

# HMI WING UL (1-4-2801-0223)

Installation and operating instructions



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### 1. IMPORTANT INFORMATION FOR INSTALLERS AND FINAL USERS

This controller should be:

- Installed only by qualified personnel in accordance with local and national regulations.
- Mounted properly as described in the manual, so the casing or enclosure is only accessible to the end user and protection against electric shock is assured.
- Proper installation is intended to care of the Class II requirements (reinforced insulation) to prevent electric shock hazard.

### 2. MANUFACTURER INFORMATION

This product is manufactured by **VTS AMERICA Inc**  
 3535 Gravel Springs Rd. Extension, Suite 201  
 GA 30519 Buford,

Phone: 001 470-809-6811,  
 Fax: 001 470-809-6815,  
 E-mail address: america@vtsgroup.com

### 3. THE PURPOSE OF THE HMI WING UL (1-4-2801-0223)

HMI WING UL unit is an electronic controller dedicated for range of WING air curtains. The controller manages the curtain's performance by means of fan revolutions and air heating capacity regulation, also supported by the time schedule.

The HMI WING UL is equipped with Modbus RTU port supporting two ways communication with BMS systems. This controller is dedicated for the following range of WING Air Curtains manufactured by VTS:

HMI WING UL  
 (1-4-2801-0223)

WING W100 (#####) EC  
 WING E100 (#####) EC  
 WING C100 (#####) EC

WING W150 (#####) EC  
 WING E150 (#####) EC  
 WING C150 (#####) EC

WING W200 (#####) EC  
 WING E200 (#####) EC  
 WING C200 (#####) EC



The (#####) part of each model name is a power supply standard description (volts/phases/hertz).  
**CAUTION.** This HMI WING UL should not be used as a controller for any other products than above listed.

### 4. TERMINALS OF THE HMI WING UL

This HMI WING UL controller has a range of terminals available on the back panel of it.

Function of each terminal is listed below:

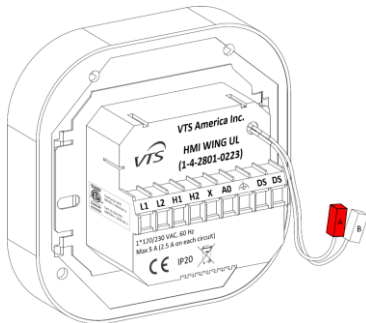


Figure 1 HMI WING UL rear panel and terminals

- L1 – Power supply phase
- L2 – Power supply phase
- H1 – Heating start signal, stage 1
- H2 – Heating start signal, stage 2
- X – Not connected (N/C)
- A0 – 0-10 Volts analog output for fan speed regulation
- ⚡ – Reference ground for 0-10 V speed regulation
- DS (left) – Optional door switch input
- DS (Right) – Optional door switch input
- A, B – RS-485 ModBUS RTU - BMS communication port

### 5. INSTALLATION AND WIRING

**CAUTION.** Before attempting to any installation works, ensure that WING air curtain (being a power supply source for this controller) is mechanically disconnected from electric power supply.

Apply one of the following connection methods, depending on type or WING unit you have

- The WING W### models – equipped with water heater.
- The WING E### models – equipped with electric heater
- The WING C### models – equipped with no heater.

**5.1. CONNECTION OF HMI WING UL CONTROLLER TO WING W100/150/200 240/1/60 MODELS**

Connect the HMI WING UL to the WING W100/150/200 air curtains according to diagram shown on Figure 2.

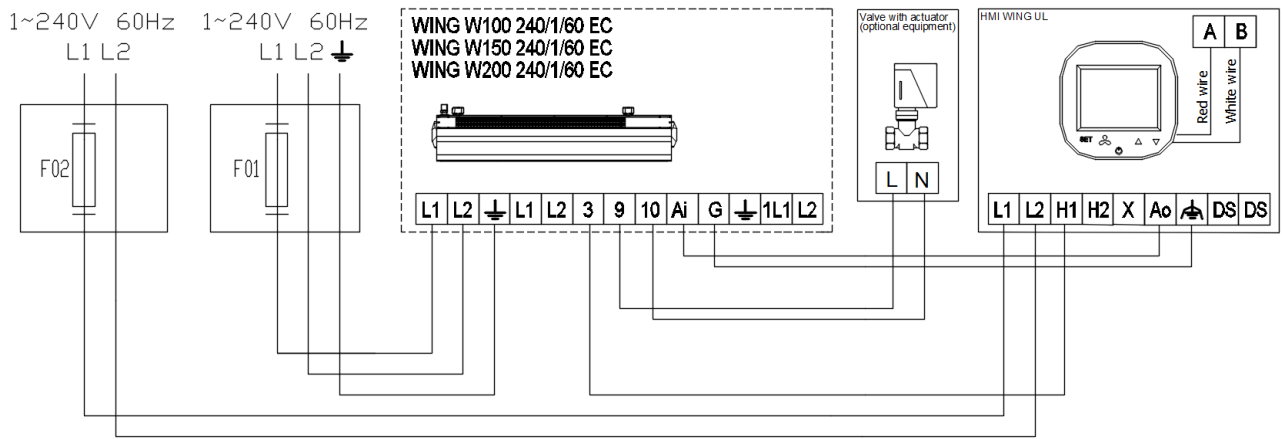


Figure 2 - WING W100/150/200 connections

**5.2. CONNECTION OF HMI WING UL CONTROLLER TO WING E100 240/1/60 MODEL.**

Connect the HMI WING UL to the WING E100 240/1/60 air curtains according to diagram shown on Figure 3.

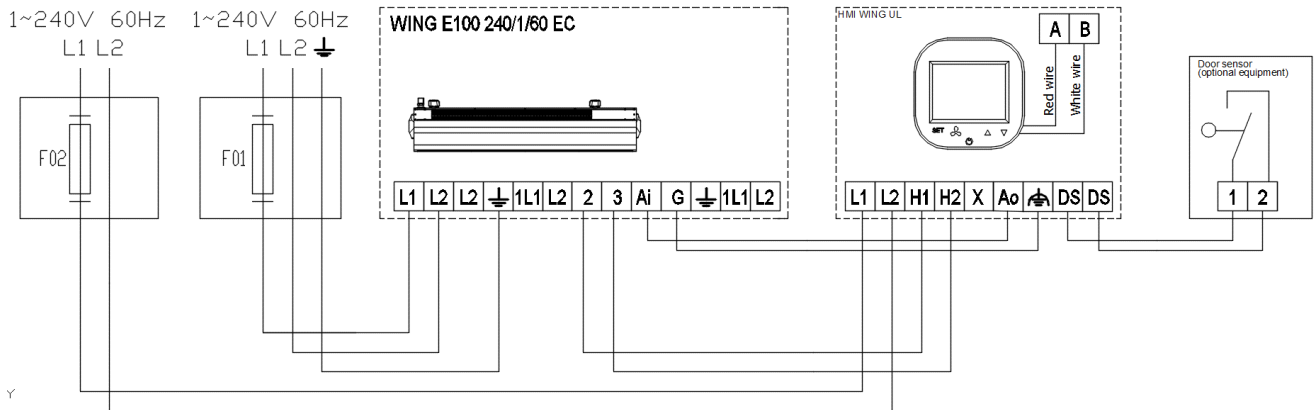


Figure 3 - WING E100 240/1/60 connections

**5.3. CONNECTION OF HMI WING UL CONTROLLER TO WING E100/150/200 240/3/60 MODELS.**

Connect the HMI WING UL to the WING E100/150/200 240/3/60 air curtains according to diagram shown on Figure 4.

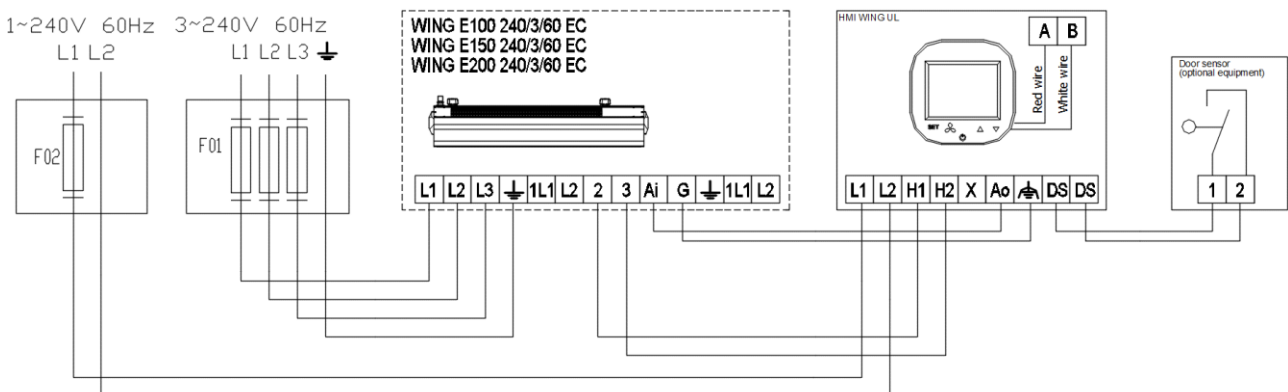


Figure 4 - WING E100/150/200 240/3/60 connections

#### 5.4. CONNECTION OF HMI WING UL CONTROLLER TO WING E100/150/200 480/3/60 MODELS.

Connect the HMI WING UL to the WING E100/150/200 480/3/60 air curtains according to diagram shown on Figure 5.

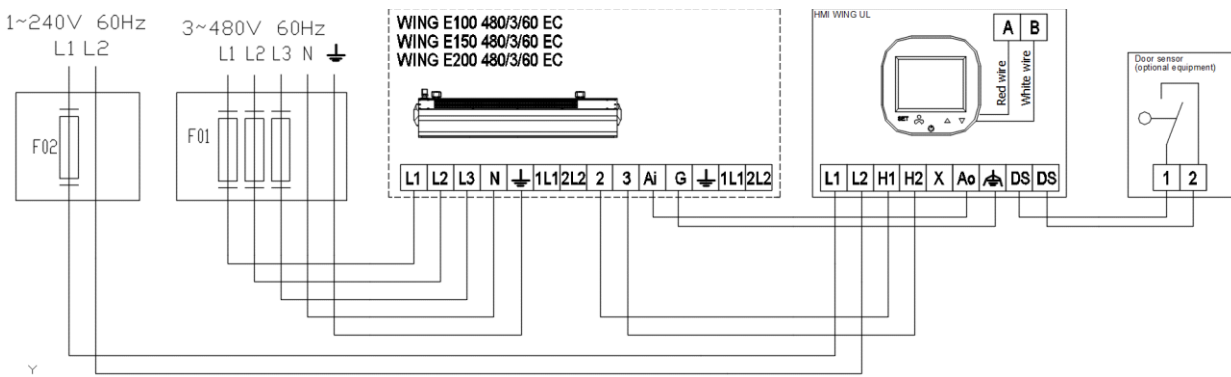


Figure 5 - WING E100/150/200 480/3/60 connections.

#### 5.5. CONNECTION OF HMI WING UL CONTROLLER TO WING C100/150/200 240/1/60 MODELS.

Connect the HMI WING UL to the WING C100/150/200 240/1/60 air curtains according to diagram shown on Figure 6.

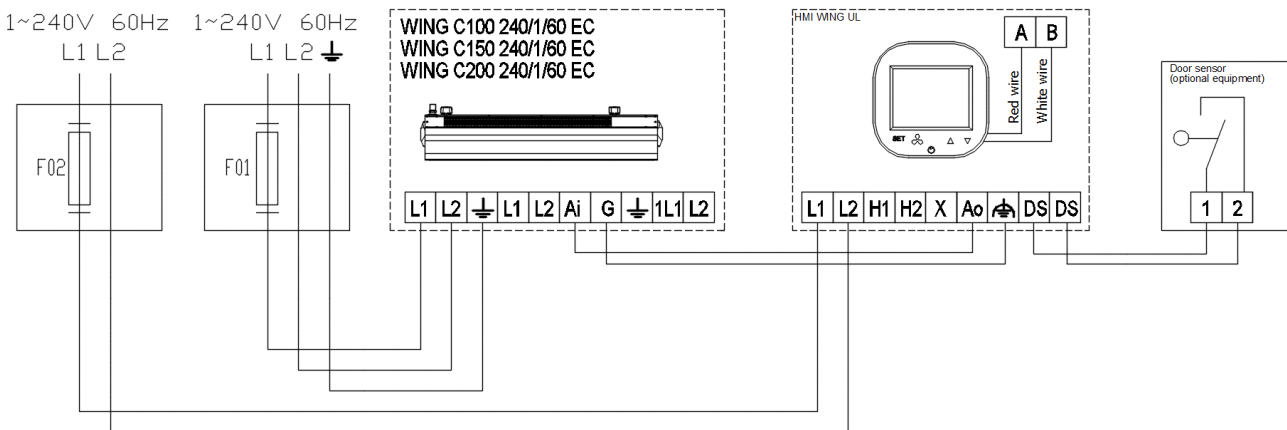
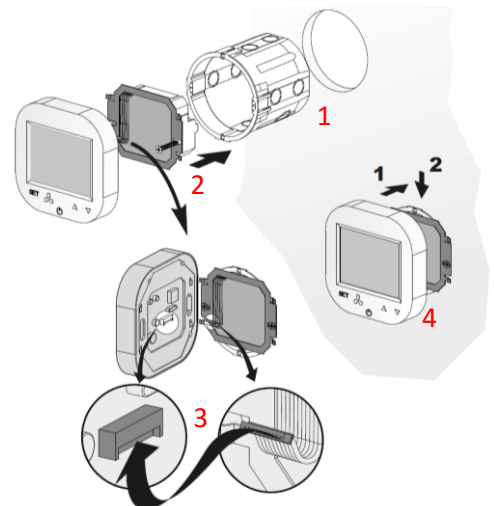


Figure 6 - WING C100/150/200 240/1/60

#### 5.6. CONTROLLER FLUSH MOUNTING

Apply the following sequence of actions while flush-mounting of this controller:

- Install the flush mounted junction box (1)
- Cross all cables through the junction box and prepare their ends for plugging into controller's terminal block (remove the shields and apply end sleeves if justified)
- Plug the wires into the controller's terminal block according to relevant wiring diagram (above listed). Ensure that cables are properly plugged and are not loose.
- Install the rear power part of the controller in the flush mounted junction box and tight both sides screws (2)
- Plug the strip cable to the terminal in the front part of controller (3)
- Mount the front part of the controller on the rear one (4)



**CAUTION.** After all installation works, check if the flash mounting is properly done (the controller is fixed in the wall and is not loose).

#### 5.7. OTHER INSTALLATION FACTS AND RECOMMENDATIONS

- Type of flush mounting junction box:
  - Flush mounted junction box Ø 60 mm, minimum depth of the box: 1-1,2"
- Flush mounted part of the controller:
  - Rear power supply unit
- Minimum height of the installation
  - 5 feet above floor level
- Minimum clearance between the controller (side edges of the front display part) and the surrounding parts of the fitment:
  - 4"
- The minimum dimensions of ventilating openings and their correct arrangements
  - N/A

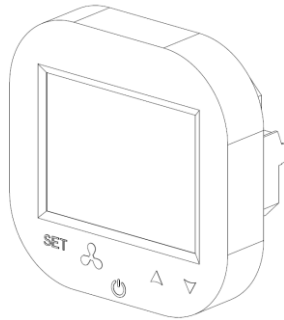
- Power supply wires
  - 2 x 18 AWG
  - Temperature of the wire insulation: 176 °F (80 °C)
- Heating stages control wires (H<sub>1</sub>, H<sub>2</sub>)
  - 2 x 18 AWG
  - Temperature of the wire insulation: 176 °F (80 °C)

- Fan revolutions 0-10 control wires
  - 2 x 18 AWG
  - Temperature of the wire insulation: 176 °F (80 °C)
- Door switch wires
  - 2 x 20 AWG
  - Temperature of the wire insulation: 176 °F (80 °C)

## 6. OPERATIONS ON THE HMI WING UL

### 6.1. FRONT PANEL

The front panel of the HMI WING UL consists of the large display and set of buttons enabling full handling of the controller and the WING unit



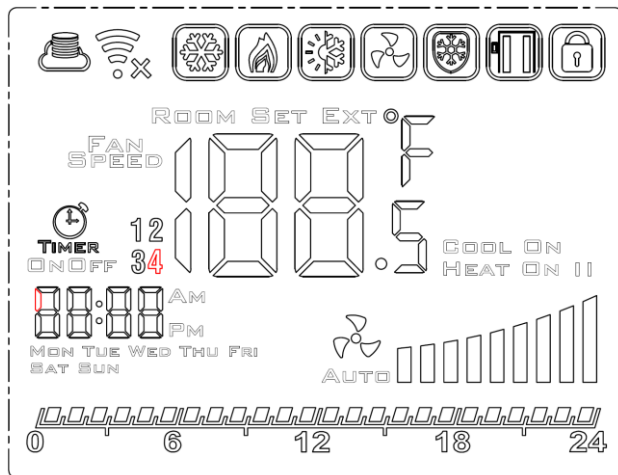
Function of each button of the HMI WING UL controller are as per following description:

- LCD Screen – displays all information related with WING unit operations like status, calendar settings, alarm information etc.
- SET – approval of selected function of parameter
- Fan button – for easy toggling between available speeds of the fan revolutions
- On-Off button – main switch of the entire WING curtains
- Arrow up – toggles between the menu items in upwards direction
- Arrow down – toggles between the menu items in downwards direction

### 6.2. DISPLAY

The display of the HMI WING UL Controller consists of the following elements

Note: Some of the display elements are not in use for WING Air Curtains. Table below show only elements specific for HMI WING UL system.













	Heating mode indicator
	Ventilation mode indicator
	Water heater defrosting mode indicator
	Air temperature indicator
	Timer mode indicator
	Time indicator
	Day of the week indicator
	Door status indicator (open/close)
	Keyboard lock indicator
	Fan status indicator
	Schedule chart

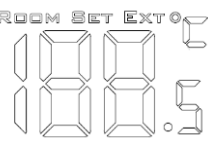
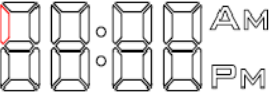


### 6.3. SWITCHING THE CONTROLLER ON AND OFF

Before attempting to any basic operations with this controller – you need to switch it on. To switch the controller on and off, press the on-off button (⏻), located below the display.

Keep in mind, that for modification of some advanced functions (advanced settings) you will start with the controller switched on (read the following chapters of this manual).

### 6.4. MAIN SETTINGS

No.	Description	Operation button
1	Heating mode*: Operation of single heater coils sections  Operation of two heater coils sections 	Function A1 [^] or [v]
2	Calendar-based work: Yes  ;  No  ; 	Function AE [^] or [v]
3	Operating mode: heating:  ; ventilation  ; heating + ventilation  +  ;	Function A3 [^] or [v]

4	Temperature display: <b>ROOM</b> (current temp.), <b>SET</b> (set temp.) <b>EXT</b> (based on external temperature sensor) 	Function A1 [^] or [v]
5	Day of the week MON TUE WED THU FRI SAT SUN	Hold [Set]+[v]
6	Hour, minute 	Hold [Set]+[v]
7	Screen lock 	Hold [v]
8	Door close/open 	n/a

**\*Note**

Minimum fan activation percentage for engaging the heating function is 60% (6 Volts on the analog signal output).

**Explanation of the operating modes:**

- Speed I: Programmable value in the range of 15-80%.

### 6.5. TIME SCHEDULE SETTINGS

#### 6.5.1. TIME/DAY SETTING

You can set the present time and day on the controller. To do it, press and hold the [Set] button and the arrow down button. The

#### 6.5.2. SCHEDULE SETTING


Having the controller in active mode, press the [Set] button and hold it for 5 seconds. The controller will enter the time (weekly) schedule settings mode.

Use the [Set] button to toggle between schedule functions [^] and [v] buttons to change the value.

The weekly schedule can be set for each day of the week and 4-time intervals for each day.

## 7. PROGRAMMING MODE

### 7.1. ADVANCED SETTINGS, SECTION A & B

To enter the advanced settings A of this controller, press and hold the  button for 5 seconds at the deactivated controller. Toggle between parameters using [Set] button. Change the value or settings of selected parameters using [^] and [v] buttons. After changes are applied, leave the settings mode by pressing power button of the controller. Your settings will be saved automatically.

- Speed II: Programmable value in the range of 15-90%.
  - Speed III: Programmable value in the range of 15-100%.
- Press to change the fan speed.

The values of the individual gears can be set from the advanced settings A: function A5, A6 and A7.)

controller will enter the time/day settings mode allowing you to set present time and day of the week.

Your schedule settings will be demonstrated on the graphical time chart like on Figure 7



Figure 7 - Time schedule chart

For advanced settings A group, the following parameters can be modified:

No.	Function	Set point
IP	Communication Modbus RTU - address	1 ... 254

A0	Modes of automatic operation: room [0], door [1], door+room [2]	selection [0, 1, 2]
A1	Regulation of the heating power level: without heating [0], first level [1], second level [2], third level [3]	Selection [0, 1, 2, 3]
A2	Temp. sensor calibration	max. $\pm 8^{\circ}\text{C}$ with the step of $0.5^{\circ}\text{C}$
A3	Heating mode: Heating [0], ventilation [1], heating+ventilation [2]	Selection [0, 1, 2]
A4	Hysteresis of differential adjuster	0.5/1/2
A5	First speed value	15-80%
A6	Second speed value	15-90%
A7	Third speed value	15-100%
A8	Fan speed delay	30....200s

Note. The Door optimum function (AA) allows increase the fan speed from currently set one in case of door opening:

- "+1" – increases the fan speed by one step when door is open

## 7.2. ADVANCED SETTINGS, SECTION C

To enter the advanced settings C of this controller, press and hold the [Set] button for 5 seconds at the deactivated controller. Toggle between parameters using [Set] button. Change the value or settings of selected parameters using [^] and [v] buttons. After changes are applied, leave the settings mode by pressing power button of the controller.

Your settings will be saved automatically. For advanced settings A group, the following parameters can be modified:

A9	Backlight time	5....600s
AA	Door optimum	0, +1, +2, +3
AB	Door sensor logic	NO [0], NC [1]
AC	Mim. Fan speed during cooling down	45-100%
AD	Min. fan speed	Only display
AE	Calendar-based work	No [0], Yes [1]
AF	Time mode	12h [1]; 24h [0]
B0	Buttons blockade	selection
B1	Extra heating time	0....90s
Bo	Default settings	Hold

- "+2" – increases the fan speed by two step when door is open.

Anytime you need to disable the "Door optimum" function, just set it to the "+0" setting.

No.	Function	Set point
B0	Temperature units	$^{\circ}\text{C}/^{\circ}\text{F}$
B1	Min. Temperature	41 ... 104 $^{\circ}\text{F}$ (5...15 $^{\circ}\text{C}$ )
B2	Max. Temperature	61 ... 104 $^{\circ}\text{F}$ (16...40 $^{\circ}\text{C}$ )
B3	Communication Modbus RTU – speed	2400/4800/9600 kbps.
B4	Communication Modbus RTU – parity	None/ odd/ even

## 8. TECHNICAL SPECIFICATION

- Power supply
  - 1\*120-230 VAC 60 Hz
- Power consumption
  - 1.5 VA
- Features of the automatic action
  - Type 1 Action, Type 1.B Action (UL 60730-1)
- Maximum current on relay outputs
  - 5 A (max 2.5 A on each circuit)
- Load type
  - Resistive, PF  $\geq 0.95$
- RS485 port voltage / current limitation
  - -7... +12V /  $\pm 250$  mA
- Temperature sensor type
  - NTC, 10 k $\Omega$  @ 77  $^{\circ}\text{F}$  (25  $^{\circ}\text{C}$ )
- Measured temperature range
  - 32  $^{\circ}\text{F}$  ... 122  $^{\circ}\text{F}$ , (0  $^{\circ}\text{C}$  ... 50  $^{\circ}\text{C}$ )
- Temperature measurement precision
  - $\pm 0.9^{\circ}\text{F}$  ( $\pm 0.5^{\circ}\text{C}$ )
- Communication
  - Relay output: Dual - NO, 250 V, 5 A: 105 cycles, AgNi @ 85  $^{\circ}\text{C}$ ; 5 x 104 cycles, AgSnO2 @ 85  $^{\circ}\text{C}$
  - Analog output: 0-10V (8 bit, I<sub>max</sub> = 20 mA)
  - Modbus RTU, 2400/4800/9600 bps,
- Working conditions limits
  - Temperature range: 32  $^{\circ}\text{F}$  ... 122  $^{\circ}\text{F}$  (0  $^{\circ}\text{C}$  ... 50  $^{\circ}\text{C}$ )
  - Relative humidity: 10-90% with no condensation.
- Storage conditions limits
  - Temperature range: -4  $^{\circ}\text{F}$  ... 122  $^{\circ}\text{F}$  (-20  $^{\circ}\text{C}$  ... 50  $^{\circ}\text{C}$ )
  - Relative humidity: 10-90% with no condensation.
- Ingress Protection
  - IP20
- Pollution Degree
  - 2
- Max working altitude
  - 6 000 ft (2 000 m) AMSL
- Construction and installation
  - Independently Flush-mounted. Flush Mount Junction Box, min 1-1,2" deep. Mounting bracket provided (a part of the controller assembly).
- Maximum mechanical load on the controller installation (flush-mounting)
  - Parallel to the the wall, downwards, both sides: 5 N
  - Parallel to the the wall, upwards (front panel unmounting direction), both sides: 2 N
  - Perpendicular to the wall: 5 N
- Dimension
  - 3-3/8" x 3-3/8" x 1-7/8" (86 x 86 x 48 mm)
- Weight
  - 5.3 oz (150 g).