Foxboro Evo™ Process Automation System

Product Specifications

Foxboro by Schneider Electric

PSS 31H-2S248

FBM248, Current/Voltage Analog/Digital/Pulse I/O Configurable Module (Redundant)

In many plant situations, the signal types associated with an installation are not well known until late in the project. The FBM248 provides the capability to accept a range of standard analog, discrete, and pulse inputs that are user selectable and changeable at the discretion of the engineer over redundant channels. The HART® input signals are electrically compatible with the standard 4 to 20 mA inputs.

OVERVIEW

The FBM248, Channel-Isolated Current/Voltage Analog/Digital/Pulse I/O Module (Redundant) contains eight redundant channels which can be individually configured for a range of analog, digital and pulse field I/O signals.

A redundant pair of the modules combine to provide redundancy at the Fieldbus Module (FBM) level, with field I/O wired to one common termination assembly via a Redundant Adapter (RH100JD). In most configurations, each module independently attempts to hold the output(s) at its specified output value(s), and each independently reports its observed value of the inputs.

The FBM248 pair validate each input and output.

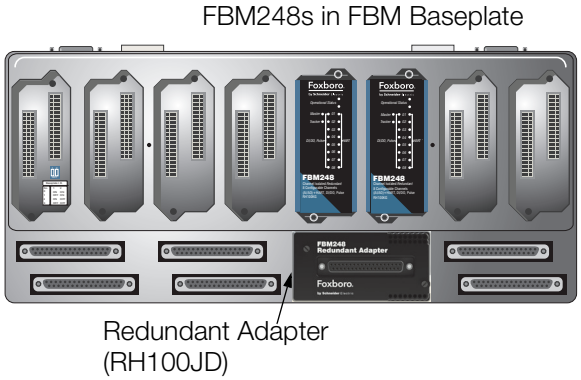


Figure 1. Redundant FBM248s Attached to a Redundant Adapter

Each I/O channel is galvanically isolated from other channels and ground.

Two types of passive termination assemblies are available for the redundant FBM248:

- DIN rail mounted TA (RH924WW), similar to those used with the other 200 Series FBMs
- Baseplate-mounted TA (RH100KR), which provides field I/O wiring support for redundant FBM248s in paired slots (that is, in positions 1 and 2, 3 and 4, 5 and 6, or 7 and 8), as shown in Figure 2. This TA mounts directly onto the field I/O connectors on the 200 Series baseplate.

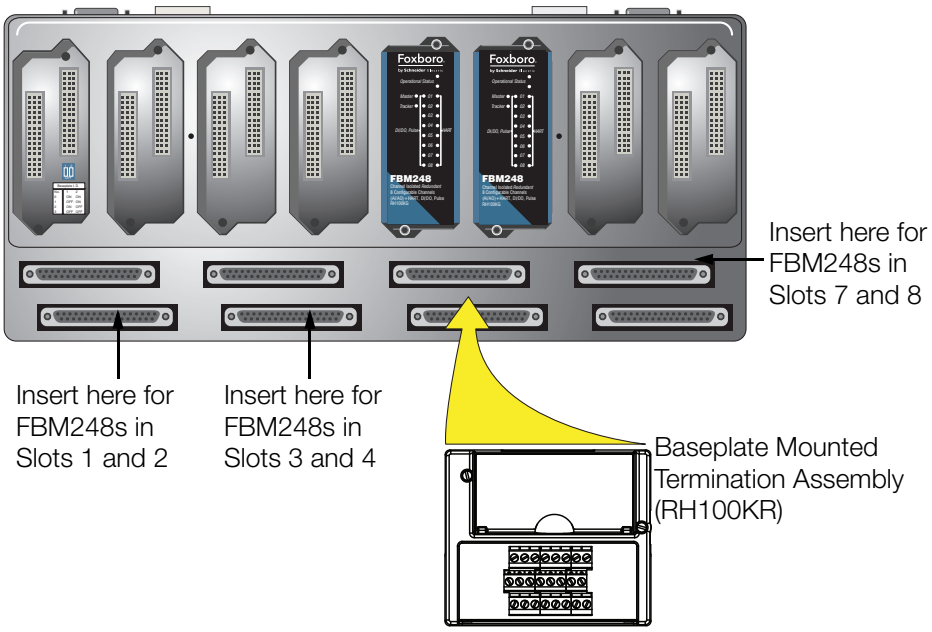


Figure 2. Baseplate-Mounted Termination Assembly (RH100KR) for FBM248 Pair

- Baseplate-mounted TA (RH101KA), which provides field I/O wiring support for redundant FBM248s in paired slots (that is, in positions 1 and 2, 3 and 4, 5 and 6, or 7 and 8), as shown in Figure 3. This TA mounts directly onto the redundant adapter (RH100JD) which must be installed directly onto the field I/O connectors on the 200 Series baseplate.

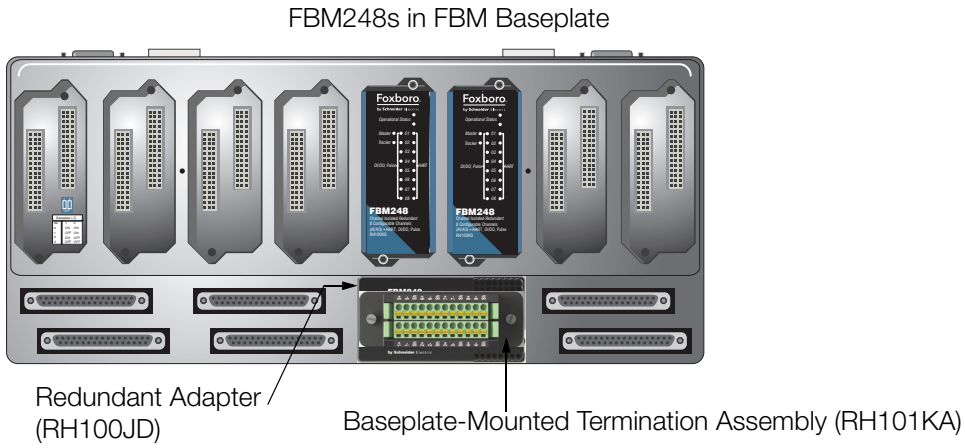


Figure 3. Baseplate-Mounted Termination Assembly (RH101KA) for FBM248 Pair (RH101KA)

The FBM248 can serve as a HART communications field device host, enabling the Foxboro Evo™ system to request and receive two digital messages per second from the field device. The message pass-through capability can be used to support HART universal, common practice, and device-specific commands, but not the burst communication mode. These commands are implemented using the PACTware (Process Automation Configuration Tool - refer to PSS 2A-1Z3 G for details).

The FBM248 must be used with Foxboro Evo Control Core Services software, v9.3 or later.

When used with the baseplate-mounted TAs, there is no need for a separate termination or marshalling enclosure. When installed in G-Series or equivalent system enclosures with baseplate-mounted TAs, the redundant FBM248s enable the system enclosure to support up to 96 FBMs and their associated Field Control Processor 280s (FCP280s) from a single enclosure's footprint. Refer to *G-Series Enclosures Overview* (PSS 31H-2GOV) or equivalent PSS for a complete list of modules supported in the system enclosures.

The FBM248 is electrically compatible with standard HART signals.

FEATURES

Key features of the FBM248 are:

- Eight redundant individual isolated channels to support:
  - HART Analog Input (AI)/Analog Output (AO) 4-20 mA
  - 0-20 mA AI/AO, non-HART
  - 0-10 V and 0-5 V AI, non-HART
  - Digital dry contact sense 24 V dc
  - Discrete voltage monitor, configurable 0 and 1 thresholds 0-10 V
  - NAMUR sensor discrete input - Signal level according to DIN EN 50227 (NAMUR): - "On" at 2.1 mA dc with short circuit detection at > 6 mA - "Off" at 1.2 mA dc with open detection at <0.25 mA
  - NAMUR dry contact sense 7.5 V dc, nominal/typical
  - Pulse count, frequency, acceleration and jerk, contact sense or voltage input
  - Discrete Output 24 V, 20 mA current or solid state switch output.
- Redundant modules increase reliability
- Rugged design suitable for enclosures in Class G3 (harsh) environments
- Executes programs for Discrete Input, Pulse Count, Sequence of Events and Transient Data Recording with support for Sustained and Momentary Digital Outputs
- Enables higher utilization of I/O points in each enclosure - fewer points on each FBM are likely to be left unused due to the versatility of the FBM248's I/O points
- Passive Termination Assemblies (TAs) - DIN rail mounted or 200 Series baseplate mounted - for locally or remotely connecting field wiring to the FBM248
- Optional baseplate-mounted Termination Assemblies (TAs) attach directly to a 200 Series baseplate, eliminating the need for mounting a separate TA on a DIN rail for the redundant FBM248s, and requiring space for the TA's cable in an enclosure
- Enables sites to reduce the number of separate types of 200 Series FBMs maintained as spares, by replacing them with a single type of 200 Series FBM - the FBM248, which supports a wide range of analog, digital and pulse field I/O applications.

HIGH ACCURACY

For high input accuracy, the module incorporates a 16-bit Sigma-Delta converter which can provide new analog input values for each channel every 100 milliseconds. For outputs, a 13-bit D/A is used.

HIGH RELIABILITY

The redundancy of the module pair, coupled with the high coverage of faults, provides a very high subsystem availability time.

STANDARD DESIGN

FBM248 has a rugged extruded aluminum exterior for physical protection of the circuits.

Enclosures specially designed for mounting the FBMs provide various levels of environmental protection, up to harsh environments (Class G3), per ISA Standard S71.04.

VISUAL INDICATORS

Light-emitting diodes (LEDs) incorporated into the front of the modules provide visual indication of the module operational status, and communication activity of the input/output channels.

Their functionality varies depending on the type of I/O signal used on each channel:

- Red and green LEDs provide indication of the FBM operational status.
- Yellow LEDs indicate HART communication activity for each channel.
- Yellow LEDs are provided to indicate the On or Off state of the discrete input or output channels, and to indicate the Master/Tracker status of each FBM248 in the pair.

EASY REMOVAL/REPLACEMENT

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

SEQUENCE OF EVENTS

The Sequence of Events (SOE) software package (for use with I/A Series software v8.x and Control Core Services software v9.0 or later) is used for acquisition, storage, display, and reporting of events associated with discrete input points in a control system. SOE, using the optional GPS based time synchronization capability, supports data acquisition across control processors at intervals of up to one millisecond, depending on the signal source.

Refer to *Sequence of Events* (PSS 31S-2SOE) to learn more about this package, and to *Time Synchronization Equipment* (PSS 31H-4C2), for a description of the optional time synchronization capability.

FIELDBUS COMMUNICATION

A Control Processor interfaces to the redundant 2 Mbps module Fieldbus used by the FBMs. The redundant FBM248s accept communication from either path (A or B) of the 2 Mbps Fieldbus — should one path fail or be switched at the system level, the module continues communication over the active path.

MODULAR BASEPLATE MOUNTING

The module mounts on a Modular baseplate, which accommodates up to eight 200 Series Fieldbus Modules. The Modular baseplate is either DIN rail mounted or rack mounted, and includes signal connectors for a redundant 2 Mbps HDLC module Fieldbus, redundant independent dc power, and termination cables or baseplate-mounted TAs.

Redundant modules must be located in adjacent positions on the baseplate (positions 1 and 2, 3 and 4, 5 and 6, or 7 and 8). To achieve the redundancy, a redundant adapter module is placed on the two adjacent baseplate termination cable connectors to provide a single termination cable connection (see Figure 1). A single termination cable connects from the redundant adapter to the associated termination assembly (TA).

To system configurator applications and monitoring through SMON and System Manager, the redundant pair are displayed as a single module. The functional redundancy is provided by the FBM248 pair, not the control blocks.

TERMINATION ASSEMBLIES

Field I/O signals connect to the FBM subsystem via:

- DIN rail mounted TA, or
- Baseplate-mounted TA.

The TAs used with the FBM248 are described in “TERMINATION ASSEMBLIES AND CABLES” on page 10.

FUNCTIONAL SPECIFICATIONS

Supported Hart Instrument Types

HART instruments compliant to Version 5, 6, or 7 of the HART specifications may be used.

Input/Output Channels

Eight I/O channels, each individually configurable as:

- HART 4-20 mA analog input or analog output
- (non-HART) 0-20 mA analog input or analog output
- (non-HART) 0-10 V and 0-5V analog input
- Digital dry contact sense 24 V dc
- NAMUR(1) sensor discrete input -
  Signal level according to DIN EN 50227 (NAMUR)
  - "On" at 2.1 mA dc with short circuit detection at > 6 mA
  - "Off" at 1.2 mA dc with open detection at <0.25 mA
  Digital voltage input, configurable 0 and 1 thresholds 0-10 V
- Pulse count, frequency, acceleration or jerk, contact sense or voltage input
- Digital output 24 V, 20 mA current or switch

Discrete inputs have configurable current or voltage thresholds when not in SOE mode.
Channel types are independently configurable without taking the module or other channels off-line.
Each channel is isolated and independent.

NOTE

Redundant pairs (input or output) are connected together by a common field I/O connector and therefore are not isolated from each other.

Input/Output Channels Specifications

INPUT RANGES

Voltage
-0.25 to 10 V dc or -0.12 to 5 V dc
(0.0 V = 1600 raw counts)
Current
0 to 20 mA dc
Pulse Count
0 to 65535 with rollover to zero
Frequency
10 Hz to 25000 Hz.

INPUT OVER-RANGE CAPABILITY

Voltage
10.2 V dc or 5.1 V dc (65,248 counts), 30 V without damage
Current
20.4 mA dc (65,280 counts), 36 mA without damage

DIGITAL SOE OR PULSE ON LEVEL

Voltage
6 V dc min, 30 V dc max.
Current
2.1 mA dc min, 10 mA dc max. NAMUR compatible

DIGITAL SOE OR PULSE OFF LEVEL

Voltage
0 V dc min, 1.8 V dc max.
Current
0 mA dc min, 1.2 mA dc max. NAMUR compatible

MINIMUM PULSE ON TIME
16 microseconds

MINIMUM PULSE OFF TIME
16 microseconds

MINIMUM PULSE PERIOD
40 microseconds

(1) For intrinsically safe installations, an external barrier is required.

FUNCTIONAL SPECIFICATIONS (CONTINUED)

Input/Output Channels Specifications (Cont.)

INPUT ACCURACY

Analog Input
0.075% of span
Temperature Coefficient
50 PPM/Deg C
Pulse Rate
0.05% of reading

ANALOG INPUT RESOLUTION
16 bits

PULSE COUNT RESOLUTION

Pulse Count
16 bits (integer)
Frequency
32 bits (integer)

INPUT UPDATE RATE

Analog
25 milliseconds, 10 milliseconds in TDR mode
Pulse count and frequency
10 or 25 milliseconds depending upon integration time setting
Digital SOE update rate
1 millisecond

ANALOG AND PULSE INPUT INTEGRATION TIME
100, 200, 500, and 1000 milliseconds, software configurable on a per FBM basis

FASTEST ALLOWED ECB BLOCK PERIOD
100 msec

INPUT SIGNAL A/D CONVERSION
Each channel performs A/D signal conversion using an independent Sigma-Delta converter

INPUT CHANNEL IMPEDANCE

Voltage Input
300K Ohm nominal
Current Input
With External Loop Supply
300 Ohm nominal
With Internal Loop Supply
250 Ohm nominal

INPUT CURRENT LIMIT
32 mA nominal

MAXIMUM OUTPUT CURRENT
20.4 mA

MAXIMUM OUTPUT LOAD IN OUTPUT MODE WHEN FBM PROVIDES POWER
750 Ohms when using FBM power

ANALOG OUTPUT ACCURACY
0.075% of span (0.1 to 20 mA)
Temperature Coefficient
50 PPM/Deg C

ANALOG OUTPUT RESOLUTION
13 bits

ANALOG OUTPUT NON-LINEARITY
Non-linearity is included in the accuracy specification.

ANALOG OUTPUT PROCESSING DELAY
30 milliseconds maximum

FIELD DEVICE CABLING DISTANCE
For current I/O Channels, maximum distance of the field device from the FBM is a function of compliance voltage (19 V dc @ 20.4 mA input), wire gauge, and voltage required at the field device.

LOOP POWER SUPPLY PROTECTION
Loop power is channel-to-channel galvanically isolated and current limited.

HART® PROTOCOL COMPATIBILITY
The channels meet the impedance requirements for a HART high Impedance Device and can be used in a HART loop without interfering with the HART signals between the field device and a Hand-Held Communicator (HHC).

Input/Output Channel Isolation

Each channel is galvanically isolated from all other channels and earth (ground). The module withstands, without damage, a potential of 600 V ac applied for one minute between any channel and ground, or between a given channel and any other channel. See CAUTION below.

FUNCTIONAL SPECIFICATIONS (CONTINUED)

CAUTION

This does not imply that these channels are intended for permanent connection to voltages of these levels. Exceeding the limits for input voltages, as stated elsewhere in this specification, violates electrical safety codes and may expose users to electric shock.

Communication

Communicates with its associated FCP280 via the redundant 2 Mbps module Fieldbus.

Power Requirements

INPUT VOLTAGE RANGE (SINGLE OR REDUNDANT)

24 V dc +5%, -10%

CONSUMPTION (MAXIMUM)

10 W total for module in Single mode
14 W total for redundant pair

HEAT DISSIPATION (MAXIMUM)

8.2 W total for module in Single mode
14.1 W total for redundant pair

Calibration Requirements

Calibration of the module and termination assembly is not required.

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 2014/30/EU
Meets EN61326:2013 Class A Emissions and Industrial Immunity Levels

ROHS COMPLIANCE

Complies with European RoHS Directive 2011/65/EU.

Regulatory Compliance (Continued)

PRODUCT SAFETY

Underwriters Laboratories (UL) for U.S. and Canada
Module can be used in UL/UL-C listed Division 2 enclosure based systems. The Fieldbus modules are UL listed as Class I, Division 2, Groups A-D and G; Division 2 hazardous locations when connected to field devices and wiring meeting entity parameter constraints specified in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). I/O circuits also meet the requirements for Class 2 as defined in Article 725 of the National Electrical Code (NFPA) and Section 16 of the Canadian Electrical Code (CSA C22.1). Class 2 compliance applies only when field circuits are module powered. Note: The UL/UL-C listing requires that the 24 V dc power source for the module is from an Foxboro® power supply that is UL/UL-C recognized (to UL 60950) as having a Safety Extra Low Voltage (SELV) output.

European Low Voltage Directive 2014/35/EU and Explosive Atmospheres (ATEX) directive 2014/34/EU
Module can be used in certified Zone 2 enclosure based systems. The modules (Without Safety Barriers) are DEMKO certified as "Ex nA IIC T4 Gc", for use in Zone 2, Group IIC, potentially explosive atmospheres when connected to field devices and wiring meeting entity parameter constraints described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA).

Calibration Requirements

Calibration of the module and termination assembly is not required.

ENVIRONMENTAL SPECIFICATIONS

Operating Conditions

TEMPERATURE

Module

-20 to +70°C (-4 to +158°F)

Termination Assembly

Polyamide (PA)

-20 to +70°C (-4 to +158°F)

Polycarbonate/Acrylonitrile Butadiene Styrene (PC/ABS)

-20 to +70°C (-4 to +158°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing

ALTITUDE

-300 to +3000 m (-1000 to +10 000 ft)

Storage Conditions

TEMPERATURE

-40 to +85°C (-40 to +185°F)

RELATIVE HUMIDITY

5 to 95% (noncondensing)

ALTITUDE

-300 to +12 000 m (-1000 to +40 000 ft)

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.

Vibration

7.5 m/s^2 (5 to 500 Hz)

PHYSICAL SPECIFICATIONS

Mounting

MODULE

FBM248 mounts on a 200 Series baseplate. The baseplate can be mounted on a DIN rail (horizontally or vertically), or horizontally on a 19-inch rack using a mounting kit. Redundant modules must be located in adjacent positions on the baseplate (positions 1 and 2, 3 and 4, 5 and 6, or 7 and 8).Refer to *Standard 200 Series Baseplates* (PSS 31H-2SBASPLT) for details.

TERMINATION ASSEMBLY

The DIN rail mounted TA (RH924WW) mounts on a DIN rail and accommodates multiple DIN rail styles including 32 mm (1.26 in) and 35 mm (1.38 in). The baseplate-mounted TA (RH100KR) mounts on the two field I/O connectors associated with its two FBM248s on a 200 Series baseplate.

Weight

MODULE

373 g (12 oz) approximate

TERMINATION ASSEMBLIES

DIN Rail Mounted TA

170 g (0.37 lb, approximate)

Baseplate Mounted TA

245 g (0.57 lb, approximate)

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 - Termination Assemblies

Refer to page 13.

Part Numbers

FBM248 MODULE

RH100KG

TERMINATION ASSEMBLIES

See “FUNCTIONAL SPECIFICATIONS – TERMINATION ASSEMBLIES” on page 11.

REDUNDANT ADAPTER

RH100JD

BASEPLATE-MOUNTED TA

RH100KR

PHYSICAL SPECIFICATIONS (CONTINUED)

Termination Cables

CABLE LENGTHS
Up to 30 m (98 ft)

CABLE MATERIALS
Polyurethane or Low Smoke Zero Halogen (LSZH)

TERMINATION CABLE TYPE
Type 1 – See Table 2 on page 12.

CABLE CONNECTION – TA TO BASEPLATE

FBM Baseplate End
37-pin D-subminiature
Termination Assembly End
25-pin D-subminiature

Field Termination Connections

DIN RAIL TA COMPRESSION-TYPE ACCEPTED WIRING SIZES

Solid/Stranded/AWG
0.2 to 4 mm^2/0.2 to 2.5 mm^2/24 to 12 AWG
Stranded with Ferrules
0.2 to 2.5 mm^2 with or without plastic collar

BASEPLATE MOUNTED TA COMPRESSION - ACCEPTED WIRING SIZES

Solid/Stranded/AWG
0.2 to 1.5 mm^2/0.2 to 1.5 mm^2/24 to 16 AWG
Stranded with Ferrules
0.25 to 0.75 mm^2 with plastic collar
0.25 to 1.5mm^2 without plastic collar

TERMINATION ASSEMBLIES AND CABLES

Field I/O signals connect to the FBM subsystem via DIN rail mounted or baseplate mounted termination assemblies (TAs).

For redundant FBM248 configurations, a redundant adapter (RH100JD) is required for connection between the FBM baseplate and the termination cable.

The DIN rail mounted TAs for the FBM248 are available in Polyamide (PA) material with compression screw terminations.

The baseplate mounted TA (RH100KR) for redundant FBM248s is available in Polycarbonate/Acrylonitrile Butadiene Styrene (PC/ABS) material with compression screw terminations.

See the following “FUNCTIONAL SPECIFICATIONS – TERMINATION ASSEMBLIES” for the TAs used with the FBM248.

The FBM248 provides sufficient loop resistance to allow use of the HART Hand-Held Terminal, or *PC20 Intelligent Field Device Configurator* (PSS 2A-1Z3 E).

A removable termination cable connects the DIN rail mounted TA to the FBM via a field connector on the baseplate in which the FBM is installed. Termination cables are available in the following materials:

- Polyurethane
- Low Smoke Zero Halogen (LSZH).

Termination cables are available in a variety of lengths, up to 30 meters (98 feet), allowing the Termination Assembly to be mounted in either the enclosure or in an adjacent enclosure. See Table 2 for a list of termination cables used with the DIN rail mounted TAs for the FBM248.

FUNCTIONAL SPECIFICATIONS – TERMINATION ASSEMBLIES

FBM Type	Input/Output Signal	TA Part Number		Termination	TA Cable	TA Certification
		PA[a]	PC/ABS[b]	Type[c]	Type[d]	Type[e]
FBM248	8 configurable I/O channels, voltage or current, analog or digital. Analog 4 to 20 mA I/O may also have the HART signal superimposed.	RH924WW		C	1	1, 2
FBM248	8 configurable I/O channels, voltage or current, analog or digital. Analog 4 to 20 mA I/O may also have the HART signal superimposed.		RH100KR	C (Baseplate-mounted)	n/a	1, 2

(a) PA is Polyamide rated from -20 to +70°C (-4 to +158°F).
(b) PC/ABS is Polycarbonate/Acrylonitrile Butadiene Styrene (PC/ABS) rated from-20 to +70°C (-4 to +158°F).
(c) C = TA with compression terminals.
(d) See Table 2 for cable part numbers and specifications.
(e) See Table 1 for Termination Assembly certification definitions.

Table 1. Certification for Termination Assemblies

Type	Certification[a]
Type 1	TAs are UL/UL-C listed as suitable for use in Class I; Groups A-D; Division 2 temperature code T4 hazardous locations. They are DEMKO certified Ex nA IIC T4 Gc for use in Zone 2 potentially explosive atmospheres.
Type 2	TAs are UL/UL-C listed for supplying field circuits Class I; Groups A-D; Division 2 hazardous locations when connected to specified 200 Series FBMs and field circuits meeting entity parameter constraints specified in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). They are also DEMKO certified for supplying field circuits for Group IIC, Zone 2 potentially explosive atmospheres. Field circuits are also Class 2 limited energy (60 V dc, 30 V ac, 100 VA or less) if customer-supplied equipment meets Class 2 limits.

(a) All TAs are UL/UL-C listed to comply with applicable ordinary location safety standards for fire and shock hazards. Hazardous location types comply with ATEX directive for II 3 G use. They also comply with the requirements of the European Low Voltage Directive. All listings/certifications require installation and use within the constraints specified in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) and the conditions stated in UL and DEMKO reports.

Table 2. Cables Types and Part Numbers

Cable Length m (ft)	Type 1 P/PVC [a]	Type 1 LSZH [b]
0.5 (1.6)	RH916DA	RH928AA
1.0 (3.2)	RH916DB	RH928AB
2.0 (6.6)	RH931RM	RH928AC
3.0 (9.8)	RH916DC	RH928AD
5.0 (16.4)	RH916DD	RH928AE
10.0 (32.8)	RH916DE	RH928AF
15.0 (49.2)	RH916DF	RH928AG
20.0 (65.6)	RH916DG	RH928AH
25.0 (82.0)	RH916DH	RH928AJ
30.0 (98.4)	RH916DJ	RH928AK

(a) P/PVC is polyurethane outer jacket and semi-rigid PVC primary conductor insulation. Temperature range: -20 to +80°C (-4 to +176°F).

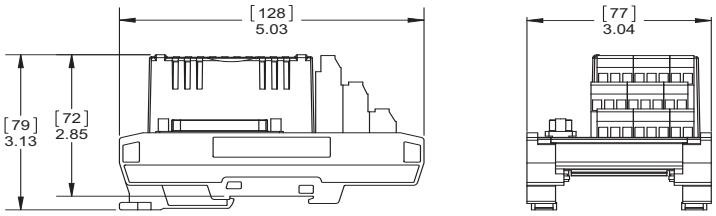
(b) Low smoke zero halogen or low smoke free of halogen (LSZH) is a material classification used for cable jacketing. LSZH is composed of thermoplastic or thermoset compounds that emit limited smoke and no halogen when exposed to high sources of heat. Temperature range: -40 to +105°C (-40 to +221°F).

DIMENSIONS–NOMINAL

[mm]
in

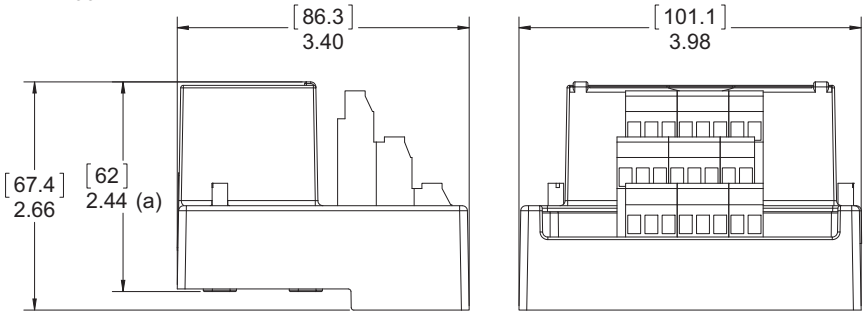
DIN Rail Mounted Termination Assembly

RH924WW



Baseplate Mounted Termination Assemblies

RH100KR



(a) Overall width – for determining DIN rail loading.
(b) Height above DIN rail (add to DIN rail height for total).

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
PSS 31H-2SBASPLT	Standard 200 Series Baseplates
PSS 31H-2GOV	G-Series Enclosures Overview
PSS 31H-4C2	Time Synchronization Equipment
PSS 31S-2SOE	Sequence of Events
PSS 31S-2TDRA	Transient Data Recorder and Analyzer
PSS 21S-3CP270IC	Control Processor 270 (CP270) Integrated Control Software
PSS 31S-3FCPICS	Field Control Processor 280 (CP280) Integrated Control Software

Foxboro®

by Schneider Electric

Schneider Electric Systems USA, Inc.
38 Neponset Avenue
Foxborough, MA 02035-2037
United States of America
www.schneider-electric.com

Global Customer Support
https://pasupport.schneider-electric.com

MB 031 0918