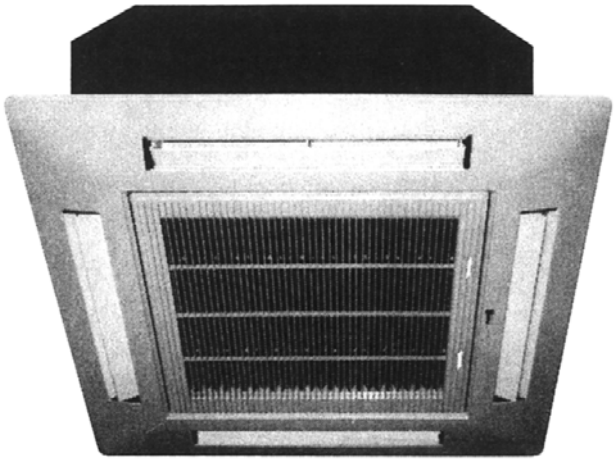
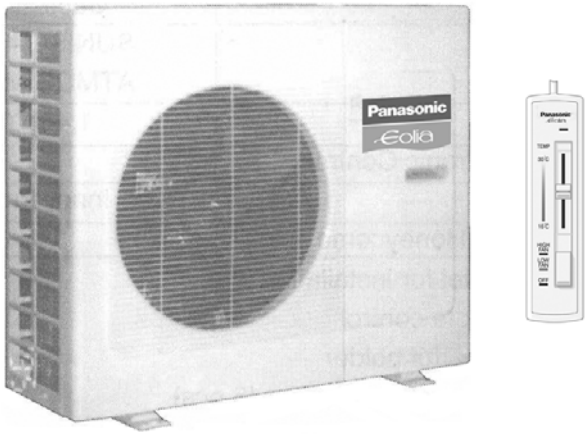
Order No. MAC0312055C3

Service Manual

Air Conditioner

CS-ES1820B CU-ES1820B
CS-ES2420B CU-ES2420B





⚠ WARNING

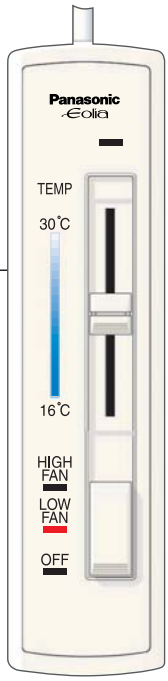
This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should 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.

CONTENTS

Panasonic
Eolia

1 Functions

Remote Control



Wired

- Max length or distance is 10 meter.

Operation Indicator LED

- Light up during air conditioner is in operation.
- Blinks when the drain pump malfunction.
  (Please call your nearest service centre)

Operation & Fan Speed Indicator

- Shown selected operation.

Simply & Easy to Operate

- 1. Slide the Operation Switch to:-

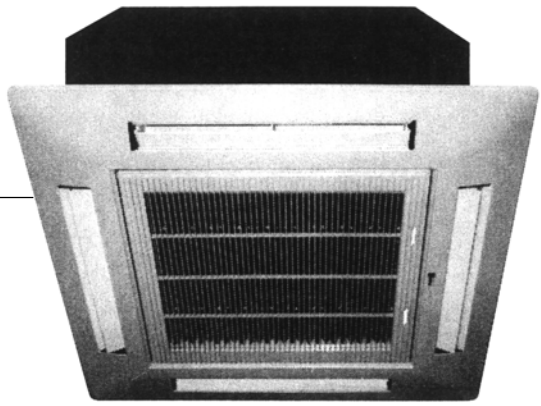
  OFF – stops all operations
  LOW FAN – Operation with low fan speed
  HIGH FAN – Operation with high fan speed

2. Slide the lever of cooling temperature setting control:-

   Downward – Low temperature (more cool)
   Upward – High temperature (less cool)

   Cooling temperature setting:-
   LOW (16°C) ~ **HIGH** (30°C)

Indoor Unit



Sensing the Room Temperature

- Room Temperature Sensor (thermistor)

Room Temperature Control

- Maintains the room temperature accordance with the setting temp.

Drain Test Switch

Circuit Protection Control

- 60 second forced operation of the compressor.

Drain Water Overflow Prevention control

- Details can be referred in the "**Operation Details**".

Drain Motor Control

- When the compressor is running, the drain motor operates intermittently running for two minutes then stopping for 100 seconds and so on.

Operation

- Cooling operation only.

Power Resume Control

- Restart previous operation mode when power supply resume after power failure.

Vertical Airflow Direction Vanes

- Manual adjustment.

Time Delay Safety Control

- Restarting is inhibited for approximately 3 minutes.

Anti-freezing Control

- 1. Piping Temperature Sensor
  2. Intake Temperature Sensor

Pump Down Switch

- Refer "Operation Details".

Starting Current Control

- Indoor fan is delayed for 1.6 second at the starting circuit.

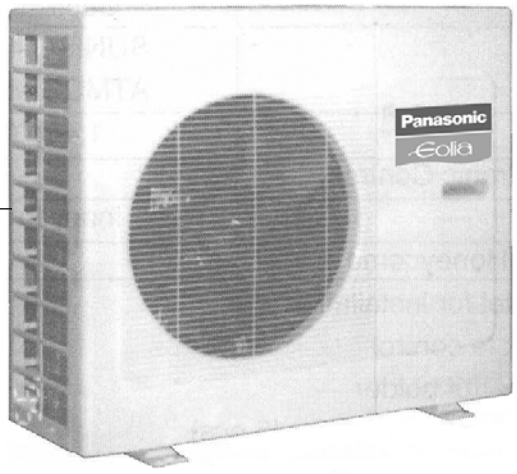
Fan Speed Control

- High and Low fan speed.

7 minutes Time Saved

- 7 minutes automatic restarting at cooling operation.

Outdoor Unit



Overload Protector

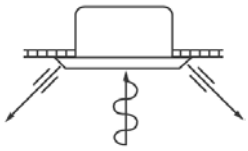
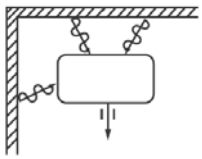
- Inner Protector.

Safety Precaution

- Current fuse to protect fan motor.

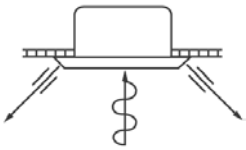
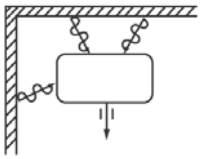
2 Product Specifications

2.1. CS-ES1820B CU-ES1820B

			Unit	Indoor unit	Outdoor unit
Power Source (Phase, Voltage, Cycle)			ø, V, Hz	Single, 240 - 220, 50	
Cooling Capacity			kW (BTU/h)	5.40 - 5.30 (18,400 - 18,000)	
Moisture Removal			l/h (Pint/h)	2.9 (6.1)	
Airflow Method			OUTLET INTAKE	SIDE VIEW 	TOP VIEW 
Noise Level			dB (A)	High 41 - 39, Low 33 - 32	57 - 55
Electrical Data	Input Power		W	2,250 - 2,080	
	Running Current		A	11.4 - 10.4	
	EER		W/W (BTU/hW)	2.4 - 2.5	
	Starting Current		A	52	
Piping Connection Port (Flare piping)			inch inch	G ; Half Union 1/2” L ; Half Union 1/4”	G ; 3-way valve 1/2” L ; 3-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”
Dimensions	Height		inch (mm)	10 - 3/16 (259)	26 - 31/32 (685)
	Width		inch (mm)	25 - 3/4 (654)	31 - 1/2 (800)
	Depth		inch (mm)	25 - 3/4 (654)	11 - 13/16 (300)
Net Weight			lb (kg)	46 (21)	132 (60)
Compressor	Description			—	Rotary (1 cylinder) rolling piston type
	Motor	Type		—	Induction (2-poles)
	Rated	Output	W	—	1,700
Fan Motor	Description			Turbo Fan	Propeller Fan
	Motor	Type		Induction (6-poles)	Induction (4-poles)
	Input		W	71 - 61	121 - 137
	Rated	Output	W	20	65
Heat Exchanger			Row / Stage	(Plate fin configuration, forced draft)	
				2/10, 17 FPI	2/26, 16 FPI
Refrigerant Control Device				—	Capillary Tube
Refrigeration Oil			(c.c.)	—	SUNISO 4GDID or ATMOS M60 (700)
Refrigerant (R-22)			g (oz)	—	1,480 (52.2)
Thermostat				Electronic Control	—
Protection Device				—	Inner Protector
Air Filter				P.P. Honeycomb	—
Air Circulation	Indoor Air	Low Fan	m^3/min (cfm)	8.99 (317) - 8.19 (289)	—
		High Fan	m^3/min (cfm)	12.5 (441) - 11.3 (399)	—
	Outdoor Air		m^3/min (cfm)	—	38.3 (1,352) - 35.2 (1,243)
	Fan Speed	Low Fan	rpm	410 - 370	545 - 610
		High Fan	rpm	570 - 515	880 - 960
Heat Exchanger	Description			Evaporator	Condenser
	Tube material			Copper	Copper
	Fin material			Aluminium	Aluminium
	Size (W × H × L)		mm	1,576 × 210 × 25.4 1,516 × 210 × 25.4	769.2 × 660.4 × 44 732.9 × 660.4 × 44
Capillary Tube	Length		mm	—	715
	Flow Rate		L/min	—	18.8
	Inner Diameter		mm	—	2.1
Capacity Control				Capillary Tube	
Compressor Capacitor			µF, VAC	—	35, 370
Fan Motor Capacitor			µF, VAC	1.5, 400	3.5, 400

- Specifications are subjected to change without prior notice for further improvement.

2.2. CS-ES2420B CU-ES2420B

			Unit	Indoor unit	Outdoor unit
Power Source (Phase, Voltage, Cycle)			ø, V, Hz	Single, 240 - 220, 50	
Cooling Capacity			kW (BTU/h)	6.70 - 5.50 (22,860 - 22,178)	
Moisture Removal			l/h (Pint/h)	3.8 (8.0)	
Airflow Method			OUTLET INTAKE	SIDE VIEW 	TOP VIEW 
Air Circulation			m^3/min cfm	13.1 - 11.8 462 - 416	
Noise Level			dB (A)	High 43 - 41, Low 35 - 34	61 - 59
Electrical Data	Input Power		W	2,800 - 2,650	
	Running Current		A	13.4 - 12.8	
	EER		W/W	2.4 - 2.5	
	Starting Current		A	57	
Piping Connection Port (Flare piping)			inch inch	G ; Half Union 5/8” L ; Half Union 1/4”	G ; 3-way valve 5/8” L ; 3-way valve 1/4”
Pipe Size (Flare piping)			inch inch	G ; (gas side) 5/8” L ; (liquid side) 1/4”	G ; (gas side) 5/8” L ; (liquid side) 1/4”
Dimensions	Height		inch (mm)	10 - 3/16 (259)	26 - 31/32 (685)
	Width		inch (mm)	25 - 3/4 (654)	31 - 1/2 (800)
	Depth		inch (mm)	25 - 3/4 (654)	11 - 13/16 (300)
Net Weight			lb (kg)	46 (21)	139 (63)
Compressor	Description			—	Rotary (1 cylinder) rolling piston type
	Motor	Type		—	Induction (2-poles)
	Rated	Output	W	—	2,200
Fan Motor	Description			Turbo Fan	Propeller Fan
	Motor	Type		Induction (6-poles)	Induction (4-poles)
	Input		W	90 - 70	186 - 167
	Rated	Output	W	25	100
Heat Exchanger			Row / Stage	(Plate fin configuration, forced draft)	
				2/10, 17 FPI	2/26, 16 FPI
Refrigerant Control Device				—	Capillary Tube
Refrigeration Oil			(c.c.)	—	SUNISO 4GDID or ATMOS M60 (1,130)
Refrigerant (R-22)			g (oz)	—	1,760 (62.1)
Thermostat				Electronic Control	—
Protection Device				—	Inner Protector
Air Filter				P.P. Honeycomb	—
Air Circulation	Indoor Air	Low Fan	m^3/min (cfm)	9.3 (328) - 8.3 (293)	—
		High Fan	m^3/min (cfm)	13.1 (462) - 11.8 (416)	—
	Outdoor Air		m^3/min (cfm)	—	44.8 (1,581) - 41.7 (1,472)
	Fan Speed	Low Fan	rpm	420 - 380	665 - 600
		High Fan	rpm	590 - 540	1,115 - 1,050
Heat Exchanger	Description			Evaporator	Condenser
	Tube material			Copper	Copper
	Fin material			Aluminium	Aluminium
	Size (W × H × L)		mm	1,576 × 210 × 25.4 1,516 × 210 × 25.4	769.2 × 660.4 × 44 732.9 × 660.4 × 44
Capillary Tube	Length		mm	—	1,170
	Flow Rate		L/min	—	21.1
	Inner Diameter		mm	—	2.4
Capacity Control				Capillary Tube	
Compressor Capacitor			µF, VAC	—	45, 370
Fan Motor Capacitor			µF, VAC	1.5, 400	3.5, 450

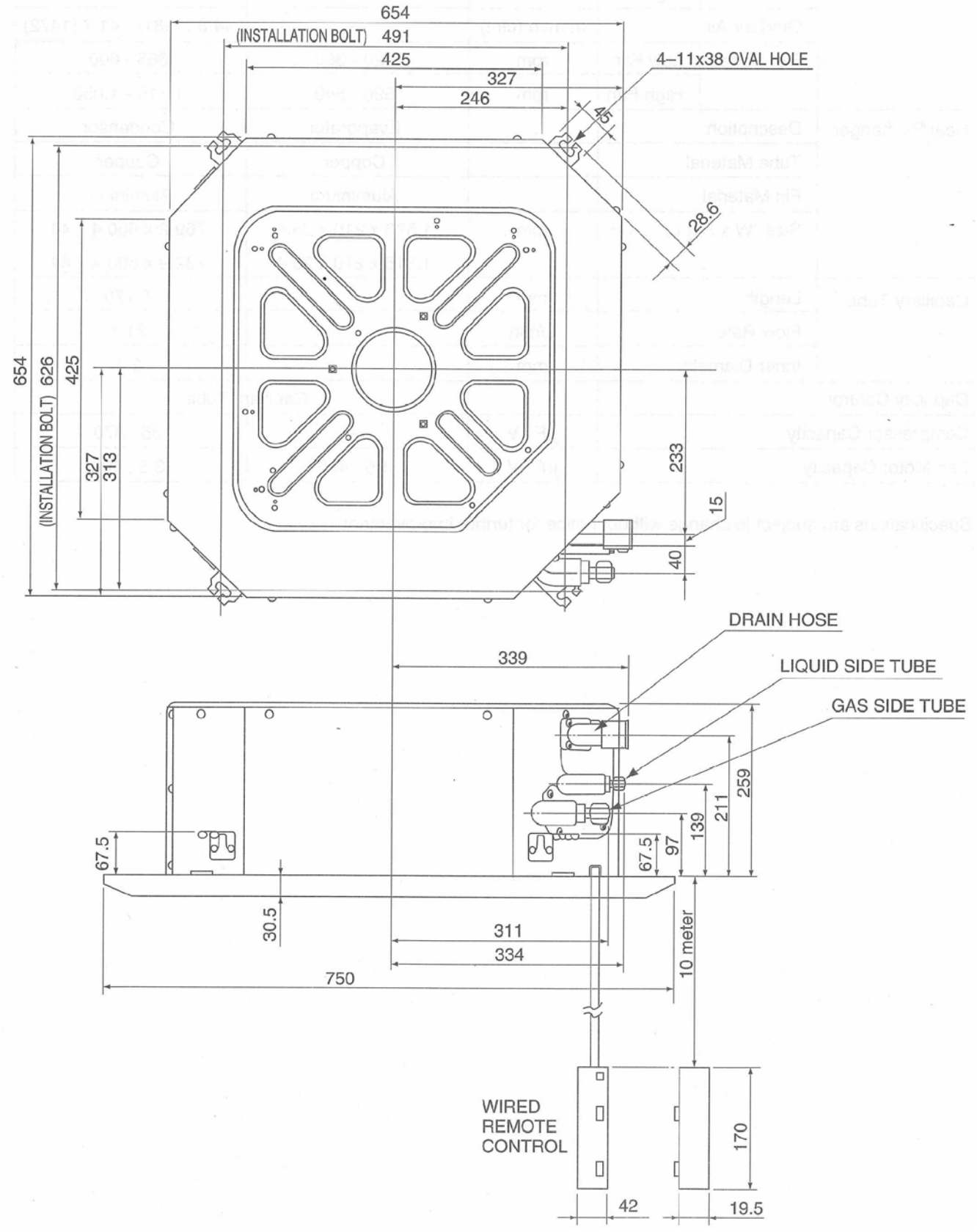
- Specifications are subjected to change without prior notice for further improvement.

3 Dimensions

3.1. Indoor Unit & Remote Control

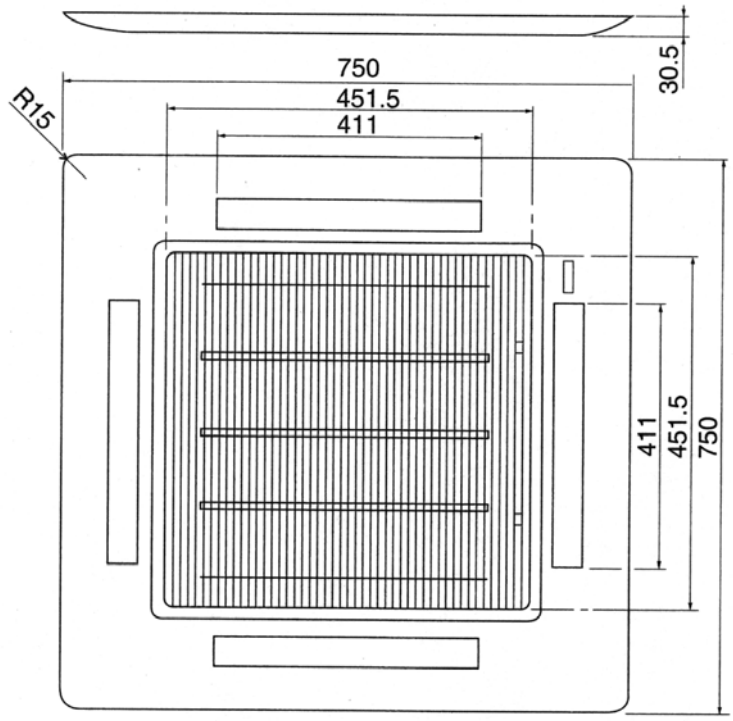
3.1.1. CS-ES1820B / CS-ES2420B

(Unit : mm)



3.2. Front Grille

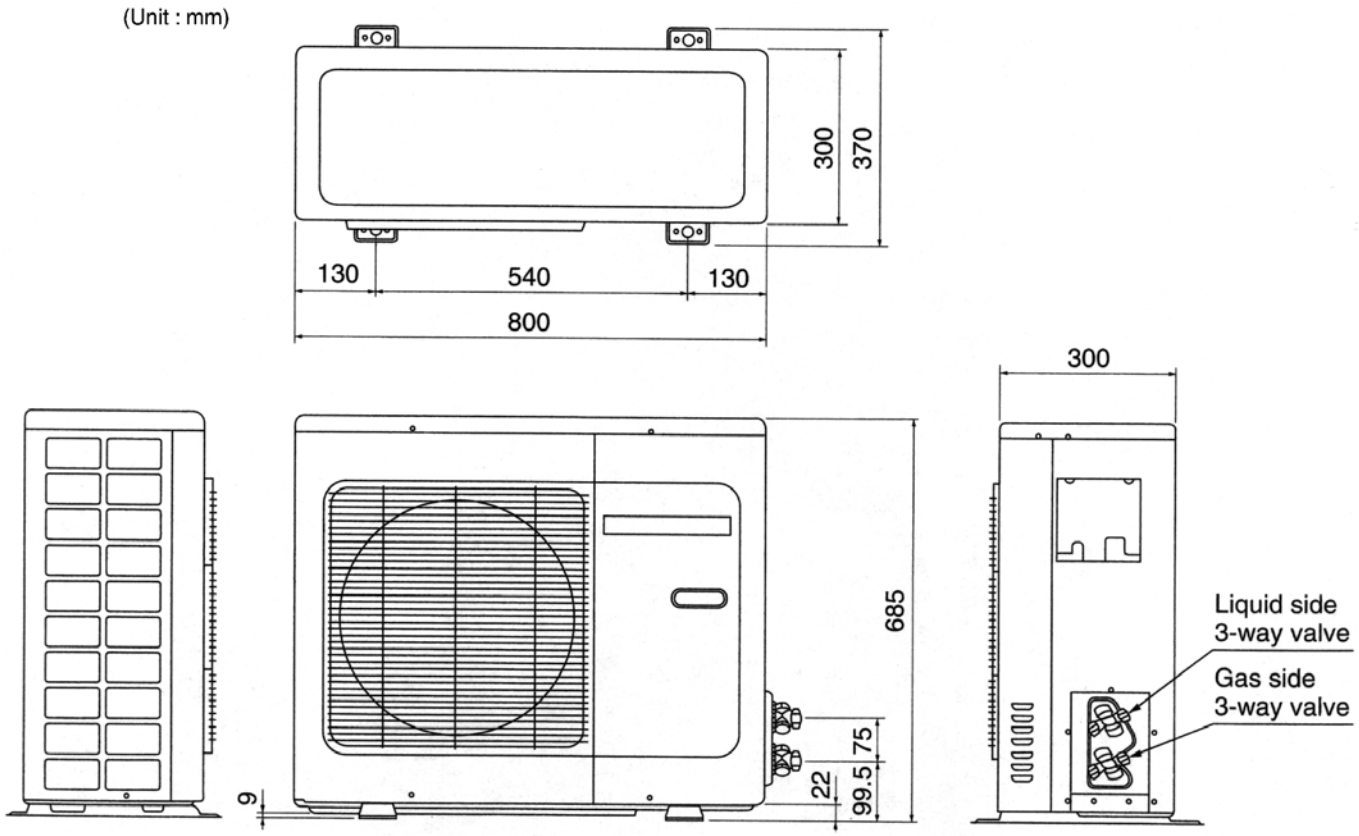
(Unit : mm)



3.3. Outdoor Unit

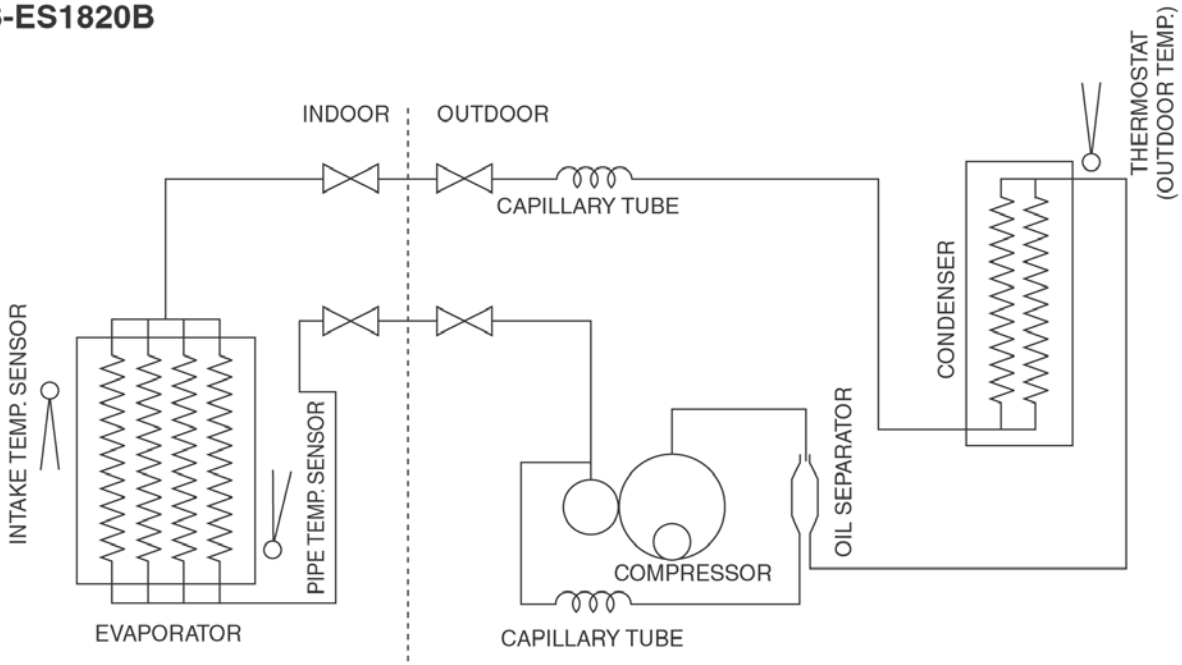
3.3.1. CU-ES1820B / CU-ES2420B

(Unit : mm)

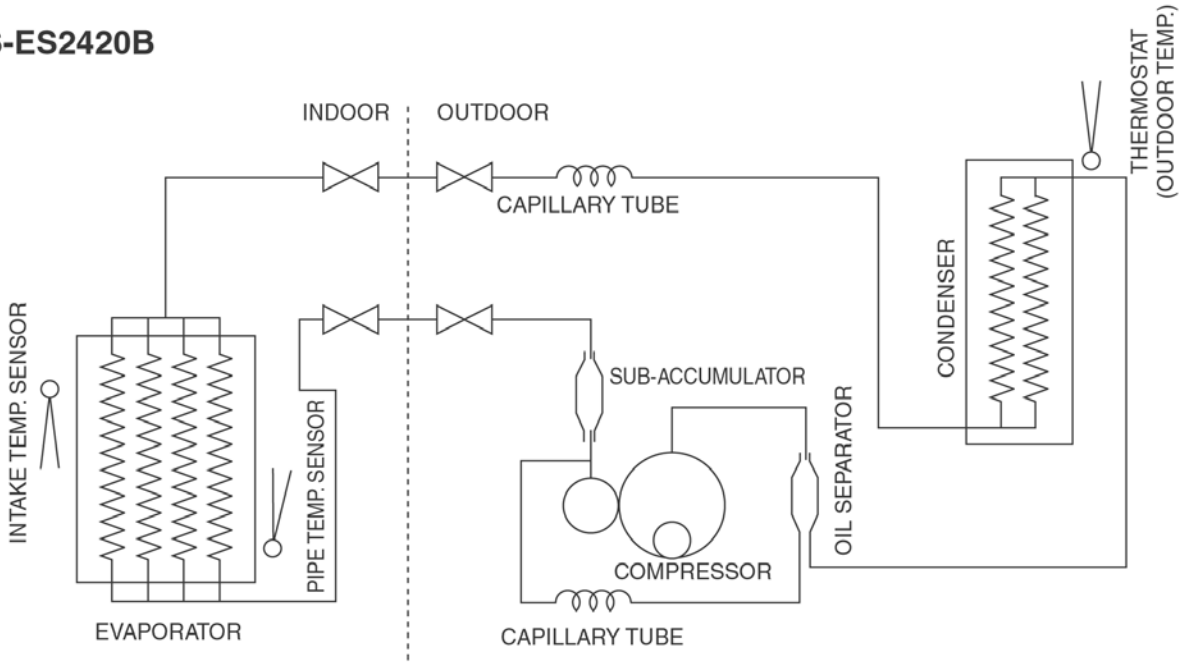


4 Refrigeration Cycle Diagram

CS-ES1820B



CS-ES2420B



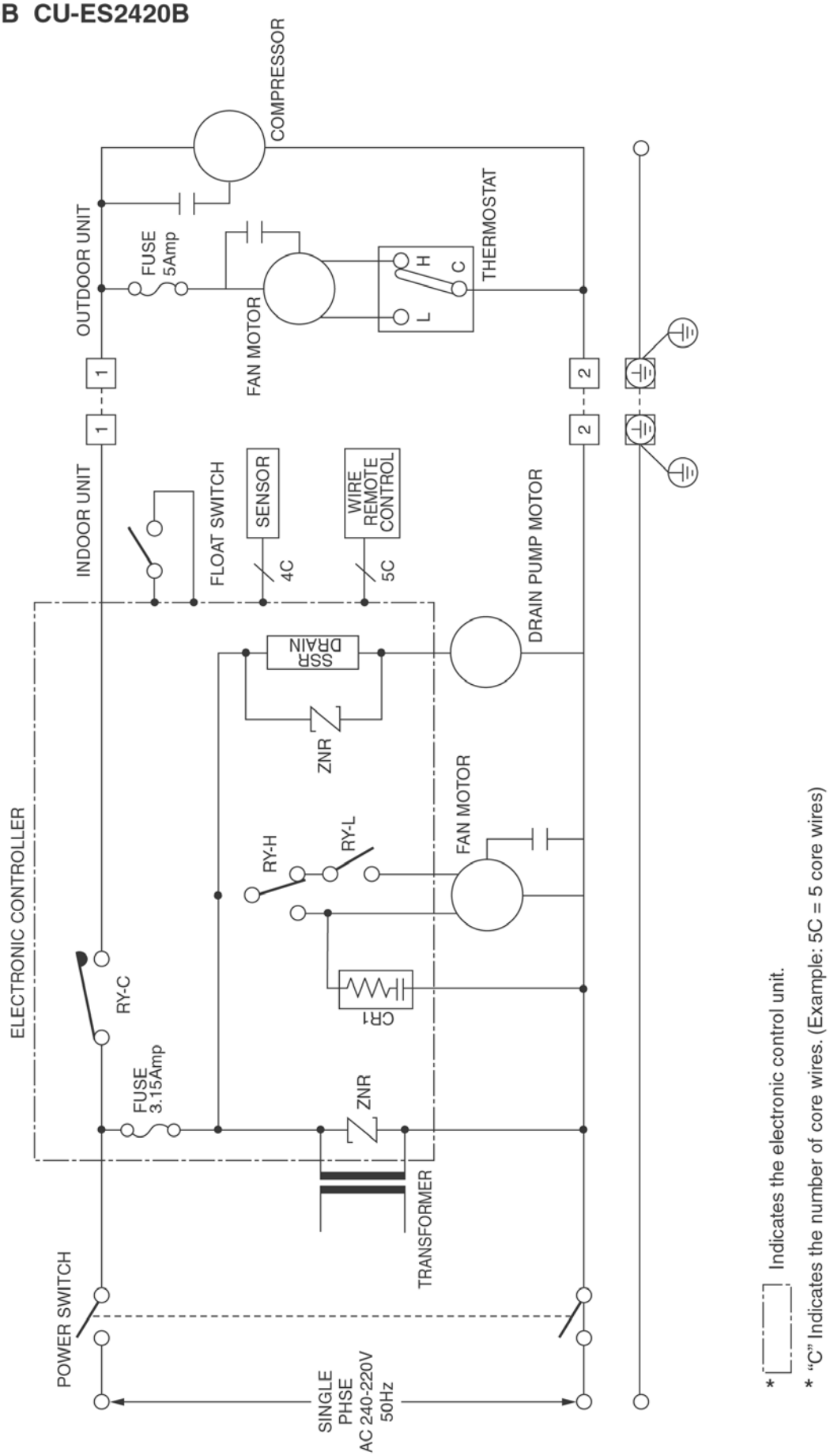
Model	Piping size		Max. Piping Length Ⓐ (m)	Max. Elevation Ⓑ (m)	Rated		*Additional Refrigerant (g/m)
	Gas	Liquid			Length (m)	Elevation (m)	
CS/CU-ES1820B	1/2"	1/4"	25	20	7	5	20
CS/CU-ES2420B	5/8"	1/4"	25	20	7	5	30

*• CS/CU-ES1820B will be installed at a 10 m distance;
The refrigerant should be added 60g .....(10-7) x 20g

*• CS/CU-ES2420B will be installed at a 12 m distance;
The refrigerant should be added 150g.....(12-7) x 30g

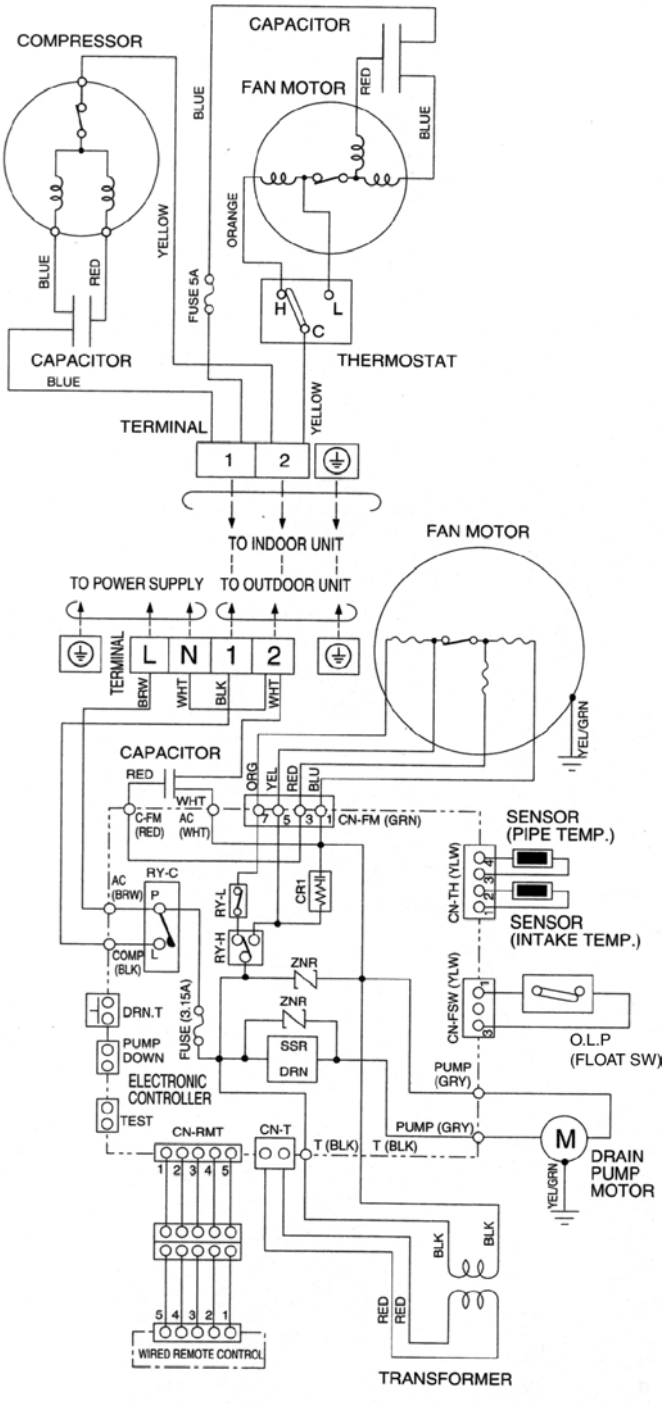
5 Block Diagram

CS-ES1820B CU-ES1820B
CS-ES2420B CU-ES2420B

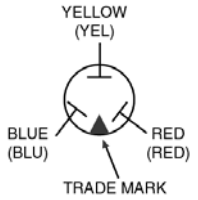


6 Wiring Diagram

CS-ES1820B CU-ES1820B
CS-ES2420B CU-ES2420B



COMPRESSOR TERMINAL



THE PARENTHESIZED LETTER
IS INDICATED ON TERMINAL COVER

REMARKS

YLW	: YELLOW
BLU	: BLUE
BRW	: BROWN
BLK	: BLACK
WHT	: WHITE
GRY	: GRAY
RED	: RED
ORG	: ORANGE
PNK	: PINK
YEL/GRN	: YELLOW/GREEN
DRN-T	: DRAIN TEST

Resistance of Indoor Fan Motor Windings

MODEL	CS-ES1820B	CS-ES2420B
CONNECTION	CWA95336	CWA95337
BLUE-YELLOW	351.9 Ω	324.3 Ω
YELLOW-ORANGE	154.4 Ω	151.5 Ω
RED-YELLOW	473.4 Ω	480.4 Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Outdoor Fan Motor Windings

MODEL	CU-ES1820B	CU-ES2420B
CONNECTION	CWA92176	CWA92183
BLUE-YELLOW	83.4 Ω	57.9 Ω
BROWN-ORANGE	67.3 Ω	70.6 Ω
RED-BROWN	66.5 Ω	74.9 Ω

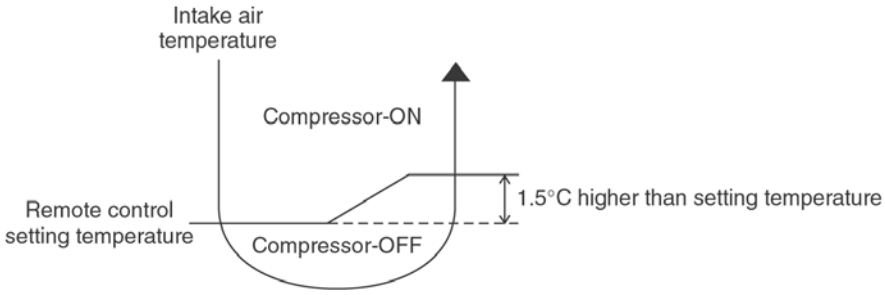
Resistance of Compressor Windings

MODEL	CU-ES1820B	CU-ES2420B
CONNECTION	2JS350D3DA02	2JS438D3AA02
C-R (Main)	0.980 Ω	1.013 Ω
C-S (Aux)	3.929 Ω	4.686 Ω

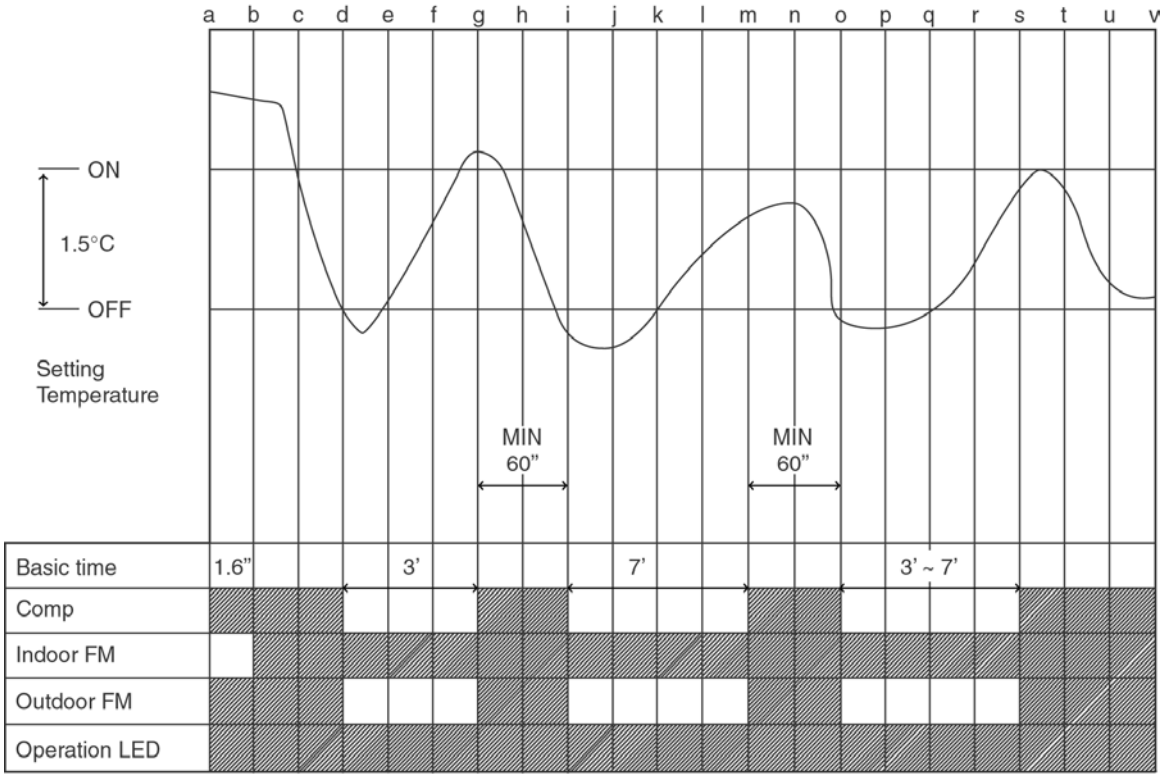
7 Operation Details

7.1. Cooling Operation

- Cooling operation can be set using remote control.
- This operation is applied to cool down the room temperature reaches the setting temperature set on the remote control.
- The remote control setting temperature, which takes the reading of intake air temperature sensor, can be adjusted from 16°C to 30°C.
- During cooling operation, the compressor will stop running and restart as shown in below figure.



7.1.1. Cooling Operation Time Diagram



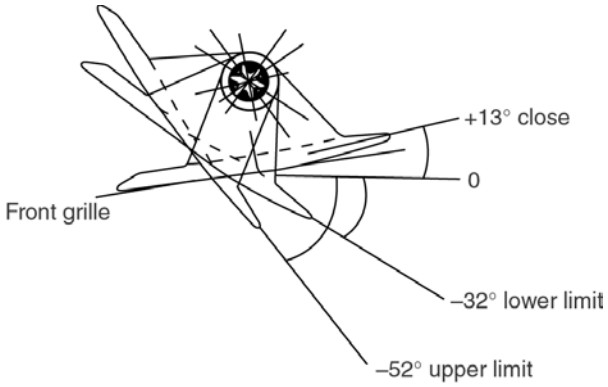
<Description of operation>

a – b : Starting current control (1.6 second delay)
d – g : Restart control (3 minutes waiting)
g – i : 60 seconds forced operation
i – m : 7 minutes time saved

In operation
Shop

7.2. Operation Control

7.2.1. Adjustable Angle Range



7.2.2. Restart Control (Time Delay Safety Control)

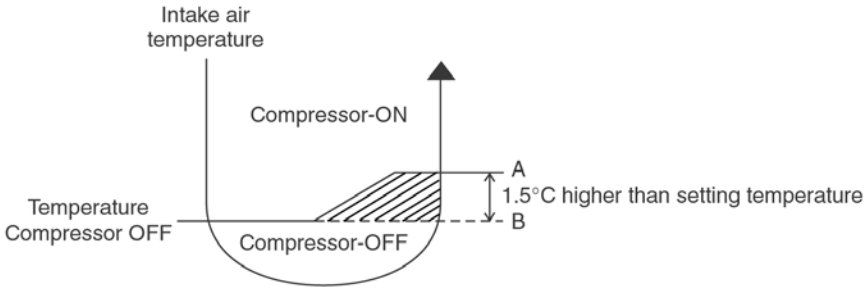
- Compressor will not restart within a period of 3 minutes after stop.
- Including:

  Temperature ON/OFF

  Wired remote control ON/OFF

7.2.3. 7 Minutes Time Save Control

- The compressor will start automatically if it has stopped for 7 minutes and the intake air temperature falls between the compressor ON temperature (A) and compressor OFF temperature (B) during the period.
- This phenomenon is to reduce the built up humidity inside a room.



7.2.4. 60 Seconds Forced Operation (Circuit Protection Control)

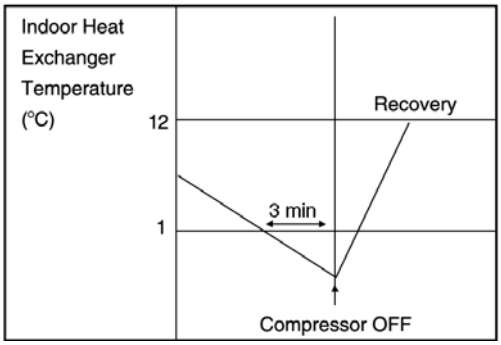
- 60 seconds forced operation of compressor when OFF point is detected instantly by thermostat right after compressor start, the compressor is kept “ON” for 60 seconds in order to protect the compressor.

7.2.5. Starting Current Control

- When the compressor, outdoor fan motor and indoor fan motor are simultaneously started, the indoor fan motor will start to operate at 1.6 second later.

7.2.6. Anti-Freezing Control

- If the temperature of the indoor heat exchanger falls below 1°C continuously for 3 minutes or more, the compressor turns off. The fan speed setting remains the same.
- This phenomenon is to protect the indoor heat exchanger from freezing and to prevent higher volume of refrigerant in liquid form returning to the compressor.
- Compressor will restart again when the indoor heat exchanger temperature rises to 12°C (Recovery).
- Restart control (Time Delay Safety Control) will be applied in this Control if the recovery time is too short.



7.3. Indoor Fan Speed Control

- When selecting the airflow volume by the operation switch, the following indoor fan speed control is executed:

  LOW FAN - Indoor fan is operated in low fan speed.

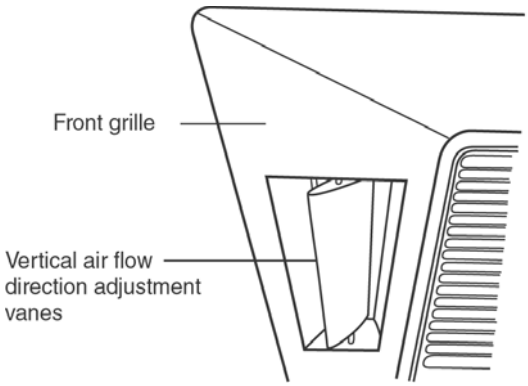
  HIGH FAN - Indoor fan is operated in high fan speed.

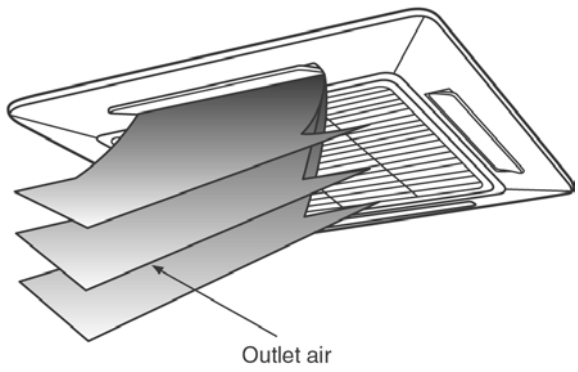
7.4. Vertical Airflow Direction Control

Please manually adjust the outlet grille's vertical air flow direction adjustment vanes.

Note:

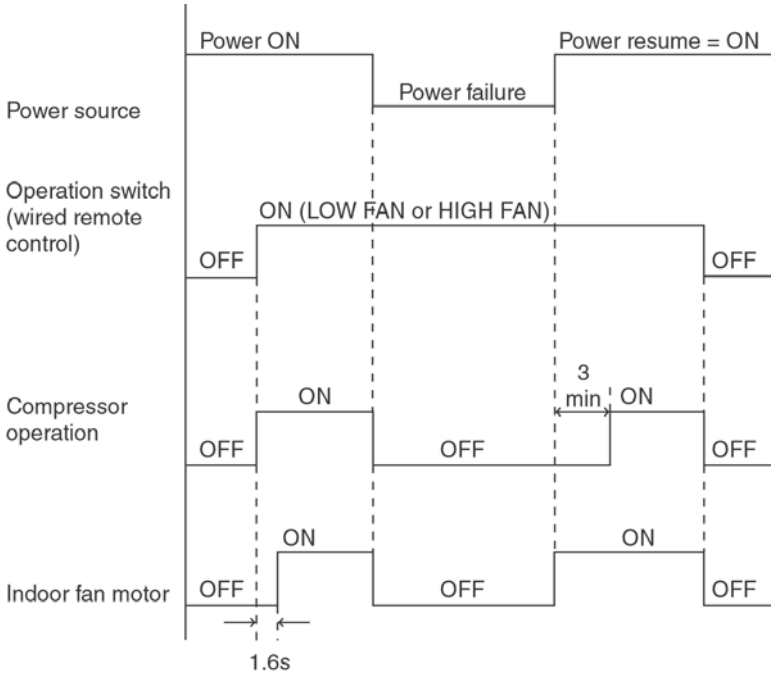
Using the cooling cycle with the vanes facing downwards for long periods of time can result in condensation forming on the outlet port, and water droplets may fall. If this happens, adjust the air flow direction.





7.4.1. Power Resume Control (Auto Restart Control)

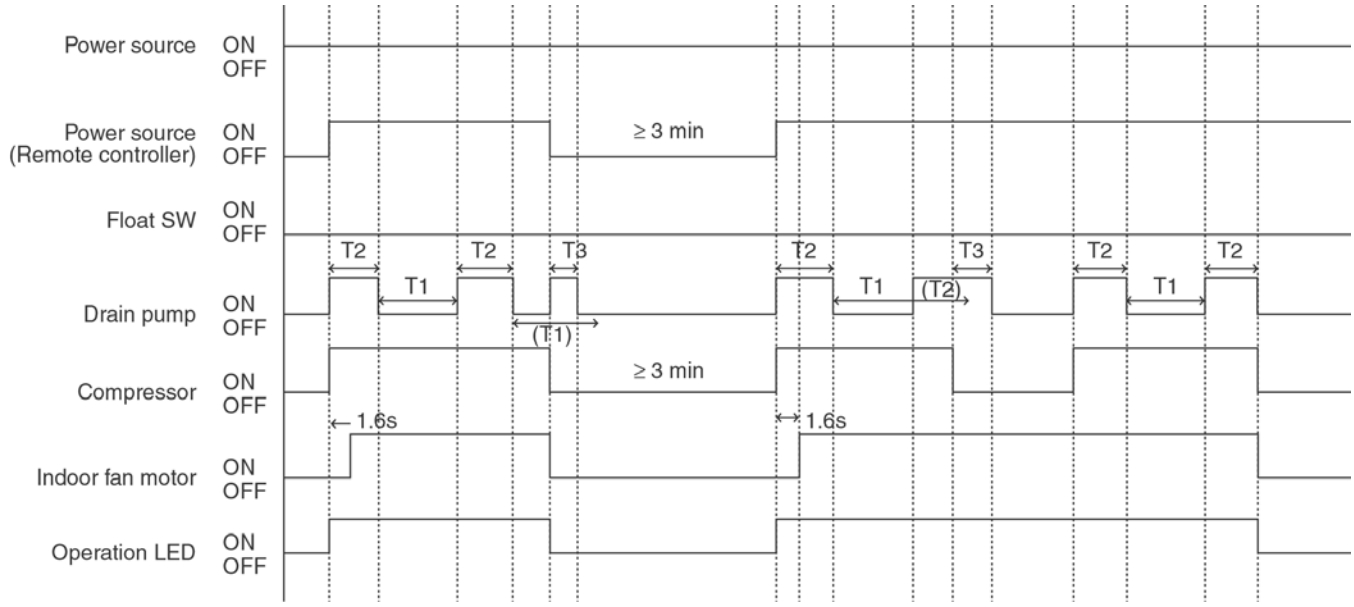
- The air conditioner will restart automatically at the previous operation mode when the power is resumed after power failure. The 3 minutes waiting is valid if operation switch is at “ON” position during supply resume.



Power resume control time chart

7.5. Drain Pump Operation Control and Timing Chart

7.5.1. Normal



(Description of operation)

Drain pump operation time)

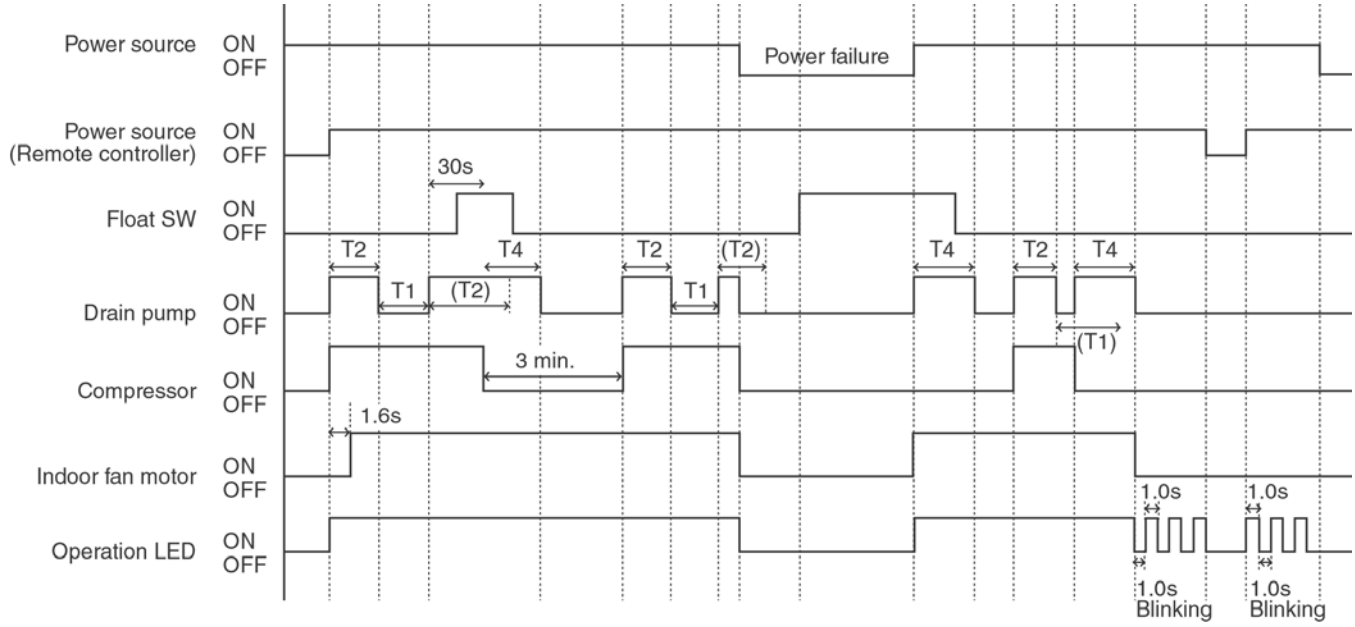
Unit: Sec.

Model name	T1 (Drain pump OFF)	T2 (Drain pump ON)	T3 (Drain pump ON when COMP OFF)	T4 (Drain pump On when float SW ON)
CS/CU-ES1820B	100	80	30	80
CS/CU-ES2420B	90	90	30	80

1. Once compressor starts, the drain pump operation will be started for T2, after that will stop the operation for T1.
2. The drain pump operates repeatedly for T2 and T1 while compressor is operating.
3. Once compressor is stopped, the drain pump will be operated for T3, after that stop.

   However, if the compressor is requested to be stopped while drain pump is operating for T2 or T1, then the operation time T2 or T1 will be ignores, and the T3 is performed.
4. When the main power source is shut-off, then the whole system will also be shut-off.

7.5.2. Abnormal



(Description of operation)

Drain pump operation time

Unit: Sec.

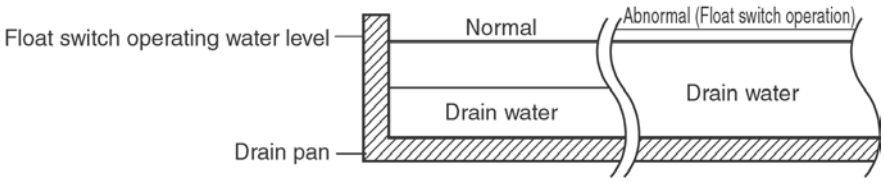
Model name	T1 (Drain pump OFF)	T2 (Drain pump ON)	T3 (Drain pump ON when COMP OFF)	T4 (Drain pump On when float SW ON)
CS/CU-ES1820B	100	80	30	80
CS/CU-ES2420B	90	90	30	80

1. Once compressor starts, the drain pump operation will be started for T2, after that will stop the operation for T1.
2. The drain pump operates repeatedly for T2 and T1 while compressor is operating.
3. During drain pump operating for T2, the float SW ON/OFF condition is ignored for 30s even though the float SW is at “ON” situation. After 30s, the drain pump will operate for T4, after that stop. However, once the drain pump is started to operate for T4, the compressor is stopped and 3 minutes waiting is performed. After drain pump is operated for T4, if the float SW condition is at “OFF” condition, then the control is shifted to “Drain pump normal operation control”.

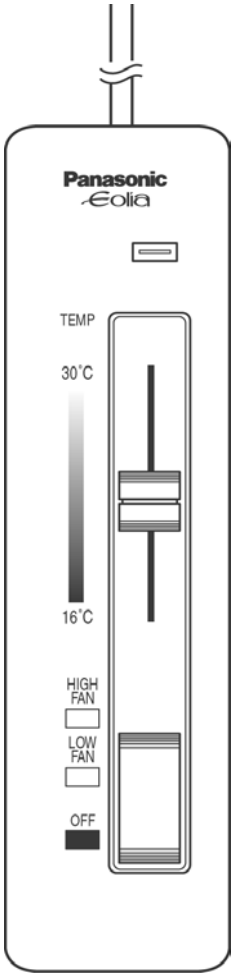
   If the float SW condition is still stated at “ON” after drain pump operated for T4, then the system will be judged as abnormal by blinking the operation LED at wired remote controller.
4. When the float SW is “ON” while drain pump operation is at T1 situation, the drain pump will immediately operate for T4, the compressor will stop once drain pump is started to operate for T4 and 3 minutes waiting is performed.
5. Operation LED will still blinking if the system is OFF/ON by operation SW at remote controller. However, the LED blinking can be reset disconnecting the power source.

7.6. Drain Water Overflow Prevention Control

Drain water will collect in the drain pan to plugging of the drain hose or damage to the drain motor etc., and if the water level rises, the float switch high water detection switch will operate, all operations will stop, and water will be prevented from overflowing from the drain pan and leaking.



7.7. Remote Control



● **Wired**

Length of the remote control wire is 10 meter.

● **Operation Indication LED**

LED - Red color

Light up during air conditioner is in operation.

Blinks when the drain pump malfunction.

(Please call your nearest service centre)

● **Operation & Fan Speed Indicator**

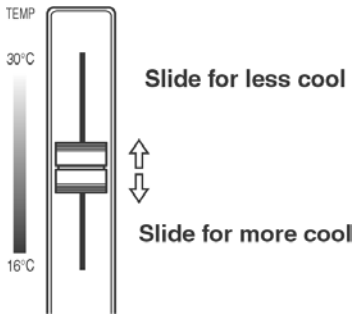
Red color Indicator

It will be shifted to the respective position when the operation mode is changed.

● **Simple & Easy To Operate**

Cooling Temperature Setting Control

Slide the lever to:

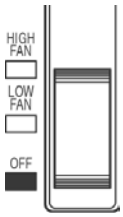


- Recommended position for cooling operation is at the centre.

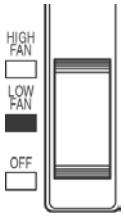
Cooling Temperature Setting

Slide the Operation Switch to:

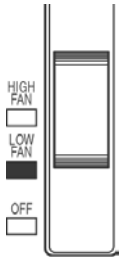
OFF — To turn “OFF” the power supply of the air conditioner.



LOW FAN — To turn “ON” the power supply of air conditioner and operate in low fan speed.



HIGH FAN — To turn “ON” the power supply of air conditioner and operate in high fan speed.



7.8. Outdoor unit

● **Overload Protector**

Inner overload protector to protect the compressor.

● **Safety Protection**

A current fuse is being used to protect the fan motor.

The fan motor will turn OFF if the current flow into the fan motor exceeds 5.0 Amp.

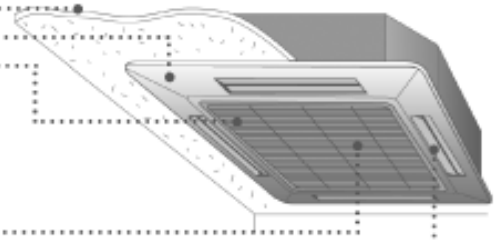
This is to protect the fan motor from burnt-out.

8 Operating Instructions

1 Name of Each Part

1.1 Indoor Unit

Ceiling
Front Grille
Air Filter (behind the intake Grille)
This is to filter dust and dirt.



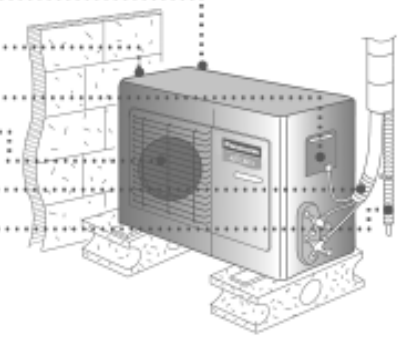
Intake Grille
Air Outlet Vane - 4 sides

1.2 Remote Control

Remote Control Wire
Operation Indication LED
Cooling Temperature Setting Control
Operation Switch
Operation/Fan Speed Indicator

1.3 Outdoor Unit

Rear Intake Vent
Side Intake Vent
Terminal Cover
Air Outlet Vent
Piping
Drain Hose



Power supply
- Set to "ON" during the season when air conditioner is in use. Set to "OFF" at end of the season.

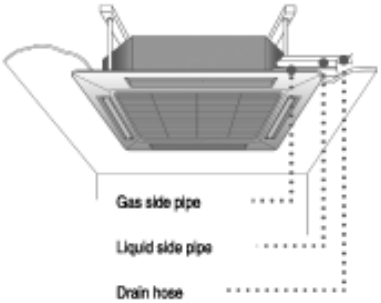
Caution
- Main power supply should be switched on before operating the air conditioner.
- The air conditioner will restart automatically at the operation mode after 3 minutes from a power failure. This will only valid if the remote control operation is set at "ON" (LOW FAN or HIGH FAN) position.

Notes
- Use under the following condition:
  - At setting temperature at 20°C or higher.
  - Humidity of 90% or less.

2 How to Use

2.1 Preparation

Switch on the main power supply.



2.2 Airflow Adjustment

Vertical air flow direction adjustment vanes

■ Vertical air flow direction adjustment vanes
Please adjust the outlet grille's vertical air flow direction adjustment vanes.

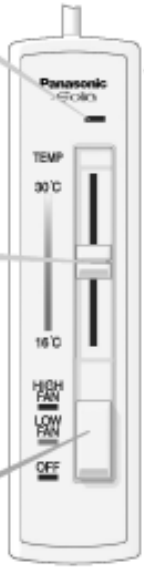
Note:
Using the cooling cycle with the vanes facing downwards for long periods of time can result in condensation forming on the outlet port, and water droplets may fall. If this happens, adjust the airflow direction.

2.3 Remote Control

Operation Indication LED • Penunjuk Operasi LED

• Light up during air conditioner is in operation.

• Blinks during drain pump malfunction.
(Please call your nearest service centre)



Cooling Temperature Setting Control

Upward – High Temp.(less cool)

Downward – Low Temp.(more cool)

Cooling temperature setting: - 16°C - 30°C

Operation Switch • Suis Operasi

(Red Colour Indicator will be shifted to the respective position when operation mode is changed.)

HIGH FAN - Operates at High fan speed

LOW FAN - Operates at Low fan speed

OFF - Stops all operations

3 Operation Hints & Caution

Operation Hints

Do not overcool the room.
This is not good for the health and wastes electricity.

Keep blinds or curtains closed.
Do not let direct sunshine enter the room when the air conditioner is in operation.

Keep the room temperature uniform.
Adjust the vertical airflow direction to ensure a uniform temperature in the room.

Make sure that the doors and windows are shut tight.
Avoid opening doors and windows as much as possible in order to keep the room cool.

Clean the air filter regularly.
Blockages in the air filter reduce the airflow and lower cooling and dehumidifying effects.
Clean at least once every two weeks. (Refer to page 4)

Ventilate the room occasionally before or when unit is not in use.
Since windows are kept closed, it is good idea to open them and ventilate the room now and then.

Caution

Use the air conditioner for cooling purpose only.
Do not use the air conditioner for other purposes, such as drying clothes, preserving foods, keeping animals, or cultivating vegetables.

Do not block the air intake and outlet vanes.
This causes lowered performance and irregular operation.

Select the most appropriate temperature.
Adjust the temperature to suit the conditions especially rooms occupied by young infants, the elderly, or the sick should be kept at an appropriate temperature.

Do not use heating apparatuses in the vicinity.
The air conditioner's plastic parts may melt if exposed to excessive heat.

Avoid exposing the body directly to a continuous unidirectional airflow for a long period.
This is not recommended for health reasons.

Do not block the outlet at the outdoor unit by placing something close to it.
This will affect the air circulation.

4 Care & Cleaning

Before Cleaning — Power supply-OFF

✔ Soaps/Household detergents

✘ Benzine/Thinner/Scouring powder

Indoor Unit

Wipe gently

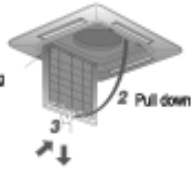
Air Filter

Clean:-  Filter — every 6 weeks

Press catcher

Function:
Helps to clean the air by capturing dust and other particles from the surrounding.

String



Remove filter

Clean - Vacuum/Wash/Dry

Reinstall

1. Be sure the FRONT side of air filter faces towards you.

2. Place filter to the hooks

Warning: Do not touch the blower wheel while it is still rotating.

Damaged Filter - Replace!

Consult nearest dealer

DIRTY FILTERS cause: unpurified air, low cooling capacity, more unpleasant smells, higher energy consumption!

NOTE: DO NOT operate without air filter. Foreign particles may enter and cause operation problems.

For extended non-operation

Select HIGH FAN

Operate to dry internal parts (2~3 hours)

OFF

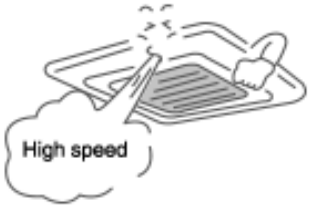
Power supply-OFF

Recommended Inspections

Consult an authorized distributor for inspection!

After several seasons and due to operational conditions, the performance may be reduced by dirt or foul odours may occur.

5 Helpful Information



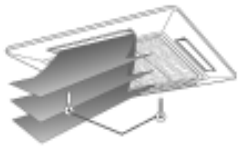
Airflow speed and cooling capacity.
The cooling capacity indicated in the specification is the value when the fan speed is set to high, and the capacity will be lower at low fan speed.

The air filters and your electric bill.
If the air filters become clogged with dust, the cooling capacity will drop, and 6% of the electricity used to operate the air conditione will be wasted.

Savings in electric consumption.
Setting the room temperature 2°C higher, will save 20% electric consumption in cooling condition.

Switch off the unit completely if there is a sign of lightning.
The air conditioner is provided with a built in protective device, but the control equipment may be adversely affected depending on the extent of lightning activity.

■ Evaluation of the performance
Measure the temperature of the intake and discharge air.
Ensure the difference between the intake temperature and the discharge is more than 8°C.



TROUBLESHOOTING

No problem

OK?

1. Operation delayed for 3 minutes after successful restart ▸ Self protection procedure ✓
2. It sounds like water flowing... ▸ Caused by refrigerant flow inside ✓
3. Mist seems to emerge from the indoor unit ▸ Condensation effect due to cooling ✓

In case of...

- Abnormal noise during operation
- Water/foreign particles have entered the Remote Control
- Water leak from Indoor Unit
- Switches/buttons do not operate properly
- Circuit breaker switches off frequently
- Power cord become unnaturally warm

TURN OFF "POWER SUPPLY"

CALL authorized distributor

1. No Operation ▸ Circuit breaker tripped?
2. Noise too loud ▸ Installation work slanted? ▸ Front grille/panel closed properly?
3. Cooling efficiency low ▸ Temperature set correctly? ▸ Windows/doors closed? ▸ Filters cleaned/replaced?
   ▸ Outdoor unit obstructed? ▸ Intake/outlet ventilators obstructed?

SAFETY PRECAUTIONS

Before operating, read the safety precautions thoroughly

EMERGENCY!

SOS Immediately isolate from the mains supply (e.g. if there is a smell of burning)

Use only for...

COOL Cooling

NEVER use this unit for purposes other than those listed in these Operating Instructions. In particular, do not use it for the preservation of food.

Installation

NEVER install, remove or reinstall yourself

NOT in potentially explosive atmosphere

Engage dealer/specialist

Connect drain hose properly

Australia (AS) Standard
The appliance is not intended for use by young children or infirm person without supervision. Young children should be supervised to ensure that they do not play with the appliance.

United Kingdom (GB) Standard
Replacement or installation of power plugs shall be performed by authorised/qualified personnel only. The wires in this mains lead are coloured in accordance with the following code:

Terminals	wires	colours
L	live	brown
N	neutral	blue
E	earth	green- yellow

Operation

Do NOT stay long in the stream of cold air

Do NOT operate with wet hands

Ventilate the room periodically

NEVER modify/damage mains cables/connectors

Place nothing on the unit -> covered openings may cause overheating

Do NOT insert finger or other objects into the unit! -> especially dangerous for children!

Unused for a long time? -> OFF

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

SAFETY PRECAUTIONS

Defects


Defect/suspicion of defect? -> Attend defects before use!


Do NOT repair yourself!


Engage dealer/specialist

Cleaning


OFF power supply (connector or breaker)


Do NOT wash!

Waste disposal


Uninstalling and disposal of the unit ONLY by dealer/specialist.


Packaging recyclable

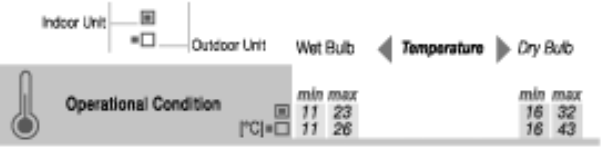
Mains connection

Engage dealer/specialist for mains connection including...


Used connectors/breakers easy reachable!


Connect protective earth!


NEVER shared



Manufactured by:
MATSUSHITA INDUSTRIAL CORP. SDN.BHD.
Lot 2, Persiaran Tengku Ampuan, Section 21, Shah Alam
Industrial Site Selangor, Malaysia

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
web site: http://www.panasonic.co.jp/global/

9 Installation Instructions

Required tools for Installation Works			
1. Philips screw driver	5. Spanner	9. Gas leak detector	13. Multimeter
2. Level gauge	6. Pipe cutter	10. Measuring tape	14. Torque wrench 18 N.m (1.8 kgf.m) 55 N.m (5.5 kgf.m) 65 N.m (6.5 kgf.m)
3. Electric drill, hole core drill (ø70 mm)	7. Reamer	11. Thermometer	15. Vacuum pump
4. Hexagonal wrench (4 mm)	8. Knife	12. Megameter	16. Gauge manifold
			17. Cirucit breaker or time delay fuse.

9.1. Safety Precautions

- Read the following “SAFETY PRECAUTIONS” carefully before installation.
- Electrical work must be installed by a licensed electrician. Be sure to use the correct rating of the power plug and main circuit for the model to be installed.
- The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.

⚠ **WARNING**	This indication shows the possibility of causing death or serious injury.

⚠ **CAUTION**	This indication shows the possibility of causing injury or damage to properties only.

The items to be followed are classified by the symbols:

	Symbol with background white denotes item that is PROHIBITED from doing.

- Carry out test running to confirm that no abnormality occurs after the installation. Then, explain to user the operation, care and maintenance as stated in instructions. Please remind the customer to keep the operating instructions for future reference.

⚠ **WARNING**
1. Engage dealer or specialist for installation. If installation done by the user is defective, it will cause water leakage, electrical shock or fire.
2. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock or fire.
3. Use the attached accessories parts and specified parts for installation. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.
4. Install at a strong and firm location which is able to withstand the set’s weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.
5. For electrical work, follow the local national wiring standard, regulation and this installation instructions. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.
6. Use the specified cable (3.5 mm^2) and connect tightly for indoor/outdoor connection. Connect tightly and clamp the cable so that no external force will be acted on the terminal. If connection or fixing is not perfect, it will cause heat-up or fire at the connection.
7. 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.
8. When carrying out piping connection, take care not to let air or other substances other than the specified refrigerant go into refrigeration cycle. Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.
9. Do not damage or use unspecified power supply cord. Otherwise, it will cause fire or electrical shock. 

⚠ CAUTION

1. Grounding is necessary. It may cause electrical shock if grounding is not perfect.
2. Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.

3. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.

ATTENTION

1. Selection of the installation location.
   Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.
2. Power supply connection to the room air conditioner.
   Connect the power supply cord of the room air conditioner to the mains using one of the following method.
   Power supply point shall be the place where there is ease for access for the power disconnection in case of emergency. In some countries, permanent connection of this room air conditioner to the power supply is prohibited.
   1. Power supply connection to the receptacle using a power plug.
      Use an approved 20A power plug with earth pin for the connection to the receptacle.
   2. Power supply connection to a circuit breaker for the permanent connection. Use an approved 20A circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3mm contact gap.
3. Do not release refrigerant.
   Do not release refrigerant during piping work for installation, re-installation and during repairing a refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.
4. Installation work.It may need two people to carry out the installation work.
5. The installation place must be able to support a load four times the indoor unit weight and avoid amplifying noise and vibration.

9.2. Accessories packed together with indoor unit

No.	Accesories part	Qty.	No.	Accessories part	Qty.
1	Paper model for installation 	1	5	Remote control holder and wire holder fixing screw 	7
2	Wired remote control complete 	1	6	Insulation material 	3
3	Remote control holder 	1	7	Plastic band	6
4	Remote control wire holder 	5	8	Front grille fixing screw 	4

9.3. Select the best location

INDOOR UNIT

- There should not be any heat source or steam near the unit.
- There should not be any obstacles to prevent the air circulation.
- There should not be any obstacles within one meter under the air intake vent.
- A place where air circulation in the room will be good.
- A place where power source, drainage and piping can be easily obtained.
- 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.
- Ceiling should be horizontal and no angle.
- Maintenance can be done from the opening on the ceiling, but it is recommended that an inspection hole of approximately 450 x 450mm^2 near the pipe connection port be provided.
- The indoor unit must allow easy connection to the outdoor unit.

OUTDOOR UNIT

- If an awning is built over the unit to prevent direct sunlight or rain exposure, be careful that heat radiation from the condenser is not restricted.
- There should not be any animals or plants which could be affected by hot air discharged.
- A place where the wind should not disturb the air outlet vent of the outdoor unit.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence, or other obstacles.
- If piping length is over the rated length, additional refrigerant should be added as shown in the table.

Model	Piping size		Max. Piping Length A (m)	Max. Elevation A (m)	Rated		Additional Refrigerant (g/m)
	Gas	Liquid			Length	Elevation	
ES1820B	1/2"	1/4"	25	20	7	5	20
ES2420B	5/8"	1/4"	25	20	7	5	30

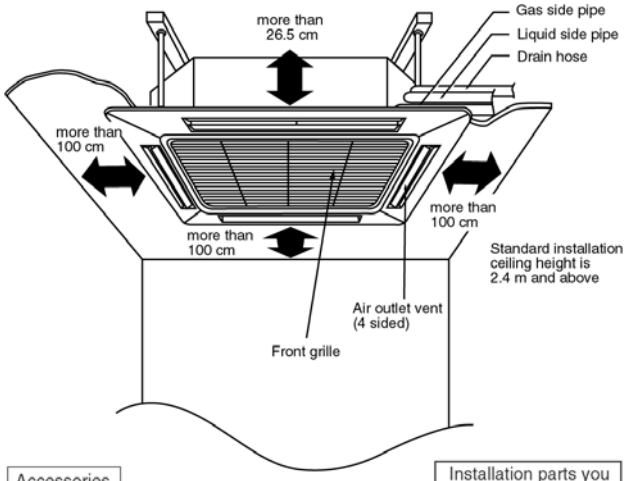
If ES1820B is installed at a10m distance
The refrigerant should be added 60g.....(10-7) x 20g
If ES2420B are installed at a12m distance
The refrigerant should be added 150g.....(12-7) x 30g

REMOTE CONTROL

- Do not install at places where there is direct sunlight or near any heat source.

■ **Important Part**

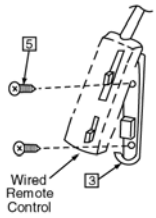
Part name	Part no.
Front grille	CZ-BT2E

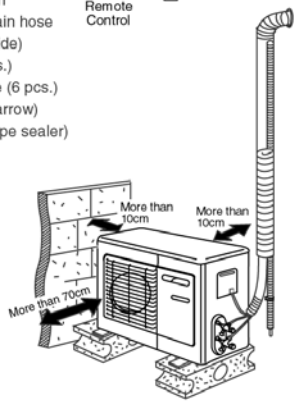


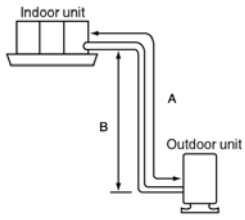
Accessories

(Flaring pipe kit)
CZ-4F3, 5,7,10AN
CZ-52F5, 7,10AN

① Bushing-sleeve
② Sleeve
③ 1/4" flared pipe with insulation
④ 1/2" or 5/8" flared pipe with insulation
⑤ Additional drain hose
⑥ Vinyl tape (wide)
⑦ Saddle (6 pcs.)
⑧ Screw-saddle (6 pcs.)
⑨ Vinyl tape (narrow)
⑩ Putty (gum type sealer)







Installation parts you should purchase

① Suspension bolt (M10...4 pcs)
② Nut (M10...12 pcs)
③ Washer (M10...8 pcs)
④ Bushing-sleeve
⑤ Sleeve
⑥ Putty (gum type sealer)
⑦ 1/4" Copper pipe (Liquid side)
⑧ 1/2" or 5/8" Copper pipe (gas side)
⑨ Vinyl tape (Wide)
⑩ Saddle
⑪ Connecting cable (3-core wire/3.5mm^2)
⑫ Insulation material (for gas pipe)
⑬ Insulation material (for liquid side pipe)
⑭ Vinyl tape (narrow)
⑮ Power supply cable for the Indoor unit. (3-Core wire/3.5mm^2)
⑯ All-Pole switch (Disconnecting means) There must be an all pole switch (Disconnecting means) with minimum 3mm contact gap in the fixed installation circuit.
⑰ Vinyl chloride hose (Inner Dia. 1" Outer Dia. 1-1/4") with insulator (Inner Dia. 1-1/4" Outer Dia. 2-1/4")

9.4. Indoor unit

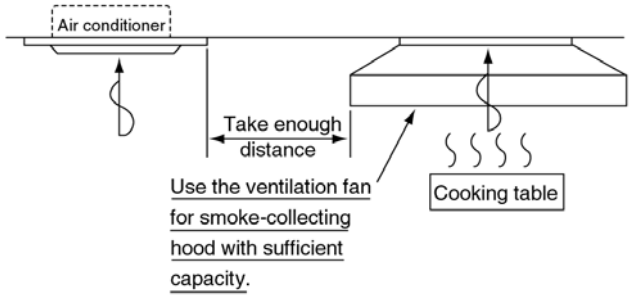
9.4.1. SELECT THE BEST LOCATION (Refer to “Select the best location” section)

Note ● Thoroughly study the following installation locations:

1. In such places as restaurants and kitchens, considerable amount of oil steam and flour are adhered to the turbo fan, the fin of the heat exchanger and the drain pump, resulting in the cause of heat exchange reduction, spraying, dispersing of water drops, drain pump malfunction, etc.

   In these cases, take the following actions:

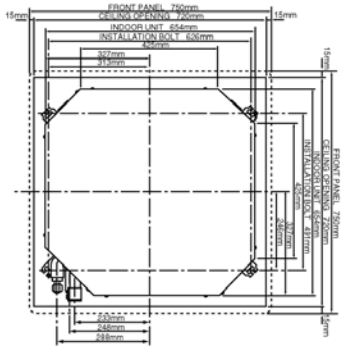
   - Make sure that the ventilation fan for smoke collecting hood on a cooking table has sufficient capacity so that it draws oily steam which should not flow into the suction of air conditioner.
   - Keep some distance from the cooking room when installing the air conditioner in order for it not to draw any oily steam.
2. Avoid installing air conditioner in such circumstances where mist of cutting oil or cut iron powder is hanging over in factories, etc.
3. Avoid places where inflammable gas is generated, flowed-in, contaminated, or leaked.
4. Avoid places where sulfurous acid gas or corrosive gas is generated.
5. Avoid places where there are machines that generate high-frequency.

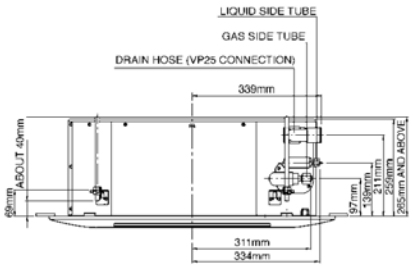


9.4.2. INDOOR UNIT INSTALLATION

1. INSTALLING ON THE CEILING

- Measure and mark the position for the Suspension bolts.

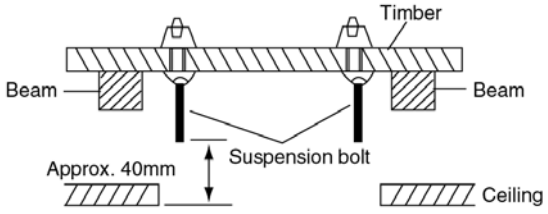




(For the wooden ceiling)

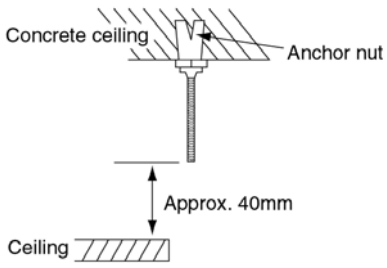
- Put the timbers on the beams to install the unit.

  The timbers are strong enough to install the unit.



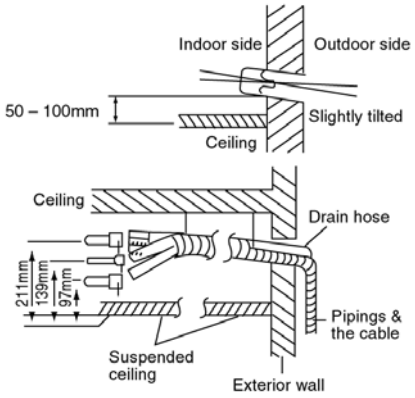
(For the concrete ceiling)

- Drill the hole for anchor nut on the ceiling.



- Drill the piping hole slightly tilted to the outdoor side with a ø 70 hole-core drill.
- Insert the insulated drain hose and the prepared pipes to inside the room through the hole.
- Guide the drain hose and the pipes as shown in the right figure.

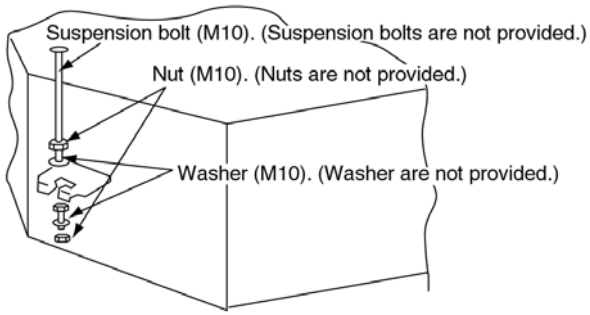
ENSURE THE DRAIN HOSE IS SLANTED TOWARDS THE OUTDOOR FOR PROPER WATER DRAINAGE.



- CONFIRM THE PITCH OF THE SUSPENSION BOLTS IS 626mm X 491mm SHARP.

1. Attach the nuts and washers to the suspension bolts, hold the unit and hang it on the suspension brackets.
2. Attach the paper model to the indoor unit, and adjust the distance to the ceiling.

   In the case of making the ceiling later, decide the opening range by using the paper model.
3. Confirm with a level that the unit is horizontal, and secure the nuts.



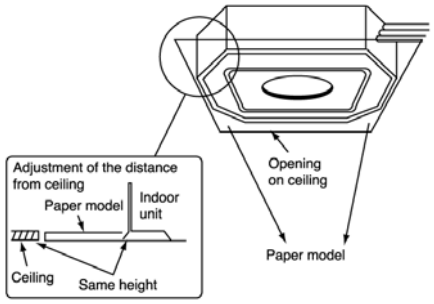
CAUTION: If the unit is inclined or the height from the ceiling is not proper, there may be a water leakage or condensation around the air outlet vent.

The paper model for installation is extended according to temperature and humidity.

Check on dimensions in using.

The dimensions of the paper model for installation are the same as those of the ceiling opening dimensions. When ceiling laminating work is not completed, be sure to fit the paper model to the air conditioner main unit to prevent dust.

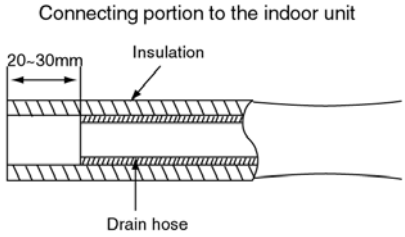
※ Be sure to discuss the ceiling drilling work with the workers concerned.



2. PIPING AND DRAINAGE

a) Preparation of the drain hose

- Insert the drain hose into the insulation to avoid the condensed water dripping inside the room.
- Gathering the pipes and connecting cable by taping.
- Tape the flaring portion to protect it from the dust or damages.

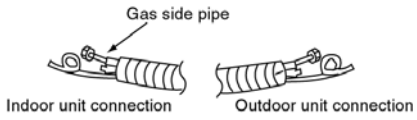


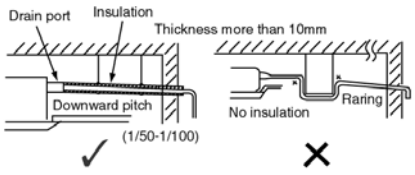
b) Connect the insulated drain hose to the drain outlet.

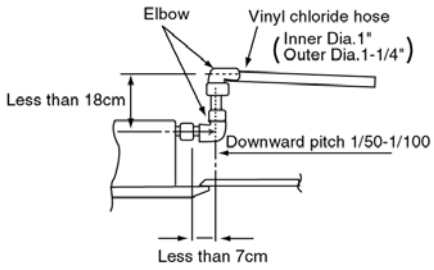
- Use a vinyl chloride hose (outer diameter 1-1/4") for the drain hose.
- Be sure to use a vinyl chloride adhesive to connect the pipe to the drain port of the indoor unit.
- Be sure to use an insulation material on the inside portion of the drain hose.

  (The insulation material is not provided.)

  The drain hose should be at a downward slope (1/50-1/100) and should be fixed with suspension pieces so as not project outward or to trap water in the pipe line.
- If drain hose is obstructed with an obstacle in the pipe line, the unit can be drained from the outside as shown on the right.







CAUTION

- DO NOT POSITION ANY PORTION OF DRAIN HOSE ON AN INCLINED POSITION.
- THE UPWARD DRAIN PORTION OF THE DRAIN HOSE MUST BE POSITIONED IN A VERTICAL POSITION NOT TO EXCEED 18cm LENGTH.

IF NOT INSTALLED PROPERLY, WATER DROPS MAY FORM OVER THE LOUVER AND CAUSE IMPROPER DRAINAGE OR DRAIN MOTOR TROUBLE.

9.4.3. PIPE FORMINGS, INSULATION AND FINISHING

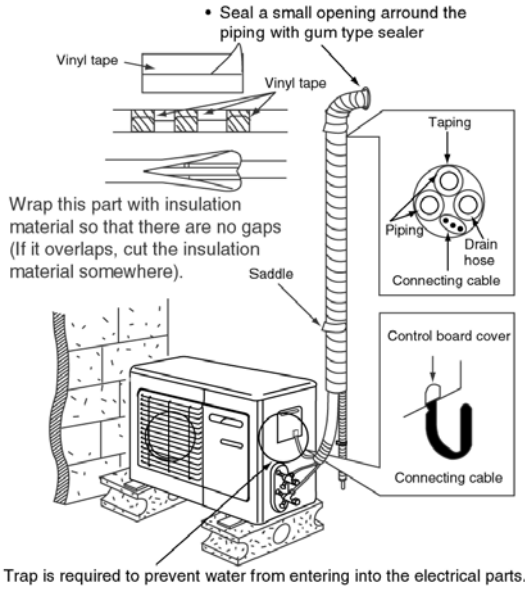
1. If you may connect an additional drain hose, the end of the drain-outlet should keep distance from the ground.

CAUTION

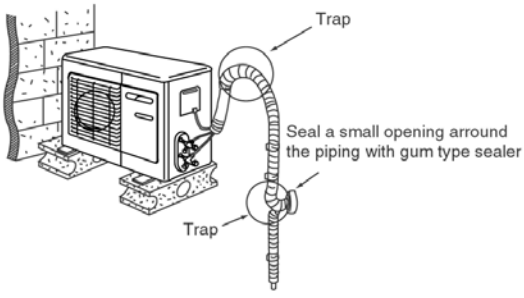
(Do not dip it into water, and fix it on the wall to avoid swinging in the wind)

In case of the Outdoor unit is installed below position of the indoor unit.

2. Tape the Pipings, drain hose and Connecting Cable from down to up.
3. From the pipings gathered by taping along the exterior wall and fix it onto the wall by saddle or equivalent.
   (Refer to the right side diagram)



In case of the Outdoor unit is installed upper position of the indoor unit.



4. Tape the Pipings, and connecting cable from down to up.
5. In order to prevent water from entering into the room form a trap with the pipe by taping the pipe along the exterior
6. wall.
   Fix the pipings onto the wall by saddle or equivalent.
   (Refer to the left side diagram)

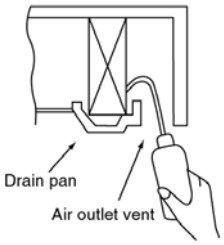
1. Checking the drainage

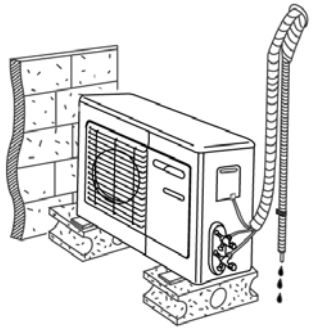
Do this check after connecting the power supply.

- Pour about 600-700cc of water in the drain pan of the indoor unit. (Pour from the position specified in the drawing by using a water supply bottle or other suitable tool.)
- Press the drain test switch of the control box-sub, to start the drain motor, and verify water drainage.

(The drain motor will automatically stop after operating for about five minutes.)

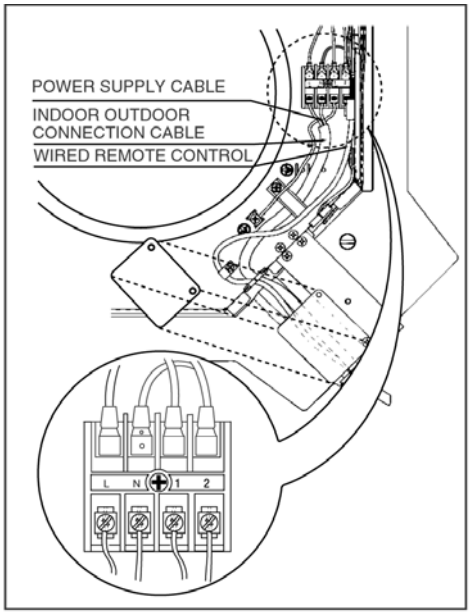
The drain test switch is provided in the control box-sub.



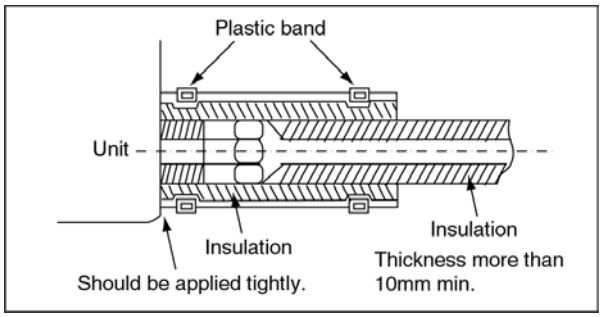


9.4.4. CONNECT THE CABLE TO THE INDOOR UNIT

1. Wrap the pipe connecting part with the insulation and bind both ends with two plastic bands. (Apply the insulation tightly so as not to leave an opening.)



Terminals on the outdoor unit	1	2	⏚
Terminals on the All-Pole switch (Disconnecting means)	1	2	⏚



2. Remove the control board side cover and connect the cable to the terminal as shown in the left figure.

   (For detail refer to wiring diagram at unit.)

   a. Cable connection to the outdoor unit.

   - Connect the locally approved cable (3.5mm^2) to the terminals on the control board-side individually according to the outdoor unit connection.
   - Ensure the color of wires of outdoor unit and the terminal No.s are the same to indoor´s respectively.

Terminals on the outdoor unit	1	2	⏚
Terminals on the indoor unit	1	2	⏚

   - Secure the cable onto the control board with the holder (clamper).

   b. Cable connection to the power supply (240-220V~, 50Hz) through All-Pole switch (disconnecting means.)

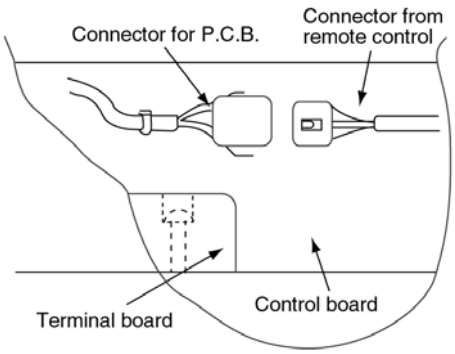
   - Connect the locally approved cable (3.5mm^2) to the control board-side and connect other end of the cable to the All-Pole switch (disconnecting means.)

Note
All-Pole switch (Disconnecting means).
There must be an All-Pole switch (disconnecting means) with minimum 3mm contact gap in the fixed installation circuit.

- Secure the cable onto the control board side with the holder (clamper.)

HOW TO INSTALL WIRED REMOTE CONTROL

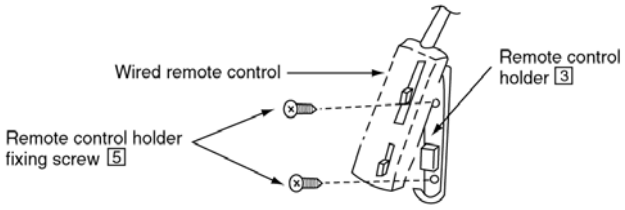
- **CONNECT THE REMOTE CONTROL WIRE AS SHOWN IN THE DIAGRAM**



1. Select the best location.

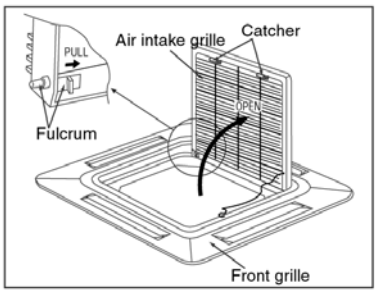
   Do not install at places where there is direct sunlight or near any heat source.
2. Install remote control holder to the wall, by fixing it with two screws.
3. Mount the wired remote control to remote control holder.
   - Engage the slots at the back of remote control to the hooks of remote control holder.
   - Then, pull down the remote control lightly.

Note:
Install the remote control less than 1.5m from the unit and within user´s reach. It is recommended to use the attached cord holders for good finish when the cord is fixed on a wall or a pillar.

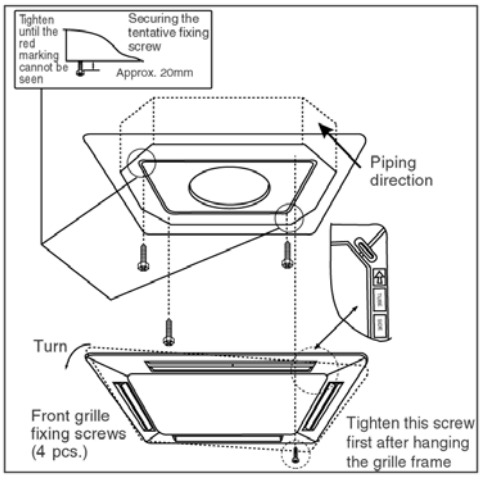


9.4.5. INSTALL THE FRONT GRILLE ONTO THE INDOOR UNIT

1. Remote the air intake grille
   - Open the air intake grille by holding the catchers (2 pcs.)
   - Move the fulcrum to the center and remove the air intake grille.
2. Fitting the front grille
   - Temporarily secure the front grille fixing screws (3 pcs.) before fitting the front grille. (For temporarily securing the front grille.)
   - Turn the front grille as illustrated on the right, place the front grille support on the front grille fixing screw, and tighten the front grille fixing screws (4 pcs.)



CAUTION
- Check before hand the height from the ceiling to the unit.
- The front grille fitting direction is determined by the unit direction.
- Only use the screws with the length of 25mm which is provided, to fix the front grille.
- Do not use other screw which is longer it may cause damage to the drain-pan and other components.



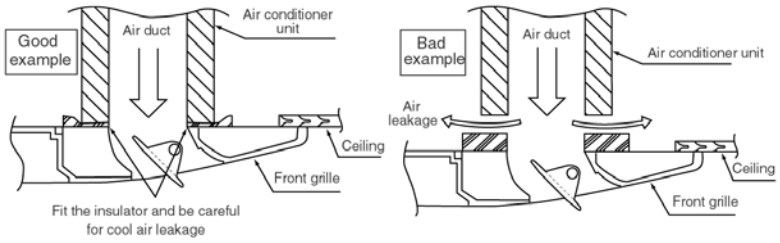
3. Fitting the air intake grille
   - Move the fulcrum of the air intake grille, and fit the air intake grille.
   - Hang the string on the unit.

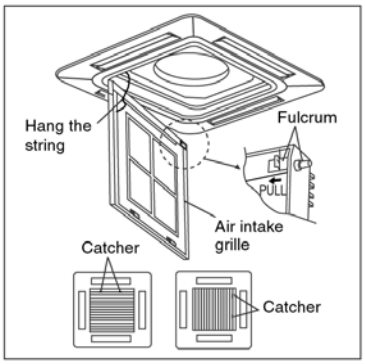
AIR INTAKE GRILLE FITTING DIRECTION

- The air intake grille fitting direction can be selected as illustrated on the right.
- When selecting direction, the ceiling design and air intake grille operability should be considered.

CAUTION
Install the front grille firmly.
Leakage of cool air causes condensation and water drops.

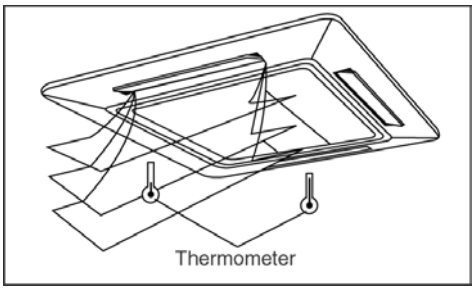
Before installing the front grille, always remove the paper model.





EVALUATION OF THE PERFORMANCE

1. Operate the unit at cooling operation mode for fifteen minutes or more.
2. Measure the temperature of the intake and discharge air.
3. Ensure the difference between the intake temperature and the discharge air is more than 8°C.



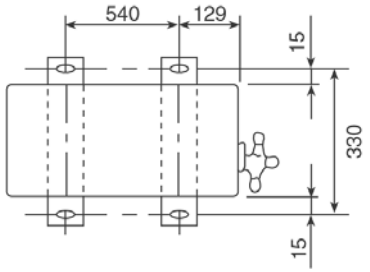
9.5. Outdoor unit

9.5.1. SELECT THE BEST LOCATION (Refer to “Select the best location” section)

9.5.2. INSTALL THE OUTDOOR UNIT

- After selecting the best location, start installation according to Indoor/Outdoor Unit Installation Diagram.

1. Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut. (ø10 mm).
2. When installing at roof, please consider strong wind and earthquake. Please fasten the installation stand firmly with bolt or nails.



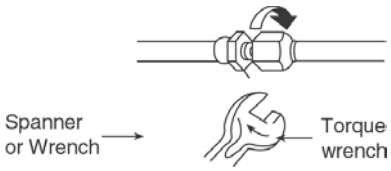
9.5.3. CONNECTING THE PIPING

Connecting The Piping To Indoor Unit

Please make flare after inserting flare nut (locate at joint portion of tube assembly) onto the copper pipe. (In case of using long piping)

Connect the piping

- Align the center of piping and sufficiently tighten the flare nut with fingers.
- Further tighten the flare nut with torque wrench in specified torque as stated in the table.

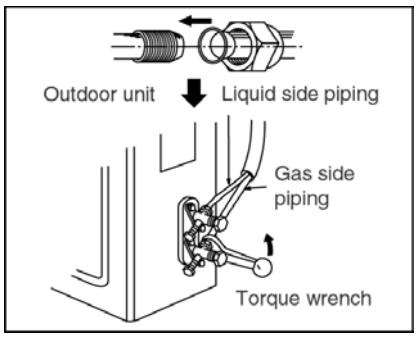


Pipe Size	Torque
Liquid Side 1/4”	18 N.m
Gas Side 1/2”	55 N.m
Gas Side 5/8”	65 N.m

Connecting The Piping To Outdoor Unit

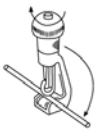
Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge. Make flare after inserting the flare nut (located at valve) onto the copper pipe.

Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

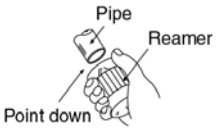


CUTTING AND FLARING THE PIPING

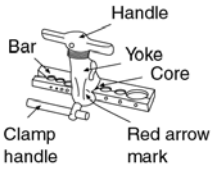
1. Please cut using pipe cutter and then remove the burrs.
2. Remove the burrs by using reamer. If burrs is not removed, gas leakage may be caused.
   Turn the piping end down to avoid the metal powder entering the pipe.
3. Please make flare after inserting the flare nut onto the copper pipes.



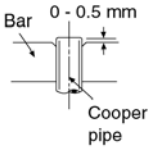
1. To cut



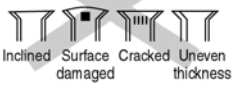
2. To remove burrs



3. To flare



■ Improper flaring ■

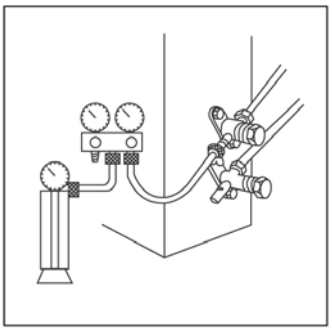


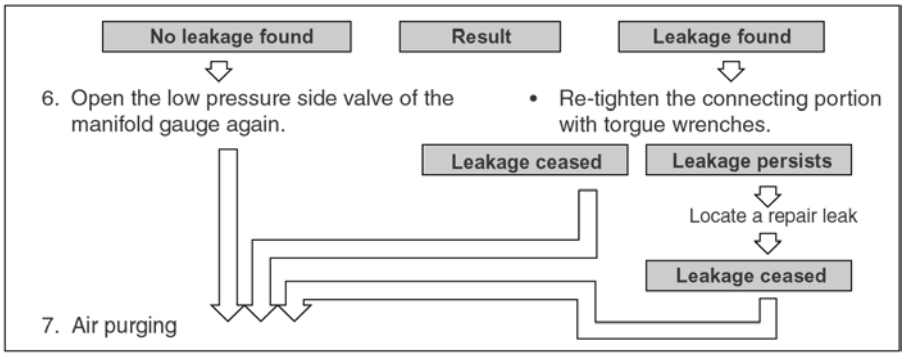
When properly flared, the internal surface of the flare will evenly shine and be of even thickness. Since the flare part comes into contact with the connections, carefully check the flare finish

9.5.4. AIR PURGING OF THE PIPING AND INDOOR UNIT

1) Checking gas leakage

1. Remove the service-port cap from both 3-way valves.
2. Connect the manifold gauge set to the service port of Liquid side 3-way valve.
3. Connect the charging cylinder to the manifold gauge set and open the valve of the cylinder.
4. Open the low pressure side valve of the manifold gauge of approx. 10 seconds and then close.
5. Check a gas leakage of the connecting portion of pipings with the gas-leak detector.

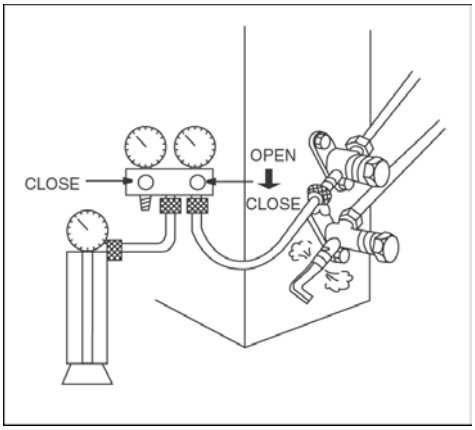




2) Air purging

The air remaining in the Refrigeration cycle which contains moisture may cause malfunction on the Compressor.

1. To purge the air, push the pin on the Gas side 3-way valve for three seconds with a Hexagonal wrench and set it free for one minute.
   - Repeat this three times.
2. To balance the refrigerant, close the low pressure side valve on the manifold gauge and release a refrigerant from the piping through service port until the gauge indicates 0.49 ~ 0.29 MPa.
3. Set the both 3-way valves to open position with the hexagonal wrench for the unit operation.



9.5.5. CONNECT THE CABLE TO THE OUTDOOR UNIT

(FOR DETAIL REFER TO WIRING DIAGRAM AT UNIT)

1. Remove the control board cover from the unit by loosening the screw.
2. Connect the locally approved cable (3.5 mm2) to the terminals on the control board individually.

Terminals on the outdoor unit	1	2	⏚
Terminals on the indoor unit	1	2	⏚

3. Secure the cable onto the control board with the holder (clamper).
4. Attach the control board cover to the original position with the screw.

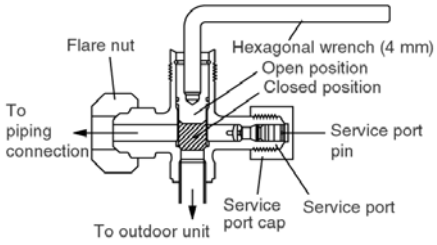
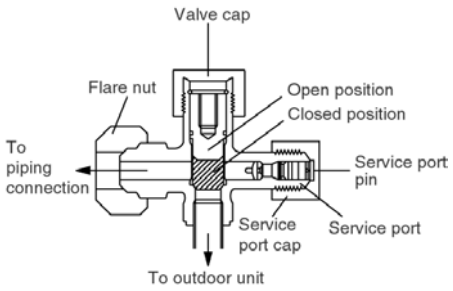
9.5.6. PIPE INSULATION

1. Please carry out insulation at pipe connection portion as mentioned in Indoor/Outdoor Unit Installation Diagram. Please wrap the insulated piping end to prevent water from going inside the piping.
2. If drain hose or connecting piping is in the room (where dew may form), please increase the insulation by using POLY-E FOAM with thickness 6mm or above.
3. Tape the pipings, drain hose and connecting cable from down to up.

CHECK ITEMS

- ☐ Is there any gas leakage at flare nut connection?
- ☐ Has the heat insulation been carried out at flare nut connection?
- ☐ Is the connecting cable being fixed to terminal board firmly?
- ☐ Is the connecting cable ends being clamped firmly?
- ☐ Is the drainage ok? (Refer to “Check the drainage” section)
  (Refer to “Check the drainage” section)
- ☐ Is the earth wire connection properly done?
- ☐ Is the indoor unit properly hooked?
- ☐ Is the power supply voltage complied with rated value?
- ☐ Is there any abnormal sound?
- ☐ Is the cooling operation normal?
- ☐ Is the thermostat operation normal?
- ☐ Is the remote control’s LED operation normal?

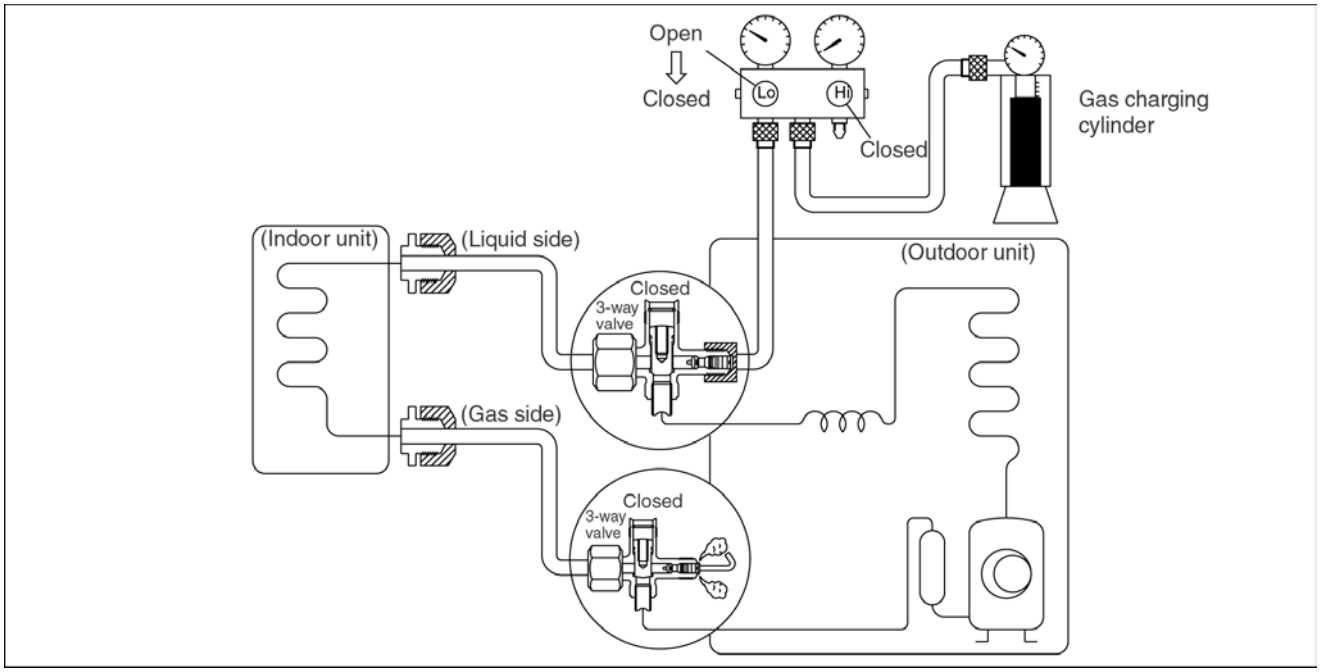
10 3-way Valve

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

10.1. Air Purging (Installation)

Required tools: Hexagonal wrench, adjustable wrench, torque wrenches, wrench to hold the joints, gas leak detector, and charging set.

The air in the indoor unit and in the piping must be purged. If air remains in the refrigeration pipes, it will affect the compressor, reduce the cooling capacity, and could lead to a malfunction.



Service port cap
Be sure, using a torque wrench to tighten the service port nut (after using the service port), so that it prevents the gas leakage from the refrigeration cycle.

Procedure:

1. **Recheck the piping connections.**
2. **Open the valve caps and service port caps for both 3-way valves.**
3. **Connect the charging cylinder to the manifold gauge as shown above.**
4. **Open the valve of the low pressure side of manifold gauge counterclockwise for 10 seconds, and then close it.**
5. **Check for gas leakage.**
   - Check the flare connections for gas leakage.
6. **Purge the air from the system.**
   - Open the Low pressure side valve of the manifold gauge.
   - Press the service port pin with the hexagonal wrench to purge the air for three seconds and then wait for one minute.
     Repeat this three times or more.
7. **Balance the refrigerant in the pipings and the indoor unit.**
   - Close the Low pressure side valve of the manifold gauge.
   - Press the service port pin with the hexagonal wrench to release the refrigerant until the gauge indicates 0.1 to 0.3 MPa.
8. **Use torque wrench to tighten the service port cap to a torque of 18 N.m.**
9. **Set the both 3-way valves to the open position.**
10. **Mount the valve caps to the 3-way valves.**
11. **Check for gas leakage.**
    - At this time, especially check for gas leakage from the both 3-way valve's caps, and from the service port caps.

Caution
If gas leakage is discovered in step (3) above, take the following measures:

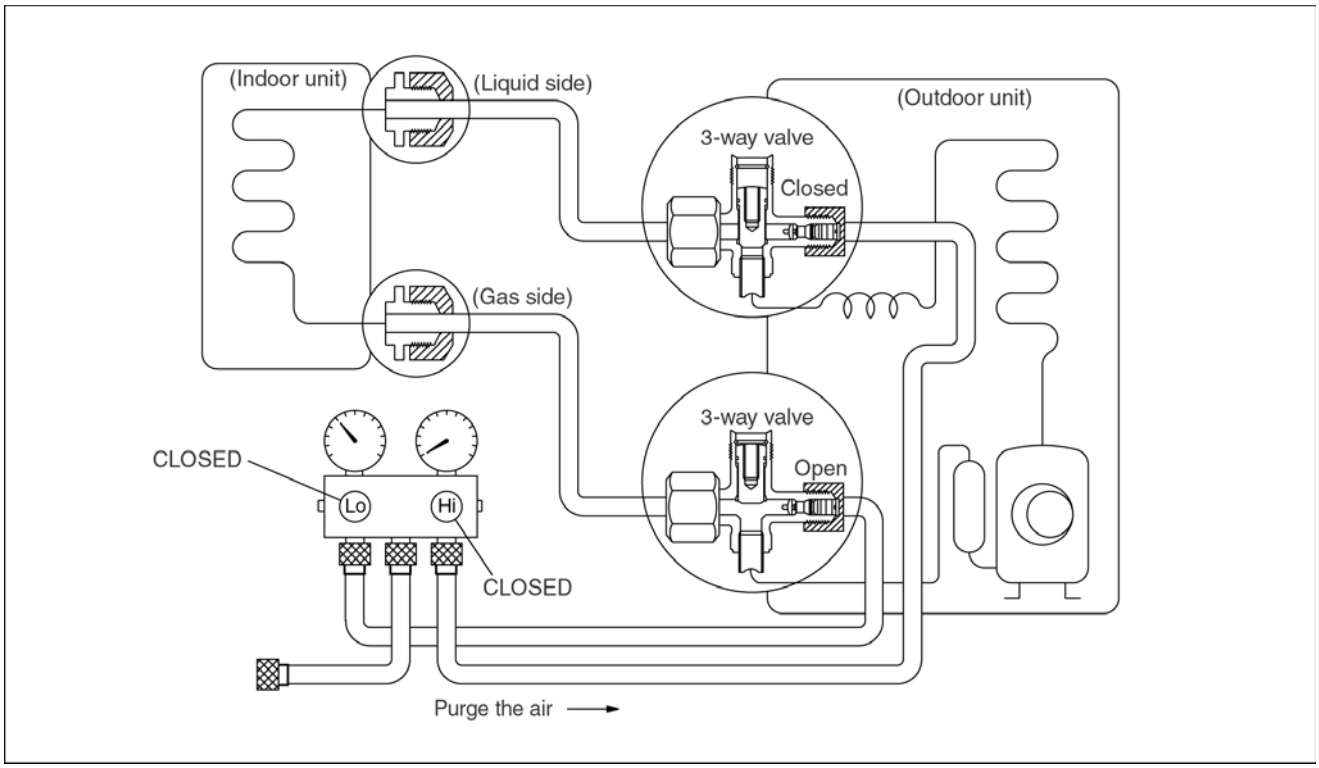
a. Re-tighten the connecting portion with torque wrenches.

   If the leakage ceases, continue the works from step (4).

b. Locate and repair the leak. (Gas leak detector)

   Repeat the works from step (1).

10.2. Pumping down (Re-installation)



Procedure:

1. **Confirm that both the 3-way valves are set to the open position.**
   - Remove the valve caps and confirm that the valve caps are in the raised 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 manifold gauge to the service port of the 3-way valve as shown above.**
   - Connect the manifold gauge to the gas side service port.

4. **Air purging of the charge hose.**
   - Open the Low pressure side valve of manifold gauge slightly to purge air from the charge hose.

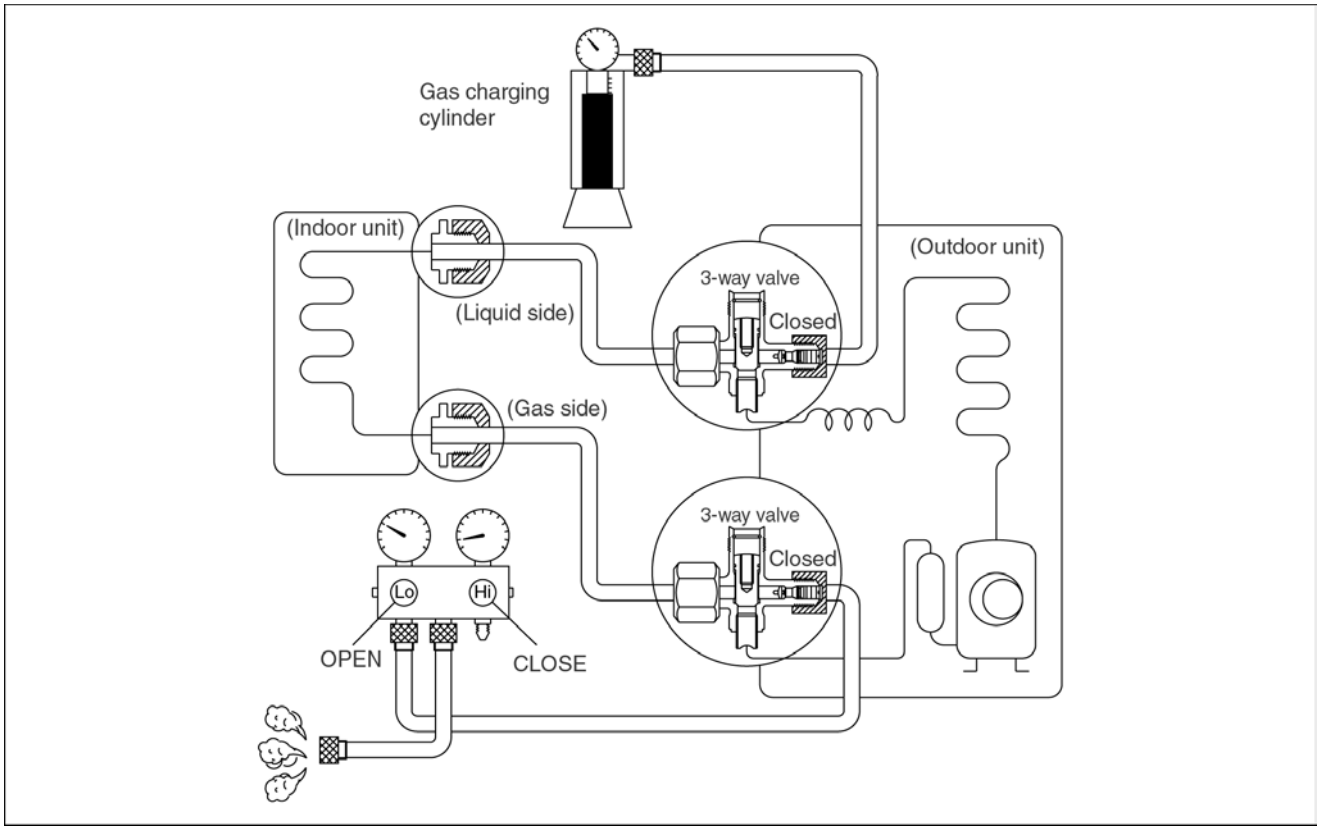
5. **Set the liquid side (High side) 3-way valve to the close position.**

6. **Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1 MPa.**
   - If the unit cannot be operated at the cooling (weather is rather cool), press the Pump Down switch on the Indoor unit.
   - So that the unit can be operated.

7. **Immediately set the gas side (Low side) 3-way valve to the close position.**
   - Do this quickly so that the gauge ends up indicating 0.1 0.3 MPa.

8. **Disconnect the manifold gauge, and mount both the 3-way valve's caps and the service port caps.**
   - Use torque wrench to tighten the service port nut to a torque of 18 N.m.
   - Be sure to check for gas leakage.

10.3. Re-air purging (Re-installation)



Procedure:

1. **Remove the cap nut from 3-way valves.**
   - Remove the cap nut from 3-way valves after carefully checked whether the piping connection was properly and certainly done.

2. **Confirm that valve in both 3-way valves are set to the CLOSE.**

3. **Connect the gas cylinder to the liquid-side (high-pressure) 3-way valve and the charge set to the gas side (low-pressure) 3-way valve.**
   - Remove the flare nut from the service ports to connect the manifold gauge and gas cylinder.
   - Close the valves on the gas cylinder and manifold gauge.

4. **Air purging.**
   - Open the valve on the gas cylinder.
   - Open the valve on the manifold gauge, discharge for three seconds and wait for one minute. Repeat this three times.

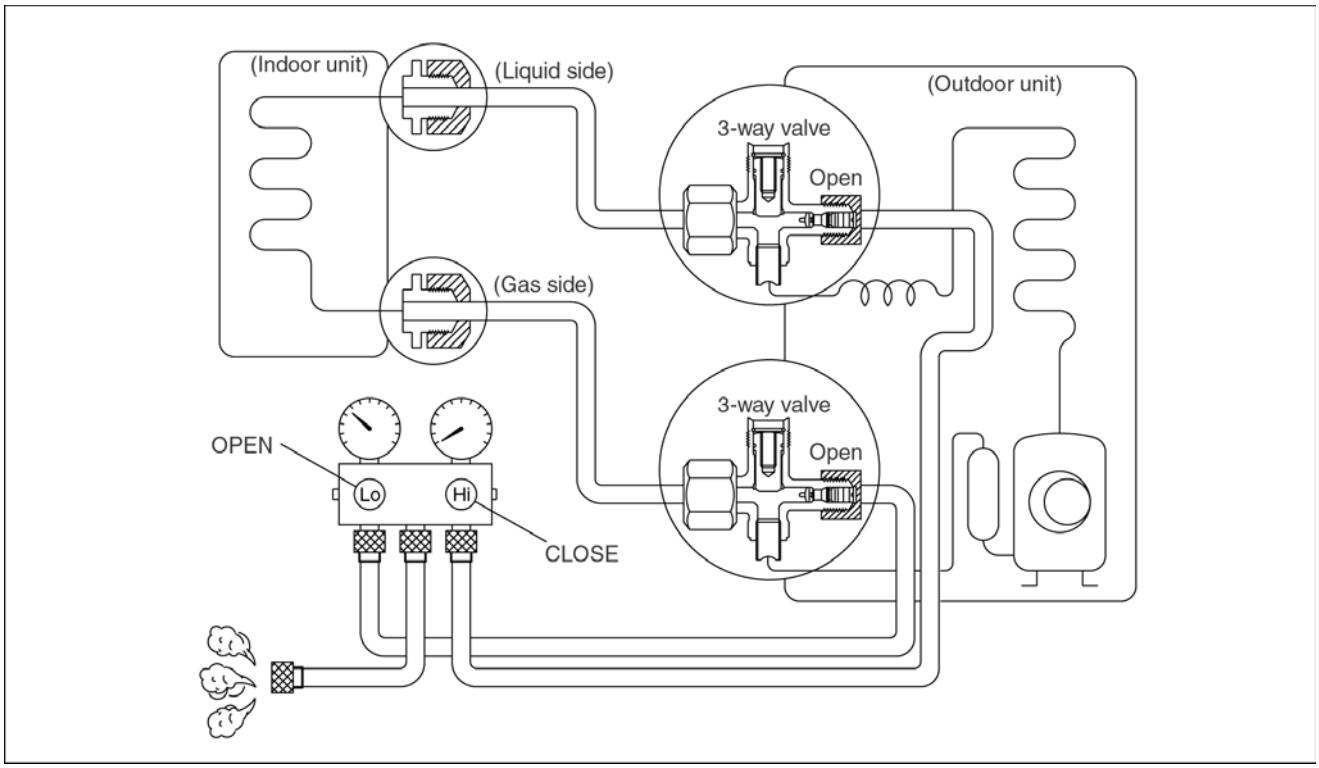
5. **Check for gas leakage.**
   - Check the flare connections for gas leakage.

6. **Discharge the refrigerant.**
   - Close the valve on the gas cylinder and discharge the refrigerant until the gauge indicates 0.1 to 0.3 MPa.

7. **Disconnect the manifold gauge and gas cylinder.**

8. **Mount the valve caps and the service port caps onto the 3-way valves.**
   - Be sure to use a torque wrench to tighten the service port nut.
   - Be sure to check for gas leakage.

10.4. Balance refrigerant of the 3-way valves



Procedure:

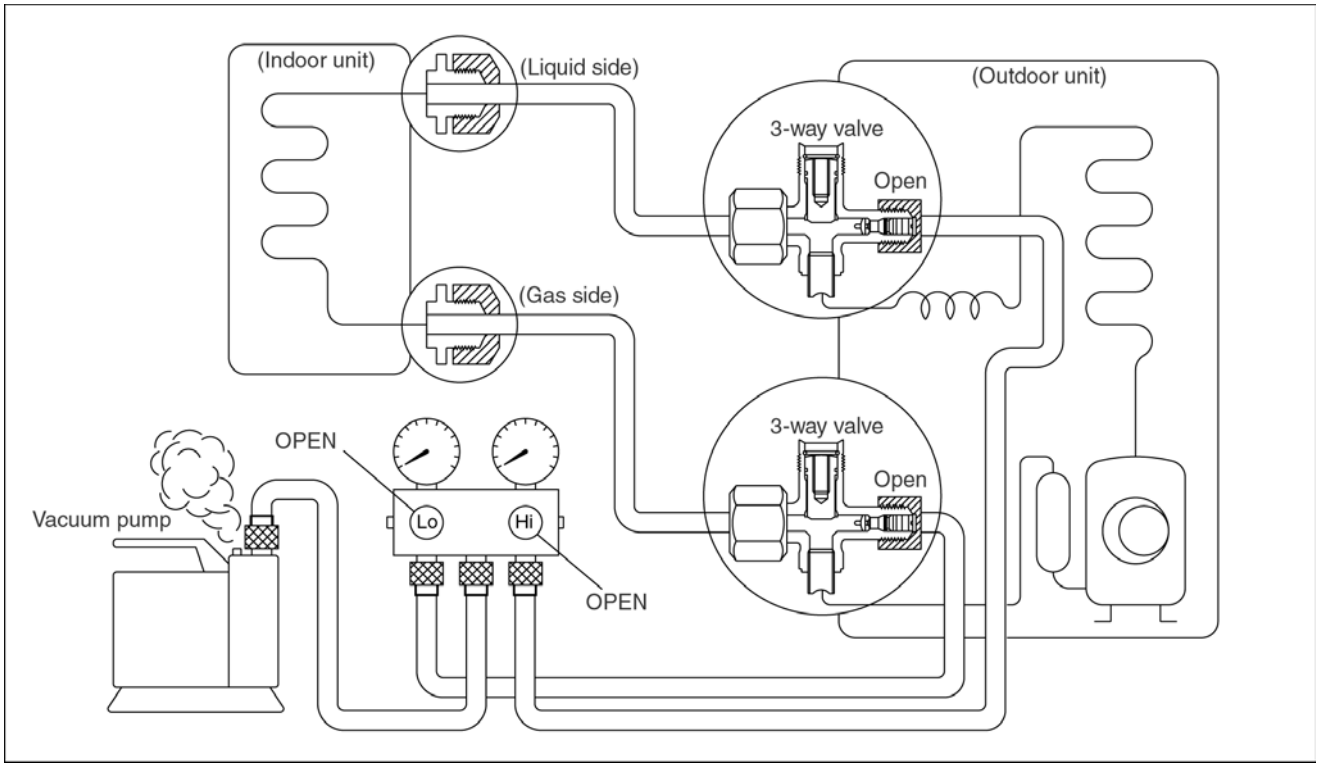
1. **Confirm that both the 3-way valves are set to the open position.**

2. **Connect the manifold gauge to the gas side (Low side) 3-way valve's port.**
   - Leave the valve on the manifold gauge closed.
   - Connect the manifold gauge to the service port.

3. **Open the valves (Low side) on the manifold gauge and discharge the refrigerant until the gauge indicates 0.1 MPa .**
   - If there is no air in the refrigeration cycle [the pressure when the air conditioner is not running is higher than **0.1 MPa**]. 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.

10.5. Evacuation (Installation)

(No refrigerant in the refrigeration cycle)



Procedure:

1. **Connect the vacuum pump to the manifold gauge's centre hose.**

2. **Evacuation for approximately one hour.**
   - Confirm that the gauge needle has moved toward -0.01 MPa.

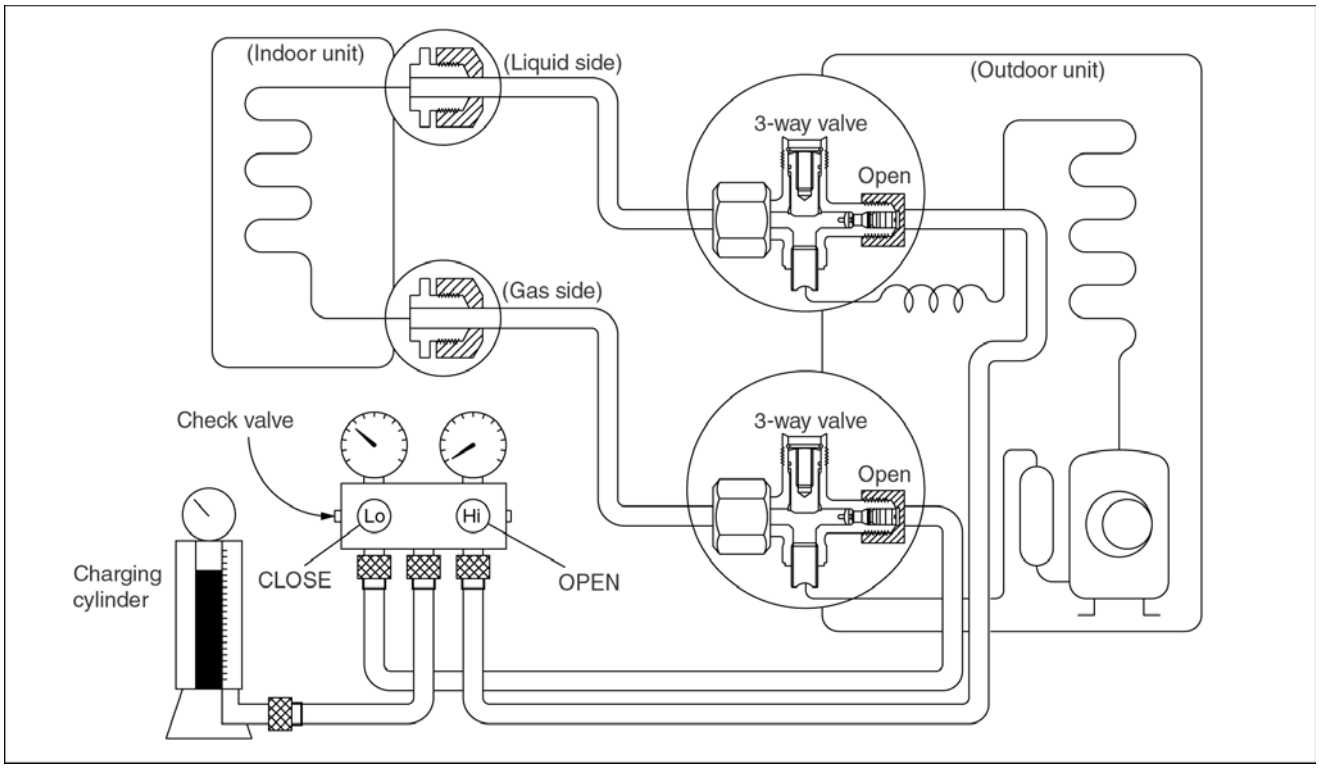
3. **Close the valve (Low side) on the manifold gauge, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).**

4. **Disconnect the manifold gauge from the vacuum pump.**
   - Vacuum pump oil.

     If the vacuum pump oil becomes dirty or depleted, replenish as needed.

10.6. Gas charging

(After Evacuation)



Procedure:

1. **Connect the charge hose to the gas 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). The procedure is the same if using a gas cylinder.

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 150g 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)

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 caps and the service port caps.**
   - Use a torque wrench to tighten the service port nut.
   - Be sure to check for gas leakage.

11 Servicing Information

11.1. Distinction of Lead Free (PbF) Printed Circuit Board

- Printed circuit boards (manufactured) using lead free solder will have a PbF stamp on the Printed Circuit board.

CAUTION

- Pb free solder has a higher melting point than standard solder; typically the melting point is 50 - 70°F (30 - 40°C) higher. Please use a high temperature solder iron and set it to 700 ± 20°F (370 ± 10°C).
- Pb free solder will tend to splash when heated too high (about 1100°F/600°C).
- If you must use Pb solder, please completely remove all of the Pb free solder on the pin or solder area before applying Pb solder. If this is not pratical, be sure to heat the Pb free solder until it melts, before applying Pb solder.

11.2. Indoor Electronic Controllers Removal Procedures

1. Open the intake grille by pressing the catcher (Fig. 1).

2. Remove the terminal cover by removing the screw (Fig. 2).

3. Remove the electronic controller cover by removing 2 screws and loosen 1 screw to half position (Fig. 3).

4. Release the:
   (Refer Fig. 4)
   - Connection to outdoor unit.
   - Connection to power sure.
   - Remote control connection.
   - CN-FM (green) connector.
   - PUMP (grey) connector.
   - CN-FSW (ylw) connector.
   - The air intake sensor by removing the screw.

5. To remove the electronic controller, release the 4 hooks that hold it to the air guider (Refer Fig. 4).

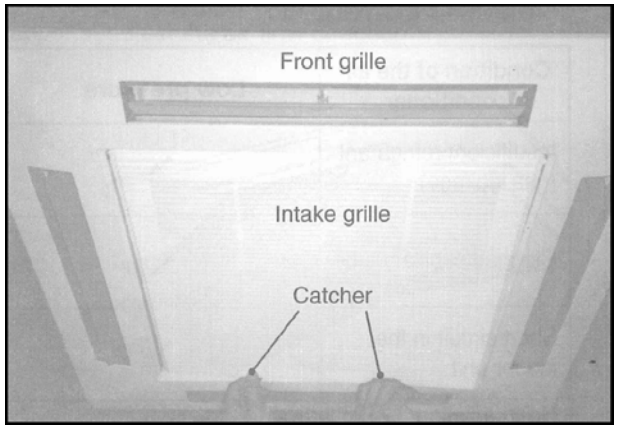


Fig. 1

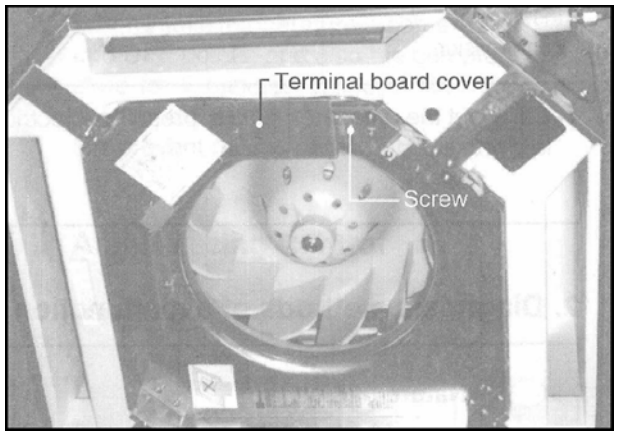


Fig. 2

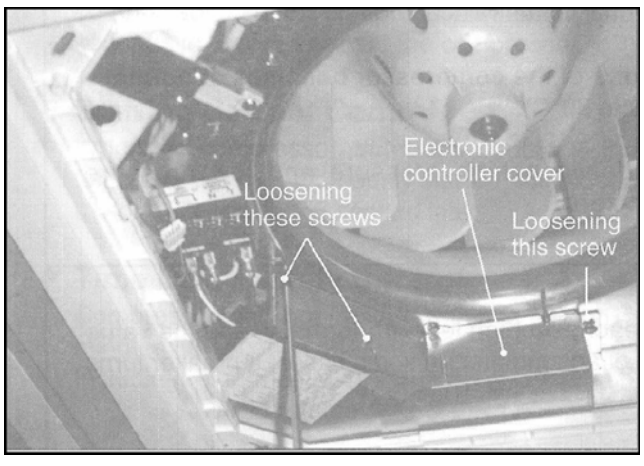


Fig. 3

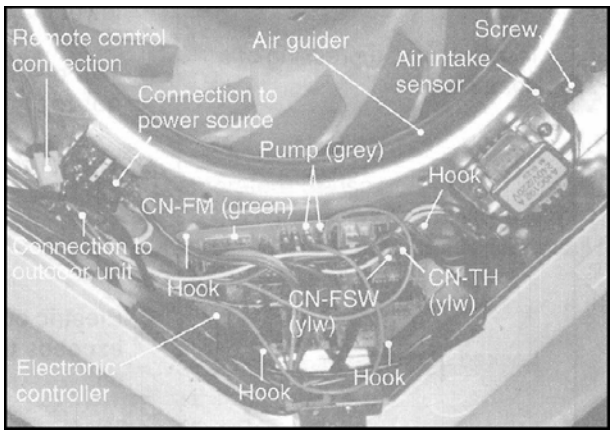


Fig. 4

11.3. Turbo Fan and Indoor Fan Motor Removal Procedure

1. Open the intake grille by pressing the catcher (Fig. 1 - previous page).

2. Remove the intake grille by:
   (Refer Fig. 6).
   - Release the string.
   - Slide the fulcrum tab to the left to release the intake grille from the front grille.

3. Remove front grille by:
   (Refer Fig. 7).
   - Remove 1 screw.
   - Loosen 3 screws to half position.
     (For safety do not remove this screws)
   - Turn the front grille to release it from the loosen screws.

4. Refer step 2-4 of “electronic controller procedure”.

5. Remove the power supply cord holder screw (Fig. 7).

6. Remove the flat piece and screw that hold the power supply cord (Fig. 8).

7. Release the:
   (Refer Fig. 9).
   - Connection from outdoor unit.
   - Connection from power source.
   - Connection of earth wires.

8. Get ready 1 bucket for you to intercept falling water, when you remove the drain plug (Fig. 9).

9. Remove 7 screws that hold the 4 pcs particular plates then remove the particular plates (Fig. 9).

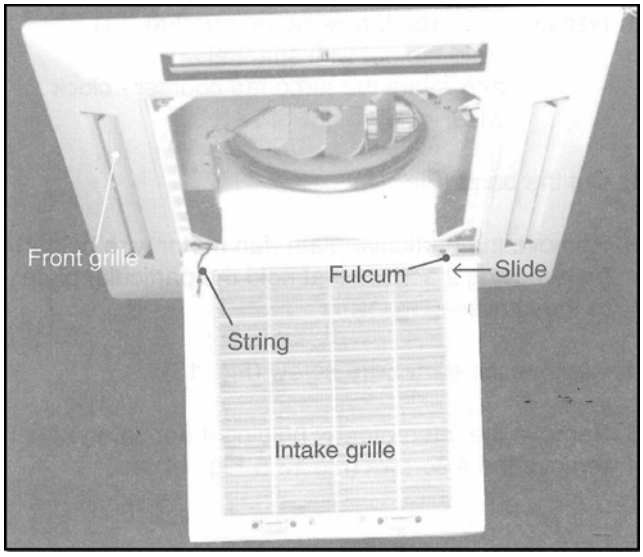


Fig. 6

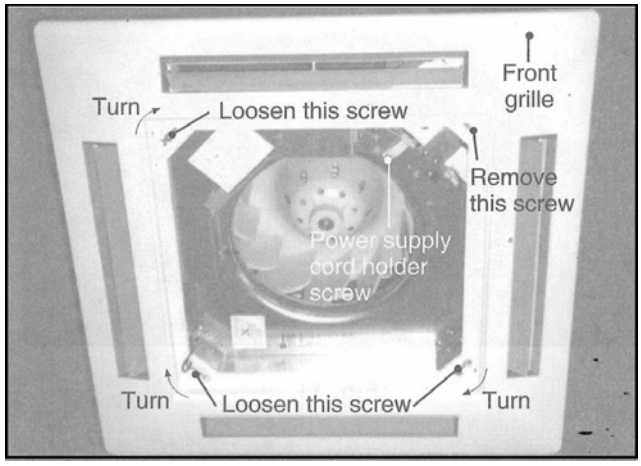


Fig. 7

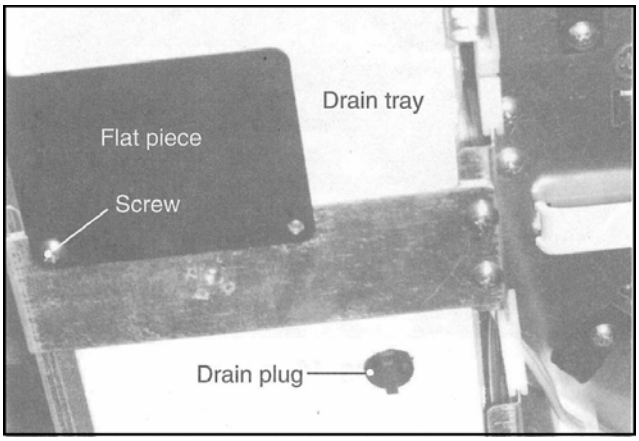


Fig. 8

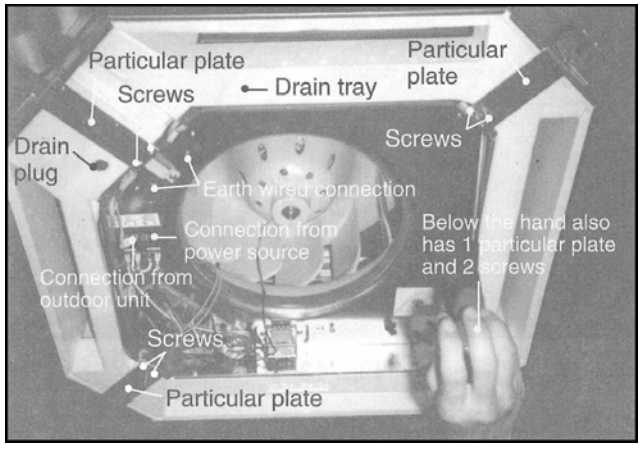


Fig. 9

10. For safety, hold the air guider then remove 8 screws. (Fig. 10)

11. Remove the turbo fan Hexagon nut (Fig. 11).
    - Hold the nut with spanner.
    - and rotate the turbo fan counter - clockwise.

12. Cut the band (Fig. 12).

13. Remove the particular plate (fan motor wire holder) by removing 2 screws that hold the particular plate to the chassis (Fig. 12).

14. Remove the earth wire screw (Fig. 13).

15. Remove the fan motor by holding it (for safety) then remove the 4 screws (Fig. 13 & Fig. 14).

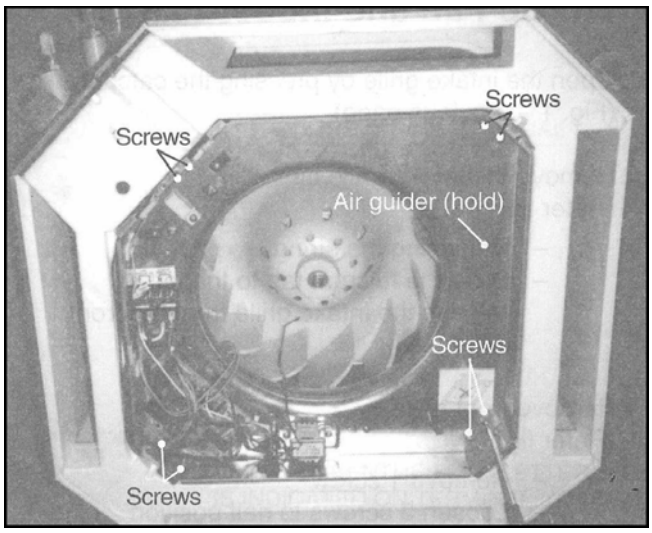


Fig. 10

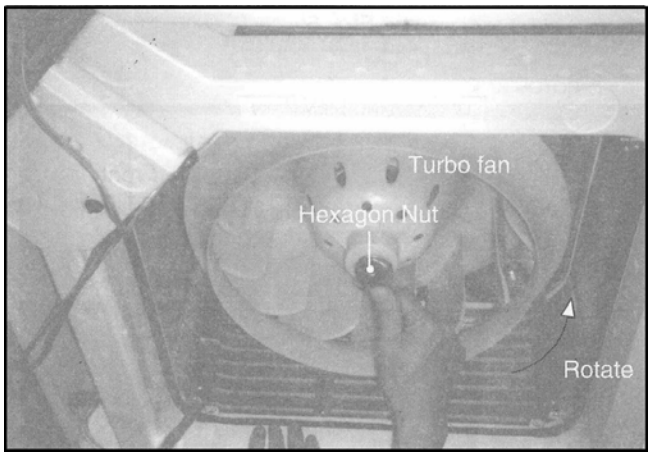


Fig. 11

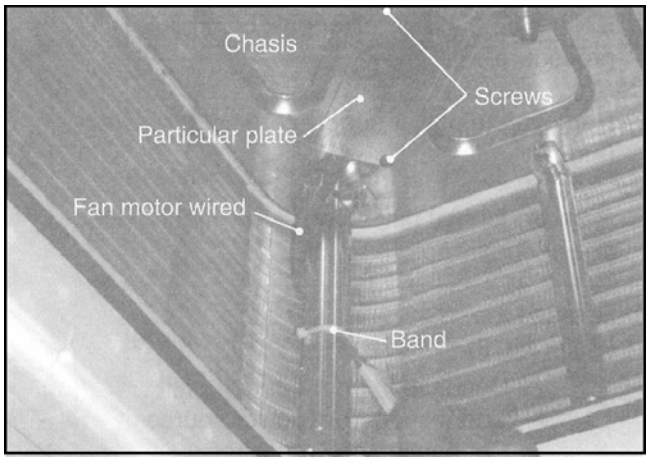


Fig. 12

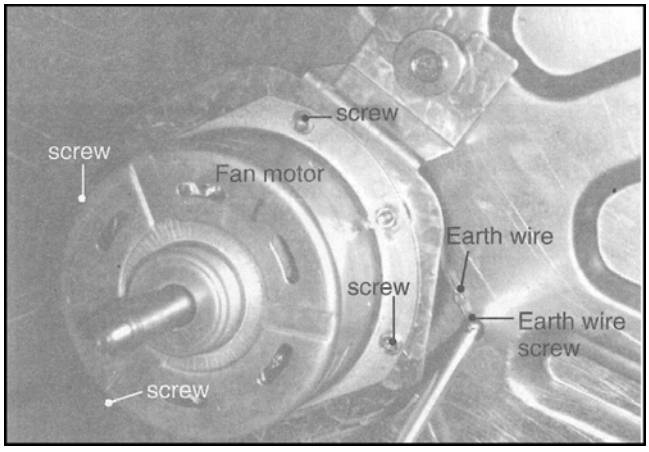


Fig. 13

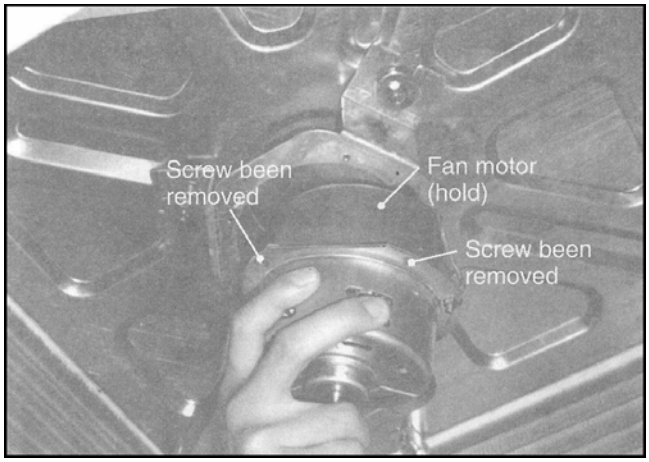


Fig. 14

11.4. Drain Pump Removal Procedure

If the LED at the wired remote control blinking while operation (Fig. 15).

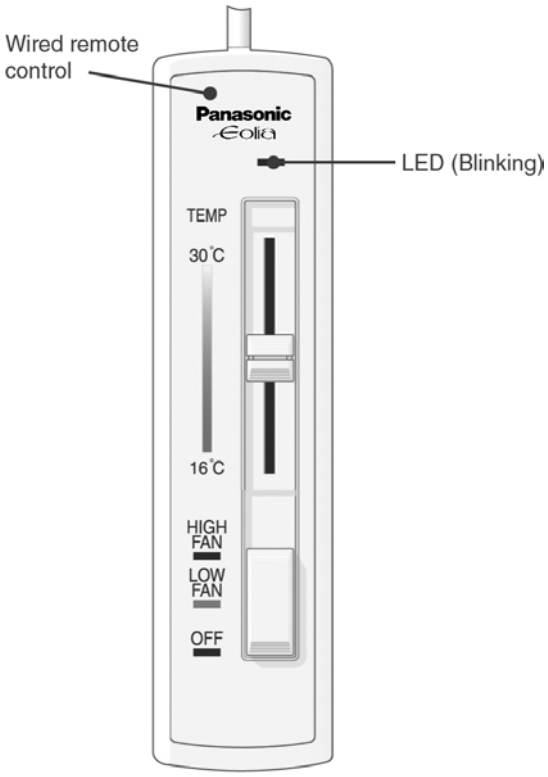


Fig. 15

Please follow this procedure:-

1. Refer step 1 - 8 of “Turbo Fan and Indoor Fan Motor Removal Procedure”.
2. Remove Drain tray (Please refer Fig. 9 - previous page).
3. Remove earth wire by removing the screws (Fig. 16).
4. Cut the band (Fig. 16).
5. Remove the drain pump nozzle by removing 4 screws on top of it (Fig. 16).
6. Pull out the drain hose from the drain pump nozzle (Fig. 17).
7. Remove 4 screws to take out the drain pump motor (Fig. 16).
8. For reinstallation please make sure the connection between the drain pump nozzle and drain hose tight by using band.

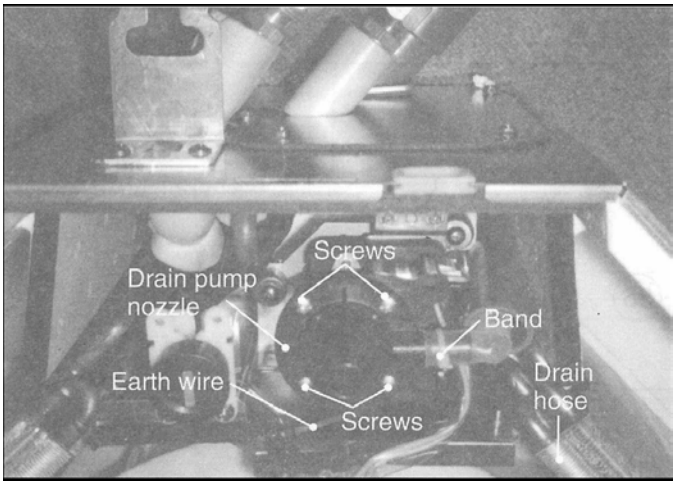


Fig. 16

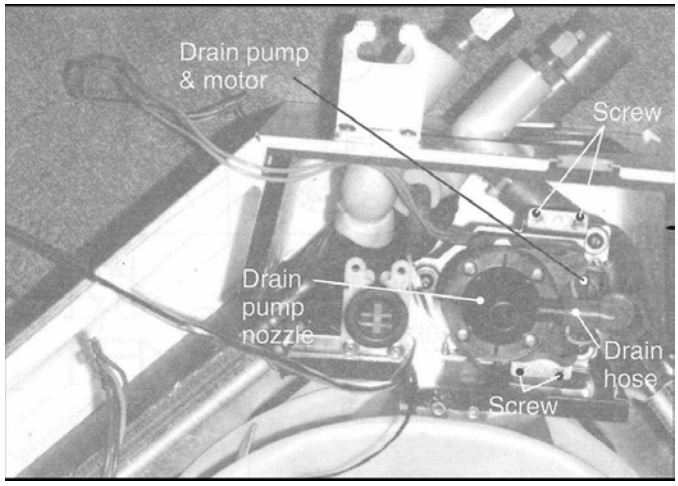


Fig. 17

12 Troubleshooting Guide

12.1. Refrigeration cycle system

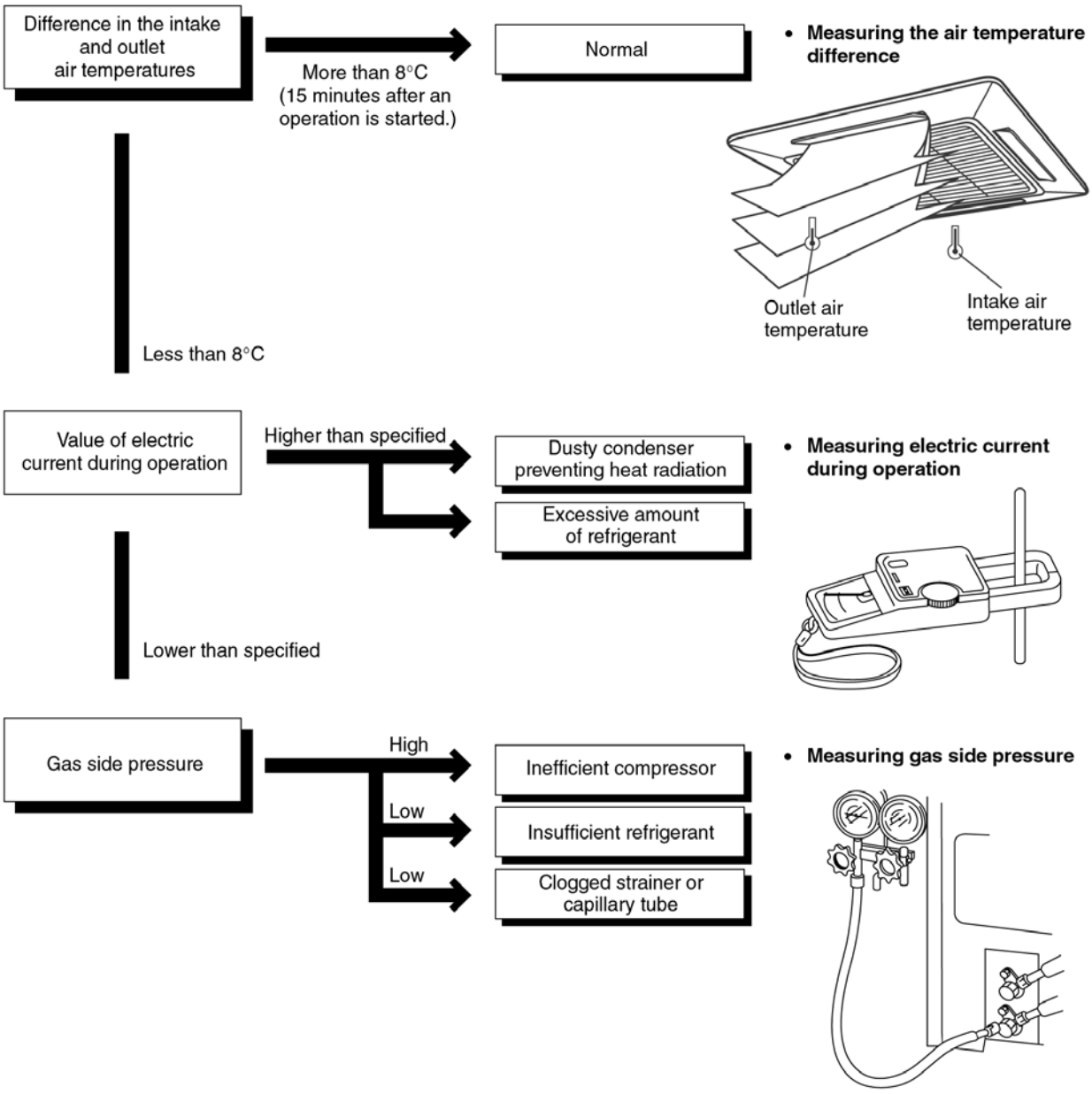
In order to diagnose malfunctions, make sure that there is no electrical problem before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of compressor and a fan.

The normal outlet air temperature and pressure of the refrigeration cycle depend on various conditions, the standard values for them are shown in the table (at 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



12.2. 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			

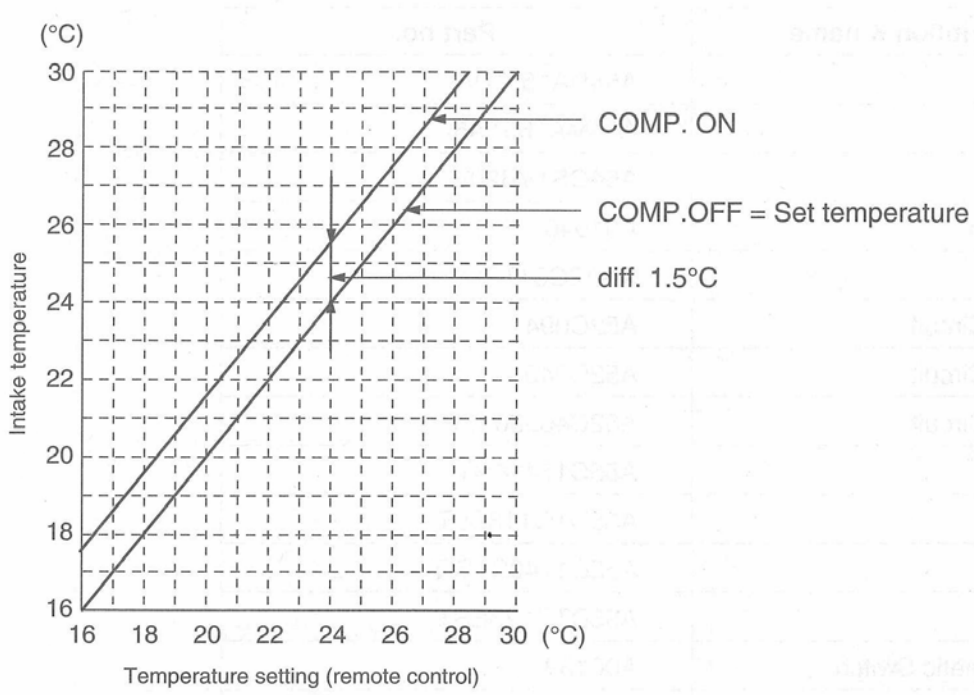
- Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

12.3. 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 has a humming sound.

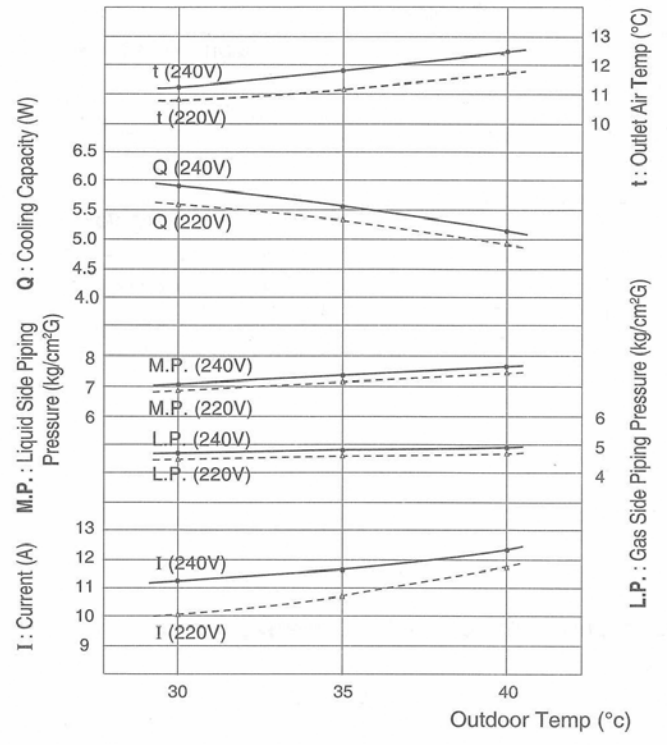
13 Technical Data

13.1. Thermostat characteristics



13.2. Operation characteristics

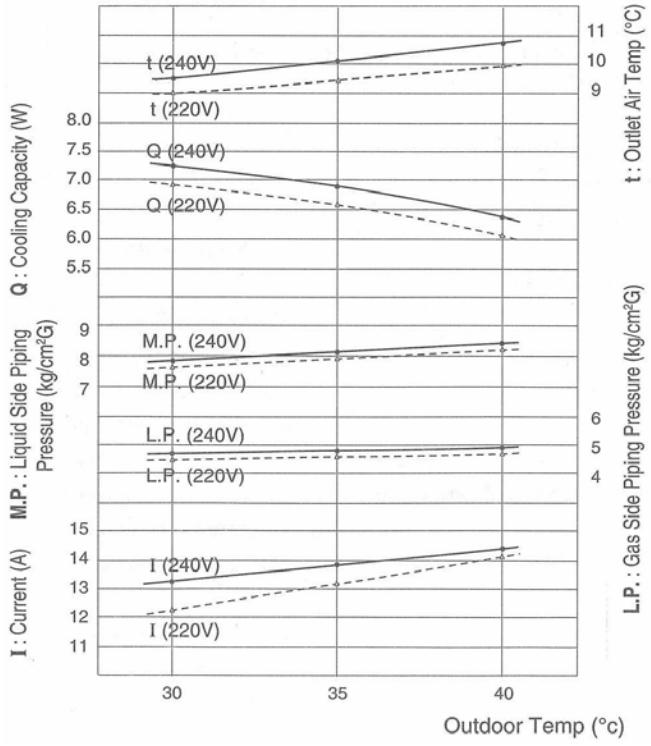
CS-ES1820B CU-ES1820B



OUTDOOR ROOM TEMPERATURE (°C)

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

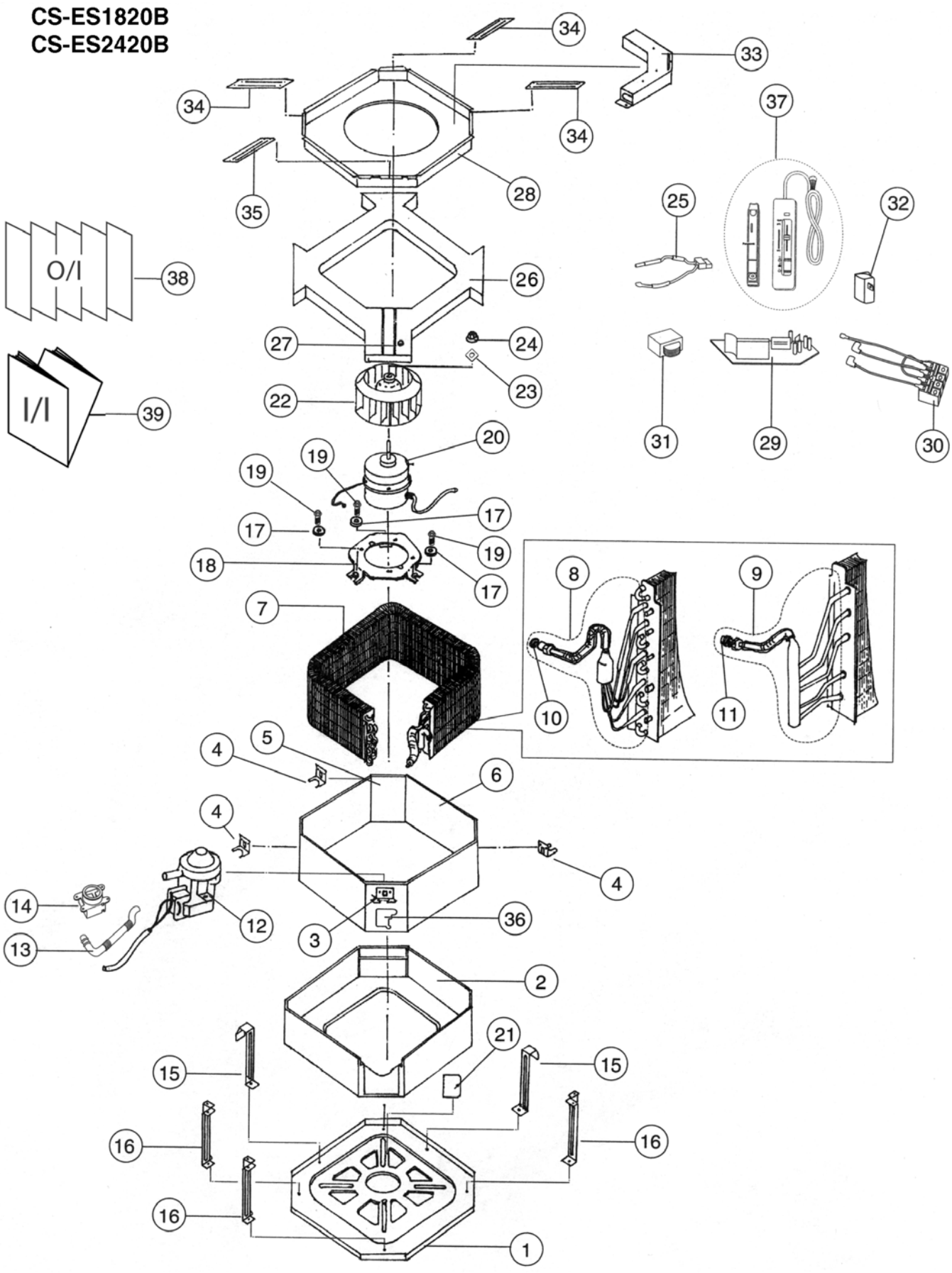
CS-ES2420B CU-ES2420B



PIPING LENGTH (m)

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

14 Exploded View (Indoor Unit)



- The above exploded view is for the purpose of parts disassembly and replacement.
  The non-numbered parts are not kept as standard service parts.

15 Replacement Parts List (Indoor Unit)

<Model: CS-ES1820B / CS-ES2420B>

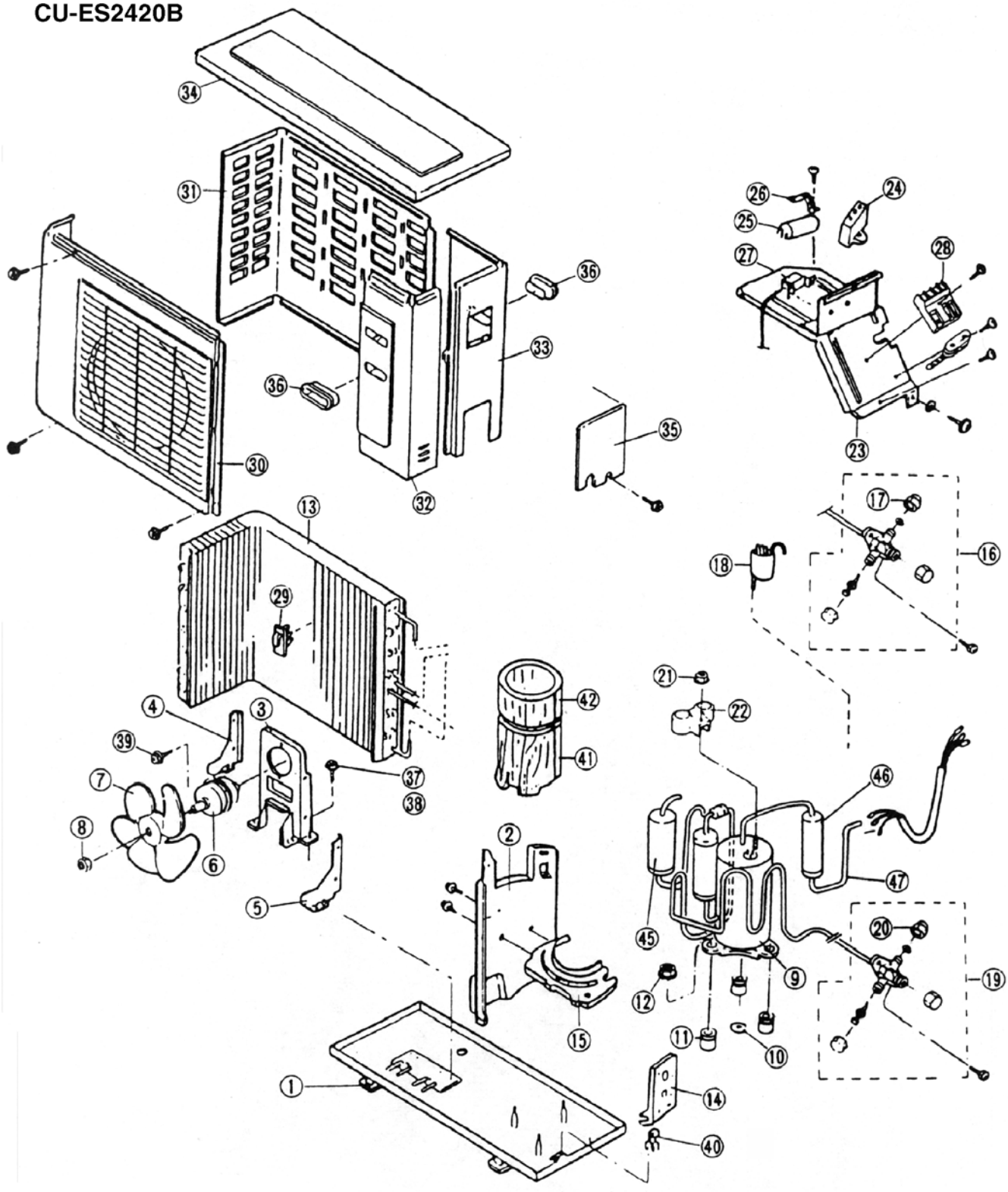
REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-ES1820B	CS-ES2420B	REMARKS
1	BASE PAN ASS'Y	1	CWD52K272	←	
2	AIR GUIDER BLOWER WHEEL	1	CWD32158	←	0
3	CABINET HOLDER (LONGER)	1	CWD91173	←	
4	CABINET HOLDER	3	CWD91174	←	
5	CABINET SIDE PLATE (WITH HOLE)	1	CWE04191	←	
6	CABINET SIDE PLATE	1	CWE04192	←	
7	EVAPORATOR	1	CWB30C185	CWB30C186	
8	TUBE ASS'Y COMPLETE (LIQUID)	1	CWT01C418	←	
9	TUBE ASS'Y COMPLETE (GAS)	1	CWT01C419	CWT01C420	
10	FLARE NUT (LIQUID)	1	CWH6002140 (1/4″)	←	
11	FLARE NUT (GAS)	1	CWT25007 (1/2″)	CWT25004 (5/8″)	
12	DRAIN PUMP	1	CWB53044	←	
13	DRAIN HOSE COMPLETE	1	CWT29C026	←	
14	OVERLOAD PROTECTOR (FLOAT SWITCH)	1	CWA12315	←	
15	EVAPORATOR HOLDER (WITH HOOK)	2	CWD91168	←	
16	EVAPORATOR HOLDER	3	CWD91169	←	
17	ANTI-VIBRATION BUSHING (FAN MOTOR)	3	CWH50188	←	
18	FAN MOTOR BRACKET	1	CWD54225	←	
19	SCREW FOR FAN MOTOR	3	CWH55242	←	
20	FAN MOTOR	1	CWA95336	CWA95337	0
21	FAN MOTOR WIRE HOLDER	1	CWD91170	←	
22	TURBO FAN	1	CWH03K046	←	
23	FLAT PIECE FOR TURBO FAN	1	CWD74175	←	
24	HEXAGON NUT FOR TURBO FAN	1	XNG8B	←	
25	SENSOR COMPLETE	1	CWA50C566	←	
26	DRAIN PAN COMPLETE	1	CWH40C106	←	
27	PLUG DRAIN PAN	1	CWB82018	←	
28	AIR GUIDER BLOWER WHEEL	1	CWD32159	←	
29	ELECTRONIC CONTROLLER	1	CWA74928	CWA741089	0
30	TERMINAL BOARD	1	CWA28C510	←	0
31	TRANSFORMER	1	CWA40C192	←	
32	CAPACITOR FOR FAN MOTOR	1	CWA31604 (1.5µF, 400V)	←	
33	ELECTRONIC CONTROLLER COVER	1	CWH13K039	←	
34	DRAIN PAN HOLDER	3	CWD91175	←	
35	DRAIN PAN HOLDER (LONGER)	1	CWD91176	←	
36	DRAIN HOSE / CABINET HOLDER	1	CWD91171	←	
37	REMOTE CONTROL COMPLETE	1	CWA75C2466	←	0
38	OPERATION INSTRUCTION	1	CWF564046	←	
39	INSTALLATION INSTRUCTION	1	CWF612444	←	

(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061).
- "O" marked parts are recommended to be kept in stock.

16 Exploded View (Outdoor Unit)

CU-ES1820B
CU-ES2420B



- The above exploded view is for the purpose of parts disassembly and replacement.
  The non-numbered parts are not kept as standard service parts.

17 Replacement Parts List (Outdoor Unit)

<Model: CU-ES1820B / CU-ES2420B>

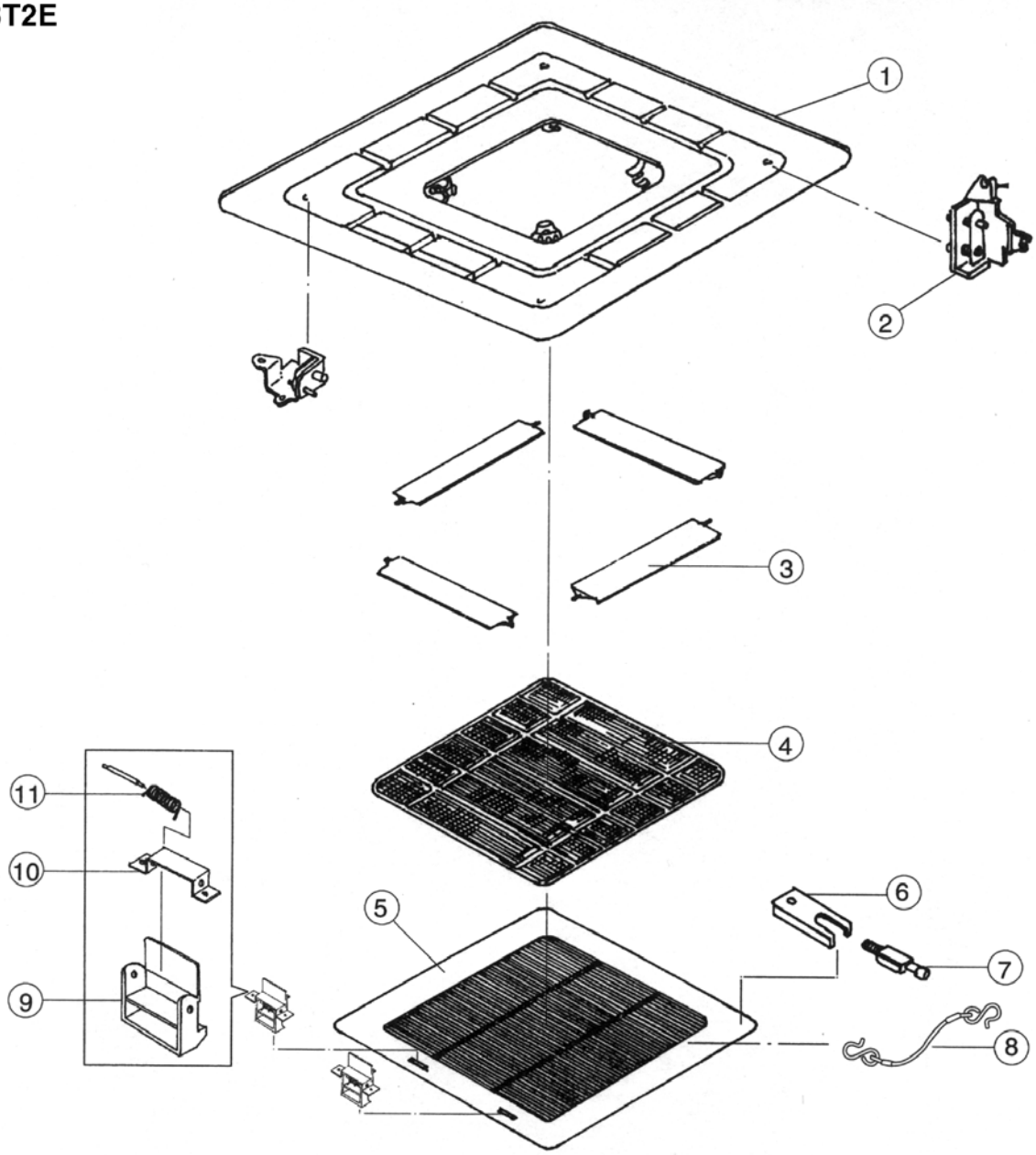
REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-ES1820B	CU-ES2420B	REMARKS
1	CHASSY ASS'Y	1	CWD50K514B	←	
2	SOUND PROOF BOARD	1	CWH15223	←	
3	FAN MOTOR BRACKET	1	CWD54145	←	0
4	SUPPORTED-FAN MOTOR BRACKET (LEFT)	2	CWD90835	←	
5	SUPPORTED-FAN MOTOR BRACKET (RIGHT)	2	CWD90836	←	
6	FAN MOTOR	1	CWA92176	CWA92183	0
7	PROPELLER FAN	1	CWH00K049	←	
8	NUT - PROPELLER FAN	1	CWH56060	←	
9	COMPRESSOR	1	2JS350D3DA02	2JS438D3AA02	0
10	PACKING-COMPRESSOR MOUNT	3	CWB81047	←	
11	BUSHING - COMPRESSOR MOUNT	3	CWH50055	←	
12	NUT - COMPRESSOR MOUNT	3	CWH4582065	←	
13	CONDENSER	1	CWB32C252	CWB32C253	
14	HOLDER COUPLING	1	CWH35113B	CWH35K030B	
15	GUIDER-COMP.	1	CWD90830	←	
16	3-WAYS VALVE (LIQUID SIDE)	1	CWB01464	CWB011183	0
17	FLARE NUT (1/4″)	1	-	-	
18	TUBE ASS'Y (STRAINER, CAPILLARY)	1	CWT02026	CWT01531	
19	3-WAYS VALVE (GAS SIDE)	1	CWB01364	CWB01430	
20	FLARE NUT (1/2″, 5/8″)	1	-	-	
21	NUT - TERMINAL COVER	1	CWH7080300	←	
22	TERMINAL COVER-COMP.	1	CWH171011	CWH171012	0
23	CONTROL BOARD	1	CWH10K331	←	
24	CAPACITOR - FAN MOTOR	1	CWA31609 (3.5µF, 400VAC)	CWA31357	0
25	CAPACITOR - COMPRESSOR	1	CWA31504 (35µF, 370VAC)	CWA31506	0
26	HOLDER-CAPACITOR	1	CWH30057	CWH30138	
27	THERMOSTAT	1	CWA15129	←	
28	TERMINAL BOARD ASS'Y	1	CWA28C381	←	
29	HOLDER-SENSOR	1	CWH32002	←	
30	AIR DISCHARGING PANEL	1	CWE06K024B	←	
31	CABINET REAR PLATE	1	CWE02096B	←	
32	CABINET FRONT PLATE	1	CWE06075B	←	
33	CABINET SIDE PLATE	1	CWE04111B	←	
34	CABINET TOP PLATE	1	CWE03101B	←	
35	CONTROL BOARD COVER	1	CWH13331A	←	
36	HANDLE	1	CWE16000E	←	
37	SCREW-FAN MOTOR BRACKET	1	CWH55101	←	
38	SCREW-SUPPORTOR	1	CWH4580345	←	
39	SCREW-FAN MOTOR MOUNT	1	CWH55252	←	
40	HOLDER-P.S.CORD	1	CWH31043	←	
41	SOUND PROOF MATERIAL (COMP.)	1	CWG30563	CWG30539	
42	SOUND PROOF MATERIAL (COMP.)	1	CWG30562	CWG30528	

(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061).
- "O" marked parts are recommended to be kept in stock.

18 Exploded View (Front Grille)

CZ-BT2E



- The above exploded view is for the purpose of parts disassembly and replacement.
  The non-numbered parts are not kept as standard service parts.

19 Replacement Part List (Front Grille)

<Model: CZ-BT2E>

NO.	DESCRIPTION & NAME	QTY	**CZ-BT2E**
1	FRONT GRILLE	1	CWE11C2868
2	SHAFT ASS'Y	4	CWH63K041
3	VANE	4	CWE24416
4	AIR FILTER	1	CWD00226
5	INTAKE GRILLE	1	CWE22297
6	COIL SPRING	1	CWH70070
7	FULCRUM	1	CWH62044
8	STRING COMPLETE	1	CWH84C027
9	CATCHER	2	CWH60094
10	PARTICULAR PIECE	2	CWD93915A
11	SPRING	2	CWH70069

(Note)

- All parts are supplied from MAICO, Malaysia (Vendor Code: 061)

20 Electronic Circuit Diagram

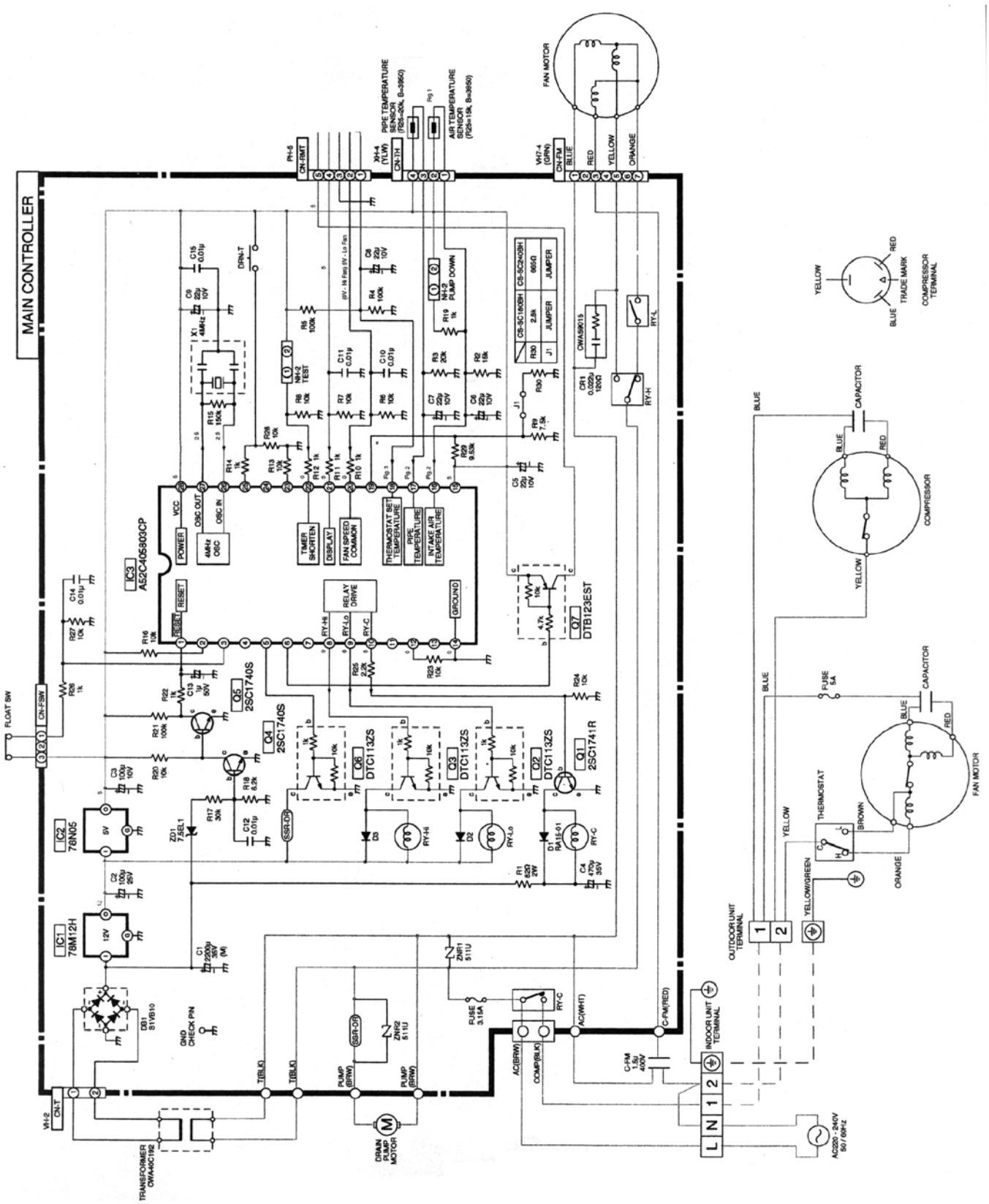


Fig. 1

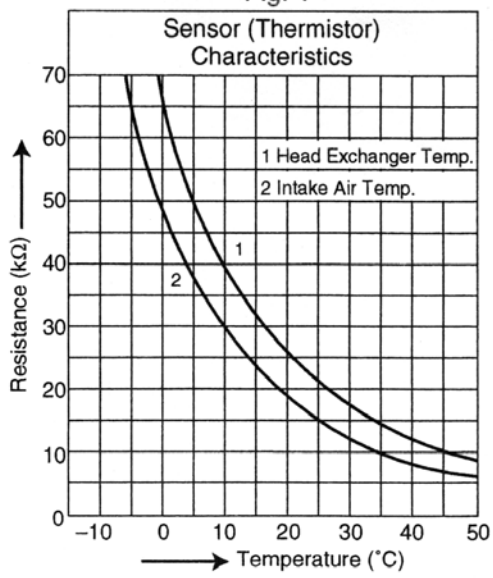
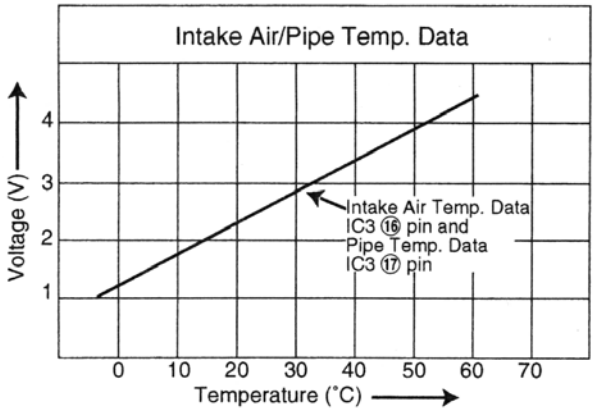


Fig. 2



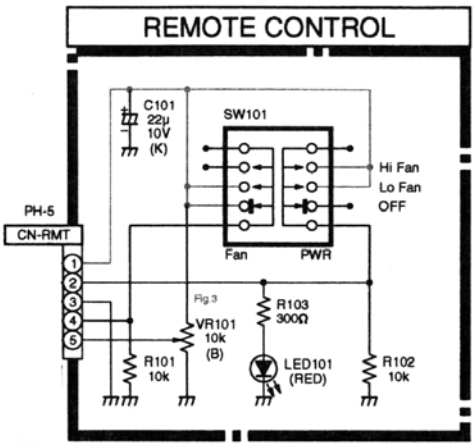


Fig. 3 - Remote Control

Remote control set temp.	LOW 16°C ⟷ HIGH 30°C
Resistance KΩ	0 ⟷ 10
Voltage at pin 18 of IC3	0V ⟷ 5V

How to use electronic circuit diagram

Before using the circuit diagram, read the following carefully.

* Voltage measurement
  Voltage has been measured with a digital tester when the indoor fan is set at high fan speed under the following conditions without setting the timer.
  Use them for servicing.

  Voltage indication is in RED.

* Indication for resistance
  a. K ... kΩ M ... MΩ
  W ... watt Not indicated ... 1/4W

* Indication for capacitor
  a. Unit μ ... μF P ... pF

* Circuit Diagram is subject to change without notice for further development.

	Intake air temperature	Temperature setting	Discharge air temperature	Pipe temperature
Cooling	27°C	16.0°C	13.5°C	12.5°C

TIMER TABLE

Timer name	Time	Test Mode (When test point Short-circuited)	Remarks
Antifreezing control	4 min.	0 sec.	Piping temperature lower than 1.0°C
	16 min.	1.6 sec.	Intake temperature is 18° or less.
Fan Motor delay	1.6 sec.	0 sec.	
Compressor Timer	60 sec.	*0 sec.	Compressor prohibit stopping
	2 min. 58 sec.	*0 sec.	Compressor restarting
	7 min.	4.2 sec.	Time safe operation
Abnormal Indication Timer	1.0 sec.	0.24 sec.	

* Count during test ON is force at 0 sec.

20.1. Indoor Unit Printed Circuit Board