

MTL8000-2/x Series Modular I/O



MTL8000 - 2/2 components

Use this option for general purpose or non-hazardous applications, or where the equipment and/or field wiring has to be mounted in Zone 2 or Division 2 hazardous areas. Select I/O modules and their field terminals followed by module carriers, Bus interface modules and power supply options.



MTL8000 - 2/1 components

Use this option for Zone 2 or Division 2 hazardous area mounting where the field wiring must connect into Zone 1, Zone 0 or Division 1 hazardous areas. The modules have intrinsic safety (IS) interfaces built in. Select I/O modules and their appropriate IS field terminals followed by module carriers, Bus interface modules and power supply options.

Overview

I/O Modules

I/O Modules - Overview

2/2 Modules

- Analog Input
- Analog Output
- Discrete Input
- Discrete Output
- Pulse Input

2/1 Modules

- Analog Input
- Analog Output
- Discrete Input
- Discrete Output
- Pulse Input

Field Terminals

2/2 and 2/1 Terminals

Carriers, Extenders, Cables

2/2 Carriers

2/2 Extenders

2/2 Cables

2/1 Carriers

2/1 Extenders

2/1 Cables

Power Supplies

DC/DC Power supplies - 2/2 and 2/1

AC/DC Power supplies - 2/2

Railbus Isolator

Bus Interface Modules

Modbus and Profibus - DP

Configurator software

Node Services Module

HART interface module

System Specification

System specification

Cable parameters and approvals

Thermocouple characterisation



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MTL8000-2/x Series - Overview

General

MTL8000 is a completely modular I/O solution for both general purpose and hazardous area applications. Based upon a carrier system that supports a range of modules, it offers a wide variety of I/O functions, including AC mains and intrinsic safety signals - even within the same node. It has an "open" architecture that allows communication with a variety of different field-buses by selecting the appropriate type of Bus Interface Module (BIM).

I/O Modules ①

I/O modules transfer signals to and from field instruments. Input modules receive signals from transmitters and sensors and convert them into a digital form for presentation to the BIM. Output modules receive commands from the BIM and transfer them to actuators. A wide range of modules is available, including types for low-level instrumentation, AC mains and intrinsically safe signals. I/O modules typically have 4, 8 or 16 field channels.

Field terminals ②

Field terminals provide the interface between the I/O modules and the field wiring. They include fusing and loop-disconnect as options. A mechanical keying system prevents an I/O module from being connected to the wrong type of field terminal.

Field terminals mount onto the module carrier, one to each I/O module. They are clamped firmly by the I/O module to form an electrical and mechanical assembly of high integrity. They may be replaced in service without removing carriers or disturbing the operation of other modules.

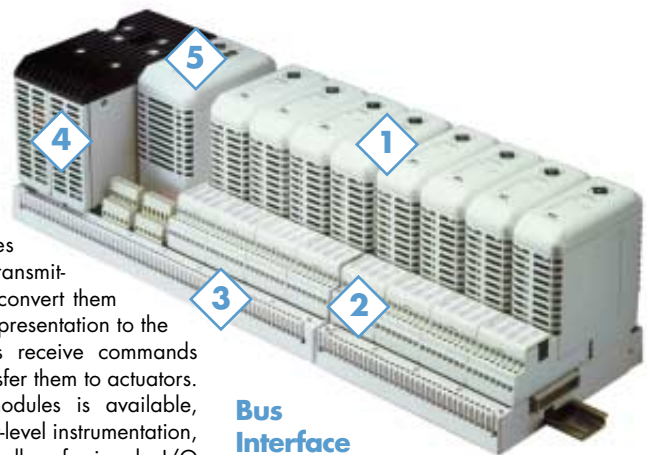
Carriers ③

Carriers form MTL8000's physical and electrical backbone by providing a mounting onto a flat panel or T- or G-section DIN rail. They support and interconnect the BIM, power supplies, I/O modules and field terminals, and carry the address, data and power lines of the internal Railbus. They provide a termination points for the LAN and field wiring cable screens and can also distribute bussed field power to the I/O modules.

I/O module carriers are available to support four or eight I/O modules.

Power supplies ④

Good power management lies at the heart of a true distributed-I/O system. MTL8000 power supplies accept locally available unregulated power and provide a regulated supply for the BIM and I/O modules. Supply redundancy is supported.



Bus Interface Module (BIM) ⑤

The BIM provides a serial data connection to a host controller, which could be a distributed control system (DCS), a programmable logic controller (PLC), or a PC running a soft control package. A choice of BIMs allows you to accommodate the most popular fieldbus protocols. The BIM also uses a fast internal bus to pass data to, and obtain data from, the I/O modules. Only one BIM is required at each node to control up to 32 I/O modules.

'HART-ability'

The use of 'smart' instruments on process plants is growing but this investment is not always fully exploited. Whether it is for a new installation, or the upgrade of an existing one, MTL has solutions that provide the connections between the HART field instruments, the control systems and the process automation maintenance software.

Specifically, the MTL8000 Process I/O system has been designed to be transparent to HART signals, thus allowing the host control software and any HART field instruments to communicate directly with each other.

In addition, MTL's HART connection system provides on-line access from a PC to the HART field devices for monitoring device performance. HART devices may be selected for regular status monitoring and alerts can be issued if the status changes. The benefits from this approach are:

- ◆ Reduced commissioning time and cost
- ◆ Reduced process downtime through status monitoring
- ◆ Lower loop maintenance costs by using field device diagnostics

Consult an MTL representative for further details.

System specification

See end of section.



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MTL8000 in your system

Figure 1 shows two possible methods for linking the MTL8000 into a system. On the left is a host controller system that uses fieldbus as the main distribution medium. On the right is a section of a typical DCS/PLC information network, with an operator station that uses a separate interface to the process fieldbus.

The number of MTL8000 nodes that can be accommodated depends upon the addressing capability of the fieldbus in use. Each MTL8000 node can address 32 I/O modules which, depending upon the number of channels per module, can provide up to 512 I/O points at a single node! A node can consist of a mixture of analog and discrete modules and this gives maximum flexibility to the system designer. Where supported by the fieldbus, full HART pass-through is provided—the MTL8000 appears “transparent”, allowing the host controller to access the HART capabilities of field instruments.

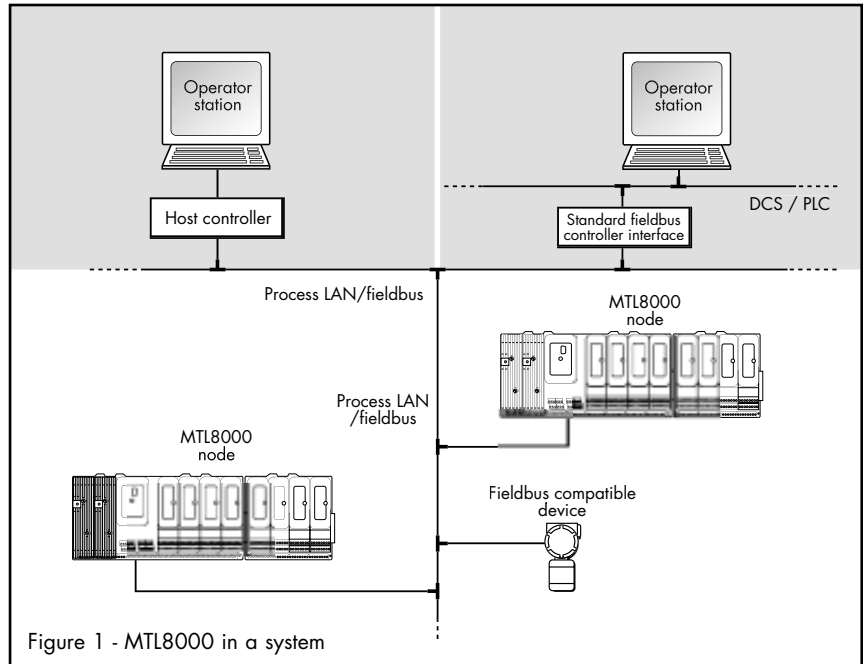


Figure 1 - MTL8000 in a system

Wide choice of fieldbus options

MTL8000 supports a number of popular fieldbus protocols: Modbus® (RTU mode), Profibus-DP, etc., and the range is growing. If your protocol is not mentioned then consult us. MTL is also interested in talking to OEM partners who want to develop their own fieldbus variations. A software core has been developed that simplifies the design of alternative control interfaces for the system.

Redundancy options

MTL8000 has been designed to increase availability and minimise downtime. Redundant LAN channels and power supplies can be specified as options to increase system availability. Possible downtime is further reduced by ensuring that the system components using active circuitry can be removed and replaced quickly and easily. Even the field terminals can be replaced without interrupting the operation of adjacent I/O modules. Carriers have no active circuitry and are unlikely to need replacement.

System power supplies

The system power supply at an MTL8000 node converts the local DC supply to power the node and can also provide field power for I/O modules with low-level field circuits. Where heavy-current or AC mains circuits are handled by the I/O modules, MTL's innovative Bussed Field Power scheme for distributing field power avoids complex wiring at the field terminal and minimises the backplane/carrier wiring.

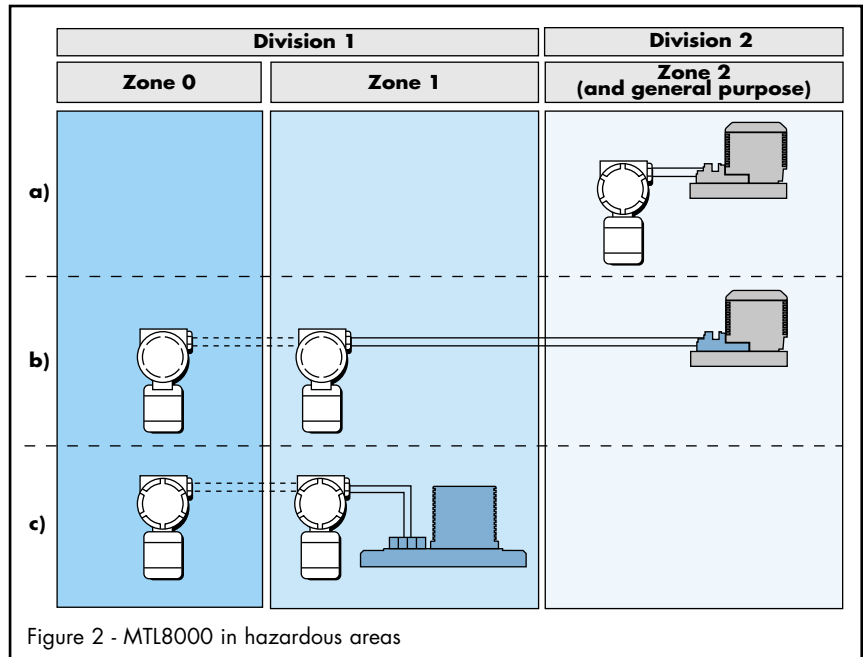


Figure 2 - MTL8000 in hazardous areas

Hazardous area applications

The MTL8000 is a truly field mountable system even in areas where flammable gases are present. It is available in three versions to suit different area classification schemes:

- a) Equipment and field wiring located in general purpose areas, Class 1, Division 2 hazardous locations or Zone 2 hazardous areas.
- b) Equipment mounted in general purpose areas, Class 1, Division 2 hazardous

locations or Zone 2 hazardous areas, with field wiring located in Division 1 hazardous locations or Zone 0 hazardous areas.

- c) MTL8000-1/1 equipment mounted in Zone 1 hazardous areas, with field wiring located in Zone 0 or Zone 1 hazardous areas.

Figure 2 illustrates the connection of field devices for these various options.



MTL8000 with general purpose field wiring

Many industry applications do not present an explosion risk from gas or dust hazards. In others, the environment may be classified as a Zone 2 or Division 2 hazardous area, where flammable material is expected to occur only in abnormal conditions. For both of these the 2/2 system provides effective distributed I/O for process control. MTL8000 supports a full range of I/O module types covering inputs and outputs for both analog and discrete circuits. The node can be mounted out on the plant in a suitable enclosure providing protection against the environment. Figure 3 shows a node containing all the key components: a Bus Interface Module, PSU modules (including a redundant one), I/O modules on carriers and a pair of carrier-extenders linked with an extension cable.

MTL8000 with intrinsic safety field wiring

The MTL8000 Process I/O System is capable of supporting I/O modules with intrinsic safety (IS) field wiring, for connection to certified or 'simple apparatus' field devices in Division 1 or Zone 0 hazardous areas (see Figure 4). A range of I/O module types with IS field circuits for industry-standard DI, DO, AI and AO applications is supported.

I/O modules with built-in protection

All voltage and current-limiting components required for IS protection are incorporated within the I/O module housings, so no external, add-on zener barriers or galvanic isolators are necessary. IS field terminals are distinguished from other types by blue colouring of the terminal housing. A unique and sophisticated mechanical keying mechanism prevents modules with different protection techniques from being interchanged, so that potentially explosive or damaging conditions cannot occur.

Integrated power supplies

Power for IS I/O modules is derived from integrated, modular power supply units. Each power unit is capable of supplying between eight and twenty I/O modules, depending on the I/O type and mix. Optional power supply redundancy is supported by means of an additional, redundant supply unit connected in an 'n+1' arrangement. In applications with mixed IS and non-IS field wiring, the full facilities of the 'Bussed Field Power' regime are retained for the non-IS part of the system.

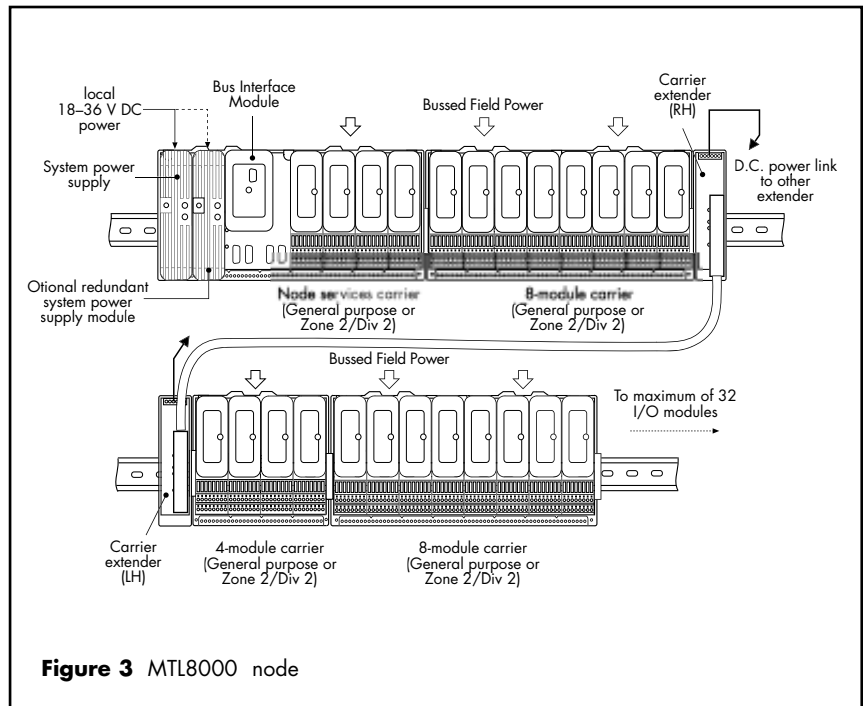


Figure 3 MTL8000 node

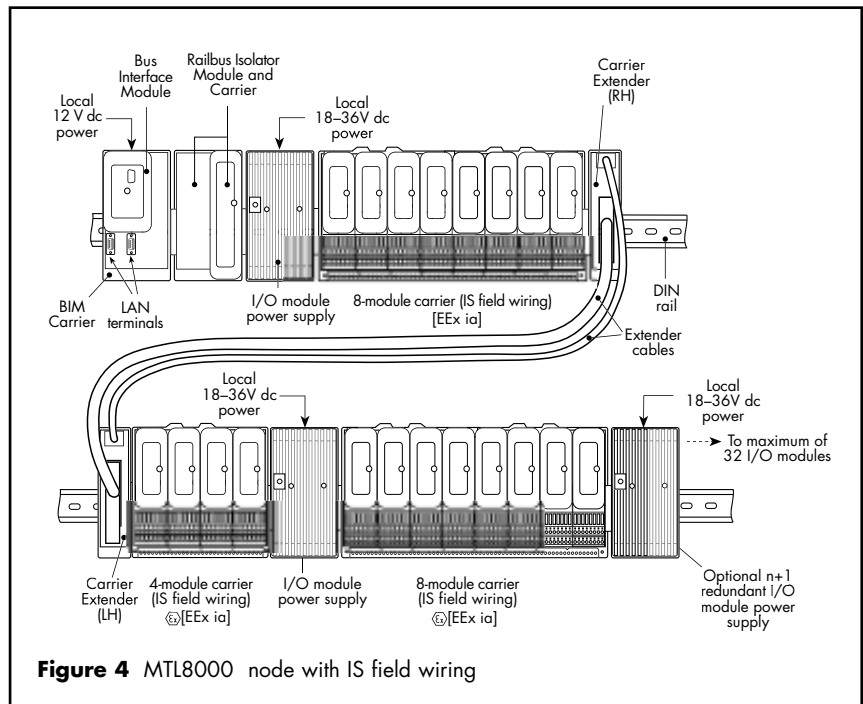


Figure 4 MTL8000 node with IS field wiring

In nodes populated only with IS I/O modules, a separate system power supply module provides power for the Bus Interface Module and 'node services'. Redundancy of this supply is also supported.

MTL8000-2/x Series - Overview

Mixed I/O types within a single node

IS and non-IS field wiring types can also be incorporated within one MTL8000 node (see Figure 5). In this arrangement, the two parts of the node are separated by a 'Railbus Isolator' module. The Railbus Isolator provides a section of internal communications bus ('Railbus') for the IS I/O modules which is protected from invasion by damaging fault voltages. Uniquely, a single MTL8000 node (under the command of one Bus Interface Module) can then support a mixture of certified IS field devices, certified Division 2 or Zone 2 field devices and general purpose I/O, including AC mains circuits. Only one Railbus Isolator is used per MTL8000 node.

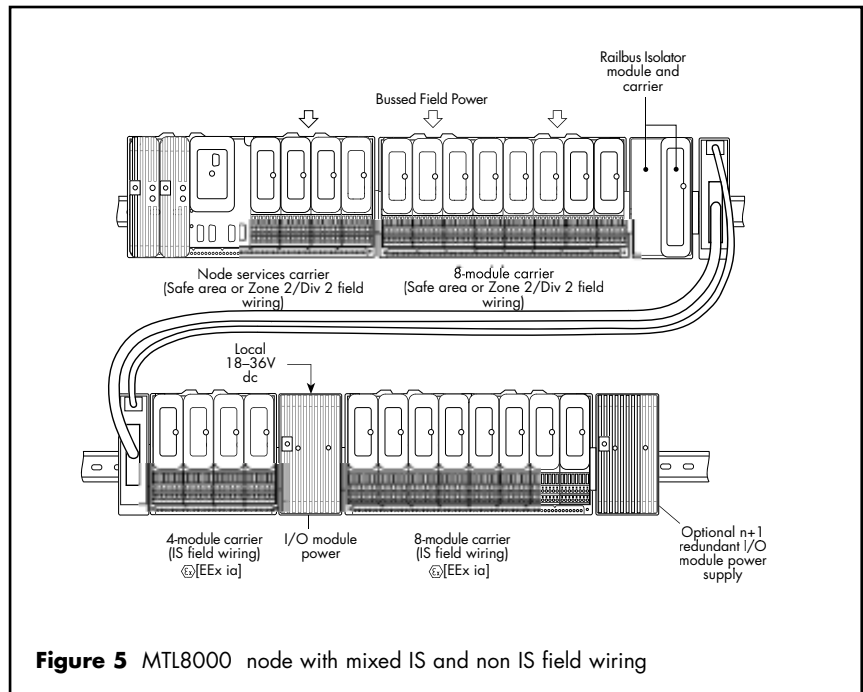
Related MTL8000 Literature

AN8000

System Specifier's Guide - Modular I/O

INM8000

Installation Guide



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