EcoStruxure™

Foxboro™ DCS

FBM219 Discrete I/O Interface Module

PSS 41H-2S219

Product Specification

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Schneider Electric™

www.schneider-electric.com

Legal Information

Overview

The FBM219 Discrete I/O Module has 24 discrete input channels and 8 discrete output channels. Associated termination assemblies (TAs) support discrete input or output signals at voltages of under 30 V dc, 120 V ac/125 V dc, or 240 V ac.

Depending on the type of I/O signal required, the TAs contain current limiting devices, fuses, relays, or relay outputs with internal or external power source and fusing.

The module with its associated TA supports the following discrete inputs and outputs:

FBM	Inputs	Outputs
FBM219	30 V dc, 125 V dc, 120 V ac, or 240 V ac (voltage monitor or contact sense)	30 V dc at 0.25 A, or 30 V dc at 5 A, or 125 V dc at 0.6 A, or 120 V ac at 5 A, or 240 V ac at 5 A Switch (external or internal power source)

When connected to the appropriate TAs, the FBM219 module provides functionality formerly provided by the 100 Series Fieldbus Module (FBM) I/O subsystem.

TAs are available which support the functionality of the 100 Series main FBM07A/B, FBM08, FBM20, and FBM24A/B/C (16 input main FBMs), when these main FBMs are used with expansion FBM14, FBM15, FBM16, FBM27 or FBM42 (8 input/8 output expansion FBMs).

Features

- 24 discrete inputs
- 8 discrete outputs
- Supports discrete input/output signals at voltages of:
  - 15 to 60 V dc
  - 120 V ac/125 V dc
  - 240 V ac
- Each input/output is group isolated
- Rugged design suitable for enclosure in Class G3 (harsh) environments
- Executes the Discrete I/O or Ladder Logic program, with the following configurable options: Input Filter Time, Fail Safe Configuration, Fail-Safe Fall-Back, and Sustained or Momentary Outputs
- Various Termination Assemblies (TAs) that contain high voltage attenuation and optical isolation for inputs

Standard Design

The module 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, per ISA Standard S71.04.

Visual Indicators

Light-emitting diodes (LEDs) incorporated into the front of the module provide visual indication of the FBM operational status, as well as the discrete states of the individual input and output points.

Easy Removal/Replacement

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

Fieldbus Communication

A Fieldbus Communications Module or a Control Processor interfaces to the redundant 2 Mbps module Fieldbus used by the FBMs. The FBM219 accepts communication from either path (A or B) of the 2 Mbps Fieldbus. If one path is unsuccessful or is switched at the system level, the module continues communication over the active path.

Modular Baseplate Mounting

The module mounts on a DIN rail mounted baseplate, which accommodates up to four or up to eight FBMs. The Modular Baseplate is either DIN rail mounted or rack mounted, and includes signal connectors for redundant Module Fieldbus, redundant independent dc power, and termination cables.

Security

Field power for contacts or solid state switches is current limited.

Termination Assemblies

Field I/O signals connect to the FBM subsystem via DIN rail mounted TAs. The TAs used with the FBM219 are described in *Termination Assemblies and Cables, page 10*.

Functional Specifications

Input/Output Channels	24 input and 8 output group isolated channels(1)
Filter/Debounce Time (2)	Configurable (No Filtering, 4, 8, 16, or 32 ms)
Voltage Monitor Function (FBM219)	Input: • On-State Voltage: 15 to 30 V dc • Off-State Voltage: 0 to 5 V dc • Current: 2.2 mA (typical) at 30 V dc Input Source Resistance Limits: • On-State: 1 kΩ (maximum) at 15 V dc • Off-State: 100 kΩ (minimum) at 30 V dc
Output Switch with External Source (FBM219)	• Applied Voltage: 60 V dc (maximum) • Load Current: 0.25 A (maximum) • Off-State Leakage Current: 0.25 mA (maximum)
Inductive Loads	Module output may require a protective diode or metal oxide varistor (MOV) connected across the inductive load.
Isolation	For TAs which provide input and output group isolation (listed in *Functional Specifications - Main Termination Assemblies, page 13*), input and output groups are group isolated from earth (ground). For details, see *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). The module/TA withstands, without damage, a potential of 600 V ac applied for one minute between any channel and ground, or between any input channel and any output channel. For TAs RH917LL (supersedes P0917LL) and RH917LP (supersedes P0917LP) (which provide input channel isolation) and TA RH917LS (supersedes P0917LS) (which provides output channel isolation), each channel is galvanically isolated from all other channels and earth (ground). The module/TA 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. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** 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. **Failure to follow these instructions will result in death or serious injury.**
Communication	Communicates with its associated FCM or FCP via the module Fieldbus.

Power Requirements	• Input Voltage Range (Redundant): 24 V dc +5%, -10% • Consumption: 6 W (maximum) at 24 V dc • Heat Dissipation: 5 W (maximum) at 24 V dc
Loop Power Supply Protection	Current limited to 2.5 mA for inputs.
Calibration Requirements	Calibration of the module and termination assembly is not required.
Regulatory Compliance: Electromagnetic Compatibility (EMC)	• *European EMC Directive 2014/30/EU*: EN 61326:2013 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. 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). For more information, see *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).
RoHS Compliance	Complies with European RoHS Directive 2011/65/EU, including amending Directives 2015/863 and 2017/2102.
Marine Certification	ABS Type Approved and Bureau Veritas Marine certified for Environmental Category EC31.
(1) Termination Assemblies RH917LL and RH917LP provide input channel isolation for this FBM and Termination Assembly RH917LS provides output channel isolation for this FBM. (2) Digital filtering available for 200 Series FBM or competitive migration modules with version 1.25H or later firmware.	

Environmental Specifications

	Operating	Storage
Temperature	• FBM219: -20 to + 70°C (-4 to +158°F) • Termination Assembly – PA: -20 to +70°C (-4 to +158°F)	-40 to +70°C (-40 to +158°F)
Relative Humidity	5 to 95% (noncondensing)	5 to 95% (noncondensing)
Altitude	-300 to +3,000 m (-1,000 to +10,000 ft)	-300 to +12,000 m (-1,000 to +40,000 ft)
Vibration	7.5 m/s^2 (5 to 500 Hz)	
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	• Module: FBM219 mounts on a baseplate or on a 100 Series conversion mounting structure. The baseplate can be mounted on a DIN rail (horizontally or vertically), or horizontally on a 19-inch rack using a mounting kit. Alternative, this FBM mounts on a 100 Series conversion mounting structure. See *Standard 200 Series Baseplates* (PSS 41H-2SBASPLT) or *100 Series Conversion Mounting Structures* (PSS 41H-2W8) for details. • Termination Assembly: The TA mounts on a DIN rail and accommodates multiple DIN rail styles including 32 mm (1.26 in) and 35 mm 1.38 in).
Weight	• Module: 284 g (10 oz) approximate • Termination Assemblies — Compression: ◦ 216 mm (8.51 in) – 420 g (0.93 lb, approximate) ◦ 267 mm (10.52 in) – 480 g (1.1 lb, approximate) ◦ 286 mm (11.25 in) – 908 g (2.0 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	See *Dimensions - Nominal, page 27*
Part Numbers	• FBM219: RH916RH • Termination Assemblies: See *Functional Specifications - Main Termination Assemblies, page 13*

Termination Cables	• Cable Lengths: Up to 30 m (98 ft) • Cable Materials: Polyurethane or Low Smoke Zero Halogen (LSZH) • Termination Cable Type: ◦ Baseplate to Main TA: Type 4 - See *Table 2, page 25* ◦ Main TA to Expansion TA: Type 6 - See *Table 3, page 26* • Cable Connection: ◦ FBM Baseplate End: 37-pin D-subminiature ◦ Termination Assembly End: 25-pin D-subminiature
Termination Assembly Construction	• Material: Polyamide (PA), compression
Field Termination Connections	• 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
Termination Assembly Switching Relays	• Electrical Service Life: 100,000 operations at rated resistive load 5,000,000 operations at no load • 5 A Relay: ◦ Type: Single-Pole, Double-Throw, Normally Open (SPDT_NO) ◦ Switching Current: 5 A at up to 120 V ac See *General Purpose Plug-In Relay Termination Assembly Specifications, page 30*

Termination Assemblies and Cables

Field I/O signals connect to the FBM subsystem via DIN rail mounted termination assemblies (TAs). Multiple types of TAs are available with FBM219 to provide I/O signal connections, signal conditioning, optical isolation from signal surges, external power connections, and/or fusing for protection of the FBM and/or field device as required by the particular FBM. Since these features are built into the termination assemblies (where required), in most applications there is no need for additional termination equipment for field circuit functions such as circuit protection or signal conditioning (including fusing and power distribution).

The DIN rail mounted termination assemblies connect to the FBM subsystem baseplate by means of removable termination cables. The cables are available in a variety of lengths, up to 30 meters (98 feet), allowing the termination assemblies to be mounted in either the enclosure or in an adjacent enclosure. See *Functional Specifications - Main Termination Assemblies, page 13* for termination cable part numbers and specifications.

Migration Use of Termination Assemblies

When an FBM219 is used to replace 100 Series FBMs, its associated termination assembly is determined based on which 100 Series FBM is being replaced. Typically, the 100 Series FBM being replaced is a main FBM and is used in conjunction with an expansion FBM.

A single FBM219 provides the I/O communications for both the 100 Series equivalent main and expansion TAs. To provide enough terminals for the field I/O wiring, two termination assemblies are used with the FBM219 - one for the field I/O wiring for the replaced main FBM, and one for the field I/O wiring for the replaced expansion FBM.

The “expansion” termination assembly is daisy-chained to the “main” termination assembly via the expansion cables listed in *Table 3, page 26*.

The table *Functional Specifications - Main Termination Assemblies, page 13* and *Functional Specifications - Expansion Termination Assemblies, page 20* list the termination assemblies needed to replace both the 100 Series main FBMs and the expansion FBMs.

Alternatively, the FBM219 can accept field wiring through a Termination Assembly Adapter (TAA) instead of the termination assemblies when replacing 100 Series FBMs. This is discussed in the *Termination Assembly Adapter Modules for 100 Series Upgrade* (PSS 41H-2W4).

The output circuits of termination assemblies used in migration/upgrading use active current limiting for circuit protection.

Discrete Inputs

Terminal assemblies with discrete inputs support twenty-four 2-wire discrete input signals at passive low voltage levels of less than 60 V dc and active high voltage levels of 120 V ac, 125 V dc, 240 V ac. Active termination assemblies support input signal conditioning for FBMs. The I/O signal conditioning circuits are designed to emulate the 100 Series FBM I/O subsystem. This provides for functional I/O equivalence during upgrades from 100 Series to 200 Series hardware. The signal conditioning functionality is built into the termination assembly. To condition signals, these termination assemblies provide optical isolation, current limiting, voltage attenuation and optional terminal blocks to connect externally supplied excitation voltage.

Low Voltage Discrete Inputs

The low voltage inputs (less than 60 V dc) use passive termination assemblies. Inputs can either be voltage monitor, switched or contact sense types. Voltage monitor inputs require an external field voltage source. Contact sense input use the FBM auxiliary +24 V dc power supply to wet field contacts.

A load may not be required for proper operation of the input channels. A diode may be required for a dc inductive load only.

High Voltage Discrete Inputs

The high voltage input circuits support 125 V dc or 120 V ac. Voltage monitor inputs require a field voltage source.

These input circuits are located on daughter boards that are mounted under the component covers of the termination assemblies.

Discrete Outputs

Termination assemblies with discrete outputs support eight 2-wire discrete output signals at passive low voltages of less than 60 V dc and active high voltage levels of 120 V ac, 125 V dc, or 240 V ac. Active termination assemblies support output signal conditioning for FBMs. The signal conditioning functionality is built into the termination assembly. To condition signals, these termination assemblies provide fuse protection, relays and terminal blocks to connect externally supplied optional power distribution.

Low Voltage Discrete Outputs

The low voltage outputs (less than 60 V dc) use passive termination assemblies. These assemblies are available with and without output protection (fusing). Termination assemblies with protection have individual user serviceable fuses that are designed to limit the output current to 2 A. Eight vertically mounted, one per channel, 3.15 A sand filled fuses (temperature derated) allow a maximum of 2 A current per output channel. Termination assemblies without fusing (unprotected) are intended for use by Foxboro engineers or customers who are using interposing relays or fuse terminal blocks between the termination assembly and the field devices.

Power for the low voltage outputs must be supplied as detailed in *Functional Specifications - Main Termination Assemblies, page 13* and *Functional Specifications - Expansion Termination Assemblies, page 20*.

High Voltage Discrete Outputs

Some high voltage output (120 V ac, 125 V dc or 240 V ac) termination assemblies use plug-in SPDT (Form C) electromechanical relays. The plug-in sockets allow field replacement of individual relays. The relays and associated sockets are located under the component covers of the termination assemblies. The termination assembly's switched outputs use unsealed, general purpose relays. These assemblies are capable of providing mixed voltage and are designed to provide signal segregation by locating the low voltage inputs an the opposite side of the terminal assembly from the outputs. High voltage discrete outputs are always externally sourced power.

The relay output termination assemblies come in either output or output with power distribution (user-supplied via terminals on the termination assembly). In both configurations, when the FBM output is on, the relay coil is energized and the relay contact is switched from normally closed (NC) position to the normally open (NO) position. The FBM +24 V dc auxiliary power supply is used to energize the relay coil.

Termination assemblies with power distribution have a dedicated terminal block which provides a connection to externally supplied power and distributed internally on the termination assembly to each of the relay output channels. The line or positive side of the supply is fused; the neutral or negative side of the supply is connected to the field.

The relay termination assembly has a pair of external excitation voltage terminals, which distribute customer-supplied wetting voltage to all input channels on the assembly. These terminals allow the field power to be daisy chained between terminal assemblies.

The new 100 Series equivalent TAs provide solid state output channels. These provide the identical functionality of the original 100 Series FBM circuits.

Functional Specifications - Main Termination Assemblies

FBM Type	Input Signal	Output Signal	TA Part No. PA[a]	Term. Type[b]	BP to TA Cable Type[c]	TA Cert. Type [d]
FBM219	24 channel, Voltage Monitor, external source 132 V ac or 150 V dc Maximum voltage Logic Zero: 0 to 20 V ac or dc Logic One: 79 to 132 V ac Logic One: 75 to 150 V dc 2.2 mA typical 20 to 150 V 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	8 channel, Output Switch, external source with power distribution SPDT (Form C) Relay:[e] ≤30 V dc: 5 A maximum ≤250 V ac: 5 A maximum Maximum total current per TA: 12 A[f]	RH917LP	C	4	5
FBM219	24 channel, Contact Sense, external source with power distribution 132 V ac or 150 V dc Maximum voltage Logic Zero: 0 to 20 V ac or dc Logic One: 79 to 132 V ac Logic One: 75 to 150 V dc 2.2 mA typical 20 to 150 V 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	8 channel, Output Switch, external source SPDT (Form C) Relay:[e] ≤30 V dc: 5 A maximum ≤250 V ac: 5 A maximum Maximum total current per TA: 12 A[f]	RH917LS	C	4	5

FBM219	24 channel, Contact Sense, external source with power distribution 132 V ac or 150 V dc Maximum voltage Logic Zero: 0 to 20 V ac or dc Logic One: 79 to 132 V ac Logic One: 75 to 150 V dc 2.2 mA typical 20 to 150 V 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	8 channel, Output Switch, external source with power distribution SPDT (Form C) Relay:(e) ≤30 V dc: 5 A maximum ≤250 V ac: 5 A maximum Maximum total current per TA: 12 A(f)	RH917LV	C	4	5
FBM219	24 channel, Voltage Monitor, external source 132 V ac or 150 V dc Maximum voltage Logic Zero: 0 to 20 V ac or dc Logic One: 79 to 132 V ac Logic One: 75 to 150 V dc 2.2 mA typical 20 to 150 V 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	8 channel, Output Switch, external source SPDT (Form C) Relay:(e) ≤30 V dc: 5 A maximum ≤250 V ac: 5 A maximum Maximum total current per TA: 12 A(f)	RH917LL	C	4	5

FBM219	24 channel, Voltage Monitor, external source 30 V dc Maximum voltage Logic Zero: 0 to 5 V dc Logic One: 15 to 30 V dc 2.2 mA typical at 30 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	8 channel, Output Switch, external source 60 V dc Maximum voltage 0.25 A dc Maximum current 0.25 mA dc Maximum off-state leakage current 0.4 A over-current fuse	RH917LE	C	4	1, 2, 4
FBM219	24 channel, Contact Sense, internal source 24 V dc Nominal open circuit voltage 7 mA dc nominal current limit 2.2 mA typical at 30 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	8 channel, Output Switch, external source 60 V dc Maximum voltage 0.25 A dc Maximum current 0.25 mA dc Maximum off-state leakage current 0.4 A over-current fuse	RH917LH	C	4	1,2, 4

FBM219	When replacing a main FBM07A: Voltage Monitor, external source 130 V dc Maximum voltage Logic Zero: 0 to 5 V dc Logic One: 15 to 130 V dc 2.2 mA typical 5 to 130 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance When replacing a main FBM07B: Contact Sense, internal source 24 V dc ±10% Open circuit voltage 2.5 mA maximum short circuit current 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance		RH924HA	C	4	1, 2, 4

FBM219	When replacing a main FBM08: 16 channel Voltage Monitor, external source 132 V ac or 150 V dc Logic Zero: 0 to 20 V ac; 0 to 20 V dc Logic One: 79 to 132 V ac; 75 to 150 V dc 2.2 mA typical 20 to 132 V ac 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance		RH924HC	C	4	1, 4
FBM219	When replacing a main FBM20: 16 channel Voltage Monitor, external source 264 V ac Maximum voltage Logic Zero: 0 to 40 V ac Logic One: 164 to 264 V ac 2.2 mA typical 40 to 264 V ac 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance		RH924HL	C	4	1

FBM219	When replacing a main FBM24A: 16 channel Voltage Monitor, external source 150 V dc Maximum voltage Logic Zero: 0 to 10 V dc Logic One: 33 to 150 V dc 2.5 mA typical 10 to 150 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance		RH924HN	C	4	1, 2, 4
FBM219	When replacing a main FBM24B: 16 channel Contact Sense, internal source 48 V dc nominal open circuit voltage 2.5 mA ±20% short circuit current 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance		RH924HP	C	4	1, 2, 4

FBM219	When replacing a main FBM24C: 16 channel Contact sense with external source on Channel 1 150 V dc Maximum voltage Logic Zero: 0 to 10 V dc Logic One: 33 to 150 V dc 2.5 mA typical 10 to 150 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance		RH924HQ	C	4	1, 2, 4

[a] PA is Polyamide rated from -20 to +70°C (-4 to +158°F).

[b] C = TA with compression terminals, RL = TA with ring lug terminals. Knife has compression terminals.

[c] See *Table 2, page 25* for cable part numbers and specifications.

[d] See *Table 1, page 25* for Termination Assembly certification definitions.

[e] Relays used to switch a dc source should have lower current limits. Relays used to switch inductive loads should have protective elements added across the load or contacts.

[f] Refer to the details of the relay specifications in *General Purpose Plug-In Relay Termination Assembly Specifications, page 30*.

Functional Specifications - Expansion Termination Assemblies

FBM Type	Input Signal	Output Signal	TA Part No. PA[a]	Term. Type[b]	Main TA to Exp. TA Cable Type[c]	TA Cert. Type [d]
FBM219	When replacing an expansion FBM14A/B: 8 channel Voltage Monitor external source 130 V dc Maximum voltage Logic Zero: 0 to 5 V dc Logic One: 15 to 130 V dc 2.2 mA typical 5 to 130 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance When replacing an expansion FBM14C/D: Contact sense internal source 24 V dc ±10% Open circuit voltage 2.5 mA maximum short circuit current 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	When replacing an expansion FBM14A/C: 8 channel Output Switch external source 60 V dc Maximum voltage 0.5 V maximum voltage drop @ 0.5 A 0.5 A maximum current 0.75 A current limit Shorted load duration: indefinite (duty-cycle limited) 1.0 mA maximum off-state leakage When replacing an expansion FBM14B/D: output switch internal source 11 V dc ±2 V Open circuit voltage Source resistance 680 Ω nominal Shorted load duration: indefinite 0.5 mA maximum off-state leakage	RH924HF	C	6	1, 2, 4
Connect this TA to the main TA.						

FBM219	When replacing an expansion FBM15: 8 channel Voltage Monitor, external source 132 V ac or 150 V dc Logic Zero: 0 to 20 V ac; 0 to 20 V dc Logic One: 79 to 132 V ac; 75 to 150 V dc 2.2 mA typical 20 to 132 V ac 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	When replacing an expansion FBM15: 8 channel Output Switch external source 132 V ac Maximum voltage 0.4 V maximum voltage drop @ 1 A 2 A maximum current per channel 12 A maximum current per TA 3 A current limit 24 A surge current limit for 10 ms Shorted load duration: indefinite (duty-cycle limited) 3 mA maximum off-state leakage	RH924HH	C	6	1
Connect this TA to the main TA.						
FBM219	When replacing an expansion FBM16: 8 channel Voltage Monitor 264 V ac Maximum voltage Logic Zero: 0 to 40 V ac Logic One: 164 to 264 V ac 2.2 mA typical 40 to 264 V ac 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	When replacing an expansion FBM16: 8 channel Output Switch external source 264 V ac Maximum voltage 0.6 V maximum voltage drop @ 0.5 A 1 A maximum current per channel 7 A maximum current per TA 1.5 A current limit 12 A surge current limit for 10 ms Shorted load duration: indefinite (duty-cycle limited) 2.5 mA maximum off-state leakage	RH924HK	C	6	1
Connect this TA to the main TA.						

FBM219	When replacing an expansion FBM27A: 8 channel Voltage Monitor, external source 150 V dc Maximum voltage Logic Zero: 0 to 10 V dc Logic One: 33 to 150 V dc 2.5 mA typical 10 to 150 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	When replacing an expansion FBM27A: 8 channel Output Switch external source 150 V dc Maximum voltage 0.4 V maximum voltage drop @ 1 A 2 A maximum current per channel 12 A maximum current per TA 2.3 A current limit 20 A surge current limit, 20 ms Shorted load duration: indefinite (duty-cycle limited) 2 mA maximum off-state leakage	RH924HX	C	6	1, 2, 4
Connect this TA to the main TA.						
FBM219	When replacing an expansion FBM27B: 8 channel Contact Sense internal source 48 V dc nominal open circuit voltage 2.5 mA ±20% short circuit current 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	When replacing an expansion FBM27B: 8 channel Output Switch external source 150 V dc Maximum voltage 0.4 V maximum voltage drop @ 1 A 2 A maximum current per channel 12 A maximum current per TA 2.3 A current limit 20 A surge current limit, 20 ms Shorted load duration: indefinite (duty-cycle limited) 2 mA maximum off-state leakage	RH924HY	C	6	1, 2, 4
Connect this TA to the main TA.						

FBM219	When replacing an expansion FBM27C: 8 channel Contact Sense external source on channel 1 150 V dc Maximum voltage Logic Zero: 0 to 10 V dc Logic One: 33 to 150 V dc 2.5 mA typical 10 to 150 V dc 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	When replacing an expansion FBM27C: 8 channel Output Switch external source 150 V dc Maximum voltage 0.4 V maximum voltage drop @ 1 A 2 A maximum current per channel 12 A maximum current per TA 2.3 A current limit 20 A surge current limit, 20 ms Shorted load duration: indefinite (duty-cycle limited) 2 mA maximum off-state leakage	RH924HZ	C	6	1, 2, 4
Connect this TA to the main TA.						

FBM219	When replacing an expansion FBM42A: 8 channel Voltage Monitor external source 60 V dc Maximum voltage Logic Zero: 0 to 5 V dc Logic One: 15 to 60 V dc 6 mA maximum input current 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance When replacing an expansion FBM42C: Contact sense internal source 24 V dc ±20% Open circuit voltage 5 mA maximum short circuit current 1 kΩ Maximum On-state resistance 100 kΩ Minimum Off-state resistance	When replacing an expansion FBM42A/C: 8 channel Output Switch external source 60 V dc Maximum voltage 0.4 V maximum voltage drop @ 1 A 2.25 A maximum current 12 A maximum current per TA 10 A surge current limit for 20 ms maximum Shorted load duration: indefinite (duty-cycle limited) 0.5 mA maximum off-state leakage	RH924JB	C	6	1, 2, 4
Connect this TA to the main TA.						

[a] PA is Polyamide rated from -20 to +70°C (-4 to +158°F).

[b] C = TA with compression terminals, RL = TA with ring lug terminals. Knife has compression terminals.

[c] See *Table 2, page 25* and *Table 3, page 26* for cable part numbers and specifications.

[d] See *Table 1, page 25* for Termination Assembly certification definitions.

Table 1 - Certifications for Termination Assemblies

Type	Certification
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 for use in Zone 2 potentially explosive atmospheres.
Type 2	TAs are UL/UL-C listed as associated apparatus for supplying non-incendive field circuits Class I; Groups A-D; Division 2 hazardous locations when connected to specified DIN rail mounted 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 as associated apparatus 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
Type 4	All field circuits are Class 2 limited energy (60 V dc, 30 V ac, 100 VA or less) if customer-supplied equipment meets Class 2 limits.
Type 5	The TA and its field circuitry are for use in only ordinary (non-hazardous) locations.

Table 2 - Cable Types (Baseplate to Main TA Cables) and Part Numbers

Cable Length	Type 4 P/PVC[(a)]	Type 4 LSZH[(b)]
0.5 (1.6)	RH916FG	RH928BA
1.0 (3.2)	RH916FH	RH928BB
2.0 (6.6)	RH931RQ	RH928BC
3.0 (9.8)	RH916FJ	RH928BD
5.0 (16.4)	RH916FK	RH928BE
10.0 (32.8)	RH916FL	RH928BF
15.0 (49.2)	RH916FM	RH928BG
20.0 (65.6)	RH916FN	RH928BH
25.0 (82.0)	RH916FP	RH928BJ
30.0 (98.4)	RH916FQ	RH928BK

[(a)] P/PVC is polyurethane outer jacket and semi-rigid PVC primary conductor insulation. P/PVC cable is rated at -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).

Table 3 - Cable Types (Main TA to Expansion TA Cables) and Part Numbers

Cable Length m (ft)	Type 6 P/PVC[a]	Type 6 LSZH[b]
0.75 (2.5)	RH924CK	RH928CQ

[a] P/PVC is polyurethane outer jacket and semi-rigid PVC primary conductor insulation. P/PVC cable is rated at -20 to +80°C (-4 to 176°F).

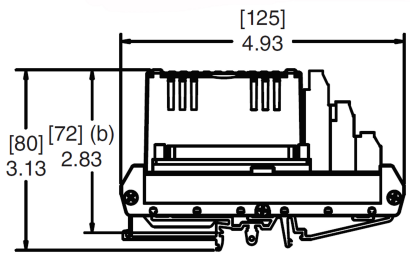
[b] Low smoke zero halogen or low smoke free of halogen (LSZH) is a material classification used for cable jacketing. LSZH is composed of thermoplastic or thermoset compounds that emit limited smoke and no halogen when exposed to high sources of heat. Temperature range: -40 to +105°C (-40 to +221°F).

Dimensions - Nominal

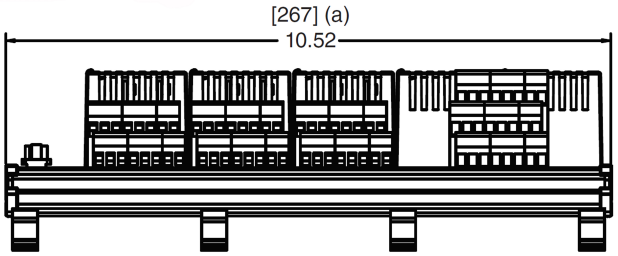
mm
in

Compression Termination Assemblies

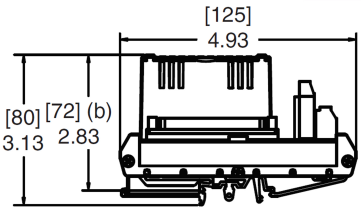
RH917LL



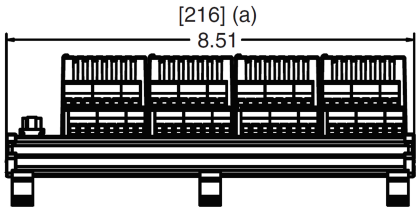
RH917LP



RH917LE



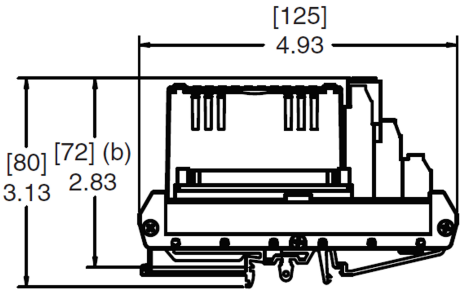
RH917LH



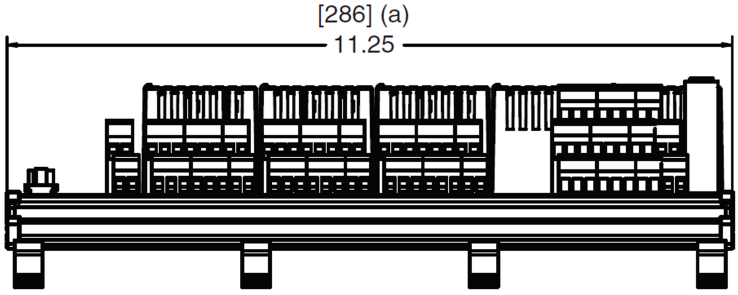
mm
in

Compression Termination Assemblies

RH917LV



RH917LS



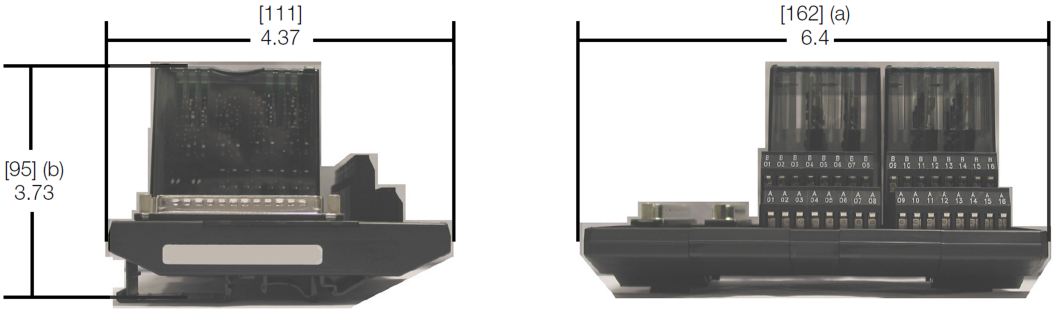
(a) Overall width – for determining DIN rail loading.
(b) Height above DIN rail (add to DIN rail height for total).

mm
in

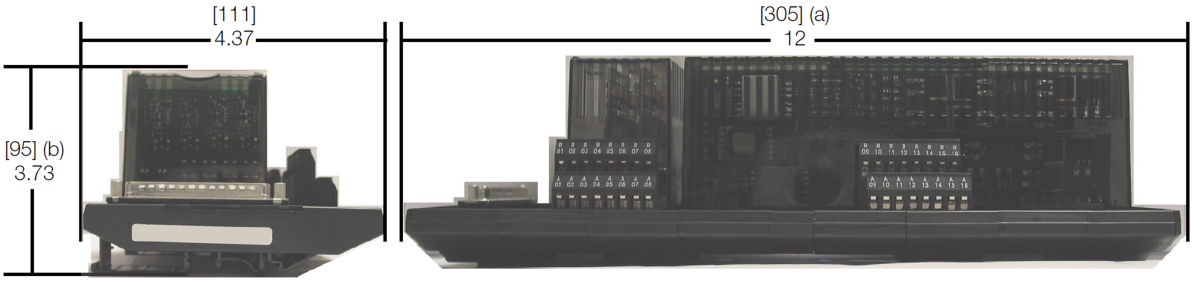
Compression Termination Assemblies

RH924HA RH924HF

RH924HC RH924HL RH924HN RH924HQ



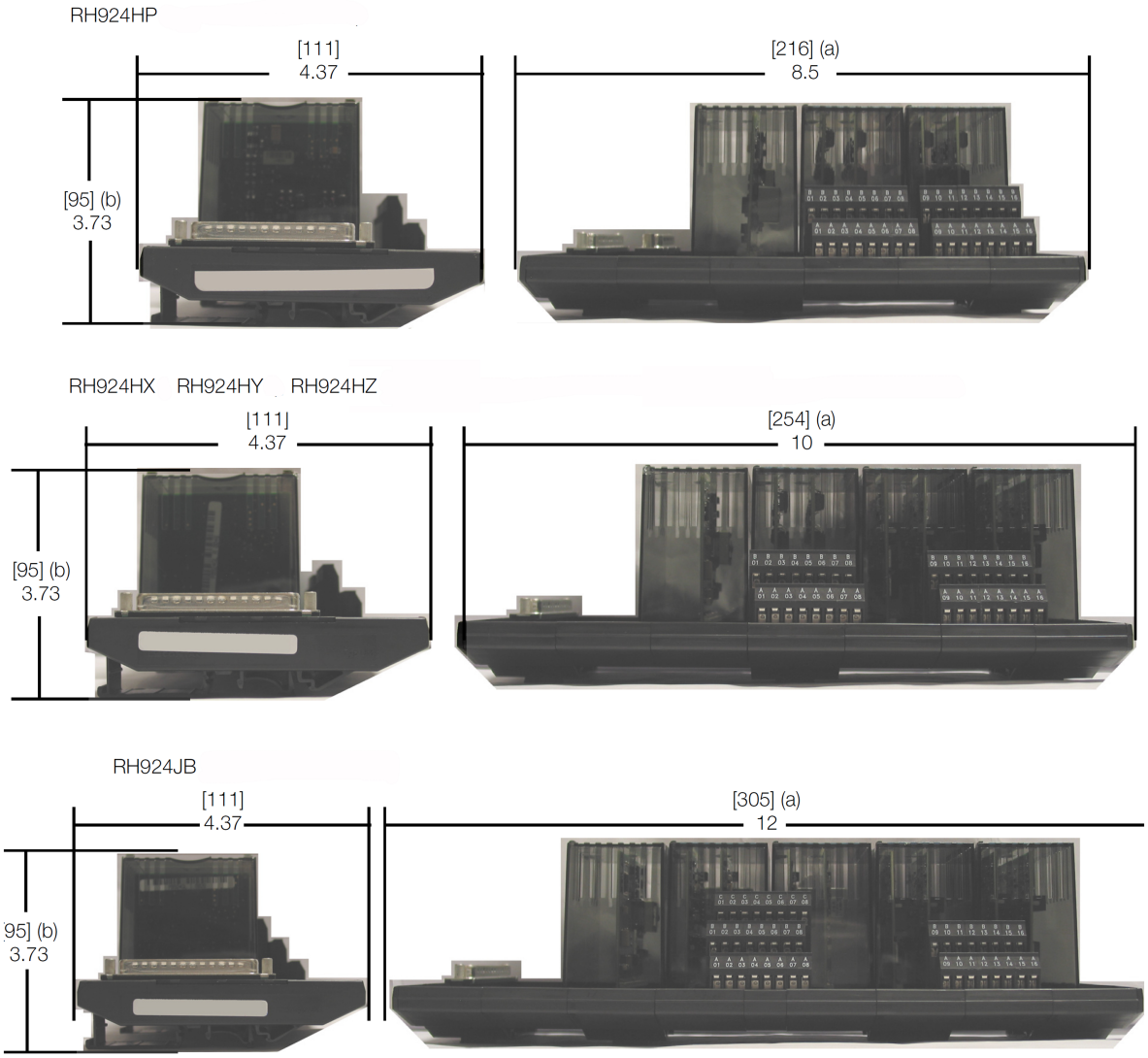
RH924HH RH924HK



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

[mm]
in

Compression Termination Assemblies



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

(a) Overall width — for determining DIN rail loading.

(b) Height above DIN rail (add to DIN rail height total).

General Purpose Plug-In Relay Termination Assembly Specifications

Part Number	P0165CL
Description	SPDT, plug-in, field replaceable
Maximum Rated Load(1) (2)	• dc Resistive: 5 A at 30 V dc, 0.6A @ 125 V dc • dc Inductive (L/R = 7 MS): 5 A at 30 V dc, 0.4 @ 125 V dc • ac Resistive: 5 A at 240 V ac • ac Inductive (P.F. = 0.4): 5 A at 240 V ac
Carry Current(1)	5 A
Maximum Operating Voltage (1)	240 V ac, 125 V dc(2)
Maximum Operating Current (1)	5A
Maximum Switching Capacity (1)	1200 VA, 150 W
Minimum Permissible Load	100 mA, 5 V dc
Contact Material	AgCdO
Contact Resistance	30 mΩ maximum
Life Expectancy	• Mechanical: 20 X 10^6 operations minimum • Electrical: 100 X10^3 (at rated load)
Response Time	• Operate: 15 ms maximum • Release: ◦ ac: 10 ms maximum ◦ dc: 5 ms maximum

(1) The manufacturer's rated load is derated; the Termination Assembly maximum rated load is 5 A at 240 V ac/5 A at 30 V dc per channel, or 12 A maximum per group of eight outputs.

(2) The relay load must be derated at the higher dc voltages. Refer to the "5 A Relay (P0165CL)" section in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) for a graph illustrating the maximum switching capacity of the 5 A relays used in the termination assemblies.

Related Product Documents

Document Number	Description
PSS 41H-2SOV	*Standard 200 Series Subsystem Overview*
PSS 41H-2W100	*100 Series Fieldbus Module Upgrade Subsystem Overview*
PSS 41H-2CERTS	*Standard and Compact 200 Series I/O - Agency Certifications*
PSS 41H-2W4	*Termination Assembly Adapter Modules for 100 Series Upgrade*
PSS 41H-2SBASPLT	*Standard 200 Series Baseplates*
PSS 41H-2W8	*100 Series Conversion Mounting Structures*
PSS 41S-3FCPICS	*Field Control Processor 280 (CP280) Integrated Control Software*
B0400FA	*Standard and Compact 200 Series Subsystem User's Guide*

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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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

PSS 41H-2S219, Rev A