Changes for the Better

MITSUBISHI ELECTRIC

FLOOR AND CEILING TYPE AIR CONDITIONERS

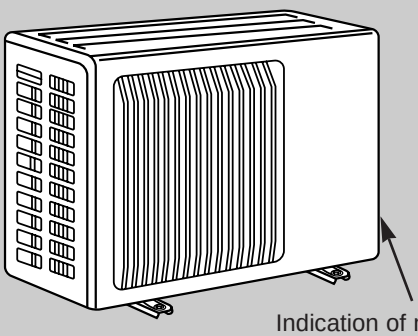
No. OB381

HFC utilized R410A

SERVICE MANUAL

Wireless type
Models

MUCFH-GA35VB -E1
MUCFH-GA50VB -E1
MUCFH-GA60VB -E1



Indication of model name
MUCFH-GA50VB -E1

CONTENTS

NOTE:
•This service manual describes technical data of outdoor units. As for indoor units MCFH-GA35VB-E1,MCFH-GA50VB-E1 and MCFH-GA60VB-E1 refer to the service manual OB380.

CE

1 TECHNICAL CHANGES

MUH-A12YV -E1 → MUCFH-GA35VB -E1

1. Indication of capacity has been changed. (BTU base → kW)

MUCFH-A18WV -E1 → MUCFH-GA50VB -E1

1. Indication of capacity has been changed. (BTU base → kW)

MUCFH-A24WV -E1 → MUCFH-GA60VB -E1

1. Indication of capacity has been changed. (BTU base → kW)

INFORMATION FOR THE AIR CONDITIONER WITH R410A REFRIGERANT

- This room air conditioner adopts HFC refrigerant (R410A) which never destroys the ozone layer.
- Pay particular attention to the following points, though the basic installation procedure is same as that for R22 conditioners.

① As R410A has working pressure approximate 1.6 times as high as that of R22, some special tools and piping parts/ materials are required. Refer to the table below.

② Take sufficient care not to allow water and other contaminations to enter the R410A refrigerant during storage and installation, since it is more susceptible to contaminations than R22.

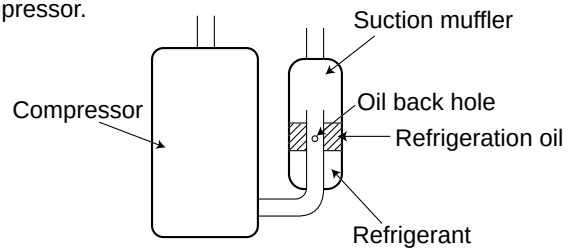
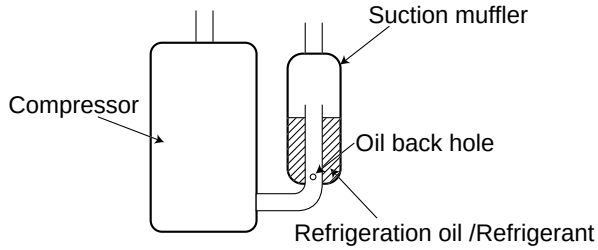
③ For refrigerant piping, use clean, pressure-proof parts/materials specifically designed for R410A. (Refer to 2. Refrigerant piping.)

④ Composition change may occur in R410A since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

		New refrigerant	Previous refrigerant
Refrigerant	Refrigerant	R410A	R22
	Composition (Ratio)	HFC-32: HFC-125 (50%:50%)	R22 (100%)
	Refrigerant handling	Pseudo-azeotropic refrigerant	Single refrigerant
	Chlorine	Not included	Included
	Safety group (ASHRAE)	A1/A1	A1
	Molecular weight	72.6	86.5
	Boiling point (℃)	-51.4	-40.8
	Steam pressure [25℃](Mpa)	1.557	0.94
	Saturated steam density [25℃](Kg/m³)	64	44.4
	Combustibility	Non combustible	Non combustible
	ODP ※1	0	0.055
	GWP ※2	1730	1700
	Refrigerant charge method	From liquid phase in cylinder	Gas phase
	Additional charge on leakage	Possible	Possible
Refrigeration oil	Kind	Incompatible oil	Compatible oil
	Color	Non	Light yellow
	Smell	Non	Non

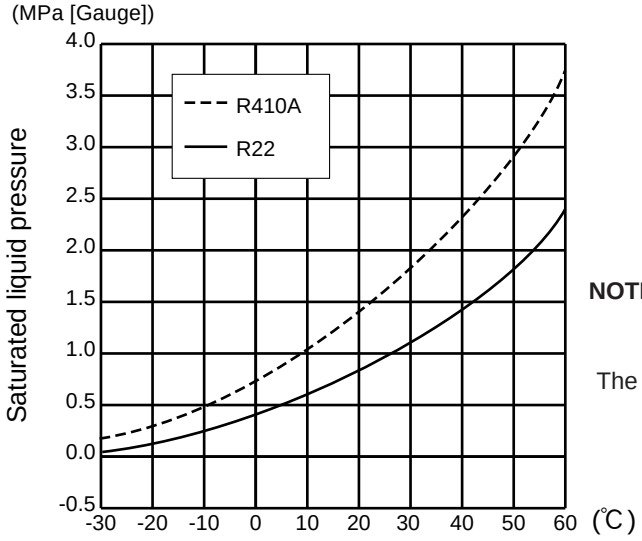
※1 :Ozone Destruction Parameter : based on CFC-11

※2 :Global Warmth Parameter : based on CO_2

	New Specification	Current Specification
Compressor	The incompatible refrigeration oil easily separates from refrigerant and is in the upper layer inside the suction muffler. Raising position of the oil back hole enables to back the refrigeration oil of the upper layer to flow back to the compressor. 	Since refrigerant and refrigerating oil are compatible each, refrigeration oil goes back to the compressor through the lower position oil back hole. 

NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

Conversion chart of refrigerant temperature and pressure



NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

1.Tools dedicated for the air conditioner with R410A refrigerant

The following tools are required for R410A refrigerant. Some R22 tools can be substituted for R410A tools.
The diameter of the service port on the stop valve in outdoor unit has been changed to prevent any other refrigerant being charged into the unit. Cap size has been changed from 7/16 UNF with 20 threads to 1/2 UNF with 20 threads.

R410A tools	Can R22 tools be used?	Description
Gauge manifold	No	R410A has high pressures beyond the measurement range of existing gauges. Port diameters have been changed to prevent any other refrigerant from being charged into the unit.
Charge hose	No	Hose material and cap size have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	6.35 mm and 9.52 mm
	No	12.7 mm and 15.88 mm
Flare tool	Yes	Clamp bar hole has been enlarged to reinforce the spring strength in the tool.
Flare gauge	New	Provided for flaring work (to be used with R22 flare tool).
Vacuum pump adapter	New	Provided to prevent the back flow of oil. This adapter enables you to use vacuum pumps.
Electronic scale for refrigerant charging	New	It is difficult to measure R410A with a charging cylinder because the refrigerant bubbles due to high pressure and high-speed vaporization

No : Not Substitutable for R410A Yes : Substitutable for R410A

2.Refrigerant piping

① Specifications

Use the refrigerant pipes that meet the following specifications.

Pipe	Outside diameter mm	Wall thickness	Insulation material
For liquid	6.35	0.8 mm	Heat resisting foam plastic Specific gravity 0.045 Thickness 8 mm
	9.52	0.8 mm	
For gas	12.7	0.8 mm	
	15.88	1.0 mm	

- Use a copper pipe or a copper-alloy seamless pipe with a thickness of 0.8 mm (6.35, 9.52, 12.7), 1.0 mm (15.88). Never use any pipe with a thickness less than 0.8 mm (6.35, 9.52, 12.7), 1.0 mm (15.88), as the pressure resistance is insufficient.

② Flaring work and flare nut

Flaring work for R410A pipe differs from that for R22 pipe.

For details of flaring work, refer to Installation manual “FLARING WORK”.

Pipe diameter	Dimension of flare nut	
mm	R410A	R22
6.35	17	17
9.52	22	22
12.7	26	24
15.88	29	27

3.Refrigerant oil

Apply the special refrigeration oil (accessories: packed with indoor unit) to the flare and the union seat surfaces.

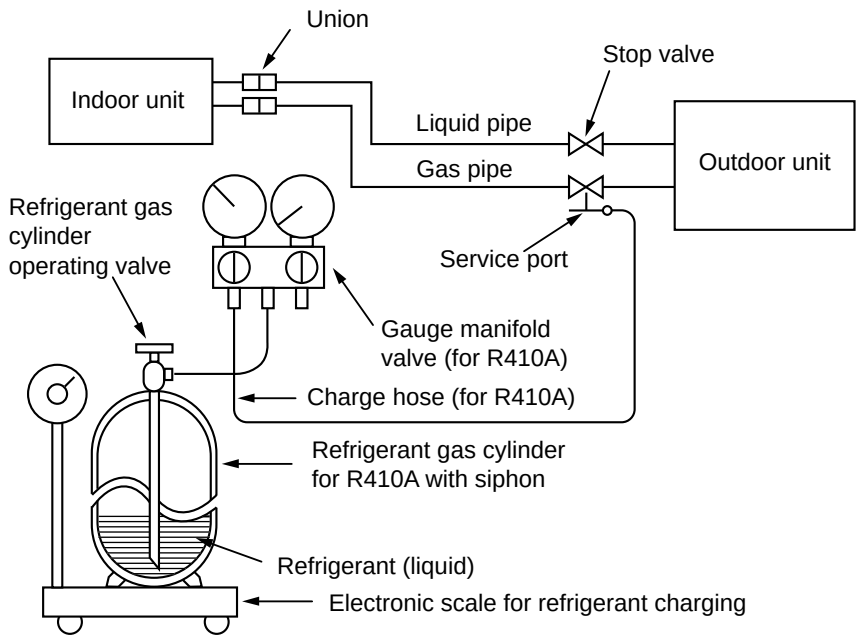
4.Air purge

- Do not discharge the refrigerant into the atmosphere.
  Take care not to discharge refrigerant into the atmosphere during installation, reinstallation, or repairs to the refrigerant circuit.
- Use the vacuum pump for air purging for the purpose of environmental protection.

5.Additional charge

For additional charging, charge the refrigerant from liquid phase of the gas cylinder.

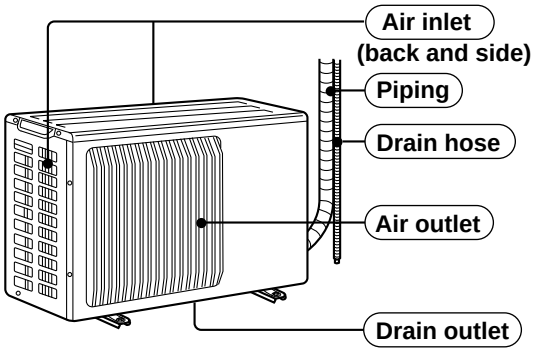
If the refrigerant is charged from the gas phase, composition change may occur in the refrigerant inside the cylinder and the outdoor unit. In this case, ability of the refrigeration cycle decreases or normal operation can be impossible. However, charging the liquid refrigerant all at once may cause the compressor to be locked. Thus, charge the refrigerant slowly.



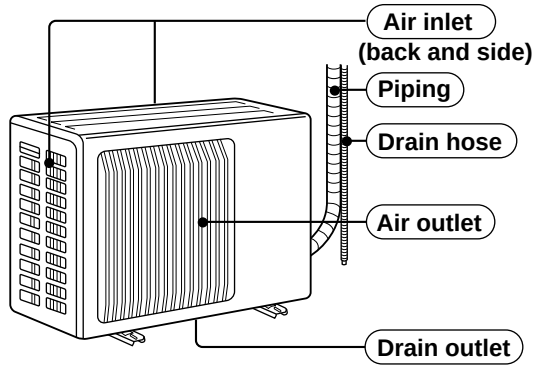
2 PART NAMES AND FUNCTIONS

OUTDOOR UNIT

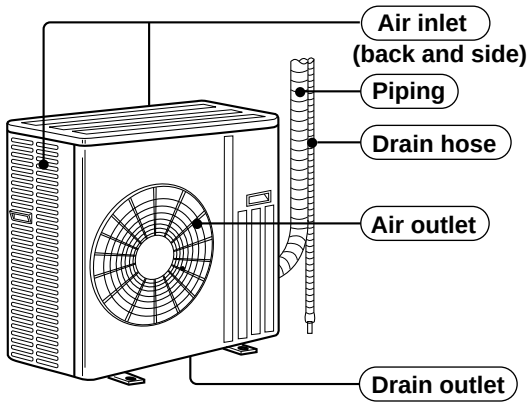
MUCFH-GA35VB -E1



MUCFH-GA50VB -E1



MUCFH-GA60VB -E1



ACCESSORIES

	Item	Q'ty		
		MUCFH-GA35VB-E1	MUCFH-GA50VB-E1	MUCFH-GA60VB-E1
①	Drain socket	1	1	1
②	Drain cap ϕ33	2	2	2
③	Drain cap ϕ16	–	1	–

3 SPECIFICATION

Outdoor model			MUCFH-GA35VB - E1		MUCFH-GA50VB - E1		MUCFH-GA60VB - E1	
Function			Cooling	Heating	Cooling	Heating	Cooling	Heating
Power supply			Single phase 230V, 50Hz		Single phase 230V, 50Hz		Single phase 230V, 50Hz	
Capacity	Capacity	kW	3.5	3.7	4.8	5.0	6.0	6.8
	Dehumidification	ℓ /h	1.5	—	2.4	—	3.1	—
	Air flow(High)	m³ /h	1,710		2,196		2,760	
Electrical data	Power outlet	A	10		15		25	
	Running current	A	4.85	4.23	8.01	8.38	10.51	11.71
	Power input	W	1,094	954	1,730	1,810	2,370	2,640
	Power factor	%	98		94		98	
	Starting current	A	29		37		74	
	Compressor motor current	A	4.54	3.92	7.62	7.99	9.93	11.13
	Fan motor current	A	0.31		0.39		0.58	
Coefficient of performance(C.O.P)			3.02	3.63	2.65	2.65	2.45	2.50
Compressor	Model		RN135VHSHT		RN196VHSHT		NN29VBAHT	
	Output	W	900		1,300		1,900	
	Winding resistance(at 20℃)	Ω	C-R 2.79 C-S 3.36		C-R 1.80 C-S 3.00		C-R 0.80 C-S 1.64	
Fan motor	Model		RA6V33-JB		RA6V50-PA		RA6V85-DA	
	Winding resistance(at 20℃)	Ω	WHT-BLK 215.1 BLK-RED 306.9		WHT-BLK 79.5 BLK-RED 83.0		WHT-BLK 68.8 BLK-RED 93.1	
Dimensions W×H×D		mm	780×540×255		850×605×290		840×850×330	
Weight		kg	40		47		74	
Special remarks	Sound level(High)	dB	49		52		53	
	Fan speed(High)	rpm	825		828		730	
	Fan speed regulator		1		1		1	
	Refrigerant filling capacity(R410A)	kg	1.00		1.85		2.20	
	Refrigeration oil (Model)	cc	620 (NEO22)		520 (NEO22)		1,200 (NEO22)	
	Thermistor RT61(at 0℃)	kΩ	33.18		33.18		33.18	

NOTE: Test conditions are based on ISO 5151.

Cooling : Indoor DB27°C WB19°C Heating : Indoor DB20°C WB 15.5°C

Outdoor DB35°C WB(24°C) Outdoor DB 7°C WB 6°C

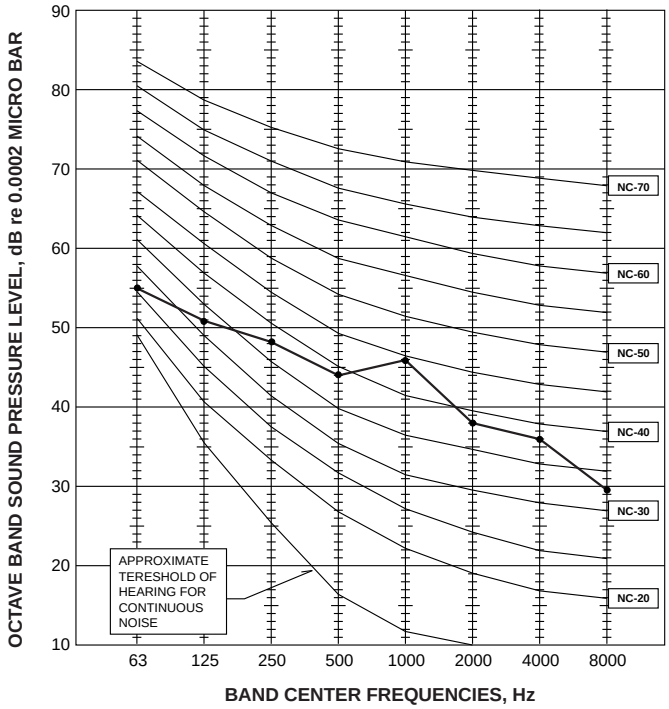
Indoor-Outdoor piping length : 5m

4 NOISE CRITERIA CURVES

MUCFH-GA35VB - E1

FUNCTION	SPL(dB(A))	LINE
COOLING	49	
HEATING		

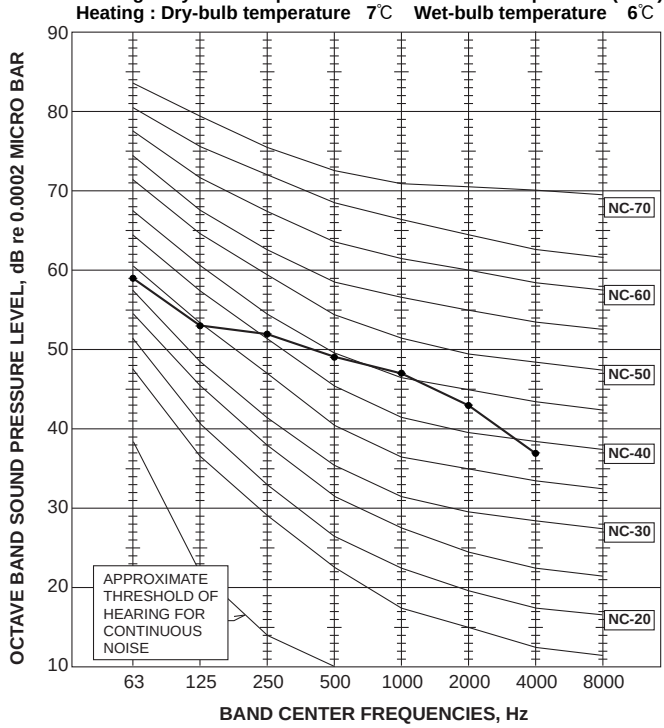
Test conditions,
Cooling : Dry-bulb temperature 35℃ Wet-bulb temperature (24℃)
Heating : Dry-bulb temperature 7℃ Wet-bulb temperature 6℃



MUCFH-GA50VB - E1

FUNCTION	SPL(dB(A))	LINE
COOLING	52	
HEATING		

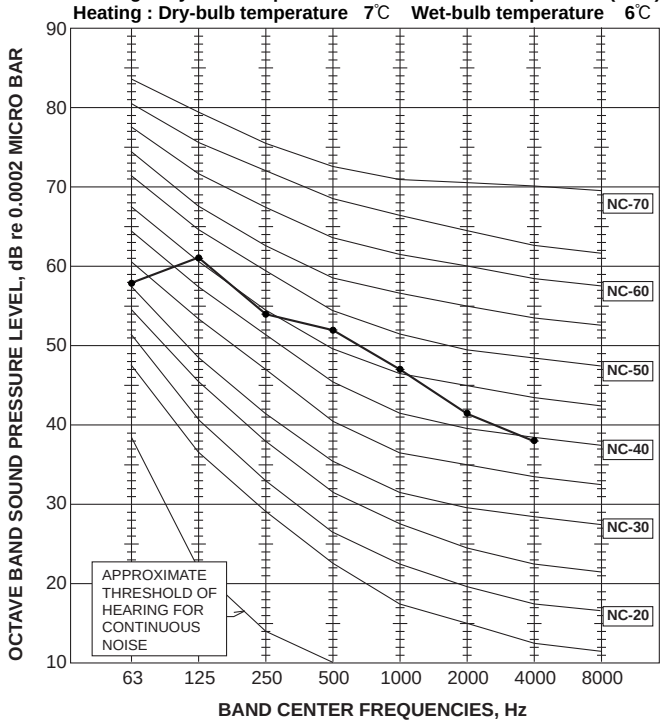
Test conditions,
Cooling : Dry-bulb temperature 35℃ Wet-bulb temperature (24℃)
Heating : Dry-bulb temperature 7℃ Wet-bulb temperature 6℃

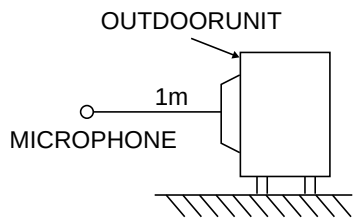


MUCFH-GA60VB - E1

FUNCTION	SPL(dB(A))	LINE
COOLING	53	
HEATING		

Test conditions,
Cooling : Dry-bulb temperature 35℃ Wet-bulb temperature (24℃)
Heating : Dry-bulb temperature 7℃ Wet-bulb temperature 6℃



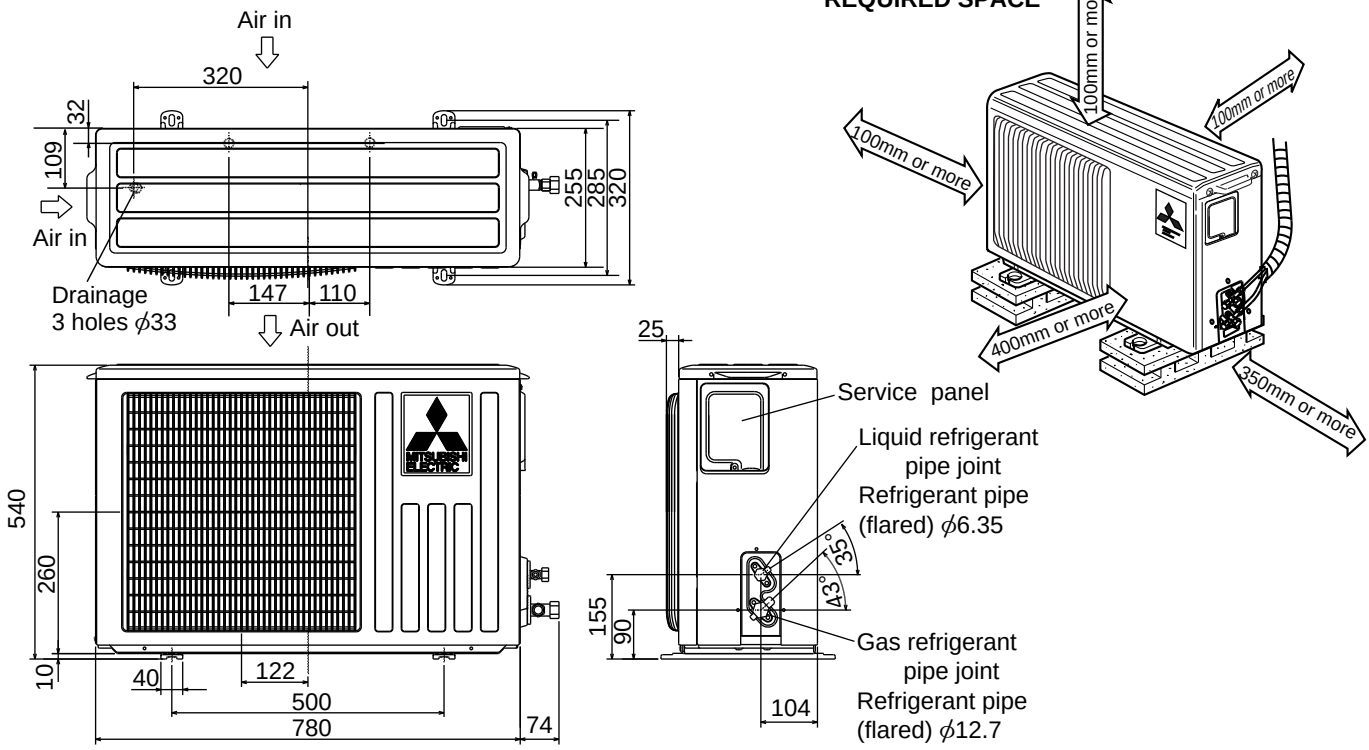


5 OUTLINES AND DIMENSIONS

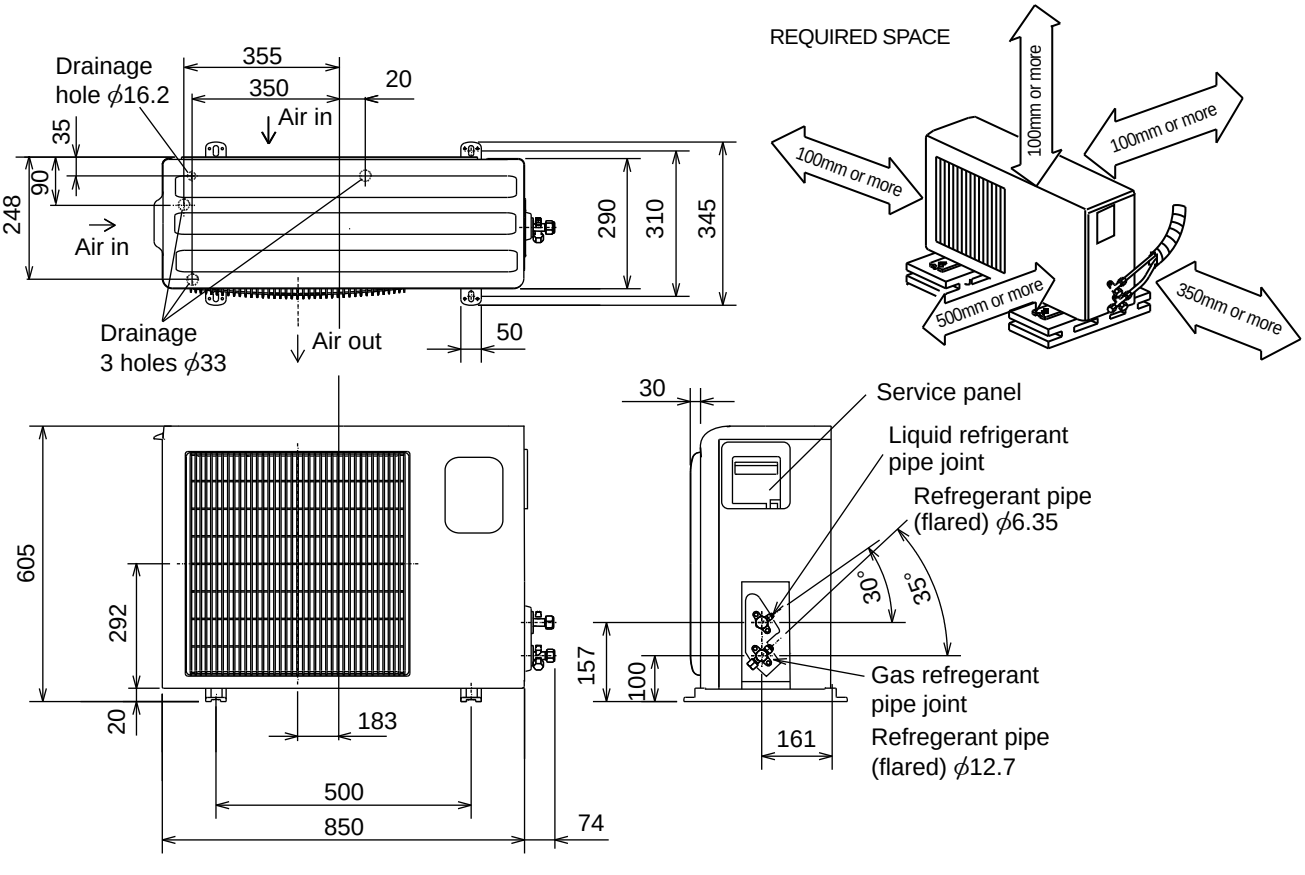
OUTDOOR UNIT

Unit: mm

MUCFH-GA35VB - E1

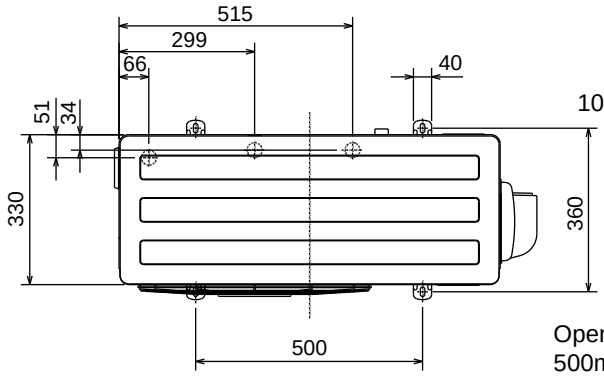


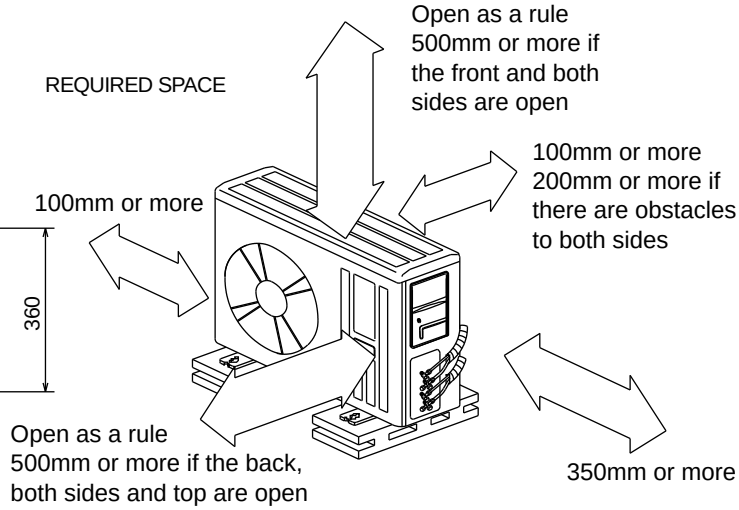
MUCFH-GA50VB - E1

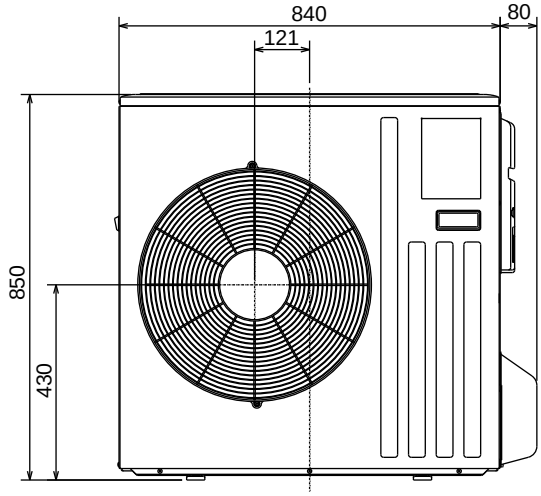


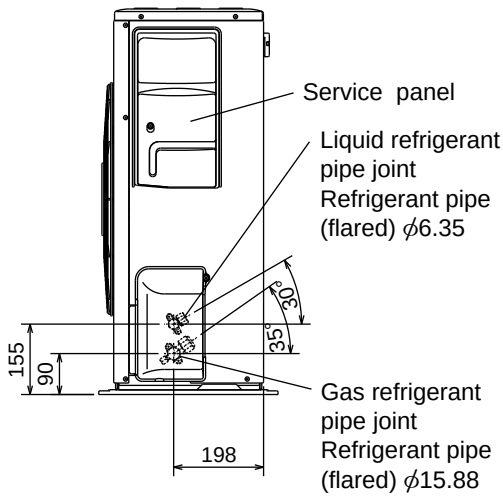
MUCFH-GA60VB - E1

Unit: mm







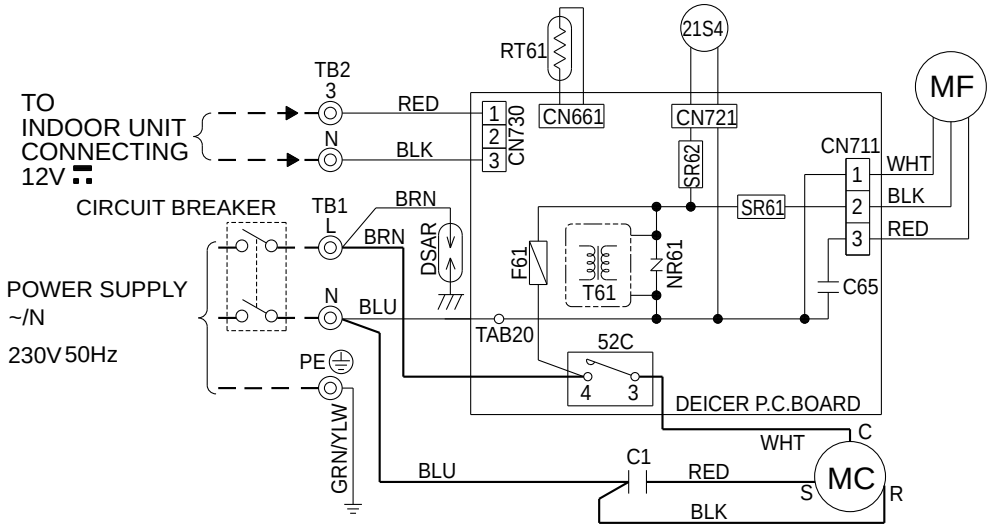


6 WIRING DIAGRAM

MUCFH-GA35VB -E1

OUTDOOR UNIT

MODEL WIRING DIAGRAM



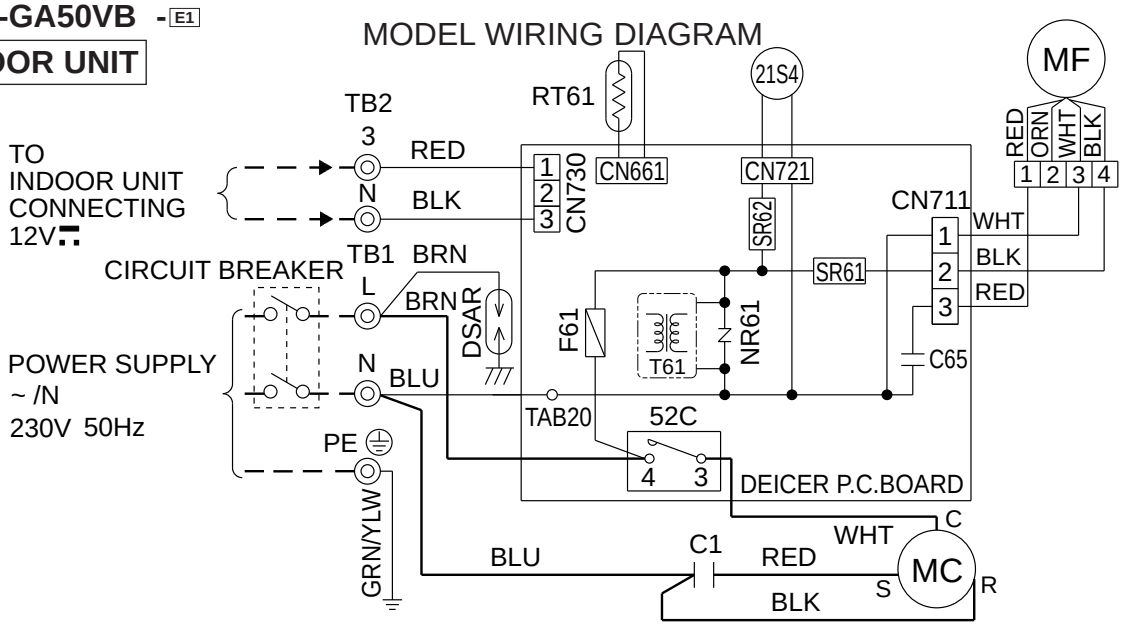
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER FUSE)	T61	TRANSFORMER
C65	OUTDOOR FAN CAPACITOR			TB1,TB2	TERMINAL BLOCK
DSAR	SURGE ABSORBER	NR61	VARISTOR	21S4	R.V. COIL
F61	FUSE(2A)	RT61	DEFROST THERMISTOR	52C	COMPRESSOR CONTACTOR
MC	COMPRESSOR(INNER PROTECTOR)	SR61,SR62	SOLID STATE RELAY		

NOTE:1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.
2. Use copper conductors only. (For field wiring)
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

MUCFH-GA50VB -E1

OUTDOOR UNIT

MODEL WIRING DIAGRAM



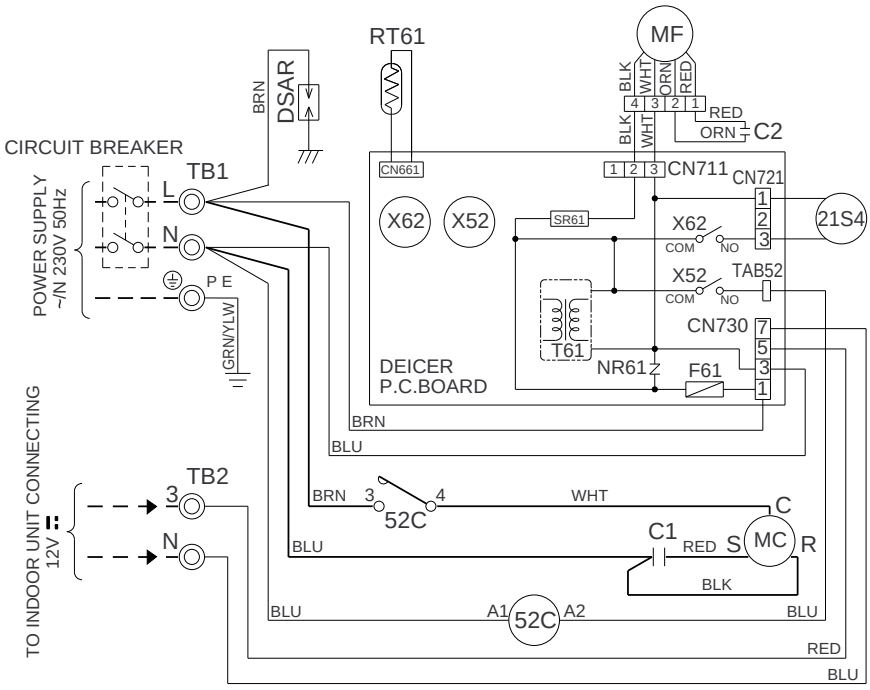
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	TB1,TB2	TERMINAL BLOCK
C65	OUTDOOR FAN CAPACITOR	NR61	VARISTOR	21S4	R.V. COIL
DSAR	SURGE ABSORBER	RT61	DEFROST THERMISTOR	52C	COMPRESSOR CONTACTOR
F61	FUSE (2A)	SR61,SR62	SOLID STATE RELAY		
MC	COMPRESOR (INNER PROTECTOR)	T61	TRANSFORMER		

NOTES: 1.About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only. (For field wiring)
3.Symbols below indicate.
◎ : Terminal block □□□□ : Connector

MUCFH-GA60VB -E1

OUTDOOR UNIT

MODEL WIRING DIAGRAM



SYMBOL	NAME
C1	COMPRESSOR CAPACITOR
C2	OUTDOOR FAN CAPACITOR
DSAR	SURGE ABSORBER
F61	FUSE (3.15A)
MC	COMPRESSOR (INNER PROTECTOR)
MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)
NR61	VARISTOR
RT61	DEFROST THERMISTOR
SR61	SOLID STATE RELAY
TB1	TERMINAL BLOCK
TB2	TERMINAL BLOCK
T61	TRANSFORMER
X52	CONTACTOR
X62	R. V. COIL RELAY
21S4	R. V. COIL
52C	COMPRESSOR CONTACTOR

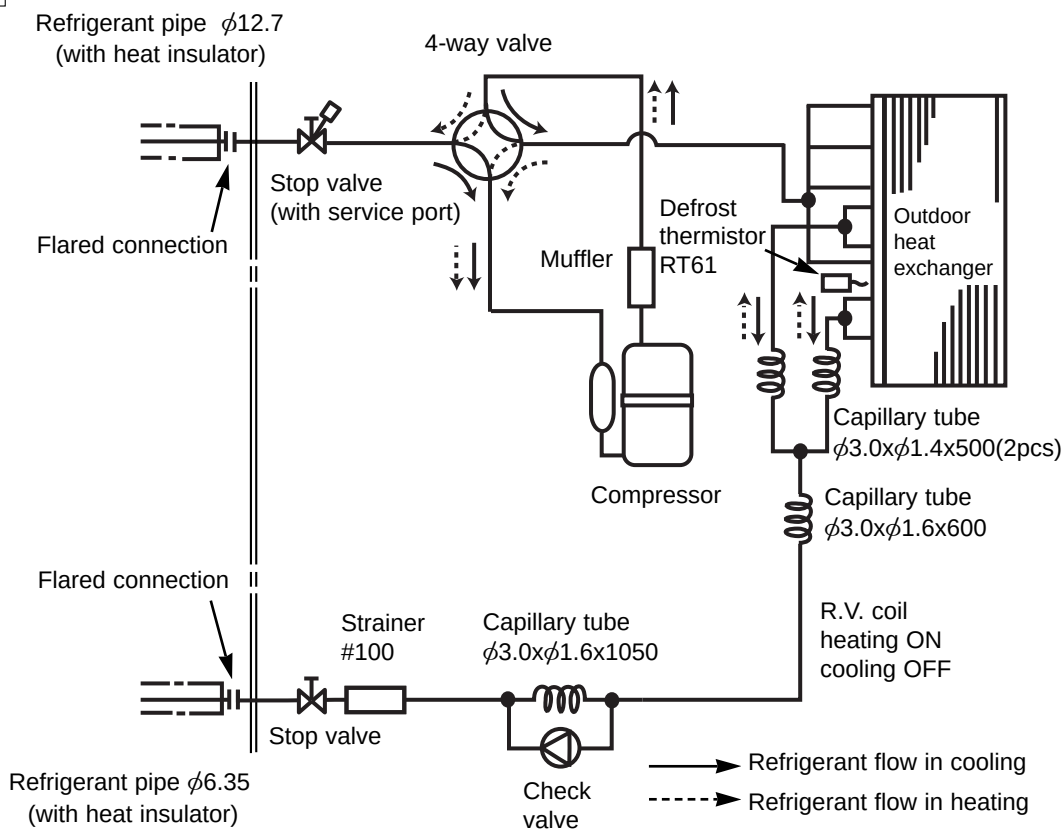
NOTES: 1.Use copper conductors only (For field wiring).
2.Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (3,N).
3.Symbols below indicate.
◎: Terminal block, □□□□: Connector

7 REFRIGERANT SYSTEM DIAGRAM

MUCFH-GA35VB -E1

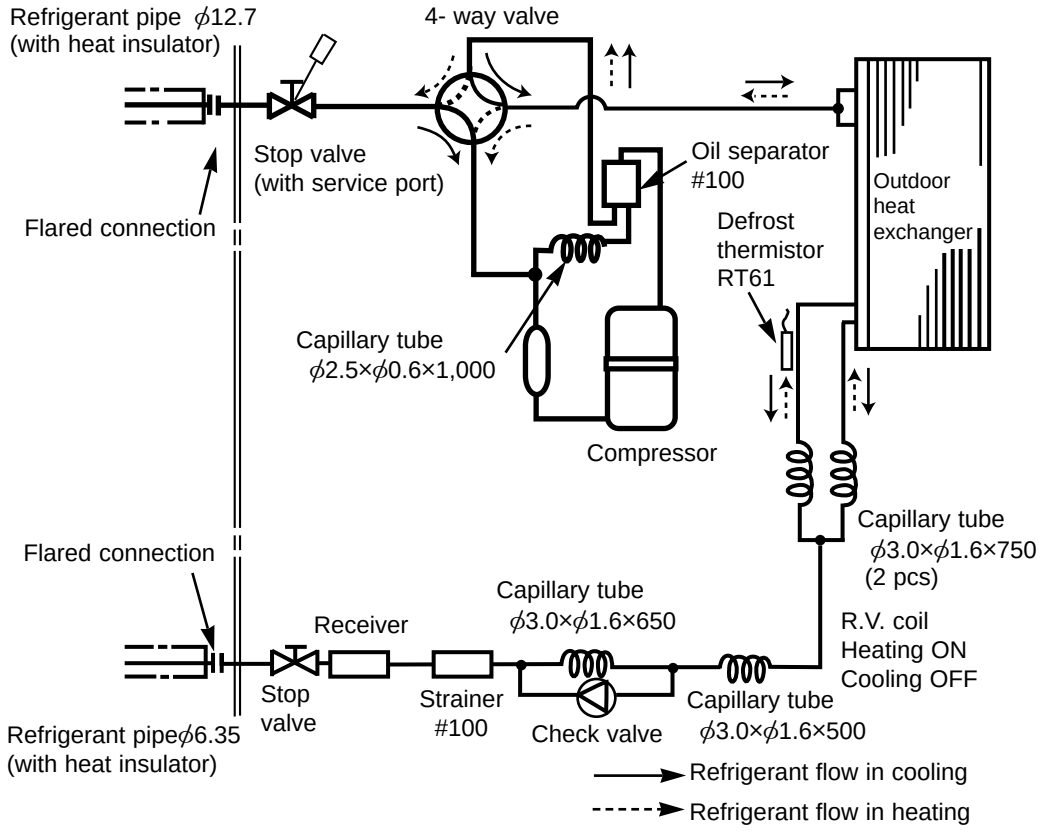
OUTDOOR UNIT

Unit:mm



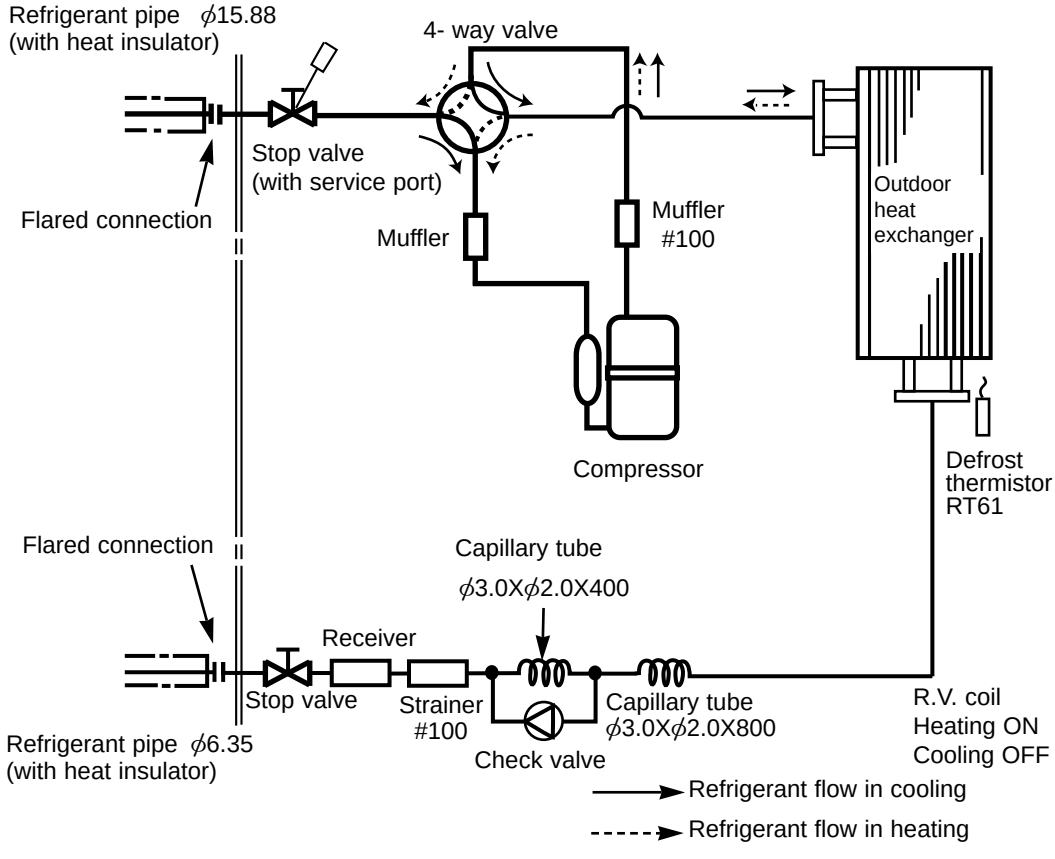
MUCFH-GA50VB -E1

OUTDOOR UNIT



MUCFH-GA60VB -E1

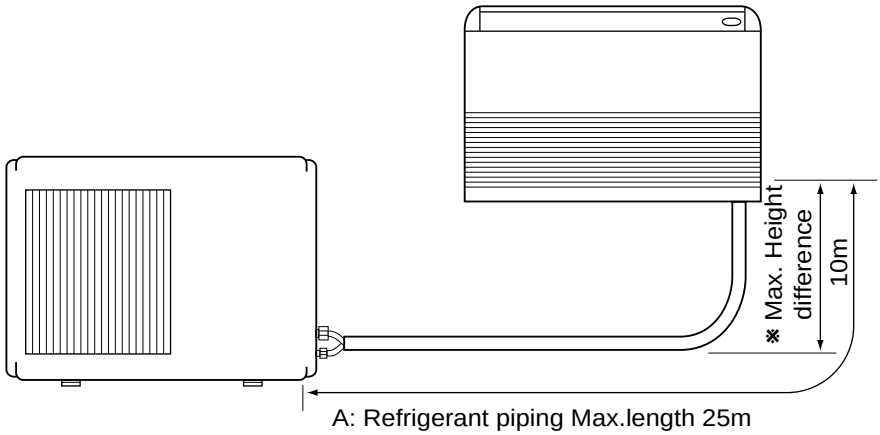
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH & MAX. HEIGHT DIFFERENCE

Model	Refrigerant piping MAX. length : m A	Piping size O.D. : mm	
		Gas	Liquid
MUCFH-GA35VB - E1	25	ϕ12.7	ϕ6.35
MUCFH-GA50VB - E1			
MUCFH-GA60VB - E1		ϕ15.88	

※It does not matter which unit is higher.



A: Refrigerant piping Max.length 25m

ADDITIONAL REFRIGERANT CHARGE (R410A : g)

If pipe length exceeds 7m, additional refrigerant (R410A) charge is required.

Models	Outdoor unit: precharged	Refrigerant piping length (one way)				
		7m	10m	15m	20m	25m
MUCFH-GA35VB - E1	1,000	0	60	160	260	360
MUCFH-GA50VB - E1	1,850					
MUCFH-GA60VB - E1	2,200					

Calculation : Xg = 20g/m X (Refrigerant piping length (m)-7)

8 PERFORMANCE CURVES

MUCFH-GA35VB -E1 MUCFH-GA50VB -E1 MUCFH-GA60VB -E1

The standard data contained in these specifications apply only to the operation of the air conditioner under normal condition. Operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

198~264V, 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

(3) MAIN READINGS

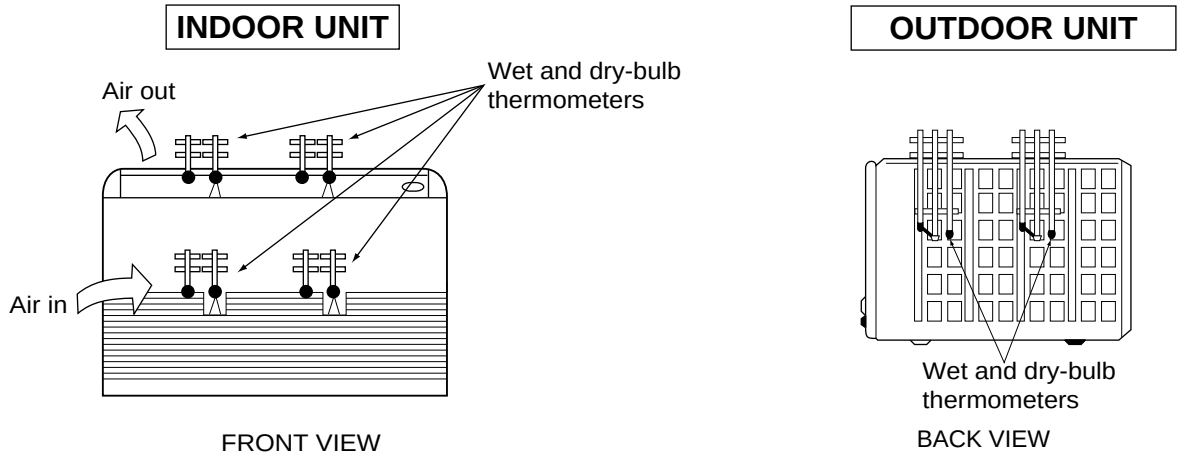
COOLING
(1) Indoor intake air wet-bulb temperature : ˚CWB
(2) Indoor outlet air wet-bulb temperature : ˚CWB
(3) Outdoor intake air dry-bulb temperature : ˚CDB
(4) Total input : W

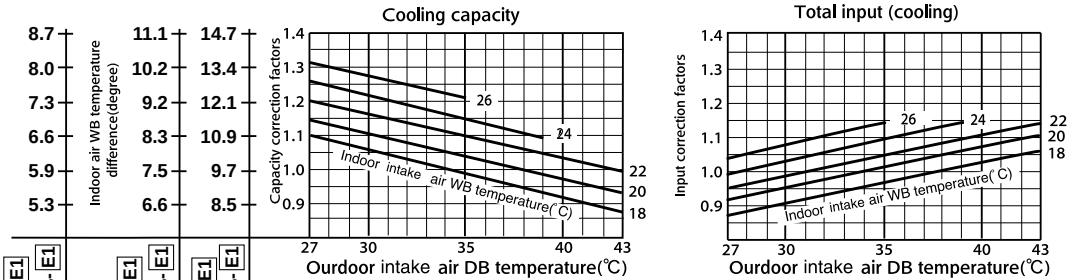
HEATING
(1) Indoor intake air dry-bulb temperature : ˚CDB
(2) Indoor outlet air dry-bulb temperature : ˚CDB
(3) Outdoor intake air wet-bulb temperature : ˚CWB
(4) Total input : W

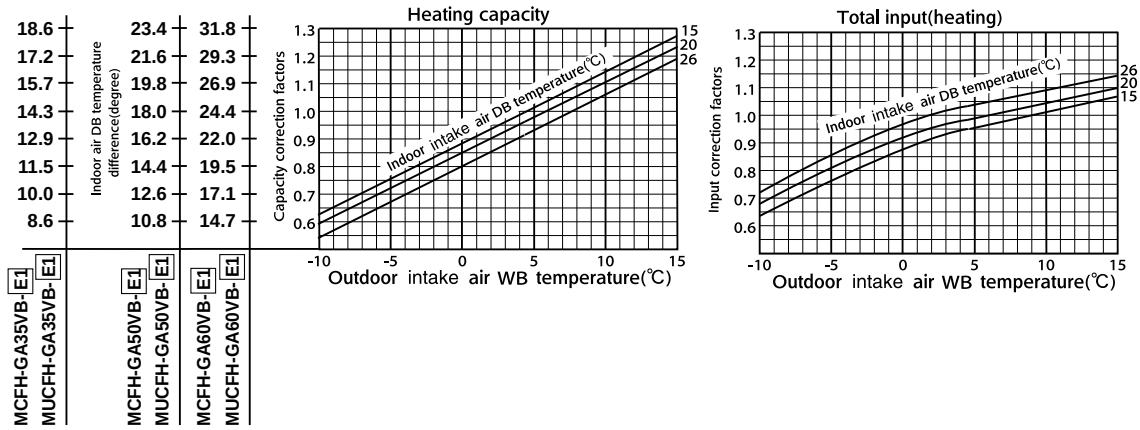
Indoor air wet/dry-bulb temperature difference on the left side of the chart on next page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb/dry-bulb temperature difference

1. Attach at least 2 sets of wet and dry-bulb thermometers to the indoor air inlet as shown in the figure, and at least 2 sets of wet and dry bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet and dry-bulb thermometers to the outdoor air inlet.
   Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of the room.
5. Press the EMERGENCY OPERATION switch once(twice) to start the EMERGENCY COOL(HEAT) MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.







OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

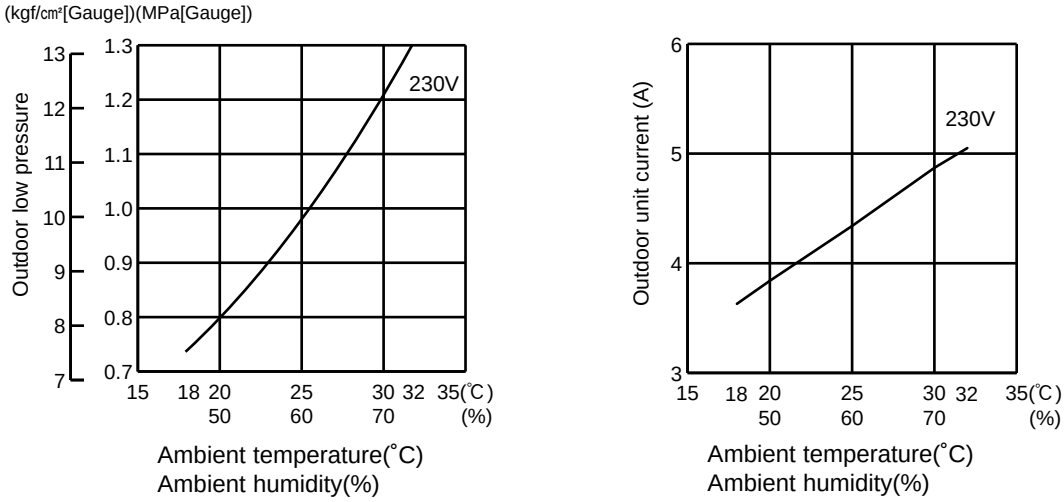
COOL operation

① Both indoor and outdoor units are under the same temperature/humidity condition.

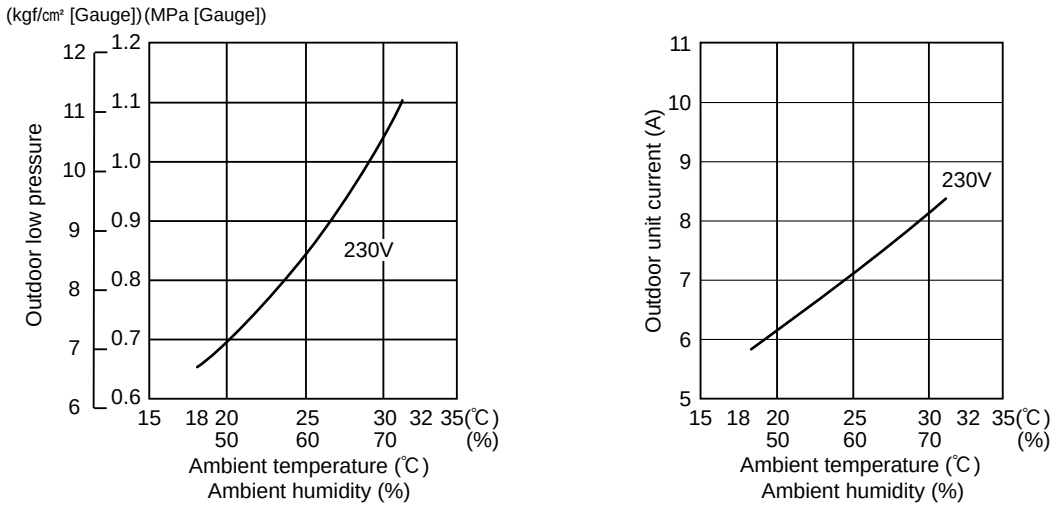
Dry Bulb temperature (˚C)	Relative humidity (%)
20	50
25	60
30	70

② Air flow should be set at MAX.
③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

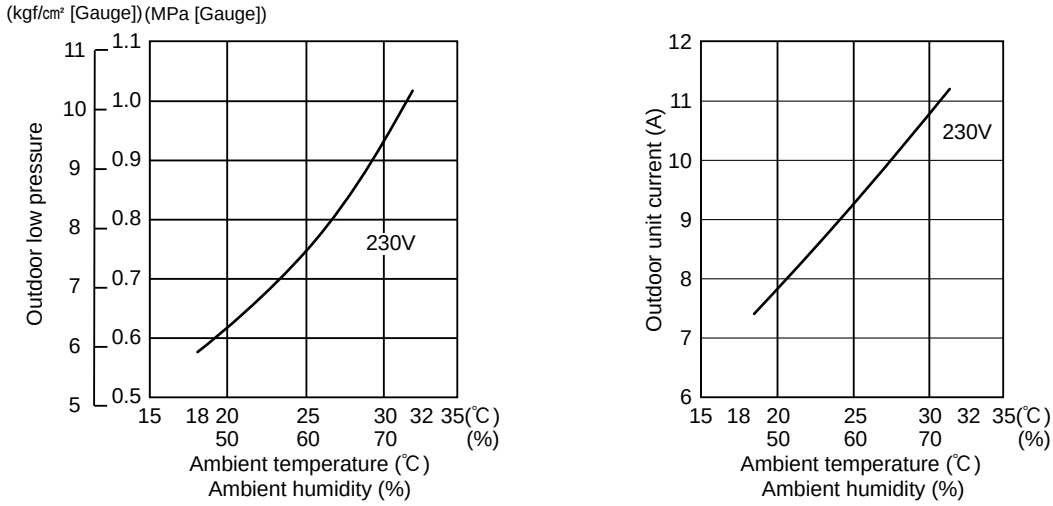
MUCFH-GA35VB- E1



MUCFH-GA50VB- E1



MUCFH-GA60VB- E1

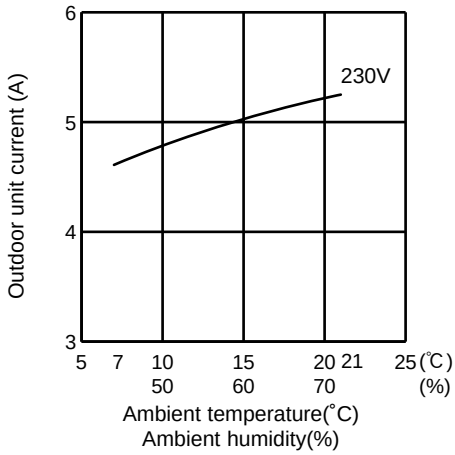


HEAT operation

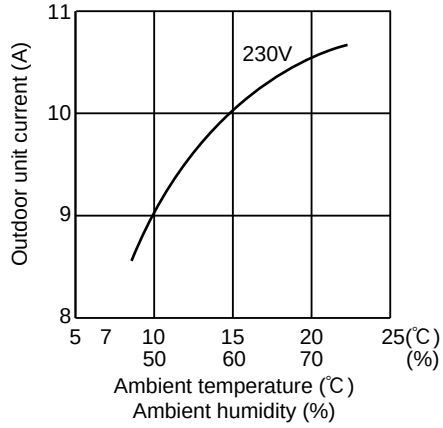
Condition Indoor : Dry bulb temerature 20.0℃
Wet bulb temerature 14.5℃

Outdoor : Dry bulb temerature 7,15,20℃
Wet bulb temerature 6,12,14.5℃

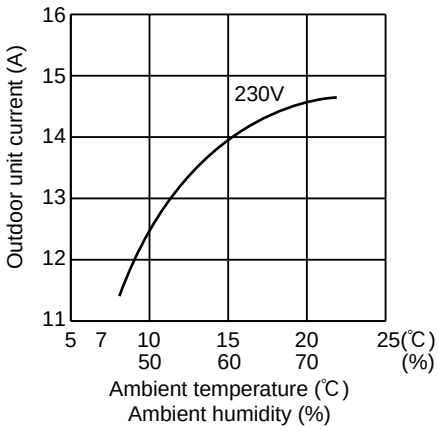
MUCFH-GA35VB- E1



MUCFH-GA50VB- E1



MUCFH-GA60VB- E1



PERFORMANCE DATA
COOL operation (230V)

MCFH-GA35VB -E1 : MUCFH-GA35VB -E1

CAPACITY :3.5(kW) SHF :0.70 INPUT :1160(W)

		OUTDOOR DB(℃)															
INDOOR DB(℃)	INDOOR WB(℃)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.11	2.14	0.52	928	3.94	2.05	0.52	974	3.78	1.97	0.52	1021	3.64	1.89	0.52	1067
21	20	4.29	1.72	0.40	974	4.11	1.65	0.40	1032	3.99	1.60	0.40	1056	3.85	1.54	0.40	1102
22	18	4.11	2.30	0.56	928	3.94	2.21	0.56	974	3.78	2.12	0.56	1021	3.64	2.04	0.56	1067
22	20	4.29	1.89	0.44	974	4.11	1.81	0.44	1032	3.99	1.76	0.44	1056	3.85	1.69	0.44	1102
22	22	4.46	1.43	0.32	1009	4.31	1.38	0.32	1073	4.20	1.34	0.32	1102	4.03	1.29	0.32	1148
23	18	4.11	2.47	0.60	928	3.94	2.36	0.60	974	3.78	2.27	0.60	1021	3.64	2.18	0.60	1067
23	20	4.29	2.06	0.48	974	4.11	1.97	0.48	1032	3.99	1.92	0.48	1056	3.85	1.85	0.48	1102
23	22	4.46	1.61	0.36	1009	4.31	1.55	0.36	1073	4.20	1.51	0.36	1102	4.03	1.45	0.36	1148
24	18	4.11	2.63	0.64	928	3.94	2.52	0.64	974	3.78	2.42	0.64	1021	3.64	2.33	0.64	1067
24	20	4.29	2.23	0.52	974	4.11	2.14	0.52	1032	3.99	2.07	0.52	1056	3.85	2.00	0.52	1102
24	22	4.46	1.79	0.40	1009	4.31	1.72	0.40	1073	4.20	1.68	0.40	1102	4.03	1.61	0.40	1148
24	24	4.69	1.31	0.28	1056	4.52	1.26	0.28	1114	4.41	1.23	0.28	1148	4.27	1.20	0.28	1206
25	18	4.11	2.80	0.68	928	3.94	2.68	0.68	974	3.78	2.57	0.68	1021	3.64	2.48	0.68	1067
25	20	4.29	2.40	0.56	974	4.11	2.30	0.56	1032	3.99	2.23	0.56	1056	3.85	2.16	0.56	1102
25	22	4.46	1.96	0.44	1009	4.31	1.89	0.44	1073	4.20	1.85	0.44	1102	4.03	1.77	0.44	1148
25	24	4.69	1.50	0.32	1056	4.52	1.44	0.32	1114	4.41	1.41	0.32	1148	4.27	1.37	0.32	1206
26	18	4.11	2.96	0.72	928	3.94	2.84	0.72	974	3.78	2.72	0.72	1021	3.64	2.62	0.72	1067
26	20	4.29	2.57	0.60	974	4.11	2.47	0.60	1032	3.99	2.39	0.60	1056	3.85	2.31	0.60	1102
26	22	4.46	2.14	0.48	1009	4.31	2.07	0.48	1073	4.20	2.02	0.48	1102	4.03	1.93	0.48	1148
26	24	4.69	1.69	0.36	1056	4.52	1.63	0.36	1114	4.41	1.59	0.36	1148	4.27	1.54	0.36	1206
26	26	4.83	1.16	0.24	1114	4.69	1.13	0.24	1172	4.62	1.11	0.24	1206	4.48	1.08	0.24	1241
27	18	4.11	3.13	0.76	928	3.94	2.99	0.76	974	3.78	2.87	0.76	1021	3.64	2.77	0.76	1067
27	20	4.29	2.74	0.64	974	4.11	2.63	0.64	1032	3.99	2.55	0.64	1056	3.85	2.46	0.64	1102
27	22	4.46	2.32	0.52	1009	4.31	2.24	0.52	1073	4.20	2.18	0.52	1102	4.03	2.09	0.52	1148
27	24	4.69	1.88	0.40	1056	4.52	1.81	0.40	1114	4.41	1.76	0.40	1148	4.27	1.71	0.40	1206
27	26	4.83	1.35	0.28	1114	4.69	1.31	0.28	1172	4.62	1.29	0.28	1206	4.48	1.25	0.28	1241
28	18	4.11	3.29	0.80	928	3.94	3.15	0.80	974	3.78	3.02	0.80	1021	3.64	2.91	0.80	1067
28	20	4.29	2.92	0.68	974	4.11	2.80	0.68	1032	3.99	2.71	0.68	1056	3.85	2.62	0.68	1102
28	22	4.46	2.50	0.56	1009	4.31	2.41	0.56	1073	4.20	2.35	0.56	1102	4.03	2.25	0.56	1148
28	24	4.69	2.06	0.44	1056	4.52	1.99	0.44	1114	4.41	1.94	0.44	1148	4.27	1.88	0.44	1206
28	26	4.83	1.55	0.32	1114	4.69	1.50	0.32	1172	4.62	1.48	0.32	1206	4.48	1.43	0.32	1241
29	18	4.11	3.45	0.84	928	3.94	3.31	0.84	974	3.78	3.18	0.84	1021	3.64	3.06	0.84	1067
29	20	4.29	3.09	0.72	974	4.11	2.96	0.72	1032	3.99	2.87	0.72	1056	3.85	2.77	0.72	1102
29	22	4.46	2.68	0.60	1009	4.31	2.58	0.60	1073	4.20	2.52	0.60	1102	4.03	2.42	0.60	1148
29	24	4.69	2.25	0.48	1056	4.52	2.17	0.48	1114	4.41	2.12	0.48	1148	4.27	2.05	0.48	1206
29	26	4.83	1.74	0.36	1114	4.69	1.69	0.36	1172	4.62	1.66	0.36	1206	4.48	1.61	0.36	1241
30	18	4.11	3.62	0.88	928	3.94	3.47	0.88	974	3.78	3.33	0.88	1021	3.64	3.20	0.88	1067
30	20	4.29	3.26	0.76	974	4.11	3.13	0.76	1032	3.99	3.03	0.76	1056	3.85	2.93	0.76	1102
30	22	4.46	2.86	0.64	1009	4.31	2.76	0.64	1073	4.20	2.69	0.64	1102	4.03	2.58	0.64	1148
30	24	4.69	2.44	0.52	1056	4.52	2.35	0.52	1114	4.41	2.29	0.52	1148	4.27	2.22	0.52	1206
30	26	4.83	1.93	0.40	1114	4.69	1.88	0.40	1172	4.62	1.85	0.40	1206	4.48	1.79	0.40	1241
31	18	4.11	3.78	0.92	928	3.94	3.62	0.92	974	3.78	3.48	0.92	1021	3.64	3.35	0.92	1067
31	20	4.29	3.43	0.80	974	4.11	3.29	0.80	1032	3.99	3.19	0.80	1056	3.85	3.08	0.80	1102
31	22	4.46	3.03	0.68	1009	4.31	2.93	0.68	1073	4.20	2.86	0.68	1102	4.03	2.74	0.68	1148
31	24	4.69	2.63	0.56	1056	4.52	2.53	0.56	1114	4.41	2.47	0.56	1148	4.27	2.39	0.56	1206
31	26	4.83	2.13	0.44	1114	4.69	2.06	0.44	1172	4.62	2.03	0.44	1206	4.48	1.97	0.44	1241
32	18	4.11	3.95	0.96	928	3.94	3.78	0.96	974	3.78	3.63	0.96	1021	3.64	3.49	0.96	1067
32	20	4.29	3.60	0.84	974	4.11	3.45	0.84	1032	3.99	3.35	0.84	1056	3.85	3.23	0.84	1102
32	22	4.46	3.21	0.72	1009	4.31	3.10	0.72	1073	4.20	3.02	0.72	1102	4.03	2.90	0.72	1148
32	24	4.69	2.81	0.60	1056	4.52	2.71	0.60	1114	4.41	2.65	0.60	1148	4.27	2.56	0.60	1206
32	26	4.83	2.32	0.48	1114	4.69	2.25	0.48	1172	4.62	2.22	0.48	1206	4.48	2.15	0.48	1241

NOTE Q :Total capacity (kW) SHF :Sensible heat factor DB :Dry-bulb temperature
SHC :Sensible heat capacity (kW) INPUT :Total power input (W) WB :Wet-bulb temperature

PERFORMANCE DATA
COOL operation (230V)
MCFH-GA35VB -E1 : MUCFH-GA35VB -E1
CAPACITY :3.5(kW) SHF :0.70 INPUT :1160(W)

		OUTDOOR DB(℃)											
INDOOR	INDOOR	35				40				43			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.43	1.78	0.52	1137	3.15	1.64	0.52	1206	3.03	1.57	0.52	1230
21	20	3.61	1.44	0.40	1183	3.36	1.34	0.40	1241	3.24	1.30	0.40	1276
22	18	3.43	1.92	0.56	1137	3.15	1.76	0.56	1206	3.03	1.70	0.56	1230
22	20	3.61	1.59	0.44	1183	3.36	1.48	0.44	1241	3.24	1.42	0.44	1276
22	22	3.82	1.22	0.32	1230	3.57	1.14	0.32	1299	3.45	1.10	0.32	1322
23	18	3.43	2.06	0.60	1137	3.15	1.89	0.60	1206	3.03	1.82	0.60	1230
23	20	3.61	1.73	0.48	1183	3.36	1.61	0.48	1241	3.24	1.55	0.48	1276
23	22	3.82	1.37	0.36	1230	3.57	1.29	0.36	1299	3.45	1.24	0.36	1322
24	18	3.43	2.20	0.64	1137	3.15	2.02	0.64	1206	3.03	1.94	0.64	1230
24	20	3.61	1.87	0.52	1183	3.36	1.75	0.52	1241	3.24	1.68	0.52	1276
24	22	3.82	1.53	0.40	1230	3.57	1.43	0.40	1299	3.45	1.38	0.40	1322
24	24	4.03	1.13	0.28	1276	3.78	1.06	0.28	1334	3.68	1.03	0.28	1363
25	18	3.43	2.33	0.68	1137	3.15	2.14	0.68	1206	3.03	2.06	0.68	1230
25	20	3.61	2.02	0.56	1183	3.36	1.88	0.56	1241	3.24	1.81	0.56	1276
25	22	3.82	1.68	0.44	1230	3.57	1.57	0.44	1299	3.45	1.52	0.44	1322
25	24	4.03	1.29	0.32	1276	3.78	1.21	0.32	1334	3.68	1.18	0.32	1363
26	18	3.43	2.47	0.72	1137	3.15	2.27	0.72	1206	3.03	2.18	0.72	1230
26	20	3.61	2.16	0.60	1183	3.36	2.02	0.60	1241	3.24	1.94	0.60	1276
26	22	3.82	1.83	0.48	1230	3.57	1.71	0.48	1299	3.45	1.65	0.48	1322
26	24	4.03	1.45	0.36	1276	3.78	1.36	0.36	1334	3.68	1.32	0.36	1363
26	26	4.24	1.02	0.24	1322	3.99	0.96	0.24	1380	3.87	0.93	0.24	1409
27	18	3.43	2.61	0.76	1137	3.15	2.39	0.76	1206	3.03	2.30	0.76	1230
27	20	3.61	2.31	0.64	1183	3.36	2.15	0.64	1241	3.24	2.07	0.64	1276
27	22	3.82	1.98	0.52	1230	3.57	1.86	0.52	1299	3.45	1.79	0.52	1322
27	24	4.03	1.61	0.40	1276	3.78	1.51	0.40	1334	3.68	1.47	0.40	1363
27	26	4.24	1.19	0.28	1322	3.99	1.12	0.28	1380	3.87	1.08	0.28	1409
28	18	3.43	2.74	0.80	1137	3.15	2.52	0.80	1206	3.03	2.42	0.80	1230
28	20	3.61	2.45	0.68	1183	3.36	2.28	0.68	1241	3.24	2.20	0.68	1276
28	22	3.82	2.14	0.56	1230	3.57	2.00	0.56	1299	3.45	1.93	0.56	1322
28	24	4.03	1.77	0.44	1276	3.78	1.66	0.44	1334	3.68	1.62	0.44	1363
28	26	4.24	1.36	0.32	1322	3.99	1.28	0.32	1380	3.87	1.24	0.32	1409
29	18	3.43	2.88	0.84	1137	3.15	2.65	0.84	1206	3.03	2.54	0.84	1230
29	20	3.61	2.60	0.72	1183	3.36	2.42	0.72	1241	3.24	2.33	0.72	1276
29	22	3.82	2.29	0.60	1230	3.57	2.14	0.60	1299	3.45	2.07	0.60	1322
29	24	4.03	1.93	0.48	1276	3.78	1.81	0.48	1334	3.68	1.76	0.48	1363
29	26	4.24	1.52	0.36	1322	3.99	1.44	0.36	1380	3.87	1.39	0.36	1409
30	18	3.43	3.02	0.88	1137	3.15	2.77	0.88	1206	3.03	2.66	0.88	1230
30	20	3.61	2.74	0.76	1183	3.36	2.55	0.76	1241	3.24	2.46	0.76	1276
30	22	3.82	2.44	0.64	1230	3.57	2.28	0.64	1299	3.45	2.21	0.64	1322
30	24	4.03	2.09	0.52	1276	3.78	1.97	0.52	1334	3.68	1.91	0.52	1363
30	26	4.24	1.69	0.40	1322	3.99	1.60	0.40	1380	3.87	1.55	0.40	1409
31	18	3.43	3.16	0.92	1137	3.15	2.90	0.92	1206	3.03	2.79	0.92	1230
31	20	3.61	2.88	0.80	1183	3.36	2.69	0.80	1241	3.24	2.59	0.80	1276
31	22	3.82	2.59	0.68	1230	3.57	2.43	0.68	1299	3.45	2.34	0.68	1322
31	24	4.03	2.25	0.56	1276	3.78	2.12	0.56	1334	3.68	2.06	0.56	1363
31	26	4.24	1.86	0.44	1322	3.99	1.76	0.44	1380	3.87	1.70	0.44	1409
32	18	3.43	3.29	0.96	1137	3.15	3.02	0.96	1206	3.03	2.91	0.96	1230
32	20	3.61	3.03	0.84	1183	3.36	2.82	0.84	1241	3.24	2.72	0.84	1276
32	22	3.82	2.75	0.72	1230	3.57	2.57	0.72	1299	3.45	2.48	0.72	1322
32	24	4.03	2.42	0.60	1276	3.78	2.27	0.60	1334	3.68	2.21	0.60	1363
32	26	4.24	2.03	0.48	1322	3.99	1.92	0.48	1380	3.87	1.86	0.48	1409

NOTE Q :Total capacity (kW) SHF :Sensible heat factor DB :Dry-bulb temperature
SHC :Sensible heat capacity (kW) INPUT :Total power input (W) WB :Wet-bulb temperature

PERFORMANCE DATA COOL operation(230V)

MCFH-GA50VB -E1 : MUCFH-GA50VB -E1

CAPACITY :4.8(kW) SHF :0.65 INPUT :1810(W)

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	5.64	2.65	0.47	1448	5.40	2.54	0.47	1520	5.18	2.44	0.47	1593	4.99	2.35	0.47	1665
21	20	5.88	2.06	0.35	1520	5.64	1.97	0.35	1611	5.47	1.92	0.35	1647	5.28	1.85	0.35	1720
22	18	5.64	2.88	0.51	1448	5.40	2.75	0.51	1520	5.18	2.64	0.51	1593	4.99	2.55	0.51	1665
22	20	5.88	2.29	0.39	1520	5.64	2.20	0.39	1611	5.47	2.13	0.39	1647	5.28	2.06	0.39	1720
22	22	6.12	1.65	0.27	1575	5.90	1.59	0.27	1674	5.76	1.56	0.27	1720	5.52	1.49	0.27	1792
23	18	5.64	3.10	0.55	1448	5.40	2.97	0.55	1520	5.18	2.85	0.55	1593	4.99	2.75	0.55	1665
23	20	5.88	2.53	0.43	1520	5.64	2.43	0.43	1611	5.47	2.35	0.43	1647	5.28	2.27	0.43	1720
23	22	6.12	1.90	0.31	1575	5.90	1.83	0.31	1674	5.76	1.79	0.31	1720	5.52	1.71	0.31	1792
24	18	5.64	3.33	0.59	1448	5.40	3.19	0.59	1520	5.18	3.06	0.59	1593	4.99	2.95	0.59	1665
24	20	5.88	2.76	0.47	1520	5.64	2.65	0.47	1611	5.47	2.57	0.47	1647	5.28	2.48	0.47	1720
24	22	6.12	2.14	0.35	1575	5.90	2.07	0.35	1674	5.76	2.02	0.35	1720	5.52	1.93	0.35	1792
24	24	6.43	1.48	0.23	1647	6.19	1.42	0.23	1738	6.05	1.39	0.23	1792	5.86	1.35	0.23	1882
25	18	5.64	3.55	0.63	1448	5.40	3.40	0.63	1520	5.18	3.27	0.63	1593	4.99	3.14	0.63	1665
25	20	5.88	3.00	0.51	1520	5.64	2.88	0.51	1611	5.47	2.79	0.51	1647	5.28	2.69	0.51	1720
25	22	6.12	2.39	0.39	1575	5.90	2.30	0.39	1674	5.76	2.25	0.39	1720	5.52	2.15	0.39	1792
25	24	6.43	1.74	0.27	1647	6.19	1.67	0.27	1738	6.05	1.63	0.27	1792	5.86	1.58	0.27	1882
26	18	5.64	3.78	0.67	1448	5.40	3.62	0.67	1520	5.18	3.47	0.67	1593	4.99	3.34	0.67	1665
26	20	5.88	3.23	0.55	1520	5.64	3.10	0.55	1611	5.47	3.01	0.55	1647	5.28	2.90	0.55	1720
26	22	6.12	2.63	0.43	1575	5.90	2.54	0.43	1674	5.76	2.48	0.43	1720	5.52	2.37	0.43	1792
26	24	6.43	1.99	0.31	1647	6.19	1.92	0.31	1738	6.05	1.87	0.31	1792	5.86	1.82	0.31	1882
26	26	6.62	1.26	0.19	1738	6.43	1.22	0.19	1828	6.34	1.20	0.19	1882	6.14	1.17	0.19	1937
27	18	5.64	4.00	0.71	1448	5.40	3.83	0.71	1520	5.18	3.68	0.71	1593	4.99	3.54	0.71	1665
27	20	5.88	3.47	0.59	1520	5.64	3.33	0.59	1611	5.47	3.23	0.59	1647	5.28	3.12	0.59	1720
27	22	6.12	2.88	0.47	1575	5.90	2.77	0.47	1674	5.76	2.71	0.47	1720	5.52	2.59	0.47	1792
27	24	6.43	2.25	0.35	1647	6.19	2.17	0.35	1738	6.05	2.12	0.35	1792	5.86	2.05	0.35	1882
27	26	6.62	1.52	0.23	1738	6.43	1.48	0.23	1828	6.34	1.46	0.23	1882	6.14	1.41	0.23	1937
28	18	5.64	4.23	0.75	1448	5.40	4.05	0.75	1520	5.18	3.89	0.75	1593	4.99	3.74	0.75	1665
28	20	5.88	3.70	0.63	1520	5.64	3.55	0.63	1611	5.47	3.45	0.63	1647	5.28	3.33	0.63	1720
28	22	6.12	3.12	0.51	1575	5.90	3.01	0.51	1674	5.76	2.94	0.51	1720	5.52	2.82	0.51	1792
28	24	6.43	2.51	0.39	1647	6.19	2.41	0.39	1738	6.05	2.36	0.39	1792	5.86	2.28	0.39	1882
28	26	6.62	1.79	0.27	1738	6.43	1.74	0.27	1828	6.34	1.71	0.27	1882	6.14	1.66	0.27	1937
29	18	5.64	4.46	0.79	1448	5.40	4.27	0.79	1520	5.18	4.10	0.79	1593	4.99	3.94	0.79	1665
29	20	5.88	3.94	0.67	1520	5.64	3.78	0.67	1611	5.47	3.67	0.67	1647	5.28	3.54	0.67	1720
29	22	6.12	3.37	0.55	1575	5.90	3.25	0.55	1674	5.76	3.17	0.55	1720	5.52	3.04	0.55	1792
29	24	6.43	2.77	0.43	1647	6.19	2.66	0.43	1738	6.05	2.60	0.43	1792	5.86	2.52	0.43	1882
29	26	6.62	2.05	0.31	1738	6.43	1.99	0.31	1828	6.34	1.96	0.31	1882	6.14	1.90	0.31	1937
30	18	5.64	4.68	0.83	1448	5.40	4.48	0.83	1520	5.18	4.30	0.83	1593	4.99	4.14	0.83	1665
30	20	5.88	4.17	0.71	1520	5.64	4.00	0.71	1611	5.47	3.89	0.71	1647	5.28	3.75	0.71	1720
30	22	6.12	3.61	0.59	1575	5.90	3.48	0.59	1674	5.76	3.40	0.59	1720	5.52	3.26	0.59	1792
30	24	6.43	3.02	0.47	1647	6.19	2.91	0.47	1738	6.05	2.84	0.47	1792	5.86	2.75	0.47	1882
30	26	6.62	2.32	0.35	1738	6.43	2.25	0.35	1828	6.34	2.22	0.35	1882	6.14	2.15	0.35	1937
31	18	5.64	4.91	0.87	1448	5.40	4.70	0.87	1520	5.18	4.51	0.87	1593	4.99	4.34	0.87	1665
31	20	5.88	4.41	0.75	1520	5.64	4.23	0.75	1611	5.47	4.10	0.75	1647	5.28	3.96	0.75	1720
31	22	6.12	3.86	0.63	1575	5.90	3.72	0.63	1674	5.76	3.63	0.63	1720	5.52	3.48	0.63	1792
31	24	6.43	3.28	0.51	1647	6.19	3.16	0.51	1738	6.05	3.08	0.51	1792	5.86	2.99	0.51	1882
31	26	6.62	2.58	0.39	1738	6.43	2.51	0.39	1828	6.34	2.47	0.39	1882	6.14	2.40	0.39	1937
32	18	5.64	5.13	0.91	1448	5.40	4.91	0.91	1520	5.18	4.72	0.91	1593	4.99	4.54	0.91	1665
32	20	5.88	4.65	0.79	1520	5.64	4.46	0.79	1611	5.47	4.32	0.79	1647	5.28	4.17	0.79	1720
32	22	6.12	4.10	0.67	1575	5.90	3.96	0.67	1674	5.76	3.86	0.67	1720	5.52	3.70	0.67	1792
32	24	6.43	3.54	0.55	1647	6.19	3.41	0.55	1738	6.05	3.33	0.55	1792	5.86	3.22	0.55	1882
32	26	6.62	2.85	0.43	1738	6.43	2.77	0.43	1828	6.34	2.72	0.43	1882	6.14	2.64	0.43	1937

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation(230V)

MCFH-GA50VB -E1 : MUCFH-GA50VB -E1

CAPACITY :4.8(kW) SHF :0.65 INPUT :1810(W)

		OUTDOOR DB(℃)											
INDOOR DB(℃)	INDOOR WB(℃)	35				40				43			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.70	2.21	0.47	1774	4.32	2.03	0.47	1882	4.15	1.95	0.47	1919
21	20	4.94	1.73	0.35	1846	4.61	1.61	0.35	1937	4.44	1.55	0.35	1991
22	18	4.70	2.40	0.51	1774	4.32	2.20	0.51	1882	4.15	2.12	0.51	1919
22	20	4.94	1.93	0.39	1846	4.61	1.80	0.39	1937	4.44	1.73	0.39	1991
22	22	5.23	1.41	0.27	1919	4.90	1.32	0.27	2027	4.73	1.28	0.27	2063
23	18	4.70	2.59	0.55	1774	4.32	2.38	0.55	1882	4.15	2.28	0.55	1919
23	20	4.94	2.13	0.43	1846	4.61	1.98	0.43	1937	4.44	1.91	0.43	1991
23	22	5.23	1.62	0.31	1919	4.90	1.52	0.31	2027	4.73	1.47	0.31	2063
24	18	4.70	2.78	0.59	1774	4.32	2.55	0.59	1882	4.15	2.45	0.59	1919
24	20	4.94	2.32	0.47	1846	4.61	2.17	0.47	1937	4.44	2.09	0.47	1991
24	22	5.23	1.83	0.35	1919	4.90	1.71	0.35	2027	4.73	1.65	0.35	2063
24	24	5.52	1.27	0.23	1991	5.18	1.19	0.23	2082	5.04	1.16	0.23	2127
25	18	4.70	2.96	0.63	1774	4.32	2.72	0.63	1882	4.15	2.62	0.63	1919
25	20	4.94	2.52	0.51	1846	4.61	2.35	0.51	1937	4.44	2.26	0.51	1991
25	22	5.23	2.04	0.39	1919	4.90	1.91	0.39	2027	4.73	1.84	0.39	2063
25	24	5.52	1.49	0.27	1991	5.18	1.40	0.27	2082	5.04	1.36	0.27	2127
26	18	4.70	3.15	0.67	1774	4.32	2.89	0.67	1882	4.15	2.78	0.67	1919
26	20	4.94	2.72	0.55	1846	4.61	2.53	0.55	1937	4.44	2.44	0.55	1991
26	22	5.23	2.25	0.43	1919	4.90	2.11	0.43	2027	4.73	2.03	0.43	2063
26	24	5.52	1.71	0.31	1991	5.18	1.61	0.31	2082	5.04	1.56	0.31	2127
26	26	5.81	1.10	0.19	2063	5.47	1.04	0.19	2154	5.30	1.01	0.19	2199
27	18	4.70	3.34	0.71	1774	4.32	3.07	0.71	1882	4.15	2.95	0.71	1919
27	20	4.94	2.92	0.59	1846	4.61	2.72	0.59	1937	4.44	2.62	0.59	1991
27	22	5.23	2.46	0.47	1919	4.90	2.30	0.47	2027	4.73	2.22	0.47	2063
27	24	5.52	1.93	0.35	1991	5.18	1.81	0.35	2082	5.04	1.76	0.35	2127
27	26	5.81	1.34	0.23	2063	5.47	1.26	0.23	2154	5.30	1.22	0.23	2199
28	18	4.70	3.53	0.75	1774	4.32	3.24	0.75	1882	4.15	3.11	0.75	1919
28	20	4.94	3.11	0.63	1846	4.61	2.90	0.63	1937	4.44	2.80	0.63	1991
28	22	5.23	2.67	0.51	1919	4.90	2.50	0.51	2027	4.73	2.41	0.51	2063
28	24	5.52	2.15	0.39	1991	5.18	2.02	0.39	2082	5.04	1.97	0.39	2127
28	26	5.81	1.57	0.27	2063	5.47	1.48	0.27	2154	5.30	1.43	0.27	2199
29	18	4.70	3.72	0.79	1774	4.32	3.41	0.79	1882	4.15	3.28	0.79	1919
29	20	4.94	3.31	0.67	1846	4.61	3.09	0.67	1937	4.44	2.97	0.67	1991
29	22	5.23	2.88	0.55	1919	4.90	2.69	0.55	2027	4.73	2.60	0.55	2063
29	24	5.52	2.37	0.43	1991	5.18	2.23	0.43	2082	5.04	2.17	0.43	2127
29	26	5.81	1.80	0.31	2063	5.47	1.70	0.31	2154	5.30	1.64	0.31	2199
30	18	4.70	3.90	0.83	1774	4.32	3.59	0.83	1882	4.15	3.45	0.83	1919
30	20	4.94	3.51	0.71	1846	4.61	3.27	0.71	1937	4.44	3.15	0.71	1991
30	22	5.23	3.09	0.59	1919	4.90	2.89	0.59	2027	4.73	2.79	0.59	2063
30	24	5.52	2.59	0.47	1991	5.18	2.44	0.47	2082	5.04	2.37	0.47	2127
30	26	5.81	2.03	0.35	2063	5.47	1.92	0.35	2154	5.30	1.86	0.35	2199
31	18	4.70	4.09	0.87	1774	4.32	3.76	0.87	1882	4.15	3.61	0.87	1919
31	20	4.94	3.71	0.75	1846	4.61	3.46	0.75	1937	4.44	3.33	0.75	1991
31	22	5.23	3.30	0.63	1919	4.90	3.08	0.63	2027	4.73	2.98	0.63	2063
31	24	5.52	2.82	0.51	1991	5.18	2.64	0.51	2082	5.04	2.57	0.51	2127
31	26	5.81	2.27	0.39	2063	5.47	2.13	0.39	2154	5.30	2.07	0.39	2199
32	18	4.70	4.28	0.91	1774	4.32	3.93	0.91	1882	4.15	3.78	0.91	1919
32	20	4.94	3.91	0.79	1846	4.61	3.64	0.79	1937	4.44	3.51	0.79	1991
32	22	5.23	3.51	0.67	1919	4.90	3.28	0.67	2027	4.73	3.17	0.67	2063
32	24	5.52	3.04	0.55	1991	5.18	2.85	0.55	2082	5.04	2.77	0.55	2127
32	26	5.81	2.50	0.43	2063	5.47	2.35	0.43	2154	5.30	2.28	0.43	2199

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation(230V)

MCFH-GA60VB -E1 : MUCFH-GA60VB -E1

CAPACITY :6.0(kW) SHF :0.64 INPUT :2450(W)

		OUTDOOR DB(℃)															
INDOOR DB(℃)	INDOOR WB(℃)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	7.05	3.24	0.46	1960	6.75	3.11	0.46	2058	6.48	2.98	0.46	2156	6.24	2.87	0.46	2254
21	20	7.35	2.50	0.34	2058	7.05	2.40	0.34	2181	6.84	2.33	0.34	2230	6.60	2.24	0.34	2328
22	18	7.05	3.53	0.50	1960	6.75	3.38	0.50	2058	6.48	3.24	0.50	2156	6.24	3.12	0.50	2254
22	20	7.35	2.79	0.38	2058	7.05	2.68	0.38	2181	6.84	2.60	0.38	2230	6.60	2.51	0.38	2328
22	22	7.65	1.99	0.26	2132	7.38	1.92	0.26	2266	7.20	1.87	0.26	2328	6.90	1.79	0.26	2426
23	18	7.05	3.81	0.54	1960	6.75	3.65	0.54	2058	6.48	3.50	0.54	2156	6.24	3.37	0.54	2254
23	20	7.35	3.09	0.42	2058	7.05	2.96	0.42	2181	6.84	2.87	0.42	2230	6.60	2.77	0.42	2328
23	22	7.65	2.30	0.30	2132	7.38	2.21	0.30	2266	7.20	2.16	0.30	2328	6.90	2.07	0.30	2426
24	18	7.05	4.09	0.58	1960	6.75	3.92	0.58	2058	6.48	3.76	0.58	2156	6.24	3.62	0.58	2254
24	20	7.35	3.38	0.46	2058	7.05	3.24	0.46	2181	6.84	3.15	0.46	2230	6.60	3.04	0.46	2328
24	22	7.65	2.60	0.34	2132	7.38	2.51	0.34	2266	7.20	2.45	0.34	2328	6.90	2.35	0.34	2426
24	24	8.04	1.77	0.22	2230	7.74	1.70	0.22	2352	7.56	1.66	0.22	2426	7.32	1.61	0.22	2548
25	18	7.05	4.37	0.62	1960	6.75	4.19	0.62	2058	6.48	4.02	0.62	2156	6.24	3.87	0.62	2254
25	20	7.35	3.68	0.50	2058	7.05	3.53	0.50	2181	6.84	3.42	0.50	2230	6.60	3.30	0.50	2328
25	22	7.65	2.91	0.38	2132	7.38	2.80	0.38	2266	7.20	2.74	0.38	2328	6.90	2.62	0.38	2426
25	24	8.04	2.09	0.26	2230	7.74	2.01	0.26	2352	7.56	1.97	0.26	2426	7.32	1.90	0.26	2548
26	18	7.05	4.65	0.66	1960	6.75	4.46	0.66	2058	6.48	4.28	0.66	2156	6.24	4.12	0.66	2254
26	20	7.35	3.97	0.54	2058	7.05	3.81	0.54	2181	6.84	3.69	0.54	2230	6.60	3.56	0.54	2328
26	22	7.65	3.21	0.42	2132	7.38	3.10	0.42	2266	7.20	3.02	0.42	2328	6.90	2.90	0.42	2426
26	24	8.04	2.41	0.30	2230	7.74	2.32	0.30	2352	7.56	2.27	0.30	2426	7.32	2.20	0.30	2548
26	26	8.28	1.49	0.18	2352	8.04	1.45	0.18	2475	7.92	1.43	0.18	2548	7.68	1.38	0.18	2622
27	18	7.05	4.94	0.70	1960	6.75	4.73	0.70	2058	6.48	4.54	0.70	2156	6.24	4.37	0.70	2254
27	20	7.35	4.26	0.58	2058	7.05	4.09	0.58	2181	6.84	3.97	0.58	2230	6.60	3.83	0.58	2328
27	22	7.65	3.52	0.46	2132	7.38	3.39	0.46	2266	7.20	3.31	0.46	2328	6.90	3.17	0.46	2426
27	24	8.04	2.73	0.34	2230	7.74	2.63	0.34	2352	7.56	2.57	0.34	2426	7.32	2.49	0.34	2548
27	26	8.28	1.82	0.22	2352	8.04	1.77	0.22	2475	7.92	1.74	0.22	2548	7.68	1.69	0.22	2622
28	18	7.05	5.22	0.74	1960	6.75	5.00	0.74	2058	6.48	4.80	0.74	2156	6.24	4.62	0.74	2254
28	20	7.35	4.56	0.62	2058	7.05	4.37	0.62	2181	6.84	4.24	0.62	2230	6.60	4.09	0.62	2328
28	22	7.65	3.83	0.50	2132	7.38	3.69	0.50	2266	7.20	3.60	0.50	2328	6.90	3.45	0.50	2426
28	24	8.04	3.06	0.38	2230	7.74	2.94	0.38	2352	7.56	2.87	0.38	2426	7.32	2.78	0.38	2548
28	26	8.28	2.15	0.26	2352	8.04	2.09	0.26	2475	7.92	2.06	0.26	2548	7.68	2.00	0.26	2622
29	18	7.05	5.50	0.78	1960	6.75	5.27	0.78	2058	6.48	5.05	0.78	2156	6.24	4.87	0.78	2254
29	20	7.35	4.85	0.66	2058	7.05	4.65	0.66	2181	6.84	4.51	0.66	2230	6.60	4.36	0.66	2328
29	22	7.65	4.13	0.54	2132	7.38	3.99	0.54	2266	7.20	3.89	0.54	2328	6.90	3.73	0.54	2426
29	24	8.04	3.38	0.42	2230	7.74	3.25	0.42	2352	7.56	3.18	0.42	2426	7.32	3.07	0.42	2548
29	26	8.28	2.48	0.30	2352	8.04	2.41	0.30	2475	7.92	2.38	0.30	2548	7.68	2.30	0.30	2622
30	18	7.05	5.78	0.82	1960	6.75	5.54	0.82	2058	6.48	5.31	0.82	2156	6.24	5.12	0.82	2254
30	20	7.35	5.15	0.70	2058	7.05	4.94	0.70	2181	6.84	4.79	0.70	2230	6.60	4.62	0.70	2328
30	22	7.65	4.44	0.58	2132	7.38	4.28	0.58	2266	7.20	4.18	0.58	2328	6.90	4.00	0.58	2426
30	24	8.04	3.70	0.46	2230	7.74	3.56	0.46	2352	7.56	3.48	0.46	2426	7.32	3.37	0.46	2548
30	26	8.28	2.82	0.34	2352	8.04	2.73	0.34	2475	7.92	2.69	0.34	2548	7.68	2.61	0.34	2622
31	18	7.05	6.06	0.86	1960	6.75	5.81	0.86	2058	6.48	5.57	0.86	2156	6.24	5.37	0.86	2254
31	20	7.35	5.44	0.74	2058	7.05	5.22	0.74	2181	6.84	5.06	0.74	2230	6.60	4.88	0.74	2328
31	22	7.65	4.74	0.62	2132	7.38	4.58	0.62	2266	7.20	4.46	0.62	2328	6.90	4.28	0.62	2426
31	24	8.04	4.02	0.50	2230	7.74	3.87	0.50	2352	7.56	3.78	0.50	2426	7.32	3.66	0.50	2548
31	26	8.28	3.15	0.38	2352	8.04	3.06	0.38	2475	7.92	3.01	0.38	2548	7.68	2.92	0.38	2622
32	18	7.05	6.35	0.90	1960	6.75	6.08	0.90	2058	6.48	5.83	0.90	2156	6.24	5.62	0.90	2254
32	20	7.35	5.73	0.78	2058	7.05	5.50	0.78	2181	6.84	5.34	0.78	2230	6.60	5.15	0.78	2328
32	22	7.65	5.05	0.66	2132	7.38	4.87	0.66	2266	7.20	4.75	0.66	2328	6.90	4.55	0.66	2426
32	24	8.04	4.34	0.54	2230	7.74	4.18	0.54	2352	7.56	4.08	0.54	2426	7.32	3.95	0.54	2548
32	26	8.28	3.48	0.42	2352	8.04	3.38	0.42	2475	7.92	3.33	0.42	2548	7.68	3.23	0.42	2622

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation(230V)

MCFH-GA60VB -E1 : MUCFH-GA60VB -E1

CAPACITY :6.0(kW) SHF :0.64 INPUT :2450(W)

		OUTDOOR DB(℃)											
INDOOR DB(℃)	INDOOR WB(℃)	35				40				43			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	5.88	2.70	0.46	2401	5.40	2.48	0.46	2548	5.19	2.39	0.46	2597
21	20	6.18	2.10	0.34	2499	5.76	1.96	0.34	2622	5.55	1.89	0.34	2695
22	18	5.88	2.94	0.50	2401	5.40	2.70	0.50	2548	5.19	2.60	0.50	2597
22	20	6.18	2.35	0.38	2499	5.76	2.19	0.38	2622	5.55	2.11	0.38	2695
22	22	6.54	1.70	0.26	2597	6.12	1.59	0.26	2744	5.91	1.54	0.26	2793
23	18	5.88	3.18	0.54	2401	5.40	2.92	0.54	2548	5.19	2.80	0.54	2597
23	20	6.18	2.60	0.42	2499	5.76	2.42	0.42	2622	5.55	2.33	0.42	2695
23	22	6.54	1.96	0.30	2597	6.12	1.84	0.30	2744	5.91	1.77	0.30	2793
24	18	5.88	3.41	0.58	2401	5.40	3.13	0.58	2548	5.19	3.01	0.58	2597
24	20	6.18	2.84	0.46	2499	5.76	2.65	0.46	2622	5.55	2.55	0.46	2695
24	22	6.54	2.22	0.34	2597	6.12	2.08	0.34	2744	5.91	2.01	0.34	2793
24	24	6.90	1.52	0.22	2695	6.48	1.43	0.22	2818	6.30	1.39	0.22	2879
25	18	5.88	3.65	0.62	2401	5.40	3.35	0.62	2548	5.19	3.22	0.62	2597
25	20	6.18	3.09	0.50	2499	5.76	2.88	0.50	2622	5.55	2.78	0.50	2695
25	22	6.54	2.49	0.38	2597	6.12	2.33	0.38	2744	5.91	2.25	0.38	2793
25	24	6.90	1.79	0.26	2695	6.48	1.68	0.26	2818	6.30	1.64	0.26	2879
26	18	5.88	3.88	0.66	2401	5.40	3.56	0.66	2548	5.19	3.43	0.66	2597
26	20	6.18	3.34	0.54	2499	5.76	3.11	0.54	2622	5.55	3.00	0.54	2695
26	22	6.54	2.75	0.42	2597	6.12	2.57	0.42	2744	5.91	2.48	0.42	2793
26	24	6.90	2.07	0.30	2695	6.48	1.94	0.30	2818	6.30	1.89	0.30	2879
26	26	7.26	1.31	0.18	2793	6.84	1.23	0.18	2916	6.63	1.19	0.18	2977
27	18	5.88	4.12	0.70	2401	5.40	3.78	0.70	2548	5.19	3.63	0.70	2597
27	20	6.18	3.58	0.58	2499	5.76	3.34	0.58	2622	5.55	3.22	0.58	2695
27	22	6.54	3.01	0.46	2597	6.12	2.82	0.46	2744	5.91	2.72	0.46	2793
27	24	6.90	2.35	0.34	2695	6.48	2.20	0.34	2818	6.30	2.14	0.34	2879
27	26	7.26	1.60	0.22	2793	6.84	1.50	0.22	2916	6.63	1.46	0.22	2977
28	18	5.88	4.35	0.74	2401	5.40	4.00	0.74	2548	5.19	3.84	0.74	2597
28	20	6.18	3.83	0.62	2499	5.76	3.57	0.62	2622	5.55	3.44	0.62	2695
28	22	6.54	3.27	0.50	2597	6.12	3.06	0.50	2744	5.91	2.96	0.50	2793
28	24	6.90	2.62	0.38	2695	6.48	2.46	0.38	2818	6.30	2.39	0.38	2879
28	26	7.26	1.89	0.26	2793	6.84	1.78	0.26	2916	6.63	1.72	0.26	2977
29	18	5.88	4.59	0.78	2401	5.40	4.21	0.78	2548	5.19	4.05	0.78	2597
29	20	6.18	4.08	0.66	2499	5.76	3.80	0.66	2622	5.55	3.66	0.66	2695
29	22	6.54	3.53	0.54	2597	6.12	3.30	0.54	2744	5.91	3.19	0.54	2793
29	24	6.90	2.90	0.42	2695	6.48	2.72	0.42	2818	6.30	2.65	0.42	2879
29	26	7.26	2.18	0.30	2793	6.84	2.05	0.30	2916	6.63	1.99	0.30	2977
30	18	5.88	4.82	0.82	2401	5.40	4.43	0.82	2548	5.19	4.26	0.82	2597
30	20	6.18	4.33	0.70	2499	5.76	4.03	0.70	2622	5.55	3.89	0.70	2695
30	22	6.54	3.79	0.58	2597	6.12	3.55	0.58	2744	5.91	3.43	0.58	2793
30	24	6.90	3.17	0.46	2695	6.48	2.98	0.46	2818	6.30	2.90	0.46	2879
30	26	7.26	2.47	0.34	2793	6.84	2.33	0.34	2916	6.63	2.25	0.34	2977
31	18	5.88	5.06	0.86	2401	5.40	4.64	0.86	2548	5.19	4.46	0.86	2597
31	20	6.18	4.57	0.74	2499	5.76	4.26	0.74	2622	5.55	4.11	0.74	2695
31	22	6.54	4.05	0.62	2597	6.12	3.79	0.62	2744	5.91	3.66	0.62	2793
31	24	6.90	3.45	0.50	2695	6.48	3.24	0.50	2818	6.30	3.15	0.50	2879
31	26	7.26	2.76	0.38	2793	6.84	2.60	0.38	2916	6.63	2.52	0.38	2977
32	18	5.88	5.29	0.90	2401	5.40	4.86	0.90	2548	5.19	4.67	0.90	2597
32	20	6.18	4.82	0.78	2499	5.76	4.49	0.78	2622	5.55	4.33	0.78	2695
32	22	6.54	4.32	0.66	2597	6.12	4.04	0.66	2744	5.91	3.90	0.66	2793
32	24	6.90	3.73	0.54	2695	6.48	3.50	0.54	2818	6.30	3.40	0.54	2879
32	26	7.26	3.05	0.42	2793	6.84	2.87	0.42	2916	6.63	2.78	0.42	2977

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA

HEAT operation(230V)

MCFH-GA35VB -E1 : MUCFH-GA35VB -E1

CAPACITY : 3.7(kW) INPUT : 1020(W)

	OUTDOOR WB(℃)													
INDOOR	-10		-5		0		5		10		15		20	
DB(℃)	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.33	663	2.81	796	3.29	898	3.77	969	4.26	1030	4.70	1061	5.18	1081
21	2.22	714	2.66	847	3.15	938	3.59	1010	4.07	1061	4.51	1091	4.98	1132
26	2.00	765	2.48	898	2.92	989	3.40	1061	3.89	1112	4.33	1142	4.81	1173

HEAT operation(230V)

MCFH-GA50VB -E1 : MUCFH-GA50VB -E1

CAPACITY :5.0(kW) INPUT :1890(W)

	OUTDOOR WB(℃)													
INDOOR	-10		-5		0		5		10		15		20	
DB(℃)	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	3.15	1229	3.80	1474	4.45	1663	5.10	1796	5.75	1909	6.35	1966	7.00	2003
21	3.00	1323	3.60	1569	4.25	1739	4.85	1871	5.50	1966	6.10	2022	6.73	2098
26	2.70	1418	3.35	1663	3.95	1833	4.60	1966	5.25	2060	5.85	2117	6.50	2174

HEAT operation(230V)

MCFH-GA60VB -E1 : MUCFH-GA60VB -E1

CAPACITY :6.8(kW) INPUT :2720(W)

	OUTDOOR WB(℃)													
INDOOR	-10		-5		0		5		10		15		20	
DB(℃)	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	4.28	1768	5.17	2122	6.05	2394	6.94	2584	7.82	2747	8.64	2829	9.52	2883
21	4.08	1904	4.90	2258	5.78	2502	6.60	2693	7.48	2829	8.30	2910	9.15	3019
26	3.67	2040	4.56	2394	5.37	2638	6.26	2829	7.14	2965	7.96	3046	8.84	3128

NOTE Q :Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature WB : Wet-bulb temperature

9 ACTUATOR CONTROL

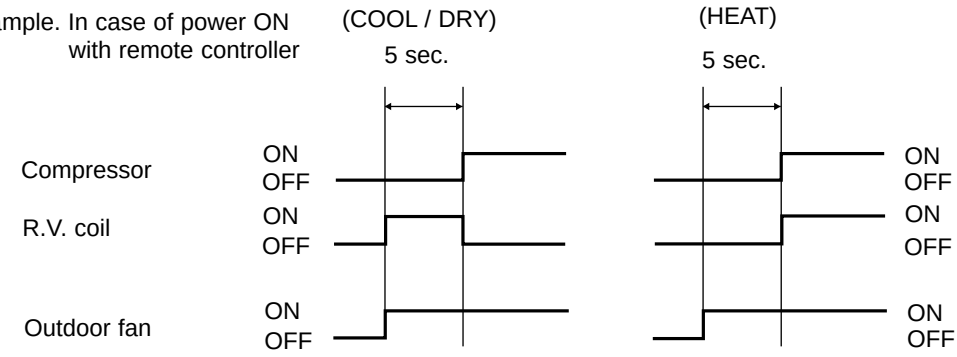
MUCFH-GA35VB -E1 MUCFH-GA50VB MUCFH-GA60VB -E1

R.V. coil control

Heating · · · · ·ON
Cooling · · · · ·OFF
Dry · · · · · · · ·OFF

NOTE. : The 4-way valve reverses for 5 seconds right before start-up of the compressor.

Example. In case of power ON with remote controller



10 SERVICE FUNCTIONS

MUCFH-GA35VB -E1 MUCFH-GA50VB -E1 MUCFH-GA60VB -E1

10-1. COMPULSORY DEFROSTING MODE FOR SERVICE

By short circuit of the connector JPDS and JPSG (MUCFH-GA35VB/GA50VB) / JPG1 and R871 (MUCFH-GA60VB) on the outdoor deicer P.C. board, defrosting mode can be accomplished regardless of the defrost interval restriction.
Defrost thermistor RT61 must read below -3℃. (Refer to 11-5.)

10-2. CHANGE IN DEFROST SETTING

<JRF> When the JRF wire of the deicer P.C. board is cut, the defrost interval time will be changed.
<JRG> When the JRG wire of the deicer P.C. board is cut, the defrost temperature will be changed.
(Refer to 11-5.)

Model	Jumper wire	Change point
MUCFH-GA35VB-E1 **MUCFH-GA50VB-E1** **MUCFH-GA60VB-E1**	JRF	Defrost interval time changes from 40 minutes to 15 minutes.
	JRG	Defrost start temperature changes from -3℃ to 0℃. (MUCFH-GA35VB/GA50VB) Defrost start temperature does not change.(-3.0℃) (MUCFH-GA60VB) Defrost finish temperature changes 10.1℃.(MUCFH-GA35VB) Defrost finish temperature changes from 3.1℃ to 10.1℃.(MUCFH-GA50VB) Defrost finish temperature changes from 3.1℃ to 15℃.(MUCFH-GA60VB)

11 TROUBLESHOOTING

MUCFH-GA35VB -E1 MUCFH-GA50VB -E1 MUCFH-GA60VB -E1

11-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

(1) Check the power supply voltage.

(2) Check the indoor/outdoor connecting wire for mis-wiring.

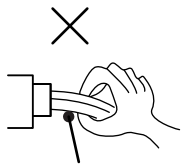
2. Take care the following during service.

(1) Before servicing the air conditioner, be sure to turn off the main unit first with the remote controller, and then after confirming the horizontal vane has completely closed, turn off the breaker.

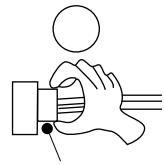
(2) Be sure to unplug the power cord before removing the air inlet grille, the front panel, the cabinet, the top panel and the electronic control P.C. boards.

(3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.

(4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



Lead wiring



Housing point

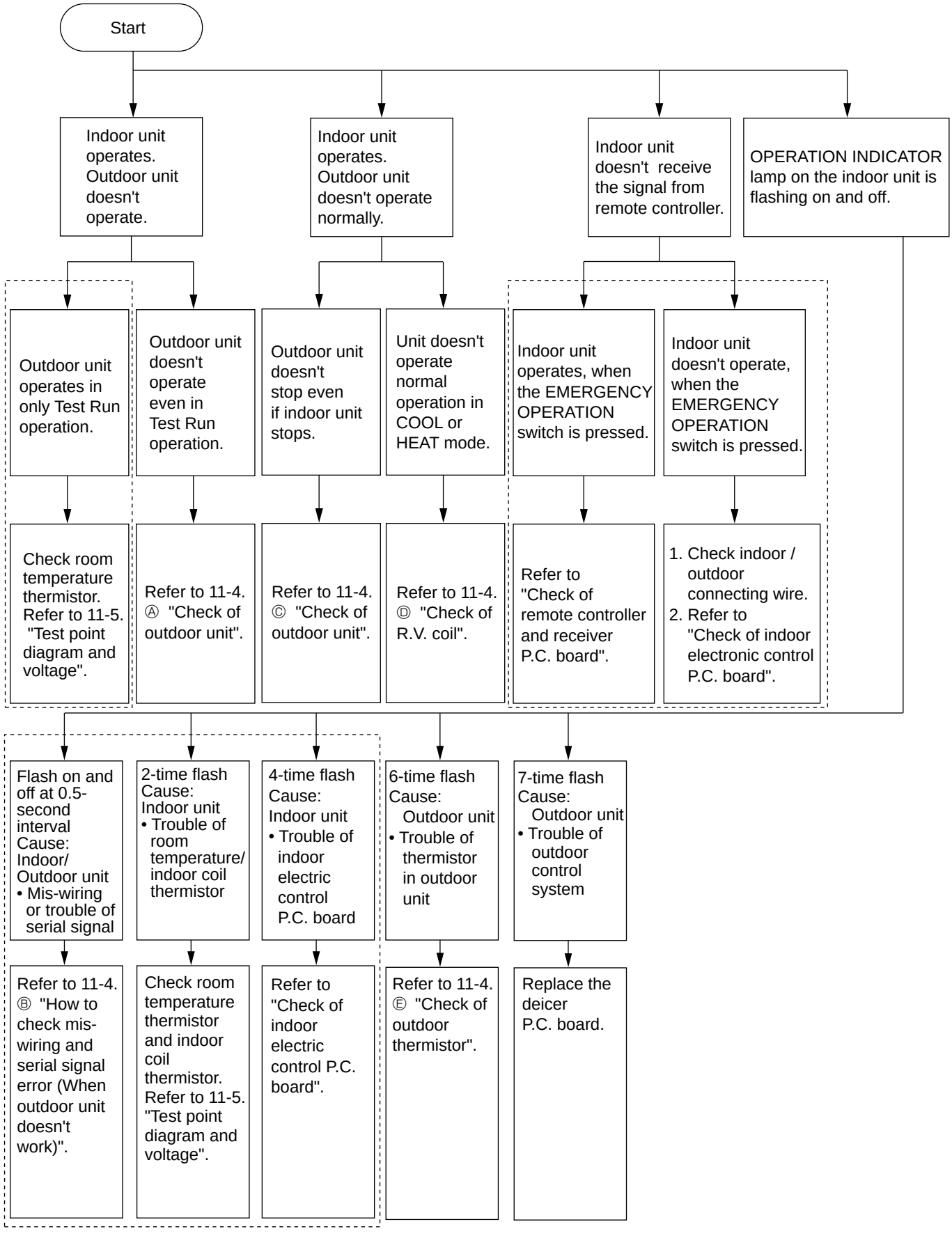
3. Troubleshooting procedure

(1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.

(2) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.

(3) When troubleshooting, refer to 11-2. “Instruction of troubleshooting”.

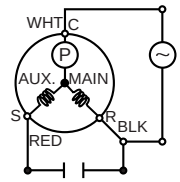
11-2. Instruction of troubleshooting

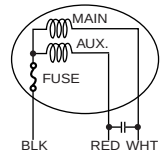


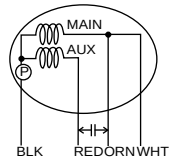
11-3. Trouble criterion of main parts

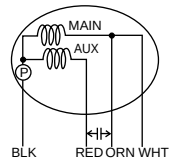
MUCFH-GA35VB - E1 MUCFH-GA50VB - E1 MUCFH-GA60VB - E1

<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Defrost thermistor (RT61)</td><td>Measure the resistance with a tester.
(Part temperature -10°C ~ 40°C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5kΩ ~ 60kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Compressor (MC)

INNER PROTECTOR
MUCFH-GA35VB
155± 5℃ OPEN
90±10℃ CLOSE
MUCFH-GA50VB /GA60VB
160± 5℃ OPEN
90±10℃ CLOSE</td><td>Measure the resistance between the terminals with a tester.
(Part temperature -10°C ~ 40°C)
<table><tr><th rowspan="2">Color of lead wire</th><th colspan="3">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>MUCFH-GA35VB</th><th>MUCFH-GA50VB</th><th>MUCFH-GA60VB</th></tr><tr><td>C-R</td><td>2.46 ~ 3.01Ω</td><td>1.05 ~ 1.30Ω</td><td>0.84 ~ 1.04Ω</td><td rowspan="2">Open or short-circuit</td></tr><tr><td>C-S</td><td>2.96 ~ 3.63Ω</td><td>2.38 ~ 2.92Ω</td><td>1.82 ~ 2.24Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>Outdoor fan motor (MF)

MUCFH-GA35VB
INNER FUSE
145±2℃ CUT OFF
MUCFH-GA50VB /GA60VB
INNER PROTECTOR
145± 8℃ OPEN
(88±15℃ CLOSE※)</td><td>Measure the resistance between the terminals with a tester.
(Part temperature -10°C ~ 40°C)
<table><tr><th rowspan="2">Color of lead wire</th><th colspan="3">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>MUCFH-GA35VB</th><th>MUCFH-GA50VB</th><th>MUCFH-GA60VB</th></tr><tr><td>WHT-BLK</td><td>191 ~ 231 Ω</td><td>70 ~ 86 Ω</td><td>61 ~ 74 Ω</td><td rowspan="4">Open or short-circuit</td></tr><tr><td>BLK-RED</td><td>272 ~ 330 Ω</td><td>74 ~ 89 Ω</td><td>83 ~ 100 Ω</td></tr><tr><td>BLK-YLW</td><td>——</td><td>——</td><td>——</td></tr><tr><td>YLW-RED</td><td>——</td><td>——</td><td>——</td></tr></table></td><td>MUCFH-GA35VB
 

MUCFH-GA50VB
 

MUCFH-GA60VB
 
</td></tr>
<tr><td>R.V. coil (21S4)</td><td>Measure the resistance using a tester. (Part temperature -10°C ~ 40°C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>1.94 kΩ ~ 2.39 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
</table>

※ Reference value

Ⓟ : INNER PROTECTOR

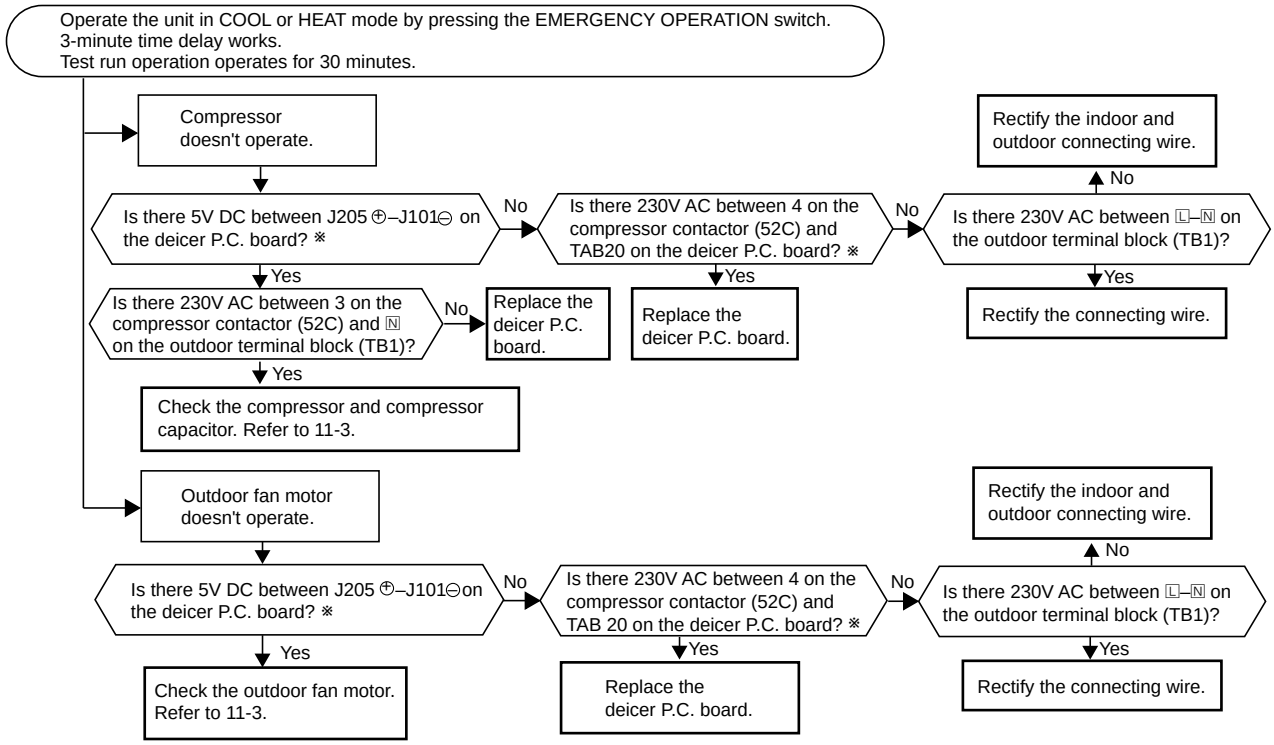
11-4. Troubleshooting flow

Compressor and/or outdoor fan motor doesn't operate.

Ⓐ Check of outdoor unit

MUCFH-GA35VB - E1

MUCFH-GA50VB - E1

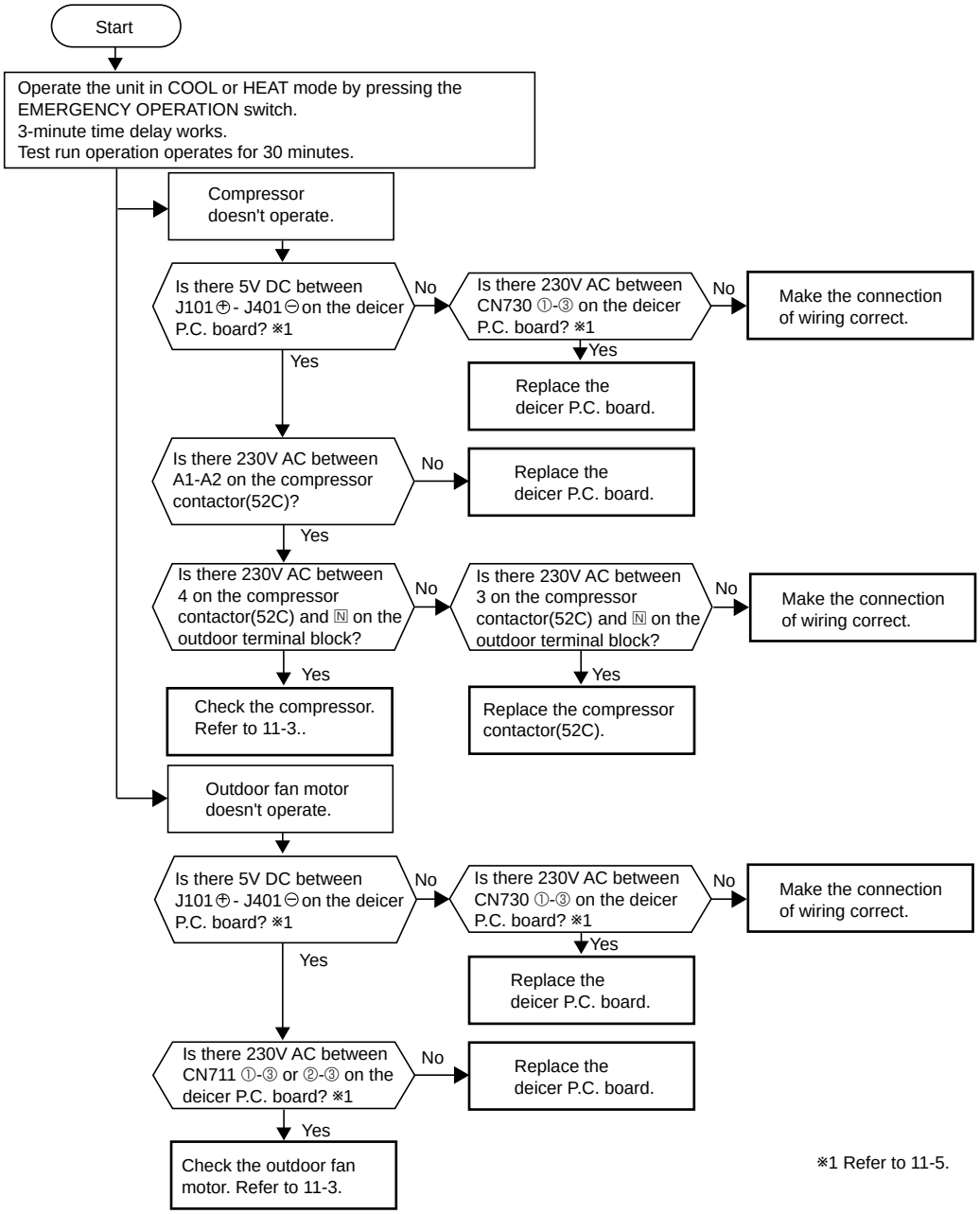


※ Refer to 11-5.

Compressor and/or outdoor fan motor doesn't operate.

Ⓐ Check of outdoor unit

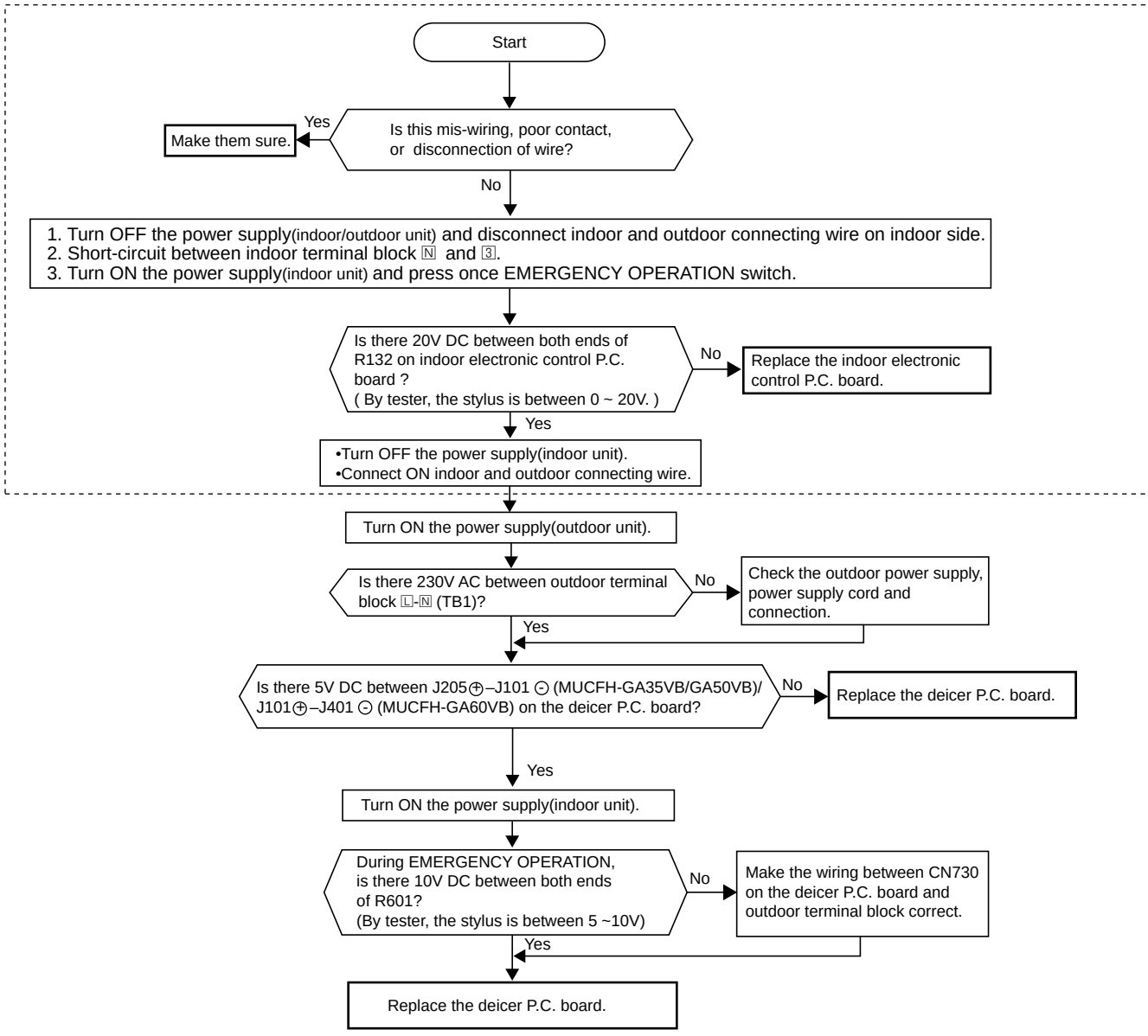
MUCFH-GA60VB - E1



※1 Refer to 11-5.

When OPERATION INDICATOR lamp flashes ON and OFF in every 0.5-second.
Outdoor unit does not operate.

Ⓑ How to check mis-wiring and serial signal error (when outdoor unit does not work)

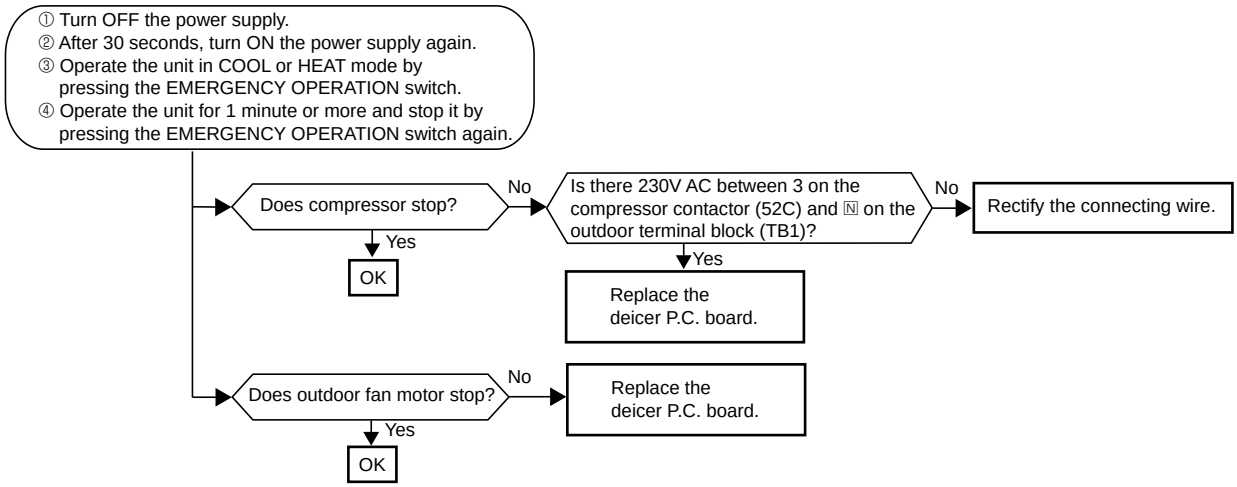


As for indoor unit, refer to the service manual OB380.

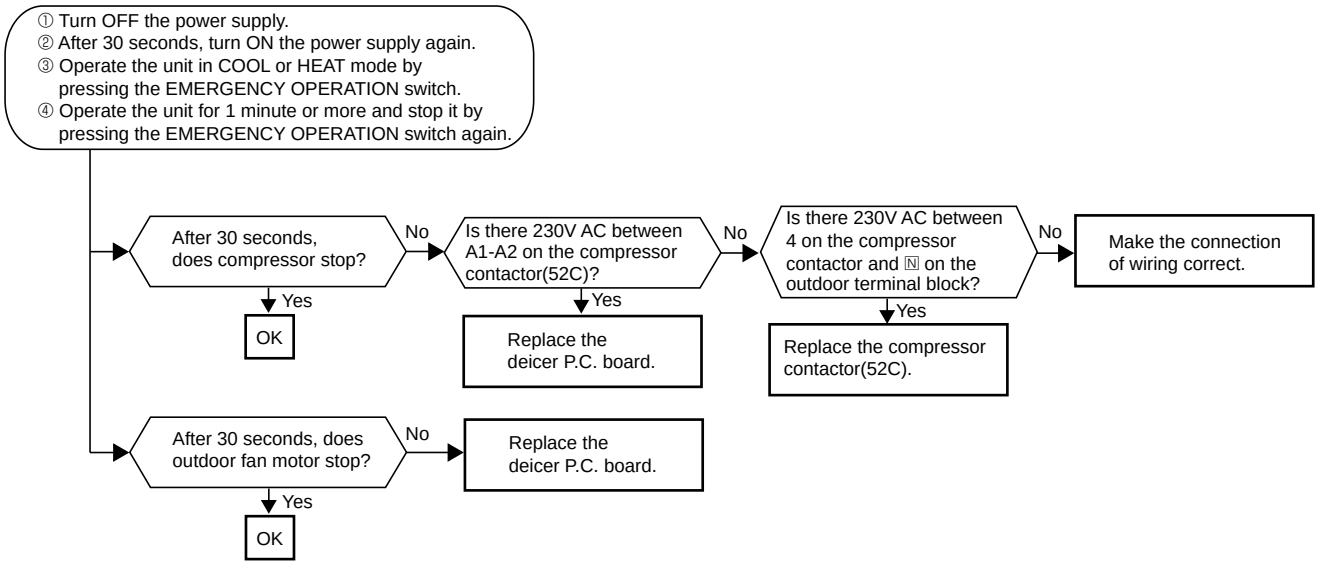
Compressor and/or outdoor fan motor doesn't stop.

Ⓒ Check of outdoor unit

MUCFH-GA35VB -E1 **MUCFH-GA50VB -E1**



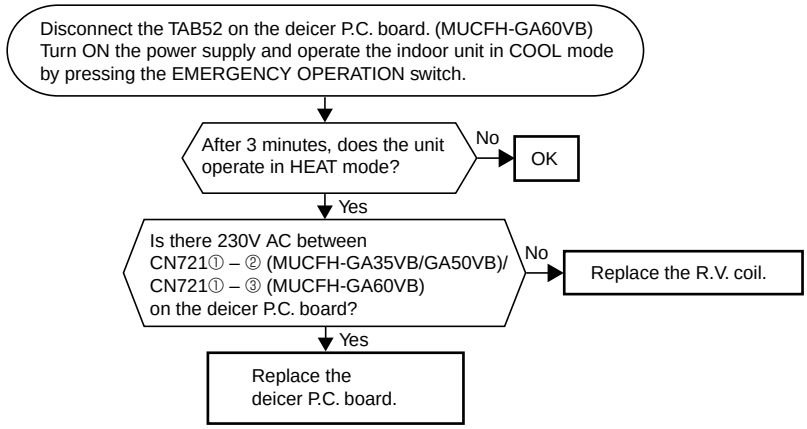
MUCFH-GA60VB -E1



Unit operates HEAT mode even if it is set to COOL mode.

Ⓓ Check of R.V. coil

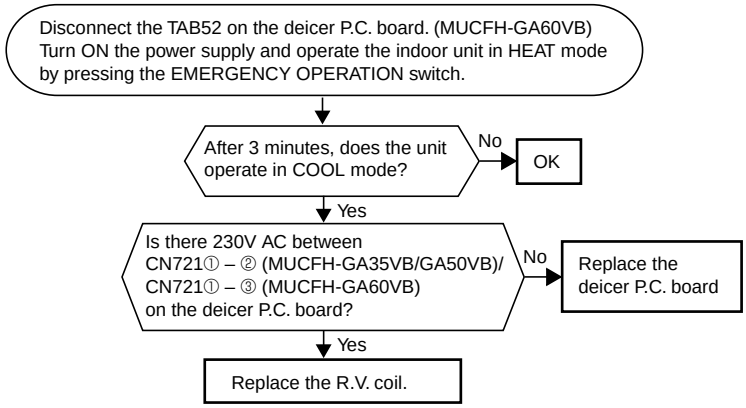
※ First, measure the resistance of R.V. coil to confirm it is disconnected or is not short-circuit.



Unit operates COOL mode even if it is set to HEAT mode.

Ⓓ Check of R.V. coil

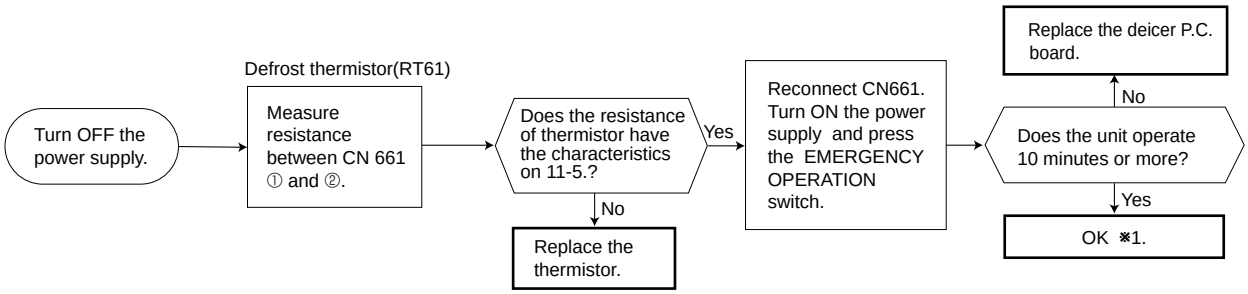
※ First, measure the resistance of R.V. coil to confirm it is disconnected or is not short-circuit.



When OPERATION INDICATOR lamp flashes 6-time.
Thermistors in the outdoor unit are abnormal.

Ⓔ Check of outdoor thermistor

※ Disconnect the connectors CN661 from the deicer P.C. board.
(Check the characteristics of each thermistor.)



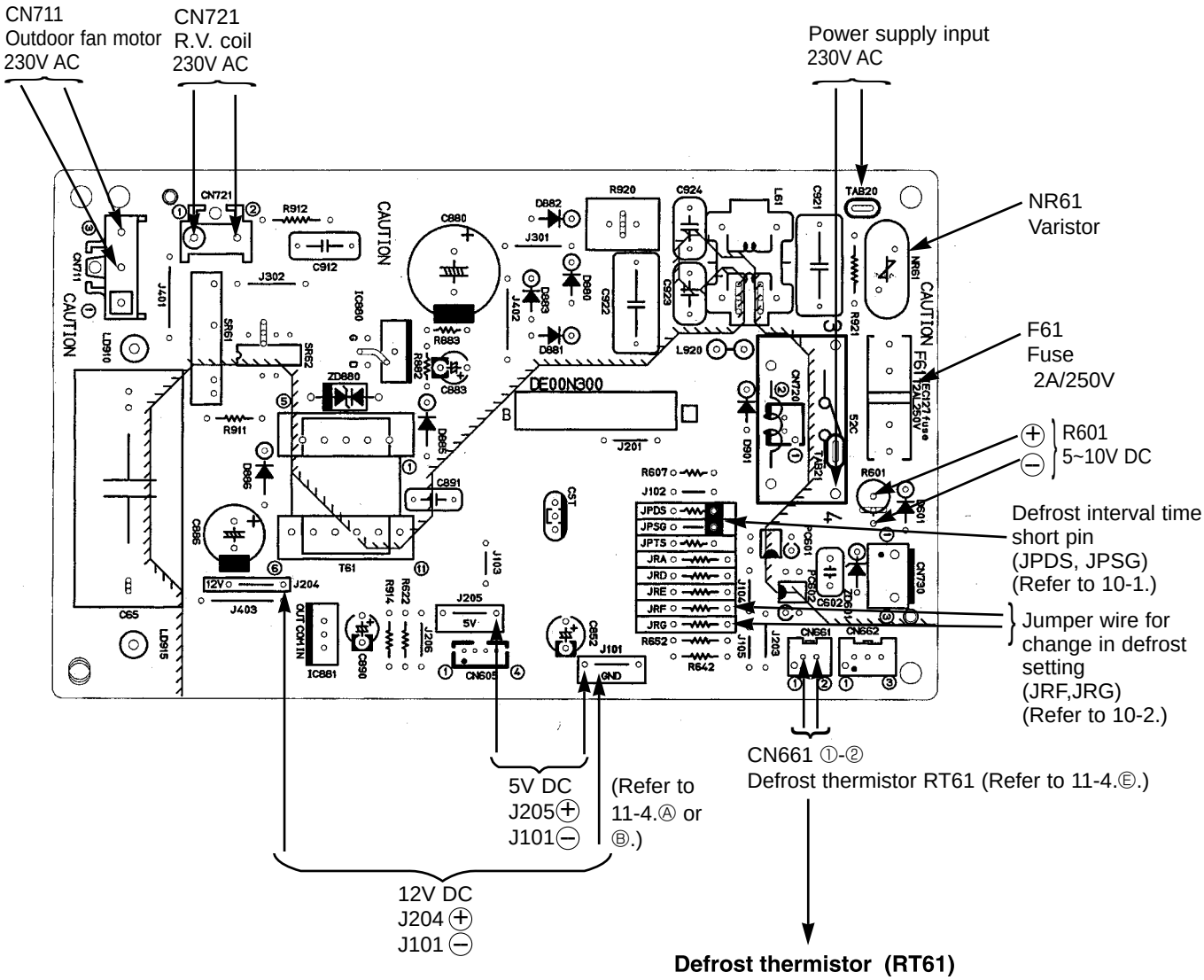
※1. It is thought defective contact of the connector.

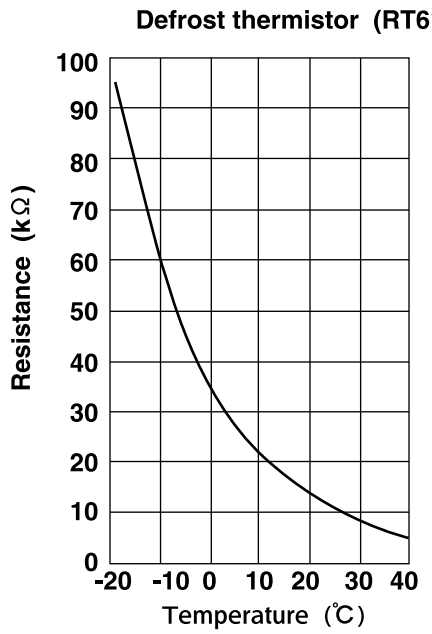
11-5. Test point diagram and voltage

MUCFH-GA35VB -E1

MUCFH-GA50VB -E1

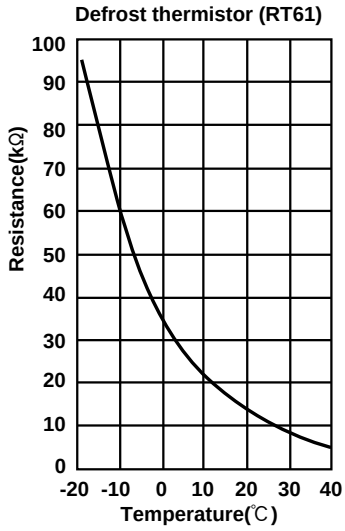
Outdoor deicer P.C. board





MUCFH-GA60VB -E1

Outdoor deicer P.C. board



CN661 ①-②
Defrost thermistor (RT61)
(Refer to 11-4.Ⓔ.)

Fan motor
(CN711)
230V

Varistor
(NR62)

R.V. coil
(CN721)
230V

12V DC

Defrost interval time short pin(JPG1, R871) (Refer to 10-1.)

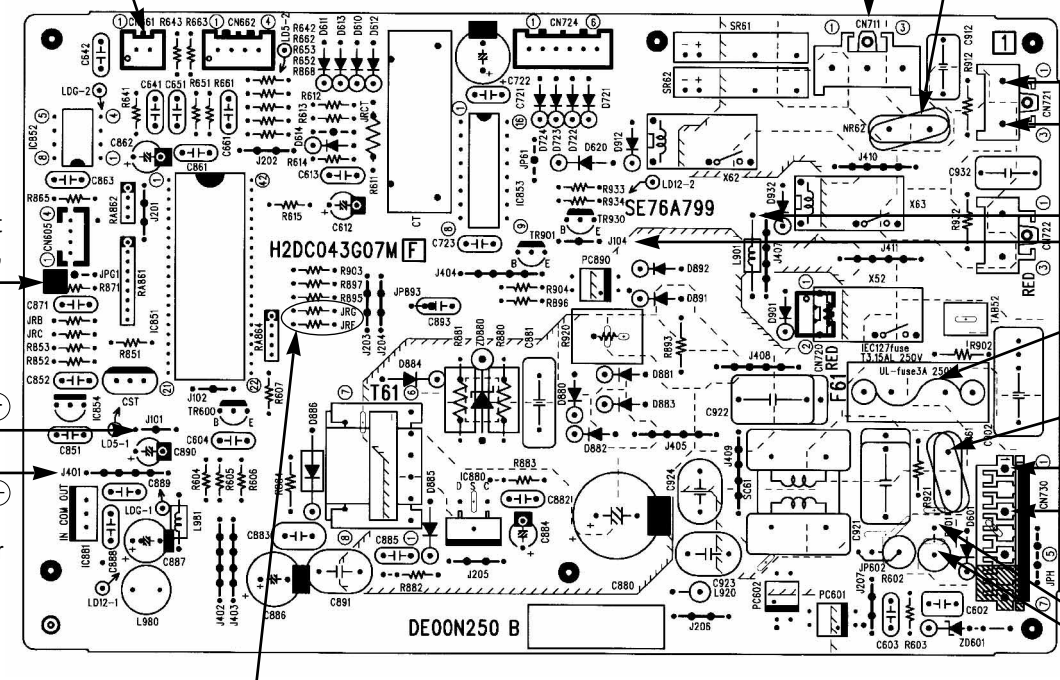
Fuse (F61)
3.15A / 250V

Varistor
(NR61)

J101 ⊕
5V DC
J401 ⊖
(Refer to 11-4.Ⓐ or Ⓑ.)

Power supply input
CN730①-③
230V AC
(Refer to 11-4.Ⓐ.)

R601
10V DC
(Refer to 11-4.Ⓑ.)



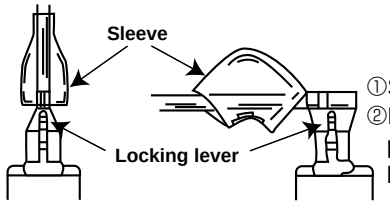
Jumper wire for change in defrost setting (JRF, JRG) (Refer to 10-2.)

12 DISASSEMBLY INSTRUCTIONS

<"Terminal with locking mechanism" Detaching points>

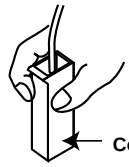
The terminal which has the locking mechanism can be detached as shown below.
There are two types (Refer to (1) and (2)) of the terminal with locking mechanism.
The terminal without locking mechanism can be detached by pulling it out.
Check the shape of the terminal before detaching.

(1) Slide the sleeve and check if there is a locking lever or not.



①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

(2) The terminal with this connector has the locking mechanism.



①Hold the sleeve, and pull out the terminal slowly.

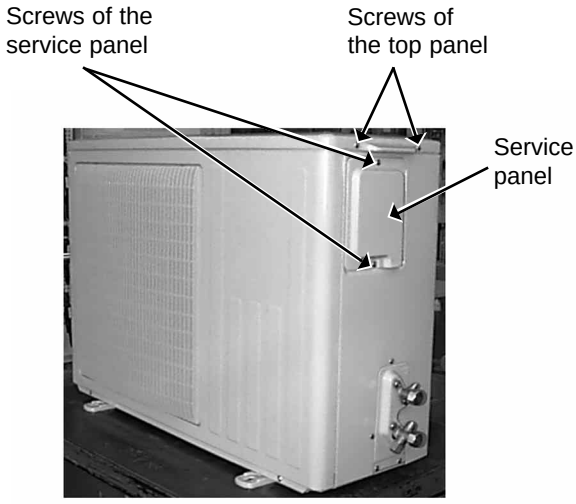
12-1. MUCFH-GA35VB - E1
OUTDOOR UNIT

OPERATING PROCEDURE

1. Removing the cabinet

(1) Remove the screws of the top panel.
(2) Remove the screw of the service panel.
(3) Remove the screws of the cabinet.
(4) Remove the screws of the front panel and motor support.
(5) Remove the service panel, and remove the screw from the insides.
(6) Remove the top panel.
(7) Remove the cabinet.

Photo 3



PHOTOS

Photo 1

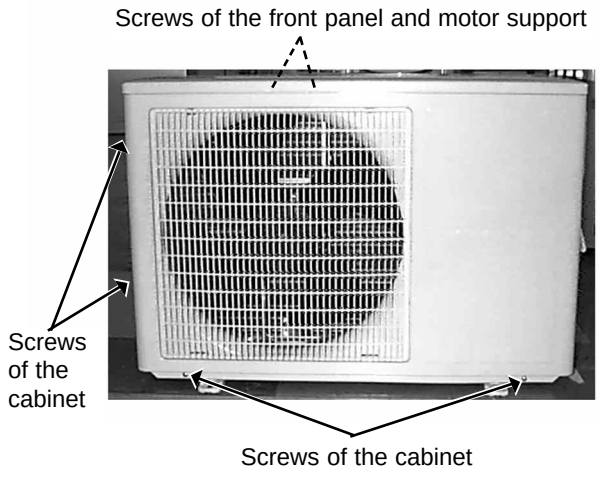
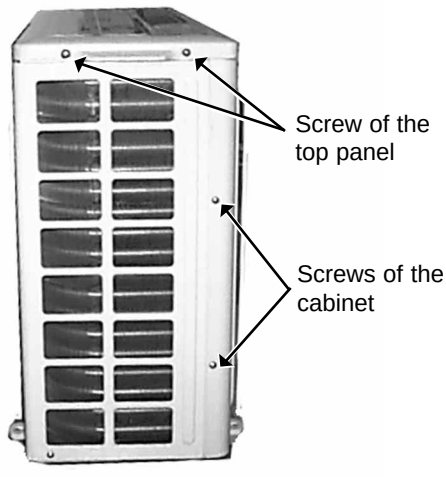
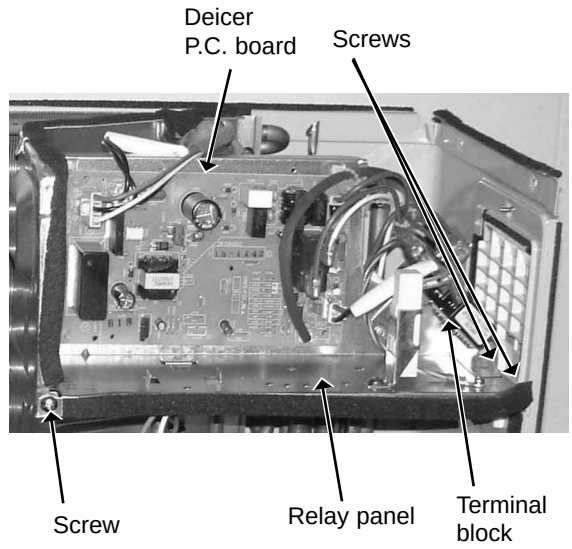
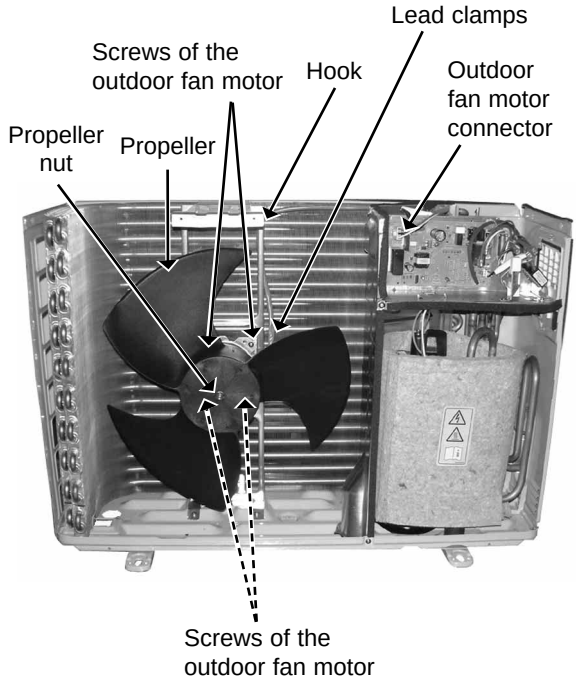
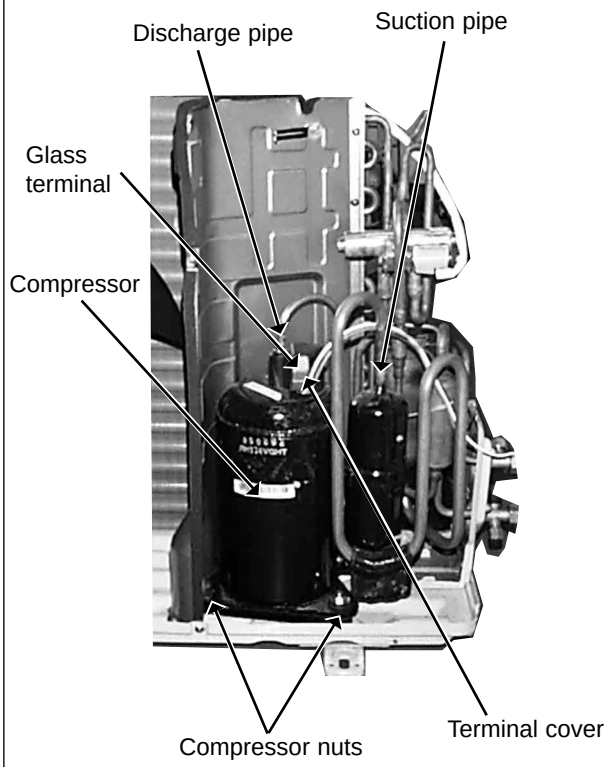


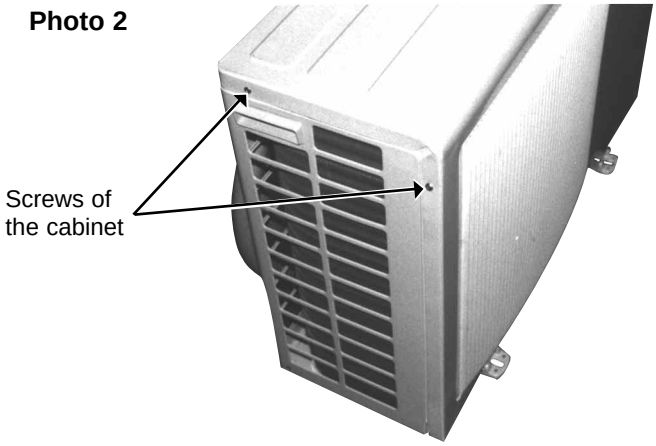
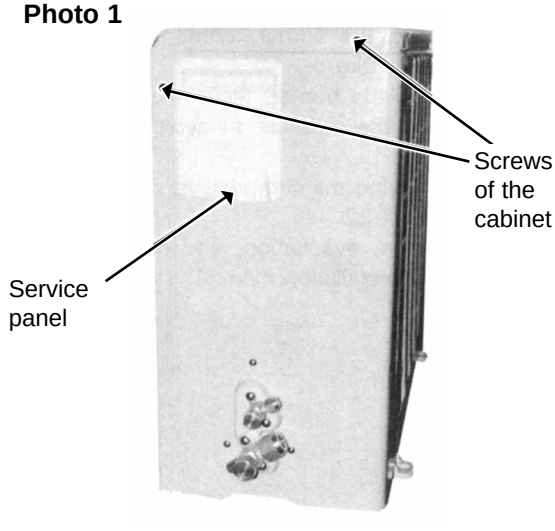
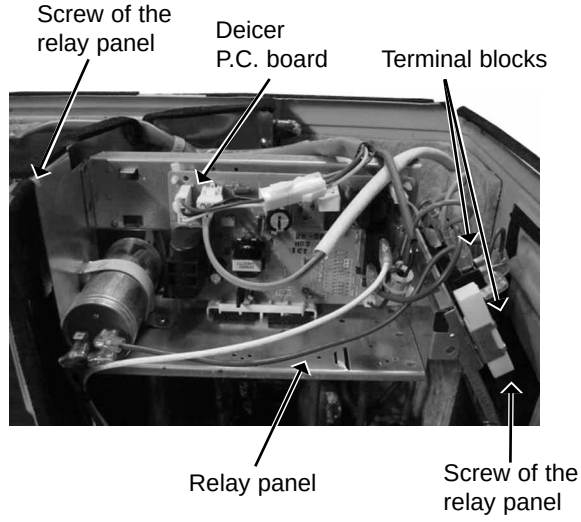
Photo 2

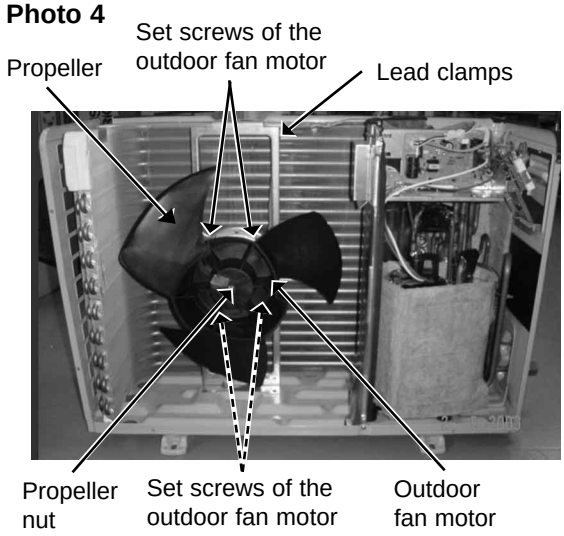
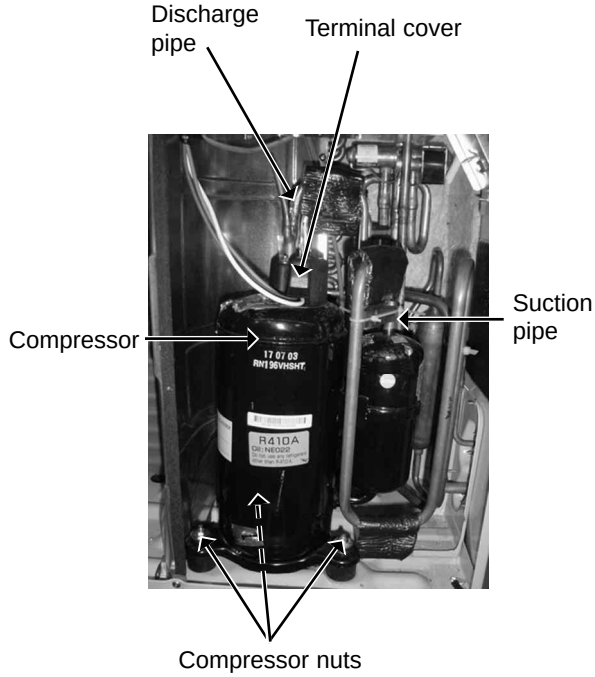


OPERATING PROCEDURE	PHOTOS
2. Removing the deicer P.C. board (1) Remove the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 4** 
3. Removing the propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut. (3) Remove the propeller. **NOTE : Loose the propeller in the rotating direction for removal.** When attaching the propeller, align the mark on the propeller and the motor shaft cut section. Set the propeller in position by using the cut on the shaft and the mark on the propeller. (4) Remove lead clamps and disconnect the outdoor fan motor connector. (5) Remove screws fixing the fan motor. (6) Remove the outdoor fan motor.	**Photo 5** 

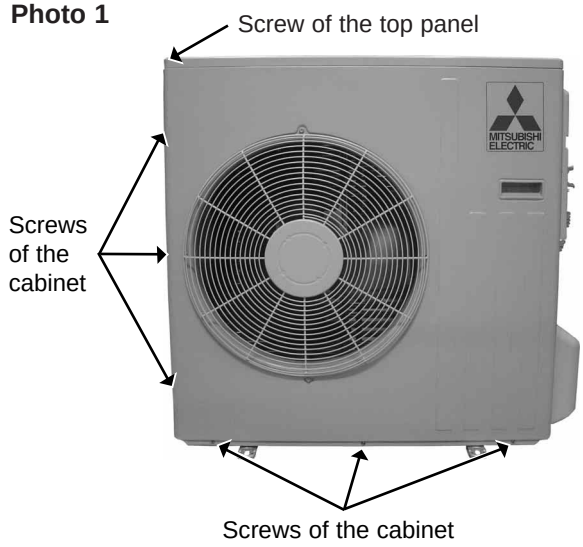
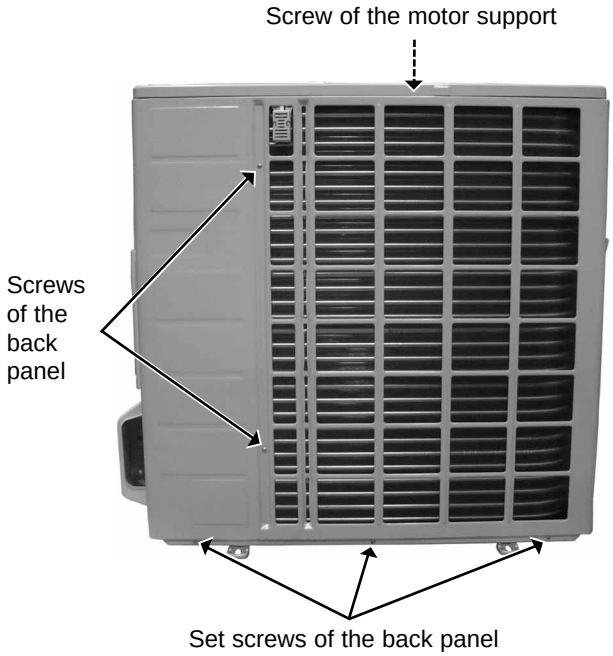
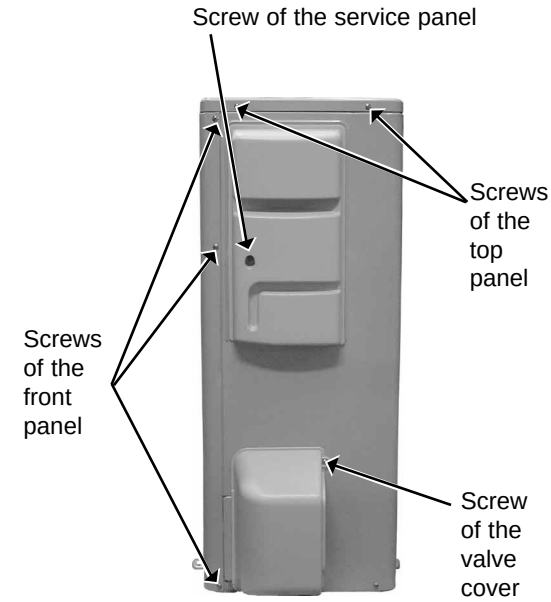
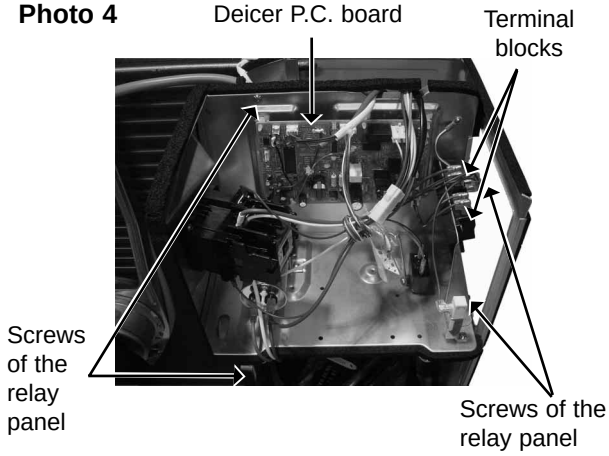
OPERATING PROCEDURE	PHOTOS
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the glass terminal of the compressor. (6) Recover gas from the refrigerant circuit. **NOTE :** Recover gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0 MPa). (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor.	**Photo 6** 

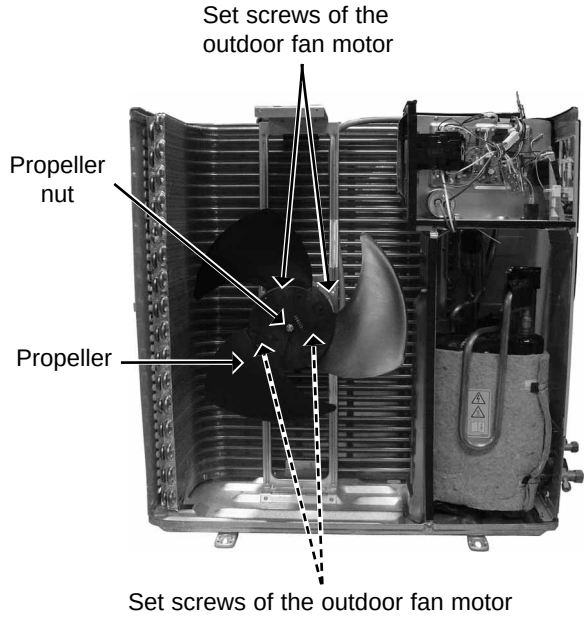
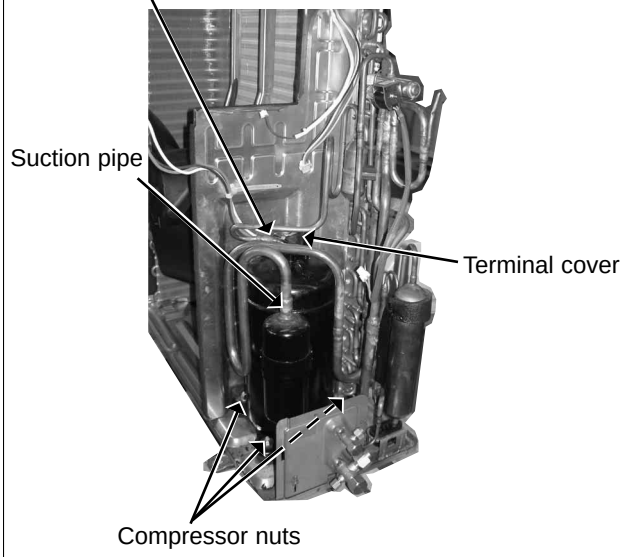
12-2. MUCFH-GA50VB -E1
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the bottom of the cabinet on both sides and remove the cabinet. **Photo 2**  	**Photo 1** 
2. Removing the deicer P.C. board (1) Remove the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 3** 

OPERATING PROCEDURE	PHOTOS
3. Removing the propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut and the propeller. **NOTE : Loose the propeller in the rotating direction for removal.** When attaching the propeller, align the mark on the propeller and the motor shaft cut section. Set the propeller in position by using the cut on the shaft and the mark on the propeller. (3) Remove the clamp of outdoor fan motor lead wire and disconnect the outdoor fan motor connector. (4) Remove the screws fixing the outdoor fan motor. (5) Remove the outdoor fan motor.	**Photo 4** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the compressor. (6) Recover gas from the refrigerant circuit. **NOTE :** Recover gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0 MPa). (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor.	**Photo 5** 

12-3. MUCFH-GA60VB -E1
OUTDOOR UNIT

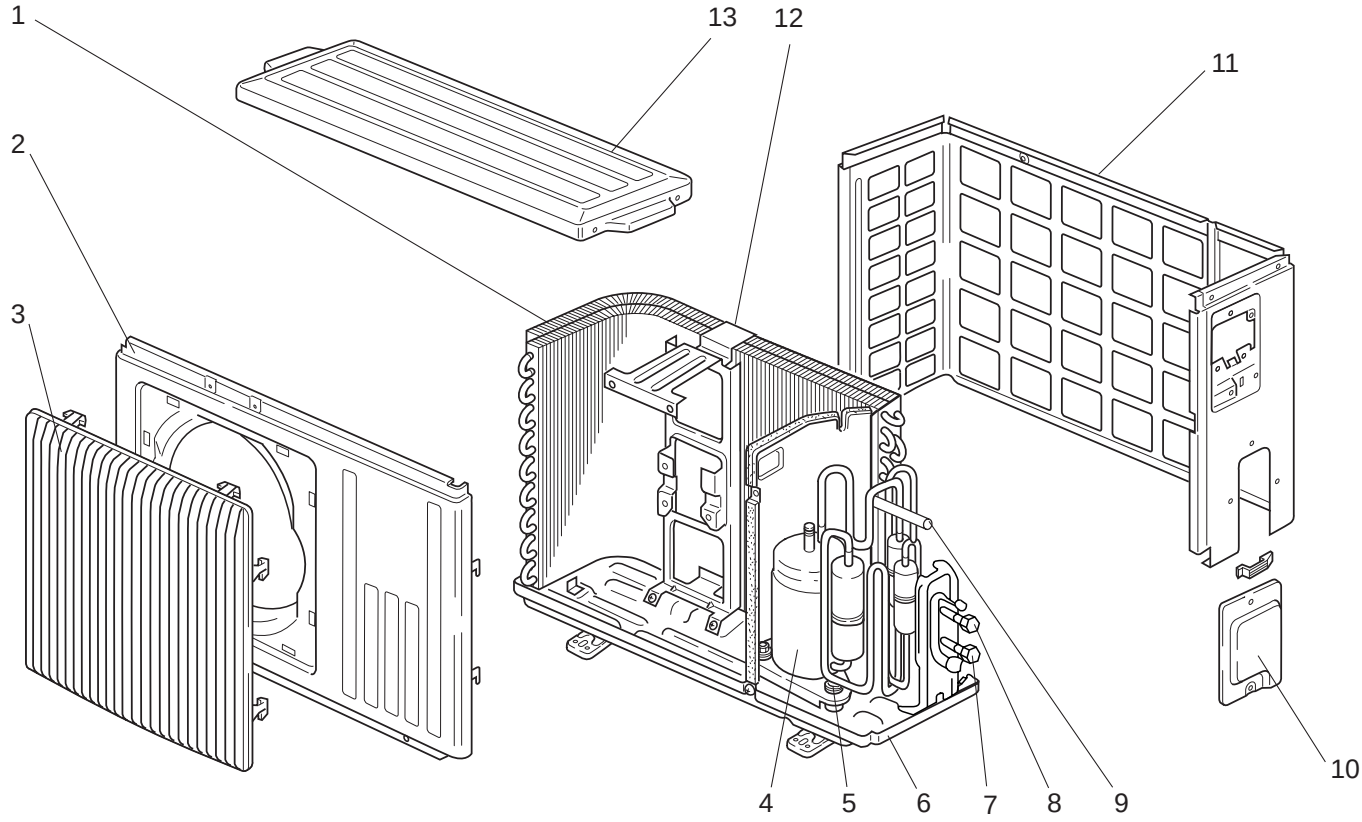
OPERATING PROCEDURE	PHOTOS
1.Removing the cabinet (1) Remove the screws of the service panel. (2) Remove the screws of the top panel. (3) Remove the screw of the valve cover. (4) Remove the service panel. (5) Remove the top panel. (6) Remove the valve cover. (7) Remove the screws of the front panel. (8) Remove the front panel. (9) Remove the screws of the back panel. (10) Remove the back panel.	**Photo 1** 
Photo 3  	**Photo 2** 
2. Removing the deicer P.C. board (1) Remove the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 4** 

OPERATING PROCEDURE	PHOTOS
3. Removing the propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut and the propeller. **NOTE : Loose the propeller in the rotating direction for removal.** When attaching the propeller, align the mark on the propeller and the motor shaft cut section. Set the propeller in position by using the cut on the shaft and the mark on the propeller. (3) Remove the clamp of outdoor fan motor lead wire and disconnect the outdoor fan motor connector. (4) Remove the screws fixing the outdoor fan motor. (5) Remove the outdoor fan motor.	**Photo 5** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the compressor. (6) Recover gas from the refrigerant circuit. **NOTE :** Recover gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0 MPa). (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor.	**Photo 6** 

13 PARTS LIST

MUCFH-GA35VB -E1

13-1. OUTDOOR UNIT STRUCTURAL PARTS

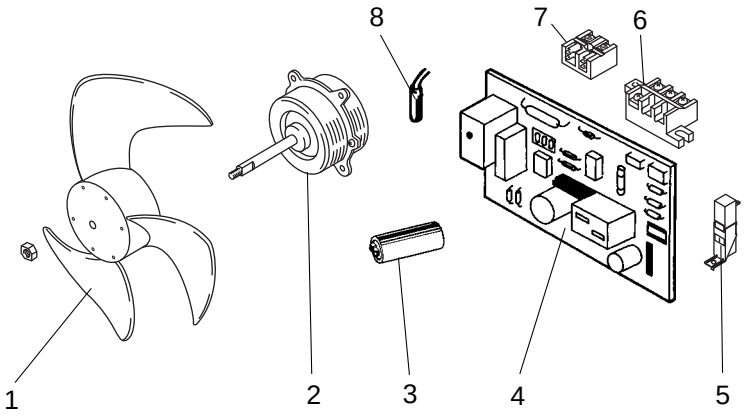


Part numbers that are circled are not shown in the illustration.

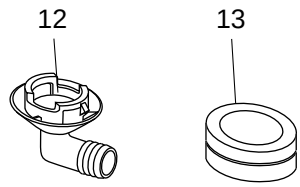
No.	Part No.	Part name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUCFH-GA35VB-E1	
1	E02 837 630	OUTDOOR HEAT EXCHANGER		1	
2	E02 815 232	CABINET		1	
3	E02 815 521	GRILLE(OUT)		1	
4	E02 754 900	COMPRESSOR	MC	1	RN135VHSHT
5	E02 075 506	COMPRESSOR RUBBER SET		3	3RUBBERS/SET
6	E02 832 290	BASE		1	
7	E02 910 661	STOP VALVE(GAS)		1	ϕ12.7
8	E02 910 662	STOP VALVE(LIQUID)		1	ϕ6.35
9	E02 931 961	4-WAY VALVE		1	
10	E02 815 245	SERVICE PANEL		1	
11	E02 836 233	BACK PANEL		1	
12	E02 442 515	MOTOR SUPPORT		1	
13	E02 815 297	TOP PANEL		1	
	E02 156 936	CAPILLARY TUBE		2	ϕ3.0xϕ1.4x500
(14)	E02 726 936	CAPILLARY TUBE		1	ϕ3.0xϕ1.6x600
	E02 837 936	CAPILLARY TUBE		1	ϕ3.0xϕ1.6x1050
(15)	E02 891 642	CHECK VALVE		1	

MUCFH-GA35VB -E1

13-2. OUTDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS



13-3. ACCESSORY



13-2. OUTDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part numbers that are circled are not shown in the illustration.

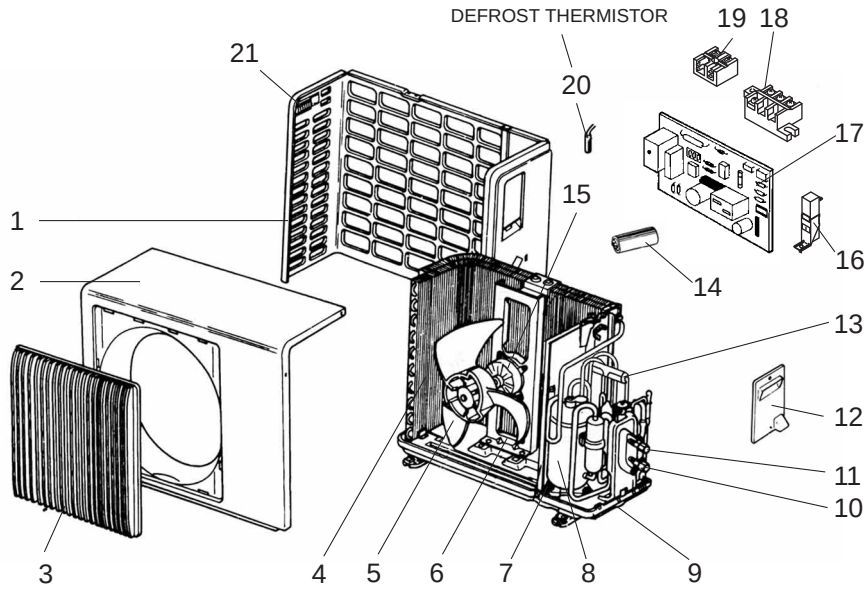
No.	Part No.	Part name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUCFH-GA35VB-E1	
1	E02 665 501	PROPELLER		1	
2	E02 672 301	OUTDOOR FAN MOTOR	MF	1	RA6V33-□□
3	E02 696 353	COMPRESSOR CAPACITOR	C1	1	30μF /440V AC
4	E02 836 451	DEICER P.C. BOARD		1	
5	E02 890 383	SURGE ABSORBER	DSAR	1	
6	E02 817 374	TERMINAL BLOCK	TB1	1	3P
7	E02 836 374	TERMINAL BLOCK	TB2	1	2P
8	E02 699 310	DEFROST THERMISTOR	RT61	1	
⑨	E02 910 490	R. V. COIL	21S4	1	
⑩	E02 095 382	FUSE	F61	1	250V /2A
⑪	E02 820 385	VARISTOR	NR61	1	

13-3. ACCESSORY

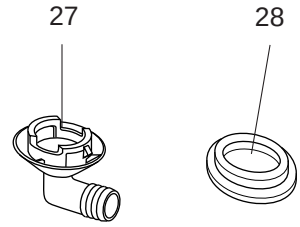
12	E02 817 704	DRAIN SOCKET		1	
13	E02 444 705	DRAIN CAP		2	ϕ33 2PCS/SET

MUCFH-GA50VB -E1

13-4. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS



13-5. ACCESSORY



13-4. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part numbers that are circled are not shown in the illustration.

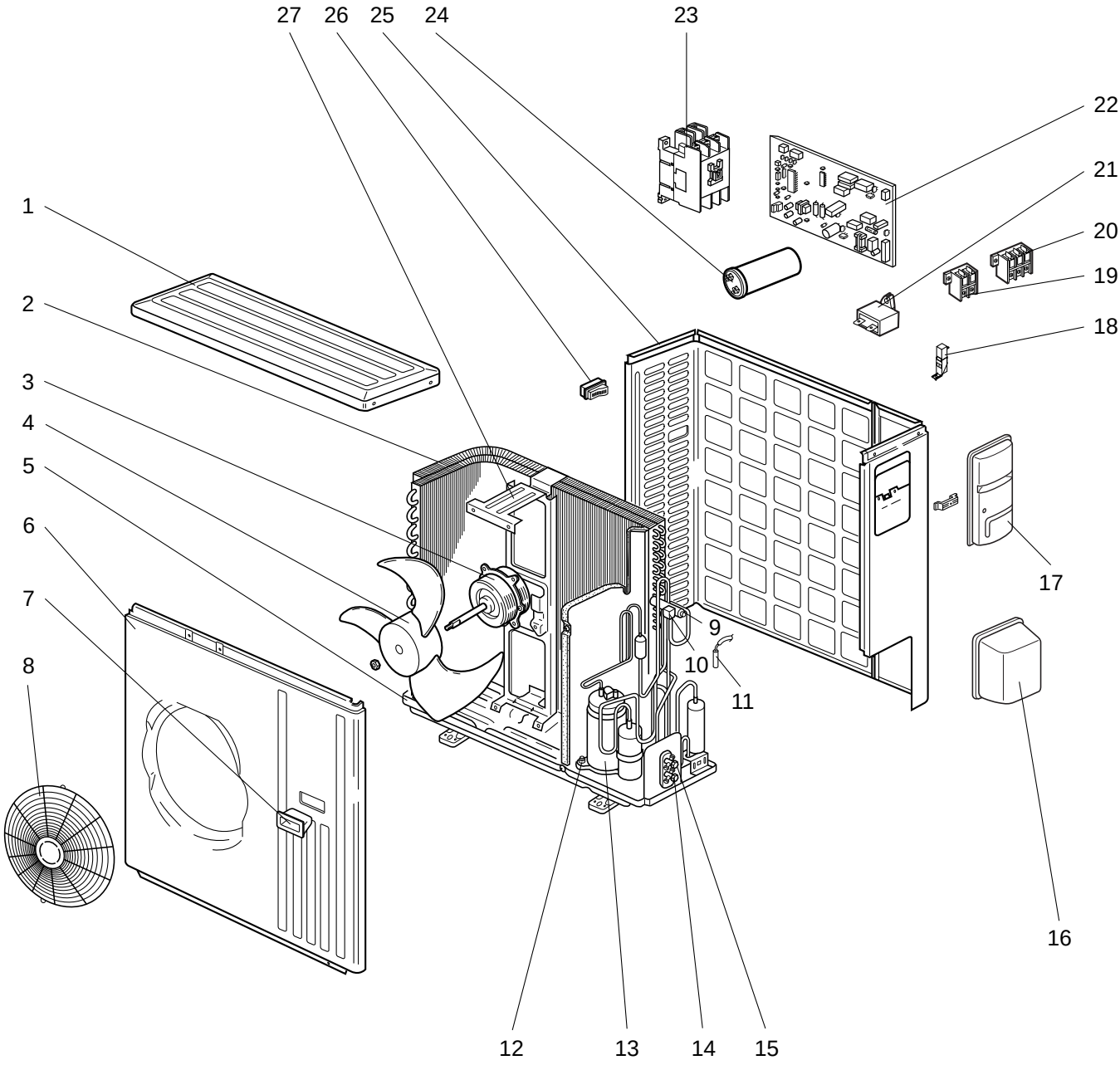
No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MUCFH-GA50VB-E1	Remarks
1	E02 817 233	BACK PANEL		1	
2	E02 817 232	CABINET		1	
3	E02 817 521	GRILLE		1	
4	E02 643 630	OUTDOOR HEAT EXCHANGER		1	
5	E02 141 501	PROPELLER		1	
6	E02 139 515	MOTOR SUPPORT		1	
7	E02 075 506	COMPRESSOR RUBBER SET		3	3RUBBERS/SET
8	E02 817 900	COMPRESSOR	MC	1	RN196VHSHT
9	E02 817 290	BASE		1	
10	E02 817 661	STOP VALVE(GAS)		1	ϕ12.7
11	E02 820 662	STOP VALVE(LIQUID)		1	ϕ 6.35
12	E02 817 245	SERVICE PANEL		1	
13	E02 891 961	4-WAY VALVE		1	
14	E02 888 353	COMPRESSOR CAPACITOR	C1	1	40μF/440V AC
15	E02 816 301	OUTDOOR FAN MOTOR	MF	1	RA6V50 - □□
16	E02 895 383	SURGE ABSORBER	DSAR	1	
17	E02 820 451	DEICER P.C. BOARD		1	
18	E02 817 374	TERMINAL BLOCK	TB1	1	3P
19	E02 821 374	TERMINAL BLOCK	TB2	1	2P
20	E02 820 310	DEFROST THERMISTOR	RT61	1	
21	E02 817 009	HANDLE		1	
22	E02 139 936	CAPILLARY TUBE		2	ϕ3.0Xϕ1.6X750
	E02 746 937	CAPILLARY TUBE		1	ϕ3.0Xϕ1.6X650
	E02 289 937	CAPILLARY TUBE		1	ϕ3.0Xϕ1.6X500
	E02 820 936	CAPILLARY TUBE		1	ϕ2.5Xϕ0.6X1000
(23)	E02 095 382	FUSE	F61	1	250V / 2A
(24)	E02 821 490	R.V. COIL	21S4	1	
(25)	E02 891 642	CHECK VALVE		1	
(26)	E02 820 385	VARISTOR	NR61	1	

13-5. ACCESSORY

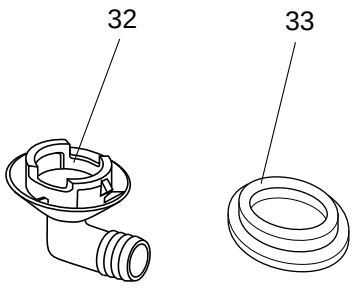
27	E02 817 704	DRAIN SOCKET		1	
28	E02 444 705	DRAIN CAP		2	ϕ33 2PCS/SET
	E02 444 706	DRAIN CAP		1	ϕ16

MUCFH-GA60VB - E1

13-6. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS



13-7. ACCESSORY



MUCFH-GA60VB -E1

13-6. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part numbers that are circled are not shown in the illustration.

No.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUCFH-GA60VB - E1	
1	E02 819 297	TOP PANEL		1	
2	E02 821 630	OUTDOOR HEAT EXCHANGER		1	
3	E02 892 301	OUTDOOR FAN MOTOR	MF	1	RA6V85- □□
4	E02 214 501	PROPELLER		1	
5	E02 821 290	BASE		1	
6	E02 819 232	CABINET		1	
7	E02 819 009	HANDLE		1	
8	E02 819 521	FAN GUARD		1	
9	E02 891 961	4-WAY VALVE		1	
10	E02 821 490	R.V. COIL	21S4	1	
11	E02 821 310	DEFROST THERMISTOR	RT61	1	
12	E02 527 506	COMPRESSOR RUBBER SET		4	4RUBBERS/SET
13	E02 821 900	COMPRESSOR	MC	1	NN29VBAHT
14	E02 819 661	STOP VALVE(GAS)		1	ϕ15.88
15	E02 821 662	STOP VALVE(LIQUID)		1	ϕ6.35
16	E02 819 650	VALVE COVER		1	
17	E02 819 245	SERVICE PANEL		1	
18	E02 890 383	SURGE ABSORBER	DSAR	1	
19	E02 821 374	TERMINAL BLOCK	TB2	1	2P
20	E02 817 374	TERMINAL BLOCK	TB1	1	3P
21	E02 895 351	OUTDOOR FAN CAPACITOR	C2	1	3.0μF/440V AC
22	E02 912 451	DEICER P.C. BOARD		1	
23	E07 012 340	COMPRESSOR CONTACTOR	52C	1	
24	E02 889 353	COMPRESSOR CAPACITOR	C1	1	55μF/440V AC
25	E02 819 233	BACK PANEL(OUT)		1	
26	E02 817 009	HANDLE		1	
27	E02 726 515	MOTOR SUPPORT		1	
(28)	E02 127 382	FUSE	F61	1	250V/3.15A
(29)	E02 336 385	VARISTOR	NR61	1	
(30)	E02 891 642	CHECK VALVE		1	
(31)	E02 069 936	CAPILLARY TUBE		1	ϕ3.0xϕ2.0x400
	E02 139 937	CAPILLARY TUBE		1	ϕ3.0xϕ2.0x800

13-7. ACCESSORY

32	E02 817 704	DRAIN SOCKET		1	
33	E02 444 705	DRAIN CAP		2	ϕ33 2PCS/SET

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