



Quick Start Guide PROFINET Switch 4/8/16-port

Version

5_{en}

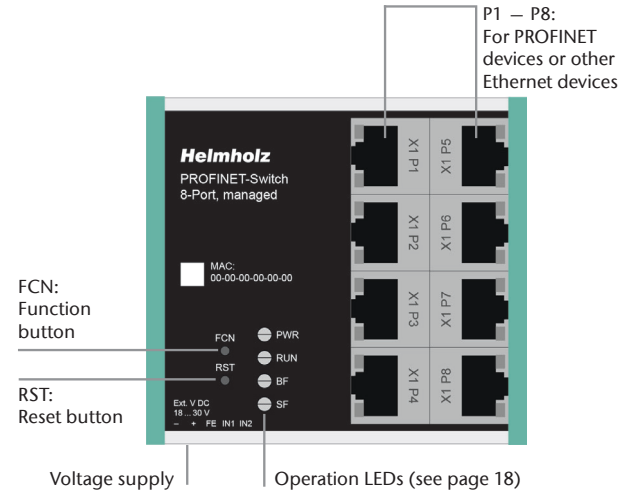
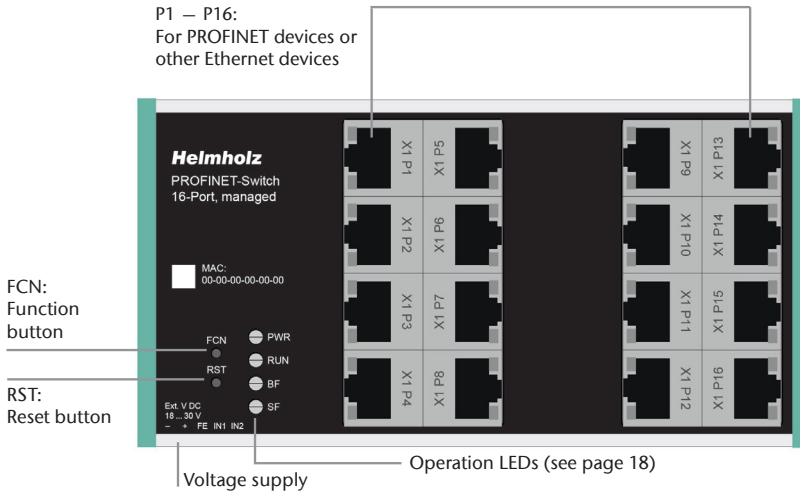
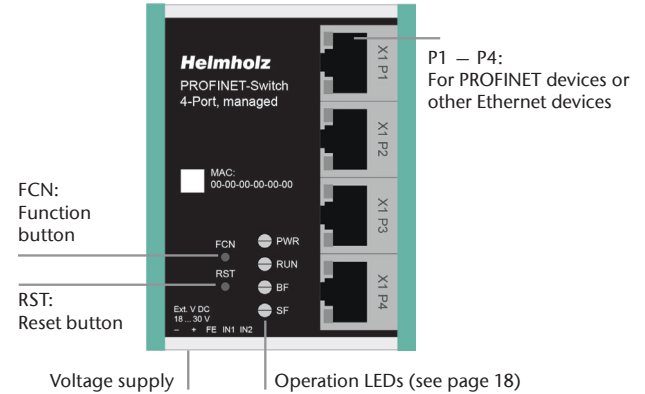
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1. Introduction

Please note: Please observe the safety instructions for the product, which can be found in the manual. You can find the manual on the accompanying CD or it can be downloaded from the website www.helmholz.de in the download area.

This document should explain the initial commissioning of the PROFINET switch for use in a PROFINET project.



2. Preparing the PROFINET switch

2.1 Connection

The PROFINET switch must be supplied with 24 V DC at the wide range input 18 – 30 V DC via the provided connector plug. The terminal (FE) is for the functional ground. Connect this correctly with the reference potential.

The RJ45 sockets “P1 – P4” (4-port switch), “P1 – P8” (8-port switch) and „P1 – P16“ (16-port switch) are used for connecting other PROFINET or Ethernet devices.

2.2 Install GSDML file

The GSDML file can be found on the enclosed CD or in the download area of the PROFINET switch at www.helmholz.com.

3. Project planning for PROFINET switch

Following installation, the PROFINET switch can be found in the hardware catalog under "PROFINET IO → Additional Field Devices → Network Components → Helmholz PN-Switch". Add the "PROFINET-Switch, 4-port", „PROFINET-Switch, 8-port“ or „PROFINET-Switch, 16-port“ device to the project and connect it with your PROFINET network.

The screenshot shows the HW Config software interface. On the left, a rack configuration table is visible:

(0) UR	
1	
2	CPU315-2PNDP
X1	MPI/DP
X2	PN-IO
X2 P1 R	Port 1
X2 P2 R	Port 2
3	
4	DO32xDC24V/0.5A
5	DO 8xRelais, bistabil
6	SAS341-1
7	CAN 300 PRO
8	
9	
10	
11	

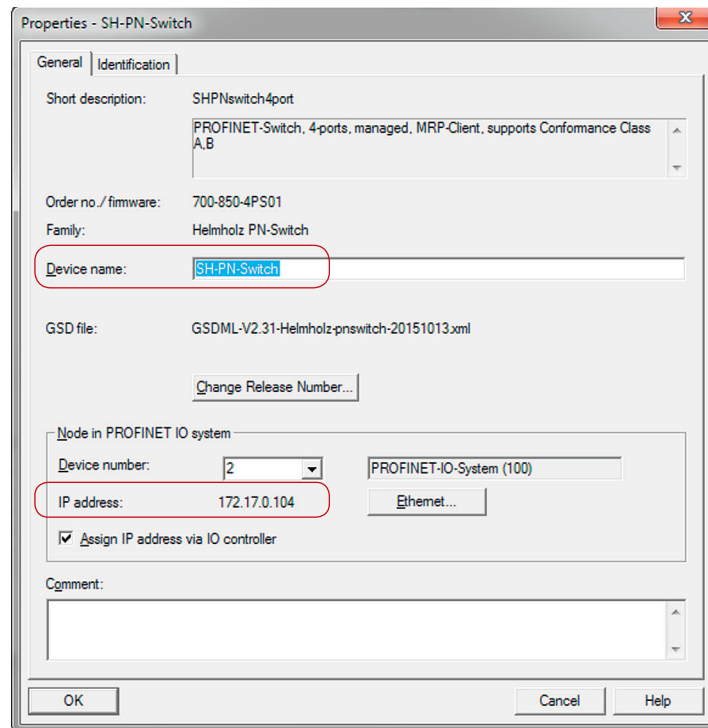
In the center, a network diagram shows a PROFINET IO system (100) connected to two devices: (10) PNPnc and (1) PNswitch. A red arrow points from the PNswitch device in the diagram to the corresponding entry in the hardware catalog on the right.

The hardware catalog on the right shows the following structure:

- PROFIBUS DP
- PROFIBUS-PA
- PROFINET IO
 - Additional Field Devices
 - Gateway
 - I/O
 - Network Components
 - Helmholz PN-Switch
 - PROFINET-Switch, 4-port
 - PROFINET-Switch, 8-port
 - Gateway
 - HMI
 - I/O
 - Ident Systems
 - Network Components
 - Sensors
 - Switching devices
- SIMATIC 300

By calling up the object properties, you can assign the PROFINET switch a unique PROFINET name and check the IP address for plausibility in the project.

Important: *The physical device must later be assigned the same name as in the project. See also Chapter 6.*

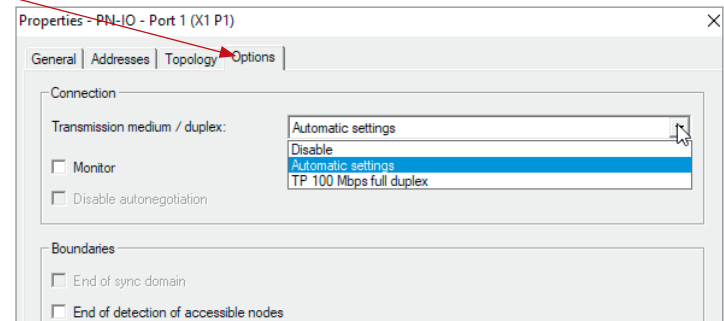


4. Setting the port properties

Each port of the PROFINET switch can be individually configured.

← → (2) SH-PN-Switch

Slot	Module	Order number	I Address	Q address	Diagnostic Address	Comment
0	SH-PN-Switch	700-850-4PS01			2038*	
X1	PN-IO				2037**	
X1 P1	Port 1				2036**	
X1 P2	Port 2				2035**	
X1 P3	Port 3				2034**	
X1 P4	Port 4				2033**	



Transfer medium/duplex:

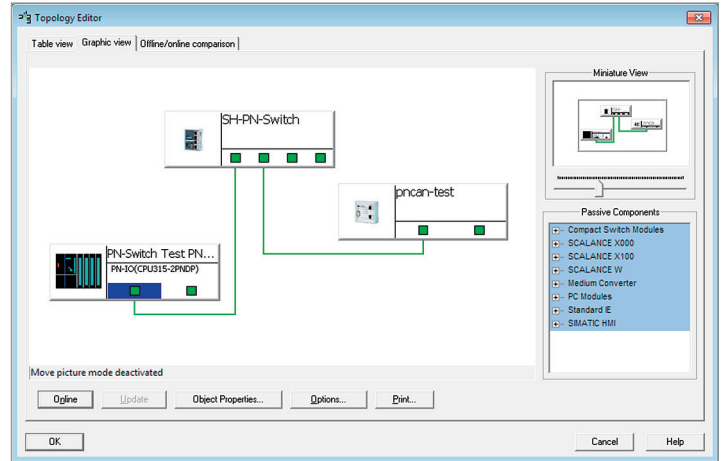
“disable”	The port is permanently switched off. This option is recommended when the port is not to be used. Unauthorized infiltration of the network is prevented.
“Automatic settings”	The port synchronizes itself automatically with the communication partner (auto-negotiation).
“TP 100 Mbps”	Fixed specification of the transmission rate. This option is recommended when connecting PROFINET IO devices.

5. Topology detection

The PROFINET switch supports the mechanisms for neighborhood detection (LLDP). With this function it is possible to detect the topology of a PROFINET network, or to specify it for purposes of checking for the correct structuring by the configuration.

If the topology was prescribed in the configuration, neighboring devices can also be assigned the PROFINET name in the event of the replacement of a device.

This function can be used for detecting the current network topology and for configuration of exchanged PROFINET-devices.



6. Assign the PROFINET switch a name

When the configuration of the PROFINET switch has been completed in the hardware configurator, it can be loaded into the PLC.

In order that the switch on the PROFINET can be found by the PROFINET controller, the PROFINET name must be set in the device.

To this purpose the function "Process Ethernet participant" is used in the SIMATIC¹ manager.

With the "Browse..." button, the network can be browsed for PROFINET participants.

The clear identification of the PROFINET switch is ensured here by the MAC address of the device.

Important: *The assigned name must agree with the name defined in the hardware configurator. See Chapter 3, pages 4/5*

If the PROFINET switch has been assigned the correct name, it is recognized and configured by the PLC.

If configuration has taken place correctly, the green "RUN" LED should be on and the "BF" and "SF" LEDs off.

Edit Ethernet Node

Ethernet node

Nodes accessible online

MAC address: 00-1B-1B-24-12-8D Browse...

Set IP configuration

Use IP parameters

IP address: Gateway

Subnet mask: Do not use router

Use router

Address: 172.17.0.100

Obtain IP address from a DHCP server

Identified by

Client ID MAC address Device name

Client ID:

Assign IP Configuration

Assign device name

Device name: SH-PN-Switch Assign Name

Reset to factory settings

Reset

Close Help

7. Media Redundancy Protocol (MRP)

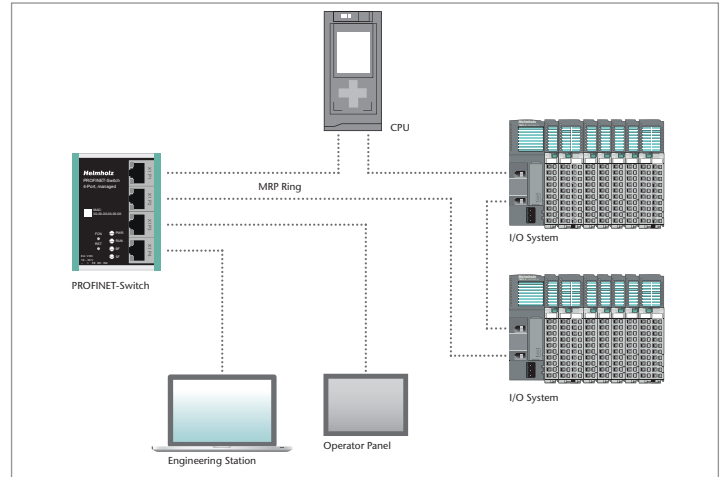
The PROFINET switch supports the optional media redundancy protocol (MRP) as MRP client. MRP enables ring wiring, which also makes operation of the PROFINET network possible in the event of the failure of a cable or of a participant.

There must be one MRP master (e.g. the CPU) in an MRP ring. All other participants of the ring are then MRP clients.

In order to assign the PROFINET switch to an MRP ring, the MRP domain must be set at slot X1 for the option "Media Redundancy".

Important: With the PROFINET switch 16-port it is currently only possible to use MRP ports between P1 to P8 or P9 to P16. MRP between the two port blocks is not possible, e.g. P1 and P16. This restriction is removed by a later firmware update.

Important: Connecting devices in ring topology without MRP roles configured on each and every device can result in malfunctions of the PN network!



← → (2) SH-PN-Switch

Slot	Module	...	Order number	I Address	Q address	Diagnostic Address	Comment
0	SH-PN-Switch		700-850-4PS01			2038*	
X1	PN-IO					2037*	
X1 P1	Port 1					2036*	
X1 P2	Port 2						
X1 P3	Port 3						
X1 P4	Port 4						

Properties - PN-IO (X1)

General | Addresses | IO Cycle | **Media Redundancy**

MRP Configuration

Instance: [v]

Domain: mprdomain-1

Role: Client

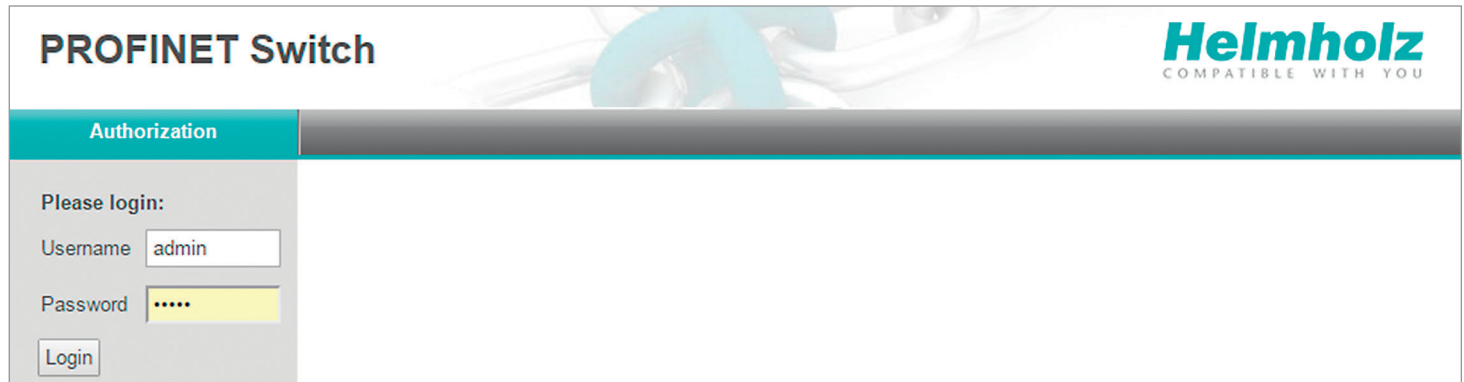
Ring port 1: (PN-IO)\Port 1 (X1 P1)

Ring port 2: (PN-IO)\Port 2 (X1 P2)

Diagnostic interrupts

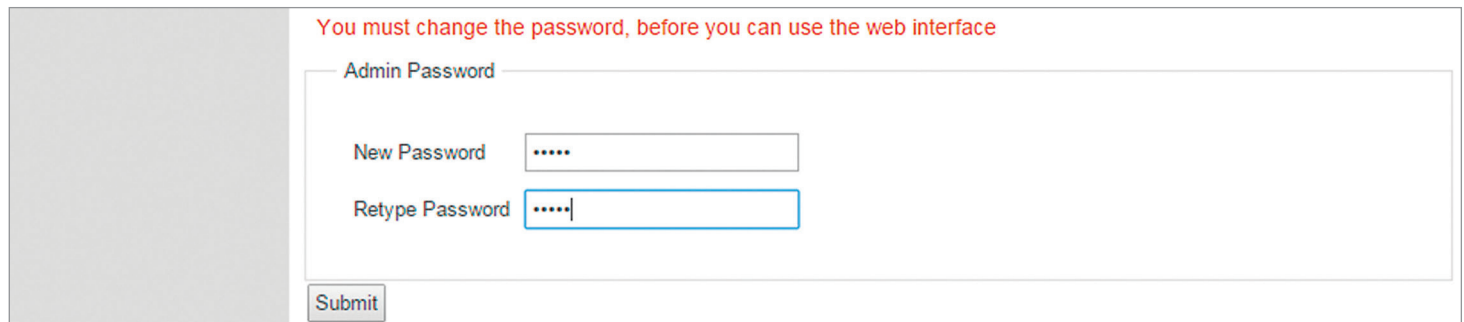
8. Diagnosis and configuration via the web interface

The web interface is also accessible under the IP address assigned to the PROFINET switch in the PROFINET network.



The screenshot shows the 'PROFINET Switch' web interface. At the top right is the 'Helmholz COMPATIBLE WITH YOU' logo. Below the title is a teal 'Authorization' header. The main content area is a light gray box with the text 'Please login:'. It contains a 'Username' field with 'admin' entered, a 'Password' field with five dots, and a 'Login' button.

When the web interface is first called up, the password of the “admin” user is the serial number of the device. The serial number is indicated on the right side of the housing (e.g., “50001234”). It is absolutely necessary to assign a new password following the first login:



The screenshot shows a password change screen. At the top, a red message reads: 'You must change the password, before you can use the web interface'. Below this is a form with three fields: 'Admin Password', 'New Password', and 'Retype Password'. The 'New Password' and 'Retype Password' fields contain five dots. A 'Submit' button is located at the bottom left of the form.


One goes to the system view following entry of the new password:

System	Agent	Switch	Statistics	
Status	System Status			
Network	Device Type:	Helmholz PN-Switch		
Restart	Device MAC:	24-EA-40-20-00-D0		
Password	Protocol Status:	Connected		
Event Log	System Failure:	no		
	System Time:	--/--/--- --:--:--		
	System Up Time:	0 days 00:12:03		

Note: If the PROFINET switch is configured and used in a PROFINET network, settings in the web interface are only to be viewed as a diagnosis. Non-configured settings acquired from PROFINET (Port Status, LLDP, DCP, Ring Redundancy) are then not possible in the web interface.


9. Switch diagnosis and settings

Extensive information and settings for the function of the switch are accessible in the Switch menu.

System	Agent	Switch	Statistics																										
Port Status	Port Status																												
Port Mirroring	<table border="1"><thead><tr><th></th><th>Status</th><th>Speed</th><th>Phys. Status</th><th>Link</th></tr></thead><tbody><tr><td>Port 1</td><td>Enabled ▼</td><td>Autoneg ▼</td><td>100 MB/FD</td><td>up</td></tr><tr><td>Port 2</td><td>Enabled ▼</td><td>Autoneg ▼</td><td>100 MB/FD</td><td>up</td></tr><tr><td>Port 3</td><td>Enabled ▼</td><td>Autoneg ▼</td><td></td><td>down</td></tr><tr><td>Port 4</td><td>Enabled ▼</td><td>Autoneg ▼</td><td>100 MB/FD</td><td>up</td></tr></tbody></table>					Status	Speed	Phys. Status	Link	Port 1	Enabled ▼	Autoneg ▼	100 MB/FD	up	Port 2	Enabled ▼	Autoneg ▼	100 MB/FD	up	Port 3	Enabled ▼	Autoneg ▼		down	Port 4	Enabled ▼	Autoneg ▼	100 MB/FD	up
	Status	Speed	Phys. Status	Link																									
Port 1	Enabled ▼	Autoneg ▼	100 MB/FD	up																									
Port 2	Enabled ▼	Autoneg ▼	100 MB/FD	up																									
Port 3	Enabled ▼	Autoneg ▼		down																									
Port 4	Enabled ▼	Autoneg ▼	100 MB/FD	up																									
ARP Table	Submit																												
LLDP																													
DCP																													
CoS																													

10. Port mirroring


In order to be able to carry out telegram analyzes or recordings, a port mirroring can be activated in the PROFINET switch. During port mirroring, the telegram traffic is completely mirrored from a “mirrored port” to the “monitor port”, where an analysis PC can record everything.

System	Agent	Switch	Statistics	
Port Status	Port Mirroring			
Port Mirroring	<input checked="" type="checkbox"/> Mirroring Enabled			
ARP Table	Mirrored Port <input type="text" value="1"/>			
LLDP	Monitor Port <input type="text" value="3"/>			
	Submit			

11. Statistics


Detailed statistics on the data transfer can be queried in the "Statistics" menu.

Among other things, the quality of the transmission can be monitored in the sub-menu "Statistics by Error".

System	Agent	Switch	Statistics			
Statistics By Size						
Statistics By Type						
Statistics By Error						
Received Packages By Size						
	64	65-127	128-255	256-511	512-1023	1024-max.
Port 1	2628	1575741	625	8	3	1
Port 2	2593	1551554	3	622	1	0
Port 3	0	0	0	0	0	0
Port 4	204	74	401	7	52	0
<input type="button" value="Refresh"/> <input type="button" value="Reset Statistics"/>						


12. Agents

To be able to see the basic information about the switch on the start page - before or without login - the option “System Status Without Login” can be selected. “Web Session Timeout” can be used to specify when an inactivity on the website should be automatically logged out for security reasons.

System	Agent	Switch	Statistics	
WEB	Agent Configuration			
I&M0	System Status Without Login <input checked="" type="checkbox"/>			
SNMP	Web Session Timeout (Minutes) <input type="text" value="10"/>			
Ring Redundancy	<input type="button" value="Submit"/>			


13. SNMP

The PROFINET switch supports SNMP ("Simple Network Management Protocol") in order to also enable the identification and diagnosis of the switch for IT administration tools.

System	Agent	Switch	Statistics	
CLI & WEB	SNMP Settings			
I&M0	System Contact	<input type="text" value="Muster GmbH"/>		
SNMP	System Name	<input type="text" value="Max Mustermann"/>		
Ring Redundancy	System Location	<input type="text" value="Maschine 7"/>		
	<input type="button" value="Submit"/>			

14. Setting the time

The PROFINET switch contains a system clock for the issuing of logs and alarm messages. This can be set either manually or automatically by an SNTP server.

System	Agent	Switch	Statistics							
Status	Base Configuration		Daylight Saving Time							
Network	Time Synchronization: <input type="text" value="Manual Setting"/>		<table border="1"><thead><tr><th>Year</th><th>Start</th><th>End</th></tr></thead><tbody><tr><td><input type="text" value="YYYY"/></td><td><input type="text" value="MMDDhh"/></td><td><input type="text" value="MMDDhh"/></td></tr></tbody></table>		Year	Start	End	<input type="text" value="YYYY"/>	<input type="text" value="MMDDhh"/>	<input type="text" value="MMDDhh"/>
Year	Start	End								
<input type="text" value="YYYY"/>	<input type="text" value="MMDDhh"/>	<input type="text" value="MMDDhh"/>								
Restart	Timezone Offset (Minutes): <input type="text" value="0"/>									
Password	<input type="button" value="Submit"/>		<input type="button" value="Submit"/>							
Event Log	Manual Time Setting									
Firmware	TIME (UTC): <input type="text" value="19"/> <input type="text" value="November"/> <input type="text" value="2015"/> <input type="text" value="13:16:00"/>									
Time	<input type="button" value="Submit"/>									

15. Resetting to factory settings

To reset the PROFINET switch to the delivery state, the "Factory Reset" function can be used in the web interface under "System" → "Restart".

Alternatively, the PROFINET switch can be reset by pressing and holding the "FCN" button while the device restarts. A restart can be carried out by switching the power supply off and on or by activating the RST button.

The successful resetting of the parameters and settings is acknowledged during the boot process by the SF LED lighting up.

16. Firmware update

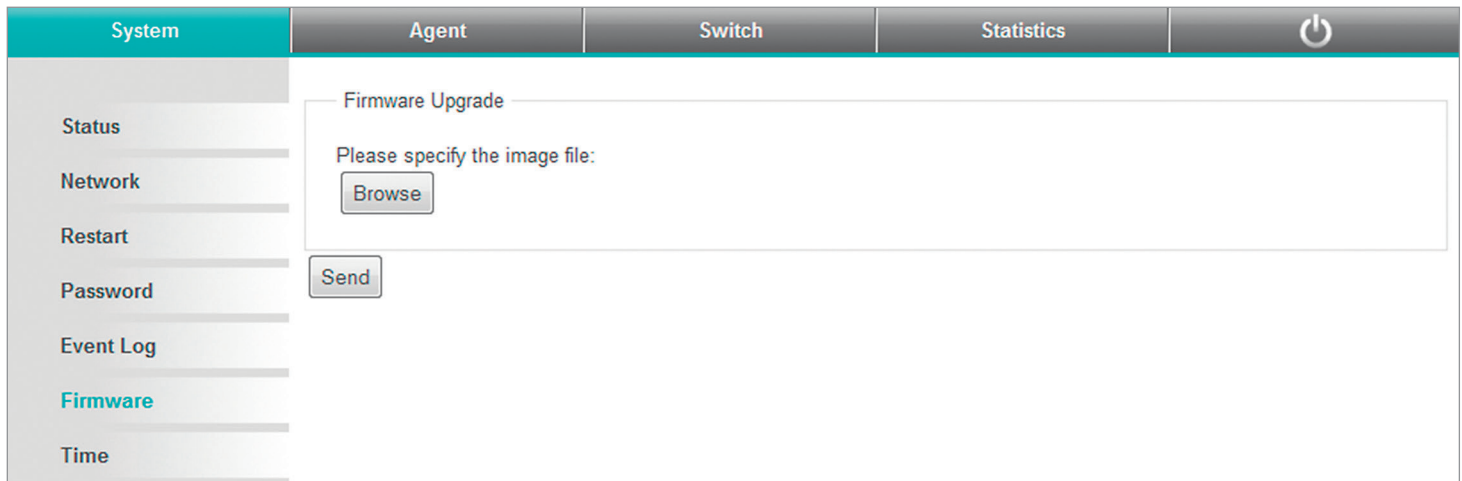
A firmware update can be carried out via the web interface. You are provided with the firmware update file by Helmholtz Support or in the download area of the PROFINET switch under www.helmholz.de.

The firmware update file can be selected in the menu "System → Firmware". The file has the ending "HUF" (Helmholz Update File).

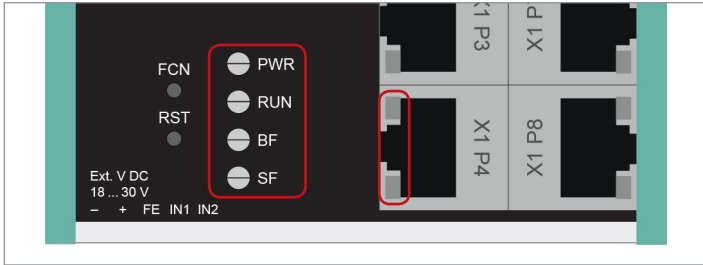
The firmware is transferred to the PROFINET switch and burned with the "Send" button.

The new firmware is active following a restart of the PROFINET switch.

Important: *Switching off the power supply during the update process can make the device unusable.*



The screenshot displays the web interface for the PROFINET switch. At the top, there is a navigation bar with tabs for "System", "Agent", "Switch", and "Statistics", along with a power icon. The "System" tab is active. On the left side, there is a sidebar menu with options: "Status", "Network", "Restart", "Password", "Event Log", "Firmware" (highlighted in blue), and "Time". The main content area shows the "Firmware Upgrade" section. It contains a text input field with the placeholder text "Please specify the image file:". Below this field is a "Browse" button. At the bottom of the section is a "Send" button.



17. LED status information

PWR

Off	No power supply or device defective
On	Device is correctly supplied with voltage

RUN

Flashing light	The device starts
On	The device is ready to operate

BF

On	The device has no configuration and/or there is no connection with the PROFINET controller
----	--

SF

On	A PROFINET diagnosis is available
----	-----------------------------------

RJ45 LEDs

Green (Link)	Connected
Orange (Act)	Data transfer at the network

Note: The LEDs "RUN", "BF" and "SF" all flash synchronously when the PROFINET function for device identification has been activated.

18. Button functions

FCN

The PROFINET switch can be reset to factory settings with the "FCN" button.

If the "FCN" button is pressed during the run-up time of the switch, the orange "SF" LED begins to flash. The blinking indicates that the switch will be immediately reset to factory settings and restarted as soon as the switch is released.

The run-up phase is indicated by the blinking of the "RUN" LED.

RST

The "RST" button triggers an immediate restart of the PROFINET switch, in the course of which all saved settings are retained.

19. Technical data

	PROFINET switch, 4-port, managed 700-850-4PS01	PROFINET switch, 8-port, managed 700-850-8PS01	PROFINET switch, 16-port, managed 700-850-16PS01
Dimensions (D x W x H)	32 x 59 x 76 mm	32 x 82 x 76 mm	32 x 146 x 76 mm
Weight	Approx. 130 g	Approx. 180 g	ca. 310 g
PROFINET ports			
- Protocol	PROFINET IO as defined in IEC 61158-6-10	PROFINET IO as defined in IEC 61158-6-10	PROFINET IO as defined in IEC 61158-6-10
- Physical layer	Ethernet	Ethernet	Ethernet
- Transmission rate	100 Mbps, full duplex	100 Mbps, full duplex	100 Mbps, full duplex
- Connection	4 x RJ45, integrated switch	8 x RJ45, integrated switch	16 x RJ45, integrated switch
- Features	Media Redundancy Protocol (MRP) Automatic addressing / topology detection (LLDP, DCP)	Media Redundancy Protocol (MRP) Automatic addressing / topology detection (LLDP, DCP)	Media Redundancy Protocol (MRP) Automatic addressing / topology detection (LLDP, DCP)
Status indicator	4 LEDs function status 8 LEDs Ethernet status	4 LEDs function status 16 LEDs Ethernet status	4 LEDs function status 32 LEDs Ethernet status
Voltage supply	DC 24 V (18 ... 30 V DC)	DC 24 V (18 ... 30 V DC)	DC 24 V (18 ... 30 V DC)
Current draw	Max. 100 mA with DC 24 V	Max. 110 mA with DC 24 V	Max. 290 mA DC 24 V
Power dissipation	Max. 2.4 W	Max. 2 W	Max. 5.5 W
Permissible ambient temperature	-40 °C ... +75 °C	-40 °C ... +75 °C	0 °C .. +60 °C
Transport and storage temperature	-40 °C ... +85 °C	-40 °C ... +85 °C	-40 °C .. +85 °C
Protection rating	IP 20	IP 20	IP 20
Certifications	CE, UL	CE, UL	CE
UL	UL 61010-1/ UL 61010-2-201	UL 61010-1/ UL 61010-2-201	–
- Voltage supply	DC 24 V (18 ... 30 V DC, SELV and limited energy circuit)	DC 24 V (18 ... 30 V DC, SELV and limited energy circuit)	–
- Pollution degree	2	2	–
- Altitude	Up to 2,000 m	Up to 2,000 m	–
- Temperature cable rating	87 °C	87 °C	–

Note:

The contents of this Quick Start Guide have been checked by us so as 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 at www.helmholz.com.

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