9372-FB range
Redundant fieldbus barrier enclosures, 5/6 spur

- For Foundation™ fieldbus networks in hazardous areas
- Redundant configuration for super-high system availability
- Complete enclosure systems for up to 6 intrinsically safe spur connections
- Failure alarm direct to host control system via integrated fieldbus device
- Mount in Zone 1 (gas) or 21 (dust) with spurs connected into Zone 0
- Compatible with FISCO and Entity certified fieldbus instruments
- Ergonomic mechanical design
- Pluggable system components, without ‘gas free’ constraints
- Optional, integrated surge protection for trunk and spurs

The 9372-FB Redundant Fieldbus Barriers are field-mounted wiring hubs that create up to six intrinsically safe spur connections from a high-energy trunk, for connection to suitably certified Foundation™ fieldbus H1 instruments. They may be installed in Zone 1 (gas) or Zone 21 (dust) hazardous areas, with the trunk wiring implemented using suitably protected cable and increased safety (Ex e) connection facilities.

Each enclosure system uses duplicated Fieldbus Barrier modules in a redundant configuration to achieve significantly higher system availability than equivalent ‘simplex’ units. The 9372-FB may therefore be selected for critical process applications where failure of the Fieldbus Barrier would otherwise result in unacceptable downtime or lost production. It is also ideal for use in Fieldbus Safety Instrumented Function (SIF) networks in which nuisance trips cannot be tolerated. Failure annunciation to the host control system is provided by means of an integrated Foundation™ fieldbus device with Digital Input Function Block capability.

In common with conventional Fieldbus Barriers, each intrinsically safe spur is capable of supporting a FISCO or ‘Entity’ certified fieldbus device located in a Zone 0 or 1 hazardous area. The short-circuit protected spurs are galvanically isolated from the trunk and require no protective ground connection in the field.

The 9372-FB redundant fieldbus barrier is based on our revolutionary 9370-FB range of products, which are supplied as complete, factory-assembled enclosure systems that do not require additional wiring, customised housings or complex ancillary components. Electrical and mechanical aspects of the design are integrated, providing the industry’s first complete, ergonomic solution for ‘High Energy Trunk’ applications in hazardous areas.

Uniquely, the key modular components of the system (Fieldbus Barrier, Terminator and Surge Protectors) may be ‘hot-plugged’ by design and without gas-clearance procedures or separate isolating switches. This virtually eliminates the risk associated with hazardous area maintenance activities, speeds module replacement and avoids the need for specialist operator training.

Optional features include pluggable surge protection components for the fieldbus trunk and individual spurs. Connection facilities with generous room for cable management are provided within the Fieldbus Barrier enclosure for the trunk and spur wiring.

For added flexibility, a redundant-capable enclosure can be specified part-populated with one 6-spur module (model no. 9375-FB). This permits future upgrading from simplex to redundant mode simply by plugging in an additional Fieldbus Barrier module and optional alarm module.

The 9372-FB Fieldbus Barrier is bus powered and requires no additional power supply in the field. When used with a fieldbus host control system, power for the trunk may be provided by redundant power supplies.
SPECIFICATION

**SPURS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>9372-FB*</th>
<th>9375-FB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of spurs</td>
<td>5 (6th spur allocated to alarm module)</td>
<td>6 (upgradable to 2)</td>
</tr>
<tr>
<td>No. of 9377-FB modules installed</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Current per spur</td>
<td>0 - 32mA</td>
<td>0 - 32mA</td>
</tr>
<tr>
<td>Total current all spurs (max.)</td>
<td>160mA</td>
<td>192mA</td>
</tr>
<tr>
<td>Current limit per spur (max.)</td>
<td>45mA</td>
<td>4.5mA</td>
</tr>
<tr>
<td>Spur short-circuit current (max.)</td>
<td>4.5mA</td>
<td>4.5mA</td>
</tr>
<tr>
<td>Spur voltage @ 20°C</td>
<td>≥ 10V @ 40mA</td>
<td></td>
</tr>
<tr>
<td>No-load voltage</td>
<td>12V min.</td>
<td></td>
</tr>
</tbody>
</table>

**TRUNK**

Data rate 31.25kBaud

Data transmission between trunk and spurs passive, no repeater function

Number of trunk connections 2 (in & out), internally connected

Maximum number of 9377-FB-R modules per segment 2 redundant pairs (total 10 spurs***)

Input voltage range (trunk) 16–32V DC

Voltage drop (trunk in to trunk out) 0V

Maximum rated current (trunk in to trunk out) 5A

Low voltage monitoring

<table>
<thead>
<tr>
<th>Typical DC current consumption for 9372-FB (mA)</th>
<th>@ 16V</th>
<th>@ 24V</th>
<th>@ 32V</th>
</tr>
</thead>
<tbody>
<tr>
<td>No load on each spur</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>typ.</td>
<td>57.9</td>
<td>57.9</td>
<td>57.9</td>
</tr>
<tr>
<td>max.</td>
<td>80.0</td>
<td>80.0</td>
<td>80.0</td>
</tr>
<tr>
<td>1 spur @ 20mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>typ.</td>
<td>102.8</td>
<td>102.8</td>
<td>102.8</td>
</tr>
<tr>
<td>max.</td>
<td>120.0</td>
<td>120.0</td>
<td>120.0</td>
</tr>
<tr>
<td>All spurs @ 20mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>typ.</td>
<td>201.7</td>
<td>201.7</td>
<td>201.7</td>
</tr>
<tr>
<td>max.</td>
<td>208.0</td>
<td>208.0</td>
<td>208.0</td>
</tr>
<tr>
<td>All spurs @ 20mA 1 short-circuit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>typ.</td>
<td>185.0</td>
<td>185.0</td>
<td>185.0</td>
</tr>
<tr>
<td>max.</td>
<td>191.0</td>
<td>191.0</td>
<td>191.0</td>
</tr>
<tr>
<td>All spurs @ 32mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>typ.</td>
<td>276.5</td>
<td>276.5</td>
<td>276.5</td>
</tr>
<tr>
<td>max.</td>
<td>288.0</td>
<td>288.0</td>
<td>288.0</td>
</tr>
</tbody>
</table>

Power dissipation (max.)

2.5W (all spurs at 32mA)

**Fieldbus terminator**

Plug-in module (part number 9378-FT) supplied with each 9372-FB or 9375-FB enclosure. Provides 100Ω + 1μF according to IEC 61158-2 - see separate specification

**Trunk surge protection**

Plug-in module (part number 9376-SP) - see separate specification

**Reverse polarity protection**

Yes

Failure alarm

Failure of either 9377-FB-R barrier module in redundant mode is annunciated over Foundation™ fieldbus via state change of DI Function Block in 9379-ALM alarm module (standard in 9372-FB enclosure)

**ELECTRICAL CONNECTIONS**

**Trunk wiring terminals**

Type: Ex e

<table>
<thead>
<tr>
<th>Cable types and capacity</th>
<th>Screw cage clamp - mm²</th>
<th>Spring cage clamp - mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid cable</td>
<td>0.5 to 4.0</td>
<td>0.5 to 4.0</td>
</tr>
<tr>
<td>Flexible cable</td>
<td>0.5 to 2.5</td>
<td>0.5 to 2.5</td>
</tr>
</tbody>
</table>

**Spur field wiring terminals**

Type: 3-way, pluggable

<table>
<thead>
<tr>
<th>Cable types and capacity</th>
<th>Screw cage clamp - mm²</th>
<th>Spring cage clamp - mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid cable</td>
<td>0.2 to 2.5</td>
<td>0.2 to 2.5</td>
</tr>
<tr>
<td>Flexible cable</td>
<td>0.25 to 2.5</td>
<td>0.25 to 2.5</td>
</tr>
</tbody>
</table>

**Grounding of cable screens (trunk & spurs)**

(Configured with wire connections in the Trunk Terminal Assembly)

**Options**

<table>
<thead>
<tr>
<th>Spur</th>
<th>Trunk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grounded at host</td>
</tr>
<tr>
<td>2</td>
<td>Grounded at field enclosure</td>
</tr>
</tbody>
</table>

Trunk and spur cable shields are not interconnected within 9377-FB-R module.

**Equipotential earth/ground connection facility**

M10 earth/grounding stud on side wall of enclosure

**BARRIER LED INDICATORS**

**Trunk Power (PWR)**

<table>
<thead>
<tr>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage &gt; 16V, internal supply healthy</td>
<td>Supply voltage &lt; 16V or no supply</td>
</tr>
</tbody>
</table>

Green

* See ordering information

** 9372-FB supports 5 spurs, 9375-FB supports 5 spurs when alarm module is fitted or 6 spurs, when alarm module not fitted. Total of 12 spurs supported for 2 x 9375-FB with no alarm module fitted.

*** The FF-846 Isolated Device Coupler registration does not include tests for hardware redundancy. Although operation of the redundancy mechanism has been thoroughly tested, registration of the redundant capability is not implied by the application of the Foundation’s checkmark.
HAZARDOUS AREA APPROVALS
Location of equipment
Safe area or Zone 1 IIC T4 or Zone 21 hazardous area
Location of connected spur equipment
Safe area or Zone 0 IIC hazardous area
Certification marking
II 2(1)GD Ex de ib mb (ia Ga) IIC T4 Gb
Ex tb IIC T80°C Db
Certificate numbers
Baseefa09ATEX0185X
IECEx BAS09.0082X
Safety description (spurs)
$U_i = 17.5\, \text{V}$
$I_{o,\text{peak}} = 246\, \text{mA}$
$I_{\text{continuous}} = 215\, \text{mA}$
$E_i = 912\, \text{mW}$
$U_i = 17.5\, \text{V}$
$C_i = 0$
$L_i = 0$
Spurs in accordance with FISCO standard IEC 60079-11
ENVELOPMENTAL
Ambient temperature (system)
<table>
<thead>
<tr>
<th>PP-System</th>
<th>SS-System</th>
<th>Storage (PP or SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>−40°C to +65°C</td>
<td>−40°C to +70°C</td>
<td>−40°C to +75°C</td>
</tr>
</tbody>
</table>
Ambient temperature (9377-FB-R module)
−40°C to +75°C
Relative humidity
< 95%, non-condensing
Electromagnetic compatibility
EN 61326 – 1:2006
NAMUR NE 21
Shock & Vibration
Vibration:
BS EN 60068-2-6: 2008 Test Fc: 1g
BS EN 60068-2-64: 1995 Test Fh: 1g
Shock:
BS EN 60068-2-27: 1993 Test Ea: 15g
MECHANICAL
Materials
937x-FB-xx-SS*: 316L Stainless Steel
937x-FB-xx-PP*: Black, Glass Reinforced Plastic (GRP)

Enclosure sizes - see dimension drawings for details
GRP, 5 spurs**: 554 x 271 x 136 mm
Stainless steel, 5 spurs**: 428 x 271 x 130 mm

Mounting position (recommended)
On vertical plane, with glands and breather on underside
Cable/Breather entries
Trunk: M20 x 2; Spur: M20 x 6, Breather: M20 x 1
Enclosures are pre-fitted with a breather and Ex e nickel-plated brass plugs in all cable gland holes. These must be replaced only with Ex e equipment certified cable glands capable of maintaining the IP level of the enclosure type. See ordering information for gland options.
Protection
Stainless steel enclosures (937x-FB-xx-SS): IP66
GRP enclosures (937x-FB-xx-PP): IP66
Intrinsically safe terminals: IP20
Ex e terminals: IP30

ASSOCIATED LITERATURE
Instruction Manual - GRP enclosures
INM9370-RD-PP
Instruction Manual - stainless steel enclosures
INM9370-RD-SS

PHYSICAL NETWORKS
IEC61158-2
FOUNDATION™ fieldbus H1
Profile type (according to FF-816)
Type 163 (isolated device coupler) FF-846***

ORDERING INFORMATION
Order as:
9372-FB-xx-XX  5-spur Redundant Fieldbus Barrier enclosure system with two 9377-FB-R Fieldbus Barrier modules and one 9379-ALM alarm module installed.
9375-FB-xx-XX  5/6-spur Fieldbus Barrier enclosure system with one 9377-FB-R Fieldbus Barrier module installed. (Upgradable to redundant operation by addition of a second 9377-FB-R module and optional 9379-ALM alarm module).
Where xx = PS (pluggable screw terminal connectors) PC (pluggable spring clamp connectors)
Where XX = SS – 316L Stainless Steel PP – Glass Reinforced Plastic (GRP) - Black
(Note: All enclosures are pre-wired and include a 9378-FT fieldbus terminator module)
9377-FB-R  Fieldbus Barrier module, 6-spur, pluggable
9378-FT  Fieldbus terminator module, pluggable
9376-SP  Trunk surge protection module, pluggable
FS32  Spur surge protection module, pluggable

CABLE GLANDS
The following M20 cable glands are Ex e equipment certified, better than IP65 rated and suitable for use with the 9370-FB range of Fieldbus Barriers. They can be supplied separately and are available to order using the following part numbers.

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Manufacturer and Type</th>
<th>Description (Qty 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCS-1000-P20</td>
<td>Jacob 50-620</td>
<td>PASWL/Ex Plastic gland</td>
</tr>
<tr>
<td>FCS-1000-C20</td>
<td>Capri 816694</td>
<td>Nickel-plated brass gland</td>
</tr>
<tr>
<td>FCS-1000-A20</td>
<td>Capri 846694</td>
<td>Armoured nickel-plated brass gland</td>
</tr>
<tr>
<td>FCS-1000-S20</td>
<td>Capri 816699</td>
<td>Stainless steel gland</td>
</tr>
<tr>
<td>FCS-1000-R20</td>
<td>Capri 846699</td>
<td>Armoured stainless steel gland</td>
</tr>
</tbody>
</table>

Figure 1 - Illustrating spur redundancy and use of optional Alarm module
9372-FB range
November 2016

**DIMENSIONS (mm)**

**Stainless Steel Enclosure**
Mounting holes: Ø 10.8mm

9372-FB-xx-SS
9375-FB-xx-SS

**GRP Enclosure**
Mounting holes: 6.5mm slot, 12mm head max.

9372-FB-xx-PP
9375-FB-xx-PP

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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.