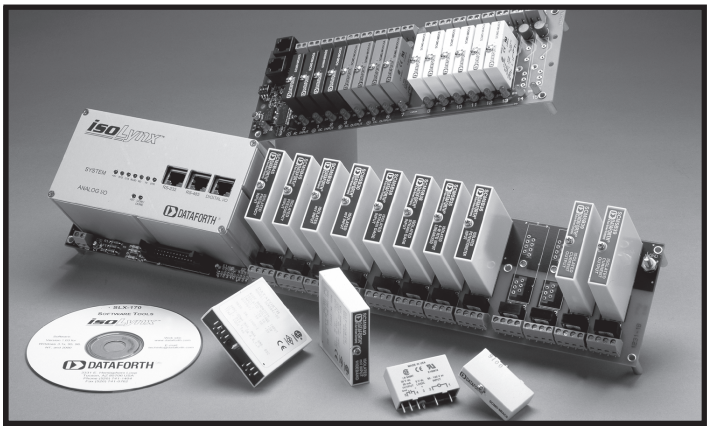
SCM5B isoLynx®

SLX200 Data Acquisition System



▶ Features

- Modbus RTU Support on RS-232 and RS-485
- Modbus TCP Support (optional)
- 240VAC Continuous Analog Input Protection
- Channel-to-Channel and Channel-to-Bus Isolation: 1500Vrms Analog I/O, 4000VDC Digital I/O
- 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: 650+ Different I/O Modules
- –40°C to +85°C Industrial Operating Temperature
- Supported by ReDAQ™ Software
- All Modules Certified to CSA, FM, CE, and ATEX Requirements
- SLX200 & SLX101 CE Compliant
- SLX200 CSA Certified, FM Approved
- Free Configuration Software

Description

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

All I/O Channel-to-Channel Isolated

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

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

Industry's Widest Signal Conditioning Selection

By selecting from over 650 standard and custom single-channel SCM5B analog I/O modules, the isoLynx® SLX200 can interface to a broad spectrum of analog signals, including millivolt, volt, milliamp, amp, linearized and non-linearized thermocouple, RTD, potentiometer, slidewire, strain gage, AC-to-true-RMS output, frequency, 2-wire transmitter, and transducers requiring DC excitation. Analog output modules are available that 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. The user can mix and match most I/O module types(3) on a per-channel basis, thus reducing wasted I/O channels and saving costs.

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

Flexible Communications and Configuration

The SCM5B isoLynx® SLX200 communicates on RS-232/RS-485 non-isolated serial links up to 115.2kbps and 10Mb/s Ethernet. Standard communication is RS-232/RS-485 and up to 32 systems can be multidropped on the RS-485 serial link. 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 isoLynx® SLX200 by the Modbus IDA organization ensures the device can be integrated onto existing Modbus networks, and most common Modbus function codes are supported. The system is also compatible with OPC.

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 one time. A free software configuration utility is provided to make configuration 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 brown-outs occur. Power-on self-test results can be obtained visually by glancing at a status LED or programatically by reading the appropriate register on the device. A section of memory is set aside for general purpose user data, some of which is stored in non-volatile memory.

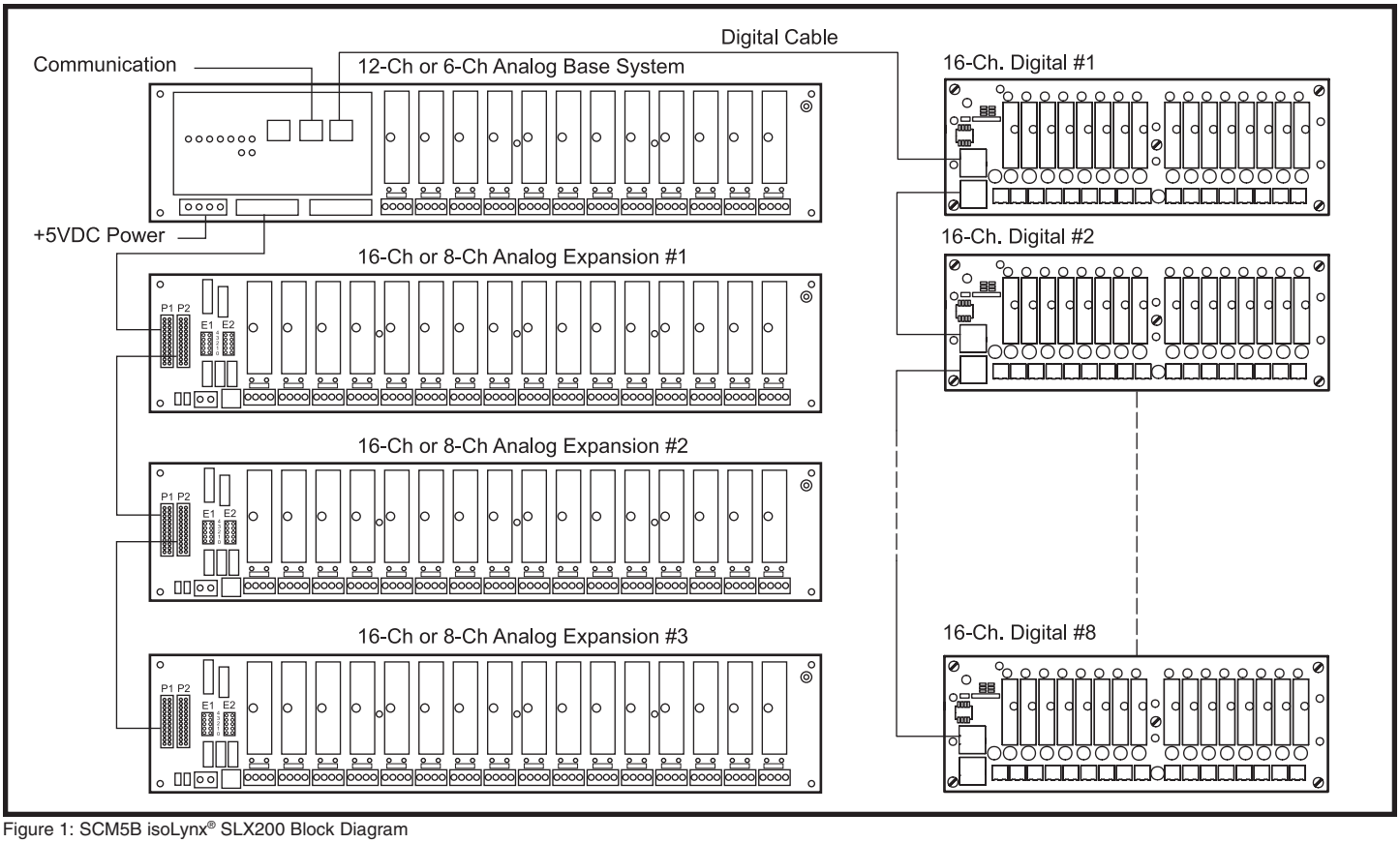

Figure 1: SCM5B isoLynx® SLX200 Block Diagram

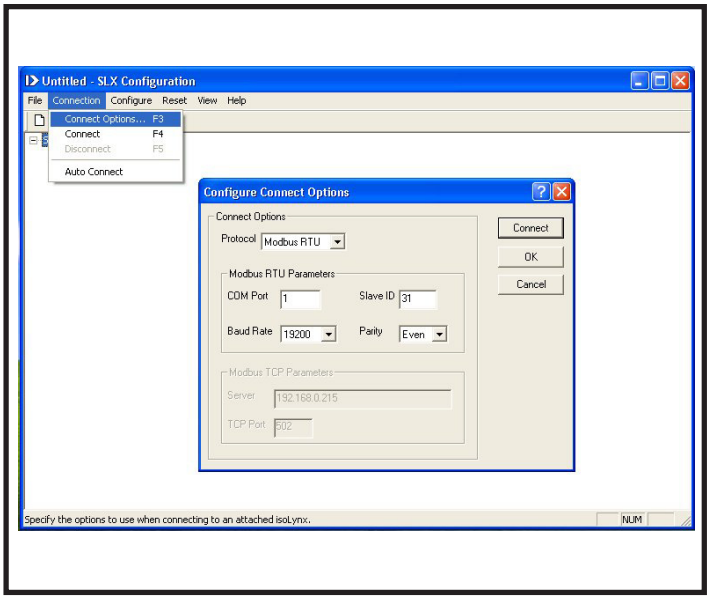

Figure 2: Configuration Utility - Communications Setup

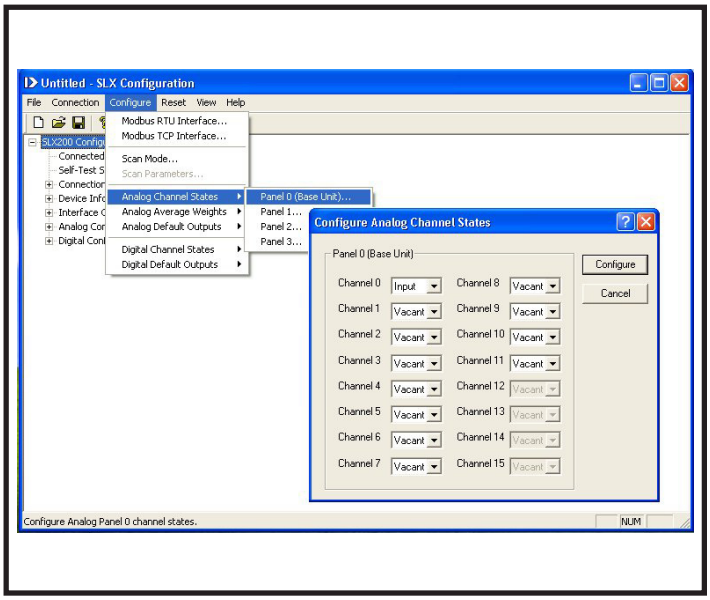

Figure 3: Configuration Utility - Analog Channel Setup

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Specifications

5B isoLynx® SLX200 Analog I/O Base Unit	
General System	
Protocol	Modbus RTU or TCP, OPC Server Compatible
I/O Capability	One 6-ch or 12-ch backpanel minimum. Expandable to 60-ch Analog I/O, 128-ch Digital I/O.
Software Tools	Free Configuration Utility, Win32 DLL, LabVIEW VI library
Digital System	
Microcontroller	High Performance RISC
Status LEDs	+5V, System Status, TD/RD (Serial), LNK/ACK (Ethernet)
Failsafe Features	Watchdog Timer & Brownout Detection - Reset to user defined configuration
Communication Interface	
Serial I/O	Separate RJ-45 modular phone jacks for RS-232 and RS-485 115.2kbps max
Port for SLX101 Digital I/O Panel	RJ-45 modular phone jack, 2-wire RS-485
RS-485	2-wire or 4-wire, 4000 feet max distance, 32 max multidrops, non-isolated To isolate, extend, or convert RS-232 or RS-485, use Dataforth LDM and DCP Data Communication products
Ethernet	RJ-45 modular phone jack, 10Base-T Default IP Address 192.168.0.215, Keep-alive timeout 7200s
Analog I/O	
Channels	Mix and match I/O types on a per channel basis(1) Maximum 60-ch differential I/O of SCM5B modules Input modules must have system output of ±5V or 0 to +5V (±10V or 0 to +10V cannot be used)
Calibration	NIST traceable test and calibration sheets ship with modules
System Accuracy	Analog Input ±0.024%(2), Analog Output ±0.006%(2)
Field Connector	High density screw clamp, 14 AWG max, 0.5N-M torque
System Connector	26-pin, male header connector
Ground Network Jumpers	Factory Default R1 100Ω; J1-J4: J1, J2, and J4 installed; J3 not installed. See Hardware User Manual for recommended grounding practices.
A/D Converter	16-bit, ±10V input, 14-bit min accuracy Resolution vs. input range: 16-bit at ±10V, 15-bit at ±5V, 14-bit at 0 to +5V
D/A Converter	16-bit, ±10V output
Isolation	1500 Vrms ch-to-ch or ch-to-internal bus
Input Protection	240VAC continuous, ESD
Throughput, Analog Input	8ms for 16 ch (~2000 ch/sec) at 115.2kbps Modbus RTU 17ms for 60 ch (~3600 ch/sec) at 115.2kbps Modbus RTU
Throughput, Analog Output	13ms for 16 ch (~1230 ch/sec) at 115.2kbps Modbus RTU 33ms for 60 ch (~1850 ch/sec) at 115.2kbps Modbus RTU
Expansion Panels	SCMPB02 (16-ch, can use up to 3), SCMPB06 (8-ch, can use up to 6)
Power Supply Requirements	
SLX200-1xx	+5VDC ±5% at 500mA, no modules installed
SLX200-2xx	+5VDC ±5% at 700mA, no modules installed
SLX200-3xx	+5VDC ±5% at 900mA, no modules installed
Dimensions (l)(w)(h)	
SLX200-xx, 12-ch	17.4" x 3.47" x 3.30" (442.0mm x 88.1mm x 83.8mm)
SLX200-xxAx, 6-ch	11.8" x 3.47" x 3.30" (300.7mm x 88.1mm x 83.8mm)
Mounting Options	Panel Mount or DIN Rail Mount
Environmental	
Operating Temp. Range	–40°C to +85°C (–40°C to +70°C for SLX200-2xx,-3xx)
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	
CE Compliant	
CSA, FM	Class I, Division 2, Groups A, B, C, D Hazardous Locations
Modbus	IDA Conformance Tested

5B isoLynx® SLX101 Digital I/O Backpanel	
General System	
Protocol	Modbus RTU or TCP, OPC Server Compatible through SLX200. Proprietary as stand-alone.
I/O Capability	One 16-ch backpanel minimum. Expandable to 128-ch Digital I/O.
Digital System	
Microcontroller	High Performance RISC
Status LEDs	+5V, System Status, Channel State
Failsafe Features	Watchdog Timer & Brownout Detection - Reset to user defined configuration
Communication Interface	
Serial I/O	Two RJ-45 modular phone jacks for daisy-chain connection 115.2kbps max
RS-485 2W	4000 feet max distance, 32 max multidrops, non-isolated
Digital I/O	
Channels	Mix and match I/O types on a per channel basis
Field Connector	High density screw clamp, 14 AWG max, 0.5N-M torque
Isolation	1000 Vrms ch-to-ch or ch-to-internal bus
Throughput	8ms for 16 ch (~2000 ch/sec) at 115.2kbps Modbus RTU 27ms for 128 ch (~4740 ch/sec) at 115.2kbps Modbus RTU
Power Supply Requirements	+5VDC ±5% at 40mA, no modules installed
Dimensions (l)(w)(h)	10.0" x 3.47" x 1.95" (254.0mm x 88.1mm x 49.5mm)
Mounting Options	Panel Mount or DIN Rail Mount
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD,EFT	Performance B
Certifications	
CE Compliant	
CSA, FM	Not covered under the SLX200 certifications. Must qualify separately based on source of I/O modules.

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

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Ordering Information

Model	Description
SLX200-10[1]	12-Ch, RS-232/485, Panel Mount
SLX200-20[1]	12-Ch, Ethernet, Panel Mount
SLX200-30[1]	12-Ch, Dual-Ethernet, Panel Mount
SLX200-11[1]	12-Ch, RS-232/485, No CJC[2], Panel Mount
SLX200-21[1]	12-Ch, Ethernet, No CJC[2], Panel Mount
SLX200-31[1]	12-Ch, Dual-Ethernet, No CJC[2], Panel Mount
SLX200-10D[1]	12-Ch, RS-232/485, DIN Rail Mount
SLX200-20D[1]	12-Ch, Ethernet, DIN Rail Mount
SLX200-30D[1]	12-Ch, Dual-Ethernet, DIN Rail Mount
SLX200-11D[1]	12-Ch, RS-232/485, No CJC[2], DIN Rail Mount
SLX200-21D[1]	12-Ch, Ethernet, No CJC[2], DIN Rail Mount
SLX200-31D[1]	12-Ch, Dual-Ethernet, No CJC[6], DIN Rail Mount (For 6-Ch. Base Unit, See Note[1])
SLX101	Backpanel Digital: 16-Ch
SLX101-D	Backpanel Digital: 16-Ch, DIN Rail Mount
SLX141-01,-02,-07	Ethernet and Serial Cable Options
SLX141-X01,-X02,-X07	Ethernet Crossover Cable Options
SLX142,143	RJ45 to DB9 Adapters
SLX144	RJ45 RS-485 Multidrop Adapter
SLX145	Fuse 4A, package of 5
SLX270	Software Tools - Config, DLL, LabVIEW
SLX280	Software and Hardware User Manuals
SCMPB02	Backpanel Analog: 16-Ch
SCMPB02-1	Backpanel Analog: 16-Ch, No CJC[2]
SCMPB02-2	Backpanel Analog: 16-Ch, DIN Rail Mount
SCMPB02-3	Backpanel Analog: 16 Ch, No CJC[2], DIN Rail Mount
SCMPB06	Backpanel Analog: 8-Ch
SCMPB06-1	Backpanel Analog: 8-Ch, No CJC[2]
SCMPB06-2	Backpanel Analog: 8-Ch, DIN Rail Mount
SCMPB06-3	Backpanel Analog: 8-Ch, No CJC[2], DIN Rail Mount
SCMXRK-002	Accessory: 19-Inch Rack Analog Backpanels
SCM5B30/31[3]	Analog Voltage Input Modules
SCM5B32[3]	Analog Current Input Modules
SCM5B33[3]	Isolated True RMS Input Modules
SCM5B34[3]	Linearized 2- or 3-Wire RTD Input Modules
SCM5B35[3]	Linearized 4-Wire RTD Input Modules
SCM5B36[3]	Potentiometer Input Modules
SCM5B37[3]	Thermocouple Input Modules
SCM5B38[3]	Strain Gage Input Modules
SCM5B39	Current Output Modules
SCM5B392[3]	Matched-Pair Servo/Motor Controller Modules
SCM5B40/41[3]	Analog Voltage Input Modules, Wide Bandwidth
SCM5B42[3]	2-Wire Transmitter Interface Modules
SCM5B43[3]	General Purpose Input Modules, with DC Exc.
SCM5B45[3]	Frequency Input Modules
SCM5B47[3]	Linearized Thermocouple Input Modules
SCM5B49	Voltage Output Modules
SCMD-MIAC5x	Miniature Digital AC Input Modules
SCMD-MIDC5x	Miniature Digital DC Input Modules
SCMD-MOAC5x	Miniature Digital AC Output Modules
SCMD-MODC5x	Miniature Digital DC Output Modules
SCMD-MORx5	Miniature Relay Output Modules
SCMXCA004-xx	System interface cable for both analog backpanels
SCMXPRT-001	Power supply, 1A, 5VDC, 120VAC U.S.
SCMXPRE-001	Power supply, 1A, 5VDC, 220VAC European
SCMXPRT-003	Power supply, 3A, 5VDC, 120VAC U.S.
SCMXPRE-003	Power supply, 3A, 5VDC, 220VAC European

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

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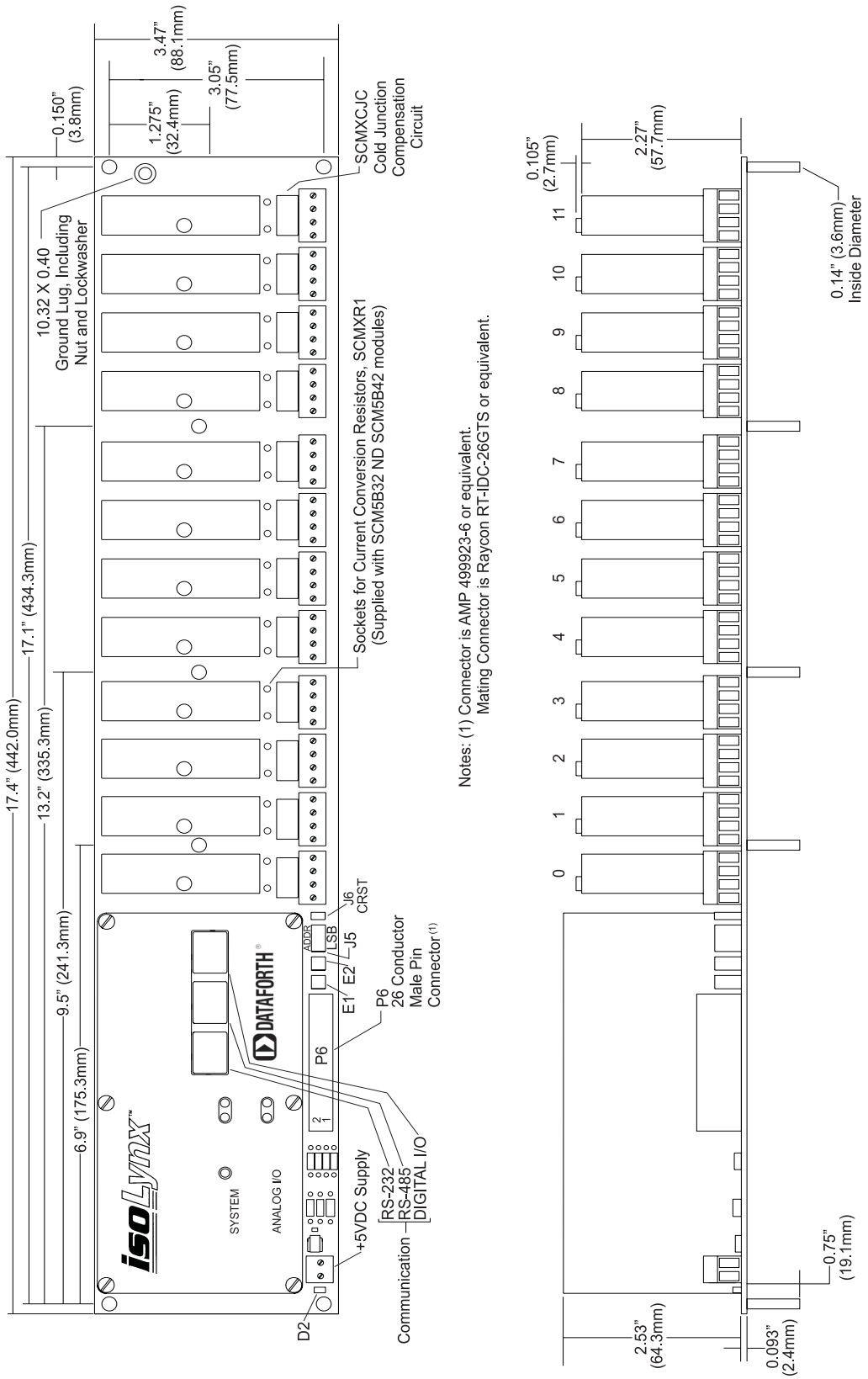

Figure 4: SLX200-xx 12-Channel Base System

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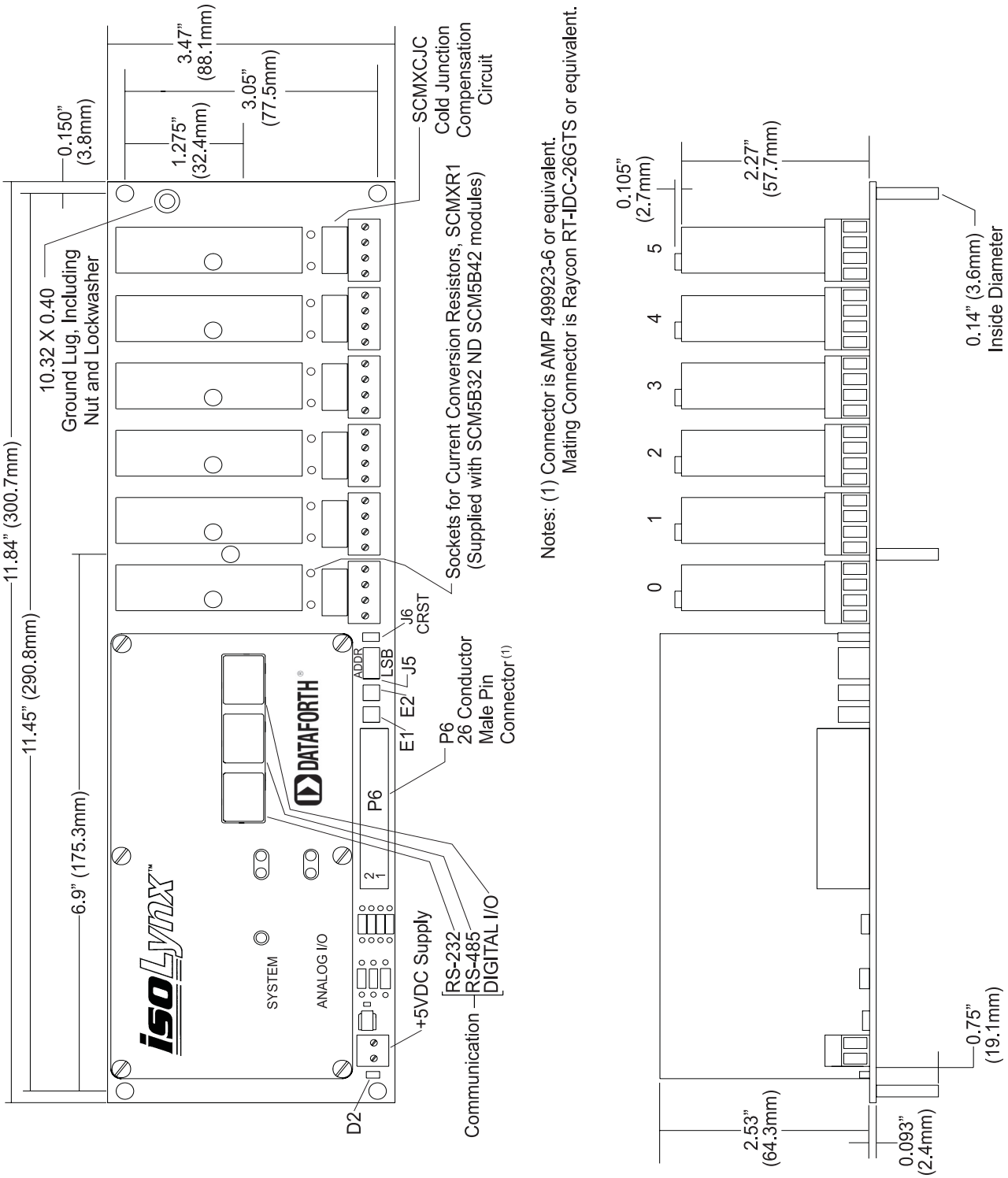

Figure 5: SLX200-xxA 6-Channel Base System

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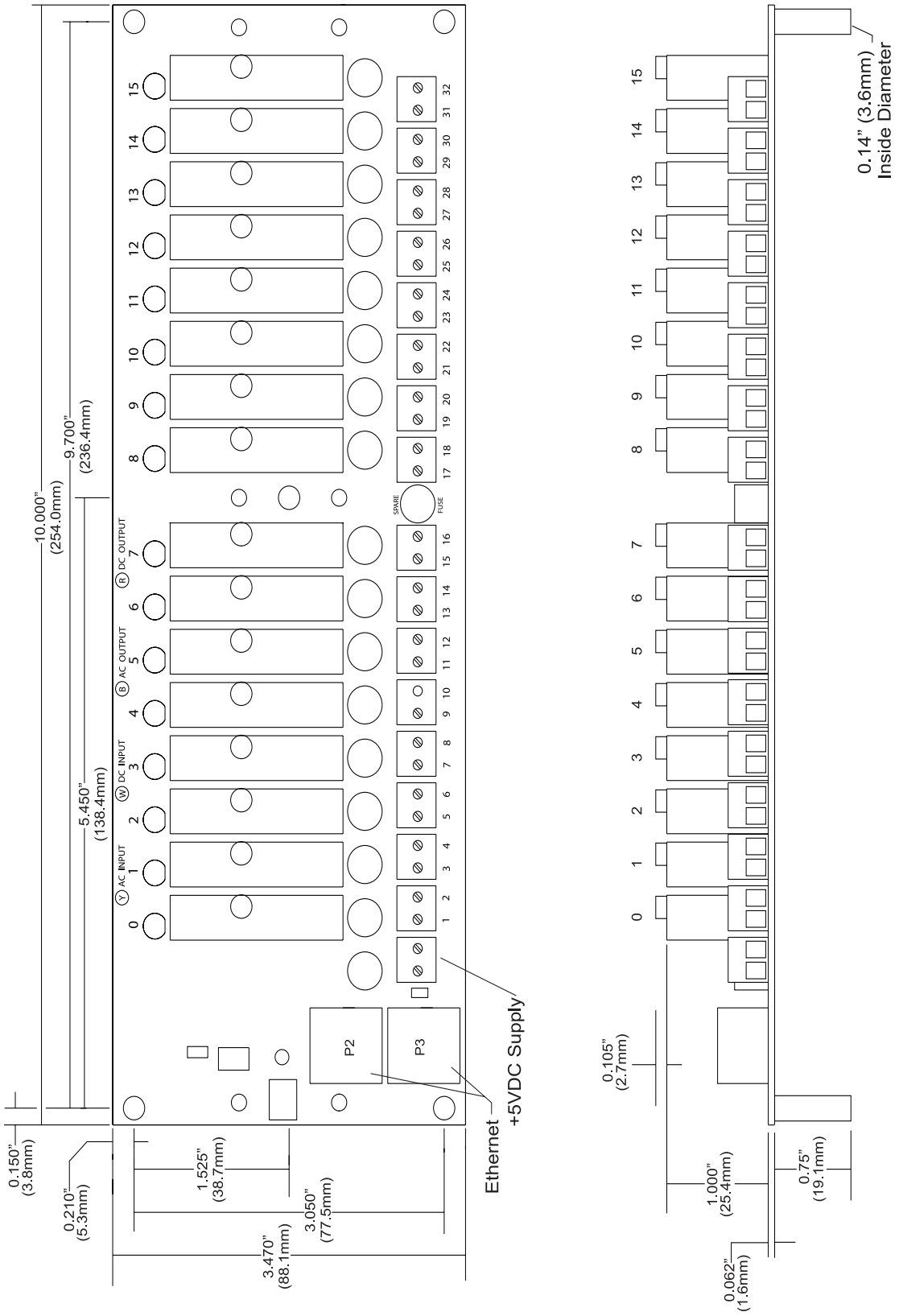

Figure 6: SLX101 Digital I/O Backpanel

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