

Pepperl+Fuchs GmbH – Lilienthalstrasse 200 – 68307 Mannheim – Germany

Please quote the following contact information when publishing:

Tel.: +49 621 776-2222, Fax: +49 621 776-27-2222, www.pepperl-fuchs.com, pa-info@de.pepperl-fuchs.com

Editorial contact: Christa Blas (extension: -1420, fax: -1108), cblas@de.pepperl-fuchs.com

Fieldbus in Zone 2 – The reality of intrinsic safety Ex ic

How to easily switch from non-incendive to intrinsically safe fieldbus design

Energy limitation Ex ic for Zone 2 – Old wine in new wineskins?

The energy limiting ignition protection type Ex nL (non-incendive) has been available to fieldbus users for years paving the way for instrumentation in the increasing number of hazardous areas, Zone 2. The different name compared to the intrinsically safe protection type Ex ia and contradictory requirements have led to ambiguity regarding correct dimension and construction of electrical circuits rather than the expected savings in installation and maintenance cost.

New wine in new wineskins: Ignition protection type Ex ic (IEC 60079-11:2007) is intrinsic safety. It is very similar and replaces protection type non-incendive Ex nL (IEC 60079-15) which becomes obsolete in 2011. With Ex ic installation is required to follow demands of intrinsic safety: separation of intrinsically safe and other circuits with a tight string length min. of 50 mm. Ex ic circuits require either marking or a light blue cable. Validation for Ex ic fieldbus circuits follows the two popular methods Entity and FISCO.

Fieldbus Infrastructure – Always with Short-circuit Protection

Fundamentally, the way how fieldbus segments are designed remains the same. The industry standard of Trunk-and-Spur topologies remains the same. Existing topologies continue to be valid.

Most specifications today demand short circuit protection for each spur in order to protect the trunk and remainder of the segment from unwanted faults typically caused by live work on devices. Thus fieldbus couplers with short-circuit protection, called Segment Protectors (SP), are typically used. Significantly higher availability of the fieldbus infrastructure is the result.

An Obvious Way for Efficient Design

The fieldbus power supply already contains voltage control and the Segment Protectors contain current limitation. So the simple and reliable way to put Ex ic ignition protection into practice is to beef up those two circuits in their electric design to comply with demands from the IEC standard. In combination the power supply and the Segment Protector realize intrinsic safety Ex ic at the spur.

This design is known as the High-Power Trunk concept already an industry standard for any hazardous area. Since the trunk's power is unlimited with regards to ignition protection, live work at the trunk is permitted only with gas clearance. However, hot work on instruments is permitted anytime.

Not only cost-effective this design makes best use of the segment by allowing a higher load current on the trunk. More devices can be connected in comparison to energy limitation at the power supply.

Product Attributes – An Example Implementation

The innovators at Pepperl+Fuchs actively involved in committee work anticipated the technical changes and even before 2007 to re-engineer the FieldConnex system components for fieldbus infrastructure. Only minor updates were necessary to qualify isolation levels of the FieldConnex Power Hub and R2 Segment Protector for FOUNDATION fieldbus H1.

The most obvious change is a plastic separator wall introduced to the R2 Segment Protector to incorporate the 50 mm tight string length between the intrinsically safe and non-intrinsically safe circuits. Similarly the Power Hub receives covers for its bulk power supply connections to clearly separate them from both, the host and spur connections.

Other Consequences for Users?

Validation now follows the already known concepts for intrinsic safety according to Entity or FISCO. Those fieldbus planners that already separate non-incendive (Ex nL) from power circuits are well prepared.

Ex ic brings intrinsic safety to Zone 2. With its requirements adapted to the risk of explosion protection it reduces cost and removes ambiguity. Working with in fieldbus instrumentation should be as easy as always. With Ex ic it is.

Key words: Fieldbus infrastructure, explosion protection, intrinsic safety, non-incendive, FieldConnex, Power Hub, Segment Protector, Ex ic, Ex nL, High-Power Trunk

Author: Dipl.-Ing./MBA Andreas Hennecke
Product Marketing Manager
Division Process Automation

Characters: 3,367, without space characters

Pictures: No. MC7522_091013_01, No. MC7422_091013_02,
No. MC7522_091013_03

October 2009



Fig. 1: Fieldbus Infrastructure for Zone 2 (Ex ic included). Simplifies the work life of fieldbus professionals.

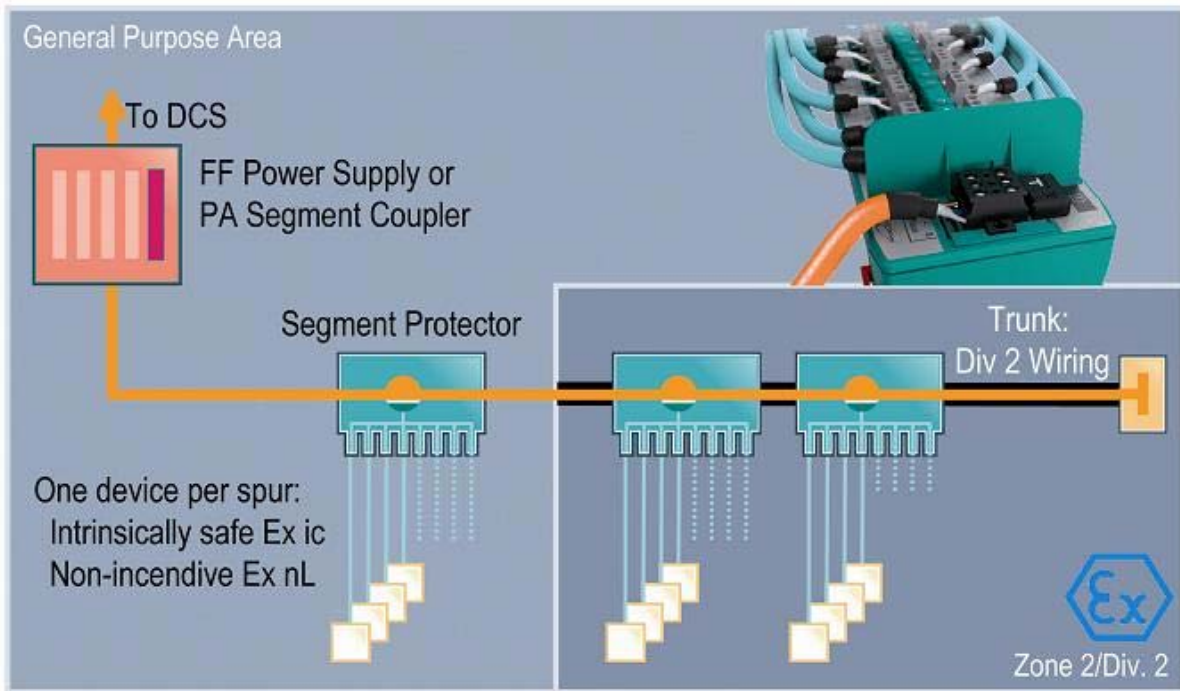


Fig. 2: Trunk-and-spur topology for Zone 2 – simple to plan, install and maintain. Live work on field instruments leaves the trunk undisturbed through short-circuit limiting fieldbus couplers.



Fig. 3: R2 Segment Protector – The short-circuit and energy limiting fieldbus coupler. A separator wall creates the 50 mm thight-string-length between trunk and spurs, the intrinsically safe Ex ic circuits.