

ComfortPoint™ Open

CPO-PC400-W/CPO-PC400-UW HVAC CONTROLLER

INSTALLATION INSTRUCTIONS

CONTENTS

General Safety Information	3	Wiring Terminals	13
Technical Data	4	Connecting Power Supply	13
Electrical Data	4	Earth Grounding	13
Power Consumption	4	Cable Specifications	14
Current Consumption	4	Wireless Connectivity	15
Operational Environment	4	Connectivity Frequency Range	15
Default IP Address	4	General Information	15
Standards	4	Automatic Resetting Fuse	16
Interfaces	5	Connection Examples	17
Tx LEDs and Rx LEDs	6	Ring LED	34
Reset Button	6	Troubleshooting with LEDs	35
General Information on the RS485 Standard	7	Troubleshooting with LEDs of	
Ethernet Interfaces and LEDs	7	RS485 Interfaces 1, 2, 3	35
Connection to Buses	8	Troubleshooting with the	
Communication Baud Rates	8	Ethernet Interface LEDs	35
Connection to Panel Buses	8	Dimensions 36	
Connection to BACnet MSTP Bus	9	CPO-PC400-W/CPO-PC400-UW	36
Connection to Field Buses	9	Appendix: Earth Grounding	37
Connection to Modbus RTU	9	ComfortPoint Open and SELV	37
Connection to CP-IO Bus	9	ComfortPoint Open and EN60204-1	37
Connection to M-Bus	10	Functional EMC Grounding	37
Power Supply	10	Controller Part Numbers	38
Transformers	10	Accessories Part Numbers	38
Switch Power Supply	11	Technical Literature	39
Fusing	11		
Power Supply of Field Devices	11		
Wiring and Set-up	13		
General Safety Considerations	13		

GENERAL SAFETY INFORMATION

- When performing any work (installation, mounting, start-up), all manufacturer instructions and in particular the Installation and Commissioning Instructions (EN1B-0077IE10) are to be observed.
- The ComfortPoint™ Open System (including the CPO-PC400-W/CPO-PC400-UW HVAC Controller, Panel Bus I/O modules, manual disconnect modules, and the auxiliary terminal packages) may be installed and mounted only by authorized and trained personnel.
- Rules regarding electrostatic discharge should be followed.
- If the ComfortPoint™ Open System is modified in any way, except by the manufacturer, all warranties concerning operation and safety are invalidated.
- Make sure that the local standards and regulations are observed at all times. Examples of such regulations are VDE 0800 and VDE 0100 or EN 60204-1 for earth grounding.
- Use only accessory equipment which comes from or has been approved by Honeywell.
- It is recommended that devices be kept at room temperature for at least 24 hours before applying power. This is to allow any condensation resulting from low shipping/storage temperatures to evaporate.
- The ComfortPoint™ Open System must be installed in a manner (e.g., in a lockable cabinet) ensuring that uncertified persons have no access to the terminals.
- Investigated according to United States Standard UL-60730-1, UL-916, and UL60730-2-9.
- Investigated according to Canadian National Standard(s) C22.2, No. 205-M1983 (CNL-listed).
- Do not open the CPO-PC400-W/CPO-PC400-UW, as it contains no user-serviceable parts inside!
- CE declarations according to LVD Directive 2014/35/EU and EMC Directive 2014/30/EU.
- Product standards are EN 60730-1 and EN 60730-2-9.
- Transmitter Antenna (From Section 6.8 RSS-GEN, Issue 5, April 2018):
 - This radio transmitter [IC: 24552-00001] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.
 - Le présent émetteur radio [IC: 24552-00001] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés cidessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Professional Installation

- This device must be professionally installed, this should be noted on grante.
- To maintain compliance, only the antenna types that have been tested shall be used, which listed in Table 33, "Antenna Part Numbers," on page 39.

- This device requires a significant technology engineering expertise towards understanding of the tools and relevant technology, not readily available to average consumer. Only a person professionally trained in the technology is competent.
- This device is not directly marketed or sold to general public.

Safety Information as per EN60730-1

The ComfortPoint™ Open System is intended for residential, commercial, and light-industrial environments.

The ComfortPoint™ Open System is an independently mounted electronic control system with fixed wiring.

The CPO-PC400-W/CPO-PC400-UW is suitable for mounting in fuse boxes conforming with standard DIN43880, and having a slot height of max. 45 mm.

It is suitable for panel rail mounting on 35 mm standard panel rail (both horizontal and vertical rail mounting possible).

The CPO-PC400-W/CPO-PC400-UW is used for the purpose of building HVAC control and is suitable for use only in non-safety controls for installation on or in appliances.

Table 1. Safety Information as per EN60730-1

Electric Shock Protection	PELV
Pollution Degree	Pollution Degree 2, suitable for use in industrial environments.
Installation	Class 3
Overvoltage Category	24 V-powered controls: Category I
Rated Impulse Voltage	330 Vac for Category I (SELV)
Automatic Action	Type 1.C (micro interruption for the relay outputs)
Software Class	Class A
Enclosure	IP20 according to EN-60529
Ball-pressure Test Temperature	>75 °C for all housing and plastic parts >125 °C in the case of devices applied with voltage-carrying parts, connectors, and terminals.
Electromagnetic Interference	Tested at 230 Vac, with the modules in normal condition.
System Transformer	Europe: safety isolating transformers according to IEC61558-2-6 U.S.A. and Canada: NEC Class-2 transformers

TECHNICAL DATA

Electrical Data

Table 2. CPO-PC400-W/CPO-PC400-UW Electrical Data

Operating Voltage (AC)	19 to 29 Vac (50/60Hz)
Operating Voltage (DC)	19 to 29 Vdc
Screw-type Terminals Conductor cross section solid	Max. 2.5 mm ²
Overvoltage Protection	Protected against overvoltages of max. 29 Vac or 40 Vdc, terminals protected against short-circuiting.

Power Consumption

Table 3. Power Consumption

Controller	Power	
	24VAC	24VDC
CPO-PC400-W/ CPO-PC400-UW	Max. 30 VA	Max. 14 W
CPO-PC400-W/ CPO-PC400-UW and CPO-MMI	Max. 35 VA	Max. 16 W

Current Consumption

Table 4. Current Consumption

Controller	Power	
	24VAC	24VDC
CPO-PC400-W/ CPO-PC400-UW	Max. 1250 mA	Max. 580 mA
CPO-PC400-W/CPO- PC400-UW and CPO- MMI	Max. 1450 mA	Max. 650 mA

Operational Environment

Table 5. CPO-PC400-W/CPO-PC400-UW Operational Environment

Ambient Operating Temperature	0 to 50 °C (32 to 122 °F)
Ambient Operating Humidity	5 to 95% relative humidity (non-condensing)

Table 5. CPO-PC400-W/CPO-PC400-UW Operational Environment

Ambient Storage Temperature	-28.9 to +70°C (-20 to 158 °F)
Ambient Storage Humidity	5 to 95% relative humidity (non-condensing)
Vibration Under Operation	0.024" double amplitude (2 to 30 Hz), 0.6 g (30 to 300 Hz)
Dust, Vibration	According to EN60730-1
RFI, EMI	Residential, commercial, and light-industrial environments
MTBF (Mean Time Between Failure)	11.5 years

Default IP Address

Table 6. Default IP Address

IP Address	192.168.0.202
Net Mask	255.255.255.0
Gateway	192.168.0.1

Standards

Table 7. Standards

Protection Class	IP20
Product Standards	UL60730-1, UL60730-2-9, UL916, EN60730-1, EN60730-2-9, CAN/CSA-E60730-1:02
Testing Electrical Components	IEC68
Certification	cUL60730-1, UL916, CE, BTL B-BC, BACnet Standard 135 version 1.14, ISO 16484-5, FCC Part15, Subpart B, CAN ICES-3 (B)/NMB-3(B), RCM, AMEV AS-B, KBOB, EAC, RoHS II, Ethernet Protocol version IEEE802.3, EN-1434-3 and EN-13757-3
System Transformer	The system transformer(s) must be safety isolating transformers according to IEC 61558-2-6. In the U.S.A. and Canada, NEC Class 2 transformers must be used.

INTERFACES

The CPO-PC400-W/CPO-PC400-UW can communicate with a wide range of devices and systems with its interfaces and is configurable for a variety of protocols.

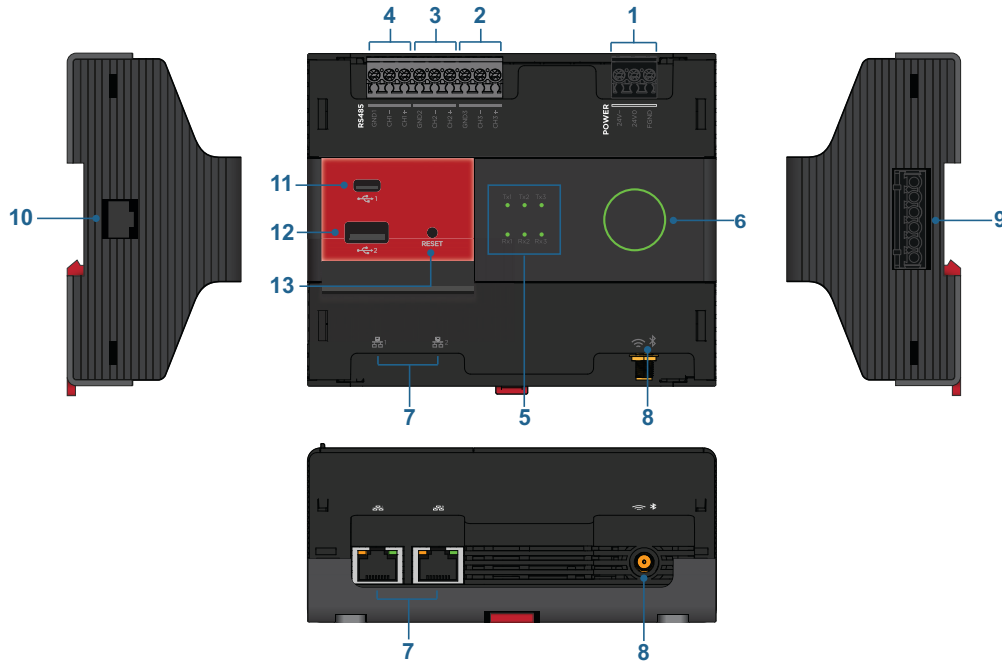


Fig. 1. CPO-PC400-W/CPO-PC400-UW Controller

Table 8. Controller Terminals (Continued)

Table 8. Controller Terminals

Type	Legend	Signal	Comment
Power Supply Terminals	1	FGND	Connect to earth ground in the field
		24V0	Power supply common
		24V~	Power supply (24 Vac/dc)
RS485 Interface 3 Terminals	2	CH3+	(+) for RS485 interface 3
		CH3-	(-) for RS485 interface 3
		GND3	GND3 for RS485 interface 3
RS485 Interface 2 Terminals	3	CH2+	(+) for RS485 interface 2
		CH2-	(-) for RS485 interface 2
		GND2	GND2 for RS485 interface 2

Type	Legend	Signal	Comment
RS485 Interface 1 Terminals	4	CH1+	(+) for RS485 interface 1
		CH1-	(-) for RS485 interface 1
		GND1	GND1 RS485 interface 1
LED	5	Tx1 LED (green)	Transmit and receive an indication for RS485 interfaces 1 to 3
		Rx1 LED (green)	
		Tx2 LED (green)	
		Rx2 LED (green)	
		Tx3 LED (green)	
LED	6	Rx3 LED (green)	Indicates the operational status of the controller
		Ring LED	

Table 8. Controller Terminals (Continued)

Type	Legend	Signal	Comment
RJ45 Interface	7	Ethernet 1	10/100 base-T/TX
		Ethernet 2	
SMA Terminal	8	For Wi-Fi and Bluetooth antenna	Antenna for both Wi-Fi and Bluetooth 802.11a/b/g/n/ac + BT 4.2
RS485 Interface 4 Terminals	9	~ (24V~)	Power supply (24 Vac/dc)
		0 (24V0)	Power supply common
		FGND	Connect to earth ground in the field
		GND	GND RS485 interface 4
		-(CH4~)	(-) for RS485 interface 4
		+(CH4+)	(+) for RS485 interface 4
RJ11 Interface	10	(+) for RS485 interface 5	MMI interface for power supply(5Vdc) to MMI device, and RS485 interface for communication with MMI
		(-) for RS485 interface 5	
		output 5Vdc	
		GND	
USB Interface	11		Micro USB port to connect with laptops, mobile, and tablets
	12		USB Type A port
Reset Button	13		Reset button to reset the device to factory default

Tx LEDs and Rx LEDs

The CPO-PC400-W/CPO-PC400-UW is equipped with three Tx LEDs and three corresponding Rx LEDs. These LEDs indicate the transmission and reception of data by the three RS485 interfaces.

Table 9. Behavior and meaning of RS485 LEDs

LED Status	Description
OFF	No communication over the given RS485 interface.
Tx ON	Transmit data over the given RS485 interface.
Rx ON	Receive data over the given RS485 interface.

Reset Button

The CPO-PC400-W/CPO-PC400-UW has a reset button to reset the device to factory default. The user should push the button for 5 seconds to reset the controller. The reset performs the following operations:

- Erases the Application (including reset of the BACnet device instance to factory default)
- Erases the Security Certificates
- Erases the Users and resets the passwords to factory default
- Resets the IP address to the factory default
- Keeps the current firmware version
- Keeps the current OS version
- Erases the onboard memory

General Information on the RS485 Standard

According to the RS485 standard (TIA/EIA-485: “Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems”), only one driver communicating via an RS485 interface may transmit data at a time. Further, according to U.L. requirements, each RS485 interface may be loaded with a max. of 32 unit loads.

BACnet MSTP connections to the RS485 interfaces must comply with the aforementioned RS485 standard. Thus, it is recommended that each end of every communication bus be equipped with one termination resistor having a resistance equal to the cable impedance (90 – 120 Ohm/ 0.25 – 0.5 W).

RS485 systems frequently lack a separate signal reference wire. However, the recommended wiring is to provide a solid signal ground (signal reference) connection in order to ensure error-free communication between drivers and receivers – unless all of the devices are electrically isolated and no earth grounding exists.

Under ideal conditions, the RS485 connection can have a max. length of 1200 meters. However, the longer the cable, the lower the transmission rate. As a rule of thumb, the transmission rate (in bps) multiplied by the cable length (in meters) should not exceed 100 million. For example, a system with a cable 1000 meters long should not be required to transmit data at rates exceeding 100 Kbps. The following table provides a few examples.

Table 10. Baud rate vs. max. cable length for RS485

Baud Rate	Max. Cable Length (L)
9.6 kbps	1200 m
19.2 kbps	1200 m
*38.4 kbps	1200 m
***56 kbps	1200 m
76.8 kbps	1200 m
**115.2 kbps	800 m

* In the case of configuration of RS485 interfaces 1, 2, and 3 of the CPO-PC400-W/CPO-PC400-UW for Field Bus, the communication rate will be automatically set to 38.4 Kbps.

** In the case of configuration of RS485 interfaces 1, 2, 3, and 4 of the CPO-PC400-W/CPO-PC400-UW for Panel Bus, the communication rate will be automatically set to 115.2 Kbps.

*** In the case of configuration of RS485 interface 4 of the CPO-PC400-W/CPO-PC400-UW for CP-IO Bus, the communication rate will be automatically set to 56 kbps.

For information on wire gauge, max. permissible cable length, possible shielding and grounding requirements, and the max. number of devices which can be connected to a bus, refer to standard EIA-485.

Ethernet Interfaces and LEDs

The two Ethernet interfaces 1 and 2 are internally connected to a single Ethernet switch.

Both Ethernet 1 and 2 can connect the controller with laptop/PC using Ethernet crossover cable. The user can upload, download, and debug the controller application using ComfortPoint™ Open Studio from the laptop/PC. This connection also establishes the Internet connectivity.

They are RJ45 female interfaces, each with a yellow activity status LED (located to the left) and a green activity LED (located to the right). The possible behaviors and corresponding meanings of these LEDs are explained in the following table.

Table 11. Behavior and meaning of Ethernet Interfaces 1 and 2

LED Status	Behavior	Meaning
Yellow LED (at left)	ON	Ethernet is working with connectivity below 100 Mbps.
	OFF	<ul style="list-style-type: none"> If green LED is ON or Flashing, then Ethernet is working with connectivity below 10 Mbps If green LED is OFF, then Ethernet is disconnected
Green link status LED (at right)	Flashing	Normal operation. The controller is transmitting/receiving data to/from the switch via cable.
	ON	Ethernet connectivity is exist but no data flow.
	OFF	No Ethernet connectivity.

The following can be connected to these two Ethernet interfaces:

- BACnet IP
- Web browser

Connection to Buses

Table 12. Connection to Buses

Protocols	Max. No. of Devices per Channel	RS485-1	RS485-2	RS485-3	RS485-4
Panel Bus	16	Yes	Yes	Yes	Yes
CP-IO Bus	16	No	No	No	Yes
Field Bus	31	Yes	Yes	Yes	No
MSTP	30	Yes	Yes	Yes	No
Modbus	30	Yes	Yes	Yes	No
M-Bus**	60	Yes**	Yes**	Yes**	No
C-Bus*	30	Yes*	Yes*	Yes*	No

NOTES:

- The communication rate across each communication interface is dependent upon the given communication protocol.
- *Not more than one channel can be configured as C-Bus channel.
- **Not more than one channel can be configured as M-Bus channel.
- **The CPO-PC400-W/CPO-PC400-UW controller can function as an M-Bus Master. It uses a standard level converter (e.g. PW60) to connect to the M-Bus devices.

Communication Baud Rates

Table 13. Communication Baud Rates

Ethernet	10/100 Mbit/s, RJ45
BACnet MSTP	9.6, 19.2, 38.4, 76.8, 115.2 Kbps
Modbus	0.3 to 115.2 Kbps
Panel Bus	115.2 Kbps
CP-IO Bus	56.7 Kbps
C-Bus	9.6, 38.4, and 76.8 Kbps
M-Bus	0.3 to 19.2 Kbps
Field Bus	38.4 Kbps
Wi-Fi	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 433 Mbps
Bluetooth	BR: up to 1Mbps EDR: up to 3Mbps BLE: up to 1Mbps
MMI Port	5Vdc power output and RS485

- The country code for the CPO-PC400-W is configurable to comply with local country regulations.

Connection to Panel Buses

The CPO-PC400-W/CPO-PC400-UW can communicate with various Panel Bus I/O modules. See "Connection to Panel Bus" section on pg. 18.

Table 14. Panel I/O modules

Name	Description	Input	Output	Manual Overrides	Status LEDs (a)
XF821	Pluggable AI module	8	–	–	–
XF822	Pluggable AO module	–	8	–	8
XFR822	Pluggable AO module	–	8	8	8
XF823	Pluggable BI module	12	–	–	12

Table 14. Panel I/O modules

Name	Description	Input	Output	Manual Overrides	Status LEDs (a)
XF824	Pluggable RO module	–	6(b)	–	6
XFR824	Pluggable RO module	–	6(b)	6	6
XFR825	Pluggable floating output module	–	3	3	3 pairs
CPO-IO830A/ XF830A/ XFU830A	Mixed I/O module	20	14	–	18

(a) In addition to Ring LED and Service LED
 (b) Changeover outputs

A max. of 16 Panel Bus I/O modules can be connected to one Panel Bus. The current consumption of the individual Panel Bus I/O modules varies according to model. For more information on Panel Bus I/O modules, see “Technical Literature” section on page 40.

Connection to BACnet MSTP Bus

The CPO-PC400-W/CPO-PC400-UW can communicate with other controllers, e.g., CPO Unitary Controllers, CPO-VAV2A, CP-VAV, CPO-R Series, CP-SPC, and CPO-DIO through BACnet MSTP Buses.

The current consumption of the individual BACnet Bus devices varies according to model. For more information on BACnet Bus devices, see “Technical Literature” section on page 40.

Connection to Field Buses

The CPO-PC400-W/CPO-PC400-UW can communicate with ComfortPoint™ Open Field Bus Adapters.

There are four ComfortPoint™ Open Field Bus Adapters to choose from (see Table 15 on page 9).

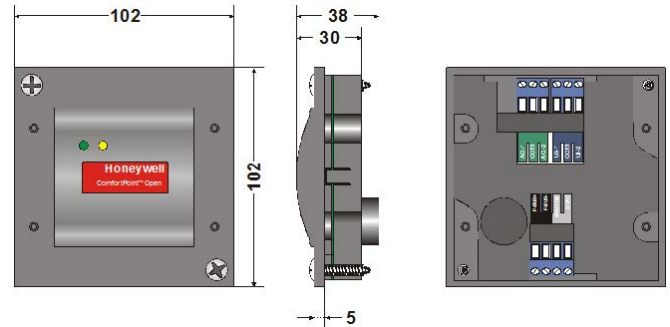


Fig. 2. CPO-FBA Dimensions (mm)

Table 15. ComfortPoint™ Open Field Bus Adapters

Model	Universal Inputs	Digital Outputs	Analog Outputs
CPO-FBA-1A	2	--	2
CPO-FBA-2A	2	2	
CPO-FBA-3A	2	1	1
CPO-FBA-4A	4	--	--

A max. of 31 FBAs can be connected to one Field Bus. Each CPO-FBA-1A has a current consumption of 213 mA. The total current consumption of the max. number of FBAs per Field Bus thus amounts to 31 x 213 mA = 6603 mA.

Fusing: See “Fusing” section on page 11.

For more information on Field Bus Adapters, see “Technical Literature” section on page 40

Connection to Modbus RTU

The CPO-PC400-W/CPO-PC400-UW can communicate with power meters, and NXL Inverters through Modbus.

Fusing: See “Fusing” section on page 11.

The current consumption of the individual Modbus devices varies according to model. For more information on Modbus devices, see “Technical Literature” section on page 40.

Connection to CP-IO Bus

The CPO-PC400-W/CPO-PC400-UW can communicate with CP-EXPIO, CP-DIO and CPO-DIO modules through the CP-IO Bus. See “Connection to a CP-IO Bus Powered by the Separate Transformer” section on page 30.

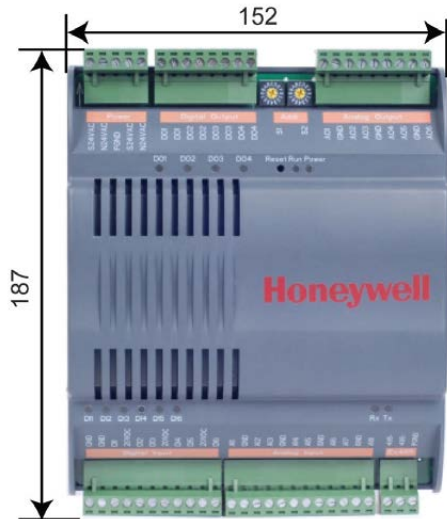


Fig. 3. CP-EXPIO Dimensions (mm)

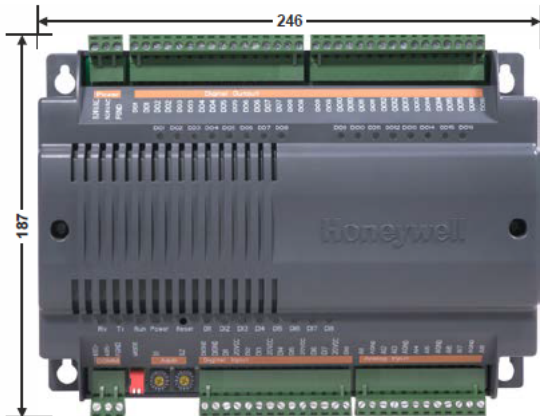


Fig. 4. CP-DIO Dimensions (mm)

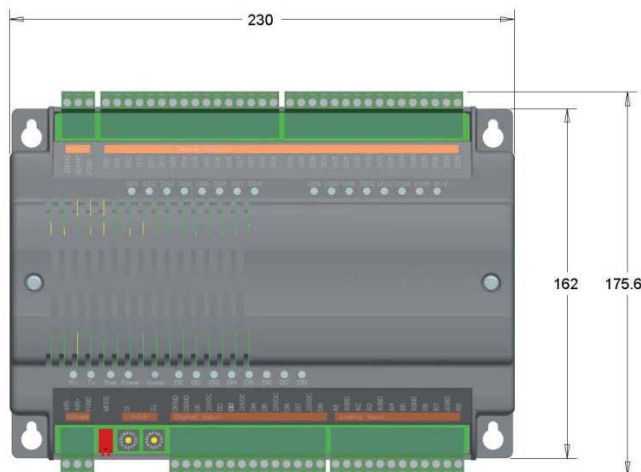


Fig. 5. CPO-DIO Dimensions (mm)

A CP-IO bus can have a maximum of 16 modules. This can be any combination of CP-EXPIO and CP-DIO modules. Each CP-EXPIO module has a current consumption of 625 mA. The total current consumption of the max. number of CP-EXPIO modules connected to one bus thus amounts to $16 \times 625 \text{ mA} = 10 \text{ A}$.

Each CP-DIO module has a current consumption of 625 mA. The total current consumption of the max. number of CP-DIO modules connected to one bus thus amounts to $16 \times 625 \text{ mA} = 10 \text{ A}$ (“Expansion I/O module” operating mode), thus necessitating the use of a 12.5 A, time-lag fuse.

Fusing: See “Fusing” section on page 11.

Each CP-DIO module features an integrated termination resistor which the user must set using the mode switch. For more information on CP-EXPIO, CP-DIO and CPO-DIO modules, see “Technical Literature” section on page 40.

Connection to M-Bus

The CPO-PC400-W/CPO-PC400-UW can communicate with M-Bus through a level converter e.g. PW60 from company Relay GmbH. See “Connection to M-Bus via Level Converter” section on page 32.

A maximum number of 60 M-Bus devices can be connected to a controller.

Bus Length

- Max. M-Bus length: 350 meters from PW60, at baud rates of 9.6 k baud or slower with shielded pair cable: J-Y-(St)-Y 2 x 2 x 0,8.
- The M-Bus can be extended to 1,000 meters, depending upon the baud rate and provided that the following electrical limitations are observed:
 - Bus voltage must be at no point fall below 12 Vdc.
 - Max. cable capacitance of 180 nF.

For bus length extension, M-Bus repeaters can be used, but have not been tested by Honeywell. Hence, it is the responsibility of the installing / commissioning personnel to ensure proper functioning.

Wiring Topology

M-Bus meters are connected to the bus cable in parallel.

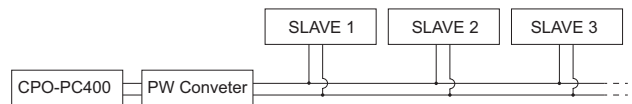


Fig. 6. Allowed M-Bus wiring topology

Cabling CPO-PC400-W/CPO-PC400 to PW60

See “Cable Specifications” section on page 14.

Cabling PW60 to M-Bus

- Use shielded, twisted pair cable J-Y-(St)-Y 2 x 2 x 0,8.
- Shielding is especially recommended when the M-Bus cable is installed in areas with expected or actual electromagnetic noise. Avoiding such areas is to be preferred.
- Connect the shield to a noise-free earth ground – only once per M-Bus connection.

WARNING

Risk of electric shock or equipment damage!

- Do not connect more than one CPO-PC400-W/CPO-PC400-UW controller to the same transformer.
- Do not connect a CPO-PC400-W/CPO-PC400-UW controller and a PW M-Bus Adapter device to the same transformer.

NOTE: If, alternatively, only a single transformer is available, when connecting a laptop, PC, web browser, Excel Touch, or 3rd-party touch panel to the USB 2.0 Device Interface on the front of the CPO-PC400-W/CPO-PC400-UW controller, use an optical isolator for the USB connection or substitute an M-Bus Miro-Master USB (Relay GmbH, D-33106 Paderborn) for the PW M-Bus Adapter.

POWER SUPPLY

Transformers

Honeywell Transformers

A transformer can power the CPO-PC400-W/CPO-PC400-UW. When determining total current consumption and selecting the appropriate transformer, take into account the number of connected modules, accessories, and field devices.

NOTE: In Europe, system transformer(s) must be safety isolating transformers according to IEC61558-2-6. In the U.S.A. and Canada, NEC Class-2 transformers must be used.

Table 16. Honeywell CRT Series Transformers (Europe)

Part No.	Primary Side	Secondary Side
CRT 2	220/230 Vac	24 Vac, 50 VA, 2 A
CRT 6	220/230 Vac	24 Vac, 150 VA, 6 A
CRT 12	220/230 Vac	24 Vac, 300 VA, 12 A

Table 17. Honeywell 1450 Series Transformers (N. America)

Part No. 14507287	Primary Side	Secondary Side
-001	120 Vac	24 Vac, 50 VA
-002	120 Vac	2 x 24 Vac, 40 VA; 100 VA from separate transformer
-003	120 Vac	24 Vac, 100 VA; 24 Vdc; 600 mA

Table 17. Honeywell 1450 Series Transformers (N. America) (Continued)

Part No. 14507287	Primary Side	Secondary Side
-004	240/220 Vac	24 Vac, 50 VA
-005	240/220 Vac	2 x 24 Vac, 40 VA; 100 VA from separate transformer
-006	240/220 Vac	24 Vac, 100 VA; 24 Vdc, 600 mA

NOTE: Standard commercially available transformers can also power the CPO-PC400-W/CPO-PC400-UW.

Switch Power Supply

To reduce overall current consumption, the CPO-PC400-W/CPO-PC400-UW can be powered by a switch mode dc power supply (rather than by a transformer).

Fusing

The choice of appropriate fusing is dependent upon the given connection scenario (i.e., cable lengths and the use of a primary and/or secondary transformer) and upon the type of connected bus.

Table 18. Fusing

Designation	Description
F1	4 A, time-lag fuse (slo-blow), e.g., Littlefuse type 218.004.
F2	Depends upon field devices.
F3 (Field Bus, only)	8 A, time-lag fuse.
F4 (CP-IO Bus, only)	8 A, time-lag fuse or 12.5 A, timelag fuse (see "Connection to a CP-IO Bus Powered by the Separate Transformer" section on page 30).

Power Supply of Field Devices

Field devices can be powered via the CPO-PC400-W/CPO-PC400-UW.

When determining the total current consumption and selecting the appropriate transformer, take into account the number of connected modules, accessories, and field device. Employing an additional transformer may be necessary. The fusing (F2) of active field devices depends upon loads in use. Single-sided (secondary-sided) earth connection of the transformer is also possible. For more information, see "Technical Literature" section on page 40.

Example 1: Power Supply via Controller Using Panel Module

- 24 V actuator connected to an analog output module
- Actuator less than 100 m away from the controller.

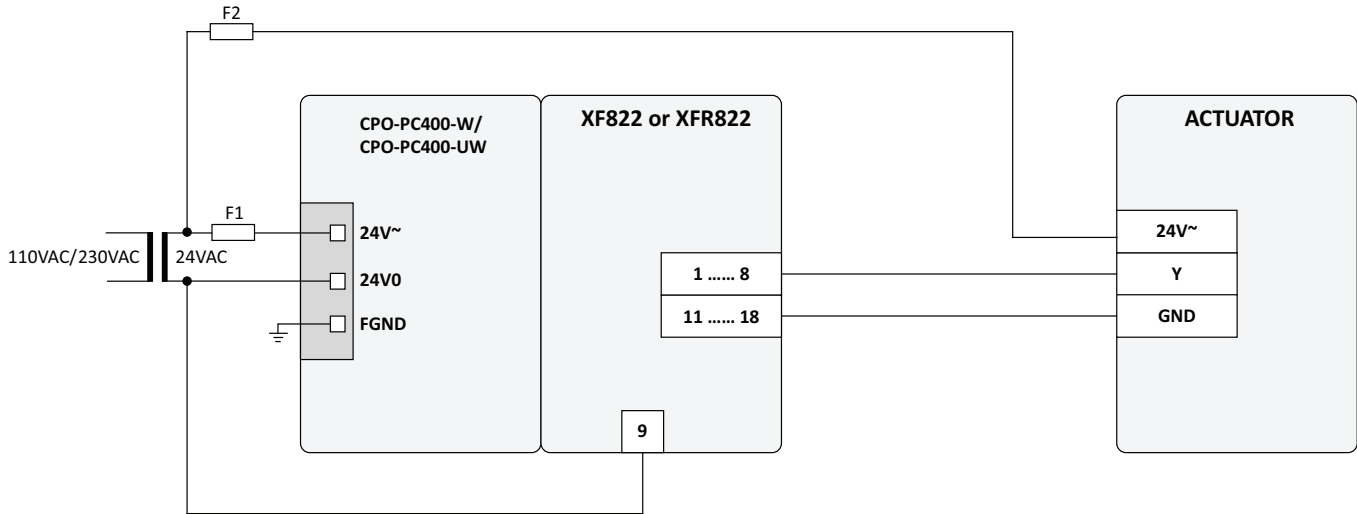


Fig. 7. Power supply of field devices via Panel Bus I/O module

Example 2: Power Supply via Separate Transformer

- 24 V actuator connected to an analog output module
- Actuator less than 100 m away from the controller

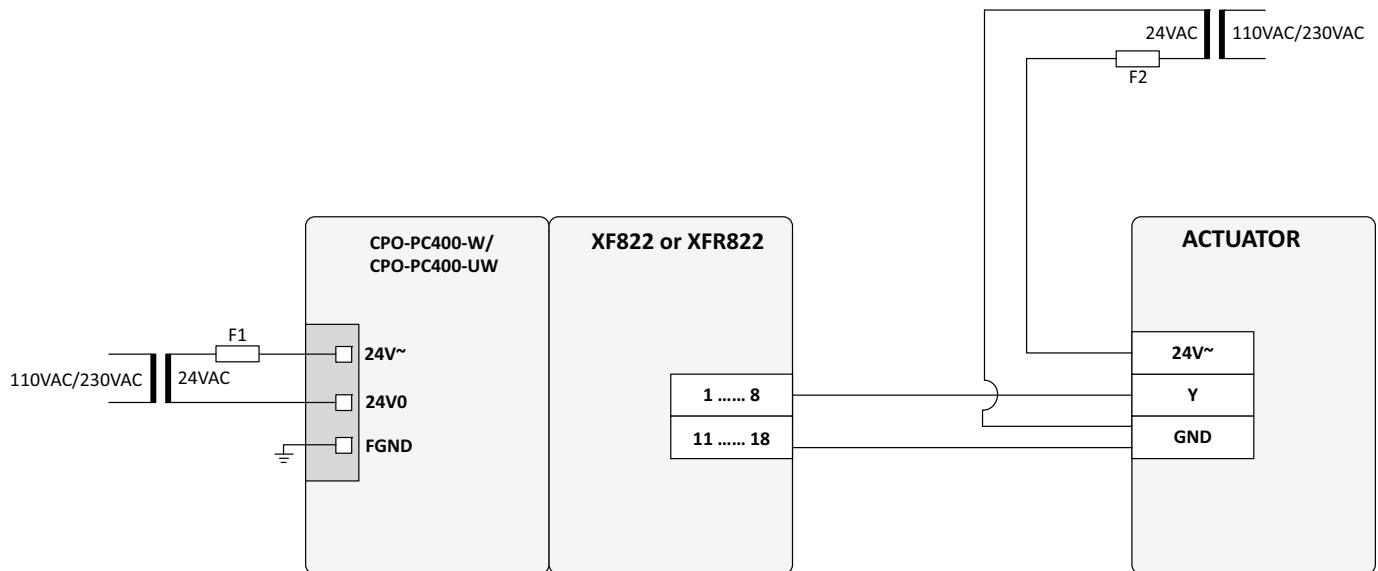


Fig. 8. Power supply of field devices via a separate transformer

WIRING AND SET-UP

General Safety Considerations

- When connecting the CPO-PC400-W/CPO-PC400-UW, VDE, National Electric Code (NEC) or equivalent, and any local regulations concerning grounding must be observed.
- Only qualified electricians may carry out electrical work.
- The electrical connections must be made at the terminals of the CPO-PC400-W/CPO-PC400-UW.
- For Europe, only: To comply with CE requirements, devices with a voltage in the range of 50 to 1000 Vac or 75 to 1500 Vdc and which are not provided with a supply cord and plug or with other means for disconnection from the supply having a contact separation of at least 3 mm in all poles must have the means for disconnection incorporated in the fixed wiring.
- Only copper conductors should be used for electrical connection.
- Only electrical cables/wires with operating temperature at least 75° C should be used for electrical connection.

WARNING

Risk of electric shock or equipment damage!

- Do not touch any live parts in the cabinet.
- Disconnect the power supply before making connections to or removing connections from controller terminals.
- Do not use spare terminals as wiring support points.
- Do not reconnect the power supply until you have completed the power supply.

CAUTION

Observe the precautions for handling electrostatic devices.

Wiring Terminals

The CPO-PC400-W/CPO-PC400-UW features both screw-type terminals and push-in terminals.

Table 19. RS485 Interfaces 1,2, and 3 Wiring Terminals Specifications

Terminal Type	Stripping Length	Torque Value	Max. Plug Gauge
Screw (Type P1)	6mm	3.1 to 3.5 lb-in (0.350 to 0.395 N-m)	28 to 14 AWG (0.0804-2.075 mm ²)
Push-in (Type P1)	8mm	N/A	26 to 14 AWG (0.1281-2.075 mm ²)

Table 20. RS485 Interface 4 Wiring Terminals Specifications

Terminal Type	Stripping Length	Torque Value	Max. Plug Gauge
Screw (Type J4)	7mm	5 to 7 lb-in (0.564 to 0.790 N-m)	Cable without ferrule: 0.2-2.5 mm ² Cable with ferrule: 0.25-2.5 mm ²
Push-in (Type J4)	10mm	N/A	Cable without ferrule: 0.2-2.5 mm ² Cable with ferrule: 0.25-2.5 mm ²

Table 21. Power Supply Wiring Terminals Specifications

Terminal Type	Stripping Length	Torque Value	Max. Plug Gauge
Screw (Type P2)	6mm	3.1 to 3.5 lb-in (0.350 to 0.395 N-m)	28 to 14 AWG (0.0804-2.075 mm ²)
Push-in (Type P2)	8mm	N/A	26 to 14 AWG (0.1281-2.075 mm ²)

Terminals support both flexible and solid cables. Wires can be equipped additionally with ferrules.

Connecting Power Supply

Connect the power supply to the power supply terminals of the CPO-PC400-W/CPO-PC400-UW.

The factory default controller must be powered ON for a minimum of 8 hrs for the first time to make the RTC function as intended.

Earth Grounding

The CPO-PC400-W/CPO-PC400-UW comply with SELV (Safety Extra-Low Voltage), so protective earth grounding is not required. However, a functional earth grounding for EMC is mandatory. For information, see "Appendix: Earth Grounding" section on page 38.

Cable Specifications

Power Supply Cable Specifications

The length of the power supply cable includes the length of the cables to connected modules.

NOTE: The supply voltage must, in any case, be at least 19.2 Vac (24 Vac -20%).

Table 22. Power Supply Cable Specifications

Device	Cable Length	Cable cross-section
CPO-PC400-W/ CPO-PC400-UW	Max. 3 m	Min. 1.5 mm ²
Panel Bus I/O	Max. 3 m	Min. 1.5 mm ²
FBA	Max. 20 m	Min. 1.5 mm ²
EXPIO	Max. 1200 m	Min. 1.5 mm ²
CPO-DIO	Max. 1200 m	Min. 1.5 mm ²
C-Bus	> 3 m	Depends on Plug Gauge. See "Wiring Terminals" section on page 13
M-Bus	> 3 m	Depends on Plug Gauge. See "Wiring Terminals" section on page 13

See also the connection diagrams presented in Fig. 9 through Fig. 26 for details.

Antenna Cable Specifications

Table 23. Antenna Cable Specifications

Device	Cable Length	Cable cross-section
Remote Antenna	Max. 3 m	5 mm ²

Field Device Power Supply Cable Specifications

Table 24. Field Device Power Supply (24 Vac) Cable Specifications

Cable Length	Cable Cross-section
≤ 100 m (300 ft.), single transformer (see "Example 1: Power Supply via Controller Using Panel Module" section on page 12.)	min. 1.5 mm ² (16 AWG)
≤ 400 m (1300 ft.), separate transformers (see "Example 2: Power Supply via Separate Transformer" section on page 12.)	not allowed for > 100 m (300 ft)

Communication Bus Cable Specifications

Table 25. Communication Cable Specifications

Interface (Buses)	Cable Type
RS485 interfaces 1, 2, and 3 (Panel Bus, BACnet Bus, Field Bus, Modbus, C-Bus, M-Bus)	One or two pairs (depending on the application) of twisted pair complying with EIA485 standard (level IV, 22 AWG, solid core, non-shielded), e.g., J-Y-Y 2 x 2 x 0.8, or shielded wire.
RS485 interface 4 (Panel Bus, CP-IO Bus)	
Ethernet 1, 2 (Ethernet Bus)	CPO-PC400-W/CPO-PC400-UW can be used with CAT5, CAT6, and CAT7 cabling. Standard Ethernet cross-over cable, Cat-5, min. 10/100 MBaud, max. length of 100 m

Use Belden 9841 or Equivalent cable with the following specifications:

RS485 Bus Cable Specifications

- An MSTP EIA-485 network shall use shielded, twisted-pair cable with a characteristic impedance between 100 and 130 ohms.
- Distributed capacitance between conductors shall be less than 100 pF per meter (30 pF per foot).
- Distributed capacitance between conductors and shield shall be less than 200 pF per meter.

WIRELESS CONNECTIVITY

Connectivity Frequency Range

Table 26. Connectivity Frequency Range

Connectivity Medium	Frequency Range	E.I.R.P for CE	E.I.R.P for FCC/IC
Bluetooth	2400 MHz-2483.5 MHz	20 mW	20 mW
Wi-Fi 2.4G	2400 MHz-2483.5 MHz	100 mW	320 mW
Wi-Fi 5G	5150 MHz-5250 MHz	200 mW	100 mW
	5250 MHz-5350 MHz	200 mW	200 mW
	5470 MHz-5725 MHz	200 mW	200 mW
	5725 MHz-5850 MHz	25 mW	100 mW

General Information

- The WLAN function for this device is restricted to indoor use only when operating in the 5150 to 5350Mhz Frequency range. Restrictions or Requirements in



ES	LU	RO
CZ	FR	HU
SI	DK	HR

- EMF Statement: To maintain compliance with the RF exposure requirement, a separation distance of 20 cm between the device and the human should be maintained.
- Alarm information in France
 - Déclaration d'exposition Attention: Cet émetteur doit être installé pour fournir une distance de séparation d'au moins 20 cm de toute personne.
 - Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
- FCC Warning Statement: "This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
 1. This device may not cause harmful interference, and
 2. This device must accept any interference received, including interference that may cause undesired operation.
 - Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

- This device complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This device must not be co-located or operating in conjunction with any other antenna or transmitter.
- End users must follow the specific operating instructions for satisfying RF exposure compliance.
- FCC Class B Statement: NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- IC Statement: This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

AUTOMATIC RESETTING FUSE

The 24V~ and 24V0 terminals at RS485-4 Interface have an automatic resetting fuse protection. The table below provides a maximum quantity of each IO module type that can be powered from the 24V~ and 24V0 terminals at RS485-4 Interface. If a mixture of IO modules is to be installed, use the table as a guide to determine if the IO modules can be powered from the 24V~ and 24V0 terminals at RS485-4 Interface or if a separate power source needs to be used.

Table 27. Automatic Resetting Fuse Protection at RS485-4 Interface - Maximum Number of IO Modules

IO Module Type*	IO Module Current Ratings (AC)**	Controller Ratings 24V~/24V0 at RS485-4		
		3 A @ 20 C (68 F) Ambient	2.4 A @ 40 C (104 F) Ambient	2.1 A @ 50 C (122 F) Ambient
XF821A	0.13 A	16	16	16
XF822A/XFR822A	0.15 A	16	16	14
XF823A	0.18 A	16	13	11
XF824A/XFR824A/ XFR825A	0.14 A	16	16	15
CPO-IO830, XF830A, XFU830A	0.2 A	15	12	10
CP-EXPIO	0.625 A	4	3	3
CPO-DIO	0.625 A	4	3	3

NOTES:

- The fuse will reset in one minute after the current is removed from the circuit.
- * Refer to “Table 12 on page 8” for the maximum number of IO modules supported by the Bus.
- ** Rating assumes all inputs and outputs are used on the IO modules.

CONNECTION EXAMPLES

Connection to Panel Bus I/O Modules Powered by a Separate Transformer

This configuration has the advantage of allowing the CPO-PC400-W/CPO-PC400-UW and the Panel Bus I/O modules to be installed in (several) different wiring cabinets – as long as the max. permissible length of $A + C \leq 3 \text{ m}$ is maintained.

This same configuration can also be extended, with multiple transformers powering Panel Bus I/O modules installed in multiple wiring cabinets for a total of max. 16 Panel Bus I/O modules.

CONNECTION VIA RS485 INTERFACES 1, 2, OR 3

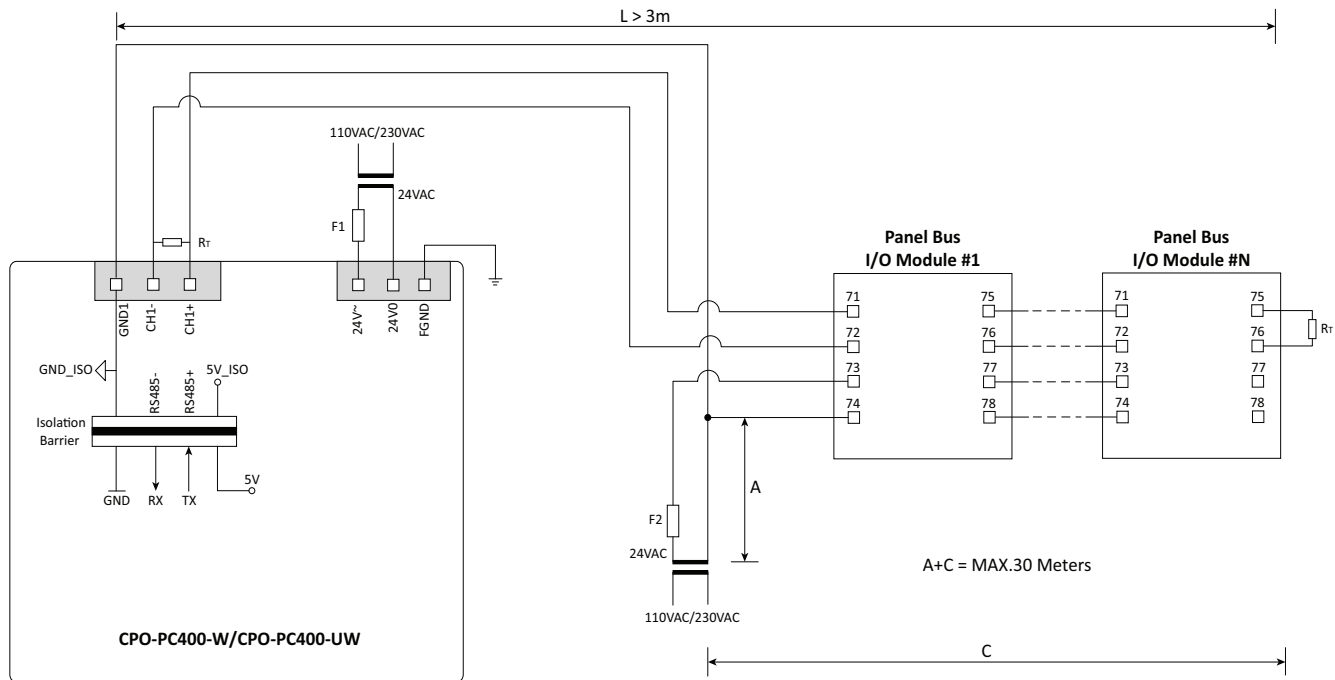


Fig. 9. Connection ($L > 3 \text{ m}$) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a Panel Bus

CONNECTION VIA RS485 INTERFACE 4

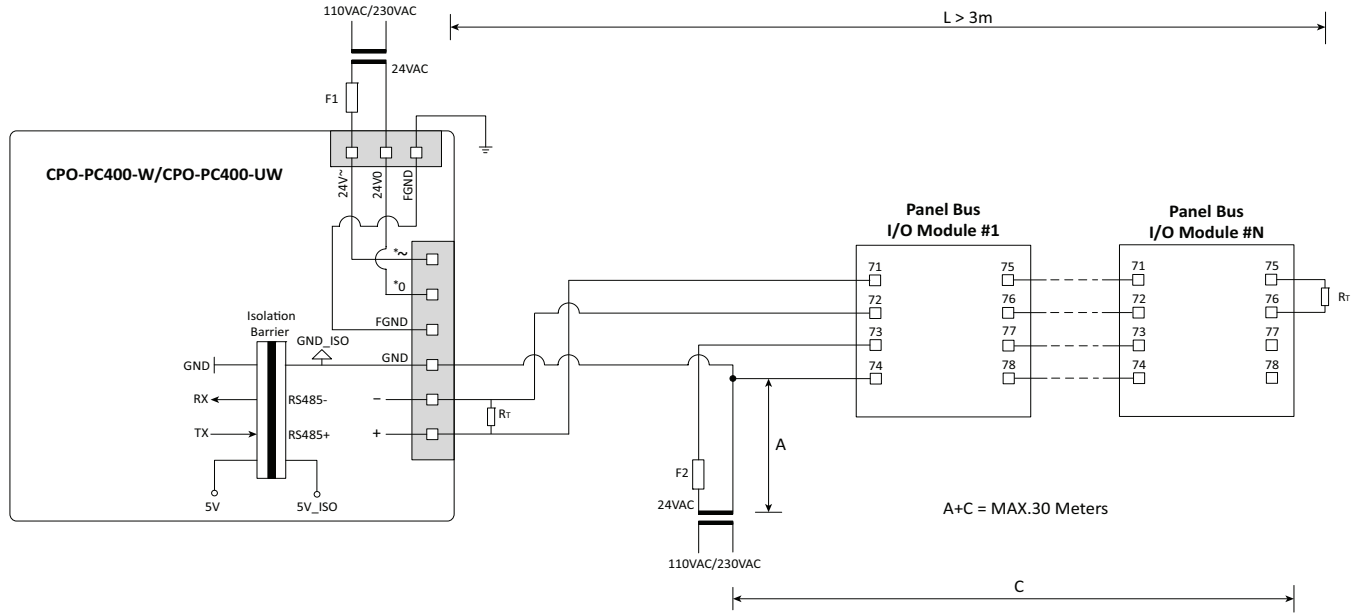


Fig. 10. Connection (L > 3 m) of RS485 interface 4 to a Panel Bus

NOTES:

- * The 24V~ and 24V0 terminals at RS485-4 Interface have an automatic resetting fuse protection. For more information, see “Wireless Connectivity” section on page 15.
- N = max. 16 modules.
- For communication cable lengths, transmission speeds, and termination see “General Information on the RS485 Standard” section on page 7. For fusing, see “Fusing” section on page 11.

Connection to Panel Bus I/O Modules Powered by the Same Transformer as the CPO-PC400-W/CPO-PC400-UW

This configuration is suitable for connecting Panel I/O modules which are all located in the same wiring cabinet as the CPO-PC400-W/CPO-PC400-UW.

CONNECTION VIA RS485 INTERFACES 1, 2, OR 3

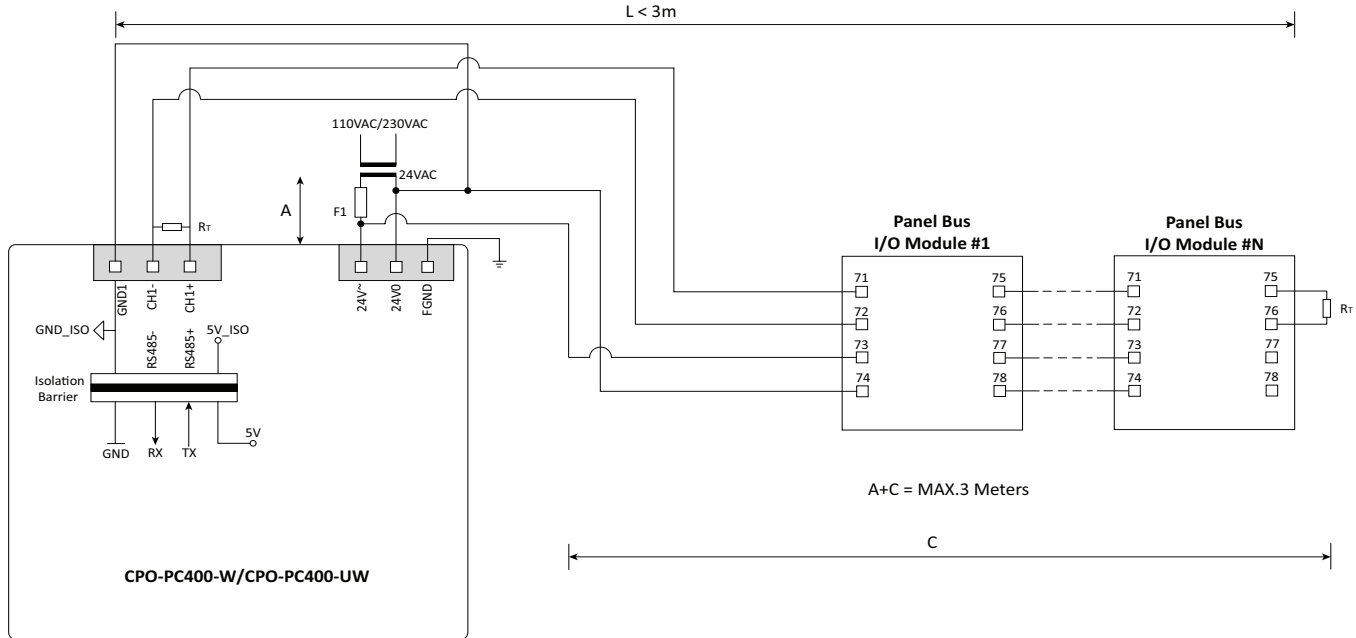


Fig. 11. Connection (L < 3 m) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a Panel Bus

NOTES:

- N = max. 16 modules.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For fusing, see “Fusing” section on page 11.

CONNECTION VIA RS485 INTERFACE 4

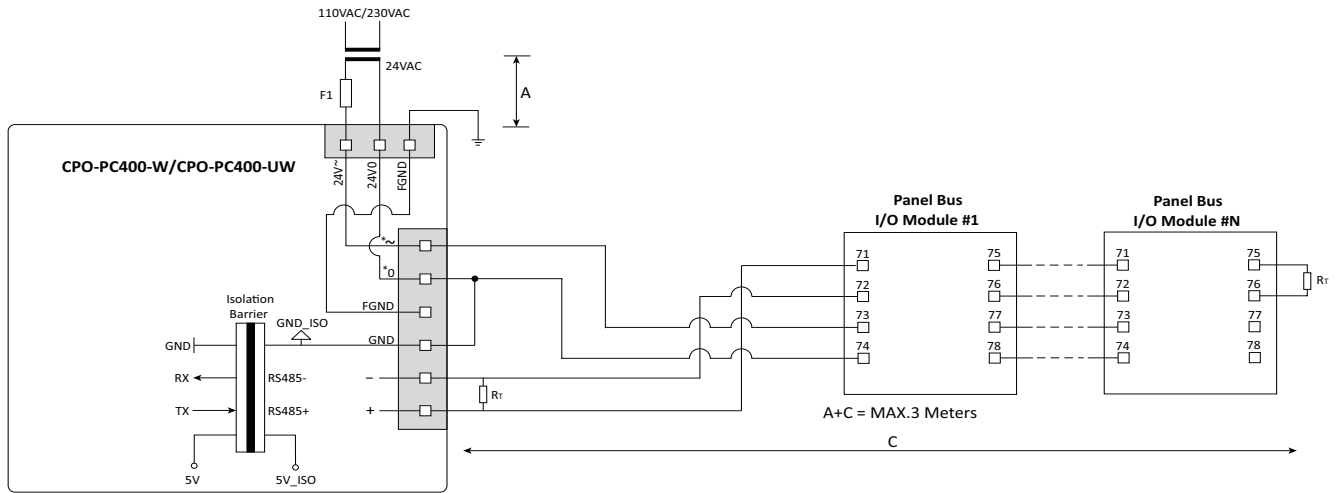


Fig. 12. Connection (A + C < 3 m) of RS485 interface 4 to a Panel Bus

NOTES:

- * The 24V~ and 24V0 terminals at RS485-4 Interface have an automatic resetting fuse protection. For more information, see “Wireless Connectivity” section on page 15.
- N = max. 16 modules.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For fusing, see “Fusing” section on page 11.

Connection to BACnet MSTP Buses with Isolated Transceivers

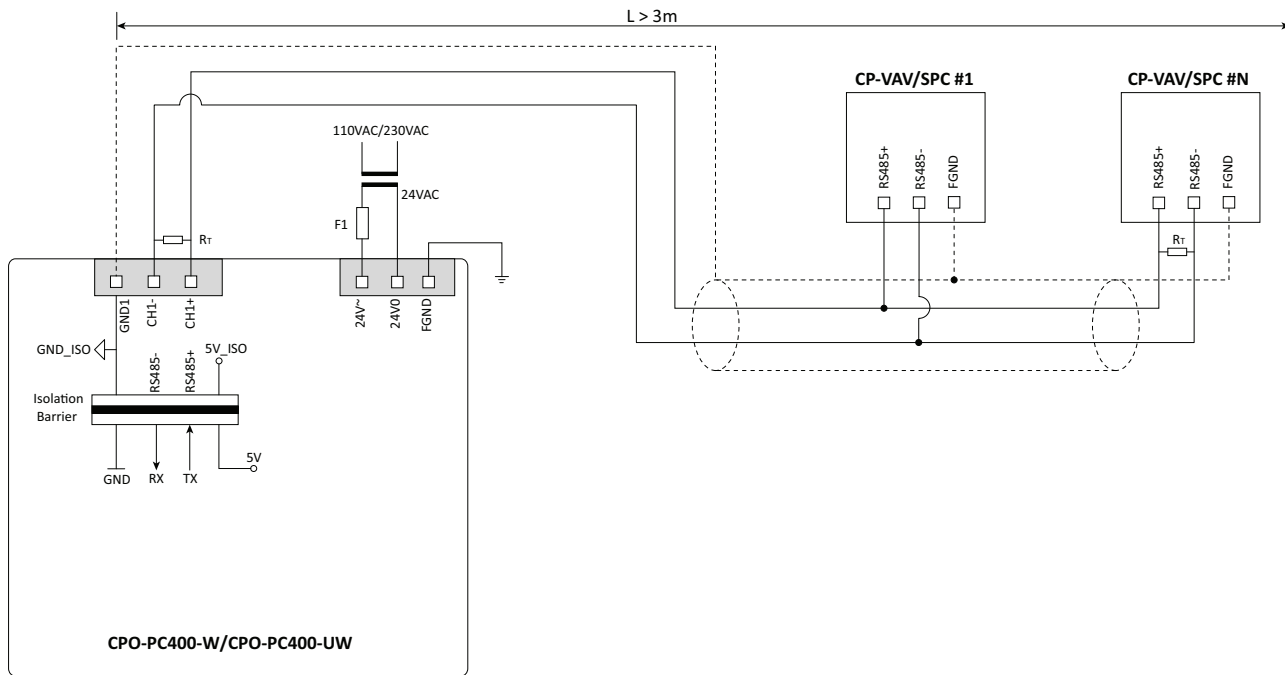


Fig. 13. Connection ($L > 3\text{ m}$) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a BACnet Bus

NOTES:

- Always power the CPO-PC400-W/CPO-PC400-UW with a transformer separate to the connected BACnet MSTP modules.
- $N = \text{max. } 30$ modules.
- Signal ground (signal reference) connection is recommended if not all devices are electrically isolated. For more information, see “General Information on the RS485 Standard” section on page 7.
- If the connected controllers do not have isolated RS485 interfaces and if they share a common ground between the power supply and Earth ground see the wiring diagrams (Fig. 14) provided in Recommended connection for BACnet MSTP Buses with non-isolated RS485 interfaces. This provides the best electrical noise rejection.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For fusing, see “Fusing” section on page 11.
- Termination resistors must be inserted directly into the terminals of the individual BACnet MSTP modules. In the above figure, the CPO-PC400-W/CPO-PC400-UW is shown operating as the Master BACnet controller;

Recommended connection for BACnet MSTPMSTP Buses with non-isolated RS485 Interfaces

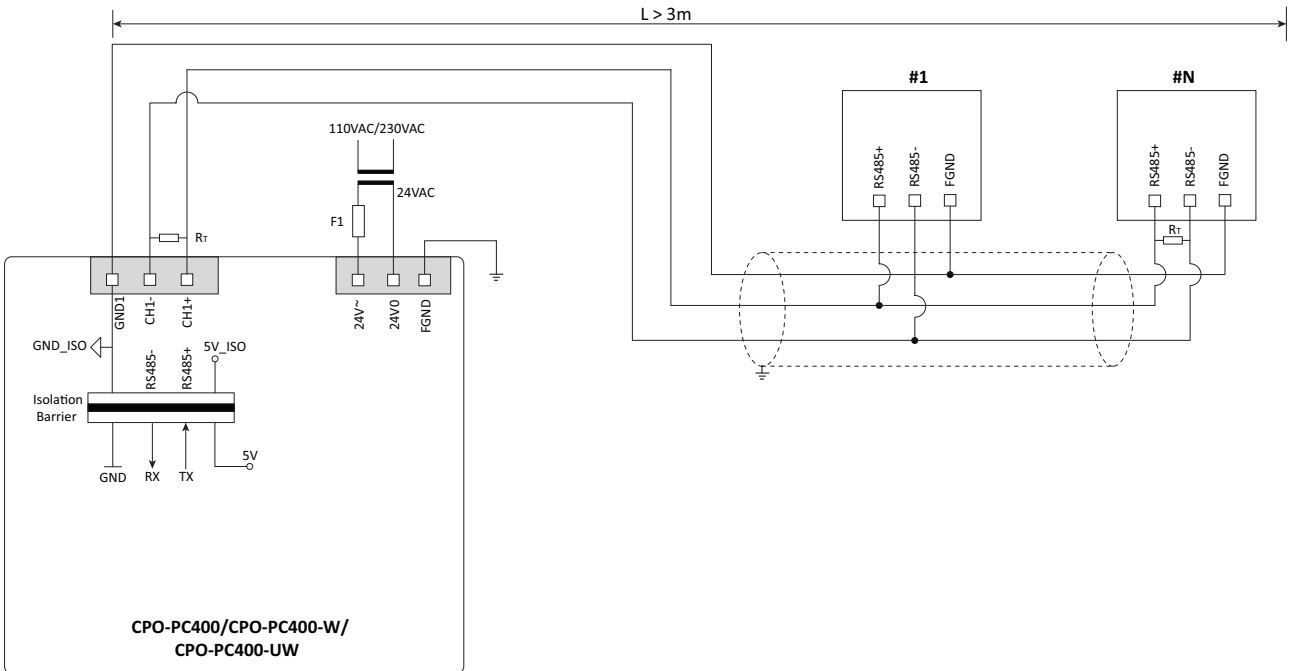


Fig. 14. Connection ($L > 3 m$) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a BACnet Bus

NOTES:

- Always power the CPO-PC400-W/CPO-PC400-UW with a transformer separate to the connected BACnet MSTP modules.
- $N = \text{max. } 30 \text{ modules}$
- Signal ground (signal reference) connection is recommended if not all devices are electrically isolated. For more information, see “General Information on the RS485 Standard” section on page 7.

Connection to C-Bus channel

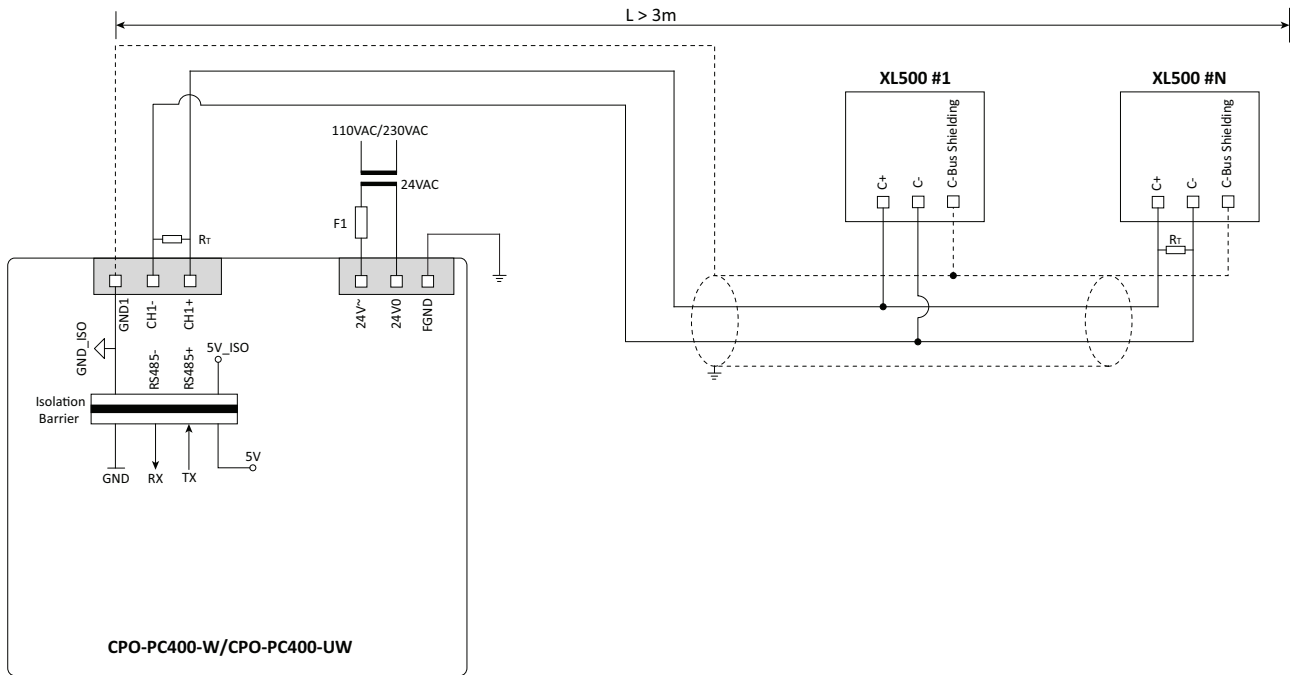


Fig. 15. Connection (L > 3 m) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a C-Bus

NOTES:

- Always power the CPO-PC400-W/CPO-PC400-UW with a transformer separate to the connected C-Bus modules.
- N = max. of 30 devices per port including CPO-PC400-W/CPO-PC400-UW.

Connection to Field Bus Modules Powered by a Separate Transformer

This configuration has the advantage of allowing the FBAs to be distributed through a building.

CONNECTION VIA RS485 INTERFACES 1, 2, OR 3

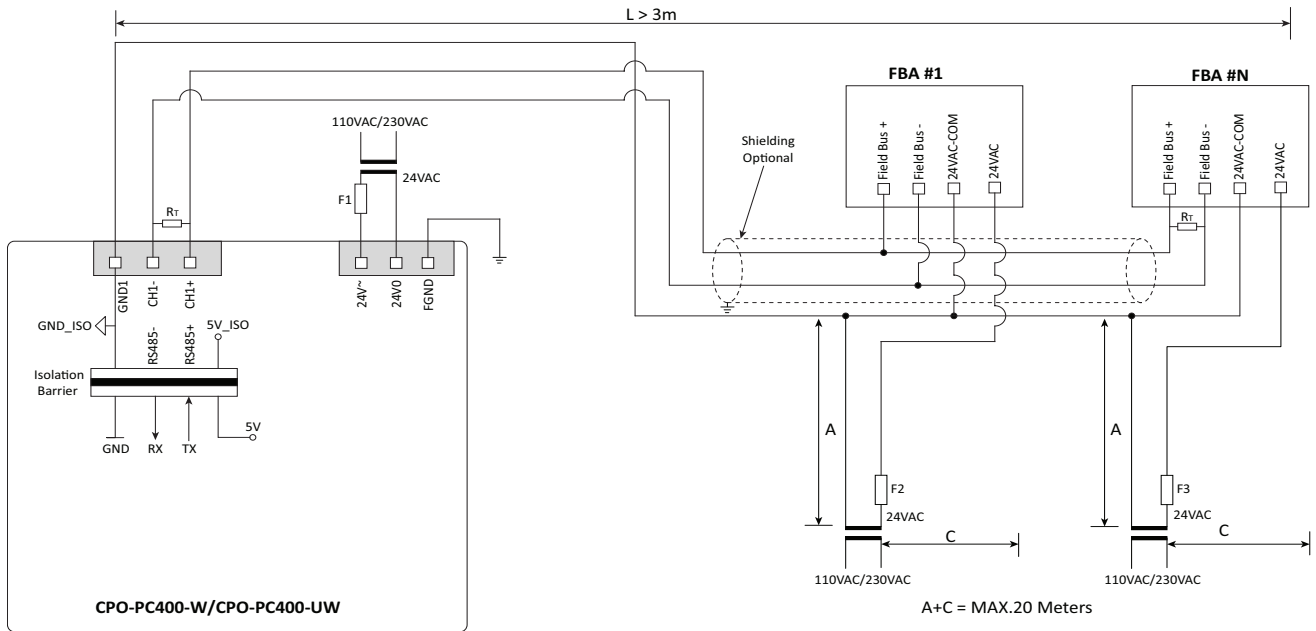


Fig. 16. Connection ($L > 3m$) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a Field Bus

NOTES:

- Signal ground (signal reference) connection is recommended. For more information, see “General Information on the RS485 Standard” section on page 7.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7.

CONNECTION VIA RS485 INTERFACES 1, 2, OR 3

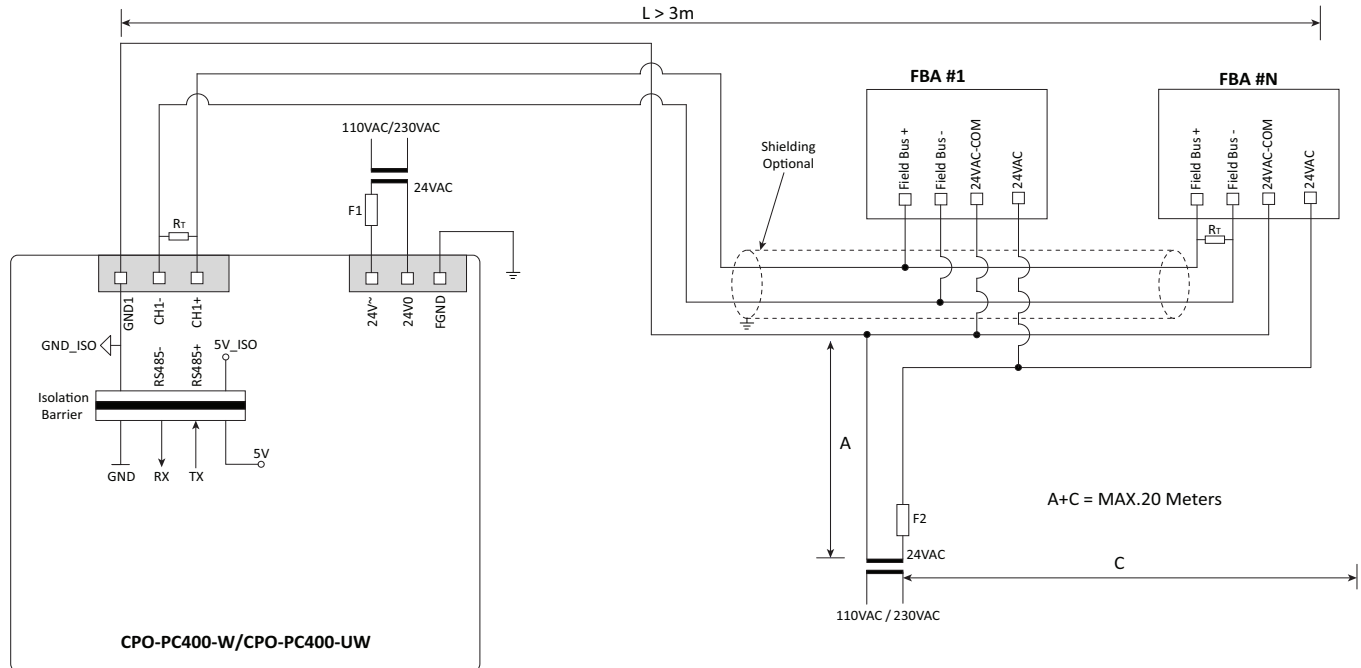


Fig. 17. Connection ($L > 3\text{ m}$) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a Field Bus

NOTES:

- Signal ground (signal reference) connection is recommended. For more information, see “General Information on the RS485 Standard” section on page 7.
- $N = \text{max. } 31$ unit loads.
- The size of the transformer must always be calculated according to the power consumption of the connected FBAs.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For fusing, see “Fusing” section on page 11.

Connection to Field Bus Modules Powered by the Same Transformer as the CPO-PC400-W/CPO-PC400-UW

This configuration is suitable for connecting FBAs which are all located in the same wiring cabinet as the CPO-PC400-W/CPO-PC400-UW.

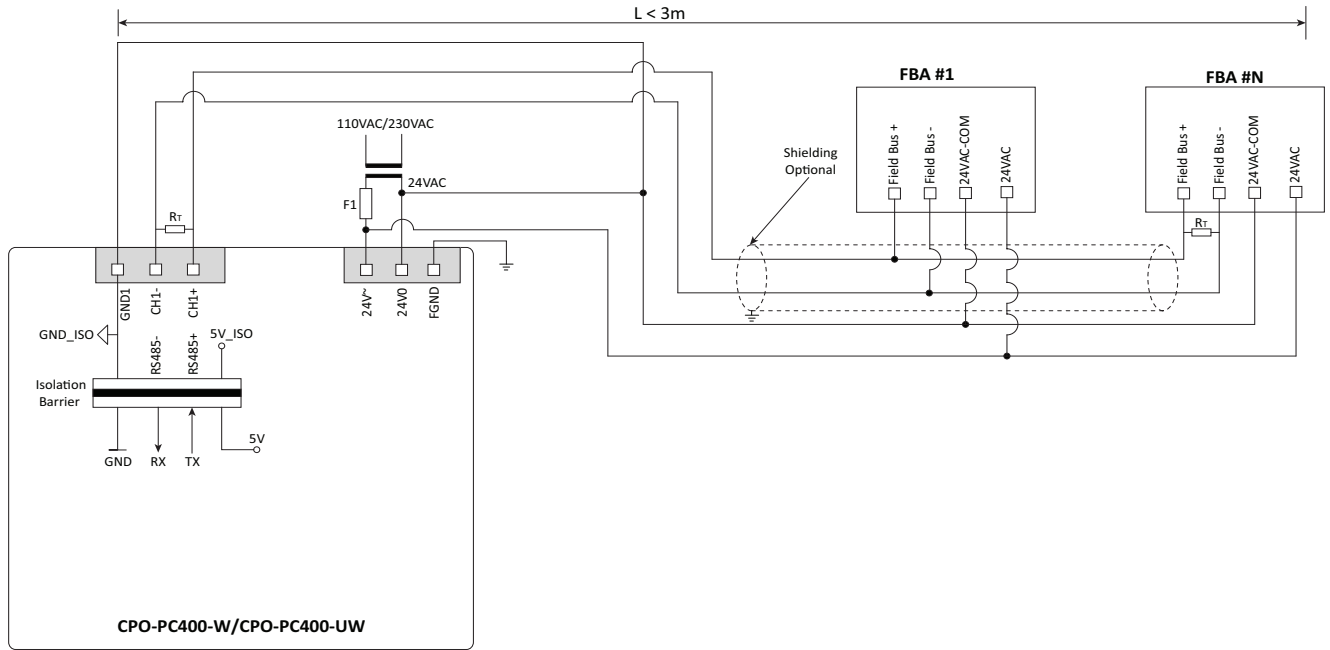


Fig. 18. Connection ($L < 3\text{ m}$) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a Field Bus

NOTES:

- N = max. 31 unit loads. Normally, in this case (i.e. with a bus length of max. 3 m), it is not necessary to employ termination resistors.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For fusing, see “Fusing” section on page 11.

Connection to Modbus Modules

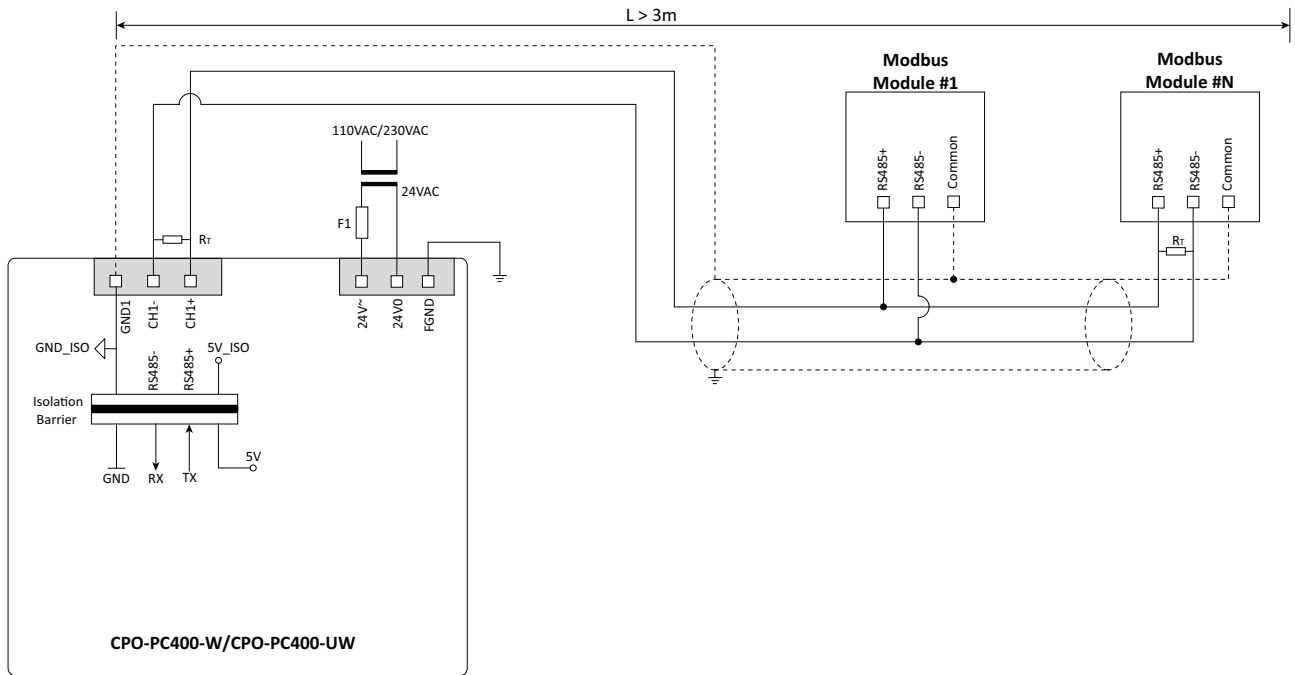


Fig. 19. Connection (L > 3 m) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a Modbus

NOTES:

- N = max. 30 unit loads. Always power the CPO-PC400-W/CPO-PC400-UW and connected Modbus modules with separate transformers. Termination resistors must be inserted directly into the terminals of the individual Modbus modules.
- Signal ground (signal reference) connection is recommended. For more information, see “General Information on the RS485 Standard” section on page 7.
- If the connected controllers do not have isolated RS485 interfaces and if they share a common ground between the power supply and Earth ground, see the wiring diagram (Fig. 20) provided in Connection to Modbus devices with non-isolated RS485 interfaces. This provides the best electrical noise rejection.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7.

Connection to Modbus devices with non-isolated RS485 interfaces

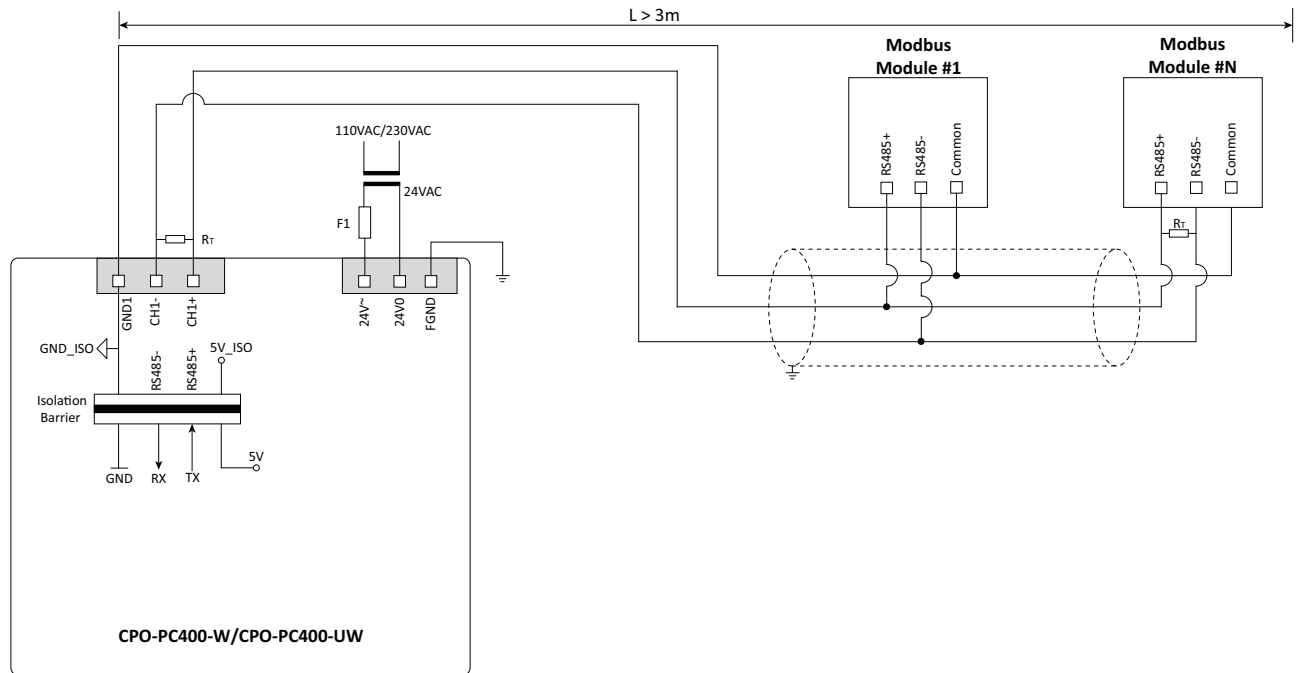


Fig. 20. Connection ($L > 3m$) of RS485 interfaces 1, 2, or 3 (RS485 interface 1 shown) to a Modbus

NOTES:

- $N = \text{max. } 30$ unit loads. Always power the CPO-PC400-W/CPO-PC400-UW and connected Modbus modules with separate transformers. Termination resistors must be inserted directly into the terminals of the individual Modbus modules.
- Signal ground (signal reference) connection is recommended. For more information, see “General Information on the RS485 Standard” section on page 7.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For fusing, see “Fusing” section on page 11.

Connection to a CP-IO Bus Powered by the Separate Transformer

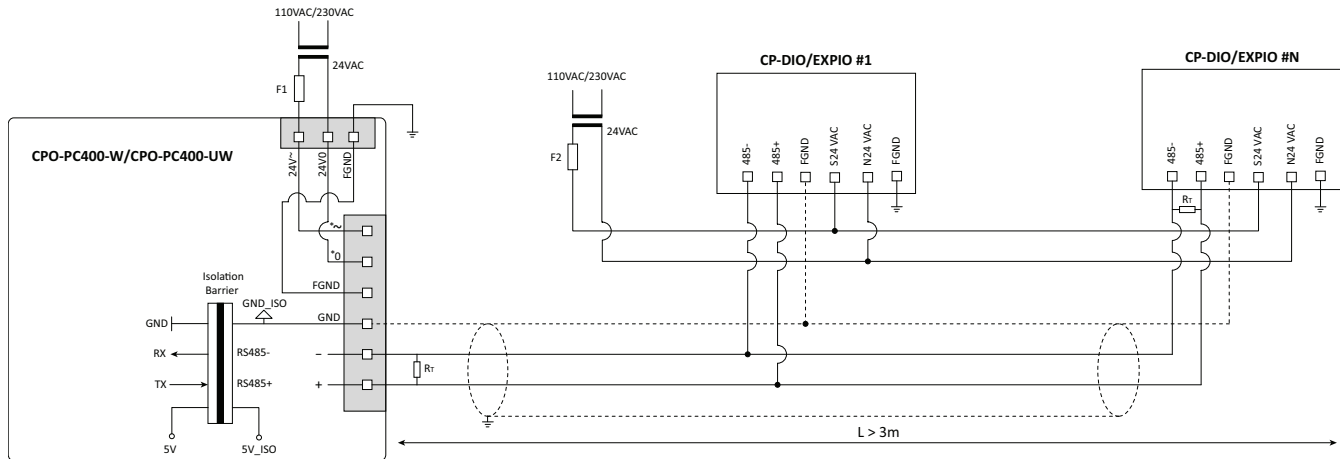


Fig. 21. Connection ($L > 3\text{ m}$) of RS485 interface 4 to a CP-IO Bus

NOTES:

- N = max. 16 CP-EXPIO modules or 16 CP-DIO modules (or a mixture thereof). The mode switch of the integrated termination resistor of the final CP-DIO (CP-DIO #N) must be set to “ON.” The CP-EXPIO module supports the addressing from address 0 to 15. Therefore, it supports 16 modules per channel. If the last module is CP-EXPIO, the end of line resistor must be included.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For capacity restrictions, see “Connection to CP-IO Bus” section on page 10. For fusing, see “Fusing” section on page 11.

Connection to a CP-IO Bus Powered by a Same Transformer

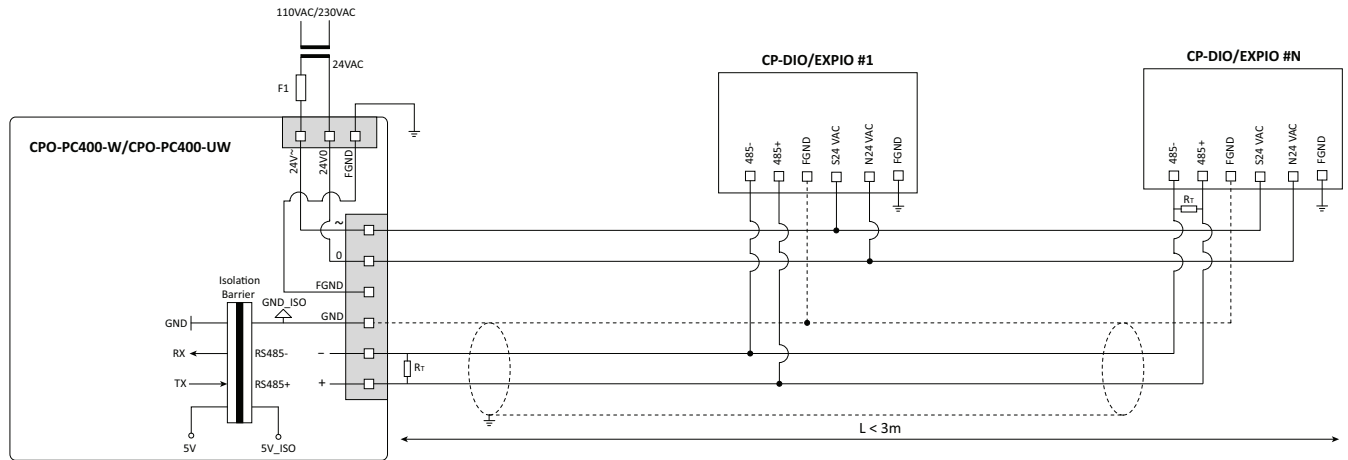


Fig. 22. Connection (L < 3 m) of RS485 interface 4 to a CP-IO Bus

NOTES:

- * The 24V~ and 24V0 terminals at RS485-4 Interface have an automatic resetting fuse protection. For more information, see “Wireless Connectivity” section on page 15.
- NOTES: N = max. 9 modules. The mode switch of the integrated termination resistor of the final CP-DIO (CP-DIO #N) must be set to “ON.” If the last module is CP-EXPIO, the end of line resistor must be included.
- For communication cable lengths, transmission speeds, and termination, see “General Information on the RS485 Standard” section on page 7. For capacity restrictions, see “Connection to CP-IO Bus” section on page 10. For fusing, see “Fusing” section on page 11.

Connection to M-Bus via Level Converter

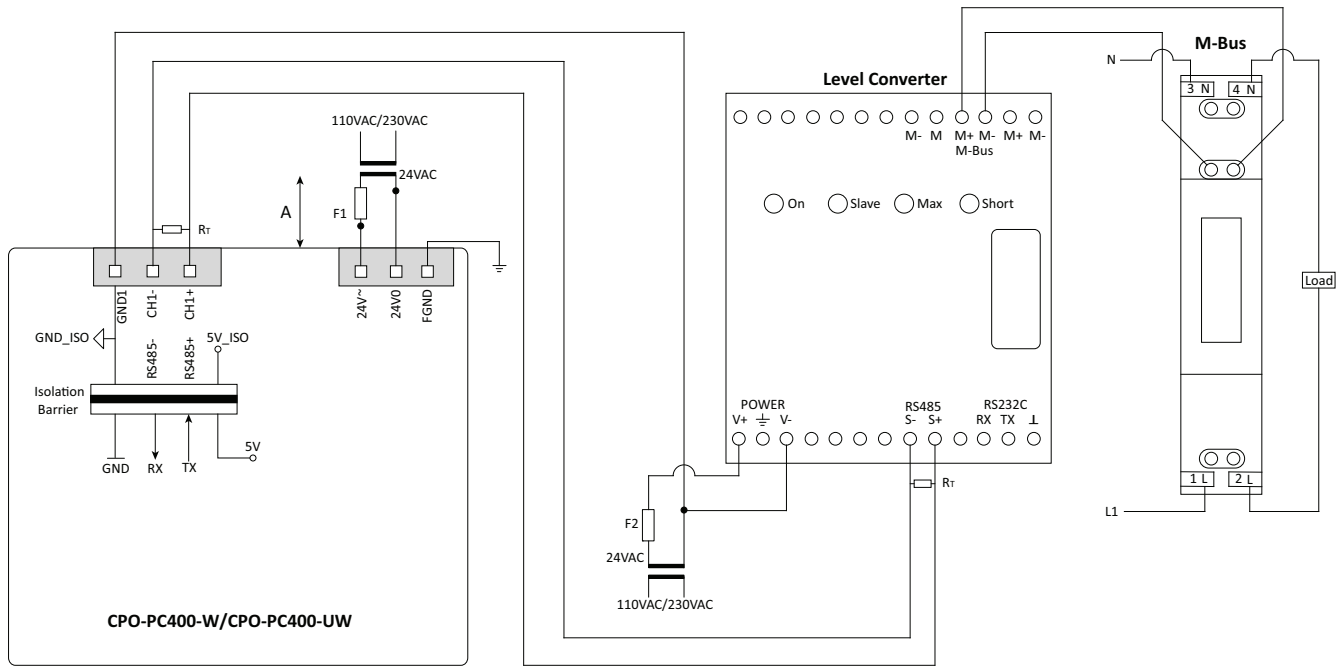


Fig. 23. Connection to M-Bus via Level Converter

Powering CPO-PC400-W/CPO-PC400-UW via Excel 500/600 Hardware Migration Kit

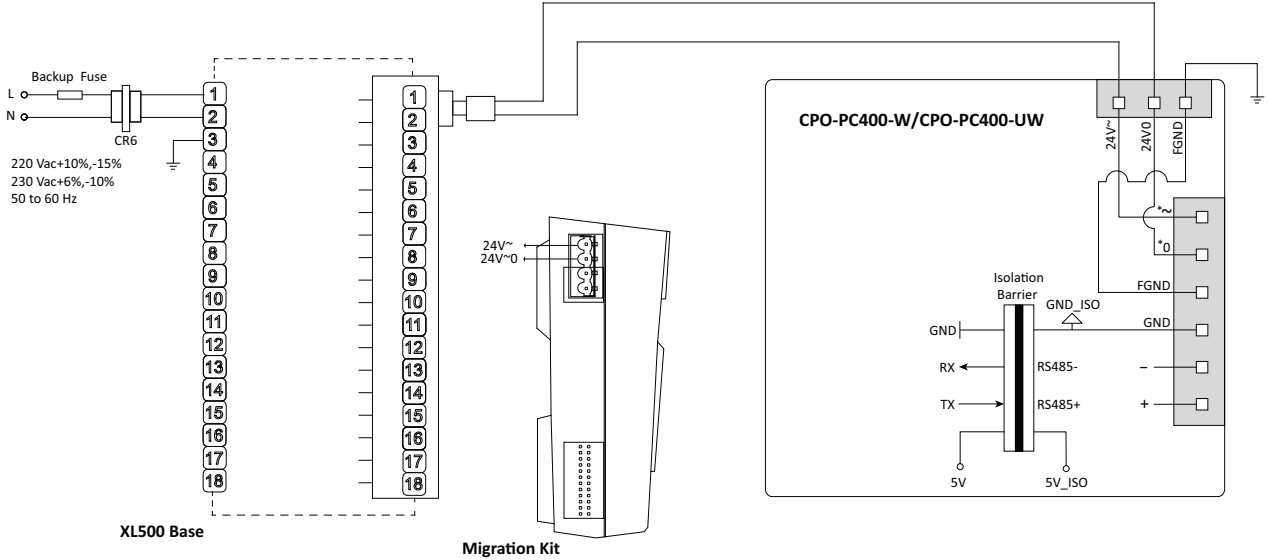


Fig. 24. Powering CPO-PC400-W/CPO-PC400-UW via Excel 500/600 hardware migration kit

Connecting I/O Modules and CPO-PC400-W/CPO-PC400-UW

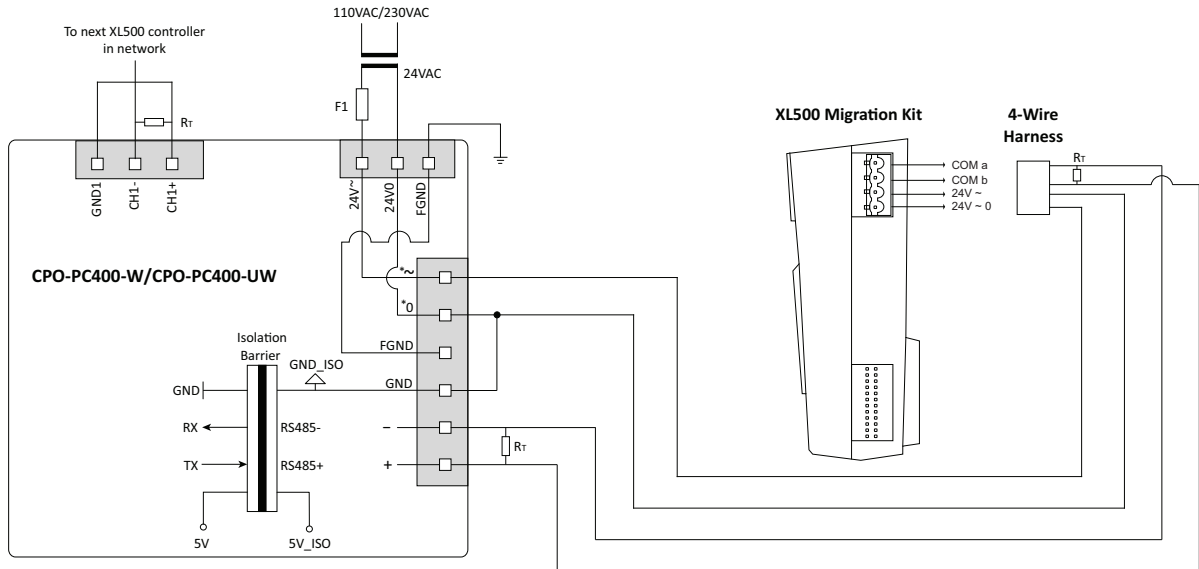


Fig. 25. Connecting I/O modules and CPO-PC400-W/CPO-PC400-UW

Table 28. Connecting I/O Module and CPO-PC400-W/CPO-PC400-UW

RS485 Interface 4 Terminals	~	24V~	Power supply for connected modules
	0	24V~0	Power supply for connected modules
	-		(-) for RS485 Interface 4
	+		(+) for RS485 Interface 4

NOTES:

- * The 24V~ and 24V0 terminals at RS485-4 Interface of the controller have an automatic resetting fuse protection. For more information, see “Wireless Connectivity” section on page 15.
- For controller RS485 interface connection details, see “Interfaces” section on page 5

Connection to CPO-MMI

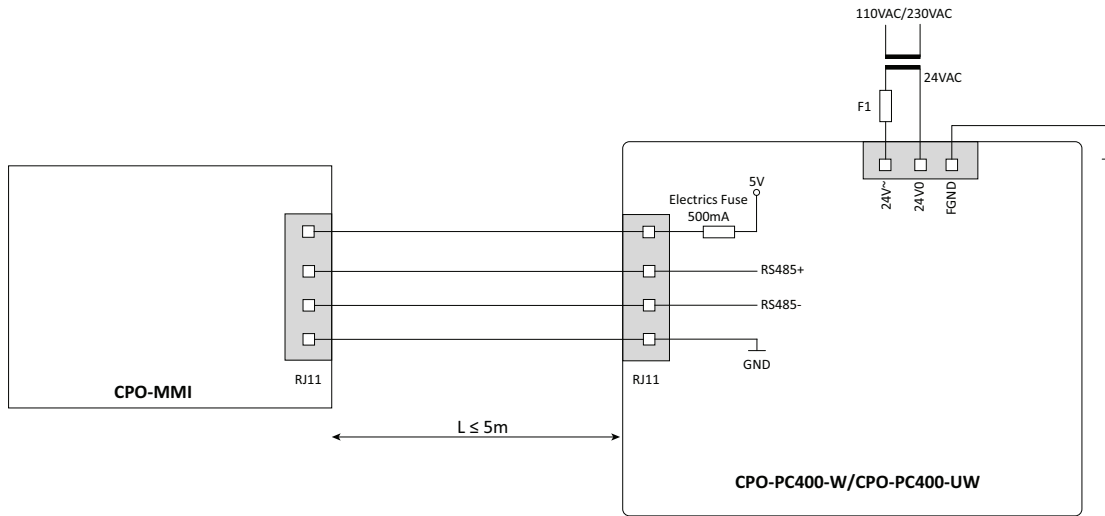


Fig. 26. Connection of RJ11 interface to a CPO-MMI device

NOTE: Maximum length of RJ11 cable is (L) 5 m.


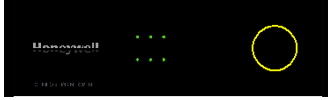

RING LED

The CPO-PC400-W/CPO-PC400-UW is built with a Ring LED to indicate the operational status of the controller.

When a controller restarts successfully, the Ring LED operates in the following pattern:

- Top half of the ring LED glows in red with high intensity.
- Two blinks with reduced delay between the blinks and subsequently stops glowing for a few milliseconds.

Table 29. Ring LED and Controller status

Light Status	Green (Normal) No Action Required 	Yellow (Minor fault) Need Action From User 	Red (Major fault) Urgently Need Action from User 
Solid	N/A	Total communication failure with one or more devices. (Applicable only for IO modules, MSTP devices, Panel Bus devices, and Field Bus devices.) NOTE: It takes a few minutes for the LED to indicate MSTP status whereas only a few seconds to indicate IO status.	<ul style="list-style-type: none"> • Factory default <ul style="list-style-type: none"> – No firmware is loaded – No application – No configuration • Firmware failure
Breathing	Controller is working properly.	N/A	N/A
Flashing	N/A	<ul style="list-style-type: none"> • Rate of MSTP or IO frames is dropping. • Controller is too busy and almost no communication with other devices. NOTE: It takes a few minutes for the LED to indicate MSTP status whereas only a few seconds to indicate IO status.	<ul style="list-style-type: none"> • Controller application has failed. (e.g.RACL or IO stops running) • Controller is booting up.
Rotating	Controller's activity in progress. (e.g. downloading application, I/O firmware, Controller firmware)*	N/A	N/A

Note: * LED status does not change when MMI firmware is downloaded from the CPO Online tool to the controller.

TROUBLESHOOTING WITH LEDs

Troubleshooting with LEDs of RS485 Interfaces 1, 2, 3

Table 30. CPO-PC400-W/CPO-PC400-UW Tx and Rx LEDs of RS485 Interfaces 1,2, and 3

Case	LED Behavior	Meaning	Remedy
1	Both LEDs of given interface flashing.	Bus is functioning properly.	No action is necessary.
		Bus is not functioning properly.	Check termination. Check the polarity of bus connections. Check for EM interference.
2	Both LEDs of given interface are OFF.	No communication over given interface.	Use ComfortMan to check interface assignment in the application. Check the wiring.

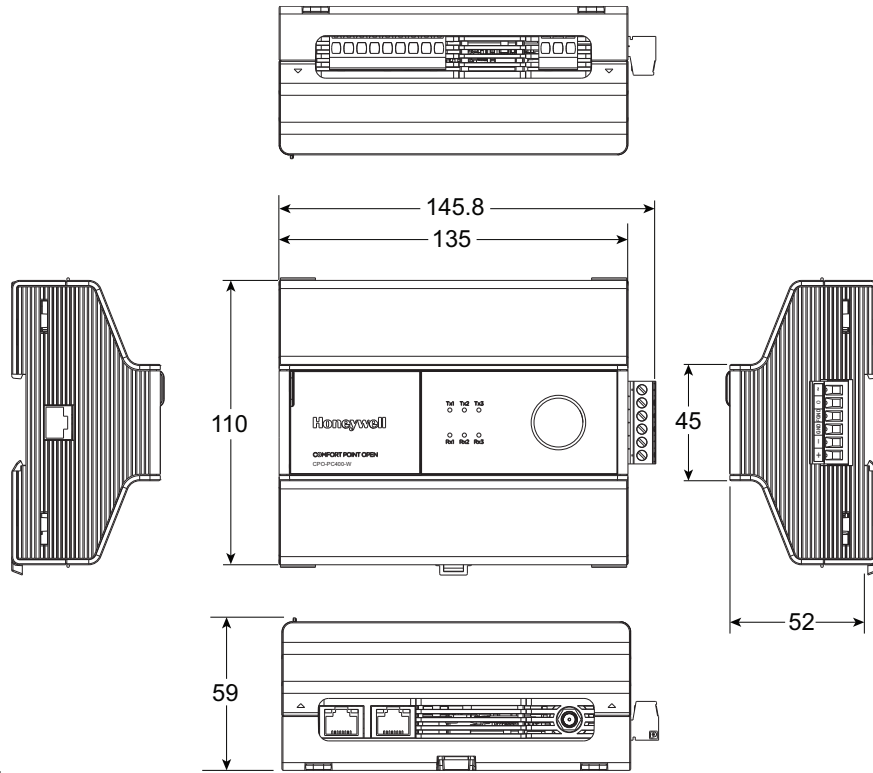
Troubleshooting with the Ethernet Interface LEDs

Table 31. CPO-PC400-W/CPO-PC400-UW link and activity LEDs of Ethernet interfaces 1 and 2

Case	LED Behavior	Meaning	Remedy
1	Yellow LED is ON steadily	Ethernet is working with connectivity below 100Mbps.	If communication problems persist, then check green LED. See Case 3 and Case 4 given below.
2	Yellow LED is OFF	<ul style="list-style-type: none"> If green LED is ON or flashing, then Ethernet is working with connectivity below 10Mbps. If green LED is OFF, then Ethernet is disconnected 	Connect the cable between the controller and the switch.
3	Green LED is flashing	Normal operation. The controller is transmitting/receiving data to/from the switch via cable.	If communication problems persist, the Ethernet parameter configuration may be defective: Check IP address, MAC address, and firmware.
4	Green LED is ON	Ethernet connectivity exists but no data flow.	Check the software configuration.
5	Green LED is OFF	Ethernet port link is down.	<ul style="list-style-type: none"> Check the cable connection between the controller and the switch. Check the switch. Use good a laptop or good cable to directly connect the controller and the switch

DIMENSIONS

CPO-PC400-W/CPO-PC400-UW



*All dimensions are in mm

APPENDIX: EARTH GROUNDING

ComfortPoint Open and SELV

In order to avoid distribution of noise or earth ground potential differences over networks or other connections, the CPO-PC400-W/CPO-PC400-UW is designed to comply with SELV (Safety Extra Low Voltage).

Furthermore, SELV offers the greatest possible safety against electrical impact.

To support SELV, all Honeywell external (CRT series) or internal transformers comply with standard EN60742. Earth grounding is therefore not recommended.

ComfortPoint Open and EN60204-1

However, if compliance with the standard EN60204-1 is required, note the following:

General Information about EN60204-1

EN60204-1 defines electrical safety for a complete application/machine including controllers, sensors, actuators and any connected/controlled electrical device.

EN60204-1 requires controllers to be powered by PELV (Protective Extra-Low Voltage) and earth grounding of the secondary side of the used transformers or earth grounding of the system ground.

Earth grounding is prescribed to prevent the unexpected start-up of connected rotating/moving machines due to an insulation fault and double earth grounding somewhere in the plant.

The use of an earth leakage monitor is also possible to fulfill PELV if earth grounding is prohibited.

When is EN60204-1 Applicable to ComfortPoint Open?

SAFETY AGAINST ELECTRICAL IMPACT

EN60204-1 is not mandatory; this is because electrical safety is provided by the use of SELV and transformers according to standard EN60742.

SAFETY AGAINST UNEXPECTED START-UP OF ROTATING/MOVING MACHINES

If the application/plant does not contain machines that can be harmful to the operator due to an unexpected start-up, the standard EN60204-1 is not applicable. If such machines are encountered, then EN60204-1 must be followed. Grounding is required.

Functional EMC Grounding

- Use a cable as short as possible for grounding: min 1.5 mm² (16 AWG).
- For connection details, refer to the following example.

EXAMPLE

Connecting a single transformer with multiple CPO-PC400-W/CPO-PC400-UW HVAC Controllers earth-grounded as per EN60204-1.

- Connect earth ground to terminal 2 of the CPO-PC400-W/CPO-PC400-UW HVAC Controllers.

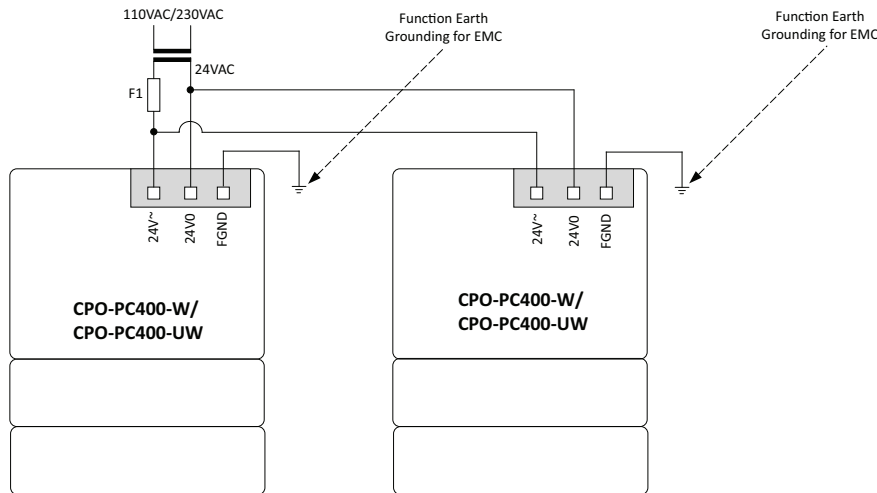


Fig. 27. Connecting and earth grounding multiple CPO-PC400-W/CPO-PC400-UW HVAC Controllers (single transformer)

NOTES:

- Use a noise-free earth ground inside the cabinet.
- Use one star-point to split power for controllers and field devices.
- If the transformer is used for several controllers, each controller ground has to be wired separately to the star point.
- If a field device that prohibits earth grounding is connected to the system ground, an isolation monitoring device must be used instead of earth grounding.
- If the field device transformer is physically far away from the controller, earth grounding must still be performed for the controller.

CONTROLLER PART NUMBERS

Table 32. Controller

Part Number	Description
CPO-PC400-W	CPO Controller with Wi-Fi and Bluetooth
CPO-PC400-UW	CPO Controller with Wi-Fi and Bluetooth (U.S.A)
CPO-PC400-W-MMIDN	CPO Controller with Wi-Fi and Bluetooth including MMI with DIN Rail Base
CPO-PC400-UW-MMIDN	CPO Controller with Wi-Fi and Bluetooth including MMI with DIN Rail Base (U.S.A)
CPO-PC400-W-MMIWL	CPO Controller with Wi-Fi and Bluetooth including MMI with Panel Door/Wall Base
CPO-PC400-UW-MMIWL	CPO Controller with Wi-Fi and Bluetooth including MMI with Panel Door/Wall Base (U.S.A)

Antenna Part Numbers

Table 33. Antenna Part Numbers

Part Number	Vendor Name	Type	Gain
CA #ANTT935-4	ADAM	External	2.4G: 2.9dbi 5G: 5.9dbi
ANT-DB1-LCD-SMA	LINX	External	2.4G: 2.8dbi 5G: 4.5dbi

Accessories Part Numbers

Table 34. Accessories

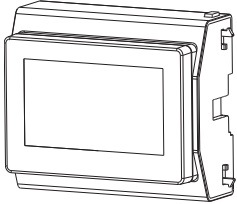
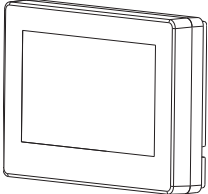

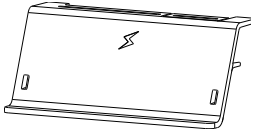
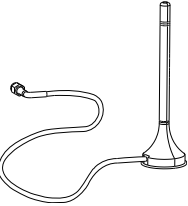

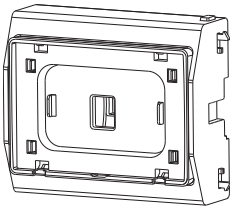
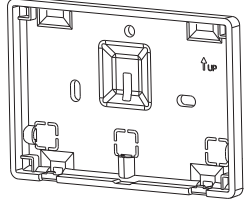
	Part Number	Description
	CPO-MMI-DN	MMI with DIN Rail Base
	CPO-MMI-WL	MMI with Panel Door/Wall Base
	CPO-PC-TCVR	Replacement Terminal Covers (Small) (Pack Quantity of 4)

Table 34. Accessories (Continued)

	Part Number	Description
	CPO-PC-EXT-TCVR	Extended Terminal Covers (Large) (Pack Quantity of 4)
	CPO-ANT-REM*	Remote Antennas (MPN: CA #ANTT935-4, Manufacturer: ADAM) (Pack Quantity of 5)
	CPO-ANT-LOC*	Local Antennas (MPN: ANT-DB1-LCD-SMA, Manufacturer: LINUX) (Pack Quantity of 5)
	CPO-MMI-ACCDN	DIN Rail Base Accessory for CPO MMI
	CPO-MMI-ACCWL	Panel Door/Wall Base Accessory for CPO MMI

TECHNICAL LITERATURE

Table 35. Technical Literature

Title	Product Literature Number	Contents
ComfortPoint™ ComfortMan – User Guide	EN2B-00084E10	ComfortMan user guide for CPO-PC400 series and PC200 ComfortPoint Open plant controllers.
ComfortPoint™ Open Webserver – User Guide	EN2B-0378GE51	Describes the detailed usage and features of the CPO web server.

Table 35. Technical Literature (Continued)

Title	Product Literature Number	Contents
ComfortPoint™ Open PC400-W/CPO-PC400-UW HVAC Controller - Data Sheet	EN0B0084-IE10	Product data for the CPO-PC400 series controllers.
ComfortPoint™ Open PC400-W/CPO-PC400-UW HVAC Controller - Mounting Guide	MU1B0087-IE10	Describes the mechanical mounting and basic wiring of the CPO-PC400 series controllers.
ComfortPoint™ Open MMI - Data Sheet	EN0B0079-IE10	Product data for the CPO-MMI device.
ComfortPoint™ Open MMI - Mounting Guide	MU1B0081-IE10	Describes the mechanical mounting and basic wiring of the CPO-MMI device.
ComfortPoint™ Open MMI - User Guide	EN2B-0080IE10	User guide for CPO-MMI device.
ComfortPoint™ Open FBA – Mounting Instructions	MU1B-0464GE51	Describes the mechanical mounting and basic wiring of the four CPO Field Bus Adapters.
ComfortPoint™ Open Mixed I/O Module – Installation & Commissioning Instructions	EN1B-0498GE51	Describes the usage and features of the CPO-IO830A.
Excel 800 Controller – Installation & Commissioning Instructions	EN1B-0375GE51	Describes pluggable Panel Bus I/O modules.
ComfortPoint™ Open FBA – Data Sheet	EN0B-0657GE51	Product Data for CPO field bus adapters.
ComfortPoint™ Open CP-EXPIO/DIO – Installation Instructions	EN1B0020-IE10R0213	Describes the usage and features of CP-EXPIO and CP-DIO.
ComfortPoint™ Open CP-EXPIO– Data Sheet	EN0B0018-IE10R0213	Product Data for CP-EXPIO.
ComfortPoint™ Open CP-EXPIO – Mounting Instructions	MU1B0006-IE10R0113	Describes the mechanical mounting and basic wiring of the CP-EXPIO.
ComfortPoint™ Open CP-DIO– Data Sheet	EN0B0017-IE10R0213	Product Data for CP-DIO.
ComfortPoint™ Open CP-DIO– Mounting Instructions	MU1B0007-IE10R0113	Describes the mechanical mounting and basic wiring of the CP-DIO.
ComfortPoint™ Open CPO-DIO– Installation & Commissioning Instructions	EN1B0025-IE10R0414	Describes the usage and features of CPO-DIO.
ComfortPoint™ Open CPO-DIO– Mounting Instructions	MU1B0026-IE10R0414	Describes the mechanical mounting and basic wiring of the CPO-DIO.
ComfortPoint™ Open CPO-DIO– Data Sheet	EN0B0027-IE10R0414	Product Data for CPO-DIO.

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