

Communication Networks for Hazardous Zone Applications

PROFIBUS PA



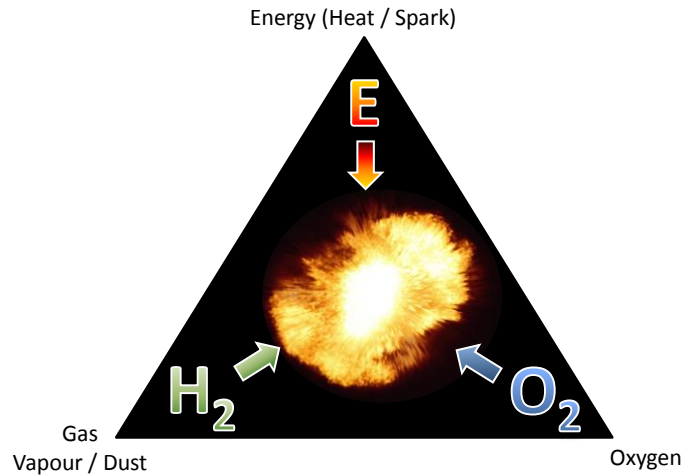
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Why use a bus?

- Less Cables
- Shorter Design & Commissioning Times
- Greater Accuracy
- Fewer Instruments
- Smarter Instruments allow Asset Management (Reduced Maintenance & Increased Reliability)

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How do we prevent an explosion?



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FISCO & FNICO

- Fieldbus Intrinsically-Safe Concept
 - According to the “Ex-i” standard
 - Safe, even under certain fault conditions
- Fieldbus Non-Incendive Concept
 - Safe only during normal operation
 - Not implemented

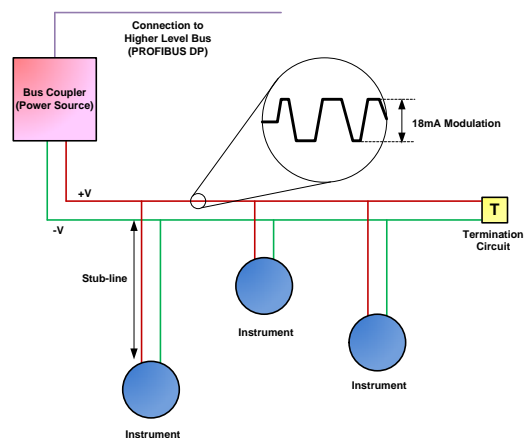
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MBP-IS

- Manchester Bus Powered Intrinsically Safe
 - IEC 61158-2
- MBP is a bus system designed for instrumentation and for application in hazardous areas
- MBP is the physical layer used for both PROFIBUS PA and Foundation Fieldbus

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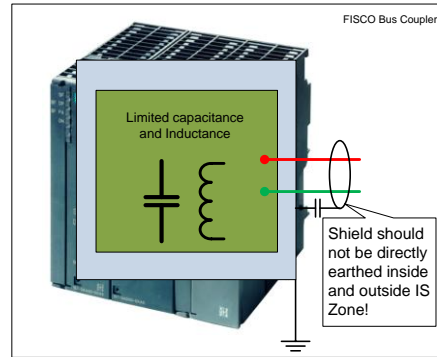
The inner workings of MBP-IS



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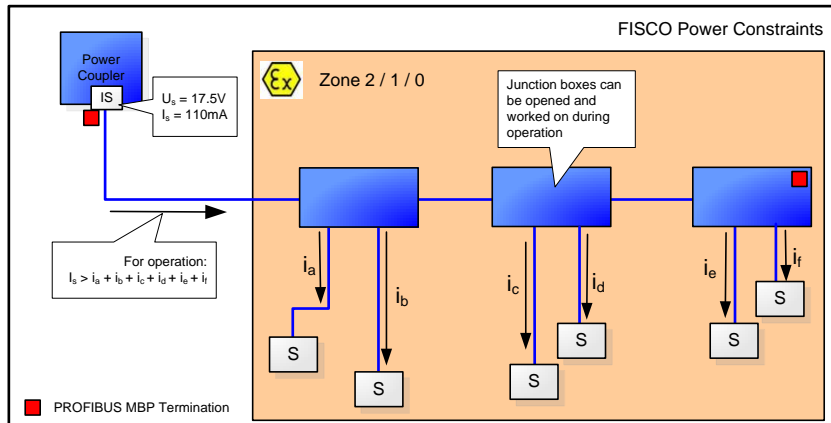
Bus Power Supplies for MBP-IS

- Should be clearly marked (Ex ia ...etc)
- Intrinsically safe with outputs of < 17.5v and < 380mA
- Limited Internal Capacitance and Inductance
- Beware of grounding!



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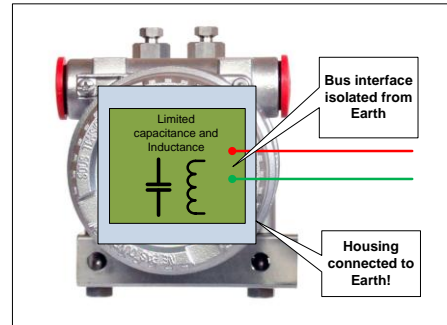
Bus Couplers for FISCO Systems



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Devices for FISCO Systems

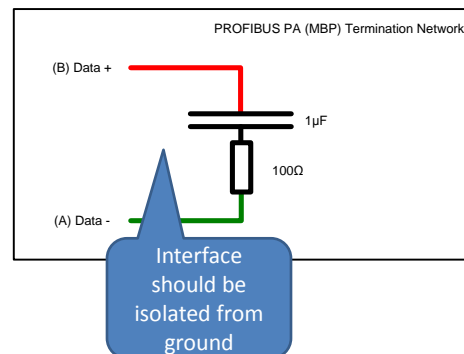
- Should be clearly marked (Ex ia ...etc)
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Terminations for MBP-IS

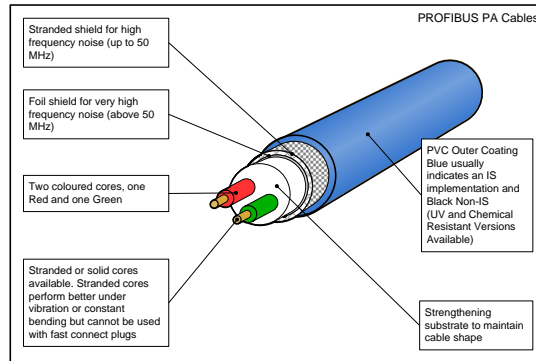
- Should be clearly marked (Ex ia ...etc)
- Intrinsically safe with inputs of 17.5v and 380mA
- Capacitance < $1.2\mu\text{F}$



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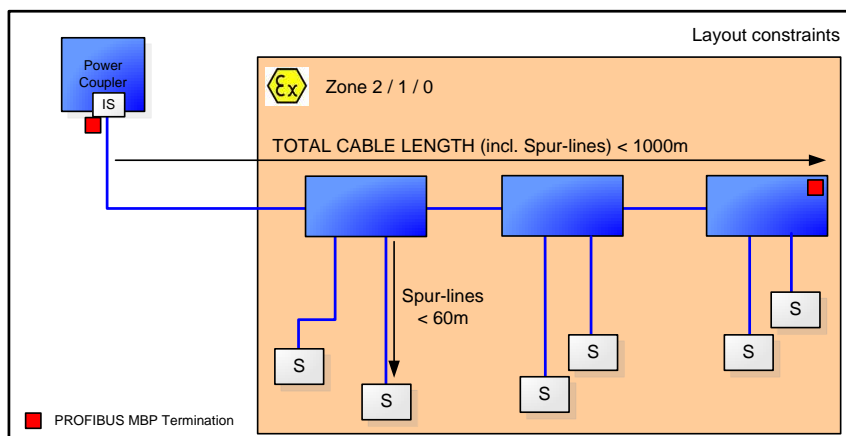
Cable for FISCO systems

- **Loop Resistance**
15 Ω /km to
150 Ω /km
- **Loop Inductance**
0,4 mH/km to
1 mH/km
- **Capacitance**
45 nF/km to
200 nF/km



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Network Layouts



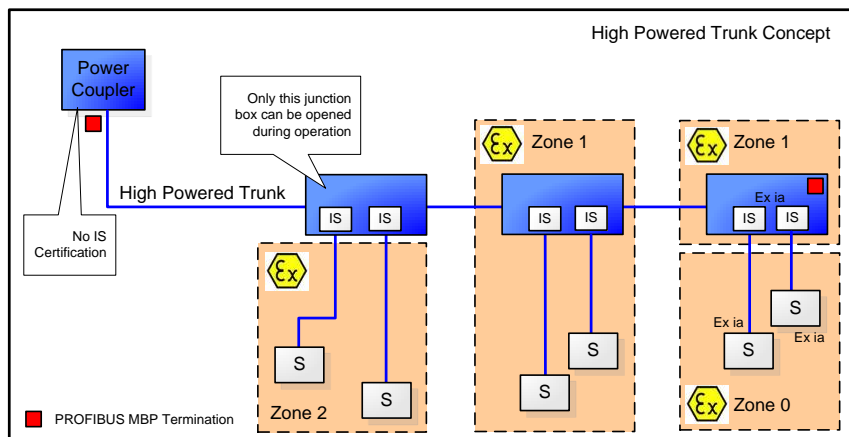
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Limitations

- Limited power means there is a limitation on number of devices that you can install on a segment (sometimes as few as 6 or 7!)
- Limited cable length decreases the distances that your network can travel

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High Powered Trunk



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