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.
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
- CO₂ 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-Vue sensors feature a backlit-display and graphical menus that provide precise environmental zone control, with any combination of the following: temperature, humidity, CO\textsubscript{2}, 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\textsubscript{2}.

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.
## Model Selection

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

1. 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.
2. Can be used to power certain types of valves and air dampers, thereby eliminating the need for a transformer.
3. A controller can support a maximum of two Allure Series Communicating Sensor models equipped with a CO₂ sensor. The remaining connected Allure Series Communicating Sensor models must be without a CO₂ sensor.
4. A controller can support four sensors among Allure EC-Smart-Vue and EC-Multi-Sensor.

## Terminal Selection

### Input Terminal Selection

<table>
<thead>
<tr>
<th>Model</th>
<th>ECB-PTU-107</th>
<th>ECB-PTU-207</th>
<th>ECB-PTU-208</th>
<th>ECB-PTU-307</th>
<th>ECB-PTU-308</th>
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<tbody>
<tr>
<td>Universal Inputs (UI)</td>
<td>UI1</td>
<td>UI2</td>
<td>UI1</td>
<td>UI2</td>
<td>UI1</td>
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<tr>
<td>Sensor Inputs (SI)</td>
<td>SI3</td>
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<td>SI3</td>
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<tr>
<td>Digital Inputs (DI)</td>
<td>DI4</td>
<td>DI5</td>
<td>DI4</td>
<td>DI5</td>
<td>DI5</td>
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<tr>
<td>Power Supply 1</td>
<td>Vref</td>
<td>Vref</td>
<td>Vref</td>
<td>Vref</td>
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</table>

UI = Universal Input
SI = Sensor Input
DI = Digital Input
Output Terminal Selection

<table>
<thead>
<tr>
<th>Model</th>
<th>ECB-PTU-107</th>
<th>ECB-PTU-207</th>
<th>ECB-PTU-208</th>
<th>ECB-PTU-307</th>
<th>ECB-PTU-308</th>
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<tbody>
<tr>
<td>Triac Outputs</td>
<td>DO5 DO6</td>
<td>DO5 DO6</td>
<td>DO5(^1) DO6(^1)</td>
<td>DO5 DO6 DO9 DO10</td>
<td>DO5(^1) DO6(^1) DO9(^1) DO10(^1)</td>
</tr>
<tr>
<td>Powered Relay Outputs</td>
<td>DO1 DO2 DO3</td>
<td>DO1 DO2 DO3</td>
<td>DO1 DO2 DO3</td>
<td>DO1 DO2 DO3</td>
<td>DO1 DO2 DO3</td>
</tr>
<tr>
<td>Digital Relay Contact Outputs</td>
<td>DO4 C4</td>
<td>DO4 C4</td>
<td>DO4 C4</td>
<td>DO4 C4 DO11 C11</td>
<td>DO4 C4</td>
</tr>
<tr>
<td>Analog Outputs(^1)</td>
<td>AO7 AO8 AO9 AO10</td>
<td>AO7 AO8</td>
<td>AO7 AO8</td>
<td>AO7 AO8</td>
<td>AO7 AO8</td>
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<tr>
<td>24 VAC Outputs(^1)</td>
<td>24V~</td>
<td>24V~</td>
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</tbody>
</table>

DO = Digital Output  
AO = Analog Output  
C = Contact

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

Recommended Applications

<table>
<thead>
<tr>
<th>Model</th>
<th>ECB-PTU-107</th>
<th>ECB-PTU-207</th>
<th>ECB-PTU-208</th>
<th>ECB-PTU-307</th>
<th>ECB-PTU-308</th>
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<tbody>
<tr>
<td>Fan Coil Unit:</td>
<td></td>
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<tr>
<td>2/4 pipes - 3 speed fan - On/Off / thermal valves</td>
<td></td>
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<tr>
<td>2/4 pipes - Variable / 3-speed fan - On/off / thermal valves</td>
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<tr>
<td>2/4 pipes - Variable / 3-speed fan - Analog actuator</td>
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<tr>
<td>2 pipes - Variable / 3-speed fan - Floating actuator</td>
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<tr>
<td>4 pipes - Variable / 3-speed fan - Floating actuator</td>
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<tr>
<td>Two Room: 2/4 pipes - Variable speed fan - On/Off / thermal valves</td>
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<tr>
<td>Heat Pump Unit:</td>
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<tr>
<td>3-speed fan</td>
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<tr>
<td>Variable speed fan</td>
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<tr>
<td>Chilled Beam:</td>
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<tr>
<td>On/Off / thermal valves</td>
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<td></td>
<td></td>
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<tr>
<td>2 pipes - Floating actuator</td>
<td></td>
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<tr>
<td>4 pipes - Floating actuator</td>
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<tr>
<td>Two Room: 2/4 pipes - On/Off / thermal / analog valves</td>
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<tr>
<td>Reversible Ceiling with 6-way valves</td>
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<tr>
<td>Unit Ventilator</td>
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### BACnet Objects List

<table>
<thead>
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<th>BACnet Objects List</th>
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<tr>
<td>BACnet Calendar Objects</td>
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<tr>
<td>☐ Special events per calendar</td>
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<tr>
<td>BACnet Schedule Objects</td>
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<tr>
<td>☐ Special events per schedule</td>
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<tr>
<td>BACnet PID Loop Objects</td>
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<tr>
<td><strong>BACnet BV Objects:</strong></td>
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<tr>
<td>☐ Commandable</td>
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<tr>
<td>☐ Non-Commandable</td>
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<td><strong>BACnet MSV Objects:</strong></td>
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<td>☐ Commandable</td>
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<tr>
<td>☐ Non-Commandable</td>
<td>40</td>
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<td><strong>BACnet AV Objects:</strong></td>
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<tr>
<td>☐ Commandable</td>
<td>25</td>
</tr>
<tr>
<td>☐ Non-Commandable</td>
<td>75</td>
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</tbody>
</table>
Product Specifications

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

Voltage Range: 100-240 VAC; -15% / +10%;
Frequency Range: 50 / 60 Hz
Overcurrent Protection: 4.0 A external circuit breaker type C or 4.0 A 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
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 / 60 Hz
Overcurrent Protection: 4.0 A external circuit breaker type C or 4.0 A 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
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.

Communications

Communication Bus: BACnet MS/TP
BACnet Profile: B-ASC
EOL Resistor: Built-in, dip switch selectable
Baud Rates: 9600, 19 200, 38 400, or 76 800 bps
Addressing: Dip switch

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 k 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-Vue Series
- Allure EC-Smart-Comfort Series
- Allure EC-Smart-Air Series
- EC-Multi-Sensor Series

Supported expansion modules per controller:
- ECx-Light-4 / ECx-Light-4D / ECx-Light-4DALI: 2
- ECx-Blind-4 / ECx-Blind-4LV: 2

1. A controller can support a maximum of two Allure Series Communicating Sensor models equipped with a CO₂ sensor. The remaining connected Allure Series Communicating Sensor models must be without a CO₂ sensor.

**Wireless Receiver**

Communication Protocol: EnOcean wireless standard
Number of Wireless Inputs: 24
Supported Wireless Receivers: Refer to the Open-to-Wireless Solution Guide
Cable: Telephone cord
- Connector: 4P4C modular jack
- 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 x 5.2 x 44”)

- **with terminal block covers**: 182 × 132 × 44 mm (7.2 x 5.2 x 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
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 kΩ Type II, III (10 kΩ @ 77°F; 25°C)

Sensor Inputs (SI)
General
Input Type: Sensor; software configurable
Accuracy: ± 32.18°F; 0.1°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 kΩ Type II, III (10 kΩ @ 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 < 1mA)
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
Inrush Current: 3.0 A maximum (<20 milliseconds)
Common Terminal: 1 per pair of outputs

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; ± 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