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# КОНТРОЛЛЕРЫ

## Технические характеристики на СРО-РС-6А, СРО-РС200, СРО-РС400



## ComfortPoint Open CPO-PC-6A PLANT CONTROLLER

DATA SHEET



### GENERAL

The ComfortPoint™ Open Plant Controller CPO-PC-6A is an Ethernet-based, freely programmable native BACnet® building Controller (B-BC), which is designed for a wide variety of complex applications.

The CPO-PC-6A features a large complement of different analog inputs, analog outputs, binary inputs, binary outputs, and relays.

The CPO-PC-6A also features numerous communication interfaces, chief among them four different RS485 interfaces (three of which are screw-type terminals located in the terminal block at the upper left-hand corner; the fourth consists of push-in terminals at the upper right-hand corner). It also possesses two standard Ethernet interfaces.

The CPO-PC-6A is thus compatible with a wide range of other electronic devices (see also Fig. 1. ComfortPoint™ Open System architecture on pg. 3).

Clearly visible LED control lamps convey important status and alarm information.

The CPO-PC-6A has a durable, anthracite-colored plastic housing conforming with DIN 43880, with a max. slot height of 45 mm. It is thus suitable for mounting in fuse boxes, but can also be mounted on 35 mm standard panel rails (both vertical and horizontal mounting possible).

### FEATURES

- BACnet 2010 certified
- 24 Vac/dc power supply (from external transformer).
- Three separate RS485 interfaces consisting of screw-type terminals.
- One additional RS485 interface consisting of push-in terminals.
- Three pairs of LEDs indicating the transmission and reception (respectively) of data via the three screw-type RS485 interfaces.
- Quick and convenient connection to neighboring modules using the XS816 Bridge Connector (regular cabling also possible).
- Alarm LED, power LED.
- Three DIP switches for manually switching internal biasing resistors to the three screw-type RS485 interfaces.
- Two Ethernet connectors and corresponding status LEDs.
- Watchdog for connection to optical or acoustical signaling devices.
- Communication using the Panel Bus communication protocol (all four RS485 interfaces), the BACnet MS/TP protocol (RS485 interfaces 1, 2, and 3), the Field Bus protocol (RS485 interfaces 1, 2, and 3), the Modbus protocol (RS485 interfaces 1, 2, and 3), and the CP-IO protocol (RS485 interface 4, only).
- Built-in advanced diagnostics software facilitating troubleshooting.
- RAM (incl. online data and real-time clock time) are buffered by a super capacitor for 72 hours.
- UTF-8 and UCS-2 character encoding formats are supported.
- Maximum number of Trend objects permitted: 100
- Maximum number of samples per Trend: 200  
**NOTE:** Trend samples are based on COV.
- Supports Peer-to-Peer communication.

## IO scan time

### Expansion IO:

Points present in IO board	No. of Extn IO Boards Connected	IO Cycle Time (Including Cycle Time Delay) ms
Input points (AI+BI)	1	198
	16	884
	n	$((n+1)*49) + 100\text{ms}$
Output points (AO+BO)	1	158
	16	564
	n	$((n+1)*29) + 100$
Input+Output	1	256
	16	1348
	n	$((n+1)*78)$

n: number of points

### Field bus scan time:

Number of modules	IO Cycle Time ms
32	505.6

### Panelbus scan time:

Points present in IO board	No. of Extn IO Boards Connected	IO Cycle Time (Including Cycle Time Delay) ms
Input points (AI+BI+ACC)	1	26
	16	116ms
	n	$(n * 6) + 20$
Output Points (AO+BO+MO)	1	$15 + 250 + 20$
	16	$240 + 250 + 20$
	n	$(n * 15) + 250 + 20$

n: number of connected boards

# DESCRIPTION

The ComfortPoint™ Open System consists of the CPO-PC-6A Plant Controller and other field-level devices as well as management-level systems connected via the controller's various interfaces and bus connections. See also Fig. 1.

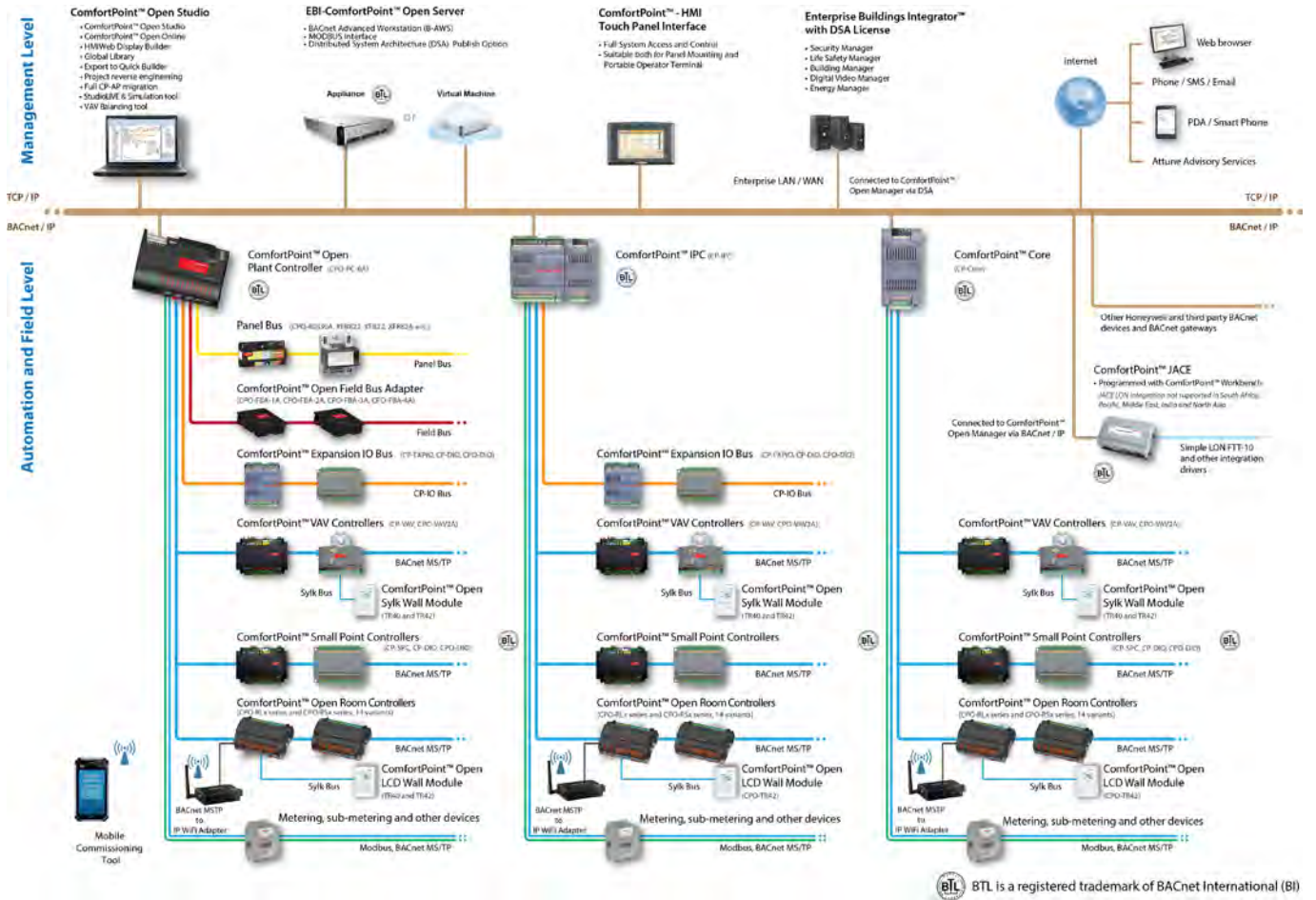


Fig. 1. ComfortPoint™ Open System architecture

## INTERFACES AND TERMINALS

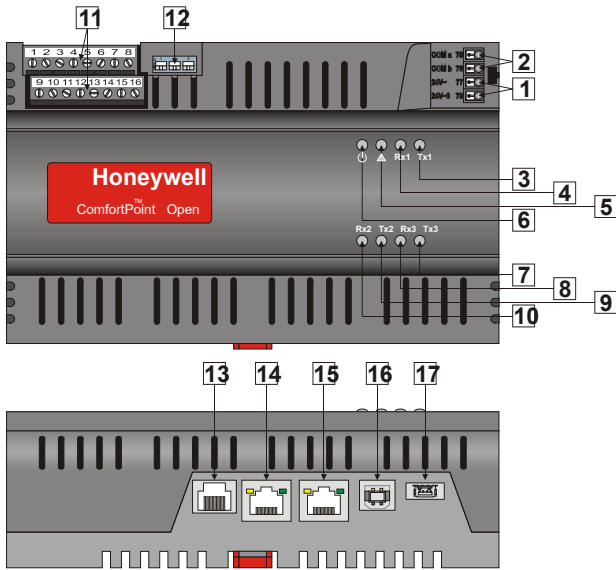


Fig. 2. Interfaces and terminals

### Legend

- 1 Power supply for I/O modules
- 2 Panel Bus communication terminals
- 3 Tx 1 LED (yellow)
- 4 Rx 1 LED (yellow)
- 5 Alarm LED (red)
- 6 Power LED (green)
- 7 Tx 3 LED (yellow)
- 8 Rx 3 LED (yellow)
- 9 Tx 2 LED (yellow)
- 10 Rx 2 LED (yellow)
- 11 two terminal blocks, incl. terminals 1-16
- 12 DIP switches for individually setting RS485 buses
- 13 RS232 interface
- 14 Ethernet 1 connector
- 15 Ethernet 2 connector
- 16 USB-B connector (not used)
- 17 USB-A connector (not used)

## CPO-PC-6A Terminals

Table 1. Description of CPO-PC-6A terminals

Type	Term.	Signal	Comment
SCREW-TYPE TERMINALS	1	24 V~	power supply (24 Vac/dc) from transformer (internal connection to terminal 77)
	2	24 V~0	power supply (24 Vac/dc) from transformer (internal connection to terminal 78)
	3		(+) for RS485 interface 1
	4		(-) for RS485 interface 1
	5		(GND) for RS485 interface 1
	6		(GND) for RS485 interface 4
	7		not used.
	8		not used.
	9		watchdog relay
	10		watchdog relay
	11		(+) for RS485 interface 2
	12		(-) for RS485 interface 2
	13		(GND) for RS485 interface 2
	14		(+) for RS485 interface 3
	15		(-) for RS485 interface 3
	16		(GND) for RS485 interface 3
PUSH-IN TERMINALS	75	COM a	(+) for RS485 interface 4
	76	COM b	(-) for RS485 interface 4
	77	24 V~	power supply for connected modules
	78	24 V~0	power supply for connected modules

### NOTICE

#### Equipment damage!

- ▶ Make sure that the CPO-PC-6A is not connected to earth ground.
- ▶ If nonetheless earth grounding is required, make sure that only terminal 2 is connected to earth ground. Terminal 1 must not be connected to earth ground.

## Tx LED and Rx LED

The CPO-PC-6A is equipped with three Tx LEDs (status: yellow/OFF) and three corresponding Rx LEDs (status: yellow/OFF).

These LEDs indicate (by flickering) the transmission / reception of data by the CPO-PC-6A via its three RS485 interfaces.

Specifically:

- Tx1 and Rx1 indicate the transmission/reception (respectively) of data by the CPO-PC-6A via its RS485 interfaces 1 (Bus 1: terminals 3, 4, and 5).
- Tx2 and Rx2 indicate the transmission/reception (respectively) of data by the CPO-PC-6A via its RS485 interfaces 2 (Bus 2: terminals 11, 12, and 13).
- Tx3 and Rx3 indicate the transmission/reception (respectively) of data by the CPO-PC-6A via its RS485 interfaces 3 (Bus 3: terminals 14, 15, and 16).

**Table 2. Behavior and meaning of RS485 LEDs**

LED behavior	meaning
OFF	No communication over the given RS485 interface.
ON steadily	Fault.
ON/OFF randomly	Communication occurring over the given RS485 interface.

## RS232 Interface

The CPO-PC-6A is equipped with an RS232 Interface for the connection of a terminal via a standard XW885 cable.

## Ethernet 1 Interface

RJ45 female interface for permanent connection to the ETHERNET network.

## Ethernet 2 Interface

For connection of a laptop or PC (onto which ComfortPoint Open Studio has been installed) via a standard Ethernet cross-over cable for application download/upload, or application de-bugging, or Internet Browser access, while the CPO-PC-6A can remain connected in the Ethernet network without interruption. This allows parallel access, e.g., without creating alarm showers at the front-end.

## USB Interfaces

USB-A and USB-B interfaces are currently not supported.

## Power LED (Green)

The CPO-PC-6A is equipped with a power LED.

**Table 3. Power LED**

behavior	meaning
<b>ON</b>	Normal operation. CPO-PC-6A is in Boot loader mode. Either Boot loader 1 or Boot loader 2 is running.
<b>OFF</b>	No power to processor, LED damaged, low voltage to board, first second of power up, or boot loader damaged or NAND flash formatting is in process.
<b>very slow blink</b>	CPO-PC-6A is operating normally and the firmware is executing the application.
<b>slow blink</b>	Firmware is not executing application.

## Alarm LED (red) and Watchdog

The alarm LED indicates the status of the watchdog relay (terminals 9 and 10). The watchdog relay is for connection to optical or acoustical signals, and allows 24 V, 500 mA dry contacts. These contacts are closed when the power is OFF, when no application is loaded, or when the firmware or application is not working properly. The watchdog resets the CPO-PC-6A if the delay since the previous trigger exceeds 20 sec. Further, the watchdog locks the CPO-PC-6A if the trigger between two restarts is not set.

**NOTE:** In the event of software problems, the CPO-PC-6A should be restarted by switching the power OFF and then back ON.

**Table 4. Alarm LED**

behavior	meaning
<b>OFF</b>	Watchdog alarm relay contacts are open = normal operation (or unpowered).
<b>ON</b>	Watchdog alarm relay contacts are closed = failure (alarm) status. <ul style="list-style-type: none"> <li>• CPO-PC-6A has encountered a hardware problem.</li> <li>• The application has a fault.</li> <li>• CPO-PC-6A powered up without application or operator has manually stopped application, e.g., using the ComfortPoint Open Online Tool. The LED will then light up 13 min. after power-up without application.</li> </ul>

**Table 5. Permissible load of terminals 9, 10**

	max. load	min. current
<b>per normally closed contact (terminals 9, 10)</b>	<b>19...29 Vac</b> current at $\cos \varphi \geq 0.6$ : 0.5A <b>19...29 Vdc</b> 0.5 A resistive or inductive	10 mA

## DIP Switches

The CPO-PC-6A features three DIP switches (equipped with 510 Ω bias resistors) located to the right of the two blocks of non-removable screw-type terminals. Each DIP switch can be used to switch the 510 Ω bias resistors of the corresponding RS485 interface ON and OFF.

- The bias resistors of RS485 interface 1 (terminals 3, 4, and 5) is switched ON/OFF using DIP switch 1.
- The bias resistors of RS485 interface 2 (terminals 11, and 13) is switched ON/OFF using DIP switch 2.
- The bias resistors of RS485 interface 3 (terminals 14, 15, and 16) is switched ON/OFF using DIP switch 3.

The resultant communication rate over RS485 interfaces 1, 2, and 3 depends upon the given communication protocol selected during engineering using ComfortPoint Open Studio.

## HARDWARE SPECIFICATIONS

Table 6. CPO-PC-6A

Feature	Description
SRAM	512 KB
NOR-Flash	4 MB
NAND-Flash	512 MB
CPU	Freescale Coldfire MCF5485, 200 MHz, 32-bit
Operating System	MQX (Message Queue eXecutive)

**NOTE:** The CPO-PC-6A does not contain a battery. The contents of RAM (incl. online data [out-of-service flag and runtime datapoint properties] and real-time clock time) are buffered by a super capacitor for (typically) 72 hours.

Serial number, date code, part number, and manufacturing location are stored in the CPO-PC-6A non-volatile memory and are thus protected against deleting or overwriting.

## GENERAL SAFETY INFORMATION

- ▶ When performing any work (installation, mounting, etc.), all manufacturer instructions and in particular the Installation and Commissioning Instructions (EN1B-0462GE51) are to be observed.
- ▶ The ComfortPoint™ Open System (including the CPO-PC-6A Plant 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.
- ▶ FCC-CERTIFIED: 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.
- ▶ 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 and UL-916.
- ▶ Investigated according to Canadian National Standard(s) C22.2, No. 205-M1983 (CNL-listed).
- ▶ Do not open the CPO-PC-6A, as it contains no serviceable parts inside!
- ▶ CE declarations according to LVD Directive 2006/95/EC and EMC Directive 2004/108/EC.
- ▶ Product standards are EN 60730-1 and EN 60730-2-9.

## Safety Information as per EN60730-1

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

The ComfortPoint Open System is an independently mounted electronic control system with fixed wiring. The CPO-PC-6A 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-PC-6A 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 7. Safety information as per EN60730-1

Shock protection	24 V-powered controls: Class III mains-powered controls: Class II
Pollution degree	Pollution Degree 2, suitable for use in home and industrial environments.
Installation	Class 3
Overvoltage category	24 V-powered controls: Category I mains-powered controls: Category II
Rated impulse voltage	330 Vac for Category I 2500 Vac for Category II
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 and connectors
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

### System Data

**Table 8. System data**

<b>operating voltage</b>	24 Vac, ± 20% (50/60 Hz), 21 ... 30 Vdc
<b>power consumption</b>	7 VA
<b>overvoltage protection</b>	Protected against overvoltages of max. 28 Vac or 40 Vdc, terminals protected against short-circuiting.

### Standards

**Table 9. Standards**

<b>protection class</b>	IP20
<b>product standards</b>	EN 60730-1, EN 60730-2-9, UL6730-1, CAN/CSA-E60730-1:02
<b>testing electrical components</b>	IEC68
<b>certification</b>	CE, cUL60730, UL916, BACnet 2010
<b>system transformer</b>	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.

### Operational Environment

**Table 10. Operational environment**

<b>ambient operating temperature</b>	0 ... 50 °C (32 ... 122 °F)
<b>ambient operating humidity</b>	5 ... 95% relative humidity (non-condensing)
<b>vibration under operation</b>	0.024" double amplitude (2 ... 30 Hz), 0.6 g (30 ... 300 Hz)
<b>dust, vibration</b>	According to EN60730-1
<b>RFI, EMI</b>	home (residential, commercial, and light-industrial) environments
<b>MTBF (Mean Time Between Failure)</b>	11.7 years

### Interfaces and Bus Connections

Via its various interfaces and bus connections, the CPO-PC-6A can be connected to a variety of devices and systems.

#### Hardware Interfaces

**Table 11. Hardware interfaces**

<b>Ethernet</b>	10/100 Mbit/s, RJ45
<b>MSTP Port</b>	Supports 9.6, 38.4, and 76.8 Kbps
<b>Modbus</b>	0.6 to 115.2 Kbps
<b>Panel bus</b>	115.2 Kbps

### Supported Communication Protocols

The following communication protocols are supported. (There are no limitations pertaining to the parallel / concurrent use of communication protocols.) See Table 12.

**Table 12. Protocols supported by communication interfaces**

<b>communication interface</b>	<b>supported protocol(s)</b>
Panel Bus (terminals 75, 76)	Panel Bus; CP-IO
RS485 interface 1 (term. 3, 4, 5)	Panel Bus, BACnet MS/TP, Mod-Bus, Field Bus
RS485 interface 2 (term. 11, 12, 13)	
RS485 interface 3 (term. 14, 15, 16)	
watchdog (terminals 9, 10)	--
RS232 interface	--
Ethernet 1 interface	BACnet/IP, Telnet
Ethernet 2 interface	BACnet/IP, Telnet
USB-A, USB-B interfaces	not used

The communication rate across each communication interface is dependent upon the given communication protocol.

### DIMENSIONS

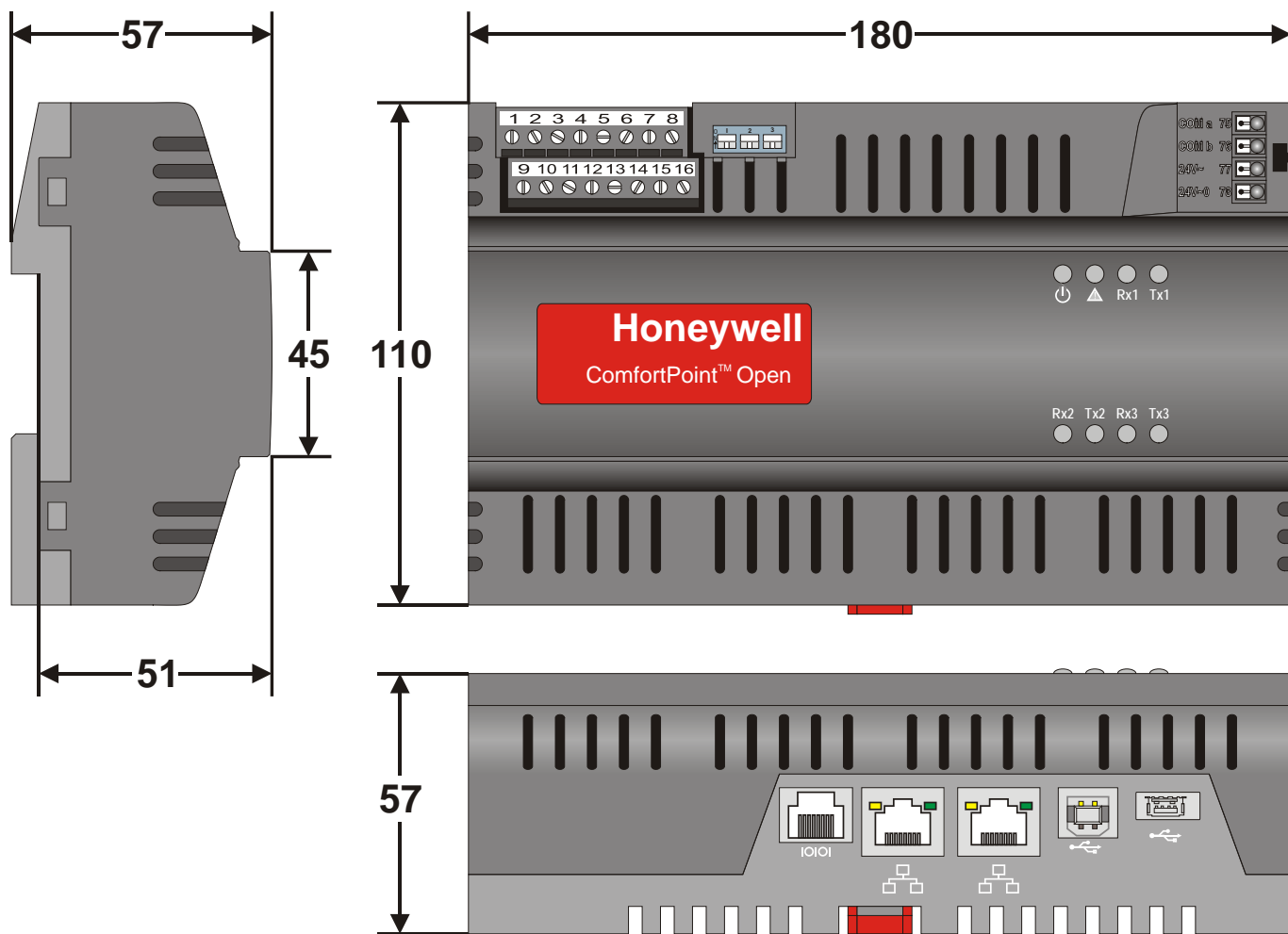


Fig. 3. CPO-PC-6A dimensions (mm)

# ComfortPoint™ Open

## CPO-PC200 PLANT CONTROLLER

### PRODUCT DATA

#### Trademark Information

ComfortPoint™ Open is a trademark of Honeywell International Inc.

BACnet® is a registered trademark of ASHRAE Inc.

#### Disclaimer

All images used in this document are for illustrative purposes only and may not match the actual product.



### Application

CPO-PC200 is an Ethernet-based, freely programmable, native BACnet® Building Controller (B-BC).

CPO-PC200 controller is designed for a wide variety of complex applications. It features numerous RS485 communication interfaces, a standard Ethernet interface, an MMI interface, and a USB interface.

This device can be mounted on either a DIN rail, or remote mounted in a horizontal or vertical position.

### FEATURES

- Conforms to BACnet Standard 135 protocol version 1.14 (ISO 16484-5).
- Three pairs of LEDs indicating the transmission and reception (respectively) of data via the RS485 interfaces 1,2, and 3.
- Ring LED to show the operational status of the controller.
- An Ethernet connector with status LED.
- An MMI interface to connect with the CPO-MMI device.
- Four RS485 interfaces to support Panel bus, BACnet MS/TP, Field Bus, Modbus, M-Bus, CP-IO protocols, and C-Bus data sharing.
- Built-in advanced diagnostics software facilitating troubleshooting.
- FRAM to store the live data for the controller including storing last known values when power is removed.
- DDR3L for Random Access Memory.
- EMMC for program storage and boot flash memory.
- UTF-8 and UCS-2 character encoding formats are supported.
- Supports Peer-to-Peer communication.
- A reset button to restore the factory default settings.
- Removable screw terminal block.
- Supports plant graphics displays.

NOTE: A maximum of 10 graphics files of a total size of 30 MB are supported.

- A micro USB port.

# INTERFACES AND TERMINALS

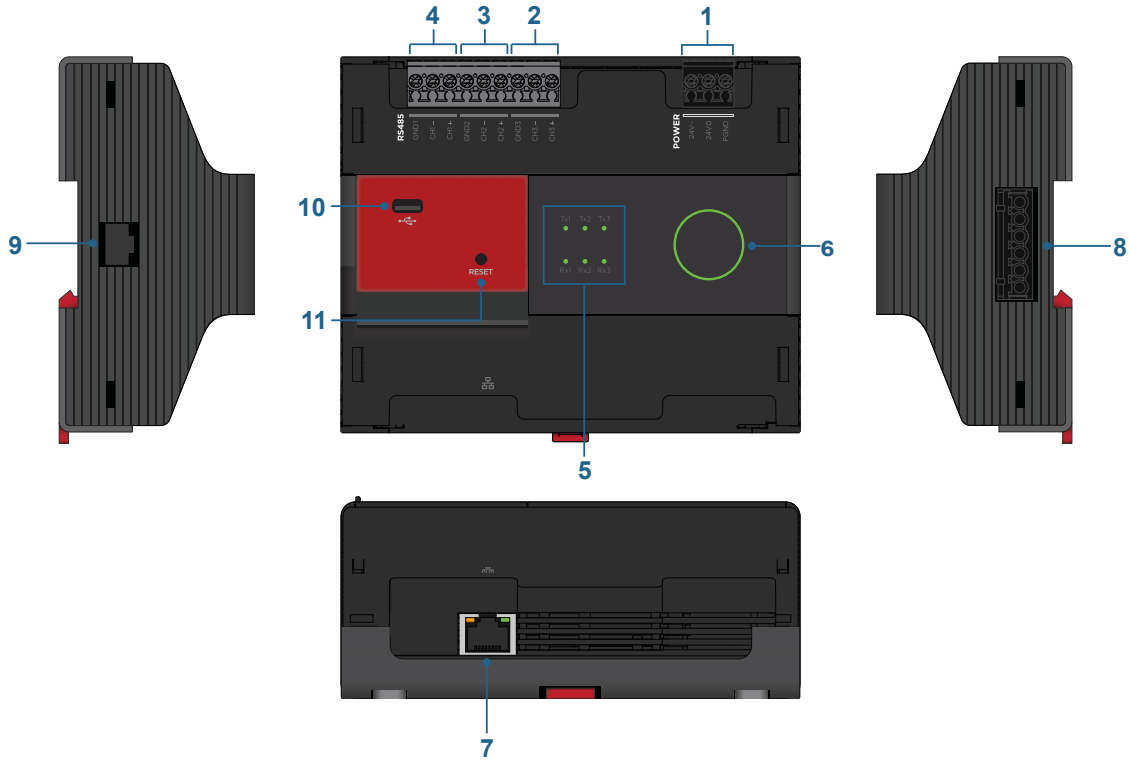


Table 1. Controller Terminals

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

Table 1. Controller Terminals (Continued)

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 indication for RS485 interfaces 1 to 3
		Rx1 LED (green)	
		Tx2 LED (green)	
		Rx2 LED (green)	
LED	6	Tx3 LED (green)	Indicates the operational status of the controller
		Rx3 LED (green)	

**Table 1. Controller Terminals (Continued)**

Type	Legend	Signal	Comment
RJ45 Interface	7	Ethernet	10/100 base-T/TX
RS485 Interface 4 Terminals	8	~ (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
RJ11 Interface	9	(+) for RS485 interface 5	MMI interface for power supply(5 Vdc) to MMI device, and RS485 interface for communication with MMI.
		(-) for RS485 interface 5	
		output 5Vdc	
		GND	
USB Interface	10		Micro USB port to connect with laptops, mobile, and tablets
Reset Button	11		Reset button to reset the device to factory default

## Tx LED and Rx LED

The CPO-PC200 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 2. 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.

## Interfaces and Bus Connections

Via its various interfaces and bus connections, the CPO-PC200 can be connected to a variety of devices and systems.

### Ethernet

Ethernet 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.

CPO-PC200 can be operated via a standard browser. By default, an integrated web-server provides all operation pages for a full browser-based operation. While browsing, the controller can remain connected in the Ethernet network without interruption.

### USB Interface

CPO-PC200 is built with micro USB port that supports USB 2.0.

**Table 3. USB Interface**

USB Port Type	Purpose
Micro USB	To connect with laptops and mobile/tablet devices by using a USB cable for monitoring and troubleshooting the controller.

# TECHNICAL DATA

## Hardware Specifications

**Table 4. Hardware Specifications**

Feature	Specifications
FRAM	768 Kbyte
DDR3L	1 Gbyte
EMMC	4 Gbyte
CPU	Dual core: Arm Cortex-A9 Frequency: 800 MHz Arm Cortex-M4 Frequency: 227MHz
Operating System	LINUX/RTOS
Real-Time Clock Timekeeping Accuracy	+/- 5 ppm: +/- 2.63 minutes per year (+/- 0.43 seconds per day)
Real-Time Clock Retention	Buffered for 72 hours by gold capacitor

## System Data

**Table 5. System Data**

Operating Voltage (AC)	19 to 29 Vac (50/60Hz)
Operating Voltage (DC)	19 to 29 Vdc
Overvoltage Protection	Protected against overvoltages of max. 29 Vac or 40 Vdc. Terminals protected against short-circuiting.

## Power Consumption

**Table 6. Power Consumption**

Controller	Power	
	24VAC	24 DC
CPO-PC200	Max. 21VA	Max. 9W
CPO-PC200 and CPO-MMI	Max. 26VA	Max. 12W

## Current Consumption

**Table 7. Current Consumption**

Controller	Power	
	24VAC	24VDC
CPO-PC200	Max. 890mA	Max. 380mA
CPO-PC200 and CPO-MMI	Max. 1070mA	Max. 510mA

## Standards

**Table 8. 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), BQB, 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.

## Operating Environment

**Table 9. Operating Environment**

Ambient Operating Temperature	0 to 50 °C (32 to 122 °F)
Ambient Operating Humidity	5 to 95% relative humidity (non-condensing)
Ambient Storage Humidity	5 to 95% relative humidity (non-condensing)
Storage Temperature	-28.9 to +70 °C (-20 to 158 °F)
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

## Controller Parameters

**Table 10. Controller Parameters**

Parameters	Max. Number
Hardware Points (AI, AO, BI, BO, MI, MO, ACC)	256
Software Points (AV, BV, MV, AF, BF)	1500
Time Schedules	100
Calendar Objects	100
Control Loops	64
Loop Objects	60
Trend Objects	100
Event Enrollment Objects	500
Event Log Object	1
Event Log Object Associated Records	10000
Point Name Characters	64
Description Characters	95

## IO Scan Time

### Expansion IO

**Table 11. Expansion IO**

Points Present in IO Board	No. of Extn IO Boards Connected	IO Cycle Time (Including Cycle Time Delay) ms
Input Points (AI+BI)	1	198
	16	884
	n	$((n+1)*49)+100$
Output Points (AO+BO)	1	158
	16	564
	n	$((n+1)*29)+100$
Input + Output	1	256
	16	1348
	n	$(n+1)*78$

n: number of points

### Field Bus Scan Time

**Table 12. Field Bus Scan Time**

Number of Modules	IO Cycle Time ms
31	505.6

### Panel bus Scan Time

**Table 13. Panel Bus Scan Time**

Points Present in IO Board	No. of Extn IO Boards Connected	IO Cycle Time (Including Cycle Time Delay) ms
Input Points (AI+BI+ACC)	1	26
	16	116
	n	$(n*6)+20$
Output Points (AO+BO+MO)	1	15+250+20
	16	240+250+20
	n	$(n*15)+250+20$

n: number of connected boards

## Connection to Buses

Table 14. 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-PC200 controller can function as an M-Bus Master. It uses standard level converter (e.g. PW60) to connect to the M-Bus devices.

## Communication Baud Rates

Table 15. Communication Baud Rates

Ethernet	10/100 Mbit/s, RJ45
BACnet MSTP	9.6, 19.2, 38.4, 76.8, 115.2 Kbps
Modbus RTU	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
MMI Port	5 Vdc power output and RS485

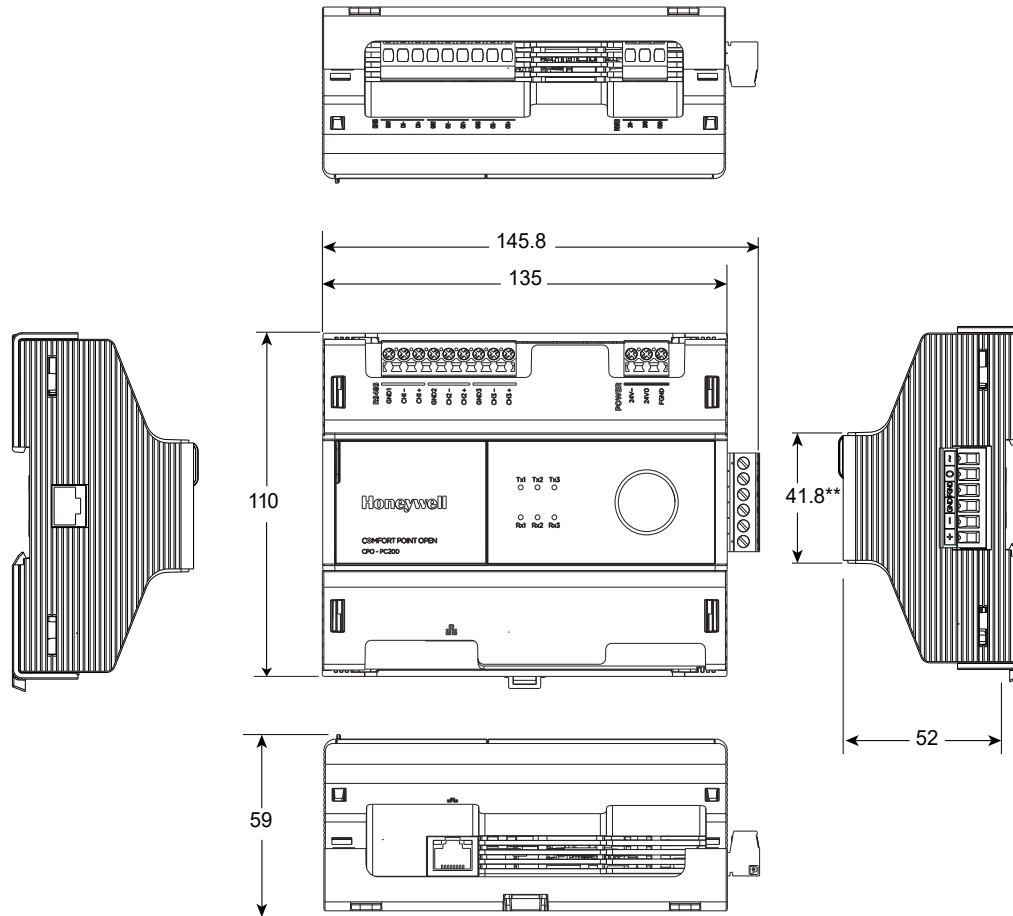
## Controller Part Numbers

Table 16. Controller

Part Number	Description
CPO-PC200	CPO Controller
CPO-PC200-IO	CPO Controller including CP-EXPIO module



# DIMENSIONS CPO-PC200



\*All dimensions are in m

\*\* This dimension is 45mm when the Small Terminal Covers (sold separately) are attached to the controller.

# ComfortPoint™ Open

## CPO-PC400 PLANT CONTROLLER

### PRODUCT DATA

#### Trademark Information

ComfortPoint™ Open is a trademark of Honeywell International Inc.

BACnet® is a registered trademark of ASHRAE Inc.

#### Disclaimer

All images used in this document are for illustrative purposes only and may not match the actual product.



## APPLICATION

CPO-PC400 is a new and advanced plant controller of the ComfortPoint™ Open (CPO) Plant Controller family. It is an Ethernet-based, freely programmable, and native BACnet® Building Controller (B-BC).

CPO-PC400 is designed for a wide variety of complex applications. This device features numerous RS485 communication interfaces, two standard Ethernet interfaces, an MMI interface, and two USB interfaces.

CPO-PC400 can be mounted on either a DIN rail or remote mounted in a horizontal or vertical position.

## FEATURES

- Conforms to BACnet Standard 135 protocol version 1.14 (ISO 16484-5).
- Three pairs of LEDs indicating the transmission and reception (respectively) of data via the RS485 interfaces 1,2, and 3.
- Ring LED to show the operational status of the controller.
- Two Ethernet connectors with status LEDs.
- An MMI interface to connect with the CPO-MMI device.
- Four RS485 interfaces to support Panel bus, BACnet MS/TP, Field Bus, Modbus, M-Bus, CP-IO protocols, and C-Bus data sharing.
- Built-in advanced diagnostics software facilitating troubleshooting.
- FRAM to store the live data for the controller including storing last known values when power is removed.
- DDR3L for Random Access Memory.
- EMMC for program storage and boot flash memory.
- UTF-8 and UCS-2 character encoding formats are supported.
- Supports Peer-to-Peer communication.
- A reset button to restore the factory default settings.
- Removable terminal blocks with Push-in or Screw terminals.
- Supports plant graphics displays.

NOTE: A maximum of 10 graphics files of a total size of

- A micro USB and a USB Type A ports.  
30 MB are supported.

NOTE: The USB Type A port is only available for use with a future firmware release.

# INTERFACES AND TERMINALS

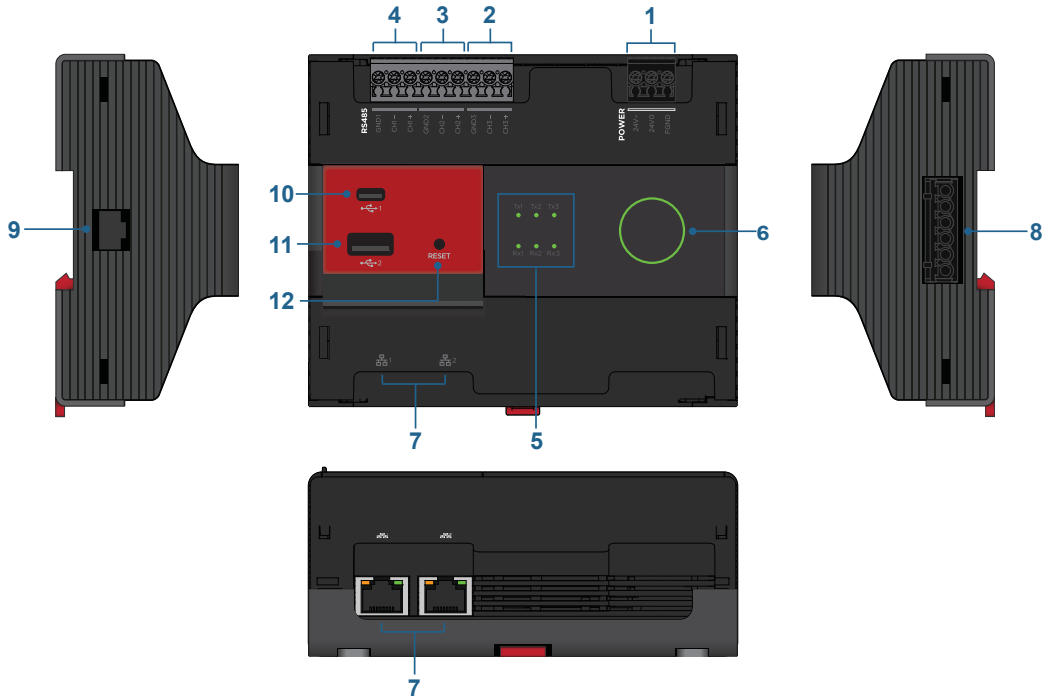


Table 1. Controller Terminals

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

Table 1. Controller Terminals (Continued)

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 indication for RS485 interfaces 1 to 3
		Rx1 LED (green)	
		Tx2 LED (green)	
		Rx2 LED (green)	
		Tx3 LED (green)	
LED	6	Ring LED	Indicates the operational status of the controller

Table 1. Controller Terminals (Continued)

Type	Legend	Signal	Comment
RJ45 Interface	7	Ethernet 1	10/100 base-T/TX
		Ethernet 2	
RS485 Interface 4 Terminals	8	~ (24V~)	Communication and power bus for expansion modules
		24V0	
		FGND	
		GND	
		(-) for RS485 interface 4	
RJ11 Interface	9	(+) for RS485 interface 4	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	10		Micro USB port to connect with laptops, mobile, and tablets
	11		USB Type A port to mount memory stick/flash drive for data transfer
Reset Button	12		Reset button to reset the device to factory default

## Tx LED and Rx LED

CPO-PC400 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 2. 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.

## Interfaces and Bus Connections

Via its various interfaces and bus connections, CPO-PC400 can be connected to a variety of devices and systems.

### Ethernet 1 and 2 Interfaces

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.

CPO-PC400 can be operated via a standard browser. By default, an integrated web-server provides all operation pages for a full browser-based operation. While browsing, the controller can remain connected in the Ethernet network without interruption.

### USB Interfaces

CPO-PC400 is built with USB ports that supports USB 2.0.

Table 3. USB Interfaces

USB Port Types	Purpose
Micro USB	To connect with laptops and mobile/tablet devices by using a USB cable for monitoring and troubleshooting the controller.
USB Type A*	To insert a memory stick/flash drive for data transfer.

NOTE: \* This option is only available for use with a future firmware release.

# TECHNICAL DATA

## Hardware Specifications

**Table 4. Hardware Specifications**

Feature	Specifications
FRAM	768 Kbyte
DDR3L	1 Gbyte
EMMC	4 Gbyte
CPU	Dual core: Arm Cortex-A9 Frequency: 800 MHz Arm Cortex-M4 Frequency: 227MHz
Operating System	LINUX/RTOS
Real-Time Clock Timekeeping Accuracy	+/- 5 ppm: +/- 2.63 minutes per year (+/- 0.43 seconds per day)
Real-Time Clock Retention	Buffered for 72 hours by gold capacitor

## System Data

**Table 5. System Data**

Operating Voltage (AC)	19 to 29 Vac (50/60Hz)
Operating Voltage (DC)	19 to 29 Vdc
Overvoltage Protection	Protected against overvoltages of max. 29 Vac or 40 Vdc. Terminals protected against short-circuiting.

## Power Consumption

**Table 6. Power Consumption**

Controller	Power	
	24VAC	24VDC
CPO-PC400	Max. 26VA	Max. 12W
CPO-PC400 and CPO-MMI	Max. 30VA	Max. 14W
CPO-PC400-W/ CPO-PC400-UW	Max. 30VA	Max. 14W
CPO-PC400-W/CPO-PC400-UW and CPO-MMI	Max. 35VA	Max. 16W

## Current Consumption

**Table 7. Current Consumption**

Controller	Power	
	24VAC	24VDC
CPO-PC400	1060 mA	500 mA
CPO-PC400 and CPO-MMI	1260 mA	570 mA
CPO-PC400-W/ CPO-PC400-UW	1250 mA	580 mA
CPO-PC400-W/CPO-PC400-UW and CPO-MMI	1450 mA	650 mA

## Standards

**Table 8. 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), BQB, RCM, AMEV AS-B, KBOB, EAC, RoHS II, Ethernet Protocol version IEEE 802.3, 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.

## Operating Environment

**Table 9. Operating Environment**

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

## Controller Parameters

**Table 10. Controller Parameters**

Parameters	Max. Number
Hardware Points (AI, AO, BI, BO, MI, MO, ACC)	500
Software Points (AV, BV, MV, AF, BF)	1500
Time Schedules	100
Calendar Objects	100
Control Loops	64
Loop Objects	60
Trend Objects	500
Event Enrollment Objects	500
Event Log Object	1
Event Log Object Associated Records	70000
Point Name Characters	64
Description Characters	95

## IO Scan Time

### Expansion IO

**Table 11. Expansion IO**

Points Present in IO Board	No. of Extn IO Boards Connected	IO Cycle Time (Including Cycle Time Delay) ms
Input Points (AI+BI)	1	198
	16	884
	n	$((n+1)*49)+100$
Output Points (AO+BO)	1	158
	16	564
	n	$((n+1)*29)+100$
Input + Output	1	256
	16	1348
	n	$(n+1)*78$

n: number of points

### Field Bus Scan Time

**Table 12. Field Bus Scan Time**

Number of Modules	IO Cycle Time ms
31	505.6

### Panel bus Scan Time

**Table 13. Panel Bus Scan Time**

Points Present in IO Board	No. of Extn IO Boards Connected	IO Cycle Time (Including Cycle Time Delay) ms
Input Points (AI+BI+ACC)	1	26
	16	116
	n	$(n*6)+20$
Output Points (AO+BO+MO)	1	15+250+20
	16	240+250+20
	n	$(n*15)+250+20$

n: number of connected boards

## Connection to Buses

Table 14. 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 controller can function as an M-Bus Master. It uses standard level converter (e.g. PW60) to connect to the M-Bus devices.

## Communication Baud Rates

Table 15. Communication Baud Rates

Ethernet	10/100 Mbit/s, RJ45
BACnet MSTP	9.6, 19.2, 38.4, 76.8, 115.2 Kbps
Modbus RTU	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
MMI Port	5 Vdc power output and RS485

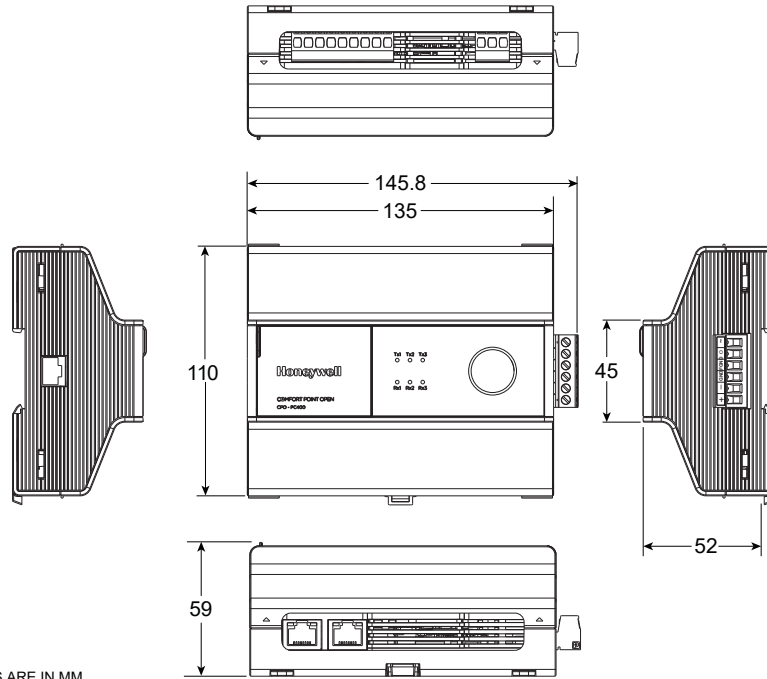
## Controller Part Numbers

Table 16. Controller

Part Number	Description
CPO-PC400	CPO Controller
CPO-PC400-MMIDN	CPO Controller including MMI with DIN Rail Base
CPO-PC400-MMIWL	CPO Controller including MMI with Panel Door/Wall Base

# DIMENSIONS

## CPO-PC400



\*ALL DIMENSIONS ARE IN MM



По вопросам продаж и поддержки обращайтесь:

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