



# ECB-PTU Series

BACnet® B-ASC Powered Terminal Unit Programmable Controllers



## Overview

The ECB-PTU Series controllers are microprocessor-based programmable controllers designed to control powered terminal units such as powered fan coil units, heat pumps units, and chilled beams.

Each controller uses the BACnet® MS/TP LAN communication protocol and is BTL®-Listed as BACnet Application Specific Controllers (B-ASC) and WSP Certified.

These controllers are optimized for ultra-low power consumption and can be operated as stand-alone units or as part of a networked system to suit any installation requirement

## Applications

These controllers meet the requirements of the following applications:

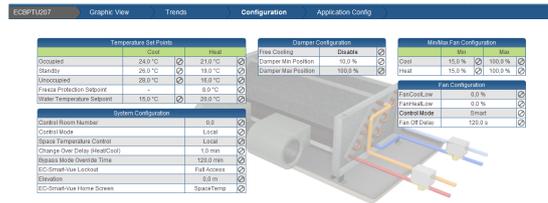
- Fan Coil Units
- Heat Pumps
- Chilled Beams
- Reversible Ceiling with 6-way valves
- Lighting fixtures and shade / sunblind motors when associated to ECx-Light/Blind Series expansion modules

## Features & Benefits

### Preloaded Applications

Factory preloaded applications allow these controllers, straight out of the box, to operate standard PTU equipment with a proven energy-efficient sequence of operation thereby eliminating the need for programming.

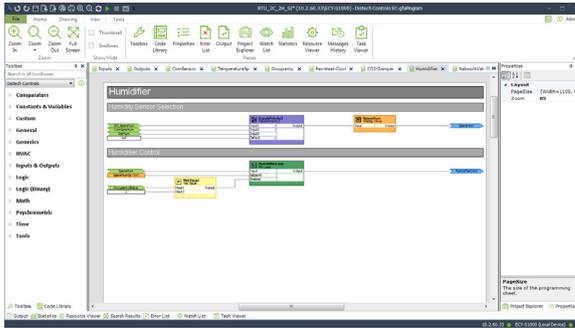
The preloaded application can be selected using an Allure EC-Smart-Vue sensor even before the network has been installed for rapid deployment or through the EC-Net™ solution using Distech Controls' *dcgfx* Applications.



DISTECH CONTROLS

## Programmability

Supports Distech Controls' EC-gfxProgram, which makes Building Automation System (BAS) programming effortless, by allowing you to visually assemble building blocks to create a custom control sequence for any HVAC, lighting, or building automation application.



## Dedicated Inputs & Outputs

Each controller has specific IOs to fulfill any type of installation:

- Universal inputs for using your preferred or engineer-specified sensors.
- Sensor inputs to ensure optimal temperature measurement processing.
- Digital inputs to accelerate the integration of binary inputs such as window contacts.
- Powered Triac outputs for direct connection of valves and actuators.
- Powered relay outputs for direct connection of ventilator fans.
- Relay contact outputs for controlling externally powered devices such as electric heater, fans, ...
- Analog outputs to provide control signals for external peripherals.
- Digital / Analog outputs for enhanced flexibility

Depending on the installation configuration and controlled equipment (valves, fans...), the suitable model will allow for simplified installation and wiring, and eliminate the need for additional external power supply.

## Increased Energy Efficiency

Improves energy efficiency when combined with:

- Motion detectors to automatically adjust a zone's occupancy mode from standby to occupied when presence is detected
- CO<sub>2</sub> sensors as part of a demand-controlled ventilation strategy that adjusts the amount of fresh air intake according to the number of building occupants

- Light switches to control both lighting and a room's HVAC occupancy / standby mode setting

## Smart Room Control Support

The Smart Room Control solution is an end-to-end system for the control of HVAC equipment, lighting, and shades/sunblinds, achieving the highest levels of comfort for occupants while cutting costs from installation time and wiring/material requirements to energy consumption. This solution combines:

- Lighting and shade/sunblind expansion modules to control lights (DALI, on/off or dimming) and shades/sunblinds (24 VDC or 100-240 VAC, up/down and angle rotation).
- Multi-sensor combining motion and luminosity (Lux) sensors and equipped with an Infrared receiver that works with a convenient remote control.
- Wireless (infrared) personal remote control for increased occupant comfort.
- Allure™ Series Communicating Sensors for increased occupant comfort settings.

## Open-to-Wireless™ Solution



The controllers are Open-to-Wireless™ ready, and when paired with the Wireless Receiver, work with a variety of wireless battery-less sensors and switches, to reduce the cost of installation and minimize the impact on existing partition walls. For supported frequencies in your area, refer to the [Open-to-Wireless Solution Guide](#).

Available with an optional Wireless Receiver that supports up to 24 wireless inputs to create wire-free installations.

## Allure™ Series Communicating Sensor Support

These controllers work with a wide range of sensors, such as the Allure Series Communicating Sensors that are designed to provide intelligent sensing and control devices for increased user experience and energy efficiency.

- Allure EC-Smart-View sensors feature a backlit-display and graphical menus that provide precise environmental zone control, with any combination of the following: temperature, humidity, CO<sub>2</sub>, and motion sensor.
- Allure EC-Smart-Comfort sensors feature colored LED indicators to provide user feedback, rotary knobs to adjust the setpoint offset and fan speed, and an occupancy override push button. This sensor can also be expanded with a combination of up to 4 add-on push button modules for lighting and shade/ sunblind control.
- Allure EC-Smart-Air sensors combine precise environmental sensing in a discreet and alluring enclosure for temperature, humidity, and CO<sub>2</sub>.



## Supported Platforms

### EC-Net<sup>AX</sup> Solution

The EC-Net<sup>AX</sup> multi-protocol integration solution is web-enabled and powered by the Niagara<sup>AX</sup> Framework, establishing a fully Internet-enabled, distributed architecture for real-time access, automation and control of devices. The EC-Net<sup>AX</sup> open framework solution creates a common development and management environment for integration of LONWORKS®, BACnet® and other protocols. Regardless of manufacturer and protocol, the EC-Net<sup>AX</sup> system provides a unified modeling of diverse systems and data, providing one common platform for development, management and enterprise applications.

□ □ □ ECB-PTU Series

## No External Transformer

Controllers in this series feature a 100-240 VAC universal power supply input that allows for direct connection to the mains and do not require external transformers, for improved reliability and reduced installation costs.

Some models have a 24 VAC power supply output that can be used to power analog dampers and valve actuators thereby eliminating the need for a transformer.

The ECx-Blind-4LV models have an embedded power supply that can eliminate the need for an external power supply to power the controlled device.

## Ultra-low Power Consumption

Careful attention was paid to the design of these controllers as well as to the selection of their components for optimal energy management. This provides ultra-low energy consumption while providing high-level control performance.

## Reduced Installation Time & Cost

Optional strain relief and terminal block covers provide enhanced electrical protection that can reduce installation costs by eliminating the need for a protective enclosure (when allowed by local regulations).

Moreover, powered digital outputs allow for direct connection of controlled loads to save installation time and wiring costs.

## eu.bac Certified Control Efficiency (pending)

The eu.bac certification schemes guarantees the highest level of performance of the products and systems, as defined in the EU-Directives and relevant EN standards. This allows building owners to ensure that their building keeps performing as well, or better than when it was first commissioned.



## BTL-Listed & WSP-Certified Controllers

These controllers are listed BTL B-ASC and certified WSP, and guarantee interoperability with other manufacturers' BTL-listed controllers.



## Model Selection

Model	ECB-PTU-107	ECB-PTU-207	ECB-PTU-208	ECB-PTU-307	ECB-PTU-308
Points	12	16	14	17	16
Universal Inputs	2	2	2	2	2
Digital Outputs	3	3	3	2	3
Sensor Inputs (NTC 10 kΩ Type II, III)	1	1	1	2	1
Wireless inputs <sup>1</sup>	24	24	24	24	24
Relay Contact Outputs ( <i>typ. Electric Heater</i> )	1 x 2 kW	1 x 2 kW	1 x 2 kW	2 x 1 kW	1 x 2 kW
Powered Relay Outputs ( <i>typ. Fan Speeds</i> )	3	3	3	3	3
Line-Powered Triac Outputs ( <i>typ. Valves</i> )	2	2	0	4	0
24 VAC Triac Outputs ( <i>typ. Valves</i> ) <sup>2</sup>	0	0	2	0	4
Analog Outputs	0	4	2	2	2
24 VAC Power Supply Outputs			■		■
Supply Voltage Input	100-240VAC	100-240VAC	100-240VAC	100-240VAC	100-240VAC
Compatible with Optional Subnet Devices:					
Allure Series and EC- Multi-Sensor Series <sup>3</sup>	4	4	4	4	4
ECx-Light-4 / ECx- Light-4D / ECx- Light-4DALI	2	2	2	2	2
ECx-Blind-4 / ECx- Blind-4LV	2	2	2	2	2

- All controllers are Open-to-Wireless ready. Available when an optional Wireless Receiver is connected to the controller. Some wireless sensors may use more than one wireless input from the controller.
- Can be used to power certain types of valves and air dampers, thereby eliminating the need for a transformer.
- A controller can support a maximum of two Allure Series Communicating Sensor models equipped with a CO<sub>2</sub> sensor. The remaining connected Allure Series Communicating Sensor models must be without a CO<sub>2</sub> sensor.
- A controller can support four sensors among Allure EC-Smart-View and EC-Multi-Sensor.

## Terminal Selection

### Input Terminal Selection

Model	ECB-PTU-107	ECB-PTU-207	ECB-PTU-208	ECB-PTU-307	ECB-PTU-308
Universal Inputs (UI) <sup>1</sup>	UI1 UI2	UI1 UI2	UI1 UI2	UI1 UI2	UI1 UI2
Sensor Inputs (SI) <sup>1</sup>	SI3	SI3	SI3	SI3 SI4	SI3
Digital Inputs (DI) <sup>1</sup>	DI4 DI5 DI6	DI4 DI5 DI6	DI4 DI5 DI6	DI5 DI6	DI4 DI5 DI6
Power Supply <sup>1</sup>	Vref	Vref	Vref	Vref	Vref

UI = Universal Input

SI = Sensor Input

DI = Digital Input

## Output Terminal Selection

Model	ECB-PTU-107	ECB-PTU-207	ECB-PTU-208	ECB-PTU-307	ECB-PTU-308
Triac Outputs	DO5 DO6	DO5 DO6	DO5 <sup>1</sup> DO6 <sup>1</sup>	DO5 DO6 DO9 DO10	DO5 <sup>1</sup> DO6 <sup>1</sup> DO9 <sup>1</sup> DO10 <sup>1</sup>
Powered Relay Outputs	DO1 DO2 DO3	DO1 DO2 DO3	DO1 DO2 DO3	DO1 DO2 DO3	DO1 DO2 DO3
Digital Relay Contact Outputs	DO4 C4	DO4 C4	DO4 C4	DO4 C4 DO11 C11	DO4 C4
Analog Outputs <sup>1</sup>		AO7 AO8 AO9 AO10	AO7 AO8	AO7 AO8	AO7 AO8
24 VAC Outputs <sup>1</sup>			24V~		24V~

DO = Digital Output

AO = Analog Output

C = Contact

1. SELV (Safety Extra Low Voltage) inputs/outputs.

## Recommended Applications

Model	ECB-PTU-107	ECB-PTU-207	ECB-PTU-208	ECB-PTU-307	ECB-PTU-308
<b>Fan Coil Unit:</b>					
<input type="checkbox"/> 2/4 pipes - 3 speed fan - On/Off / thermal valves	■				
<input type="checkbox"/> 2/4 pipes - Variable / 3-speed fan - On/off / thermal valves		■	■		
<input type="checkbox"/> 2/4 pipes - Variable / 3-speed fan - Analog actuator		■	■		
<input type="checkbox"/> 2 pipes - Variable / 3-speed fan - Floating actuator		■	■		
<input type="checkbox"/> 4 pipes - Variable / 3-speed fan - Floating actuator				■	■
<input type="checkbox"/> Two Room: 2/4 pipes - Variable speed fan - On/Off / thermal valves				■	■
<b>Heat Pump Unit:</b>					
<input type="checkbox"/> 3-speed fan	■				
<input type="checkbox"/> Variable speed fan		■	■		
<b>Chilled Beam:</b>					
<input type="checkbox"/> On/Off / thermal valves	■		■		
<input type="checkbox"/> 2 pipes - Floating actuator	■		■		
<input type="checkbox"/> 4 pipes - Floating actuator				■	■
<input type="checkbox"/> Two Room: 2/4 pipes - On/Off / thermal / analog valves				■	■
Reversible Ceiling with 6-way valves		■	■		
Unit Ventilator		■	■		

## BACnet Objects List

<b>BACnet Objects List</b>	
BACnet Calendar Objects	1
<input type="checkbox"/> Special events per calendar	25
BACnet Schedule Objects	2
<input type="checkbox"/> Special events per schedule	5
BACnet PID Loop Objects	8
<b>BACnet BV Objects:</b>	
<input type="checkbox"/> Commandable	10
<input type="checkbox"/> Non-Commandable	40
<b>BACnet MSV Objects:</b>	
<input type="checkbox"/> Commandable	10
<input type="checkbox"/> Non-Commandable	40
<b>BACnet AV Objects:</b>	
<input type="checkbox"/> Commandable	25
<input type="checkbox"/> Non-Commandable	75

# Product Specifications

## Power Supply (ECB-PTU-107 / 207 / 307)

Voltage Range 100-240 VAC; -15%/+10%;

Frequency Range 50/60Hz

Overcurrent Protection 4.0A external circuit breaker type C or  
4.0A fast acting high breaking external fuse (250 VAC min)

Device Insulation Type Double Insulation



Overvoltage Category II - 2.5 kV

Power Consumption 0.9 W plus all external loads<sup>1</sup>

Maximum Consumption 4.0 A

1. External loads must include the power consumption of any connected modules such as subnet devices, wireless module (1VA) and triac outputs.. Refer to the respective module's datasheet for related power consumption information.

## Power Supply (ECB-PTU-208 / 308)

Voltage Range 100-240 VAC; -15%/+10%;

Frequency Range 50/60Hz

Overcurrent Protection 4.0A external circuit breaker type C or  
4.0A fast acting high breaking external fuse (250 VAC min)

Device Insulation Type Double Insulation



Overvoltage Category II - 2.5 kV

Power Consumption < 2.7 W plus all external loads<sup>1</sup>

Maximum Consumption 3.5 A

1. External loads must include the power consumption of any connected modules such as subnet devices, wireless module (1VA) and triac outputs.. Refer to the respective module's datasheet for related power consumption information.

Device Insulation Type Double Insulation



## Communications

Communication Bus BACnet MS/TP

BACnet Profile B-ASC<sup>1</sup>

EOL Resistor Built-in, dip switch selectable

Baud Rates 9600, 19 200, 38 400, or 76 800 bps

Addressing Dip switch

1. Refer to Distech Controls' Protocol Implementation Conformity Statement for BACnet.

## Hardware

Processor STM32 (ARM Cortex™ M3) MCU, 32 bit

CPU Speed 68 MHz

Memory 384 kB Non-volatile Flash (applications)  
1 MB Non-volatile Flash (storage)  
64 kB RAM

Status Indicator Green LEDs: Controller & Power Status

LAN Tx & Rx

## Subnetwork

Communication	RS-485
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45
Connection Topology	Daisy-chain
Maximum number of supported room devices per controller combined	4

### Supported room devices:

- Allure EC-Smart-View Series<sup>1</sup>
- Allure EC-Smart-Comfort Series
- Allure EC-Smart-Air Series<sup>1</sup>
- EC-Multi-Sensor Series

### Supported expansion modules per controller:

- |   |   |
|---|---|
| <input type="checkbox"/> ECx-Light-4 / ECx-Light-4D / ECx-Light-4DALI | 2 |
| <input type="checkbox"/> ECx-Blind-4 / ECx-Blind-4LV                  | 2 |

1. A controller can support a maximum of two Allure Series Communicating Sensor models equipped with a CO<sub>2</sub> sensor. The remaining connected Allure Series Communicating Sensor models must be without a CO<sub>2</sub> sensor.

## Wireless Receiver<sup>1</sup>

Communication Protocol	EnOcean wireless standard
Number of Wireless Inputs <sup>2</sup>	24
Supported Wireless Receivers	Refer to the Open-to-Wireless Solution Guide
Cable	Telephone cord
<input type="checkbox"/> Connector	4P4C modular jack
<input type="checkbox"/> Length (maximum)	6.5ft (2m)

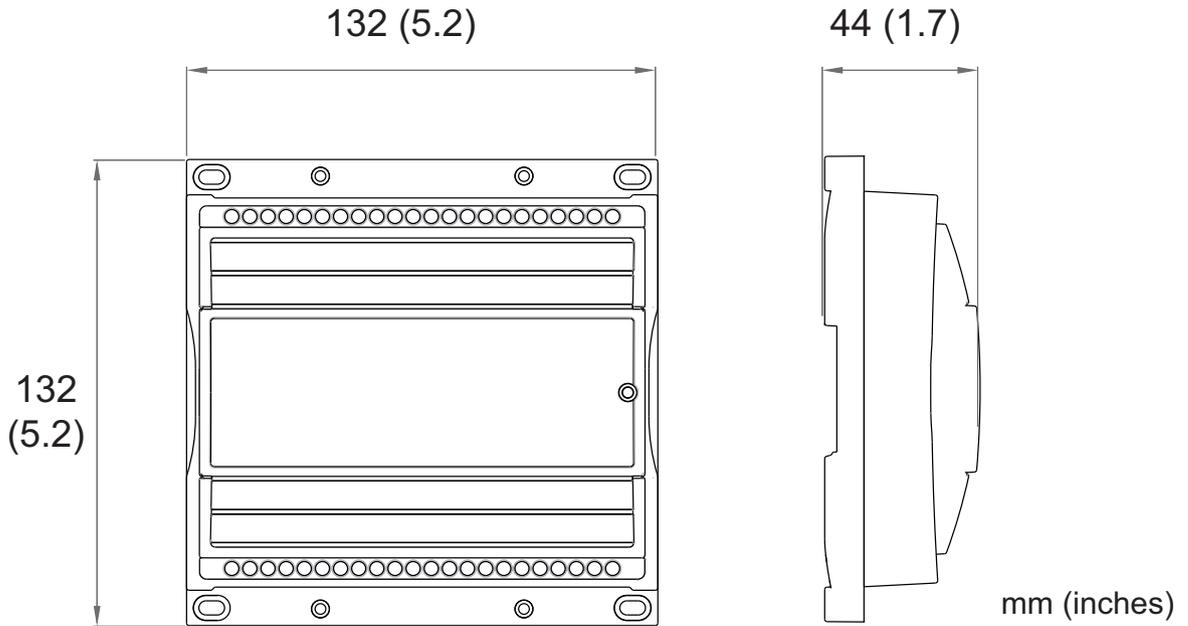


1. Available when an optional external Wireless Receiver module is connected to the controller. Refer to the Open-to-Wireless Solution Guide for a list of supported EnOcean wireless modules.
2. Some wireless modules may use more than one wireless input from the controller.

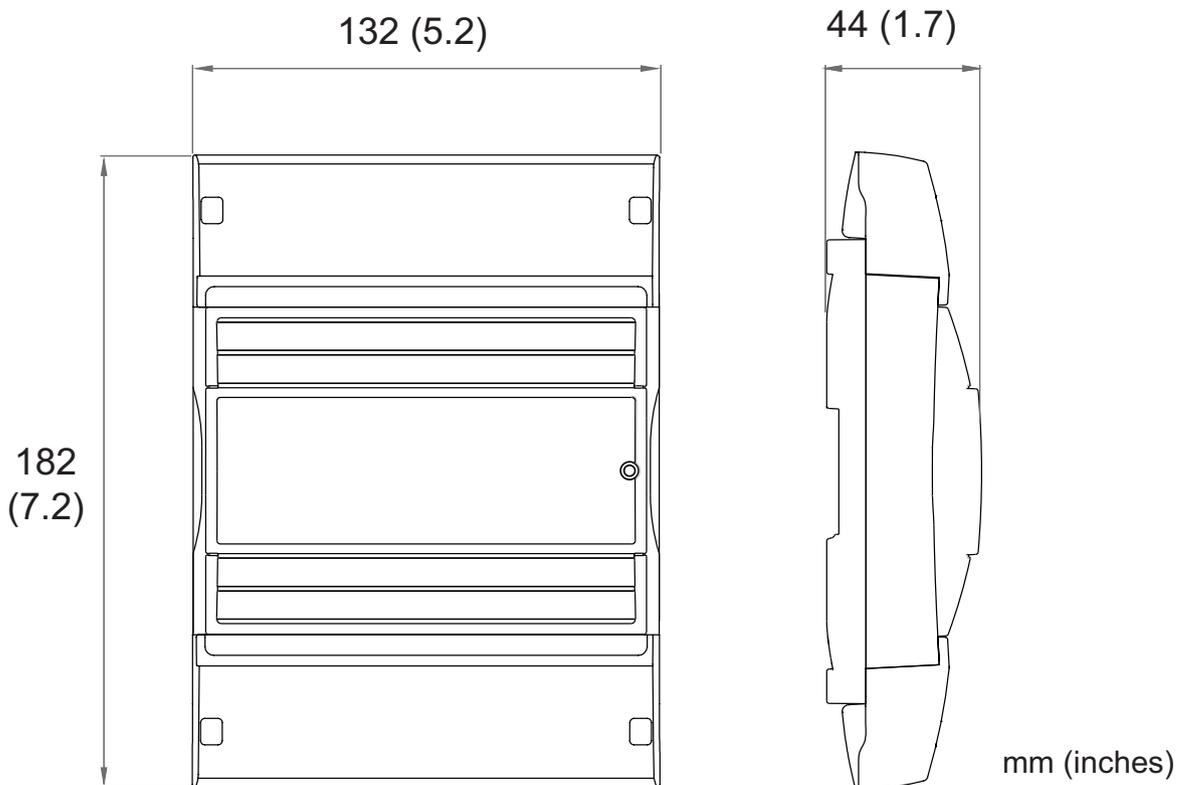
## Mechanical

### Dimensions

- without terminal block covers ————— 132 × 132 × 44 mm (5.2 × 5.2 × 44")



- with terminal block covers ————— 182 × 132 × 44 mm (7.2 × 5.2 × 44")



### Shipping Weight:

- ECL-PTU-107 / ECL-PTU-207 ————— 0.82lbs (0.37 kg)
- ECB-PTU-307 ————— 0.86lbs (0.39 kg)
- ECB-PTU-208 / ECB-PTU-308 ————— 0.93lbs (0.42 kg)

Enclosure Material \_\_\_\_\_ ABS  
Enclosure Rating \_\_\_\_\_ Plastic housing, UL94-5VB flammability rating  
Color \_\_\_\_\_ Blue casing & grey connectors  
Installation \_\_\_\_\_ Direct DIN-rail mounting or wall mounting

## Environmental

Operating Temperature \_\_\_\_\_ 41°F to 104°F (+5°C to +40°C)  
Storage Temperature \_\_\_\_\_ -4°F to 158°F (-20°C to +70°C)  
Relative Humidity \_\_\_\_\_ 0 to 90% Non-condensing  
Ingress Protection Rating \_\_\_\_\_ IP30 (with terminal block cover and strain relief)  
Altitude \_\_\_\_\_ < 6561ft (2000m)  
Pollution Degree \_\_\_\_\_ 2

## Certified Performances

eu.bac license number \_\_\_\_\_ 213324

### Chilled Ceiling Systems

Cooling Control Accuracy \_\_\_\_\_ 0.36°F (0.2°C)

### Fan Coil Systems (2 pipes + electric heater)

Heating Control Accuracy \_\_\_\_\_ 0.18°F (0.1°C)

Cooling Control Accuracy \_\_\_\_\_ 0.18°F (0.1°C)

### Fan Coil Systems (4 pipes)

Heating Control Accuracy \_\_\_\_\_ 0.18°F (0.1°C)

Cooling Control Accuracy \_\_\_\_\_ 0.18°F (0.1°C)

## Standards and Regulation<sup>1</sup>

CE:

Emission \_\_\_\_\_ EN61000-6-3: 2006; A1:2010; Generic standards for residential, commercial and light-industrial environments

Immunity \_\_\_\_\_ EN61000-6-1: 2005; Generic standards for residential, commercial and light-industrial environments

FCC \_\_\_\_\_ This device complies with FCC rules part 15, subpart B, class B

UL Listed (CDN & US) \_\_\_\_\_ UL 61010-1 Safety Requirements for Electrical Equipment For Measurement, Control, And Laboratory Use - Part 1: General Requirements - Edition 2 - Revision Date 2008/10/28

\_\_\_\_\_ CSA C22.2 NO. 61010-1 Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use - Part 1: General Requirements - Edition 2 - Revision Date 2008/10/01

\_\_\_\_\_ File number: E352591



1. Must be mounted with strain reliefs and terminal block covers or in a junction box to comply with CE and UL regulations.

# Specifications – Inputs

## Universal Inputs (UI)

### General

Input Type ————— Universal; software configurable

### Contact

Type ————— dry contact (0 - 3.3VDC)

### Counter

Type ————— dry contact (0 - 3.3VDC)

Maximum Frequency ————— 1Hz maximum

Minimum Duty Cycle ————— 500milliseconds On / 500milliseconds Off

### 0 to 10VDC

Range ————— 0 to 10VDC

### Resistance/Thermistor

Type ————— 10 k $\Omega$  Type II, III (10 k $\Omega$  @ 77°F; 25°C)

## Sensor Inputs (SI)

### General

Input Type ————— Sensor; software configurable

Accuracy —————  $\pm 32.18^\circ\text{F}$ ;  $0.1^\circ\text{C}$  @ 77°F; 25°C (controller only)

### Contact

Type ————— dry contact (0 - 3.3VDC)

### Counter

Type ————— dry contact (0 - 3.3VDC)

Maximum Frequency ————— 1Hz maximum

Minimum Duty Cycle ————— 500milliseconds On / 500milliseconds Off

### Resistance

Resistor ————— 10 k $\Omega$  Type II, III (10 k $\Omega$  @ 77°F; 25°C)

## Digital Inputs (DI)

### General

Input Type ————— Digital; software configurable

### Contact

Type ————— dry contact (0 - 3.3VDC)

### Counter

Type ————— dry contact (0 - 3.3VDC)

Maximum Frequency ————— 20Hz maximum

Minimum Duty Cycle ————— 20milliseconds On / 20milliseconds Off

## Power Supply (Vref)

Output (Vref) ————— 5VDC for polarization ( $I < 1\text{mA}$ )

# Specifications – Outputs

## Triac Outputs

### General

For ECB-PTU-107, ECB-PTU-207, and ECB-PTU-307

Output Type \_\_\_\_\_ Triac  
Voltage Range \_\_\_\_\_ 100-240 VAC (same as device power supply)  
Maximum Current per Output \_\_\_\_\_ 0.5A continuous  
\_\_\_\_\_ 1 A @15% duty cycle for a 10-minute period  
Inrush Current \_\_\_\_\_ 3.0 A maximum (<20 milliseconds)  
Common Terminal \_\_\_\_\_ 1 per pair of outputs

### General

For ECB-PTU-208 and ECB-PTU-308

Output Type \_\_\_\_\_ Triac  
Voltage \_\_\_\_\_ See on-board 24 VAC power supply  
Current \_\_\_\_\_ See on-board 24 VAC power supply  
Power Source \_\_\_\_\_ Internal on-board 24 VAC power supply  
Common Terminal \_\_\_\_\_ 1 per pair of outputs

### Digital (On/Off)

Voltage Range for Models:

- ECB-PTU-107 / ECB-PTU-207 / ECB-PTU-307 \_\_\_\_\_ 0 or 100-240 VAC  
(Same as device power supply)
- ECB-PTU-208 / ECB-PTU-308 \_\_\_\_\_ 0 or 24 VAC

### PWM

Application \_\_\_\_\_ Typically Thermal Valve Control  
Range \_\_\_\_\_ Adjustable period from 2 to 65 seconds

### Floating

Minimum Outputs \_\_\_\_\_ 2 consecutive outputs  
Minimum Pulse On/Off Time \_\_\_\_\_ 500 milliseconds  
Drive Time Period \_\_\_\_\_ Adjustable from 10 to 600 seconds

## Powered Relay Outputs

### General

Output Type \_\_\_\_\_ Digital  
Application \_\_\_\_\_ Typically Fan Speeds  
Current \_\_\_\_\_ 3.0 A max. (inductive or resistive load) for the total sum of the 3 outputs  
Resting State \_\_\_\_\_ Normally open  
Common Terminal \_\_\_\_\_ Shared

### Digital (On/Off)

Voltage Range \_\_\_\_\_ 0 or 100-240 VAC (Same as device power supply)

## Digital Relay Contact

### General

Output Type \_\_\_\_\_ Digital  
Application \_\_\_\_\_ Typically Electric Heater  
Output Protection \_\_\_\_\_ Must be protected with a 10.0 A external circuit breaker or a  
10.0 A external fast acting, high breaking fuse (250 VAC min.)

### Contact

Type \_\_\_\_\_ Dry contact  
Voltage Range \_\_\_\_\_ 100 to 255 VAC  
Current for models:  
 ECB-PTU-107 / ECB-PTU-207 / ECB-PTU-208 / ECB-PTU-308 — 9.0 A max. on a resistive load  
(2 kW @ 230 VAC)  
 ECB-PTU-307 \_\_\_\_\_ 6.0 A max. on a resistive load (1.4 kW @ 230 VAC)  
Resting State \_\_\_\_\_ Normally Open  
Common Terminal \_\_\_\_\_ Dedicated digital

## Analog

### ECB-PTU-207 / ECB-PTU-208 / ECB-PTU-307 / ECB-PTU-308 models only

#### General

Output Type \_\_\_\_\_ Analog  
Voltage Range \_\_\_\_\_ 0 to 10VDC linear  
Current \_\_\_\_\_ 5 mA maximum

## 24 VAC Outputs

### ECB-PTU-208 / ECB-PTU-308 models only

Voltage \_\_\_\_\_ See on-board 24 VAC power supply  
Current \_\_\_\_\_ See on-board 24 VAC power supply  
Power Source \_\_\_\_\_ Internal on-board 24 VAC power supply

## On-board 24 VAC power supply

### ECB-PTU-208 / ECB-PTU-308 models only

Voltage Range \_\_\_\_\_ 24 VAC;  $\pm$  10%  
Frequency Range \_\_\_\_\_ 50 Hz  
Current \_\_\_\_\_ 500 mA max. on a resistive load (12 VA @ 24 VAC)  
Peak current \_\_\_\_\_ 0.8 A max.  
Protection \_\_\_\_\_ Short-circuit protected  
\_\_\_\_\_ Overload protected

Specifications subject to change without notice.

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