Smart thermostat FC660

Data sheet

Subject to technical alteration

Issue date: 17.12.2024

Application

FC660 smart thermostat is a device for indoor temperature control. It is mainly applied to conventional system or heat pump system for heating/cooling, with 3 modes easily switchable: Holiday, Away and Home. The device is of high reliability and practicability, and it can support up to 3H/2C system.

Compatibility

The Smart Thermostat works with most 24V systems, including gas fuel, electric fuel, oil fuel, heat pump and radiant.

It can control:

- Heating: one and two stages (W1, W2)
- Cooling: one and two stages (Y1, Y2)
- Heat pump: with auxiliary (O/B, AUX)
- Fan (G)
- Power (C, RH, RC)

Security Advice – Caution

The installation and assembly of electrical equipment should only be performed by authorized personnel.

The product should only be used for the intended application. Unauthorized modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

CAUTION! Risk of electric shock due to live components within the enclosure, especially devices with mains voltage supply .

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual

Compatibility

As a component of a large-scale fixed installation, Manufacturer products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most of the products may contain valuable materials that should be recycled and not disposed of as domestic waste. Please note the relevant regulations for local disposal.

Technical Data

Power supply	AC 24V 50/60Hz
Network technology	WIFI 2.4G communication
Measuring range temp.	0~+50℃
Control functions	Set point adjustment 0~50℃ (default +16~+30℃)
Display	TFT Resolution 480*480 Colorful display
Enclosure	Aluminum alloy, tempered glass, fire proof PC & ABS
Protection	IP20 according to EN60529
Cable entry	Rear entry
Ambient condition	-10~+50℃, max. 95%rH non-condensing
Mounting	Surface mounted
Dispaly size	86*86*33.8mm
Base size	86*86*4.5mm

CE power and frequency band information are as follows:

Transmitter Frequency:2.4G Wi-Fi: 2412-2472MHz

Receiver Frequency:2.4G Wi-Fi: 2412-2472MHz

RF-Output Power:2.4G Wi-Fi: 17.95dBm

Mounting advice

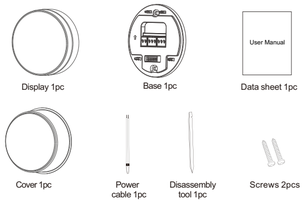
Dear customer,

Thank you very much for your purchase, so glad to have nice chance to serve you. In order to have a good experience, please keep this user manual properly, after buying our product .

Ensure all power is disconnected before installing. Do not connect to live operating equipment.

* Please install the product at normal temperature with good ventilation, keep away from heat source, windows and doors, avoid direct sunlight.

Product list



Installation Description

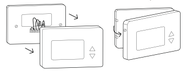
Step 1: Power off your Heating, Ventilation, and Air Conditioning (HVAC) system by using the master switch or circuit breaker box. This is important for your safety.

Tip: Look for your master switch or circuit breaker box in the basement, attic, utility closet, or behind a wall panel near the thermostat.

STEP 2: Confirm your system is off by turning on your heat (during winter) or your AC (during summer). Wait a few minutes —you should not feel air coming from your vents.

Tip: If you have a boiler, check to see that the main flame is extinguished.

Step 3: Remove your old thermostat cover from the wall.



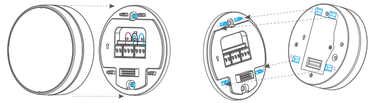
Tip: Many thermostats simply pop off or unclip from the base, while others may have screws that you will need to remove.

Step 4: Take a picture of the wires connected to the terminals of your old thermostat. You may need to reference this photo later.

WARNING: this thermostat is designed for 24VAC with a 0.5A maximum current. Do not connect it to line (high) voltage or millivolt systems.

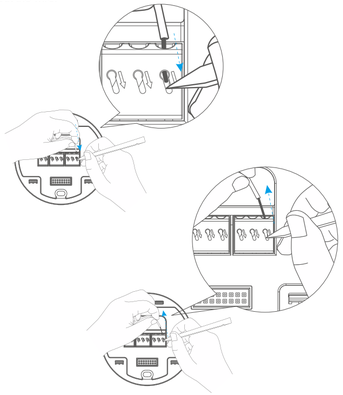
Step 5: Separate the base from thermostat by disassembly tool, pulling the control wires through the large opening in the thermostat base.

Next, level and mount the base on the wall using the supplied screws. Do not over tighten the mounting screws as the thermostat base may warp causing an improper seating of the thermostat connecting pins to the terminal blocks. Use a properly sized installation tool to indicate the connection terminal according to the arrow of the base before connecting each wire to its dedicated terminal.



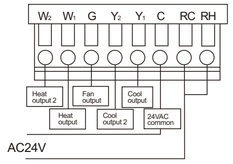
Fasten the base and display unit

Connection wires: Use the disassembly tool to push the terminal down according to the arrow on the base and insert the wire into the terminal at the same time. If need remove the wire from terminal, use the installation tool to push the terminal down in the arrow direction and pull out the wire.

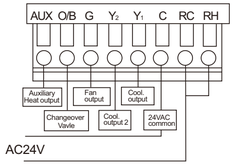


Terminal Connection wiring diagram

Wiring diagram Conventional system



Wiring diagram Heat Pump system

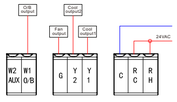


Terminals Explanation

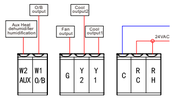
RH	Power for heating, AC24V
RC	Power for cooling, AC24V
C	Common wire, AC24V
Y1	First outdoor stage cooling on conventional systems or first heat and cool on heat pump systems
Y2	Second outdoor stage cooling on conventional systems or second heat and cool on two stage heat pump systems
G	Indoor blower (fan)
W1	First indoor stage heat on conventional systems or first stage auxiliary on heat pump systems
W2	Second indoor stage heat on conventional systems or second stage auxiliary heat on heat pump systems
O/B	Changeover (reversing valve) connection for heat pump or zone panel systems
AUX	Auxiliary output

Wiring Instructions

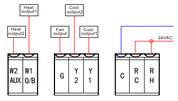
Heat pump system



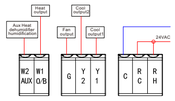
Heat pump system with Aux device



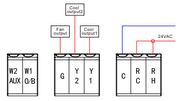
Conventional system



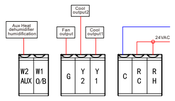
Conventional system with Aux device



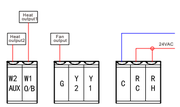
Cooling only system



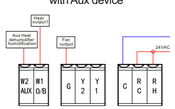
Cooling only system with Aux device



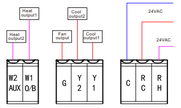
Heating only system



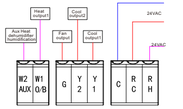
Heating only system with Aux device



Dual power supply conventional system

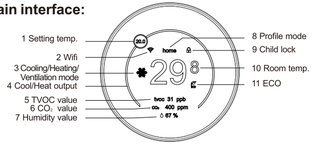


Dual power supply conventional system with Aux device



Display panel

Main interface:



1 Setpoint – Factory default is 16~30℃(60~86℉)

2 Wifi symbol – 3 different status display

- Blink in gap indicates the thermostat is offline
- Rapid blink indicates the device is in pairing
- Normal status indicates the thermostat connects to router or server successfully

3 Cooling, Heating & Ventilation mode – When the user selects cooling mode, the thermostat detects the room temperature is higher than the set temperature, the cooling start signal will be output.

When the user selects heating mode, the thermostat detects the room temperature is lower than the set temperature, the heating start signal will be output.

When the user selects ventilation mode, only the fan start signal is output, the cooling and the heating outputs are keep off.

4 Cooling & Heating output

- Circle color showed blue-the thermostat is running cooling output
- Circle color showed red-the thermostat is running heating output
- Circle color showed white-the thermostat without any output

5 TVOC display – Room air quality

6 CO_2 display – Room air quality

7 Humidity display – Relative room humidity

8 Profile mode – Support holiday/home/away mode adjustment (Holiday mode will only display when the user set this holiday mode in Parameter Setting)

9 Lock - Local thermostat will not be workable when this symbol indicated unless it is released by APP on smart phone or input the thermostat password (Factory default password "987", and the user can set the password, if the user forgot the revised password, the user can input the super password "999" to restore the factory default password "987").

10 Temperature display – The thermostat displays room temperature. (Factory default: ℃ display), the user can switch to Fahrenheit (°F) by APP

11 ECO mode – In ECO mode it will show the leaf and the word ECO in the display

In ECO mode, factory default cooling temperature is 28℃, heating temperature is 19℃.(The user can revised the ECO temperature in Parameter Setting)

Communication

Wifi communication:

Download APP:

1.1Search for "Smart Life" or "Tuya Smart" in IOS/Android App and download, or scan the relevant QR code here.

IOS & Android

1.2 Register account in APP.

2.1 In parameter set two interface, choose the “Wifi pair” to enter pair mode, the “Wifi” symbol flash in main interface, the device is in pairing status.

2.2 Click on “+” symbol to “Add device” on “Smart Life” or “Tuya Smart”, turn on phone WIFI, and then find “Small Home Appliance” menu to click on “Thermostat (Wi-Fi)”, then please follow the step to input wifi account no. and password.

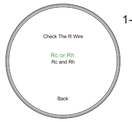
2.3 Follow up with the guideline to operate the next step, the APP will automatic search the device, and add in its register here.

2.4 Connect successfully, then the user can control the smart thermostat by APP.

Function operation instruction

System configuration:

The thermostat is powered on for the first time, follow the display guideline to select and confirm the system configuration;



1-Select “Check the R wire”, rotation the first ring to select the “Rc or Rh” or “Rc and Rh”, press the touch panel to confirm the selection. (Tip: The System Configuration confirmation method for each selection is the same)

2-Select “Equipment Installation Setting”, rotation the first ring to select the “Heat Pump” or “Multi Heat Pump” or “Heat Only” or “Cool Only” or “Back(Back to the Previous Level)”.

3-Select “How is your O/B Reversing Valve energized”, rotation the first ring to select the “On cool” or “On Heat”.

4-Select “Second level cool and heat setting”, rotation the first ring to select the “Yes” or “No”.

5-Select “Auxiliary setting”, rotation the first ring to select the “None” or “First stage heat for heat pump” or “Humidification” or “Dehumidifier”.

6-Select “Equipment startup delay”, rotation the second ring to select the delay time from 0~15min, factory default 3min.

7-Select temperature display format “℃” or “℉” by anticlockwise the second ring.

8-Select “Dead band setting” by rotation the second ring from 0.5℃(1℉) to 5℃ (9℉), factory default 0.5℃(1℉).

9-Select “Temperature difference setting” by rotation the second ring from 1℃(2℉) to 5℃(9℉), factory default 1℃.

10-Final confirm “Equipment type”, display the parameters previously selected by the user, if correct, select “Next” and press the touch panel to proceed to the next step; Finally, select “Finish” to enter Main Interface.

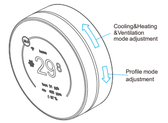
Main interface function operation:

Set temperature setting

In main interface, clockwise rotation the first ring, the setting temperature would be 0.5℃ increase; Otherwise, anticlockwise rotation the first ring will keep temperature 0.5℃ decrease.

Profile Mode Selective

Rotate the second ring in clockwise to adjust the profile mode: away→home→away...to recycle.



Mode selective

Rotate the second ring in anticlockwise to adjust the mode: cooling→heating→ventilation→cooling...to recycle

Note: In mode switch, each operation will have an prompt on panel, rotate the first ring to select whether switch, press the panel to confirm the selection.

You need to rotate the second ring by a larger amplitude (more than 1/4 turn) to shift the modes

Parameter Setting

Enter into Parameter Setting

In main interface long press the panel for more than 2-second, then the user get the parameter setting interface:

Rotation the first ring to select the parameter setting, and press the panel to confirm the selection.

(Tip: The Parameter Setting method is the same)

Main interface

Profile modes setting (Tip: In parameter setting interface, enter main interface method is the same→Short press the panel then enter main interface.)

Rotation the first ring to select 3 modes (Away mode/Daily mode/Holiday mode) and press the panel to confirm the selection.

1 “Away mode” setting:
Set the “Heat” & “Cool” temperature, and “Fan” mode to On/Off.

2 “Daily mode” setting:
Set “Temp. time set” from Monday to Sunday(Figure 1), each day can be set 6 periods(Figure 2) according to the user’s requirement (Figure 3);

Figure 1

Figure 2

Figure 3

3 “Holiday mode” setting

Set “Holiday start time”(Figure 4), “Holiday stop time”(Figure 5) & “Holiday setting temp.”(Figure 6), time setting sequence is month, day, year, hour, minute, and am/pm. In “Holiday setting” interface, select heat/cool “On” or “Off ” and temperature setting from 16~30℃, fan runtime(min/hr) from 0~60 (Tip: We recommend 0 min/hr.)

Figure 4

Figure 5

Figure 6

Parameter set one

Rotation the first ring to select the parameter and press the panel to confirm the selection. Select “Back” to return to the previous interface.

(Tip: The Parameter Selection & Confirmation method is the same)

1 Temp./hum. offset: Set temperature offset from 0~10℃, the temperature offset would be 0.5℃ increase or decrease; Set humidity offset from 0~100%, the humidity offset would be 1% increase or decrease.

2 Temp. up/down limit: Set the upper setting temperature limit from 16.5~50℃; Set the lower setting temperature limit from 1~30℃.

3 IO state: Display the thermostat input and output state.

4 System set: Input password “987” to enter System Configuration.

5 System information:Display the thermostat software & hardware version.

6 Password modification: Input old password “987” to reset the password according to user’s requirement.If the user forgot the modified password, the user can input the super password “999” to restore the factory default password “987”.

7 Restore factory settings: Input password “987” to restore to factory default value.

Power On/Off set
Press the touch panel to select “Power On” or “Power Off”.

Parameter set two

1 ECO mode: Set the ECO cool temperature and ECO heat temperature

2 Wifi pairing: Select the reset the wifi pair, the thermostat is in pairing status.

3 Backlight delay: The thermostat backlight setting from 0~100% brightness

4 Time: Time setting sequence is month, day, year, format, hour,am/pm, minute.

5 Fault list:Setting the fault parameters.

6 Service supports: If you have any questions, please scan the panel QR code to contact the technician.

7 Modbus:Setting the Modbus-RTU parameters.

Fan On/Off Set
Press the panel to select “Fan On” or “Fan Off”.

Key Lock/Unlock Set
Press the panel to select “Lock” or “Unlock”.

ECO On/Off Set
Press the panel to select ECO mode “On” or “Off”.

Modbus communication Register

Input Register

Address		Access	Description	Resolution / Unit		
0	0x0000	Read-only	Firmware-Version e.g.0x1A0 0=1.0	NC		
1	0x0001	Read-only	**Value of the room temperature ℃** 0...500 -> 0...50.0°C	0.1	°C	
2	0x0002	Read-only	**Value of the room humidity %** 0...100%	1	RH%	
3	0x0003	Read-only	**Value of room TVOC** 0...60000ppb	1	ppb	
4	0x0004	Read-only	**Value of room CO₂** 400...60000ppm	1	ppm	
5	0x0005	Read-only	**Equipment type** 0x00 = single stage heat pump 0x01 = multi-stage heat pump 0x02 = cooling only 0x03= heating only			
6	0x0006	Read-only	**Y1 status** 0x00 = OFF 0x01 = ON			
7	0x0007	Read-only	**Y2 status** 0x00 = OFF 0x01 = ON			
8	0x0008	Read-only	**W1 status** 0x00 = OFF 0x01 = ON			
9	0x0009	Read-only	**W2 status** 0x00 = OFF 0x01 = ON			
10	0x000A	Read-only	**FAN status** 0x00 = OFF 0x01 = ON			
11	0x000B	Read-only	**O/B(reversing valve) status** 0x00 = OFF 0x01 = ON			
12	0x000C	Read-only	**Auxiliary electric heater status** 0x00 = OFF 0x01 = ON			
13	0x000D	Read-only	**WIFI status** 0x00 = Offline 0x01 = Online			
14	0x000E	Read-only	**Fault code** E01=NTC sensor fault			

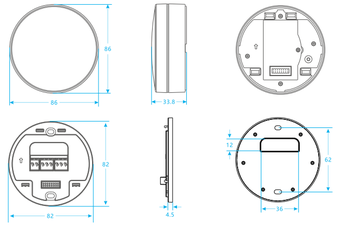
Holding Register

General settings

Address		Access	Description	Resolution / Unit		Default
256	0x0100	Read-write	Customer set Device IP address 1...247	1.0		1
257	0x0101	Read-write	**LCD Temperature Unit** 0=°C 1=°F	°C/°F		0
258	0x0102	Read-write	**Backlight intensity operated** 0...100	1.0	%	80
259	0x0103	Read-write	**Backlight operating delay setting** 1...255 = 1...255 seconds ON	1.0		30
260	0x0104	Read-write	**Internal Sensor Temperature Offset (°C)** -100...100 -> -10.0...10.0°C	0.1	°C	0
261	0x0105	Read-write	**Internal Sensor Temperature Offset** -10.0...10.0°F	1	°F	0
262	0x0106	Read-write	**Humidity offset** -20...20%	1	RH	0
263	0x0107	Read-write	**Individual passwords setting** 001-998、default=987, 000 = no password			987

264	0x0108	Read-write	**Stand-by status** 0x00=power OFF 0x01=power ON	NC		1
265	0x0109	Read-write	**Working mode setting** 0x00=controller cooling mode only, Comfort Mode 0x01=controller heating mode only, Comfort Mode 0x02=ventilating	NC		0
266	0x010A	Read-write	**scene mode** 0x00= Comfortable mode 0x01= away mode			0
267	0x010B	Read-write	**Set point range (°C)** 90...380 °C-> 9...38°C		°C	210
268	0x010C	Read-write	**Set point range (°F)** 48...99 °F		°F	69
269	0x010D	Read-write	**Key lock** 0x00=unlocked 0x01=locked			0
270	0x010E	Read-write	**Compressor startup delay time** 0...15minutes		min	3
271	0x010F	Read-write	**Dead band temperature setting** 5...50=0.5-5°C		°C	5
272	0x0110	Read-write	**Dead band temperature setting** 1...10 °F		°F	2
273	0x0111	Read-write	**Y2/W2 hysteresis Celsius temperature setting** 10...50=1-5°C		°C	1
274	0x0112	Read-write	**Y2/W2 hysteresis Fahrenheit temperature setting** 2...10 °F		°F	2
275	0x0113	Read-write	**Year setting** 2023–2099			2023
276	0x0114	Read-write	**Month setting** 01-12			01
277	0x0115	Read-write	**Day setting** 01-31			01
278	0x0116	Read-write	**Hour setting** 00-23			0
279	0x0117	Read-write	**Minute setting** 00-59			0

Dimension



FCC Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.