

# Service Manual

## Air Conditioner

**CS-F28DTE5 CU-L50DBE5**  
**CS-F50DTE5 CU-L50DBE5**

*Simplified*



Please file and use this manual together with the service manual for Model No. CS-F24DTE5 CU-L24DBE5, CS-F28DTE5 CU-L28DBE5, CS-F34DTE5 CU-L34DBE5, CS-F43DTE5 CU-L43DBE5, CS-F50DTE5 CU-L50DBE8, Order No. MAC0504060C2.

### ⚠ WARNING

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

### ⚠ PRECAUTION OF LOW TEMPERATURE

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

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# Panasonic®

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# 1 Service Information

## 1.1. Operation range

### 1.1.1. Power supply

The applicable voltage range for each unit is given in the following table. The working voltage among the three phases must be balanced within a 3% deviation from each voltage at the compressor terminals. The starting voltage must be higher than 85% of the rated voltage.

MODEL	Unit Main Power		Applicable Voltage	
	Phase, Volts	Hz	Max	Min
L24DBE5	1~240	50	264	216
L28DBE5	1~220	50	242	198
L34DBE5	1~230	50	253	207
L43DBE5	1~240	50	264	216
L50DBE5				
L50DBE8	3N~380	50	418	342
	3N~400	50	440	360
	3N~415	50	457	374

### 1.1.2. Indoor and outdoor temperature

- Model 50Hz CU-L24DBE5, CU-L28DBE5, CU-L34DBE5, CU-L43DBE5, CU-L50DBE5, CU-L50DBE8

Operating	Hz	Indoor Temp. (D.B./W.B.) (°C)		Outdoor Temp. (D.B./W.B.) (°C)	
		Max	Min	Max	Min
Cooling	50	32/23	21/15	43/-	-15/-
Heating	50	27/-	16/-	24/18	-20/-

## 2 Specifications

### 2.1. Product Specification

#### 2.1.1. CS-F28DTE5 CU-L50DBE5 (For Australia only)

ITEM / MODEL			Indoor Unit			Outdoor Unit
			CS-F28DTE5 x 2			CU-L50DBE5
Cooling Capacity			CZ-RD513C (Wired)			CZ-RL513T (Wireless)
			Remote Control			
Cooling Capacity			kW			14.0
Cooling Capacity			BTU/h			47,700
Heating Capacity			kW			16.0
Heating Capacity			BTU/h			54,600
Refrigerant Charge-less			m			30
Standard Air Volume for High, Medium and Low Speed			m <sup>3</sup> /min			Hi 18 x 2 Me 16 Lo 14 Hi 98
			cfm			636 x 2 565 495
Outside Dimension (H x W x D)			mm			210 x 1245 x 700 1340 x 900 x 320
			inch			8-9/32 x 49-1/64 x 27-9/16
Net Weight			kg (lbs)			33 (73) 110 (242)
Piping Connection	Refrigerant	Gas	mm (inch)			O.D Ø 15.88 (5/8) Flared Type
		Liquid	mm (inch)			O.D Ø 9.53 (3/8) Flared Type
	Drain	mm			O.D Ø 20 I.D Ø 20 x 1	
Compressor	Type, Number of Set		-			Hermetic - 2P (Rotary), 1
	Starting Method		-			DC - INV control
	Motor	Type	-			4-pole single phase brushless motor
Rated Output		kW			- 3.8	
Fan	Type, Number of Set		Sirocco fan-4			Mix flow fan - 1
	Motor	Type	4-pole single phase induction motor			6-pole single phase induction motor
		Rated Output	kW			0.04 x 2 0.07 x 2
Air-heat Exchanger (Row x Stage x FPI)			Slit-fin type (2 x 12 x 18)			Corrugate-fin type (2 x 51 x 18)
Refrigerant Control			-			Exp. Valve
Refrigerant Oil (Charged)			cm <sup>3</sup>			FV50S (1200)
Refrigerant (Charged) R410A			kg (oz)			- 3.50 (123)
Running Adjustment	Control Switch		Wireless or Wired Remote Control			-
	Room Temperature		Thermostat			-
Safety Devices			Temperature, current and pressure protection control for compressor, Internal thermostat for FM, High pressure switch, Current trans, Crankcase heater			
Noise Level			dB (A)			Hi 45 Lo 41 Cooling 55, Heating 57
			Power level dB			Cooling : Hi 62 Lo 58 Heating : Hi 62 Lo 58
Moisture Removal			L/h (Pt/h)			9.0 (19.0)
EER			W/W			2.91
COP			W/W			3.34

- Cooling capacities are based on indoor temperature of 27°C D.B. (80.6°F D.B.), 19.0°C W.B. (66.2°F W.B.) and outdoor air temperature of 35°C D.B. (95°F D.B.), 24°C W.B. (75.2°F W.B.)
- Heating capacities are based on indoor temperature of 20°C D.B. (68°F D.B.) and outdoor air temperature of 7°C D.B. (44.6°F D.B.), 6°C W.B. (42.8°F W.B.)

#### ELECTRICAL DATA (50 Hz)

ITEM / MODEL			Condition by JIS-B8615		
Volts	V		240		
Phase			Single		
Power Consumption	kW	Cool	4.81		
		Heat	4.79		
Running Current	A	Cool	21.0		
		Heat	20.9		
Starting Current	A		21.0		
Power Factor	%	Cool	95		
		Heat	95		
*Power Factor means total figure of compressor, indoor fan motor and outdoor fan motor.					
Panasonic	Power source			AC, 1~240V 50Hz	

## 2.1.2. CS-F50DTE5 CU-L50DBE5 (For Australia only)

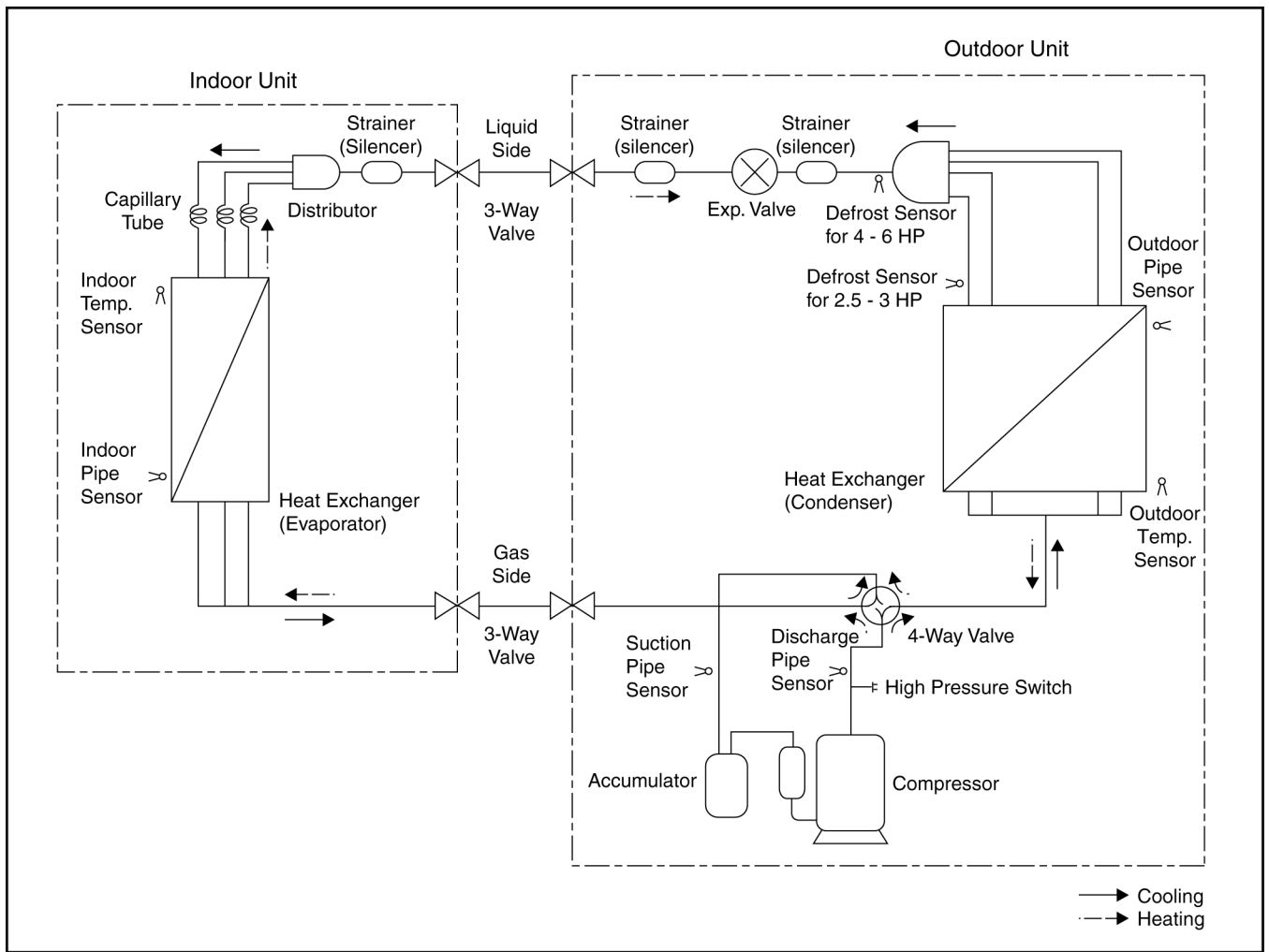
ITEM / MODEL			Indoor Unit			Outdoor Unit			
			Main Body			CS-F50DTE5			CU-L50DBE5
			Panel			CZ-BT03P			
			Remote Control			CZ-RD513C (Wired) CZ-RL513T (Wireless)			
Cooling Capacity			kW		14.0				
			BTU/h		47,700				
Heating Capacity			kW		16.0				
			BTU/h		54,600				
Refrigerant Charge-less			m		30				
Standard Air Volume for High, Medium and Low Speed			m <sup>3</sup> /min		Hi 32	Me 28	Lo 26	Hi 98	
			cfm		1130	1040	960	3460	
Outside Dimension (H x W x D)			mm		250 x 1600 x 700		1340 x 900 x 320		
			inch		9-27/32 x 62-31/32 x 27-9/16		52-7/8 x 35-7/16 x 12-19/32		
Net Weight			kg (lbs)		47 (104)		105 (231)		
Piping Connection		Refrigerant	Gas	mm (inch)				O.D Ø 15.88 (5/8) Flared Type	
			Liquid	mm (inch)				O.D Ø 9.53 (3/8) Flared Type	
		Drain	mm				O.D Ø 20	I.D Ø 20 x 1	
Compressor		Type, Number of Set		-			Hermetic - 2P (Rotary), 1		
		Starting Method		-			DC - INV control		
		Motor	Type	-			4-pole single phase brushless motor		
Rated Output	kW		-			3.8			
Fan		Type, Number of Set		Sirocco fan-4			Mix flow fan - 2		
		Motor	Type	4-pole single phase induction motor			6-pole single phase induction motor		
			Rated Output	kW		0.14		0.07 x 2	
Air-heat Exchanger (Row x Stage x FPI)			Slit-fin type (3 x 14 x 18)			Corrugate-fin type (2 x 51 x 18)			
Refrigerant Control			-			Exp. Valve			
Refrigerant Oil (Charged)			cm <sup>3</sup>		-		FV50S (1200)		
Refrigerant (Charged) R410A			kg (oz)		-		3.50 (123)		
Running Adjustment		Control Switch		Wireless or Wired Remote Control			-		
		Room Temperature		Thermostat			-		
Safety Devices			Temperature, current and pressure protection control for compressor, Internal thermostat for FM, High pressure switch, Current trans, Crankcase heater						
Noise Level			dB (A)		Hi 50 Lo 46		Cooling 55, Heating 57		
			Power level dB		Cooling : Hi 67 Lo 63 Heating : Hi 67 Lo 63		Cooling 69, Heating 71		
Moisture Removal			L/h		9.0				
EER			W/W		2.91				
COP			W/W		3.34				

- Cooling capacities are based on indoor temperature of 27°C D.B. (80.6°F D.B.), 19.0°C W.B. (66.2°F W.B.) and outdoor air temperature of 35°C D.B. (95°F D.B.), 24°C W.B. (75.2°F W.B.)
- Heating capacities are based on indoor temperature of 20°C D.B. (68°F D.B.) and outdoor air temperature of 7°C D.B. (44.6°F D.B.), 6°C W.B. (42.8°F W.B.)

### ELECTRICAL DATA (50 Hz)

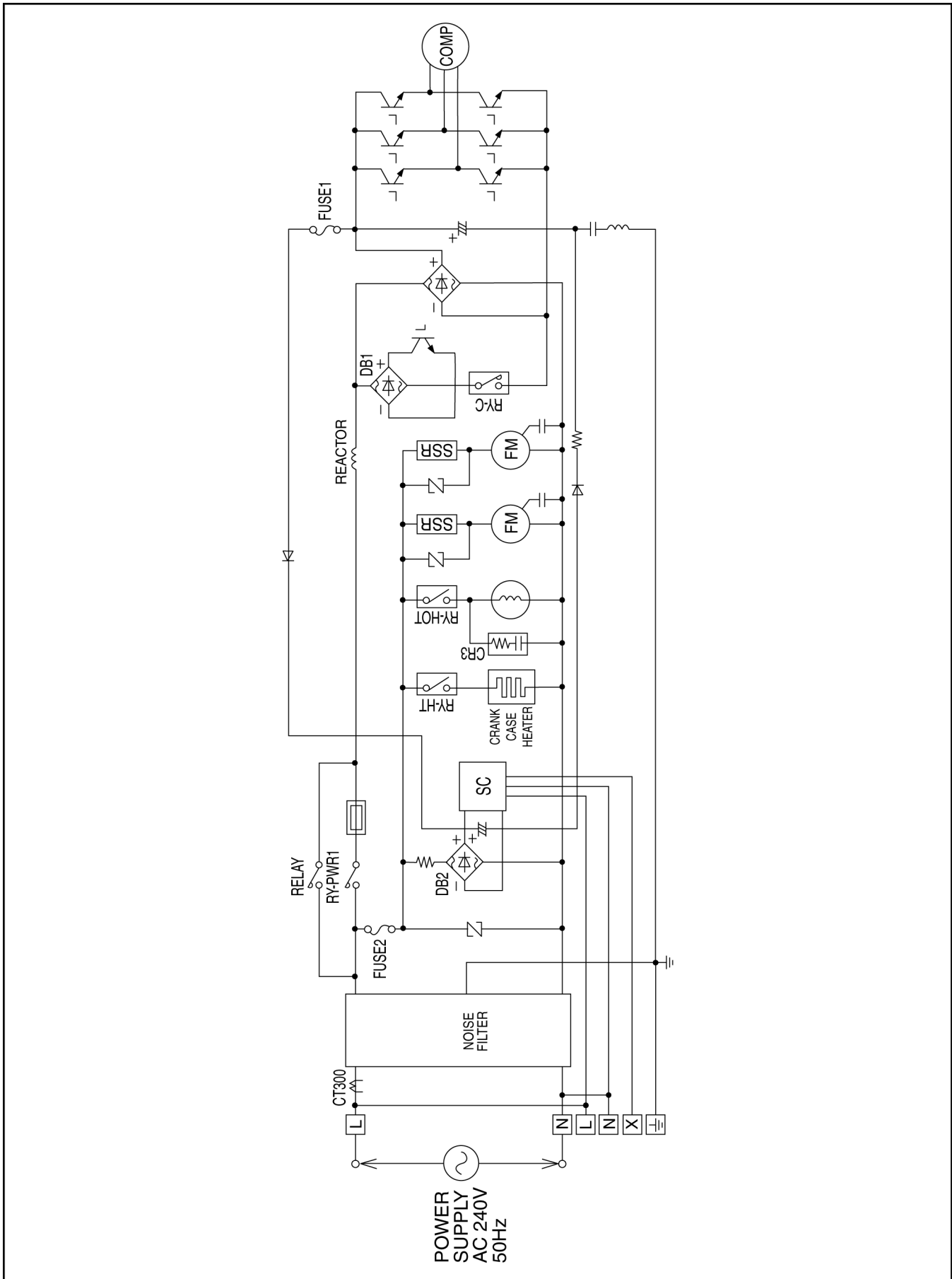
ITEM / MODEL			Condition by JIS-B8615	
Volts	V		240	
Phase			Single	
Power Consumption	kW	Cool	4.81	
		Heat	4.79	
Running Current	A	Cool	21.0	
		Heat	20.9	
Starting Current	A		21.0	
Power Factor	%	Cool	95	
		Heat	95	
*Power Factor means total figure of compressor, indoor fan motor and outdoor fan motor.				
Panasonic	Power source		AC, 1~240V 50Hz	

### 3 Refrigeration Cycle



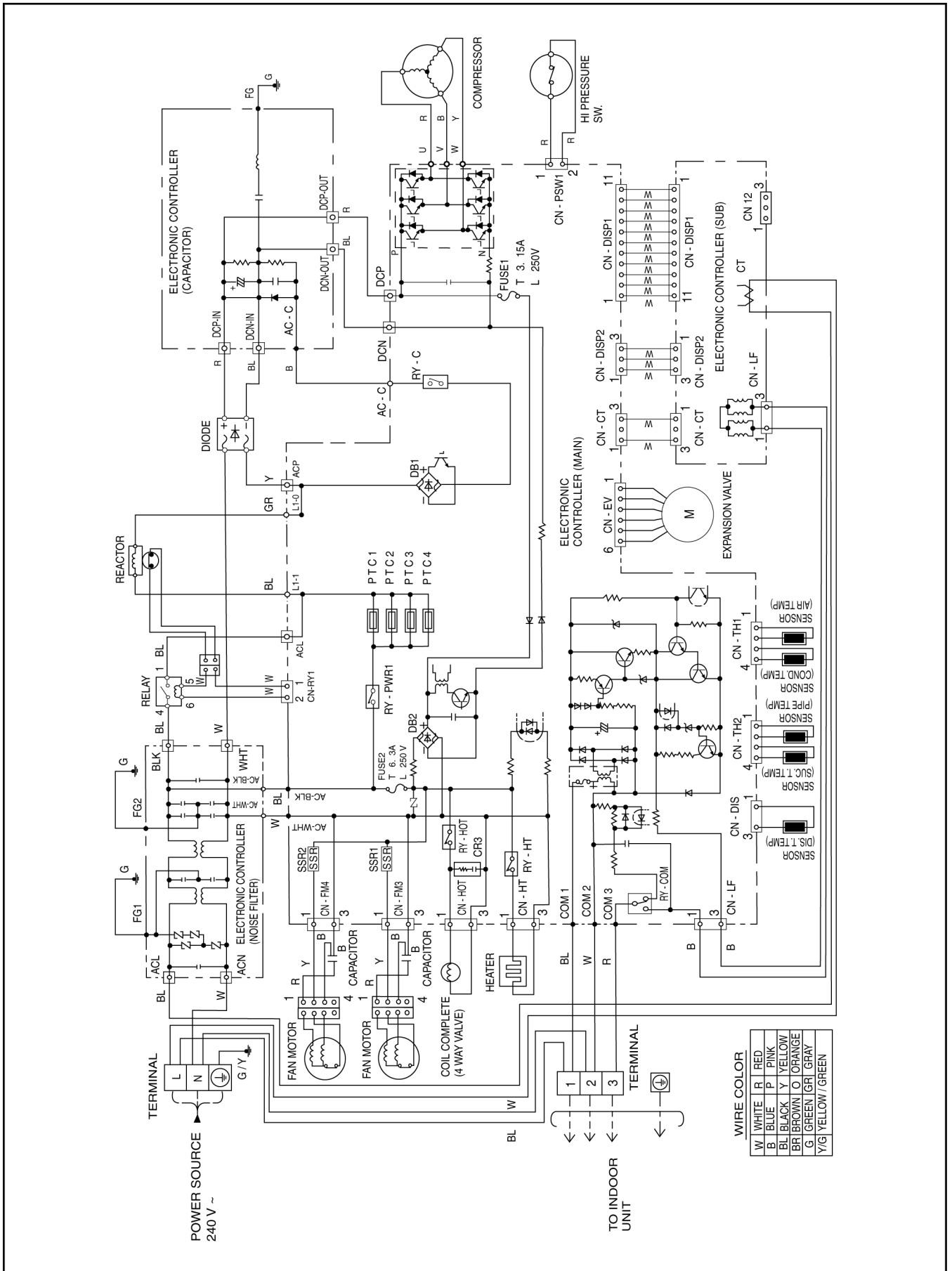
# 4 Block Diagram

## 4.1. CU-L50DBE5



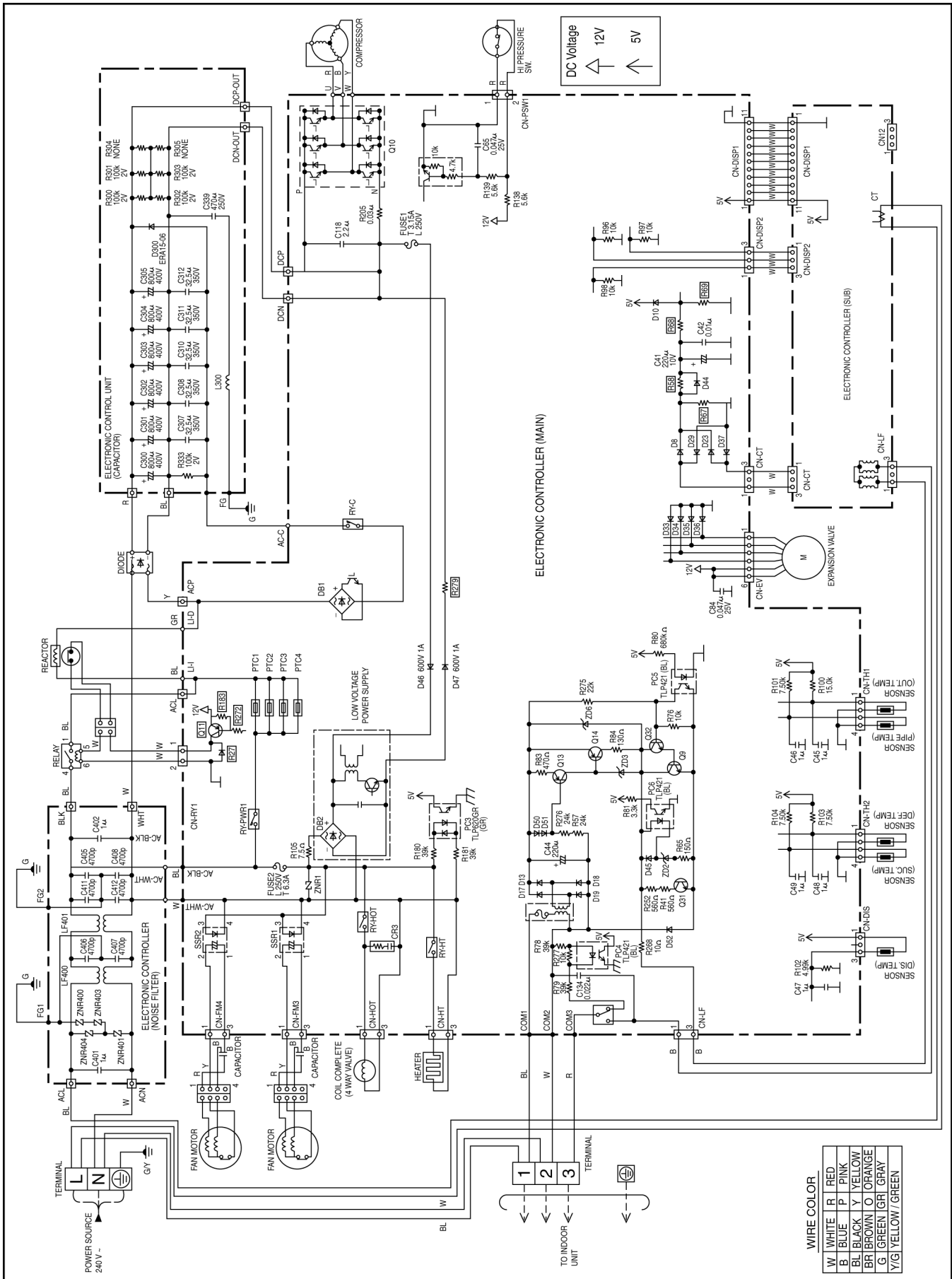
# 5 Wiring Diagram

## 5.1. CU-L50DBE5



# 6 Electronic Circuit Diagram

## 6.1. CU-L50DBE5





# 7 Installation Instruction

## 7.1. Outdoor Unit Installation

**AIR CONDITIONERS OUTDOOR UNIT INSTALLATION INSTRUCTIONS**

**REFRIGERANT  
R410A**

HP	Model name
2.5 HP	CU-L24DB**
3 HP	CU-L28DB**
4 HP	CU-L34DB**
5 HP	CU-L43DB**
6 HP	CU-L50DB**

**Precautions in terms of safety**

Carry out installation work with reliability after through reading of this "Precautions in terms of safety".

- Precautions shown here are differentiated between ⚠ Warnings and ⚠ Cautions. Those that have much chances for leading to significant result such as fatality or serious injury if wrong installation would have been carried out are listed compiling them especially into the column of ⚠ Warnings.

However, even in the case of items which are listed in the column of ⚠ Cautions, such items also have a chance for leading to significant result depending on the situations.

In either case, important descriptions regarding the safety are listed, then observe them without fail.

- As to indications with illustration


⚠ This mark means "Caution" or "Warning".

⊥ This mark means "Earth".

- After installation work has been completed, do not only make sure that the unit is free from any abnormal condition through the execution of trial run but also explain how to use and how to perform maintenance of this unit to the customer according to the instruction manual.
- In addition, request the customer to keep this manual for installation work together with instruction manual.

<span style="border: 1px solid black; padding: 2px;">⚠</span> <b>Warnings</b>	
<p>▲ The appliance must be installed by technician, who takes into account the requirements given by ISO5149 or eventual equivalent requirements.</p>	<p>▲ If installing inside a small room, measures should be taken to prevent refrigerant levels from building up to critical concentrations in the event of a refrigerant leak occurring. Please discuss with the place of purchase for advice on what measures may be necessary to prevent critical concentrations being exceeded. If the refrigerant leaks and reaches critical concentration levels, there is the danger that death from suffocation may result.</p>
<p>▲ As to installation, request the distributor or vendor to perform it. Imperfection in installation caused by that having been carried out by the customer himself may leads to water leakage, electric shock, fire, etc.</p>	<p>▲ Securely attach the protective covers for the outdoor unit connection cables and power cord so that they do not lift up after installation. If the covers are not properly attached and installed, the terminal connections may overheat, and fire or electric shock may result.</p>
<p>▲ Carry out the installation work with reliability according to this manual for installation work. Imperfection in installation leads to water leakage, electric shock, fire, etc.</p>	<p>▲ Switch off all supplies before accessing any electrical part.</p>
<p>▲ Carry out the installation work with reliability on the place that can bear the weight of this unit sufficiently. Insufficient strength leads to injury due to falling of the unit.</p>	<p>▲ If refrigerant gas escapes during installation, ventilate the affected area. If the refrigerant gas comes into contact with sparks or naked flames, it will cause toxic gases to be generated.</p>

⚠ **Warnings**



<p>▲ The unit must be installed in accordance with applicable national and local regulations. Any electrical work should only be carried out by qualified technician and use exclusive circuits without fail. Presence of insufficient capacity in power circuit or imperfection in execution leads to electric shock, fire, etc.</p> <p>▲ Wiring shall be connected securely using specified cables and fix them securely so that external force of the cables may not transfer to the terminal connection section. Imperfect connection and fixing leads to fire, etc.</p>	<p>▲ When performing piping work do not mix air except for specified refrigerant (R410A) in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high tension inside the refrigerant cycle.</p> <p>▲ Earth This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, lightning rod and telephone. Otherwise, it may cause electrical shock in case the equipment breakdown or has leakage current. </p> <p>▲ Installation of Earth Leakage Current Breaker This equipment must be installed with earth leakage current breaker. Otherwise, it may cause electrical shock and fire in case the equipment breakdown or has leakage current.</p>
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⚠ **Cautions**

<p>▲ Do not install the unit at the place where the possibility of inflammable gas leakage exists. If such gas leakages should arise and the gas builds up around the unit, such situation may lead to ignition.</p>	<p>▲ Drain piping should be made to ensure secure drainage according to the manual for installation work and carry out the thermal insulation to prevent the occurrence of condensation. Imperfection in piping work leads to water leakage and may cause the house and property, etc. to become wet.</p> <p>▲ Position the indoor unit and outdoor unit, power cords and indoor/outdoor unit connection cables in a way so that they are at least 1 meter away from televisions and radios. This is to avoid problem such as interference with picture and/or sound. (However, note that depending on the electromagnetic wave conditions, interference may still occur even if the separation distance is more than 1 meter.)</p>
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### 7.1.1. Accessories supplied with outdoor unit

- The following parts are supplied as accessories with each outdoor unit. Check that all accessory parts are present before installing the outdoor unit.

Part name	Q'ty	Diagram	Application
Protective bushing	2		For protecting electrical wires
Banding strap	3		For tying electrical wires together

Heat pump-types only			
Part name	Q'ty	Diagram	Application
Drain elbow AS	1		For connecting the drain pipe (with ring seat)

### 7.1.2. Before installation work

- This product is using new refrigeration (R410A). The basic way of installation work is the same as usual, but water and impurities should be controlled more strictly than before due to characteristic of refrigerating machine oil. Therefore, selection of materials to use and processing, storing and brazing need appropriate construction and control.

1. Tools and materials

There are tools and materials for both new refrigeration and usual refrigeration you can use together and for either two of them you can use. Use the below for new refrigeration.

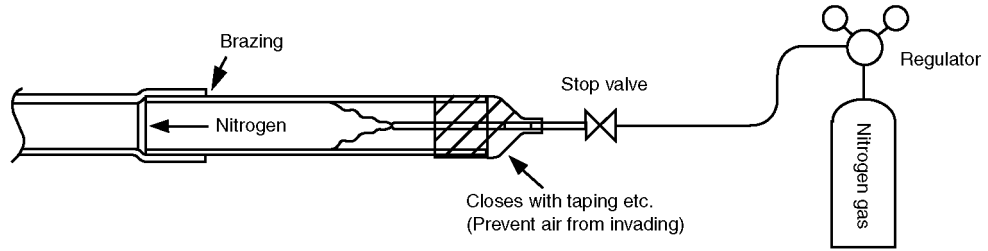
- Vacuum pump (with back flow preventor system)
- Gas leakage detection warning device
- Gauge manifold
- Charge hose

2. Installation work

a. Brazing work

Brazing work needs replacing air inside pipe with nitrogen gas in order to prevent oxidization scale from occurring. This is called nitrogen replacement, and one of very important work in brazing refrigerant piping. (Oxidation preventive is not possible to use)

**(Work method)**



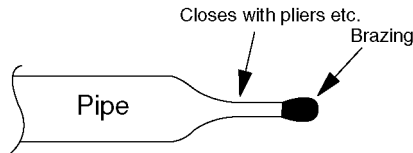
**b. Prevention measure for refrigerant piping**

Prevention measure for refrigerant piping is very important work to prevent water-dust-rubbish from getting in. All piping terminals needs sealing such as shown below.

Place	Period of work	Method of seal
Outside	More than 1 month	Pinch
	Less than 1 month	Pinch or taping
Inside	Not specified	

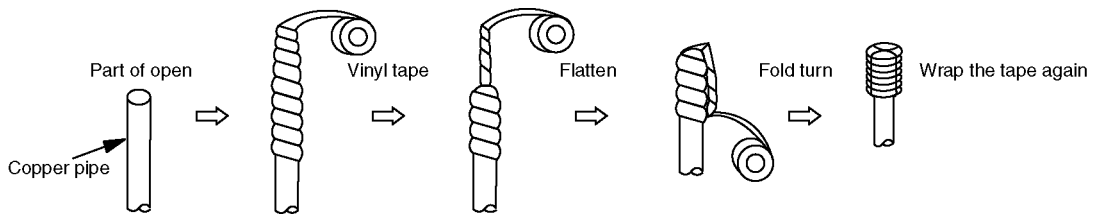
• How to pinch

Close terminal part of piping with pliers and seal the gap with brazing.



• How to tape

Seal terminal part of piping with vinyl tape.



**3. Vacuum pumping**

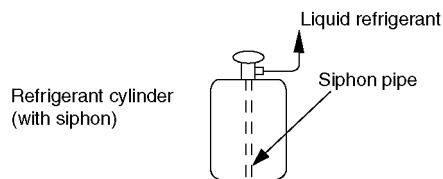
The purpose of vacuum pumping work is to remove and dry air inside the piping or nitrogen at air tightness test. Perform the work carefully.

⚠ Caution	Use the vacuum pump with the backflow prevention mechanism to prevent backflow of oil.
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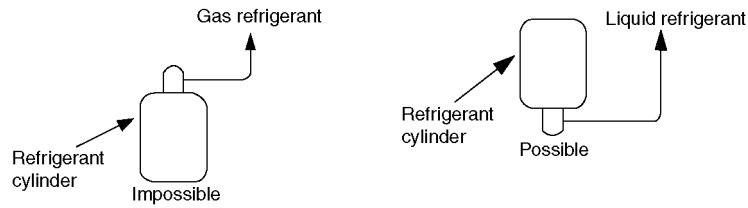
Vacuuming time	60 minutes or more	⚠ Vacuum pump capacity	60 l/min or more
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**4. Refrigerant filling**

Refrigerant filling must be done in the state of liquid refrigerant. If this is done in gas refrigerant, the balance of refrigerant composition will collapse and damage the operation.



For the use of a gas cylinder without siphon inside, turn it upside down and use it.  
(We recommend manifold with sight glass.)



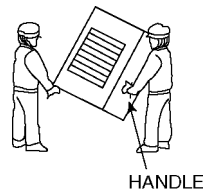
⚠ Caution	Do not use a "CHARGE CYLINDER".
⚠ <b>Caution</b>	As a rule, please collect all existing refrigerants in the system outside the system when the refrigerant leakage occurs by the system. After that, please fill new refrigerant of a regulated amount again.

**DRY VACUUMING**

- If vacuum pump possible vacuuming until less than -100.7kpa.
  1. Running vacuum pump at both liquid and gas side for more than 1 hour and vacuuming until -100.7kpa.
  2. After that keep the pressure -100.7kpa for 1 hour and confirm the vacuum gauge value not increasing.
  3. If vacuum gauge value is increase, there is possibility of water inside the unit or there is any leakage.

**7.1.3. Regarding handling**

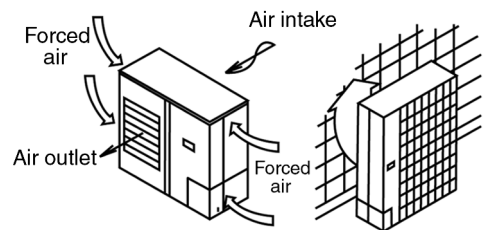
Handling the unit by hold the handle at compressor side and hold the basepan bottom at fan side.



**7.1.4. Selecting the outdoor unit installation locations**

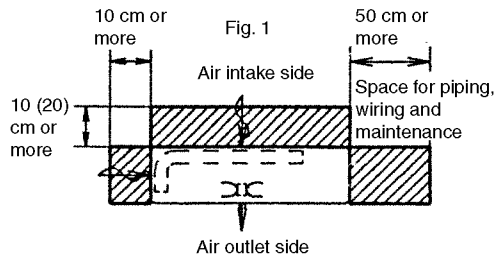
- Select location which satisfies the following condition, and then confirm with the customer that such a place is satisfactory before installing the outdoor unit.

1. There should be sufficient ventilation.
2. The outdoor unit should be sheltered as much as possible from rain and direct sunlight, and the air should be able to move around so that hot and cold air do not build up.
3. There should not be animals or plants near the air outlet which could be adversely affected by hot or cold air coming out from the unit.
4. The outlet air and operating noise should not be a nuisance to other occupants nearby.
5. The location should be able to withstand the full weight and vibration of the outdoor unit, and it should also be level and safe for the unit to be installed.
6. The intake and outlet should not be covered.
7. There should not be danger of flammable gas or corrosive gas leaks.
8. There should be as little back-ventilation (air blowing directly onto the fan) as possible.  
(If strong wind blows directly onto the fan, it may cause problems with normal operation.)
  - If you know which direction the prevailing wind comes from during the operating season, set the outdoor unit at a right-angle to this wind direction, or so that air outlet faces toward a wall or fence.
  - If there are obstructions near the outdoor unit and the wind direction is not constant, install an optional air guider.
9. Do not allow any obstacles near the outdoor unit which will interfere with air flow around the air intake and air outlet.
10. If installing in a location which is prone to snowfall, place the installation base as high as possible, and be sure to install a roof or enclosure which does not allow snow to accumulate.
11. Avoid installing the unit in places where petroleum products (such as machine oil), salinity, sulphurous, gases or high-frequency noise are present.

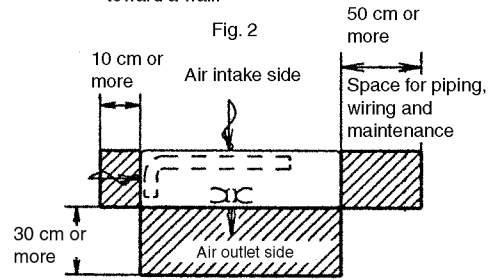


12. Be sure to leave enough space around the outdoor unit to maintain proper performance and to allow access for routine maintenance.
- Allow enough space from any obstacles as shown in Fig. 1.2 below in order to prevent short-circuits from occurring. (If installing more than one outdoor unit, make the necessary space available as outlined in 13.) However, there should be at least 1 meter of free space above the unit.
  - The height of any obstacles at the air intake and outlet sides should not be greater than the height of the outdoor unit.

- When facing the air intake side toward a wall.

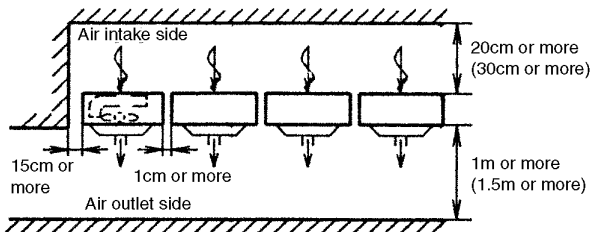


- When facing the air outlet side toward a wall.

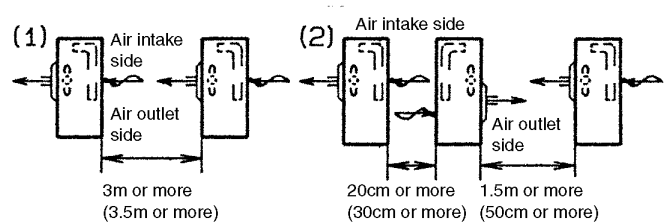


13. If installing more than one outdoor unit, allow enough space around each unit as shown below.

- When installing units side by side



- When installing units facing each other



✕ Maintain sufficient space above the unit.

Values inside brackets indicate distances when installing the 4HP - 6HP.

- The distance given above are the minimum distance required in order to maintain proper performance. Allow as much space as possible in order to get the best performance from the units.

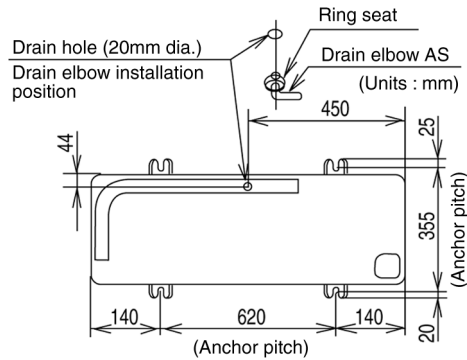
### 7.1.5. Transporting and installing the outdoor unit

- Transporting

1. The outdoor unit should be transported in its original packaging as close to the installation location as possible.
2. If suspending the outdoor unit, use a rope or belt, and use cloth or wood as padding in order to avoid damaging the unit.

- Installation

1. Read the "Selecting the outdoor unit installation location" section thoroughly before installing the outdoor unit.
2. If installing the unit to a concrete base or other solid base, use M10 or W3/8 bolts and nuts to secure the unit, and ensure that the unit is fully upright and level. (The anchor bolt positions are shown in the diagram at the right side.) In particular, install the unit at a distance from the neighbouring building which conforms to regulations specified by local noise emission regulation standards.
3. Do not install the outdoor unit to the building's roof.
4. If there is a possibility that vibration may be transmitted to the rooms of the building, place rubber insulation between the unit and the installation surface.
5. Drain water will be discharged from the outdoor unit when operating the system in heating or defrosting modes. Select an installation location which will allow the water to drain away properly, or provide a drainage channel so that the water can drain away. (If this is not done, the drain water may freeze during winter, or the water may spill down to areas underneath the installation location.)



- If a drain pipe needs to be installed, insert the accessory drain elbow into the mounting hole at the bottom of the outdoor unit, and connect a hose with an inside diameter of 15mm to this drain elbow. (The hose is not supplied.)

⊗ If using the drain elbow, install the outdoor unit on a base which is at least 5cm high.

**NOTE** In cold regions (where the outdoor air temperature can drop to 0°C or below continuously for 2-3 days), the drain water may freeze, and this may prevent the fan from operating. Do not use the drain elbow in such cases.

### 7.1.6. Connecting the pipes

- Use a clean pipe which does not include water or dust for inside of piping.
- When cutting the refrigerant pipes, a piping cutter must be used. Before connecting the refrigerant pipes, blow nitrogen and blow off dust in the pipes. (Never use tools which cause a lot of dust such as a saw and a magnet.)
- When waxing replace nitrogen inside the piping after removing dirt and dust. (In order to prevent oxidation scale from forming inside the piping).
- The refrigerant pipes are of particular importance. The installation work for refrigerant cycles in separate-type air conditioners must be carried out perfectly.

1. Refer to the table below for the pipe diameters equivalent lengths and indoor/outdoor unit difference of elevation.

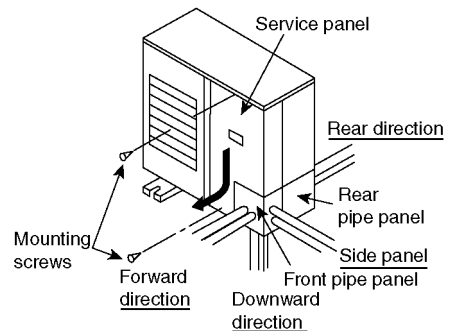
Pipe diameter (mm)		Equivalent length (m)	Difference of elevation (m)
Liquid-side pipes	Gas-side pipes		
ø9.53 x 0.8	ø15.88 x 1.0	50	30

2. Local pipes can project in any of four directions.

- Make holes in the pipe panels for the pipes to pass through.
- Be sure to install the pipe panels to prevent rain from getting inside the outdoor unit.

[Removing the service panel].

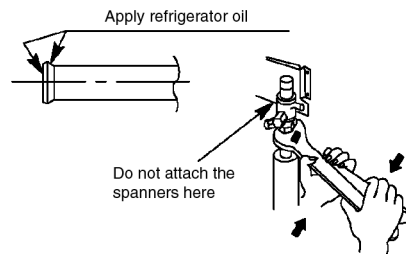
- (1) Remove the two mounting screws.
- (2) Slide the service panel downward to release the pawls. After this, pull the service panel toward you to remove it.



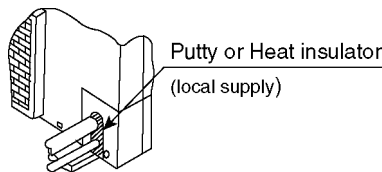
3. Notes when connecting the refrigerant pipes.

- Use clean copper, pipes with no water or dust on the insides.
- Use phosphorus-free, unjointed copper pipes for the refrigerant pipes.
- If it is necessary to cut the refrigerant pipes, be sure to use a pipe cutter, and use compressed nitrogen or an air blower to clean out any foreign particles from inside the pipe.
- Be careful not to let any dust, foreign materials or water get inside the pipes during connection.
- If bending the pipes, allow as large a bending radius as possible. Do not flex the pipes any more than necessary.
- If joining pipe ends, do so before tightening the flare nut.
- Always blow the pipe end with nitrogen while joining pipe ends.  
(This will prevent any oxide scaling from occurring inside the pipe.)
- If using long pipe lengths with several joined pipe ends, insert strainers inside the pipes. (Strainers are not supplied.)
- When tightening the flare nuts, coat the flare (both inside surfaces) with a small amount of refrigerator oil, and screw in about 3-4 turns at first by hand.
- Refer to the following table for the tightening torques. Be sure to use two spanners to tighten.  
(If the nuts are overtightened, it may cause the flares to break or leak.)

Flare nut fastening torque N•m (kgf•cm)			
ø6.35 mm	18 (180)	ø15.88 mm	65 (660)
ø9.53 mm	42 (430)	ø19.05 mm	100 (1020)
ø12.7 mm	55 (560)		



4. After piping connection has been completed, make sure that the joint areas of the indoor and outdoor units are free from gas leakage by the use of nitrogen, etc.
5. Air purge within connection piping shall be carried out by evacuation.
6. Close the tube joining area with putty heat insulator (local supply) without any gap as shown in below figure.  
(To prevent insects or small animal entering)



**7.1.7. Heat insulation**

△ Caution	Use a material with good heat-resistant properties as the heat insulation for the pipes. Be sure to insulate both the gas-side and liquid-side pipes. If the pipes are not adequately insulated, condensation or water leakages may occur.
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Liquid-side pipes	Material that can withstand 120°C or higher
Gas-side pipes	

**7.1.8. Charging with refrigerant**


- At the time of shipment from the factory, this unit is charged with enough refrigerant for an equivalent pipe length of 30m. If the equivalent pipe length used will be 30m or less, no additional charging will be necessary.
- If the equivalent pipe length will be between 30 and 50m, charge with additional refrigerant according to the equivalent length given in the table below.  
- For standard type

Additional charging amount	Equivalent length
0.05 kg/m	50m

- Pump down operation
  - Operate the pump down according to the following procedures.

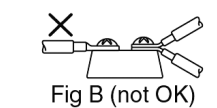
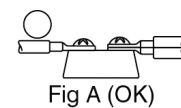
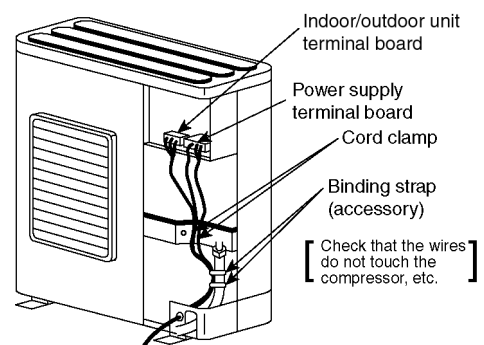
Procedure	Notes
1. Confirm the valve on the liquid side and the gas side is surely open.	
2. Press the PUMP DOWN switch on outdoor printed board for 1 second or more.	Perform the cooling operation for five minutes or more.
3. Shut the valve on the liquid side surely.	When the valve is shut halfway, the compressor is occasionally damaged.

### 7.1.9. Electrical wiring

△ Warning	The units must be connected to the supply cables for fixed wiring by qualified technician. Feed the power source to the unit via a distribution switch board designed for this purpose, the switch should disconnected all poles with a contact separation of at least 3mm. When the supply cable is damaged, it must be replaced by qualified technician.
△ Warning	Be sure to install a current leakage breaker, main switch and fuse to the main power supply, otherwise electric shocks may result.
△ Warning	Be sure to connect the unit to secure earth connection. If the earthing work is not carried out properly, electric shocks may result. 
△ Warning	Wiring shall be connected securely by using specified cables and fix them securely so that external force of the cables may not transfer to the terminal connection section. Imperfect connection and fixing leads to fire, etc.

- Connect the power supply wiring and indoor/outdoor unit connection wiring according to the electrical circuit diagram instructions.
- Clamp the wires securely to the terminal connections using cord clamps so that no undue force is placed on the wires.
- Once all wiring work has been completed, tie the wires and cords together with the binding strap so that they do not touch other parts such as the compressor and pipes.

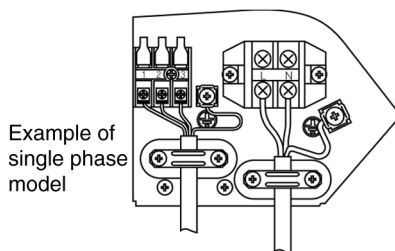
1. Connect the power supply line to a 3-phase/380-415V (or single-phase 220-240V) power supply.
2. The equipment shall be connected to a suitable mains network with a main impedance less than the value indicated in the table of power supply specifications.
3. Be sure to connect the wires correctly to terminal board with connecting the crimp type ring terminal to the wires.
4. The binding screws inside the power supply box may become loosened due to vibration during transportation, so check that they are tightened securely.
5. Tighten the binding screws to the specified torque while referring to the table below.
6. If connecting two separate wires to a single crimped terminal, place the two crimped terminal wires together as shown in Fig. A. (If the arrangement shown in Fig. B is used, poor contacts or contact damage may result.)
7. If momentarily turning on the power supply for both the indoor and outdoor units, do not turn the power off again until at least 1 minute has passed (except when a reversed phase has been detected).



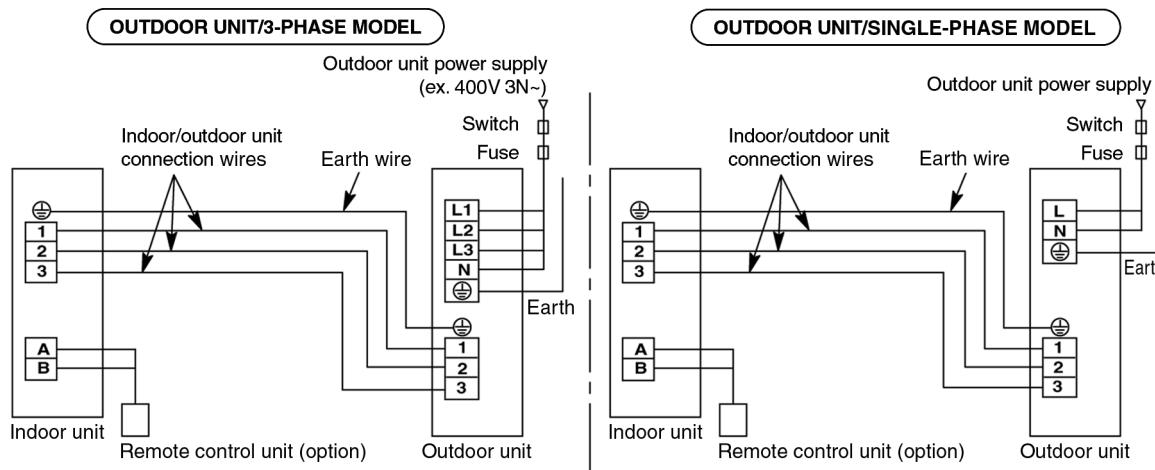
△ Warning	Use only the specified cables for wiring connections. Connect the cable securely, and secure them properly so that no undue force will be applied to the terminal connections. If the terminals are loose or if the wires are not connected securely, fire may result.
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Terminal screw	Tightening torque N.cm {kgf.cm}
M3	69 ~ 98 {7 ~ 10}
M4	157 ~ 196 {16 ~ 20}
M5	196 ~ 245 {20 ~ 25}





Earth lead wire shall be longer than other lead wires as shown in the figure for the electrical safety in case of the slipping out of the cord from the anchorage.



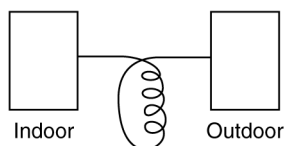
• Power supply specifications

Model name		Leakage current breaker (A)	Circuit breaker (Minimum Capacity)		Minimum power supply cables	4mm <sup>2</sup> cable based on length (m)	Maximum permissible impedance (Ω)	Indoor/outdoor unit connection
			Switch (A)	Fuse (A)				power cables (terminals ①, ②, ③, ⊕)
CU-L24DB***	220V-240V~	30	30	20	4mm <sup>2</sup>	14	0.1	2.5 mm <sup>2</sup> x 4
CU-L28DB***	220V-240V~	30	30	20		14	0.1	
CU-L34DB***	220V-240V~	40	40	30		9	0.05	
CU-L43DB***	220V-240V~	40	40	40		8	0.05	
CU-L50DBE5	240V~	40	40	40		8		

NOTE

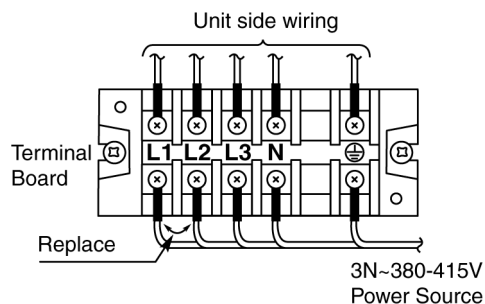


1. Where ground work (earth) is carried out, do not connect the ground return to the gas pipe, water line pipe, grounded circuit of the telephone and lightning rod, or ground circuit of other product in which earth leakage breaker is incorporated. (Such action is prohibited by statute, etc.)



1. Make sure the indoor and outdoor connection wires are detangled. (There might be effect to received outside noise.)
2. Use the standard power supply cables for Europe (such as H05RN-F or H07RN-F which conforms to CENELEC (HAR) rating specifications) or use the cables based on IEC standard. (245IEC57, 245IEC66)
3. Select the particular size of electrical wire for power supply cables in accordance with the standards of the given nation and region.

## 7.1.10. Connecting power supply cables



### CAUTION

- For three phase model, never operate the unit by pressing the electromagnetic switch.
- Never correct the phase by switching over any of the wires inside the unit.

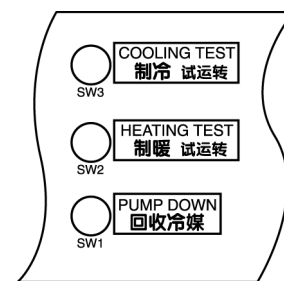
## 7.1.11. Precautions with regard to test operation

### CAUTION

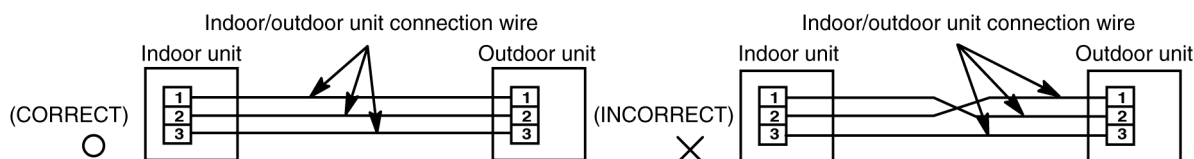
- Always be sure to use a properly-insulated tool to operate the switch on the circuit board. (Do not use your finger or a metallic object.)
- Never turn on the power supply until all installation work has been completed.
- Turn on the circuit breaker 12 hours or more before a test run. (By supplying power to crankcase heater, compressor is warmed and liquid compressing is prevented.)
- Check that the voltage is 90% of rated voltage or higher when starting the unit. (The unit will not operate if the voltage is less than 90% of rated voltage.)
- Test operation can be carried out using the remote control unit or by using the switch on the printed circuit board inside the outdoor unit.

If carrying out test operation at the printed circuit board of the outdoor unit, follow the procedure given below. (If using the remote control unit to carry out test operation, refer to the installation manual which is supplied with the indoor unit.)

- Press the COOL or HEAT switch for 1 second or more. (Be sure to select cooling mode first, and run the units in this mode for 5 minutes or more.)
- Press the TEST button once more to cancel test operation mode.
- When performing heating test operation when the outside temperature is high, or cooling test operation when the outside temperature is low, the protection circuits may sometimes operate within a few minutes.



**NOTE 1** These units are equipped with connection error prevention circuits. If the units do not operate, it is possible that the connection error prevention circuits have been operated. In such cases, check that the Indoor/outdoor unit connection wire (connected to terminals ①, ② and ③) is connected correctly. If they are connected incorrectly, connect them correctly. Normal operation should then commence.



**NOTE 2** Do not short the remote control unit wires to each other. (The protection circuit will be activated and the units will not operate.) Once the cause of the short is eliminated, normal operation will then be possible.

**NOTE 3** When running the units in heating mode during test operation, be sure to run the units in cooling mode first before selecting this mode. If heating mode is selected first, it may cause problems with operation of the compressor.

**NOTE 4** Test operation should be carried out for a minimum of 5 minutes. (Test operation will be cancelled automatically after 30 minutes.)

**NOTE 4** Test operation mode should always be cancelled once test operation itself has been completed.

**NOTE** If the self-diagnosis function reports a problem but more than one problem has developed at the indoor and/or outdoor units, the problem display on the remote control unit may not match the LED display on the outdoor unit printed circuit board. In such cases, check both locations and remove the causes of the problems.

### 7.1.12. As to making the inspection after completion of work fully understood

- At the time when the work has been completed, measure and record the characteristics of test run without fail and keep the measuring date, etc.
- Carry out the measurement regarding room temperature, outside air temperature, suction and air discharge temperatures, wind velocity, wind volume, voltage current, presence of abnormal vibration, operating pressure, piping temperature, compressive pressure, airtight pressure as items to be measured.
- As to the structure and appearance, check following items.

- Short circuit of the blow-out air
- Smooth flow of the drain
- Reliable thermal insulation
- Leakage of refrigerant

- Mistake in wiring
- Reliable connection of the ground wire
- Looseness in terminal screw, fastening torque

M3... 69-98N.cm {7-10kgf.cm} M4... 157-196N.cm {16-20kgf.cm}  
M5... 196-245N.cm {20-25kgf.cm}

### 7.1.13. As to delivery to the customer

- Request the customer to operate this air conditioner viewing instruction manual come with indoor unit in practice and explain how to operate.
- Deliver the instruction manual to the customer without fail.

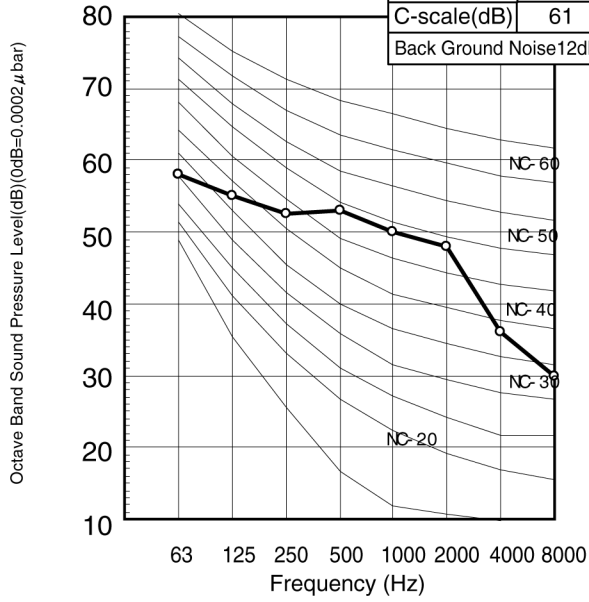
# 8 Technical Data

## 8.1. Sound Data

CU-L50DBE5(Cooling)

Octave Band Central Frequency(Hz)

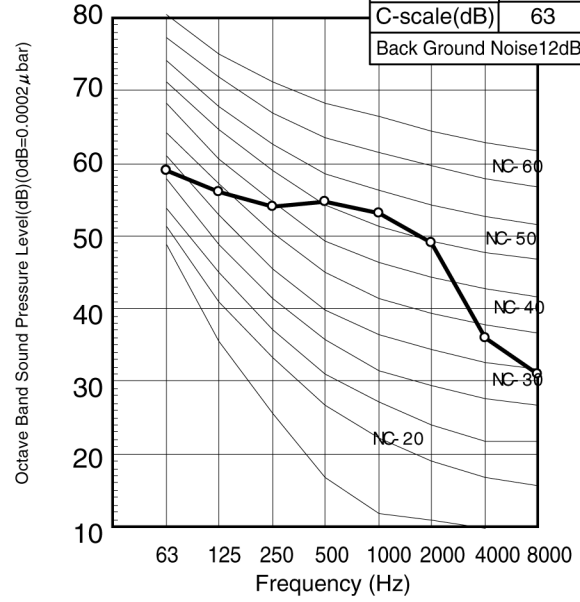
Frequency	50Hz
Fan Speed	H
A-scale(dB)	55
C-scale(dB)	61
Back Ground Noise	12dB



CU-L50DBE5(Heating)

Octave Band Central Frequency(Hz)

Frequency	50Hz
Fan Speed	H
A-scale(dB)	56
C-scale(dB)	63
Back Ground Noise	12dB



## 8.2. Capacity And Power Consumption

### 8.2.1. Cooling performance

Model name	Max cooling capacity	
	Max capacity (kw)	Max power consumption (kw)
CS-F24DTE5 / CU-L24DBE5	6.5	2.3
CS-F28DTE5 / CU-L28DBE5	7.5	2.45
CS-F34DTE5 / CU-L34DBE5	12	3.4
CS-F43DTE5 / CU-L43DBE5	13.5	4.3
CS-F50DTE5 / CU-L50DBE5	16	5.1

Calculation of actual cooling capacity and power consumption:

Example: CS-F24DTE5 / CU-L24DBE5

- Calculation of the actual cooling capacity and power consumption for the following cooling conditions;  
Indoor temperature of 27/19°C and outdoor temperature of 40°C (Standard condition).

Calculation method

1. Find the cooling capacity ratio and the power consumption ratio from the cooling capacity graph and power consumption graph for model CS-F24DTE5 / CU-L24DBE5.
  - The cooling capacity ratio indicate at the intersection between an outdoor unit air inlet temperature of 40°C on the horizontal axis and an indoor unit air inlet temperature on 27/19°C is 0.95.
  - The cooling power consumption ratio from the same intersection on the power consumption graph is 1.03.
2. Thus,
  - Actual cooling capacity = cooling capacity ratio x rated cooling capacity =  $0.95 \times 6.5 = 6.18$  (kw).
  - Actual cooling power consumption = cooling power consumption x rated power consumption =  $1.03 \times 2.45 = 2.52$  (kw).

### 8.2.1.1. CS-F50DTE5 CU-L50DBE5

Indoor intake air ambient temperature		Outdoor intake air ambient temperature (D.B./°C)																	
		-15°C			-10°C			-5°C			0°C			0°C			5°C		
		TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT
DB	WB	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
23	17	15.36	11.83	2.47	15.10	11.63	2.51	14.85	11.43	2.55	14.59	11.24	2.59	15.50	11.94	2.76	14.96	11.52	2.80
	19	16.00	11.84	2.71	15.74	11.65	2.75	15.49	11.46	2.79	15.23	11.27	2.83	16.18	11.98	3.01	15.78	11.67	3.05
	22	16.64	11.81	2.91	16.38	11.63	2.95	16.13	11.45	2.98	15.87	11.27	3.02	16.86	11.97	3.22	16.46	11.68	3.26
25	17	15.62	11.87	2.55	15.36	11.67	2.59	15.10	11.48	2.63	14.85	11.28	2.67	15.78	11.99	2.84	15.37	11.68	2.89
	19	16.26	11.87	2.75	16.00	11.68	2.79	15.74	11.49	2.83	15.49	11.31	2.87	16.46	12.01	3.05	16.05	11.72	3.09
	22	17.02	11.92	2.95	16.77	11.74	2.98	16.51	11.56	3.02	16.26	11.38	3.06	17.27	12.09	3.26	16.86	11.80	3.30
27	17	15.87	11.90	2.75	15.62	11.71	2.79	15.36	11.52	2.83	15.10	11.33	2.87	16.05	12.04	3.05	15.64	11.73	3.09
	19	16.51	11.89	2.87	16.26	11.70	2.91	16.00	11.52	2.95	15.74	11.34	2.98	16.73	12.04	3.18	16.32	11.75	3.22
	22	17.28	11.92	3.10	17.02	11.75	3.14	16.77	11.57	3.18	16.51	11.39	3.22	17.54	12.11	3.43	17.14	11.82	3.47
29	17	16.26	12.03	2.79	16.00	11.84	2.83	15.74	11.65	2.87	15.49	11.46	2.91	16.46	12.18	3.09	16.05	11.88	3.14
	19	16.90	12.00	2.98	16.64	11.81	3.02	16.38	11.63	3.06	16.13	11.45	3.10	17.14	12.17	3.30	16.73	11.88	3.35
	22	17.54	11.92	3.22	17.28	11.75	3.26	17.02	11.58	3.30	16.77	11.40	3.34	17.82	12.11	3.55	17.41	11.84	3.60
32	17	16.51	12.05	2.95	16.26	11.87	2.98	16.00	11.68	3.02	15.74	11.49	3.06	16.73	12.21	3.26	16.32	11.91	3.30
	19	17.15	12.01	3.06	16.90	11.83	3.10	16.64	11.65	3.14	16.38	11.47	3.18	17.41	12.19	3.39	17.00	11.90	3.43
	22	17.79	11.92	3.18	17.54	11.75	3.22	17.28	11.58	3.26	17.02	11.41	3.30	18.09	12.12	3.51	17.68	11.85	3.55

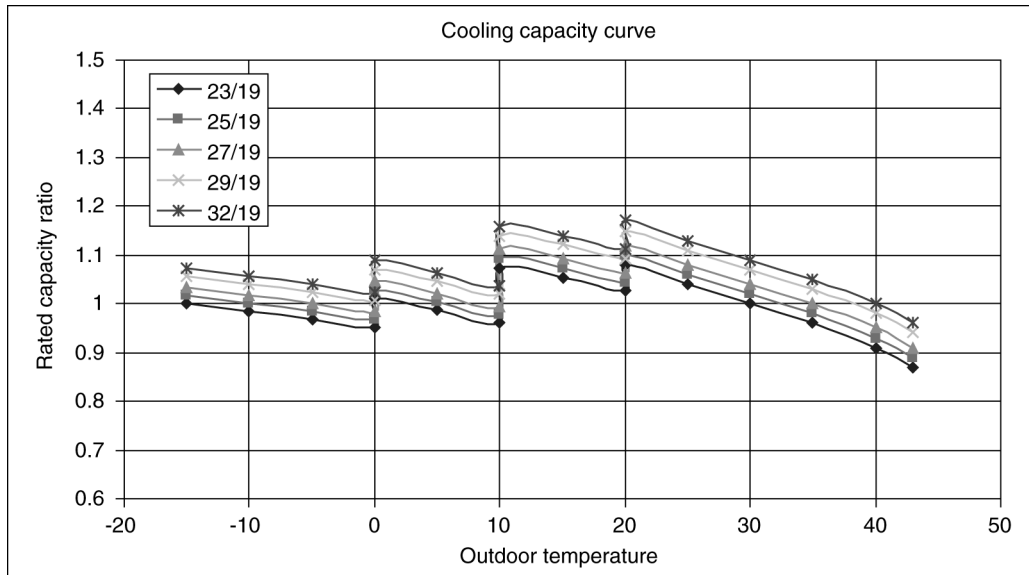
Indoor intake air ambient temperature		Outdoor intake air ambient temperature (D.B./°C)																	
		10°C			10°C			15°C			20°C			20°C			25°C		
		TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT
DB	WB	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
23	17	14.69	11.46	2.89	16.42	12.80	3.24	16.11	12.73	3.38	15.66	12.52	3.57	16.48	13.18	3.88	15.84	12.83	4.08
	19	15.37	11.53	3.14	17.18	12.88	3.52	16.87	12.82	3.66	16.42	12.64	3.80	17.28	13.31	4.13	16.64	12.98	4.34
	22	16.05	11.55	3.35	17.94	12.91	3.75	17.63	12.87	3.89	17.18	12.71	4.04	18.08	13.38	4.39	17.44	13.08	4.59
25	17	14.96	11.52	2.97	16.72	12.87	3.33	16.42	12.80	3.47	15.96	12.61	3.66	16.80	13.27	3.98	16.16	12.93	4.18
	19	15.64	11.57	3.18	17.48	12.94	3.57	17.18	12.88	3.71	16.72	12.71	3.89	17.60	13.38	4.23	16.96	13.06	4.44
	22	16.46	11.68	3.39	18.39	13.06	3.80	18.09	13.02	3.94	17.63	12.87	4.13	18.56	13.55	4.49	17.92	13.26	4.69
27	17	15.23	11.58	3.18	17.02	12.94	3.57	16.72	12.87	3.71	16.26	12.69	3.89	17.12	13.35	4.23	16.48	13.02	4.44
	19	15.91	11.62	3.30	17.78	12.98	3.71	17.48	12.94	3.85	17.02	12.77	4.04	17.92	13.44	4.39	17.28	13.13	4.59
	22	16.73	11.71	3.51	18.70	13.09	3.94	18.39	13.06	4.08	17.94	12.91	4.22	18.88	13.59	4.59	18.24	13.32	4.79
29	17	15.64	11.73	3.18	17.48	13.11	3.57	17.18	13.05	3.71	16.72	12.87	3.89	17.60	13.55	4.23	16.96	13.23	4.44
	19	16.32	11.75	3.39	18.24	13.13	3.80	17.94	13.09	3.94	17.48	12.94	4.13	18.40	13.62	4.49	17.76	13.32	4.69
	22	17.00	11.73	3.64	19.00	13.11	4.08	18.70	13.09	4.22	18.24	12.95	4.41	19.20	13.63	4.79	18.56	13.36	4.90
32	17	15.91	11.77	3.35	17.78	13.16	3.75	17.48	13.11	3.89	17.02	12.94	4.08	17.92	13.62	4.44	17.28	13.31	4.54
	19	16.59	11.78	3.47	18.54	13.17	3.89	18.24	13.13	4.04	17.78	12.98	4.22	18.72	13.67	4.59	18.08	13.38	4.79
	22	17.27	11.74	3.60	19.30	13.13	4.04	19.00	13.11	4.18	18.54	12.98	4.36	19.52	13.66	4.74	18.88	13.40	4.95

Indoor intake air ambient temperature		Outdoor intake air ambient temperature (D.B./°C)											
		30°C			35°C			40°C			43°C		
		TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT
DB	WB	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	
23	17	15.20	12.62	4.34	14.56	12.38	4.59	13.76	11.97	4.90	13.12	11.68	5.15
	19	16.00	12.80	4.59	15.36	12.60	4.85	14.56	12.23	5.15	13.92	11.97	5.41
	22	16.80	12.94	4.85	16.16	12.77	5.10	15.36	12.44	5.41	14.72	12.22	5.66
25	17	15.52	12.73	4.44	14.88	12.50	4.69	14.08	12.11	5.00	13.44	11.83	5.25
	19	16.32	12.89	4.69	15.68	12.70	4.95	14.88	12.35	5.25	14.24	12.10	5.51
	22	17.28	13.13	4.95	16.64	12.98	5.20	15.84	12.67	5.51	15.20	12.46	5.76
27	17	15.84	12.83	4.69	15.20	12.62	4.95	14.40	12.24	5.25	13.76	11.97	5.51
	19	16.64	12.98	4.85	16.00	12.80	5.10	15.20	12.46	5.41	14.56	12.23	5.66
	22	17.60	13.20	5.05	16.96	13.06	5.30	16.16	12.77	5.61	15.52	12.57	5.87
29	17	16.32	13.06	4.69	15.68	12.86	4.95	14.88	12.50	5.25	14.24	12.25	5.46
	19	17.12	13.18	4.95	16.48	13.02	5.20	15.68	12.70	5.51	15.04	12.48	5.71
	22	17.92	13.26	5.15	17.28	13.13	5.41	16.48	12.85	5.71	15.84	12.67	5.92
32	17	16.64	13.15	4.79	16.00	12.96	5.05	15.20	12.77	5.15	14.56	12.38	5.61
	19	17.44	13.25	5.05	16.80	13.10	5.30	16.00	12.80	5.61	15.36	12.60	5.87
	22	18.24	13.32	5.20	17.60	13.20	5.46	16.80	12.94	5.76	16.16	12.77	6.02

TC : Total Cooling Capacity  
 SHC : Sensible Heat Capacity  
 IPT : Power Consumption

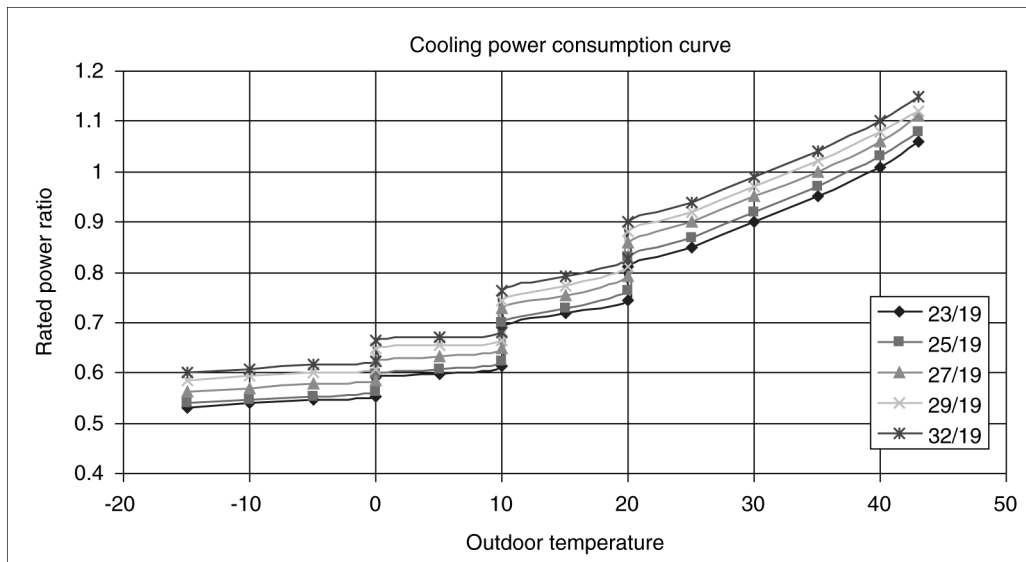
### Cooling capacity curve

Indoor intake air ambient temperature		Outdoor intake air ambient temperature (D.B./°C)															
		-15°C	-10°C	-5°C	0°C	0°C	5°C	10°C	10°C	15°C	20°C	20°C	25°C	30°C	35°C	40°C	43°C
		TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC
DB	WB	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	
23	17	15.36	15.10	14.85	14.59	15.50	14.96	14.69	16.42	16.11	15.66	16.48	15.84	15.20	14.56	13.76	13.12
	19	16.00	15.74	15.49	15.23	16.18	15.78	15.37	17.18	16.87	16.42	17.28	16.64	16.00	15.36	14.56	13.92
	22	16.64	16.38	16.13	15.87	16.86	16.46	16.05	17.94	17.63	17.18	18.08	17.44	16.80	16.16	15.36	14.72
25	17	15.62	15.36	15.10	14.85	15.78	15.37	14.96	16.72	16.42	15.96	16.80	16.16	15.52	14.88	14.08	13.44
	19	16.26	16.00	15.74	15.49	16.46	16.05	15.64	17.48	17.18	16.72	17.60	16.96	16.32	15.68	14.88	14.24
	22	17.02	16.77	16.51	16.26	17.27	16.86	16.46	18.39	18.09	17.63	18.56	17.92	17.28	16.64	15.84	15.20
27	17	15.87	15.62	15.36	15.10	16.05	15.64	15.23	17.02	16.72	16.26	17.12	16.48	15.84	15.20	14.40	13.76
	19	16.51	16.26	16.00	15.74	16.73	16.32	15.91	17.78	17.48	17.02	17.92	17.28	16.64	16.00	15.20	14.56
	22	17.28	17.02	16.77	16.51	17.54	17.14	16.73	18.70	18.39	17.94	18.88	18.24	17.60	16.96	16.16	15.52
29	17	16.26	16.00	15.74	15.49	16.46	16.05	15.64	17.48	17.18	16.72	17.60	16.96	16.32	15.68	14.88	14.24
	19	16.90	16.64	16.38	16.13	17.14	16.73	16.32	18.24	17.94	17.48	18.40	17.76	17.12	16.48	15.68	15.04
	22	17.54	17.28	17.02	16.77	17.82	17.41	17.00	19.00	18.70	18.24	19.20	18.56	17.92	17.28	16.48	15.84
32	17	16.51	16.26	16.00	15.74	16.73	16.32	15.91	17.78	17.48	17.02	17.92	17.28	16.64	16.00	15.20	14.56
	19	17.15	16.90	16.64	16.38	17.41	17.00	16.59	18.54	18.24	17.78	18.72	18.08	17.44	16.80	16.00	15.36
	22	17.79	17.54	17.28	17.02	18.09	17.68	17.27	19.30	19.00	18.54	19.52	18.88	18.24	17.60	16.80	16.16



### Cooling power consumption curve

Indoor intake air ambient temperature		Outdoor intake air ambient temperature (D.B./°C)															
		-15°C	-10°C	-5°C	0°C	0°C	5°C	10°C	10°C	15°C	20°C	20°C	25°C	30°C	35°C	40°C	43°C
		IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT
DB	WB	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	
23	17	2.47	2.51	2.55	2.59	2.76	2.80	2.89	3.24	3.38	3.57	3.88	4.08	4.34	4.59	4.90	5.15
	19	2.71	2.75	2.79	2.83	3.01	3.05	3.14	3.52	3.66	3.80	4.13	4.34	4.59	4.85	5.15	5.41
	22	2.91	2.95	2.98	3.02	3.22	3.26	3.35	3.75	3.89	4.04	4.39	4.59	4.85	5.10	5.41	5.66
25	17	2.55	2.59	2.63	2.67	2.84	2.89	2.97	3.33	3.47	3.66	3.98	4.18	4.44	4.69	5.00	5.25
	19	2.75	2.79	2.83	2.87	3.05	3.09	3.18	3.57	3.71	3.89	4.23	4.44	4.69	4.95	5.25	5.51
	22	2.95	2.98	3.02	3.06	3.26	3.30	3.39	3.80	3.94	4.13	4.49	4.69	4.95	5.20	5.51	5.76
27	17	2.75	2.79	2.83	2.87	3.05	3.09	3.18	3.57	3.71	3.89	4.23	4.44	4.69	4.95	5.25	5.51
	19	2.87	2.91	2.95	2.98	3.18	3.22	3.30	3.71	3.85	4.04	4.39	4.59	4.85	5.10	5.41	5.66
	22	3.10	3.14	3.18	3.22	3.43	3.47	3.51	3.94	4.08	4.22	4.59	4.79	5.05	5.30	5.61	5.87
29	17	2.79	2.83	2.87	2.91	3.09	3.14	3.18	3.57	3.71	3.89	4.23	4.44	4.69	4.95	5.25	5.46
	19	2.98	3.02	3.06	3.10	3.30	3.35	3.39	3.80	3.94	4.13	4.49	4.69	4.95	5.20	5.51	5.71
	22	3.22	3.26	3.30	3.34	3.55	3.60	3.64	4.08	4.22	4.41	4.79	4.90	5.15	5.41	5.71	5.92
32	17	2.95	2.98	3.02	3.06	3.26	3.30	3.35	3.75	3.89	4.08	4.44	4.54	4.79	5.05	5.15	5.61
	19	3.06	3.10	3.14	3.18	3.39	3.43	3.47	3.89	4.04	4.22	4.59	4.79	5.05	5.30	5.61	5.87
	22	3.18	3.22	3.26	3.30	3.51	3.55	3.60	4.04	4.18	4.36	4.74	4.95	5.20	5.46	5.76	6.02

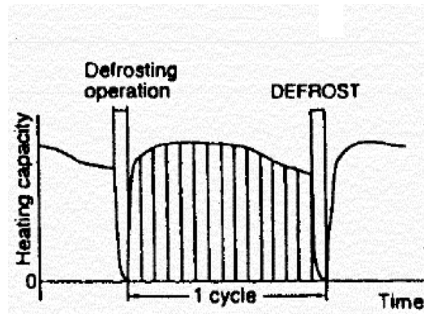




## 8.2.2. Heating performance

Model name	Max heating capacity	
	Max capacity (kw)	Max power consumption (kw)
CS-F24DTE5 / CU-L24DBE5	7.5	3.15
CS-F28DTE5 / CU-L28DBE5	8.5	3.25
CS-F34DTE5 / CU-L34DBE5	13.5	4.20
CS-F43DTE5 / CU-L43DBE5	15.5	5.00
CS-F50DTE5 / CU-L50DBE5	18	6.00

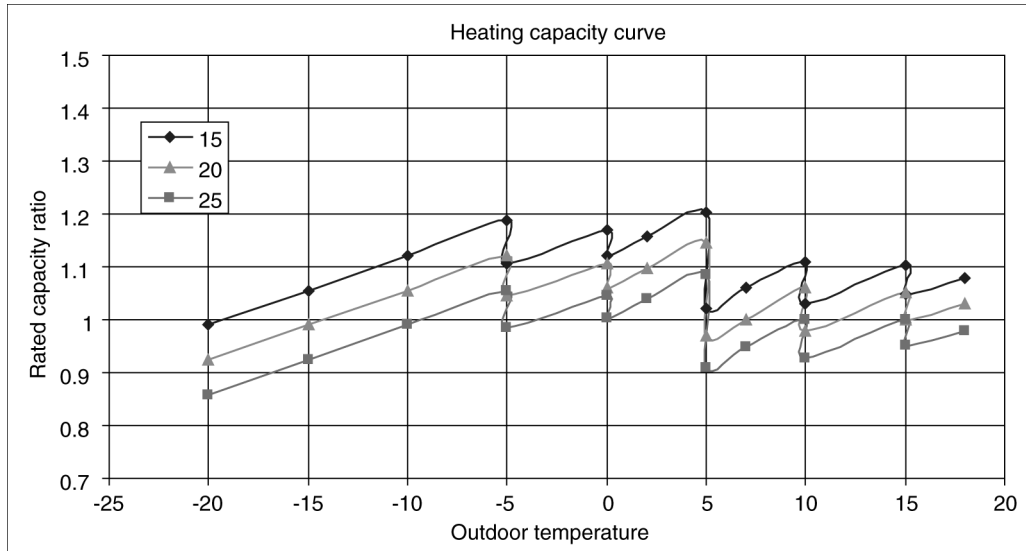
1. Heating capacity when the unit is frosted over or while being defrosted will vary depending on outdoor temperature and the frosting.
2. Heating capacity must be compensated because it does not take into account the capacity drop incurred when the unit is frosted over and while it is being defrosted.
3. Therefore, to obtain the integral heating capacity in consideration over frosting and defrost operations.
4. Heating capacity must be multiplied by the compensation coefficient below.



### 8.2.2.1. CS-F50DTE5 CU-L50DBE5

#### Heating capacity curve

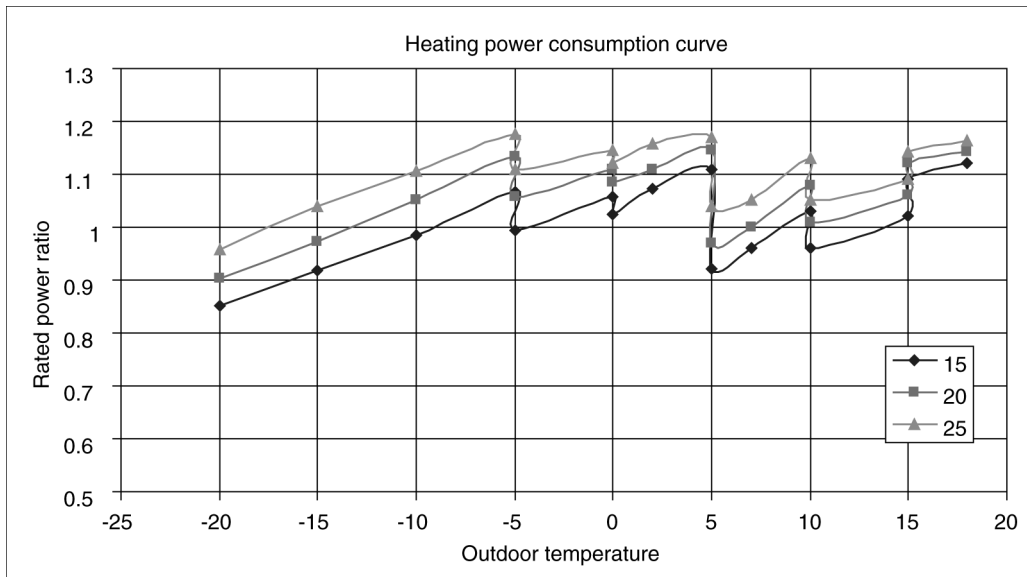
Indoor intake air ambient temperature	Outdoor intake air ambient temperature (D.B./°C)															
	-20°C	-15°C	-10°C	-5°C	-5°C	0°C	0°C	2°C	5°C	5°C	7°C	10°C	10°C	15°C	15°C	18°C
DB	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
15	17.82	19.01	20.20	21.38	19.93	21.03	20.18	20.82	21.66	18.36	19.08	19.98	18.54	19.84	18.87	19.40
20	16.63	17.82	19.01	20.20	18.82	19.93	19.12	19.75	20.60	17.46	18.00	19.08	17.61	18.91	17.99	18.52
25	15.44	16.63	17.82	19.01	17.71	18.82	18.05	18.69	19.54	16.38	17.10	18.00	16.69	17.98	17.11	17.64



	Outdoor intake air ambient temperature (D.B./ °C)										
	-20°C	-15°C	-10°C	-5°C	0°C	2°C	5°C	7°C	10°C	15°C	>15°C
Heating capacity compensation coefficient	0.93	0.93	0.93	0.92	0.84	0.88	0.96	1	1	1	1

### Heating power consumption curve

Indoor intake air ambient temperature	Outdoor intake air ambient temperature (D.B./°C)															
	-20°C	-15°C	-10°C	-5°C	-5°C	0°C	0°C	2°C	5°C	5°C	7°C	10°C	10°C	15°C	15°C	18°C
	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT	IPT
DB	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
15	5.02	5.42	5.81	6.29	5.87	6.24	6.05	6.33	6.55	5.43	5.66	6.08	5.66	6.02	6.44	6.62
20	5.34	5.73	6.21	6.69	6.24	6.54	6.41	6.55	6.77	5.72	5.90	6.37	5.96	6.25	6.62	6.74
25	5.66	6.13	6.53	6.93	6.54	6.76	6.62	6.84	6.91	6.14	6.20	6.67	6.20	6.43	6.74	6.86



	Outdoor intake air ambient temperature (D.B./ °C)									
	-20°C	-15°C	-10°C	-5°C	0°C	5°C	7°C	10°C	15°C	>15°C
Heating capacity compensation coefficient	0.93	0.93	0.93	0.92	0.86	0.97	1	1	1	1

## 8.3. Safety device

### 8.3.1. Indoor unit

Indoor unit	Heat pump model		CS-F24DTE5	CS-F28DTE5	CS-F34DTE5	CS-F43DTE5	CS-F50DTE5
	Cooling only model						
For fan motor protection							
Internal protector	OFF	°C	135	135	135	135	135
	ON	°C	87	87	86	86	86
For condensation temperature protection control							
Heat exchanger thermistor	OFF	°C	58	58	58	58	58
	RESET	°C	54	54	54	54	54
For P.C.B current protection							
Current fuse	CUT	A	3.15	3.15	3.15	3.15	3.15

Note : Protection controlled by P.C.B installed of FM inside.

### 8.3.2. Outdoor unit

Outdoor unit	Heat pump model	50Hz	CU-L24DBE5	CU-L28DBE5	CU-L34DBE5	CU-L43DBE5	CU-L50DBE5	
For refrigerant cycle								
High pressure switch	OFF	✕MPa	4.2	4.2	4.2	4.2	4.15	
	ON	✕MPa	3.3	3.3	3.3	3.3	3.3	
For compressor over current protection for cooling mode								
CT1 frequency down	OFF	A	12	12.6	17	20	22.5	
	RESET	A	8	9	13	15	17.5	
CT2 compressor stop	OFF	A	16	17	22	25	27.5	
For compressor over current protection for heating mode								
CT1 frequency down	OFF	A	14.6	14.6	23	25	25.2	
	RESET	A	8	9	13	15	17.5	
CT2 compressor stop	OFF	A	18	19	28	30	30	
Discharge temp protection								
Discharge temperature thermistor (Td)	Compressor OFF	°C	Td ≥ 110°C → Comp OFF					
			Td ≥ 110°C x 3 times within 1 hour → display error cord					
Liquid compress protection								
Crankcase heater	-	W	33	33	33	33	33	
For fan motor protection								
Internal protector (49F)	OFF	°C	135	135	135	135	135	
	ON	°C	87	87	87	87	87	
For condensation temperature protection control								
Heat exchanger thermistor (Th)	OFF	°C	58	58	58	58	58	
	RESET	°C	54	54	54	54	54	
For control protection								
Fuse	CUT	A	6.3	6.3	6.3	6.3	6.3	

✕ 1MPa = 10.2kgf/cm<sup>2</sup>

## 8.4. Operating characteristics

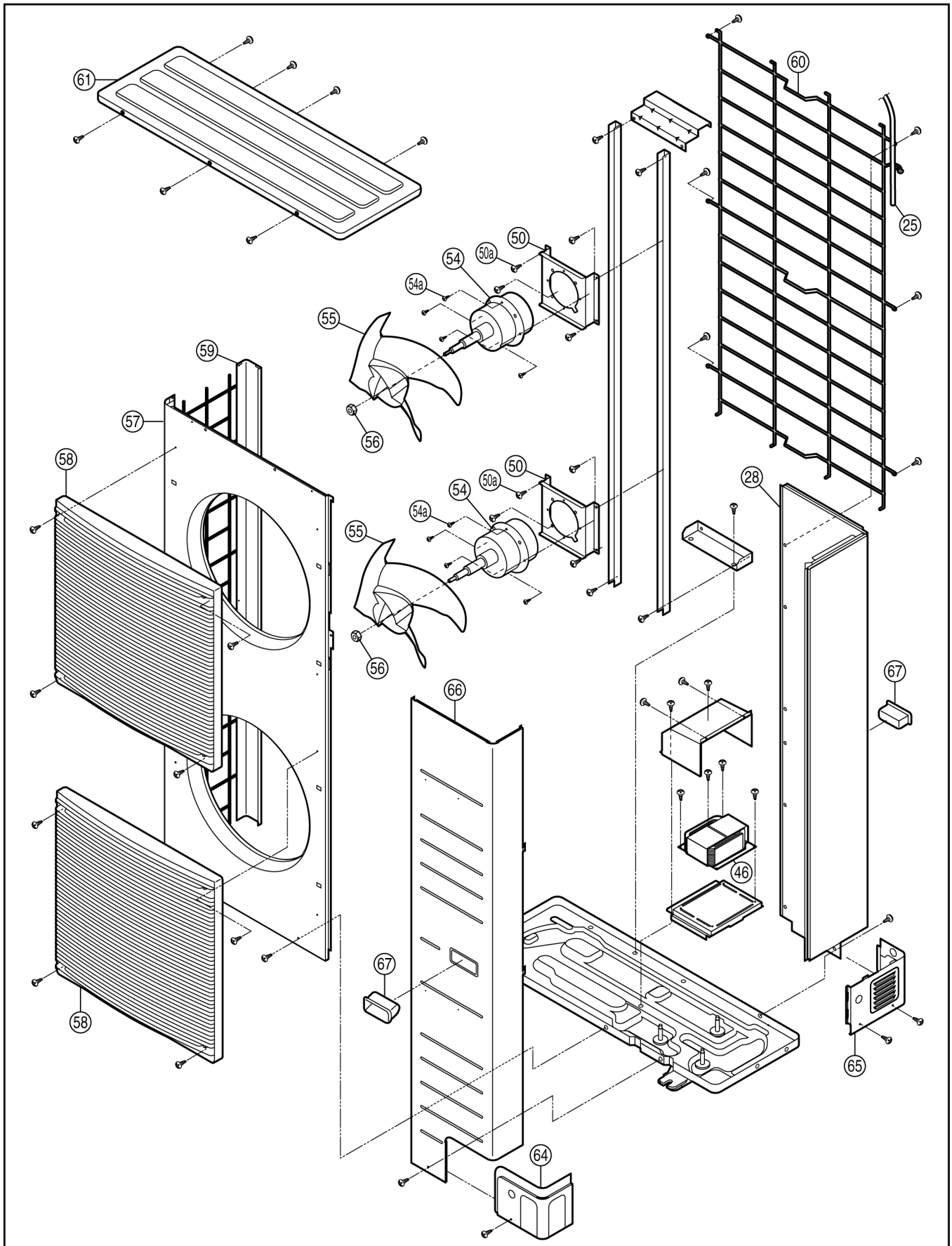
Model		Main Power Source		Compressor Motor			Indoor Unit Fan Motor		Outdoor Unit Fan Motor	
		Voltage	Frequency	S.C.	R.C. (A)	IPT (kW)	R.C.	IPT	R.C.	IPT
		(V)	(Hz)	(A)	COOL / HEAT	COOL / HEAT	(A)	(kW)	(A)	(kW)
H E A T  P U M P  M O D E L	CS-F24DTE5	220	50	9.9	7.28 / 7.98	1.55 / 1.69	0.17	0.03	0.55	0.12
	CU-L24DBE5	230	50	9.5	6.98 / 7.68	1.55 / 1.69	0.17	0.03	0.55	0.12
		240	50	9.2	6.78 / 7.38	1.55 / 1.69	0.17	0.03	0.55	0.12
		CS-F28DTE5	220	50	11.1	8.8 / 9.2	1.85 / 1.96	0.20	0.035	0.55
	CU-L28DBE5	230	50	10.7	8.5 / 8.9	1.85 / 1.96	0.20	0.035	0.55	0.12
		240	50	10.3	8.1 / 8.5	1.85 / 1.96	0.20	0.035	0.55	0.12
		CS-F34DTE5	220	50	14.4	10.7 / 12.2	2.29 / 2.60	0.35	0.07	1.10
	CU-L34DBE5	230	50	13.9	10.3 / 11.8	2.29 / 2.60	0.35	0.07	1.10	0.24
		240	50	13.5	10.0 / 11.3	2.29 / 2.60	0.35	0.07	1.10	0.24
		CS-F43DTE5	220	50	19.5	15.5 / 16.6	3.31 / 3.55	0.45	0.09	1.10
	CU-L43DBE5	230	50	18.8	15.0 / 16.1	3.31 / 3.55	0.45	0.09	1.10	0.24
		240	50	18.2	14.5 / 15.6	3.31 / 3.55	0.45	0.09	1.10	0.24
CS-F50DTE5		220	-	-	-	-	-	-	-	-
CU-L50DBE5	230	-	-	-	-	-	-	-	-	-
	240	50	20.8	19.14 / 19.54	4.31 / 4.41	2.67	0.10	1.10	0.24	

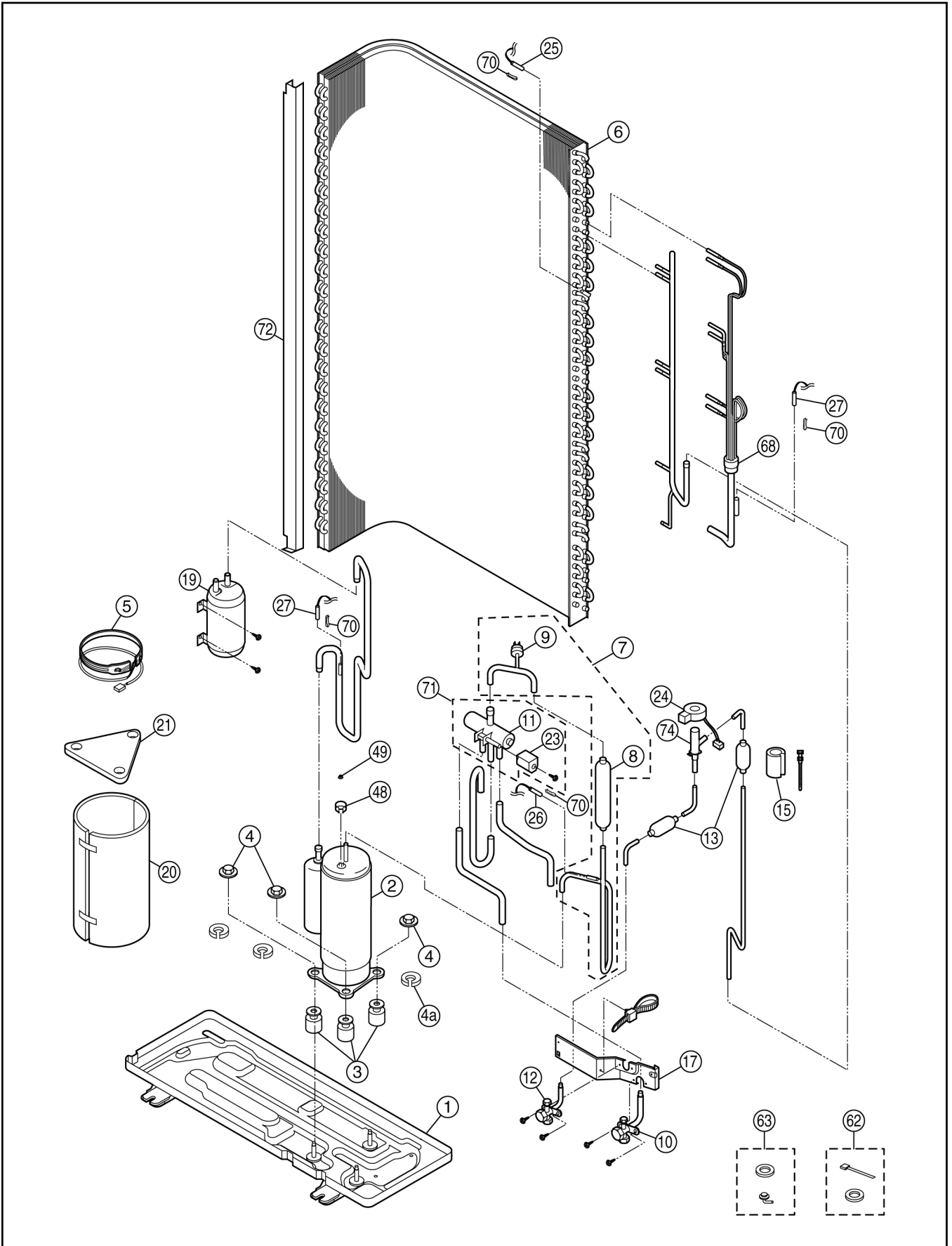
Legend : S.C. : Starting Current  
R.C. : Running Current  
IPT : Power Consumption

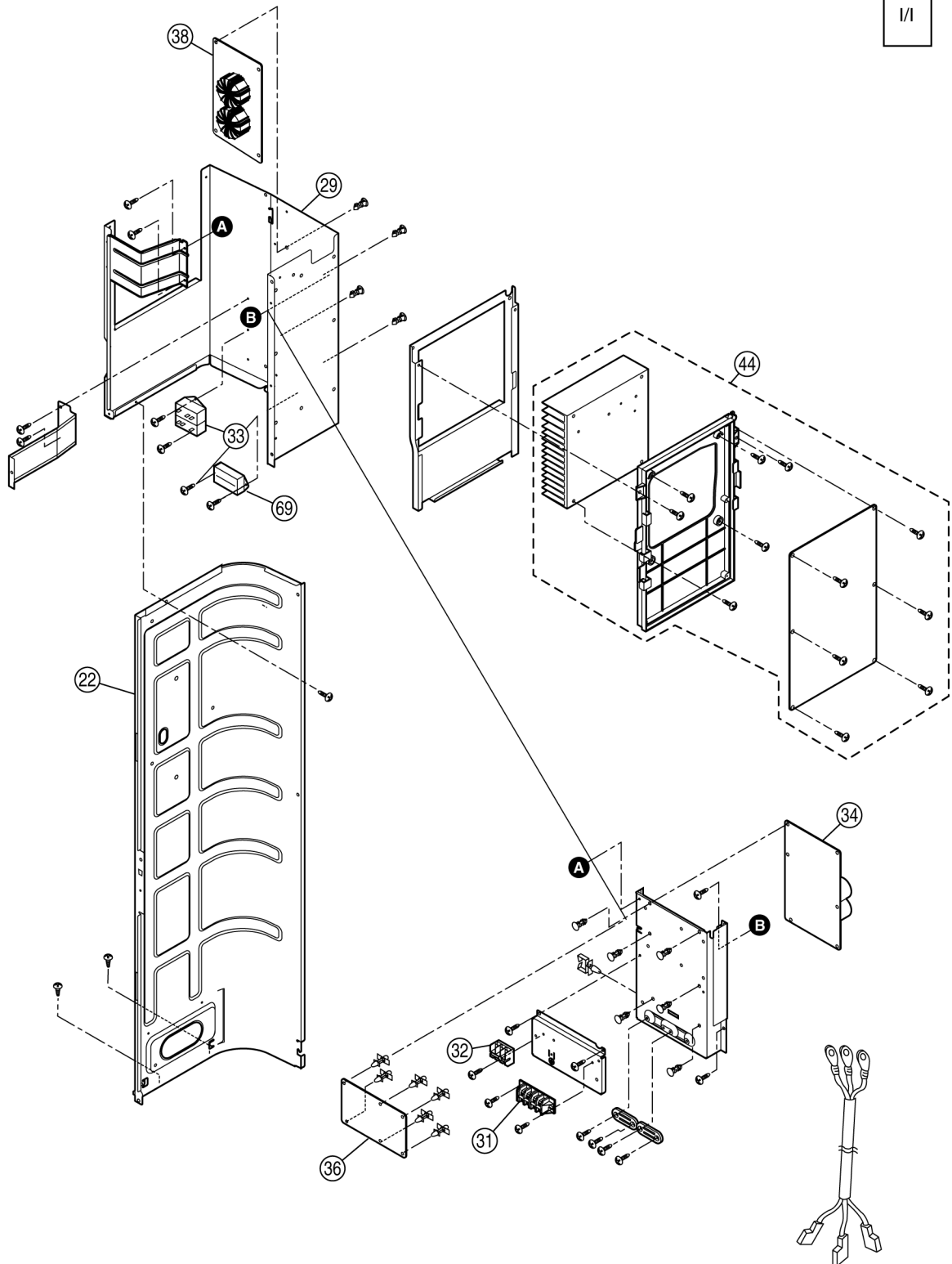
# 9 Exploded View and Replacement Parts List

## 9.1. Outdoor Unit

CU-L50DBE5









NO.	PART DESCRIPTION	QTY	CU-L50DBE5
1	BASE PAN ASS'Y	1	CWD52K1110
2	COMPRESSOR	1	5JD420XAA22
3	ANTI-VIBRATION BUSHING	3	CWH50055
4	NUT FOR COMP. MOUNT.	3	CWH561049
4a	PACKING	3	CWB811017
5	CRANKCASE HEATER	1	CWA341013
6	CONDENSER COMPLETE	1	CWB32C1594
7	TUBE ASS'Y(PRESSURE SWITCH)	1	CWT023392
8	DISCHARGE MUFFLER	1	CWB121014
9	HIGH PRESSURE SWITCH	1	CWA101007
10	3-WAYS VALVE (GAS)	1	CWB011251
11	4-WAYS VALVE	1	CWB001046
12	3-WAYS VALVE (LIQUID)	1	CWB011292
13	STRAINER	2	CWB111032
15	PIPE HOLDER RUBBER	5	CWG251021
17	HOLDER-SERVICE VALVE	1	CWD911425
19	ACCUMULATOR ASS'Y	1	CWB131026A
20	SOUND PROOF MATERIAL-COMP	1	CWG302265
21	SOUND PROOF MATERIAL	1	CWG302266
22	SOUND-PROOF BOARD ASS'Y	1	CWH15K1019
23	V-COIL COMPLETE	1	CWA43C2169J
24	V-COIL COMPLETE	1	CWA43C2177J
25	SENSOR-OD TEMP./COIL	1	CWA50C2229
26	SENSOR-COMP.DISCHARGE	1	CWA50C2230
27	SENSOR-COMP.SUCT/DEFROST	1	CWA50C2231
28	CABINET REAR PLATE	1	CWE02C1014
29	CONTROL BOARD ASS'Y	1	CWH10K1049
31	TERMINAL BOARD ASS'Y	1	CWA28K1107
32	TERMINAL BOARD ASS'Y	1	CWA28K1076J
33	CAPACITOR-FAN MOTOR (3/460)	2	DS461355QP-A
34	ELECTRONIC CONTROLLER (P. SUPPLY)	1	CWA744662
36	ELECTRONIC CONTROLLER (DISPLAY)	1	CWA743566
38	ELECTRONIC CONTROLLER (NOISE FILTER)	1	CWA743567
44	ELECTRONIC CONTROLLER (MAIN)	1	CWA73C2413R
46	REACTOR	2	G0C452J00001
48	TERMINAL COVER	1	CWH171035
49	NUT FOR TERMINAL COVER	1	CWH7080300J
50	BRACKET FAN MOTOR	1	CWD54K1014
50a	SCREW-BRACKET FAN MOTOR	4	CWH551040J
54	FAN MOTOR	2	CWA951538
54a	SCREW-FAN MOTOR	8	CWH551040J
55	PROPELLER FAN	2	CWH001021
56	NUT for PROPELLER FAN	2	CWH561038J
57	CABINET FRONT PLATE	1	CWE061098A
58	DISCHARGE GRILLE	2	CWE201073
59	CABINET SIDE PLATE	1	CWE04K1023A
60	WIRE NET	1	CWD041103A
61	CABINET TOP PLATE COMPLETE	1	CWE03C1021
62	ACCESSORY COMPLETE	1	CWH82C1105
63	BAG-COMPLETE (L-TUBE)	1	CWG87C2030
64	PIPE COVER (FRONT)	1	CWD601074A
65	PIPE COVER (BACK)	1	CWD601075A
66	CABINET FRONT PLATE COMPLETE	1	CWE06C1091
67	HANDLE	2	CWE161008
68	TUBE ASS'Y (CAPILLARY TUBE)	1	CWT07K1196
69	MAGNETIC SWITCH	1	CWA001023
70	SPRING FOR SENSOR	4	CWH711010
71	4-WAYS VALVE COMPLETE	1	CWB00C1022
72	CONDENSER SIDE PLATE	1	CWD932477
73	INSTALLATION INSTRUCTION	1	CWF613052
74	EXPANSION VALVE	1	CWB051020J

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