9471-ET(G)

Intrinsically Safe Gigabit Ethernet 4 Port Serial Gateway

- **Intrinsically Safe ATEX /UKEX/ IECEx / North America (MET$_{c/us}$) approvals**

- **4 Communication Ports - RS232/TTL/485/422 (2 & 4 Wire)**

- **Serial Modbus Protocol**

- **Dual Port Switch 10/100/1000Mbps LAN (daisy-chain capability)**

- **LAN to Serial**

- **Modbus/TCP ⇔ Modbus/RTU (or ASCII) Protocol**

- **Compact dimensions (W: 42 x H: 160 x D: 140 mm)**

- **Ex ia IIB T4 Ga, [Ex ia Da] IIIC (non-mining), Ex ia I Ma (M1 mining).**

- **Ta = -40ºC to +70ºC**

- **Zone 1 / Zone 21 mounting (Zone 0 / Zone 20 with a suitable Ex ia Power Supply)**

The 9471-ET(G) is an Intrinsically Safe (IS) Ethernet to Serial 4 Port Communication Module suitable for Zone 1 / Zone 21 mounting, **(Zone 0 / Zone 20 with a suitable Ex ia Power Supply).**

The Module allows existing Intrinsically Safe equipment with an RS485/ **RS422** or **RS232/TTL** port to become **Ethernet Enabled** via a Cat5e/6 cable connection into an **IS Ethernet Network** (LAN). The unit has 4 serial ports, each one supporting either RS485/RS422 or RS232/TTL depending upon the configuration required. There are 2x RJ45 (LAN) ports that support 10/100/1000 IS Ethernet connections- these allow 'daisy-chaining' of units together.

Power (12V DC) is supplied to the module either locally or using **Power over Ethernet** (PoEx) from either LAN port - This requires the PoEx output to be wired to the Supply Input terminals by the user.

Note: PoEx not available on Gigabit versions

The compact and cost effective design makes it the ideal choice for many applications:

Petrochem - Process Monitoring, Legacy Systems...

Mining - Underground Communication Links, Machine Monitoring, Legacy Systems….

Electrical connections are via cage-clamp and/or screw type plug/ socket terminals along with RJ45 type connectors for the Ethernet LAN ports.

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9471-ET(G)

June 2023

SPECIFICATION

Power supplies
12VDC IS Power Supply Input or
PoEx™ (Power over IS Ethernet)
Typically 12V @ 150mA (Inrush < 200mA)
Ui = 15.4V
9492-PS recommended

Ethernet
Intrinsically Safe 10/100/1000Base-T
Connector
RJ45 (x2)
Cable Length
Up to 100m Cat5e
PoEx
Powered Device

IS SERIAL CONNECTIONS

	RS232/422/485
No. of Channels	4
Connector Type	Screw terminals
Baudrate	1200-230K4 baud
Parity	Even/Odd/None
Data Bits	8
Stop Bits	1

SAFETY

Location of Unit
Zone 1, IIB T4 hazardous area (9471-ETG)
Zone 1, IIC T4 hazardous area (9471-ET)

Certification Code
Ex ia IIB T4 Ga (9471-ETG)
Ex ia IIC T4 Ga (9471-ET)
[Ex ia Da] IIIC T135°C (non-mining)
Ex ia I Ma (M1 mining)
Ta =-40°C to +70°C

Certificate numbers
CML 19ATEX2414X
IECEx CML 19.0150X
IECEx ExTC 20.0019X
CML 21UKEX21072X

See certificates for further information

ENVIRONMENTAL

Operating Temperature
-40°C…+70°C
Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing
Ingress Protection
Select enclosure to suit application,
see certificates for information

MECHANICAL

Width	42mm
Height	160mm
Depth	140mm
Weight	1500g
Mounting	Din Rail

LED INDICATORS

	OFF	FLASH	ON
PWR (green)	Power Fail	N/A	Power OK
WDG (red/green)	Fault	Green- Healthy (10Hz)	Fault
TX (green)	Idle	Transmititng Serial Data	N/A
RX (red)	Idle	Receiving Serial Data	Fault - RX data polarity is inverted
STAT (red/green)	N/A	Green- Identify module mode	Red (fault) Green (healthy)
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 1000 (green)	10/100Mbps	N/A	1000Mbps

DATA & POWER TERMINALS

Power & External LEDs (CON1)

Pin	Function	Pin	Function
1	Power In +12V#	2	Power In 0V#
3	LAN1 PoEx +12V#	4	LAN1 PoEx 0V#
5	LAN2 PoEx +12V#	6	LAN2 PoEx 0V#
7		8	
9		10	
11	0V	12	0V
13	LAN1 LED	14	LAN2 LED
15	COM1 LED	16	COM2 LED
17	COM3 LED	18	COM4 LED

#Connect LAN1 OR LAN2 PoEx terminals to Power In terminals to use this function
- LEDS wire between LED terminal and 0V (no resistor required)

LAN (RJ45)
10/100/1000 BASE-T Ethernet

Pin	10/100 Function	Gigabit Function
1	Tx +	BI_DA+
2	Tx-	BI_DA-
3	Rx +	BI_DB+
4	PoEx +12V*	BI_DC+
5	PoEx +12V*	BI_DC-
6	Rx-	BI_DB-
7	PoEx 0V*	BI_DD+
8	PoEx 0V*	BI_DD-

*PoEx not available on Gigabit ports

PORT 1 & 2 (CON3)
RS485/422/232/TTL Ports

Pin	Function	Pin	Function
1	1Tx+/A	2	1Tx-/B
3	1Rx+	4	1Rx-
5	1Tx (RS232)	6	0V
7	1Rx (RS232)	8	0V
9	2Tx+/A	10	2Tx-/B
11	2Rx+	12	2Rx-
13	2Tx (RS232)	14	0V
15	2Rx (RS232)	16	0V

PORT 3 & 4 (CON4)
RS485/422/232/TTL Ports

Pin	Function	Pin	Function
1	3Tx+/A	2	3Tx-/B
3	3Rx+	4	3Rx-
5	3Tx (RS232)	6	0V
7	3Rx (RS232)	8	0V
9	4Tx+/A	10	4Tx-/B
11	4Rx+	12	4Rx-
13	4Tx (RS232)	14	0V
15	4Rx (RS232)	16	0V

ORDERING INFORMATION

Part Number	Description	Comments
9471-ETG	**4-Port Serial Gateway (Gigabit)**	**Standard**
9471-ET	4-Port Serial Gateway (10/100 PoEx)	Special Order

Note: Special order items may incur a minimum order quantity

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Technical data
MTL industrial ethernet

January 2022
EPS 9474-ET(G)/BxLAN Rev 2

CROUSE-HINDS
SERIES

9474-ET(G)/BxLAN
MTL intrinsically safe ethernet interface

- **ATEX / UKEX / IECEx certified**
- **Compact dimensions (cased- W:72xH:90xD:60 mm OEM- W:40xH:78xD:20 mm)**
- **DIN-rail mounting (cased version)**
- **Suitable for safe area mounting**
- **OEM version for incorporating into other designs**
- **Loop powered**
- **[Ex ia Ma] I**
  [Ex ia Ga] IIC or IIB (depending on model)
  [Ex ia Da] IIIC
- **Ta = -40°C to +70°C**

The BxLAN is available in versions to suit different applications.

Boxed Types

- **9474-ET**   10/100Mbps Ethernet Interface
- **9474-ETG**   10/100/1000Mbps Gigabit Ethernet Interface

OEM PCB Type

- **BxLAN**   10/100Mbps Ethernet Interface

The two Ethernet LAN ports are provided with RJ45 connectors, the two IS Safety earth conductors are terminated into screw type terminals. The OEM type may have PCB headers fitted instead of the connectors if the user wishes to mount it directly onto their PCB.

The Gigabit versions are suitable for IIB gas groups, the 100Mbps versions are suitable for IIC gas groups. All versions are suitable for Group I Mining.

The Ethernet LAN ports are marked up HAZ and SAFE. The connection going into the Hazardous Area must be plugged into the RJ45 marked HAZ and the Safe Area device is connected to the port marked SAFE.

It is recommended that the RJ45 Cat5e cable that is used for the Hazardous Area LAN connection is Blue in colour to identify this cable as carrying Intrinsically Safe signals and the Safe Area LAN cable be some other colour to avoid any confusion.

Two independent high integrity safety earths are required, this is the same requirement as with any diode safety barrier type device. The conductors used should be 0.75mm^2 minimum.

9474-ET(G) BxLAN
January 2022

SPECIFICATION

Ethernet dependent on model type

BxLAN: Intrinsically Safe 10/100Base-T
9474-ET: Intrinsically Safe 10/100Base-T
9474-ETG: Intrinsically Safe 10/100/1000Base-T

Connector

RJ45

Cable Length

Up to 100m Cat5e

CONNECTIONS

Safe Area LAN	RJ45 Cat5e
Haz Area LAN	RJ45 Cat5e
Earth*	2 Individual conductors of 0.75mm^2 minimum

Note: Both Safety earths must be connected at all times.

SAFETY

Location of Unit

Safe area mounting

Certification Code

[Ex ia Ma] I
[Ex ia Ga] IIC or IIB (depending on model)
[Ex ia Da] IIIC
Ta =-40°C to +70°C

Certificate numbers

CML 16ATEX2050X
IECEx CML 16.0025X
CML 21UKEX21071X

See certificates for further information

ENVIRONMENTAL

Operating Temperature

-40°C…+70°C

Storage Temperature

-40°C…+70°C

Humidity

0…95% RH, non-condensing

Ingress Protection

Select enclosure to suit application, see certificates for information

MECHANICAL

Boxed Version	
Width	72mm
Height	90mm
Depth	60mm
Weight	104g
Mounting	DIN-rail

OEM Version	
Width	40mm
Height	78mm
Depth	20mm
Weight	58g
Mounting	Screw

DATA TERMINALS (Safe and Haz)

BxLAN / 9474-ET
10/100 BASE-T Ethernet

Pin	Function
1	Tx +
2	Tx-
3	Rx +
4	*n/c
5	*n/c
6	Rx-
7	*n/c
8	*n/c

9474-ETG
1000BASE-T Ethernet

Pin	Function
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

n/c pairs 4+5 and 7+8 are terminated with 75R+1nF internally

ORDERING INFORMATION

Part Number	Description
BxLAN	OEM PCB 10/100Base-T
9474-ET	Boxed 10/100Base-T
9474-ETG	Boxed 10/100/1000Base-T

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The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

9475-ET(G)

Intrinsically Safe Gigabit Ethernet Dual Port Media Converter Switch

- **Intrinsically Safe ATEX / UKEX / IECEx Certification / North America (MET$_{c/us}$) approvals**

- **Dual 1310nm Fibre-Optic Ports (10Km)**

- **CPU Management Feature**

- **Dual Port Switch 10/100/1000Mbps LAN (daisy-chain capability)**

- **Fibre-Optic Repeater Mode with 2 Local LAN Ports**

- **Compact dimensions (W: 42 x H: 160 x D: 140 mm)**

- **Ex ia op is IIB T4 Ga, [Ex ia Da] IIIC (non-mining), Ex ia op is I Ma (M1 mining).**

- **Ta = -40ºC to +70ºC**

- **Zone 1 / Zone 21 mounting (Zone 0 / Zone 20 with a suitable Ex ia Power Supply)**

The 9475-ET(G) is an Intrinsically Safe (IS) Dual Port Media Converter Module suitable for Zone 1 / Zone 21 mounting, **(Zone 0 / Zone 20 with a suitable Ex ia Power Supply).**

The use of 1310nm optics (instead of 850nm) allows a longer fibre-optic link length, typically 10Km at (Gigabit) 1000Mbps using Single Mode fibre or 500m when using multi-mode fibre

There are 2x RJ45 (LAN) ports that support 10/100/1000 IS Ethernet connections – these can allow 'daisy-chaining' of units together.

Power (12V DC) is supplied to the module either locally or using Power over Ethernet (PoEx) from either LAN port - This requires the PoEx output to be wired to the Supply Input terminals by the user (9475 used as a Powered Device).

Alternatively PoEx can provide power to another device connected to the LAN port (Power Source) by connecting power into the PoEx terminals to feed the LAN device (9475 used as a Power Source)

TAKE CARE - DO NOT connect multiple power supplies together when using PoEx!

Note: PoEx not available on Gigabit LAN versions

The compact and cost effective design makes it the ideal choice for many applications:

Petrochem -	Process Monitoring, Galvanic Isolation...
Mining -	Underground Communication Links, Machine Monitoring….

Electrical connections are via cage-clamp and/or screw type plug/socket terminals along with RJ45 type connectors for the Ethernet LAN ports. The Fibre ports are duplex SC type.

9475-ET(G)

Augsut 2023

SPECIFICATION

Power supplies
12VDC IS Power Supply Input
Typically 12V @ 270mA (Inrush < 200mA)
Ui = 15.4V
9492-PS-PLUS recommended

Ethernet
Intrinsically Safe 10/100/1000Base-T
Connector
RJ45 (x2)
Cable Length
Up to 100m Cat5e
PoEx
Powered Device or Power Source

FIBRE OPTIC CONNECTIONS
Connector (Top Port TX, Bottom Port RX)
Duplex SC (Gigabit 1000Mbps single-mode or multi-mode)
1000BASE-X

SAFETY
Eye Safety
Class 1 LED/Laser Product

Location of Unit
Zone 1, IIBT4 hazardous area (9475-ETG)
Zone 1, IICT4 hazardous area (9475-ET)

Certification Code
Ex ia op is IIBT4 Ga (9475-ETG)
Ex ia op is IICT4 Ga (9475-ET)
[Ex ia Da] IIIC T135°C (non-mining)
Ex ia op is I Ma (M1 mining)
Ta =-40°C to +70°C

Certificate numbers
CML 19ATEX2414X
IECEx CML 19.0150X
IECEx ExTC 20.0019X
CML 21UKEX21072X

See certificates for further information

ENVIRONMENTAL
Operating Temperature
-40°C…+70°C
Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing
Ingress Protection
Select enclosure to suit application,
see certificates for information

MECHANICAL

Width	42mm
Height	160mm
Depth	140mm
Weight	1500g
Mounting	Din Rail

LED INDICATORS

	OFF	FLASH	ON
PWR (green)	Power Fail	N/A	Power OK
WDG (red/green)	Fault	Green- Healthy (10Hz)	Fault
STAT (red/green)	N/A	Green – Identify module mode	Red (fault) Green (healthy)
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 1000 (green)	10/100Mbps	N/A	1000Mbps
FIBRE Ports (purple)	No Link	Data	Linked

FIBRE PORT SPECIFICATION (Gigabit)

1000BASE-X

TX Output (1310nm)
Single-Mode   -9.5dBm (min),-3dBm (max)   *note1

RX Sensitivity
Single-Mode   -21dBm (max)

note1 – transmit power coupled into 9um single-mode fibre

DATA & POWER TERMINALS

Power & External LEDs (CON1)

Pin	Function	Pin	Function
1	Power In +12V	2	Power In 0V
3	LAN1 PoEx +12V#	4	LAN1 PoEx +0V#
5	LAN2 PoEx +12V#	6	LAN2 PoEx +0V#
7		8	
9		10	
11	0V	12	0V
13	LAN1 LED	14	LAN2 LED
15	FIBRE1 LED	16	FIBRE2 LED
17		18	

#Powered Device: Connect LAN1 OR LAN2 PoEx Out terminals to Power In terminals to use this function.
#Power Source: Connect a power supply to LAN1 PoEx In and/or LAN2 PoEx In terminals to use this function.

TAKE CARE - DO NOT connect multiple power supplies together when using PoEx

- LEDS wire between LED terminal and 0V (no resistor required)

LAN (RJ45)
10/100/1000 BASE-T Ethernet

Pin	10/100 Function	Gigabit Function
1	Tx +	BI_DA+
2	Tx-	BI_DA-
3	Rx +	BI_DB+
4	PoEx +12V*	BI_DC+
5	PoEx +12V*	BI_DC-
6	Rx-	BI_DB-
7	PoEx 0V*	BI_DD+
8	PoEx 0V*	BI_DD-

*PoEx not available on Gigabit ports

ORDERING INFORMATION

Part Number	Description	Comments
9475-ETG	**Dual Media Converter – Gigabit Single/Multi-Mode SC Fibre (Gigabit LAN)**	**Standard**
9475-ET	**Dual Media Converter – Gigabit Single/Multi-Mode SC Fibre (10/100 LAN + PoEx)**	**Special Order**

Note: Special order items may incur a minimum order quantity

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9476-ET(G)

Intrinsically Safe Gigabit Ethernet
6 Port Managed Switch

- **Intrinsically Safe ATEX / UKEX / IECEx Certification / North America (MET$_{C/US}$) approvals**

- **6 Port Switch 10/100/1000Mbps LAN**

- **6x Gigabit Ports or Mixed Gigabit and 10/100 PoEx Versions**

- **CPU Management Feature**

- **Compact dimensions (W: 42 x H: 160 x D: 140 mm)**

- **Ex ia IIB T4 Ga, [Ex ia Da] IIIC (non-mining), Ex ia I Ma (M1 mining).**

- **Ta = -40ºC to +70ºC**

- **Zone 1 / Zone 21 mounting (Zone 0 / Zone 20 with a suitable Ex ia Power Supply)**

The 9476-ET(G) is an Intrinsically Safe (IS) 6-Port Managed Ethernet Switch suitable for Zone 1 / Zone 21 mounting, **(Zone 0 / Zone 20 with a suitable Ex ia Power Supply).**

The 6x RJ45 (LAN) ports support 10/100/1000 IS Ethernet connections. Available in 6 Port Gigabit and also Mixed Gigabit and 10/100 + PoEx versions to suit various applications.

Power (12V DC) is supplied to the module locally along with **Power over Ethernet** (PoEx) for the connected devices where required.

Note: PoEx not available on Gigabit ports

The compact and cost effective design makes it the ideal choice for many applications:

Petrochem -	Process Monitoring & Control...
Mining -	Underground Communication Links,PLC and Machine Monitoring…

Electrical connections are via cage-clamp and/or screw type plug/socket terminals along with RJ45 type connectors for the Ethernet LAN ports.

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9476-ET(G)

June 2023

SPECIFICATION

Power supplies
12VDC IS Power Supply Input
PoExTM (Power over IS Ethernet)
Typically 12V @ 350mA (Inrush < 200mA)
U_i = 15.4V
9492-PS-PLUS recommended

Ethernet
Intrinsically Safe 10/100/1000Base-T
Connector
RJ45 (x6)
Cable Length
Up to 100m Cat5e
PoEx
Power Source

SAFETY

Location of Unit
Zone 1, IIBT4 hazardous area (9476-ETG)
Zone 1, IICT4 hazardous area (9476-ET)

Certification Code
Ex ia IIBT4 Ga (9476-ETG versions)
Ex ia IICT4 Ga (9476-ET)
[Ex ia Da] IIICT135°C (non-mining)
Ex ia I Ma (M1 mining)
Ta =-40°C to +70°C

Certificate numbers
CML 19ATEX2414X
IECEx CML 19.0150X
IECEx ExTC 20.0019X
CML 21UKEX21072X

See certificates for further information

ENVIRONMENTAL

Operating Temperature
-40°C…+70°C
Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing
Ingress Protection
Select enclosure to suit application,
see certificates for information

MECHANICAL

Width	42mm
Height	160mm
Depth	140mm
Weight	1500g
Mounting	Din Rail

LED INDICATORS

	OFF	FLASH	ON
PWR (green)	Power Fail	N/A	Power OK
WDG (red/green)	Fault	Green- Healthy (10Hz)	Fault
STAT (red/green)	N/A	Green – Identify module mode	Red (fault) Green (healthy)
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 1000 (green)	10/100Mbps	N/A	1000Mbps

DATA & POWER TERMINALS

Power & External LEDs (CON1)

Pin	Function	Pin	Function
1	Power In +12V	2	Power In 0V
3	LAN3 PoEx +12V	4	LAN3 PoEx 0V
5	LAN4 PoEx +12V	6	LAN4 PoEx 0V
7	LAN5 PoEx +12V	8	LAN5 PoEx 0V
9	LAN6 PoEx +12V	10	LAN6 PoEx 0V
11	0V	12	0V
13	LAN1 LED	14	LAN2 LED
15	LAN3 LED	16	LAN4 LED
17	LAN5 LED	18	LAN6 LED

- LEDS wire between LED terminal and 0V (no resistor required)

LAN (RJ45)
10/100/1000 BASE-T Ethernet

Pin	10/100 Function	Gigabit Function
1	Tx +	BI_DA+
2	Tx-	BI_DA-
3	Rx +	BI_DB+
4	PoEx +12V*	BI_DC+
5	PoEx +12V*	BI_DC-
6	Rx-	BI_DB-
7	PoEx 0V*	BI_DD+
8	PoEx 0V*	BI_DD-

*Note - PoEx only on LAN3-6 ports when 10/100

PoEx not available on Gigabit ports

ORDERING INFORMATION

Part Number	Description	Comments
9476-ETG	**6 Port Gigabit Ethernet Switch (6x Gigabit)**	**Standard**
9476-ET2G	**2+4 Port Gigabit Ethernet Switch (2x Gigabit + 4x 10/100 PoEx)**	**Standard**
9476-ET3G	3+3 Port Gigabit Ethernet Switch (3x Gigabit + 3x 10/100 PoEx)	Special Order
9476-ET4G	4+2 Port Gigabit Ethernet Switch (4x Gigabit + 2x 10/100 PoEx)	Special Order
9476-ET	6 Port Ethernet Switch (6x 10/100 4x PoEx)	Special Order

Note: Special order items may incur a minimum order quantity

9478-ETG

MTL Intrinsically Safe Gigabit*
Ethernet Galvanic Isolator

- **Intrinsically Safe ATEX / UKEX / IECEx Certification / North America (MET$_{c/us}$) approval**

- **Galvanically Isolated Safe and Hazardous Area Ports**

- **Dual Port Switch 10/100/1000Mbs LAN (daisy-chain capability)**

- **Single IS Ethernet Switch Port 10/100/1000Mbs* LAN**

- **Safe and Hazardous sides link independently with auto- negotiation**

- **Status LEDs**

- **Single 12V/24VDC (10-30V) supply**

- **Compact dimensions (W: 42 x H: 160 x D: 140 mm)**

- **[Ex ia Ga] IIB, [Ex ia Da] IIIC (non-mining),**

  [Ex ia Ma] I (M1 mining).

- **Ta = -40ºC to +70ºC**

- **Safe Area or Zone 2 / Zone 22 mounting**

The 9478-ET(G) is an Intrinsically Safe (IS) Ethernet Isolator suitable for Safe Area or Zone 2 / Zone 22 mounting for connection to intrinsically safe certified devices mounted in a Zone 0 location. The IS Ethernet isolator allows the interconnection of a Zone 2 or uncertified safe area device to the intrinsically safe 9400-ET range 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/6 cables in preference to fibre

Transparent operation- 10/100/1000Mbps, Full/Half Duplex with AutoNegotiation. Supports IEEE 802.3: 10Base-T, 100Base-TX and 1000Base-TX.

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

There are 2x RJ45 (LAN) ports on the Safe Area side that support 10/100/1000 standard Ethernet connections – these can allow 'daisychaining' of units together. The single Hazardous Area RJ45 provides an IS LAN connection

10/100/1000Mb* IS Ethernet twisted pair (Cat5e/6) RJ45 connection (100metres length max.) provide total galvanic isolation (Um=253Vac) from safe to hazardous areas.

The module operates from a single supply in the Safe Area of 10…30Vdc at approx. 24V @ 110mA or 12V @ 200mA.

The compact and cost effective design makes it the ideal choice for many applications:

Petrochem -	Process Monitoring, Galvanic Isolation...
Mining -	Underground Communication Links, Machine Monitoring….

Electrical connections are via cage-clamp and/or screw type plug/ socket terminals along with RJ45 type connectors for the Ethernet LAN ports.

* 9478-ETG supports 10/100/1000Mbs on safe area and hazardous area ports
 9478-ET supports 10/100Mbs on safe area and hazardous area ports

EⁱTⁱN
Powering Business Worldwide

9478-ETG

June 2023

SPECIFICATION

Power supply
12V/24VDC (10-30V) Power Supply Input
Typically 24V @ 110mA or 12V @ 200 mA.

Input protection
Fuse + supply reversal diode

Ethernet
Standard 10/100/1000Base-T (Safe Area Port)
Intrinsically Safe 10/100/1000Base-T (Haz. Area Port)

Connector
RJ45 (x2) Safe Area
RJ45 (x1) Haz. Area

Cable Length
Up to 100m Cat5e

SAFETY

Location of Unit
Safe Area or Zone 2 / 22

Certification Code
[Ex ia Ga] IIB (9478-ETG)
[Ex ia Ga] IIC (9478-ET)
Ex ec [Ex ia] IIB T4 Gc (9478-ETG)
Ex ec [Ex ia] IIC T4 Gc (9478-ET)
[Ex ic Gc] IIB (9478-ETG)
[Ex ic Gc] IIC (9478-ET)
[Ex ia Da] IIIC (non-mining)
[Ex ia Ma] I (M1 mining)
Ta =-40°C to +70°C

Certificate numbers
CML 21ATEX21077X
CML 21ATEX41106X
CML 21UKEX21078X
CML 21UKEX41107X
IECEx CML 21.0121X
IECEx ExTC 22.0002X

See certificates for further information

ENVIRONMENTAL

Operating Temperature
-40°C…+70°C

Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing

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

MECHANICAL

Width	42mm
Height	160mm
Depth	140mm
Weight	400g
Mounting	Din Rail

LED INDICATORS

	OFF	FLASH	ON
12V/24V PWR (green)	Power Fail	N/A	Power OK
HAZ PWR (green)	Internal Supply Fail	N/A	Power OK
STAT (green)	Fault	Healthy	Healthy
WDG (green)	Fault	Green – Healthy (10Hz)	Fault
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 1000 (green)	10/100Mbps	N/A	1000Mbps

Note: The HAZ PWR LED indicator monitors the internal isolated power supply generated from the 12V/24V Safe Area supply input.

DATA & POWER TERMINALS

Power (Enclosure Terminals)

Pin	Function	Pin	Function
1	Power In +12V/24V	2	Power 0V
3	Power In +12V/24V	4	Power 0V
5		6	
7		8	
9		10	

Note – Power terminals 1+3 and 2+4 internally connected
         To allow looping to other units

LAN (RJ45 - SK1, SK2)
10/100/1000 BASE-T Ethernet

Pin	10/100 Function	Gigabit Function
1	Tx +	BI_DA+
2	Tx-	BI_DA-
3	Rx +	BI_DB+
4		BI_DC+
5		BI_DC-
6	Rx-	BI_DB-
7		BI_DD+
8		BI_DD-

Hazardous Area RJ45 SK2 is marked BLUE

ORDERING INFORMATION

Part Number	Description	Comments
9478-ETG	Ethernet Isolator – 10/100/1000Mbps Gigabit	**Standard**
9478-ET	Ethernet Isolator – 10/100/Mbps	Special Order

Powering Business Worldwide

9478-ETX

MTL Intrinsically Safe Gigabit Ethernet Galvanic Isolator

- **Intrinsically Safe ATEX / UKEX / IECEx Certification / North America (MET$_{C/US}$) approvals**

- **Galvanically Isolated Safe and Hazardous Area Ports**

- **Single IS Ethernet Switch Port 10/100/1000Mbs LAN**

- **Easy installation with independent Safe and Hazardous links with auto- negotiation**

- **Status LEDs**

- **Single 12V/24VDC (10-30V) supply**

- **Easy migration of 9468-ET with same dimensions (W: 100 x H: 75 x D: 116 mm)**

- **[Ex ia Ga] IIB, [Ex ia Da] IIIC (non-mining),**

  [Ex ia Ma] I (M1 mining).

- **Ta = -40ºC to +70ºC**

- **Safe Area or Zone 2 / Zone 22 mounting**

The 9478-ETX(G) is an Intrinsically Safe (IS) Ethernet Isolator suitable for Safe Area or Zone 2 / Zone 22 mounting.

The RJ45 (LAN) port on the Safe Area side supports 10/100/1000 standard Ethernet connections. The Hazardous Area RJ45 provides an IS LAN connection.

A single (12V/24V DC) power supply is required plus a 12V IS power supply if PoEx is required.

The compact and cost effective design makes it the ideal choice for many applications:

Petrochem -	Process Monitoring, Galvanic Isolation...
Mining -	Underground Communication Links, Machine Monitoring….

Electrical connections are via cage-clamp and/or screw type plug/socket terminals along with RJ45 type connectors for the Ethernet LAN ports.

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9478-ETX

June 2023

SPECIFICATION

Power supply
12V/24VDC (10-30V) Power Supply Input
Typically 24V @ 110mA or 12V @ 200mA
12VDC IS Power Supply Input PoEx (*optional with 9478-ETX)
9492-PS-PLUS recommended

Input protection
Fuse + supply reversal diode

Ethernet
Standard 10/100/1000Base-T (Safe Area Port)
Intrinsically Safe 10/100/1000Base-T (Haz. Area Port)

Connector
RJ45 (x1) Safe Area
RJ45 (x1) Haz. Area

Cable Length
Up to 100m Cat5e

SAFETY

Location of Unit
Safe Area or Zone 2 / 22

Certification Code
[Ex ia Ga] IIB (9478-ETXG)
[Ex ia Ga] IIC (9478-ETX)
Ex ec [Ex ia] IIB T4 Gc (9478-ETXG)
Ex ec [Ex ia] IIC T4 Gc (9478-ETX)
[Ex ic Gc] IIB (9478-ETXG)
[Ex ic Gc] IIC (9478-ETX)
[Ex ia Da] IIIC (non-mining)
[Ex ia Ma] I (M1 mining)
Ta =-40°C to +70°C

Certificate numbers
CML 21ATEX21077X
CML 21ATEX41106X
CML 21UKEX21078X
CML 21UKEX41107X
IECEx CML 21.0121X
IECEx ExTC 22.0002X

See certificates for further information

ENVIRONMENTAL

Operating Temperature
-40°C…+70°C
Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing
Ingress Protection
Select enclosure to suit application,
see certificates for information

MECHANICAL

Width	100mm
Height	75mm
Depth	116mm
Weight	400g
Mounting	Din Rail

LED INDICATORS

	OFF	FLASH	ON
12V/24V PWR (green)	Power Fail	N/A	Power OK
HAZ PWR (green)	Internal Supply Fail	N/A	Power OK
STAT (green)	Fault	Healthy	Healthy
WDG (green)	Fault	Green – Healthy (10Hz)	Fault
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 1000 (green)	10/100Mbps	N/A	1000Mbps

Note: The HAZ PWR LED indicator monitors the internal isolated power supply generated from the 12V/24V Safe Area supply input.

DATA & POWER TERMINALS

Power (Enclosure Terminals)

Terminal	Function
T1	Power In +12V/24V
T2	Power In +12V/24V
T3	Power 0V
T4	Power 0V
T5-13	No connections
T14	PoEx +12V*
T15	PoEx 0V*

Note – Power terminals 1+2 and 3+4internally connected
To allow looping to other units

**LAN (RJ45 - SK1, SK2)
10/100/1000 BASE-T Ethernet**

Pin	10/100 Function	Gigabit Function
1	Tx +	BI_DA+
2	Tx-	BI_DA-
3	Rx +	BI_DB+
4	PoEx +12V*	BI_DC+
5	PoEx +12V*	BI_DC-
6	Rx-	BI_DB-
7	PoEx 0V*	BI_DD+
8	PoEx 0V*	BI_DD-

*Note- PoEx only on SK2 of ETX model
Hazardous Area RJ45 SK2 is marked BLUE

ORDERING INFORMATION

Part Number	Description	Comments
9478-ETXG	Ethernet Isolator – 10/100/1000Mbps Gigabit	**Standard**
9478-ETX	Ethernet Isolator – 10/100/Mbps + PoEx	Special Order

9479-ET(G)-CSL

CSL Intrinsically Safe Gigabit Ethernet WLAN AP / Bridge

- **Intrinsically Safe ATEX / UKEX / IECEx / North America (MET$_{C/US}$) approvals**
- **Dual Band 2.4GHz / 5GHz WLAN Support**
- **Access Point (AP) Mode**
- **or Client/Bridge Mode**
- **Dual Port Switch 10/100/1000Mbs LAN (daisy-chain capability)**
- **Compact dimensions (W: 42 x H: 160 x D: 140 mm)**
- **Ex ia IIB T4 Ga, Ex ia [ia Da] IIIC T135° Db (non-mining) Ex ia I Ma (M1 mining).**
- **Ta = -40°C to +70°C**
- **Zone 1 / Zone 21 mounting (Zone 0 / Zone 20 with a suitable Ex ia Power Supply)**

The 9479-ET-CSL is an Intrinsically Safe (IS) WLAN AP/Bridge Module suitable for Zone 1 / Zone 21 mounting, **(Zone 0 / Zone 20 with a suitable Ex ia Power Supply).**

It may be configured as either an AP or Client/Bridge. Also supporting either 2.4GHz or 5GHz operation further extends its range of applications.

There are 2x RJ45 (LAN) ports that support 10/100/1000 IS Ethernet connections – these can allow 'daisy-chaining' of units together.

Power (12V DC) is supplied to the module either locally or using **Power over Ethernet** (PoEx) from the LAN port - This requires the PoEx output to be wired to the Supply Input terminals by the user.

Note: PoEx not available on Gigabit versions

The compact and cost effective design makes it the ideal choice for many applications:

Petrochem -	Process Monitoring, Galvanic Isolation etc.
Mining -	Underground Communication Links, Machine Monitoring etc.

Electrical connections are via cage-clamp and/or screw type plug/socket terminals along with RJ45 type connectors for the Ethernet LAN ports. The antenna connections are SMA type

SPECIFICATION

Power supplies
12VDC IS Power Supply Input or
PoEx™ (Power over IS Ethernet)
Typically 12V @ 300mA (Inrush < 200mA)
U_i = 15.4V
9492-PS-PLUS recommended

Ethernet
Intrinsically Safe 10/100/1000Base-T
Connector
RJ45 (x2)
Cable Length
Up to 100m Cat5e
PoEx
Powered Device

ANTENNA CONNECTIONS

Connector (Top Port MAIN, Bottom Port AUX)
SMA (MAIN)
SMA (AUX)

SAFETY

Location of Unit
Zone 1, IIBT4 hazardous area (9479-ETG)
Zone 1, IICT4 hazardous area (9479-ET)

Certification Code
Ex ia IIBT4 Ga (9479-ETG)
Ex ia IICT4 Ga (9479-ET)
Ex ia [ia Da] IIICT135°C Db
Ex ia I Ma (M1 mining)
Ta =-40ºC to +70ºC

Certificate numbers
CML 19ATEX2414X
IECEx CML 19.0150X
IECEx ExTC 20.0019X (QLD)
CML 21UKEX21072X
See certificates for further information

ENVIRONMENTAL

Operating Temperature
-40°C…+70°C (full WLAN specification -20 to +60°C)
Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing
Ingress Protection
Select enclosure to suit application,
see certificates for information

MECHANICAL

Width	42mm
Height	160mm
Depth	140mm
Weight	1500g
Mounting	Din Rail

LED INDICATORS

	OFF	FLASH	ON
PWR (green)	Power Fail	N/A	Power OK
WDG (green)	Fault	Green- Healthy (10Hz)	Fault
STAT (green)	Initialising or Fault	N/A	Healthy
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 1000 (green)	10/100Mbps	N/A	1000Mbps
WLAN ACT (blue)	No Link	Data	Linked

WLAN

TX Output – 802.11n
2.4GHz: 18 to 20.5 dBm
5GHz: 15 to 18 dBm
(per antenna output in 2T/2R mode)

RX Sensitivity – 802.11n
2.4GHz:-92 to -73 dBm
5GHz:-96 to -72 dBm

Data Rates
802.11n : up to 300Mbps (2T/2R)
802.11a/h : 6 to 54Mbps
802.11b : 1 to 11Mbps
802.11g : 1 to 54Mbps

Security – AP Mode
WEP, WPA-PSK, WPA2-PSK, WPA/WPA2,
SSID visibility status

Security – Client/Bridge Mode
WEP, WPA-PSK, WPA2-PSK, WPA/WPA2,
AES/TKIP/WEP by hardware encryption

DATA & POWER TERMINALS

Power & External LEDs (CON1)

Pin	Function	Pin	Function
1	Power In +12V#	2	Power In 0V#
3	LAN1 PoEx +12V#	4	LAN1 PoEx 0V#
5	LAN2 PoEx +12V#	6	LAN2 PoEx 0V#
7		8	
9		10	
11	0V	12	0V
13	LAN1 LED	14	LAN2 LED
15	WLAN LED	16	
17		18	

LAN (RJ45)
10/100/1000 BASE-T Ethernet

Pin	10/100 Function	Gigabit Function
1	Tx +	BI_DA+
2	Tx-	BI_DA-
3	Rx +	BI_DB+
4	PoEx +12V*	BI_DC+
5	PoEx +12V*	BI_DC-
6	Rx-	BI_DB-
7	PoEx 0V*	BI_DD+
8	PoEx 0V*	BI_DD-

-#Connect LAN1 OR LAN2 PoEx terminals to Power In terminals to use this function
- LEDS wire between LED terminal and 0V (no resistor required)

*PoEx not available on Gigabit ports

ORDERING INFORMATION

Part Number	Description	Comments
9479-ETG-CSL	**Gigabit WLAN AP / Bridge**	**Standard**
9479-ET-CSL	WLAN AP / Bridge (10/100 PoEx)	Special Order (Subject to MOQ)

Note: 2x Antenna required (not included) these need to be ordered separately

ACCESSORIES

Part Number	Description
ANTSMA94	**Antenna SMA Plug, length 150mm Gain, 3dBi**
ANT94	**Antenna TNC Plug, length 150mm Gain, 3dBi**
ANT94RA	**Stubby Antenna TNC 90° Plug, length 80mm, Gain 2dBi**
CSL-RG316-SMA-1000	**SMA Bulkhead Socket ⇔ SMA Plug, length 1000mm RG316 Cable Assembly**
CSL-RG316-TNC-SMA-1000	**TNC Bulkhead Socket ⇔ SMA Plug, length 1000mm RG316 Cable Assembly**

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

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Technical data
MTL industrial ethernet

June 2017
EPS 9661-ETW Rev 1

CROUSE-HINDS
SERIES

9661-ETW

MTL intrinsically safe ethernet to serial 4 port communication module

- **Intrinsically safe ATEX / IECEx certification**
- **4 Communication Ports - RS232/422/485 (2 & 4 Wire)**
- **Serial Modbus Protocol**
- **Bluetooth Dual Mode V2.1**
- **Wi-Fi supporting 802.11 a/b/g/n standards (2.4 & 5 GHz)**
- **Dual Port Switch 10/100Mb LAN (daisy-chain capability)**
- **LAN or Wi-Fi to Serial comms**
- **Wi-Fi, Bluetooth & LAN co-existence**
- **Modbus/TCP <-> Modbus/RTU (or ASCII) protocol**
- **Compact design**
- **Certified for a variety of applications including Mining**
- **Zone 0 mounting**
- **Connection into Zone 0 Gas or Zone 20 Dust Hazardous Areas**

The 9661-ETW is an MTL Intrinsically Safe (IS) Ethernet to Serial 4 Port Communication Module suitable for Zone 1 mounting with a suitable Ex ib power supply, Zone 0 with a suitable Ex ia power supply.

The Module allows existing Intrinsically Safe equipment with an **RS485/RS422 or RS232/TTL** port to become **Ethernet Enabled** via either Wi-Fi (WLAN) or a Cat5/6 cable connection into an **IS Ethernet Network** (LAN). The unit has 4 serial ports, each one supporting either RS485/RS422 or RS232/TTL depending upon the configuration required. There are 2 RJ45 (LAN) ports that support 10/100 IS Ethernet connections - these allow 'daisy-chaining' of units together.

Power (12V DC) is supplied to the module either locally or using **Power over Ethernet (PoEx™)** from the LAN port - This requires the PoEx output to be wired to the Supply Input terminals by the user.

The compact and cost effective design makes it the ideal choice for many applications such as **Petrochemical -** Process Monitoring, Legacy Systems and **Mining -** Underground Communication Links, Machine Monitoring and Legacy Systems.

Electrical connections are made via cage-clamp plug/socket terminals along with a dual RJ45 type connector for the Ethernet LAN ports. Twin SMA Style RF connectors allow one or two antenna to be connected as required.

E·T·N
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9661-ETW

June 2017

SPECIFICATION

Power Supplies
12VDC Power Supply input or PoEx™ (Power over IS Ethernet) typically 12V @ 150mA
9492-PS recommended

Ethernet
Intrinsically Safe 10/100Base-T

Connector
RJ45

Cable Length
Up to 100m Cat5e

PoEx
Powered device

IS SERIAL CONNECTIONS

	RS232/422/485
No. of Channels	4
Connector Type	Screw terminals
Baudrate	1200-230K4 baud
Parity	Even/Odd/None
Data Bits	8
Stop Bits	1

SAFETY

Location of Unit
Zone 0, IIC T4 hazardous area
Zone 0, I hazardous area

Certification Code
Ex ia IIC T4 Ga
[Ex ia Da] IIIC T135°C (non-mining)
Ex ia I Ma (M1 mining)
Ta = -40°C to +70°C

Certificate numbers
CML 16ATEX2131X
IECEx CML 16.0053X

See certificates for further information

ENVIRONMENTAL

Operating Temperature
-40°C…+70°C

Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing

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

MECHANICAL

Width	45mm
Height	147mm
Depth	155mm
Weight	357g
Mounting	DIN-rail

LED INDICATORS

	OFF	FLASH	ON
PWR (green)	Power Fail	N/A	Power OK
WDG (red/green)	Fault	Green - Healthy (10Hz)	Fault
WLAN (red/blue)	Idle	Red (config mode) Blue data	Red (fault) Blue (connected) Purple (connecting)
TX (green)	Idle	Transmitting Serial Data	N/A
RX (red)	Idle	Receiving Serial Data	Fault – RX data polarity is inverted
STAT (red/green)	N/A	Green – Identify module mode	Red (fault) Green (healthy)
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 100 (green)	10Mbps	N/A	100Mbps

DATA & POWER TERMINALS

PORT 1,2,3,4 (CON6+7)
RS485/422/232/TTL Ports

Pin	Function
1 (9)	Tx+/A
2 (10)	Tx-/B
3 (11)	Rx+
4 (12)	Rx-
5 (13)	Tx (RS232)
6 (14)	0V
7 (15)	Rx (RS232)
8 (16)	0V

Screw Terminals (CON5+3)
*Note - PoEx only on LAN2 port

Pin	Function
1	PoEx +12V
2	NC
3	PoEx 0V
4	Power +12V
5	NC
6	Power 0V

LAN (RJ45)
10/100 BASE-T Ethernet

Pin	Function
1	Tx +
2	Tx-
3	Rx +
4	PoEx +12V*
5	PoEx +12V*
6	Rx-
7	PoEx 0V*
8	PoEx 0V*

WiFi Antenna Connectors (SMA)

SMA Connector	Antenna
Front	Main (2.4 + 5GHz)
Rear	MIMO (2.4GHz)

Ordering information

Part No.	
9661-ETW	4-Port Serial Gateway with Wi-Fi

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