



Relcom



redundant power  
system for fieldbus  
network segments

## FPS-I Series



- Redundant power conditioner for high availability applications
- Replace power modules without resetting the fieldbus
- High power output
- Two levels of power redundancy
- Component failure alarm
- Integrated fieldbus terminator
- Simplified power wiring

The **MTL-Relcom redundant fieldbus power system (FPS-I Series)** provides redundant power conditioning for fieldbus network segments and facilitates the connection of redundant bulk DC supplies. The system is fully 'hot-swappable' meaning that individual power conditioning modules and input power supplies can be replaced without interrupting power or communication on the fieldbus segment. An alarm circuit provides warning in case of a power conditioning module or input power supply failure. The system is designed so that power for several fieldbus segments can be provided from a single cabinet with minimal wiring.

**One fieldbus segment terminator** is built into each power system. Each FPS includes two plug-in power modules. These modules function as power conditioners, providing impedance between the input DC power supply and the fieldbus. This impedance is necessary to prevent the input DC power supply from degrading the digital fieldbus signal.

**Each power module** provides galvanic isolation of 250V ac between the fieldbus segment and the input power supplies. Each FPS-I supplies 350mA at 25V dc to the fieldbus segment. This output is maintained even if only one power module is installed. This level of output power allows for construction of very long fieldbus segments with a large number of bus-powered transmitters.

Each FPS provides both power conditioning and input power supply redundancy to each fieldbus segment.

**LED indicators on each power module** and near each of the two input power supply connections give clear visual indication that components are functioning properly. To minimize system downtime, an alarm circuit provides notification if any of the power supply components fail. This allows failed components to be replaced so that power system integrity is maintained.

**The alarm circuitry is galvanically isolated** from the fieldbus segments and input power supplies. The two power modules plug into a DIN rail mounted backplane (Redundant Coupler or RCT) that contains one segment terminator and provides connections to the two input power supplies, H1 host system, fieldbus trunk cable, and alarm circuitry.

**A bus configuration is used** for the input power and alarm connections so that up to eight fieldbus power systems can be easily wired together to share input power supplies and provide a common alarm circuit. Pictured above is a Redundant Fieldbus Power Supply with connections to the Fieldbus H1 host shown at the top of the picture.



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May 2007

# FPS-I REDUNDANT FIELDBUS POWER SYSTEM

**Segments that do not require** the high availability provided by redundant power conditioning may be operated with only a single FPS-IPM. To prevent an unwanted alarm condition due to the second FPS-IPM not being fitted, a blanking module should be installed in the blank slot. These are supplied in a pack of 10 as part number FPS-BLK10.

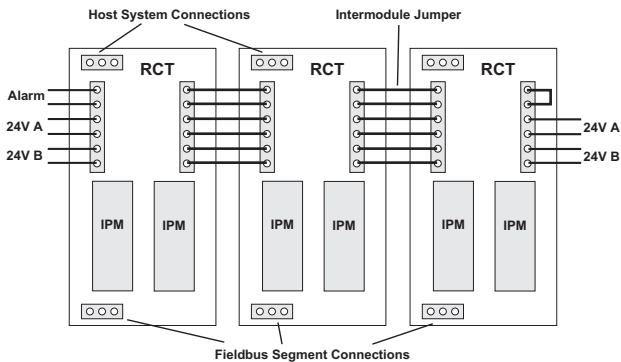
## INSTALLATION

### Mounting

MTL-Relcom Redundant Fieldbus Power Systems (FPS) are designed for mounting on 35mm DIN rail. For maximum cooling, the DIN rail should be mounted horizontally so that air can flow vertically between the power modules.

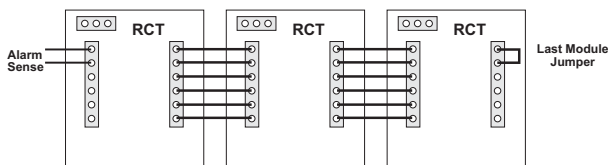
### Input power supply connections

For redundant operation, two separate DC power supplies should be connected to each FPS. Four pairs of terminals are provided on each FPS for this purpose; two pairs for each input power supply. The extra pair of terminals for each input power supply are intended to be used for connection to another FPS installed immediately adjacent to the first. Prefabricated jumper assemblies are included with each FPS-I for this purpose. When multiple Fieldbus Power Systems are wired together using jumper assemblies, redundant connections should be made to the two input power supplies using the terminal pairs located at each end of the row of systems. Up to eight segments can be wired together using the supplied jumper assemblies. An example of three systems wired this way is shown below:



### Alarm wiring connections

Next to the input power terminals, terminal pairs are provided for connection of the alarm circuit. Each prefabricated jumper assembly includes a pair of wires for the alarm circuit. To complete the alarm circuit, a jumper wire must be installed on the end module as shown below:



In normal operation, the alarm circuit is closed. It will open if:

- either input power supply < 18V dc
- output of either power module < 22V dc
- the fieldbus is shorted (short circuit resistance < 14Ω)

### H1 host and fieldbus trunk connections

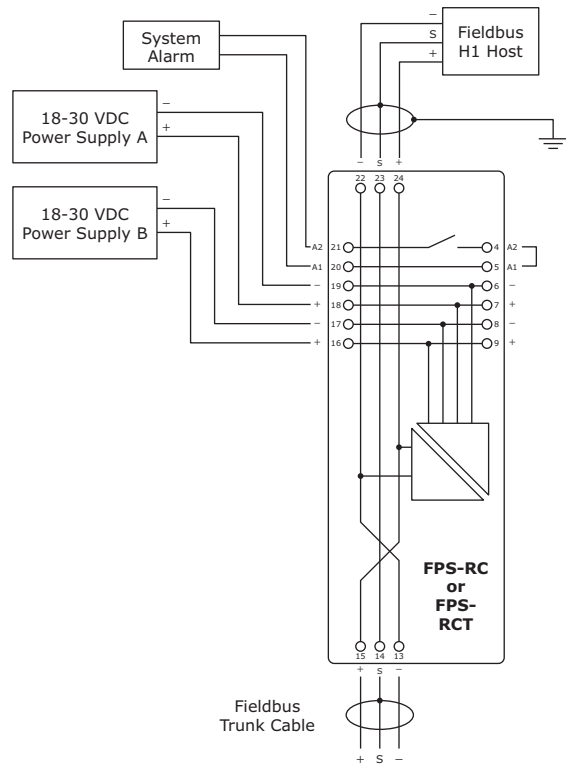
Two 3-conductor (+, shield, and -) connectors are provided for connection to the H1 host and to the fieldbus trunk cable. A green LED next to the connector labeled 'Fieldbus' indicates that power is being supplied to the fieldbus segment.

### Fieldbus segment terminators

Two terminators are required for each Fieldbus H1 network segment. One terminator is built into the RCT backplane of each FPS. The second Terminator should be positioned at the opposite end of the segment trunk cable.

A Redundant Coupler without a built-in terminator is also available (part number FPS-RC).

### Wiring



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## SPECIFICATION

### MECHANICAL

#### Mounting method

DIN-rail

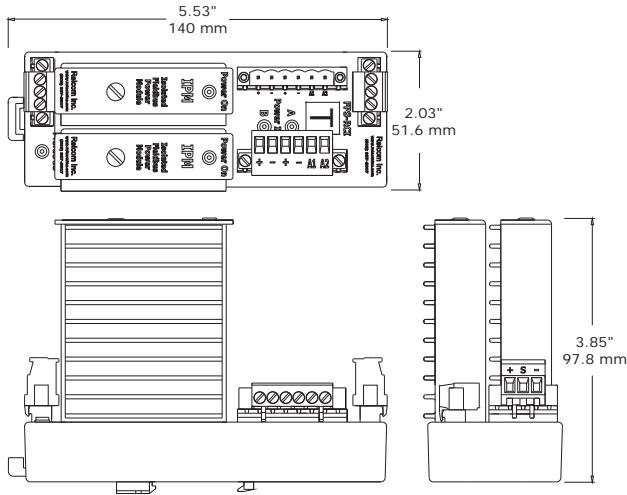
#### DIN-rail types

'Top hat', 35mm x 7.5mm or 35mm x 15mm to EN50022

#### Terminals

Rising cage clamp screw terminals

#### Physical Dimensions



### ENVIRONMENTAL

#### Ambient temp

#### Operating, optimum orientation \*

-40°C to +65°C †

-40°C to +70°C (250mA max. design current) †

#### Storage

-40°C to +85°C

#### Ingress Protection

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

#### Case Material

Power Module – Black anodised aluminium  
Redundant coupler – Lexan polycarbonate

### ELECTRICAL

#### EMC compliance

To EN61326:1998 Electrical equipment for measurement, control and laboratory use - EMC requirements

#### Electrical safety

EN 61010-1

### OUTPUT

#### Number of channels

One

#### Voltage

Minimum 25.0V dc

#### Design current

0 to 350mA

#### Current limit

385mA nominal

#### Output ripple

Complies with clause 22.6.2 of the fieldbus standard ††

#### Minimum load

No load

#### Isolation

Fieldbus to power supply 250V ac rms withstand

\* Optimum orientation is when the DIN rail is mounted horizontally on a vertical surface

† when installed in hazardous locations maximum temperature is reduced to 60°C

†† The applicable fieldbus specifications and standards are: FOUNDATION fieldbus™ 31.25kbit/s Physical Layer Profile Specification, document FF-816, IEC 61158-2:1993 and ISA-S50.02:1992 for 31.25kbit/s fieldbus systems.

### INPUT

#### Input voltage

19.2 - 30V dc

#### Current consumption with 350mA output load

820mA (typical) 895mA (max.) at 18V

630mA (typical) 685mA (max.) at 24V

540mA (typical) 600mA (max.) at 28V

#### Power dissipation with 350mA output load

5.7W (typical)

#### Maximum number of cascaded FPS-I modules

8 units

#### Alarm

Alarm contact rating: 1.0A max @ 30Vdc max

Alarm contact status: Normally closed

Alarm threshold input: <18Vdc

output: <22Vdc

## HAZARDOUS AREA APPROVALS

#### Location of module

Safe area, Zone 2, IIC T4 hazardous area or Class 1, Div 2, Groups A, B, C, D T4 hazardous location

#### Location of field wiring

Zone 2, IIC hazardous area or Class 1, Div 2, Groups A, B, C, D hazardous location

#### Field wiring protection

Normally non-arcing/Ex nA

## CERTIFICATION

### EUROPE (ATEX)

EN50021

500-463

Ex II 3 G EEx nA IIC T4

T<sub>amb</sub> = -40°C to +60°C

### USA (FM)

Class No.3611

3021700

Class1, Div 2 Grps A-D

T<sub>amb</sub> = 60°C

### CANADA (CSA)

C22.2 No.213

1279454

Class1, Div 2 Grps A-D; Ex nA IIC T4

T<sub>amb</sub> = -40°C to +60°C

## PHYSICAL NETWORKS

IEC61158-2

Foundation Fieldbus H1

## ORDERING INFORMATION

Description	Part Number
Redundant Fieldbus Power System	FPS-I
Includes: 2 FPS-IPM 1 FPS-RCT 2 FPS-A01 1 FPS-A03 1 FPS-A04	
Redundant Fieldbus Power System (no terminator)	FPS-2
Includes: 2 FPS-IPM 1 FPS-RC 2 FPS-A01 1 FPS-A03 1 FPS-A04	
Components and Accessories	Part Number
Power Module	FPS-IPM
Redundant Coupler	FPS-RCT
Redundant Coupler (no Terminator)	FPS-RC
3-pin Fieldbus Connector	FPS-A01
Power and Alarm Connector	FPS-A03
Power and Alarm Jumper Assembly	FPS-A04
Blanking module (pack of 10)	FPS-BLK10
Heavy Duty DIN Rail End Stop	ETL 7000
35mm DIN Rail, 1m Length	THR 7000



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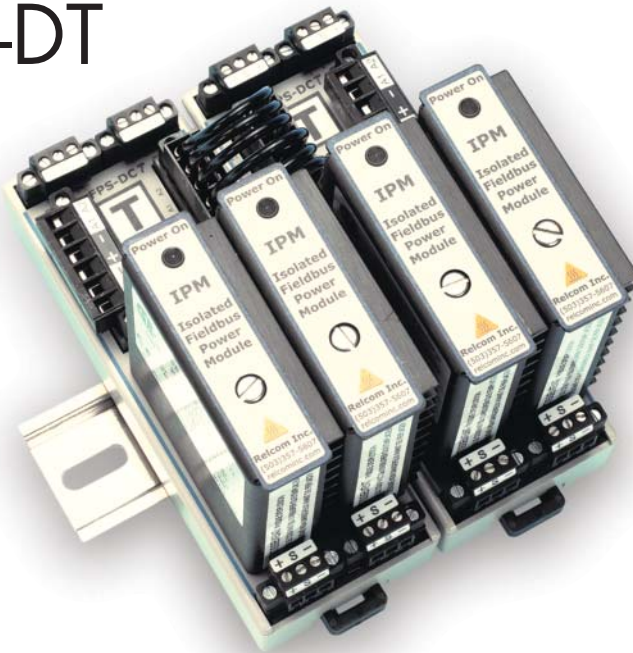


Relcom Inc.



## dual power supplies for fieldbus network segments

# FPS-D/-DT



- High power output
- Component failure alarm
- Integrated fieldbus terminator (-DT model)

The **MTL-Relcom dual fieldbus power supplies** provide power conditioning for two fieldbus network segments and facilitate the connection of input power supplies. An alarm circuit provides warning in case of a power conditioning module or input power supply failure. The system is designed so that power for several fieldbus segments can be provided from a single cabinet with minimal wiring.

**Two fieldbus segment terminators** are built into each FPS-DT power supply. Each FPS includes two plug-in Isolated Power Modules, or IPM's. These modules function as power conditioners, providing impedance between the input DC power supply and the fieldbus. This impedance is necessary to prevent the input DC power supply from degrading the digital fieldbus signal.

**Each isolated power module** provides galvanic isolation of 250V ac between the fieldbus segment and the input power supplies. Each IPM, supplies 350mA at 25V dc to the fieldbus segment. This level of output power allows for construction of very long fieldbus segments with a large number of bus-powered field devices.

**LED indicators on each IPM** and near each of the two input power supply connections give clear visual indication that components are functioning properly. To minimize system downtime, an alarm circuit provides notification if any of the power supply components fail. This allows failed components to be replaced so that power system integrity is

- Simplified power wiring
- Pluggable connectors
- Host and field connections
- Redundant power feeds

maintained.

**The alarm circuitry is galvanically isolated** from the fieldbus segments and input power supplies. The two IPM's plug into a DIN rail mounted Dual Coupler Base that contains one segment terminator per IPM (-DT model) and provides connections to the two input power supplies, two H1 host systems, two fieldbus trunk cables, and alarm circuitry.

**A bus configuration** is used for input power and alarm connections to multiple FPS power supplies. Up to five power supplies can be connected together by the bus. Input 24 VDC power is fed to both ends of the interconnected group so that if a power supply needs to be added or changed, this can be done without disrupting the other power supplies. The connections between the power supplies use a jumper cable assembly (FPS-A04), supplied with each dual power system.

**Each power supply** has a normally-closed relay contact for the alarm circuit. The bus provides a common circuit for all the relays in series. If there is a failure in any of the supplies, the relay is opened to signal an alarm.

**If FPS-IPM** power modules are not installed in all available slots of the FPS carrier(s), e.g. on an unused segment, an alarm condition will be generated. To prevent the alarm a blanking module can be fitted. These modules are available in packs of ten as part number FPS-BLK10.



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May 2004

## SPECIFICATION

### MECHANICAL

#### Mounting method

DIN-rail

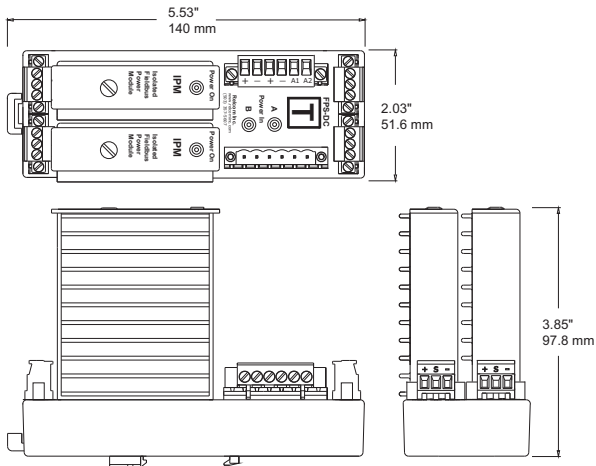
#### DIN-rail types

'Top hat', 35mm x 7.5mm or 35mm x 15mm to EN50022

#### Terminals

Rising cage clamp screw terminals

#### Physical Dimensions



### ENVIRONMENTAL

As FPS-I

### ELECTRICAL

#### EMC compliance

To EN61326:1998 Electrical equipment for measurement, control and laboratory use - EMC requirements

#### Electrical safety

EN 61010-1

### OUTPUT

#### Number of channels

Two

#### Voltage

Minimum 25.0V dc

#### Current

0 to 350mA

#### Output ripple

Complies with clause 22.6.2 of the fieldbus standard†

#### Minimum load

No load

#### Isolation

Fieldbus to power supply 250V ac rms withstand

### INPUT

#### Input voltage

19.2 - 30V dc

#### Current Consumption

With 2 segments at 350mA load: 1.37A (typ) at 20V  
1.14A (typ) at 24V  
0.98A (typ) at 28V

#### Power dissipation with 350mA output load

10.2W (max) at rated output

#### Maximum number of cascaded FPS modules

5 units (10 Isolated Power Modules)

#### Alarm

Alarm contact rating: 1.0A max @ 30V dc max

Alarm contact status: Normally closed

Alarm threshold

input: <18V dc

output: <22V dc

† The applicable fieldbus specifications and standards are: Foundation™ Fieldbus 31.25kbit/s Physical Layer Profile Specification, document FF-816, IEC 61158-2: 1993 and ISA-S50.02-1992 for 31.25kbit/s fieldbus systems.

## HAZARDOUS AREA APPROVALS

### Location of module

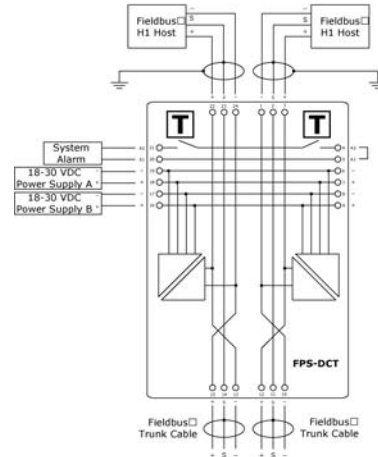
Safe area, Zone 2, IIC T4 hazardous area or Class 1, Div 2, Groups A, B, C, D T4 hazardous location

### Location of field wiring

Zone 2, IIC hazardous area or Class 1, Div 2, Groups A, B, C, D hazardous location

### Field wiring protection

Normally non-arcing/Ex nA



## CERTIFICATION

### EUROPE (ATEX)

EN50021 Ex II 3 G EEx nA IIC T4

500-463

### USA (FM)

Class No.3611 Class1, Div 2 Grps A-D

Pending

### CANADA (CSA)

C22.2 No.213 Class1, Div 2 Grps A-D; Ex nA IIC T4

1279454

## PHYSICAL NETWORKS

IEC61158-2

Foundation Fieldbus H1

## ORDERING INFORMATION

### Description

Fieldbus Dual Power System with Terminator

Includes: 2 FPS-IPM  
1 FPS-DCT  
4 FPS-A05  
1 FPS-A03  
1 FPS-A04

### Part Number

FPS-DT

Fieldbus Dual Power System (no Terminator)

Includes: 2 FPS-IPM  
1 FPS-DC  
4 FPS-A05  
1 FPS-A03  
1 FPS-A04

FPS-D

### Components and Accessories

Isolated Power Module  
Dual Power Back-Plane with Terminator  
Dual Power Back-Plane no Terminator  
3-pin Fieldbus Connector (3.5mm)  
5-pin Power and Alarm Connector  
Power and Alarm Jumper Assembly  
Heavy Duty DIN Rail End Stop  
35mm DIN rail, 1m length  
Blanking module (pack of 10)

### Part Number

FPS-IPM  
FPS-DCT  
FPS-DC  
FPS-A05  
FPS-A03  
FPS-A04  
ETL 7000  
THR 7000  
FPS-BLK10



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