invensys
Foxboro®

PSS 21H-8J3 B4

I/A Series® Remote Terminal Unit (RTU)
SCD2200 for Oil, Gas, and Water SCADA Applications

The I/A Series® SCD2200 is an Intelligent Station Computing Device capable of performing a full range of control and data acquisition functions in all industrial remote SCADA applications.

SCD2200 OVERVIEW

The SCD2200 has been designed to remotely operate in harsh environments and to be easily configured for SCADA applications such as:

- Oil and gas production including offshore platforms
- Well monitoring, wet gas, and high level well control applications
- Oil and gas transportation facilities plus pipelines
- Water and wastewater treatment plants
- Water and heating distribution networks

In order to match customer needs, the SCD2200 supports several modular plug-and-play options.

For example, low-density or high-density I/O modules, redundant CPU, redundant power supplies, communication lines, interfaces to the typical communications media, and optimized transmission techniques for low speed data lines are available.

Based on a 166 MHz high performance CPU, and extensive flash memory, the SCD2200 performs a wide range of control functions, from simple data acquisition to sophisticated, closed-loop algorithms, through a user-friendly sequence configurator (graphic and literal programming languages compliant to IEC 61131-3 & IEC 61499).

The smallest SCD2200 configuration is available in a compact 4-slot backplane. The SCD2200 is highly scalable and can support a 4-slot backplane, a 6-slot backplane, or a 12-slot backplane. The 12-slot backplane configuration can then be further expanded into racks to a maximum of 64-slots (modules) per logical node. These SCD2200 configurations are suitable for indoor mounting or outdoor field mounting when installed within an IP65/NEMA4 certified enclosure supplied by third party vendors.

FEATURES

Key features include:

- Low power consumption
- High reliability, modularity and accuracy
- Redundancy (optional) of CPU, power supply and communication lines
- Flexible hardware configuration
- Easy plug and play installation
- Default-configuration at power on
- IEC 61131-3 compliant user-friendly sequence configurator for RTU-resident automatic sequence and control functions
- 32-bit CPU, operating at 166 MHz
- 32 MB RAM plus 16MB FLASH memory (default 9 MB Free)
- Up to 5 dual communications modules, high I/O density cards
- Power supply modules with built-in battery backup charger, with battery temperature feedback
- 1,500 VRMS isolation for all I/O channels
- DNP3 Master and Slave
- DNP3 Secure Authentication 2.0

SCD2200 TYPICAL FUNCTIONS AND FUNCTIONAL PROGRAMMING ENVIRONMENT

Typical functions of the SCD2200 include:

- Pulse inputs acquisition, counting and freezing
- Pulse or permanent digital outputs
- Digital and analog outputs with check-before-operate security
- Programmable Sequence Control functions through user-friendly package
- I/O signals driven by local Sequences
- Sequence-programs allowing remote loading/unloading
- Store and Forward communication technique for time-stamped digital/analog chronological archives
- Report by Exception scanning
- Broadcast addressing, protocol dependent
- Dial-up, unsolicited and spontaneous calls from RTU to control centers on switched telephone lines
- Interface to a local operator workstation or diagnostic terminal
- Sequence of Events (SOE) with 1 ms resolution
- Powerful RTU and/or PLC using local and remote I/O (optional)
- Flow calculation (optional): AGA3, AGA7, AGA8, NX19
- Management of PID algorithms.

See Figure 1.

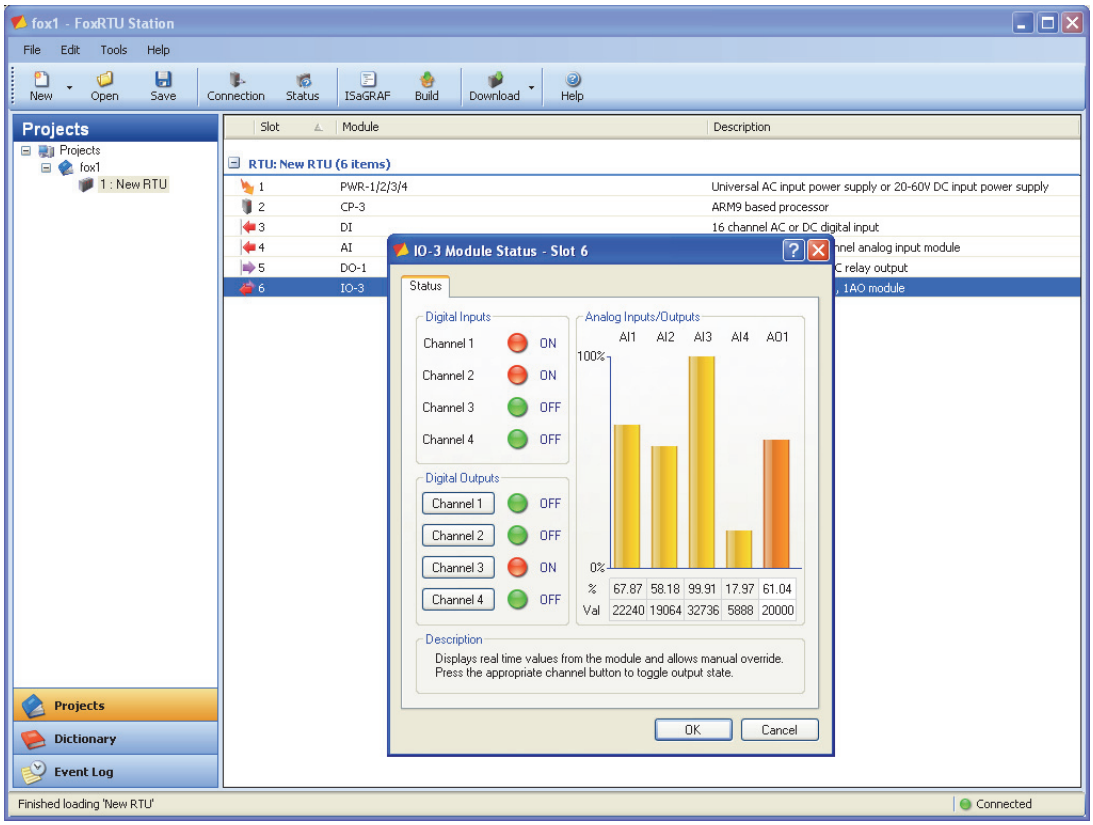


Figure 1. Functional Engineering Environment (FoxRTU Station)

FoxRTU Station Software

The FoxRTU Station software is a new integrated operating environment that combines configuration, programming, development, and maintenance in one simple-to-use package. Now you can view, edit, and diagnose your SCD2200 solution with a single, highly intuitive user interface.

FoxRTU Station eliminates the need to change back and forth between software packages or engage in complicated programming as you move from module to module. With its embedded ISaGRAF IEC-61131-3 compliant standard, the system supports:

- Ladder Logic
- Structured Text
- Function Block Diagrams
- Sequential Function Charts
- Instruction Lists
- Flowcharts.

In addition, pre-programmed function blocks make it easy to add new capabilities to your SCD2200 RTU solution.

ARCHITECTURE

The SCD2200 architecture is based on a passive bus structure sharing all RTU functional blocks: CPU, I/O modules, and communication modules supporting communication line interfaces.

Each I/O module can be easily installed or removed through standard DIN 41612 connectors. All modules are equipped with front-mounted diagnostic and indication LEDs. The modules are hot swappable, and capable of being configured in a redundant configuration on the serial backplane.

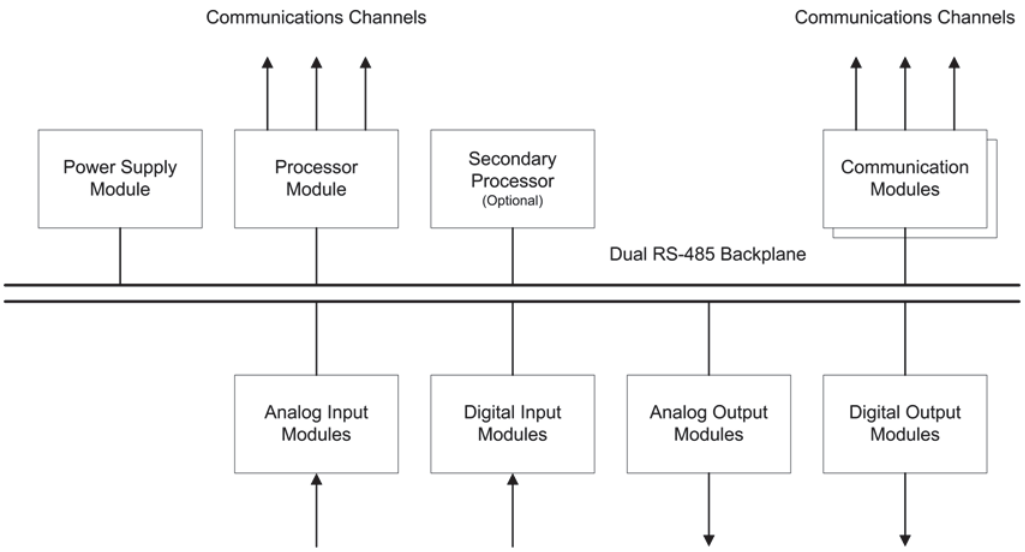


Figure 2. SCD2200 Bus Architecture

HARDWARE LAYOUT

The SCD2200 is a modular computing device, using a system of similar modules which plug into a passive backplane. Backplanes are available in 4-, 6- or 12-slot variations, which can be combined by extender cables to form a larger RTU.

Each rack mounted system requires a separate power supply module, but can operate with either a single CPU or dual CPUs in Redundant mode.

A common arrangement for redundancy is to have two Power supplies and two CPUs managing a non-redundant set of IO modules.

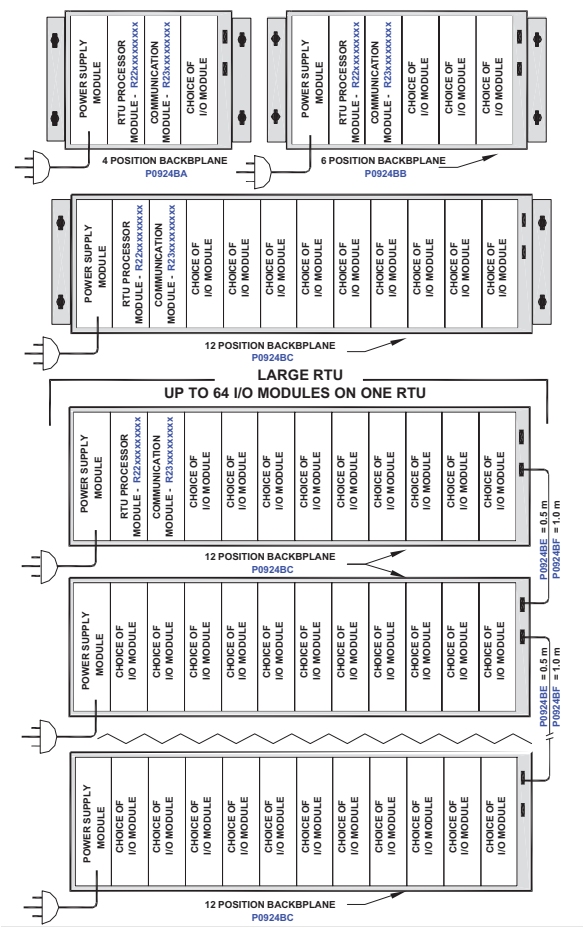


Figure 3. Possible Backplane Module Layouts

CP-3 MODULE

The 32-bit CPU consists of:

- 166 MHz clock speed
- Real-time calendar clock
- 1 Fixed Ethernet 10/100 Base T Port
- Two optional communication ports supporting a number of communication interface cards
- AT-HAYES compatible firmware protocol to drive modem and radio external devices.

The CP-3 module supports both MC-3 and MC-31 modules in a mixed communications environment.

Figure 4. SCD2200 CPU Module

MC-31 OPTIONAL COMMUNICATION MODULE

The MC-31 communication module is an optional module which supports many communication line interfaces. The MC-31 communication module contains a fixed Ethernet communication port and two optional communication ports supporting a number of communication interface cards.

These optional communication cards include:

- OPT D: V.34 PSTN Dial
- OPT F: Serial over optical
- OPT H: Hart Bell 202 - 1 to 15 devices multi-drop
- OPT I: Isolated serial [RS-232, RS-485, RS-422]
- OPT L: V.23 2/4 wire for leased line and packet data radio interface support
- OPT R2: Spread Spectrum 900 MHz Australian version
- OPT R3: Spread Spectrum 2.4 GHz International version, available on Port 3
- OPT R4: Spread Spectrum 900 MHz US version
- OPT T3: 10/100BaseT Ethernet

The MC-31 communication module requires the CP-3 module as a pre-requisite module. The MC-31 communication module does not support multiple masters on the same Ethernet port.

Figure 5. MC-31 Communication Module

INPUT/OUTPUT (I/0) MODULES

Common characteristics include:

- HCMOS technology
- Optical isolation
- Address free.

Front-mounted diagnostic LED and indication LED allows for:

- Quick disconnect I/O terminations.

Figure 6. Typical SCD2200 I/O Modules

POWER SUPPLY MODULES

The following power supply modules are available:

- PS-12 AC input, 100 to 240 V ac power supply (without 24 V dc isolated converter)
- PS-22 DC input, 20 to 60 V dc power supply (without 24 V dc isolated converter)
- PS-12 AC input, 100 to 240 V ac power supply with 24 V dc isolated converter
- PS-22 DC input, 20 to 60 V dc power supply with 24 V dc isolated converter

Figure 7. SCD2200 Power Supply Module

BACKPLANES

The backplane allows the processor module to communicate with other modules in the RTU. It also allows power to be supplied to each of the modules. The following options are available:

- 4-slot backplane
- 6-slot backplane
- 12-slot backplane

Multiple backplanes can be linked together to create an RTU with up to 64 modules.

Backplanes are designed for surface mounting to support all of the modules and individual mounting brackets are supplied.

One or two 4-slot backplanes or a single 6-slot backplane can be mounted in a 19-inch rack with a special 19-inch rack backplane mounting bracket. A 12-slot backplane is mountable in a 19-inch rack using a set of alternative WINGS rack mounting brackets.

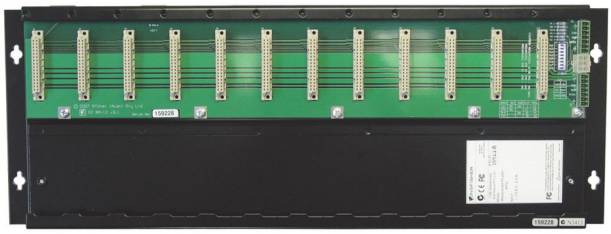


Figure 8. Empty 12-Slot Backplane

FUNCTIONAL SPECIFICATIONS

CP-3 Module

PROCESSOR

ARM9 processor operating at 166 MHz
32 Mb SDRAM
16 Mb Flash
128 kb of battery backed CMOS static RAM.
Real Time Clock
10/100 Mbits/s Ethernet Interface
2 optional ports for communication options

MC-31 Module

ETHERNET COMMUNICATIONS

10/100BaseT
PPP Dial via D option

OPTIONAL COMMUNICATIONS BOARDS FOR CP-3 OR MC31 MODULE

OPT D: V.34 PSTN Dial
OPT F: Serial over optical
OPT H: Hart Bell 202 - 1 to 15 devices multi-drop
OPT I: Isolated serial (RS-232,RS-485, RS-422)
OPT L: V.23 2/4 wire for leased line and packet data radio interface support
OPT R2:Spread Spectrum 900 MHz Australian version
OPT R3:Spread Spectrum 2.4 GHz International version, available on Port 3
OPT R4: Spread Spectrum 900 MHz US version
OPT T3: 10/100BaseT Ethernet (CP3 or MC31 only)

Communication

Modbus protocol interface (RS-232-C/RS-485, ASCII and binary and Modbus TCP)
DNP3 master and slave interface (RS-232-C/ RS-485, RS-422, TCP/IP, and UDP) with DNP3 Secure Authentication 2.0
For more information refer to the *SCD2200 R5.0 Release Notes* (B0780RE)
Five serial communication modules each with two ports either RS-232-C and/or RS-485 interface [Max 17 ports]
Asynchronous communication
Automatic dialing/answer in switched network mode
Master/slave RTUs dial
Transmission rate from 300 to 115 Kbps

I/O Modules

AI-10

8 Channel Analog Inputs
5 kV field to logic isolation
0 to 20 mA; 4 to 20 mA current signals
0 to 2 V dc; 0 to 5 V dc; 0 to10 V dc voltage signals [Software Select]
16-bit resolution
0.1% accuracy @ 25°C

AO-3

4 Channel Analog Outputs with Open Loop Detection
0 to 20 mA; 4 to 20 mA outputs
12-bit digital-to-analog converter resolution
0.2% accuracy @ 25°C
3 kV Isolation

DI-5

16 Channel Digital Inputs / 4 counters
One common per eight channels
1.5 kV isolation
Isolated Output to power inputs
16-bit Pulse Counting on Channels 1 - 4.
Frequency Counting:
Channels 1 and 2 - 10 KHz maximum
Channels 3 and 4 - 255 Hz maximum
Positive or Negative Polarity Inputs

I/O Modules (Continued)

DI-10

16 Channel Digital Inputs / Counters
Opt-isolated inputs for 24 V dc contacts, 3 kV Isolation
Opt-isolated pulse inputs for 24 V dc contacts
16-bit/counter resolution:
4 fast channels at 10 KHz resolution
12 medium speed channels at 1 KHz resolution
Also supports ac inputs (20 to 125 V ac) and dc inputs (+6 to 130 V dc)

DO-1

8 Channel Digital Outputs
SPDT/SPST relays contacts
5A @ 30 V dc output (maximum) for each contact
Check-before-operate, protocol dependent

FUNCTIONAL SPECIFICATIONS (CONTINUED)

I/O Modules (Continued)

DO-2

16 Channel Digital Outputs
SPDT/SPST relays contacts
5 A @ 30 V dc output (maximum) for each contact
Check-before-operate, protocol dependent

DO- 6

16 Channel Relay Driver
Open drain N-FET outputs
Rated load 70 mA per channel, 30 V dc maximum

IO-3

Multi - IO Module
AI: 4 x (0 to 20 mA; 4 to 20 mA; 0 to 5 V; 1 to 5 V) inputs
DI: 4 x (1 kV Isolated) inputs
AO: 1 x (0 to 20 mA; 4 to 20 mA) outputs
DO: 4 x SPST contacts outputs

Power Supply Modules

PS-12 AC INPUT POWER SUPPLY
90 to 260 V ac input, from 48 to 62 Hz, with battery charger providing 12 V dc floating connection
Also supports 96 to 340 V dc

PS-22 DC INPUT POWER SUPPLY
24 V dc input, positive/negative/floating grounded, with battery charger providing 12 V dc floating connection

ISOLATION TESTS PERFORMED
High voltage isolation
Common mode:
1,500 V - single pulse 1.2 µs/50 µs
Differential mode:
1,500 V - single pulse 1.2 µs/50 µs
Isolation resistance
> 100 MΩ

FUNCTIONAL SPECIFICATIONS (CONTINUED)

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 89/336/EEC
Meets: EN 50081-2 Emission standard
EN 50082-2 Immunity standard
EN 61326-1

CISPR 11, Industrial Scientific and Medical (ISM) Radio-frequency Equipment Electromagnetic Disturbance Characteristics - Limits and Methods of Measurement
Meets: Class A Limits

IEC 61000-4-2 ESD Immunity
Contact 4 kV, air 4 kV

IEC 61000-4-3 Radiated Field Immunity
3 V/m at 80 to 1000 MHz

IEC 61000-4-4 Electrical Fast Transient/Burst Immunity
1 kV on AC and DC power lines; 0.5kV on I/O and communication lines

IEC 61000-4-5 Surge Immunity
1kV on ac and dc power lines;1 kV on I/O and communication lines

IEC 61000-4-6 Immunity to Conducted Disturbances Induced by Radio frequency Fields
3 V (rms) at 150 KHz to 80 MHz on I/O, dc power and communication lines

IEC 61000-4-11 Voltage Dips, Short Interruptions and Voltage Variations Immunity
Compliant

PRODUCT SAFETY

MET Laboratories (MET) for U.S. and Canada
NRTL/MET-C listed as compliant with UL 60950-1/CSA C22.2 No. 60950-1, Second Edition: Safety of Information Technology Equipment, Rev. March 27 2007

MODULE ENVIRONMENTAL SPECIFICATIONS

Operating

TEMPERATURE
-20 to +70°C (-4 to +158°F)

RELATIVE HUMIDITY
5 to 95% (noncondensing) at 40°C (104°F)

ALTITUDE
0 to 2,000 m (0 to 6562 ft)

Storage

TEMPERATURE
-40 to +85°C (-40 to +185°F)

RELATIVE HUMIDITY
5 to 95% (noncondensing) at 40°C (104°F)

Vibration

5.0 m/s^2 (0.5 g) from 5 to 500 Hz

PHYSICAL SPECIFICATIONS

Modules

MOUNTING
Mount onto a modular backplane.

MASS
284 g (10 oz) approximate
454 g (16 oz) approximate (Power Supply only)

DIMENSIONS

HEIGHT
174 mm (6.9 in)

WIDTH
35 mm (1.4 in)

DEPTH
156 mm (6.1 in)

Backplanes

Backplanes are designed for surface mounting and include mounting brackets (2 pieces). The 12-slot backplane can also be mounted on wing rack brackets suitable for a 19-inch rack.

CONFIGURATIONS
Support 4, 6, or 12-slot configurations. Multiple backplanes linked with up to 64 modules. For mounting in a 19-inch rack, the 4-slot (dual) and 6-slot (single) modular backplane can be mounted using a 19-inch rack mounting adapter; the 12-slot uses a mounting bracket set.

DIMENSIONS

HEIGHT
176 mm (6.9 in)

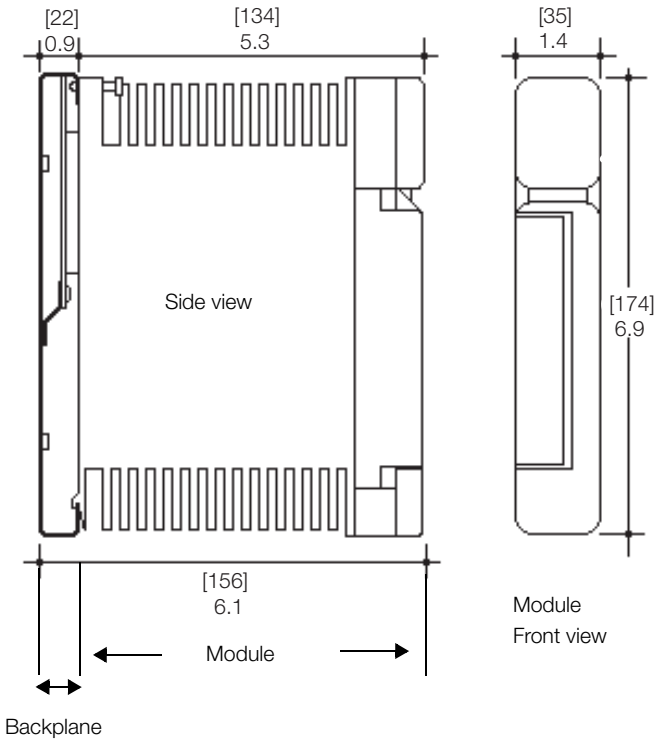
WIDTH
4-slot 194 mm (7.6 in)
6-slot 266 mm (10.5 in)
12-slot 482 mm (19.0 in)

DEPTH
22 mm (0.9 in)

DIMENSIONS - NOMINAL

[mm]
in

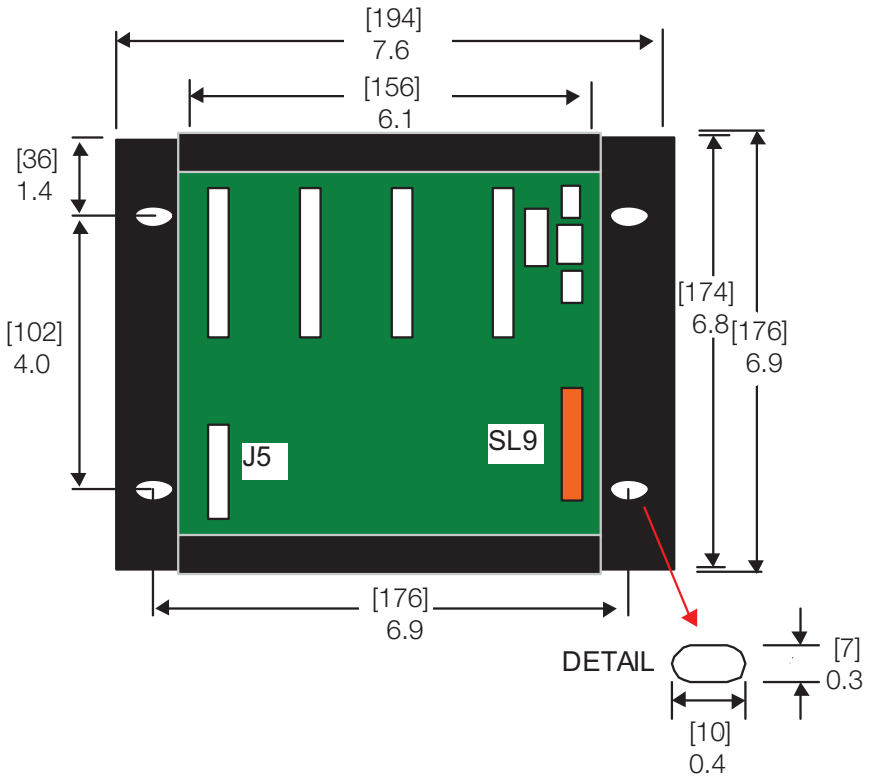
Module Mounted on Backplane



DIMENSIONS - NOMINAL (CONTINUED)

[mm]
in

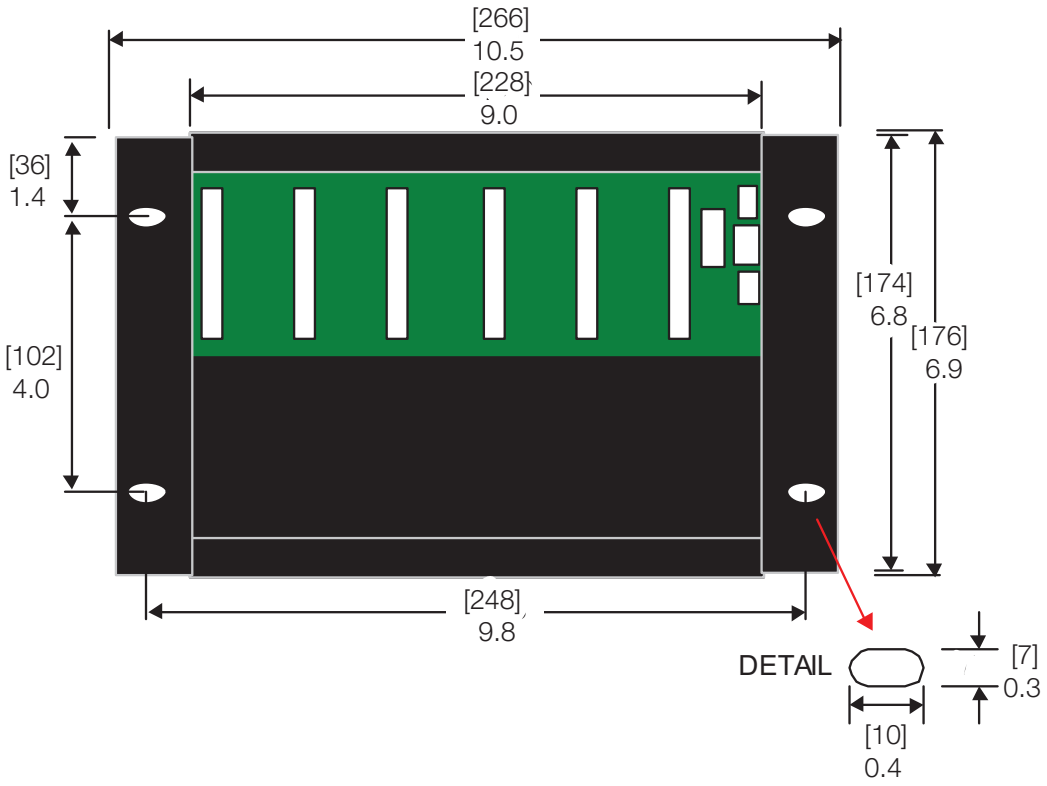
4-Slot Backplane



DIMENSIONS - NOMINAL (CONTINUED)

[mm]
in

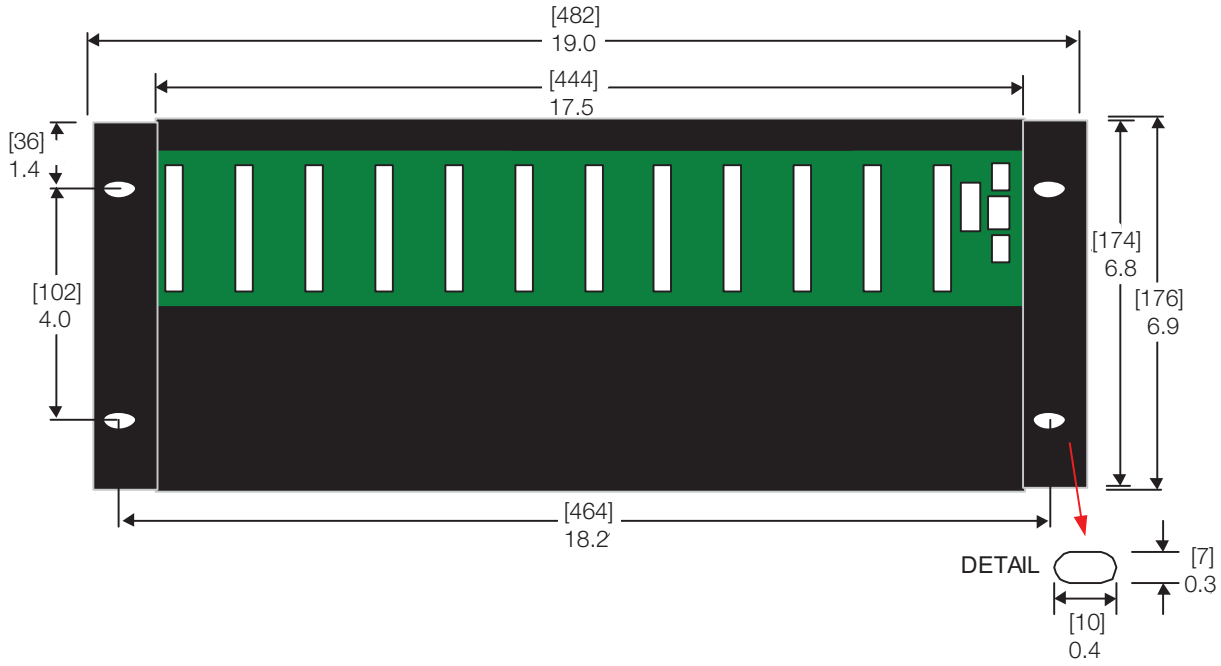
6-Slot Backplane



DIMENSIONS - NOMINAL (CONTINUED)

[mm]
in

12-Slot Backplane



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