wieland
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wienet LMS 16-W

Ethernet switch

USER MANUAL

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NOTE

Note!

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Conformity Information

For more information regarding CE marking and Declaration of Conformity (DoC), please contact your local Wieland Electric customer service organization.

CE

Technical support

Up-to-date information concerning the product is available from the following websites:
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1 About this manual

Please read this section carefully before you use this manual and the *wienet* Switch from Wieland. Here you will find all the information required for commissioning and operation.

1.1 Target groups and qualification of personnel

Commissioning and installation of components for such types of installations must be considered. Therefore, the system manual is targeted at the following:

- Those who can verify that they have the corresponding training and already have corresponding basic knowledge
- System integrators
- Electricians

1.2 Structure of the manual

As a guidance the overall table of contents is available in the manual at the beginning.

1.3 Presentation of safety-relevant information

Information that warns of personal injury or property damage are emphasized by safety instructions. Please read this information carefully.
This operating manual uses various safety notices that are assigned according to the severity of a potential hazard:

Danger!

Immediate or likely danger. Personal injury or death is possible.



Warning!

Possible danger. Not heeding this warning can lead to minor injuries.



Attention!

Damages to property is likely if these warnings are not heeded.



Note!

Supplementary information and useful tips, indirectly related to the safety of personnel or property.

NOTE!

"Danger" or "Warning" are strictly used for cases which present a risk to life or limb. Damage to property only falls into these categories if there is also a risk of personal injury that corresponds to these levels.

Please, observe the following instructions:



Attention!

- The switch must be used in compliance with all applicable international and national laws and in compliance with any special restrictions regulating the utilization of the switch in prescribed applications and environments.
- To prevent possible injury to health and damage to appliances and to ensure that all the relevant provisions have been complied with, use only the original accessories.
- Unauthorised modifications or utilization of accessories that have not been approved may result in damage to the switch and in a breach of applicable regulations. Unauthorized modifications or utilization of accessories that have not been approved may result in the termination of the validity of the guarantee.
- The switch can not be opened.
- Disconnect power before making any configuration changes.
- If DC voltage is supplied by an external circuit, a protection device on the Power supply input is recommended.



Warning!

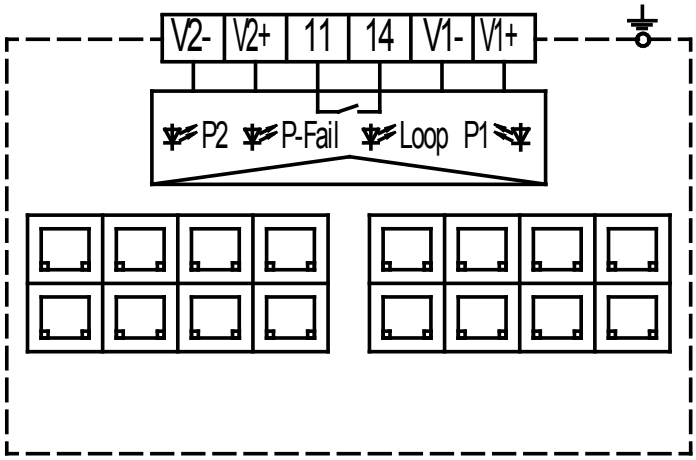
- The voltage must not be exceeded by 48 V DC max.at the power connector on the switch.
- Do not expose the switch to extreme ambient conditions. Protect the switch against dust, moisture and high temperature.
- The switch should not be used at petrol stations of flammable and explosive materials. We remind the users of the duty to observe the restrictions concerning the utilization of radio devices at petrol stations, in chemical plants, or in the course of blasting works in which explosives are used.
- Switch off the switch when travelling by plane. Utilization of the switch in a plane may endanger the operation of the plane or interfere with the mobile telephone network, and may be unlawful. Failure to observe these instructions may result in the suspension or cancellation of telephone services for the respective client, or, it may result in legal sanctions; it may also result in both eventualities.
- When using the switch in the close proximity of personal medical devices, such as cardiac pacemakers or hearing aids, you must proceed with heightened caution.
- If it is in the proximity of TV sets, radio receivers and personal computers, the telephone may cause interference.
- It is recommended that you should create an appropriate copy or backup of all the important settings that are stored in the memory of the device.

2 Product Disposal Instructions

The WEEE (Waste Electrical and Electronic Equipment: 2012/19/EU) directive has been introduced to ensure that electrical/electronic products are recycled using the best available recovery techniques to minimize the impact on the environament. This product contains high quality materials and components which can be recycled. At the end of it's life this product MUST NOT be mixed with other commercial waste for disposal. Check the terms and conditions of your supplier for disposal information.

3 Switch description

The 16 port 10/100-TX with 4 Port High-Power PoE Industrial Switch is a cost-effective solution, which meets the high reliability requirements demanded by industrial applications, and also supports to operate in the wide temperature range from -40°C to 75°C. The equipment supports 12 V to 48 V DC power input and provides the PoE function with 48 V DC output for kinds of Powered Devices to receive power as well as data over an RJ-45 cable.



Block diagram

3.1 High-Speed Transmissions

The *wienet* LMS 16-W includes a switch controller that can automatically sense transmission speeds (10/100 Mbps). The RJ-45 interface can also be auto-detected, so MDI or MDI-X is automatically selected and a crossover cable is not required. All Ethernet ports have memory buffers that support the store-and-forward mechanism. This assures that data is properly transmitted.

3.2 Dual Power Input

wienet LMS 16-W redundant power input design is with power reserve protection to prevent the switch device broken by wrong power wiring. When one of the power inputs fails, P-Fail LED will turn on and send an alarm through a relay output for notifying the user.

3.3 Flexible Mounting

wienet LMS 16-W is extremely compact and can be mounted on a DIN-rail or a panel, so it is suitable for any space-constrained environment.

3.4 Advanced Protection

wienet LMS 16-W supports up to 3,000 V DC surge protection for power line, and also supports 6,000 V ESD for Ethernet ports. With these two strong protections, it can secure equipment against unregulated voltage and make systems safer and more reliable. Further, *wienet* LMS 16-W provides currency overload protection with a resettable fuse to ensure that the device component won't be damaged by overload current.

3.5 Wide Operating Temperature

The operating temperature of the *wienet* LMS 16-W is between -40 ~ 75 ℃. With such a wide range, you can use the *wienet* LMS 16-W in some of the harshest industrial environments that exist.

3.6 Easy Troubleshooting

LED indicators make troubleshooting quick and easy. Each 10/100 Base-TX port has 2 LEDs that display the link status, transmission speed and collision status. Also the three power indicators P1, P2, P-Fail and Loop help you diagnose immediately.

3.7 Features

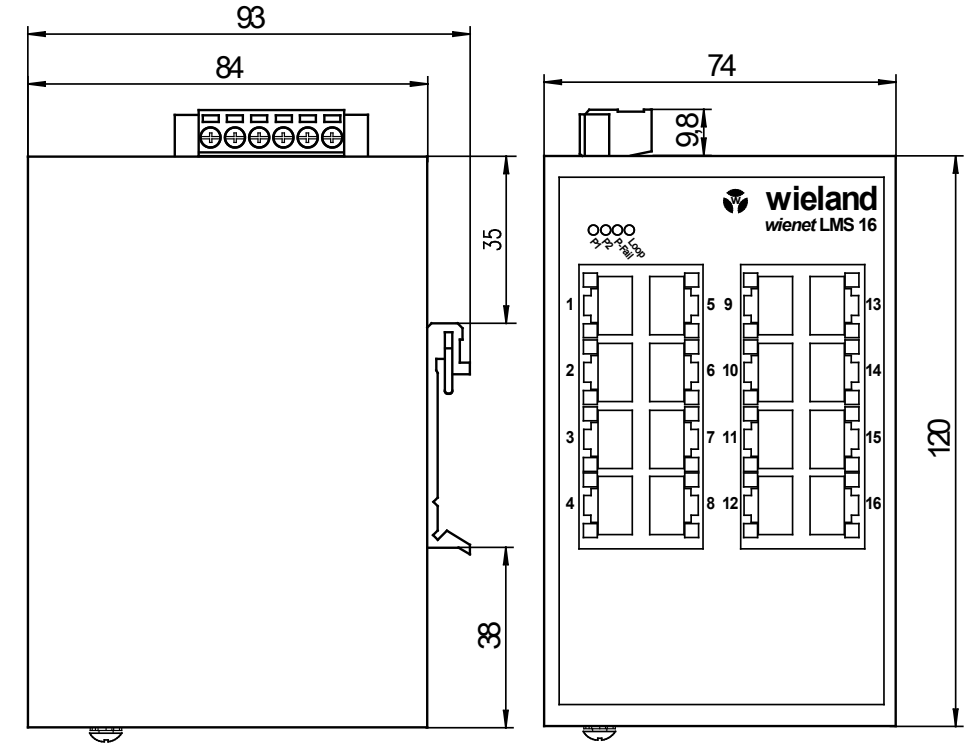
- Provides 16 x 10/100Base-TX ethernet ports with 4 PoE injectors of RJ-45 connector
- Supports +12 to 48 V DC power input
- Provides flexible mounting: DIN-rail, wall mounting
- Supports operating temperature from -40 ~ 75 ℃

4 Contents of Package

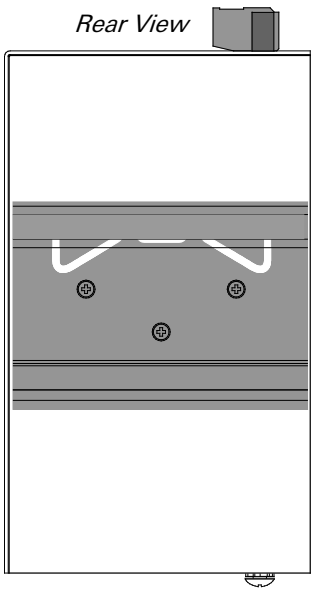
- 1 x *wienet* LMS 16-W Industrial Ethernet Switch
- 1 x Wall mounting bracket and screws
- 1 x DIN-rail mounting bracket and screws (preassembled)
- 1 x Installation instructions

5 Switch Design

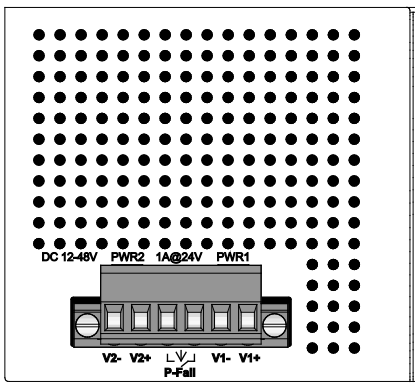
5.1 Basic dimensions of the switch



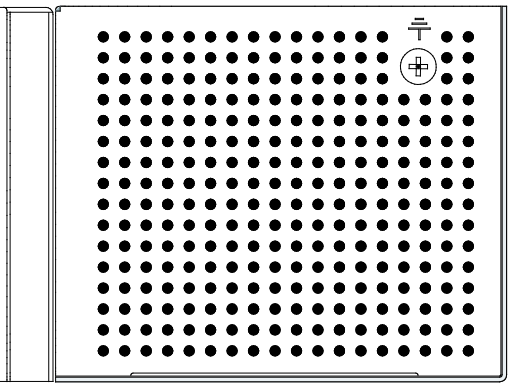
Rear View



Top View



Bottom View



5.2 Ordering code

Ordering code is shown in the table below.

Name	Order code	Features – interfaces
LMS 16-W	83.040.1334.0	16x ETH 10/100 TX

5.3 Mounting and demounting recommendations

Possibility to be put on a work surface, DIN rail EN 60715 with included clip.

For the most of applications with a built-in switch in a switch board it is possible to recognize two kinds of environments:

1. no public and industry environment of low voltage with high interference,
2. public environment of low voltage without high interference.

For both of these environments it is possible to mount the switch to a switch board if the common EMC-rules according to EN 60439-1 are noted.

NOTE

Note!

For compliance with EN 60439-1 ed.2:00 + A1:04 specification when mounting the switch to a switch-board the following assembly issues have to be observed:

For several cables we recommend to bind the bunch. We recommend for this use:

- The length of the bunch (combination of power supply and data cables) can be a maximum of 1.5 m. If the length of data cables exceeds 1.5 m or if the cables are lead outside the switch – board, we recommend installing over – voltage protectors (surge suppressors).
- Between data cables and cables with reticular tension of ~ 230 V / 50 Hz sufficient space (min. 50 mm) should be kept.
- A certain space must be kept before the cables for connecting or disconnecting singular cables.

For correct function of the switch we recommend to use it in a switch-board with earth-bonding distribution frame for grounding of the power supply, of the switch, the data cables and the antenna.

5.4 Mounting and demounting on a DIN rail

Mounting

The installation on a standard DIN mounting rail is possible. The DIN-rail kit is screwed on the industrial switch when out of factory. If the DIN-rail kit is not screwed on the industrial switch, please screw the DIN-rail kit on the switch first.

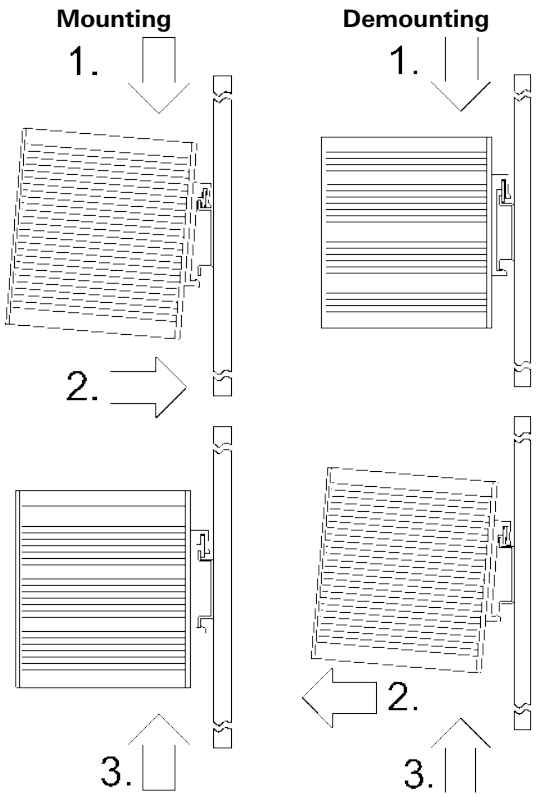
For installing the device follow the steps described beneath:

1. Slightly tilt the lower part of the switch backwards, away from the DIN rail.
2. Hang the switch on the DIN rail.
3. Push the switch down and against the rail until it clicks in place.
4. Check if the switch is sitting tight on the mounting rail.

Demounting

For uninstalling the device follow the steps described beneath:

1. Switch off the power supply.
2. Lightly push the switch down and tilt the lower part of the switch away from the DIN-Rail.
3. Pull the switch upwards off the DIN-Rail.



5.5 Mounting on a wall

The LMS 16-W switch can be wall-mounted by using the included mounting kit. The wall mounting option provides better shock and vibration resistance than the DIN rail vertical mount.

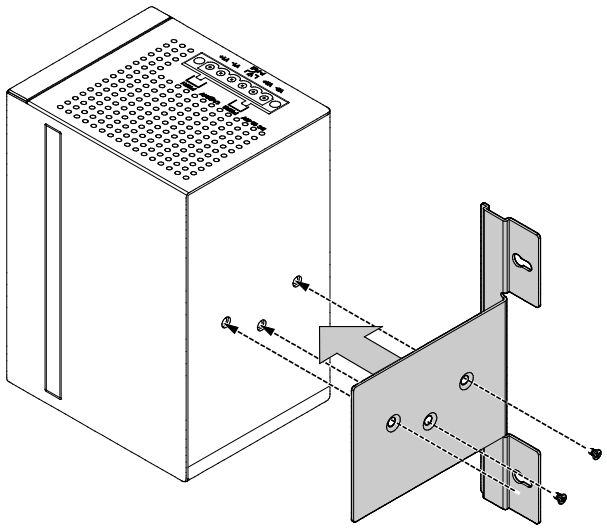
NOTE

Note!

When installing, make sure to allow enough space to properly install the cabling.

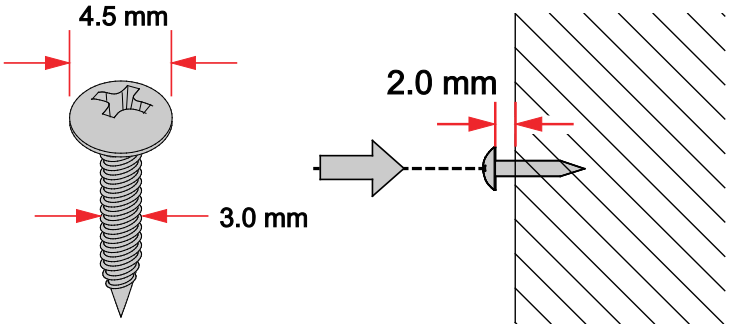
For installation follow the steps described beneath:

1. Rotate the device to the rear side and locate the DIN mounting plate.
2. Remove the screws securing the DIN mounting plate to the rear panel of the switch.
3. Remove the DIN mounting plate. Store the DIN mounting plate and provided screws for later use.
4. Align the wall mounting plates on the rear side. The screw holes on the device and the mounting plates must be aligned, see the following illustration.
5. Secure the wall mounting plates with M3 screws, see the following figure.



Installing wall mount plates

6. Locate the installation site and place the switch against the wall, making sure it is the final installation location.
7. Use the wall mounting plates as a guide to mark the locations of the screw holes.
8. Drill four holes over the four marked locations on the wall, keeping in mind that the holes must accommodate wall sinks in addition to the screws.
9. Insert the wall sinks into the walls.
10. Insert the screws into the wall sinks. Leave a 2 mm gap between the wall and the screw head to allow for wall mounting plate insertion.

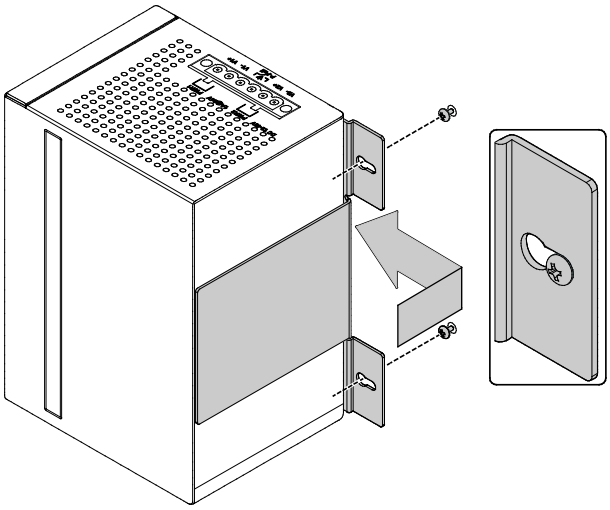


NOTE **Note!**

Make sure the screws dimensions are suitable for use with the wall mounting plate.

Do not completely tighten the screws into the wall. A final adjustment may be needed before fully securing the wall mounting plates on the wall.

11. Align the wall mounting plate over the screws on the wall.
12. Install the wall mounting plate on the screws and slide it forward to lock in place.
13. Once the device is installed on the wall, tighten the screws to secure the device.

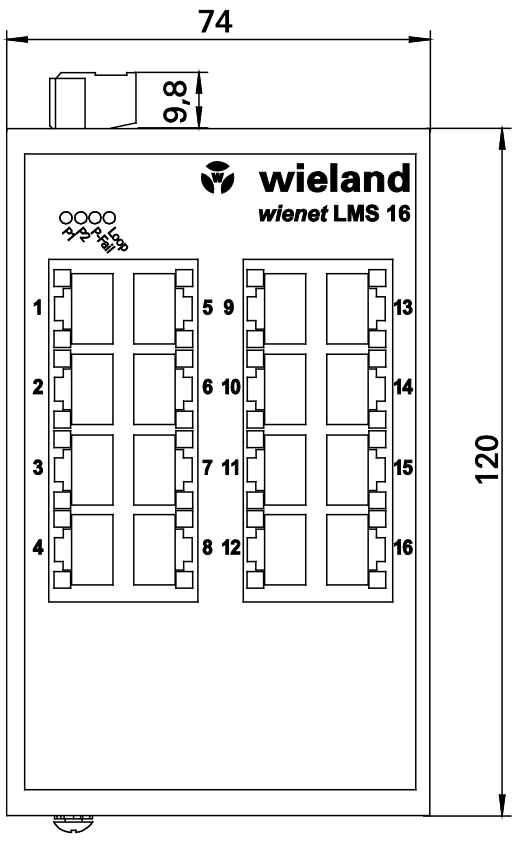


Wall mount installation

5.6 Description of the Front-Panel

On the front panel some LEDs can be found which indicate the power and network status.

LED Definition			
LED	**Color**	**Description**	
P1	Green	On	Power input 1 is active
		Off	Power input 1 is inactive
P2	Green	On	Power input 2 is active
		Off	Power input 2 is inactive
P-Fail	Red	On	Power input 1 or 2 is in-active
		Off	Power input 1 and 2 are active or no power input
Loop	Red	On	Loop is detected
		Off	No loop detected

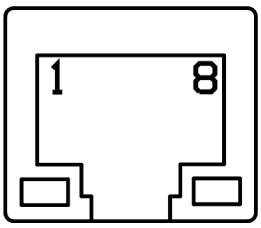


5.6.1 Ethernet Port (ETH0 to ETH16)

Panel socket RJ45. It is suggested to adopt ELA/TIA as the wiring of the RJ-45.

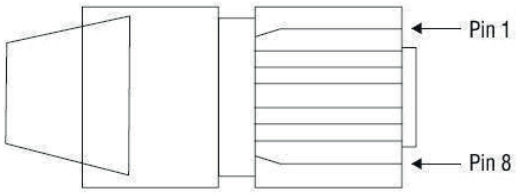
For RJ45 connectors, data-quality, twisted pair cabling (rated CAT5 or better) is recommended. The connector bodies on the RJ45 Ethernet ports are metallic and connected to the GND terminal. For best performance, use shielded cabling. Shielded cabling may be used to provide further protection.

Pin	Signal mark	Description	Data flow direction
1	TXD+	Transmit Data – positive pole	Input/Output
2	TXD-	Transmit Data – negative pole	Input/Output
3	RXD+	Receive Data – positive pole	Input/Output
4	DC+	POE power + (if POE is equipped)	
5	DC+	POE power + (if POE is equipped)	
6	RXD-	Receive Data – negative pole	Input/Output
7	DC-	POE power - (if POE is equipped)	
8	DC-	POE power - (if POE is equipped)	



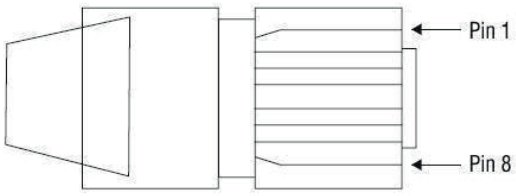
Ethernet connector

Pin assignment RJ45-Plug



EIA/TIA-568B

1. White, Orange
2. Orange
3. White, Green
4. Blue
5. White, Blue
6. Green
7. White, Brown
8. Brown



EIA/TIA-568A

1. White, Green
2. Green
3. White, Orange
4. Blue
5. White, Blue
6. Orange
7. White, Brown
8. Brown

5.6.2 Network connection

The *wienet* LMS 16-W switch has 16 x RJ-45 ports that support connection to 10 Mbps Ethernet, or 100 Mbps Fast Ethernet, and half or full duplex operation. The switch can be connected to other hubs or switches through a twisted-pair straight through the cable or a crossover cable up to 100 m long. The connection can be made from any TX port of the Switch (MDI-X) to another hub or switch either MDI-X or uplink MDI port.The switch supports auto-crossover to make networking more easy and flexible. You can connect any RJ-45 (MDI-X) station port on the switch to any device such as a switch, bridge or switch.

5.7 Power connection and wiring

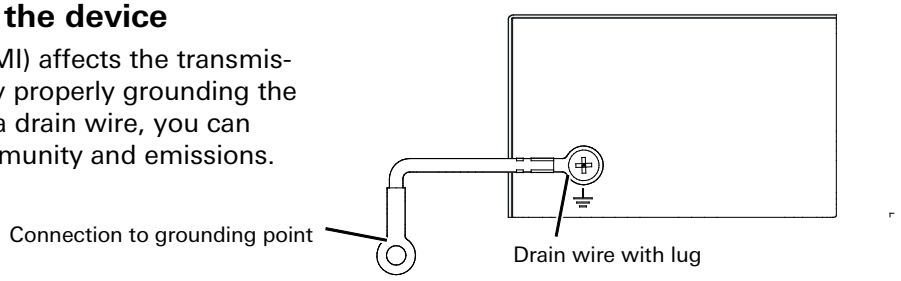
WARNING

Warning!

- The device only supports the voltage outlined in the type plate. Do not use any other power components except those specifically designated for the switch device.
- Properly ground the device before connecting. Lack of a proper grounding setup may result in a safety risk and could be hazardous.
- Do not service equipment or cables during periods of lightning activity.
- Do not service any components unless qualified and authorized to do so.
- Do not block air ventilation holes.

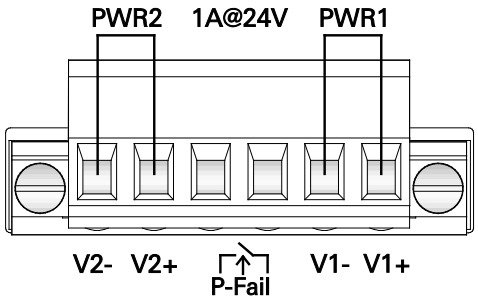
5.7.1 Grounding the device

Electromagnetic Interference (EMI) affects the transmission performance of a device. By properly grounding the device to earth ground through a drain wire, you can setup the best possible noise immunity and emissions.



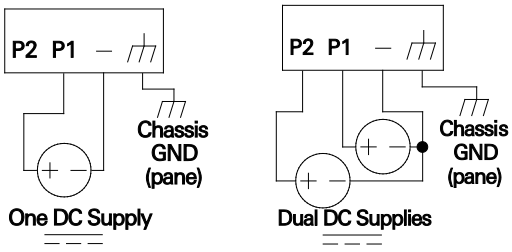
5.7.2 Overview

The switch can be powered by using the same DC source used to power other devices. A DC voltage range of 12 to 48 V DC must be applied between the V1+ terminal and the V1- terminal (PWR1), see the following illustrations. A Class 2 power supply is required to maintain a UL60950 panel listing. The chassis ground screw terminal should be tied to the panel or chassis ground.



A redundant power configuration is supported through a secondary power supply unit to reduce network down time as a result of power loss.

The switch supports 12 and 48 V DC. Dual power inputs are supported and allow you to connect a backup power source.



- The Terminal Block (CN1) is suitable for 14-22 AWG (0.35 - 2.5 mm^2). Torque value 5,6 lb-in.
- The cross sectional area of the earthing conductors shall be at least 3.31 mm^2.
- Calculate the maximum possible current for each power and common wire. Make sure the power draw is within limits of local electrical code regulations.
- For best practices, route wiring for power and devices on separate paths.
- Do not bundle together wiring with similar electrical characteristics.
- Make sure to separate input and output wiring.
- Label all wiring and cabling to the various devices for more effective management and servicing.

NOTE

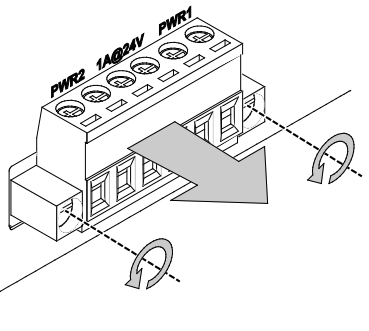
Note!

Routing communications and power wiring through the same conduit may cause signal interference. To avoid interference and signal degradation, route power and communications wires through separate conduits.

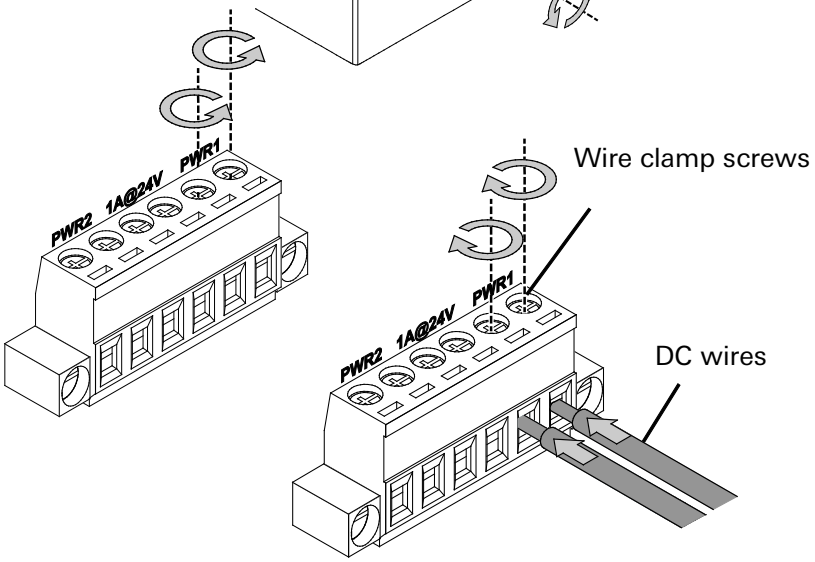
5.7.3 Wiring the power outputs

Make sure the power is not connected to the switch or the power converter before proceeding.

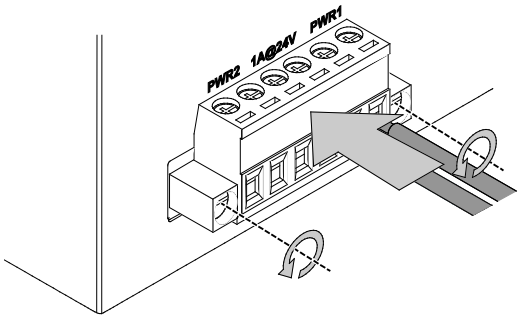
1. Loosen the screws securing the terminal block to the terminal block receptor.
2. Remove the terminal block from the switch.



3. Insert a small flat-bladed screw driver in the V1+/V1- wire-clamp screws, and loosen the screws.
4. Insert the negative/positive DC wires into the V1+/V1- terminals of PWR1.
5. Tighten the wire-clamp screws to secure the DC wires in place.
6. If setting up power redundancy, connect PWR2 in the same manner.



7. Align the terminal block over the terminal block receptor on the switch.
8. Insert the terminal block and press it in until it is flush with the terminal block receptor.
9. Tighten the screws on the terminal block to secure it to the terminal block receptor. If there is no gap between the terminal block and the terminal receptor, the terminal block is seated correctly.



6 Technical Parameters

6.1 Basic parameters

Ethernet	
Ethernet standard	IEEE 802.3, 802.3u, 802.3x, 802.3 af
Transfer rate	10/100 Mbps
Connectors	8 x RJ45, 4 with PoE
Auto sensing	yes
Auto negotiation	yes
Auto-Crossing (MDI / MDI-X)	yes
Communication	Full duplex / half duplex
Ethernet cable length	100 m max. (Twisted Pair)
Switching mode	Store-and-forward switching mode
Topologies	Line, star, mesh
Integrated isolation between ports	1,500 V

Switch Properties	
MAC Table Size	8k entries
Switching Band width	3,2 GBit/s
Jumbo Frame	2048 Bytes
Loop detection	yes
Power supply	
Redundant power supply	yes (P1, P2)
Nominal Supply voltage	12V ... 48 V DC (8.4 V ... 52.8 V DC)
Reverse polarity protection	yes
Connectors	6-pin screw terminal block (power and relay)
Power consumption (typ/max)	72 W (max.) at 48 V DC 69,4 W (max.) at 24 V DC
Power per PoE port	15,4 W bei 48 V DC
General data	
Ambient operating temperature	-40 … +75°C
Ambient relative humidity	5 … 95 %, non-condensing
Storage temperature	-40 … +85 °C
Mounting on	DIN rail 35 mm (EN60715), wall mounting possible
Degree of protection	IP30
MTBF	4.653.552 h
Dimensions	see dimensional drawing, fig. 1, in chapter 5.1
Weight	670 g
Housing material	Metal
Module earth	⏚ screw and by snapping onto earthed DIN rail (Caution: must be with low impedance)
Shock and vibration	
Shock	IEC60068-2-27
Vibration	IEC60068-2-6
Free fall	IEC60068-2-32 (ISTA Test Procedure 2A)
Power Connectors	
Conductor size AWG	14-22 solid/stranded
Rated conductor size	0.35 … 2.5 mm² solid/stranded
Conductor strip length	7-8 mm
Torque	0.5 Nm max.(5.6 lbf-in) max.
Norms and approvals	
FCC	FCC Part 15, Subpart B, Class A
EMS Emission: Immunity:	EN55011, EN55022 Class A; EN61000-6-4; EN55024; EN61000-6-2 EN61000-4-2; EN61000-4-3; EN61000-4-4; EN61000-4-5; EN61000-4-6; EN6000-4-8,
Approval	cULus (UL508)

6.2 Standards and regulations

The switch complies with the following standards and regulations:

Standards and regulations	
Telecom and emission	ETSI EN 300 328 v1.8.1
EMC	U.S.A.: FCC Part 15 CISPR 22 IEC61000-4-2/3/4/5/6/8 EN61000-6-1/2/3/4
Safety	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013, EN 62311:2008

FCC CLASS A
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

7 Troubleshooting

Attention!

Danger of burning the converter down if a power adapter with DC output voltage higher than 48 V is used. Please check the correct power supply,in a range from 12 to 48 V DC.



Note!

Select the proper UTP cable to construct user network. Use Unshielded Twisted-Pair (UTP) or Shielded Twisted-Pair (STP) cable for RJ-45 connections:

- 100 Category 3, 4 or 5: cable for 10 Mbps connections
- 100 Category 5: cable for 100 Mbps connections.
- Cable length of twisted pair connection may not exceed 100 meters (328 feet).

NOTE

7.1 Diagnosis with LED Indicators

The switch can be easily monitored through panel indicators. They assist in identifying common problems and help find possible solutions.

7.2 FAQ troubleshooting

✍ *The power indicator does not light up while the power cord is plugged in.*

- *Check for loose power connections, power losses or surges at the power outlet.*
- *If the problem is still not resolved, please contact the local dealer for assistance.*

✍ *The transmission of data packets doesn't work although the LED indicators are normal and the connected cables are correct.*

- *Check your system's ethernet devices, their status and the network or device configuration.*

8 Recommended Literature

[1] Wieland Electric: Installation instructions,