
Appendix B MTL Power Supplies for Intrinsically Safe Fieldbus Applications

The MTL9121 IS and the MTL9122 IS Power Supplies can be used to power field devices in hazardous areas for FISCO (Fieldbus Intrinsically Safe COncept) IS applications. The MTL9121 IS power supply can power up to five (5) 20 mA devices in Gas Group IIC and the MTL9122 IS power supply can power up to twelve (12), 20 mA devices in Gas Group IIB. Ensure that the fieldbus devices and all components used in the application are rated and certified for IS applications in these Gas Groups. With the exception of the IS power supplies, many fieldbus components (H1 card, terminators, and wiring components) are the same for IS and non-IS installations.

The MTL9122 IS and 9121 IS power supplies have a host side terminator switch and a host side power switch on the front of the unit. The terminator on the IS side is permanently connected. Both power supplies are fieldbus repeater power supplies that repeat the fieldbus signal from the field to the host and power both the fieldbus segment and the host.

This chapter addresses FISCO IS applications with devices in Class I Division 1 or Zone 1 EExib locations. If a field device in your application is not certified for FISCO IS, an MTL Fieldbus Entity Spur Adapter can be used. Similarly, if a field device in your application is located in a Zone 0 Hazardous area, an MTL Fieldbus IS EExia Spur Adapter can be used.

Refer to the MTL documentation and/or visit the DeltaV website (www.easydeltav.com) and follow the links to MTL for additional information on their products.

Note

The Series 2 H1 card requires a power supply for each port in IS applications. The MTL9121 and 9122 IS Power Supplies can provide this power.

DC Power Considerations for IS Power Applications

The available current to power a field device depends on the length and resistance characteristics of the fieldbus cable. Table 8 shows the maximum distances in meters for a given load on the 9121 IS power supply and Table 9 shows the same information for the 9122 IS power supply. The following assumptions are made:

- MTL9121 IS Power Supply voltage is 12 VDC at 110 mA at 0° C
- MTL9122 IS Power Supply Voltage is 12.8 VDC at 250 mA at 0° C
- Minimum Device Voltage = 9.5 VDC (.5V device margin)
- Each device has an average load of 20 mA
- Fieldbus Type A 18 AWG cable @ 22 ohms/km is used
- Cable Resistance (Type A) = 22 Ohms/km x 2 (loop) = 44 Ohms/ km
- Devices are connected on one end of the cable and the fieldbus power supply 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 that segment.

Table 8 Distance per Load on 9121 IS Power Supply

Number of field devices	Power Supply Load (mA)	Maximum Distance (meters)
1	20	1000
2	40	1000
3	60	940
4	80	710
5	100	560
5	110	510

Table 9 Distance per Load on 9122 IS Power Supply

Number of field devices	Power Supply Load (mA)	Maximum Distance (meters)
1	20	1900
2	40	1870
3	60	1250
4	80	930
5	100	750
6	120	620
7	140	530
8	160	460
9	180	410
10	200	370
11	220	340
12	240	310
12	250	300

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.

Host Power

Both the MTL9121 IS and 9122 IS power supplies can provide power to the host in the safe area. The supplies are rated at 30 mA and are capable of providing host power for either the simplex or redundant Series 2 H1 cards. The distance between the host and the IS power supply can exceed 1000 meters.

Installing the MTL Intrinsically Safe Power Supplies

The MTL9121 and 9122 Intrinsically Safe power supplies install on a DIN Rail and are powered by a typical bulk 24 VDC power supply. The IS power supplies connect to the segment wiring to power the fieldbus devices that are not self-powered. On the top of each supply is a 3 pin connector for connection to the safe area host fieldbus and a 3 pin connector for connection to the safe area 24 V power. On the bottom of each supply is a 3 pin connector for connection to the IS area. The following figure shows the connectors.

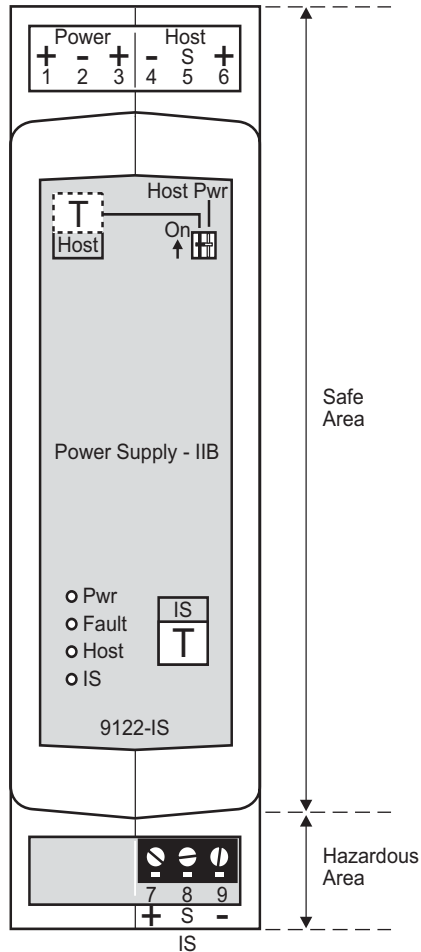


Figure 17 Connectors on the MTL 9122 IS Power Supply

Note

The hazardous area wiring must remain separated from the safe area wiring. This includes the shield drain wires as they must be separate wires all the way to the ground connection.

**To wire the safe area**

The 24 VDC power input and host connectors are on the top of the power supply.

1. Connect the primary power supply positive (+) wire to pin 1.
2. Connect the primary power negative (-) 24 V return to pin 2.
3. Connect a secondary power supply positive (optional) (+) wire to pin 3.

If using a primary and secondary 24 VDC power supply, be sure to connect the power supply returns together.

4. Connect the host segment negative (-) to pin 4.
5. Connect the host segment shield to pin 5.
6. Connect the host segment positive (+) to pin 6.

**To wire the hazardous area**

The IS connector is on the bottom of the power supply.

1. Connect the IS area fieldbus segment positive (+) wire to pin 7.
2. Connect the IS area fieldbus segment shield (S) wire to pin 8 and to a shield ground connection.
3. Connect the IS area fieldbus segment negative (-) wire to pin 9.

Switches

The power supplies have a switchable host side terminator and host power switch. (The field side terminator is permanently connected.)

- Host terminator ON is the upper position; host terminator OFF is the lower position
- Host power ON is the upper position; host power OFF is the lower position

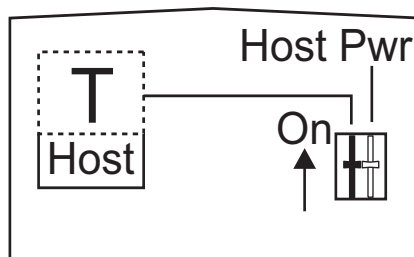


Figure 18 Terminator and Power Switches

The segment layout determines the location of the terminator and if the switchable terminator on the power supply is used. Be sure that two terminators are on the host side and two terminators are on the fieldbus side of each power supply. Similarly, the use of the switchable power capability is dependent upon the needs of the particular IS application. The Series 2 H1 card requires power; therefore, the host power switch should be ON. If more than one IS power supply is connected to the same segment (as in Figure 19), host power should be provided by one unit only. Be sure the additional unit's host power switches are in the OFF position.

Intrinsically Safe Application Example with an MTL9122

The following figure shows an IS application that allows up to 16 devices on the segment. The maximum cable length on the MTL9122 portion of the segment is 1900 meters *and* the maximum total cable length per segment is 1900 meters.

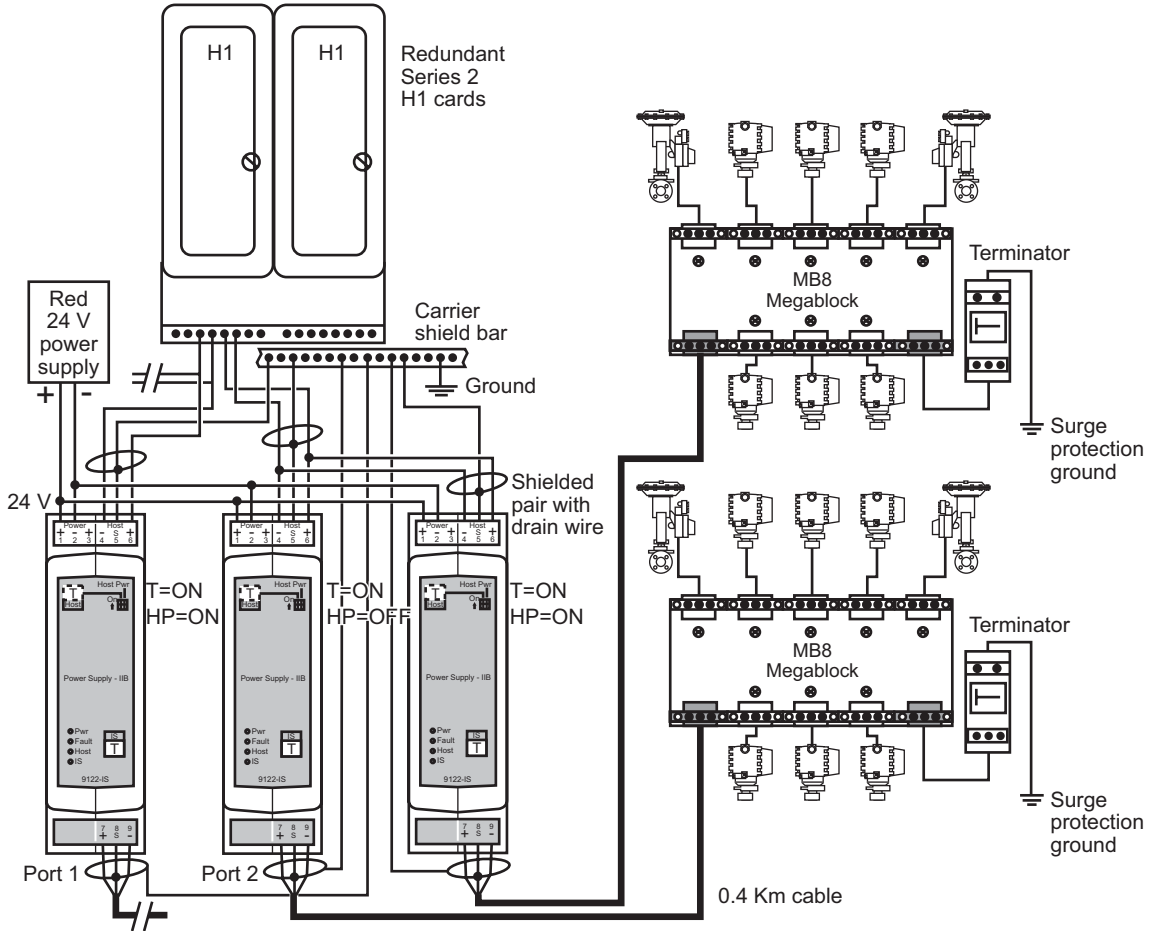


Figure 19 16 IS Devices on a Segment

Note

Ensure that all components are rated and certified for IS applications.

