

# 9188

## 8 segment redundant fieldbus power for Yokogawa CENTUM CS3000

- Redundant fieldbus power for Foundation™ fieldbus cards
- Integrated connections to redundant ALF111 Foundation fieldbus™ communication modules
- Flexible N+1 redundancy
- Low lifetime costs
- Low capital cost whilst supporting future expansion
- Fully isolated
- Hot swappable power modules\*
- Low power dissipation
- On-line diagnostics option
- Pluggable trunk surge protection option



The 9188 fieldbus power system is designed to provide redundant power for eight, or four, Foundation™ fieldbus H1 segments on the Yokogawa CENTUM CS3000. It is optimised for use in general purpose and hazardous area High Energy Trunk architectures which, with the appropriate FieldPlus wiring components, supports fieldbus devices using all hazardous area protection techniques. The power supply has been designed to optimise cabinet layouts, maximising the number of fieldbus segments powered per cabinet while providing space for installing and maintaining cable connections and minimising the operating temperature.

Power for the fieldbus segments is provided by two groups of up to three 919x-FP 4-segment power modules, operating in N+1 redundant configuration (load sharing). For redundant applications requiring 250 to 500mA current per segment, three 919x-FP power modules are fitted on the carrier for each 4 segment group. For redundant applications, initially requiring up to 250mA current per segment, two 919x-FP modules are fitted on the carrier, with the option of adding a third power module to allow for future segment expansion. Failure alarms and galvanic isolation are incorporated into each 919x-FP module. Passive inductors and terminators on each fieldbus segment deliver the highest level of availability.

Each 919x-FP module monitors the output of the four fieldbus segments and indicates an alarm (by means of a built-in, normally-closed relay) if any of the segments is shorted, or its output is below the minimum output voltage threshold. Failure of either of the bulk power input supplies is also announced. The alarm contacts are volt-free and galvanically isolated from other circuitry. Connections to the alarm relays are made via terminals on the 9188-CA-Px carrier; a separate alarm module is not required for this function. LED indicators show the status of each 919x-FP module and that of the four individual segments. In normal operation each segment LED is lit, showing that the segment is powered. If a segment is shorted, this LED is extinguished, and the module Alarm LED is lit.

The 919x-FP module provides galvanic isolation between the 24V DC input power and the fieldbus segments, as required by the IEC61158-2 fieldbus standard and the Fieldbus Foundation™ FF-831 validation test for power supplies. There is also galvanic isolation between the fieldbus segments, thereby preventing multiple segment failures due to ground faults on more than one segment.

9188-x1 versions (with 9191-FP modules fitted) should be selected for all general purpose applications, and for 'High Energy Trunk' installations with Fieldbus Barriers or non-energy limited spurs. 9188-x2 versions (with 9192-FP modules fitted) should be selected for applications requiring Ex ic spur connections; in this case the power supply should be used in conjunction with F30 Ex ic Adaptors and F300 range of Megablock device couplers. Refer also to data sheet EPS F30.

A separate physical layer diagnostics module may be installed on the carrier to automatically collect and distribute additional diagnostic information for each of the eight fieldbus segments. For more information see the F809F-Plus product specification.

Pluggable FS32 surge-protection modules for each fieldbus trunk are available as an option reducing the installed cost of providing surge protection on fieldbus networks. These pluggable modules are simple to fit in a new installation, or as a retrofit option.

Redundant 24V DC (nom.) input power is connected to the 9188-CA-Px carrier using two-part pluggable connectors. System connections are compatible with ALF111 fieldbus communication modules, via AKB336 cables, and field wiring connections are available with either pluggable screw terminals (9188-CA-PS) or pluggable spring clamp terminals (9188-CA-PC). The pluggable connections are screw-retained providing a reliable connection in an industrial environment.

\* Gas clearance certificate required in Zone 2/Division 2 hazardous areas

**SPECIFICATION**

**Location of equipment**

Safe area,  
Class I Div 2 Groups ABCD T4 or  
Class I Zone 2 IIC T4 †

**OUTPUT**

	9191-FP	9192-FP
Number of channels	Four (4)	
Voltage (DC)	28.0 - 32.0V	19.0 - 22.0V
Design current (per segment)	0 to 250mA	
Current limit	>320mA	
Minimum load	0mA	

**9188 SYSTEM**

**Input voltage (DC)**

19.2 - 30.0V

**Isolation**

**Fieldbus to input power  
Segment to segment**

500V AC rms withstand ‡  
850V DC withstand  
‡ in accordance with FF-831

**Current consumption**

(24V input, all outputs fully loaded)

	9188-21-P*	9188-22-P*
Current consumption	1.5A	1A

**Power dissipation per segment**

(24V input, all outputs fully loaded)

Power dissipation per segment	1.3W	1.1W
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**Number of segments**

**Output Voltage (DC)**

Number of segments	Four (4)	Four (4)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module

**Design current (per segment)**

Design current (per segment)	0 to 250mA	0 to 250mA
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**Current consumption**

(24V input, all outputs fully loaded)

	9188-41-P*	9188-42-P*
Current consumption	2.9A	2.1A

**Power dissipation per segment**

(24V input, all outputs fully loaded)

Power dissipation per segment	2.5W	2.3W
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**Number of segments**

**Output Voltage (DC)**

Number of segments	Four (4)	Four (4)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module

**Design current (per segment)**

Design current (per segment)	0 to 500mA	0 to 500mA
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**Current consumption**

(24V input, all outputs fully loaded)

	9188-61-P*	9188-62-P*
Current consumption	5.7A	4.1A

**Power dissipation per segment**

(24V input, all outputs fully loaded)

Power dissipation per segment	2.5W	2.3W
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**Number of segments**

**Output Voltage (DC)**

Number of segments	Eight (8)	Eight (8)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module

**Design current (per segment)**

Design current (per segment)	0 to 250mA	0 to 250mA
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**Current consumption**

(24V input, all outputs fully loaded)

	9188-91-P*	9188-92-P*
Current consumption	5.7A	4.1A

**Power dissipation per segment**

(24V input, all outputs fully loaded)

Power dissipation per segment	2.5W	2.3W
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**Number of segments**

**Output Voltage (DC)**

Number of segments	Eight (8)	Eight (8)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module

**Design current (per segment)**

Design current (per segment)	0 to 500mA	0 to 500mA
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**ALARMS**

**Alarm contact rating**

1A maximum @ 30V DC maximum

**Alarm contact status**

Normally closed

**Alarm threshold**

	9191-FP	9192-FP
Alarm threshold	<16V	<10V

**CONNECTIONS**

**ELECTRICAL CONNECTIONS**

**System connectors**

Host 1A, Host 1B, Host 2A, Host 2B via AKB336 cables to ALF111 modules

**Diagnostics segment terminals**

3-way fixed screw terminal connector 0.14 to 2.5 mm<sup>2</sup>

**Field & Power terminals**

Pluggable rising cage-clamp screw terminals (-PS)

Conductor size: 0.14 to 2.5 mm<sup>2</sup>

Pluggable spring-clamp terminals (-PC)

Conductor size: 0.2 to 2.5 mm<sup>2</sup>

**Alarm & ground terminals**

2-way fixed screw terminal connector 0.14 to 2.5 mm<sup>2</sup>

**Common connection for segment shields and ground**

Common connection for segment shields and ground

**Terminators**

A single termination is provided on each segment

**ENVIRONMENTAL**

**Ambient temperature - operating**

-20°C to +60°C (optimum orientation)

-20°C to +50°C (non-optimum orientation)

**Ambient temperature - storage**

-40°C to +85°C

**Relative Humidity**

< 95%, non-condensing

**Ingress protection**

IP20 to BS EN 60529 (Additional protection by means of enclosure)

**MECHANICAL**

**Dimensions**

See following page

**Mounting method**

- Integrated fixings for 'Top hat' DIN rail, 35mm x 7.5mm to EN50022
- Four-hole surface mount - M4

**Weights**

9191-FP	0.2kg
9192-FP	0.2kg
9188-CA-P*	1.1kg

**ELECTRICAL**

**EMC Compliance**

To EN61326:2006 Electrical equipment for measurement, control and laboratory use - EMC requirements

**PHYSICAL NETWORKS**

IEC61158-2

ISA-S50.02 Part 2-1992

Foundation™ fieldbus H1

Profibus PA

## SURGE PROTECTION

The design of the 9188 has made the installation of effective surge protection on fieldbus trunk a simple matter, through the use of individual FS32 modules. A grounding bar is available, that is attached to the power supply carrier to provide both mechanical support for the FS32 modules as well as a way of connecting them to a local low impedance ground point to dissipate any induced surge currents. See the Accessories section below. A full technical datasheet for the FS32 is available from the MTL website.

## ORDERING INFORMATION

PART NO	DESCRIPTION
<b>9188-CA-Px</b>	Carrier, unpopulated
<b>9191-FP</b>	4-segment power module: 28V, 250mA
<b>9192-FP</b>	4-segment power module: 19V, 250mA, for Ex ic spur applications
<b>9197-BLK</b>	Alarm blanking module (used in any empty power module position to defeat the carrier alarm)
<b>9188-21-Px</b>	4 segment system with 9188-CA-Px carrier, 2 x 9191-FP and 4 x 9197-BLK
<b>9188-41-Px</b>	4 segment system with 9188-CA-Px carrier, 3 x 9191-FP and 3 x 9197-BLK
<b>9188-61-Px</b>	8 segment system with 9188-CA-Px carrier, 4 x 9191-FP and 2 x 9197-BLK
<b>9188-91-Px</b>	8 segment system with 9188-CA-Px carrier and 6 x 9191-FP
<b>9188-22-Px</b>	4 segment system with 9188-CA-Px carrier, 2 x 9192-FP and 4 x 9197-BLK
<b>9188-42-Px</b>	4 segment system with 9188-CA-Px carrier, 3 x 9192-FP and 3 x 9197-BLK
<b>9188-62-Px</b>	8 segment system with 9188-CA-Px carrier, 4 x 9192-FP and 2 x 9197-BLK
<b>9188-92-Px</b>	8 segment system with 9188-CA-Px carrier and 6 x 9192-FP

x = S or C

S = Pluggable Screw Terminal Connectors

C = Pluggable Spring Clamp Connectors

Add - CC to above part numbers for Conformally Coated version for installations in corrosive environments

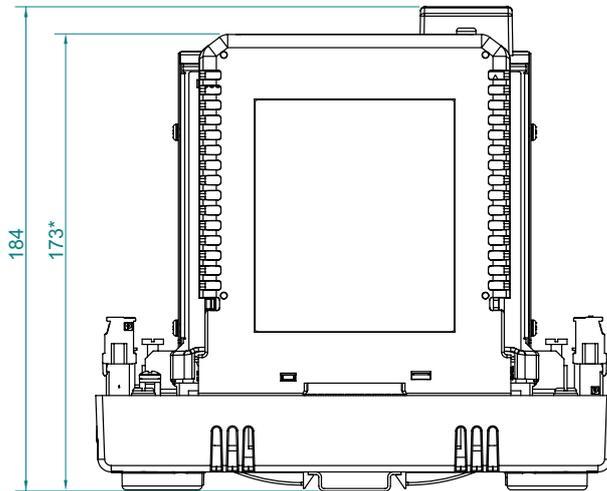
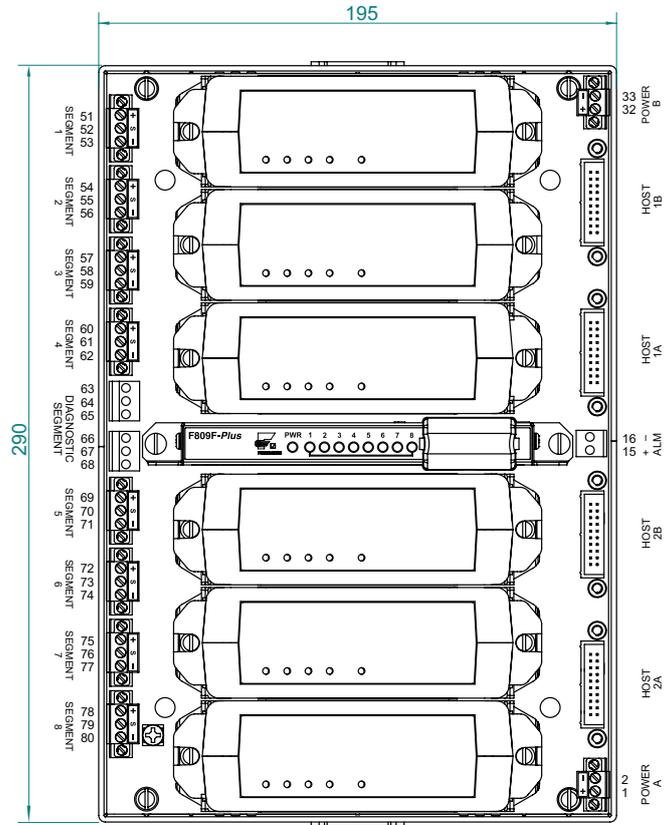
<b>F809F-Plus*</b>	Fieldbus diagnostic module
<b>FS32*</b>	Fieldbus Surge Protector
<b>9180-BAR</b>	9180 trunk bar

\* See datasheet on MTL web site for full technical specification

## APPROVALS - for the latest certification information visit [www.mtl-inst.com/certificates/](http://www.mtl-inst.com/certificates/)

Region (Authority)	Power Supply version	Standard	Certificate	Approved for	Ratings
Fieldbus Foundation™		FF-831	PS079000	–	Power Supply Type 132
US (FM)	9188-x1 (with 9191-FP module)	Class 3611: 2004 Class 3600: 2011 Class 3810: 2005 ANSI/ISA-60079-0: 2009 ANSI/ISA-60079-15: 2009	3046854	NI/I/2/ABCD/T4 I/2/AEx nA nC/IIC/T4	
Canada (FM)		CSA C22.2 No. 213: 1987 (R2008) CSA E60079-15: 2002 (R2012) CSA E60079-0: 2011 C22.2 No. 1010.1: 2004 (R2009)	3046854C	NI/I/2/ABCD/T4 I/2/AEx nA nC/IIC/T4	
IECEX (Baseefa)	9188-x1 (with 9191-FP module)	IEC 60079-0:2011 IEC 60079-15:2010	IECEX BAS 11.0119X IECEXBAS11.0113U	II 3 G Ex nA nC IIC T4 Gc	Maximum output voltage 32V (9191-FP) 22V (9192-FP)
ATEX (Eaton)	9188-x2 (with 9192-FP module)	EN 60079-0:2011 EN 60079-15:2010	MTL12ATEX9188X	II 3 G Ex nA nC IIC T4	

**DIMENSION DRAWING**



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