MTL9200 Series
Industrial ethernet switches and media converters

Instruction Manual

INM9200

INSTALLATION WARNINGS - These products should not be used to replace proper safety interlocking. No software-based device (or any other solid-state device) should ever be designed to be responsible for the maintenance of consequential equipment or personnel safety. In particular, MTL disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in any application. All power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.

For hazardous locations based on Class I, Division 2 requirements – These products are operator interface units to be used within control panels. These devices are intended for use in Class I, Division 2, Hazardous Locations, industrial control applications. The enclosure shall be suitable for the location.

For hazardous locations based on ATEX requirements – A minimum IP54 rated enclosure is needed for ATEX unless an equivalent degree of protection is supplied by the location.

FCC Statement - This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and receiver; Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; Consult the dealer or an experienced radio/TV technician for help.

CONTENTS

Safety Standards

These industrial Ethernet Switches meet the following standards plus others:

Note: Some ratings may be pending on newer models. Contact MTL for latest info.

MTL is an ISO9001:2000 certified company. These devices are design, developed and manufactured per an ISO9001 quality management system.

Electrical safety –

- CE per Low Voltage Directive and EN61010-1 (IEC1010)
- UL recognition per UL508 (UL File # E179490)

See warnings below.

Install the Managed Switches in accordance with local and national electrical codes.

Lightning Danger: Do not work on equipment during periods of lightning activity.

Do not connect a telephone line into one of the Ethernet RJ45 connectors.

EMC (emissions and immunity) –

- CE per EMC directive, EN 55022 or IEC 61326-1 or EN 61000-6-2/4
- FCC part 15 and ICES 003; Class B. See FCC statement on previous page.

End of life disposal –

This symbol means that within the European Union the product must be recycled in accordance with the WEEE directive and local environment regulations. Contact MTL regarding proper disposal.

✓RoHS **RoHS compliance –**

Complies with the materials restrictions in EU Directive 2002/95/EC (EU RoHS Directive)

Hazardous Locations –

- CE per ATEX directive and EN50021/EN60079-15 (Zone 2);
  EEx nA II T4 X (–40°C ≤ Ta ≤ +85°C)
- UL per UL1604 (Class I, Div. 2), Groups A,B,C,D (UL File # E192531)

	WARNING! - EXPLOSION HAZARD
⚠	1. SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2 (ZONE 2) USE.
	2. WHEN IN HAZARDOUS LOCATIONS, DISCONNECT POWER BEFORE REPLACING OR WIRING UNITS.
	3. DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
	4. IN HAZARDOUS OR POTENTIALLY HAZARDOUS LOCATION, DO NOT SEPARATE ANY PART OF THE UNIT WHEN ENERGIZED. USE THE UNIT FOR INTERNAL CONNECTIONS ONLY.

1 GENERAL INFORMATION

1.1 Overview

This manual will help you install and maintain these industrial Ethernet switches. Installation of these switches is very easy and they will begin to operate as soon as they are powered up. For the unmanaged models (denoted by -ET in their part number) there are no user settings so they are truly plug and play. The managed models (denoted by -ETM in their part number) will act as unmanaged switches until they are configured otherwise. Refer to the managed switch software manual for configuration of advanced network functionality.

> **NOTE:**
> This manual covers only the installation and wiring of these switches. For the managed models refer to the separate Software User Manuals for details on configuration and use of the management functions such as SNMP, RSTP, IGMP, VLANs, security, port mirroring and much more.

1.2 Operation

Unlike an Ethernet hub that broadcasts all messages out of all ports, these industrial Ethernet switches will intelligently route Ethernet messages only out of the appropriate port. The major benefits of this are increased bandwidth and speed, reduction or elimination of message collisions, and deterministic performance when tied with real-time systems.

These industrial Ethernet switches can support 10BaseT (10 Mbps), 100BaseT (100 Mbps) and 1000BaseT (100 Mbps) on their RJ45 ports (depending on the model). Each of these ports will independently auto-sense the speed/duplex, mdi/mdix-crossover and polarity allowing you to use straight, crossed or even mis-wired cables. Some models also have one or more fibre optic ports for making noise immune connections over distances up to 120 km.

1.3 Performance specifications

These general specifications apply to these industrial Ethernet switches. Refer to Section 7 for complete technical specifications.

Number of ports	2, 5, 6, 8, 9, 10, 16 or 18 Ethernet ports
Ethernet Switch Type	Unmanaged (ET models) or managed (ETM models)
Ethernet Switch Mode	Store and forward, wire-speed, non-blocking
Ethernet Protocols	All standard IEEE 802.3 protocols supported
RJ45 Ports Speed	10/100 or 10/100/1000 Mbps
RJ45 Ports Operation	Auto-negotiation, auto-mdi/mdix-crossover and auto-polarity
Fibre Optic Port Speed	100 Mbps (SC or ST) or 1000 Mbps (SFP/LC)
Fibre Optic Type	Multimode, singlemode, long-haul or special application

2   LED INDICATORS

2.1   Overview

All the Ethernet switches have 1 or 2 communication LEDs for each port and a power LED. The managed models also have an "OK" output LED, a status LED and dual power LEDs. Refer to the sample pictures below for the location of these LEDs.
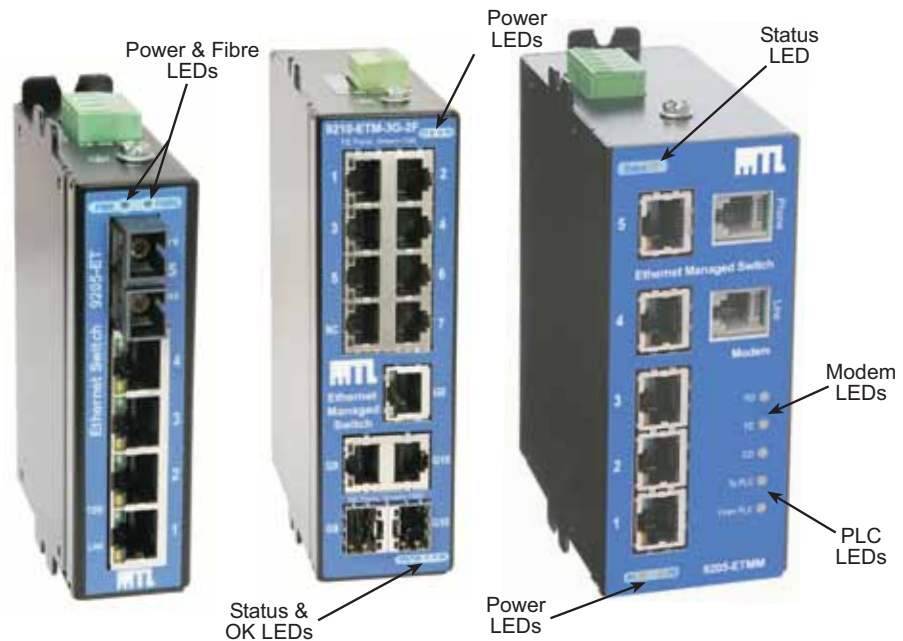

Figure 2.1 - Front panel LEDs

2.1.1   Status LED

Managed Models Only: The Status LED indicates the overall health of the switch. It is normally ON solid indicating that no internal CPU or software problems are detected. It will flash when loading firmware and briefly on power up or reset. Otherwise, if it is OFF or flashing for an extended period of time then a problem is detected. In this case, please contact MTL for support.

2.1.2   Power LED

On unmanaged models there is typically one power LED that is ON if either of the power inputs (P1 or P2) has power applied. On the managed models (and some unmanaged models) there are *two* Power LEDs that indicate which of the respective inputs has power applied to it.

2.1.3   ACT/LNK LED

This is the Yellow LED on models with two LEDs per RJ45 port.

ON (yellow) (not flashing)	Indicates that there is a proper Ethernet connection (Link) between the port and another Ethernet device, but no communications activity is detected.
ON (yellow) (flashing)	Indicates that there is a proper Ethernet connection (Link) between the port and another Ethernet device, and that there is communications activity.
OFF	Indicates that there is not a proper Ethernet connection (Link) between the port and another Ethernet device. Make sure the cable has been plugged securely into the ports at both ends.

2.1.4   Speed 10/100 LED

This is the Green LED on models with two LEDs per RJ45 port.

ON (green)	A 100 Mbps (100BaseT) connection is detected.
OFF	A 10 Mbps (10BaseT) connection is detected.

2.1.5 ACT/LNK Speed LED

This is a bi-color (green and yellow or orange) LED on models with one LED per RJ45 port.

	Switch with no gigabit ports i.e. 10/100Mbps	**Switch with some gigabit ports** i.e. 10/100/1000Mbps
ON Solid (not flashing)	Indicates that there is a proper Ethernet connection (Link) between the port and another Ethernet device, but no communications activity is detected.	
Flashing	Indicates that there is a proper Ethernet connection (Link) between the port and another Ethernet device, and that there is communications activity.	
Green	A 100Mbps connection is detected.	A 1000Mbps connection is detected.
Yellow or Orange	A 10Mbps connection is detected.	A 10 or 100Mbps connection is detected.
OFF	Indicates that there is not a proper Ethernet connection (Link) between the port and another Ethernet device. Make sure the cable has been plugged securely into the ports at both ends.	

2.1.6 OK LED

Managed models mostly and some unmanaged models: This LED indicates the status of the power inputs. There is an output screw terminal that can be connected as shown in the wiring diagrams. The output voltage from the screw terminal marked 'OK' will be the same as the applied switch input voltage. The output will be ON when both the PI and P2 terminals have power applied to them. It will be OFF if either input does not have power or if the switch software is not running.

2.1.7 From PLC input LED

9205-ETMM Model Only: This LED indicates the status of the Discrete "From PLC" input on the modem. There is an input screw terminal that can be connected as shown in the diagram. When a voltage is applied to the 'From PLC' input the LED will be ON. When no voltage is applied the LED will be OFF.

2.1.8 'To PLC' output LED

9205-ETMM Model Only: This LED can indicate Power Status or Modem Connection status. There is an output screw terminal that can be connected as shown in the wiring diagram. The output voltage from the screw terminal marked 'OK' will be the same as the applied switch input voltage. In "OK output" mode the output will be ON when both P1 and P2 terminals have power applied to them. It will be OFF if either input does not have power or if the switch software is not running. In "Carrier Detect" mode the output will be ON when the CD LED is ON and will be OFF when the CD LED is OFF.

2.1.9 CD LED

9205-ETMM Model Only: The CD LED indicates if there is a carrier (successful connection) established between the 9205-ETMM and another modem. When the connection is not established it is OFF, and when the Carrier is established it is ON.

2.1.10 RD LED

9205-ETMM Model Only: The RD LED flashes when the 9205-ETMM is receiving data from the phone line port. If this LED flashes when the CD LED is OFF it could indicate a Ring coming in from a calling device. When the CD LED is ON, the RD LED flashes to indicate communication coming in from the remote device.

2.1.11 TD LED

9205-ETMM Model Only: The TD LED will flash as the 9205-ETMM transmits data out to the modem. When the CD LED is ON, the TD LED flashes to indicate the 9205-ETMM is communicating with a remote modem.

3   INSTALLATION

3.1   Overview

A number of mounting options are available for the packages, as shown below. (Note: Not all methods are available on all models. Refer to Figure 3.1 and the mechanical diagrams in Section 6 for additional details.)

3.1.1   Vertical, snap-on, DIN-rail mounting

This offers the quickest method of installation and optimal utilization of rail space. Mounting facilities (A) on the rear of the unit enable it to be attached to DIN rail. See Section 3.2 for full details.

3.1.2   Vertical screw-to-panel mounting

Where provided, rear lugs (B) permit panel mounting, which provides better shock and vibration resistance than DIN-rail mounting. See fixing hole details and dimensions for individual cases in Section 6.   This method requires the metal DIN-rail bracket to be detached by removing the three fixing screws that secure the bracket to the case. Retain the bracket and screws for possible future use.

3.1.3   Flat screw-to-panel mounting

This method, when available, offers low profile orientation in shallow boxes plus the best shock and vibration resistance. Use side lugs (C), when provided, to mount the unit. See fixing hole details and dimensions for individual cases in Section 6.
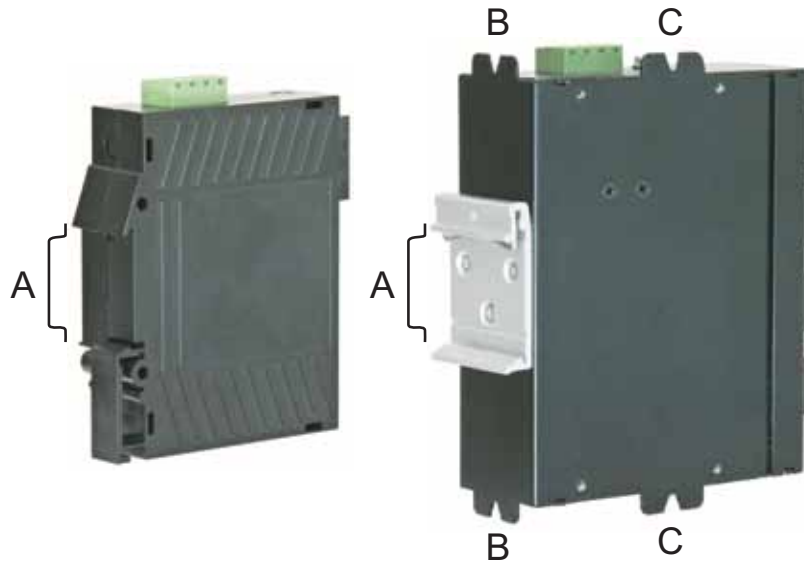

Figure 3.1 - Mounting options

3.2   DIN-rail mounting

All units can be mounted on standard DIN rail (EN50022) using the rear brackets and others can be screwed directly to a flat panel. Refer to the diagrams below for details.

Note: Ensure that adequate space is provided to route the Ethernet copper or fibre optic cables.

3.2.1   DIN rail mounting and removal of 9200-ETX Lexan packaged units

Units packaged in the Lexan case have a flexible clip that fits onto DIN rail as shown in Figure 3.2. Engage the top part of the clip as shown and then press the lower part of the case onto the DIN rail until it engages positively.

Figure 3.2: Mounting the Lexan case style products
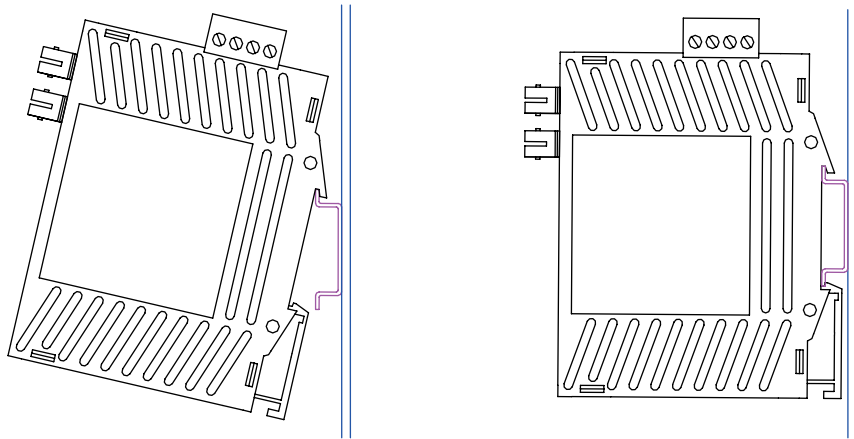
Removal of the Lexan cased products requires the use of wide flat-bladed screwdriver, which is engaged as shown in Figure 3.3, then levered against the case to spring the flexible clip free of the DIN rail. Rotate the lower part of the case away from the DIN rail, then disengage the case from the upper part.
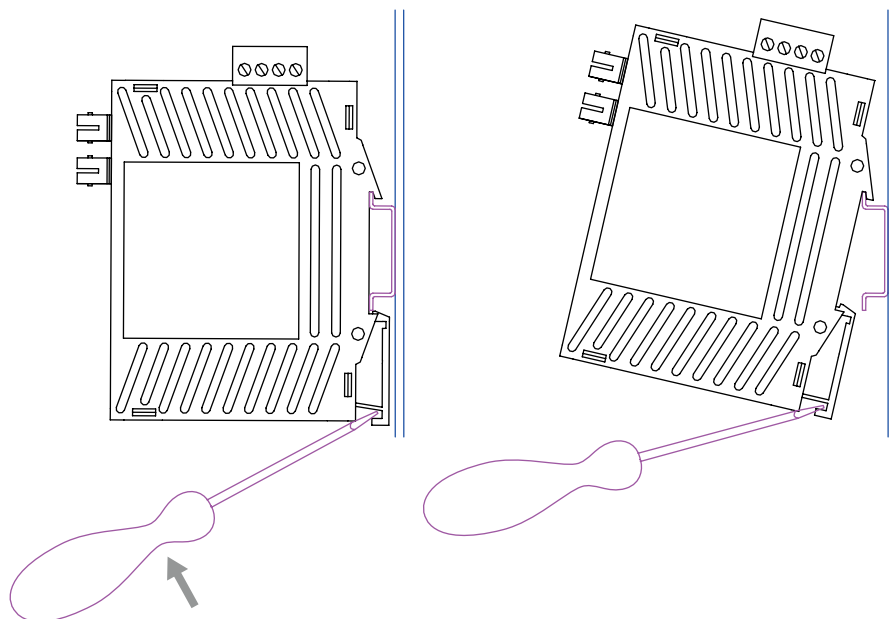

Figure 3.3: Removing the Lexan case style units from DIN rail

3.2.2 DIN rail mounting and removal of 9200-ET and 9200-ETM metal cased units

Units packaged in a metal case have a spring loaded clip on the back for fitting onto standard DIN rail. Refer to Figure 3.3.
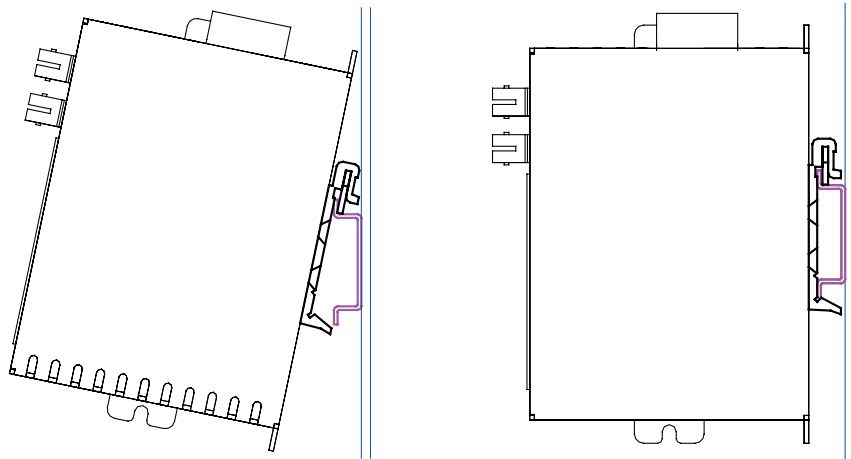

Figure 3: Mounting the metal cased units on DIN rail

To mount a metal case, hook the upper (sprung) part of the rear clip over the DIN rail, then press the lower part of the case to the rail until the clip engages positively.
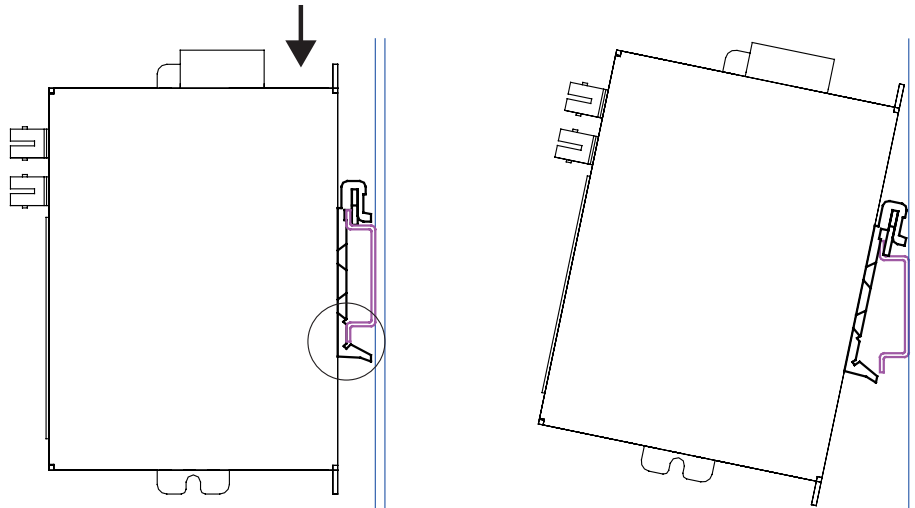

Figure 4: Removing the metal cased units from DIN rail

To remove the metal cased units, press the case onto the DIN rail, as shown in Figure 4, until the lower part of the clip is freed from the rail - see circled area. Rotate the lower part of the case away from the DIN rail, release the pressure on the unit, and disengage it from the upper part of the rail.

IMPORTANT NOTES REGARDING THERMAL PERFORMANCE AND HEAT DISSIPATION

The slimline metal case switches use the heavy-gauge all-aluminum case as a large heat-sink. Therefore, the case can become warm during operation (especially with large loads such as all ports linked and active). This is normal operation. For best performance it is recommended that a DIN-rail spacer (such as an end clamp) be used between the switch and adjacent devices. This will leave an air gap for best heat dissipation from the case. It is also important that the air slots are not blocked.

For best thermal performance when direct panel mounting to a metal surface, a thermal compound or pad should be used between the mounting face and the mounting surface. This will reduce any air gaps and optimize the transfer of heat from the case to the mounting surface.

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4 POWER AND OUTPUT WIRING

4.1 Overview

These industrial Ethernet switches can be powered from the same DC source that is used to power your other devices. A voltage in the range of 10 to 30 VDC needs to be applied between the 'P1' (+) terminal and the '–' terminal as shown in the diagrams on the next page. The chassis screw terminal should be connected to panel or chassis ground. To reduce down time resulting from power loss, these switches can optionally be powered redundantly with a second power supply (P2) as shown in the diagrams.

The managed models also have an "OK" output that can be tied to a PLC input or other device to indicate when there is a power loss. When ON, this output will provide the same voltage that is applied to the switches' power terminals. See the wiring diagrams on the next page.

4.2 Screw torque

CAUTION
Take care that wiring screw torque does not exceed 0.57 Nm (5 in-lb).

4.3 Wiring connections

⚠	WARNING!
BEFORE PERFORMING ANY WIRING TO THESE SWITCHES MAKE SURE … • MAKE SURE THE AREA IS CURRENTLY NON-HAZARDOUS (ESPECIALLY WHEN WORKING IN CLASS I, DIV 2 OR ZONE 2 HAZARDOUS LOCATIONS) • TURN OFF THE POWER TO THE SWITCH • UNPLUG THE SCREW TERMINAL BLOCK (This is especially important on the units that have a metal case as shown below. Connecting or disconnecting wires to the screw block when it is in place and the power is turned on can allow the screwdriver to short the power to the case.)	

Figure 4.1 - Power connector and grounding screw

NOTE
To meet UL certification requirements you MUST do one of the following: 1.   Install a 3.33 Amp maximum fuse at the input of the switch. OR 2.   Use a Class 2 rated power supply to power the switch.

Model numbers	Single DC power	Redundant DC power
9205-ETM **9208-ETM**	Alarm output load (opt.) — Single DC supply — Chassis GND (panel). OK P2 P1 – ⏚. Front / Rear	Alarm output load (opt.) — Dual DC supplies — Chassis GND (panel). OK P2 P1 – ⏚. Front / Rear
9202-ETX **9205-ETX** **9205-ET** **9208-ETX** **9208-ET** **9209-ETX** **9209-ET**	Single DC supply — Chassis GND (panel). P2 P1 – ⏚. Front / Rear	Dual DC supplies — Chassis GND (panel). P2 P1 – ⏚. Front / Rear
9205-ETMM	PLC or other device — IN OUT — Single DC supply — Chassis GND (panel). From PLC / To PLC / P2 + / P1 + / – / ⏚. IN OUT IN IN. Front / Rear	PLC or other device — IN OUT — Dual DC supplies — Chassis GND (panel). From PLC / To PLC / P2 + / P1 + / – / ⏚. IN OUT IN IN. Front / Rear
9208-ETMG	Alarm output load (opt.) — Single DC supply — Chassis GND (panel). OK P2 P1 – ⏚. Front / Rear	Alarm output load (opt.) — Dual DC supplies — Chassis GND (panel). OK P2 P1 – ⏚. Front / Rear
9210-ETM **9216-ETM** **9218-ETM**	Chassis GND (panel) — Single DC supply — Alarm output load (opt.). ⏚ P1 P2 – OK. Front / Rear	Chassis GND (panel) — Dual DC supplies — Alarm output load (opt.). ⏚ P1 P2 – OK. Front / Rear

Front = front panel of switch/modem,   **Rear** = rear of switch/modem

5   COMMUNICATIONS PORTS

5.1   Overview

These industrial Ethernet switches provide connections to standard Ethernet devices such as PLCs, Ethernet I/O, industrial computers and much more. Three types of communication ports may be found on these switches: RJ45 (copper) Ethernet ports, fibre optic Ethernet ports and a serial or USB console port for management (managed models).

5.2   RJ45 wiring

Use data-quality (not voice-quality) twisted pair cable rated category 5 (or better) with standard RJ45 connectors. For best performance use shielded cable. Straight through or crossover RJ45 cable can be used regardless of the device the switch is to be connected to as all the ports are capable of auto-mdi/mdix-crossover detection.

The RJ45 Ethernet port connector bodies on these products are metallic and are connected to the Chassis GND terminal, so shielded cables may be used to provide further protection. To prevent ground loops, the cable shield should be tied to the metal connector body at one end of the cable only. Electrical isolation is also provided on the Ethernet ports for increased reliability.

Straight-thru Cable Wiring	
Pin 1	Pin 1
Pin 2	Pin 2
Pin 3	Pin 3
Pin 6	Pin 6

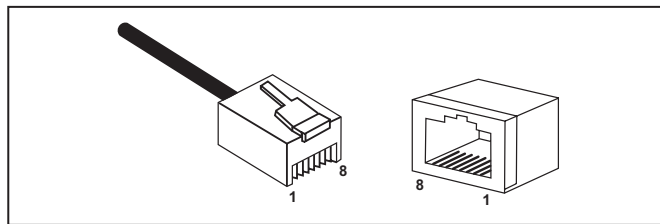| Cross-over Cable Wiring	
Pin 1	Pin 3
Pin 2	Pin 6
Pin 3	Pin 1
Pin 6	Pin 2

Figure 5.1: Ethernet plug & socket pin assignments

NOTE
The maximum cable length for 10/100/1000BaseT is typically 100 meters (328 ft.).

5.3   Ethernet fibre wiring guidelines

Depending on the model these industrial Ethernet switches may have up to four fibre optic ports. All 100 Mbps fibre ports are available with either dual SC or ST style connectors. They are also available with multimode, singlemode, long-haul and custom (for connections up to 120+ km) or special-application transceivers. Refer to the technical specifications for details.

All 1000 Mbps fibre ports are provided as mini-gbic SFP (small form pluggable). These accept plug-in fibre transceivers that typically have an LC style connector. They are available with multimode, singlemode, long-haul (for connections up to 80+ km) or special application transceivers. Refer to the technical specifications for details.

SFP modules

For each fibre port there is a transmit (TX) and receive (RX) signal. When making fibre optic connections, make sure that the transmit (TX) port of the switch connects to the receive (RX) port of the other device, and the receive (RX) port of the switch connects to the transmit (TX) port of the other device.

Use standard fibre optic wiring techniques (not covered by this manual) to make your connections. The corresponding ACT/LNK LED will display a steady ON or flash when you have made a proper connection.

5.4   Duplex operation

The RJ45 ports will auto-sense for Full or Half duplex operation, while the fibre ports are configured for full duplex operation. Note: Fibre devices with half duplex settings should still communicate with the switch. If otherwise then please contact MTL. On managed models the duplex setting is software configurable.

5.5   Verifying connectivity

After all Ethernet and/or fibre connections are made, check the LED's corresponding to the ports that each of the devices are connected to. Ensure that for each port that is in use, the LED is ON or blinking. If a port LED is off, go back and check for connectivity problems between that port and the network device connected to that particular port. In addition, the color of the LED should indicate the speed for which your device is connected at (see prior section on LEDs).

5.6   Telephone port wiring

A standard cross-wired telephone patch cable should be used to connect to the phone line provided by the phone company. Tip and Ring are the only two pins used on the Ethernet Land-Line modem.

5.7   Serial console port wiring

Another way to configure the switch is through the RJ45 console RS232 port. Use a DB9F to RJ45F adapter along with an RJ45 male to RJ45 male straight-thru-wired patch cable to make a connection between a COM port on your PC (DB9 male) and the RS232 port of the Managed Switch (RJ45 female).

A typical DB9F to RJ45F adapter should be wired as follows:

Switch		Adapter	
RJ45F Pin #	**Signal Name**	**Signal Name**	**DB9F Pin**
1	RI/DSR in	DTR out	4
2	DCD in	N/C	n/c
3	DTR out	DSR in	6
4	GND	GND	5
5	RXD in	TXD out	3
6	TXD out	RXD in	2
7	CTS in	RTS out	7
8	RTS out	CTS in	8

5.8 USB console port wiring

Newer models of these switches may also have an USB port instead of, or in addition to, the RS232 port. Use a standard USB cable with a mini-USB plug on one end and an A-type-USB plug on the other end. The A-type plug goes into a standard USB port on a computer. The mini-USB plug goes into the USB port on the switch. The RS232 (RJ45) and mini USB ports may be located on the bottom edge or the front face of the switch

Refer to the software user manual for how to use this USB port.

Figure 5.2 - The RS232 (RJ45) and mini USB ports

SPECIFICATION

These are the hardware specifications for the industrial Ethernet switches covered by this manual. For the managed models, refer to the software user manual or datasheet for complete software specifications.

General Specifications:

Ethernet switch type
Unmanaged or managed with up to 9 ports

Operating mode
Store and forward, wire-speed switching, non-blocking

Devices supported
All IEEE 802.3 compliant devices are supported

Protocols
(managed models only) SNMPv1/v2/v3, RMON, DHCP, SNTP, TFTP, STP, RSTP, QoS/CoS/ToS/DS, IGMPv1/v2, VLAN (tag and port based), HTTP, HTTPS (SSL & TSL), Telnet, SSH and more

Industrial protocols supported
Modbus/TCP, EtherNet/IP, PROFInet, Foundation Fieldbus HSE and others

Standards (depends on model)
IEEE 802.3, 802.3u, 802.3ab/z, 802.3x, 802.1D/w, 802.1p, 802.1Q and others

Management interfaces (managed models only)
Web (see online demo), text (Telnet & SSH), CLI (command line interface) and SNMP (see software manual for supported MIBs)

Open source Linux (managed models only)
The Linux Advantage – Contact MTL for more information

MAC addresses
1024 on unmanaged (ET) models;
2048 on managed (ETM)models;
8192 on Gigabit (ETMG) models

Memory bandwidth
3.2 Gbps on ET & ETM models; 32 Gbps on ETMG models

Latency for 10 Mbps
16μs + frame time (typical)

Latency for 100/1000 Mbps
<5μs + frame time (typical)

Varies on load and settings

Ethernet isolation
1500 VRMS 1 minute

Management serial port (managed models only)
RS232 (TXD, RXD and GND), 9600, 8, N, 1 fixed and/or mini-USB

Copper RJ45 Ports:
(10/100 Mbps or 10/100/1000 Mbps)

Copper ports
Shielded RJ45

Speed
10/100 Mbps or 10/100/1000 Mbps (depending on model)

Protocols supported
All standard IEEE 802.3

Auto-crossover
Yes, allows you to use straight or cross wired cables

Auto-sensing operation
Yes, Full and half duplex

Auto-negotiating
Yes, 10BaseT and 100BaseT

Auto-polarity
Yes, on the TD and RD pair

Flow control
Automatic

Ethernet isolation
1500 VRMS 1 minute

Plug and play
Yes

Cable requirements
Twisted pair (Cat. 5 or better) (shielded recommended)

Max. cable distance
100 metres

SC or ST Fibre Ports:
(100BaseF multimode or singlemode)

100BaseF ports
Up to 4

Fibre port mode
Multimode (mm) or Singlemode (sm)

Fibre port connector
Duplex SC or ST

Optimal fibre cable
50/125 or 62.5/125μm for mm; 9/125μm for sm

Centre wavelength
1300 nm (other wavelengths available)

Multimode
Links up to 4 km typ.; 1310nm;
use with 50 or 62.5/125μm fibre
> Transmitter power (dB): –21 min., –17 typ., –14 max.
> Receiver sensitivity (dB): –34 typ., –31 max.

Singlemode
Links up to 20 km typical; 1310nm;
use with 9/125μm fibre
> Transmitter power (dB): –15 min., –11 typ., –8 max.
> Receiver sensitivity (dB): –36 typ., –31 max.

Singlemode long haul
Links up to 40 km typical; 1310 nm;
use with 9/125μm fibre
> Transmitter power (dB): –5 min., –3 typ., 0 max.
> Receiver sensitivity (dB): –36 typ., –34 max.

Nominal max. distance (full duplex)
(see web for details)
4km with multimode;
20km with singlemode;
up to 120km with long haul singlemode

Half and full duplex
Full duplex on unmanaged models;
Software configurable on managed models

Ethernet compliance
100BaseF

Eye safety
IEC 60825-1, Class 1; FDA 21 CFR 1040.10 and 1040.11

SFP Mini-Gbic SFP (pluggable) Ports: (many types available)

Note: On the Gigabit (G) models these ports are pluggable and accept many different types of pluggable SFP (Mini-Gbic) transceiver modules for Gigabit fibre connections.

Gigabit SFP ports
Up to 4

Port types supported
Gigabit fibre multimode, fibre singlemode, fibre long-haul singlemode, fibre single-strand and more
Note: 100 Mbps fibre transceiver modules are also supported on these ports.

Fibre port connector
LC typically for fibre (depends on module)

Optimal fibre cable
Typical 50 or 62.5/125µm for multimode (mm); Typical 8 or 9/125µm for singlemode (sm)

Fibre wavelength (typical)
850nm for mm; 1310nm for sm; 1550nm for long haul sm

TX output power
See fibre transceiver datasheet for details.

RX input sensitivity
See fibre transceiver datasheet for details.

Max. distance (full duplex)
Up to 80+ km with long haul singlemode modules

Half and full duplex
Software configurable

Ethernet compliance
1000BaseT and 1000BaseF (SX/LX/LH)

Eye safety
IEC 60825-1, Class 1; FDA 21 CFR 1040.10 and 1040.11

Industrial Telephone Modem (9205-ETMM only)

Maximum data rates
56 kbps

Compatibility
V.90, V.34, V.32, V.32 bis, V.22, V.22 bis, V.21

Data compression
V.42 bis

Error correction
V.42 MNP or LAP

Ringer
0.3

Jacks
2 RJ11 (phone and line)

Command sets
Standard AT and S register

Country compatibility
World-wide (100+ countries)

Telecom ratings
FCC Part 68; Industry Canada CS03-8; CTR21 (98/482/EC); ACA TS 001 and ACA TS 002

"PLC" Input and Output (9205-ETMM only)

PLC / Alarm output voltage
Same as switch input power voltage

Maximum current output
0.5A

PLC / Trigger input voltage
10-30 VDC

Typically current input
6.5 mA @ 24 VDC

"OK" Alarm Output (managed models only)

"OK" Output
ON if P1 and P2 have power and switch software is running

Voltage
Same as switch input voltage

Maximum current output
0.5A

Power Input:

Power input
Redundant input terminals

Input power (typical with all ports active at 100 Mbps)

2.0 W (2-port converter with 1 fibre),

2.0 W (5-port unmanaged w/0 fibre)
3.0 W (5-port unmanaged w/1 fibre)
5.0 W (6-port unmanaged w/2 fibre)
4.0 W (8-port unmanaged w/0 fibre)
8.0 W (8-port unmanaged w/3 fibre)
5.0 W (9-port unmanaged w/1 fibre)

3.6 W (5-port managed w/0 fibre)
4.8 W (5-port with phone modem)
5.6 W (5-port managed w/2 fibre)
4.3 W (8-port managed w/0 fibre)
6.3 W (8-port managed w/2 fibre)
9.0 W (8-port managed w/4 fibre)

12 W   (8-port man. gigabit w/0 fibre)
15 W   (8-port man. gigabit w/4 fibre)
5.0 W (10-port man. gigabit w/0 fibre)
7.0 W (10-port man. gigabit w/2 fibre)
7.0 W (16-port man. gigabit w/0 fibre)
8.0 W (18-port man. gigabit w/0 fibre)
10 W   (18-port man. gigabit w/2 fibre)

Input voltage (all models)
10-30 VDC (continuous)

Reverse power protection
Yes

Transient protection
15,000 watts peak

Spike protection
5,000 watts (10x for 10µS)

Environmental and Compliances:

Operating temperature range

9202-ETX models	–10 to +60°C
9205-ETX models	–10 to +60°C
9205-ETMM model	–40 to +75°C
9208-ETMG model	–40 to +75°C
9205/8/9-ET models	–40 to +85°C
9208-ET models	–40 to +75°C
9205/8-ETM models	–40 to +75°C
9210/9218-ETM models	–40 to +75°C
9216-ETM model	–40 to +75°C

Note: Continuous operation at the maximum operating temperature may reduce the life of the product.

Contact MTL if wider ranges are needed.

Storage temperature range
–40 to +85°C

Humidity (non-condensing)
5 to 95% RH
Contact MTL for optional conformal coating.

Vibration, shock & freefall
EC68-2-6, –27, –32

Electrical safety
UL508, EN61010-1, CE

EMC: emissions and immunity
FCC part 15, ICES-003;
EN55022 and/or IEC61326-1 and/or
EN61000-6-2/4

Hazardous Locations
UL1604, EN50021/EN60079-15 (Zone2),
CE (ATEX)

Eye safety (fibre models)
IEC60825-1, Class 1; FDA 21 CFR
1040.10 and 1040.11

Mean Time Between Failure
>1,000,000 hours typical
per MIL-HDBK-217F2 Ground Benign at 35°C

ISO9001:2000
Certified "Total Quality" company

Mechanical:

Ingress protection
IP30 (all models)

Packaging and protection
UL94V0 Lexan plastic for all plastic cased units.
Aluminum with protective finish for all metal cased units.

Dimensions (L x W x H)
See mechanical diagrams for details

Weights (typical)

|		
9202-ETX and 9205-ETX	Lexan case	110g
9205-ET	metal case	110g
9205-ETM	metal case	230g
9205-ETMM	metal case	310g
9206/8/9-ETX	metal case	170g
9206/8/9-ET	metal case	230g
9208-ETM	metal case	280g
9208-ET-3x & 9208-ETM-4x	metal case	310g
9208-ETMG-4F	metal case	450g
9210-ETM-3G-2F	metal case	340g
9216-ETM	metal case	450g
9218-ETM-2G-2F	metal case	460g
SFP transceiver	–	16.5g

6 CASE DIMENSION DRAWINGS
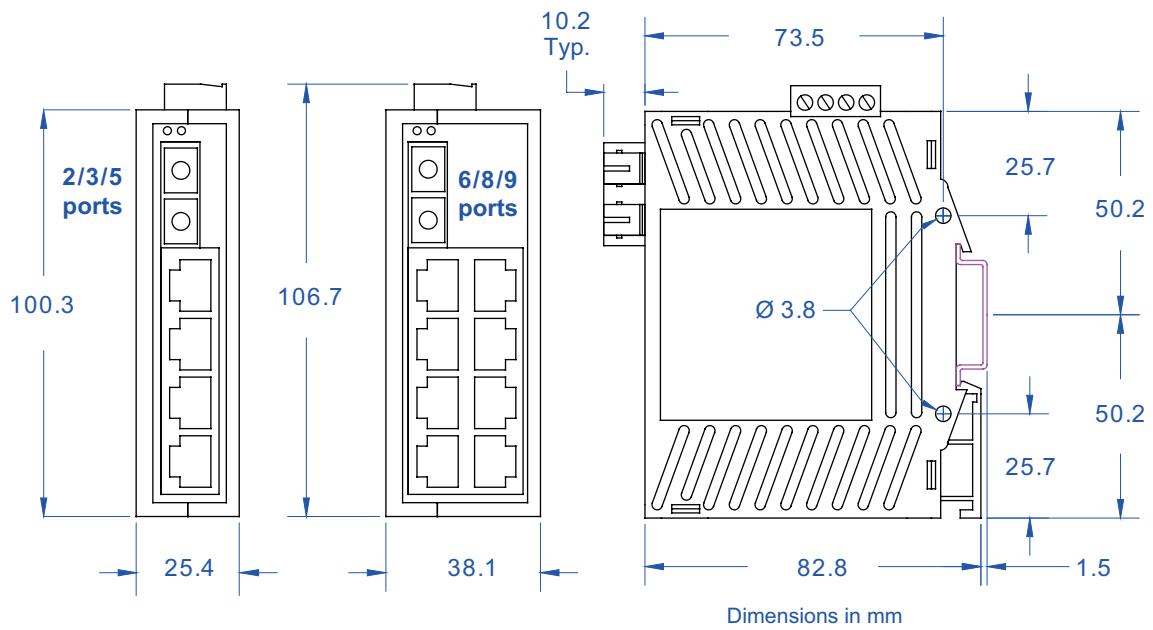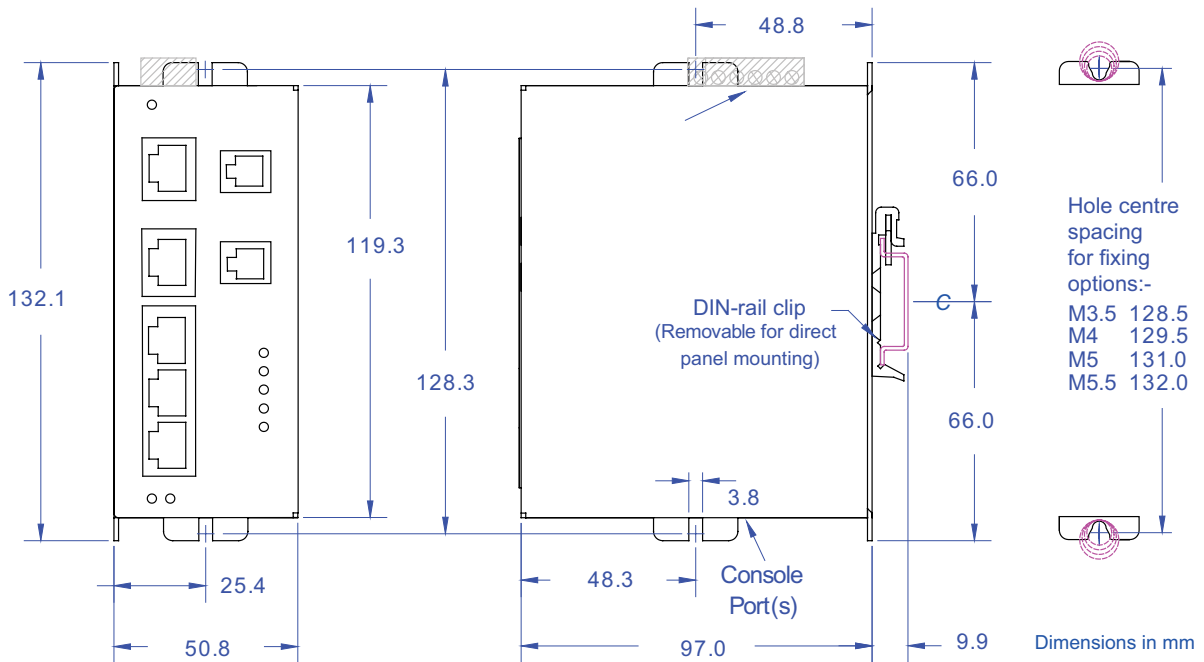

9202-ETX and 9205-ETX in Lexan case
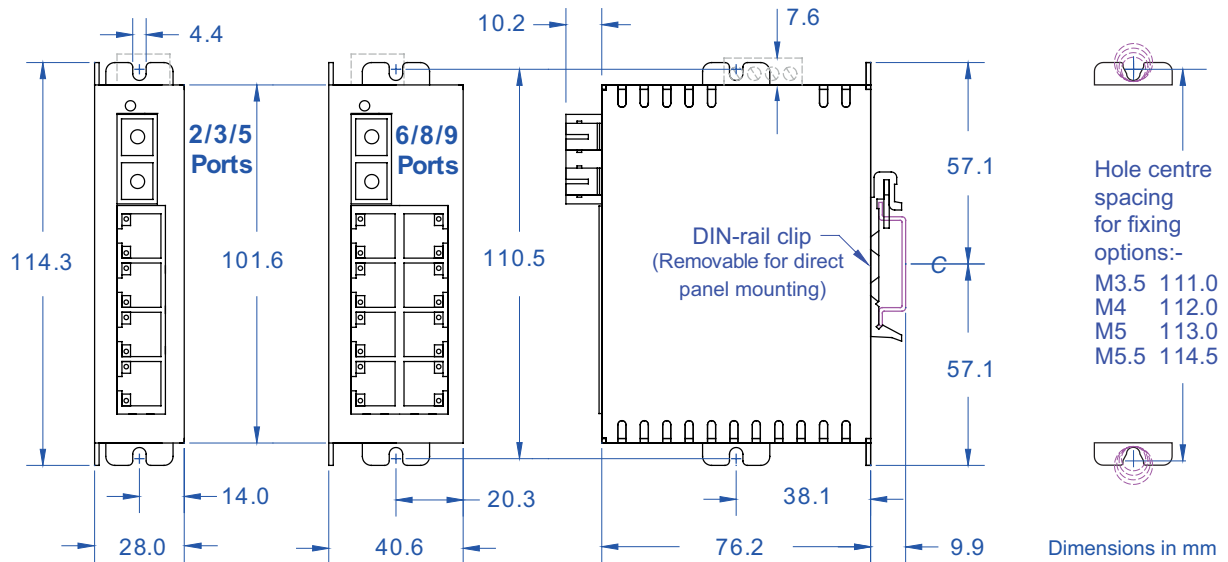
9205/8/9-ET and -M/-S/-L in metal case
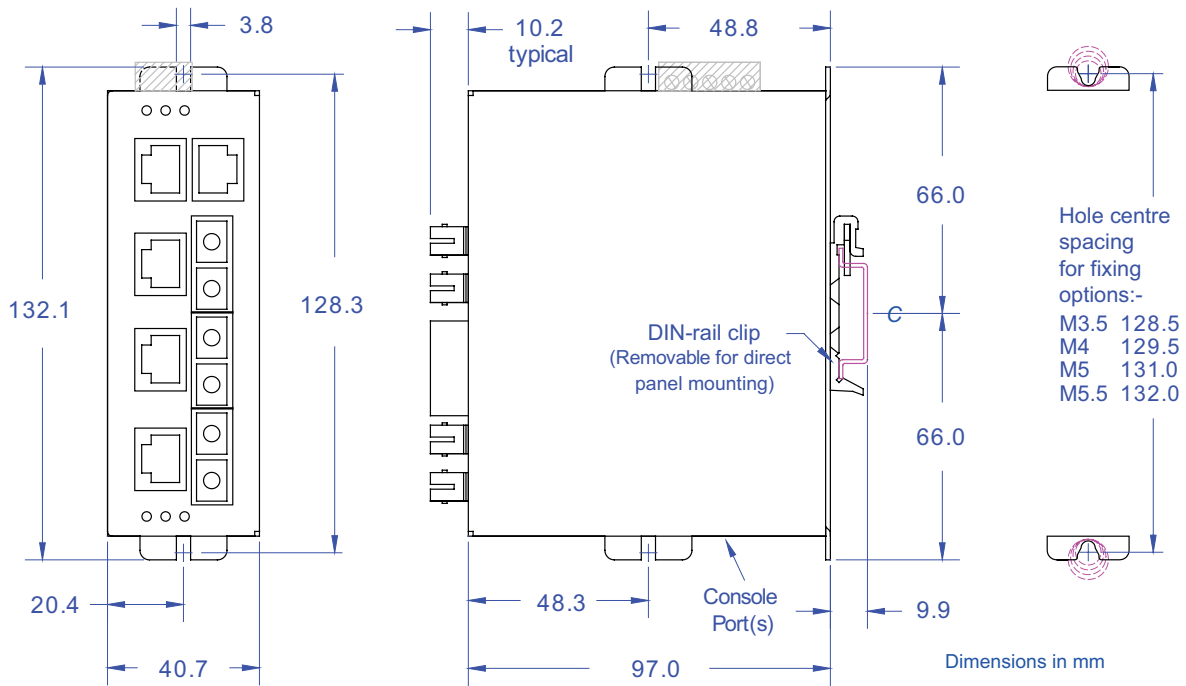
Note: See Section 3.1 for details of DIN-rail clip removal.
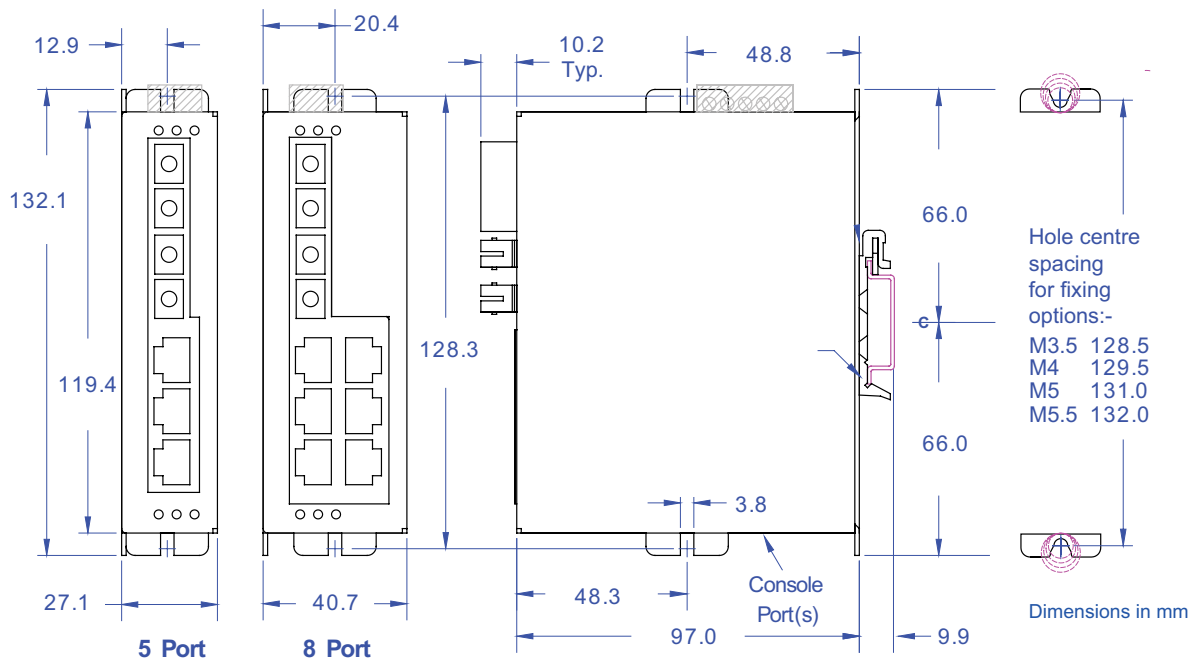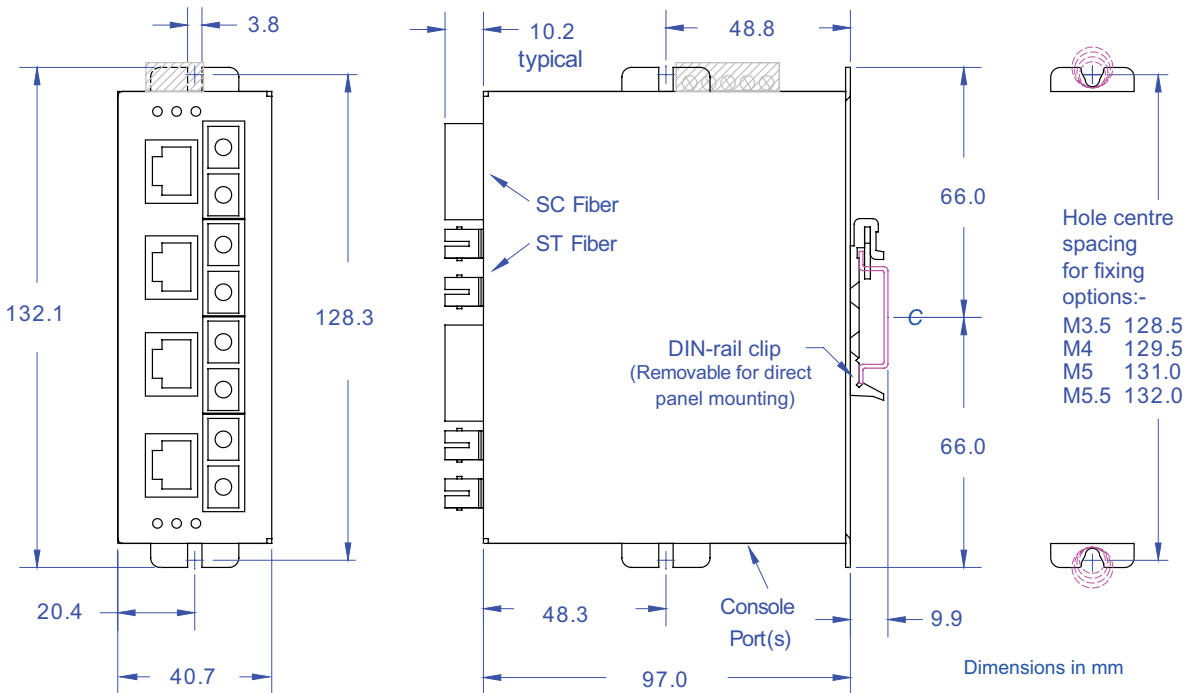
9205/8-ETM and -2M/-2S/-2L in metal case

9205-ETMM and -M/-S/-L in metal case
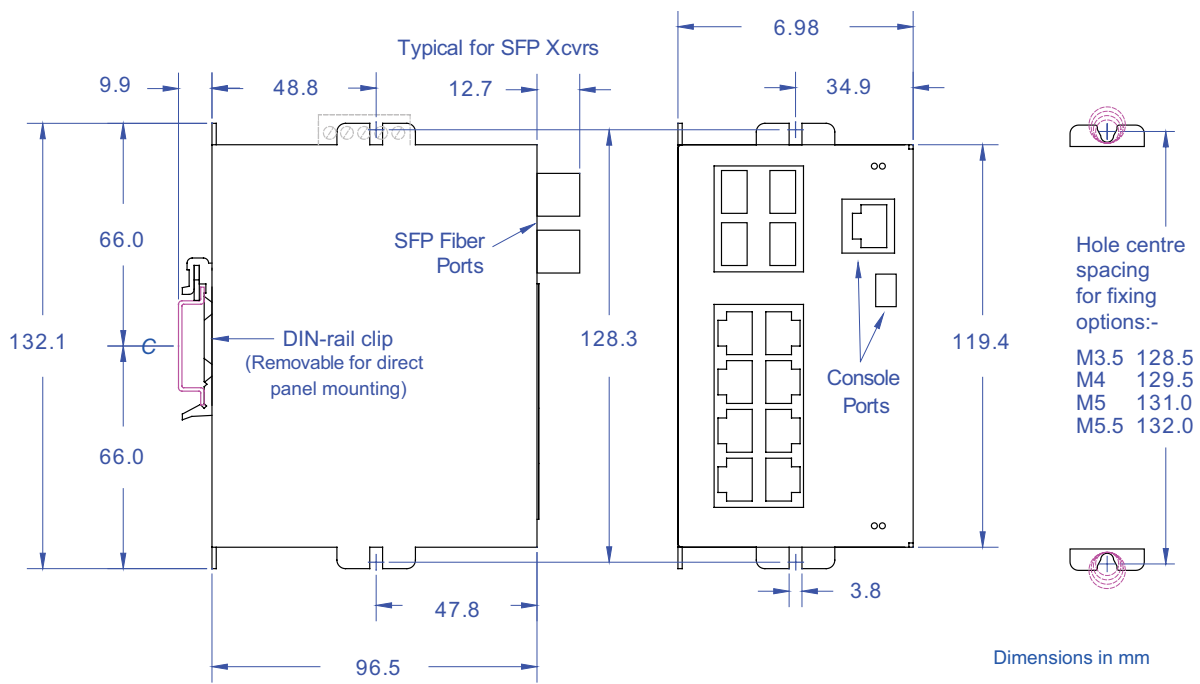
Note: See Section 3.1 for details of DIN-rail clip removal.

3.8

10.2
typical

48.8

66.0

Hole centre
spacing
for fixing
options:-
M3.5 128.5
M4   129.5
M5   131.0
M5.5 132.0

132.1

128.3

DIN-rail clip
(Removable for direct
panel mounting)

C

66.0

20.4

48.3

Console
Port(s)

9.9

40.7

97.0

Dimensions in mm

9208-ET-3M/-3S/-3L in metal case

3.8

10.2
typical

48.8

SC Fiber

ST Fiber

66.0

Hole centre
spacing
for fixing
options:-
M3.5 128.5
M4   129.5
M5   131.0
M5.5 132.0

132.1

128.3

DIN-rail clip
(Removable for direct
panel mounting)

C

66.0

20.4

48.3
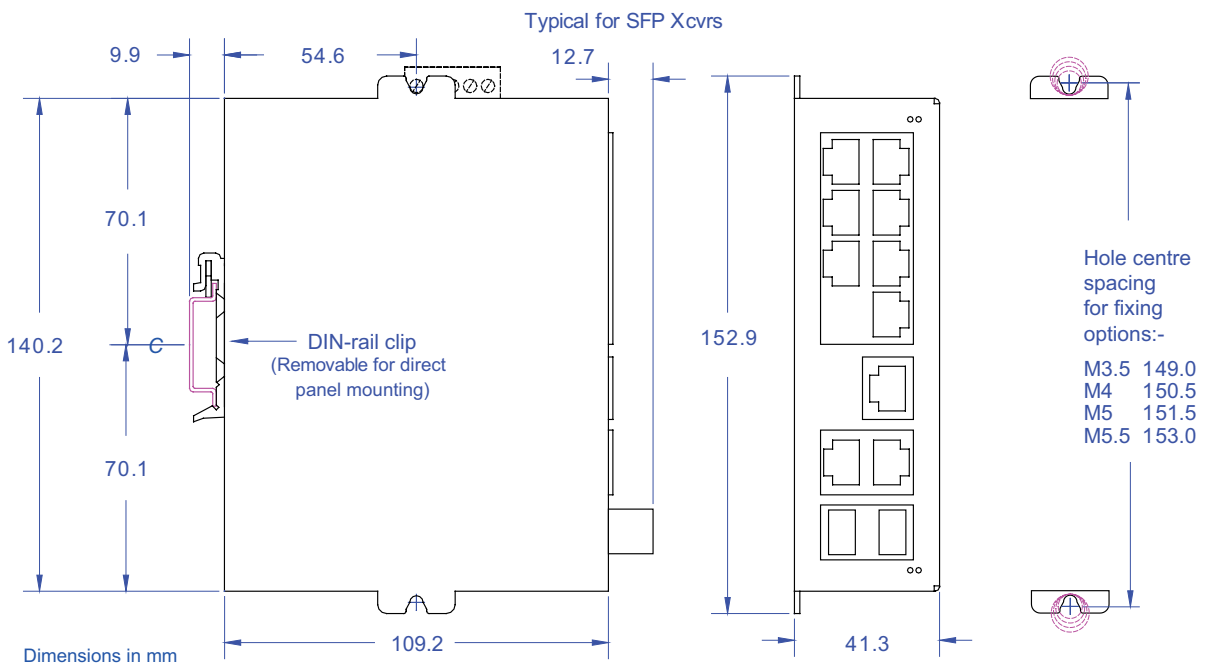
Console
Port(s)

9.9

40.7

97.0

Dimensions in mm

9208-ETM-and -4M/-4S/-4L in metal case
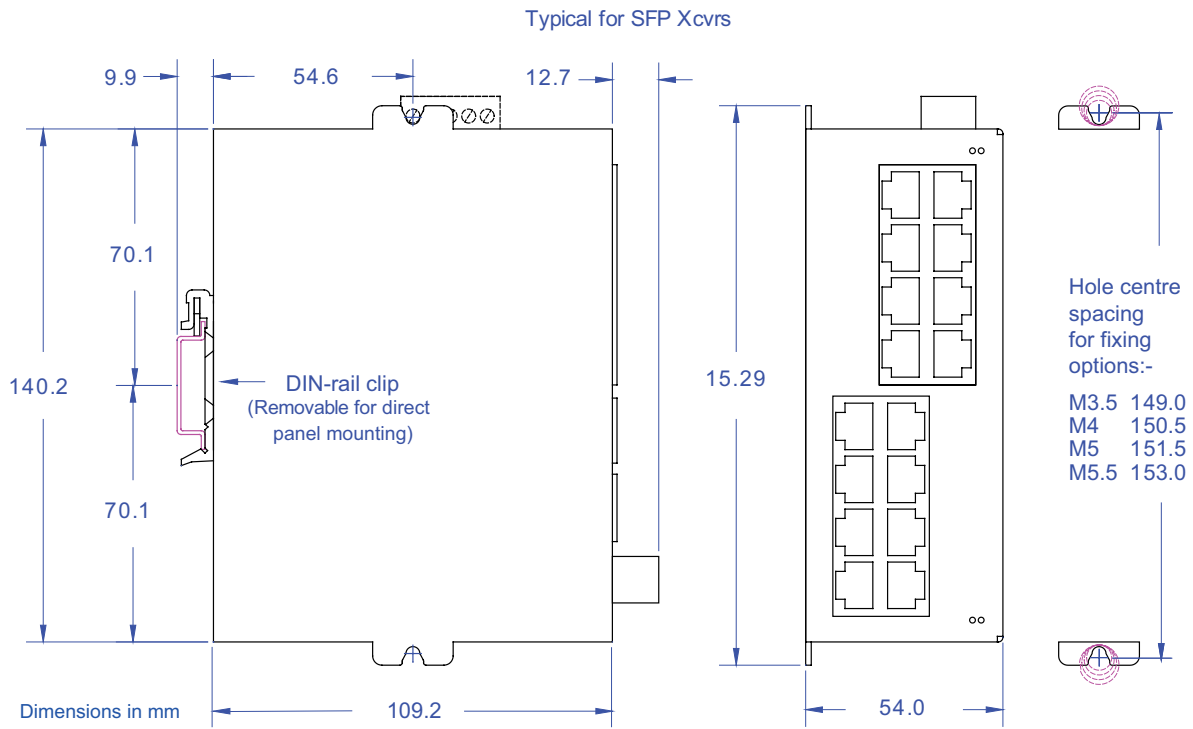
Note: See Section 3.1 for details of DIN-rail clip removal.
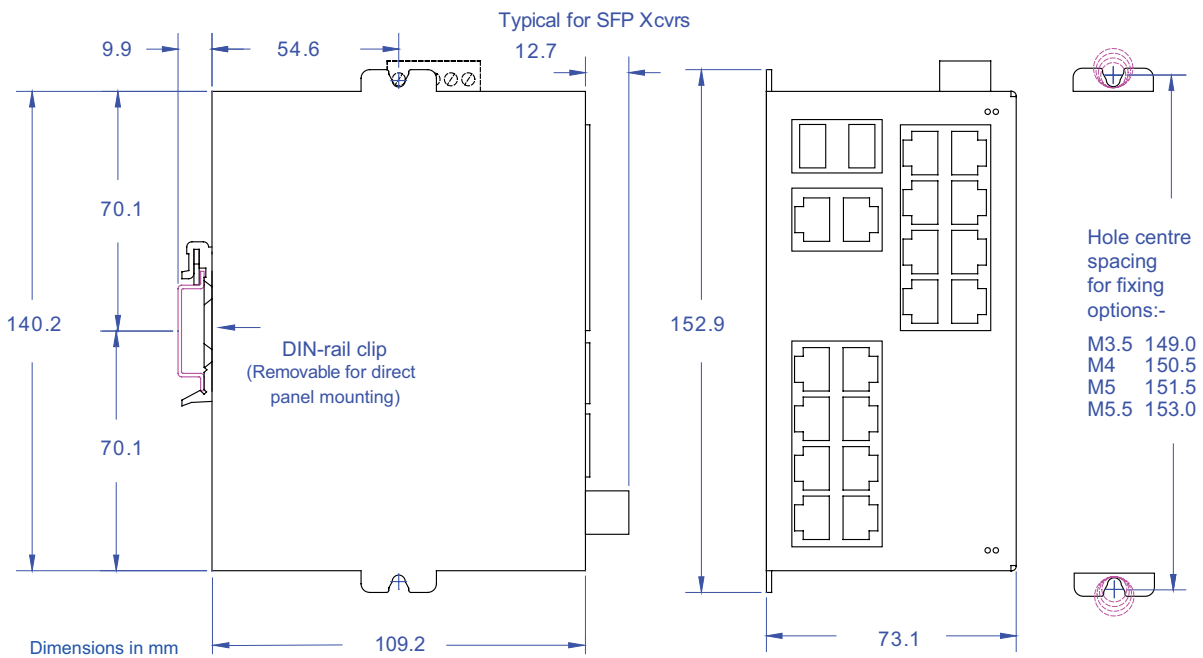
9208-ETMG-4F in metal case

9210-ETM-3G-2F in metal case

Note: See Section 3.1 for details of DIN-rail clip removal.

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Typical for SFP Xcvrs

9.9   54.6   12.7

70.1

140.2

DIN-rail clip
(Removable for direct
panel mounting)

70.1

15.29

Hole centre
spacing
for fixing
options:-

M3.5 149.0
M4   150.5
M5   151.5
M5.5 153.0

Dimensions in mm   109.2   54.0

9216-ETM in metal case

Typical for SFP Xcvrs

9.9   54.6   12.7

70.1

140.2

DIN-rail clip
(Removable for direct
panel mounting)

70.1

152.9

Hole centre
spacing
for fixing
options:-

M3.5 149.0
M4   150.5
M5   151.5
M5.5 153.0

Dimensions in mm   109.2   73.1

9218-ETM-2G-2F in metal case

Note: See Section 3.1 for details of DIN-rail clip removal.