Remote-I/O-System u-remote UR67
I/O-Module IP67 for PROFINET IO-Link
Manual

Let's connect.

UR67-PN-HP-8IOL-12-30M 2426250000

UR67-PN-HP-8IOL-12-60M 2426260000

Weidmüller

Content

Manufacturer

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1 About this documentation

1.1 Symbols and notes

The safety notices in this documentation are designed according to the severity of the danger.

DANGER

Imminent danger to life!
Notes with the signal word "Danger" warn you of situations that will result in serious injury or death if you do not follow the instructions given in this manual.

WARNING

Possible danger to life!
Notes with the signal word "Warning" warn you of situations that may result in serious injury or death if you do not follow the instructions given in this manual.

CAUTION

Risk of injury!
Notes with the signal word "Caution" warn you of situations that may result in injury if you do not follow the instructions given in this manual.

ATTENTION

Material damage!
Notes with the signal word "Attention" warn you of hazards that may result in material damage.

Text next to this arrow are notes that are not relevant to safety, but provide important information about proper and effective work procedures.

The situation-dependent safety notices may contain the following warning symbols:

Symbol	Meaning
	Warning against dangerous electrical voltage
	Warning against electrostatically charged components
	Warning against automatic startup
	Observe the documentation

- ► All instructions can be identified by the black triangles next to the text.
- – Lists are marked with a tick.

Female connections with sockets are illustrated using empty circles.

Male connections with pins are illustrated using filled circles.

1.2 Complete documentation

The documentation is intended for trained electricians who are familiar with national and international laws, provisions and standards.

All documents can also be downloaded from the Weidmüller website.

1.3 Standard data structure

All information about the structure of data (e.g. process data and parameters) refers to the standard data format settings in the module parameters. These are shown in the Motorola format.

2 Safety

This chapter includes general safety instructions on handling the UR67 modules. Specific safety instructions for specific tasks and situations are given at the appropriate places in the documentation.

All work may only be carried out by trained electricians who are familiar with the safety standards that apply to automation technology.

The documentation must be stored in such a way that it is accessible to operating staff at all times.

2.1 General safety notice

When working during ongoing operations, the emergency stop mechanisms must not be made ineffective.

If faults connected to a u-remote product cannot be rectified, the product in question must be sent to Weidmüller. Weidmüller assumes no liability if the module is tampered with!

All connected devices must comply with the requirements set out in EN 61558-2-4 and EN 61558-2-6. Only cables and accessories that meet the requirements and provisions regarding safety, electromagnetic compatibility and, if necessary, telecommunications terminal equipment, as well as the specifications, may be installed. Information on the specific cables and accessories that are permitted to be installed is provided in this manual or can be requested from Weidmüller.

Electrostatic discharge

u-remote products can be damaged or destroyed by electrostatic discharge. When handling the products, the necessary safety measures against electrostatic discharge (ESD) according to IEC 61340-5-1 and IEC 61340-5-2 must be observed. The packing and unpacking as well as the installation and disassembly of a device may only be carried out by qualified personnel.

Fusing

The operator must set up the equipment so that it is protected against overloading. The upstream fuse must be designed so that it does not exceed the maximum load current. The maximum permissible load current can be found in the technical data. The operator must decide whether additional surge protection is required according to IEC 62305. Voltages that exceed +/-30 V may cause the destruction of the modules. A power supply with secure isolation must be used.

Earthing (functional earth FE)

Every UR67-IO-Link module is equipped with an earth connection, with the connection point labelled “XE”. Further information is available in chapters 5 and 6.

Shielding

Shielded lines are to be connected with shielded plugs in compliance with the relevant standard (see chapter 6).

2.2 Intended use

The UR67-IO-Link modules are decentral input and output devices in a PROFINET network that can be used as an IO-Link master. The products are designed for use in industrial automation and may only be used within the scope of the stated technical specifications. The devices to be connected must comply with the requirements set out in EN 61558-2-4 and EN 61558-2-6.

The industrial environment is labelled as such to ensure that consumers are not directly connected to the public low-voltage network. Additional measures must be taken for use in the home, and in the business and commercial sectors.

Any intervention in the products hardware or software other than described in this manual may only be realised by Weidmüller.

Malfunction-free operation is only guaranteed if the housing is fully assembled. Observance of the documentation is also part of the intended use.

2.3 Legal notice

The UR67-series products comply with the EU Directive 2014/30/EU (EMC Directive).

Components of the following free software products are integrated into the modules:

Componente	License	Link
jQuery	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-customSelect	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-i18n	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-overscroll	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-ui	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
JSZip	MIT	https://github.com/Stuk/jszip/blob/master/LICENSE.markdown
md5 (as part of CryptoJS)	MIT	https://code.google.com/archive/p/crypto-js/wikis/License.wiki
snap-svg	Apache license 2.0	https://github.com/adobe-webplatform/Snap.svg/blob/master/LICENSE
underscore	MIT	https://github.com/jashkenas/underscore/blob/master/LICENSE

3 System overview

The UR67-IO-Link modules are IO-Link master modules that are based on PROFINET. The metal housing (zinc diecast, completely encapsulated) ensures that they conform to the IP67 protection class. The UR67-IO-Link modules come in two designs:
- UR67-PN-HP-8IOL-12-30M: 30-mm width, 8 I/O ports
- UR67-PN-HP-8IOL-12-60M: 60-mm width, 8 I/O ports

The UR67-IO-Link modules support the IO-Link standard V1.1. The output current is a maximum of 2 A per port. Four ports have output circuits that are electrically isolated from the rest of the network and from the sensor electronics.
The modules support a fail-safe function, which can be used to set how a channel configured as an output is to respond to an impaired or interrupted PROFINET communication.
All of the module interfaces are equipped with protection against inverse polarity, short circuits and overloads.

3.1 Port characteristics

All ports are colour-coded and therefore cannot be mixed up:
- PROFINET network (green): D-coded, 4-pole M12 plug-in connector (IN and OUT). The maximum transmission rate is 100 Mbps.
- I/O ports (black): 8 A-coded, 5-pole M12 plug-in connectors
- Power supply connections (grey): L-coded, 5-pole M12 connector (IN and OUT).

Characteristics of the I/O ports

Each module features 8 I/O ports:
- 4 type-A ports (IO-Link specification class A) with an additional, hard-wired digital input at pin 2.
- 4 type-B ports (IO-Link specification class B) with different designs depending on the type of module:
  - UR67-PN-HP-8IOL-12-30M:
    with an electrically isolated auxiliary power supply connected to pins 2 and 5, respectively, and a total current of 4 A
  - UR67-PN-HP-8IOL-12-60M:
    with an electrically isolated auxiliary power supply connected to pins 2 and 5, respectively, each with a max. current of 2 A (8 A total current). The auxiliary power supply can be configured as a digital output.

LED

Each I/O port is assigned two status LEDs which change colour and the frequency at which they flash according to the status of the respective port (see chapter 12).

3.2 Fieldbus characteristics

PROFINET product characteristics

The UR67-IO-Link modules support PROFINET IO device IRT (Isochronous Real-Time). This allows time-critical process data to be transmitted between the network components in real time. The modules conform to the PROFINET specification V2.3 as well as to the requirements of Conformance Class C (CC-C).
The integrated Ethernet switch with two PROFINET ports allows for the PROFINET network to be set up in a line or ring topology A highly available network infrastructure can be set up by also implementing the Media Redundancy Protocol (MRP).

Supported protocols

The UR67-IO-Link modules use the following protocols:
- **DCP**: for the automatic allocation of IP addresses
- **LLDP**: for device detection in the immediate surroundings (neighbourhood detection)
- **SNMP**: for monitoring network components and the communication between the master and the device

I&M functions

Identification and maintenance data (I&M) is information saved in the module.
- The identification data is read-only manufacturer information on the module.
- The maintenance data is system-independent information created during the project planning process.

Modules can be easily identified online using the I&M data. The following are supported:
- Module-specific I&M functions I&M 0–4 for the network interfaces (slot 0)
- The I&M functions specifically for IO-Link master I&M 0 and I&M 99 (IO-Link master directory) for the IO-Link ports (slot 1)

Alarm and diagnostic messages

The modules offer expanded PROFINET alarm and diagnostic messages.

Configuration and parameterisation

A GSDML file is needed to configure and parameterise the module in the engineering tool.

The current GSDML file can be downloaded from the Weidmüller website.

3.3 IO-Link functions

Parameter storage

This function saves and monitors the IO-Link device and IO-Link master parameters so that it is easier to exchange individual components (IO-Link device or IO-Link master). The function can only be used if it is supported by the IO-Link device and IO-Link master (IO-Link specification V1.1 and higher).

Device validation

After being enabled, this function checks whether the identification data for the connected IO-Link device matches the values set in the IO-Link master. The transfer of the process data will only start once all of the checked values match.

Parameterisation of IO-Link devices

The IO-Link devices can be parameterised in PROFINET using the control unit with the Siemens function components IO_LINK_CALL (STEP 7) and IO_LINK_DEVICE (TIA Portal).

3.4 Web server

The web server can be used to display the UR67-IO-Link module on a connected PC. This allows you to execute the following functions for test purposes or during commissioning or service work:

- Query the module status
- Display and change the module parameters
- Access diagnostic information
- Operate the module in Force mode for testing purposes

3.5 Accessories

Protective caps

Protection class IP67 is only realised with a completely connected module. This means that all of the ports not being used must be sealed off using protective caps.

Size	Usage	Protective cap	Order No.
M12	Sensor connection	SAI-SK M12	9456050000
M12	Bus-out and power-out	SAI-SK-M12-UNI	2330260000
M12	Bus-in and power-in	SAI-SK M12 connector	1781520000

Markers

Module and port markers are available to label equipment. All of the markers can be printed using the Weidmüller PrintJet ADVANCED (Order No. 1324380000).

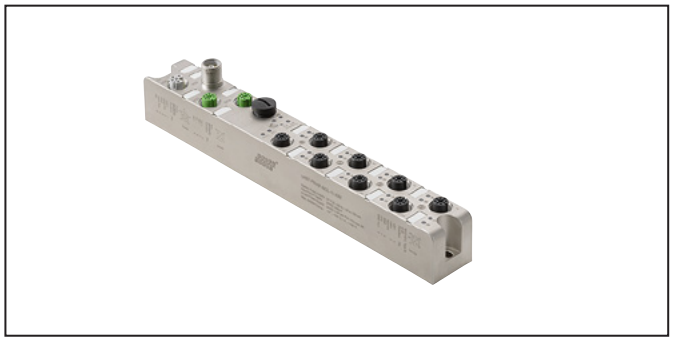
Module	Markers	Order No.
UR67-PN-HP-8IOL-12-30M	MF 5/10 MC NE WS	1954050000
UR67-PN-HP-8IOL-12-60M	ESG-M8/20 MC NE WS	1027290000

Conductors and connections

In order to select suitable cables, we recommend referring to Weidmüller Catalogue 8 or the Product Configurator on the Weidmüller website.

4 Module descriptions

4.1 UR67-PN-HP-8IOL-12-30M



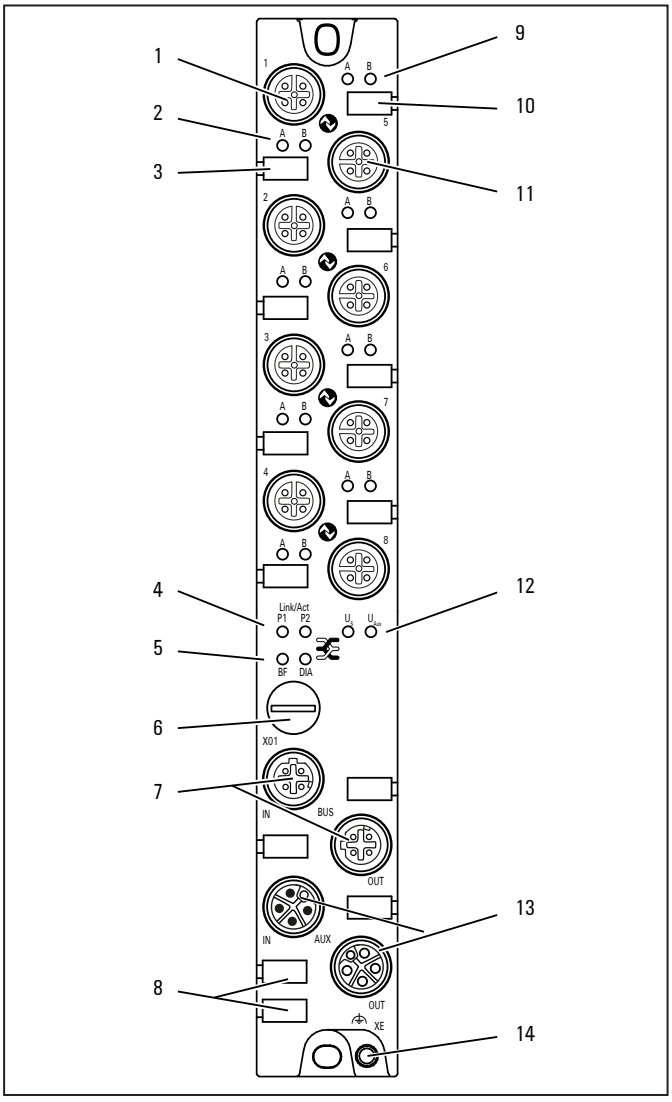
Digital IO-Link module UR67-PN-HP-8IOL-12-30M (Order No. 2426250000)

The digital IO-Link module UR67-PN-HP-8IOL-12-30M is intended for the decentralised control in a PROFINET-network. The module has 8 slots (M12, 5-pole, A-coded, 4 of type A and 4 of type B) for connecting signal lines as well as connections for the fieldbus (M12, 4-pole, D-coded) and for the power supply (M12, 5-pole, L-coded).

Diagnostic and status LEDs

LED	Colour	Meaning
1 ... 8 A	Green	IO-Link COM mode: IO-Link communication
	Yellow	Standard I/O mode: status of the digital input or output at C/Q (pin 4), cable "on"
1 ... 8 B	White	Status of the digital input at pin 2, cable "on"
Lnk/Act P1, P2	Green	Ethernet connection to another participant available, link detected
U_{Aux}	Green	Auxiliary sensor/actuator power supply > 18 V
U_S	Green	System/sensor power supply > 18 V
BF	Off	Connection to the PROFINET controller active
DIA	Off	No diagnosis available

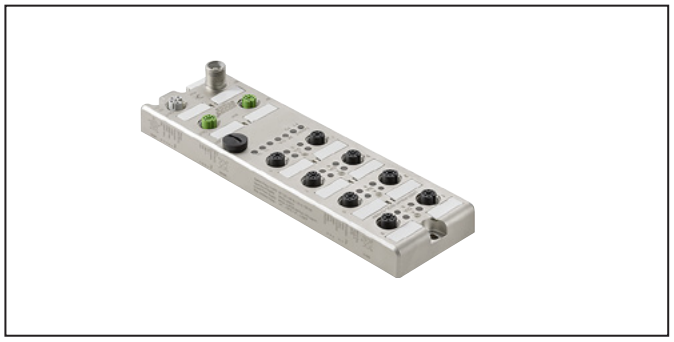
LED displays (normal operation), error messages see chapter 12



UR67-PN-HP-8IOL-12-30M

1 I/O port type A (1–4)
2 Status LED port 1
3 Marker port 1
4 Ethernet connection LED (Link/Act)
5 Fieldbus (BF) and diagnostics (DIA) LED
6 Micro-USB port (not to be used by the customer)
7 Fieldbus ports (IN, OUT)
8 Module markers
9 Status LED port 5
10 Marker port 5
11 I/O port type B (5–8)
12 Status LED power supply
(U_S = system/sensor power supply, U_{Aux} = auxiliary sensor/actuator power supply)
13 Supply voltage connections (IN, OUT)
14 Earth connection

4.2 UR67-PN-HP-8IOL-12-60M



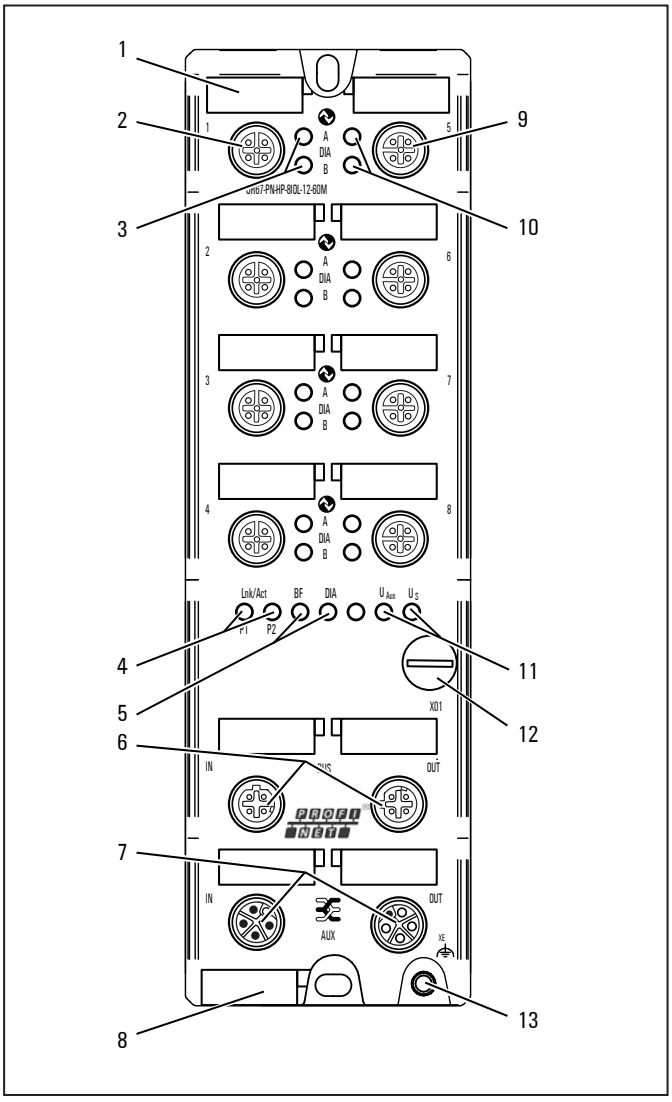
Digital IO-Link module UR67-PN-HP-8IOL-12-60M (Order No. 2426260000)

The digital IO-Link module UR67-PN-HP-8IOL-12-60M is intended for the decentralised control in a PROFINET-network. The module has 8 slots (M12, 5-pole, A-coded, 4 of type A and 4 of type B) for connecting signal lines as well as connections for the fieldbus (M12, 4-pole, D-coded) and for the power supply (M12, 5-pole, L-coded).

Diagnostic and status LEDs

LED	Colour	Meaning
1 ... 8 A	Green	IO-Link COM mode: IO-Link communication
	Yellow	Standard I/O mode: status of the digital input or output at C/Q (pin 4), cable "on"
1 ... 8 B	White	Status of the digital input at pin 2, cable "on"
Lnk/Act P1, P2	Green	Ethernet connection to another participant available, link detected
U_{Aux}	Green	Auxiliary sensor/actuator power supply > 18 V
U_S	Green	System/sensor power supply > 18 V
BF	Off	Connection to the PROFINET controller active
DIA	Off	No diagnosis available

LED displays (normal operation), error messages see chapter 12



UR67-PN-HP-8IOL-12-60M

1 Marker port 1
2 I/O port type A (1–4)
3 Status LED port 1
4 Ethernet connection LED (Link/Act)
5 Fieldbus (BF) and diagnostics (DIA) LED
6 Fieldbus ports (IN, OUT)
7 Supply voltage connections (IN, OUT)
8 Module markers
9 I/O port type B (5–8)
10 Status LED port 5
11 Status LED power supply
(U_S = system/sensor power supply, U_{Aux} = auxiliary sensor/actuator power supply)
12 Micro-USB port (not to be used by the customer)
13 Earth connection

4.3 Connector pin assignment

I/O port type A			
M12, 5-pole	**Pin**	**Signal**	**Function**
	1	L+	IO-Link +24 V power supply
	2	IN-x	Ch. B: Digital input (type 1)
	3	L-	IO-Link GND_U_S power supply
	4	C/Q	Ch. A: IO-Link data communication
	5	n. c.	Not connected

I/O port type B			
M12, 5-pole	**Pin**	**Signal**	**Function**
	1	L+	IO-Link +24 V power supply
	2	U_{Aux} (+24 V)	Ch. B auxiliary power supply (electrically isolated from the system/sensor power supply)
	3	L-	IO-Link GND_U_S power supply
	4	C/Q	Ch. A: IO-Link data communication
	5	GND_U_{Aux}	Earth/reference potential U_{Aux}

ATTENTION

For the system/sensor power supply and the actuator power supply, please only use power supplies that conform to PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) requirements. Power supplies in accordance with EN 61558-2-6 (transformer) or EN 60950-1 (switched-mode power supply) meet these requirements.

Power supply connection			
M12, 5-pole, L-coded	**Pin**	**Signal**	**Function**
 OUT	1	U_S (+24 V)	System/sensor power supply
	2	GND_U_{Aux}	Earth/reference potential U_{Aux}
	3	GND_U_S	Earth/reference potential U_S
 IN	4	U_{Aux} (+24 V)	Auxiliary power supply (electrically isolated)
	5	FE (PE)	Functional earth

PROFINET port			
M12, 4-pole, D-coded	**Pin**	**Signal**	**Function**
	1	TD+	Transmission data +
	2	RD+	Receive data +
	3	TD-	Transmission data -
	4	RD-	Receive data -

ATTENTION

The product can be destroyed!

► Never place the power supply (24 V DC) on the signal or data lines.

4.4 Technical data

Technical data	UR67-PN-HP-8IOL-12-30M (2426250000)	UR67-PN-HP-8IOL-12-60M (2426260000)
Bus system		
Protocol	PROFINET IO device, Conformance Class C (CC-C)	
Device identification (DeviceID)	0x0134 hex	
Vendor identification (VendorID)	0x18C6 hex	
GSDML file	GSDML-Vx.x-WI-UR67-yyyymmdd.xml	
Update cycle	1 ms	
Data transmission rate	100 Mbps full duplex	
Auto-negotiation	Supported	
Supported Ethernet protocols	Ping, ARP, LLDP, DCP, HTTP, TCP/IP, MRP Client, SNMPv1 (network diagnosis): Read community: public; Write community: private	
Switch functionality	integrated, IRT supported	
Connection	M12, 4-pole, D-coded	
Electrical isolation of the Ethernet ports/FE	2,000 V DC	
I/O ports 1–8		
Number	4 type A and 4 type B	
Connection	M12, 5-pole, A-coded	
Ch. A / C/Q / pin 4 configured as a digital input		
Number	max. 8 configurable	
Input type	NO contact, P-switching	
Input wiring	Type 1 in acc. with IEC 61131-2	
Rated input voltage	24 V DC	
Input current at 24 V DC	typically 3 mA	
Short-circuit-proof	yes	
Status indicator	Yellow LED	
Diagnosis indicator	Red LED for each port	
Ch. A / C/Q / pin 4 configured as a digital output		
Number	max. 8 configurable	
Output type	NO contact, P-switching	
Rated output current per channel [1]		
Signal status "1"	max. 500 mA	
Signal status "0"	max. 1 mA	
Signal level of the outputs		
Signal status "1"	min. (U_S – 1 V)	
Signal status "0"	max. 2 V	
Max. output current	9 A/module[2]	
Short-circuit-proof	yes	

1) In the case of inductive loads in utilisation category DC13 (in acc. with EN 60947-5-1), the outputs can operate with currents of 0.5 A and a frequency of 1 Hz..
2) Technically possible and approved on the following conditions: looped sensor/system power supply – max. 2.5 A; STL 204 power supply cable (5 x 1.0 mm²); max. ambient temperature – 40°C; max. current-carrying capacity – 12 A

Technical data	UR67-PN-HP-8IOL-12-30M (2426250000)	UR67-PN-HP-8IOL-12-60M (2426260000)
Overload-proof	yes	
Short circuit or overload behaviour	Switch off, automatic switch on	
Status indicator	Yellow LED for each output	
Diagnosis indicator	Red LED for each port	
Ch. A / C/Q / pin 4 as IO-Link channel in COM mode		
IO-Link master specification	v1.1, IEC 61131-9	
Transfer rates	4.8 kbaud (COM 1), 38.4 kbaud (COM 2) and 230.4 kbaud (COM 3)	
Cable lengths for the IO-Link device	max. 20 m	
Number of IO-Link ports	max. 8 configurable	
Ports 1– 4, type B, ch. B / pin 2 as digital inputs		
Number	4	
Input type	NO contact, P-switching	
Input wiring	Type 1 in acc. with IEC 61131-2	
Rated input voltage	24 V DC	
Input current at 24 V DC	typically 3 mA	
Status indicator	White LED	
Diagnosis indicator	Red LED for each port	
Ports 5–8, type B, ch. B / pin 2 configured as digital 2-A output		
Number	–	4
Output type	–	NO contact, P-switching
Rated output current per channel [1]	–	2 A
Signal status "1"	–	max. 2 A
Signal status "0"	–	max. 1 mA
Signal level of the outputs	–	
Signal status "1"	–	min. (U_{Aux} – 1 V)
Signal status "0"	–	max. 2 V
Max. output current	–	16 A/module[2]
Short-circuit-proof	–	yes
Overload-proof	–	yes
Short circuit or overload behaviour	–	Switch off, no automatic switch on
Filter period in the event of a signal change	–	0–255 ms; default 80 ms
Status indicator	–	White LED for each output
Diagnosis indicator	–	Red LED for each port
Module electronics/sensor power supply		
Rated voltage U_S	24 V DC (SELV/PELV)	
Voltage range	24 V DC ± 25%	
Electronics current consumption	typically 160 mA (± 20% with rated voltage U_S)	

1) In the case of inductive loads in utilisation category DC13 (in acc. with EN 60947-5-1), the outputs can operate with currents of 0.5 A and a frequency of 1 Hz..
2) Technically possible and approved on the following conditions: looped sensor/system power supply – max. 2.5 A; STL 204 power supply cable (5 x 1.0 mm²); max. ambient temperature – 40°C; max. current-carrying capacity – 12 A

Technical data	UR67-PN-HP-8IOL-12-30M (2426250000)	UR67-PN-HP-8IOL-12-60M (2426260000)
Sensor voltage	min. (U_S–1.5 V)	
Sensor current consumption (L+/pin 1)	max. 500 mA per port (at T_u 30°C)	
Short-circuit protection/ overload-protection for the sensor power supply	yes, for each port	
Polarity protection	yes	
Status indicator (U_S)	Green LED	
Connection	M12-Power, 5-pole, L-coded, pin 1	
Power supply for type-B ports (auxiliary power supply)		
Rated voltage U_{Aux}	24 V DC (SELV/PELV)	
Voltage range	24 V DC ± 25%	
Polarity protection	yes	
Status indicator (U_{Aux})	Green LED	
Connection	M12-Power, 5-pole, L-coded, pin 4	
General data		
Protection class	IP 67 (when screwed in only)	
Ambient temperature	–20°C to +70°C (–4°F to +158°F)	
Weight	480 g	500 g
Dimensions		
Housing material	Zinc diecast, nickel matt surface finish	
Vibration resistance – vibration (DIN EN 60068-2-6 (2008-11))	15 g/5–500 Hz	
Vibration resistance – impact (DIN EN 60068-2-27 (2010-02))	50 g/11 ms, ±X,Y,Z	
Tightening torques		
M12 plug-in connector	0.5 Nm	

1) In the case of inductive loads in utilisation category DC13 (in acc. with EN 60947-5-1), the outputs can operate with currents of 0.5 A and a frequency of 1 Hz..
2) Technically possible and approved on the following conditions: looped sensor/system power supply – max. 2.5 A; STL 204 power supply cable (5 x 1.0 mm²); max. ambient temperature – 40°C; max. current-carrying capacity – 12 A

5 Installation and wiring

WARNING

Dangerous contact voltage!

- ► All installation and wiring work must be carried out with the power supply disconnected.
- ► Make sure that the place of installation has been disconnected from the power supply!

5.1 Preparations for installation

Make sure that the permitted environmental conditions for installation and operation are observed (see Technical data).

Installation position and dimensions

The modules must be installed on a level surface. The installation dimensions and tightening torques for the fixings are provided in the installation drawings on the following pages.

Unpacking the delivery

- ► Please check the delivery for completeness and transport damage.
- ► Please report any transport damage immediately to the respective transport company.

ATTENTION

The product can be destroyed by electrostatic discharge!

u-remote products can be destroyed by electrostatic discharge.

- ► Please make sure that personnel and work equipment are adequately earthed!

- ► Unpack the parts.
- ► Dispose of all packaging in accordance with the local disposal guidelines. The cardboard packaging can be sent for paper recycling.

5.2 Installing the module and earth connection

- ► Drill the holes for the fixings (for the drilling dimensions, see the installation drawings on the following pages).
- ► Affix each module with two screws and a washer (as per DIN EN ISO 7089).
- ► Observe the screw dimension and tightening torques indicated.

Element	Torque
M12 plug-in connector	0.5 Nm
M12 protective cap	0.5 Nm

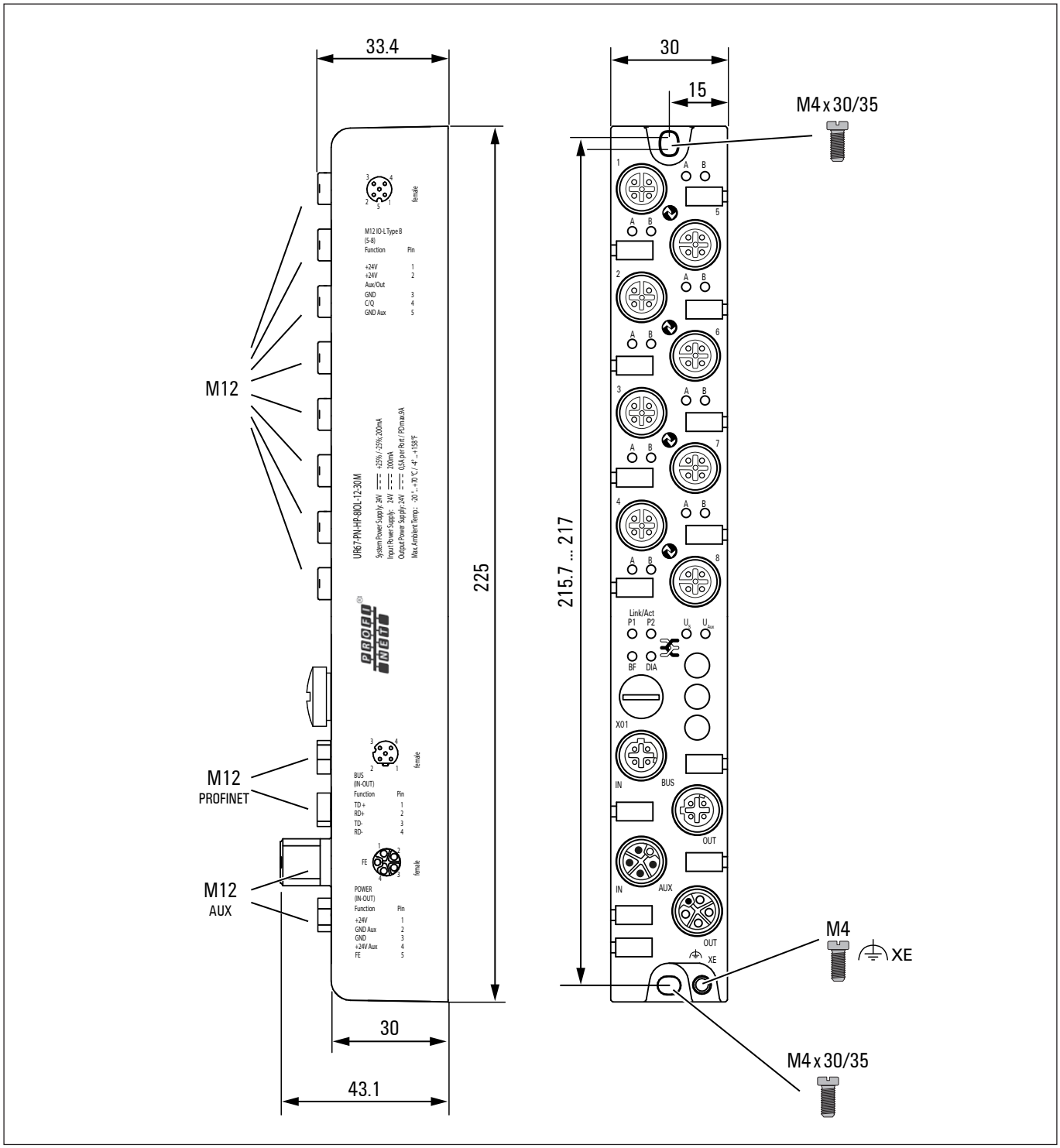
The modules have an earth connection (“XE”) with an M4 thread for discharging interference currents and for EMC stability.

- ► Connect the earth connection to the reference earth via a low-impedance connection.

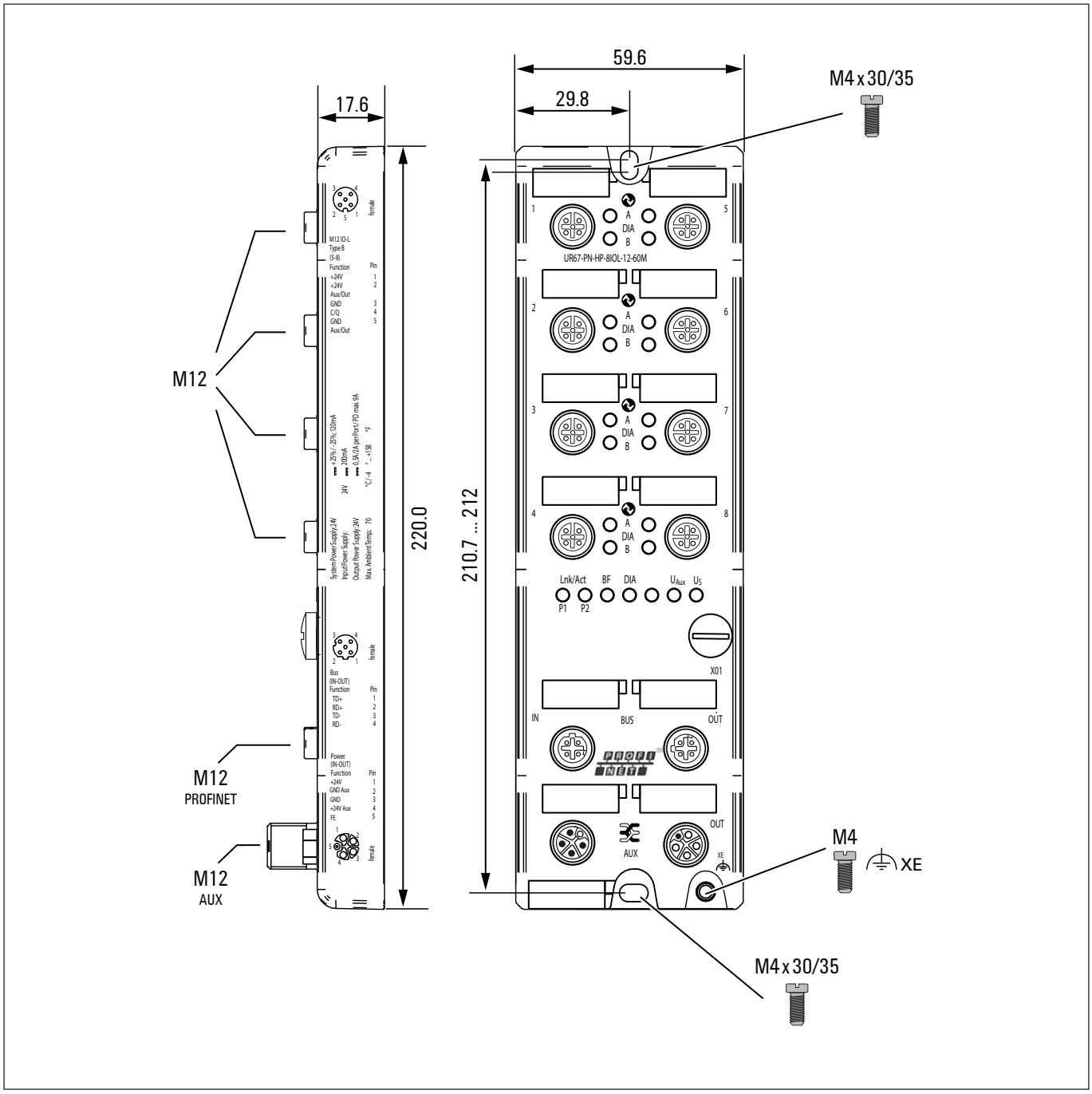
If the mounting surface is earthed, the connection can be made directly via the mounting screws.

If the mounting surface is not earthed, use an earthing strap or a suitable cable!

- ► Connect the earthing strap or the FE cable to the earth connection (“XE”) using an M4 screw.



Installation dimensions UR67-PN-HP-8IOL-12-30M



Installation dimensions UR67-PN-HP-8IOL-12-60M

5.3 Attaching markers

The module and all ports can be labelled using markers. This ensures clear allocation at all times during maintenance work.

- ► Press the labelled marker into the corresponding fixture opening.
- ► To remove a marker, lever it out carefully using a screwdriver (2.5 or 3 mm).

5.4 Wiring

WARNING

Dangerous contact voltage!

- ► All installation and wiring work must be carried out with the power supply disconnected.
- ► Make sure that the place of installation has been disconnected from the power supply!

Once the module has been mechanically installed, the wiring can be carried out in accordance with the wiring plan.

Ensure compliance with the minimum permissible cable bending radius.

All unused ports must be sealed with protective caps in order to achieve protection class IP67.

5.5 Insulation test

Insulation tests must always be carried out before each commissioning and in accordance with the respective national provisions.

ATTENTION

The product can be destroyed by too high test voltage!

Please observe the following during insulation tests:

- – The test voltage within a channel must be between 24 V and max. GND of 30 V!*
- – A test voltage of max. 500 V can be applied to all other connection points.

* We recommend connecting 24 V and GND at the power supply plug.

6 Earthing and shielding

6.1 Earthing of shielded cables

Electrical and electronic systems must be designed such that they are largely safeguarded against electrical interference, thus enabling them to operate securely even in the case of transient interference voltages.

Electrical interference can be introduced into electric circuits in a variety of ways. The most frequent causes are due to inductive interference. In addition, galvanic and capacitive coupling as well as electrical fields and other processes are causes for interference voltages. Here, high-frequency voltage fluctuations – known as transients – are the cause of interference with a high level of effectiveness.

Shielded cables increase interference resistance

The sources of interference voltages can rarely be eliminated and even then not always completely. Thus, it is necessary to take measures to combat their effect. In general, the more effectively interference voltages can be kept away from circuit elements or can be discharged, the less electrical circuits are affected. This can be accomplished in a variety of ways with varying levels of effectiveness. A very effective measure, in particular for safeguarding against inductive effects, i.e. ensuring "electromagnetic compatibility" (EMC), is the shielding of electrically functional components to earth potential. In doing so, for instance, components are installed in metallic, earthed housings and the connecting lines are equipped with shielding.

In general, it can be said that interference from cables can be combated by routing cables as far away as possible from each other, keeping the common return as short as possible and using twisted-pair wire. Far better protection, however, is provided by completely shielding of all cables. This is the most effective measure that can be taken against the coupling of interference signals.

The best type of shielding consists of a braided mesh sleeve that uses individual wires made of non-magnetic materials (copper, aluminium). The braided mesh should be sufficiently large and also be as thick as possible. For cables that are equipped with foil shields, it is necessary to be aware of the low mechanical strength and the low current-carrying capacity of the shielding.

Proper use of shielded cables

The shielding of cables will only result in the desired effect if this is implemented properly. Incorrect earthing or the use of improper components that perform their task inadequately reduces or even totally eliminates the effect. Placing the shielding at any spot on the earth potential will not suffice, as this earth connection may have no effect on high frequencies. In addition, ground loops must also be taken into consideration. Furthermore, the shielding should be earthed over a large surface area. Beyond that, the quality of the shield conductor and earthing accessories is also important.

Weidmüller clamping bracket KLBUE 10-20 SC (Order No. 1712321001)

In practice, the shield is still often twisted and connected to a terminal point. There is very high attenuation (voltage drop) on these connections, especially for high-frequency interference. Therefore, this type of shielding should not be used, even for short cable lengths. The shielding of the cable is practically negated and can, at best, be helpful for low-frequency interference. We recommend that there is a large amount of surface contact with the braided shield of the cable.

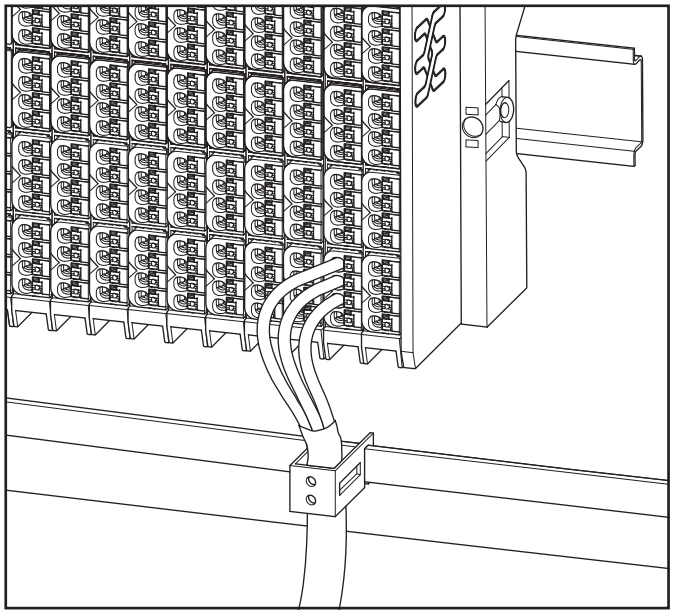
There are generally four distinct types of coupling:

- Galvanic coupling
- Capacitive coupling
- Inductive coupling
- Radiation coupling

These types of interference usually occur mixed together, but they can be categorised as follows:

- Electromagnetic fields
- Ripple voltage (50 Hz)
- Lightning
- Interference pulses (current, voltage)
- Transient surge voltages
- Radio interference
- ESD (electrostatic discharge)
- Burst
- Mains feedback

Another area of concern as regards shield contact is the “flow” within the conductor. Temperature changes caused by the current lead to changes in the conductor cross-section. A rigid contact can therefore only be partially effective. A self-adjusting contact is what is really required. Weidmüller's clamping bracket products (KLBÜ series) provide the perfect solution to meet this challenge.



Use of a clamping bracket

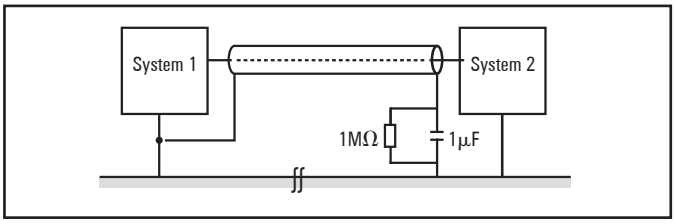
Effective shielding

It is important that the shielding is not positioned on the earth of the connected component, but on the protective earth. In the case of components that are installed in a metal housing, the shielding must be positioned to this housing. If no earthed housing is available, the shielding is positioned on a separate earth.

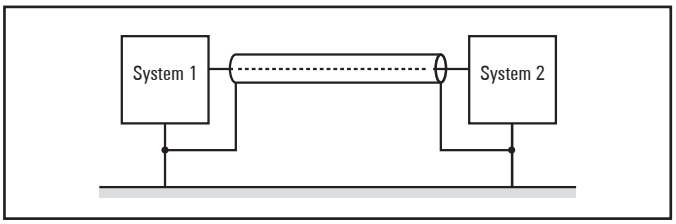
When installing ground connections on shielding, it is generally also important that no earth loops are created. The smaller the earth loop, the less the danger of the induction of interference voltages. It is therefore most suitable to have a purely neutral-point installation.

The following sketches show the possible shielding connections to protective earth.

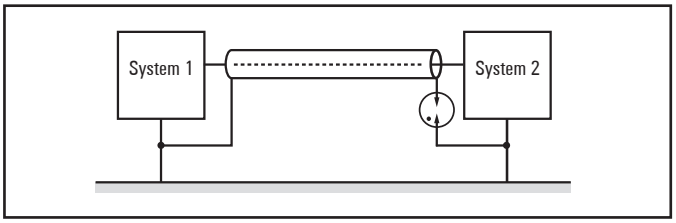
A one-sided connection of the shielding protects against capacitive coupling of interference voltages.



If you use a two-sided shielding connection, make sure that compensating current (different earth potentials) does not flow through the cable shield.



If you wish to avoid the disadvantages associated with creating an earth loop with two-sided shields, it is recommended you connect one side of the shield through a high impedance.

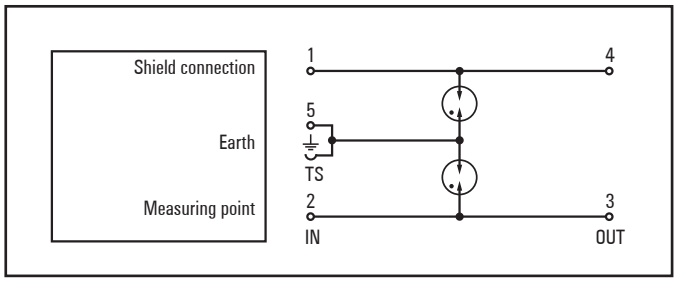


For longer lengths of shielded cables, such as if a sensor must be added to a control panel, a potential difference between both end points must not be ignored.

However, such shield conductors are relatively expensive and also require more time in working with them. Another possibility would be to place an additional voltage equalising cable between the measurement location and the control panel. The shield can then be hooked up on both sides.

A high-impedance earth connection is also another option. In the control panel, the shield is then connected to the earth potential, and the shield has a high-impedance connection to earth at the measurement location via a gas discharge tube. This solves the problem of a potential transfer and 50-Hz humming.

For non-isolated measurement locations, two gas discharge tubes must be installed. One connects the shield to earth, and the other connects it to the non-isolated measurement location. This method prevents a galvanic coupling between the measurement circuit and the earthed measurement location.



Summary

Earthing is a key element for the reliable functioning of an electrical system in the event of interference. In this regard, HF-related aspects must be taken into consideration. Only the proper use of materials and a well thought-out circuit design will lead to success.

6.2 Potential ratios

The reference potentials of system/input supply and output supply are galvanically isolated from each other.

6.3 Electromagnetic compatibility (EMC)

u-remote products completely meet EMC requirements. EMC planning, however, is necessary prior to installation.
Aspects to consider include all potential interference sources such as galvanic, inductive and capacitive couplings, as well as radiation couplings.

Ensuring EMC

To ensure EMC, the following basic principles must be observed during installation of the u-remote modules:

- Proper, extensive earthing of inactive metal parts
- Correct shielding of cables and equipment
- Proper layout of wires – cabling
- Creation of a uniform reference potential and earthing of all electrical equipment
- Special EMC measures for special applications (e.g. frequency converters, servo drives)
- Contactors and relay coils must be equipped with the corresponding interference suppressors.
- Devices and function units with higher interferance potential have to be capsuled if necessary.

Earthing of inactive metal parts

The earthing of all inactive metal parts reduces the influence of coupled interference. For this purpose, all inactive metal parts (such as switch cabinets, cabinet doors, support beams, mounting plates, DIN rails, etc.) must be connected to each other over a large surface area with low impedance, whereby a uniform reference potential is ensured for all control unit elements.

Required measures:
- Removal of the insulating layer around screw connections. Protection of connection points against corrosion
- Connection of moving earthed components (cabinet doors, separated mounting plates, etc.) through short earthing straps with large surfaces
- When possible, avoid using aluminium parts, because aluminium oxidises easily and in this respect is unsuited for earthing

PE connection

The connection from earth to the PE (protective earth) connection must be done centrally.

WARNING

Possible danger to life!
In the event of a fault, the earth must never take on a dangerous contact voltage, which is why it must be connected to a PE conductor.

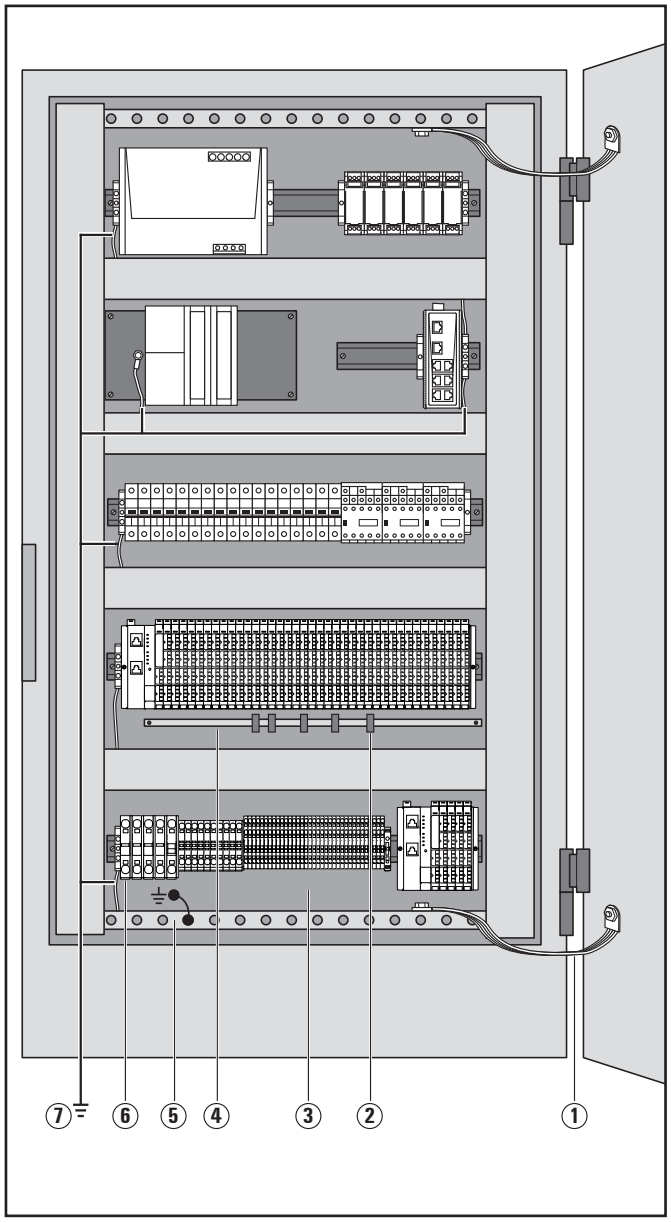
Unearthed operation

In the event of unearthed operation, the corresponding safety regulations must be observed.

Sensor and actuator lines

To avoid antenna effects caused by looped lines, all lines that go to a certain sensor or actuator should be combined in one cable.

Cabinet design according to EMC guideline:



1 Earthing strips
Earthing strips must be used for connecting inactive metal parts if it is not possible to connect two large pieces of metal. Use short earthing strips with large surfaces.

2 Clamping bracket for signal cables
If shielded signal cables are used, the shield must be attached to the clamping bracket (KLBÜ series) on the busbar over a large surface. The braided shield must cover and make good contact with a large part of the clamping bracket.

3 Mounting plate
The support beam for holding control components must be connected to a large part of the cabinet housing.

4 Busbar
The busbar must be connected via the rail holding fixture. The cable shields are fixed to the busbar.

5 Protective earth conductor rail
The protective earth conductor rail must likewise be attached to a large part of the mounting plate, and it must be connected to the protective earth conductor system via an external cable with a cross-section of at least 10 mm^2, in order to discharge interference current.

6 Protective earth terminal strip
The protective earth terminal strip must be connected to the protective earth conductor rail in a neutral-point configuration.

7 Cable to protective conductor system (earthing point)
The cable must be connected to a large part of the protective conductor system.

See also:
EMC Directive 2014/30/EU

6.4 Shielding of cables

To prevent the coupling of interference voltages and the decoupling of interference fields in cables, only shielded cables made from well-conducting material (copper or aluminium) with braided shielding and a coverage of at least 80 % should be used in the design of a cable shield.

Only when a cable shield is connected to the local reference potential on both sides is it possible to achieve optimal shielding against electric and magnetic fields. Exceptions are possible, for example, with high-impedance, symmetrical or analogue signal cables. If a shield is attached on only one side, this merely achieves an isolation against electric fields.

ATTENTION

Material damage!
Requirements for effective shielding design:
- The shield connection to the shield bus should be low impedance
- The shield must be connected directly at its entrance into the system
- Keep cable ends as short as possible
- Do not use cable shields for equipotential bonding

When connecting a data cable using a sub-D connector, the connection must be made through the connector's shield collar and never through pin 1.
The data cable's shield must be attached to the shield bus with the insulation stripped away. The shield is to be connected and attached with clamping brackets or similar metal fixing devices. The shield bus must be connected to the reference potential surface through a low impedance (e.g. fastening point with a separation of 10 to 20 cm). The brackets must surround and make contact with a large part of the shield.
Isolation of the cable shield should be avoided. Instead, it should be routed into the system (for example, the switch cabinet) up to the interface connection.

ATTENTION

Shielding of field bus cables
When shielding field-bus cables, the installation guidelines for the respective field buses must be observed. (See the websites of the field bus organisations.)

Material damage!
If it is only possible to have a one-sided shield connection for reasons specific to the circuit or equipment, the second side of the cable shield can be routed to the local reference potential via a capacitor (with short connections). To prevent disruptive discharges when interference pulses occur, a varistor or a resistor can also be wired in parallel to the capacitor.
As an alternative, a doubled version (galvanically isolated) can be used, whereby the inner shield is connected on one side and the outside shield is connected on both sides.

Equipotential bonding

If system components are positioned separately from each other, potential differences may arise, provided that:

- Power is provided from different sources
- The earthing is implemented at different system parts, despite the cable shields being connected at both sides

A voltage equalising cable must be used for equipotential bonding.

WARNING

Possible danger to life!
The shield must not be used for equipotential bonding!

The following features are essential for a voltage equalising cable:

- In the case of cable shields on both ends, the impedance of the equalising cable must be considerably smaller than that of the shield connection (maximum 10 % of its impedance)
- When the length of the equalising cable is less than 200 m, its cross-section must be at least 16 mm^2 If the cable is greater than 200 m in length, a cross-section of at least 25 mm^2 is necessary.
- Large-surface connection with the PE conductor or the earthing and corrosion protection are requirements for long-term safe operation
- They must be made of copper or galvanised steel
- In order to keep the enclosed area as small as possible, the equalising cable and signal cable must be routed as close to each other as possible

Wiring of inductances

In case of inductive loads we recommend a suppressor circuit directly on the load. The ground (PE/FE) must be positioned star-shaped according to the standards.

7 Commissioning

WARNING!

Manipulation of the control unit!
During commissioning, the system may be manipulated to such an extent that life-threatening personal injury and damage to materials may occur.
► Make sure that system components cannot start-up unintentionally!

The procedures applied during commissioning depend on which control unit is being used. The descriptions in this chapter use commissioning with the Siemens SIMATIC Manager Step7 as an example. (V5.5 SP2 and higher).

7.1 Requirements and factory settings

Before you start the commissioning work, the following requirements must be fulfilled.
– The control unit must be in operation.
– The UR67-IO-Link modules must be completely installed and wired up.
– The control unit and all UR67-IO-Link modules must be connected to the PROFINET network; a PC or laptop must also be connected.
– The power supply must be turned on.

MAC addresses

Each module has two unique MAC addresses allocated by the manufacturer and which cannot be changed by the user. The first MAC address is printed on the side of the module.

PROFINET parameter factory settings

Parameter	Factory setting
IP address	0.0.0.0
Subnet mask	0.0.0.0
Device name	UR67-PN-HP-8IOL-60M UR67-PN-HP-8IOL-30M
VendorID	0x0134 hex
DeviceID	0x18C6 hex

7.2 Installing the GSDML file

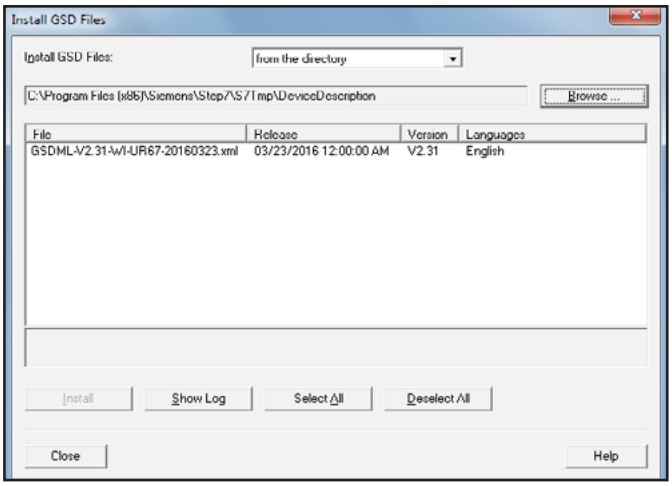
A description of all module variants is provided in the file named **GSDML-Vx.x-WI-UR67-yyyymmdd.xml** (**x.x** stands for the software version, **yyyymmdd** for the file issue date). The GDSML file and the associated bitmap files are stored together in the archive file **DeviceDescription.zip**.

► Download and unpack the archive file from the Weidmüller website.

► Store the supplied bitmap files for visualising the modules in the same folder as the GSDML file.

Projects must not be open in the hardware configuration tool while the GSDML file is being installed!
► If necessary, close all open projects before installing the GSDML file!

► Start SIMATIC Manager.
► In the hardware configuration tool, navigate to **Extras/ Install GSD files**.
► Select the directory in which you have stored the file describing the device.
The files available are displayed.



Selecting the GSDML file

► Select the file that you would like to install.
► Click **Install**.
► When the installation is complete, click **Close**.
► Update the device catalogue via **Extras/Update catalogue**.
The UR67-IO-Link modules associated with the current file describing the device are now listed in the device catalogue.

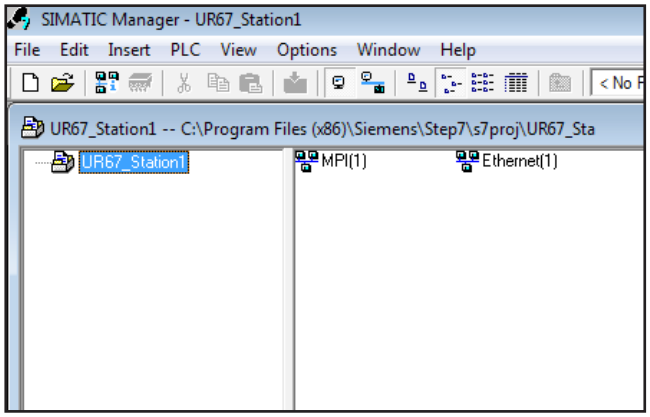
7.3 Connecting the module to the PROFINET network

► To set up a new project, click **File/New** in SIMATIC Manager.

The "New Project" window opens.

► Enter a name for the new project (e.g. UR67_Station1) and click **OK**.

The new project is displayed in SIMATIC Manager.

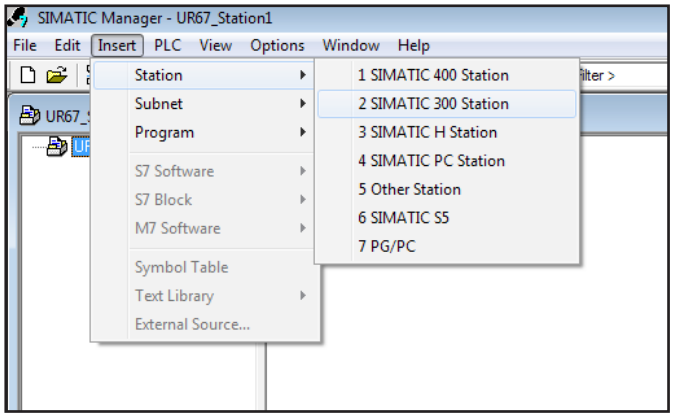


Creating a new project

Adding a control unit type

► Select the project in SIMATIC Manager.

► Select the control unit type via **Insert/Station** (e.g. SIMATIC 300).



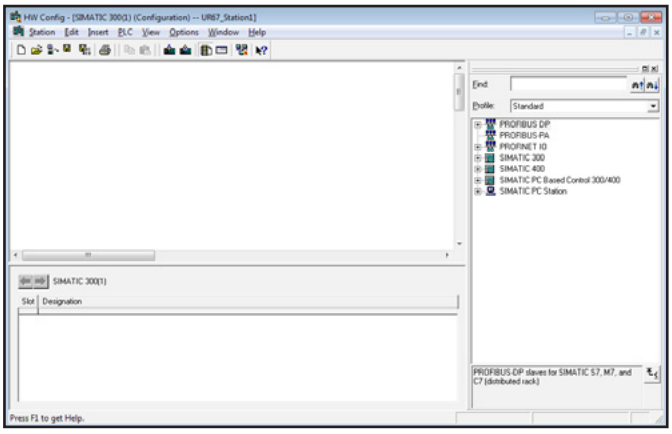
Adding a station

► Double-click on the project name so that the station (SIMATIC 300) is displayed below in the directory tree.

► Click on the station (SIMATIC 300).

► Double-click **Hardware** on the right-hand side of the window.

The hardware configuration tool (**HW Config**) opens.

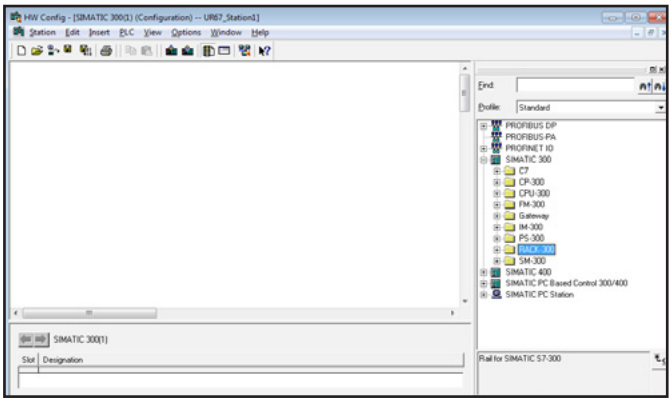


Hardware configuration tool

► The device catalogue is displayed on the right-hand side of this window. If this does not occur, open the catalogue via **View/Catalogue**.

Adding a profile rail

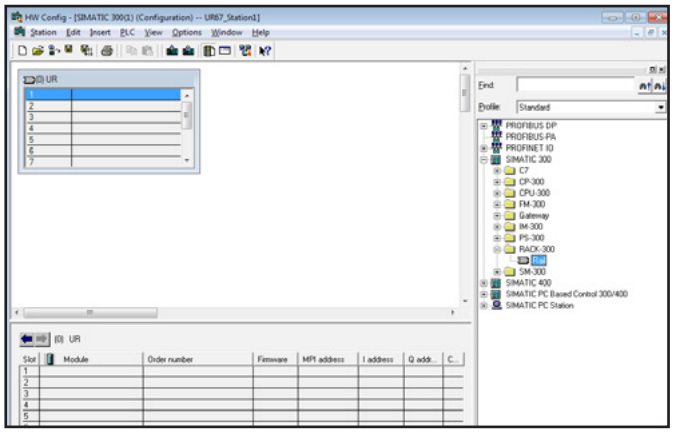
► In the device catalogue, select the profile rail in use (e.g. SIMATIC 300/RACK-300).



Selecting a profile rail

► Double-click on the profile rail or drag it to the left-hand side of the window using the mouse.

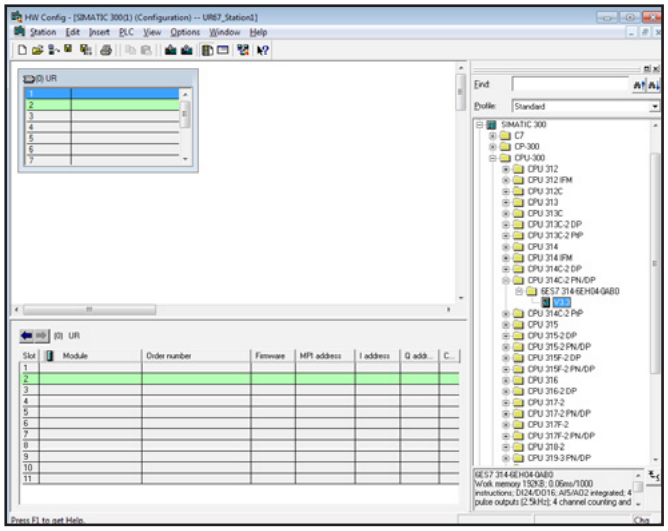
The profile rail (UR) is displayed with the open positions.



Profile rail with open positions

Selecting the control unit version

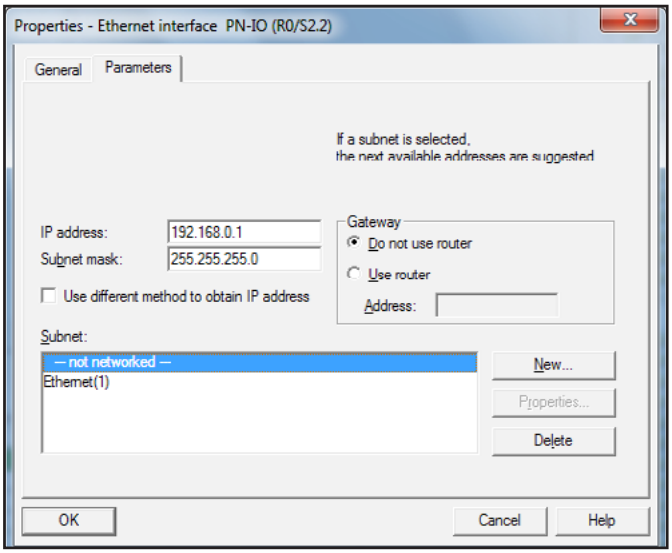
- ► Click on the second line of the **UR** table.
- ► From the catalogue, select the control unit in use and its version.



Selecting the control unit version

- ► Double-click on the respective version, or use the mouse to drag it to the second position in the table on the left-hand side of the window.

The **Ethernet interface properties** window opens.



Ethernet interface properties

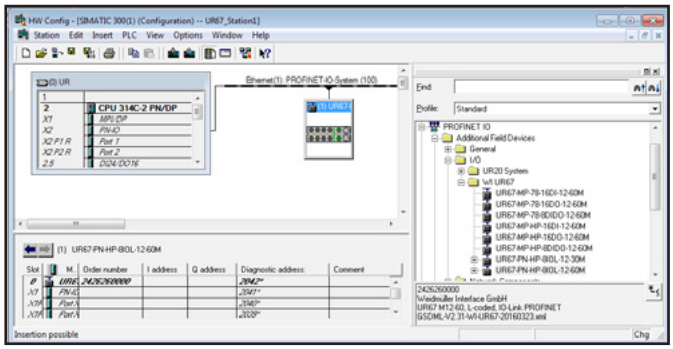
- ► Enter the designated IP address and the subnet mask.
- ► Click on **New**.

The **New Industrial Ethernet subnet properties** window opens.

- ► Enter a name for the subnet and confirm by clicking **OK**.
- ► Select the new subnet in the **Ethernet interface properties** window and confirm by clicking **OK**.

Adding the module to the subnet

► Click on the network line in the configuration window.
► In the device catalogue, select the module under **PROFINET IO/Additional field devices/ I/O /WI UR67**.
► Double-click on the module or drag it to the subnet line.
The module is added to the subnet.



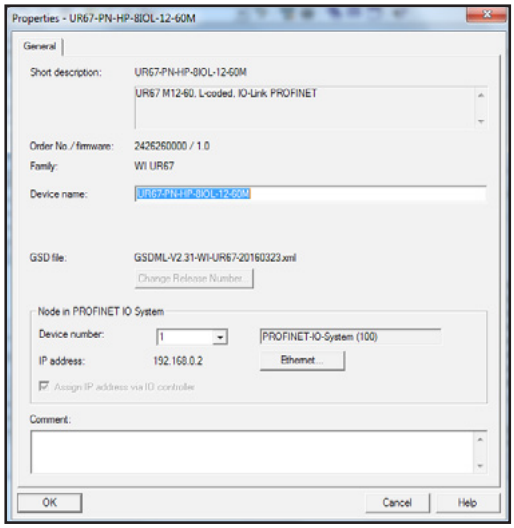
IO-Link module in the subnet

7.4 Assiging device names

PROFINET I/O devices are addressed in PROFINET via a unique device name. These names can be freely assigned; however, they can only be used once in the network.

Viewing and changing device names

► Double-click on the module.
The **Properties...** window opens.



Master module properties

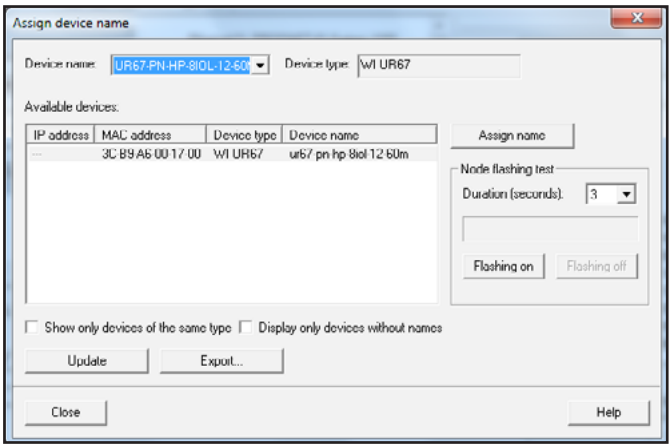
The device name must match the name that has been assigned to the module.

► Change the device names as required.
► Check whether the displayed IP address is correct and whether the control unit and module are in the same Ethernet subnet.
► Confirm the settings by clicking **OK**.

All settings only take effect once they have been loaded into the component/control unit (see the section entitled “Assigning a device name to an IO-Link module”).

Assigning a device name to an IO-Link module

To assign a device name to a module, the PC must be connected to the module via a PROFINET connection.
► Select the module.
► Open the dialogue box **PLC/Ethernet/Assign device name**.



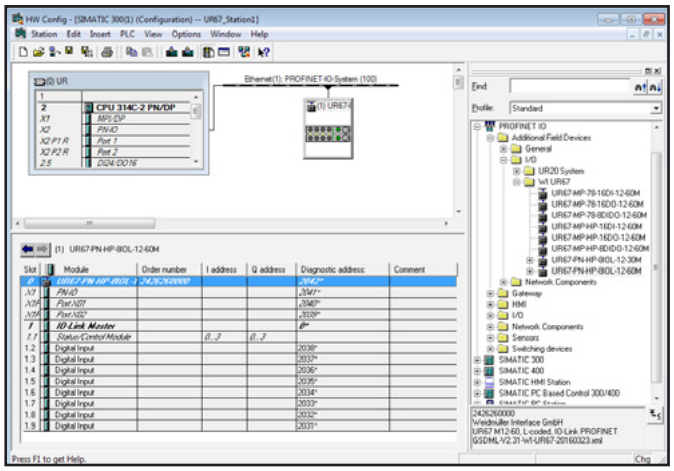
Assigning a device name

► Select the IO-Link module required.
► Click on **Assign name**.
► Close the dialogue box.

7.5 Configuring IO-Link channels

Viewing the configuration of IO-Link channels

In the original state as at delivery, all IO-Link channels (C/Q or ch. A/pin 4 of the I/O port) for slot 1 are configured as digital inputs in accordance with the IO-Link specification. This configuration is automatically adopted. The IO-Link channels in subslots 2–9 can be configured individually (port 1 of the module goes with subslot 2, port 8 goes with subslot 9, etc.). The input and output addresses specified by the hardware manager can be changed.

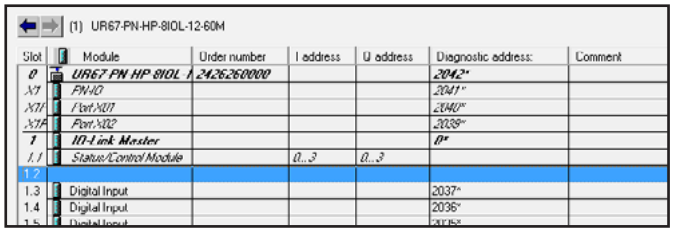


Example configuration of an IO-Link module upon delivery

Deleting an IO-Link channel configuration

- ► In the overview of the **hardware configuration tool**, select the channel that you would like to delete.
- ► Using the right mouse button, click on the channel and select **Delete**.
- ► Confirm the dialogue box that appears by clicking **Yes**.

The free IO-Link subslot is displayed in the overview.



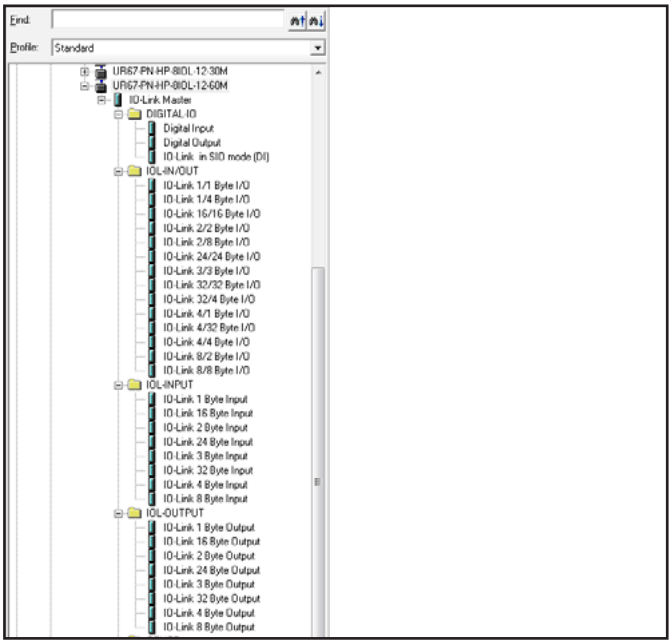
Slot	Module	Order number	I address	Q address	Diagnostic address:	Comment
0	UR67 PN HP 8IOL	2426260000			2042*	
X1	PN-IO				2041*	
X1	Port X01				2040*	
X1	Port X02				2039*	
1	IO-Link Master				0*	
1.1	Status/Control Module		0...3	0...3		
1.2						
1.3	Digital Input				2037*	
1.4	Digital Input				2036*	

Deleted IO-Link channel configuration

Creating an IO-Link channel configuration

- ► In the hardware catalogue, open the module that you would like to configure.

The potential configurations are displayed.



Potential configurations for the selected module

- ► Using the left mouse button, click on and drag (drag & drop) the required configuration to a free IO-Link subslot.

Options for the IO-Link channel C/Q (ch. A/pin 4)

Digital Input

In this mode, the channel functions as a digital input. The IO-Link master does not establish communication with the connected IO-Link device. Parameterisation is possible if COM mode has been enabled for the IO-Link device. To do this, in the cyclical output data of the status/control module the corresponding channel bit of byte 2 “COM mode” must be set (s. chapter 8).

The status of the digital input signal is not updated during operation in COM mode!

Digital output

In this mode, the channel functions as a digital output. It is not possible to establish communication with the connected device.

IO-Link in SIO mode (DI)

In this mode, IO-Link devices can be parameterised. As part of this process, the COM mode fallback mechanism of SIO mode is used in order to ensure that the COM mode bits of the status/control module do not have to be set. In this mode, the IO-Link device is parameterised upon start-up of the module and subsequently switches back to the digital input mode via the fallback mechanism.

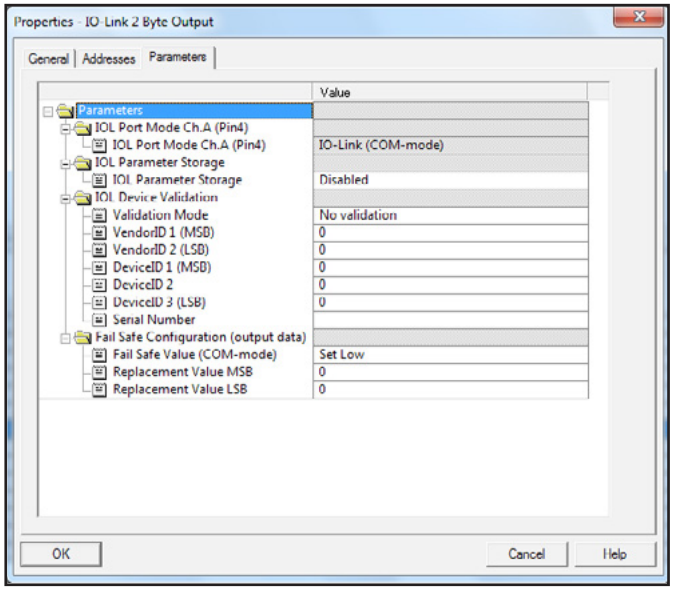
IO-Link ... (COM mode)
In COM mode, the process data is always exchanged with the IO-Link device via a communication link. Once the IO-Link master detects the baud rate of the connected device, it automatically establishes communication with this device. In addition, the device can be parameterised.
There are configurations available with 1 to 32 bytes of input data and/or output data. If a configuration module does not match the device exactly, the next largest data length must be selected.

Inactive
In this mode, the L+ power supply (pin 1) for the port is deactivated, i.e. the channel is not used.

7.6 Parameterising the IO-Link channels

► In the hardware configuration tool, double-click on the relevant IO-Link subslot.
The **Properties** window opens.

► Click on the **Parameter** tab.



IO-Link channel properties

"IOL Parameter Storage" parameter

The parameterising server for the IO-Link module can be parameterised under **IOL Parameter Storage**. The parameterising server manages the IO-Link device parameters in order to ensure that the IO-Link master module or an IO-Link device (IO-Link specification version 1.1 or higher) can be exchanged very easily. The following options can be set:

Disabled
Factory setting. The function is disabled and saved data remains unchanged.

Download only (master to device)
If the parameter data saved in the IO-Link master does not match the data on the connected IO-Link device and there have been no upload requests made by the IO-Link device, data is downloaded from the IO-Link master to the IO-Link device.
In this mode, the IO-Link device can be swapped.

Upload only (device to master)
If a connected IO-Link device requests an upload (upload flag active) or if there is no valid data in the IO-Link master, e.g. after a Clear command or in the delivery condition prior to the first data upload, data is uploaded from the IO-Link device to the IO-Link master.
In this mode, the IO-Link master can be swapped.

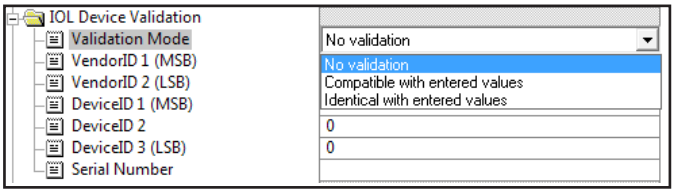
Download and Upload
Parameter data is exchanged between the IO-Link master and the IO-Link device if an inconsistency is detected.

Status IO-Link-Master	Status IO-Link-Device	Aktion
Invalid Data (Cleared before)	Upload flag active	Upload
Invalid Data (Cleared before)	Upload flag not active	Upload
Valid Data	Upload flag active	Upload
Valid Data	Upload flag not active	Download

Disabled and Cleared
The **Parameter Storage** function is disabled and saved data is deleted.

"IOL Device Validation" parameter

This function allows the identification characteristics of a connected IO-Link device to be checked. The transfer of the process data is only started once the characteristics match the values set in the IO-Link master.
The values to be checked must be entered in the IO-Link master (see below).



"Device Validation" parameter

► Under **"Validation Mode"**, select the required option.

No validation
Factory setting. The function is disabled and there is no validation.

Compatible with entered values
Only the VendorID and the DeviceID are compared. This setting allows for the IO-Link device to be replaced with a device of the same type without the need for changes to be made in the engineering tool.

Identical with entered values
The VendorID, the DeviceID and the serial number are compared.
This setting allows for the IO-Link device to be replaced with a device of the same type if the serial number is to be changed accordingly in the engineering tool.

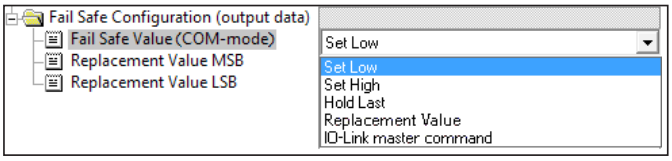
Entering values to be checked

- ► Enter the **VendorID** for the IO-Link device being used as a decimal value in the input fields "VendorID 1" (most significant byte – MSB) and "VendorID 2" (least significant byte – LSB).
- ► Enter the **DeviceID** for the IO-Link device being used as a decimal value in the input fields "DeviceID 1" (most significant byte – MSB) to "DeviceID 3" (least significant byte – LSB).
- ► Enter the **serial number** for the IO-Link device being used as a string in the "Serial Number" input field (max. 16 characters)

"Fail Safe Configuration" parameter (for outputs only)

This parameter can only be used for IO-Link channels in COM mode and for output data. In COM mode, IO data is exchanged between the IO-Link master and the IO-Link device by means of serial communication..

Fail Safe Value (COM-Mode)



"Fail Safe Configuration (output data)" parameter

Set low
Factory setting. All of the bits for the output data are transferred to the IO-Link device with the value "0".

Set high
All of the bits for the output data are transferred to the IO-Link device with the value "1".

Hold last
The last valid output value received from the control unit is continuously transmitted to the IO-Link device on a cyclical basis.

Replacement value
The replacement value entered (see below) is continuously transmitted to the IO-Link device on a cyclical basis..

IO-Link master command
IO-Link-specific mechanisms are applied for valid and invalid output process data. The IO-Link device determines the behaviour of the outputs.

Entering a replacement value (replacement value)

- ► Enter the replacement value in the "Replacement Value" field.

Depending on the way in which the data length is configured, enter the value as a decimal value either bytewise (0–255) or wordwise (0–65535) in the indicated order (MSB/MSW = most-significant byte/word, LSB/LSW = least-significant byte/word).

7.7 Parameterising the status/control module

The status/control module is pre-configured in subslot 1.1.

Slot	Module	Order number	I address	Q address	Diagnostic address:	Comment
0	UR67 PN HP 8IOL	2426260000			2042*	
X1	PN-IO				2041*	
X1A	Port X01				2040*	
X1B	Port X02				2039*	
1	IO-Link Master				0*	
1.1	Status/Control Module		0...3	0...3		

Subslot 1.1

The status/control module contains 4 bytes of input data and 4 bytes of output data for digital I/O data as well as status- and control bits for the IO-Link master. The bit allocations are detailed in chapter 8.

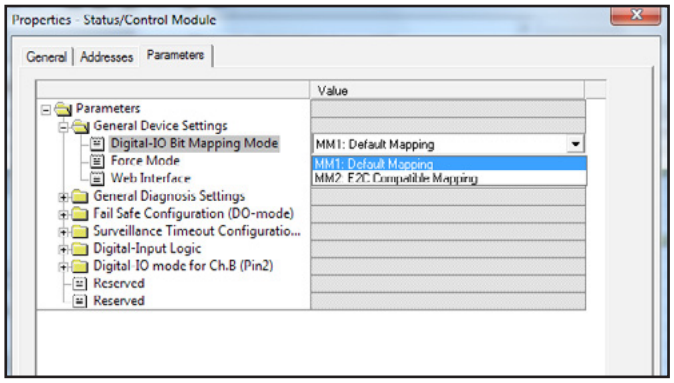
► All parameterisations that do not apply to ports in IO-Link COM mode can also be carried out via the status/control module. Double-click on **Status/Control Module**.

The "Status/Control Module" window opens.

► Click on the "Parameter" tab.

The parameters are displayed.

"General Device Settings" parameter



"General Device Settings" parameter

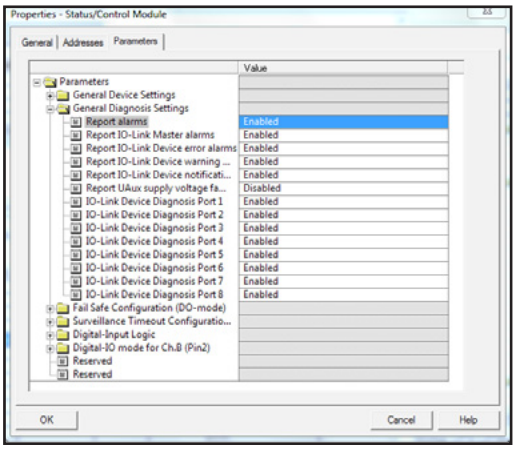
Digital IO bit-mapping mode

Define the mapping of the input and output bits in the cyclic data of the status/control module, which is exchanged between the control unit and the IO-Link master module (for information on bit allocation, see chapter 8).

- MM1: Mapping Mode 1 (default mapping). In this mode, the first channel bit (C/Q, ch. A/pin 4) and then the second channel bit (ch. B/pin 2) are transmitted alternately. MM1 is the default factory setting.
- MM2: Mapping Mode 2 (MM2, E2C compatible mapping). In this mode, all of the first channel bits (C/Q, ch. A/pin 4) are transferred initially and then all second channel bits (ch. B/pin 2).

"General Diagnosis Settings" parameter

This parameter can be used to enable and disable diagnoses and the diagnosis level.

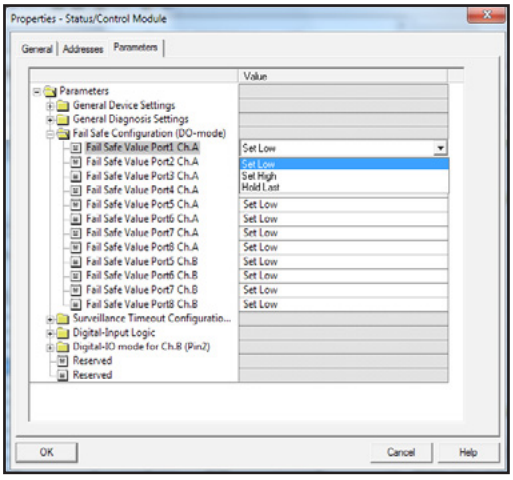


"General Diagnosis Settings" parameter (factory setting)

In the original state as at delivery, the "Report U/A supply voltage fault" option is disabled. This prevents a diagnostic message from being generated when the supply voltage U_{Aux} is switched on or off at a subsequent point in time.

"Fail Safe Configuration (DO mode)" parameter

The IO-Link module supports a fail-safe function for channels that are used as a digital output. You can determine which status the outputs are to adopt after an interruption or a loss of communication in the PROFINET IO network.



"Fail Safe Configuration (DO mode)" parameter

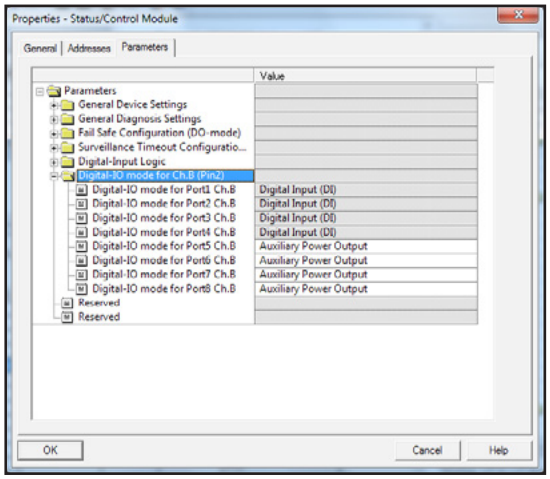
Set low
The output channel is deactivated, the output bit is set to 0.

Set high
The output channel is activated, the output bit is set to 1.

Hold last
The last output status is retained.

"Digital IO mode for ch. B/pin 2" parameter

In the original state as at delivery, the type-A I/O ports (ports 1–4) are configured as **digital inputs** and the type-B I/O ports (ports 5–8) as **auxiliary power outputs**.
This setting cannot be changed for the UR67-PN-HP-8IOL-12-30M module type.
The ports can be parameterised for the UR67-PN-HP-8IOL-12-60M module type.



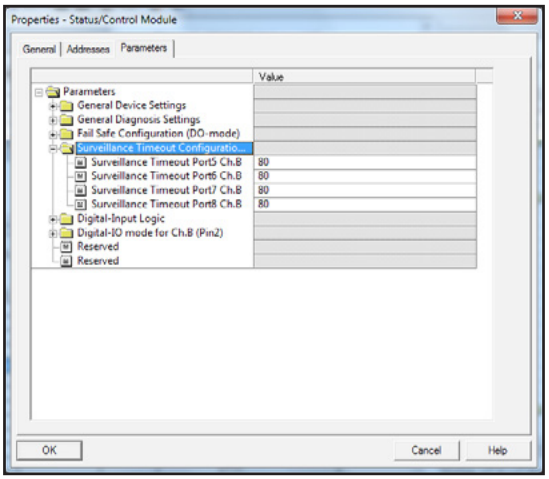
"Digital IO mode for ch. B/pin 2" parameter

Auxiliary power supply
Factory setting. In this mode, pin 2 and pin 5 serve as the auxiliary voltage output. The auxiliary voltage is supplied from the U_{Aux} power supply input. The auxiliary voltage output cannot be controlled.

Digital output (DO)
In this mode, ch. B/pin 2 is used as a digital output. The control bits are transferred from the control unit to the IO-Link master module within the status/control module. A delay time can be parameterised for the outputs (see "Surveillance Timeout Configuration").

"Surveillance Timeout Configuration" parameter (only with UR67-PN-HP-8IOL-12-60M)

This parameter is only relevant when the separate power supply U_{Aux} for the type-B IO-Link channels has been configured as an additional digital output ("Digital-IO mode for ch. B (pin 2)").

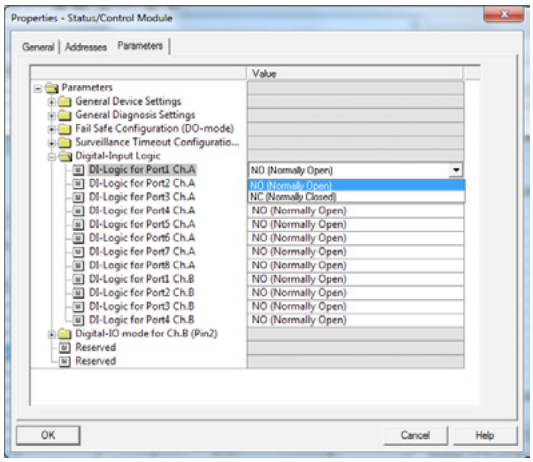


"Surveillance Timeout" parameter

A delay time ("Surveillance Timeout") can be configured for this special case. Once this period of time has expired, the output is monitored and error states are reported as diagnoses.
The delay time can be individually set for each output channel. The delay time starts everytime the status of the output channel changes, i.e. when the output channel is activated (rising edge) or deactivated (falling edge).
The delay time can be set from 0 to 255 ms (factory setting: 80 ms). When an output channel is in a static state (switched permanently on or off), the value is typically set as 5 ms.

"Digital Input Logic" parameter

You can use this parameter to define the logic of the channels that are used as digital inputs.



"Digital Input Logic" parameter

NO (normally open)

Factory setting for all channels. If a sensor is not activated, it has an open switch output for this setting (low level). The IO-Link module input detects a low level and delivers a 0 to the control unit.

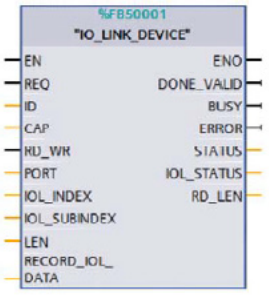
NC (normally closed)

If a sensor is not activated, it has a closed switch output for this setting (high level). The IO-Link module input detects a high level, inverts the signal and delivers a 0 to the control unit.

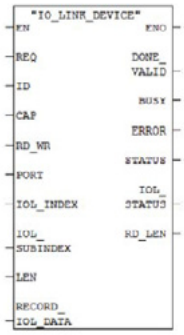
7.8 Parameterising the IO-Link device

SIEMENS STEP 7 IO-Link library

The "IO_LINK_CALL" function component allows for acyclic communication with an IO-Link device: device parameters are written and parameters, measured values and diagnostic data are read. In the more recent versions of the IO-Link library, "IO_LINK_CALL" has been replaced by the "IO_LINK_DEVICE" component.



STEP 7 V13 SP1 (TIA Portal)



STEP 7 V5.5 (SIMATIC Manager)

Service data is uniquely addressed via the index and subindex and can be accessed and written via the logical start address of the inputs for the status/control module (ID), the Client Access Point (CAP = 255) and the corresponding IO-Link connection (PORT: 1–8 for IO-Link connections).

Use the logical start address of the inputs for the status/control module (slot 1, subslot 1) as ID. In the case of "1200/1500 CPU", use the hardware address of the status/control module (slot 1, subslot 1) as ID.

If you use the logical start address for the IO_LINK_CALL component, the input address may need to be made smaller or equal to the output address. If necessary, you must adjust the value in the engineering tool.

The processing of the function component always takes multiple PLC cycles. The access, use of IO-Link port functions and the remanent backing up and recovery of device data must be controlled by the user program. Further information is available in the SIEMENS document "Acyclic reading and writing with the IO-Link library".

7.9 Simple Network Management Protocol (SNMP)

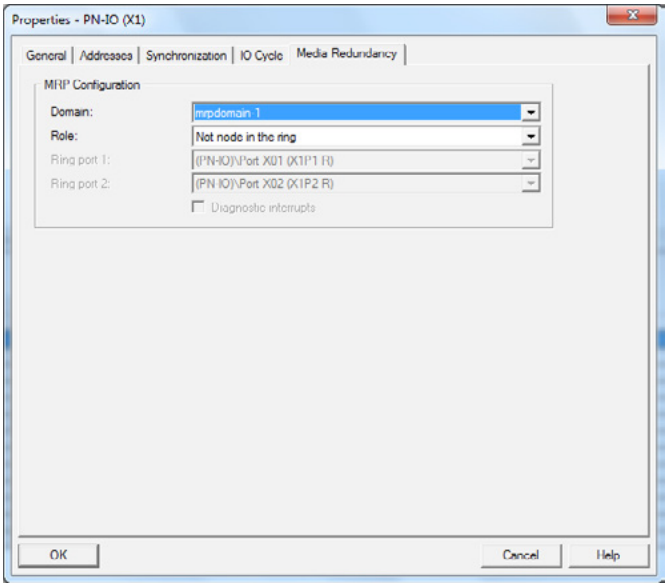
The UR67 PN IO-Link modules support the objects listed in the PROFINET specification in accordance with protocol standard SNMP v1. This includes objects from RFC 1213 MIB-II (system group and interfaces group) and from LLDP-MIB.

The passwords are:
- Read community: public
- Write community: private

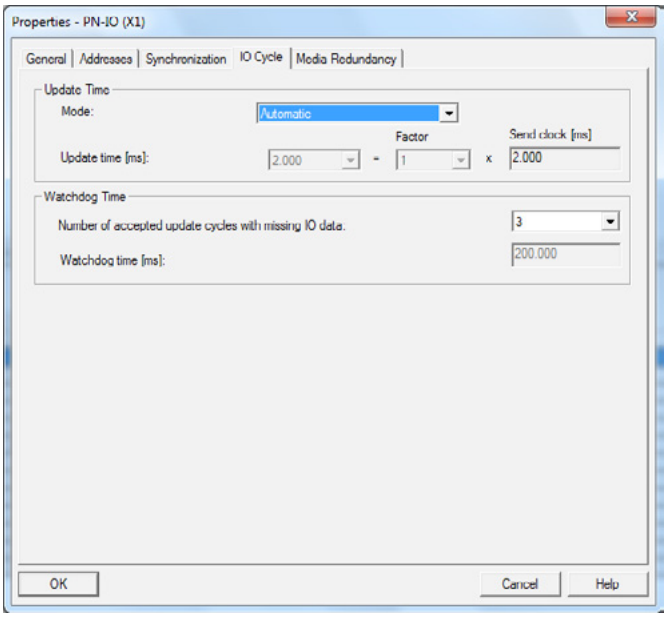
7.10 Media Redundancy Protocol (MRP)

Using the UR67 PN IO-Link modules, a redundant PROFINET communication network can be set up with a ring topology and no need for additional switches. In this instance, an MRP redundancy manager closes the ring, detects individual outages and in the event of an error sends data packages via the redundant path.

To use MRP, the following requirements must be met:
- All devices must support MRP.
- MRP must be enabled on all devices.
- The devices are only connected via the ring ports – a meshed topology is not permitted.
- A maximum of 50 devices may be connected within the ring network.
- All of the devices have the same redundancy domains.
- One device is configured as the redundancy manager, all others as redundancy clients.
- A prioritised start-up (PSU) is not permitted.
- For all devices, the response monitoring time must in each case be longer than the reconfiguration time (typically 200 ms; in the case of UR67 PN IOL modules, min. 90 ms).
- The automatic network setting must be used on all devices.



Setting up media redundancy in STEP7 (example)



Setting the response monitoring time in STEP7 (example)

7.11 Identification & Maintenance functions (I&M)

The UR67 PROFINET IO-Link modules can clearly identify the devices installed in the system via device-specific data (electronic type plates). This data can be readout acyclically at any time. In addition, the location designation, installation date and further descriptions can be saved in the module during system creation.

Module-specific I&M functions

The module-specific I&M functions 0 to 4 can be readout and written via slot 0. Data sets are allocated via the specified index.

I&M 0 (slot 0, index 0xAFF0)

Data object	Length [byte]	Access	Default/description
MANUFACTURER_ ID	2	Read	0x0134 (Weidmüller)
ORDER_ID	20	Read	Order number of module in ASCII
SERIAL_NUMBER	16	Read	Defined in production process in ASCII
HARDWARE_REVISION	2	Read	Hardware revision of device
SOFTWARE_REVISION	4	Read	Software revision of device
REVISION_COUNTER	2	Read	Incremented for every static stored parameter change on IOLink Master (e.g. Device Name or IP-Address)
PROFILE_ID	2	Read	0xF600 (Generic device)
PROFILE_SPECI-FIC_TYPE	2	Read	0x0003 (IO-Module)
IM_VERSION	2	Read	0x0101 (I&M Version 1.1)
IM_SUPPORTED	2	Read	0x001E (I&M 1...4 is supported)

I&M 1 (slot 0, index 0xAFF1)

Data object	Length [byte]	Access	Default/description
TAG_FUNCTION	32	Read/ Write	0x20 ff. (empty)
TAG_LOCATION	22	Read/ Write	0x20 ff. (empty)

I&M 2 (slot 0, index 0xAFF2)

Data object	Length [byte]	Access	Default/description
INSTALLATION_DATE	16	Read/ Write	0x20 ff. (empty); Supported data format is a visibile string with a fix length of 16 byte; "YYYY-MM-DD hh:mm" or "YYYY-MM-DD" filled with blank spaces

I&M 3 (slot 0, index 0xAFF3)

Data object	Length [byte]	Access	Default/description
DESCRIPTOR	54	Read/ Write	0x20 ff. (empty)

I&M 4 (slot 0, index 0xAFF4)

Data object	Length [byte]	Access	Default/description
SIGNATURE	54	Read/ Write	0x20 ff. (empty)

I&M functions for IO-Link master

The specific I&M functions 0 and 99 for the IO-Link master can be exported via slot 1. Data sets are allocated via the specified index.

I&M 0 (slot 1, index 0xAFF0)

Data object	Length [byte]	Access	Default/description
MANUFACTURER_ ID	2	Read	0x0134 (Weidmüller)
ORDER_ID	20	Read	Order number of module
SERIAL_NUMBER	16	Read	Defined in production process
HARDWARE_REVISION	2	Read	Hardware revision of device
SOFTWARE_REVISION	4	Read	Software revision of device
REVISION_COUNTER	2	Read	Incremented for every static stored parameter change on IOLink Master (e.g. Device Name or IP-Address)
PROFILE_ID	2	Read	0x4E00 (IO-Link Master)
PROFILE_SPECI-FIC_TYPE	2	Read	0x0000
IM_VERSION	2	Read	0x0101 (I&M Version 1.1)
IM_SUPPORTED	2	Read	0x0001 (Profile specific)

I&M 99 (slot 0, index 0xB063)

Data object	Length [byte]	Access	Default/description
IOL_VERSION	1	Read	0x11 (IO-Link Version 1.1)
IOL_PROFILE_VERSION	1	Read	0x10 (IO-Link Profile Version 1.0)
IOL_FEATURE_SUP-PORT	4	Read	0x00000000
NUMBER_OF_PORTS	1	Read	0x08 (Number of supported IOLink Ports)
REF_PORT_CONFIG	1	Read	0x00 (No port configuration data supported)
REF_IO_MAPPING	1	Read	0x00 (No I/O mapping data supported)
REF_IPAR_DIRECTORY	1	Read	0x00 (No iPar directory supported)
REF_IOL_M	1	Read	0x00 (No IOL-M parameter supported)
NUMBER_OF_CAPS	1	Read	0x01 (Number of Client Access Points)
INDEX_CAP1	1	Read	0xFF (Client Access Point for IOL_CALL)

I&M functions for IO-Link devices

The specific I&M functions 16 to 23 for IO-Link devices can be readout via slot 1, subslot 1. Data sets are allocated via the specified index. Only data that is not equal to zero is received if a connection to an IO-Link device has been established.

I&M 16...23 (slot 1, subslot 1, index 0xB000...0xB007)

Data object	Length [byte]	Access	Default/description
VENDOR_ID	2	Read	0x0000 (IO-Link Device Vendor ID)
DEVICE_ID	4	Read	0x00000000 (IO-Link Device ID)
FUNCTION_ID	2	Read	0x0000 (IO-Link Device Function ID)
RESERVED	10	Read	0x00 ff.

Reading and writing I&M data

Within its standard library, SIEMENS **STEP 7** contains system function block for writing and reading I&M data. Every data set contains a 6-byte block header which is followed by the I&M record. The data to be transferred thus only starts after the header. The content of the header must also be taken into account during all writing processes. The following table illustrates the structure of a data set.

Data object	Length [byte]	Data type	Coding	Description
BlockType	2	Word	I&M 0: 0x0020 I&M 1: 0x0021 I&M 2: 0x0022 I&M 3: 0x0023 I&M 4: 0x0024 I&M 16...23: 0x0F00 I&M 99: 0x0F00	BlockHeader
BlockLength	2	Word	I&M 0: 0x0038 I&M 1: 0x0038 I&M 2: 0x0012 I&M 3: 0x0038 I&M 4: 0x0038 I&M 16...23: 0x0014 I&M 99: 0x000F	
BlockVersion-High	1	Byte	0x01	
BlockVersion-Low	1	Byte	0x00	
I&M Data	I&M 0: 54 I&M 1: 54 I&M 2: 16 I&M 3: 54 I&M 4: 54 I&M 16...23: 18 I&M 99: 13	Byte		I&M Record

I&M read record

I&M data can be read via the RDREC (SFB52) function block in STEP 7. As part of this process, the logical address of the slot/subslot (ID) and the I&M index (INDEX) must be used as transfer parameters. Return parameters describe the length of the I&M data received as well as a status or error message.

I&M write record

I&M data can be written via the WRREC (SFB53) function block in STEP 7. As part of this process, the logical address of the slot/subslot (ID), the I&M index (INDEX) and the data length (LEN) must be used as transfer parameters. Return parameters describe a status or error message.

8 Bit allocation

The UR67 PROFINET IO-Link master modules use a modular device model. Slot 1, subslot 1 contains the **IO-Link master status/control module** with 4 bytes of input data and 4 bytes of output data. This module is pre-configured in the GSDML file for the IO-Link master.
The I/O ports, which according to their configuration can have different operating modes and data lengths, are mapped out in subslots 2 to 9 of slot 1.

8.1 Process data of status/control module, slot 1/subslot 1

Digital IO Mapping Mode 1 (default mapping)

If Mapping Mode 1 has been configured for the IO-Link master, the status/control module data is transferred as follows.

Byte 0, digital input status								
Bit	7	6	5	4	3	2	1	0
Port	4	4	3	3	2	2	1	1
Pin	2	4	2	4	2	4	2	4
Ch. No.	4	4	3	3	2	2	1	1
Byte 1, digital input status								
Bit	7	6	5	4	3	2	1	0
Port	8	8	7	7	6	6	5	5
Pin	2[1)]	4	2[1)]	4	2[1)]	4	2[1)]	4
Ch. No.	8[1)]	8	7[1)]	7	6[1)]	6	5[1)]	5
Byte 2, IOL-COM state								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	4	4	4	4	4	4	4	4
Ch. No.	8	7	6	5	4	3	2	1
Byte 3, IOL PD valid								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	4	4	4	4	4	4	4	4
Ch. No.	8	7	6	5	4	3	2	1

1) Only UR67-PN-HP-8IOL-12-60M

Input data of status/control module, Mapping-Mode 1

- The status of the digital outputs is returned in the digital input data.
- Ch. No.: channel number of the PROFINET device model used for diagnostic messages.
- IOL-COM state: the “IOL-COM state” displays whether the corresponding port has established communication with the IO-Link device.
- IOL-PD valid: the “IOL-PD valid” information shows whether the IO-Link process data for the corresponding port is valid.

Byte 0, digital output state								
Bit	7	6	5	4	3	2	1	0
Port	4	4	3	3	2	2	1	1
Pin	–	4	–	4	–	4	4	–
Ch. No.	–	4	–	3	–	2	1	–
Byte 1, digital output state								
Bit	7	6	5	4	3	2	1	0
Port	8	8	7	7	6	6	5	5
Pin	2[1)]	4	2[1)]	4	2[1)]	4	2[1)]	4
Ch. No.	8[1)]	8	7[1)]	7	6[1)]	6	5[1)]	5
Byte 2, COM mode								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	4	4	4	4	4	4	4	4
Ch. No.	8	7	6	5	4	3	2	1
Byte 3, reserved								
Bit	7	6	5	4	3	2	1	0
Port	–	–	–	–	–	–	–	–
Pin	–	–	–	–	–	–	–	–
Ch. No.	–	–	–	–	–	–	–	–

1) Only UR67-PN-HP-8IOL-12-60M

Output data of status/control module, Mapping Mode 1

- **Byte 0, (pin 4, C/Q mode):** the digital output at the corresponding port can be controlled via the process data. The I/O port must be configured as a digital output in the engineering tool.
- Using byte 2 **(COM mode)**, I/O ports that are configured in the digital input operating mode are temporarily switched to COM mode provided that the corresponding COM control bit is set. Process data is not exchanged during this period of time.

Digital IO Mapping Mode 2 (E2C compatibility)

If Mapping Mode 2 has been configured for the IO-Link master, the status/control module data is transferred as follows.

Byte 0, digital input status								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	4	4	4	4	4	4	4	4
Ch. No.	8	7	6	5	4	3	2	1
Byte 1, digital input status								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	2[1)]	2[1)]	2[1)]	2[1)]	2	2	2	2
Ch. No.	8[1)]	7[1)]	6[1)]	5[1)]	4	3	2	1
Byte 2, IOL-COM state								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	4	4	4	4	4	4	4	4
Ch. No.	8	7	6	5	4	3	2	1
Byte 3, IOL PD valid								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	4	4	4	4	4	4	4	4
Ch. No.	8	7	6	5	4	3	2	1

1) Only UR67-PN-HP-8IOL-12-60M

Input data of status/control module, Mapping Mode 2

- The status of the digital outputs is returned in the digital input data.
- Ch. No.: channel number of the PROFINET device model used for diagnostic messages.
- IOL-COM state: the "IOL-COM state" displays whether the corresponding port has established communication with the IO-Link device.
- IOL-PD valid: the "IOL-PD valid" information shows whether the IO-Link process data for the corresponding port is valid.

Byte 0, digital output state								
Bit	7	6	5	4	3	2	1	0
Port	4	4	3	3	2	2	1	1
Pin	–	4	–	4	–	4	–	4
Ch. No.	–	4	–	3	–	2	–	1
Byte 1, digital output state								
Bit	7	6	5	4	3	2	1	0
Port	8	8	7	7	6	6	5	5
Pin	2[1)]	4[1)]	2[1)]	4[1)]	2	4	2	4
Ch. No.	8[1)]	8[1)]	7[1)]	7[1)]	6	6	5	5
Byte 2, COM mode								
Bit	7	6	5	4	3	2	1	0
Port	8	7	6	5	4	3	2	1
Pin	4	4	4	4	4	4	4	4
Ch. No.	8	7	6	5	4	3	2	1
Byte 3, reserved								
Bit	7	6	5	4	3	2	1	0
Port	–	–	–	–	–	–	–	–
Pin	–	–	–	–	–	–	–	–
Ch. No.	–	–	–	–	–	–	–	–

1) Only UR67-PN-HP-8IOL-12-60M

Output data of status/control module, Mapping Mode 2

- **Byte 0, (pin 4, C/Q mode):** the digital output at the corresponding port can be controlled via the process data. The I/O port must be configured in the digital output operating mode.
- Using byte 2 **(COM mode)**, I/O ports that are configured in the digital input operating mode are temporarily switched to COM mode provided that the corresponding COM control bit is set. Process data is not exchanged during this period of time.

8.2 Process data of IO-Link ports, slot 1/ subslots 2–9

The process data lengths of the I/O ports in COM mode are dependent on the respective configuration. Data lengths of 1–32 bytes of input data and 1–32 bytes of output data can be configured. The data content is set out in the descriptions of the IO-Link devices.
If exact data lengths are not provided for configuring the IO-Link device, the next largest data length must be selected. The selected mapping mode for the status/control module does not affect the process data of the IO-Link ports.

9 Diagnostics

9.1 System/sensor power supply

ATTENTION

Make sure that the supply voltage for the system/sensor power supply does not fall below 18 V DC when taking the measurement at the furthest-away participant.

The voltage value of the system/sensor power supply is monitored globally. If the voltage falls below 18 V, an error message is generated and the U_S LED lights up red. The error message does not affect the outputs.
The following collective diagnostic message is generated:

Channel number of diagnosis	0x8000 (diagnosis not channel-specific)
Channel related diagnosis code	0x0002
Channel related diagnosis code message	Undervoltage
Extended description	Low voltage of system/sensor power supply (U_S), detected by IO-Link master

9.2 Auxiliary/actuator power supply

The voltage value of the auxiliary/actuator power supply is monitored globally. If the voltage falls below 18 V, an error message is generated and the U_{Aux} LED lights up red. If output channels are activated, other error messages caused by the voltage error will be generated at the I/O ports.
U_{Aux} diagnostics reporting is disabled in the factory settings and has to be enabled by means of parameterisation.
The following collective diagnostic message is generated:

Channel number of diagnosis	0x8000 (diagnosis not channel-specific)
Channel related diagnosis code	0x0103
Channel related diagnosis code message	Low voltage of auxiliary power supply (U_{Aux}), detected by IO-Link master

9.3 I/O port sensor power supply outputs

In the event of an overload or a short circuit between pin 1 and pin 3 of the ports (1–8), the following channel-specific diagnostic messages are generated:

Channel number of diagnosis	0x01 - 0x08
Channel related diagnosis code	0x0001
Channel related diagnosis code message	Short circuit
Extended description	Short circuit or overload of sensor power supply at Pin 1 of IO-Port detected by IO-Link master

9.4 Digital 500 mA outputs

The digital outputs at the C/Q pin are short-circuit-proof and overload-proof. In the event of an error, the output is deactivated and switched back on again automatically as part of the cycle.
The following PROFINET diagnostic message is generated:

Channel number of diagnosis	0x01 - 0x08
Channel related diagnosis code	0x010A
Channel related diagnosis code message	Short circuit or overload of digital output at Pin 4 / Ch. A of IOL-Port in DIO mode, detected by IO-Link master

9.5 Digital 2.0 A outputs

On the UR67-PN-HP-8IOL-12-60M module type, there is a 2.0 A output on each of the four type-B I/O ports. Channel errors are identified by comparing the target value set by the control unit with the actual value of the output channel.

Target value	Actual value	Comment
Active	Active	OK, no diagnosis
Off	Off	OK, no diagnosis
Active	Off	Short-circuit Channel indicator is red Channel error bit in the diagnosis is set Channel is blocked after troubleshooting

Interpretation of channel errors

During a status change (activation/rising edge or deactivation/falling edge), channel errors are filtered for the length of the parameterised delay time (“Surveillance-Timeout”, factory setting 80 ms). As a result, premature error messages that can be caused by switching on a capacitive load, by switching off an inductive load or by other voltage peaks during a change in status are avoided.
If the output channel is in a static state (permanently activated or deactivated), the filter time between error detection and the diagnostic message is typically 5–10 ms.

The following PROFINET diagnostic message is generated:

Channel number of diagnosis	0x05 - 0x08
Channel related diagnosis code	0x0109
Channel related diagnosis code message	Short circuit or overload of digital output at Pin 2/ Ch. B of Type B IO-Port, detected by IO-Link master

9.6 Type-B port aux. power supply

Module type UR67-PN-HP-8IOL-12-30M

In the event of an overload or a short circuit between pin 2 and pin 5 of ports 5–8, the following collective diagnostic message is generated:

Channel number of diagnosis	0x8000 (Diagnose nicht kanalbezogen)
Channel related diagnosis code	0x0108
Channel related diagnosis code message	Short circuit or overload of auxiliary power supply at Pin 2 of Type B IO-Ports, detected by IO-Link master

Module type UR67-PN-HP-8IOL-12-60M

In the event of an overload or a short circuit between pin 2 and pin 5 of ports 5–8, the following channel-specific diagnostic message is generated:

Channel number of diagnosis	0x05 - 0x08
Channel related diagnosis code	0x0108
Channel related diagnosis code message	Short circuit or overload of auxiliary power supply at Pin 2 of Type B IO-Ports, detected by IO-Link master

9.7 IO-Link C/Q

The following error message is generated when:
- an IO-Link device has been removed in COM mode;
- an incorrect IO-Link device has been plugged in;
- an electrical error occurs on the C/Q (pin 4) cable e.g. due to a short circuit.

Channel number of diagnosis	0x01 - 0x08
Channel related diagnosis code	0x0006
Channel related diagnosis code messae	Line break
Extended description	Missing/wrong device, broken wire or short circuit/ overload at Pin 4/ Ch. A of IOL-Port, detected by IO-Link master

9.8 IO-Link device diagnoses

Diagnoses that the device sends to the IO-Link master are reported via a standard channel diagnosis and an extended channel diagnosis.

Standard channel diagnosis message:

Channel number of diagnosis	0x01 - 0x08
Channel related diagnosis code	Depends on IO-Link device diagnosis
Channel related diagnosis code message	Depends on IO-Link device diagnosis

Extended channel diagnosis message:

Channel number of diagnosis	0x01 - 0x08
Ext. channel related diagnosis code	0x9000
Ext. channel value	EventCode << 16 | ChannelNumber << 8 | EventQualifier

EventCode: diagnosis code that is reported by the IO-Link device (see documentation on the IO-Link device).
ChannelNumber: the IO-Link master port (1–8) to which the device that reports an error message is connected.
EventQualifier:

	Mode		Type		Res.	Instance		
Bit	7	6	5	4	3	2	1	0

	Value	Definition
Event Qualifier Instance		
	0	Unknown
	1	Phy
	2	DL
	3	AL
	4	Application
	5...7	Reserved
Event Qualifier Res.		
This bit is reserved and set to 0		
Event Qualifier Type		
	0	Reserved
	1	Information
	2	Warning
	3	Error
Event Qualifier Mode		
	0	Reserved
	1	Event single shot
	2	Event dissappears
	3	Event appears

10 Web server

The web server is used to display the UR67 module on a connected PC. This allows you to do the following for test purposes or during commissioning or service work:
- Query the module status
- Display and change the module parameters
- Access diagnostic information
- Operate the module in Force mode for testing purposes

10.1 Connecting and starting up the web server

Requirements:

Web browser

The web server can be used with the following web browsers:
- Mozilla Firefox 4.0 or higher
- Google Chrome 9.0 or higher
- Opera 10.61 or higher
- Microsoft Internet Explorer 9, 10 and 11

Screen resolution

When working with the web server, we recommend using a screen resolution of 1280 x 800 or higher, but at least 1024 x 768. The operator front-end is displayed optimally when the browser window is maximised.

Starting up the web server

The module must be completely assembled and supplied with power.

► Make sure that the PC and the module are connected via Ethernet.

An IP address must be assigned to the module (e.g. via an engineering tool). The PC and the module must be in the same subnet.

► Open one of the browsers listed above.
► In the address line, enter the IP address of the module.

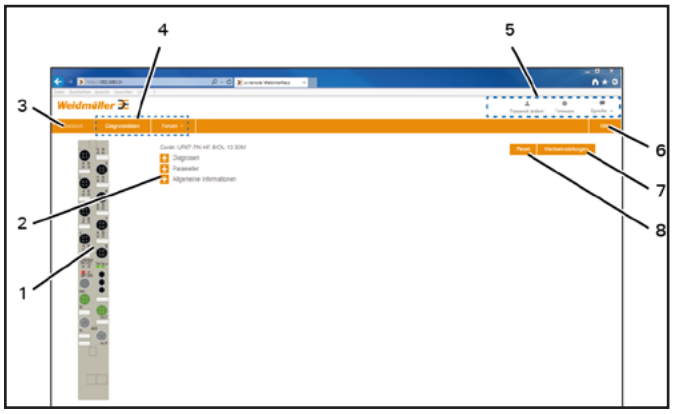
The web server will then be started up. The connected module will be displayed.

If the web server does not start up:
► Clear the browser cache. Deleting only the history is not a sufficient measure in this instance.
► Restart the web server.
► Check the module IP address and whether the right subnet has been selected.

10.2 Getting to know and arranging the web server

Module overview

The overview page is displayed every time the web server is started up.



Overview page with operating elements

1 Module detailed view
2 Show or hide details
3 Access to overview page
4 Access to web server functions
5 Menu bar
6 Open help dialogue box
7 Reset the module to factory settings
8 Restart the web server

You can access the overview page at any time by clicking **Overview**.

Operating instructions

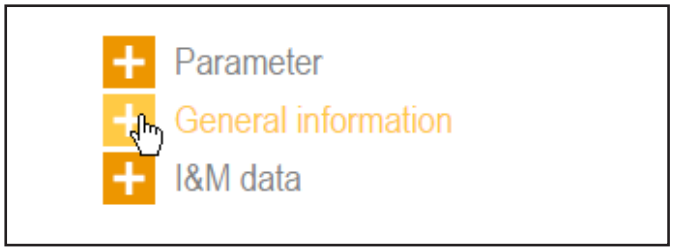
Single mouse clicks (left mouse button) are sufficient for operating the web server. Some areas of the interface are mouse-sensitive, i.e. they change when the cursor is moved over these areas and without clicking the mouse ("mouse-over").

When the cursor changes to this icon, the user is expected to click the mouse.

When the cursor changes to this icon, you can move the screen view by pressing and holding the left mouse button while moving the mouse.

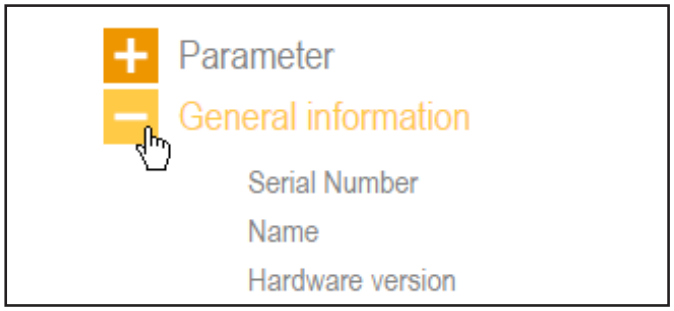
Show or hide content

All entries that are marked with a square plus symbol can be opened and the content displayed with a single mouse click.



Showing content

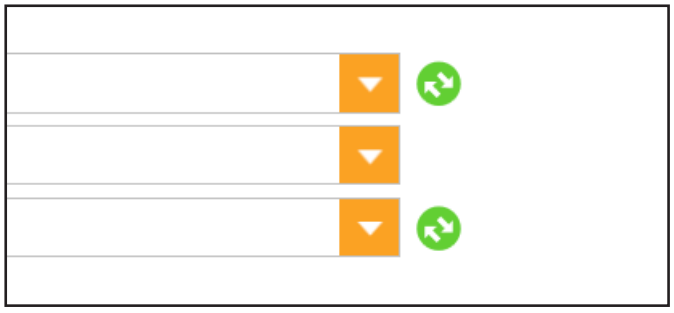
Conversely, content can be hidden by clicking on the square minus symbol.



Hiding content

Tracking changes

Any settings changed will be marked with a green symbol.

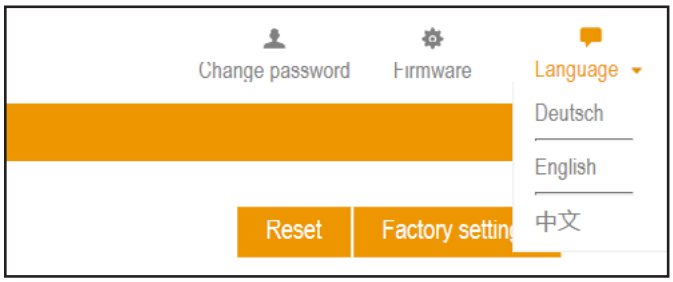


Changes marked with symbol

In this state, you can revert each individual change that has not yet been accepted by the module back to its original setting. All changes are only accepted when you click on **Apply changes**. All changes are reset when you click on **Restore**. Once you have applied or restored the changes, the markers will be removed.

Setting the language

► To change the language, click on **Language** in the menu bar and then on the required setting.



Setting the language

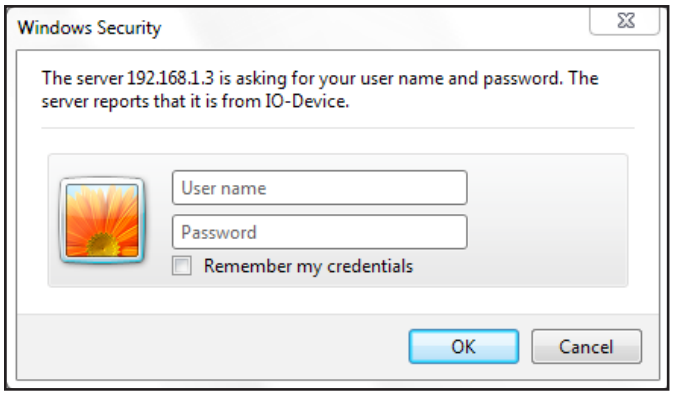
Entering a password

Access to the following functions is restricted by means of password protection:

- Changing parameters
- Operating the module in Force mode
- Downloading firmware updates
- Changing a password

Users without a user ID have read-only rights, but no write access. They cannot use the specified functions. A password is requested the first time an attempt is made in a session to access these functions.

► Enter the username and password and confirm by clicking on **OK**



Entering the username and password

In the original state as at delivery, the login credentials are as follows:

User name: **admin**
Password: **Detmold**

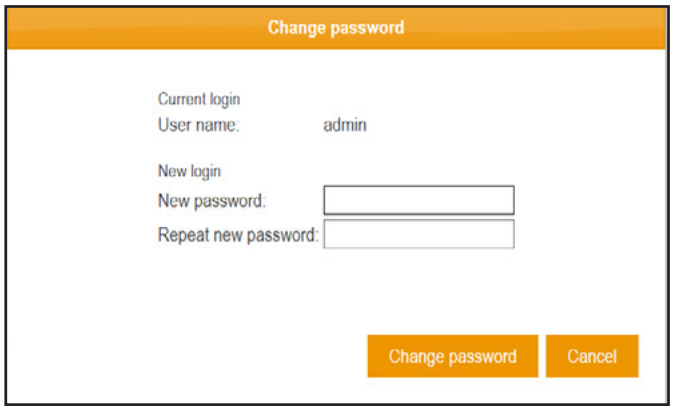
In order to prevent unauthorised access, the login details must be changed when setting up the web server. The local data security provisions must subsequently be observed.

Once you have successfully entered the username and password, you will not have to do it again for the same session. You cannot log out.

To prevent unauthorised access, make sure to always close the browser once you have finished working and when you leave your workstation for a short period of time.

Changing the password

► Click on **Change password**.
The "Change password window opens. You may be prompted beforehand to enter your username and password.

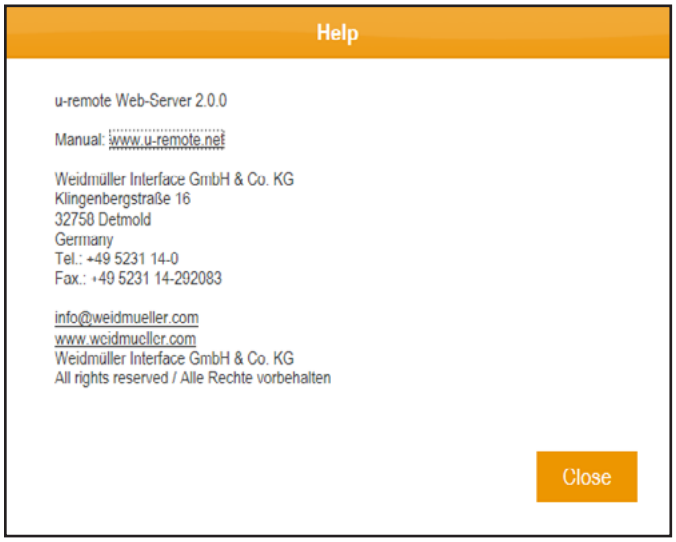


Change password

The new password must contain at least three characters and is case-sensitive.
► Enter a new password.
► Re-enter the password and click on **Change password**.

Documentation

► Click on **Help**.

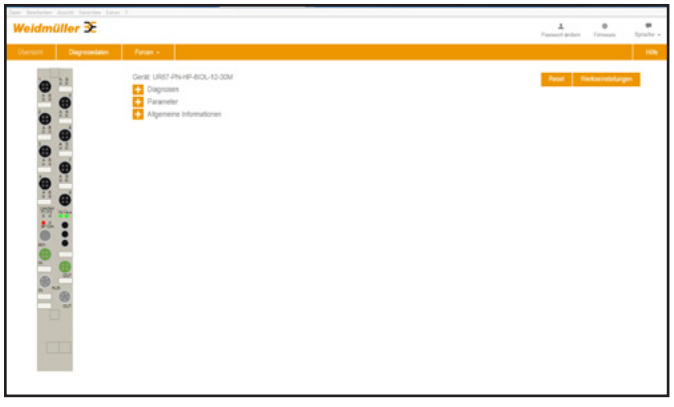


Help dialogue box

► Click on the link to open the Weidmüller website.
You will be connected to the Weidmüller website in a new browser window.

10.3 Module settings and diagnostics

► Open the overview page.



Overview page

Here you can:
- Access and change module parameters
- Display diagnoses
- Show general information on the module
- Change a password
- Reset changes
- Reset the module to factory settings

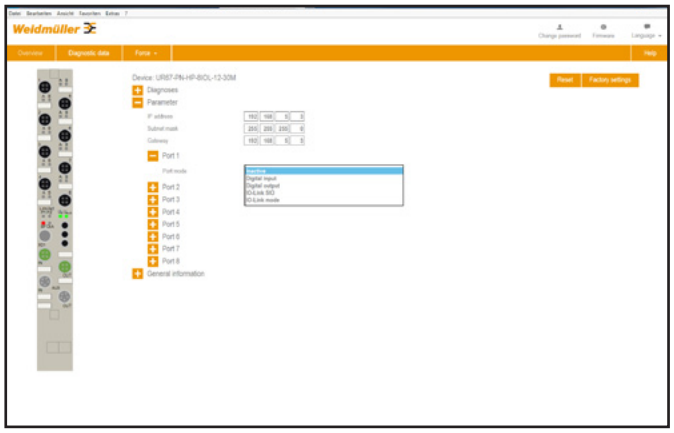
Module settings can only be accessed when Force mode is not enabled.

Status data can be displayed at any time regardless of the fieldbus connection. Any changes to settings can only be saved when the fieldbus is not active.

Accessing and editing parameters

► Open the overview page.
► Click on **Parameter**.
The parameters are displayed.

For parameters that can be edited, you can enter the changes in the respective entry field or choose alternative settings from a dropdown menu.



Accessing and editing module parameters

► Enter the required changes.
Each change is labelled with a green symbol until it has been applied.

► Click on **Apply changes** to save the changes.

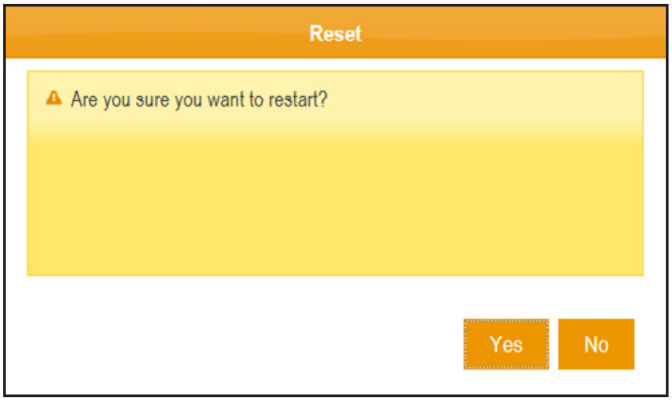
All changes are only accepted when you click on **Apply changes**. All changes are reset when you click on **Restore**. The changes are then transferred to the module and the green labels removed.

Resetting the web server

Performing a reset allows you to undo all the changes that have been made since the last time that the web server was started up.

The module is restarted during the reset process! All data that is not protected against power failure is reset.

► Open the overview page.
► Click on **Reset** and then on **Yes**.



Restarting the web server and module

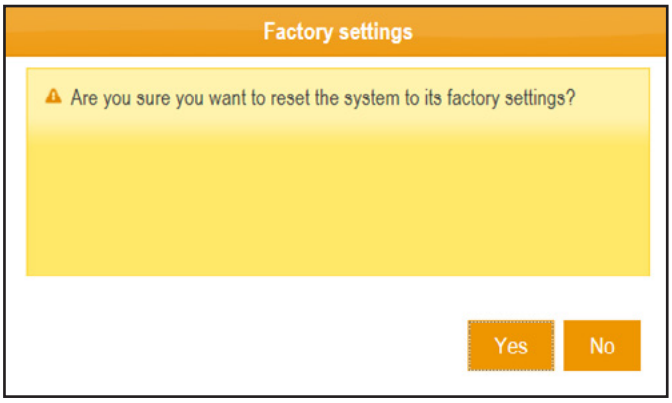
The module and the web server are restarted.

Resetting the module to factory settings

This function allows you to reset the module to its original state upon delivery. The following data is reset as part of this process:
- All module parameters
- Login data and password protection
- Changes to module parameters that have been saved in the module

The module is restarted during the reset process!

► Open the overview page.
► Click on **Factory settings** and then on **Yes**.

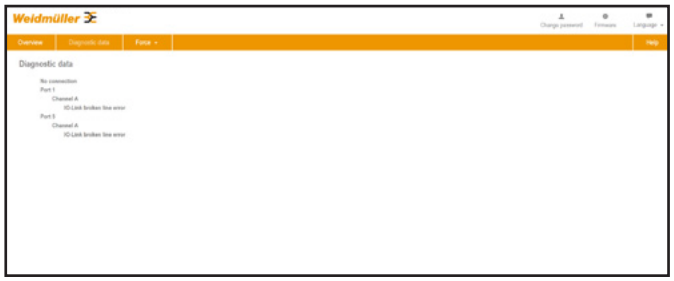


Resetting the module to factory settings

The module and the web server are restarted. The module will once again be in the same state as it was when it was initially delivered.

Displaying diagnostic data

► Click on “Diagnostic data”.
All of the current diagnostic messages are displayed.



Display of diagnostic data

10.4 Web server in Force mode

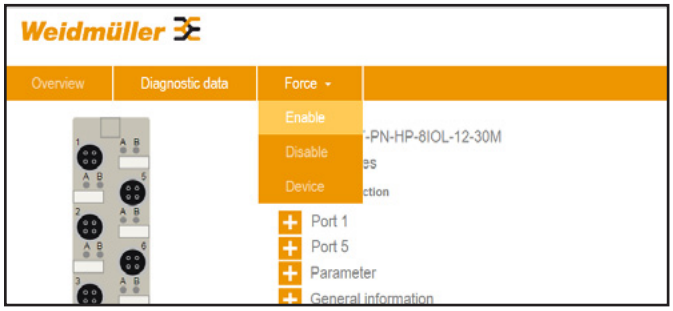
Enabling Force mode

	WARNING!
	Manipulation of the control unit! In Force mode, the system may be manipulated to such an extent that life-threatening personal injury and damage to materials may occur. Only use Force mode if you are very familiar with the connected system and know at all times the consequences that your actions will have!

If Force mode is enabled when the fieldbus is connected, a diagnostic alarm is triggered. Depending on the parameterised alarm behaviour, output process data may continue to be transferred by the PLC and processed by the module for all unforced output channels. All of the forced output channels ignore the process data and proceed exclusively according to the forced values. Input process data is always transferred regardless of whether it is simulated through forced operations or has been imported via physical inputs.

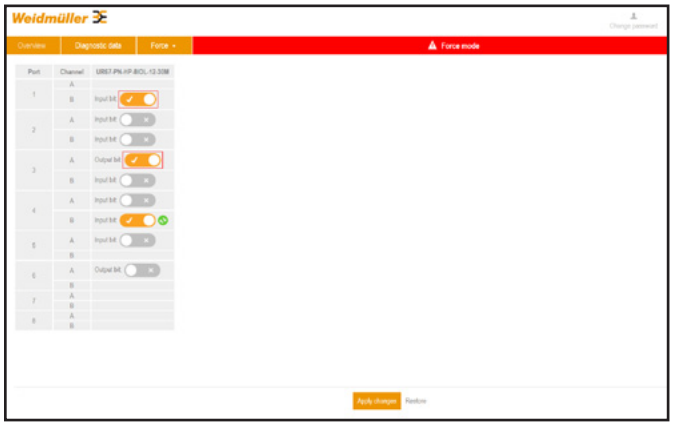
If Force mode is enabled without a fieldbus connection being established, the fieldbus interface will be deactivated for the duration of forced operations. A new fieldbus connection may only be established again once Force mode has been terminated.

Force mode allows you to carry out functional tests or preconfigure the module prior to commissioning, even if sensors or actuators have not yet been connected. To do so, you must change the operating mode of the web server.
► Click on **Force** and **Enable**.



Enabling Force mode

The web server is now in Force mode, which can be identified by the red bar. Forced channels can be identified by a red border.

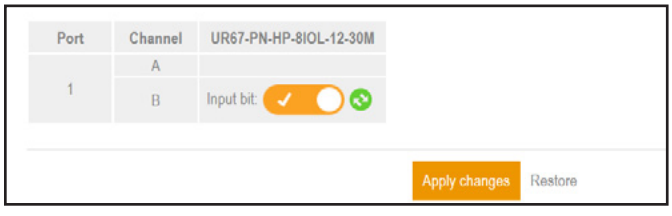


Display in Force mode

Force mode is terminated when the connection between the web server and the module is interrupted.

Forcing channels

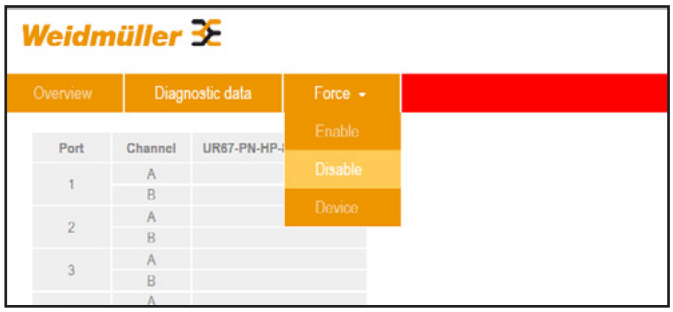
► To force a channel, click on the slider button and then on **Apply changes**.



Forcing a channel

Disabling Force mode

► To disable Force mode, click on **Force** and **Disable**.



Disabling Force mode

The station is put back into the status it was in prior to forced operations.

10.5 Updating firmware

A firmware update cannot be reversed. The old firmware in the module is overwritten.

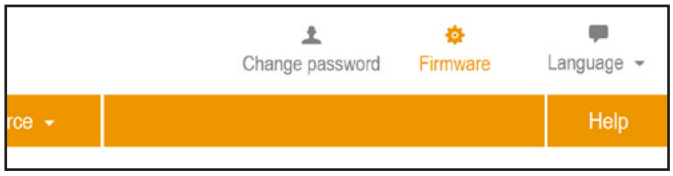
► Download the current firmware for the components to be updated from the Weidmüller website.

Firmware files have the “bsc” file extension. The file for the UR67-IO-Link modules, for example, is named UR67-PN-IOL-00XX.bsc.

► Make sure that the power supply is not interrupted during the firmware update.
► Do not make any changes to the module during the firmware update.

You cannot access the module via the web server while the firmware files are being loaded.

► To carry out a firmware update, click on **Firmware** in the menu bar.



Firmware update menu

The name of the firmware is displayed along with the version that is currently being run.

Updating firmware

► Click on **Select firmware**.
► Select the firmware file from the storage location on your computer and click **Open**.
► Click on **Update now**.

The firmware is updated. Once the update has finished, you will be prompted to restart the coupler.

► Click **Reset**.
► Wait until the coupler has restarted and the station overview is displayed in the web server.

If the web server does not restart, delete the temporary browser data (clear the cache; deleting only the history is not a sufficient measure in this instance) and try to access the web server again.

11 Disassembly and disposal

WARNING

Dangerous contact voltage!

- ► All installation and wiring work must be carried out with the power supply disconnected.
- ► Make sure that the place of installation has been disconnected from the power supply!

11.1 Disassembling the u-remote module

- ► Remove all cables and lines.
- ► Unscrew the mounting screws on the module.
- ► Please observe the instructions for proper disposal.

11.2 Disposing of the u-remote module

ATTENTION

Products in the u-remote series are subject to WEEE (EU Directive 2012/19 EU), which regulates the collection and recycling of electrical and electronic equipment.

- ► Make sure that disassembled products are properly disposed of!

When all u-remote products reach the end of their life cycle, you can return them to Weidmüller, and we will arrange for their proper disposal. This also applies to countries outside the European Union.

- ► Please pack the products properly and send them to your responsible distributor.

You can find the address of your respective country representative on the Weidmüller website.

12 LED indicators

LED	Display	Description
U_{Aux}	Green	Auxiliary sensor/actuator voltage >18 V
	Red	Auxiliary sensor/actuator voltage ≤18 V
	Off	None of the states described above
U_S	Green	System/sensor voltage >18 V
	Off	System/sensor voltage ≤18 V
1–8 A	Green	IO-Link COM mode: IO-Link communication available
	Green flashing	IO-Link COM mode: IO-Link communication not available
	Yellow	Status of the digital input or output at C/Q (pin 4), cable "on"
	Off	None of the states described above
1–8 B	White	Status of the digital input at pin 2, cable "on"
	Red	IO-Link COM mode: IO-Link communication error or cable overload or short-circuit at C/Q (pin 4)
	Red	All modes: cable overload or short circuit at L+ (pin 1)
	Red	SIO mode: overload or short circuit at C/Q
	Off	None of the states described above
P1 Lnk/Act **P2 Lnk/Act**	Green	Ethernet connection to another participant available, link detected
	Yellow flashing	Data being exchanged with another participant
	Off	No connection to another participant, no link and no data exchange
BF	Red	Bus error. No configuration and no or slow physical connection
	Red flashing (2 Hz)	Link available but no communication link to the PROFINET controller
	Off	PROFINET controller has established an active connection to the device
DIA	Red	PROFINET diagnostic alarm activated
	Red flashing (1 Hz)	Watchdog timeout; FailSafe mode activated
	Red flashing (2 Hz, 3 sec)	DCP signal service triggered via the bus
	Lights up red twice	Firmware update downloading
	Off	No diagnosis available

Weidmüller – Your Partner in Industrial Connectivity

As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs. Together we set standards in Industrial Connectivity.

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