
Chapter 4 Non-Incendive Fieldbus Applications

This chapter provides information about fieldbus applications that provide Non-Incendive (NI) power to fieldbus devices located in hazardous areas.

The Pepperl+Fuchs FieldConnex® Fieldbus Power Hub and FieldConnex® Segment Protector provide Non-Incendive power for Non-Incendive applications.

Refer to the Pepperl+Fuchs documentation and/or visit the DeltaV website (www.easydeltav.com) and follow the links for additional information on these products.

Ensure that the fieldbus devices and all components used in the application are rated and certified for Non-Incendive applications.

Warning

In any hazardous area installation it is important to read and follow the device manufacturer's design and installation documents. Failure to follow the documentation could result in an unapproved and unsafe application. Additionally, in hazardous locations follow your plant's procedures for making the area safe during installation and maintenance operations.

DC Power Considerations for Non-Incendive Applications

The basic NI application uses the Fieldbus Power Hub with the FBPS-1.23.500 Isolated Power Supply Module to provide power for field devices connected through one or more Segment Protectors. Other options are available for NI applications:

- When all devices are certified for NI applications and rated at 32 volts or above, the FBPS-1.500 Power Supply Module can be substituted for 21 volts. This allows for the longer trunk lengths indicated in “High Availability Fieldbus Applications” on page 27.
- When all devices are certified for FNICO (Fieldbus Non-Incendive COnccept) Non-Incendive applications and rated at 17.5 volts or above, the FBPS-1.17.500 Power Supply Module can be substituted for 21 volts. This allows for shorter trunk lengths.

An application using the Fieldbus Power Hub and Segment Protector offers non-incendive field wiring outputs to the devices. Therefore, live maintenance at the field device is possible.

The available power to a field device depends on the length and resistance characteristics of the fieldbus cable. The formula for the calculations in Table 7 on page 59, which shows the maximum distance for a given load on the Fieldbus Power Hub, are based on the following assumptions:

- Power Supply Voltage = 21.0 VDC @ 500 mA
- Each device is certified Non-Incendive at 24 VDC or greater
- Minimum Device Voltage = 9 VDC (Calculations use 9.5 VDC)
- Maximum Voltage drop from cable = 11.5VDC
- Maximum Voltage drop from Segment Protector = 1.0 VDC
- Each device has an average load of 20 mA
- Each device is connected on a 10 meter maximum spur cable
- Each spur has a maximum of one device connected.
- Fieldbus Type A 18 AWG cable @ 22 ohms/km (44 ohms/km loop resistance) at 22°C
- Devices are connected on one end of the cable and the Fieldbus Power Hub is connected on the other end of the cable
- Maximum Distance (km) = (Allowed Loop V drop / Loop current) / Loop resistance per km

There will be different restrictions and limitations on your segment if these assumptions do not hold for your segment layout. If your devices average more than 20 mA per device, reduce the maximum cable length indicated in the table for that number of devices or reduce the number of devices on the segment. Refer to the device documentation for information on current requirements for the device.

When referring to Table 7, remember that the Series 2 H1 card requires 12 mA of fieldbus power in simplex mode and an additional 12 mA of fieldbus power (24 mA total) in redundant mode. The distance associated with the segment protector accounts for the possibility of a short on a spur which would increase the current on the trunk and also reduce the voltage to the other devices.

Fieldbus Power Hub

Use the Fieldbus Power Hub with the FBPS-1.23.500 Isolated Power Supply Module and the Segment Protector for NI applications. Refer to “Pepperl+Fuchs Fieldbus Power Hub for Redundant Fieldbus Power” on page 39 for information on the Fieldbus Power Hub system. Table 7 provides specifications for the Fieldbus Power Hub with the Isolated Power Supply Module.

Table 7 Fieldbus Power Hub with FBPS-1.23.500 Isolated Power Supply Module Specifications

Fieldbus Power Hub with FBPS-1.23.500	Specification
Input voltage	24 VDC (19.2-35 VDC)
Fieldbus output current – FBPS-1.23.500	500 mA @ 21-23 VDC
Typical power dissipation	2.5 W per segment
Dimensions	22.1 cm. x 24.6 cm. x 16.2 cm. (8.7 in. x 9.7 in. x 6.4 in.)
Operating temperature range	-40 to 60 °C
Alarm contact rating - Diagnostic Module	1 A max @ 50 VDC max

Short Circuit Protection with Segment Protectors

Refer to “Short Circuit Protection with Segment Protectors” on page 44

Installing and Connecting the Fieldbus Power Hub

Follow the instructions in “Installing and Connecting the Fieldbus Power Hub” on page 46. Be sure to use the FBPS-1.23.500 Power Supply Modules rather than the FBPS-1.500.

Installing and Connecting the Fieldbus Segment Protector

Follow the instructions in “Installing and Connecting the Fieldbus Segment Protector” on page 47.

Verifying the Installation

Refer to “Verifying the Installation” on page 48.

Non-Incendive Application Example

Figure 13 shows an application that uses a redundant pair of Series 2 H1 cards with redundant fieldbus power and short circuit protection for devices on a long (0.5 km) trunk cable. If a failure occurs on an H1 card, a 24 V power supply, or a fieldbus power supply, the segments continue to operate as expected. A status indication on connected alarms alerts the operator that an error has occurred. It is assumed that the application design follows the criteria specified in “DC Power Considerations for Non-Incendive Applications” on page 57. Therefore, if a short occurs when a device is installed or removed from the segment, only that device is affected; the rest of the segment is unchanged.

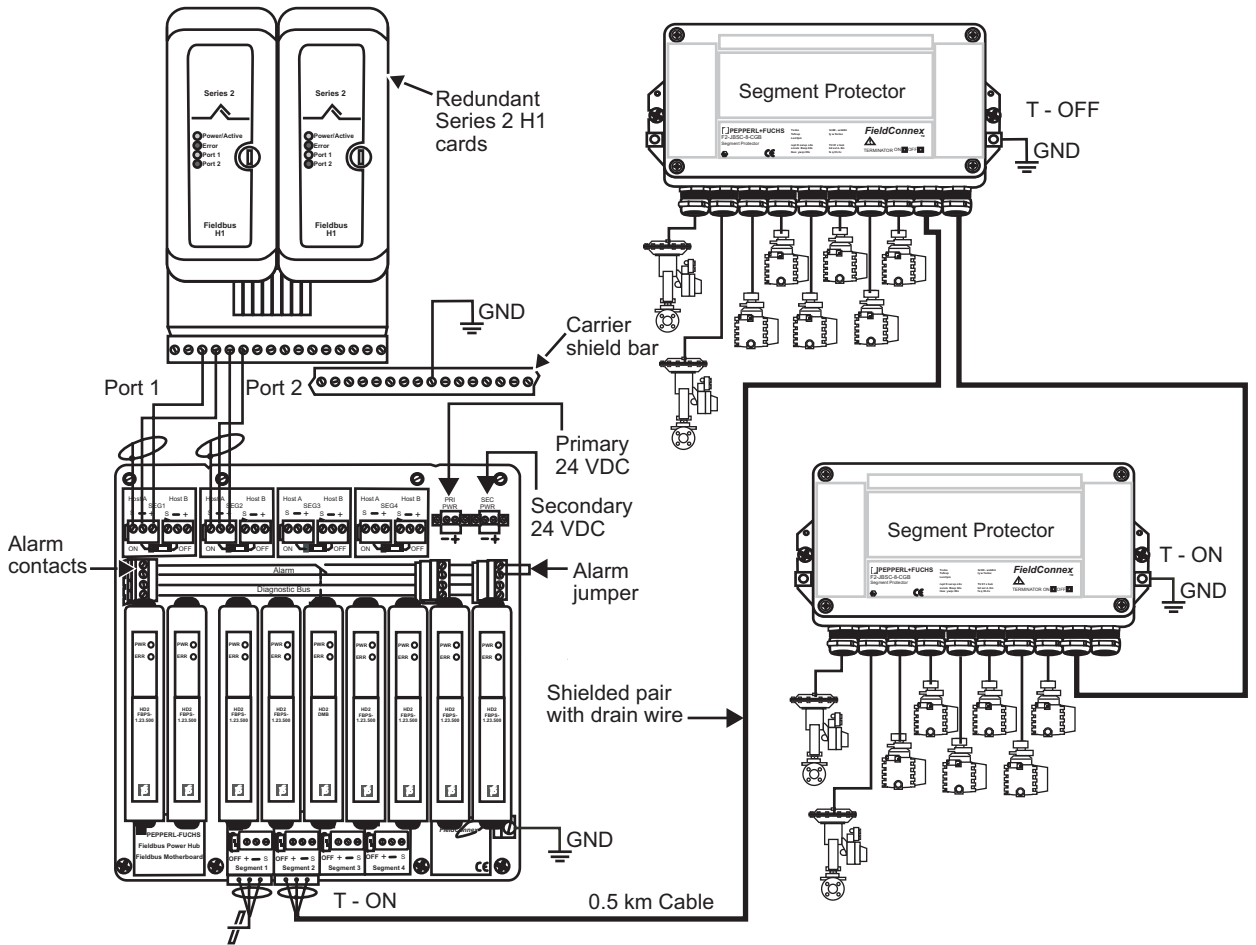


Figure 13 NI Application with 16 Devices Using the Fieldbus Power Hub and Segment Protectors

