

## TLC3-FCR-2T-230, Programmable Fan Coil Controller

### Features

- The PWM control option reduces room temperature fluctuations and energy consumption
- Low power energy consumption: < 1W per unit
- Temperature control for 2 or 4-pipe fan coil systems.
- Choose between one 3-point actuator and two binary heating/cooling stages
- Automatic fan control for three stage fans.
- Cost saving option with Economy functionality and set point limitations
- Control for single stage heating, cooling and fan only operation modes
- Deluxe Version:
  - Clock and time schedule functions with power failure clock protection
  - Blue backlight for LCD
  - Infrared remote controller option:
  - With special features for Boost and delayed switching on or off

### Ordering

| Item Name             | Item code     | Variant      | Power    | Features                   |
|-----------------------|---------------|--------------|----------|----------------------------|
| TLC3-FCR-2R-24        | 40-10 0130    | Standard     | 24VAC/DC | Fan coil controller with:  |
| TLC3-FCR-2R-24-W01    | 40-10 0130-01 | Cooling only |          | 1 TI int                   |
| TLC3-FCR-2R-D-24      | 40-10 0135    | Deluxe       | 24VAC/DC | 3 DO (Relay) Fan control   |
| TLC3-FCR-2R-D-24-W01  | 40-10 0135-01 | Cooling only |          | 2 DO (Relay) Valve control |
| TLC3-FCR-2T-230       | 40-10 0118    | Standard     | 230VAC   | Fan coil controller with:  |
| TLC3-FCR-2T-230-W01   | 40-10 0118-01 | Cooling only |          | 1 TI int                   |
| TLC3-FCR-2T-D-230     | 40-10 0119    | Deluxe       | 230VAC   | 3 DO (Relay) Fan control   |
| TLC3-FCR-2T-D-230-W01 | 40-10 0119-01 | Cooling only |          | 2 DO (TRIAC) Valve control |

### Selection of valve actuators and fans

Binary auxiliary devices: E.g. fans and on/off valves. Do not directly connect fans that exceed 2A and actuators that exceed 0.3A.

### Mounting location

- Install the controller on an easy accessible interior wall, approx. 1.5 m above the floor in an area of average temperature.
- Avoid direct sunlight or other heat sources, e.g. the area above radiators and heat emitting equipment.
- Avoid locations behind doors, outside walls and below or above air discharge grills and diffusers.
- Location of mounting is less critical if external temperature sensors are used.

### Installation

1. Connect the wires to be connected to the terminals of the power case according to wiring diagram
2. Install the mounting plate to the flush mounting box. Make sure that the nipple with the front holding screw is facing to the ground. Make sure the mounting screw heads do not stand out more than 5 mm (0.2") off the surface of the mounting plate.
3. Ensure that the jumpers are set correctly.
4. Slide the two latches located on the top of the front part into the hooks at the upper side of the mounting plate.
5. Carefully lower the front part until the interconnector reaches the mounting-plate. Continue pressing in a gentle way until the front part is fully connected. While inserting the connectors, a slight resistance can be felt. This is normal. Do not use excessive force!
6. With a Philips-type screw driver of size #2, carefully tighten the front holding screw to secure the front part to the mounting plate. This screw is located on the front lower side of the unit. There is no need to tighten the screw too much.

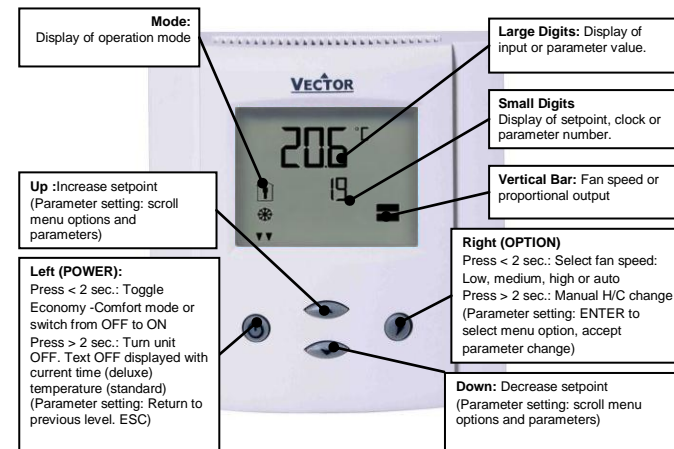
### Power Failure

Upon power-interruption, all parameters and setpoints are memorized in non-volatile memory and therefore do not have to be re-entered again.

### Error messages

- Err1:** Error temperature sensor. The internal temperature sensor may be damaged or not present.  
**FP:** Steady: Frost protection is active.  
 Blinking: Frost protection activated in the past and is now inactive. Confirm with OPTION key.

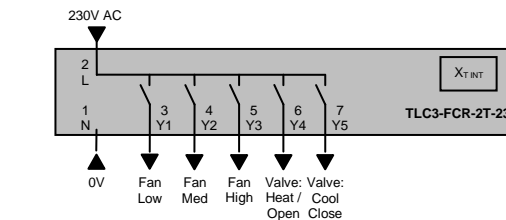
## Display and Operation



## Technical Specification

|                |   |  |
|----------------|---|--|
| Power Supply   | Operating Voltage   | 210 – 250 V AC 50/60 Hz  |
|                | Power Consumption   | Max 1W, 1.5VA  |
|                | Electrical Connection   | Terminal Connectors  |
|                | Deluxe type only: Power backup for real time clock                    | Min 48h if charged for 24h   |
| Signal Inputs  | Temperature Inputs  | RT Internal  |
|                | Range Accuracy  | 0...50 °C (32...122 °F)<br>0.5°C (1°F)   |
| Signal Outputs | Digital Switching Outputs   | DO1 to DO3   |
|                | Switching Type  | Relays   |
|                | AC Switching power  | 250V AC 2A max. each output  |
|                | Digital Switching Outputs   | DO4...DO5, TRIAC   |
| Environment    | Switching Type  | TRIAC  |
|                | AC Switching power  | 250V AC 0.3A max. each output  |
|                | Insulation strength   |  |
|                | between contacts and system electronics: between neighboring contacts | 3750V AC to EN 60 730-1<br>1250V AC to EN 60 730-1   |
| Standards      | Operation   | To IEC 721-3-3   |
|                | Climatic Conditions   | class 3 K5   |
|                | Temperature   | 0°C ... 50°C (32°F... 122°F)   |
|                | Humidity  | <95% R.H. non-condensing   |
| Standards      | Transport & Storage   | To IEC 721-3-2 and IEC 721-3-1   |
|                | Climatic Conditions   | class 3 K3 and class 1 K3  |
|                | Temperature   | -25°C... 70°C (-13°F... 158°F)   |
|                | Humidity  | <95% R.H. non-condensing   |
| Standards      | Mechanical Conditions   | class 2M2  |
|                | conformity  |  |
|                | EMC Directive   | 2004/108/EC  |
|                | Low Voltage Directive   | 2006/95/EC   |
| General        | Product standards   |  |
|                | Automatic electrical controls for household and similar use           | EN 60 730 – 1  |
|                | Special requirement on temperature dependent controls                 | EN 60 730 – 2 - 9  |
|                | Electromagnetic compatibility for domestic sector                     | Emissions: EN 60 730-1<br>Immunity: EN 60 730-1  |
| General        | Degree of Protection  | IP30 to EN 60 529  |
|                | Pollution Class   | II (EN 60 730-1)   |
|                | Safety Class  | II (IEC 60536)   |
|                | Overvoltage Category  | III (EN 60 730-1)  |
| General        | RoHS  | Compliant  |
|                | Materials   |  |
|                | Cover, back part  | ABS plastic (UL94 class V-0)   |
|                | Mounting Plate  | Galvanized Steel   |
| General        | Dimensions (H x W x D)  | Front part: 21 x 88 x 88mm (0.8 x 3.5 x 3.5 in.)<br>Power case: 60 x 50 x 32mm (2.4 x 2.0 x 1.3 in.) |
|                | Weight (including package)  | Standard: 295g (10.4oz)<br>Deluxe (-D): 305g (10.7oz)  |

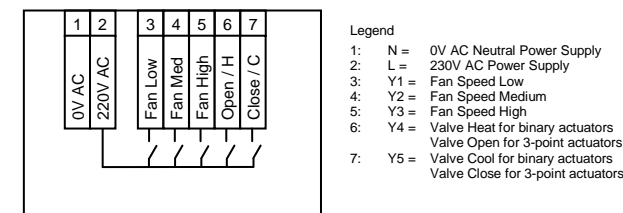
## Wiring Diagram



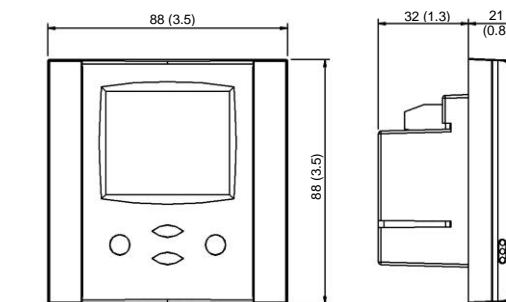
### Description:

|    |                        |   |
|----|------------------------|---|
| N  | Power supply:          | 0V Neutral  |
| L  | Power supply:          | 230VAC  |
| Y1 | Binary output 230V AC: | Fan:Low   |
| Y2 | Binary output 230V AC: | Fan:Medium  |
| Y3 | Binary output 230V AC: | Fan:High  |
| Y4 | Binary output 230V AC: | Valve: Heating or Open if in 3-point floating mode  |
| Y5 | Binary output 230V AC: | Valve: Cooling or Close if in 3-point floating mode |

### Terminal Connections



## Dimensions



Space required in flush mounting box: (H x W x D) 60 x 50 x 32mm (2.4 x 2.0 x 1.3 in.)  
 Distance for mounting screws: Horizontal and vertical: 45 to 63mm (1.8 to 2.5 in.)

## Configuration parameters for firmware version 1.0

The TLC3-FCR-2T can be adapted to wide variety of fan coil applications. The adaptation is done with parameters. The parameters can be changed on the unit without the need of additional equipment.

### Identifying the firmware version

The parameters and functionality of controller depend on its firmware revision. It is therefore important to use a matching product version and parameter set. The firmware version is shown on the large LCD digits when pressing UP and DOWN buttons for more than 3 seconds simultaneously.

### Changing parameters

The parameters may only be accessed by entering a code. There are two levels of parameters: User operation parameters for access control settings and Expert parameters for control functions and unit setup. The codes for user levels and expert levels are different. Only control experts should be given the control parameter code.

The parameters can be changed as follows:

- Press UP and DOWN button simultaneously for three seconds. The display shows the software version in the large digits and the software revision in the small digits.
- Pressing the OPTION button will indicate CODE on the small digits and 000 on the large digits.
- The code for accessing the user parameters is 009
- Select this using UP or DOWN buttons.
- Press OPTION button after selecting the correct code.
- Once logged in, the parameter is displayed immediately.
- Select the parameters with the UP/DOWN buttons. Change a parameter by pressing the OPTION button. The MIN and MAX symbols show up and indicate that the parameter may be modified now. Use UP or DOWN buttons to adjust the value.
- After you are done, press OPTION or POWER in order to return to the parameter selection level.
- Press the POWER button again so as to leave the menu. The unit will return to normal operation if no button is pressed for more than 5 minutes.

## User Parameters (Access Code: 09)

| Parameter | Description   | Range    | Standard  |
|-----------|---|----------|---|
| UP 00     | Enable change of operation modes,   | ON, OFF  | ON (Enabled)                                    |
| UP 01     | Enable change of set points   | ON, OFF  | ON (Enabled)                                    |
| UP 02     | Enable manual control fan speeds  | ON, OFF  | ON (Enabled)                                    |
| UP 03     | Enable manual change of Heating/Cooling Mode.<br>Applies only for 2-pipe or 4-pipe systems.   | ON, OFF  | W00 = ON<br>W01 = OFF                           |
| UP 04     | Enable Access to time programs  | ON, OFF  | ON (Enabled)                                    |
| UP 05     | State after power failure: 0 = OFF, 1 = ON, 2 = Last State  | 0, 1, 2  | 2   |
| UP 06     | Enable Economy (unoccupied) Mode.<br>Shift the setpoint to a lower temperature in winter or higher temperature in summer in order to save energy. May be activated through the POWER button, or with the external input (typically for key card switches in hotel rooms or motion detectors for meeting rooms.) | ON, OFF  | ON<br>(Economy )                                |
| UP 07     | Celsius or Fahrenheit, OFF for Celsius, ON for Fahrenheit   | ON, OFF  | OFF (Celsius)                                   |
| UP 08     | Calibrate internal temperature sensor<br>-10° to +10° in 0.1° steps. (Sensor is factory calibrated, use this feature for field adjustment only as required.)  | -10...10 | 0   |
| UP 09     | Enable Frost Protection.<br>Activates the output independent of operation mode when the control temperature drops below 5°C or 41°F. The controller returns to normal operation when the temperature increases above 10°C or 50°F.  | ON, OFF  | W00 = ON<br>W01 = OFF                           |
| UP 10     | Select contents of Large LCD display in standard mode:  | 0...4    | 02<br>Temperature                               |
|           | 00 = OFF<br>01 = Setpoint<br>02 = Temperature Sensor<br>03 = Output Fan Speed<br>04 = Clock   |          |   |
| UP 11     | Select contents of small LCD display in standard mode<br>(use table of UP 10)   | 0...4    | Standard:<br>01 Setpoint<br>Deluxe:<br>04 Clock |
| UP 12     | Contents of vertical bar in standard mode<br>OFF = Fan Speed: 0 – 3 levels<br>ON = Control output 0 – 10 levels   | ON, OFF  | OFF (FAN)                                       |
| UP 13     | Clock display type: Only available for deluxe version<br>OFF = Show 24hour clock<br>ON = Show 12hour clock (AM, PM)   | ON, OFF  | OFF (24h)                                       |
| UP 14     | Reset timer for override mode: Only available for deluxe version<br>0 = Reset of override mode is not active.<br>1...255 = delay in minutes to switch off device if ON/Economy mode is activated while the unit is scheduled to be in OFF mode  | 0...255  | 60 (Min)  |

## Control Parameters (Access Code: 241)

Warning! Only experts should change these settings!

### Setpoint limitation

| Parameter | Description                             | Range            | Standard    |
|-----------|---|------------------|-------------|
| FC 00     | Minimum set point limit in heating mode | -40-60°C (160°F) | 16°C (61°F) |
| FC 01     | Maximum set point limit in heating mode | -40-60°C (160°F) | 24°C (75°F) |
| FC 02     | Minimum set point limit in cooling mode | -40-60°C (160°F) | 18°C (64°F) |
| FC 03     | Maximum set point limit in cooling mode | -40-60°C (160°F) | 30°C (86°F) |

### Controls Configuration

|       |   |                 |   |
|-------|---|-----------------|---|
| FC 04 | Economy temper Economy (unoccupied) Mode temperature shift:<br>The comfort (occupied) setpoint is shifted by the value set with parameter. If heating is active the comfort setpoint will be decreased, if cooling is active, the setpoint will be increased. (Enable with UP06.)ature shift  | 0-100°C (200°F) | 5.0°C (10°F)  |
| FC 05 | Switching Span Heating  | 0-100°C (200°F) | 1.5°C (3°F)   |
| FC 06 | Switching Span Cooling  | 0-100°C (200°F) | 1.0°C (2°F)   |
| FC 07 | Switching Hysteresis is the difference between switching on and switching off. A small hysteresis will increase the number of switching cycles and thus the wear on fan and relays contacts.  | 0-100°C (200°F) | 0.5°C (1°F)   |
| FC 08 | Mold Protection: OFF = Disabled, ON = Enabled   | ON, OFF         | OFF   |
| FC 09 | Switching delay min running time of fan speed   | 0...255s        | 10s   |
| FC 10 | Switching delay min stopping time of fan speed  | 0...255s        | 10s   |
| FC 11 | Control option:<br>0 = Cooling only<br>1 = Heating only<br>2 = 2-pipe system<br>3 = 4-pipe system   | 0...3           | Default = 3<br>W01 = 0<br>W02 = 1<br>W03 = 2<br>W04 = 3 |
| FC 12 | Dead Zone Span:<br>The Dead Zone Span lies between the heating and the cooling setpoint. The output is off while the temperature is within the dead zone span. A negative dead zone is not possible.  | 0...100°        | 1.0°C (2°F)   |
| FC 13 | Heat/Cool Changeover Delay (if set to FC11 = 3):<br>A demand to switch between heating and cooling must persist for the length of time set with this parameter before the controller switches. Prevents activation of a sequence during a short-term change in temperature in order to protect equipment (with control overshoot for example) | 0...255 min     | 5 min   |

### Control Configuration for PWM – 3-point floating mode

|       |                           |                   |               |
|-------|---------------------------|-------------------|---------------|
| FC 14 | P – band heating $X_{PH}$ | 0-10.0°C (20.0°F) | 2.0°C (4.0°F) |
| FC 15 | P – band cooling $X_{PC}$ | 0-10.0°C (20.0°F) | 2.0°C (4.0°F) |

### Proportional control(P-band)

The proportional control function calculates the output based on the difference between setpoint and measured value. The proportional band (P-band) defines the difference between setpoint and measured value which will result in a 100% output. Setting the proportional band to 0 disables proportional control.

### Output Parameters

|       |   |             |                   |
|-------|---|-------------|-------------------|
| FC 16 | Output setting, Binary, PWM or 3-point:<br>0 = Binary or PWM (DO4 Heating, DO5 Cooling)<br>1 = 3-point binary output (DO4 open, DO5 close)<br>2 = 3-point floating output (DO4 open, DO5 close) | 0...2       | 0<br>Binary / PWM |
| FC 17 | Running Time in 3-point mode  | 0...255 s   | 90 s              |
| FC 18 | PWM cycle time heating, 0 disables PWM mode   | 0...100 min | 0                 |
| FC 19 | PWM cycle time cooling, 0 disables PWM mode   | 0...100 min | 0                 |

### 3-point floating:

For floating point outputs the running time of the actuator used needs to be specified with FC17. Running time is defined as the time required for the actuator to run from fully open to fully closed and vice versa. Actuators with a fixed running time are recommended. Once fully open or fully closed the running time for the actuator is extended for a full run-time cycle. This will allow the actuator position to be synchronized in case it has been moved during off time or an actuator with variable running time was used.

### Pulse With Modulation (PWM)

In PWM mode the digital output will be switched on/off once per cycle. The on and off times are calculated according to the control sequence.