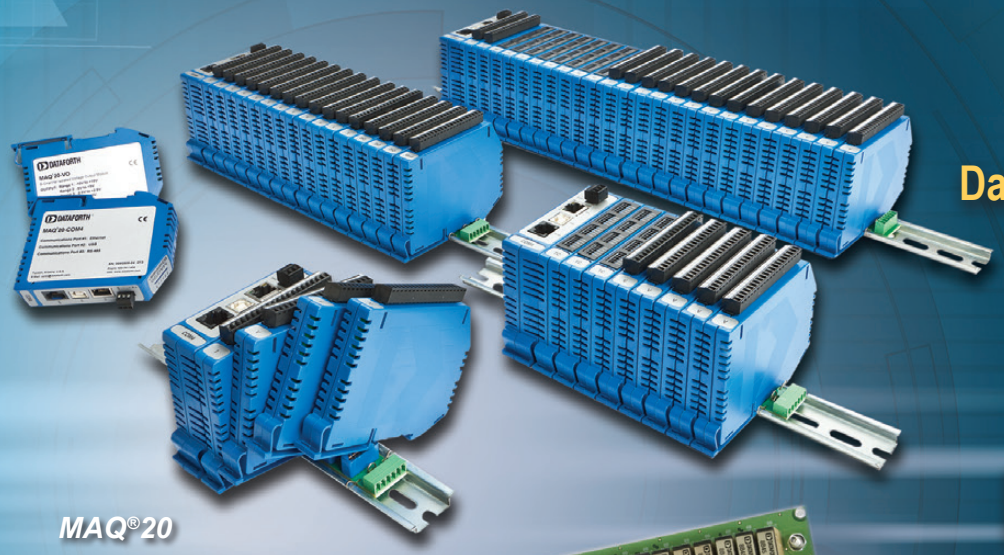
DATAFORTH®

2024 Catalog
MAQ®20
SLX200
SLX300

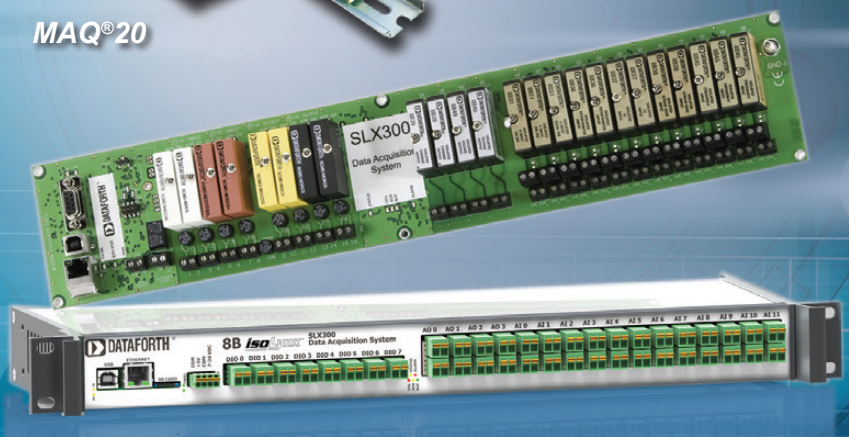
Data Acquisition Systems

Instrument Class®

Industrial Electronics



MAQ®20



SLX300

Celebrating

40 YEARS

Instrument Class®
INNOVATION

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The Company

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

Global Service and Support

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

Research and Development Team

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

Automated Manufacturing and Test

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

Quality Control

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

www.dataforth.com

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

The Future

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

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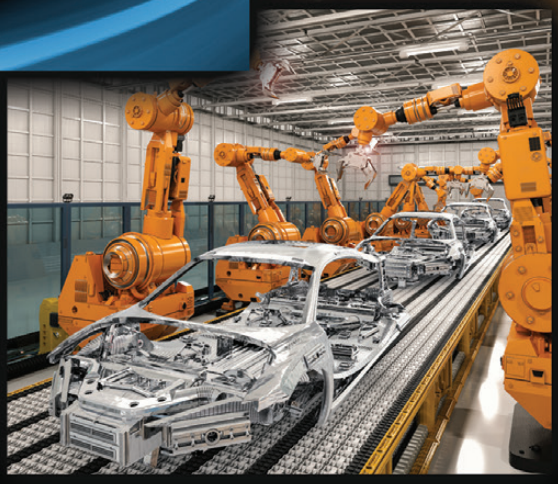
Dataforth

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

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

Additional Resources

- Application Notes
- Tech Notes
- Press and Product Releases



Our Track Record Proves We are Dedicated to Your Success!

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SCM5B Isolated Analog Signal Conditioning Modules

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

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

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

SCM5B Key Features

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



SCM7B Isolated Process Control Signal Conditioning Modules

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

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

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



SCM7B Key Features

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

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

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

SensorLex® 8B Isolated Analog Signal Conditioning Modules

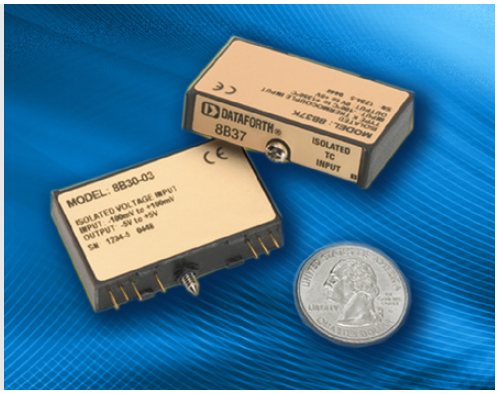
Miniature Size, 2-way Isolation, 5V Supply Voltage, *Instrument Class*® Performance

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

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

8B SensorLex Key Features

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



SCMD Isolated Digital I/O Modules

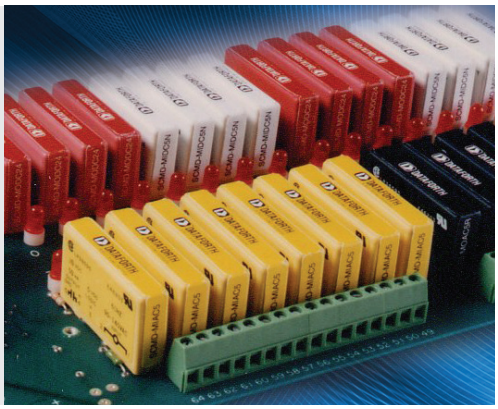
Miniature Digital I/O Modules with 4kV Isolation

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

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

Key SCMD Features

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



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

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

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

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

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

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

DSCA Key Features

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



SCM9B Isolated Analog Signal Conditioning Modules

Isolated, Intelligent Signal Conditioning Products

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

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

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

SCM9B Key Features

SCM9B Sensor-to-Computer Modules

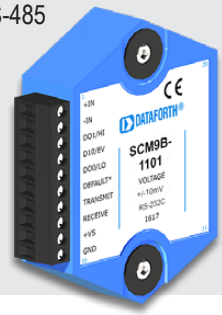
- 500Vrms Input Isolation
- Programmable Scaling and Linearization
- ASCII Command/Response Protocol
- 15-bit Measurement Resolution
- Continuous Self-calibration
- Analog Readback
- DIN-rail Mountable D100 Series

SCM9B Computer-to-Analog Output Modules

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

SCM9B Converters and Repeaters

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



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

DSCL Industrial Loop Isolators and Transmitters

Passive, Active, Programmable 4-20mA Loop Products

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

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

Key DSCL Features

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

Compact 6.2mm Signal Converters

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



DSCP User-Programmable Transmitters

Passive, Active, Programmable 4-20mA Loop Products

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

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

Key DSCP Features

- Full Family of Loop Isolators and Transmitters
- Signal-powered Passive Loop Isolator Models
- Wide Range 24-60V or 85-230V AC/DC Powered Models
- Jumper and Software Configurable Models
- 4000Vrms Isolation
- PCB, DIN-rail, Panel Mount, or Instrument Head Mounting
- Multiple Channels per Package Available
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- Manufactured per RoHS III Directive 2015/863

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- 1.6 oz (45g) Per Module



DSCT Loop-Powered Isolated Two-wire Transmitters

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

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

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

Key DSCT Features

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



DCP and LDM Industrial Data Communication Products

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

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

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

Key Data Communication Features

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



SCM5B isoLynx® SLX200 Data Acquisition System

Fast, Intelligent, Modular, Fully Isolated

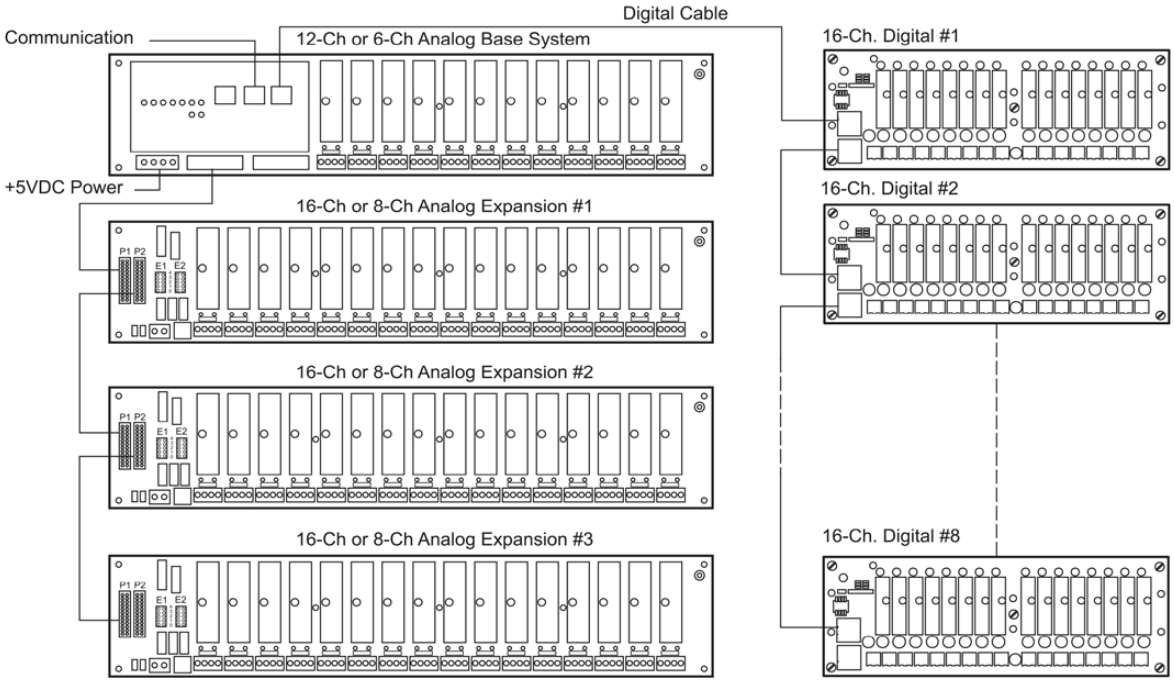
Implements industry-standard Modbus® RTU and TCP protocols, enabling communication with existing third-party software drivers and HMI/SCADA packages

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

SCM5B isoLynx SLX200 Key Features

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





SCM5B isoLynx SLX200 System Example

8B isoLynx® SLX300 Data Acquisition System

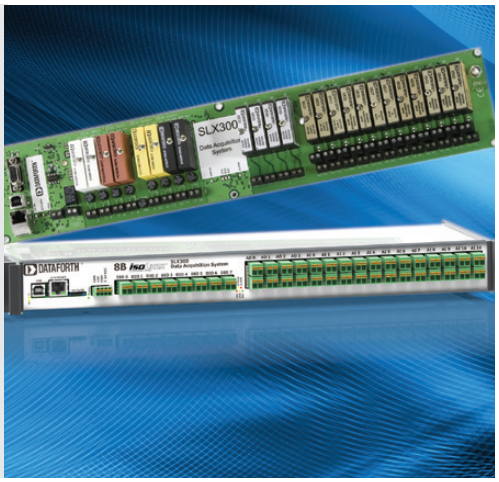
Flexible, Compact, Modular, Reliable

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

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

8B isoLynx SLX300 Key Features

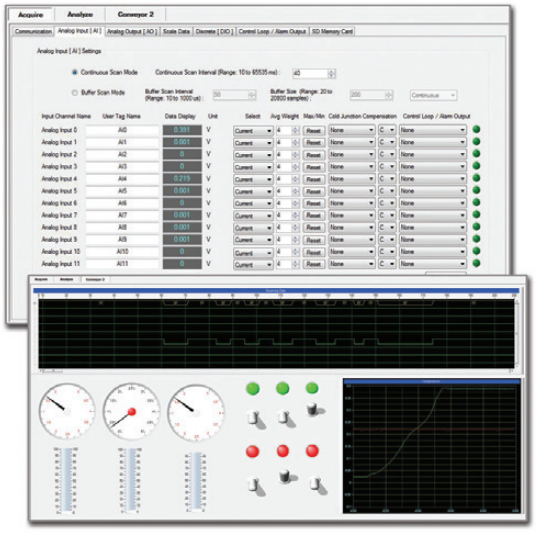
- Modbus RTU and TCP Support
- 1500Vrms Input-to-Output and Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Wide I/O Selection
  - – Analog – 19 product families, 130+ models
  - – Digital – 6 product families, 20+ models
- Mix and Match Analog and Digital I/O
- Advanced Features Including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



ReDAQ® Shape Software for SLX300

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

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



ReDAQ Shape for SLX300 Key Features

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

Functions:

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

MAQ®20 Industrial Data Acquisition and Control System

High Performance, Powerful, Flexible, Industrial, Rugged Design

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

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

MAQ20 Key Features

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

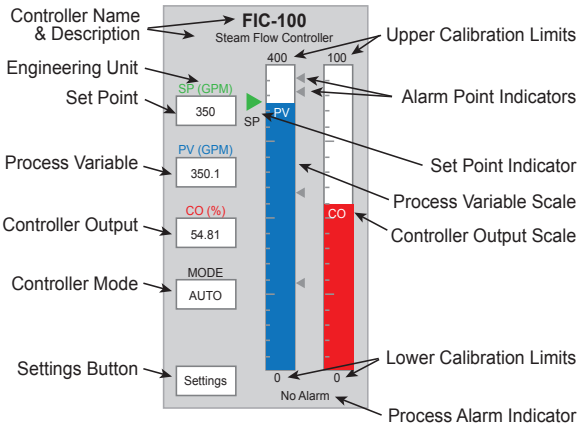


PID Loop Control

This highly effective controller operates in ReDAQ Shape for MAQ20 software

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

Key PID Controller Features... with ReDAQ Shape Software



PID Faceplate in ReDAQ Shape Software

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

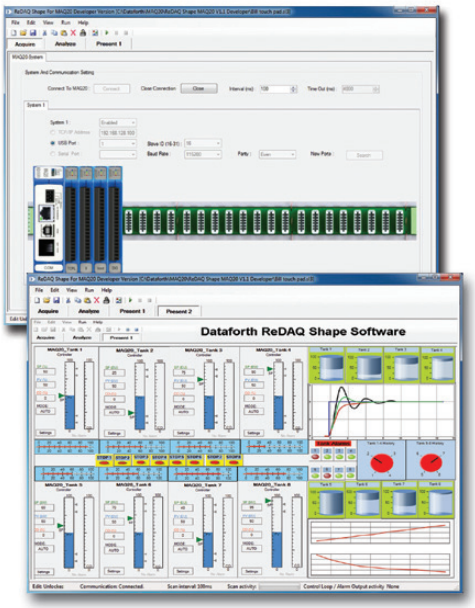
ReDAQ® Shape Software for MAQ®20

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

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

ReDAQ Shape for MAQ20 Key Features

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



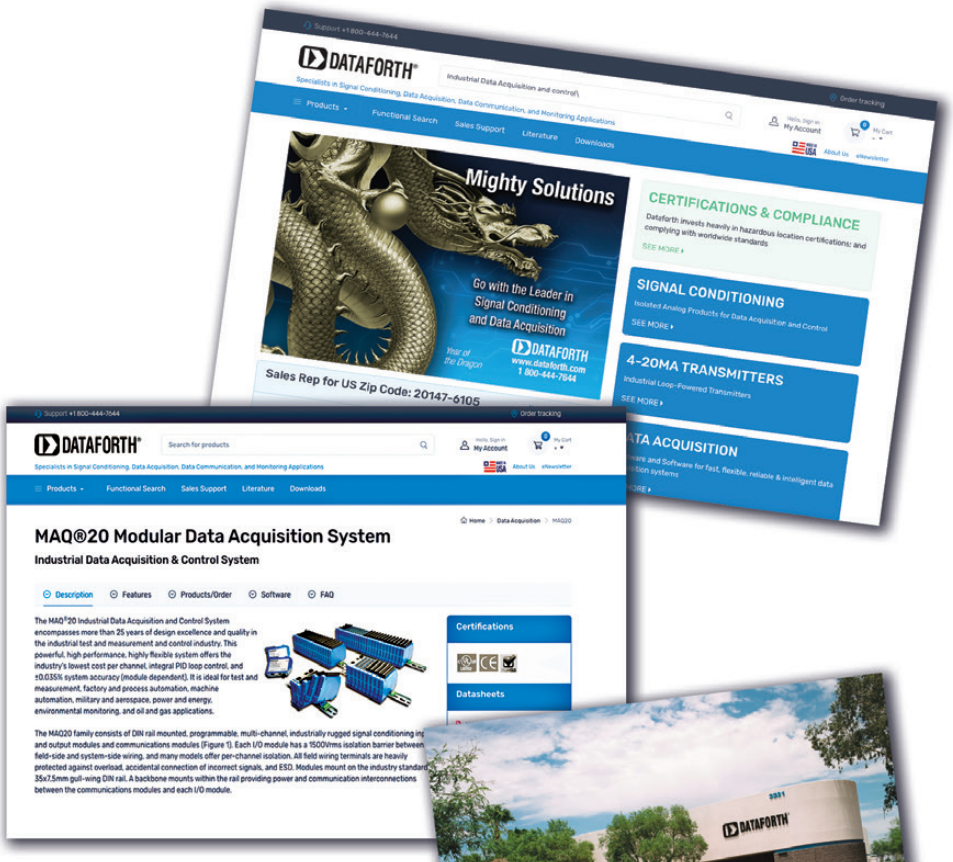
The Dataforth System Builder

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

Visit Dataforth's Website: dataforth.com

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

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





Online Help
Online Ordering
Data Sheets
Application Notes
Product Information



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SCM5B, SCM7B, 8B, SCM9B

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

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

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

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

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High-accuracy Energy Monitoring Module

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

Data Acquisition (DAQ) System - MAQ20

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

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High-voltage Attenuator Modules - SCMHVAS-Mxxxx

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

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

See Discontinued Devices at the End of the Document.

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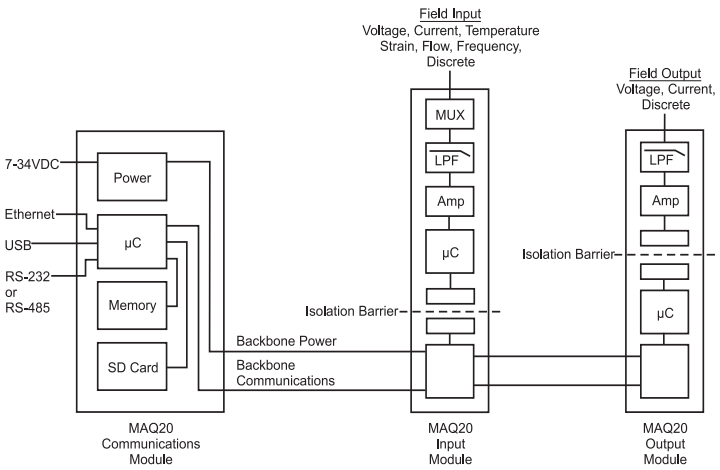
MAQ®20

Industrial Data Acquisition and Control System



DESCRIPTION

The MAQ®20 Industrial Data Acquisition and Control System encompasses more than 30 years of design excellence and quality in the industrial test and measurement, and process control industry. This powerful, high-performance, highly flexible system offers the industry's most affordable price per channel, integral PID loop control, and ±0.035% system accuracy (module dependent). It is ideal for test and measurement, factory and process automation, machine automation, military and aerospace, power and energy, environmental monitoring, and oil and gas applications. The MAQ20 family consists of DIN-rail mounted, programmable, multi-channel, industrially rugged, signal conditioning input and output modules and communications modules (Figure 1). Each I/O module has a 1500Vrms isolation barrier between field-side and system-side wiring, and many models offer per-channel isolation. All field wiring terminals are heavily protected against overload, accidental connection of incorrect signals, and ESD. Modules mount on the industry-standard 35x7.5mm gull-wing DIN-rail. A backbone mounts within the rail providing power and communication interconnections between the communications modules and each I/O module.



MAQ20 System Block Diagram

FEATURES

- Industry's Most Affordable Price per Channel
- ±0.035% Accuracy (typ)
- 1500Vrms Channel-to-Bus Isolation
- Up to 240Vrms Continuous Field I/O Protection
- ANSI/IEEE C37.90.1 Transient Protection
- Direct Connection to Internet Option
- Graphical Control Software
  - ReDAQ® Shape for MAQ20 Software
- Advanced Features Including Integral PID Control, Alarms, Counters, Timers, PWMs, and more
  - Up to 8 PID Loops with ReDAQ Shape Software
  - Formulas, Data Logger, TEDS, PID
- Wide Range 7-34VDC-input Power
- –40°C to +85°C Industrial Operating Temperature
- System is a Modbus® Server and Can Operate Remotely without Local PC
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low-cost per Channel
- Modular IoT enabled, ready to use
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

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The Modules: Compact, Flexible, and Powerful

One MAQ®20 communications module can interface to up to 24 I/O modules to construct a system with a maximum of 384 channels that fits within a standard 19" instrumentation rack. Processors within each module make this distributed system extremely powerful.

- **Communications Modules:** Ethernet, RS-232, RS-485, and USB with host application software interfacing to the system using Modbus® TCP or Modbus RTU protocol.

- **Analog Input Modules:** Interface to a wide range of standard industrial sensors and equipment and offers up to 16 channels of input, each of which can be independently configured; signal ranges are user-selectable and offered in differential and per-channel isolated single-ended configurations.

- **Process Voltage and Process: Current-input Modules:** Offer 8-channel differential input or 16-channel single-ended input for precise measurement of voltage and current signals; all channels are individually configurable for range, alarm limits, and averaging.

- **Thermocouple-input Modules:** Offer 8 differential-input channels, all of which are individually configurable for range, alarm limits, and averaging. Separate models are offered for interfacing to Type J, Type K, Type T, and Types R and S sensors.

- **RTD and Potentiometer-input Modules:** Interface to 2-wire, 3-wire, and 4-wire sensors including five RTD types and potentiometers. Modules offer five or six channels, each configurable for sensor, range, alarm limits, and averaging.

- **Strain-gauge Input Module:** Connects to full-, half-, and quarter-bridge sensors and offers four channels; each channel is configurable for range, alarm limits, averaging, bandwidth, excitation, and gain. Additional features are autozero, shunt cal, and 6-wire connection.

- **Frequency-input Module:** Accepts zero-crossing and TTL signals with frequencies from 1Hz to 1MHz plus State Change and provides a DC stimulus for contact sensors. This module has eight channels, each configurable for range and alarm limits.

- **Isolated Process Voltage and Process Current-input Modules:** Offer 8 isolated-input channels with multiple ranges and high-resolution conversion for precise measurement of voltage and current signals; channels are individually configurable for range, alarm limits, averaging, and high-speed burst scan.



Figure 1: Communications Module with I/O Modules

- **Analog Output Modules: Process Voltage and Process Current-output Modules:** Drive valves, perform other crucial process operations, and provide up to eight channels of output which can be independently configured.

- **Discrete Input/Output Modules:** Provide multiple channels of isolated AC/DC input and AC/DC output per module and offer advanced special functions as well as alarm capability. Twenty-channel input and 20-channel output models offer low per-channel cost.

- **High-density Input Modules with or without Compliance Voltage:** Offer 20 input channels. One module interfaces to 10-120VDC/VAC signals; the other model has a 24VDC compliance voltage source on each channel for interfacing to relay contacts, solid state switches, or other devices requiring excitation.

- **High-density Isolated Output Module:** Provides 20 output channels that can switch up to 60VDC signals and sink up to 3A of current. Channels can be switched individually or in blocks and have user-configurable default output states.

- **Discrete-Relay-output Module:** Provides 20 isolated SPST latching relay output channels with contact state readback that can switch between 2A at 30V and 0.4A at 150V. Relays can be controlled individually or in blocks and have user-configurable default states.

The **System Backbone** resides within the DIN-rail used for module mounting and provides power to and interface between the communications module and the I/O modules. Modules mount on industry-standard 35x7.5mm gull-wing DIN-rails.

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Outstanding Functionality

The MAQ®20 system can operate remotely without host PC intervention. It can also operate as a standalone data logger. Additional features include:

- Up to 4GB of logged data can be transferred via FTP during real-time acquisition
- System firmware automatically registers installation and removal of I/O modules
- Load share power supply modules enable system expansion, standby and redundant power
- Hot swappable I/O modules with field-side pluggable terminal blocks on most models
- Sophisticated packaging allows high-density mounting in 3U increments
- I/O modules can be mounted remotely from the communications module

Output modules are programmable for user-defined waveforms. Discrete I/O modules offer seven high-level functions including pulse/frequency counter, pulse/frequency counter with de-bounce, waveform measurement, time between events, frequency generator, PWM generator, and one-shot pulse generator.

System power is connected to the communications module, which in turn powers the I/O modules. For systems with power supply requirements greater than those the communications module provides, the MAQ20-PWR3 load share power supply module can provide additional power. When a MAQ20 I/O module is inserted into a system, module registration occurs automatically, data acquisition starts, and data is stored locally in the module. The system is based on a Modbus-com® compatible memory map, which ensures easy access to acquired data, configuration settings, and alarm limits. Information is stored in consistent locations from module to module for ease of use and system design.

Software

- ReDAQ® Shape Graphical HMI Design & Runtime Solution

The MAQ20 system comes with free configuration software. In addition, other software solutions may also be used such as LabVIEW™, VIs, C API, Python API, and OPC Server.

Leading-Edge PID Loop Control

The MAQ20 provides PID loop control with ReDAQ Shape software for MAQ20. With ReDAQ Shape, the powerful Dataforth MAQ20 communications module is capable of autonomously running up to 8 PID control loops; faceplates within the software enable an engineer or operator to configure the many features of loop control and monitor processes. Additional advanced features include formulas, data logging, TEDS, and scripting. Typical PID applications include steam, water, and chemical flow control; tank level control; heat-exchanger / reactor temperature control, and pressure control.

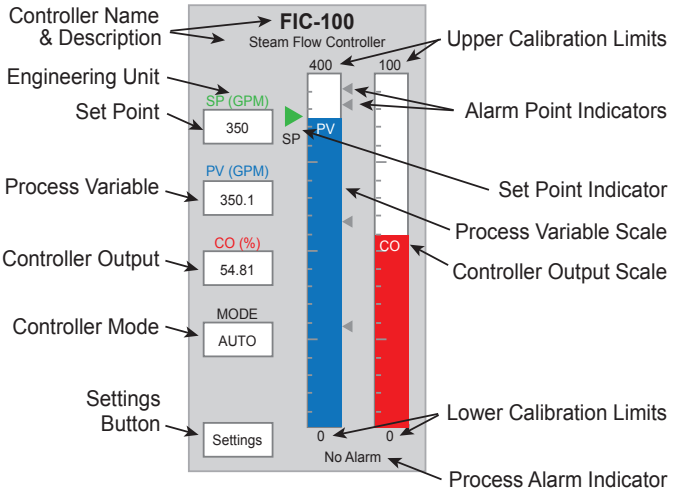


Figure 3: PID Faceplate in ReDAQ Shape Software

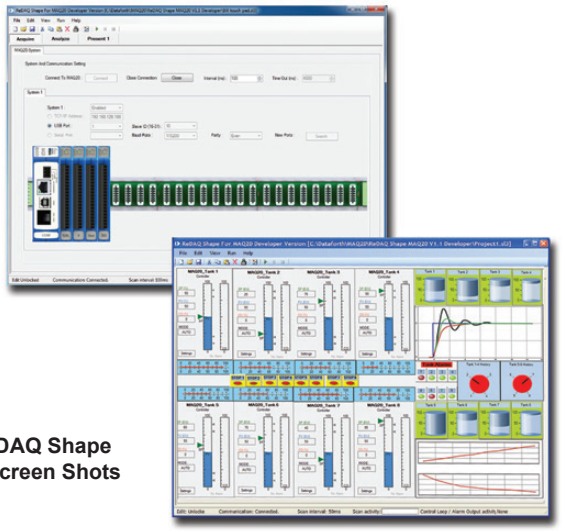


Figure 2: ReDAQ Shape for MAQ20 Screen Shots

Like all Dataforth products, the MAQ20 system provides exceptional isolation, protection, accuracy, and reliability. All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly found in heavy industrial environments.

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MAQ®20 Data Acquisition System Selection Guide

COMMUNICATIONS MODULES

MODEL	DESCRIPTION
MAQ20-COM2	Communications Module; Ethernet, USB, RS-232
MAQ20-COM4	Communications Module, Ethernet; USB, RS-485

VOLTAGE & CURRENT ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-MVDN	Analog Input Module; mV, 8-ch, Differential
MAQ20-VSN	Analog Input Module; V, 16-ch, Single Ended
MAQ20-VDN	Analog Input Module; V, 8-ch, Differential
MAQ20-ISN	Analog Input Module; mA, 16-ch, Single Ended
MAQ20-IDN	Analog Input Module; mA, 8-ch, Differential

ISOLATED VOLTAGE & CURRENT ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-ISOMV1	Isolated Analog Voltage-input Module, 8-ch, ±100mV
MAQ20-ISOV1	Isolated Analog Voltage-input Module, 8-ch, ±1V
MAQ20-ISOV2	Isolated Analog Voltage-input Module, 8-ch, ±10V
MAQ20-ISOV3	Isolated Analog Voltage-input Module, 8-ch, ±20V
MAQ20-ISOV4	Isolated Analog Voltage-input Module, 8-ch, ±40V
MAQ20-ISOV5	Isolated Analog Voltage-input Module, 8-ch, ±60V
MAQ20-ISOI1	Isolated Analog Current-input Module, 8-ch, ±20mA

THERMOCOUPLE ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-JTC	Analog Input Module; Type J Thermocouple, 8-ch
MAQ20-KTC	Analog Input Module; Type K Thermocouple, 8-ch
MAQ20-TTC	Analog Input Module; Type T Thermocouple, 8-ch
MAQ20-RSTC	Analog Input Module; Type R and Type S Thermocouple, 8-ch

RTD AND POTENTIOMETER ANALOG INPUT MODULES

MODEL	DESCRIPTION
MAQ20-RTD31	Analog Input Module; RTD/Potentiometer, 3-wire, Type Pt and Ni, 6-ch
MAQ20-RTD41	Analog Input Module; RTD, 4-wire, Type Pt and Ni, 5-ch

STRAIN GAUGE ANALOG INPUT MODULE

MODEL	DESCRIPTION
MAQ20-BRDG1	Analog Input Module; Bridge/Strain-gauge, 4-ch

FREQUENCY ANALOG INPUT MODULE

MODEL	DESCRIPTION
MAQ20-FREQ	Analog Input Module; Frequency, 8-ch

VOLTAGE & CURRENT ANALOG OUTPUT MODULES

MODEL	DESCRIPTION
MAQ20-VO	Analog Output Module; Voltage, 8-ch
MAQ20-IO	Analog Output Module; Current mA, 8-ch

DISCRETE INPUT / OUTPUT MODULES

MODEL	DESCRIPTION
MAQ20-DIOL	Discrete Input/Output Module; 3-60VDC In, 3-60VDC Out, 5-ch In, 5-ch Out
MAQ20-DIOH	Discrete Input/Output Module; 90-280VAC/VDC In, 24-280VAC Out, 4-ch In, 4-ch Out

DISCRETE HIGH-DENSITY INPUT MODULES WITH OR WITHOUT COMPLIANCE VOLTAGE

MODEL	DESCRIPTION
MAQ20-DIV20	Discrete Input Module; 10-32VDC In, 20-ch
MAQ20-DIVC20	Discrete Input Module; 10-24VDC In, 24VDC Compliance, 20-ch

DISCRETE HIGH-DENSITY OUTPUT MODULE

MODEL	DESCRIPTION
MAQ20-DODC20SK	Discrete Output Module; 10-60VDC Out, 20-ch

DISCRETE RELAY OUTPUT MODULE

MODEL	DESCRIPTION
MAQ20-DORLY20	Relay-output Module; 2A at 30V, 0.4A at 150V, 20-ch SPST

LOAD SHARE POWER SUPPLY MODULE

MODEL	DESCRIPTION
MAQ20-PWR3	Load Share Power Supply Module

SYSTEM BACKBONES

MODEL	DESCRIPTION
MAQ20-BKPL4	DIN-rail Backbone; Accepting 1 COM Module plus 4 I/O Modules
MAQ20-BKPL8	DIN-rail Backbone; Accepting 1 COM Module plus 8 I/O Modules
MAQ20-BKPL16	DIN-rail Backbone; Accepting 1 COM Module plus 16 I/O Modules
MAQ20-BKPL24	DIN-rail Backbone; Accepting 1 COM Module plus 24 I/O Modules

SOFTWARE

MODEL	DESCRIPTION
MAQ20-940	ReDAQ® Shape Software for MAQ20 – Developer Version
MAQ20-941	ReDAQ Shape Software for MAQ20 – User Version

POWER SUPPLIES

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

ACCESSORIES

BACKBONE EXPANSION CABLES

MODEL	DESCRIPTION
MAQ20-XCA01	Backbone Expansion Cable; 1 meter (39.4")
MAQ20-XCA02	Backbone Expansion Cable; 2 meter (78.7")

CABLES TO INTERFACE 8B BACKPANELS TO MAQ20-VSN MODULE

MODEL	DESCRIPTION
MAQ20-5B26-0.3	IDC26-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-5B26-0.6	IDC26-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-5B26-01	IDC26-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-8B25-0.3	DB25-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-8B25-0.6	DB25-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-8B25-01	DB25-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-XTB03	MAQ20 Terminal Block, 3 Positions
MAQ20-XTB20	MAQ20 Terminal Block, 20 Positions

USB AND ETHERNET CABLES AND ADAPTERS

MODEL	DESCRIPTION
SLX141-01, -02, -07	Ethernet Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX141-X01, -X02, -X07	Ethernet Crossover Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX142, 143	RJ45 to DB9 Adapters
SLX144	RJ45 RS-485 Multidrop Adapter
SLX146-02, -07	Null Modem Serial Cable, Female DB-9 to Female DB-9; 2m (78.7"), 7m (275.6")
SLX147-01, -02, -05	USB Cable, Type A to Type B; 1m (39.4"), 2m (78.7"), 5m (196.9")
SLX148-4	4GB Micro SD Card and USB Adapter

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Communications Modules

Provide Connection, Power, Interface

DESCRIPTION

The MAQ®20 communications module is offered in two models and provides the connection between a host computer and a MAQ20 Data Acquisition System. MAQ20-COM4 communicates using Ethernet, USB, or RS-485; MAQ20-COM2 uses Ethernet, USB, or RS-232. Ethernet communications use the Modbus® TCP protocol and USB communications are based on the Modbus RTU protocol, which RS-485 and RS-232 communications also use. Serial communications over RS-485 can be either 2-wire or 4-wire.

When using the Ethernet interface, up to four simultaneous socket connections are supported. Serial communications over RS-232 or RS-485 can be run at baud rates as fast as 921.6kbps.

A very useful feature of the MAQ20 system is the capability to store acquired data locally for later analysis. This is provided by the easily accessible and removable 4GB micro-SD memory card that is in the MAQ20-COMx module and can be used to log data acquired from all input modules.

Each MAQ20-COMx module can interface to up to 24 I/O modules in any combination, allowing high channel counts and great flexibility in system configuration.

To power the system, a 7-34VDC power source is connected to the communications module. Regulated and protected supplies within the module then provide power both to the internal circuits and to all I/O modules in the system. When many high power I/O modules are used in a system, MAQ20-PWR3 load share power supply modules can be installed in standard I/O module slots to provide the necessary additional power.

To ensure robustness, the communications interface-to-bus isolation is 50VDC and power input terminals are protected against overvoltage, transient, and reverse connections.

At a minimum, a MAQ20 Data Acquisition System must have a communications module, a backbone, and one I/O module.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

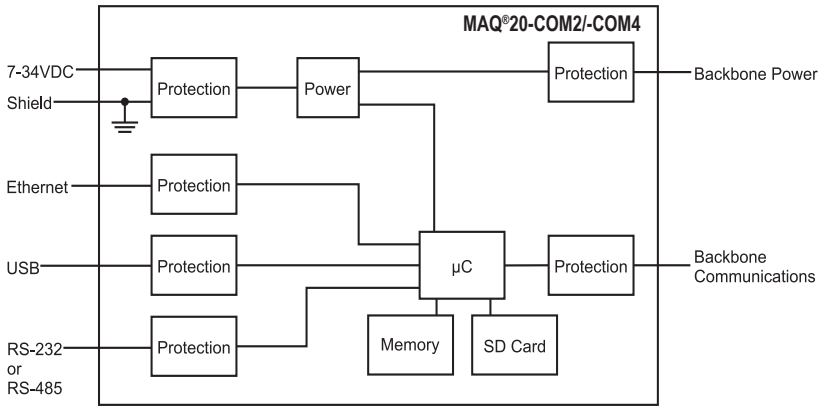
- Connect Host Computer and MAQ20 System
- Communicate Using Ethernet, USB, RS-485 or RS-232
- Up to 4 Simultaneous Socket Connections with Ethernet
- Baud Rates to 921.6kbps with RS-232/RS-485
- Follow Modbus® TCP or RTU Protocols
- Store Acquired Data Locally
- Interface to up to 24 I/O Modules
- 50VDC Comm. Interface-to-Bus Isolation
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular IoT Enabled, Ready-to-Use
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20 Communications Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-COM4 MAQ20-COM2	Ethernet, USB, RS-485 Ethernet, USB, RS-232
Communications Ethernet USB RS-485 RS-232	 10/100 Base-T (1000 Base-T Compatible) RJ-45, Modbus® TCP USB 2.0, Type B, Proprietary Modbus Over USB 2-wire or 4-wire, up to 921.6kbps, Up to 4000 ft, RJ-45, Modbus RTU Up to 921.6kbps, RJ-45, Modbus RTU
CMV Power-to-Bus Communication Port-to-Bus Transient	 50VDC 50VDC ANSI/IEEE C37.90.1
Power Supply Input Power Power to Bus Power Conversion Efficiency Quiescent Current	 7-34VDC at 2A (max) 5VDC at 3A (max) 76% 100mA
Dimensions (h)x(w)x(d)	 4.51" x 1.11" x 3.26" (114.6mm x 28.2mm x 82.8mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

Power Input Terminal Block Position (top to bottom)	Input Connections	
1	7 - 34 VDC	+
2	7 - 34 VDC	–
3		SHIELD

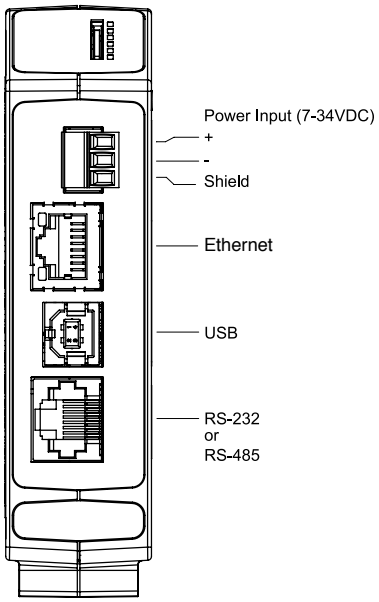
For input connections and full details on module operation, refer to:
MA1040 – MAQ20 Communications Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-COM4	Ethernet, USB, RS-485
MAQ20-COM2	Ethernet, USB, RS-232



Communications Module



Communications Module Input Connections

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Analog Input Modules: Process Voltage & Process Current

Interface to Volt, Millivolt, and Milliamp Sensors and Equipment

DESCRIPTION

MAQ®20 voltage and current analog input modules interface to a wide range of volt, millivolt, and milliamp sensors and equipment used in industrial and test and measurement applications. They offer 8-channel differential input or 16-channel single-ended input for precise measurement of voltage and current signals. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe operation. Hardware low-pass filtering in each channel provides rejection of 50Hz and 60Hz line frequencies. Field I/O connections are made through a pluggable terminal block with four positions provided for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, thereby preserving data integrity.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the sampling rate of enabled channels.

Input ranges are selectable on a per-channel basis. The MAQ20-MVDN, -VDN, and -VSN modules have five user-selectable input ranges; the MAQ20-IDN and -ISN modules have two. Over-range and under-range up to 2% beyond the specified input values is allowed, and accuracy is guaranteed to full scale.

Cables to interface 8B backpanels to the MAQ20-VSN module are available; the 8B modules and backpanel assembly provide 1500Vrms channel-to-channel isolation.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

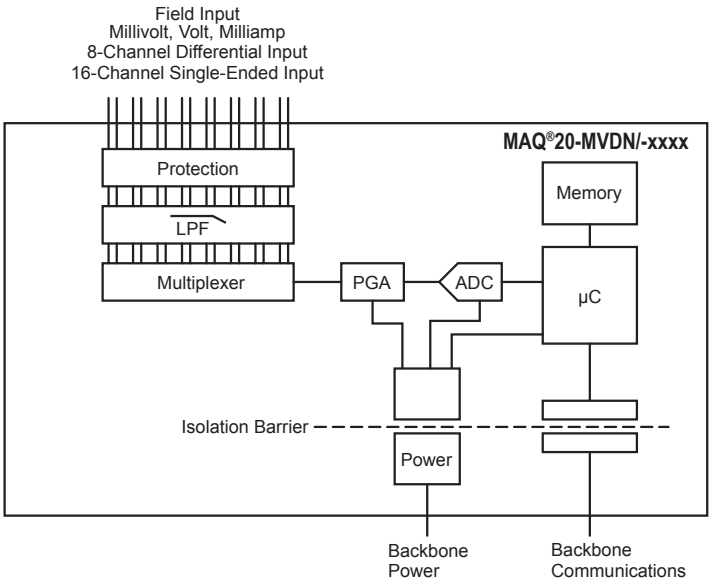
- Interface to Volt, Millivolt, Milliamp Sensors and Equipment
- 8-channel Differential or 16-channel Single-Ended Input
- All Channels Individually Configurable for Range, Alarms, Averaging
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 240Vrms Continuous Overload
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20 Voltage-input and Current-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-MVDN	8-channel, mV, Differential Input ±50mV, ±100mV, ±250mV, ±1.0V (Default), ±2.0V
MAQ20-VDN	8-channel, Volt, Differential Input ±5V (Default), ±10V, ±20V, ±40V, ±60V
MAQ20-VSN	16-channel, Volt, Single-Ended Input ±5V (Default), ±10V, ±20V, ±40V, ±60V
MAQ20-IDN	8-channel, mA, Differential Input 0-20mA (Default), 4-20mA
MAQ20-ISN	16-channel, mA, Single-Ended Input 0-20mA (Default), 4-20mA
Per Channel Setup	Individually Configurable for Range, Alarms, Averaging
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	±28V Peak (-VDN), ±3V Peak (-MVDN, -IDN), 0V (-VSN, -ISN)
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	30dB at 50/60Hz
Accuracy(1)	±0.035% Span
Linearity / Conformity	±0.02% Span
Resolution	0.012% Span
Stability	
Zero	±15ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	3Hz
Scan Rate	200 Ch/s
Alarms	High / High-High / Low / Low-Low
Power Supply Current	30mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858, ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1041 – MAQ20 mV-V-mA Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-MVDN	Analog Input Module; mV, 8-ch, Differential
MAQ20-VDN	Analog Input Module; V, 8-ch, Differential
MAQ20-VSN	Analog Input Module; V, 16-ch, Single Ended
MAQ20-IDN	Analog Input Module; mA, 8-ch, Differential
MAQ20-ISN	Analog Input Module; mA, 16-ch, Single Ended

Cables to Interface 8B Backpanels to MAQ20-VSN Module

Model	Description
MAQ20-8B25-0.3	DB25-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-8B25-0.6	DB25-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-8B25-01	DB25-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-5B26-0.3	IDC26-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-5B26-0.6	IDC26-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-5B26-01	IDC26-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long

Terminal Block Position (top to bottom)	MAQ20-MVDN, MAQ20-VDN and MAQ20-IDN Input Connections	MAQ20-VSN and MAQ20-ISN Input Connections
1	CH0 +IN	CH0 +IN
2	CH0 –IN	CH1 +IN
3	SHIELD	CH0, CH1, CH2, CH3 –IN, SHIELD
4	CH1 +IN	CH2 +IN
5	CH1 –IN	CH3 +IN
6	CH2 +IN	CH4 +IN
7	CH2 –IN	CH5 +IN
8	SHIELD	CH4, CH5, CH6, CH7 –IN, SHIELD
9	CH3 +IN	CH6 +IN
10	CH3 –IN	CH7 +IN
11	CH4 +IN	CH8 +IN
12	CH4 –IN	CH9 +IN
13	SHIELD	CH8, CH9, CH10, CH11 –IN, SHIELD
14	CH5 +IN	CH10 +IN
15	CH5 –IN	CH11 +IN
16	CH6 +IN	CH12 +IN
17	CH6 –IN	CH13 +IN
18	SHIELD	CH12, CH13, CH14, CH15 –IN, SHIELD
19	CH7 +IN	CH14 +IN
20	CH7 –IN	CH15 +IN

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Analog Input Modules: Process Voltage & Process Current

Isolated Channel-to-channel, High-resolution Conversion, Wide Bandwidth

DESCRIPTION

The MAQ®20-ISOMV1 and MAQ20-ISOVx voltage input modules and MAQ20-ISO1 current input module offer 8 isolated input channels with multiple signal ranges and high-resolution conversion for precise measurement of a wide range of analog voltage and current signals. All channels are individually configurable for range, alarm limits, averaging, and high-speed burst scan to match the most demanding applications. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Signal bandwidth is 1kHz for voltage input and 1kHz for current input. The burst scan mode allows up to 5kS/s per channel to be captured simultaneously. Field I/O connections are made through a pluggable terminal block with four positions provided for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors. In addition, the MAQ20-ISOMV1, -ISOVx, and -ISOI1 modules have 300Vrms continuous channel-to-channel isolation. Overloaded channels do not adversely affect other channels in the module, thereby preserving data integrity.

Signal ranges for the voltage input modules are from ±100mV to ±60V, and for the current input module, 0 to 20mA.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

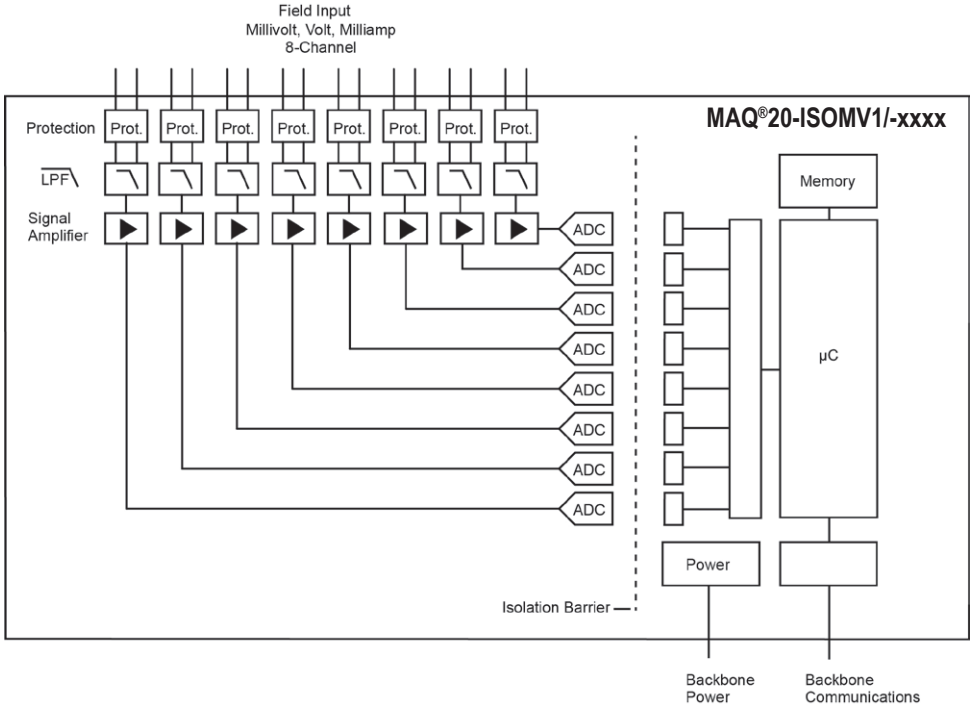
- 8 Isolated Input Channels with Multiple Ranges and High Resolution Conversion
- Precise Measurement of Wide Range of Analog Voltage and Current Signals
- Channels Individually Configurable for Range, Alarm Limits, Averaging, and High-speed Burst Scan Mode
- 1500Vrms Input-to-Bus Isolation
- 300Vrms Ch-to-Ch Isolation
- Each Channel Protected up to 240Vrms Continuous Overload
- Overloaded Channels Do Not Adversely Affect Other Channels
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-ISOMV1/-ISOVx/-ISO1 Modules Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-ISOMV1 MAQ20-ISOV1 MAQ20-ISOV2 MAQ20-ISOV3 MAQ20-ISOV4 MAQ20-ISOV5 MAQ20-ISOI1	0 to +100mV, ±100mV (Default) 0 to +1V, ±1V (Default) 0 to +10V, ±10V (Default) 0 to +20V, ±20V (Default) 0 to +40V, ±40V (Default) 0 to +60V, ±60V (Default) 0-20mA (Default), 4-20mA, ±20mA
Per Channel Setup Input Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient CMR NMR	Individually Configurable for Range, Alarms, Averaging, Burst Scan 240Vrms (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute 300Vrms, 425V_{PEAK} ANSI/IEEE C37.90.1 100dB at 50/60Hz 20dB/decade
Accuracy(1) Linearity / Conformity Resolution Stability Zero Span	±0.035% Span ±0.02% Span 0.0015% Span 15ppm/°C 35ppm/°C
Bandwidth Scan Rate Continuous Burst Alarms Open Input Response mV Input Detection Time Power Supply Current	1kHz Voltage-input, 1kHz Current-input 500 Ch/s net, 65 Ch/s at 8-ch Simultaneous 5kS/s per Channel High / High-High / Low / Low-Low Upscale <5s 270mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" ((83.1mm x 114.6mm x 15.3mm))
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A ±0.5% Span Error Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1062 – MAQ20 Ch-ch Isolated mV-V-mA Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-ISOMV1	Isolated Analog Voltage-input Module, 8-ch, ±100mV
MAQ20-ISOV1	Isolated Analog Voltage-input Module, 8-ch, ±1V
MAQ20-ISOV2	Isolated Analog Voltage-input Module, 8-ch, ±10V
MAQ20-ISOV3	Isolated Analog Voltage-input Module, 8-ch, ±20V
MAQ20-ISOV4	Isolated Analog Voltage-input Module, 8-ch, ±40V
MAQ20-ISOV5	Isolated Analog Voltage-input Module, 8-ch, ±60V
MAQ20-ISOI1	Isolated Analog Current-input Module; 8-ch, ±20mA

Terminal Block Position (Top to Bottom)	Input Connections
1	CH0 +IN
2	CH0 –IN
3	SHIELD
4	CH1 +IN
5	CH1 –IN
6	CH2 +IN
7	CH2 –IN
8	SHIELD
9	CH3 +IN
10	CH3 –IN
11	CH4 +IN
12	CH4 –IN
13	SHIELD
14	CH5 +IN
15	CH5 –IN
16	CH6 +IN
17	CH6 –IN
18	SHIELD
19	CH7 +IN
20	CH7 –IN

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Analog Input Modules: Thermocouple

Interface to Types J, K, T, R and S Thermocouples

DESCRIPTION

The MAQ®20 thermocouple analog input modules have 8 differential input channels. Separate models are offered for interfacing to Type J, Type K, Type T, and Types R and S thermocouples. Cold-junction Compensation uses four internal sensors resulting in industry-leading measurement accuracy in any system configuration and over the entire system operating temperature range. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. High, Low, High-High, and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe operation. Hardware low-pass filtering in each channel provides rejection of 50Hz and 60Hz line frequencies. Field I/O connections are made through spring cage terminal blocks with four positions provided for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 150Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, thereby preserving data integrity.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the sampling rate of enabled channels.

Input ranges are selectable on a per-channel basis. The MAQ20-JTC, -KTC, -TTC and -RSTC modules have two to four user-selectable input ranges, depending on the model. Over-range and under-range up to 2% beyond the specified input values is allowed. Sensor linearization is performed in the module, and accuracy is guaranteed to full scale.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

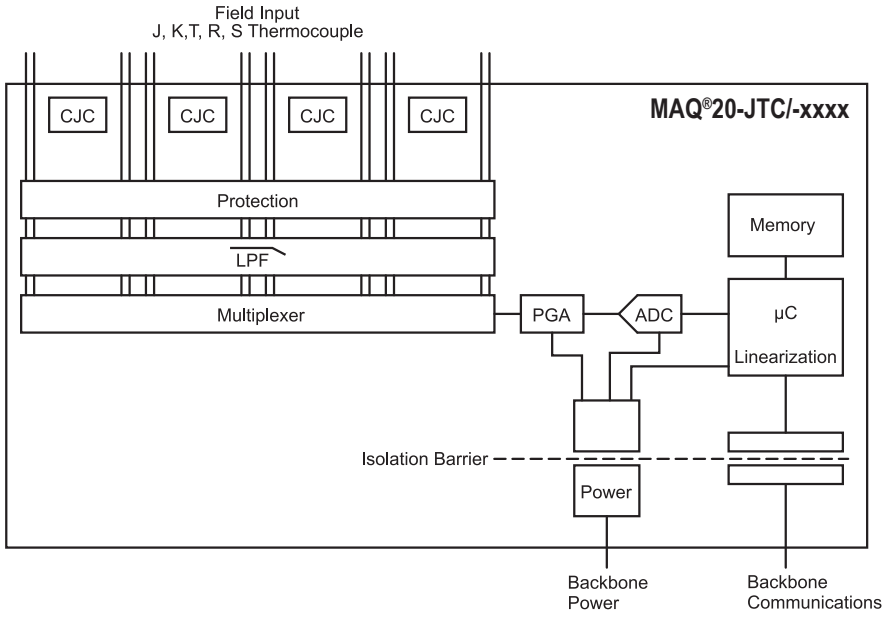
- 8 Differential-Input Channels
- Interface to Types J, K, T , R and S Thermocouples
- All Channels Individually Configurable for Range, Alarms, Averaging
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 150Vrms Continuous Overload
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20 Thermocouple-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-JTC	8-ch., Type JTC, Differential Input –100°C to +760°C (Default) –100°C to +393°C, –100°C to +199°C
MAQ20-KTC	8-ch., Type KTC, Differential Input –100°C to +1350°C (Default) –100°C to +651°C, –100°C to +332°C
MAQ20-TTC	8-channel, Type TTC, Differential Input –100°C to +400°C (Default), –100°C to +220°C
MAQ20-RSTC	8-channel, Type RTC and Type STC, Differential Input Type R: 0°C to +1750°C (Default), 0°C to +990°C Type S: 0°C to +1750°C, 0°C to +970°C
Per Channel Setup	Individually Configurable for Range, Alarms, Averaging
Input Protection	
Continuous	150Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	$\pm 3V_{PEAK}$
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	26dB at 50/60Hz
Accuracy(1)	±0.06% Span
Conformity	±0.035% Span
Cold-junction Compensation	±0.25°C at +25°C, ±1.0°C at –40°C to +85°C
Resolution	0.020% Span
Stability	
Zero	±15ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	3Hz
Scan Rate	200 Ch/s
Alarms	High/ High-High / Low / Low-Low
Open Input Response	Downscale, <5s, Flag Set
Power Supply Current	30mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis and repeatability. Does not include CJC accuracy.

For input connections and full details on module operation, refer to:
MA1047 – MAQ20 Thermocouple-input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-JTC	Analog Input Module; Type J Thermocouple, 8-ch
MAQ20-KTC	Analog Input Module; Type K Thermocouple, 8-ch
MAQ20-TTC	Analog Input Module; Type T Thermocouple, 8-ch
MAQ20-RSTC	Analog Input Module; Type R and Type S Thermocouple, 8-ch

Terminal Block Position (top to bottom)	MAQ20-xTC Input Connections
1	CH0 +IN
2	CH0 –IN
3	SHIELD
4	CH1 +IN
5	CH1 –IN
6	CH2 +IN
7	CH2 –IN
8	SHIELD
9	CH3 +IN
10	CH3 –IN
11	CH4 +IN
12	CH4 –IN
13	SHIELD
14	CH5 +IN
15	CH5 –IN
16	CH6 +IN
17	CH6 –IN
18	SHIELD
19	CH7 +IN
20	CH7 –IN

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Analog Input Modules: RTD and Potentiometer

Interface to 2-wire, 3-wire, and 4-wire Sensors

DESCRIPTION

Two MAQ®20 resistance input modules are offered. One interfaces to 2-wire and 3-wire sensors and has 6 input channels (MAQ20-RTD31); the other interfaces to 4-wire sensors and has 5 input channels (MAQ20-RTD41). The 2-wire/3-wire module interfaces to 3 types of sensors: 100Ω Pt and 120Ω Ni RTDs, and potentiometers up to 5kΩ; the 4-wire module interfaces to 100Ω Pt and 120Ω Ni RTDs. Precision, low-magnitude current sources are used to minimize sensor self-heating and cancel lead resistance errors when using 3-wire sensors. All channels are individually configurable for sensor, range, alarm limits, and averaging to match the most demanding applications. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Hardware low-pass filtering in each channel provides rejection of 50 and 60Hz line frequencies. Field I/O connections are made through a pluggable terminal block with positions designated for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, which preserves data integrity.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the sampling rate of enabled channels.

Input sensors and input ranges are selectable on a per-channel basis. One to three ranges are available depending on the input sensor. Over-range and under-range up to 2% beyond the specified input values is allowed. Sensor linearization is performed in the module, and accuracy is guaranteed to full scale.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

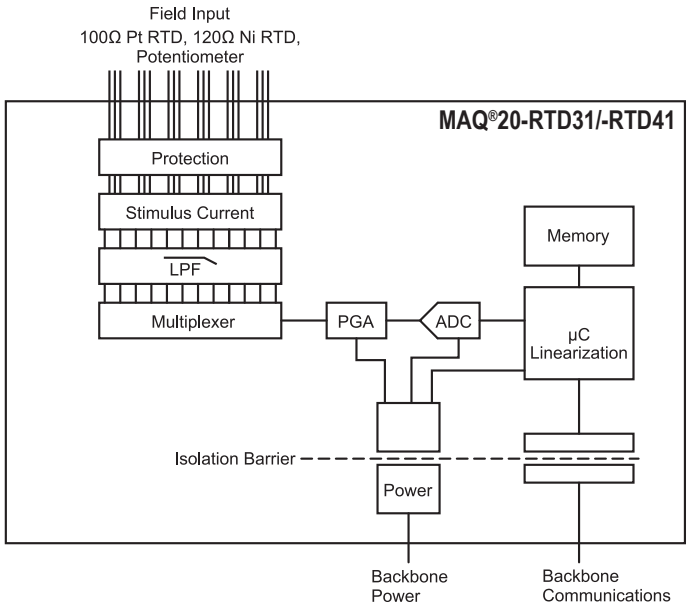
- 6 Input Channels for 2-wire or 3-wire Sensors
- 5 Input Channels for 4-wire Sensors
- Interface to Pt100, Ni120 RTDs, and Potentiometers up to 5kΩ
- All Channels Individually Configurable for Sensor, Range, Alarms, Averaging
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 240Vrms Continuous Overload
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-RTD31/-RTD41 RTD and Potentiometer-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-RTD31	6-channel, 2-wire or 3-wire Pt100, Ni120, Potentiometer-input 100Ω Pt α = 0.00385; –200°C to +850°C (Default) 100Ω Pt100 α = 0.00385; –200°C to +200°C Pt100 α = 0.00385; –100°C to +100°C Ni120 α = 0.00672; –80°C to +300°C Potentiometer 0Ω to 5kΩ
MAQ20-RTD41	5-channel, 4-wire Pt100, Ni120 100Ω Pt α = 0.00385; –200°C to +850°C (Default) 100Ω Pt100 α = 0.00385; –200°C to +200°C Pt100 α = 0.00385; –100°C to +100°C Ni120 α = 0.00672; –80°C to +300°C
Per Channel Setup	Individually Configurable for Range, Alarms, Averaging
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	$\pm 3V_{PEAK}$
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	20dB at 50/60Hz
Accuracy(1)	±0.06% Span
Conformity	±0.035% Span
Resolution	0.012% Span
Stability	
Zero	±50ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	3Hz
Scan Rate	200 Ch/s
Alarms	High / High-High / Low / Low-Low
Open Input Response	Upscale or Downscale, <5s, Flag Set
Power Supply Current	35mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1044 – MAQ20 RTD-Potentiometer Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-RTD31	Analog Input Module; RTD/Potentiometer, 2-wire or 3-wire, Type Pt and Ni, 6-ch
MAQ20-RTD41	Analog Input Module; RTD, 4-wire, Type Pt and Ni, 5-ch

Terminal Block Position (top to bottom)	MAQ20-RTDx1 Input Connections
1	CH0 +EXC/SHIELD
2	CH0 +IN
3	CH0 –IN
4	CH1 +EXC/SHIELD
5	CH1+IN
6	CH1 –IN
7	CH2 +EXC/SHIELD
8	CH2 +IN
9	CH2 –IN
10	NC
11	NC
12	CH3 +EXC/SHIELD
13	CH3 +IN
14	CH3 –IN
15	CH4 +EXC/SHIELD
16	CH4 +IN
17	CH4 –IN
18	CH5 +EXC/SHIELD
19	CH5 +IN
20	CH5 –IN

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Analog Input Module: Strain-gauge

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Interface to Full-, Half-, and Quarter-bridge Sensors

DESCRIPTION

The MAQ®20-BRDG1 strain gauge input module offers 4 input channels and can interface to full-, half-, and quarter-bridge sensors using 4-wire or 6-wire connections. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. In addition, sampling rate, resolution, bandwidth, excitation voltage, and choice of shunt calibration resistors are user-settable parameters. Input signals are sampled simultaneously and burst mode can be used to capture fast events. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Hardware low-pass filtering in each channel provides rejection of unwanted frequencies. Field I/O connections are made through spring cage terminal blocks with positions designated for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 30Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, which preserves data integrity.

Input ranges are selectable on a per-channel basis. Four ranges are available. Over-range and under-range up to 2% beyond the specified input values is allowed, and accuracy is guaranteed to full scale.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

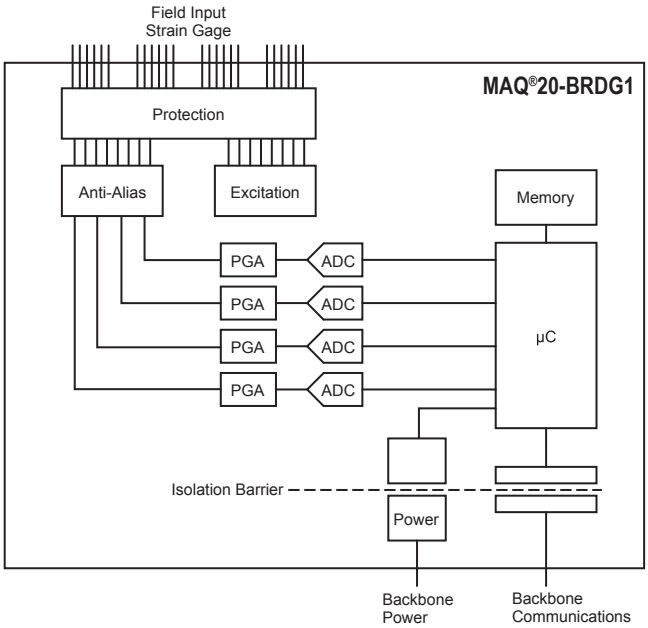
- 4 Input Channels for 4-wire or 6-wire Sensors
- Bridge Resistance 100Ω to 1kΩ
- Interface to Full, Half and Quarter (with external bridge completion) Sensors
- All Channels Individually Configurable for Range, Alarms, Averaging
- 24-bit Resolution
- Programmable Sampling Rate and Resolution
- Simultaneous Sampling of Input, Bandwidth Signals
- Burst Mode for Capturing Fast Events
- Programmable Excitation, Shunt Calibration, Remote Sense
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 30Vrms Continuous Overload
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-BRDG1 Strain-gauge Input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-BRDG1	Full, Half, Quarter Bridge 4-wire or 6-wire Connection
Number of Channels Per Channel Setup	4 Individually Configurable for Range, Alarms, Averaging
Input Range Input Protection Continuous Transient Excitation Voltage Bridge Resistance Shunt Calibration	±100mV, 0.8mV/V to 40mV/V Sensitivity 30Vrms (max) ANSI/IEEE C37.90.1 2.5V, 3.333V, 5.0V, 10.0V 100Ω to 1kΩ 60kΩ, 100kΩ, 200kΩ, External
Excitation Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient CMR NMR	 30Vrms (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute $\pm 3V_{PEAK}$ ANSI/IEEE C37.90.1 100dB at 50/60Hz 60dB/Decade
Accuracy(1) Linearity Resolution ADC Resolution Stability Zero Span	±0.03% Span ±0.01% Span 0.0005% to 0.005% Span 24-bit 50ppm/°C 75ppm/°C
Bandwidth Scales with Sample Rate Sampling Rate, Simultaneous Alarms Power Supply Current	 Programmable to 17kHz 1ks/s to 32ks/s Burst High / High-High / Low / Low-Low 400mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A ±0.5% Span Error Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1046 – MAQ20 Strain-gauge Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-BRDG1	Analog Input Module; Bridge/Strain-gauge, 4-ch

Sensor Connection	Terminal	Terminal	Sensor Connection
CH0			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH1			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH2			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH3			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL

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Analog Input Module: Frequency

Measure Frequencies to 1MHz

DESCRIPTION

The MAQ®20-FREQ frequency input module offers 8 input channels for measuring frequencies up to 1MHz. All channels are individually configurable for range and alarm limits to match the most demanding applications. Four controllable outputs can be used for sensor excitation or as 5V logic compatible outputs. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Field I/O connections are made through a pluggable terminal block with positions designated for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 240Vrms continuous overload in case of inadvertent wiring errors.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the system sampling rate of enabled channels.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

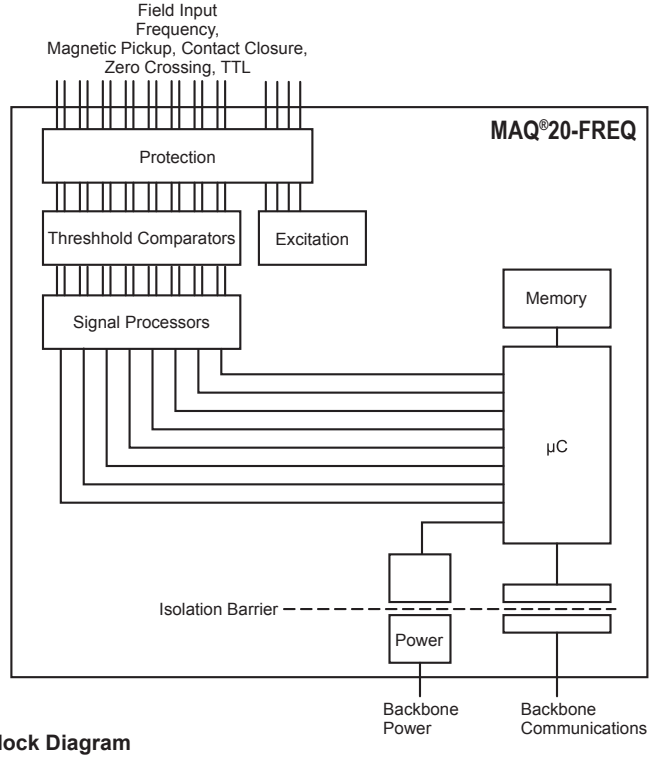
- 8 Input Channels
- 50mV Sensitivity
- 1Hz to 1MHz plus State Change Frequency Range
- DC + Signal ≤300Vrms Operating Range
- All Channels Individually Configurable for Range and Alarms
- 4 Excitation Sources to Power Sensors or Provide 5V Logic Compatible Output
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 240Vrms
- Selective Enabling of Module Channels for Scanning
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-FREQ Frequency-input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-FREQ	8-channel, Frequency-input, 1Hz to 1MHz, Plus State Change Detect
Input Signal	50mV Sensitivity Operating Range: DC + Signal 300Vrms
Excitation	Four 5V Sources at 8mA each Use for Sensor Excitation or 5V Logic Compatible Output
Per Channel Setup	Individually Configurable for Range, Alarms
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	0V
Transient	ANSI/IEEE C37.90.1
Resolution and Accuracy	32 Bits
Clock Accuracy	±0.003%
Clock Accuracy Over Temp	±0.01%, –40°C to +85°C
Scan Rate	1000 Ch/s
Alarms	High / High-High / Low / Low-Low
Power Supply Current	400mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1048 – MAQ20 Frequency-input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-FREQ	Analog Input Module; Frequency, 8-ch

Terminal Block Position (top to bottom)	MAQ20-FREQ I/O Connections
1	CH0 +IN
2	CH0 –IN
3	CH1 +IN
4	CH1 –IN
5	EXC0 / OUT0
6	CH2 +IN
7	CH2 –IN
8	CH3 +IN
9	CH3 –IN
10	EXC1 / OUT1
11	CH4 +IN
12	CH4 –IN
13	CH5 +IN
14	CH5 –IN
15	EXC2 / OUT2
16	CH6 +IN
17	CH6 –IN
18	CH7 +IN
19	CH7 –IN
20	EXC3 / OUT3

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Analog Output Modules: Process Voltage and Process Current

8 Isolated Voltage or Current-outputs

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DESCRIPTION

The MAQ®20 voltage output module, MAQ20-VO, and current output module, MAQ20-IO, offer 8 isolated voltage or current outputs. All channels are individually configurable for range and programmable output to match the most demanding applications. High-level-per-channel isolation gives the module unmatched ruggedness and flexibility while default outputs provide essential functionality for fail-safe systems. User-defined waveform outputs allow application-specific sophisticated, autonomous control. Field output connections are made through a pluggable terminal block which simplifies wiring during system setup and reconfiguration.

Input-to-bus isolation is a robust 1500Vrms and channel-to-channel isolation is 300Vrms. In addition, each channel is protected up to 40Vrms continuous overload in case of inadvertent wiring errors.

Channels in a module can be selectively enabled for output. All channels are enabled by default; however, non-used channels can be disabled to increase the refresh rate of enabled channels.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

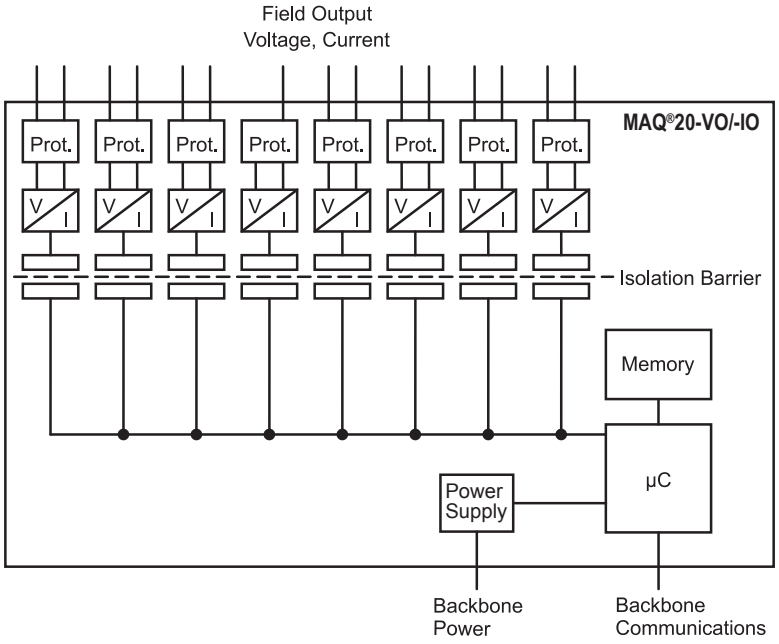
- 8 Isolated Output Channels
- Voltage or Current-output
- All Channels Individually Configurable for Range and Programmable Output
- User-defined Default Output and Output Waveform
- 1500Vrms Input-to-Bus Isolation
- 300Vrms Channel-to-Channel Isolation
- Each Channel Protected up to 40Vrms Continuous Overload
- Selective Enabling of Module Channels for Refresh
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-IO and MAQ20-VO Voltage & Current-output Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-VO	8 Isolated Channel Voltage-output 0-2.5V, 0-5V, 0-10V, ±2.5V, ±5V, ±10V (Default)
MAQ20-IO	8 Isolated Channel Current-output 0-20mA (Default), 4-20mA
Per Channel Setup	Individually Configurable for Range, Default Output, Waveform
MAQ20-VO	
Output Drive (Max Load)	10mA (1000Ω at 10V)
Over-range	10.5V
MAQ20-IO	
Compliance	15VDC
Load Range	0-600Ω
Over-range	21.5mA
Current Limit	26mA
Output Protection	
Continuous	40Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	300Vrms
Transient	ANSI/IEEE C37.90.1
CMR	75dB at 50/60Hz
Accuracy(1)	±0.040% Span
Linearity / Conformity	±0.030% Span
Resolution	0.024% Span
Stability	
Zero	±25ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	100Hz
Update Rate	1600 Ch/s
Power Supply Current	
MAQ20-VO	270mA at No-Load, 480mA at Full-Load
MAQ20-IO	210mA at No-Load, 650mA at Full-Load
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

Ordering Information

Model	Description
MAQ20-VO	Analog Output Module; Voltage, 8-ch
MAQ20-IO	Analog Output Module; Current mA, 8-ch

Terminal Block Position (top to bottom)	MAQ20-VO & MAQ20-IO Output Connections
1	CH0 +OUT
2	CH0 –OUT
3	CH1 +OUT
4	CH1 –OUT
5	SHIELD
6	CH2 +OUT
7	CH2 –OUT
8	CH3 +OUT
9	CH3 –OUT
10	SHIELD
11	CH4 +OUT
12	CH4 –OUT
13	CH5 +OUT
14	CH5 –OUT
15	SHIELD
16	CH6 +OUT
17	CH6 –OUT
18	CH7 +OUT
19	CH7 –OUT
20	SHIELD

For input connections and full details on module operation, refer to:
MA1042 – MAQ20 Voltage and Current-output Module Hardware User Manual

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Discrete Input / Output Modules

5 Input Channels and 5 Output Channels (MAQ®20-DIOL)
4 Input Channels and 4 Output Channels (MAQ®20-DIOH)

DESCRIPTION

The MAQ20-DIOL discrete input/output module has 5 isolated discrete input channels and 5 isolated discrete output channels. Input channels accept 3-60VDC signals and output channels switch 3-60VDC signals at up to 3A load.

The MAQ20-DIOH discrete input/output module has 4 isolated discrete inputs and 4 isolated discrete outputs. Input channels accept 90-280VAC/VDC signals and output channels switch 24-280VAC signals at up to 3A AC load. **NOTE: -DIOH output channels switch AC loads only.**

Discrete output channels have user-configurable default output states which are set up on power up or module reset. In addition to performing standard discrete I/O, the channels can be configured to perform seven special functions: Pulse/Frequency Counter, Pulse/Frequency Counter with De-bounce, Waveform Measurement, Time Between Events, Frequency Generator, Pulse Width Modulation (PWM) Generator, and One-Shot Pulse Generator. Up to four special functions can run simultaneously. High, Low, High-High, and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Field I/O connections are made through a pluggable terminal block.

Input-to-bus isolation is a robust 1500Vrms and channel-to-channel isolation is 300Vrms. Each individual channel has continuous overload and reverse connection protection in case of inadvertent wiring errors.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

- Rugged Isolation and Protection for Industrial Control
- User-defined Default Output and Output Waveform
- 7 High-performance Special Functions
- 1500Vrms Input-to-Bus Isolation
- 300Vrms Channel-to-Channel Isolation
- Continuous Overload and Reverse Protection
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

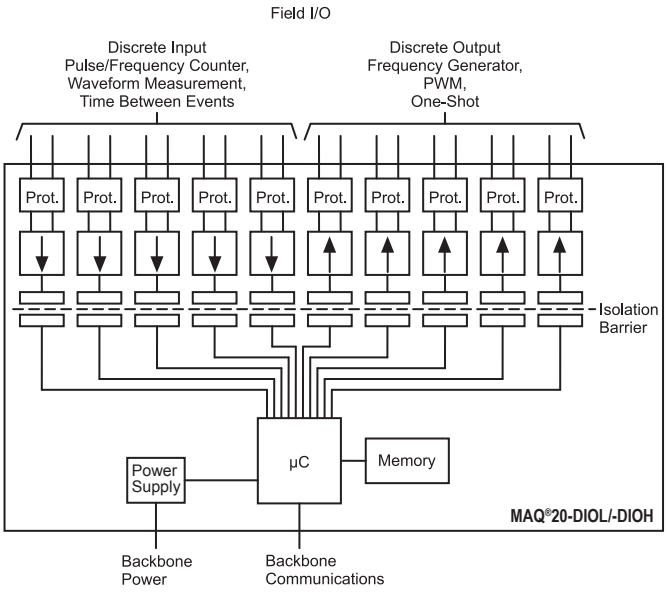
BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

IMPORTANT: The DIOH module can only switch AC loads, not DC. The output switch is AC only with zero-crossing detection.



MAQ20-DIOL/-DIOH Discrete Input/Output Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-DIOL	5 Isolated Channel Discrete Input, 3-60VDC 5 Isolated Channel Discrete Output, 3-60VDC
MAQ20-DIOH	4 Isolated Channel Discrete Input, 90-280VAC/VDC 4 Isolated Channel Discrete Output, 24-280VAC
Per Channel Setup	Individually Configurable for Range, Default Output, Waveform
Input Protection	
Continuous, -DIOL	70VDC (max), Reverse Polarity Protected
Continuous, -DIOH	350VAC/VDC (max)
Transient	ANSI/IEEE C37.90.1
Output Protection	
Continuous, -DIOL	70VDC (max), Reverse Polarity Protected
Continuous, -DIOH	350VAC/VDC (max)
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 Minute
Channel-to-channel	300Vrms, 425VDC
Transient	ANSI/IEEE C37.90.1
Output Load (Combined load, all channels)(1)	
MAQ20-DIOL	
T_A= +25°C, Freq = 0 to 1500Hz, Duty Cycle = 5-100%	3A (2A if Adjacent Module T_{CASE}>50°C)
T_A= +85°C, Freq = 0 to 500Hz, Duty Cycle = 5-100%	2A (1A if Adjacent Module T_{CASE}>50°C)
MAQ20-DIOH	
T_A= +25°C, Freq = 0 to 1500Hz	3Arms
T_A= +85°C, Freq = 0 to 500Hz	3Arms
Switching Characteristics	
MAQ20-DIOL	
Input Channel Turn-on/ Turn-off Time	25µs / 55µs
Output Channel Turn-on/ Turn-off Time	20µs / 40µs
MAQ20-DIOH	
Input Channel Turn-on/ Turn-off Time	20ms / 30ms (VAC), 1ms / 1ms (VDC)
Output Channel Response Time	0.5 Cycle
I/O Special Functions (**MAQ20-DIOL**)	
Pulse/Frequency Counter**	Freq to 10kHz, Count to 10M**, RPM to 65k
Pulse/Frequency Counter w/De-bounce	Freq to 3kHz, Count to 10M
Waveform Measurement	Freq to 500Hz, # Periods, Pulse Width, Period, Duty Cycle
Time Between Events**	Min**, Max**, Avg**, Selectable Timebase**
Frequency Generator	Up to 700Hz
PWM Generator	200µs (min) Period, Selectable Timebase
One-Shot Pulse Generator	100µs (min) Programmable Pre- and Post-Delay
Scan/Update Rate	3500 Ch/s
Alarms (**MAQ20-DIOL**)	High / High-High / Low / Low-Low
Power Supply Current	30mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)

Specifications (continued)

Module	Description
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
**Also applicable to MAQ20-DIOH
(1) See manual for detailed calculations of load ratings based on ambient temperature, multiple channels, and adjacent modules.

Ordering Information

Model	Description
MAQ20-DIOL	Discrete Input/Output Module; 3 to 60VDC In, 3 to 60VDC Out, 5-ch In, 5-ch Out
MAQ20-DIOH	Discrete Input/Output Module; 90 to 280VAC/VDC In, 24 to 280VAC Out, 4-ch In, 4-ch Out

Terminal Block Position (top to bottom)	MAQ20-DIOL Field Connections	MAQ20-DIOH Field Connections
1	DO CH0 +OUT	DO CH0 +OUT
2	DO CH0 –OUT	DO CH0 –OUT
3	DO CH1 +OUT	DO CH1 +OUT
4	DO CH1 –OUT	DO CH1 –OUT
5	DO CH2 +OUT	DO CH2 +OUT
6	DO CH2 –OUT	DO CH2 –OUT
7	DO CH3 +OUT	DO CH3 +OUT
8	DO CH3 –OUT	DO CH3 –OUT
9	DO CH4 +OUT	NC
10	DO CH4 –OUT	NC
11	DI CH0 +IN	NC
12	DI CH0 –IN	NC
13	DI CH1 +IN	DI CH0 +IN
14	DI CH1 –IN	DI CH0 –IN
15	DI CH2 +IN	DI CH1 +IN
16	DI CH2 –IN	DI CH1 –IN
17	DI CH3 +IN	DI CH2 +IN
18	DI CH3 –IN	DI CH2 –IN
19	DI CH4 +IN	DI CH3 +IN
20	DI CH4 –IN	DI CH3 –IN

For input connections and full details on module operation, refer to:
DIOL – MA1043 Discrete Input-Output Module Hardware User Manual

For input connections and full details on module operation, refer to:
DIOH – MA1058 Discrete Input-Output Module Hardware User Manual

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Discrete Input Modules: High Density Voltage

20 Input Channels with or without Compliance Voltage

DESCRIPTION

The MAQ®20-DIV20 and MAQ20-DIVC20 are two versions of the same module, offering 20 discrete input channels. The MAQ20-DIV20 interfaces to 10-120VDC/VAC signals. The MAQ20-DIVC20 interfaces to 10-24VDC signals and has a 24VDC compliance voltage source on each channel for interfacing to relay contacts, solid state switches, or other devices that require an excitation. Discrete input states can be read individually or as a block. Logic polarity can be user defined as standard or inverted. The field inputs are designed for harsh industrial environments and have fast switching times. Pulses as narrow as 200µs can be measured. Field input connections are made through high-density spring-cage terminal blocks.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 150Vrms continuous overload in case of inadvertent wiring errors.

The high channel count within the narrow module package gives exceptional functionality while preserving valuable mounting space. The high density minimizes cost per channel resulting in economical monitoring solutions.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

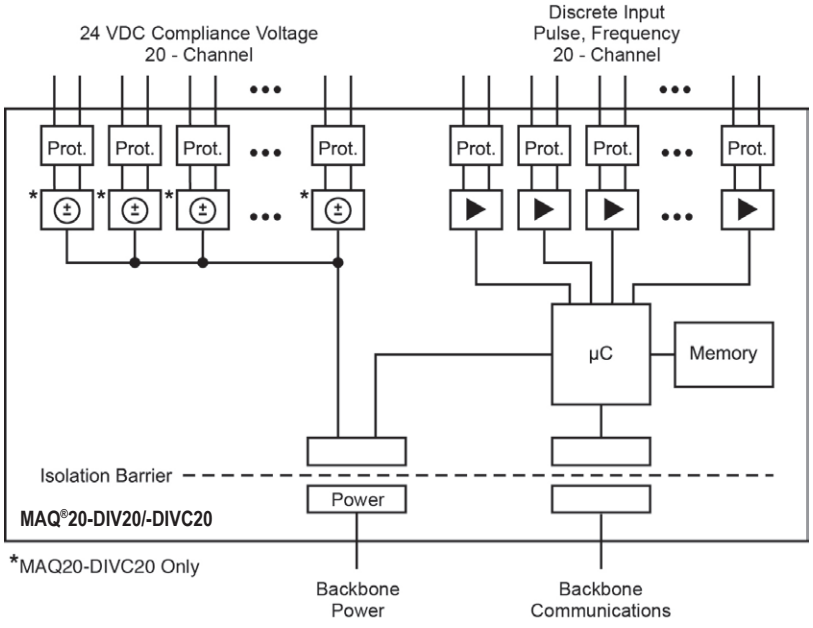
- 20 Discrete Input Channels
- Interfaces to 10-120VDC/VAC Signals (MAQ20-DIV20)
- 24VDC Compliance Voltage for Interface to Relay Contacts, Solid State Switches and Other Devices Requiring Excitation (MAQ20-DIVC20)
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 150Vrms Continuous Overload
- User-defined Logic Polarity
- Fast Switching Times
- Field Input Connections Use Spring Cage Terminal Blocks
- Most Affordable Price per Channel
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



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MAQ20-DIV20/-DIVC20 Discrete Input Voltage Modules Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-DIV20 MAQ20-DIVC20	10-120VDC/VAC-input, 24VDC Nominal 10-24VDC-input, 24VDC Compliance Voltage per Channel
Number of Channels Input Resistance	20 77kΩ
Switching Characteristics Turn-on/Turn-off Time Switching Threshold, Turn-on/Turn-off	 50µs / 50µs 9.0V / 5.5V
Input Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient	 150Vrms (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute 0V ANSI/IEEE C37.90.1
Input Functions Logic Selection Block Read	 Standard / Inverted 20 Channel
Scan/Update Rate Power Supply Current	1300 Ch/s Net, 65 Ch/s at 20-ch Simultaneous 50mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" ((83.1mm x 114.6mm x 15.3mm))
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1059 – MAQ20-DIV20/-DIVC20 Discrete Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-DIV20	Analog Input Module; Discrete Input Voltage, 20-ch
MAQ20-DIVC20	Analog Input Module; Discrete Input 24VDC Compliance Voltage, 20-ch

Field Connection (MAQ20-DIV20/ -DIVC20)	Terminal	Terminal	Field Connection (MAQ20-DIV20)	Field Connection (MAQ20-DIVC20)
CH0 +IN	1	2	CH0 –IN	CH0 VC*
CH1 +IN	3	4	CH1 –IN	CH1 VC*
CH2 +IN	5	6	CH2 –IN	CH2 VC*
CH3 +IN	7	8	CH3 –IN	CH3 VC*
CH4 +IN	9	10	CH4 –IN	CH4 VC*
CH5 +IN	11	12	CH5 –IN	CH5 VC*
CH6 +IN	13	14	CH6 –IN	CH6 VC*
CH7 +IN	15	16	CH7 –-IN	CH7 VC*
CH8 +IN	17	18	CH8 –IN	CH8 VC*
CH9 +IN	19	20	CH9 –IN	CH9 VC*
CH10 +IN	21	22	CH10 –IN	CH10 VC*
CH11 +IN	23	24	CH11 –IN	CH11 VC*
CH12 +IN	25	26	CH12 –IN	CH12 VC*
CH13 +IN	27	28	CH13 –IN	CH13 VC*
CH14 +IN	29	30	CH14 –IN	CH14 VC*
CH15 +IN	31	32	CH15 –IN	CH15 VC*
CH16 +IN	33	34	CH16 –IN	CH16 VC*
CH17 +IN	35	36	CH17 –IN	CH17 VC*
CH18 +IN	37	38	CH18 –IN	CH18 VC*
CH19 +IN	39	40	CH19 –IN	CH19 VC*

NOTES: *VC = $V_{COMPLIANCE}$

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Discrete Output Module: High Density, Isolated

20 Output Channels with User-configurable Default Output States

DESCRIPTION

The MAQ®20-DODC20SK module has 20 isolated discrete output channels that can switch up to 60VDC signals and sink up to 3A of current. Channels can be switched individually or in block format. User-configurable default output states which are set upon power up or module reset ensure fail-safe operation for critical applications. Logic polarity can be user defined as standard or inverted. The isolated field outputs are designed for harsh industrial environments and have fast switching times. Field output connections are made through high-density spring cage terminal blocks.

Output-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 60VDC continuous overload in case of inadvertent wiring errors. 150Vrms channel-to-channel isolation gives the module the ability to control equipment with or without common signal grounds or different pieces of equipment with multiple reference potentials.

The high channel count within the narrow module package gives exceptional functionality while preserving valuable mounting space. The high density minimizes cost per channel resulting in economical control solutions.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

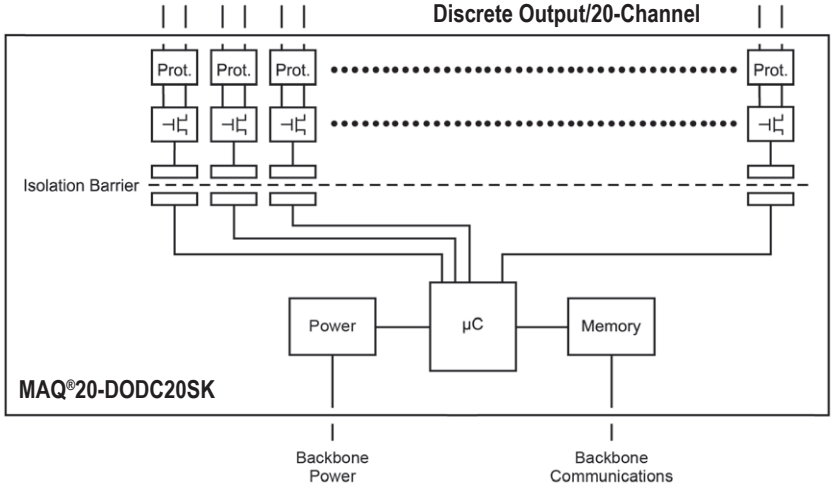
- 20 Isolated Discrete Output Channels with User-configurable Default Output States
- Channels Switch up to 60VDC Signals and Sink up to 3A Current
- Channels Switched Individually or in Blocks
- 1500Vrms Output-to-Bus Isolation
- 150Vrms Channel-to-Channel Isolation
- Each Channel Protected up to 60VDC Continuous Overload
- User-defined Logic Polarity
- Fast Switching Times
- Field Output Connections Use Spring Cage Terminal Blocks
- Most Affordable Price per Channel
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-DODC20SK Discrete Output Voltage Module Block Diagram

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Specifications

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

Module	Description
MAQ20-DODC20SK	10-60VDC-output at 3A (max) per Channel
Number of Channels Output Configuration	20 Open Drain MOSFET
Switching Characteristics Turn-on/Turn-off Time Output Load (Combined load, all channels) T_A = +25°C T_A = +85°C	 1ms /1ms 30A 10A
Output Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient	 60VDC (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute 150Vrms, 212 V_{PEAK} ANSI/IEEE C37.90.1
Output Functions Logic Selection Block Write Default Relay State on Power Up/Reset	 Standard / Inverted 20 Channel User-configurable
Update Rate Power Supply Current	1300 Ch/s net, 65 Ch/s at 20-ch Simultaneous 30mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" (83.1mm x 114.6mm x 15.3mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

Ordering Information

Model	Description
MAQ20-DODC20SK	Discrete Output Module; Up to 60VDC Signals, 3A Current, 20-ch

Field Connection (MAQ20–DODC20SK)	Terminal	Terminal	Field Connection (MAQ20–DODC20SK)
CH0 +OUT	1	2	CH0 –OUT
CH1 +OUT	3	4	CH1 –OUT
CH2 +OUT	5	6	CH2 –OUT
CH3 +OUT	7	8	CH3 –OUT
CH4 +OUT	9	10	CH4 –OUT
CH5 +OUT	11	12	CH5 –OUT
CH6 +OUT	13	14	CH6 –OUT
CH7 +OUT	15	16	CH7 –OUT
CH8 +OUT	17	18	CH8 –OUT
CH9 +OUT	19	20	CH9 –OUT
CH10 +OUT	21	22	CH10 –OUT
CH11 +OUT	23	24	CH11 –OUT
CH12 +OUT	25	26	CH12 –OUT
CH13 +OUT	27	28	CH13 –OUT
CH14 +OUT	29	30	CH14 –OUT
CH15 +OUT	31	32	CH15 –OUT
CH16 +OUT	33	34	CH16 –OUT
CH17 +OUT	35	36	CH17 –OUT
CH18 +OUT	37	38	CH18 –OUT
CH19 +OUT	39	40	CH19 –OUT

For input connections and full details on module operation, refer to:
MAQ20-DODC20SK Discrete Output Module Hardware User Manual

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Discrete Output Module: Relay

Isolated SPST Latching Relay-output Channels

DESCRIPTION

The MAQ®20-DORLY20 module has 20 isolated SPST latching relay output channels that can switch between 2A at 30V and 0.4A at 150V. Each channel has contact state readback to verify the physical output state. Relays can be controlled individually or in blocks and have user configurable default output states which are set upon power up, power loss, and module reset to ensure fail-safe operation for critical applications. Relay state control can be user defined as standard or inverted logic. The isolated field outputs are designed for harsh industrial environments and have fast switching times. Advanced output functions SPDT, DPDT, 4x5 Crosspoint Matrix, 8-channel Differential Multiplexer, 20:1 Multiplexer and Null Mode are configured with external field terminal block wiring and controlled by module commands. Field output connections are made through high-density spring cage terminal blocks. Reserve power is stored and used for predictable shutdown to user-defined relay states upon loss of module power.

Output-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 150Vrms continuous overload in case of inadvertent wiring errors. 150Vrms channel-to-channel isolation gives the module the ability to control equipment with or without common signal grounds or different pieces of equipment with multiple reference potentials.

The high channel count within the narrow module package gives exceptional functionality while preserving valuable mounting space. The high density minimizes cost per channel resulting in economical control solutions.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

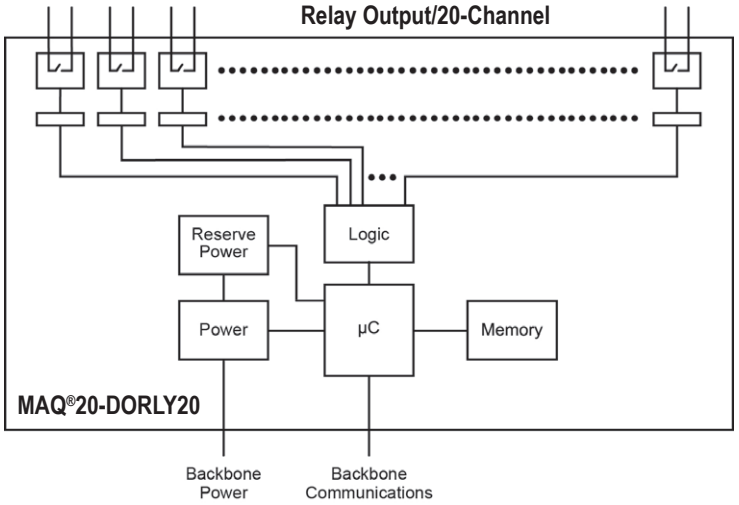
- 20 Isolated SPST Latching Relay-output Channels
- Channels Switch Between 2A at 30V and 0.4A at 150V
- Contact State Readback on Each Channel
- Relays Controlled Individually or in Blocks
- User-configurable Default States
- 1500Vrms Channel-to-Bus Isolation
- 150Vrms Channel-to-Channel Isolation
- Advanced Output Functions
- User-defined Logic Polarity
- Fast Switching Times
- Field Output Connections Use Spring Cage Terminal Blocks
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-DORLY20 Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-DORLY20	60W per Channel (2A at 30V to 0.4A at 150V)
Number of Channels Output Configuration	20 SPST Latching Relay with Contact State Readback
Switching Characteristics Turn-on/Turn-off Time Output Load T_A = +25°C T_A = +85°C	 1ms / 1ms 60W per channel (max) (2A at 30V to 0.4A at 150V) 40W per channel (max) (1.3A at 30V to 0.27A at 150V)
Output Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient	 ±150V_{PEAK} (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute 150Vrms, 212 V_{PEAK} ANSI/IEEE C37.90.1
Standard Output Functions Logic Selection Block Write Default Relay State on Power Up Default Relay State on Power Loss Default Relay State on Reset Advanced Output Functions Configure with External Wiring	 Standard / Inverted 20 Channel User-configurable User-configurable User-configurable SPDT, DPDT, 4x5 Crosspoint Matrix, 8-channel Differential Multiplexer, 20:1 Multiplexer, Null Mode
Update Rate Power Supply Current	1300 Ch/s net, 65 Ch/s at 20-ch Simultaneous 30mA
Dimensions (h)x(w)x(d)	3.27" x 4.51" x 0.60" (83.1mm x 114.6mm x 15.3mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A ±0.5% Span Error Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

Ordering Information

Model	Description
MAQ20-DORLY20	Discrete Output Module; Isolated SPST Latching Relay Channels

Field Connection	Terminal	Terminal	Field Connection
CH0 POLE	1	2	CH0 THROW
CH1 POLE	3	4	CH1 THROW
CH2 POLE	5	6	CH2 THROW
CH3 POLE	7	8	CH3 THROW
CH4 POLE	9	10	CH4 THROW
CH5 POLE	11	12	CH5 THROW
CH6 POLE	13	14	CH6 THROW
CH7 POLE	15	16	CH7 THROW
CH8 POLE	17	18	CH8 THROW
CH9 POLE	19	20	CH9 THROW
CH10 POLE	21	22	CH10 THROW
CH11 POLE	23	24	CH11 THROW
CH12 POLE	25	26	CH12 THROW
CH13 POLE	27	28	CH13 THROW
CH14 POLE	29	30	CH14 THROW
CH15 POLE	31	32	CH15 THROW
CH16 POLE	33	34	CH16 THROW
CH17 POLE	35	36	CH17 THROW
CH18 POLE	37	38	CH18 THROW
CH19 POLE	39	40	CH19 THROW

For input connections and full details on module operation, refer to:
MA1063 – MAQ20-DORLY20 Discrete Relay Output Module Hardware User Manual

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System Backbones

Distributed Power and Communications

DESCRIPTION

The MAQ®20 system backbone resides within the DIN-rail used for module mounting and provides power to and interface between the communications module and the I/O modules. Standard backbones provide for one communication module and 4, 8, 16, or 24 I/O modules. The longest backbone, which accommodates 24 I/O modules, fits in an industry standard 19" rack. Each backbone utilizes a pluggable connector system on each end such that varying system channel counts can be configured using the standard backbones. As a result of this pluggable system, the main part of a system, including the communications module, can be installed in one location while other sets of I/O modules installed in remote locations connect to the main system through a wire harness.

Modules mount on industry-standard 35x7.5mm gull-wing DIN-rails.

Once a system is established with a system backbone and a communications module, system configuration is accomplished by applying power and installing the I/O modules. These are hot swappable and true 'plug and run'. When an I/O module is plugged into any backbone position, the communications module automatically recognizes that it has been added to the system, registers it in the system configuration record, and makes it immediately available in the host software for use in data acquisition and control, and test and measurement applications. Similarly, when a module is removed from any backbone position, the communications module recognizes that it has been unplugged, removes it from the system configuration, and disables it in the software.

FEATURES

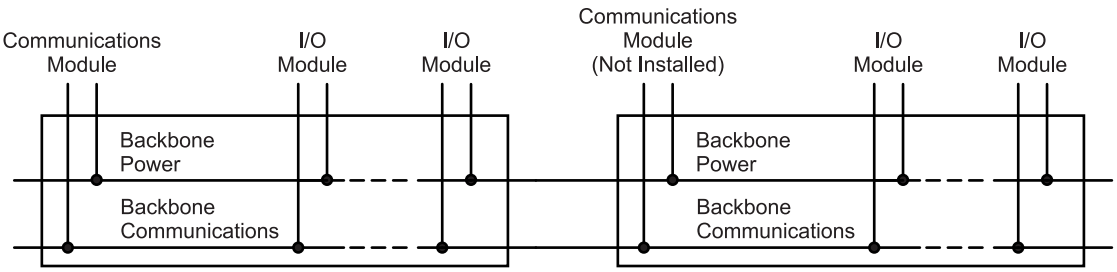
- Compact Mounting in DIN-rail Channel
- Distributed Power and Communications
- 4-, 8-, 16- and 24-position Models
- Simplify System Wiring
- Expandable for Local or Distributed Installation
- Prevent Reverse Installation
- Long-Life, Durable, Vibration Resistant Contacts
- Modules are Hot Swappable and True "Plug and Run"
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



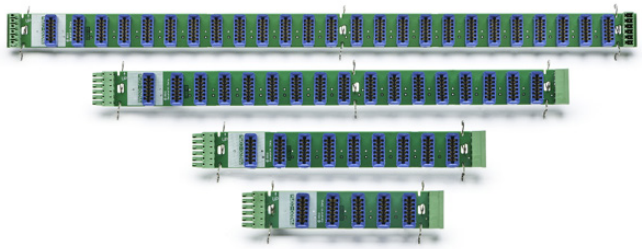
MAQ20 Backbone Block Diagram

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Specifications

Module	Description
MAQ20-BKPL4	DIN-rail Backbone, Accepting 1 COM Module plus 4 I/O Modules
MAQ20-BKPL8	DIN-rail Backbone, Accepting 1 COM Module plus 8 I/O Modules
MAQ20-BKPL16	DIN-rail Backbone, Accepting 1 COM Module plus 16 I/O Modules
MAQ20-BKPL24	DIN-rail Backbone, Accepting 1 COM Module plus 24 I/O Modules
Expansion and Distributed Installation	
Mechanical	Male/Female pluggable terminal blocks at each end of the backbone allow direct interconnection or remote installation using the accessory expansion cable.
Expansion Distance	100ft (30m) (max)
Mounting	
Physical	Spring clips hold the backbone in the DIN-rail. When modules are installed, the backbone is secured to the DIN-rail.
Reverse Protection	Mechanical interface prevents reverse module installation.
Electrical	
Circuitry	Passive
Inter-Module Communications	RS-485
Dimensions (h)x(w)x(d)	
MAQ20-BKPL4	5.05" x 0.94" (127.1mm x 3.9mm)
MAQ20-BKPL8	7.53" x 0.94" (191.1mm x 3.9mm)
MAQ20-BKPL16	12.63" x 0.94" (320.9mm x 3.9mm)
MAQ20-BKPL24	17.41" x 0.94" (442.1mm x 3.9mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

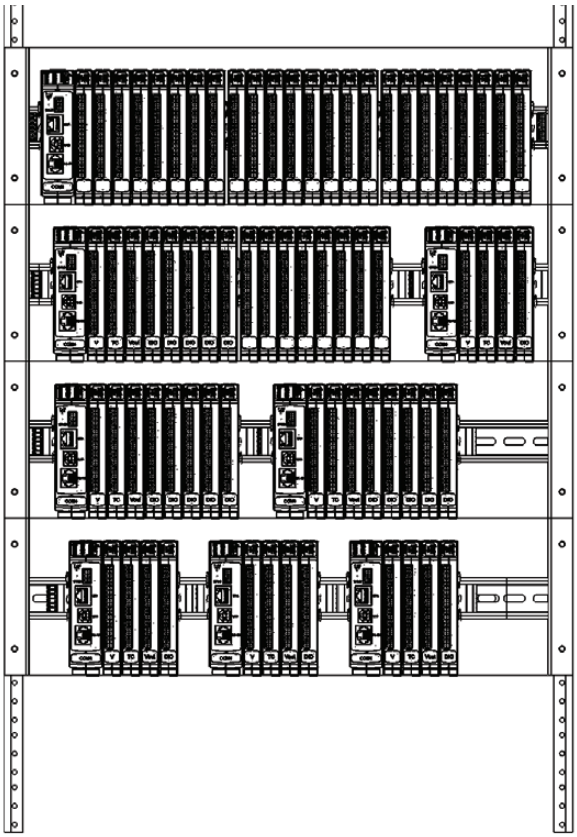


MAQ20 Backbones for 4-, 8-, 16-, and 24-I/O Modules

For input connections and full details on module operation, refer to:
MA1040 – MAQ20 Communications Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-BKPL4	DIN-rail Backbone; Accepting 1 COM Module Plus 4 I/O Modules
MAQ20-BKPL8	DIN-rail Backbone; Accepting 1 COM Module Plus 8 I/O Modules
MAQ20-BKPL16	DIN-rail Backbone; Accepting 1 COM Module Plus 16 I/O Modules
MAQ20-BKPL24	DIN-rail Backbone; Accepting 1 COM Module Plus 24 I/O Modules



Flexible Backbone System Allows Configuration with Communications Module and 4-, 8-, 16-, and 24-I/O Modules in 19" Rack Space

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MAQ20-940/-941

ReDAQ® Shape for MAQ®20

DESCRIPTION

Dataforth offers ReDAQ Shape software for MAQ20 as an easy and efficient development tool for use with the MAQ20 Industrial Data Acquisition and Control System. This software enables users to create, save, and open graphical user interface projects for test, process, data collection, and data analysis applications. Built-in functions in the Acquire and Analyze panels are pre-configured and can be used as is. Just three easy steps are required to create data acquisition and control projects in the Presentation panel using 65 high-quality tools and powerful MAQ20 functions.

ReDAQ Shape for MAQ20 is ideal for data acquisition, monitoring and control applications. It enables users to easily interact with the Dataforth PID loop controller, which the user accesses through faceplates within the software.

The ReDAQ Shape software also provides an effective way to configure and customize MAQ20 functions for specific application requirements. The toolbox tools are easily moved, re-sized, cut, copied, pasted, and deleted. The main screen of ReDAQ Shape shows a representation of the system inclusive of the communications module and any installed I/O modules. This graphic is updated as I/O modules are added to or removed from the system. Modules can be given unique identifiers, and I/O module channels can be assigned tag names to represent process variables they control.

Based on programming tools incorporated from Microsoft Visual Studio® and National Instruments Measurement Studio®, ReDAQ Shape software for MAQ20 has a very short user-learning curve and offers integrated, across-the-board applicability for data acquisition and control applications. It requires only a one-time low-cost license fee.

Link to ReDAQ software.

FEATURES

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

BENEFITS

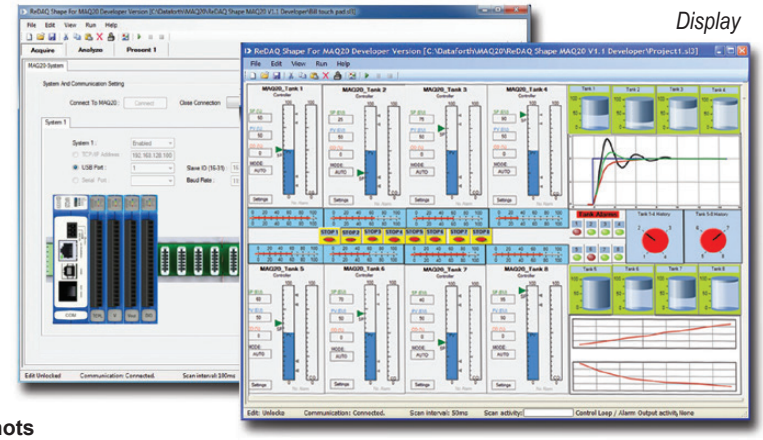
- Free Versions Available
- Enables Easy and Fast Setup of MAQ20 Systems
- Intuitive Graphic Interface
- One Time Purchase, No Upgrade Fees
- User Version Allows for Safe Operation (No Changes to Program Possible)

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

Configure

Display



ReDAQ Shape Software Screen Shots

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PID Control Using MAQ®20-COMx Modules and ReDAQ® Shape for MAQ20 Software

DESCRIPTION

The powerful Dataforth MAQ20 communications module is capable of autonomously running up to 8 PID control loops; faceplates within ReDAQ Shape software enable the user to configure the many features of loop control and monitor processes.

With proportional and derivative modes that can act on error or a process variable, the controller can eliminate process bumps from set point changes. Gap control provides improved loop stability near the set point while retaining high-response speed. The ability to change tuning settings without disturbing the process when the controller is in automatic mode, and the option to track the set points of process variables during manual operation, are both key features that enable smooth operation in both manual and automatic modes.

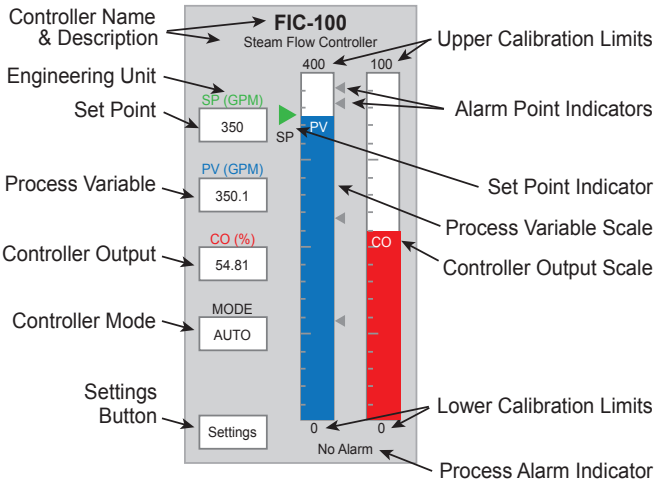
To ensure sensitive equipment is well protected, the controller's output range can be limited. The anti-reset windup feature both minimizes overshoot and improves stability after output saturation conditions.

The integrated Auto-Tuner simplifies the complex task of control loop tuning with separate methods for integrating and self-regulating loops.

Typical PID Control Applications

- Steam, water, and chemical flow control
- Tank level control
- Heat-exchanger / reactor temperature control
- Pressure control

Many types of processes in a wide variety of applications can be managed using the Dataforth PID controller in the MAQ20 system. Its high level of performance and broad range of features are paralleled only by much larger state-of-the-art distributed control systems.



PID Faceplate in ReDAQ Shape Software

FEATURES

- Separate Panels for Setting Basic, Advanced, and Alarm Items
- Noninteracting and Parallel PID Control Algorithms
- Up to 8 Loops of PID Control
- Controller Runs in Real Time
- Controller Accessed through Faceplates
- Proportional and Derivative Modes can Act on Error or Process Variable
- Gap Control
- Built-in Process Variable Filtering
- Bumpless Manual-automatic Control-mode Transfer
- Change Tuning Settings Easily in Automatic Mode
- Optional Process Variable Set Point Tracking in Manual Mode
- Limit Controller Output Range
- Anti-reset Windup
- Four Process Alarms
- Full-featured Faceplate for Numeric and Visual Feedback
- Integrated Auto-Tuner

BENEFITS

- Easy-use
- Simplifies Complex Task of Control-loop Tuning
- Build-in Features Improve Stability and Help Protect Sensitive Equipment
- Quick Setup

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management

Ordering Information

Model	Description
MAQ20-940	ReDAQ Shape Software for MAQ20 Developer Version
MAQ20-941	ReDAQ Shape Software for MAQ20 User Version

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Accessories

Expansion Cables and Load Share Power Supply Module

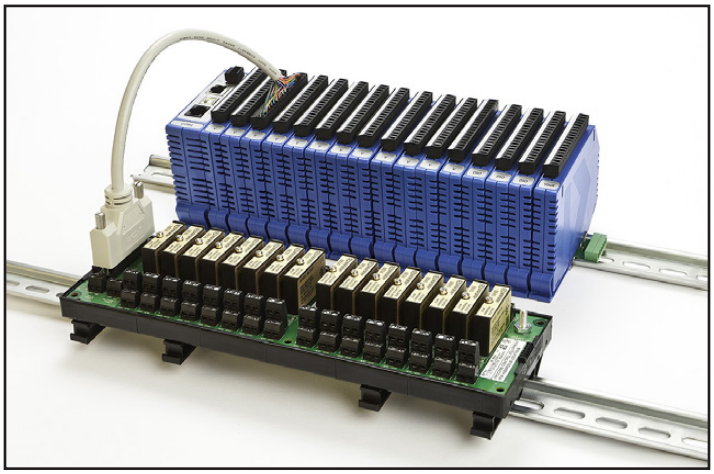
DESCRIPTION

Accessories for the MAQ®20 Industrial Data Acquisition and Control System include backbone expansion cables and a load-share power supply module for systems that have power supply requirements greater than those the communications module provides.

Also available are cables to interface 8B backpanels to the MAQ20-VSN module, and USB and Ethernet cables and adapters.

A MAQ20 Demonstration Suitcase with process simulator is offered to sales channels.

The five PWR-PS5RxW power supplies used by the MAQ20 are the same as those used by DSCA signal conditioners.



Cable Interfacing 8B Backpanel to MAQ20-VSN Module



8B Backpanel Interface Cable

Ordering Information

Backbone Expansion Cables

Model	Description
MAQ20-XCA-01	Backbone Expansion Cable; 1 meter (39.4")
MAQ20-XCA-02	Backbone Expansion Cable; 2 meter (78.7")

Load-share Power Supply Module

Model	Description
MAQ20-PWR3	Load-share Power Supply Module

Cables to Interface 8B and 5B Backpanels to MAQ20-VSN Module

Model	Description
MAQ20-8B25-0.3	DB25-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-8B25-0.6	DB25-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-8B25-01	DB25-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long
MAQ20-5B26-0.3	IDC26-to-20 Pos Screw Term Transition Cable, 0.3m (11.8") Long
MAQ20-5B26-0.6	IDC26-to-20 Pos Screw Term Transition Cable, 0.6m (23.6") Long
MAQ20-5B26-01	IDC26-to-20 Pos Screw Term Transition Cable, 1.0m (39.4") Long

USB and Ethernet Cables and Adapters

Model	Description
MAQ20-XTB03	MAQ20 Terminal Block, 3 Positions
MAQ20-XTB20	MAQ20 Terminal Block, 20 Positions
SLX141-01, -02, -07	Ethernet Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX141-X01, -X02, -X07	Ethernet Crossover Cable, 1m (39.4"), 2m (78.7"), 7m (275.6")
SLX142, 143	RJ45-to-DB9 Adapters
SLX144	RJ45 RS-485 Multidrop Adapter
SLX146-02, -07	Null Modem Serial Cable, Female DB-9 to Female DB-9; 2m (78.7"), 7m (275.6")
SLX147-01, -02, -05	USB Cable, Type A to Type B; 1m (39.4"), 2m (78.7"), 5m (196.9")
SLX148-4	4GB Micro SD Card and USB Adapter

PWR-PS5RxW Power Supplies

Model	PWR-PS5R7W	PWR-PS5R15W	PWR-PS5R30W	PWR-PS5R60W	PWR-PS5R120W
Input	100 to 240VAC Nominal; 85 to 264VAC, 100 to 370VDC Compatible				
Output Voltage & Current Ratings	24V, 0.3A	24V, 0.65A	24V, 1.3A	24V, 2.5A	24V, 5.0A
Power	7.5W	15W	30W	60W	120W
Dimensions (h)x(w)x(d)	2.95" x1.77" x 2.76" (75mm x 45mm x 70mm)	3.54" x 0.89" x 3.74" (90mm x 22.5mm x 95mm)	3.54" x 0.89" x 3.74" (90mm x 22.5mm x 95mm)	3.74" x 1.42" x 4.25" (95mm x 36mm x 108mm)	4.53" x 1.81" x 4.76" (115mm x 46mm x 121mm)

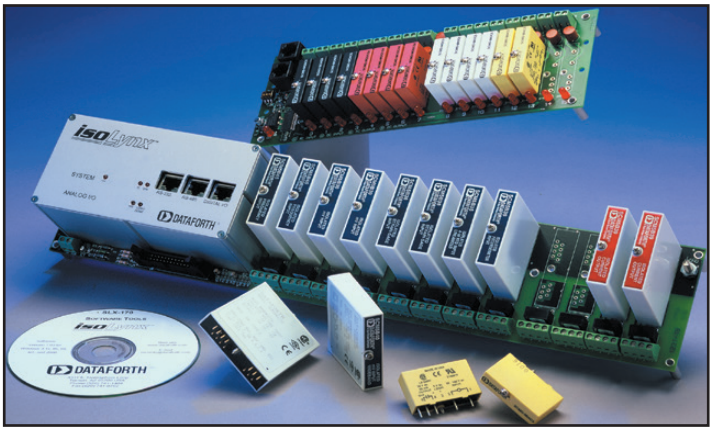
NOTE:
For complete PWR-PS5RxW Power Supplies specifications, see Power Supply Recommendations.

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5B isoLynx®

SLX200 Data Acquisition System



DESCRIPTION

The SCM5B isoLynx® SLX200 is a fast, intelligent, fully isolated data acquisition system providing superior reliability, accuracy, and isolation for a wide range of rugged industrial applications. It offers maximum flexibility of analog and digital I/O selection at competitive prices for a broad range of factory automation, process control, test and measurement, machine control, and data acquisition applications. The isoLynx SLX200 implements the industry standard Modbus® RTU and TCP protocols, thereby enabling communication with a wide variety of existing third-party software drivers and HMI/SCADA packages. It is fully certified by Modbus-IDA and compatible with OPC.

All I/O Channel-to-Channel Isolated

The flexible, modular design combines a 6- or 12-channel I/O Controller-base system and optional 8- or 16-channel expansion backplanes, which can be either panel or DIN-rail mounted (see Figure 1).

One I/O Controller unit can operate up to 60 channels of differential analog I/O and 128 channels of digital I/O, using Dataforth's SCM5B analog and SCMD digital modules. The Controller contains a powerful high-speed microcontroller, A/D and D/A subsystem, communication interface, data storage memory, and status LEDs. The A/D system is built around a 16-bit, successive approximation converter and can convert a maximum 60-channel configuration in 17ms. The D/A converter is also a 16-bit device and can write a maximum 60-channel configuration in 33ms.

Industry's Widest I/O Selection

By selecting from over 250 standard and custom single-channel SCM5B analog I/O modules, the isoLynx SLX200 can interface to a broad spectrum of analog signals, including millivolt, volt, milliamp, amp, linearized and non-linearized thermocouple, RTD, potentiometer, slidewire, strain gauge, AC to True RMS output, frequency, 2-wire transmitter, and transducers requiring DC excitation. Analog output modules are available which provide a wide selection of current or voltage output ranges. Industry standard miniature digital I/O modules are used for digital AC/DC input and output requirements. Users can mix and match most I/O module types on a per-channel basis, thus reducing wasted I/O channels and saving costs.

FEATURES

- Modbus® RTU Support on RS-232 and RS-485
- Modbus TCP Support (optional)
- 1500Vrms Input-to-Output and Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- 16-bit A/D, D/A
- Up to 6-Pole Analog Input Filtering
- ±0.012% Base System Accuracy, No Modules
- ±0.005% Base System Linearity, No Modules
- ±0.03% Module Accuracy
- ±0.005% Module Linearity
- Best I/O Selection: 250+ Different I/O Modules
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- All Analog I/O Modules Certified to CSA C/US, CE, and ATEX Requirements
- SLX200 & SLX101 CE Compliant
- SLX200 CSA C/US Certified (Class I, Division 2, Groups A, B, C, D)
- Manufactured per RoHS III Directive 2015/863

Interface to digital signals is provided by the dedicated SLX101 digital I/O backpanel. This intelligent backpanel is designed to interface to the SLX200 but can also be used stand-alone for digital I/O-only systems.

The operation and storage temperature range for the SCM5B isoLynx SLX200 is –40°C to +85°C; the relative humidity is 0 to 95% noncondensing. Power requirement is +5VDC, 2.5W base system with no modules installed. The SLX200 and SLX101 are CE Compliant. SLX200 is CSA C/US Certified for Class I, Division 2 Hazardous Locations.

Flexible Communications and Configuration

The SCM5B isoLynx SLX200 communicates on RS-232/RS-485 serial links up to 115.2kbps or 10Mb/s Ethernet. Up to 32 systems can be multidropped on the RS-485 serial link and up to 4 sockets are supported on Ethernet. Optional Ethernet communication boards are available; these can be factory installed or field upgradeable.

The communication protocol is Modbus RTU for RS-232/RS-485 or Modbus TCP for Ethernet. Modbus is an open, industry-standard protocol that defines how devices on a network or bus communicate with each other. Full certification of the SCM5B isoLynx SLX200 by Modbus-IDA ensures the device can be integrated into existing Modbus networks, and most common Modbus function codes are supported. The system is also OPC compatible.

As device configuration is performed using standard Modbus function codes, any third-party software application that supports the Modbus RTU and/or Modbus TCP protocol can be used to configure the device. Configuration parameters are stored in non-volatile memory, so configuration only has to happen once. Free configuration software is provided to ensure configuration is easy and intuitive (see Figure 2 and Figure 3).

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Powerful Firmware Features

The SCM5B isoLynx SLX200 hosts many powerful firmware features. Two analog scan modes are supported: one for general-purpose signal monitoring with running average, maximum, and minimum values available for each analog input; the other with user-configurable scan parameters such as scan list, scan rate, and scan count, used to obtain data with highly accurate time correlation between samples. Configurable default output values ensure output signals get set at safe values when unexpected power outages or brownouts occur. Power-on self-test results can be obtained visually by glancing at a status LED or programatically by reading the appropriate register on the device. A section of memory is set aside for general-purpose user data, some of which is stored in non-volatile memory.

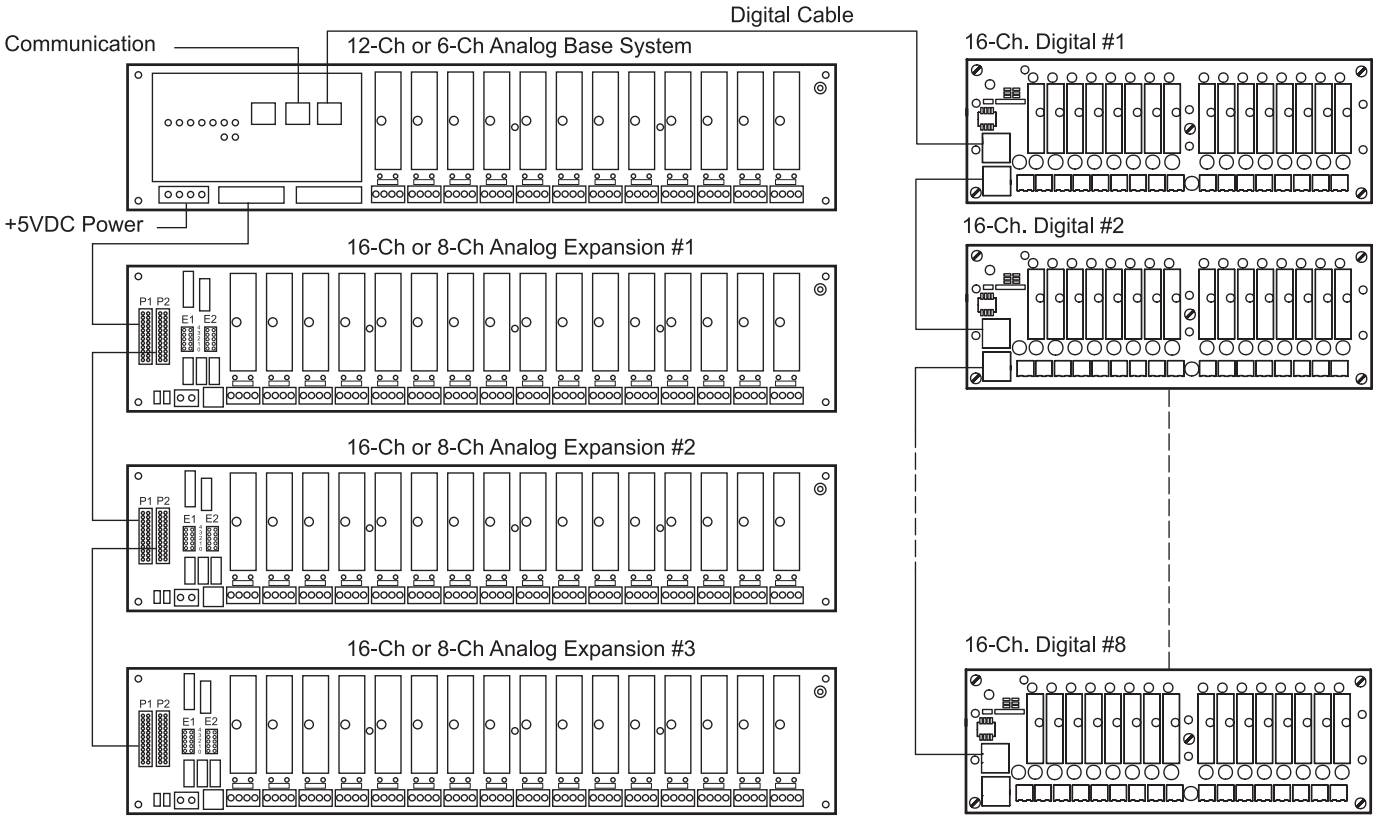


Figure 1: SCM5B isoLynx SLX200 Block Diagram - [For Dimensions and Pinouts, See Page 6-39]

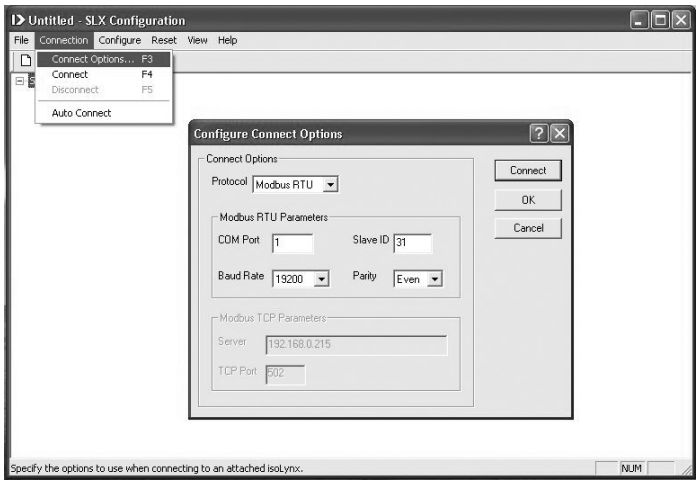


Figure 2: Configuration Utility - Communications Setup

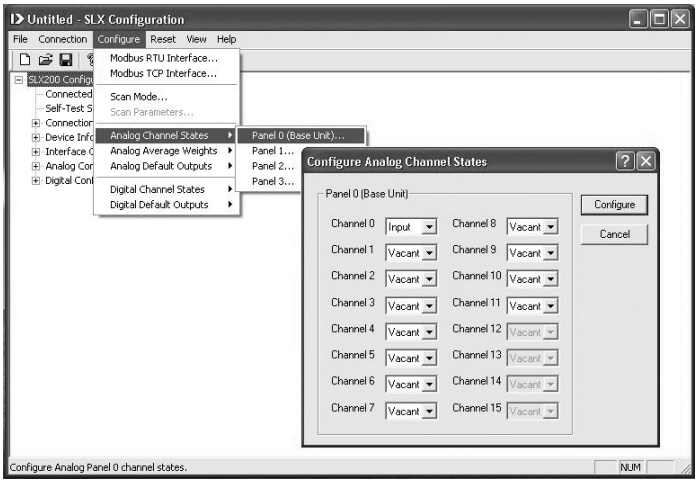


Figure 3: Configuration Utility - Analog Channel Setup

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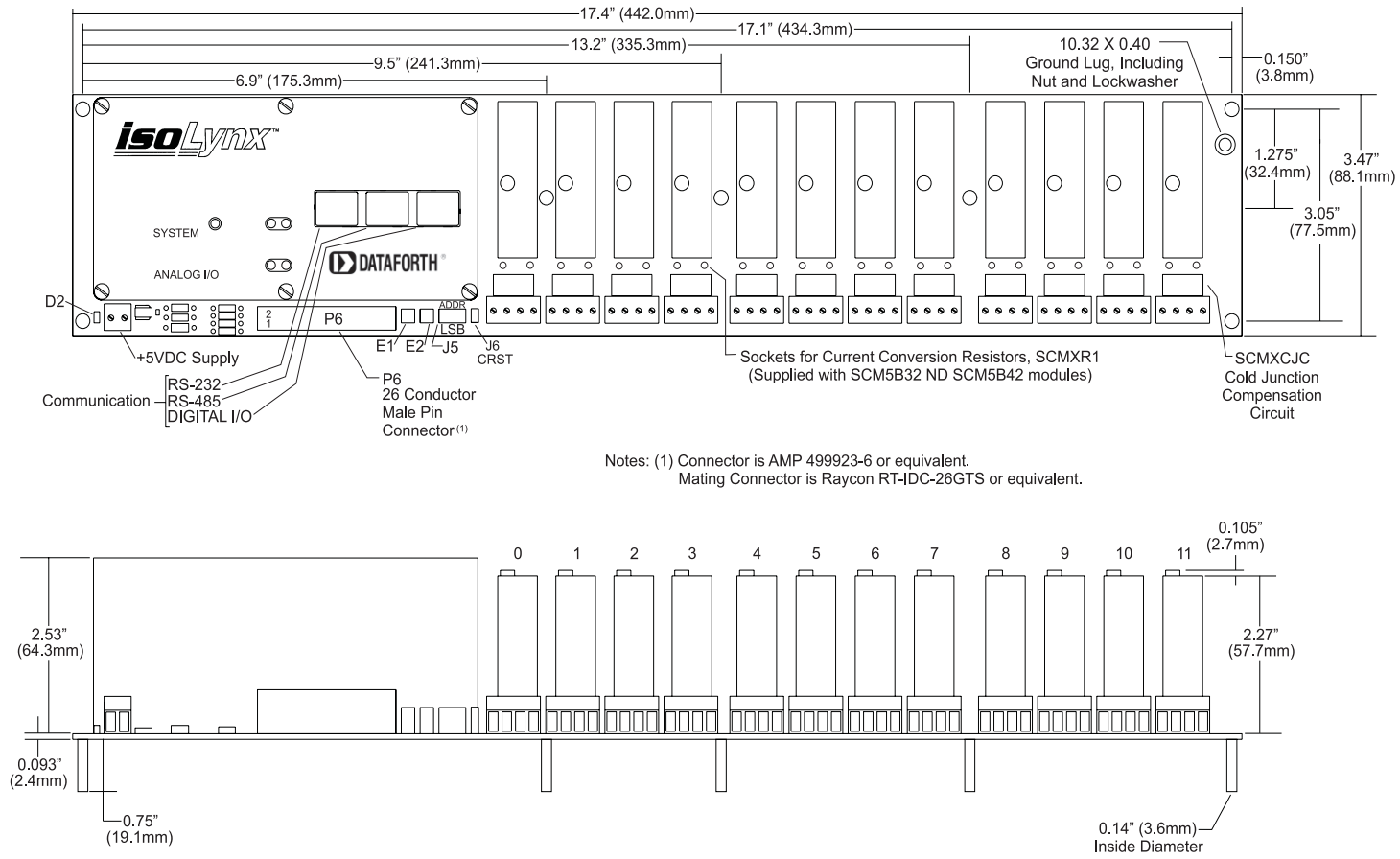


Figure 4: SLX200-xx 12-channel Base System

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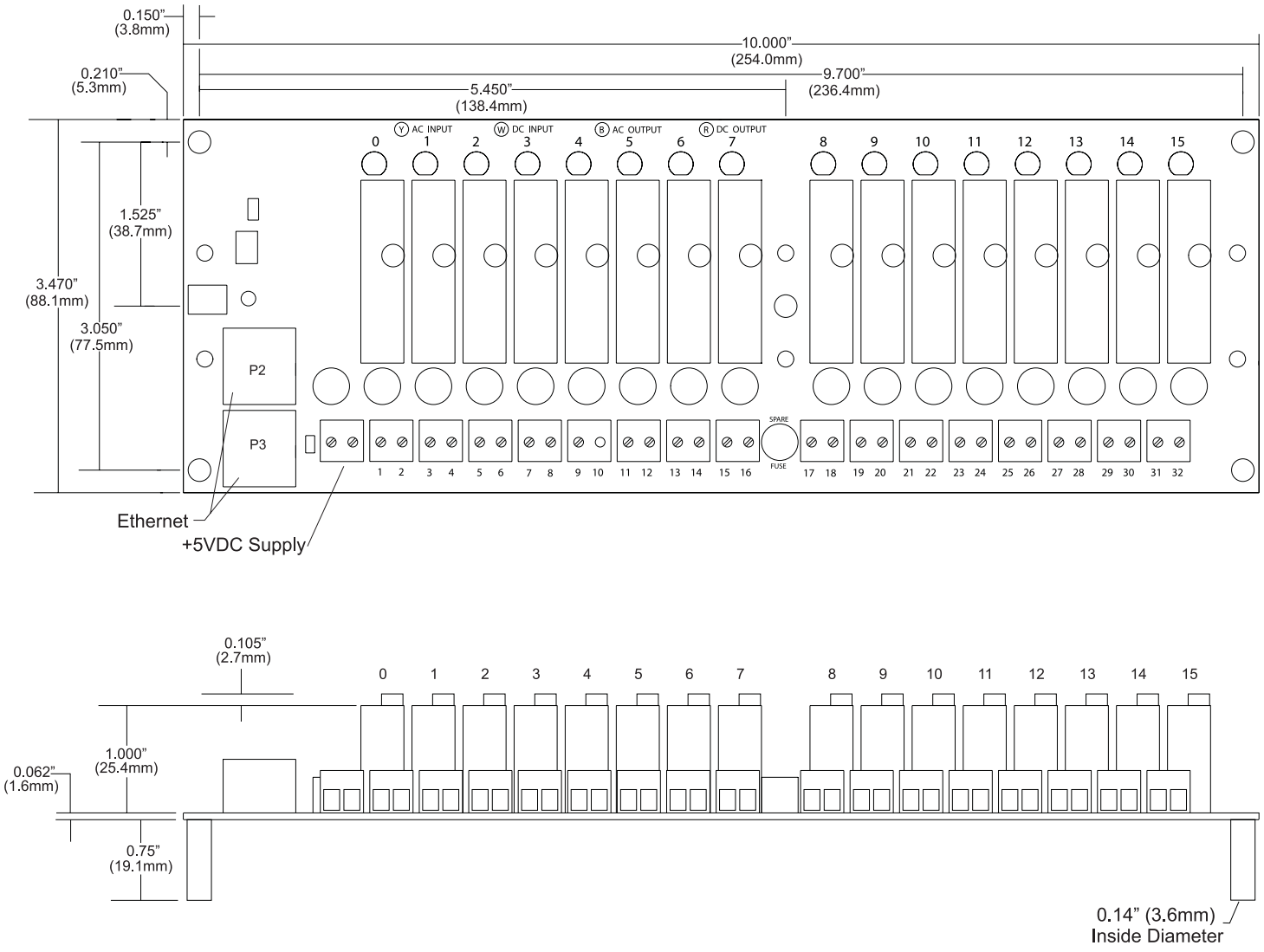


Figure 5: SLX101 Digital I/O Backpanel

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Specifications

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

5B isoLynx® SLX200 Analog I/O Base Unit	
General System	
Protocol	Modbus® RTU or TCP, OPC Server Compatible
I/O Capability	One 6-ch or 12-ch Backpanel Minimum; Expandable to 60-ch Analog I/O, 128-ch Digital I/O
Software Tools	Free Configuration Utility, Win32 DLL, LabVIEW™ VI Library
Digital System	
Microcontroller	High-performance RISC
Status LEDs	+5V, System Status, TD/RD (Serial), LNK/ACK (Ethernet)
Failsafe Features	Watchdog Timer and Brownout Detection - Reset to User Defined Configuration
Communication Interface	
Serial I/O	Separate RJ-45 Modular Phone Jacks for RS-232 and RS-485 115.2kbps (max)
Port for SLX101 Digital I/O Panel	RJ-45 Modular Phone Jack, 2-wire RS-485
RS-485	2-wire or 4-wire, 4000 Feet (max) Distance, 32 (max) Multidrops, Non-isolated
	To Isolate, Extend, or Convert RS-232 or RS-485, Use Dataforth LDM and DCP Data Communication Products
Ethernet	RJ-45 Modular Phone Jack, 10Base-T
	Default IP Address 192.168.0.215, Keep-alive Timeout 7200s
Analog I/O	
Channels	Mix and Match I/O Types on a Per Channel Basis(1)
	Maximum 60-ch Differential I/O of SCM5B Modules
	Input Modules Must Have System Output of ±5V or 0 to +5V (±10V or 0 to +10V cannot be used)
Calibration	NIST Traceable Test and Calibration Sheets Ship with Modules
System Accuracy	Analog Input ±0.024%(2), Analog Output ±0.006%(2)
Field Connector	High-density Screw Clamp, 14 AWG (max), 0.5N-M Torque
System Connector	26-pin, Male Header Connector
Ground Network Jumpers	Factory Default R1 100Ω; J1-J4: J1, J2, and J4 Installed; J3 Not Installed. See Hardware User Manual for Recommended Grounding Practices.
A/D Converter	16-bit, ±10V Input, 14-bit (min) Accuracy
	Resolution vs. Input Range: 16-bit at ±10V, 15-bit at ±5V, 14-bit at 0 to +5V
D/A Converter	16-bit, ±10V Output
Isolation	1500Vrms Ch-to-ch or Ch-to-Internal Bus
Input Protection	240VAC Continuous, ESD
Throughput, Analog Input	8ms for 16 Ch (~2000 ch/s) at 115.2kbps Modbus RTU
	17ms for 60 Ch (~3600 ch/s) at 115.2kbps Modbus RTU
Throughput, Analog Output	13ms for 16 Ch (~1230 ch/s) at 115.2kbps Modbus RTU
	33ms for 60 Ch (~1850 ch/s) at 115.2kbps Modbus RTU
Expansion Panels	SCMPB02 (16-ch, can use up to 3), SCMPB06 (8-ch, can use up to 6)
Power Supply Requirements	
SLX200-1xx	+5VDC ±5% at 500mA, No Modules Installed
SLX200-2xx	+5VDC ±5% at 700mA, No Modules Installed
SLX200-3xx	+5VDC ±5% at 900mA, No Modules Installed
Dimensions (l)x(w)x(h)	
SLX200-xx, 12-ch	17.4" x 3.47" x 3.30" (442.0mm x 88.1mm x 83.8mm)
SLX200-xxAx, 6-ch	11.8" x 3.47" x 3.30" (300.7mm x 88.1mm x 83.8mm)
Mounting Options	Panel Mount or DIN-rail Mount
Environmental	
Operating Temp. Range	–40°C to +85°C (–40°C to +70°C for SLX200-2xx,-3xx)
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	
CE Compliant	
CSA, FM	Class I, Division 2, Groups A, B, C, D Hazardous Locations
Modbus	IDA Conformance Tested

5B isoLynx® SLX101 Digital I/O Backpanel	
General System	
Protocol	Modbus RTU or TCP, OPC Server Compatible Through SLX200. Proprietary as Stand-alone.
I/O Capability	One 16-ch Backpanel Minimum. Expandable to 128-ch Digital I/O.
Digital System	
Microcontroller	High-performance RISC
Status LEDs	+5V, System Status, Channel State
Failsafe Features	Watchdog Timer & Brownout Detection - Reset to User-defined Configuration
Communication Interface	
Serial I/O	Two Rj-45 Modular Phone Jacks for Daisy-chain Connection
RS-485 2W	115.2kbps (max) 4000 Feet (max) Distance, 32 (max) Multidrops, Non-isolated
Digital I/O	
Channels	Mix and Match I/O Types on a Per-channel Basis
Field Connector	High-density Screw Clamp, 14 AWG (max), 0.5N-M Torque
Isolation	1000 Vrms Ch-to-ch or Ch-to-Internal Bus
Throughput	8ms for 16 Ch (~2000 ch/s) at 115.2kbps Modbus RTU
	27ms for 128 Ch (~4740 ch/s) at 115.2kbps Modbus RTU
Power Supply Requirements	+5VDC ±5% at 40mA, No Modules Installed
Dimensions (l)x(w)x(h)	10.0" x 3.47" x 1.95" (254.0mm x 88.1mm x 49.5mm)
Mounting Options	Panel Mount or DIN-rail Mount
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Non-condensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	
CE Compliant	
CSA, FM	Not Covered Under the SLX200 Certifications. Must Qualify Separately Based on Source of I/O Modules.

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Modules with system output of ±10V or 0-10V cannot be used in the SLX200 systems. This includes SCM5Bxx-xxD, SCM5B392-13, -14, SCM5B42-02, and SCM5B48-01.
(2) 10V span for analog input, 20V span for analog output. Does not include SCM5B module accuracy.

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Ordering Information

Model	Description
SLX200-10[1]	12-ch, RS-232/485, Panel Mount
SLX200-11[1]	12-ch, RS-232/485, No CJC[2], Panel Mount
SLX200-10D[1]	12-ch, RS-232/485, DIN-rail Mount
SLX200-11A[1]	6-ch, Base Unit, µC and A/D Bds, RS-232/485, No CJC, Panel, Modbus
SLX200-11AD[1]	6-ch, Base Unit, µC and A/D Bds, RS-232/485, No CJC, DIN, Modbus
SLX200-11D[1]	12-ch, RS-232/485, No CJC[2], DIN-rail Mount (For 6-ch. Base Unit, See Note[1])
SLX101	Backpanel Digital: 16-ch
SLX101-D	Backpanel Digital: 16-ch, DIN-rail Mount
SLX141-01,-02,-07	Ethernet and Serial Cable Options
SLX141-X01,-X02,-X07	Ethernet Crossover Cable Options
SLX142,143	RJ45 to DB9 Adapters
SLX144	RJ45 RS-485 Multidrop Adapter
SLX145	Fuse 4A, Package of 5
SLX270[3]	Software Tools and User Manuals
SLX280[3]	Software and Hardware User Manuals
SCMPB02	Backpanel Analog: 16-ch
SCMPB02-1	Backpanel Analog: 16-ch, No CJC[3]
SCMPB02-2	Backpanel Analog: 16-ch, DIN-rail Mount
SCMPB02-3	Backpanel Analog: 16 Ch, No CJC[3], DIN-rail Mount
SCMPB06	Backpanel Analog: 8-ch
SCMPB06-1	Backpanel Analog: 8-ch, No CJC[3]
SCMPB06-2	Backpanel Analog: 8-ch, DIN-rail Mount
SCMPB06-3	Backpanel Analog: 8-ch, No CJC[3], DIN-rail Mount
SCMXRK-002	Accessory: 19-inch Rack Analog Backpanels
SCM5B30/31[4]	Analog Voltage-input Modules
SCM5B32[4]	Analog Current-input Modules
SCM5B33[4]	Isolated True RMS Input Modules
SCM5B34[4]	Linearized 2- or 3-wire RTD-input Modules
SCM5B35[4]	Linearized 4-wire RTD-input Modules
SCM5B36[4]	Potentiometer-input Modules
SCM5B37[4]	Thermocouple-input Modules
SCM5B38[4]	Strain-gauge Input Modules
SCM5B39	Current-output Modules
SCM5B392[4]	Matched-pair Servo/Motor Controller Modules
SCM5B40/41[4]	Analog Voltage-input Modules, Wide Bandwidth
SCM5B42[4]	2-wire Transmitter Interface Modules
SCM5B43[4]	General-purpose Input Modules, with DC Exc.
SCM5B45[4]	Frequency-input Modules
SCM5B47[4]	Linearized Thermocouple-input Modules
SCM5B49	Voltage-output Modules
SCMD-MIAC5x	Miniature Digital AC-input Modules
SCMD-MIDC5x	Miniature Digital DC-input Modules
SCMD-MOAC5x	Miniature Digital AC-output Modules
SCMD-MODC5x	Miniature Digital DC-output Modules
SCMD-MORx5	Miniature Relay-output Modules
SCMXCA004-xx	System Interface Cable for Both Analog Backpanels
SCMXPRT-001	Power supply, 1A, 5VDC, 120VAC US
SCMXPRE-001	Power supply, 1A, 5VDC, 220VAC European
SCMXPRT-003	Power supply, 3A, 5VDC, 120VAC US
SCMXPRE-003	Power supply, 3A, 5VDC, 220VAC European

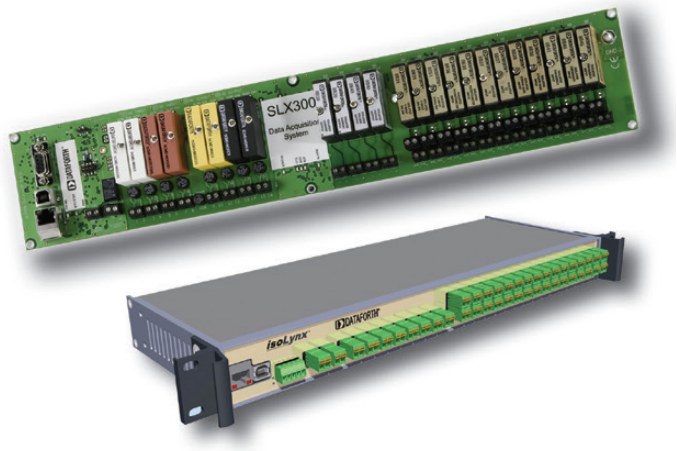
NOTES:
(1) SLX200 suffix changes to -xxA or -xxAD for 6-ch base unit.
(2) Cold-junction Compensation. Required for SCM5B37 and SCM5B47.
(3) Downloadable from website.
(4) Modules with system output of ±10V or 0-10V cannot be used in the SLX200 systems.
This includes SCM5Bxx-xxD, SCM5B392-13, -14, SCM5B42-02, and SCM5B48-01.

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8B isoLynx® Systems

SLX300 Data Acquisition System



FEATURES

- Modbus® RTU and TCP Support
- 1500Vrms Input-to-Output & Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Wide I/O Selection:
  - Analog - 20 Families, 89 Models
  - Digital - 5 Families, 14 Models
- Mix and Match Analog & Digital I/O
- Advanced Features Including Alarms, Counters, Timers, PWMs, and More
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- C-UL-US Listed (Class I, Division 2, Groups A, B, C, D)
- CE Compliant
- ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

DESCRIPTION

Dataforth's 8B isoLynx® SLX300 data acquisition system builds on the proven reliability and outstanding performance of the SCM5B isoLynx® SLX200 DAQ system and miniature-sized SensorLex® 8B isolated signal conditioning modules to provide a compact, low-cost solution for wide ranging, rugged industrial applications. Like the SLX200, the SLX300 ensures superior reliability, accuracy, and isolation. Through the use of pluggable modules, the SLX300 offers maximum flexibility of analog and digital channel configuration for factory automation, process control, test and measurement, machine control, and data acquisition applications. The isoLynx SLX300 uses industry-standard Modbus® RTU and TCP protocols, thus enabling communication with a wide range of existing third-party software tools and HMI/SCADA packages.

Fast I/O Channel-to-Channel Isolated

Using Dataforth's SensorLex 8B analog modules and SCMD digital modules, the flexible, modular SLX300 design can be configured with up to twelve channels of isolated analog input, four channels of isolated analog output, and eight channels of isolated digital I/O (Figure 3). The isolation rating is 1500Vrms from input to output and from channel to channel. The system can be powered by +5VDC or a wide range 7 to 34VDC using the 8BPWR-2 module, and it can be either panel or DIN-rail mounted. Multiple powerful, high-speed microcontrollers and high-performance data converters at the heart of the system enable mix and match analog and digital I/O at sustained rates of up to 3.0kS/s. In addition, a burst mode of operation is provided for analog input that allows sampling up to 100kS/s on analog input channels.

Industry's Widest I/O Selection

The isoLynx SLX300 can be configured for any application by selecting from over 89 analog I/O modules and 14 digital I/O modules. These module selections enable monitoring of common industrial signals including millivolt, volt, milliamp, amp, linearized and non-linearized thermocouple, 3- and 4-wire RTD, potentiometer, slidewire, strain gauge, AC-to-True RMS output, frequency, 2-wire transmitter, and DC LVDT. Analog output modules provide isolated high-level voltage and current options. Industry-standard digital I/O solid-state relay modules provide AC/DC input and output monitoring and control. Both analog and digital output channels can be configured as alarm outputs. The ability to mix and match module types on a per-channel basis ensures maximum system flexibility. Operation and storage temperature for the isoLynx SLX300, as well as for all analog and digital I/O modules used in the most extreme environments, is –40ºC to +85ºC; the relative humidity range is 0 to 95% noncondensing. The SLX300 system is C-UL-US Listed, CE Compliant, and designed for operation in Class I, Division 2 Hazardous Locations.

Powerful Functionality

The SLX300 has many features and special-purpose functions specifically for data acquisition and control. Current sampled data from analog input channels is stored to a 192k sample buffer. Data is available as minimum, maximum, and average readings with selectable averaging weight. A burst mode of operation allows up to 100kS/s sampling rate on analog input channels and also provides a waveform generator function using the analog output channels. Continuous scan mode scans up to 16 input channels, and burst sampling mode can be set up with a 48-entry scan list to specify scan sequence, scan rate, and scan count. In addition to performing standard digital I/O, the eight digital I/O channels can be configured to perform seven different special functions: pulse/frequency counter, pulse/frequency counter with de-bounce, waveform measurement, time between events, frequency generator, pulse width modulation (PWM) generator, and one-shot generator. The SLX300 also allows four alarm states – high, high-high, low, and low-low – to be set on the analog input and digital I/O special function channels with alarm output mapped to a user-selectable analog or digital output channel.

Configurable analog and digital default output values ensure output signals are set to safe values upon system startup or when unexpected power outages or brownouts occur. System status and mode LEDs constantly display communication activity, mode of operation, and alarm status.

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Flexible Communications and Configuration

The isoLynx SLX300 interfaces to a host system through a choice of communication links. RS-232 or RS-485 serial links operate from 2.4kbps to 921.6kbps, use true fail-safe transceivers, and have software-controlled termination networks, eliminating the need for dip switches. A USB Virtual Communications Port provides a common connection to computers and a 10/100 Base-T Ethernet connection is also available. Up to 32 systems can be multi-dropped on the RS-485 serial link and up to 4 sockets are supported on Ethernet.

The Modbus® RTU protocol used on serial and USB interfaces, and the Modbus TCP protocol used on the Ethernet interface are open, industry standard protocols that define how devices on a network communicate with each other. This ensures that the system can be integrated seamlessly onto existing Modbus networks using common Modbus function codes.

Free configuration software is provided for quick and easy system setup (see Figure 1 and Figure 2). Channel I/O setup, communication, default output, and other parameters are stored in non-volatile memory. A LabVIEW™ VI library enables fast application development using industry-standard tools. The SLX300 system can be either panel or DIN-rail mounted. It is also available in a rack-mounted or bench-top 1U enclosure.

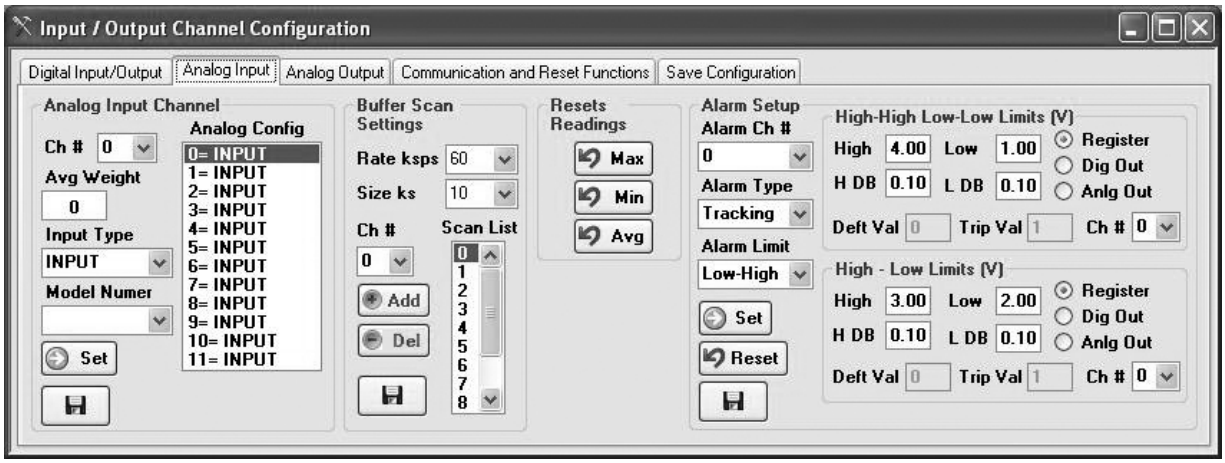
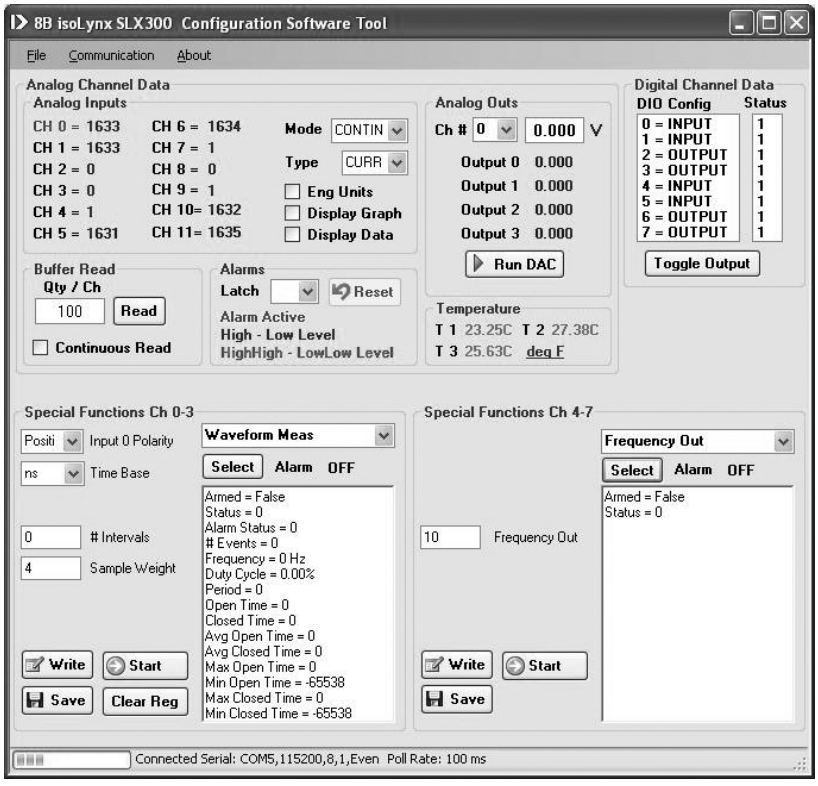


Figure 1: Configuration Tool - System Setup



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Figure 2: Configuration Tool - Channel Monitoring and Data Display

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Specifications

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

8B isoLynx® SLX300	
Analog Input	
Channel Count	12
Module Type	Mix and Match-input Types on a Per-channel Basis 8B30/31/32/33/34/35/36/37/ 38/40/41/42/43/45/47/50/51/PT All Models with 0-5V Output
Accuracy(1)	±0.07%
Resolution	±0.024%
Cold-junction Compensation	
Accuracy, +25ºC	±0.5ºC
Accuracy, –40ºC to +85ºC	±1.5ºC
Input Protection	240VAC Continuous, ESD per EN61000-6-2
Isolation (Input-to-Output and Ch-to-ch)	1500Vrms (max)
Throughput(2)	3.0kS/s (max) Continuous, 100ks/s (max) Burst(3), Programmable
Sampling Buffer	192k Sample, 384k Bytes
Scan List	Up to 48 Entries in Any Order
Averaging	Selectable Weight
Alarm	Program High/High-High/Low/Low-Low Per Channel
Alarm Response	Programmable Analog Out, Digital Out
Analog Output	
Channel Count	4
Module Type	Mix and Match-output Types on a Per-channel Basis 8B39/49 All Models with 0-5V Input
Accuracy(1)	±0.07%
Resolution	±0.024%
Output Protection	40VAC (max), ESD per EN61000-6-2
Isolation (Output-to-Input and Ch-to-ch)	1500Vrms (max)
Throughput(2)	1.0ks/s (max) Continuous 4.0ks/s (max) Burst, Programmable
Programmable Waveform	16k Samples Per Channel
Digital I/O	
Channel Count	8
Module Type	Mix and Match-I/O Types on a Per-channel Basis SCMD-MIAC5x, SCMD-MIDC5x SCMD-MOAC5x, SCMD-MODC5x SCMD-MORx5, SCMD-PT
Isolation (Input-to-Output and Ch-to-ch)	1500Vrms (max)
Throughput(2)	2.0ks/s (max) Continuous

8B isoLynx® SLX300 (continued)	
Digital I/O Special Functions	
Pulse/Frequency Counter	Frequency to 80kHz, Count to 10M, RPM to 65k
Pulse/Frequency Counter with De-bounce	Frequency to 50Hz, Count to 10M
Waveform Measurement	Frequency to 15kHz, # Periods, Pulse Width, Period, Duty Cycle
Time Between Events	Min, Max, Avg, Selectable Timebase
Frequency Generator	Up to 100kHz
PWM Generator	Selectable Timebase
One-Shot Generator	20µs (min) Pulse, Programmable Pre- and Post-delay
Alarm	Program High/High-High/Low/Low-Low per function
Alarm Response	Programmable Digital Out
Communications	
RS-232	2.4kbps to 921.6kbps, DB-9 Connector
RS-485	2.4kbps to 921.6kbps, Pluggable Screw Terminal Connector
USB	USB-to-Serial Bridge (Virtual Communications Port), Type B
Ethernet	10/100 Base-T, Static IP, RJ-45 Connector
Protocol	
RS-232, RS-485, USB	Modbus® RTU
Ethernet	Modbus TCP
Software Tools	Free Configuration Software Tool
Power	
+5VDC	270mA(4)
7-34VDC (8BPWR-2 Required)	320mA(4)
Physical	
Dimensions (l)(w)(h)	
Panel Mount	16.24" x 3.47" x 1.92" (413mm x 88mm x 49mm)
DIN-rail Mount	16.24" x 3.47" x 2.00" (413mm x 88mm x 51mm)
Bench-Top 1U Enclosure	16.73" x 6.0" x 1.72" (424.9mm x 152.4mm x 43.7mm)
Mounting	Panel or DIN-rail Rack-Mounted or Bench-Top 1U Enclosure
Environmental	
Operating Temp. Range	–40ºC to +85ºC
Storage Temp. Range	–40ºC to +85ºC
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity, EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) System accuracy does not include module accuracy or SLX300 CJC accuracy. SLX300 CJC accuracy replaces CJC accuracy in 8B37/47 module datasheets. Reference module datasheets for further details.
(2) Throughput varies with system configuration.
(3) Burst Mode Scan rate is reduced when CJC, linearization, averaging, and/or alarm functions are enabled.
(4) Does not include module power consumption. Reference module datasheets for further details.

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Ordering Information

Model	Description
SLX300-10(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, Panel Mount
SLX300-20(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, Panel Mount
SLX300-30(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP), Panel Mount
SLX300-40(S)*	12-ch AI, 4-ch AO, 8-ch DIO, Ethernet, Panel Mount
SLX300-10D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, DIN-rail Mount
SLX300-20D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, DIN-rail Mount
SLX300-30D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP), DIN-rail Mount
SLX300-40D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, Ethernet, DIN-rail Mount
SLX300-10U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, SD Card, 1U Box
SLX300-20U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, SD Card, 1U Box
SLX300-50U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP) & Ethernet, SD Card, 1U Box
SLX146-02, -07	Null Modem Serial Cable, Female DB-9 to Female DB-9; 2m, 7m
SLX147-01, -02, -05	USB Cable, Type A to Type B; 1m, 2m, 5m
SLX370(1)	Software Tools, Config Sample, LabVIEW™ VI
SLX380(1)	Quick Start Guide, Hardware Manual, Software Manual
SLX141-01, -02, -07	Ethernet Cable, 1m, 2m, 7m
SLX141-X01, -X02, -X07	Ethernet Crossover Cable, 1m, 2m, 7m
SCMXRK-002	19" Metal Rack for Mounting Backpanels
SCMXRAIL1-XX	DIN EN50022-35x7.5 (Slotted Steel), Length -XX in meters
SCMXRAIL3-XX	DIN EN50022-35x15 (Slotted Steel), Length -XX in meters
8B30-04, -05, -06	mV Input-modules, 3Hz BW
8B31-04, -05, -06, -08, -10, -13	Voltage-input Modules, 3Hz BW
8B32-01, -02	Current-input Modules, 3Hz BW
8B34-01, -02, -03, -04	2- and 3-wire RTD-input Modules, 3Hz BW
8B35-01, -02, -03, -04	4-wire RTD-input Modules, 3Hz BW
8B36-01, -02, -03, -04	Potentiometer-input Modules, 3Hz BW
8B37J, K, T, R, S	Thermocouple-input Modules, Non-linearized, 3Hz BW

Model	Description
8B38-06, -07, -08	Strain-gauge Input Modules, 3kHz BW
8B38-36, -37, -38	Strain-gauge Input Modules, 3Hz BW
8B39-01, -03	Current-output Modules, 100Hz BW
8B40-04, -05, -06	mV-input Modules, 1kHz BW
8B41-04, -05, -06, -08, -10, -13	Voltage-input Modules, 1kHz BW
8B42-01, -02	2-wire Transmitter-input Modules, 100Hz BW
8B43-11 through -15	DC LVDT-input Modules, 1kHz BW
8B45-01 through -08	Frequency-input Modules
8B47J-xx, K-xx, T-xx	Thermocouple-input Modules, Linearized, 3Hz BW
8B49-01, -02	Voltage-output Modules, 100Hz BW
8B50-04, -05, -06	mV-input Modules, 20kHz BW
8B51-04, -05, -06, -08, -10, -13	Voltage-input Modules, 20kHz BW
8BPT	Non-isolated Signal Pass Thru Module
8BPWR-2	Power Supply Module, 7-34VDC-input
SCMD-MIAC5x	Miniature Digital AC-input Modules
SCMD-MIDC5x	Miniature Digital DC-input Modules
SCMD-MOAC5x	Miniature Digital AC-output Modules
SCMD-MODC5x	Miniature Digital DC-output Modules
SCMD-MORx5	Miniature Relay-output Modules
SCMD-PT	Miniature Pass-thru Module
SCMXPRT-001	Power Supply, 5VDC, 1A, 120VAC-input
SCMXPRE-001	Power Supply, 5VDC, 1A, 220VAC-input
SCMXPRT-003	Power Supply, 5VDC, 3A, 120VAC-input
SCMXPRE-003	Power Supply, 5VDC, 3A, 220VAC-input
PWR-4505	Power Supply, 5VDC, 5A, 85-264VAC-input
PWR-PS5R15W	Power Supply, 24VDC, 0.65A, 100-240VAC-input
PWR-PS5R30W	Power Supply, 24VDC, 1.3A, 100-240VAC-input
PWR-PS5R60W	Power Supply, 24VDC, 2.5A, 100-240VAC-input
PWR-PS5R120W	Power Supply, 24VDC, 5.0A, 100-240VAC-input

NOTES: *Add an 'S' suffix to any SLX300 system part number to order the system bundled with ReDAQ® Shape software. (1) Downloadable from website.
LabVIEW™ VI is a trademark of National Instruments.

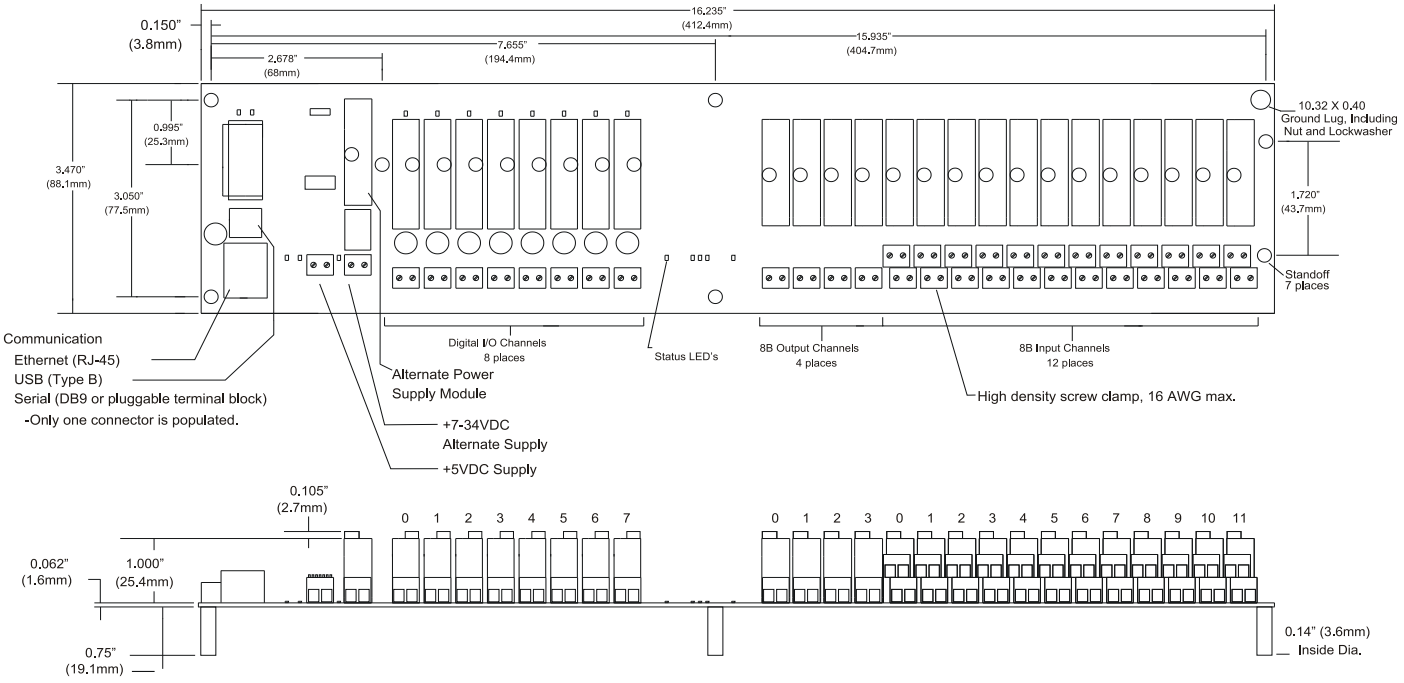


Figure 3: 8B isoLynx SLX300 Block Diagram

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SLX930

ReDAQ® Shape Software for 8B isoLynx® SLX300

DESCRIPTION

ReDAQ Shape, Dataforth's out-of-the-box DAQ software for the SLX300, provides the easiest and most efficient development tool to create, save, and open graphical user interface projects for test, process, data collection and data analysis applications. Built-in functions in the Acquire and Analyze panels are pre-configured and can be used without setup. Just three easy steps are required to create data acquisition and control projects using 18 high-quality tools and powerful isoLynx® SLX300 functions. These projects are developed and executed in the software's Presentation panel.

The ReDAQ Shape tools include:

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

ReDAQ Shape also provides the most effective way to configure and customize SLX300 functions for specific application requirements. The toolbox tools are easily moved, re-sized, cut, copied, pasted, and deleted. They also support any graphical file format so presentations made with other software can be loaded into ReDAQ Shape.

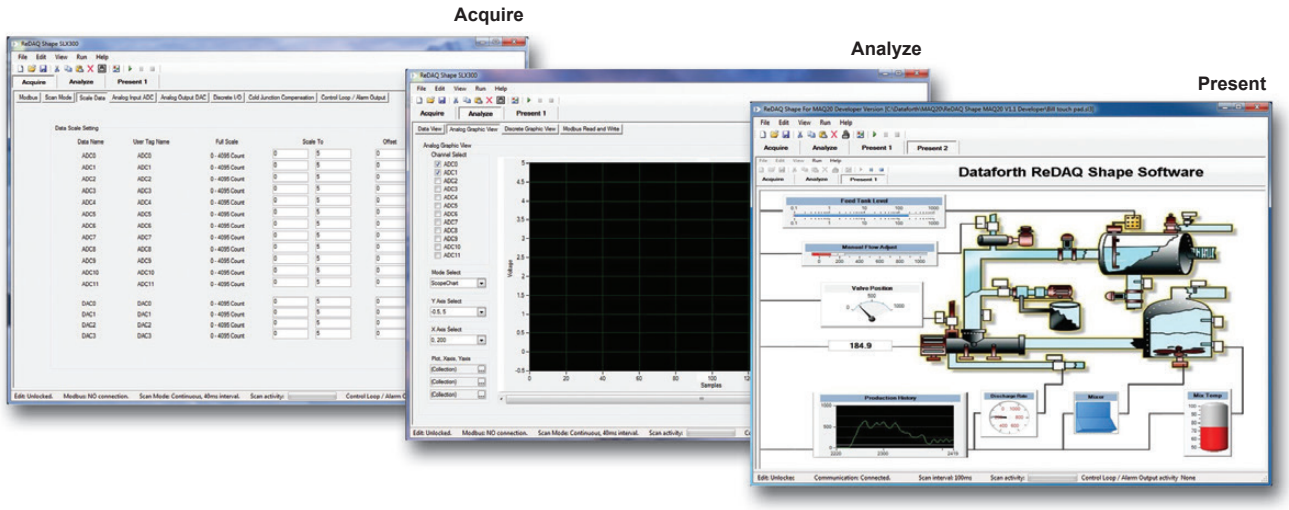
In contrast to other graphical software environments, ReDAQ Shape software for SLX300 has a very short user-learning curve. It is based on programming tools incorporated from Microsoft Visual Studio® and National Instruments Measurement Studio®, ensuring its ease-of-use and integrated, across-the-board applicability for data acquisition and control applications.

FEATURES

- 3 Easy Steps to Create Customized Presentation Panels
- No Setup or Configuration Required in Acquire and Analyze Panels
- 18 High-quality Toolbox Tools
- Supports Any Graphical File Format
- Integrated, Across-the-board Applicability
- Most Effective Way to Set Up and Configure 8B isoLynx SLX300 Functions:
  - Continuous and burst scan modes for 12 analog input and 4 analog output channels
  - Automatically scales data from counts to engineering units
  - 8 discrete I/O with 7 special functions: pulse/frequency counter, pulse/frequency counter with de-bounce, waveform measurement, time between events, frequency generator, PWM generator, one-shot pulse generator
  - Customer user tag name for any input and output
  - Cold-junction Compensation and linearization for Thermocouple-input modules
  - Control loop and alarm output
  - Three Function timer (count-down, 24hr/day, day/time) with 10 programmable events

Ordering Information

Model	Description
SLX930	ReDAQ Shape Software for SLX300



ReDAQ Shape for SLX300 Screen Shots

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Downloads

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

Press Releases

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

See all PRESS RELEASES

Application Notes

ENGINEERING BASICS

- Measuring RMS Values of Voltage and Current (AN101)
- IC Op Amp Errors: What Are They and How Bad Can They Be (AN102)
- Common-Mode Voltage (AN103)
- 4-20mA Transmitters (AN104)
- Practical Thermocouple Temperature Measurements (AN107)
- When Good Grounds Go Bad (AN108)
- Single Phase AC Measurements Revisited (AN109)
- 3-Phase AC Calculations Revisited (AN110)
- Current Modules Measure Power Factor (AN111)
- Filtering in Signal Conditioning Modules, SCMs (AN112)
- Phase Angles and Time Delays (AN113)
- Accuracy versus Resolution (AN114)
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- Basic Bridge Circuits (AN117)
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- Wind Turbines Today (AN120)
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- Tuning Control Loops for Fast Response (AN123)
- Tuning Control Loops with the IMC Tuning Method (AN124)
- Tuning Level Control Loops (AN125)
- Tuning Surge Tank Level Control Loop (AN126)
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- RMS Revisited (AN128)
- Harmonics and Utility Costs (AN129)

SCM5B MODULES

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

SCM7B MODULES

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

DSCA MODULES

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

LDM485, RS-485 DEVICES

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

MAQ®20 MODULES

- Cross Point Switch Using MAQ20-DORLY Module (AN901)
- MAQ20 PID Control in a Home Heating Application (AN902)

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Tech Notes

- Active, Analog, Elliptic Filter
- Eddy Current - Skin, and Proximity Effects
- Could We Actually Achieve "Warp Speed"?
- What is This Crest Factor Thing?
- Coulomb's Law
- Faraday's Law of Induction
- Power Supply Isolation
- When to Use Closed-Loop Control Instead of Open-Loop Control
- Aliasing, Anti-Aliasing - What is That Anyway?
- Made in the USA
- MAQ20 Data Acquisition System Features
- Advanced CJC Method
- MAQ20-BRDG1, Strain Gauge Bridge Module
- 3-Year Warranty
- ISO9001
- Hazardous Locations in the European Union - ATEX Directive
- Hazardous Locations in North America
- Certifications
- Why Should Sensors Be Isolated
- Signal Conditioning and Alias Filters
- Low-Pass Filter Rise Time vs Bandwidth
- Strain Gauge Signal Conditioners
- Why Isolate Analog Signals?
- RTD Tutorial
- Six Sigma - What? Why? How?
- Windmill Applications
- Introduction to Thermocouples
- RTD, Resistance Temperature Detector
- Shielding and Grounding
- 5B for Piezo-Electric Accelerometers
- Configurable 5B Module
- Hysteresis Specifications
- Miniature Electronics... 8B Modules
- A Question from Dataforth's President
- Unbalanced Voltages Increase Cost
- Dataforth Test Reports
- Normal Mode Rejection, NMR
- Bridge Circuit Measurements
- Signal-to-Noise Ratio, SNR
- Accuracy versus Resolution
- Filtering - Phase Angles and Time Delays
- Uncertainty Principle
- Galvanic Isolation
- Quick Reference for RS-323, -422, -423, -485
- It's All About Isolation and Protection
- Serial Data
- Signal Conditioner with Power Supply
- Isolated I/O to Serial Data
- Loop Isolators
- Test Reports
- Measuring True RMS
- 2-wire, 4-20mA Applications
- System Accessories
- Why True RMS?
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- Transient Protection
- Signal Conditioner Life
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- DIN or 5B/7B Option
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- Programmable Signal Conditioning
- When Good Grounds Go Bad
- Input Resistance
- Drift Specs
- Failure Rates
- Industrial Date Acquisition
- Single Phase Revisited
- 3-phase AC Calculations Revisited
- Using Ethernet for Data Acquisition
- Linearity and Conformity
- Reproducibility - Repeatability
- Surge Withstand Capability
- Easy Recalibration Procedure
- System Throughput
- Sampling Rates and THE LAW
- Signal Conditioning Article
- Measured vs Combinational Error
- Power Supply Sensitivity
- Filtering Noise
- Filtering in Signal Conditioning Modules
- Resistor Thermal Noise
- Sampling Law
- Signal Conditioners - Buy vs Build
- Confident Strain-Gauge Measurements
- Advanced CJC Method Used in Dataforth Thermocouples Significantly Improves Accuracy

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DISCONTINUED DEVICES - Isolator Products

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

DISCONTINUED DEVICES - Backpanels

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

DISCONTINUED DEVICES - Power Supply

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

DISCONTINUED DEVICES - Sensor-to-computer Products

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

DISCONTINUED DEVICES - Line Drivers and Converters

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

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To view the current Dataforth Corporation Warranty, please click on the link below for the Dataforth Standard Terms and Conditions of Sale Applying to Products Sold by Dataforth Corporation. The Warranty in its entirety is Section 3. Please check this link periodically for updates.

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

Application Support

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

Returns/Repair Policy

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

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

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

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

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