

WAGO ETHERNET Accessories 852



852-0111

5 Port 100BASE-TX Industrial ECO Switch Mounting, Installation and Handling

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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1 Notes about this Documentation



Note

Always retain this documentation!

This documentation is part of the product. Therefore, retain the documentation during the entire service life of the product. Pass on the documentation to any subsequent user. In addition, ensure that any supplement to this documentation is included, if necessary.

1.1 Validity of this Documentation

This documentation is only applicable to WAGO ETHERNET accessory products "5 Port 100BASE-TX Industrial ECO Switch" (852-0111).

This documentation is only applicable from FW/HW Version 01/06.

1.2 Copyright

This Manual, including all figures and illustrations, is copyright-protected. Any further use of this Manual by third parties that violate pertinent copyright provisions is prohibited. Reproduction, translation, electronic and phototechnical filing/archiving (e.g., photocopying) as well as any amendments require the written consent of WAGO Kontakttechnik GmbH & Co. KG, Minden, Germany. Non-observance will involve the right to assert damage claims.

1.3 Symbols



DANGER

Personal Injury!

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.



DANGER

Personal Injury Caused by Electric Current!

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Personal Injury!

Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Personal Injury!

Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Damage to Property!

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.



NOTICE

Damage to Property Caused by Electrostatic Discharge (ESD)!

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.



Note

Important Note!

Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.



Information

Additional Information:

Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

1.4 Number Notation

Table 1: Number Notation

Number Code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

1.5 Font Conventions

Table 2: Font Conventions

Font Type	Indicates
<i>italic</i>	Names of paths and data files are marked in italic-type. e.g.: <i>C:\Program Files\WAGO Software</i>
Menu	Menu items are marked in bold letters. e.g.: Save
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: File > New
Input	Designation of input or optional fields are marked in bold letters, e.g.: Start of measurement range
"Value"	Input or selective values are marked in inverted commas. e.g.: Enter the value "4 mA" under Start of measurement range .
[Button]	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: [Input]
[Key]	Keys are marked with bold letters in square brackets. e.g.: [F5]

2 Important Notes

This section includes an overall summary of the most important safety requirements and notes that are mentioned in each individual section. To protect your health and prevent damage to devices as well, it is imperative to read and carefully follow the safety guidelines.

2.1 Legal Bases

2.1.1 Subject to Changes

WAGO Kontakttechnik GmbH & Co. KG reserves the right to provide for any alterations or modifications. WAGO Kontakttechnik GmbH & Co. KG owns all rights arising from the granting of patents or from the legal protection of utility patents. Third-party products are always mentioned without any reference to patent rights. Thus, the existence of such rights cannot be excluded.

2.1.2 Personnel Qualification

All sequences implemented on Series 852 devices may only be carried out by electrical specialists with sufficient knowledge in automation. The specialists must be familiar with the current norms and guidelines for the devices and automated environments.

All changes to the controller should always be carried out by qualified personnel with sufficient sufficient skills in PLC programming.

2.1.3 Proper Use of the Industrial Switches

The device is designed for the IP30 protection class. It is protected against the insertion of solid items and solid impurities up to 2.5 mm in diameter, but not against water penetration. Unless otherwise specified, the device must not be operated in wet and dusty environments.

2.1.4 Technical Condition of Specified Devices

The devices to be supplied ex works are equipped with hardware and software configurations, which meet the individual application requirements. These modules contain no parts that can be serviced or repaired by the user. The following actions will result in the exclusion of liability on the part of WAGO Kontakttechnik GmbH & Co. KG:

- Repairs,
- Changes to the hardware or software that are not described in the operating instructions,
- Improper use of the components.

Further details are given in the contractual agreements. Please send your request for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

2.1.5 Standards and Regulations for Operating the Industrial Switches

Please observe the standards and regulations that are relevant to installation:

- The data and power lines must be connected and installed in compliance with the standards to avoid failures on your installation and eliminate any danger to personnel.
- For installation, startup, maintenance and repair, please observe the accident prevention regulations of your machine (e.g., DGUV Regulation “Electrical Installations and Equipment”).
- Emergency stop functions and equipment must not be deactivated or otherwise made ineffective. See relevant standards (e.g., DIN EN 418).
- Your installation must be equipped in accordance to the EMC guidelines so electromagnetic interferences can be eliminated.
- Please observe the safety measures against electrostatic discharge according to DIN EN 61340-5-1/-3. When handling the modules, ensure that environmental factors (persons, workplace and packing) are well grounded.
- The relevant valid and applicable standards and guidelines regarding the installation of switch cabinets must be observed.

2.2 Safety Advice (Precautions)

For installing and operating purposes of the relevant device to your system the following safety precautions shall be observed:



DANGER

Do not work on devices while energized!

All power sources to the device shall be switched off prior to performing any installation, repair or maintenance work.



DANGER

Only install in appropriate housings, cabinets or electrical operation rooms!

WAGO's 852 Series ETHERNET Switches are considered exposed operating components. Therefore, only install these switches in lockable housings, cabinets or electrical operation rooms. Access must be limited to authorized, qualified staff having the appropriate key or tool.



DANGER

Ensure a standard connection!

To minimize any hazardous situations resulting in personal injury or to avoid failures in your system, the data and power supply lines shall be installed according to standards, with careful attention given to ensuring the correct terminal assignment. Always adhere to the EMC directives applicable to your application.

NOTICE

Do not use in telecommunication circuits!

Only use devices equipped with ETHERNET or RJ-45 connectors in LANs. Never connect these devices with telecommunication networks.

NOTICE

Replace defective or damaged devices!

Replace defective or damaged device/module (e.g., in the event of deformed contacts), since the long-term functionality of device/module involved can no longer be ensured.

NOTICE

Protect the components against materials having seeping and insulating properties!

The components are not resistant to materials having seeping and insulating properties such as: aerosols, silicones and triglycerides (found in some hand creams). If you cannot exclude that such materials will appear in the component environment, then install the components in an enclosure being resistant to the above-mentioned materials. Clean tools and materials are imperative for handling devices/modules.

NOTICE

Clean only with permitted materials!

Clean housing and soiled contacts with propanol.

NOTICE

Do not use any contact spray!

Do not use any contact spray. The spray may impair contact area functionality in connection with contamination.

NOTICE

Do not reverse the polarity of connection lines!

Avoid reverse polarity of data and power supply lines, as this may damage the devices involved.

NOTICE



Avoid electrostatic discharge!

The devices are equipped with electronic components that may be destroyed by electrostatic discharge when touched. Please observe the safety precautions against electrostatic discharge per DIN EN 61340-5-1/-3. When handling the devices, please ensure that environmental factors (personnel, work space and packaging) are properly grounded.

2.3 Special Use Conditions for ETHERNET Devices

If not otherwise specified, ETHERNET devices are intended for use on local networks. Please note the following when using ETHERNET devices in your system:

- Do not connect control components and control networks to an open network such as the Internet or an office network. WAGO recommends putting control components and control networks behind a firewall.
- Limit physical and electronic access to all automation components to authorized personnel only.
- Change the default passwords before first use! This will reduce the risk of unauthorized access to your system.
- Regularly change the passwords used! This will reduce the risk of unauthorized access to your system.
- If remote access to control components and control networks is required, use a Virtual Private Network (VPN).
- Regularly perform threat analyses. You can check whether the measures taken meet your security requirements.
- Use “defense-in-depth” mechanisms in your system's security configuration to restrict the access to and control of individual products and networks.

3 General

3.1 Scope of Supply

- Industrial Eco Switch
- Carrier rail support

3.2 Industrial ETHERNET Technology

The range of WAGO switches ensures scalability of your network infrastructure with outstanding electrical and mechanical characteristics. These robust devices are designed for industrial use and they are fully compliant with IEEE 802.3, 802.3u.

They have voltage supply with a supply voltage range of 18 ... 30 V.

Characteristics such as auto negotiation and auto MDI/MDIX (crossover) on all 10/100BASE-TX ports are realized.

3.3 Switching Technology

Industrial ETHERNET primarily uses switching technology. This technology allows any network subscriber to send at any time because the subscriber always has an open peer-to-peer connection to the next switch. The connection is bidirectional, i.e., the subscriber can send and receive at the same time (full duplex).

The targeted use of switching technology can increase real-time capability because the peer-to-peer connection prevents collisions in network communication.

3.4 Auto Negotiation

The Industrial Switch's 10/100Mbps switched RJ-45 ports auto negotiates with connected devices to determine the fastest data transmission rate supported by both devices. This helps make the Switch a plug and play device. The Switch's RJ-45 ports support full or half duplex, depending on which transmission speed is supported by the attached device.

3.5 Functioning of Switches

Switches analyze all incoming data packages and forward them to the port where the corresponding destination address is located. Exceptions are the multicast and broadcast telegrams, which are forwarded to all active ports of the switch.

For selective forwarding of the telegrams, each switch contains of an address / port assignment table in which the assignments of the destination addresses to a specific port of the switch are stored. The address / port mapping table is typically generated and maintained automatically by the switch through a self-learning process. Incoming data packages are analyzed, filtered and forwarded directly to

the appropriate port by using this assignment table based on their destination address. The incoming data package is sent to all ports, if there is no corresponding entry in the assignment table for a destination address. If a destination address answers, the assignment table is complemented with this destination address as well as the associated port.

3.6 Port Speed & Duplex Mode

After a cable is plugged into a specific port, the system uses auto negotiation to determine the transmission mode for the new twisted pair connection:

If the connected device does not support auto negotiation or has auto negotiation disabled, an auto sensing process is initiated to select the speed and set the duplex mode to half duplex.

4 Device Description

The Industrial Switch was designed for easy installation in an industrial environment where vibration, shock, heat, and RF interference may be commonplace.

The Industrial Switch, with its small, compact size, was specifically designed for easy carrier rail mounting and can be installed where space is limited.

The Industrial Switch is ideal for deployment with multiple high-speed servers for shared bandwidth 10 Mbps or 100 Mbps workgroups. With the highest bandwidth 200 Mbps (100 Mbps full duplex mode), any port can provide workstations with a congestion-free data pipe for simultaneous access to the server.

The Industrial Switch is expandable by cascading two or more switches together in a 'daisy-chain' fashion. As all ports support 200 Mbps, the Industrial Switch can be cascaded from any port and to any number of switches.

The Industrial Switch combines dynamic memory allocation with store-and-forward switching to ensure that the buffer is effectively allocated for each port, while controlling the data flow between the transmit and receive nodes to guarantee against all possible packet loss.

Other key features are:

- Five (5) 10/100BASE-TX Ports
- Comprehensive front-panel diagnostic LEDs
- Supports Auto-MDI/MDI-X
- Full/half-duplex transfer modes for each port
- Wide supply voltage range 18 ... 30 V
- Store-and-forward switching method
- Integrated address Look-Up Engine, supports 2 K absolute MAC addresses
- Supports surge protection
- Power input polarity protection function
- IEEE 802.3x flow control for full duplex
- Wide temperature range -40 °C ... +70 °C
- Auto negotiation on all ports
- Rugged metal-IP30 case
- Vibration/Shock operational

The 852-111 has 5 ports with each port featuring Auto-negotiation and auto MDI/MDI-X detection. Existing 10Mbps networks can now be upgraded effortlessly to higher speed 100Mbit/s Fast ETHERNET networks. The 852-111 5-port density can be used to create multiple segments to alleviate client congestion and provide dedicated bandwidth to each user node.

The 852-111 is a cost-effective solution to keep up with the constant demands for emerging IP-based industry communication needs. The switch can be easily configured and installed and is also ideally suited for small to medium-sized networks.

4.1 View

4.1.1 Front view

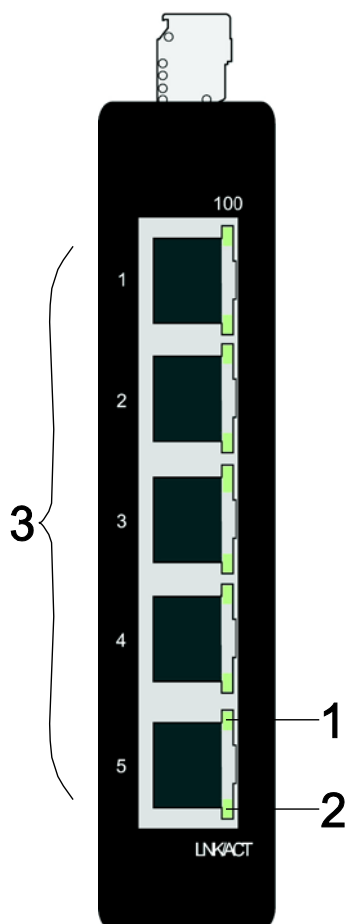


Figure 1: Front view of Industrial ECO Switch

Table 3: Legend for "Front view of industrial ECO switch" figure

Position	Description
1	TX port 100 Mbps LED
2	TX port LNK/ACT LED
3	TX ports (5)

4.1.2 TOP View

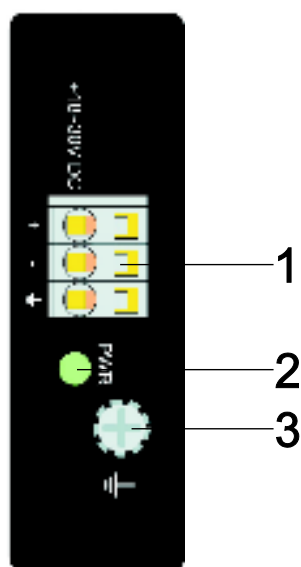


Figure 2: Top view of Industrial ECO Switch

Table 4: Legend for "Top view of the industrial ECO switch" figure

Position	Description
1	Terminal block (male connector) for power input (PWR)
2	Primary power LED
3	Grounding Screw

4.2 Connectors

4.2.1 Power Supply (PWR)

The female connector can easily be connected to the 3-pole male connector located on the top of the ECO switch.

The male connector shows the following pin assignment:

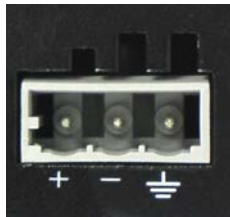


Figure 3: Power supply (PWR) port

Table 5: Legend for "Power supply (PWR) port" figure

Pin	Description	Description
+	PWR	Primary DC input
-	PWR	Primary DC input
⏏	GND	Ground potential (functional earth)



NOTICE

Damage to Property Caused by Electrostatic Discharge (ESD)!

Industrial ECO switch for DC operation: Power supply is provided via an external direct-current power source. As the industrial ECO switch is not equipped with a power switch, it switches on immediately when you apply the direct-current power supply.

4.2.2 10/100BASE-TX Ports

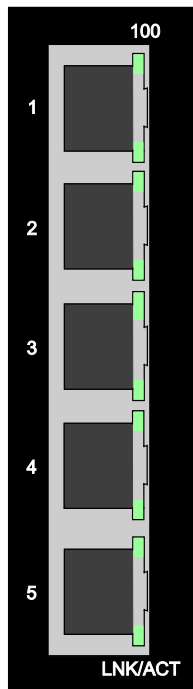


Figure 4: 10/100BASE-TX

The 10/100BASE-TX ports support network speeds of either 10 Mbit/s or 100 Mbit/s, and can operate in half- and full-duplex transfer modes. The ports also offer automatic MDI/MDI-X crossover detection that gives true “plug and play” capability – just plug the network cables into the ports and the ports will adjust according to the end-node devices. The following are the recommended cables for the RJ-45 connectors:

- 100 m – Cat. 5 or better

4.3 Display Elements

The industrial ECO switch is equipped with a power LED ("PWR") and with network LEDs ("1000" or "10/100") for the appropriate port.

You can see the status of the industrial ECO switch at a quick glance of the power supply LED, while the network LEDs provide information about the connection actions.

4.3.1 Power Supply LED

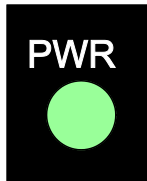


Figure 5: Power supply LED

Table 6: Legend for "Power supply LED" figure

LED	Name	Status	Description
PWR	Primary Power LED	Green	The industrial ECO switch uses the primary power supply.
		OFF	The primary power supply has been switched off, or a fault has occurred.

4.3.2 Network LEDs

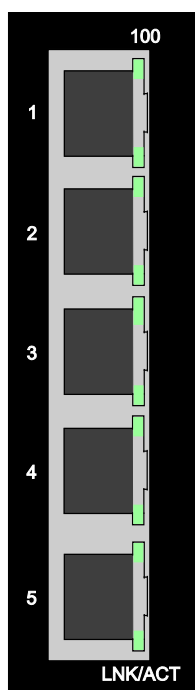


Figure 6: Network LEDs

Table 7: Legend for "Network LEDs" figure

LED	Name	Status	Description
100	TX-port 100 Mbps LED (1 LED for each port)	Green	Port operating at 100 Mps (1 LED for each port).
		OFF	Port operating at below 100 Mps.
LNK/ ACT	TX port LNK/ACT LED (1 LED for each port)	Green	Illuminated when connectors are attached (1 LED for each port).
		Green flashing	Data traffic passing through port.
		OFF	No valid link established on port.

4.4 Technical Data

4.4.1 Device Data

Table 8: Technical data - device data

Width	Wall mounting	97 mm
	Carrier rail mounting	23.4 mm
Height	Wall mounting	23.4 mm
	Carrier rail mounting	73.8 mm (from the top edge of the carrier rail)
Length	Wall mounting	109.2 mm
	Carrier rail mounting	109.2 mm
Weight		145 g
Mounting		Wall mounting (horizontal or vertical), or mounting on a carrier rail
Protection type		IP30

4.4.2 Power Supply

Table 9: Technical data - supply

Supply voltage	18 ... 30 VDC
Power consumption, max.	3 W

4.4.3 Communication

Table 10: Technical data - communication

Ports	5 x 10/100BASE-TX (RJ-45)
Standards	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX/FX, IEEE 802.3x Flow Control
Topology	Star

4.4.4 LEDs

Table 11: Technical Data – LEDs

Power supply	Power (PWR), green
Communication (per port)	Link/Activity (LNK/ACT), green
	Speed (100 Mbit/s), green

4.4.5 Environmental Conditions

Table 12: Technical data - environmental conditions

Surrounding air temperature, operation	-40 °C ... +70 °C
Surrounding air temperature, operation, DNV GL (Temperature class D)	-25 °C ... +70 °C
Surrounding air temperature, operation, UL	-40 °C ... +60 °C
Surrounding air temperature, storage	-40 °C ... +80 °C
Relative humidity (without condensation)	95 %
Vibration resistance	Acc. to IEC 60068-2-6
Shock resistance	Acc. to IEC 60068-2-27
EMC-1 immunity to interference	Acc. to EN 61000-6-2
EMC-1 Emission of interference	Acc. to EN 61000-6-4
Standard Compass Safe Distance 0.3 Degree deflection	1000 mm
Steering, Standby, Emergency Compass Safe Distance 1.0 Degree deflection	650 mm

4.5 Approvals

The following approvals have been granted for the WAGO ETHERNET accessory product “5 Port 100BASE-TX Industrial ECO Switch” (852-0111):

 Conformity Marking

 UL508

The following ship approvals have been granted for the WAGO ETHERNET accessory product “5 Port 100BASE-TX Industrial ECO Switch” (852-0111):



DNV GL
[Temperature: D, Humidity: B, Vibration: C, EMC: B,
Enclosure: A]

The DNV GL Marine Type Approval is only valid if using the 852-9101 Carrier Rail Adapter in conjunction with an ETHERNET Switch. This adapter is available as an accessory (see “Accessories” section).

5 Mounting

5.1 Installation site

The location selected to install the industrial ECO switch may greatly affect its performance. When selecting a site, we recommend considering the following rules:

- Install the industrial ECO switch at an appropriate place. See section "Device Description" > ... > "Technical Data" for the acceptable temperature and humidity operating ranges.
- Fix the provided brackets at the back of the industrial ECO switch to a carrier rail to protect the industrial ECO switch from falling.

Make sure that the heat output from the industrial ECO switch and ventilation around it is adequate. Do not place any heavy objects on the industrial ECO switch.

5.2 Installation on a Carrier Rail

The carrier rail must optimally support the EMC measures integrated into the system and the shielding of the internal data bus connections.

Place the industrial ECO switch onto the carrier rail from the top and snap it into position.

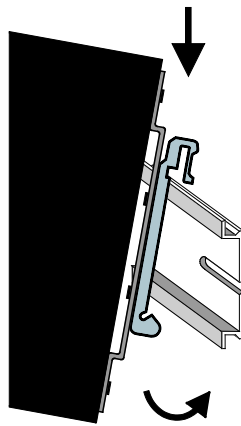


Figure 7: Snapping onto the carrier rail

5.3 Removal from DIN-Rail

To remove the device from the carrier rail, press down on the industrial ECO switch and pull it out of the carrier rail.

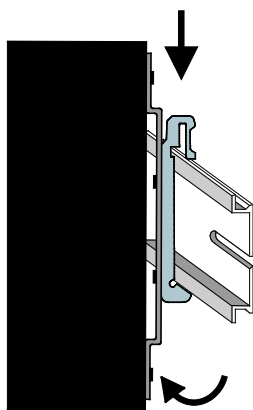


Figure 8: Removing the device from the carrier rail

5.4 Screw Mounting

The industrial ECO switch can be mounted vertically or horizontally directly on an even surface using the boreholes on the side of the device.

The surface must be able to bear at least 1.5 kg for the industrial ECO switch.

Use the drilling template given in the appendix to mark the boreholes.

6 Connect Devices

6.1.1 Power Supply

The industrial ECO switch uses direct-current power supply for 18 ... 30 V.

The primary network link is established via a power source located on the top of the industrial ECO switch.

The terminal block is composed of three contact pins and can be inserted and removed easily by hand to connect to the three-pin terminal block receptor (male contacts located on the top of the switch).

1. PWR +/- conductors:
To connect or disconnect the conductors, actuate the spring directly in the female connector using a screwdriver or an operating tool and insert or remove the conductor.
2. Plug the female connector into the male connector of the switch if it has not already been plugged in.
3. Connect a suitable grounding conductor to the grounding lug on the top of the industrial ECO switch.

Note



Important note!

The ground for the industrial ECO switch prevents electromagnetic interference from electromagnetic radiation.

Observe the corresponding standards for EMC-compatible installations as well.

4. Check whether the power LED on the top of the device lights up when power is supplied to the device. If not, check to ensure that the power cable is plugged in correctly and fits securely.

7 Accessories

Table 13: Accessories

Description	Item Number
Carrier Rail Adapter	852-9101

The 852-9101 Carrier Rail Adapter is required for “Industrial ECO Switch” (852-111) installations that comply with the DNV GL standard.

8.1 RJ-45 Cables 100BASE-TX

When connecting your network devices, use a standard Category 5 cable for a 10BASE-T configuration for 100BASE-TX. The pin assignments are as follows:

Table 14: RJ-45 Cables

Contact	Description	Pair	Color
1	TD+	2	White/Orange
2	TD-	2	Orange
3	RX+	3	White/Green
4	N/A	1	Blue
5	N/A	1	White/Blue
6	RX-	3	Green
7	N/A	4	White/Brown/
8	N/A	4	Brown

Table 15: Cable Configuration

Application	Cable Type	Application
Switch to switch or network adapter	Straight-through cable	Switch Hub End 1 ←————→ 1 2 ←————→ 2 3 ←————→ 3 6 ←————→ 6
Terminal device to switch	Crossover cable	Switch Converter End #1 End #2 1 ←————→ 1 2 ←————→ 2 3 ←————→ 3 6 ←————→ 6

Comment

The Industrial-ECO-Switch provides Auto-MDI/MDI-X and the NWay function at the RJ-45 port.

8.2 Drilling Template for Screw Mounting

The industrial ECO switch can be mounted vertically or horizontally using the boreholes on the side of the device.

Use the drilling template shown below to mark the boreholes.

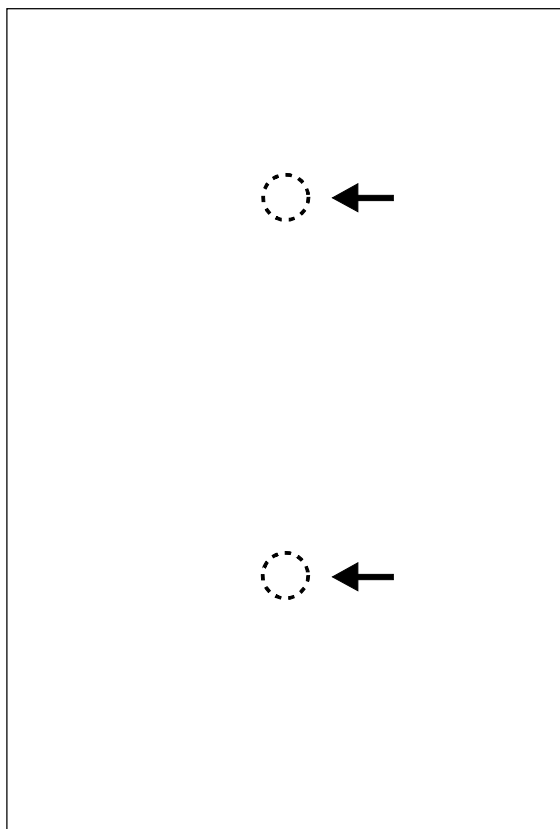


Figure 9: Drilling template

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