

Programmable Thermostat

MH6-HP

Introduction

MH6-HP programmable thermostat is a Z-Wave Plus enabled device for indoor temperature control. It is mainly applied to heat pump system for heating/cooling, with 3 modes easily switchable: Schedule, Hold and Holiday. The device is of high reliability and practicability, and it can support up to 3H/2C system. This product can be included and operated in any Z-Wave network with other Z-Wave certified devices from any other manufacturers. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

Features:

- Elegant design with 4.3" LCD display
- Individual programming Schedules:
7 days*4 time periods
- Tempered glass panel with
Capacitive touch buttons
- NTC thermistor
- Built-in Z-Wave module



Specification

Power supply: AC24V, 50/60Hz

Power dissipation: 2W

Dimension: 136*94*26mm

Output: <1A (Resistant load)

Temperature range: 41°F -99°F (5°C -37°C)

Display accuracy: ±0.5 °C

Wiring: Terminals

Installation dimension: 60mm / 82mm (hole pitch)

Safety Information

To protect yourself and others from danger and to protect the device from damage, please read the safety information before using it.

Important!

- A qualified electrician with the understanding of wiring diagrams and knowledge of electrical safety should complete installation following the instructions.
- Before installation, please confirm the real voltage complying with the device's specification. Cut off any power supply to secure the safety of people and device.
- During installation, protect the device from any physical damage by dropping or bumping. If happens, please contact the supplier for maintenance.

- Keep the device away from acid-base and other corrosive solids, liquids, gases, to avoid damage.
- Avoid overexertion during operation, to protect device from mechanical damage.
- Read all instructions and documentation and save for future reference.

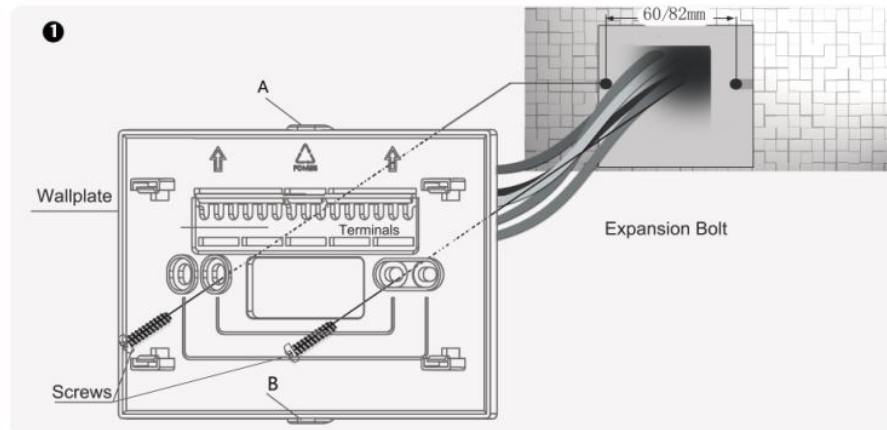
Installation & Wiring

CAUTION: Cut off power supply at circuit breaker or fuse before installation to avoid fire, shock or death!

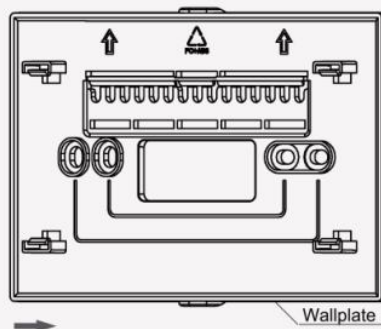
Installation

Step1

Separate the Wallplate from the faceplate by pulling them at A and B, and then insert all wires into the right terminals according to the wiring diagram. Fixed the Wallplate into the junction box with M4*18mm screws. Please pay more attention to the installation direction of the Wallplate(as shown at right).



2



Step2

Check all the wires, and then evenly push the faceplate into the Wallplate till the Wallplate and faceplate fit tightly.

Wiring diagram

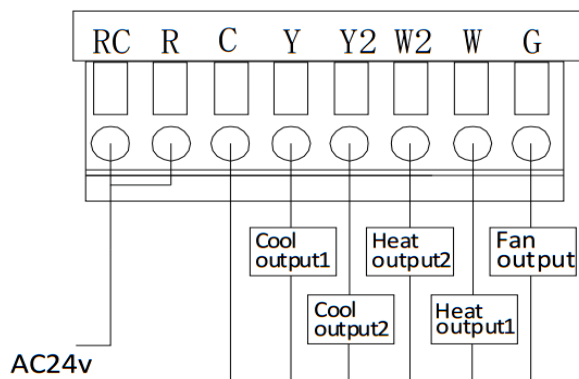


Figure I: Wiring guide
Conventional systems

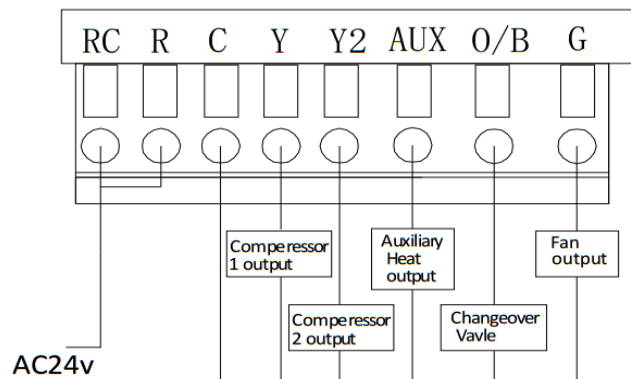


Figure II: Wiring guide
heat pump systems

Wiring Terminals

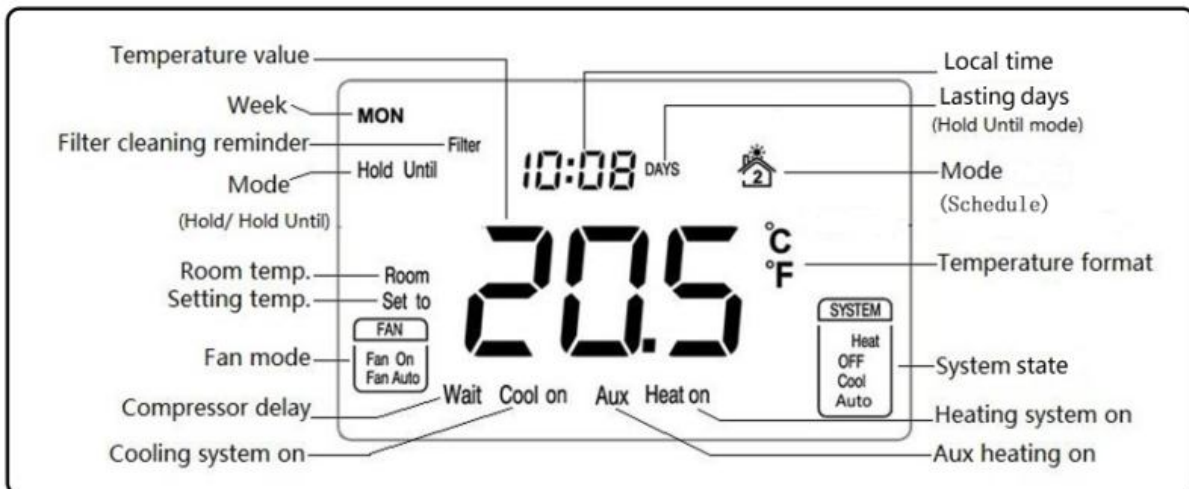
| Terminals | Explanation | Remark |
|-----------|----------------------------------|---|
| RC | Cooling power (two transformers) | Joined with R by jumper (one transformer) |
| R | Heating power (two transformers) | Joined with RC by jumper (one transformer) |
| W (O/B) | Heat output | Changeover valve output (heat pump) |
| Y | Cool output | Compressor output (heat pump) |
| G | Fan output | |
| C | 24VAC common | Connect only when AC power |
| Y2 | Cool output 2 | 2 nd stage compressor output (heat pump) |
| W2(AUX) | Heat output 2 | Auxiliary heat output (heat pump) |

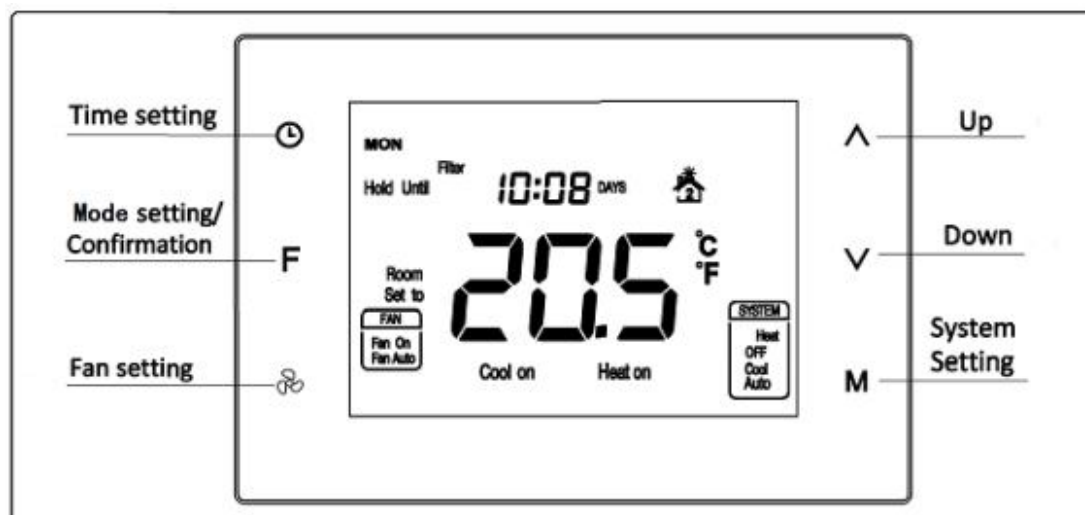
Controlling Type

| No. | Type | Terminals | Wiring | Compressor delay |
|-----|----------------------|------------------|------------------------------|------------------|
| 0.0 | 1H/1C (conventional) | R、G、W、Y | Diagram conventional systems | none |
| 1.0 | 1H/2C (conventional) | R、G、W、Y、Y2 | | none |
| 2.0 | 2H/2C (conventional) | R、G、W、Y、W2、Y2 | | none |
| 3.0 | 2H/1C (conventional) | R、G、W、Y、W2 | | none |
| 4.0 | 1H/1C (heat pump) | R、G、O/B、Y | Diagram heat pump systems | 1 min (default) |
| 5.0 | 2H/1C (heat pump) | R、G、O/B、Y、AUX | | 1 min (default) |
| 6.0 | 2H/2C (heat pump) | R、G、O/B、Y、Y2 | | 1 min (default) |
| 7.0 | 3H/2C (heat pump) | R、G、O/B、Y、AUX、Y2 | | 1 min (default) |

* **Note:** Before operation, pls set the controlling type based on the real situation by referring to the Secret Menu (last page) and following the instruction.

Display & Buttons





Operation

Temperature format(°C/ °F)

In normal display interface, press \odot & **F** button synchronically for at least 3 sec to switch between °C and °F. (*Not available in **Hold** or **Hold Until** Mode.*)

Local time setting

Press & hold \odot for 3 sec to enter into the interface for local time setting. First, 00 year flashes (0~99 indicates 2000~2099 year), press ∇ or \wedge to modify the values, then press \odot to switch to 01 month, month value flashes, press ∇ or \wedge to modify the values, then press \odot to switch to 02 day, day value flashes, press ∇ or \wedge to modify the values, then press \odot to switch to 03 hour, hour value flashes, press ∇ or \wedge to modify the values, then press \odot to switch to 04 minute, minute value flashes, press ∇ or \wedge to modify the values. Continually press \odot , it will switch among Year-Month-Day-Hour-Minute. Press **F** to save the status then back to the temperature setting interface, “Set to” displays and temperature value flashing, then press ∇ or \wedge to modify the value, press **F** or wait for the delay time end, return back to normal display.

(*Local time can not be set in **Hold Until** mode*)

System state setting

In normal display interface, press **M** slowly to switch among “**Heat, OFF, Cool & Auto**”. After the state change, “Set to” displays and temperature value flash for 5 sec. Users can choose to change the value for temperature setting. If not, press **F** twice to save the change and return to normal display.

(*Changed value only valid in this current Schedule, and will lose if Schedule, system state changes or power off*)

- **OFF**: In this state, Heating, Cooling and Fan will all forced close. Displays keep on.
- **Auto**: In this state, a constant temperature will be kept. Device will activate/ stop heating/cooling system automatically according to the setting and room temperature.

Conventional system

- **Heat**
Room temp. \leq Setting temp. -1 °C, “Heat on” displays and 1st stage heating system is on;

Room temp. \leq Setting temp. -2°C , “Heat on” & “AUX” display and 2nd stage heating system is on; *(not available for 1 stage heat system)*

Room temp. \geq Setting temp., heating system stops and “Heat on” disappears from screen.

Note: 2nd heat stops and “AUX” disappears when temp. difference is less than 1 $^{\circ}\text{C}$.

- **Cool**

Room temp. \geq Setting temp. $+1^{\circ}\text{C}$, “Cool on” displays and 1st stage cooling system is on;

Room temp. \geq Setting temp. $+2^{\circ}\text{C}$, “Cool on” stays and 2nd stage cooling system is on ;
(not available for 1 stage cool system)

Room temp. \leq Setting temp., cooling system stops and “Cool on” disappears from screen.

Note: 2nd cool stops when temp. difference is less than 1 $^{\circ}\text{C}$.

Heat pump system

- **Heat** (Changeover valve keep closed)

Room temp. \leq Setting temp. -1°C , “Heat on” displays and 1st stage heating system is on;

Room temp. \leq Setting temp. -2°C , “Heat on” stays and 2nd stage heating system is on;

Room temp. \leq Setting temp. -3°C , “Heat on” & “AUX” display and Aux heating system is on;

Room temp. \geq Setting temp., heating system stops and “Heat on” disappears from screen.

Note: Aux heat stops and “AUX” disappears when temp. difference is less than 2 $^{\circ}\text{C}$. 2nd heat stops when temp. difference is less than 1 $^{\circ}\text{C}$.

- **Cool** (Changeover valve keep open)

Room temp. \geq Setting temp. $+1^{\circ}\text{C}$, “Cool on” displays and 1st stage cooling system is on;

Room temp. \geq Setting temp. $+2^{\circ}\text{C}$, “Cool on” stays and 2nd stage cooling system is on;


Room temp. \leq Setting temp., cooling system stops and “Cool on” disappears from screen.

Note: 2nd cool stops when temp. difference is less than 1 $^{\circ}\text{C}$.

Compressor protection

After an operation of heating/cooling system, there is a 1 min compressor off time to protect compressor. “Wait” will display on the screen if next operation is activated within the 1 min period.

Fan mode setting

Press  to switch among “Fan on & Fan Auto”.

- **Fan on** : Fan is always on.

- **Fan Auto** : Fan runs automatically only when heating/cooling system is on.


*(If system is in **OFF** state, the fan will always off)*










Note: In this device application, the “OFF bit” is ignored in “Thermostat Fan CC” and “Thermostat Fan Mode Set CC”, and the value always be “0” in Thermostat Mode Report CC.

Mode setting

Press **F** to switch among “Schedule, Hold & Hold Until (Holiday)” modes.

● Schedule

Any icon from  stands for one time period, and there are 4 periods can be set in one day.

- Under the time setting mode, press  to enter into time setting interface, the time parameter of cooling or heating mode can be set. Press  then switch among **7 days** → **5+2 days** → **a whole week**: [MON→TUE→WED→THU→FRI→SAT→SUN→ (MON TUE WED THU FRI) → (SAT SUN) → (MON TUE WED THU FRI SAT SUN)]. When setting the parameters, press F to exit to the modify interface, then get back to the temperature setting interface.
- 1. Press ,  flashes then press  or  to change the time (changes in 15 minutes at a time);
- 2. After completed the time setting, Press **M** to switch to the temperature setting, setting temperature flash and press  or  to modify the setting temperature.
- 3. After finished the above steps, press **M** to switch to 2st period of Monday and repeat item 1 and 2 steps, then complete 4 periods of Monday setting. Press  to save and enter schedule setting for the following day.
- Under the time setting mode, when the time is set to - - : - -, the current schedule will be disabled, and it will follow the previous time setting until enter into the next schedule. If 4 period of a day is - - - : - --, then it will run the last schedule by default.




The below table is the time parameter setting in different modes: *(Factory Default)*

| Periods | Time | Parameters | |
|---------|---------|------------|---------------|
| | | Heating | Cooling/ Auto |
| 1 | 06 : 00 | 21.0°C | 25.5°C |
| 2 | 08 : 00 | 16.5°C | 29.5°C |
| 3 | 18 : 00 | 21.0°C | 25.5°C |
| 4 | 22 : 00 | 16.5°C | 28.0°C |

(Notes: Cooling and Auto mode use the same setting schedule.)

● Hold

This mode comes after “**Schedule**” by pressing **F**. In this mode, device will keep a constant temperature until next change.

- “**Hold**” & “**Set to**” display and temperature value flashing. Press  or  can change the value, and press **F** to save the setting;
- Press **M** can set system state;
- Press  can set fan mode.

● Hold Until (Holiday)

This mode comes after “**Hold**” by pressing **F** again. In this mode, device will follow the setting temperature and lasting days when users are out for a holiday. And then back to follow **Schedules** after the holiday.

- “Hold Until” & “Set to” display and temperature value flashing. Press ∇ or \wedge can change the value, and press **F** to save the setting. Then days value flashing, users can choose from 1-365 days by pressing \wedge or ∇ ;
- Press **M** can set system state;
- Press ∞ can set fan mode.
-

Override temperature setting

During any Schedule period, press \wedge or ∇ can enter an interface for temperature setting. Press \wedge or ∇ to change setting temperature, and press **F** to save the change. The changed setting only valid in the current Schedule period, device will follow the original schedule in next period.

Filter cleaning reminder

“Filter” will flash on the screen to remind users of cleaning furnace filter, and 90 calendar days are the default timing. In **Schedule** mode, to press ∞ for 3 sec, “Filter” will disappear from screen.

Sensor error

If “FF” flashes at temperature display area, it means the temp. sensor is out of work(short-circuit or broken-circuit), all the outputs will be forced close, and only back to normal work until the sensor circuit is normal again.

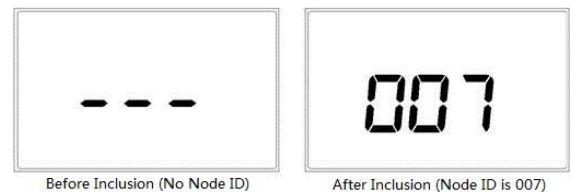
Z-Wave operation

● Adding & Removing of Z-Wave network

In normal display, press & hold \wedge to enter interface for adding or removing of Z-Wave network. Before device added into network, “- - -” will display on the screen. Then press \wedge once, device will enter learning mode to get a node ID. If adding is success, a node ID will display on the screen in a few seconds.

A node ID can always inform us whether the device is in the network or not.

After adding, press & hold \wedge will return to normal display. Now the device is ready to be operated by controller/ gateway in Z-Wave network.



Note: Follow the same steps to remove the device from the network.

● Association Group

Thermostat supports 1 association group (0x01), which can include only one Node ID. A gateway is suggested to associate with this group. Then if any changes happen, such as: temperature, working mode, fan state etc., the thermostat will report to this associated device (gateway).

| AG identifier | Max Node ID | Command Classes | Trigger situation |
|---------------|-------------|--|-------------------------------|
| 0x01 | 1 | COMMAND_CLASS_SENSOR_MULTILEVEL_V5, SENSOR_MULTILEVEL_REPORT_V5 | When temperature change >0.5℃ |

| | | | |
|--|--|---|---|
| | | COMMAND_CLASS_THERMOSTAT_MODE_V2, THERMOSTAT_MODE_REPORT | When thermostat mode changes |
| | | COMMAND_CLASS_THERMOSTAT_OPERATING_STA TE, THERMOSTAT_OPERATING_STATE_REPORT | When thermostat status changes |
| | | COMMAND_CLASS_THERMOSTAT_SETPOINT_V2, THERMOSTAT_SETPOINT_REPORT_V2 | When temperature setpoint changes |

● **Command Class supported by the device:** (All CC supports S2 unauthenticated level)

| | |
|--------------------------------------|---|
| COMMAND_CLASS_VERSION, | COMMAND_CLASS_THERMOSTAT_SETPOINT, |
| COMMAND_CLASS_MANUFACTURER_SPECIFIC, | COMMAND_CLASS_THERMOSTAT_MODE, |
| COMMAND_CLASS_POWERLEVEL, | COMMAND_CLASS_THERMOSTAT_OPERATING_STATE, |
| COMMAND_CLASS_ASSOCIATION, | COMMAND_CLASS_THERMOSTAT_FAN_MODE, |
| COMMAND_CLASS_ASSOCIATION_GRP_INFO, | COMMAND_CLASS_THERMOSTAT_FAN_STATE, |
| COMMAND_CLASS_BASIC, | COMMAND_CLASS_SUPERVISION, |
| COMMAND_CLASS_FIRMWARE_UPDATE_MD | |
| COMMAND_CLASS_SENSOR_MULTILEVEL_V5, | |

Command Class supported by the device: (Not supports S2)

COMMAND_CLASS_ZWAVEPLUS_INFO
COMMAND_CLASS_TRANSPORT_SERVICE
COMMAND_CLASS_SECURITY_2

Note: Basic CC is used to control energy saving mode and comfort mode:

- Basic Set (Value = 0x00) = Set Off Mode
- Basic Set (Value = 0xFF) = Set Auto Mode
- Basic Get = Get Report
- Basic Report (Value = 0x00) = Report off Mode
- Basic Report (Value = 0xFF) = Report other Modes

Restoring Factory Settings:

- 1、Remove the device out from Z-Wave network can restore factory setting.
- 2、Configure the parameter 10 in secret menu can restore the factory setting also. Please use this procedure only when the network primary controller is missing or otherwise inoperable.

1-year Limited Warranty

MCOHome warrants this product to be free from defects in material and workmanship under normal and proper use for one year from purchase date of the original purchaser. MCOHome will, at its option, either repair or replace any part of its products that prove defective by reason of improper workmanship or materials. THIS LIMITED WARRANTY DOES NOT COVER ANY DAMAGE TO THIS PRODUCT THAT RESULTS FROM IMPROPER INSTALLATION, ACCIDENT, ABUSE, MISUSE, NATURAL DISASTER, INSUFFICIENT OR EXCESSIVE ELECTRICAL SUPPLY, ABNORMAL MECHANICAL OR ENVIRONMENTAL CONDITIONS, OR ANY UNAUTHORIZED DISASSEMBLY, REPAIR OR MODIFICATION. This limited warranty shall not apply if: (i) the product was not used in accordance with any accompanying instructions, or (ii) the product was not used for its intended function. This limited warranty also does not apply to any product on which the original identification information has been altered, obliterated or removed, that has not been handled or packaged correctly, that has been sold as second-hand or that has been resold contrary to Country and other applicable export regulations.

Secret Menu

In **Schedule** Mode, long press \wedge and \vee synchronically can enter into secret menu, and the code is 5138. Press \wedge or \vee can change the setting, and press **M** can save and switch to the following item.

Table 1

| Item | Explain | Range | Default | Remark |
|------|---------------------------------|----------------------------|----------|--|
| 0 | Controlling Type | 0.0-7.0 | 0.0 | See table "Controlling Type" |
| 1 | (1H/1C) Differential | 0.5°C/1°C/1.5°C/2°C | 1.0°C | |
| 2 | Temperature calibration | -10°C~10°C | 0.0°C | |
| 3 | Temperature setting upper limit | 0-37°C | 37.0°C | Upper limit value > lower limit value |
| 4 | Temperature setting lower limit | 0-37°C | 5.0°C | |
| 5 | Filter change reminder | 1 /2 /30 /60 /90 /120 days | 090 days | |
| 6 | Clock format | 12 /24 hours | 24.0 | |
| 7 | Compressor protection delay | 0~10min | 1.0min | |
| 8 | Back light setting | ON/OF | OF | ON back-lit always on OF back-lit half bright when no operation |
| 9 | Temperature format | °C/°F | °C | |
| 10 | Restore factory setting | OF/ON | OF | ON for restoring |