ECL-PTU Series

LonMark® Certified Powered Terminal Unit Programmable Controllers

Overview

The ECL-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 LonTalk® communication protocol and is LONMARK certified as an SCC Fan Coil Controller.

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:

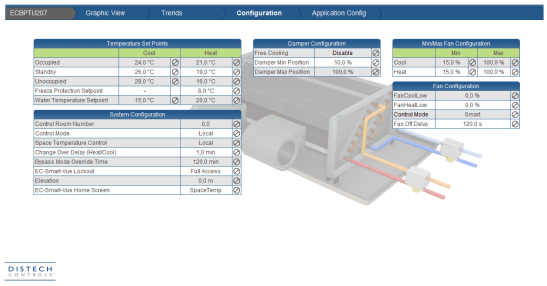
- ☐ Fan Coil Units
- ☐ Heat Pumps
- ☐ Chilled Beams
- ☐ Reversible Ceiling with 6-way valves
- ☐ Lighting fixtures and shade / sunblind motors when associated to ECx-Light/Blind Series expansion modules

Features & Benefits

Preloaded Applications

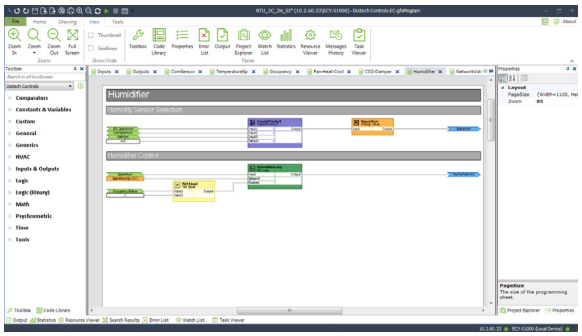
Factory preloaded applications allow these controllers, straight out of the box, to operate standard PTU equipment with a proven energy-efficient sequence of operation thereby eliminating the need for programming.

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-*gfx*Program, 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_2 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

Open-to-Wireless™

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_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_2.

Supported Platforms

EC-Net^{AX} Solution

The EC-Net^{AX} multi-protocol integration solution is web-enabled and powered by the Niagara^{AX} Framework, establishing a fully Internet-enabled, distributed architecture for real -time access, automation and control of devices. The EC- Net^{AX} 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^{AX} system provides a unified modeling of diverse systems and data, providing one common platform for development, management and enterprise applications.

LonWorks Network Services

The LNS® client-server platform allows multiple users, running different LNS-compatible applications, to access a common source for directory, installation, management, monitoring and control services for the network system being managed. Distech Controls' Lonwatcher is an example of a LNS-based network management tool that can use Plug-Ins to configure and monitor controllers and devices in the control system.

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.

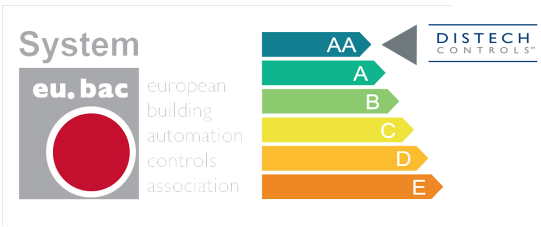
Reduced Installation Time & Cost

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

					
Model	**ECL-PTU-107**	**ECL-PTU-207**	**ECL-PTU-208**	**ECL-PTU-307**	**ECL-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[1]	24	24	24	24	24
Relay Contact Outputs *(typ. Electric Heater)*	1 x 2 kW	1 x 2 kW	1 x 2 kW	2 x 1 kW	1 x 2 kW
Powered Relay Outputs *(typ. Fan Speeds)*	3	3	3	3	3
Line-Powered Triac Outputs *(typ. Valves)*	2	2	0	4	0
24 VAC Triac Outputs *(typ. Valves)*[2]	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 Communicating Sensors[2]	Up to 4[3,4]	Up to 4[3,4]	Up to 4[3,4]	Up to 4[3,4]	Up to 4[3,4]
EC-Multi-Sensor series	Up to 4[4]	Up to 4[4]	Up to 4[4]	Up to 4[4]	Up to 4[4]
ECx-Light-4 / ECx-Light-4D /	2	2	2	2	2
ECx-Blind-4 / ECx-Blind-4LV	2	2	2	2	2

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 CO_2 sensor. The remaining connected Allure Series Communicating Sensor models must be without a CO_2sensor.
4. A controller can support four sensors among Allure EC-Smart-Vue 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)[1]	UI1 UI2	UI1 UI2	UI1 UI2	UI1 UI2	UI1 UI2
Sensor Inputs (SI) [1]	SI3	SI3	SI3	SI3 SI4	SI3
Digital Inputs (DI) [1]	DI4 DI5 DI6	DI4 DI5 DI6	DI4 DI5 DI6	DI5 DI6	DI4 DI5 DI6
Power Supply[1]	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[1] DO6[1]	DO5 DO6 DO9 DO10	DO5[1] DO6[1] DO9[1] DO10[1]
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[1]		AO7 AO8 AO9 AO10	AO7 AO8	AO7 AO8	AO7 AO8
24 VAC Outputs[1]			24V~		24V~

DO = Digital Output

AO = Analog Output

C = Contact

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

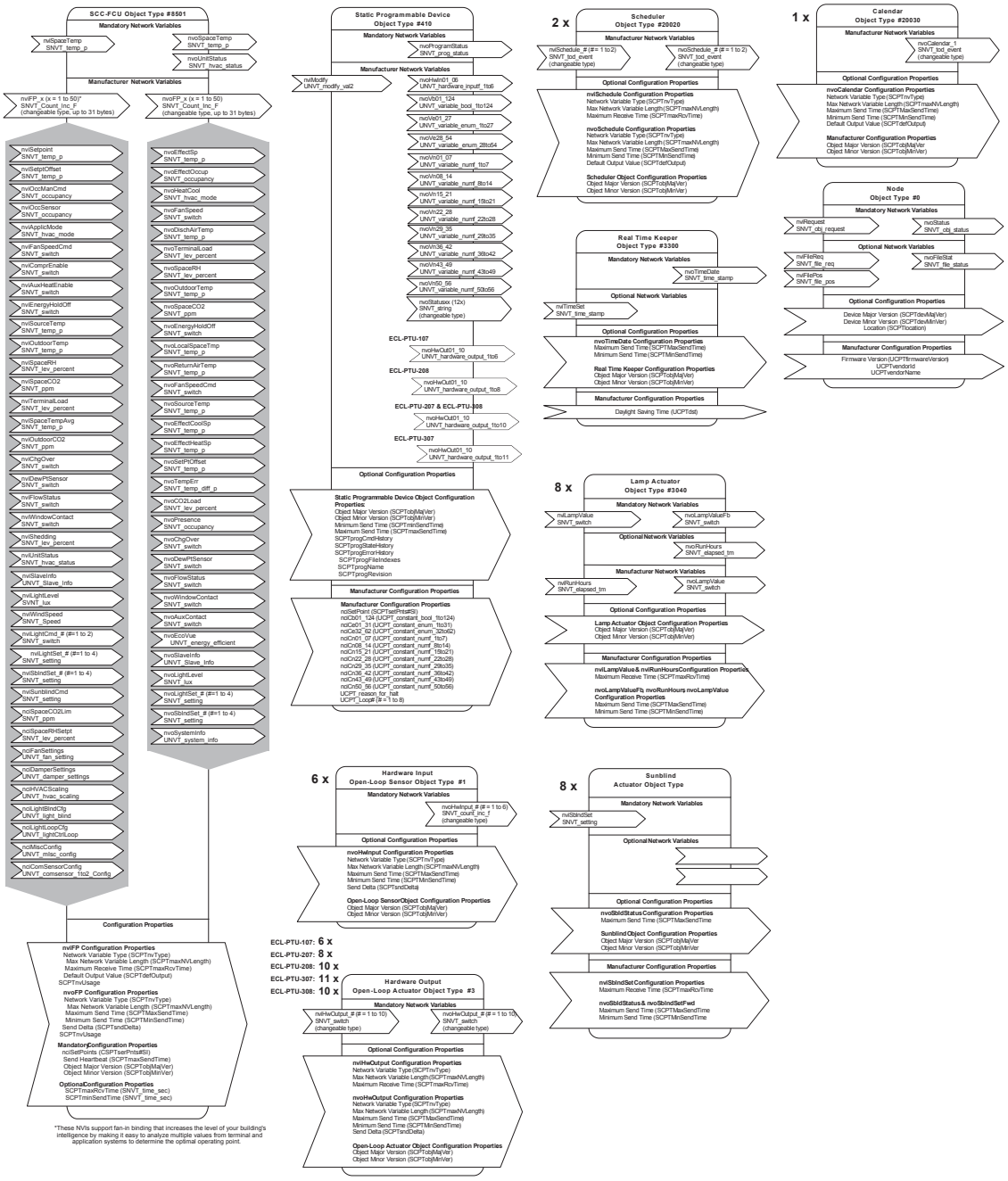
Recommended Applications

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

Objects List

Model	ECL-PTU-107	ECL-PTU-207	ECL-PTU-208	ECL-PTU-307	ECL-PTU-308
Calendar Objects	1	1	1	1	1
□ Events per calendar	25	25	25	25	25
Schedule Objects	2	2	2	2	2
□ Special events per schedule	5	5	5	5	5
Lamp Actuator Objects	8	8	8	8	8
Sunblind Actuator Objects	8	8	8	8	8
PID Loop Objects	8	8	8	8	8
Constants:					
□ Boolean	124	124	124	124	124
□ Enumeration	62	62	62	62	62
□ Numeric	56	56	56	56	56
Variables:					
□ Boolean	124	124	124	124	124
□ Enumeration	54	54	54	54	54
□ Numeric	56	56	56	56	56
nciSetpoint	■	■	■	■	■
Total Network Variables	236	244	240	246	244
Network Variable Input (General Usage):					
□ NVI Changeable Type, Up to 31 Bytes	50	50	50	50	50
Network Variable Output (General Usage):					
□ NVO Changeable Type, Up to 31 Bytes	50	50	50	50	50
Hardware Input Network Variable:					
□ nvoHwInput per Hardware Input	■	■	■	■	■
Hardware Output Network Variable:					
□ nviHwInput per Hardware Output	■	■	■	■	■
□ nvoHwInput per Hardware Output	■	■	■	■	■

Functional Profile



Product Specifications

Power Supply (ECL-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[1]

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 (ECL-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[1]

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 — LonTalk Protocol

Transceiver — FT 5000 Free Topology Smart Transceiver

Channel — TP/FT-10; 78Kbps

LonMark Interoperability Guidelines — Version 3.4

Device Class — SCC Fan Coil

LonMark Functional Profile :

- □ Input Objects — Open-Loop Sensor #1
- □ Output Objects — Open-Loop Actuator #3
- □ Node Object — Node Object #0
- □ Real Time Clock — Real Time Keeper #3300
- □ Scheduler — Scheduler #20020
- □ Calendar — Calendar #20030
- □ Programmable Device — Static Programmable Device #410
- □ Lamp Objects — Lamp Actuator #3040
- □ Sunblind Objects — Sunblind Actuator #6110
- □ SCC Object — SCC Fan Coil #8501

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-Vue Series[1]
- ☐ Allure EC-Smart-Comfort Series
- ☐ Allure EC-Smart-Air Series[1]
- ☐ 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 CO_2 sensor. The remaining connected Allure Series Communicating Sensor models must be without a CO_2 sensor.

Wireless Receiver[1]

Communication Protocol — EnOcean wireless standard

Number of Wireless Inputs[2] — 24

Supported Wireless Receivers — Refer to the Open-to-Wireless Solution Guide

Cable — Telephone cord

- ☐ Connector — 4P4C modular jack
- ☐ Length (maximum) — 6.5ft (2m)

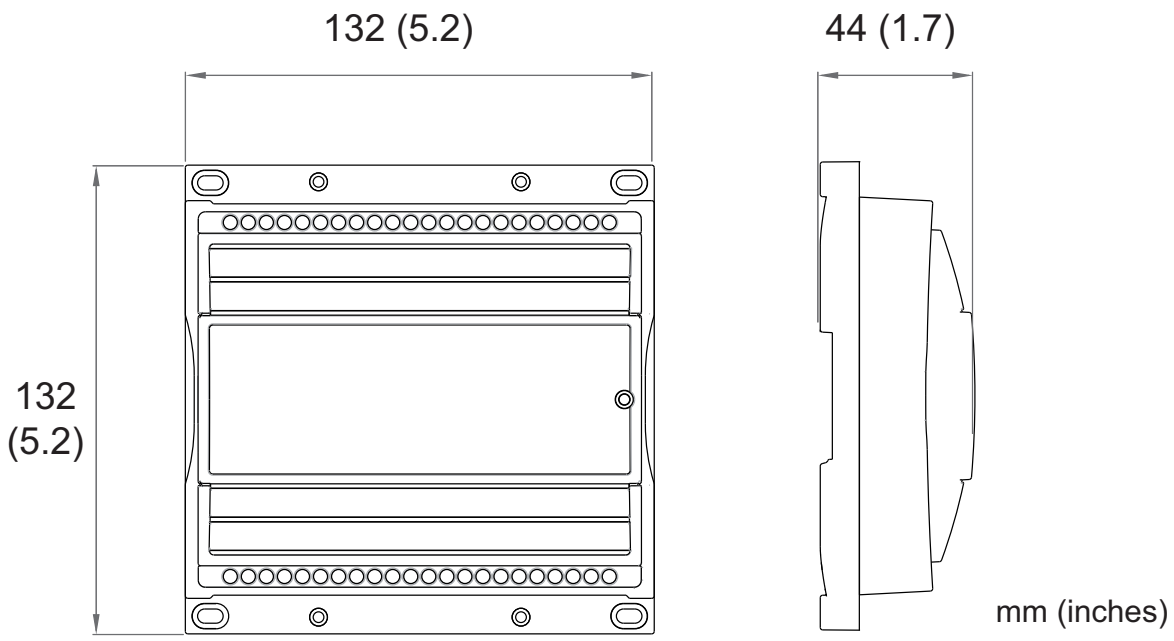
enocean®

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.

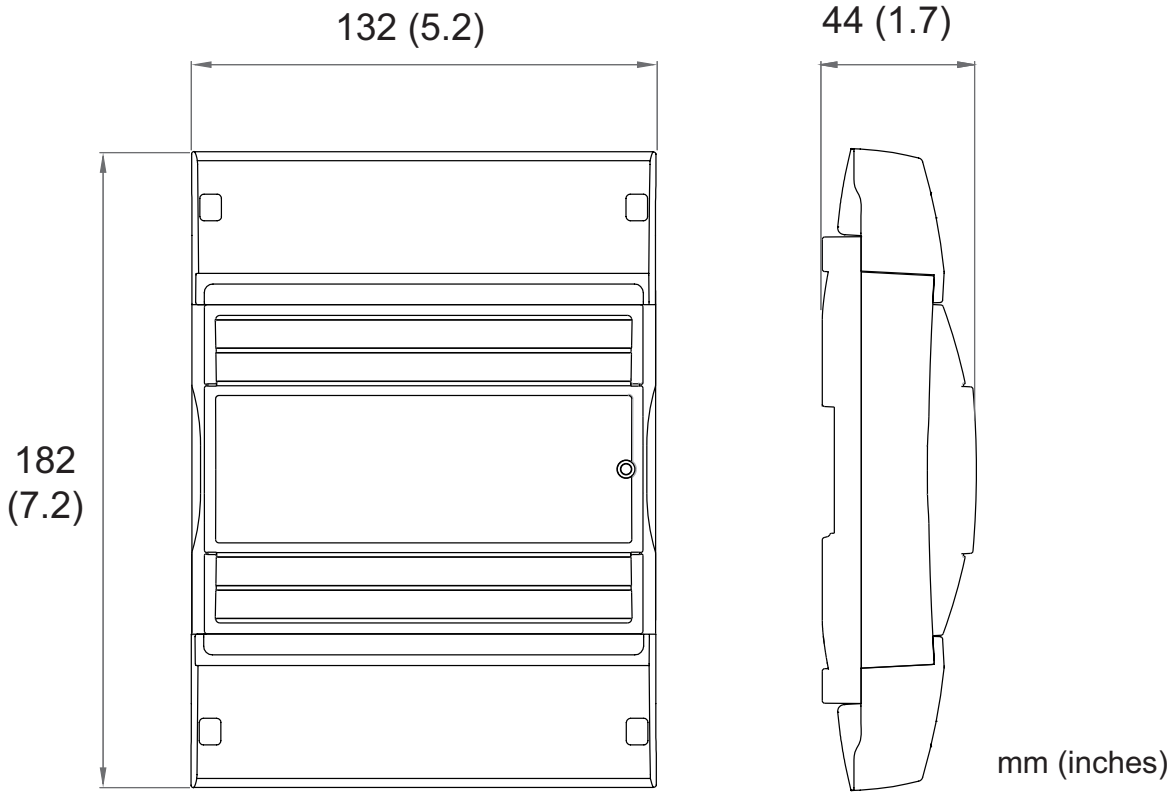
Mechanical

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

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[1]

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

ECL-PTU-107, ECL-PTU-207, and ECL-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 ECL-PTU-208 and ECL-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:
- ☐ ECL-PTU-107 / ECL-PTU-207 / ECL-PTU-307 — 0 or 100-240 VAC (Same as device power supply)
- ☐ ECL-PTU-208 / ECL-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:

- ECL-PTU-107 / ECL-PTU-207 / ECL-PTU-208 / ECL-PTU-308 - 9.0 A max. on a resistive load (2 kW @ 230 VAC)
- ECL-PTU-307 — 6.0 A max. on a resistive load (1.4 kW @ 230 VAC)

Resting State — Normally Open

Common Terminal — Dedicated digital

Analog

ECL-PTU-207 / ECL-PTU-208 / ECL-PTU-307 / ECL-PTU-308 models only

General

Output Type — Analog

Voltage Range — 0 to 10VDC linear

Current — 5 mA maximum

24 VAC Outputs

ECL-PTU-208 / ECL-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

ECL-PTU-208 / ECL-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