

# T7600

## LCD Digital Fancoil Thermostats



### Product Bulletin

The T7600 Series includes the T7600, T7601 and T7603 Modbus thermostats designed to control heating and cooling in commercial, industrial and residential installations.

Typical applications include the control of fancoil units, simple heat-pumps, single or two stage heating and a combination of heating and cooling equipment. As part of the system, the thermostats range includes:

- T7601-TF20-9JS0 manages multiple configurations with two and four pipes On/Off valve control and proportional fan with EC motor.
- T7600-TF20-9JS0 offers the same multiple configurations with multispeed fan control.
- T7600-TF21-9JS0 provides two or four pipe proportional control with multispeed fan control.
- T7600-TB21-9JA0 can provide two pipe proportional control with motor positioning feedback and multispeed fan control
- T7603-T000-9JF0 is a single stage heater controller without the need for configuration.

All models have two configurable inputs to complete your configuration, and Modbus RTU communication that improves usability and enhances energy saving strategies.

The large LCD touchscreen display of the T7600 thermostats provides the status of current working mode, the fan speed, the indoor temperature and the temperature set point.



## Features

- **Stylish appearance**  
Flush mount for stylish low profile installation.
- **Customizable backlit display helps tenants to meet building policy**  
Thermostat can show actual Temperature or Set Point only, in addition the keypad can be locked to avoid misuse.
- **Configurable options reduce stock**  
Through a simple menu the T7600 can be configured to manage different applications reducing the number of items stocked at your warehouse.
- **Energy Saving and other functions**  
The two inputs can be configured to manage Occupancy, Auto-Changeover, Dew Point warning or to read remote temperature sensors.
- **Stand-Alone or Communicating**  
For simple stand-alone applications to systems managed by a Building Automation System through Modbus RTU.
- **Mounting plate and protection cap make installation safe**  
The mounting plate allows installation without opening the sensor. The removable and repositionable protection cap protects the sensor during commissioning and decorating. Both avoid the risk of component damage during installation phase.

## Product Overview

The line voltage T7600 series are designed to control heating and cooling through air conditioning units in commercial and residential applications. Typical applications include the control of two or four pipe fancoil units, two stage heater, water heat-pump and a combination of heating and cooling equipment. Depending on the model, valve control can be On/Off or Proportional in combination with three speed fans or EC motor control with cut-off. The On-board high accuracy NTC sensor allows precision comfort control over occupied space area. The internal NTC sensor will be automatically disabled if a remote cable sensor is connected to detect the temperature. The same input and same cable sensor, a NTC10K Type II of TS-6300 series, can be used to detect the seasonal changeover in the two pipe configuration.

All models have configurable digital inputs to provide:

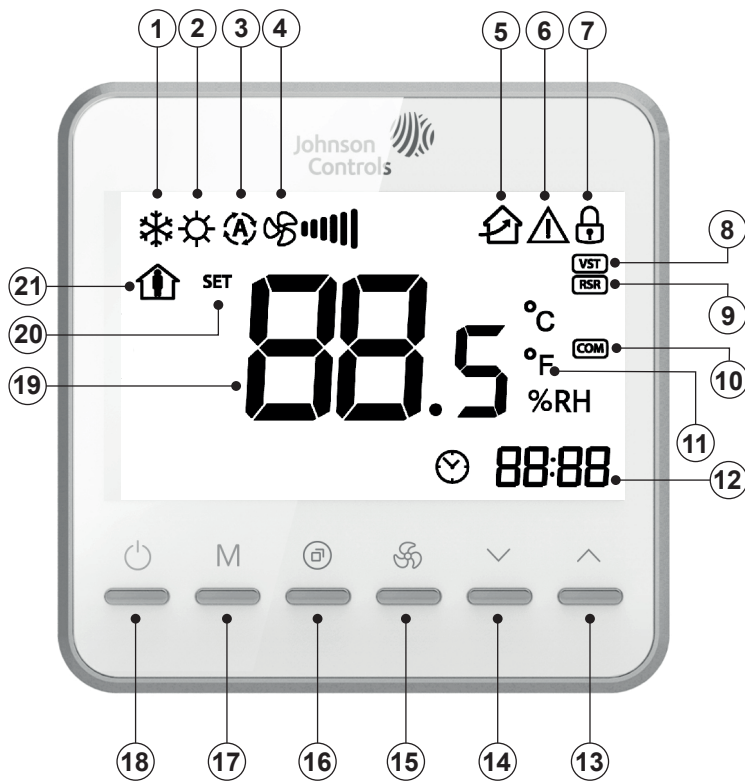
- Set Point reduction when the space is not occupied.
- Detect the dew point condition to close the cooling valve.
- Shut off thermostat remotely, i.e. when windows are open fan stops and valves will close.
- Filter alarm, a delta pressure sensor across the filter can indicate the filter dirty condition.

The T7600 thermostats provide all flexibility you need to configure: the Frost protection, the Set point working range and the cooling and heating Set Point for the Unoccupied mode. Frost protection can be activated and configured to work within a range from 0 to 20°C. The default set point working range of 5°C to 35°C can be changed to any value between 0° to 40°C. As well the Cooling and Heating SP reduction can be set to any value between 0°C to 40°C. Fan operation can be different depending on the T7600 model, the range is offering the classic three speed fan and the proportional mode (EC motors). The analog output for fan control can be configured defining the minimum and maximum voltage of the output between 0 to 10 V. At minimum Speed a line voltage relay could be used to switch off the EC motor board (EC motor cut-off). Also the Fan mode, when the required temperature is achieved, can be configured between: No fan or low fan speed. Setting the thermostat parameters is done directly from its display or through Modbus. It is also possible Lock the thermostat push-buttons thus preventing unauthorized adjustment, show on the display only the Set point, or define the thermostat condition after restart.

*For more details about the possible configuration please refer to the installation guide.*

## LCD Display

T7600 with its large LCD screen displays the working mode (cooling, heating, air venting, floor heating), fan speed, indoor temperature and set point.



1	Mode Cooling
2	Mode Heating
3	Mode Auto, when Auto-Changeover is set
4	Fan Speed, Low, Medium, High and Auto
5	Active with TiO2/ESP* filter ON. Flash with Filter Alarm
6	Active when Errors or Dew point alarm is present
7	Active when Keypad is locked
8	Active when valve is opening
9	Active when Remote Sensor is connected
10	Flashing when Modbus communication fails
11	Engineering units, Celsius or Fahrenheit (Configurable)
12	Timer On and OFF, indicates next activation in hh:mm
13	Button Up, used to change values i.e. Set point
14	Button Down, used to change values i.e. Set point
15	FAN, changes fan speed from Low, Medium, High and Autospeed
16	Special, press one second to activate TiO2/ESP filter* relay output press three seconds to program On/OFF timer
17	Mode, select from Auto/Heating/Cooling/Ventilation*
18	Set thermostat ON and OFF
19	Display Temperature and Set point
20	SET appears together with Set point
21	Show Occupied / Unoccupied Status

\* Depending from Thermostat configuration

Timer On/Off function allows user to set the OFF delay to switch off the thermostat after a preprogrammed time interval. As well, it is possible to define the ON Delay that will switch on the thermostats after another preprogrammed time interval. The time interval can be set in steps of 30 min up to 24 hours.

The electrostatic filter (TiO2/ESP) is toggled On/Off pressing the Key 12, or it can be programmed to follow the Fan status. In this configuration one of the line voltage relay is dedicated to power the Filter unit.

## Modbus

T7600 thermostats are equipped with Modbus RTU communication, which provides information to a building automation system in order to implement enhanced energy saving strategies. Up to 64 devices can be addressed on a single bus.

Through the bus it will be possible to read the status and send commands to: Set unit On/off, read room temperature and change the set point, determine the Fan speed, set the Occupied or Non-Occupied status with relevant Set point reduction, Lock the keypad or even change the applications.

## Product Range

Type	Feature	T7601-TF20-9JS0	T7600-TF20-9JS0	T7600-TF21-9JS0	T7603-T000-9JF0	T76000-TB21-9JA0
Application	Two pipe heating or cooling On/Off	•	•	---	• <sup>6</sup>	---
	Two pipe On/Off three wires	•	•	---	---	---
	Two pipe On/Off with TiO2/ESP filter command	•	•	---	---	---
	Two pipe modulating valve (AO)	•	•	•	---	•
	Water source heat pump	•	•	---	---	---
	Four pipe heating and cooling On/Off	•	•	---	---	---
	Four pipe heating and cooling proportional (AO)	---	---	•	---	---
FAN	Three speeds line voltage On/Off	---	•	•	---	•
	EC MOTOR AO (0 - 10 V) with Cut-Off (230 VAC 2 Amp)	•	---	---	---	---
Inputs	Remote room sensor or two pipe Auto-Changeover (10K NTC) <sup>3</sup>	•	•	•	---	•
	Occupied status with set point reduction <sup>1</sup>	•	•	•	•	•
	Dew point alarm with thermostat shut down <sup>1</sup>	•	•	•	---	•
	Shut Off valve and fan i.e. Windows open <sup>1</sup>	•	•	•	•	•
	Filter dirty alarm <sup>1</sup>	•	•	•	•	•
	Motor position feedback (AI)	---	---	---	---	•
Functions	Display key lock <sup>2</sup>	•	•	•	•	•
	Display temperature and set point or set point only	•	•	•	•	•
	Display °C or °F values (Configurable)	•	•	•	•	•
	Configure set point upper and lower limits between 0 to 40°C	•	•	•	•	•
	Configure heating/cooling set points when unoccupied	•	•	•	•	•
	Activate and configure frost protection set point	•	•	•	•	•
	Configure fan mode when temperature is reached (no fan or low fan)	•	•	•	---	•
	Configure fan speed when unoccupied	•	•	•	---	•
	Configure heating stage and Interstage difference	•	•	---	---	---
	Activation of TiO2/ESP filter <sup>5</sup>	•	•	---	---	---
	Fan speed manual control (Low, Mid, High, Auto)	•	•	•	---	•
	Mode heating/cooling/ventilation only or auto mode <sup>3</sup>	•	•	•	---	•
	Restart after power failure <sup>4</sup>	•	•	•	•	•

### Note

<sup>1</sup> The input can be configured to execute one of the functions indicated.

<sup>2</sup> Key lock function has four options: No lock / Lock all keys / Lock the keys except fan speed and set point keys / Lock the On/Off and timer key, lock all keys except On/Off. When the Key lock function is active for a temporary unlock press and hold fan key for five seconds.

<sup>3</sup> Auto mode is available when auto-Changeover is enabled. In the four pipes the changeover is depending from the Room temperature deviation from SP. In the two pipes application a cable sensor on the pipe is required. (JC 10K NTC).

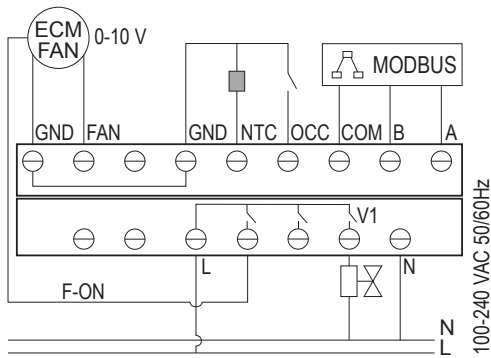
<sup>4</sup> After a power loss the thermostat can restart ON, OFF or as it was before the event (last condition).

<sup>5</sup> Thermostat provides a line voltage relay output to an external Electrostatic filter, the output can be activate manually or automatically with the Fan.

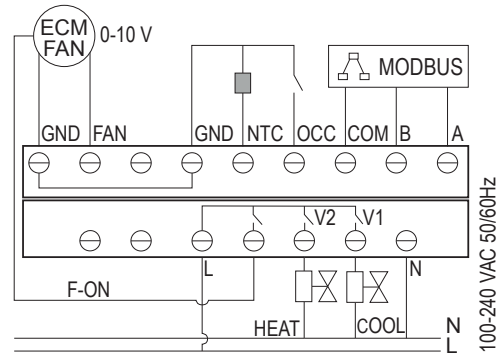
<sup>6</sup> Single stage Heating only.

# Wirings

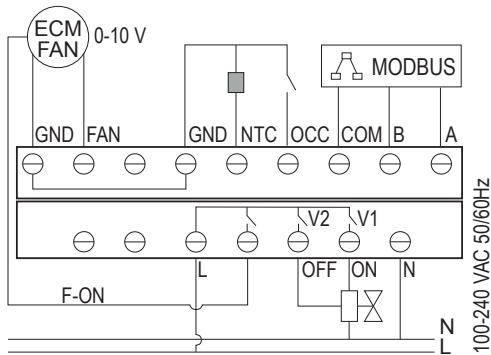
## T7601-TF20-9JS0 Heating and Cooling with Proportional Fan (EC Motor)



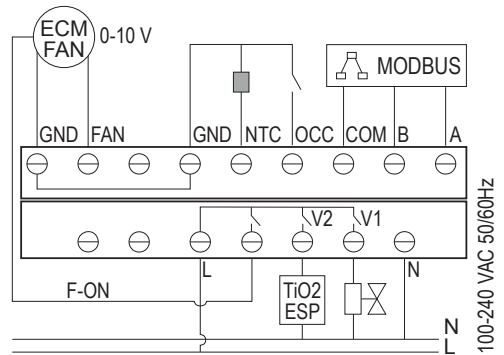
**P00 - Two pipe On/Off with EC Motor**



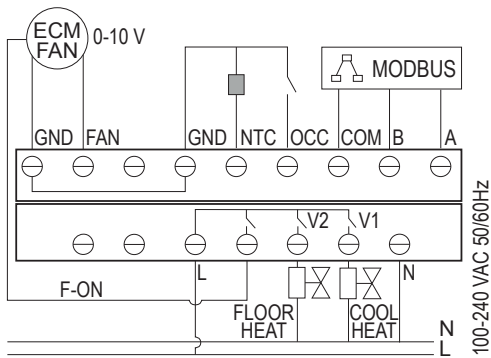
**P01 - Four pipe On/Off with EC Motor**



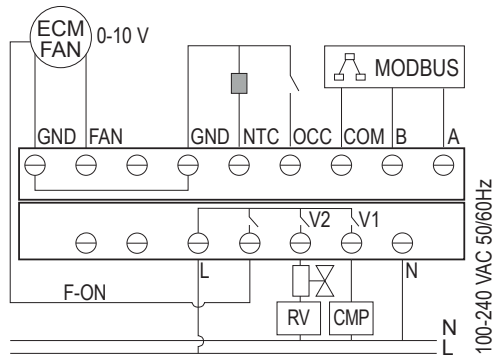
**P02 - Two pipe three wires On/Off with EC Motor**



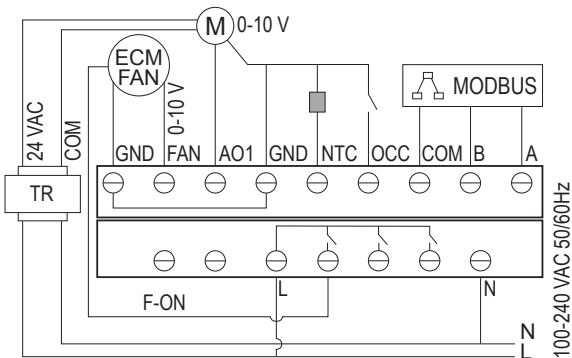
**P03 - Two Pipe/ECM with remote electrostatic filter**



**P04 - Two pipe/ECM with Floor heating**



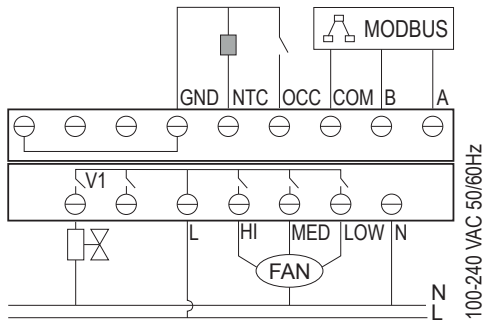
**P05 - Water source heat pump**



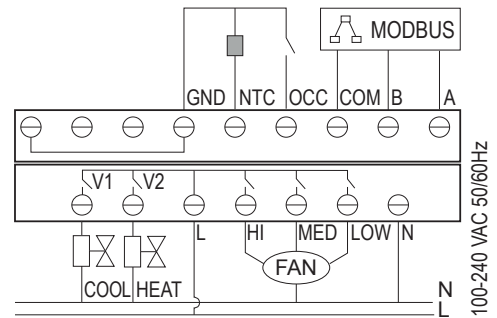
**P06 - Two pipe proportional with EC Motor**

## Wirings

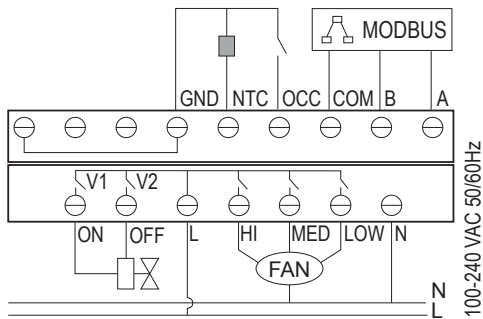
### T7600-TF20-9JS0 On/Off Heating and Cooling with Three Speeds FAN



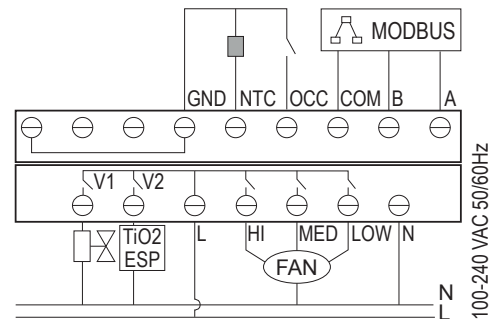
**P00 - Two pipe On/Off three speed fan**



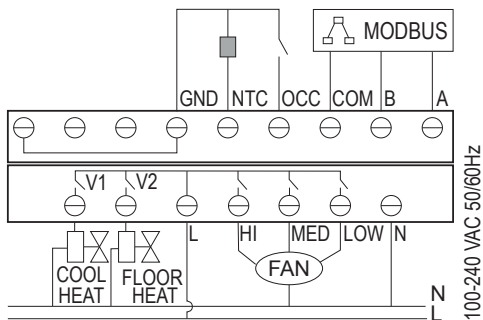
**P01 - Four pipe On/Off three speed fan**



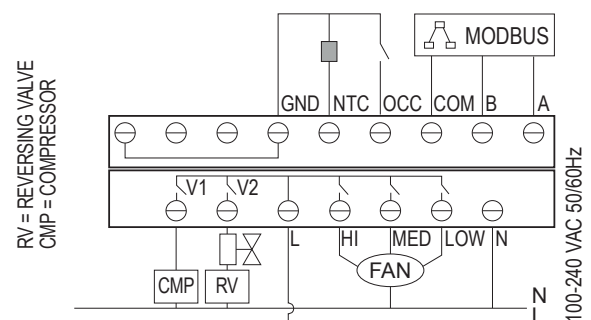
**P02 - Two pipe On/Off with three wire valve**



**P03 - Two pipe On/Off with TiO2/ESP**



**P04 - Two pipe On/Off with floor heating**



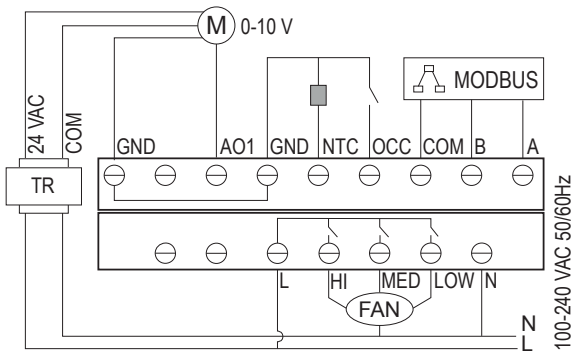
**P05 - Water source heat pump**

#### Note

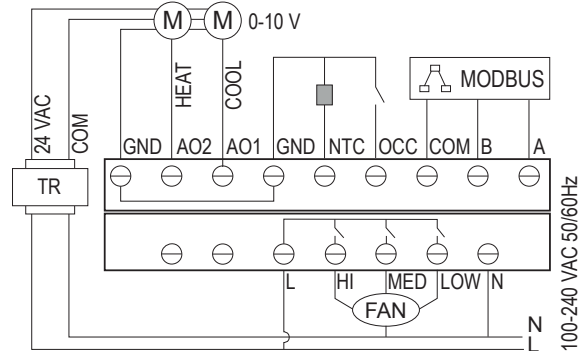
- The two pipe configurations can detect automatically the seasonal change (Auto-Changeover) using a cable sensor NTC 10K JC type II of the TS-6300 series on the supply pipe.
- The Floor heating configuration is a two stage heating, at first stage the Floor valve will be activated. The second stage will be activated when the temperature difference ( $|SP-Temp|$ ) is bigger than the interstage value defined in the configuration. At Second stage the second valve will open and the Fan starts. During Summer with this configuration the thermostat will work as a two pipe cooling only fancoil with three speed fan, the floor heating valve will be not activated.

## Wirings

### T7600-TF21-9JS0 Proportional Heating and Cooling with Three Speeds Fan

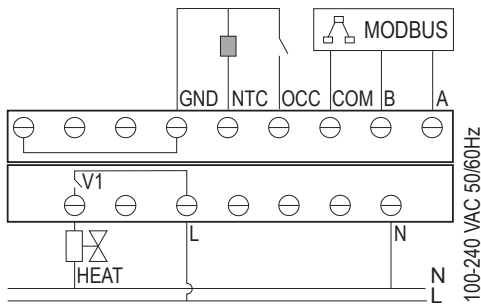


**P00 - Two pipe proportional three speed fan**



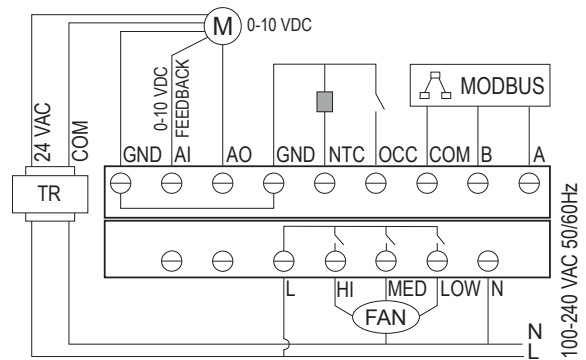
**P01 - Four pipe proportional**

## Special Applications



**T7603-T000-...JF0**

**Single stage heater  
(No configurable)**



**T7600-TB21-...JA0**

**Two pipe proportional with PICV  
(No configurable)**



When connected, the On/Off switch of the thermostat does not disconnect power to the unit; Only the LCD and Relay outputs are turned OFF.



Use this T7600 series thermostat only for operating control. Where failure or malfunction of the T7600 series thermostat could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the system. Incorporate and maintain other devices such as supervisory/alarm systems or safety/ limit controls intended to warn of, or protect against, failure or malfunction of the T7600 series thermostat.

## Technical Specification

Products	T7601-TF20-9JS0	T7600-TF21-9JS0	T7600-TF20-9JS0	T7600-TB21-9JA0	T7603-T000-9JFS0
Applications	Two or Four Pipe On/Off with EC motor Fan	Two or Four Pipe Proportional with Three speed Fan	Two or Four Pipe On/Off with Three speed Fan	Two Pipe proportional with Feedback	Single stage heater
Inputs 1	JC 10 K NTC Type II Configurable as remote sensor or Auto-Changeover on two pipe configuration				As remote sensor only
Inputs 2	Configurable Digital Input: Occupancy, SP reduction, Dew point alarm, Shut off, Filter alarm				
Inputs 3	---	---	---	Analog Input Motor feedback	---
Valves Outputs	2 x SPST Relay 2.2A @ 240 VAC 3.6A in-rush cosΦ 0.98	2 x AO 0...10 V (100 K Ohms)	2 x SPST Relay 2.2A @ 240 VAC 3.6A in-rush cosΦ 0.98	1 x AO 0...10 V (100 K Ohms)	1 x SPST Relay 2.2A @ 240 VAC 3.6A in-rush cosΦ 0.98
Fan Outputs	ECM AO = 0...10 V Configurable with Cut-off relay	3 x SPST Relay 2.2A @ 240 VAC 3.6A in-rush cosΦ 0.98	3 x SPST Relay 2.2A @ 240 VAC 3.6A in-rush cosΦ 0.98	3 x SPST Relay 2.2A @ 240 VAC 3.6A in-rush cosΦ 0.98	---
Power Requirements	AC 100 – 240 V, 50/60Hz, 5VA				
Accuracy	±1°C with Display resolution 0.5°C				
Set point Range	Default Set point range: 5.0°C to 35.0°C in 0.5°C increments Upper and lower limits configurable between: 0 to 40°C				
Communication	Modbus, Baud rate: 4800, 9600. Address 1 to 64.				
Termination	Screw terminals blocks: 1.0 – 1.5 mm <sup>2</sup> conductors for 5 mm for power and relays, signal 0.14 - 1.5 mm <sup>2</sup> conductors				
Conditions	<p><b>Operating</b> 0 to 40°C 10% to 90% Non-Condensing RH</p> <p><b>Storage</b> -20 o 60°C and 5% to 65% Non-Condensing RH</p>				
Housing Material	Polycarbonate				
Protection Class	IP20				
Dimensions (H x W x D)	88 x 88 x 46.2 mm				
Shipping Weight	Approximately: 300 g				
<b>CE Compliance</b>	Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the Low Voltage Directive (LVD), the EMC Directive, and the RoHS Directive.				

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.