Please read this manual carefully before installation and keep it for future reference.

Installation & Owner's Manual

MRCOOL®

COMFORT MADE SIMPLE

Hyper-Heat Single-Zone 24K-60K Ducted Air Handler & Condenser

Due to updates and constantly improving performance, the information and instructions within this manual are subject to change without notice. Please visit www.mrcool.com/documentation to ensure you have the latest version of this manual.

Version Date: 06/27/23

BEFORE PERFORMING ELECTRICAL WORK, READ THESE REGULATIONS

****NOTE: ELECTRICAL WORK MUST BE COMPLETED BY A QUALIFIED TECHNICIAN!****

⊘ ***DO NOT*** **connect any other equipment to the power circuit for the unit. Only connect the unit to an individual branch circuit.**

⊘ ***DO NOT*** **allow wires to touch or rest against the refrigerant piping, compressor, or any other moving parts within the unit.**

1. All wiring must comply with local and national electrical codes, regulations, and must be installed by a licensed electrician.
2. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
3. If there is a serious safety issue with the power supply, stop work immediately. Explain the issue to the client, and refuse to continue the installation until the safety issue is properly resolved.
4. Power voltage should be within 90-110% of the rated voltage. An insufficient power supply can cause a malfunction, electrical shock, and/or fire.
5. If connecting power to fixed wiring, a switch or circuit breaker that disconnects all poles, and has a contact separation of at least 1/8 in (3 mm), must be incorporated in the fixed wiring. The qualified technician/electrician must use an approved circuit breaker or switch.
6. The circuit, including any switches, should have a capacity 1.5 times the maximum unit current (amps).
7. Installation of an external surge suppressor at the outdoor disconnect is recommended.
8. Make sure the unit/system is properly grounded.
9. Every wire must be firmly and securely connected. Loose wiring can cause the terminal to overheat, which could result in a malfunction and/or fire.
10. If the unit has an auxiliary electric heater, it must be installed at least 40 in (1 m) away from combustible materials.
11. To avoid electrical shock, never touch the electrical components soon after the power supply has been turned off. Always wait 10 minutes or more before touching the electrical components once the power has been turned off.
13. Ensure that the electrical wiring and signal wiring do not cross. This could cause distortion, interference, or possibly damage to the circuit boards
14. The unit must be connected to the main outlet. Normally, the power supply must have an impedance of 32 ohms.
15. Connect the outdoor wires before connecting the indoor wires.

WARNING

*******BEFORE PERFORMING ANY ELECTRICAL WORK, TURN OFF ALL POWER TO THE SYSTEM!*******

NOTE: The wire colors of this series/model may differ from previous models, other series and general conventions. All wiring must be performed in accordance with the wiring diagram on the back of the wiring cover of the outdoor condenser and/or the wiring diagrams found in this section of the manual.

IMPORTANT!

Depending upon the capacity of unit and accessories (electric heat kit, wired thermostat, etc.) being installed, additional electrical components (circuit breakers, conduit, air switch, etc.) and wiring may need to be purchased separately to properly connect the system. Selection and installation of these components and wiring should only be performed by a qualified technician.

Outdoor Unit Wiring & Electrical Specifications

SELECT THE CORRECT CABLE TO CONNECT THE POWER SUPPLY TO THE OUTDOOR UNIT

• See table below for gauge requirements of power cables for outdoor condenser.

NOTE: The table below is a standard chart, the AWG ratings and wiring needs will change based on wire length and temperature.

Minimum Wire Gauge for Power Cables

	Model Capacity (BTU/hr)	Appliance Amps (A)	
		MCA	MOP
Single-Zone Condensers	24K	25	35
	36K	41	50
	48K	42	50
	60K	44	60

Indoor Unit Wiring & Electrical Specifications (for units without optional electric heat kit)

				BRANCH CIRCUIT	
Unit Capacity	Volts-Phase	Rated Input Current of Power Conversion Equipment Amps	Minimum Circuit Amps	Minimum Wire Size (AWG*)	Fuse/ Circuit Breaker Amps
24K	208/230-1	3.0	4.0	14#	15.0
36K	208/230-1	4.0	5.0	14#	15.0
48K	208/230-1	6.0	7.5	14#	15.0
60K	208/230-1	7.0	9.0	14#	15.0

*** Use copper wire only to connect the unit. If anything other than uncoated (non-plated) 75°C copper wire (solid wire for 10 AWG and smaller, stranded wire for larger than 10 AWG) is used consult the applicable tables of the National Electric Code (ANSI/NFPA 70).**

NOTE

- **If branch circuit wire length exceeds 100 ft, consult NEC 210-19a to determine maximum wire length. Use a 2% voltage drop.**
- **If the unit is to have an electric heat kit installed (optional), please refer to the Installation of Air Handler Heat Kit section of manual for more detailed information regarding the electrical specifications.**

Air Switch Diagram

Air switch diagram (shown with optional electric heat kit)

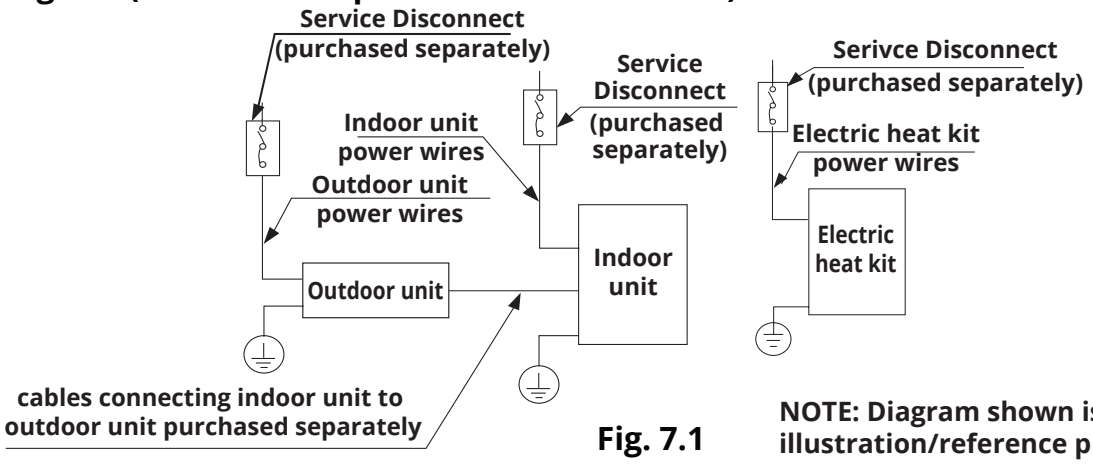


Fig. 7.1

NOTE: Diagram shown is for illustration/reference purposes only.

NOTE ON AIR SWITCH

- **When the maximum current of the air conditioner is more than 16A, a service disconnect with protective device shall be used (purchased separately). Refer to Fig. 7.1.**

Systems in the North American market should be wired according to NEC & CEC requirements and state & local regulations.

Please note that units that are equipped with an optional heat kit, the heat kit uses a power supply that is independent of the power supply of the air handler & blower. This power supply may also require an air switch as well. Please be aware of this when wiring the heat kit.

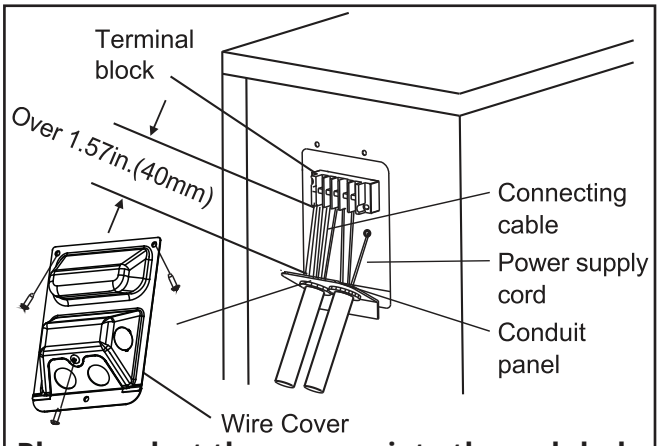
Outdoor Unit Wiring

The wiring and other electrical components (insulation or conduit) to connect the indoor and outdoor units must be purchased separately. Please refer to the beginning of **Electrical Connections** section of the manual for wiring specification guidelines. Follow the steps below to wire the outdoor condenser. **NOTE: For more detailed illustrations of the different variations of wiring connections, depending on your specific application, please refer to the wiring diagrams further in this section of the manual.**

1. Prepare the cables for connection.
   a. Select the correct cable size based on the unit being installed. Ensure to size each wire used so that is several inches longer than the required length for wiring. This will allow for some slack and prevent the wire from being under tension.
   b. Using wire strippers, strip the jacket from each end of the cable to reveal approximately 6 in (15 cm) of wire.
   c. Strip the insulation from the ends of the wire.
   d. Stranded wire requires u-lugs or ring terminals to be crimped onto the ends of the wire.
2. Remove the 3 screws from the electrical wiring cover on the outdoor condenser. Then, remove the cover, as shown in the image below.
   NOTE: Wiring connections must strictly follow the diagram found inside the wiring cover.

NOTE ON CABLE RECOMMENDATIONS

The type of cable that is selected to wire the indoor and outdoor unit are based on local electrical codes and regulations. The recommended gauge (AWG) of the cables used should be based the Minimum Circuit Ampacity (MCA) and Maximum Overcurrent Protection (MOP) ratings. These are indicated on the nameplate of the outdoor unit and listed in the tables at the beginning of this section of the manual.



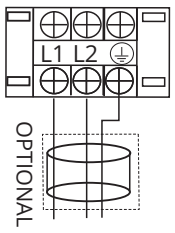
Please select the appropriate through-hole according to the diameter of the wire.

Outdoor Unit Wiring

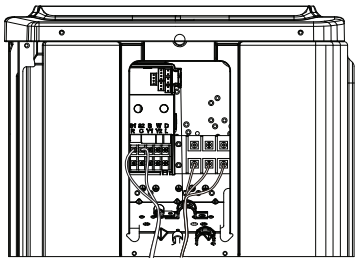
WARNING

The risk of electric shock can cause injury or death. Disconnect all remote electric power supplies before servicing.

3. Remove the caps on the conduit panel.
4. Mount the conduit tubes (not included, purchased separately) onto the conduit panel.
5. Properly connect the wiring by securely fastening the u-lug or ring terminal of each wire to the corresponding terminal on the terminal block as shown below.



Outdoor Unit Wiring for Condenser



Outdoor Unit

WARNING

Isolate the power wires and communication wires by the strain relief and ensure they have enough slack. Keep them separated and *DO NOT* allow them to intertwine. If this occurs it could create interference and cause the unit to malfunction.

6. Ensure the unit is properly grounded in accordance with any and all state and local codes.
7. Ensure all wiring is properly insulated and protected in accordance with any and all state and local codes.
8. Then, reinstall the electrical wiring cover by positioning it into place and reinstalling the screws. Once complete, route the indoor unit wiring to the air handler.

Indoor Unit Wiring

1. Prepare the cables for connection.
   a. Using wire strippers, strip approximately 6 inches (15 cm) of the outside rubber jacket.
   b. Once rubber jacket section is removed, strip the same length of interior insulation from the end of the wire.
2. Open the front panel of the indoor unit. Then, using a screwdriver, remove the cover of the electric control box of the indoor unit.
3. Route and thread the power and communication cables through the wire outlet.
4. Properly connect the wiring by securely fastening the u-lug or ring terminal of each wire to the corresponding terminal on the terminal block. Refer to the unit serial number and the wiring diagram located on the electric control box cover (**Fig. 7.2**). **NOTE: For more detailed illustrations of the different variations of wiring connections, depending on your specific application, please refer to the wiring diagrams on pages 47-50.**
5. Clamp down the cable with the cable clamp. The cable must not be loose or pull on the u-lugs.

WARNING

Isolate the power wires and communication wires and keep them separated to ensure they *DO NOT* intertwine as this could cause the unit to malfunction.

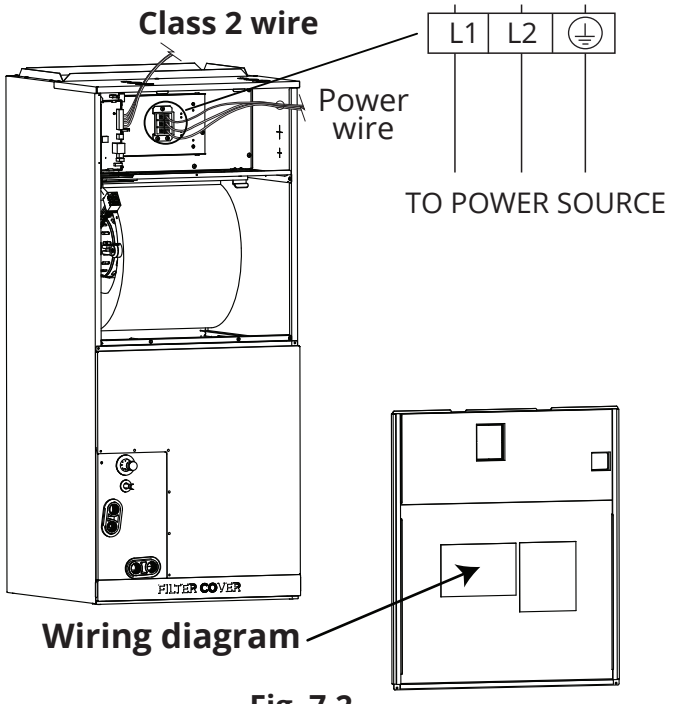


Fig. 7.2

CAUTION

- **While connecting the wires, strictly follow the wiring diagram.**
- **The refrigerant circuit can become very hot. Keep all wiring and cables away from the copper piping.**

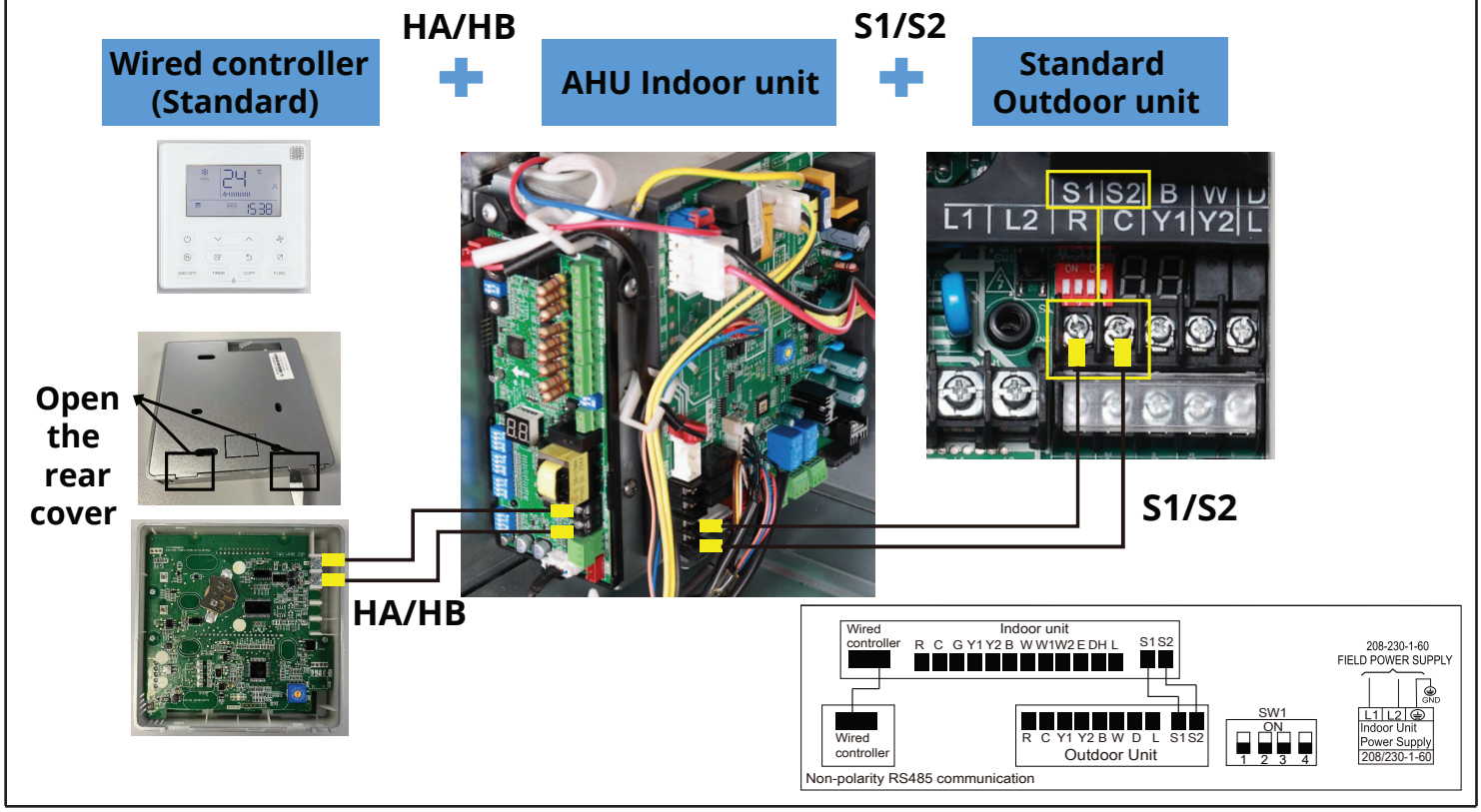
Wiring Diagrams & Connection Methods

The wiring diagrams below and on the following pages show the proper wiring and DIP switch settings (for indoor and outdoor units) depending upon your application and the type of thermostat used (standard wired controller or 24V thermostat).

Scenario	Controller	Indoor Unit	Connection between indoor & outdoor units	Outdoor Unit	AHU DIP switch		ODU DIP switch
					SW1-1	SW1-4	S1-2
Scenario 1 (Recommended)	Wired controller (Standard)	Air handler	RS485: S1/S2	Standard outdoor unit	OFF (Default)	OFF (Default)	OFF (Default)
Scenario 2	24V Thermostat	Air handler	RS485: S1/S2	Standard outdoor unit	ON	OFF (Default)	OFF (Default)
Scenario 3	24V Thermostat	Air handler	24V: R/C/B/Y1/Y2/G/W	Standard outdoor unit	ON	ON	ON
Scenario 4	24V Thermostat	Air handler	24V: R/C/B/Y1/Y2/G/W	Third party outdoor unit	ON	ON	n/a

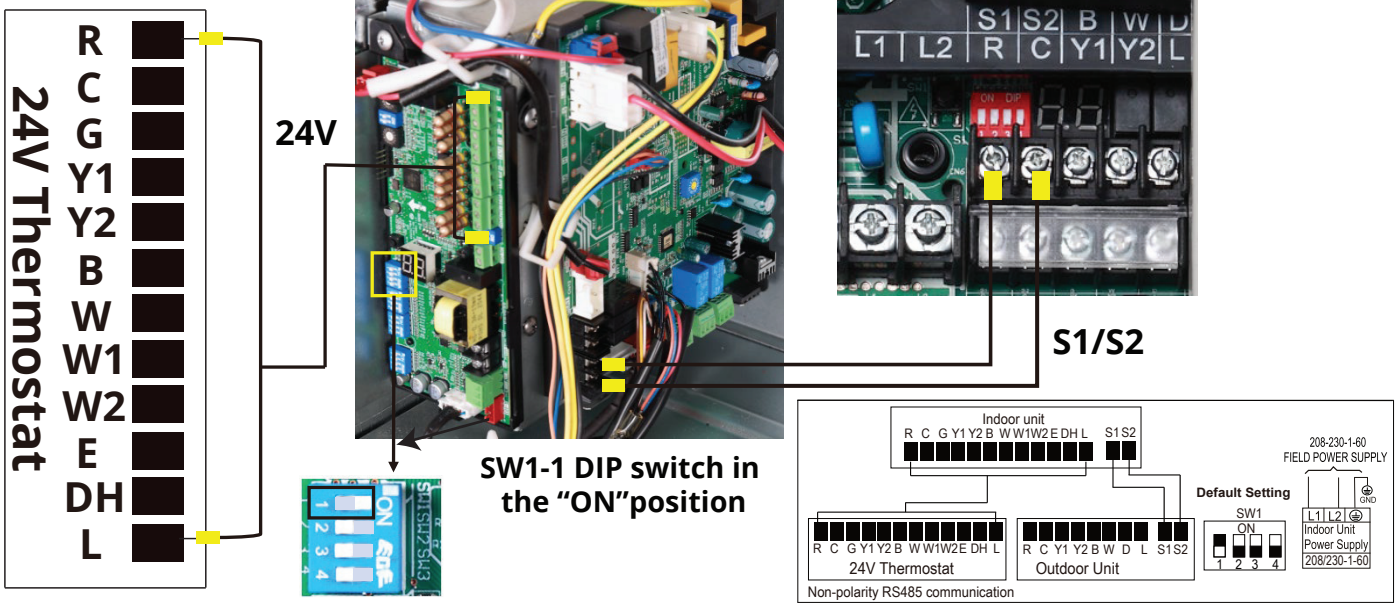
NOTE: Adjust dip switch settings before powering on the unit.

Scenario 1: Standard & Recommended



Scenario 2:

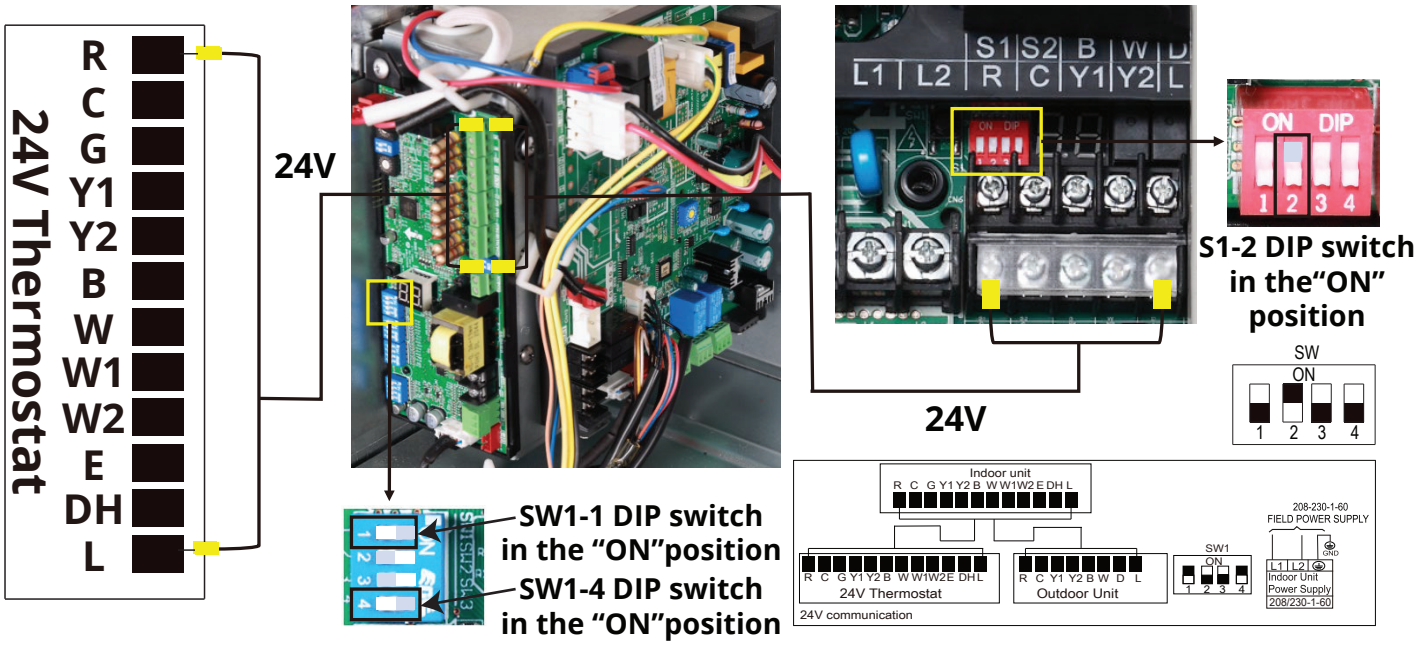
24V Thermostat + 24V AHU Indoor unit + S1/S2 Standard Outdoor unit



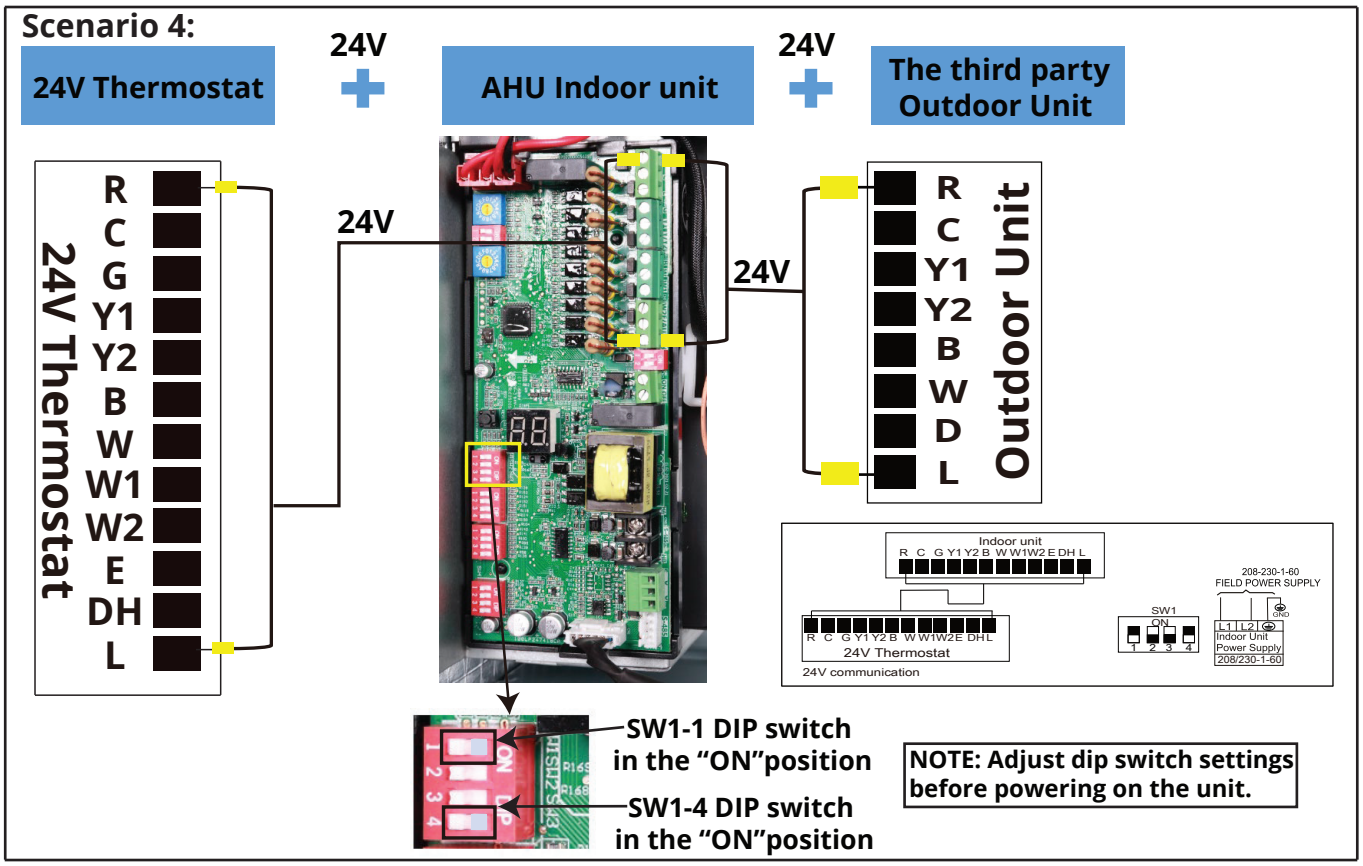
NOTE: Adjust dip switch settings before powering on the unit.

Scenario 3

24V Thermostat + 24V AHU Indoor unit + 24V Standard Outdoor unit



NOTE: Adjust dip switch settings before powering on the unit.



Wiring Diagrams & Connection Methods (Without Communication)

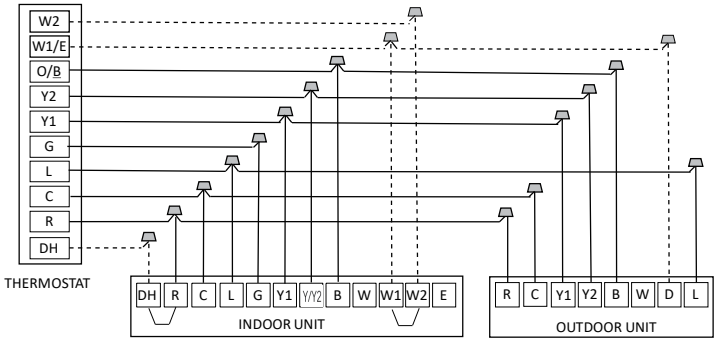
Connection Method C (36K-60K units ONLY):

The following wiring diagrams are suitable for the AHU and outdoor condenser when used with a 24V thermostat without communication.

NOTE

- **This equipment uses B functionality. The terminal is energized for heating functionality. Please ensure thermostat is setup for B functionality.**

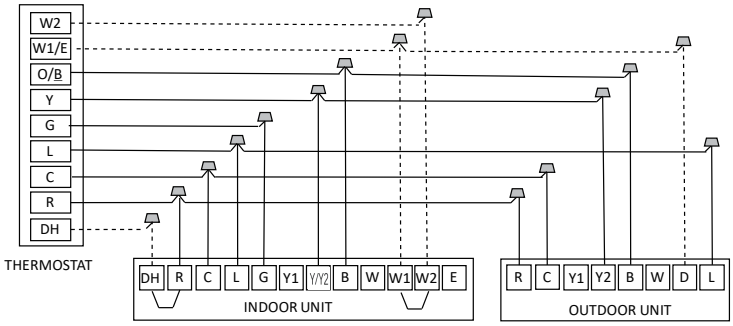
Wiring for 4H and 2C thermostat



S4-2 DIP switch off
Perform disconnection and short-circuit to achieve partition, control or dehumidification

S4-1 DIP switch off
Disconnect and short circuit to realize heating segment

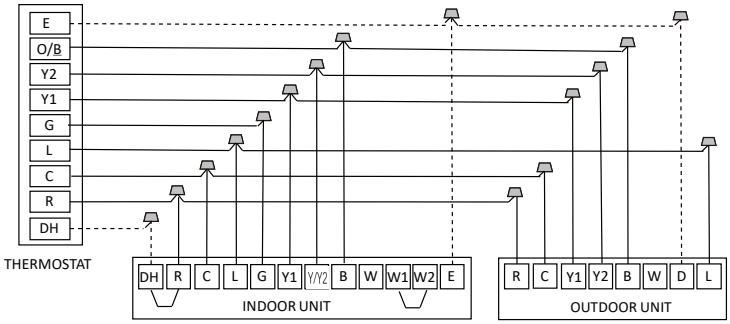
Wiring for 3H and 1C thermostat



S4-2 DIP switch off
Perform disconnection and short-circuit to achieve partition, control or dehumidification

S4-1 DIP switch off
Disconnect and short circuit to realize heating segment

Wiring for 3H and 2C thermostat

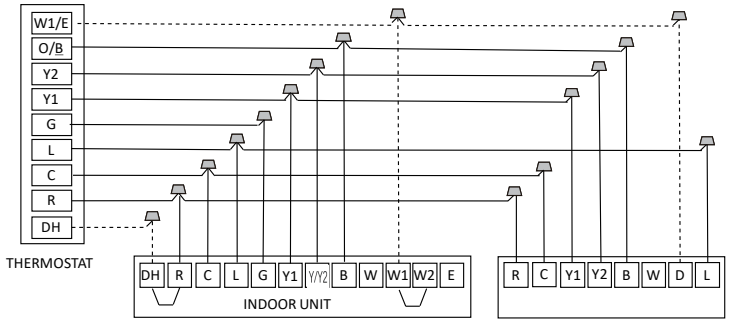


S4-2 DIP switch off
Perform disconnection and short-circuit to achieve partition, control or dehumidification

Emergency heating control two groups of electric heating at the same time

Wiring Diagrams & Connection Methods

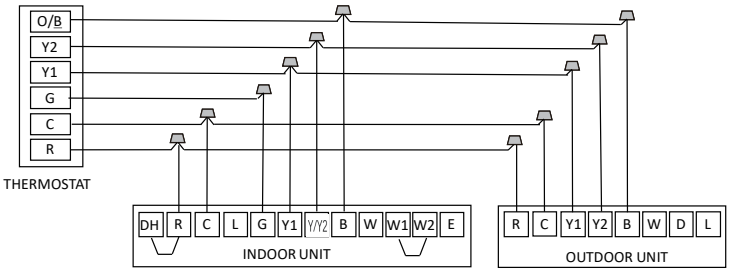
Wiring for 3H and 2C thermostat



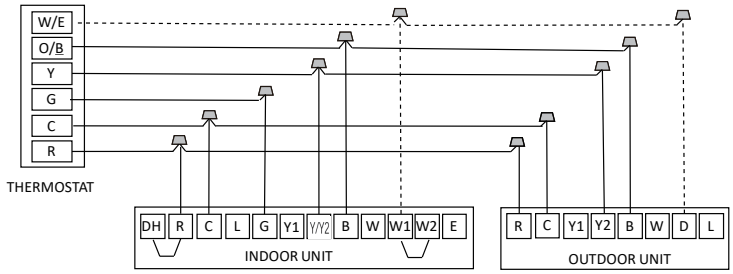
S4-2 DIP switch off
Perform disconnection and short-circuit to achieve partition, control or dehumidification

S4-1 DIP switch off
Disconnect and short circuit to realize heating segment

Wiring for 2H and 2C thermostat

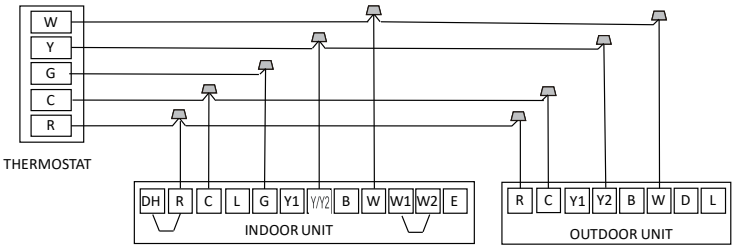


Wiring for 2H and 1C thermostat



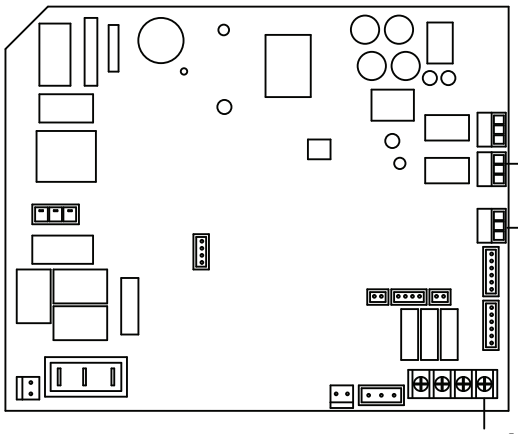
S4-1 DIP switch off
Disconnect and short circuit to realize heating segment

Wiring for 1H and 1C thermostat



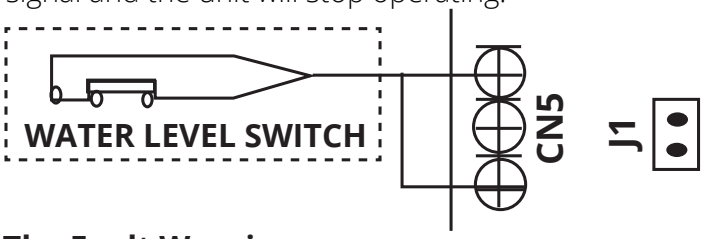
NOTE: This the least preferred method of control wiring and should only be used for emergency situations. Full comfort capacity may not be achieved using this method.

Wiring for Optional Functions

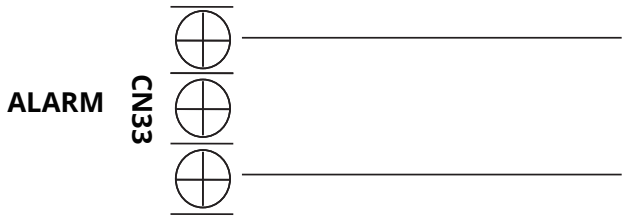


Liquid Level Switch:

This unit has a liquid level detection interface. If you choose to incorporate this function, it will be necessary to purchase a liquid level switch separately, connect it to the CN5 interface, and remove J1. When the water receiving pan is full, the water level switch will become disconnected. Then, the water level switch sends a signal and the unit will stop operating.



The Fault Warning

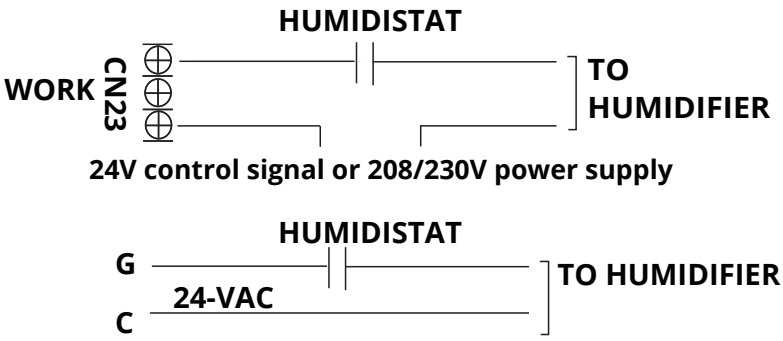


Alarm Output:

An alarm output (CN33) can be utilized if actions are required when a fault is present. This is a passive outlet port, so you will need to input a voltage signal. The relay is normally open during normal operation. It closes when a fault condition is active.

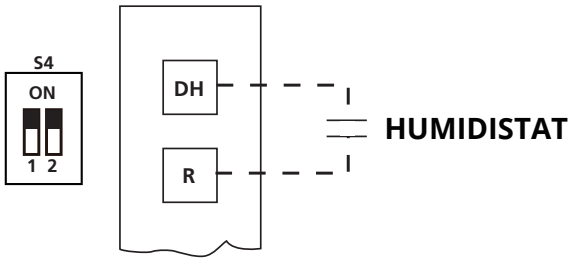
Wiring for Optional Functions (cont'd)

Humidification Control Wiring:



To connect a humidifier, utilize the passive signal "WORK" output (CN23) port, as well as the G and C wires on the controller, and wire the humidistat and humidifier per the above wiring diagram. When the fan is running, the CN23 relay will be closed which will allow power to be routed to the humidifier when the humidistat is below the humidity setpoint. If the thermostat or zone controller has a HUM interface, connect the humidifier directly to the HUM and C ports.

Dehumidification Control Wiring:



Dehumidification control requires an external humidistat at DH and R. Set the S4-2 dip switch to OFF. When the humidity rises and exceeds the set value of the humidistat, the 24V signal of DH changes to 0V, the cooling system then begins the dehumidification operation, and the air volume drops to 80% of the nominal cooling air volume.

Control Logic

Indoor Unit Connector

Connector	Purpose
R	24V Power Connection
C	Common
G	Fan Control
Y	Low Cooling
Y/Y2	High Cooling
B	Heating Reversing Valve
W	Heating Control
W1	Stage 1 Electric Heating
W2	Stage 2 Electric Heating
E/AUX	Emergency Heating
DH/DS/BK	Dehumidification/Zoning Control
L	System Fault Error

Outdoor Unit Connector

Connector	Purpose
R	24V Power Connection
C	Common
Y1	Low Cooling
Y2	High Cooling
B	Heating Reversing Valve
W	Heating Control
D	Defrost Heat
L	System Fault Error

LED Display

The control displays unit status as well as any active fault codes on the LED display. If the unit is functioning normally, the LED will display the current temperature setpoint. Or, if a 24V thermostat is used, a functional display code from the table on the following page will be shown. When a fault code is active, the display will flash the active code.

Please refer to the fault code table located in the troubleshooting section of the Service Manual for more detailed fault code information.

Functional Display

Mode	Priority	G	Y1	Y/Y2	B	W	W1	W2	E/AUX	DH/DS/BK	Display
Shut down	/	0	0	0	0	0	0	0	0	*	00
Fan	7	1	0	0	0	0	0	0	0	1	01
Fan		1	0	0	0	0	0	0	0	0	
Cooling	6	*	1	0	0	0	0	0	0	1	02
Cooling 2		*	*	1	0	0	0	0	0	1	03
Dehumidification 1		*	1	0	0	0	0	0	0	0	04
Dehumidification 2		*	*	1	0	0	0	0	0	0	05
Heating 1	5	*	1	0	1	0	0	0	0	1	06
Heating 2		*	*	1	1	0	0	0	0	1	07
Heating 2		*	*	*	*	1	0	0	0	1	
Electric heating 1	3	*	0	0	0	0	1	0	0	*	08
Electric heating 1		*	0	0	0	0	0	1	0	*	
Electric heating 2		*	0	0	0	0	1	1	0	*	09
Heating 1 + electric heating 1	4	*	1	0	1	0	1	0	0	1	10
Heating 1 + electric heating 1		*	1	0	1	0	0	1	0	1	
Heating 2 + electric heating 1		*	*	1	1	0	1	0	0	1	
Heating 2 + electric heating 1		*	*	*	*	1	1	0	0	1	
Heating 2 + electric heating 1		*	*	1	1	0	0	1	0	1	
Heating 2 + electric heating 1		*	*	*	*	1	0	1	0	1	
Heating 1 + electric heating 2		*	1	0	1	0	1	1	0	1	11
Heating 2 + electric heating 2		*	*	1	1	0	1	1	0	1	
Heating 2 + electric heating 2		*	*	*	*	1	1	1	0	1	
Emergency heating	1	*	*	*	*	*	*	*	1	*	12
Heating zone control	2	*	1	0	1	0	*	*	0	0	13
Heating zone control		*	*	1	1	0	*	*	0	0	
Heating zone control		*	*	*	*	1	*	*	0	0	

NOTES:
- 1 = signal, 0 = no signal
- The terminal input signal is stable for 1 second before confirmation.

DIP Switch Definitions

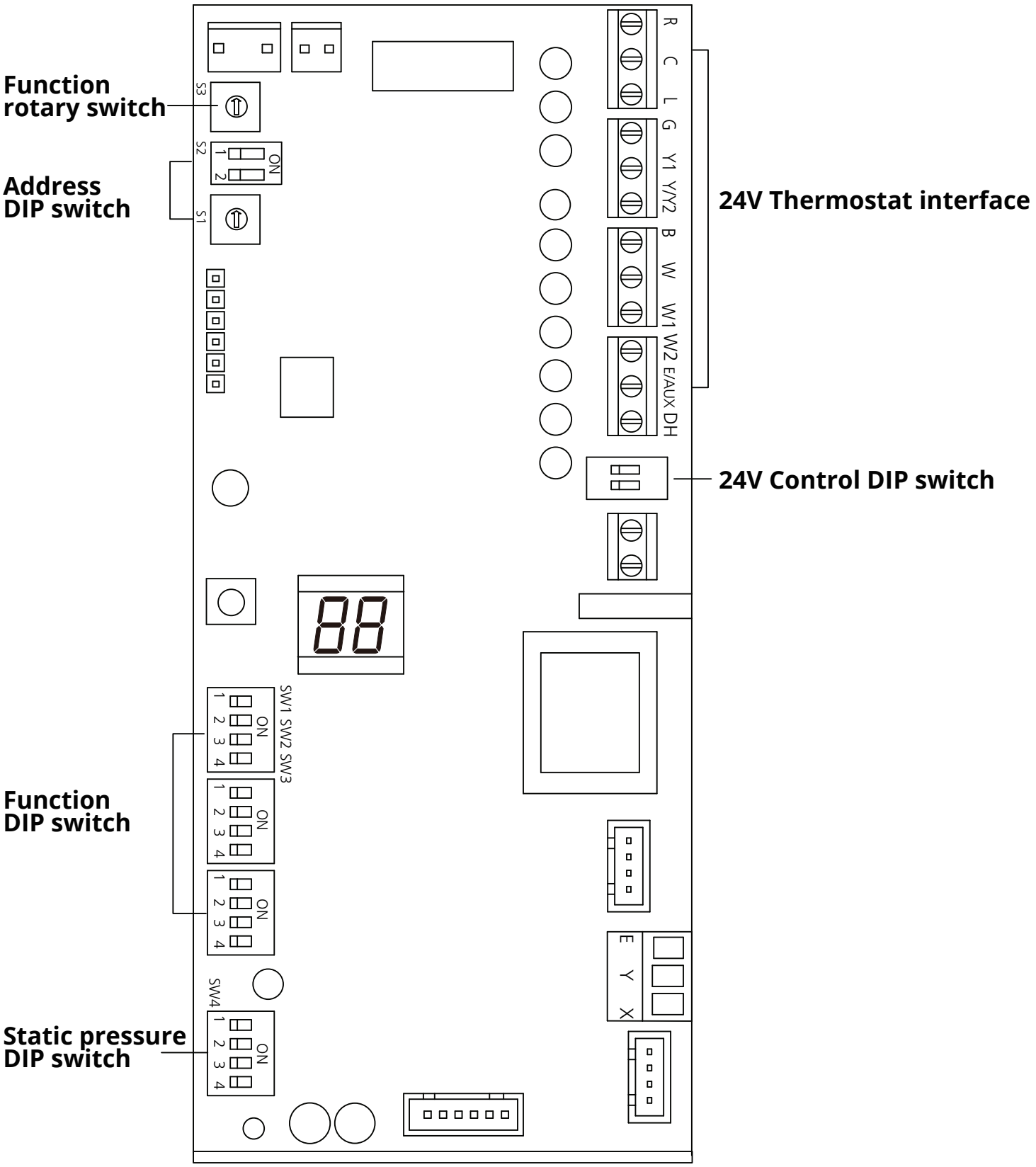
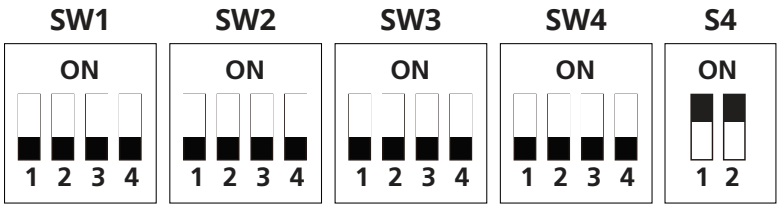


Fig. 7.3

Function DIP Switch Settings

The 24V thermostat mode needs to refer to the following DIP switch settings.



SW4-1	• 000 is the default
SW4-2	• 000/001/010/011/100/101/110/111, internal machines with different abilities, electric heating and PSC classification for use
SW4-3	

NOTE: The SW4 DIP switch is only for use by certified service technicians for the purpose debugging and adjusting the system, please *DO NOT* touch it.

Indoor Unit Dial Code

NO.	Dial code	Features	ON	OFF
1	SW1-1	Whether 24V thermostat is used or not.	YES	NO
2	SW1-2	Anti-cold blow protection option.	NO	YES
3	SW1-3	Single cooling/heating and cooling options.	Cooling	Cooling & Heating
4	SW1-4	Stand alone indoor unit or full system.	Indoor unit only	Full system
5	SW2-1	First stage auxiliary heating.	1.8°F (1°C)	3.6°F (2°C)
6	SW2-2	Electric heat on delay.	30 minutes	15 minutes
7	SW2-3	Electric auxiliary heating delay to start time.	YES	NO
8	SW2-4	Compressor / Auxiliary heat outdoor ambient lockout.	The heater will not operate if the outdoor temperature is greater than the temperature set by S3.	The compressor will not operate if the outdoor temperature is lower than the temperature set by S3.
9	SW3-1	Maximum continuous runtime allowed before system automatically stages up capacity to satisfy set point. This adds 32.9 to 37.4°F (0.5 to 3.0°C) to the user set point in the calculated control point to increase capacity and satisfy user set point.	30 minutes	90 minutes.
10	SW3-2	Cooling and heating Y2 temperature differential adjustment.	1.8°F (1°C)	3.6°F (2°C)
11	SW3-3	Temperature differential to activate second stage auxiliary heating.	3.6°F (2°C)	5.4°F (3°C)
12	Rotary Switch S3	Set outdoor temperature limitation (for auxiliary heat or compressor).	0 means that the temperature protection is not turned on, 1-F is -4-46°F (-20-8°C) respectively, and each scale represents 3.6°F (2°C).	
13	S4-1	Default ON.	Short circuit W1 and W2.	W1, W2 separate.
14	S4-2	DH function selection.	DH is off by default.	DH on.

Outdoor Unit DIP Switch Setting

NO.	Dial code	Features	ON	OFF
1	SW-1	Metering device location	Outdoor throttling (normally closed single-way solenoid valve is not powered on).	Indoor throttling(normally closed single-way solenoid valve store).
2	SW-3	Communication setting	24V communication scheme	485 communication scheme
3	SW-3	Strong cold and strong heat function	The cooling/heating target pressure compensation value is valid.	The cooling/heating target pressure compensation value is invalid.
4	SW-4	Function to be defined	———	———

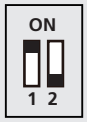
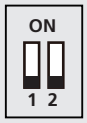
Address DIP Switch

Address dialing S1+S2: When the user uses the centralized controller, the address dialing is required.

Network address: The address silkscreen is NET address, which is composed of a 16-bit address rotary code S2 plus a two-digit DIP switch S1 (set during electrical installation, no network function needs to be set).

- When S2 is 00 (the dialing code is not connected), the address value is the value of S2.
- When S2 is 10 (corresponding to the switch of the hardware connected to the 10K resisitor), the network address value is S2 plus 32.
- When S2 is 01 (corresponding to the dial code of the 5.1K resistor connected to the hardware is turned on), the network address value is the value of S2 plus 16.
- When S2 is 11 (all dialing codes are on), the network address value is the value of S2 plus 48.

Determined by dial code S2 1-10K 2-5.1K

S2 DIP switch selection	Website address
	S2 + 48
	S2 + 32
	S2 + 16
	S2

Air volume table

Model	SW4-1, 2, 3, setting (default) Air Volume (CFM)	001 Air Volume (CFM)	010 Air Volume (CFM)	011 Air Volume (CFM)	NOTES
24K	880	850	830	800	The airflow DIP switch can only change the air volume when the electric heat is turned on, and the unit cooling & heating air volume remains unchanged. If the DIP switch setting is incorrect, the default airflow will be run.
	15KW	8KW, 15KW	8KW, 10KW	5KW	
36K	1320	1255	1190	1125	
	20KW	15KW	8KW, 10KW	5KW, 8KW	
48K	1760	1675	1580	1490	
	20KW	10KW, 15KW	8KW, 10KW	8KW	
60K	2195	2055	1920	1775	
	- -	15KW, 20KW	10KW, 15KW	10KW	

High, medium and low air volume parameters

24K			36K			48K			60K		
Fan speed	Static pressure (Pa/in WC)	Air volume (CFM)	Fan speed	Static pressure (Pa/in WC)	Air volume (CFM)	Fan speed	Static pressure (Pa/in WC)	Air volume (CFM)	Fan speed	Static pressure (Pa/in WC)	Air volume (CFM)
Low	0/0	598	Low	0/0	879	Low	0/0	946	Low	0/0	1151
	25/0.1	613		25/0.1	883		25/0.1	943		25/0.1	1133
	37/0.15	625		37/0.15	888		37/0.15	942		37/0.15	1136
	50/0.2	630		50/0.2	892		50/0.2	948		50/0.2	1132
	75/0.3	632		75/0.3	893		75/0.3	947		75/0.3	1128
	100/0.4	635		100/0.4	893		100/0.4	940		100/0.4	1134
	125/0.5	631		125/0.5	892		125/0.5	940		125/0.5	1130
	150/0.6	624		150/0.6	890		150/0.6	933		150/0.6	1133
	200/0.8	614		200/0.8	873		200/0.8	925		200/0.8	1126
	250/1.0	624		250/1.0	826		250/1.0	925		250/1.0	1118
Mid	0/0	692	Mid	0/0	1010	Mid	0/0	1155	Mid	0/0	1367
	25/0.1	690		25/0.1	1001		25/0.1	1156		25/0.1	1358
	37/0.15	685		37/0.15	1001		37/0.15	1154		37/0.15	1362
	50/0.2	695		50/0.2	1000		50/0.2	1154		50/0.2	1361
	75/0.3	693		75/0.3	995		75/0.3	1143		75/0.3	1360
	100/0.4	692		100/0.4	995		100/0.4	1147		100/0.4	1352
	125/0.5	688		125/0.5	996		125/0.5	1149		125/0.5	1353
	150/0.6	684		150/0.6	983		150/0.6	1143		150/0.6	1348
	200/0.8	670		200/0.8	996		200/0.8	1140		200/0.8	1340
	250/1.0	654		250/1.0	969		250/1.0	1113		250/1.0	1316
High	0/0	752	High	0/0	1137	High	0/0	1325	High	0/0	1608
	25/0.1	746		25/0.1	1123		25/0.1	1328		25/0.1	1590
	37/0.15	750		37/0.15	1119		37/0.15	1337		37/0.15	1586
	50/0.2	756		50/0.2	1120		50/0.2	1337		50/0.2	1560
	75/0.3	750		75/0.3	1112		75/0.3	1330		75/0.3	1561
	100/0.4	746		100/0.4	1111		100/0.4	1333		100/0.4	1554
	125/0.5	741		125/0.5	1113		125/0.5	1338		125/0.5	1549
	150/0.6	745		150/0.6	1101		150/0.6	1335		150/0.6	1545
	200/0.8	735		200/0.8	1094		200/0.8	1321		200/0.8	1543
	250/1.0	714		250/1.0	1088		250/1.0	1321		250/1.0	1548