Programmable Enhanced Unitary Controller

PEC Series

Overview

As a programmable unitary controller, PEC8445 is a BACnet advanced application controller that receives the BTL (B-AAC) certification and supports the BACnet IP communication protocol. PEC hosts automation features such as schedule, alarm.

PEC8445-PB1-SM supports the Honeywell EM communication bus, which can connect up to eight extension modules. PEC8445-PB1-SO supports the Modbus RTU communication protocol, which can connect to Modbus RTU devices, such as smart meters and networked FCUs.

PEC8445 provides fast downloading and data updating, and supports numerous network topologies allowing flexible networking and wiring. The controller hardware incorporates Honeywell user experiences, underscoring the human-friendly element in both appearance and use. The controller is programmable and can be widely used to control different building equipment.

Features

- The BACnet IP controller supports Ethernet communication and receives BTL (B-AAC) certification.
- PEC hosts automation features such as schedule, alarm, can work independently.
- Fully programmable to meet different HVAC applications.
- Fast response in downloading and updating data.
- Dual-Ethernet port allows it to support both star and daisy chain connection, as well as ring connection (optional RSTP switch required).
- This product supports dynamic or static IP address.
- Adopting Honeywell's universal controller features, the stunning external design safeguards its flexible and easy-to-use operation.
- Color-coded removable terminal blocks enable convenient and fault free termination.
- PEC8445-PB1-SM supports connections to extension modules using the EM bus with its own input/output points.
- PEC8445-PB1-SO supports access to Modbus RTU data from such as smart meters and FCUs, using the Modbus RTU bus with its own input/output points.
- Additional network security with advanced security encryption standard.
- Embedded programmable tool under Niagara platform with user friendly interface.
- The graphical programming tool supports offline simulation.
- CE, BTL, UL, and RoHS certification.

Technical Parameters

Table 1. Controller Model

Controller Model	UI	DI	AO	DO	Performance
PEC8445-PB1-SM	8	4	4	5	PUC5533-EM2 PUC6002-EM2 A combination of up to 8 modules
PEC8445-PB1-SO	8	4	4	5	PUC5533-EM2 PUC6002-EM2 Third-party Modbus RTU A combination of up to 8 modules

Note: The serial port settings of the 3rd-party RTU should be consistent with the IO extension module in the combination scenario.

Processor: NXP Kinetis 32-bit processor; 120 MHz

Memory: 256k Bytes RAM. 16MB flash memory

Real-Time Clock Backup Power Supply: Super capacitor maintains power to the onboard real-time clock for a minimum of 72 hours when supply power to the controller is disconnected.

Electrical

- Rated Voltage: 24 VAC; 50/60 Hz
- Power Consumption:

  5 VA max. (controller only)

  15 VA max. (including the controller and all inputs/outputs and communications)

Operating Environment

- Storage Temperature: -40°C to 65.5°C
- Operating Temperature: 0°C to 50°C
- Relative Humidity: 5% to 95% non-condensing
- Protection rating: IP20

Dimensions (H/W/D)

- PEC8445: 220*115*57.5MM

Honeywell

PEC8445-PB1-SO Technical Specifications for Communicating with Third-Party Units

Supported Modbus Specifications

Physical layer	RS485
Protocol type	Modbus-RTU
Baud rate	4800/9600/19200/38400
Parity bit	none/odd/even
Stop bit	1/2

Supported Modbus Function Codes

Read discrete input	02
Read coil	01
Write a single coil	05
Read input register	04
Read holding register	03
Write a single holding register	06
Write multiple holding registers	16

Supported Data Types

- 32bit Float (3210, 1032)
- Long integer (3210, 1032)
- Integer
- Boolean

Certifications

- BTL (B-AAC)
- CE
- UL
- RoHS

Real-time Clock

- Operating range: 24 hours, 365 days, multi-year calendar
- Power Failure Backup: 72 hours at 0°C to 50°C

Input and Output

Digital input (DI)

Input type: dry contact, pulse input

- Dry contact (open circuit ≥ 12K Ohms; closed circuit ≤ 500 Ohms)
- Pulse input (DI1 only) a maximum pulse frequency of 15 Hz, minimum pulse width of 20 ms

Digital output (DO)

Output type: dry contact relay output

- Dry contact relay output
  Rated voltage: 24 VAC, 50 / 60 Hz
  Rated current: 0 mA ~ 1 A(AC), uninterrupted

Analog Output (AO)

Output type: analog current, analog voltage, and digital output, which is customizable

- Analog current output:
  Current output range: 4.0 ~ 20.0 mA
  Load resistance: 550 Ohms max.
- Analog voltage output:
  Voltage output range: 0 ~ 10 VDC
  Maximum output current: 10 mA
  Load resistance: minimum 600 Ohms
- Digital output:
  False (0%): produces 0 VDC, (0 mA)
  True (100%): produces the maximum 11 VDC, (22 mA)

Set out in Table 2 are details of universal input (UI).

Table 2. UI Details

Input Type	Sensor	Operating Range
Room/Zone Discharge Air Outdoor Air Temperature	20K Ohm NTC	-40°C to 93°C
Resistance input	Generic	100 Ohms ~ 100K Ohms
Voltage input	Transmitter Controller	0 ~ 10 VDC
Current input	Transmitter Controller	Software settings Requires external 500-Ohm resistor
Discrete Input	Dry Contact closure	Open circuit ≥ 12K Ohms Closed circuit ≤ 500 Ohms

Analog Input/Analog Output Resolution

Input: 12-bit resolution

Output: 16-bit resolution

Communication Interface

- Ethernet: Two 10/100-Mbps adaptive RJ45 ports support star-network and daisy-chain connections, as well as ring redundancy connections (which require a RSTP-based switch). It is recommended to use category 5 cable.
- Sylk: one Sylk port, 18 ~ 22-AWG shielded, twisted-pair cable are recommended.
- 485 bus: one RS485 port, which supports up to eight expansion devices, 18 ~ 22-AWG shielded, twisted-pair cable are recommended.

Controller LED Status Display

The device status can be displayed via LED.

Table 3. STA LED Status Description

STA LED Status	Status Description
Lights off	No power; damaged LED; insufficient power supply; initial power-on; or boot loader damaged.
Solid on (green)	Start up power insufficient. Check power supply – this requires about 3.5 sec – occurs on power up, reset and refresh.
Blinking mode 1 – continuously blinks on for 1 sec and off for 1 sec	Operating normally.
Blinking mode 2 – continuously blinks on for 0.5 sec and off for 0.5 sec	Equipment alarm active; downloading configuration; loss of configuration.
Blinking mode 3 – continuously blinks on for 0.25 sec and off for 0.25 sec	Equipment in firmware upgrading mode.

*LED blinks in red: the hardware is damaged.

Table 4. 485 LED Status Light Description

RS485 Communication Status.

485 LED Status	Status Description
Solid off	The equipment not installed or configuration document corrupted.
Solid off, blink once every 2.5 seconds	Controller is operating normally with no communication.
Solid off, blink twice every 2.5 seconds	Controller is operating normally with communication.
Solid off, blink 3 times every 2.5 seconds	Controller is operating normally with transmission of document in progress.

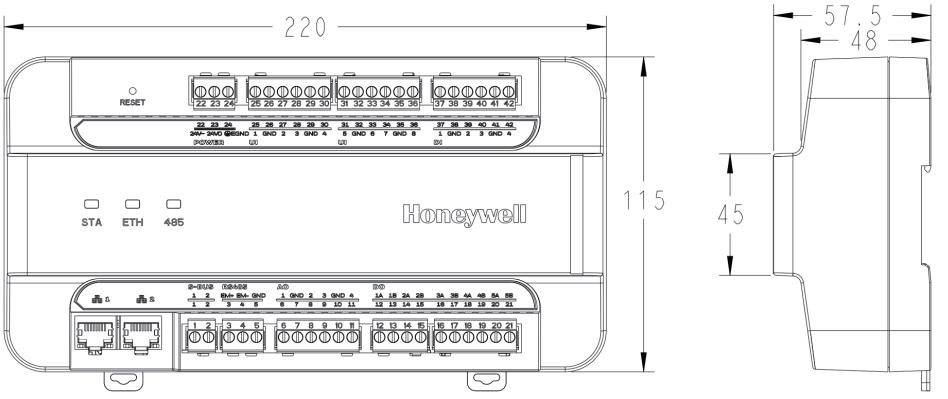
Table 5. ETH LED Status Description

BACnet IP communication status. After the controller is powered on, LED will display one of the following status as described in Table 5.

ETH LED Status	Status Description
Solid on (green)	Equipment fault or system crushed.
Solid on, blink once every 2.5 seconds	Bootloader running with no IP link.
Solid on, blink twice every 2.5 seconds	Bootloader running with BACNet communication.
Solid on, blink 3 times every 2.5 seconds	Bootloader running with BACNet communication and data tranmission.
Solid off	No power supply, equipment malfunction or system crushed.
Solid off, blink once every 2.5 seconds	Controller is operating normally, without IP link.
Solid off, blink twice every 2.5 seconds	Controller is operating normally with BACnet communication.
Solid off, blink 3 times every 2.5 seconds	Controller is operating normally with communication and data transmission.
Rapid blinking	Equipment fault or system crashed.

Pollution degree: Level 2
Protection against electric shock: Class II
Contact separation situation: micro-gap structure
Load type: continuous type
Input and output connections: use screw clamp terminals
Installation method: DIN rail installation EN50022

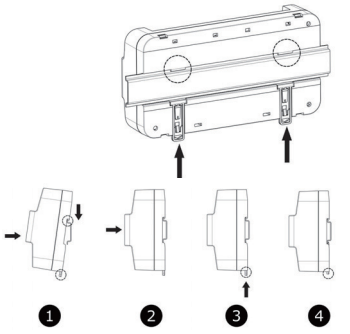
Product Dimensions (unit: mm)



Product Installation

Installation notes:

- Removable terminals make it easier for installation and maintenance;
- Controller must be installed in adequate space for wiring, maintenance and removal;
- Product supports DIN rail. DIN rail specification: EN50022 7.5 mm x 35 mm.



Installation Instructions:

1.Pull both hooks at the base of the controller. Tilt the controller and fix the hooks on the top of the controller onto the guide rails;
2.Press the controller for it to fit the guide rail;
3.Push in both hooks at the base to fasten the controller;
4.The controller after the hooks are pushed in is as shown in Figure 4.

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