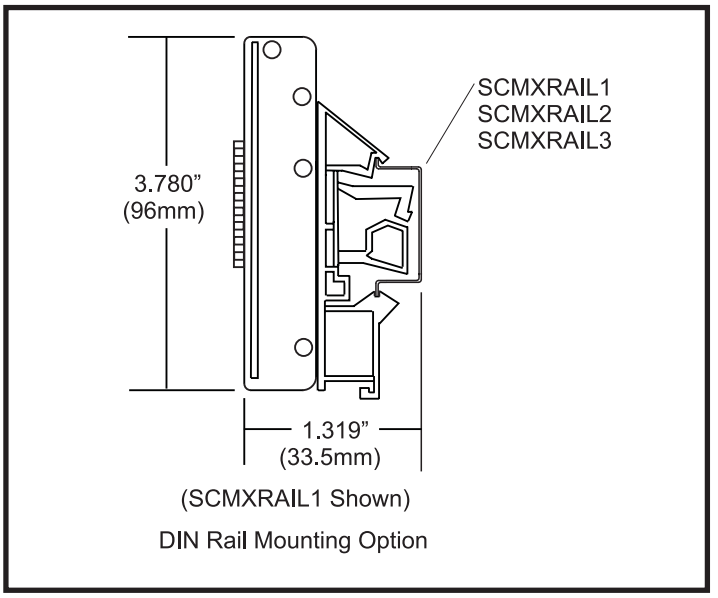


Figure 15: 8BPxx-2, 8BPxx-3 Backpanel DIN Rail Mounting Option

8B-PROTO

Breadboard Kit

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.

8BPT

Pass-Through Module

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.

8BXCJC

Cold Junction Compensation Sensor

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.

SCM9B

Isolated, Intelligent Signal Conditioning Products

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 gage, 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
- Manufactured per RoHS Directive 2002/95/EC

▶ SCM9B Selection Guide

SCM9B-1000/2000 Sensor-to-Computer Products Page 150 ("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

MODEL	INPUT RANGE	OUTPUT
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

▶ SCM9B Selection Guide (Continued)

MODEL	INPUT RANGE	OUTPUT
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
Strain Gage 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	Timer	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 INPUTS	DIGITAL OUTPUTS	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 **Page 154**

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

SCM9B-D100 DIN Rail Mount Sensor-to-Computer Modules **Page 156**

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

▶ SCM9B Selection Guide (Continued)

MODEL	INPUT RANGE	OUTPUT
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-3000/4000 Computer-to-Analog Output Products Page 159
("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
Current Output		
SCM9B-3251/4251	0 to 20mA	RS-232C
SCM9B-3252/4252	0 to 20mA	RS-485
SCM9B-3261/4261	4 to 20mA	RS-232C
SCM9B-3262/4262	4 to 20mA	RS-485

SCM9B-A1000/A2000 Converters/Repeaters Page 161

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 Page 162

MODEL	DESCRIPTION
SCM9B-D192	RS-485 Repeater

SCM9B-H1700 Digital I/O Boards Page 164

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

Accessories and Software Page 165

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

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 environment, 40°C temperature, and quality level of B-2. Our specified humidity level is 95% RH noncondensing.

MODEL	FAILURES/10^6 HRS	MTBF (HRS)
SCM9B-1xxx/2xxx/3xxx/4xxx/5xxx	9.52	105,000
SCM9B-17xx	8.16	123,000

SCM9B-1000/2000 Series

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 (see Figure 1).

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 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

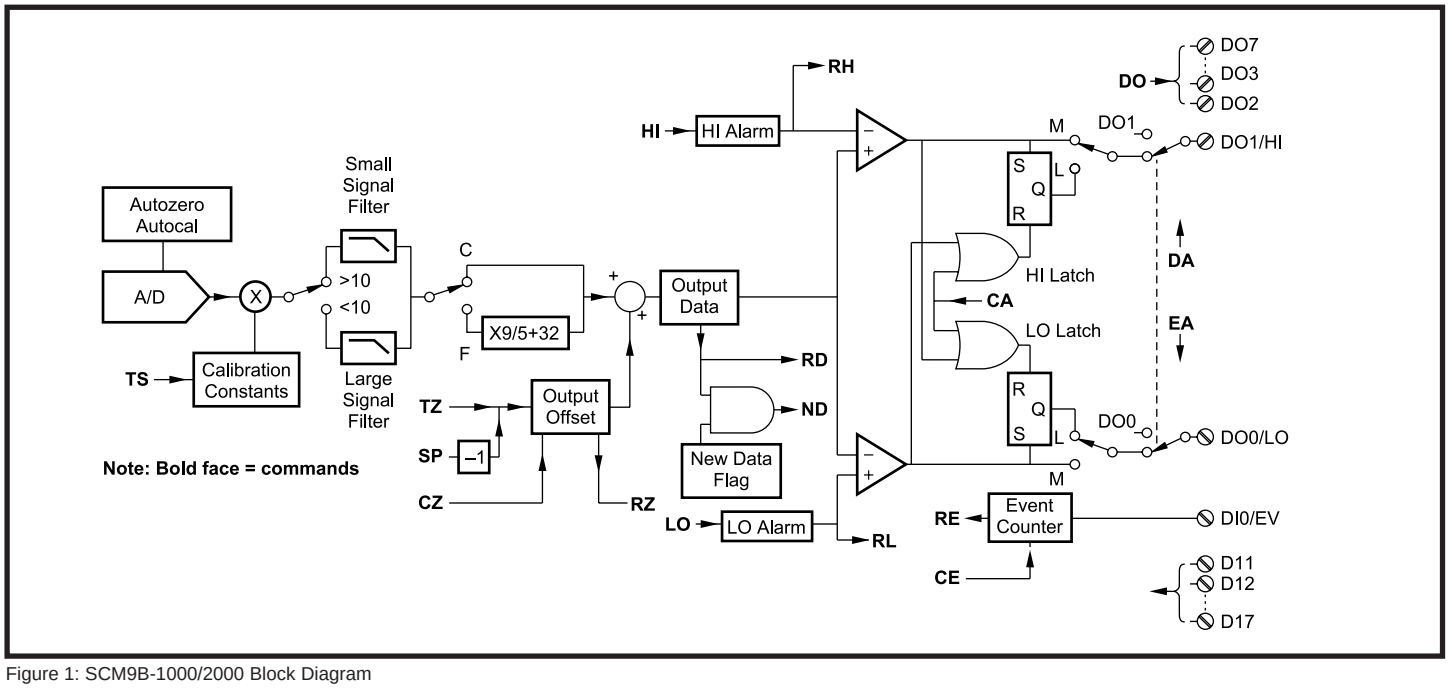


Figure 1: SCM9B-1000/2000 Block Diagram

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, 4-20mADC.
- 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 = .00385, .00392, 100Ω at 0°C,
  .00388, 100Ω at 25°C.
- Ranges: .00385 = –200°C to +850°C.
  .00392 = –200°C to +600°C.
  .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.

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 Spans).
  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.

Ordering Information

Voltage Input

Model	Description
SCM9B-1101/2101	±10mV Input/RS-232C Output
SCM9B-1102/2102	±10mV Input/RS-485 Output
SCM9B-1111/2111	±100mV Input/RS-232C Output
SCM9B-1112/2112	±100mV Input/RS-485 Output
SCM9B-1121/2121	±1V Input/RS-232C Output
SCM9B-1122/2122	±1V Input/RS-485 Output
SCM9B-1131/2131	±5V Input/RS-232C Output
SCM9B-1132/2132	±5V Input/RS-485 Output
SCM9B-1141/2141	±10V Input/RS-232C Output
SCM9B-1142/2142	±10V Input/RS-485 Output
SCM9B-1151/2151	±100V Input/RS-232C Output
SCM9B-1152/2152	±100V Input/RS-485 Output

Current Inputs

Model	Description
SCM9B-1211/2211	±10mA Input/RS-232C Output
SCM9B-1212/2212	±10mA Input/RS-485 Output
SCM9B-1221/2221	±1mA Input/RS-232C Output
SCM9B-1222/2222	±1mA Input/RS-485 Output
SCM9B-1231/2231	±100mA Input/RS-232C Output
SCM9B-1232/2232	±100mA Input/RS-485 Output
SCM9B-1241/2241	±1A Input/RS-232C Output
SCM9B-1242/2242	±1A Input/RS-485 Output
SCM9B-1251/2251	4-20mA Input/RS-232C Output
SCM9B-1252/2252	4-20mA Input/RS-485 Output

Thermocouple Inputs

Model	Description
SCM9B-1311	J Thermocouple Input/RS-232C Output
SCM9B-1312	J Thermocouple Input/RS-485 Output
SCM9B-1321	K Thermocouple Input/RS-232C Output
SCM9B-1322	K Thermocouple Input/RS-485 Output
SCM9B-1331	T Thermocouple Input/RS-232C Output
SCM9B-1332	T Thermocouple Input/RS-485 Output
SCM9B-1341	E Thermocouple Input/RS-232C Output
SCM9B-1342	E Thermocouple Input/RS-485 Output
SCM9B-1351	R Thermocouple Input/RS-232C Output
SCM9B-1352	R Thermocouple Input/RS-485 Output
SCM9B-1361	S Thermocouple Input/RS-232C Output
SCM9B-1362	S Thermocouple Input/RS-485 Output
SCM9B-1371	B Thermocouple Input/RS-232C Output
SCM9B-1372	B Thermocouple Input/RS-485 Output
SCM9B-1381	C Thermocouple Input/RS-232C Output
SCM9B-1382	C Thermocouple Input/RS-485 Output

RTD Inputs

Model	Description
SCM9B-1411	.00385 RTD Input/RS-232C Output
SCM9B-1412	.00385 RTD Input/RS-485 Output
SCM9B-1421	.00392 RTD Input/RS-232C Output
SCM9B-1422	.00392 RTD Input/RS-485 Output
SCM9B-1431	.00388 RTD Input/RS-232C Output
SCM9B-1432	.00388 RTD Input/RS-485 Output
SCM9B-1451	2252Ω Thermistor Input/RS-232C Output
SCM9B-1452	2252Ω Thermistor Input/RS-485 Output
SCM9B-1461	TD Thermistor Input/RS-232C Output
SCM9B-1462	TD Thermistor Input/RS-485 Output

Strain Gage Inputs

Model	Description
SCM9B-1511/2511	±30mV Bridge Input, 5V Excitation/RS-232C Output
SCM9B-1512/2512	±30mV Bridge Input, 5V Excitation/RS-485 Output
SCM9B-1521/2521	±30mV Bridge Input, 10V Excitation/RS-232C Output
SCM9B-1522/2522	±30mV Bridge Input, 10V Excitation/RS-485 Output
SCM9B-1531/2531	±100mV Bridge Input, 5V Excitation/RS-232C Output
SCM9B-1532/2532	±100mV Bridge Input, 5V Excitation/RS-485 Output
SCM9B-1541/2541	±100mV Bridge Input, 10V Excitation/RS-232C Output
SCM9B-1542/2542	±100mV Bridge Input, 10V Excitation/RS-485 Output
SCM9B-1551/2551	1-6V Bridge Input, 8V Excitation/RS-232C Output
SCM9B-1552/2552	1-6V Bridge Input, 8V Excitation/RS-485 Output
SCM9B-1561/2561	1-6V Bridge Input, 10V Excitation/RS-232C Output
SCM9B-1562/2562	1-6V Bridge Input, 10V Excitation/RS-485 Output

Timer/Frequency Inputs

Model	Description
SCM9B-1601/2601	Frequency Input/RS-232C Output
SCM9B-1602/2602	Frequency Input/RS-485 Output
SCM9B-1611/2611	Timer Input/RS-232C Output
SCM9B-1612/2612	Timer Input/RS-485 Output
SCM9B-1621	Event Counter/RS-232C Output
SCM9B-1622	Event Counter/RS-485 Output
SCM9B-1631/2631	Accumulator, Frequency Input/RS-232C Output
SCM9B-1632/2632	Accumulator, Frequency Input/RS-485 Output
SCM9B-1641/2641	Accumulator, Timer Input/RS-232C Output
SCM9B-1642/2642	Accumulator, Timer Input/RS-485 Output

Digital Inputs/Outputs

Model	Description
SCM9B-1701	7 Digital Inputs, 8 Digital Outputs/RS-232C Output
SCM9B-1702	7 Digital Inputs, 8 Digital Outputs/RS-485 Output
SCM9B-1711	15 Digital Inputs and/or Outputs/RS-232C Output
SCM9B-1712	15 Digital Inputs and/or Outputs/RS-485 Output

SCM9B-5000 Series

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 on IBM-compatible diskette to make the 5000 easier to learn and use.

▶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

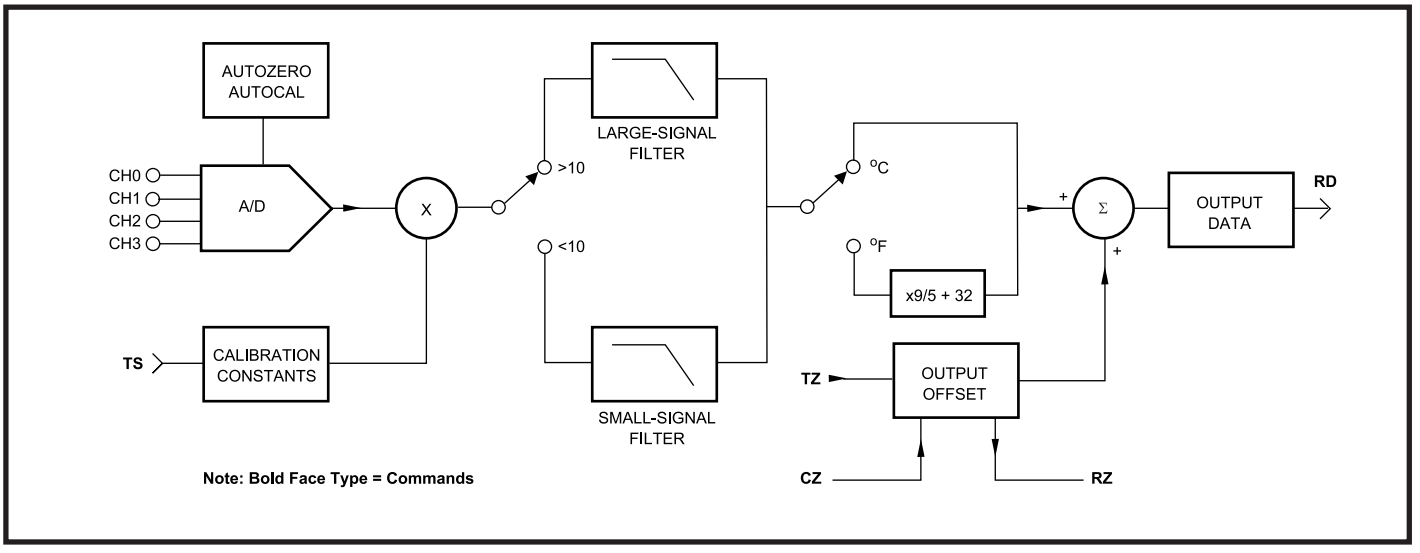


Figure 1: SCM9B-5000 Block Diagram

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 & 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.

Ordering Information

Voltage Input

Model	Description
SCM9B-5111	±100mV Input/RS-232C Output
SCM9B-5112	±100mV Input/RS-485 Output
SCM9B-5121	±1V Input/RS-232C Output
SCM9B-5122	±1V Input/RS-485 Output
SCM9B-5131	±5V Input/RS-232C Output
SCM9B-5132	±5V Input/RS-485 Output
SCM9B-5141	±10V Input/RS-232C Output
SCM9B-5142	±10V Input/RS-485 Output
SCM9B-5151	±100V Input/RS-232C Output
SCM9B-5152	±100V Input/RS-485 Output

Current Inputs

Model	Description
SCM9B-5251	4-20mA Input/RS-232C Output
SCM9B-5252	4-20mA Input/RS-485 Output

Thermocouple Inputs

Model	Description
SCM9B-5311	J Thermocouple Input/RS-232C Output
SCM9B-5312	J Thermocouple Input/RS-485 Output
SCM9B-5321	K Thermocouple Input/RS-232C Output
SCM9B-5322	K Thermocouple Input/RS-485 Output
SCM9B-5331	T Thermocouple Input/RS-232C Output
SCM9B-5332	T Thermocouple Input/RS-485 Output
SCM9B-5341	E Thermocouple Input/RS-232C Output
SCM9B-5342	E Thermocouple Input/RS-485 Output

Thermistor Inputs

Model	Description
SCM9B-5451	2252Ω Thermistor Input/RS-232C Output
SCM9B-5452	2252Ω Thermistor Input/RS-485 Output

SCM9B-D100 Series

DIN Rail Mount Sensor-to-Computer Modules

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.

Theory Of Operation

Each Dataforth module is a complete single-channel data acquisition system. Each unit contains analog signal conditioning circuits optimized for a specific input type. Sensor signals are converted to digital data with a micro processor-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 processors 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 allows 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 inputs 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 constants 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.

▶ 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

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 Functions 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 command and response protocol using ASCII characters for easy troubleshooting and interpretation of data values.

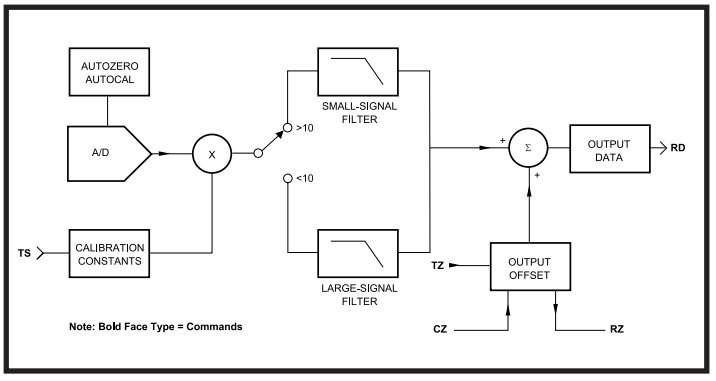


Figure 1: SCM9B-D100 Block Diagram

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 Protected Commands

CZ	Clear Zero	$1CZ	*
RR	Remote Reset	$1RR	*
SU	Setup Module	$1SU31070142	*
TS	Trim Span	$1TS+00600.00	*
TZ	Trim 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 is compatible with Windows 95, 98, NT 4.0+, 2000, XP operating systems and distributed on CD-ROM. The Utility Software simplifies configuration of all user-selectable options such as device address, data rate and filtering constants.

Process Control Software

Modbus RTU protocol is supported by virtually all commercial process control software programs available today. These programs operate on IBM and compatible personal computers in the Windows 95, 98, NT and IBM OS/2 environments.

Specifications

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

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

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

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

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

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

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

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

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

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

Specifications (cont.)

D14x RTD Inputs
- RTD types: α = .00385, .00392, 100Ω at 0°C, .00388, 100Ω at 25°C.
- Ranges: .00385 = -200°C to +850°C. .00392 = -200°C to +600°C. .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 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.

Ordering Information

Voltage Input

Model	Description
SCM9B-D110	±10mV Input/RS-485 Output
SCM9B-D111	±100mV Input/RS-485 Output
SCM9B-D112	±1V Input/RS-485 Output
SCM9B-D113	±5V Input/RS-485 Output
SCM9B-D114	±10V Input/RS-485 Output
SCM9B-D115	±100V Input/RS-485 Output

Current Inputs

Model	Description
SCM9B-D125	4-20mA Input/RS-485 Output

Thermocouple Inputs

Model	Description
SCM9B-D131	J Thermocouple Input/RS-485 Output
SCM9B-D132	K Thermocouple Input/RS-485 Output
SCM9B-D133	T Thermocouple Input/RS-485 Output
SCM9B-D134	E Thermocouple Input/RS-485 Output
SCM9B-D135	R Thermocouple Input/RS-485 Output
SCM9B-D136	S Thermocouple Input/RS-485 Output
SCM9B-D137	B Thermocouple Input/RS-485 Output
SCM9B-D138	C Thermocouple Input/RS-485 Output

RTD/Thermistor Inputs

Model	Description
SCM9B-D141	.00385 RTD Input/RS-485 Output
SCM9B-D142	.00392 RTD Input/RS-485 Output
SCM9B-D143	.00388 RTD Input/RS-485 Output
SCM9B-D145	2252Ω Thermistor Input/RS-485 Output
SCM9B-D146	TD Thermistor Input/RS-485 Output

Bridge Inputs

Model	Description
SCM9B-D151	30mV Bridge Input, 5V Excitation/RS-485 Output
SCM9B-D152	30mV Bridge Input, 10V Excitation/RS-485 Output
SCM9B-D153	100mV Bridge Input, 5V Excitation/RS-485 Output
SCM9B-D154	100mV Bridge Input, 10V Excitation/RS-485 Output

Timer and Frequency Inputs

Model	Description
SCM9B-D161	Frequency Input/RS-485 Output

Digital Inputs/Outputs

Model	Description
SCM9B-D171	6 Digital Inputs/RS-485 Output
SCM9B-D172	6 Digital Outputs/RS-485 Output

SCM9B-3000/4000 Series

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 on IBM-compatible diskette 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

Programmable Features (4000 Series)
(Provides intelligent features not found in the 3000 Series)

- Fully Programmable Output Slopes: 0.01V/s (mA/s) to 10,000V/s (mA/s)
- Programmable Data Scaling to any Desired Units
- True Analog Readback of Output Signal
- Programmable Starting Value
- Programmable Watchdog Timer Provides Orderly Shutdown in the Event of Host Failure

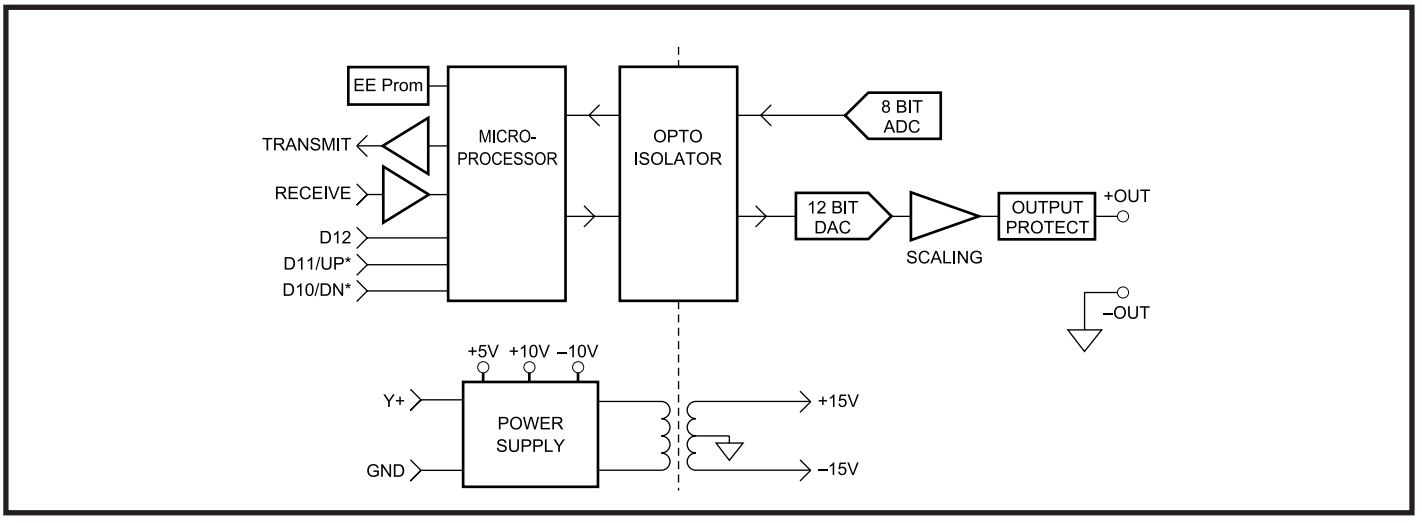


Figure 1: SCM9B-3000/4000 Block Diagram

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.

Ordering Information

Voltage Output

Model	Description
SCM9B-3121/4121	±1V Output/RS-232C Input
SCM9B-3122/4122	±1V Output/RS-485 Input
SCM9B-3131/4131	±5V Output/RS-232C Input
SCM9B-3132/4132	±5V Output/RS-485 Input
SCM9B-3141/4141	±10V Output/RS-232C Input
SCM9B-3142/4142	±10V Output/RS-485 Input
SCM9B-3161/4161	0 to 1V Output/RS-232C Input
SCM9B-3162/4162	0 to 1V Output/RS-485 Input
SCM9B-3171/4171	0 to 5V Output/RS-232C Input
SCM9B-3172/4172	0 to 5V Output/RS-485 Input
SCM9B-3181/4181	0 to 10V Output/RS-232C Input
SCM9B-3182/4182	0 to 10V Output/RS-485 Input

Current Output

Model	Description
SCM9B-3251/4251	0 to 20mA Output/RS-232C Input
SCM9B-3252/4252	0 to 20mA Output/RS-485 Input
SCM9B-3261/4261	4 to 20mA Output/RS-232C Input
SCM9B-3262/4262	4 to 20mA Output/RS-485 Input

SCM9B-A1000/A2000

RS-232C/RS-485 Converters, RS-485 Repeaters

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

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

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 & 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).

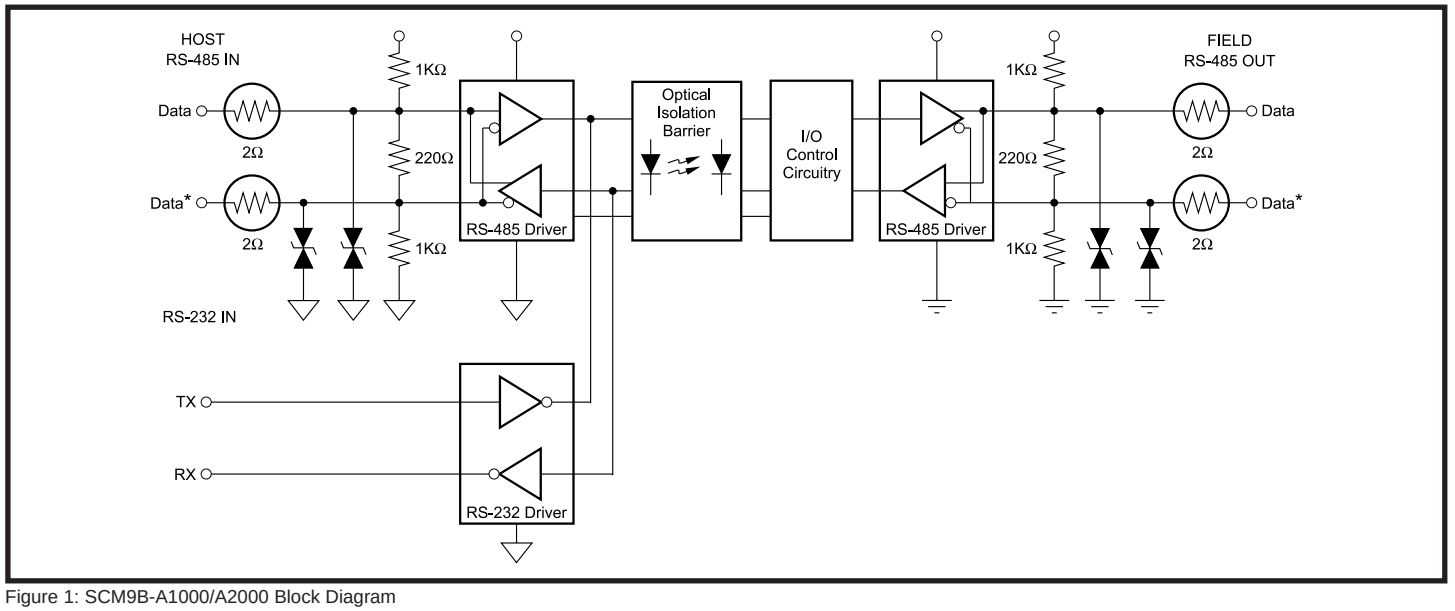


Figure 1: SCM9B-A1000/A2000 Block Diagram

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.

Automatic RS-485 Bus Supervision

The SCM9B-D192 automatically controls bus direction in hardware without the need of handshaking signals from the host computer. As shown in figure 1, the I/O control circuitry monitors both RS-485 drivers. The RS-485 drivers in the converter are always in the receive mode until either RS-485 driver receives the start of a character to be retransmitted. When the start of a character is detected, the I/O circuitry enables the proper RS-485 driver for one character time at the selected data rate. When the character time expires the drivers return to receive mode. Since the converters are bidirectional it does not matter which driver receives the character.

Isolation

The SCM9B-D192 is designed to protect host computers from destructive fault conditions that may occur on the RS-485 data lines. The host input connections on each converter are optically-isolated to 500VAC from the RS-485 connections. The optical-isolation will prevent short circuits to hazardous AC voltages on the RS-485 data lines, or static discharges, from reaching a host computer. The RS-485 output is connected to earth ground to provide a safe path for static discharge. The power supply ground should reference earth ground to provide a safe path for static discharge.

Surge Protection

The SCM9B-D192 RS-485 drivers contain internal surge-protection on the data lines. Internal high speed transient suppressors on each RS-485 data line protect the driver from dangerous voltage levels, or spikes, that can occur on the data lines. Thermistors are installed in series with each RS-485 data line to protect the drivers against overcurrent and excessive voltage conditions. In a fault condition the normally low impedence thermistor reacts by rapidly increasing its impedance thus limiting excessive current flow. Once the fault condition is corrected the thermistor will return to its normally low impedance.

▶ 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
- Transient Suppression on RS-485 Data Lines
- Internal Jumper Selectable Termination Resistors
- CE Compliant

Specifications

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

- Max common mode voltage: 500Vrms, 60s duration.
- Data rates: 300,600,1200,2400, 4800, 9600, 19200, 38400, 57600, 115200bps (dip-switch selectable).
- Temperature range (operating & storage): –25°C to +70°C.
- Relative humidity: 0 to 95% Noncondensing.
- Warranty: 12 months on workmanship and materials.

Power Specifications
- Requirements: +5VDC regulated.
- Power consumption: 1.0W Max (RS-485 driver on).

Mechanical
- Case: ABS case with screw terminal barrier plug (supplied).

Ordering Information

Model	Description
SCM9B-D192	RS-485 Repeater

RS-485 Termination

The RS-485 standard is highly immune to noise when each data line is properly biased and terminated. Each RS-485 driver is connected to pull-up and pull-down biasing resistors and termination resistors to insure the proper termination technique for any RS-485 system.

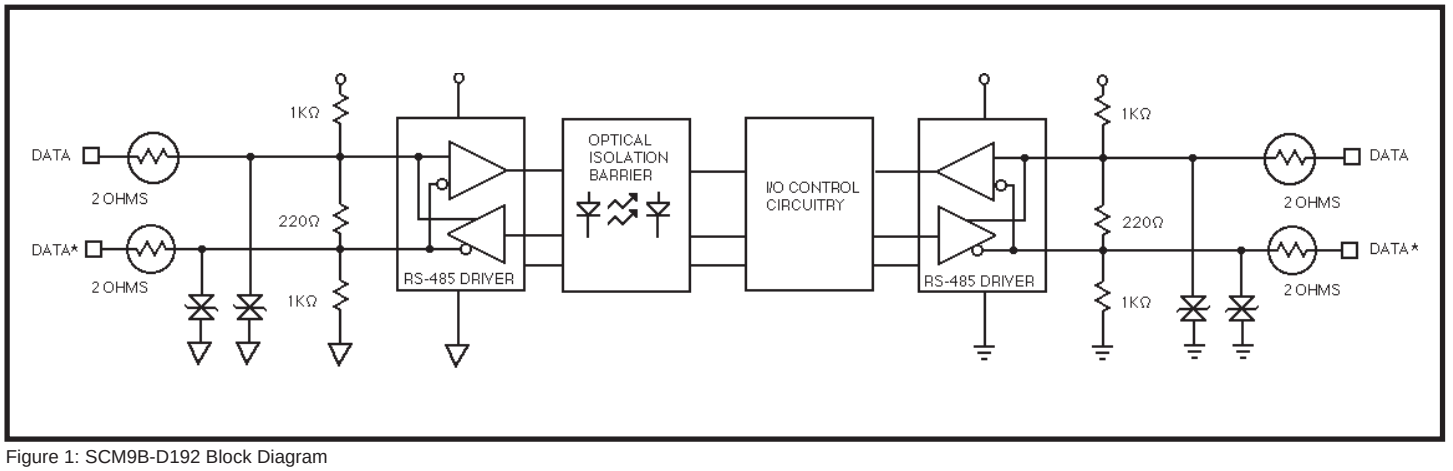


Figure 1: SCM9B-D192 Block Diagram

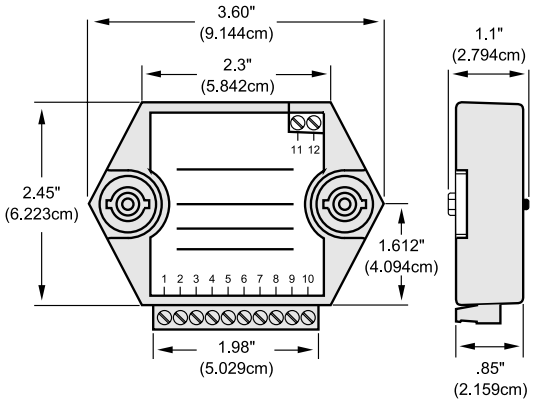
SCM9B Series

Mechanical Dimensions

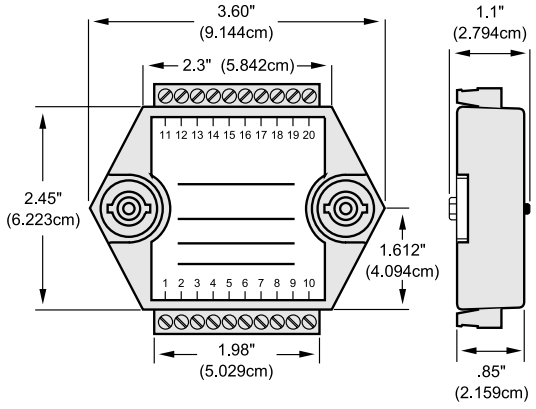
Mechanicals and Dimensions-SCM9B-1000/2000/3000/4000/5000

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

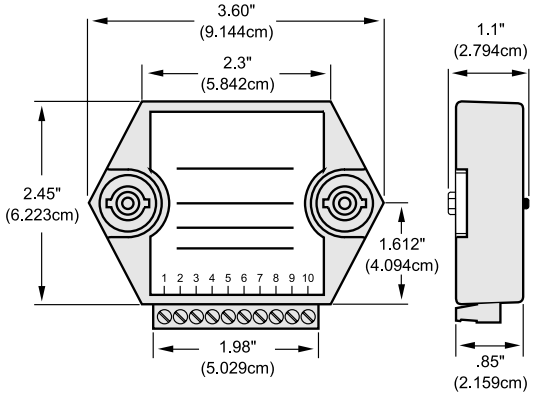
1300 Series



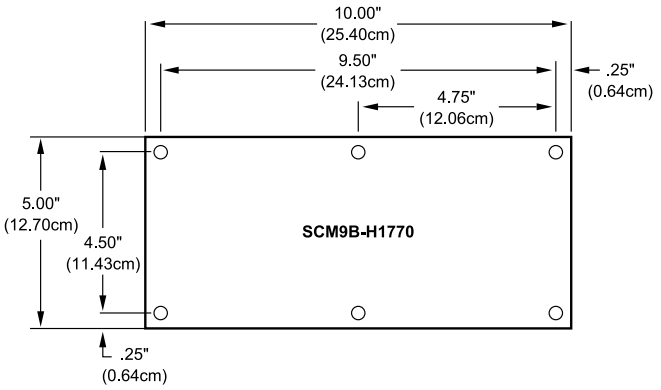
1700 Series

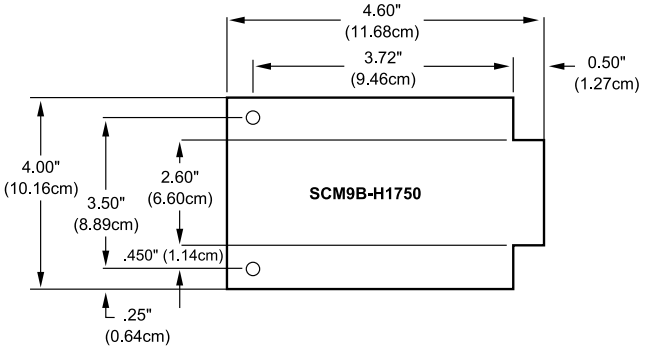


1000/2000/3000/4000/5000 Series

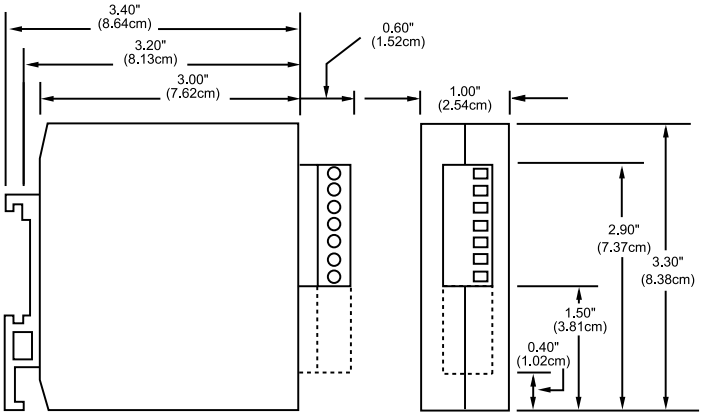


NOTE: Spacing for mounting screws
= 2.700" (6.858 cm). Screw threads are 6 X 32.



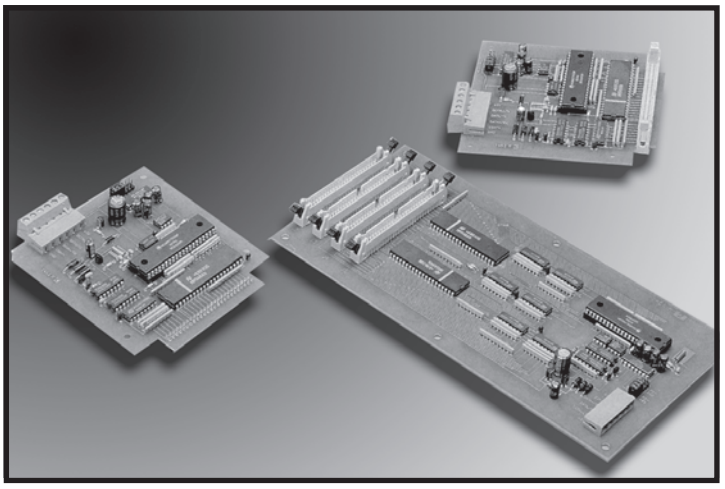


D100 Series



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.

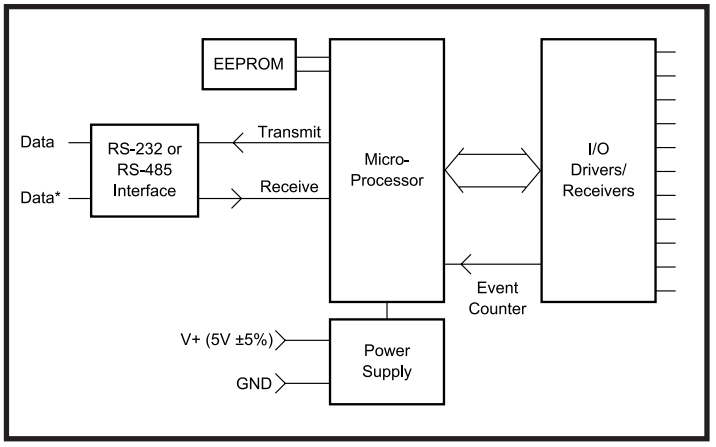


Figure 1: SCM9B-H1750/H1770 Block Diagram

▶ 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" Racks
- Compatible with All SCM9B Products
- Same Command Set as 1700 Series Modules
- CE Compliant

Specifications

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

H1750: 24 digital inputs and digital outputs
H1770: 64 digital inputs and digital outputs

- Input voltage levels: 0-10V without damage
- Input switching levels: High, 3.5V min., Low, 1.0V max.
- Outputs: 0-10V, 15mA max. load
- Power requirements: +5VDC ±0.25V at 30mA max. (not including I/O module requirements)
- User selectable RS-232/RS-485 communications

Digital

- 8-bit CMOS microcomputer
- Nonvolatile memory storage for start up values — eliminates software initialization

Mechanical

H1750: 4.00" x 4.60"
H1770: 5.00" x 10.00"

Ordering Information

Model	Description
SCM9B-H1750	24 Digital Inputs/Outputs
SCM9B-H1770	64 Digital Inputs/Outputs
SCM9B-HCA1	4 Ribbon Connector Assembly

▶ **SCM9B Accessories**

SCM9B-PB08/PB14

8- and 14-Channel Mounting Backplanes

Description

The SCM9B-PB08 and PB14 are 8- and 14-channel mounting backplanes (Figure 1). 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 swaged thru-hole standoffs for mounting, a hold-down bar, and holes for an RS-485 termination resistor.

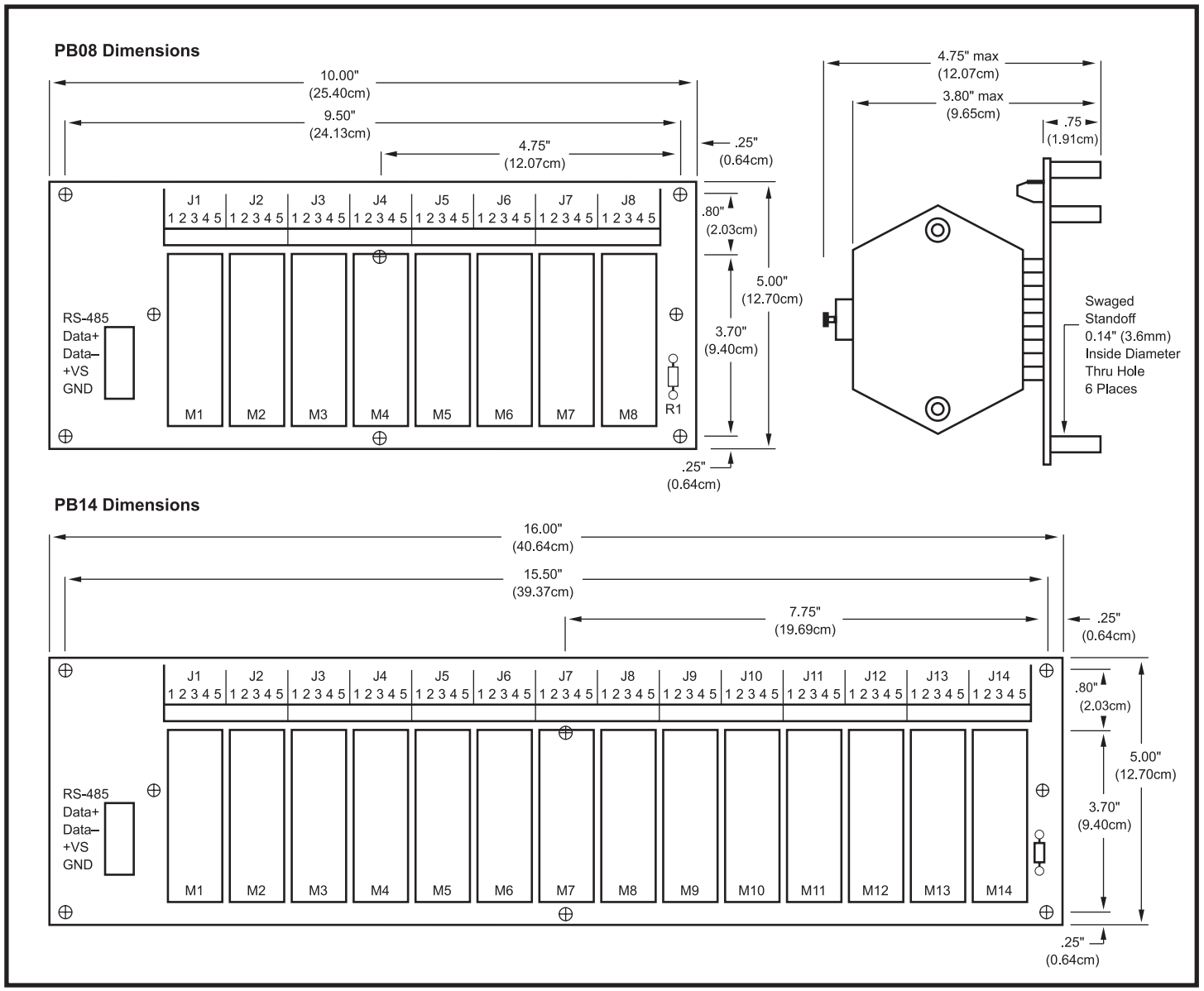
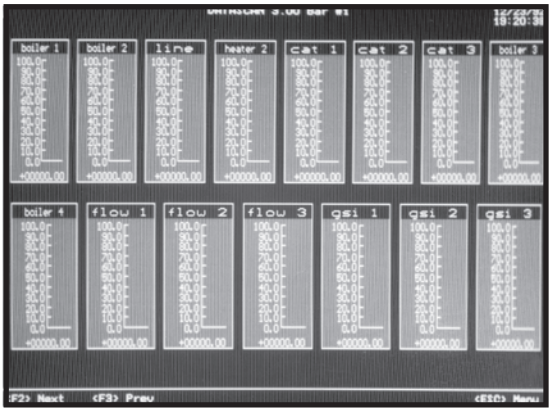


Figure 1: SCM9B-PB08/PB14 Dimensions

▶ SCM9B Software

SCM9B-S1200

Scansoft Data Logging Software



SCM9B-S1200 Scansoft Data Logging Software is a menu-driven program that acquires data from 1000 and 2000 series modules. The program uses menus to configure up to 64 analog inputs and 24 digital inputs. The acquired data is displayed as text or graphically using bar or trend graphs. The software is provided at no charge on request with a purchase order and is not copy protected.

Menus are used to set up the modules for a data acquisition run allowing configuration of start-up, data rates, display, and data logging. Each channel has a set up screen status that allows you to specify your data acquisition hardware, and software options.

▶ Features

- Menu-Driven Utility Software
- Scan and Display up to 64 1000/2000 Modules
- Scan and Display up to 24 Digital Inputs
- Real Time Display of Acquired Data
- Bargraph, Trend and Text Displays
- Label Channels — Boiler Room, Furnace, etc.
- Save & Recall System & Module Setups
- Selectable Module Scan Rate
- Selectable Log to Printer Rate
- Selectable Log Data to Disk Rate
- Selectable Alarm Notification to Printer

Ordering Information

Model	Description
SCM9B-S300	Series S1000/2000/3000/4000 Utility Software and S1200 Data Logging Software

Data Acquisition Software

Dataforth offers several data acquisition software solutions including: Software packages for customers who do not want to write code; sample programs and sample forms; ActiveX objects and .dll for programmers; utility software for setup.

WinWedge®

WinWedge captures serial data, custom tailors it to your needs, then transfers the data to any Windows XP, 2000, or DOS application, either by sending keystrokes to the application's window or by passing the data through dynamic data exchange (DDE) conversations.

WinWedge makes it very easy to input real-time data directly into Excel, Access, LIMS, MMIs, statistical and math software, VB, and any Windows XP or 2000 application program.

WinWedge also transmits prompts or commands out the serial port to control or query your instruments directly from within other Windows applications or directly from WinWedge.

Consider WinWedge as a fully customizable serial I/O device driver. See www.taltech.com.

Programming Samples

Sample programs with source code are offered in popular programming languages such as MS-Visual Basic and MS-Visual C++ for customers who want to expand the functionality of their programs. The sample programs are a starting point for modifying an existing program or building a custom application. These programs contain pre-written routines that perform all of the serial I/O controls to open, close, read, and write commands through a host computer serial port. The programs also include routines to read analog data, read discrete digital input status, and write both analog and digital output values.

Simple program forms are included to exercise these functions. These forms can be easily modified or replaced by a programmer to properly display the data from SCM9B products in a format specific to any application.

ActiveX Controls

A set of ActiveX objects that supports the ASCII protocol commands AO, DI, DO, RD, RE is offered. The ActiveX controls allow easy implementation of ASCII protocol within programming environments such as Visual Basic. The controls perform all the serial I/O, and command and response parsing, and return the data values in the appropriate data format.

Dynamic Link Library

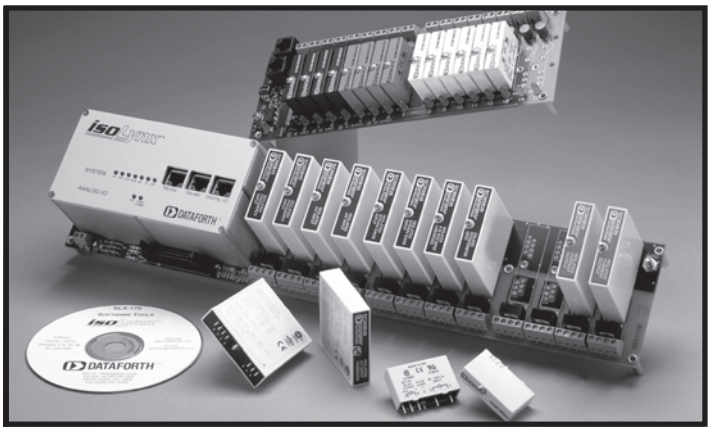
A callable dynamic link library (.dll) that performs all the serial I/O handling and supports many of the ASCII protocol commands is also available. A sample program is included, with source code, to illustrate calling the library.

Utility Software

Utility software makes it easy to set up your SCM9B product on a Windows based computer. The utility software is available free of charge and shipped on a CD-ROM with each order.

SCM5B isoLynx®

SLX200 Data Acquisition System



Features

- Modbus RTU Support on RS-232 and RS-485
- Modbus TCP Support (optional)
- 1500Vrms Input-to-Output & 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
- Supported by ReDAQ® Freedom 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)
- Free Configuration Software
- Manufactured per RoHS Directive 2002/95/EC

Description

Faulty thousand-dollar data acquisition systems can shut down billion-dollar operations. 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 module 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 17msec. The D/A converter is also a 16-bit device and can write a maximum 60-channel configuration in 33msec.

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 gage, 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.

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% non-condensing. 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 onto 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).

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.

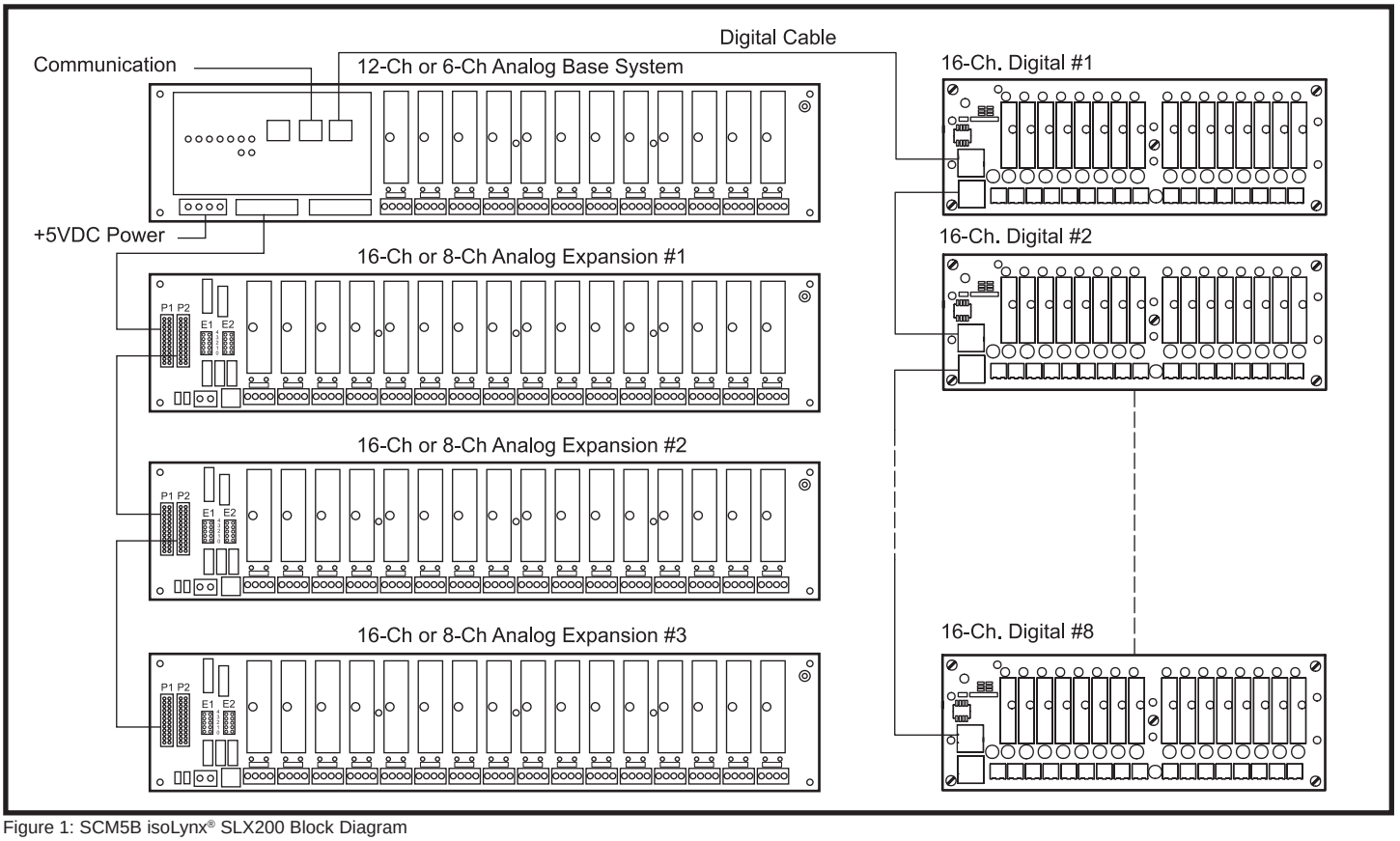


Figure 1: SCM5B isoLynx® SLX200 Block Diagram

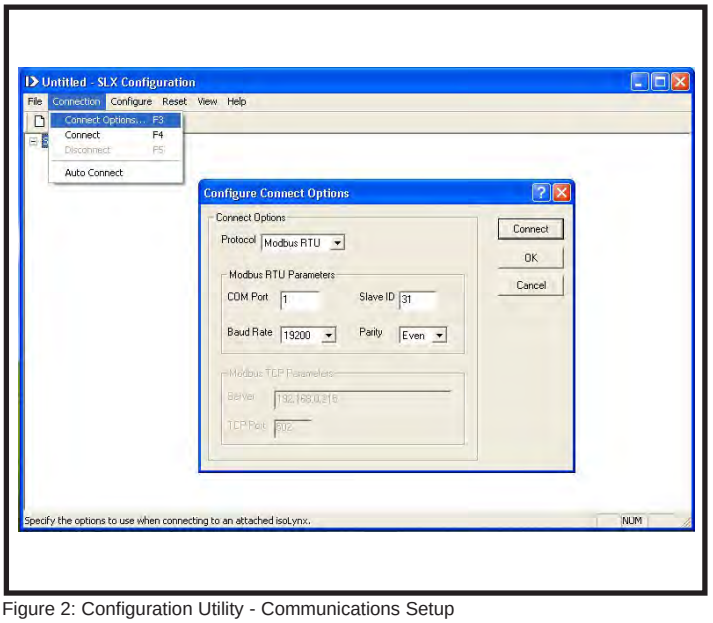


Figure 2: Configuration Utility - Communications Setup

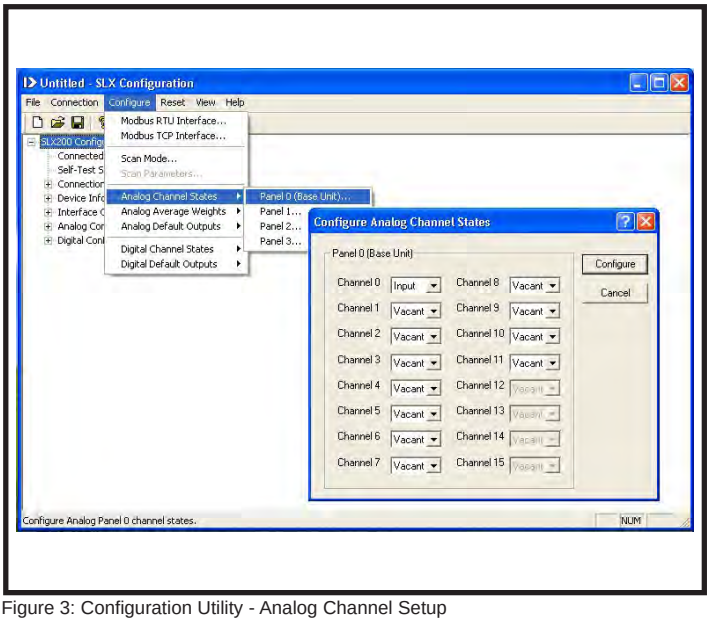


Figure 3: Configuration Utility - Analog Channel Setup

Specifications

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 & 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	1500 Vrms ch-to-ch or ch-to-internal bus
Input Protection	240VAC continuous, ESD
Throughput, Analog Input	8ms for 16 ch (~2000 ch/sec) at 115.2kbps Modbus RTU 17ms for 60 ch (~3600 ch/sec) at 115.2kbps Modbus RTU
Throughput, Analog Output	13ms for 16 ch (~1230 ch/sec) at 115.2kbps Modbus RTU 33ms for 60 ch (~1850 ch/sec) 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)(w)(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 115.2kbps max
RS-485 2W	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/sec) at 115.2kbps Modbus RTU 27ms for 128 ch (~4740 ch/sec) at 115.2kbps Modbus RTU
Power Supply Requirements	+5VDC ±5% at 40mA, no modules installed
Dimensions (l)(w)(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% 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	Not covered under the SLX200 certifications. Must qualify separately based on source of I/O modules.

NOTES:
(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.

Ordering Information

Model	Description
SLX200-10[1]	12-Ch, RS-232/485, Panel Mount
SLX200-20[1]	12-Ch, Ethernet, Panel Mount
SLX200-30[1]	12-Ch, Dual-Ethernet, Panel Mount
SLX200-11[1]	12-Ch, RS-232/485, No CJC[2], Panel Mount
SLX200-21[1]	12-Ch, Ethernet, No CJC[2], Panel Mount
SLX200-31[1]	12-Ch, Dual-Ethernet, No CJC[2], Panel Mount
SLX200-10D[1]	12-Ch, RS-232/485, DIN Rail Mount
SLX200-20D[1]	12-Ch, Ethernet, DIN Rail Mount
SLX200-30D[1]	12-Ch, Dual-Ethernet, DIN Rail Mount
SLX200-11D[1]	12-Ch, RS-232/485, No CJC[2], DIN Rail Mount
SLX200-21D[1]	12-Ch, Ethernet, No CJC[2], DIN Rail Mount
SLX200-31D[1]	12-Ch, Dual-Ethernet, No CJC[6], 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	Software Tools and User Manuals on CD-Rom
SLX280	Software and Hardware User Manuals, Print Version
SCMPB02	Backpanel Analog: 16-Ch
SCMPB02-1	Backpanel Analog: 16-Ch, No CJC[2]
SCMPB02-2	Backpanel Analog: 16-Ch, DIN Rail Mount
SCMPB02-3	Backpanel Analog: 16 Ch, No CJC[2], DIN Rail Mount
SCMPB06	Backpanel Analog: 8-Ch
SCMPB06-1	Backpanel Analog: 8-Ch, No CJC[2]
SCMPB06-2	Backpanel Analog: 8-Ch, DIN Rail Mount
SCMPB06-3	Backpanel Analog: 8-Ch, No CJC[2], DIN Rail Mount
SCMXRK-002	Accessory: 19-Inch Rack Analog Backpanels
SCM5B30/31[3]	Analog Voltage Input Modules
SCM5B32[3]	Analog Current Input Modules
SCM5B33[3]	Isolated True RMS Input Modules
SCM5B34[3]	Linearized 2- or 3-Wire RTD Input Modules
SCM5B35[3]	Linearized 4-Wire RTD Input Modules
SCM5B36[3]	Potentiometer Input Modules
SCM5B37[3]	Thermocouple Input Modules
SCM5B38[3]	Strain Gage Input Modules
SCM5B39	Current Output Modules
SCM5B392[3]	Matched-Pair Servo/Motor Controller Modules
SCM5B40/41[3]	Analog Voltage Input Modules, Wide Bandwidth
SCM5B42[3]	2-Wire Transmitter Interface Modules
SCM5B43[3]	General Purpose Input Modules, with DC Exc.
SCM5B45[3]	Frequency Input Modules
SCM5B47[3]	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 U.S.
SCMXPRE-001	Power supply, 1A, 5VDC, 220VAC European
SCMXPRT-003	Power supply, 3A, 5VDC, 120VAC U.S.
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) 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.

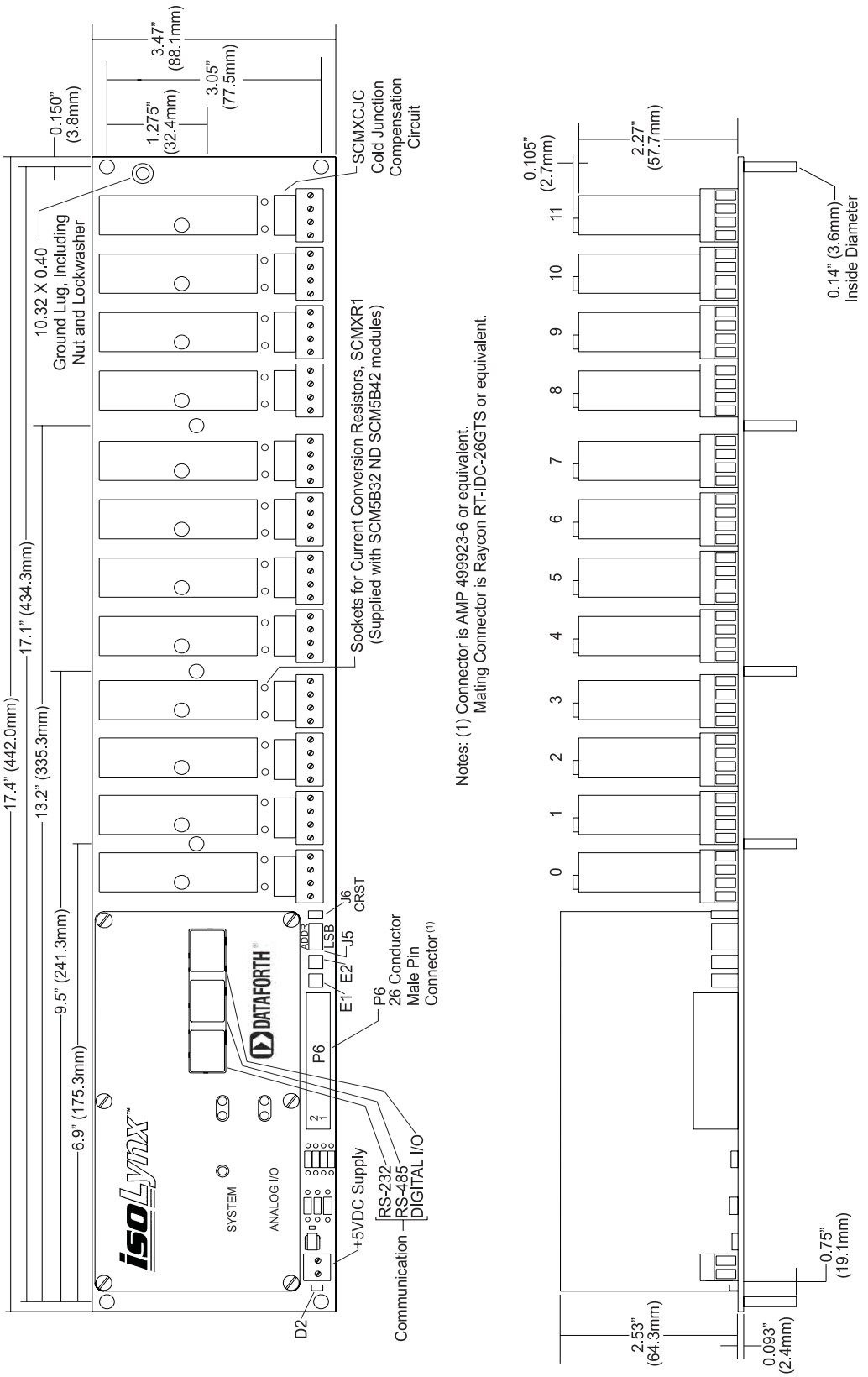


Figure 4: SLX200-xx 12-Channel Base System

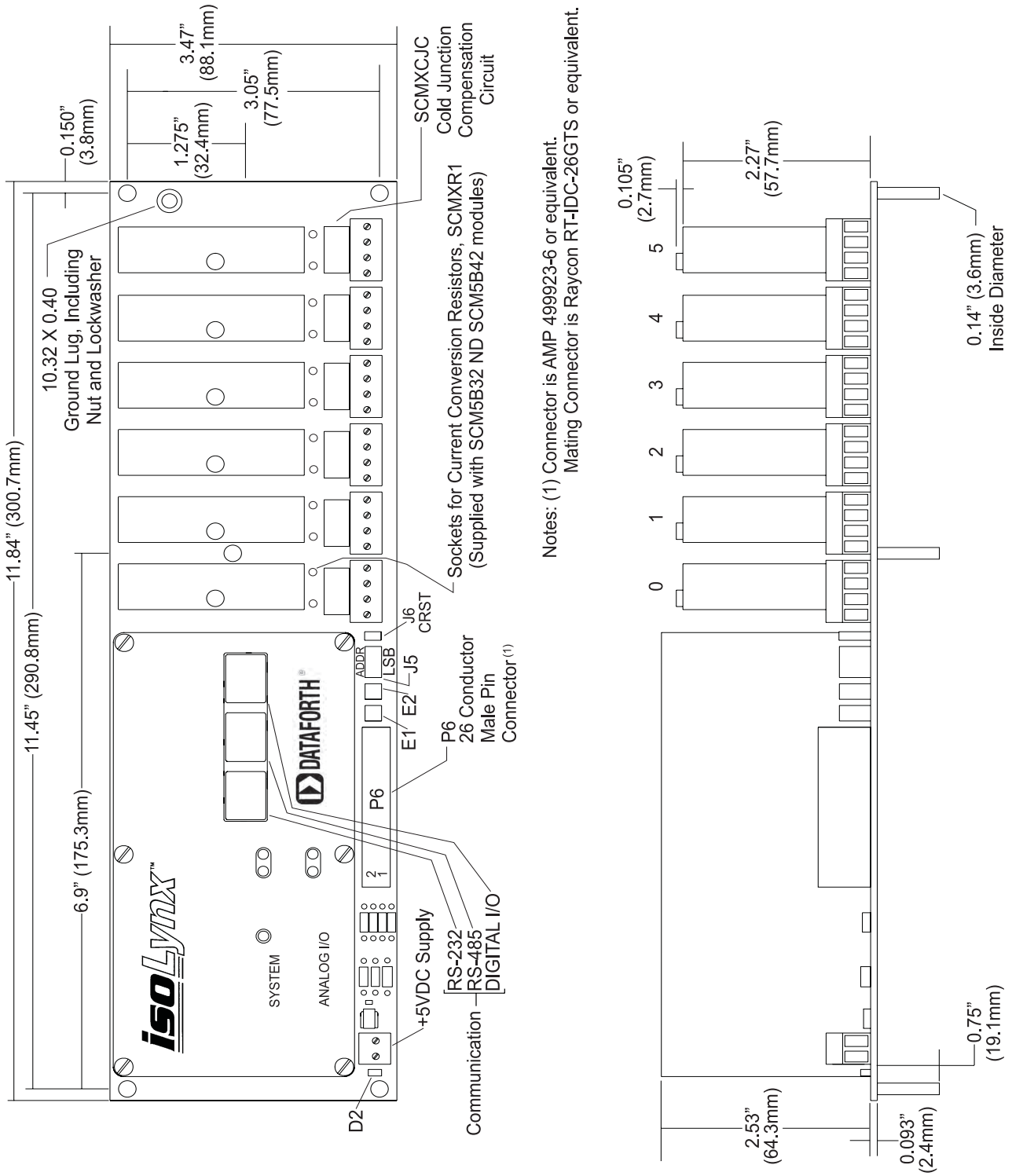


Figure 5: SLX200-xxA 6-Channel Base System

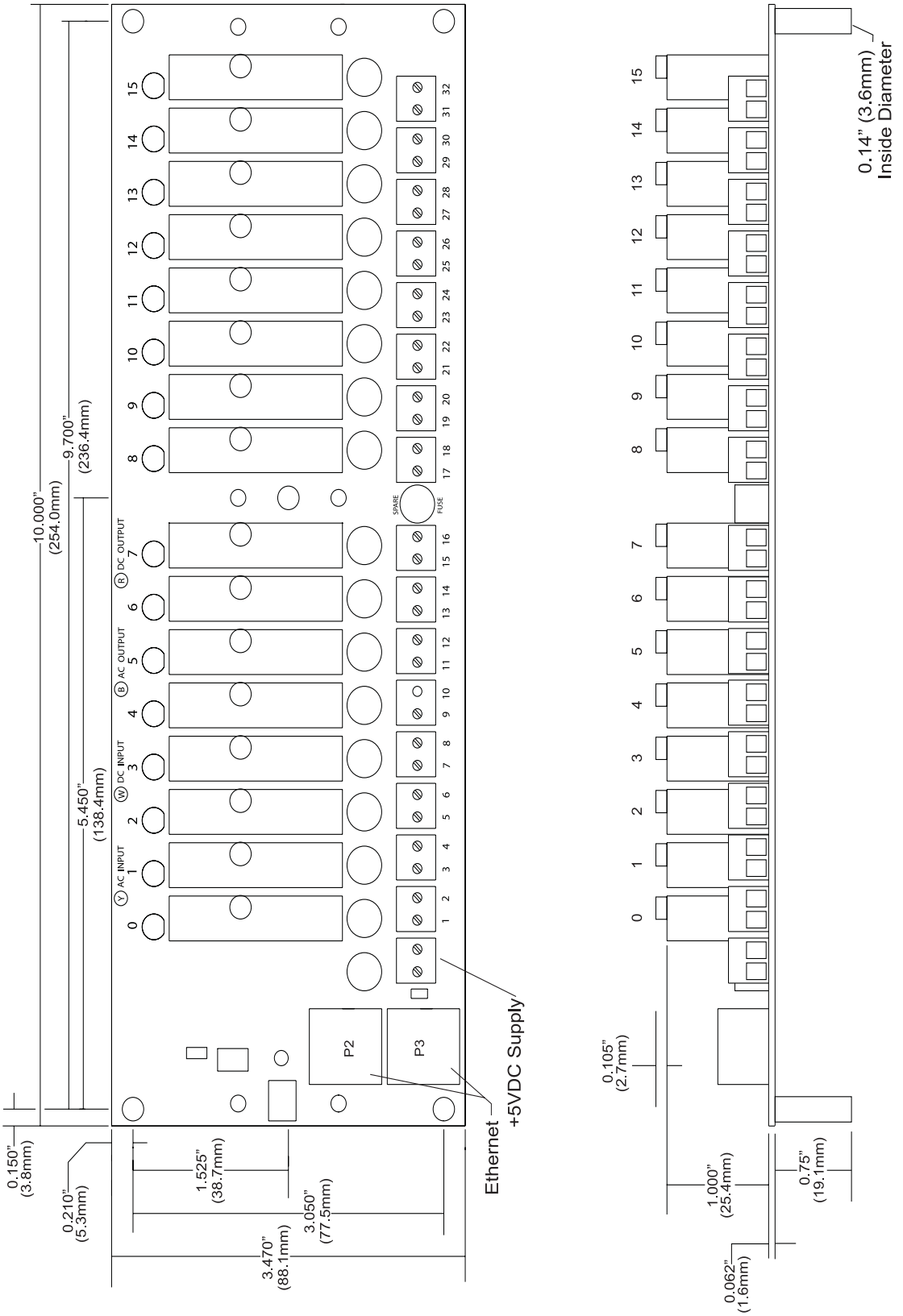
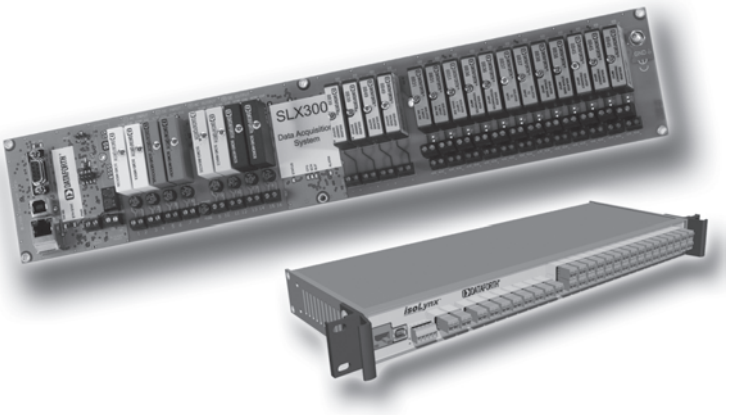


Figure 6: SLX101 Digital I/O Backpanel

8B isoLynx®

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 - 15 Families, 70 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
- CE Compliant
- UL/CUL Listing and ATEX Compliance Pending
- Manufactured per RoHS Directive 2002/95/EC

Description

Dataforth's newest 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. 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 simultaneous 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 70 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 gage, 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 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.

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 modern computers and a 10/100 Base-T Ethernet connection is also available. Up to 32 systems can be multidropped 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.

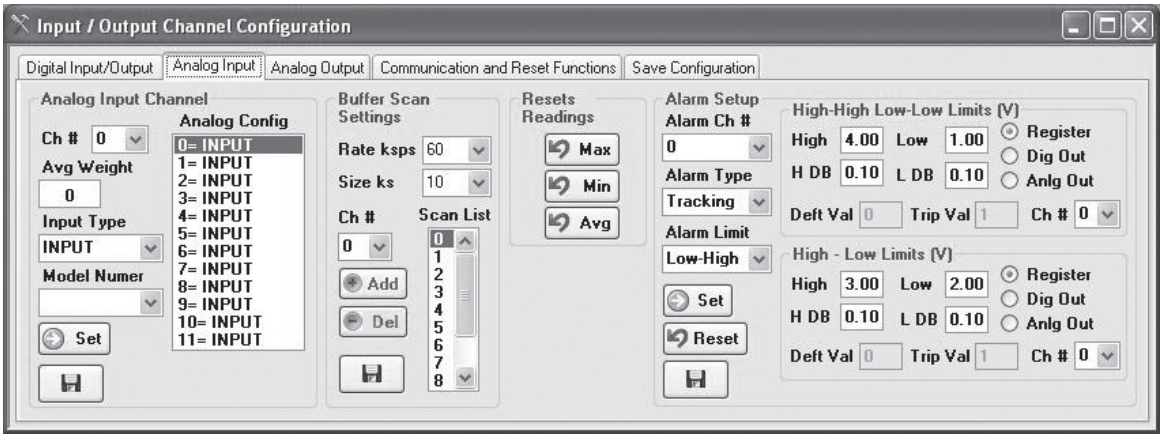


Figure 1: Configuration Tool - System Setup

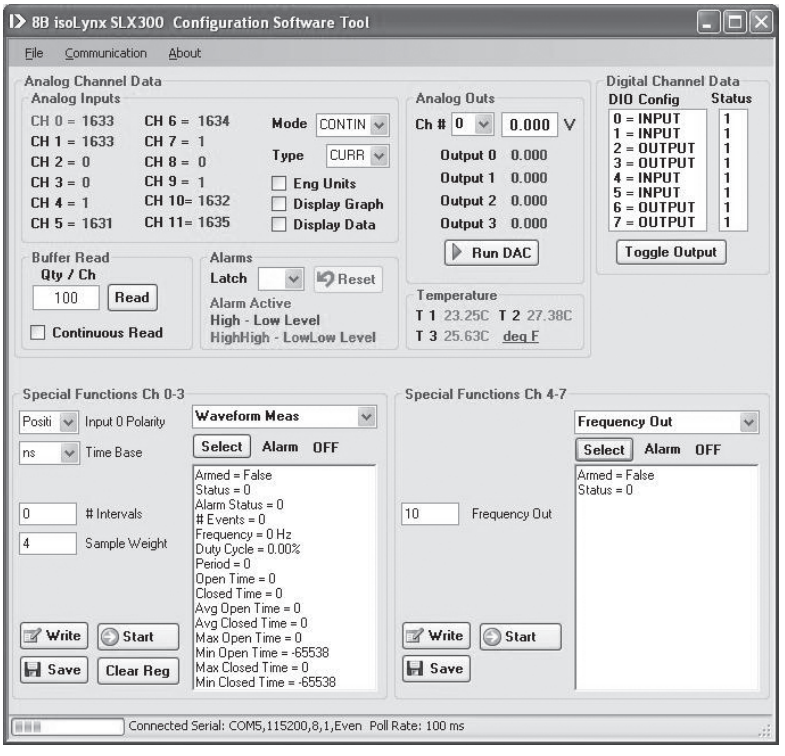


Figure 2: Configuration Tool - Channel Monitoring and Data Display

Specifications

Typical at T_A=+25°C and +5V power

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 & Ch-to-Ch)	1500Vrms max
Throughput[2]	3.0kS/s max continuous, 100kS/s max burst[4], 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 (Ouput-to-Input & 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 & Ch-to-Ch)	1500Vrms max
Throughput[2]	2.0kS/s max continuous

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[3]
7-34VDC (8BPWR-2 required)	320mA[3]
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:
(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) Does not include module power consumption. Reference module datasheets for further details.
(4) Burst Mode Scan rate is reduced when CJC, linearization, averaging, and/or alarm functions are enabled.

Ordering Information

Model	Description
SLX300-10	12-Ch AI, 4-Ch AO, 8-Ch DIO, RS-232, Panel Mount
SLX300-20	12-Ch AI, 4-Ch AO, 8-Ch DIO, RS-485, Panel Mount
SLX300-30	12-Ch AI, 4-Ch AO, 8-Ch DIO, USB (VCP), Panel Mount
SLX300-40	12-Ch AI, 4-Ch AO, 8-Ch DIO, Ethernet, Panel Mount
SLX300-10D	12-Ch AI, 4-Ch AO, 8-Ch DIO, RS-232, DIN Rail Mount
SLX300-20D	12-Ch AI, 4-Ch AO, 8-Ch DIO, RS-485, DIN Rail Mount
SLX300-30D	12-Ch AI, 4-Ch AO, 8-Ch DIO, USB (VCP), DIN Rail Mount
SLX300-40D	12-Ch AI, 4-Ch AO, 8-Ch DIO, Ethernet, DIN Rail Mount
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	Software Tools on CD; Config Sample, LabVIEW VI
SLX380	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	milliVolt 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
8B38-06, -07, -08	Strain Gage Input Modules, 3kHz BW
8B38-36, -37, -38	Strain Gage Input Modules, 3Hz BW

Model	Description
8B39-01, -03	Current Output Modules, 100Hz BW
8B40-04, -05, -06	milliVolt 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 -20	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	milliVolt 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-PS5RB	Power Supply, 24VDC, 0.6A, 100-240VAC Input
PWR-PS5RC	Power Supply, 24VDC, 1.3A, 100-240VAC Input
PWR-PS5RD	Power Supply, 24VDC, 2.1A, 100-240VAC Input
PWR-PS5RE	Power Supply, 24VDC, 4.2A, 100-240VAC Input

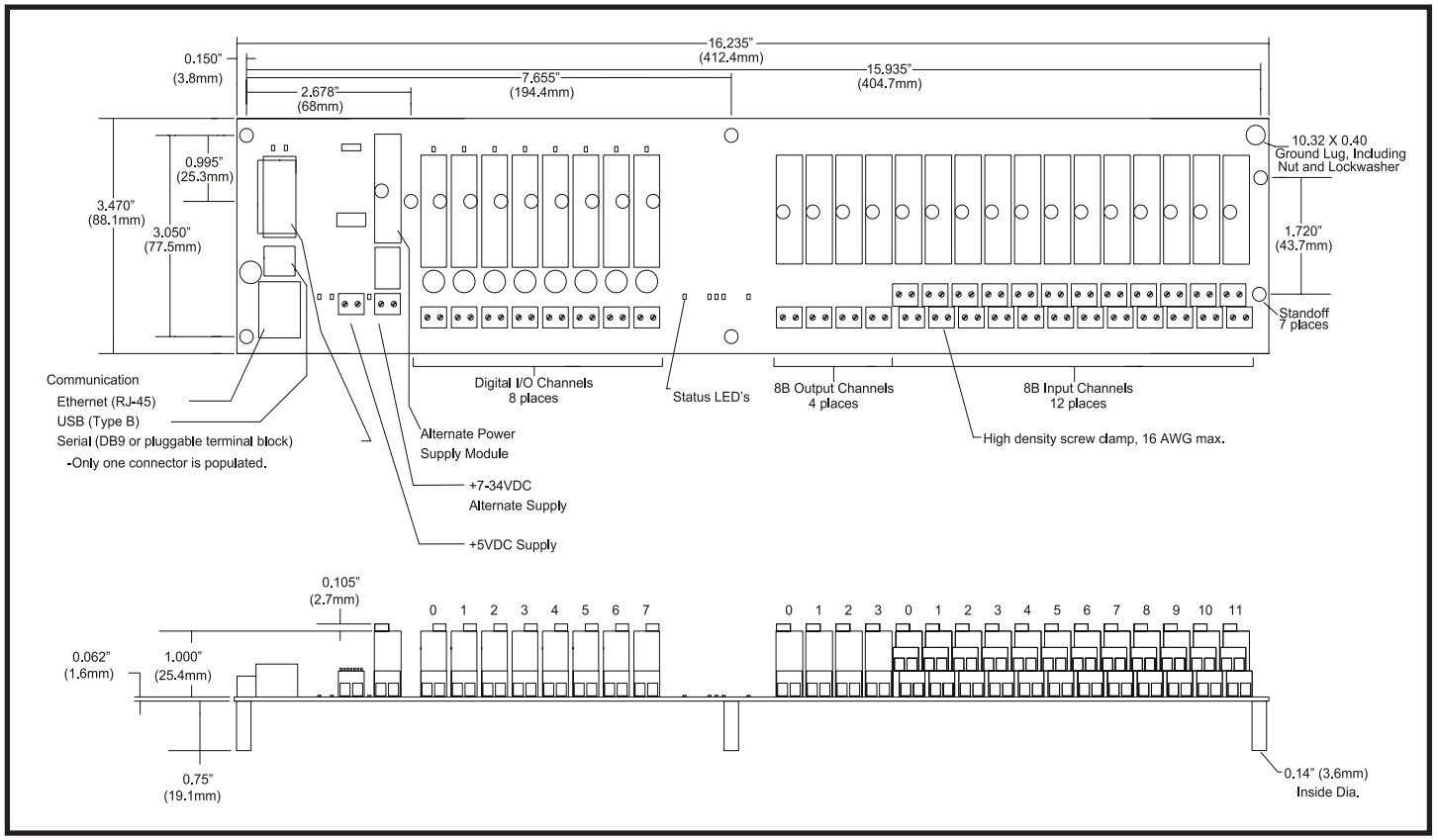


Figure 3: 8B isoLynx® SLX300 Block Diagram

SLX920

ReDAQ® Freedom SCADA Software for SCM5B isoLynx® SLX200

Description

Combined with one or more SCM5B isoLynx® SLX200 systems, Dataforth's ReDAQ® Freedom supervisory control and data acquisition (SCADA) software provides an effective solution for factory automation, process control, test and measurement, machine control, and data acquisition applications. ReDAQ® Freedom enables data to be monitored and outputs to be set, locally or remotely, via an intranet or the Internet.

Establishing a complete automation or test system with ReDAQ® Freedom is simple. The core software runs under Windows and sets up the central server, which then can connect to many SLX200 units via one or more networks. The networks can be RS-485, dedicated Ethernet connections, or a combination of the two. Users access the system with an intranet or the Internet; no application software is required because the HMI is delivered via web browsers.

Because this powerful software is browser-based, remote control and monitoring are readily achieved. The administrator creates an I/O website using ReDAQ® Freedom - Designer, which generates Java applets such as pie charts, histograms, graphs, and mimics using a graphical user interface. When viewed in users' browsers, these dynamic real-time graphical displays respond in real-time to external signals. Input data to the graphics comes from SCM5B isolated analog signal conditioning modules in the SLX200 units.

Multiple alarm levels can be set and, whenever a monitored signal crosses an alarm level, a built-in SMTP client generates an email indicating system status.

A lossless data historian is built into ReDAQ® Freedom. The historian runs automatically and continuously captures data at regular intervals. This historized data then can be used to generate history tables or graphs.

ReDAQ® Freedom also provides for the exchange of current and historical data with other applications via XML. In addition, users can create Excel spreadsheets using current and historical data.

▶ Features

ReDAQ® Freedom - Server

- Generates Data Tables and Excel Spreadsheets
- Integrated XML Data Exchange
- Dynamic Calculations including Mean, Median, Maximum, Minimum, Variance and Standard Deviation
- Built-in Real-time, Lossless Historian
- Built-in SMTP Client Generates Emails upon Alarm
- No User Application Software Required: Access Entirely Browser-based
- Streams Real-time Data to ReDAQ® Freedom - Designer for Graphical Displays

ReDAQ® Freedom - Designer

- Generates Real-time and History Graphics Including:
  - Live Tables
  - Graphs
  - Histograms
  - Pie Charts
  - Mimics

- Evaluates Math Expressions Using: +, -, *, /, ^, %, sqrt, sqr, sin, cos, tan, acos, asin, atan, sinh, cosh, tanh, asinh, acosh, atanh, exp, log, min, max, ceil, floor, abs, neg, and rand

Ordering Information

Model	Description
SLX920	ReDAQ® Freedom Software including ReDAQ® Freedom - Server and ReDAQ® Freedom - Designer

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 as well as to test, process, and analyze acquired data. Built-in functions in the Acquire and Analyze panels can be used without setup and configuration. Just three easy steps are required to create customized Presentation panels using 18 high quality controls and powerful isoLynx® SLX300 functions.

The ReDAQ Shape controls include:

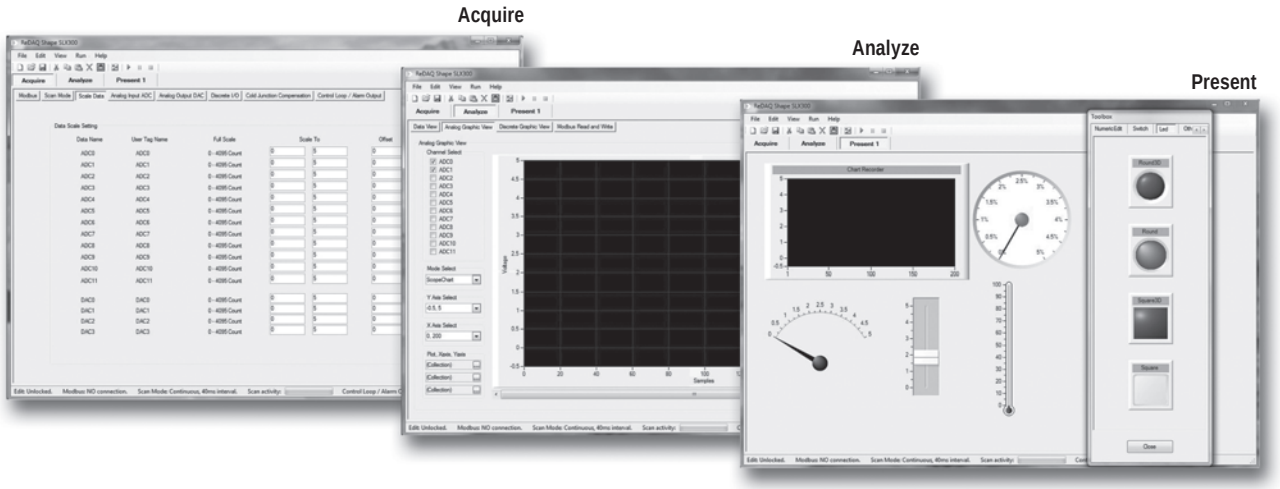
- Button
- Picture Box
- Text Box
- Group Box
- Label
- LED
- Switch
- Numeric Edit
- Thermometer
- Slide
- Tank
- Gage
- Meter
- Knob
- Chart Recorder
- Oscilloscope
- XY Plot
- Discrete Waveform Graph

ReDAQ® Shape also provides the most effective way to set up and configure the 8B isoLynx® SLX300 functions. The software controls are easily used to create, move, re-size, cut, copy, paste, and delete; 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 SLX300 software has a very short user-learning curve. It was created using programming tools incorporated from Microsoft Visual Studio® and National Instruments Measurement Studio™, ensuring its integrated, across-the-board applicability.

▶Features

- 3 Easy Steps to Create Customized Presentation Panels
- No Setup or Configuration Required in Acquire and Analyze Panels
- 18 High Quality Controls
- Supports Any Graphical File Format
- Integrated, Across-the-Board Applicability
- Most Effective Way to Set Up & 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



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 10-60, 90-140, and 180-280VAC and 3.3-32 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
- Manufactured per RoHS Directive 2002/95/EC

▶ 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 **Page 181**

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 MODULES, MINIATURE **Page 182, 183**

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 **Page 184**

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 version (280VAC for AC modules) with low leakage output current.
ML	FET output version of DC module, 5.0A, 50VDC.

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 computer system. Other benefits include reduction of field wiring costs and 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. See “Accessories” section.

▶ 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

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.

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

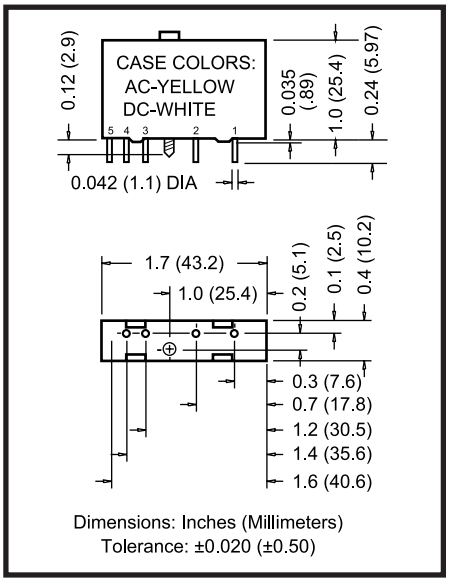


Figure 1: SCMD-MIAC/MIDC Physical Dimensions

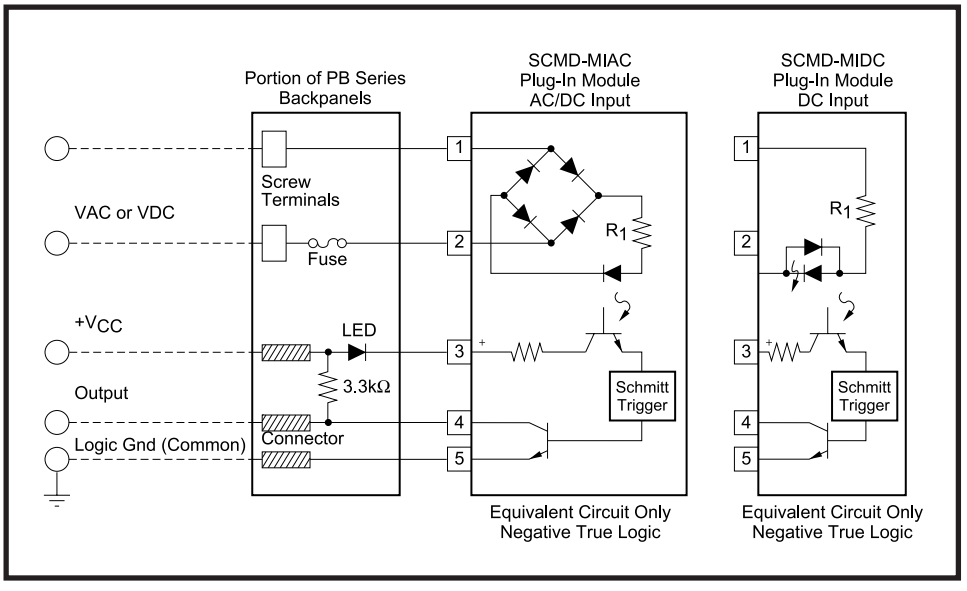


Figure 2: SCMD-MIAC/MIDC Circuit Diagrams

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. See "Accessories" section .

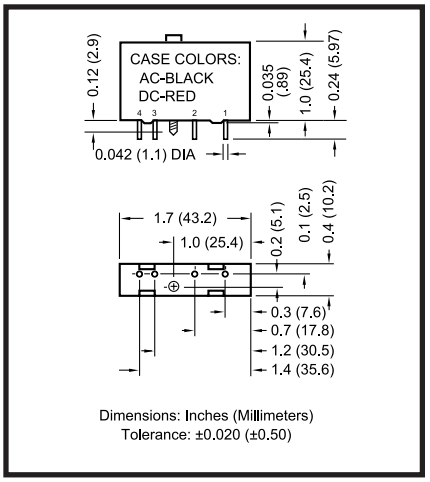


Figure 1: SCMD-MOAC/MODC Physical Dimensions

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 version (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 100 Amp 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
- 3.5 Amp AC Modules Provide Extra Switching Capability
- 5.0 Amp DC Modules Available
- Operating Temperature –30° C to +80° C
- UL Listed, CSA Certified, CE Compliant

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

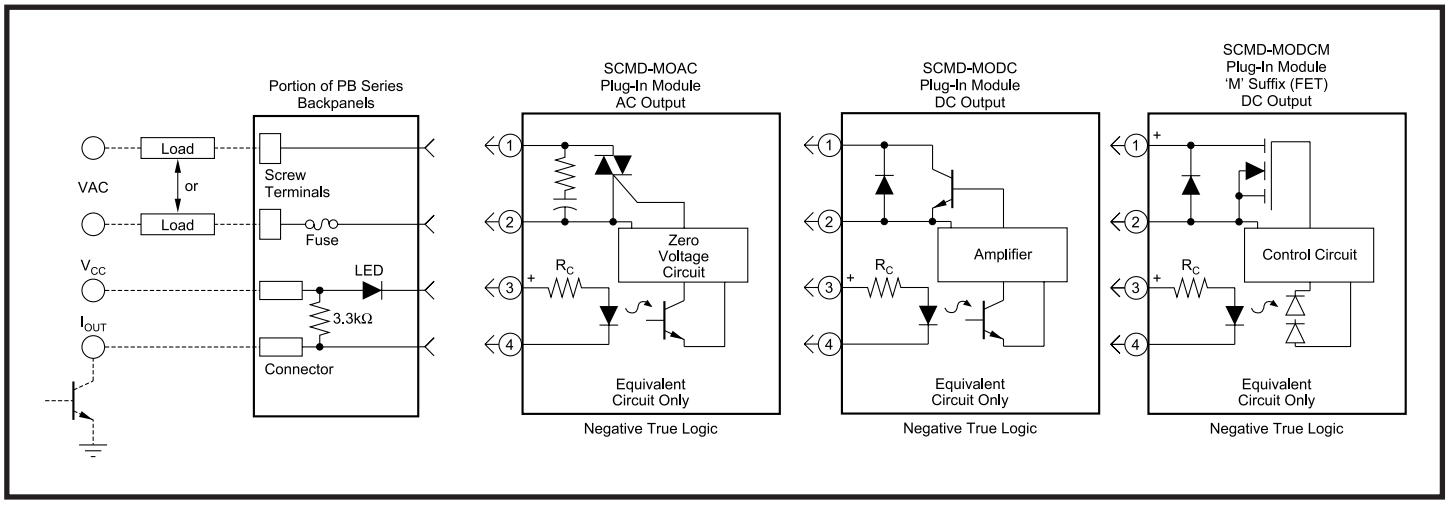


Figure 2: SCMD-MOAC/MODC Circuit Diagrams

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 relays, solenoids, motor starters, or indicator lamps. 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. See "Accessories" section.

▶ 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

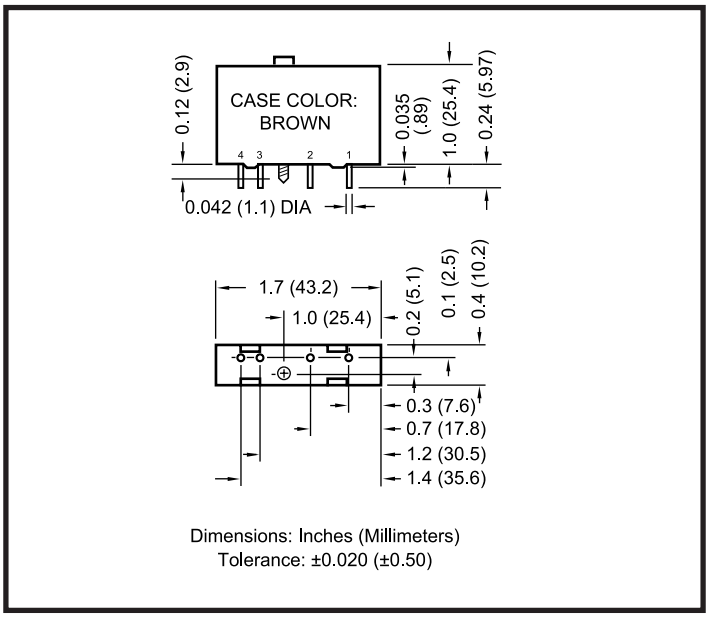


Figure 1: SCMD-MORO/MORC Physical Dimensions

Ordering Information

Model	Output Range	Supply Voltage	Contact
SCMD-MORO5	100/125 VDC/Vrms	5V	Normally open
SCMD-MORC5	100/125 VDC/Vrms	5V	Normally closed
SCMD-MORO24	100/125 VDC/Vrms	24V	Normally open
SCMD-MORC24	100/125 VDC/Vrms	24V	Normally closed

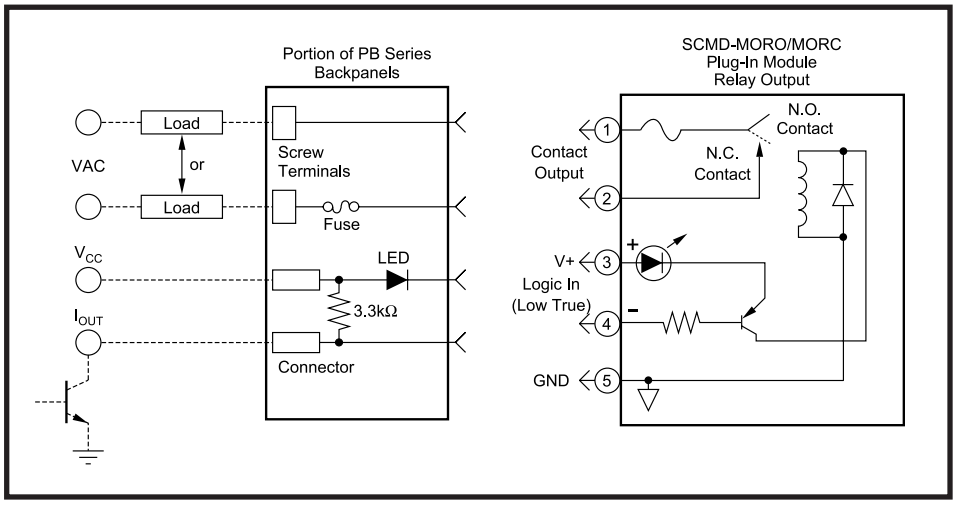


Figure 2: SCMD-MORO/MORC Circuit Diagrams

SCMD Accessories*

Digital I/O Module Backpanels

Ordering Information

Model	Description
SCMD-PB4	4-Ch Backpanel, Full Size & Miniature
SCMD-PB4R	4-Ch Backpanel, Full Size & Miniature, Output Only
SCMD-PB8SM	8-Ch Backpanel, 50-trace I/O male card edge
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 & Miniature, DIN Rail Mount
SCMD-PB4RD	4-Ch Backpanel, Full Size & Miniature, Output Only, DIN Rail Mount
SCMD-PB8SMD	8-Ch Backpanel, 50-trace I/O male card edge, 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

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
- 5 Amp 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 5 or 24 Volt Logic Supplies
- Plastic Captive-Screw Retaining System for All Modules
- PB4, PB4R, PB8SM, PB16SM, PB16TSM, and PB24SM, UL Listed, CSA Certified and CE Compliant

***For technical details and drawings, reference Dataforth Website, www.dataforth.com**

DSCA

High Performance DIN Isolated Analog Signal Conditioners

Description

Each Instrument-Class™ DSCA 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 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 systems. Output modules accept high-level analog voltage signals from a system, then buffer, isolate, filter, and amplify before providing a current or voltage output to a field device.

▶ Features

- ±0.03% Accuracy (Typical)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation & 240Vrms Field-side Protection
- ANSI/IEEE C37.90.1 Transient Protection
- True 3-Way Isolation
- Wide Supply Voltage, 15 to 30VDC
- Industry Standard Output of 0 to +10V, ±10V, 0 to 20mA, or 4 to 20mA
- 4- to 6-Pole Low-Pass Filtering
- Up to 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- –40°C to +85°C Operating Temperature
- Screw Terminals and Plug-in Terminal Blocks Simplify Wiring and Maintenance
- C-UL-US Listed (Class I, Division 2, Groups A, B, C, D)
- CE and ATEX Compliant
- Manufactured per RoHS Directive 2002/95/EC

▶ DSCA Selection Guide

ANALOG VOLTAGE INPUT MODULES, 3Hz BW Page 188

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 Page 190

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA32-01	4mA to 20mA	2, 3, 4
DSCA32-02	0mA to 20mA	2, 3, 4
DSCA32-03	–20mA to 20mA	1

ISOLATED TRUE RMS INPUT MODULES Page 192

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 Page 194

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

▶ DSCA Selection Guide (Continued)

POTENTIOMETER INPUT MODULES Page 196

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 Page 198

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 GAGE INPUT MODULES Page 200

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 Page 202

MODEL	INPUT RANGE	OUTPUT RANGE
DSCA39-01	0V to +10V	4mA to 20mA
DSCA39-02	–10V to +10V	4mA to 20mA
DSCA39-03	0V to +10V	0mA to 20mA
DSCA39-04	–10V to +10V	0mA to 20mA
DSCA39-05	0mA to 20mA	0mA to 20mA
DSCA39-07	–10V to +10V	-20mA to +20mA

ANALOG VOLTAGE INPUT MODULES, 3kHz BW Page 204

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 +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 Page 206

MODEL	INPUT RANGE	OUTPUT RANGE†
DSCA42-01	4mA to 20mA	0V to +10V & 3, 4
DSCA42-02	4mA to 20mA	2V to +10V

GENERAL PURPOSE INPUT MODULES, DC EXCITATION Page 208

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

▶ DSCA Selection Guide (Continued)

FREQUENCY INPUT MODULES Page 210

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 (0 TO +10V OUTPUT) Page 212

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 Page 214

MODEL	INPUT RANGE	OUTPUT RANGE
DSCA49-04	0V to +10V	–10V to +10V
DSCA49-05	–10V to +10V	–10V to +10V
DSCA49-06	–10V to +10V	0V to +10V

ACCESSORIES Page 217

PWR-PS5RA	Power Supply, 24V, 0.3A, 100-240VAC Input
PWR-PS5RB	Power Supply, 24V, 0.6A, 100-240VAC Input
PWR-PS5RC	Power Supply, 24V, 1.3A, 100-240VAC Input
PWR-PS5RD	Power Supply, 24V, 2.1A, 100-240VAC Input
PWR-PS5RE	Power Supply, 24V, 4.2A, 100-240VAC Input
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

† 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 to 20mA	C	DSCA30-01C
4. 0 to 20mA	E	DSCA30-04E
5. 0 to +5V	A	DSCA33-01A
6. 0 to 1mA	B	DSCA33-01B

‡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
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			

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.

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. 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 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

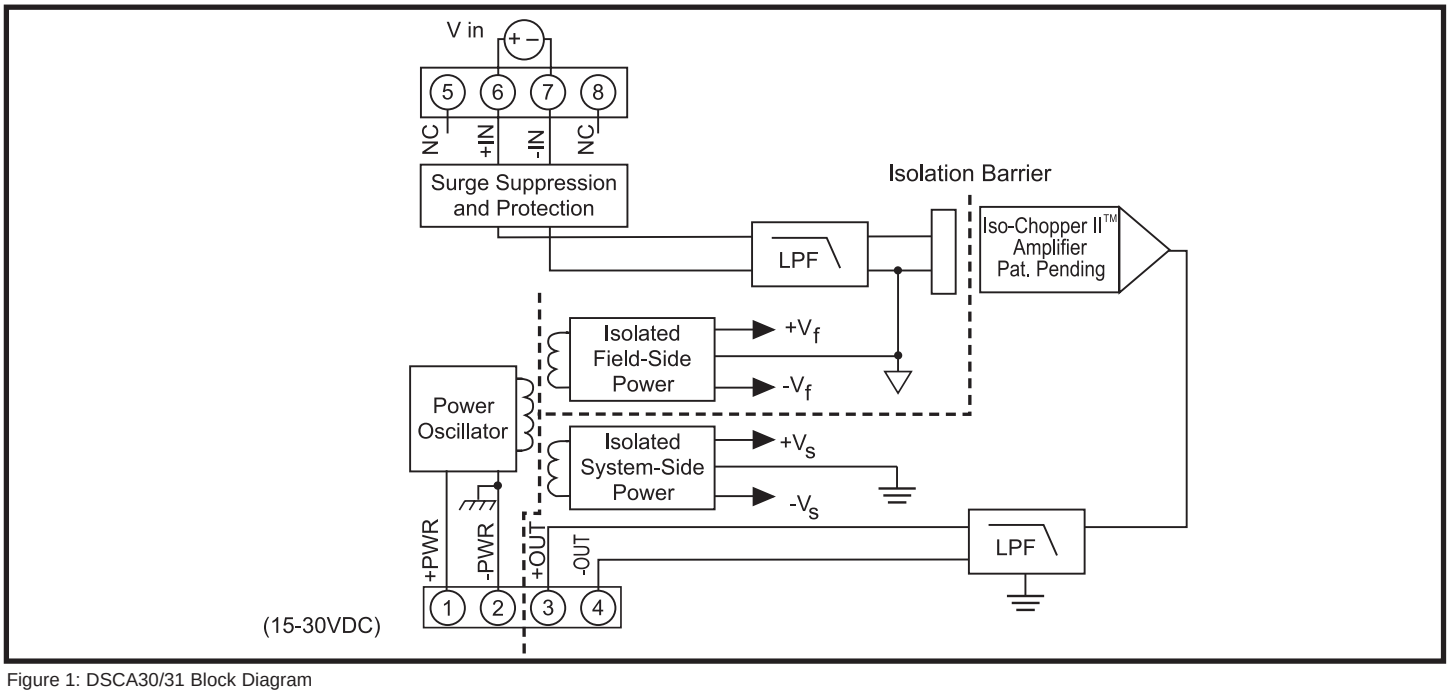


Figure 1: DSCA30/31 Block Diagram

Specifications

Typical at T_A = +25°C and +24V voltage supply

Model	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	*
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)	160dB	*
Accuracy(1)	±0.03% Span	*
Linearity	±0.01% Span	*
Adjustability	±5% Zero and Span	*
Stability		
Input Offset	±0.5µV/°C	±5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})	*
Zero Suppression	±50ppm(V_z)(2)/°C	*
Gain	±35ppm/°C	±55ppm/°C
Output Noise, 100kHz BW	250µVrms (V_{OUT}), 1µArms (I_{OUT})	*
Bandwidth, –3dB	3Hz	*
NMR	85dB at 60Hz, 80dB at 50Hz	*
Response Time, 90% Span	165ms	*
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	*
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	*
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	*

NOTES:
* Same specification as DSCA30.
(1) Includes linearity, hysteresis and repeatability.
(2) V_z is the nominal input voltage that results in 0V or 0mA output.

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.

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 to 20mA	C	DSCA30-04C
4. 0 to 20mA	E	DSCA30-04E

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. Signal filtering is accomplished with a five-pole filter which 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 Milliamp Level Signals
- Industry Standard Output of 0 to +10V, 0 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 105dB CMR
- 5 Poles of Filtering
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

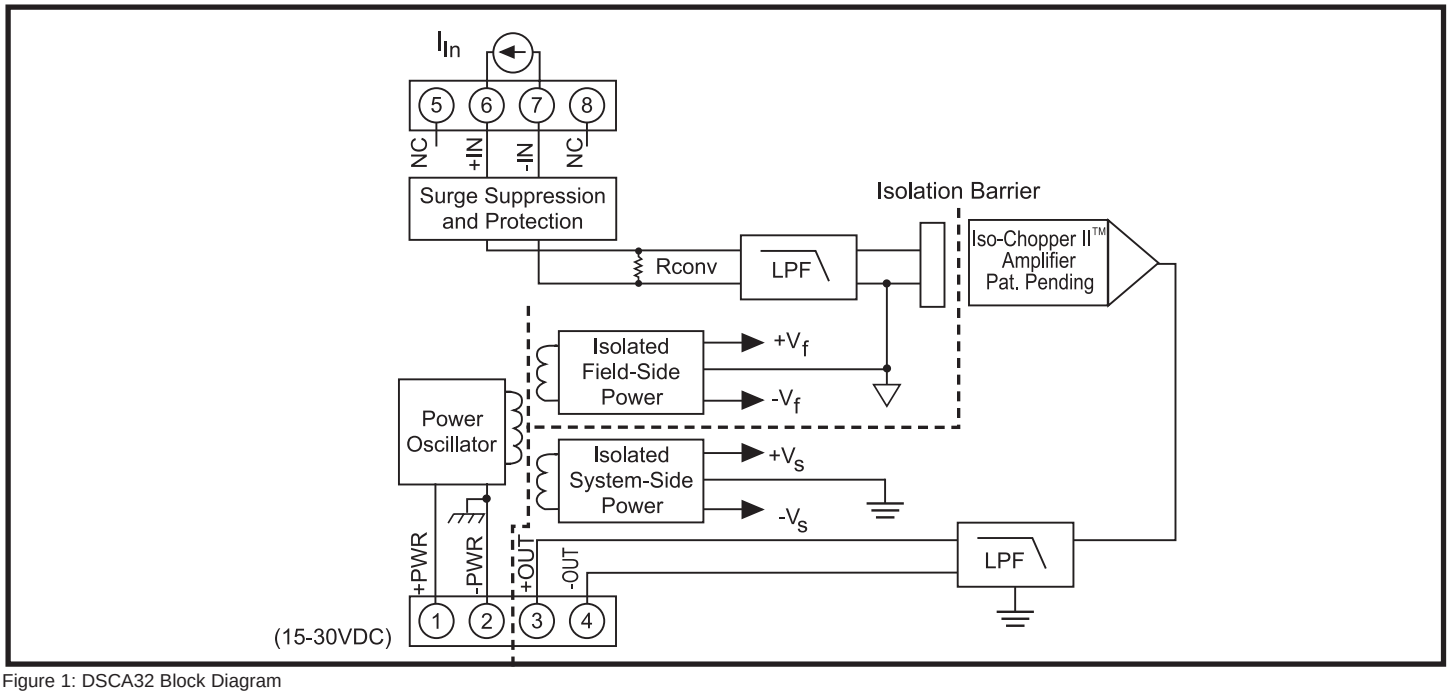


Figure 1: DSCA32 Block Diagram

Specifications

Typical at T_A=+25°C and +24V supply voltage

Module	DSCA32
Input Range	0-20mA or 4-20mA
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}), 1.2µArms (I_{OUT})
Bandwidth, –3dB	100Hz
NMR (–3dB at 100Hz)	100dB/decade Above 100Hz
Response Time, 90% Span	5ms
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
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
Mechanical Dimensions	2.95" x 0.89" x 4.13"
(h)(w)(d)	(75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail

NOTES:
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range	Output Range†
DSCA32-01	4mA to 20mA	2, 3, 4
DSCA32-02	0mA to 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 to 20mA	C	DSCA32-01C
4. 0 to 20mA	E	DSCA32-01E

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.

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 1).

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 to 20mA, 4 to 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 & DC) or 10Arms Continuous
- 100dB CMR
- ANSI/IEEE C37.90.1 Transient Protection
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed and CE Compliant
- ATEX Compliant (all models except DSCA33-04x, -05x)

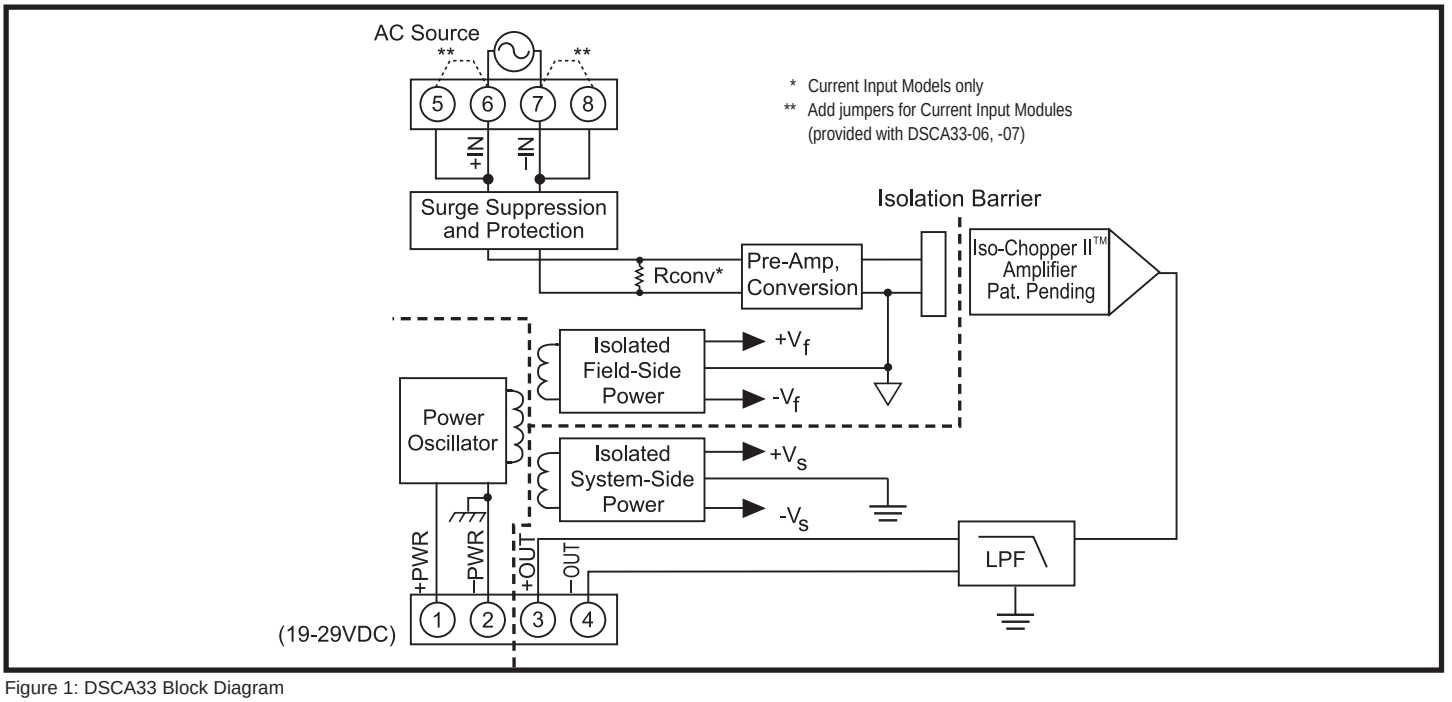


Figure 1: DSCA33 Block Diagram

Specifications

Typical at T_A=+25°C and +24V supply voltage

Module	DSCA33
Input	
Signal Range	100mV 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
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
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN50022-35x7.5 or -35x15 rail

NOTES:
(1) For 1 to 25 seconds the max allowable transient current rating is $\sqrt{2500 / (\text{event time})}$. For less than 1 second, ANSI/IEEE C37.90.1 applies with a 0.05Ω load. For greater than 25 seconds, the 10A 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
2. 0V to +10V	NONE	DSCA33-01
3. 4 to 20mA	C	DSCA33-01C
4. 0 to 20mA	E	DSCA33-01E
5. 0V 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.

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. 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.

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 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 ±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 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.08% Accuracy
- ±0.025% Conformity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

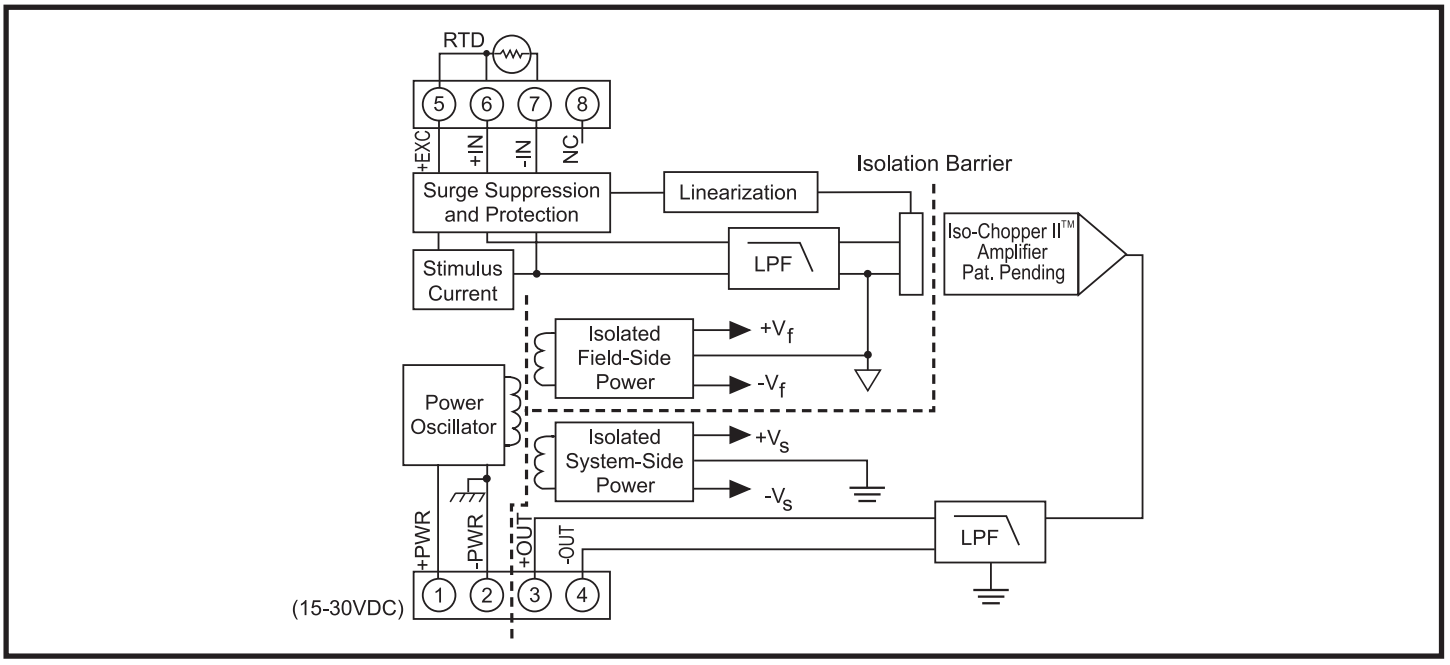


Figure 1: DSCA34 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	
'+' Lead	Upscale
'–' Lead	Non-deterministic
'x' Lead	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
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
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

NOTES:
(1) Includes conformity, hysteresis and repeatability.

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.

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	NA
2. 0V to +10V	NONE	DSCA34-01
3. 4 to 20mA	C	DSCA34-01C
4. 0 to 20mA	E	DSCA34-01E

**RTD Standards

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

DSCA

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. 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 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 Potentiometers up to 10kΩ
- Industry Standard Output of 0 to +10V, 0 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

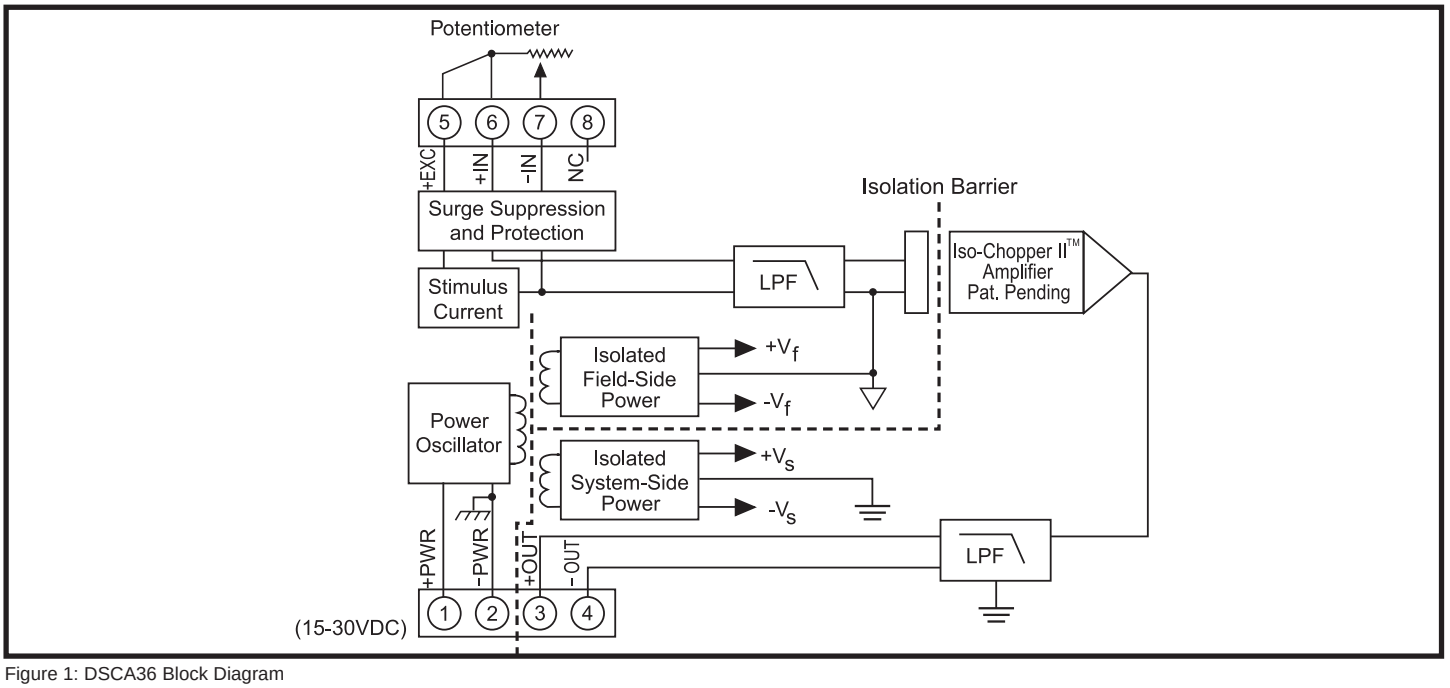


Figure 1: DSCA36 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	
'+' Lead	Upscale
'–' Lead	Non-deterministic
'x' Lead	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
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
Mechanical Dimensions	2.95" x 0.89" x 4.13"
(h)(w)(d)	(75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail

NOTES:
(1) Includes linearity, hysteresis and repeatability.

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.

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	NA
2. 0V to +10V	NONE	DSCA36-01
3. 4 to 20mA	C	DSCA36-01C
4. 0 to 20mA	E	DSCA36-01E

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. 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 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 ±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 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.05% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

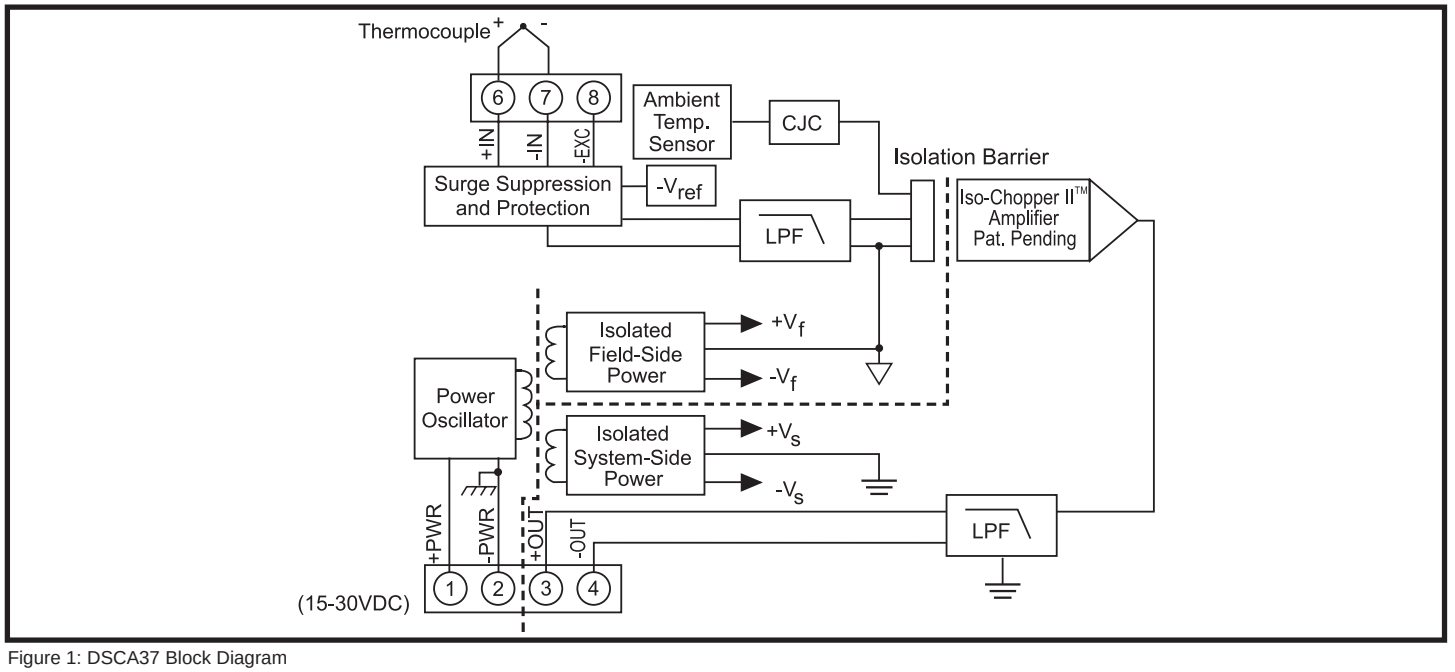


Figure 1: DSCA37 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	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 to 30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
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
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

NOTES:
(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.

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	NA
2. 0V to +10V	NONE	DSCA37J-01
3. 4 to 20mA	C	DSCA37J-01C
4. 0 to 20mA	E	DSCA37J-01E

‡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

DSCA38

Strain Gage Input Signal Conditioners

Description

Each DSCA38 strain gage input module provides a single channel of strain gage input which is filtered, isolated, amplified, and converted to a high-level voltage output. 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 gage 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 exctitation.

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 Gages
- Industry Standard Output of ±10V, 0 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 100dB CMR
- Fully Isolated Excitation Supply
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

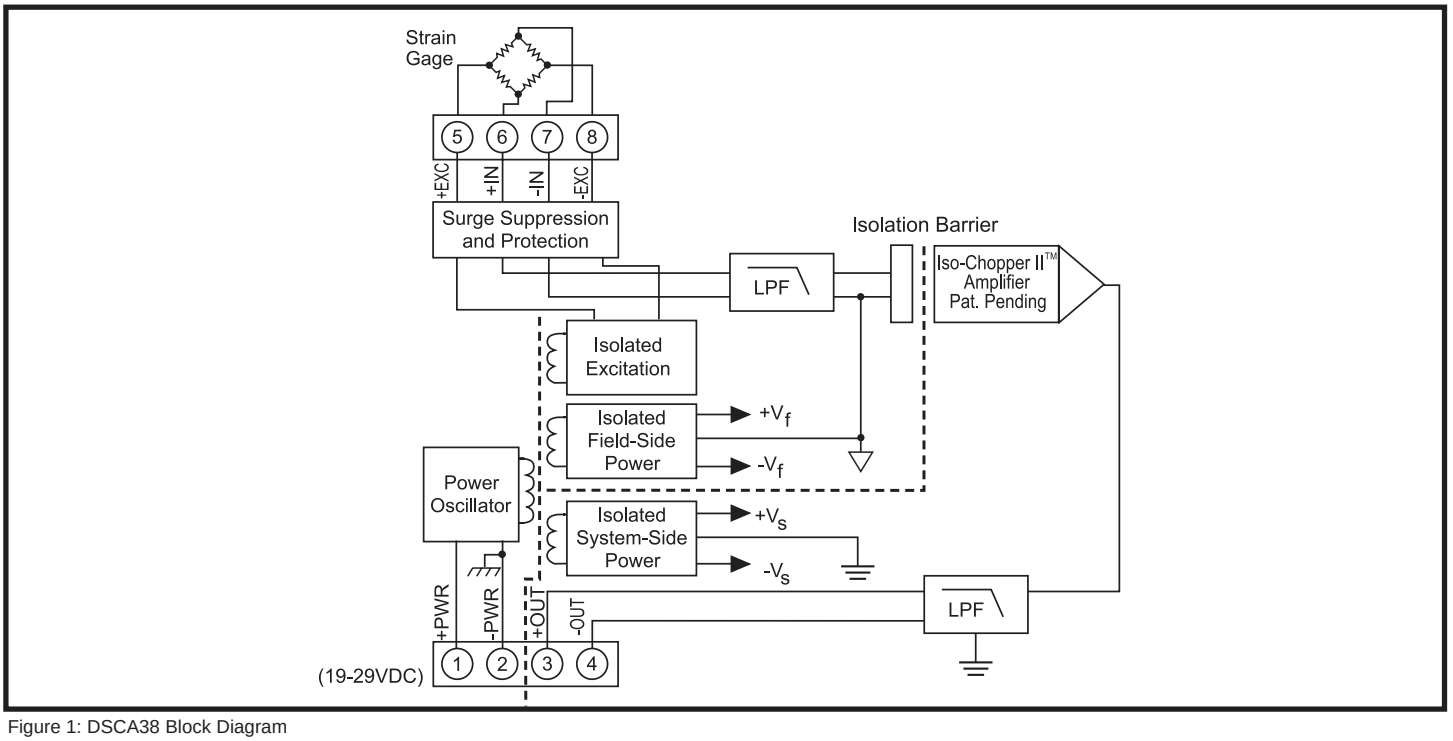


Figure 1: DSCA38 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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/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
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
Mechanical Dimensions	2.95" x 0.89" x 4.13"
(h)(w)(d)	(75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail

NOTES:
(1) Includes linearity, hysteresis and repeatability. (2) Strain Element.

Ordering Information

Model	Input Bridge Type	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 to 20mA	C	DSCA38-08C
4. 0 to 20mA	E	DSCA38-08E

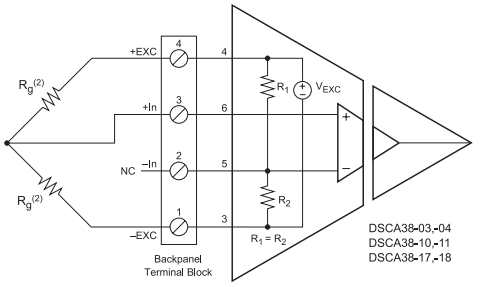


Figure 2: Half Bridge Connection

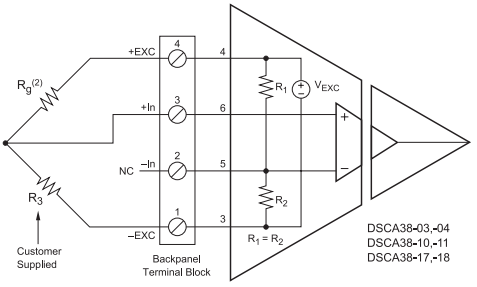


Figure 3: Quarter Bridge Connection

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.

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. 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 to 20mA, 0 to 20mA, or –20 to +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 Range of Supply Voltage
- 100dB CMR
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

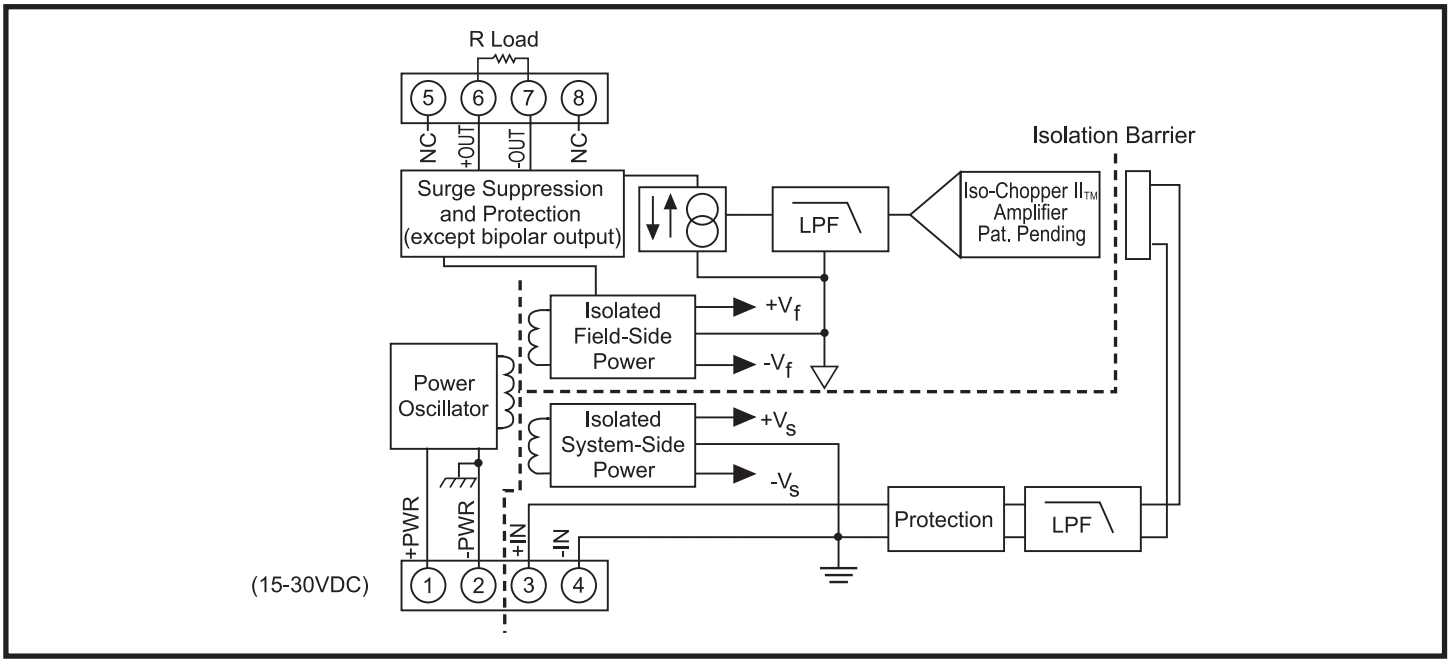


Figure 1: DSCA39 Block Diagram

Specifications

Typical at T_A=+25°C and +24V supply voltage

Model	DSCA39-01, -02, -03, -04	DSCA39-05	DSCA39-07
Output Range	4 to 20mA or 0 to 20mA	0 to 20mA	–20mA to +20mA
Over Range Capability	10%	*	5%
Output Compliance Voltage			
(Open Circuit)	22VDC	*	±15VDC
Load Resistance Range	0 to 750Ω	*	0 to 500Ω
Output Protection			
Continuous	240Vrms max	*	*
Transient	ANSI/IEEE C37.90.1	*	*
Input Range	±10V or 0V to +10V	0 to 20mA	±10V
Input Resistance			
Normal	2MΩ	<100Ω	*
Power Off	2MΩ	<100Ω	*
Overload	2MΩ	65kΩ	*
Input Protection			
Continuous	±35V max	75mA	*
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)	±0.03% Span	*	±0.05%
Linearity	±0.01% Span	*	*
Adjustability	±5% Zero and Span	*	*
Stability			
Offset	±20ppm/°C	*	*
Gain	±40ppm/°C	±50ppm/°C	*
Output Noise, 100kHz Bandwidth	4µArms	*	*
Bandwidth, –3dB	1kHz	*	*
NMR	100dB/Decade Above 1kHz	*	*
Response Time, 90% Span	475µs	*	*
Power Supply			
Voltage	15 to 30VDC	*	19 to 29VDC
Current	65mA	*	*
Sensitivity	±0.0003%/%	*	*
Protection			
Reverse Polarity	Continuous	*	*
Transient	ANSI/IEEE C37.90.1	*	*
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	*	*
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	*	*

NOTES:
* Same specification as DSCA39-01, -02, -03, -04
(1) Includes linearity, hysteresis and repeatability.

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.

Ordering Information

Model	Input Range	Output Range
DSCA39-01	0V to +10V	4mA to 20mA
DSCA39-02	–10V to +10V	4mA to 20mA
DSCA39-03	0V to +10V	0mA to 20mA
DSCA39-04	–10V to +10V	0mA to 20mA
DSCA39-05	0mA to 20mA	0mA to 20mA
DSCA39-07	–10V to +10V	–20mA to +20mA

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. Signal filtering is accomplished with a five-pole filter. 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 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 100dB CMR
- 3 kHz Signal Bandwidth
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

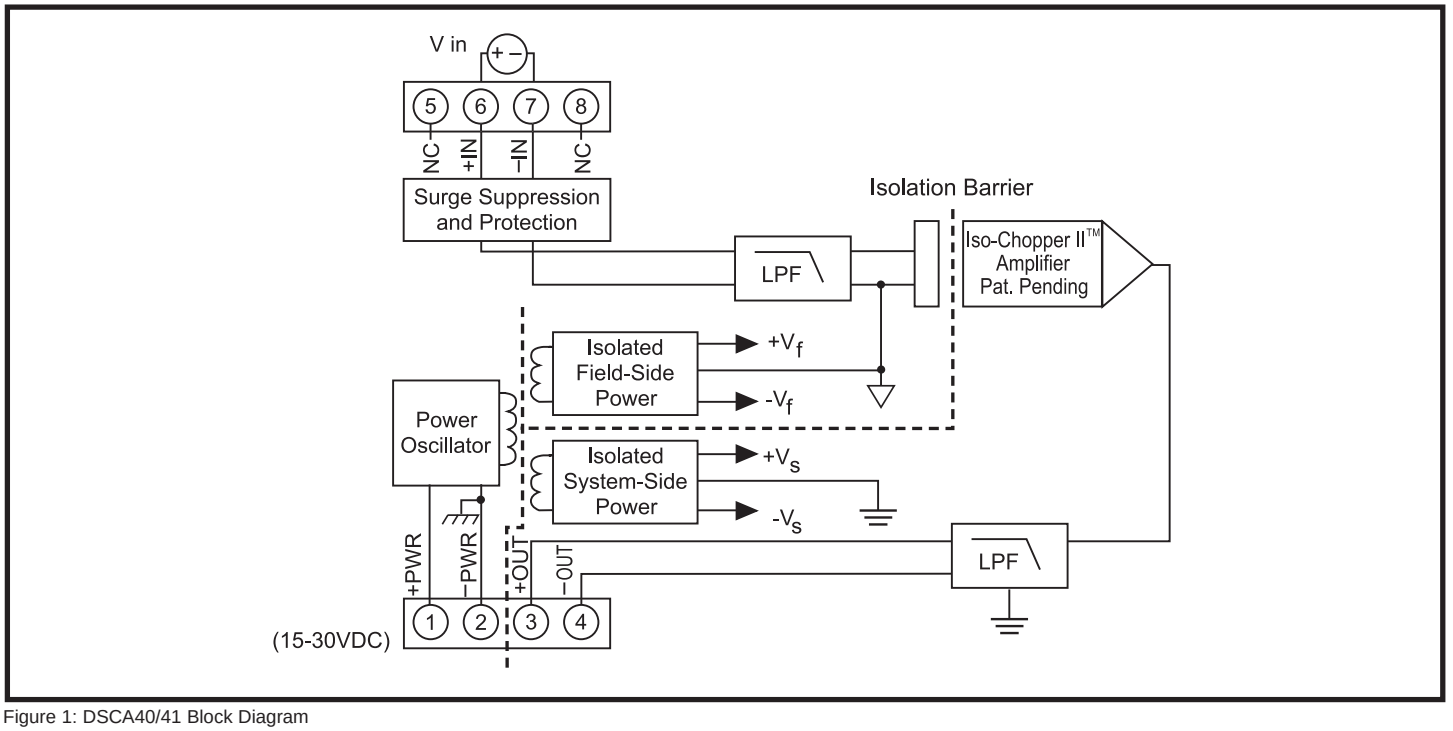


Figure 1: DSCA40/41 Block Diagram

Specifications

Typical at T_A=+25°C and +24V supply voltage

Model	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	*
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	±0.5µV/°C	±5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})	*
Zero Suppression	±50ppm(V_Z)(2)/°C	*
Gain	±35ppm/°C	±55ppm/°C
Output Noise, 100kHz Bandwidth	750µVrms (V_{OUT}), 3µArms (I_{OUT})	*
Bandwidth, –3dB	3kHz	*
NMR	100dB/decade above 3kHz	*
Response Time, 90% Span	170µs	*
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	*
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	*
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	*

NOTES:
* Same specification as DSCA40.
(1) Includes linearity, hysteresis and repeatability.
(2) V_z is the nominal input voltage that results in 0V or 0mA output.

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.

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 to 20mA	C	DSCA40-04C
4. 0 to 20mA	E	DSCA40-04E

DSCA42

2-Wire Transmitter Interface Signal Conditioners with Loop Power

Description

Each DSCA42 2-wire transmitter interface module provides a single channel of 4 to 20mA process current input which is filtered, isolated, amplified, and converted to a high-level voltage output. 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 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 Process Loop Signals
- Industry Standard Output of 0 to +10V, 2 to +10V, 0 to 20mA, or 4 to 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 Range of Supply Voltage
- 105dB CMR
- 5 Poles of Filtering
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

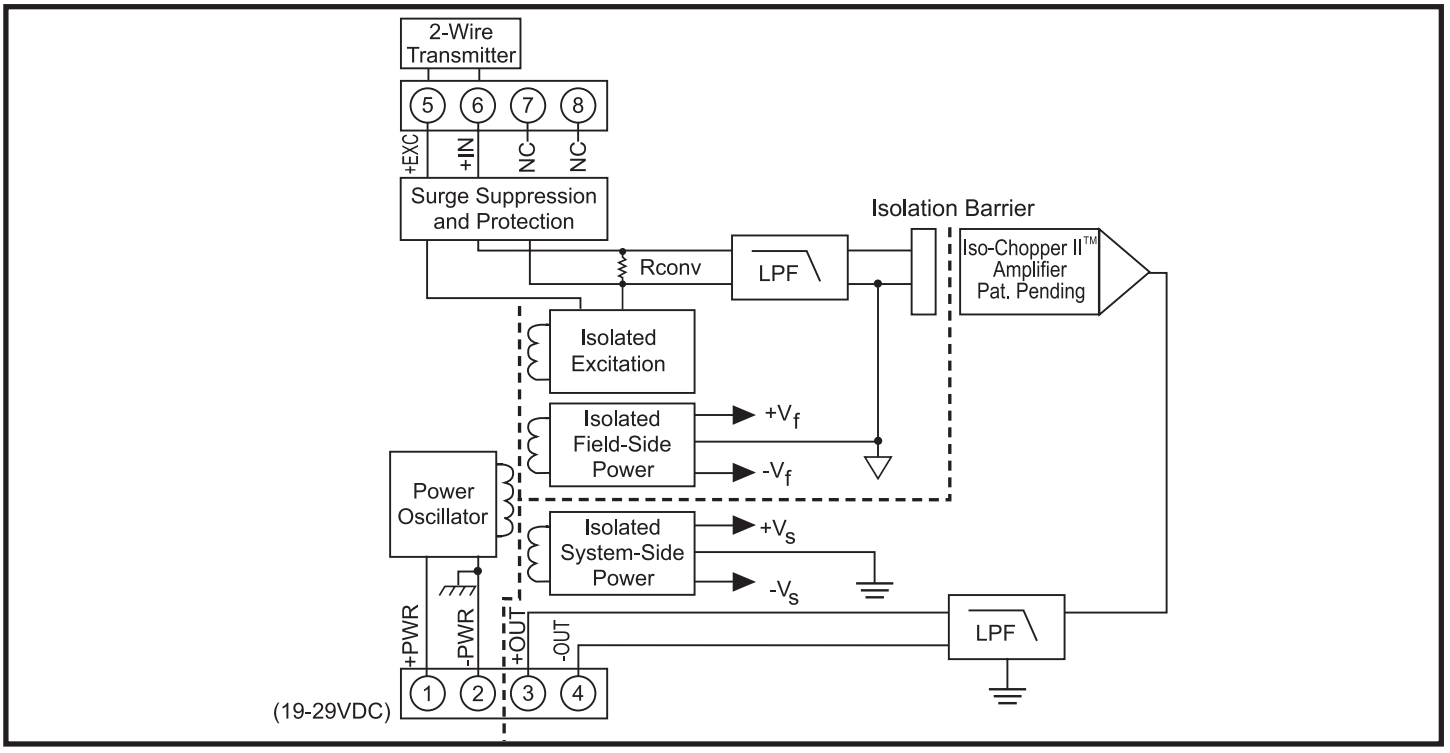


Figure 1: DSCA42 Block Diagram

Specifications

Typical at T_A = +25°C and +24V voltage supply

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	500µVrms (V_{OUT}), 2µArms (I_{OUT})
Bandwidth, –3dB	100Hz
NMR (-3dB at 100Hz)	100dB/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
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
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

NOTES:
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range	Output Range
DSCA42-01	4mA to 20mA	0V to +10V
DSCA42-02	4mA to 20mA	2V to +10V
DSCA42-01C	4mA to 20mA	4 to 20mA
DSCA42-01E	4mA to 20mA	0 to 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 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.

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. 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 exctitation.

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 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 100dB CMR
- Fully Isolated Excitation Supply
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

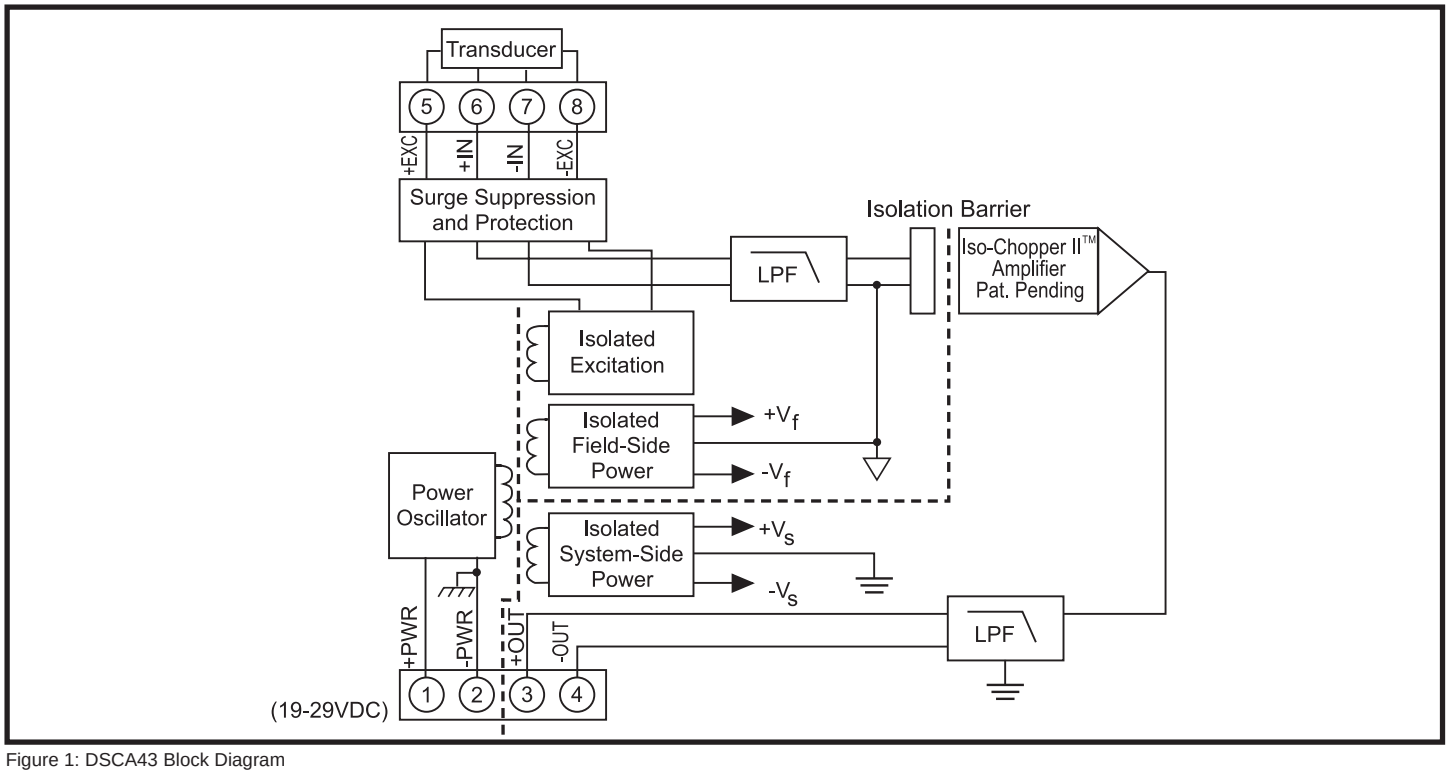


Figure 1: DSCA43 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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 maximum
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	750µVrms (V_{OUT}), 3µArms (I_{OUT})
Bandwidth, –3dB	3kHz
NMR	100dB/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
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
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

NOTES:
(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 to 20mA	C	DSCA43-11C
4. 0 to 20mA	E	DSCA43-11E

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.

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 1).

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 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.

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 to 20mA, or 4 to 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
- C-UL-US Listed
- CE and ATEX Compliant

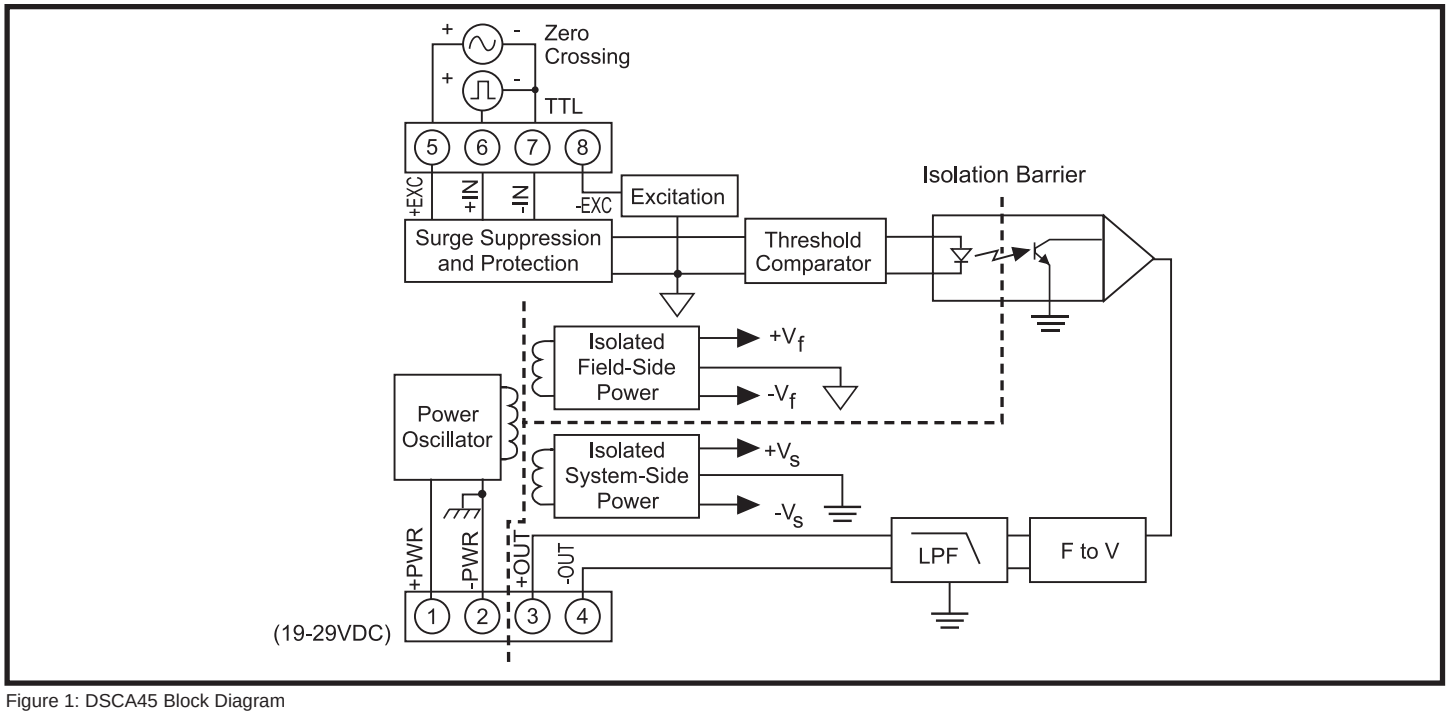


Figure 1: DSCA45 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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
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
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN50022-35x7.5 or -35x15 rail

NOTES:
(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 to 20mA	C	DSCA45-01C
4. 0 to 20mA	E	DSCA45-01E

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.

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. 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 47MW, ±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 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 160dB CMR
- 85dB NMR at 60Hz, 80dB at 50Hz
- ±0.08% Accuracy
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

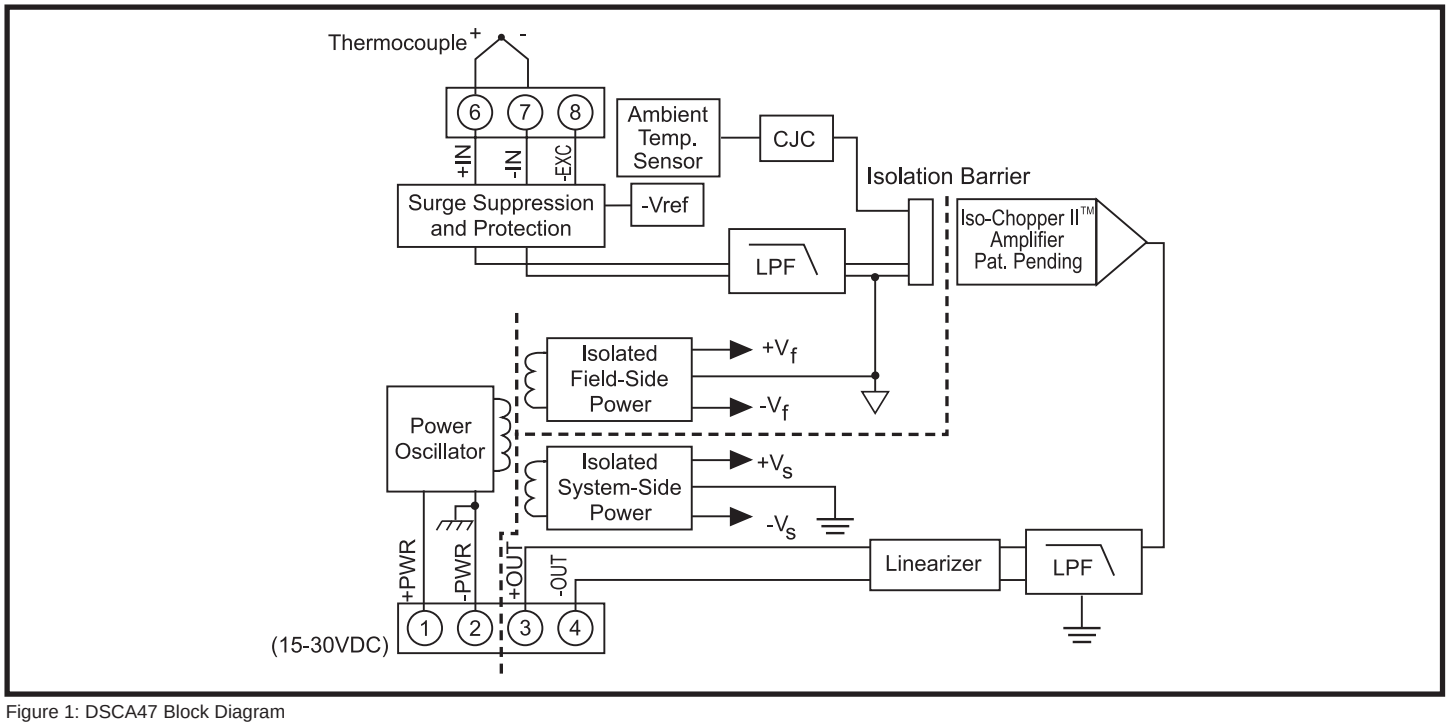


Figure 1: DSCA47 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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
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
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

NOTES:
(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.

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 to 20mA	C	DSCA47J-01C
4. 0 to 20mA	E	DSCA47J-01E

‡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

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. 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 Range of Supply Voltage
- 110dB CMR
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

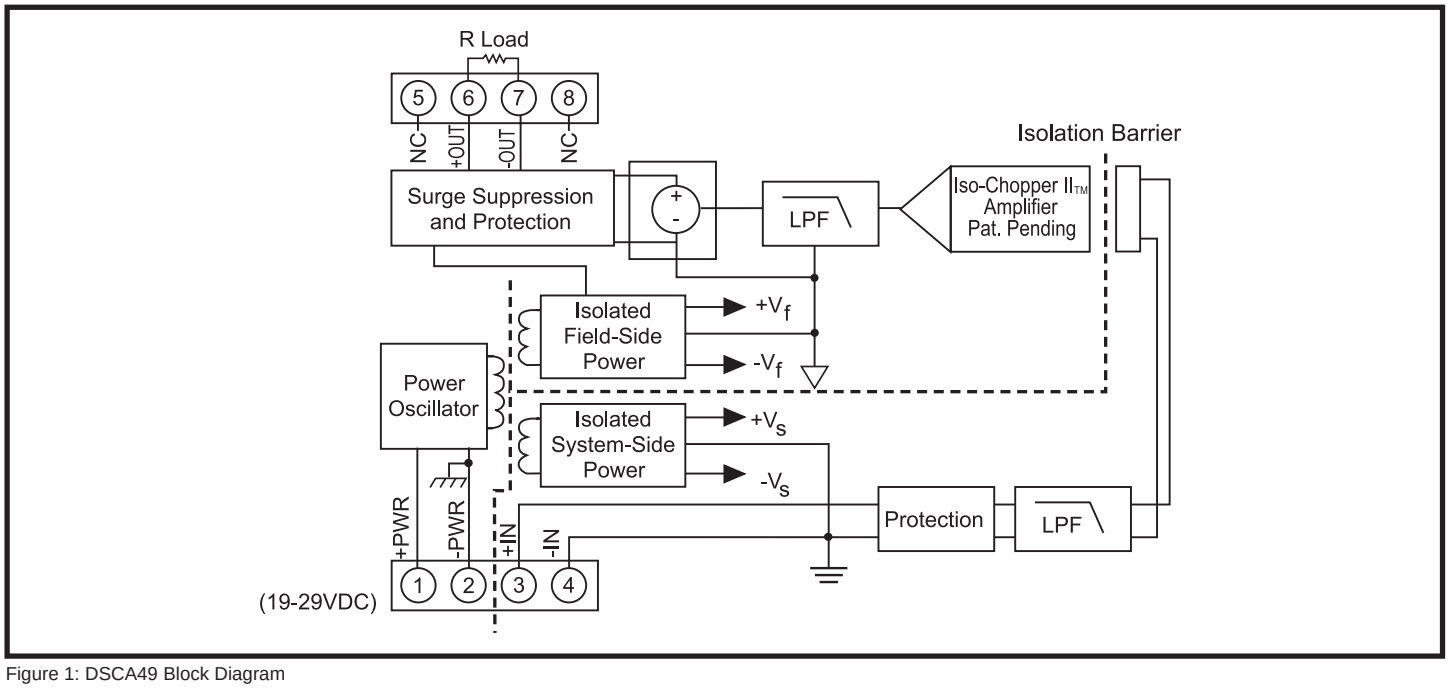


Figure 1: DSCA49 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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/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
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
Mechanical Dimensions	2.95" x 0.89" x 4.13"
(h)(w)(d)	(75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5

NOTES:
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range	Output Range
DSCA49-04	0V to +10V	–10V to +10V
DSCA49-05	–10V to +10V	–10V to +10V
DSCA49-06	–10V to +10V	0V 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 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-PS5R Series

Switching Power Supplies

Description

Dataforth's new PWR-PS5R 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-PS5R series makes your power supply choice a simple one. The PWR-PS5R series is UL, C-UL and TUV Approved, CE Compliant, and UL 508 Listed. Models are available with output ratings from 7.5W to 100W with 24VDC output voltages. Customers may choose from a very wide range of input voltages (85 to 264VAC, and 105 to 370VDC compatible), making the PWR-PS5R series an unbeatable package of versatility.

▶ Features

- Universal AC Input (85 to 264VAC)
- DC Compatible Input (105 to 370VDC)
- Unique Spring-Up Terminals
- DIN Rail or Panel Mount
- Five Different Output Capacities: 7.5W to 100W
- UL, C-UL, and TUV Approvals
- CE Compliant, UL 508 Listed
- Certified to EN60950
- IP20 Protection (EN60529)
- Compliant with EMC Directives EN50081-2 and EN50082-2

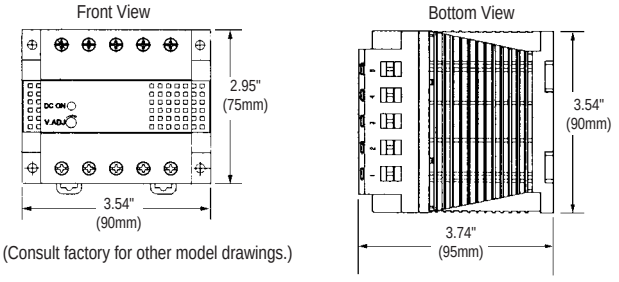
Specifications PWR-PS5R Series

Model	PWR-PS5RA	PWR-PS5RB	PWR-PS5RC	PWR-PS5RD	PWR-PS5RE
Input	100 to 240VAC nominal; 85 to 264VAC, 105 to 370VDC compatible				100 to 120VAC 200 to 240VAC (Jumper Selectable)
Frequency	47 to 63Hz				
Input Current	0.17A at 100V 0.11A at 200V	0.3A at 100V 0.2A at 200V	0.68A at 100V 0.45A at 200V	1.15A at 100V 0.75A at 200V	2.5A at 100V 1.5A at 200V
Output Voltage & Current Ratings	24V, 0.3A	24V, 0.6A	24V, 1.3A	24V, 2.1A	24V, 4.2A
Temperature Change	0.05%				
Ripple Voltage	2% p-p maximum (including noise)				
Overcurrent Protection	105% minimum				
Overvoltage Protection	120% minimum (Zener-limiting)		120% minimum, auto reset		
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 minimum (500VDC megger)				
Operating Temperature	–10 to +60°C				
StorageTemperature	–30 to +85°C				
Operating Humidity	20 to 90% RH (avoid condensation)				
Dimensions (w x d) All H = 2.95" (75mm)	1.77" x 2.76" (45mm x 70mm)	1.77" x 3.74" (45mm x 95mm)	3.54" x 3.74" (90mm x 95mm)	3.54" x 3.74" (90mm x 95mm)	5.71" x 3.74" (145mm x 95mm)
Terminal Screw	M3.5 Phillips screws in spring-up terminals				

Ordering Information

Model	Power	Output
PWR-PS5RA	7.5W	24VDC/0.3A
PWR-PS5RB	15W	24VDC/0.6A
PWR-PS5RC	30W	24VDC/1.3A
PWR-PS5RD	50W	24VDC/2.1A
PWR-PS5RE	100W	24VDC/4.2A

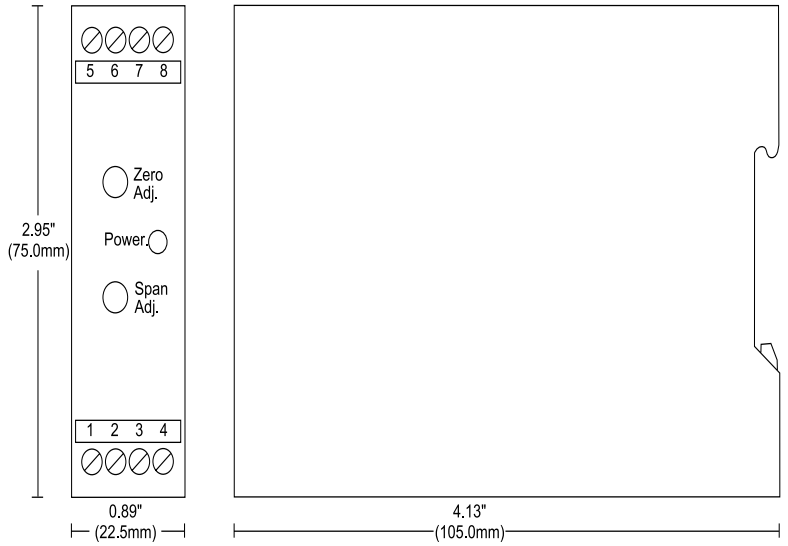
PWR-PS5RC/D



(Consult factory for other model drawings.)

DSCA

Module Dimensions



NOTES:

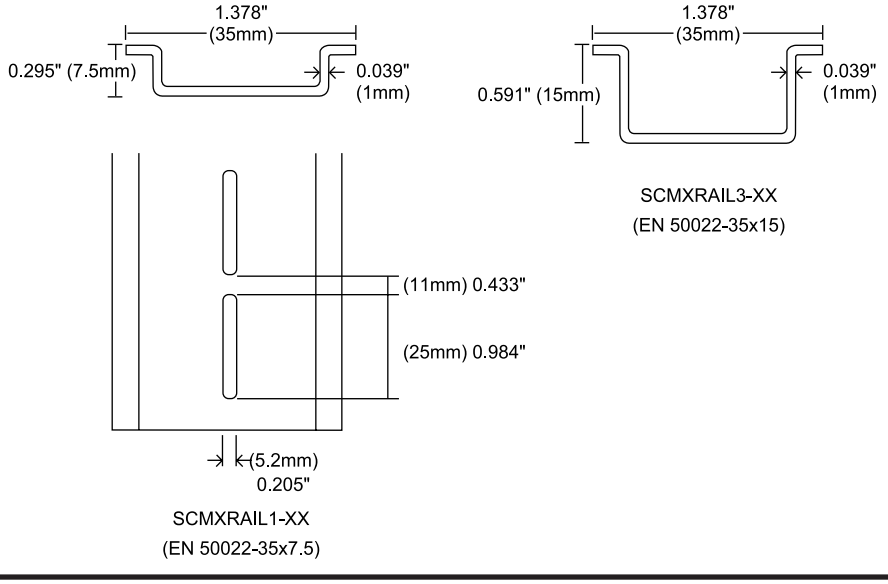
1) Pluggable terminal blocks accept wire sizes AWG 22-12. Strip wire insulation 0.27 in. (7mm) prior to insertion in terminal block.

2) DSCA modules can be mounted to DIN rails shown in Accessories section.

▶ Accessories for DSCA Analog Modules

SCMXRAIL1-XX/SCMXRAIL3-XX

Din Rail

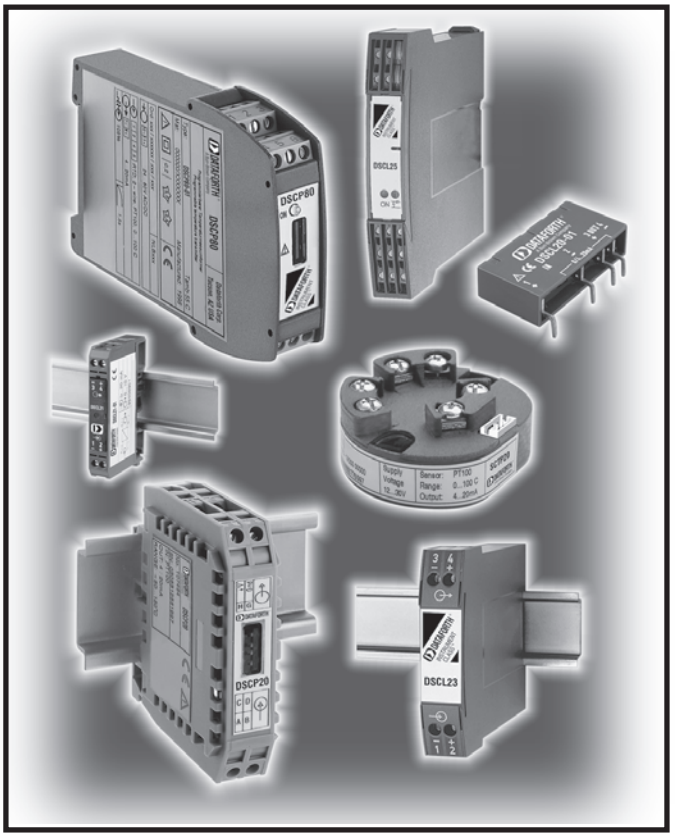


DSCL, DSCP, SCTP

Industrial Loop Isolators and Transmitters

Description

Dataforth's new DSCL, DSCP, and SCTP series of products is a complete family of loop and universal AC/DC powered models of 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 signals then 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 systems. 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 24 to 60V or 85 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 Directive 2002/95/EC

▶ Loop Isolators and Transmitters Selection Guide

Characteristic	DSCL20	DSCL21	DSCL22	DSCL23	DSCL24 (Single Ch)	DSCL24 (Multi-Ch)	DSCP55
Channels per Module	1	1	1, 2, or 3	1 or 2	1	2	1
Mechanical Format	Component	DIN	DIN	DIN	DIN	DIN	DIN
Isolation Voltage Type	500Vrms Signal & Pwr	500Vrms Signal & Pwr	4000Vrms (1 ch) Signal & Pwr	2300Vrms 3-Way	2300Vrms 3-Way	2300Vrms 3-Way	1500Vrms Signal
Input Range from Field	0/4-20mA	0/4-20mA	0/4-20mA	4-20mA	Std/Jumper	Std/Factory	mV, V, mA, TC, RTD
Output Range to System	0/4-20mA	mA or V	mA or V	4-20mA	Std/Jumper	Std/Factory	mA
Output Split to 2 Channels	—	—	Yes	Yes	—	Yes	—
Accuracy	<±0.1%	<±0.1%	<±0.1%	<±0.2%	<±0.2%	<±0.2%	±0.1%
Bandwidth	750Hz	750Hz	500Hz	200Hz	15Hz	15Hz	1Hz
Load Range Current Voltage	0-600Ω —	0-600Ω >5MΩ	0-1000Ω >5MΩ	0-1000Ω —	0-600Ω >2kΩ	0-600Ω >2kΩ	500Ω 1kΩ
Power Supply	Passive	Passive	Passive	12-30VDC	Univ AC/DC Pwr	Univ AC/DC Pwr	Passive/DC Pwr
Dimensions (h x w x d)	0.8 x 0.4 x 1.6 in	2.9 x 0.5 x 1.9 in	see specs	see specs	4.7 x 0.7 x 5.7 in	4.7 x 0.7 x 5.7 in	3.67 x 0.24 x 4.04 in
Operating Temp Range	–20°C to +65°C	–20°C to +65°C	–25°C to +55°C	–25°C to +55°C	–25°C to +55°C	–25°C to +55°C	–20°C to +65°C

▶ Configurable Transmitters Selection Guide

Characteristic	DSCP20	DSCP61	DSCP62	DSCP63	DSCP64	DSCP65	DSCP81	SCTP20
Channels per Module	1	1	1	1	1	1	1	1
Mechanical Format	DIN	DIN	DIN	DIN	DIN	DIN	DIN	Head
Isolation Voltage Type	Nonisolated —	1500Vrms Signal	1500Vrms Signal	1500Vrms Signal	1500Vrms Signal	1500Vrms Signal	2300Vrms 3-Way	Non/1500V Non/3-Way
Input Range from Field	Configurable	RTD	TC	mA or V	mA or V for 2WTX	mV	Configurable	Configurable
Output Range to System	Configurable	mA or V	mA or V	mA or V	mA or V	mA or V	Configurable	Configurable
Accuracy	<±0.2%	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%	<±0.2%	<±0.2%
Bandwidth	Configurable	1Hz	1Hz	1Hz	1Hz	1Hz	Configurable	Configurable
Load Range Current Voltage	0-900Ω —	500Ω 2kΩ	500Ω 2kΩ	500Ω 2kΩ	500Ω 2kΩ	500Ω 2kΩ	0-600Ω >2kΩ	0-900Ω —
Power Supply	Loop Power	19.2-30VDC	19.2-30VDC	19.2-30VDC	19.2-30VDC	19.2-30VDC	Univ AC/DC Pwr	Loop Power
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	2.7 x 0.7 x 4.5 in	0.66 x 1.69 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	–25°C to +55°C	–25°C to +80°C

▶ Accessory

Model	Description
DSCP70	Power supply connection module for DIN rail power bus

DSCL20

Loop Powered Isolator - “Component Module”

Description

Each 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

The compliance voltage or loop voltage must not exceed 17V, as this may damage the module.

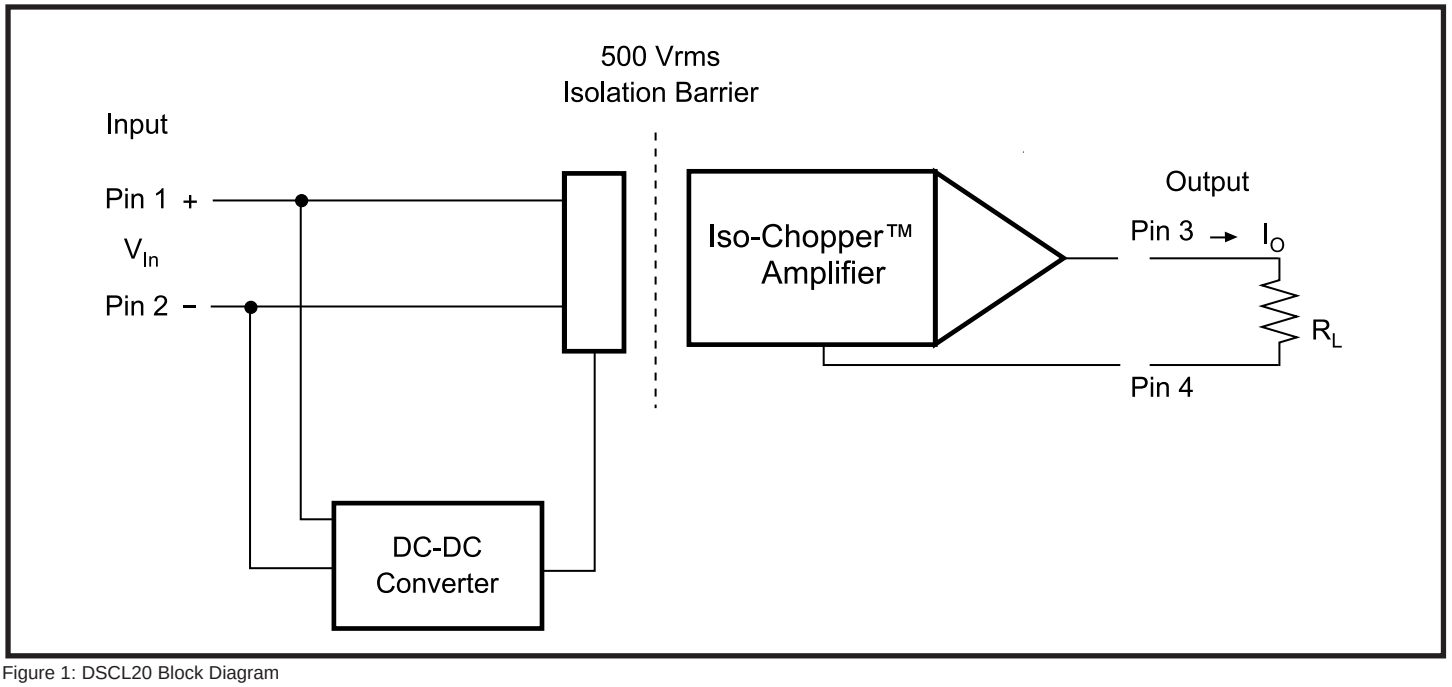


Figure 1: DSCL20 Block Diagram

Specifications

Typical at T_A=+25°C

Module	DSCL20
Input Range	0/4-20mA
Input Current	50mA max at 18V max
CMV Input to Output	500Vrms, 1 Minute
Accuracy[1] (at 100Ω Load)	±0.05% Span Typical
	±0.1% Span Max
Linearity	Included in Accuracy
Stability	<50ppm/°C
Overshoot	<20µA (Typical 5µA)
Compliance Voltage[2] (V_{in})	17V max
Voltage drop	<2V (for 500Ω Load)
Output Range	0/4-20mA
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 (Typical <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:
(1) Additional error <0.2% at 500Ω load
(2) $V_{in}=I_O R_L$ + <2V

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

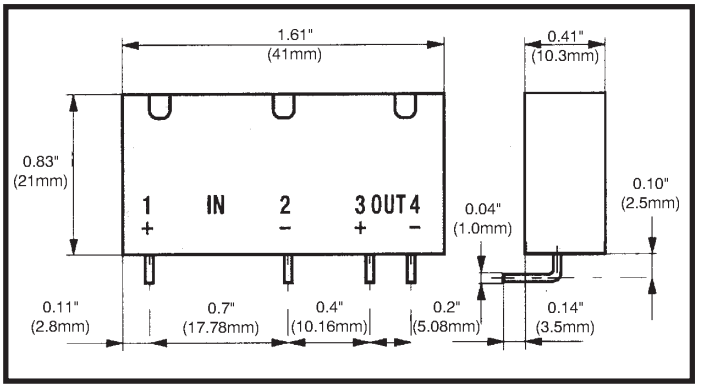


Figure 1: DSCL20-01 (Bent Pins)

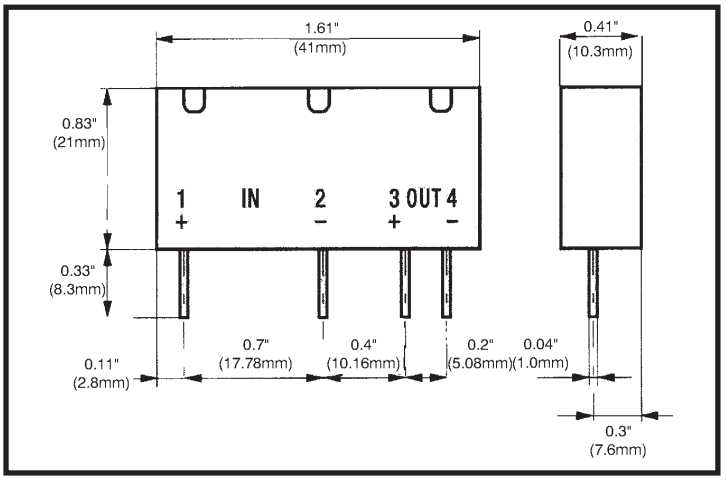


Figure 2: DSCL20-02 (Straight Pins)

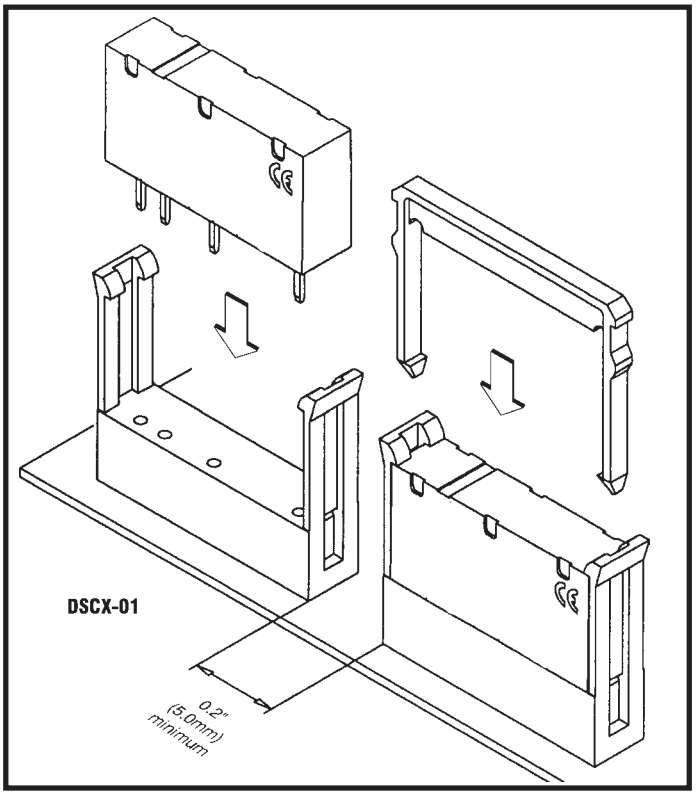


Figure 3: DSCX-01 Socket and Hold-down Accessory for DSCL20-02 (Straight Pin Modules)

DSCL21

Loop Powered Isolator - DIN Mount

Description

Each 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 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, 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
- No Recalibration or Maintenance Required
- 500Vrms Transformer Isolation
- Prevents Ground-Loop Problems
- Prevents the Transfer of Interference Voltages and Currents
- High Accuracy Over Full Span
- CE Compliant

The compliance voltage or loop voltage must not exceed 17V, as this may damage the module.

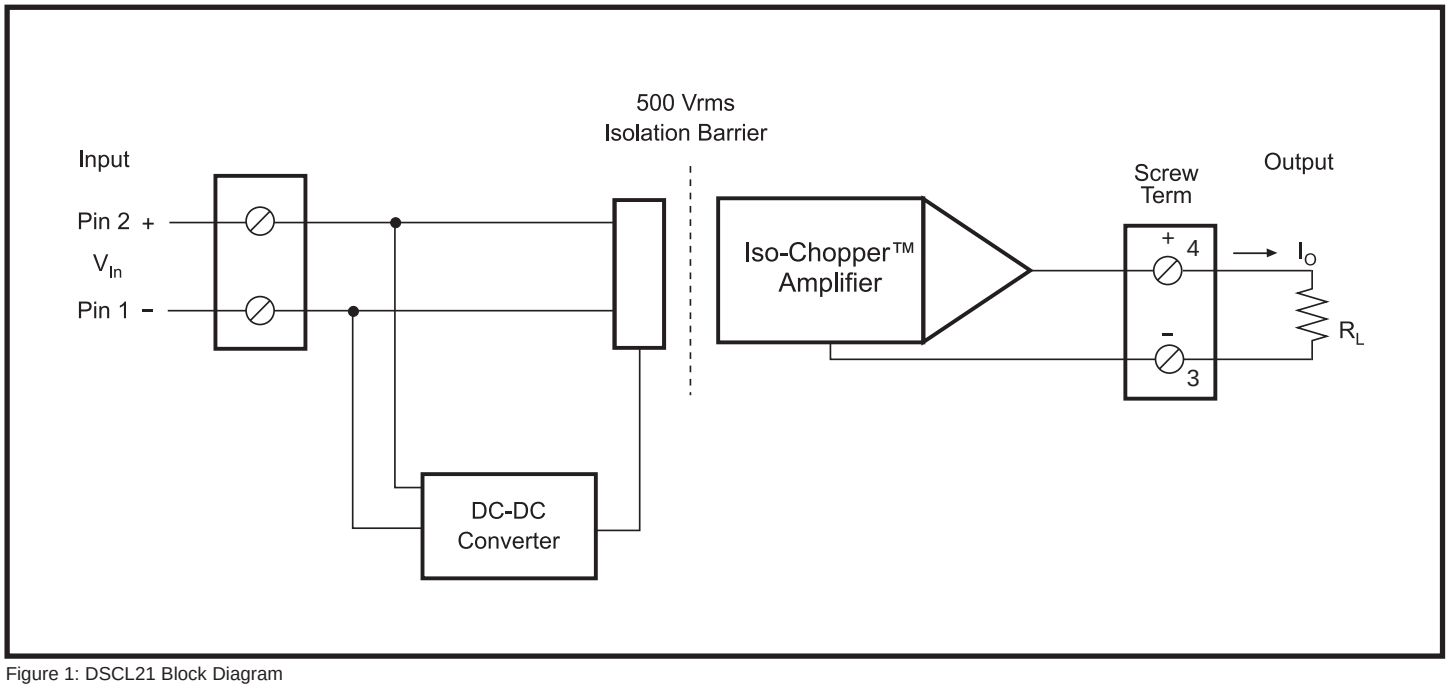


Figure 1: DSCL21 Block Diagram

Specifications

Typical at T_A=+25°C; Load R=100Ω (I_{out}), ≥5MΩ(V_{out})

Module	DSCL21-01
Input Range	0/4-20mA
Input Current	50mA max at 18V max
CMV Input to Output	500Vrms, 1 Minute
Accuracy	±0.1% Span Typical ±0.2% Span Max (at 100Ω Load)(1)
Linearity	Included in Accuracy
Stability	<50ppm/°C
Overshoot	<20µA (Typical 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 (Typical <5mV)
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:
(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)

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.

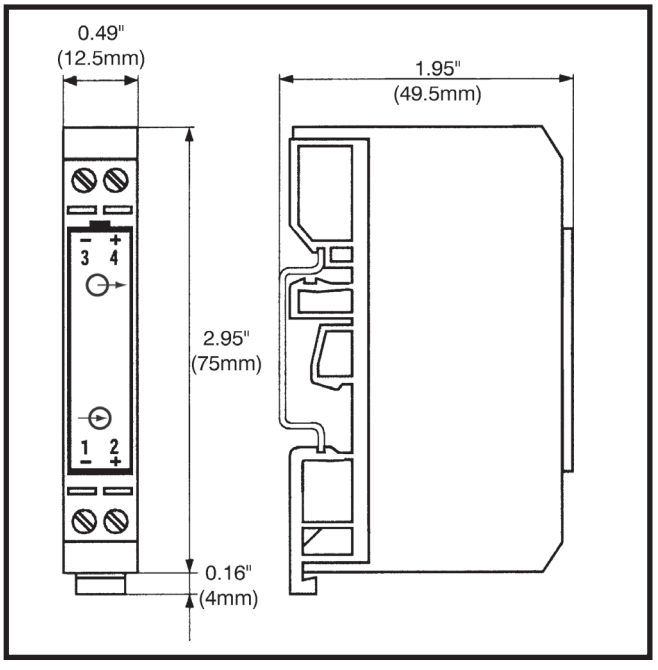


Figure 2: DSCL21 Dimensions

DSCL22

Loop Powered Isolator - DIN or Panel Mount

Description

Each DSCL22 loop powered isolator provides 1, 2, or 3 channels 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 DSCL22 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.

If one input to two isolated outputs is desired, multiple channel units may be configured as a splitter (see Figure 2).

▶ Features

- No Power Supply Required, Signal Powered from 0-20mA (or 4-20mA) Input
- Simplified Wiring For Fast Installation
- DIN Rail or Panel Mountable
- Narrow DIN Package, Mounts up to 27 Devices into a 19" Rack Space
- No Recalibration or Maintenance Required
- Up to 4000Vrms Transformer Isolation
- Prevents Ground-Loop Problems
- Prevents the Transfer of Interference Voltages and Currents
- High Accuracy Over Full Span
- CE Compliant

The compliance voltage or loop voltage must not exceed 25V, as this may damage the module.

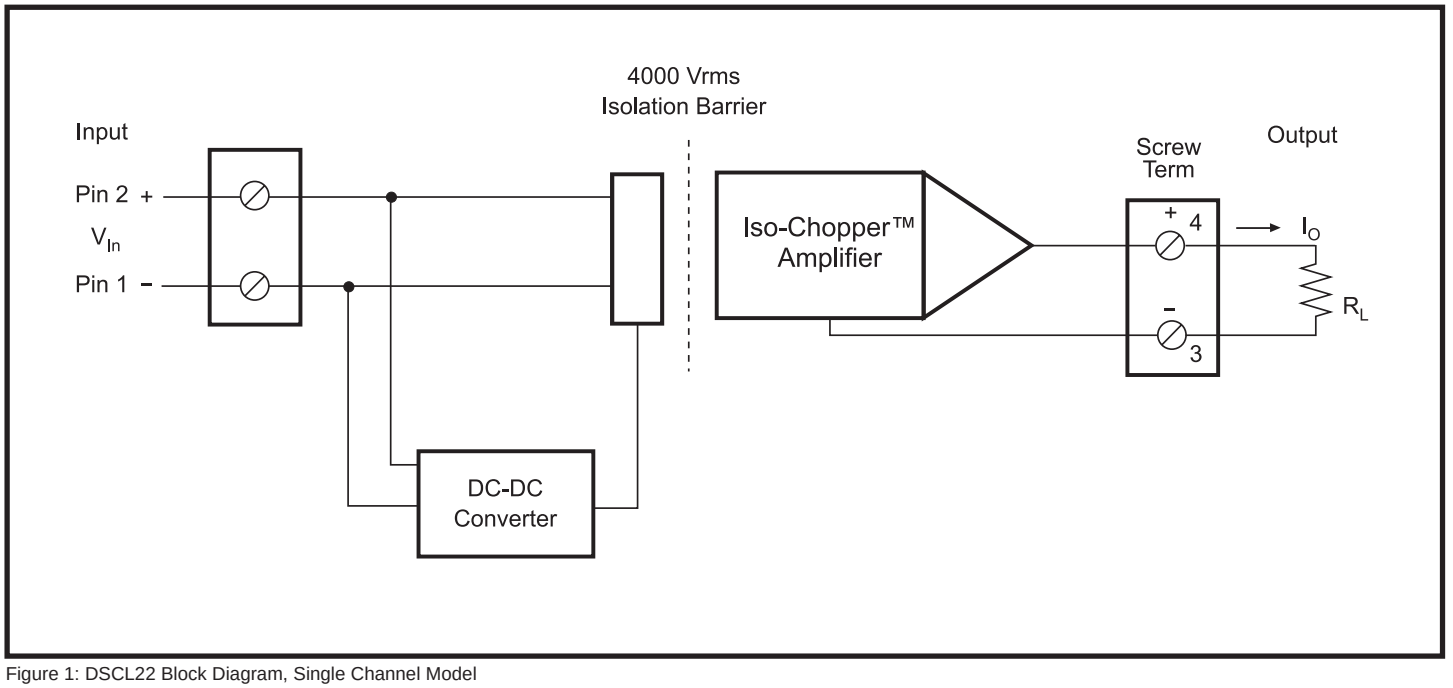


Figure 1: DSCL22 Block Diagram, Single Channel Model

Specifications

Typical at T_A=+25°C, Load R = 250Ω (current out)

Module	DSCL22-01,-11,-21
Input Range	0/4-20mA
Input Current	50mA max at 27V max
CMV Input to Output	4000Vrms (1ch) or 2300Vrms (2 & 3ch), 1 Minute
Accuracy	±0.05% Span Typical ±0.1% Span Max (at 250Ω Load)(1)
Linearity	Included in Accuracy
Stability	<50ppm/°C
Input Overshoot	<20µA (Typical 5µA)
Compliance Voltage(2) (V_{in})	25.65V max
Voltage Drop	<2.6V (for 500Ω Load)
Output Range	0/4-20mA
Limit Upper Range	40mA
Bandwidth, –3dB	500Hz
CMR (50Hz or 60Hz)	112dB
NMR	20dB per Decade Above 500Hz
Response Time	1ms, to 90% Span
Load Resistance Range	0-1000Ω
Output Noise	<20mV (Typical <5mV)
Environmental	Weight Approximately 100g.
Housing Material	Lexan 940 (UL 94 V-O)
Shock Test	50g (10 Shocks, 3 Axis)
Operating Temp. Range	–25°C to +55°C
Storage Temp. Range	–40°C to +70°C
Relative Humidity	0 to 75% Noncondensing
Emissions	EN50081-2 (Radiated, Conducted)
Immunity	EN50082-2 (ESD, RF, EFT)

NOTES:
(1) Additional error <0.05% per 100Ω above 250Ω
(2) $V_{in}=I_O R_L$ + <2.6V

Dimensional and Wiring Information

The DSCL22 DIN mount package accepts EN50022 (35 x 7.5) type rails; Dataforth PN SCMXRAIL1-xx. Multiple DSCL22 modules may be mounted next to each other without affecting input or output signals. The DSCL22 may be mounted in any position.

Screw terminals with wire protection clamps sized for 2 x 0.75mm^2 or 1 x 2.5mm^2 wires. The DSCL22 requires no maintenance.

Ordering Information

Model	Channels	Input Range	Output Range	Figure
DSCL22-01	1	0-20mA (4-20mA)	0-20mA (4-20mA)	3
DSCL22-11	2	0-20mA (4-20mA)	0-20mA (4-20mA)	4
DSCL22-21	3	0-20mA (4-20mA)	0-20mA (4-20mA)	4

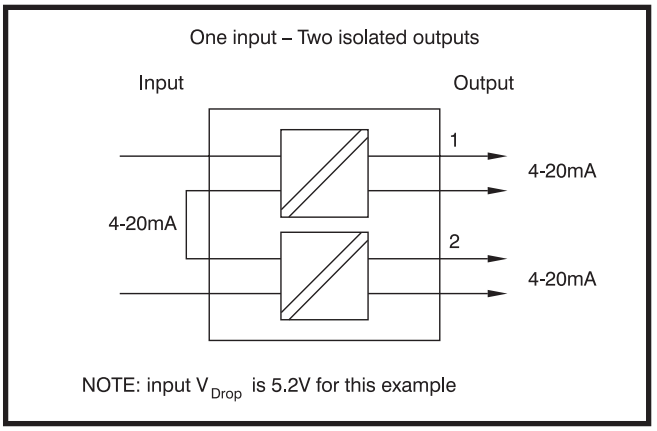


Figure 2: Multi-Channel Versions may be used as a Splitter

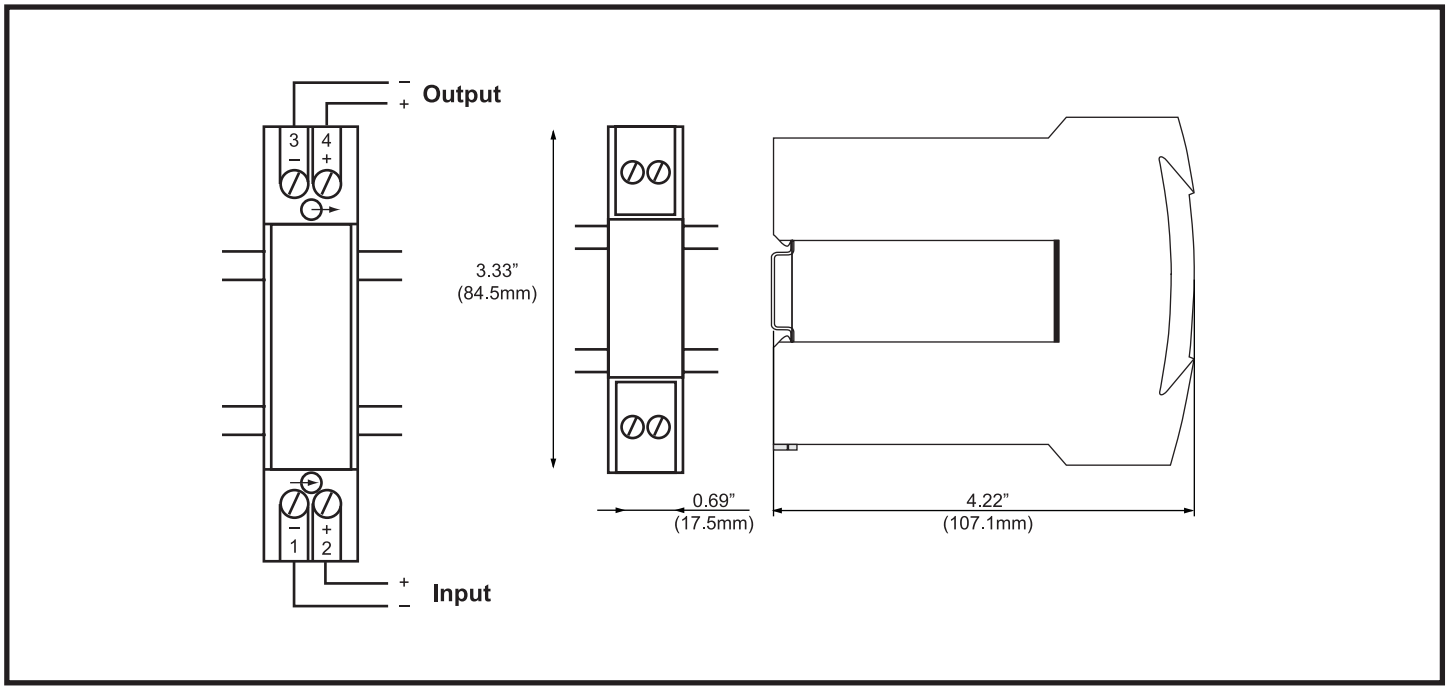


Figure 3: DSCL22-01 Wiring and Dimensions

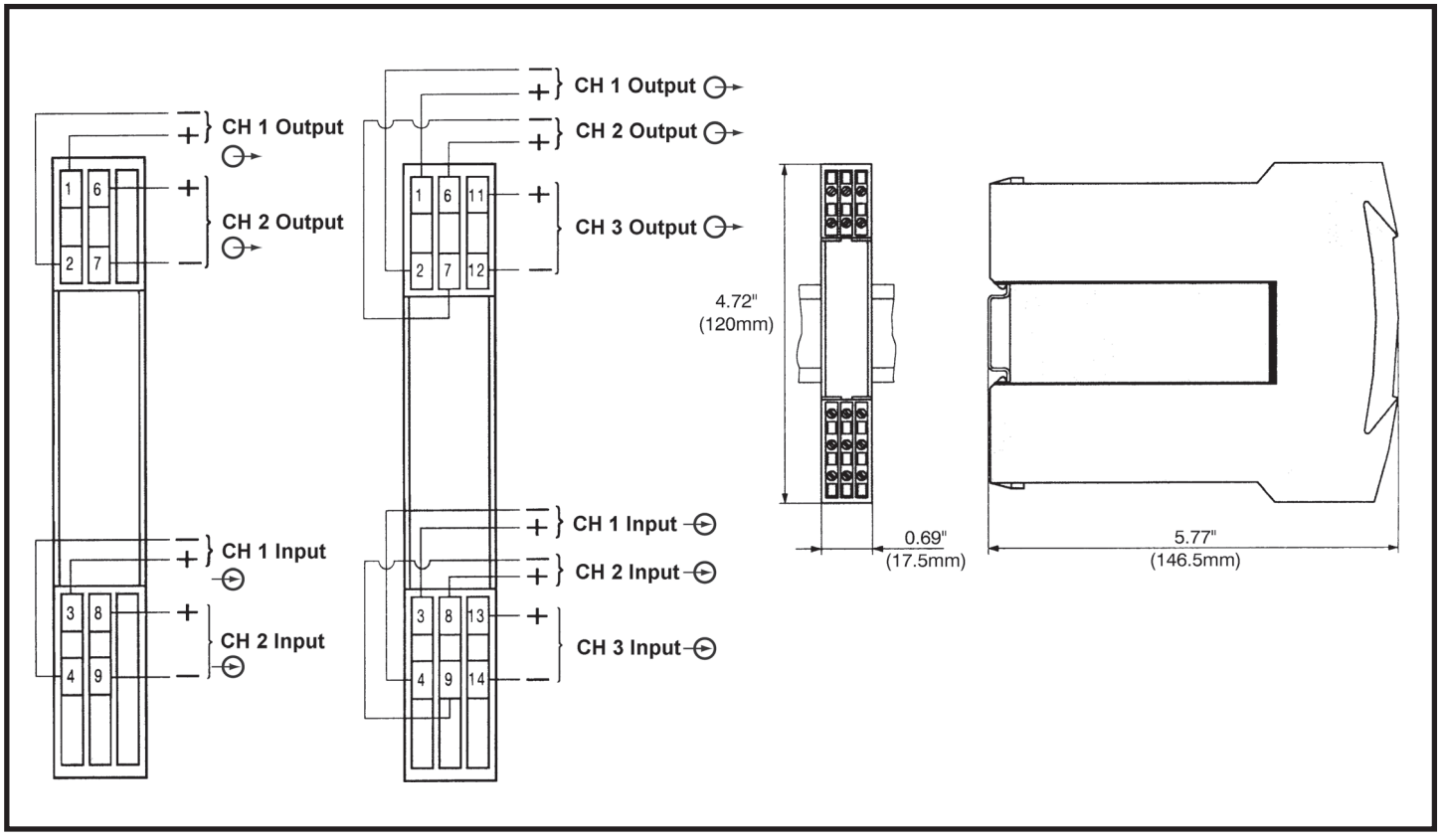


Figure 4: DSCL22-11,-21 Wiring and Dimensions

DSCL23

4 to 20mA Isolator with DC Supply - DIN or Panel Mount

Description

Each DSCL23 loop powered isolator provides 1 or 2 channels of analog signal protection by electrically isolating its input from output for any DC process signal in the range 4-20mA. The DSCL23 feeds isolated DC power to the field transmitter and returns a fully isolated 4-20mA analog 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

- Feeds DC Power to 4 to 20mA Transmitter, Isolates Loop
- Simplified Wiring for Quick Install and Signal Protection
- DIN Rail or Panel Mountable
- Narrow DIN Package, Mounts up to 27 Devices into a 19" Rack Space
- No Recalibration or Maintenance Required
- 2300Vrms Transformer Isolation
- Prevents Ground-Loop Problems
- Prevents the Transfer of Interference Voltages and Currents
- High Accuracy Over Full Span
- CE Compliant

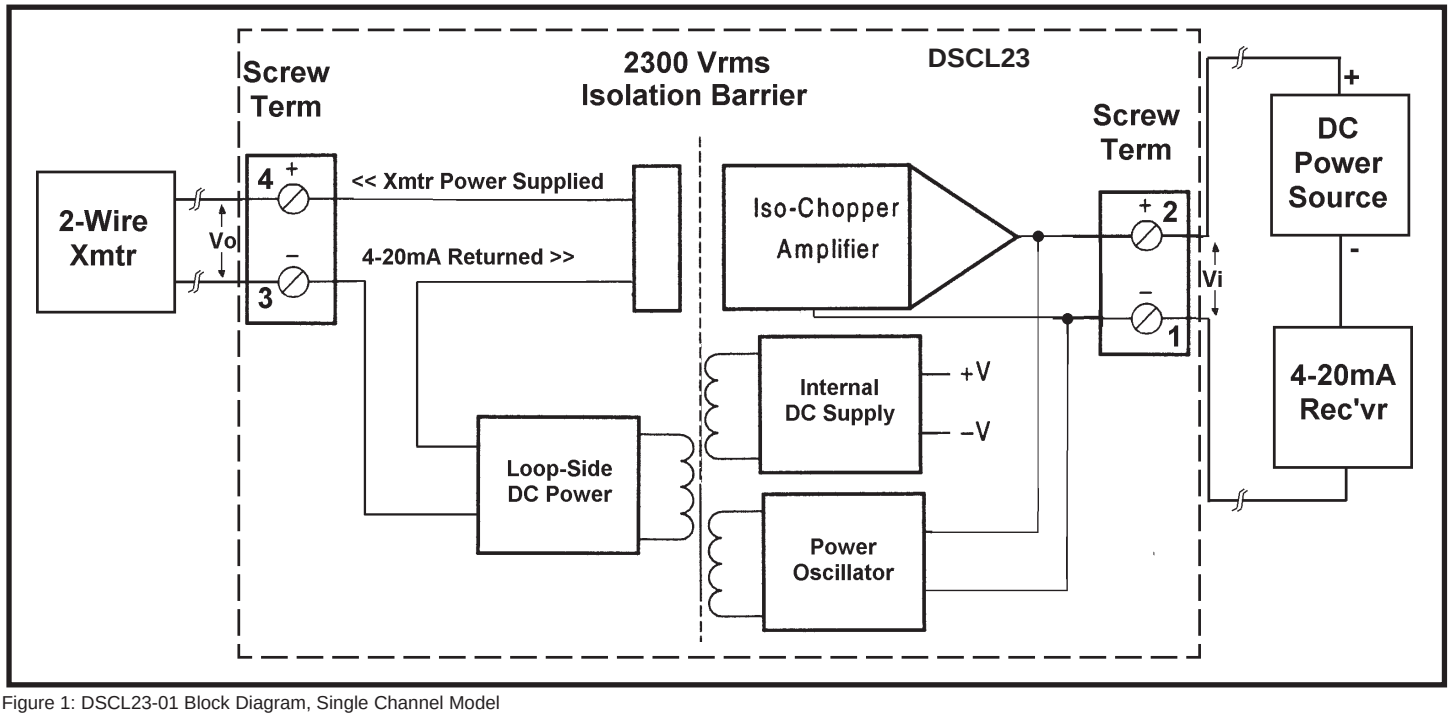


Figure 1: DSCL23-01 Block Diagram, Single Channel Model

Specifications

Typical at T_A=+25°C and +24VDC Power

Module	DSCL23-01	DSCL23-02
Input Range[2] from Xmtr	4-20mA	*
CMV Input to Output	2300Vrms, 1 Minute	*
Accuracy	±0.1% Span Typical	*
	±0.2% Span Max	*
Linearity	Included in Accuracy	*
Stability	<50ppm/°C	*
Overshoot	<20µA (Typical 5µA)	*
Output Range[1] to System	4-20mA (50mA max)	*
Bandwidth, –3dB	200Hz	*
CMR (50Hz or 60Hz)	80dB	*
NMR	20dB per Decade Above 200Hz	*
Response Time	2ms, to 90% Span	*
Output Noise	<20mV p-p (Typical <5mV p-p) (120 kHz)	*
DC Power Source, Vi[1]	12-30VDC (24V nom)	*
Xmtr. Power Supplied, Vo[2]	>19.3VDC at 20mA and 24V Power Vi	*
Environmental	Weight Approx. 100g	Weight Approx. 200g
Housing Material	Lexan 940 (UL 94 V-O)	*
Operating Temp. Range	–25°C to +55°C	*
Storage Temp. Range	–40°C to +70°C	*
Shock Test	50g (10 Shocks, 3 Axis)	*
Relative Humidity	0 to 75% Noncondensing	*
Emissions	EN50081-2 (Radiated, Conducted)	*
Immunity	EN50082-2 (ESD, RF, EFT)	*

NOTES:
*Same specification as DSCL23-01
(1) At connection between isolator and Power Supply
(2) At connection between isolator and 2-Wire Transmitter.

Ordering Information

Model	Channels	Input Range	Output Range	Figure
DSCL23-01	1	4-20mA	4-20mA	2
DSCL23-02	2	4-20mA	4-20mA	3

Dimensional and Wiring Information

The DSCL23 DIN mount package accepts EN50022 (35 x 7.5) type rails; Dataforth PN SCMXRAIL1-xx. Both DSCL models may be adapted for screw mounting to wall or panel.

Multiple DSCL23 modules may be mounted next to each other without affecting input or output signals. The compact and narrow 17.5mm housing allows for up to 27 devices in a 19" rack space. The DSCL23 may be mounted in any position.

Screw terminals with wire protection clamps sized for 2 x 0.75mm^2 or 1 x 2.5mm^2 wires.

The DSCL23 requires no maintenance.

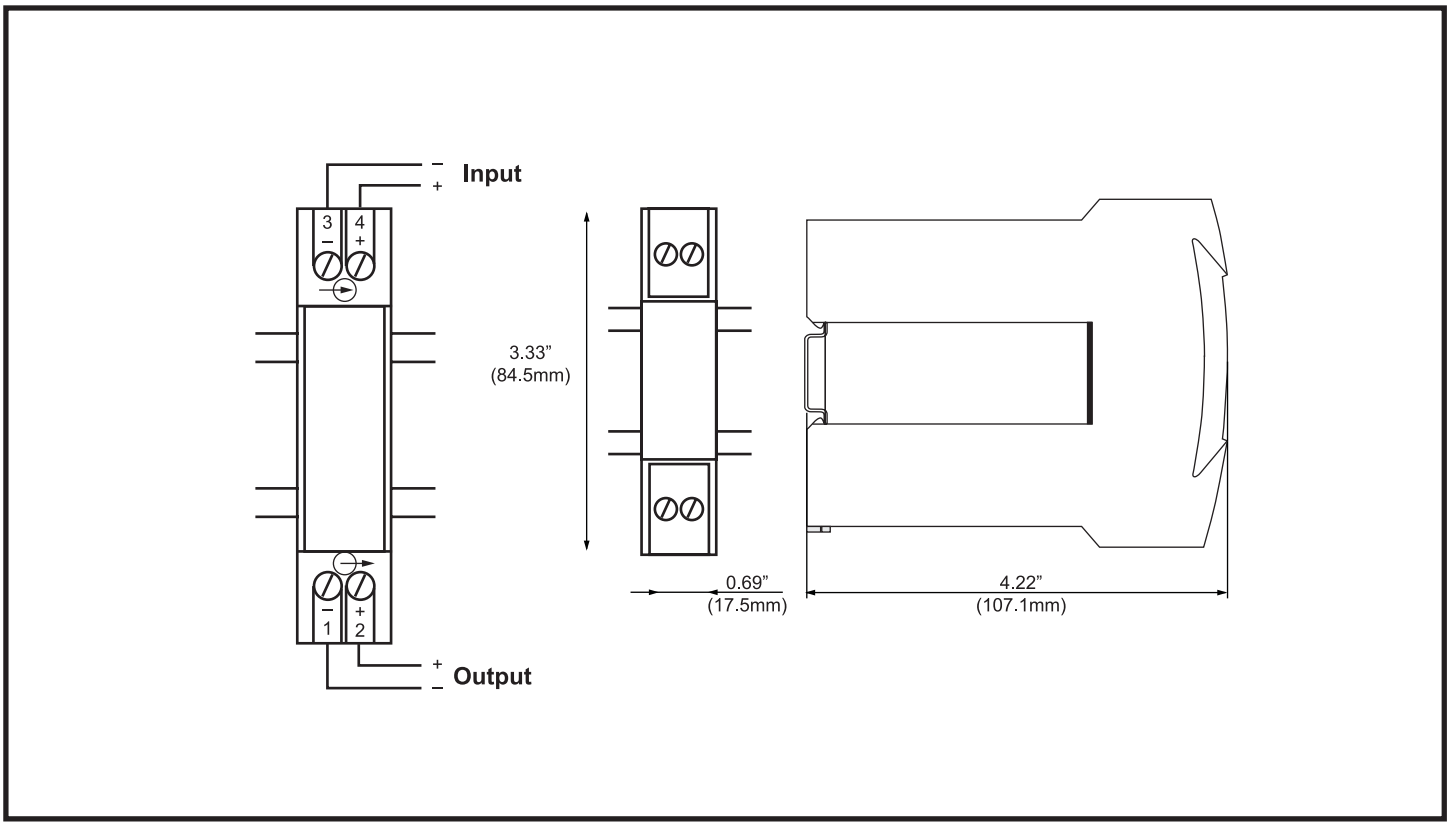


Figure 2: DSCL23-01 Wiring and Dimensions

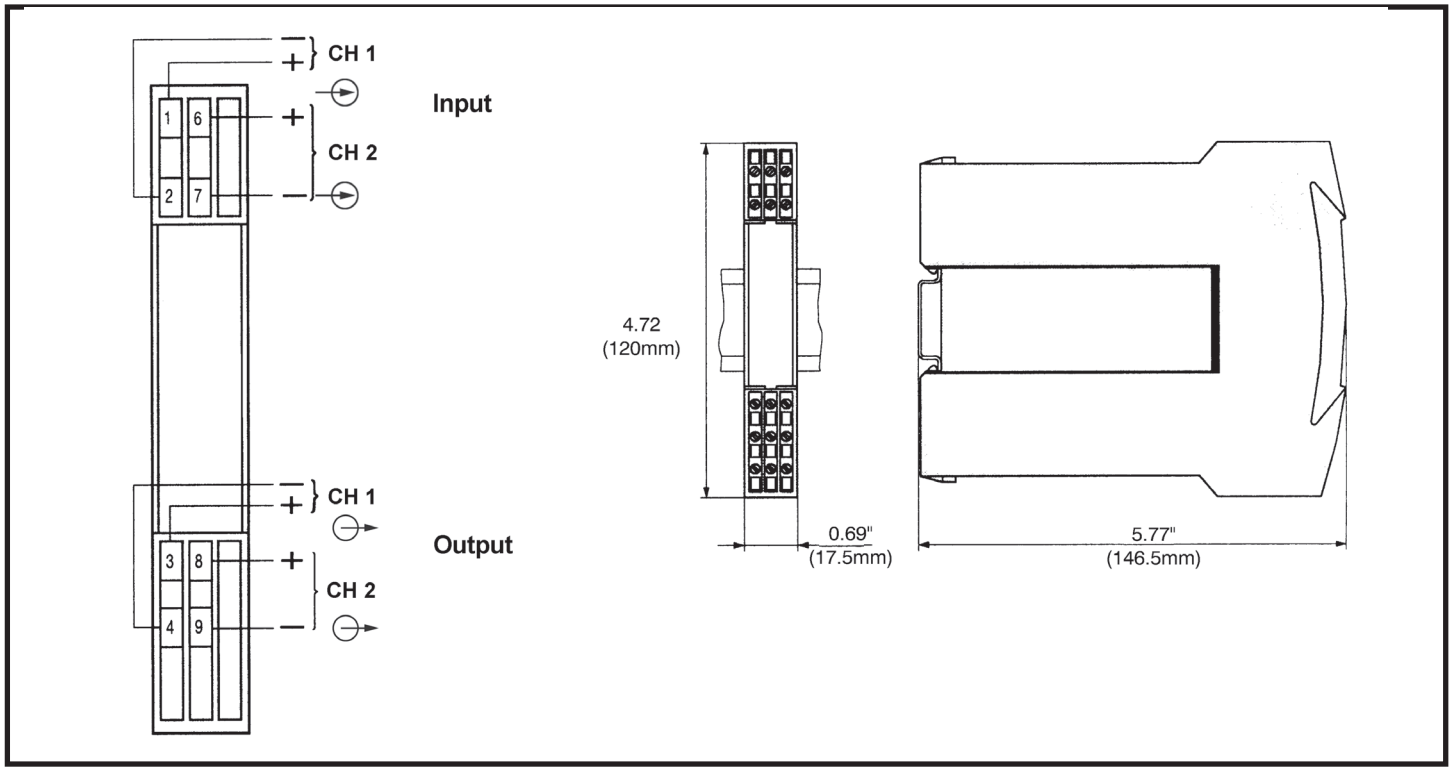


Figure 3: DSCL23-02 Wiring and Dimensions

DSCL24 (Single Channel)

Jumper Configurable - DIN or Panel Mount

Description

Each single channel DSCL24 module provides up to 36 different configurations of process current or voltage inputs and outputs. A unique snap-in tool allows quick extraction of the module's circuit board to permit the user to reposition four (4) jumpers and reconfigure each module's I/O. The factory default setting provides 4-20mA input and output current.

Each module provides full 3-way isolation with 2300Vrms CMV input to output and 3700Vrms CMV power supply to I/O protection. Two module versions are offered that accept universal power supply of either 24 to 60VDC or AC and 85 to 230VDC or AC with the alternating current usage accepting 45 to 400Hz power.

▶ Features

- Uses Universal Power Supply of 24 to 60V or 85 to 230V AC/DC
- Configuration Jumpers Allows up to 36 I/O Settings
- Three-Way Isolation for 2300Vrms Protection
- Prevents Ground-Loop Problems
- Prevents the Transfer of Interference Voltages and Currents
- High Accuracy Over Full Span
- No Recalibration or Maintenance Required
- Narrow DIN Package, Mounts up to 27 Devices into a 19" Rack Space
- DIN Rail or Panel Mountable
- CE Compliant

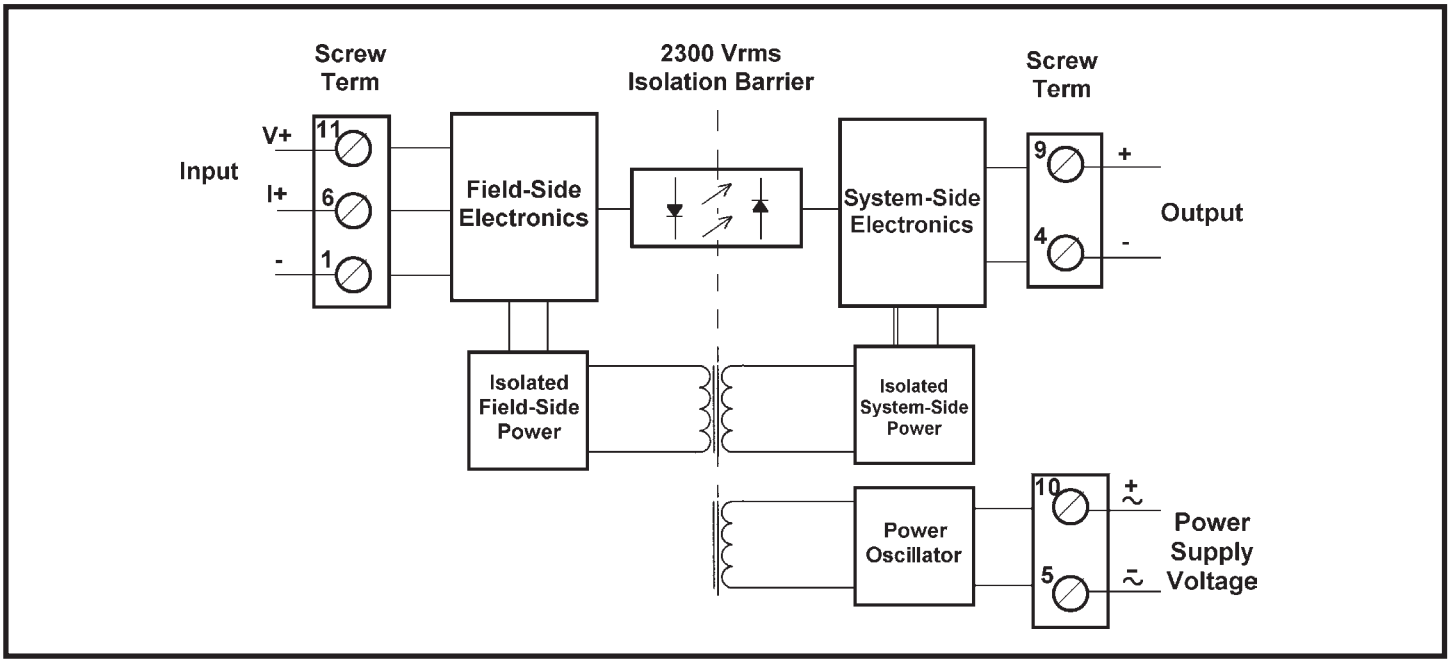


Figure 1: DSCL24 Block Diagram

Specifications

Typical at T_A=+25°C and 24VDC or 230VAC ±10% supply voltage

Module	DSCL24-01,-02
Input Range(1)	0/4-20mA, ±20mA, 2-10V, 0-10V, ±10V
Input Limit (I_{in})	50mA, ±50mA
Input Limit (V_{in})	40V, ±40V
CMV Input to Output	2300Vrms, 1 min.
CMV Power Supply to I/O	3700Vrms, 1 min.
Accuracy (at 250Ω Load)	±0.1% Span Typical ±0.2% Span Max
Input Resistance	15Ω Current Mode, 100kΩ Voltage Mode
Linearity	Included in Accuracy
Stability	<100ppm/°C
Input Overshoot	<20µA (Typical 5µA)
Output Range(1)	0/4-20mA, ±20mA, 2-10V, 0-10V, ±10V
Output Limit (I_{out})	20mA, ±20mA
Output Limit (V_{out})	10V, ±10V
Limit Upper Range	40mA
Bandwidth, –3dB	15Hz
CMR (50Hz or 60Hz)	110dB
NMR	16dB at 50/60 Hz
Response Time	30ms, to 90% Span
Load Resistance Range	≤600Ω Current Mode, ≥2kΩ Voltage Mode
Output Noise	<0.5% p-p
Power Supply	
Voltage	(24 to 60) or (85 to 230)VDC/AC at 45-400Hz
Tolerance	DC –15% to +33%, AC ±15%
Power consumption	DC ≤1.2W, AC ≤3VA
Environmental	Weight Approximately 180g
Housing Material	Lexan 940 (UL 94 V-O)
Shock Test	50g (3 Shocks, 6 Axis)
Operating Temp. Range	–25°C to +55°C
Storage Temp. Range	–40°C to +70°C
Relative Humidity	0 to 75% Noncondensing
Emissions	EN50081-2 (Radiated, Conducted)
Immunity	EN50082-2 (ESD, RF, EFT)

NOTES:
(1) Thirty-six unique I/O ranges are jumper configurable. See Tables 1 & 2 for configuration options.

Configuration Guide

The default setting of factory stock modules is 4 to 20mA for both module input and output, that is, jumpers are inserted in positions B1 and B4 designating 4-20mA input and jumpers ST4 and ST3 are in position for current output.

However, the output can be user reconfigured for an alternative voltage or current signal by inserting the plug-in jumpers ST4 and ST3 in the appropriate positions shown in table 1.

Ordering Information

Model	Input (default(1))	Output (default(1))	Power Supply
DSCL24-01	4-20mA	4-20mA	24-60VDC/AC
DSCL24-02	4-20mA	4-20mA	85-230VDC/AC

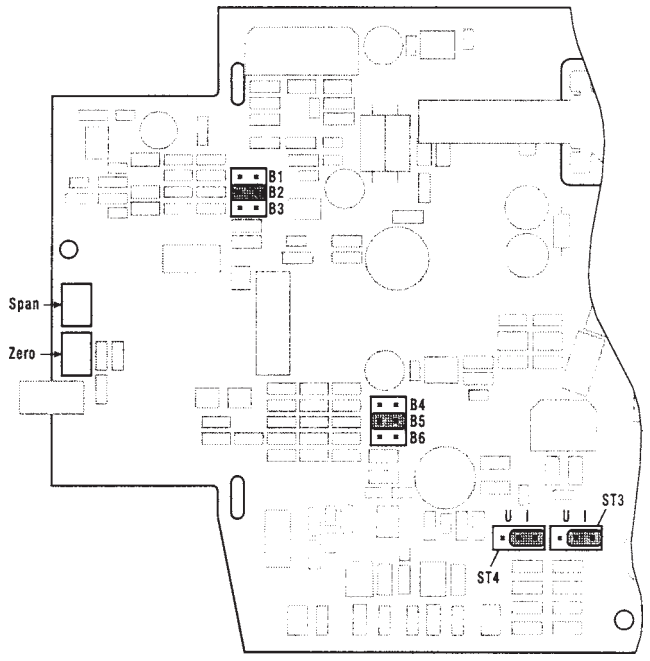
Table 1: Select Output Voltage or Current

Output ⊖→	Jumpers ST 4	ST 3
Voltage [V]	U I	U I
Current [mA]	U I	U I

Table 2: Select Voltage or Current Ranges

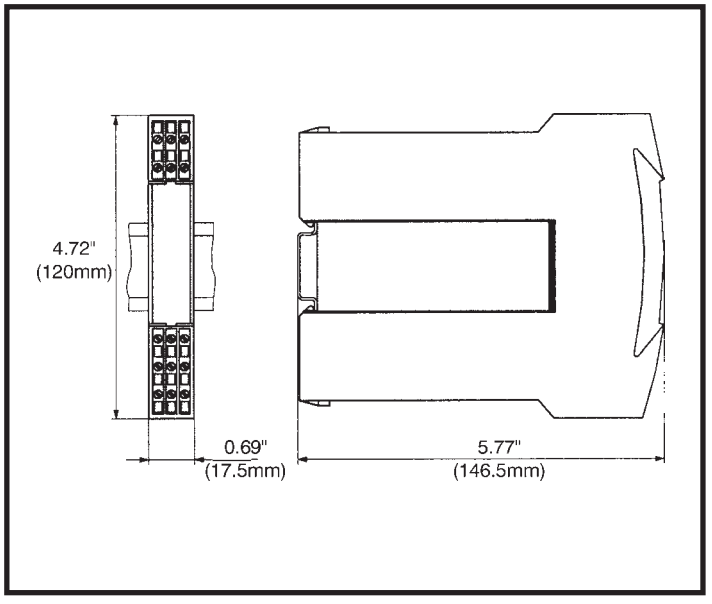
⊖→ \ ⊖→	**4...20 mA**	0...20 mA	–20…20 mA	2…10 V	0…10 V	–10…10 V
4...20 mA	**B1, B4**	B2, B4	B3, B4	B1, B4	B2, B4	B3, B4
0...20 mA	B1, B5	B2, B5	B3, B5	B1, B5	B2, B5	B3, B5
–20…20 mA	B1, B6	B2, B6	B3, B6	B1, B6	B2, B6	B3, B6
2…10 V	B1, B4	B2, B4	B3, B4	B1, B4	B2, B4	B3, B4
0…10 V	B1, B5	B2, B5	B3, B5	B1, B5	B2, B5	B3, B5
–10…10 V	B1, B6	B2, B6	B3, B6	B1, B6	B2, B6	B3, B6

NOTE: B1 through B6 Jumpers marked on PC board

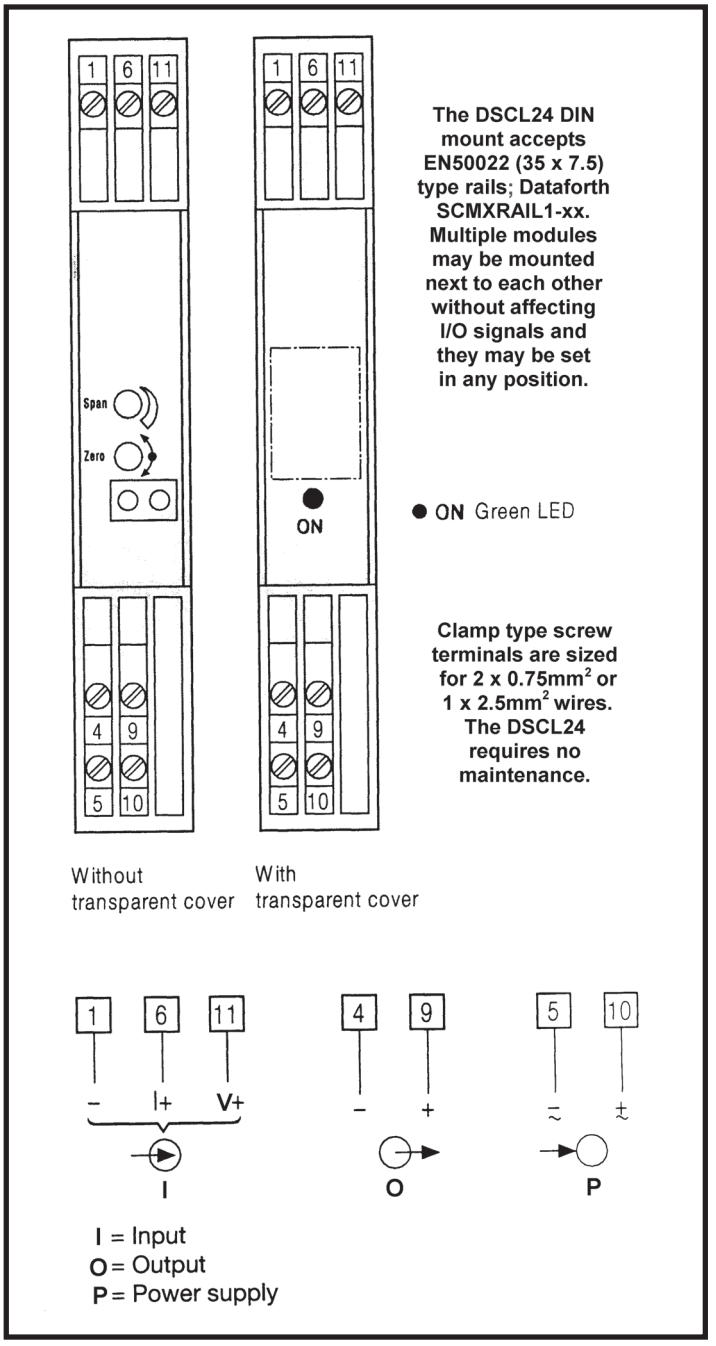


Jumpers B1 to B6 (table 2) are used for selecting the standard configurable ranges. Providing that the 'Span' and 'Zero' potentiometers are not adjusted, changing the range has no effect on the modules' accuracy. The 'Span' and 'Zero' allow ±10% adjustments.

Dimensions



Connection Guide



DSCL24 (Multi-Channel)

Factory Configurable Isolator - DIN or Panel Mount

Description

Each multi-channel DSCL24 module provides up to 252 different configurations of process current or voltage inputs and outputs. The factory default setting provides 4-20mA input and output current. Alternatively, users may complete and submit a specific configuration table that instructs the factory on how to solder in configuration jumpers.

Each module provides full 3-way isolation with 2300Vrms CMV input to output and 3700Vrms CMV power supply to I/O protection. Two module versions are offered that accept universal power supply of either 24 to 60VDC or AC and 85 to 230VDC or AC with the alternating current usage accepting 45 to 400Hz power.

▶ Features

- Uses Universal Power Supply of 24 to 60V or 85 to 230V AC/DC
- Factory Configured Soldered Jumpers Allows up to 250+ I/O Settings
- Three-Way Isolation for 2300Vrms Protection
- Prevents Ground-Loop Problems
- Prevents the Transfer of Interference Voltages and Currents
- High Accuracy Over Full Span
- No Recalibration or Maintenance Required
- Narrow DIN Package, Mounts up to 27 Devices into a 19" Rack Space
- DIN Rail or Panel Mountable
- CE Compliant

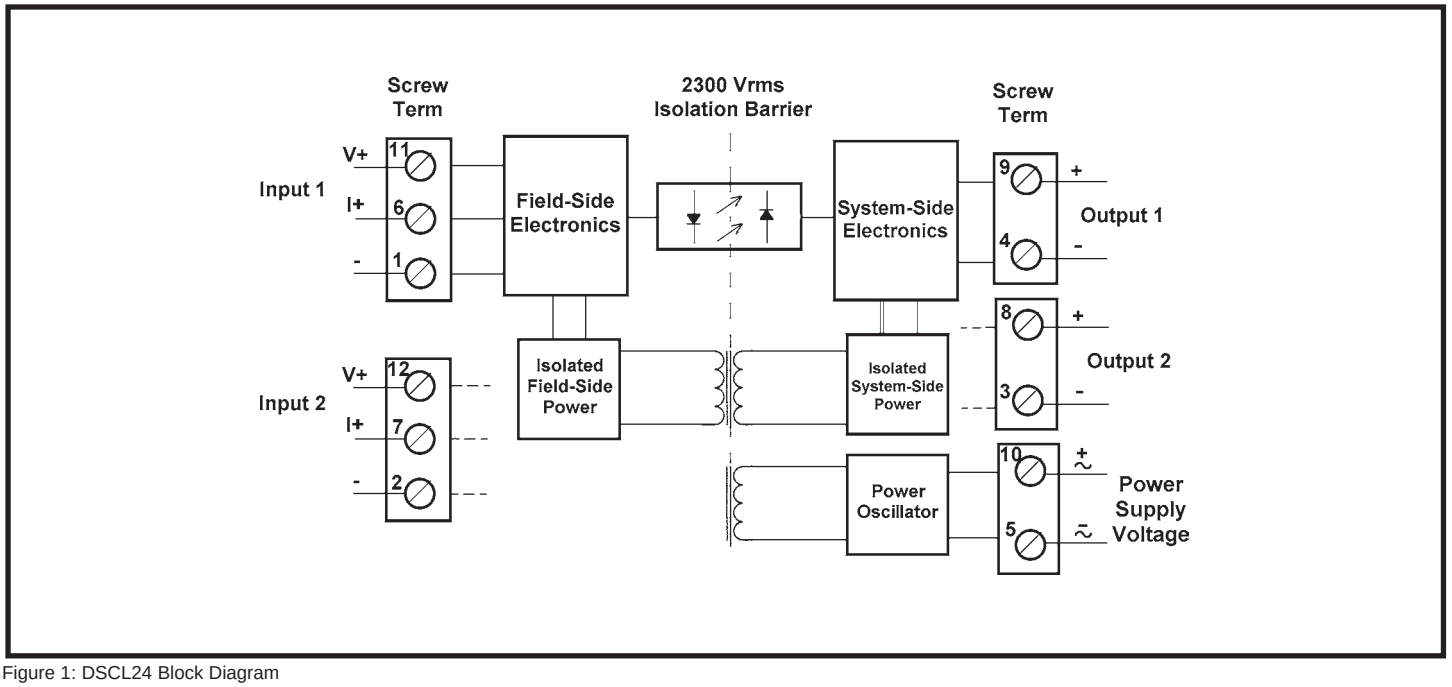


Figure 1: DSCL24 Block Diagram

Specifications

Typical at T_A=+25°C and 24VDC or 230VAC ±10% supply voltage

Module	DSCL24-11,-12
Input Range(1)	4-20mA
Input Limit	40mA, ±40mA
CMV Input to Output	2300Vrms, 1 min.
CMV Power Supply to I/O	3700Vrms, 1 min.
Accuracy (at 250Ω Load)	±0.1% Span Typical, ±0.2% Span Max
Input Resistance	15Ω Current Mode
Linearity	Included in Accuracy
Stability	<100ppm/°C
Input Overshoot	<20µA (Typical 5µA)
Output Range(1)	4-20mA
Limit Upper Range	40mA
Bandwidth, –3dB	15Hz
CMR (50Hz or 60Hz)	110dB
NMR	16dB at 50/60Hz
Response Time	30ms, to 90% Span
Load Resistance Range	≤600Ω Current Mode
Output Noise	<0.5% p-p
Power Supply	
Voltage	(24 to 60) or (85 to 230)VDC/AC at 45-400Hz
Tolerance	DC –15% to +33%, AC ±15%
Power Consumption	DC ≤1.6W, AC ≤3.4VA
Environmental	Weight Approximately 180g.
Housing Material	Lexan 940 (UL 94 V-O)
Shock Test	50g (3 Shocks, 6 Axis)
Operating Temp. Range	–25°C to +55°C
Storage Temp. Range	–40°C to +70°C
Relative Humidity	0 to 75% Noncondensing
Emissions	EN50081-2 (Radiated, Conducted)
Immunity	EN50082-2 (ESD, RF, EFT)

NOTES:
(1) 250+ unique I/O ranges are factory configurable. See Table 1 for configuration options.

Configuration Options

The default setting of factory stock modules is 4 to 20mA for both module input and output.

Alternatively, users may complete and submit Table 1 specifics that the factory will use to apply solder-in jumpers configuring the module as desired.

NOTE: Modules once configured for a specific user I/O range cannot be subsequently reconfigured.

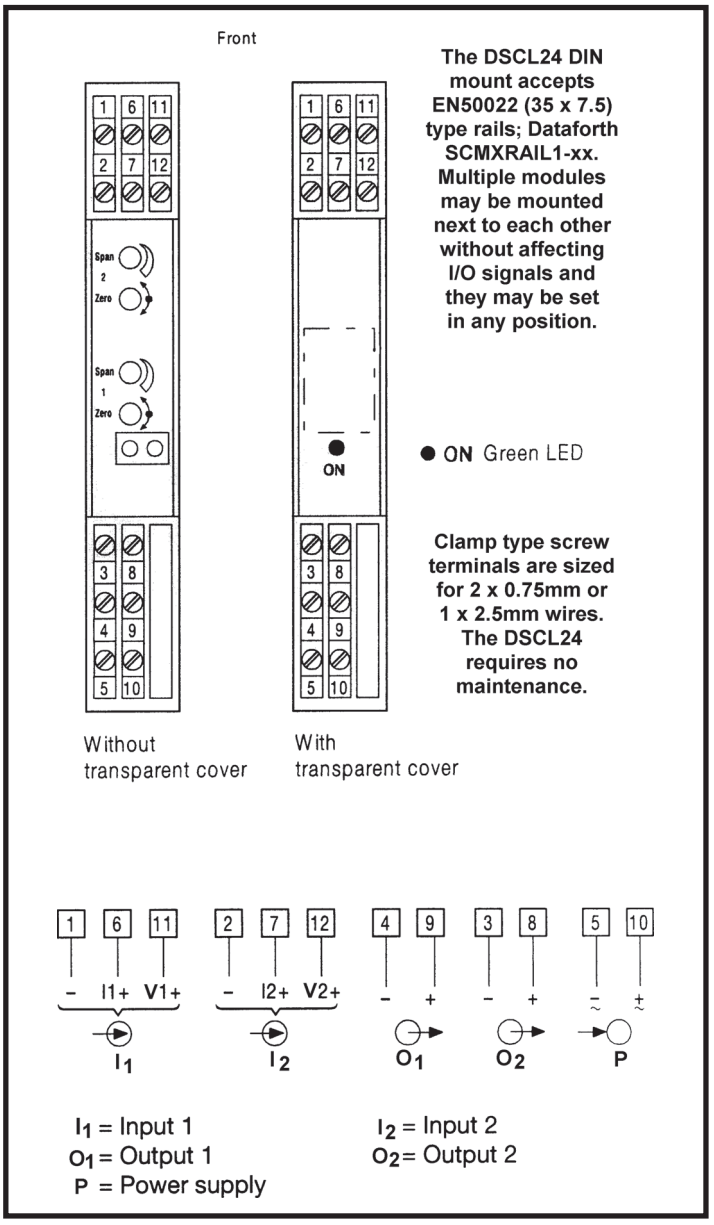
Factory Configuration

Check-mark the desired Input and Output range for each channel in the table at right. Copy and submit this configuration sheet with your purchase order. The factory will assign a DSCL24-xxxx part number to your specific configuration. This part number may be used on subsequent orders. The 'Span' and 'Zero' potentiometers allow ±10% adjustments beyond the following factory solder jumper settings.

Table 1: Configuration Checklist

Input Current (mA)	Chn 1	Chn 2
0 to 0.1		
0 to 0.2		
0 to 0.5		
0 to 1		
0 to 2		
0 to 5		
0 to 10		
0 to 20		
0.2 to 1		
1 to 5		
2 to 10		
4 to 20		
-0.1 to 0.1		
-0.2 to 0.2		
-0.5 to 0.5		
-1 to 1		
-2 to 2		
-5 to 5		
-10 to 10		
-20 to 20		
Input Voltage (V)	**Chn 1**	**Chn 2**
0 to 0.1		
0 to 0.2		
0 to 0.5		
0 to 1		
0 to 2		
0 to 5		
0 to 10		
0 to 20		
0 to 40		
0.2 to 1		
1 to 5		
2 to 10		
4 to 20		
-0.1 to 0.1		
-0.2 to 0.2		
-0.5 to 0.5		
-1 to 1		
-2 to 2		
-5 to 5		
-10 to 10		
-20 to 20		
Output Current (mA)	**Chn 1**	**Chn 2**
0 to 20		
4 to 20		
-20 to 20		
Output Voltage (V)	**Chn 1**	**Chn 2**
0 to 10		
2 to 10		
-10 to 10		

Connection Guide

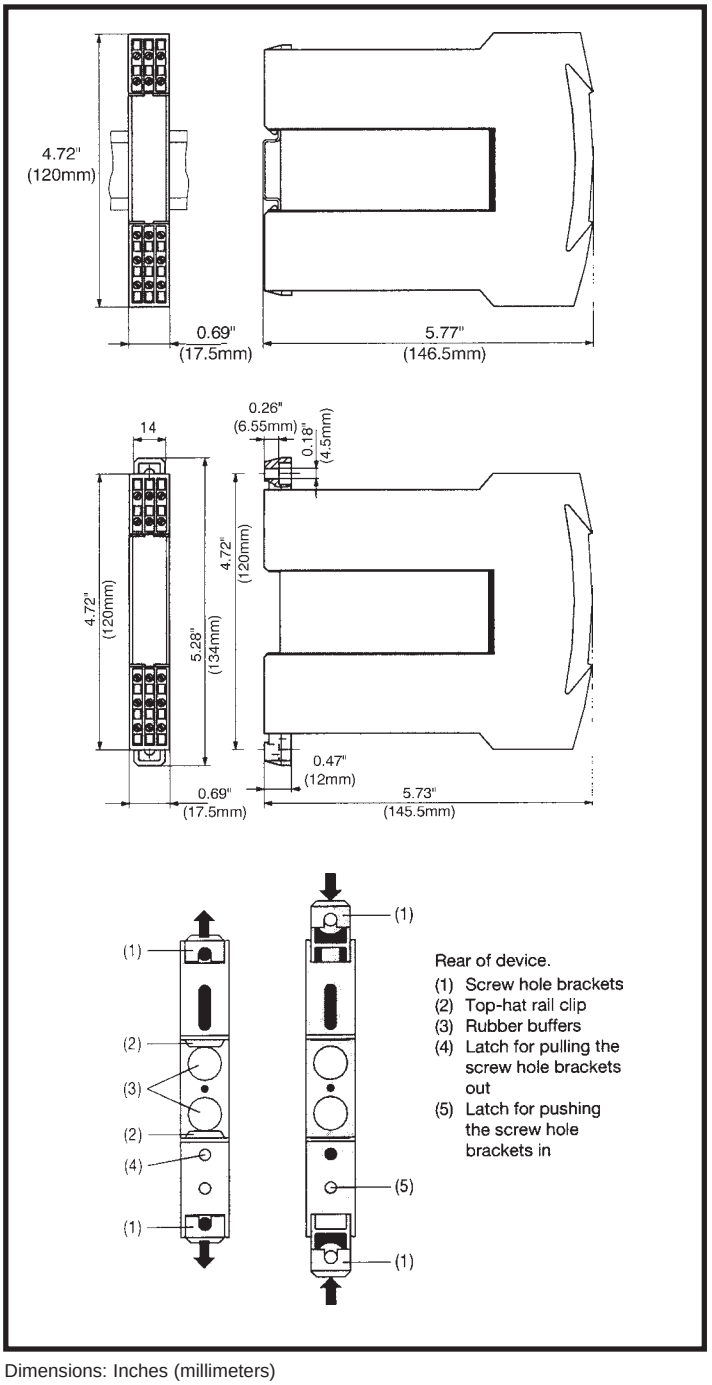


Ordering Information

Model	Input (default*)	Output (default*)	Power Supply
DSCL24-11	(2) 4-20mA, 4-20mA	(2) 4-20mA, 4-20mA	24-60VDC/AC
DSCL24-12	(2) 4-20mA, 4-20mA	(2) 4-20mA, 4-20mA	85-230VDC/AC

NOTES:
* 250+ unique I/O ranges are factory configurable. See Table 1 for configuration options.

Dimensions and Mounting



Dimensions: Inches (millimeters)

DSCL

DSCP20

Programmable 2-Wire Temperature Transmitter, DIN Mount

Description

Each DSCP20 2-wire transmitter is designed for measuring temperature using thermocouples or RTDs. 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 two, three or four 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

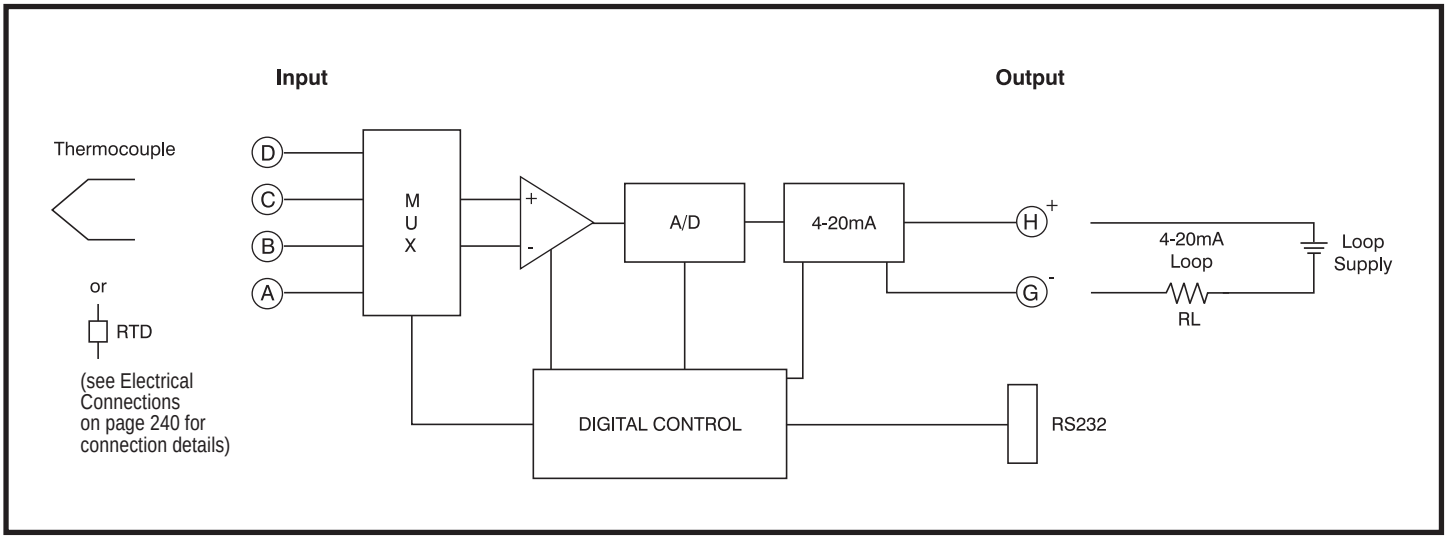


Figure 1: DSCP20 Block Diagram

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
B	Pt30Rh-Pt6Rh
E	NiCr-CuNi
J	Fe-CuNi
K	NiCr-Ni
L	Fe-CuNi
N	NiCrSi-NiSi
R	Pt13Rh-Pt
S	Pt10Rh-Pt
T	Cu-CuNi
U	Cu-CuNi
C	W5 Re/W26 Re
D	W3 Re/W25 Re

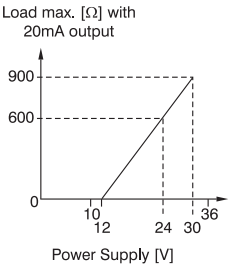
Specifications

Typical at T_A=+25°C, 24V loop supply voltage, R_L=250Ω; PT100, 3 wire, 0-600°C

Module	DSCP20
Input Range, Thermocouple	Reference Table 1
Thermocouple Types:	
B,E,J,K,N,R,S,T,L,U,C,D	
Cold Junction Compensation	
Internal	Incorporated Pt 100
External	0 to 60°C, Configurable
Input Resistance	>10MΩ
Input Range, RTD	Reference Table 1
RTD Types: Pt 100, Ni 100	
RTD Excitation Current	≤0.20mA
Input Resistance	>10MΩ
Lead Resistance	≤30Ω per Lead
Output Range	4 to 20mA or Inverse 20 to 4mA
Output Noise	<1% p-p
Loop Supply Voltage	12 to 30 VDC
Reverse Supply Protection	Continuous
Load Resistance	See Note 1
Output Response for Input Failure	Configurable to hold value of output immediately prior to input failure, or value between 4 and 21.6mA
Output Time Response	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
Environmental	
Operating Temp. Range	–25°C to +80°C
Storage Temp. Range	–40°C to +80°C
Relative Humidity	0 to 75% Noncondensing
Emissions	EN50081-2 (Radiated, Conducted)
Immunity	EN50082-2 (ESD, RF, EFT)
Mechanical Dimensions (h)(w)(d)	2.44" x 0.67" x 2.56" (62mm x 17mm x 65mm)
Housing Material	Polyamide, Flammability Class V2 According to UL 94
Mounting	DIN EN 50022-35x7.5 or EN 50035-G32

NOTES:

(1): Load Resistance: $R_L(\text{max}) = \frac{\text{Loop Supply (V)} - 12\text{V}}{I_{OUTPUT}(\text{max})}$



(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 to 20mA output, open circuit detect = 21.6mA output.

(4) Submit configuration form shown on page 238, and factory will assign part number prior to order entry.

(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.

Ordering Information

Model	Input Range/Description	Output Range
DSCP20 (Basic Configuration)(3)	Configurable RTD or Thermocouple, User Programmed	4 to 20mA, or Inverted
DSCP20-xxxx (Contact Factory)(4)	Configurable RTD or Thermocouple, Factory Programmed	4 to 20mA, or Inverted

Accessories

Model	Description
DSCX-887	PC Interface Cable
DSCX-416	Module Interface Cable
DSCX-895	Configuration Software

Table 1

Measured Variables	Measuring Ranges Limits	Min. Span	Max. Span
RTD: 2, 3, or 4-wire			
Pt 100, Standard IEC 60 751	–200 to +850°C	50°C	850°C
Ni 100, Standard DIN 43 760	–60 to +250°C	50°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)		±0.015% Span Typ., ±0.05% Span max
Thermocouples (<500°C Span)		±0.015% Span Typ., ±0.05% Span max
High Initial Value	Factor:	±0.0002 Typ., ±0.0005 max
	Error:	(Factor)*(Initial Value/Span)*100 [%]
Influence of Lead Resistance		±0.01% per Ω
Internal Cold Junction Compensation		±(0.5°C/Span)*(100) [%]

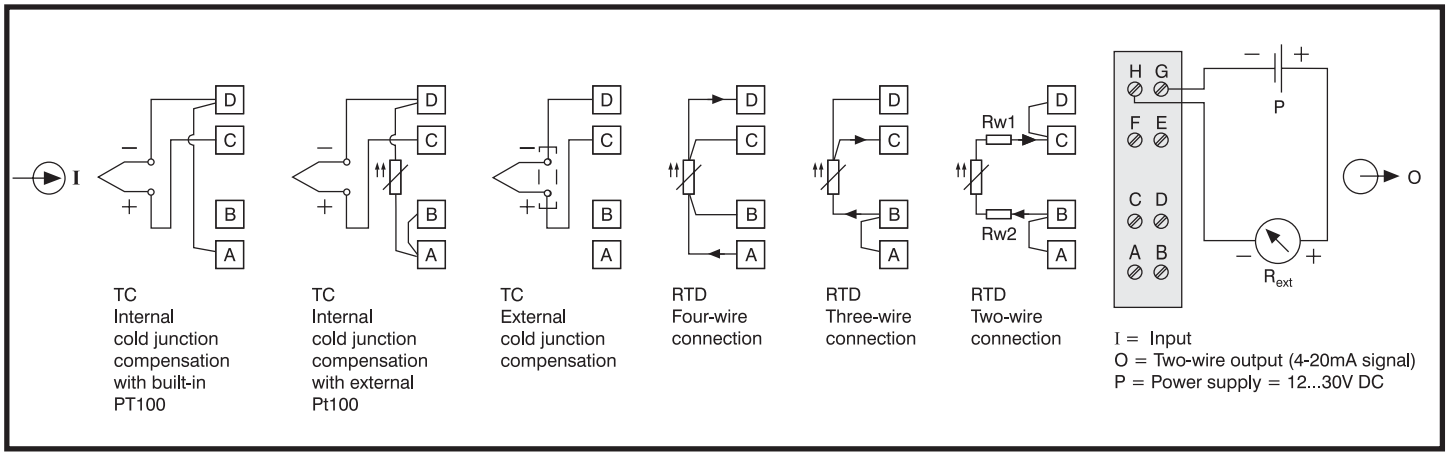
DSCP

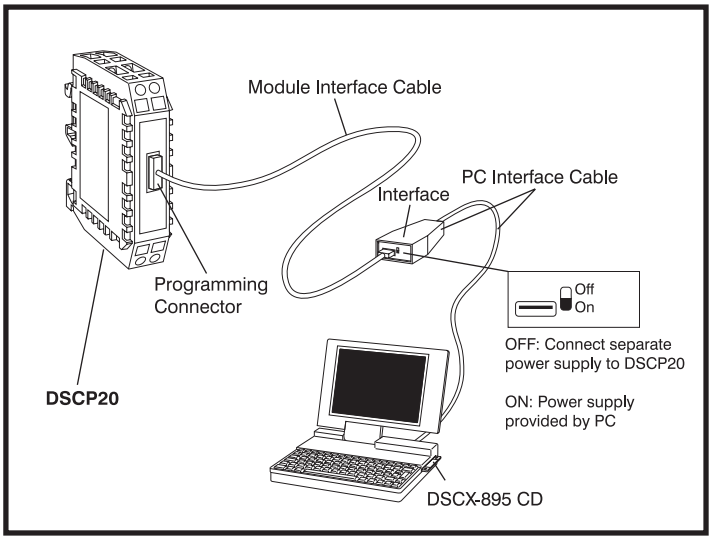
Table 3: Temperature Measuring Ranges

Measuring range examples	Resistance thermometers		Thermocouples											
[°C]	Pt100	Ni100	B	E	J	K	L	N	R	S	T	U	C[1]	D[2]
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
	NOTE A		NOTE B											

NOTE A: 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.
NOTE B: Range of span is 2mV minimum to 80mV maximum. The ratio of the min value to the span must be less than or equal to 10.
NOTE (1): W5 Re W26 Re (ASTM E 988-90)
NOTE (2): W3 Re W25 Re (ASTM E 988-90)
NOTE (3): For two-wire connections, the end value is made up of the measured end value (Ω) plus the total resistance of the leads.

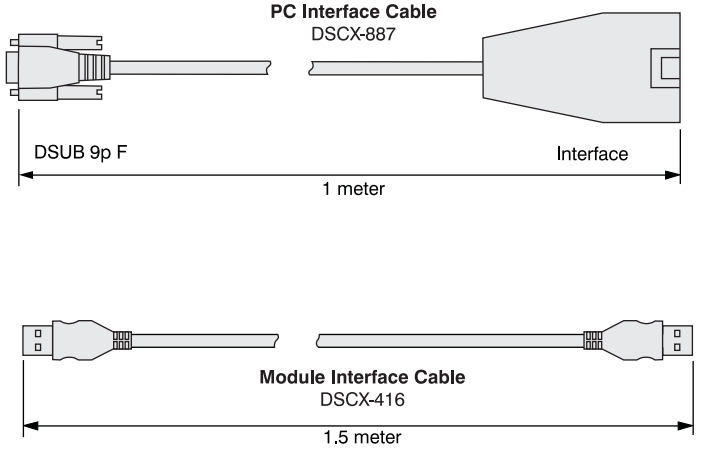
Electrical Connections





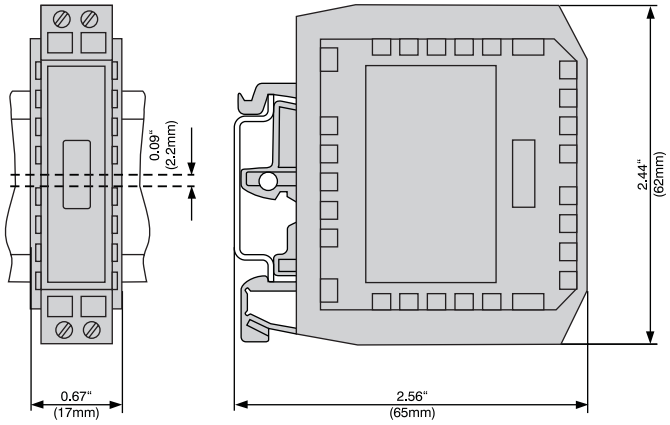
Example of the set-up for programming a DSCP20 without the power supply.
For this case the switch on the interface must be set to "ON'.

Table 4: Accessories and Spare Parts

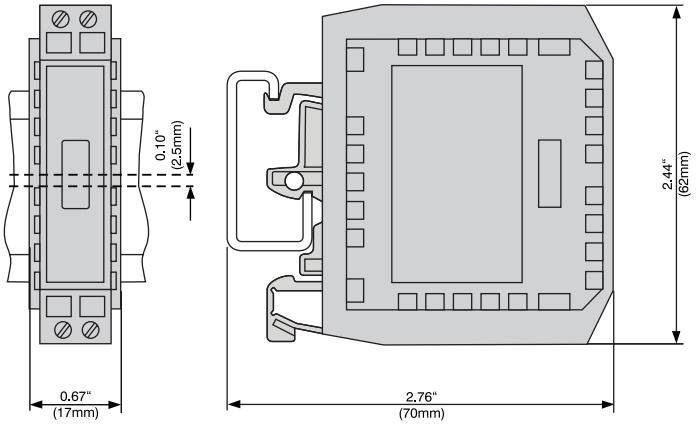


Dimensions

Dimensions: inches (millimeters)



DSCP20 Clipped onto a Top-Hat Rail EN 50-022-35 x 7.5



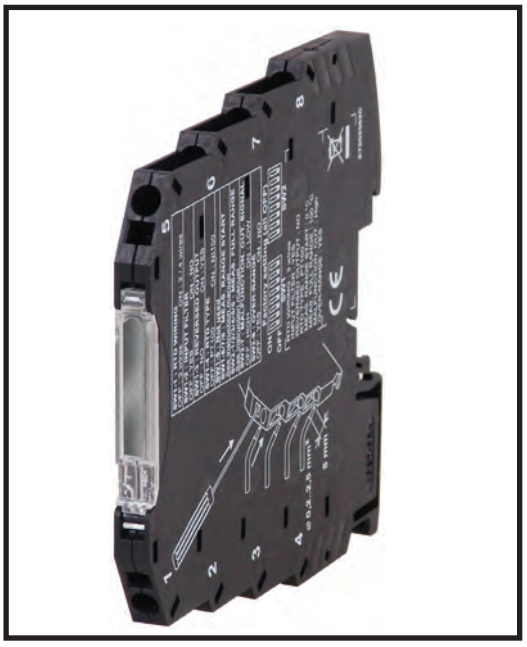
DSCP20 Clipped onto a Rail "G" EN 50-035-G32

DSCP55

Pt100, Ni100/Loop-Powered Converter

Description

Each DSCP55 RTD Loop-Powered Converter provides a single channel of RTD input which is amplified, linearized and converted to a highlevel 4 to 20mA or 20 to 4mA output. Inputs may be connected by 2, 3, or 4 wires and measurement range may be configured by dip-switch.

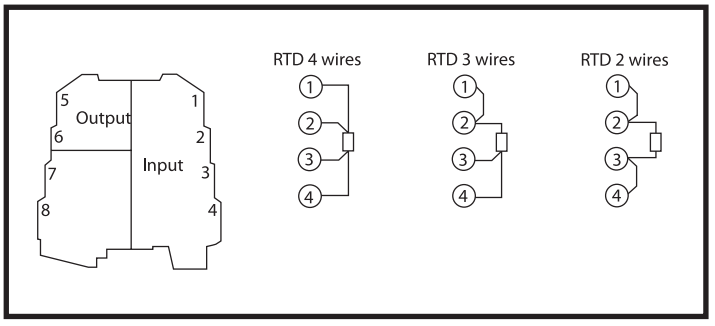


▶ Features

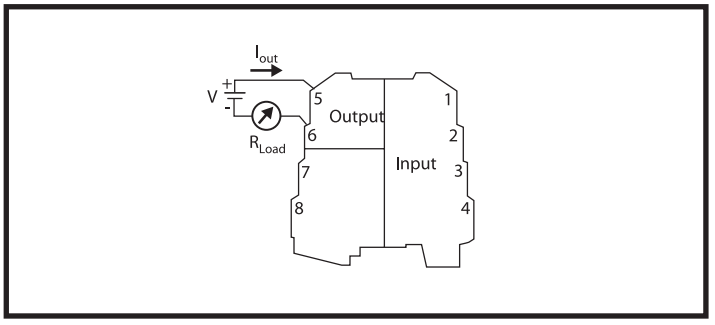
- Input: Pt100 (–200°C to + 650°C)
  Ni100 (–60°C to + 250°C)
- Output: Current (4 to 20 or 20 to 4mA)
- Spring Cage Clamp Connection
- 16-Bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-Switch
- Compact 6.2mm DIN Housing
- CE Compliant

Electrical Connections

Input



Output and power supply



Specifications

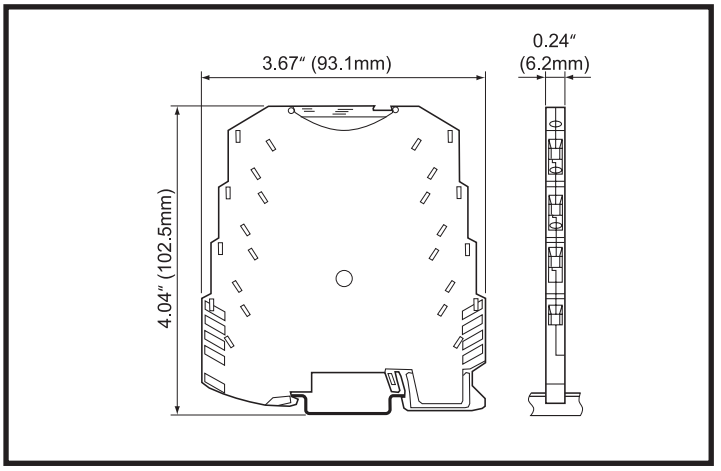
Typical at T_A=+25°C and +24VDC loop power

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 to 20 or 20 to 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 to 30VDC
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
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)

Ordering Information

Model	Description
DSCP55	Pt100, Ni100 Loop-Powered Converter

Dimensional Drawing



DSCP61

Pt100-to-DC Current/Voltage Converter

Description

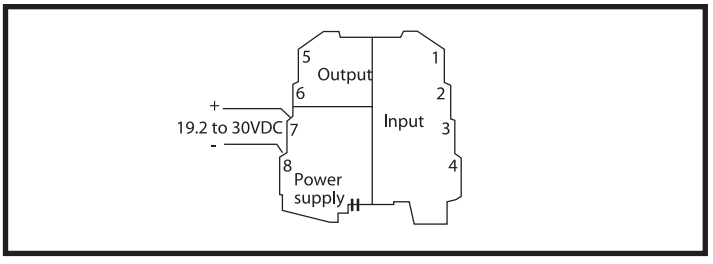
Each DSCP61 RTD Pt100 Converter provides a single channel of RTD input which is amplified, linearized and converted to a high-level current or voltage output. Inputs may be connected by 2, 3, or 4 wires and measurement range may be configured by dip-switch to cover a range of –150°C to +650°C. Power 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

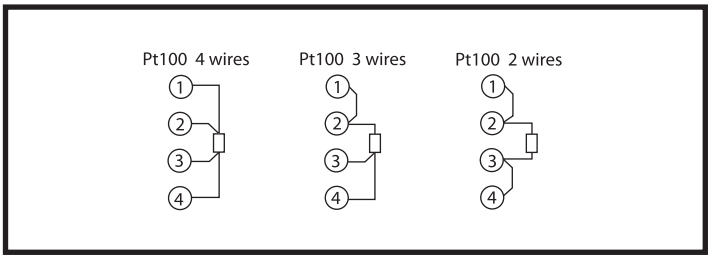
- Input: Pt100 (2, 3, 4 wires, –150°C to +650°C)
- Output Current: 0 to 20, 4 to 20, 20 to 0, 20 to 4mA
- Output Voltage: 0 to 5, 1 to 5, 0 to 10, 10 to 0VDC
- 1500Vrms Galvanic Isolation, 3-Way
- 19.2 to 30VDC Power
- Spring Cage Clamp Connection
- 14-Bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-Switch
- Compact 6.2mm DIN Housing
- CE Compliant

Electrical Connections

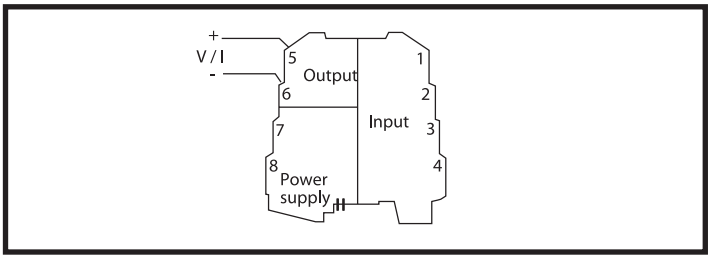
Power supply



Input



Output



Specifications

Typical at T_A=+25°C and +24VDC 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	±0.1% (max)
Thermal Drift	<100ppm/°K
A/D Conversion	14-bit
Processing	Floating point 32-bit
Response Time, 90% Span (selectable)	<50ms (without filter), <200ms (with filter)
Isolation	1500Vrms (1 minute), 3-Way
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	0 to 20, 4 to 20, 20 to 0 or 20 to 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 to 5, 1 to 5, 0 to 10 or 10 to 0VDC Load resistance: 2kΩ (min)
Power Supply	19.2 to 30VDC
Power Consumption	500mW (21mA at 24VDC)
Hot Swapping	Yes
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
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)

Ordering Information

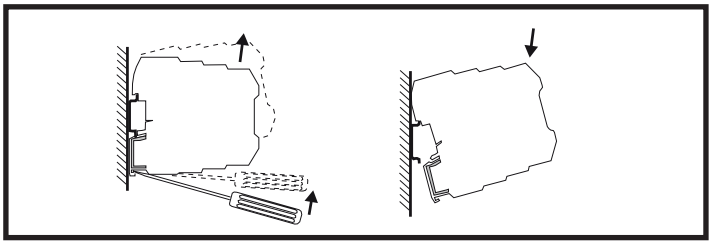
Model	Description
DSCP61	Pt100-to-DC Current/Voltage Converter

Accessories

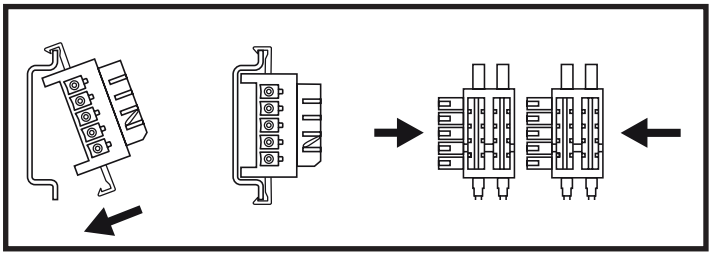
Model	Description
DSCX-02	DIN Rail Expandable Power-Bus Connector
DSCP70	Power Supply Connection Module

Installation

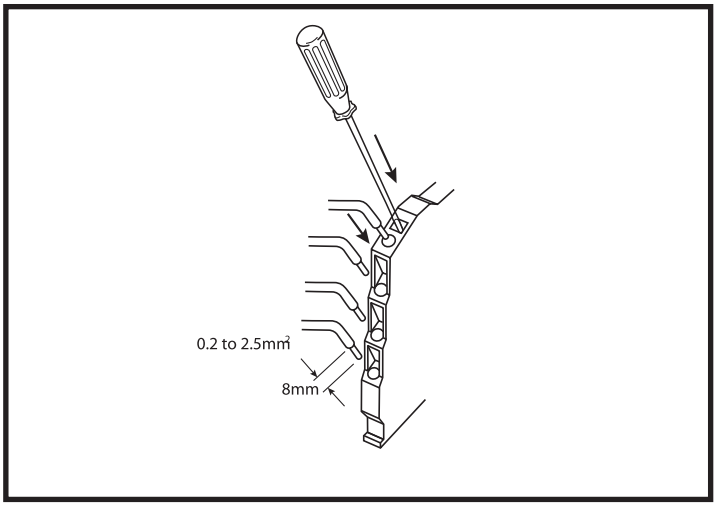
Inserting/extracting module on DIN guide



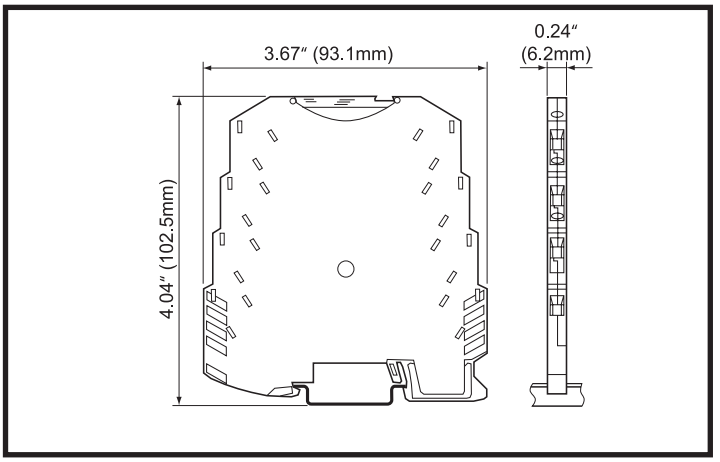
Expandable power-bus connector



Spring cage clamp connection



Dimensional Drawing



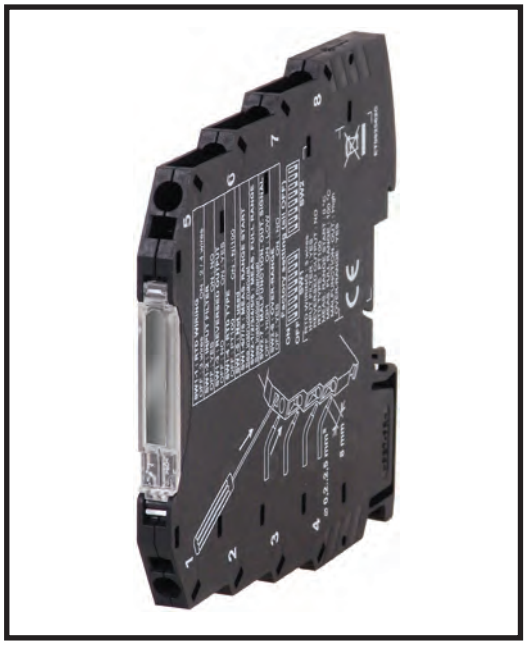
DSCP

DSCP62

Thermocouple-to-DC Current/Voltage Converter with Relay Output

Description

Each 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 ther-mostat. 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.

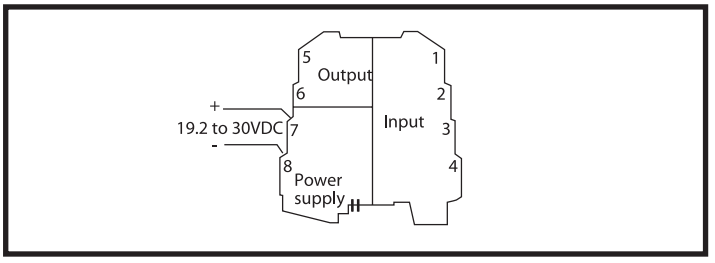


▶ Features

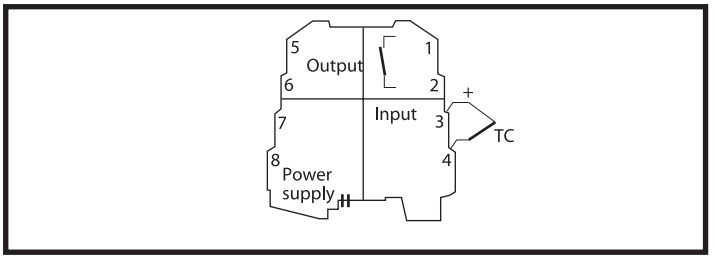
- Input: Thermocouple types J, K, E, N, S, R, B, T
- Output Current: 0 to 20, 4 to 20, 20 to 0, 20 to 4mA
- Output Voltage: 0 to 5, 1 to 5, 0 to 10, 10 to 0VDC
- Auxiliary Relay for Alarm or Control
- 1500Vrms Galvanic Isolation, 3-Way
- 19.2 to 30VDC Power
- Spring Cage Clamp Connection
- 14-Bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-Switch
- Compact 6.2mm DIN Housing
- CE Compliant

Electrical Connections

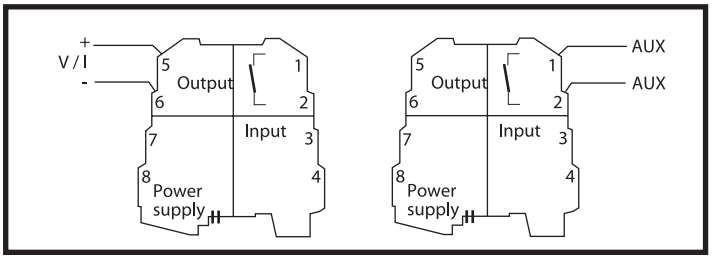
Power supply



Input



Output



Specifications

Typical at T_A=+25°C and +24VDC power

Module	DSCP62
Input (selectable)	
Thermocouple Type EN 60584-1	J, K, E, N, S, R, B, T
	Measurement range: Depends on thermocouple type and dip-switch setting
	Span: 100°C (min)
Input Impedance	10MΩ
Accuracy	±0.1% (max)
Cold Junction Error	1.5°C (max)
Thermal Drift	<120ppm/°K
A/D Conversion	14-bit
Processing	Floating point 32-bit
Response Time, 90% Span (selectable)	<25ms (without filter), <55ms (with filter)
CMRR	>135dB, referred to power supply side
Isolation	1500Vrms (1 minute), 3-Way
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	0 to 20, 4 to 20, 20 to 0 or 20 to 4mA Load resistance: 500Ω (max)
Current Output Protection	25mA (max)
Fault Output	102.5% or 105% of full-scale value in case of over-range
Voltage	0 to 5, 1 to 5, 0 to 10 or 10 to 0VDC Load resistance: 2kΩ (min)
Auxiliary Relay Output	Rated 60mA (max) at 24VAC
Power Supply	19.2 to 30VDC
Power Consumption	<600mW (24mA at 24VDC)
Hot Swapping	Yes
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
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)

Ordering Information

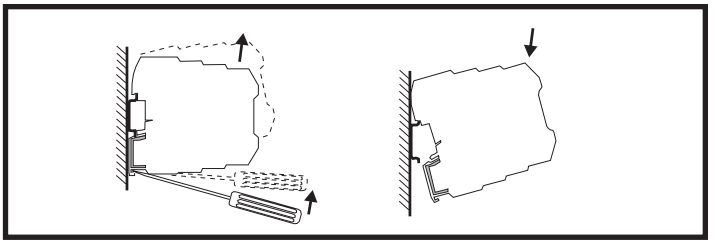
Model	Description
DSCP62	Thermocouple Converter

Accessories

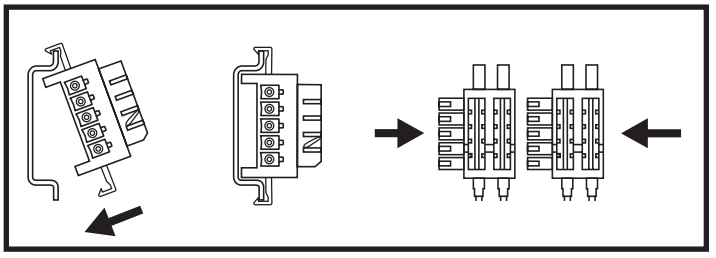
Model	Description
DSCX-02	DIN Rail Expandable Power-Bus Connector
DSCP70	Power Supply Connection Module

Installation

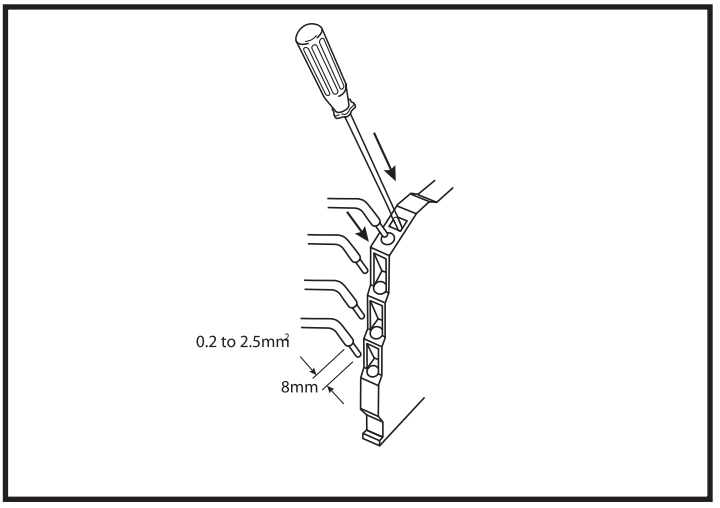
Inserting/extracting module on DIN guide



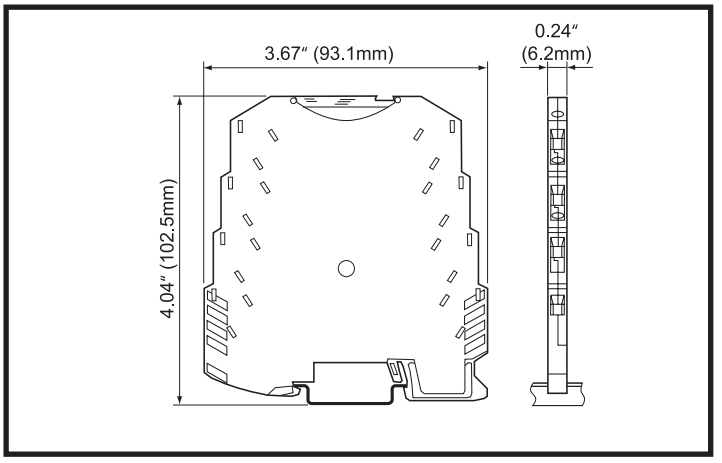
Expandable power-bus connector



Spring cage clamp connection



Dimensional Drawing



DSCP

DSCP63

DC Voltage/Current Converter

Description

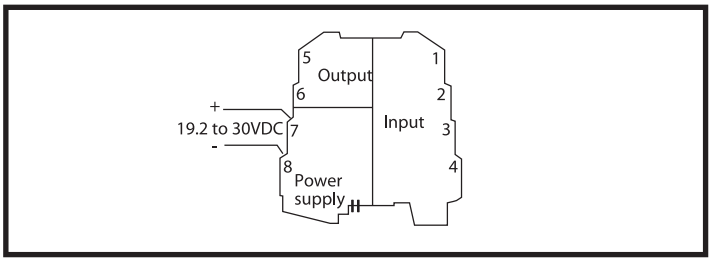
Each DSCP63 Voltage/Current Converter provides a single channel of voltage or current input which is converted to a voltage or current output. It is designed for industrial standard voltage or current signals. Input/output range, filter, fault indication, square root function and other functions may 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

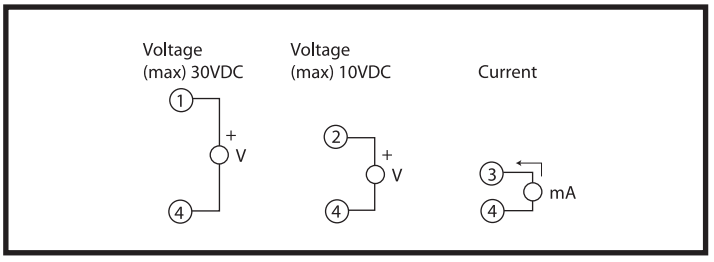
- Input Voltage: 0 to 5, 0 to 10, 0 to 15, 0 to 30, 1 to 5, 2 to 10VDC
- Input Current: 0 to 20, 4 to 20mA
- Output Voltage: 0 to 5, 0 to 10, 1 to 5, 2 to 10VDC
- Output Current: 0 to 20, 4 to 20, 20 to 0, 20 to 4mA
- 1500Vrms Galvanic Isolation, 3-Way
- 19.2 to 30VDC Power
- Spring Cage Clamp Connection
- 14-Bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-Switch
- Compact 6.2mm DIN Housing
- CE Compliant

Electrical Connections

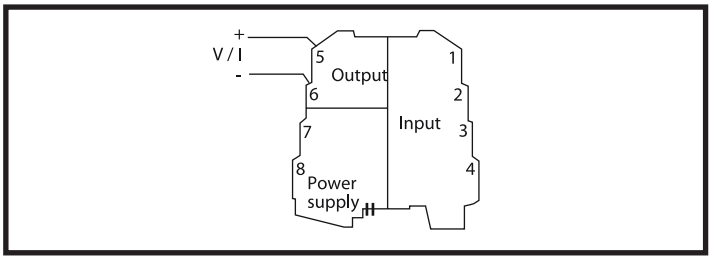
Power supply



Input



Output



Specifications

Typical at T_A=+25°C and +24VDC power

Module	DSCP63
Input (selectable)	
Voltage (maximum 50VDC)	0 to 15, 0 to 30VDC (input R = 325kΩ)
Voltage (maximum 30VDC)	0 to 5, 1 to 5, 0 to 10, 2 to 10VDC (input R = 110kΩ)
Current (maximum 24mA)	0 to 20, 4 to 20mA (input R = 35Ω)
Accuracy	±0.1% (max)
Thermal Drift	<120ppm/°K
A/D Conversion	14-bit
Processing	Floating point 32-bit
Response Time, 90% Span, (selectable)	<35ms (without filter), <74ms (with filter)
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 to 20, 4 to 20, 20 to 0 or 20 to 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 to 5, 1 to 5, 0 to 10 or 2 to 10VDC Load resistance: 2kΩ (min)
Power Supply	19.2 to 30VDC
Power Consumption	<600mW (22mA at 24VDC)
Hot Swapping	Yes
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
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)

Ordering Information

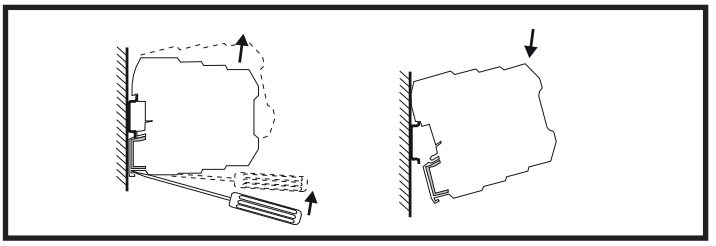
Model	Description
DSCP63	DC Voltage/Current Converter

Accessories

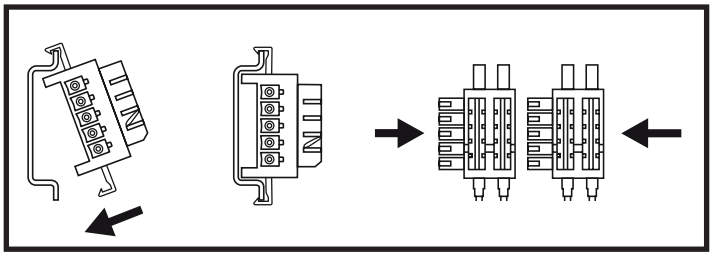
Model	Description
DSCX-02	DIN Rail Expandable Power-Bus Connector
DSCP70	Power Supply Connection Module

Installation

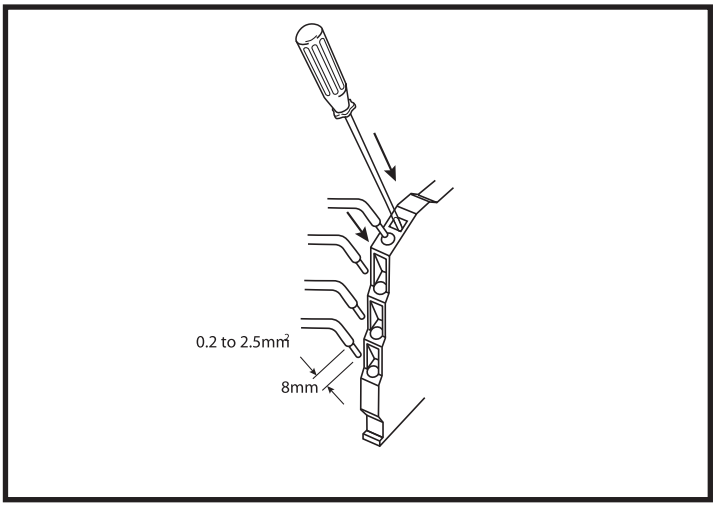
Inserting/extracting module on DIN guide



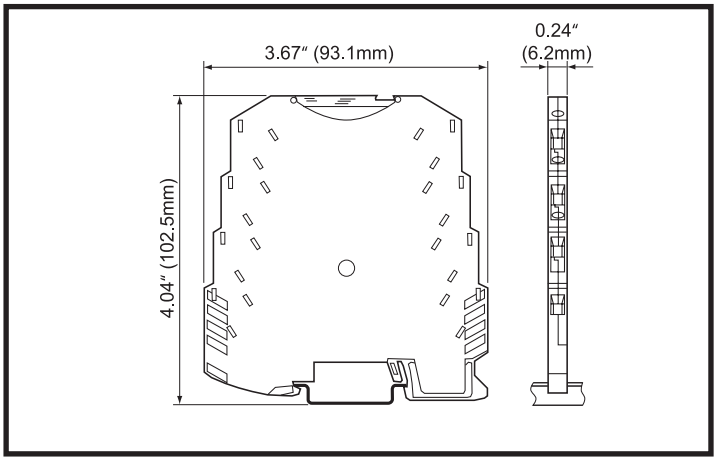
Expandable power-bus connector



Spring cage clamp connection



Dimensional Drawing



DSCP64

DC Voltage/Current Converter with Transducer Power Supply

Description

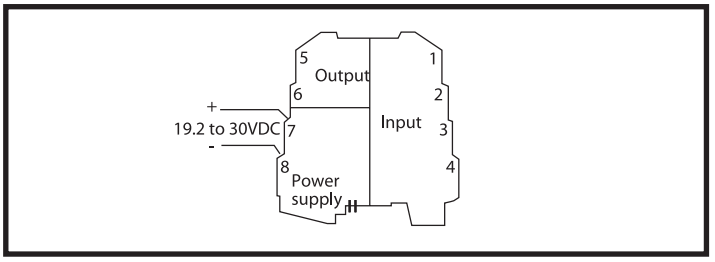
Each DSCP64 Voltage/Current Converter provides a single channel of voltage or current input which is converted to a current or voltage output. An auxiliary power supply is provided for powering the input transducer/sensor. It is designed for industrial standard voltage or current signals. Input/output 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

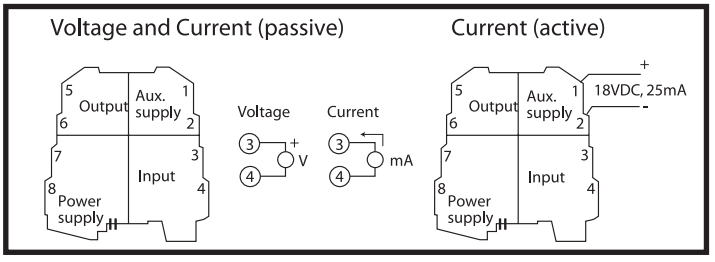
- Input Voltage: 0 to 5, 0 to 10, 1 to 5, 2 to 10VDC
- Input Current: 0 to 20, 4 to 20mA
- Output Voltage: 0 to 5, 0 to 10, 1 to 5, 2 to 10VDC
- Output Current: 0 to 20, 4 to 20, 20 to 0, 20 to 4mA
- 1500Vrms Galvanic Isolation, 4-Way
- 19.2 to 30VDC Power
- Spring Cage Clamp Connection
- 14-Bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-Switch
- Compact 6.2mm DIN Housing
- CE Compliant

Electrical Connections

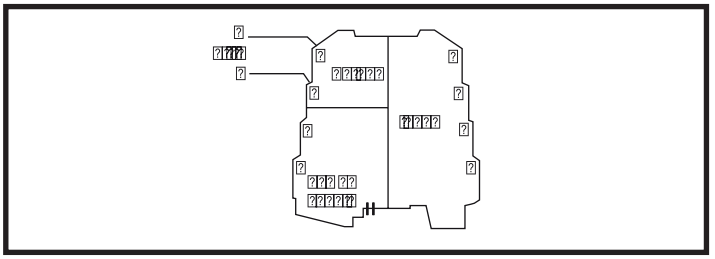
Power supply



Input



Output



Specifications

Typical at T_A=+25°C and +24VDC power

Module	DSCP64
Input (selectable)	
Voltage	0 to 5, 1 to 5, 0 to 10, 2 to 10VDC (input R = 110kΩ)
Current	0 to 20, 4 to 20mA (input R = 35Ω)
Accuracy	±0.1% (max)
Thermal Drift	<120ppm/°K
A/D Conversion	14-bit
Processing	Floating point 32-bit
Response Time, 90% Span, (selectable)	<35ms (without filter), <74ms (with filter)
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 to 20, 4 to 20, 20 to 0 or 20 to 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 to 5, 1 to 5, 0 to 10 or 2 to 10VDC Load resistance: 2kΩ (min)
Auxiliary Power Supply	17 to 21VDC, 0 to 25mA
Power Supply	19.2 to 30VDC
Power Consumption	23mA (max) at 24VDC with output at 20mA and auxiliary supply not used 45mA (max) at 24VDC with output at 21mA and auxilliary supply at 21mA
Hot Swapping	Yes
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
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)

Ordering Information

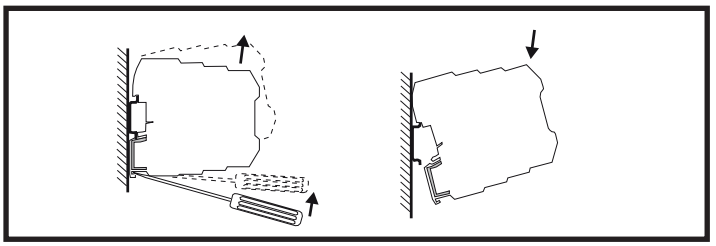
Model	Description
DSCP64	DC Voltage/Current Converter

Accessories

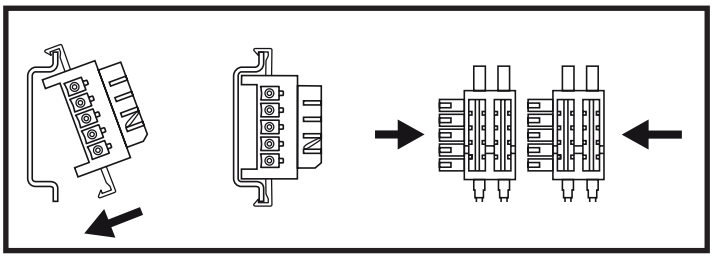
Model	Description
DSCX-02	DIN Rail Expandable Power-Bus Connector
DSCP70	Power Supply Connection Module

Installation

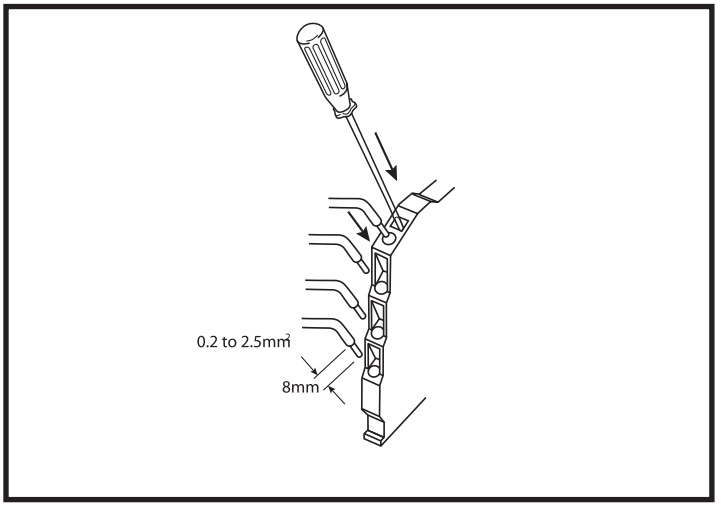
Inserting/extracting module on DIN guide



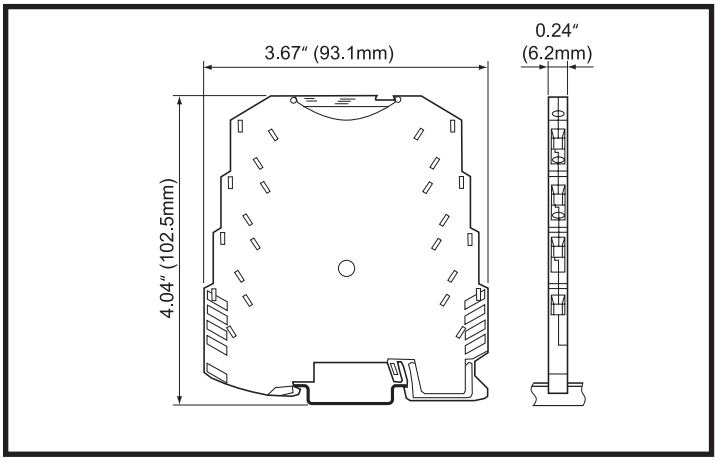
Expandable power-bus connector



Spring cage clamp connection



Dimensional Drawing



DSCP

DSCP65

DC Low Voltage Converter

Description

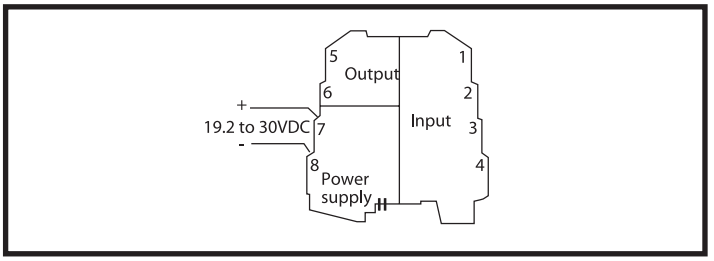
Each DSCP65 Low Voltage Converter provides a single channel of low voltage input which is converted to a current or voltage output. It is designed for industrial standard voltage or current signals. Input/output range, filter, fault indication, and other functions may be configured by dip-switch. Power 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

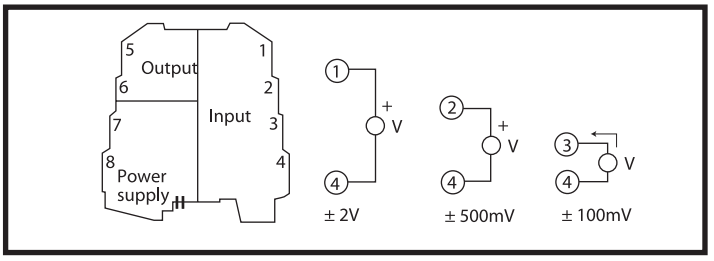
- Input Voltage: 25mV to 2VDC in 15 Settable Steps
- Output Voltage: 0 to 5, 1 to 5, 0 to 10, 2 to 10VDC
- Output Current: 0 to 20, 4 to 20, 20 to 0, 20 to 4mA
- 1500Vrms Galvanic Isolation, 3-Way
- 19.2 to 30VDC Power
- Spring Cage Clamp Connection
- 14-Bit Resolution
- Better than ±0.1% Accuracy
- Configuration by Dip-Switch
- Compact 6.2mm DIN Housing
- CE Compliant

Electrical Connections

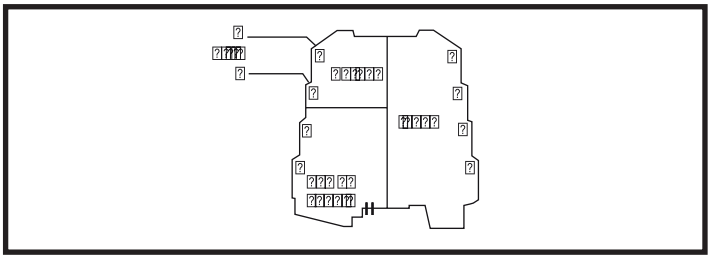
Power supply



Input



Output



Specifications

Typical at T_A=+25°C and +24VDC 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 to 20, 4 to 20, 20 to 0 or 20 to 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 to 5, 1 to 5, 0 to 10 or 2 to 10VDC Load resistance: 2kΩ (min)
Voltage Output Maximum	12.5VDC
Power Supply	19.2 to 30VDC
Power Consumption	<600mW (22mA at 24VDC)
Hot Swapping	Yes
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
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)

Ordering Information

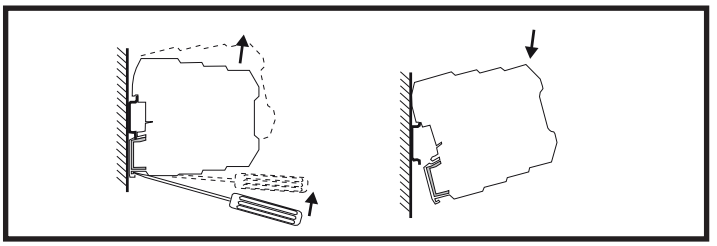
Model	Description
DSCP65	DC Low Voltage Converter

Accessories

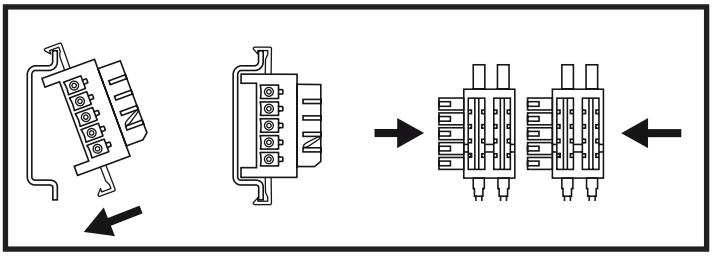
Model	Description
DSCX-02	DIN Rail Expandable Power-Bus Connector
DSCP70	Power Supply Connection Module

Installation

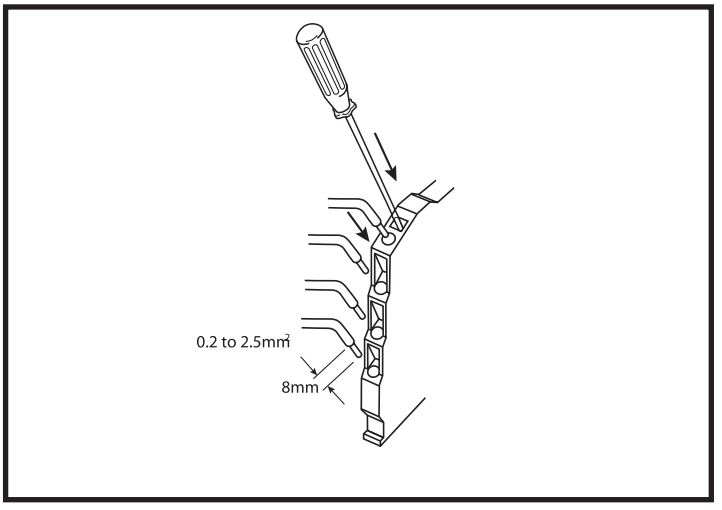
Inserting/extracting module on DIN guide



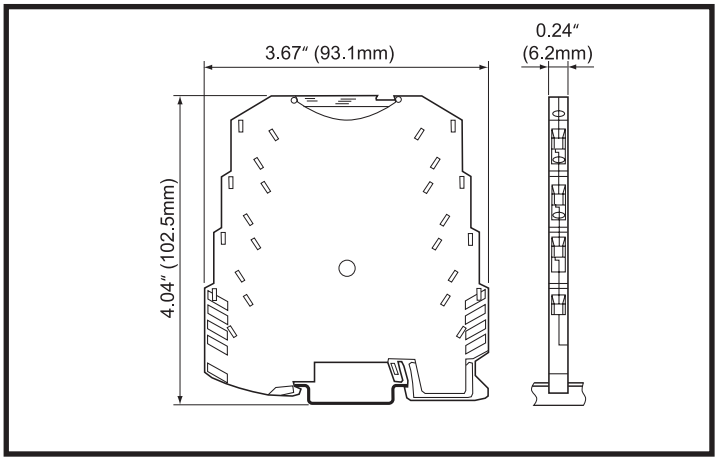
Expandable power-bus connector



Spring cage clamp connection



Dimensional Drawing



DSCP

DSCP70

Power Supply Connection Module for DIN Rail Power Bus

Description

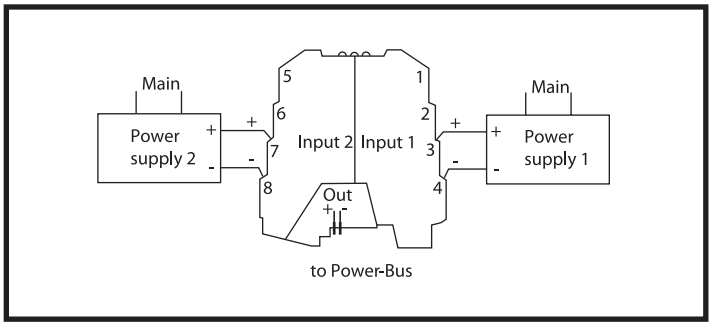
Each DSCP70 Power Supply Connection Module permits the delivery of power to DSCP6x modules through DIN rail mounted power-bus connectors. An external power supply, or supplies for redundant operation, are connected to the terminals of the DSCP70. The DSCP70 then routes the power to the DIN rail power-bus, 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

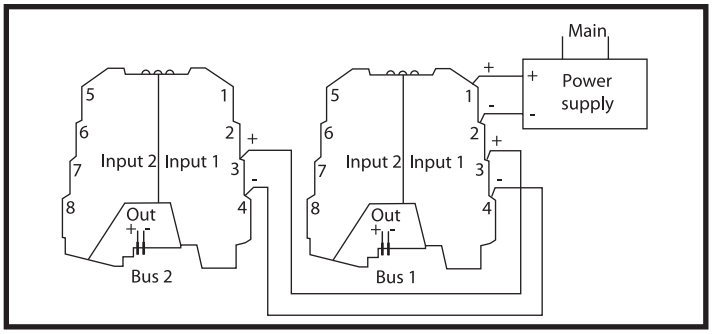
- Delivers Power to DSCP6x Modules Via DIN Rail
- Two Independent Inputs Allow Redundant Power
- LED Indication of Power Supply Presence
- LED Indication of Reversed Power Connection
- 19.2 to 30VDC Power
- Spring Cage Clamp Connection
- Compact 6.2mm DIN Housing
- CE Compliant

Electrical Connections

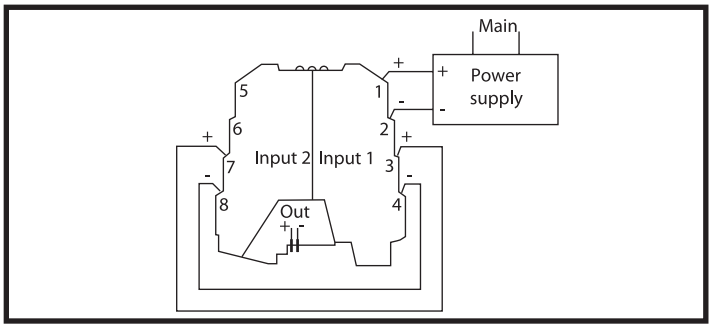
Example of connection with redundant power supply



Example of connection to more than one bus



Example of connection with inputs connected in parallel: 2 A output



Specifications

Typical at T_A=+25°C and +24VDC power

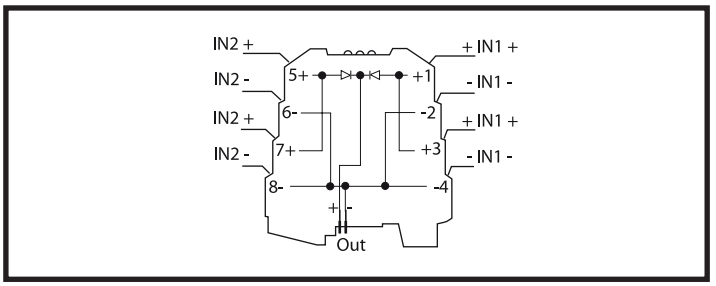
Module	DSCP70
Input	
Voltage	19.2 to 30VDC
Current Capacity	4A maximum per terminal
Protection	Each positive input must have an external fuse
Output	
Internal Voltage Drop	300mV
Current Capacity	One input = 1.6A parallel inputs 1 and 2 = 2A
Filter	Differential mode: 4.7mH and two 470nF per input
Power Consumption	5mA per input maximum
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
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)

Ordering Information

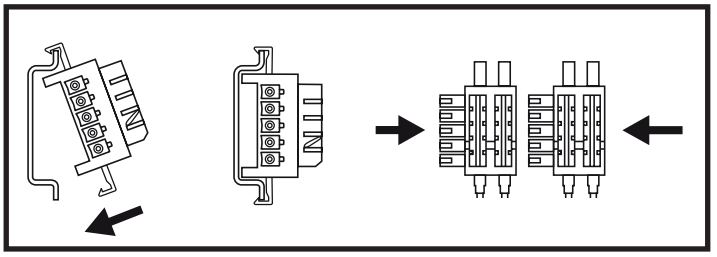
Model	Description
DSCP70	Power Supply Connection Module
DSCX-02	DIN Rail Expandable Power-Bus Connector

Installation

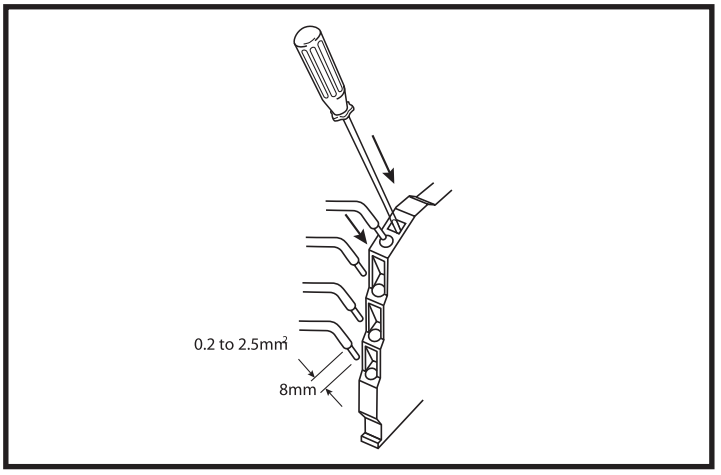
Internal wiring



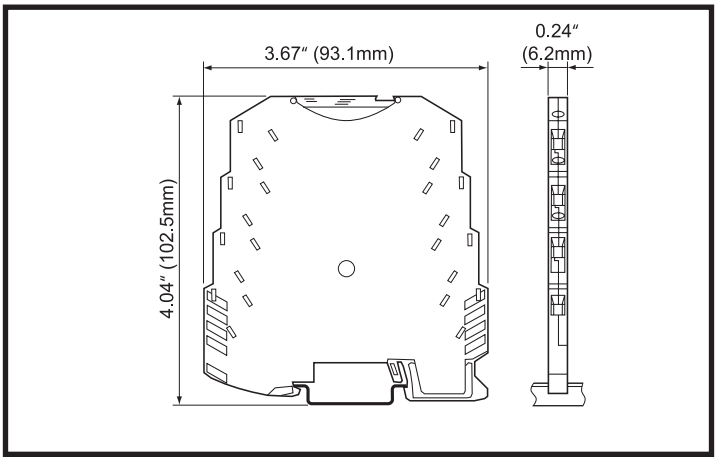
Expandable power-bus connector



Spring cage clamp connection



Dimensional Drawing



DSCP

DSCP81

Configurable Voltage/Current Input Signal Conditioner, DIN Mount

Description

Each 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. 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 and request factory configuration.

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 to 60VDC/AC or 85 to 230VDC/AC
- Alarm Relay Output
- Mounts on Standard DIN Rail
- –25C to +55C Operating Temperature
- CE Compliant

There is impending danger of high voltage on any DSCP81 connections from high input voltage or high power supply voltage.

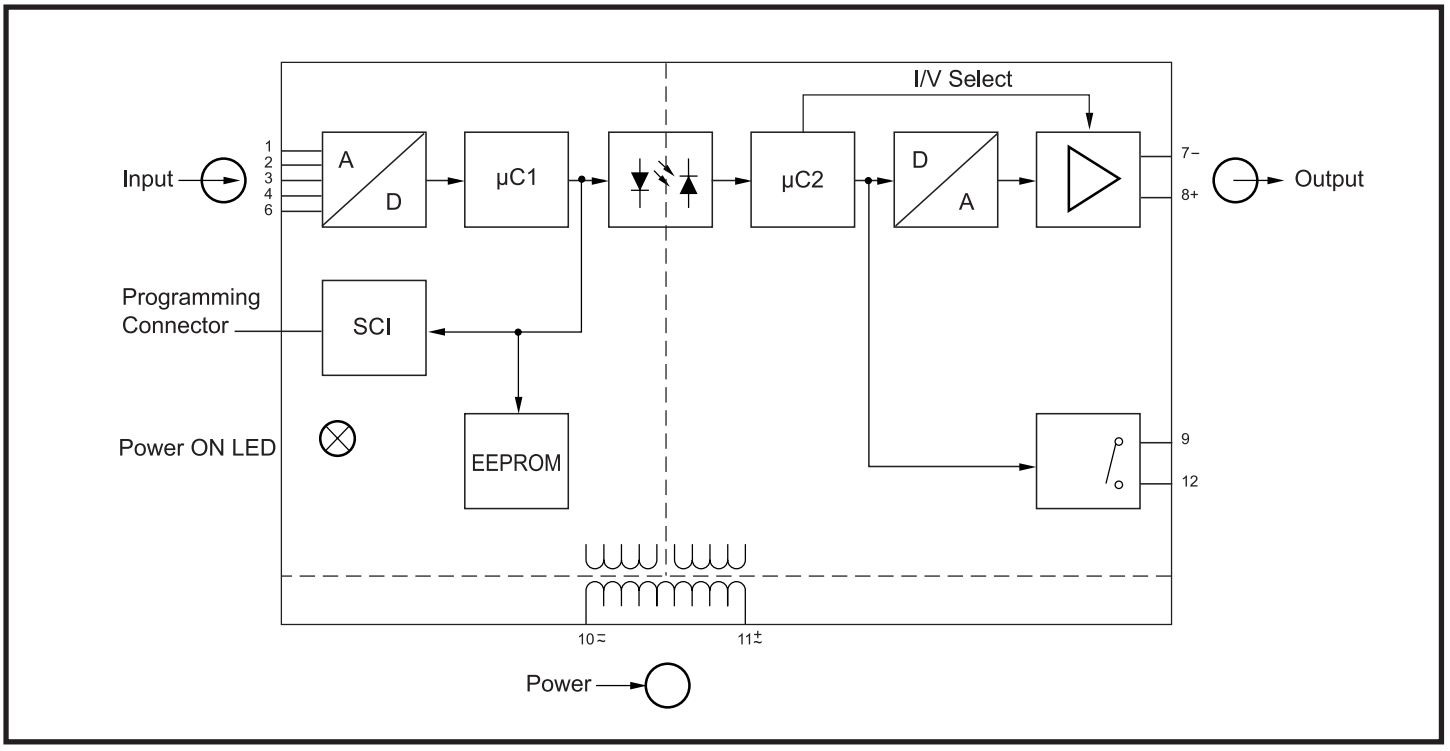


Figure 1: DSCP81 Block Diagram

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 min.
CMV, Power Supply to Input & Output	3700Vrms, 1 min.
CMV, Power Supply to Relay	2300Vrms, 1 min.
CMV, Output to Relay	2300Vrms, 1 min.
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 to 60VDC/AC, or 85 to 230VDC/AC; 45 to 400Hz AC
Tolerance	DC –15% to +33%, AC ±15%
Power Consumption	DC ≤1.2W, AC ≤2.5VA
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)
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 Acc. To UL 94
Mounting	DIN EN 50022-35x7.5 or –35x15

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
DSCP81-01-xxxx (Contact Factory[3])	Factory Configured, 24 to 60VDC/AC Power	Factory Configured V or I Output
DSCP81-02-xxxx (Contact Factory[3])	Factory Configured, 85 to 230VDC/AC Power	Factory Configured V or I Output

Accessories

Model	Description
DSCX-787	PC Interface Cable
DSCX-587	Module Interface Cable
DSCX-557	Configuration Software

Table 1: Configurable Input Filter Settings

Response Time (63%) [s]		Response Time[4] (99%) [s]	
50Hz	60Hz	50Hz	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:
(1) Includes linearity and repeatability errors at reference conditions.
(2) Shipped as 4 to 20mA input, 4 to 20mA output, linearization = linear, input filter = 80ms, ripple suppression = 60Hz, alarm function = inactive.
(3) Submit configuration form shown on page 243, and factory will assign part number prior to order entry.
(4) Configuration software allows selection of the (99%) values.

Figure 2: 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, Features 6, 7 and 8 for details
(2) In relation to the analog input span

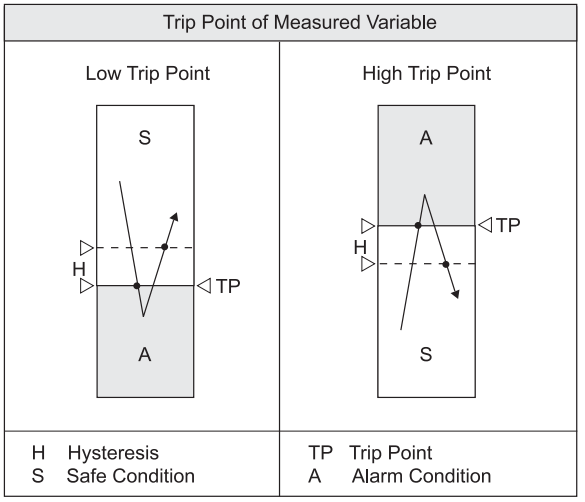


Table 2: Input Range and Associated Connection Diagram

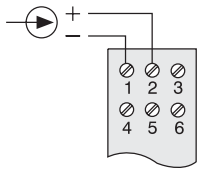
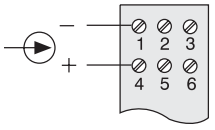
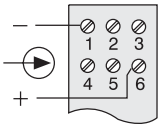
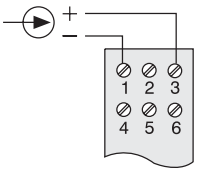
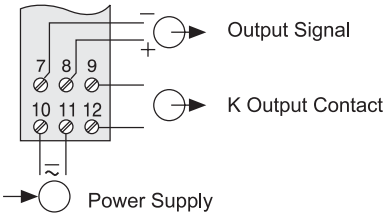
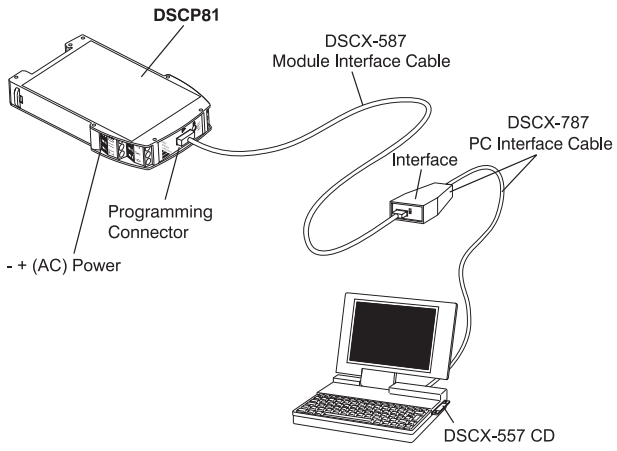
Measuring Mode/Application	DC Voltage			DC Current
Measuring Range Limits	≤ ± 1.7V	> ± 1.7 to ≤ ± 100V	> ± 100 to ± 1000V	≤ ± 100 mA
= Input Signal				
= Output Signal K = Output Contact = Power Supply				

Figure 3: 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 supplied on a CD and runs under Windows 95, 98, NT and 2000.

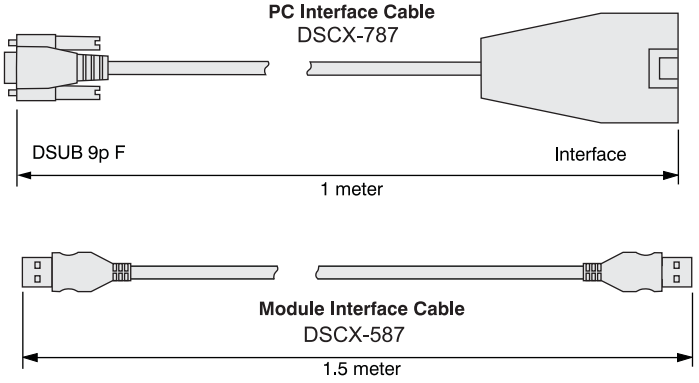
IMPORTANT!

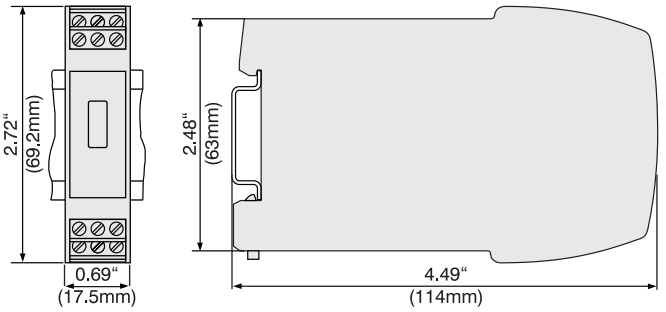
1. DO NOT connect the DSCX-587 module interface cable to the DSCP81 programming connector when >253 V is applied to the DSCP81 input.

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 >24 V is connected to the DSCP81.

Figure 4: Product Dimensions





DSCP81 Clipped onto a Top-Hat Rail (35 x 15mm or 35 x 17 mm, acc. to EN 50 022).

SCTP20

Programmable 2-Wire Temperature Transmitter, Head Mount

Description

Each SCTP20 2-wire transmitter is designed for measuring temperature using thermocouples or RTDs. The input type, measurement range, and other features are software configurable. A PC, the DSCX-887 and DSCX-440 interface cables, and the DSCX-895 configuration software are required to configure the transmitter. Communication is serial RS-232C. User can choose an isolated or non-isolated model.

The SCTP20 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, Cu50*, and Ni 100, can be interfaced in a two, three or four 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

- No Power Supply Required, Powered From Output Loop Current
- Interfaces to All Standard Thermocouples and RTDs
- Software Configurable Input Type and Range
- Isolated (1500Vrms) and Non-Isolated Versions Available
- Open and Short-Circuit Input Detection
- Configurable with or without Output Loop Power Connected
- –25°C to +80°C Operating Temperature
- CE Compliant

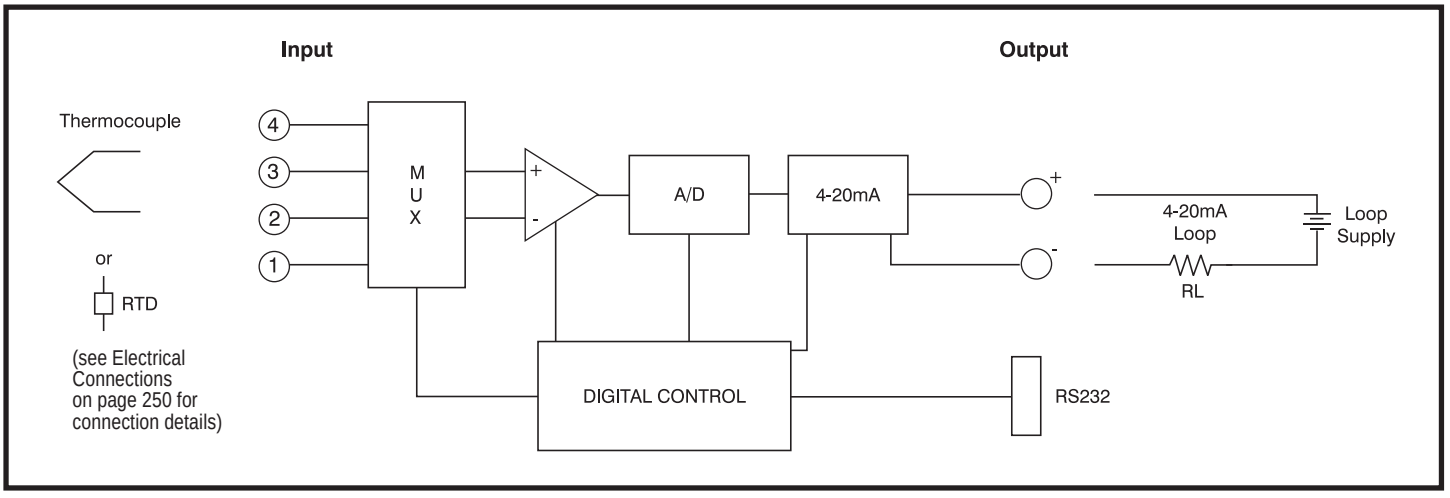


Figure 1: SCTP20 Block Diagram, Non-Isolated Model

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

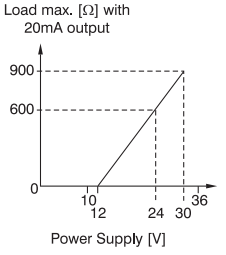
Type	Material
B	Pt30Rh-Pt6Rh
E	NiCr-CuNi
J	Fe-CuNi
K	NiCr-Ni
L	Fe-CuNi
N	NiCrSi-NiSi
R	Pt13Rh-Pt
S	Pt10Rh-Pt
T	Cu-CuNi
U	Cu-CuNi
C	W5 Re/W26 Re
D	W3 Re/W25 Re

Specifications

Typical at T_A=+25°C, 24V loop supply voltage, R_L=250Ω; PT100, 3 wire, 0-600°C

Module	SCTP20-01	SCTP20-02
Input Range, Thermocouple	Reference Table 1	*
Thermocouple Types: B,E,J,K,N,R,S,T,L,U,C,D		
Cold Junction Compensation		
Internal	Incorporated Pt 100	*
External	0 to 60°C, Configurable	*
Input Resistance	>10MΩ	*
Input Range, RTD	Reference Table 1	*
RTD Types: Pt 100, Ni 100		
RTD Excitation Current	≤ 0.20mA	*
Input Resistance	>10MΩ	*
Lead Resistance	≤30Ω per Lead	*
Output Range	4 to 20mA or Inverse 20 to 4mA	*
CMV, Input to Output	Not Isolated	1500Vrms, 1 min.
Output Noise	< 1% p-p	*
Loop Supply Voltage	12 to 30 VDC	*
Reverse Supply Protection	Continuous	*
Load Resistance	See Note 1	*
Output Response for Input Failure	Configurable to hold previous output value, or value between 4 and 21.6mA	*
Output Time Response	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	*
Environmental		
Operating Temp. Range	–25°C to +80°C	*
Storage Temp. Range	–40°C to +80°C	*
Relative Humidity	0 to 75% Noncondensing	*
Emissions	EN50081-2 (Radiated, Conducted)	*
Immunity	EN50082-2 (ESD, RF, EFT)	*
Mechanical Dimensions (h)(w)	0.66" x 1.69" (16.8mm x 43mm)	1.21" x 1.69" (30.8mm x 43mm)
Housing Material	Lexan 940, Flammability Class V0 According To UL 94	*
Mounting	Shape B Version Terminal Head	*

NOTES:
***** Same specification as SCTP20-01
(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 to 20mA output, open circuit detect = 21.6mA output.
(4) Submit configuration form shown on page 248, and factory will assign part number prior to order entry.
(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.

Ordering Information

Model	Input Range/Description	Output Range
SCTP20-01 (Basic Configuration)(3)	Factory User Configurable RTD or Thermocouple, Not Isolated	4 to 20mA, or Inverted
SCTP20-01-xxxx (Contact Factory)(4)	Factory User Configurable RTD or Thermocouple, Not Isolated	4 to 20mA, or Inverted
SCTP20-02 (Basic Configuration)(3)	Factory User Configurable RTD or Thermocouple, Isolated	4 to 20mA, or Inverted
SCTP20-02-xxxx (Contact Factory)(4)	Factory User Configurable RTD or Thermocouple, Isolated	4 to 20mA, or Inverted

Accessories

Model	Description
DSCX-887	PC Interface Cable
DSCX-440	Module Interface Cable
DSCX-895	Configuration Software

Table 1

Measured Variables	Measuring Ranges Limits	Min. Span	Max. Span
RTD: 2, 3, or 4-wire			
Pt 100, Standard IEC 60 751	–200 to +850°C	50°C	850°C
Ni 100, Standard DIN 43 760	–60 to +250°C	50°C	250°C
Thermocouple Type B, E, J, K, N, R, S, T; Standard IEC 60 584-1	According to type	2mV(5)	80mV(5)
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			

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)	±0.015% Span Typ., ±0.05% Span max
Thermocouples (<500°C Span)	±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) [%]

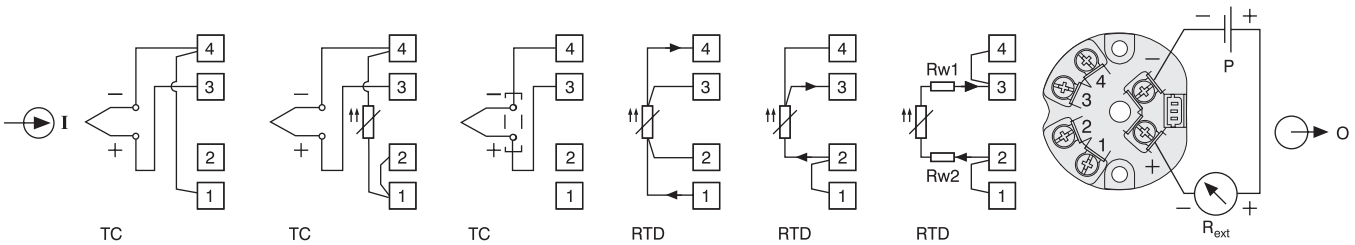
SCTP

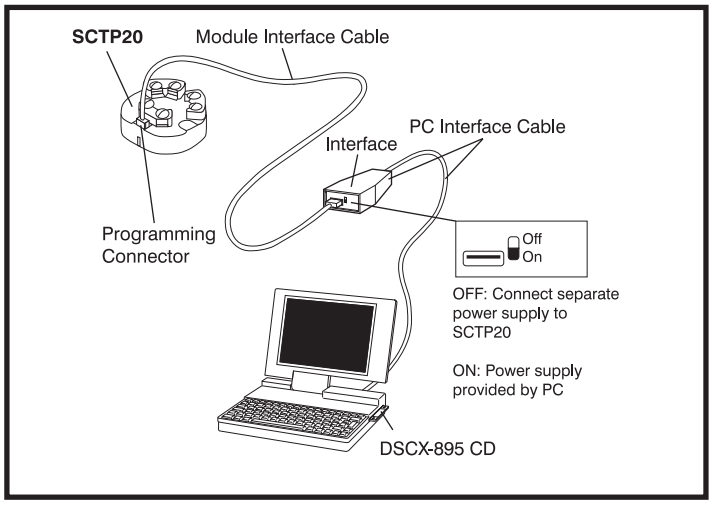
Table 3: Temperature Measuring Ranges

Measuring range examples	Resistance thermometers		Thermocouples											
[°C]	Pt100	Ni100	B	E	J	K	L	N	R	S	T	U	C(1)	D(2)
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
	NOTE A		NOTE B											

NOTE A: 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.
NOTE B: Range of span is 2mV minimum to 80mV maximum. The ratio of the min value to the span must be less than or equal to 10.
NOTE (1): W5 Re W26 Re (ASTM E 988-90)
NOTE (2): W3 Re W25 Re (ASTM E 988-90)
NOTE (3): For two-wire connections, the end value is made up of the measured end value (Ω) plus the total resistance of the leads.

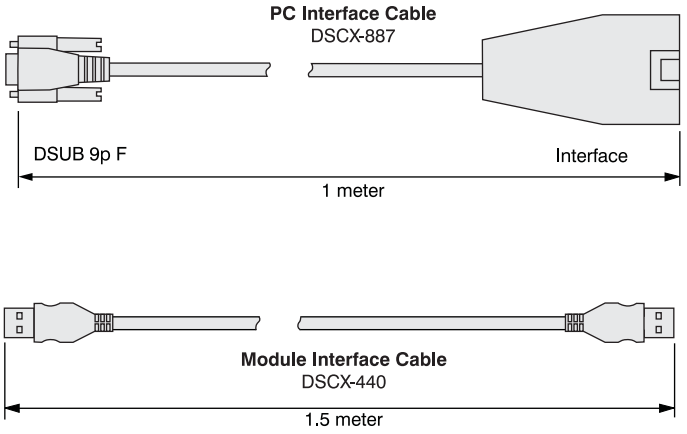
Electrical Connections





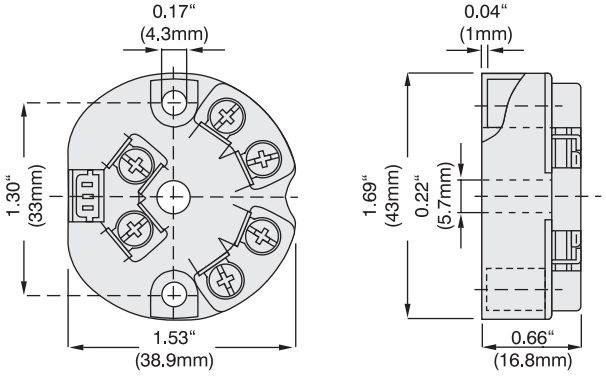
Example of the set-up for programming a SCTP20 without the power supply.
For this case the switch on the interface must be set to "ON'.

Table 4: Accessories and Spare Parts

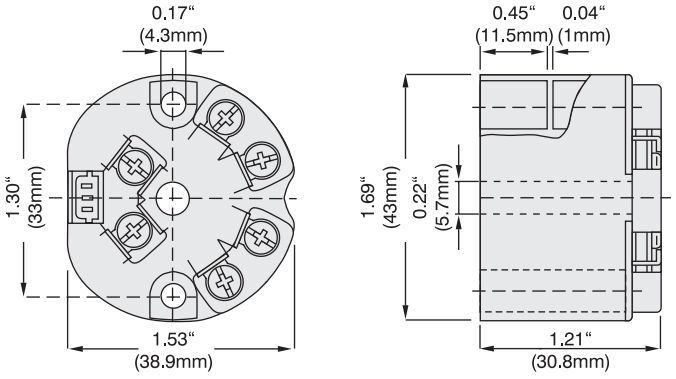


Dimensions

Dimensions: inches (millimeters)



SCTP20-01 Input/Output **Not** Electrically Isolated



SCTP20-02 Input/Output Electrically Isolated

DSCT

Isolated DIN Rail Mount 2-Wire Transmitters

Instrument Class® Performance

"Best of Breed" 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 new 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. The DSCT is the latest introduction of **Instrument Class®** products available from Dataforth, which provide superior specifications such as ±0.03% accuracy, five poles of 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 to 20-milliamp range.

Two-wire transmission loops are very economical methods 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 (Typical)
- ±0.01% Linearity
- 1500Vrms Transformer Isolation & 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 Directive 2002/95/EC

▶ DSCT Selection Guide

ANALOG VOLTAGE INPUT TRANSMITTERS Page 264

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 Page 266

MODEL	INPUT RANGE
DSCT32-01	4 to 20mA
DSCT32-02	0 to 20mA

LINEARIZED 2- OR 3-WIRE RTD INPUT TRANSMITTERS Page 268

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 Page 270

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 Page 272

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 Page 274

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 Page 277

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 Page 216

PWR-PS5RA	Power Supply, 24V, 0.3A, 100-240VAC Input
PWR-PS5RB	Power Supply, 24V, 0.6A, 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
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	0.00385	DIN 43760	JIS C 1604-1989
120Ω Ni	0.00672		

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 1). 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

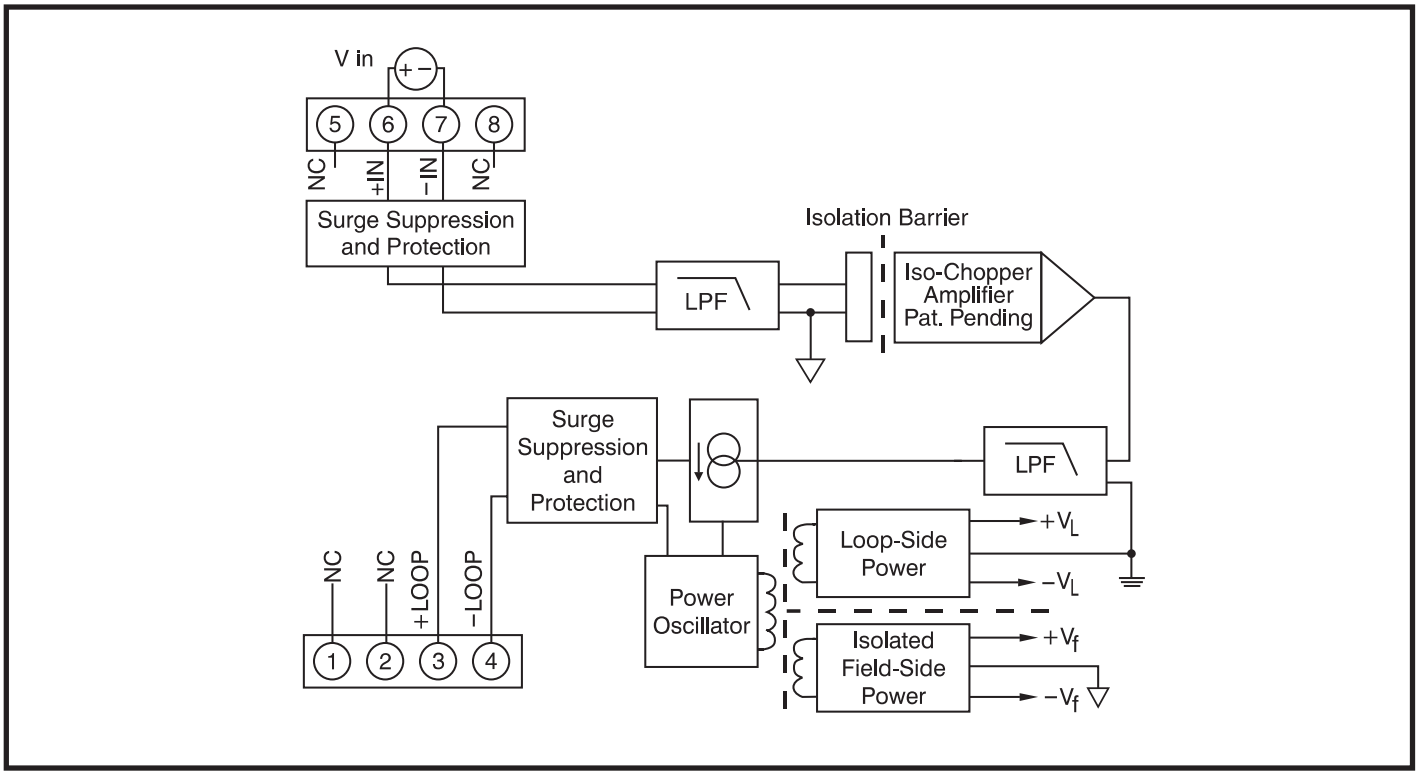


Figure 1: DSCT30/31 Block Diagram

Specifications

Typical at T_A = +25°C and +24V loop voltage

Model	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	*
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	±20ppm/°C	*
Gain	±80ppm/°C	*
Noise		
Output, 100kHz	3µArms	*
Bandwidth, –3dB	3Hz	*
Response Time, 90% Span	165ms	*
Output Range	4mA to 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	*
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	
Mechanical Dimensions	2.95" x 0.89" x 4.13"	*
(h)(w)(d)	(75mm x 22.5mm x 105mm)	*
Mounting	DIN EN 50022 –35x7.5 or –35x15 rail	*

NOTES:
* Same specification as DSCT30.
(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

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 1). 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

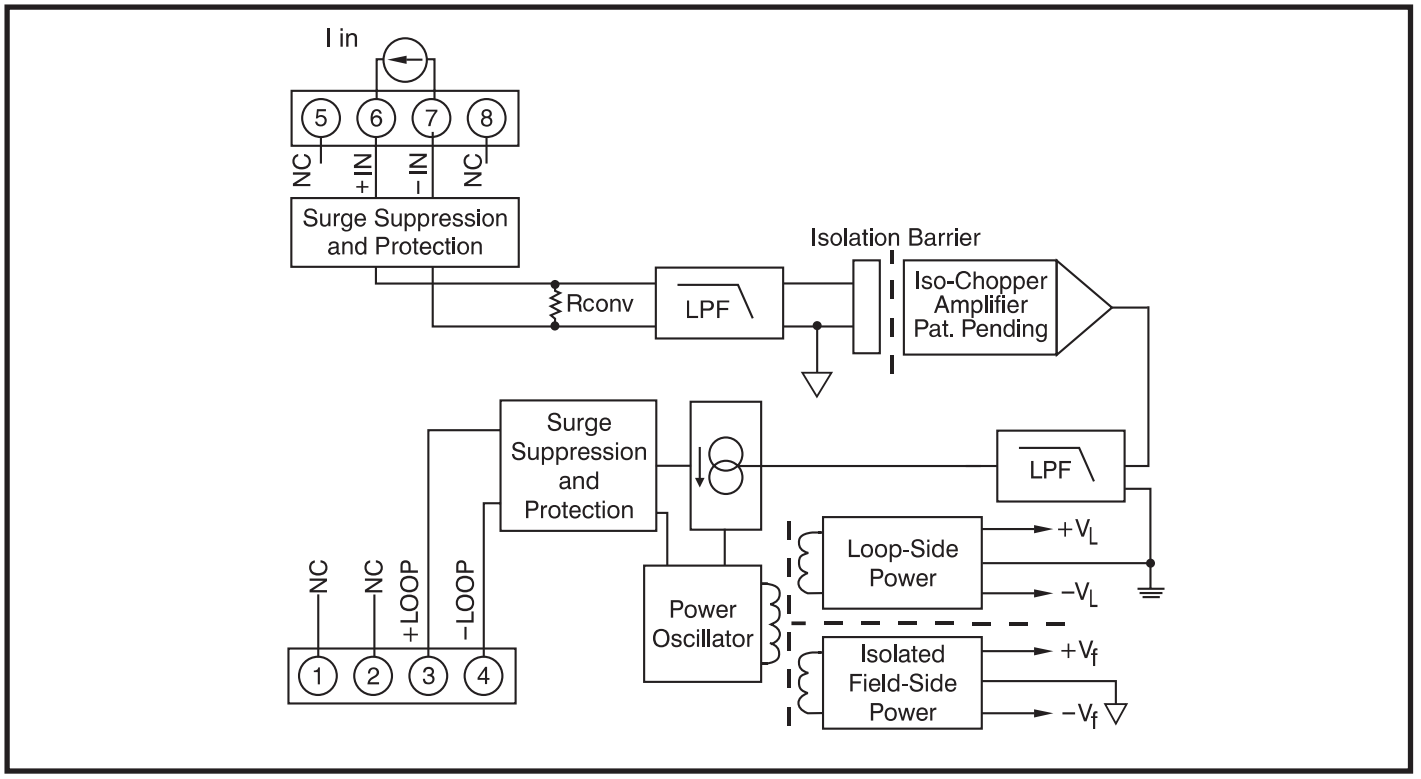


Figure 1: DSCT32 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	4mA to 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
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
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

NOTES:
(1) Includes linearity, hysteresis and repeatability.

Ordering Information

Model	Input Range
DSCT32-01	4-20mA
DSCT32-02	0-20mA

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 1). 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.

▶ 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

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.

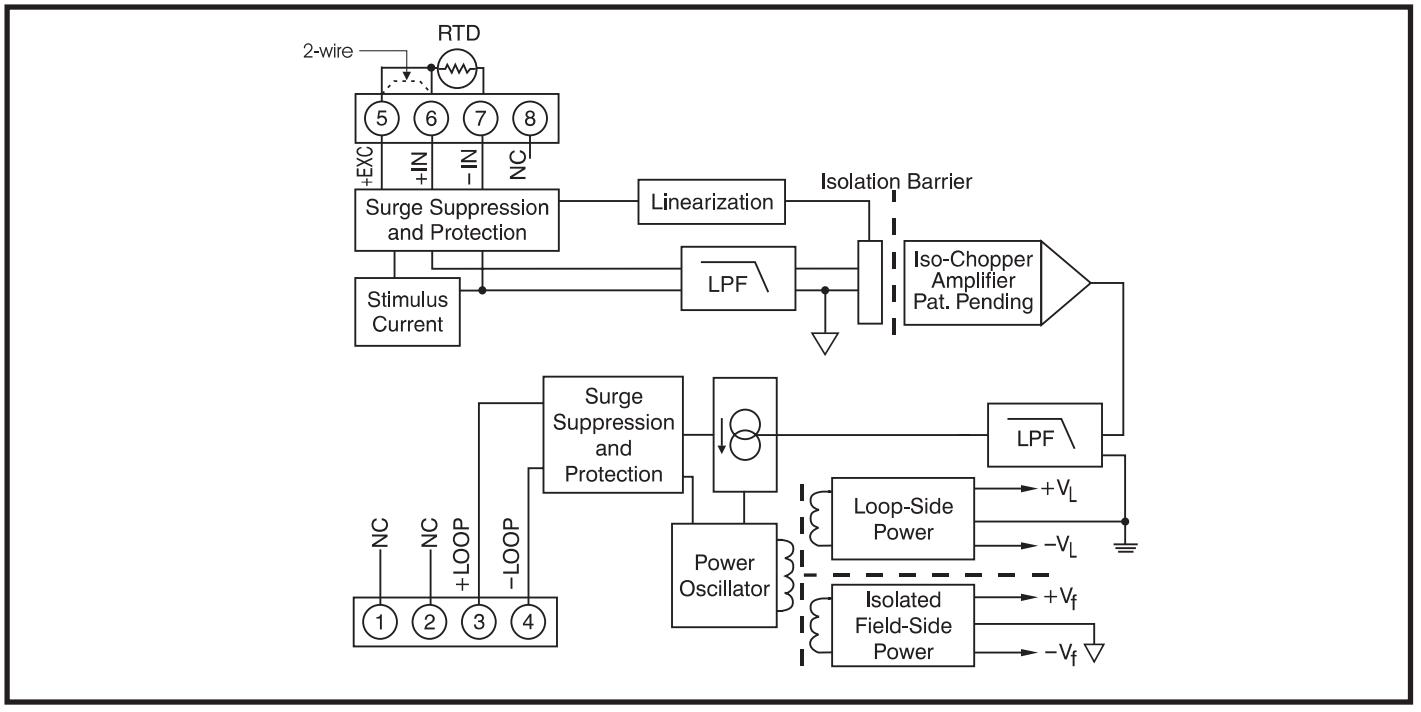


Figure 1: DSCT34 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	4mA to 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
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
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

NOTES:
(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

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 1). 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

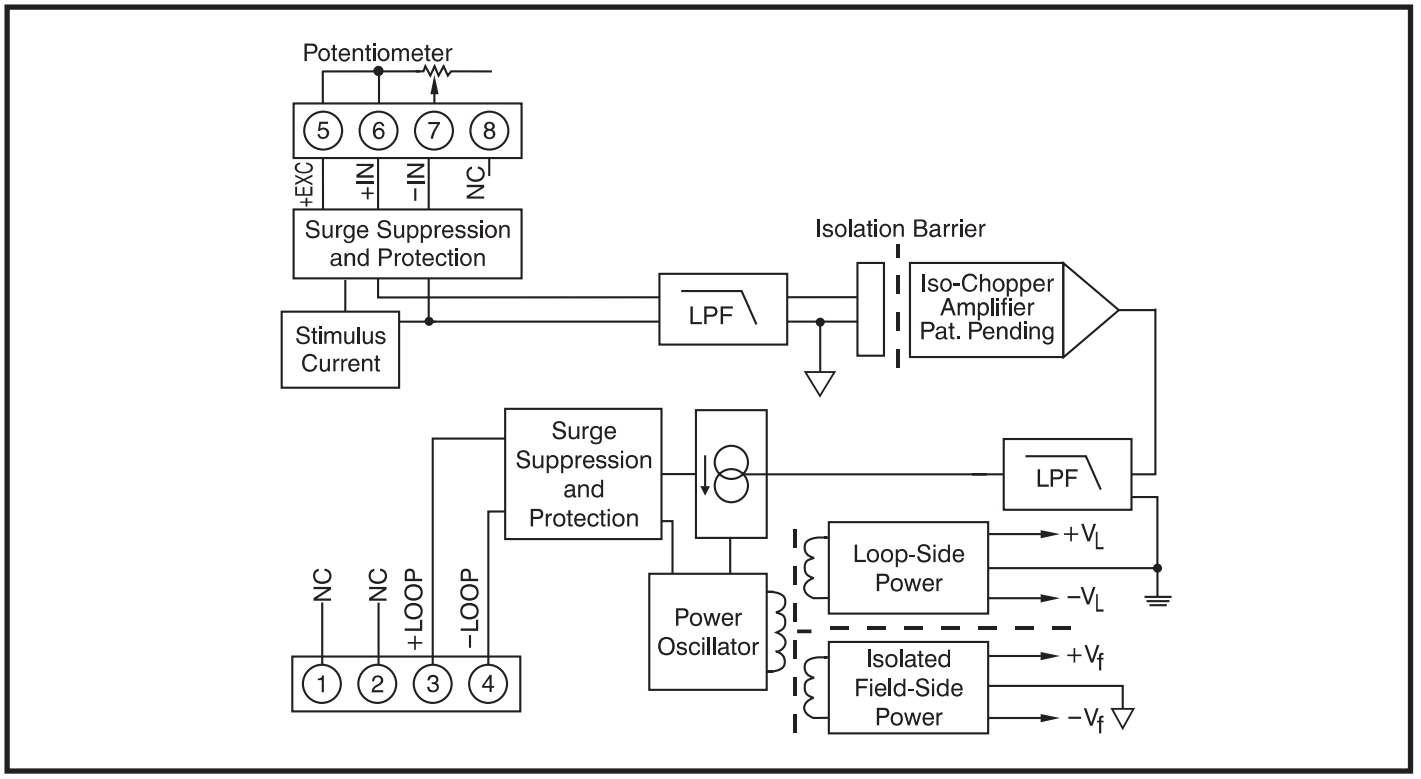


Figure 1: DSCT36 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	4mA to 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
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
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

NOTES:
(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

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 1). 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

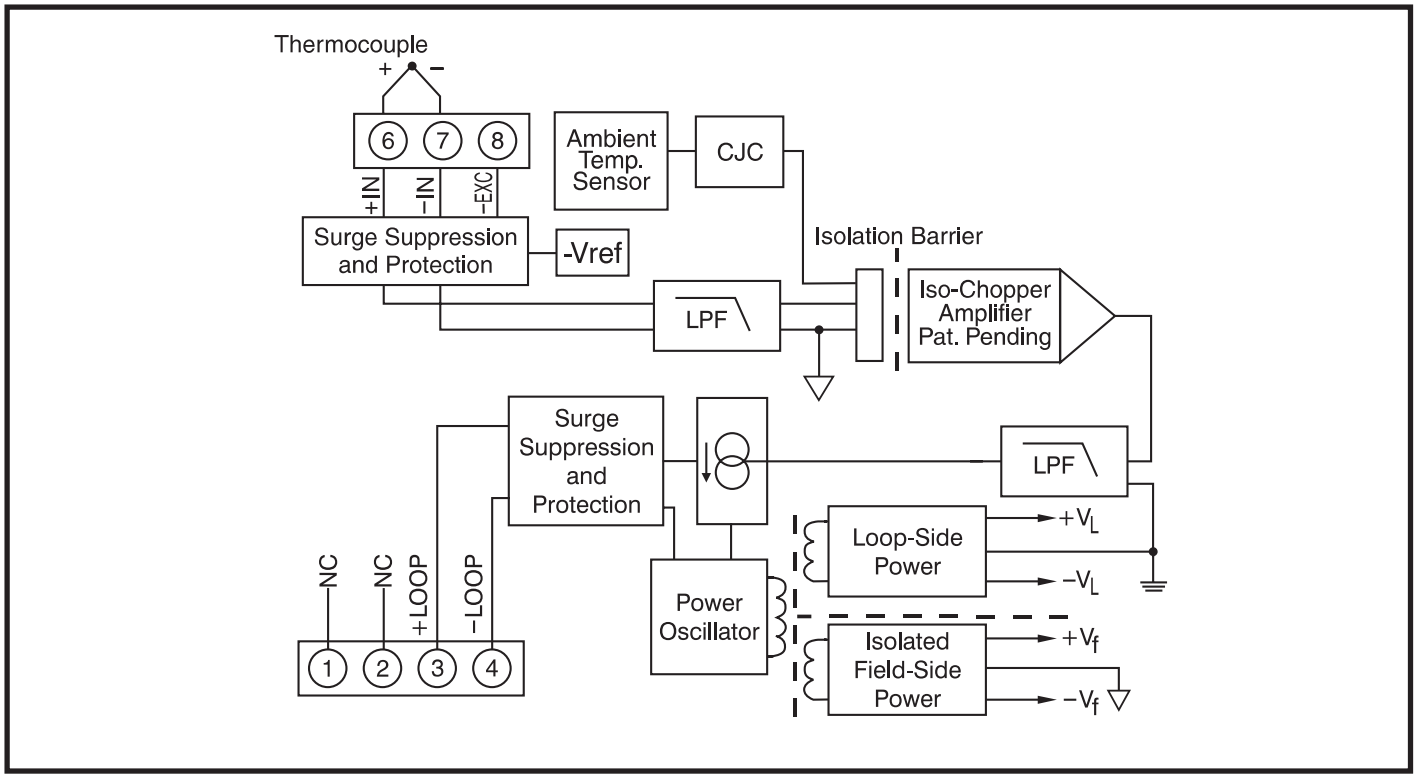


Figure 1: DSCT37 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	4mA to 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
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
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

NOTES:
(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

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 1). 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

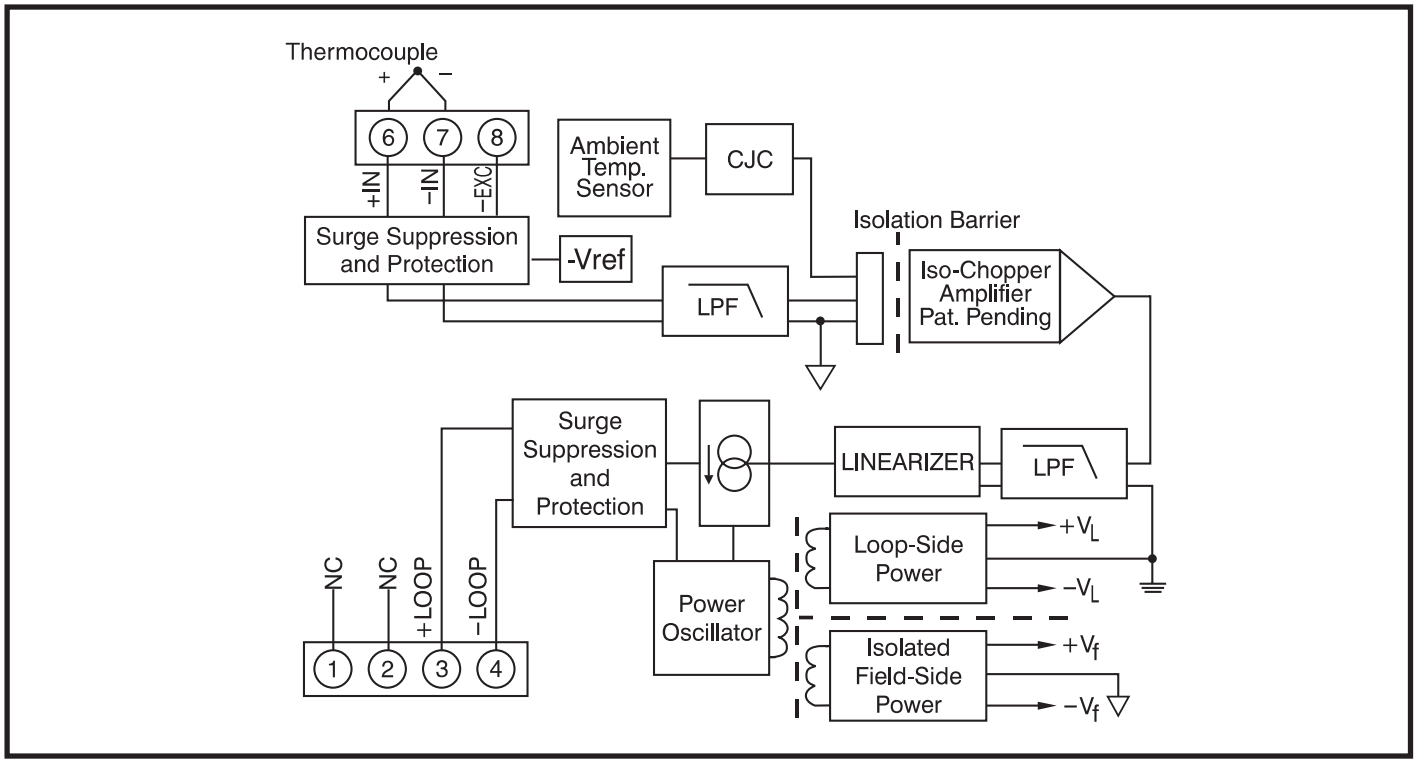


Figure 1: DSCT47 Block Diagram

Specifications

Typical at T_A=+25°C and +24V 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	4mA to 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
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
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

NOTES:
(1) Includes conformity, hysteresis, repeatability and CJC error.

Ordering Information

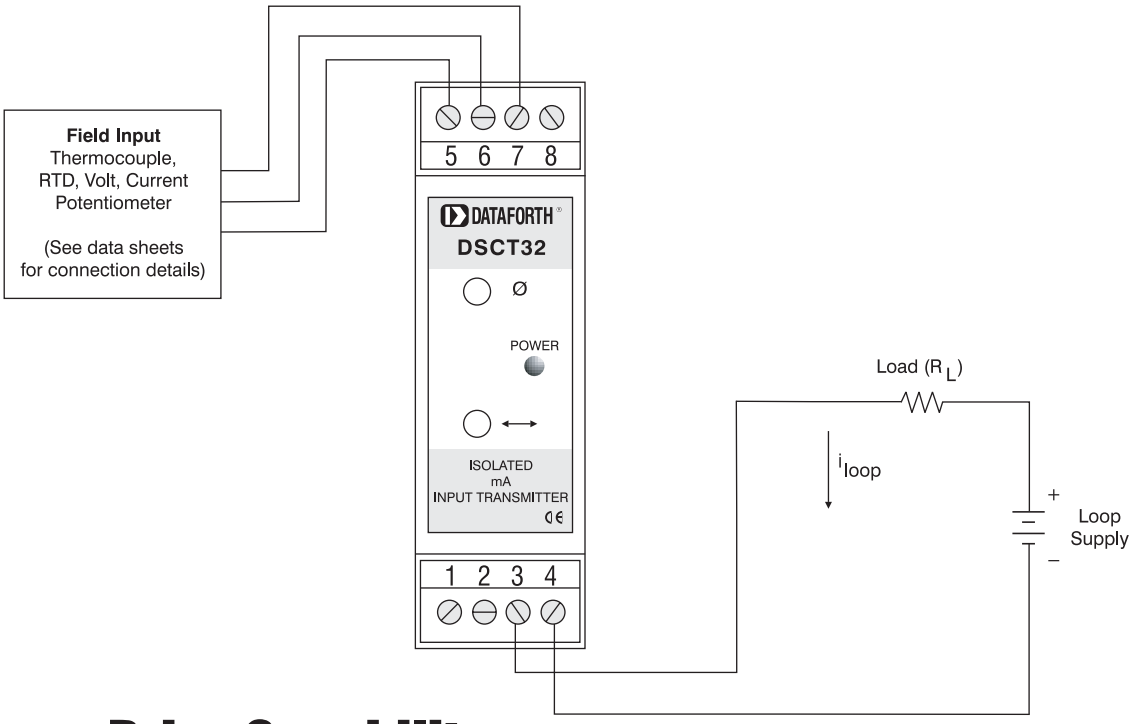
Model	TC Type‡	Input Range	Accuracy(1)	
DSCT47J-01	J	0°C to +760°C (+32°F to +1400°F)	±0.1% span	±0.76°C
DSCT47J-02	J	–100°C to +300°C (–148°F to +572°F)	±0.1% span	±0.40°C
DSCT47J-03	J	0°C to +500°C (+32°F to +932°F)	±0.1% span	±0.50°C
DSCT47K-04	K	0°C to +1000°C (+32°F to +1832°F)	±0.1% span	±1.00°C
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

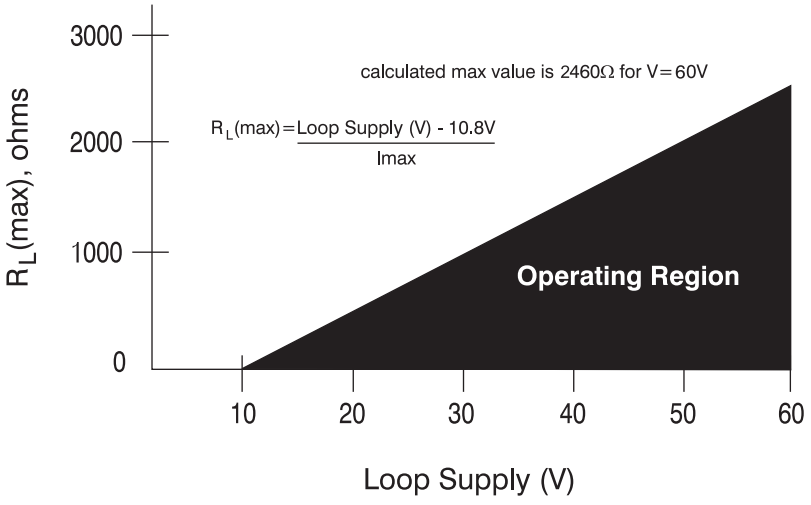
DSCT Wiring Diagram



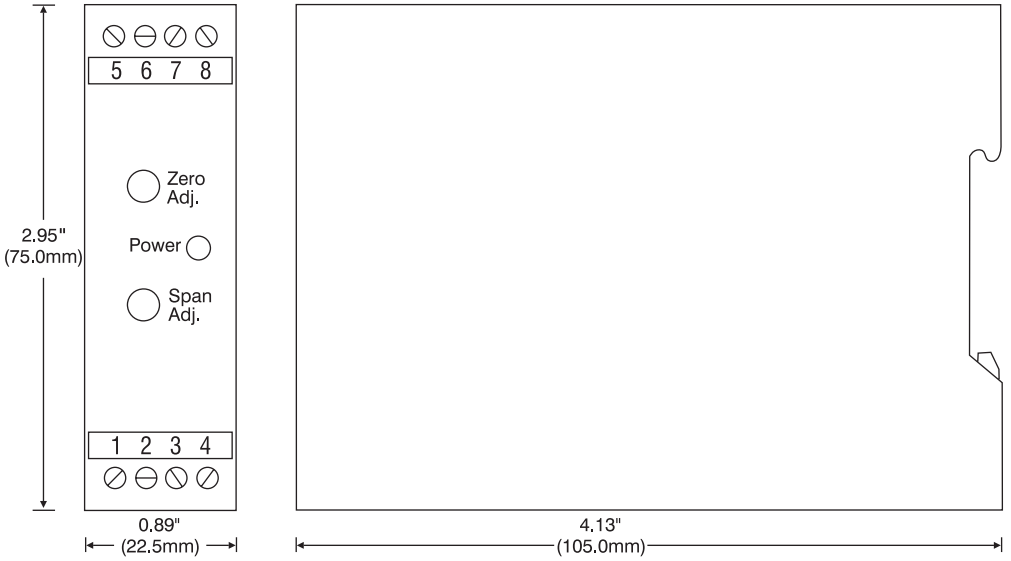
DSCT Loop Drive Capability

The DSCT Transmitter's wide range of Loop Supply Voltage (10.8V to 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.



DSCT Module Dimensions

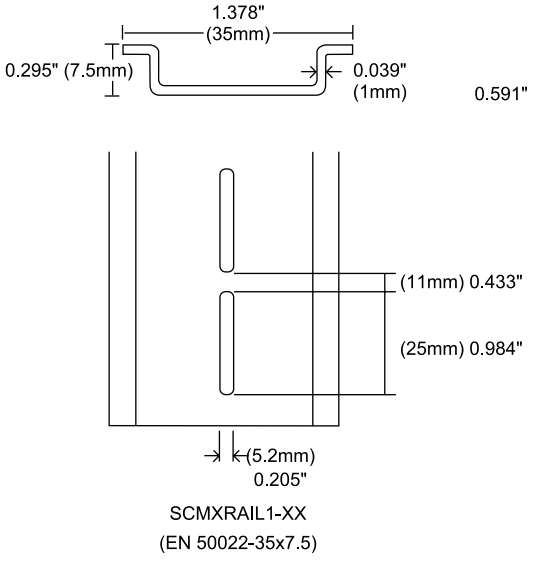


NOTES:

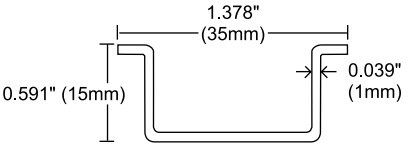
1) Pluggable terminal blocks accept wire sizes AWG 22-12. Strip wire insulation 0.27 in. (7mm) prior to insertion in terminal block.

2) DSCA modules can be mounted to DIN rails shown in Accessories section.

Accessories for DSCT Analog Modules



SCMXRAIL1-XX
(EN 50022-35x7.5)



SCMXRAIL3-XX
(EN 50022-35x15)

Data Communication Products

Protecting Valuable Industrial LANS and Data Communication Systems

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 CRTs, computers, and other online equipment, and production downtime. Our heavy duty modems "harden" and protect these systems, and can extend communications for many miles without expensive cabling.

Our LDM Series limited distance modems 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.

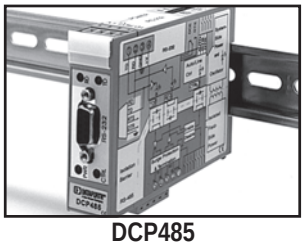
Our DCP485 DIN Rail RS-232 to RS-485 converter/line driver provides 1500 Vrms continuous isolation and data transfer up to 115.2 kbps with automatic RS-485 line control while powered from +10 to +30 VDC.

▶Features

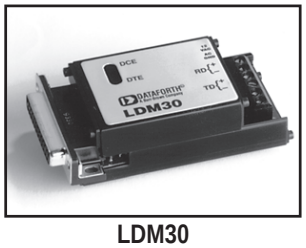
- 1500Vrms Isolation with Optocouplers and Power DC-to-DC Converter (3000Vp, 1 min)
- Industrial Temperature Range
- DTE/DC Selection Switches, Diagnostic LEDs
- Rugged, Compact Industrial Packaging, Choice of Host Connectors
- Data Rates to 115.2kbps
- Distances to 12 Miles (20km)
- Multidrop, Handshake Functions
- 2- or 4-Wire, Simplex/Duplex Connection
- Full Line of Power and Connector Accessories
- CE Compliant
- Manufactured per RoHS Directive 2002/95/EC

▶Applications

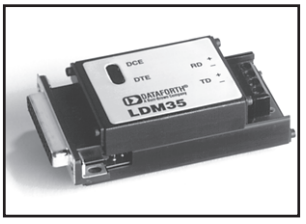
- Protects Equipment from Damage due to Power Surges, Transients, Lightning; Breaks Ground Loops
- Extends RS-232 Communication Distances without Expensive Low-Capacitance Cabling
- Connects RS-232 Devices to RS-422 and RS-485 Devices
- Ideal Choice for Industrial and Institutional LANs


DCP485


DCP35



LDM30



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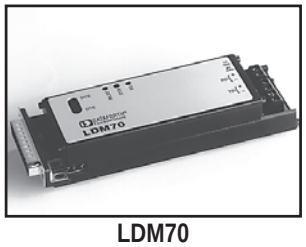


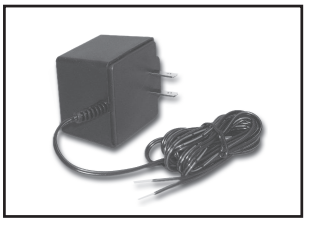
LDM70

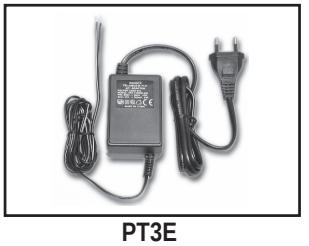
LDM422

LDM485

LDM80

LDM85


PT3


PT3E

▶ Data Communications Selection Guide

Limited Distance Modems

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 (0.5 mi) (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 (.8 mi) (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) (.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) (.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) (.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 (2.2 mi) (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, 85-264 VAC, 47-63 Hz In
PWR-PS5RA	24 VDC, 0.31 A Out
PWR-PS5RB	24 VDC, 0.63 A Out
PWR-PS5RC	24 VDC, 1.25 A Out
PWR-PS5RD	24 VDC, 2.08 A Out
PWR-PS5RE	24 VDC, 4.17 A 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 2.5M bps NRZ TTL and 100K bps RS-232/422.
(6) Externally powered +10V to +30VDC.

DCP485

Fully Isolated DIN Rail RS-232 to RS-485 Converter/Line Driver

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

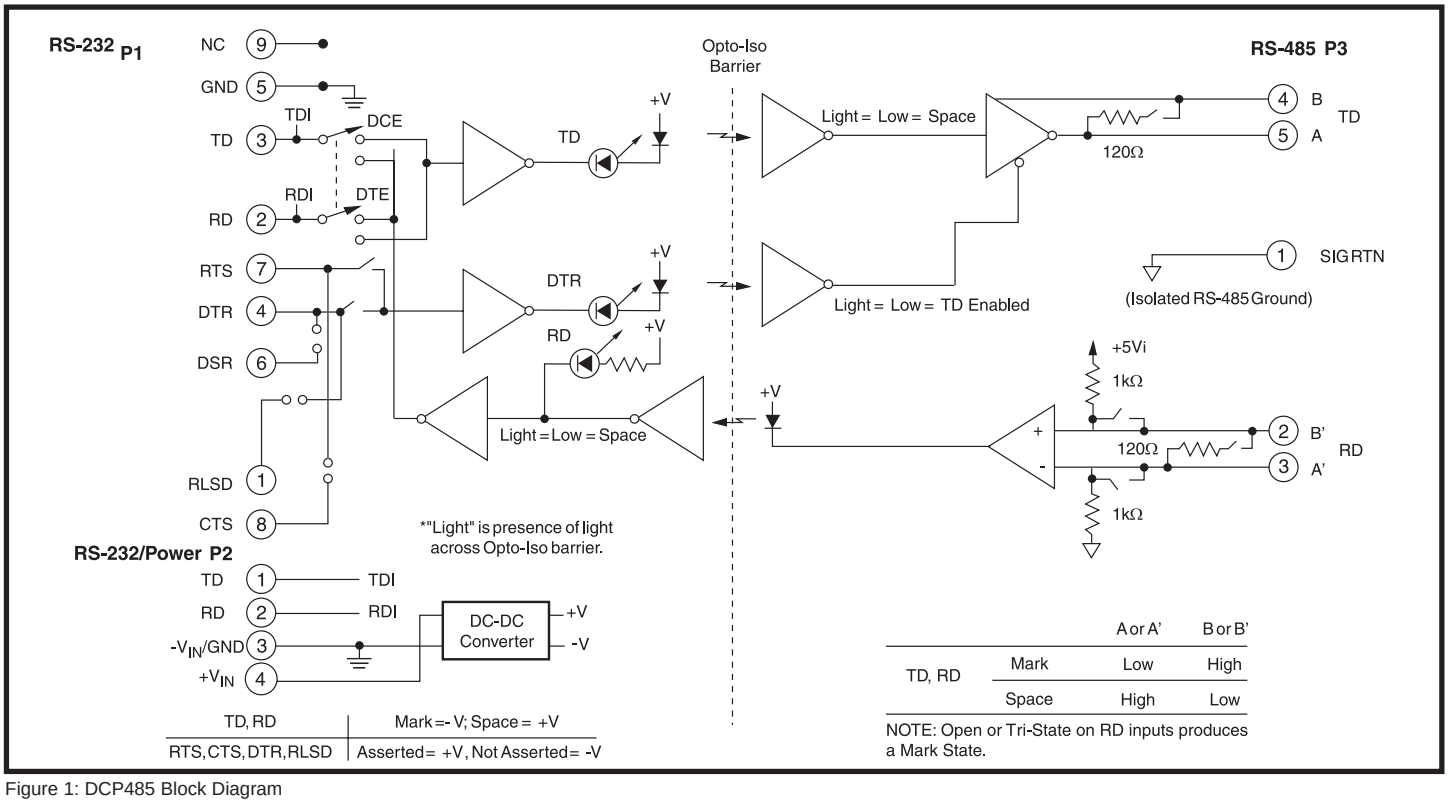


Figure 1: DCP485 Block Diagram

Specifications

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	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:
(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	Male RS-232 connector
DCP485-S	Female RS-232 connector
Power Supply	DIN Rail Mount
PWR-PS5RA	85-264 VAC, 47-63 Hz In 24 VDC, 0.31 A Out

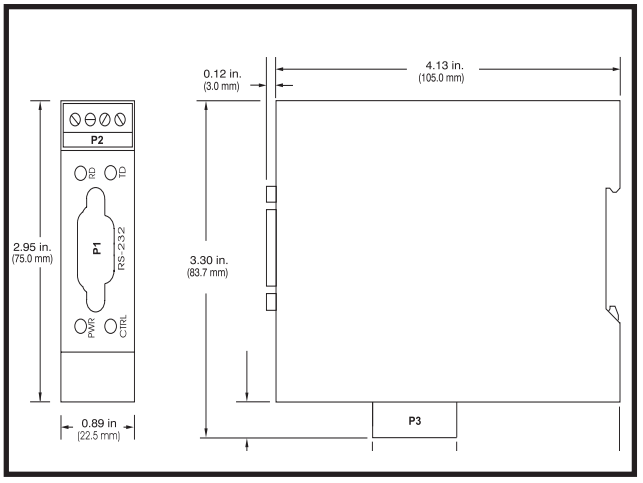


Figure 2: DCP485 Dimensions

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

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.

▶ 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

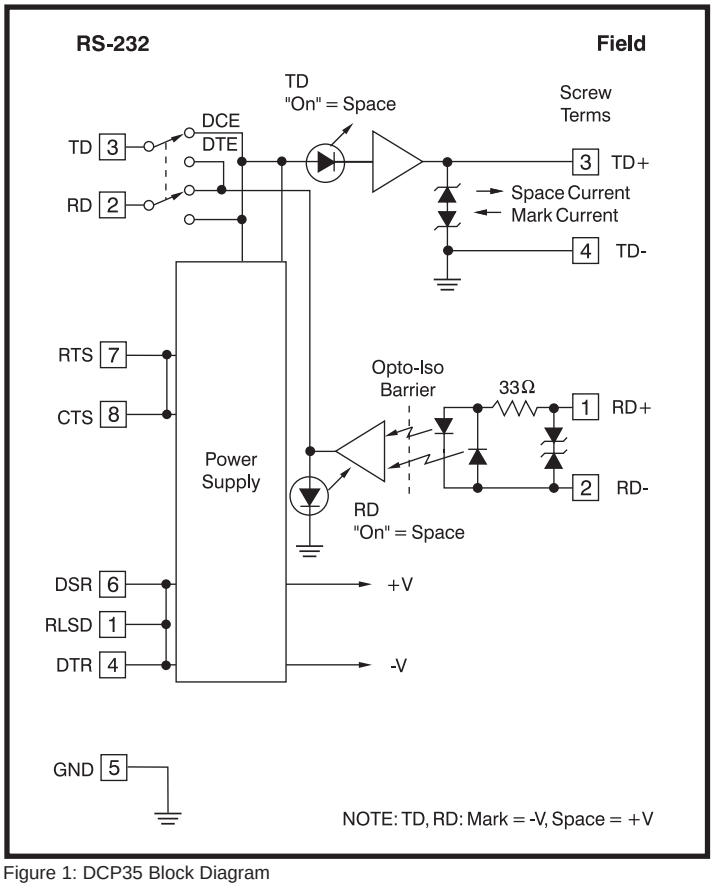


Figure 1: DCP35 Block Diagram

Specifications

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	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:
(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

RS-232 Pin Descriptions			Field Pin Descriptions		
			Screw Terms		
Pin 1	RLSD	[8] Receive Line Signal Detect	Pin 1	RD+	Receive Data +
Pin 2	RD	[3] Receive Data	Pin 2	RD-	Receive Data -
Pin 3	TD	[2] Transmit Data	Pin 3	TD+	Transmit Data +
Pin 4	DTR	[20] Data Terminal Ready	Pin 4	TD-	Transmit Data -
Pin 5	SG	[7] Signal Ground			
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 [ ].

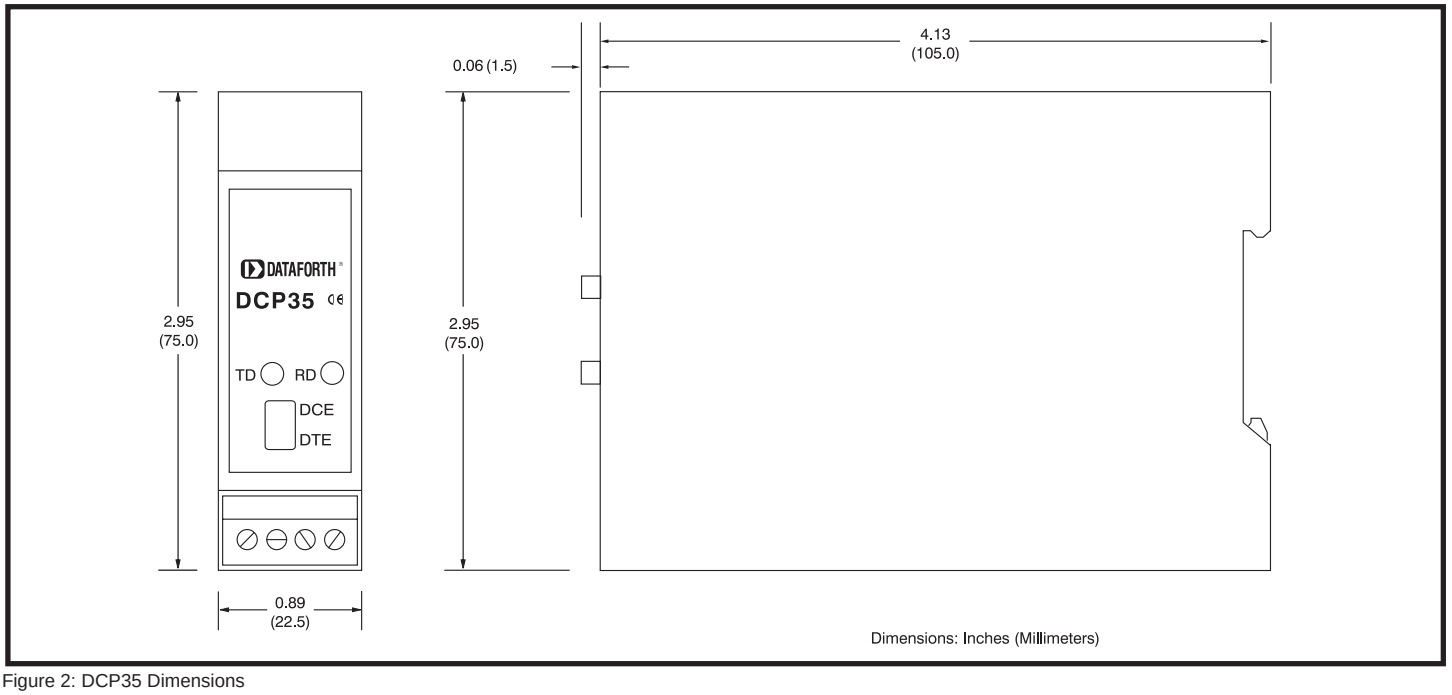


Figure 2: DCP35 Dimensions

LDM30

General Purpose Limited Distance Modem

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 modems 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 modem 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.

▶ 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

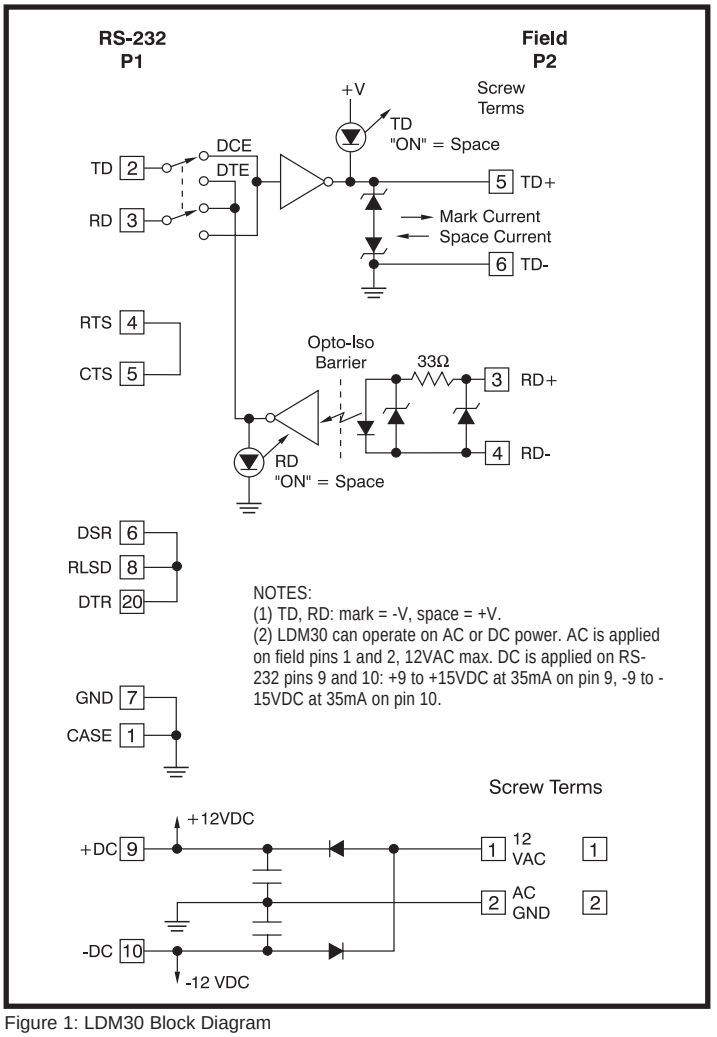


Figure 1: LDM30 Block Diagram

Specifications

Model	LDM30
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 11.3 19.3
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
Power AC operation(2) DC operation	 12VAC at 92mA ±9VDC to ±15VDC, 35mA
Environmental: Operating Temperature Range Storage Temperature Range Relative Humidity	 0°C to +70°C –10°C to +85°C 0 to 95% Noncondensing
Dimensions	3.6" x 2.1" x 1" (91.4mm x 53.3mm x 25.4mm)
Weight PT3 and PT3E	3.5 oz (100g) max 11.0 oz (312g) max
MTTF(3)	>150,000 hrs

NOTES:
(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	U.S. transformer	Screw termination
LDM30-PE	Male	European transformer	Screw termination
LDM30-SE	Female	European transformer	Screw termination

Model	Description
PT3	U.S. style wall mount transformer, 120VAC
PT3E	Euro style wall mount transformer, 220VAC

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 [ ].

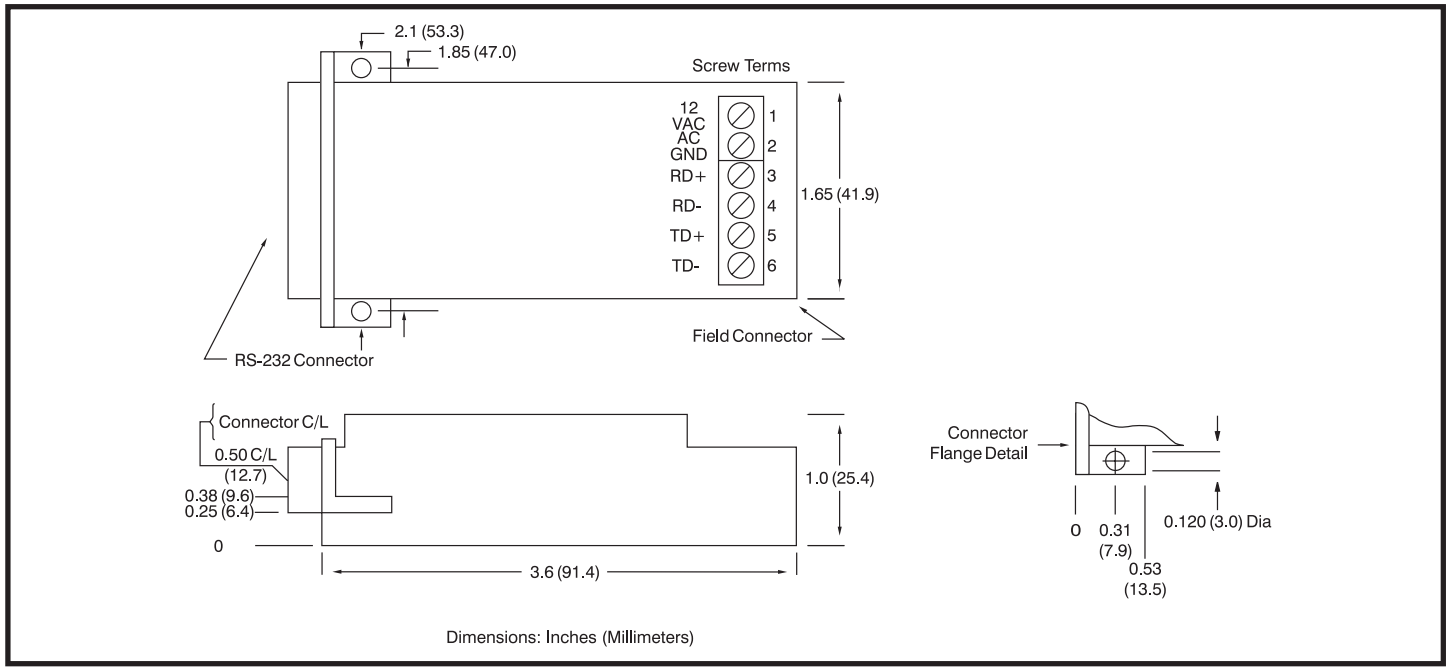


Figure 2: LDM30 Dimensions

LDM35

Signal Powered Limited Distance Modem

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 modems 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 modem 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.

▶ 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 Two Miles (3.3km) at 9600bps, One-Half Mile (0.8km) at 19,200bps, Seven 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

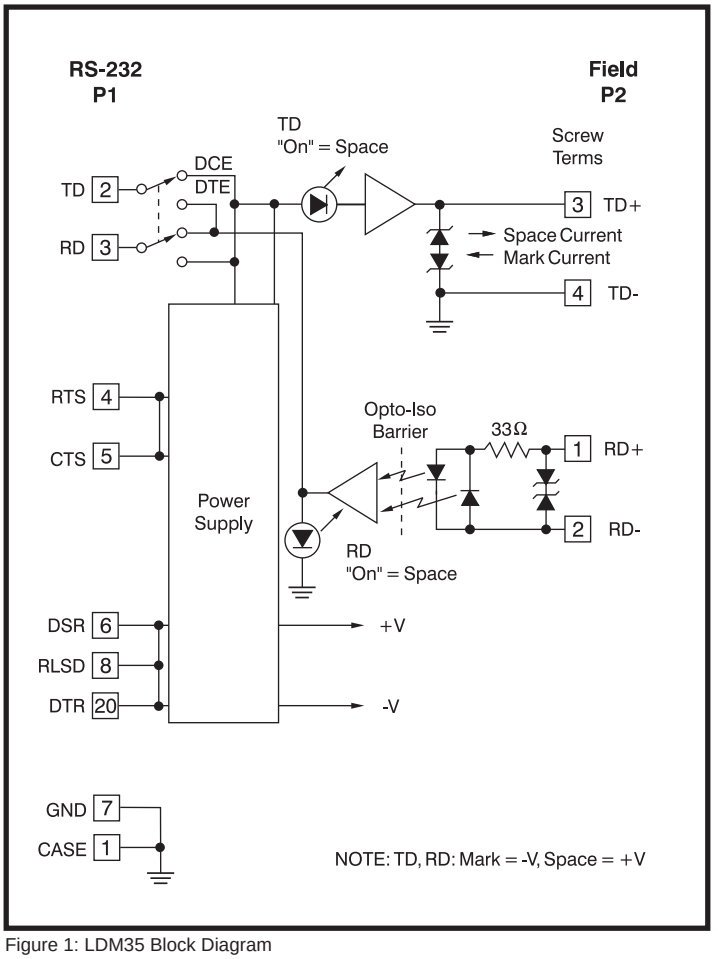


Figure 1: LDM35 Block Diagram

Specifications

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, 1min. 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	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:
(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

RS-232 P1 Pin Descriptions				Field P2 Pin Descriptions
				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 +
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 [ ].

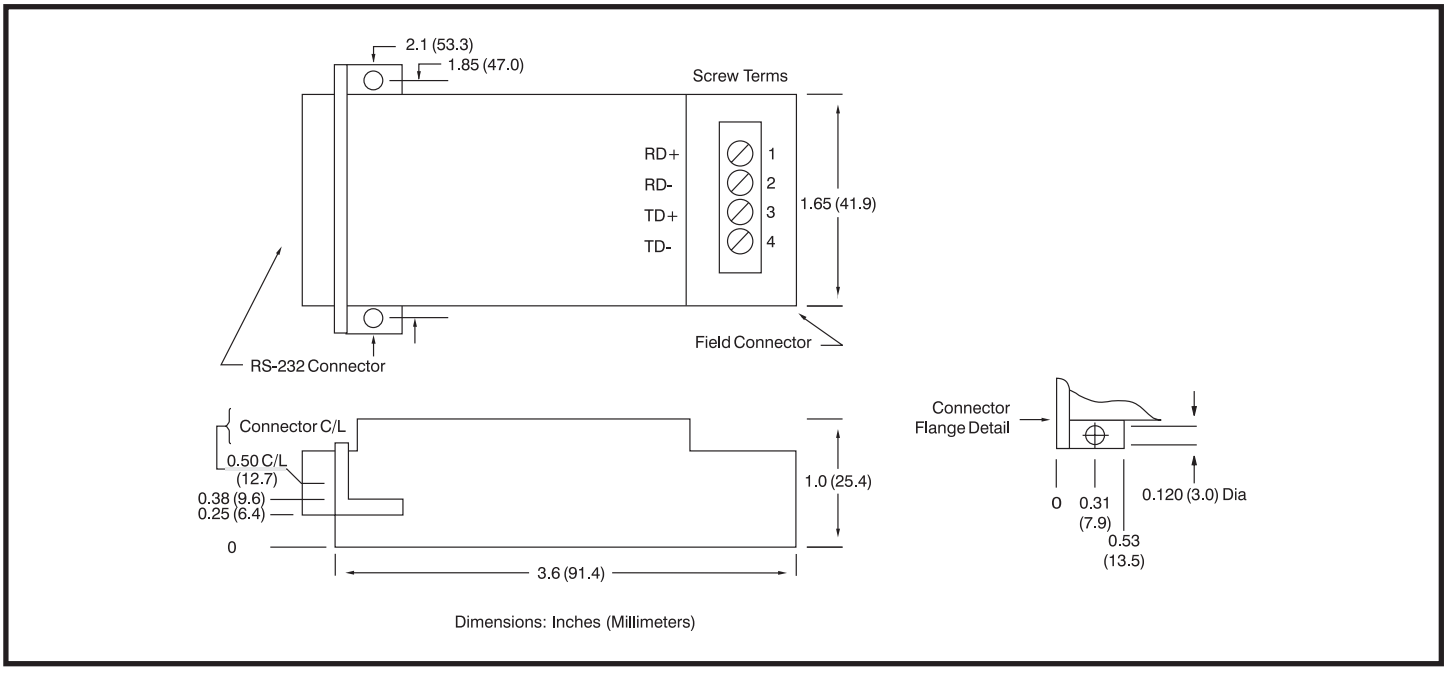


Figure 2: LDM35 Dimensions

LDM70

Fully Isolated Limited Distance Modem

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 modems 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 modem 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 modern, 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
- Surge Protectors
- Four 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

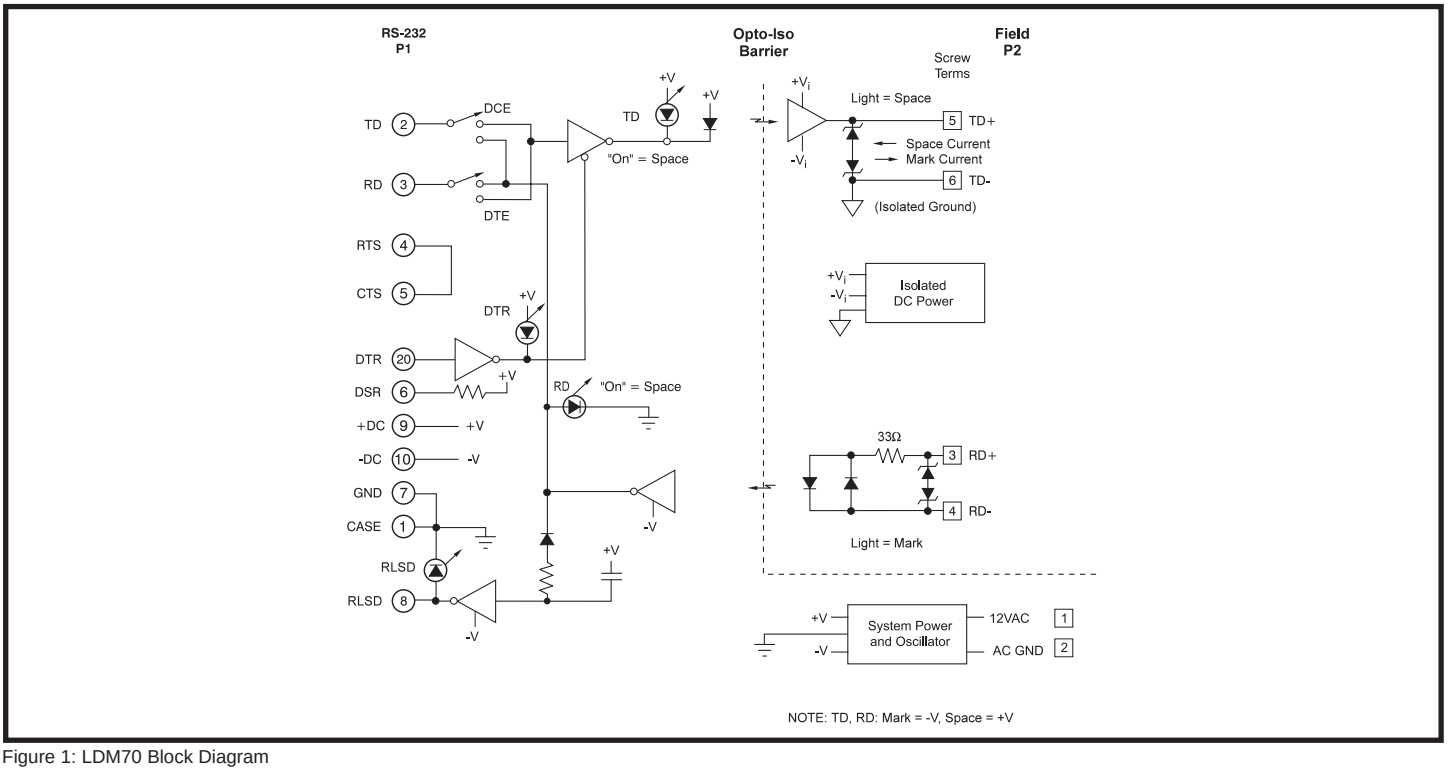


Figure 1: LDM70 Block Diagram

Specifications

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 min. 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	5.7" x 2.1" x 1" (144.8mm x 53.3mm x 25.4mm)
Weight PT3 and PT3E	5.5 oz (156g) max 11.0 oz (312g) max
MTTF(3)	>100,000 hrs

NOTES:
(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-P	Male	Host-powered	Screw termination
LDM70-S	Female	Host-powered	Screw termination
LDM70-PT	Male	U.S. transformer	Screw termination
LDM70-ST	Female	U.S. transformer	Screw termination
LDM70-PE	Male	European transformer	Screw termination
LDM70-SE	Female	European transformer	Screw termination

Model	Description
PT3	U.S. style wall mount transformer, 120VAC
PT3E	Euro style wall mount transformer, 220VAC

RS-232 P1 Pin Descriptions				Field P2 Pin Descriptions
				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 [ ].

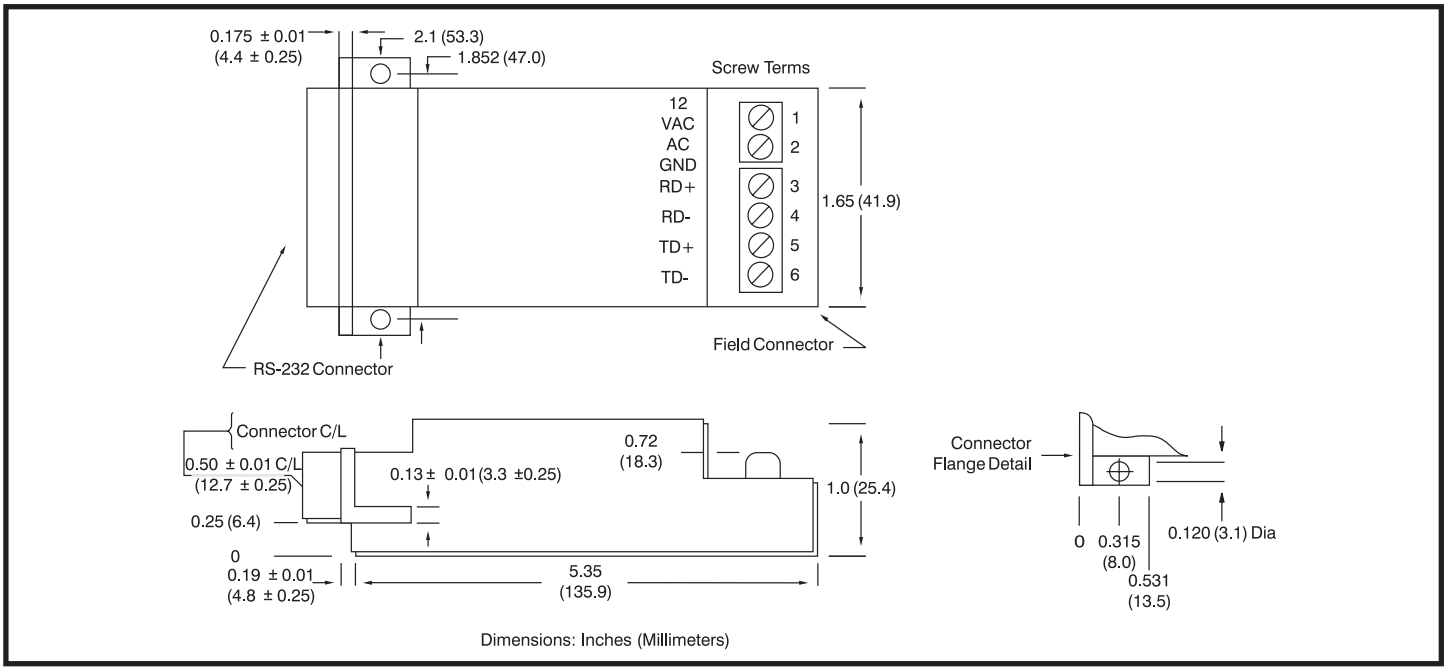


Figure 2: LDM70 Dimensions

LDM422

Fully Isolated Limited Distance Modem, RS-232/422 Converter

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

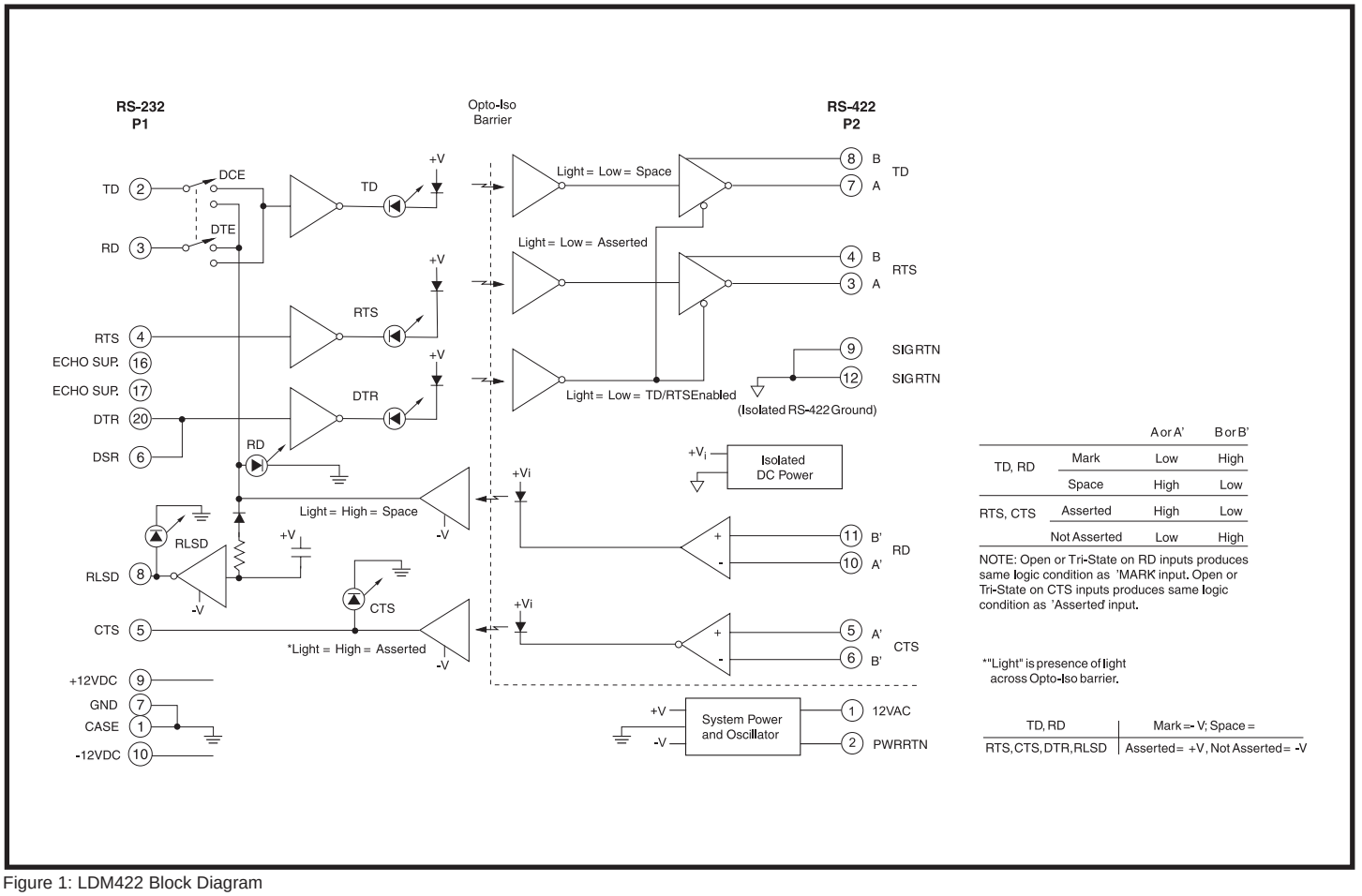


Figure 1: LDM422 Block Diagram

Specifications

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. Norestrictions apply for distances of 1 mile (1.7 km) or less.
Common Mode Isolation Differential Mode Surge Protection (9 devices)	Surge: 1500Vp, 1 min. 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 & 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	6.6" x 2.1" x 1.28" (167.6mm x 53.3mm x 32.5mm)
Weight PT3 and PT3E	7 oz (198g) max 11.0 oz (312g) max
MTTF(3)	>100,000 hrs

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
LDM422-PE	Male RS-232 connector, Euro power transformer
LDM422-SE	Female RS-232 connector, Euro power transformer
PT3	Wall mount U.S. power transformer, 120VAC
PT3E	Wall mount Euro power transformer, 220VAC

RS-232 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	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 [ ].

NOTES:
(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).

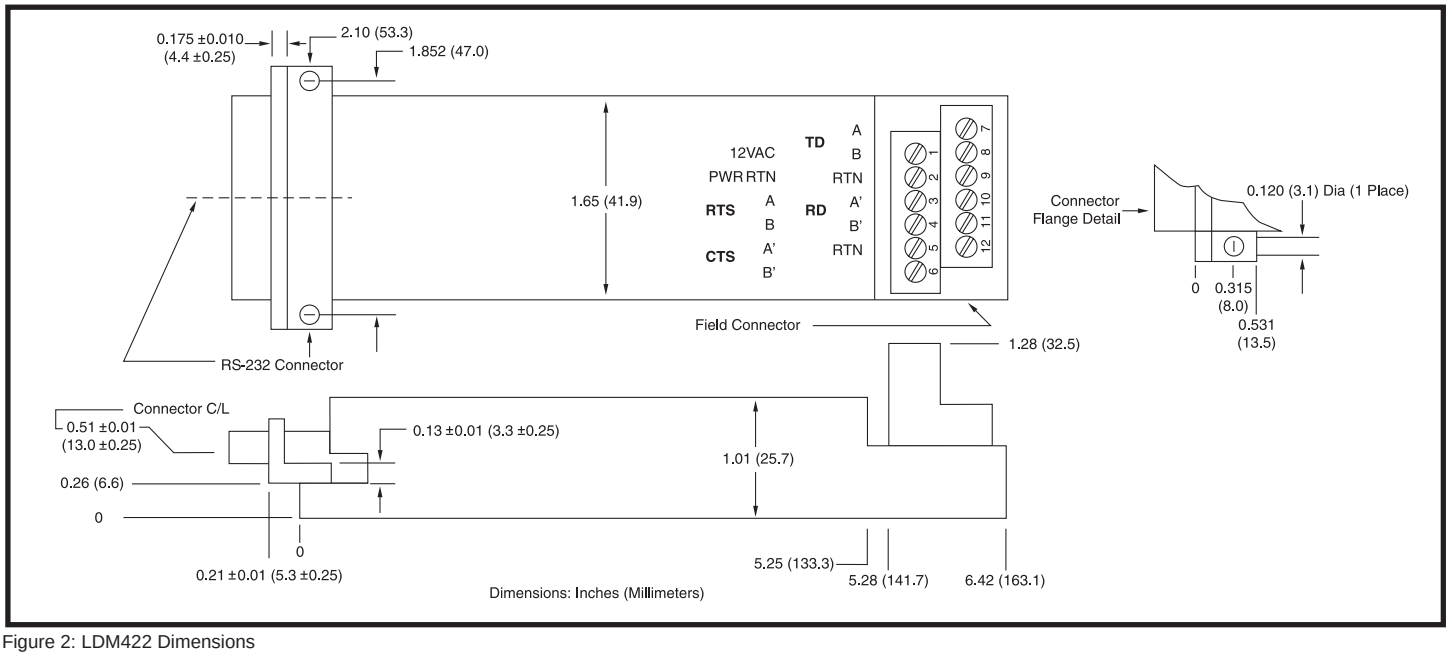


Figure 2: LDM422 Dimensions

Data Comm

LDM485

Fully Isolated Limited Distance Modem, RS-232/485 Converter

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 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. 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

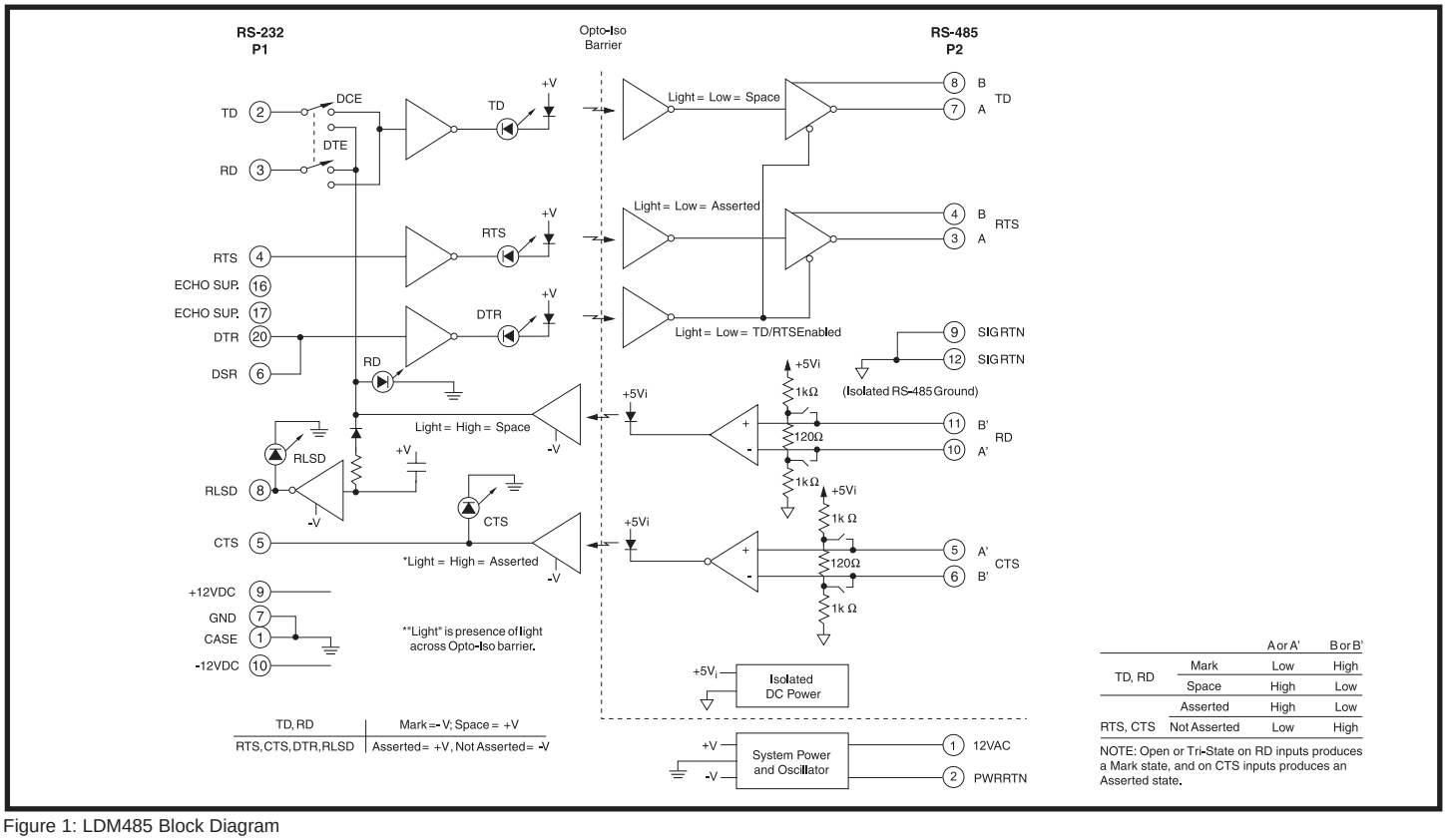


Figure 1: LDM485 Block Diagram

Specifications

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 min. 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	6.6" x 2.1" x 1.28" (167.6mm x 53.3mm x 32.5mm)
Weight PT3 and PT3E	7 oz (198g) max 11.0 oz (312g) max
MTTF[4]	>100,000 hrs

Ordering Information

Model	Description
LDM485-P	Male RS-232 connector
LDM485-S	Female RS-232 connector
LDM485-PT	Male RS-232 connector and U.S. power transformer
LDM485-ST	Female RS-232 connector and U.S. power transformer
LDM485-PE	Male RS-232 connector, European power transformer
LDM485-SE	Female RS-232 connector, European power transformer
PT3	Wall mount U.S. power transformer, 120VAC
PT3E	Wall mount Euro power transformer, 220VAC

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 Pin 7 Pin 8	CTS B' TD A 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 [ ].

NOTES:
(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).

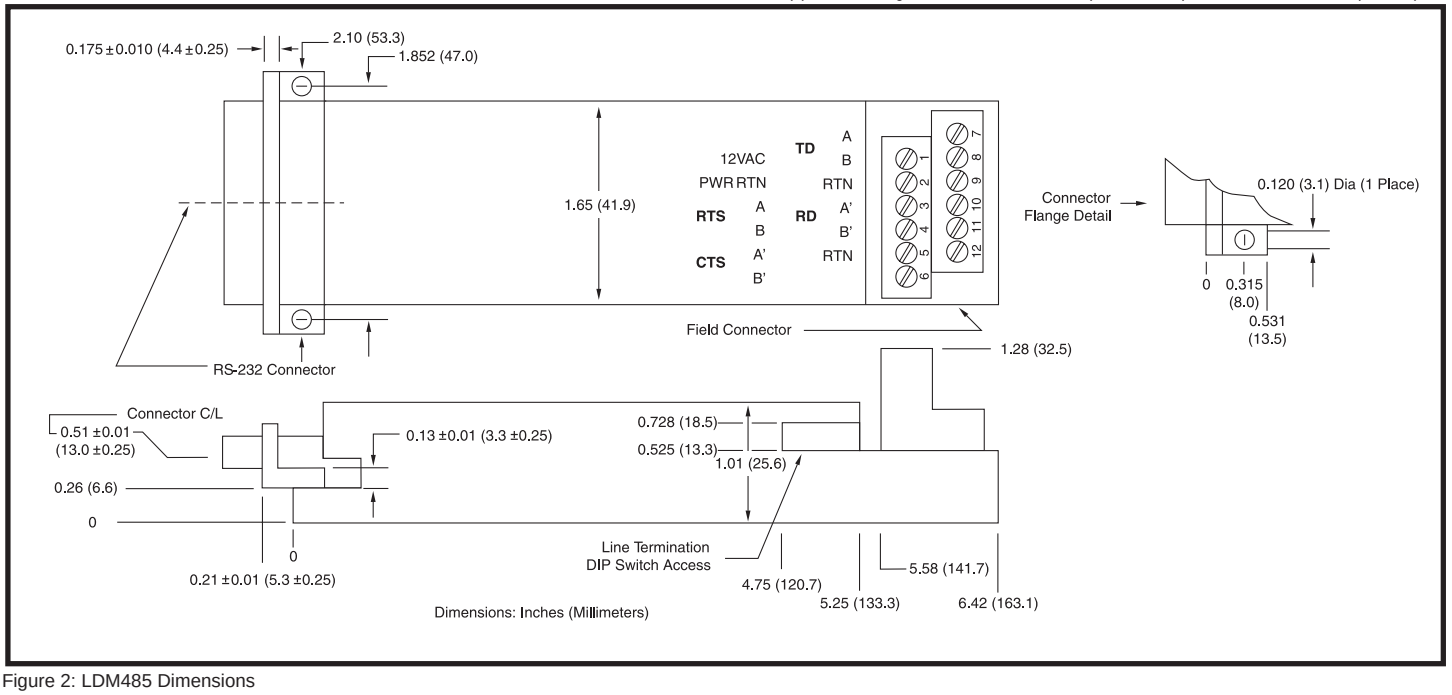


Figure 2: LDM485 Dimensions

LDM80

Signal Powered Fiber Optic Modem

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

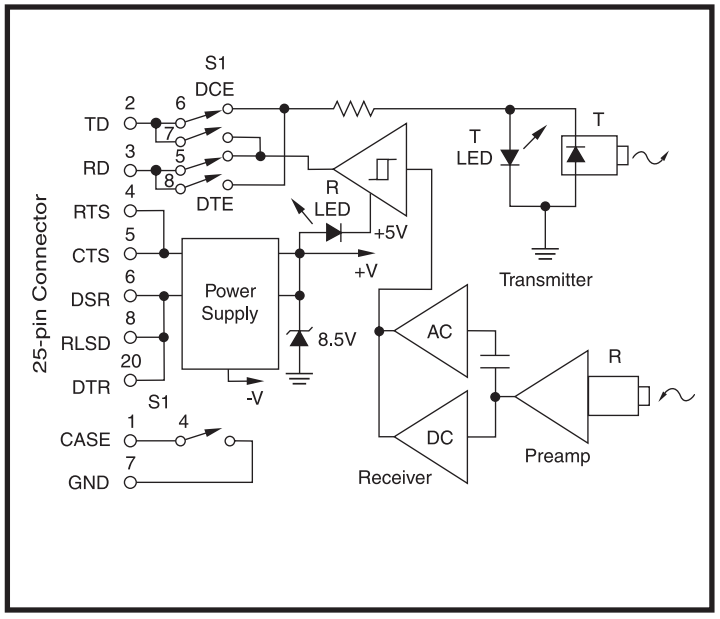


Figure 1: LDM80 Block Diagram

Specifications

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 Output from 1m cable	850 nm wavelength –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 and/or DC operation	+5.0 to +8.5VDC, no current limit, 5mA >+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	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

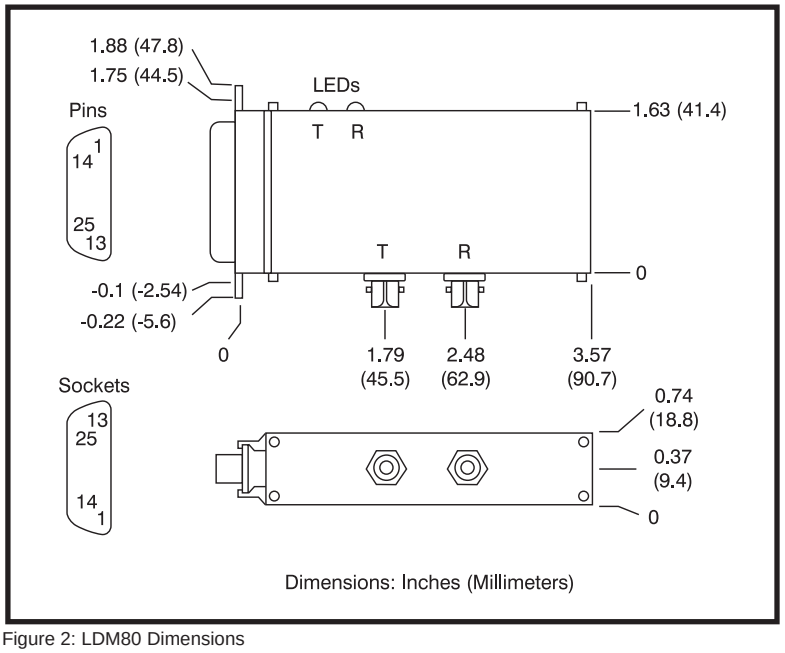


Figure 2: LDM80 Dimensions

Ordering Information

Model	Description
LDM80-P-025	Pinned RS-232 connector, ST fiber optic connector
LDM80-S-025	Socketed RS-232 connector, ST fiber optic connector

Pin Descriptions			Fiber Optic
Pin 1	CASE	Ground	
Pin 2	TD	[3] Transmit Data	T
Pin 3	RD	[2] Receive Data	
Pin 4	RTS	[7] Request To Send	
Pin 5	CTS	[8] Clear To Send	R
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 [ ].

NOTES:
(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).

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.*

LDM85

Fiber Optic Modem

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

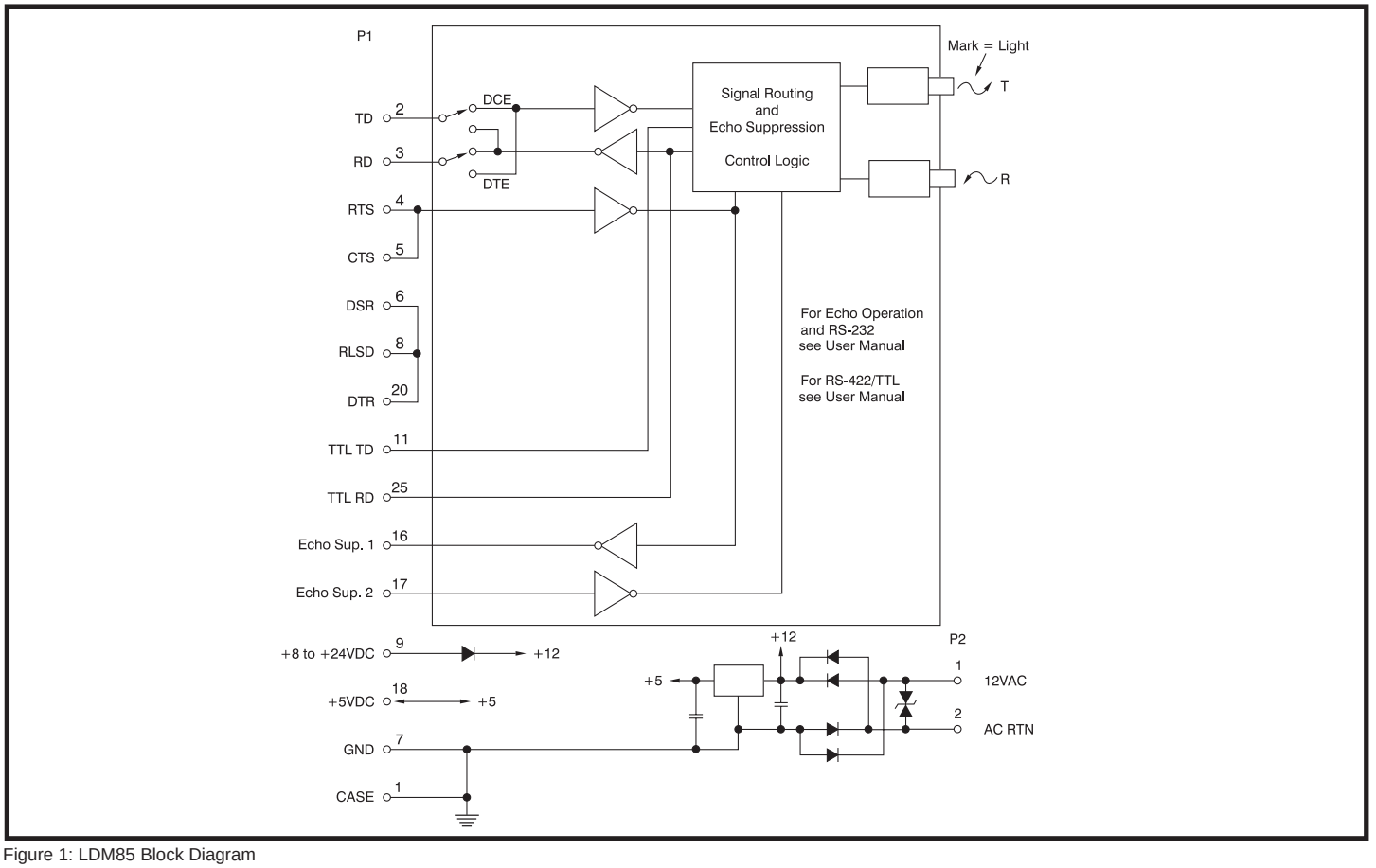


Figure 1: LDM85 Block Diagram

Specifications

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, DSR, DTR, RLSD
Optical Transmitter Numerical Aperture Optical Port Diameter Optical Receiver Equivalent Numerical Aperature Optical Port Diameter Optical Connectors	820 nm wavelength –11.5dBm typical output from 1 m cable, –16dBm minimum output (–40°C to +85°C) 0.49 290 mm –25dBm to –12dBm dynamic range for logic 1, –24dBm minimum input logic 1 (–40°C to +85°C), –40dBm maximum input logic 0 0.50 400 µm 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	3.75" x 2.1" x 1" (95.3mm x 53.3mm x 25.4mm)
Weight PT3, PT3E	3.7 oz (105g) max 11.0 oz (312g)
MTTF(3)	>120,000 hrs

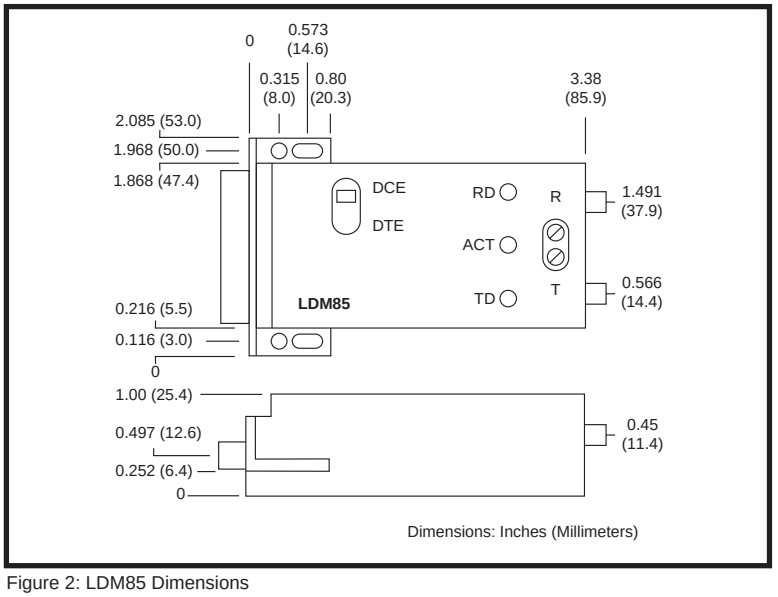


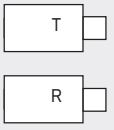
Figure 2: LDM85 Dimensions

Ordering Information

Model	Description
LDM85-P(4)(5)	Pinned RS-232 connector
LDM85-S(4)(5)	Socketed RS-232 connector
LDM85-PT(4)(5)	Pinned RS-232 connector, U.S. wall transformer, 120VAC
LDM85-ST(4)(5)	Socketed RS-232 connector, U.S. wall transformer, 120VAC
LDM85-PE(4)(5)	Pinned RS-232 connector, European wall transformer, 220VAC
LDM85-SE(4)(5)	Socketed RS-232 connector, European wall transformer, 220VAC
PT3	U.S. wall Transformer, 120VAC
PT3E	European wall transformer, 220VAC

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		
Pin 16	Echo Sup 1		Echo Suppress Control Out		
Pin 17	Echo Sup 2		Echo Suppress Control In		
Pin 18	+5VDC		+5VDC Power In, Pull Up Power Out		
Pin 20	DTR	[4]	Data Terminal Ready		
Pin 25	TTL RD		TTL RD Inverse of RD		

Fiber Optic



Pin numbers given are for the 25-pin connector with the 9-pin equivalent in [ ].

NOTES:
(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 internal echo suppression, add 1 to the part number.
(5) For ST fiber optic connector, add -025 to the part number.

PT3

US Style Wall-Mount Transformer

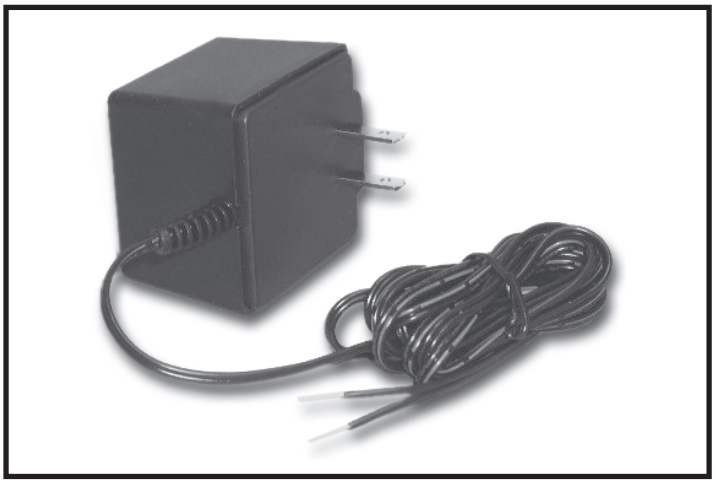


Figure 1: PT3 Power Supply

Specifications

Model	PT3
Electrical Specifications Input Output	 120VAC, 60Hz, 18W 12VAC, 1000mA, 12.0VA
Output Cable Length	6.0 ft (1.83m) minimum
Dimensions	2.21 in x 2.14 in x 1.65 in (56.1 mm x 54.4 mm x 41.9 mm)
Weight	11.0 oz (312g)

PT3E

European Style Transformer

Figure 2: PT3E Power Supply

Specifications

Model	PT3E
Electrical Specifications Input Output	 230VAC, 50Hz, 10W 12VAC, 500mA, 6VA
Input Cable Length Output Cable Length	3.5 ft (1.1m) minimum 6.0 ft (1.83m) minimum
Dimensions	2.70 in x 1.95 in x 1.60 in (68.6 mm x 49.5 mm x 40.6 mm)
Weight	11.0 oz (312g)

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1. Complete product model number.
2. Product serial number.
3. Name, address, and telephone number of person returning product.
4. Special repair instructions.
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
3331 E. Hemisphere Loop
Tucson, AZ 85706 USA

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