WAGO-SPEEDWAY 767

Manual

767-1201

FC PROFINET IO 8DI 24V DC

PROFINET IO Fielbus Coupler

Version 2.2.0

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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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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally protected by trademark or patent.

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1 Notes about this Documentation

The fieldbus coupler shall only be installed and operated in conjunction with these operating instructions and the system description.

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.

⚠ WARNING

Observe release notes!
Please note that, within the SPEEDWAY system, a function is provided **without restriction** only if all system's components have the same system-wide firmware release. Therefore, always observe the appropriate release notes on products used.

NOTICE

Supply layout!
In addition to these operating instructions, you will need the "WAGO *SPEEDWAY 767*, System Description and Information" manual, which can be downloaded at www.wago.com. There you will find information regarding supply layout, etc.

1.1 Validity of these Operating Instructions

These operating instructions are only applicable to the WAGO SPEEDWAY 767 Series fieldbus coupler FC PROFINET IO 8DI 24V DC, 767-1201.

1.2 Copyright

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
italic	Names of paths and data files are marked in italic-type. e.g.: *C:\Program Files\WAGO Software*
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 that serve to increase the efficiency of technical progress. 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 the module may only be carried out by electrical specialists with sufficient knowledge in automation. The specialists must be familiar with the current standards and guidelines for the module and automation environment.

2.1.3 Use in Compliance with Underlying Provisions

The fieldbus coupler for PROFINET IO serves to provide digital process data of digital and analog I/O modules. The data is gathered by the PROFINET IO Controller and made available to a control system for further processing.

The fieldbus coupler shall not be used to control safety-related functions; i.e., emergency-off devices shall not be operated with this fieldbus coupler.

The fieldbus coupler may only be operated in combination with components of the WAGO SPEEDWAY 767 Series.

The fieldbus coupler was developed for applications requiring IP 67 (NEMA type 6, 6P) protection.

The fieldbus coupler is expandable by a maximum of 63 I/O modules from the WAGO SPEEDWAY 767 Series.

Applications other than those described in this manual are not permitted.

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. WAGO Kontakttechnik GmbH & Co. KG will be exempted from any liability in case of changes in hardware or software as well as to non-compliant usage of devices.

Please send your request for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

2.2 Safety Advice (Precautions)

DANGER

Electric voltage!
Operate the 767 Series components exclusively with 24 VDC PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) voltage sources. Failure to comply may result in electric shock.

CAUTION

Hot connection sockets!
Even when taking into account derating, high surface temperatures on the metallic connection sockets and on the enclosure can arise during operation. If the 767 Series component has been in operation, allow it to cool off before moving it.

NOTICE

The highest current carrying capacity of the supply contacts is 4 A!
Always observe the maximum current carrying capacity per supply line (U_{LS}, U_A) for each 767 Series component and the overall power consumption for all 767 components. Neither of these values shall exceed 4 A since an increase in current causes the contacts to overheat and damages the 767 Series components. Information regarding the power demand of each 767 Series component can be found in the corresponding data sheet, which is available from www.wago.com.

NOTICE

Exposed connections!
If connections have not been closed with protective caps, liquid or dirt can penetrate the components of the 767 Series module and ruin it. Therefore, close all unnecessary connections with protective caps, which must be ordered separately, in order to maintain the IP67 degree of protection. (See section “Accessories” of the fieldbus coupler/controller manual.)

- Always keep the cover cap of the DIP switch closed.
- Disconnect the power supply from the system on which you wish to mount the 767 Series device.
- Observe the appropriate accident prevention regulations for your system during assembly, start-up, maintenance, and repairs. For example, BGV A3, “Electrical systems and equipment”.
- The operating instructions for the 767 Series module and the system description must be laid out ready on site.
- Observe the exact positioning (coding) between plug and socket.

- The 767 Series device shall not come into contact with substances having seeping and insulating properties. Otherwise, additional measures shall be taken for the device, such as installation of an enclosure that is resistant to the above-mentioned substance properties.
- Electronic components fulfilling the ESD requirements according to the IEC 61000-6-2 are integrated in the 767 device. As higher voltages may occur, under unfavorable circumstances, due to electrical charge in the field, discharge must be ensured before performing work on the 767 system.
- Ensure that the potential equalization is correctly laid out.
- Keep all cables a sufficient distance away from electromagnetic sources of interference in order to maintain a high level of interference resistance of the 767 system against electromagnetic emissions. Use only shielded cables at the necessary locations, and always observe the appropriate standards for EMC-suitable installations.
- For the power supply and for the S-BUS, use only pre-assembled WAGO system cables, so the specified characteristics of the technical data can be achieved.
- Replace defective or damaged modules (e.g., deformed connections), else function disruptions can occur in the respective fieldbus stations or nodes.
- When laying any cables, make sure that you do not lay them within the shear range of movable machine parts.
- For each activity, observe the corresponding personnel qualification in the corresponding section.
- Observe the marking on the front and rear side of the module.

2.3 Safety Equipment

All 767 Series products are designed to meet the requirements of IP67. This includes complete protection against accidental contact with electrical voltage and currents – even when wet.

2.4 Notes on Operation

When integrating the 767 module in your machine or system, all the currently applicable norms, regulations and guidelines shall be observed during all activities: for example, BGV A3, “Electrical systems and equipment”, DIN EN 418, EN 60204. The emergency stop equipment shall remain effective in all operating modes of the system and machine.

For protection from electromagnetic interferences

- Connect your system to protective earth (PE), and
- Ensure that the cable routing and the installation of the fieldbus cable, S-BUS cable, supply cable, and sensor or actuator cable are correct.

The following elements for 24 V supply shall be present:

- Outer lightning protection on buildings
- Inner lightning protection of supply lines and signal lines
- Safe electrical separation of low voltage 24 VDC through PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) voltage sources

2.5 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 System Description

The fieldbus has been established for many years in automation.
A fieldbus such as PROFIBUS assists in the transmission of local input and output signals. These communication systems have been further developed to the extent that, today, perfected technologies with optimized power are available.

ETHERNET-based communication systems are continuously gaining more meaning. These systems utilize the advantages of information technology, with such standards as ETHERNET or TCP/IP. Thus, improved communication possibilities are being unveiled in automation – including, for example, the integration of devices from the field level to the company management level using a fieldbus. However, even the administration of the network with SNMP and the use of web services for the diagnosis and maintenance of devices are characteristics of an ETHERNET-based fieldbus system.

PROFINET is an open and cross-vendor automation standard from the PROFIBUS User Organization. This fieldbus uses the experiences with PROFIBUS as well as the standardized functionalities from ETHERNET.

Characteristics of PROFINET

- Communication system for factory and process automation
- Integration of local field devices
- Real-time cabability (RT) and isochronic realtime cabability (IRT)
- Synchronous uses (motion control)
- Diagnostic capability of controller and device
- Network administration and diagnostics with IT services
- Cross-vendor engineering
- Safety-oriented communication (PROFIsafe)
- Uniform communication at all levels

PROFINET distinguishes the following types of devices:

- IO Controller
  Controller in which the automation program runs
- IO Device
  Locally assigned field device that is assigned to an IO Controller
- IO Supervisor:
  Programming device/PC with start-up and diagnostic functions

Cyclic user data and event-driven alarms are transmitted between the IO Controller and the IO Devices via the real-time channel. The transmission of information such as parameterization and configuration, as well as the reading of diagnostic information, is carried out via the standard channel based on UDP/IP.

Communication

The following protocols are available for ETHERNET-based communication:

- **TCP/UDP**
  Built on the Internet protocol, the TCP (“Transmission Control Protocol”) assumes the security of the data transfer through the network. In addition, the TCP produces a connection between two parties for the duration of the data transmission. The communication is carried out in a full-duplex operation, i.e. both parties can receive and send data simultaneously. The transmitted user data is supplied with a 16-bit checksum from the TCP, and each data packet contains a sequence number.
  Thus, it is ensured that the loss of TCP packets is detected and that they can be resent in the correct sequence, if necessary.

  The UDP protocol is responsible for the data transfer, as is the TCP protocol. In contrast to the TCP protocol, the UDP is not connection-oriented; that is, there are no control mechanisms for the data exchange between sender and receiver.The advantage of this protocol lies in the efficiency of the data that is to be transmitted, and therefore in the resultant higher processing speed.

- **DCP**
  The “Discovery and Configuration Protocol” makes it possible to set the station name or the IP address, which are necessary to enable a data exchange between the IO Controller and IO Device. Moreover, the DCP is used for the basic identification and configuration of a device.

Note

Additional information
Additional information and documents relating to PROFINET are made available by the PROFIBUS User Organization on its website: www.profibus.com**.**

4 Device Description

The fieldbus coupler serves to integrate I/O modules of series 767 into a PROFINET network. Based on IP class C, PROFINET IO structurally allows the connection of up to 253 fieldbus couplers with 63 I/O modules each.

Note

IP network
In an IP network, the addresses 0 and 255 are reserved. At least one other IP address is reserved for the IO Controller.

The maximum number of fieldbus couplers is dependent on the utilized IO Controller and the available user data of the connected I/O modules.

Every topology can be implemented in a PROFINET network. The two ETHERNET connections of the fieldbus coupler are internally connected via an ETHERNET switch. Therefore, you can integrate the fieldbus coupler not only in a network with star topology, but also with line topology. The maximum distance between two fieldbus couplers is 100 m. Up to 20 fieldbus couplers are cascadable, such that a maximum line of 2 km can be achieved.

In order to set up a connection with an IO Controller, the fieldbus coupler must be connected to a network with a transfer rate of 100 Mbit/s in full-duplex mode. A different network setup is not allowed according to PROFINET specifications for cyclic data exchange. For this reason, only switches are to be used in a PROFINET network.

An internal server is available to you for Web-based applications. In essence, HTML pages stored in the fieldbus coupler allow access to information on time settings and status of the fieldbus node via Web browsers.

Summary of fieldbus coupler properties:

- Eight digital inputs, type 1, 24VDC
- USB interface for service purposes, as well as parameterization and configuration
- Sealable operation panel for the operating mode switch and address switch (DIP switch)
- Modular and extendable by up to 63 external I/O modules
- Two ETHERNET connections connected internally via a switch
- Transfer rate of 100 Mbit/s, full-duplex
- Parameterization and configuration by means of GSDML or FDT/DTM (incl. diagnosis and simulation)

Detailed information regarding the fieldbus coupler can be found in section “Technical Data”.

4.1 Connectors

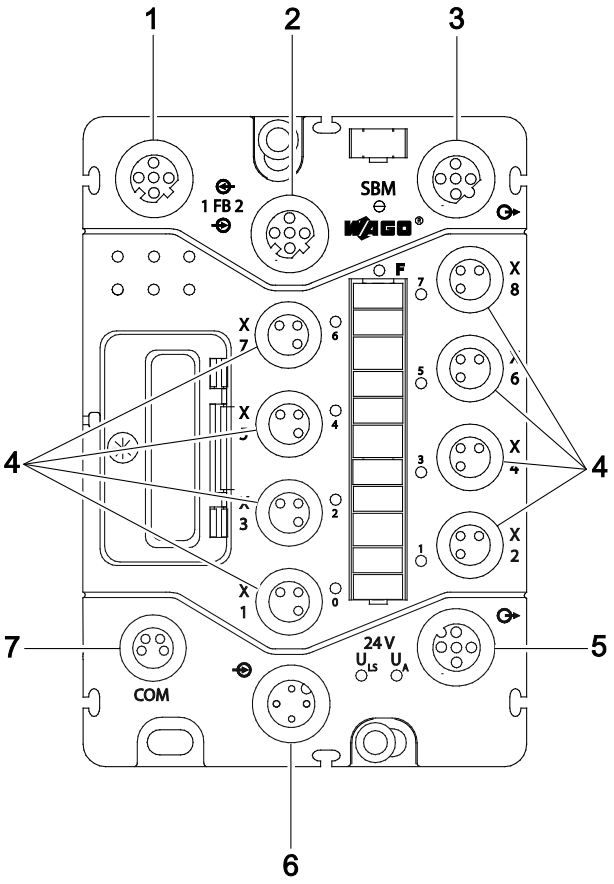


Figure 1: Connectors

Table 3: Legend for figure “Connectors”

Position	Description	Function
1, 2	ETHERNET connections, M12 socket, D-coded	Physical connections for the integration of the fieldbus coupler into the ETHERNET network.
3	S-BUS output M12 socket, B-coded	Physical connection for connecting I/O modules to the S-BUS and for closing the S-BUS.
4	Digital inputs X1 – X8 M8 socket	For connecting digital sensors (e.g., initiators or limit switches).
5	Supply output M12 socket, A-coded	Use of the system and/or field supply for the following I/O module.
6	Supply input M12 plug, A-coded	Infeed of system and field power supply
7	USB interface M8 socket, 4 poles	Parameterization independent of fieldbus, configuring and diagnosing entire fieldbus station and updating device software.

4.2 Marking Possibilities and Fastening

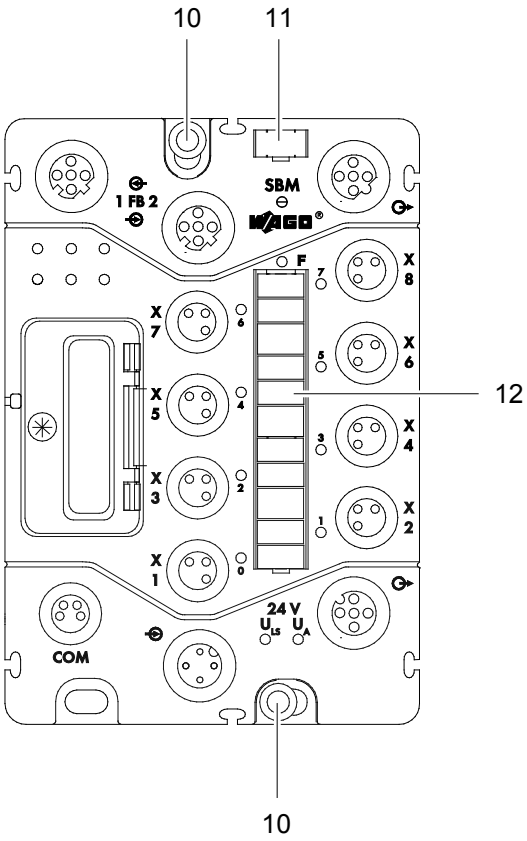


Figure 2: Marking possibilities and fastening

Table 4: Legend for figure “Marking possibilities and fastening”

Position	Description	Function
10	Mounting holes	With integrated function earth (FE) socket for fastening and grounding the fieldbus coupler.
11	Module marker card	For identifying the fieldbus coupler inside a fieldbus station.
12	Channel marker strip	For identifying input channels.

4.3 Display Elements

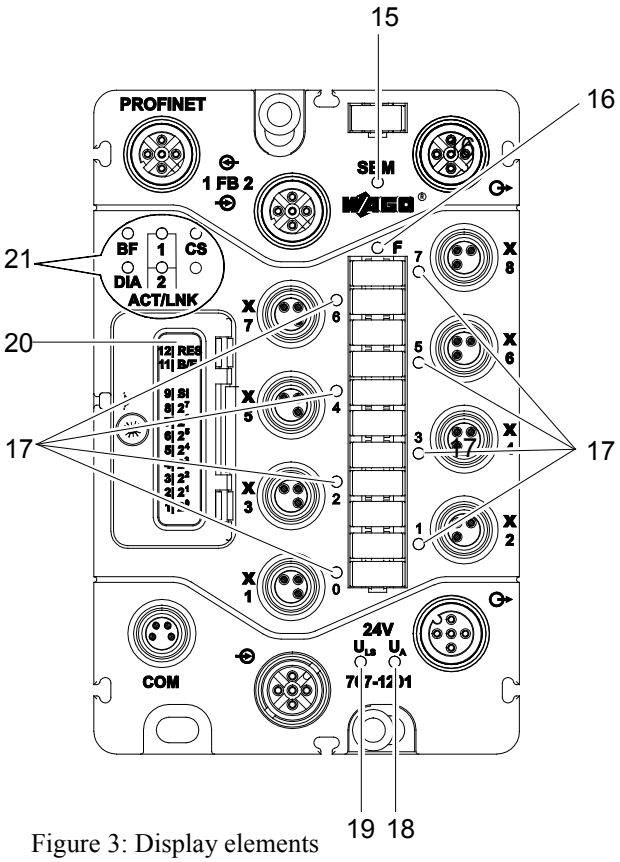


Figure 3: Display elements

Table 5: Legend for Figure “Display Elements”

Position	LED/ Operating element	Color	Meaning
15	SBM	Green, red	Status of S-BUS Master
16	F	Red	Diagnostic information of digital inputs is available.
17	LEDs 0 to 7	Yellow	Input signal pending
18	U_A	Green	Actuator supply is present
19	U_{LS}	Green	Logic supply and sensor supply are present.
20	Address and operating mode switch (DIP switch)	-	Setting the PROFINET station name. Executing a hardware reset.

Position	LED/ Operating element	Color	Meaning
21	BF	Red	Indicating the device condition with respect to the PROFINET communication.
	DIA	Red	Indicating one or more disruptions in the fieldbus coupler
	ACT/LNK 1	Green	Status of the physical connection to the ETHERNET network (FB 1)
	ACT/LNK 2	Green	Status of the physical connection to the ETHERNET network (FB 2)
	CS	Green, red	Status of the fieldbus coupler

Note

Detailed information
Detailed information can be found in section “Diagnostics”.

4.4 Operating Elements

The DIP switch is used to set the PROFINET station name for the fieldbus coupler. The fieldbus coupler is accessible under this name in the PROFINET network. Moreover, the DIP switch makes it possible to execute a hardware reset of the fieldbus coupler and to start the bootstrap loader. A sealable, transparent cover protects the DIP switch. The allocation of values is as follows:

Table 6: Default Settings of DIP Switch

Switch	1	2	3	4	5	6	7	8	9	10	11	12
Binary value for/ Functions	2^0	2^1	2^2	2^3	2^4	2^5	2^6	DN	DNI	-	Boot/ Execute	Reset
Switch setting	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

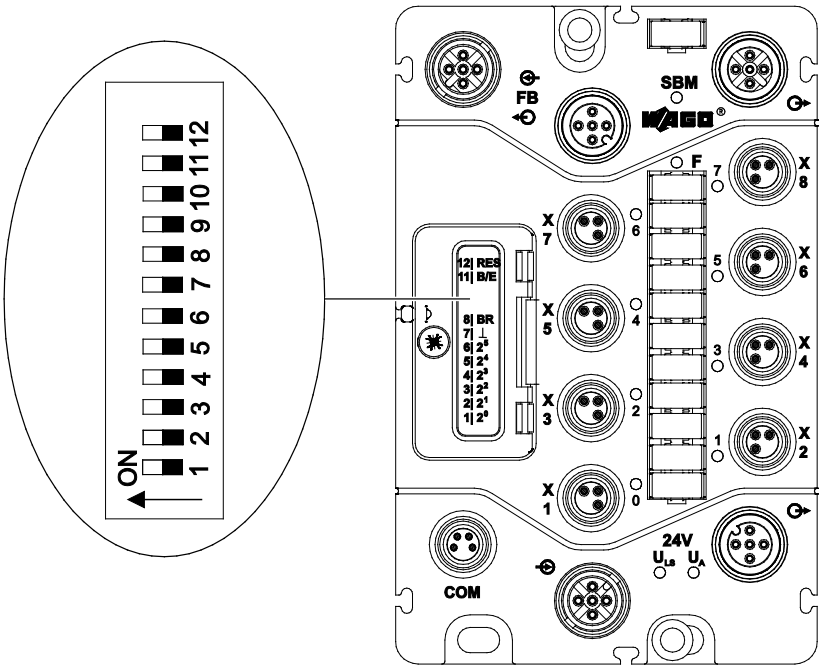


Figure 4: DIP switch. All switches are set on “Off” at delivery

Table 7: Explanation of DIP Switch

Switch	On	Off
1 … 7	These switches are used to set the instance of the station name for the fieldbus coupler. For the station name to be assigned, switch 9 must be in the “On” position. The instance 0 is not visible in the name. The instances 1 … 127 are separated by a hyphen in the station name.	
8	Switch 8 selects the station name which is to be used for instantiation of the fieldbus coupler using switches 1 through 7. You have the choice between two station names. When the switch is in the “Off” position, the fieldbus coupler loads the name “wago-767-1201”; when in the “On” position, it loads the name “wagox767x1201”.	
9	In the “OFF” switch position, the fieldbus coupler loads the station name saved in the devices retentive memory. The station name can be changed according to the PROFINET specification via a PROFINET IO connection to a PROFINET controller or engineering tool.	
10	No function.	
11	This DIP switch must always be set to “Off”.	
12	This switch is used to initiate a hardware reset of the fieldbus coupler. You can override this status by returning the switch to “Off”.	Normal operating

Note

Detailed information
Detailed information can be found in section “Commissioning” … > … “Setting the PROFINET Station Name”.

4.5 Labeling

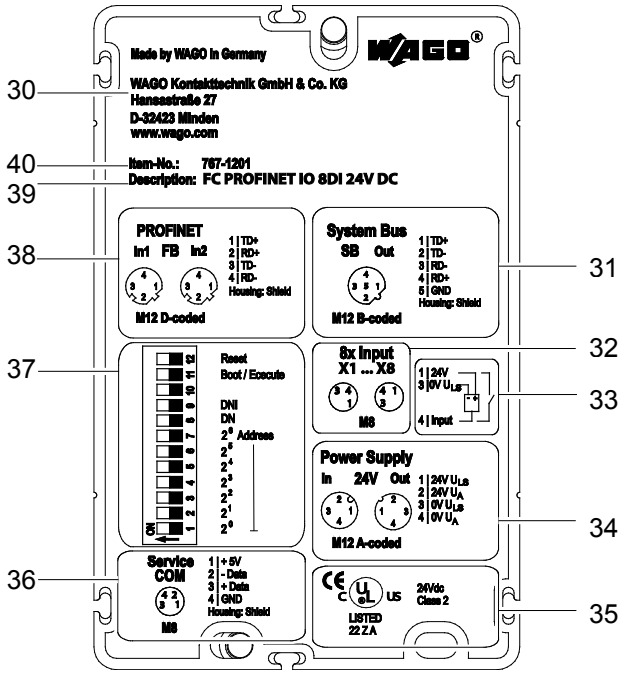


Figure 5: Labeling on the Back Side

Table 8: Legend for Figure “Labeling on the Back Side”

Position	Description
30	Manufacturer's mailing address
31	Connection assignment of S-BUS
32	Connection assignment of digital inputs
33	Connection example
34	Connection assignment of supply input and output
35	Information on approvals and CE marks
36	Connection assignment of USB interface
37	Labeling and assignment of DIP switch
38	Connection assignment of field bus input and output
39	Clear labeling of fieldbus coupler
40	Item number

On the side of the fieldbus coupler a label is printed providing information which is helpful in case of warranty claims:

- BA: Work order number (50)
- SN: Serial number (50)
- Work order number and serial number (50)
- MAC Addresses (51)
  Three MAC addresses are stored in the fieldbus coupler:
  MAC Address 1: MAC Address of the fieldbus coupler
  MAC Address 2: MAC Address of the FB1 ETHERNET connection
  MAC Address 3: MAC Address of the FB2 ETHERNET connection
- Manufacturing number (52)

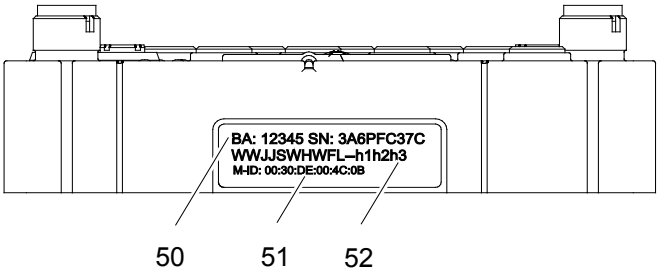


Figure 6: Label on fieldbus coupler

Table 9: Description of manufacturing number

Abbreviation	Description
WW	Week of production
JJ	Year of production
FW	Firmware release index When updating the firmware, please note that, the firmware release index may not be conformed to the printed firmware release index on the side of the fieldbus coupler. The “Electronic Type Label” (see section “Electronic Type Label”) shows the actual firmware release index.
HW	Hardware release index
FL	Firmware loader release index
h1h2h3	Internal manufacturer information

4.6 Schematic Diagram

The following schematic diagram provides an overview of the power supply and principle of operation of the power supply connections, as well as the digital inputs of the fieldbus coupler (see also section “Connecting the Supply Cable” and “Connecting the Sensor Cables”).

Please note that the common power supply of the sensors is distributed to all connections (pin 1 each) of the fieldbus coupler.

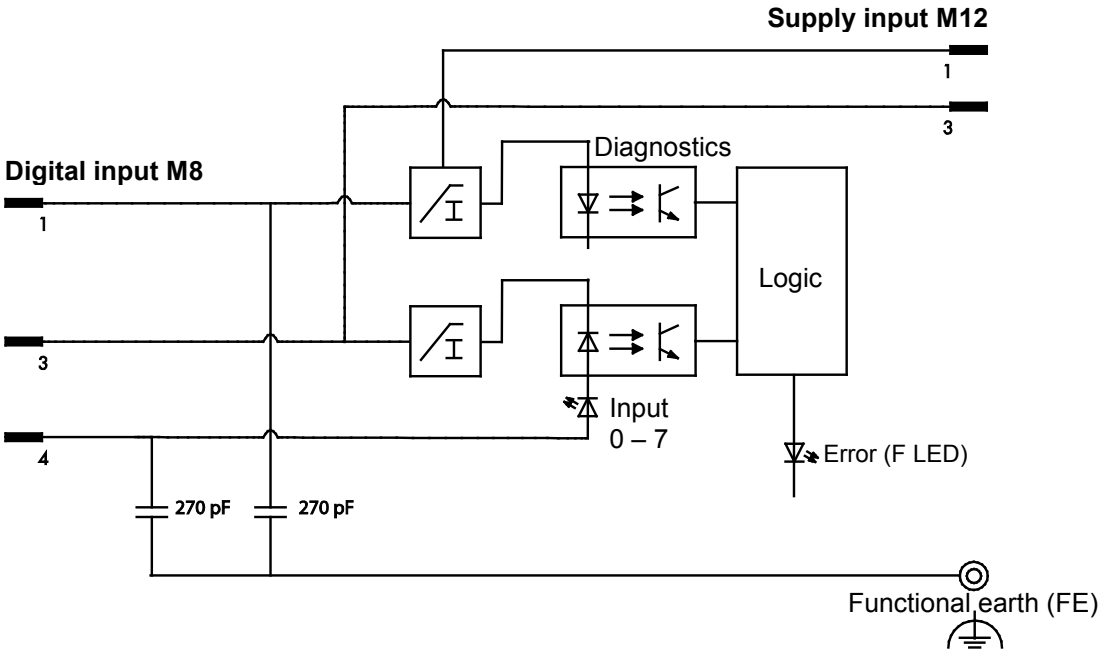


Figure 7: Schematic diagram

4.7 Dimensions

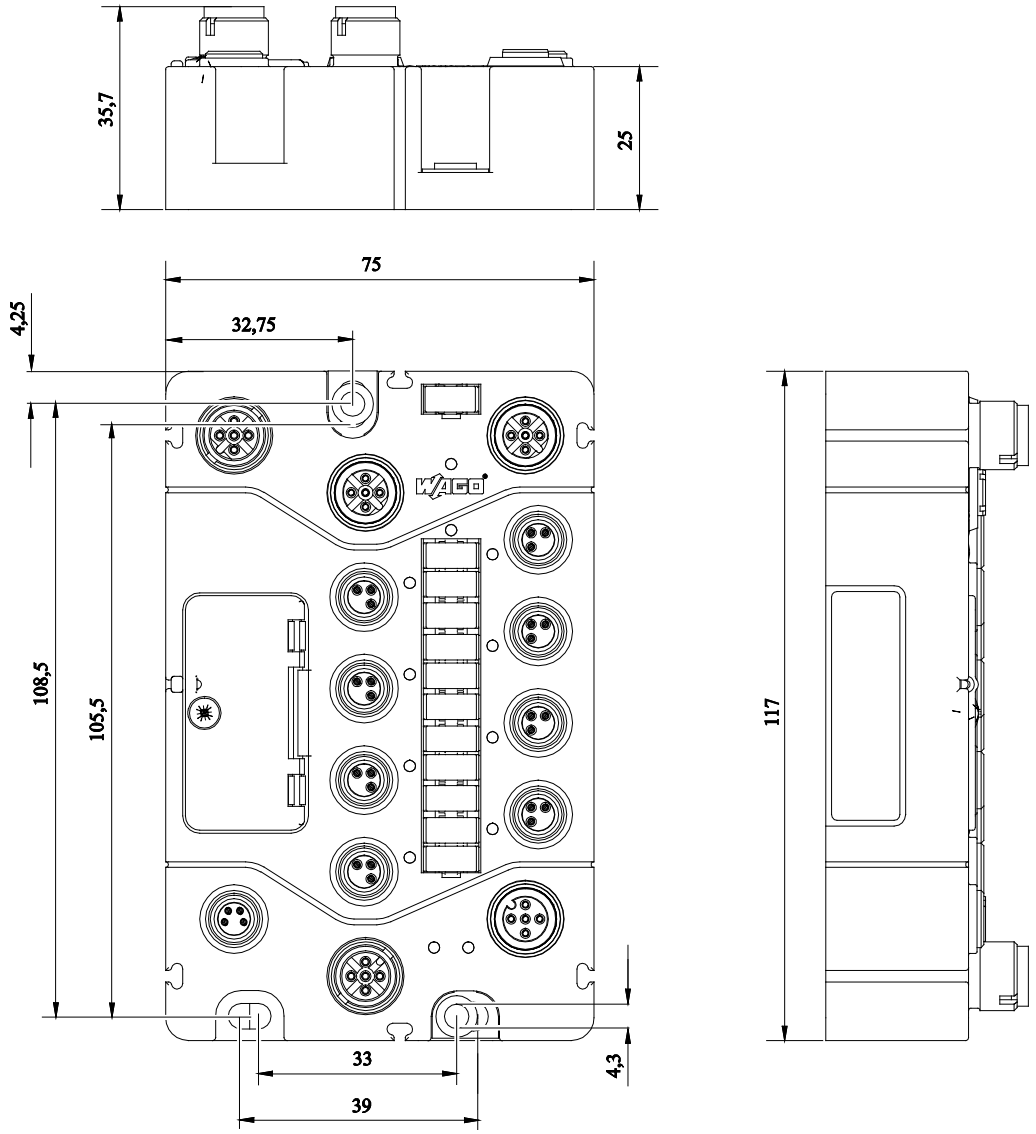


Figure 8: Dimensions of fieldbus coupler in mm

4.8 Technical Data

Note

Different technical data for applications in hazardous areas!
If the device is used in an application in the hazardous area, the technical data contained in the ATEX/IECEx certificate are binding in this application!

4.8.1 Device Data

Table 10: Technical data – Device data

Width	75 mm
Height	35.7 mm
Length	117 mm
Weight	Approx. 377 g

4.8.2 System Data

Table 11: Technical data – System data

Device Type	PROFINET IO Device
Connection type	M12 connectors, D coded, 4 poles
Transmission rate	100 Mbit/s, full duplex
Transmission medium	100Base-TX, twisted pair copper cables
Station address	Adjustable via DCP
Protocols	PROFINET IO, DCP, SNMP, LLDP
Additional data	See PROFINET specification

4.8.3 Supply

Table 12: Technical data – Supply

Connection type	M12 connectors, A coded, 4 poles *
Protections	Reverse voltage protection for U_{LS} + U_A and short-circuit protection for sensor supply
Current carrying capacity of the supply connections	Maximum 8 A (U_{LS}: 4 A, U_A: 4 A)
Supply voltage Logic and sensor voltage U_{LS} Actuator voltage U_A **	 24 VDC (-25 % … +30 %) 24 VDC (-25 % … +30 %)
Supply current Logic and sensor current I_{LS} Actuator current I_A	 Typically 125 mA + sensors (max. 400 mA) 5 mA

* Derating should be observed.

** Also required for supply transmission.

4.8.4 Communication

Table 13: Technical Data – Communication

Connection type	Shielded M12 connector, B coded, 5 poles
Number of expendable modules	63

4.8.5 Inputs

Table 14: Technical Data – Inputs

Number of inputs	8
Connection type	M8 connectors, 3 poles
Wire connection	2- to 3-wire
Input Filter	Parametrizable
Input characteristic	Type 1, acc. to IEC 61131-2
Signal voltage 0	-3 VDC … +5 VDC
Signal voltage 1	+15 VDC … +30 VDC
Input wiring	High-side switching
Input voltage	24 VDC (-30 VDC < U_{IN} < +30 VDC)
Input current	Typically 2.8 mA
Cable length, unshielded	≤ 30 m
Wrong connection of inputs	No effect

4.8.6 Configurable Functions

Table 15: Technical Data – Configurable Functions

Fieldbus coupler	See section “Parameterization”
Digital inputs Input filter (per channel) Inversion (per channel) Online simulation (per channel) Diagnostics (per module)	 0.1/0.5/3/15 /20 ms/filter off on/off (only via FDT/DTM) Lock/unlock; simulation value: 0/1 (only via FDT/DTM) Enable/disable

4.8.7 Diagnostics

Table 16: Technical Data – Diagnostics

Per module	Short circuit/wire break of sensor supply
Per module	Undervoltage (U_{LS} + U_A)

4.8.8 Process Image

Table 17: Technical Data – Process Image

Input process image	Max. 1024 bytes
Output process image	Max. 1024 bytes

4.8.9 Indicators

Table 18: Technical Data – Indicators

CS: Fieldbus coupler status	LED (green/red)
DIA: PROFINET diagnostics	LED (red)
ACT/LNK 1: Fieldbus 1	LED (green)
ACT/LNK 2: Fieldbus 2	LED (green)
BF: PROFINET bus error	LED (red)
X1 … X8: Input signal status	LED (yellow)
F: Error status	LED (red)
U_{LS} + U_A: Supply status	LED (green)
SBM: Status of S-BUS Master	LED (green/red)

4.8.10 Service Interface COM

Table 19: Technical Data – Service Interface

Type	USB standard 1.1
Connection type	M8 connectors, 4 poles

4.8.11 Isolation

Table 20: Technical Data − Isolation

Channel - Channel	No
U_{LS}, U_A, S-BUS, fieldbus	500 VDC each

4.9 Approvals

The following approvals have been granted to 767-1201 fieldbus coupler:

CE Conformity Marking

cULus $_{c}UL_{US}$ UL508

The following Ex approvals are pending for 767-1201 fieldbus coupler:

BVS 15 ATEX E098X

II 3 G Ex nA IIC T5 Gc
II 3 D Ex tc IIIB T90°C Dc

IECEx BVS 15.0083X

Ex nA IIC T5 Gc
Ex tc IIIB T90°C Dc

4.10 Standards and Guidelines

The fieldbus coupler 767-1201 meets the following standards and guidelines:

PROFINET IEC61158

EU EMC Directive	2014/30/EU
EMC CE-Immunity to interference	acc. to EN 61000-6-2
EMC CE-Emission of interference	acc. to EN 61000-6-4
EU Directive	2014/34/EU
Explosive atmosphere Devices – General requirements	EN 60079-0
Explosive atmosphere Equipment protection by type of protection “n”	EN 60079-15
Explosive atmosphere Equipment dust ignition protection by enclosure “t”	EN 60079-31
Explosive atmospheres General requirements	IEC 60079-0
Explosive atmospheres Equipment protection by type of protection “n”	IEC 60079-15
Explosive atmospheres Equipment dust ignition protection by enclosure “t”	IEC 60079-31

5 Mounting

The fieldbus coupler can be fastened directly to your system using screws. It can also be mounted on a carrier rail using an adapter (WAGO accessory) or fastened to a profile rail using a surface mounting profile (WAGO accessory).

For mounting on a flat surface, WAGO offers spacers to assist in the mounting process that can be inserted between the 767 Series component. This helps by providing sufficient mounting distance for compact direct mounting, as well as eliminating gaps where dirt could accumulate. A cable tie can be fastened through each of two mounts in the spacer, which together serve to relieve strain from the sensor and actuator cables.

5.1 Information on Mounting

The following information shall always be observed:

- Disconnect the power supply from the system before you start with installation.
- The maximum diameter of the drill hole of the fieldbus coupler's mounting holes is not to exceed 4 mm.
  Otherwise, a full contact with function earth (FE) socket of the fieldbus coupler not be guaranteed. This may lead to restrictions in the shielding.
- The cover cap of the DIP switch must be closed and bolted.
- To protect the fieldbus coupler from tensile forces that may arise, do not bridge spaces with it.
- Screw down the fieldbus coupler down only on flat contact surfaces to protect it from warping.
- Ensure that the connectors are not soiled during installation. Dirt and other such substances damage the contacts, allowing corrosion to develop.
- To avoid damaging the fieldbus coupler, do not mount it in shear areas of moving devices.
- Arrange for a sufficient potential equalization in your system.
- Use all mounting holes to mount the fieldbus coupler to your system so all FE connections lie on a ground potential.

Any mounting position is possible.

Note

Ensure a safe mounting position!
In explosion hazardous environments no increased mechanical loads must be present at the installation location. If shocks are possible, a shock protection must be installed between the device and the possible source of the shock.

5.2 Tools and Accessories Required for Mounting

Depending on the mounting type, the following tools are required for installation:

- A screwdriver for M4 fixing screws
- Drilling machine to pre-drill the mounting holes for the fieldbus coupler to be mounted to the system and, if applicable, for the imperforated carrier rail.
- M4 thread cutter (bottoming tap or hand tap set)

The WAGO accessories listed below are required for mounting. The associated item numbers can be found in the “Accessories” section.

- Carrier rail adapter, including fixing screws and perforated or imperforated carrier rails (DIN 35 x 7.5) according to EN 60715, also available from WAGO.

  or

- Profile adapter, including fixing screws
- Spacer (optional)

Three M4x12 screws are required for direct mounting of the fieldbus coupler. The length of the screw shaft is to be selected according to the mounting type.

Bore measurements

When fastening the 767 Series component without a threaded hole, the clearance hole must not be wider than 4mm so as to ensure safe contact of the FG (functional ground) connections.

5.3 Direct Mounting on Your System

Mount the fieldbus coupler directly on a level surface of your system, without using WAGO accessories. Direct mounting of the fieldbus coupler is to be carried out as follows:

1. Disconnect the power supply from those devices on which you wish to mount the fieldbus coupler.

2. Mark the drill holes using the hole drilling template printed on the packaging. You can also hold the fieldbus coupler in the desired position and mark the drill holes. Ensure that there is sufficient space around the 767 Series component to enable you to connect all cable without problems.

Note

Direct Mounting
We recommend using WAGO spacers for compact direct mounting. If these are used, the resulting additional distance from the second 767 Series component is to be noted. See section “Mounting the Module” > “Mounting the Spacer in the Case of Compact Arrangement”.

3. Fasten the fieldbus coupler to the grounded frame of your system or to another grounding point with the M4x12 screws via the three mounting holes.

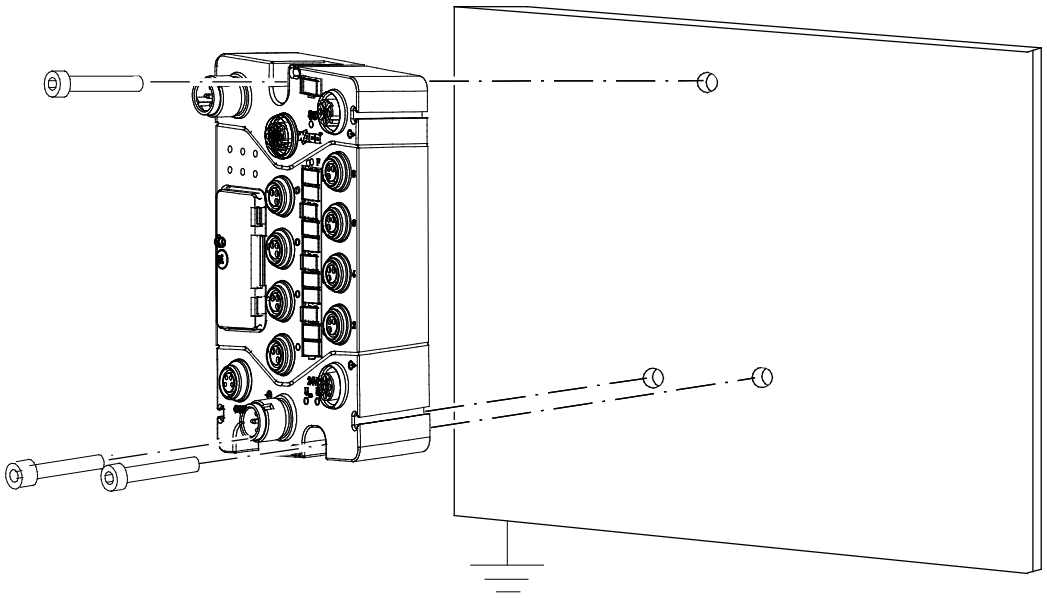


Figure 9: Mounting the fieldbus coupler on the grounded system

5.4 Mounting on a Carrier Rail (only with WAGO Accessories)

5.4.1 Fastening the Carrier Rail Adapter to the Fieldbus Coupler

A carrier rail adapter is required to mount the fieldbus coupler on carrier rails.

Screw together the fieldbus coupler and carrier rail adapter using the M4 threaded screws provided, as shown in the following figure.

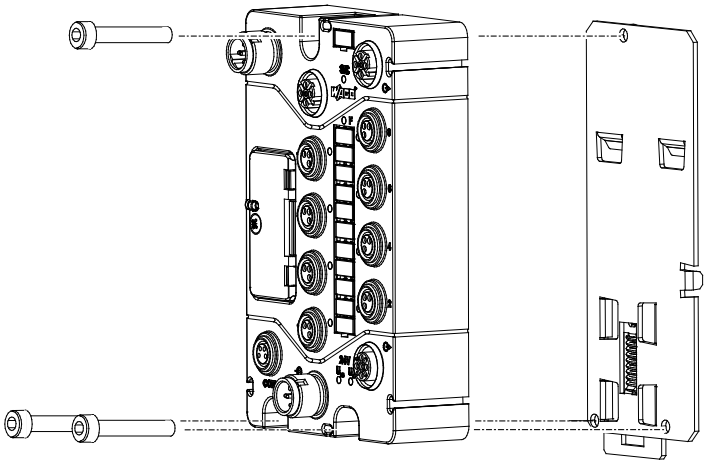


Figure 10: Fastening the fieldbus coupler to the carrier rail adapter

5.4.2 Fastening the Fieldbus Coupler with Carrier Rail Adapter to a Carrier Rail

In order to provide a clear representation, the carrier rail adapter in the figure below is shown without the fieldbus coupler.

When mounting the fieldbus coupler to a carrier rail (DIN rail 35 x 7.5) using a carrier rail adapter, proceed as follows:

1. Disconnect the power supply from those devices on which you wish to mount the fieldbus coupler.
2. Set the fieldbus coupler onto the edge of the carrier rail (61) with the two notches (60).
3. Press the undersurface against the lower carrier rail edge until the latch (62) locks in place.

Note

Use end stops
When mounting the rail vertically or if shock or vibration loading should occur, the use of end stops (item no.: 249-116 or 249-117) for stabilization is required.

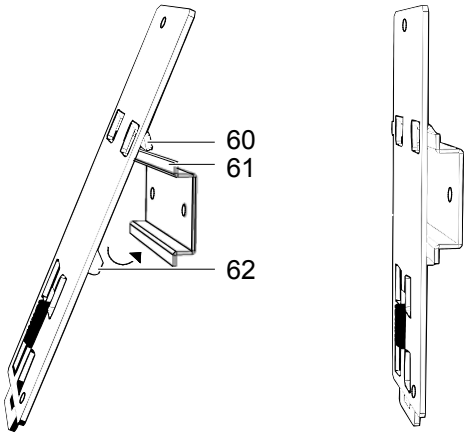


Figure 11: Mounting the carrier rail adapter

5.5 Mounting on a Profile Rail (only with WAGO Accessories)

5.5.1 Fastening the Profile Adapter to the Fieldbus Coupler

Aside from using carrier rail adapters to fasten the fieldbus coupler, you also have the option to fasten it to a profile rail using the profile adapter and nuts, provided that this mounting type is supported by your system. You are to supply the necessary nuts.

Screw together the fieldbus coupler and the profile adapter using the M4 threaded screws provided, as shown in the following figure.

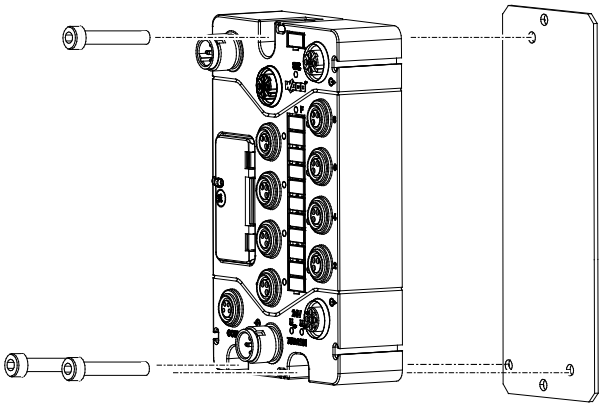


Figure 12: Fastening the fieldbus coupler to the profile adapter

5.5.2 Fastening the Fieldbus Coupler with Profile Adapter to a Profile Rail

To fasten the fieldbus coupler to a profile rail of your system, two nuts are required with one screw each (length of screw threads must be compatible with your system).

1. Disconnect the power supply from those devices on which you wish to mount the fieldbus coupler.

2. Insert the two screws into the holes above and beneath the fastened fieldbus coupler on the profile adapter.

3. Fasten an appropriate nut on each of these screws.

4. Insert the profile adapter with the attached fieldbus coupler into the profile rail of your system. Position it and tighten the screws.

5.6 Replacing the Marker Card and Strip

A blank module marker card (11) and channel marker strip (12) are attached when delivered. For labeling them, proceed as follows:

1. Press the slot screwdriver (maximum slot width: 3mm) into the small opening under the cover and lever it up.
2. Remove the protective cover.
3. Mark the marker card resp. marker strip with a waterproof pen.
4. Reinsert the protective cover and press it firmly in place.

New cards, strips and pens can be obtained from WAGO.

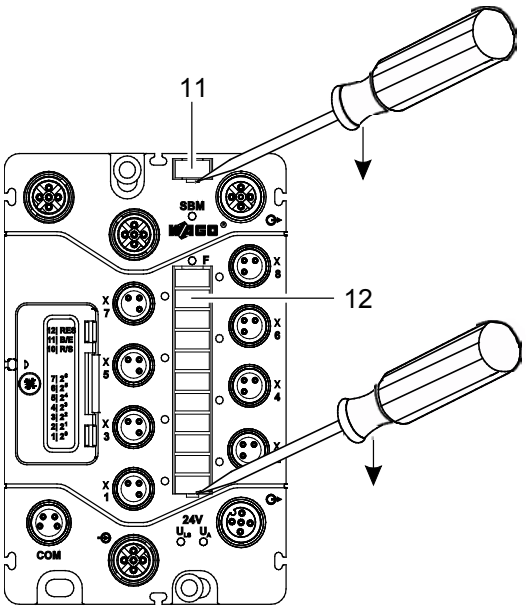


Figure 13: Replacing the marker card and strip

5.7 Mounting the Spacer in the Case of Compact Arrangement

By using the spacer, a sufficient mounting distance can be achieved when directly mounting the 767 Series components, and gaps can be eliminated where otherwise dirt and other substances could accumulate. In addition, it is possible to optimize the cable routing of the sensors and actuators. For this purpose, two fastening lugs each are included on the spacer for cable ties.

1. Disconnect the power supply from those devices on which you wish to mount the fieldbus coupler.

2. The spacer can only be inserted into the appropriate openings of the fieldbus coupler from the bottom. To bind both components, place the fieldbus coupler on the spacer or push the spacer from the bottom into the coupler.

3. Fasten the components on a flat surface by fastening the fieldbus coupler to the grounded frame of your system or to another grounding point with three M4 screws via the mounting holes.

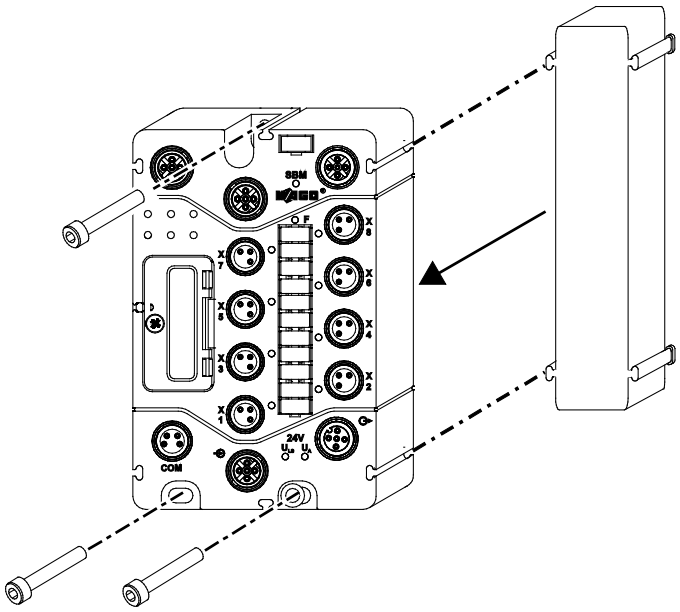


Figure 14: Attaching a spacer

4. When attaching 767 Series component, only one 767 component connected with a spacer can be attached and screwed on to the preceding component due to the mounting direction. The last 767 component is fastened without a spacer.

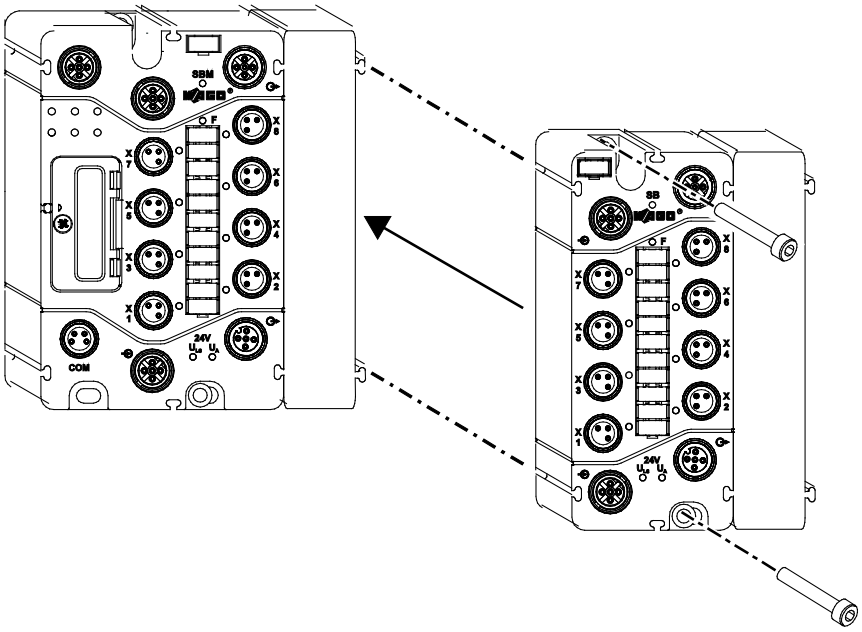


Figure 15: Attaching another 767 component to the fieldbus coupler

6 Connecting Data and Supply Cables

6.1 Notes

DANGER

Electric voltage!
Operate the 767 Series components exclusively with 24 VDC PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) voltage sources. Failure to comply may result in electric shock.

NOTICE

The highest current carrying capacity of the supply contacts is 4 A!
Always observe the maximum current carrying capacity per supply line (U_{LS}, U_A) for each 767 Series component and the overall power consumption for all 767 components. Neither of these values shall exceed 4 A since an increase in current causes the contacts to overheat and damages the 767 Series components. Information regarding the power demand of each 767 Series component can be found in the corresponding data sheet, which is available from www.wago.com.

NOTICE

Exposed connections!
If connections have not been closed with protective caps, liquid or dirt can penetrate the components of the 767 Series module and ruin it. Therefore, close all unnecessary connections with protective caps, which must be ordered separately, in order to maintain the IP67 degree of protection. (See section “Accessories” of the fieldbus coupler/controller manual.)

- The connectors must be disconnected from the power supply when screws are tightened.
- Tighten the connectors by hand. To achieve the required torque (see below) for the connector, use the torque wrench with the order number **206-701**.

  Torque for M8 connectors: 0.6 Nm
  Torque for M12 connectors: 1.0 Nm

NOTICE

Use torque wrench 206-701!
Only use the specified torque wrench. Using mechanical tools can cause the threads to strip.
In this case, replace the module!

- Observe the exact positioning (coding) between plug and socket.

- For both power supply and S-BUS (system bus), use only pre-assembled WAGO system cables. This is the only means whereby the specified characteristics of the technical data can be achieved.
- Keep all cables a sufficient distance away from electromagnetic sources of interference in order to maintain a high level of interference resistance of the 767 system against electromagnetic emissions.
- Observe the minimum bending radiuses of the WAGO system cable. For more information, see the technical data at www.wago.com.
- When laying all cable, ensure that you do not lay it in shear areas of moving machine parts.
- The cable shield of the fieldbus cable must be connected with functional ground on both ends over a wide area.
- Observe the correct layout of the potential equalization.
- Do not use drop lines under any circumstances. This can lead to amplified line reflections and signal distortions, which greatly impair the transmission quality.

6.2 Required Accessories

The WAGO accessories listed below are required for connecting the data and supply cable. The associated item numbers can be found in the “Accessories” section.

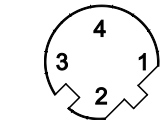
- S-BUS M12 terminator, IP 67
- S-BUS and supply cables, pre-assembled on both ends, IP 67
- USB cable pre-assembled on both ends, IP 67

6.3 Connecting the Fieldbus Cable

To set up a connection with an IO Controller, the fieldbus coupler must be connected to a network with a transfer rate of 100 Mbit/s in full-duplex mode.

The following table outlines the connection assignments for the ETHERNET connections:

Table 21: ETHERNET connection assignments

Connection	Contact	Description
IN 	1	TX+
	2	RX+
	3	TX-
	4	RX-
	Connecting thread	Shielded

If you do not use a pre-assembled ETHERNET cable, a shielded M12 plug with the IP 67 degree of protection is to be connected to this.

To connect a cable which is pre-assembled on one end only to an RJ-45 plug, proceed as follows:

Contact	Connection	Color	Contact of RJ-45 plug
1	TX+	Yellow	1
2	RX+	Blue	2
3	TX-	Brown	3
4	RX-	White	6

Because the Auto MDI(X) functionality for the respective ETHERNET connection FB1 or FB2 is activated, a cross-over cable is not necessary. This functionality automatically detects the direction for sending data and receiving data so that it is irrelevant which cable type is used (crossed or uncrossed).

6.3.1 Connecting a Fieldbus Coupler to an ETHERNET Network

To connect the fieldbus coupler to an ETHERNET network, proceed as follows:

1. Disconnect the power supply from those devices on which you have mounted the fieldbus coupler.

2. Connect the fieldbus coupler with the ETHERNET network by plugging the socket of the ETHERNET cable (F) into the IN connection ⊖ (1).

3. Tighten the socket using the knurled-head screw.

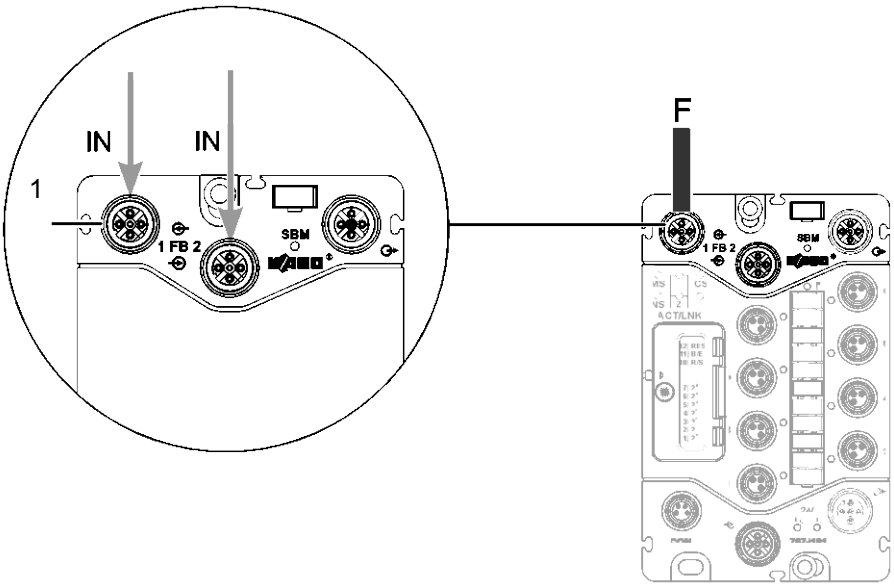


Figure 16: The fieldbus coupler is connected to the ETHERNET network

6.3.2 Connecting Several Fieldbus Couplers inside an ETHERNET Network

The network topology in the following figure consists of a mixed star and line topology. Up to 20 fieldbus couplers can be connected to the ETHERNET network on the line topology. An ETHERNET switch is required to set up a star topology or a mixed topology. The number of fieldbus couplers on a star topology is limited only by the IEEE 802.3 ETHERNET specification.

The connection of several fieldbus couplers with the ETHERNET network can be carried out as shown in the following example:

1. Disconnect the power supply from those devices on which you have mounted the fieldbus coupler.

2. For the star topology, connect the respective ETHERNET cable (W1, W2) with the IN connection ⊖ (1) of a fieldbus coupler and an ETHERNET switch, as shown in the following figure. Tighten the plugs of the ETHERNET cable.

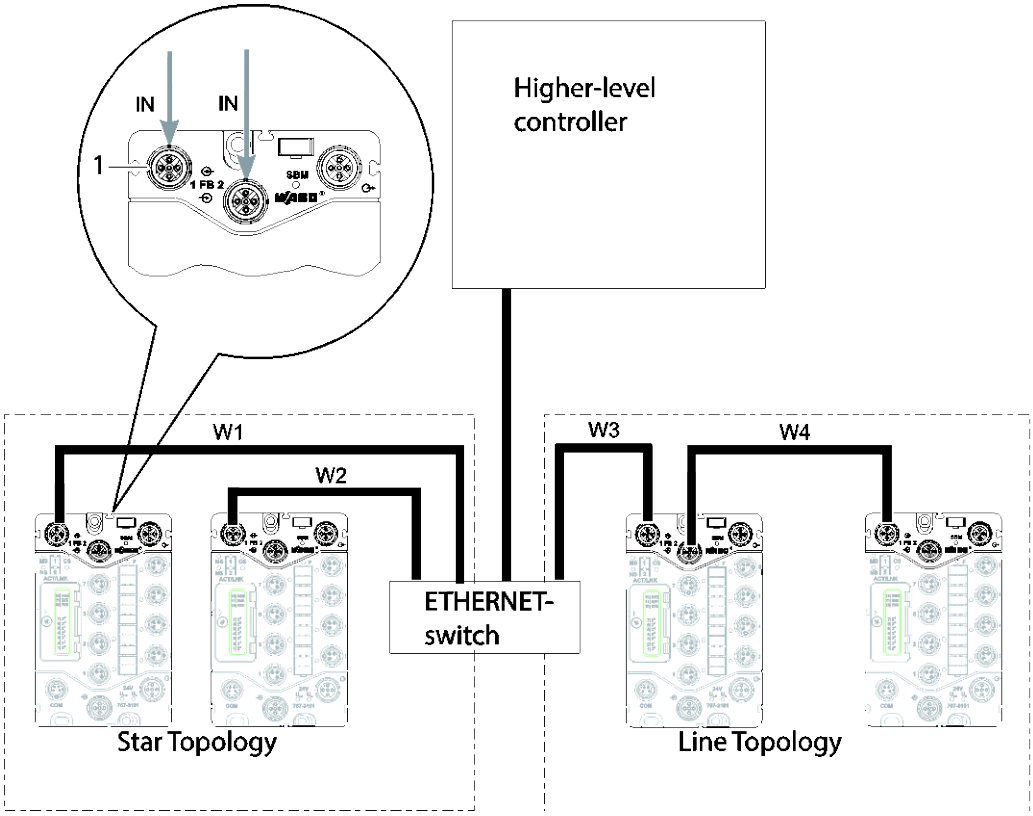


Figure 17: Example setup of a mixed topology with four fieldbus couplers

3. For a line topology, connect the ETHERNET cables (W3, W4) with the connections IN (1) and IN (2) on the fieldbus coupler, as shown in the following figure. Tighten the plugs of the ETHERNET cable.

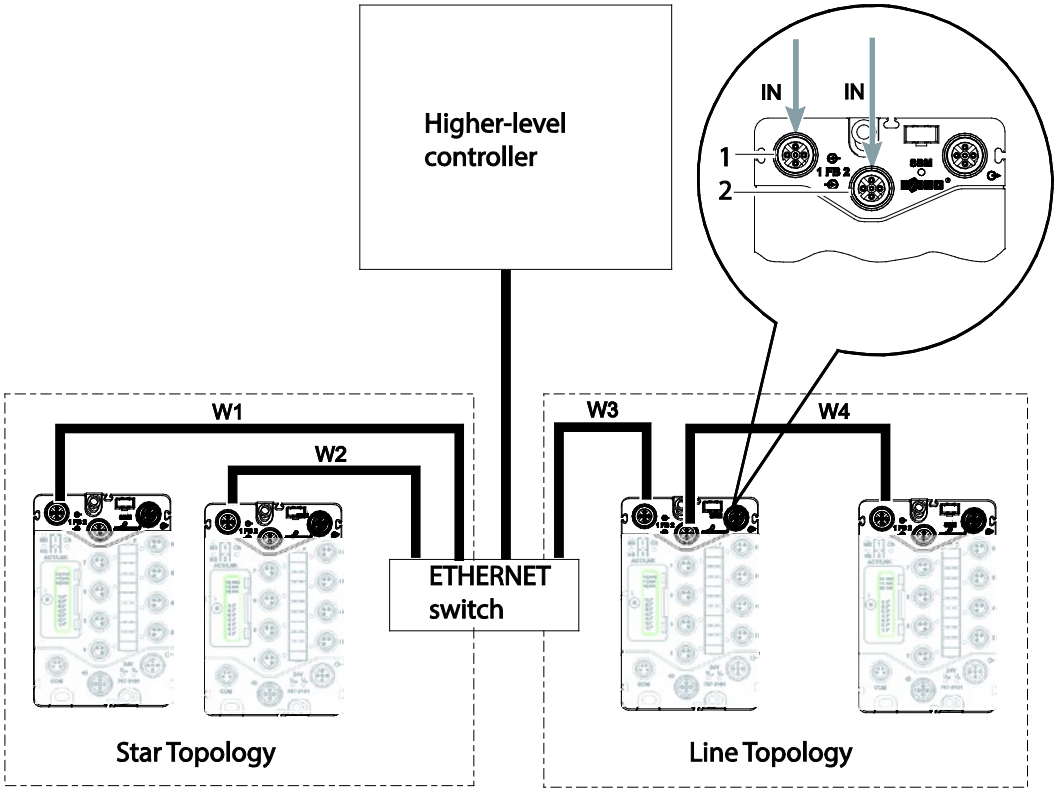


Figure 18: Example setup of a mixed topology with four fieldbus couplers

6.4 Connecting the S-BUS Cable

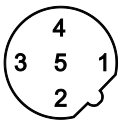
The S-BUS is used for communication between the fieldbus coupler and the connected I/O modules.

Requirement:

- A WAGO S-BUS cable pre-assembled on both ends is readily available to you. This is necessary for optimal signal transmission.
- The S-BUS terminator is available to you, which is necessary for communication.

The following table outlines the assignment of the S-BUS connection.

Table 22: S-BUS connection assignment

Connection	Contact	Description
OUT 	1	TD +
	2	TD -
	3	RD -
	4	RD +
	5	GND
	Connecting thread	Shielded

To connect the S-BUS cable to fieldbus couplers and I/O modules, proceed as follows:

1. Disconnect the power supply from those devices on which you have mounted the fieldbus coupler.

2. Connect the S-BUS cable (S1) with the OUT connection (3) of the fieldbus coupler and the IN connection (8) of the subsequent I/O module. For example, if two I/O modules have been connected to the fieldbus coupler, connect the S-BUS cables (S1, S2) to the associated IN and OUT connections, as shown in the following figure.

3. Tighten the plugs and sockets using the knurled-head screws.

4. Attach the S-BUS terminator (T) to the last I/O module as shown in the figure and tighten it.

If you do not connect any I/O modules to the S-BUS, screw the S-BUS terminator (T) onto the S-BUS OUT output (3) of the fieldbus coupler.

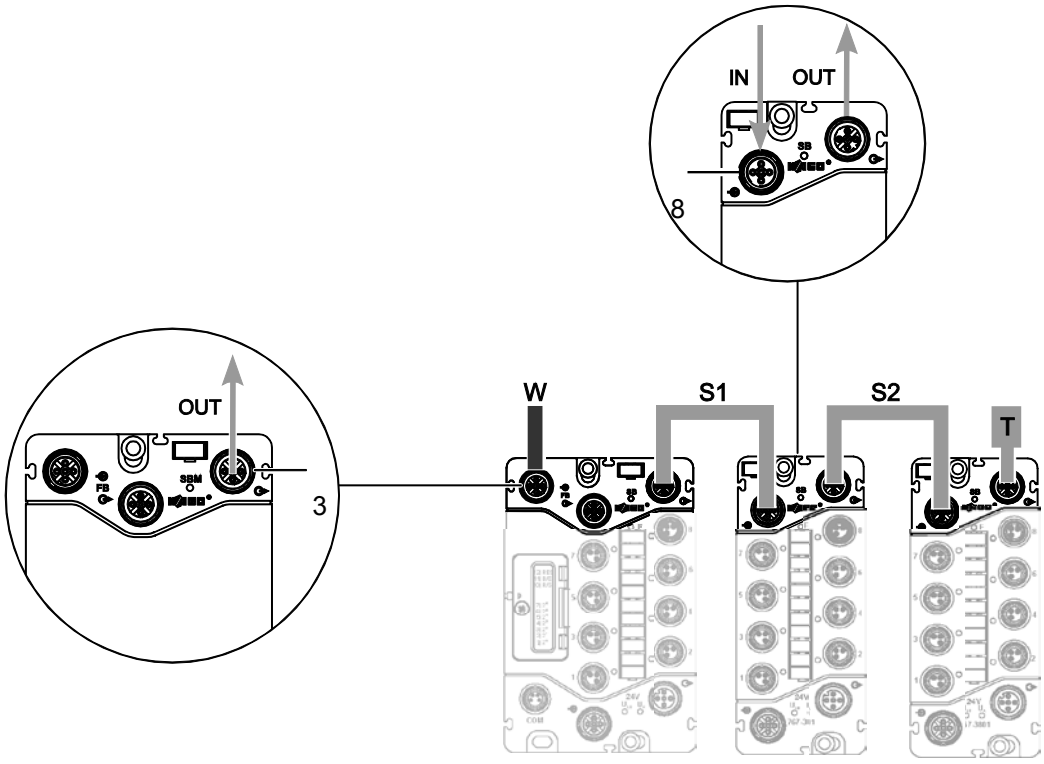


Figure 19: S-BUS is connected to one fieldbus coupler and two I/O modules

6.5 Connecting the Supply Cable

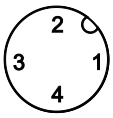
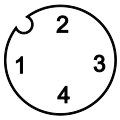
The supply cable provides power to the fieldbus coupler and the connected I/O modules.

Requirement:

- A supply cable for +24 VDC and 0 VDC must be connected to the supply input (6 in the figure on the next page) via appropriate fuses.
- The WAGO supply cable pre-assembled on both ends must be available (K1 and K2 in the figure on the following page).

The following table outlines the assignment of the supply connections:

Table 23: Supply connection assignment

Connection		Contact	Description
IN	OUT		
		1	24 VDC U_{LS}
		2	24 VDC U_A
		3	0 V U_{LS}
		4	0 V U_A

NOTICE

The highest current carrying capacity of the supply contacts is 4 A!
Always observe the maximum current carrying capacity per supply line (U_{LS}, U_A) for each 767 component and the overall power consumption for all 767 components. Neither of these values shall exceed 4A since an increase in current causes the contacts to overheat and damages the 767 components. Information regarding the power demand of each 767 component can be found in the corresponding data sheet, which can be downloaded at www.wago.com.

To connect the supply cable to the fieldbus coupler and I/O modules, proceed as follows:

1. Disconnect the power supply from those devices on which you have mounted the fieldbus coupler.

2. Connect the power supply cable (K0) with the fieldbus coupler by plugging the socket in the IN connection ⊖ (6) of the fieldbus coupler.

3. Tighten the socket using the knurled-head screw.

4. Connect the power supply transmission cable (K1) with the OUT connection ⊕ (5) of the fieldbus coupler and the IN connection ⊖ (8) of the subsequent I/O module.
   For example, if two I/O modules have been connected to the fieldbus coupler, connect the power supply transmission cables (K1, K2) to the associated IN and OUT connections as shown in the following figure.

5. Tighten the plugs and sockets using the knurled-head screw.

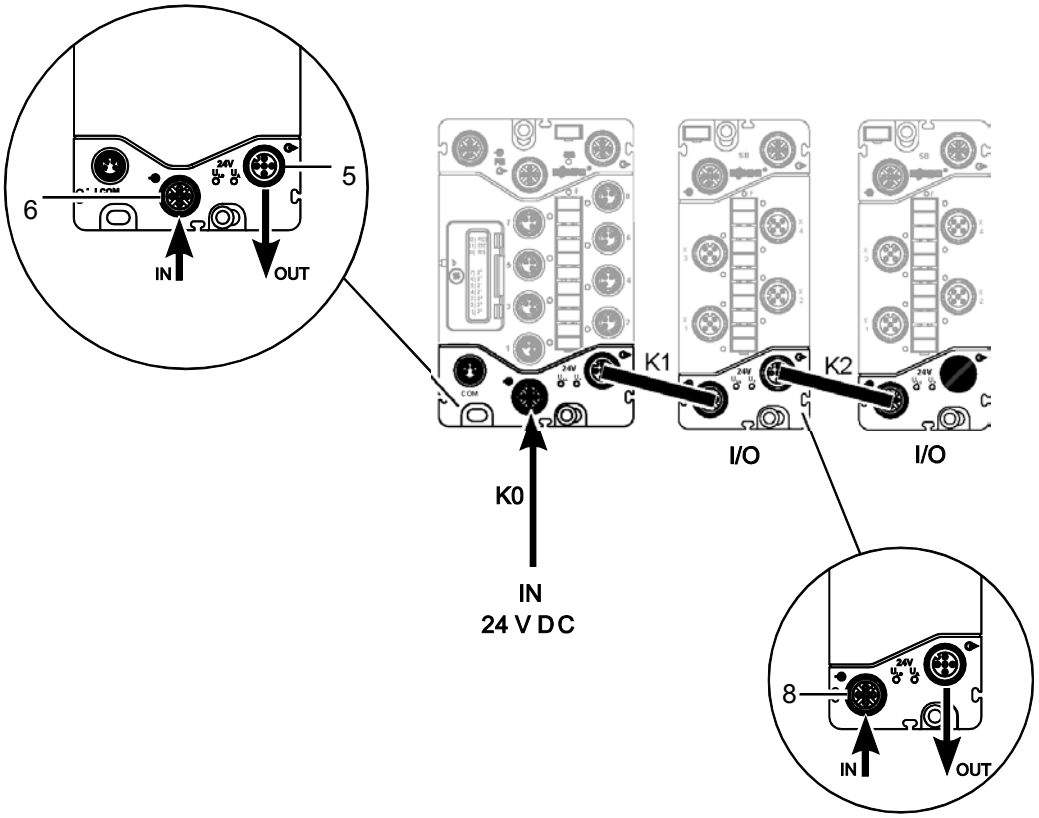


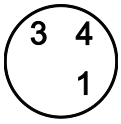
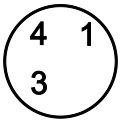
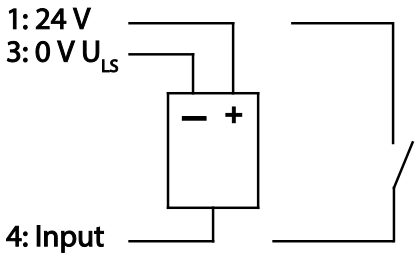
Figure 20: Supply cable connected with fieldbus coupler and I/O modules

6.6 Connecting the Sensor Cables

The sensor cables provide power to the connected sensors and transmit the sensor signals.

When using cables that have not been pre-assembled, make sure that these cables are equipped with M8 plugs rated to IP 67. The following table outlines the assignment of the sensor connections:

Table 24: Connection assignment of digital inputs

Connection		Connection diagram
IN  X1, X3, X5, X7	IN  X2, X4, X6, X8	

NOTICE

The highest current carrying capacity of the supply contacts is 4 A!
Ensure that the sensors are supplied with power from the U_{LS} supply line. The sensors´ power consumption is to be taken into consideration when determining the present power demand for the U_{LS} supply line.

NOTICE

The total maximum power consumption of the sensors must not exceed 400 mA!
Please note that the combined power consumption of all connected sensors is not to exceed 400 mA. The distribution of power among the existing connections is depending on the individual power requirements of the sensors.

To connect the sensors to the digital inputs X1 … X8, proceed as follows:

1. Disconnect the power supply from those devices/machines on which you have mounted the fieldbus coupler.

2. Insert the sensor cable plug into a digital input socket (4) of the fieldbus coupler, and tighten it via knurled nut.

3. Screw a protective cap on all unused input sockets to ensure that IP67 degree of protection is provided.

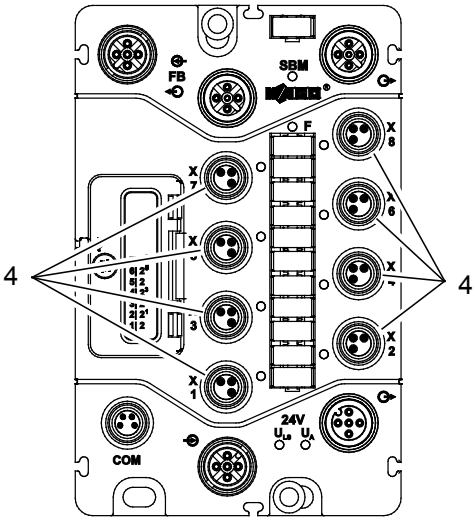


Figure 21: Digital inputs

6.7 Connecting the USB Cable

The fieldbus coupler's USB connection can be used to either configure the fieldbus coupler with an FDT/DTM frame application or to use general service functions. To use the USB connection, the USB driver "WAGO_767_USB_DRIVER_Setup" (item no.: 759-922) must be installed on your computer. This driver can be obtained on the Internet at www.wago.com.

The USB driver is also included on the "WAGOframe" CD-ROM (item no.: 759-370).

After installing the WAGO USB driver, the following COM port is supplied by the USB connection:

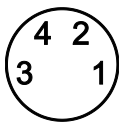
- **I/O-Service**
  This COM port is needed to configure the fieldbus coupler using WAGOframe.

Note

Communication disruption due to faulty data transmission
When using the USB connection, a faulty USB data transmission or an outage can cause communication disruptions. This can be due to additional or inappropriate USB distributors (hubs) or to USB cables that are too long (max. 5 m) or inappropriate. One should therefore refrain from using additional devices if possible.

When using a USB cable that has not been pre-assembled, M8 plugs with the IP 67 degree of protection are to be connected. The following table outlines the assignment of the USB connection:

Table 25: USB connection assignment

Connection	Contact	Description
IN 	1	+ 5 V
	2	- Data
	3	+ Data
	4	GND
	Connecting thread	Shielded

1. Connect your PC with the fieldbus coupler by inserting the USB cable plug into the fieldbus coupler's USB connection COM (7) and tightening it.

2. Switch on the fieldbus coupler. Please refer to section “Switching on the Fieldbus Coupler” for more information. After the fieldbus coupler has been switched on, your operating system detects a new device and installs the USB driver.

Note

Driver installation
During installation of the driver, an MS Windows message may appear several times informing you that the Windows Logo Test failed. Ignore this message and click **[Continue with installation]**.

3. When the USB connection is not in use, screw a protective cap on it to comply with the IP 67 degree of protection.

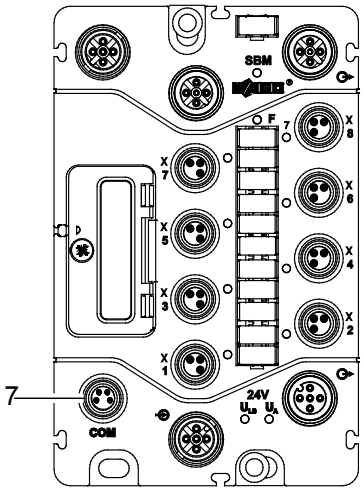


Figure 22: USB interface

7 Commissioning

NOTICE

Exposed connections!
If connections have not been closed with protective caps, liquid or dirt can penetrate the components of the 767 Series module and ruin it. Therefore, close all unnecessary connections with protective caps, which must be ordered separately, in order to maintain the IP67 degree of protection. (See section “Accessories” of the fieldbus coupler/controller manual.)

Before starting up the 767 node, ensure that the following requirements are met:

- The fieldbus coupler is mounted properly (see section “Mounting the Fieldbus Coupler”).
- All necessary supply and sensor lines, as well as the S-BUS and fieldbus cable, are securely fastened onto the appropriate connections (see section “Connection to the Data and Supply Cable”).
- The S-BUS terminator is fastened (see section “Connecting Data and Supply Cables”).
- An appropriate potential equalization is implemented in your system.
- The shielding is carried out properly.
- The power supply of the higher-level controller is switched on (see associated manual).

7.1 Setting the PROFINET Station Name

To operate the PROFINET fieldbus coupler in a network, it must be assigned a unique name.

This should be carried out via the DCP with the DIP switch or with a configuration tool such as Step7 when the fieldbus coupler is connected to the ETHERNET network and is ready for operation (BF LED flashed red). A station name communicated via the DCP overwrites the current name and is saved permanently.

The retentive memory for the station name is a DCP option.
A temporary name set via DCP deletes any name saved in retentive memory. Restarting the device clears the name. In this case, the device has no name after a restart (if DIP 9=Off).

If the option for retentive memory in DCP is set, the name is again available even after restarting the device.

Switch 9 must be switched off for the fieldbus coupler to load the station name from memory at each system start.

If assignment of the station name is desired via the DIP switch, then switch on switch 9 when disconnected from power. The station name is selected via switch 8, and the instance is established using switches 1 through 7 (e.g. wagox767x1201x**1**, wagox767x1201x**2**, …). In the default status, the station name is “wago-767-1201” (default setting).

Table 26: Default settings of DIP switch

Switch	1	2	3	4	5	6	7	8	9	10	11	12
Binary values	2^0 (1)	2^1 (2)	2^2 (4)	2^3 (8)	2^4 (16)	2^5 (32)	2^6 (64)	DN	DNI	-	Boot/ Execute	Reset
Switch setting	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

Requirement:
The fieldbus coupler is not connected to the power supply.

To set the station name via the DIP switch, proceed as follows:

1. Open the cover by unscrewing the M3 screw with a screwdriver.

2. Set the station name of the fieldbus coupler by switching on switch 9. Select the station name with switch 8 (Off = wago-767-1201, On = wagox767x1201).

3. Use switches 1 through 7 to assign an instance to the fieldbus coupler.

4. Close the cover and screw it securely in place to maintain degree of protection IP 67.

Note

Station name

The station name is only active when the fieldbus coupler is connected to the power supply. The IP address configured for the fieldbus coupler is allocated automatically by the I/O controller after fieldbus coupler identification.

In the following example, switches 3, 5 and 6 are switched on (switch 8 is off!). Thus, the new station address of the “wago-767-1201-52” fieldbus coupler is as follows ($2^2 + 2^4 + 2^5 = 4 + 16 + 32 = 52$).

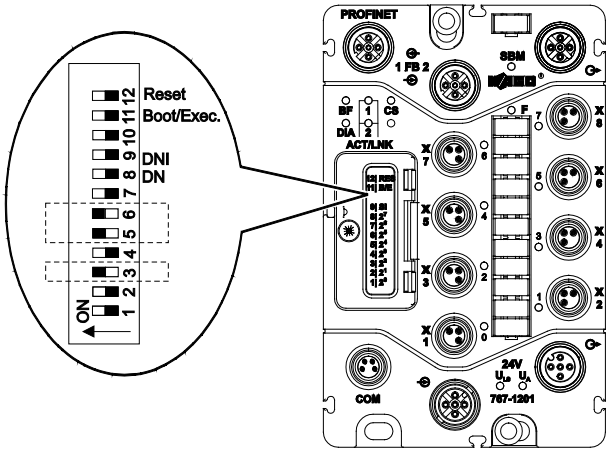


Figure 23: DIP switch set for instance 52

7.2 Switching on the Fieldbus Coupler

The fieldbus coupler starts running immediately when the power supply is switched on. Depending on how the name assignment for the fieldbus coupler is to be carried out, the station name may need to be set via the DIP switch before switching on the power supply.

After an initialization phase, the fieldbus coupler and all I/O modules connected to it are ready for operation. The fieldbus coupler indicates operational readiness when the BF LED blinks red. If the fieldbus coupler is not attached to the ETHERNET network via either the FB1 or FB2 ETHERNET connection, the BF LED illuminates red. In this state, the fieldbus coupler is not ready for operation.

Note

Data exchange
A data exchange with the IO Controller can only take place when the station name of the fieldbus coupler is consistent with the name of the configuration.

Note

Disruption during operation
None of the 767 Series devices are to be removed or added during operation, as this causes a disruption in the 767 station.

7.3 The Web-Based Management (WBM)

The Web-Based Management (WBM) serves to configure the fieldbus coupler. An Internet browser is needed in order to use the WBM. Enter the IP address of the fieldbus coupler into the address bar (e.g., http://192.168.1.100).

Note

IP Address
The device can only be accessed via an IP address if the station name is set (via DIP switch, temporarily assigned by a controller or read from retentive memory) AND
it has an IP address (temporarily assigned by the controller or retentive memory).

If both exist in the memory, then it is not necessary to establish a connection to a controller.

If you select the first time a link from the navigation bar, appears the password prompt, because the WBM part is password-protected.

Note

No password protection
The home (“Information” page) and the pages “ETHERNET” 'and “TCP / IP” are not password protected.

The user names and passwords are explained in section “User Administration”.

Figure 24: “Authentication required” dialog box

7.3.1 “Information” View

After entering the IP address, the start page “Information” appears from the web-based management. This site provides information on the fieldbus coupler, the network and the blink code.

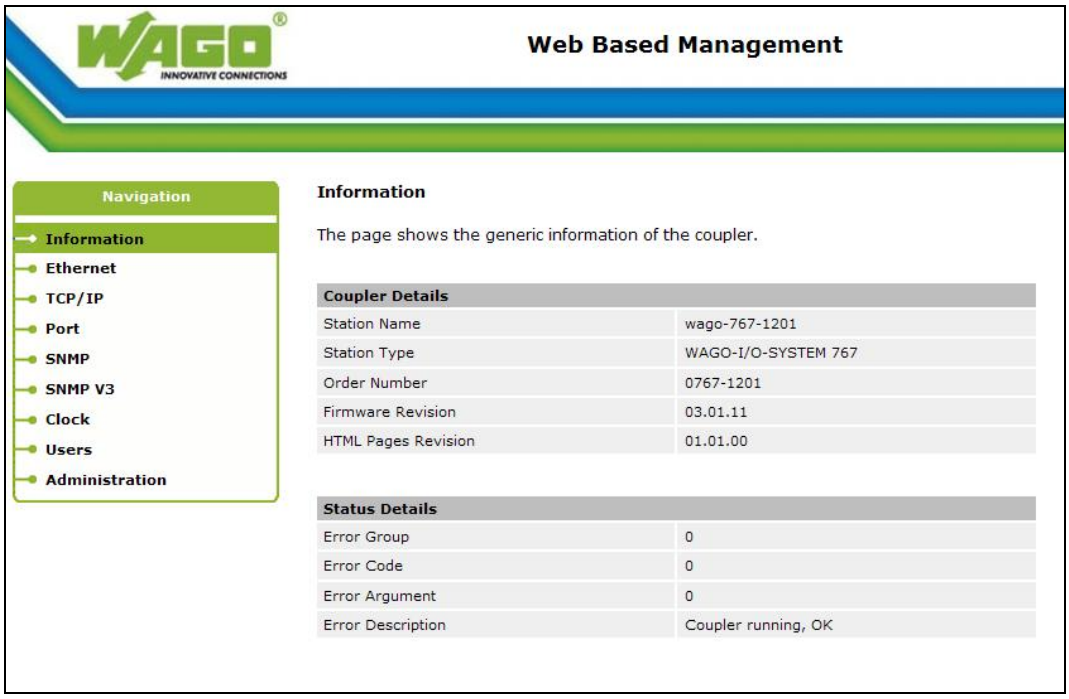


Figure 25: “Information” view

The following table explains the parameters listed on the site:

Table 27: Parameter description of the page “Information”

Coupler Details	
Station Name	Displays the user selected (via DIP switch or the PROFINET controller) station name.
Station Type	Displays the WAGO-SPEEDWAY-767-System.
Order Number	Displays the item number of the fieldbus coupler.
Firmware Revision	Displays the current status of the firmware.
HTML Pages Revision	Displays the current status of the version of the WBM pages.
Status Details	
Error Group	The error group, error code and error argument specify an error condition. For more information, see section “Meaning of the Blink Codes and Procedures for Troubleshooting”.
Error Code	
Error Argument	
Error Description	Network Details

7.3.2 “ETHERNET” View

The “ETHERNET” page contains information about the physical connection to the connected ETHERNET network. The value displayed cannot be changed.

The following table explains the parameters listed on the site:

Table 28: Parameter description of the page “ETHERNET”

ETHERNET Details		
MAC Address	Displays the MAC address, which helps identify and address the fieldbus coupler.	
ETHERNET Port Details		
	ETHERNET Port FB1	ETHERNET Port FB2
MAC Address	Displays the both port MAC address.	
Link state	Displays the current link status (up/down) of the port.	
Link speed	Displays the current transmission rate of the ETHERNET network; if you want data exchange via a fieldbus controller, you must operate the fieldbus coupler in a full-duplex network with 100 Mbit/s.	
Link mode	Displays the current transmission mode of the ETHERNET network; if you want data exchange via a fieldbus controller, you must operate the fieldbus coupler in a full-duplex network with 100 Mbit/s.	
Autonegotiation	Displays whether the automatic search for the optimal ETHERNET speed is activated.	
Auto MDIX	Displays if the Auto MDI-X function of the ETHERNET connection is enabled or disabled; the function employs an internal switching functionality to allow use of either crossed (cross-over) or straight-in (patch) cables.	

7.3.3 “TCP/IP” View

This page displays the TCP/IP settings.

You can use a project tool to change the configuration via the DCP protocol.

The following table explains the parameters listed on the site:

Table 29: Parameter description of the page “TCP/IP”

Active used IP configuration	
IP address	Displays the current IP address of the fieldbus coupler.
Subnet mask	Displays the current subnet mask of the fieldbus coupler.
Gateway	Displays the current gateway address of the fieldbus coupler.
Permanent stored IP configuration	
IP address	Displays the IP address of the fieldbus coupler stored in non-volatile memory.
Subnet mask	Displays the subnet mask of the fieldbus coupler stored in non-volatile memory.
Gateway	Displays the gateway address of the fieldbus coupler stored in non-volatile memory.

7.3.4 “Port” View

On this page for the protocol configuration, select the protocol that you would like to use for communication.

1. To confirm your entries, click **[SUBMIT]**.

2. To clear your entries, click **[RESET]**.

3. Your entries are not active until the software has been reset. To reset the software, click “Administration” in the navigation bar and then **[Software Reset]**.
   Alternatively, reset the software be cycling the system power supply.

Table 30: Parameter description of the page “Port”

Port Settings	
FTP	When this checkbox is selected, the protocol for file transfer is active. *Default setting: active*
HTTP	When this checkbox is selected, the Webserver (WBM) is active. *Default setting: active* Notice! By disabling the port, you are no longer able to reach the device WBM after restarting the device. To enable the port again later, use the “WAGOframe” programming tool (ETHERNET/IPV4/WEB-Server-Configuration).
SNMP	When the checkbox is selected, the device's SNMP functionality is available. *Default setting: active*
WAGO Services	When the checkbox is selected, the service protocol is available via TCP (“WAGOframe”). *Default setting: active*

7.3.5 “SNMP” View

The SNMP V1 and V2c network management protocols are configured on this page.

1. To confirm your entries, click **[SUBMIT]**.
2. To clear your entries, click **[RESET]**.
3. Your entries are not active until the software has been reset. To reset the software, click on “Administration” in the navigation bar and then **[Software Reset]**.
   Alternatively, reset the software be cycling the system power supply.

Table 31: Parameter description of the page “SNMP”

SNMP Configuration		
Entry	**Value (Default)**	**Description**
System Description	WAGO 0767-1201 FC PROFINET IO	Device name (sysName)
System Location (physical)	local	Location of device (sysLocation)
System Contact	support@wago.com	E-mail contact address (sysContact)
SNMP V1/V2 Manager Configuration		
Entry	**Value (Default)**	**Description**
Protocol Enable	SNMP V1/V2c ☑	☑ Activating SNMP Version 1/2c ☐ Deactivating SNMP-Version 1/2c
Local Community Name	public	Used community name
SNMP V1/V2 Trap Receiver Configuration		
Entry	**Value (Default)**	**Description**
Trap Receiver 1	0.0.0.0	IP address of **1.** used SNMP manager
Community Name 1	public	**1.** Community name of the network community used
Trap Version 1	V1 ◉ V2 ○	V1 ◉ V2 ○ Activating Traps Version 1 V1 ○ V2 ◉ Activating Traps Version 2
Trap Receiver 2	0.0.0.0	IP address of **2.** used SNMP manager
Community Name 2	public	**2.** Community name of the network community used
Trap Version 2	V1 ◉ V2 ○	V1 ◉ V2 ○ Activating Traps Version 1 V1 ○ V2 ◉ Activating Traps Version 2

7.3.6 “SNMP V3” View

The SNMP V3 network characteristics are configured on this page.

1. To confirm your entries, click **[SUBMIT]**.
2. To clear your entries, click **[RESET]**.
3. Your entries are not active until the software has been reset. To reset the software, click on “Administration” in the navigation bar and then **[Software Reset]**.
   Alternatively, reset the software be cycling the system power supply.

Table 32: Parameter description of the page “SNMP V3”

SNMP Configuration V3 (User)		
Entry	**Value Example)**	**Description**
1. User / 2. User	activate ☑	☑ Activating user 1 or 2
		☐ Deactivating user 1 or 2
Security Protocol	None ○ MD5 ◉ SHA1 ○	None ◉ MD5 ○ SHA1 ○ No encryption of the authentication
		None ○ MD5 ◉ SHA1 ○ Encryption of the authentication with MD5
		None ○ MD5 ○ SHA1 ◉ Encryption of the authentication with SHA1
Security Name	SecurityName-x	Enter the name, if the “Security Protocol” MD5 or SHA1 has been selected.
Security Key	Security Key	Enter the password with at least 8 characters, if “Security Protocol” MD5 or SHA1 has been selected.
Privacy Enable	DES ☑	☑ Activate the DES encryption of the data
		☐ Deactivate the DES encryption of the data
Privacy Key	Privacy Key	Enter the password of at least 8 characters in the encryption with DES
Notification/ Trap Enable	V3 ☑	☑ Activate the notification traps of the SNMP version 3
		☐ Deactivate the notification traps of the SNMP version 3
Notification Receiver IP	192.168.1.10	IP address of the notification manager

7.3.7 “Clock” View

On this page, the real-time clock is configured. The time and date can only be changed as user **admin** and **user**.

1. To clear your entries, click **[RESET]**.
2. To confirm your entries, click **[SUBMIT]**.
3. Your entries are not active until the software has been reset. To reset the software, click on “Users” in the navigation bar and then “Software reset”. You can also disconnect the power supply from the fieldbus coupler and then reconnect it.

Table 33: Parameter description of the page “Clock”

Configuration data	
Time on device	Set the time here.
Date (YYYY-MM-DD)	Set the date here.
Time zone (+/- hour:minute)	Set the time zone here.
Summer time	If this checkbox is activated, the WBM is set to summer time.
Display mode	
12-hour clock	Switching between 12-hour and 24-hour time display.

7.3.8 “Users” View

On this page, the passwords of the users **admin**, **user** and **guest** can be changed. Passwords can only be changed by the **admin** user. An overview of passwords can be found in section “User Administration”.

1. From the “user” selection box, select the user whose password you wish to change.
2. Enter your new password in the “New password” field.
3. Reenter the password in the “Confirm password” field to verify spelling.
4. To clear your entries, click **[RESET]**.
5. To confirm your entries, click **[SUBMIT]**. The password of the selected user is changed.

7.3.9 “Administration” View

On this page, you can reset the software or reset all parameters to the default status. You can only use these functions if you are logged on as the “admin” user. An overview of passwords can be found in section “User Management”.

1. To activate modified parameters in the fieldbus coupler, click on **[Software Reset]**.

2. To reset all parameters of the WBM to the default status, click on **[Restore Factory Settings]**. This also resets the IP address, causing the connection to the fieldbus coupler to be lost. In your configuration environment, assign a new IP address and station name to communicate with the device again.

8 Configuration

This section contains all information required for configuration of the 767 components for PROFINET IO.

Before parameterization of the 767 components, the configuration is to be carried out to determine the structure of the input and output process images. The size of such is identified from the configuration data. The contents of the process images are exchanged in the active data traffic with the IO Controller.

To generate the configuration data, transfer the topology of the station setup into the configuration software. Each I/O module appears in the hardware catalog of the configuration software.
For example, if a station is connected which consists of the fieldbus coupler, 2 x 8DI, 3 x 8DO and 2 x 4AI, the I/O modules are to be arranged in the configuration software in this order. If the configured topology deviates from the physical topology, the fieldbus coupler provides corresponding diagnostic information.

Before loading the configuration data into the IO Controller, the fieldbus coupler and I/O modules are to be parameterized. For more information on parameterization, see section “Parameterizing”

8.1 Information for Process Image

After starting up the fieldbus coupler, it automatically identifies all connected I/O modules. The size of the process image is established from the configuration data of the fieldbus coupler and of the I/O modules connected to it. The process image is limited to 1024 bytes of in- and output data. Thus, I/O modules can be connected to the fieldbus coupler until the process image reaches a maximum size of 1024 bytes in the sending direction and/or in the receiving direction. If the maximum size is exceeded in the corresponding input or output process image, an error message appears in the configuration software being used.

8.2 GSDML File

The GSDML file (Generial Station Description Markup Language) describes the properties of the fieldbus coupler and I/O modules which are necessary for a configuration, such as the characteristics or the parameter data. This file is required to configure the IO Controller and the fieldbus coupler for the active data exchange.

The GSDML file can be obtained at www.wago.com. When installing this file, please refer to the information provided in the documentation of the configuration software which you are using. The GSDML file is imported and installed from the configuration software.

8.2.1 Compatibility of Fieldbus Couplers Version R3/R5 and the GSDML Files

In addition to the functionality of the fieldbus coupler, the structure of GSDML files has changed in version R5 compared to version R3. For fieldbus coupler version R5, there is an R5 GSDML file created in accordance with the GSDML standard version 2.25.

In principle, the R3 GSDML file can be used with a fieldbus coupler version R5. However, there are some limitations as shown in the following table. An R5 GSDML file cannot be used with a fieldbus coupler version R3.

Table 34: Compatibility of field bus couplers version R3/R5 and the GSDML files

Property	**Field bus coupler version R5**		**Field bus coupler Version R3**
	R5-GSDML	R3-GSDML	R3-GSDML
GSDML version	2.25	2.2	2.2
I/O modules	all modules 3801 3802 3803 3804 3805 3806 4801 4802 4803 4804 4805 4806 4807 4808 5201 5202 5203 5204 5401 5801 5802 5803 6401 6402 6403 7401 …	all modules up to version R3 3801 3802 3803 3804 4801 4802 4803 4804 4805 4806 6401 6402 6403 7401	
DAP	Only advanced DAPs	Simple and advanced DAPs	Simple and advanced DAPs
Data format of the process image	Motorola/Intel	only Motorola	Motorola/Intel
Shared Device	yes	no	no
I&M 1-4 –Data	yes	no	no

9 Parameterizing

This section contains essential information for the parameterization of the 767 components, such as responding correctly in case of error and enabling diagnostic messages.

After the parameters of the fieldbus coupler and I/O modules have been set with your configuration tool, load the project (configuration data and parameter data) into the IO Controller (e.g. SIEMENS S7). The IO Controller conveys the configuration to the fieldbus coupler. After a successful configuration, the IO Controller conveys the operating settings (parameters) to the fieldbus coupler and I/O modules via acyclic services.

The adjustable properties of the fieldbus coupler and the I/O modules are defined by the installed GSDML file.

9.1 Parameterization of the Fieldbus Coupler

The following properties can be parameterized for the entire node via the fieldbus coupler (default values in ***italics***):

Table 35: Parameterization data of the fieldbus coupler

Parameter	Description
Module/channel diagnostics	disabled ***enabled***

You can also apply the following settings to the digital inputs of the fieldbus coupler:

Table 36: Parameterization data of digital inputs of the fieldbus coupler

Parameter	Description
Module	
Diagnostics: Short circuit field supply	***disabled*** enabled
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 8	
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15.0 20.0
Substitute strategy	***Provide substitute value*** Provide last value
Substitute value	***0*** 1

9.2 Parameters of the I/O Modules

The following is a description of all adjustable properties of the I/O modules of the 767 system (preset values in ***italics***):

9.2.1 8-Channel Digital Input Modules (767-3801, 767-3802, 767-3803, 767-3804, 767-3805)

The following settings can be applied to the digital input modules (preset values in ***italics***):

Table 37: Parameters of the 8DI module

Parameter	Description
Module	
Diagnostics: Short circuit field supply	***disabled*** enabled
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 8	
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15.0 20.0
Substitute strategy	***Provide substitute value*** Provide last value
Substitute value	***0*** 1

9.2.2 8-Channel Digital Output Modules (767-4801, 767-4802, 767-4803, 767-4804, 0767-4801/0000-0800, 0767-4802/0000-0800, 0767-4803/0000-0800, 0767-4804/0000-0800)

The following settings can be applied to the digital output modules (preset values in ***italics***):

Table 38: Parameters of the 8DO module

Parameter	Description
Module	
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 8	
Diagnostics: Short circuit	***disabled*** enabled
Diagnostics: Overtemperature	***disabled*** enabled
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1

9.2.3 8-Channel Digital Output Modules (767-4805, 767-4806, 767-4807, 0767-4807/0000-0800)

The following settings can be applied to the digital output modules (preset values in ***italics***):

Table 39: Parameters of the 8DO module

Parameter	Description
Module	
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 8	
Diagnostics: Overtemperature	***disabled*** enabled
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1

9.2.4 TTL Incremental/SSI Encoder Interface (767-5201)

The following settings can be applied to the TTL Incremental/SSI Encoder Interface (preset values in ***italics***):

9.2.4.1 Function with 2 Incremental Encoders

Table 40: Parameter function with 2 Incremental Encoders

Parameter	Description
Module	
Diagnostics field supply channel 1, 2	***disabled*** enabled
Diagnostics field supply channel 3, 4	***disabled*** enabled
Diagnostics: Short circuit field supply	***disabled*** enabled
Channel 1.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 1.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1

Table 40: Parameter function with 2 Incremental Encoders

Parameter	Description
Channel 2.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 2.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1

Table 40: Parameter function with 2 Incremental Encoders

Parameter	Description
Channel 3 – Incremental-Encoder 1 / Channel 4 – Incremental-Encoder 2	
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 21 DI 3[2] via DI 3[1] DI 4[2]
Input Gate	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Input Preset	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 6[1] DI 8[2]
Cam digital output	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Counter mode	***Up/Down counter*** Gate-time/Frequency counter Gate-time/Cycle-time counter
Gate time [ms]	1 10 100 ***1000***
Interference signal filter [µs]	***off*** 0,5 1 2
4-fold evaluation	***off*** on

[1] Encoder 1
[2] Encoder 2

9.2.4.2 Function with 2 SSI Encoders

Table 41: Parameter function with 2 SSI Encoders

Parameter	Description
Module	
Diagnostics field supply channel 1, 2	***disabled*** enabled
Diagnostics field supply channel 3, 4	***disabled*** enabled
Diagnostics: Short circuit field supply	***disabled*** enabled
Channel 1.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 1.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 2.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0

Table 41: Parameter function with 2 SSI Encoders

Parameter	Description
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 2.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 3 – SSI Encoder 1 / Channel 4 – SSI Encoder 2	
Diagnostics SSI	***disabled*** enabled
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Input Gate	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Input Preset	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 6[1] DI 8[2]
Cam digital output	***off*** via DO 1 via DO 2[1] DO 3[2] via DO 3[1] DO 4[2]
Baud rate [kHz]	62,5 125 ***250*** 500 1000 2000
Number of data bits (single-turn)	8 … 23 ***13***
Number of data bits (multi-turn)	0 … 15 ***12***

Table 41: Parameter function with 2 SSI Encoders

Parameter	Description
Evaluation alarmbit	***off*** on
Parity	***None*** Odd Even
Encoding format	***Binary*** Gray

[1] SSI Encoder 1
[2] SSI Encoder 2

9.2.4.3 Function with 1 Incremental Encoder and 1 SSI Encoder

Table 42: Parameter function with 1 Incremental Encoder and 1 SSI Encoder

Parameter	Description
Module	
Diagnostics field supply channel 1, 2	***disabled*** enabled
Diagnostics field supply channel 3, 4	***disabled*** enabled
Diagnostics: Short circuit field supply	***disabled*** enabled
Channel 1.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 1.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 2.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0

Table 42: Parameter function with 1 Incremental Encoder and 1 SSI Encoder

Parameter	Description
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 2.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 3 – Incremental Encoder 1	
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 2 via DI 3
Input Gate	***off*** via DI 1 via DI 2 via DI 3
Input Preset	***off*** via DI 1 via DI 2 via DI 6
Cam digital Output	***off*** via DI 1 via DI 2 via DI 3
Counter mode	***Up/Down counter*** Gate-time/Frequency counter Gate-time/Cycle-time counter
Gate time [ms]	1 10 100 ***1000***
Interference signal filter [µs]	***off*** 0,5 1 2

Table 42: Parameter function with 1 Incremental Encoder and 1 SSI Encoder

Parameter	Description
4-fold evaluation	***off*** on
Channel 4 – SSI Encoder 1	
Diagnostics SSI	***disabled*** enabled
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 3 via DI 4
Input Gate	***off*** via DI 1 via DI 3 via DI 4
Input Preset	***off*** via DI 1 via DI 3 via DI 8
Cam digital output	***off*** via DO 1 via DO 3 via DO 4
Baud rate [kHz]	62,5 125 ***250*** 500 1000 2000
Number of data bits (single-turn)	8 … 23 ***13***
Number of data bits (multi-turn)	0 … 15 ***12***
Evaluation alarmbit	***off*** on
Parity	***None*** Odd Even
Encoding format	***Binary*** Gray

9.2.5 HTL Incremental Encoder/ Counter Interface (767-5202)

The following settings can be applied to the HTL Incremental Encoder/ Counter Interface (preset values in ***italics***):

9.2.5.1 Function with 2 Counters

Table 43: Parameter function with 2 Counters

Parameter	Description
Module	
Diagnostics field supply channel 1, 2	***disabled*** enabled
Diagnostics field supply channel 3, 4	***disabled*** enabled
Diagnostics: Short circuit field supply	***disabled*** enabled
Channel 1.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 1.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 2.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output

Table 43: Parameter function with 2 Counters

Parameter	Description
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 2.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 3 – Counter 1 / Channel 4 – Counter 2	
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Input Gate	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Input Preset	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 6[1] DI 8[2]
Cam digital Output	***off*** via DO 1 via DO 2[1] DO 3[2] via DO 3[1] DO 4[2]
Counter mode	***Up/Down counter*** Gate-time/Frequency counter Gate-time/Cycle-time counter Pulse-duration measurement Pulse-width measurement

Table 43: Parameter function with 2 Counters

Parameter	Description
Gate time [ms]	1 10 100 ***1000***
Input counter direction	***off*** via DI 5[1] DI 7[2]

[1] Counter 1
[2] Counter 2

9.2.5.2 Function with 2 Incremental Encoders

Table 44: Parameter function with 2 Incremental Encoders

Parameter	Description
Module	
Diagnostics field supply channel 1, 2	***disabled*** enabled
Diagnostics field supply channel 3, 4	***disabled*** enabled
Diagnostics: Short circuit field supply	***disabled*** enabled
Channel 1.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 1.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 2.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0

Table 44: Parameter function with 2 Incremental Encoders

Parameter	Description
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 2.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 3 – Incremental Encoder 1 / Channel 4 – Incremental Encoder 2	
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Input Gate	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 3[1] DI 4[2]
Input Preset	***off*** via DI 1 via DI 2[1] DI 3[2] via DI 6[1] DI 8[2]
Cam digital Output	***off*** via DO 1 via DO 2[1] DO 3[2] via DO 3[1] DO 4[2]
Counter mode	***Up/Down counter*** Gate-time/Frequency counter Gate-time/Cycle-time counter
Gate time [ms]	1 10 100 ***1000***
Interference signal filter [µs]	***off*** 0,5 1 2

Table 44: Parameter function with 2 Incremental Encoders

Parameter	Description
4-fold evaluation	***off*** on

[1] Encoder 1
[2] Encoder 2

9.2.5.3 Function with 1 Counter and 1 Incremental Encoder

Table 45: Parameter function with 1 Counter and 1 Incremental Encoder

Parameter	Description
Module	
Diagnostics field supply channel 1, 2	***disabled*** enabled
Diagnostics field supply channel 3, 4	***disabled*** enabled
Diagnostics: Short circuit field supply	***disabled*** enabled
Channel 1.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 1.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 2.1	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0

Table 45: Parameter function with 1 Counter and 1 Incremental Encoder

Parameter	Description
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
PWM Output / Frequency [Hz]	***deactivated*** 500 2k 10k
Channel 2.2	
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Filter time [ms]	***deactivated*** 0.065 0.25 1.0
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Channel 3 – Counter 1	
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 2 via DI 3
Input Gate	***off*** via DI 1 via DI 2 via DI 3
Input Preset	***off*** via DI 1 via DI 2 via DI 6
Cam digital Output	***off*** via DI 1 via DI 2 via DI 3
Counter mode	***Up/Down counter*** Gate-time/Frequency counter Gate-time/Cycle-time counter Pulse-duration measurement Pulse-width measurement
Gate time [ms]	1 10 100 ***1000***
Input counter direction	***off*** via DI 5

Table 45: Parameter function with 1 Counter and 1 Incremental Encoder

Parameter	Description
Channel 4 – Incremental Encoder 1	
Diagnostics Counter	***disabled*** enabled
Input Latch	***off*** via DI 1 via DI 3 via DI 4
Input Gate	***off*** via DI 1 via DI 3 via DI 4
Input Preset	***off*** via DI 1 via DI 3 via DI 8
Cam digital Output	***off*** via DO 1 via DO 3 via DO 4
Counter mode	***Up/Down counter*** Gate-time/Frequency counter Gate-time/Cycle-time counter
Gate time [ms]	1 10 100 ***1000***
Interference signal filter [µs]	***off*** 0,5 1 2
4-fold evaluation	***off*** on

[1] Encoder 1
[2] Encoder 2

9.2.6 Serial Interface (767-5203)

The following settings can be applied to the Serial Interface (preset values in ***italics***):

Note

Parameter Combinations
Not all parameter combinations are valid.
More information about valid parameterizations is available in the respective I/O module manual.

Table 46: Parameters of the Serial Interface

Parameter	Description
Module	
Diagnostics: Short circuit field supply	***disabled*** enabled
channel 0, 1, 2, 3	
Operating mode	***Digital input*** Digital output
Diagnostics	***disabled*** enabled
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15.0 20.0
Substitute strategy	***Provide or apply substitute value*** Provide or hold last value
Substitute value	***0*** 1
Interface 1, 2	
Operating mode	RS-232 ***RS-422/-485hHalf duplex*** RS-422/485 full duplex
Transmission rate [Baud]	2400 4800 ***9600*** 19200 38400 57600 115200
Stop bits	7 ***8***
Stop bits	***1*** 2
Parity	***None*** Odd Even
Flow control	***None*** Xon/Xoff RTS/CTS

9.2.7 MOVILINK Interface (767-5204)

The following settings can be applied to the MOVILINK Interface (preset values in ***italics***):

Note

Parameter Combinations
Not all parameter combinations are valid.
More information about valid parameterizations is available in the respective I/O module manual.

Table 47: Parameters of the MOVILINK Interface

Parameter	Description
Module	
Basic setting	***Mailbox Mode*** Easy Mode, Serial Interface 1 Easy Mode, Serial Interface 2
Diagnostics: Short circuit field supply	***disabled*** enabled
Interface 1, Interface 2	
Operating mode	***RS-485*** RS-232
Transmission rate [Baud]	***9600*** 57600
Channel 0 … 3	
Operating mode	***Digital input*** Digital output
Diagnostics	***disabled*** enabled
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15 20
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1

9.2.8 DIO Module with 8 Channels (767-5801, 767-5802, 767-5803, 0767-5801/0000-0800, 0767-5802/0000-0800, 0767-5803/0000-0800)

Note

Delay in Establishing the Connection
After the function mode of one or more 580x modules has been changed, it can take several seconds to establish a connection when first establishing communication with a fieldbus controller. The cause is that the function mode of the I/O modules is changed and then saved.
The delay only occurs when first establishing the connection.

The following settings can be applied to the DIO Module with 8 Channels (preset values in ***italics***):

9.2.8.1 Operating mode DO: Operation as a Digital Output module

Table 48: Parameters for operation as a digital output module

Parameter	Description
Diagnostics: Short circuit field supply	***disabled*** enabled
Diagnostics	***disabled*** enabled
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1

9.2.8.2 Operating mode DI: Operation as Digital Input module

Table 49: Parameters for operation as a digital input module

Parameter	Description
Diagnostics: Short circuit field supply	***disabled*** enabled
Diagnostics	***disabled*** enabled
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15.0 20.0

9.2.8.3 Operating mode DIO: Combined Operation of Digital Input- and -Output module

Table 50: Parameters for operation as Digital Input- and -Output module

Parameter	Description
Diagnostics: Short circuit field supply	***disabled*** enabled
Diagnostics	***disabled*** enabled
Function mode	***Digital input*** Digital output
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15.0 20.0

9.2.8.4 Operating mode DIO + 1 Counter: Combined Operation of Digital Input- and -Output module with 1 Counter

Table 51: Parameters for operation as Digital Input- and –Output module with 1 Counter

Parameter	Description
Diagnostics: Short circuit field supply	***disabled*** enabled
Counter mode	***Event counter*** Gate time counter Pulse duration counter
Counter direction	***Up*** Down
Counter Reset at limit value	***disabled*** enabled
Diagnostics	***disabled*** enabled
Operating mode	***Digital input*** Digital output
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15.0 20.0

9.2.8.5 Operating mode DIO + 2 Counters: Combined Operation of Digital Input- and –Output modules with 2 Counters

Table 52: Parameters for operation as Digital Input- and –Output modules with 2 Counters

Parameter	Description
Diagnostics: Short circuit field supply	***disabled*** enabled
Counter mode	***Event counter*** Gate time counter Pulse duration counter
Counter direction	***Up*** Down
Counter Reset at limit value	***disabled*** enabled
Diagnostics	***disabled*** enabled
Operating mode[4]	***Digital input*** Digital output
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	***0*** 1
Filter time [ms]	deactivated 0.1 0.5 ***3.0*** 15.0 20.0

9.2.9 4-Channels Analog Input Modules Voltage/Current (767-6401)

The following settings can be applied to the analog input modules voltage/current (default values in ***italics***):

Table 53: Parameters of the 4AI U/I modules

Parameter	Description
Module	
Sample mode (channels 1 … 4)	***asynchronous*** synchronous to S-BUS cycle
Diagnostics: Short circuit field supply	***disabled*** enabled
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 4	
Diagnostics: Lower limit	***disabled*** enabled
Diagnostics: Upper limit	***disabled*** enabled
Process alarm: Lower user limit	***disabled*** enabled
Process Alarm: Upper user limit	***disabled*** enabled
Diagnostics: Overload	***disabled*** enabled
Diagnostics: Line break	***disabled*** enabled
Measurement parameter/range	***0 … 10 V*** +/-10 V 0 … 20 mA 4 … 20 mA +/-20mA user defined 1 … 4
Input filter	***deactivated*** 50 Hz 60 Hz
Upper user limit	-32768 … ***32767***
Lower user limit	***-32768*** … 32767
Sample rate [kHz]	***1.000*** 0.500 0.250 0.125

9.2.10 4-Channel RTD Analog Input Modules (767-6402)

The following settings can be applied to the RTD analog input modules (default values in ***italics***):

Table 54: Parameters of the 4AI RTD Modules

Parameter	Description
Module	
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 4	
Diagnostics: Lower limit	***disabled*** enabled
Diagnostics: Upper limit	***disabled*** enabled
Process alarm: Lower user limit	***disabled*** enabled
Process Alarm: Upper user limit	***disabled*** enabled
Measurement parameter/range	***Thermal resistor Pt100*** Thermal resistor Pt200 Thermal resistor Pt500 Thermal resistor Pt1000 Thermal resistor Ni100 Thermal resistor Ni120 Thermal resistor Ni1000 Resistor 1k Resistor 4k Potentiometer user defined 1 … 4
Integration time [ms]	***2.0*** 4.0 8.0 16.7 20.0 30.0 60.0 120.0
Sensor connection	deactivated 2-wire ***3-wire*** 4-wire
Upper user limit	-32768 … ***32767***
Lower user limit	***-32768*** … 32767

9.2.11 4-Channel TC Analog Input Modules (767-6403)

The following settings can be applied to the TC analog input modules:

Table 55: Parameters of the 4AI TC Modules

Parameter	Description
Module	
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 4	
Diagnostics: Upper limit	***disabled*** enabled
Diagnostics: Lower limit	***disabled*** enabled
Diagnostics: Line break	***disabled*** enabled
Process alarm: Lower user limit	***disabled*** enabled
Process Alarm: Upper user limit	***disabled*** enabled
Measurement parameter/range	Thermocouple type B Thermocouple type C Thermocouple type E Thermocouple type J ***Thermocouple type K*** Thermocouple type N Thermocouple type R Thermocouple type S Thermocouple type T Voltage +/- 36 mV Voltage +/- 72 mV Voltage +/- 145 mV Voltage +/- 290 mV user defined 1 … 2
Integration time [ms]	2.0 4.0 8.0 16.7 20.0 30.0 ***60.0*** 120.0
Sensor connection	deactivated external CJC ***local CJC of current channel*** local CJC of previous channel
Upper user limit	-32768 … ***32767***
Lower user limit	***-32768*** … 32767

9.2.12 4-Channel Analog Output Modules Voltage/Current (767-7401)

The following settings can be applied to the analog output modules (default values in ***italics***):

Table 56: Parameters of the 4AO U/I modules

Parameter	Description
Module	
Sample mode (channels 1 … 4)	***asynchronous*** synchronous to S-BUS cycle
Diagnostics: Short circuit actuator supply	***disabled*** enabled
Diagnostics: Undervoltage U_{LS}	***disabled*** enabled
Diagnostics: Undervoltage U_A	***disabled*** enabled
Channel 1 … 4	
Diagnostics: External fault	***disabled*** enabled
Output variable/range	**0 … 10 V** +/-10 V 0 … 20 mA 4 … 20 mA +/-20 mA user defined 1 … 4
Output	***disabled*** enabled
Substitute strategy	***Set substitute value*** Keep last value
Substitute value	-32768 **…** ***0*** **…** 32767

10 Acyclic Services

Using acyclic services, you can read out or modify information of the fieldbus coupler and the connected I/O modules. The fieldbus coupler supports all PROFINET-specific services (such as diagnostic services) and the manufacturer-specific services (I&M services and parameterization services). Each service is designated by a defined index.

Examples

Table 57: PROFINET-specific services

Index	Access authorization	Description
0xE00C	R	Diagnostic data, maintenance data and status data of a communication relationship
0xF000	R	Identification data of the actual configuration for a defined profile (API)
0xF020	R	Data of a communication relationship for a defined profile (API)

Table 58: Manufacturer-specific services

Index	Access authorization	Description
0x4000	R/W	Parameterization of the coupler and I/O modules
0xAFF0	R	I&M0 maintenance and identification data set

In slot 0, subslot 1 (Fieldbus coupler), the following I&M services to read and write:

Table 59: Fieldbus-coupler specific services

Index	Access authorization	Description
0xAFF1	R/W	I&M1
0xAFF2	R/W	I&M2
0xAFF3	R/W	I&M3
0xAFF4	R/W	I&M4

Note

Write access
Modifying information of the fieldbus coupler and I/O modules is only possible when write access is granted for the respective service.

10.1 I&M Services

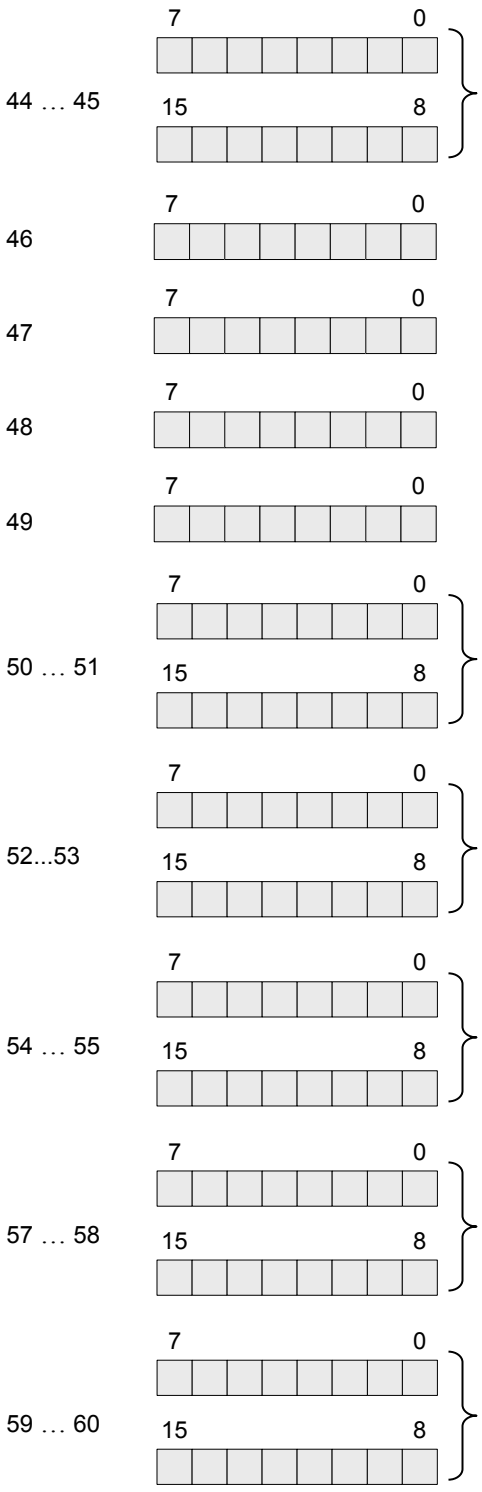
The information available in the 767 components is not only relevant for the actual automation function, but are also used by various applications during the entire life cycle. Of particular significance is data that is pertinent to service and maintenance processes.

Uniform data structures and access mechanisms were defined for PROFINET in the “Identification and Maintenance Functions” (I&M) so that applications can access this information without regard to device type or profile. I&M data can be retrieved both for the fieldbus coupler and for the existing I/O modules.

Additional information is necessary to analyze the I&M data and can be obtained on the Internet at www.profibus.com. This website offers device-specific information (e.g. device documentation and the device description file).

The following table lists the parameters of the I&M0 data set and describes the values by means of the fieldbus coupler.

Byte offset		
0 … 1	***Block type***	
	0x0020:	I&M0
2 … 3	***Block length***	
	56:	54 byte I&M0 data + 2-byte version
4	***Block version (high)***	
	1:	Data set version
5	***Block version (low)***	
	0:	Data set version
6 … 7	***Manufacturer ID***	
	0x011D:	WAGO
8 … 27	***Order designation (20 characters)***	
	“0767-1201”	
28 … 43	***Serial number (16 characters)***	
	“???”	No serial number
	“12AB3456”	Serial number



Hardware version
0x0002: Hardware version

Software prefix
V: Official release version

Software functionality
2: Level of development

Troubleshooting
1: Error status

Modifications
5: Correction status

Version counter
0x0001: Series of version

Profile identification
0x0000: Standard profile

Profile type
0x0000: Standard type

I&M version
0x0101: I&M Version

I&M support
0x0000: I&M0 data set

10.2 Parameter Services

The parameterization of the 767-1201 PROFINET coupler is only possible via the acyclic services, for which the index 4000_H is to be used.

After configuration of the fieldbus coupler, the IO Controller conveys the parameterization data in order to change the settings of the coupler and the I/O modules according to the configuration. An overview of the parameters that are to be set can be found in section “Parameterizing”.

The coupler and the I/O modules can also exchange data without parameterization with an IO Controller. In this case, the settings used are the standard settings designated in ***cursive*** in section “Parameterizing”.

10.3 Diagnostic Services

The diagnostic services help to read out disruptions in the fieldbus coupler or the I/O modules. The PROFINET specification defines various data sets in this regard. The following table lists several diagnostic services:

Table 60: Diagnostic services

Index	Access authorization	Description
0x800B	R	Diagnostic data of a sub-module
0x800C	R	Diagnostic data, maintenance data and status data of a sub-module
0xC00B	R	Diagnostic data of a module
0xC00C	R	Diagnostic data, maintenance data and status data of a module
0xE00B	R	Diagnostic data of a communication relationship
0xE00C	R	Diagnostic data, maintenance data and status data of a communication relationship
0xF00B	R	Diagnostic data for a defined profile (API)
0xF00C	R	Diagnostic data, maintenance data and status data for a defined profile (API)

The structure of the diagnostic data is the same for each data set in the conveyance and is displayed in section “Diagnostics”.

11 Operation with 2 Fieldbus Controllers (Shared Device)

The fieldbus coupler can accept connections (AR) with 2 fieldbus controllers (IOCAR) and 1 supervisor (IOSAR) and communicate with all at the same time (see section “Features of GSDML Version R5”).

In the context of PROFINET, it is generally assumed that each I/O module is assigned to only one fieldbus controller.

However, it is also possible to assign one I/O module to two fieldbus controllers. In this case, the first fieldbus controller connected to the device obtains access rights (Lock) to the I/O module. Only this fieldbus controller can parameterize the I/O module and read or write process data. Access by another fieldbus controller is rejected with an error message. When establishing a connection through a second fieldbus controller, I/O modules that “belong” to another fieldbus controller marked as “LockedByIOC” in the “ModuleDiffBlock”.

Only when the connection to the first fieldbus controller is interrupted can I/O modules from the next pending fieldbus controller be accepted. For this purpose, the device sends a “Release Alarm” for each I/O module claimed by other fieldbus controllers. The I/O module is then accepted by the fieldbus controller, reparameterized and process data is exchanged with it. This can lead to a change in the functionality of the I/O module if the parameters set for the I/O module in the configurations of both fieldbus controllers differ (see also the following warning).

If the “duplicate configuration” is unwanted, e.g., the Shared Device functionality of the Siemens Step7 controller can be used that prevents this tool aided.

Note

Behavior of the Process Image when Establishing a Connection
A second connection established during an existing connection results in an interruption in refreshing the existing process image of the first connection while setting up the new process image. This takes max. 100 ms. During this time, the process image available at the beginning of setting up the process image is sent.

⚠ WARNING

Using Digital Input/Output Modules

When using digital input/output modules (e.g., 5801, 5802, 5803), please note that the operating mode of the I/O module is defined in the configuration. It depends on the type of submodule assigned to the I/O module. If you have assigned the I/O module to two different fieldbus controllers that assign different submodules to the I/O module in your configuration, the operating mode depends on the order in which the fieldbus controllers connect to the fieldbus controller. The first fieldbus controller determines the operating mode of the I/O module. For the second fieldbus controller, the I/O module is marked as “WRONG Module” in the “ModuleDiffBlock”.

The configuration error can cause the I/O module to behave differently when restarting the system (e.g., hybrid module is configured sometimes as an input, sometimes as an output).

12 PROFINET IO Diagnostics

This section contains all information required to analyze the diagnostic information of the 767 components for PROFINET IO.

PROFINET IO offers the possibility of reporting error statuses in the form of device diagnostics. Disruptions in the 767 components are stored in a diagnostic memory until corrected. During data exchange, the fieldbus coupler sends a diagnostic alarm to the IO Controller so that the disruption can be responded to. The fieldbus coupler conveys the stored diagnostic information on demand (acyclic service). The presence of a disruption is also indicated via the DIA LED on the fieldbus coupler.

Note

Diagnostic information
Some diagnostic information, such as a short circuit or undervoltage, is not available until release within the scope of parameterization.

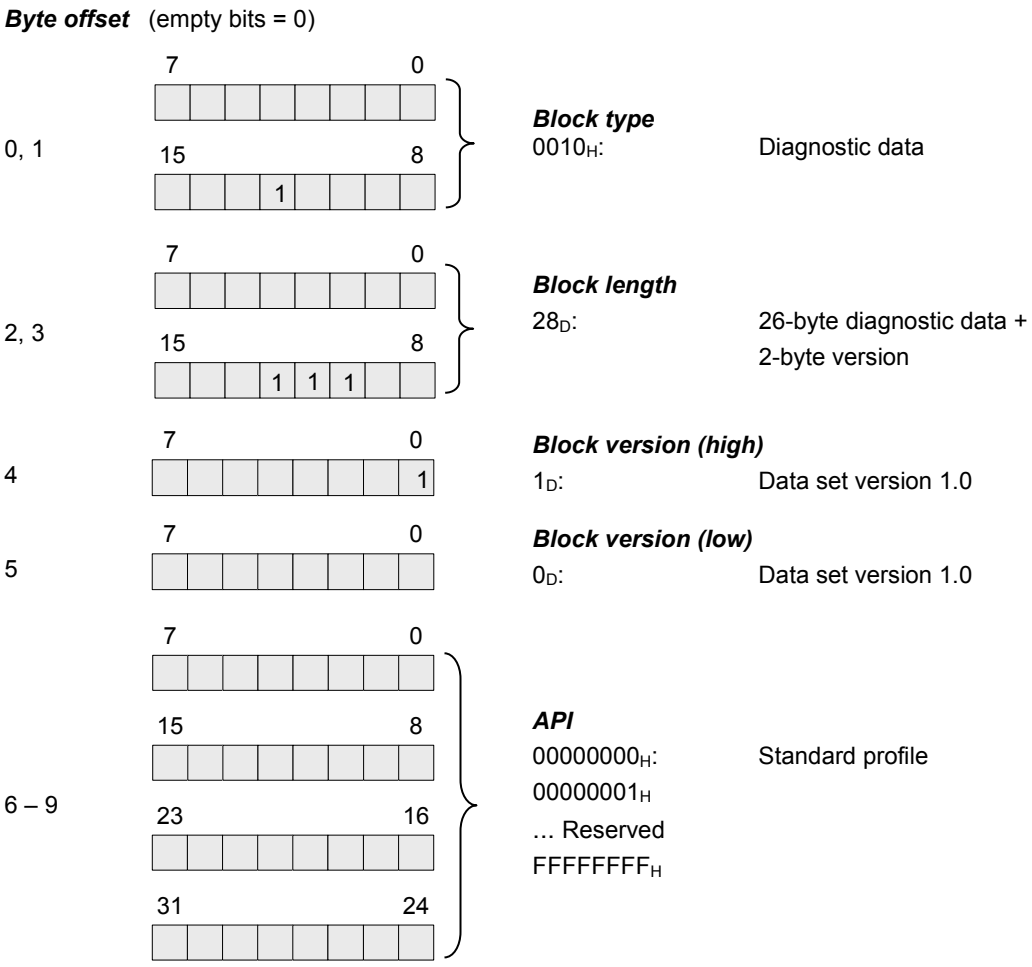
For the fieldbus coupler, the advanced diagnostic is used to indicate disruptions in the configuration and parameterization, as well as disruptions on the S-BUS. The advanced diagnostic always includes the error type and, in contrast to the basic diagnostics, the expanded error type for additional information. Thus, a diagnosis can be made not only for undervoltage on an I/O module, but also for decreases in the actuator voltage (U_A) and the logic and sensor voltages (U_{LS}).

The disruptions can be indicated with the help of the configuration tool that you used to create your project. According to the information from the GSDML file, the disruptions are textually displayed. The diagnostic data of a disruption is structured as follows:

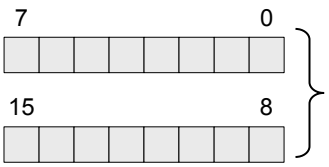
Note

Transmission format

The data is portrayed in Motorola format. This portrayal is consistent with the transmission format in a PROFINET network.



10, 11



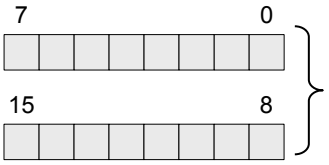
Slot (module slot)

0_D:	Coupler module
1_D:	Integrated digital inputs
2_D … 64_D:	I/O modules
65_D … 65535_D:	Reserved

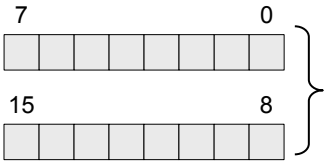
Sub-slot (sub-module slot)

0_D:	Reserved
1_D:	Coupler, I/O module
2_D … 32767_D:	Reserved
32768_D:	ETHERNET interface
32769_D:	FB1 ETHERNET connection
32770_D:	FB2 ETHERNET connection
327710_D … 65535_D:	Reserved

12, 13



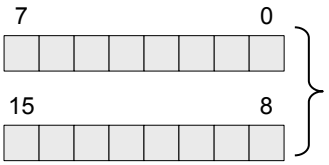
14, 15



Channel number (source of error)

0000_H... $7FFF_H$:	Channel
8000_H:	Sub-module
8001_H... $FFFF_H$:	Channel

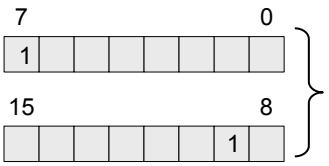
16, 17



Channel properties

See explanation of channel properties

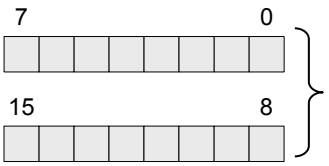
18, 19



Structure identification (diagnostic type)

8002:	Advanced diagnostic

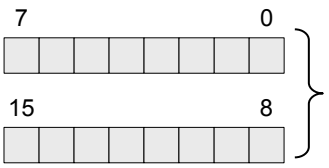
20, 21



Channel number (source of error)

0000_H... $7FFF_H$:	Channel
8000_H:	Sub-module
8001_H... $FFFF_H$:	Channel

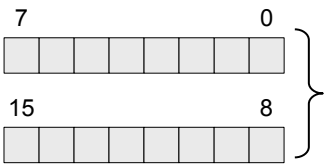
22, 23



Channel properties

See explanation of channel properties on next page.

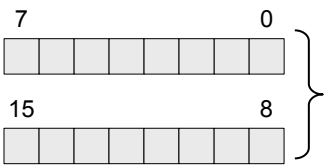
24, 25



Error type

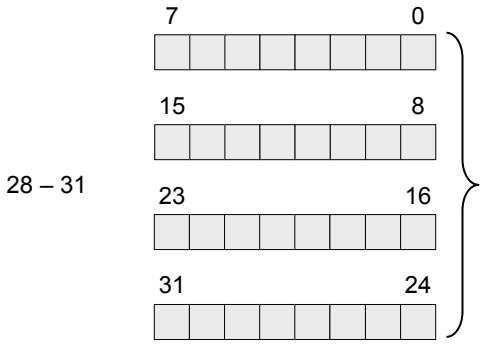
See description of error types in section “PROFINET IO Diagnostics”.

26, 27



Expanded error type

See description of error types in section “PROFINET IO Diagnostics”.



Additional diagnostic information

Coupler-specific error values (value 0 or corresponding to expanded error type)

The channel properties are stored in a 16-bit value and defined as follows in accordance with the PROFINET specification:

Table 61: Channel properties, type (bit 0 … 7)

Type	Description
00_H	The value is to be used in connection with a module-specific diagnostic (channel number = 8000_H) or when the data width of the channel is not specified.
01_H	Channel-specific diagnostic, channel data width = 1 bit.
02_H	Channel-specific diagnostic, channel data width = 2 bits.
03_H	Channel-specific diagnostic, channel data width = 4 bits.
04_H	Channel-specific diagnostic, channel data width = 8 bits.
05_H	Channel-specific diagnostic, channel data width = 16 bits.
06_H	Channel-specific diagnostic, channel data width = 32 bits.
07_H	Channel-specific diagnostic, channel data width = 64 bits.

Table 62 Channel properties, group diagnostic (bit 8)

Diagnostic	Description
00_H	This diagnostic can be assigned to the module or to a channel.
01_H	This is a group diagnostic that was released by one or more channels.

Table 63: Channel properties, maintenance information (bit 9 … 10)

Information	Description
00_H	This diagnostic describes a disruption. The diagnostic incident is defined in bit 11 … 12.
01_H	This diagnostic describes a status of the module in which maintenance is required. The diagnostic incident is defined in bit 11 … 12.
02_H	This diagnostic describes a status of the module in which maintenance should be carried out soon. The diagnostic incident is defined in bit 11 … 12.
03_H	This diagnostic describes a disruption. According to the error type, qualified information is also conveyed.

Table 64: Channel properties, incident (bit 11 … 12)

Diagnostic	Description
00_H	This diagnostic is no longer available, including the advanced diagnostic information (maintenance).
01_H	A diagnostic has arisen or continues to exist.
02_H	This diagnostic is no longer available.
03_H	This diagnostic is no longer available, but other error messages are stored in the diagnostic memory.

Table 65: Channel properties, data direction (bit 13 … 15)

Direction	Description
00_H	Manufacturer-specific definition, e.g. with a module-specific diagnostic.
01_H	This is a channel with input data.
02_H	This is a channel with output data.
03_H	This is a channel with both input and output data.

12.1 Standard Error Types

The standard error types describe general errors with disruptions in the I/O modules and the internal digital inputs of the fieldbus coupler. The standard error types are defined in the PROFINET specification.

Table 66: Standard error types and description

Error type	Expanded error type	Description
1	0	Short circuit
2	0	Undervoltage
3	0	Overvoltage
4	0	Overload
5	0	Overtemperature
6	0	Line break
7	0	Upper limit
8	0	lower limit
9	0	Error

12.2 Configuration-Specific Error Types

The configuration-specific error types describe errors arising with the configuration of the fieldbus coupler and the I/O module. These can include differences between the preset and the actual configuration, resource conflicts, or errors with creating the process image. The expanded error type provides a more specific description of the error.

Table 67: Configuration-specific error types and description

Error type	Expanded error type	Description
257	513	Resources unavailable
	514	(Sub-)Module type mismatch
	515	Unknown module identifier
	516	Unknown submodule identifier
	517	-
	518	-
	519	Submodule locked by IO Controller
	520	Submodule locked by IO Device
	521	Submodule locked by IO Supervisor
	522	Consumer data length failure
	523	Diagnostic data length failure
	524	Provider data length failure
	525	Consumer data offset failure
	526	Diagnostic data offset failure
	527	Provider data offset failure
	528	Adding process image information failed
	529	Building process image failed
	530	Building process image failed
	531	Recalculation of process image failed

12.3 Parameterization-Specific Error Types

The parameterization-specific error types describe errors arising with the parameterization of the fieldbus coupler and the I/O module. These can include invalid data content or faulty access to an I/O module. The expanded error type provides a more specific description of the error.

Table 68: Parameterization-Specific Error Types and description

Error type	Expanded error type	Description
16	257	Invalid interface
	258	Invalid reference
	259	Invalid device identifier
	260	Invalid application relationship
	261	Invalid application profile identifier
	262	Invalid module or invalid slot
	263	Invalid submodule or invalid subslot
	264	Invalid submodule type
	265	Invalid range
	266	Invalid submodule state
	267	Invalid record data index
	769	Resources unavailable
	770	Invalid parameter information
	771	Invalid parameter data length
	772	Invalid parameter data type
	785	Unsupported diagnostic behavior
	786	Unsupported peripherie bus handling
	787	Invalid data format (endianess)
	801	Enabling diagnostic events failed
	802	Disabling diagnostic events failed

12.4 User-Specific Error Types

The user-specific error types describe errors that are caused by an internal problem with the fieldbus coupler. These errors are only recorded in the diagnostic memory during parameterization. The expanded error type provides a more specific description of the error.

Table 69: User-Specific Error Types and description

Error type	Expanded error type	Description
16	31489	Resources unavailable
	31490	Unsupported feature
	31491	Invalid version
	31492	Undefined failure
	31493	Access denied
	31494	Enabling diagnostic events failed
	31495	Disabling diagnostic events failed
	32001	Module login procedure failed
	32002	Module logout procedure failed
	32003	Invalid module data
	32004	Invalid module data length
	32005	Module access denied
	32257	Attribute read only
	32258	Unknown attribute
	32259	Invalid attribute value
	32260	Unknown instance
	32261	Unknown class
	32262	Inactive instance
	32263	Unexecutable service
	32264	Unknown request
	32265	Timeout
	32266	Invalid module data length
	32267	Buffer overrun
	32268	Unknown service
	32269	Attribute write only
	32270	Invalid parameter data or number
	32271	Invalid parameter version
	32272	Module access denied
	32273	Command length error
	32274	Missing asynchronous communication request flag
	32275	Unknown user
	32276	Invalid password according to the requested user
	32277	Invalid session identifier according to the requested user
	32278	An user is still logged, execution not possible
	32279	Access not allowed at the moment (initialisation state)
	32641	Module processes another request at the moment

Table 69: User-Specific Error Types and description

Error type	Expanded error type	Description
16	32642	Module busy
	32643	Positive fragment acknowledge
	32644	Negative fragment acknowledge
	32647	Send next fragment
	32648	Command error / unknown command
	32650	Request rejected
	32651	Command error / unknown command
	32652	Request rejected, timeout
	32653	asynchronous attribute information available
	32654	Request rejected, invalid state

Errors that are attributable to a problem with the S-BUS are also defined using user-specific error types. The fieldbus coupler stores these S-BUS errors (error type 256) in the diagnostic memory. The expanded error type provides a more specific description of the error.

12.5 Expanded Standard Error Types

Expanded standard error types provided additional information about errors that are not sufficiently described by the standard error types 1 through 9 due to the definitions in the PROFINET specification. For a detailed description of the error, the fieldbus coupler therefore utilizes the error type 258 instead of types 1 through 9. The expanded error type provides a more specific description of the error.

Table 70: Expanded standard error types and description

Error type	Expanded error type	Description
258	1	Undefined failure
258	2	Undervoltage ULS (Logic/Sensor)
258	3	Undervoltage UA (Actor)
258	4	Load error (short circuit/line break)
258	5	Short circuit field supply
258	6	Open load field supply
259	1	Setting modules into RUN mode failed
513	262	Restart the coupler, please!
513	267	Restart the coupler, please!
513	518	Break after module of slot x
513	523	Communication error
514	260	Update process is completed, please wait
514	516	Module firmware will be updated

13 The File System

Two partitions of the file system are available to the user including a RAM disk and a partition in Flash memory.

Table 71: Summary of file system partitions

Partition	Format	Type	Size	Use
R:\	FAT 12	RAM disk	approx. 500 kB	-
U:\	FAT 12	Flash disk	approx. 900 kB	WBM pages

The R:\ partition is designed as nonpermanent RAM disk and can be used to temporarily store data. These files are lost when the system is restarted. To save files permanently, use partitions “U:\”.
You can access the partitions above via FTP.

13.1 User Management

Access to the web-based management and via FTP is password protected. In the default status, the following users and access authorizations are defined:

Table 72: User Management

User name	Password	WBM	FTP	WAGOframe
admin	wago	Full access	Full access	Full access
user	user	Limited access	Full access	Limited access
guest	guest	Limited access	Full access	Read access

Use WBM and WAGOframe to change the passwords.

13.2 Access via FTP

To access the fieldbus coupler using FTP, proceed as follows:

1. Open the DOS console. Click on the start menu and select “Run”. Enter the `cmd` command and click **[OK]**.

2. In the DOS console, enter the `ftp` command with the IP address of the fieldbus coupler. In the following example, the command is:

   ```
   ftp 192.168.1.100
   ```

3. To log on to FTP, enter your user name and password.

You are now logged on in FTP. You can now, for example, access the directory with the pages of the web-based management by entering the `CD U:\` command. By means of the regular FTP commands, you have the option of copying these pages to your PC and customizing them.

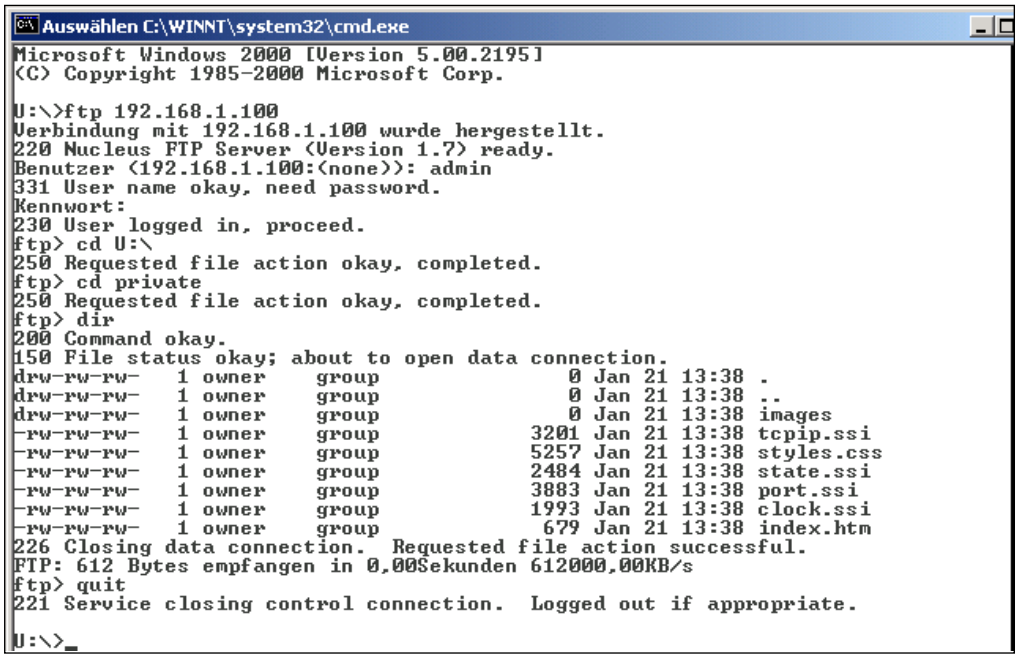


Figure 26: Connection setup using FTB in the DOS console

14 Diagnostics

14.1 LED Signaling

For the local diagnostic, the fieldbus coupler contains various LEDs that display the operating state of both the fieldbus coupler and the S-BUS. This information can also be displayed with WAGOframe. For more information, see section “Readout of Blink Codes using WAGO DTMs”.

14.2 PROFINET Status Messages

The following table lists the PROFINET status messages that are indicated by the LEDs (21) on the fieldbus coupler. Information regarding remedies of certain causes is also provided.

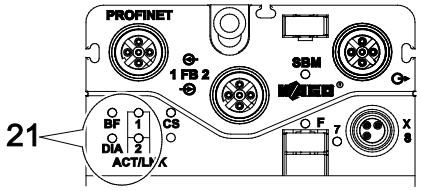


Figure 27: LEDs which display status messages

Table 73: ETHERNET status messages

LED	Color/status	Cause	Remedy/information
BF	Off	The fieldbus coupler is in the process of exchanging data.	-
	Red	The fieldbus coupler is not connected to the ETHERNET network.	Check the cable connection of the FB1 and/or FB2 ETHERNET connections.
	Red, flashing	The fieldbus coupler is connected to the ETHERNET network and is not in the process of exchanging data.	Check the connection to the IO Controller and the configuration
	Green, flashing	Flashing test is active. This mode takes precedence over the other indicating modes. As long as it is active the status of the PROFINET link is not indicated by the red LED.	The flashing test is enabled by a PROFINET command from the configuration tool. The test is used to identify a specific device in the configuration.
DIA	Off	No diagnostic message is present.	-
	Red	A diagnostic message is present.	Read out the diagnostic message via your configuration tool and resolve the displayed error.
ACT/LNK 1	Off	Fieldbus coupler has no connection with the physical network.	Check the cable connection of the FB1 ETHERNET connection.
	Green	Connection to physical network is present.	-
	Green, flashing	Data is being exchanged via ETHERNET.	-
ACT/LNK 2	Off	Fieldbus coupler has no connection with the physical network.	Check the cable connection of the FB2 ETHERNET connection.
	Green	Connection to physical network is present.	-
	Green, flashing	Data is being exchanged via ETHERNET.	-

14.3 Operational Messages of the Fieldbus Coupler

The following table lists the operational messages that are signalized via LEDs. Information regarding remedies of certain causes is also provided.

Note

Disable diagnoses
Use the diagnostic overview (see section “Parameterizing” > “Diagnostic Overview and Parameters of Inputs”) to disable specific diagnostics (see F-LED). In this case, the LED is disabled (off).

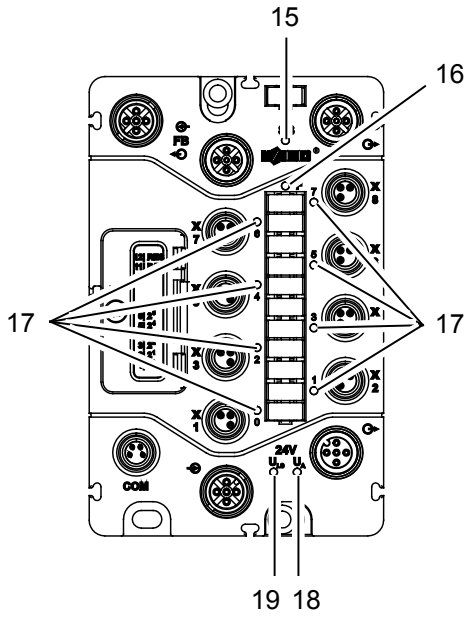


Figure 28: LEDs which display operational messages

Table 74: Operational messages of the fieldbus coupler

Pos.	LED	Color	Cause	Correction
15	SBM	Green flashing	S-BUS is being started.	-
		Green	S-BUS is functioning without problems.	-
		Red	Disruption on the S-BUS.	Check whether all components are connected to the S-BUS. Also check the S-BUS connection and S-BUS cable
16	F	Red	Group error. At least one diagnostic message is available on the digital inputs.	Check the power supply of the connected sensors.
17	I/O	Yellow	Input signal pending	-
18	U_A	Green	Actuator supply is present.	-
		OFF	Actuator supply is not present.	Connect the power supply and check the voltage level, if applicable.
19	U_{LS}	Green	Logic supply and sensor supply are present.	-
		OFF	Logic supply and sensor supply are not present.	Connect the power supply and check the voltage level, if applicable.

14.4 Error Messages from the Fieldbus Coupler via LED Signals

Error messages or warnings from the fieldbus coupler are displayed in WAGOframe. They are also displayed via the CS LED (21) as a blink code.

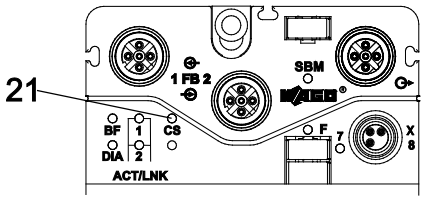


Figure 29: Indicator of blink codes via CS LED

An error is always displayed as **three blinking sequences** in a cyclic manner:

1. The first blinking sequence indicates the **group number.**
   The starting point in identifying the error is the group number, from which the error groups can be determined. The number of blink pulses indicates the specific error group.
   Example:
   Group number 1: Group of S-BUS errors.

2. After a short pause, the second blinking sequence appears and indicates the **error code**. The number of blink pulses indicates the specific error code that describes the type of error.
   Example:
   Error code 5: S-BUS terminator not attached to last I/O module.

3. After another pause, the third blinking sequence appears and indicates the error argument. The number of blink pulses indicates the **error argument**, which provides supplemental descriptions of the error; for example, on which of the 767 components an error is present.
   Example:
   Entry 0 … 63: In which of the connected I/O modules this error has arisen. For example, if “5” is indicated in the blink code, the error arose in the fifth I/O module (the “0” denotes the digital inputs of the fieldbus coupler)

The group number, error code and error argument are displayed as blink codes that are to be converted into numbers. The blink code can display numbers with single, double or triple digits. A zero is always expressed in four cycles of 20 Hz; zeroes preceding a digit(s) are ignored.

14.4.1 Progression of Blink Sequence

The following table outlines the progression of the blink codes over time. If there is no number in the second position (“1” in the number “10”) or third position (“1” in the number “100”) for the group number, error code or error argument, the subsequent pause does not take place; instead, the next sequence is initiated (designated in ***bold and cursive*** font in the following table).

Table 75: Overview of the blink codes

Description	Frequency	Additional explanations
Start sequence blinks	10 cycles with 12.5 Hz each (12.5 times per second)	Initiation of start phase
Pause	1 s	
Group number		
Group number (third (100) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to group number
Pause	2 s	-
Group number (second (10) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to group number
Pause	2 s	-
Group number (first (1) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to group number
Pause	***2 s***	-
Blinks	***40 ms***	Initiation of error code
Pause	***2 s***	
Error code		
Error code (third (100) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to error code
Pause	2 s	-
Error code (second (10) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to error code
Pause	2 s	-
Error code (first (1) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to error code
Pause	***2 s***	-
Blinks	***40 ms***	Initiation of error argument
Pause	***2 s***	
Error argument		
Error argument (third (100) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to error argument
Pause	2 s	-
Error argument (second (10) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to error argument
Pause	2 s	-
Error argument (first (1) position)	Repeats: 0.5 s on and 0.5 s off	Repeats according to error argument
Pause	4 s	-
Progression restarts when start sequence blinks		

14.4.2 Example of an Error Message via Blink Code

The following example clarifies an error message as indicated by the blink code. An S-BUS error is displayed when the software update for the sixth I/O module fails.

Initialization:

1. The CS LED begins with the initiation of the start phase: quick flashing of about 1 s
2. A one-second pause occurs.

Group number 1: S-BUS error

3. The CS LED blinks once for the first digit: 0.5 s on and off.
4. The initiation of the error code follows with a pause of two seconds, 40ms of blinking and another pause of two seconds.

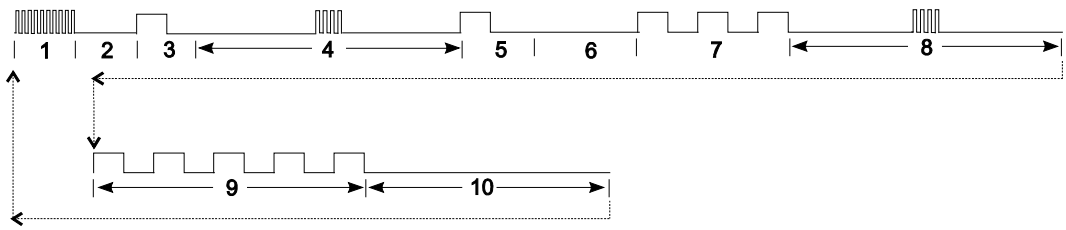
Error code 13: software update for I/O module failed

5. The CS LED blinks once for the first digit.
6. A two-second pause occurs.
7. The CS LED blinks 3 times for the second digit.
8. The initiation of the error argument follows with a pause of two seconds, 40ms of blinking and another pause of two seconds.

Error argument 5: I/O module in the sixth slot

9. The CS LED blinks 5 times for the first digit.
10. A four-second pause occurs.

The blink code starts when the start phase is initiated. This process is repeated if only one error is present; if more are present, the next pending error is processed.



14.4.3 Meaning of the Blink Codes and Procedures for Correcting Them

In this section, all errors and warnings are listed that are given by the CS LED and BUS LED.

The errors and warnings are divided into the following error groups:

Table 76: List of error groups

Group number	Name	Display
1	S-BUS error	CS LED
2	S-BUS warnings	
3	-	
4	-	
5	General internal hardware errors	
6	General internal hardware warnings	
7	General software errors	
8	General software warnings	
9	Specific internal hardware errors	
10	-	
11	PROFINET and ETHERNET specific errors	
12	-	
13	Firmware loader error	
14	Error with firmware download	

If the subsequent errors and warnings are not corrected with the indicated measures, please contact the WAGO AUTOMATION Support. Be ready to give them the blink code that is displayed.

Phone: +49 571 887 555
Fax: +49 571 887 8555
E-mail: support@wago.com

Table 77: Group Number 1: S-BUS Error

Error code	Error argument	Cause	Correction
1	0 … 63	Error during S-BUS initialization.	Check the cable for damage. Perform a restart by disconnecting the power supply and then reconnecting it.
2			
3			
4			
5		Error during S-BUS initialization. The last I/O module could not be initialized.	Check the cables to and from the last I/O module. Make sure that the S-BUS terminator is plugged into the last I/O module or are not connected to the fieldbus coupler as 63 I/O modules.
6	0 … 63	Error when starting S-BUS. An S-BUS disruption exists on the I/O module that is located in front of the I/O module indicated by the error argument.	Check the cable for damage. Perform a restart by disconnecting the power supply and then reconnecting it.
	255	The “Restart” function (see “S-BUS Master” in section “Parameterization”) is deactivated; a short disruption occurred on the S-BUS. This could not be localized since the disruption on the S-BUS no longer existed during investigation of the disruption point.	
7	0 … 63	Error when starting S-BUS.	
8			
9			
10			
11	1	A disruption in the S-BUS has arisen.	Check whether the S-BUS cable is connected properly.
			Check the S-BUS cable for damages.
12	1	Switching to software update mode is not possible.	Perform a restart by disconnecting the power supply and then reconnecting it.
13	0 … 63	Software update for an I/O module failed. The physical address of this module is indicated by the error argument.	

Table 77: Group Number 1: S-BUS Error

Error code	Error argument	Cause	Correction
14	1	Authentication failed.	Perform a restart by disconnecting the power supply and then reconnecting it.
	2		
15	0 … 63	Current software is defective. S-BUS operation only possible in recovery mode to load new software. The physical address of the I/O module is indicated by the error argument.	Perform a firmware update of the I/O modules.
16	1	Error when starting the S-BUS.	Perform a restart by disconnecting the power supply and then reconnecting it.
	2		
	3	Error when stopping the S-BUS	
17	0	Error at the digital inputs of the fieldbus coupler	
18	0 … 63	Communication test with an I/O module failed. The physical address of this module is indicated by the error argument.	
19	0	Error when initializing the S-BUS	Perform a restart by disconnecting the power supply and then reconnecting it. If you cannot eliminate the error, please contact WAGO support.
…	255		
23			
24	1		
25	0 … 63	The parameters of an I/O module are invalid. The physical address of this module is indicated by the error argument.	Retry the I/O module update via WAGOframe.
26			

Table 78: Group Number 2: S-BUS Warnings

Error code	Error argument	Cause	Correction
1	1	Cycle time of S-BUS cannot be applied.	Specify a higher cycle time.
2	1	Restart of S-BUS was performed.	-
	2	Communication on the S-BUS was stopped.	-
	3	Error reaction of S-BUS was activated.	-
3	0	Invalid OPH configuration	Check the maximum configuration definition, the configuration level definition and the physical node configuration.
4	255	Firmware update of I/O module	The modules switch to the mode for updating the firmware. In this mode, no process data is exchanged.
5	0 … 255	User settings for sensor-/actor delay are invalid.	Change user settings for sensor-/actor delay.

Table 79: Group Number 5: General Internal Hardware Errors

Error code	Error argument	Cause	Correction
1	1	Error when accessing flash memory.	Perform a restart by disconnecting the power supply and then reconnecting it.
	2		
	7	Error when initializing the USB stack.	
2	1	EEPROM error	
	2		
	3	Real-time clock (RTC) is defective.	Contact WAGO support.
	4		
3	1	RAM error	Perform a restart by disconnecting the power supply and then reconnecting it. If you cannot eliminate the error, please contact WAGO support.
	2		
	3		
4	1	Error in internal coprocessor.	
	2		
	3		
	4		
5	1		
	2		
	3		
	4		
6	1	Combination of hardware and software not allowed.	Perform a firmware update on the fieldbus coupler
	9	EEPROM error	Perform a restart by disconnecting the power supply and then reconnecting it.
7	255	Internal fault	These blink codes assist the support team in further error investigation. Please be ready to give them the group number, error code and error argument.
…			
18			

Table 80: Group Number 6: General Internal Hardware Warnings

Error code	Error argument	Cause	Correction
1	1	Fieldbus coupler has not been connected to power supply for six days (back-up capacitor of RTC empty).	Set the real-time clock via WAGOframe.

Table 81: Group Number 7: General Software Errors

Error code	Error argument	Cause	Correction
The blink codes for the general software errors assist the WAGO support team in further error investigation. Please be ready to give them the group number, error code and error argument.			

Table 82: Group Number 8: General Software Warnings

Error code	Error argument	Cause	Correction
The blink codes for the general software warnings assist the WAGO support team in further error investigation. Please be ready to give them the group number, error code and error argument.			

Table 83: Group Number 9: Specific Hardware Errors

Error code	Error argument	Cause	Correction
The blink codes for the general software warnings assist the WAGO support team in further error investigation. Please be ready to give them the group number, error code and error argument.			

Table 84: Group Number 11: Fieldbus-specific Software Error

Error code	Error argument	Cause	Correction
1	1	Error during ETHERNET driver initialization	Perform a restart of the fieldbus coupler.
	2	Error during TCP/IP batch initialization	
	3	Duplicate IP address	Check the configuration of the IP address.
2	1	Error during FTP initialization	Contact WAGO support.
	2	Error during SNTP initialization	
	3	Error during ETHERNET initialization	
	4	Error during Webserver initialization	
	5	Error during service protocol initialization	
	6	Error during SNMP initialization	
3	1	Error during SNTP configuration	Check the configuration of the SNTP parameters.
4	ARG	Operating system error	Contact WAGO support.

Table 85: Group Number 13: Firmware Loader Error

Error code	Error argument	Cause	Correction
1	1	No firmware in fieldbus coupler.	Perform a firmware update using the USB interface
	2	Firmware checksum error.	
	3		
2	1	USB communication disrupted.	Perform a restart by disconnecting the power supply and then reconnecting it.
	2		
	3		
	4		
	5		
	6		
	7		
3	1	EEPROM error or incompatible firmware	Perform a restart by disconnecting the power supply and then reconnecting it. Perform a firmware update using the USB interface
	2		
	3		
	4		
	5		
	6		
	7		
	8		
4	1	Internal fault	
	2		
5	1		
	2		
6	1	Access to flash memory not possible	
	2		
	3		
	4	Wrong firmware version	
	5	Internal fault	
7	1	Error in firmware file	
	2		
	3		
	4		
	5		
	6		
	7		
8	1	Real-time clock (RTC) is defective	-
	2		
	3		

Table 85: Group Number 13: Firmware Loader Error

Error code	Error argument	Cause	Correction
9	1	Error of the internal co-processor	Perform a restart by disconnecting the power supply and then reconnecting it.
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
10	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
11	1	Error when accessing Interrupt Controller	
	2		
12	1	SDRAM error	

Table 86: Group Number 14: Error with Firmware Download

Error code	Error argument	Cause	Correction
1	0	Switching to software update mode is not possible	Perform a restart by disconnecting the power supply and then reconnecting it.
2	0 … 63	Software update for I/O module failed. The error argument indicates the logical module address.	
3	1	Internal fault	These blink codes assist the support team in further error investigation. Please be ready to give them the group number, error code and error argument.
	2		
	3		
	4		

14.5 Readout of Blink Codes using WAGO DTMs

Error messages or warnings from the fieldbus coupler are also displayed in WAGOframe under the “Blink code” entry. For this to function, the WAGOframe software (or another FDT border application) and the WAGO DTMs must be installed on your PC. For more information, see section “Parameterization via FDT/DTM”. An overview of the meaning of the blink codes can be found in section “Meaning of the Blink Codes and Procedures for Correcting Them”.

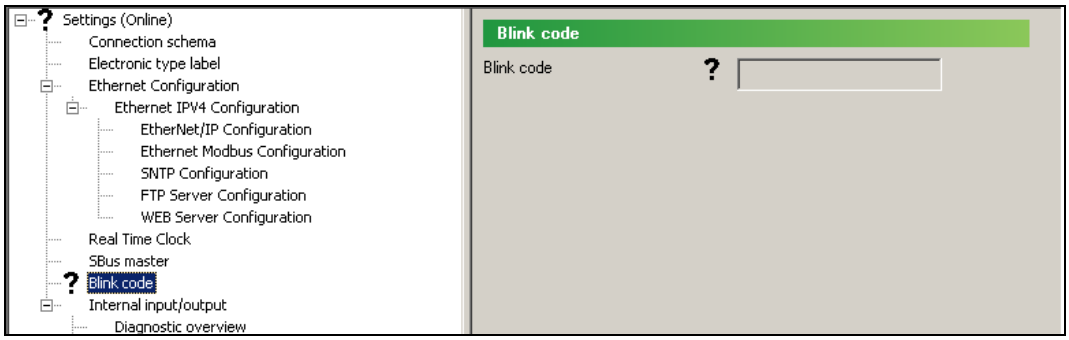


Figure 30: Example of the blink code display under the “Blink code” parameter in WAGOframe

Note

Web-based management

Error messages or warnings from the fieldbus coupler are also displayed in the web-based management on the “Information” page.

15 Parameterization via WAGOframe

This section explains device parameterization with the help of an FDT border application (FDT/DTM) using WAGOframe.

⚠ DANGER

Changing parameters!
When parameters are incorrectly modified with an FDT/DTM border application (e.g. WAGOframe), machine components could be placed in a dangerous state and personnel and machines could be at risk.
Before changing the parameters, ensure that the machine components are in a safe and defined state and switch off the higher-level controller.
Also ensure before start-up that no personnel remain in the danger area of the machine components.

FDT is an abbreviation for “Field Device Tool”. This refers to an application that can be utilized for parameterization of the fieldbus devices independent of the fieldbus being used. For this purpose, the application needs supplementation in the form of software components, which establish the communication with the individual devices and supply the adjustable parameters. These software components are called DTM (Device Type Manager) and produced by the device manufacturers.

FDT/DTM represents an open concept in which the individual components of various manufacturers work together. The concept thus reduces the number of proprietary, manufacturer-specific software solutions and cultivates a uniform operating concept inside a comprehensive operating program.

For the parameterization of a 767 node, an appropriate DTM is available for each 767 component. Use this DTM to parameterize the 767 components. The 767 components can be parameterized either online or offline. The offline mode enables the parameterization of a 767 component that is not yet present. In the offline mode, first store the parameter in a project and later transfer it to the 767 components.

In the online mode, there is a direct connection between the display and the connected 767 components. If a 767 component is in the online mode, its name is displayed in **bold** and ***italic*** font in the network window.

15.1 Installing the FDT/DTM Components

The following sections deal exclusively with WAGOframe.

When using another FDT/DTM frame application, install only the USB driver (item no.: 759-922), the Service Interface DTM (item no.: 759-371) and the WAGO DTM (item no.: 759-361) on your computer. These can be obtained on the Internet at www.wago.com.

Information on configuring the fieldbus coupler using WAGO DTM can be obtained in section “Parameterizing”.

1. Insert the “WAGOframe” CD into your CD-ROM drive.

2. The start screen appears. Select the desired installation language. A product selection window opens. If Autostart is not activated, open the “Language.htm” file.

Figure 31: Start screen of WAGOframe CD

3. To install the necessary 767 programs, click on the appropriate link. A window opens displaying the corresponding installation programs.

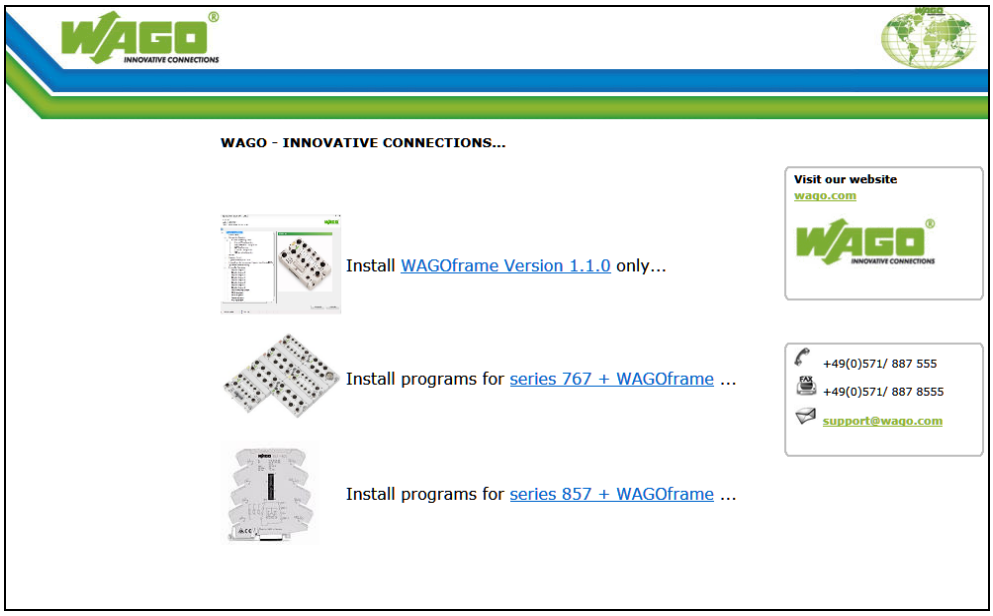


Figure 32: Window for product selection 1

4. To enable you to use the devices of the 767 series, install the FDT/DTM components shown below by clicking on the appropriate link. The “File Download” dialog box opens. To install the programs, click **[Open]**.

   - USB driver, 759-922
   - WAGOframe (installation is only necessary if an FDT/DTM border application has been installed on your PC), 759-370
   - WAGO service interface DTM, 759-371
   - DTM for the fieldbus coupler and I/O modules, 759-361
   - DTM for the system update, 759-362

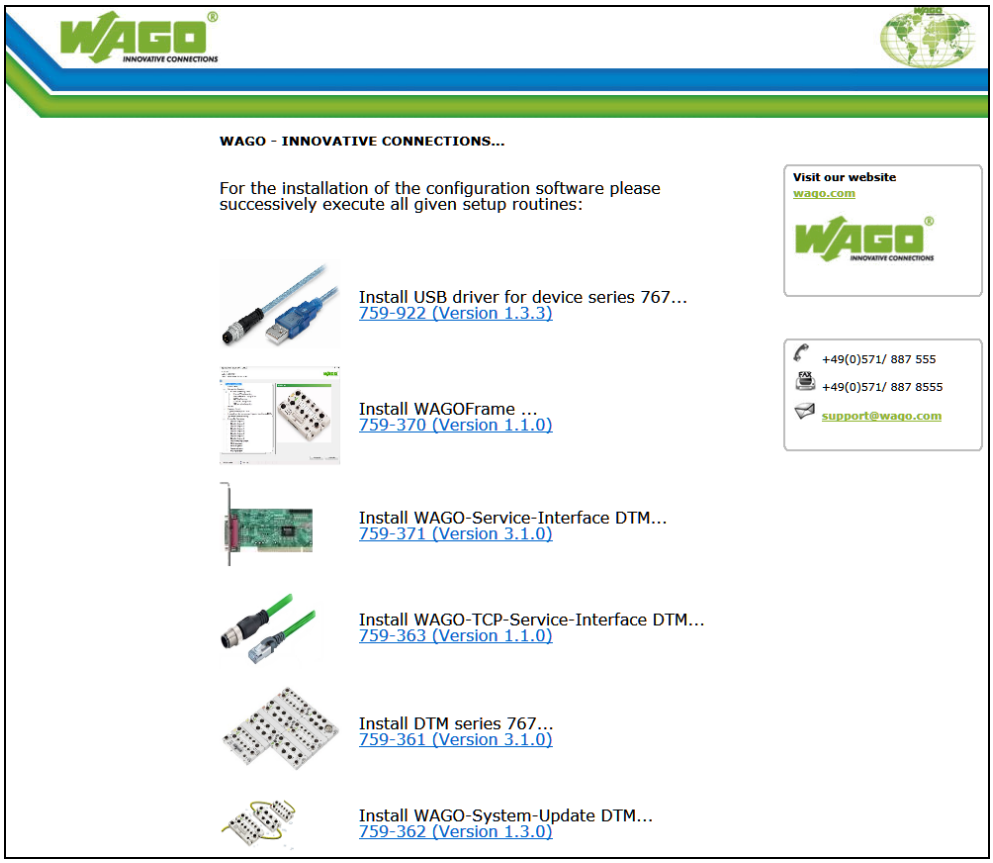


Figure 33: Window for product selection 2

5. After installing all necessary 767 programs connect your computer with the fieldbus coupler via the USB cable. See also section “Connecting Data and Supply Cables” > “Connecting the USB Cable”.

15.2 Starting WAGOframe

1. Start the FDT border application by double-clicking on the WAGOframe logo on your desktop.

Figure 34: WAGOframe logo

2. You can also start WAGOframe from the start menu of your operating system by clicking on “Start” and selecting **Programs** > **WAGO Software** > **WAGOframe**.

3. When the “Device Selection Wizard” opens, select “Expert Mode”. The “Point to Point Mode” only applies to the configuration of directly connected devices with no S-BUS (such as WAGO Jumpflex). Click **[Next]**.

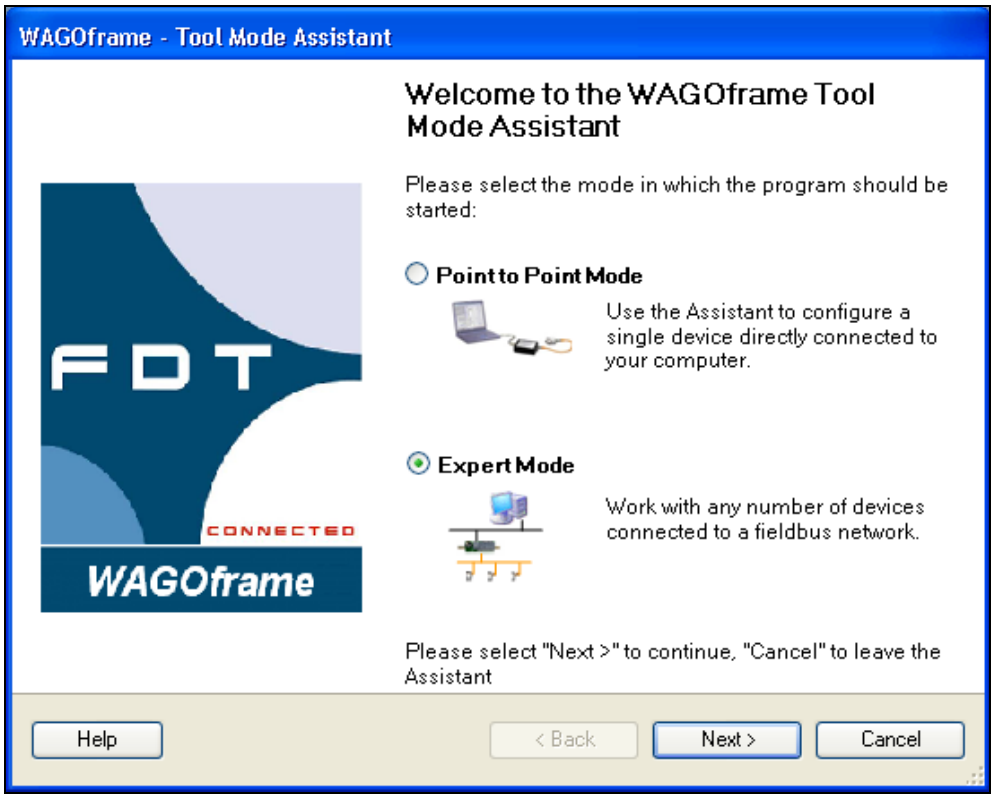


Figure 35: “Device Selection Wizard”

4. When opened for the first time, the “Query WAGOframe” dialog box appears. Click **[Yes]** to automatically set up the device catalog on your PC. After the device catalog has been updated, all 767 components for which a DTM is installed are listed.

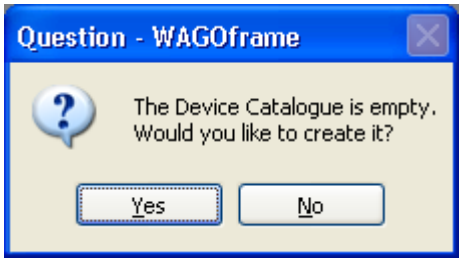


Figure 36: “Query WAGOframe” dialog box (exemplary)

15.3 Expansion of Device Catalog to include 767 Components

WAGOframe automatically detects newly installed DTMs at the next start-up. To expand the device catalog, proceed as follows:

1. To update the device catalog, navigate to the menu bar and select **View > Device Catalog**.

2. In the “Query WAGOframe” dialog box, click **[Yes]** to update the device catalog.

After updating, the device drivers for the 767 components appear in the device catalog.

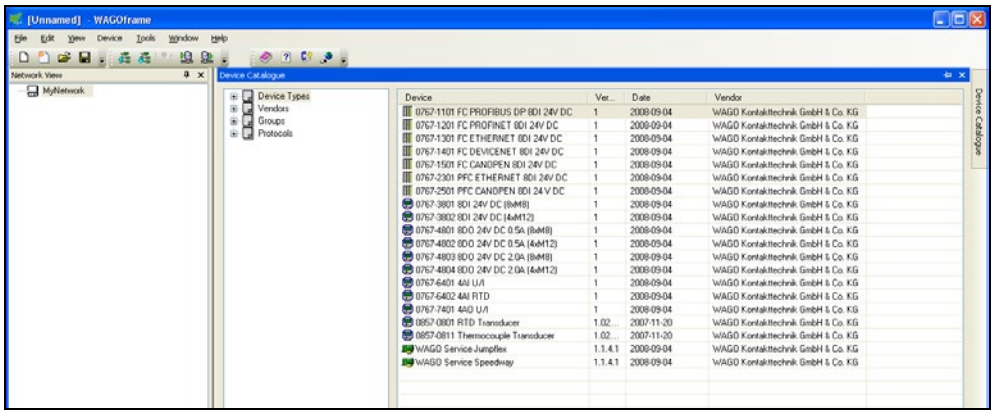


Figure 37: View of device catalog (example)

15.4 Setting Up Network Manually

In order to work with the 767 components, the exact node structure topology must be copied into the “Network View” of WAGOframe.

Note

Setting up the network
Depending on the application, you can create the network manually (see this section), automatically (see section “Set up network automatically” or using the Life list (see section “Life list”).

15.4.1 Adding the Communication DTM

So that you can parameterize the fieldbus coupler and the I/O modules connected with it, establish a connection to your PC via the USB interface.

Note

Access via ETHERNET
You can access WAGOframe also via ETHERNET (only 767-1201, -1301, -2301). See section “Parameterization via WAGOframe” > “Service Communication via ETHERNET”.

1. Right-click on “Network” in the “Network View” pane.
2. In the context menu, select **Add…**. The “Add...” dialog box opens.

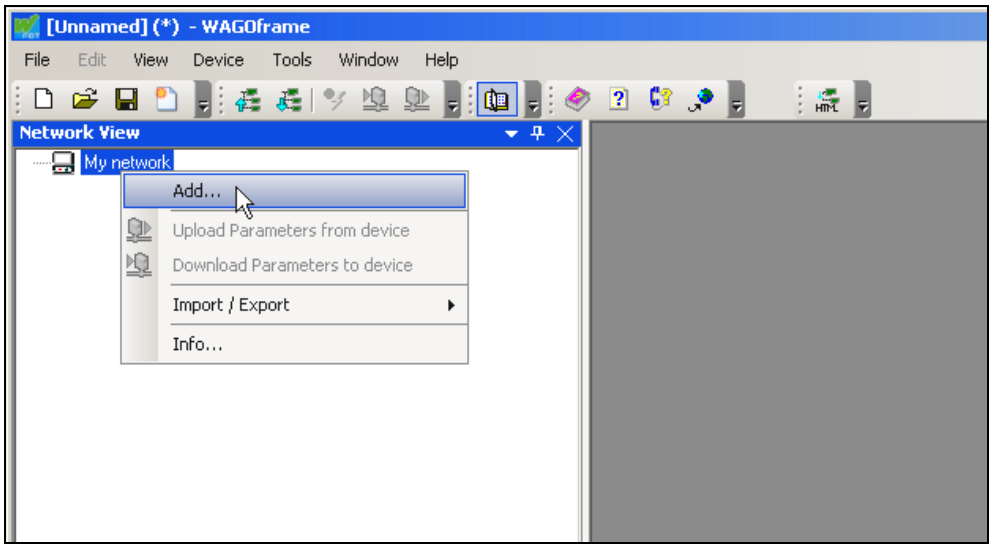


Figure 38: Adding the communication DTM (example)

3. In the “Add” dialog box, select “WAGO Service Speedway”.

4. Click **[OK]** to confirm your selection.

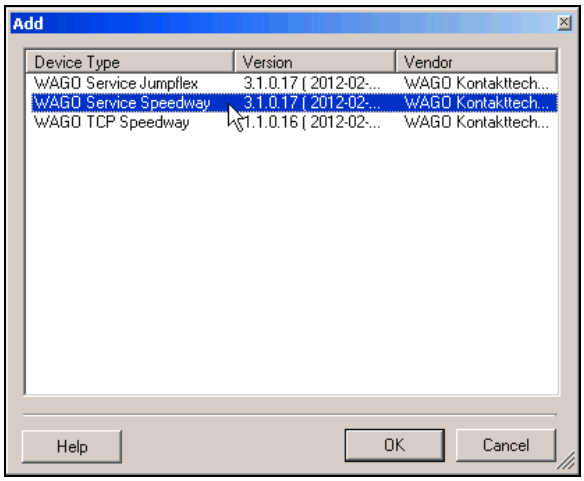


Figure 39: Selecting the communication DTM (example)

15.4.2 Selecting the Communications Interface for WAGOframe

This chapter is only relevant if you use “Online Parameter Setting”.

Requirement:
The fieldbus coupler must be switched on and your PC must be connected with the USB interface. For more information, see section “Connection to the Data and Supply Cable” > “Connecting the USB Cable”.

1. Double-click on the “WAGO Service Speedway” DTM in the “Network View” pane. The DTM for the interface configuration opens.

2. Select the COM port that you use from the **Interface selection** box. If the list of available interfaces is empty, check whether the fieldbus coupler is switched on and connected to your PC via the USB cable.
If you establish the connection via **[Go online]** later, the COM port is checked. If it is incorrect, it is automatically selected.

3. Click **[Apply]** and then **[Close]**.

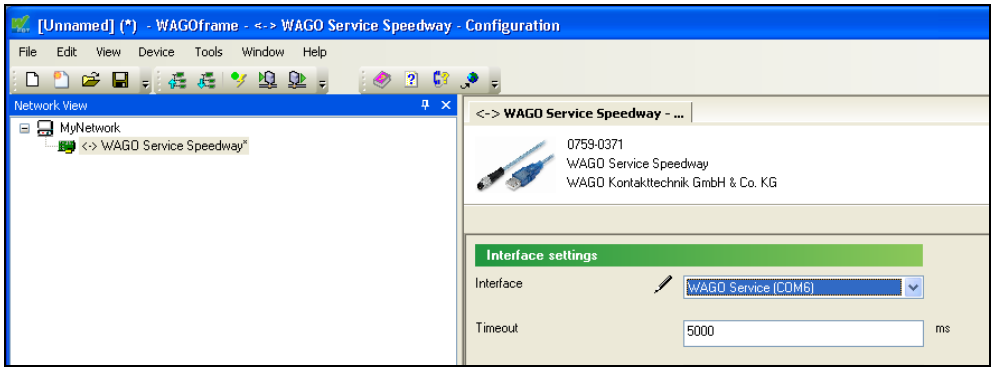


Figure 40: The DTM for the interface configuration (example)

Note

COM Port
This COM port number remains constant for the fieldbus coupler currently connected. When connecting a different fieldbus coupler to the PC, the COM port also changes. In this case, “WAGO Service Speedway” attempts to select the new COM port automatically. If several fieldbus couplers are connected to the PC, select the correct COM port.

The “WAGO SPEEDWAY Portmapper” is used to specify a constant COM port. The software is contained on the “WAGOframe” CD-ROM.

15.4.3 Adding a Fieldbus Coupler

To incorporate the fieldbus coupler into WAGOframe, proceed as follows:

1. Right-click on the “WAGO Service Speedway” DTM in the “Network View” pane.

2. In the context menu, select **Add…**. The “Add…” dialog box opens.

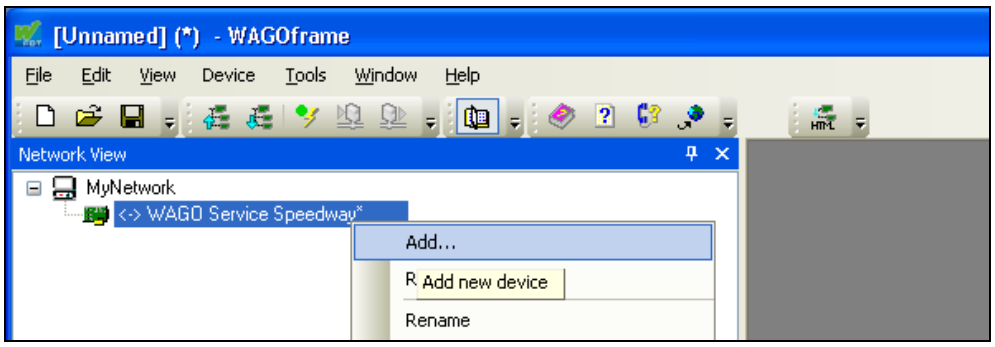


Figure 41: Adding a fieldbus coupler (example)

3. In the “Add…” dialog box, select the fieldbus coupler that you use.

4. Click **[OK]** to submit your selection.

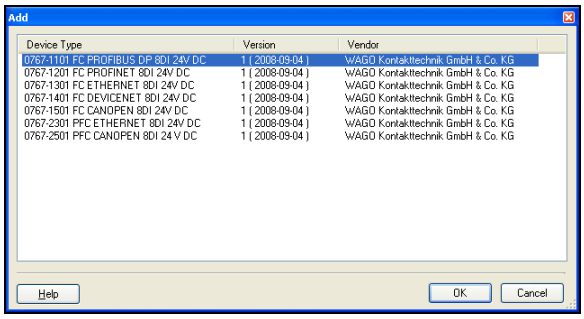


Figure 42: Adding the fieldbus coupler (example)

15.4.4 Adding the I/O Modules

To incorporate the I/O modules that you use into WAGOframe, proceed as follows:

1. Right-click on the “<Speedway:> 0767-xxxx” device driver in the “Network View” pane.

2. In the context menu, select **Add...**. The “Add…” dialog box opens.

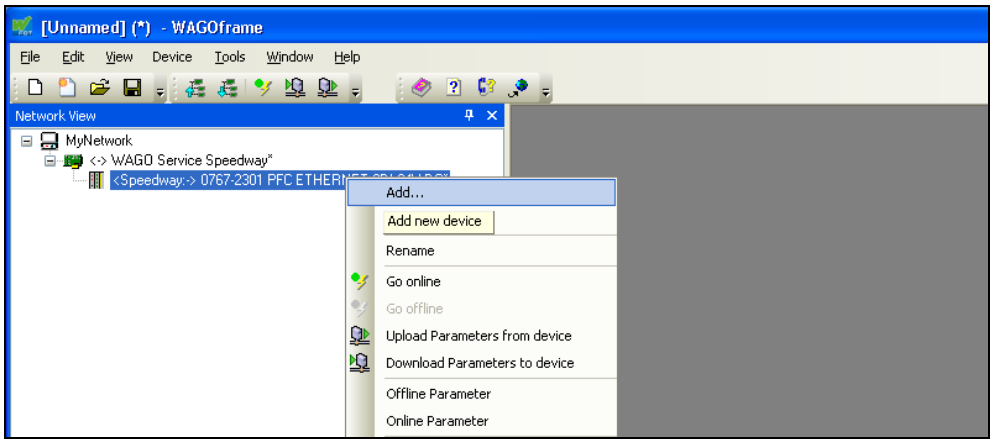


Figure 43: Adding the I/O modules (example)

3. In the “Add…” dialog box, select the I/O module's device type.

4. Click **[OK]** to confirm your selection.

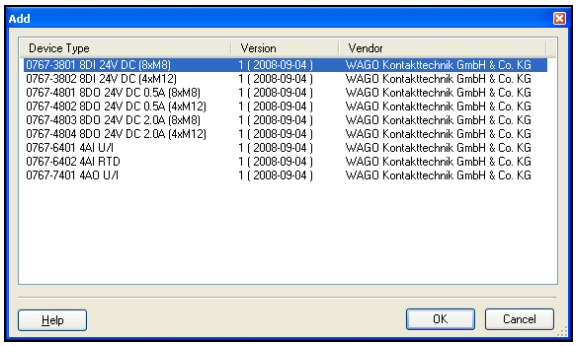


Figure 44: Selecting an I/O module (example)

5. Repeat steps one through four until the module arrangement is concordant with your fieldbus node. In our example, two I/O modules were added.

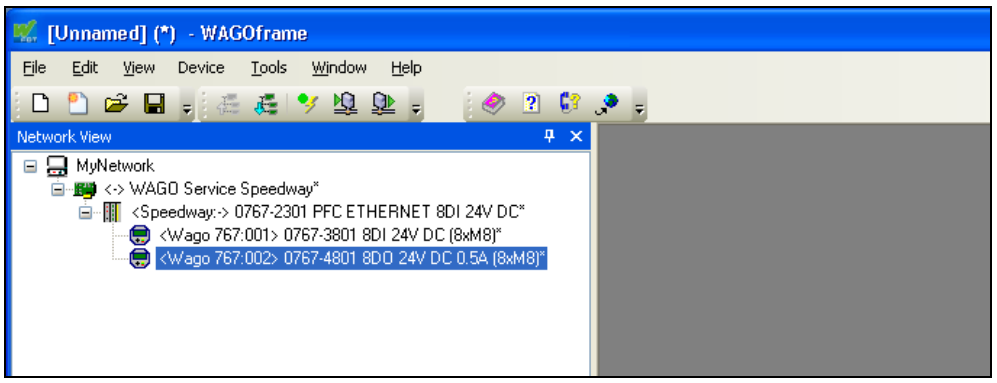


Figure 45: Two added I/O modules

To avoid having to apply the physical process image of the 767 components created in WAGOframe in the “Network View” again, you can save the topology as a project file. Click [**File**] > [**Save**].

15.5 Online and Offline Parameter Setting

The options of online and offline parameter setting are available for configuring the 767 components. The offline mode enables the parameterization of a 767 component that is not yet present. In the offline mode, first store the parameters in a project and later transfer them to the 767 components. In the online mode, there is a direct connection between the display and the connected 767 components. If a 767 component is in the online mode, its name is displayed in ***bold and italic*** font in the network window.

15.5.1 Offline Parameter Setting

Requirement:
To configure the fieldbus coupler in offline mode, the network structure of the 767 node must have been transferred to WAGOframe (see section "Parameterization via WAGOframe" > "Setting Up Network Manually").

For offline configuration, proceed as follows:

1. Right-click on the "<Speedway:> 0767-xxxx" device driver of the fieldbus coupler in the "Network View" pane.

2. In the context menu, select **Offline Parameter**. The configuration interface opens with the fieldbus coupler parameters. Details on these parameters can be found in section "Parameterizing".

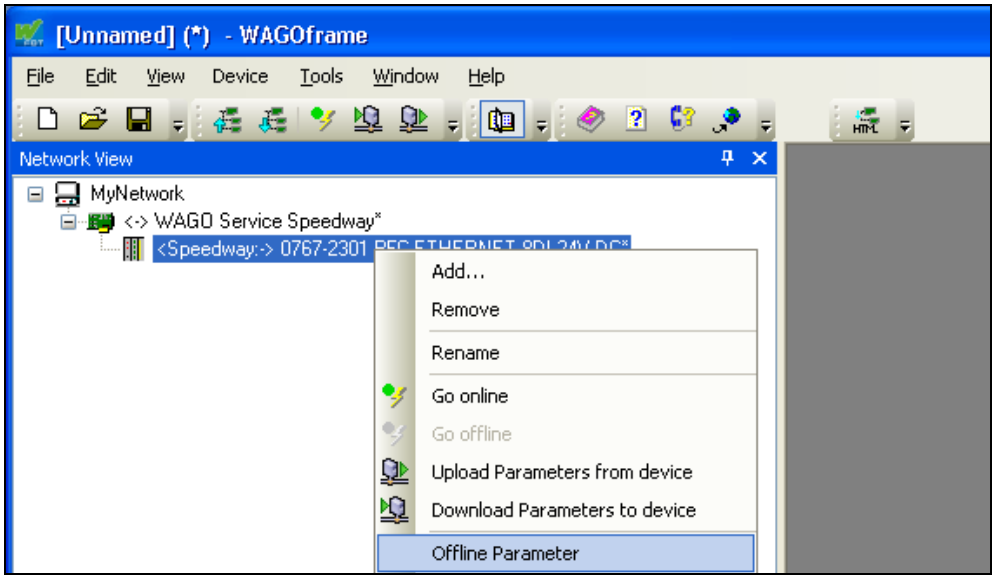


Figure 46: Opening the configuration interface (offline, example)

3. To configure the I/O modules, right-click on one of the I/O modules in the "Network View".

4. In the context menu, select **Offline Parameter**. The configuration interface opens with the corresponding I/O module parameters. Information on these parameters can be found in the respective I/O module manual.

5. Save the configuration in a project by clicking on **[Accept]** and **[File]** > **[Save]**.

6. Transfer the project file to the respective 767 component. To transfer parameters, right-click on the fieldbus coupler or on the respective I/O module and select **Download Parameters to device** from the context menu.

15.5.2 Online Parameter Setting

Requirement:
To configure the fieldbus coupler in online mode, the network structure of the 767 node must have been transferred to WAGOframe (see section “Parameterization via WAGOframe” > “Setting Up Network Manually”). You can also utilize the “Set Up Network” option as described in section “Parameterizing” > “Setting Up Network Manually”.

For offline configuration, proceed as follows:

1. Right-click on the “<Speedway:> 0767-xxxx” device driver in the “Network View” pane.

2. In the context menu, select **Go online**. When the progress bar reaches 100%, a connection to the fieldbus coupler has been established. Repeat this step for each desired I/O module.

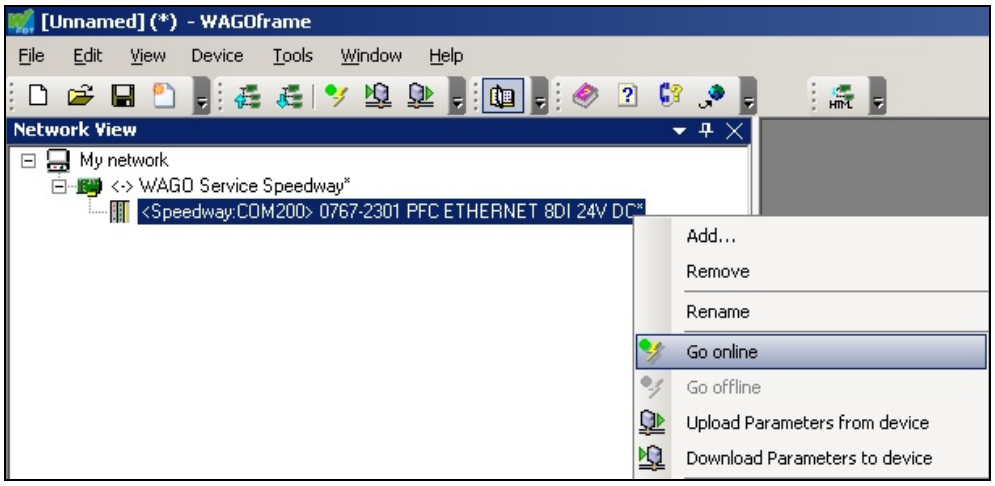


Figure 47: Setting up a connection to the fieldbus coupler (example)

3. In the context menu, select **Online Parameter**. The configuration interface opens with the fieldbus coupler parameters. Details on these parameters can be found in section “Parameterizing”.

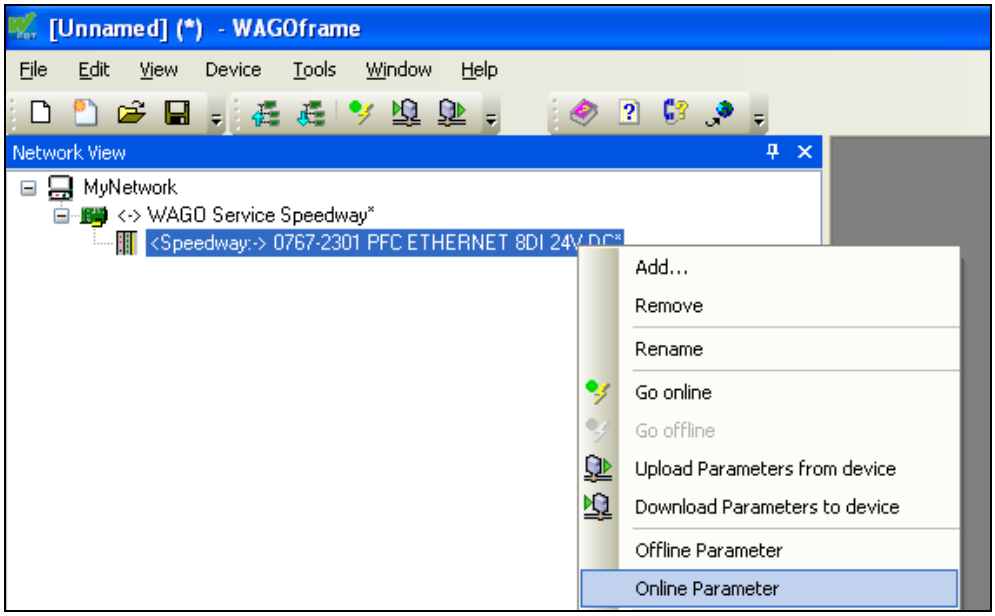


Figure 48: Opening the configuration interface (online, example)

4. To configure the I/O modules, right-click on one of the I/O modules in the “Network View”.

5. In the context menu, select **Online Parameter**. The configuration interface opens with the corresponding I/O module parameters. Information on these parameters can be found in the respective I/O module manual.

Note

Online Parameter Setting
If you are unable to select the “Online Parameter Setting” entry, the “Offline Parameter Setting” interface may still be open. Close the interface.

6. To save the parameters in the respective 767 components, click **[Write]**.

7. To read the current parameterization in the respective 767 components, click **[Read]**.

15.6 The “Additional Functions” and “Scan” Selections

Requirement:
You have switched on the fieldbus coupler, connected your PC with the USB connection and established a communication link to the 767 components (“Go online” in the context menu).

The “**Additional Functions**” selection from the context menu provides the following additional functionalities in addition to the possibility of parameterization:

- Change bus address
  Here you can change the S-BUS addresses for individual I/O modules.

- I/O owner assignment
  Here you can specify to which process image (e.g., fieldbus) an I/O module should belong (irrelevant for this fieldbus coupler).

- Diagnostics setup
  Here you can enable or disable synchronous diagnostics and diagnostic confirmation of the I/O modules, as well as the integrated digital inputs of the fieldbus coupler.

- Service page
  You can use the Service page to restore the default state for selected 767 components.

- User management
  In the user management, you can change the preset passwords (see section “User Management”) for the guest, user and admin users. In addition, you can reset all passwords to their default state.

- File system
  Here you administer the file system of the fieldbus coupler.

The “**Scan**” selection from the context menu offers the following options:

- Set up network
  Add all 767 components connected to the PC by the USB cable to the network view.

- Life list
  Add individual 767 components connected to the PC by the USB cable to the “Network View”.

15.6.1 Changing the Bus Address

Requirement: Disconnect the communication link to the fieldbus coupler (“Go offline” in the context menu).

If you wish to simply configure select I/O modules instead of the entire topology, add these I/O modules manually to the Network View. For these I/O modules to be accessible at the correct bus address, you must assign them the correct addresses. To do so, please proceed as follows:

1. Right-click on the coupler in the “Network View” pane.

2. In the context menu, select **Additional Functions** > **Change bus addresses**. A window opens with a list of the bus nodes.

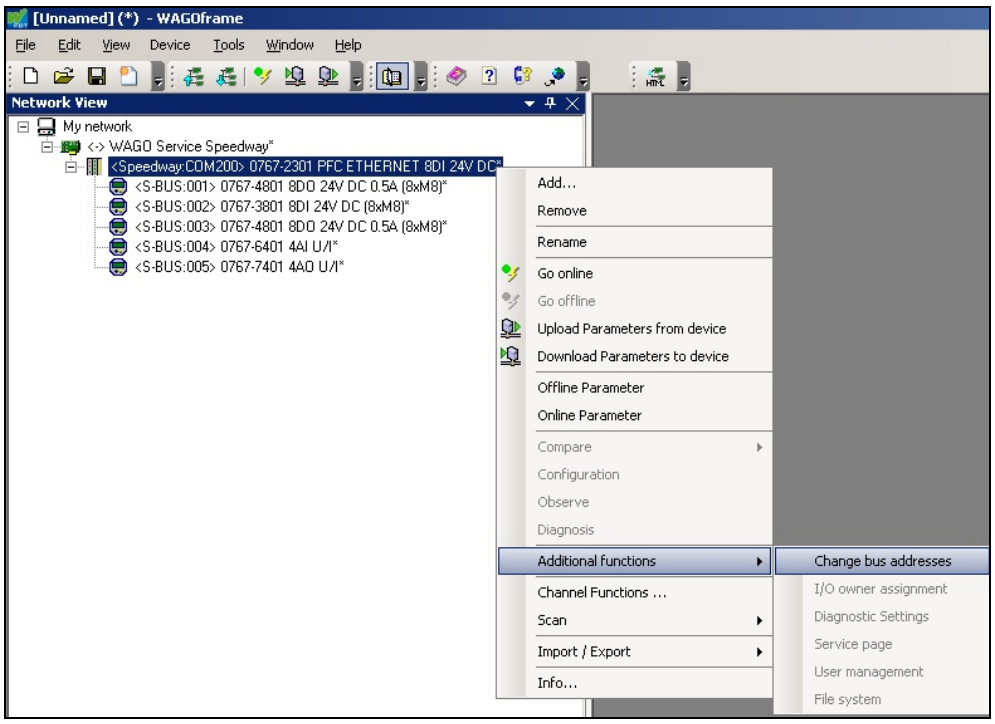


Figure 49: Opening the “List of Bus Nodes” window (example)

3. Now select an I/O module from the “List of Bus Nodes” to which you wish to assign a new bus address. The current address is displayed in the **New Bus Address** field. Enter here the desired new address and click **[Apply]**.

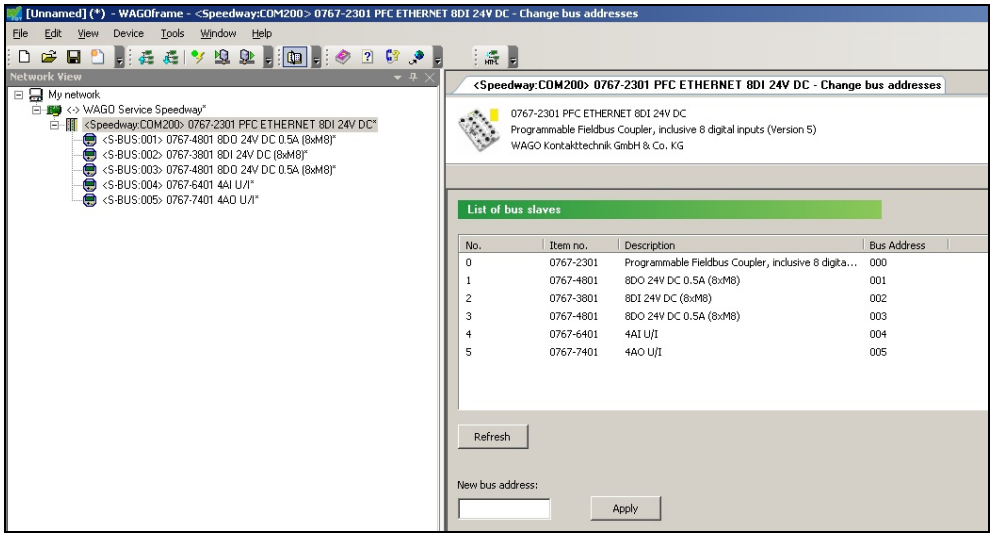


Figure 50: Assigning new bus addresses for the I/O modules (example)

15.6.2 Service Page

The Service page is used to restore the default state for selected 767 components.

1. Right-click on the fieldbus coupler in the “Network View” window.
2. In the context menu, select **Additional Functions** > **Service Page**.

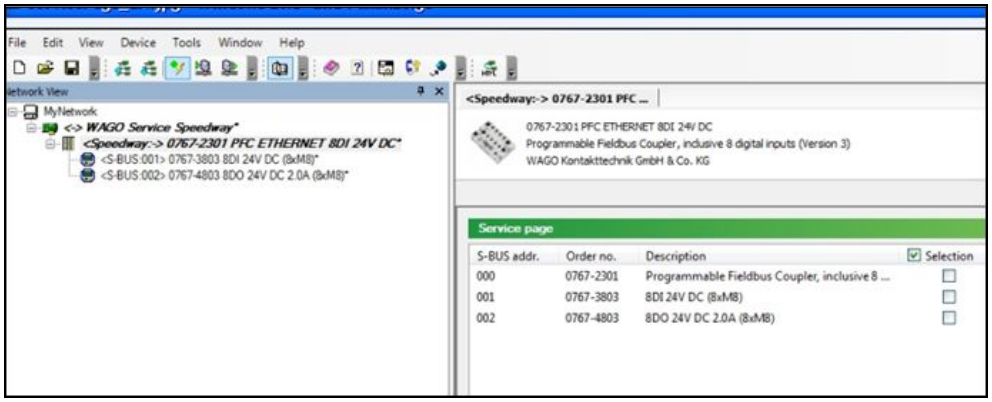


Figure 51: Service page (example)

Table 87: Service page

Parameter/button	Description
S-BUS Addr.	Displays the physical position of the devices in the 767 node. 000: Fieldbus coupler 001: First I/O module connected to the fieldbus coupler 002: Second I/O module connected to the fieldbus coupler
Item No.	Item number of a 767 component
Designation	Designation of a 767 component
Selection	Selection of the 767 components that should be reset to the default state.
[Update list]	Update the 767 components displayed in the DTM after changing the physical topology (e.g., I/O module removed or added).
[Restore factory]	Reset the selected 767 components to the default state.
[Reset]	Reset of the 767 components

15.6.3 User Management

Use the user management to change the preset passwords for the users **guest, user** and **admin** or set the changed passwords back to the default.

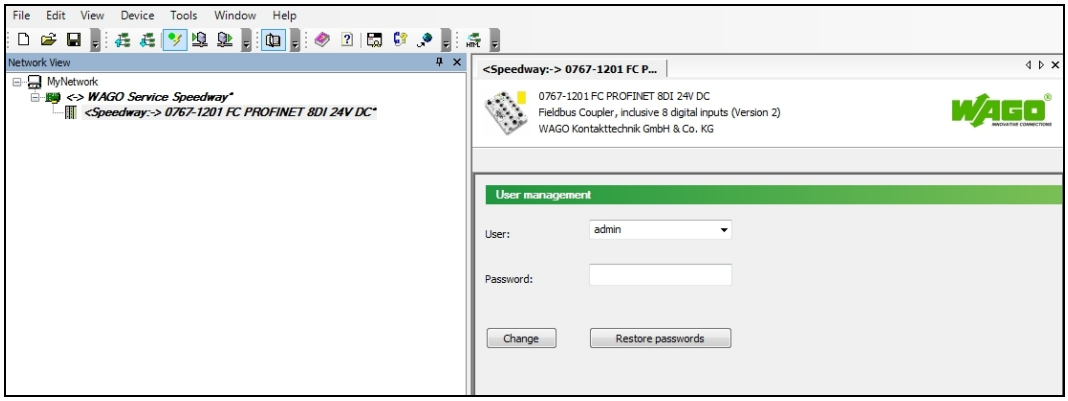


Figure 52: User management (example)

Table 88: User management

Parameter/button	Description
User	Select a user whose password should be changed.
Password	Enter a password for the selected user. Only ASCII characters are permitted.
[Change]	Save the new password for the selected user. A dialog appears. Enter admin to confirm the new password and click [OK].
[Reset password]	Reset the password to the default state. This must be performed by a superuser with a special password. Obtain the password indicating the ID listed in the dialog for WAGO Support.

Figure 53: Prompt to reset passwords

15.6.4 File System

Use the file system function to administer the file system on the fieldbus coupler. You can format drives, extract data from the firmware, create or delete directories, upload, download and delete files.

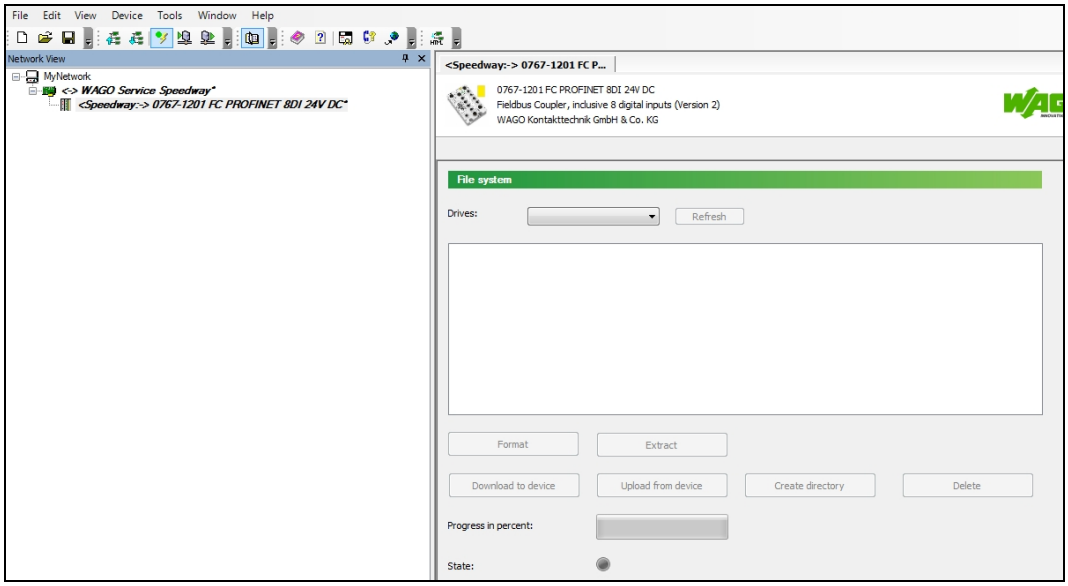


Figure 54: File system (example)

Table 89: File system

Parameter/button	Description
Drives	Select the fieldbus coupler drive: U:\ (WBM pages) – not available for 767-2501 P:\ (CODESYS-Program) – only for 767-2301 and 767-2501
[Reread]	Reread the drive currently selected.
[Format]	Format the drive selected under “Drives”. All files are deleted.
[Extract]	Extract files from the firmware (WBM, system settings, etc.). **Note:** Any changes made to the existing files may be overwritten when files are extracted again!
[Download to device]	Copy files from the file system of the PC to the fieldbus coupler. **Without selection:** Data is saved to the top level of the file system. **Selected folder:** Data is saved to the selected folder.
[Upload from device]	Copy files from the fieldbus coupler to the PC (e.g., to edit them).
[Create directory]	Create a new director (folder) **Without selection:** The new directory is created at the top level of the file system. **Selected folder:** The new directory is created in the selected folder of the file system.
[Delete]	Delete selected files or directories (folders). You can only delete empty directories (folders).
State	Status display of an operation: Green: The selected procedure is completed. Yellow: The selected procedure is active. Red: Error in the action just executed.

15.6.5 Set up network automatically

This involves inserting all 767 components into the topology that are connected to the USB connection.

1. Right-click on a coupler in the “Network View” pane or directly on the “WAGO Service Speedway” DTM.

2. In the context menu, select **Scan** > **Create Network**.
If the “WAGO Service Speedway” DTM is selected, all components connected to the 767 nodes will be carried over into the topology. If your coupler is selected, only the I/O modules will be attached to the coupler.

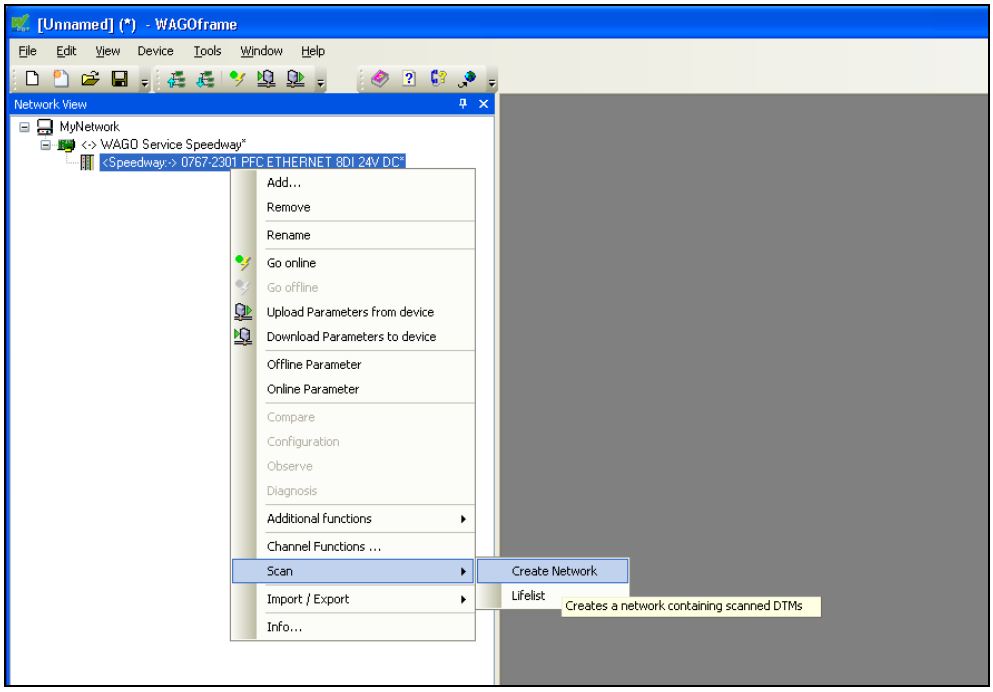


Figure 55: Setting up the network (example)

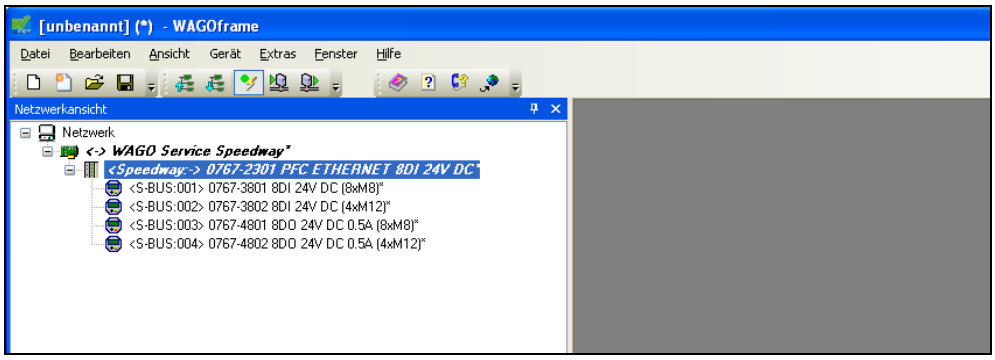


Figure 56: Components connected to the 767 node (example)

15.6.6 Life List

The life list is used to search for all devices connected to the S-BUS in order to select them for configuration directly.

You have the option to use the “WAGO Service Speedway” DTM to search for the connected fieldbus coupler or to use the device driver for the fieldbus coupler to search for I/O modules connected to it.

To search for fieldbus couplers or I/O modules, proceed as follows:

1. Right-click on the respective device driver in the “Network View” pane. In this example, the device driver for the fieldbus coupler is selected to search for the I/O modules connected to it.

2. In the context menu, select **Scan > Life List**. The life list opens.

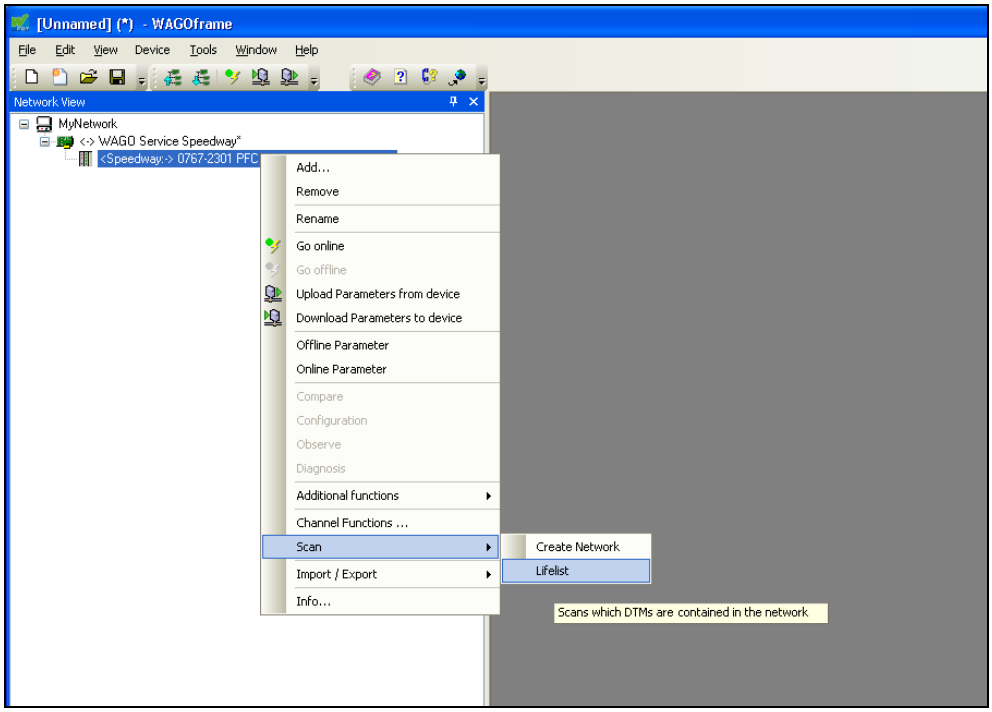


Figure 57: Searching for connected I/O modules using the life list (example)

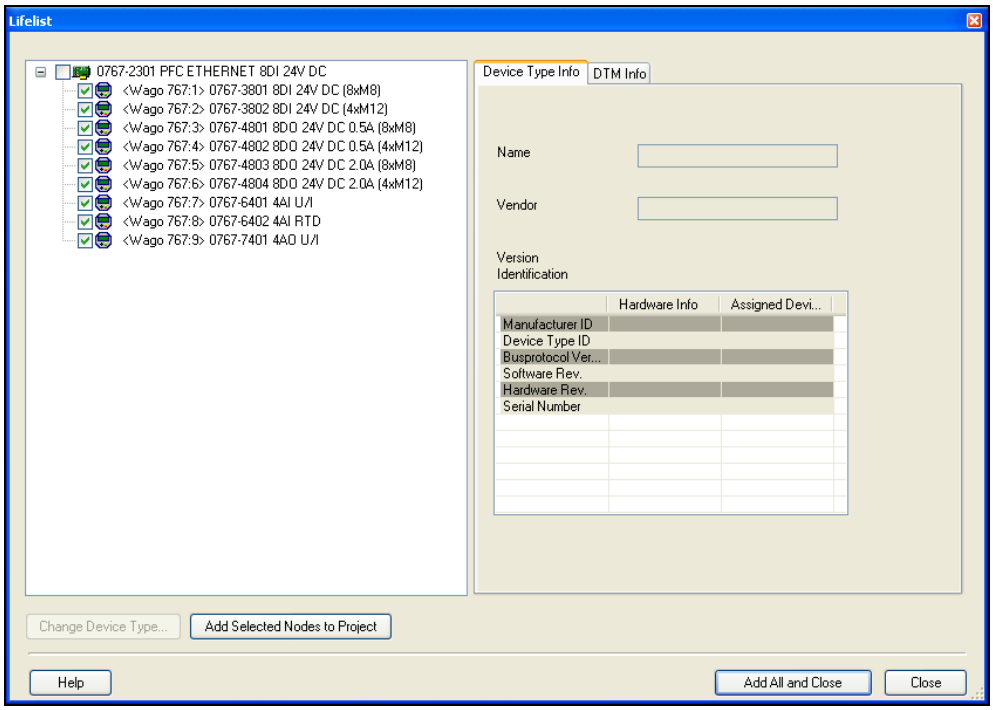


Figure 58: Connected I/O modules of the selected fieldbus coupler (example)

3. Now select from the list those devices that you wish to carry over into the “Network View” for configuration. Click **[Add Selected Nodes to Project]** and then **[Close]**.

15.6.7 System Update

15.6.7.1 Notes on System Update

Firmware update for the 767 Series components is performed via system update. To ensure that the fieldbus node remains consistent and executable after updating the firmware, system update must be performed for both fieldbus coupler and connected I/O modules.

NOTICE

System update!
Before performing the system updates it must be ensured in order to avoid any possible damage to the 767 system:

- The power supply must not be interrupted during system updates.

- The physical fieldbus connection must be exists. To exclude the influence of the field bus, but no data transmission via the fieldbus may take place (ACT / LNK LED (s) lights/light green).

Preconditions for update via USB:
- You have installed the DTM (759-370) WAGOframe.
- You have installed the DTM (759-371) WAGO service interface.
- You have installed the DTM (759-922) USB driver.
- You have installed the DTM (759-362) system update.
- Update packages are available for the connected 767 Series components.

Preconditions for update via ETHERNET:
- You have installed the DTM (759-370) WAGOframe.
- You have installed the DTM (759-363) WAGO TCP service interface (for update via ETHERNET).
- You have installed the DTM (759-362) system update.
- Update packages are available for the connected 767 Series components.

System Update Procedure

To perform a system update for each 767 Series component, please complete the following steps:

1. Read 767 components' parameters and save them on your PC.

2. Update 767 Series components' firmware.

3. Rewrite parameters from your PC to the 767 Series components.

4. Set parameters to valid and finish the procedure.

Note

IP address and Device Name
The device has an IP address AND a device name.

15.6.7.2 Service Communication via USB

This section describes how to access your SPEEDWAY node via the WAGO USB communication cable (756-4101/0042-0030).

15.6.7.2.1 Adding the Communication DTM USB

So that you can parameterize the fieldbus coupler and the I/O modules connected with it via the USB connection, establish a connection between your PC and the 767 node via the WAGO communication cable.

1. Select the respective COM port (I/O Service Port COM (xx)) in the interface settings.

Note

Access to the port
Make sure that the selected port is not blocked by other applications.

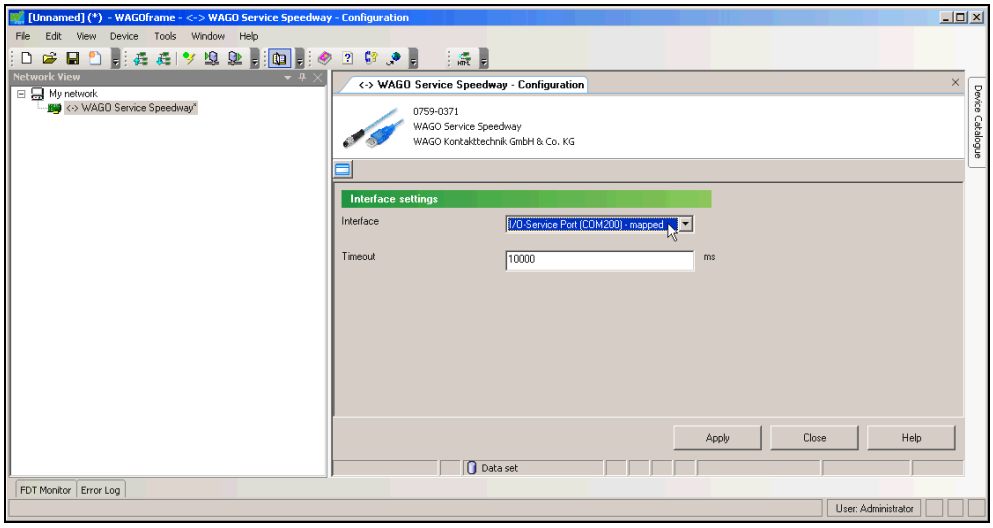


Figure 59: Select COM port

2. Right-click on “Network” in the “Network View” window.

3. In the context menu, select **Add**. The “Add...” dialog opens.

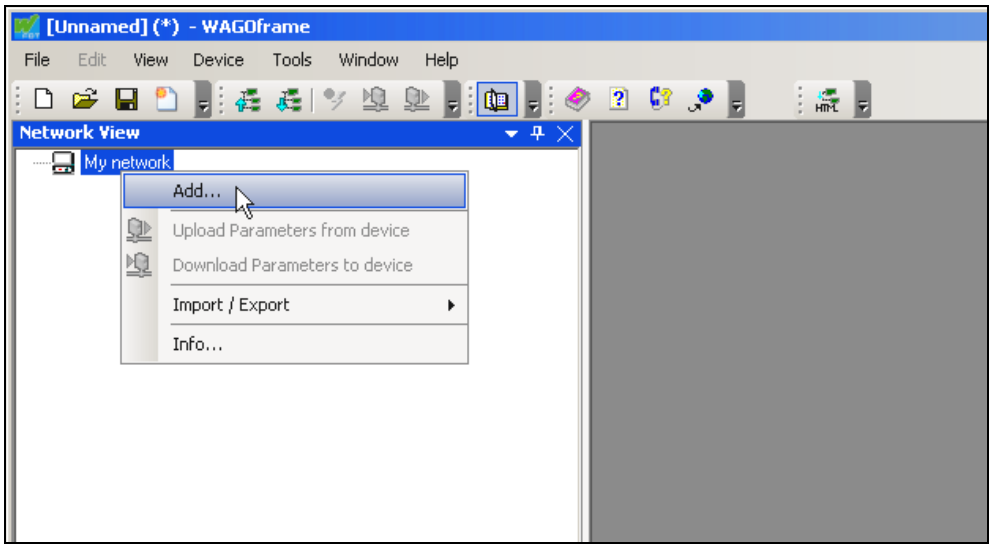


Figure 60: Adding the communication DTM

4. In the “Add” dialog, select “WAGO Service Speedway”.

5. Click **[OK]** to confirm your selection.

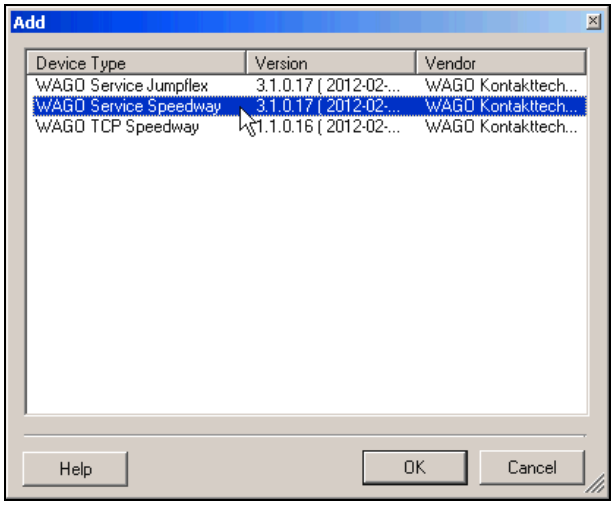


Figure 61: Selecting the communication DTM USB

15.6.7.2.2 Adding the DTM System Update

To add the DTM system update to WAGOframe, please proceed as follows:

1. In “Network View”, right-click on the “WAGO Service Speedway” DTM.
2. In the **Add...** context menu, select “Add”. The “Add” dialog box opens.

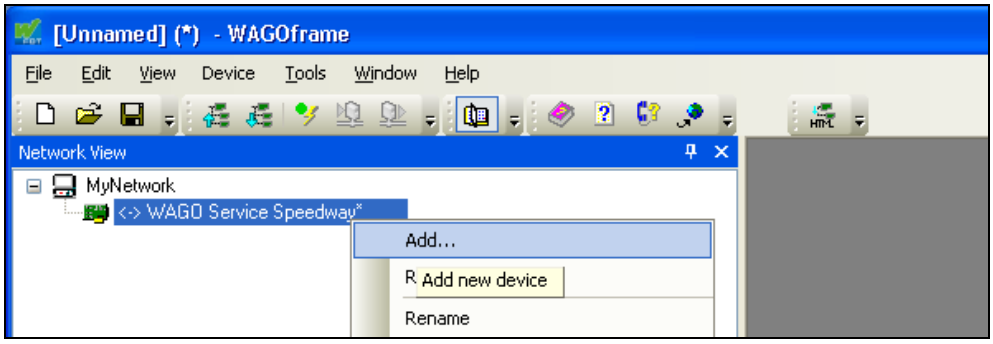


Figure 62: Adding the DTM system update

3. In the “Add” dialog box, select the DTM **0767 System Update**.
4. Click **[OK]** to confirm your selection.

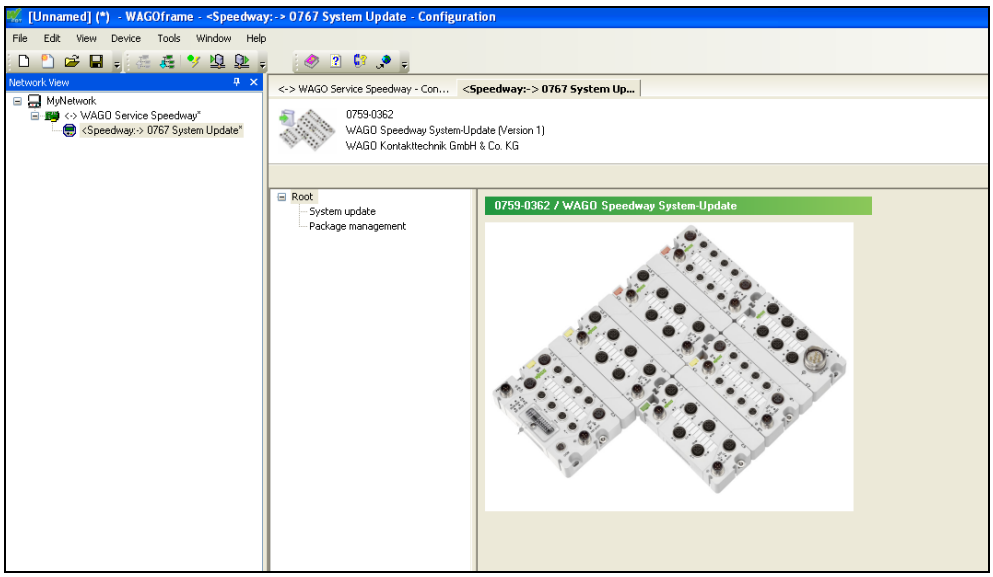


Figure 63: System update 1 (example)

15.6.7.2.3 Go online to 767 Nodes using Update DTM

The firmware can only be updated when a communication connection exists between Update DTM and 767 node. Please proceed as follows:

1. In the “Network View”, right-click on the “<Speedway:> 0767 System Update” device driver.

2. In the context menu, select **Go online**. When the progress bar displays 100% and the entry is displayed in ***bold italics***, the communication connection is established.

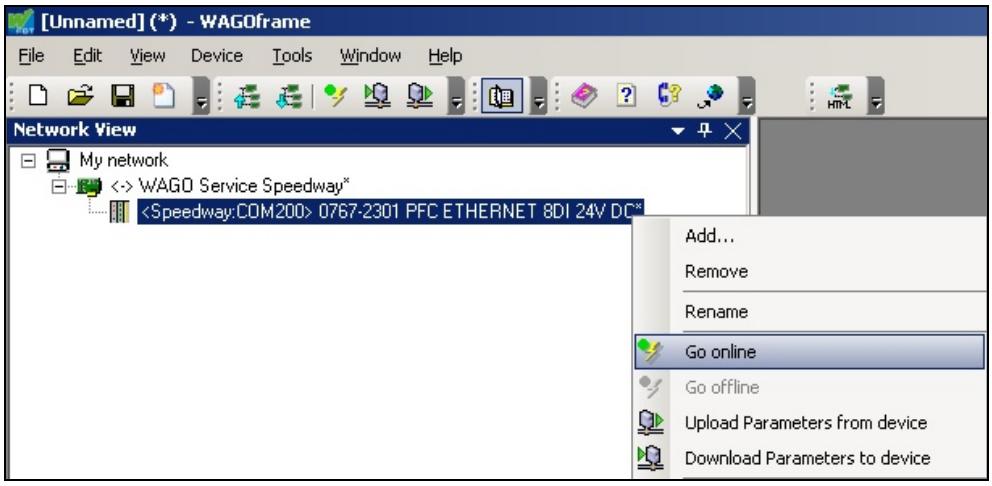


Figure 64: Go online to 767 node (example)

15.6.7.2.4 Updating the 767 Components

The current firmware is available from WAGO Support. Send an e-mail with the subject “Current Speedway Firmware” and the item number of the respective 767 components to: support@wago.com.

Import firmware packages

To use the received firmware packages, import them into the DTM system update. Please proceed as follows:

1. Save the received firmware packages with the “*.wup” extension to any directory on your PC.

2. Open the DTM user interface by double clicking “**0767 System Update”** in the network view.

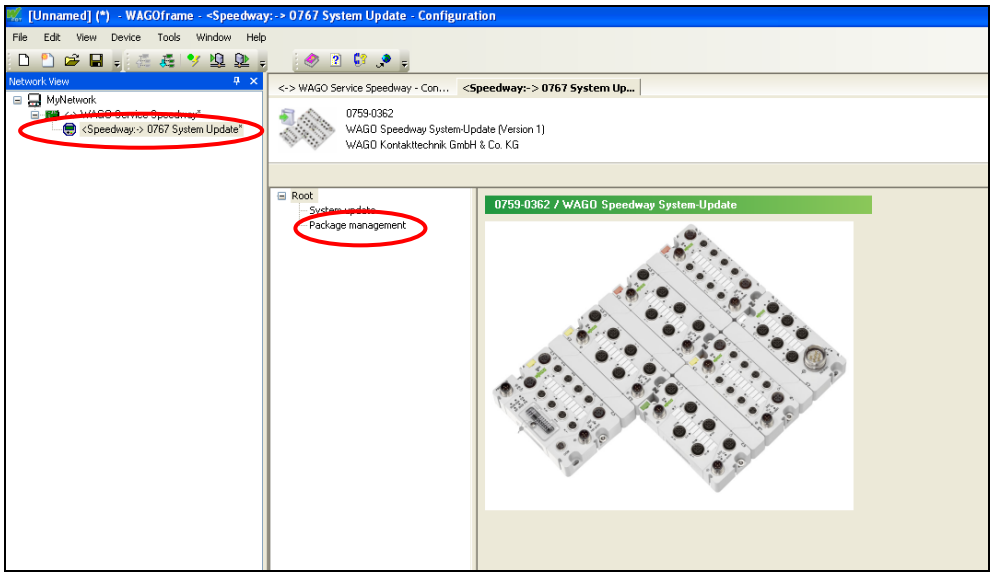


Figure 65: Package management 1 (example)

3. Click “Package Management” in the left window of WAGOframe.

4. To import the received firmware files, click **[Import]**. In the window that opens, go to the directory where you have saved the firmware files and select the file to be used. Click **[Open]** to apply the files.

Note

Adding firmware files.
Multiple firmware files can be added by selecting more than one.

Delete firmware packages

To maintain a clear “Package Management” interface, you can remove unneeded update packages from the view. Please proceed as follows:

1. Select the required firmware files in the right window.

2. Click **[Delete]** to remove the selected firmware packages.

Note

Context menu.
“Select/deselect all” is possible from the context menu.

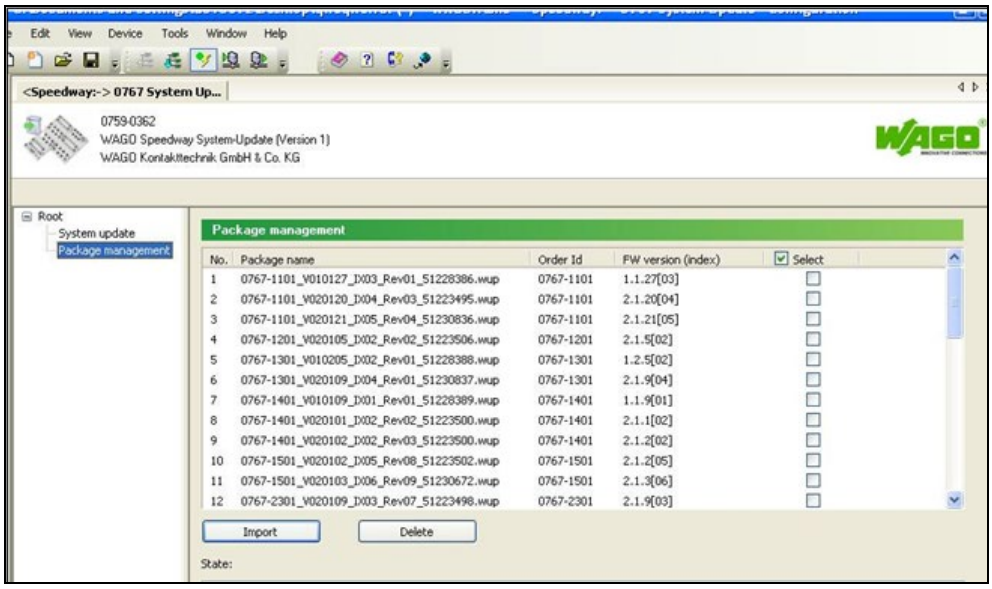


Figure 66: Package management 2 (example)

System update

Note

Updating the firmware
When updating the firmware of the fieldbus coupler, the saved module parameters may be overwritten. Therefore, check your existing configuration after updating the firmware.

Perform the system update here. The module settings you made normally remain unchanged. Otherwise, a corresponding warning message appears. If you still want to update the firmware, the 767 components are returned to their default state.

1. Click “System Update” in the left window.

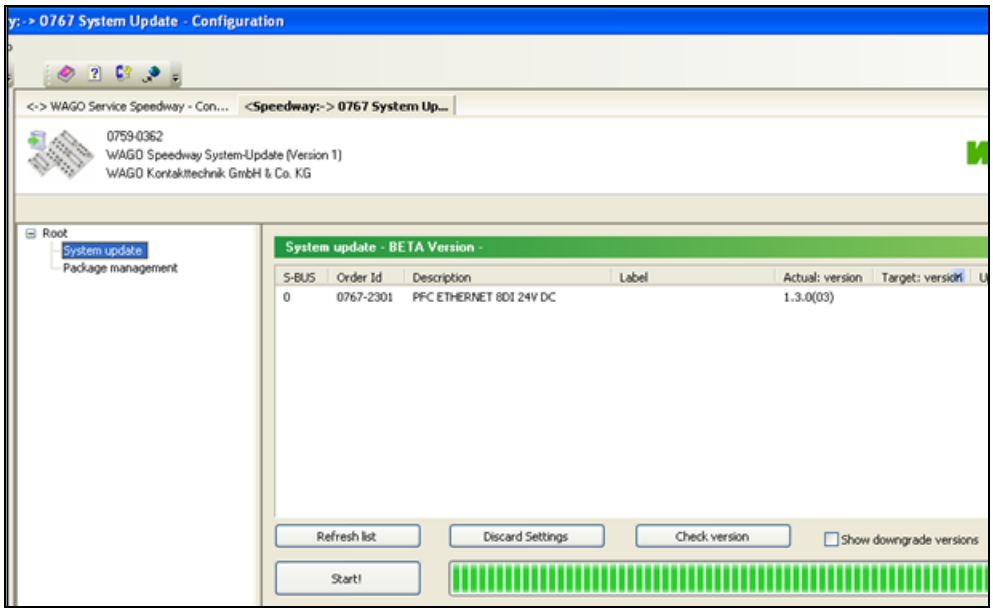


Figure 67: System update 2 (example)

2. The fieldbus coupler and all connected I/O modules are listed in the right window. All 767 components that can be updated are pre-selected. If the pre-selection is incorrect or if specific 767 components should not be updated, deselect them (“Update?” column).
   “Actual: Version”: Firmware currently present on the device
   “Target: Version”: Version of the firmware that should be loaded into the 767 components. If multiple “Target” versions can be selected, select the one relevant to you.

3. Click **[Start!]** to update the system. The 767 components are marked in yellow while being updated.

Note

Firmware actualization
During the firmware updating process, the fieldbus coupler disconnects each of its COM ports. A PC equipped with Windows 2000 will detect this, and a Windows message appears. This is not an error message. Confirm the message by pressing [OK].

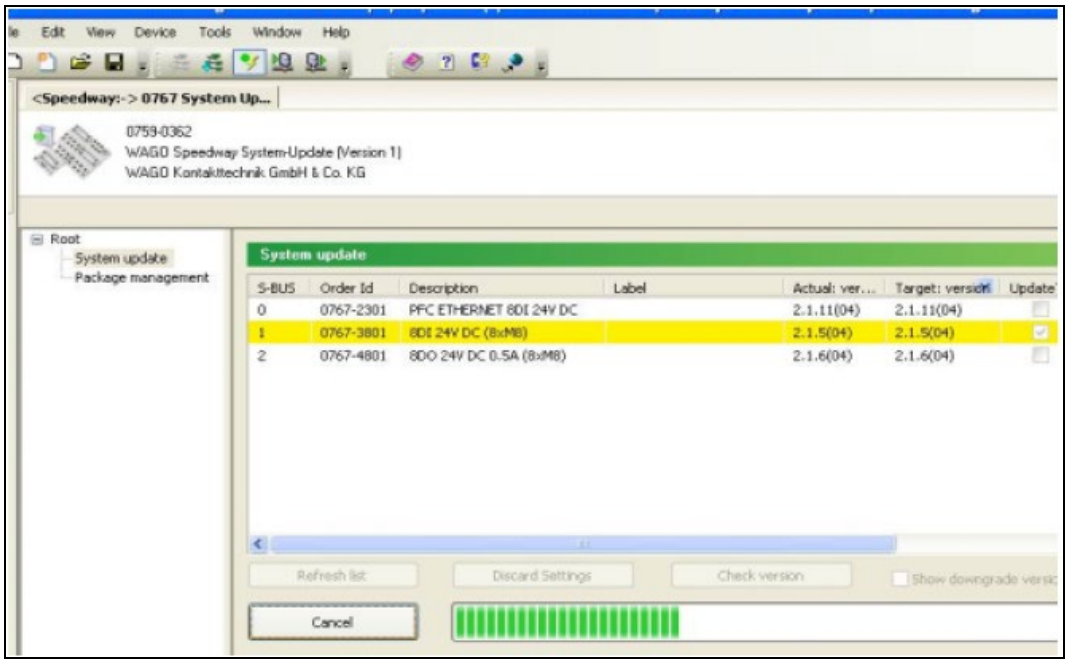


Figure 68: System Update 2 (example)

Table 90: Buttons

Button	Description
[Update List]	Use this function to read the node design and the view updates.
[Discard Settings]	Discard the selections and settings performed by you.
Display downgrade versions	If this checkbox is selected, the versions to downgrade a device are also displayed in the list of target versions.
[Start!]/[Abort]	Start/abort system update.

4. If the system update is finished, the updated 767 components are displayed in green (see figure).

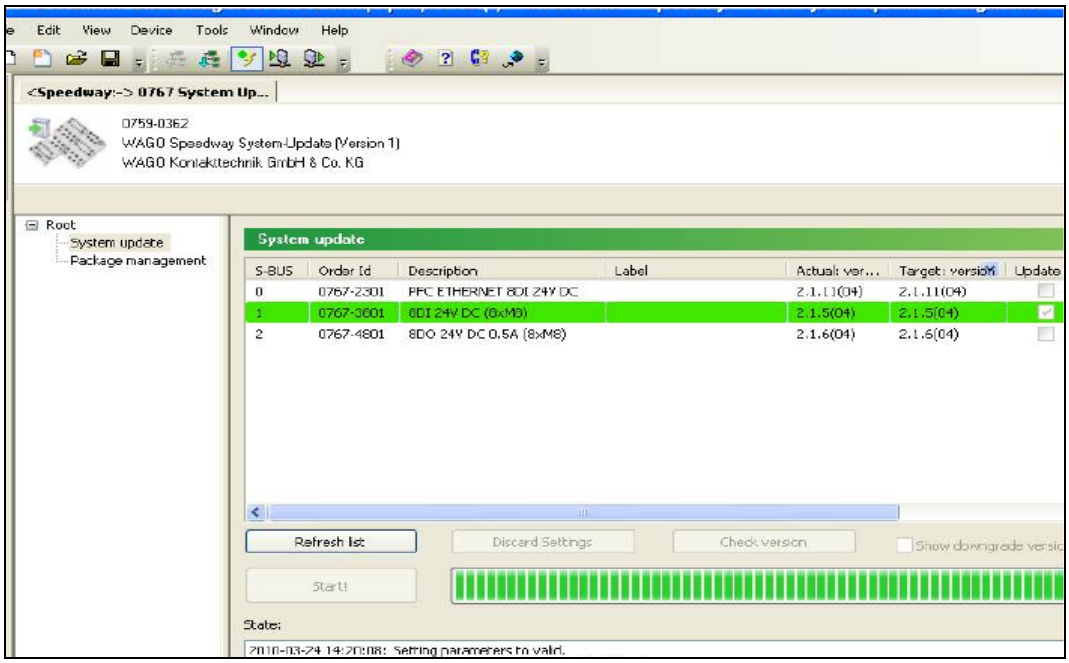


Figure 69: System Update 3 (example)

During system update, all relevant information is stored on your PC. Update can be repeated subsequently if the system update fails (components are displayed in red). In this case, original parameters remain unchanged.

If the update for a device fails, please contact WAGO Support.

15.6.7.3 Service Communication via ETHERNET

This section describes how to access your SPEEDWAY Station via ETHERNET with the DTM.

15.6.7.3.1 Adding the Communication DTM ETH

So that you can parameterize the fieldbus coupler and the I/O modules connected with it, establish a connection between your PC and the ETHERNET network. The service interface 6626 is preset. You can set the port under “Address Range”. Note that the port cannot be blocked by a firewall.

1 Right-click on “Network” in the “Network View” window.

2 In the context menu, select **Add**. The “Add...” dialog opens.

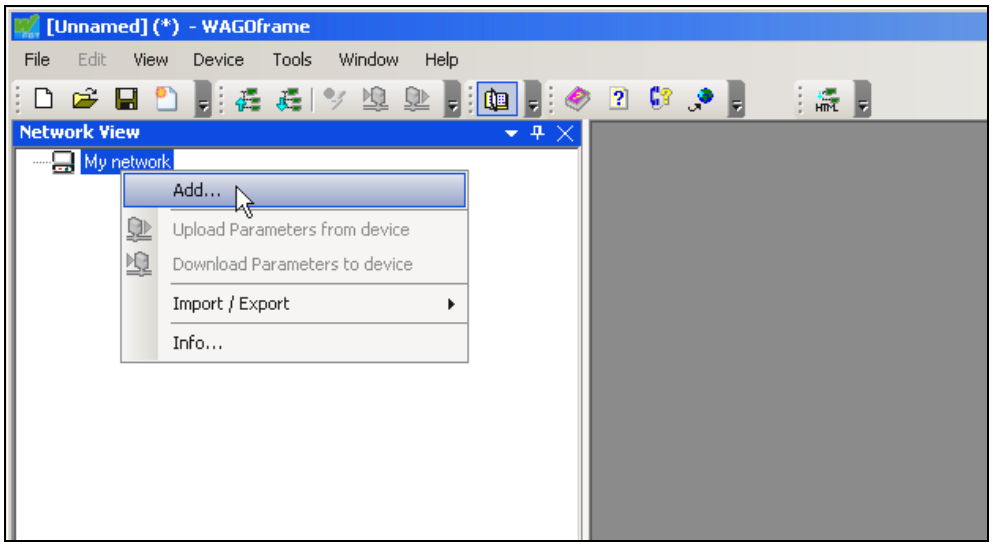


Figure 70: Adding the Communication DTM

3 In the “Add” dialog, select “WAGO TCP Speedway”.

4 Click **[OK]** to confirm your selection.

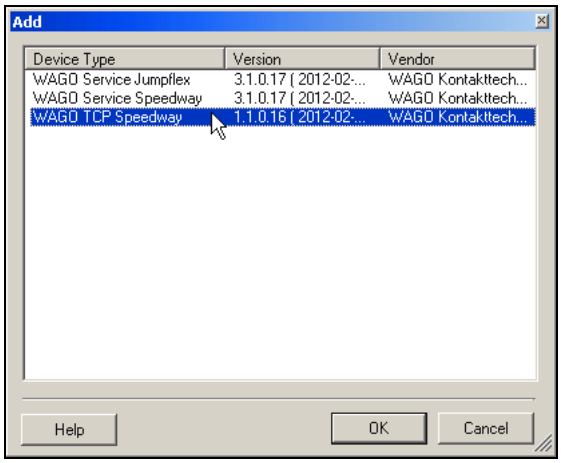


Figure 71: Selecting the Communication DTM TCP

15.6.7.3.2 ETHERNET Communication (DTM is offline)

1 Double-click on the “WAGO TCP Speedway” communication DTM in the “Network View” window. The DTM for the interface configuration opens.

Note

Setting the Port
You can only set the port as long as no DTM has been added below the “WAGO TCP Speedway”!

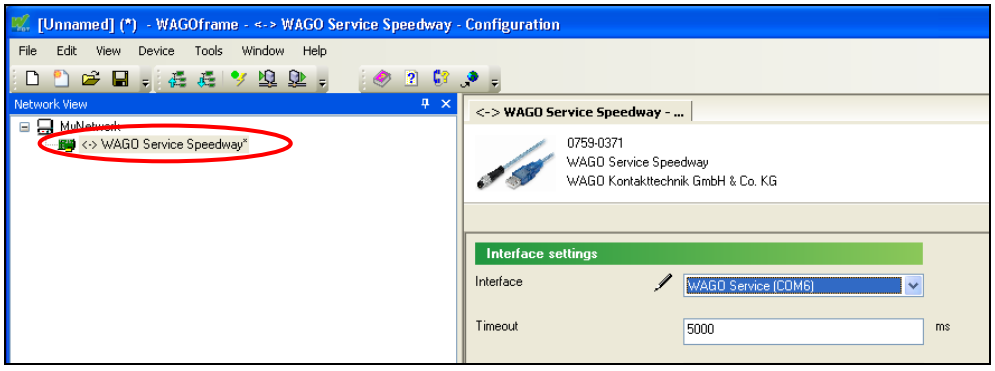


Figure 72: DTM for the Interface Configuration

2 In “Network View”, right-click on “WAGO TCP Speedway” and select the **Add ...** entry in the context menu. The “Add” dialog opens.

3 In the “Add” dialog, select the corresponding fieldbus coupler. Click **[OK]** to confirm your selection. The fieldbus coupler appears in “Network View” at the bottom right.

Note

Additional Information
Additional information (adding the I/O modules, etc.) is available in the section “Manual Setup of the Network”.

So that the DTM added in “Network View” (e.g. 767-2301) can communicate with the physical fieldbus coupler, both DTMs must be linked to each other.

4 Enter the exact IP address or the IP address range of the 767 network under “Address Range”, so that the 767 components are recognized during the network scan.

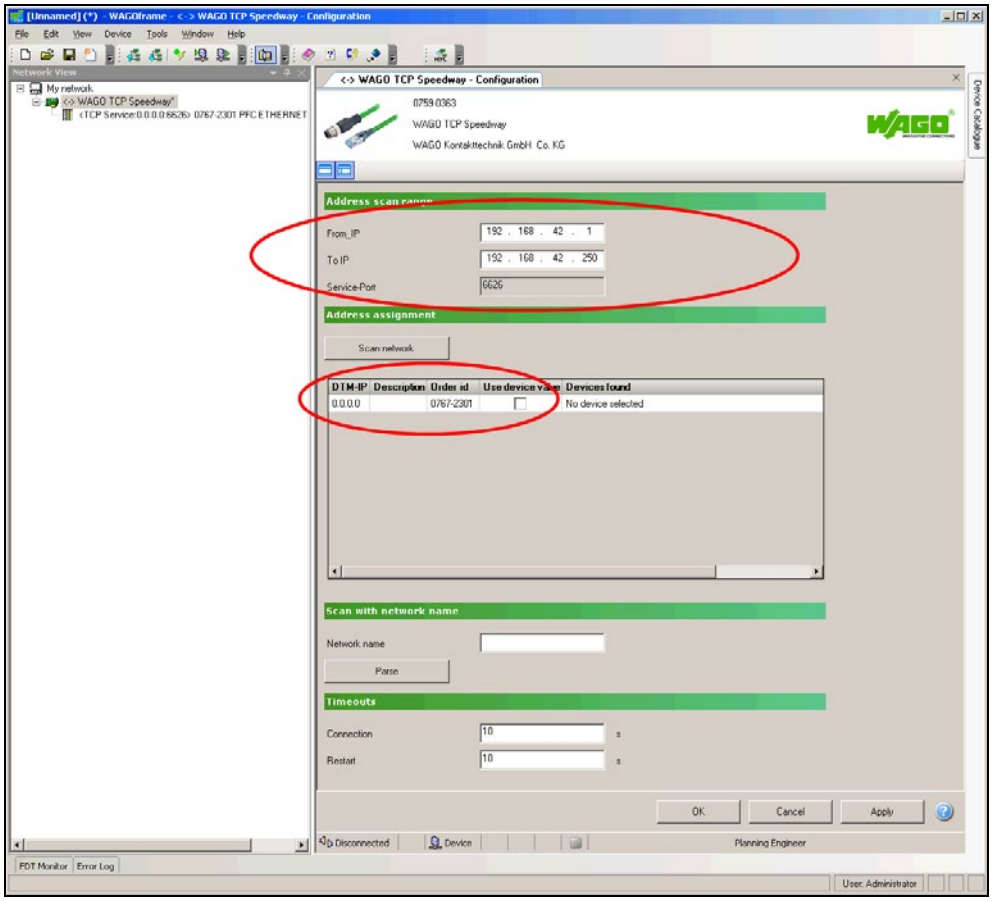


Figure 73: Selecting the Address Range

5 Click **[Scan Network]**. The physical fieldbus couplers appear with their IP address in the “Device found” pane.

Note

IP address

The PROFINET fieldbus coupler can only be accessed via an IP address if it has received a valid device name (e.g., by assignment using a configuration tool or by setting the DIP switches to a static device name) and an IP address (using a configuration tool).

6 Assign the IP address of the physical fieldbus coupler to the fieldbus coupler DTM from the “Network View” by selecting the correct IP address from the list that appears below the “Device found” pane. Click **[Apply]** to complete the link.

If you want to apply the IP address to the settings of the linked DTM, activate the “Apply Device Value” checkbox and click **[Apply]**.

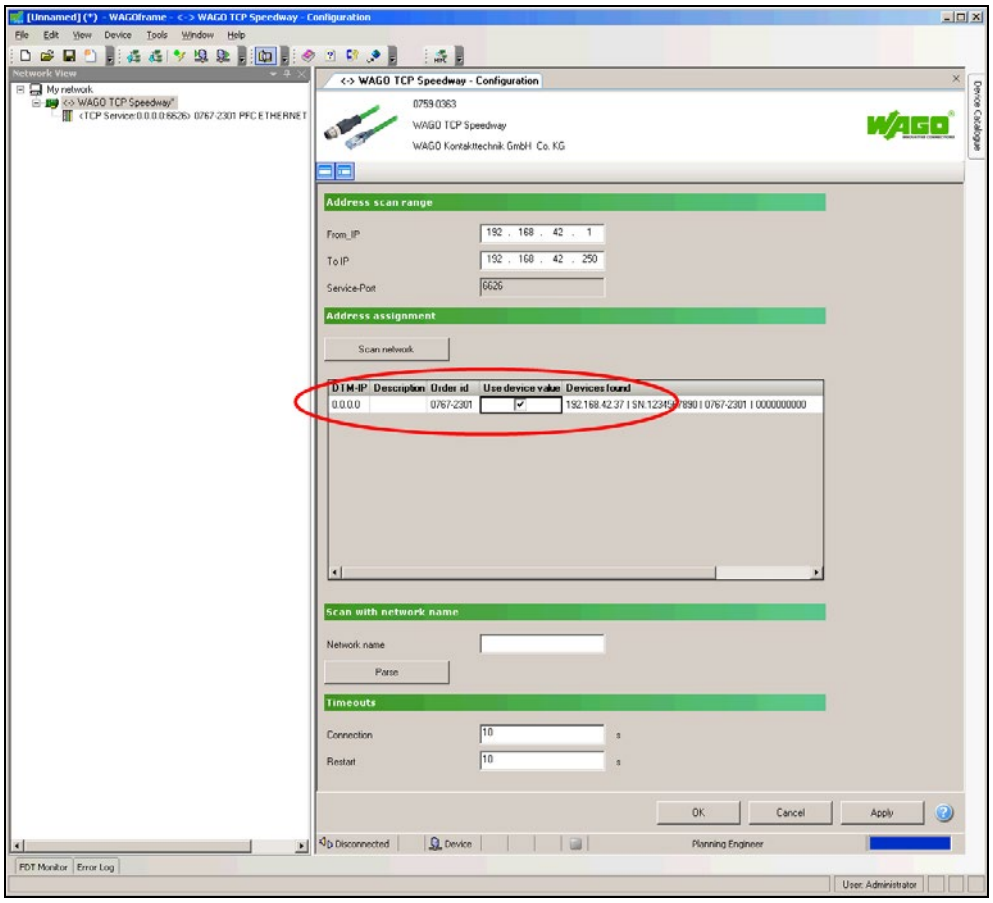


Figure 74: Apply Device Value

7 Parameterize the 767 components and save the parameterization as a project file. Transfer the project file later to the respective 767 components.

Note

Additional Information
Additional information is available in the section “Online and Offline Parameterization”.

15.6.7.3.3 ETHERNET Communication (DTM is online)

1 Double-click on the “WAGO TCP Speedway” communication DTM in the “Network View” window. The DTM for the interface configuration opens.

2 Enter the IP address or IP address range of the 767 network and click **[Apply]**.

3 In “Network View”, right-click on the “WAGO TCP Speedway”. In the context menu, select Scan > Set Up Network. All 767 components in the specified IP address range are automatically added to the “Network View”.

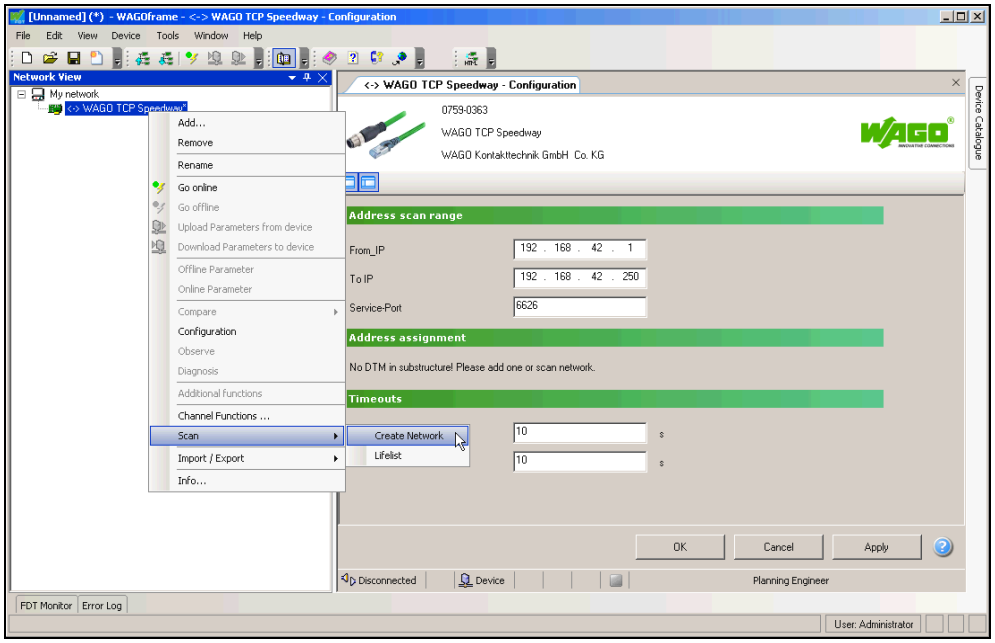


Figure 75: Network Setup

4 To set the parameters, right-click on the respective 767 components. In the context menu select “Online Parameterization”. The parameterization interface opens with the parameters of the respective 767 components.

Note

Additional Information
Additional information is available in the section “Online and Offline Parameterization”.

System Update

Note

Updating the Firmware
When updating the firmware of the fieldbus coupler, the saved module parameters may be overwritten. Therefore, check your existing configuration after updating the firmware.

Note

Update via ETHERNET
If the fieldbus coupler is set to BootP or DHCP before the update and the respective server is not available during and after the update, the error message “Update failed” may appear in the DTM although the update is done.
The cause is that the fieldbus coupler retains the communication settings during the update. The fieldbus coupler is only reset to BootP or DHCP at the end of the update.

15.7 Parameterization

All parameters listed here can be set using WAGOframe (or another FDT/DTM border application) for the fieldbus coupler. If you use a fieldbus for the parameterization, only certain parameters are configurable, depending on fieldbus type.

The following sections contain information on the parameters and their descriptions.

To open the parameterization user interface (DTM) of a 767 component, double-click on the appropriate 767 component in the “Network View”. The parameterization user interface can also be opened by right-clicking on **Offline Parameter** or **Online Parameter** in the context menu.
If several parameterization user interfaces are open, select one via the corresponding tabs. If you switch a 767 component from the online mode to the offline mode or vice versa, close the parameterization user interface and reopen it.

Depending on the selection of parameterization user interfaces, various buttons are at your disposal:

Table. 91: DTM buttons

Button	Description
[Read] *(Online mode only)*	Reads and displays the parameters found in the 767 components.
[Write] *(Online mode only)*	Writes the modified values to the 767 components.
[Close] *(Online and offline mode)*	Closes the parameterization user interface (DTM).
[Apply] *(Offline mode only)*	Applies the entries in the project. Please note that the project should also be subsequently saved (**File > Save**).
[Help] *(Online and offline mode)*	Opens the online help for an entry that has been previously selected in the DTM (e.g., digital inputs, global setting).
	Shows/hides parameter overview.
	Displays the product data sheet. A PDF reader must be installed on your PC.
	Opens the DTM online help.

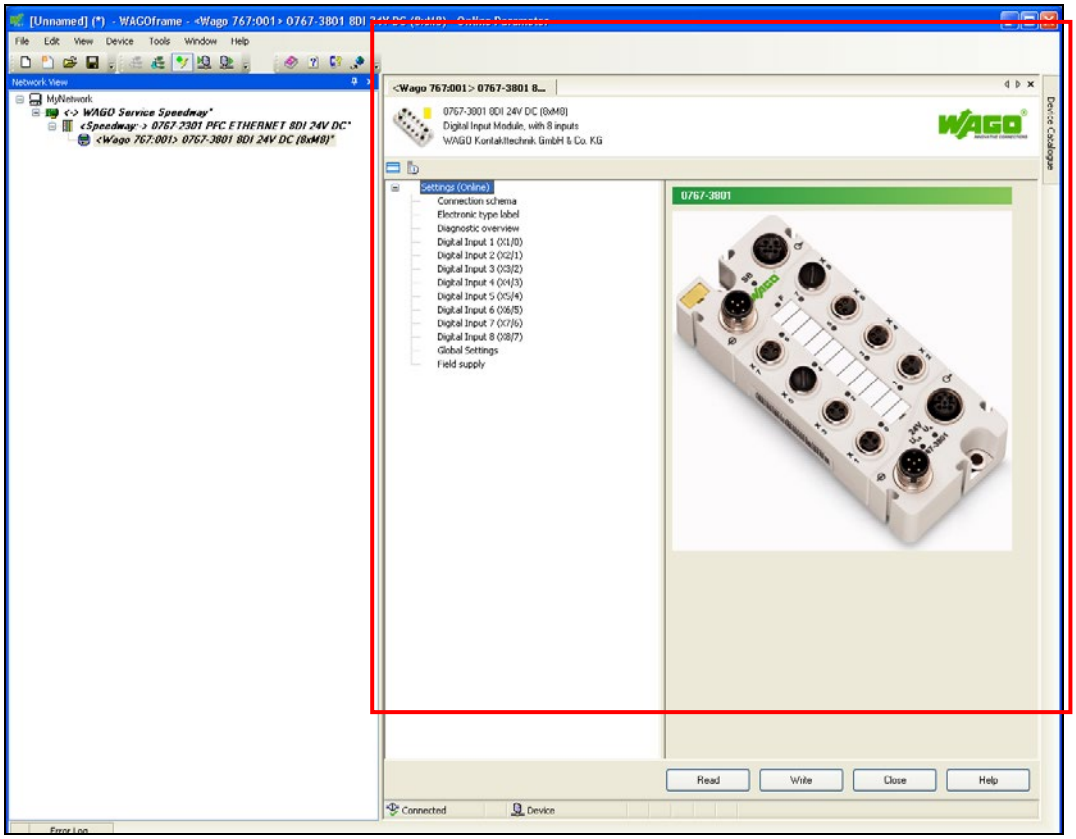


Figure 76: Example of an opened DTM with the available parameters

15.7.1 General Parameters

Electronic type label

Table 92: Information about the fieldbus coupler

Parameter	Description
Vendor	Manufacturer
Release index	FW.HW.FL **FW:** Actual firmware release index When updating the firmware, please note that the firmware release index may not be conformed to the printed firmware release index on the side of the fieldbus coupler. **HW:** Hardware release index **FL:** Actual firmware loader release index
Firmware revision	General information on the module
Firmware loader revision	
Order number	
Description	
Serial number	
Date of production	
Designation	Electronic marking field (max. 40 characters)

General fieldbus information

Table 93: General fieldbus information

Parameter	Description
Cyclic data exchange enabled	Enable or disable here a cyclic data exchange with the fieldbus. **Checkbox selected:** Cyclic data exchange enabled. **Checkbox not selected:** Cyclic data exchange disabled.

Date/Time

Table 94: Time settings

Parameter	Description
Daylight saving time	Activate or deactivate summer time here.
Time zone	Select your time zone here.
Actual time	Set the date and time here.
UTC	World time display

To transfer the current local time from your PC to the fieldbus coupler, click **[Apply PC time]** and then **[Write]**.

DIP switch

Display of the switch positions of the existing DIP switches on the fieldbus coupler.

Blink Code

Table 95: Display of errors

Parameter	Description
Blink code	Display of blink code (error group, error code and error argument).

A list of blink codes and error descriptions, as well as information on error correction, can be found in section “Meaning of the Blink Codes and Procedures for Correcting Them”.

15.7.2 Fieldbus specific Parameters

ETHERNET

Table 96: Overview of ETHERNET specific parameters

Parameter	Description
MAC address	Displays the MAC address of the fieldbus coupler.

PROFINET IO

Table 97: Overview of PROFINET specific parameters

Parameter	Description
Station name of device	Displays the station name of the fieldbus coupler.
Vendor Id	Registered manufacturer identification for WAGO Kontakttechnik GmbH & Co. KG assigned by PROFIBUS & PROFINET International: 0x011D (285)
Device Id	Displays the device identification number of the fieldbus coupler: 0x02FF (767)
Max. number of communications relations	Displays the maximum number of supported application relations of the fieldbus coupler: 3 = 2 x IOCAR + 1 x IOSAR
Actual number of communications relations	Displays the actual number of active application relations of the fieldbus coupler.
Type	WAGO SPEEDWAY 767

Fieldbus Service Communication

Parameters	Description
Service Communication via Fieldbus	Activate and deactivate the EtherNet/IP protocol.
IP Port of Service Communication	Set the IP port of the service communication.

FTP Server Configuration

Table 98: Parameters for configuring the FTP server

Parameter	Description
Enable FTP server	Activate or deactivate the FTP server here.

WEB Server Configuration

Table 99: Parameters for configuring the WEB server

Parameter	Description
Enable WEB server	Activate or deactivate the Web server here.
Port number	Communications port for the Web server. Default setting: 80

SNMP Configuration

Table 100: Parameter for the SNMP Configuration

Parameters	Description
Activate SNMP	Choose if you want to enable or disable SNMP.
Device description	The device name of the fieldbus coupler is displayed.
Email contact address	The email contact address is displayed.
Device location	The location of the device is displayed.
Activate SNMP V1/V2c	Choose if you want to enable or disable SNMP V1/V2c.
Community name used	The community name used is displayed.
1st trap receiver	The IP address for the 1st trap receiver is displayed.
1st trap community name used	The 1st name of the network community used is displayed.
1st trap version	Choose if you want to enable trap version 1 or 2.
2nd trap receiver	The IP address for the 2nd trap receiver is displayed.
2nd trap community name used	The 2nd name of the network community used is displayed.
2nd trap version	Choose if you want to enable trap version 1 or 2.

SNMP V3 Configuration

Table 101: Parameters for the SNMP V3 Configuration

Parameters	Description
Activate user 1 / user 2	Choose if you want to enable or disable user 1.
Authentication type	Select the authentication type. - None - MD5 - SHA1
Authentication name	Enter the authentication name if you have selected MD5 or SHA1 as the authentication type.
Authentication key	Enter the password with at least 8 characters if you have selected MD5 or SHA1 as the authentication type.
Enable encryption	Choose if you want to enable or disable DES encryption.
Encryption password	Enter the password with at least 8 characters if you have selected DES encryption.
Activate notification/trap	Choose if you want to enable or disable notification/trap.
Notification recipient	The IP address of the notification recipient is displayed.

15.7.3 Diagnostic Overview and Parameters of Inputs

Diagnostic Overview

The currently pending diagnostics existing on the module are displayed here. In this view of the DTM, you can enable simulation of the diagnostics, as well as disable transmission of the diagnostics. When disabling transmission, make sure that the display behavior of each LED changes that indicates the specific diagnostics (section “Operational Messages of the Fieldbus Coupler via LED Signals”).
The diagnostic overview is only available in online mode.

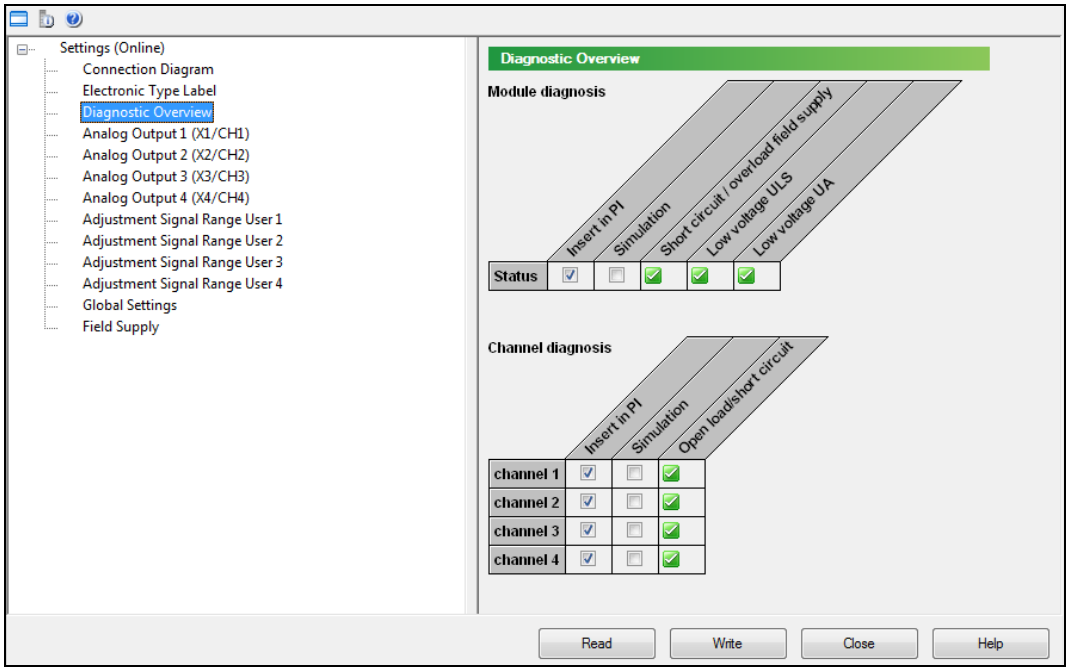


Figure 77: Diagnostic overview of the fieldbus coupler (example)

Table 102: Diagnostic setup

Parameter	Description
Insert in PI	This parameter disables/enables transmission of diagnostics. Doing so has no effect on the size of the process image, but does affect its content.
Simulation	If you have selected the “Insert in PI” checkbox, the “Simulation” parameter is released. You can select the diagnostics you want to simulate. Click the **[Write]** button to transfer the simulated values to the module.
Status	Displays whether there is a diagnostics: X mark: There is a diagnostic message. Check mark: There is no diagnostic message.

Table 103: Information about existing module diagnostics

Diagnostics	Description
Short circuit/overload field supply	The device has detected a short circuit or overload of the field supply (only possible when field supply is switched on).
Low voltage U_{LS}	If an undervoltage of the logic or sensor supply (U_{LS}) of < 18 V occurs on the device, a corresponding diagnostic message is generated and the F-LED illuminates. The substitute value strategy that you have parameterized is used on the digital inputs.
Low voltage U_A	If an undervoltage of the actuator supply (U_A) of < 18 V occurs on the device, a corresponding diagnostic message is generated and the F-LED illuminates. The undervoltage of the actuator supply has no functional effect on the device.

Parameters of Digital Inputs

Table 104: Adjustable parameters of the digital inputs

Parameter	Description
Designation	Electronic marking field (max. 40 characters).
Input value	The current input signal is displayed here. If the “Simulation Input Value” parameter has been selected, select here the input value that is to be simulated: **If simulation is switched off*** **Checkbox unselected:** Input value (0) **Checkbox selected:** Input value (1) **If simulation is switched on** **Checkbox unselected:** Input is simulated with value 0 **Checkbox selected:** Input is simulated with value 1
Signal inverting	You can invert the currently pending input signal here. **Checkbox unselected*:** Input signal is reproduced in the process image in the same manner as at the input **Checkbox selected:** Input signal is reproduced in the process image in an inverted manner
Filter time	Set the input filter for the measured signals here. You have the following options: none 0.1 ms 0.5 ms 3 ms* 15 ms 20 ms

Table 104: Adjustable parameters of the digital inputs

Parameter	Description
Substitute Value Strategy	This releases, if the field bus supports, the substitute value or the last input value in cases such as a fieldbus interruption. You have the following options: - Switch to substitute value* - Retain last value
Substitute Value	Enter here the process value that is used in case of an error. In the case of an error (fieldbus interruption), this value is used with the "Switch to Substitute Value" substitute value strategy. **Checkbox unselected:** 0* **Checkbox selected:** 1
Simulation input value	This simulation can be used to simulate input values. **Checkbox unselected*:** The value at the inputs is carried over into the process image. **Checkbox selected:** The simulation value is inserted into the process data independent of the input value. The "Input Value" parameter is selected.

* Default setting

Global Settings

Table 105: Adjustable parameters for the entire fieldbus coupler

Parameter	Description
Simulation diagnostic	If the checkbox is selected, you can simulate a low voltage diagnostic. To generate a low voltage diagnostic, one or both of the two checkboxes "Low voltage U_{LS}" and "Low voltage U_A" must be selected. *Default setting: unselected*
Low voltage U_{LS}	In the case of an undervoltage of the logic and sensor supply (U_{LS}) or the actuator supply (U_A), the corresponding diagnostic is displayed here.
Low voltage U_A	

Parameters of Field Supply

Table 106: Adjustable parameters of the field supply

Parameter	Description
Enable field supply	Switch on the field supply (24VDC) for the sensors here. *Default setting: selected*
Autorestart delay	In the event of a short circuit, the sensor supply is switched off for a parametrizable amount of time. Here, enter the delay time (in 100-ms increments); after this time, the sensor supply is restarted. If the short circuit still exists, the process is repeated.
Simulation diagnostic	The simulation can be used to simulate a short circuit. *Default setting: unselected*
Short circuit/overload	If simulation is deactivated, the respective error is displayed upon emergence. If simulation is activated, you can simulate one of the errors by selecting the appropriate parameter.

16 Service

This section contains information on maintenance and service.

16.1 Updating the Firmware

Information on updating the firmware can be found in section “System Update”.

16.2 Replacing the Fieldbus Coupler

To replace the fieldbus coupler, e.g., to change variants, proceed as described in the following sections.

16.2.1 Disconnecting the Cables

Before removing the connectors, clean the fieldbus coupler to ensure that no dirt or other material comes in contact with the connections. This can lead to damage of the contacts.

To unplug the cables, proceed as follows:

1. Disconnect the power supply from those devices on which you have mounted the fieldbus coupler.

⚠ CAUTION

Hot connection sockets!
Even when taking into account derating, high surface temperatures on the metallic connection sockets and on the enclosure can arise during operation. If the 767 Series component has been in operation, allow it to cool off before moving it.

2. Unscrew all screw connections and remove the cables.

16.2.2 Removing the Fieldbus Coupler from your System

To remove the fieldbus coupler from the framework of your system, proceed as follows:

1. Disconnect the power supply from those devices on which you have mounted the fieldbus coupler.

2. Release the fieldbus coupler from the framework of your system by unscrewing the M4 screws.

16.2.3 Removing the Fieldbus Coupler from the Carrier Rail

In order to keep a clear representation, the mounting rail adapter in the following figure (B, C) is shown without the fieldbus coupler.

If the fieldbus coupler is mounted on a mounting rail, proceed with the removal as follows:

1. Disconnect the power supply from those devices on which you have mounted the fieldbus coupler.

2. To remove the fieldbus coupler, press down the release eyebolt of the mounting rail adapter using a slot screwdriver (B) and remove it from the mounting rail (C).

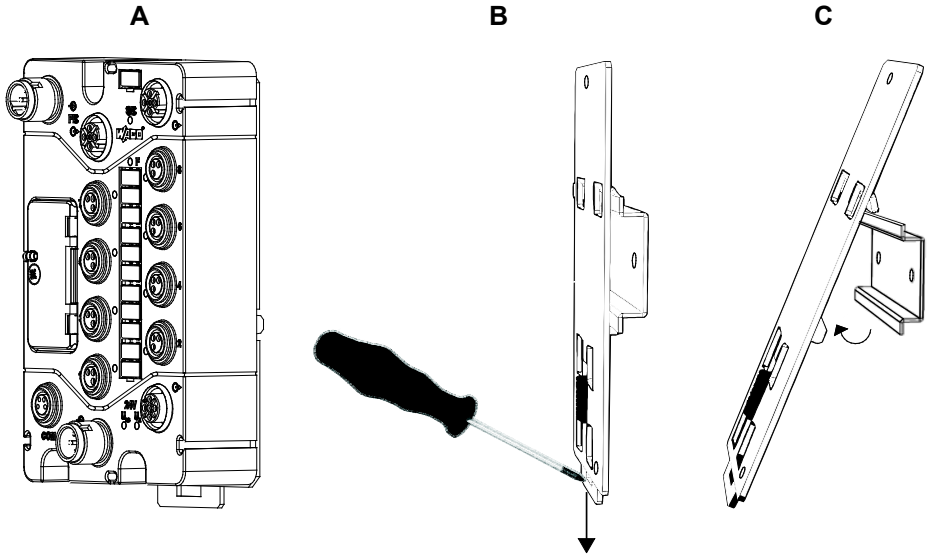


Figure 78: Removing the fieldbus coupler (with the mounting rail adapter) from the mounting rail

16.2.4 Removing the Fieldbus Coupler from the Profile Adapter

If the fieldbus coupler is mounted on a profile adapter, proceed with the removal as follows:

1. Disconnect the power supply from the device on which you have mounted the fieldbus coupler before attempting to remove.

2. Unscrew the screws on which the nuts are fastened and remove the fieldbus coupler from the profile rail of your system.

3. Unscrew the screws that connect the fieldbus coupler with the profile adapter.

16.2.5 Connecting a New Fieldbus Coupler

To connect the fieldbus coupler, proceed as described in sections “Mounting the Fieldbus Coupler” through “Start-Up”.

16.3 Disposal

Do not dispose of the 767 components in the household waste; observe the laws which apply to them. You can also contact a certified waste management company.

17 Use in Hazardous Environments

The modular system WAGO-*SPEEDWAY 767* (electrical equipment) is designed for use in Zone 2 and 22 hazardous areas.

The following sections include both the general identification of components (devices) and the installation regulations to be observed. The individual subsections of the “Installation Regulations” section must be taken into account if the fieldbus coupler and the I/O module of the series WAGO-*SPEEDWAY 767* has the required approval or is subject to the range of application of the ATEX directive.

17.1 Marking Configuration Examples

17.1.1 Marking for Europe According to ATEX and IEC-Ex

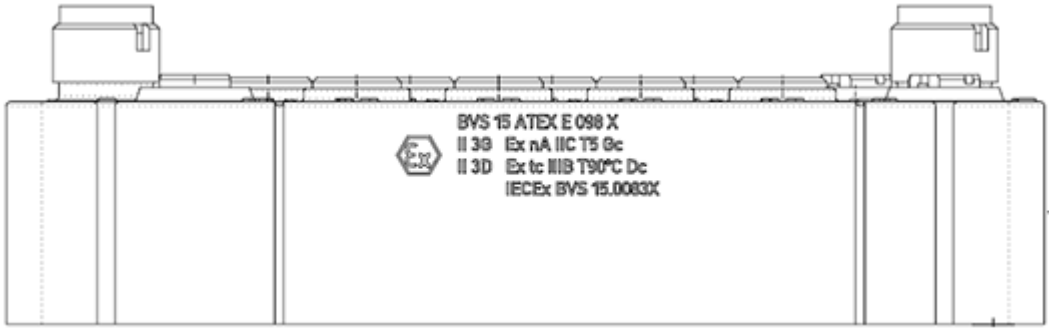


Figure 79: Side Marking Example for approved WAGO SPEEDWAY 767 Series Fieldbus Coupler according to ATEX and IECEx

Table 107: Legend for Figure “Side Marking Example for approved WAGO SPEEDWAY 767 Series Fieldbus Coupler according to ATEX and IECEx”

Printing on Text	Description
BVS 15 ATEX E098X IECEx BVS 15.0083X	Approving authority and certificate numbers
Dust	
II	Equipment group: All except mining
3D	Category 3 (Zone 22)
Ex	Explosion protection mark
Tc Dc	Type of protection and equipment protection level (EPL): protection by enclosure
IIIB	Explosion group of dust
T90°C	Max. surface temperature of the enclosure (without a dust layer)
Gases	
II	Equipment group: All except mining
3G	Category 3 (Zone 2)
Ex	Explosion protection mark
nA Gc	Type of protection and equipment protection level (EPL): Non-sparking equipment
IIC	Explosion group of gas and vapours
T5	Temperature class: Max. surface temperature 100 °C

17.2 Installation Regulations

For the installation and operation of electrical equipment in hazardous areas, the valid national and international rules and regulations which are applicable at the installation location must be carefully followed.

17.2.1 Special Conditions for Safe Use (ATEX Certificate BVS 15 ATEX E098X)

1. The Modular I/O-System has to be protected against UV emitting light.
2. The permitted ambient temperature range is −25°C … +50 C.
3. The Modular I/O-System has to be installed in a way that it is protected against any mechanical and electrostatical hazards. This may be realized by a protection measure according to the documentation mentioned in the Test Report. In this case the earthling of the metal cage has to be established by the end user.
4. The plug shall be in accordance with all applicable clauses of IEC/EN 60079-0 and IEC/EN 60079-15. A minimum degree of protection IP54 according to IEC/EN 60529 shall be ensured. This may be realized by accessories series 756 of WAGO Kontakttechnik GmbH & Co. KG. In this case the torque is 0.6 Nm.

17.2.2 Special Conditions for Safe Use (IEC Ex Certificate IECEx BVS 15.0083X)

1. The Modular I/O-System has to be protected against UV emitting light.
2. The permitted ambient temperature range is −25°C … +50 C.
3. The Modular I/O-System has to be installed in a way that it is protected against any mechanical and electrostatical hazards. This may be realized by a protection measure according to the documentation mentioned in the Test Report. In this case the earthling of the metal cage has to be established by the end user.
4. The plug shall be in accordance with all applicable clauses of IEC/EN 60079-0 and IEC/EN 60079-15. A minimum degree of protection IP54 according to IEC/EN 60529 shall be ensured. This may be realized by accessories series 756 of WAGO Kontakttechnik GmbH & Co. KG. In this case the torque is 0.6 Nm.

18 Accessories

In this chapter you will find a list of the most important accessory components that you need to begin operating the fieldbus coupler. The carrier rails, spacers, etc., as well as the entire accessories program from the AUTOMATION field, can be found in the Internet www.wago.com or in the “AUTOMATION” catalog.

18.1 S-BUS Cable, Assembled on One End

Table 108: S-BUS cable, assembled on one end, B coded

Description	Length	Item number	PU
S-BUS cable, M12 socket, straight, one free cable end	2.0 m	756-1301/0060-0020	1
S-BUS cable, M12 socket, straight, one free cable end	5.0 m	756-1301/0060-0050	
S-BUS cable, M12 socket, straight, one free cable end	10.0 m	756-1301/0060-0100	
S-BUS cable, M12 socket, straight, one free cable end	20.0 m	756-1301/0060-0200	
S-BUS cable, M12 socket, right angle, one free cable end	2.0 m	756-1302/0060-0020	
S-BUS cable, M12 socket, right angle, one free cable end	5.0 m	756-1302/0060-0050	
S-BUS cable, M12 socket, right angle, one free cable end	10.0 m	756-1302/0060-0100	
S-BUS cable, M12 socket, right angle, one free cable end	20.0 m	756-1302/0060-0200	
S-BUS cable, M12 plug, straight, one free cable end	2.0 m	756-1303/0060-0020	
S-BUS cable, M12 plug, straight, one free cable end	5.0 m	756-1303/0060-0050	
S-BUS cable, M12 plug, straight, one free cable end	10.0 m	756-1303/0060-0100	
S-BUS cable, M12 plug, straight, one free cable end	20.0 m	756-1303/0060-0200	
S-BUS cable, M12 plug, right angle, one free cable end	2.0 m	756-1304/0060-0020	
S-BUS cable, M12 plug, right angle, one free cable end	5.0 m	756-1304/0060-0050	
S-BUS cable, M12 plug, right angle, one free cable end	10.0 m	756-1304/0060-0100	
S-BUS cable, M12 plug, right angle, one free cable end	20.0 m	756-1304/0060-0200	

18.2 S-BUS Cable, Assembled on One End, Suitable for Drag Chains

Table 109: S-BUS cable, assembled on one end, B coded, suitable for drag chains

Description	Length	Item number	PU
S-BUS cable, M12 socket, straight, one free cable end	2.0 m	756-1501/0060-0020	1
S-BUS cable, M12 socket, straight, one free cable end	5.0 m	756-1501/0060-0050	
S-BUS cable, M12 socket, straight, one free cable end	10.0 m	756-1501/0060-0100	
S-BUS cable, M12 socket, straight, one free cable end	20.0 m	756-1501/0060-0200	
S-BUS cable, M12 socket, right angle, one free cable end	2.0 m	756-1502/0060-0020	
S-BUS cable, M12 socket, right angle, one free cable end	5.0 m	756-1502/0060-0050	
S-BUS cable, M12 socket, right angle, one free cable end	10.0 m	756-1502/0060-0100	
S-BUS cable, M12 socket, right angle, one free cable end	20.0 m	756-1502/0060-0200	
S-BUS cable, M12 plug, straight, one free cable end	2.0 m	756-1503/0060-0020	
S-BUS cable, M12 plug, straight, one free cable end	5.0 m	756-1503/0060-0050	
S-BUS cable, M12 plug, straight, one free cable end	10.0 m	756-1503/0060-0100	
S-BUS cable, M12 plug, straight, one free cable end	20.0 m	756-1503/0060-0200	
S-BUS cable, M12 plug, right angle, one free cable end	2.0 m	756-1504/0060-0020	
S-BUS cable, M12 plug, right angle, one free cable end	5.0 m	756-1504/0060-0050	
S-BUS cable, M12 plug, right angle, one free cable end	10.0 m	756-1504/0060-0100	
S-BUS cable, M12 plug, right angle, one free cable end	20.0 m	756-1504/0060-0200	

18.3 S-BUS Cable, Assembled on Both Ends

Table 110: S-BUS cable, assembled on both ends, B coded

Description	Length	Item number	PU
S-BUS cable, M12 socket, M12 plug, straight	0.2 m	756-1305/0060-0002	1
S-BUS cable, M12 socket, M12 plug, straight	0.3 m	756-1305/0060-0003	
S-BUS cable, M12 socket, M12 plug, straight	0.5 m	756-1305/0060-0005	
S-BUS cable, M12 socket, M12 plug, straight	1.0 m	756-1305/0060-0010	
S-BUS cable, M12 socket, M12 plug, straight	2.0 m	756-1305/0060-0020	
S-BUS cable, M12 socket, M12 plug, straight	5.0 m	756-1305/0060-0050	
S-BUS cable, M12 socket, M12 plug, straight	10.0 m	756-1305/0060-0100	
S-BUS cable, M12 socket, M12 plug, straight	20.0 m	756-1305/0060-0200	
S-BUS cable, M12 socket, M12 plug, straight	50.0 m	756-1305/0060-0500	
S-BUS cable, M12 socket, M12 plug, angular	0.2 m	756-1306/0060-0002	
S-BUS cable, M12 socket, M12 plug, angular	0.3 m	756-1306/0060-0003	
S-BUS cable, M12 socket, M12 plug, angular	0.5 m	756-1306/0060-0005	
S-BUS cable, M12 socket, M12 plug, angular	1.0 m	756-1306/0060-0010	
S-BUS cable, M12 socket, M12 plug, angular	2.0 m	756-1306/0060-0020	
S-BUS cable, M12 socket, M12 plug, angular	5.0 m	756-1306/0060-0050	
S-BUS cable, M12 socket, M12 plug, angular	10.0 m	756-1306/0060-0100	
S-BUS cable, M12 socket, M12 plug, angular	20.0 m	756-1306/0060-0200	
S-BUS cable, M12 socket, M12 plug, angular	50.0 m	756-1306/0060-0500	

18.4 S-BUS Cable, Assembled on Both Ends, Suitable for Drag Chains

Table 111: S-BUS cable, assembled on both ends, B coded, suitable for drag chains

Description	Length	Item number	PU
S-BUS cable, M12 socket, straight, M12 plug, straight	0.2 m	756-1505/0060-0002	1
S-BUS cable, M12 socket, straight, M12 plug, straight	0.3 m	756-1505/0060-0003	
S-BUS cable, M12 socket, straight, M12 plug, straight	0.5 m	756-1505/0060-0005	
S-BUS cable, M12 socket, straight, M12 plug, straight	1.0 m	756-1505/0060-0010	
S-BUS cable, M12 socket, straight, M12 plug, straight	2.0 m	756-1505/0060-0020	
S-BUS cable, M12 socket, straight, M12 plug, straight	5.0 m	756-1505/0060-0050	
S-BUS cable, M12 socket, straight, M12 plug, straight	10.0 m	756-1505/0060-0100	
S-BUS cable, M12 socket, straight, M12 plug, straight	20.0 m	756-1505/0060-0200	
S-BUS cable, M12 socket, straight, M12 plug, straight	50.0 m	756-1505/0060-0500	
S-BUS cable, M12 socket, angular, M12 plug, angular	0.2 m	756-1506/0060-0002	
S-BUS cable, M12 socket, angular, M12 plug, angular	0.3 m	756-1506/0060-0003	
S-BUS cable, M12 socket, angular, M12 plug, angular	0.5 m	756-1506/0060-0005	
S-BUS cable, M12 socket, angular, M12 plug, angular	1.0 m	756-1506/0060-0010	
S-BUS cable, M12 socket, angular, M12 plug, angular	2.0 m	756-1506/0060-0020	
S-BUS cable, M12 socket, angular, M12 plug, angular	5.0 m	756-1506/0060-0050	
S-BUS cable, M12 socket, angular, M12 plug, angular	10.0 m	756-1506/0060-0100	
S-BUS cable, M12 socket, angular, M12 plug, angular	20.0 m	756-1506/0060-0200	
S-BUS cable, M12 socket, angular, M12 plug, angular	50.0 m	756-1506/0060-0500	

18.5 S-BUS Cable, Not Fitted With Connectors

Table 112: S-BUS cable, not fitted with connectors

Description	Length	Item number	PU
S-BUS cable, not fitted with connectors	25.0 m	756-1300/0000-0250	1
S-BUS cable, not fitted with connectors	50.0 m	756-1300/0000-0500	
S-BUS cable, not fitted with connectors	100.0 m	756-1300/0000-1000	

18.6 S-BUS Cable, Not Fitted With Connectors, Suitable for Drag Chains

Table 113: S-BUS cable, not fitted with connectors, suitable for drag chains

Description	Length	Item number	PU
S-BUS cable, not fitted with connectors	25.0 m	756-1500/0000-0250	1
S-BUS cable, not fitted with connectors	50.0 m	756-1500/0000-0500	
S-BUS cable, not fitted with connectors	100.0 m	756-1500/0000-1000	

18.7 S-BUS Terminator and USB Cable

Table 114: S-BUS terminator and USB cable

Description	Item number	PU
S-BUS terminator, M12 plug, straight, B coded	756-9409/0060-0000	1
USB communication cable	756-4101/0042-0030	

18.8 Accessories for S-BUS

Table 115: Accessories for S-BUS

Description	Item number	PU
M12 plug, straight, B coded can be preassembled; shielded spring clamp technology	756-9401/0060-0000	1
M12 plug, angular, B coded can be preassembled; shielded spring clamp technology	756-9403/0060-0000	
M12 socket, straight, B coded can be preassembled; shielded spring clamp technology	756-9402/0060-0000	
M12 socket, angular, B coded can be preassembled; shielded spring clamp technology	756-9404/0060-0000	
M12 terminator, connection straight	756-9405/0060-0000	

18.9 Power Supply Cable, Assembled on One End

Table 116: Power supply cable, assembled on one end, A coded

Description	Length	Item number	PU
Power supply cable, M12 socket, straight, one free cable end	2.0 m	756-3101/0040-0020	1
Power supply cable, M12 socket, straight, one free cable end	5.0 m	756-3101/0040-0050	
Power supply cable, M12 socket, straight, one free cable end	10.0 m	756-3101/0040-0100	
Power supply cable, M12 socket, straight, one free cable end	20.0 m	756-3101/0040-0200	
Power supply cable, M12 socket, right angle, one free cable end	2.0 m	756-3102/0040-0020	
Power supply cable, M12 socket, right angle, one free cable end	5.0 m	756-3102/0040-0050	
Power supply cable, M12 socket, right angle, one free cable end	10.0 m	756-3102/0040-0100	
Power supply cable, M12 socket, right angle, one free cable end	20.0 m	756-3102/0040-0200	
Power supply cable, M12 plug, straight, one free cable end	2.0 m	756-3103/0040-0020	
Power supply cable, M12 plug, straight, one free cable end	5.0 m	756-3103/0040-0050	
Power supply cable, M12 plug, straight, one free cable end	10.0 m	756-3103/0040-0100	
Power supply cable, M12 plug, straight, one free cable end	20.0 m	756-3103/0040-0200	
Power supply cable, M12 plug, right angle, one free cable end	2.0 m	756-3104/0040-0020	
Power supply cable, M12 plug, right angle, one free cable end	5.0 m	756-3104/0040-0050	
Power supply cable, M12 plug, right angle, one free cable end	10.0 m	756-3104/0040-0100	
Power supply cable, M12 plug, right angle, one free cable end	20.0 m	756-3104/0040-0200	

18.10 Power Supply Cable, Assembled on Both Ends

Table 117: Power supply cable, assembled on both ends, A coded

Description	Length	Item number	PU
Power supply cable, M12 socket, M12 plug, straight	0.2 m	756-3105/0040-0002	1
Power supply cable, M12 socket, M12 plug, straight	0.3 m	756-3105/0040-0003	
Power supply cable, M12 socket, M12 plug, straight	0.5 m	756-3105/0040-0005	
Power supply cable, M12 socket, M12 plug, straight	1.0 m	756-3105/0040-0010	
Power supply cable, M12 socket, M12 plug, straight	2.0 m	756-3105/0040-0020	
Power supply cable, M12 socket, M12 plug, straight	5.0 m	756-3105/0040-0050	
Power supply cable, M12 socket, M12 plug, straight	10.0 m	756-3105/0040-0100	
Power supply cable, M12 socket, M12 plug, straight	20.0 m	756-3105/0040-0200	
Power supply cable, M12 socket, M12 plug, angular	0.2 m	756-3106/0040-0002	
Power supply cable, M12 socket, M12 plug, angular	0.3 m	756-3106/0040-0003	
Power supply cable, M12 socket, M12 plug, angular	0.5 m	756-3106/0040-0005	
Power supply cable, M12 socket, M12 plug, angular	1.0 m	756-3106/0040-0010	
Power supply cable, M12 socket, M12 plug, angular	2.0 m	756-3106/0040-0020	
Power supply cable, M12 socket, M12 plug, angular	5.0 m	756-3106/0040-0050	
Power supply cable, M12 socket, M12 plug, angular	10.0 m	756-3106/0040-0100	
Power supply cable, M12 socket, M12 plug, angular	20.0 m	756-3106/0040-0200	

18.11 Power Supply Cable, Not Fitted With Connectors

Table 118: Power supply cable, not fitted with connectors

Description	Length	Item number	PU
Power Supply cable, not fitted with connectors	25.0 m	756-3100/0000-0250	1
Power Supply cable, not fitted with connectors	50.0 m	756-3100/0000-0500	
Power Supply cable, not fitted with connectors	100.0 m	756-3100/0000-1000	

18.12 Accessories for Power Supply Cable

Table 119: Accessories for power supply cable

Description	Item number	PU
M12 plug, straight, screw clamp connection PG9	756-9203/0040-0000	1
M12 plug, right angle, screw clamp connection PG9	756-9206/0040-0000	
M12 socket, straight, screw clamp connection PG9	756-9213/0040-0000	
M12 socket, right angle, screw clamp connection PG9	756-9216/0040-0000	

18.13 ETHERNET, PROFINET Cable, Assembled on One End

Table 120: ETHERNET, PROFINET cable, assembled on one end, D coded

Description	Length	Item number	PU
ETHERNET, PROFINET cable, M12 plug, straight, one free cable end	2.0 m	756-1201/0060-0020	1
ETHERNET, PROFINET cable, M12 plug, straight, one free cable end	5.0 m	756-1201/0060-0050	
ETHERNET, PROFINET cable, M12 plug, straight, one free cable end	10.0 m	756-1201/0060-0100	
ETHERNET, PROFINET cable, M12 plug, straight, one free cable end	20.0 m	756-1201/0060-0200	
ETHERNET, PROFINET cable, M12 plug, angular, one free cable end	2.0 m	756-1202/0060-0020	
ETHERNET, PROFINET cable, M12 plug, angular, one free cable end	5.0 m	756-1202/0060-0050	
ETHERNET, PROFINET cable, M12 plug, angular, one free cable end	10.0 m	756-1202/0060-0100	
ETHERNET, PROFINET cable, M12 plug, angular, one free cable end	20.0 m	756-1202/0060-0200	

18.14 ETHERNET, PROFINET Cable, Assembled on Both Ends

Table 121: ETHERNET, PROFINET cable, assembled on both ends, D coded

Description	Length	Item number	PU
ETHERNET, PROFINET cable, M12 plug, straight, M12 plug, straight	2.0 m	756-1203/0060-0020	1
ETHERNET, PROFINET cable, M12 plug, straight, M12 plug, straight	5.0 m	756-1203/0060-0050	
ETHERNET, PROFINET cable, M12 plug, straight, M12 plug, straight	10.0 m	756-1203/0060-0100	
ETHERNET, PROFINET cable, M12 plug, straight, M12 plug, straight	20.0 m	756-1203/0060-0200	
ETHERNET, PROFINET cable, M12 plug, angular, M12 plug, angular	2.0 m	756-1204/0060-0020	
ETHERNET, PROFINET cable, M12 plug, angular, M12 plug, angular	5.0 m	756-1204/0060-0050	
ETHERNET, PROFINET cable, M12 plug, angular, M12 plug, angular	10.0 m	756-1204/0060-0100	
ETHERNET, PROFINET cable, M12 plug, angular, M12 plug, angular	20.0 m	756-1204/0060-0200	

18.15 Accessories for ETHERNET and PROFINET

Table 122: Accessories for ETHERNET and PROFINET

Description	Item number	PU
M12 plug, straight, D coded san be preassembled; shielded spring clamp technology	756-9501/0060-0000	1
M12 plug, angular, D coded can be preassembled; shielded spring clamp technology	756-9501/0040-0000	
Adapter, angular, M12 socket, D coded/RJ-45 socket	756-9503/0040-0000	
Adapter, straight, M12 socket, D coded/RJ-45 socket	756-9504/0040-0000	
ETHERNET Connector RJ-45, IP 20	750-975	
PROFINET Connector RJ-45, IP 20	750-976	

18.16 Torque Wrench M8 and M12

Table 123: Torque wrench M8 and M12

Description	Item number	PU
Torque Wrench M8 and M12	206-701	1

18.17 Carrier Rail / Profile Adapters and Spacer Module

Table 124: Carrier rail / profile adapters and spacer module

Description	Item number	PU
Carrier rail adapter	767-121	1
Profile adapter	767-123	
Spacer module	767-111	

18.18 Protective Caps

Table 125: Protective caps

Description	Item number	PU
M8 protective caps for connection sockets	756-8101	1
M12 protective caps for connection sockets	756-8102	
M12 protective caps for connection plugs	756-8103	

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