9189
8 segment redundant fieldbus power supply

- Redundant fieldbus power for Foundation™ fieldbus cards
- 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 9189 fieldbus power system is designed to provide redundant power for eight, or four, Foundation™ fieldbus H1 segments for use with all fieldbus systems. 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 9191-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 9191-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 9189-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.

9189-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. 9189-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 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 9189-CA-Px carrier using two-part pluggable connectors. Field wiring connections are available with either pluggable screw terminals (9189-CA-PS) or pluggable spring clamp terminals (9189-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
- Class I Zone 2 IIC T4

**OUTPUT**

<table>
<thead>
<tr>
<th></th>
<th>9191-FP</th>
<th>9192-FP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td>Four (4)</td>
<td>Four (4)</td>
</tr>
<tr>
<td>Voltage (DC)</td>
<td>28.0 - 32.0V</td>
<td>19.0 - 22.0V</td>
</tr>
<tr>
<td>Current limit</td>
<td>&lt;320mA</td>
<td>&gt;320mA</td>
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<tr>
<td>Minimum load</td>
<td>0mA</td>
<td>0mA</td>
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**9189 SYSTEM**

<table>
<thead>
<tr>
<th></th>
<th>9189-21-P*</th>
<th>9189-22-P*</th>
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<tbody>
<tr>
<td>Input voltage (DC)</td>
<td>19.2 - 30.0V</td>
<td>850V DC withstand</td>
</tr>
<tr>
<td>Fieldbus to input power Segment to segment</td>
<td>500V AC rms withstand ‡</td>
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<table>
<thead>
<tr>
<th></th>
<th>9189-41-P*</th>
<th>9189-42-P*</th>
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</thead>
<tbody>
<tr>
<td>Current consumption (24V input, all outputs fully loaded)</td>
<td>1.5A</td>
<td>1A</td>
</tr>
<tr>
<td>Power dissipation per segment (24V input, all outputs fully loaded)</td>
<td>1.3W</td>
<td>1W</td>
</tr>
<tr>
<td>Number of segments</td>
<td>Four (4)</td>
<td>Four (4)</td>
</tr>
<tr>
<td>Output Voltage (DC)</td>
<td>As 9191-FP module</td>
<td>As 9192-FP module</td>
</tr>
<tr>
<td>Design current (per segment)</td>
<td>0 to 250mA</td>
<td>0 to 250mA</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>9189-61-P*</th>
<th>9189-62-P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption (24V input, all outputs fully loaded)</td>
<td>2.9A</td>
<td>2.1A</td>
</tr>
<tr>
<td>Power dissipation per segment (24V input, all outputs fully loaded)</td>
<td>2.5W</td>
<td>2.3W</td>
</tr>
<tr>
<td>Number of segments</td>
<td>Four (8)</td>
<td>Eight (8)</td>
</tr>
<tr>
<td>Output Voltage (DC)</td>
<td>As 9191-FP module</td>
<td>As 9192-FP module</td>
</tr>
<tr>
<td>Design current (per segment)</td>
<td>0 to 500mA</td>
<td>0 to 500mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>9189-91-P*</th>
<th>9189-92-P*</th>
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</thead>
<tbody>
<tr>
<td>Current consumption (24V input, all outputs fully loaded)</td>
<td>5.7A</td>
<td>4.1A</td>
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<tr>
<td>Power dissipation per segment (24V input, all outputs fully loaded)</td>
<td>2.5W</td>
<td>2.3W</td>
</tr>
<tr>
<td>Number of segments</td>
<td>Eight (8)</td>
<td>Eight (8)</td>
</tr>
<tr>
<td>Output Voltage (DC)</td>
<td>As 9191-FP module</td>
<td>As 9192-FP module</td>
</tr>
<tr>
<td>Design current (per segment)</td>
<td>0 to 500mA</td>
<td>0 to 500mA</td>
</tr>
</tbody>
</table>

**ALARMS**

- **Alarm contact rating**
  - 1A maximum @ 30V DC maximum
- **Alarm contact status**
  - Normally closed
- **Alarm threshold**
  - 9191-FP: <16V
  - 9192-FP: <10V

**CONNECTIONS**

**ELECTRICAL CONNECTIONS**

- **System & optional 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 screw terminals (-PC)
    - Conductor size: 0.2 to 2.5 mm²
- **2-way fixed screw terminal connector 0.14 to 2.5 mm²**

**Cable screen ground connections**

- User-selectable jumper for segment shields: isolated (default) or interconnected and ground connection

**Terminators**

- A single termination is provided on each segment

**ENVIRONMENTAL**

- **Ambient temperature**
  - Operating: –20°C to +60°C (optimum orientation)
  - Non-optimum orientation: –20°C to +50°C
- **Relative Humidity**
  - < 95%, non-condensing
- **Ambient temperature**
  - Storage: –40°C to +85°C
- **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
- 9189-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 9189 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

<table>
<thead>
<tr>
<th>PART NO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>9189-CA-Px</td>
<td>Carrier, unpopulated</td>
</tr>
<tr>
<td>9191-FP</td>
<td>4-segment power module: 28V, 250mA</td>
</tr>
<tr>
<td>9192-FP</td>
<td>4-segment power module: 19V, 250mA, for Ex ic spur applications</td>
</tr>
<tr>
<td>9197-BLK</td>
<td>Alarm blanking module (used in any empty power module position to defeat the carrier alarm)</td>
</tr>
<tr>
<td>9189-21-Px</td>
<td>4 segment system with 9189-CA-P* carrier, 2 x 9191-FP and 4 x 9197-BLK</td>
</tr>
<tr>
<td>9189-41-Px</td>
<td>4 segment system with 9189-CA-P* carrier, 3 x 9191-FP and 3 x 9197-BLK</td>
</tr>
<tr>
<td>9189-61-Px</td>
<td>8 segment system with 9189-CA-P* carrier, 4 x 9191-FP and 2 x 9197-BLK</td>
</tr>
<tr>
<td>9189-91-Px</td>
<td>8 segment system with 9189-CA-P* carrier and 6 x 9191-FP</td>
</tr>
<tr>
<td>9189-22-Px</td>
<td>4 segment system with 9189-CA-P* carrier, 2 x 9192-FP and 4 x 9197-BLK</td>
</tr>
<tr>
<td>9189-42-Px</td>
<td>4 segment system with 9189-CA-P* carrier, 3 x 9192-FP and 3 x 9197-BLK</td>
</tr>
<tr>
<td>9189-62-Px</td>
<td>8 segment system with 9189-CA-P* carrier, 4 x 9192-FP and 2 x 9197-BLK</td>
</tr>
<tr>
<td>9189-92-Px</td>
<td>8 segment system with 9189-CA-P* carrier and 6 x 9192-FP</td>
</tr>
</tbody>
</table>

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/certificates/

<table>
<thead>
<tr>
<th>Region (Authority)</th>
<th>Power Supply version</th>
<th>Standard</th>
<th>Certificate</th>
<th>Approved for</th>
<th>Ratings</th>
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</thead>
<tbody>
<tr>
<td>Fieldbus Foundation™</td>
<td></td>
<td>FF-831</td>
<td>PS079000</td>
<td>–</td>
<td>Power Supply Type 132</td>
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| US (FM)            | 9189-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/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/T4 |
| IECEx (Baseefa)    | 9189-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 |
| ATEX (Eaton)       | 9189-x2 (with 9192-FP module) | EN 60079-0:2011  
                     |         | EN 60079-15:2010  
                     |         | MTL13ATEX9189X  
                     |         | II 3 G Ex nA nC IIC T4 |

Maximum output voltage
32V (9191-FP)  
22V (9192-FP)
The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
The F101 and F102 fieldbus power supplies are designed to provide power for a single Foundation™ fieldbus H1 segment. Galvanic isolation, power conditioning and segment termination are incorporated into each F101 or F102 module. Termination of the fieldbus segments is normally enabled with a switch on the module, but may be switched off for those few applications that do not require a Terminator at the Fieldbus Power Supply.

**For extreme reliability,** the modules use passive components for power conditioning and a reliable DC/DC converter to provide galvanic isolation and power regulation. The connectors used for power input and the Fieldbus are high quality pluggable types with screw retention. Spring-clamp (-PC) and screw-terminal (-PS) connector versions are supported.

**The modules can be powered** from a supply between 19.2 – 30.0 DC. The incoming power can be applied via a top-mounted connector, which supports onward looping of power wiring, or by using a proprietary plug-in connector on a DIN-rail bussing system.

**LED indicators show the status** of the modules. In normal operation, the green Power LED is lit, showing that there is proper input voltage to the module and the red Fault LED is off. If the fieldbus segment is shorted, or in an over-current condition, the Fault LED blinks. An internal module error is indicated by a steady light on the red Fault LED. The status of the internal terminator switch is also indicated by an illuminated ‘T’ symbol.

**F101 and F102 modules provide galvanic isolation** between the input power and the fieldbus segments, as required by the IEC61158-2 fieldbus standard and the Fieldbus Foundation™ FF-831 validation test for fieldbus power supplies.

**The F101 is specifically intended** for use in applications that require live-workable, energy-limited spurs in Zone 2 or Division 2 hazardous areas where the field devices are certified Ex nL or Ex i with Uᵢ ≤ 24V.

**The F102 has a high output voltage** and should be specified for applications requiring heavily loaded segments and/or long cable lengths.

*Foundation™ fieldbus is a trademark of Fieldbus Foundation™, Austin, Texas.*
SPECIFICATION

Location of equipment
Safe Area, Class I Div 2 Groups ABCD T4, or
Class I Zone 2 IIC T4 hazardous area
IEC Zone 2 IIC T4

INPUT

Input voltage
19.2 – 30.0V DC

Reverse polarity protection
Yes

Current consumption
see Input Current graph

Power dissipation
see Power Dissipation graph

Note: modules are capable of operating at full load without spacing

OUTPUT

Number of Channels
One (1)

Voltage
F101: 21.5 – 24.0V DC
F102: 27.9 – 30.0V DC

Design Current
0 to 500mA per segment

Segment Current Limit
> 550mA

Minimum Load
0mA

Isolation
Fieldbus to input power: Tested at 500V ACrms in accordance
with FF-831

ELECTRICAL CONNECTIONS

Fieldbus wiring (host and field)
Screw-secured, 3-way pluggable connectors in screw
terminal or spring clamp version, 0.14 to 2.5mm²

Power input
Screw-secured, 4-way pluggable connector in screw terminal
or spring clamp version, 0.14 to 2.5mm² (see diagram)

DIN-rail power bussing option
Proprietary connection system - see Ordering Information

Fieldbus terminator
100, switchable

MECHANICAL

Mounting method
Integrated fixings for vertical ‘Top hat’ DIN-rail, 35mm x
7.5mm to EN50022

Housing material
Polycarbonate

Tagging strip
To accept paper legend

ENVIRONMENTAL

Ambient temperature
Operating: −40°C to +65°C* (at maximum rated output)
−40°C to +70°C* (at 400mA output)
Storage: −40°C to +85°C
* fitted on horizontal DIN-rail mounted on a vertical plane

Relative humidity
<95%, non-condensing

Ingress protection
IP20 to BS EN60529 (Additional protection by means of enclosure)

F101/102 - BLOCK DIAGRAM
(showing interconnection scheme)

The above diagram shows a basic illustration of how the F101 or
102 is wired. For detailed wiring information, see the installation
instructions.

PHYSICAL NETWORKS

IEC61158-2
ISA-S50.02 Part 2-1992
FOUNDATION fieldbus H1
Profibus PA

LED INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>ON</th>
<th>Flashing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (green)</td>
<td>Power fail or internal fault</td>
<td>Power OK</td>
<td>—</td>
</tr>
<tr>
<td>Fault (red)</td>
<td>Normal</td>
<td>Internal error, replace module</td>
<td>Output current limit exceeded</td>
</tr>
<tr>
<td>Terminator (white 'T')</td>
<td>Terminator disabled</td>
<td>Terminator enabled</td>
<td>—</td>
</tr>
</tbody>
</table>
F101 PARAMETERS (typical)

F101 Input vs Output Current @ 25°C

F101 Power Dissipation @ 25°C

F102 PARAMETERS (typical)

F102 Input vs Output Current @ 25°C

F102 Power Dissipation @ 25°C

F101/102 DIMENSIONS (mm) (shown with screw-clamp connectors)

* + 5mm with spring clamp connectors
### Ordering Information

<table>
<thead>
<tr>
<th>PART No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F101-PS</td>
<td>Fieldbus Power Supply (21.5V min., 500mA) pluggable screw-terminal connectors</td>
</tr>
<tr>
<td>F101-PC</td>
<td>Fieldbus Power Supply (21.5V min., 500mA) pluggable spring-clamp connectors</td>
</tr>
<tr>
<td>F102-PS</td>
<td>Fieldbus Power Supply (27.9V min., 500mA) pluggable screw-terminal connectors</td>
</tr>
<tr>
<td>F102-PC</td>
<td>Fieldbus Power Supply (27.9V min., 500mA) pluggable spring-clamp connectors</td>
</tr>
</tbody>
</table>

### Approvals

**EU (Relcom)**
- Standard: EN61326-1:2013
- Certificate: Class A Industrial Locations
- Approved for: CE
- Ratings: Power Supply Type 132

**US (FM)**
- EN50079-15: 2002
- EN 6079-15: 2010

**Canada (FM)**
- EN6079-15: 2010
- RELC09ATEX1008X
- Zone 2 IIC T4

**ATEX (Relcom)**
- EN 60079-0:2012 + A11:2013
- EN 60079-15:2010
- RELC09ATEX1008X
- Zone 2 IIC T4

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September 2016

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
The F104 fieldbus power supply is designed to provide power for a single Foundation™ fieldbus H1 segment. Galvanic isolation, power conditioning and segment termination are incorporated into each F104 module.

The F104 has low current consumption and is ideal for use in solar-powered applications such as instrumentation nodes for remote well-heads. This is achieved by providing a lower output voltage to the fieldbus segment than with conventional fieldbus power supplies. This eliminates unnecessary power dissipation in the fieldbus instruments. The 13V nominal output is nevertheless sufficient to support up to 10 typical instruments on a 200m trunk cable.

Termination of the fieldbus segment is selected using a switch on the module, and is normally enabled, but it may be switched out for those few applications that do not require a terminator at the Fieldbus Power Supply.

For extreme reliability, the module uses passive components for power conditioning and a reliable DC/DC converter to provide galvanic isolation and power regulation. The connectors used for power input and the fieldbus are high quality pluggable types with screw retention. Spring-clamp (-PC) and screw-terminal (-PS) connector versions are supported.

LED indicators show the status of the module. In normal operation, the green Power LED is lit, showing that there is proper input voltage to the module and the red Fault LED is off. If the fieldbus segment is shorted, or in an over-current condition, the Fault LED blinks. An internal module error is indicated by a steady light on the red Fault LED. The status of the internal terminator switch is also indicated by an illuminated ‘T’ symbol.

The F104 can be powered from a power supply between 10 to 30V DC; a range that easily accommodates typical 12V and 24V solar-powered battery systems. The incoming power can be applied via a top-mounted connector, which supports onward looping of power wiring, or by using a proprietary plug-in connector on a DIN-rail bussing system.

The F104 module provides galvanic isolation between the input power and the fieldbus segments, as required by the IEC 61158-2 fieldbus standard and the Fieldbus Foundation™ FF-831 validation test for fieldbus power supplies.

Foundation™ fieldbus is a trademark of Fieldbus Foundation™, Austin, Texas.
SPECIFICATION

Location of equipment
Safe Area, Class I Div 2 Groups ABCD T4, or
Class I Zone 2 IIC T4 hazardous area
IEC Zone 2 IIC T4 or Zone 22 hazardous area

INPUT

Input voltage
10.0 – 30.0V DC

Reverse polarity protection
Yes

Current consumption
see Input Current graph

Power dissipation
see Power Dissipation graph

Note: modules are capable of operating at full load without spacing

OUTPUT

Number of Channels
One (1)

Voltage
13.0 – 14.0V DC

Design Current
0 to 250mA

Segment Current Limit
> 280mA

Minimum Load
10mA

Isolation
Fieldbus to input power: Tested at 500V ACrms in accordance
with FF-831

ELECTRICAL CONNECTIONS

Fieldbus wiring (host and field)
Screw-secured, 3-way pluggable connectors in screw
terminal or spring clamp version, 0.14 to 2.5mm²

Power input
Screw-secured, 4-way pluggable connector in screw terminal
or spring clamp version, 0.14 to 2.5mm² (see diagram)

DIN-rail power bussing option
Proprietary connection system - see Ordering Information

Fieldbus terminator
100, switchable

MECHANICAL

Mounting method
Integrated fixings for vertical ‘Top hat’ DIN-rail, 35mm x
7.5mm to EN50022

Housing material
Polycarbonate

Tagging strip
To accept paper legend

ENVIRONMENTAL

Ambient temperature
Operating: –40°C to +70°C*
Storage: –40°C to +85°C
* fitted on horizontal DIN-rail mounted on a vertical plane

Relative humidity
<95%, non-condensing

Ingress protection
IP20 to BS EN60529 (Additional protection by means of
enclosure)

F104 - BLOCK DIAGRAM

(showing interconnection scheme)
The above diagram shows a basic illustration of how the F104
is wired. For detailed wiring information, see the installation
instructions.

PHYSICAL NETWORKS

IEC61158-2
ISA-S50.02 Part 2-1992
FOUNDATION™ fieldbus H1
Profibus PA

LED INDICATORS

<table>
<thead>
<tr>
<th>OFF</th>
<th>ON</th>
<th>Flashing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (green)</td>
<td>Power fail or internal</td>
<td>Power OK</td>
</tr>
<tr>
<td></td>
<td>fault</td>
<td></td>
</tr>
<tr>
<td>Fault (red)</td>
<td>Normal</td>
<td>Internal error,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace module</td>
</tr>
<tr>
<td>Terminator</td>
<td>terminator disabled</td>
<td>Terminator enabled</td>
</tr>
<tr>
<td>white ‘T’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F104 PARAMETERS (typical)

F104 DIMENSIONS (mm)
(shown with screw-clamp connectors)

* + 5mm with spring clamp connectors
ORDERING INFORMATION

<table>
<thead>
<tr>
<th>PART No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F104-PS</td>
<td>Fieldbus Power Supply (13.0V, 250mA) pluggable screw-terminal connectors</td>
</tr>
<tr>
<td>F104-PC</td>
<td>Fieldbus Power Supply (13.0V, 250mA) pluggable spring-clamp connectors</td>
</tr>
<tr>
<td>PBUS01</td>
<td>Power Bus DIN-rail connectors, pack of 5</td>
</tr>
<tr>
<td>PBUS02</td>
<td>Power Bus DIN-rail input plug and socket set</td>
</tr>
<tr>
<td>PBUS03</td>
<td>DIN-rail mounted strain relief clamps, pack of 2</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Region (Authority)</th>
<th>Standard</th>
<th>Certificate</th>
<th>Approved for</th>
<th>Ratings</th>
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<tbody>
<tr>
<td>EU (Relcom)</td>
<td>EN61326-1:2013</td>
<td>PS072902</td>
<td>Class A Industrial Locations</td>
<td>CE</td>
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<tr>
<td>(Fieldbus Foundation™)</td>
<td>FF-831</td>
<td>3035979</td>
<td>Class I, Div 2, ABCD, T4</td>
<td>Power Supply Type 132</td>
</tr>
<tr>
<td>Canada (FM)</td>
<td>CAN/CSA-E60079-15: 2002 C22.2 No. 213: 2004 C22.2 No. 1010.1: 2004</td>
<td>3035979C</td>
<td>Class I, Zone 2, IIC, T4</td>
<td>Ni/II/2/ABCD/T4 Ta=70°C Ex nA nL IIC T4 Ta=70°C</td>
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<tr>
<td>ATEX (Relcom)</td>
<td>EN 60079-0:2012+A11:2013 EN 60079-15:2010</td>
<td>RELC09ATEX1008X</td>
<td>Zone 2 IIC T4</td>
<td>Ex nA IIC T4</td>
</tr>
</tbody>
</table>

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The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
System Overview
The 910x power supply systems provide an intrinsically safe field network for FOUNDATION™ fieldbus systems in hazardous areas. Variants are available for integration into proprietary fieldbus control systems. The output of the power supply modules complies with the Fieldbus Intrinsically Safe Concept (FISCO) model, in accordance with IEC standard 60079-27. The key advantages of FISCO over earlier ‘Entity’ model installations to FF-816 are higher available field current and reduced safety documentation, while retaining the ability to conduct maintenance while energised and without ‘gas clearance’. The 910x systems build on MTL 912x-IS range of power supplies, which have become established as the industry standard solution for FISCO networks. The 910x systems now achieve higher levels of overall system availability by providing redundancy of the power modules.

When used with intrinsically safe versions of MTL Megablock field wiring hubs, the power supply systems allow complete FISCO networks to be assembled for even the most demanding process applications.

Architecture
Each IS fieldbus segment is powered by a redundant pair of pluggable FISCO power supply modules. The modules operate in active/hot standby mode, ensuring that the fieldbus segments are continually powered. In the event of a failure of an active power supply module, the field circuit is automatically transferred to the standby module. The change-over is managed by Supply Arbitration Modules (SAMs), which monitor the health of the FISCO power supplies while maintaining intrinsic safety requirements during the transition to the standby module. The SAMs are also duplicated and replaceable, meaning that there are no non-redundant system components.

Switch-over is achieved rapidly and in accordance with Foundation fieldbus™ specifications, and without risk of losing fieldbus devices from the bus. A combination of LED diagnostics and alarm signalling provides failure notification of FISCO power supplies and SAMs, allowing failed hardware to be identified and full redundancy to be restored by module replacement.

MTL 910x-22
Redundant, 4-segment FISCO power supply system - IIB Gas Groups

- Redundant power supply configuration for high system availability
- 4 segments
- Enhancement of field-proven 912x-IS FISCO power supply
- For IIB Gas Groups
- Variants for direct integration into proprietary fieldbus control systems
- Rugged construction for easy cabinet mounting and resistance to shock and vibration
Carrier
The module carrier provides fieldbus power for four fieldbus segments. It supports pluggable power supply and arbitration modules for each segment and all connection facilities. Each carrier has connections for redundant 24V input power, host fieldbus segments and intrinsically safe field trunks. A volt-free failure alarm is also provided for connection to a digital input module. There are no active electronic circuits on the carrier, resulting in long calculated Mean Time to Failure (MTTF) and overall high system availability.

The carrier dimensions are designed to provide high packing density in typical 800mm wide equipment cabinets. Survival in high-vibration marine environments is achieved by secure panel-mount fixings.

The FISCO power supply module is a pluggable -22 version of MTL 912x-IS power supplies, and supports the same level of features. LED indicators provide information on system health and assist with fault diagnosis.

DIMENSIONS (mm) - (9107-22-PS model shown)
SPECIFICATION

OUTPUTS
Number of segments
Four
Voltage @ 25°C
12.9 min.
Note: Temperature coefficient 12mV/°C maximum. If the power supply and fieldbus cable are operated at low temperatures, the reduced resistance of the cable more than compensates for the reduction in output voltage.

Design current
0 to 245mA
Current limit
> 270mA
Output ripple
Complies with clause 12.7.3 of EN61158-02:2004
Minimum load
No load
Isolation
Host fieldbus to intrinsically safe fieldbus: 250V ac rms
Host/intrinsically safe fieldbus to power supply: 250V ac rms
Um = 253V rms

INPUTS
Input voltage
19.2 - 30V dc
Current consumption per segment (full load)
570 mA (typical) 625 mA (max.) at 24V
Note: Some variants may draw additional current where optional host power modules are supported - consult MTL product line.
Power dissipation per segment
@200mA load  9.7W (typical) 10.2W (max.)
Power dissipation per segment (full load)
10.3W (typical) 11.5W (max.)

SAFETY
Location of fieldbus power supply carrier
Safe area or Zone 2 IEC T4 hazardous area depending on model.
Location of field wiring
Zone 1, IIB hazardous area
Field wiring protection
Intrinsically safe
Safety description, each segment
14.8V, 359mA, 5.31W, 0.50μF*, 550μH
* When used in accordance with IEC60079-27, there is no need to take into consideration Co and Lo.
Certification markings
Depends upon model chosen - see specific data sheet
Certificate numbers
ATEX: Depends upon model chosen - see specific data sheet
IECEx: Depends upon model chosen - see specific data sheet
Certification is compatible with
• Fieldbus Foundation™ FFB16-FISCO.
• IEC 60079-27 FISCO Standard
• EC Directive 94/9/EC

FIELDBUS TERMINATION
One fixed, plus one fixed or switchable terminator per host segment on module carrier (depending upon model).
Fixed terminator per field segment inside each 9122-IS module.

CONNECTIONS
Hazardous area fieldbus
3-way pluggable rising cage-clamp screw terminals per segment
Conductor size: 0.14 to 2.5 mm²
Host fieldbus
Screw or sprung cage clamp terminals or proprietary host connector - determined by model type
24V power
2-way pluggable rising cage-clamp screw terminal each for Power A and Power B
Conductor size: 0.14 to 2.5 mm²
Alarm
2-way rising cage-clamp screw terminal
Conductor size: 0.14 to 2.5 mm²

ALARMS
Alarm contact rating
Max. 250V, 100mA (solid state)
Alarm contact status
Normally closed, open on failure of any FISCO power supply module or Supply Arbitration Module

MECHANICAL
Mounting
Surface mounting
Weight
5–6kg approx. depending upon model
Dimensions
Refer to diagram.

ENVIRONMENTAL
Ambient temperature
–20°C to +60°C (operating)
–40°C to +85°C (storage)
Ingress protection
IP20 to BS EN 60529 (Additional protection by means of enclosure)

LED INDICATORS
Carrier Power Inputs
<table>
<thead>
<tr>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (green)</td>
<td>Power fail</td>
</tr>
</tbody>
</table>

FISCO Power Supply
<table>
<thead>
<tr>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (green)</td>
<td>Power fail or internal fault</td>
</tr>
<tr>
<td>Fault (red)</td>
<td>Normal</td>
</tr>
<tr>
<td>Host Comm (yellow)</td>
<td>Comms failure</td>
</tr>
<tr>
<td>IS Comm (yellow)</td>
<td>Comms failure</td>
</tr>
</tbody>
</table>

Supply Arbitration Module (SAM) - 9129-IS
Active Mode
Active LED - ON | Standby LED - OFF
Standby Mode
Active LED - OFF | Standby LED - ON
Fault/Alarm Mode
Active LED or Standby LED - OFF or FLASHING†
† During startup, either of the LEDs may flash for up to 10 seconds - this is normal operation.

Patents applied for.
<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
<th>For use with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>9101-22-PS*</td>
<td>Redundant FISCO power supply system, 4-segment pluggable screw terminals</td>
<td>Invensys Foxboro I/A</td>
</tr>
<tr>
<td>9107-22-PS*</td>
<td>Redundant FISCO power supply system, 4-segment, pluggable screw terminals</td>
<td>Universal, non-powered host control systems</td>
</tr>
<tr>
<td>9108-22-PS</td>
<td>Redundant FISCO power supply system, 4-segment, pluggable screw terminals</td>
<td>Yokogawa CENTUM CS3000</td>
</tr>
<tr>
<td>9108-22-PC</td>
<td>Redundant FISCO power supply system, 4-segment, pluggable spring clamp</td>
<td>Yokogawa CENTUM CS3000</td>
</tr>
<tr>
<td>9109-22-PS*</td>
<td>Redundant FISCO power supply system, 4-segment, pluggable screw terminals</td>
<td>Universal, powered host control systems †, including: Emerson DeltaV and Honeywell Series ’C’ I/O</td>
</tr>
</tbody>
</table>

* Consult MTL product line for availability
† 9109-22-PS provides 30mA to energise H1 card in host control system. 9107-22-PS does not.
The MTL 9121-IS is a fieldbus repeater isolator which repeats the fieldbus signal from a safe area, Zone 2 fieldbus to an intrinsically safe fieldbus for connection to devices in Zone 1. The 9121-IS provides up to 120mA, typically powering up to 8 x 15mA field devices in Gas Group IIC.

The 9121-IS is certified to FISCO (Fieldbus Intrinsically Safe Concept) requirements in IEC60079-11: 2011 Equipment protection by intrinsic safety i and IEC 60079-25: 2010 Intrinsically Safe Electrical Systems. This allows the power supplied to the IS fieldbus to exceed the limit set in the original FF-816 IS physical layer profile. This increases the number of devices on an IS fieldbus from typically 4 x 20mA devices with maximum of 80m cable run, to up to 6 x 20mA devices with 400m cable run using the 9121-IS.

In addition, FISCO reduces the documentation required. Intrinsically safe systems have been installed in accordance with IEC 60079-25: 2010 Intrinsically Safe Electrical Systems entity calculations or similar local code of practice. This requires:
- calculation of cable parameters
- comparison of safety descriptions
- creation of descriptive system document

The administrative work involved in carrying this out in accordance with the end users procedures is usually considerable. Simply adding a new field device to an IS segment will require all this documentation to be updated.

Fieldbus intrinsically safe systems can now also be installed in accordance with FISCO requirements in IEC 60079-25: 2010 Intrinsically Safe Electrical Systems. This:
- eliminates need to calculate cable parameters
- reduces safety documentation to a list of devices
- allows addition of devices without a review of safety documentation
- as proven by test, allows longer cables with higher capacitance

To install a fieldbus system to the FISCO requirements in IEC 60079-25: 2010 Intrinsically Safe Electrical Systems the cable used in the system must comply with the following parameters:
- Loop resistance $R_c$: 15 to 150 ohms/km
- Loop inductance $L_c$: 0.4 to 1 mH/km
- Capacitance $C_c$: 80 to 200 nF/km
- Maximum length of each spur cable: 60 m in IIC and IIB
- Maximum length of each trunk cable: 1 km in IIC 5 km in IIB

When cable which complies with this specification is used, no further consideration of cable parameters is necessary. Virtually any instrument cable suitable for a fieldbus signal will comply.

*Foundation™ fieldbus is a trademark of Fieldbus Foundation™, Austin, Texas.*
**MODULE SPECIFICATION**

See also Common Specification

**OUTPUT**

**Number of channels**
One

**Voltage**
12.4V (min.) at 25°C (see note)

**Design current**
0 to 120mA

**Current limit**
>140mA

**Output ripple**
Complies with clause 22.6.2 of the fieldbus standard†

**Minimum load**
No load

**Maximum cable length**
Determined by IS load, see MTL Application Note AN9026 for details

**Isolation**
Input to output: 250V ac rms
Input and output to power supply: 250V ac rms
\( Um = 250V \) rms

**INPUT**

**Input voltage**
19.2 - 30V dc

**Current consumption**:
- 235mA (typical) 330mA (max.) at 20V
- 190mA (typical) 265mA (max.) at 24V
- 155mA (typical) 216mA (max.) at 30V

**Power dissipation with 110mA load**:
2.9W (typical) 4.3W (max.)

**Input protection**
Fuse + supply reversal diode

Note: Temperature coefficient 12mV/°C. If the power supply and fieldbus cable are operated at low temperatures, the reduced resistance of the cable more than compensates for the reduction in output voltage.

Fieldbus Foundation™ and FOUNDATION™ are trademarks of Fieldbus Foundation, Austin, Texas, USA.

† The applicable fieldbus specifications and standards are:
- FOUNDATION™ fieldbus 31.25 kb/s
- Physical Layer Profile Specification, document FF-816.

**SAFETY**

**Location of module**
Safe area, Zone 2, IIC T4 hazardous area.

**Location of field wiring**
Zone 1, IIC T4 hazardous area.

**Field wiring protection**
Intrinsically safe

**Certification Code**
- IECEx BAS 04.0031
- MTL02ATEX9121
- BAS02ATEX7276
- IECEx BAS 04.0031

**ATEX certificate numbers**
MTL02ATEX9121
BAS02ATEX7276

**IECEx certificate number**
IECEx BAS 04.0031

**Certification is compatible with**
Fieldbus FOUNDATION FF816-FISCO.
FISCO requirements in IEC60079-11:
- 2011 Equipment protection by intrinsic safety i and
- IEC 60079-25: 2010 Intrinsically Safe Electrical Systems
EC Directive 94/9/EC (ATEX 100A)

**MECHANICAL**

**Mounting**
DIN rail/surface mounting

**Module width**
42mm

**Weight**
360g

**LED INDICATORS**

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (green)</td>
<td>Power fail</td>
<td>Power OK</td>
</tr>
<tr>
<td>Fault (red)</td>
<td>Normal</td>
<td>Fault</td>
</tr>
<tr>
<td>Host Comm (yellow)</td>
<td>Comms failure</td>
<td>Comms OK</td>
</tr>
<tr>
<td>IS Comm (yellow)</td>
<td>Comms failure</td>
<td>Comms OK</td>
</tr>
</tbody>
</table>

* When used in accordance with IEC/TS 60079-27, there is no need to take into consideration \( Co \) and \( Lo \).
COMMON SPECIFICATIONS

MECHANICAL
Mounting method
Flat panel or DIN- rail
DIN-rail types
‘Top hat’, 35 x 7.5mm to EN 50022 or 35 x 15mm to EN 50022

ENVIRONMENTAL
Ambient temp
Operating, optimum orientation *
-40°C to +70°C
(except where stated in individual module specifications)
Operating, non-optimum orientation *
-40°C to +50°C
(except where stated in individual module specifications)
Storage
-40°C to +85°C
Relative Humidity
5 to 95% RH (non-condensing)

Vibration - Operating, Storage & Transport
Sinusoidal Vibration
EN 60068-2-6
10-500 Hz.
6 g for surface mounting,
1 g for DIN-rail mounting
Random Vibration
BS2011: Part 2.1
20-500 Hz
5 g for surface mounting,
1 g for DIN-rail mounting

Shock - Storage & Transport
EN 60068-2-32
1 m drop onto flat concrete

Shock - Storage & Transport
EN 60068-2-27
30 g peak acceleration
with 11 ms pulse width

Shock - Storage & Transport
EN 60068-2-27
30 g peak acceleration
with 11 ms pulse width

Ingress Protection
IP20 to BS EN 60529
(Additional protection by means of enclosure).
Corrosive atmospheres:
Designed to meet ten year service in Class G3 corrosive
environment, as defined by ISA Standard SP71.04

ELECTRICAL
EMC compliance
To EN 61326-1:2013 Electrical equipment for measurement,
control and laboratory use - EMC requirements.
Class A equipment Table 2 - Industrial locations
Electrical safety
EN 61010-1

PHYSICAL NETWORK
IEC61158-2
FOUNDATION Fieldbus H1
Profibus PA

TERMINALS (PLUGGABLE)
Rising cage clamp screw terminals
Specify -PS
Conductor size: 0.14 to 2.5mm2
Spring clamp terminals
Specify - PC
Conductor size: 0.14 to 2.5mm2

FIELDBUS TERMINATOR
Host side
Selectable by switch on top of unit
IS side
Permanently connected terminator

HOST SIDE POWER (selectable by switch on top of unit)
Voltage
14V
Current
0 to 30mA
Output ripple
Complies with clause 22.6.2 of the fieldbus standard
Minimum load
No load
Maximum cable length
Determined by host side load

Terminal numbering

ORDERING INFORMATION

9121-IS-PC FISCO power supply, IIC, with spring clamp terminals
9121-IS-PS FISCO power supply, IIC, with screw terminals
9321-SC Spur Connector - Entity (for use with 9121-IS)
9322-SC Spur Connector - Ex ia
9323-SC Spur Connector - Entity (for use with 9122-IS or 9121-IS)
The MTL 9122-IS is a fieldbus repeater isolator which repeats the fieldbus signal from a safe area, Zone 2 fieldbus to an intrinsically safe fieldbus for connection to devices in Zone 1. The 9122-IS provides up to 265mA, typically powering up to 16 x 20mA field devices in Gas Group IIB.

The 9122-IS is certified to FISCO (Fieldbus Intrinsically Safe Concept) requirements in IEC60079-11: 2011 Equipment protection by intrinsic safety and IEC 60079-25: 2010 Intrinsically Safe Electrical Systems. This allows the power supplied to the IS fieldbus to exceed the limit set in the original FF-816 IS physical layer profile. This increases the number of devices on an IS fieldbus from typically 4 x 20mA devices with maximum of 80m cable run, to up to 12 x 20mA devices with 250m cable run using the 9122-IS.

In addition, FISCO reduces the documentation required. Intrinsically safe systems have been installed in accordance with IEC 60079-25: 2010 Intrinsically Safe Electrical Systems entity calculations or similar local code of practice. This requires:
- calculation of cable parameters
- comparison of safety descriptions
- creation of descriptive system document

The administrative work involved in carrying this out in accordance with the end users procedures is usually considerable. Simply adding a new field device to an IS segment will require all this documentation to be updated.

Fieldbus intrinsically safe systems can now also be installed in accordance with FISCO requirements in IEC 60079-25: 2010 Intrinsically Safe Electrical Systems. This:
- eliminates need to calculate cable parameters
- reduces safety documentation to a list of devices
- allows addition of devices without a review of safety documentation
- as proven by test, allows longer cables with higher capacitance

To install a fieldbus system to the FISCO requirements in IEC 60079-25: 2010 Intrinsically Safe Electrical Systems the cable used in the system must comply with the following parameters:
- Loop resistance $R_c$: 15 to 150 ohms/km
- Loop inductance $L_c$: 0.4 to 1 mH/km
- Capacitance $C_c$: 80 to 200 nF/km
- Maximum length of each spur cable: 60 m in IIC and IIB
- Maximum length of each trunk cable: 1 km in IIC 5 km in IIB

When cable which complies with this specification is used, no further consideration of cable parameters is necessary. Virtually any instrument cable suitable for a fieldbus signal will comply.

Foundation™ fieldbus is a trademark of Fieldbus Foundation™, Austin, Texas.
MODULE SPECIFICATION
See also Common Specification

OUTPUT

Number of channels
- One

Voltage
- 13.1V (min.) at 25°C (see note)

Design current
- 0 to 265mA

Current limit
- >280mA

Output ripple
- Complies with clause 22.6.2 of the fieldbus standard†

Minimum load
- No load

Maximum cable length
- Determined by IS load, see MTL Application Note AN9026 for details

Isolation
- Input to output: 250V ac rms
- Input and output to power supply: 250V ac rms
- Um = 250V rms

INPUT

Input voltage
- 19.2 - 30V dc

Current consumption:
- 380mA (typical) 495mA (max.) at 20V
- 315mA (typical) 410mA (max.) at 24V
- 255mA (typical) 330mA (max.) at 30V

Power dissipation with 240mA load:
- 4.1W (typical) 6W (max.)

Input protection
- Fuse + supply reversal diode

SAFETY

Location of module
- Safe area, Zone 2, IIC T4 hazardous area.

Location of field wiring
- Zone 1, IIB T4 hazardous area.

Field wiring protection
- Intrinsically safe

Certification Code
- IIC (2) GD [Ex ib] IIB, IIC (2) 3 GD Ex nA IIB T4.

Safety description
- 14.8V, 359mA, 5.31W, 0.50μF*, 550μH*

ATEX certificate numbers
- MTL02ATEX9122
- BAS02ATEX7277

IECEx certificate number
- IECEx BAS 04.0031

Certification is compatible with
- Fieldbus FOUNDATION FF816-FISCO.
- EC Directive 94/9/EC (ATEX 100A)

MECHANICAL

Mounting
- DIN rail/surface mounting

Module width
- 42mm

Weight
- 360g

LED INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (green)</td>
<td>Power fail</td>
<td>Power OK</td>
</tr>
<tr>
<td>Fault (red)</td>
<td>Normal</td>
<td>Fault</td>
</tr>
<tr>
<td>Host Comm (yellow)</td>
<td>Comms failure</td>
<td>Comms OK</td>
</tr>
<tr>
<td>IS Comm (yellow)</td>
<td>Comms failure</td>
<td>Comms OK</td>
</tr>
</tbody>
</table>

* When used in accordance with IEC/TS 60079-27, there is no need to take into consideration Co and Lo.

Note: Temperature coefficient 12mV/°C. If the power supply and fieldbus cable are operated at low temperatures, the reduced resistance of the cable more than compensates for the reduction in output voltage.

Fieldbus Foundation™ and FOUNDATION™ are trademarks of Fieldbus Foundation, Austin, Texas, USA.

† The applicable fieldbus specifications and standards are:
- FOUNDATION™ fieldbus 31.25 kb/s
- Physical Layer Profile Specification, document FF-816.
COMMON SPECIFICATIONS

MECHANICAL
Mounting method
Flat panel or DIN-rail
DIN-rail types
‘Top hat’, 35 x 7.5mm to EN 50022 or 35 x 15mm to EN 50022

ENVIRONMENTAL
Ambient temp
Operating, optimum orientation *
-40°C to +70°C
(except where stated in individual module specifications)
Operating, non-optimum orientation *
-40°C to +50°C
(except where stated in individual module specifications)
Storage
-40°C to +85°C
Relative Humidity
5 to 95% RH (non-condensing)

Vibration - Operating, Storage & Transport
<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinusoidal Vibration</td>
<td>EN 60068-2-6</td>
<td>10-500 Hz, 5 g for surface mounting, 1 g for DIN-rail mounting</td>
</tr>
<tr>
<td>Random Vibration</td>
<td>BS2011:Part 2.1</td>
<td>20-500 Hz, 5 g for surface mounting, 1 g for DIN-rail mounting</td>
</tr>
</tbody>
</table>

Shock - Storage & Transport
<table>
<thead>
<tr>
<th>Type</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60068-2-32</td>
<td>1 m drop onto flat concrete</td>
</tr>
</tbody>
</table>

Shock - Storage & Transport
<table>
<thead>
<tr>
<th>Type</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60068-2-27</td>
<td>30 g peak acceleration with 11 ms pulse width</td>
</tr>
</tbody>
</table>

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

Corrosive atmospheres:
Designed to meet ten year service in Class G3 corrosive environment, as defined by ISA Standard SP71.04

ELECTRICAL
EMC compliance
To EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements.
Class A equipment Table 2 - Industrial locations.
Electrical safety
EN 61010-1

PHYSICAL NETWORK
IEC61158-2
FOUNDATION Fieldbus H1
Profibus PA

TERMINALS (PLUGGABLE)
Rising cage clamp screw terminals
Specify -PS
Conductor size: 0.14 to 2.5mm2
Spring clamp terminals
Specify - PC
Conductor size: 0.14 to 2.5mm2

FIELDBUS TERMINATOR
Host side
Selectable by switch on top of unit
IS side
Permanently connected terminator

HOST SIDE POWER (selectable by switch on top of unit)
Voltage
14V
Current
0 to 30mA
Output ripple
Complies with clause 22.6.2 of the fieldbus standard
Minimum load
No load
Maximum cable length
Determined by host side load

Terminal numbering

<table>
<thead>
<tr>
<th>Host side</th>
<th>NI/IS connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power Supply No 1 +ve</td>
</tr>
<tr>
<td>2</td>
<td>Power Supply 0V</td>
</tr>
<tr>
<td>3</td>
<td>Power Supply No 2 +ve</td>
</tr>
<tr>
<td>4</td>
<td>Fieldbus trunk +ve</td>
</tr>
<tr>
<td>5</td>
<td>Fieldbus trunk shield</td>
</tr>
<tr>
<td>6</td>
<td>Fieldbus trunk +ve</td>
</tr>
<tr>
<td>7</td>
<td>NI/IS fieldbus trunk +ve</td>
</tr>
<tr>
<td>8</td>
<td>NI/IS fieldbus trunk shield</td>
</tr>
<tr>
<td>9</td>
<td>NI/IS fieldbus trunk -ve</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Host side</th>
<th>Host side</th>
</tr>
</thead>
<tbody>
<tr>
<td>9122-IS-PC</td>
<td>FISCO power supply, IIB, with spring clamp terminals</td>
</tr>
<tr>
<td>9122-IS-PS</td>
<td>FISCO power supply, IIB, with screw terminals</td>
</tr>
<tr>
<td>9322-SC</td>
<td>Spur Connector - Ex ia</td>
</tr>
<tr>
<td>9323-SC</td>
<td>Spur Connector - Entity (for use with 9122-IS or 9121-IS)</td>
</tr>
</tbody>
</table>