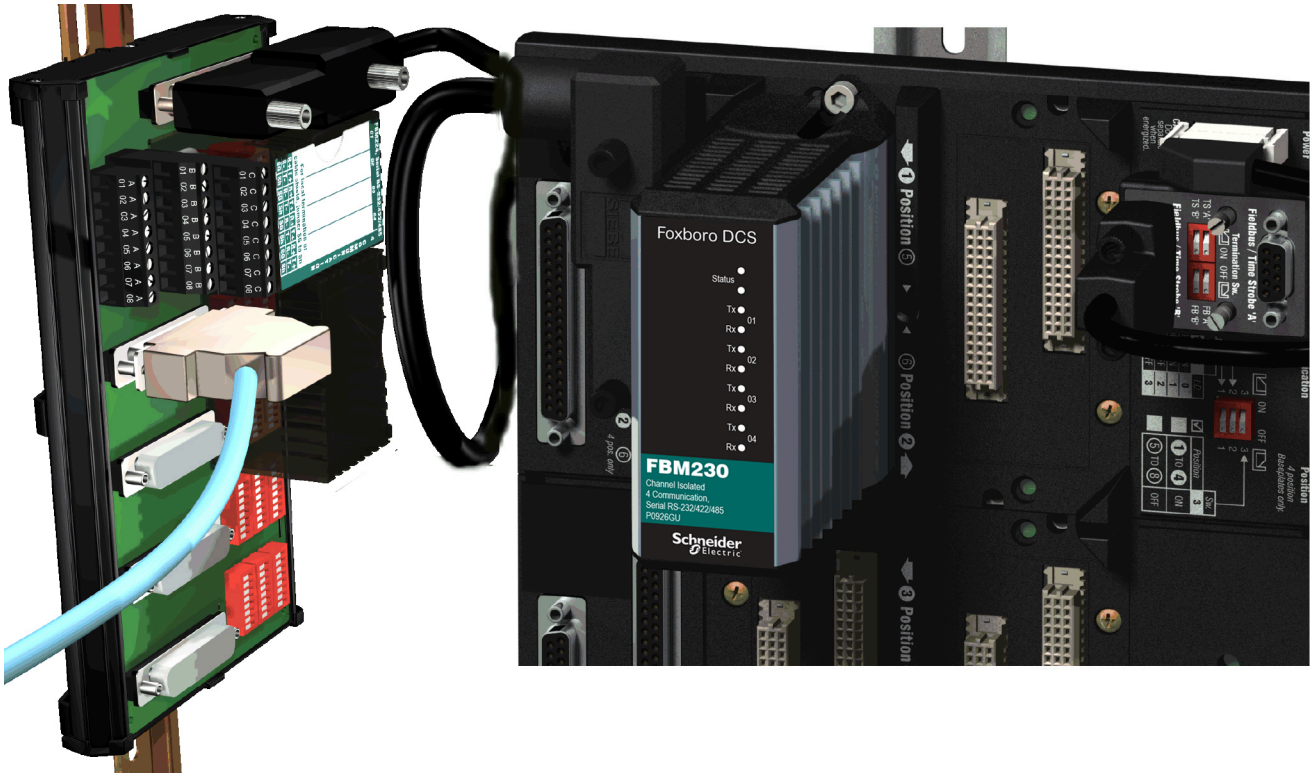
Foxboro™ DCS

FBM230 Field Device System Integrator Module, Four Serial Ports, Single

PSS 41H-2S230

Product Specification

May 2025



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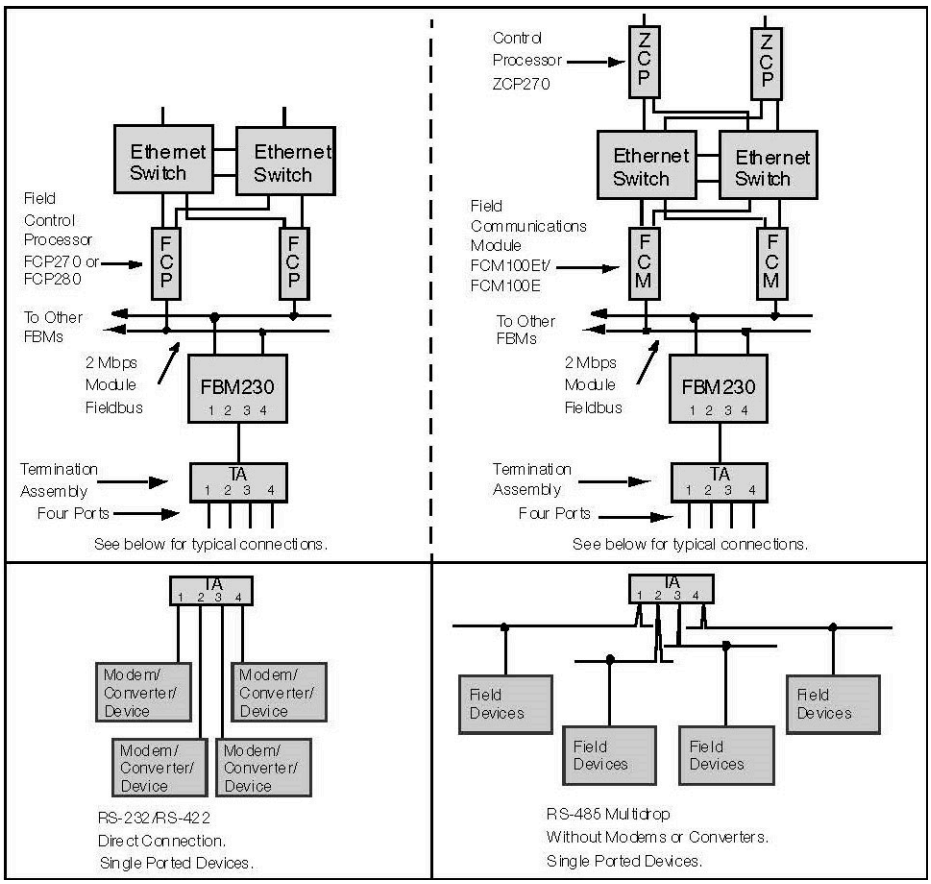
Overview

The FBM230 Field Device System Integrator (FDSI) module provides a serial interface between single-ported field I/O devices and the EcoStruxure™ Foxboro™ DCS system.

The FBM230 has four ports - each can be individually configured in software for RS-232, RS422 or RS-485. This provides a single FBM230 the flexibility to connect to multiple similar but not identical devices. Physical wiring is in accordance with Electronic Industrial Association (EIA) standard RS-232, RS422 or RS-485.

The FBM230 and its associated termination assembly (TA) accommodate several types of connections to single ported devices; direct connection to devices; connection to modems when used with the RS-232 communication interface, and multidrop connections to RS-485 devices. Intrinsic safety devices can be connected between the TA and the field device. The general network configurations are shown in Figure 1.

Figure 1. FBM230 in Typical Network Configurations



NOTE: Each FBM230 port (1 through 4) can be individually configured for RS-232, RS-422, or RS-485 communication standards.

Features

The key features of the FBM230 are:

- Four ports - each can be individually configured in software for RS-232, RS422 or RS-485
- Supports RS-232, RS-422 or RS-485 communication interface standards
- I/O software drivers downloadable from a library of available protocols
- Up to 2000 DCI block connections
- Communicates with up to 64 RS-485 or up to 4 direct connect RS-232 or RS-422 devices
- Integrates field device data into a Foxboro DCS control database
- Field mounted
- Class G3 (harsh) environments.

Serial Link Setup

Data communication between the FBM230 and field devices are through the 4-ported termination assembly (TA). Two different TAs, one with compression screw connections and the other with ring lug connections, have terminals for each port for RS-422 and RS-485 wiring, with DIP-switch-selectable bus termination resistors per port. For RS-232 wiring, the TA has four standard DB-25 male connectors and a break-out bank of 24 DIP switches for each port that can be used for any RS-232 wiring configuration (for example, to connect Clear-to-Send to Request-to-Send).

I/O Drivers

This FBM is a generic hardware module in which different software drivers can be loaded. These drivers configure the FBM to recognize a particular protocol used by the field device. Several of the software drivers are standard product offerings. Other custom drivers can be developed to meet specific needs. These drivers are dynamically downloaded to the FBM230 with software code specifically designed to interface with the third party device’s protocol.

The configuration procedures and the software requirements for each driver are unique to the device(s) being integrated into the system.

Configurator

The FDSI configurator sets up the FBM230 port via XML device configuration files. The port configurator allows for easy setup of the communication parameters for each port (such as, communication interface standard, baud rate, parity). The device configurator is not needed for all devices, but when needed it configures device specific and point specific considerations (such as, scan rate, address of the data to be transferred and the amount of data to be transferred in one transaction).

Operations

Each FBM230 can access up to 64 RS-485 or up to 4 direct connect RS-232 or RS-422 devices to read or write data.

From the Foxboro DCS control station to which the FBM230 is connected (refer to Figure 1, page 3), up to 2000 Distributed Control Interface (DCI) data connections can be made to read or write data. Supported data types are determined by the particular driver loaded on the FBM230, which converts the data to the DCI data types listed below:

- An analog input or output value (integer or IEEE single-precision floating point)
- A single digital input or output value
- Multiple (packed) digital input or output values (packed in groups of up to 32 digital points per connection).

Thus, an FBM230 can access up to 2000 analog I/O values, or up to 64000 digital I/O values, or a combination of digital and analog values spread over the four ports of the FBM230 up to the maximum capacity a user allows within the sizing guidelines of the control processor. The frequency of access to the FBM230 data by a control station can be as fast as 500 ms. The performance depends on each device type and the layout of data in the device.

The FBM230 collects the required data from the devices, performs the necessary conversions, and then stores the converted data in its database for incorporation into the Foxboro DCS plant management functions and operator displays. Data may also be written out to the individual devices from the Foxboro DCS system.

Control Block Support

The FBM230 offers control block support for the following standard Foxboro DCS system Distributed Control Interface (DCI) block types:

BIN	Binary Input
BINR	Binary Input Redundant
BOUT	Binary Output
IIN	Integer Input
IOUT	Integer Output
PAKIN	Packed Input
PAKOUT	Packed Output
PLSOUT	Pulse Output
RIN	Real Input
RINR	Real Input Redundant
ROUT	Real Output
STRIN	String Input
STROUT	String Output

The DCI blocks are configured just like other Foxboro DCS control blocks. The DCI blocks address and read/write data from/to the addressed field device.

Standard, Rugged Design

The FBM230 has a rugged extruded aluminum exterior for physical and electrical protection of the circuits. Enclosures, specially designed for mounting the FBMs, provide various levels of environmental protection, up to harsh environments per ISA Standard S71.04.

Modular Baseplate Mounting

The module mounts on a Modular Baseplate, which accommodates up to four or eight FBMs. The Modular Baseplate is either DIN rail mounted or rack mounted. The Modular Baseplate includes signal connectors for the FBMs, provides connections for redundant independent DC power supplies, I/O cable connections, and 2Mbps Module Fieldbus connections.

Easy Removal/Replacement

The FBM230 module can be removed or replaced without removing field device termination cabling, power, or communications cabling.

Fieldbus Communication

The Fieldbus Communication Module (FCM100Et or FCM100E) or the Field Control Processor (FCP280 or FCP270) interface the redundant 2 Mbps module Fieldbus used by the FBMs. The FBM230 accepts communication from either path of the redundant 2 Mbps Module Fieldbus - should one path fail or be switched at the system level, the module continues communication over the active path.

Visual Indicators

Light-emitting diodes (LEDs) incorporated into the front of the module provide visual indication of the module's operational status, and the communication activity (transmit or receive) of each of the four communication ports.

Termination Assembly

The FBM230 termination assembly (TA) is part of the Foxboro DCS system Standard 200 Series subsystem field wiring termination family.

Each FBM230 termination assembly and its associated termination cable provide connection compliance to the electrical interface standards (RS-232, RS-422 or RS-485) between the field devices and the FBM230.

The TA has four DB-25 cable connectors for RS-232 communication interface and switches to match the RS-232 signal pinout of the DB-25 connectors to various field devices.

The TA has a three-tier compression type or ring lug connections for RS-422 and RS-485 communication interfaces. Switch-selectable termination resistors are built into

the TA for active termination when used with RS-422 and RS-485 communication interfaces.

Key features of the TA include:

- Combination foot that supports 32 or 35 mm DIN rail mounting
- Three-tier termination for RS-422 and RS-485 and four DB-25 cable connectors for RS-232 communication interfaces
- Switches to select transmit and receive signals and other RS-232 communication signals
- Switch-selectable termination resistors for RS422 and RS-485 communication
- Polyamide construction.

Functional Specifications

<table>
<tr>
<td>Device Communications</td>
<td>
Interface

Four serial I/O communication ports provide interface to up to four direct connect RS-232, RS-422 devices or up to 64 devices via four RS-485 buses (Up to 16 devices per port). Each port is a single logical port to single ported devices.

Bus Characteristics

General
Electronic Industrial Association (EIA) RS-232, RS-422 or RS485 communications selectable on a per port basis. The RS-485 physical communication medium consists of twisted-pair shielded copper cable containing a single conductor pair. The RS-422 is a 4–wire physical communication medium. The RS-232 physical communication medium is a DB-25 cable to a customer supplied device/modem/converter.
EIA RS-232, RS-422 and RS-485 I/O Communication

Asynchronous communication, direct connect link (RS-232)
Transmission Rate: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 baud.
Protocol: 8-bit characters; odd, even or no parity, 1 or 2 stop bits.

NOTE: For driver specific limitations on I/O Capacity and Data Types Transferred, refer to the corresponding driver PSS or User’s Guide.

I/O Capacity

Up to 64 devices per FBM230 maximum (number of actual devices is performance dependent) with up to 2000 DCI connections.

Data Types Transferred

2-byte or 4-byte signed or unsigned integers, 4byte IEEE single- precision floating values, or binary values. Automatic conversion for other types as implemented by the downloadable driver.

Fastest Allowed ECB Block Period

500 msec

Channel Isolation

Each communication channel is galvanically isolated and referenced to earth (ground). The module can withstand, without damage, a potential of 600 VAC applied for one minute between either channel and earth.

⚠⚠DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
Although the module can withstand a maximum of 600 VAC applied for one minute between any channel, DO NOT apply voltages beyond the published input ranges. The channels are NOT intended for permanent connection to hazardous voltage circuits. Understand that connection of these channels to voltages greater than 30 VAC or 60 VDC violates electrical safety code requirements and may expose users to electric shock.
Failure to follow these instructions will result in death or serious injury.
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<tr>
<td>Module Fieldbus Communication</td>
<td>Communicates with its associated FCM100Et, FCM100E, FCP270, or FCP280 via the redundant 2 Mbps module Fieldbus.</td>
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</table>

FBM230 Power Requirements	• Input Voltage Range (Redundant) 24 V DC +5%, -10% • Consumption 7 W (maximum) • Heat Dissipation 7 W (maximum)
Regulatory Compliance, Electromagnetic Compatibility (EMC)	European EMC Directive 2014/30/EU Meets: EN61326-1:2013 Class A Emissions and Industrial Immunity Levels
Regulatory Compliance, Product Safety	• *Underwriters Laboratories (UL) for U.S. and Canada* UL/UL-C listed as suitable for use in UL/UL-C listed Class I, Groups A-D; Division 2; temperature code T4 enclosure based systems when connected to specified Foxboro DCS processor modules as described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). Communications circuits also meet the requirements for Class 2 as defined in Article 725 of the National Electrical Code (NFPA No.70) and Section 16 of the Canadian Electrical Code (CSA C22.1). Conditions for use are as specified in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). • *European Low Voltage Directive 2014/35/EU and Explosive Atmospheres (ATEX) Directive 2014/34/EU* DEMKO certified as Ex nA IIC T4 for use in certified Zone 2 enclosure when connected to specified processor modules as described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA).
IECEx Certification	IECEx Certified
Calibration Requirements	Calibration of the module or termination assembly is not required.

Environmental Specifications

	Operating	Storage
Temperature	Rev A to L: -20 to +70°C (-4 to +158°F) Rev M and later: 0 to +70°C (32 to +158°F)	-40 to +70°C (-40 to +158°F)
Relative Humidity	5 to 95% (noncondensing)	5 to 95% (noncondensing)
Contamination	Suitable for use in Class G3 (Harsh) environments as defined in ISA Standard S71.04, based on exposure testing according to EIA Standard 364-65, Class III.	

Physical Specifications

Mounting	The FBM230 mounts on a Modular Baseplate. The Modular Baseplate can be mounted horizontally or vertically on a DIN rail, or mounted horizontally in a 19-inch rack using a mounting kit. Refer to PSS 31H-2SBASPLT for details. The TA has a combination foot that supports 32 or 35 mm DIN rail mounting.
Part Numbers	• Module: P0926GU • TA Ring Lug: P0926PA • TA Compression Screw: RH926GH (supersedes P0926GH)
Dimensions (Module)	• Height: 102 mm (4 in) 114 mm (4.5 in) including mounting lugs • Width: 45 mm (1.75 in) • Depth: 104 mm (4.11 in)
Dimensions (TA)	See Dimensions — Nominal, page 13.
Mass	• Module: 284 g (10 oz) approximate • Termination Assembly ◦ Ring Lug (P0926PA): 363 g (0.8 lb) approximate ◦ Compression Screw (RH926GH (supersedes P0926GH)): 272 g (0.6 lb) approximate
Cables	• FBM230 to TA Lengths 1 m (3.2 ft) to 5 m (16.4 ft) • Termination Cable Type Type 5 - seeTermination Cable Types and Part Numbers, page 12. • TA RS-232 Connection (DB-25 Cable) to Modem/Converter/Device Up to 15 m (50 ft) for custom cables per EIA Standard RS232. • RS-422 and RS-485 Up to 1200 m (3937 ft)

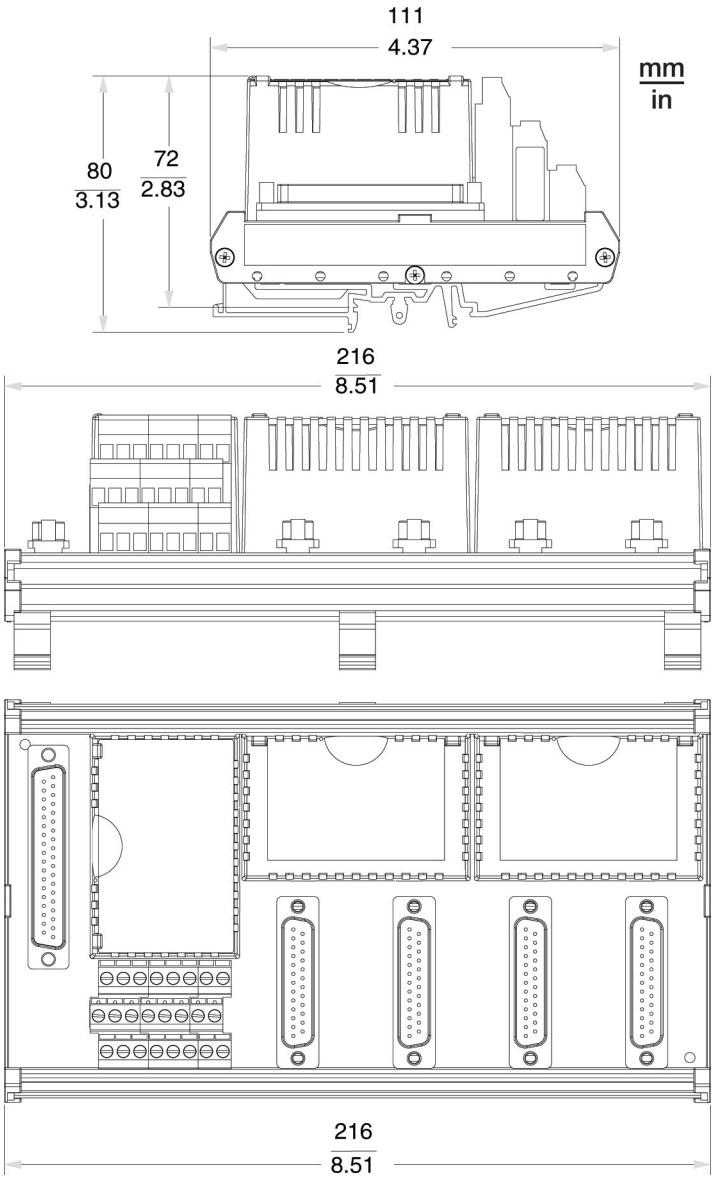
Termination Cable Types and Part Numbers

Length m (ft)	Type 5 LSZH[a]
1.0 (3.2)	RH928AW (supersedes P0928AW)
2.0 (6.6)	RH928AX (supersedes P0928AX)
3.0 (9.8)	RH928AY (supersedes P0928AY)
5.0 (16.4)	RH928AZ (supersedes P0928AZ)

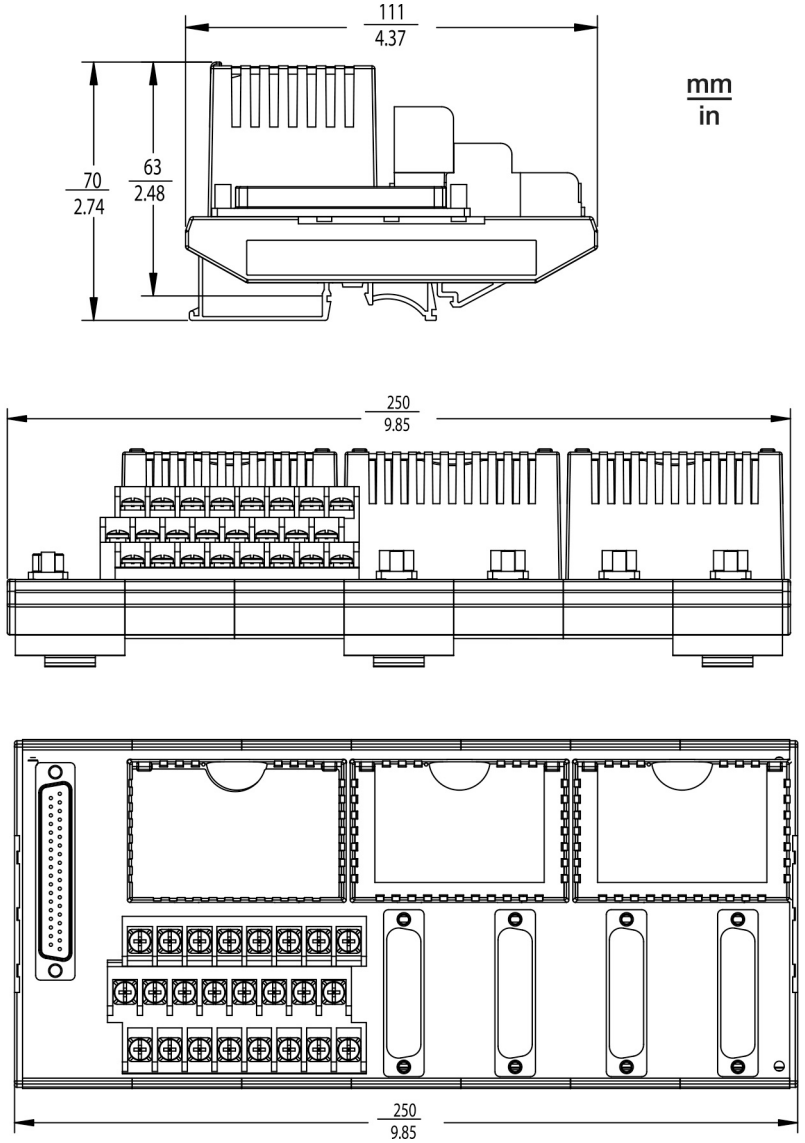
[a] Low smoke zero halogen or low smoke free of halogen (LSZH) is a material classification used for cable jacketing. LSZH is composed of thermoplastic or thermoset compounds that emit limited smoke and no halogen when exposed to high sources of heat. Temperature range: -40 to +105°C (-40 to +221°F)

Dimensions - Nominal

Compression Screw Termination Assembly (RH926GH (supersedes P0926GH))



Ring Lug Termination Assembly (P0926PA)



Related Product Specification Sheets

PSS Number	Description
PSS 31H-2SOV	Standard 200 Series Subsystem Overview
PSS 31H-2CERTS	Standard and Compact 200 Series I/O - Agency Certifications

Proposition 65

WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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PSS 41H-2S230, Rev B