

MTL 9109-22

4-segment, redundant, FISCO power supply

- Redundant power supply configuration for high system availability
- 245mA output per segment for IIB Gas Groups
- Redundant host power for Emerson DeltaV and Honeywell Experion-PKS Series C H1 cards
- 4 segments
- Enhancement of field-proven 912x-IS FISCO power supply
- Rugged construction for easy cabinet mounting and resistance to shock and vibration



System Overview

The 9109 power supply system provides an intrinsically safe field network for FOUNDATION™ fieldbus systems in hazardous areas. 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 9109 system builds on the MTL 912x-IS range of power supplies, which have become established as the industry standard solution for FISCO networks. The 9109 system now achieves 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 system allows 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.

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 modules are pluggable versions of MTL 912x-IS range, and support the same level of features. LED indicators provide information on system health and assist with fault diagnosis.

Redundant host power

The 9109-22 power supply is intended for control systems equipped with H1 interface cards requiring current from the host fieldbus segment in order to operate. Such systems include Emerson DeltaV and Honeywell Experion-PKS with 4-link Fieldbus Interface Module.

The 9109 system is therefore equipped with redundant, pluggable 9126-PU power supply modules that provide up to 30mA for each of the four segments. These modules are also duplicated and replaceable.



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SPECIFICATION

OUTPUTS

Number of segments

Four

Voltage

12.9V (min.) at 25°C (see note)

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
 $U_m = 253V$ rms

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.

INPUTS

Input voltage

19.2 - 30V dc

Current consumption per segment (full load):

570 mA (typical) 625 mA (max.) at 24V

Power dissipation per segment (200mA load):

9.7W (typical) 10.2W (max.)

Power dissipation per segment (full load):

10.3W (typical) 11.5W (max.)

Host power supply current consumption

The current drawn by the 9126-PU modules to provide power to the host H1 card depends on the number of host segments connected; the host demand current per segment; and the nominal power supply voltage. The table below provides a guide to the typical current drawn by a pair of 9126-PU modules.

For example, the current drawn by a pair of 9126-PU modules from a 24V supply, supporting 4 segments, each demanding 24mA, is ~198mA.

No. Of segs.	Host demand current			Supply voltage
	12mA	24mA	30mA	
1	Typical 9126-PU supply current (mA)			
	140	152	158	19.2V
	137	146	150	24V
2	138	144	148	30V
	152	175	187	19.2V
	147	163	172	24V
3	145	158	165	30V
	164	200	216	19.2V
	156	180	193	24V
4	153	173	183	30V
	175	222	245	19.2V
	165	198	215	24V
	160	187	200	30V

SAFETY

Location of fieldbus power supply carrier

Safe area

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

See 'Approvals' table

Certification is compatible with

- Fieldbus FOUNDATION FF816-FISCO.
- IEC 60079-27 FISCO Standard
- EC Directive 94/9/EC

FIELDBUS TERMINATION

1 x fixed terminator and 1 x switchable terminator per host segment on module carrier
 Fixed terminator per field segment inside each 9122-IS module

CONNECTIONS

Host fieldbus

2 x 3-way fixed rising cage-clamp screw terminals per segment
 Conductor size: 0.14 to 2.5 mm²

Hazardous area fieldbus

3-way pluggable rising cage-clamp screw terminals per segment
 Conductor size: 0.14 to 2.5 mm²

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 fixed 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

6.5kg approx.

Dimensions (refer also to diagram)

255(w) x 354(h) x 154(d) mm

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

	OFF	ON
Power (green)	Power fail	Power OK

Host PSU modules - 9126-PU

	OFF	ON
Seg1 - Seg4 (green)	Power fail	Power OK

FISCO Power Supply - 9122-IS-CM

	OFF	ON
Power (green)	Power fail or internal fault	Power OK
Fault (red)	Normal	Fault
Host Comm (yellow)	Comms failure	Comms OK
IS Comm (yellow)	Comms failure	Comms OK

Supply Arbitration Module (SAM) - 9129-IS

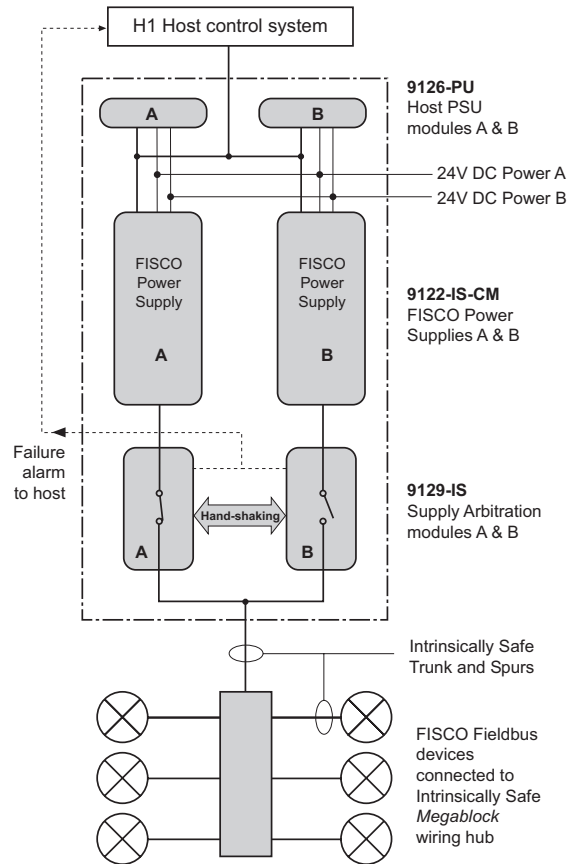
Active Mode	Active LED - ON	Standby LED - OFF
Standby Mode	Active LED - OFF	Standby LED - ON
Fault/Alarm Mode	Active LED or Standby LED - OFF or FLASHING*	

* Note: During startup, either of the LEDs may flash for up to 10 seconds - this is normal operation.

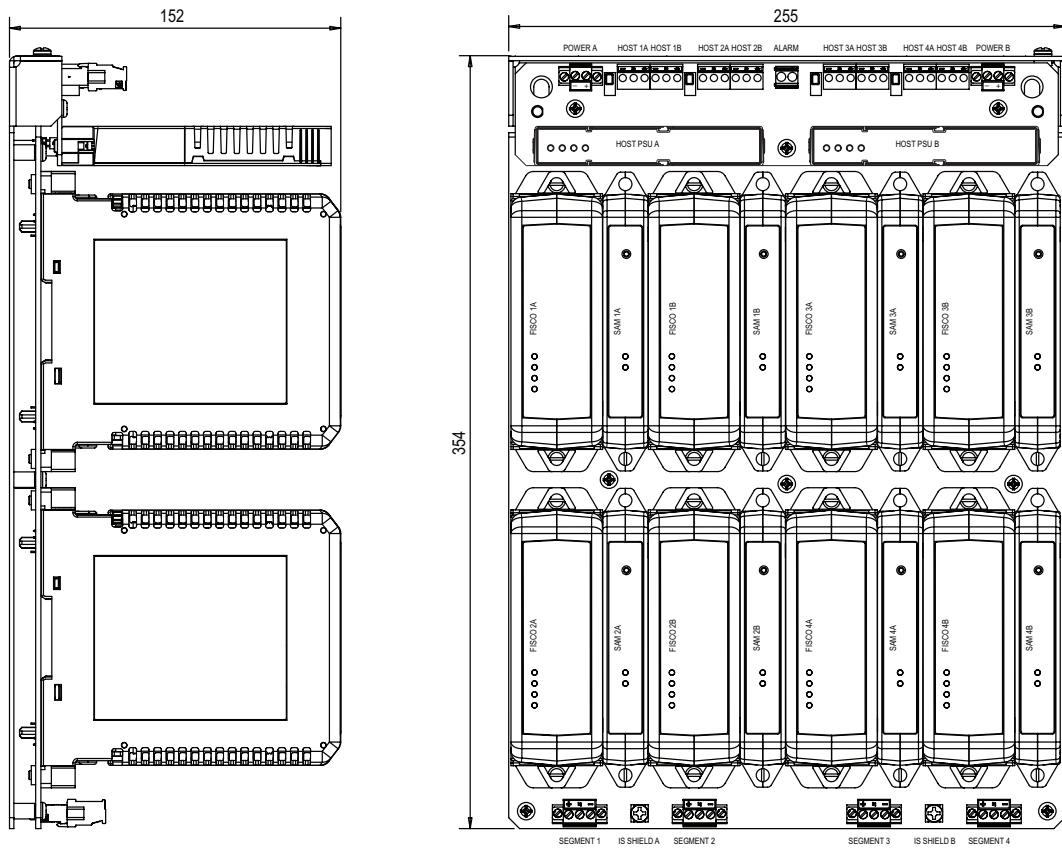
ORDERING INFORMATION

Description	Part Number
Redundant FISCO power supply system (4 segment, pluggable screw terminals, IIB Gas Group) Comprises: 8 x 9122-IS-CM, 8 x 9129-IS, 1 x 9109-CA-PS, 2 x 9126-PU	9109-22-PS
FISCO power supply (IIB Gas Group, pluggable carrier mount)	9122-IS-CM
Supply arbitration module	9129-IS
Host power supply module	9126-PU
Alarm blanking module (To defeat carrier alarm - if power supplies and supply arbitration modules are not fitted. Two required per segment)	9127-BLK
Module carrier (4 segment, pluggable screw terminals)	9109-CA-PS

**REDUNDANCY BLOCK DIAGRAM
(one segment shown)**



DIMENSIONS (mm)



APPROVALS

Authority	ATEX	IECEX
Standards	EN 60079-0 EN 60079-11 EN 60079-27 EN 61241-11	IEC 60079-0 IEC 60079-11 IEC 60079-27 IEC 61241-11
Certification markings	E II (2) GD [Ex ib Gb] IIB (-20°C ≤ T _a ≤ 60°C) [Ex ib Db] IIIC (-20°C ≤ T _a ≤ 60°C)	[Ex ib Gb] IIB (-20°C ≤ T _a ≤ 60°C) [Ex ib Db] IIIC (-20°C ≤ T _a ≤ 60°C)
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