Today in Process Automation many
different methods are used to power and to
communicate with end devices. Such methods
may include 4-20mA; a variety of different
fieldbus standards; serial communications -
including RS232, RS422 and RS485; video;
telephony and Ethernet.

Where applications require high bandwidth,
Ethernet is the ideal solution as it provides
open connectivity and can be combined with
Ethernet Remote I/O and Linking Devices
to connect to low bandwidth 4-20mA and
fieldbus systems. But Ethernet has rarely been
used in hazardous areas because of the high
cost involved and the limitations involved in
order to carry out maintenance.

The 9460-ET Series provides cost-effective
Intrinsically Safe (IS) Ethernet equipment
that can be installed and maintained
easily in hazardous areas. The intrinsically
safe hazardous area certification permits the
components to be mounted in a
Zone 2 hazardous area and connected to
intrinsically safe equipment in a Zone 0 or 1;
or Division 1 hazardous area.

In Process Automation it is also preferable to
use a single cable to provide both power and
communications to the end device. The 9460-
ET Series can deliver Intrinsically Safe Power
over Ethernet (PoEx™) with a single Cat 5e
or Cat 6 cable, allowing live connection and
disconnection of the end device in Zone 0 and
1 hazardous areas.

The 9461-ET Ethernet Gateway provides
existing intrinsically safe equipment with "Ethernet connectivity" by allowing
conventional serial communication equipment
to be connected to an Ethernet network. Many
intrinsically safe devices such as analysers,
weighing systems, dust monitors, etc. have
RS232, RS422 or RS485 serial connectivity.
Providing these devices with Ethernet
connectivity offers considerable hardware and
integration cost savings.

The 9465-ET Copper to Fibre Optic Media
Converter enables an Ethernet network to
be extended over a much greater distance.
A multi mode fibre optic link running at
100Mbps can go distances of up to
2 km, or an extended distance of 5 km is
achievable at 10Mbps. With single mode fibre
longer distances are supported.

The 9466-ET Ethernet switch allows the
interconnection of intrinsically safe Ethernet
networking components via its 5 ports. It
also enables a copper Ethernet network to be
extended beyond the 100 metre distance limit
between Ethernet devices.

The 9468-ET is an intrinsically safe Ethernet
isolator enabling Ethernet devices in
Zone 2, or a safe area, to communicate
with intrinsically safe Ethernet networking
components operating in the hazardous area.
A further application is the use of a pair of
9468-ET isolators to permit an Ethernet cable
to cross a hazardous area.

The 9469-ET Intrinsically safe Wireless LAN
product is a multi-functional module that can
be used as an 802.11a/b/g/h Access Point, a
Wireless Bridge or a Wireless Repeater. Many
end users have recognised the benefits of
giving mobile operators access to control and
maintenance system data.
A choice of intrinsically safe PDAs and Zone 2 PCs offering 802.11 wireless connectivity is now available. The 9469-ET offers lower costs and easier maintenance for WLAN equipment installed in hazardous areas, compared to the alternative of large, expensive flameproof enclosures fitted with specialist certified antennas.

The 9491-PS Power Supply is the preferred method for supplying the 9460-ET Series of IS Ethernet Modules as it is based on an isolating power supply. It takes a 24V DC Safe Area/Zone 2 supply and produces an Intrinsically Safe 12V DC nominal output capable of powering the Ethernet modules mounted in a Zone 1/Division 1 hazardous area.

The 9466-ET Ethernet Switch and the 9468-ET IS Ethernet Isolator are capable of distributing power to compatible devices connected to their IS ports providing Power over Intrinsically Safe Ethernet (PoEx™) via the RJ45 Cat5e cables. This method eliminates the need for a separate power supply cable to each Ethernet device; simplifying both installation and maintenance. A 9491-PS power supply is required to power the 9466-ET and an additional 9491-PS is required for each powered Ethernet port. Similarly, one 9491-PS is required to power the IS Ethernet port of the 9468-ET IS Ethernet Isolator. The 9461-ET, 9465-ET and 9469-ET can be powered directly from a 9491-PS intrinsically safe power supply or using Power over IS Ethernet (PoEx™).

The MTL IS Ethernet applications range from immediate needs for Hazardous Area WLAN infrastructure; IS serial device connectivity; and Ethernet connections across hazardous areas to long term opportunities to develop Ethernet field devices.
9461-ET
Intrinsically Safe Serial to Ethernet Gateway

- Serial to Ethernet Gateway
- Zone 1, Division 1 mountable in suitable enclosure
- Four serial-port intrinsically safe inputs:
  2 x RS232/TTL
  2 x RS485/RS422
- 10/100Mbs Ethernet
- ATEX / IECEx certified
- FM / FMC approved
- Wide temp. range –20°C to +70°C
- High Performance 32-bit processor
- PoEx™ Power over IS Ethernet option

The 9461-ET Ethernet Gateway gives existing intrinsically safe equipment “Ethernet connectivity” by allowing conventional serial communication port equipment to be connected to an Ethernet network.

Two 9-way D-type serial ports are provided which are RS232/TTL compatible. In addition, the module’s front panel screw terminals (T6 - T15) provide two RS485/RS422, 2- or 4- wire ports, giving a total of four serial ports. All ports can operate at speeds up to 115K2baud.

Various protocols are available (eg: Serial Modbus, Modbus/TCP, Ethernet IP etc) in addition to Serial Tunneling.

The 9466-ET is designed for hazardous-area mounting inside a suitable enclosure with intrinsically safe Zone 1, ATEX and IECEx certification and Division 1 FM USA and Canada approvals. The ATEX and IECEx approvals cover both surface industry and mining applications.

The design is based on a high performance ARM9 155MHz 32-bit RISC Processor (ARM926EJ-S).

The gateway may be powered by an intrinsically safe power supply or by Power over IS Ethernet (PoEx) providing intrinsically safe power and Ethernet communications over a single Cat5e cable.

10/100Mb Ethernet twisted pair (Cat5e) RJ45 connection (100metres length max).

Status LEDs are provided on the front panel to indicate:
- 'Power On'
- Network Link established
- Tx/Rx activity for all COM ports

Configuration is via a Microsoft® Windows™ interface which enables the IP address and the protocol conversion to be defined.

The Gateway can also act as the host processor for the 9466-ET Managed Ethernet Switch giving remote access to the switch’s management features over the Ethernet network.

The module is supplied as a DIN-rail mounting device.
**SPECIFICATION**

See also System Specification

**POWER INPUT**
PoEx or separately powered

**Input voltage**
12V DC (10–15.4V)

**Input current**
150mA

**Input protection**
Fuse + supply reversal diode

**ETHERNET**
Intrinsically Safe 10/100 base T

**Connector**
RJ45

**PoEx**
Powered Device

**IS SERIAL CONNECTIONS**

<table>
<thead>
<tr>
<th></th>
<th>RS232</th>
<th>RS422/485</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of channels</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Connector Type</td>
<td>DB-9 male</td>
<td>Screw terminals</td>
</tr>
<tr>
<td>Baudrate</td>
<td>300-115K2 baud</td>
<td>300-115K2 baud</td>
</tr>
<tr>
<td>Parity</td>
<td>Even/Odd/None</td>
<td>Even/Odd/None</td>
</tr>
<tr>
<td>Data Bits</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Stop Bits</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Flow Control</td>
<td>RTS/CTS/XON/XOFF</td>
<td>XON/XOFF</td>
</tr>
</tbody>
</table>

**SAFETY**

Location of module
Zone 1, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

Location of field wiring
Zone 0, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

**ENVIROMENTAL**

Ambient temp
Operating –20°C to +70°C
Storage –20°C to +70°C

Relative Humidity
5 to 95% RH (non-condensing)

Ingress Protection
Select enclosure to suit application, see certificate for information

**DATA & POWER TERMINALS**

**COM 1 & 2 (DB-9 male)**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>RS232/TTL*</td>
</tr>
<tr>
<td>5</td>
<td>N/C</td>
</tr>
<tr>
<td>6</td>
<td>RTS</td>
</tr>
<tr>
<td>7</td>
<td>N/C</td>
</tr>
<tr>
<td>8</td>
<td>+5V o/p</td>
</tr>
</tbody>
</table>

* Pin 4 - O/C for RS232, connect to pin 5 for TTL levels

**LAN (RJ45)**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tx +</td>
</tr>
<tr>
<td>2</td>
<td>Tx –</td>
</tr>
<tr>
<td>3</td>
<td>Rx +</td>
</tr>
<tr>
<td>4</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>5</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>6</td>
<td>Rx –</td>
</tr>
<tr>
<td>7</td>
<td>Supply 0V - PoEx †</td>
</tr>
<tr>
<td>8</td>
<td>Supply 0V - PoEx †</td>
</tr>
</tbody>
</table>

† When using PoEx, no supply is required on screw terminals 1 to 4

**Screw Terminals †**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>2</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>3</td>
<td>0V</td>
</tr>
<tr>
<td>4</td>
<td>0V</td>
</tr>
</tbody>
</table>

† Terminals 1+2 and 3+4 are linked internally.

**MECHANICAL**

Mounting
DIN rail

**Dimensions (mm)**
Length 75
Width 100
Height (off rail) 116

Weight
1200 g

**LED INDICATORS**

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td>WDG (red)</td>
<td>Watchdog Fault</td>
<td>Healthy (10Hz)</td>
<td>Watchdog Fault</td>
</tr>
<tr>
<td>TX (x4) (green)</td>
<td>idle</td>
<td>Transmitting Serial Data</td>
<td>N/A</td>
</tr>
<tr>
<td>RX (x4) (red)</td>
<td>idle</td>
<td>Receiving Serial Data</td>
<td>Fault – RX data polarity is inverted</td>
</tr>
<tr>
<td>STAT (red)</td>
<td>Status is Normal</td>
<td>Not used at present</td>
<td>Not used at present</td>
</tr>
<tr>
<td>ACT (yellow)</td>
<td>Ethernet link disconnected</td>
<td>Ethernet link activity</td>
<td>Ethernet link connected</td>
</tr>
<tr>
<td>100 (green)</td>
<td>Ethernet link set to 10Mbps</td>
<td>N/A</td>
<td>Ethernet link is 100Mbps</td>
</tr>
</tbody>
</table>

The given data is only intended as a product description and should not be regarded as a legal warranty of proper ties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.
The 9465-ET 10/100Mbps Copper to Fibre Optic Media Converter allows an Ethernet network to be extended over a greater distance. A multi-mode fibre optic link may be up to 2km in length when running at 100Mbps and due to the use of 1300nm optics an extended distance of 5km is achievable at 10Mbps. Longer distances are achievable with single mode fibre.

Longer distances are obtained by simply connecting a 9466 (10/100Mbps Ethernet Switch) between two 9465 media converters, effectively giving a ‘repeater’ function (This also provides 3x UTP ports available for local network connectivity), this can be repeated as required.

The use of fibre optics gives exceptional immunity to noise and electrical interference, it is also used when connecting a Hazardous Area network to a Zone 2 / Safe Area network or device.

The 9465-ET is designed for hazardous-area mounting inside a suitable enclosure with intrinsically safe Zone 1, ATEX and IECEx certification and Division 1 FM USA and Canada approvals. The ATEX and IECEx approvals cover both surface industry and mining applications.

Fibre Optic connection options:
- ST style 62.5/125µm Multimode (9465-ET-M-ST)
- SC style 62.5/125µm Multimode (9465-ET-M-SC)
- SC style 9µm Single-mode (9465-ET-S-SC)

When installed in a Zone 1 or Division 1 hazardous area the converter may be powered by an intrinsically safe power supply or by Power over IS Ethernet (PoEx) providing intrinsically safe power and Ethernet communications over a single Cat5e cable.

When mounted in a safe area the converter may be powered by a 12V dc general-purpose power supply and the ‘IS op’ approval allows connection of the fibre optic cable into the hazardous area.

Status LEDs are provided on the front panel to indicate:
- ‘Power On’
- Fibre Optic ‘Link 10Mb or 100Mb’ established
- Fibre Optic ‘Tx/Rx Activity’
- Copper UTP ‘Link 10Mb or 100Mb’ established
- Copper UTP ‘Tx/Rx Activity’

10/100Mb Ethernet twisted pair (Cat5e) RJ45 connection (100metres length max).

Transparent operation - 10/100Mbps, Full/ Half Duplex with Auto-Negotiation. Supports IEEE 802.3: 10Base-T, 10Base-FL, 100Base-TX and 100Base-FX/SX.

The module is supplied as a DIN-rail mounting device.
SPECIFICATION

See also System Specification

POWER INPUT
PoEx or separately powered
Input voltage
12V DC (10–15.4V)
Input current
160mA
Input protection
Fuse + supply reversal diode

ETHERNET
Intrinsically Safe 10/100 base T
Connector
RJ45
PoEx
Powered Device

FIBRE PORT
10/100 base FX
Connector
SC or ST (multi-mode), SC (single-mode)

OPTICAL FIBRE
Multi mode distance
2Km @100Mbps / 5Km@10Mbps typ. (62.5/125)
Single mode distance
T.B.A.

TX Output (1300nm)
Multi mode -19dBm (min), -14dBm (max) *note1
Single mode -15dBm (min), -8dBm (max) *note2
RX Sensitivity
Multi mode -33.9dBm (ave), -31dBm (min)
Single mode -25dBm (min)

SAFETY
Eye Safety
Class I Laser/LED product
Location of module
Zone 1, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Location of field wiring
Zone 0, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location

Ethernet protection
intrinsically safe
Fibre optic protection
inherently safe
Certification Code
See approvals
Safety description
See certificate

MECHANICAL
Mounting
DIN rail
Dimensions (mm)
Length 75
Width 55
Height (off rail) 116
Weight 700 g

LED INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td>ACT (red)</td>
<td>Idle</td>
<td>Ethernet link activity</td>
<td>Ethernet link activity</td>
</tr>
<tr>
<td>10 (yellow)</td>
<td>No Ethernet link at 10Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 10Mbps</td>
</tr>
<tr>
<td>100 (green)</td>
<td>No Ethernet link at 100Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 100Mbps</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL

Ambient temp
Operating -20°C to +70°C
Storage -20°C to +70°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
Select enclosure to suit application, see certificate for information

DATA & POWER TERMINALS

LAN (RJ45)
10/100 BASE-T Ethernet
(TX/RX crossed MDI-X)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rx +</td>
</tr>
<tr>
<td>2</td>
<td>Rx –</td>
</tr>
<tr>
<td>3</td>
<td>Tx +</td>
</tr>
<tr>
<td>4</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>5</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>6</td>
<td>Tx –</td>
</tr>
<tr>
<td>7</td>
<td>Supply 0V - PoEx †</td>
</tr>
<tr>
<td>8</td>
<td>Supply 0V - PoEx †</td>
</tr>
</tbody>
</table>

10/100 BASE-FL Ethernet
ST(or SC) - Fibre Optic
Top Port TX
Bottom Port RX

Screw Terminals †

<table>
<thead>
<tr>
<th>PWR</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>2</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>3</td>
<td>0V</td>
</tr>
<tr>
<td>4</td>
<td>0V</td>
</tr>
<tr>
<td>5–8</td>
<td>No connections</td>
</tr>
</tbody>
</table>

† When using PoEx, no supply is required on screw terminals 1 to 4

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantees. In the interest of further technical developments, we reserve the right to make design changes.
9466-ET
Intrinsically Safe Managed Ethernet Switch

- 5-port 10/100Mbps links
- Zone 1, Division 1 mountable in suitable enclosure
- Broadcast “storm” protection
- Intelligent Routing
- Programmable Management
- ATEX / IECEx certified
- FM / FMC approved
- Wide temp. range –20°C to +70°C
- Half/Full Duplex
- Power source for PoEx Power over IS Ethernet
- Status LEDs to show activity

The 9466-ET 10/100Mbps, Layer 2, Ethernet switch allows the interconnection of MTL 9400-ET series networking modules via its 5 ports. It also enables an Ethernet network to cover a greater distance using either Cat5e cable or fibre-optic for longer spans. This capability is due to the low latency ‘store and forward’ mechanism integral to the switch, which ensures that the stringent timing associated with Ethernet is maintained.

With the 9466-ET switch each connection is effectively a ‘point-topoint’ network segment unlike the older generation hubs that were simple ‘dumb’ repeaters. The old hubs needed to impose a limit on overall network length to ensure proper collision detection; this limit is overcome by the 9466-ET. Broadcast “storm” protection is also provided to eliminate network overload due to excessive ‘broadcast’ & ‘multicast’ packets.

The 9466-ET switch can also distribute power to compatible devices connected to each of its five ports via the RJ45 Cat5e cables (PoEx). This method eliminates the separate power supply cable to the device simplifying installation and maintenance.

The 9466-ET is designed for hazardous-area mounting inside a suitable enclosure with intrinsically safe Zone 1, ATEX and IECEx certification and Division 1 FM USA and Canada approvals. The ATEX and IECEx approvals cover both surface industry and mining applications.

The default mode of operation is a 5-port, unmanaged switch with auto negotiation. However the onboard EEPROM memory can be configured via the serial RS232/TTL port either in the safe area, using a PC, or in the hazardous area using the 9461-ET Ethernet Gateway as its host processor.

Programmable features such as Rate Limiting, VLAN support and Forced Speed and Duplex settings may be configured in this way, along with access to MIB counters etc. The 9466-ET also has Intelligent Routing with automatic address learning, aging and migration.

It supports IEEE 802.3: 10Base-T, 100Base-TX and also MDI / MDI-X auto crossover, for easy cascading of switches with standard cables.

The module is supplied as a DIN-rail mounting device.
SPECIFICATION

See also System Specification

POWER INPUT
Separately powered
Input voltage
12V DC (10–15.4V)
Input current
200mA
Input protection
Fuse + supply reversal diode

ETHERNET
Intrinsically Safe 10/100 base T, auto negotiation speed and X-over Ports
5
Connector
RJ45
PoEx
Power Source Equipment, each port selectable by connection of IS power supply such as 9491-IS

TECHNOLOGY
Standards
IEEE802.3, 802.3u, 802.3x, 802.1d, 802.1p, 802.1q
Protocols
IGMP V1/V2 device
MIB Counters
(via RS232 port)
Flow Control
IEEE802.3x flow control, back pressure flow control
IS RS232 MANAGED SWITCH CONNECTION
Number of channels
1
Connector Type
8-pin mini-DIN
Baudrate
115K2baud
Parity
None
Data Bits
8
Stop Bits
1
Flow Control
None

SAFETY
Location of module
Zone 1, IIC T4 hazardous area or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Location of field wiring
Zone 0, IIC T4 hazardous area or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Ethernet protection
intrinsic safe
Certification Code
See approvals
Safety description
See certificate

MECHANICAL
Mounting
DIN rail
Dimensions (mm)
Length 75
Width 100
Height (off rail) 116
Weight
1200 g

LED INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td>WDG (red)</td>
<td>Watchdog Fault</td>
<td>Healthy (10Hz)</td>
<td>Watchdog Fault</td>
</tr>
<tr>
<td>FDX (red)</td>
<td>Half Duplex</td>
<td>N/A</td>
<td>Full Duplex</td>
</tr>
<tr>
<td>10 ACT (yellow)</td>
<td>No Ethernet link at 10Mbps</td>
<td>Ethernet connected and activity at 10Mbps</td>
<td></td>
</tr>
<tr>
<td>100 ACT (green)</td>
<td>No Ethernet link at 100Mbps</td>
<td>Ethernet connected and activity at 100Mbps</td>
<td></td>
</tr>
</tbody>
</table>

ENVIRONMENTAL

Ambient temp
Operating –20°C to +70°C
Storage –20°C to +70°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
Select enclosure to suit application, see certificate for information

DATA & POWER TERMINALSW

LAN PORTS (RJ45) 10/100 BASE-T Ethernet

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tx +</td>
</tr>
<tr>
<td>2</td>
<td>Tx –</td>
</tr>
<tr>
<td>3</td>
<td>Rx +</td>
</tr>
<tr>
<td>4</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>5</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>6</td>
<td>Rx –</td>
</tr>
<tr>
<td>7</td>
<td>Supply 0V - PoEx †</td>
</tr>
<tr>
<td>8</td>
<td>Supply 0V - PoEx †</td>
</tr>
</tbody>
</table>

Screw Terminals

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>2</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>3</td>
<td>0V</td>
</tr>
<tr>
<td>4</td>
<td>0V</td>
</tr>
<tr>
<td>5</td>
<td>No Connection</td>
</tr>
<tr>
<td>6</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>7</td>
<td>0V</td>
</tr>
<tr>
<td>8</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>9</td>
<td>0V</td>
</tr>
<tr>
<td>10</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>11</td>
<td>0V</td>
</tr>
<tr>
<td>12</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>13</td>
<td>0V</td>
</tr>
<tr>
<td>14</td>
<td>+12V DC in</td>
</tr>
<tr>
<td>15</td>
<td>0V</td>
</tr>
</tbody>
</table>

Notes:
1. Terminals 1+2 and 3+4 are linked internally
2. When using PoEx – ‘inject’ device power into terminals 6 to 15 as required

† = Power over Ethernet (PoEx)
9468-ET
Intrinsically Safe Ethernet Isolator

• Zone 2 mountable for connections to Zone 0 and 1
• Galvanically isolated RJ45 ports
• Transparent operation
• Compact alternative solution to fibre optics and media converters
• ATEX / IECEx certified
• FM / FMC approved
• Wide temp. range –20°C to +70°C
• Single 20–30V DC power supply
• Status LEDs to show activity

The 9468-ET 10/100Mbps, Isolating Ethernet Barrier allows the interconnection of a Zone 2 or un-certified safe area device to the intrinsically safe 9400-ET series of Ethernet networking products, operating in the hazardous area.

The isolating barrier provides a compact alternative solution to fibre optic cable and media converters and for when it is desirable to use Cat5e cables in preference to fibre.

The 9468-ET is designed for Zone 2 hazardous-area mounting inside a suitable enclosure and has intrinsically safe ATEX and IECEx approvals, together with IS approval for USA and Canada. FM Division 2 mounting approval is pending. The ATEX and IECEx approvals cover both surface industry and mining applications.

10/100Mb Ethernet twisted pair (Cat5e) RJ45 connections (100metres length max). These RJ45 ports provide total galvanic isolation (Um=253Vac) from safe to hazardous areas. Status LEDs are provided on the front panel to indicate:
• 'Power On'
• Safe Area UTP 'Link 10/100Mb' established
• Safe Area UTP 'Tx/Rx Activity'
• Haz. Area UTP 'Link 10/100Mb' established
• Haz. Area UTP 'Tx/Rx Activity'

The module operates from a single supply in the Safe Area of 20…30Vdc at approx 220mA.

Transparent operation - 10/100Mbps, Full/Half Duplex with Auto-Negotiation. Supports IEEE 802.3: 10Base-T and 100Base-TX.

The module is supplied as a DIN-rail mounting device.
**SPECIFICATION**

See also System Specification

**POWER INPUT**
Separately powered
Input voltage
24V DC (20–30V)
Input current
220mA
Input protection
Fuse + supply reversal diode

**GENERAL PURPOSE ETHERNET**
10/100 base T

**IS ETHERNET**
Intrinsically Safe 10/100 base T

**SAFETY**
Location of module
Safe Area
Zone 2 hazardous area
Location of field wiring
Zone 0, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Ethernet protection
Intrinsically safe
Certification Code
See approvals
Safety description
See certificate

**MECHANICAL**
Mounting
DIN rail
Dimensions (mm)
Length 75
Width 100
Height (off rail) 116
Weight 380 g

**LED INDICATORS**

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>24V Power fail</td>
<td>N/A</td>
<td>24V Power OK</td>
</tr>
<tr>
<td>ACT (red)</td>
<td>Idle</td>
<td>Ethernet link activity</td>
<td>Ethernet link activity</td>
</tr>
<tr>
<td>10 (yellow)</td>
<td>No Ethernet link at 10Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 10Mbps</td>
</tr>
<tr>
<td>100 (green)</td>
<td>No Ethernet link at 100Mbps</td>
<td>Poor link</td>
<td>Ethernet connected at 100Mbps</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL**

Ambient temp
Operating –20°C to +70°C
Storage –20°C to +70°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
Select enclosure to suit application, see certificate for information

**DATA & POWER TERMINALS**

**LAN Terminals (RJ45)**
10/100 BASE-T Ethernet
Safe Area and Hazardous Area (marked blue)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rx +</td>
</tr>
<tr>
<td>2</td>
<td>Rx –</td>
</tr>
<tr>
<td>3</td>
<td>Tx +</td>
</tr>
<tr>
<td>4</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>5</td>
<td>Supply 12V - PoEx †</td>
</tr>
<tr>
<td>6</td>
<td>Tx –</td>
</tr>
<tr>
<td>7</td>
<td>Supply 0V - PoEx †</td>
</tr>
<tr>
<td>8</td>
<td>Supply 0V - PoEx †</td>
</tr>
</tbody>
</table>

**Screw Terminals**

<table>
<thead>
<tr>
<th>PWR</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+20 – 30V DC in</td>
</tr>
<tr>
<td>2</td>
<td>+20 – 30V DC in</td>
</tr>
<tr>
<td>3</td>
<td>0V</td>
</tr>
<tr>
<td>4</td>
<td>0V</td>
</tr>
<tr>
<td>5-13</td>
<td>No connections</td>
</tr>
<tr>
<td>14</td>
<td>Supply in 12V - PoEx †</td>
</tr>
<tr>
<td>15</td>
<td>Supply in 0V - PoEx †</td>
</tr>
</tbody>
</table>

† When using PoEx, inject device power into terminals 14 & 15 (marked blue).

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantees. In the interest of further technical developments, we reserve the right to make design changes.
The 9469-ET is a multi-functional module that can be used as an Access Point, Wireless Bridge (Client) or Wireless Repeater. When used in the Access Point (AP) mode, it allows wireless devices to connect through it and onto the wired Ethernet network, either in AD-HOC or Infrastructure modes.

When used as a Bridge, it makes it possible to turn any 10/100 Ethernet device into a wireless device, or to connect two network segments together to make a single network (without the interconnecting wire or fibre optic).

Additionally, the module may also be used in its Wireless Repeater (WDS) mode to extend the range covered by a wireless network.

The 9469-ET is designed for hazardous-area mounting inside a suitable enclosure with intrinsically safe Zone 1, ATEX and IECEx certification and Division 1 FM USA and Canada approvals. The ATEX and IECEx approvals cover both surface industry and mining applications.

The unit may be powered by an intrinsically safe power supply or by Power over IS Ethernet (PoEx) providing intrinsically safe power and Ethernet communications over a single Cat5e cable.

The Tri-Band operation offers flexibility in situations where the 2.4GHz band may be overcrowded or where operation in the 5GHz and 5.4GHz bands is desired. Optional dual antennae also provide diversity improving wireless operation.

The intrinsically safe approval of the 9469-ET allows the use of a wider range of antennae that are classified as "simple apparatus". The ANT94 omni-directional antenna (2.4GHz, 3dBi gain) is ideal for use where good general coverage is required.

Compliant with IEEE 802.11 a/b/g/h & Super AG standards, up to 108 Mbps data rate and provides security: WEP, WPA-PSK, WPA2-PSK and IEEE 802.1X (RADIUS).

Status LEDs are provided on the front panel for:

- ‘Power On’
- ‘WLAN ’ Activity’
- Copper UTP ‘Activity’
- Copper UTP ‘10/100Mb Link’

Configuration is straightforward with an easy to use web-based application. The unit supports 802.11d (multi-country roaming) which allows the country to be selected during setup, ensuring the configuration complies with regulatory limits.

The module is supplied as a Din-rail mounting device.
SPECIFICATION

See also System Specification

POWER INPUT
PoEx or separately powered
Input voltage
12V DC (10–12.8V)
Input current
270mA
Input protection
Fuse + supply reversal diode

IS ETHERNET
Intrinsically Safe 10/100 base T
Connector
RJ45
PoEx
Powered Device

WLAN
Standards
IEEE 802.11a/b/g/h
Frequency range
2.4 / 5.4GHz
Data Rate
up to 108Mbps (Super AG mode)
Modulation
OFDM: BPSK, QPSK, 16QAM, 64QAM, DSSS: DBPSK, DQPSK, CCK
Operating channels (802.11bg)
USA / Canada 1-11
Europe / Australia 1-13
Japan 1-14 (channel 14 for 802.11b only)
Security
64/128 bits WEP, WPA-PSK, WPA2-PSK, IEEE 802.11x (RADIUS) authentication, MAC address filtering, SSID broadcast control
Transmit power
+20dBm with TPC (100mW max)
RX Sensitivity
−92dBm for IEEE 802.11a/g
−95dBm for IEEE 802.11b

SOFTWARE
Administration
Web based management using any standard web browser (Internet Explorer, Netscape, Mozilla...), SNMP agent

SAFETY
Location of module
Zone 1, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Location of field wiring
Zone 0, IIC T4 hazardous area
or Class 1, Div 1, Groups A, B, C, D T4 hazardous location
Ethernet protection
intrinsically safe
Certification Code
See approvals
Safety description
See certificate

MECHANICAL
Mounting
DIN rail
Dimensions (mm)
Length 75
Width 100
Height (off rail) 116
Weight
1200 g

LED INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>FLASH</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR (green)</td>
<td>Power fail</td>
<td>N/A</td>
<td>Power OK</td>
</tr>
<tr>
<td>WLAN (yellow)</td>
<td>Idle</td>
<td>Wireless LAN data activity</td>
<td>N/A</td>
</tr>
<tr>
<td>STAT (red)</td>
<td>AP mode = Normal status.</td>
<td>Bridge mode = attempting to connect to AP</td>
<td>Fault</td>
</tr>
<tr>
<td></td>
<td>Bridge mode = connection to AP is established</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT (yellow)</td>
<td>Ethernet link disconnected</td>
<td>Ethernet link activity</td>
<td>Ethernet link connected</td>
</tr>
<tr>
<td>100 (green)</td>
<td>Ethernet link set to 10Mbps</td>
<td>N/A</td>
<td>Ethernet link is 100Mbps</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL

Ambient temp
Operating −20°C to +60°C (except where stated in individual module specifications)
Storage −20°C to +60°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
Select enclosure to suit application, see certificate for information

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantees. In the interest of further technical developments, we reserve the right to make design changes.
The 9491-PS Power Supply is the preferred method for supplying the 9460-ET series of intrinsically safe Ethernet modules and is based on an isolating power supply. It takes a 24V DC safe area / Zone 2 supply and produces an intrinsically safe, 12V DC nominal output capable of powering the Ethernet modules mounted in a Zone 1 hazardous area. FM approval for USA and Canada is pending for Division 2 mounting to power Ethernet modules mounted in a Division 1 hazardous area.

Each 9491-PS can power a single Ethernet module. In order to provide multiple outputs required for several Ethernet modules, the 9491-PS power supply module is ganged up to the required number of ways, either DIN-rail mounted or using the power distribution backplane to simplify the 24VDC input connection to the modules.

The 9491-PS module has LED power indication for both input and output along with internal current limiting and electronic auto-reset circuit breaker action to protect the module in the event of its output being short circuited or overloaded. This also minimises the power dissipation during the fault to a negligible level, thus improving reliability.

The output can be from either the Ex ia IIB or Ex ib IIB output connectors depending upon application. The ‘ib’ IIB output providing a higher useable output power where the Gas Group and Zone allows.
**SPECIFICATION**

See also System Specification

**POWER INPUT**
Separately powered
Input voltage
24V DC (20–30V)
Input current
350mA
Input protection
Fuse + supply reversal diode

**Connections** (see dimension drawing)
- DIN rail mounting: screw terminals – capacity 2.5mm² stranded or single core
- Backplane mounting: multipin connector

**POWER OUTPUT**

**[Ex ia]** output (pins 1 & 3)
Graph shows normal working range & total available range

Minimum output voltage
Equivalent circuit
62% maximum
12.1V minimum

Minimum output voltage
Equivalent circuit
1.32% maximum
12.1V minimum

Connectors
9491-PS is supplied with two IS output connectors.
Capacity 2.5mm² stranded or single core
(When using crimp ferrules for the IS connectors the metal tube length should be 12mm and the wire trim length 14mm.)

**ISOLATION**
Isolation - input to output
Um = 253V rms

**SAFETY**
Safe area, Zone 2, Division 2*

**Location of field wiring**
- **[Ex ia]** output
  Zone 0, IIB hazardous area
  or Class 1, Div 1, Groups C, D hazardous location*
- **[Ex ib]** output
  Zone 1, IIB hazardous area
  or Class 1, Div 1, Groups C, D hazardous location*

**Certification Code**
See approvals

**Safety Description**
See certificate
* certification pending

---

**DIMENSIONS (mm)**

Optimal TN5000 tag holder for individual module identification
Accepts tag label 25 x 12.5 x 0.5mm, 0.2mm thick

**MECHANICAL**
Mounting
DIN rail or power distribution backplane

**Dimensions**
See diagram

**Weight**
130 g

**ENVIRONMENTAL**

**Ambient temp**
- Operating 0°C to +70°C
- Storage −20°C to +70°C

**Relative Humidity**
5 to 95% RH (non-condensing)

**Ingress Protection**
Select enclosure to suit application, see certificate for information

**LED INDICATORS**

<table>
<thead>
<tr>
<th>Pwr (green)</th>
<th>OFF</th>
<th>Flash</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>24V power fail</td>
<td>N/A</td>
<td>output overload or short circuit present</td>
<td>IS power OK</td>
</tr>
</tbody>
</table>

| IS (green) | IS power fail | output overload or short circuit present | IS power OK |

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MECHANICAL
Mounting method
DIN-rail
DIN-rail types
‘Top hat’, 35 x 7.5 mm to EN 50022 or DIN 46277

ENVIRONMENTAL
Ambient temp
Operating –20°C to +70°C
(except where stated in individual module specifications)
Storage –20°C to +70°C
Relative Humidity
5 to 95% RH (non-condensing)
Ingress Protection
IP20 to BS EN 60529
(Additional protection by means of enclosure)

ELECTRICAL
EMC compliance
To EN61326:1998 Electrical equipment for measurement, control
and laboratory use – EMC requirements
Electrical safety
EN 61010-1

APPLICABLE STANDARDS:
• Factory Mutual Research Co., Class No. 3610 for Class I, II, III,
  Divisions 1 and 2, Groups A - G hazardous locations (Intrinsically
  safe circuits).
• Factory Mutual Research Co., Class No. 3611 for Class I,
  Division 2, Groups A, B, C, D hazardous locations
• EN 60079-0:2006, IEC 60079-0:2004 Electrical apparatus for
  explosive gas atmospheres – General requirements
• EN 60079-11:2007, IEC 60079-11:2006 Explosive atmospheres
  -Equipment protection by intrinsic safety “i”
• EN/IEC 60079-15:2005 Electrical apparatus for explosive
  gas atmospheres - Construction, test and marking of type of
  protection “n” electrical apparatus
  explosive gas atmospheres - Intrinsically safe systems ‘i’
  explosive gas atmospheres - Part 28: Protection of equipment
  and transmission systems using optical radiation
• IEC 61241-0:2004 Electrical apparatus for use in the presence of
  combustible dust. General requirements
• IEC 61241-11:2005 Electrical apparatus for use in the presence of
  combustible dust. Protection by intrinsic safety “ID”
• EN 50303:2000 Group I, Category M1 equipment intended to
  remain functional in atmospheres endangered by firedamp and/
  or coal dust
• EC Directive 94/9/EC (ATEX 100A)

PHYSICAL NETWORK
Ethernet
## APPROVALS

### 9461-ET, 9465-ET-x-xx, 9466-ET

<table>
<thead>
<tr>
<th>Region</th>
<th>Europe (ATEX)</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
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<td>SIRA</td>
<td>SIRA</td>
<td>FM</td>
<td>FMC</td>
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<td>Standard</td>
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</tr>
<tr>
<td>9461-ET &amp; 9466-ET Approved for</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>9465-ET-x-xx Approved for</td>
<td></td>
<td></td>
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<tr>
<td>Cert. no.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>§ (see specification for operating temperature range)</td>
<td></td>
<td></td>
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</tbody>
</table>

### 9468-ET

<table>
<thead>
<tr>
<th>Region</th>
<th>Europe (ATEX)</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>SIRA</td>
<td>SIRA</td>
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<td>FMC</td>
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<tr>
<td>Standard</td>
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<td>Approved for</td>
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<tr>
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</tr>
</tbody>
</table>

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* (for guidance on the Gc, nLc & nAc marking)  § (see specification for operating temperature range)
### 9469-ET

<table>
<thead>
<tr>
<th>Region</th>
<th>Europe (ATEX)</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>SIRA</td>
<td>SIRA</td>
<td>FM</td>
<td>FM</td>
</tr>
<tr>
<td>Approved for</td>
<td>Ga Ex ia IIC T4 Ex iaD 20 T135°C (Ta = −40°C to +60°C)§</td>
<td>Ga Ex ia IIC T4 Ex iaD 20 T135°C Ma Ex ia I (Ta = −40°C to +60°C)§</td>
<td>IS/I/1/ABCD/T4 Ta=60°C I/0/AEx ia IIC T4 Ta=60°C</td>
<td>IS/I/1/ABCD/T4 Ta=60°C I/0/AEx ia IIC T4 Ta=60°C</td>
</tr>
<tr>
<td>Cert. no.</td>
<td>Sira 07ATEX2064X</td>
<td>IECEx SIR 07.0042X</td>
<td>3034995</td>
<td>3034995C</td>
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§ (see specification for operating temperature range)

### 9491-PS

<table>
<thead>
<tr>
<th>Region</th>
<th>Europe (ATEX)</th>
<th>International IECEx</th>
<th>USA</th>
<th>Canada</th>
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<tbody>
<tr>
<td>Authority</td>
<td>SIRA</td>
<td>SIRA</td>
<td>FM</td>
<td>FM</td>
</tr>
<tr>
<td>Approved for</td>
<td>(Ga) [Ex ia] IIB (Gb) [Ex ib] IIB (Ex iaD) [Ex ibD] (Ma) [Ex ia] I (Mb) [Ex ib] I Ta = 0°C to +70°C</td>
<td>(Ga) [Ex ia] IIB (Gb) [Ex ib] IIB (Ex iaD) [Ex ibD] (Ma) [Ex ia] I (Mb) [Ex ib] I Ta = 0°C to +70°C</td>
<td>IS/I/1/ABCD/T4 Ta=60°C I/0/AEx ia IIC T4 Ta=60°C</td>
<td>IS/I/1/ABCD/T4 Ta=60°C I/0/AEx ia IIC T4 Ta=60°C</td>
</tr>
<tr>
<td>Cert. no.</td>
<td>Sira 08ATEX2188</td>
<td>IECEx SIR 08.0072</td>
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<td>Pending</td>
</tr>
<tr>
<td>Approved for</td>
<td>Ex nAc [ia] [ib] IIB T4 (Ta = 0°C to +70°C)</td>
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</tr>
<tr>
<td>Cert. no.</td>
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<td>IECEx SIR 08.0117X</td>
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</tbody>
</table>

* (for guidance on marking)

### ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9461-ET</td>
<td>IS serial to Ethernet gateway</td>
<td>AN9454</td>
<td>Omni-directional antenna - 2.4GHz, 3dB gain</td>
</tr>
<tr>
<td>9465-ET-M-ST</td>
<td>IS media converter</td>
<td>9491-PS</td>
<td>IS power supply</td>
</tr>
<tr>
<td>9465-ET-M-SC</td>
<td>IS media converter</td>
<td>CSL9405-xxx</td>
<td>Copper twisted pair FTP Patch Cable (pre-terminated with RJ45 - RJ45 connectors)</td>
</tr>
<tr>
<td>9465-ET-S-SC</td>
<td>IS media converter</td>
<td>-xxx suffix denotes the cable length.</td>
<td></td>
</tr>
<tr>
<td>9466-ET</td>
<td>IS managed Ethernet switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9468-ET</td>
<td>IS Ethernet isolator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9469-ET</td>
<td>IS wireless AP/bridge</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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