

SpaceLogic Thermostat

TH900 Programmable Series for PTAC, Heat Pump & Gas/Oil Furnace Applications

TH903-DM-W, TH907-DM-W, TH907-DM-B

User Guide

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Life Is On



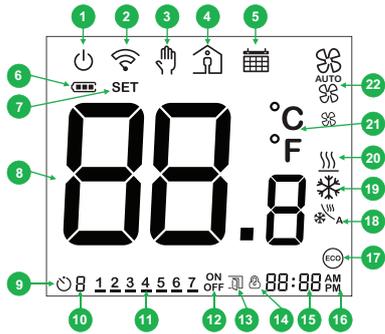
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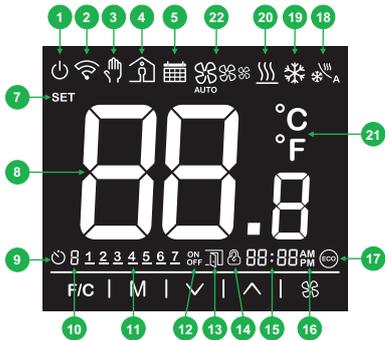
1. LCD

1.1. LCD Layout & Icon Descriptions

TH903



TH907



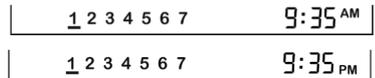
LCD Icon Descriptions

ID	Icon	Description
1	Off icon	When the device is in Off mode, this icon will be displayed on the screen.
2	RF icon	This icon is visible when the device is operating via wireless communication, with a gateway or connected to the Cloud.
3	Hand icon	Indicates temporary Hold mode (or override) is running. The device will stay at the current set-point until the next scheduled event occurs.
4	Occupancy icon	This icon is visible when the room is occupied.
5	Schedule icon	This icon is visible when a calendar setting is enabled.
6	Not used	Not used (TH903 only)
7	SET icon	This icon is visible when the LCD displays the set-point temperature. It is not displayed when the LCD shows the room temperature.
8	Temperature	Room temperature/set-point temperature.
9	Timer icon	This icon is used when setting a schedule.
10	Program number	Program numbers 1 through 4, used when setting a schedule.
11	Day icon	Numbers 1 (Monday) through 7 (Sunday). Underlined number corresponds with the current day of the week.
12	ON/OFF	In User/System Setting mode, ON = enabled and OFF = disabled. When the device is in Off mode, the Off icon will also appear.
13	Door icon	This icon is displayed when a door or window is open.

ID	Icon	Description
14	Key Lock icon	This icon is displayed when keys/buttons are locked.
15	Time	Real-time clock (RTC), HH = hours, MM = minutes.
16	AM/PM	Real-time clock (RTC), AM = midnight to noon, MM = noon to midnight.
17	ECO icon	This icon is visible when the ECO / Set-back mode is enabled.
18	Auto Changeover icon	This icon is visible when the Auto Changeover mode is enabled.
19	Cooling icon	This icon is visible when Cooling mode is enabled.
20	Heating icon	This icon is visible when Heating mode is enabled.
21	Temperature units	°F = Fahrenheit , °C = Celsius
22	Fan Speed icon	Low speed = small fan logo Middle speed = medium fan logo High speed = large fan logo Auto speed = auto and large fan logos

1.2. HH:MM Clock Display Format

- A numeric day of the week is displayed (number 1 = Monday, number 7 = Sunday). The underlined number corresponds with the current day of the week.
- Time is displayed in a 12-hour format. Single-digit hours do not include a leading zero (example, 9:35 AM, 9:35 PM, as shown below, rather than 09:35 AM, 09:35 PM, etc.).



- The colon between the hour and minute flashes when the device is in Normal mode, and is lit continuously when the clock is being set.

1.3. Room Temperature Display Format

- Single-digit temperatures do not include a leading zero (example, 5°C rather than 05°C, etc.).
- Temperatures that exceed the upper limit of 50°C/122°F are shown as 'HI' on the display. Temperatures between 99.5 and 122°F are shown as '99.9°F' on the display if the default display temperature selection is room temperature. The device measures temperatures internally every 15 seconds in °C format only.

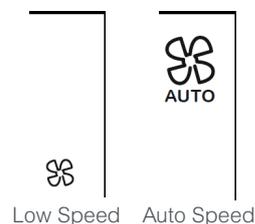


2. Operation

2.1. Normal Mode

2.1.1. Fan Speeds

Use the Fan button to move between LOW speed and AUTO speed.



2.1.2. Fan/Temperature/Time Operation (Off Mode/Standby)

To enable or disable the fan when in Off (Standby) mode:

- **Fan enabled:** When the fan is enabled in the Settings menu, it will remain at the last fan speed set by the user when the device is in Off mode. Or, press the Fan button to select a fan setting. Auto Fan is not available in this scenario.
- **Fan disabled** (default value): When the fan is disabled, the fan will be off when Off mode is entered. The Fan button is disabled in this scenario.

To enable or disable the temperature display when in Off (Standby) mode:

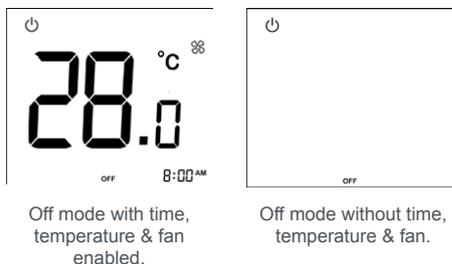
- **Temperature display enabled:** The temperature will be shown if Off mode time is enabled.
- **Temperature display disabled** (default value): When Off mode time is disabled, the temperature will not be displayed during Off mode.

To enable or disable the clock when in Off (Standby) mode:

- **Clock display enabled:** The clock will be shown if Off mode time is enabled.
- **Clock display disabled** (default value): When Off mode time is disabled, the clock will not be displayed during Off mode.

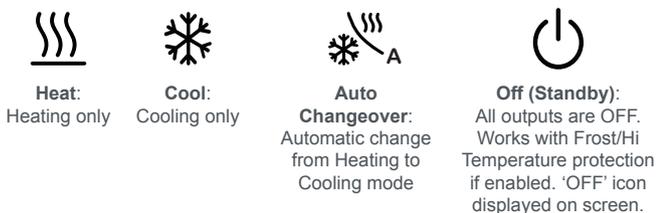
The following is a sample screen in Off mode with the time display, temperature display and fan enabled. The temperature display will be set-point/room temperature (default setting is set-point temperature).

Also included is a sample screen showing Off mode without time display, temperature display and fan. This is the default setting.



2.1.3. Mode Operation

A short press of the Mode button is used to cycle through the modes (Auto > Off by default, Heat > Cool > Auto > Off if heating and cooling are enabled. See 2.3.8 for details).



2.1.4. Set-point Temperature Operation

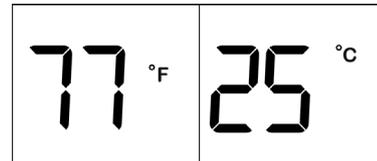
The default display temperature is the set-point temperature of the selected mode if 'Default Display Temperature' is chosen as the set-point temperature. Otherwise, the device will display the room temperature.

Use the UP and DOWN buttons to set the set-point temperature.



2.1.5. Temperature Conversion

Use the F/C button to switch the room temperature to display in Fahrenheit or Celsius format.

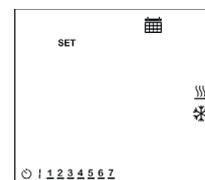


2.2. User Setup Setting Mode

User Setup Setting mode allows the system and programming parameters to be set up.

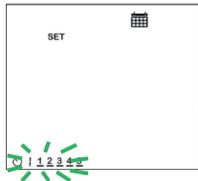
- To enter the User Setup Setting mode, hold the FAN button under Off mode for 15 seconds.
- Scroll forward between screens using the DOWN button. Scroll backward between screens using the UP button. Scrolling is continuous through all settings and reversed in direction using the UP and DOWN buttons.
- Use the MODE (enter) button to change the parameters on the screen. A parameter will flash to indicate that scrolling between the choices is enabled.
- Use the F/C (back) button to return to view-only mode. The parameters will not flash, indicating that they are not editable.
- Use the F/C button to move one level back from Edit mode to the menu setting screen.
- The view-only screen is displayed when all parameters have been set.
- The device exits the User Setup Setting mode after the last value on the last screen is set or the FAN (Home) button is pressed. The device will also exit this mode automatically if no button is pressed for 30 seconds.

2.2.1. Programming Schedule Mode Configuration

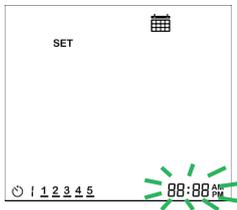


1. Press the MODE button to enter the configuration.
2. Press the UP or DOWN button to select the schedule pattern to be programmed:
 - 1-7: Identical program every day
 - 5-2: Separate program for weekdays and weekends
 - 1, 2, 3, 4, 5, 6, 7: Separate program each day
3. Press the MODE button to confirm and move to the next step.

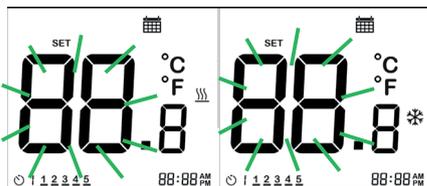
The example below shows the selected days flashing.



4. Press the UP or DOWN button to set the first ,second,..., program start time hour.
5. Press the MODE button to confirm the Start time Hour (P1).
6. Press the UP and DOWN buttons to set the start time in 10-minute increments (P1).
7. Press the MODE button to confirm the start time minutes.
8. Press UP and DOWN buttons to select AM/PM, then press the MODE key to confirm the start time and move to the next step.



9. Press the UP or DOWN button to set the first heating set-point (P1). Press the MODE button to confirm and move to the next step.
10. Press the UP or DOWN button to set the first cooling set-point (P1). Press the MODE button to confirm and move to the next step.



11. Repeat until the fourth program is set.

Notes:

- During the settings process, pressing the FAN button will exit to the home display.
- During the settings process, pressing the C/F button will also return to the menu setting page. Data will be set at the stage where the return is triggered by the user.
- For the 5-2 setting (separate program for weekdays and weekends), the programming schedule for 6-7 follows the programming schedule for 1-5.
- For the 1-7 setting (identical program every day), finishing the programming schedule for days 1-7 will exit the program setting mode.
- For the 1, 2, 3, 4, 5, 6, 7 setting (separate program for each day), the programming schedule sequence is Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday, followed by the exit of the program setting mode. If a programming day is chosen in the middle of the week,

the process ends on Sunday.

- A long press of the UP or DOWN button changes fast time and temperature in 4Hz.
- The selected item will not flash if it is being adjusted. Flashing will resume about 0.5 seconds after button release.
- The unit will return to home display after 30 seconds if no button is pressed and any settings which have been changed are stored. The unit will run with the new program settings.
- It is possible to review or change settings when a temporary hold is enabled or when frost protection is enabled.
- P2 start time is greater than P1 start time; P3 start time is greater than P2 start time; P4 start time is greater than P3 start time 00.
- The heat set-point is set first and should be less than the cool set-point.
- The cool set-point cannot be set lower than the heat set-point plus the auto dead-band gap.
- If a P2 start time that is less than the P1 Start time is entered, the program will be auto-corrected to:
P2 start time = P1 start time + 10 minutes. The same is true for the P3 and P4 start times.
- The auto-corrected start time will be shown when the set-point is selected.

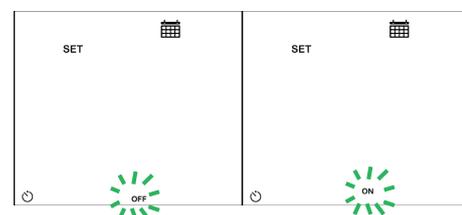
The pre-programmed default settings are listed below.

Event	Time	Heat Set-point	Cool Set-point
P1	6:00 a.m.	21 °C (70 °F)	25.5 °C (78 °F)
P1	8:00 a.m.	18°C (64 °F)	26 °C (80 °F)
P1	6:00 p.m.	21 °C (70 °F)	25.5 °C (78 °F)
P1	10:00 p.m.	18°C (64 °F)	26 °C (80 °F)

2.2.2. Programming Schedule Mode Enable/Disable

Press the MODE button to enter the configuration. After pressing MODE button, the configuration is saved.

Use the UP and DOWN buttons to scroll between ON and OFF.



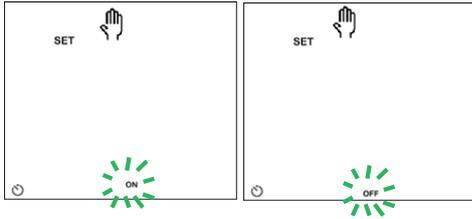
2.2.3. Temporary Hold Enable/Disable

The HOLD (hand) icon will be shown on the screen and the ON/OFF icon will be flashing on the screen. By default, OFF will be flashing.

Use the ON/OFF to select whether to enable or disable the Temporary Hold function by pressing the UP and DOWN buttons. The latest configuration will be shown if it is not the first-time configuration.

After selecting enable (ON) or disable (OFF), press the MODE key to save the configuration and move to the next

item. If Temporary Hold is disabled, the device will follow the set schedule. Users can only change the mode and the fan.

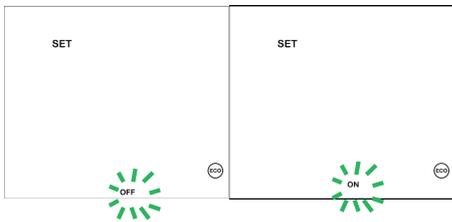


2.2.4. ECO Mode Enable/Disable

Press the MODE button to enter the configuration.

Use the UP and DOWN buttons to scroll between ON and OFF.

In ECO mode (Setback mode), the setback range is used and the fan will use the last fan setting. If Fan Auto is used, Fan Low will be configured.

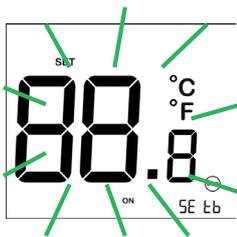


2.2.5. Setback Configuration (SETB)

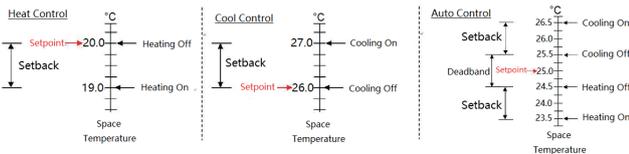
The setback configuration enables users to enter the range. There is one setback range to be set for all Heat/Cool and Auto modes.

The differential range is from 0.5 to 5 °C (1 to 10 °F), with a default of 3°C (6 °F). The display will show the last setback configuration (default if first setup) at this menu.

Press the UP and DOWN buttons to set the setback range from 0.5 to 5 °C (1 to 10 °F) in increments of 0.5 °C (1°F). Press the MODE button to save the new settings and move to the next menu item.



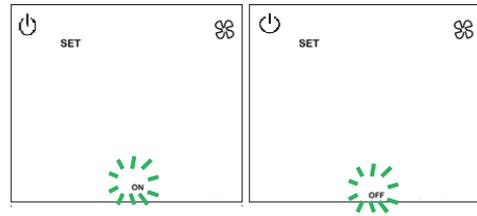
The diagram below shows the setback control.



2.2.6. Off Mode: Fan/Temperature/Clock Enable/Disable

1. Press the Mode button to enter the Fan ON/OFF setting. Use the UP and DOWN buttons to scroll between ON and OFF. Press the Mode button to save the desired fan ON/OFF state.

2. Enter the desired clock ON/OFF setting. The clock icon will appear in the lower left corner of the display and ON/OFF icon flashes. The fan icon is hidden. Use the UP and DOWN buttons to enable or disable the clock in Off mode. Press the Mode button to save the clock ON/OFF state.

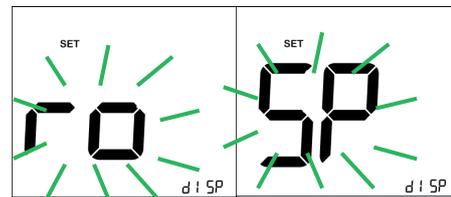


3. Enter the desired room temperature ON/OFF setting. The 'disp' icon will flash in the lower right corner of the display. Press UP and DOWN buttons to scroll between the ON and OFF settings. If ON is selected, the temperature display is shown when the device is in Off mode, otherwise it is not shown. Press the Mode button to save the temperature ON/OFF state and return to the Settings menu.

2.2.7. Default Display Temperature

Default display temperature can be either be the room temperature or the set-point temperature.

To set the default display temperature, press the UP and DOWN buttons to select 'ro' (for room) or 'SP' (for set-point). During selection, 'ro' and 'SP' will flash. Press the MODE button to save the configuration and return to the Settings menu.

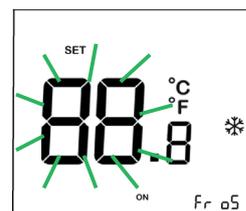


2.2.8. Frost Protection Enable/Disable

With Frost Protection ON, press the MODE button to select the frost protection temperature.



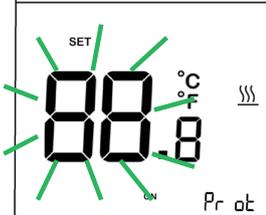
Press the UP and DOWN buttons to set the frost protection temperature. Allowable temperatures range from 5 to 15 °C (41 to 59 °F) with a default of 5 °C (41°F). Press the MODE button to confirm and continue to the next menu item.



2.2.9. High Temperature Protection Set-point

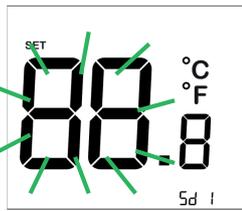
Press the MODE button to enter the high temperature protection set-point setup. The temperature on the display will flash. Press the UP and DOWN buttons to select the desired protection temperature and then press the MODE button to confirm and move to next menu item.

If the room temperature surpasses the protection temperature, Cooling mode will be activated even if the system is in Off mode. Allowable temperatures range from 25 to 35°C (77 to 95 °F). The default is 35 °C (95°F).



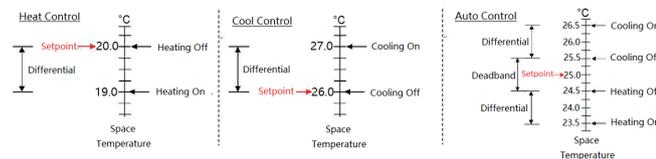
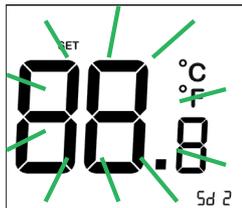
2.2.10. Switching Differential, First Stage

Press the MODE button to enter the configuration. Use the UP and DOWN buttons to scroll between 0.5 to 2°C in increments of 0.5 °C, or from 1 to 4°F in increments of 1°F.



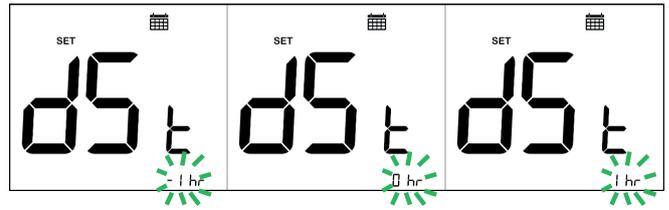
2.2.11. Switching Differential, Second Stage

Press the MODE button to enter the configuration. Note that this is available only on second-stage HVAC systems. Use the UP and DOWN buttons to scroll between 0.5 to 2°C in increments of 0.5 °C, or from 1 to 4°F in increments of 1°F.



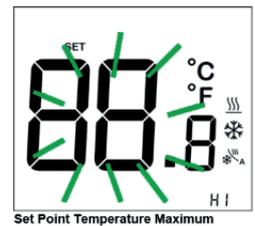
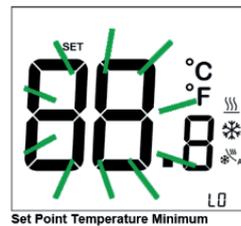
2.2.12. Daylight Savings Time

Press the MODE button to enter the configuration. Use the UP and DOWN buttons to scroll between -1 and 1 hour. The default is set to 0.



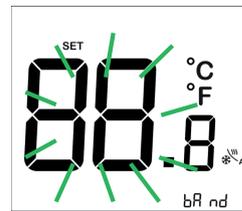
2.2.13. Set-point Temperature Range

This menu item is used to set the maximum and minimum Heating and Cooling mode set-points. Press the MODE button to enter the configuration. The minimum and maximum set-points for Cooling mode are followed by minimum and maximum set-points for Heating mode. Use the UP and DOWN buttons to scroll between 5 to 35°C in increments of 0.5 °C, or from 41 to 95°F in increments of 1°F. The default range is 18 to 26 °C (64 to 78 °F).



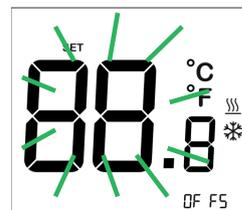
2.2.14. Auto Mode Dead-band

Press the MODE button to enter the configuration. Use the UP and DOWN buttons to scroll between 1 and 3 °C in increments of 0.5 °C, or from 2 to 6 °F in increments of 1°F. The default range is 1 °C (2 °F).



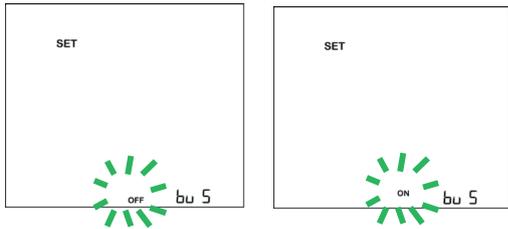
2.2.15. Temperature Offset

Press the MODE button to enter the configuration. Use the UP and DOWN buttons to scroll between -3 and 3 °C in increments of 0.5 °C, or from -6 to 6 °F in increments of 1°F.

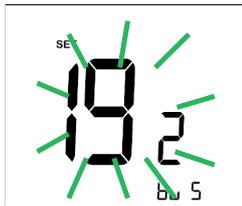


2.2.16. Modbus Enable/Disable

Press the UP and DOWN buttons to scroll between Modbus (bus) ON and OFF. Press the MODE button to confirm and move to the next menu item. Default setting is OFF.



If Modbus is ON, press the UP and DOWN buttons to select the baud rate (19200, 9600, 38400, 76800). The menu shows 192, 96, 384 and 768 for the corresponding baud rates.



Press the MODE button to confirm and move to the next menu item. The Modbus address is set by the on-board jumper.

Notes:

1. The Modbus address should be set to a different number in the same network.
2. The Modbus encoding format is an 11-bit format: 1 start bit + 8 data bits + parity check (*note1) + 1 stop bit.

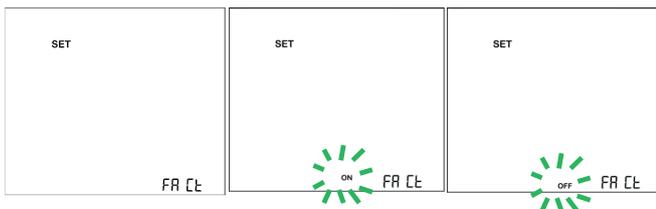
2.2.17. Factory Reset

Press the MODE button to enter the configuration.

Use the UP and DOWN buttons to scroll between ON and OFF ('no', default).

If ON is selected, press and hold the MODE button for >15 seconds to ensure that the device does not accidentally enter the factory reset mode. A short press of the MODE button under 'ON' will have no effect. A short press of the MODE button under 'OFF' will return the device to the Menu Setting screen.

Once the factory reset is complete, all settings revert to their factory defaults. The device will return to the Home screen in Off mode.



2.3. Installer Setup Setting Mode

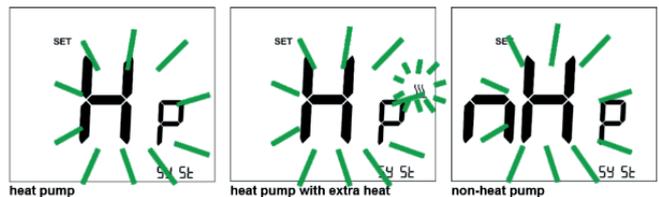
The Installer Setup Setting mode allows the system and programming parameters to be set up at installation.

- The mode is entered when the unit is in OFF mode (but powered)

- Press and hold the F/C button for >15 seconds. Release the F/C button after the screen flickers, then press the UP button within 3 seconds.
- Scroll forward between screens using the DOWN button.
- Scroll backward between screens using the UP button.
- Use the MODE (enter) button to enter a screen to change its parameters. A flashing parameter indicates that scrolling between setting choices is enabled.
- Scroll between choices with either the UP or DOWN button.
- Scrolling is continuous through all settings and reversed in direction by switching between the UP and DOWN buttons.
- The unit leaves the Installer Setup Setting mode after the last value of the last screen is set or the user presses the FAN button. This mode can also be exited by waiting 30 seconds without a key press.

2.3.1. System Type (Heat Pump/Non-Heat Pump)

Use the UP and DOWN buttons to scroll between heat pump (default), heat pump with extra heat and non-heat pump.

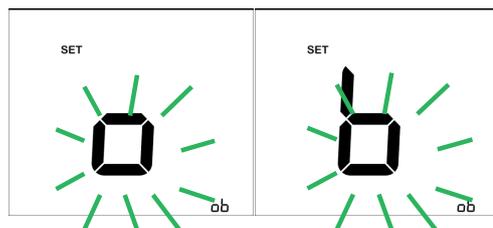


Note: If the system type is changed by mistake, the steps below should be followed, otherwise the system type will not be saved.

- If 'Heat pump' is chosen, item 2.3.2 should be selected by pressing the MODE button, can return until see item 2.3.6
- If 'Heat pump with extra heat' is chosen, items 2.3.2 and 2.3.3 should be selected by pressing the MODE button, then can return until see item 2.3.6
- If 'Non-heat Pump' is chosen, item 2.3.4 should be selected by pressing the MODE button, then can return until see item 2.3.6

2.3.2. O/B Valves

Use the UP and DOWN buttons to scroll between O and B type valves. Note: This screen will be skipped if the system type is 'Non-heat Pump'.

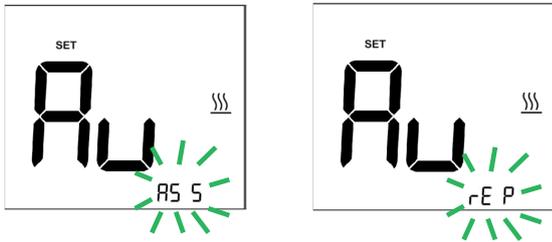


2.3.3. Aux. Heat (Extra Heat) Setup

The Auxiliary Heat terminal (W3 for 2Cool/3Heat/1Fan models) supports two operational modes. The following only applies to Heating mode control and only with extra heat.

- 1. Assist mode:** In this mode, O/B and Y control the compressor signal while W3 controls the auxiliary heat strip). Both the compressor and auxiliary heat are activated when the difference between the room temperature and the set-point temperature is greater than the threshold.
- 2. Replacement mode:** In this mode, if the difference between room temperature and the set-point temperature is greater than a large threshold, the compressor signal will be OFF (Y + O/B) and only the auxiliary heat will be activated. There is a 3-minute delay in restarting the heat pump when the auxiliary heat is shut down.

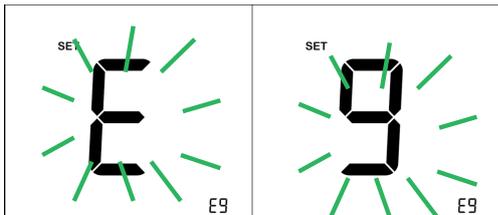
Press the MODE button to enter the selection mode. Press the UP/DOWN buttons to choose between 'AS S' (Assist) or 'rE P' (Replacement) modes. Press the MODE button again to confirm and move on to the next menu item. The default is Assist mode.



2.3.4. Electric/Gas

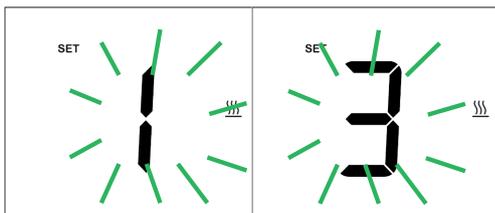
Use the UP and DOWN buttons to scroll between 'E' (electric) and 'g' (gas).

Note: This screen will be skipped if the system type is 'heat pump' or 'heat pump with extra heat'. This will be shown only if the fan coil (FC) selection is 'n' (no).



2.3.5. Heat Stage Number

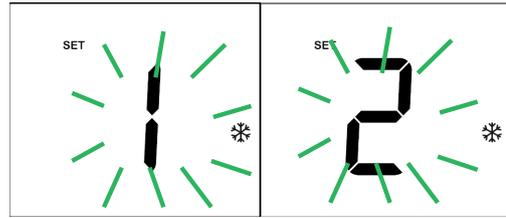
Use the UP and DOWN buttons to scroll between '0' and '3'. If the stage is set to '0', heat is not supported and the system is in Cooling mode only. In this case, auto change-over is disabled.



2.3.6. Cool Stage Number

Use the UP and DOWN buttons to scroll between 0, 1 and 2. If the stage is set to '0', cooling is not supported and the

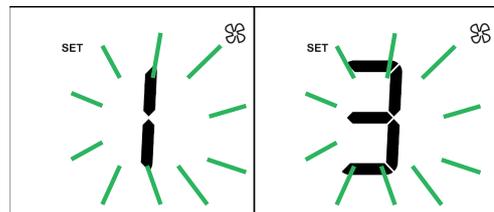
system is in Heating mode only. In this case, auto change-over is disabled.



Note: System settings will be saved at this stage. If the Installer Setup Setting mode is exited prior to this step, the settings will not be saved and the previous settings will be used.

2.3.7. Fan Type

Fan number selection is handled automatically by the device. There is no user selection for this item.



2.3.8. System Work Mode Sequence Menu

Select the System Mode sequence based on the number of heating and cooling stages selected.

Factory default is OFF, AUTO.

1. OFF, AUTO, HEAT, COOL
2. OFF, AUTO
3. OFF, HEAT ONLY
4. OFF, COOL ONLY

2.3.8.1 OFF, AUTO, HEAT, COOL

This screen appears if the number of heating and cooling stages is not equal to 0. It is not shown if 2-pipe fan coil is selected. When this option is selected, it is possible to scroll through the OFF, AUTO, HEAT and COOL modes from the Home screen.



2.3.8.2 OFF, AUTO

This screen appears if the number of heating and cooling stages is not equal to 0. This screen is not shown if 2-pipe fan coil is selected. When this option is selected, it is possible to scroll through the OFF and AUTO modes from the Home screen. This is the default mode.



2.3.8.3 OFF, HEAT ONLY

This screen appears if the number of cooling stages is equal to 0 or if a 2-pipe fan coil system with heat only is selected. When this option is selected, it is possible to scroll through the OFF and HEAT modes from the Home screen.



2.3.8.4 OFF, COOL ONLY

This screen appears if the number of heating stages is equal to 0 or if a 2-pipe fan coil system with cool only is selected. When this option is selected, it is possible to scroll through the OFF and COOL modes from the Home screen.



2.3.9. Day Selection

Use the UP and DOWN buttons to scroll between '1' (Monday) and '7' (Sunday).



2.3.10. Time Selection

Use the UP and DOWN buttons to scroll to set the hour first. Press the MODE button to confirm the selection.

Use the UP and DOWN buttons to scroll to set the seconds. Press the MODE button to confirm the selection. The seconds will be cleared to 0.

Note: Only after changing the minutes, will the seconds be cleared. Changing hours will not clear the seconds.



2.3.11. Key Card/Door/Occupancy/Window Sensor Settings

The various setting combinations shown in the table below are available for the external inputs (AUX1 and AUX2) and the on-board PIR sensor.

Note: On-board PIR logic is only necessary for product versions that contain on-board PIR. ECO mode in the unoccupied state is only available if ECO mode is enabled. Otherwise, the thermostat will go to OFF mode directly (skipping ECO mode) if ECO mode is disabled.

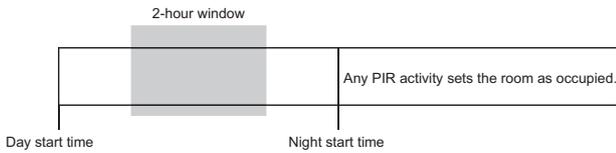
No.	Setting	Description
1	All sensors off	All input sensors and on-board PIR disabled. Occupancy cannot be determined. ECO mode (setback) is disabled. Configurable delay is not necessary.
2	Key card only	Key card switch stays open (high/low) or closed (high/ low) when the room is occupied. ECO mode is determined after a configurable delay.
3	Key card + balcony door	Occupancy can only be determined by the key card or door switch close operation. ECO mode will be activated if balcony door is open.
4	Key card + external occupancy sensor	Occupancy is detected based on activity from either sensor.
5	Balcony door only	ECO mode is activated if door switch is open.
6	External occupancy sensor	The external occupancy sensor is the external PIR sensor for detecting the occupancy status. The external occupancy sensor is assumed to be a two-transition signal. The signal transition can be defined in the next menu item. Occupancy is determined by the PIR activity within a period of time (day or night). Configurable duration: 1 to 8 hours Configurable day start time: 6:00 a.m. to 6:00 p.m. Configurable night start time: 6:00 p.m. to 6:00 a.m. The PIR has two options: day start time to night start time, or night start time to day start time.
7	Window switch only	ECO mode is activated if a window is open.
8	Window switch + balcony door switch	ECO mode is activated if both a door and a window are open.
9	Window switch + external occupancy sensor	ECO mode is activated if a window is open. Occupancy is determined by activity from the external occupancy sensor.

Occupancy Based on PIR Sensor Only

Occupancy detection is based on two time periods: day time (awake) and night time (sleep). The day and night start times are configurable.

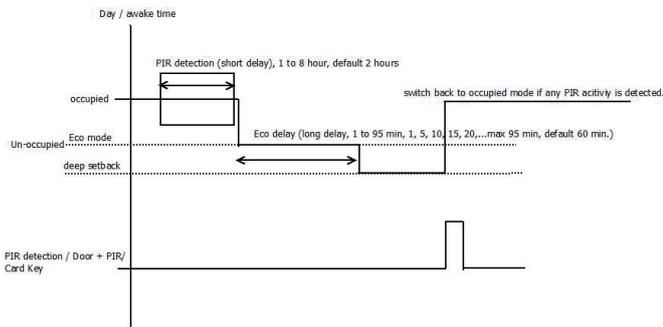
- **Day time (awake) detection:** Any activity detected by the PIR sensor within the 'running window' period will designate the room as occupied. If there is no activity during this period, then the room is considered to be unoccupied. The period for the running window is configurable.

- **Night time (sleep) detection:** If activity is detected during the night time period, the room will be set as occupied for the entire night period.

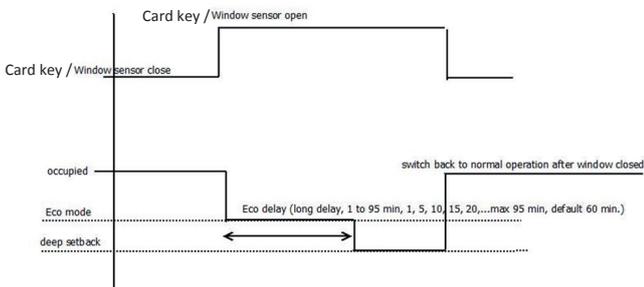


Unoccupied State

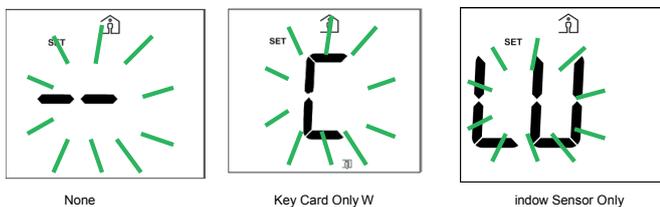
When the system is determined to be in an unoccupied state, it enters ECO mode (based on the ECO mode delay time) and then enters deep setback. During deep setback, the device is in Off mode, with frost protection and high temperature protection continuing to be monitored.



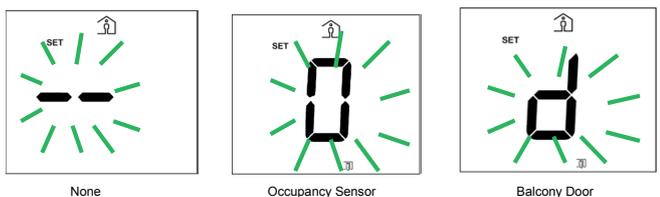
Window Sensor/Key Card Open



Sensor Input Setting (AUX1)



Sensor Input Setting (AUX2)



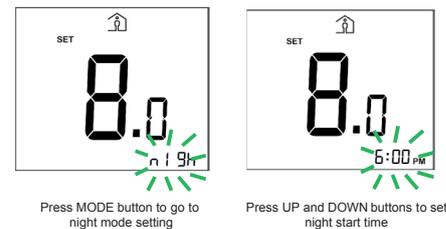
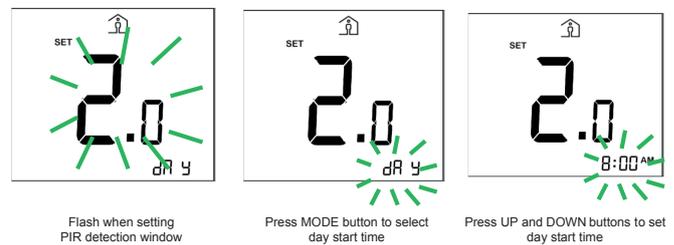
Use the UP and DOWN buttons to scroll between sensor combinations. Press the MODE button to confirm and move

to the next menu item. Default state is 'All sensors off'. The display will show the last saved configuration for this menu item.

2.3.12. Occupancy Detection Duration

This setting is available if the PIR, external occupancy sensor, on-board PIR and external PIR, or door with PIR setting is selected. There are inputs for the day and night start times. If the duration is PIR related or for occupancy sensor detection, then the input should be in hours. Press the UP and DOWN buttons to change the hour duration for the PIR detection window (0 hours for each unit. 0 to 8 hours, no delay for test mode if 0 hours is selected, the default is 2 hours). Then press the MODE key to set the day start time in hours.

After setting the PIR detection window time, press the MODE button to confirm. The 'day' icon will flash. Press the UP and DOWN buttons to select the start time in hours (6:00 a.m. to 6:00 p.m., default 8:00 a.m.). Press the MODE button to confirm and set the night start time.

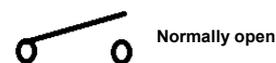


Night (sleep) start time setting from 6:00 p.m. to 6:00 a.m. (default 8:00 p.m.). Press the UP and DOWN buttons to set time in hours and press the MODE button to confirm. Press the UP and DOWN buttons to set the night start time. Press MODE to save and proceed to the next menu.

Occupancy Normally Open/Normally Closed Settings for AUX1 and AUX2

After setting the day and night start times, the next step is to set the normally open and normally closed for AUX1.

Normal open ('no') is a contact that does not flow current in its normal state. Energizing it and switching it on will close the contact, causing it to allow current flow.

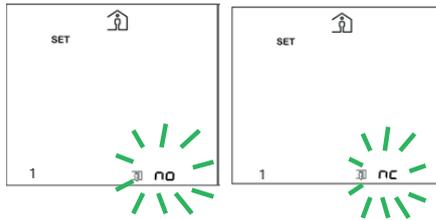


Normal closed ('nc') is a contact that flows current in its normal state. Energizing it and switching it on will open the contact, causing it to not allow current flow.

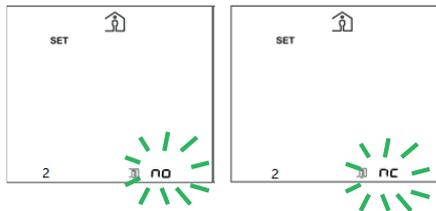


Normal Open	Normal Closed	Logic State
Aux input = 0 (open circuit)	Aux input = 1 (closed circuit)	Off
Aux input = 1 (closed circuit)	Aux input = 0 (open circuit)	On

Press the UP and DOWN buttons to choose 'nc' (normally closed) or 'no' (normally open) for AUX1.



After setting AUX1, the next step is to set normal open and normal close for AUX2. Press the UP and DOWN buttons to choose 'nc' (normally closed) or 'no' (normally open) for AUX2. Then press the MODE key to save and return to the menu setting screen.

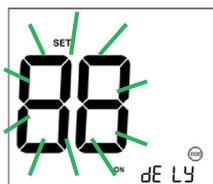


2.3.13. ECO Mode Delay

ECO mode delay is used for occupancy detection or window sensor detection. There are two scenarios that use this parameter.

1. If no occupancy is detected, the device will enter ECO mode and remain for the duration of the ECO mode delay time. The delay time can range from 1 to 95 minutes (in 5-minute increments: 1, 5, 10, 15 minutes, etc.). The default is 60 minutes. After the ECO mode delay ends, the system enters OFF mode.
2. If the room is occupied and a window is opened, ECO mode will be entered. After the ECO mode delay, the system will enter OFF mode.

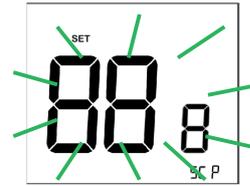
Note: **This screen will be skipped** if ECO mode is disabled (default disable, section 2.2.4). The system will enter OFF mode automatically without first entering ECO mode. **This screen will be shown if ECO mode is enabled** (setting, section 2.2.4), then press the UP and DOWN buttons to set the delay in 5-minute increments. Press the MODE button to return to the settings menu.



2.3.14. Short Cycle Protection (SCP)

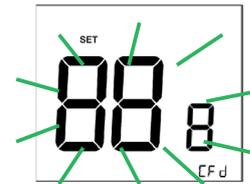
Press the UP and DOWN buttons to set the Short Cycle Protection time. Select a time from 3 to 7 minutes entered in

seconds (180 to 420 seconds). Default is 300 seconds, 30 seconds for each step.



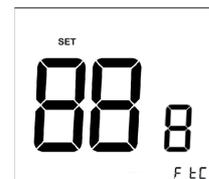
2.3.15. Cooling Fan Delay (CFD)

Press the UP and DOWN buttons to set the Cooling Fan Delay. Select a time from 1 to 5 minutes entered in seconds (60 to 300 seconds). Default is 300 seconds.



2.3.16. Fan-On to Compressor-On Delay

Press the UP and DOWN buttons to set the Fan-On to Compressor-On Delay. Select a time from 1 to 5 minutes entered in seconds (60 to 300 seconds). Default is 300 seconds.



2.3.17. Version Number

This screen can be viewed in the installer setup after the Fan-On to Compressor-On Delay option. This information is read-only; pressing the MODE button will have no effect. Press the Fan button to exit the installer setup.



3. Error Display

If the temperature sensor is not working correctly due to an invalid data read or I²C read error, the display will show an error code ('Er') and return the device to Off mode.

4. Button Lock

1. When the device is ON, press and hold the MODE button for >15 seconds. Release the MODE button once the Lock icon flickers. Press the UP button within 3 seconds (after 3 seconds, the process will repeat and it will be necessary to wait for 15 seconds again to activate the Lock icon). The Lock icon appears on the display.
2. When the Lock icon is activated, press and hold the MODE button for >15 seconds. Release the MODE button after the Lock icon flickers, then press the UP button

within 3 seconds (after 3 seconds, the process will repeat and it will be necessary to wait for 15 seconds again to deactivate the Lock icon). The Lock icon disappears from the display.

5. Modbus Specifications

Modbus Communication Interface

No.	Specification	Description
1	Physical interface	RS485 half-duplex
2	Baud rate	Configurable 9600, 19200, 38400 & 76800 bps
3	Transmission mode	RTU format
4	Data stream format	Address Function Code, Data Number, Data 1 ... Data n, CRC high, CRC low
5	Address	1 to 31
6	Function code	1, 2, 3, 4, 6
7	Data number	< 255
8	Data	0 to 255
9	CRC	CRC-16
10	Encoding format	11-bit format: 1 start bit + 8 data bits + parity check + 1 stop bit
12	0 Address	Broadcast address
13	Interface	A (+), B (-), Ground

Function Code 01 Message

Function Code	Register Address	Protocol	Description
01	1 (0)	Cooling Stage 1 status	0 = OFF 1 = ON
01	2 (1)	Cooling Stage 2 status	0 = OFF 1 = ON
01	4 (3)	Reversing valve status	0 = OFF 1 = ON
01	5 (4)	Fan Stage 1 status	0 = OFF 1 = ON
01	9 (8)	Heating Stage 1 status	0 = OFF 1 = ON
01	10 (9)	Heating Stage 2 status	0 = OFF 1 = ON
01	11 (10)	Heating Stage 3 status	0 = OFF 1 = ON

Function Code 02 Message

Function Code	Register Address	Protocol	Description
01	3 (2)	Internal temperature sensor	0 = OK 1 = Fault

Function Code 03 Message

Function Code	Register Address	Protocol	Description
03/06	2 (1)	Temperature units	0 = Fahrenheit 1 = Celsius

Function Code	Register Address	Protocol	Description
03/06	3 (2)	Thermostat status	00 = Conventional HVAC system with gas furnace (read only) 01 = Conventional HVAC system with electric furnace (read only) 02 = Heat pump system (read only) 03 = Heat pump system with W3 extra heat (read only) 05 = On-board temperature sensor fail (read only)
03/06	4 (3)	System work mode	0 = Off mode 1 = Cool only 2 = Heat only 3 = Auto
03/06	5 (4)	Setpoint temperature	5 to 35 °C (41 to 95 °F)
03/06	6 (5)	Fan mode	00 = Fan Stage 1 03 = Auto
03/06	7 (6)	Setback (ECO) temperature variance (delta from user-selected temperature set-point)	0.5 to 5°C (1 to 10 °F), configurable
03/06	8 (7)	Dead-band setting (only for Auto Changeover mode)	1 to 3 °C (2 to 6 °F) in increments of 0.5 °C (1°F)*, configurable
03/06	9 (8)	Cooling stage	0 = Cooling disabled 1 = 1 stage 2 = 2 stages
03/06	10 (9)	Fan stage	1 = 1 stage (read only)
03/06	11 (10)	Room occupation status	0 = Unoccupied (read only) 1 = Occupied (read only)
03/06	13 (12)	Setback (ECO) mode	00 = Not in Setback (ECO) mode (read only) 01 = In Setback (ECO) mode (read only)
03/06	14 (13)	Button lock status	00 = Buttons unlocked 01 = Buttons locked
03/06	15 (14)	First stage switching differential	0.5 to 2 °C (1 to 4 °F), configurable*
03/06	16 (15)	Heat mode, max limit	5 to 35 °C (41 to 95 °F)*
03/06	17 (16)	Cool mode, min limit	5 to 35 °C (41 to 95 °F)*
03/06	19 (18)	Heat stage, total number	0 = Heating disabled 1 = 1 stage 2 = 2 stages 3 = 3 stages
03/06	20 (19)	Heat pump type	00 = Non-heat pump 01 = Heat pump 02 = Heat pump with extra heat (W3) assist 03 = Heat pump with extra heat (W3) replace
03/06	21 (20)	O/B valve type	00 = O valve 01 = B valve
03/06	22 (21)	Furnace type (non-heat pump)	00 = Gas/oil furnace 01 = Electric furnace

Function Code	Register Address	Protocol	Description
03/06	23 (22)	7-day program schedule mode	00 = 1-7, program all days of the week the same 01 = 5-2, program weekdays (5) separately 02 = 5-2, program week-end (2) separately 03 = 1, 2, 3, 4, 5, 6, 7 individual days, Sunday separate 04 = 1, 2, 3, 4, 5, 6, 7 individual days, Monday separate 05 = 1, 2, 3, 4, 5, 6, 7 individual days, Tuesday separate 06 = 1, 2, 3, 4, 5, 6, 7 individual days, Wednesday separate 07 = 1, 2, 3, 4, 5, 6, 7 individual days, Thursday separate 08 = 1, 2, 3, 4, 5, 6, 7 individual days, Friday separate 09 = 1, 2, 3, 4, 5, 6, 7 individual days, Saturday separate
03/06	24 (23)	7-day program schedule for 4 set-points each day	00= Set program 1 start time (P1)** 01= Set program 2 start time (P2)** 02= Set program 3 start time (P3)** 03= Set program 4 start time (P4)**
03/06	25 (24)	7-day program schedule for 4 set-points each day, start time	P1-4 start time valid range from 0x0000-0x05A0 (1440 minutes per day). A value of 0xFFFF indicates the field is unused. All other values are reserved.***
03/06	26 (25)	7-day program schedule, heat set-point	5 to 35°C (41 to 95°F)*
03/06	27 (26)	7-day program schedule, cool set-point	5 to 35°C (41 to 95°F)*
03/06	28 (27)	7-day program schedule disable/enable	0 = OFF (disabled) 1 = ON (enabled)
03/06	29 (28)	LCD temperature display	00 = Only display set-point temperature 01= Only display room temperature
03/06	30 (29)	Room temperature (from the remote Modbus controller)	0 to 50°C (32 to 122°F) to cover the PTAC temperature
03/06	31 (30)	AUX1 input settings	00 = AUX1 input disabled 01 = Key card only 02 = Window sensor
03/06	32 (31)	AUX2 input settings	00 = AUX2 input disabled 01 = External occupancy sensor 02 = Balcony door sensor

*Program all temperature VS data conversion as follows:

Temperature = Data / 10°C

Example: Temp = 25.5°C, Data (255) = 00H FFH. Temp = 5.0 °C,

Data (50) = 00H 32H

**The P1 end time cannot be equal to or later than P2 start time (e.g. If the P2 start time is 8:00 p.m., then the P1 end time can only be 7:50 p.m.). The P2 time range must be between the P1 end time and the P3 start time. The P3 time range must be between the P2 end time and the P4 start time. The P4 time range must be between P3 and 0:00.

***Start time = Data / 60, example: Data (480) = 01H E0H => Start Time = 8:00 a.m.

6. User/Installer Setting Mode Defaults

User Setup Setting Mode

No.	Parameter	Default	Description
1	Programming Schedule mode	1 to 7	1-7 - Identical program every day 5-2 - Separate program for weekdays and week-ends 1, 2, 3, 4, 5, 6, 7 – Separate program for each day 10-minute program time resolution, 4 set-points each day, independent program temperature for heating and cooling modes
2	Programming Schedule mode, enable/disable	OFF (Disable)	ON = Enable OFF = Disable
3	Temporary hold, enable/disable	OFF (Disable)	ON = Enable OFF = Disable
4	ECO mode, enable/disable	OFF (Disable)	ON = Enable OFF = Disable
5	Setback configuration (SETB)	3°C (6°F)	0.5 to 5°C (1 to 10 °F)
6	Off mode fan on/clock/option, enable/disable	OFF (Disable) both for fan on/clock/option, enable/disable	ON = Enable OFF = Disable This setting determines whether the device displays fan on/clock/temperature while in Off mode.
7	Default display temperature	SP	'ro'(flashing) = Default display temperature is room temperature 'SP'(flashing) = Default display temperature is set-point temperature
8	Frost protection enable/disable	OFF (Disable)	ON = Enable OFF = Disable
		5°C (41°F)	Setpoint range 5 to 15°C (41 to 59 °F) when enabled
9	Hi temperature protection setpoint	ON (Enable)	ON = Enable OFF = Disable
		35°C (95°F)	25 to 35°C (77 to 95°F)
10	Switching differential (first stage)	1°C (2°F)	0.5 to 2°C (1 to 4°F)
11	Switching differential (second stage)	1°C (2°F)	0.5 to 2°C (1 to 4°F)
12	Daylight Savings Time	0	-1 to 1 hour

No.	Parameter	Default	Description
13	Setpoint temperature range	18°C (64°F)	Cooling mode min setpoint value, setting range 5 to 35°C (41 to 95°F)
		26°C (79°F)	Cooling mode max setpoint value, setting range 5 to 35°C (41 to 95°F)
		18°C (64°F)	Heating mode min setpoint value, setting range 5 to 35°C (41 to 95°F)
		26°C (79°F)	Heating mode max setpoint value, setting range 5 to 35°C (41 to 95°F)
14	Auto mode dead-band	1°C (2°F)	1 to 3°C (2 to 6°F)
15	Temperature Offset	0°C / 0°F	-3 to 3°C (-6 to 6 °F)
16	Modbus enable/disable	OFF (Disable)	ON = Enable OFF = Disable

Installer Setup Setting Mode

(For TH903-DM-W, TH907-DM-W, TH907-DM-B: 7-day program, 3heat,2cool,1fan,Modbus)

No.	Parameter	Default	Description
17	System type (heat pump / non-heat pump)	nHp (non-heat pump)	Hp = heat pump Hp + heat icon = heat pump with extra heat nHp = non-heat pump
18	O/B	b	o = O valve b = B valve (only shown under heat pump or heat pump with extra heat mode)
19	AUX heat (extra heat) setup	ass	ass = W3 assist mode rep = W3 replacement mode (only shown under heat pump or heat pump with extra heat mode, W3 for 2C3H1 fan models)
20	Electric/Gas	e	e = Conventional electric HVAC system and fan auto will control the fan on/off automatically. g = Conventional gas HVAC system and fan auto will disable the Fan. However, Fan 1, 2, 3 is selected, the fan will still be operated as Fan 1, 2, 3. (only shown under non-heat pump mode and FCU selection 'n' (conventional HVAC selection, default setting))
21	Heat stage number	3	0 = The system is in Cooling mode only. Heating mode and Auto Change-over are not supported. 1 = System max heat stage is 1 2 = System max heat stage is 2 3 = System max heat stage is 3

No.	Parameter	Default	Description
22	Cool stage number	2	0 = The system is in Heating mode only. Cooling mode and Auto Change-over are not supported. 1 = System max cool stage is 1 2 = System max cool stage is 2
23	Fan type	1	1 or 3 fans, selected by the device automatically. No manual selection is available for this parameter.
24	System work mode	OFF, AUTO	OFF + Auto icon = OFF, Auto OFF + Heat icon = OFF, Heat only OFF + Cool icon = OFF, Cool only OFF+ Auto icon = OFF, Auto, Heat, Cool
25	Card key/door occupancy/ window sensor setting	-- (None)	AUX1 sensor input setting '...' (flashing) = None 'C' (flashing) = Key card only 'LU' (flashing) = Window sensor only
		-- (None)	AUX2 sensor input setting '...' (flashing) = None 'O' (flashing) = External occupancy sensor 'd' (flashing) = Balcony door
26	Occupancy detection duration	2 (hours)	PIR detection window, range is 0-8 hours, no delay for test mode if 0 hours is selected
		8:00am	Day (awake) start time setting, range 6:00 a.m. to 6:00 p.m.
		8:00pm	Night (sleep) start time setting, range 6:00 p.m. to 6:00 a.m.
		NC	Occupancy Normal Open (NO) / Normal Close (NC) status setting for AUX1/2: 'nc' = AUX1/2 input dry contact normal close 'no' = AUX1/2 input dry contact normal open
27	ECO mode delay	60 (minutes)	Range 1 to 95 minutes (Increments: 1, 5, 10, 15 minutes, etc.)
28	Short Cycle Protection (SCP)	300 (seconds)	Range 180 to 420 seconds, 30-second increments
29	Cooling Fan Delay (CFD)	300 (seconds)	60 to 300 seconds
30	Fan on to compressor on delay	300 (seconds)	60 to 300 seconds

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