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Quickstart Guide
Ethernet Cable Guard

Order number: 700-200-LAN01

Version
1 en

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1 Safety instructions

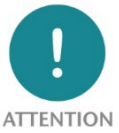
Target audience

This description is only intended for trained personnel qualified in control and automation engineering who are familiar with the applicable national standards. For installation, commissioning, and operation of the components, compliance with the instructions and explanations in this operating manual is essential. The specialist personnel is to ensure that the application or the use of the products described fulfills all safety requirements, including all applicable laws, regulations, provisions, and standards.

Intended use

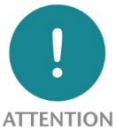
The device has a protection rating of IP 20 (open type) and must be installed in an electrical operating room or a control box/cabinet to protect it against environmental influences. To prevent unauthorized operation, the doors of control boxes/cabinets must be closed and possibly locked during operation. The consequences of improper use may include personal injury to the user or third parties, as well as property damage to the control system, the product, or the environment. Use the device only as intended!

Operation



Successful and safe operation of the device requires proper transport, storage, setup, assembly, installation, commissioning, operation, and maintenance. Operate the device only in flawless condition. The permissible operating conditions and performance limits (technical data) must be adhered to. Retrofits, changes, or modifications to the device are strictly forbidden.

Security



The device is a network infrastructure component and therefore an important element in the security consideration of a plant. When using the device, therefore, observe the relevant recommendations to prevent unauthorized access to installations and systems.

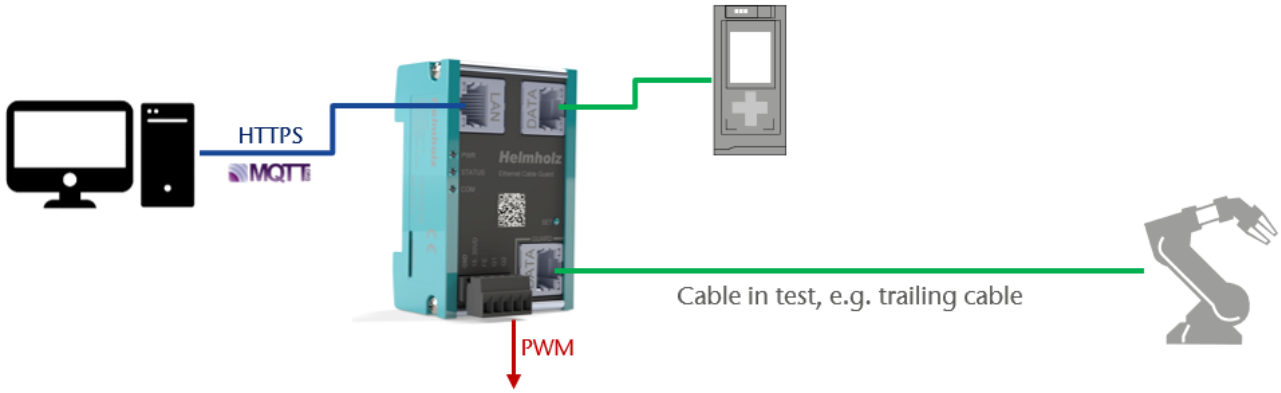
2 Introduction

This document explains the initial commissioning of the Ethernet Cable Guard. The latest version of the documentation can be found at www.helmholz.de or scan the QR code directly.

3 Function of the Ethernet Cable Guard

The Ethernet Cable Guard enables the service life monitoring of Ethernet data cables (100Base-TX) with a focus on dynamic applications in automation technology, such as a trailing cable to moving machine parts (robots). With the Ethernet Cable Guard, system availability can be increased, and downtimes can be planned. This enables a significant reduction in maintenance costs.

The Cable Guard is looped into the cable harness to be monitored and can provide information about the quality of the cable connection via a status LED, a separate network connection or a digital output. The feedback can be displayed as a PWM signal at the output. The alarm limit value can be set individually ("lifetime" 99 - 50 %).



For integration into IIoT structures, the monitored cable status can also be sent via MQTT by the Cable Guard.

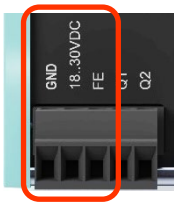
The particularly compact design is suitable for use in decentralized control cabinets and can be mounted on standard DIN rails.

The Cable Guard is also suitable for EtherCAT, EtherNet/IP and 2-pair PROFINET applications.

4 Connection

4.1 Power supply

The Cable Guard be supplied with DC 24 V at the wide-range input DC 18 ... 28 V via the supplied connector plug.



The housing of the Cabel Guard is not grounded. Please connect the functional earth terminal ("FE") of the PN/PN Coupler properly to the reference potential.

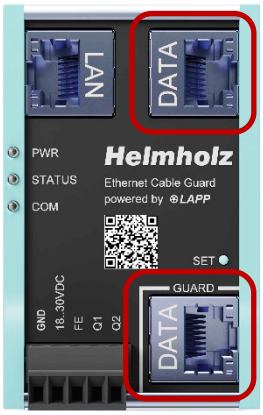
The device is intended to be supplied by an isolated Limited Energy Source according to UL61010-1 (3rd ed cl. 9.4) or according to UL60950-1/UL62368-1 or Class 2 according to NEC. Please use Cu power supply wires, AWG 28-12. Maximum length of removed insulation is 10 mm. Temperature cable rating is 87 °C.

4.2 Network

The Cable Guard has two "DATA" RJ45 connections for the link to be monitored.

The cable to be monitored (e.g. a trailing cable) must be connected to the lower connection ("Guard"). The upper DATA connection should then be connected to the communication partner (e.g. the control unit) using another standard industrial Ethernet cable.

The Cable Guard is thus looped into the cable to be monitored via these two connections.



NOTE

The cable measurement is carried out at the lower "Guard DATA" connection over the entire cable (minimum length 2 m) up to the connected communication partner. The Cable Guard does not change the content of the data transmission between the DATA connections.

WARNING

Data transmission between the two DATA connections only works if the Cable Guard is supplied with power and is in normal operating mode!

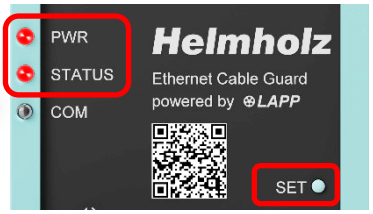
The left RJ45 Ethernet socket "LAN" is used to connect a TCP/IP network for accessing the web interface and sending MQTT messages.

5 Initial commissioning

Please connect the device to the power supply. Please also note the information above on using the functional earth (FE).

As soon as the DATA connections are connected via Ethernet cables and the links are in place (see ports of the RJ45 connections), a teach-in must be carried out for the device to function correctly (this also applies to any cable replacement).

To do this, press the SET button for 20 seconds. As soon as the PWR and STATUS LEDs light up red continuously, the teach-in is started. Now release the SET button. The PWR LED now lights up green and the status LED flashes green, the teach-in is carried out and the cable is now calibrated.



Once the teach-in process is complete, the PWR and STATUS LEDs light up green continuously. This is the normal operating status of the device. Monitoring of the cable is now active.

The teach-in values are permanently stored in the device and are retained even in the event of a power failure or a firmware update (software update).

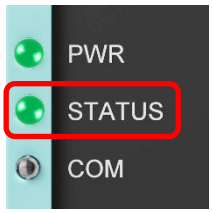
The teach-in process is only necessary after reinstalling the Cable Guard or after replacing the cable.

The status of the line is displayed via the STATUS LED:

Green = The cable is OK

Flashing red = Maintenance of the cable is required (plan replacement)

Permanently red = The cable is defective



WARNING

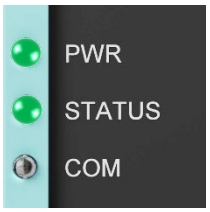
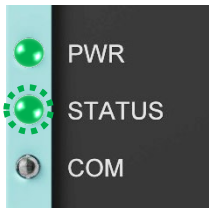
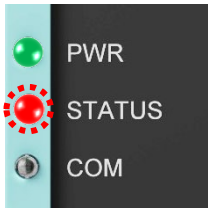
Data transmission between the two DATA connections only works if the Cable Guard is supplied with power and is in normal operating mode!

Further configuration and more information about the status of the Cable Guard can be found on the device's website.

NOTE

If the Cable Guard is restarted after a teach-in or if there has been a power failure, the measurement takes a few seconds until a measured value is available again. This is indicated after the restart by a green flashing STATUS LED (initialization).

5.1 Display of the operating statuses via the LEDs

Ready for operation & Line is OK: PWR and STATUS are permanently green 	**Teach-In / Initialization:** PWR is permanent green STATUS flashes green 
Maintenance required: PWR is permanent green STATUS flashed red 	**Cable defective:** PWR is permanent green STATUS is permanent red
No teach-in performed: Only PWR is green 	**Teach-in faulty:** PWR flashes alternately red/green

6 Website

6.1 Access to the website

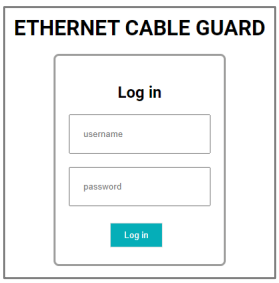
Connect the LAN interface of the Cable Guard to your PC using a standard Ethernet cable. When accessing the website for the first time, set your PC interface to the appropriate subnet, e.g. with the IP address 192.168.0.1 with subnet mask 255.255.255.0 for LAN access.

Open the website in a current browser with "https://192.168.0.32".

NOTE

For security reasons, the web interface can only be accessed via a secure HTTPS connection. To access the website, an exception rule may need to be confirmed in the browser. In the "Settings" menu, you can store your own certificate for securing the connection if required.

When you log in for the first time, you will be asked to set a password for the default user "admin". The password must be at least 8 characters long.



WARNING

Please memorize the password well! For security reasons, there is no way to reset the password without resetting the device to factory settings.

6.2 Main view

After logging in, the Cable Guard "Home" website always opens.

The main view contains information about the device and cable status.

The menu on the left-hand side contains additional functions for further configuration or firmware updates

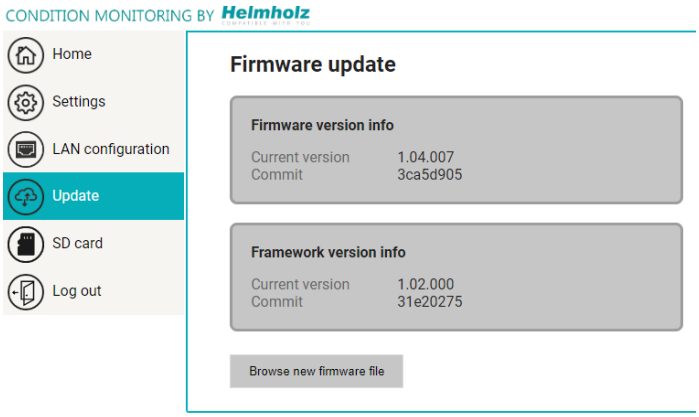
For further information on the configuration options, please refer to the manual.

6.3 Firmware Update

The firmware update can be accessed on the web interface via the "Update" menu item.

The current firmware version is displayed and a new firmware can be uploaded to the device using the "Browse new firmware file" button.

The Cable Guard saves the firmware file in its internal memory. After the device is restarted, the firmware is checked. If the content is correct, the firmware is used, otherwise the device is restarted with the old firmware.



ACHTUNG

Operation of the Cable Guard is interrupted during the update process.
Data transmission between the two DATA connections is interrupted during the update.

Do not switch off the device during the update process! Switching off the power supply can destroy the device.

All settings, the teach-in values and the current measurement of the cable are not changed by the firmware update.

6.4 Factory Reset

The Cable Guard can be reset to factory settings using the "SET" button when the device is switched on.

When the Cable Guard is reset, the complete configuration and all measurement data are irretrievably deleted and IP settings are reset to the factory settings. The firmware remains up to date.

To activate a reset to factory settings, disconnect the Cable Guard from the power supply. Now press and hold the SET button and switch the power supply back on. After 8 seconds, the PWR LED flashes alternately red/green.

Now release the SET button. The factory reset is now performed, and the Cable Guard then restarts.

7 Technical data

Order number	**700-200-LAN01**
Name	Ethernet Cable Guard
Scope of delivery	Ethernet Cable Guard with power supply plug
Dimensions (D x W x H)	35 x 48,5 x 75,5 mm
Weight	Approx. 110 g
LAN interface	
Number	1
Connection	RJ45
Transmission rate	10/100 Mbit/s, full duplex
Protocols	HTTPS web access, MQTT V3.1.1 & V5
DATA Interface	
Number	2, IN / OUT („Guard“)
Connection	RJ45
Transmission rate	100 Mbits/s (100BaseTX)
Delay	735 ns at 100 Mbit/s
Outputs (Q1 / Q2)	
Number	2
Type	Q1: Push-Pull (NO) / Q2: Push-Pull (PWM)
Current	Max 0,2 A
Protection	Overload protection, short-circuit protection
Status indication	
Function status	3 LEDs
Ethernet status	6 LEDs
Power supply	
Voltage supply	24 V DC (18 ... 30 V DC)
Current dray	max. 75 mA at 24 V DC
Power dissipation	Max. 1.9 W
Ambient conditions	
Ambient temperature	-40° C bis 65° C
Transport and storage temp.	-40° C bis 80° C
Relative air humidity	95% r H without condensation
Protection rating	IP20
Pollution degree	2
Mounting position	As desired
Approvals	CE

NOTE

The contents of this Quick Start Guide have been checked by us to ensure that they match the hardware and software described. However, we assume no liability for any existing differences, as these cannot be fully ruled out. The information in this Quick Start Guide is, however, updated on a regular basis. When using your purchased products, please make sure to use the latest version of this Quick Start Guide, which can be viewed and downloaded on the Internet from www.helmholz.de.

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