MANUAL

PNU32.0 Profinet Interface

Universal Motor Controller

Important notice

Target group
This description is intended for the use of trained specialists in electrical installation and control and automation engineering, who are familiar with the applicable national standards.

Safety requirements
The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Using this handbook

Symbols
This technical document contains symbols to point the reader to important information, potential risks and precautionary information. The following symbols are used:

	Sign to indicate a potentially dangerous situation that can cause damage to the connected devices or the environment.
	Sign to indicate important information and conditions.
	Sign to indicate a potentially dangerous situation that can cause human injuries.

Terms and abbreviations

ACD	Address Conflict Detection – mechanism used by devices to detect other devices in the network using the same IP address
MRP	Media Redundancy Protocol
MRC	Media Redundancy Client
MRM	Media Redundancy Manager
IP address	Each device to be addressed as a node on an Ethernet network needs to have a unique IP address
Controller/Device	Controller/Device is a model of communication where one device, such as a PLC, has control over one or more other devices (here PNU32.0 and UMC100.3). In the Modbus TCP context, the controller is the client and the device is the server.
MAC	Medium Access Control
MAC address	Unique address of every Ethernet device
PLC	Programmable Logic Controller
SoE	Sequence of Events

Related documents

Technical documentation	Document No.
UMC100.3 Technical manual en	2CDC135032D0204

Table of contents

Cyber security

Legal disclaimer
This product is designed to be connected and to communicate information and data via a network interface.

It is your sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be) and to establish and maintain appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of antivirus programs, etc) to protect the product, the network, its system and interfaces against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

ABB Ltd and its affiliates are not liable for damages and/or losses related to such security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Although ABB provides functionality testing on the products and updates that we release, you should institute your own testing program for any product updates or other major system updates (to include but not limited to code changes, configuration file changes, third party software updates or patches, hardware change out, etc) to ensure that the security measures that you have implemented have not been compromised and system functionality in your environment is as expected.

For more information/contact regarding ABB cyber security see: http://www.abb.com/cybersecurity

Deployment guideline
This device shall be connected only to **a private/restricted network and not to any public networks**.
When connecting PNU32.0 to public networks, security measures must be taken to reduce the cyber security risks. Such measures are not provided by the PNU32.0 device: "external equipment“ is needed.
This private/restricted network can be connected for access via Internet or other network when using **“external equipment”** which can be separated devices or devices that combine **firewall, router and secure VPN functionality**. The cyber security standard of these external equipment depends on the customer and the targeted security level.

This “Cyber Security Deployment” guideline cannot suggest concrete products for **“external equipment”** to make a secure system setup. This must be decided along the specific project, requirements and existing infrastructure.

Recommendations
When commissioning a network system, it is important to address the cyber security problems by making a cyber security assessment of the system. Examples of methods to reduce security vulnerabilities include:

- Network connection
  Limit the connections with routers/firewall and similar products
- Network access control
  Add some control/limitations on the network using routers/firewall and similar products
- Network monitor
  If required, add products which can monitor the network access and traffic
- Network separation
  For cyber security and to protect the factory system, it is good to separate the remote connection gateway as noted in Figure 2, Network separation
- It is highly recommended to contact cyber security personnel/consultants to make an effective cyber security assessment of the system
- From a cyber security point and the protection of the industry factory system, it is advisable to separate the remote connection gateway from the factory control connected gateways

Overview

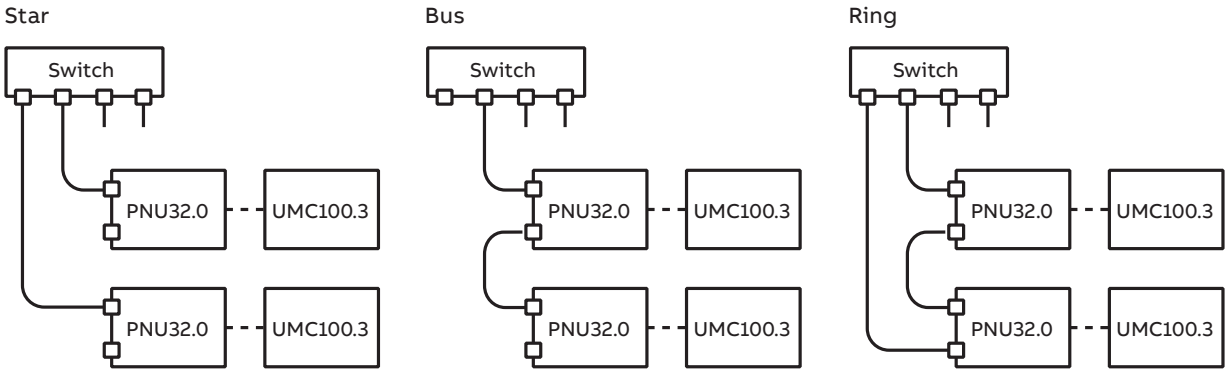
The PNU32.0 Ethernet adapter module supports the PROFINET IO network protocol. This chapter contains a short description of PROFINET IO and the PNU32.0 Ethernet adapter module.

Highlighted features

- The PNU32.0 Ethernet adapter module provides Ethernet connectivity for the motor controller UMC100.3
- Through the PNU32.0 Ethernet Adapter module it is possible to:
  - give control commands to the device (Start, Stop, Auto, etc.). The commands‘ meaning depends on the connected device
  - read status information and actual values from the device
  - change parameter values
  - read maintenance counters
  - reset a trip
- The PNU32.0 supports the Profinet S2 redundancy function
- Configuration from within the control system by using start-up parameters (similar to block parameters of PROFIBUS)
- A built-in two-port switch allows the flexible usage in bus, star or ring network topologies
- The Media Redundancy Protocol (MRP) is implemented (client). MRP is standardized in IEC/EN 62439-2 and offers cable redundancy in case of a single failure
- Location supervision for the detection of interchanged drawers in withdrawable systems
- Time stamped diagnosis: ABB proprietary Sequence of Event (SoE) support (800xA)

Ethernet

Ethernet standards support a variety of physical media (coaxial cable, twisted pair, fiber optics) and topologies (bus, ring and star). The PNU32.0 Ethernet Adapter supports twisted pair as the physical media in a bus, ring and star topology. Possible topologies are shown in Figure 1. The PNU32.0 is compatible with Ethernet standards IEEE 802.3 and IEEE 802.3u.



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01 Different topologies can be realized with the PNU32.0 Ethernet Adapter. For the ring structure a special switch must be used. See chapter Communication for more information.

PROFINET IO

PROFINET IO is a fieldbus protocol that enables communication between programmable controllers and distributed field devices in Ethernet network. The protocol classifies devices into IO controllers, IO supervisors and IO devices, with each having a specific collection of services.

PROFINET IO uses three different communication channels to exchange data. The standard UDP/IP and TCP/IP channel is used for parameterization and configuration of devices and for acyclic operations. The Real Time (RT) channel is used for cyclic data transfer and alarms. The third, Isochronous Real Time (IRT) channel, is used in applications such as motion control (not implemented in PNU32.0).

PROFINET IO devices are structured in slots and sub-slots, which can correspondingly contain modules and sub-modules. Devices can have almost any number of slots and sub-slots and they can be virtual or real. Device-specific data is represented in slot 0; module and sub-module specific data in subsequent slots and sub-slots. One of the benefits of PROFINET IO is the diagnostics and alarm mechanism. Every module and sub-module provides alarm data to the IO controller using the real-time channel. Diagnostic data including process alarms can be read non-cyclically from the device by using record data.

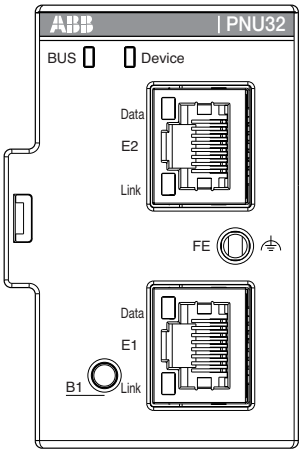
Profinet Interface PNU32.0 – also with ModbusTCP
The PNU32.0 communication interface enables the UMC100.3 Universal Motor Controller to work on a Profinet network. The Profinet communication protocol takes over the process control, while the basic ModbusTCP functionality is ideal for remote asset monitoring.

The device also supports Profinet S2 master redundancy and MRP. It fulfills the Profinet v2.4 specifications and is approved with the PNO (Profinet Organization).

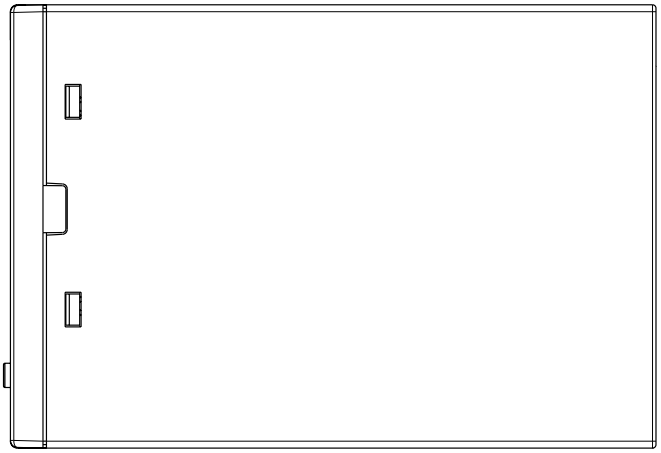
The PNU32.0 can be used in two different ways depending on the application of the Universal Motor Controller UMC100.3:
- UMC100.3 fix-mounted in the MCC (Motor Control Center)
  In this case the PNU32.0 communication interface is mounted directly on the UMC100.3 motor controller. It is supplied by the motor controller and is mechanically locked to it.
- UMC100.3 used in a drawer
  In common withdrawable applications, the PNU32.0 can also be mounted in the cable chamber of the MCC, outside the drawer. Instead of wiring two Ethernet cables inside the drawer, just one simple 5-wire cable is required for the connection. This simplifies wiring and offers some additional advantages.

Two RJ45 Ethernet ports with an integrated switch allow easy integration in all kinds of network topologies and also support ring structures. Media Redundancy Protocol (MRP) functionality ensures effective communication even in the event of a ring interruption. LEDs on the front for Device Status (Device), Network Status (BUS) and Ethernet communication make device status identification fast.

See chapter “Technical Data / LED Status Indication” for detailed information.



Device	LED module status
Bus	LED network status
E2	RJ45 Ethernet port 2
FE	Functional earth connector
E1	RJ45 Ethernet port 1
B1	Button



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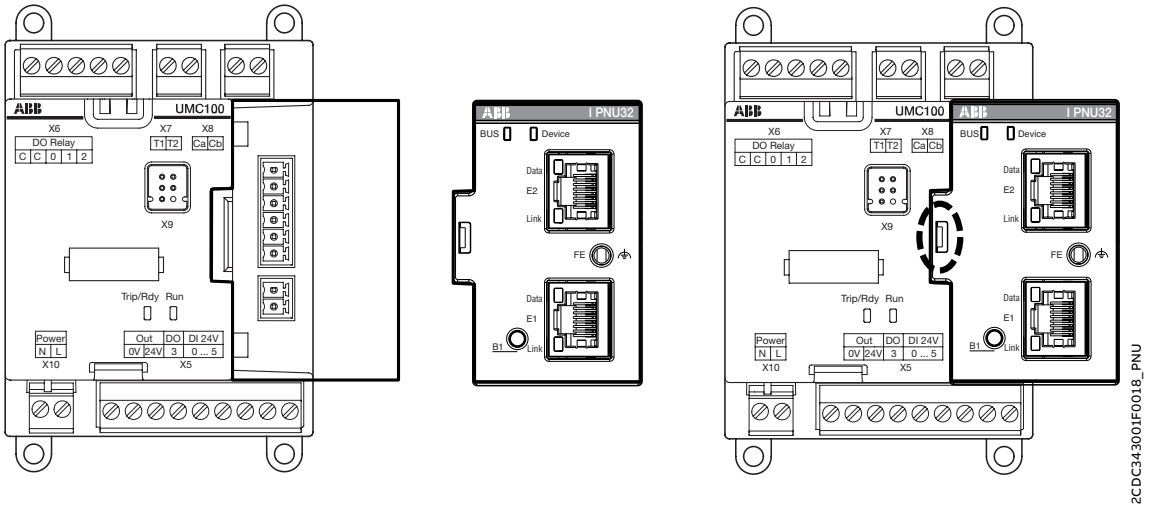
02 Side and top view of the PNU32.0

Installation

Mounting and dismounting
Depending on the application, the Profinet interface PNU32.0 can be mounted either directly on the UMC100.3 or remotely from the UMC100.3 using the single mounting kit (SMK3.0).

Mounting the PNU32.0 directly on a UMC100.3
When the module is installed directly on the UMC100.3, the UMC100.3 with PNU32.0 looks and behaves like a device with an integrated Profinet communication. No additional accessories are required.
In this case the PNU32.0 is supplied by the UMC100.3, and it is mechanically locked.



03 Mounting PNU32.0 direct on a UMC100.3

Mounting the PNU32.0 remotely from the UMC100.3

The PNU32.0 can be mounted separately by using the Single Mounting Kit (SMK3.0) adapter. This is recommended in drawer applications. The PNU32.0 communication interface is mounted in the cable chamber of the MCC and the connection to the UMC100.3 is done by simple cables, avoiding ethernet cabling inside the drawer.

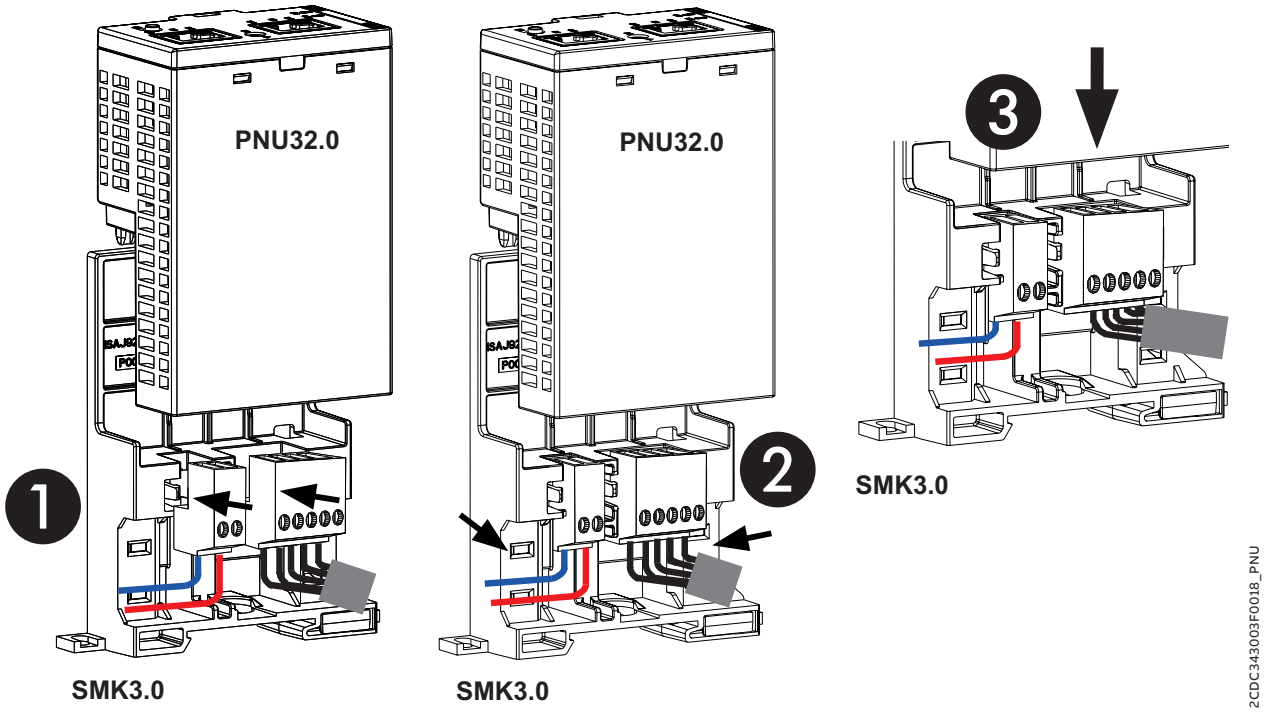
In this case the PNU32.0 must be supplied separately to keep it working even if the drawer is removed. The SMK3.0 adapter is delivered including a terminal block for connection to the 24 V DC supply. The connection to the drawer is done by a cable CDP24.150 (accessories) which fits directly into the SMK3.0 adapter. If vibrations are expected, it is recommended to fix the SMK3.0 adapter with end stops on the DIN rail or to fix it with screws.

All connectors are also available as spare parts to create individual cable connections. See chapter, Ordering Data. In this case the total cable length (inside + outside the drawer) should not exceed 3 m.

Step 1:
Snap in the communication and supply connectors

Step 2:
Fix cables with cable ties

Step 3:
Move down the PNU32.0 until snapped in



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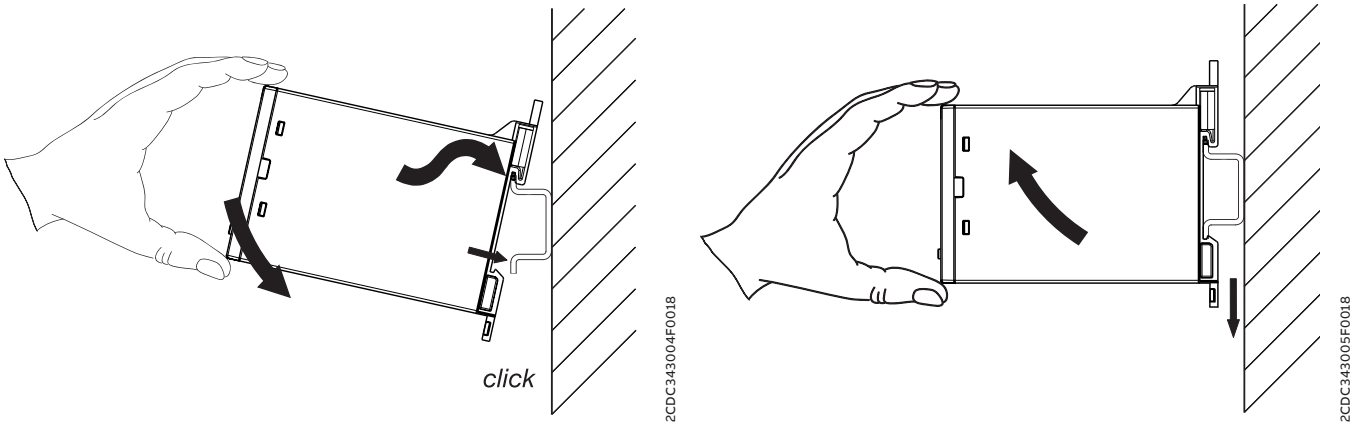
04 Mounting PNU32.0 on a SMK3.0 adapter



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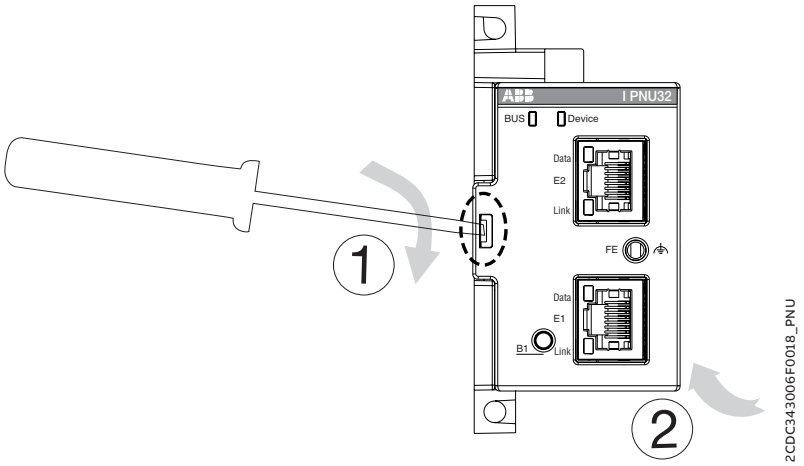
05 Mounting and dismounting on a DIN rail

Dismounting PNU32.0
Follow the procedure shown below to dismount the PNU32.0 from UMC100.3 or SMK3.0. Unlock with a screwdriver and detach PNU32.0



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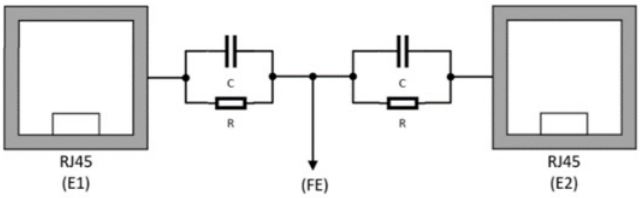
06 Dismounting PNU32.0

Electrical Installation

General
Locate the communication cables as far away from the motor cables as possible. Avoid parallel runs. Use bushings at cable entries.

Ethernet connection
The network cable is connected to the RJ45 connectors on the PNU32.0 interface. Standard CAT5e or higher, FTP or STP cables can be used. Cables and switches need to be suitable for use in industrial environments. Functions like DLR (Device Level Ring) require the use of switches or other devices that support this functionality.

Functional earth
There is a special connector FE provided for shielding the RJ45 housings. A wire with 14…18 AWG / 1…2.5 mm² (recommended 1.5 mm²) should be connected to functional earth to improve shielding. The wire can be pushed in without the use of a special tool. The shield is capacitively connected to the FE terminal, if this is not sufficient, we recommend connecting the cable shield directly, low impedance to FE.



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07 FE functional earth

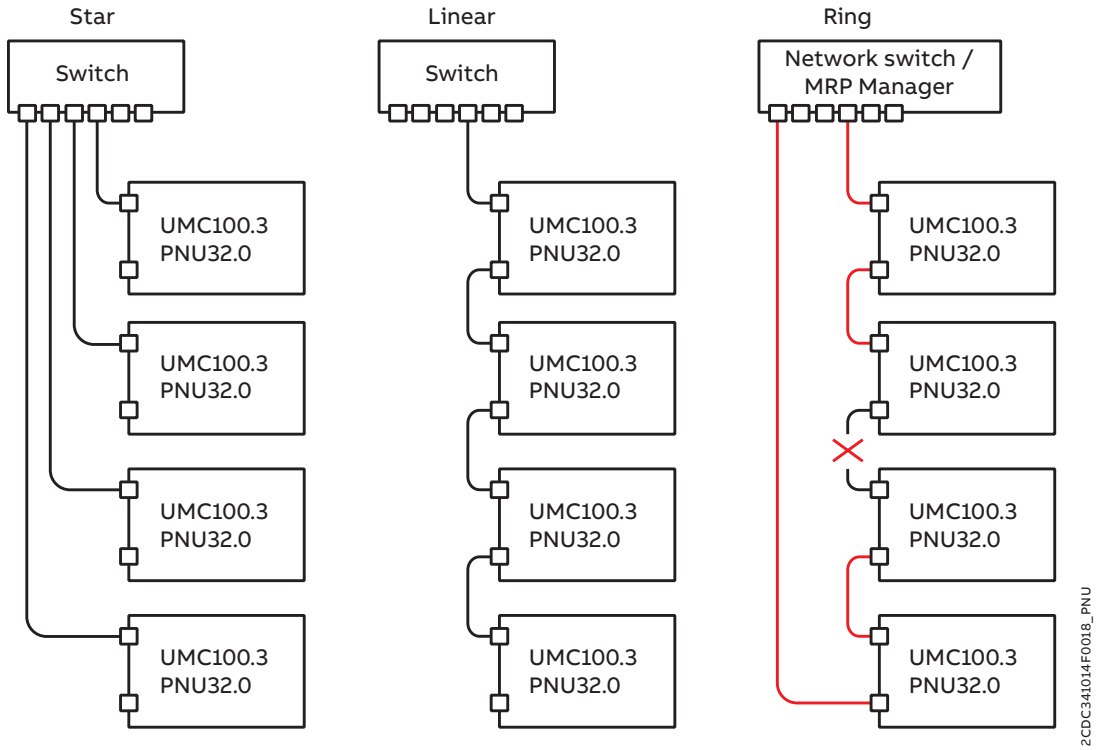
Power supply connection
The PNU32.0 needs to be supplied by 24 V DC if it is remote mounted on a SMK3.0 Single Mounting Kit.

Ethernet communication

The user of this product should be aware that the unsecure nature of the serial Modbus protocol exposes the communication between the product and the control system. Authentication and integrity of transmitted information is not provided by the protocol. The main security is provided through monitoring the cybersecurity, topology (asset management) and correct operation of the data networks using the cybersecurity monitoring modules and features of the firewalls and managed switches.

Profinet

Topologies
The PNU32.0 supports all kinds of network topologies.



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08 The figure shows how a single network failure is corrected in an MRP network. The MRP master has detected a network problem and has closed its internal switch to maintain connectivity to all network nodes. The green path shows how all network nodes are now reached.

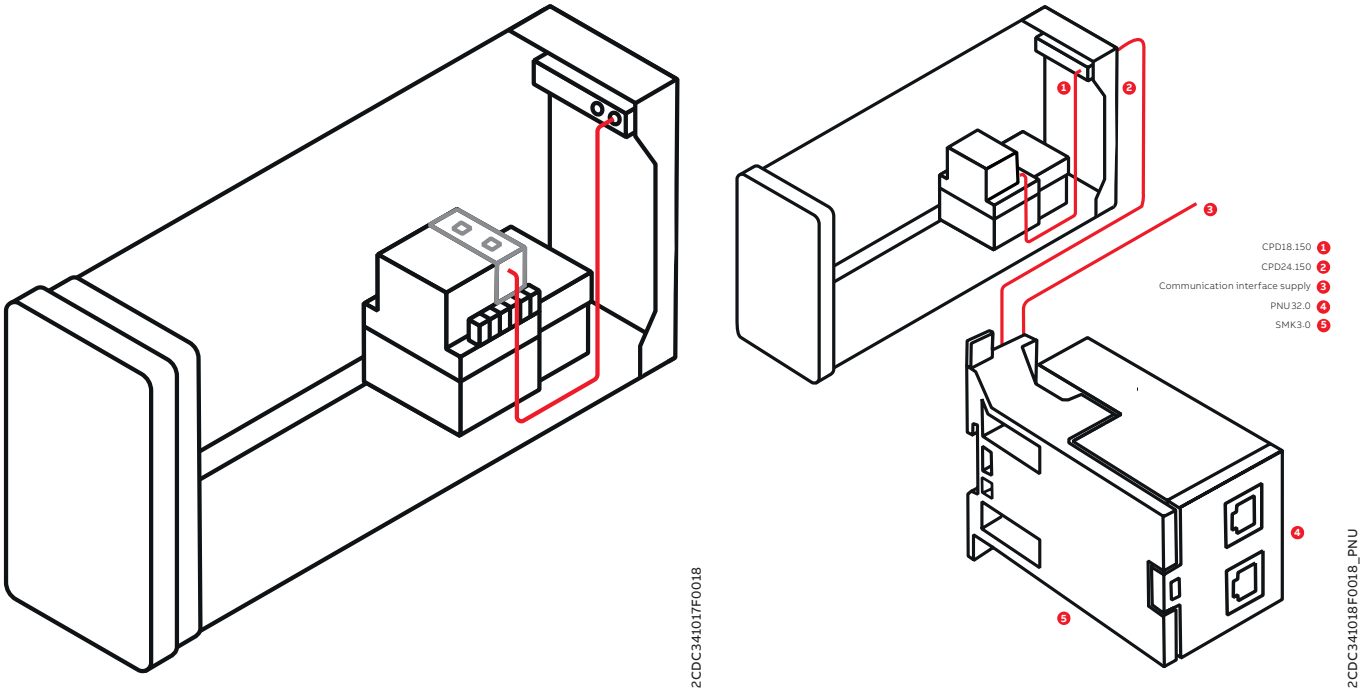
Star topology
In star topology only one RJ45 cable must be connected between the PNU32.0 and a switch. An unmanaged standard switch can be used in this operation mode.

Bus topology
In bus topology the internal two-port-switch of the PNU32.0 is used to connect PNU32.0 to PNU32.0. Only the first PNU32.0 in the chain needs to be connected to a switch. The second Ethernet port of the last PNU32.0 can be left unconnected. An unmanaged standard switch can be used in this operation mode.

Ring topology with network redundancy
Ring topology offers cable redundancy on the Ethernet side. The topology is similar to the bus topology, but the last PNU32.0 in the chain must be connected to the switch again to close the ring. A managed switch supporting MRP and acting as an MRP manager must be used in this case. The redundancy protocol implemented in the PNU32.0 is according to EN/IEC 62439-2. The MRP standard defines two principal device roles in an MRP network. The MRP manager – typically a managed

network switch – and MRP clients – typically automation devices like the PNU32.0. The MRP master sends out test telegrams cyclically to check the health status of the network. If everything is ok, it blocks telegrams on one side of its internal switch to avoid loops. If somewhere in the network a fault is detected, the MRP master reorganizes the network and closes its internal switch. Thus, all network nodes are still accessible (right).

Ring topology with network redundancy in drawout systems
Drawout systems are used where highest availability and shortest downtimes should be achieved. In such systems all the devices required for a single motor feeder are installed into a drawer to ensure fast and easy exchange in the event of a failure. Here the PNU32.0 offers the following benefits:



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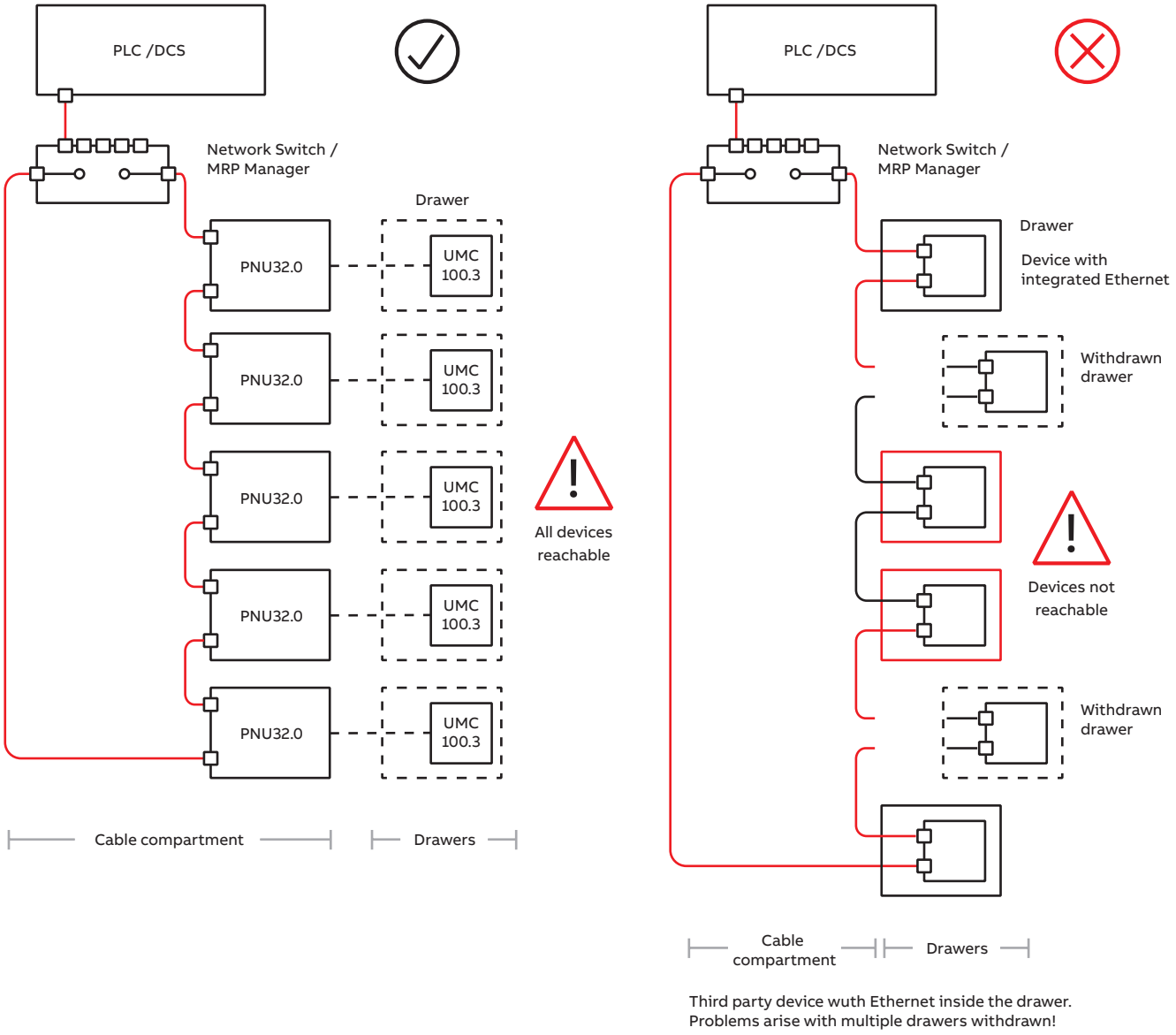
09 Withdrawable application

- No need to connect two Ethernet cables with many thin wires to multiple drawer contacts
- Taking out one drawer does not open the Ethernet communication line
- No missing IP address – no network reconfiguration required
- No by-pass switches for each drawer required (as sometimes recommended)
- Taking out several drawers does not result in the loss of a segment of the ring

The figure below (right) shows a situation where devices have integrated Ethernet and two drawers are withdrawn. Devices between these two drawers cannot be reached anymore. Also, the MRP redundancy function cannot solve this situation.

The solution with PNU32.0 is shown on the left. The PNU32.0 is not mounted inside the drawer but is installed in the cable compartment where the switch and other central equipment are installed. The Ethernet cable is not connected to the UMC mounted inside the drawer. Instead, the robust and well known FBP interface goes to the UMC in the drawer. As a result, no special measures are required in the case that one or more drawers are withdrawn.

A removed drawer cannot disturb the Ethernet communication in any way.



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10 The left side shows the benefits of not having Ethernet connected inside a drawer.

Address Check
If the UMC is used in MCCs the address check can be enabled. This ensures that the bus address in the communication interface and the UMC must match before the bus communication can start. This ensures that in the event of an unintentional permutation of a drawer the bus address stays in place and does not move with the drawer. A precondition for this function is the separation of communication interface and UMC.

If Address Check OFF:

UMC100.3 FBP address and PNU32.0 communication module FBP address must match.

If not, no address check mismatch is not shown on the panel. Communication will not start, as long as the mismatch occurs.

In that case, it is advised to set all UMC100.3 FBP addresses to the same addresses e.g. “1”, so the UMC100.3 can be replaced easily without having to deal with address mismatch at all.

If Address Check ON:

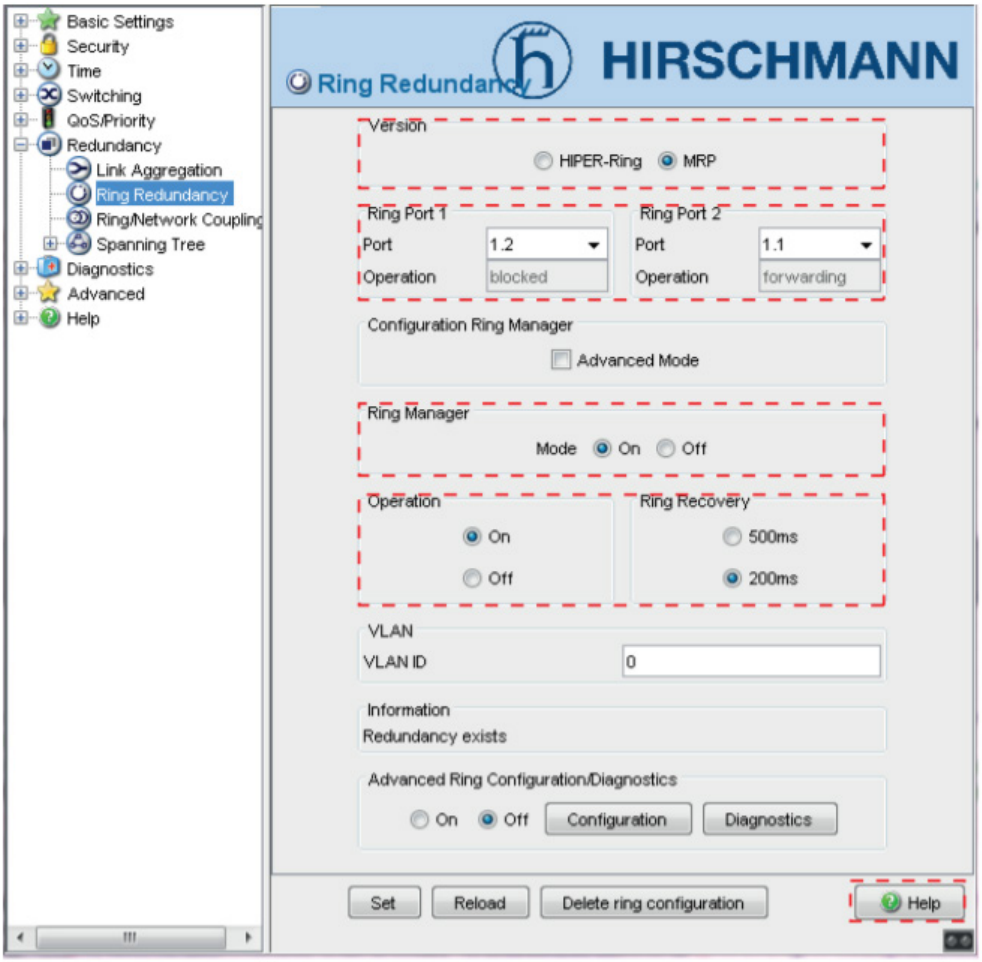
UMC100.3 FBP address and PNU32.0 communication module FBP address must match.

If not, address check mismatch will be shown on the panel. Communication will not start, as long as the mismatch occurs. This will make sure, that no drawer is accidentally put into the wrong location.

Switch configuration for ring topology

Managed switches from various vendors offer the possibility to configure ring topologies with MRP redundancy. In the following example, a network switch from Belden/Hirschmann is used. The screenshots are taken from the RS20 configuration tool.

- Follow the setup instructions of the switch manual
- Open the „Redundancy“ page and select the marked options shown in the figure below. To get help press the Help button.



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11 The page ‚Ring Redundancy‘ enables the MRP redundancy protocol and defines the ports that are the start and end of the ring.

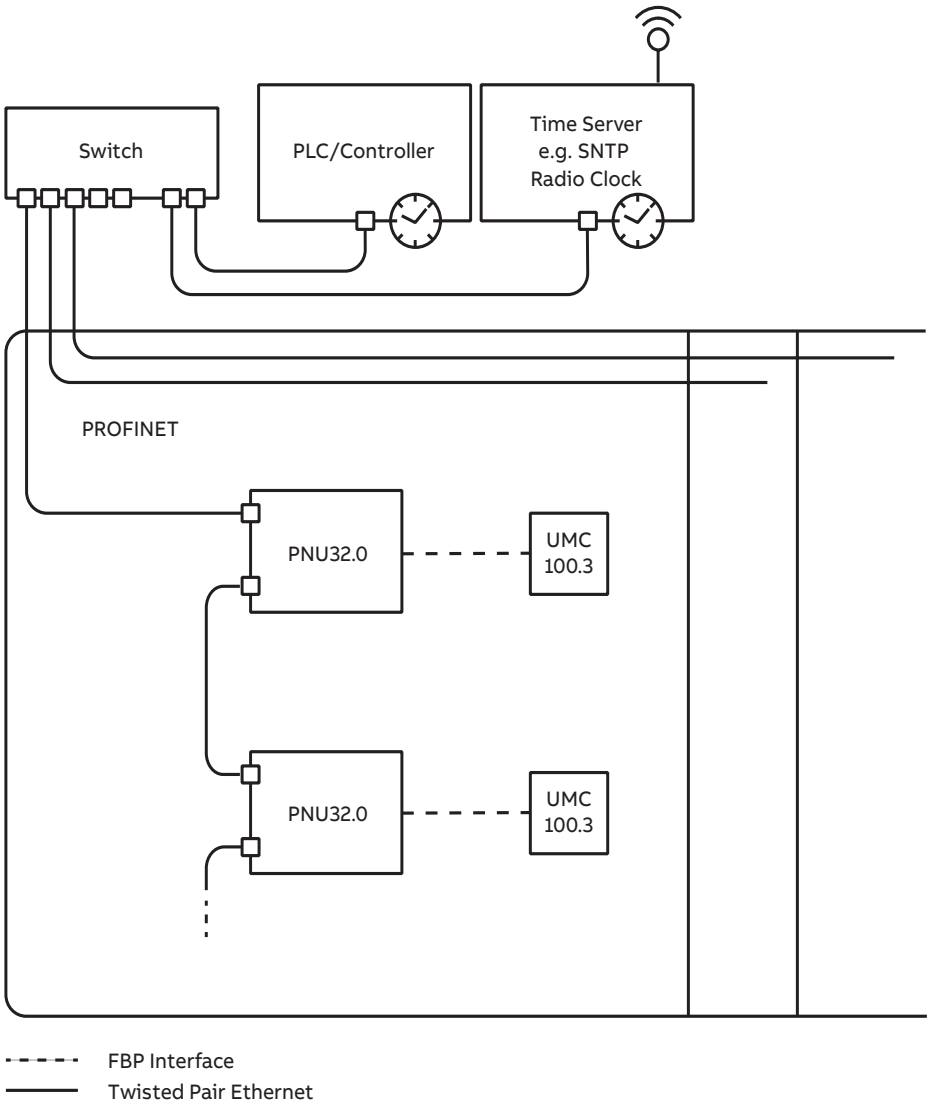
Time-Stamped diagnosis events
The Simple Network Time Protocol (SNTP) specified in Internet standard RFC-1305 is widely used to synchronize computer clocks on the Internet.

It provides comprehensive mechanisms to access national time and frequency dissemination services, organize the time-synchronization subnet and adjust the local clock in each participating subnet peer [RFC-1305].

Due to its wide application and good availability of various time servers this protocol was chosen in the PNU32.0 for clock synchronization. The PNU32.0 uses a unicast (point-to-point) protocol to get the actual time from the time server. The IP address of the timer server must therefore be set.

If Diagnosis Mode is set to “SoE”, a diagnosis event is time-stamped with the current time in the PNU32.0. This functionality is implemented as ABB specific solution and works with e.g. the 800xA DCS.

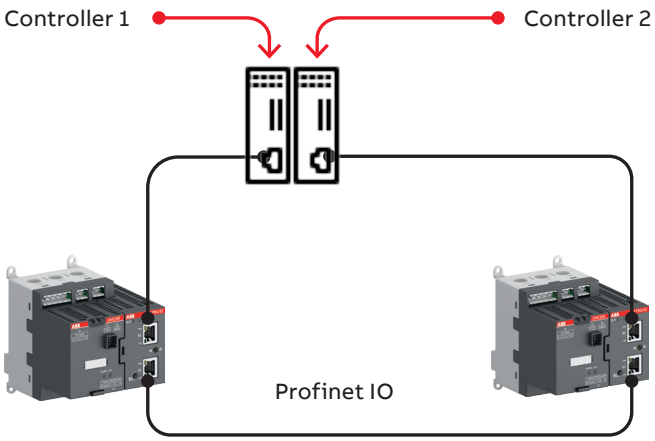
- Once a valid time is received from the time server after power-on, that new time is used in the PNU32.0. From that moment on, time stamps in any diagnosis message are marked valid.
- If no time server can be found after power-on, the time stamp is marked invalid and the master must timestamp the event on its side.
- If the time server is lost after one successful synchronization the PNU32.0 increments its internal clock automatically and marks diagnosis events as valid.
- Once the time server is available again, the PNU32.0 automatically re-synchronizes its clock.



Profinet S2 System Redundancy
The Profinet interface of the PNU32.0 is a NAP (Network Access Point).

This NAP can have up to two application relationships (ARs) with two controllers - one AR per controller. During operation, one controller is used for the IO communication (primary AR), the other is used as reserve (backup AR).
If there is a fault with the primary AR, the controllers change to the backup AR. The benefit of this solution is, that in case of a Controller failure, operation can continue.

This reduces downtime and therefore increases productivity.



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12 The Profinet IO S2 redundancy enables master redundancy. In case of fault of one controller, the back-up controller directly takes over communication

ModbusTCP for remote Asset Monitoring
To optimize process operation and maintenance planning, the PNU32.0 communication module offers access to the process data and parameters also through the ModbusTCP protocol. This enables remote asset monitoring, while the process control is done via Profinet. Both protocols run in parallel on the same physical ethernet network. PROFINET IO will have priority. ModusTCP communication is enabled on default and can be deactivated via the PLC/DCS configuration. The respective indexes/registers are the same as for the Port 1 of the PNQ22/ MTQ22. For further details please see the document 2CDC135068M0201.

In PNU32.0 the ModbusTCP communication supports concurrent connections to two ModbusTCP masters.

It is possible to read the cyclic communication via ModbusTCP, e.g. address 12288d, only if the Profinet communication is active. The acyclic communication is independent of Profinet being active.

The PNU32.0 allows for block read out of acyclic data. This massively frees up capacity of the DCS controller and therefore increases performance.

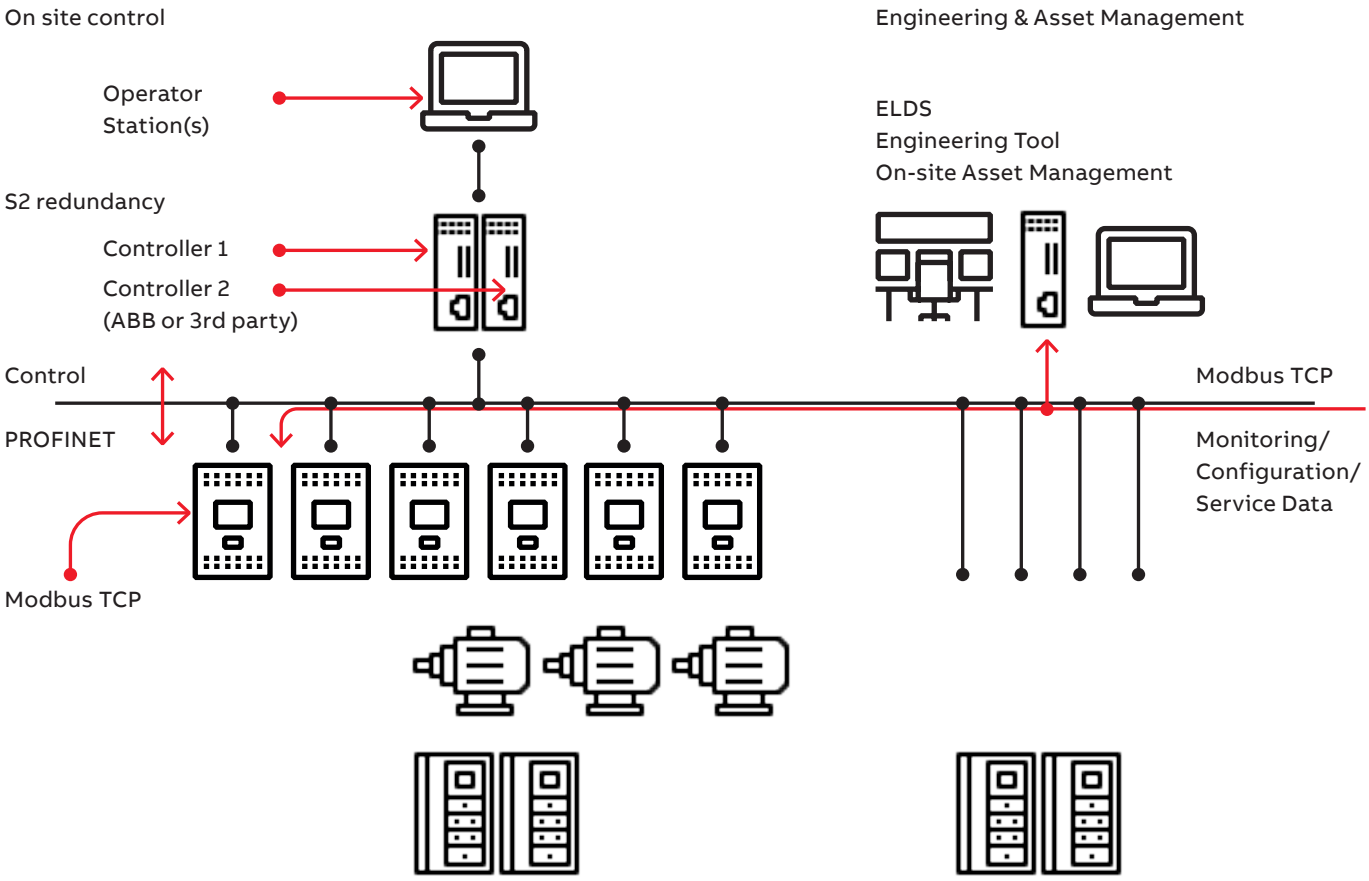
The data of the acyclic addresses 0x0431…0x047E, which can be found in the “Acyclic mapping” document, can be read/ write in blocks bigger than 8 byte per request.
It is also possible to start at any other address and read out less than 624 bytes.

Example 1: Starting at address 0x0431 and reading out all 624 bytes at once. Therefore, getting all acyclic information in one read request.

Example 2: Starting at any other address within 0x0431…0x047E and read any number of bytes (dividable by 8). For example, the request starts at address 0x0467 and reads out 16 bytes. This will obtain the “UMC Measuring Data 1/2".

Example 3: A request starting at either address 0x0436 and writing 16 bytes or on 0x046A writing 24 bytes, is also possible.

The same process also applys for the acyclic communication with ModbusTCP (PNU32.0 only). The respective addresses are also in the “Acyclic mapping” document in the ModbusTCP table port 1.



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List of Open Ports/ Services

Direction	Service/Port	Protocol	Description
Out	NTP/123	TCP	PNU32 uses this to synchronize its internal clock with a network time server
IN	Modbus/ 502	TCP	
IN	SNMP/ 161	TCP	SNMP
IN	Profinet/ 34964	UDP	Profinet RPC Endpointmapper
IN	Profinet/ 49152	UDP	Profinet RPC Device Server
IN	Profinet/ 49153	UDP	Profinet RPC Device Server

Control system integration

Network configuration
To enable communication through the Ethernet network, the PNU32.0 needs a valid IP address. IO controllers and some configuration tools have a Discovery and Configuration Protocol (DCP) for assigning the IP address and the device name. These tools usually show the MAC addresses of the devices they find using a network scan. You can find the PNU32.0 MAC address on the PNU32.0 product label. This allows you to match the MAC address shown in the configuration tool with the real device.

Examples of such DCP discovery tools can be found on our website:
www.abb.com > Products > Low Voltage Products > Motor Controllers > Universal Motor Controllers > Application Notes

Some tools also provide the option to activate LED flashing on a selected PNU32.0. This makes it faster to identify the selected device on a network with many nodes.

When the PNU32.0 is initialized, the IP address is transferred to the PROFINET IO communication stack. If there is a need to change the IP address it should be done with a DCP tool such as Webserver 800xA PROFINET Controller or the Siemens Step7 configuration tool.

GSDML description
Properties and services of a PROFINET IO device are described in a GSD file that is written in GSDML (General Station Description Markup Language). The GSD file describes the device-specific modules and the method of assigning modules and sub-modules to predefined slots and sub-slots.

The latest GSD file can be downloaded from our website:
www.abb.com > Products > Low Voltage Products > Motor Controllers > Universal Motor Controllers > Ethernet Interfaces

At the time of this manual‘s publication, only the Universal Motor Controller UMC100.3 is supported.

Parameterization

Device specific parameters
It is possible to configure device-specific parameters in the PROFINET IO controller. Parameters are always downloaded by the PROFINET Controller during system start-up. This allows the central management of device parameters and device parameterization from within the system. Device specific parameters (e.g. for UMC100) are explained in the related device.

Note for UMC100.3:
Only if you want to create a customer specific logic, the UMC100.3 configuration tool must be used for logic creation and download via service Laptop. Alternatively download from the UMC100-PAN is possible if parameters and/or logic were stored there.

PNU32.0 specific parameters
The following table lists the parameters that influence the behavior of the PNU32.0:

Parameter	Options	Description
Expected FBP Address	0 ... 255	The device address set in the connected device must be set here too. This allows crosschecking that the right device is connected to a PNU32.0 port. This feature is useful in Motor Control Center (MCC) applications where drawers can be easily swapped by accident. See also UMC100 parameter „Address Check“.
Write Block Parameters	Disabled / Enabled	Allows blocking of the start-up parameters in the PNU32.0. Set this parameter to “Disabled if you want to locally configure a device (e.g. UMC100). Set it to Enabled, if you want to configure a device (e.g. UMC100) in the PROFINET IO Controller configuration tool (e.g. Control Builder in case of 800xA).
SNTP Server IP First octet ... Fourth octet	0...255	IP-V4 address of the Simple Network Time Protocol (SNTP) time server in the network. This address is required for time-stamped diagnosis.
Diagnosis Model	Standard / SoE	Set type of diagnosis model. See section PNU32.0 and Device Diagnosis for details.

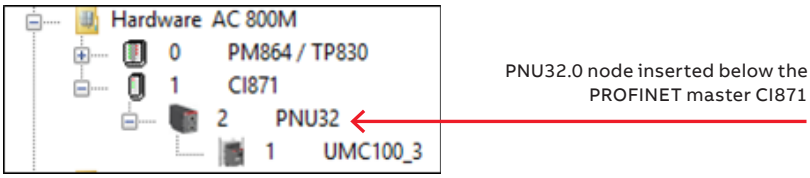
I/O Data Exchange
After start-up the PROFINET IO controller enters cyclic data exchange with the devices. The cyclically transfered I/O data depends on the selected modules (e.g. four times UMC100). Please use the manual of the connected device (e.g. UMC100) for details about transfered data.

PNU32.0 and Device Diagnosis
The Profinet standard defines different types of diagnosis events:

1. Plug and pull alarms: These alarms are triggered when a device (e.g. UMC100.3) is connected or disconnected to the detached PNU32.0.
2. Diagnostics alarms: In case parameter Diagnosis Model is set to Standard, device-specfic diagnosis messages (e.g. PTC wire break in case of UMC100) are reported as diagnostics alarms.
3. Process alarms: In case parameter Diagnosis Model is set to SoE, device-specific diagnosis messages are sent as process alarms in a proprietary ABB sequence of events (SoE) format. This format includes time stamping information and requires an SNTP server in the network.

Integration into 800xA from ABB
The UMC100 via PNU32.0 and PROFINET IO is supported in System 800xA from version 5.1 FP onwards. The S2 redundancy is supported from SV6.1 onwards.

The following figure shows the configuration in 800xA with one UMC100.3 configured below one PNU32.0.



13 Integration of the PNU32.0 with one UMC100.3 into the Control builder tool.

The I/O data connectivity and parameterization is done via the UMC100.3 module below the PNU32.0 module.

PROFINET connectivity supports enhanced diagnosis functionality. Standard 800xA diagnosis functionality such as indication for module missing is given, as well as UMC100-specific diagnosis such as PTC temperature high or thermal overload.

ABB Sequence of Events (SoE) can also be enabled by setting the configuration flag diagnosis model (see section Parameterization). Diagnosis will then be time stamped by PNU32.0/UMC100.3. Active time synchronization of PNU32.0 via Ethernet is a precondition.

When using the 800xA SV6.1 it is possible to change the most parameters in runtime. Parameters which are used to calculate the thermal model, e.g. nominal current and trip class, should not be changed. Also, with the PNU32.0 it is possible to read more than just 8 byte in one request.

FIM UMC Edition PROFINET
The UMC100.3 can also be accessed via the PROFINET network with the FIM v2.2.1 or higher. This software allows configuration and monitoring of the UMC100.3 motor controllers from a PC. To do so, each PNU32.0 device needs to be given an IP address, as described above, and connected to a PC with an RJ-45 cable to the ethernet network.

When connecting via FIM v2.2.1, or higher, to the UMC100.3, while also having connected a PLC, both can change parameters in the UMC100.3. This may lead to inconsistencies. Changes of the FBP address or the IP address by PLC may disconnect the communication of FIM to the devices.

The following is advised:

1. In use-cases with a PLC involved: Give the PNU32.0s a device names and IP addresses with a DCP tool. Set the FBP addresses matching between UMC and the PLC. Connect the PLC to the PNU32.0s and establish stable communication. Afterwards, connect the PC, running FIM, to that PROFINET network.
2. In use-cases with no PLC involved: Give the PNU32.0s a device names and IP addresses with a DCP tool. Then connect FIM to them.

Establishing PLC communication to a PNU32.0, which currently communicates with FIM, will terminate the FIM connection.

A trial version of the FIM UMC Edition software can be found here:
https://new.abb.com/low-voltage/products/motor-controllers/fim-umc-edition

The necessary PROFINET device package can be downloaded inside the device catalog in the FIM UMC Edition software or here: www.abb.com > Products > Low Voltage Products > Motor Controllers > Universal Motor Controllers > Documents > Software

Additionally, in order to install the Profinet communication server on the system, instructions on this page need to be adhered to: https://new.abb.com/control-systems/fieldbus-solutions/fim/connectivities/profinet > Setup instruction

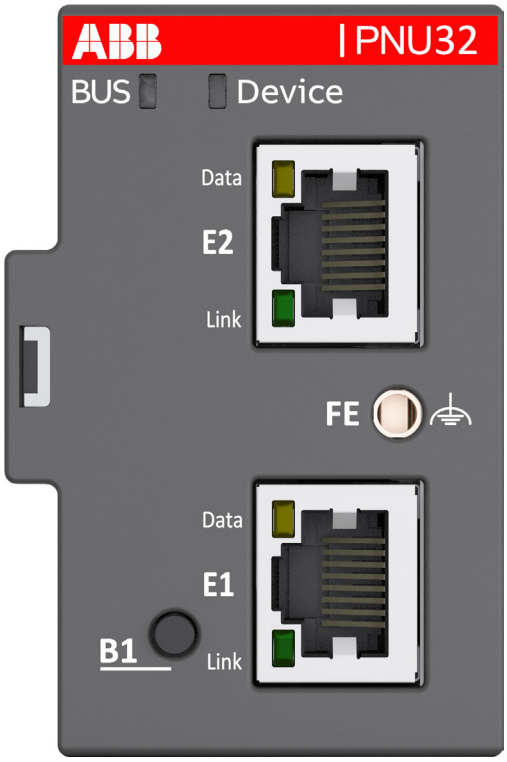
Technical data

LED status indication
The PNU32.0 provides LEDs for detailed diagnostics:

Device	Device Status	bicolor green/red
Bus	Bus Status	bicolor green/red

Each RJ45 connector has two LEDs:

Data	yellow
Link	green



14 Front view of PNU32.0

During Startup all LEDs switch to Green for 1s, Off for ½ s, Red for 1s and then again Off for ½ s. After that the actual state of FBP ports, device and Profinet is displayed.

The following tables show the LED behavior:

Device Status LED	
Normal operation	Green
Flashing, device detection from Controller	Green blinking
Major Internal Fault	Red
Minor Internal Fault (e.g. configuration of IP settings)	Red blinking
Communication Fault on FBP port	Yellow blinking
Address Mismatch Configuration Mismatch	Yellow

Bus Status LED	
Communication to Controller established	Green
Waiting for Connection	Green blinking
Physical Ethernet connection issue (e.g. double use of IP address)	Red
External communication fault, connection to Controller (AR) lost	Red blinking

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General data

Supply	
Supply voltage	24 V DC (-20% ... +30%) (19.2 ... 31.2 V DC) incl. ripple Use SELV or PELV approved power supply unit if supplied separately!
Current consumption	Typ. 90 mA, max. 130 mA at 19.2 ... 31.2 V DC
Total power dissipation	Typ. 2.2 W, max. 2.5 W
Buffering time	10 ms
Reverse polarity protection	Yes

Communication interfaces	
Type of Interface	Profinet
Number and kind of Ethernet interfaces	2 ports RJ45
Functional earth connector	Yes, for RJ45 shielding
Ethernet baudrate	10 / 100 Mbit/s
Duplex modes	Half Duplex, Full Duplex, Auto-Negotiation
Autocrossover	Yes
Autosensing	Yes
Redundancy support	MRP, S2
Address conflict detection	Yes
Webserver	No
Interface to UMC100.3	Yes
Short-circuit protection on UMC100.3 port	Yes
Cable length between PNU32.0 and UMC100.3	It is strongly recommended to limit the length to 3m
Micro-USB port	Reserved, no isolation

Diagnosis	
Ethernet ports	RJ45 with LED
Profinet	Device status (Device), Network status (Bus)

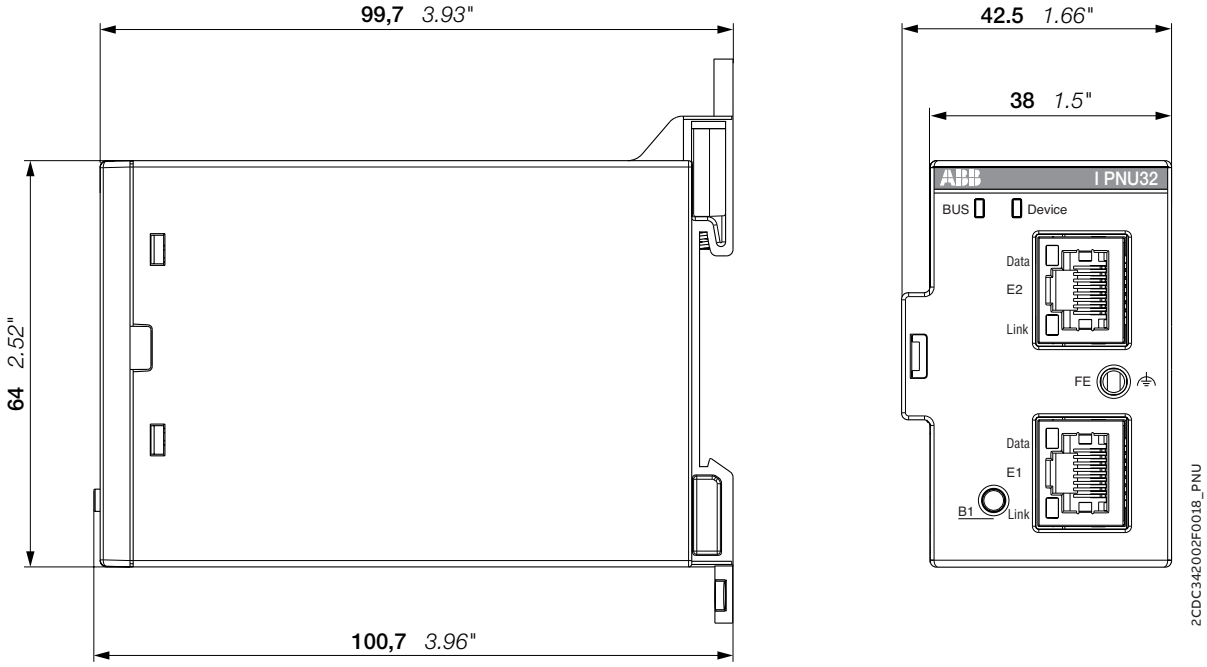
Installation, mounting, dimensions	
Mounting position	Any
Type of mounting	Direct on UMC100.3 or remote on SMK3.0 adapter. If vibrations are expected, it is recommended to fix the SMK3.0 adapter with end stops on the DIN-rail or to fix it with screws.
Dimensions (W x H x D)	38 x 64 x 93 mm
Net weight	0.110 kg
Required spacing	None

Environmental conditions	
Pollution degree terminals RJ45	3
Temperature range (storage/operation)	-25 ... +70 °C / 0 ... +60 °C
Humidity	10 ... 95 %, not condensing
Vibration (sinusoidal) acc. to IEC/EN 60068-2-6 (Fc)	0.7 g / 10 .... 150 Hz (mounted on UMC100.3 / SMK3.0)
Shock (half-sine) acc. to IEC/EN 60068-2-27 (Ea)	15 g / 11 ms
Altitude	2000 m, for higher altitudes please contact your local sales unit

Standards / directives	
Product standard	IEC/EN61010-2-201
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU, incl. 2015/863/EU

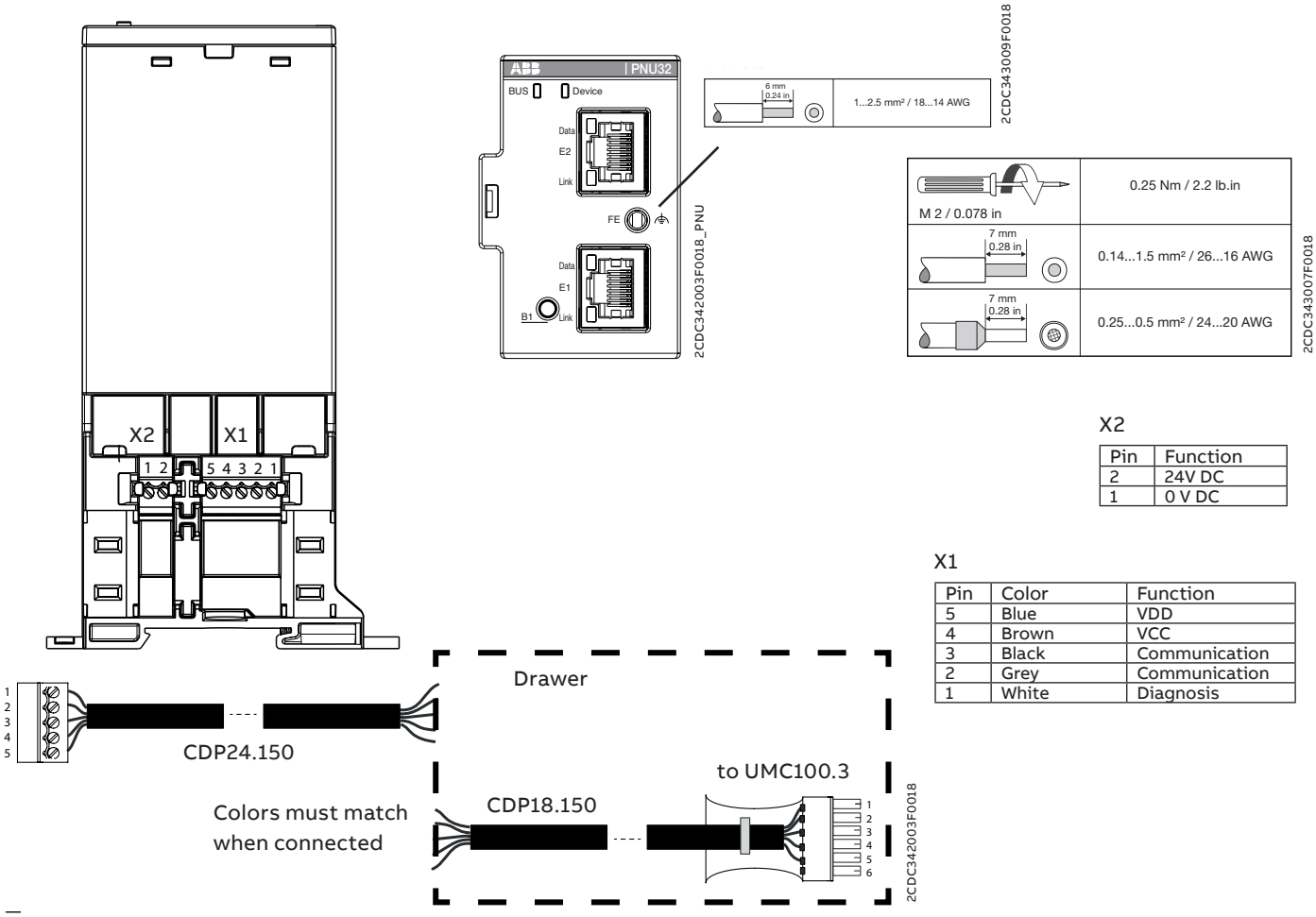
Approvals, certificates
PNO
CE, cUL

Dimensions



15 Side view and front view of PNU32.0

Connection cables



X2

Pin	Function
2	24V DC
1	0 V DC

X1

Pin	Color	Function
5	Blue	VDD
4	Brown	VCC
3	Black	Communication
2	Grey	Communication
1	White	Diagnosis

16 Connection cables used with PNU32.0

Ordering data

Order code	Type	Description
1SAJ263000R0100	PNU32.0	EtherNet/IP™ communication interface
1SAJ929600R0001	SMK3.0	Single mounting kit for separate mounting of the communication interface
1SAJ929180R0015	CDP18.150	Cable between UMC100.3 and drawer inside, 1.5 m
1SAJ929240R0015	CDP24.150	Cable between SMK3.0 and drawer outside, 1.5 m
1SAJ929610R0001	SMK3-X2.10	Terminal block 2-pol. for SMK3.0 supply, 10 pcs
1SAJ929620R0001	SMK3-X1.10	Terminal block 5-pol. for SMK3.0 communication, 10 pcs

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ABB STOTZ-KONTAKT GmbH
Smart Power Division
Eppelheimer Strasse 82
69123 Heidelberg, Germany

You can find the address of your local sales organization on the ABB homepage

abb.com/lowvoltage

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Document number 1SAC200130M0001 Rev. C (06/2024)