9181

8 segment redundant fieldbus power for Invensys Foxboro I/A® series control systems

- **Redundant fieldbus power for Foundation™ fieldbus cards**
- **Integrated connections to Foxboro I/A baseplate**
- **Flexible N+1 redundancy**
- **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 9181 fieldbus power system is designed to provide redundant power for up to eight FOUNDATION™ fieldbus segments. It has host-side connections that allow direct integration into Invensys Foxboro I/A® series control systems using standard pre-assembled cables. 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.

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 9181-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.

9181-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. **9181-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 Series 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 surge-protection components for each fieldbus trunk are available as an option reducing the installed cost of providing surge protection on fieldbus networks. Consult MTL for availability.

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 9181-CA-Px carrier using two-part pluggable connectors. System connections are compatible with Foxboro I/A® Series baseplates, using P0916Dx cables, and field wiring connections are available with either pluggable screw terminals (9181-CA-PS) or pluggable spring clamp terminals (9181-CA-PC). The pluggable connections are screw-retained providing a reliable connection in an industrial environment.

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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	

9181 SYSTEM

Input voltage (DC)	19.2 - 30.0V
Isolation	
Fieldbus to input power	500V AC rms withstand ‡
Segment to segment	850V DC withstand
	‡ *in accordance with FF-831*

	9181-21-P*	9181-22-P*
Current consumption (24V input, all outputs fully loaded)	1.5A	1A
Power dissipation per segment (24V input, all outputs fully loaded)	1.3W	1.1W
Number of segments	Four (4)	Four (4)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module
Design current (per segment)	0 to 250mA	0 to 250mA

	9181-41-P*	9181-42-P*
Current consumption (24V input, all outputs fully loaded)	2.9A	2.1A
Power dissipation per segment (24V input, all outputs fully loaded)	2.5W	2.3W
Number of segments	Four (4)	Four (4)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module
Design current (per segment)	0 to 500mA	0 to 500mA

	9181-61-P*	9181-62-P*
Current consumption (24V input, all outputs fully loaded)	2.9A	2.1A
Power dissipation per segment (24V input, all outputs fully loaded)	1.3W	1.1W
Number of segments	Eight (8)	Eight (8)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module
Design current (per segment)	0 to 250mA	0 to 250mA

	9181-91-P*	9181-92-P*
Current consumption (24V input, all outputs fully loaded)	5.7A	4.1A
Power dissipation per segment (24V input, all outputs fully loaded)	2.5W	2.3W
Number of segments	Eight (8)	Eight (8)
Output Voltage (DC)	As 9191-FP module	As 9192-FP module
Design current (per segment)	0 to 500mA	0 to 500mA

ALARMS

Alarm contact rating
1A maximum @ 30V DC maximum

Alarm contact status
Normally closed

Alarm threshold	9191-FP
Segment output voltage	<16V

CONNECTIONS

ELECTRICAL CONNECTIONS

System connectors
25-pin subminature D-type connector - compatible with Foxboro system cables from the P0916Dx series. (Select a cable of the appropriate length.)

Diagnostics segment terminals
3-way fixed screw terminal connector 0.14 to 2.5 mm²

Field & Power terminals
Pluggable rising cage-clamp screw terminals (-PS)
Conductor size: 0.14 to 2.5 mm²
Pluggable spring-clamp terminals (-PC)
Conductor size: 0.2 to 2.5 mm²

Alarm & ground terminals
2-way fixed screw terminal connector 0.14 to 2.5 mm²

Cable screen ground connections
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
9181-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 9181 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
9181-CA-Px	Carrier, unpopulated
9191-FP	4-segment power module: 28V, 250mA
9192-FP	4-segment power module: 19V, 250mA, for Ex ic spur applications
9197-BLK	Alarm blanking module (used in any empty power module position to defeat the carrier alarm)
9181-21-Px	4 segment system with 9181-CA-P* carrier, 2 x 9191-FP and 4 x 9197-BLK
9181-41-Px	4 segment system with 9181-CA-P* carrier, 3 x 9191-FP and 3 x 9197-BLK
9181-61-Px	8 segment system with 9181-CA-P* carrier, 4 x 9191-FP and 2 x 9197-BLK
9181-91-Px	8 segment system with 9181-CA-P* carrier and 6 x 9191-FP
9181-22-Px	4 segment system with 9181-CA-P* carrier, 2 x 9192-FP and 4 x 9197-BLK
9181-42-Px	4 segment system with 9181-CA-P* carrier, 3 x 9192-FP and 3 x 9197-BLK
9181-62-Px	8 segment system with 9181-CA-P* carrier, 4 x 9192-FP and 2 x 9197-BLK
9181-92-Px	8 segment system with 9181-CA-P* 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

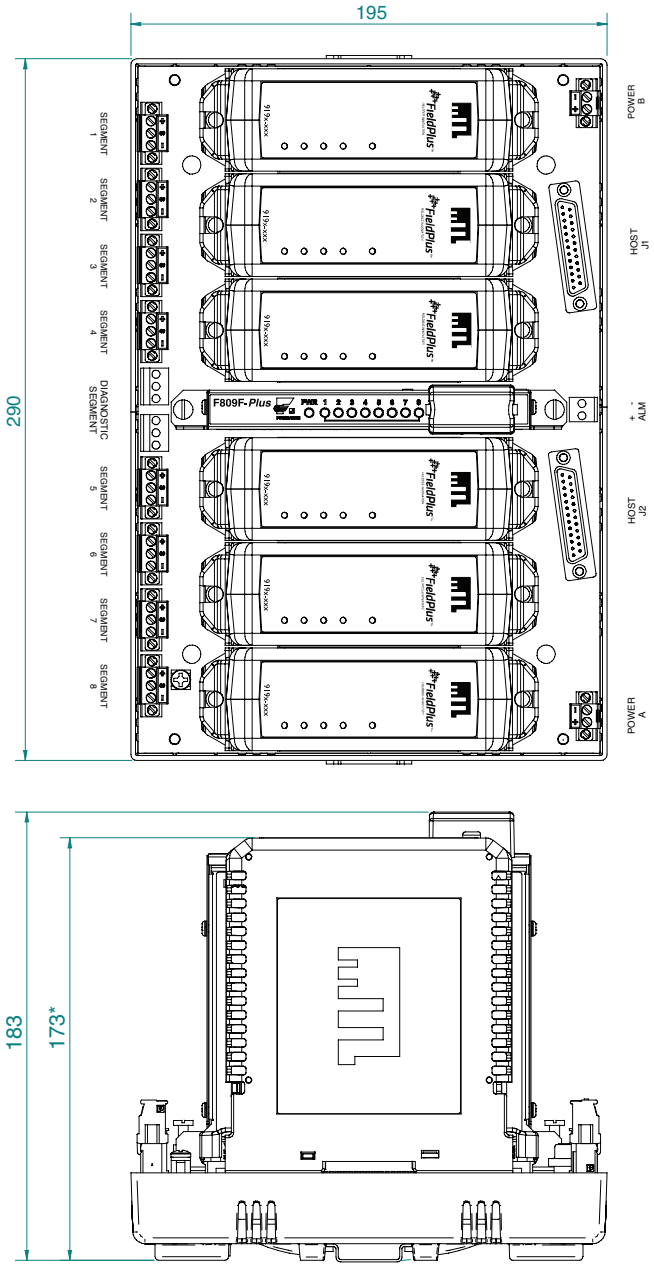
F809F-Plus*	Fieldbus diagnostic module
FS32*	Fieldbus Surge Protector
9180-BAR	9180 trunk bar

* See datasheet on MTL web site for full technical specification

APPROVALS - *for the latest certification information visit www.mtl-inst.com/support/certificates/*

Region (Authority)	Power Supply version	Standard	Certificate	Approved for	Ratings
Fieldbus Foundation™	9181-x1 (with 9191-FP module)	FF-831	PS079000	–	Power Supply Type 132
US (FM)		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)	9181-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 (MTL)	9181-x2 (with 9192-FP module)	EN 60079-0:2011 EN 60079-15:2010	MTL13ATEX9181X	II 3 G Ex nA nC IIC T4	

DIMENSION DRAWING (9181-91-PS shown)



*This dimension applies if the F809F-*Plus* diagnostic module is not used.

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