

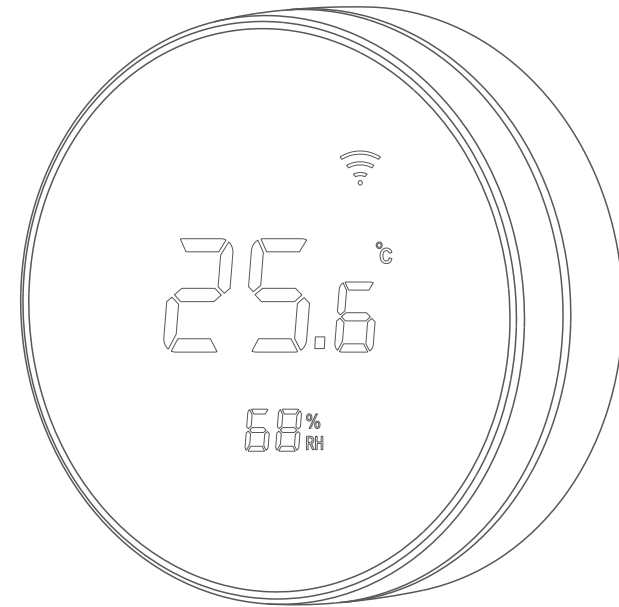
## Bandary Smart thermostat FC610

Fan coil controller

### Datasheet

Subject to technical alteration

Issue date: 28.08.2020



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### Application

The Dual-Right thermostat FC610, With Microcomputer control and WIFI communication technology to detect the difference between room temperature and setting temperature ,then through controlling the fan , ON/OFFvalve and modulating valve to keep the room at comfortable and constant temperature This series product apply to control two pipe or four pipe fan coil ,two wire or three wire motorized valve ,3-stage fan ,EC fan and an electrical heating coil system . you can also control your thermostat anyway where you are by APP in your cell phone ,with 1-way RS485 interface to BMS control system , can realize centralized control and management.

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## 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. Unauthorised 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 (usually between 198..240 V).**

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

## Notes on Disposal



As a component of a large-scale fixed installation, Bandary 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.

## Remarks to Room Sensors

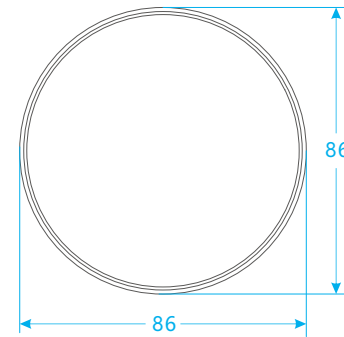
### Location and Accuracy of Room Sensors

The room sensor should be mounted in a suitable location for measuring accurate room temperature. The accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important, that the back plate is completely flush to the wall so that there is sufficient circulation of air through the vents in the cover, otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. The temperature sensor should not be covered by furniture or other objects. Mounting next to doors (due to draught) or windows (due to colder outside wall) should be avoided.

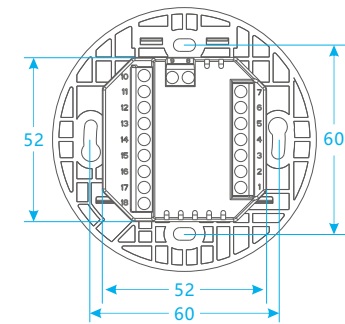
### Surface and Flush Mounting

The measuring result is influenced by the thermal characteristics of the wall. A solid concrete wall responds to thermal fluctuations within a room in a much slower than a light-weight structure wall. Room temperature sensors installed in flush-mounted boxes have a longer response time to thermal variations. In extreme cases they detect the radiant heat of the wall even if the air temperature in the room is lower for example. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor is the smaller the deviations limited in time are.

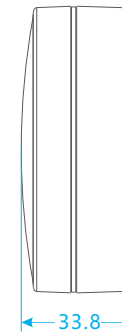
### Dimension:



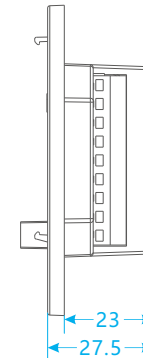
Front



Backpack



Side



Backside

			0b0000 0011= controller cooling mode only, Comfort Mode 0b0000 0100= ventilating (PI loop controls fan stages only, valves closed)  0b0001 0000= FC610 off (Frost protection active), ECO Mode 0b0001 0001= controller auto mode (heating&cooling), ECO Mode 0b0001 0010= controller heating mode only, ECO Mode 0b0001 0011= controller cooling mode only, ECO Mode 0b0001 0100= ventilating (PI loop controls fan stages only, valves closed)  <b>HMI mode</b> 0b1xxx xxxx=HMI mode ,controller OFF 0b1xxx xx01=show symbol "ventilating " 0b1xxx xx10=show symbol "heating " 0b1xxx xx11=show symbol "cooling" 0b1xxx x110=show AUTO+ heating symbol 0b1xxx x111=show AUTO+ cooling symbol 0b1xxx x101= show AUTO+ ventilating symbol 0b1xxx1xxx=reserved			
515	0x0203	Read-write	<b>Active Symbols</b> 0x00= show none 0x01= show Leaf 0x02= show dew point 0x04= show frost protect ON 0x08= show open window 0x10= show Attention! 0x20= show hourglass 0x40= show lock 0x80= show ECO			0
516	0x0204	Read-write	<b>Control variable y%(HMI MODE)</b> 0-100% If output is 2-point ,output will be ON for control variable >5%	0.1	%	0
517	0x0205	Read-write	<b>Room temperature on LCD (HMI mode)</b> 0...500=0...50°C	0.1	%	0

Technical Data		
<b>Measuring values</b>	temperature	
<b>Output switch contact</b>	<b>terminal 5   6</b> 2 normally open contacts, 250 V load max 3 A (heating & cooling via 2-point control )	<b>terminal 2   3   4 – LO   ME   HI</b> 3x normally open contact, 250 V load max. 3 A, Fan
<b>Output voltage</b>	<b>terminal 16   17</b> 2x 0..10 V for heating and cooling	<b>terminal 15</b> 1x 0..10 V for fan
<b>Inputs</b>	<b>terminal 14</b> input for external sensor NTC10K	<b>terminal 12– ESI   DP</b> input digital for floating contact, window contact, dew point sensor
	<b>terminal 13 - OCC</b> input digital for floating contact, occupancy sensor, key card switch	
<b>Network technology</b>	RS485 Modbus, RTU, half-duplex, baud rate 4.800, 9.600, 19.200 or 38.400, parity: non (2 stopbits), even or odd (1 stopbit)  WIFI 2.4G wifi communication	
<b>Power supply</b>	24 DC/AC 50/60Hz	
<b>Power consumption</b>	Max 3w	
<b>Max load current</b>	<3A	
<b>Measuring range temp.</b>	+1..+50 °C	
<b>Accuracy temperature</b>	±1 K (typ. at 21 °C)	
<b>Control functions</b>	set point adjustment +1..+50 °C, (default +16..+30 °C)	
<b>Display</b>	LCD Ø49 mm, black background white lighting	
<b>Enclosure</b>	Power unit :Fire proof PC+ABC  Display unit : Aluminum Alloy + High strength 3D Curved tempered glass	
<b>Protection</b>	IP20 according to EN 60529	
<b>Cable entry</b>	rear entry	
<b>Connection electrical</b>	terminal block max. 1,5 mm²	
<b>Ambient condition</b>	-10..+50 °C, max. 95% rH non-condensing	
<b>Mounting</b>	flush mounted with standard 86*86 wall box (Ø=60 mm)	
<b>Dimension(L*W*H)</b>	86*86*61mm	

## Mounting advices

Dear customer,

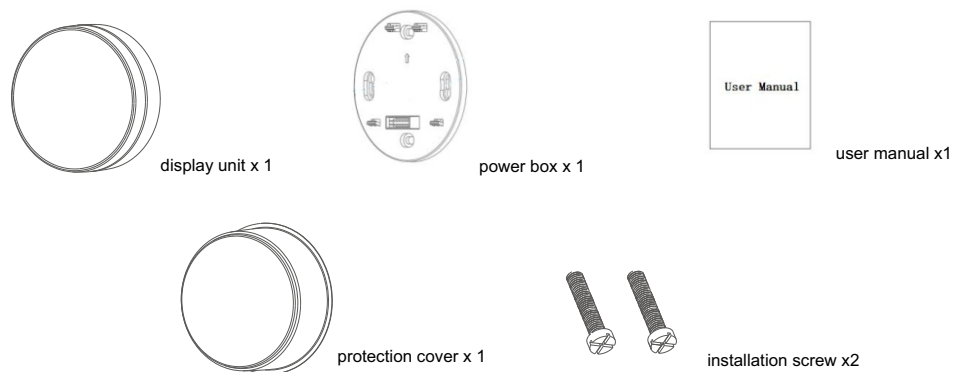
Thank you very much for choosing Bandy products, so glad to have nice chance to serve you. In order to have a good experience ,please keep this user manual properly ,after buying our product .

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.

\* This product should be installed on standard 86 \*86 wall box and kept 60mm between two installation screws.

### Product list:



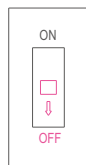
## Installation Description

### 1. Switch off power

This protects you and avoids blowing a fuse in your equipment.

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

This product should be installed on standard 86 \*86 wall box and kept 60mm between two installation screws.



Electric control panel

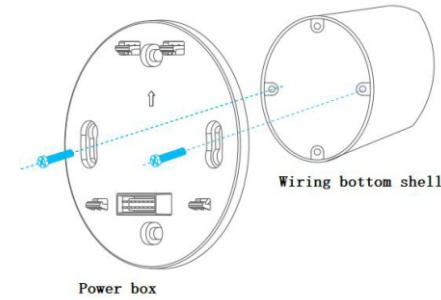
### Installation steps:

Step 1: Please follow the wiring diagram to connect the wires.

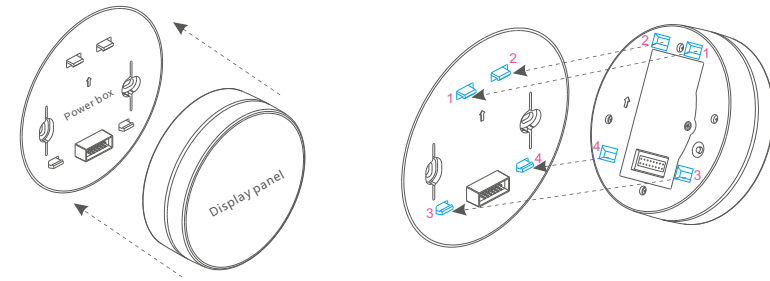
418	0x01A2	Read-write	reserved		0
419	0x01A3	Read-write	reserved		0
420	0x01A4	Read-write	reserved		0
464	0x01D0	Read-write	<p><b>Make next day(s) holiday</b></p> <p>0bxxx0000= None</p> <p>0bxxx00001 ...0bxxx11111 days of holidays (next n-days (starting next 0:00) forces the coming 1...31 days to be treated as the day specified by the 3 MSB. Does overwrite the calendar.</p> <p>0b000xxxxx = use ECO setting</p> <p>0b001xxxxx = set day = Mo</p> <p>0b010xxxxx = set day = Tu</p> <p>0b011xxxxx = set day = Wed</p> <p>0b100xxxxx = set day = Thu</p> <p>0b101xxxxx = set day = Fr</p> <p>0b110xxxxx = set day = Sat</p> <p>0b111xxxxx = set day = Sun</p>		0
496	0x01F0	Read-write	<p>system time—year</p> <p>2022-2099</p>		2022
497	0X01F1	Read-write	<p>system time—month</p> <p>1-12</p>		1
498	0X01F2	Read-write	<p>system time—day</p> <p>1-31</p>		1
499	0X01F3	Read-write	<p>system time-hour</p> <p>00-23</p>		0
500	0X01F4	Read-write	<p>system time-minutes</p> <p>00-59</p>		0
501	0X01F5	Read-write	<p>system time-seconds</p> <p>00-59</p>		0
<b>Holding Register (operation to override FC from Modbus)</b>					
	<b>Address</b>	<b>Access</b>	<b>Description</b>	<b>Resolution / Unit</b>	<b>Default</b>
512	0x0200	Read-write	<p><b>Active fan speed setting</b></p> <p>0 = OFF</p> <p>1, 2, 3 = Stage 1, 2, 3</p> <p>4 = Auto / DC-Fan</p>		0
513	0x0201	Read-write	<p><b>setpoint temperature</b></p> <p>0...500 -&gt; 0...50,0°C</p>		0
514	0x0202	Read-write	<p><b>Controller Mode</b></p> <p>b0000 0000=F610 off</p> <p>(Frost protection active), Comfort Mode</p> <p>0b0000 0001=</p> <p>controller auto mode (heating&amp;cooling), Comfort Mode</p> <p>0b0000 0010=</p> <p>controller heating mode only, Comfort Mode</p>		0

			Sunday in October (-1h) 7=MEX (First Sunday in April (+1h) - Last Sunday in October (-1))			
403	0x0193	Read-write	7day4periods programmable 0=deactivated 1=activated			0
404	0x0194	Read-write	1 period :Start time hour 0-23h	h		0
405	0x0195	Read-write	1 period :Start time minute 0-59m	min		0
406	0x0196	Read-write	1 period :Start setpoint 0...500 -> 0...50,0°C	°C		210
407	0x0197	Read-write	2 period : start time hour 0-23h	h		0
408	0x0198	Read-write	2 period : start time minute 0-59m	min		0
409	0x0199	Read-write	2 period : start setpoint 0...500 -> 0...50,0°C	°C		210
410	0x019A	Read-write	3 period :start time hour 0-23h	h		0
411	0x019B	Read-write	3 period :start time minute 0-59m	min		0
412	0x019C	Read-write	3 period :start setpoint 0...500 -> 0...50,0°C	°C		210
413	0x019D	Read-write	4 period : start time hour 0-23h	h		0
414	0x019E	Read-write	4 period :start time minute 0-59m	min		0
415	0x019F	Read-write	4 period :start setpoint 0...500 -> 0...50,0°C	°C		210
416	0x01A0	Read-write	reserved			0
417	0x01A1	Read-write	reserved			0

Step 2: Fix the thermostat power box to the wall box through itself two installation screws with distance between axes of 60mm.

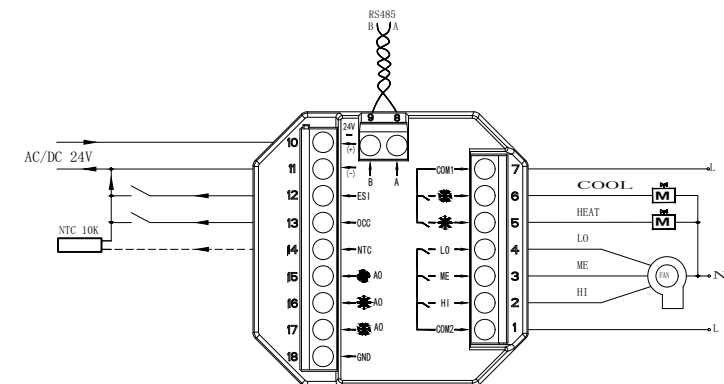


Step 3 : Fasten the power box and display unit .Don't press the panel in order to protect LCD ,and put the plastic cover on the panel to protect the panel.

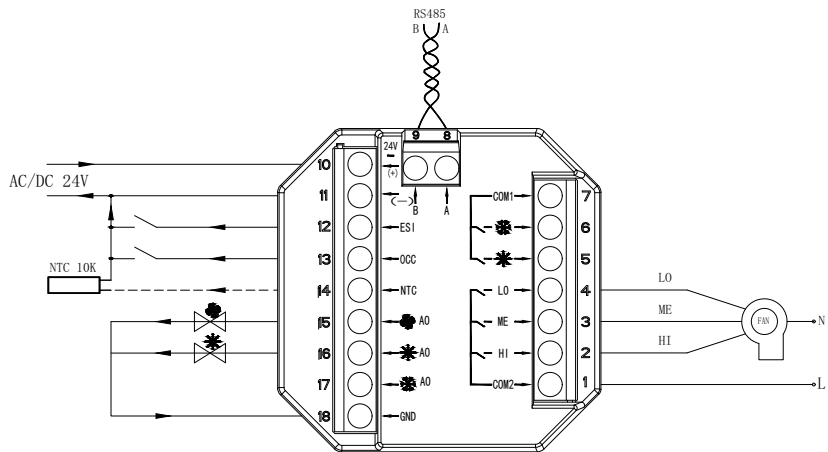


### Terminal Connection wiring diagram

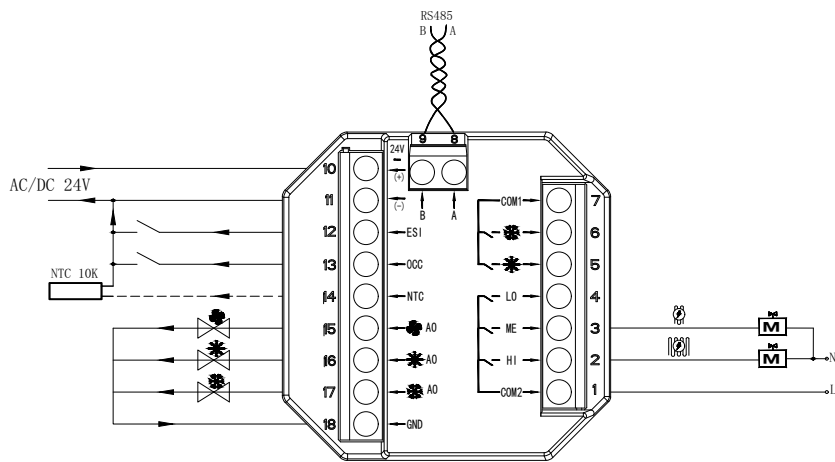
#### FC610 5DO wiring diagram



**FC610 2AO3DO wiring diagram**



**FC610 3AO2DO wiring diagram**



			9 = Dew Point Sensor (Open = Dewpoint crossed, disable cooling) 10 = Dew Point Sensor (Closed = Dewpoint crossed, disable cooling)			
337	0x0151	Read-write	<b>Configuration external input 2</b> 0 = No function 1 = Occupancy sensor (Open = Occupied) 2 = Occupancy sensor (Closed = Occupied) 3 = Window contact (Open = Window Open) 4 = Window contact (Closed = Window Open) 5 = Disable heating (Open = Heating disabled) 6 = Disable heating (Closed = Heating Disabled) 7 = Disable cooling (Open = Disable Cooling) 8 = Disable cooling (Closed = Disable Cooling) 9 = Dew Point Sensor (Open = Dewpoint crossed, disable cooling) 10 = Dew Point Sensor (Closed = Dewpoint crossed, disable cooling)			0
338	0x0152	Read-write	<b>Configuration Sensor Input</b> 0 = none 1 = Change Over Temp sensor (NTC10K) 2 = Ext. Temp sensor (NTC10K) 3 = Temperature Limiter			0
339	0x0153	Read-write	<b>ESI (Energy Savings Input) - ON delay</b> ON delay for ESI. Delays Energy stop by n seconds	1.0	s	0
340	0x0154	Read-write	<b>OCC input - OFF delay</b> 0...65535 -> 0...65535 seconds	1.0	s	1800

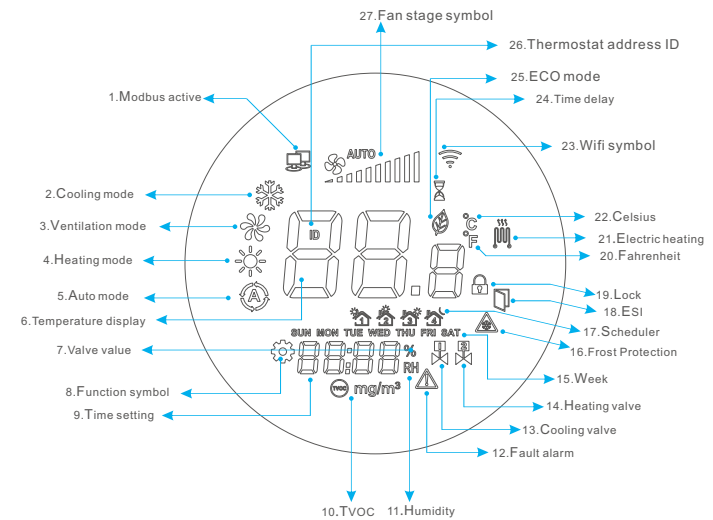
**Timer**

Address	Access	Description	Resolution / Unit	Default
400	0x0190	reserved		0
401	0x0191	reserved		0
402	0x0192	<b>Automatic Summer/winter time</b> 0=OFF 1=EU automatic (last Sunday in March (+1h) - last Sunday in October (-1h) 2=US automatic (2nd Sunday in March (+1h) - 1st Sunday in November (-1h) 3=AUS automatic (First Sunday in October (+1h) - 1st Sunday in April (-1h) 4=BR automatic (First Sunday in November (+1h) - Third Sunday in February (-1h) 5=CHL automatic (Second Sunday in August (+1h) - Second Sunday May (-1h) 6=ISR (Friday before last Sunday in March + 1h) - Last		0

303	0x012F	Read-write	Electrical Heater Stage 3 Threshold control variable 0..100%	1.0	%	90
304	0x0130	Read-write	Valve type selection 5DO: 0= ON-OFF (ON = Valve Open, OFF = Valve Closed) 1=PWM (0%= 0%PWM .. 100% = 100% PWM) 2= OFF-ON (OFF = Valve Open, ON = Valve Closed) 3= inverted PWM (0%= 100%PWM . 100% = 0% PWM) AO2DO3R, AO3DO2R: 4= proportional (0V = 0% ..10V = 100%) 5=invers proportional (0V = 100% ..10V = 0%) 6: proportional Belimo 6 way 7: proportional Sauter 6 way with Ø15mm 8: proportional Sauter 6 way with Ø20mm 9: proportional Belimo 6 way, counter direction 10: proportional Sauter 6 way with Ø15mm, counter direction 11: proportional Sauter 6 way with Ø20mm, counter direction DO5R,AO2DO3R, AO3DO2R: 12: no valve			5DO:0 AO2DO3R:4 AO3DO2R:4
305	0x0131	Read-write	reserved			0

Inputs					
Address	Access	Description	Resolution / Unit	Default	
336	0x0150	Read-write	Configuration external input 1 0 = No function 1 = Occupancy sensor (Open = Occupied) 2 = Occupancy sensor (Closed =Occupied) 3 = Window contact (Open = Window Open) 4 = Window contact (Closed = Window Open) 5 = Disable heating (Open = Heating disabled) 6 = Disable heating (Closed = Heating Disabled) 7 = Disable cooling (Open = Disable Cooling) 8 = Disable cooling (Closed = Disable Cooling)		0

### Display panel



- 1 Modbus active – When the device is connected to BMS via to RS485 interface ,the Modbus symbol will active.
- 2 Cooling mode – when the set temperature is lower than room temperature ,the device will work in cooling mode.
- 3 Ventilation mode - Fan is working, water valve keeps off.
- 4 Heating mode – when the set temperature is higher than room temperature ,the device will work in heating mode .
- 5 Auto mode –The thermostat switches automatically between cooling and heating according to the temperature difference between set temperature and room temperature. A time delay of approx..1min between cooling /heating mode changes is implemented to ensure safe and eco-friendly operation .Auto mode will be active in below types:
- 6 Temperature display – Normally ,the device displays room temperature .when the user change temperature ,it displays set temperature ,after 4 seconds ,display room temperature. (Factory default : °C display ),you can switch to Fahrenheit (°F) by APP or Modbus.
- 7 Valve value – valve value%
- 8 Function symbol – Temperature setting, Mode adjustment or Parameter setting status
- 9 Time setting –Real time of Day
- 10 TVOC – Room air quality
- 11 Humidity – Relative room humidity
- 12 Fault alarm – ERROR alarm symbol and display ERROR code
- 13 Cooling valve – Cooling mode is active .
- 14 Heating valve – heating mode is active
- 15 week-week display

16 Frost Protection – In Standby the display is off, but the control loop is actively monitoring the temperature and will activate the heating output if the room temperature drops below the frost protection threshold.

17 Scheduler– one day is divided into 4 periods.The user can set temperature for every period individually. the user has set a set temperature during operation ,the current period runs with the last set temperature ,the next period will adopt the changed settings.

18 ESI – Windows function detection, When ESI symbol is lighted indicates ESI function is active ( Optional )

19 Lock – Local thermostat will not be workable when this symbol indicated unless it is released by APP on smart phone ,Modbus register or the device power off and restart .

20 Fahrenheit (°F) – indicates Fahrenheit (°F) display

21 Electric heating – indicates electric heating is active .The device has this function only in cooling only + Electric heater system

22 Celsius(°C) – indicates Celsius(°C) display

23 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.

24. Time delay symbol

25 ECO mode – ECO mode is active ,set temperature will be replaced by ECO .

26 Thermostat address ID – Indicates the ID address on modbus .

27 Fan stage symbol – Different fan speed display. Low level ( 3 pillars), Middle level ( 7 pillars), High level ( 10 pillars), Auto speed ("Auto" be shown) as below:



## Communication

Bandary Thermostat FC610 supports wifi and Modbus dual communication .

### Modbus communication :

<b>Communication-section</b>	1..247
<b>Factory default:</b>	1
<b>Address 0:</b>	broadcast address
<b>Communication-Interface:</b>	RS485
<b>Communication-Protocol:</b>	Modbus-RTU
<b>Baud Rate:</b>	4800 bps / 9600 bps / 19200 bps / 38400 bps (optional)
<b>Factory default:</b>	9600 bps
<b>Parity:</b>	no parity / odd parity / straight parity (optional)
<b>Factory default:</b>	no parity
<b>Data:</b>	8 bit
<b>Stop:</b>	2 bit

282	0x011A	Read-write	<b>PWM Cycle time</b> DO5R: 0 = no PWM for valves but 2-point control			15
283	0x011B	Read-write	<b>Deadband</b> 1...100 -> 0,1...10,0K	0.1	K	10
284	0x011C	Read-write	<b>Heating Proportional Band Xp_heat</b> 1...100 -> 0,1...10,0°C	0.1	°C	20
285	0x011D	Read-write	<b>Heating Integration Time Tn_heat</b> 0...255 = 0...255 Minutes	1.0	min	30
286	0x011E	Read-write	<b>Cooling Proportional Band Xp_cool</b> 1...100 -> 0,1...10,0°C	0.1	°C	20
287	0x011F	Read-write	<b>Cooling Integration Time Tn_cool</b> 0...255 = 0...255 Minutes	1.0	min	30
288	0x0120	Read-write	<b>Minimal limit of the control variable heat</b> 0..100	1.0	%	0
289	0x0121	Read-write	<b>Maximal limit of the control variable heat</b> 0..100	1.0	%	100
290	0x0122	Read-write	<b>Minimal limit of the control variable cool</b> 0..100	1.0	%	0
291	0x0123	Read-write	<b>Maximal limit of the control variable cool</b> 0..100	1.0	%	100
292	0x0124	Read-write	<b>Fan stage 1 ON threshold control variable heat</b> 0..100	1.0	%	5
293	0x0125	Read-write	<b>Fan stage 2 ON threshold control variable heat</b> 0..100	1.0	%	35
294	0x0126	Read-write	<b>Fan stage 3 ON threshold control variable heat</b> 0..100	1.0	%	70
295	0x0127	Read-write	<b>Fan stage 1 ON threshold control variable cool</b> 0..100	1.0	%	5
296	0x0128	Read-write	<b>Fan stage 2 ON threshold control variable cool</b> 0..100	1.0	%	35
297	0x0129	Read-write	<b>Fan stage 3 ON threshold control variable cool</b> 0..100	1.0	%	70
298	0x012A	Read-write	<b>Frost protection temperature threshold</b> 50...150 -> 5,0...15,0°C	0.1	°C	70
299	0x012B	Read-write	<b>Change-Over Temperature Threshold for Heating</b> 0...500 -> 0...50,0°C	0.1	°C	300
300	0x012C	Read-write	<b>Change-Over Temperature Threshold for Cooling</b> 0...500 -> 0...50,0°C In case temperature is in between both thresholds the last state will be maintained	0.1	°C	190
301	0x012D	Read-write	<b>Electrical Heater Stage 1 Threshold control variable</b> 0..100%	1.0	%	65
302	0x012E	Read-write	<b>Electrical Heater Stage 2 Threshold control variable</b> 0..100%	1.0	%	80



			0x00=unlocked 0x01=lock			
270	0x010E	Read-write	reserved			0

Set point settings						
Address	Access	Description	Resolution / Unit		Default	
271	0x010F	Read-write	<b>Default Setpoint after Power On Reset</b> 0...500 -> 0...50,0°C	0.1	°C	210
272	0x0110	Read-write	<b>Setpoint temperature lower limit</b> 0...500 -> 0...50,0°C	0.1	°C	160
273	0x0111	Read-write	<b>Setpoint temperature upper limit</b> 0...500 -> 0...50,0°C	0.1	°C	300
274	0x0112	Read-write	<b>Setpoint increment/decrement value</b> 1...100 -> 0,1...10,0°C	0.1	°C	5
275	0x0113	Read-write	<b>ECO mode temperature setpoint cooling</b> 250...450 = 25,0...45,0°C	0.1	°C	300
276	0x0114	Read-write	<b>ECO mode temperature setpoint heating</b> 120...240 = 12,0...24,0°C	0.1	°C	190

PI controller						
Address	Access	Description	Resolution / Unit		Default	
277	0x0115	Read-write	reserved			0
278	0x0116	Read-write	<b>Fan coil type</b> 0b00000000= 2-pipe : cooling&heating with Change-Over 0b00000001= 4-pipe : cooling&heating			1
279	0x0117	Read-write	<b>Fan stages and operation modes</b> 0b00000000 = none, (fan key is locked the fan symbol will be faded on the LCD) 0bxxxx0001 = single stage; 0bxxxx0010 = 2 stages 0bxxxx0011 = 3 stages 0bxxxx1000 = EC Fan 0b0001xxxx = fan works not in heating mode 0b0010xxxx = fan works not in cooling/ventilation mode (0b0011xxxx = fan works not in heating & cooling mode)			3
280	0x0118	Read-write	<b>Start fan at highest stage for _ seconds</b> 0...60 -> fan start at highest fan stage for 0...60s seconds	1.0	s	0
281	0x0119	Read-write	<b>Fan OFF-Delay</b> 0= fan never stops 1..255 = Fan stops 1...255 minutes after valves closing	1.0	min	15

## Wifi communication:

### Download APP:

1.1 For IOS devices ,search for "Smart life" in Apple store and download ,or scan the relevant QR code here .



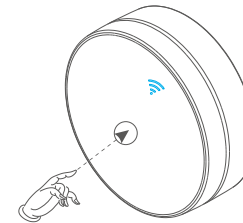
1.2 For Android devices ,search for "Smart life" in google play and download ,or scan the relevant QR code .



1.3 Add device in APP.

1.4 Register account in APP .

2.2 In stand-By mode ,Long pressing "ON/OFF" key for more than 3-second until the "wifi" symbol flash ,clockwise rotation the first ring to confirm,the device is in pairing status



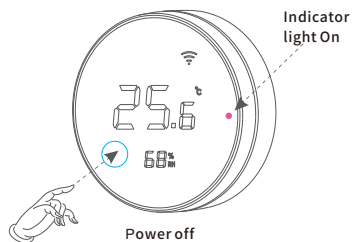
2.3 click on "+" symbol on "Smart life",and then find "small home appliance "menu to click on "thermostat" symbol , then you will be asked for inputting wifi account No and password ,input WIFI account No. and passwords .

2.4 follow up with the guider to operate next step, the app will automatic search the device ,and add in its register table.

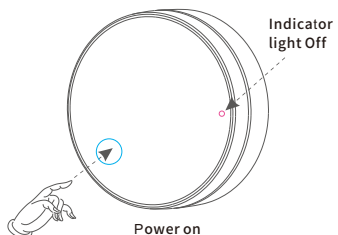
## Function operation instruction

### ON/OFF:

In stand-By mode, press any point of the panel can switch on the panel .First press ,thermostat is on ECO mode ,Second press , the thermostat will turn on, and indicator light will be lighted ,the indicator light display different color to indicate different mode. Without any operation , thermostat will access in screen saver mode after backlights delay time ,but indicator light always keeps lighting .



In normal mode, the indicator light and LCD display will be turned off after pressing the touch panel.

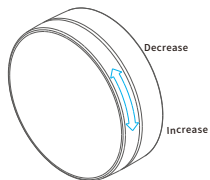


**Set temperature setting:**

In normal mode, clockwise rotation the first ring, the setting temperature would be 0.5°C increase ,otherwise, Anti-Clockwise rotation the first ring will keep temperature 0.5°C decreased . When rotation the first ring , the set temperaute will be blink in 5-second on the main interface, then it shows the room current temperature.

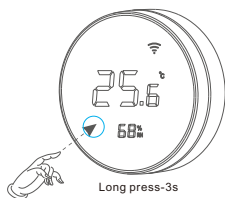
**Fan stage Setting**

In normal mode, Anti- clockwise rotation the second ring, the fan speed would be decreased progressively, otherwise, Clockwise rotation the second ring will keep fan speed increase progressively.



**Mode selective**

In normal Mode, long press the touch panel for more than 3 seconds until current mode symbol start blinking, rotate the first ring to adjust mode. Cooling/Ventilation/Heating/Auto cooling & heating/cooling.. to recycle.



Step 1, Long press the touch panel for more than 3 seconds

10	0x000A	Read-only	<b>External input 1</b> 0 = Contact Open, 1= contact closed (for window contact, dew point sensor)		
11	0x000B	Read-only	<b>External input 2</b> 0 = Contact Open, 1= contact closed (for OCC-sensor, keycard Switch)		

**Holding Register**

General settings					
	Address	Access	Description	Resolution / Unit	Default
256	0x0100	Read-write	<b>Customer set Device location identification</b> 0...65535	1.0	1
257	0x0101	Read-write	<b>LCD Temperature Unit</b> 0=°C 1=°F		0
258	0x0102	Read-write	<b>Back-Box type</b> 05 = DO5R 23=2AO3DO 32=3AO2DO		05
259	0x0103	Read-write	<b>reserved</b>		0
260	0x0104	Read-write	<b>Backlight intensity non operated</b> 0..25	1.0 %	25
261	0x0105	Read-write	<b>Backlight operating delay setting</b> 1...255 = 1...255 seconds ON	1.0 s	15
262	0x0106	Read-write	<b>Internal Sensor Temperature Offset</b> (added to meaured value) -50...50 -> -5,0...5,0°C	0.1 °C	0
263	0x0107	Read-write	<b>external Sensor Temperature Offset</b> (added to meaured value) -50...50 -> -5,0...5,0°C	0.1 °C	0
264	0x0108	Read-write	<b>Screen saver mode</b> 0= display panel off 1=temp+humidity 2=temp+clock		1
265	0x0109	Read-write	<b>Individual passwords setting</b> 000-998, default=987		987
266	0x010A	Read-write	<b>External temperature (limiter) sensor high limit</b> (338=3, for limiter) -200...+1000 -> -20,0...+100,0°C	0.1 °C	40
267	0x010B	Read-write	<b>External temperature (limiter) sensor low limit</b> (338=3, for limiter) -200...+1000 -> -20,0...+100,0°C	0.1 °C	0
268	0x010C	Read-write	<b>Power failure</b> 0=keep off after power-on-reset 1=return to last state after power failure 2=switch on after power-on-reset		1
269	0x010D	Read-write	<b>Key-lock</b>		0

		<b>2 = Ext. Temp sensor (NTC10K)</b>	
		<b>3 = Temperature Limiter</b>	

**Restore to factory default value:**

Input password "999" to restore to factory default value ,if the user forget the passwords and reset the passwords ,as well the parameters .

**Modbus communication Register:**

**Input Register**

Address	Access	Description	Resolution / Unit
0	0x0000	Read-only <b>Bandary Model identification</b> 0xFF10 = 5DO 0xFF11 = 3AO2DO 0xFF12 = 2AO3DO	
1	0x0001	Read-only <b>Firmware-Version</b> e.g. 0x100 = 1.0.0	
2	0x0002	Read-only <b>Back-Box type</b> <b>05 = DO5R</b> <b>23=2AO3DO</b> <b>32=3AO2DO</b>	
3	0x0003	Read-only <b>Value of the integrated temperature sensor °C</b> 0...500 -> 0...50,0°C	0,1 °C
4	0x0004	Read-only <b>fan status</b> 0x00 = Manual OFF 0x01 = Manual low 0x02 = Manual medium 0x04 = Manual high 0x08 = Auto OFF 0x09 = Auto low 0x0A = Auto medium 0x0C = Auto high	
5	0x0005	Read-only <b>VA1 status</b> 0-100 0 = 0 (Off) ...100% (On), e.g. 693 = 69,3% of PWM cycle time ON	
6	0x0006	Read-only <b>VA2 status</b> 0-100 0 = 0 (Off) ...100% (On), e.g. 693 = 69,3% of PWM cycle time ON	
7	0x0007	Read-only electrical heating status 0-100 = 0 ...100%	
8	0x0008	Read-only <b>External temperature sensor °C</b> 0...500 -> 0...50,0°C	0.1 °C
9	0x0009	Read-only <b>failure status</b> 0x00=no failure 0x01= control loop temperature sensor alarm 0x02=external temperature sensor high limit Alarm 0x04=external temperature sensor low limit Alarm 0x08= change over sensor missing alarm	



Step 2.change the mode by rotation the first ring

**Wake up**

In normal mode, without any operation, the thermostat will access in screen saver mode after the backlight delay time , you can wake up the thermostat by pressing the touch panel ,by rotation the ring , by APP ,or by motion sensor .

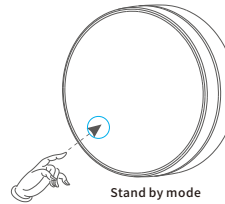


Motion sensor: when thermostat detects the specific distance of hand waving ,thermostat will be wake up, and the touch panel will be lighted .

**Parameter Setting**

Enter into Parameter Setting

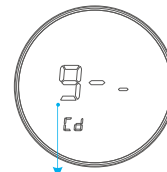
Long press the touch panel for more than 6- second in Stand-By mode, then you are asked to enter the passwords (Factory default:987).Please follow up with below steps to set:



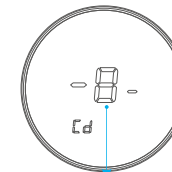
Stand by mode

Step 1 Long press the touch panel for more than 6-second in Stand-By mode, then you are asked to enter the passwords (Factory default:987).

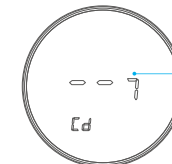
Step 2 Rotate first ring to input first digit value(9) of the password and short press the panel to confirm ,and then input second digital value (8),then the last value (7),and short press the panel to confirm.



Code 1



Code 2



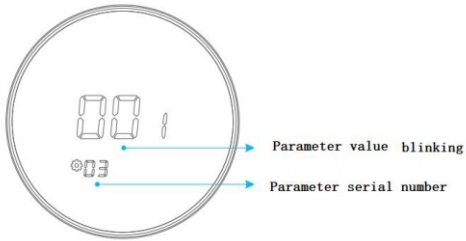
Code 3

Step 3 If password is correct, it will access in parameter setting interface.if the password is wrong ,you need to re-input correctly passwords to access in parameter setting interface.

Step 4 access in parameter setting interface ,the first low of digit indicates the parameter value, the second low of digit indicates the parameter No.

Please find the example as below figure:

03 indicates parameter No.(03- memo after power failure),001 indicates the parameter value (restore last status before power failure)



Shift to next parameter No. by rotation the first ring ,and short press panel to confirm ,rotation the first ring to change the parameter value which you want to set ,and short pressing the panel to confirm. If finish the parameter setting ,long pressing panel for 3-second to exit the parameter setting interface .

Time setting:

If thermostat is connecting to the internet ,the Real time will be updated . If fail to Wifi connection, the user can manual set the date by parameter No.10 . please follow up with orders to set Year/ Month /Date/ Hour& Minute.

**Parameter table:**

No.	Name of parameter	Parameter definition	Factory default
1	Internal Temperature offset	-5.0 °C~5.0°C/23°F ~41°F	0°C/32°F
2	External temperature offset	-5.0 °C~5.0°C/23°F ~41°F	0°C/32°F
3	Upper temperature limited	0°C~50°C / 32°F ~99°F	30°C/86°F
4	Down temperature limited	0°C~50°C / 32°F ~99°F	16°C/60°F
5	Frost protection	5°C~15°C / 41°F ~59°F	7°C/44°F
6	Lock	0=deactivated 1=activated	0
7	Screen saver mode	0= display panel off 1=temp+humidity 2=temp+clock	1
8	Backlight delay off	10-255 seconds	15
9	Power failure	0=stay off after power on 1=restore last status before power failure 2=stay on after power on	1
10	Time	0=deactivated 1=activated	0
11	Schudler	0=deactivated 1=activated	0

12	Backlight intensity for screen saver	0...25	25
13	Individual password	0-998	987
14	Temperature format	0 0 0=°C 1=°F	0
15	Communication ID	0 1...247	1
16	Baud rate(bps)	1=4800 2=9600 3=19200 4=38400	2
17	Parity	0=none, 1=odd 2=even	0
18	Stop Bits	1 = 1 Stopbit 2 = 2 Stopbits	2
19	Winter/summer time	0=OFF 1=EU 2=US 3=AUS 4=BR 5=CHL 6=ISR 7=MEX	0
20	Power box type	05=5DO 23=2AO3DO 32=3AO2DO	05
21	Fan coil type	0=2pipe cool&heat 1=4-pipe cool&heat	1
22	Valve type	depending on back-box type: DO5R: 0= ON-OFF (ON = Valve Open, OFF = Valve Closed) 1=PWM (0%= 0%PWM .. 100% = 100% PWM) 2= OFF-ON (OFF = Valve Open, ON = Valve Closed) 3= inverted PWM (0%= 100%PWM .. 100% = 0% PWM) AO2V-DO3R, AO3V_DO2R: 4= proportional (0V = 0% ..10V = 100%) 5=invers proportional (0V = 100% ..10V = 0%) 6: proportional Belimo 6 way 7: proportional Sauter 6 way with Ø15mm 8: proportional Sauter 6 way with Ø20mm 9: proportional Belimo 6 way, counter direction 10: proportional Sauter 6 way with Ø15mm, counter direction 11: proportional Sauter 6 way with Ø20mm, counter direction DO5R,AO2V-DO3R, AO3V_DO2R: 12: no valve	DO5R:0 2AO3DO:4 3AO2DO:4
23	changeover	0= 0= none 1 = Change Over Temp sensor (NTC10K)	0