

Revision A:

- Conditions of operation frequency have been added.

Please void OB297.

No. OB297
REVISED EDITION-A

SERVICE MANUAL

Wireless type
Models

MSZ09UN (W)

MSZ12UN (W)

▪ **MUZ09UN**

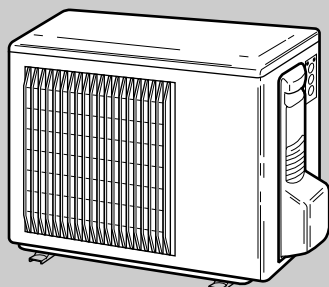
▪ **MUZ12UN**



MSZ09UN
INDOOR UNIT



Remote
controller



MUZ09UN
MUZ12UN
OUTDOOR UNIT

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The Slim Line.
From Mitsubishi Electric.



Mr. SLIM™

Revision A:

- Conditions of operation frequency have been added.
- SPECIFICATION, DATA, WIRING DIAGRAM and PARTS LIST have been partially modified.

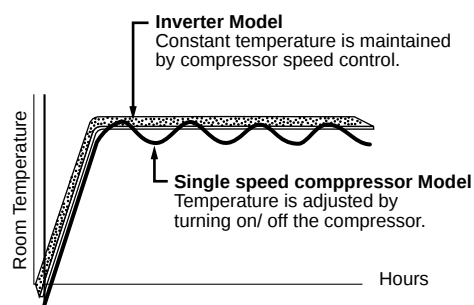
1 FEATURES

Optimum comfort year-round

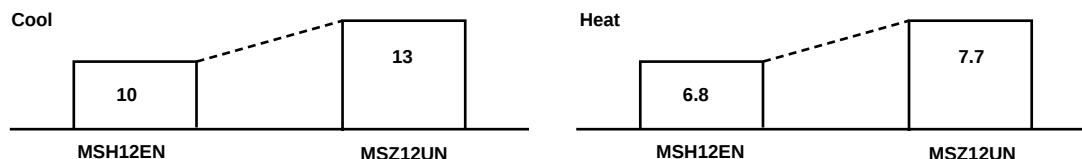
To ensure that a room is never too cold or too hot, inverter technology allows the system to detect subtle fluctuations in room temperature and adjust automatically. Unlike conventional air conditioning units that must start or stop the compressor repetitively, inverter units offer finely tuned operation – such as the accurate control of room temperature – for a more comforting airflow and far less temperature variations.

High-speed cooling & heating

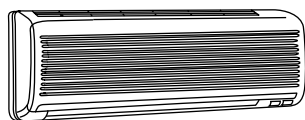
Ideal and comforting performance is assured by controlling compressor rotation according to the cooling and heat load of a room. Inverter technology promotes maximum compressor efficiency by flexibly changing the rotation speed of it to accurately match operating requirements.

**Extra energy – savings**

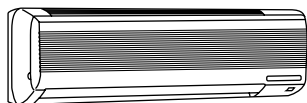
Inverter technology makes the value of SEER and HSPF better compared to non-inverter model's value.



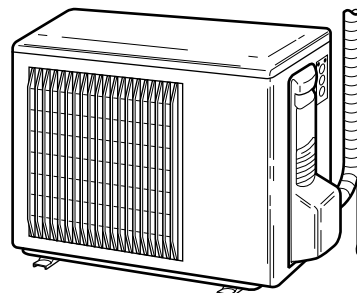
Model	Cooling capacity	Heating capacity	SEER	HSPF(I/V)
MSZ09UN	8,800 Btu/h	12,300 Btu/h	12.0	7.7/6.7
MSZ12UN	11,400 Btu/h	16,000 Btu/h	13.0	7.7/6.7



MSZ09UN



MSZ12UN

LCD wireless
remote controllerMUZ09UN
MUZ12UN

The sound level of indoor unit has been lowered.

Sound level**(dBA)**

Model	MSH09EW	MSZ09UN	MSH12EN	MSZ12UN
Fan speed				
High / Low	43 / 32	36 / 22	48 / 38	42 / 35

The height of indoor unit has been shortened.

(in.)

Model	MSH09EW	MSZ09UN	MSH12EN	MSZ12UN
Size	14-13/16	10-15/16	14-3/16	12-5/8

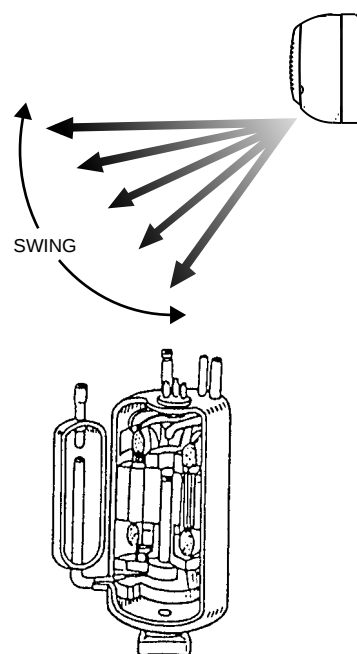
"I FEEL CONTROL" IN OUR LCD WIRELESS REMOTE CONTROLLER WITH ON/OFF PROGRAM TIMER

Mitsubishi Electric's new wireless remote controller incorporates a number of advanced features that provides even greater control and ease-to-use. It has a liquid crystal display which indicates such information as mode, fan speed and temperature selected as well as the programmed ON/OFF timer. It is also equipped with "I Feel Control", a unique Mitsubishi Electric feature that allows the user to adjust the temperature to exactly the level he or she wants simply by tapping the button that describes present conditions : "Too Cool" or "Too Warm". The optimum temperature set this way is that memorized for immediate recall whenever the air conditioner is used again.

Select desired air flow direction.

REMOTE-CONTROL OPERATION MODE

Using the remote controller, you can select from five airflow settings to match room layout and the location of people. Also, you can set the vane to swing automatically.



AUTO-RESTART FUNCTION

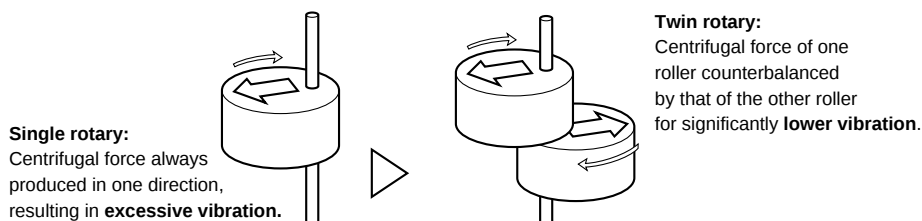
The auto-restart function restarts the equipment when power is restored following an outage automatically. Operation resumes in the mode in which the equipment was running immediately before the outage.

HIGH PERFORMANCE ROTARY COMPRESSOR

The advanced design of Mitsubishi Electric's powerful and energy efficient rotary compressor results in lower operating costs and longer service life.

Outdoor unit: Twin rotary compressor greatly reduces noise

Unlike conventional models equipped with a single rotary, the features a twin-rotary compressor that provides balanced rotation – the centrifugal force of one roller is counterbalanced by the other – for significantly reduced vibration and noise. It's exactly this kind of technology that makes Mitsubishi Electric's outdoor units so quiet.



The sound level of outdoor unit has been lowered.

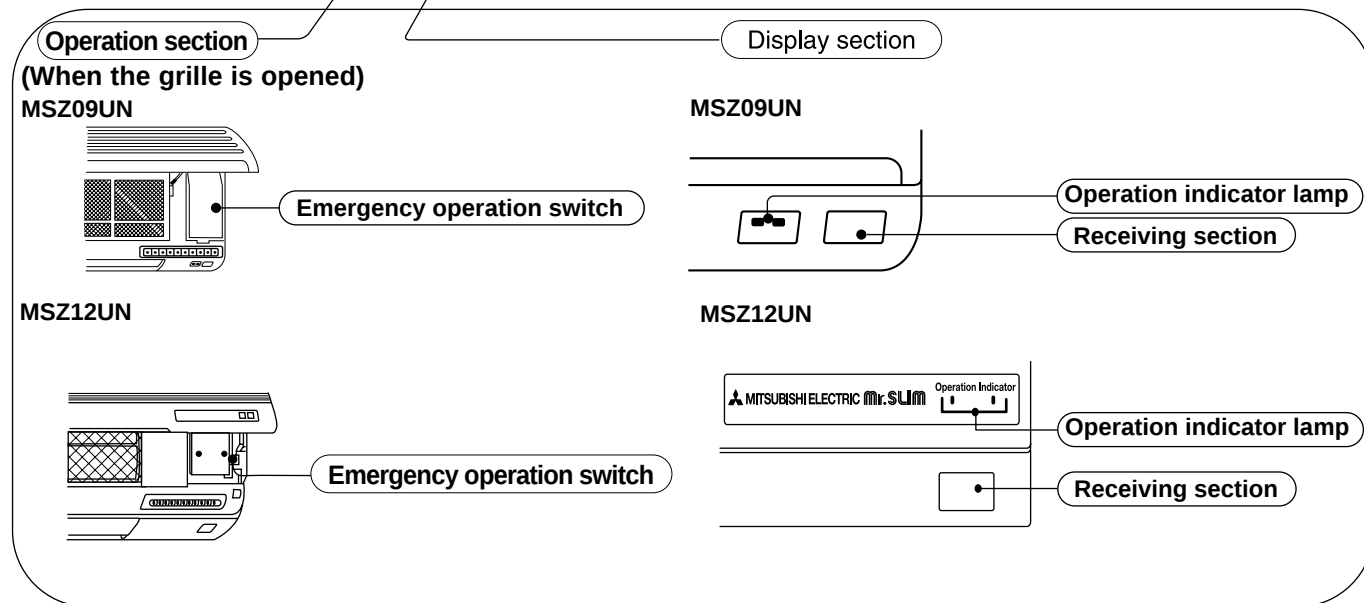
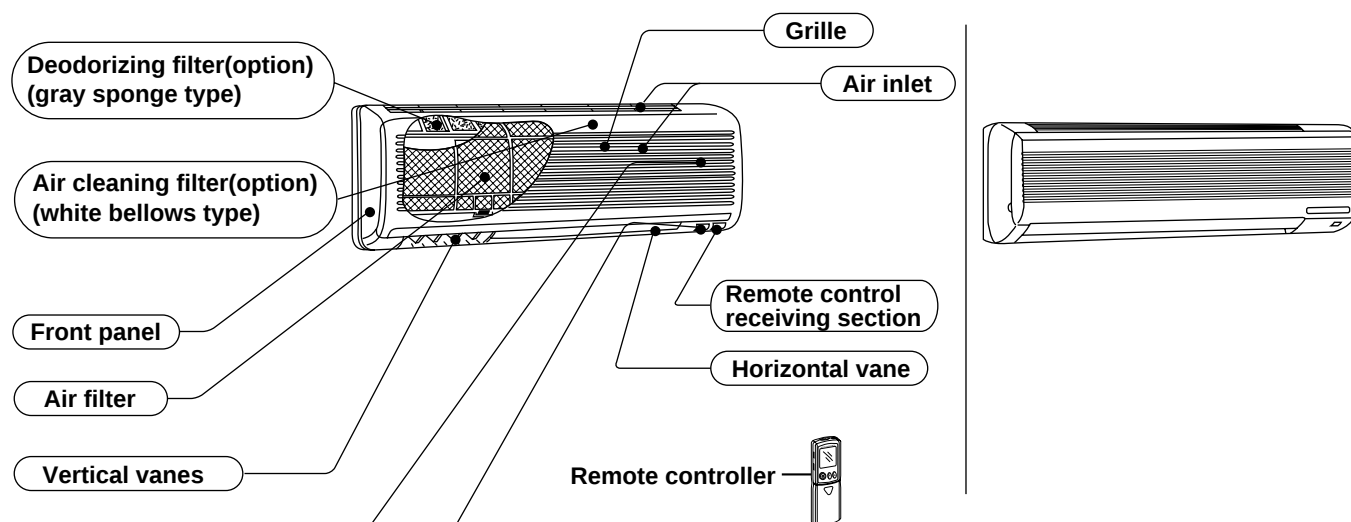
Sound level (Cooling/Heating) dB(A)

MUH12EN	MUZ12UN
54 / 54	49 / 49

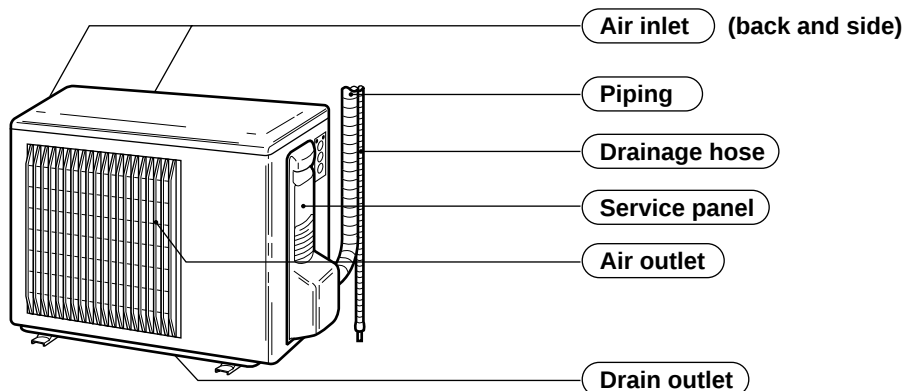
INDOOR UNIT

MSZ09UN

MSZ12UN



OUTDOOR UNIT

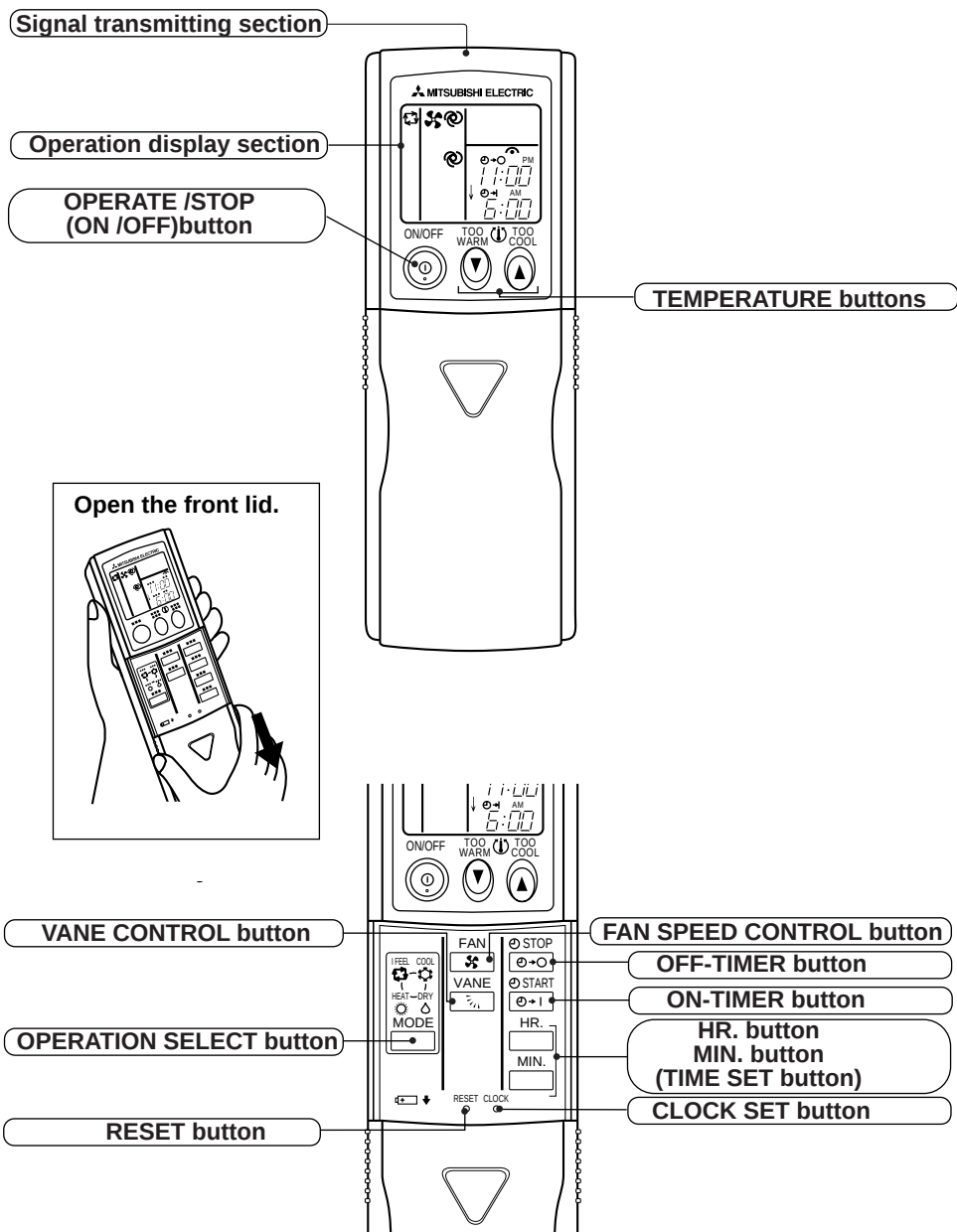
MUZ09UN
MUZ12UN

ACCESSORIES

		MSZ09UN	MSZ12UN
①	Installation plate	1	1
②	Installation plate fixing screw 4 x 25 mm(0.16 x 0.98 in.)	5	6
③	Remote controller mounting hardware	1	1
④	Fixing screw for ③ 3.5 x 16 mm(0.14 x 0.63 in.) (Black)	2	2
⑤	Battery (AAA) for remote controller	2	2
⑥	Wireless remote controller	1	1
⑦	Felt tape (Used for left or left-rear piping)	1	1

REMOTE CONTROLLER

MSZ09UN
MSZ12UN



Item		Model	MSZ09UN	MSZ12UN
Capacity	Cooling #1	Btu/h	8,800(2,600~9,700)	11,400(2,900~13,000)
Rated(Minimum~Maximum)	Heating 47 #1	Btu/h	12,300(2,300~15,700)	16,000(2,400~19,500)
Capacity Rated	Heating 17 #2	Btu/h	10,000	11,600
Power consumption	Cooling #1	W	980(290~1,250)	1,140(290~1,460)
Rated(Minimum~Maximum)	Heating 47 #1	W	1,320(280~1,770)	1,590(280~2,050)
Power consumption Rated	Heating 17 #2	W	1,420	1,760
EER #1 [SEER] #3	Cooling		9.0 [12.0]	10.0[13.0]
HSPF IV(V) #4	Heating		7.7 (6.7)	
COP	Heating #1		2.73	2.95
INDOOR UNIT MODEL			MSZ09UN	MSZ12UN
External finish			White	
Power supply		V, phase, Hz	115, 1, 60	
Max. fuse size (time delay)/ Disconnect switch		A	15	
Min. circuit ampacity		A	0.5	0.6
Fan motor		F.L.A	0.37	0.43
Auxiliary heater		A(kW)	—	
Airflow Low—Med.—High	HEAT Dry	CFM	184-237-297	360-395-452
	COOL Dry(Wet)	CFM	148(124)-215(180)-279(233)	360(311)-395(339)-452(388)
Moisture removal		pt./h	2.3	2.8
Sound level Low-Med.-High		dB(A)	22-29-36	35-39-42
Cond. drain connection O.D.		in.	5/8	
Dimensions	W	in.	33-1/2	39-15/16
	D	in.	7-1/2	
	H	in.	10-15/16	12-5/8
Weight		lb.	20	31
OUTDOOR UNIT MODEL			MUZ09UN	MUZ12UN
External finish			Munsell 5.6Y 8.0/0.5	
Power supply		V, phase, Hz	208/230, 1, 60	
Max. fuse size (time delay)		A	15	
Min. circuit ampacity		A	14	
Fan motor		F.L.A	0.43	
Compressor	Model		SHV-130FEA	
	Winding resistance (at 68°F) Ω		U-V 1.05 U-W 1.05 U-W 1.05	
	R.L.A		9.7	
	L.R.A		41	
Refrigerant control			Liner expansion valve	
Sound level		dB(A)	49	
Defrost method			Reverse cycle	
Dimensions	W	in.	28	
	D	in.	10-1/16	
	H	in.	21-1/4	
Weight		lb.	75	
REMOTE CONTROLLER			Wireless type	
Control voltage (by built-in transformer)			12V DC	
REFRIGERANT PIPING			Not supplied (optional parts)	
Refrigerant pipe size (Min. wall thickness)	Liquid	in.	1/4 (0.0265)	
	Gas	in.	3/8 (0.0285)	1/2 (0.0285)
Connection method	Indoor		Flared	
	Outdoor		Flared	
Between the indoor & outdoor units	Height difference	ft.	Max. 25	
	Piping length	ft.	Max. 49	
Refrigerant charge (R22)			2 lb. 7 oz.	2 lb. 14 oz.
Refrigerating oil (Model)		oz.	10.8 (MS56)	

NOTE : Test conditions are based on ARI 210/240.

#1 : Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, (75°FWB) Rated frequency: Hz
 (heating) — Indoor : 70°FDB, 60°FWB, Outdoor : 47°FDB, 43°FWB Rated frequency: Hz
 #2 : (heating) — Indoor : 70°FDB, 60°FWB, Outdoor : 17°FDB, 15°FWB Maximum frequency: Hz

Test condition

※3, ※4

(Unit : [°F])

	Mode	Test	Indoor air condition		Outdoor air condition	
			Dry bulb	Wet bulb	Dry bulb	Wet bulb
ARI	SEER (Cooling)	"A" Cooling Steady State at rated compressor Speed	80	67	95	(75)
		"B-2" Cooling Steady State at rated compressor Speed	80	67	82	(65)
		"B-1" Cooling Steady State at minimum compressor Speed	80	67	82	(65)
		Low ambient Cooling Steady State at minimum compressor Speed	80	67	67	(53.5)
		Intermediate Cooling Steady State At Intermediate compressor Speed※5	80	67	87	(69)
	HSPF (Heating)	Standard Rating-Heating at rated compressor Speed	70	60	47	43
		Low temperature Heating at rated compressor Speed	70	60	17	15
		Max temperature Heating at minimum compressor Speed	70	60	62	56.5
		High temperature Heating at minimum compressor Speed	70	60	47	43
		Frost Accumulation at rated compressor Speed	70	60	35	33
		Frost Accumulation at Intermediate compressor Speed※5	70	60	35	33

※5 : At Intermediate compressor Speed

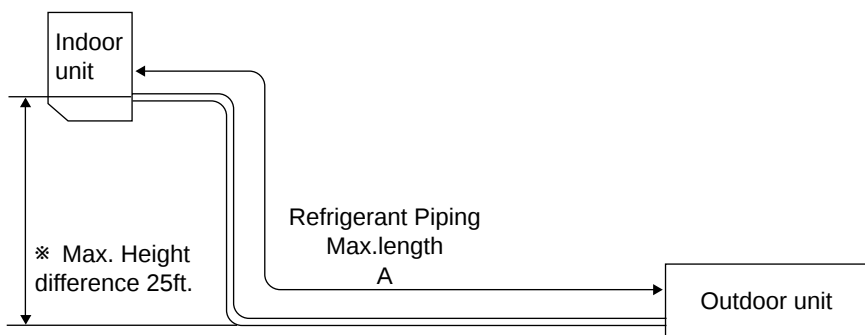
=("Cooling rated compressor speed" - "minimum compressor speed") / 3 + "minimum compressor speed".

MAX. REFRIGERANT PIPING LENGTH

Model	Additional piping Max. length : ft. A	Piping size : in.				Length of connecting pipe : in.	
		Gas		Liquid		Indoor unit	Outdoor unit
		Outside diameter	Minimum Wall thickness	Outside diameter	Minimum Wall thickness		
MSZ09UN MUZ09UN	49	φ 3/8	0.0285	φ 1/4	0.0265	Gas : 16-15/16	Gas : 0
MSZ12UN MUZ12UN		φ 1/2				Liquid : 19-11/16	Liquid : 0

MAX. HEIGHT DIFFERENCE

※ Height difference should be within 25ft. regardless of which unit, indoor or outdoor position is high.



MSZ09UN MUZ09UN

MSZ12UN MUZ12UN

4-1. PERFORMANCE DATA

1) COOLING CAPACITY

Model	Indoor air	Outdoor intake air DB temperature(°F)														
	IWB (°F)	75			85			95			105			115		
		TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC
MSZ09UN	71	10.8	6.1	0.87	10.1	5.7	0.96	9.5	5.4	1.03	8.8	5.0	1.08	8.1	4.6	1.13
	67	10.2	7.1	0.82	9.5	6.7	0.91	8.8	6.2	0.98	8.2	5.7	1.04	7.5	5.3	1.09
	63	9.6	8.0	0.78	8.9	7.4	0.87	8.3	6.9	0.94	7.5	6.3	1.00	6.9	5.7	1.04
MSZ12UN	71	14.0	8.3	1.01	13.1	7.8	1.11	12.3	7.3	1.20	11.4	6.8	1.26	10.5	6.3	1.31
	67	13.2	9.7	0.96	12.3	9.0	1.05	11.4	8.3	1.14	10.6	7.7	1.21	9.7	7.1	1.27
	63	12.4	10.7	0.91	11.5	9.9	1.01	10.7	9.3	1.09	9.7	8.4	1.16	8.9	7.7	1.21

NOTE 1. IWB : Intake air wet-bulb temperature

TC : Total Capacity (x10³ Btu/h), SHC : Sensible Heat Capacity (x10³ Btu/h)

TPC : Total Power Consumption (kW)

2. SHC is based on 80°F of indoor intake air DB temperature.

2) COOLING CAPACITY CORRECTIONS

Model	Refrigerant piping length (one way : ft.)		
	25 (std.)	40	49
MSZ09UN MUZ09UN MSZ12UN MUZ12UN	1.0	0.954	0.927

3) HEATING CAPACITY

Model	Indoor air	Outdoor intake air WB temperature(°F)											
	IDB (°F)	15		25		35		43		45		55	
		TC	TPC	TC	TPC	TC	TPC	TC	TPC	TC	TPC	TC	TPC
MSZ09UN	75	7.1	0.98	8.9	1.16	10.6	1.29	12.0	1.35	12.4	1.37	14.0	1.43
	70	7.6	0.95	9.2	1.13	10.9	1.25	12.3	1.32	12.7	1.35	14.3	1.40
	65	7.7	0.91	9.7	1.09	11.3	1.22	12.7	1.29	13.0	1.31	14.6	1.37
MSZ12UN	75	9.3	1.18	11.6	1.39	13.8	1.55	15.6	1.63	16.1	1.65	18.2	1.72
	70	9.8	1.14	12.0	1.36	14.2	1.51	16.0	1.59	16.5	1.62	18.6	1.69
	65	10.1	1.10	12.6	1.31	14.6	1.47	16.5	1.55	17.0	1.57	19.0	1.65

NOTE: 1. IDB : Intake air dry-bulb temperature

TC : Total Capacity (x10³ Btu/h)

TPC : Total Power Consumption (kW)

2. Above data is for heating operation without any frost.

How to operate with fixed operational frequency of the compressor.

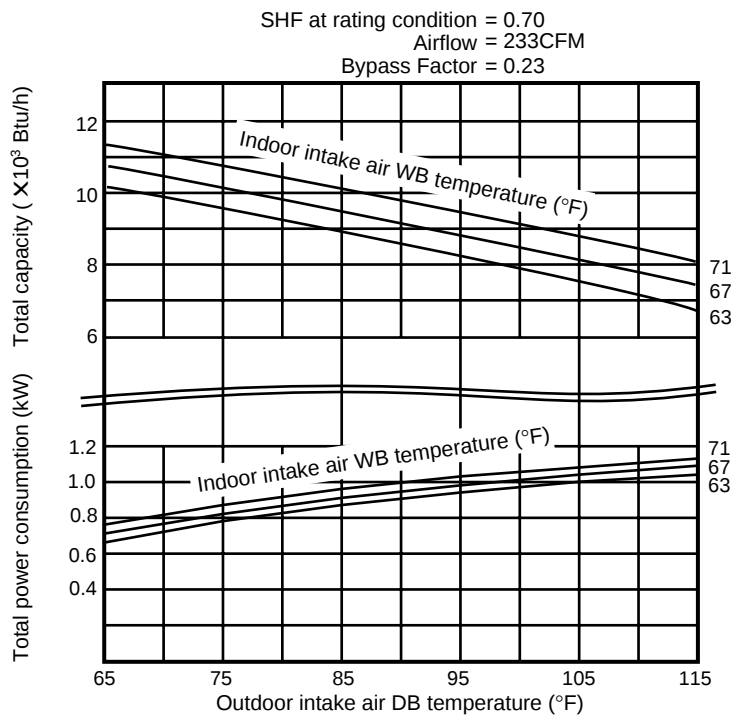
1. Press the EMERGENCY OPERATION switch on the front of the indoor unit, and select either EMERGENCY COOL mode or EMERGENCY HEAT mode before starting to operate the air conditioner.
2. The compressor starts up.
The operational frequency of the compressor is MSZ09UN: 64Hz, MSZ12UN: 70Hz in EMERGENCY COOL mode and 58Hz in EMERGENCY HEAT mode.
3. The fan speed of the indoor unit is High.
4. This operation continues for 30minutes.
5. In order to release this operation, press the EMERGENCY OPERATION switch twice or once, or press any button on the remote controller.

4-2. PERFORMANCE CURVE

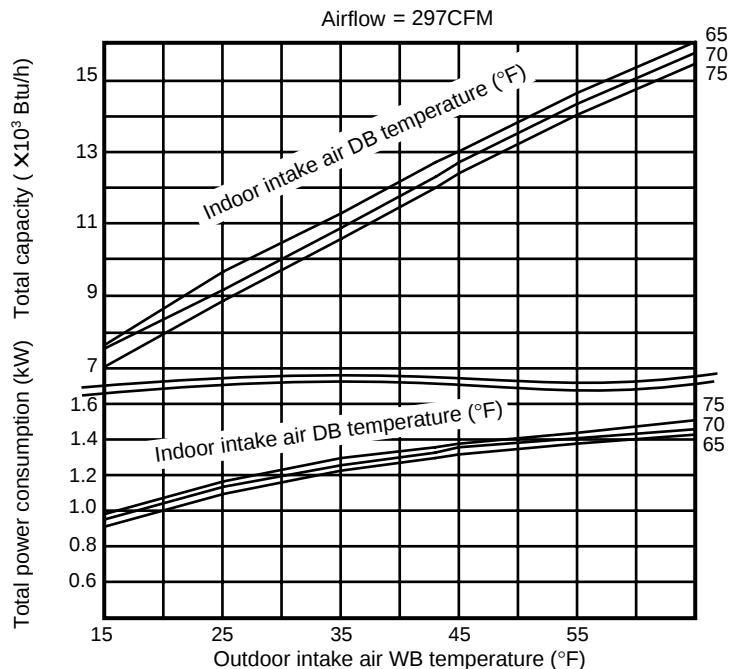
How to operate with fixed operational frequency of the compressor.

1. Press the EMERGENCY OPERATION switch on the front of the indoor unit, and select either EMERGENCY COOL mode or EMERGENCY HEAT mode before starting to operate the air conditioner.
2. The compressor starts up.
The operational frequency of the compressor is 64Hz in EMERGENCY COOL mode and 58Hz in EMERGENCY HEAT mode.
3. The fan speed of the indoor unit is High.
4. This operation continues for 30minutes.
5. In order to release this operation, press the EMERGENCY OPERATION switch twice or once, or press any button on the remote controller.

MSZ09UN MUZ09UN (Cooling)



MSZ09UN MUZ09UN (Heating)

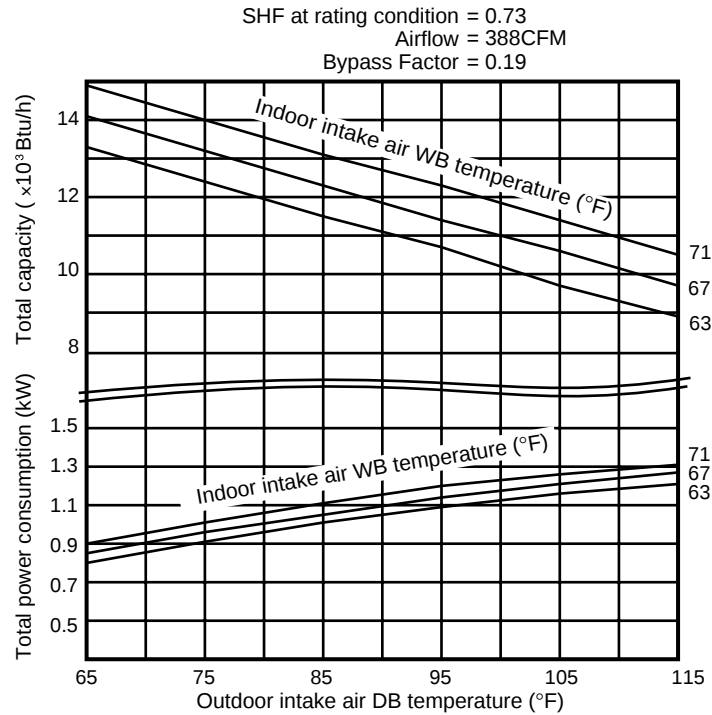


This value of frequency is not the same as the actual frequency in operating. Refer to the page 16, 17 for the relationships between frequency and capacity.

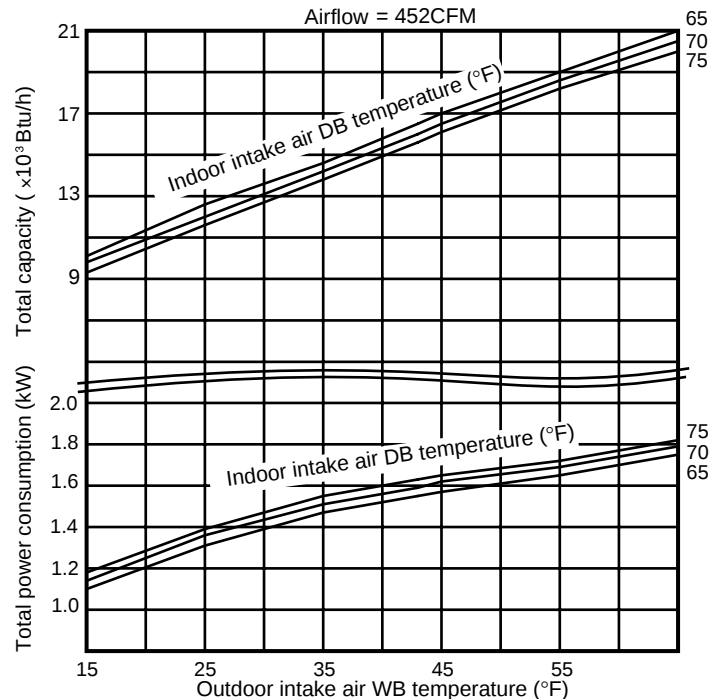
How to operate with fixed operational frequency of the compressor.

1. Press the EMERGENCY OPERATION switch on the front of the indoor unit, and select either EMERGENCY COOL mode or EMERGENCY HEAT mode before starting to operate the air conditioner.
2. The compressor starts up.
The operational frequency of the compressor is 70Hz in EMERGENCY COOL mode and 58Hz in EMERGENCY HEAT mode.
3. The fan speed of the indoor unit is High.
4. This operation continues for 30minutes.
5. In order to release this operation, press the EMERGENCY OPERATION switch twice or once, or press any button on the remote controller.

MSZ12UN MUZ12UN
(Cooling)



MSZ12UN MUZ12UN
(Heating)



This value of frequency is not the same as the actual frequency in operating. Refer to the page 16, 17 for the relationships between frequency and capacity.

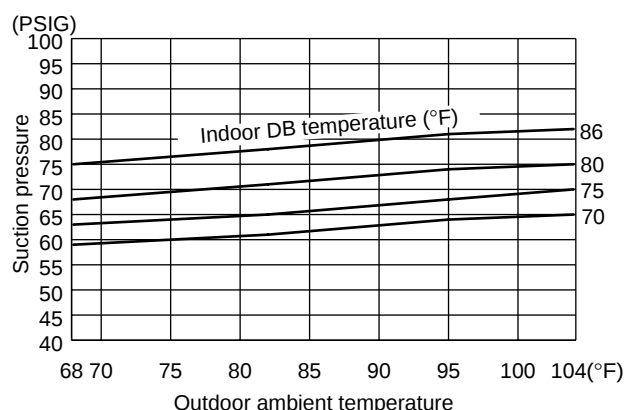
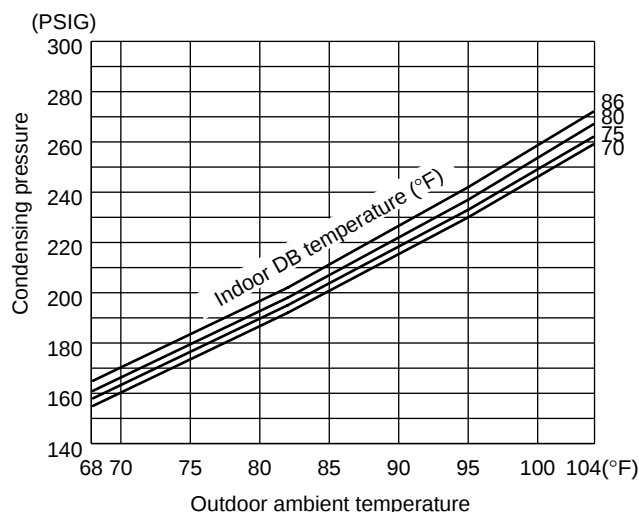
4-3. Condensing pressure

How to operate with fixed operational frequency of the compressor.

1. Press the EMERGENCY OPERATION switch on the front of the indoor unit, and select either EMERGENCY COOL mode or EMERGENCY HEAT mode before starting to operate the air conditioner.
2. The compressor starts up.
The operational frequency of the compressor is MSZ09UN: 64Hz, MSZ12UN: 70Hz in EMERGENCY COOL mode and 58Hz in EMERGENCY HEAT mode.
3. The fan speed of the indoor unit is High.
4. This operation continues for 30minutes.
5. In order to release this operation, press the EMERGENCY OPERATION switch twice or once, or press any button on the remote controller.

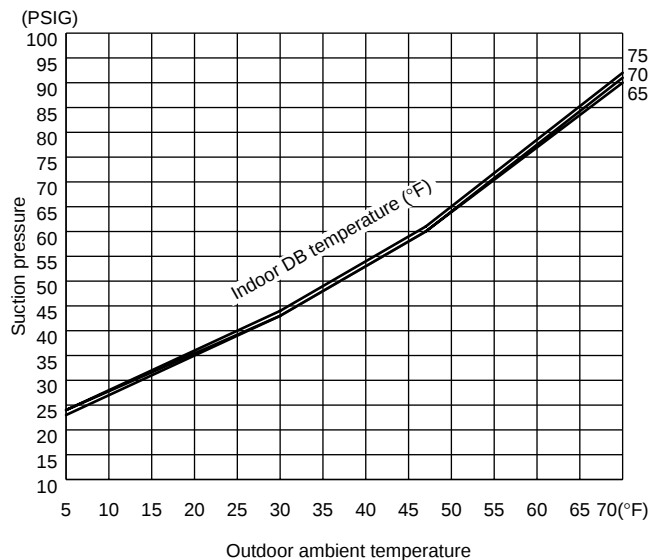
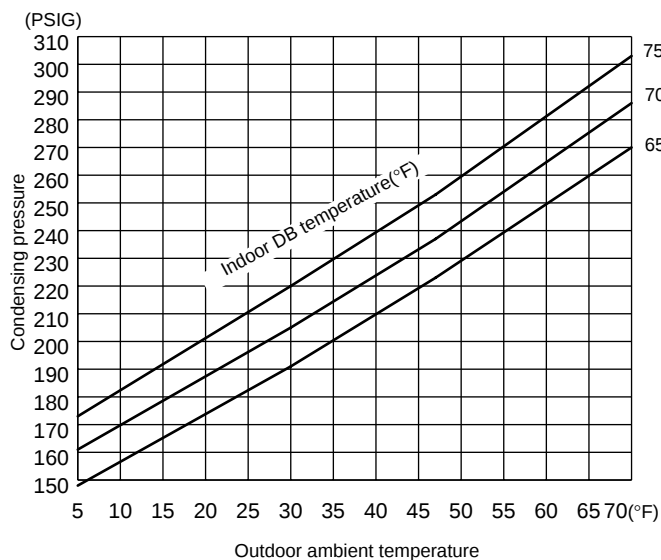
MSZ09UN (Cooling)

Data is based on the condition of indoor humidity 50%.
Air flow should be set to High speed.



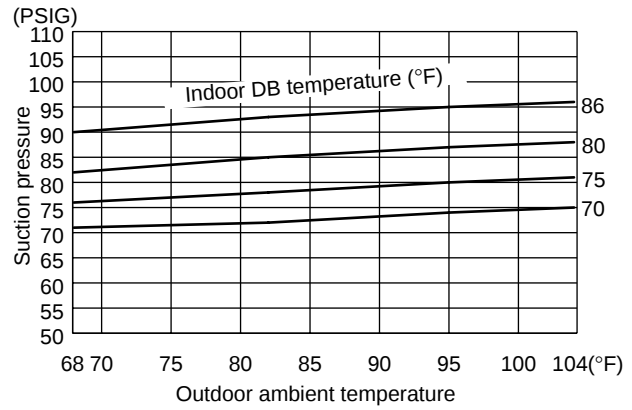
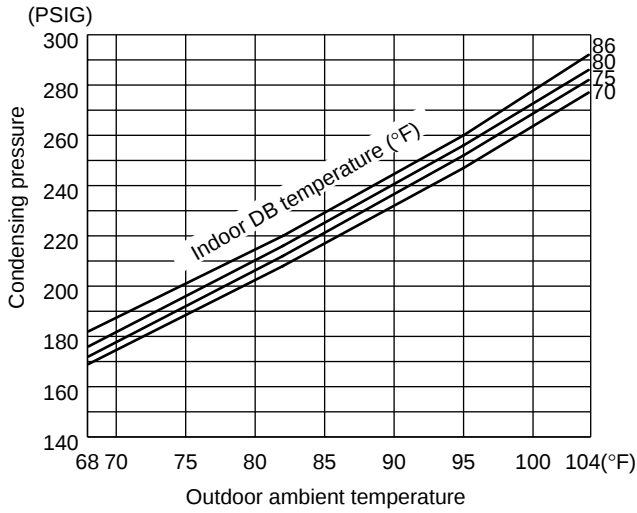
MSZ09UN (Heating)

Data is based on the condition of outdoor humidity 75%.
Air flow should be set to High speed.
Data is for heating operation without any frost.



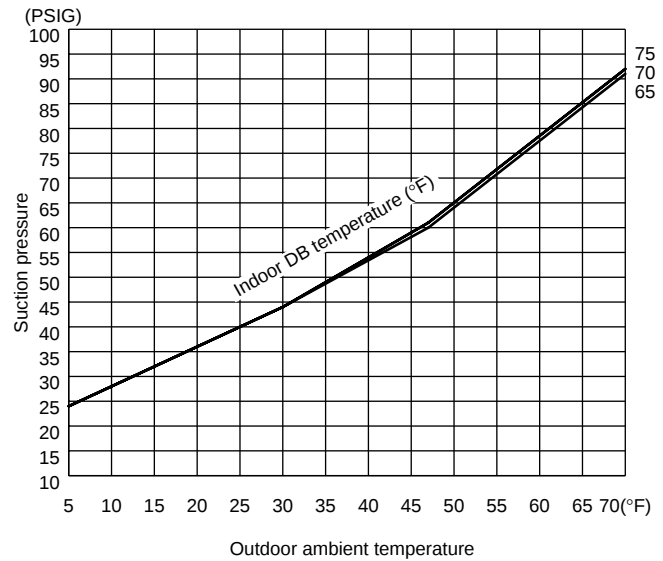
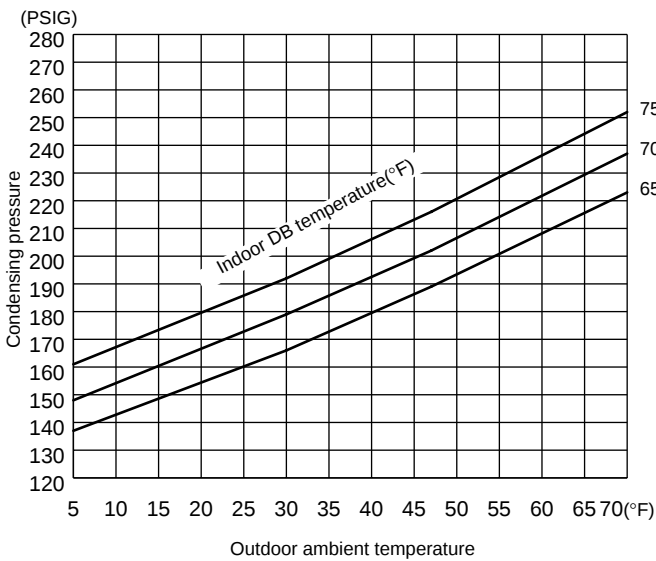
MSZ12UN
(Cooling)

Data is based on the condition of indoor humidity 50%.
Air flow should be set to High speed.



MSZ12UN
(Heating)

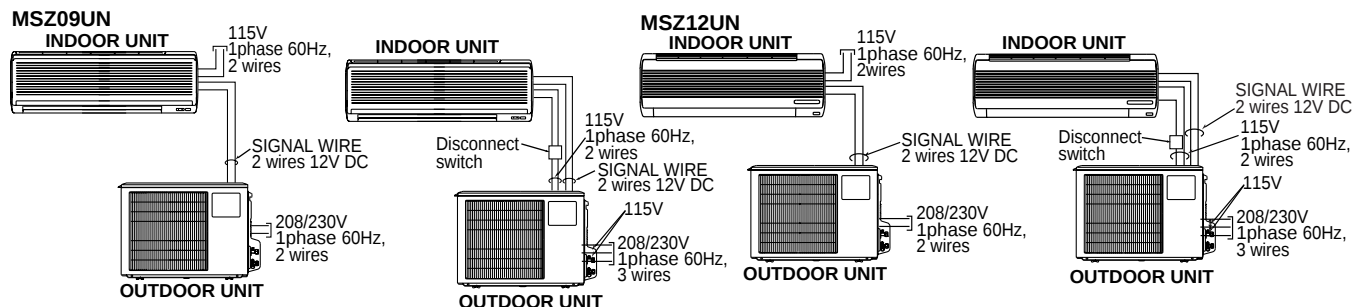
Data is based on the condition of outdoor humidity 75%.
Air flow should be set to High speed.
Data is for heating operation without any frost.



4-4. STANDARD OPERATION DATA

Model			MSZ09UN		MSZ12UN	
Item		Unit	Cooling	Heating	Cooling	Heating
Total	Capacity	Btu / h	8,800	12,300	11,400	16,000
	SHF	—	0.70	—	0.73	—
	Input	kW	980	1,320	1,140	1,590
	Rated frequency	Hz	64	76	70	99
Electrical circuit	Indoor unit		MSZ09UN		MSZ12UN	
	Power supply (V, phase, Hz)		115, 1, 60		115, 1, 60	
	Input	kW	0.035		0.047	
	Fan motor current	A	0.34		0.41	
	Aux. heater current	A	—		—	
	Outdoor unit		MUZ09UN		MUZ12UN	
	Power supply (V, phase, Hz)		208/230, 1, 60		208/230, 1, 60	
	Input	kW	0.945	1.285	1.093	1.543
	Comp. current	A	5.34/5.11	6.84/6.81	5.84/5.71	8.24/7.71
	Fan motor current	A	0.36/0.39		0.36/0.39	
Refrigerant circuit	Condensing pressure	PSIG	237	276	256	265
	Suction pressure	PSIG	74	59	87	57
	Discharge temperature	°F	184	198	186	197
	Condensing temperature	°F	112	122	118	
	Suction temperature	°F	52	36	54	34
	Comp. shell bottom temp	°F	154	172	160	171
	Ref. pipe length	ft.	25		25	
	Refrigerant charge (R22)	—	2 lb. 7 oz.		2 lb. 14 oz.	
Indoor unit	Intake air temperature	DB	°F	80	70	80
		WB	°F	67	60	67
	Discharge air temperature	DB	°F	57	100	58
		WB	°F	56	—	56
	Fan speed (High)	rpm	950	1,000	1,200	
	Airflow (High)	CFM	233(Wet)	297(Dry)	388(Wet)	452(Dry)
Outdoor unit	Intake air temperature	DB	°F	95	47	95
		WB	°F	—	43	—
	Fan speed	rpm	650/720		650/720	
	Airflow	CFM	847/953		847/953	

POWER SUPPLY



* Control voltage

Power supply voltage to serial signal circuit is 12V DC.
Voltage between ① - and ② + on in-out terminal block will be 12V DC peak voltage.

4-5. OPERATING RANGE

(1) POWER SUPPLY

	Model	Rated voltage	Guaranteed Voltage
Indoor unit	MSZ09UN MSZ12UN	115V 1phase 60Hz	Min. 103V 115V Max. 127V ----- ----- -----
Outdoor unit	MUZ09UN MUZ12UN	208/230V 1phase 60Hz	Min. 198V 208V 230V Max. 253V ----- ----- -----

(2) OPERATION

Function	Intake air temperature	Indoor		Outdoor	
	Condition	DB (°F)	WB (°F)	DB (°F)	WB (°F)
Cooling	Standard temperature	80	67	95	—
	Maximum temperature	95	71	115	—
	Minimum temperature	67	57	67	—
	Maximum humidity	78%		—	
Heating	Standard temperature	70	60	47	43
	Maximum temperature	80	67	75	65
	Minimum temperature	70	60	17	15

4-6. OUTLET AIR SPEED AND COVERAGE RANGE

Model	Mode	Function	Air flow (CFM)	Air speed (ft./sec.)	Coverage range (ft.)
MSZ09UN	HEAT	Dry	297	15.8	22.3
		Wet	233	12.4	17.6
	COOL	Dry	279	14.9	21.0
MSZ12UN	HEAT	Dry	452	18.2	29.2
		Wet	388	15.6	25.2
	COOL	Dry	452	18.2	29.2

- The air coverage range is the figure up to the position where the air speed is 1 ft./sec., when air is blown out horizontally from the unit properly at the High speed position.

The coverage range should be used only as a general guideline since it varies according to the size of the room and furniture arranged inside the room.

4-7. ADDITIONAL REFRIGERANT CHARGE R22(oz.)

Model		Outdoor unit precharged (up to 25ft.)	Refrigerant piping length (one way)					
			25ft.	30ft.	35ft.	40ft.	45ft.	49ft.
MSZ09UN	MUZ09UN	2 lb. 7 oz.	0	1.62	3.24	4.86	6.48	8.10
MSZ12UN	MUZ12UN	2 lb. 14 oz.						

MSZ09UN MSZ12UN MUZ09UN MUZ12UN

The standard data contained in these specifications apply only to the operation of the system under normal conditions. Since 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 system under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

INDOOR UNIT 103 ~ 127V 60Hz
OUTDOOR UNIT 198 ~ 253V 60Hz

(2) AIR FLOW

Air flow should be set at MAX.

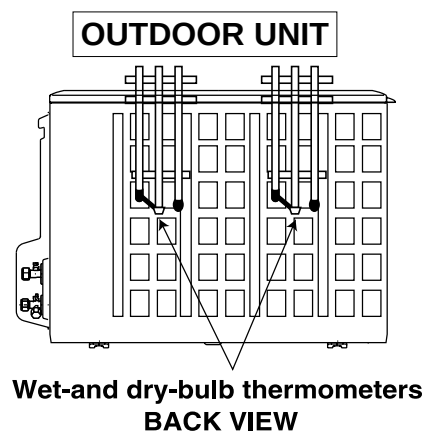
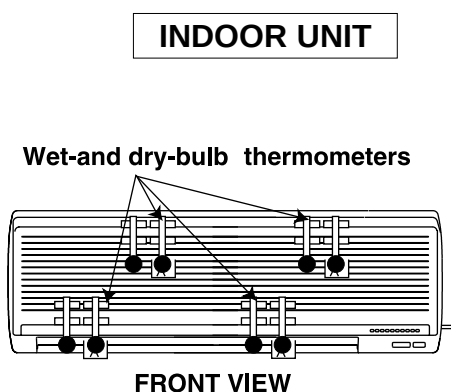
(3) MAIN READINGS

(1) Indoor intake air wet-bulb temperature	:°F WB	} Cooling
(2) Indoor outlet air wet-bulb temperature	:°F WB	
(3) Outdoor intake air dry-bulb temperature	:°F DB	
(4) Total input	:W	} Heating
(5) Indoor intake air dry-bulb temperature	:°F DB	
(6) Outdoor intake air wet-bulb temperature	:°F WB	
(7) Total input	:W	

Indoor air wet/dry-bulb temperature difference on the left side of the chart on page 16 and 17 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.

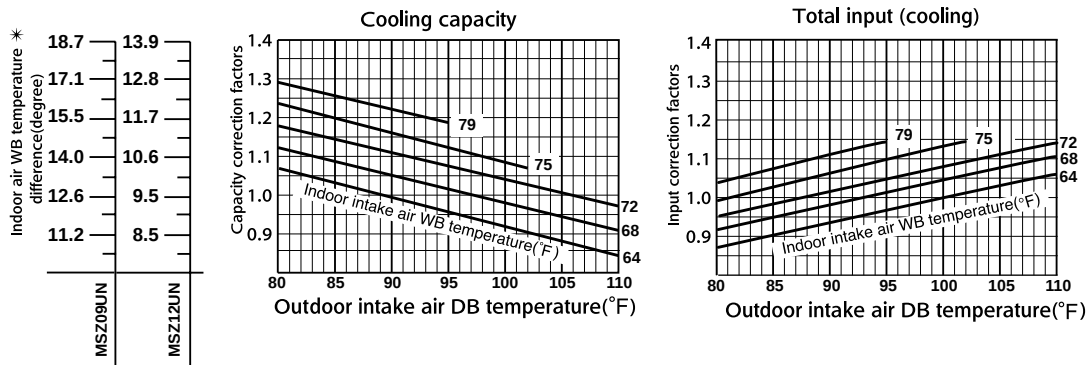
How to measure the indoor air wet-bulb/ dry-bulb temperature difference

1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake 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 intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of 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.



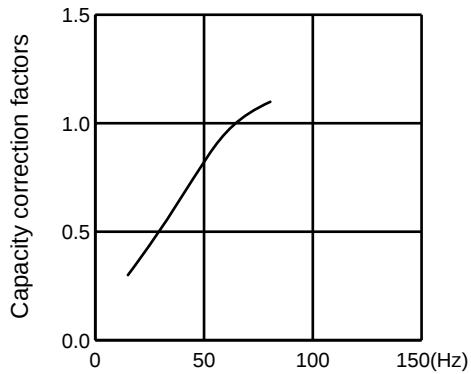
Cooling capacity

* These values are under rated (frequency).



MUZ09UN

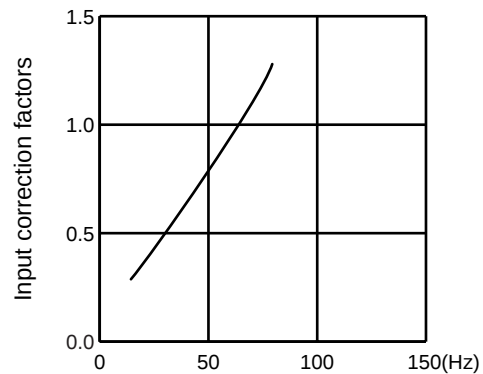
Correction of Cooling capacity



The operational frequency of compressor

MUZ09UN

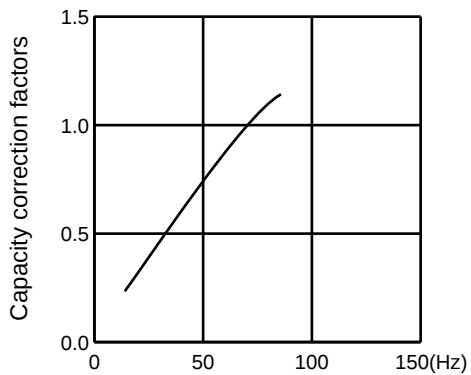
Correction of total input



The operational frequency of compressor

MUZ12UN

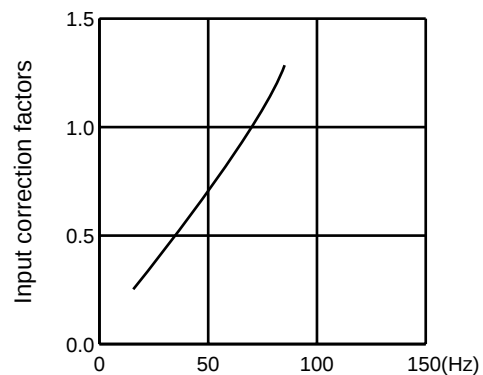
Correction of Cooling capacity



The operational frequency of compressor

MUZ12UN

Correction of total input

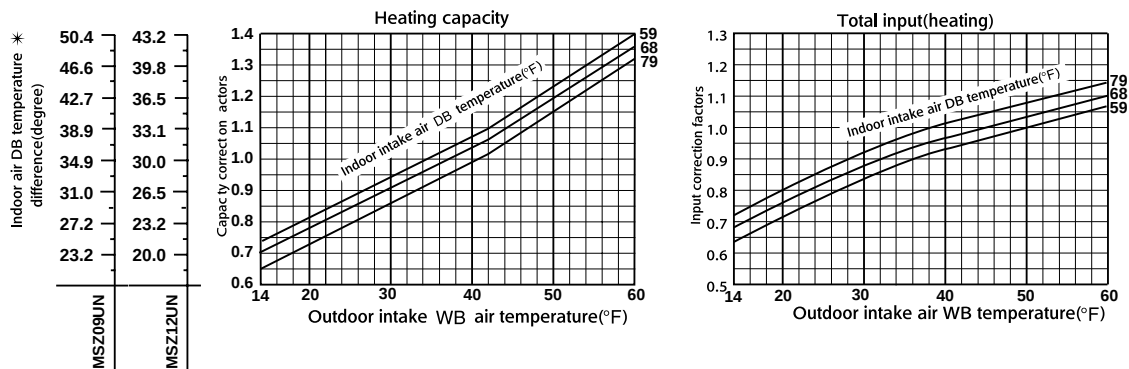


The operational frequency of compressor

Heating capacity

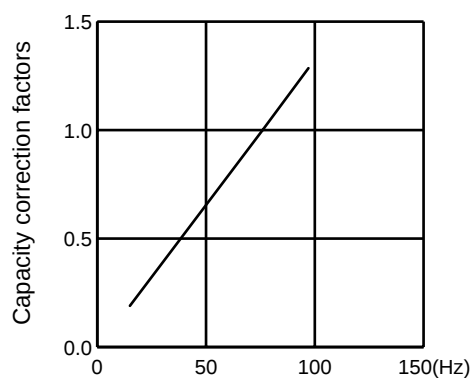
NOTE: The following curves are for the heating operation without any frost.

* These values are under rated (frequency).



MUZ09UN

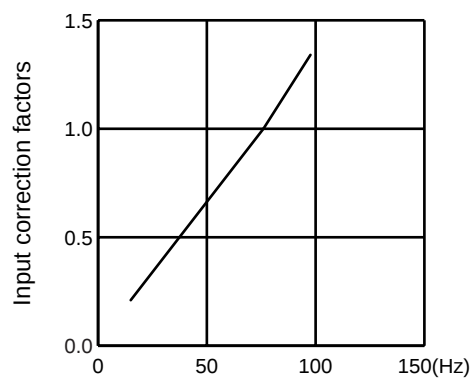
Correction of Heating capacity



The operational frequency of compressor

MUZ09UN

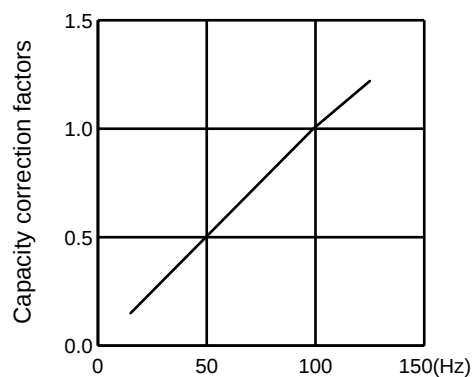
Correction of total input



The operational frequency of compressor

MUZ12UN

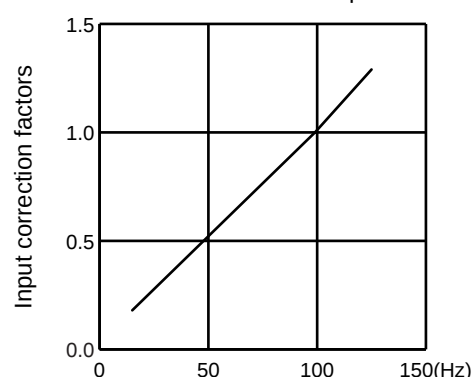
Correction of Heating capacity



The operational frequency of compressor

MUZ12UN

Correction of total input

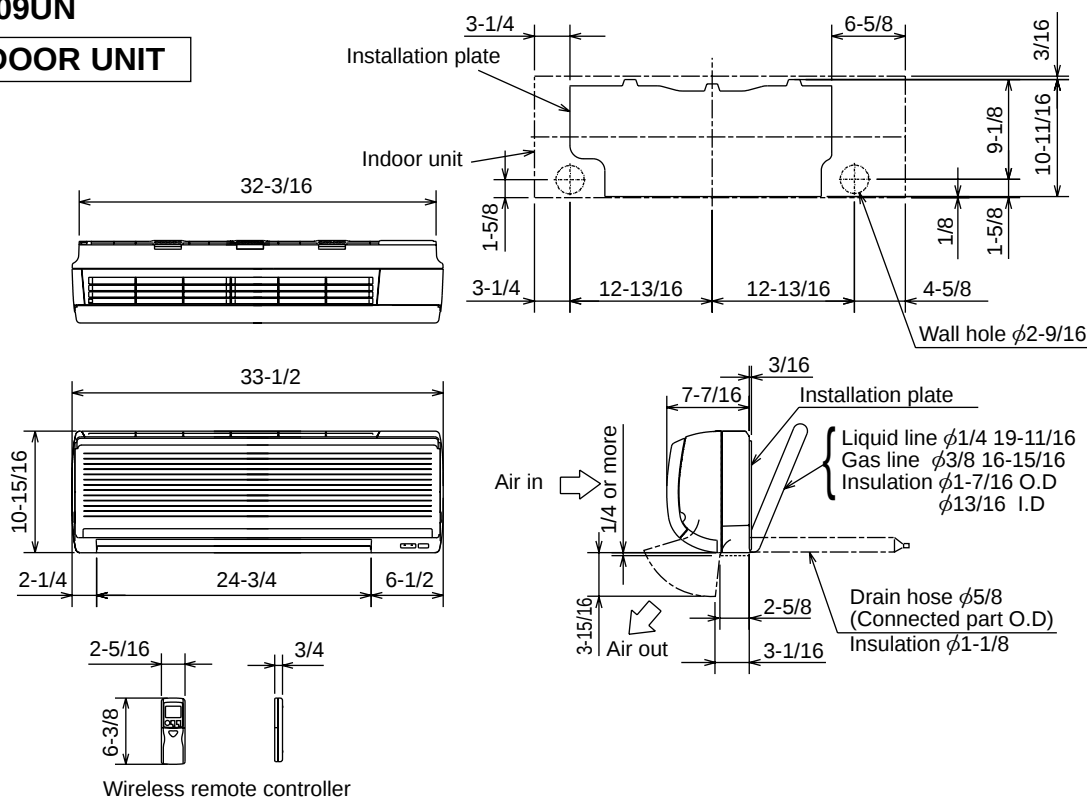


The operational frequency of compressor

MSZ09UN

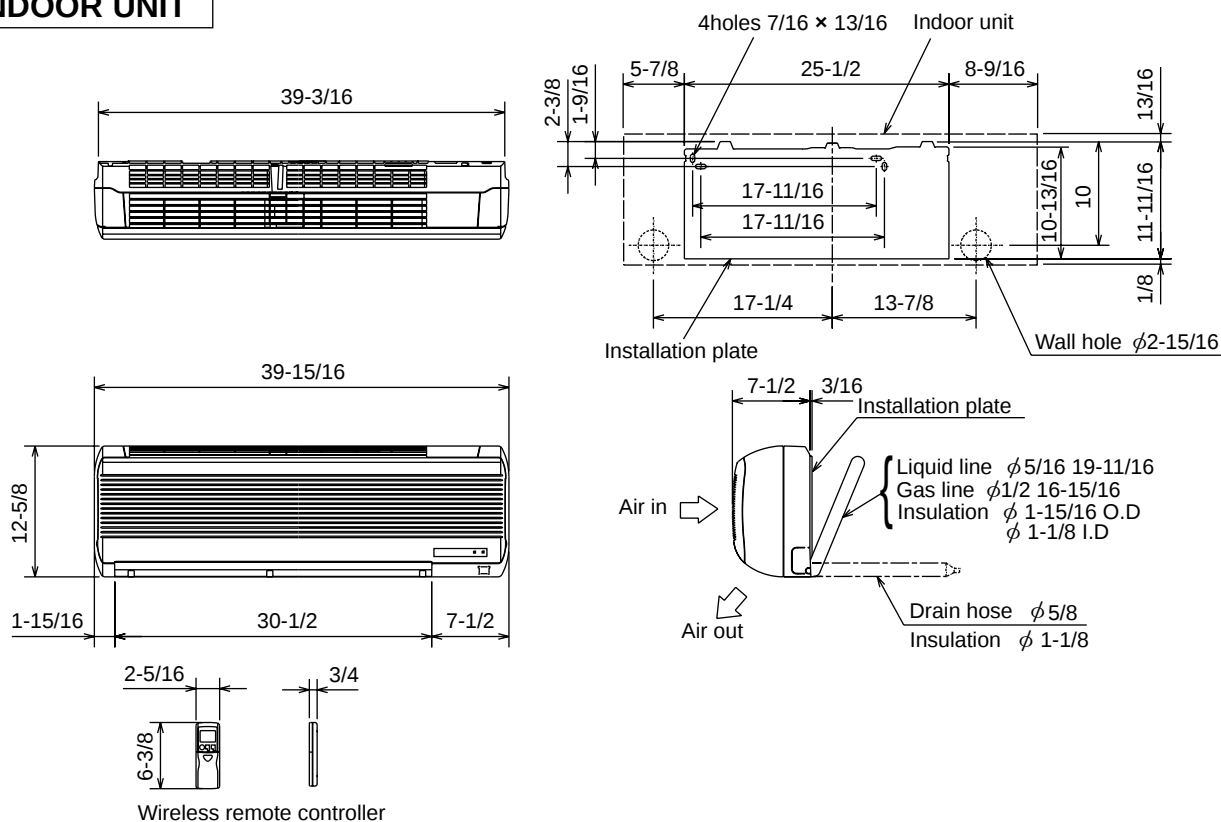
Unit: inch

INDOOR UNIT



MSZ12UN

INDOOR UNIT



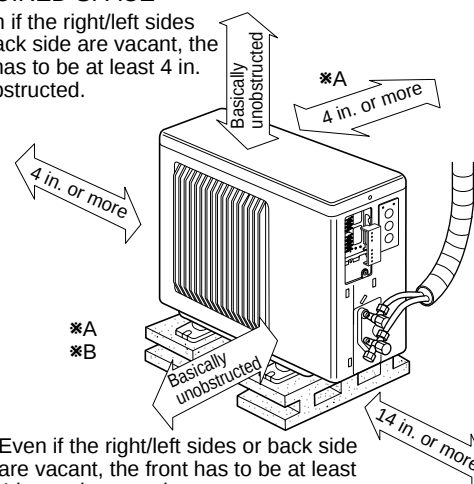
MUZ09UN MUZ12UN

OUTDOOR UNIT

Unit: inch

REQUIRED SPACE

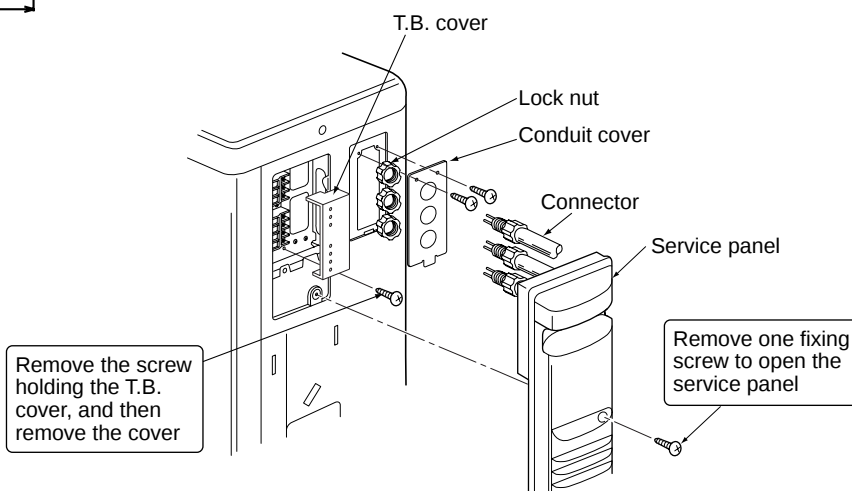
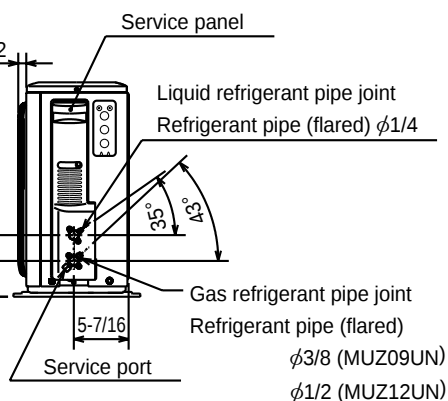
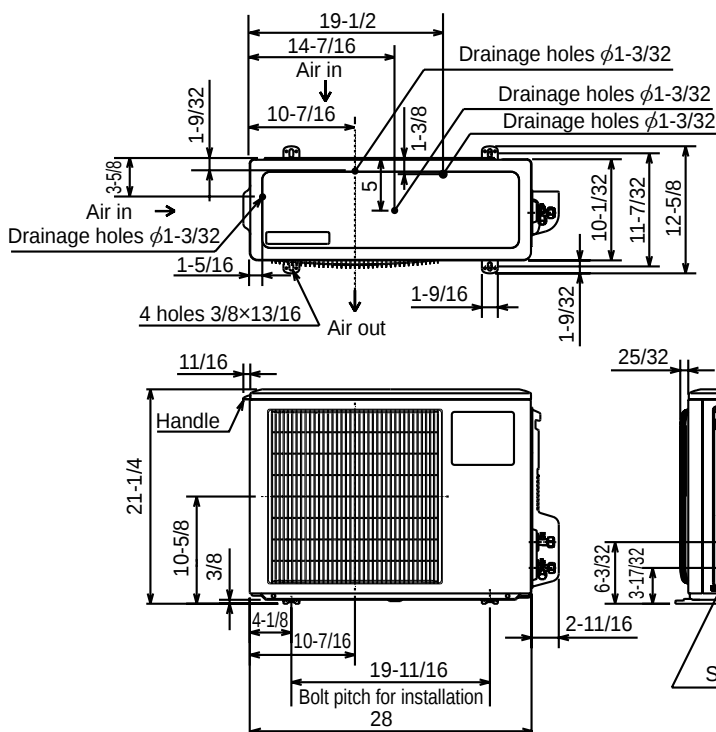
Even if the right/left sides or back side are vacant, the top has to be at least 4 in. unobstructed.



Even if the right/left sides or back side are vacant, the front has to be at least 4 in. unobstructed.

※A In case of poorly-ventilated place, the front or the back has to be at least 8 in. unobstructed.

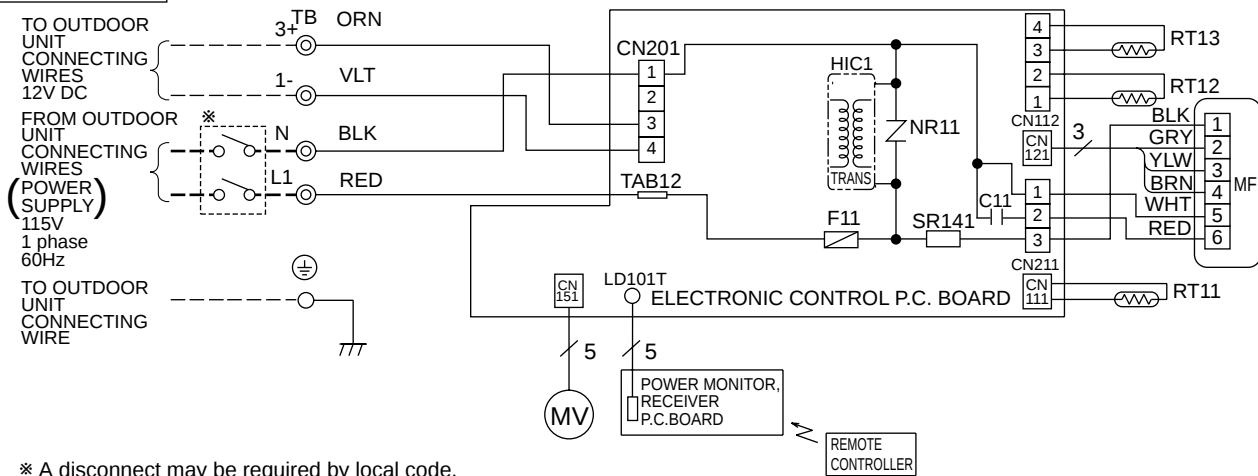
※B The wall may get dirty in case the air is discharged toward it.



MSZ09UN

MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MV	VANE MOTOR	RT13	SUB INDOOR COIL THERMISTOR
F11	FUSE(3A)	NR11	VARISTOR	SR141	SOLID STATE RELAY
HIC1	DC/DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR	TB	TERMINAL BLOCK
MF	INDOOR FAN MOTOR(INNER FUSE)	RT12	MAIN INDOOR COIL THERMISTOR		

NOTE:1. About the outdoor side electric wiring, refer to the outdoor unit electric wiring diagram for servicing.

2. Use copper conductors only.(For field wiring)

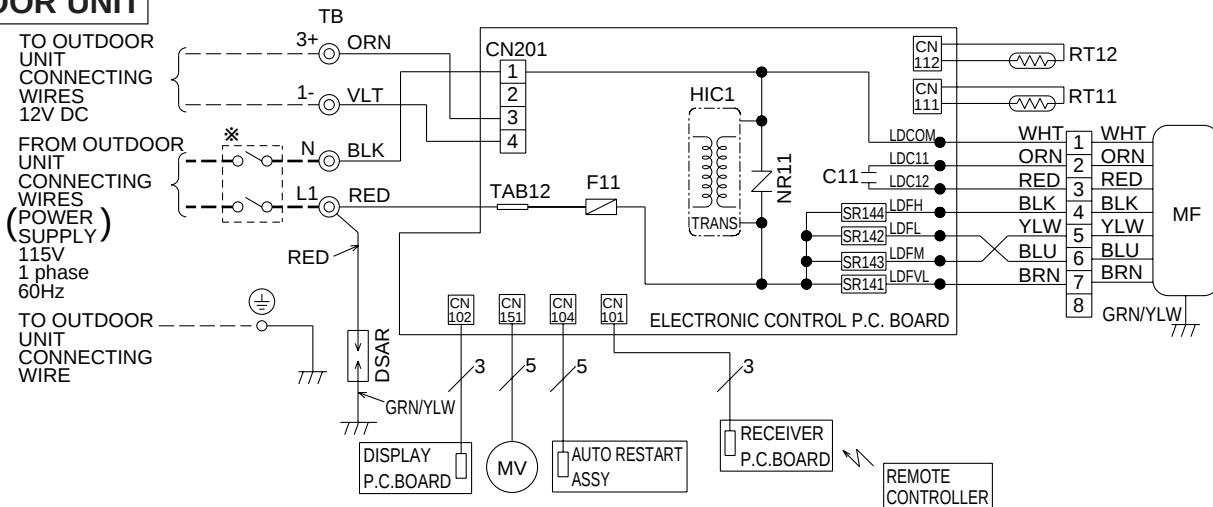
3. Symbols below indicate;

⊙: Terminal block, □□□□: Connector

MSZ12UN

MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MF	INDOOR FAN MOTOR(INNER FUSE)	RT12	INDOOR COIL THERMISTOR
DSAR	SURGE ABSORBER	MV	VANE MOTOR	SR141-SR144	SOLID STATE RELAY
F11	FUSE(3A)	NR11	VARISTOR	TB	TERMINAL BLOCK
HIC1	DC/DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR		

NOTE:1. About the outdoor side electric wiring, refer to the outdoor unit electric wiring diagram for servicing.

2. Use copper conductors only. (For field wiring)

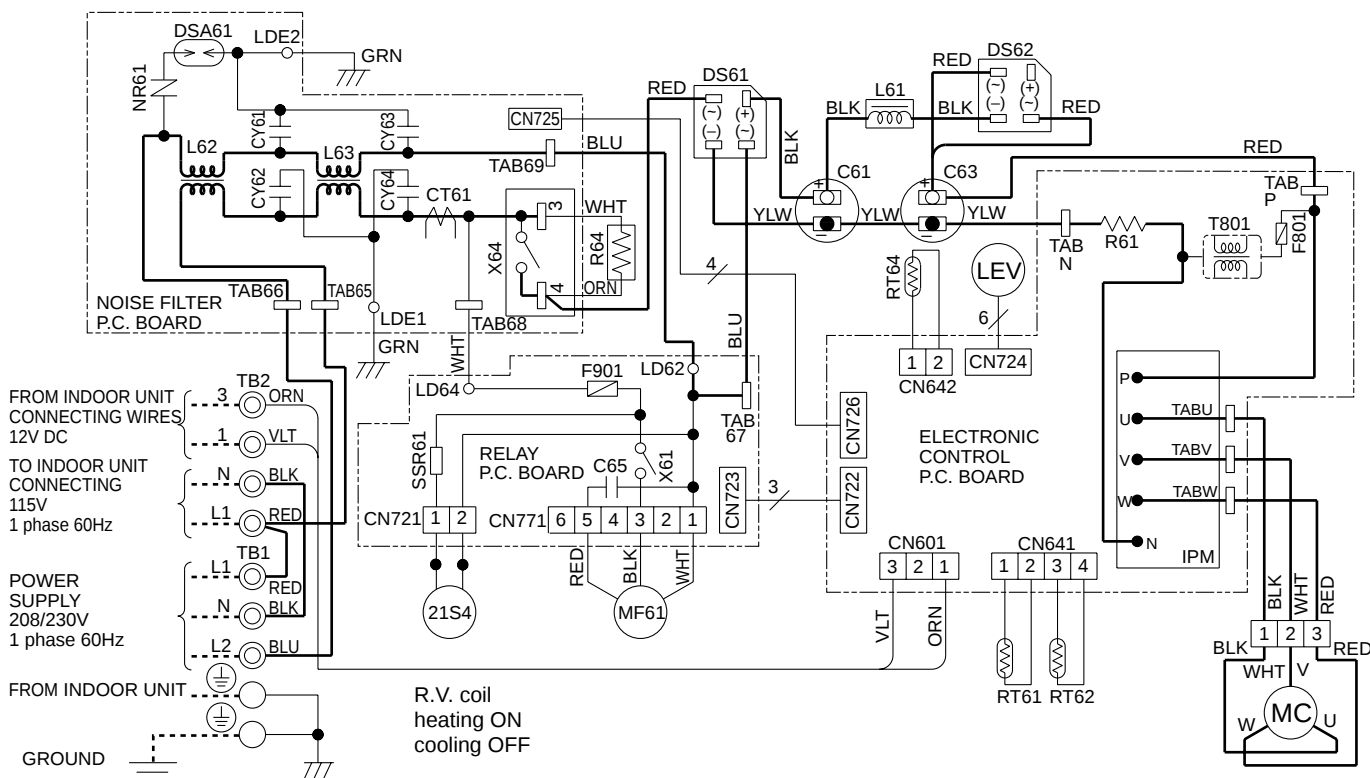
3. Symbols below indicate;

⊙: Terminal block, □□□□: Connector

**MUZ09UN
MUZ12UN**

MODELS WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CT61	CURRENT TRANSFORMER	LEV	EXPANSION VALVE COIL	R64	CURRENT-LIMITING RESISTOR
C61	POWER-FACTOR CAPACITOR	L61	REACTOR	SSR61	SOLID STATE RELAY
C63	SMOOTHING CAPACITOR	L62,L63	COMMON MODE CHOKE COIL	TB1,2	TERMINAL BLOCK
C65	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR	T801	TRANSFORMER
CY61~64	CAPACITOR	MF61	OUTDOOR FAN MOTOR(INNER PROTECTOR)	X61	FAN MOTOR RELAY
DSA61	SURGE ABSORBER	NR61	VARISTOR	X64	RELAY
DS61,62	DIODE STACK	RT61	DEFROST THERMISTOR	21S4	R.V. COIL
F801	FUSE (2A)	RT62	DISCHARGE TEMPERATURE THERMISTOR		
F901	FUSE (1A)	RT64	FIN TEMPERATURE THERMISTOR		
IPM	INTELLIGENT POWER MODULE	R61	CURRENT-DETECTING RESISTOR		

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

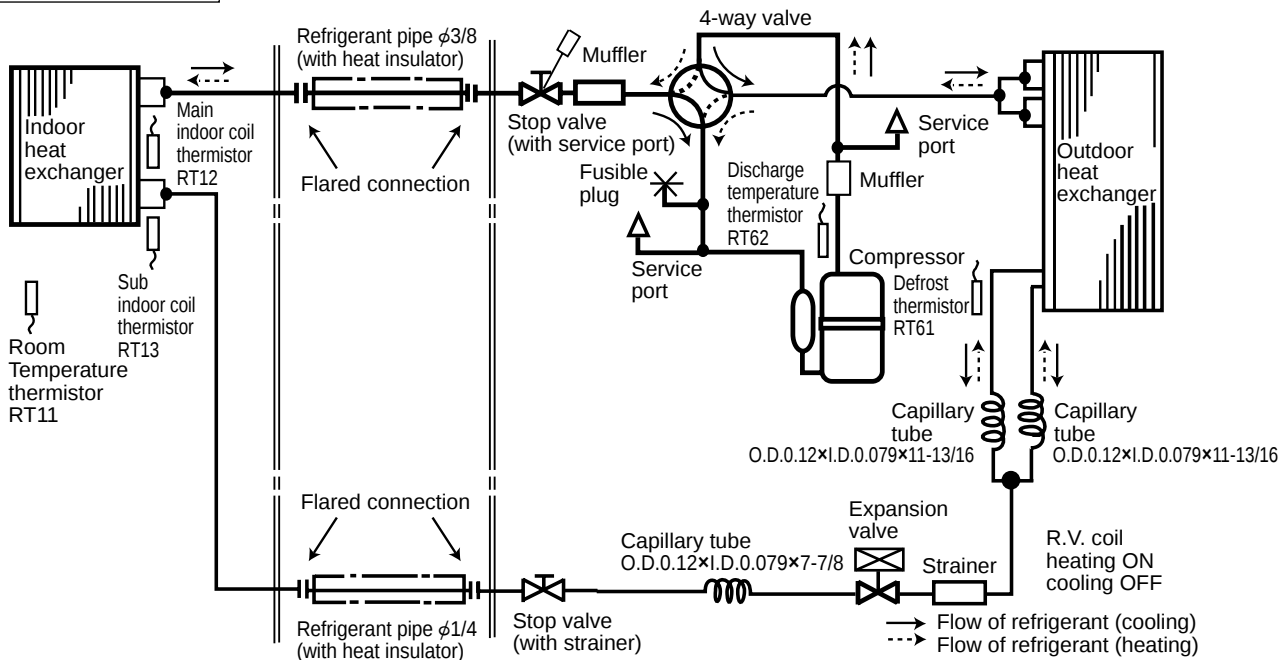
Unit:inch

MSZ09UN

MUZ09UN

INDOOR UNIT

OUTDOOR UNIT



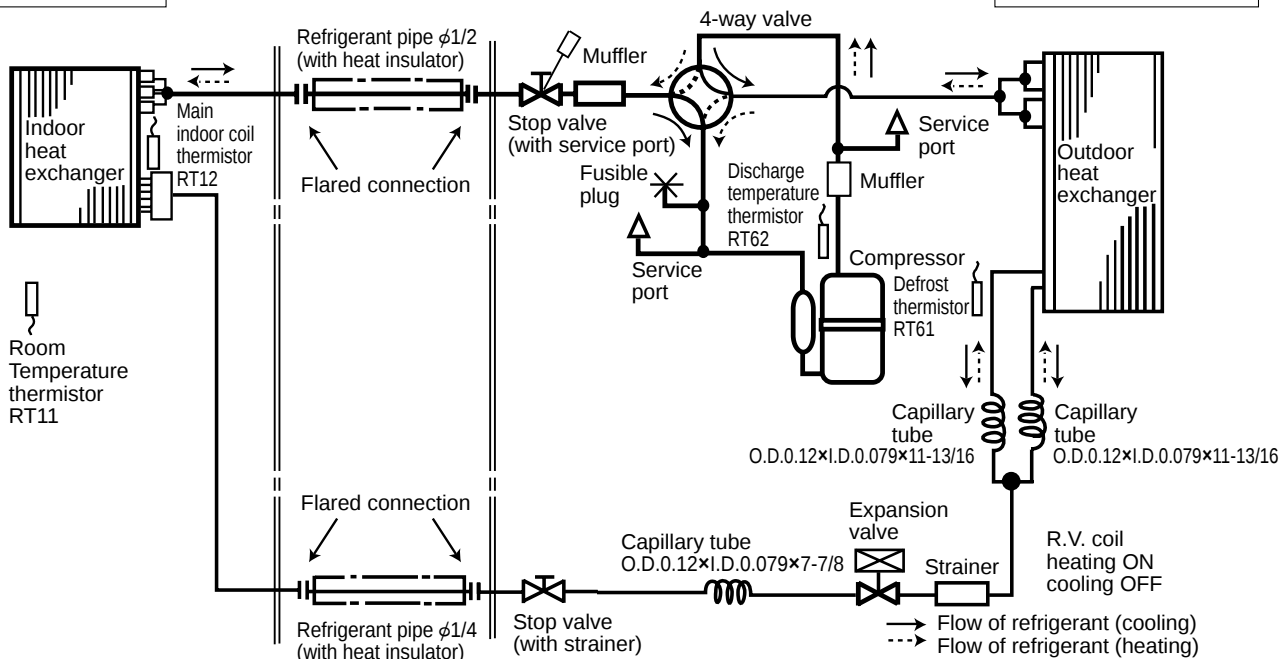
Unit:inch

MSZ12UN

MUZ12UN

INDOOR UNIT

OUTDOOR UNIT



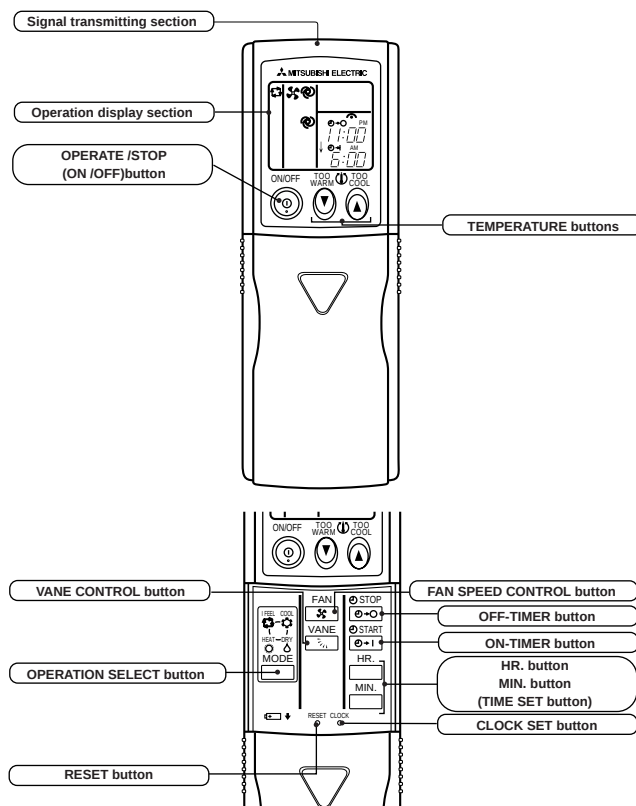
MSZ09UN MUZ09UN
MSZ12UN MUZ12UN

Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.

Indoor unit receives the signal with a beep tone.

When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

WIRELESS REMOTE CONTROLLER

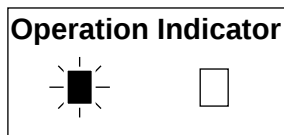


INDOOR UNIT DISPLAY SECTION

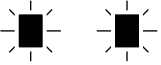
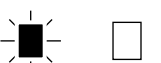
Operation Indicator lamp

The operation indicator located at the right side of the indoor unit indicates the operation state.

- The following indication applies regardless of shape of the indicator.



 **lighted**
 **not lighted**

Indication	Operation state	Difference between target temperature and room temperature
	This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained.	Approx. 4 °F or more
	This shows that the room temperature is approaching the target temperature.	Approx. 4 °F or less

8-1. "I FEEL CONTROL" OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- (2) Press OPERATION SELECT button to set "I FEEL CONTROL". Then a beep tone is heard.
- (3) The operation mode is determined by the room temperature at start-up of the operation.

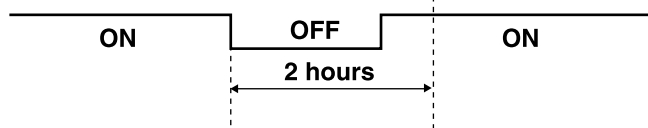
Initial room temperature	mode
77°F or more	COOL mode of "I FEEL CONTROL"
73°F to 77°F	DRY mode of "I FEEL CONTROL"
less than 73°F	HEAT mode of "I FEEL CONTROL"

- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (⌚ START) operation, mode is determined according to the room temperature as the operation starts.
- When the system is stopped with the OPERATE/STOP(ON/OFF) button on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" mode, the system operates in previous mode automatically regardless of the room temperature.

Operation time chart Example

Previous operation
COOL mode of
"I FEEL CONTROL"
or COOL mode

Restart
COOL mode of
"I FEEL CONTROL"

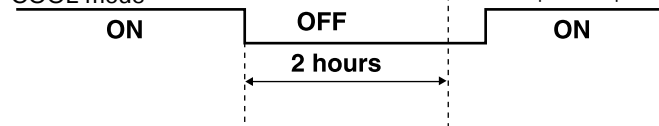


When the system is restarted after 2 hours and more, the operation mode is determined by the room temperature at start-up of the operation.

Operation time chart Example

Previous operation
COOL mode of
"I FEEL CONTROL" or
COOL mode

Restart
COOL or DRY or HEAT
mode of "I FEEL CON-
TROL" that determined
by room temperature at
start-up of the operation.



- (4) The initial set temperature is decided by the initial room temperature.

Mode	Initial room temperature	Initial set temperature	
COOL mode of “I FEEL CONTROL”	79°F or more	75°F	✱ 1
	77°F to 79°F	Initial room temperature minus 4°F	
DRY mode of “I FEEL CONTROL”	73°F to 77°F	Initial room temperature minus 4°F	
HEAT mode of “I FEEL CONTROL”	less than 73°F	79°F	

- ✳1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of the room temperature at restart.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURE buttons

In "I FEEL CONTROL" mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature can be controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm.

Each time the TOO WARM or TOO COOL button is pressed, the indoor unit receives the signal and emits a beep tone.

● Fuzzy control

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.

In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.



... To raise the set temperature 2~4 degrees(°F)



... To lower the set temperature 2~4 degrees(°F)

8-1-1. COOL mode of "I FEEL CONTROL"

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In AUTO the fan speed is as follows.

MSZ09UN

Initial temperature difference	Fan speed	Difference between room temperature and set temperature during operation
Room temperature minus set temperature : 3 degrees or more	High	2 deg. 3 deg. 4 deg.
Room temperature minus set temperature : Between 2 and 3degrees	Med.	
Room temperature minus set temperature : less than 2 degrees	Low	

MSZ12UN

Initial temperature difference	Fan speed	Difference between room temperature and set temperature during operation
Room temperature minus set temperature : 4 degrees or more	High	2 deg. 3 deg. 4 deg. 7 deg.
Room temperature minus set temperature : Between 2 and 4 degrees	Med.	
Room temperature minus set temperature : less than 2 degree	Low	

2. Coil frost prevention

① Temperature control

The operational frequency of the compressor is controlled based on the temperature of the indoor coil thermistor(RT12).

Temperature of indoor coil thermistor:RT12	Operation frequency
approx. 46°F or above	normal
approx. 43°F to 46°F	fixed
approx. 39°F to 43°F	lowering at the rate of 3Hz/min.
approx. 39°F or below	lowering at the rate of 6Hz/min. Compressor is turned off for 5 minutes when temperature of indoor coil thermistor continues approx. 39°F or below for 5 minutes or more.

The indoor fan maintains the actual speed of the moment.

② Time control

When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

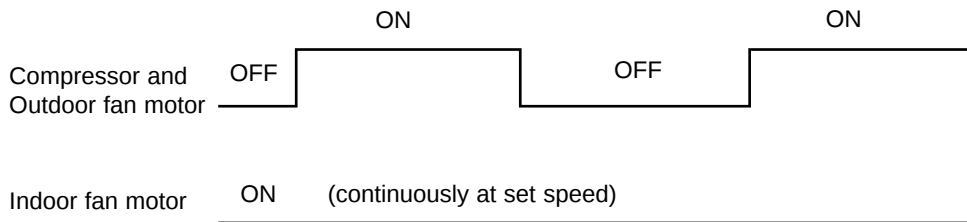
a. Compressor has been continuously operating.

b. Indoor fan speed is Low or Med..

c. Room temperature is below 79°F.

When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes High or the room temperature exceeds 79°F. However, when two of the above conditions (b.and c.) are satisfied again. Time accumulation is resumed.



8-1-2. DRY mode of "I FEEL CONTROL"

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the temperature.

By such controls, amount of air flow of indoor unit will be reduced in order to lower humidity without much room temperature drop.

MSZ09UN

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In AUTO fan operation, fan speed becomes Low.

2. The operation of the compressor and indoor/ outdoor fan

Compressor operates by room temperature control and time control.

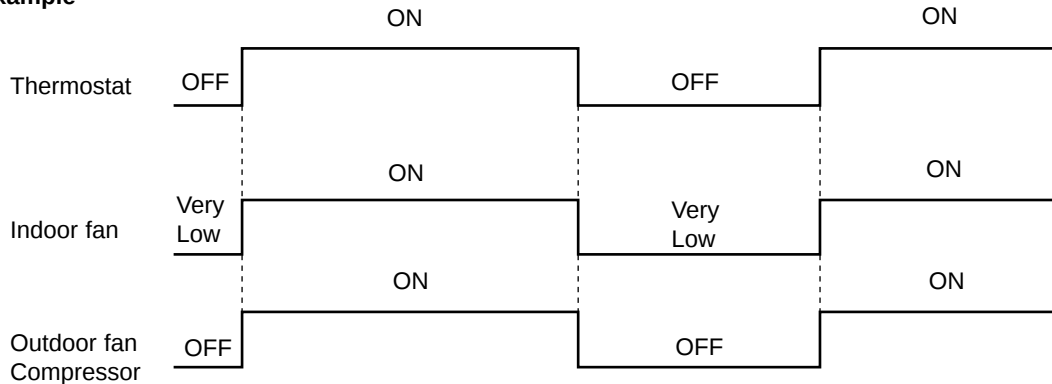
Set temperature is controlled to fall 4°F as initial set temperature.

Indoor fan and outdoor fan operate in the same cycle as the compressor.

Operational frequency control at compressor is fixed 30Hz.

Operation time chart

Example



3. Coil frost prevention

- The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL".

- Indoor fan operates at the set speed and the compressor stops for 5 minutes, because protection (Coil frost prevention) has the priority.

However, when coil frost prevention works while the compressor is not operating, the speed becomes the set speed.

MSZ12UN

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In AUTO fan operation, fan speed becomes Low.

2. The operation of the compressor and indoor/ outdoor fan

Compressor operates by room temperature control and time control.

Set temperature is controlled to fall 4°F as initial set temperature.

Indoor fan and outdoor fan operate in the same cycle as the compressor.

Operational frequency control at compressor is fixed 30Hz.

- When the room temperature is 73°F or over:

When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.

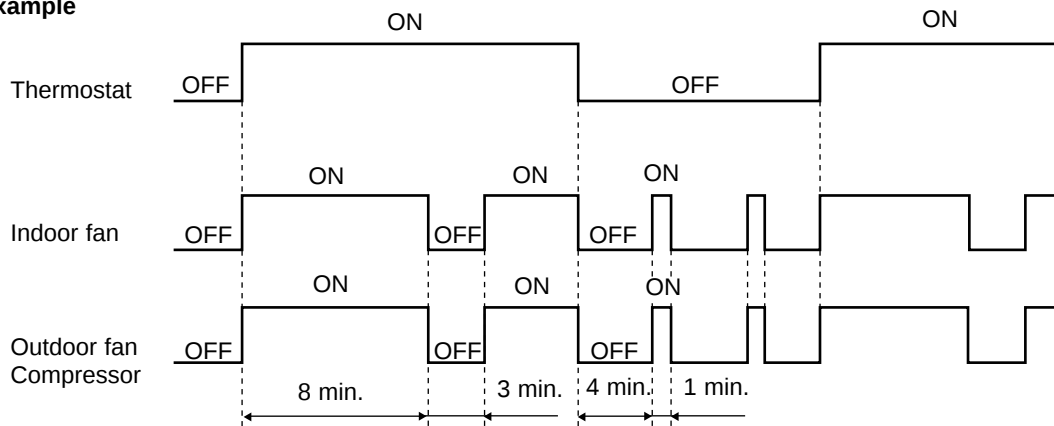
When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

- When the room temperature is under 73°F.

When the thermostat is ON, the compressor repeats 2 minutes ON and 3 minutes OFF.

When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

Operation time chart Example



3. Coil frost prevention

- The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL".
- Indoor fan operates at the set speed and the compressor stops for 5 minutes, because protection (Coil frost prevention) has the priority. However, when coil frost prevention works while the compressor is not operating, the speed becomes the set speed.

8-1-3. HEAT mode of "I FEEL CONTROL"

1. Indoor fan speed control

- (1) In AUTO the fan speed is as follows.

Initial temperature difference	Fan speed	Difference between room temperature and set temperature during operation
Set temperature minus room temperature: 4 degrees or more	High	4 deg. 7 deg.
Set temperature minus room temperature: Between 2 and 4 degrees	Med.	2 deg. 3 deg.
Set temperature minus room temperature: less than 2 degree	Low	

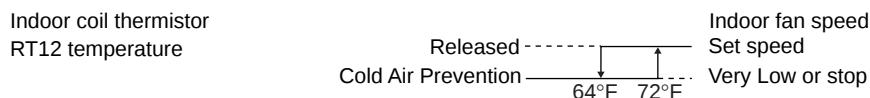
- (2) Cold air prevention control

MSZ09UN

- ① When the compressor is not operating,
 - (I) if the temperature of indoor coil thermistor RT12 is 64°F or less, the indoor fan stops.
 - (II) if the temperature of indoor coil thermistor RT12 is more than 64°F, the indoor fan operates at Very Low.
- ② When the compressor is operating,
 - (I) if the temperature of RT12 is 72°F or more, the indoor fan operates at set speed.
 - (II) if the temperature of RT12 is less than 72°F and
 - (i) if the temperature of room temperature thermistor RT11 is 59°F or less, the indoor fan stops.
 - (ii) if the temperature of room temperature thermistor RT11 is more than 59°F, the indoor fan operates at Very Low.

MSZ12UN

- When the compressor is operating,
- (I) if the temperature of indoor coil thermistor RT12 is less than 64°F or, the indoor fan operates at Very Low. But if the temperature of room temperature thermistor RT11 is 59°F or less, the fan stops.
 - (II) if the temperature of indoor coil thermistor RT12 is more than 72°F, the indoor fan operates at set speed.



NOTE : If the temperature of RT12 reads from 64°F to 72°F at the air conditioner starting and also after defrosting, this control works.

(3) Warm air control.

When any condition of ①(a. ~ d.) and the condition of ② as follows are satisfied at the same time, warm air control works.

- ① a.) when the operation mode has been changed to HEAT mode
- b.) when cold air prevention has been released
- c.) when defrosting has been finished
- d.) when the compressor starts in HEAT mode

- ② When the temperature of indoor coil thermistor RT12 is less than 99°F.

When warm air control works, the indoor fan speed changes as follows to blow out warm air gradually.

Gradation of indoor fan speed in initial

<Time condition>	<Indoor fan speed>
less than 2 minutes-----	Low
2 minutes to 4 minutes-----	Med.
more than 4 minutes-----	High

The upper limit of the indoor fan speed in MANUAL is the set speed.

The upper limit of the indoor fan speed in AUTO is the speed decided by indoor fan speed control.

When the temperature of RT12 has been 99°F or more, or when the set speed has been changed, this control is released and the indoor fan speed is the set speed.

(4) Flow soft control

When the thermostat (compressor) is off, the indoor fan operates as follows.

	< RT12 >	< Indoor fan speed >
<MSZ09UN>	less than 64°F	off
	64°F or more	Very Low
<MSZ12UN>	—	Very Low

NOTE : When the thermostat(compressor) turns on, the indoor fan operates at set speed. But until cold air prevention and warm air control is released, the indoor fan follows them.

2. High pressure protection

In HEAT mode the indoor coil thermistor RT12 detects the temperature at the indoor heat exchanger and controls the compressor operational frequency to prevent the condensing pressure from increasing excessively.

Temperature of indoor coil thermistor:RT12	Operation frequency
approx. 131°F or below	normal
approx. 140°F to 131°F	lower at the rate of 6Hz/min.
approx. 167°F to 140°F	lower at the rate of 30Hz/min.
approx. 167°F or above	Compressor is turned off and it is turned on 3 minutes later.

3. Overload starting

When the room temperature thermistor reads 64°F or above, the compressor runs with its maximum frequency regulated for 3 minutes after the start-up.

4. Defrosting

(1) Starting conditions of defrosting

When the following three conditions, a), b), and c), are satisfied, the defrosting starts.

- a) The defrost thermistor reads 26.6°F or below.
- b) The cumulative operation time of the compressor has reached any of the set values: 35, 32 and 35 or more minutes.
- c) More than 1 minute have passed since the start-up of the compressor.

* Set value of compressor operation time(hereinafter referred to as defrost interval)

The first defrost interval is 35 minutes long, and the second 32 minutes long. The third and subsequent intervals are set to be longer, and less frequent, depending on defrosting time.

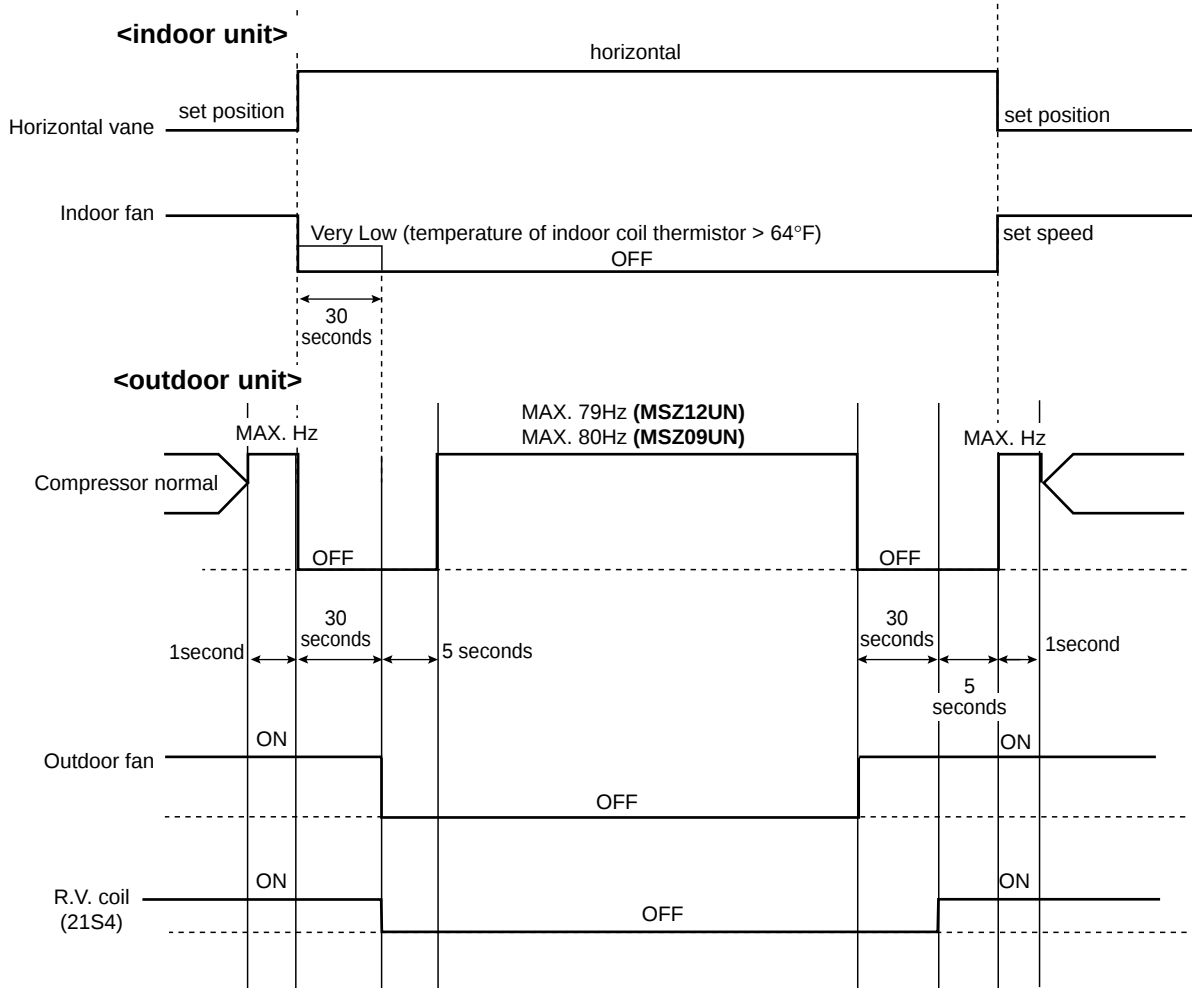
The third and subsequent defrost intervals follow any of the three patterns 10 minutes longer, the same, 10 minutes shorter compared with the previous defrost interval ... with normal 55 minutes, the longest 115 minutes and the shortest 30 minutes.

(2) Releasing conditions of defrosting

Defrosting is released when any of the following condition is satisfied:

- a) The defrost thermistor reads 55°F or above.
- b) Defrosting time has exceeded 10 minutes.
- c) Some other modes than HEAT mode is set during defrosting.

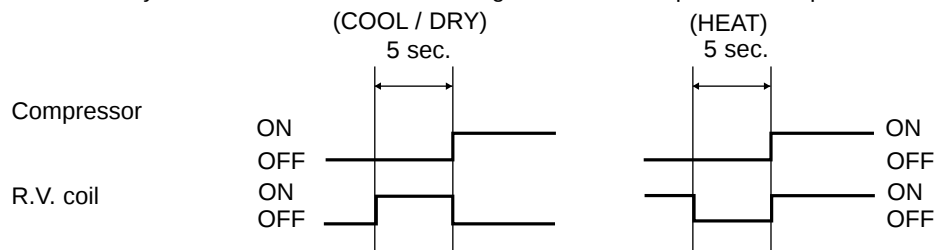
Time chart of defrosting in HEAT mode (reverse type)



5. 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.



6. Outdoor fan motor control

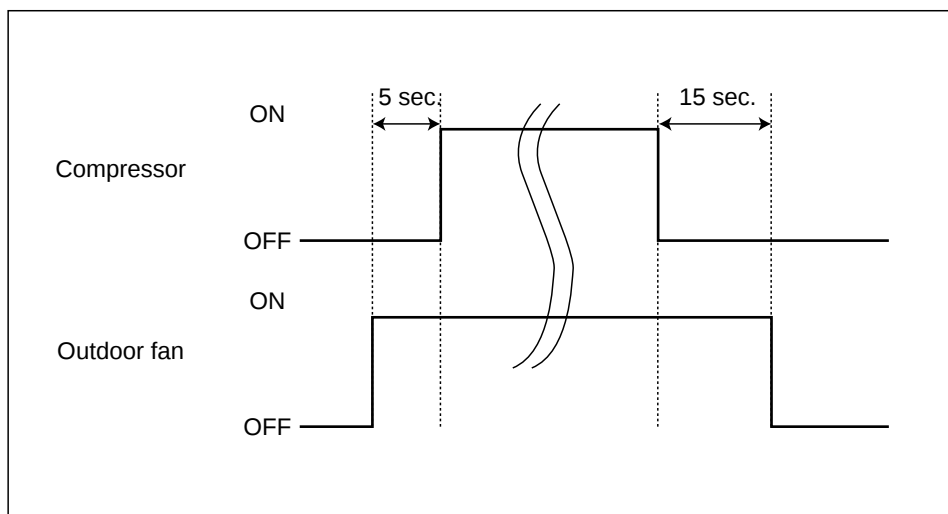
The fan motor turns ON/OFF, interlocking with the compressor.

[ON]

The fan motor turns ON 5 seconds before the compressor starts up.

[OFF]

The fan motor turns OFF 15 seconds after the compressor has stopped running.



8-2. COOL OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.

OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.

- (2) Select COOL mode with the OPERATION SELECT button.

- (3) Press the TEMPERATURE buttons.

(TOO WARM or TOO COOL button) to select the desired temperature.

The setting range is 59 ~ 89°F

* Indoor fan continues to operate regardless of thermostat's OFF-ON at set speed.

* Coil frost prevention is as same as COOL mode of "I FEEL CONTROL".

8-3. DRY OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.

OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.

- (2) Select DRY mode with the OPERATION SELECT button.

- (3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.

Thermostat (SET TEMP.) does not work.

The other operations are same as DRY mode of "I FEEL CONTROL".

- (4) DRY operation will not function when the room temperature is 55°F or below.

8-4. HEAT OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.

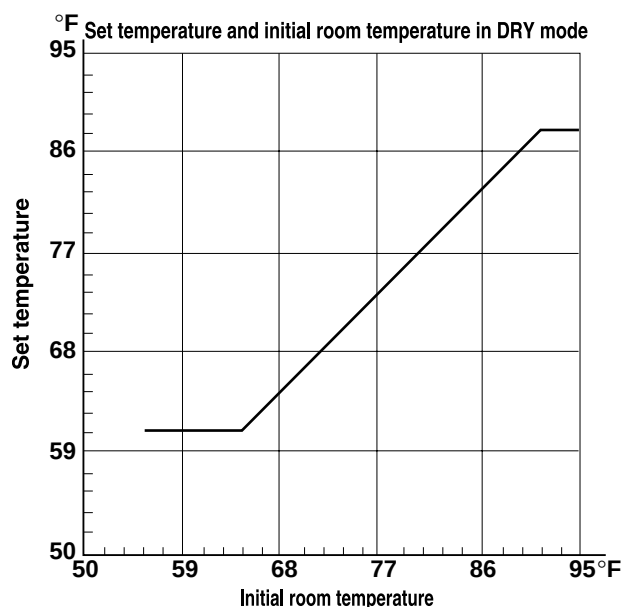
OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.

- (2) Select HEAT mode with the OPERATION SELECT button.

- (3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.

The setting range is 59 ~ 89°F.

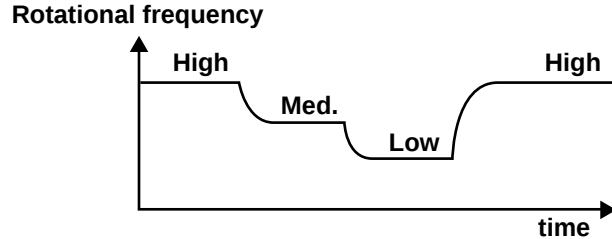
- (4) Indoor fan speed control, high pressure protection, defrosting, 4-way valve control are the same as HEAT mode of "I FEEL CONTROL".



8-5. FAN MOTOR CONTROL <MSZ09UN>

(1) Rotational frequency feedback control

The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feed-back the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (High, Med., Low) the microprocessor controls SR141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



(2) Fan motor lock-up protection

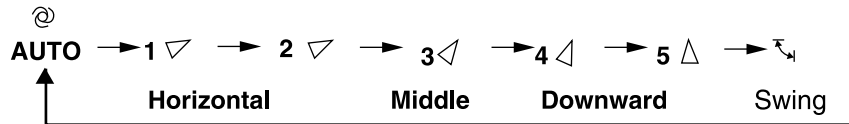
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (Refer to page 42.)

8-6. AUTO VANE OPERATION

(1) Vane motor drive

These models are equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.

(2) The horizontal vane angle and mode changes as follows by pressing the VANE CONTROL button.



(3) Positioning

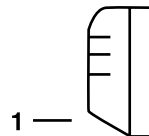
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

- When the OPERATE/STOP(ON/OFF) button is pressed. (POWER ON/OFF)
- When the vane control is changed AUTO to MANUAL.
- When the SWING is finished.
- When the test run starts.
- When the power supply turns ON.

(4) VANE AUTO mode

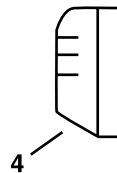
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

- ① In COOL and DRY operation



Vane angle is fixed to Angle 1.

- ② In HEAT operation



Vane angle is fixed to Angle 4.

(5) STOP (operation OFF) and ON-TIMER standby

When the following cases occur, the vane returns to the closed position.

- When the OPERATE/STOP (ON/OFF) button is pressed (POWER OFF).
- When the operation is stopped by the emergency operation.
- When the ON-TIMER is in standby.

(6) Dew prevention

During COOL or DRY operation at vane Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

(7) SWING MODE

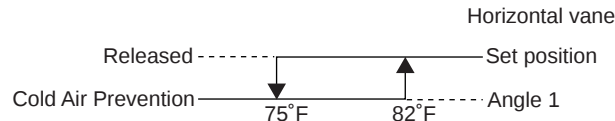
By selecting SWING mode with the VANE CONTROL button, the horizontal vane swings vertically. The remote controller displays “”.

(8) Cold air prevention in HEAT operation.

When any of the following conditions occurs in HEAT operation, the horizontal vane angle changes to Angle 1 automatically to prevent cold air blowing on users.

- ① Compressor is not operating.
- ② Defrosting is performed.
- ③ Indoor coil thermistor RT12 reads 75°F or below.
- ④ Indoor coil thermistor RT12 temperature is raising from 75°F or below, but it does not exceed 82°F.

Indoor coil thermistor RT12 temperature



NOTE : If the temperature of RT12 reads from 75°F to 82 °F at the air conditioner starting, this control works.

8-7. TIMER OPERATION

1. How to set the timer.

(1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.

(2) Check that the current time is set correctly.

NOTE : Timer operation will not work without setting the current time. Initially “AM0:00” blinks at the current time display of TIMER MONITOR, so set the current time correctly with CLOCK SET button.

(3) Press ON/OFF TIMER buttons to select the operation.

“ON-TIMER” button... AUTO START operation (ON timer)

“OFF-TIMER” button... AUTO STOP operation (OFF timer)

(4) Press HR. and MIN. button (TIME SET button) to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when “→|” or “→○” mark is flashing.

These marks disappear in 1 minute.

After setting the ON timer, check that OPERATION INDICATOR lamp of the indoor unit lights.

NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

- A power failure occurs.
- The circuit breaker functions.

2. Cancel

TIMER setting can be cancelled with the ON/OFF TIMER buttons.

To cancel the ON timer, press the “ON-TIMER” button.

To cancel the OFF timer, press the “OFF-TIMER” button.

TIMER is cancelled and the display of set time disappears.

PROGRAM TIMER

- The OFF timer and ON timer can be used in combination.

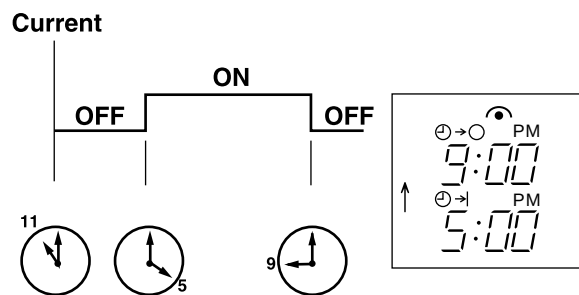
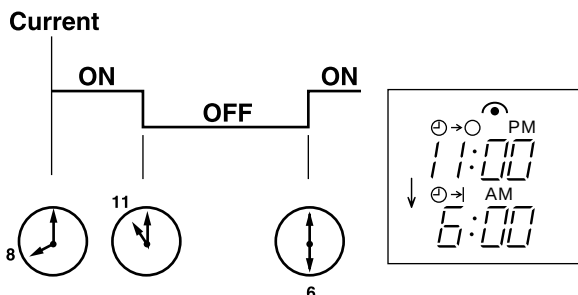
- “↑” and “↓” display shows the order of the OFF timer and ON timer operation.

(Example 1) The current time is 8:00 PM.

The unit turns off at 11:00 PM, and on at 6:00 AM.

(Example 2) The current time is 11:00 AM.

The unit turns on at 5:00 PM, and off at 9:00 PM.



NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

8-8. EMERGENCY-TEST OPERATION

In case of test run operation or emergency operation, use the EMERGENCY OPERATION switch on the front of the indoor unit. Emergency operation is available when the remote controller is missing, has failed or the batteries of remote controller run down. The unit will start and the OPERATION INDICATOR lamp will light.

The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at High speed and the system is in continuous operation. (The thermostat is ON.)

After 30 minutes of test run operation the system shifts to EMERGENCY COOL / HEAT MODE with a set temperature of 75°F.

The fan speed shifts to Med. speed.

The coil frost prevention works even in emergency operation, and defrosting cycle as well.

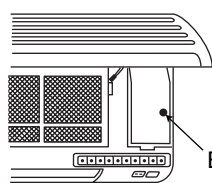
In the test run or emergency operation, the horizontal vane operates in VANE AUTO (@) mode.

Emergency operation continues until the EMERGENCY OPERATION switch is pressed once or twice or the unit receives any signal from the remote controller. In case of latter normal operation will start.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.

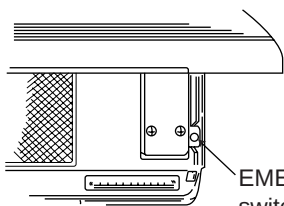
- The following indication applies regardless of shape of the indicator.

MSZ09UN



EMERGENCY OPERATION switch

MSZ12UN



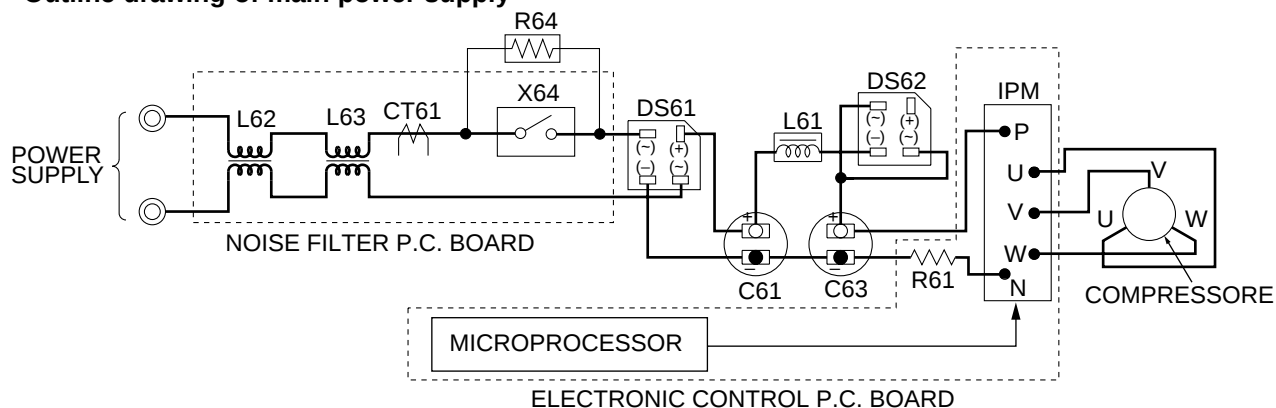
EMERGENCY OPERATION switch

OPERATION INDICATOR lamp

Press once <Cool>		☐
Press again <Heat>	☐	
Press once again <Stop>	☐	☐

8-9. Main power supply circuit

Outline drawing of main power supply



1. Outline of main power supply circuit

- (1) When the electricity is turned on to the outdoor unit

Rush current generates in the main power supply circuit.

To prevent the rush current from running into the main power supply circuit, R64(Current-limiting resistor) absorbs the rush current.

After the rush current is absorbed, X64(Relay) is ON and the circuit to R64 is short-circuited, then the electricity to R64 is bypassed.

Following the indoor unit's operation, X64 is switched to ON or OFF.

(2) At normal operation

Alternating current supplied from power supply is eliminated of any noise by L62(Common mode choke coil) and L63 (Common mode choke coil). Then DS61(Diode stack) performs full-wave rectification of alternating current and the alternating current is converted to direct current.

C63(Smoothing capacitor) stabilizes the power supply converted to direct current from alternating current and supplies it to IPM(Intelligent power module).

Direct current rectified by DS61 is converted to three-phase alternating current by IPM. Microcomputer installed in the electronic control P.C. board controls frequency and voltage of three-phase alternating current converted by IPM.

Three-phase alternating current from IPM is supplied to the compressor with frequency and voltage decided by microcomputer based on various kinds of information. R61(Current-detecting resistor) is installed for overload protection of the compressor and for protection of IPM.

CT61(Current transformer) measures the current of main power supply circuit.

2. Power factor improvement of power supply

Unlike inverter-less alternating current circuit, the power factor of this inverter circuit is improved by extending the period of the current running in the circuit. C63 is used in this circuit to supply stable direct current voltage. However, in case only C63 is used for stable supply of direct current, the power factor of power supply is lowered because the period of direct current running in the circuit is short. Therefore, for improvement of power factor, the circuit also uses C61(Power factor capacitor), L61(Reactor) and DS62(Diode stack) to prepare the direct current circuit to extend the period of the current running in the circuit.

3. Elimination of electrical noise

Noise filter circuit is formed by L62, L63, and the condenser installed on the noise filter P.C. board. It eliminates the electrical noise (both common mode and normal mode noise) of alternating current power supply supplied to main power supply circuit. Noise filter circuit also absorbs electrical noise that is generated in the inverter circuit and prevents it from reaching outside of the unit.

4. IPM

Six power transistors that outputs the direct current waveform as three-phase alternating current waveform, the driving circuit which operates the power transistors, and the overcurrent detecting circuit which protects the power transistors are built into the IPM. It can simplify and miniaturize the control circuit.

Symbol	Name	Function
C61	POWER FACTOR CAPACITOR	It improves the power factor of power supply.
C63	SMOOTHING CAPACITOR	It stabilizes the direct current voltage.
CT61	CURRENT TRANSFORMER	It measures the current of main power supply circuit.
DS61	DIODE STACK	It converts the alternating current voltage to direct current voltage.
DS62	DIODE STACK	It is combined with L61 to improve the power factor of power supply.
IPM	INTELLIGENT POWER MODULE	It generates three-phase alternating current and operates compressor.
L61	REACTOR	It is combined with DS62 to improve the power factor of power supply.
L62	COMMON MODE CHOKE COIL	It eliminates and absorbs the electrical noise.
L63	COMMON MODE CHOKE COIL	It eliminates and absorbs the electrical noise.
R61	CURRENT-DETECTING RESISTOR	It detects the current and protects the compressor and IPM.
R64	CURRENT-LIMITING RESISTOR	It absorbs the rush current so not to run into the main power supply circuit when the electricity is turned on.
X64	RELAY	It short-circuits the circuit to current-limiting resistor when the compressor operates.

8-10. Operational frequency control of outdoor unit

1. Outline

The operational frequency is as following:

First, the target operational frequency is set based on the difference between the room temperature and the set temperature.

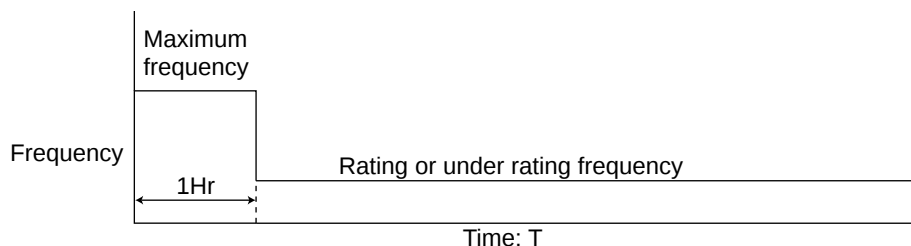
Second, the target operational frequency is regulated by discharge temperature protection, high pressure protection, electric current protection and overload protection and also by the maximum/minimum frequency.

Maximum/minimum frequency in each operation mode.

Applied model	COOL			HEAT			DRY
	minimum frequency	rated frequency	maximum frequency	minimum frequency	rated frequency	maximum frequency	
MSZ09UN	15	64	80	15	76	98	30
MSZ12UN	15	70	85	15	99	125	30

※ The maximum frequency in COOL mode varies according to operation hours as shown below.

※ However, it is under rating frequency when indoor fan speed is set to MANUAL Low or AUTO Low.



2. Control by the difference between the room temperature and the set temperature

The frequency is controlled by the difference between the room temperature and the set temperature.

(1) Frequency when the unit starts operation

At the cooling operation

The difference between the room temperature and the set temperature (deg.)	Operation frequency (Hz)
1.8 or less	15
1.8 to 2.3	15
2.3 to 3.6	20
3.6 to 4.9	25
4.9 to 5.9	30
5.9 to 6.7	40
6.7 or more	MSZ09UN:80/ MSZ12UN:85

At the heating operation

The difference between the room temperature and the set temperature (deg.)	Operation frequency (Hz)
2.3 or less	15
2.3 to 3.1	15
3.1 to 4.1	20
4.1 to 5.4	25
5.4 to 5.9	30
5.9 to 6.7	40
6.7 or more	MSZ09UN:98/ MSZ12UN:125

(2) Frequency after the unit starts operation (Except for the case where the unit operates with the maximum operation frequency)

In case the difference between the room temperature and the set temperature shown on (1) is changed during operation or it is not changed for 128 seconds, the compressor operates with new operation frequency that is calculated from actual operation frequency and the rate of change by fuzzy control.

3. Frequency control by estimated discharge temperature (for protecting the discharge temperature in case the estimated discharge temperature is 212 °F or higher)

By calculating the difference between the current discharge temperature and the discharge temperature 15 seconds before, a discharge temperature in one minutes is estimated. As a result, the frequency and LEV are controlled as shown the table below.

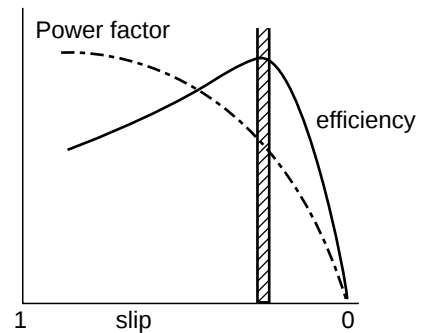
Estimated discharge temperature(°F)	Frequency control	LEV control
241 or higher	Lowered by 12Hz	Opened by 30 pulse
232 to 241	Lowered by 6Hz	Opened by 20 pulse
219 to 232	Regulated so that the frequency will not rise	Opened by 20 pulse
212 to 219	No correction	Opened by 20 pulse
212 or lower	No correction	No correction

8-11. Optimal voltage control

The purpose of optimal voltage control is to operate the compressor at optimal voltage that meets the load detected by the power factor of the compressor.

1. Optimal

As shown on the right the efficiency (ratio of output against input) of the motor in the compressor becomes optional when the sliding (ratio of difference between the actual number of rotation and the number of synchronous rotation of motor) is one fixed value. The value of sliding can be calculated from the power factor since the sliding and the power factor are mutually related as shown the table on the right. To make the value of sliding so that the efficiency of motor is optimal, the power factor of the compressor is detected. Then the detected power factor is controlled so that its efficiency can be high. As a result, it is possible to operate the compressor at optimal voltage.



2. How to determine the optimal voltage

Compare the detected power factor with the target power factor so that the efficiency of motor is optimal, the voltage correction value is changed and the optimal output voltage is determined.

Optimal output voltage[V]= Standard voltage at certain frequency [V]x voltage correction value(%)

Target power factor minus detected power factor (Calculated value is supposed to be "A".)	Calculation of voltage correction value (%)
$A \leq -2\%$	Previous voltage correction value minus 1
$-2\% < A < +2\%$	Same as previous voltage correction value
$A \geq +2\%$	Previous voltage correction value plus 1

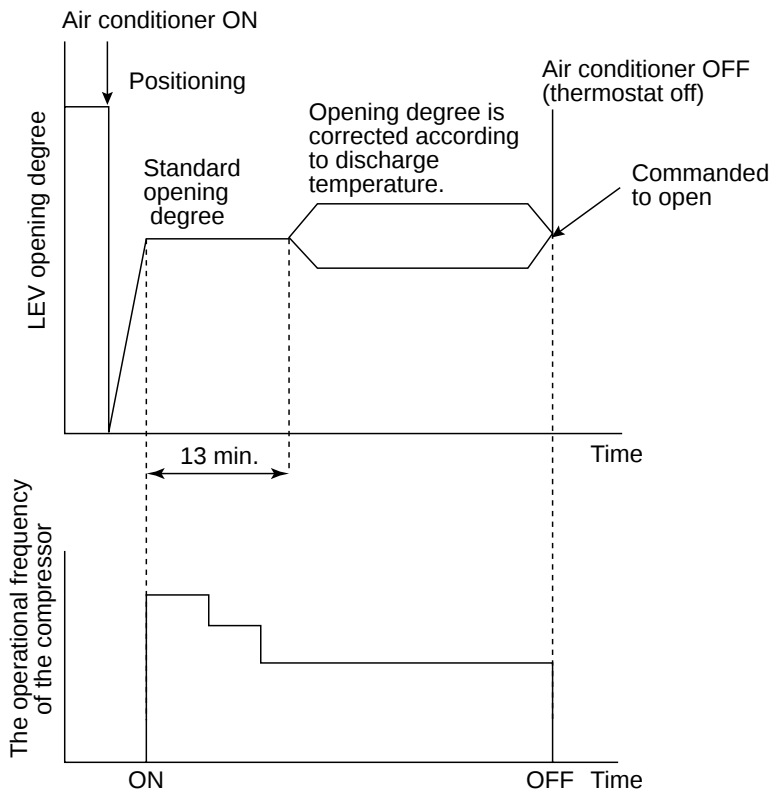
8-12. Expansion valve control (LEV control)

(1) Outline of LEV control

The LEV basic control is comprised of setting LEV opening degree to the standard opening degrees set for each operational frequency of the compressor. However, when any change in indoor/outdoor temperatures or other factors cause air conditioning load fluctuation, the LEV control also works to correct LEV opening degree based on discharge temperature (Shell temperature) of the compressor, developing the unit's performance.

standard specification	Control range	from min. 33 pulse to max. 500 pulse.
	Actuating speed	LEV opens 40 pulse/sec. and close 90 pulse/sec.
	Opening degree adjustment	LEV opening degree is always adjusted in opening direction. (When reducing the opening degree, LEV is once over-closed, and then adjusted to the proper degree by opening.
general operation	Unit OFF	LEV remains at max. opening degree (reaches max. opening degree approx. 15 minutes after compressor stops)
	Remote controller ON	LEV is positioned. (first full-closed at zero pulse and then positioned.)
	During 2 to 13 minutes after compressor starts	Opening degree is adjusted according to standard opening degree. (Standard opening degree is set for each rotational frequency of compressor)
	More than 13 minutes have passed since compressor start-up	LEV opening degree is corrected to get target discharge temperature of compressor. (For discharge temperature lower than target temperature, LEV is corrected in closing direction.) (For discharge temperature higher than target temperature, LEV is corrected in opening direction.) *It may take more than 30 minutes to reach target temperature, depending on operating conditions.
	Thermostat OFF	LEV starts to open every 3 pulse/sec. from the same opening degree as that when the Unit turned OFF (and becomes full-opened after approx. 15 minutes.)
	Thermostat ON	LEV is controlled in the same way as that is after the compressor has started up.
	Defrosting in HEAT mode	LEV is adjusted to open 500 pulse.

(2) Time chart



(3) Control data

(a) Reference value of target discharge temperature (COOL/HEAT °F)

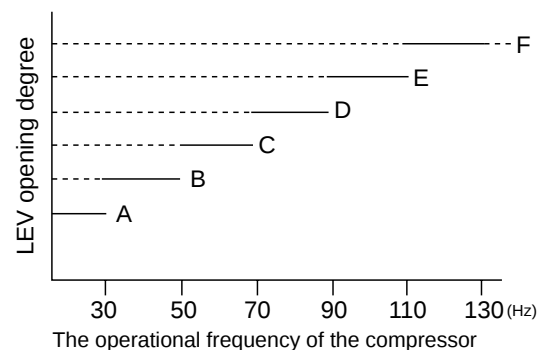
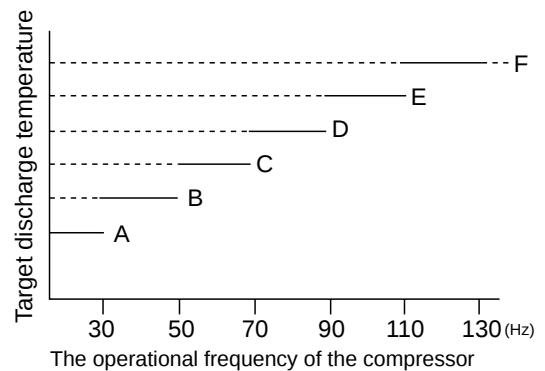
	A	B	C	D	E	F
MSZ09UN	136/120	145/136	156/151	165/160	-/169	-/-
MSZ12UN	126/118	129/135	138/151	151/160	-/169	-/172

MSZ09UN

In COOL mode, the two indoor coil thermistor (one main and one sub) sense temperature ununiformity (super heat) at the heat exchanger. And when temperature difference have developed, the indoor coil thermistors adjust LEV opening to get approximate 16 degrees lower temperature than the target temperature in the table above, thus diminishing super heat.

(b) Reference value of LEV standard degree opening (COOL/ HEAT pulse)

	A	B	C	D	E	F
MSZ09UN	120/100	170/130	210/160	230/180	-/200	-/-
MSZ12UN	190/120	220/170	250/190	280/210	-/230	-/240



MSZ09UN MUZ09UN
MSZ12UN MUZ12UN

9-1. CHANGE IN DEFROST SETTING

<JS> When the JS wire of the outdoor electronic control P.C. board is cut, the defrost temperature will be changed.
(Refer to page 58.)

Jumper wire	Change point
JS	Deforst finish temperature changes from 55°F to 59°F.

9-2. TIMER SHORT MODE

For service, set time can be shortened by short circuit of JPG and JPS the indoor electronic control P.C. board.
The time will be shortened as follows. (Refer to page 56 or 57.)

Set time : 1 minute → 1-second

Set time : 3 minute → 3-second (It takes 3 minutes for the compressor to start operation. However, the starting time is shortened by short circuit of JPG and JPS.)

9-3. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

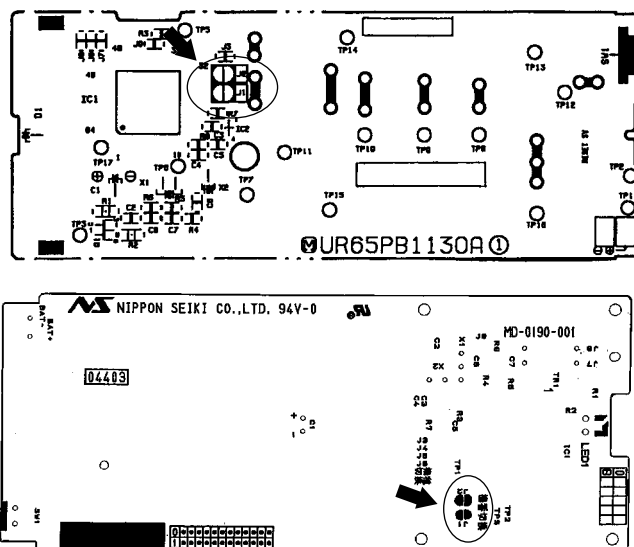
A maximum of 4 indoor units with wireless remote controllers can be used in a room.

In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the indoor unit number.

How to modify the remote controller P.C. board

Remove batteries before modification.

The board has a print as shown below :



NOTE : For remodelling, take out the batteries and press the OPERATE/STOP(ON/OFF) button twice or 3 times at first. After finish remodelling, put back the batteries then press the RESET button.

The P.C. board has the print "J1" and "J2". Solder "J1" and "J2" according to the number of indoor unit as shown in Table 1.
After modification, press the RESET button.

Table 1

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	—	Solder J1	Same as at left	Same as at left
No. 3 unit	—	—	Solder J2	Same as at left
No. 4 unit	—	—	—	Solder both J1 and J2

How to set the remote controller exclusively for particular indoor unit

After you turn the breaker ON, the first remote controller that sends the signal to the indoor unit will be regarded as the remote controller for the indoor unit.

The indoor unit will only accepts the signal from the remote controller that has been assigned to the indoor unit once they are set. The setting will be cancelled if the breaker has turned off, or the power supply has shut down.

Please conduct the above setting once again after the power has restored.

9-4. AUTO RESTART FUNCTION

When the indoor unit is operated with the remote controller, the signals of the operation mode, the set temperature, and the fan speed are sent from the indoor electronic control P.C. board and memorized in the auto restart assembly. When the main power is turned off and then turned back on, the unit restarts automatically in the memorized set conditions approximately after 3 minutes.

How to release "AUTO RESTART FUNCTION"

- ① Turn off the main power for the unit.
- ② Pull out the indoor electronic control P.C. board and the display P.C.board. (Refer to page 61 or 64.)
- ③ <MSZ09UN>

Solder the Jumper wire or the Resistor 220Ω to the JR07 on the indoor electronic control P.C.board. (Refer to page 56.)

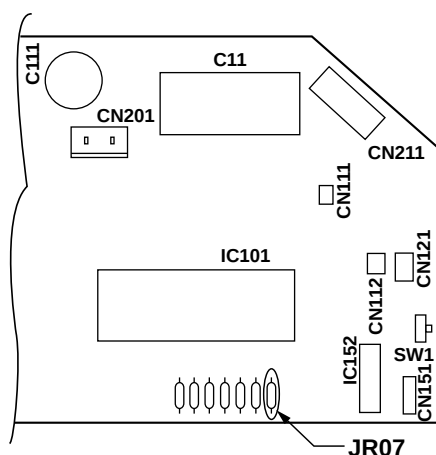
<MSZ12UN>

Disconnect the AUTO RESTART ASSY from CN104, and solder the Jumper wire to JHA on the indoor electronic control P.C. board.(Refer to page 57.)

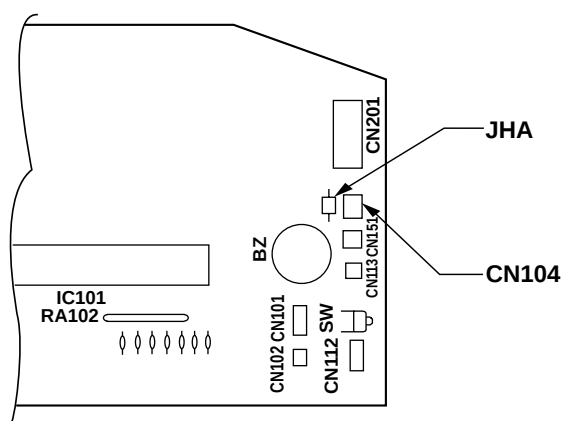
Operation

- ① If the main power (115V AC) has been cut, the operation settings remain.
- ② After the power is restored, the unit restarts automatically according to the memory.(However, it takes at least 3 minutes for the compressor to start running.)

MSZ09UN



MSZ12UN



NOTE:

- The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
- If the main power is turned off or a power failure occurs while AUTO START/STOP timer is active, the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
- When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart. Therefore, the special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one.

MSZ09UN MUZ09UN
MSZ12UN MUZ12UN

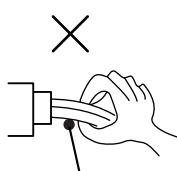
10-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

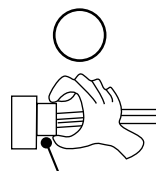
- 1) Check the power supply voltage.
- 2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

- 1) Before servicing the air conditioner, first be sure to turn off the remote controller to stop the unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
- 2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
- 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) Before servicing check that the connector and terminal are connected properly.
- 3) 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.
- 4) When troubleshooting, refer to the flow chart on page 42 and the check table on page 43.

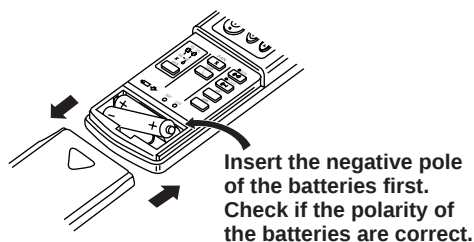
4. How to replace batteries

Weak batteries may cause the remote controller malfunction.

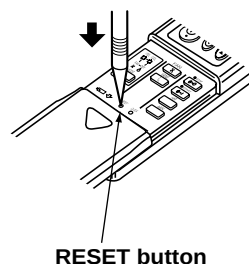
In this case, the remote controller can be repaired only by the battery replacement. To operate the remote controller normally, replace the batteries in the following order.

This remote controller has the RESET button. After refilling new batteries, press the RESET button with tip end of ball point pen or the like, and then use the remote controller.

- ① Remove the front lid and replace batteries. Then re-attach the front lid.



- ② Press the RESET button.

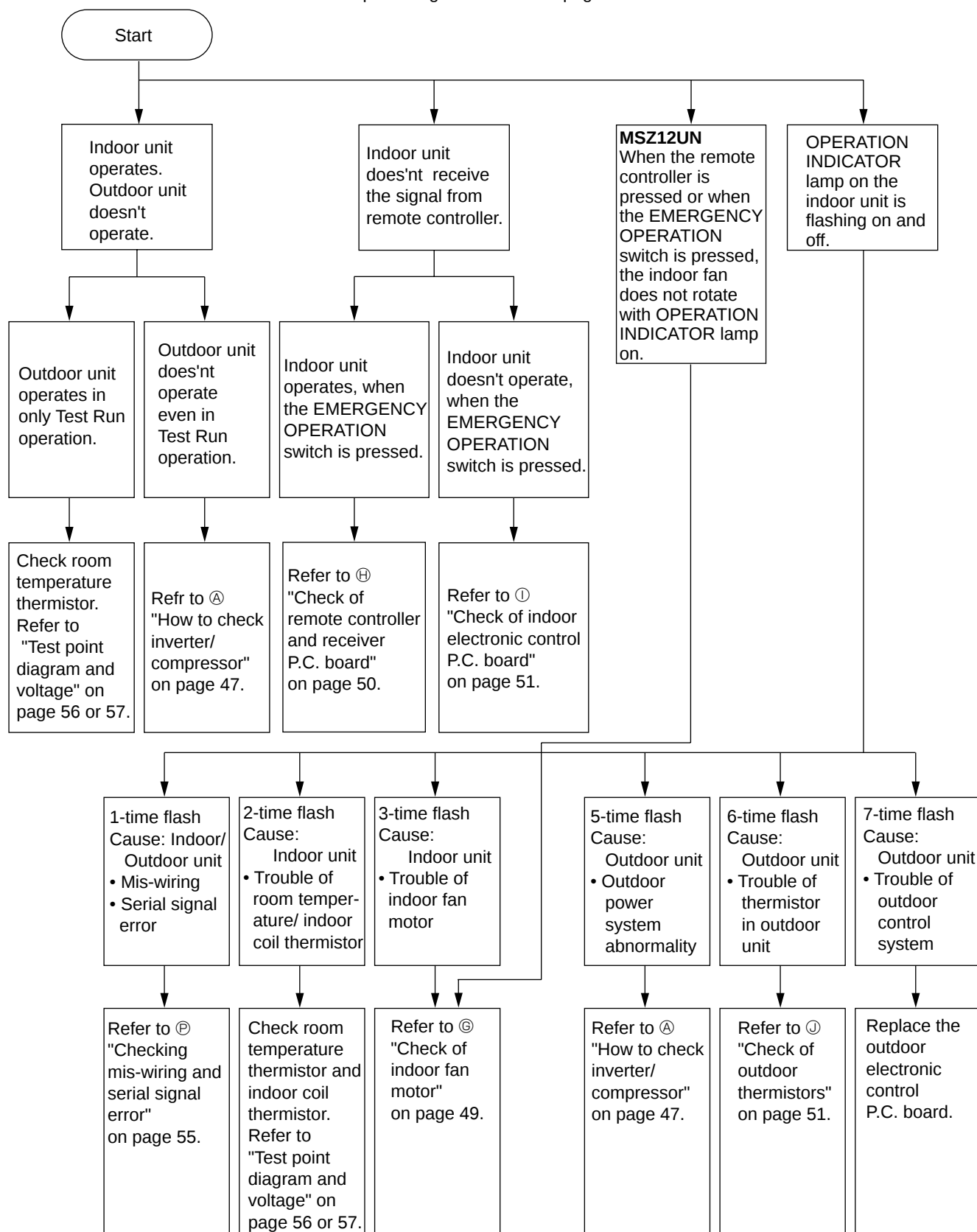


NOTE : If the RESET button is not pressed, the remote controller may not operate correctly.

10-2. Troubleshooting procedure

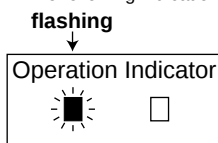
The following procedure facilitates identifying defective points.

Details of OPERATION INDICATOR lamp flashing are located on page 43.



1. Troubleshooting check table

- The following indication applies regardless of shape of the indicator.



- Flashing of the OPERATION INDICATOR lamp (on the left-hand side) indicates possible abnormalities.
- The OPERATION INDICATOR lamp (on the left-hand side) is lighted during normal operation.
- Flashing of the operation indicator lamp (on the left-hand side) indicates possible abnormalities.
- The operation indicator lamp (on the left-hand side) is lighted during normal operation.

No.	Symptom	Operation indicator lamp	Abnormal point	Detection method	Checkpoint
1	Outdoor unit does not operate.	repeated flashes every 0.5 seconds	Mis-Wiring	When the unit operates by the remote controller or emergency operation switch at 3 minutes after the main power supply is turned on. 3 minutes after power supply turns ON, when serial signal is not received.	Refer to 'Checking serial signal error' on page 55.
2		1-time flash 2.5 seconds OFF	Serial signal	When indoor electronic control P.C. board does not receive serial signals from outdoor unit for 4 to 5 seconds,	
3		2-time flash 2.5 seconds OFF	Indoor coil thermistor Auxiliary indoor coil thermistor Room temperature thermistor	Indoor electronic control P.C. board constantly detects resistance every 8 seconds. When thermistor shorts or opens.	
4	Indoor fan motor repeats 12 seconds ON and 3 minutes OFF. When the indoor fan motor breaks, the fan keeps stopping.	3-time flash 2.5 seconds OFF	Indoor fan motor	When rotational frequency feedback signal is not emit during 12-second indoor fan operation.	Refer to ⑥ "Check of indoor fan motor" on page 49.
5	Outdoor unit does not operate.	5-time flash 2.5 seconds OFF	Outdoor power system	When compressor has stopped due to overcurrent protection or start-up failure protection 3 times in a row within 1 minute after start-up.	Refer to ④ "How to check inverter/compressor" on page 47.
6		6-time flash 2.5 seconds OFF	Outdoor thermistors	<Thermistor short> Thermistors are abnormal when they short after compressor start-up. <Thermistor open> Thermistors are abnormal when they open after compressor start-up. Discharge temperature thermistor is abnormal when open circuit is detected more than 10 minutes after compressor start-up. Defrost thermistor is abnormal when open circuit is detected more than 1 minutes after compressor start-up.	- Shortage of refrigerant - Outdoor electronic control P.C. board Refer to ⑨ "Check of outdoor thermistors" on page 51.
7		7-time flash 2.5 seconds OFF	Outdoor control system	When nonvolatile memory data cannot be read properly on outdoor control P.C. board, outdoor unit stops and restarts 3 minutes later.	Replace outdoor electronic control P.C. board.

When the indoor unit has started operation and the above detection method has detected an abnormality (the first detection after the power ON), the indoor electronic control P.C. board turns OFF the indoor fan motor with the OPERATION INDICATOR lamp flashing.

(Outdoor LED indication table)

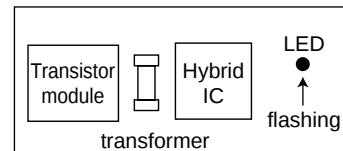
MUZ09UN

MUZ12UN

NOTE 1. The location of LED is illustrated at the right figure.

2. LED lights up during normal operation.

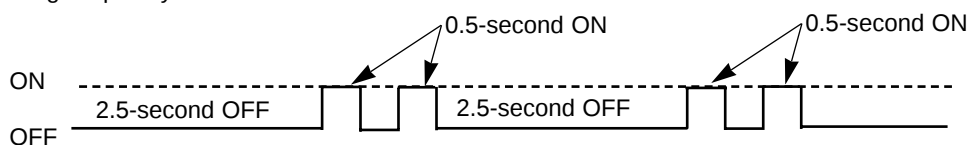
<Outdoor electronic control P.C. board>



No.	Symptom	LED indication	Abnormal point	Detection method	Checkpoint
1	Outdoor unit does not operate	1-time flash every 2.5 seconds NOTE: For abnormality location, refer to 'Indoor troubleshooting check table' on page 43.	Outdoor power system	When compressor has stopped by over current protection within 1 minute after compressor start-up 3 times in a row, compressor stops and then restarts 3 minutes later.	· Refer to ㉔ 'How to check inverter/compressor' on page 47.
2			Outdoor thermistors	MUZ09UN When discharge temperature thermistor, defrost thermistor or fin temperature thermistor shorts or opens during compressor running, compressor stops and restarts 3 minutes later. MUZ12UN When discharge temperature thermistor, defrost thermistor or fin temperature thermistor shorts or opens during compressor running, compressor stops.	· Refer to ㉔ 'Check of outdoor thermistors' on page 51.
3			Outdoor control system	When nonvolatile memory date cannot be read properly, compressor stops and restarts 3 minutes later.	Replace outdoor electronic control P.C. board.
4	'Outdoor unit stops and restarts 3 minutes later' is repeated	2-time flash 2.5 seconds OFF	Overcurrent protection	When 29A current flows into IPM, compressor stops and restarts 3 minutes later.	Refer to ㉔ 'How to check inverter/compressor on page 47.
5		3-time flash 2.5 seconds OFF	Discharge temperature overheat protection	When discharge temperature thermistor exceeds 241°F, compressor stops and restarts 3 minutes later. (Compressor restarts when discharge temperature thermistor reads 212°F or below.)	· Check refrigerant circuit and refrigerant amount. · Refer to ㉔ 'Check of outdoor thermistors' on page 51.
6		4-time flash 2.5 seconds OFF	Fin temperature thermistor overheat protection	When temperature at heat sink exceeds 182°F or outdoor electronic control P.C. board exceeds 172°F, compressor stops and restarts 3 minutes later.	· Check around outdoor unit. · Check outdoor unit air passage.
7		5-time flash 2.5 seconds OFF	High pressure protection	When indoor coil thermistor exceeds 167°F, compressor stops and restarts 3 minutes later.	· Check refrigerant circuit and refrigerant amount. · Check stop valve.
8	Outdoor unit operates (at low frequency)	1-time flash 2-5 seconds OFF	Frequency drop by current protection	When current from power outlet exceeds 9A, compressor frequency lowers.	The unit is normal, but check the following. · Check if indoor filters are clogged · Check if refrigerant is short. · Check if indoor/outdoor unit air outlets are short cycled.
9		3-time flash 2-5 seconds OFF	Frequency drop by high pressure protection	When indoor coil thermistor exceeds 131°F in HEAT mode, compressor frequency lowers.	
			Frequency drop by defrosting in COOL mode	When indoor coil thermistor reads 43°F or below in COOL mode, compressor frequency lowers.	
10		4-time flash 2-5 seconds OFF	Frequency drop by, discharge temperature protection.	When discharge temperature thermistor exceeds 232°F, compressor frequency lowers.	
11	Outdoor unit operates	6-time flash 2-5 seconds OFF	Power factor detection	When power factor of compressor is not detected. * In this case, compressor continues running.	Check compressor wiring.
12		7-time flash 2-5 seconds OFF	Low discharge temperature protection	When discharge temperature has been 122°F or below for 20 minutes.	· Refer to ㉔ 'Check of LEV' on page 54. · Check refrigerant circuit and refrigerant amount.
13		9-time flash 2-5 seconds OFF	inverter check mode	When connector of compressor disconnect, inverter check mode starts.	· Check if connector is connected. · Refer to ㉔ 'How to check inverter/compressor on page 47.

The flashing frequency shows the number of times the LED blinks after every 2.5-second OFF.

(Example) When the flashing frequency is "2".



2. Trouble criterion of main parts

Part name	Check method and criterion			Figure													
Room temperature thermistor(RT11)	Measure the resistance with a tester. (Part temperature 50°F ~ 86°F)																
Main indoor coil thermistor(RT12)																	
Sub indoor coil thermistor(RT13)																	
Defrost thermistor(RT61)	Measure the resistance with a tester. (Part temperature 14°F ~ 104°F)																
Discharge temperature thermistor (RT62)	Disconnect the connector and measure the resistance with a tester. Before measurement, hold the thermistor with your hands to warm it up. (Part temperature : 32°F~104°F)																
Fin temperature thermistor (RT64)	Disconnect the connector and measure the resistance with a tester. (Part temperature :32°F~104°F)																
Compressor (MC)	Measure the resistance between the terminals with a tester. (Part temperature 14°F ~ 104°F)			WHT 2 RED 3 BLK 1 V W U Compressor motor													
Indoor fan motor(MF)	Measure the resistance between the terminals with a tester. (Part temperature 50°F ~ 86°F)			MSZ09UN WHT 1 RED 2 BLK 3 MAIN AUX. FUSE YLW 1 GRY 2 BRN 3													
	Motor part	<table><tr><td rowspan="2">Color of lead wire</td><td>Normal</td><td rowspan="2">Abnormal</td></tr><tr><td>MSZ09UN</td></tr><tr><td>WHT-BLK</td><td>76~83 Ω</td><td rowspan="2">Open or short-circuit</td></tr><tr><td>BLK-RED</td><td>70~76 Ω</td></tr></table>	Color of lead wire		Normal	Abnormal	MSZ09UN	WHT-BLK	76~83 Ω	Open or short-circuit	BLK-RED	70~76 Ω					
	Color of lead wire	Normal			Abnormal												
		MSZ09UN															
	WHT-BLK	76~83 Ω	Open or short-circuit														
BLK-RED	70~76 Ω																
Sensor part	Measure the voltage Power ON.																
INNER FUSE 262± 4°F CUT OFF	<table><tr><td>Color of lead wire</td><td>Normal</td><td>Abnormal</td></tr><tr><td>BRN-YLW</td><td>4.5 ~ 5.5V</td><td rowspan="2">Remain 0V or 5V</td></tr><tr><td>YLW-GRY</td><td>(When fan revolved one time) 0V → 5V → 0V (Approx.)</td></tr></table>	Color of lead wire	Normal	Abnormal	BRN-YLW	4.5 ~ 5.5V	Remain 0V or 5V	YLW-GRY	(When fan revolved one time) 0V → 5V → 0V (Approx.)								
Color of lead wire	Normal	Abnormal															
BRN-YLW	4.5 ~ 5.5V	Remain 0V or 5V															
YLW-GRY	(When fan revolved one time) 0V → 5V → 0V (Approx.)																
Motor part	<table><tr><td rowspan="2">Color of lead wire</td><td>Normal</td><td>Abnormal</td></tr><tr><td>MSZ12UN</td><td rowspan="6">Open or short-circuit</td></tr><tr><td>WHT-BLK</td><td>65~72 Ω</td></tr><tr><td>BLK-YLW</td><td>8~10 Ω</td></tr><tr><td>YLW-BLU</td><td>4~ 6 Ω</td></tr><tr><td>BLU-BRN</td><td>5~ 7 Ω</td></tr><tr><td>BRN-RED</td><td>28~31 Ω</td></tr></table>	Color of lead wire	Normal	Abnormal	MSZ12UN	Open or short-circuit	WHT-BLK	65~72 Ω	BLK-YLW	8~10 Ω	YLW-BLU	4~ 6 Ω	BLU-BRN	5~ 7 Ω	BRN-RED	28~31 Ω	MSZ12UN BLK MAIN FUSE RED ORN WHT AUX.1 AUX.2 AUX.3 AUX.4
Color of lead wire	Normal		Abnormal														
	MSZ12UN	Open or short-circuit															
WHT-BLK	65~72 Ω																
BLK-YLW	8~10 Ω																
YLW-BLU	4~ 6 Ω																
BLU-BRN	5~ 7 Ω																
BRN-RED	28~31 Ω																

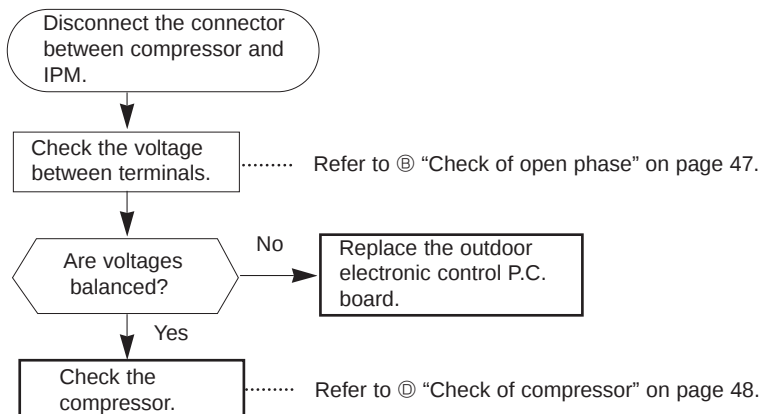


Part name	Check method and criterion	Figure										
Outdoor fan motor(MF61) INNER PROTECTOR 266± 14°F OPEN 174± 30°F CLOSE	Measure the resistance between the terminals with a tester. (Part temperature 14°F ~ 104°F) <table><tr><td>Color of lead wire</td><td>Normal</td><td>Abnormal</td></tr><tr><td>WHT-BLK</td><td>169~208Ω</td><td rowspan="2">Open or short-circuit</td></tr><tr><td>BLK-RED</td><td>246~301Ω</td></tr></table>	Color of lead wire	Normal	Abnormal	WHT-BLK	169~208Ω	Open or short-circuit	BLK-RED	246~301Ω			
Color of lead wire	Normal	Abnormal										
WHT-BLK	169~208Ω	Open or short-circuit										
BLK-RED	246~301Ω											
Vane motor(MV)	Measure the resistance between the terminals with a tester. (Part temperature 50°F ~ 86°F) <table><tr><td colspan="2">Normal</td><td>Abnormal</td></tr><tr><td>MSZ09UN</td><td>MSZ12UN</td><td rowspan="3">Open or short-circuit</td></tr><tr><td>BRN-other one</td><td>RED-other one</td></tr><tr><td>282 ~ 306Ω</td><td>358 ~ 388Ω</td></tr></table>	Normal		Abnormal	MSZ09UN	MSZ12UN	Open or short-circuit	BRN-other one	RED-other one	282 ~ 306Ω	358 ~ 388Ω	
Normal		Abnormal										
MSZ09UN	MSZ12UN	Open or short-circuit										
BRN-other one	RED-other one											
282 ~ 306Ω	358 ~ 388Ω											
R.V. coil (21S4)	Measure the resistance between the terminals with a tester. (Part temperature :14°F~104°F) <table><tr><td>Normal</td><td>Abnormal</td></tr><tr><td>1.2kΩ ~ 1.6kΩ</td><td>Open or short-circuit</td></tr></table>	Normal	Abnormal	1.2kΩ ~ 1.6kΩ	Open or short-circuit							
Normal	Abnormal											
1.2kΩ ~ 1.6kΩ	Open or short-circuit											
Expansion valve (LEV)	Measure the resistance with a tester. (Part temperature : 14°F~104°F) <table><tr><td>(CN724)</td><td>Normal</td><td>Abnormal</td></tr><tr><td>WHT-RED</td><td rowspan="4">39 ~ 56Ω</td><td rowspan="4">Open or short-circuit</td></tr><tr><td>RED-ORN</td></tr><tr><td>YLW-BRN</td></tr><tr><td>BRN-BLU</td></tr></table>	(CN724)	Normal	Abnormal	WHT-RED	39 ~ 56Ω	Open or short-circuit	RED-ORN	YLW-BRN	BRN-BLU		
(CN724)	Normal	Abnormal										
WHT-RED	39 ~ 56Ω	Open or short-circuit										
RED-ORN												
YLW-BRN												
BRN-BLU												

©:INNER PROTECTOR

**When OPERATION INDICATOR lamp flashes 5-time.
Outdoor unit does not operate.**

Ⓐ How to check inverter/ compressor



Ⓑ Check of open phase

Be sure to use the analog voltmeter for measurement.

With the connector between compressor and IPM disconnected, activate the inverter and measure the balance of voltage between terminals.

Operation mode	Model	Operational frequency [Hz]	Output voltage [V]
COOL	MSZ09UN	64	120
	MSZ12UN	70	130
HEAT	MSZ09UN	58	110
	MSZ12UN		

<< Operation method >>

Start heating operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (test-run mode)

<< Measurement point >>

at 3 points

BLK-WHT

BLK-RED

WHT-RED

* Measure AC voltage between the lead wires at 3 points.

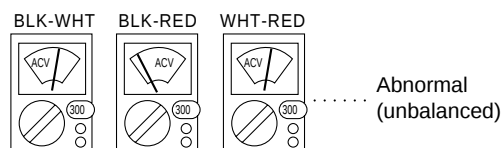
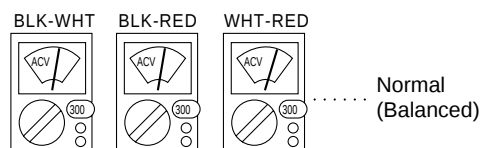
<< Judgment >>

Balanced normal

Unbalanced abnormal (open phase)

Shutdown by overcurrent abnormal (short)

Voltmeter indication



NOTE 1. Measure AC voltage, at 3 points more than one minute after the outdoor fan motor starts running.

2. The output voltage values in above table have tolerance within $\pm 20\%$.

Ⓒ Check of open IPM

Disconnect the connector between compressor and IPM, and measure resistance between terminals on the IPM.

<< Measurement point >>

at 6 points

BLK-WHT, WHT-BLK

BLK-RED, RED-BLK

WHT-RED, RED-WHT

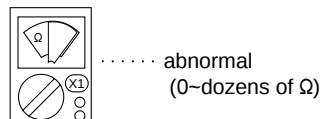
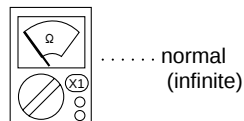
* Measure resistance between the lead wires at 3 points

<< Judgment >>

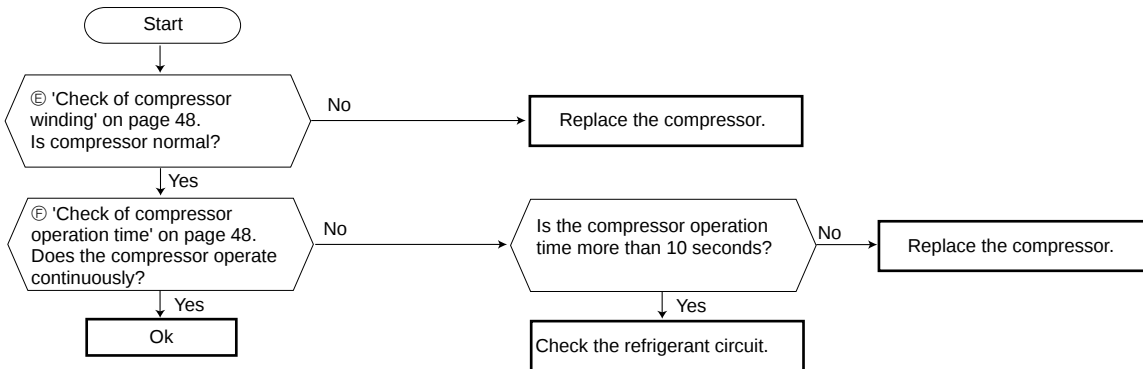
Infinite [Ω] normal

0~dozens of abnormal (short)

ohmmeter indication



D Check of compressor



E Check of compressor winding

Disconnect the connector between compressor and IPM, and measure resistance between the compressor terminals.

<<Measurement point>>

at 3 points

BLK-WHT

BLK-RED

WHT-RED

<<Judgment>>

0.92 to 1.14Ω at -14°F to 104°F of part temperature

0[Ω]abnormal [short]

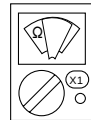
Infinite[Ω]abnormal [open]

NOTE 1. Be sure to zero the ohmmeter before measurement.

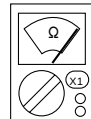
2. Winding resistance for each phase is 1.05Ω at 68°F.

* Measure resistance between the lead wires at 3 points.

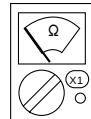
Ohmmeter indication



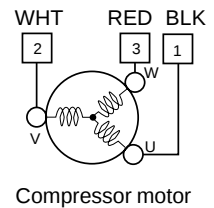
..... normal
(1~several Ω)



..... abnormal
(0Ω short)



..... abnormal
(infinite..... open)



F Check of compressor operation time

Connect the compressor and activate the inverter. Then measure the time until the inverter stops due to overcurrent.

<<Operation method>>

Start heating or cooling operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (Test-run mode)

<<Measurement>>

Measure the time from the start of outdoor fan running till the stop of the inverter due to overcurrent.

<<Judgment>>

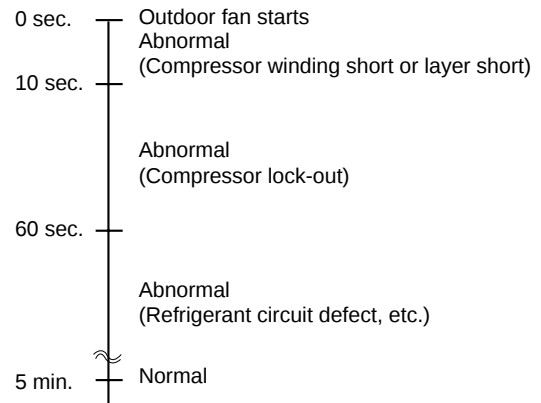
For reference

0~10 seconds.....abnormal (short)

10~60 seconds.....abnormal (compressor lock-out)

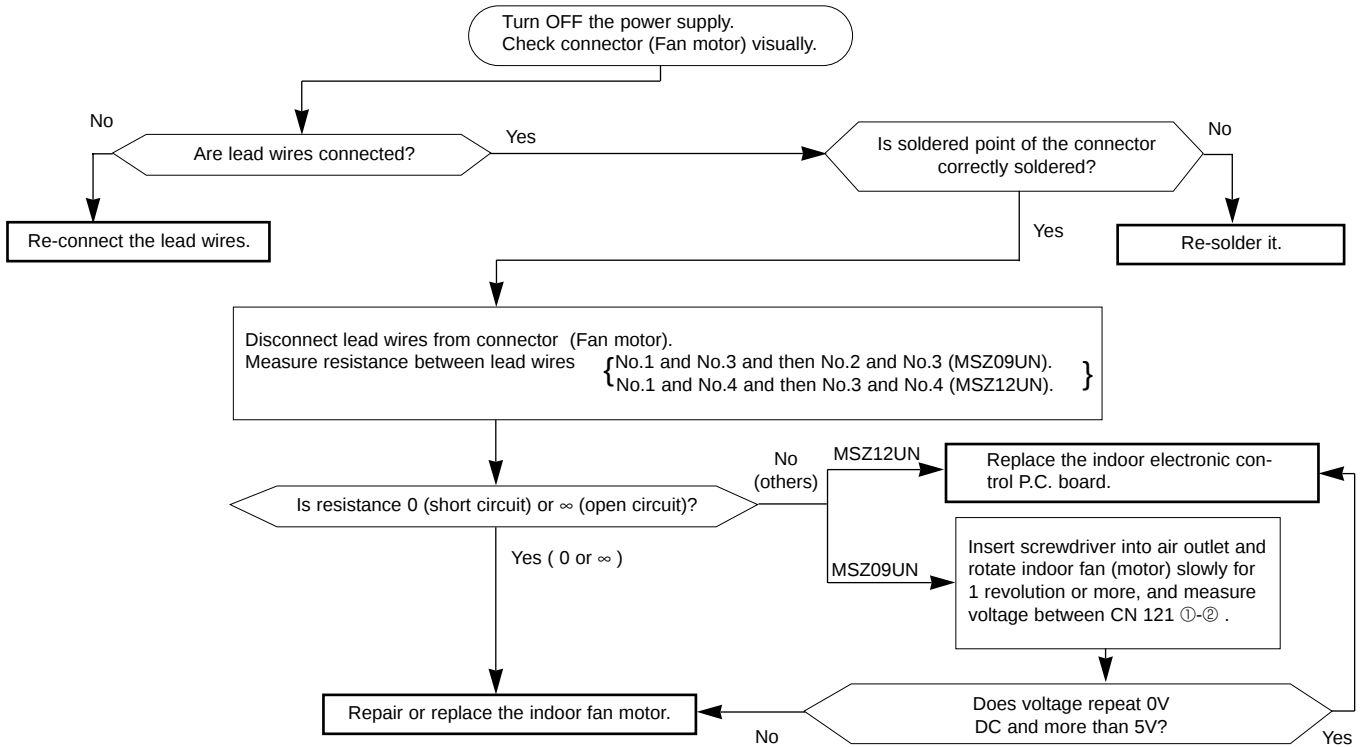
60 seconds~5 minutes.....abnormal (refrigerant circuit defect)

more than 5 minutes.....normal



When OPERATION INDICATOR lamp flashes 3-time.
Indoor fan does not operate.

Ⓒ Check of indoor fan motor

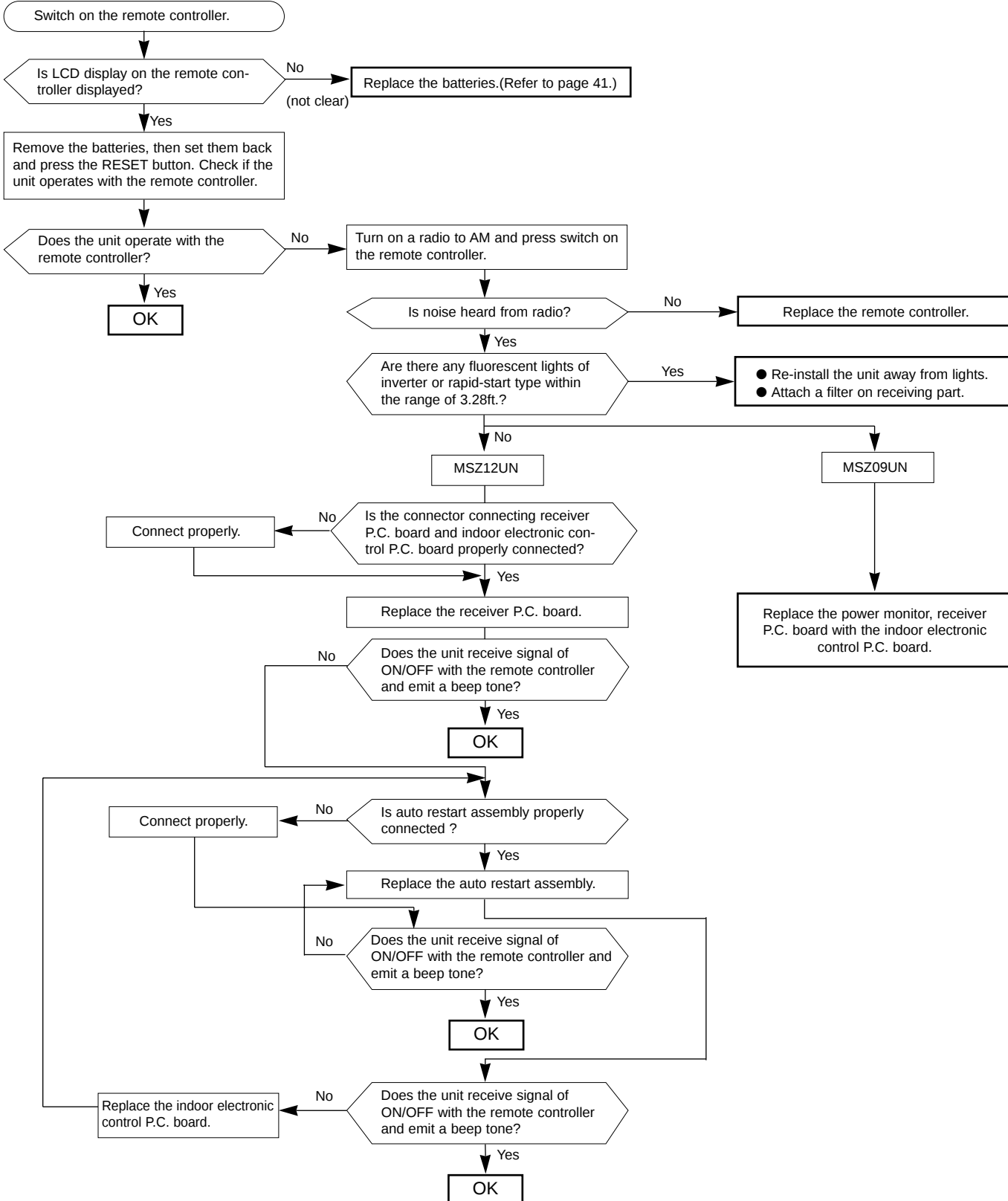


Indoor unit operates by pressing the EMERGENCY OPERATION switch, but does not operate with the remote controller.

H Check of remote controller and receiver P.C. board

*Check if the remote controller is exclusive for this air conditioner.

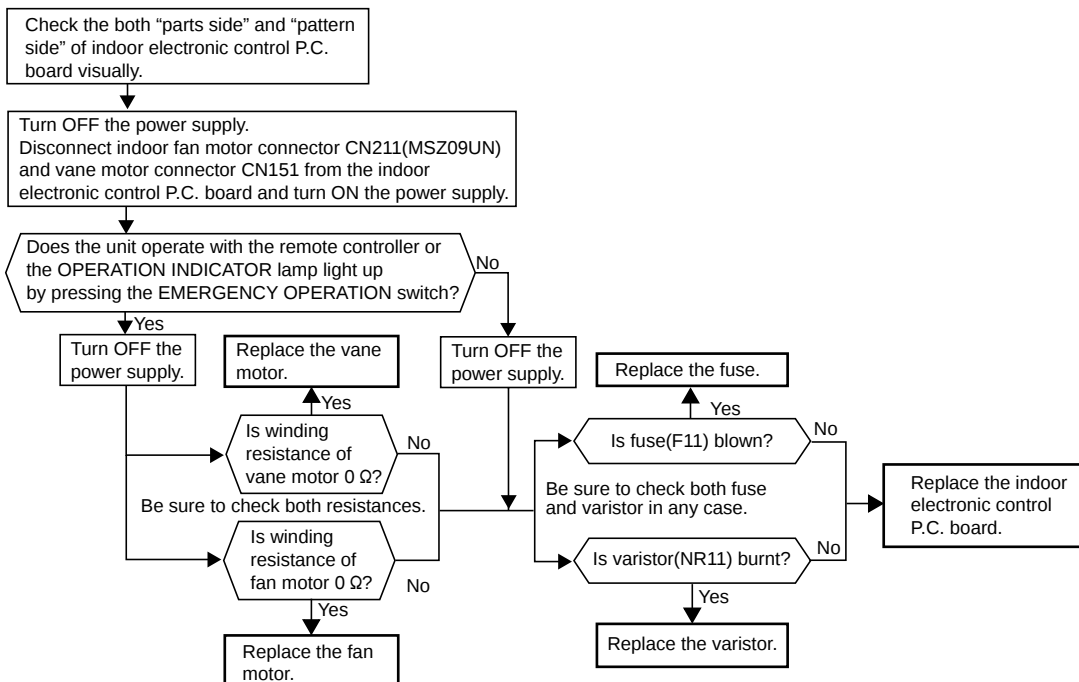
*In case of replacing the receiver P.C. board of MSZ09UN, replace the indoor electronic control P.C. board with it because they are unified.



The unit doesn't operate with the remote controller.

Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.

① Check of indoor electronic control P.C. board

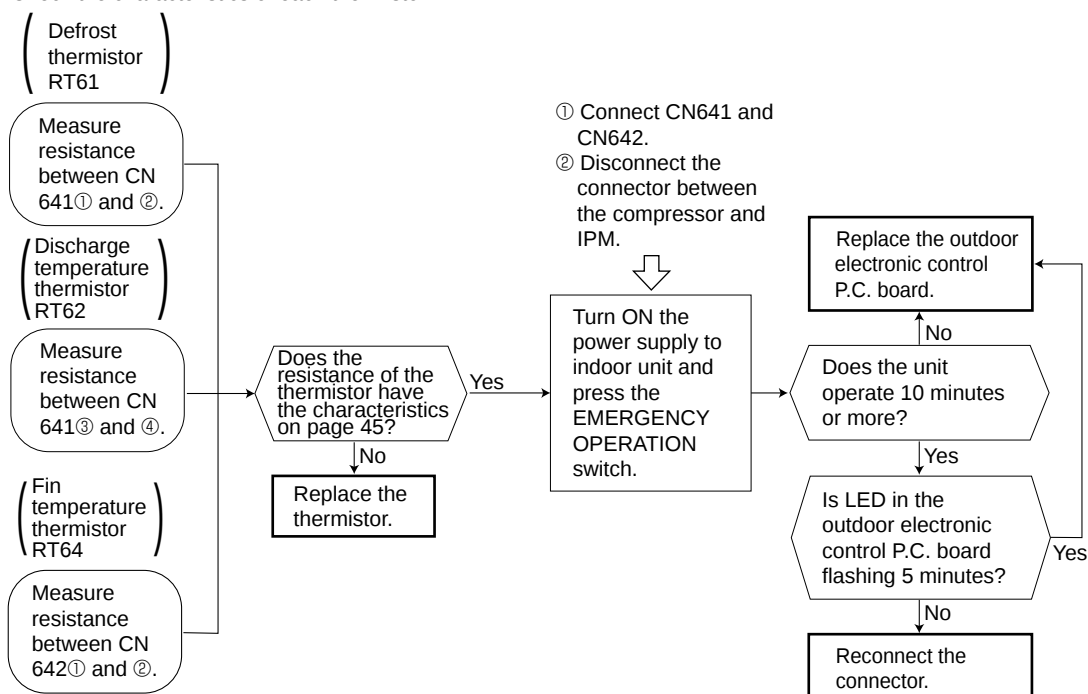


When OPERATION INDICATOR lamp flashes 6-time.

The thermistors in the outdoor unit are abnormal.

② Check of outdoor thermistors

Disconnect the connectors CN641 and CN642 from the outdoor electronic control P.C. board.
Check the characteristics of each thermistor.

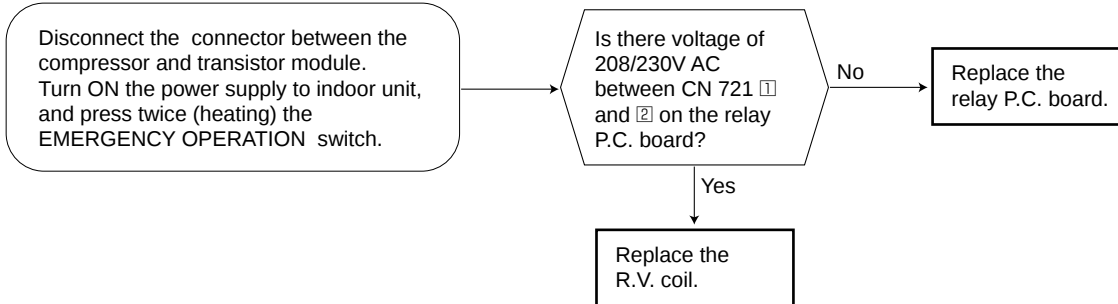
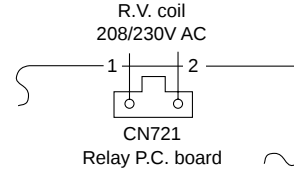


Cooling operates when heating is expected.

Ⓚ Check of R.V. coil

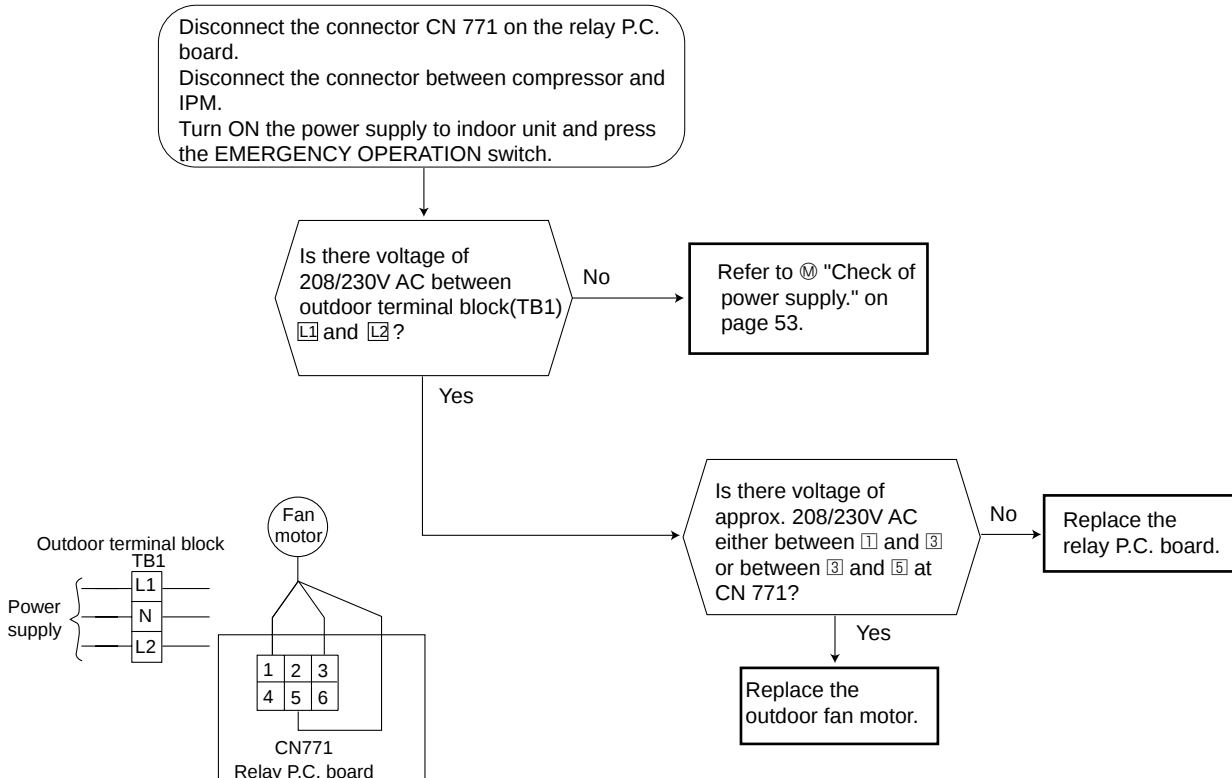
Measure resistance of the R.V. coil to check if it is defective or not.

If the connector CN 721 is not connected or the R.V. coil is open, the voltage occurs between the terminals even when the control is OFF.



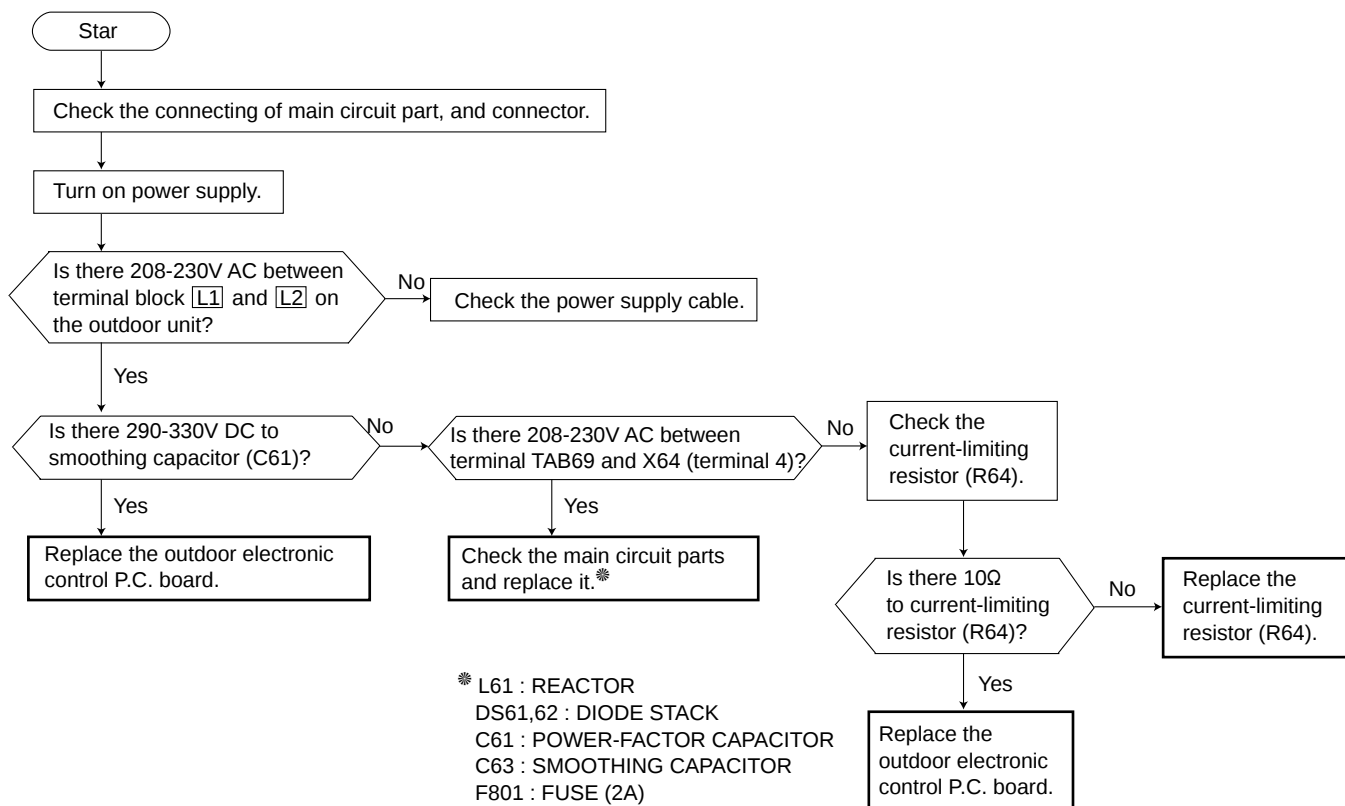
Outdoor fan motor does not work.

Ⓛ Check of outdoor fan motor



Inverter does not work.

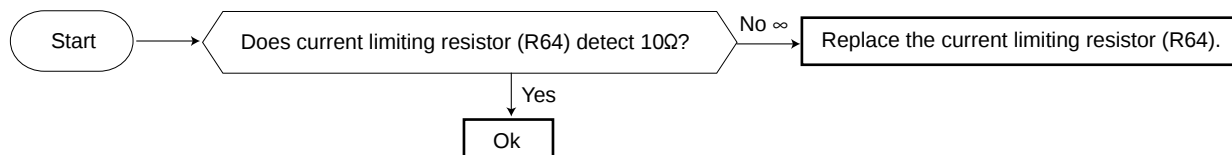
Ⓜ Check of power supply



Outdoor unit does not operate.

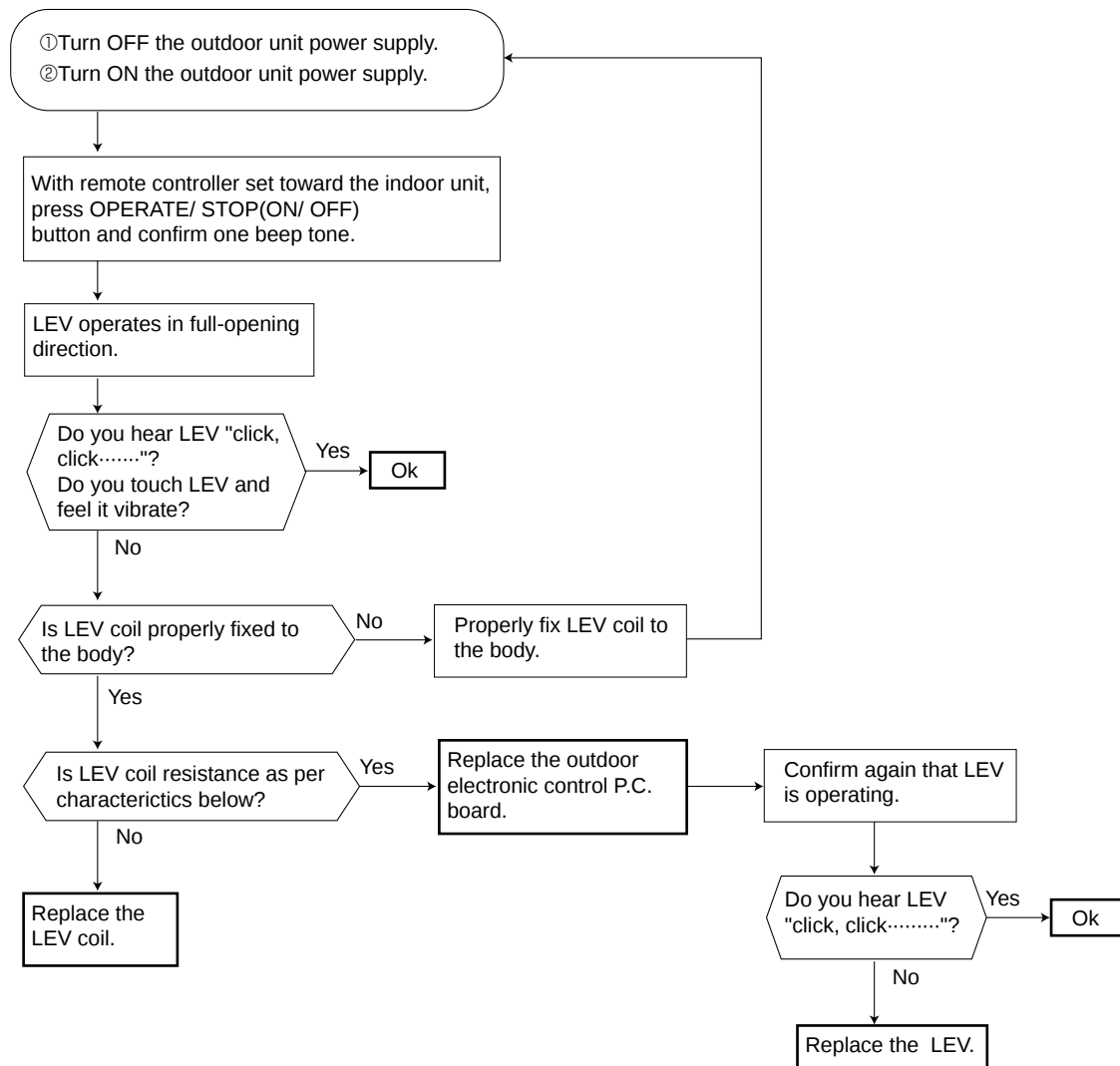
Ⓝ Check of rush current limiting circuit

When the current limiting resistor is open, the rush current limiting relay may not be working properly. Therefore confirm the limiting resistor works properly after replacing it.



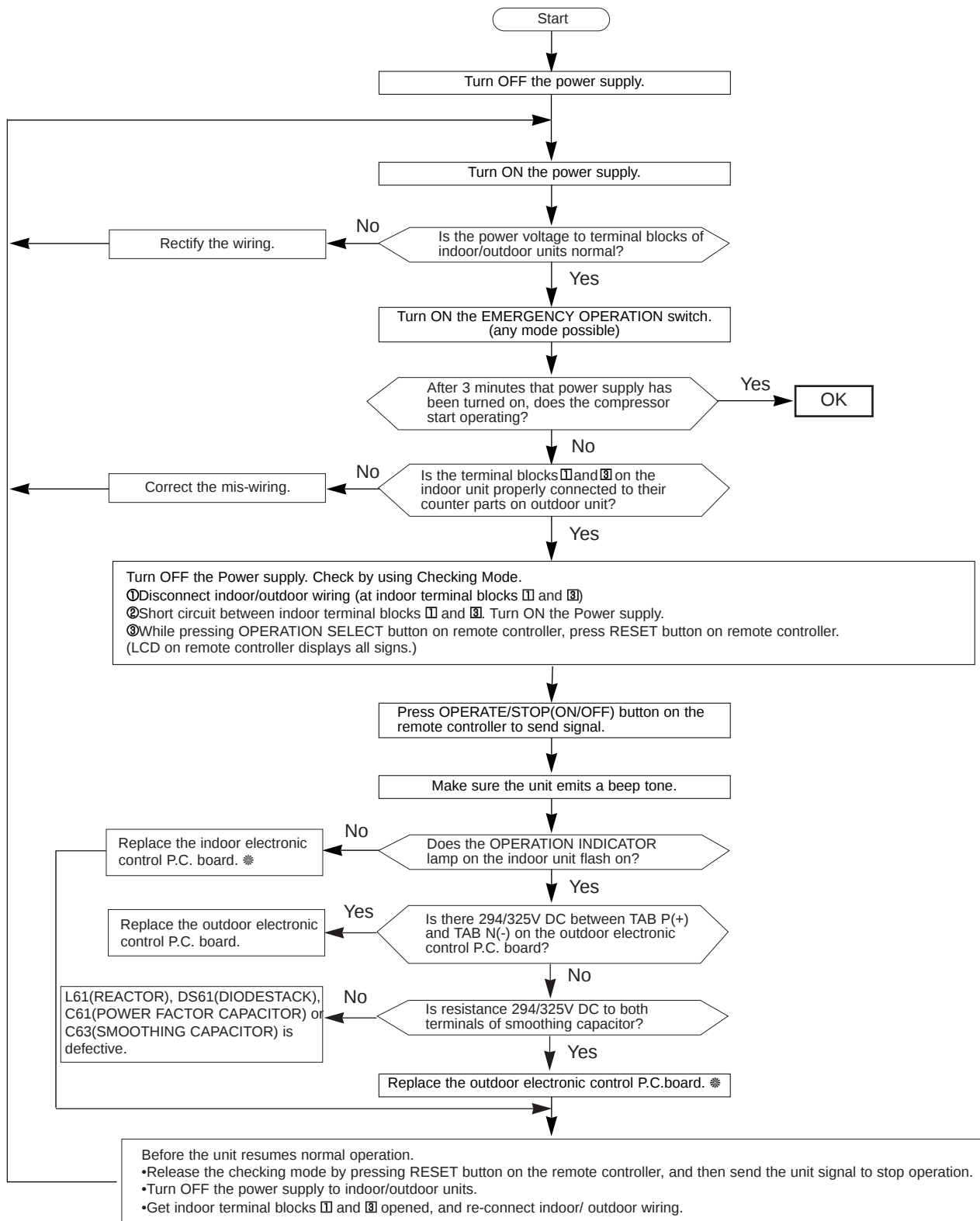
Heating/Cooling does not operate.

① Check of expansion valve (LEV)



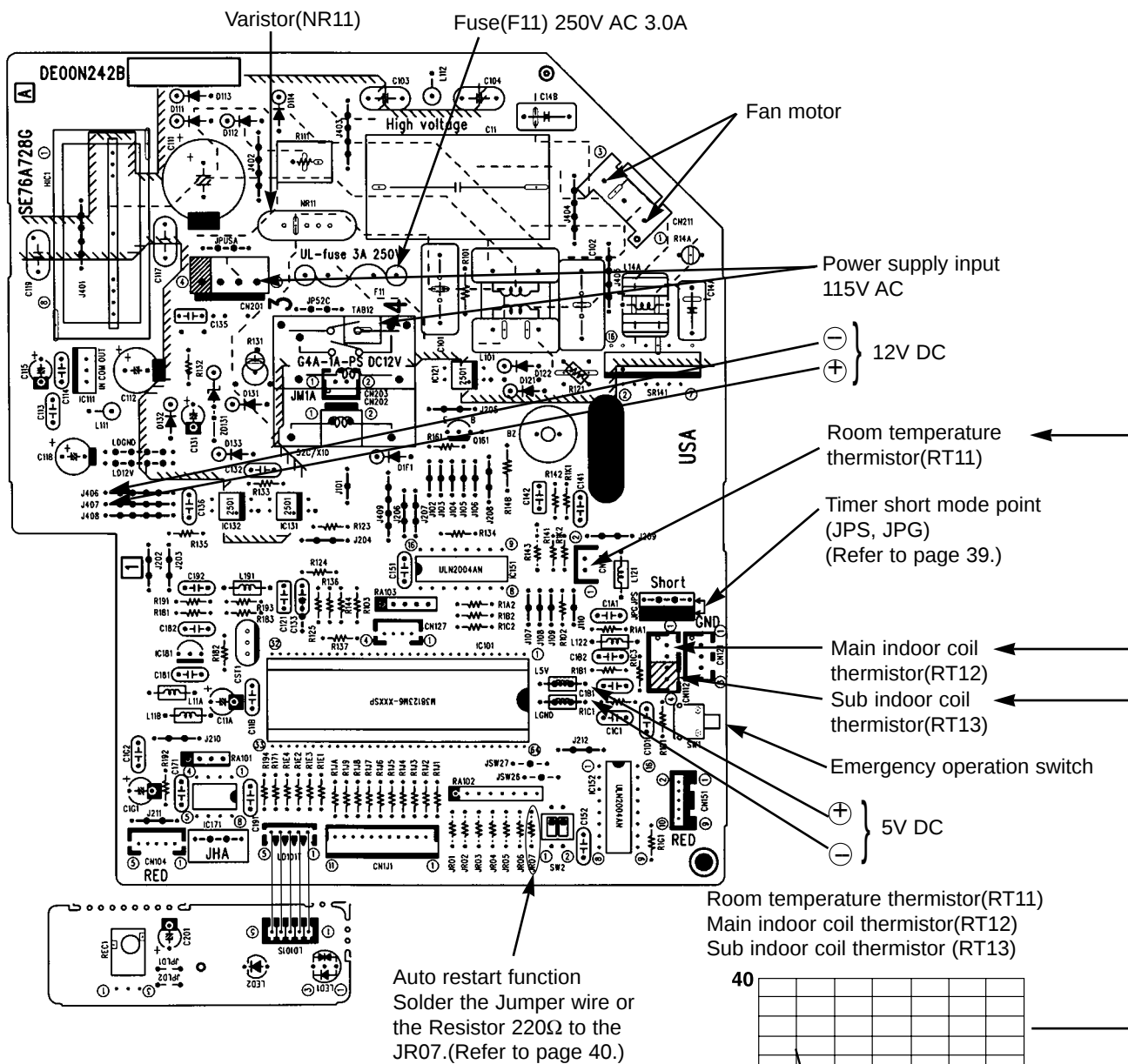
When OPERATION INDICATOR lamp flashes once.
Outdoor unit doesn't operate.

P How to check mis-wiring and serial signal error

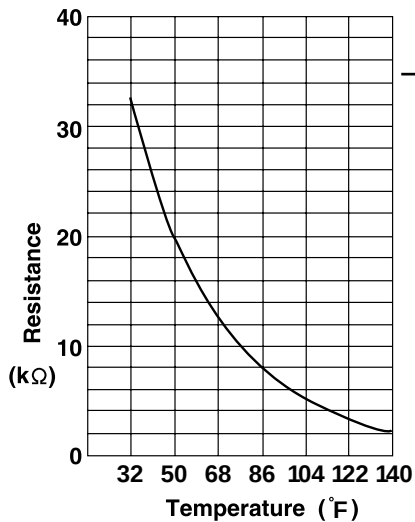


※ Be sure to turn OFF the power supply to indoor/outdoor units in replacing P.C. board.

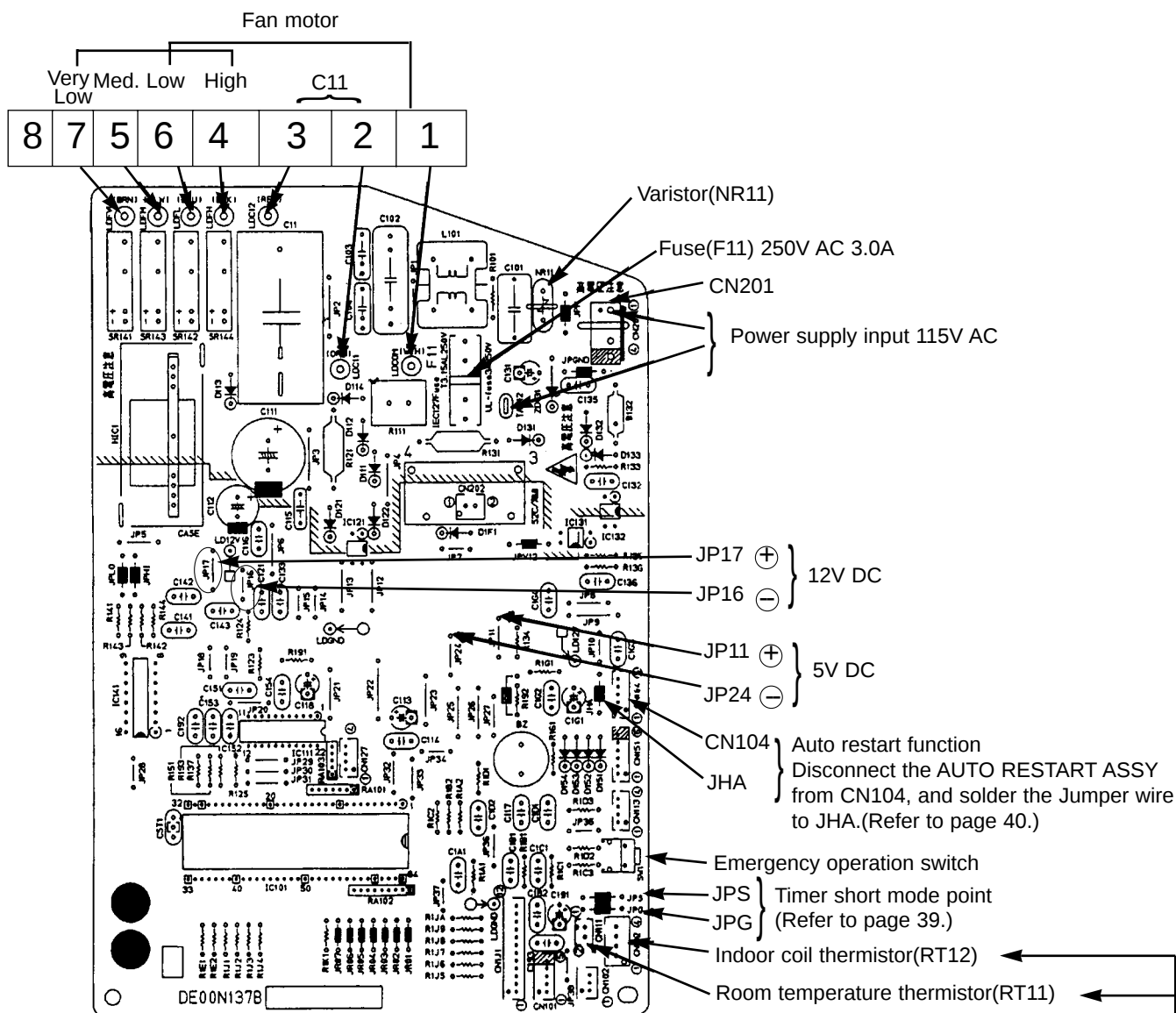
TEST POINT DIAGRAM AND VOLTAGE **MSZ09UN** **Indoor electronic control P.C. board**



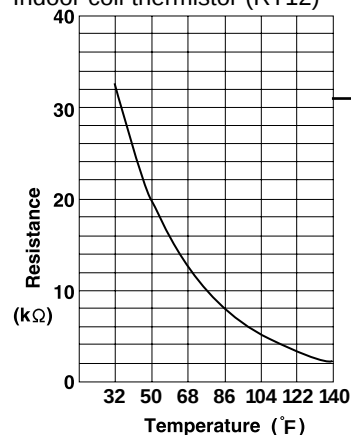
Room temperature thermistor(RT11)
 Main indoor coil thermistor(RT12)
 Sub indoor coil thermistor (RT13)



TEST POINT DIAGRAM AND VOLTAGE **MSZ12UN** **Indoor electronic control P.C. board**



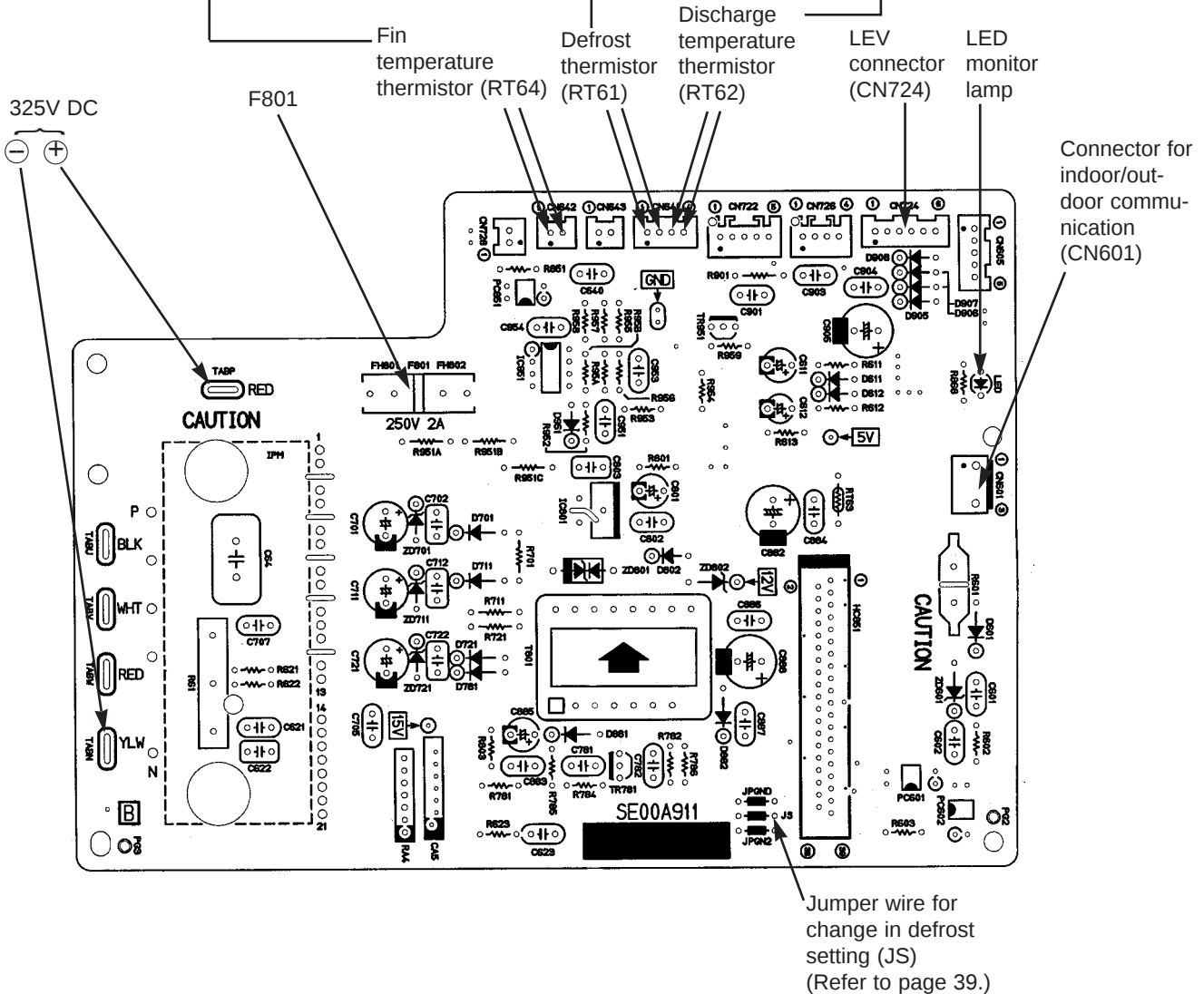
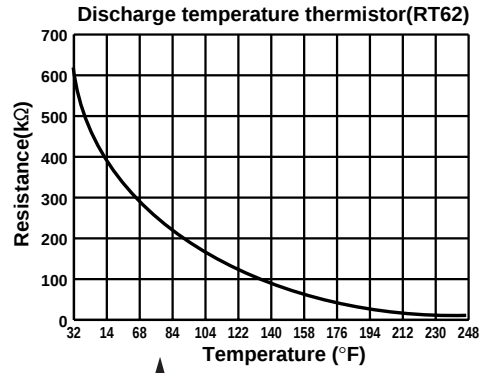
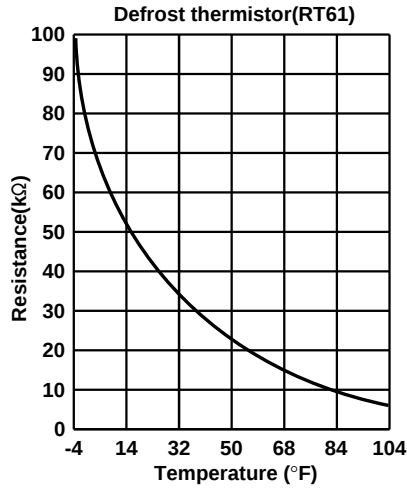
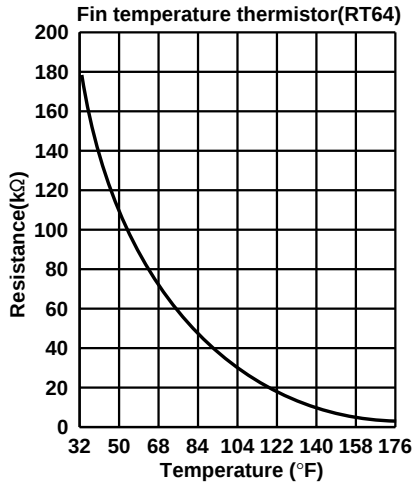
Room temperature thermistor (RT11)
 Indoor coil thermistor (RT12)



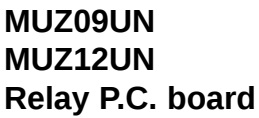
MUZ09UN

MUZ12UN

Outdoor electronic control P.C. board



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RELAY OPERATION

MSZ09UN

MSZ12UN

MODE	THERMOSTAT	X64	INDOOR FAN SPEED	OUTDOOR FAN SPEED
COOL & COOL mode of I FEEL CONTROL	ON	ON	AUTO or set speed	ON
	OFF	ON		OFF
DRY & DRY mode of I FEEL CONTROL	MSZ09UN			
	ON	ON	AUTO(=Low) or set speed	ON
	OFF	ON	Very Low speed	OFF
	MSZ12UN			
	ON	ON	When the compressor operates. AUTO(=Low) or set speed	When the compressor operates. ON When the compressor stops. OFF
	OFF	ON	When the compressor stops. OFF	
HEAT & HEAT mode of I FEEL CONTROL	MSZ09UN			
	ON	ON	AUTO or set speed	ON
	OFF	ON	OFF or Very Low speed	OFF
	MSZ12UN			
	ON	ON	AUTO or set speed	ON
	OFF	ON	Very Low speed	OFF

COIL FROST PREVENTION

MODE	THERMOSTAT	X64	INDOOR FAN SPEED	OUTDOOR FAN SPEED
COOL mode of I FEEL CONTROL	ON	ON	AUTO or set speed	OFF
	OFF	ON		
DRY & DRY mode of I FEEL CONTROL	ON	ON	AUTO(=Low) or set speed	OFF
	OFF	ON		

DEFROSTING

MODE	THERMOSTAT	X64	INDOOR FAN SPEED	OUTDOOR FAN SPEED
HEAT & HEAT mode of I FEEL CONTROL	ON	ON	OFF	OFF

SOLID STATE RELAY (INDOOR FAN MOTOR RELAY)

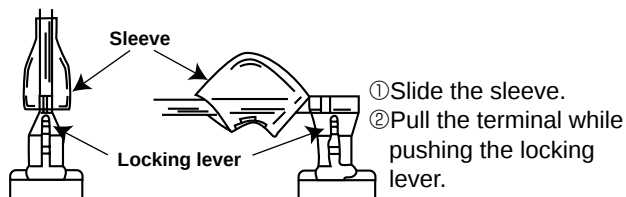
MSZ12UN

Indoor fan speed	Relay turning ON
High	SR144
Med.	SR143
Low	SR142
Very Low	SR141
OFF	All fan relays are OFF.

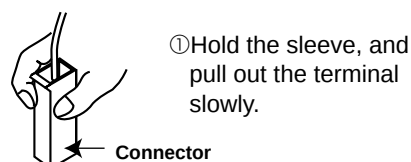
<"Terminal with lock mechanism" Detaching points>

In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

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



(2) The terminal with this connector is a terminal with lock mechanism



11-1. MSZ09UN INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screw caps at the bottom of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	Photo 1 Front panel Screws
2. Removing the electronic control P.C. board and the power monitor, receiver P.C. board (1) Remove the front panel. (Refer to 1.) (2) Remove the screw of the electrical cover. Remove the electrical cover. (3) Remove the screw of the terminal block. (4) Disconnect all the connectors and all the lead wires on the electronic control P.C. board. (5) Remove the electronic control P.C. board. (6) Remove the R.L holder. (7) Open the R.L holder and remove the power monitor, receiver P.C. board.	Photo 2 Indoor electronic control P.C. board Screw of the terminal block Screw of the electrical cover R.L holder Power monitor, receiver P.C. board

OPERATING PROCEDURE

3. Removing the electrical box

- (1) Remove the front panel. (Refer to 1.)
- (2) Remove the electrical cover. (Refer to 2.)
- (3) Disconnect the connector of the indoor coil thermistor(CN112).
- (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board.
- (5) Remove the screw of ground wire.
- (6) Remove the fan motor lead wire and indoor coil thermistor lead wire from the electrical box.
- (7) Remove the lead wire of vane motor from the bottom of electrical box.
- (8) Remove the R.L holder.
- (9) Remove the screw of the conduit cover.
- (10) Pull down the conduit cover and remove it.
- (11) Remove the screws of the conduit plate and remove the conduit plate.
- (12) Remove the screw fixing the electrical box, remove the electrical box.

4. Removing the vane motor

- (1) Remove the front panel. (Refer to 1.)
- (2) Remove the electrical box. (Refer to 3.)
- (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.
- (4) Remove the screws (both upper and lower) of the vane motor, disconnect the connector.
- (5) Remove the vane motor.

PHOTOS

Photo 3

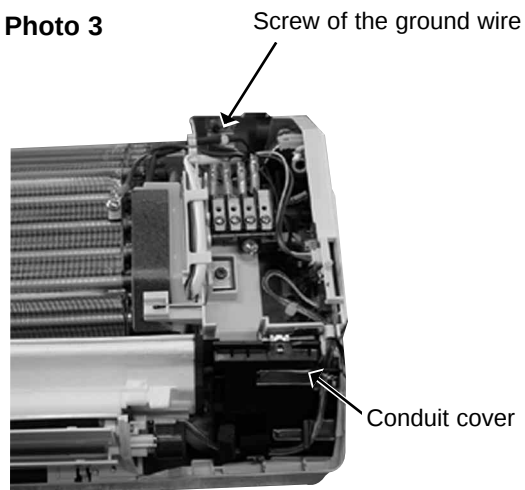


Photo 4

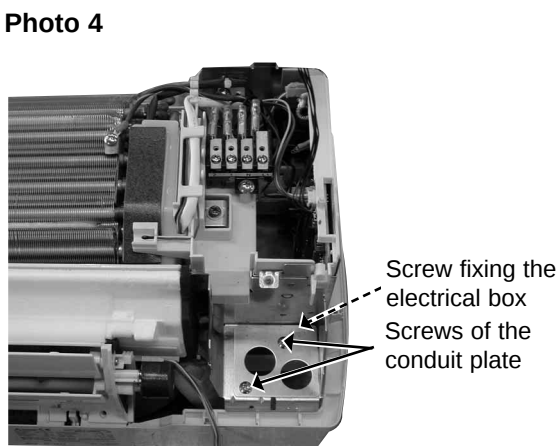
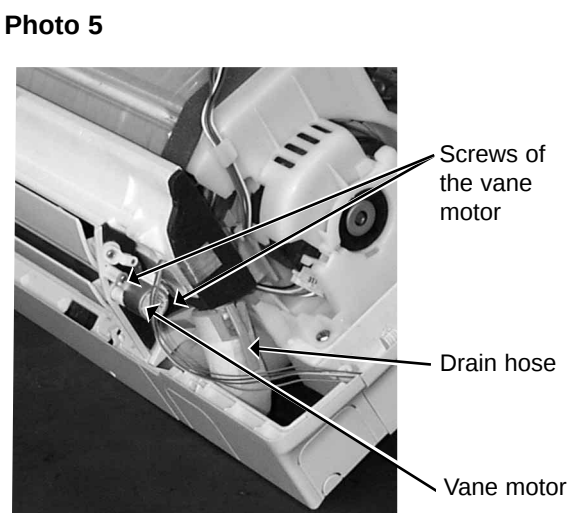
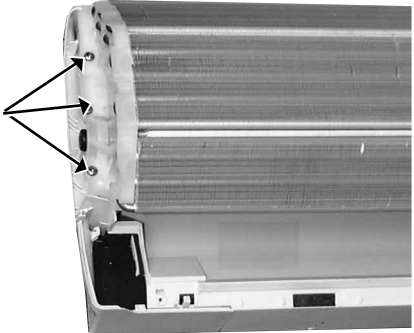
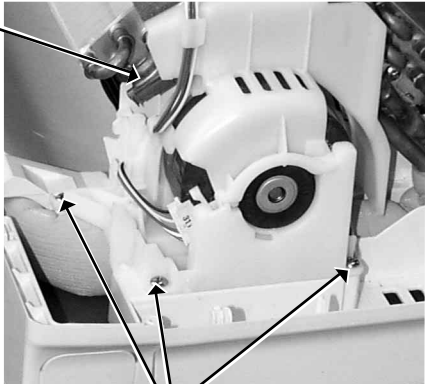


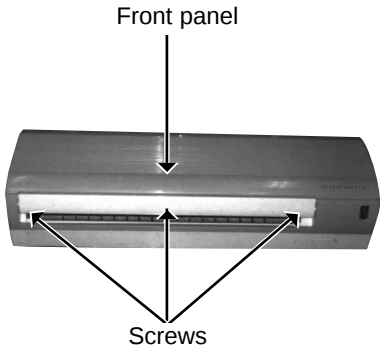
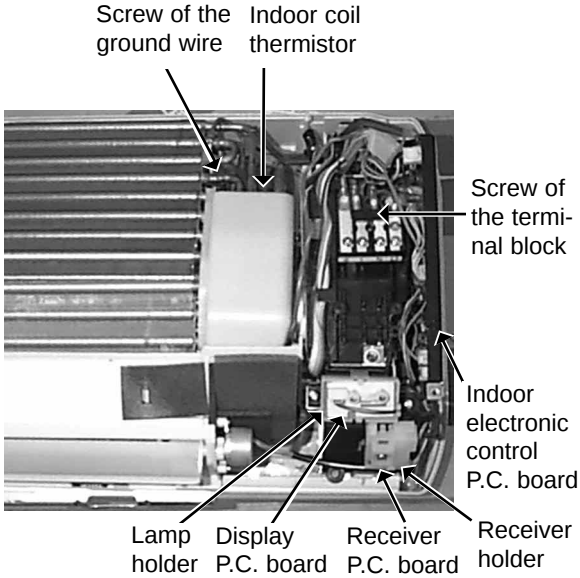
Photo 5



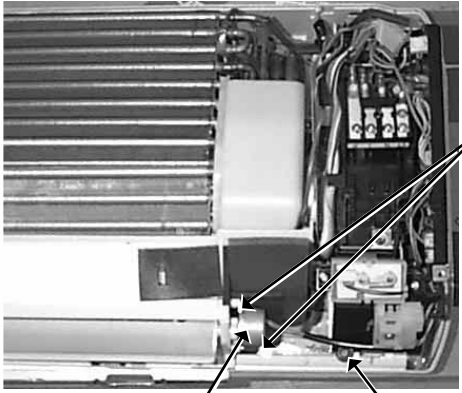
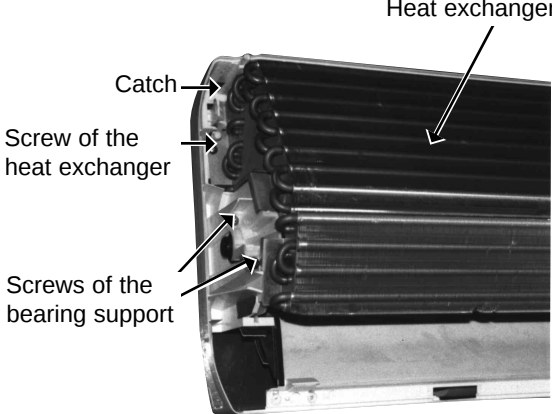
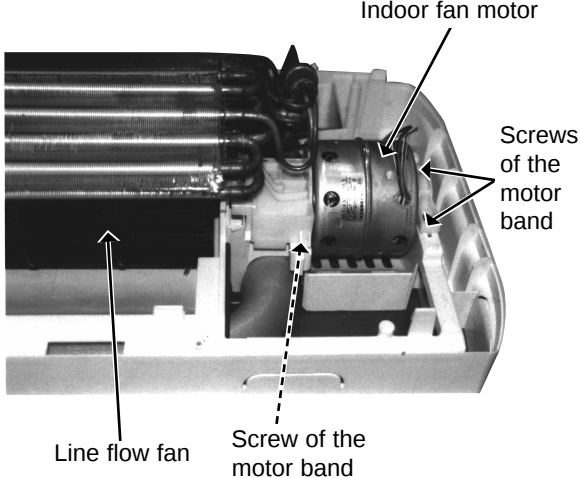


OPERATING PROCEDURE	PHOTOS
5. Removing the line flow fan and the indoor fan motor (1) Remove the front panel. (Refer to 1.) (2) Remove the electrical box. (Refer to 3.) (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly. (4) Remove the hexagon socket set screw from the line flow fan. (5) Remove the screws fixing the fan motor, remove the fan motor. (6) Remove the screws fixing the left side of the heat exchanger. (7) Lifting the left side of the heat exchanger. (8) Remove the line flow fan.	Photo 6 Screws fixing the left side of the heat exchanger  Photo 7 Indoor coil thermistor  Screws of the fan motor

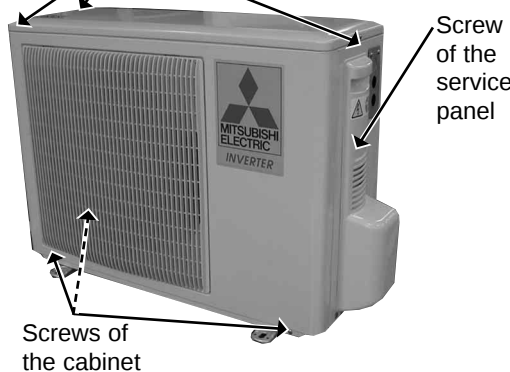
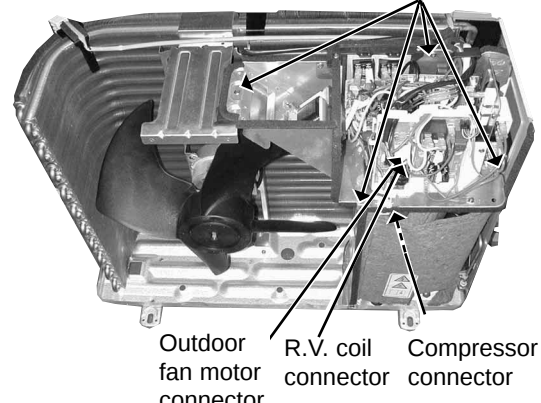
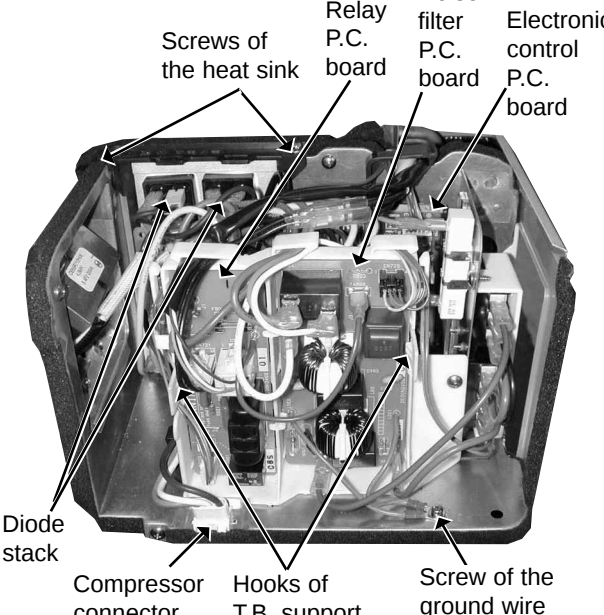
11-2. MSZ12UN INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screw caps at the bottom of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	Photo 1 
2. Removing the electronic control P.C. board, the receiver P.C. board and the display P.C. board (1) Remove the front panel. (Refer to 1.) (2) Remove the electrical cover. (3) Remove the screw of the terminal cover. (4) Remove the screw of the terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder and the receiver P.C. board. (7) Remove the screw of the ground wire. (8) Disconnect all the connectors and all the lead wires on the electronic control P.C. board. (9) Remove the electronic control P.C. board and display P.C. board.	Photo 2 

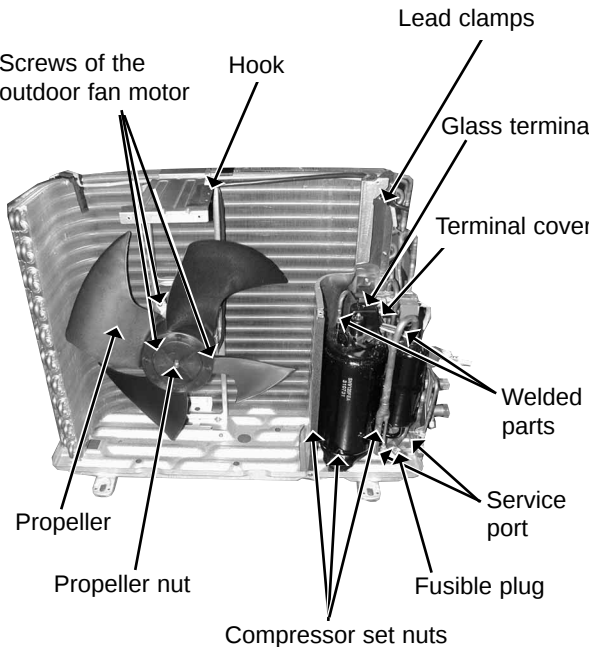


OPERATING PROCEDURE	PHOTOS
3. Removing the electrical box (1) Remove the front panel. (Refer to 1.) (2) Remove the electrical cover. (3) Remove the connector of the indoor coil thermistor (CN112). (4) Remove the motor connector and the vane motor connector (CN151) on the electronic control P.C. board. (5) Remove the screw of the electrical box, remove the electrical box.	Photo 3 
4. Removing the vane motor (1) Remove the front panel. (Refer to 1.) (2) Remove the electrical box. (Refer to 3.) (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly. (4) Remove the screws (both upper and lower) of the vane motor, disconnect the connector. (5) Remove the vane motor.	Photo 4 
5. Removing the indoor fan motor and the line flow fan (1) Remove the front panel. (Refer to 1.) (2) Remove the electrical box. (3) Unhook the catch on the both sides of the nozzle assembly. (4) Remove the nozzle assembly. (5) Remove the screws of the bearing support. (6) Remove the screw of the heat exchanger and unhook the catch. (7) Lifting the heat exchanger, remove the bearing support. (8) Loose the screw fixing the line flow fan, remove the line flow fan. (9) Remove the screws of the motor band, remove the fan motor.	Photo 5 

11-3. MUZ09UN MUZ12UN OUTDOOR UNIT

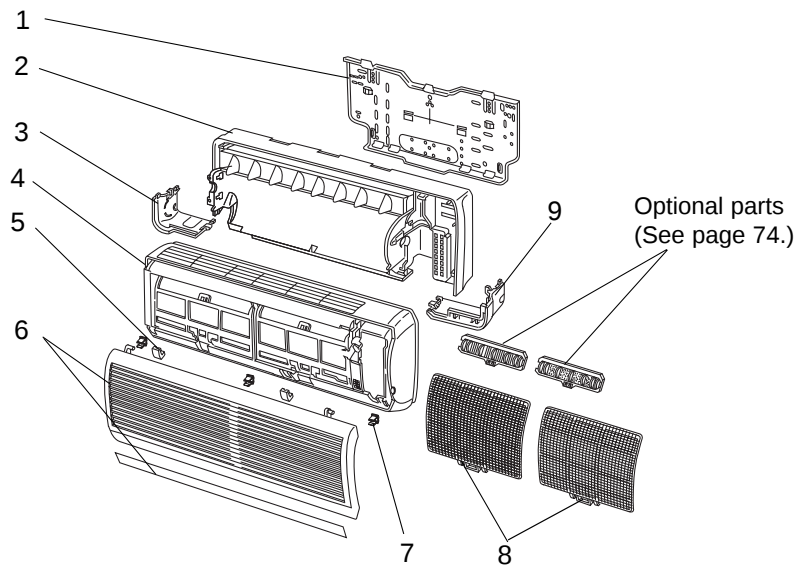
OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screw fixing the service panel. (2) Pull down the service panel and remove it from the cabinet. (3) Remove the screws fixing the top panel and remove the top panel. (4) Remove the screws fixing the cabinet and remove the cabinet. Photo 2 	Photo 1 
2. Removing the inverter assembly (1) Remove the service panel, top panel and the cabinet. (Refer to 1.) (2) Disconnect the connectors (CN641 and CN724) on the electronic control P.C. board. (3) Remove the connectors (CN771 and CN721) on the relay P.C. board. (4) Remove the screws fixing the inverter assembly. (5) Remove the compressor connector. (6) Remove the inverter assembly. 3. Removing the noise filter P.C. board (1) Remove the service panel, top panel and the cabinet. (Refer to 1.) (2) Remove all the connectors and the terminals on the noise filter P.C. board. (3) Remove the screw of ground wire on the relay panel. (4) Remove the hooks of T.B. support. Then, remove the noise filter P.C. board.	Photo 3 
4. Removing the relay P.C. board (1) Remove the service panel, top panel and the cabinet. (Refer to 1.) (2) Remove all the connectors and the terminals on the relay P.C. board. (3) Remove the hooks of T.B. support. Then, remove the relay P.C. board. 5. Removing the electronic control P.C. board (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Remove the inverter assembly. (3) Remove the terminal of diode stack. (4) Remove all the connectors and the terminals on the electronic control P.C. board. (5) Remove the screws fixing the heat sink. (6) Pull up the heat sink and remove the electronic control P.C. board from the relay panel. (7) Remove the screws fixing the heat sink on the electronic control P.C. board. (8) Remove the electronic control P.C. board from the heat sink.	Photo 4 



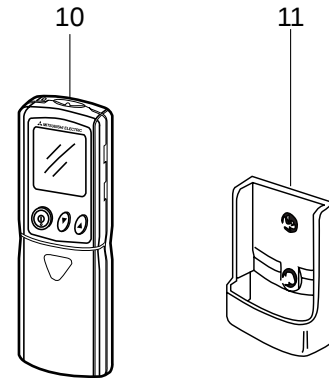
OPERATING PROCEDURE	PHOTOS
6. Removing the propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut. (3) Remove the propeller. NOTE : Loose the propeller in the rotating direction for removal. When attaching the propeller, align the mark on the propeller 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 
7. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the inverter assembly. (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. (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. NOTE ● Before using the torch, reclaim gas from the pipes until the pressure gauge shows 0 PSIG. ● Use the torch under the condition that gas can be recovered even when the inner pressure rises by heat. ● Reclaim all refrigerant in an environmentally acceptable manner.	

MSZ09UN (W)

12-1. INDOOR UNIT STRUCTURAL PARTS



12-2. ACCESSORY AND REMOTE CONTROLLER



12-1. INDOOR UNIT STRUCTURAL PARTS

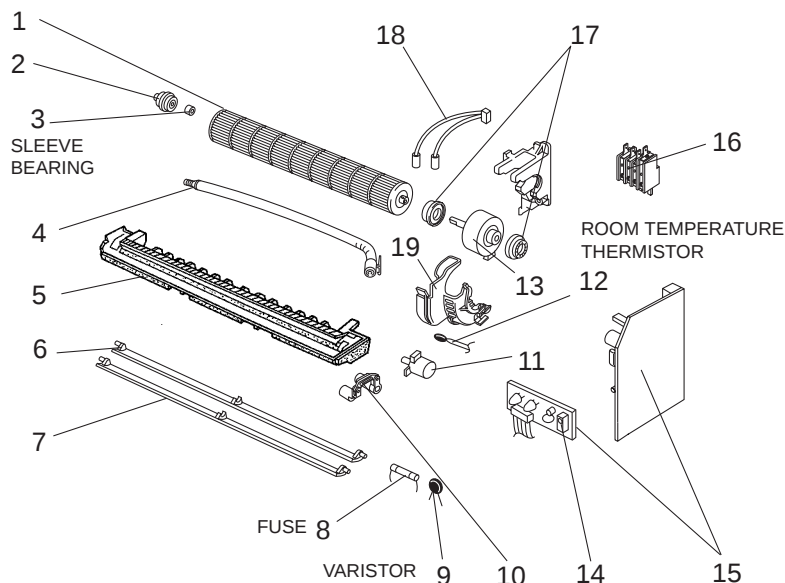
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MSZ09UN (W)	
1	E02 408 970	INSTALLATION PLATE		1	
2	E02 409 234	BOX(W)		1	
3	E02 409 976	CORNER BOX LEFT (W)		1	
4	E02 424 000	FRONT PANEL ASSEMBLY(W)		1	Including 5,6,7
5	E02 409 067	SCREW CAP(W)		2	
6	E02 424 010	GRILLE(W)		1	
7	E02 408 142	CATCH (W)		3	3PCS/SET
8	E02 408 100	AIR FILTER		2	
9	E02 409 975	CORNER BOX RIGHT (W)		1	

12-2. ACCESSORY AND REMOTE CONTROLLER

10	E02 545 426	REMOTE CONTROLLER		1	
11	E02 527 083	REMOTE CONTROLLER HOLDER		1	

MSZ09UN (W)

12-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS



12-4. INDOOR UNIT HEAT EXCHANGER

12-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

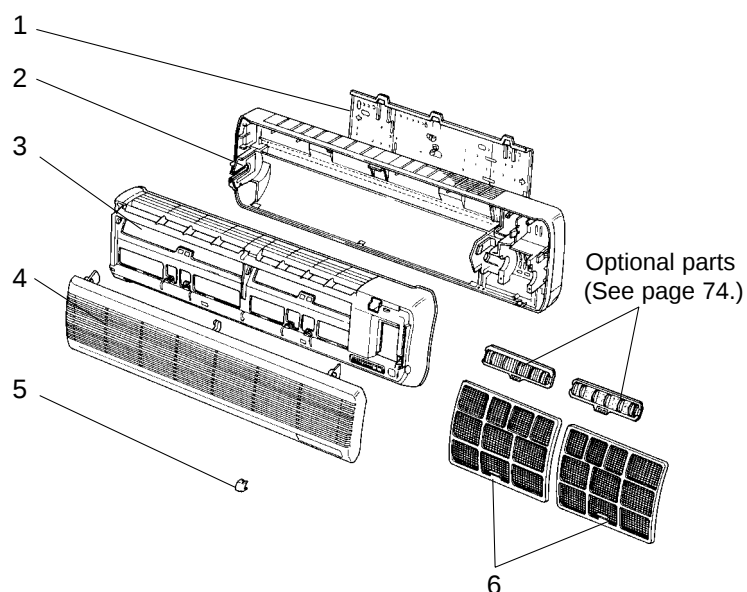
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MSZ09UN (W)	
1	E02 408 302	LINE FLOW FAN		1	
2	E02 408 509	BEARING MOUNT		1	
3	E02 001 504	SLEEVE BEARING		1	
4	E02 661 702	DRAIN HOSE		1	
5	E02 409 235	NOZZLE(W)		1	
6	E02 409 040	VANE UPPER (W)		1	
7	E02 409 041	VANE LOWER (W)		1	
8	E02 268 382	FUSE	F11	1	250V/3A
9	E02 268 385	VARISTOR	NR11	1	
10	E02 408 034	VANE CRANK SET		1	
11	E02 408 303	VANE MOTOR	MV	1	
12	E02 541 308	ROOM TEMPERATURE THERMISTOR	RT11	1	
13	E02 268 300	INDOOR FAN MOTOR	MF	1	RC4W19- □□
14	E02 713 468	RECEIVER		1	
15	E02 713 452	ELECTRONIC CONTROL P.C. BOARD		1	AUTO RESTART
16	E02 545 375	TERMINAL BLOCK	TB	1	
17	E02 151 505	FAN MOTOR RUBBER MOUNT		2	2PCS/SET
18	E02 448 307	INDOOR COIL THERMISTOR SET	RT12,RT13	1	Main, Sub
19	E02 408 333	MOTOR BAND		1	

12-4. INDOOR UNIT HEAT EXCHANGER

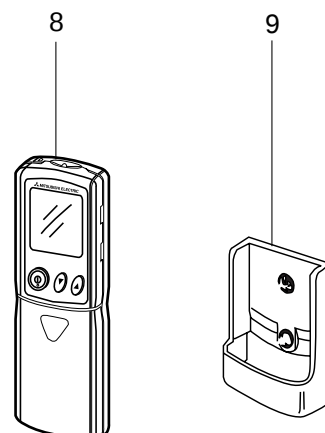
20	E02 518 620	INDOOR HEAT EXCHANGER		1	
21	E02 151 667	UNION(LIQUID)		1	φ 1/4
22	E02 151 666	UNION(GAS)		1	φ 3/8

MSZ12UN (W)

12-5. INDOOR UNIT STRUCTURAL PARTS



12-6. ACCESSORY AND REMOTE CONTROLLER



12-5. INDOOR UNIT STRUCTURAL PARTS

Part number that is circled is not shown in the illustration.

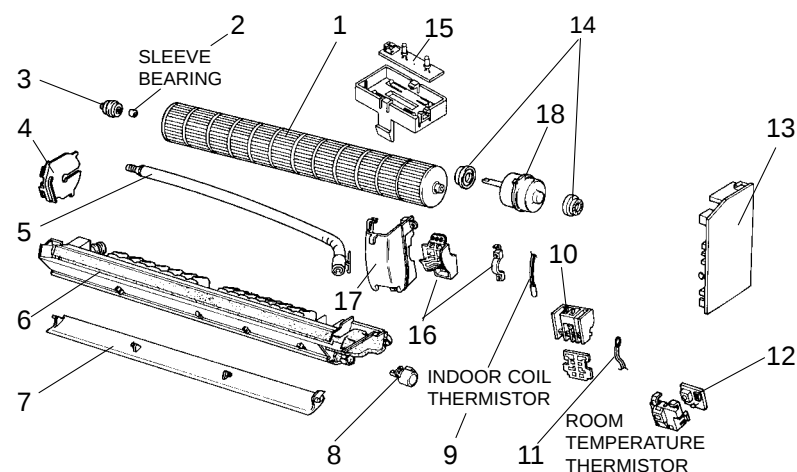
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MSZ12UN (W)	
1	E02 141 970	INSTALLATION PLATE		1	
2	E02 143 234	BOX(W)		1	
3	E02 138 000	FRONT PANEL ASSEMBLY(W)		1	Including 4,5
4	E02 138 010	GRILLE(W)		1	
5	E02 143 067	SCREW CAP(W)		3	3PCS/SET
6	E02 141 100	AIR FILTER		2	
⑦	E02 470 007	LAMP PANEL(W)		1	

12-6. ACCESSORY AND REMOTE CONTROLLER

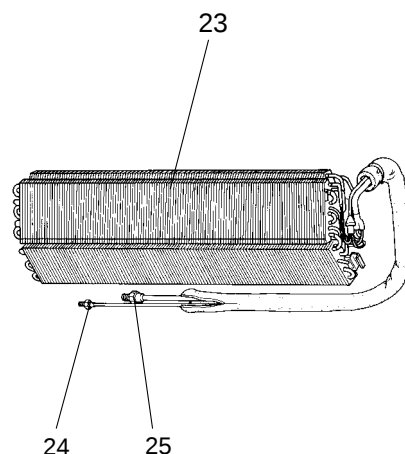
8	E02 545 426	REMOTE CONTROLLER		1	
9	E02 527 083	REMOTE CONTROLLER HOLDER		1	

MSZ12UN (W)

12-7. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS



12-8. INDOOR UNIT HEAT EXCHANGER



12-7. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

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

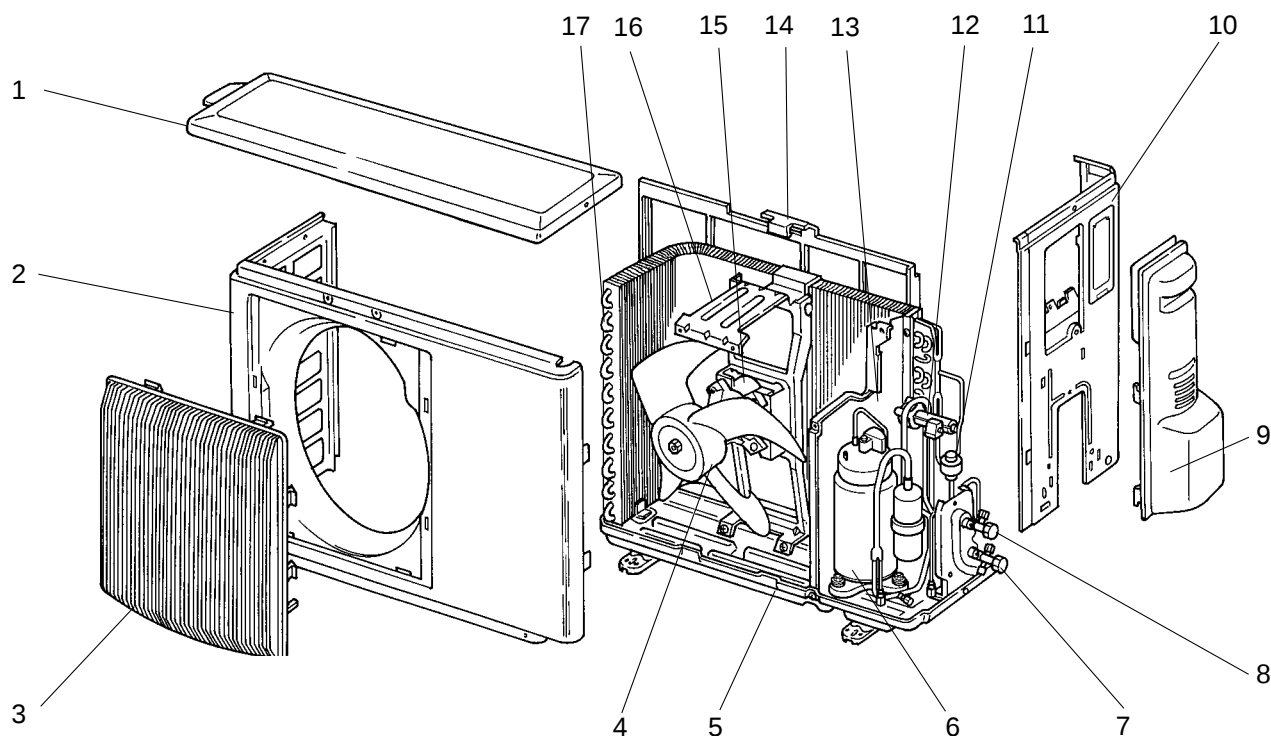
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MSZ12UN (W)	
1	E02 141 302	LINE FLOW FAN		1	
2	E02 001 504	SLEEVE BEARING		1	
3	E02 141 509	BEARING MOUNT		1	
4	E02 494 512	BEARING SUPPORT		1	
5	E02 408 702	DRAIN HOSE		1	
6	E02 143 235	NOZZLE(W)		1	
7	E02 143 040	VANE(W)		1	
8	E02 408 303	VANE MOTOR	MV	1	
9	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	
10	E02 289 375	TERMINAL BLOCK	TB	1	
11	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	
12	E02 141 468	RECEIVER P.C. BOARD		1	
13	E02 714 450	ELECTRONIC CONTROL P.C. BOARD		1	
14	E02 001 505	FAN MOTOR RUBBER MOUNT		2	2PCS/SET
15	E02 138 329	DISPLAY P.C. BOARD		1	
16	E02 138 333	MOTOR BAND ASSEMBLY		1	
17	E02 542 541	WATER CUT		1	
18	E02 270 300	INDOOR FAN MOTOR	MF	1	RA4W18-□□
19	E02 270 452	AUTO RESTART ASSEMBLY		1	
20	E02 268 382	FUSE	F11	1	250V/3A
21	E02 268 385	VARISTOR	NR11	1	
22	E02 475 383	SURGE ABSORVER	DSAR	1	

12-8. INDOOR UNIT HEAT EXCHANGER

23	E02 141 620	INDOOR HEAT EXCHANGER		1	
24	E02 138 667	UNION(LIQUID)		1	φ1/4
25	E02 179 667	UNION(GAS)		1	φ1/2

MUZ09UN MUZ12UN

12-9. OUTDOOR UNIT STRUCTURAL PARTS AND FUNCTIONAL PARTS

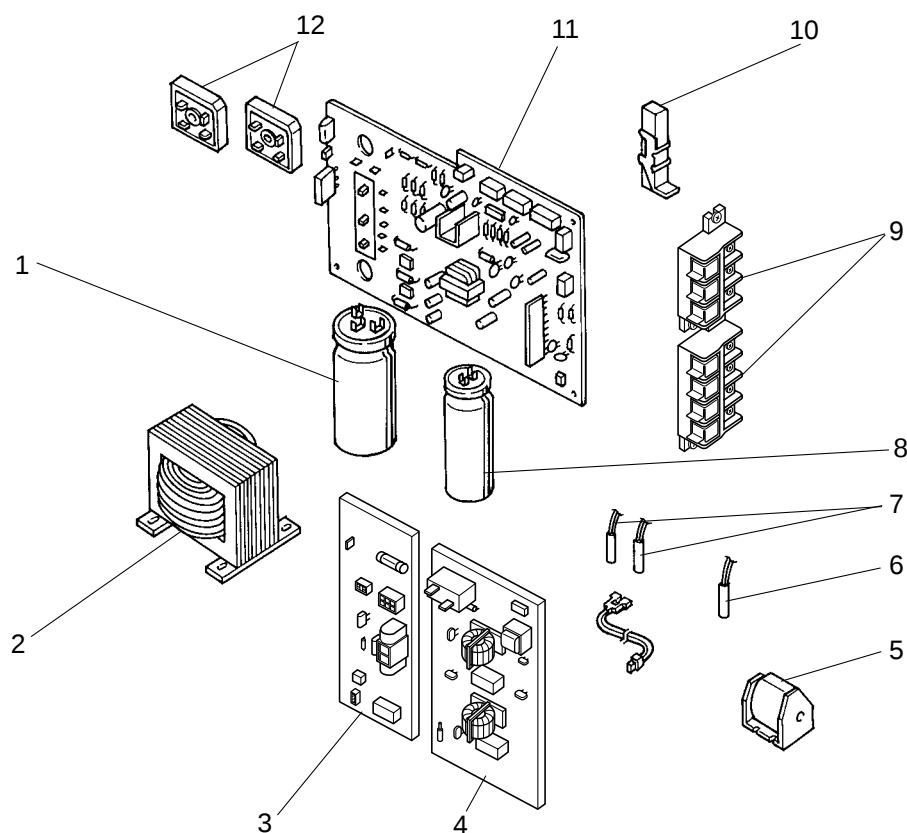


Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MUZ09UN	MUZ12UN	
1	T2W E93 297	TOP PANEL		1	1	
2	T2W E45 232	FRONT PANEL		1	1	
3	T2W E56 521	GRILLE		1	1	
4	M21 47L 501	PROPELLER		1	1	
5	T2W E93 290	BASE		1	1	
6	T92 501 280	COMPRESSOR	MC	1	1	SHV-130FEA
7	M21 20A 661	STOP VALVE (GAS)		1		φ3/8
	M21 20T 661	STOP VALVE (GAS)			1	φ1/2
8	M21 20A 662	STOP VALVE (LIQUID)		1	1	φ1/4
9	T2W E93 245	SERVICE PANEL		1	1	
10	T2W E93 531	BACK PANEL		1	1	
11	T2W E93 645	EXPANSION VALVE		1	1	LEV, CAPILLARY TUBE
12	T2W H95 642	4-WAY VALVE		1	1	
13	M21 45G 293	SEPARATOR		1	1	
14	T2W E93 523	CONDENSER NET		1	1	
15	T2W E93 301	OUTDOOR FAN MOTOR	MF61	1	1	RA6N30-□□
16	M21 50L 515	MOTOR SUPPORT		1	1	
17	T2W E93 630	OUTDOOR HEAT EXCHANGER		1	1	
18	T2W E45 936	CAPILLARY TUBE O.D. 0.12X I.D. 0.079X 11-13/16		1	1	O.D. 0.12X I.D. 0.079X 15-3/4 2PCS/SET
19	T2W E93 651	COIL (LEV)		1	1	
20	T2W E93 943	MUFFLER		1		
	T2W E94 943	MUFFLER			1	
21	M21 00E 943	MUFFLER SPECIAL		1	1	

When servicing, cut the tube to the proper length as shown in the REFRIGERANT SYSTEM DIAGRAM. Refer to page 22.

MUZ09UN MUZ12UN
12-10. OUTDOOR UNIT
ELECTRICAL PARTS

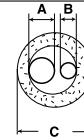
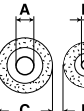


Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MUZ09UN	MUZ12UN	
1	T2W E68 357	SMOOTHING CAPACITOR	C63	1	1	2500 μ F/420VAC
2	T2W E93 337	REACTOR	L61	1	1	
3	T2W E93 441	RELAY P.C. BOARD		1	1	
4	T2W E68 424	NOISE FILTER P.C. BOARD		1	1	
5	T2W 827 389	R.V. COIL	21S4	1	1	
6	M21 J89 308	FIN TEMPERATURE THERMISTOR	RT64	1	1	
7	T2W E93 307	THERMISTOR SET	RT61,62	1	1	Defrost, Discharge
8	T2W E68 356	POWER-FACTOR CAPACITOR	C61	1	1	165 μ F/420VAC
9	T2W E93 376	TERMINAL BLOCK	TB2	1	1	4P
	T2W E94 376	TERMINAL BLOCK	TB1	1	1	3P
10	M21 PG2 361	CURRENT-LIMITING RESISTOR	R64	1	1	RGB20FSY 10 Ω
11	T2W E93 451	ELECTRONIC CONTROL P.C. BOARD		1		
	T2W E94 451	ELECTRONIC CONTROL P.C. BOARD			1	
12	T2W E45 447	DIODE STACK	DS61, DS62	2	2	
13	T2W 800 382	FUSE	F801	1	1	250V/2A
14	T2W E88 382	FUSE	F901	1	1	250V/1A

13-1. REFRIGERANT PIPES

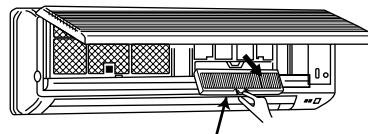
The air conditioner has flared connections its on indoor and outdoor sides.
Please use the optional extension pipe as follows.

Model	Part No.	Pipe length	Pipe size						Additional refrigerant charge R22(oz.)
			Cross- section	A-Gas(in.)		B-Liquid(in.)		Insulation (in.)	
				Outside diameter	Wall thickness	Outside diameter	Wall thickness		
MSZ09UN MUZ09UN	MAC-645PI	10ft.		3/8	0.03	1/4	0.03	C 1-3/8	0
	MAC-646PI	16ft.							4.29
	MAC-647PI	23ft.							12.86
	MAC-648PI	33ft.							
	MAC-649PI	49ft.							
MSZ12UN MUZ12UN	MAC-660PI-US	10ft.		1/2	0.04	1/4	0.03	C 1-7/32 D 1-1/16	0
	MAC-661PI-US	16ft.							4.29
	MAC-662PI-US	23ft.							12.86
	MAC-663PI-US	33ft.							
	MAC-664PI-US	49ft.							

13-2. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

Model	Part No.
MSZ09UN	MAC-1300FT
MSZ12UN	MAC-1100FT



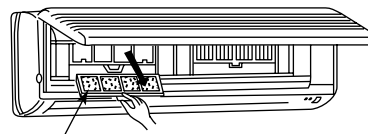
Air cleaning filter (White bellows type)

13-3. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
- Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
- For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
- When the filter color is still dark even after cleaning, replace the filter with a new one.

Replace the filter at least once a year.

Model	Part No.
MSZ09UN	MAC-1800DF
MSZ12UN	MAC-1600DF



Deodorizing filter (Gray sponge type)

- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.

13-4. DRAIN SOCKET SET

Model	Part No.
MUZ09UN MUZ12UN	MAC-812DS

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