Foundation™ Fieldbus Physical Layer Components for Safe and Hazardous Areas

Presented to
FF Roadshow Brno 2012
14th November 2012
MTL Scope in Fieldbus Application

- Host H1 Card
- Power Supply / Conditioner
- Diagnostic Tools
- Control Room
- Field
- Trunk
- Spur
- Segment
- Terminator
- Conditioned Power Supply
- Host
- Device Coupler

Segment
<table>
<thead>
<tr>
<th>F10x Series</th>
<th>918x Series</th>
<th>F800 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw-secured, pluggable connectors throughout</td>
<td>+, S, - connector sequence for fault-tolerance</td>
<td></td>
</tr>
<tr>
<td>High output power (500mA) for ‘High Energy Trunk’ applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-segment, non-redundant, DIN-rail</td>
<td>Compact, high availability, redundant</td>
<td>Classic high-density, redundant</td>
</tr>
<tr>
<td>Ideal for batch and small-scale applications</td>
<td>Ideal for large-scale fieldbus installations</td>
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<tr>
<td>F104 ‘Eco’ module for remote solar powered sites</td>
<td>Unique ‘n+1’ redundancy saves cost</td>
<td>Component-free module carrier</td>
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F10x Series Power Supply

Provide power for a single Foundation™ fieldbus H1 segment.

Ideal for small and medium-sized fieldbus installations requiring non-redundant power, such as in batch processing applications.

Galvanic isolation, power conditioning and segment termination are incorporated into each module.

DIN-rail power bus option reduces wiring and installation costs.
Eco-power for remote Fieldbus nodes

- Remote, solar-powered fieldbus nodes require low-loss power supply schemes
- F104 specifically designed for solar-powered, battery-backed FF applications
- 10-30V power supply range
- Low output to minimise field losses
Redundant Power Supply Block Diagram

- H1 Host
- Host Connections: + S -
- 24V Bulk Power A: + (24V Bulk Power A), - (Field Connections)
- 24V Bulk Power B: + (24V Bulk Power B), - (Field Connections)
- Isolation: FF Power Module 1
- FF Power Module 2
- Alarm: Red line
Evolution: 8-segment Power Supply

+ Redundant fieldbus power for 8 segments
+ Power modules with ‘Proven Track Record’
+ Carrier accommodates Redundant FBM228 Foxboro I/A Series® H1 cards
+ Supports on-line ‘physical layer’ diagnostics module
+ Redundant 24V bulk power inputs
+ Fixed terminator on each segment
+ Module and bulk power failure signalled by volt-free relay
F800 Series Power Supply

- Redundant fieldbus power for FOUNDATION™ fieldbus cards
- Component-free module carrier for highest system availability
- Compact, high-density format using 8-segment modules
- Hot swappable power modules
- Wide range of versions for DCS integration
- Screw secured pluggable field and power feed connections for reliability, testing and maintenance
- On-line diagnostics option
- Screen pass-through or ground option without accessories
918x Series Power Supply

- Redundant fieldbus power for FOUNDATION™ fieldbus cards
- Flexible N+1 redundancy
  - Reduce initial capital cost by up to 25%
  - Lower replacement cost
  - Supporting future expansion
- Hot swappable power modules
- Low power dissipation
- Screw secured pluggable field and power feed connections for reliability, testing and maintenance
- On-line diagnostics option
- Screen pass-through or ground option without accessories
- Pluggable trunk surge protection option
**Module A**
powers 4 segments at 250mA

**Module B**
powers 4 segments at 500mA or provides redundancy at 250mA

**Module C**
Provides redundancy for 4 segments at 500mA

N+1 redundancy
6 modules provide redundant power at 500mA for 8 segments.
+ Connects spurs to trunk cable
+ Typically up to 12 devices supported, one per spur
+ Short-circuit protected
+ Optional, built-in terminator
+ Avoids DIN-rail terminals and wire links!
Spur short-circuit protection

Current limit set at approx 40-60mA, depending on Megablock type

Increase in segment current when spur short-circuit occurs

= Short-circuit current – normal field device current
## Megablock Wiring Hubs

![F300 Series](image1)

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<th>F300 Series</th>
<th>F200 Series</th>
<th>F200-XE Series</th>
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<td>applications</td>
<td>Division 1</td>
<td>IEC Zone 1</td>
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**F300 Series**
- For all general purpose and Division 2 applications

**F200 Series**
- Intrinsically safe, for FISCO applications in Division 1

**F200-XE Series**
- Ex me for connection to Ex d instruments in IEC Zone 1
## Field Enclosures

### “Off the Shelf” Standard Enclosures
- Standard proven designs reduce project costs
- Supplied pre-drilled and optionally fitted with cable glands
- Generous space for cable terminations
- Choice of stainless steel or Glass Reinforced Plastic

### Complete Engineered Solutions
- Built to detailed customer specification
- Internal wiring as required
- Custom options: hinged door; gland plates; viewing windows
- Choice of materials
## High Energy Trunk
**Div 2/Non-Incendive Spurs**

<table>
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<th>Benefits</th>
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<td>Low cost, reliable and robust</td>
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<tr>
<td>Live-workable Non-Incendive spurs in Division 2 hazardous areas</td>
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<tr>
<td>Use F300 Series Megablocks</td>
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<tr>
<td>‘Non-arcing’ spur option for simple, non-live-workable networks</td>
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<td>Compatible with general-purpose, high-density fieldbus power supplies, eg F800 and 918x Series</td>
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**Key:**
- Non-Live Working
- Live Working

**Zone 2/Safe Area Division 2**

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**Introduction**  |  **Product Portfolio**  |  **Product Networks**  |  **Case Study**
High Energy Trunk
Div 1/ Explosionproof

Benefits
- Simple, high reliability networks for safe and hazardous areas
- Megablock (F300 Type) must be in Explosionproof enclosure if in Div 1
- Wide choice of suitably-certified explosionproof field instrument types
- Compatible with general-purpose, high-density Fieldbus power supplies, eg F800 and 918x Series
High Energy Trunk with Fieldbus Barrier

Benefits

- Supports long cable lengths and heavily loaded segments
- Suitable for any IEC Zone or Gas Group
- Compatible with FISCO and Entity certified IS field devices
- New generation products allow safer operation and maintenance
- Compatible with general-purpose, high density fieldbus power supplies
Fieldbus Barriers

- Complete, fully-assembled enclosure systems
- 6 or 12 spur spurs per enclosure
- Choice of stainless steel or GRP enclosure materials
- Flexible modular construction allows easy expansion and retro-fittable surge protection
- Complete segregation of non live-workable circuits
- Unique Redundant option for high network availability
Hot-pluggable system components, even in hazardous areas

- Trunk terminals
- Trunk Terminal Assembly (TTA) housing
- Spur surge protector (optional)
- "Live pluggable" 6-spur Fieldbus Barrier modules
- Screw-secured, pluggable spur terminals
- Pluggable trunk surge protector (optional)
# Fieldbus Barrier

**Value proposition:** Higher reliability

## Value

**Improved productivity; greater competitiveness**

## Benefit

**Higher reliability; fewer interruptions to production**

## Feature

**Elimination of internal interconnecting wiring and duplicated terminals/terminator**

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**Diagram:**
- **Duplicated Fieldbus Terminators**
- **Complex switches for module removal**
- **Duplicated field wiring terminals**
- **Internal "hook-up" wiring**
- **Single Fieldbus Terminator**
- **No duplication of wiring terminals**
- **Isolating switches not required**
- **No internal "hook-up" wiring**
Fieldbus Intrinsically Safe Concept

**Features**

- Safest possible technique in hazardous areas
- Unique power supply redundancy delivers high system availability (IEC Zone 1 only)
- Single IS protection method used throughout
- Internationally recognised and defined in national standards

**Key:**
- Non-Live Working
- Live Working

**Zone 1 Division 1**
The industry’s standard FISCO power supply
Provides fully live-workable field network
Large installed base worldwide
Choice of module types:
  - 912x-IS Series single-segment, simplex, DIN-rail mounting
  - 910x-22 Series, multi-segment, redundant
Exploits full potential of IEC60079-27 FISCO standard: 10 or more fieldbus devices per segment
### 912x-IS Series Simplex

- Choice of versions for IIC/Groups A, B and IIB/Groups C, D hazards
- Straightforward installation on DIN-rail
- Multi-drop capability for multiple segment from single host H1 port
- Wide range of agency approvals

### 910x-22 Series Redundant

- Unique active/hot-standby redundancy scheme
- Multi-segment versions for direct DCS integration, minimising engineering effort
- Highest system availability when combined with Megablock wiring hub
- Suitable for critical applications in Zone 1 hazardous areas
- Lloyd’s Register marine approvals
### FBT-6 Fieldbus Monitor

- **Fieldbus powered**
- Connects at fieldbus power supply, field JB or field device
- Ideal for installation and commissioning
- Certified for connection to fieldbus networks in Zone/Division 1 and 2
- Measures noise, signal level, device re-transmissions, short-to-shield
- Uploads measurement data to a PC via USB port

### F809F Diagnostic Module

- Monitors health of 8 fieldbus segments
- Installs on fieldbus power supply carrier
- Communicates over Foundation™ fieldbus H1 segment
- Network status and parameters displayed in instrument management software
- Easily integrates into your choice of fieldbus control system
- Enhanced EDDL and Fieldbus FDT/DTM user interfaces

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**Physical Layer Diagnostic Tools**
### Fieldbus Surge Protection

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<tr>
<th>FP32</th>
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<th>TP32</th>
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<tr>
<td>![FP32 Image]</td>
<td>![FS32 Image]</td>
<td>![TP32 Image]</td>
</tr>
<tr>
<td>DIN rail mounting for easy installation and automatic earthing</td>
<td>Mounts directly on Megablock trunk or spur connectors</td>
<td>Screws into a spare conduit entry on field instrument</td>
</tr>
<tr>
<td>20kA maximum surge current per line</td>
<td>Retro-fittable to installed Megablocks</td>
<td>Optional integrated fieldbus terminator</td>
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<td>Fieldbus Displays</td>
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<tr>
<td>Provide valuable information such as process variables, text and graphics to plant operators</td>
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<tr>
<td>Global approvals allow installation in safe and hazardous areas</td>
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<td></td>
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<tr>
<td>Up to 8 process variables per display unit</td>
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<tr>
<td>Bus-powered</td>
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<tr>
<td>Integrated alarm functions with operator-programmable set-points</td>
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Thank You

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For further information please visit: www.FieldPlus.info