

Safety Connection Systems

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Safety Connection Systems






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Safety Connection Systems Quick Selection Guide

	 898 Safety-Wired T-Port	 898 Safety-Wired Distribution Box	 898 Safety-Wired Distribution Box	 898 Safety-Wired Shorting Plug	 888 Receptacles
Description	T-Port/splitters designed for use with connectorized safety wiring without enunciation	Passive distribution box designed for use with connectorized safety wiring	Passive distribution box designed for use with connectorized safety wiring	Shorting plugs designed for use with safety-wired distribution boxes	Male receptacles for use with safety switches
Features	<ul style="list-style-type: none"> • 4-pin DC micro models for 2 N.C. or 1 N.O./1 N.C. contacts • Red PUR body indicating safety wiring • Ratcheting coupling nut • Rugged durable construction 	<ul style="list-style-type: none"> • Models without enunciation • 4-pin DC Micro versions • Red PBT body indicating safety wiring • Rugged durable construction 	<ul style="list-style-type: none"> • Models with enunciation • 4-pin DC micro, 6-pin AC micro, or 8-pin DC micro versions • Red PBT body indicating safety wiring • Rugged durable construction 	<ul style="list-style-type: none"> • 4-pin DC micro, 6-pin AC micro, or 8-pin DC micro versions • Red PVC body indicating safety wiring • Rugged durable construction 	<ul style="list-style-type: none"> • 4-pin DC micro, 6-pin AC micro, or 8-pin DC micro versions • M16, M20, and 1/2 NPT mounting threads • 4-, 5-, 6-, and 8-pin styles • Rugged durable construction
Available Models	<ul style="list-style-type: none"> • DC micro, 2 N.C. • DC micro, 1 N.O./1 N.C. 	<ul style="list-style-type: none"> • No enunciation, 2 N.C. <ul style="list-style-type: none"> • No enunciation, 1 N.O./1 N.C. 	<ul style="list-style-type: none"> • Enunciation, 1 N.O./1 N.C. • Enunciation, 1 N.O./2 N.C. • Enunciation, 2 OSSD • 8-pin DC micro, 2 OSSD 	<ul style="list-style-type: none"> • 4-pin DC micro, 2 N.C. • 4-pin DC micro, 1 N.O./1 N.C. • 6-pin AC micro, 1 N.O./2 N.C. • 8-pin DC micro, 2 OSSD 	<ul style="list-style-type: none"> • 4-pin DC micro • 5-pin DC micro • 6-pin AC micro • 8-pin DC micro
Additional Information	See page 5-6	See page 5-7	See page 5-12	See page 5-11	See page 5-12

Overview

The Allen-Bradley Guardmaster® safety connection systems are complete wiring solutions dedicated to machine safety. These quick disconnect-based systems consist of safety wired t-ports and distribution boxes as well as patchcords and shorting plugs. Specifically intended for use with dry-contact safety switches, safety connection systems provide flexible and reliable connections between safety interlock switches, E-stops, cable pull switches, and safety relays. And while this system is ideal for use with these components, it is not suitable for use with light curtains, safety mats, or pressure sensitive safety edges.

Allen-Bradley Guardmaster safety connection systems are designed to:

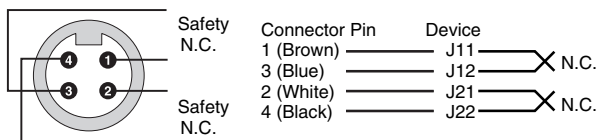
- Reduce installation cost
- Ease system expansion
- Simplify troubleshooting
- Promote system modularity
- Provide for Safety PLC input expansion
- Support systems up to Category 3 (per EN954-1)

Safety connection systems layouts are available with or without enunciation capabilities, allowing the user the option of direct feedback for the status of individual switches in the system. Enunciation systems utilize an auxiliary contact as input to tower lights, audible alarms, PLC input cards, etc.

Systems without Enunciation

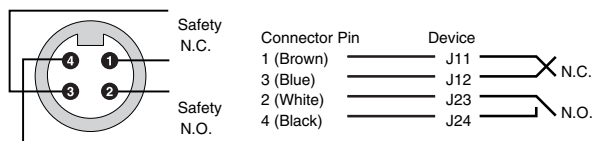
As illustrated in the example layout below, wiring systems for applications not requiring enunciation use a combination of patchcords, shorting plugs, safety wired distribution boxes, and t-ports for series wiring of safety circuits. Distribution boxes for such an application are dual channel models with 2 N.C. or 1 N.C. + 1 N.O. contact configurations. See the wiring diagrams below for connector pin assignments.

Dual Channel 2 N.C.



Male Connector (On Switch)

Dual Channel 1 N.C./1 N.O.



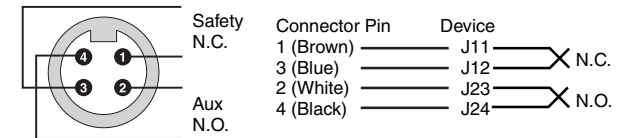
Male Connector (On Switch)

Note: Shorting plugs must be used on all unused ports for the system to operate.

Systems with Enunciation

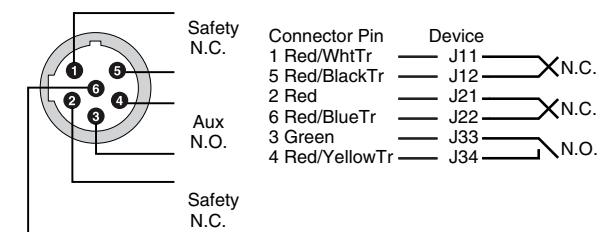
As shown below, system layouts with enunciation require patchcords, shorting plugs, and distribution boxes, which allow for series wiring of the safety circuits while providing a separate circuit for enunciation. Distribution boxes are offered for these applications in two contact configurations: dual channel with 2 N.C. or single channel with 1 N.C. Each type also provides a N.O. auxiliary contact that is interfaced with the enunciation device to provide visual or audible alarm indication. In addition, LEDs on the distribution boxes assist in the troubleshooting of this system. See the wiring diagrams below for the associated connector pin configurations.

Single Channel 1 N.C./1 N.O.

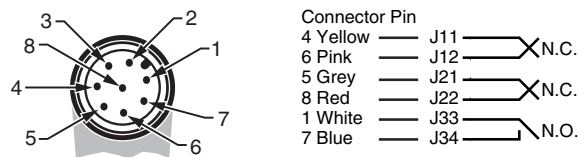


Male Connector (On Switch)

Dual Channel 2 N.C./1 N.O.



Male Connector (On Switch)



Note: Shorting plugs must be used on all unused ports for the system to operate.

Installation Considerations

Some important notes regarding safety connection systems:

- To help ensure that only authorized personnel can access the connections, safety distribution boxes should be mounted in the guarded area as defined in the risk assessment for the application.
- The safety connection system is designed to simplify the installation of safety devices—it does **not** control the safety circuit.
- Since the safety circuits are wired in series, shorting plugs must be installed in all unused distribution box ports in order for the system to operate.

Dual Channel 2 N.C./1 N.O.



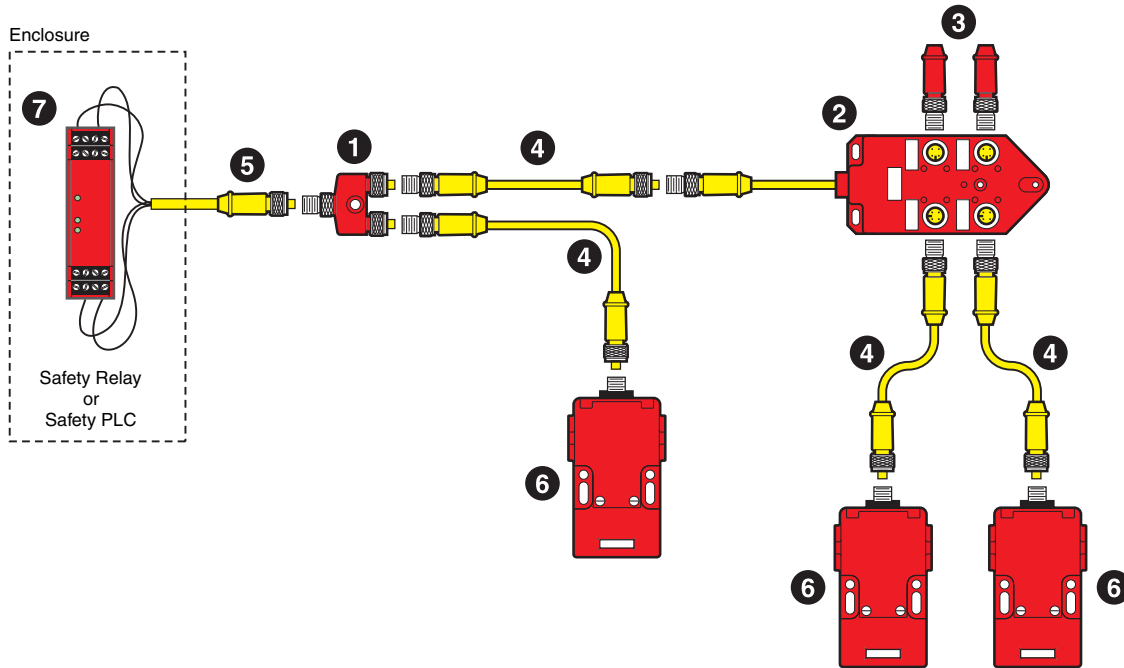
Visit our website: www.ab.com/catalogs

Publication M117-CA001A-EN-P

Introduction

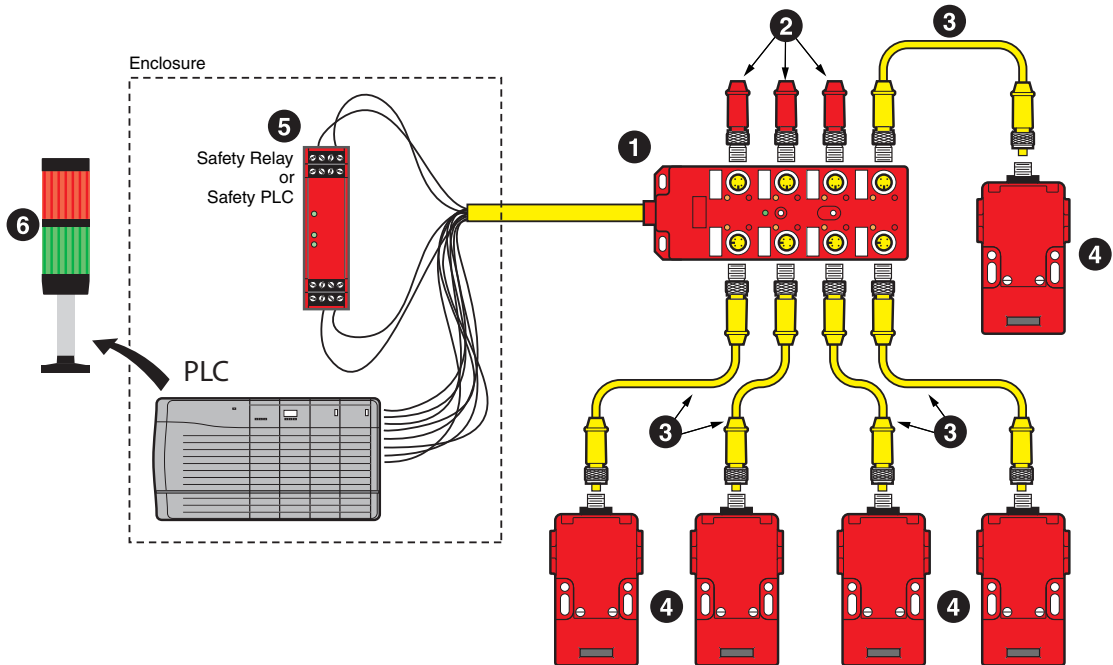
Example Layout

Without Enunciation



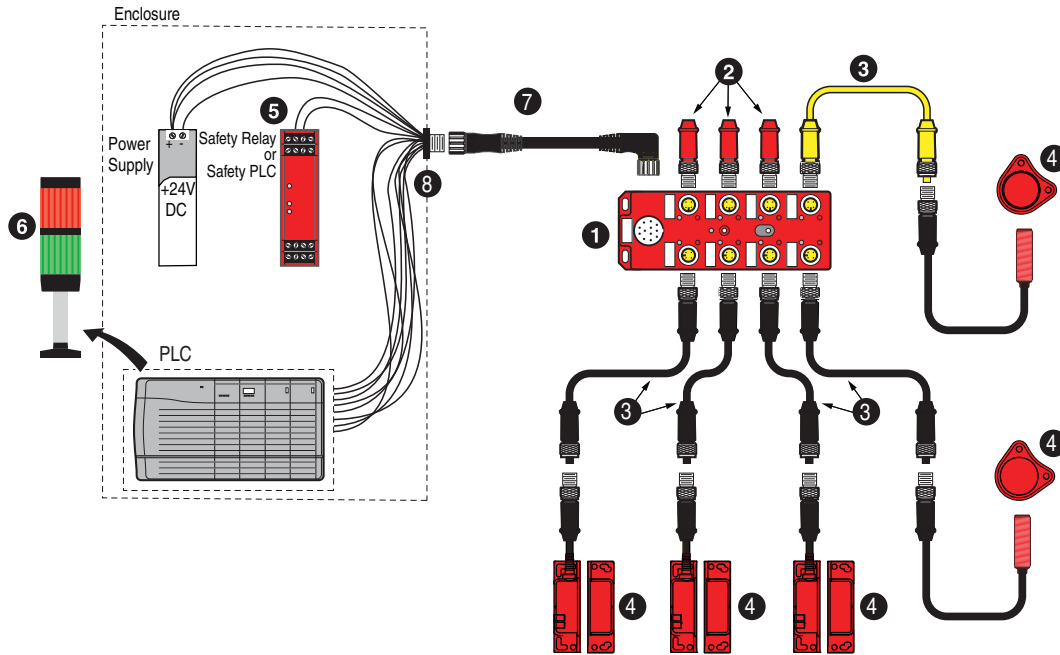
- 1. Safety-Wired Splitter/T-Port5-6
- 2. Safety-Wired Distribution Box.....5-8
- 3. Shorting Plug.....5-14
- 4. Device Patchcord.....3-44
- 5. Device Cordset.....3-44
- 6. Safety Switch with QD.. See *Safety Products catalog*
- 7. Safety Relay..... *Products catalog*

With Enunciation



- 1. Safety-Wired Distribution Box.....5-8
- 2. Shorting Plug.....5-14
- 3. Device Patchcord.....3-80
- 4. Safety Switch with QD See *Safety Products catalog*
- 5. Safety Relay *Products catalog*
- 6. Tower Light See *Industrial Controls catalog*

SensaGuard Safety Switches with Enunciation



- | | | |
|--|---------------------------------------|-------------------------------------|
| 1. Safety-Wired Distribution Box.....5-8 | 4. SensaGuard with QD..... See Safety | 7. Device Patchcord (M23).....3-130 |
| 2. Shorting Plug.....5-14 | 5. Safety Relay..... Products catalog | 8. Receptacle (M23)3-132 |
| 3. Device Patchcord.....3-80 | See Industrial | |
| | 6. Tower Light..... Controls catalog | |

Safety Connection Systems
Safety Wired T-Port
 Dual-Channel, No Enunciation



Specifications

Connector Shell Material	Epoxy coated zinc
Contact Material	Brass, gold over nickel plating
O-Ring Material	Fluorelastomer
Enclosure Type Rating	IP67, NEMA 6P
Operating Temperature [C (F)]	-20...105° (-13...221°)

Features

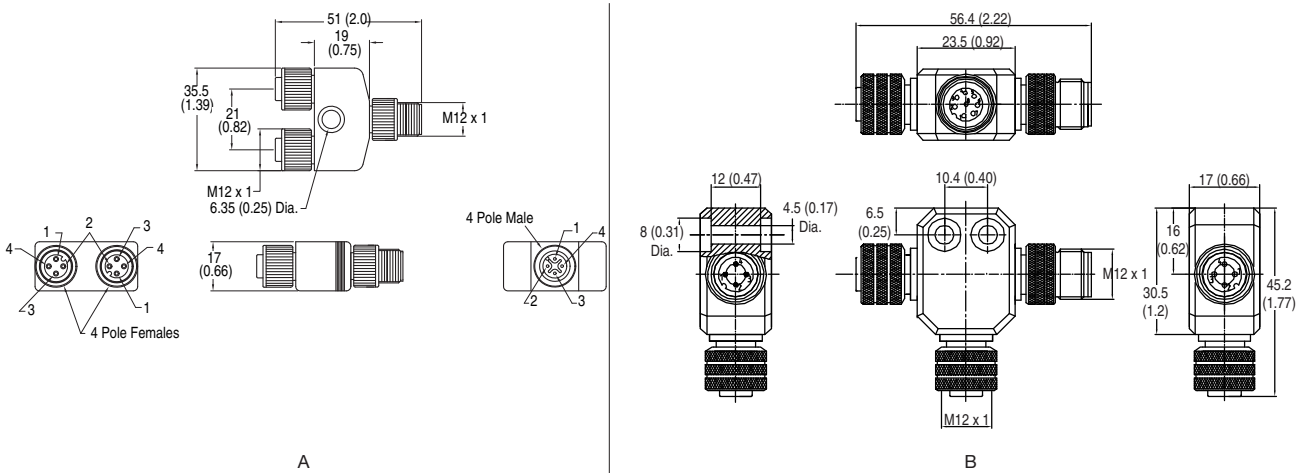
- T-port/splitter designed for use with dual-channel safety devices with 4-pin DC micro connector
- PUR body offers good oil and chemical resistance
- Ratcheting coupling nut for vibration resistance
- For use in Category 2 or 3 systems per EN 954-1
- SensaGuard units may be wired in series maintaining a Cat. 4/SIL 3 rating

Product Selection

Face View of Female	Rating	Face View of Male	Configuration	Wiring	Dimensions	Housing Material	Connector Insert Material	Cat. No.
	10...30V DC 3 A		2 N.C.		A	Red PUR	PUR	898D-43LY-D4
			1 N.O. & 1 N.C.		A	Red PUR	PUR	898D-43KY-D4
			For use with SensaGuard switches only		B	Black PVC	Polyamide	898D-438Y-D8

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



Safety Connection Systems

Safety Wired Distribution Boxes

Dual-Channel, N.C., No Enunciation



Specifications

Housing Material	Red PBT
Connector Insert Material	PBT
Connector Shell Material	Nickel-plated brass
Contact Material	Gold-plated palladium/nickel
Cable O.D.	9.8 mm (0.39 in.)
Cable Type	Oil-resistant yellow PVC jacket, 22 AWG conductors
Enclosure Type Rating	IP67
Operating Temperature [C (F)]	-20...105° (-13...221°)

Features

- Prewired for dual-channel N.C. safety
- 4 or 8 safety wired 4-pin DC micro connectors
- 4-pin male DC micro pigtail main connection
- For use in category 2 or 3 systems per EN 954-1

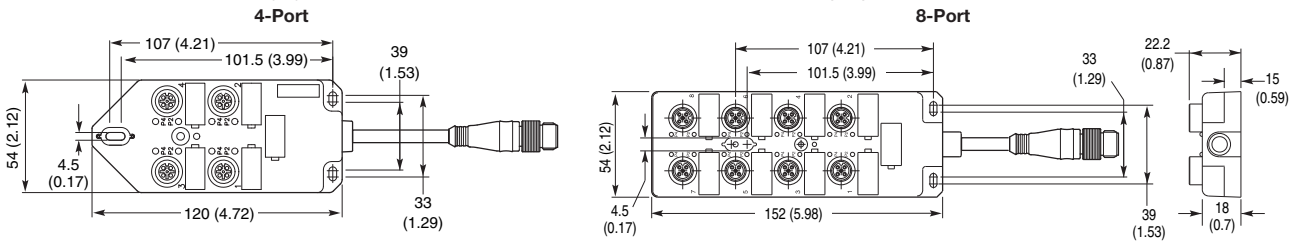
Product Selection

Face View of Female	No. of Ports	Illuminated	Rating	Face View of Male	Cable Length	Cat. No.
	4	No LED	10...30V DC		0.2 m (8 in.)	898D-44LT-DM4
	8					898D-48LT-DM4
Shorting plug for unused ports						898D-41LU-DM
Patchcord, straight to straight DC Micro						889D-F4ACDM-*

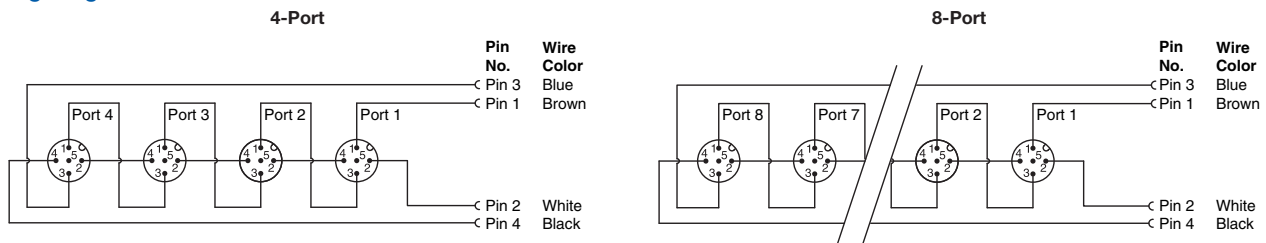
* Length in meters (1, 2, 3, 5, 10 standard).

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



Wiring Diagrams



5-Safety Connections

Safety Connection Systems

Safety Wired Distribution Boxes

Dual-Channel, N.C./N.O., No Enunciation



Specifications

Housing Material	Red PBT
Connector Insert Material	PBT
Connector Shell Material	Nickel-plated brass
Contact Material	Gold-plated palladium/nickel
Cable O.D.	9.8 mm (0.39 in.)
Cable Type	Oil-resistant yellow PVC jacket, 22 AWG conductors
Enclosure Type Rating	IP67
Operating Temperature [C (F)]	-20...105° (-13...221°)

Features

- Prewired for dual-channel (one N.O./one N.C.) safety
- 4 or 8 safety wired 4-pin DC micro connectors
- 4-pin male DC micro pigtail main connection
- For use in category 2 or 3 systems per EN 954-1

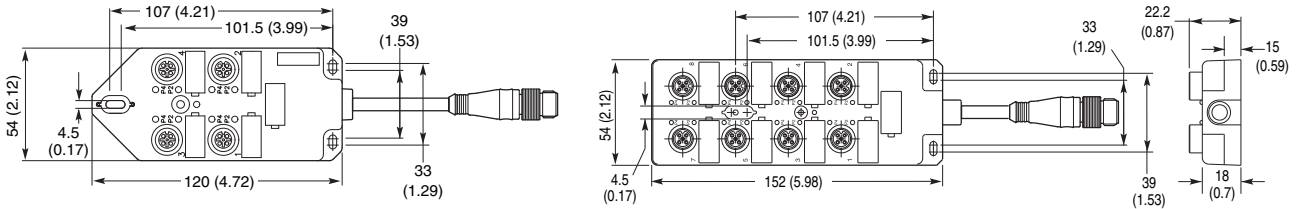
Product Selection

Face View of Female	No. of Ports	Illuminated	Rating	Face View of Male	Cable Length	Cat. No.
	4	No LED	10...30V DC		0.2 m (8 in.)	898D-44LT-DM4
	8					898D-48LT-DM4
Shorting plug for unused ports						898D-41LU-DM
Patchcord, straight to straight DC Micro						889D-F4ACDM-*

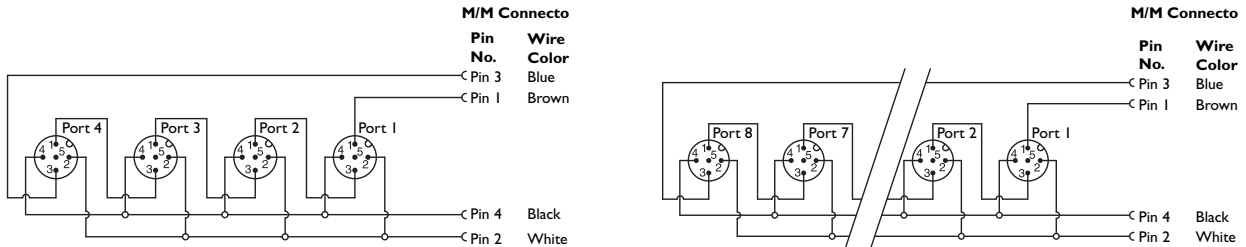
* Length in meters (1, 2, 3, 5, 10 standard).

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



Wiring Diagrams



5-Safety Connections

Safety Connection Systems

Safety Wired Distribution Boxes

Single-Channel N.C. plus Individual N.O. Enunciation



Specifications

Housing Material	Red PBT
Connector Insert Material	PBT
Connector Shell Material	Nickel-plated brass
Contact Material	Gold-plated palladium/nickel
Cable O.D.	9.8 mm (0.39 in.)
Cable Type	Oil-resistant yellow PVC jacket, (12) 18 AWG conductors
Enclosure Type Rating	IP67
Operating Temperature [C (F)]	-20...105° (-13...221°)

Features

- Prewired for single-channel (N.C.) safety with enunciation
- 8 safety wired 4-pin DC micro connectors
- Individual enunciation output for each port
- For use in category 2 or 3 systems per EN 954-1

Product Selection

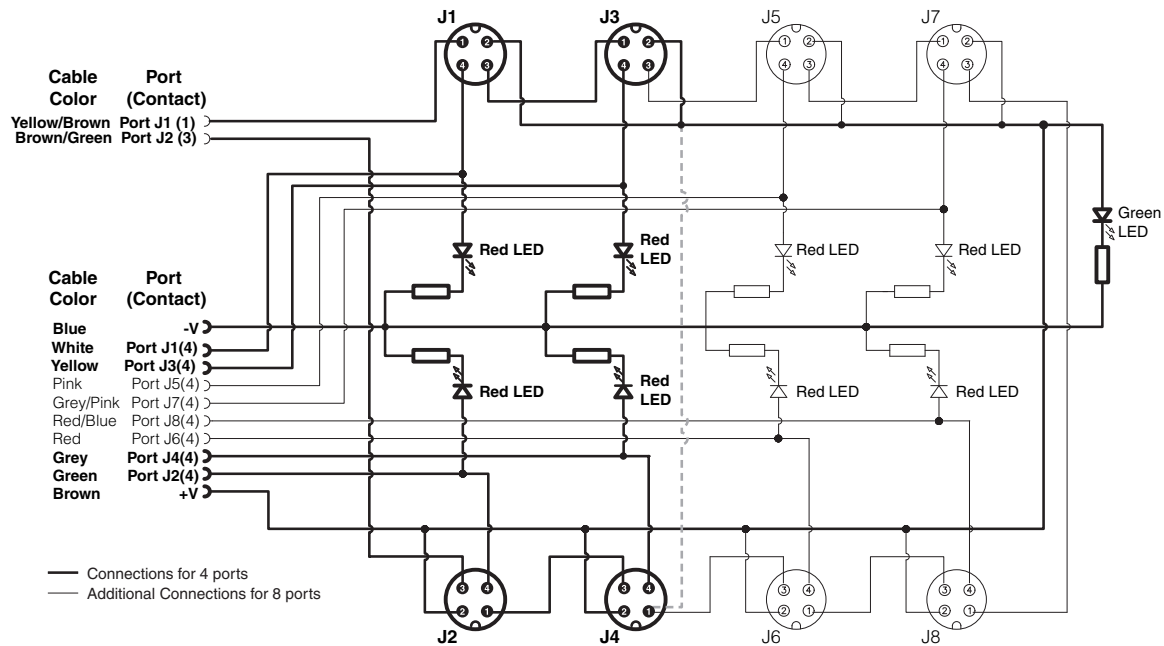
Face View of Female	No. of Ports	Illuminated	Rating	Face View of Male	Cable Length	Cat. No.
	4	LEDs	10...30V DC	Cable	5 m (16.4 ft)	898D-P44JT-A5
	8				10 m (32.8 ft)	898D-P44JT-A10
					5 m (16.4 ft)	898D-P48JT-A5
	10 m (32.8 ft)				898D-P48JT-A10	
Shorting plug for unused ports						898D-41KU-DM
Patchcord, straight to straight DC Micro						889D-F4ACDM-*

* Length in meters (1, 2, 3, 5, 10 standard).

Approximate Dimensions

See 8-port dimensions on page 5-8.

Wiring Diagrams



5-Safety Connections

Safety Connection Systems Safety Wired Distribution Boxes

8-Port, Dual-Channel (2 N.C.) plus Individual N.O. Enunciation



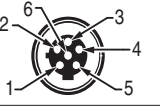
Specifications

Housing Material	Red PBT
Connector Insert Material	PBT
Connector Shell Material	Nickel-plated brass
Contact Material	Gold-plated palladium/nickel
Cable O.D.	9.8 mm (0.39 in.) OD
Cable Type	Oil-resistant yellow PVC jacket, (6) 19 AWG conductors and (8) 22 AWG conductors
Enclosure Type Rating	IP67
Operating Temperature [C (F)]	-20...105° (-13...221°)

Features

- Prewired for dual-channel N.C. safety plus individual N.O. enunciation
- Eight 6-pin AC micro connectors
- 14-conductor main cable
- Individual enunciation output for each port
- For use in category 2 or 3 systems per EN 954-1

Product Selection

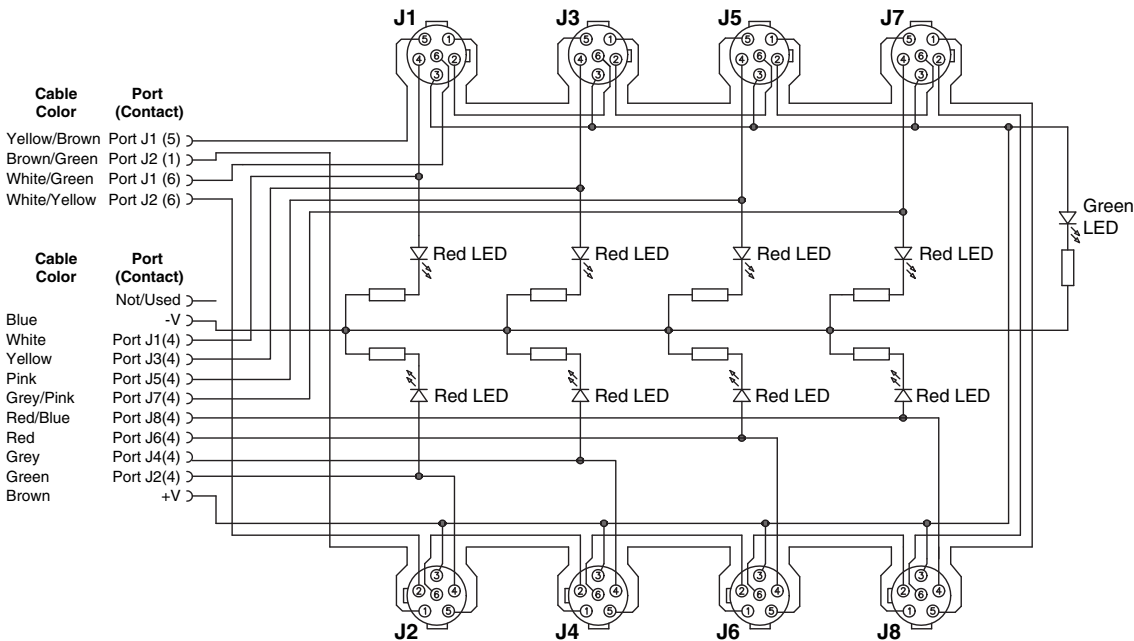
Face View of Female	No. of Ports	Illuminated	Rating	Face View of Male	Cable Length	Cat. No.
	8	LEDs	10...30V DC	Cable	5 m (16.4 ft)	898R-P68MT-A5
					10 m (32.8 ft)	898R-P68MT-A10
Shorting plug for unused ports						898R-61MU-RM
Patchcord, straight to straight DC Micro						889R-F6ECRM-*

* Length in meters (1, 2, 3, 5, 10 standard).

Approximate Dimensions

See 8-port dimensions on page 5-8.

Wiring Diagrams



5-Safety Connections

Safety Connection Systems

Safety Wired Distribution Boxes

8-Pin, Two OSSD Signals per Port, M23 Main Connector



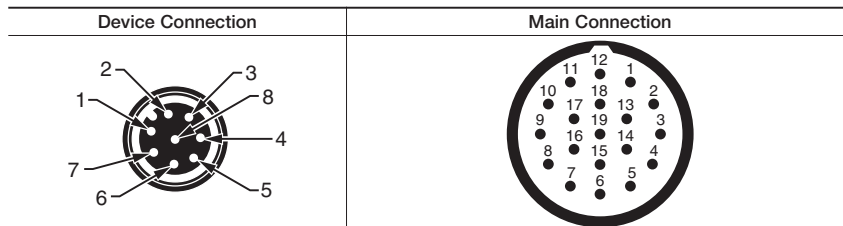
Specifications

Certifications		UL Recognized and CSA Certified
Mechanical		
Material	Red Pocolan	
Connector Insert Material	PBT	
Receptacle Shell Material	Zinc diecast with nickel plating	
Contact Material	Gold-plated palladium/nickel	
Main Connector Style	19-pin M23	
Environmental		
Enclosure Type Rating	IP67; 1200 psi washdown	
Operating Temperature [C (F)]	-20...+90° (-4...+194°)	

Features

- Prewired for SensaGuard switches (suitable to Cat. 4, SIL 3)
- Compatible with dual-channel N.C. safety switches (suitable to Cat. 3, SIL 2)
- Pocolan body offers good oil and chemical resistance
- Four and eight DC micro connectors
- 19-pin M23 quick disconnect
- LED version for use with PNP (sourcing) field devices
- Snap-in markers for box and port identification can be used with 1492 Fast Track™ marker printer system

Pinout

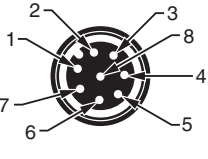
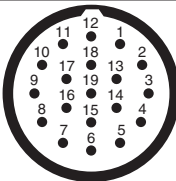


4-Port (2 OSSD)	8-Port (2 OSSD)	Description	Color	M23 Connector (Male 19-Pin)
(+) All Ports Pin 2	(+) All Ports Pin 2	+24V DC	Brown	19
(-) All Ports Pin 7	(-) All Ports Pin 7	Common	Blue	6
Ground	Ground	Ground	Green/Yellow	12
Pin 5	Pin 5	Safety A (OSSD)	Pink	17
Pin 8	Pin 8	Safety A+ (OSSD)	Red	2
Pin 6	Pin 6	Safety B (OSSD)	Grey	3
Pin 4	Pin 4	Safety B+ (OSSD)	Yellow	16
Port 1 Pin 1	Port 1 Pin 1	Aux J1	Grey/Pink	7
Port 2 Pin 1	Port 2 Pin 1	Aux J2	Red/Blue	4
Port 3 Pin 1	Port 3 Pin 1	Aux J3	White/Green	8
Port 4 Pin 1	Port 4 Pin 1	Aux J4	Brown/Green	14
—	Port 5 Pin 1	Aux J5	White/Yellow	9
—	Port 6 Pin 1	Aux J6	Yellow/Brown	13
—	Port 7 Pin 1	Aux J7	White/Grey	10
—	Port 8 Pin 1	Aux J8	Grey/Brown	18
Pin 3	Pin 3	Lock Command	Black	11

Safety Connection Systems Safety Wired Distribution Boxes

8-Pin, Two OSSD Signals per Port, M23 Main Connector

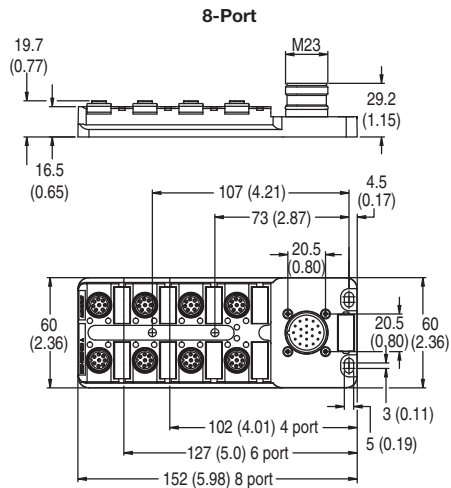
Product Selection

Face View of Female	No. of Ports	Illuminated	Rating	Face View of Male	Cat. No.
	4 port	PNP LED	10...30V DC		898D-P84RT-M19
	8 port				898D-P88RT-M19
8-pin shorting plug					898D-81RU-DM
8-pin field attachable connector-straight					871A-TS8-DM1
Sealing caps					1485A-M12
Labels					1492-MS9X20
Device Patchcords (straight to straight)					* 889D-F8ABDM-2
Homerun Patchcord for 4- or 8-Port (Right angle female to straight male)					* 889M-R19RMMU-2
Homerun Cordset for 4- or 8-Port (Right angle female to flying leads)					* 889M-R19RM-2

* Replace -2 with -1, -3, -5, -10 for standard length in meters.

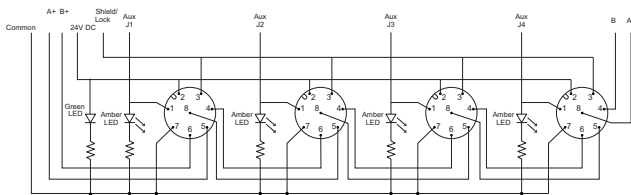
Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

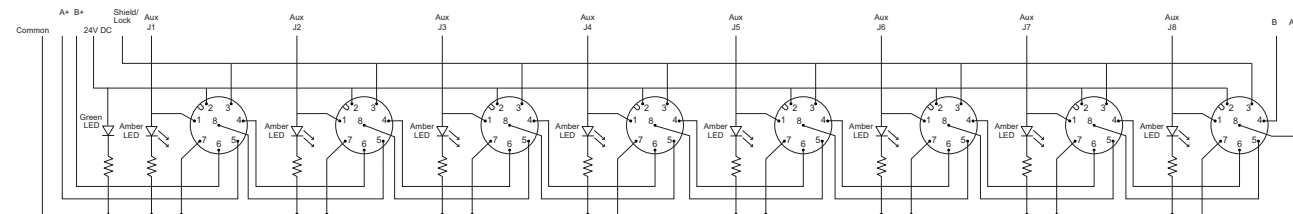


Wiring Diagrams

4-Port Safety Distribution Block



8-Port Safety Distribution Block



5-Safety Connections

Safety Connection Systems

Safety Wired Shorting Plug



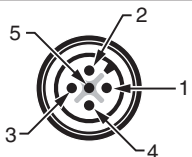
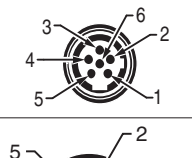
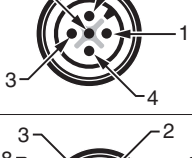
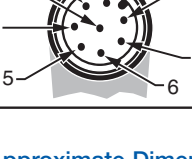
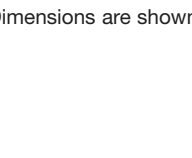
Specifications

Connector Insert Material	PUR
Connector Shell Material	RED PVC
Contact Material	Brass, gold over nickel plating
O-Ring Material	Fluorelastomer
Enclosure Type Rating	IP67, NEMA 6P
Operating Temperature [C (F)]	-20...105° (-13...221°)

Features

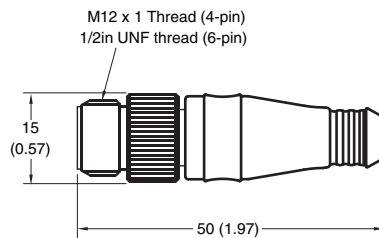
- Shorting plug designed for use with safety-wired distribution boxes
- PVC body offers good oil and chemical resistance
- Ratcheting coupling nut on 4-pin models for vibration resistance

Product Selection

Face View of Male	Rating	Configuration	Wiring	Coupling Nut Material	Cat. No.
	10...30V DC 4 A	2 N.C.	Pin 1 Pin 2 Pin 3 Pin 4	Epoxy-coated zinc	898D-41LU-DM
		1 N.O. & 1 N.C.	Pin 1 Pin 2 —NA Pin 3 Pin 4 —NA	Epoxy-coated zinc	898D-41KU-DM
		2 N.C. & 1 N.O.	Pin 1 Pin 2 Pin 3 —NA Pin 4 —NA Pin 5 Pin 6	Nickel-plated brass	898R-61MU-RM
		For use with SensaGuard compatible T-Ports only	Pin 1 <u>PWR</u> Pin 2 <u>OSSD 1+</u> Pin 3 <u>NA</u> Pin 4 <u>OSSD 2+</u>	Nickel-plated brass	898D-418U-DM
		2 OSSD	Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8	Nickel-plated brass	898D-81RU-DM

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.





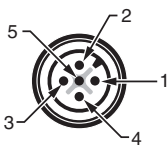
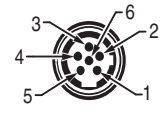

Specifications

Connector Shell Material	Nickel-plated brass
Connector Insert Material	Nylon
Contact Type	Machined brass with gold over nickel plating
Wire Insulation	Oil resistant PVC, 22 AWG stranded copper, 300V
Operating Temperature [C (F)]	-20...+105° (-4...+221°)

Features

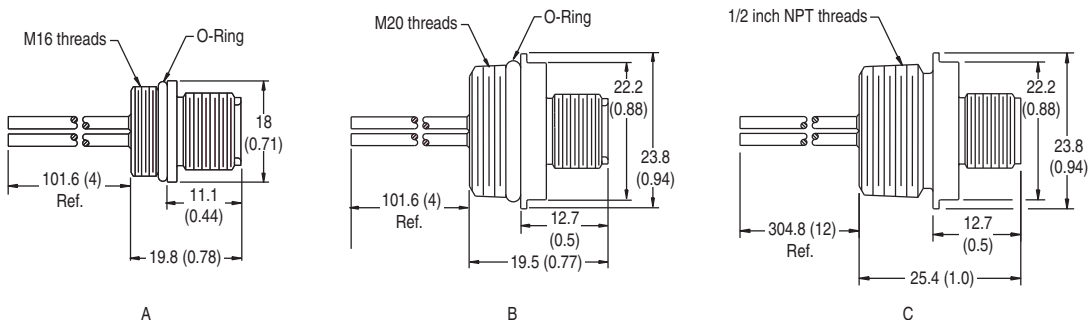
- Male bulkhead receptacles
- 4-, 5- or 8-pin DC micro configuration
- M16, M20 or 1/2 inch-14 NPT mounting threads

Product Selection

Face View of Male	Wire Color	Wire Rating	Length [m (ft)]	Panel Mount Thread Size	Drawing	Cat. No.
	1 Brown 2 White 3 Blue 4 Black	22 AWG 300V 3 A	0.1 (0.3)	M16 x 1	A	888D-M4AC9-4N
			0.3 (1)	M20 x 1.5	B	888D-M4AC8-4N
			0.1 (0.3)	1/2 inch-14 NPT	C	888D-M4AC1-0M3
			0.3 (1)	1/2 inch-14 NPT	C	888D-M4AC1-0M3
	1 Red/White Tr 2 Red 3 Green 4 Red/Yellow Tr 5 Red/Black Tr 6 Red/Blue Tr	22 AWG 300V 3 A	0.1 (0.3)	M16 x 1	A	888R-M6AC9-4N
			0.3 (1)	M20 x 1.5	B	888R-M6AC8-4N
			0.3 (1)	1/2 inch-14 NPT	C	888R-M6AC1-0M3
	1 White 2 Brown 3 Green 4 Yellow 5 Grey 6 Pink 7 Blue 8 Red	24 AWG 36V DC/30V AC 1.5 A	0.1 (0.3)	M16 x 1	A	888D-M8AC9-4N
				M20 x 1.5	B	888D-M8AC8-4N

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



Safety Connection Systems
Receptacles, AC Micro
 6-Pin



Specifications

Connector Shell Material	Nickel-plated brass
Connector Insert Material	Nylon
Contact Material	Machined brass
Wire Insulation	Oil-resistant PVC, 22 AWG stranded copper, 300V, UL Recognized and CSA Certified
Operating Temperature [C (F)]	-20...+105° (-4...+221°)

Features

- Male bulkhead receptacles
- 6-pin configuration
- M16, M20 or 1/2inch-14NPT mounting threads

Product Selection

Face View of Male	Wire Color	Wire Rating	Length [m (ft)]	Panel Mount Thread Size	Drawing	Cat. No.
	1 Red/White Tr 2 Red 3 Green 4 Red/Yellow Tr 5 Red/Black Tr 6 Red/Blue Tr	22 AWG 300V 3 A	0.1 (0.3)	M16 x 1	A	888R-M6AC9-4N
				M20 x 1.5	B	888R-M6AC8-4N
			0.3 (1)	1/2 inch-14 NPT	C	888R-M6AC1-1F

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

