



# HEAT CONTROLLER

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## **Installation and Operation Manual**

### **CMA12SB-0 Series** Horizontal/Side Discharge Condensing Units

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## 1. PRECAUTIONS

- Be sure to be in conformity with the local, national and international laws and regulations.
- Read "PRECAUTIONS" carefully before installation.
- The following precautions include important safety items.
- Keep this manual with the owner's manual in a handy place for future reference.

The safety precautions listed here are divided into two categories.



### WARNING

Failure to observe a warning may result in death.



### CAUTION

Failure to observe a caution may result in injury or damage to the equipment.

After completing the installation, make sure that the unit operates properly during the start-up operation. Please instruct the customer on how to operate the unit and keep it maintained. Also, inform customers that they should store this installation manual along with the owner's manual for future reference.



### WARNING

**Be sure only trained and qualified service personnel to install, repair or service the equipment.**

Improper installation, repair, and maintenance may result in electric shocks, short-circuit, leaks, fire or other damage to the equipment.

**Follow these installation instructions strictly.** If installation is defective, it will cause water leakage, electrical shock and fire.

**Use the attached accessories and specified parts for installation.**

otherwise, it will cause the unit to fall, water leakage, electrical shock and fire.

**Install at a strong and firm location which is able to withstand the unit's weight.**

If the strength is not enough or installation is not properly done, the set will fall to cause injury.

**This appliance should not be installed in a laundry room.**

**The enclosure of the appliance shall be marked by word, or by symbols, with the direction of the fluid flow.**

**For electrical work, follow the local and national wiring standards, regulations and this installation instructions. An independent circuit must be used.**

If electrical circuit capacity is not enough or electrical work is defective, it will cause electrical shock or fire.

**Use specified cable and connect tightly. Clamp the cable so that no external force acts on the terminal.**

If connection is not perfect, it will cause heat or fire at the connection.

**Wire 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-up at connection point of terminal, fire or electrical shock.

**If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.**

**An all-pole disconnect switch having a contact separation of at least 3mm in all poles should be used on fixed wiring.**

**When carrying out piping connection, take care not to let air or substances go into refrigeration lines.**

Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.

**Carry out the installation taking into account strong winds, typhoons or earthquakes.** Improper installation work may result in the equipment falling and causing accidents.

If the refrigerant leaks during installation, ventilate the area immediately.

Toxic gas may be produced if the refrigerant comes into contact with fire.

The temperature of refrigerant circuit will be high, please keep communication cable away from the copper tube.

After completing the installation work, check for refrigerant leakage.

Toxic gas may be produced if the refrigerant leaks into the room and comes into contact with a source of fire, such as a heater, stove or cooker.



## CAUTION

### Ground the air conditioner.

Do not connect the ground wire to gas or water pipes, lightning rod or a telephone ground wire. Incomplete grounding may result in electric shocks.

### Be sure to install an earth leakage breaker.

Failure to install an earth leakage breaker may result in electric shocks.

**This appliance is not intended for use by young children or infirm persons without supervision.**

### Don't install the air conditioner in the following locations:

- Near petrolatum
  - Where there is salty air surrounding (near the coast).
  - Where there is caustic gas (the sulfide, for example) existing in the air (near a hot spring).
  - The voltage varies (in factories).
  - In buses or cabinets.
  - In kitchen.
  - Where there are strong electromagnetic waves existing.
  - Where there are flammable materials or gas.
  - Where there is acid or alkaline liquid evaporating.
  - Other special conditions.
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## 2. INSTALLATION INFORMATION

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- To install properly, please read this "installation manual" first.
  - The air conditioner must be installed by qualified persons.
  - When installing the indoor unit or its tubing, please follow this manual as strictly as possible.
  - If the air conditioner is installed on a metal part of the building, it must be electrically insulated according to the relevant standards to electrical appliances.
  - When all the installation work is finished, please turn on the power only after a thorough check.
  - Product improvements may occur without notice in this manual.
- 

### ORDER OF INSTALLATION

- Select the location;
- Install the outdoor unit;
- Install the connecting pipe ;
- Wiring;

### 3. OUTDOOR UNIT INSTALLATION

#### 3.1 Location

■ The outdoor unit should be installed in a location that meets the following requirements:

- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and can not be reached by strong wind.
- It must be a dry and well ventilating place.
- The support is flat and horizontal and can stand the weight of the outdoor unit. And will no create additional noise or vibration.
- Your neighborhood will not mind the noise or expelled air.
- It is easy to install the connecting pipes or cables.
- Determine the air outlet direction where the discharged air is not blocked.
- There is no danger of fire due to leakage of flammable gas.
- The piping length between the outdoor unit and the indoor unit may not exceed the allowable piping length.
- In the case that the installation location is exposed to strong wind such as a seaside, make sure the fan operates properly by putting the unit lengthwise along the wall or using a shield. (Refer to Fig.6-1)
- If possible, do not install the unit where it is exposed to direct sunlight.
- If necessary, install a blind that does not interfere with the air flow.
- During the heating mode, water drains off the outdoor unit ,The condensate should be drained well away by the drain hole to an appropriate place.
- Select the position where it will not be subject to snow drifts, accumulation of leaves or other seasonal debris. If unavoidable, please cover with a shelter.
- Locate the outdoor unit as close to the indoor unit as possible.
- If possible, please remove the obstacles nearby to prevent the performance from being impeded by too little air circulation.
- The minimum distance between the outdoor unit and obstacles described in the installation chart does not mean that the same is applicable to the situation of an airtight room. Leave open two of the three directions (M,N,P) (Refer to Fig.3-5)

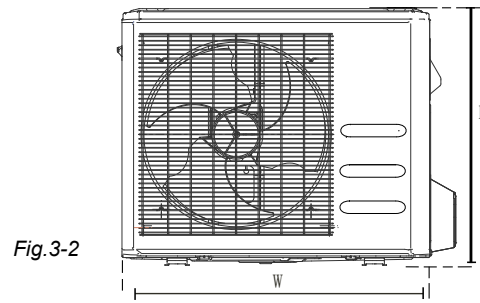


Fig.3-2

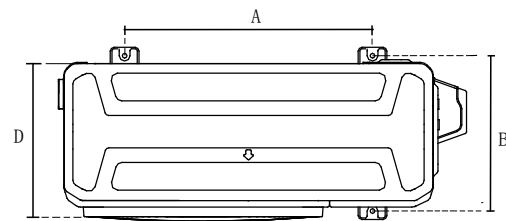
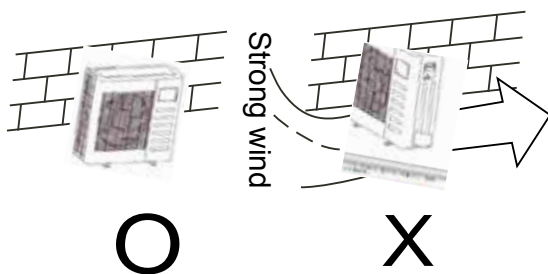


Fig.3-4

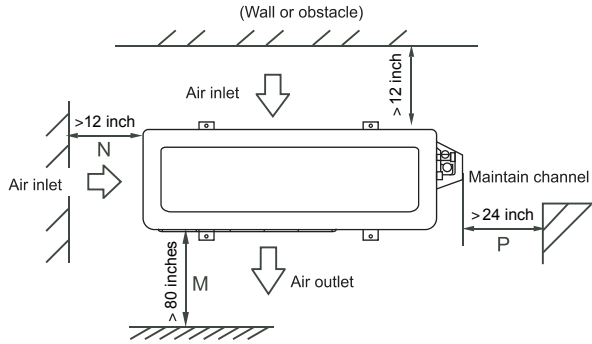
**Table 3.1: Length Specifications of Split Type Outdoor Unit (unit: mm/inch)**

Model	Outdoor Unit Dimensions W x H x D	Mounting Dimensions	
		Distance A	Distance B
12	770x555x300 (30.3x21.85x11.8)	487 (19.2)	298 (11.7)



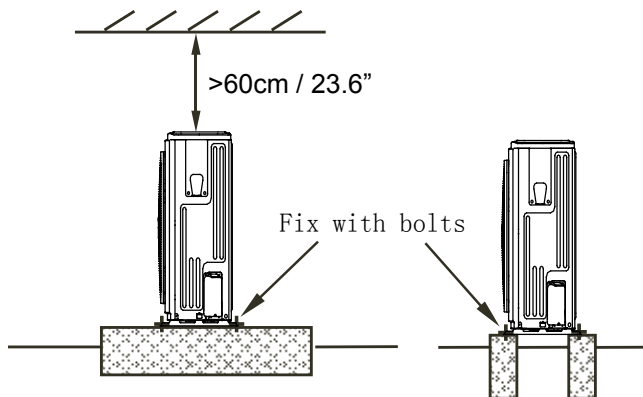
### 3.2 Clearance for installation and maintenance

1. Split type outdoor unit



### 3.3 Moving and installation

- Since the center of gravity of the unit is not at its physical center, please be careful when lifting with a sling.
- Never hold the inlet of the outdoor unit to prevent it from deforming.
- Do not touch the fan with hands or other objects.
- Do not lean it more than 45°, and do not lay it horizontally.
- Install concrete foundation according to the specifications of the outdoor units. (Refer to Fig. 3-6)
- Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind. (Refer to Fig. 3-6)



### 4. INSTALL CONNECTING PIPE

Check whether the height difference between the indoor unit and outdoor unit, the length of refrigerant pipe, and the number of bends meet the following requirements:

Table 4-1

The type of models	Capacity (Btu/h)	The length of refrigerant pipe	The max height drop
R410A air conditioner and Centrifugal fan outdoor unit	<18K	20m/66ft	8m/26ft



#### CAUTION

All field piping must be provided by a licensed refrigeration technician and must comply with the relevant local and national codes.

Do not let air, dust, or other impurities fall in the pipe system during the time of installation.

The connecting pipe should not be installed until the indoor and outdoor units have been fixed already.

Keep the connecting pipe dry, and do not let moisture in during installation.

Insulate completely on both sides of the gas piping and the liquid piping. Otherwise, this can sometimes result in water leakage.

### 4.1 The Procedure of Connecting Pipes

- 1 Drill a hole in the wall (suitable just for the size of the wall conduit), then set fittings, such as wall conduit and cover.
- 2 Bind the connecting pipe and the cables together tightly with binding tapes.  
Pass the bound connecting pipe through the wall conduit from outside. Be careful of the pipe allocation to do no damage to the tubing.
- 3 Connect the pipes. Refer to "How to Connect the pipes" for details.
- 4 Expel the air with a vacuum pump. Refer to "How to expel the air with a vacuum pump" for details.
- 5 open the stop valves of the outdoor unit to make the refrigerant pipe connecting the indoor unit with the outdoor unit to allow flow.
- 6 Check leakage. Check all the joints with leak detector or soapy water.
- 7 Cover the joints of the connecting pipe with soundproof / insulating sheath (fittings), and bind it well with tape to prevent leakage.



#### CAUTION

Be sure to with insulating materials cover all the exposed parts of the flare pipe joints and refrigerant pipe on the liquid-side and the gas-side. Ensure that there is no gap between them.  
Incomplete insulation may cause water condensation.

### How to connect the pipes

#### 1 Flaring

- Cut pipe with a pipe cutter. (refer to Fig. 4-1)

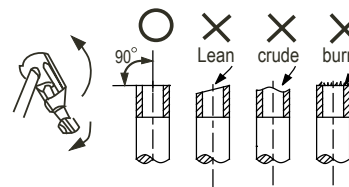


Fig. 4-1

- Insert a flare nut onto a pipe and flare the pipe.
- Refer to Table 4-2 for the dimension of flare nut spaces.

Table 4-2

Pipe gauge	Tightening torque	Flare dimensin A		Flare shape
		min (mm)	max	
Ø6.35/0.25in	14.2~17.2 N.m (144~176 kgf.cm)	8.3/0.327in	8.7/0.343in	
Ø9.52/0.375in	32.7~39.9 N.m (333~407 kgf.cm)	12.0/0.472in	12.4/0.488in	
Ø12.7/0.5in	49.5~60.3 N.m (504~616 kgf.cm)	15.4/0.606in	15.80.622in	
Ø15.9/0.626in	61.8~75.4 N.m (630~770 kgf.cm)	18.6/0.732in	19.0/0.748in	
Ø19.1/0.725in	97.2~118.6 N.m (990~1210 kgf.cm)	22.9/0.902in	23.3/0.917in	

**2 Connect the indoor unit first, then the outdoor unit.**

- Bend the tubing in proper way. Do not harm them.

Bend the pipe with thumb



min-radius 100mm

Fig.4-2

- The bending angle should not exceed 90°.
- Bending position is preferably in the middle of the bendable pipe. The larger the bending radius the better it flows.
- Do not bend the pipe more than three times.
- When connecting the flare nut, coat the flare both inside and outside with either oil or ester oil and initially tighten by hand 3 or 4 turns before tightening firmly.

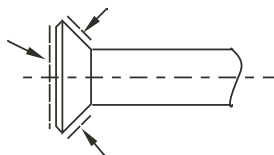


Fig.4-3

- Be sure to use both a spanner and torque wrench together when connecting or disconnecting pipes to /from the unit. (Fig.4-4)

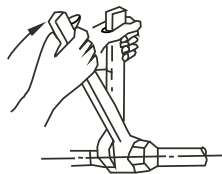


Fig.4-4

**CAUTION**

Too much torque will harm the flare and too little will cause leakage. Please determine the torque according to Table 4-2.

After the connecting work is finished, be sure to check that there is no gas leak.

**How to expel the air with a vacuum pump**

**Access valve operation**

**1. Opening access valve**

- 1) Remove the cap and turn the valve counterclock-wise with the hexagon wrench.
- 2) Turn it until the shaft stops. Do not apply excessive force to the access valve. Doing so may break the valve body, as the valve is not a backseat type. Always use a service tool.
- 3) Make sure to tighten the cap securely.

**2. Closing stop valve**

- 1) Remove the cap and turn the valve clockwise with the hexagon wrench.
- 2) Securely tighten the valve until the shaft contacts the main body seal.

Make sure to tighten the cap securely.  
For tightening torque, refer to the table below.

Table 4-3

Tightening torque N.M (Turn clockwise to close)				
Stop Valve size	Shaft (valve body)		Cap (Valve lid)	Maintenance nut
Ø6.4	5.4~6.6	Hexagonal wrench 4 mm	13.5~16.5	11.5~13.9
Ø9.5			18~22	
Ø12.7	8.1~9.9	Hexagonal wrench 6 mm	23~27	
Ø15.9	13.5~16.5	Hexagonal wrench 6 mm	23~27	
Ø22.2	27~33	Hexagonal wrench 10 mm	36~44	
Ø25.4				

**CAUTION**

Always use a charge hose for service port connection.

After tightening the cap, check that no refrigerant leaks are present.

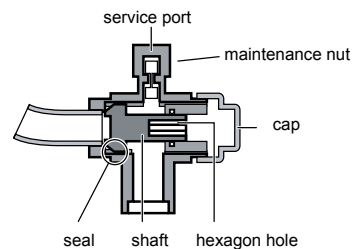


Fig.4-5

**Using the vacuum pump**

- 1 Loosen and remove the maintenance nuts of stop valves A and B, and connect the charge hose of the manifold valve to the service port of stop valve A. (Be sure that stop valves A and B are both closed)
- 2 Connect the joint of the charge hose with the vacuum pump.
- 3 Open the Lo-lever of the manifold valve completely.
- 4 Turn on the vacuum pump. At the beginning of pumping, loosen the maintenance nut of stop valve B a little to check whether the air comes in (the sound of the pump changes, and the indicator of compound meter turns below zero). Then fasten the maintenance nut.
- 5 When the pumping has finished, close the Lo-lever of the manifold valve completely and turn off the vacuum pump. Run pump for 15 minutes or more and check that the compound meter indicates -76cmHg(-1X10<sup>5</sup>Pa)
- 6 Loosen and remove the cap of service valves A and B to open stop valve A and B completely, then fasten the cap.
- 7 Disassemble the charge hose from the service port of service valve A, and fasten the nut.

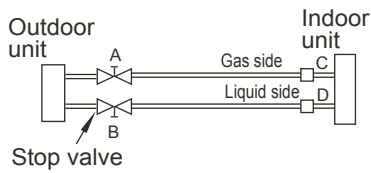


Fig.4-6

## 4.2. Refrigerant pipe installation

### Allowed Length and Rise of Pipes

Requirements are different when installing the outdoor unit, please refer to outdoor unit installation manual for detailed information.

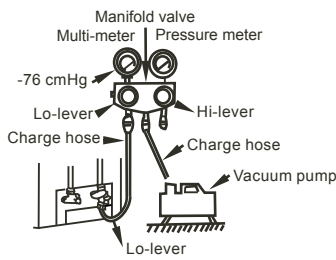


Fig.4-7



### CAUTION

- Ventilate the air if there was any refrigerant leakage during the installation. Leaked refrigerant will generate poisonous gas if exposed to fire.
- Make sure there is no refrigerant leakage after the installation. Leaked refrigerant will generate poisonous gas if exposed to fire.

## 4.3 Note On Adding Refrigerant

### ! CAUTION

- Refrigerant charging must be performed after wiring, vacuuming and the leak test.
- **DO NOT** exceed the maximum allowable quantity of refrigerant or overcharge the system. Doing so can damage or impact the unit's function.
- Charging with unsuitable substances may cause explosions or accidents. Ensure that the appropriate refrigerant is used.
- Refrigerant containers must be opened slowly. Always use protective gear when charging the system.
- **DO NOT** mix refrigerants types.

Some systems require additional charging depending on pipe lengths. The standard pipe length varies according to local regulations. For example, in North America, the standard pipe length is 7.5m (25')

The additional refrigerant to be charged can be calculated using the following formula:

#### Liquid Side Diameter

	φ6.35(1/4")	φ9.52(3/8")	φ12.7(1/2")
<b>Fixed-frequency R410A:</b>	(Total pipe length - standard pipe length) x20g(0.21oz)/m(ft)	(Total pipe length - standard pipe length) x40g(0.42oz)/m(ft)	(Total pipe length - standard pipe length) x60g(0.64oz)/m(ft)



## 5. CONNECTIVE DIAGRAM

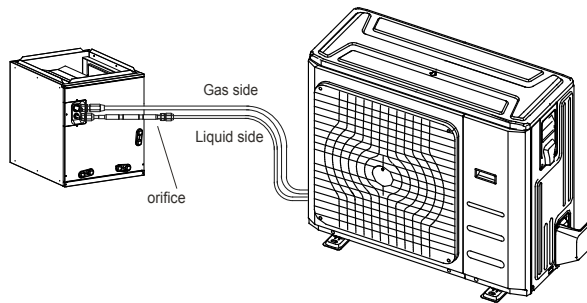


Fig. 5-1

## 6. WIRING

The appliance shall be installed in accordance with national wiring regulations.

The air conditioner should use separate power supply with rated voltage.

The external power supply to the air conditioner should have ground wiring, which is linked to the ground wiring of the indoor and outdoor unit.

The wiring work should be done by qualified persons according to circuit drawing.

An all-pole disconnect device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating of above 10mA shall be incorporated in the fixed wiring according to national code.

Be sure to locate the power wiring and the signal wiring well to avoid cross-interference.

Do not turn on the power until you have carefully after wiring.

The power cord type designation is H07RN-F.



### NOTE

Remark per EMC Directive 2004/108/EC  
For to prevent flicker impressions during the start of the compressor (technical process) following installation conditions do apply.

- 1 The power connection for the air conditioner has to be done at the main power distribution. The distribution has to be of a low impedance, normally the required impedance reaches at a 32 A fusing point.
- 2 No other equipment can be connected with this power line.
- 3 For detailed installation acceptance please refer to your power supplier, if restrictions do apply for products like washing machines, air conditioners or electrical ovens.
- 4 For power details of the air conditioner refer to the rating plate of the product.
- 5 For any questions contact your local dealer.

## 6.1 Connect the cable

- Disassemble the bolts from the cover.(If there isn't a cover on the outdoor unit, disassemble the bolts from the maintenance board, and pull it in the direction of the arrow to remove the protection board.)  
(Refer to Fig.6-1)
- Connect the communication cables to the terminals as identified with their respective matched numbers on the terminal block of indoor and outdoor units.
- Re-install the cover or the protection board.
- The temperature of refrigerant circuit will be high, please keep the communication cable away from the copper tube.

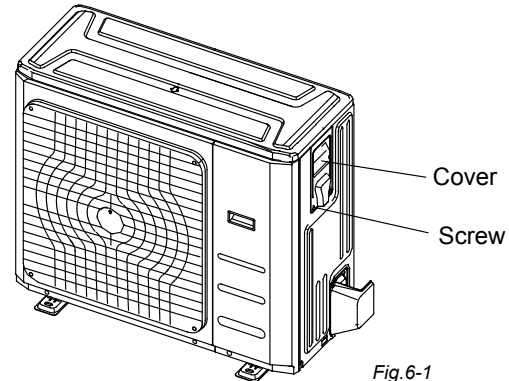


Fig.6-1



### NOTE

All the pictures in this manual are for explanation purpose only. They may be slightly different from the air conditioner you purchased (depending on model).The actual shape shall prevail.

## 6.2 Power Specifications

(Refer to Table6-1)

## 6. Outdoor unit

1. Remove the electric parts cover from the outdoor unit.
2. Connect the communication cables to the terminals as identified with their respective matched numbers on the terminal block of indoor and outdoor units. (Communication cable sheath length to be removed and insert into the terminal block.)
3. To prevent the ingress of water, form a loop in the communication cable as illustrated in the installation diagram of indoor and outdoor units.
4. Insulate unused cords (conductors) with PVC-tape. Process them so they do not touch any electrical or metal parts.

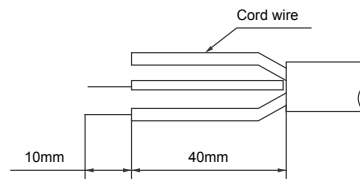


Fig.6-2



### CAUTION

Wrong wiring connections may cause some electrical parts to malfunction.

Table 6-1

MODEL		12	18	24	36
POWER (outdoor)	PHASE	1Phase	1Phase	1Phase	1Phase
	VOLT	115V	208/230V	208/230V	208/230V
CIRCUIT BREAKER/FUSE(A)		20	15	20	30
MCA		15	15	15	20



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Due to ongoing product improvements, specifications and dimensions are subject to change and correction without notice or incurring obligations. Determining the application and suitability for use of any product is the responsibility of the installer. Additionally, the installer is responsible for verifying dimensional data on the actual product prior to beginning any installation preparations.

Incentive and rebate programs have precise requirements as to product performance and certification. All products meet applicable regulations in effect on date of manufacture; however, certifications are not necessarily granted for the life of a product. Therefore, it is the responsibility of the applicant to determine whether a specific model qualifies for these incentive/rebate programs.



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