

WAGO Industrial Switches



852-1106 Industrial Switch 16 Ports 1000BASE-T

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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 “Industrial Switch” (852-1106).

This documentation is only applicable from .

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., 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 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).

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 directly 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 Package Contents

- One Industrial Switch
- DIN rail bracket
- Protective caps for unused ports

3.2 Industrial ETHERNET Technology

The range of WAGO Switches ensures scalability of your network infrastructure with outstanding electrical and mechanical characteristics. These rugged devices are designed for industrial use and are fully compliant with the IEEE 802.3, 802.3u, 802.3ab, 802.3az, 802.3x and 802.1p standards.

They have power supply with a supply voltage range of 12 ... 60 V.

Characteristics such as auto-negotiation and auto MDI/MDIX (crossover) on all 10/100/1000BASE-T ports are also 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 Autonegotiation

Autonegotiation allows the switch to detect the transmission rate and operating mode for each port and the connected subscriber or subscribers, and to set them automatically. The highest possible mode (transmission speed and operating mode) is set.

Autonegotiation is available to ETHERNET subscribers connected to the switch via copper cable.

This make the switch a plug-and-play device.

3.5 Autocrossing

Autocrossing (MDI/MDI-X, "Medium Dependent Interface") automatically reconfigures the receive and transmit signals for twisted-pair interfaces as needed. This allow users to use wired and crossover cables in the same manner 1:1.

3.6 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.

3.7 Store-and-forward switching mode

In “Store and Forward” mode, the ETHERNET switch caches the entire data telegram, checks it for errors (CRC checksum) and if there are no errors, puts it in a queue. Subsequently, the data telegram (MAC table) is selectively forwarded to the port that has access to the addressed node.

The time delay required by the data telegram to pass the store-and-forward switch depends on the telegram length.

Advantage of “Store and Forward”:

The data telegrams are checked for correctness and validity. This prevents faulty or damaged data telegrams from being distributed via the network.

3.8 Line Depth in PROFINET

Line depth (cascading) is the number of all switches in a communication path.

The maximum line depth depends on the send cycle and the switch mode used.



Note

Observe line depth!

Observe the maximum line depth for switches in Store-and-Forward mode according to the “Topology Check” section of PI-PROFINET Commissioning Guideline (PROFINET_Commissioning_8081) (www.profibus.com).

3.9 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 852-1106 is an industrial ETHERNET switch with 16 10/100/1000BASE-T ports, with auto-negotiation and auto-MDI-/MDI-X detection at every port.

Using the industrial switch's 16 ports, several segments can be set up for reducing network load and a dedicated bandwidth assigned to each user node.

The 852-1106 is a cost-effect solution to keep up with the constant demands of IP-based, industrial communication needs.

The industrial switch has a rugged housing, redundant power supply and function monitoring with a relay. These functions make it ideal for a wide range of applications.

4.1 View

4.1.1 Front View

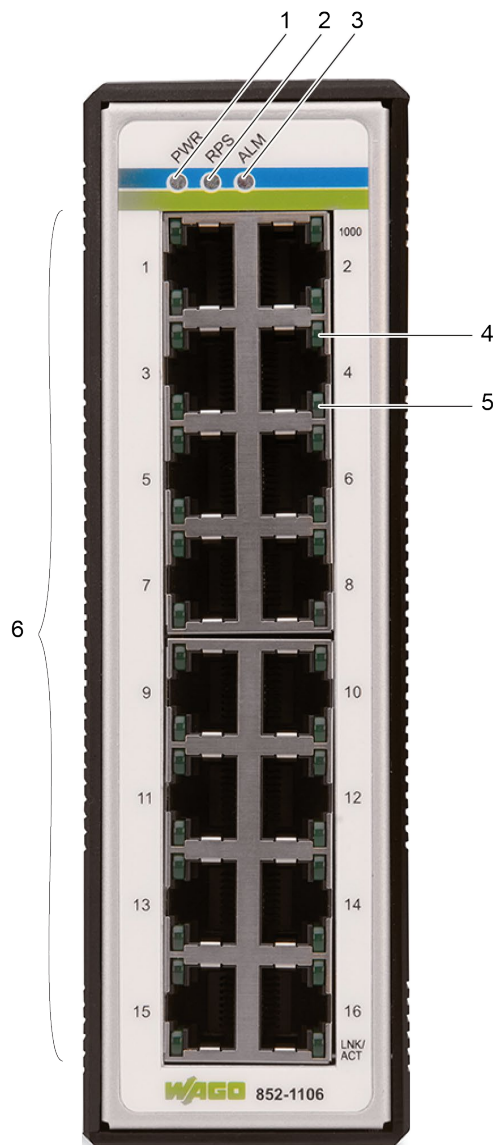


Figure 1: Front View of the Industrial Switch

Table 3: Legend for Figure “Front View of the Industrial Switch”

Pos.	Description	Meaning	Details see Section
1	PWR	Status LED Power Supply	“Device Description” > “Display Elements”
2	RPS	Status LED Redundant Voltage Supply	“Device Description” > “Display Elements”
3	ALM	Status LED Alarm	“Device Description” > “Display Elements”
4	-	Status LED T-Port 1000 Mbit/s (1 LED for each port)	“Device Description” > “Display Elements”
5	-	Status LED T-Port LNK/ACT (1 LED for each port)	“Device Description” > “Display Elements”

Table 3: Legend for Figure "Front View of the Industrial Switch"

Pos.	Description	Meaning	Details see Section
6	-	Port 16 x RJ-45 (10/100/1000BASE-T-Ports)	"Device Description" > "Connectors"

4.1.2 Top View

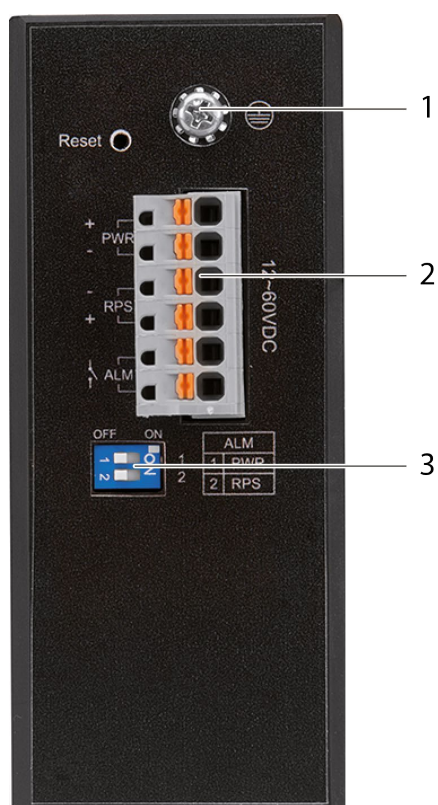


Figure 2: Top View of the Industrial Switch

Table 4: Legend for Figure "Top View of the Industrial Switch"

Pos.	Description	Meaning	Details see Section
1	-	Grounding screw	-
2	-	Terminal block (male connector) for power supply (PWR/RPS/ALM) and potential free alarm contact	"Device Description" > "Connectors"
3	-	Alarm selector	"Device Description" > "Operating elements"

4.2 Connectors

4.2.1 Grounding screw

The switch must be grounded. Connect the grounding screw to the ground potential. Do not operate the switch without an appropriately installed protective earth conductor.



Figure 3: Grounding screw

4.2.2 Power Supply (PWR/RPS)

The female connector (Order No. 2231-106/026-000) can easily be connected to the 6-pole male connector located on the top of the switch.

The male connector shows the following pin assignment:

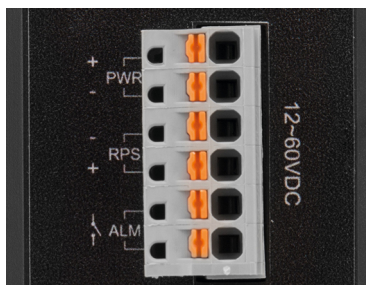


Figure 4: Power Supply (PWR/RPS) Port

Table 5: Legend for Figure "Power Supply (PWR/RPS) Port"

Pin	Description	Meaning
+	PWR	Primary DC input
-	PWR	Primary DC input
+	RPS	Secondary DC input
-	RPS	Secondary DC input
	ALM	Contact for external Alarm
	ALM	Contact for external Alarm



NOTICE

Damage to Property Caused by Electrostatic Discharge (ESD)!

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

4.2.3 Network Connections

The industrial switch uses ports with copper connectors that can be used with ETHERNET and/or Fast ETHERNET protocols.

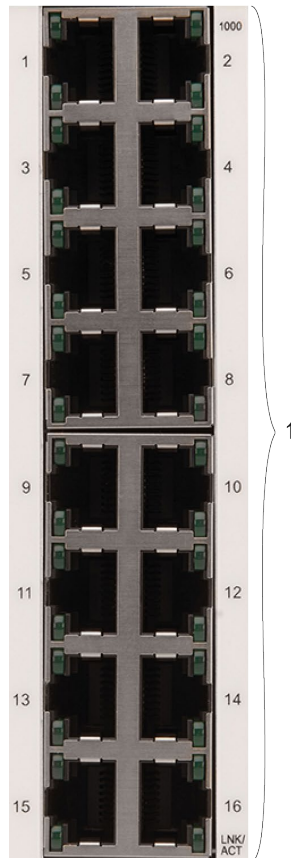


Figure 5: Network Connections

Table 6: Legend for Figure "Network Connections"

No.	Description	Meaning	Details see Section
1	-	Connection 16 x RJ-45 (10/100/1000BASE-T ports)	"Device Description" > ... "10/100/1000BASE-T ports"

4.2.3.1 10/100/1000Base-T

The 10/100/1000Base-T ports support network speeds of 10 Mbit/s, 100 Mbit/s and 1000 Mbit/s and can be operated in half and full-duplex transmission modes. These ports also provide automatic crossover detection (Auto-MDI/MDI-X), with plug&play capabilities. Simply plug the network cables into the ports; they then adapt to the end node devices. We recommend the following cable for the RJ-45 ports:

- 100 m – Cat 5e or higher

4.3 Display Elements

The industrial switch is equipped device LEDs and port LEDs. You can see the status of the industrial switch at a quick glance of the device LEDs, while the port LEDs provide information about connection actions.

4.3.1 Device LEDs



Figure 6: Device LEDs

Table 7: Legend for Figure "Device LEDs"

LED	Name	Status	Description
PWR	Primary Power LED	Green	The primary supply voltage is connected to the industrial switch.
		Off	The primary power supply is off or has an error.
RPS	Redundant Power System LED	Green	The secondary supply voltage is connected to the industrial switch.
		Off	The redundant power supply has been switched off or a fault has occurred.
ALM	Alarm LED	Red	Lights up when power supply error.
		Off	No alarm to report.

4.3.2 Port LEDs

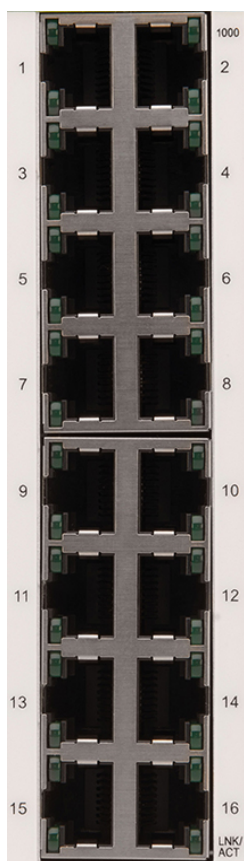


Figure 7: Port LEDs

Table 8: Legend for Figure "Network LEDs"

LED	Name	Status	Description
1000	TX Port 1000 Mbit/s LED (1 LED for each port)	Green	Port in operation at 1000 Mbit/s.
		OFF	Connection in operation at less than 1000 Mbit/s.
LNK/ ACT	LNK/ACT LED (1 LED for each port)	Green	Port in operation at 1000 Mbit/s.
		Green flashing	Data traffic being routed over the port.
		OFF	No proper link established at the port.

4.4 Operating Elements

4.4.1 DIP Switches

On the top side of the industrial switch there are DIP switches to configure the alarm and arbiter configurations.

The meaning of the DIP switch settings are described below:



Figure 8: DIP Switches

Table 9: Legend for Figure "DIP Switches"

No.	Name	Status	Description
1	PWR	ON	The alarm reporting function for the primary power supply is activated.
		OFF	The alarm reporting function for the primary power supply is deactivated.
2	RPS	ON	The alarm reporting function for the secondary power supply is activated.
		OFF	The alarm reporting function for the secondary power supply is deactivated.

The external alarm and the redundant power supply can be manually switched on and off by DIP switches.

DIP switch must be set to "ON" position in order to activate the alarm function. Default setting is "OFF".

The following is the Recommended Procedure for configuring and setting DIP switches during initial installation:

1. Turn all DIP switches "OFF".
2. Install the industrial switch into your network.
3. Turn the corresponding port DIP switch "ON".
4. Activate the industrial switch.

4.5 Label

4.5.1 Hardware and Software Version

There is a label with the serial no “SN” on the back of the industrial switch.

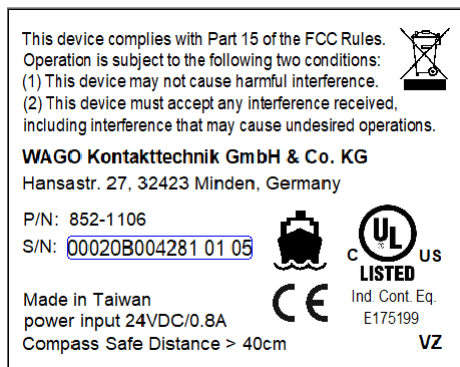


Figure 9: Label

Table 10: Legend for Figure “Label (Example)”

No.	“SN” Description
01	Firmware version (left number sequence)
05	Hardware version (right number sequence)

4.6 Technical Data

4.6.1 Device Data

Table 11: Technical Data - Device Data

Width	Carrier rail mounting	50 mm
Height	Carrier rail mounting	162 mm (from the top edge of the carrier rail)
Length	Carrier rail mounting	120 mm
Weight		920 g
Degree of protection		IP30

4.6.2 Power Supply

Table 12: Technical Data – Power Supply

Supply voltage	12 ... 60 VDC (CE, UL) 24 V DC (DNV GL) 12/24/48 V DC (LR)
Power consumption, max.	12 W

4.6.3 Communication

Table 13: Technical Data – Communication

Ports	16 x 10/100/1000BASE-T (RJ-45)
Standards	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX/FX IEEE 802.3ab 1000BASE-T IEEE 802.3x Flow Control IEEE 802.3az Energy Efficient Ethernet IEEE 802.1p CoS Prioritization
PROFINET	Conformance Class A (CC-A)
Topology	Star, Tree, Line

4.6.4 Alarm contact

Table 14: Technical Data – Alarm contact

Switching current	0.5 AAC/125 V 1 ADC/30 V
Max. Switching voltage	250 VAC/2 A 220 VDC
Pull-in time max.	6 ms
Drop-out time max.	4 ms

4.6.5 Environmental Conditions

Table 15: Technical Data - Environmental Conditions

Surrounding air temperature (operation)	-40 ... +70 °C (CE, UL) -25 ... +70 °C (DNV GL) +5 ... +70 °C (LR)
Surrounding air temperature (storage)	-40 ... +80 °C
UL 61010 Use Pollution degree	Indoor 2
Relative humidity (without condensation)	5 ... 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
Compass safe distance	> 40 cm

4.7 Approvals

The following approvals have been granted for the WAGO ETHERNET accessory product “Industrial Switch” (852-1106):


 Conformity Marking


 Ordinary Locations UL61010-2-201 (E175199)

Table 16: Assignment UL – Hardware Version

Approval	Hardware Version
UL	valid from version 04

The following ship approvals have been granted for the WAGO ETHERNET accessory product “Industrial Switch” (852-1106):

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

 LR (Lloyd’s Register) Env. 1, 2, 3

Note



Applicable from HW 05!

This ship approvals are only applicable from HW 05. Switches with hardware version 04 do not have ship approvals!

The hardware versions 04 and 05 are technically identical.
For hardware version 05, the label and the operating and assembly instructions have been adapted to the requirements of the ship approvals.

5 Mounting

5.1 Installation site

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

- Install the industrial switch at an appropriate place. See section “Device Description” > ... > “Technical Data” for the acceptable temperature and humidity operating ranges.

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



CAUTION

Personal Injury Caused by Hot Surface!

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

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

5.3 Removal from DIN-Rail

To remove the industrial switch from the DIN rail, insert a suitable tool into the metal tab under the switch and deflect the metal tab downward.

You can then release the switch down from the DIN rail and remove it upwards.

6 Connect Devices

6.1 Power Supply

The industrial switch uses direct-current power supply for 12 ... 60 V.

The primary network link is established via a 6-pin plug-in connection located on the top of the industrial switch.

The female connector (order-no. 2231-106/026-000) is composed of six connecting terminals and can be inserted and removed easily by hand to connect to the 6-pin plug connector located on the top of the switch.

1. Connect a suitable grounding conductor to the grounding lug on the top of the switch.

Note



Ground for the switch

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

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

2. Plug the female connector into the male connector of the switch if it has not already been plugged in. Check the tight fit of the multipoint connector by gently shaking it.
3. PWR +/-:
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.
4. Check whether the power LED "PWR" 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.
5. RPS +/-:
To connect or disconnect the conductors, actuate the spring in the female connector directly using a screwdriver or an operating tool and insert or remove the conductor.
6. Check whether the power LED "RPS" 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 Appendix

7.1 RJ-45 Cable

Always use category 5e cables to connect your network devices. The pin assignment is given below:

Table 17: RJ-45 Cable

Contact	Description		Pair	Color (acc. EIA/TIA 568B)
	4-wire	8-wire		
1	TD	D1+	2	White/Orange
2	TD-	D1-	2	Orange
3	RX+	D2+	3	White/Green
4	Not assigned	D3+	1	Blue
5	Not assigned	D3-	1	White/Blue
6	RX-	D2-	3	Green
7	Not assigned	D4+	4	White/Brown
8	Not assigned	D4-	4	Brown

Note



Functions on the RJ45 connector

The industrial switch offers the functions autocrossing und autonegotiation to the RJ-45 connection.

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