Installation and Operating Instructions

Part Number 40VM900012

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SAFETY CONSIDERATIONS

Read and follow manufacturer instructions carefully. Follow all local electrical codes during installation. All wiring must conform to local and national electrical codes. Improper wiring or installation may damage thermostat.

Understand the signal words — DANGER, WARNING, and CAUTION. DANGER identifies the most serious hazards, which will result in severe personal injury or death. WARNING signifies hazards that could result in personal injury or death. CAUTION is used to identify unsafe practices, which would result in minor personal injury or product and property damage.

Recognize safety information. This is the safety-alert symbol (⚠). When this symbol is displayed on the unit and in instructions or manuals, be alert to the potential for personal injury. Installing, starting up, and servicing equipment can be hazardous due to system pressure, electrical components, and equipment location.

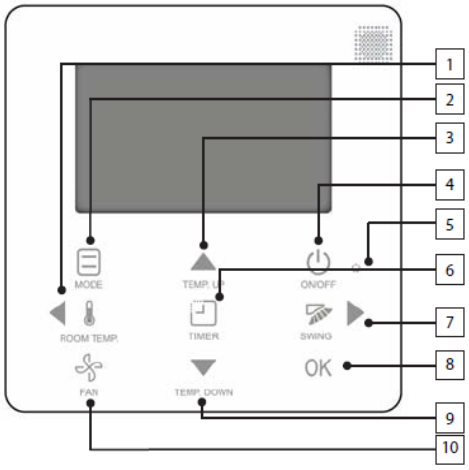
GENERAL

The VRF (variable refrigerant flow) wired non-programma-ble controller is a wall-mounted, low-voltage thermostat that maintains room temperature by controlling system operation. The controller, which does not require batteries, is capable of displaying temperatures from 54ºF to 86ºF.

The wired non-programmable controller accessory is available for use with the VRF (variable refrigerant flow) indoor units listed in Table 1. Figure 1 shows a description of the buttons used on this controller. Figure 2 shows a description of the screen icons.

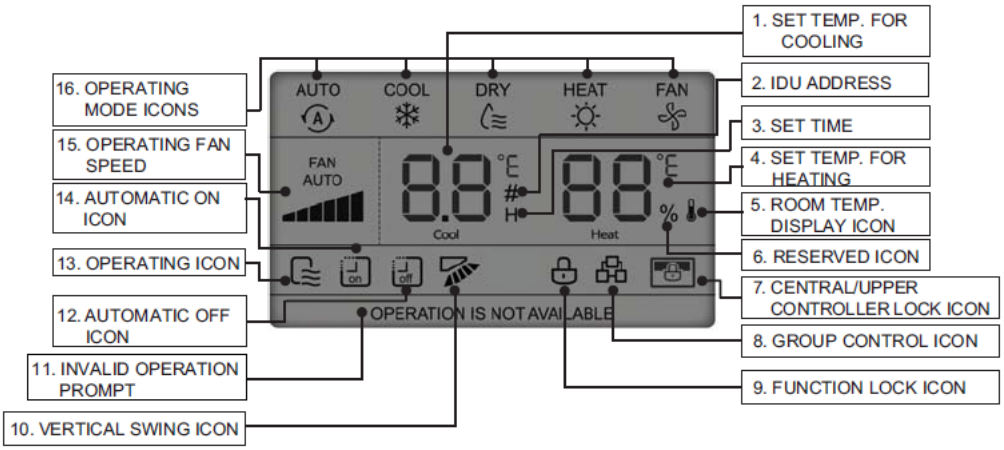
Table 1 — Wired Controller Accessory Usage

UNIT	SIZES
40VMC Compact Cassette Indoor Unit	007, 009, 012, 015
40VMF 4-Way Cassette Indoor Unit	009, 012, 015, 018, 024, 030, 036, 048
40VMH High Static	024, 030, 036, 048, 054, 072, 096
40VML Low Static Ducted Indoor Unit	007, 009, 012, 015, 018, 024
40VMM Medium Static Ducted Indoor Unit	007, 009, 012, 015, 018, 024, 030, 036, 048
40VMR Floor Console - Recessed Indoor Unit	007, 009, 012, 015, 018, 024
40VMU Under Ceiling/Floor Indoor Unit	012, 018, 024, 030, 036, 048
40VMV Vertical AHU Fan Coil	018, 024, 030, 036, 048, 054
40VMW High Wall Indoor Unit	007, 009, 012, 015, 018, 024, 030
40VMZ Reheat Unit	009, 012, 015, 018, 024



BUTTON	DESCRIPTION
1. Left button/ ROOM TEMP button	Selects options to the left / Checks the room temperature.
2. MODE	Selects the running mode.
3. TEMP. UP button	Increases the set temperature/Selects upward options.
4. ON/OFF button	Powers the IDU (Indoor Unit) on/off.
5. LED	Stays solid green when the unit is powered on and blinks if there is a fault.
6. TIMER button	Opens timer settings.
7. Right button/ SWING button	Selects options to the right / Sets the swing location and starts automatic swing.
8. OK button	Confirms the selection.
9. TEMP. DOWN button	Reduces the set temperature / Selects downward options.
10. FAN	Selects the fan speed.

Fig. 1 — Button Description



DISPLAY ICON	DESCRIPTION
1. Set Temp for Cooling	Displays the set temperature for cooling on the wired controller.
2. IDU Address	Displays the IDU (Indoor Unit) address when the IDU is in error or query status.
3. Set Time	Displays the automatic on/off set time. For example, “10H” indicates that the unit will automatically turn on/off in 10 hours.
4. Set Temp. for Heating	Displays the set temperature for heating on the wired controller.
5. Room Temp Display Icon	Displayed on when the wired controller displays the indoor temperature.
6. Reserved Icon	Reserved icon (not used).
7. Central/Upper Controller Lock Icon	Displayed when the upper computer/central controller locks the IDU functions and the wired controller cannot be used for these functions.
8. Group Control Icon	Displayed when the wired controller controls multiple IDUs (max 16 IDUs).
9. Function Lock Icon	Displayed when the wired controller locks the on/off function, mode, or temperature setting.
10. Vertical Swing Icon	Displays vertical swing status when the IDU supports vertical swing.
11. Invalid Operation Prompt	Displayed for two seconds if an operation is invalid.
12. Automatic Off Icon	When this icon is displayed, the automatic-off function is set.
13. Operating Icon	Displayed when the unit is powered on and operating.
14. Automatic On Icon	When this icon is on, the automatic-on function is set.
15. Operating Fan Speed	Displays the fan speed set by the wired controller.
16. Operating Mode Icons	Displays the running mode set by the wired controller.

Fig. 2 — Display Description

INSTALLATION CONSIDERATIONS

The thermostat should be mounted:

- approximately 48 in. from the floor
- on a section of wall without water or drainage pipes

The thermostat should **NOT** be mounted:

- where it can be directly affected by the unit's discharge airflow
- close to a window, on an outside wall, or next to a door leading to the outside
- near shelves or curtains that may restrict air movement
- near heat sources such as direct sunlight, heaters, dimmer switches, and other electrical devices

INSTALLATION

Perform the following procedure to install the thermostat:

1. Turn off all power to the indoor unit.

⚠ WARNING

Electrical shock can cause personal injury or death. Before installing thermostat, shut off all power to this equipment during installation. There may be more than one power disconnect. Tag all disconnect locations to alert others not to restore power until work is completed.

2. If an existing thermostat is being replaced:
   a. Remove existing thermostat from wall or unit.
   b. Disconnect wires from existing thermostat. Do not allow wires to fall back into the wall or unit.
   c. Discard or recycle old thermostat.

⚠ CAUTION

Failure to follow this caution may result in equipment damage or improper operation.

Improper wiring or installation may damage the thermostat. Check to make sure wiring is correct before proceeding with installation or turning on unit.

3. Use 16 to 20 AWG (American Wire Gage), stranded twisted pair shielded 2-core wiring. Be sure the distance between the controller and the indoor units is not more than 820 ft.
4. For exposed wall-hung or under-ceiling/floor units, provide a 1-in. by 1-in. square opening in the surface behind the unit to route the shielded 2-core control cable, furred in to connect the indoor unit display panel to the controller.
5. For concealed ducted, high-static ducted, cassette, or vertical units, the shielded 2-core cable can be routed through the plenum and the wall to connect the indoor unit display panel and the controller.
6. Insert a flat-head screwdriver into the slots provided on the bottom of the controller to pop open the back mounting plate. See Fig. 3.

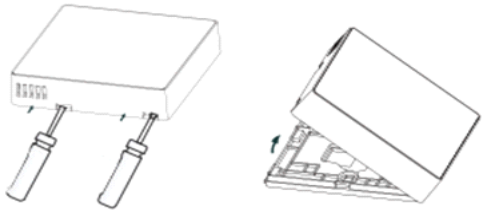


Fig. 3 — Opening Back Mounting Plate

7. Provide a 1-in. by 1-in. square opening in the wall where the controller will be mounted to accommodate the control cable.
8. Attach the back mounting plate directly over the opening using 2 screws, and route the control cable as shown in Fig. 4.

⚠ CAUTION

Over-tightening the screw will cause deformation to the rear cover and LCD damage.

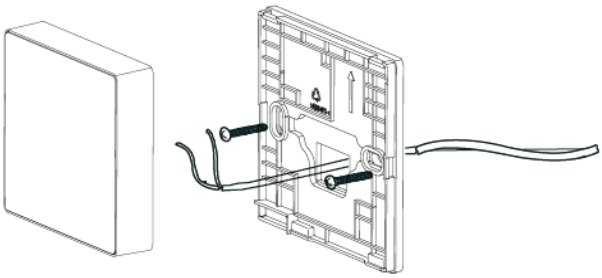


Fig. 4 — Attaching Back Plate

9. Connect one end of the shielded 2-core control cable to the indoor unit HA/HB terminal on the unit and other end to the controller HA/HB terminal. For connecting the con-troller to a single indoor unit see Fig. 5. For connecting the controller to multiple indoor units see Fig. 6.

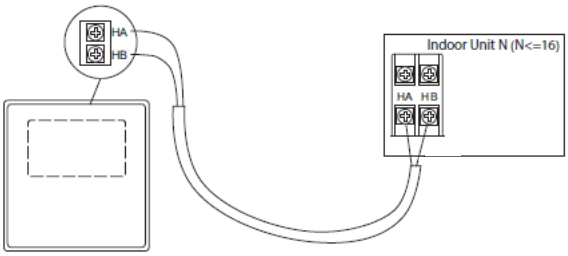


Fig. 5 — One-to-One Control Connection

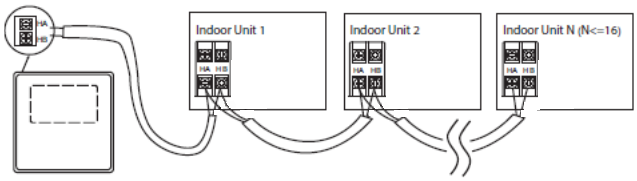


Fig. 6 — Group Controller Connection

10. Mount the controller back onto the mounting plate. See Fig. 7.

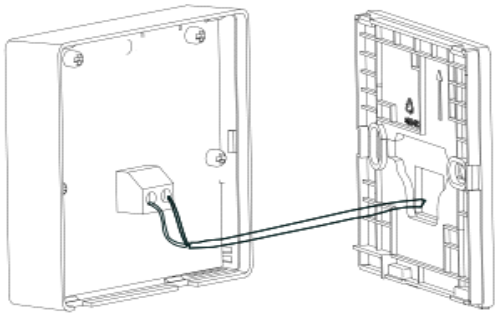


Fig. 7 — Mounting Controller

OPERATION

ON/OFF Setting — Press the ON/OFF button to turn the IDU (indoor unit) on/off. When the IDU is powered on, the wired controller's Operat-ing icon and LED turn on at the same time as shown in Fig. 8.

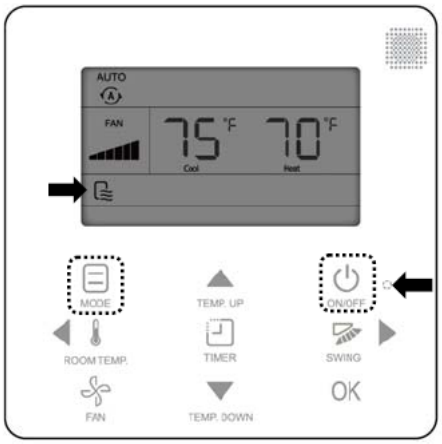


Fig. 8 — IDU Operating icon and LED

Setting the Mode — Pressing MODE once or more than once sets functions in the sequence shown in Fig. 9.

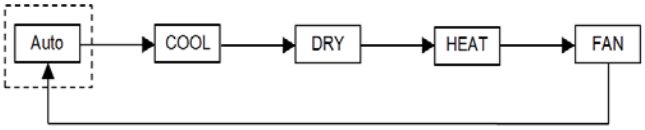


Fig. 9 — Sequence of Functions

IMPORTANT: When the wired controller is connected to a heat pump system, AUTO mode is unavailable. Fan speed cannot be adjusted in DRY mode.

Fan Speed Setting — In AUTO, cooling, heating, or fan-only mode, press FAN to change the fan speed. Pressing FAN changes the setting in the following cycle: automatic air flow, low air flow, medium air flow, high air flow as shown in Fig. 10.

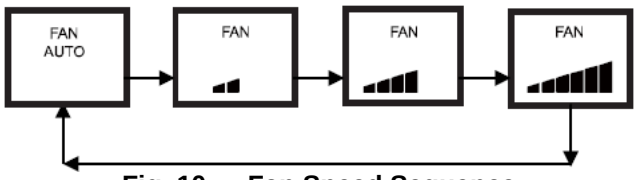


Fig. 10 — Fan Speed Sequence

Temperature Setting — In AUTO, cooling, DRY, or heating mode, press TEMP. UP or TEMP. DOWN to adjust the temperature as shown in Fig. 11.

Fig. 11 — Setting the Temperature

When adjusting the set temperature in AUTO mode, press TEMP. UP or TEMP. DOWN and then the "Cool" icon blinks. Then, press TEMP. UP or TEMP. DOWN to set the cooling temperature in AUTO mode as shown in Fig. 12.

Fig. 12 — Setting Cooling Temperature

Press the left or right button within 3 seconds to switch between the set temperature for cooling and heating in AUTO mode as shown in Fig. 13.

Fig. 13 — Switching Between Cooling and Heating

The set temperature range for cooling and DRY mode on the wired controller is 62°F to 86°F. The set temperature range for heating on the wired controller is 54°F to 86°F.

Automatic ON/OFF Settings — Press the TIMER button to enter automatic-on settings. The screen displays the timer, and the automatic-on icon is on as shown in Fig. 14.

Fig. 14 — Entering the Automatic-on Menu

Press TEMP. UP or TEMP. DOWN within 3 seconds to adjust the automatic-on time as shown in Fig. 15.

Fig. 15 — Adjusting the Automatic-on Time

If you press OK or do not press any button within 3 seconds, the wired controller will confirm the set time and exit the automatic-on/off setting status as shown in Fig. 16.

Fig. 16 — Confirming the Automatic-on Time

When the automatic-on time is set to a value other than 0.0H, the automatic-on setting is valid and the IDU will be turned on at the set time. When the automatic-on time is set 0.0H, the automatic-on setting is canceled. Press TIMER twice on the main interface to enter automatic off settings. The screen displays the timer, and the automatic-off icon is on.

NOTE: When the set automatic-on/off time is less than 10 hours, the value will be increased or decreased in units of 0.5 hour. When the set automatic-on/off time is greater than 10 hours, the value will be increased or decreased in units of 1 hour.

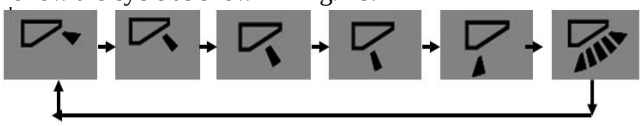
NOTE: Automatic-on and automatic-off can be set at the same time. When the automatic-on time is equal to the automatic-off time and the two are smaller than 10 hours, the automatic-off time will be delayed for 0.5 hour. If the two equal or exceed 10 hours but are less than 24 hours, the automatic-off time will be delayed for 1 hour. If the two are equal to 24 hours, the automatic-on time will be put forward 1 hour.

NOTE: After automatic-on or automatic-off is set, the automatic-on/off setting will be canceled when you press ON/OFF to turn the unit on/off. Automatic-off and automatic-on are set in the same way.

Swing Setting for Louvers — The swing function of the wired controller is available when the connected IDU has the vertical swing function. When the IDU is on, press the SWING button to control vertical swing as shown in Fig. 17.

Fig. 17 — Setting the Swing

When the SWING button is pressed multiple times, it will follow the cycle as shown in Fig. 18:



: The icon indicates that automatic swing is started.

Fig. 18 — Swing Sequence

The swing function of the wired controller is invalid when the IDU connected to the wired controller does not have the vertical swing function. If you press the SWING button at that time, the screen displays "OPERATION IS NOT AVAILABLE" for 2 seconds.

Room Temperature Display — When the unit is on, press ROOM TEMP. to view the indoor temperature as shown in Fig. 19.

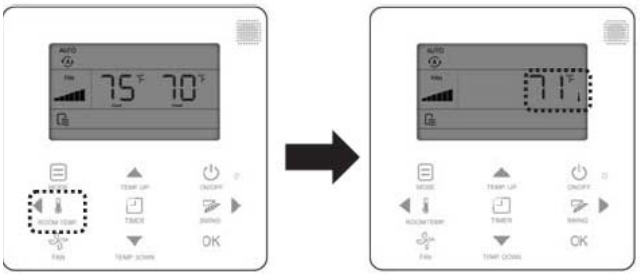


Fig. 19 — Displaying the Indoor Temperature

When the unit is off and in standby mode, the wired controller displays the indoor temperature by default as shown in Fig. 20.

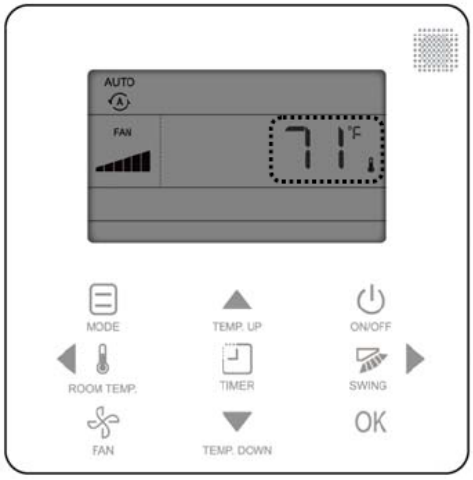


Fig. 20 — Default Display When in Standby Mode

Locking the Controller — The locking function can lock ON/OFF, mode, or temperature setpoint. Refer to Table 2 below. The controller is unlocked by following the same procedures.

Table 2 — Locking Functions

LOCKING FUNCTION	OPERATION MODE
Locking / unlocking on / off function	Press TEMP. UP and TEMP. DOWN at the same time, and then press the ON/OFF button within 15 seconds.
Locking / unlocking mode	Press TEMP. UP and TEMP. DOWN at the same time, and then press the MODE button within 15 seconds.
Locking / unlocking temperature	Press TEMP. UP and TEMP. DOWN at the same time, and then press the TEMP. UP/TEMP. DOWN button within 15 seconds.

Press and hold TEMP. UP and TEMP. DOWN at the same time until the locking icon blinks. Press ON/OFF, MODE, or TEMP. UP/TEMP. DOWN within 15 seconds to

lock the ON/OFF, mode setting, and temperature setting functions, respectively, as shown in Fig. 21.

Fig. 21 — Locking the Controller

Once the Locking function is activated for a specific function, pressing the specific button will cause the screen to display "OPERATION NOT AVAILABLE" for 2 seconds. The Operating icon and lock icon will then blink for 2 seconds.

Parameter Settings — Press and hold the MODE and FAN buttons for five seconds to enter the parameter setting mode as shown in Fig. 22.

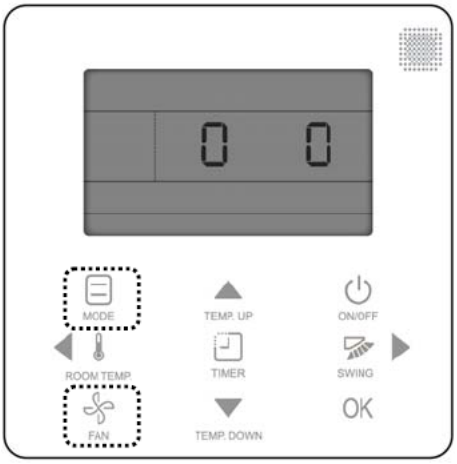


Fig. 22 — Entering the Parameter Setting Menu

Parameter settings are classified into 1G code and 2G code. 1G indicates the parameter category, and 2G indicates parameter content as shown in Fig. 23.

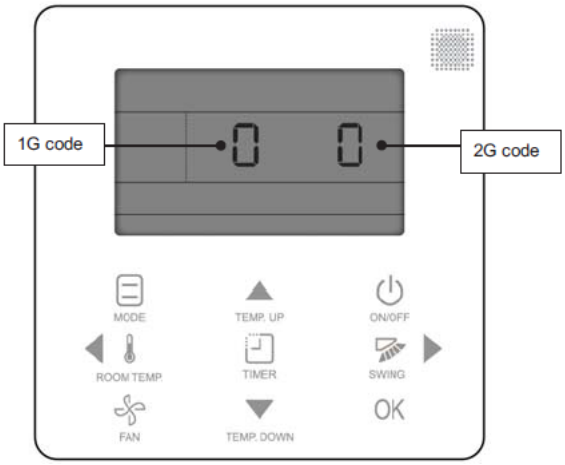


Fig. 23 — 1G and 2G Code Location

Press the left/right button to select the 1G code as shown in Fig. 24.

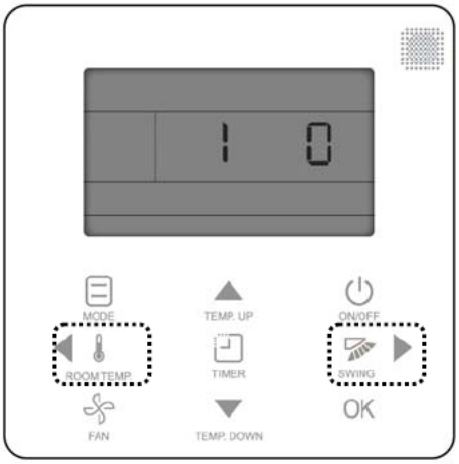


Fig. 24 — Selecting the 1 G Code

Press TEMP. UP/TEMP. DOWN to select the 2G code as shown in Fig. 25.

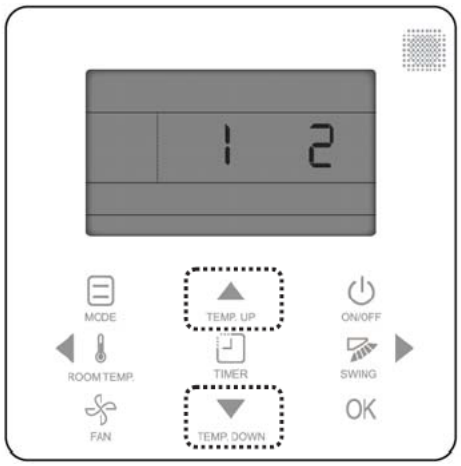


Fig. 25 — Selecting the 2G Code

Press OK or wait 15 seconds to confirm the setting automatically and exit parameter settings (see Fig. 26). Table 3 lists the detailed parameter codes.

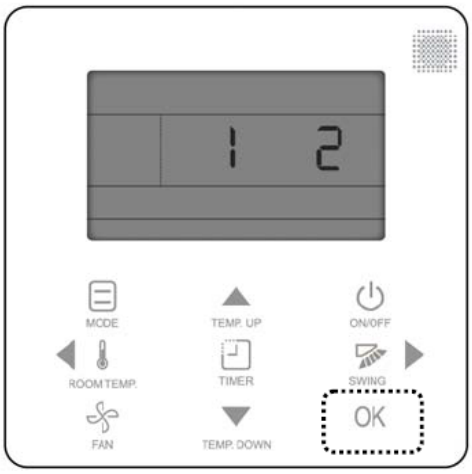


Fig. 26 — Exiting the Parameter Settings Menu

Table 3 — Parameter Codes

The table below lists the detailed parameter codes:

1G code	Parameter category	2G code	Description
0	Selection room temperature sensor	0	Uses room temperature sensor on the IDU.
		1 (default)	Uses the room temperature sensor on the wired controller.
1	Room temperature sensor temperature compensation of wired controller	(0 to 10)	Degrees Fahrenheit: 0:-5ºF, 1:-4ºF, 2:-3ºF, 3:-2ºF, 4:-1ºF, 5:0ºF (default), 6:1ºF, 7:2ºF, 8:3ºF, 9:4ºF, 10:5ºF
			Degrees Celsius: 0:-5ºC, 1:-4ºC, 2:-3ºC, 3:-2ºC, 4:-1ºC, 5:0ºC (default), 6:1ºC, 7:2ºC, 8:3ºC, 9:4ºC, 10:5ºC
2	Setting the upper limit for heating	86ºF (default), 85ºF, 84ºF… 30ºC (default), 29ºC, 28ºC…	Regulates the upper temperature limit for heating; the low temperature limit for heating is 54ºF/12ºC
3	Setting the lower limit for cooling	62ºF (default), 63ºF, 64ºF… 17ºC (default), 18ºC, 19ºC…	Regulates the lower temperature limit for cooling; the upper temperature limit for cooling is 86ºF/30ºC.
4	Selecting IDU capacity interval	0 (default)	Thermal on (1ºF/1ºC)
		1	Thermal on (2ºF/1ºC)
5	AUTO mode delay switching time Δt	0 (default)	Δt=15min
		1	Δt=30min
		2	Δt=60min
		3	Δt=90min
6	Anti-cold wind setting/set the temperature when the heating fan stops	0 (default)	68ºF/20ºC
		1	50ºF/10ºC
		2	59ºF/15ºC
		3	75ºF/24ºC
		4	82ºF/28ºC

7	Fan off after a delay of Δt when the unit is off (reserved)	0 (default)	Δt=4min
		1	Δt=8min
		2	Δt=12min
		3	Δt=16min
8	Setting the fan speed in cooling standby mode	0	Turn off the fan
		1	Low
		2	Medium
		3	High
		E (default)	Maintain the current fan speed
9	Setting the fan speed in heating standby mode. (Not available for heat pump system)	0 (default)	Turn off the fan
		1	Low
		2	Medium
		3	High
		E	Maintain the current fan speed
10	Setting the IDU static pressure	(0 to 25)	0: 0 in WC (default) 1: 0.04 in WC 2: 0.08 in WC 3: 0.12 in WC 4: 0.16 in WC 5: 0.20 in WC 6: 0.24 in WC 7: 0.28 in WC 8: 0.32 in WC 9: 0.36 in WC 10: 0.40 in WC 11: 0.44 in WC 12: 0.48 in WC 13: 0.52 in WC 14: 0.56 in WC 15: 0.60 in WC 16: 0.64 in WC 17: 0.68 in WC 18: 0.72 in WC 19: 0.76 in WC 20: 0.80 in WC 21: 0.84 in WC 22: 0.88 in WC 23: 0.92 in WC 24: 0.96 in WC 25: 1.0 in WC
11	OCCUPANCY DELAY of Δt when nobody is sensed indoors	0 (default)	Δt=0min
		1	Δt=15min
		2	Δt=30min
		3	Δt=60min
12	Setting the opening temperature of dry contact 4; dry contact 4 is opened when the temperature is lower than the set temperature ΔT	0 (default)	ΔT=1ºF/1ºC
		1	ΔT=2ºF/1ºC
		2	ΔT=3ºF/2ºC
		3	ΔT=4ºF/2ºC
		4	ΔT=5ºF/3ºC

13	Delayed closing setting of dry contact 4	0 (default)	Closed in 15 min
		1	Closed in 30 min
		2	Closed in 45 min
14	Whether the IDU is connected to a third-party heat source	0 (default)	No third-party heat source connected
		1	A third-party heat source connected
15	Fan control when the third-party heat source starts	0	Not turn on the fan forcedly
		1 (default)	Forcibly turn on the fan
16	Occupancy set temperature offset	0°F/0°C	/
		2°F/1°C	
		4°F/2°C(default)	
		6°F/3°C	
		8°F/4°C	
17	Occupancy delay function	0 (default)	Invalid
		1	Valid

Indoor Unit Addressing — Each indoor unit must have a unique address that can be set from 0-63 for proper system operation.

- Indoor units can be addressed automatically in heat pump systems. Dip switch "S6" in outdoor unit main board to 00 (default set in factory) means auto addressing for each indoor units. When the system is first powered on, this auto addressing process can take approximately 6 minutes or more, depending on the number of indoor units in the system.
- Indoor units can be addressed manually using remote controllers. The whole system, outdoor units, indoor units and MDC are included, and should be powered on when setting an address by remote controllers. If "FE" displays on LED screen of the controller or display board of indoor unit, there is no address for this unit. After setting all indoor units' addresses, cut off the power supply of indoor units and power on again to clear this error.

To manually set indoor unit address, press and hold ROOM TEMP and SWING together for 3 seconds to enter the following menu. It displays FE# 00 if there is no address for this indoor unit; otherwise it displays current address of the indoor unit. Clicking TEMP.UP or TEMP.DOWN to change 00 to address number you want to set. Then press OK to confirm and exit the setting interface.

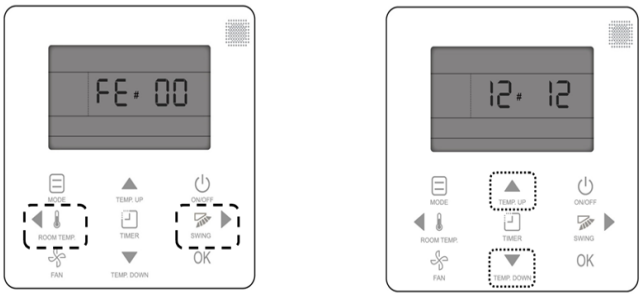


Fig. 27 — Manually Set Indoor Unit Addressing

Query Function

Press FAN and OK at the same time and hold for 3 seconds to open the query function as shown in Fig. 28. The wired controller can query the number of connected IDUs and addresses, IDU sensor T1/T2A/T2B, and error records.

Fig. 28 — Opening the Query Function

After entering the query function, the wired controller displays the IDU address and the total number of connected IDUs. When the wired controller controls multiple IDUs at the same time, press TEMP. UP or TEMP. DOWN to select IDUs with different addresses as shown in Fig. 29.

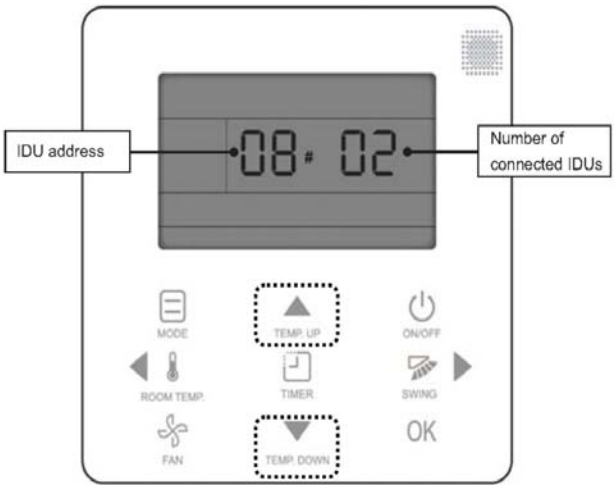


Fig. 29 — IDU Address Display

Press OK to query the IDU at the current address as shown in Fig. 30.

Fig. 30 — Querying the IDU

Press TEMP. UP or TEMP. DOWN to switch between different parameters to display as shown in Fig. 31.

Fig. 31 — Parameter Display

Table 4 below lists the parameter numbers and parameter information.

Table 4 — Parameter Descriptions

PARAMETER NO.	PARAMETER INFORMATION
0	IDU T1 sensor
1	IDU T2A sensor
2	IDU T2B sensor
3	Previous ODU error code
4	Previous IDU error code
5	Previous wired controller error code

LEGEND

IDU — Indoor Unit
ODU — Outdoor Unit

Press FAN to return to the IDU address display and the total number of connected IDUs on the previous row. Press the OK button or wait 15 seconds to exit the parameter query function automatically.

Error Code Display — The wired controller can display the error codes for the IDU (indoor unit) and ODU (outdoor unit) connected to the wired controller, as well as the error codes of the wired controller. If an error occurs, the LED and Operating icon blink as shown in Fig. 32.

Fig. 32 — Controller Display When in Error

The wired controller displays the address and error code of the faulty IDU at the same time. Figure 33 shows that an E4 error has occurred on the IDU at address 12. In case of an ODU error, address 0 is displayed along with the ODU error code. Figure 31 shows that an F3 error has occurred at the ODU.

Fig. 33 — Example of an Error Code

Refer to indoor and outdoor unit installation instructions for a list of their respective error codes. For wired controller error codes, refer to Table 5 below:

Table 5 — Wired Controller Error Codes

CODE	DESCRIPTION
E9	Wired controller and IDU communication error.
E7	Wired controller EEPROM error.
FP	Overflow of number of online IDUs.

LEGEND

EEPROM — Electronically Erasable Programmable Read-only Memory
IDU — Indoor Unit

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