

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.

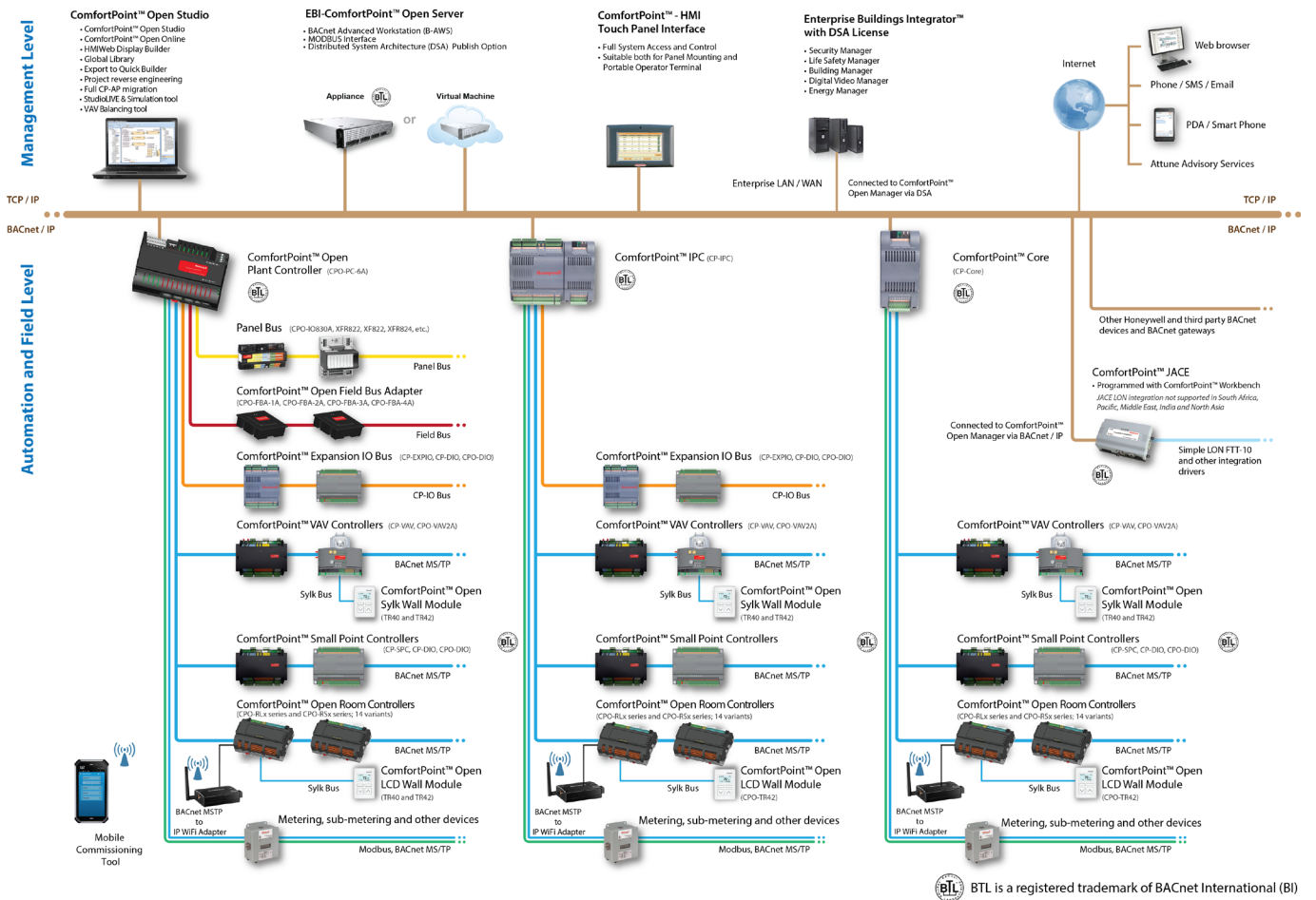


Fig. 1. ComfortPoint™ Open System architecture

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INTERFACES AND TERMINALS

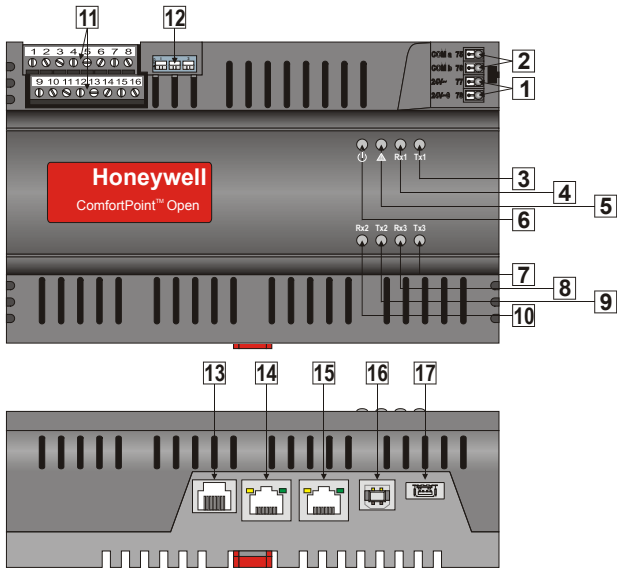


Fig. 2. Interfaces and terminals

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
ON	Normal operation. CPO-PC-6A is in Boot loader mode. Either Boot loader 1 or Boot loader 2 is running.
OFF	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.
very slow blink	CPO-PC-6A is operating normally and the firmware is executing the application.
slow blink	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
OFF	Watchdog alarm relay contacts are open = normal operation (or unpowered).
ON	Watchdog alarm relay contacts are closed = failure (alarm) status. <ul style="list-style-type: none"> • CPO-PC-6A has encountered a hardware problem. • The application has a fault. • 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.

Table 5. Permissible load of terminals 9, 10

	max. load	min. current
per normally closed contact (terminals 9, 10)	19...29 Vac current at $\cos \varphi \geq 0.6$: 0.5A 19...29 Vdc 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, 12, 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, start-up), 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 user-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

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

Standards

Table 9. Standards

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

Operational Environment

Table 10. Operational environment

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

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

communication interface	supported protocol(s)
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

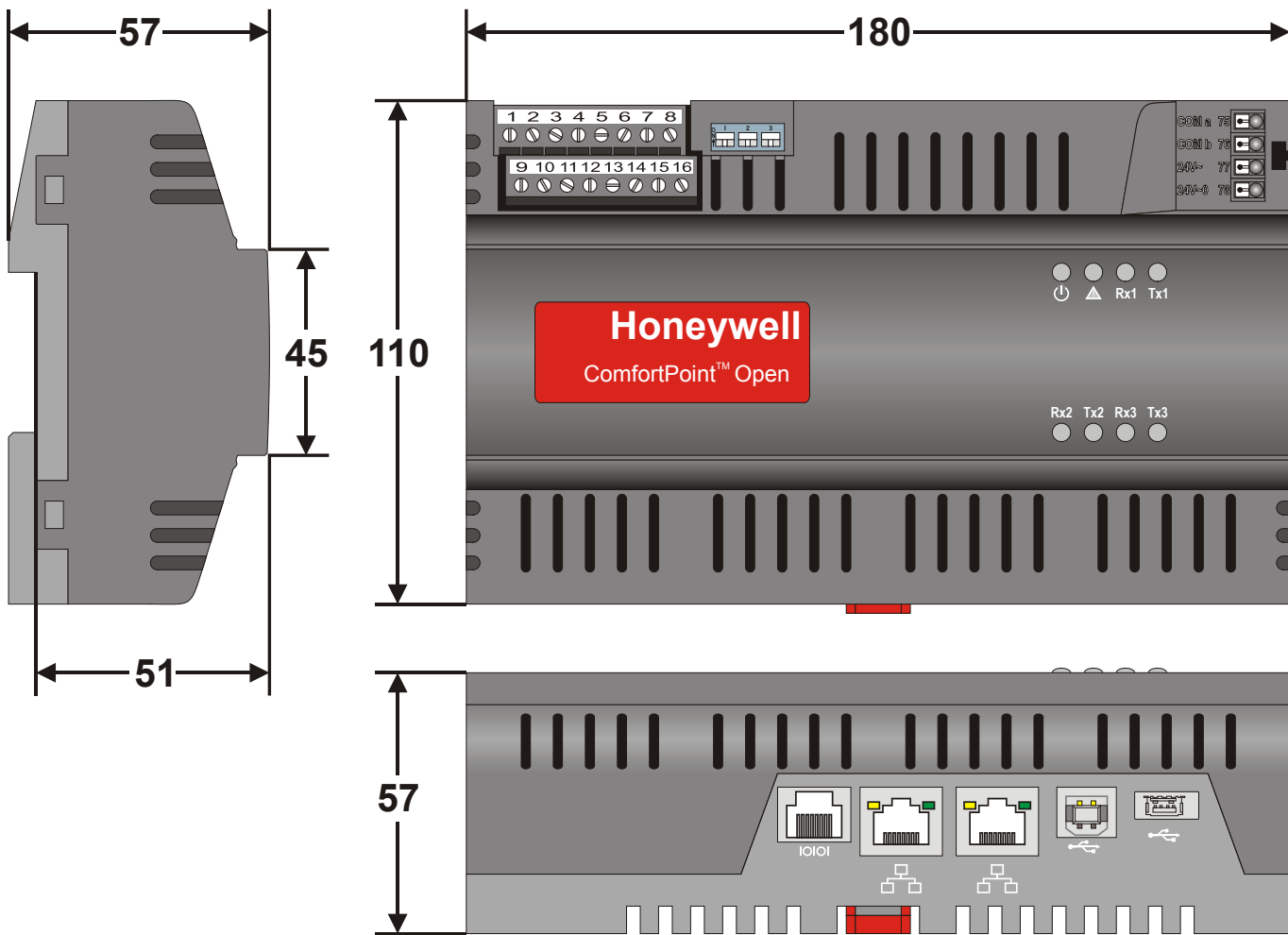


Fig. 3. CPO-PC-6A dimensions (mm)

Honeywell

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