

ComfortStar[®]

Technical Manual

R410A 60Hz 14SEER Side-Discharge Outdoor Unit

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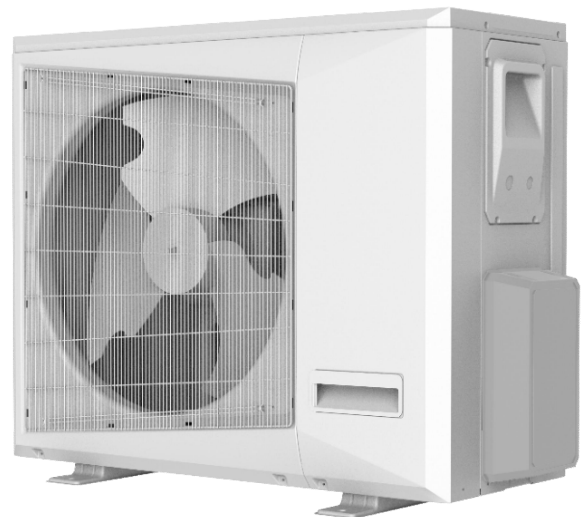
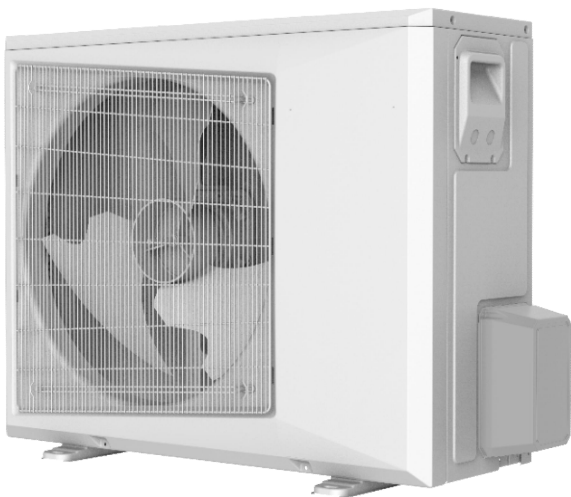
R410A 60Hz 14SEER Side-Discharge Outdoor unit

PART I .General Information

1. Model Names of Outdoor Units

Model name	Packing Dimension (W×H×D) (mm)	Net/Gross weight(kg)	Power supply
CHD12CA-14	915×380×600	34.5/37	115V/60Hz/1Ph
CHD18CD-14	975×420×770	48/52	208~230V/60Hz/1Ph
CHD24CD-14	1075×495×875	57/61.5	208~230V/60Hz/1Ph
CHD30CD-14	1075×495×875	64/69	208~230V/60Hz/1Ph
CHD36CD-14	1075×495×890	64/69	208~230V/60Hz/1Ph
CHD48CD-14	1145×545×1015	90/105	208~230V/60Hz/1Ph

2. External Appearance



3. Features

➤ **Operation Features:**

- (1) Long Piping & Cost Effective
- (2) Low noise operation, as low as 52dB(A)
- (3) 24V communication Protocol, it's much safer than others and easier to connect to IDU.

➤ **Performance Features:**

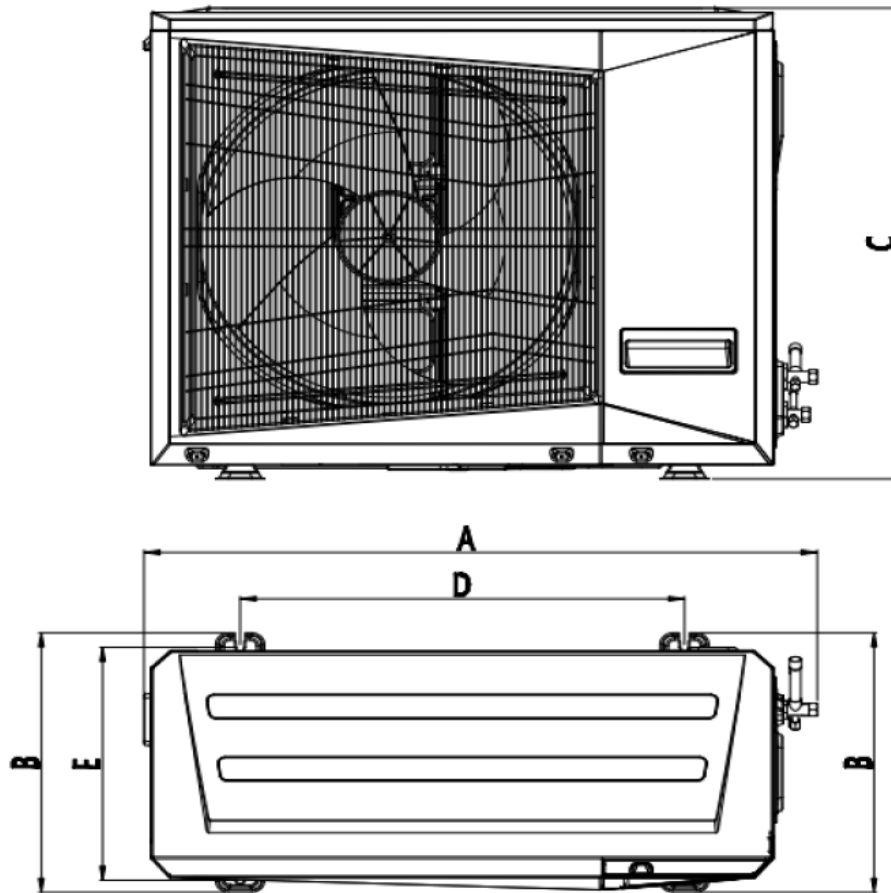
- (1) AHRI Certified & ETL listed.
- (2) R410A environment friendly refrigerant.
- (3) Wide operation temperature range: 65⁰F-109⁰F; Heating: 39⁰F-75⁰F.
- (4) AC/DC motors are adopted (12/18/24/30K: AC motor; 36/48K: DC motor).
- (5) Well-known brand fixed compressor (GMCC, HITACHI , LG) with reliable quality.
- (6) Continuous Cooling Transformation Inner-grooved tube has high thermometric conductivity.

➤ **Reliability Features:**

- (1) Concealed stop valve design.
- (2) Painted galvanized steel cabinet.
- (3) Safe and reliable famous compressor.
- (4) Multi protections to avoid unit broken.
- (5) Service window to check the operation states.
- (6) Refrigerant cooling PCB to increase the PCB life.

PART II .Outdoor unit

1. Dimensions

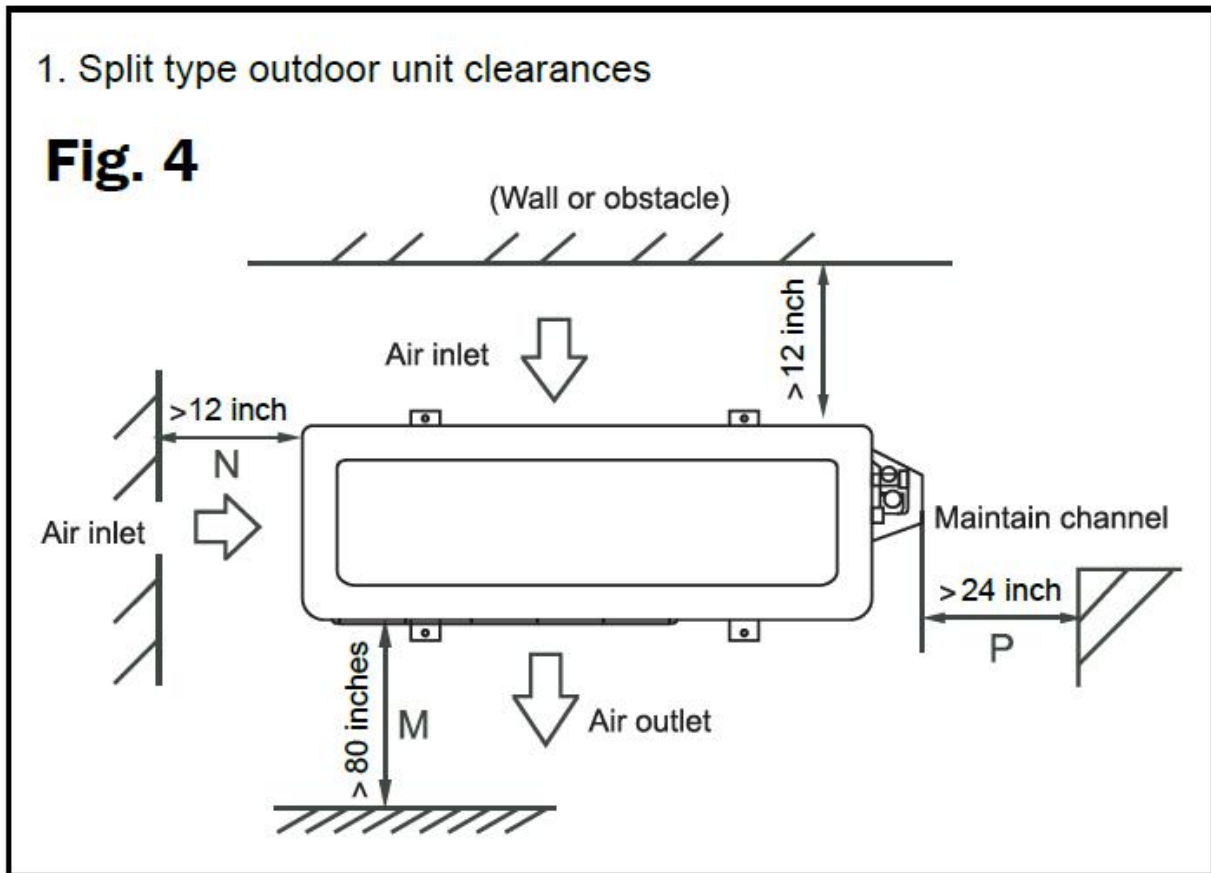


Applicable for 12-48K

Units in inches

MODEL	A	B	C	D	E
12K	33.5	13.6	21.9	20.0	11.0
18K	36.0	15.0	27.6	21.4	12.8
24K/30K/36K	40.0	17.5	31.9	26.4	15.2
48K	43.3	20.8	34.3	25.0	17.4

2. Service Space

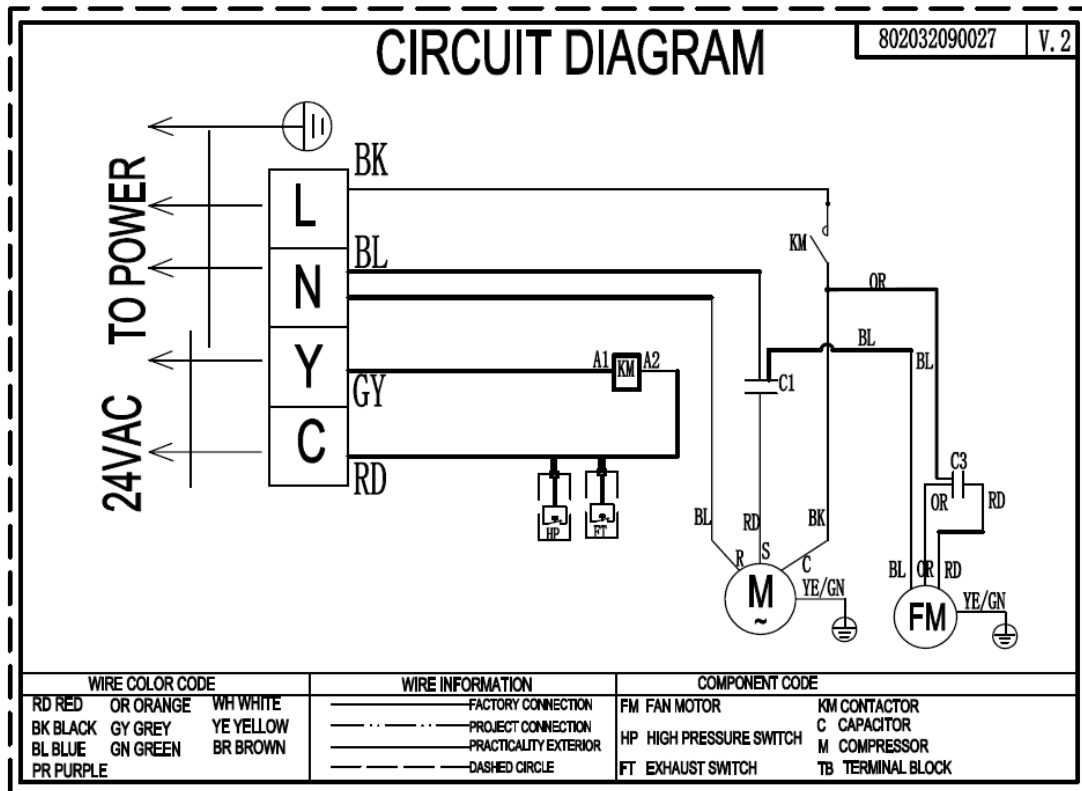


Ens

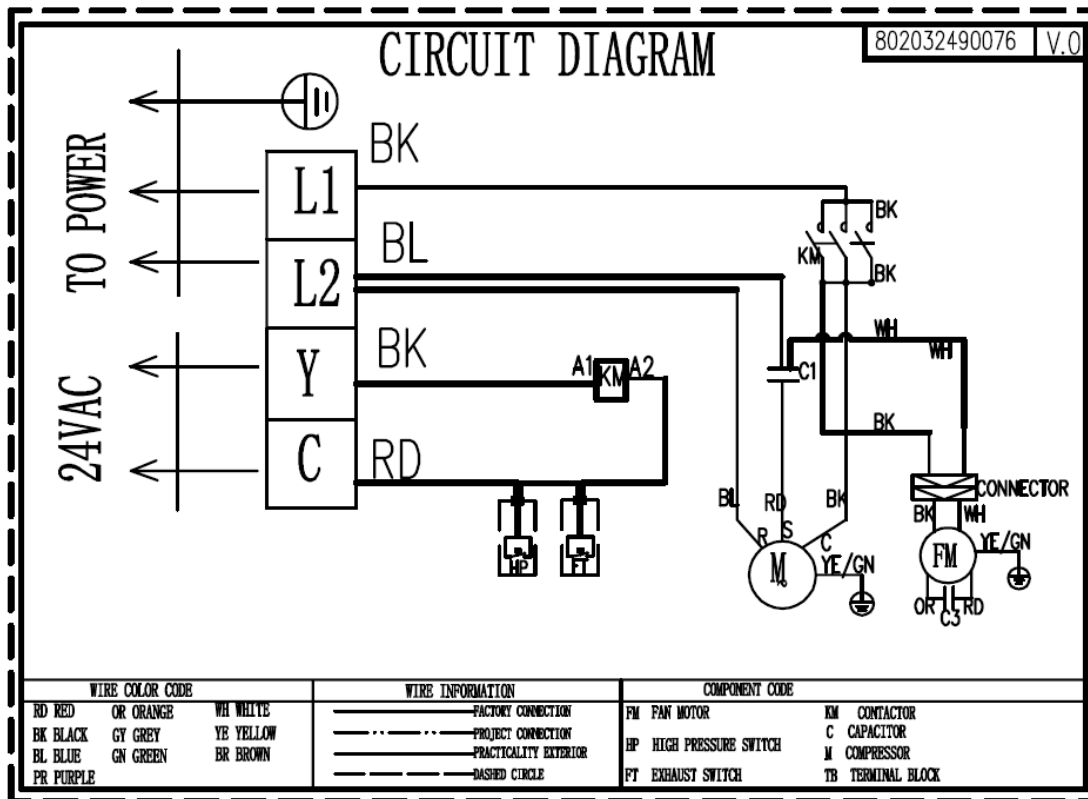
ure that there is sufficient clearance around the unit for installation and maintenance. Clearance must be maintained to ensure that air inlets and outlets are not obstructed.

3. Wiring Diagrams

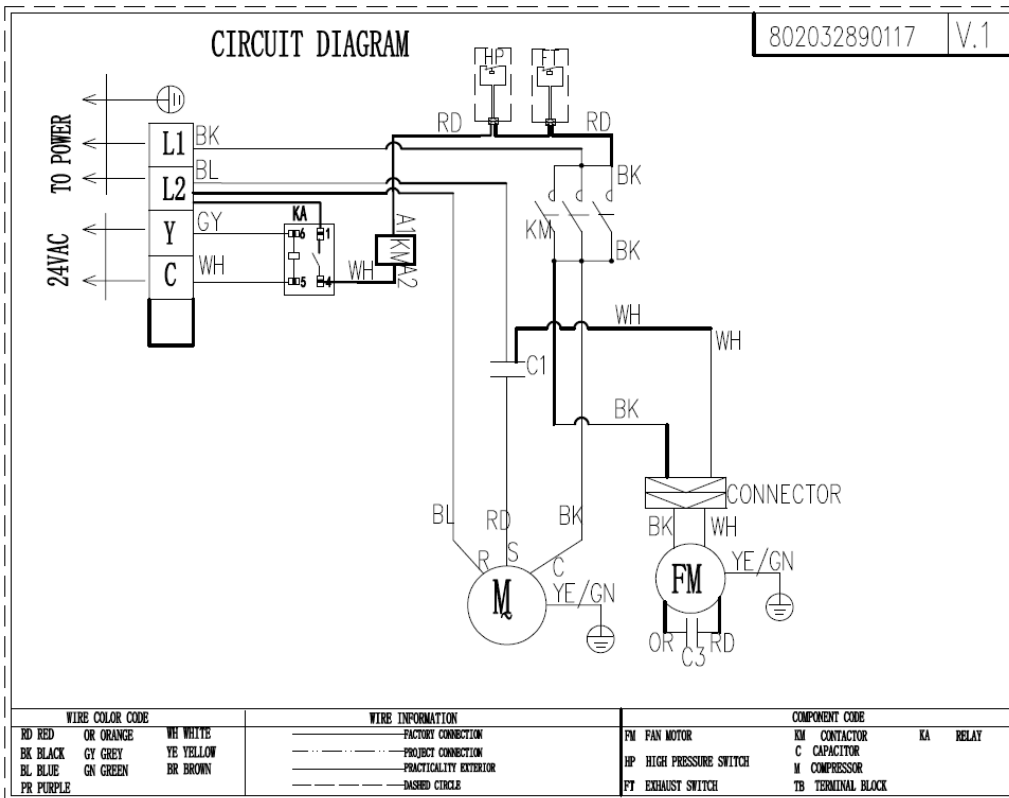
(1) CHD12CA-14



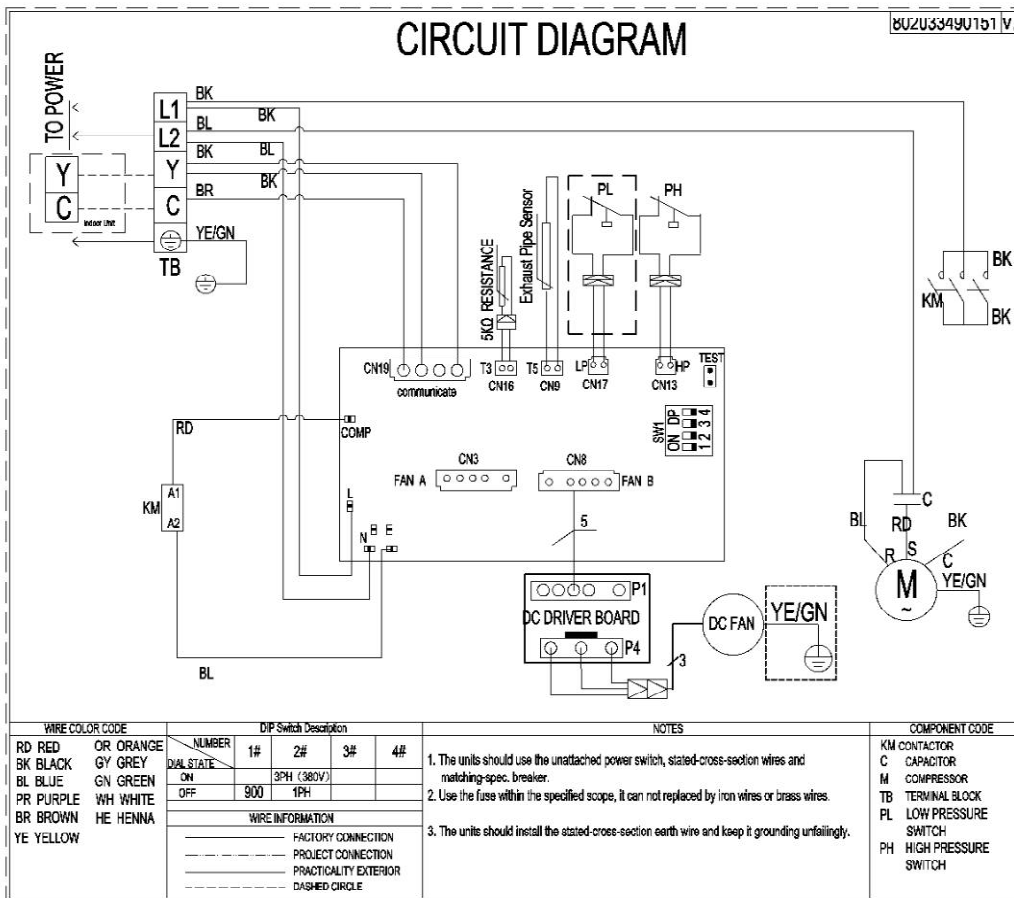
(2) CHD18CD-14



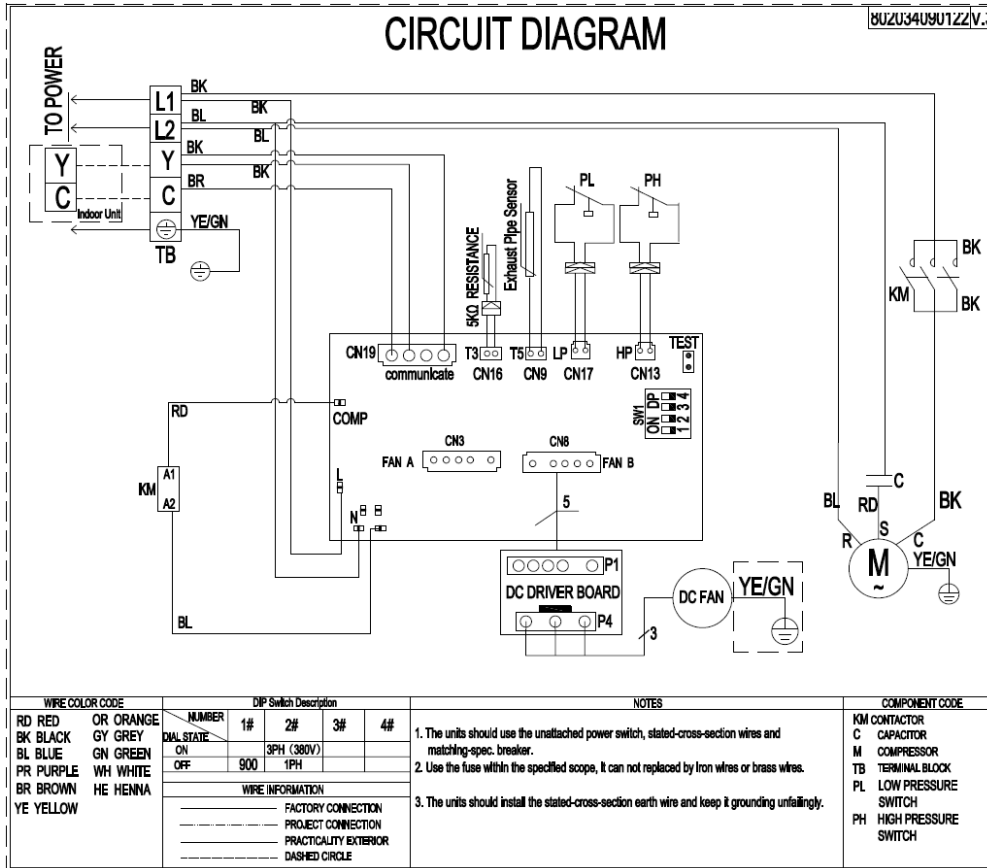
(3) CHD24CD-14 & CHD30CD-14



(4) CHD36CD-14



(5) CHD48CD-14



4. Electric characteristics

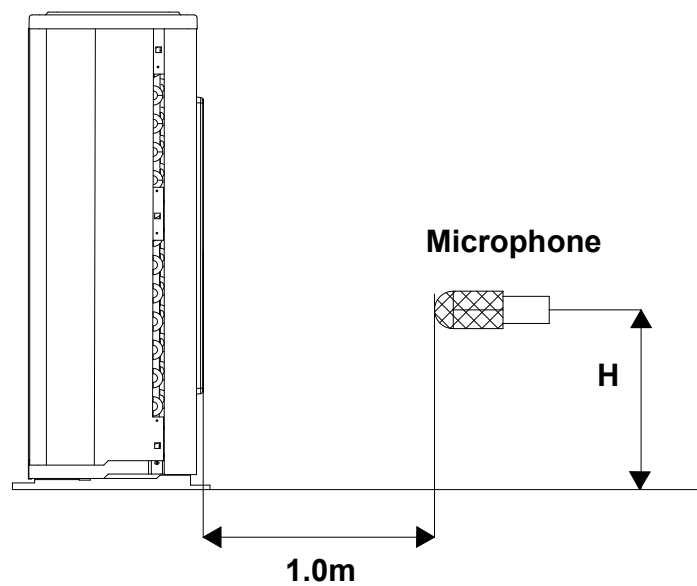
Model	Indoor Units			
	Hz	Voltage	Min.	Max.
CHD12CA-14	60	115V	108	120
CHD18CD-14	60	208-230V	198	254
CHD24CD-14	60	208-230V	198	254
CHD30CD-14	60	208-230V	198	254
CHD36CD-14	60	208-230V	198	254
CHD48CD-14	60	208-230V	198	254

5. Operation Limit

Heat Controller Condensing units are designed to operate in cooling at outside temperatures between 65°F (18°C) and 109°F (43°C). If the condensing unit will be used to cool at temperatures below 65°F (18°C), a low ambient control must be field installed. Operation below 65°F (18°C) without low ambient control will void the warranty.

6. Sound Levels

Outdoor Unit



Note: $H = 0.5 \times (\text{height of outdoor unit})$

Model	Noise level dB(A)
12K	52
18K	56
24K	58
30K	58
36K	58
48K	60

Part III Installation

1. Precaution on Installation

NOTE:

- (1) This equipment must be properly grounded and installed with and ground leakage current breaker, otherwise it may cause electrical shock.
- (2) Do not install the unit in place where leakage of flammable gas may occur. If gas leaks and accumulates near or surroundings the unit, it may cause fire.
- (3) Carry out drainage piping as mentioned in installation instructions. If drainage is not properly done, water may enter the room and damage the furniture.
- (4) For electrical work, follow all local and National electrical codes and these installation instructions. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or a defect found in electrical work, it may cause electrical shock or fire.
- (5) Use specified cable, connect tightly and clamp the cable so that no external force will be acted on the terminal. If connection is loose, it may cause excessive heat build-up.
- (6) Wiring routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause heat build-up at connection point of terminal, fire or electrical shock.
- (7) When carrying out piping connection, take care not to let air substances other than the specified refrigerant go into refrigeration circuit. Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.
- (8) Do not modify the length of the power supply cord or use an extension cord, and do not share the single outlet with other electrical appliances. Otherwise, it may cause fire or electrical shock.

1.1. Measure the necessary length of the connecting pipe, and make it by the following way:

- a. Connect the indoor unit at first, then the outdoor unit.
- b. Bend the tubing in proper way. Do not harm them.

Pipe gauge	Tightening torque	Flare dimension A		Flare shape
		Min (mm)	Max	

Φ6.4	15~16N.m (153~163 kgf.cm)	8.3	8.7	
Φ9.5	25~26N.m (255~265kgf.cm)	12.0	12.4	
Φ12.7	35~36N.m (357~367kgf.cm)	15.4	15.8	
Φ15.9	45~47N.m (459~480 kgf.cm)	18.6	19.1	
Φ19.1	65~67N.m (663~684kgf.cm)	22.9	23.3	

CAUTIONS:

- Daub the surfaces of the flare pipe and the joint nuts with frozen oil, and wrench it for 3~4 rounds
- With hands before fasten the flare nuts.

Be sure to use two wrenches simultaneously when you connect or disconnect the pipes.

- The stop value of the outdoor unit should be closed absolutely (as original state). Every time you connect it, first loosen the nuts at the part of stop value, then connect the flare pipe immediately (in 5 minutes). If the nuts have been loosened for a long time, dusts and other impurities may enter the pipe system and may cause malfunction later. So please expel the air out of the pipe with refrigerant before connection.
- Expel the air after connecting the refrigerant pipe with the indoor unit and the outdoor unit. Then fasten the nuts at the repair-points.

1.2. Locate the Pipe

- Drill a hole in the wall (suitable just for the size of the wall conduit), then set on the fittings such as the wall conduit and its cover.
- Bind the connecting pipe and the cables together tightly with binding tapes. Do not let air in, which will cause water leakage by condensation.
- Pass the bound connecting pipe through the wall conduit from outside. Be careful of the pipe allocation to do no damage to the tubing.

1.3. Connect the pipes

1.4. Then, open the stem of stop values of the outdoor unit to make the refrigerant pipe connecting the indoor unit with the outdoor unit in fluent flow.

1.5. Be sure of no leakage by checking it with leak detector or soap water.

1.6. Cover the joint of the connecting pipe to the indoor unit with the soundproof / insulating sheath (fittings), and bind it well with the tapes to prevent leakage.

2. Leak test evacuation & Release of refrigerant

The condensing unit is supplied with R-410a charge sufficient for most matching evaporator units. Charge must be added for interconnecting tubing.

The unit's service valves are shipped in the closed position and should not be opened until final connections and evacuation are completed.

The recommended procedure for leak test, evacuation, and release of refrigerant is outlined below:

- (1). Complete the final piping connections to the indoor and outdoor units using high temperature brazing alloy.
- (2). Connect a charging manifold to the service ports provided at the service valves.
- (3). Pressurize the lines and evaporator with nitrogen and leak check all connections with soap bubbles. Repair as necessary any faulty joints. If brazing is required be sure to **RELEASE THE NITROGEN FIRST**. Re-test as needed.
- (4). Connect a vacuum pump to the manifold center connection, start the pump and open the manifold valves.
- (5). Evacuate to 500 microns or less for a minimum of 30 minutes. Close the manifold valves and shut off the pump. Note the vacuum reading and wait 15 minutes. Take a new vacuum reading. A reading of 800 microns or higher indicates the presence of moisture or a leak.
- (6). Repair as necessary and repeat steps 3, 4 & 5.
- (7). Confirm that manifold valves are closed and disconnect the vacuum pump.
- (8). Remove the caps from the services valves. Open the valves to the fully 'back-seat' position. Replace service valve caps and tighten.

3. Additional Refrigerant Charge

The length of refrigerant lines and the number of bends determine the pressure drop which affects capacity and efficiency of the system and oil return to the compressor. The outdoor unit connections are flare type. Tube size should always be the same diameter as the connections provided at the service valves. Up sizing of lines can result in inadequate oil return to the compressor and excessive refrigerant charge and will void the warranty.

Refrigerant Piping		Model No.					
		12	18	24	30	36	48
Liquid-Gas	In.	1/4-1/2	3/8-5/8	3/8-3/4			
Max.Refrigerant Line Length*	Ft.	82				98	
Max.Elevation Vertical Lift**	Ft.	33				49	

Note: Minimum pipe length must not be less than 15 feet.

Choose a location that places the condensing unit as close to the indoor unit as possible. The maximum separation is dependent on model. Use only clean refrigeration grade tubing. Avoid piping on wet or rainy days. Always keep the tube ends capped until you are ready to make the final connections. Remove burrs from cut ends of tubing. Use tube benders to avoid kinking.

Insulate the suction line with Armaflex or equivalent with a wall thickness of at least 3/8". Support the tubing adequately to avoid sags that can trap oil.

Isolate the tubing so as not to transmit noise to the building structure. Avoid sharp edges that could cut the tubes. Maximum vertical lift (compressor above evaporator) is dependent on model. Trap risers with a 'P' trap every 10 feet.

Caution

- Refrigerant cannot be charged until field wiring has been completed.
- Refrigerant may only be charged after performing the leak test and the vacuum pumping.
- When charging a system, care shall be taken that its maximum permissible charge is never exceeded, in view of the danger of liquid hammer.
- Charging with an unsuitable substance may cause explosions and accidents, so always ensure that the appropriate refrigerant is charged.
- Refrigerant containers shall be opened slowly.
- Always use protective gloves and protect your eyes when charging refrigerant.

The outdoor unit is factory charged with refrigerant. Calculate the added refrigerant according to the diameter and the length of the liquid side pipe of the outdoor unit/indoor unit

R(g) L(m)	D(mm)	φ6.4	φ9.5	φ12.7
		Less than 5m (One-way)	—	—
Added Refrigerant When		30g/m×(L-5)	65g/m×(L-5)	120g/m×(L-5)

Over 5m(One-way)

Remark:

R (g): Additional refrigerant to be charged

L (m): The length of the refrigerant pipe (one-way)

D (mm): Liquid side piping

$$R = T \times (L-25)\text{ft}$$

R(oz): Additional refrigerant to be charged

L(ft): The length of the liquid pipe

T(oz): The quantity of the charged refrigerant per additional foot

MODEL	12	18	24	30	36	48
oz/ft	0.16		0.32			

4. Unit wiring

ELECTRICAL WIRING AND SUPPLY VOLTAGE:

All electrical wiring must be done according to NEC and local codes. Nameplate data indicates the operating voltage, phase, ampacity, maximum over current protection, and min. voltage.

The contractor is to provide an individual branch circuit for over current protection for the unit as required by code. Run power supply wiring through a weatherproof disconnect box and conduit to the unit connection. Disconnects are required to be within sight and easy reach of the unit (usually within 3 feet).

Check the unit wiring diagram for the number of conductors required. Route neatly and protect from sharp edges and damage.

Inadequate wiring and/or improper electrical supply will likely result in failure of the compressor and other electrical components and voids the warranty.

NOTE: The supply voltage must be consistent with the rated voltage of the air conditioner, not to exceed +/- 10%. Ensure the unit is properly grounded.

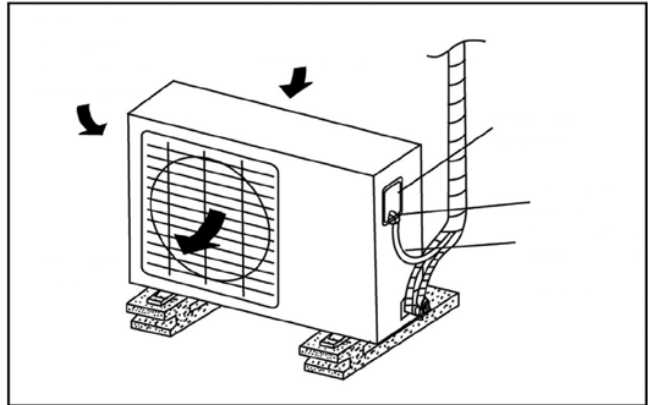
Outdoor unit wiring connection

1. Remove the electrical control cover from the outdoor unit.

2. Connect the cables to the terminals as identified with their respective designated terminal spaces on terminal block of indoor and outdoor units. 600V THHN 14 AWG/4 conductor unshielded stranded copper cable is recommended, however NEC/local codes prevail.
3. To prevent the entrance of water into outdoor unit, form a loop in the cable [See Fig. 6].
4. Insulate any unused conductors with PCV/ Electrical tape, so that they do not touch any other exposed electrical or metal parts.

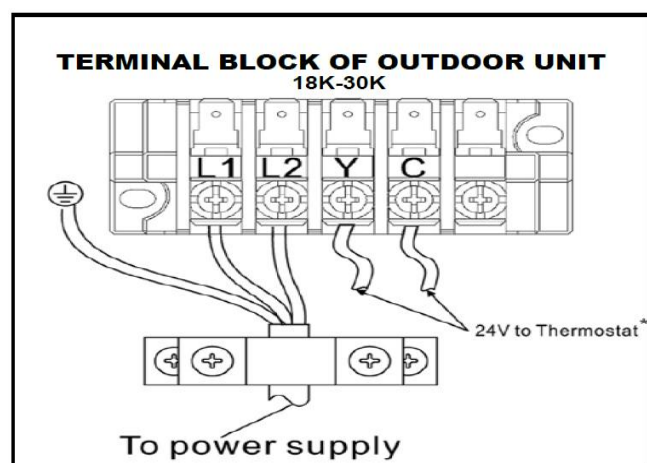
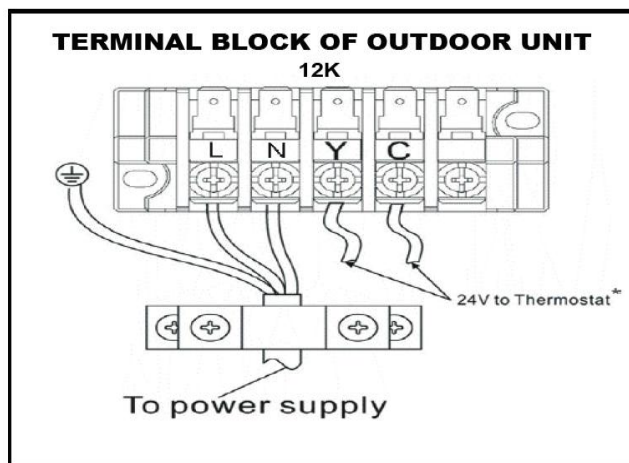
CAUTION

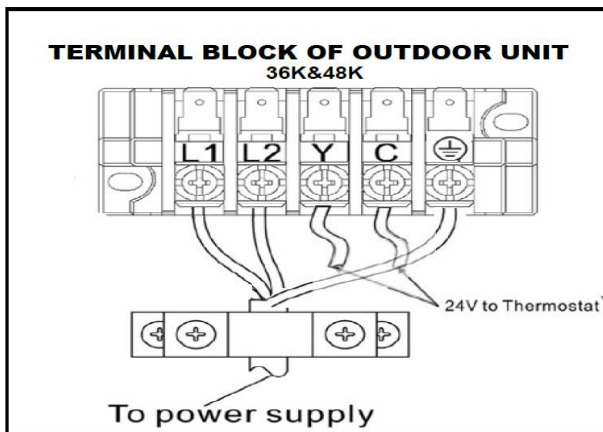
Incorrect wiring connections may cause electrical parts to malfunction. All wiring must comply with local and national electrical codes and be installed by qualified and skilled electricians.



MODEL		12	18	24	30	35	48
POWER (Outdoor)	PHASE	1PHASE	1PHASE	1PHASE	1PHASE	1PHASE	1PHASE
	VOLT	115V	208/230V	208/230V	208/230V	208/230V	208/230V
CIRCUIT BREAKER/FUSE(A)		15	15	15	20	25	40
MINIMUM CIRCUIT AMPACITY(A)		11	10	11.5	14	16	25

OUTDOOR UNIT WIRING CONNECTION





5. Insulation Work

5.1 Insulation material and thickness

5.1.1. Insulation material

Insulation material should adopt the material which is able to endure the pipe's temperature: no less than 70°C in the high-pressure side, no less than 120°C in the low-pressure side (For the cooling type machine, no requirements at the low-pressure side.)

- ◆ Example: Heat pump type----Heat-resistant Polyethylene foam (withstand above 120°C)
Cooling only type----Polyethylene foam (withstand above 100°C)

5.1.2. Thickness choice for insulation material

Insulation material thickness is as follows:

	Pipe diameter (mm)	Adiabatic material thickness
Refrigerant pipe	Φ6.4—Φ25.4	10mm
	Φ28.6—Φ38.1	15mm
Drainage pipe	Inner diameter Φ20—Φ32	6mm

5.2 Refrigerant pipe insulation

5.2.1. Work Procedure

- ① Before laying the pipes, the non-jointing parts and non-connection parts should be heat insulated.
- ② When the gas proof test is eligible, the jointing area, expanding area and the flange area should be heat insulated

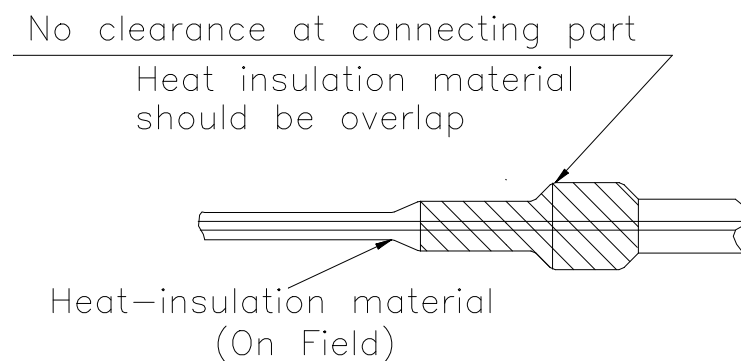
5.2.2. Insulation for non-jointing parts and non-connection parts

wrong	right	
Gas pipe and liquid pipe should not be put together to insulate	Insulate the gas pipe (cooling only)	Insulate the gas pipe and liquid pipe

For construction convenience, before laying pipes, use insulation material to insulate the pipes to be dealt with, at the same time, at two ends of the pipe, remain some length not to be insulated, in order to be welded and check the leakage after laying the pipes.

5.2.3. Insulate for the jointing area, expanding area and the flange area

- ① Insulate for the jointing area, expanding area and the flange area should be done after checking leakage of the pipes
- ② Make sure there's no clearance in the joining part of the accessorial insulation material and local preparative insulation material.



5.3 Drainage pipe insulation

The connection part should be insulated, or else water will be condensing at non-insulation part.

5.4 Note

5.4.1 The jointing area, expanding area and the flange area should be heat insulated after passing the pressure test

5.4.2 The gas and liquid pipe should be heat insulated individually, the connecting part should be heat insulated individually.

5.4.3 Use the attached heat-insulation material to insulate the pipe connections (pipes' tie-in, expand nut) of the indoor unit.

6. Test Operation

(1) The test operation must be carried out after the entire installation has been completed.

(2) Please confirm the following points before the test operation.

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop valves are both opened.
- The air conditioner is pre-heated by turning on the power.

(3) According to the user's requirement, install the remote controller when the remote controller's signal can reach the indoor unit smoothly.

(4) Test operation

Set the air conditioner under the mode of "COOLING" with the remote controller, and check the following points.

For Outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.