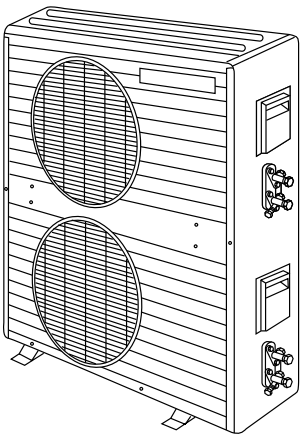
ORDER NO. MAC9611041C2

Service Manual

Multi-Split Air Conditioner

CS-MC120KE / CU-MC240KE



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Panasonic

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

⚠ PRECAUTION OF LOW TEMPERATURE

In order to avoid frostbite, be assured of no refrigerant leakage during the installation or repairing of refrigeration circuit.

Features

- **High Efficiency**
- **Compact Design**
- **Comfort Improvement**
  – Wider range of horizontal discharge air
  – Longer hours of sleep mode operation
- **Auto Restart**
  – Auto restart operation after power failure
- **Removable and Washable Front Panel**
- **Installation Work Improvement**
  – Long piping up to 15 m.
- **Quality Improvement**
  – Low voltage protection
  – Gas leakage protection
  – Prevent compressor reverse cycle
  – 2-stage OLP to protect compressor
- **Service Improvement**
  – Easy fan motor replacement procedure

Functions

Remote Control

OFF / ON

Operation OFF / ON

MODE

Operation Mode Selection

- AUTO Automatic Operation Mode
- COOL Cooling Operation Mode
- DRY Soft Dry Operation Mode
- FAN Air Circulation Mode

FAN SPEED

Indoor Fan Speed Selection

- Low Speed
- Medium Speed
- High Speed
- AUTOFAN Automatic Fan Speed

AIR SWING

Airflow Direction Control

- SWING Automatic Airflow Direction Control
- MANUAL Airflow Direction Manual Control

TEMP.

Room Temperature Setting

- Temperature Setting (16˚C to 30˚C)
- Automatic Operation
  - ◄ 2˚C lower than standard
  - Standard
  - ► 2˚C higher than standard

ON-TIMER
OFF-TIMER

Timer Operation Selection

- 24-hour, OFF / ON Real Timer Setting.

TIME

Time / Timer Setting

- Hours and minutes setting.

SET
CANCEL

Timer Operation Set / Cancel

- ON Timer and OFF Timer setting and cancellation.

CLOCK
(時計)

Clock Setting

- Current time setting.

SLEEP

Sleep Mode Operation OFF / ON

Functions

Indoor Unit

POWER ⏻

Power Switch OFF / ON

AUTO OFF / ON

Auto Operation Switch

- Used when the remote control cannot be used.

Remote Control Signal Receiving Sound Control

- It can be controlled by pressing Auto Operation Switch for 10 seconds.

TEST RUN OFF / ON

Operation Test Running / Pump Down Switch

- Used when test running or servicing.

Operation Indication Lamps (LED)

- POWER (Red)..... Lights up in operation, blinks in Automatic Operation Mode judging
- SLEEP (Orange)..... Lights up in Sleep Mode Operation
- TIMER (Orange)..... Lights up in Timer Setting

Operation Mode

- Cooling, Soft Dry, Air Circulation and Automatic Mode.

Time Delay Safety Control

- Restarting is inhibited for appro. 3 minutes.

7 Minutes Time Save Control

- Cooling Operation only.

Auto Restart Control

- Operation is restarted after power failure at previous setting mode.

Anti-Freezing Control

- Anti-Freezing control for indoor heat exchanger. (Cooling and Soft Dry)

Sleep Mode Auto Control

- Indoor Fan operates and stops at 4-second intervals at low speed.
- Operation stops after 8 hours.

Indoor Fan Speed Control

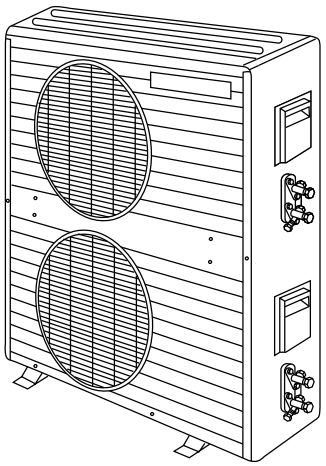
- High, Medium and Low.
- Automatic Fan Speed Mode
  - Cooling : Fan rotates at Hi and Me speed. Deodorizing control is available.
  - Soft Dry : Fan rotates at SLo and Lo speed. Deodorizing control is available.

Airflow Direction Control

- Automatic air swing and manual adjusted by remote control for vertical airflow.
- Manually adjusted by hand for horizontal airflow.

Functions

Outdoor Unit



Compressor Reverse Rotation Protection Control

- To protect compressor from reverse rotation when there is a instantaneous power failure.

Overload Protector

- 2-Stage OLP to protect the compressor. Overload Protector will trip when
  - Temperature of compressor increases to 120°C.
  - High temperature or high current flows to compressor. (Refer circuit diagram for OLP characteristic)

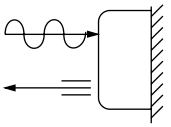
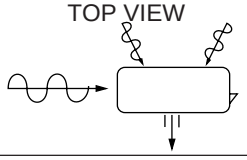
60 Secs. Forced Operation Control

- Once the compressor is activated, it does not stop for 60 secs. (Stops immediately with remote control stop signal.)

Outdoor Fan Operation Control

- Inner protector.

Product Specifications

			Unit	CS-MC120KE	CU-MC240KE
Cooling Capacity			kW Btu/h	3.50 × 2 - 3.45 × 2 11,900 × 2 - 11,800 × 2	
Moisture Removal			ℓ/h Pint/h	2.0 × 2 4.2 × 2	
Power Source			Phase V Cycle	Single 240 - 220 50	
Airflow Method			OUTLET INTAKE	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)		m^3/min (cfm)	7.3 (260)	–
	Indoor Air (Me)		m^3/min (cfm)	7.6 (270)	–
	Indoor Air (Hi)		m^3/min (cfm)	8.3 (290)	–
	Outdoor Air		m^3/min (cfm)	–	22.0 (780)
Noise Level			dB (A)	High 39 - 39, Low 36 - 35	(1 Unit) (2 Unit) High 49 - 48, High 52 - 51
Electrical Data	Input		W	1,260 × 2 - 1,210 × 2	
	Running Current		A	5.7 × 2 - 5.7 × 2	
	COP		W/W	2.7 - 2.8	
	Starting Current		A	25 × 2	
Piping Connection Port (Flare piping)			inch inch	G ; Half Union 1/2" L ; Half Union 1/4"	G ; 3-way valve 1/2" L ; 2-way valve 1/4"
Pipe Size (Flare piping)			inch inch	G (gas side) ; 1/2" L (liquid side) ; 1/4"	G (gas side) ; 1/2" L (liquid side) ; 1/4"
Drain Hose	Inner diameter		mm	12	–
	Length		m	0.7	–
Power Cord Length Number of core-wire			m	2.1 3 (1.0 mm^2)	– –
Dimensions		Height	inch (mm)	11-7/16 (290)	41-5/32 (1045)
		Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
		Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight			lb (kg)	18 (8.0)	179 (81)
Compressor		Type		–	Rotary (1 cylinder) rolling piston type
	Motor	Type		–	Induction (2-poles)
	Rated	Output	W	–	1,100 × 2
Air Circulation		Type		Cross-flow Fan	Propeller Fan
		Material		AS + Glass Fiber 30%	AES + Glass Fiber 16%
	Motor	Type		Induction (4-poles)	Induction (6-poles)
		Input	W	27	60.7 × 2
		Rated Output	W	10	20 × 2
	Fan Speed	Low	rpm	1,200	–
		Medium	rpm	1,250	–
		High	rpm	1,360	730

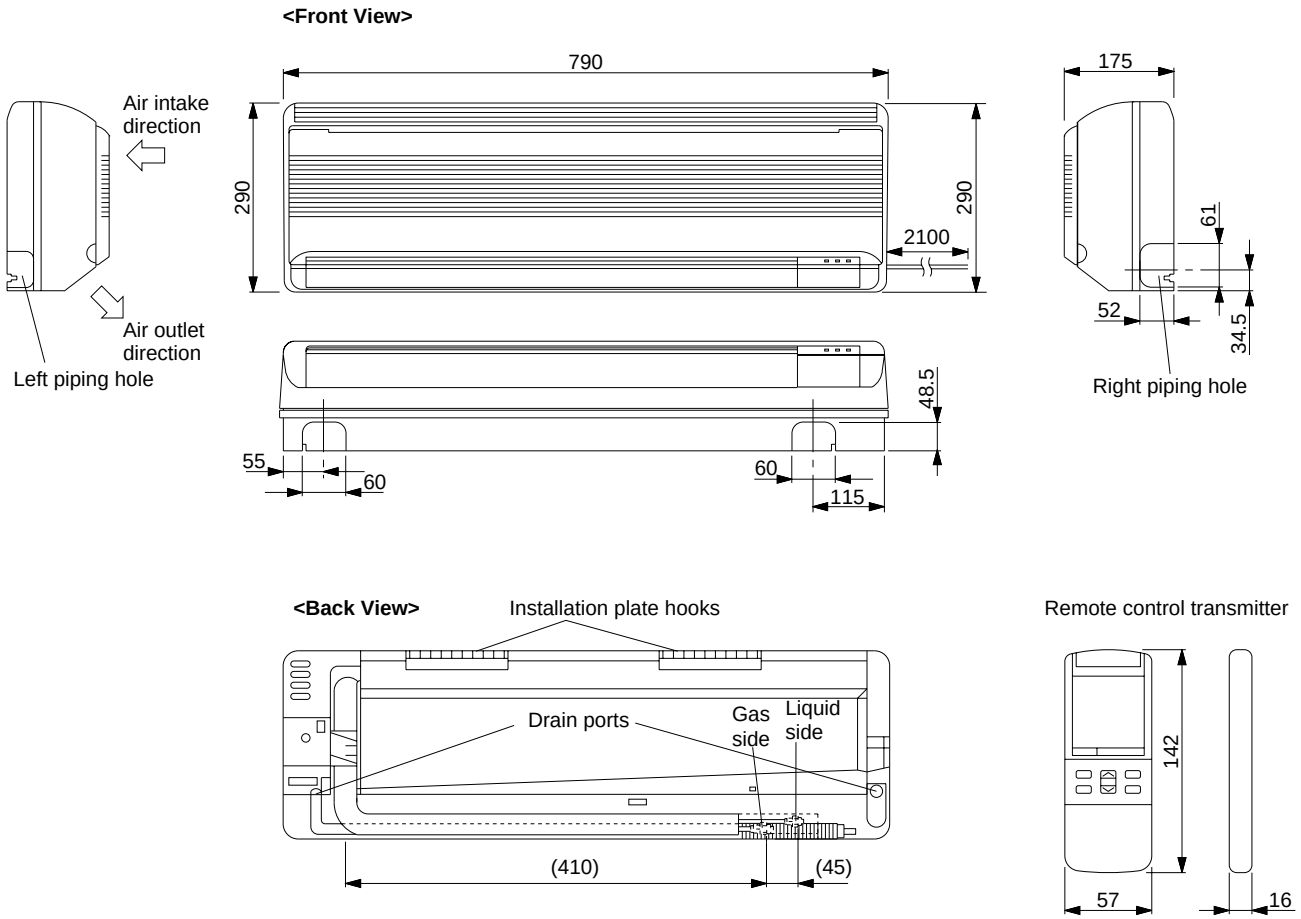
Product Specifications

		Unit	CS-MC120KE	CU-MC240KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slot Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft) 2 × 12	1 × 19
	FPI		21	21
	Size (W × H × L)	mm	600 × 252 × 25.4	776.2 × 482.6 × 22
Refrigerant Control Device			–	Capillary Tube
Refrigeration Oil		(c.c)	–	SUNISO 4GDID or ATMOS M60 (430 × 2)
Refrigerant (R-22)		g (oz)	–	670 × 2 (23.7 × 2)
Thermostat			Electronic Control	–
Protection Device			–	2-Stage Overload Protector
Capillary Tube	Length Flow Rate Inner Diameter	mm ℓ/min mm	– – –	560 16.7 1.7
Air Filter	Material Style		P.P. Honeycomb	–
Capacity Control			Capillary Tube	
Compressor Capacitor		μF, VAC	–	30 μF, 370 VAC
Fan Motor Capacitor		μF, VAC	1.0 μF, 450 VAC	(Upper unit)1.0 μF, 400 VAC (Lower unit)1.2 μF, 400 VAC

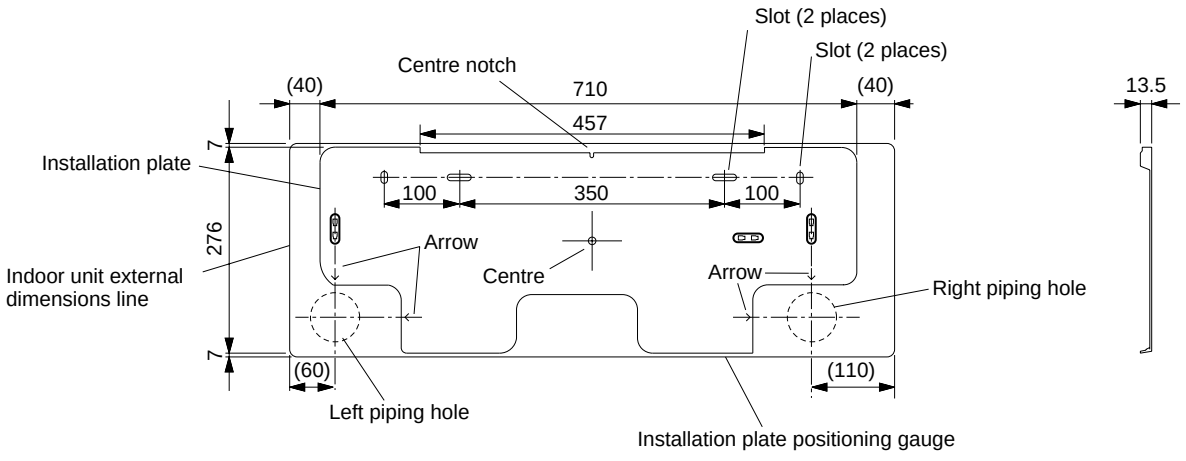
• Specifications are subject to change without notice for further improvement.

Dimensions

CS-MC120KE

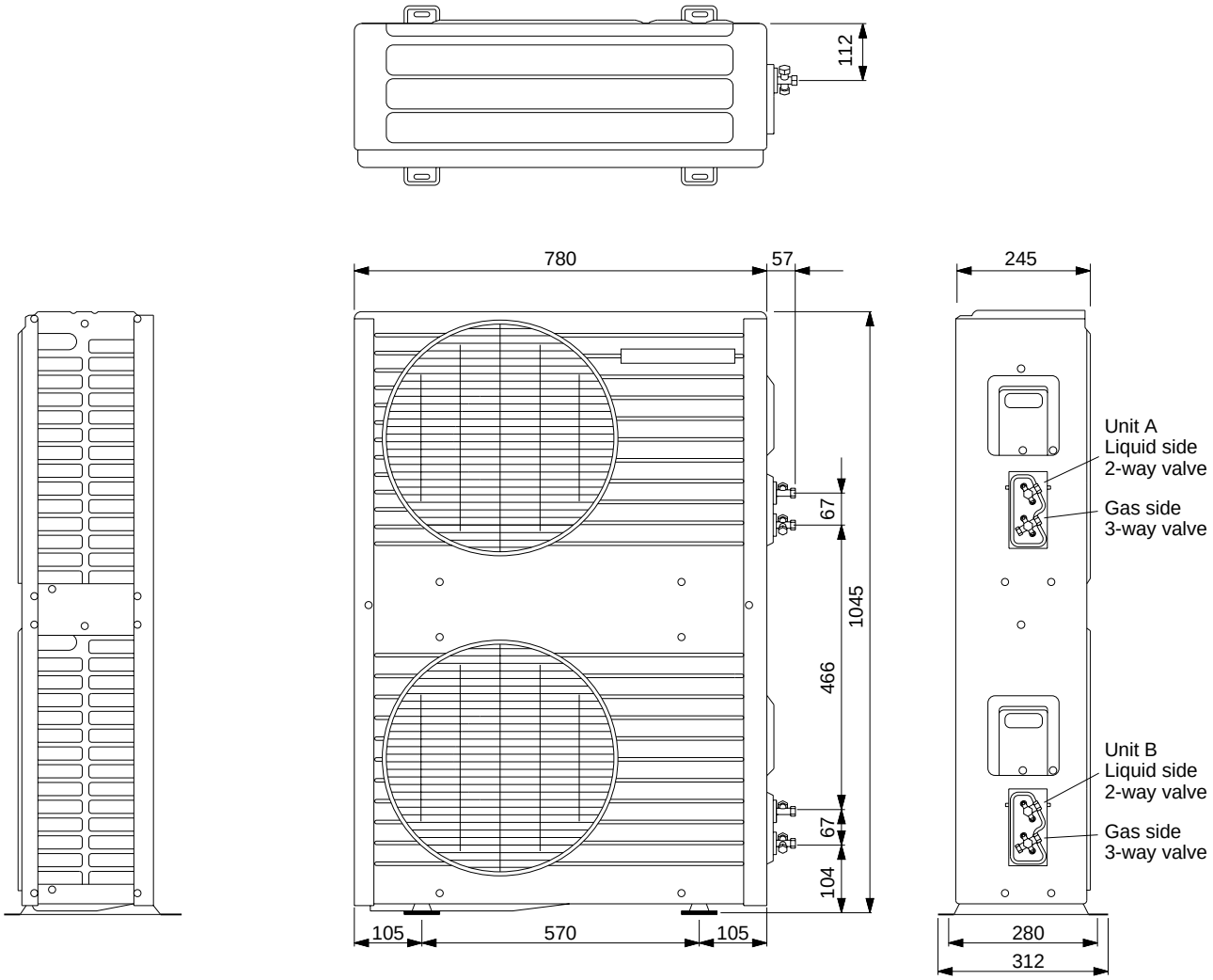


Relative position between the indoor unit and the installation plate <Front View>



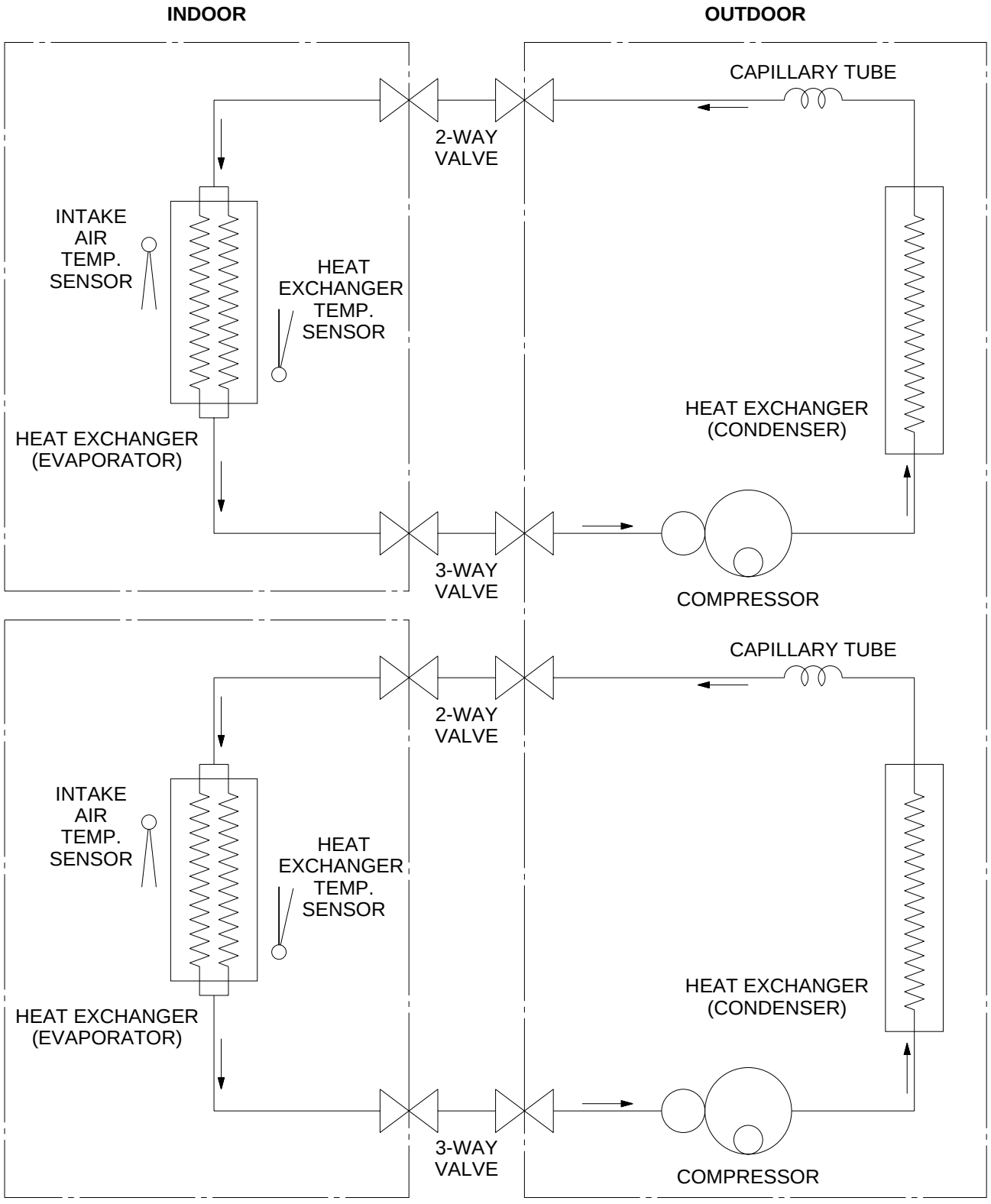
Dimensions

CU-MC240KE



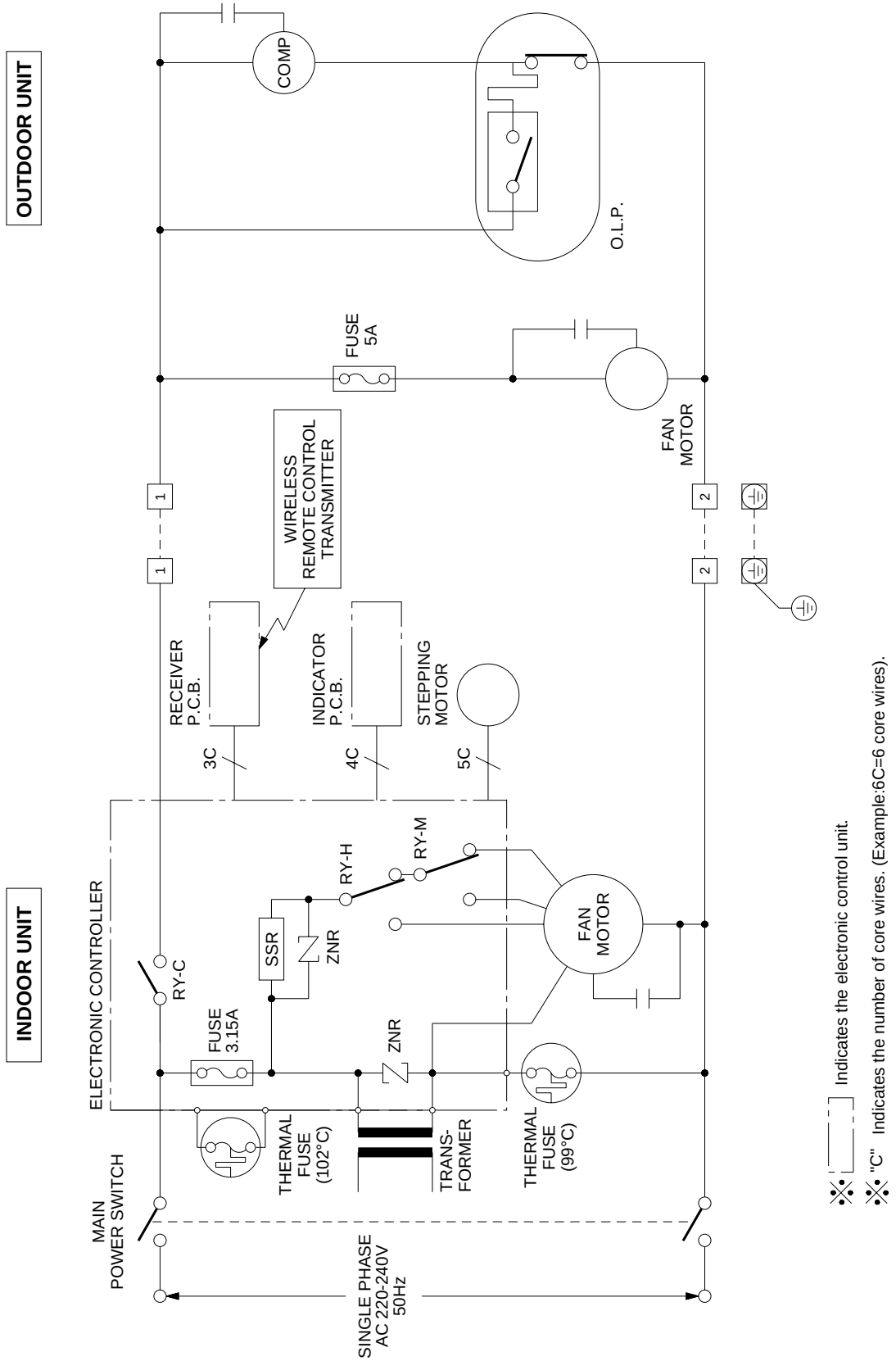
Refrigeration Cycle Diagram

CS-MC120KE / CU-MC240KE



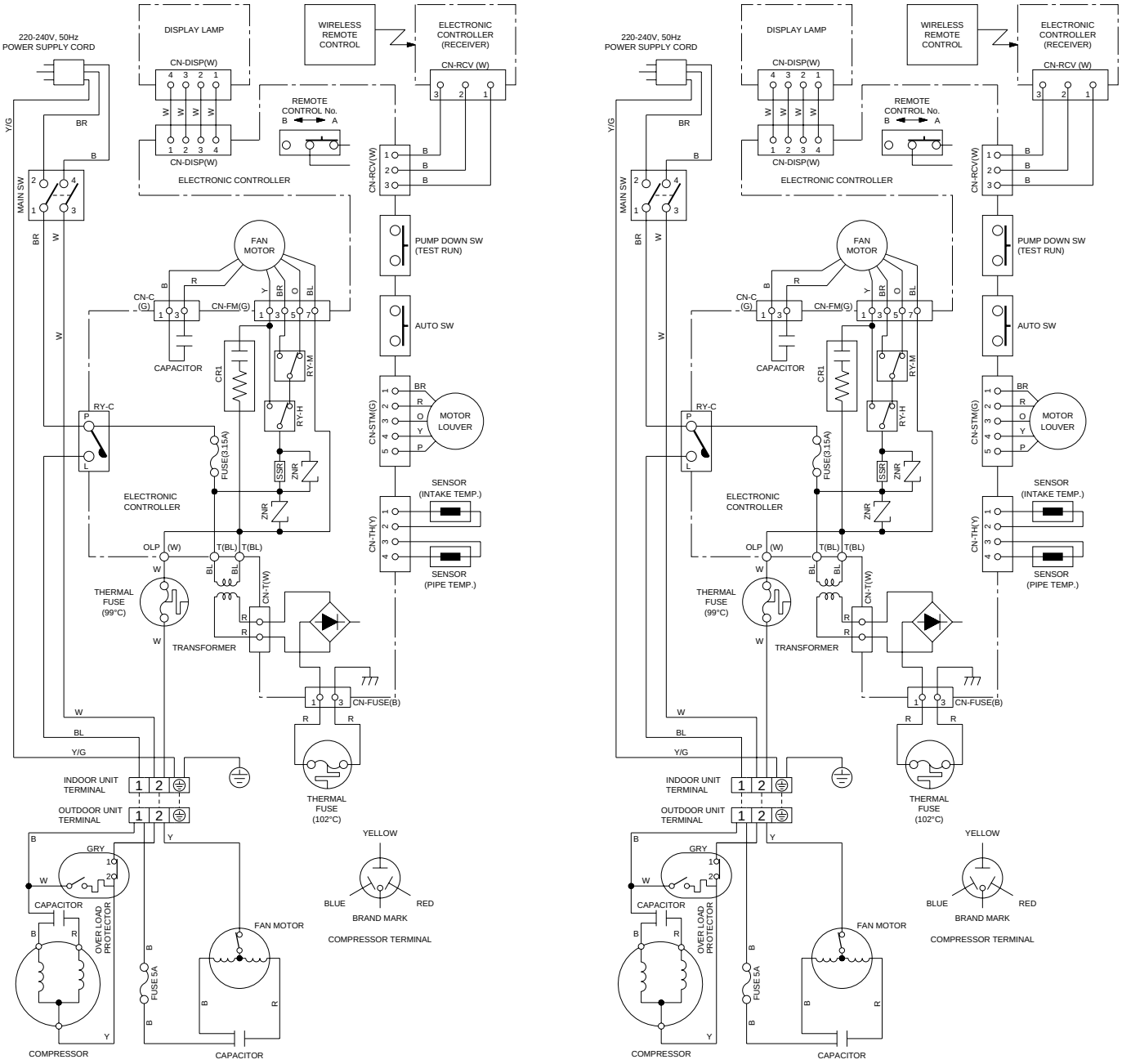
Block Diagram

CS-MC120KE / CU-MC240KE



Wiring Diagram

CS-MC120KE / CU-MC240KE



REMARKS:

B	:	BLUE
BR	:	BROWN
BL	:	BLACK
W	:	WHITE
R	:	RED
O	:	ORANGE
P	:	PINK
Y/G	:	YELLOW/ GREEN
GRY	:	GRAY

Resistance of Indoor Fan Motor Windings

CONNECTION	CWA92231 (Ω)
YELLOW - BLUE	515.9
YELLOW - BROWN	139.3
BROWN - ORANGE	28.3
ORANGE - RED	311.9

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95319 (Ω)
BLUE - YELLOW	260.5
YELLOW - RED	446.0

Resistance of Compressor Windings

CONNECTION	2KS224D5AC02 (Ω)
C-R	2.45
C-S	3.86

Operation Details

1) Cooling Mode Operation

Cooling in operation according to Remote Control setting.

Time Delay Safety Control (3 minutes)

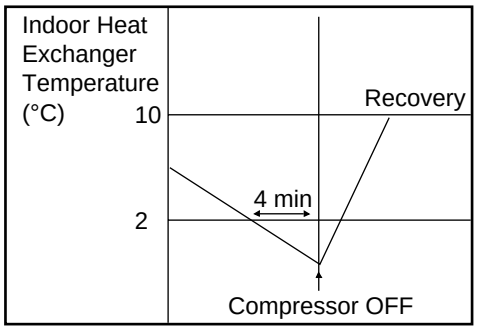
- When the compressor is stopped by Power Switch, Remote Control or there is a power failure, it restarts after 3 minutes when the Power Switch, Remote Control is turned ON or the power supply is resumed.
- When the setting temperature is reached during cooling operation, the compressor stops and it will not start for 3 minutes.

7 minutes Time Saved Control

- The compressor will start automatically if it has stopped for 7 minutes even if the room temperature is below the compressor ON temperature.

Anti-Freezing Control

- If the temperature of the indoor heat exchanger falls continously below 2°C for 4 minutes, the compressor turns off to protect the indoor heat exchanger from freezing. The fan speed setting remains the same.
- Compressor recommences when the indoor heat exchanger temperature rises to 10°C (Recovery).
  ※ 3 minutes waiting of Time Delay Safety Control is valid for Cooling Operation.



Compressor Reverse Rotation Protection Control

- If the compressor is operating continually for 5 minutes or longer and the temperature difference between intake air and indoor heat exchanger is 2.5˚C or less for 2 minutes, compressor will stop and restart automatically. (Time Delay Safety Control is valid).

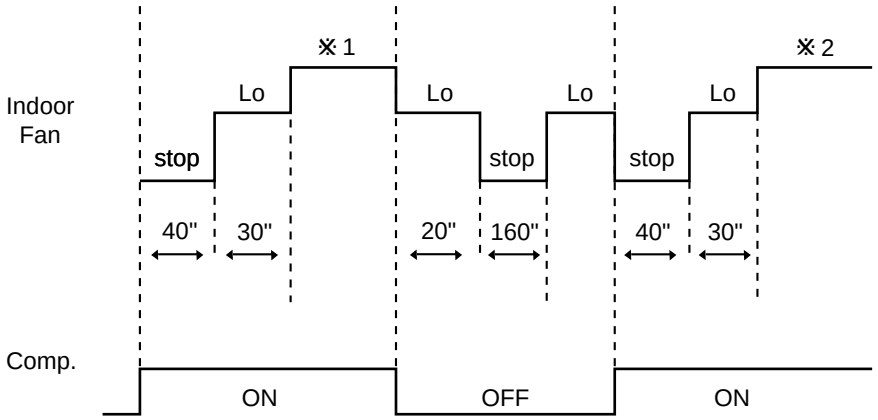
• Compressor starts for ⩾ 5 minutes
• Δ T ⩽ 2.5˚C for 2 minutes → Compressor OFF → Compressor restarts (3 minutes waiting)

Δ T = Intake air temperature – Indoor heat exchanger temperature
This is to protect reverse rotation of the compressor when there is a instantaneous power failure.

Operation Details

Automatic Fan Speed Mode

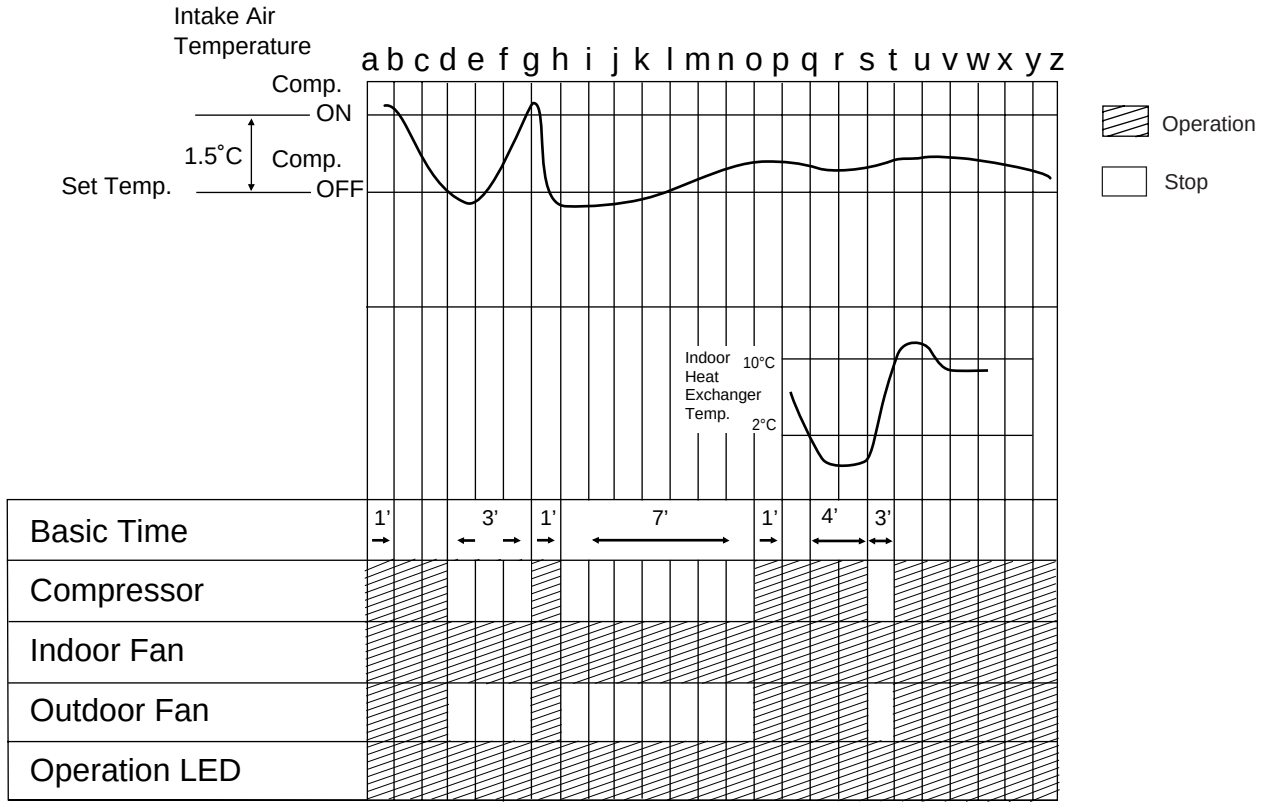
When Automatic Fan Speed is selected at Remote Control during cooling operation.
- Fan speed rotates in the range of Hi to Me.
- Deodorizing Control.



※1 Fan Speed is Hi until the compressor stops (when the room temperature reaches setting temperature).

※2 Fan Speed is Me after the compressor restarts.

Cooling Operation Time Diagram



<Description of operation>

d – g	:	Time Delay Safety Control (waiting for 3 minutes)
g – h	:	60 sec. Forced Operation
h – 0	:	7 min. Time Saved Control
q – t	:	Anti Freezing Control

<Condition>

a – h	:	When outdoor temperature is high
h – p	:	When outdoor temperature is moderate
p – w	:	When outdoor temperature is low

Operation Details

2) Soft Dry Mode Operation

- The unit starts cooling operation until the room temperature reaches the setting temperature set on the Remote Control, and then Soft Dry operation will start.
- During Soft Dry operation, the Indoor Fan will operate and stop at 4-second intervals at low speed.
- The operation will be switched on and off for up to 10 minutes “ON” and 6 minutes “OFF”. Once Soft Dry operation is turned off, it stops for 6 minutes.

Time Delay Safety Control

- Once the compressor stops, it will not start for 3 minutes during Cooling operation.

Anti-Freezing Control

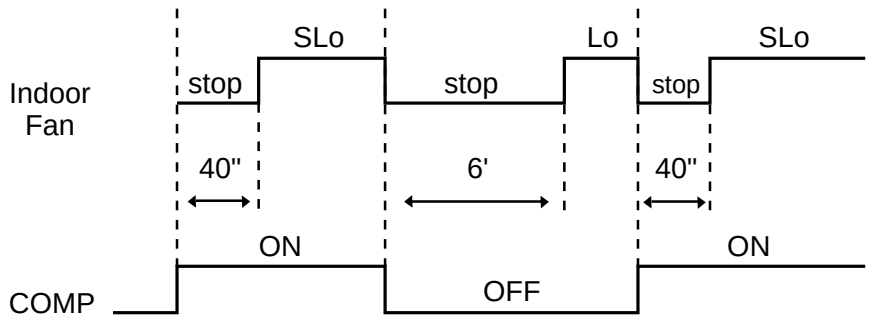
- Same as Anti-Freezing Control for Cooling Mode operation. (For Soft Dry region, 6 minutes waiting is valid during compressor stops.)

Compressor Reverse Rotation Protection

- Same as Compressor Reverse Rotation Protection Control for Cooling Mode Operation. (Refer page 17)

Automatic Fan Speed Mode

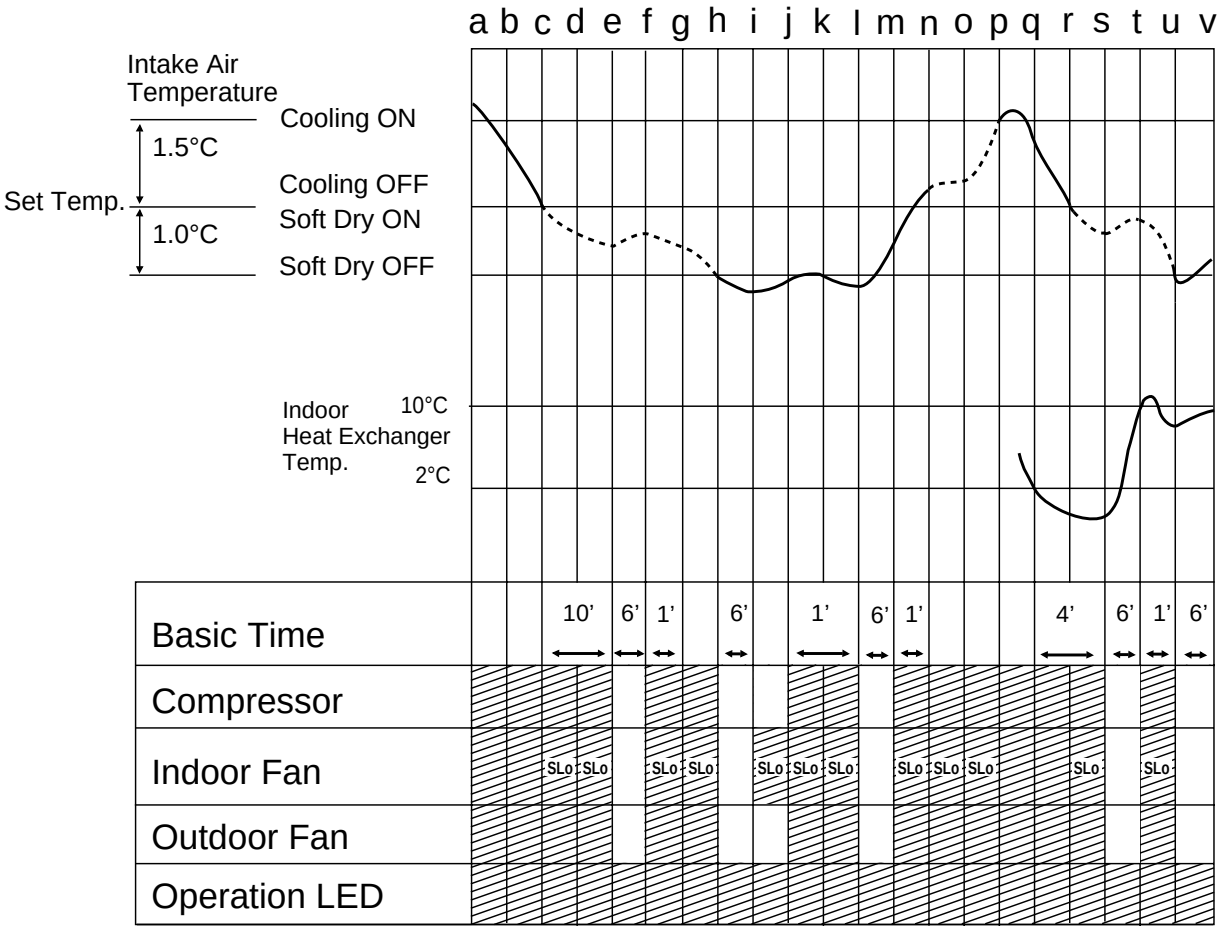
When Automatic Fan Speed is selected at Remote Control during Soft Dry Operation.
- Fan speed rotates at SLo and Lo speed.
- Deodorizing Control.



※ SLo: Indoor Fan rotates at 4-second intervals at low speed.

Operation Details

Soft Dry Operation Time Diagram



<Description of operation>

a – c, p~r	:	Cooling Operation
c – p	:	Soft Dry Operation
e – f	:	Soft Dry OFF
j – l	:	60 sec. Forced Operation
q – t	:	Anti Freezing Control

- - - - - Soft Dry operation

Operation

Stop

<Condition>

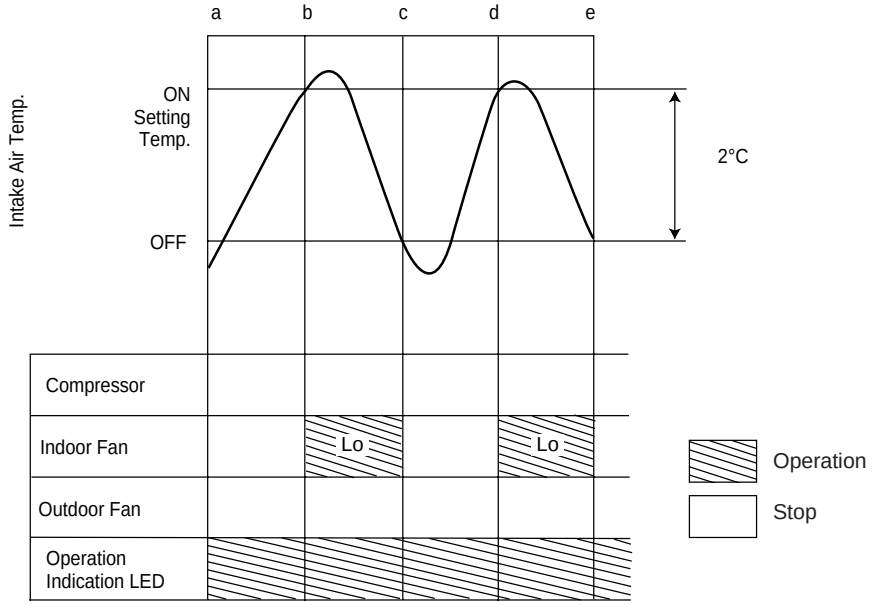
a – h	:	When outdoor temperature is high
h – p	:	When outdoor temperature is moderate
p – u	:	When outdoor temperature is low

Operation Details

3) Air Circulation Mode Operation

- When the temperature near the ceiling reaches the setting temperature, Air Circulation Mode operation commences at low airflow volume. It stops when the temperature drops to 2°C below the setting temperature.

Air Circulation Mode Operation Time Diagram



4) Automatic Mode Operation

Standard for Determining Operation Mode

↑
Intake air temperature

23°C

Cooling Mode

Soft Dry Mode

	Setting Temperature (Standard)
Cooling Mode	25°C
Soft Dry Mode	22°C

(a) Indoor fan operates at Lo fan speed for 20 seconds.
(b) After judging indoor air temperature, the operation mode is determined and operation continued at the mode determined.
(c) After the operation mode has been determined, the mode does not change. However, Soft Dry mode operation includes Cooling mode operation.
(d) If Automatic Mode operation is started while the air conditioner is operating, operation will continue. If current operation is in Cooling mode (including the operation which is a part of Soft Dry mode operation), it will be maintained, for 20 seconds at Lo fan speed. Then, the selected operation mode will continue.
(e) Room temperature adjustment.
The following are added to the setting temperature specified as above.

	Cooling	Soft Dry
Higher → +2°C	27°C	24°C
Standard → ±0°C	25°C	22°C
Lower → –2°C	23°C	20°C

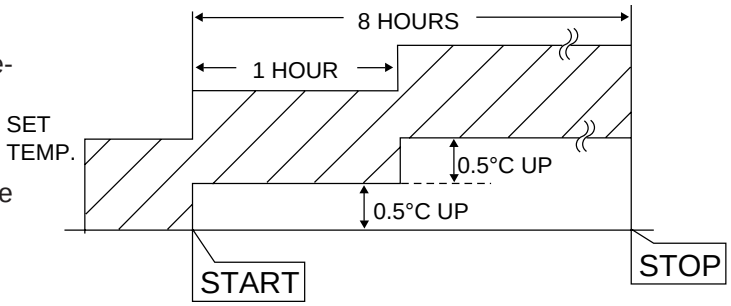
Operation Details

5) Sleep Mode Auto Operation

Cooling or Soft Dry Operation

When you press the SLEEP Mode, the following movement will start to avoid overcooling.

- The fan speed is automatically set to Low.
- The setting temperature will be risen by **0.5**°C at the start of operation and by **0.5**°C one hour later.
- The operation will stop after **8** hours.



6) Auto Restart Control

- If there is a power failure, operation will be automatically restarted when the power is resumed. It will start with previous operation mode and airflow direction. (Time Delay Safety Control is valid)
- Auto Restart Control is not available when Timer or Sleep Mode is set.
- This control can be omitted by cutting the jumper wire J2. (Refer Circuit Diagram)

7) Indoor Fan Speed Control

- Auto Fan Speed Control
  When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table.
- Manual Fan Speed Control
  Basic fan speed adjustment (3 settings, from Lo to Hi) can be carried out by using the Fan Speed selection button.

Fan Speed		Hi	Me	Lo	SLo	Stop
Cooling	Manual	○	○	○		
	Automatic	○	○			
Soft Dry				○	○	○
Air Circulation				○		○

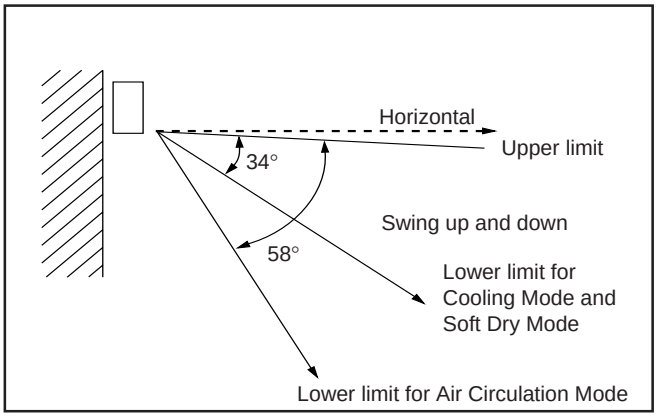
※ SLo: Indoor Fan rotates at 4-second intervals at Low speed.

Operation Details

8) Airflow Direction Control

Airflow Direction Auto-Control

- When set a Airflow Direction Auto-Control with remote control, the louver swings up and down as shown in the diagram.
- The louver does not swing when the Indoor Fan stops during operation.
- When stopped with remote control, the discharge vent is closed with the louver.

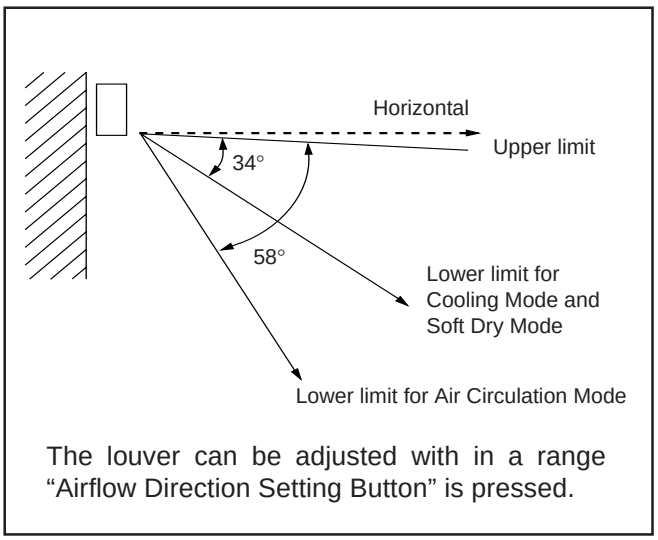


※ The left and right airflow direction louvers can be adjusted manually.

※ 1 There is no swinging while indoor fan is stopped during Cooling and Soft Dry operation.
※ 2 In Air Circulation operation, when the intake air temperature reaches set temperature, the airflow direction is changed from upper limit to lower limit. When the intake air temperature falls to 2°C lower than set temperature, the airflow direction is changed from lower limit to upper limit.

Airflow Direction Manual Control

- When the airflow direction set button is pressed, the automatic airflow is released and the airflow direction louver move up and down in the range shown in the diagram.
  The louver can be stopped by releasing the button at the desired louver position.
- When the remote control is used to stop the operation, the discharge vent is closed with airflow direction louver.



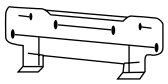
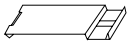
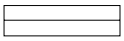
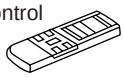
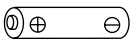
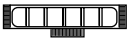
※ The left and right airflow direction louvers can be adjusted manually.

9) Delay ON Timer Control

- When the Delayed ON Timer is set by using the remote control, the unit will start operate slightly before the set time, so that the room will reach nearly to the set temperature by the desired time.
- For Cooling and Soft Dry mode, the operation will start 15 minutes before the set time.
- For Automatic mode, the indoor fan will operate at SLo speed for 20 seconds 15 minutes before the set time to detect the intake air temperature to determine the operation mode. The operation indication lamp will blink at this time.

Installation Information

Attached accessories

No.	Accessories part	Qty.	No.	Accessories part	Qty.
1	Installation plate 	1	6	Clamping cover of piping 	1
			7	Vinyl tape 	3
2	Installation plate fixing screw 	6	8	Vinyl tape 	1
3	Remote control 	1			
4	Battery 	2			
5	Air purifying filter 	2			

Accessories: Flaring piping kit
CZ-4F5, 7, 10 AN

SELECT THE BEST LOCATION

INDOOR UNIT

- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Indoor unit of this room air conditioner shall be installed on the wall in a height of at least 2.3 m.

OUTDOOR UNIT

- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over the rated length, additional refrigerant should be added as shown in the table.

MODEL	Piping size		Rated Length	Max. Elevation (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid				
MC120K	1/2"	1/4"	7	5	15	15

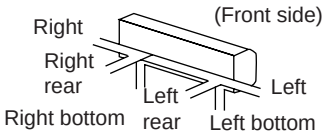
Installation Information

Indoor / Outdoor unit installation diagram

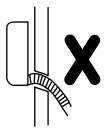
Length of power supply cord

about 1.1 m about 1.8 m

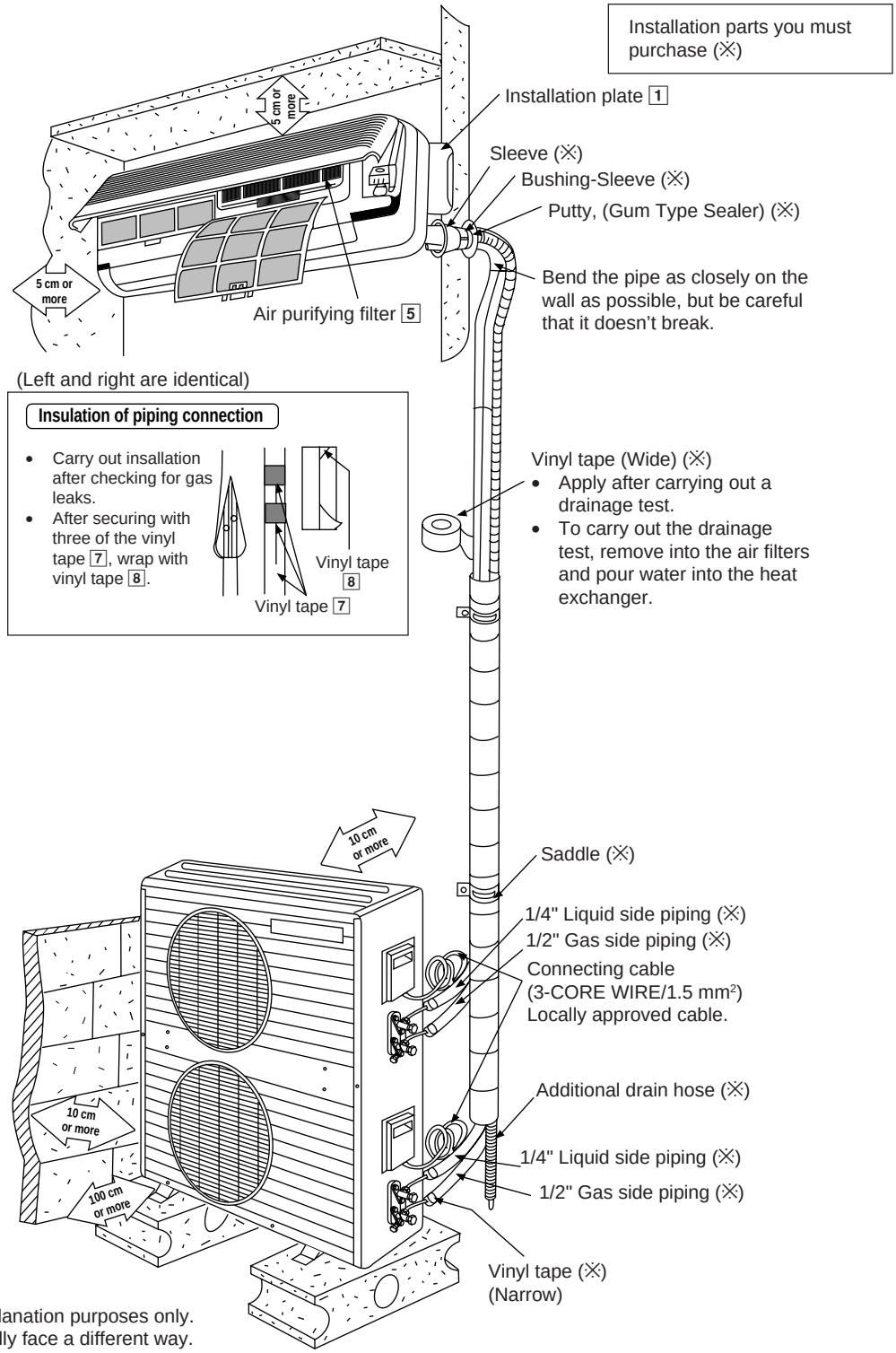
Piping direction



Attention not to bend up drain hose

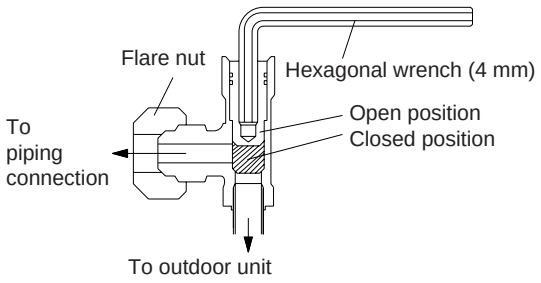
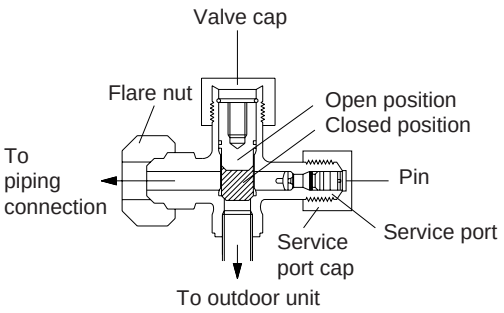


Installation parts you must purchase (※)



- This illustration is for explanation purposes only. The indoor unit will actually face a different way.

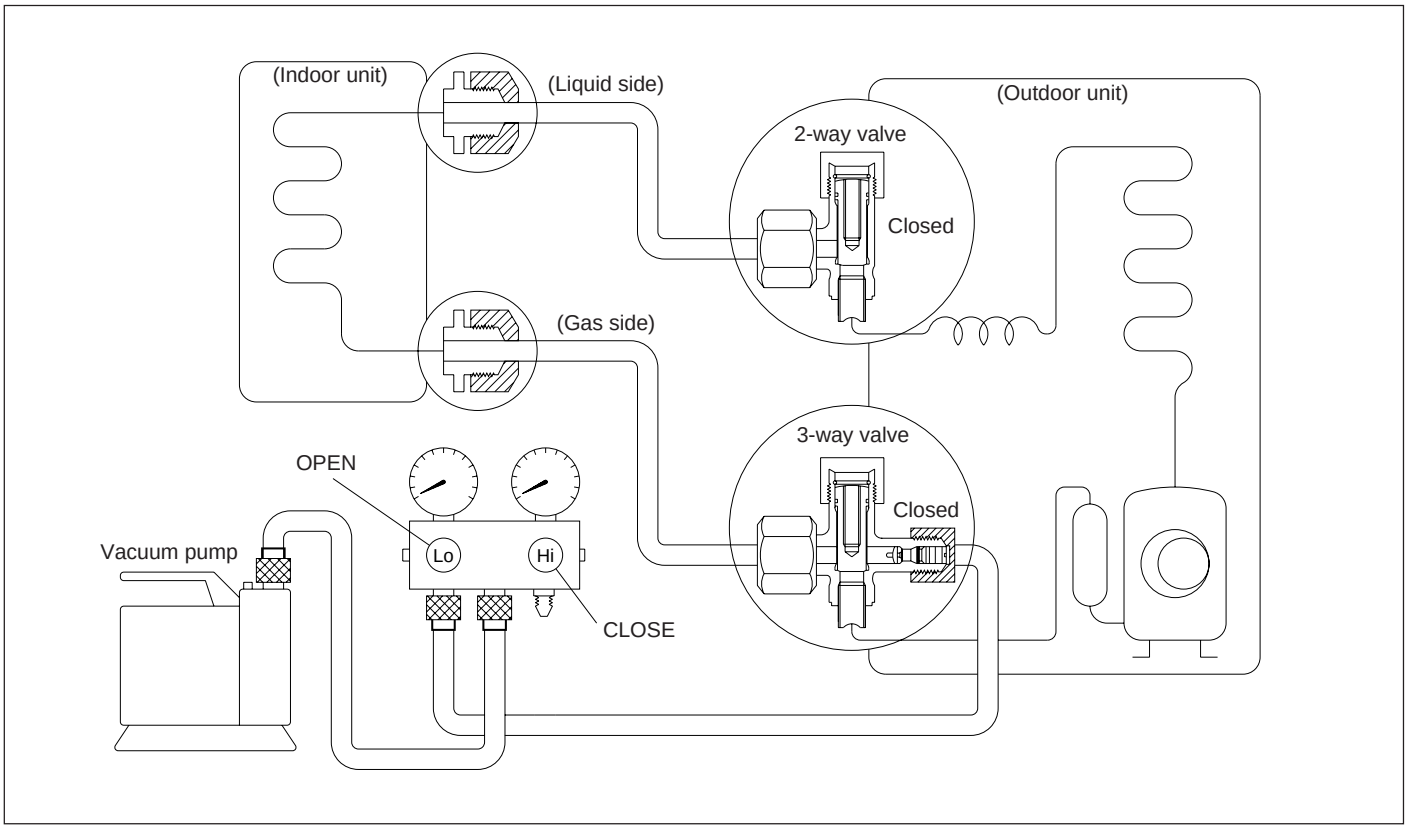
2-way • 3-way Valve

	2-way Valve (Liquid Side)	3-way Valve (Gas Side)	
			
Works	Shaft Position	Shaft Position	Service Port
Shipping	Close (With valve cap)	Closed (With valve cap)	Closed (With cap)
Evacuation (Installation and Re-installation)	Closed (Counter-Clockwise)	Closed (Clockwise)	Open (Push-pin)
Operation	Open (With valve cap)	Open (With valve cap)	Closed (With cap)
Pumping down (Transferring)	Closed (Clockwise)	Open (Counter-clockwise)	Open (Connected manifold gauge)
Evacuation (Servicing)	Open	Open	Open With vacuum pump
Gas charging (Servicing)	Open	Open	Open (With charging cylinder)
Pressure check (Servicing)	Open	Open	Open (Connected manifold gauge)
Gas releasing (Servicing)	Open	Open	Open (Connected manifold gauge)

1 Evacuation of Installation

WHEN INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.

If air remain in the indoor unit and refrigeration pipes, it will affect the compressor, reduce to cooling capacity, and could lead to a malfunction.



Procedure:

(1) Connect a charging hose with a push pin to the Low side of a charging set and the service port of a 3-way valve.
- Be sure to connect the end of the charging hose with the push pin to the service port.

(2) Connect the centre hose of the charging set to a vacuum pump.

(3) Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 MPa (0 cmHg) to –0.1 MPa (–76 cmHg). Then evacuate the air for approximately ten minutes.

(4) Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID GAS LEAKAGE.

(5) Disconnect the charging hose from the vacuum pump and from the service port of the 3-way valve.

(6) Tighten the service port cap at a torque of 18 N•m with a torque wrench.

(7) Remove the valve caps of the 2-way valve and the 3-way valve. Position both of the valves to "open" using a hexagonal wrench (4 mm).

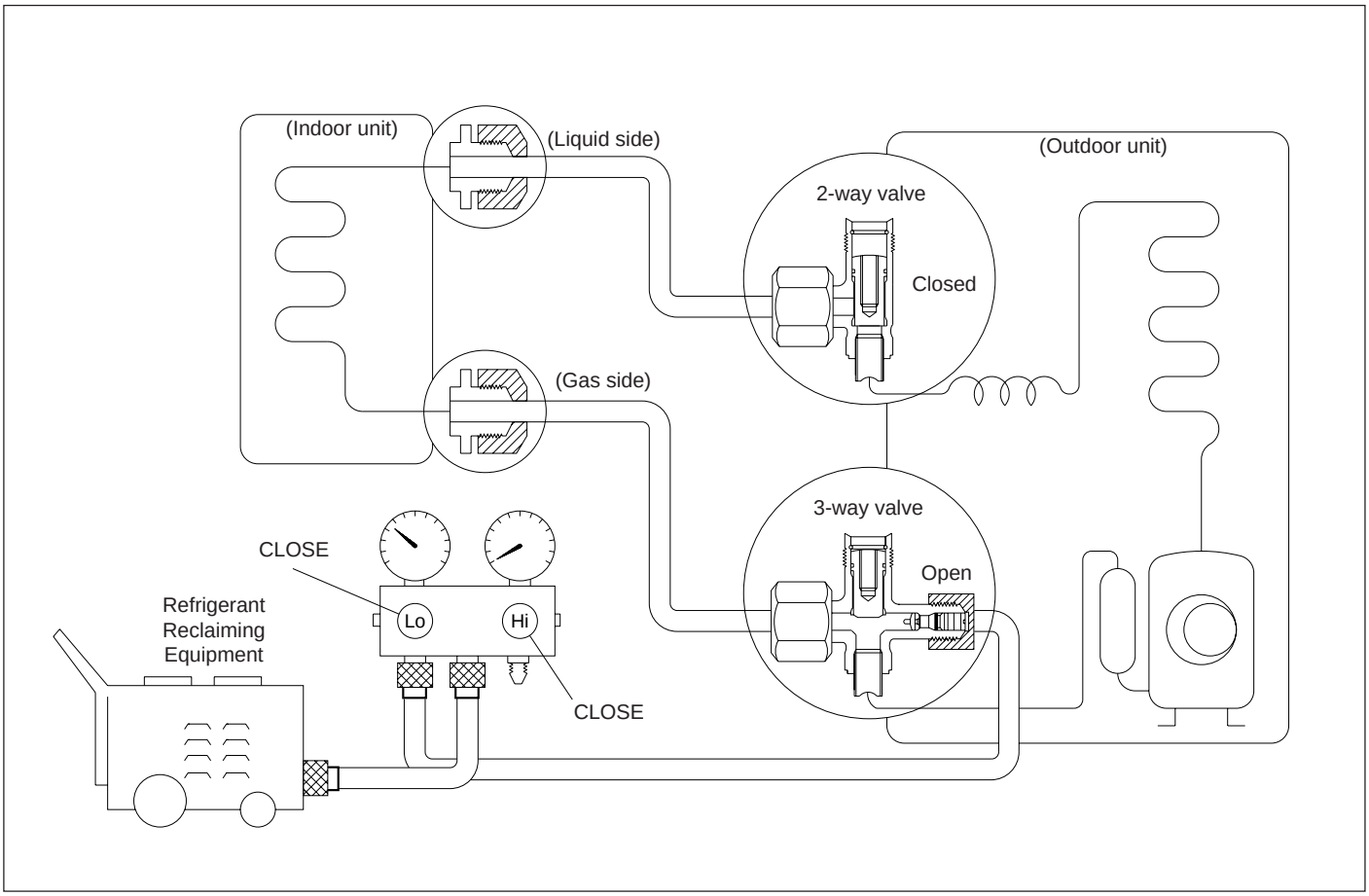
(8) Mount the valve caps onto the 2-way and 3-way valves.
- Be sure to check for gas leakage.

Caution

If gauge needle does not move from 0 cmHg to –76 cmHg in step (3) above, take the following measures:

If the leaks stop when the piping connections are tightened further, continue working from step (3).
If the leaks do not stop when the connections are retightened, repair the location of the leak.

2 Pumping down



Procedure:

(1) Confirm that both the 2-way and 3-way valves are set to the opened position.
- Remove the valve stem caps and confirm that the valve stems are in the opened position.
- Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.
- Connect the charge hose with the push pin to the Gas service port.

(4) Air purging of the charge hose.
- Open the low-pressure valve on the charge set slightly to purge air from the charge hose.

(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0 MPa (0 kg/cm²G).

If the unit cannot be operated at the cooling condition (weather is rather cool), short the Pumping Down pins on the Main Control P.C.B.

(Simply press the pumping down button if it is equipped.)

So that the unit can be operated.

(7) Immediately set the 3-way valve to the closed position.
- Do this quickly so that the gauge ends up indicating 0.1 MPa (1 kg/cm²G) to 0.3 MPa (3 kg/cm²G)

(8) Use refrigerant reclaiming equipment to collect refrigerant from indoor unit and pipes.

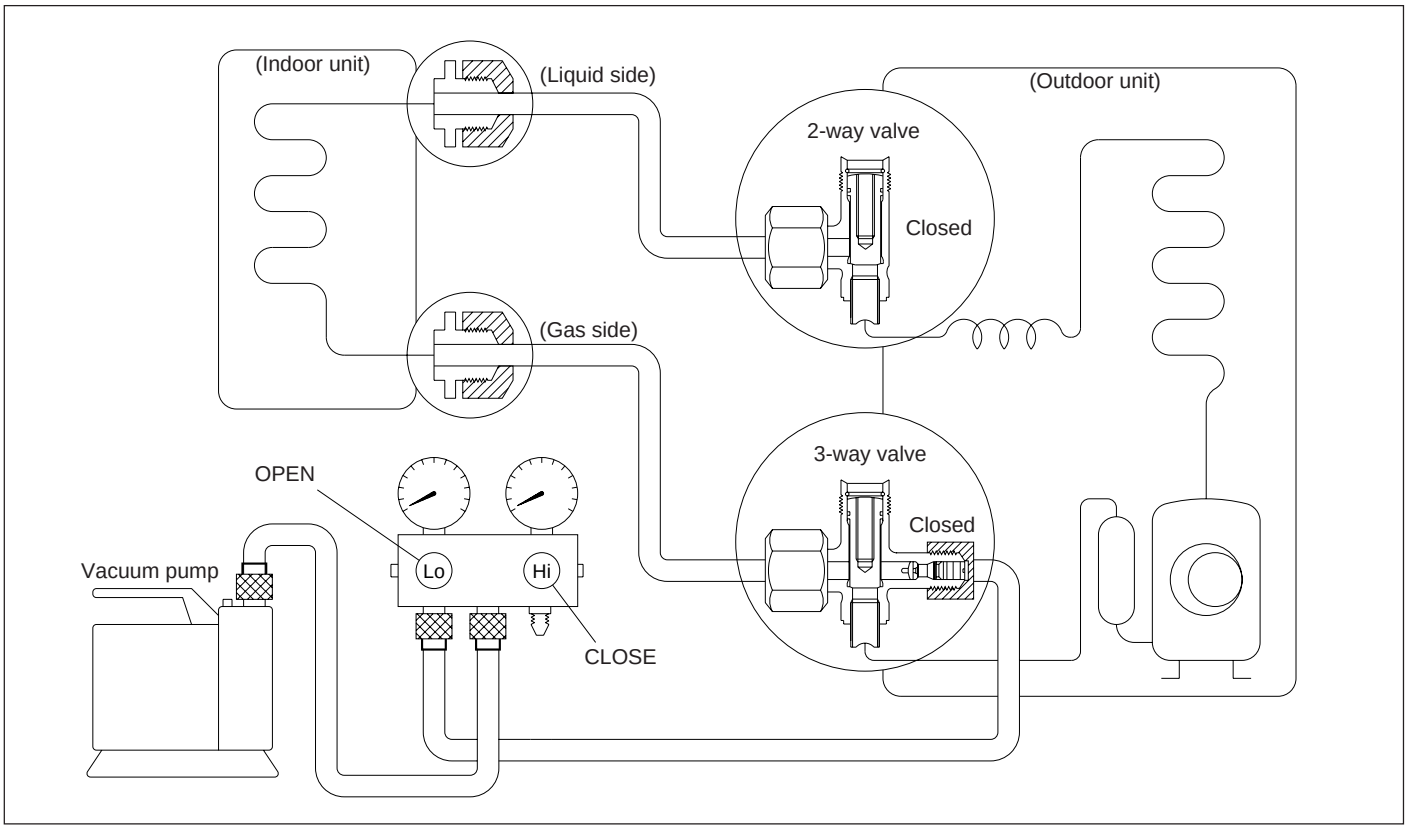
(9) Disconnect the charge set, and mount the 2-way and 3-way valve's stem caps and the service port caps.
- Use a torque wrench to tighten the service port cap to a torque of 18 N•m.
- Be sure to check for gas leakage.

(10) Disconnect pipes from indoor unit and outdoor unit.

3 Evacuation of Re-installation

WHEN RE-INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.

If air remain in the indoor unit and refrigeration pipes, it will affect the compressor, reduce to cooling capacity, and could lead to a malfunction.



Procedure:

(1) Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
- Be sure to connect the end of the charging hose with the push pin to the service port.

(2) Connect the center hose of the charging set to a vacuum pump.

(3) Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 MPa (0 cmHg) to –0.1 MPa (–76 cmHg). Then evacuate the air for approximately ten minutes.

(4) Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID GAS LEAKAGE.

(5) Disconnect the charging hose from the vacuum pump .

(6) Charge the pipes and indoor unit with gas refrigerant from 3-way valve service port, and then discharge the refrigerant until low side (gas side) gauge needle indicates 0.3 MPa (3 kg/cm^2)

(7) Tighten the service port cap at a torque of 18N•m with a torque wrench.

(8) Remove the valve caps of the 2-way valve and the 3-way valve. Position both of the valves to "open" using a hexagonal wrench (4 mm).

(9) Mount valve caps onto the 2-way and 3-way valves.
- **BE SURE TO USE REFRIGERANT RECLAIMING EQUIPMENT WHILE DISCHARGING THE REFRIGERANT.**
- Purge the air from charge set's centre hose.
- Be sure to check for gas leakage.

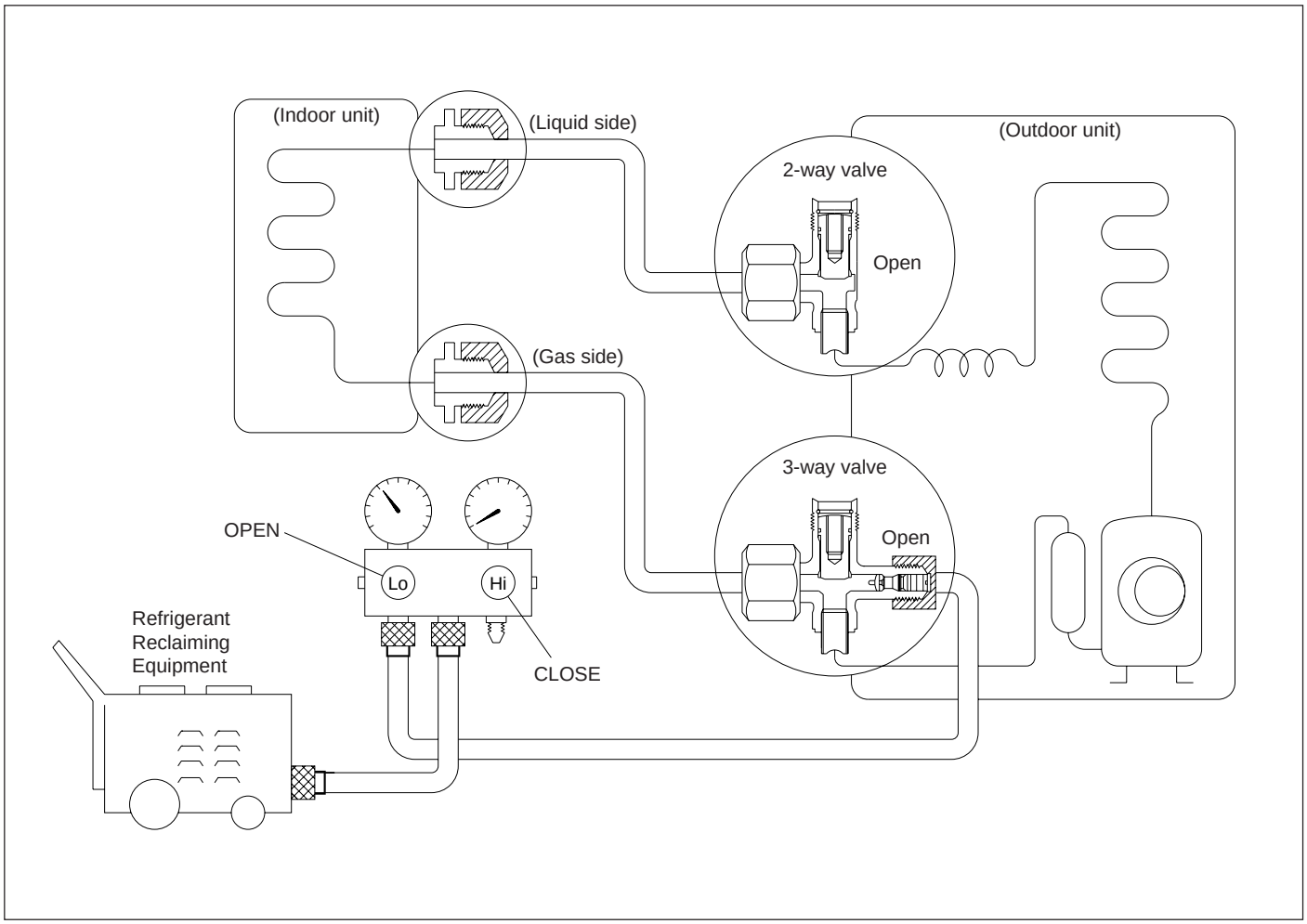
Caution

If gauge needle does not move from 0 MPa (0 cmHg) to –0.1 MPa (–76 cmHg) in step (3) above, take the following measures:

If the leaks stop when the piping connections are tightened further, continue working from step (3).
If the leaks do not stop when the connections are retightened, repair the location of the leak.

4 Balance refrigerant of the 2-way, 3-way valves

(Lack of refrigerant in the refrigeration cycle)



Procedure:

(1) Confirm that both the 2-way and 3-way valves are set to the open position.

(2) Connect the charge set to the 3-way valve's service port.
- Leave the valve on the charge set closed.
- Connect the charge hose with the push-pin to the service port.

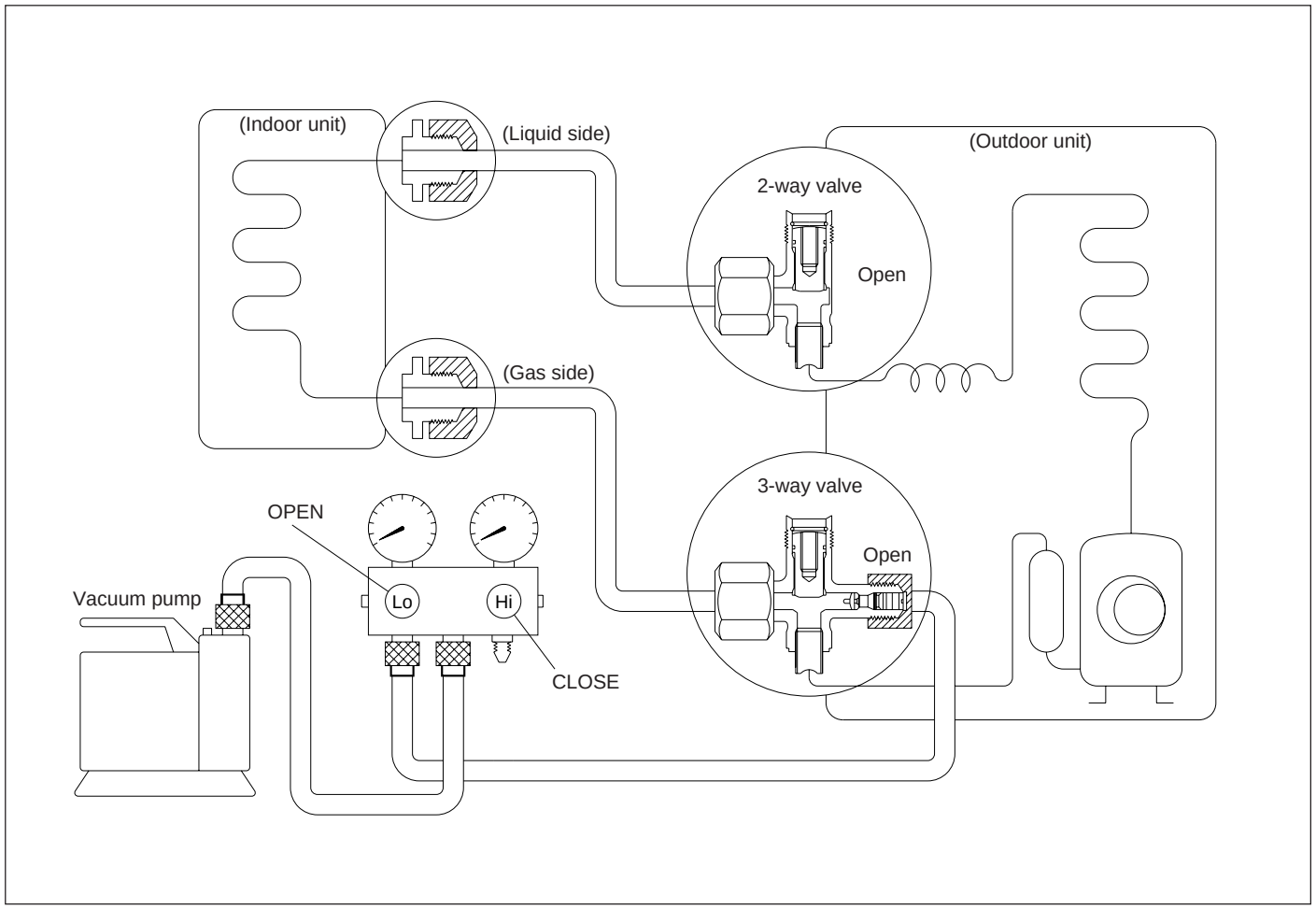
(3) Connect the charge set's centre hose to refrigerant reclaiming equipment.
- Purge the air from charge hose.

(4) Open the valve (Low side) on the charge set and discharge the refrigerant until the gauge indicates 0.05 MPa (0.5 kg/cm^{2}G) to 0.1 MPa (1 kg/cm^{2}G).
- If there is no air in the refrigeration cycle (the pressure when the air conditioner is not running is higher than 0.1 MPa (1 kg/cm^{2}G), discharge the refrigerant until the gauge indicates 0.05 MPa (0.5 kg/cm^{2}G) to 0.1 MPa (1 kg/cm^{2}G). If this is the case, it will not be necessary to apply a evacuation.
- Discharge the refrigerant gradually; if it is discharged too suddenly, the refrigeration oil will also be discharged.

(5) Turn on refrigerant reclaiming equipment .

5 Evacuation

(No refrigerant in the refrigeration cycle)



Procedure:

(1) Connect the vacuum pump to the charge set's centre hose.

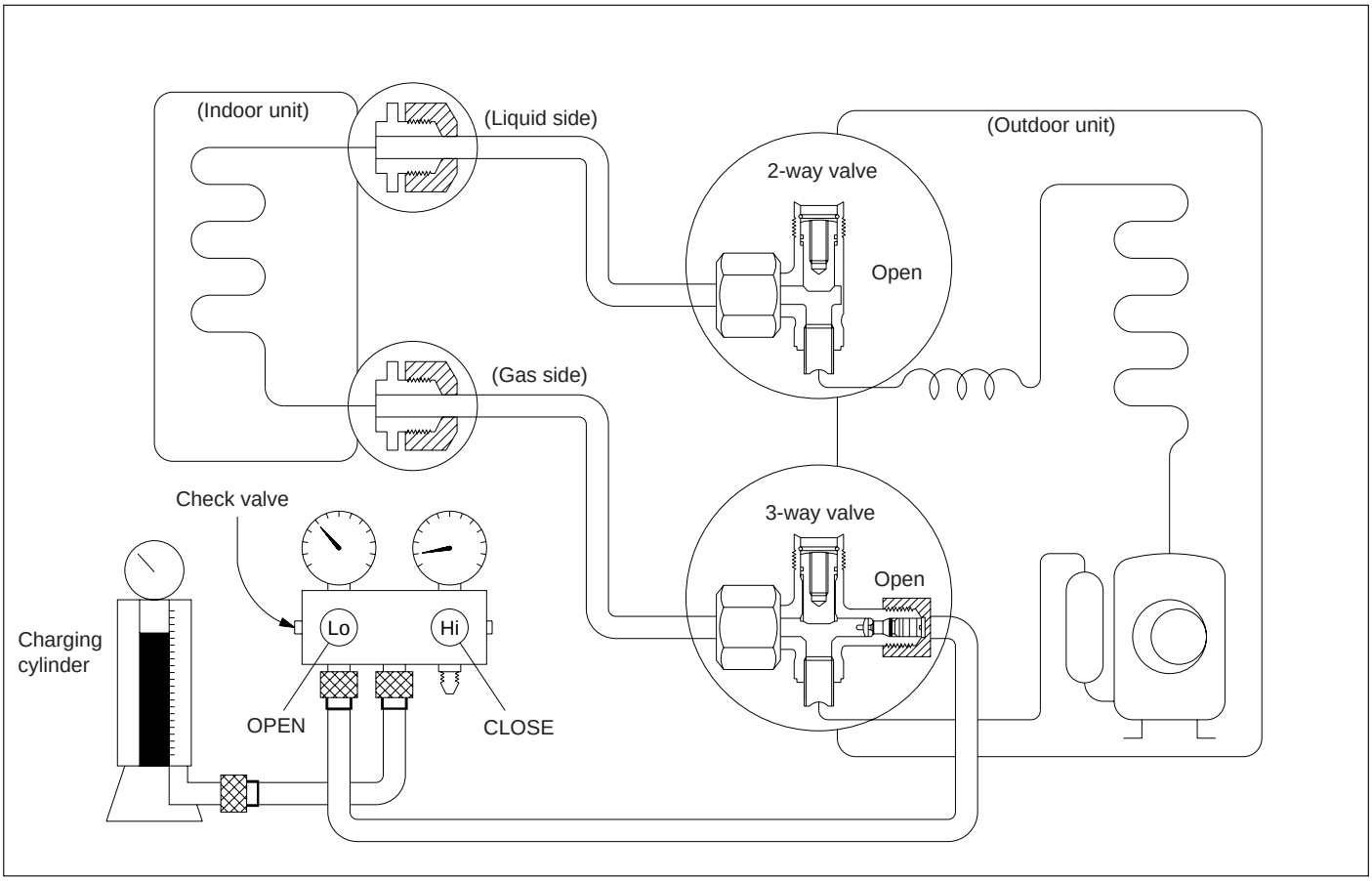
(2) Evacuation for approximately one hour.
- Confirm that the gauge needle has moved toward –0.1 MPa (–76 cmHg) [vacuum of 4 mmHg or less.]

(3) Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

(4) Disconnect the charge hose from the vacuum pump.
- Vacuum pump oil
  If the vacuum pump oil becomes dirty or depleted, replenish as needed.

6 Gas charging

(After Evacuation)



Procedure:

(1) Connect the charge hose to the charging cylinder.

- Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder.

(2) Purge the air from the charge hose.

- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

(3) Open the valve (Low side) on the charge set and charge the system with liquid refrigerant.

- If the system cannot be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150 g each time) while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure. (pumping down-pin)

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with large amount of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valve's service port.

- Stopping partway will allow the refrigerant to be discharged.
- If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

(5) Mount the valve stem caps and the service port cap.

- Use torque wrench to tighten the service port cap to a torque of 18 N•m.
- Be sure to check for gas leakage.

Servicing Information

- **Inspection points for the Indoor Electronic Controller**

1. The Electronic Controller, a signal Receiver and an Indicator can be seen by removing the Front Grille and Control Board Cover, as shown in the Fig. 1.

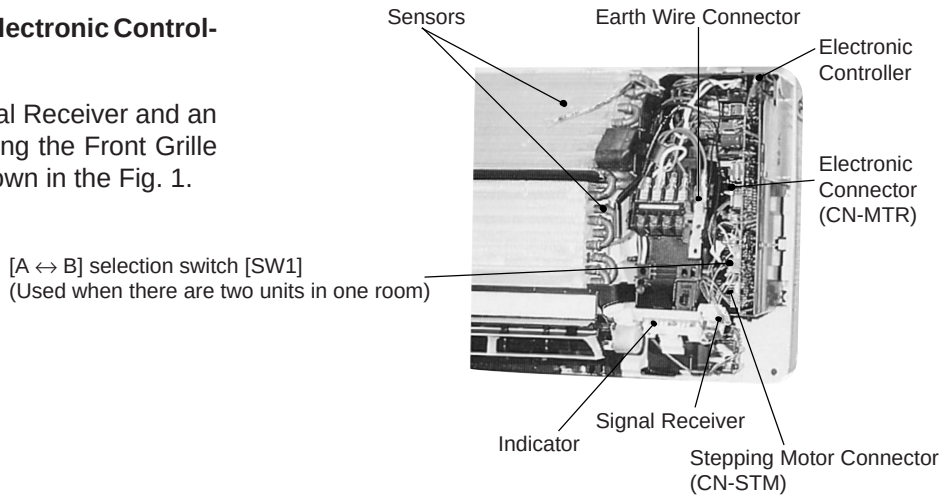


Fig. 1

- **Indoor Fan Motor removal procedure**

1. Remove the connector CN-MTR (GREEN) of Fan Motor and connector CN-STM (GREEN) of stepping motor from the electronic controller. Release the earth wire (YELLOW-GREEN) from the control board and sensors from its holders. (Refer Fig. 1)

2. Remove the Control Board
   The Control Board can be removed by releasing the top, left and right tabs shown in Fig. 2, 3, 4.

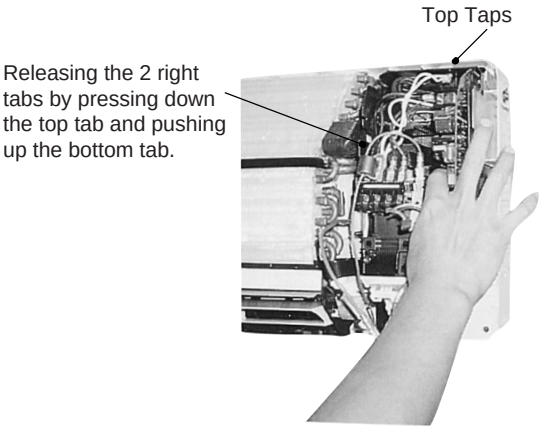


Fig. 2

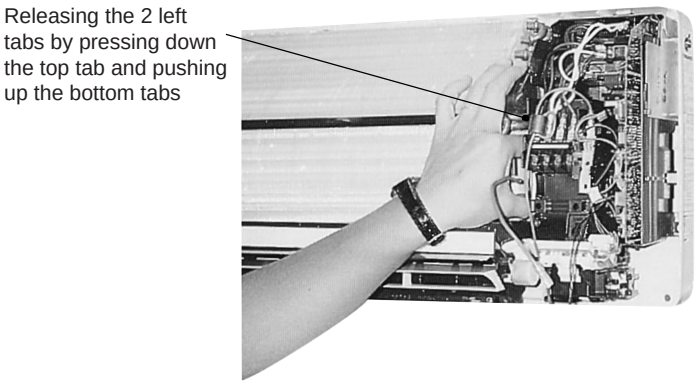


Fig. 3

Fig. 4

Servicing Information

3. Remove the Fan Motor
   Loosen the Fan Motor securing screw at the junction with Cross Flow Fan. (Fig. 5)

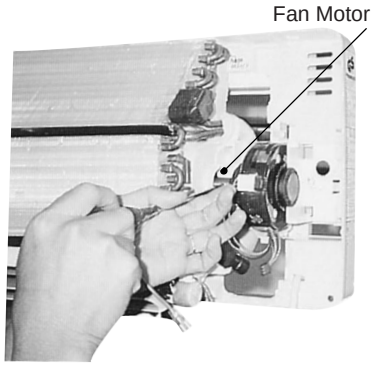


Fig. 5

Remove the particular piece and the Fan Motor can be taken off as shown in Fig. 6 and 7.

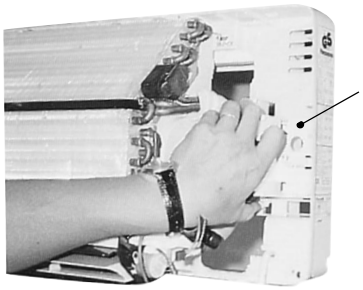


Fig. 6

Fig. 7

4. To fix the Indoor Fan Motor, ensure that the Fan Motor securing screw is positioned at the rear end and the Fan Motor lead wire is positioned parallel to the Fan Motor. (Fig. 8)

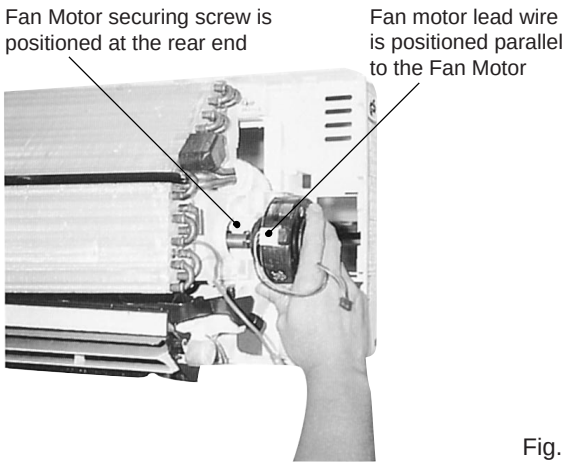


Fig. 8

Servicing Information

- **Cross Flow Fan Removal Procedure**

1. Remove the Indoor Fan Motor.
   (Refer to the removal procedure of the Indoor Fan Motor.) (Fig. 9)

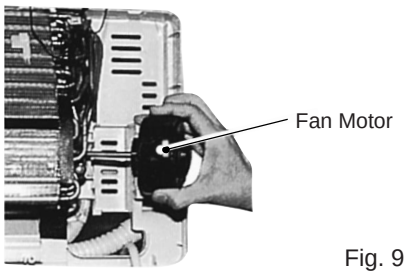


Fig. 9

2. Remove the Air Discharge Grille by taking off the screws that hold the Air Discharge Grille and then pull the Air Discharge Grille in a down and forward direction. (Fig. 10)

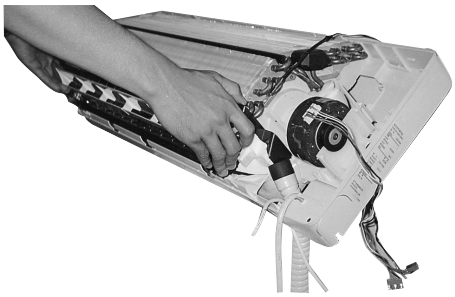


Fig. 10

3. Pull off the Bearing at the left of the Cross Flow Fan. (Fig. 11)

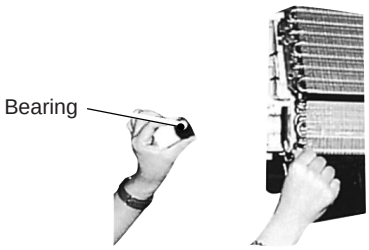


Fig. 11

4. Take off the mounting tab on the left side of the Heat Exchanger, pull the Heat Exchanger forward (left side) and remove the Cross Flow Fan.
   (Fig. 12)

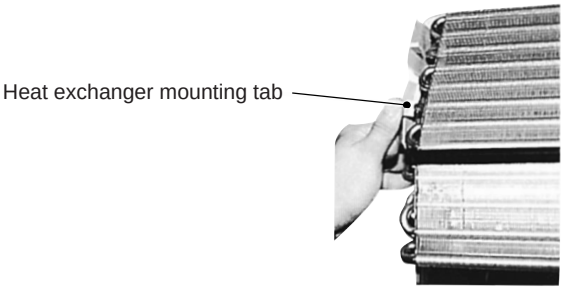
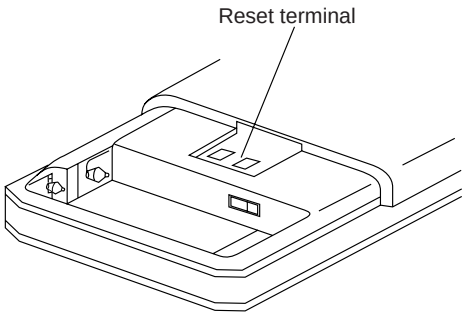


Fig. 12

Servicing Information

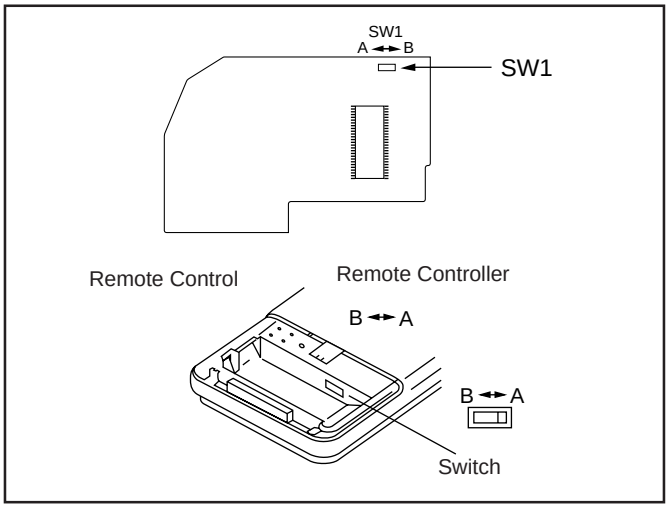
- **Remote Control Reset**

  When the batteries are inserted for the first time, or the batteries are replaced, all the indications will blink and the remote control might not work.
  If this happens, remove the back cover of the remote control and you will find a resetting terminal, and by shorting it with a minus screwdriver, it will return to normal.



- **Changing the wireless remote control transmission code**

  When two indoor units are installed in the same room, in order to prevent operating errors caused by using two remote controls, set up the remote control [B ↔ A] switch (SW1).
  The unit is set to A when it is shipped.



- **By adding a jumper wire to the remote control side and a carbon resistor (1/4 W, 10 kΩ) to the indoor printed circuit board, it is possible to select 4 types of transmission codes including one at time of delivery condition (1).**

	Remote control		Indoor printed circuit board		Note
	Switch SW B ↔ A	J – B	Switch SW1	RX	
1	A	———	A	———	At product delivery
2	B	———	B	———	
3	A	Jumper wire	A	10kΩ	
4	B	Jumper wire	B	10kΩ	

Troubleshooting Guide

Refrigeration cycle system

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor or a fan.
The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions; the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

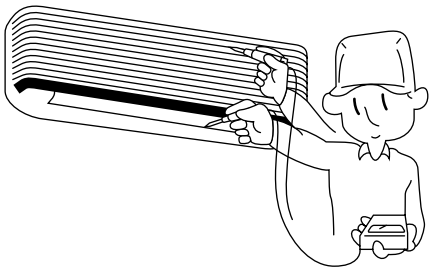
	Gas pressure MPa (kg/cm^2G)	Outlet air temperature (°C)
Cooling mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16

★ Condition: Indoor fan speed; High
Outdoor temperature 35°C

Difference in the intake and outlet air temperatures

→ Above 8°C (15 minutes after an operation is started.) → Normal

- **Measure the air temperature difference**

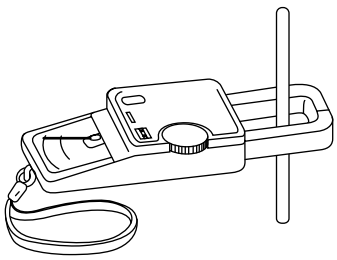


↓ Less than 8°C at cooling mode

Value of electric current during operation

→ Higher than specified → Dusty condenser preventing heat radiation
→ Excessive amount of refrigerant

- **Measure the electric current during operation**

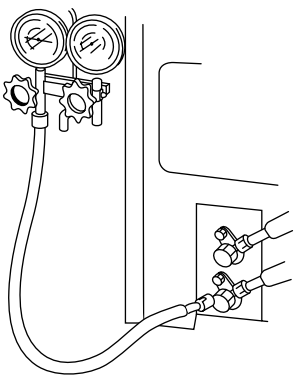


↓ Lower than specified

Gas side pressure

→ Cooling Mode High → Inefficient compressor
→ Low → Insufficient refrigerant
→ Low → Clogged strainer or capillary tube

- **Measure the gas side pressure**



Troubleshooting Guide

1. Relationship between the condition of the air conditioner and pressure and electric current

Condition of the air conditioner	Cooling Mode		
	Low Pressure	High Pressure	Electric current during operation
Insufficient refrigerant (gas leakage)	↘	↘	↘
Clogged capillary tube or Strainer	↘	↘	↘
Short circuit in the indoor unit	↘	↘	↘
Heat radiation deficiency of the outdoor unit	↗	↗	↗
Inefficient compression	↗	↘	↘

- Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

2. Diagnosis methods of a malfunction of a compressor

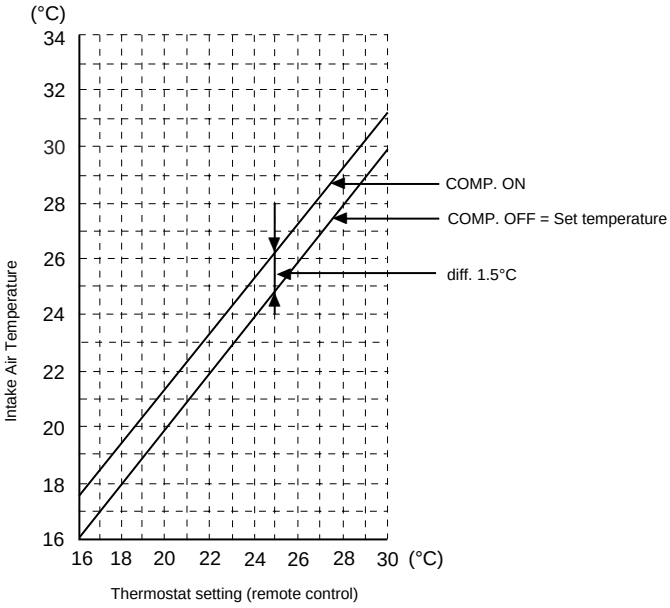
Nature of fault	Symptom
Insufficient compressing of a compressor	• Electric current during operation becomes approximately 20% lower than the normal value. • The discharge tube of the compressor becomes abnormally hot (normally 70 to 90°C). • The difference between high pressure and low pressure becomes almost zero.
Locked compressor	• Electric current reaches a high level abnormally, and the value exceeds the limit of an ammeter. In some cases, a breaker turns off. • The compressor is a humming sound.

Technical Data

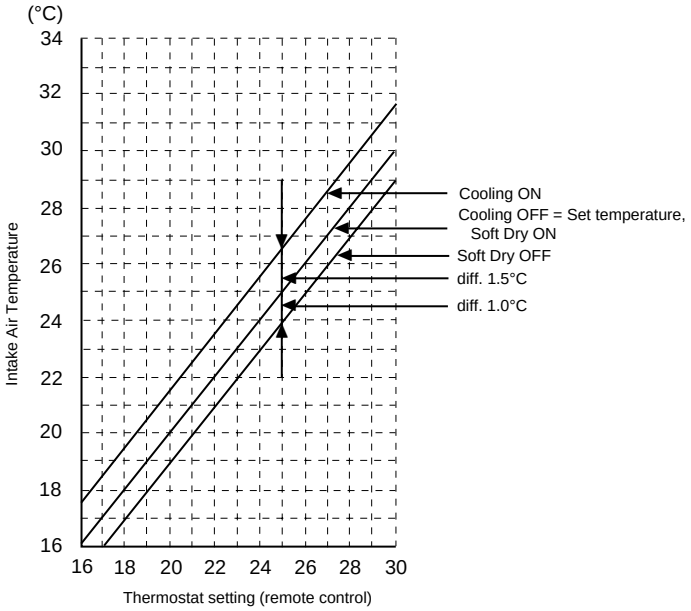
■ Thermostat characteristics

CS-MC120KE

- **Cooling**



- **Soft Dry**

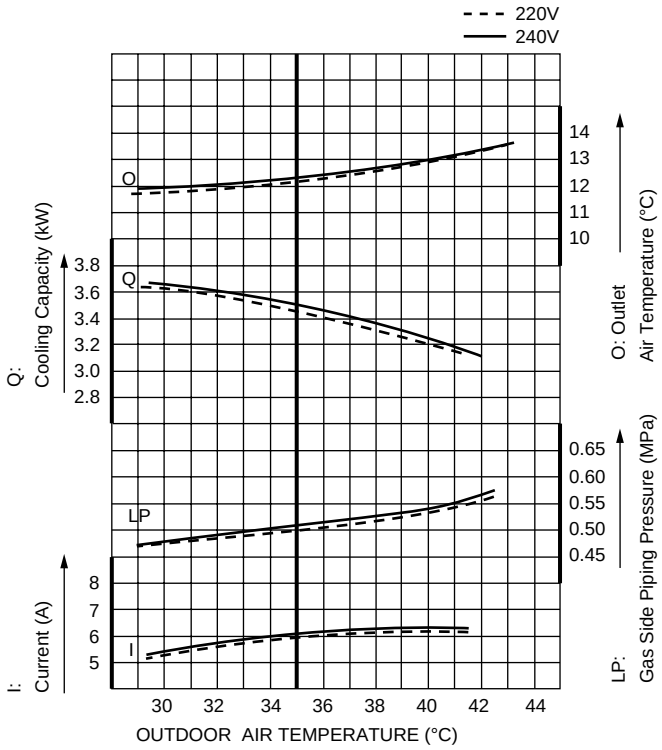


■ Operation characteristics

CS-MC120KE/CU-MC240KE

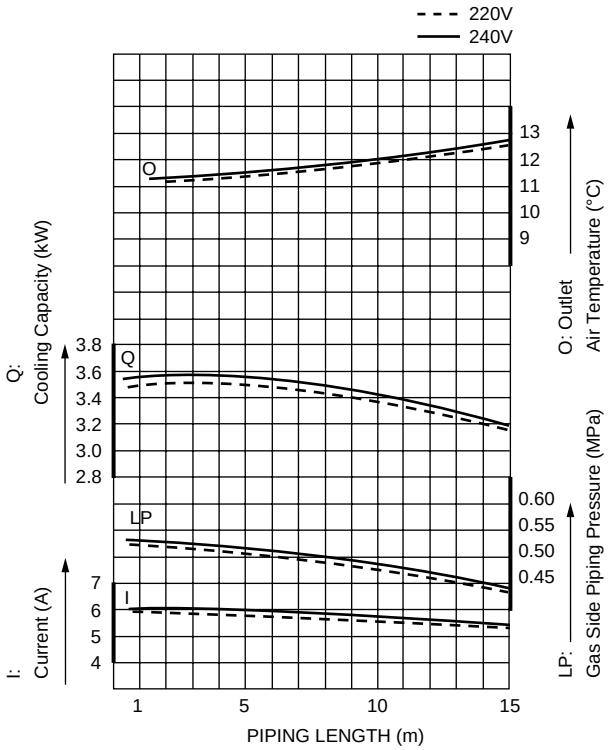
The capability value shown is the value for one unit. For a total for two unit, multiply by 2.

- **Cooling Characteristic**



[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 5 m

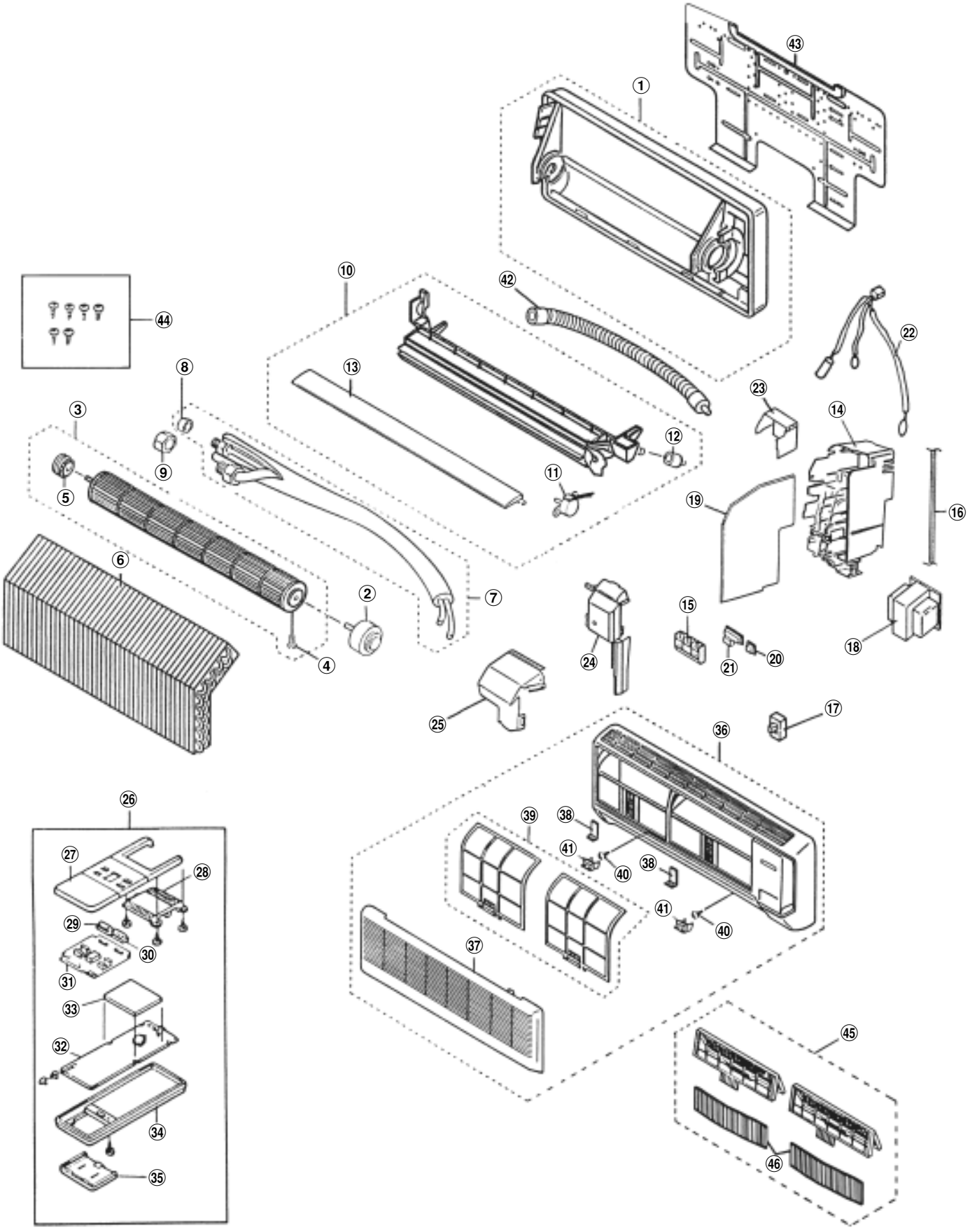
- **Piping Length Characteristic**



[Condition] Room temperature: 27/19°C
Outdoor temperature: 35/24°C
Cooling operation: At High fan

Exploded View

CS-MC120KE



Replacement Parts List

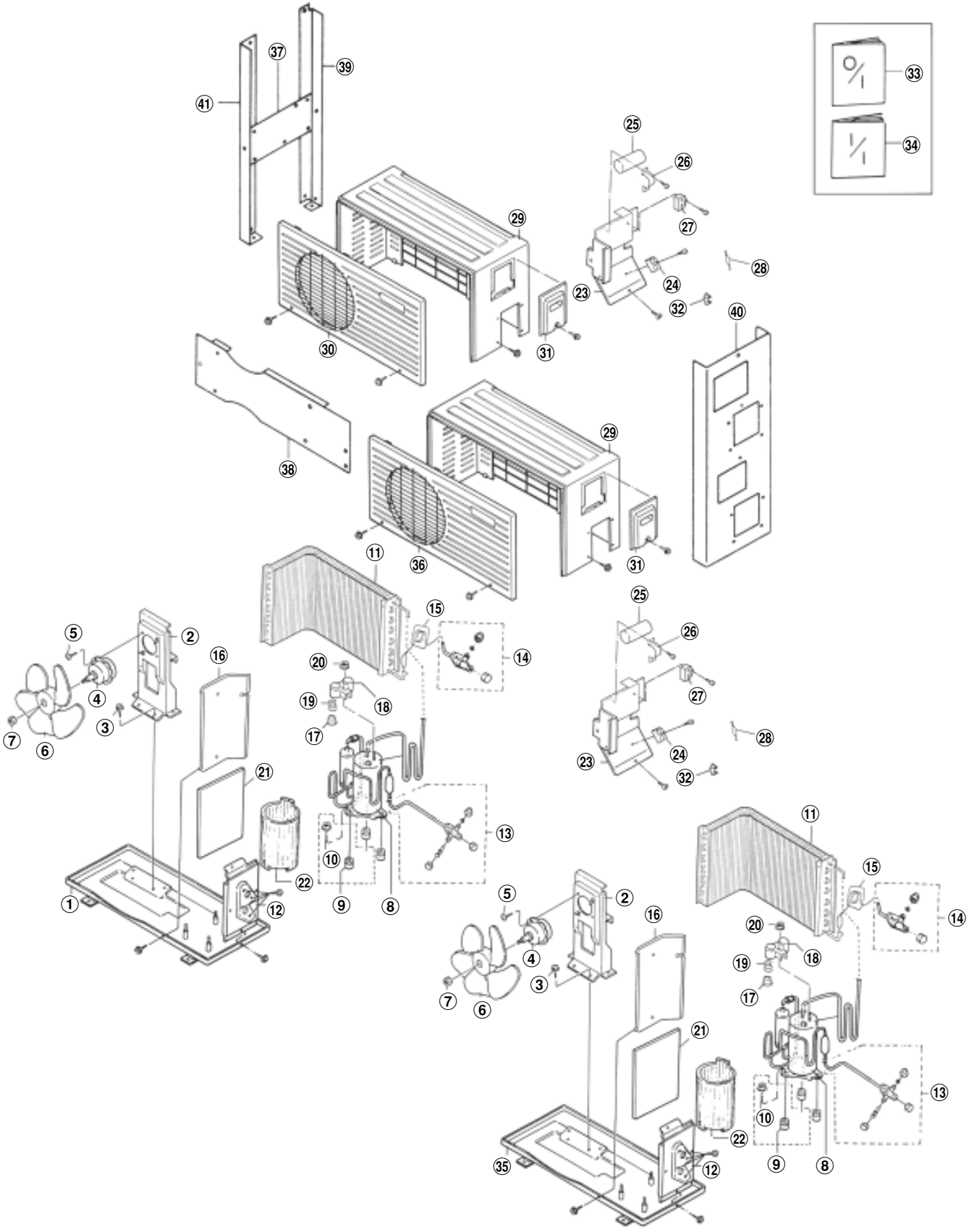
<Model: CS-MC120KE>

NO.	DESCRIPTION & NAME	QTY	CS-MC120KE	REMARKS
1	CHASSY COMPLETE	1	CWD50C202	
2	FAN MOTOR	1	CWA92231	○
3	CROSS FLOW FAN COMPLETE	1	CWH02C053	
4	SCREW – CROSS FLOW FAN	1	CWH4580304	
5	BEARING ASS'Y	1	CWH64K007	
6	EVAPORATOR	1	CWB30C146	
7	TUBE ASS'Y COMPLETE	1	CWT01C238	
8	FLARE NUT (1/4")	1	CWH6002140	
9	FLARE NUT (1/2")	1	CWT25007	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C481	
11	MOTOR – AIR SWING	1	CWA98245	○
12	TAP – DRAIN TRAY	1	CWH52C003	
13	VANE	1	CWE24394	
14	CONTROL BOARD	1	CWH10887	
15	TERMINAL BOARD COMPLETE	1	CWA28C472	○
16	POWER SUPPLY CORD	1	CWA20C616	
17	SLIDE SWITCH	1	CWA04088	○
18	TRANSFORMER COMPLETE	1	CWA40C246	○
19	ELECTRONIC CONTROLLER	1	CWA74859	○
20	RECEIVER	1	CWA74321	○
21	INDICATOR COMPLETE	1	CWE39C271	○
22	SENSOR COMPLETE	1	CWA50C521	○
23	CONTROL BOARD TOP COVER	1	CWH13383	
24	CONTROL BOARD FRONT COVER	1	CWH13C256	
25	CONTROL BOARD COVER PIECE	1	CWH13385	
26	REMOTE CONTROL COMPLETE	1	CWA75C560	○
27	REMOTE CONTROL CASE CO.	1	CWE15C241	
28	CONTROL PANEL	1	CWE311064	
29	KNOB	1	CWE17196A	
30	KNOB	1	CWE17286	
31	CONTACTOR	1	CWA65036C	
32	PCB – REMOTE CONTROL	1	CWA74572	
33	INDICATOR	1	CWE39199	
34	REMOTE CONTROL CASE	1	CWE15128A	
35	COVER	1	CWB80040A	
36	FRONT GRILLE COMPLETE	1	CWE11C590	
37	INTAKE GRILLE COMPLETE	1	CWE22C287	
38	PARTICULAR PIECE	2	CWD93C070	
39	AIR FILTER	2	CWD00215	
40	SCREW – FRONT GRILLE	2	XTN4+16C	
41	CAP – FRONT GRILLE	2	CWH52230	
42	DRAIN HOSE	1	CWH5880580	
43	INSTALLATION PLATE	1	CWH36122	
44	BAG COMPLETE – INSTALLATION SCREW	1	CWH82C194	
45	AIR PURIFYING FILTER COMPLETE	1	CWD00C111	
46	AIR PURIFYING FILTER	2	CWD00220	○

(Note)
- All parts are supplied from MAICO, Malaysia (Vendor Code: 061).
- The above parts are kept for seven years in accordance with MEI service policy. However, longer lead time will be taken in supplying the non-numbered parts.
- ○ marked parts are recommended to be kept in stock.

Exploded View

CU-MC240KE



Replacement Parts List

<Model: CU-MC240KE>

NO.	DESCRIPTION & NAME	Q'TY	CU-MC240KE	REMARKS
1	CHASSY ASS'Y (UPPER)	1	CWD50K625A	
2	FAN MOTOR BRACKET	2	CWD54171	
3	SCREW – FAN MOTOR BRACKET	8	CWH4580399	
4	FAN MOTOR	2	CWA95319	○
5	SCREW – FAN MOTOR MOUNT	6	CWH55027	
6	PROPELLER FAN	2	CWH00K040	
7	NUT – PROPELLER FAN	2	CWH56032	
8	COMPRESSOR	2	2KS224D5AC02	○
9	ANTI – VIBRATION BUSHING	6	CWH50055	
10	NUT – COMPRESSOR MOUNT	6	CWH4582065	
11	CONDENSER	2	CWB32C224	
12	HOLDER COUPLING ASS'Y	2	CWH35K019A	
13	3-WAY VALVE	2	CWB01379	○
14	2-WAY VALVE	2	CWB02243	○
15	TUBE ASS'Y (STRAINER CAPILLARY)	2	CWT01C239	
16	SOUND PROOF BOARD	2	CWH15265	
17	OVERLOAD PROTECTOR	2	CWA67C1211	○
18	TERMINAL COVER	2	CWH17038	
19	HOLDER – O.L.P.	2	CWH34033	
20	NUT – TERMINAL COVER	2	CWH7080300	
21	SOUND PROOF MATERIAL	2	CWG30833	
22	SOUND PROOF MATERIAL	2	–	
23	CONTROL BOARD	2	CWH10878	
24	TERMINAL BOARD ASS'Y	2	CWA28K217	
25	CAPACITOR – COMPRESSOR	2	CWA31647	○
26	HOLDER CAPACITOR	2	CWH30057	
27	CAPACITOR – FAN MOTOR	1,1	CWA31341, CWA31342	○
28	FUSE	2	XBA2C50TR0	○
29	CABINET ASS'Y	2	CWE00K318A	○
30	CABINET FRONT PLATE	1	CWE06C104A	
31	CONTROL BOARD COVER	2	CWH13C286	
32	FUSE HOLDER	2	XCSCW011	
33	OPERATING INSTRUCTION	1	CWF561246	
34	INSTALLATION INSTRUCTION	1	CWF61480	
35	CHASSY ASS'Y (LOWER)	1	CWD50K611A	
36	CABINET FRONT PLATE	1	CWE06C108A	
37	FLAT PLATE	1	CWD64189A	
38	FLAT PLATE	1	CWD90955A	
39	FLAT PLATE	1	CWD90960A	
40	FLAT PLATE	1	CWD90977A	
41	FLAT PLATE	1	CWD90959A	

(Note)
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Electronic Parts List

<Model: CWA74859>

SYMBOL	DESCRIPTION & NAME	PART NO.
BZ1	SOUND GENERATOR	A48005
C–FM	SH CAPACITOR	A31694
D2	DIODE	A54RA15–01V3
DB1	DIODE	A54CS1VB20E
FUSE	FUSE	XBA2C31TR0
IC1	INTEGRATED CIRCUIT	A52D0001W013
IC2	INTEGRATED CIRCUIT	A52C040
IC3	INTEGRATED CIRCUIT	A52MPA2003C
IC4	INTEGRATED CIRCUIT	A52BR9011B
IC5	INTEGRATED CIRCUIT	A52C094
L1, L2	V–COIL	A43036
Q3	TRANSISTOR	A55DTC143XST
Q2	TRANSISTOR	A55DTC114EST
Q4, Q5	TRANSISTOR	A55C1740STPR
Q1	TRANSISTOR	A55C1741ASTR
RY–H, RY–M	ELECTRO MAGNETIC RELAY	A00160
RY–C	ELECTRO MAGNETIC RELAY	A00106
SSR	TYRISTOR	A56W2DEH1–5
SW3	SLIDE SWITCH	A04042
SW1, SW2	PUSH SWITCH	A01059
X1	RESONATOR	A45ST8.0MTWT
ZD1	DIODE	A54D7.5EL1TB
ZNR1, ZNR2	DIODE	A54C036

(Note) ● All parts are supplied from MACC, Malaysia (Vendor Code: 086).

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