



SPLIT-TYPE AIR CONDITIONERS

No. OB274

SERVICE MANUAL

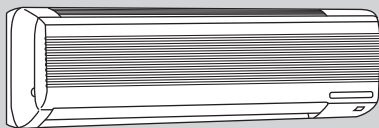
Wireless type
Models

MS09TW _(W) · **MU09TW**

MS12TN _(W) · **MU12TN**

MS15TN _(W) · **MU15TN**

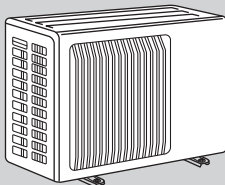
MS17TN _(W) · **MU17TN**



MS12TN
MS15TN
MS17TN
INDOOR UNIT



Remote
controller



MU15TN
MU17TN
OUTDOOR UNIT

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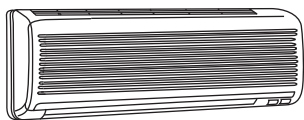
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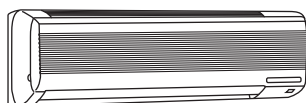
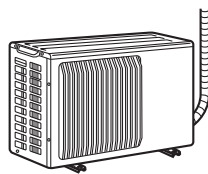
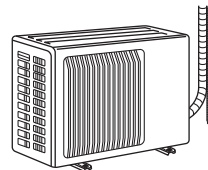
The Slim Line.
From Mitsubishi Electric.



Mr. SLIM™



MS09TW

MS12TN
MS15TN
MS17TNLCD wireless
remote controllerMU09TW
MU12TNMU15TN
MU17TN

Models	Cooling capacity	SEER
MS09TW	8,500Btu/h	10.2
MS12TN	12,300/12,600Btu/h	11.3/11.3
MS15TN	14,300/14,600Btu/h	10.5/10.5
MS17TN	15,900/16,100Btu/h	10.2/10.2

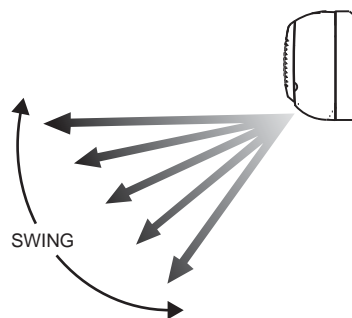
"I FEEL CONTROL" IN OUR LCD WIRELESS REMOTE CONTROLLER WITH ON/OFF PROGRAM TIMER

Mitsubishi Electric's new wireless remote controller incorporates a number of advanced features that provide 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 then 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.

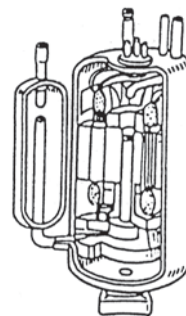


AUTO-RESTART FUNCTION

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



MS09NW2 MS09TW

1. Indoor unit has changed
2. Remote controller has changed.

MS12NN2 MS12TN

1. Remote controller has changed.
2. Union size of connect pipe for gas has changed.

MS15NN2 MS15TN**MS17NN2 MS17TN**

1. Remote controller has changed.

MU09NW2 MU09TW

1. Outdoor unit has changed.

MU12NN2 MU12TN

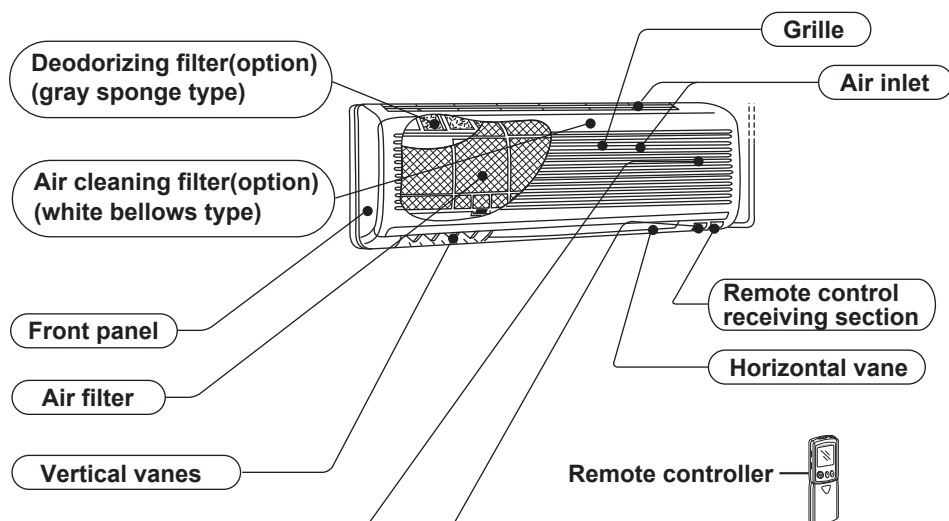
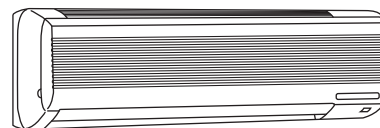
1. Outdoor unit has changed.

MU15NN2 MU15TN**MU17NN2 MU17TN**

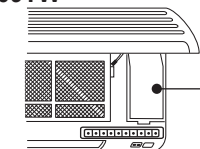
1. Only model name has changed.

INDOOR UNIT

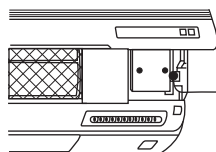
MS09TW

MS12TN
MS15TN
MS17TN

Operation section
(When the front panel is opened)
MS09TW

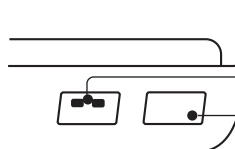


Emergency operation switch

MS12TN
MS15TN
MS17TN

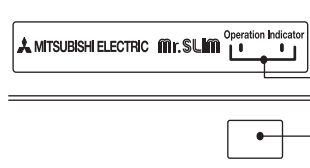
Emergency operation switch

Display section
MS09TW



Operation indicator lamp

Receiving section

MS12TN
MS15TN
MS17TN

Operation Indicator lamp

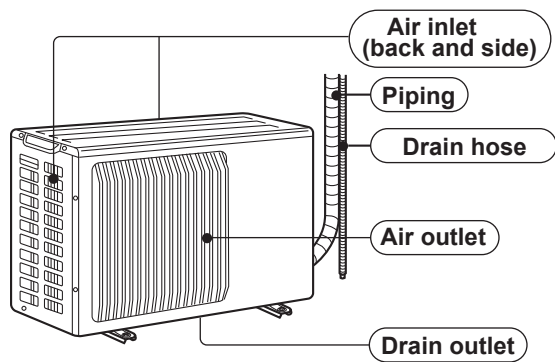
Receiving section

ACCESSORIES

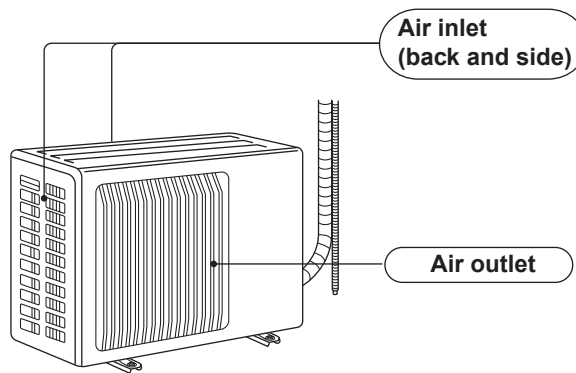
		MS09TW	MS12TN MS15TN MS17TN
①	Installation plate	1	1
②	Installation plate fixing screw 4 x 25 mm(0.16 x 0.98 in.)	5	6
③	Remote controller mounting hardware	1	1
④	Fixing screw for ③ 3.5 x 16 mm(0.14 x 0.63 in.) (Black)	2	2
⑤	Battery (AAA) for remote controller	2	2
⑥	Wireless remote controller	1	1
⑦	Felt tape (Used for left or left-rear piping)	1	1

OUTDOOR UNIT

MU09TW
MU12TN



MU15TN
MU17TN



REMOTE CONTROLLER

MS09TW

MS12TN

MS15TN

MS17TN

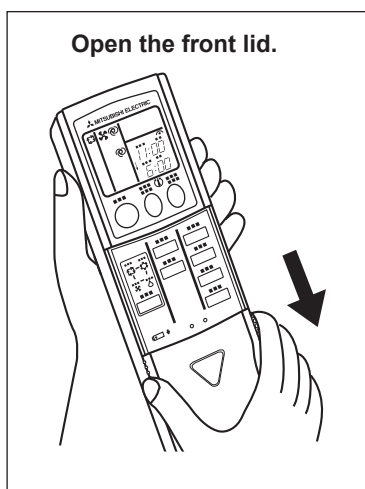
Signal transmitting section

Operation display section

**OPERATE /STOP
(ON /OFF)button**

TEMPERATURE buttons

Open the front lid.



FAN SPEED CONTROL button

OPERATION SELECT button

RESET button

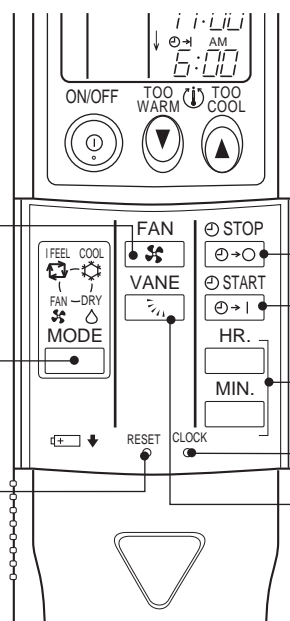
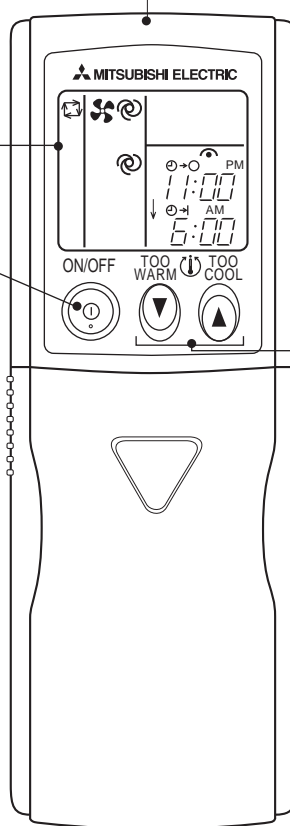
OFF-TIMER button

ON-TIMER button

**HR. button
MIN. button
(TIME SET button)**

CLOCK SET button

VANE CONTROL button



Item		Model	MS09TW	MS12TN
Cooling capacity	#1	Btu/h	8,500	12,300/12,600
Power consumption	#1	W	840	1,100/1,130
EER #1 [SEER] #2			10.1 [10.2]	11.2/11.2 [11.3/11.3]
INDOOR UNIT MODEL			MS09TW	MS12TN
External finish			White	
Power supply		V, phase, Hz	115, 1, 60	
Max. fuse size (time delay)/ Disconnect switch		A	15	
Min. ampacity		A	0.5	0.6
Fan motor		F.L.A	0.37	0.43
Airflow Low—Med.—High	FAN Dry	CFM	191-237-289	360-395-452
	COOL Dry(Wet)	CFM	166(138)-219(184)-272(226)	360(314)-395(342)-452(392)
Moisture removal		pt./h	2.3	3.2
Sound level Low-Med.-High		dB(A)	26-31-36	36-39-42
Cond. drain connection O.D.		in.	5/8	
Dimensions	W	in.	33-1/2	39-15/16
	D	in.	7-1/2	7-1/2
	H	in.	10-15/16	12-5/8
Weight		lb.	20	31
OUTDOOR UNIT MODEL			MU09TW	MU12TN
External finish			Munsell 5Y7/1	
Power supply		V, phase, Hz	115, 1, 60	208/230, 1, 60
Max. fuse size (time delay)		A	15	
Min. ampacity		A	11	12
Fan motor		F.L.A	0.60	0.42
Compressor	Model		RH130WGJT	RH167NHDT
	Winding resistance (at 68°F)Ω		C-R 0.85 C-S 1.21	C-R 2.16 C-S 3.11
	R.L.A		7.8	9.0
	L.R.A		41.0	29.0
Refrigerant control			Capillary tube	
Sound level		dB(A)	46	49
Dimensions	W	in.	30-23/32	30-3/4
	D	in.	10-1/32	10-1/16
	H	in.	21-1/4	21-1/4
Weight		lb.	71	84
REMOTE CONTROLLER			Wireless type	
Control voltage (by built-in transformer)			12V DC	
REFRIGERANT PIPING			Not supplied (optional parts)	
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)			1 lb. 11 oz.	2 lb. 9 oz.
Refrigerant oil (Model)			9.3 (MS56)	16.1 (MS56)

Notes : Test conditions are based on ARI 210/240

h1 : Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, (75°FWB)

h2 : Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 82°FDB, 65°FWB

Operating Range

		Indoor intake air temperature	Outdoor intake air temperature
Cooling	Maximum	95°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	67°FDB

Item		Model	MS15TN	MS17TN
Cooling capacity	*1	Btu/h	14,300/14,600	15,900/16,100
Power consumption	*1	W	1,370/1,400	1,570/1,600
EER *1 [SEER] *2			10.4/10.4 (10.5/10.5)	10.1/10.1 (10.2/10.2)
INDOOR UNIT MODEL			MS15TN	MS17TN
External finish			White	
Power supply		V, phase, Hz	115, 1, 60	
Max. fuse size (time delay)/Disconnect switch		A	15	
Min. ampacity		A	0.6	0.7
Fan motor		F.L.A	0.43	0.51
Airflow Low—Med.—High	Dry	CFM	360-395-452	406-441-491
	Wet	CFM	293-321-367	346-374-417
Moisture removal		pt./h	4.7	5.1
Sound level Low-Med.-High		dB(A)	36-39-42	40-43-45
Cond. drain connection O.D.		in.	5/8	
Dimensions	W	in.	39-15/16	
	D	in.	7-1/2	
	H	in.	12-5/8	
Weight		lb.	31	
OUTDOOR UNIT			MU15TN	MU17TN
External finish			Munsell 5Y7/1	
Power supply		V, phase, Hz	208/230, 1, 60	
Max. fuse size (time delay)		A	20	
Min. ampacity		A	14	15
Fan motor		F.L.A	0.52	
Compressor	Model		RH207NHDT	RH231NHDT
	Winding resistance (at 68°F)Ω		C-R 1.68 C-S 2.78	C-R 1.65 C-S 2.67
	R.L.A		10.0	11.0
	L.R.A		35.0	38.0
Refrigerant control			Capillary tube	
Sound level		dB(A)	52	52
Dimensions	W	in.	33-7/16	
	D	in.	11-7/16	
	H	in.	23-13/16	
Weight		lb.	92	97
REMOTE CONTROLLER			Wireless type	
Control voltage (by built-in transformer)			12V DC	
REFRIGERANT PIPING			Not supplied (optional parts)	
Pipe size (Min. wall thickness)	Liquid	in.	1/4 (0.0265)	
	Gas	in.	5/8 (0.0315)	
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. 14 oz.	3 lb.
Refrigerant oil (Model)			16.1 (MS56)	

Notes : Test conditions are based on ARI 210/240

h1 : Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, (75°FWB)

h2 : Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 82°FDB, 65°FWB

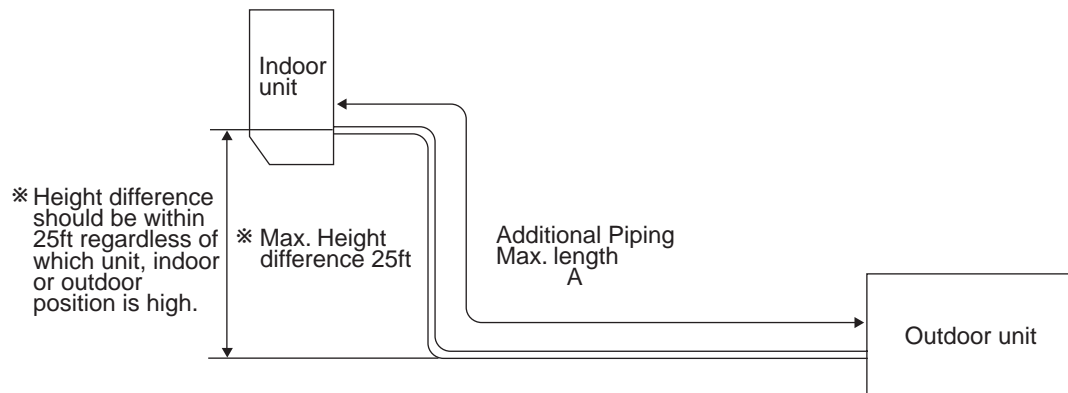
Operating Range

		Indoor intake air temperature	Outdoor intake air temperature
Cooling	Maximum	95°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	67°FDB

MAX. REFRIGERANT PIPING LENGTH & MAX. HEIGHT DIFFERENCE

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		
MS09TW MU09TW	49	ϕ 3/8	0.0285	ϕ 1/4	0.0265	Gas : 16-15/16 Liquid : 19-11/16	Gas : 0 Liquid : 0
MS12TN MU12TN		ϕ 1/2					
MS15TN MU15TN MS17TN MU17TN		ϕ 5/8	0.0315				

MAX. HEIGHT DIFFERENCE



5-1. PERFORMANCE DATA

1) COOLING CAPACITY

MS09TW MS12TN MS15TN MS17TN MU09TW MU12TN MU15TN MU17TN

(115V)

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
MS09TW	71	10.4	5.9	0.75	9.7	5.5	0.82	9.1	5.2	0.88	8.5	4.8	0.93	7.8	4.4	0.97
	67	9.9	6.9	0.71	9.2	6.4	0.78	8.5	6.0	0.84	7.9	5.5	0.89	7.3	5.1	0.93
	63	9.3	7.7	0.67	8.6	7.2	0.74	8.0	6.7	0.80	7.3	6.1	0.86	6.6	5.5	0.89

(208V)

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
MS12TN	71	15.1	8.7	0.98	14.1	8.1	1.07	13.2	7.6	1.16	12.3	7.1	1.22	11.3	6.5	1.27
	67	14.3	10.1	0.92	13.3	9.4	1.02	12.3	8.7	1.10	11.4	8.1	1.17	10.5	7.5	1.22
	63	13.4	11.3	0.88	12.4	10.5	0.97	11.6	9.8	1.05	10.5	8.9	1.12	9.6	8.1	1.17
MS15TN	71	17.5	9.1	1.22	16.4	8.5	1.34	15.4	7.9	1.44	14.3	7.4	1.51	13.2	6.8	1.58
	67	16.6	10.8	1.15	15.4	10.0	1.27	14.3	9.3	1.37	13.3	8.6	1.45	12.2	7.9	1.52
	63	15.6	12.2	1.10	14.4	11.3	1.21	13.4	10.5	1.31	12.2	9.6	1.40	11.2	8.7	1.45
MS17TN	71	19.5	10.1	1.40	18.2	9.4	1.53	17.1	8.8	1.65	15.9	8.2	1.73	14.6	7.6	1.81
	67	18.4	12.0	1.32	17.2	11.2	1.45	15.9	10.3	1.57	14.8	9.6	1.66	13.6	8.8	1.74
	63	17.3	13.6	1.26	16.1	12.6	1.39	14.9	11.7	1.50	13.6	10.6	1.60	12.4	9.7	1.66

(230V)

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
MS12TN	71	15.4	8.9	1.01	14.4	8.3	1.10	13.5	7.8	1.19	12.6	7.3	1.25	11.6	6.7	1.30
	67	14.6	10.4	0.95	13.6	9.7	1.05	12.6	8.9	1.13	11.7	8.3	1.20	10.8	7.6	1.25
	63	13.7	11.6	0.90	12.7	10.7	1.00	11.8	10.0	1.08	10.8	9.1	1.15	9.8	8.3	1.20
MS15TN	71	17.9	9.2	1.25	16.7	8.6	1.37	15.7	8.1	1.47	14.6	7.5	1.55	13.4	6.9	1.61
	67	16.9	11.0	1.18	15.8	10.2	1.30	14.6	9.5	1.40	13.6	8.8	1.48	12.5	8.1	1.55
	63	15.9	12.5	1.12	14.7	11.6	1.24	13.7	10.8	1.34	12.5	9.8	1.43	11.4	8.9	1.48
MS17TN	71	19.7	10.2	1.42	18.4	9.5	1.56	17.3	8.9	1.68	16.1	8.3	1.77	14.8	7.7	1.84
	67	18.7	12.1	1.34	17.4	11.3	1.48	16.1	10.5	1.60	15.0	9.7	1.70	13.8	8.9	1.78
	63	17.5	13.7	1.28	16.3	12.7	1.42	15.1	11.9	1.53	13.8	10.8	1.63	12.6	9.8	1.70

Notes 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)		
	25ft (std)	40ft	49ft
MS09TW MS12TN MS15TN MS17TN	1.0	0.954	0.927

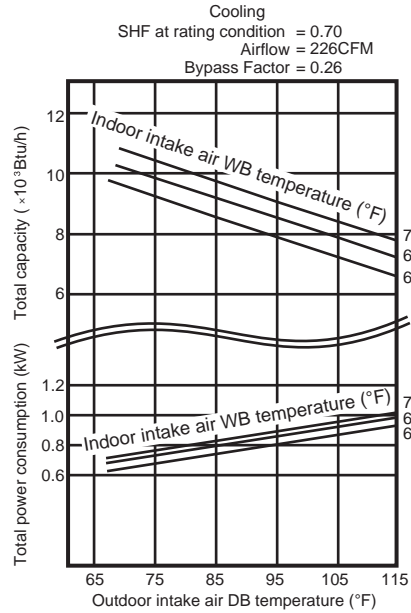
5-2. PERFORMANCE CURVE

NOTE : A point on the curve shows the reference point.

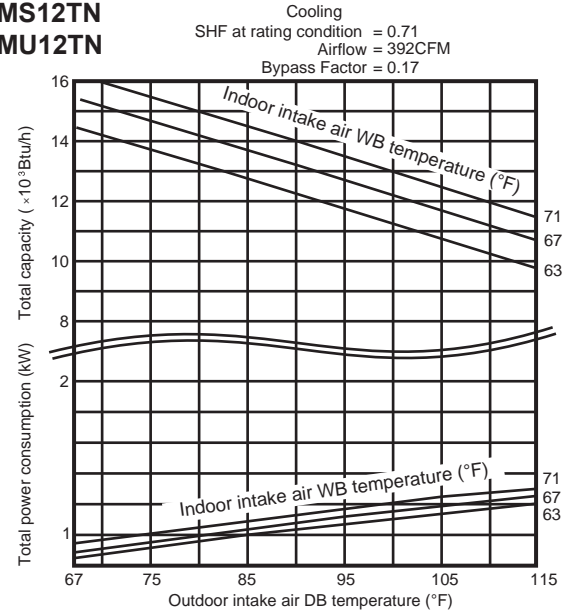
Curves in graph of MS(MU)12/15/17TN shows curves under 230V AC.

As for curves under 208V AC, refer to PERFORMANCE DATA on page 10.

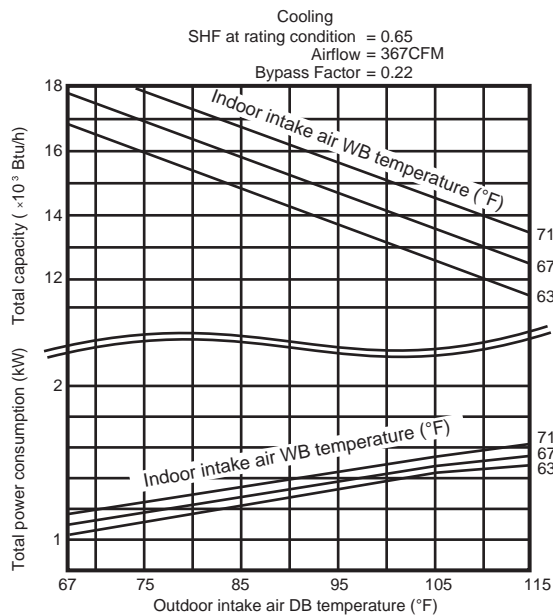
MS09TW MU09TW



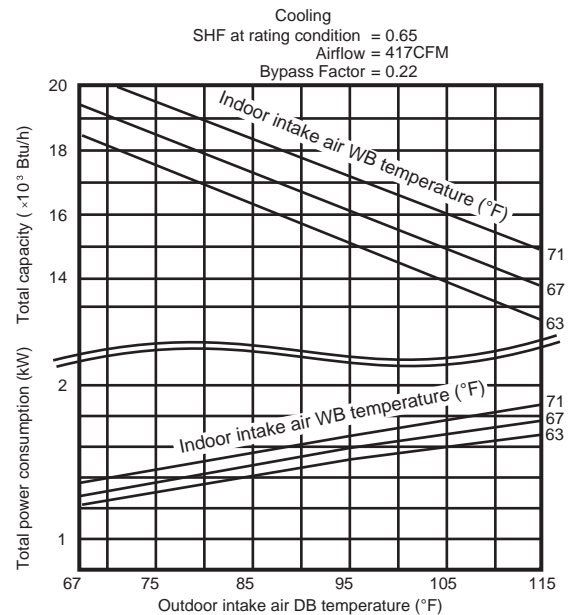
MS12TN MU12TN



MS15TN MU15TN



MS17TN MU17TN



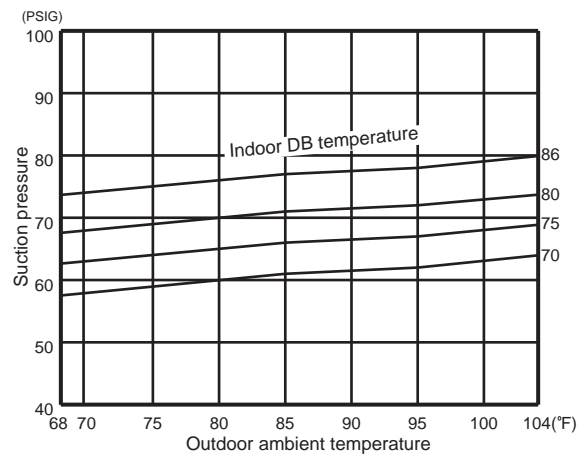
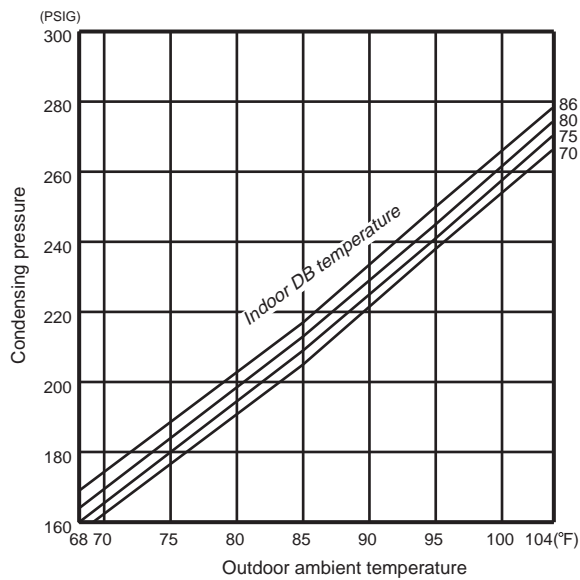
5-3. Condensing pressure

Data is based on the condition of indoor humidity 50%.

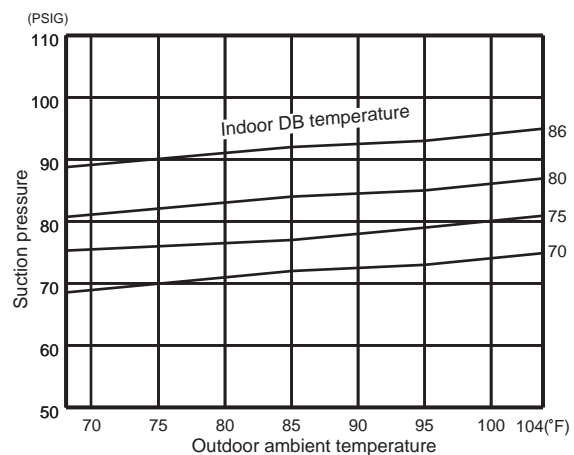
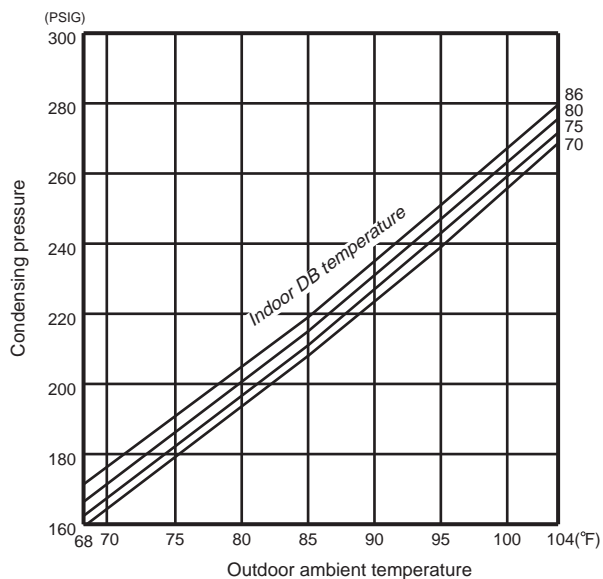
Air flow should be set at High.

A point on the curve shows the reference point.

MU09TW

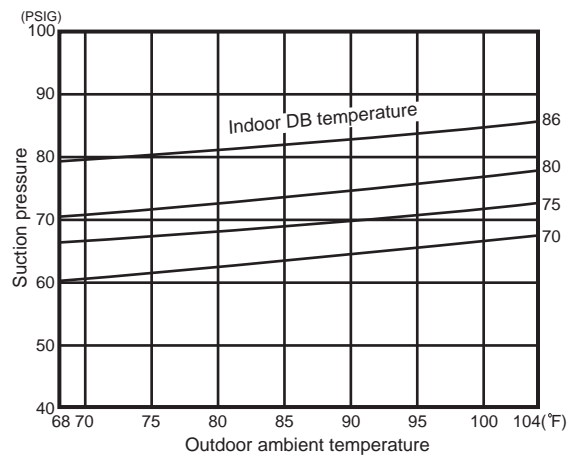
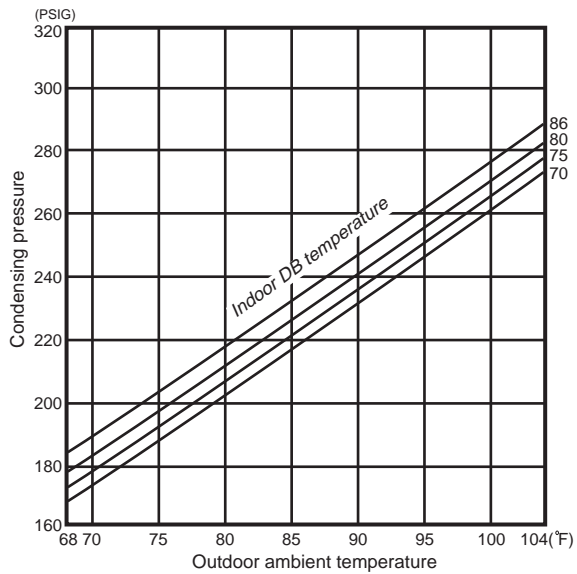


MU12TN

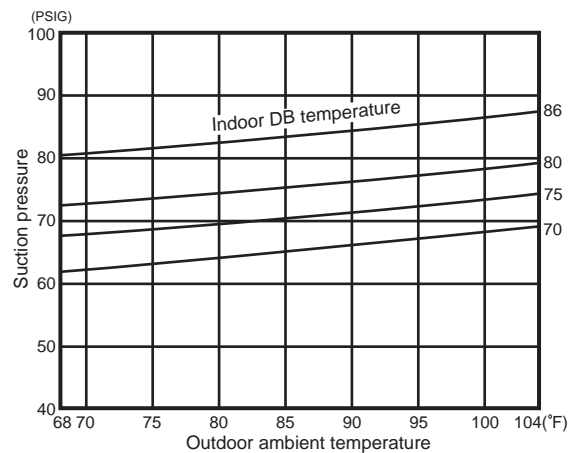
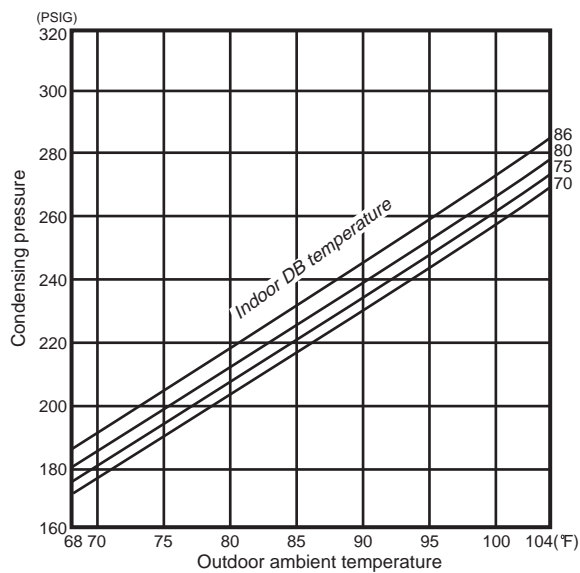


Data is based on the condition of indoor humidity 50%.
 Air flow should be set at High.
 A point on the curve shows the reference point.

MU15TN



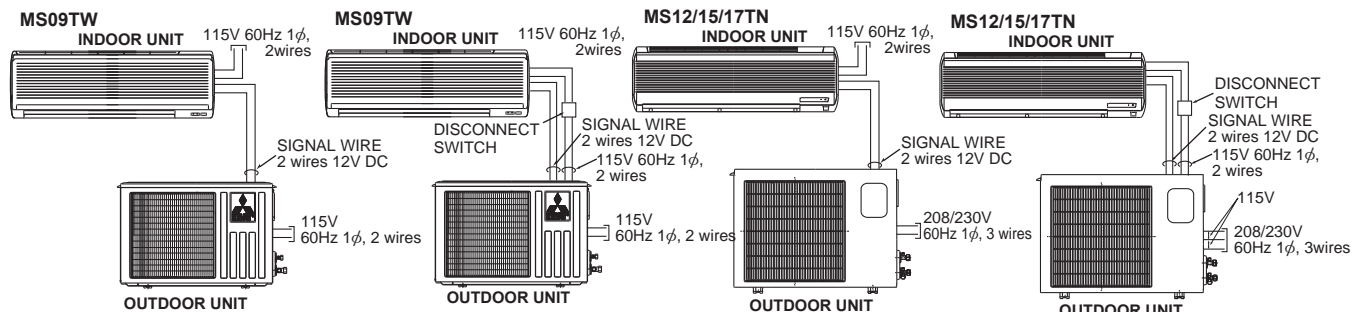
MU17TN



5-4. STANDARD OPERATION DATA

Model			MS09TW	MS12TN	MS15TN	MS17TN
Item		Unit	Cooling	Cooling	Cooling	Cooling
Total	Capacity	Btu / h	8,500	12,300/12,600	14,300/14,600	15,900/16,100
	SHF	—	0.70	0.71	0.65	0.65
	Input	kW	0.84	1.10/1.13	1.37/1.40	1.57/1.60
Electrical circuit	INDOOR UNIT MODEL		MS09TW	MS12TN	MS15TN	MS17TN
	Power supply (V, phase, Hz)		115, 1, 60	115, 1, 60	115, 1, 60	115, 1, 60
	Input	kW	0.035	0.047	0.047	0.054
	Fan motor current	A	0.34	0.41	0.41	0.47
	OUTDOOR UNIT MODEL		MU09TW	MU12TN	MU15TN	MU17TN
	Power supply (V, phase, Hz)		115, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60
	Input	kW	0.805	1.053/1.083	1.323/1.353	1.516/1.546
	Comp. current	A	6.61	4.84/4.41	6.01/5.51	7.01/6.41
	Fan motor current	A	0.59	0.36/0.39	0.49	0.49
Refrigerant circuit	Condensing pressure	PSIG	245	247	256	252
	Suction pressure	PSIG	73	85	77	77
	Discharge temperature	°F	182	175	166	174
	Condensing temperature	°F	115	116	116	114
	Suction temperature	°F	52	54	48	46
	Comp. shell bottom temp	°F	167	160	154	160
	Ref. pipe length	ft.	25	25	25	25
	Refrigerant charge (R22)	—	1 lb. 11 oz.	2 lb. 9 oz.	2 lb. 14 oz.	3 lb.
Indoor unit	Intake air temperature	DB	°F	80	80	80
		WB	°F	67	67	67
	Discharge air temperature	DB	°F	60	58	56
		WB	°F	57	56	54
	Fan speed (High)	rpm	890	1,200	1,200	1,290
	Airflow (High)	CFM	262(Wet)	392(Wet)	367(Wet)	417(Wet)
Outdoor unit	Intake air temperature	DB	°F	95	95	95
		WB	°F	—	—	—
	Fan speed	rpm	640	700/740	830/900	830/900
	Airflow	CFM	985	974/1,034	1,324/1,430	1,288/1,394

POWER SUPPLY



• Both wirings can be applied to all MODELS.

• Outline of MU12TN is as same as one of MU09TW.

[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.

5-5. OPERATING RANGE

(1) POWER SUPPLY

	Model	Rating	Guaranteed Voltage
Indoor unit	MS09TW MS12TN MS15TN MS17TN	115V 60Hz 1 ϕ	Min. 103V 115V Max. 127V ----- ----- -----
Outdoor unit	MU09TW MU12TN MU15TN MU17TN	208/230V 60Hz 1 ϕ	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%		—	

5-6. OUTLET AIR SPEED AND COVERAGE RANGE

Model	Mode	Function	Air flow (CFM)	Air speed (ft./sec.)	Coverage range (ft.)
MS09TW	FAN	Dry	289	15.4	21.8
	COOL	Dry	272	14.5	20.5
		Wet	226	12.0	17.1
MS12TN	FAN	Dry	452	18.2	29.2
	COOL	Wet	392	15.8	25.5
MS15TN	FAN	Dry	452	18.2	29.2
	COOL	Wet	367	14.8	23.9
MS17TN	FAN	Dry	491	19.7	31.7
	COOL	Wet	417	16.8	27.0

1The 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 in the room.

5-7. ADDITIONAL REFRIGERANT CHARGE (R22(oz.))

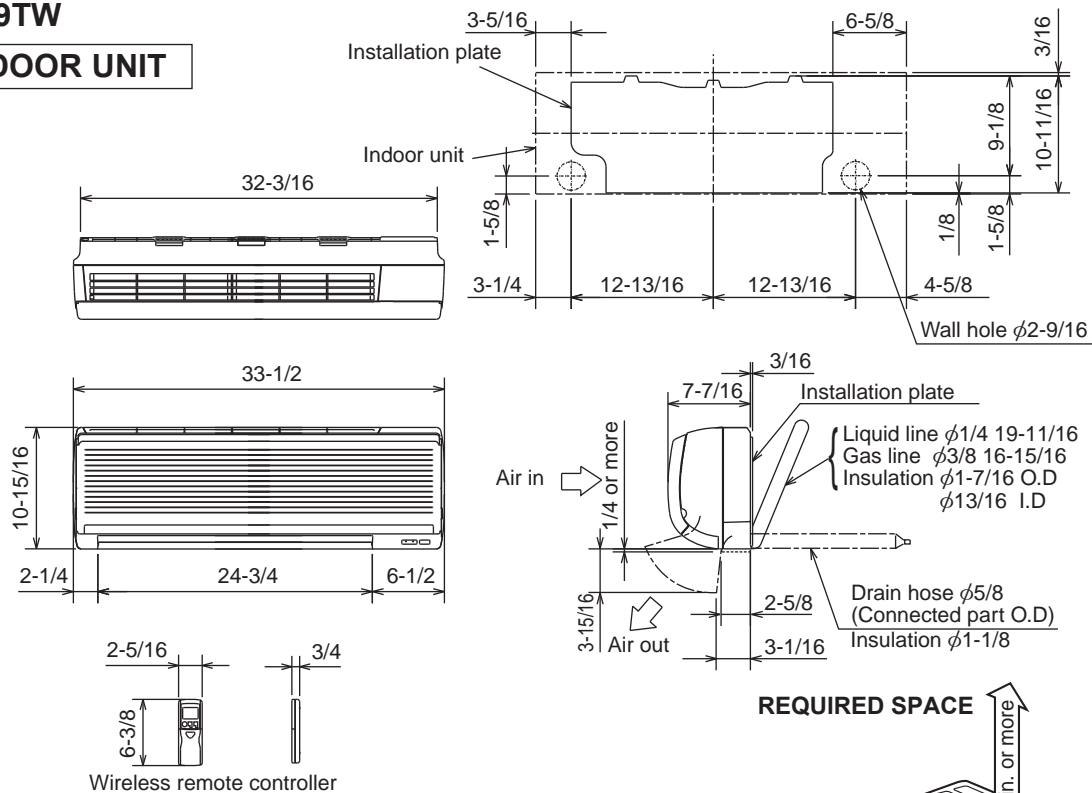
Model	Outdoor unit precharged (up to 25ft.)	Refrigerant piping length (one way)					
		25ft.	30ft.	35ft.	40ft.	45ft.	49ft.
MS09TW MU09TW	1 lb. 11 oz.	0	0.53 (1/2)	1.06 (1)	1.59 (3/2)	2.12 (2)	2.54 (5/2)
MS12TN MU12TN	2 lb. 9 oz.						
MS15TN MU15TN	2 lb. 14 oz.						
MS17TN MU17TN	3 lb.						

CALCULATION : Xoz. = 0.53/ 5oz./ft. x (Additional Piping Length-25) ft.

MS09TW

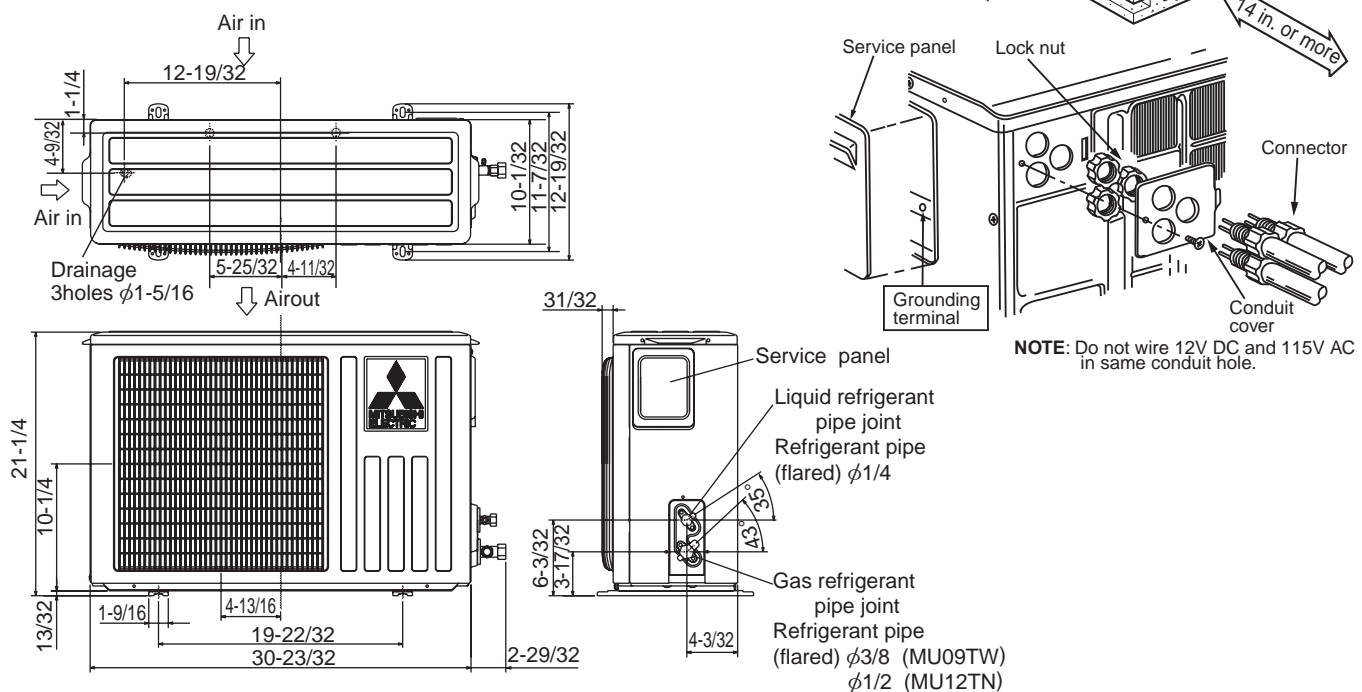
INDOOR UNIT

Unit : inch



MU09TW MU12TN

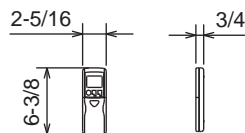
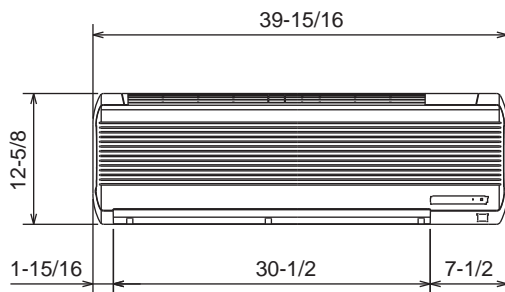
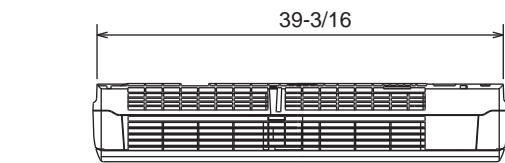
OUTDOOR UNIT



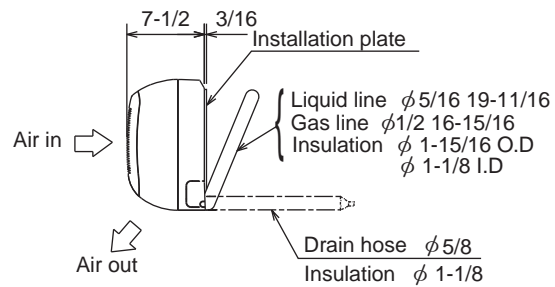
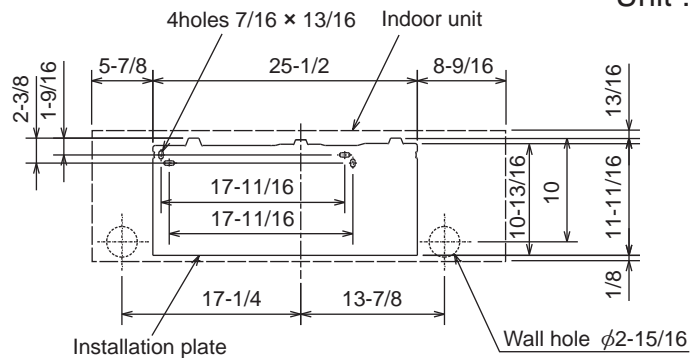
MS12TN MS15TN MS17TN

INDOOR UNIT

Unit : inch

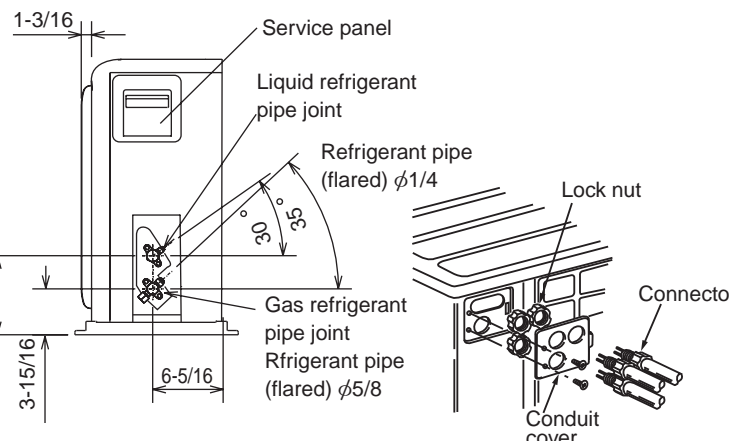
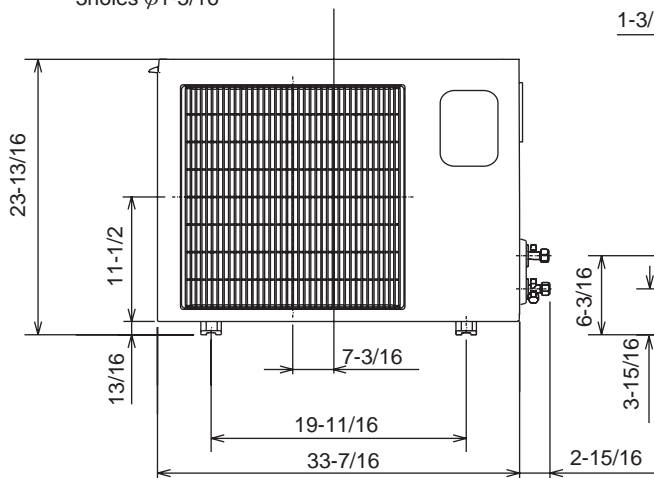
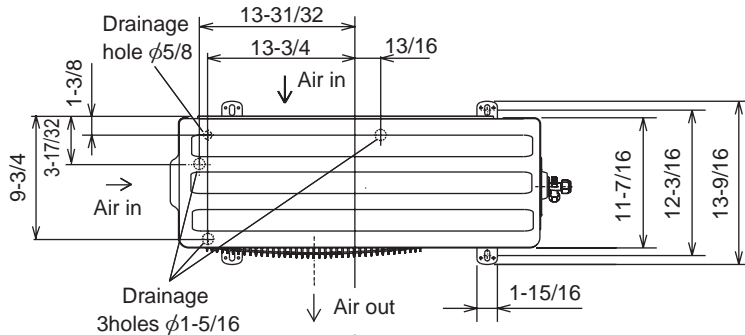


Wireless remote controller



MU15TN MU17TN

OUTDOOR UNIT

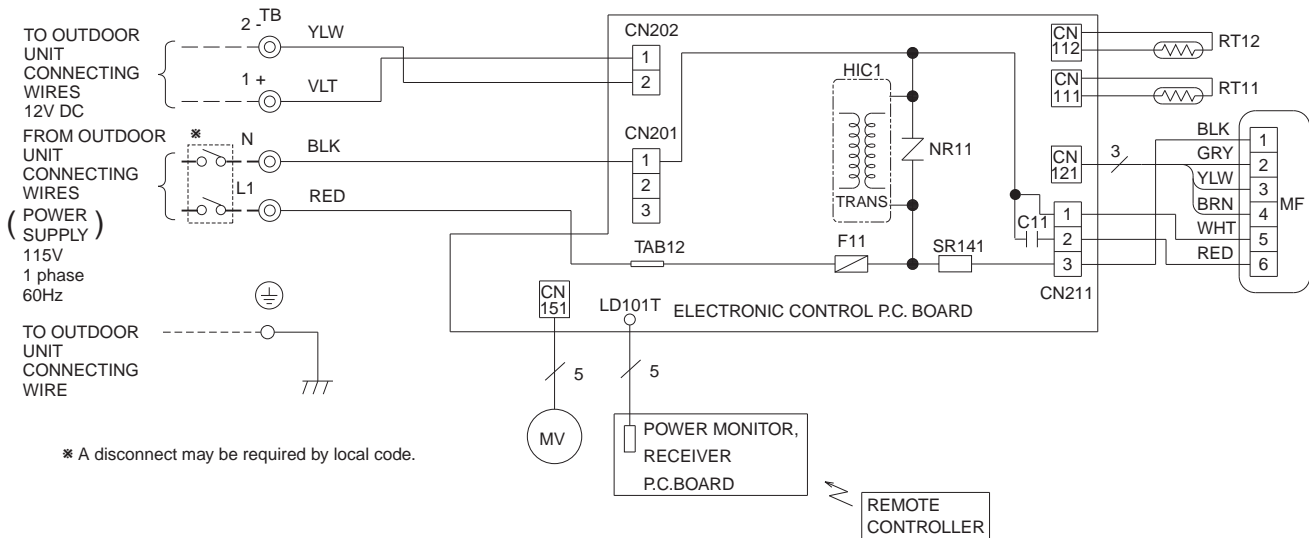


NOTE: Do not wire 12V DC and 115V AC in same conduit hole.

MS09TW

MODEL WIRING DIAGRAM

INDOOR UNIT



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

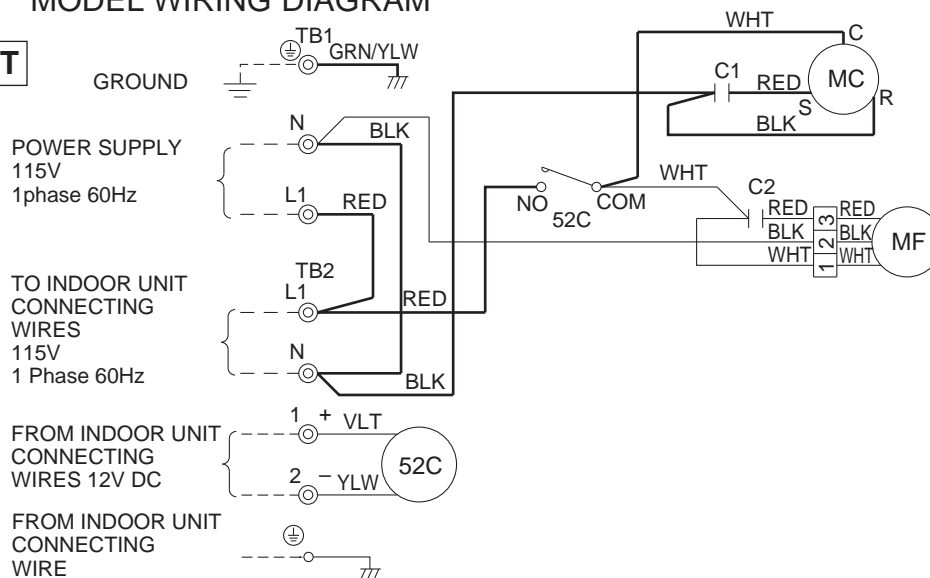
NOTE:1. About the outdoor side electric wiring, refer to the outdoor unit electric wiring diagram for servicing.
 2. Use copper conductors only.(For field wiring)
 3. Symbols below indicate;
 ○ : Terminal block, □ : Connector

SG79J021H01

MU09TW

MODEL WIRING DIAGRAM

OUTDOOR UNIT



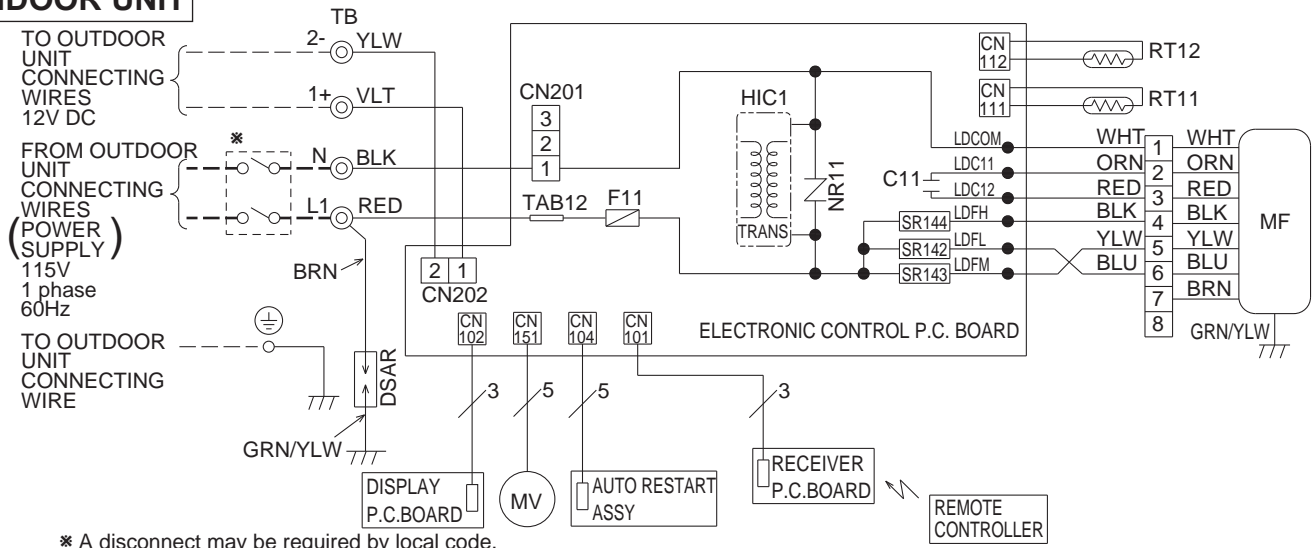
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MC	COMPRESSOR (INNER PROTECTOR)	TB1, TB2	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	52C	COMPRESSOR CONTACTOR

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

VG79B009H01

MS12TN MS15TN MS17TN MODELS WIRING DIAGRAM

INDOOR UNIT



* A disconnect may be required by local code.

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	SR142-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;

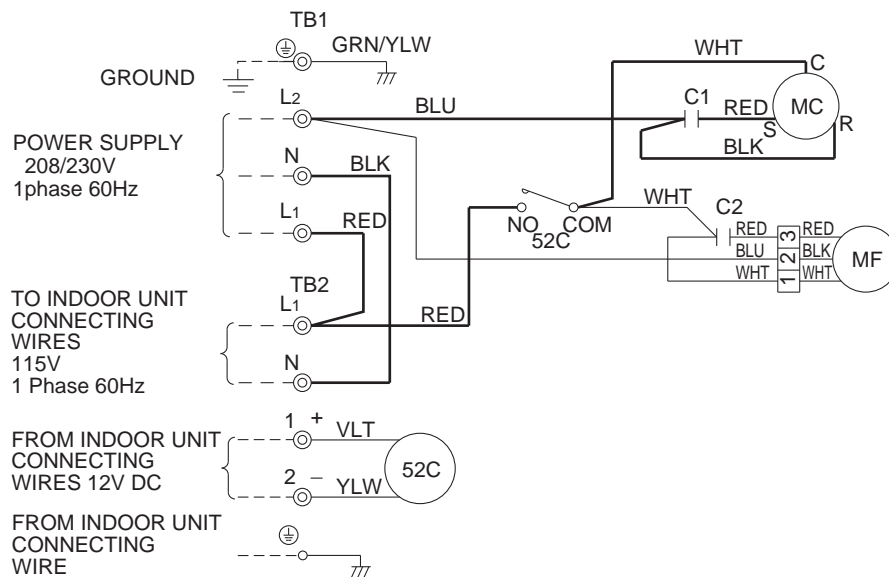
○ : Terminal block, □ □ □ □ : Connector

VG79B015H01

MU12TN

MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MC	COMPRESSOR(INNER PROTECTOR)	TB1,TB2	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MF	OUTDOOR FAN MOTOR(INNER PROTECTOR)	52C	COMPRESSOR CONTACTOR

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;

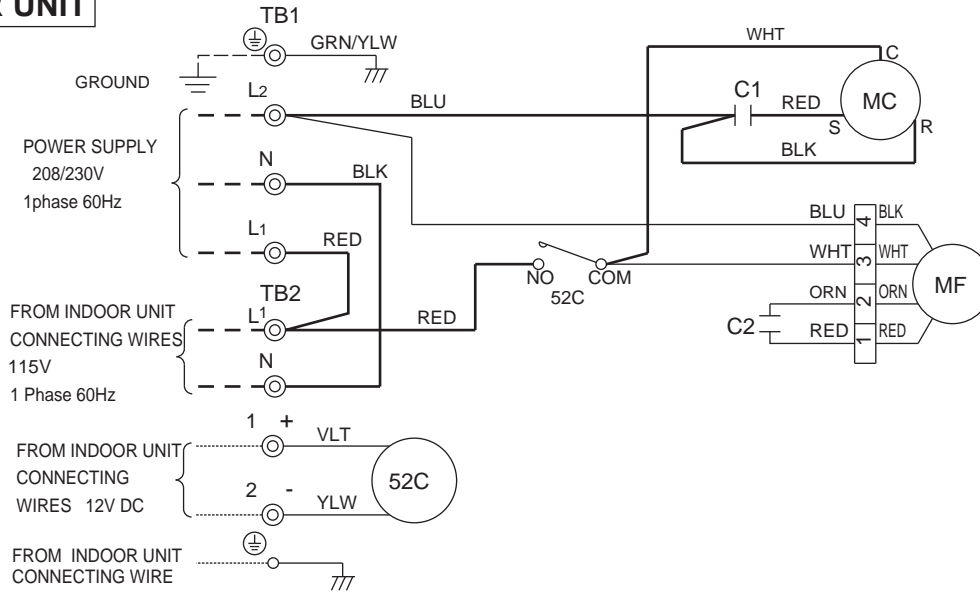
○ : Terminal block, □ □ □ □ : Connector

VG79B010H01

MU15TN MU17TN

MODELS WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	52C	COMPRESSOR CONTACTOR
C2	OUTDOOR FAN CAPACITOR	TB1	TERMINAL BLOCK		
MC	COMPRESSOR (INNER PROTECTOR)	TB2	TERMINAL BLOCK		

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

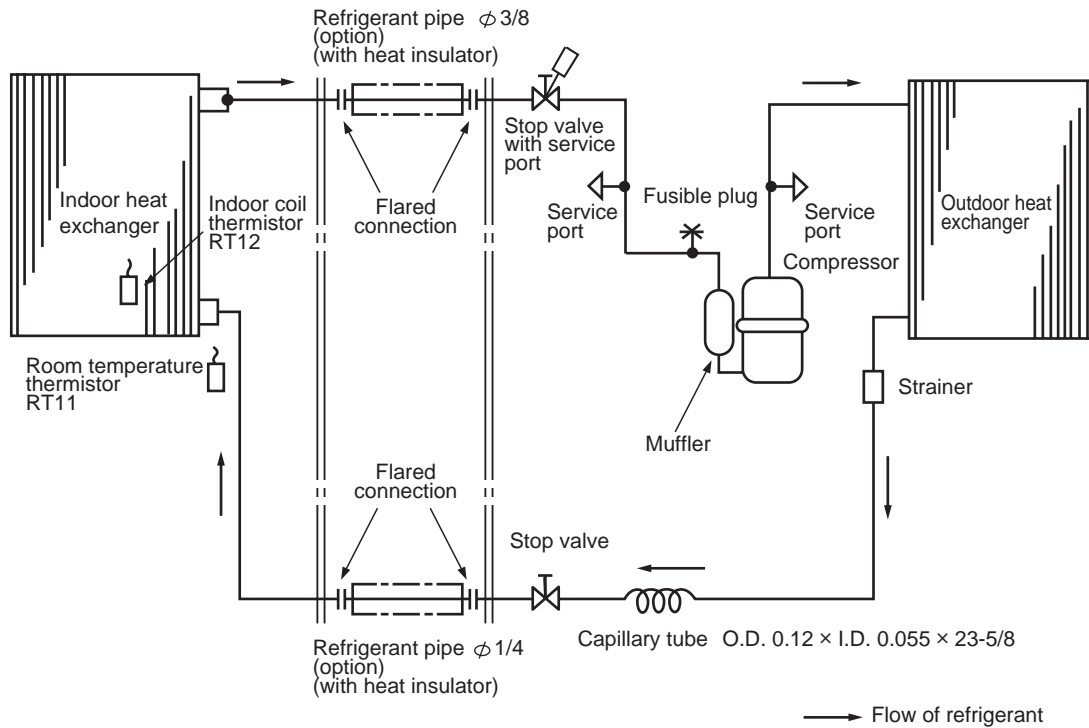
SG79B999H01

MS09TW

Unit: inch
MU09TW

INDOOR UNIT

OUTDOOR UNIT

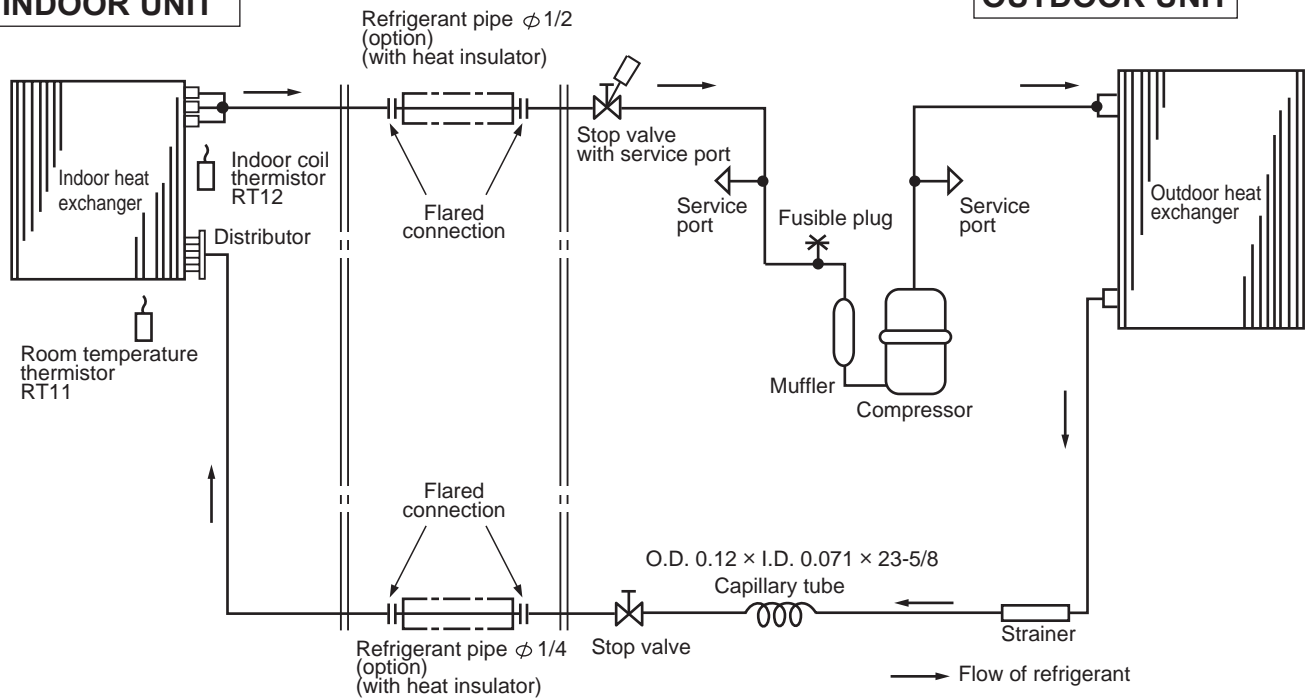


MS12TN

MU12TN

INDOOR UNIT

OUTDOOR UNIT

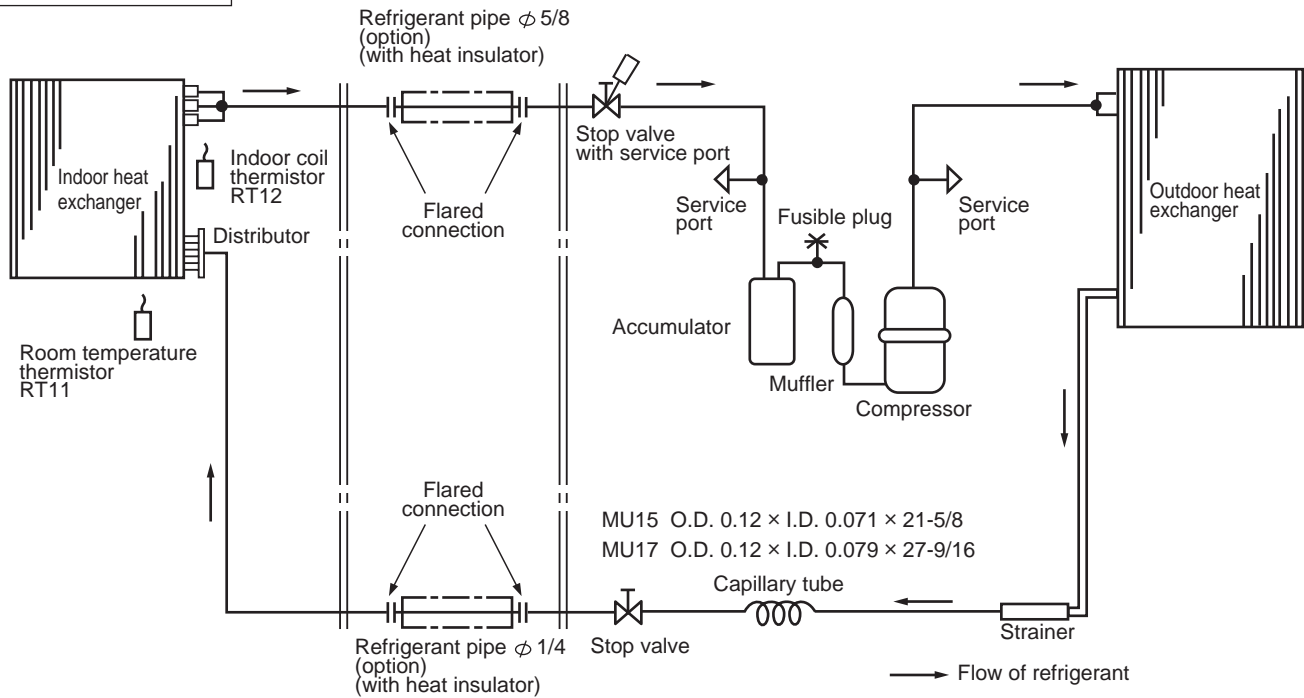


**MS15TN
MS17TN**

**MU15TN
MU17TN**

INDOOR UNIT

OUTDOOR UNIT



MS09TW MU09TW

MS12TN MU12TN

MS15TN MU15TN

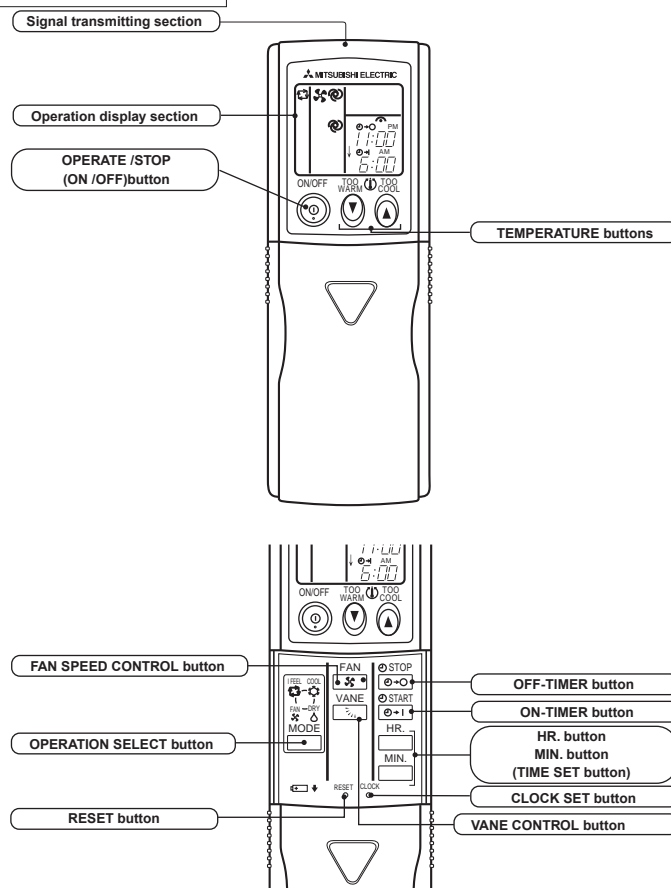
MS17TN MU17TN

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.

Operation 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

9-1. "I FEEL CONTROL" OPERATION

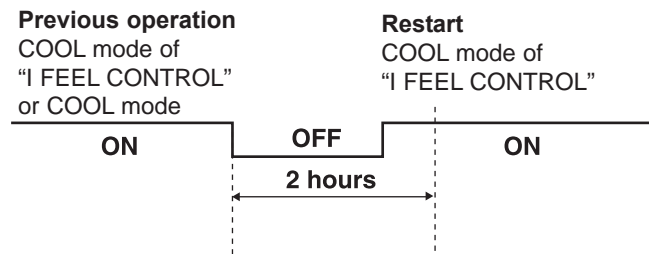
- (1) Press OPERATE/STOP(ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit will turn on with a beep tone.
- (2) Press OPERATION SELECT button to set "I FEEL CONTROL". Then a beep tone is heard.
- (3) The operation mode is determined by the room temperature at start-up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

Initial room temperature	mode
more than 77°F	COOL mode of "I FEEL CONTROL"
55°F to 77°F	DRY mode of "I FEEL CONTROL"

- 1 Once the mode is fixed, the mode will not change by room temperature afterwards.
- 1 Under the ON-TIMER operation, the mode is determined according to the room temperature at set time the operation starts.
- 1 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

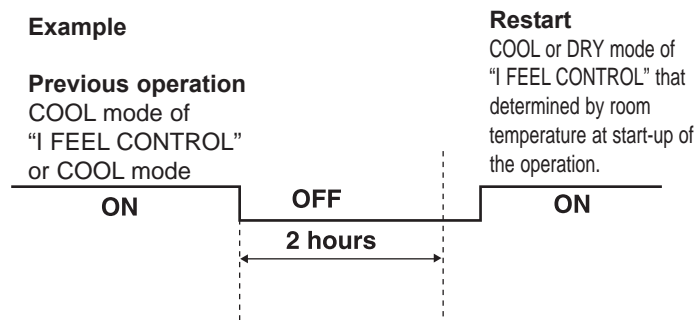
Example



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

Operation time chart

Example



- (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”	55°F to 77°F	Initial room temperature minus 4°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 is 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.

1. 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)

— 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.

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

2. Coil frost prevention

< Temperature control

<MS09> When the indoor coil thermistor RT12 reads 39°F or below for 5 minutes, the coil frost prevention mode starts.

<MS12/15/17> When the indoor coil thermistor RT12 reads 30°F or below, the coil frost prevention mode starts immediately. However the coil frost prevention doesn't work for 5 minutes since the compressor has started.

The indoor fan operates at the set speed the compressor stops for 5 minutes.

After that, if RT12 still reads below 39°F (MS09) or below 30°F (MS12/15/17) this mode is prolonged until the RT12 reads over 39°F (MS09) or 30°F (MS12/15/17).

> Time control

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

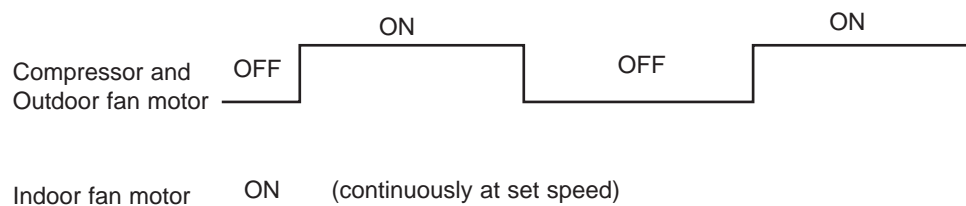
a. Compressor has been continuously operating.

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.



—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.

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.

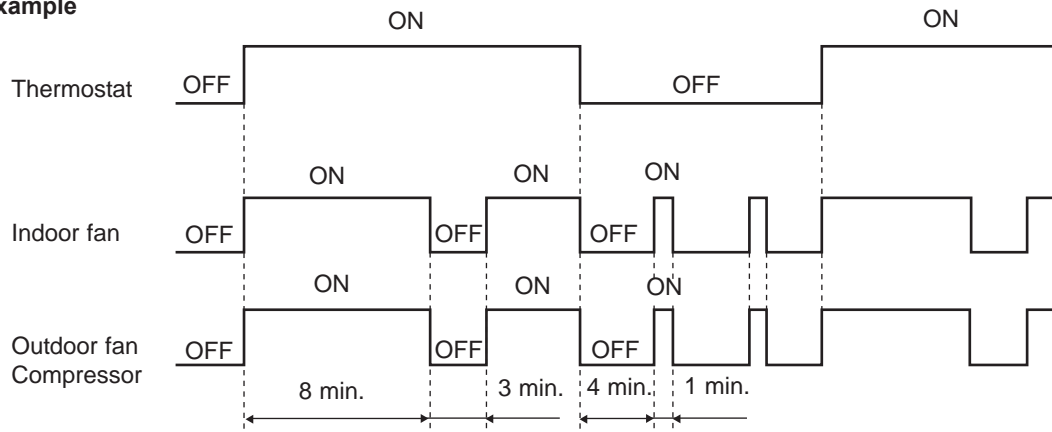
Set temperature is controlled to fall 4°F as initial set temperature.

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

- 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.

Operation time chart

Example



3. Coil frost prevention

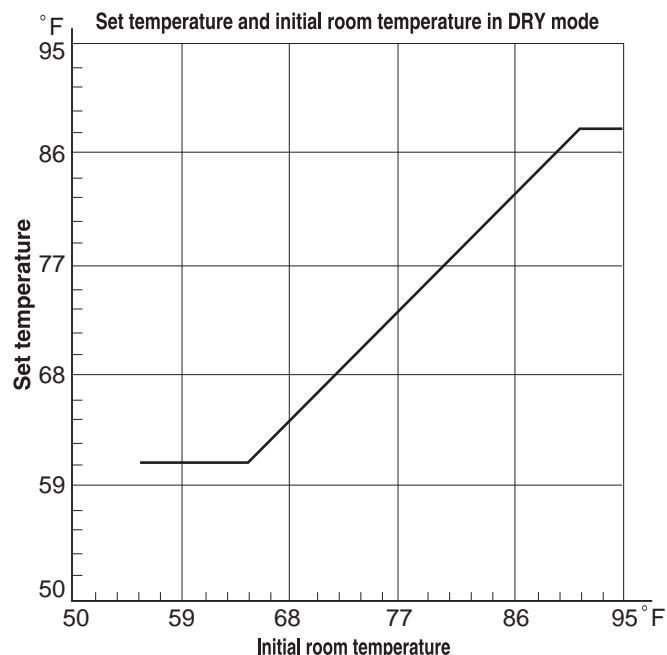
- The operation is as same as coil frost prevention during COOL mode of “I FEEL CONTROL”.
- Indoor fan operates at the set speed and the compressor stops for 5 minutes, because protection (Coil frost prevention) has the priority.
However, when coil frost prevention works while the compressor is not operating,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

9-2. 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”.

9-3. 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 TEMPERATURE) 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.

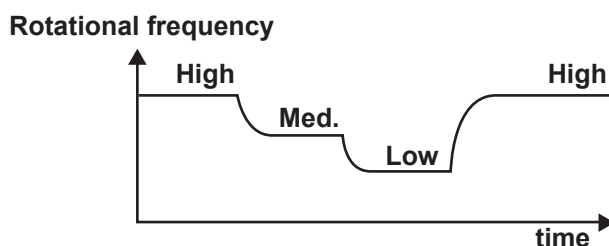


9-4. FAN OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button. OPERATION INDICATOR lamp of the indoor unit turns ON with a beep tone.
 - (2) Select FAN mode with the OPERATION SELECT button.
 - (3) Select the desired fan speed. When AUTO, it becomes Low.
- Only indoor fan operates. Outdoor unit does not operate.

9-5. FAN MOTOR CONTROL<MS09>

- (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 34.)

9-6. 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

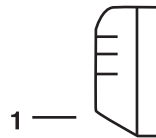
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

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

(4) VANE AUTO mode

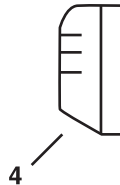
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



Vane angle is fixed to Angle 1.

② In FAN 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.

- (a) When the OPERATE/STOP (ON/OFF) button is pressed (POWER OFF).
- (b) When the operation is stopped by the emergency operation.
- (c) 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 “”.

9-7. 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 (TIMER 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.

1A power failure occurs.

1The 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

1The OFF timer and ON timer can be used in combination.

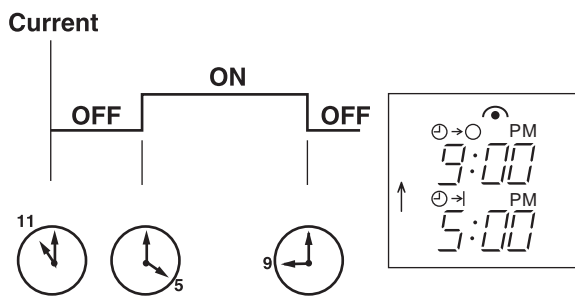
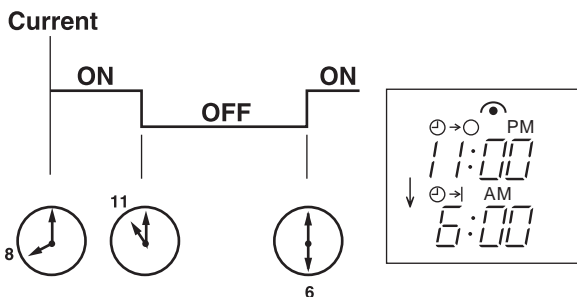
1"↑" and "↓" display shows the order of the OFF timer and ON timer operation.

(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.

9-8. 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 MODE with a set temperature of 75°F. The fan speed shifts to Med. speed.

The coil frost prevention works even in emergency operation.

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 again 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.

MS09TW

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

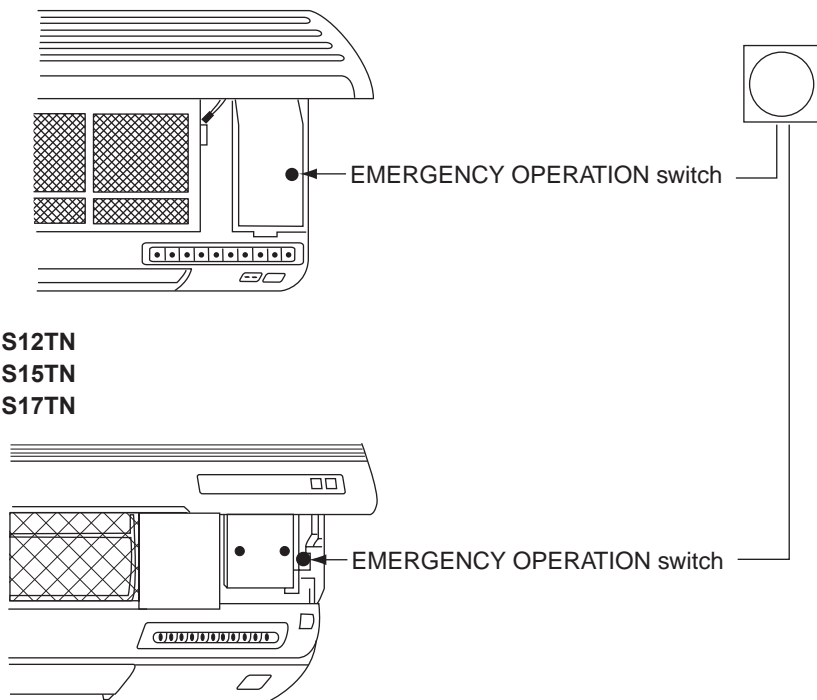
OPERATION INDICATOR lamp

Press once <Cool>  
Press once again <Stop>  

MS12TN

MS15TN

MS17TN



MS09TW MS12TN MS15TN MS17TN**10-1. TIMER SHORT MODE**

For service, set time can be shortened by short circuit of JPG and JPS the electronic control P.C. board.

The time will be shortened as follows. (Refer to page 39 or 40.)

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.)

10-2. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

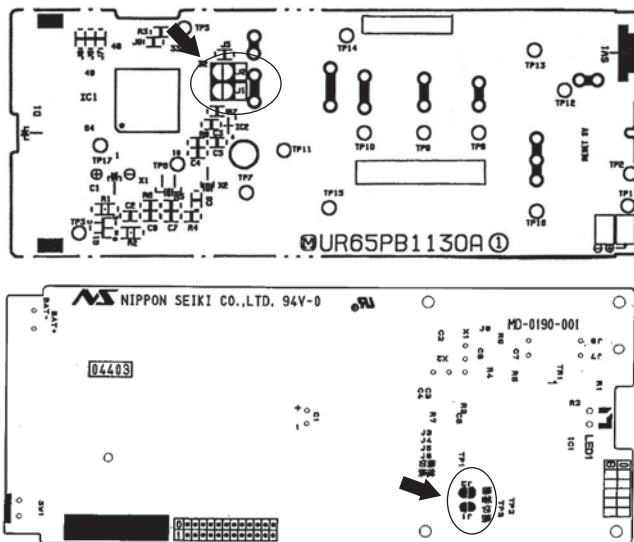
A maximum of 4 indoor units with wireless remote controllers can be used in a room.

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.

10-3. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, the set temperature, and the fan speed are memorized by controlled the indoor electronic control P.C. board(MS09) the auto restart assembly(MS12/1517).

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.

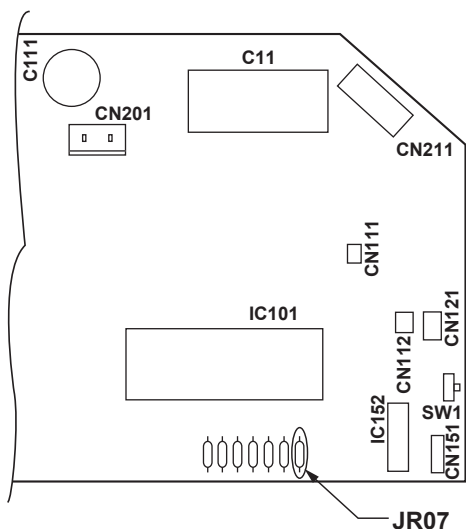
How to release “AUTO RESTART FUNCTION”

- 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 42 or 45.)
- ③ **<MS09>**
Solder the Jumper wire or the Resistor 220 Ω to the JR07 on the indoor electronic control P.C.board. (Refer to page 39.)
<MS12/15/17>
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 40.)

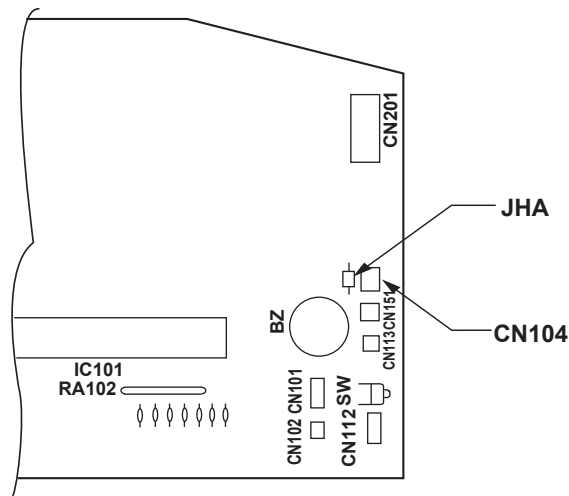
Operation

- 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.)

MS09



MS12/15/17



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 power 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.

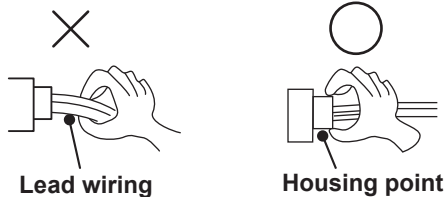
MS09TW MS12TN MS15TN MS17TN MU09TW MU12TN MU15TN MU17TN

11-1. Cautions on troubleshooting**1. Before troubleshooting, check the following:**

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

2. Take care the following during 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.

**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 and the check table on page 34.

4. How to replace batteries

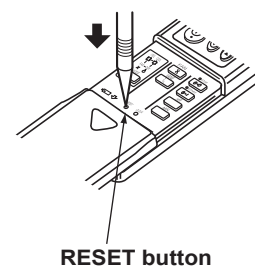
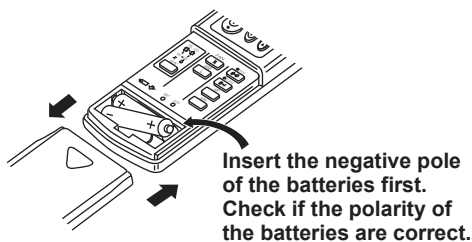
Weak batteries may cause the remote controller malfunction.

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.

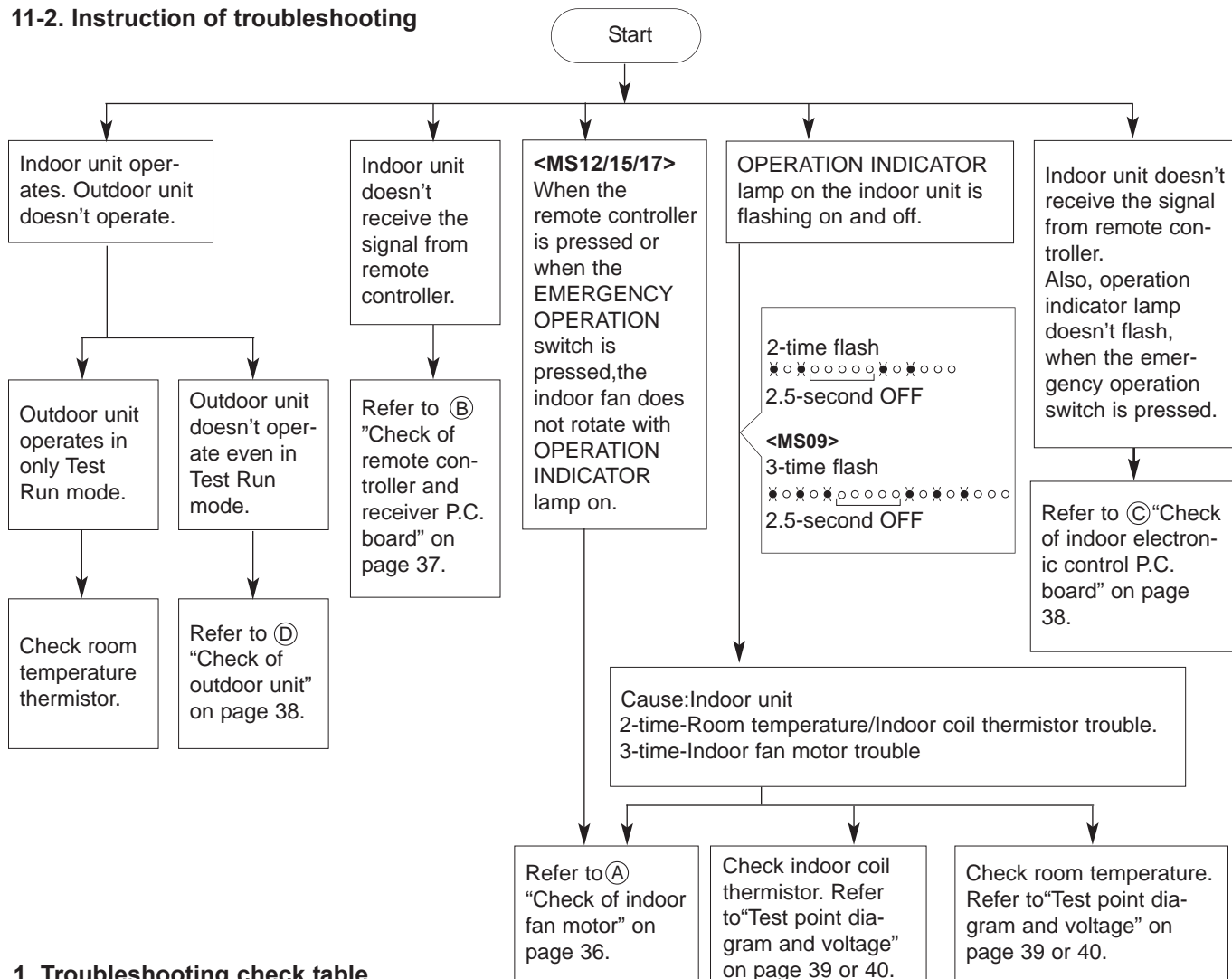
- ① Remove the front lid and replace batteries. Then re-attach the front lid.

- ② Press the RESET button.



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

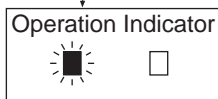
11-2. Instruction of troubleshooting



1. Troubleshooting check table

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

flashing



- 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.

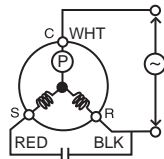
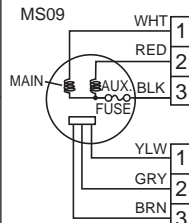
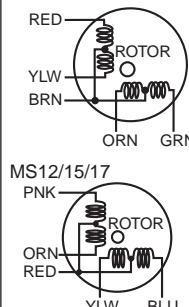
Before taking measures make sure that the symptom reappears, for accurate troubleshooting.

Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Check point
1	Indoor coil thermistor	2-time flash ●●○○○○○○●●○○○○ 2.5-second OFF	Outdoor unit does not run.	Detects Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.	1Check resistance of thermistor. 1Re-connect connector. 1Check indoor electric P.C. board.
	Room temperature thermistor				
2	Indoor fan motor	<MS09> 3-time flash ●●●○○○○○○●●●○○○○ 2.5-second OFF	Indoor fan repeats 12 seconds ON and 3 minutes OFF. When the indoor fan breaks, the fan keeps stopping.	When rotational frequency feedback signal is not emit during 12-second indoor fan operation.	1Disconnect connector CN211 and then check connector CN121 ②-③ to make sure rotational frequency feedback signal of 1.5V or over exists. 1Check indoor electronic control P.C. board. 1Check indoor fan motor. 1Re-connect connector.

MS09TW MS12TN MS15TN MS17TN MU09TW MU12TN MU15TN MU17TN

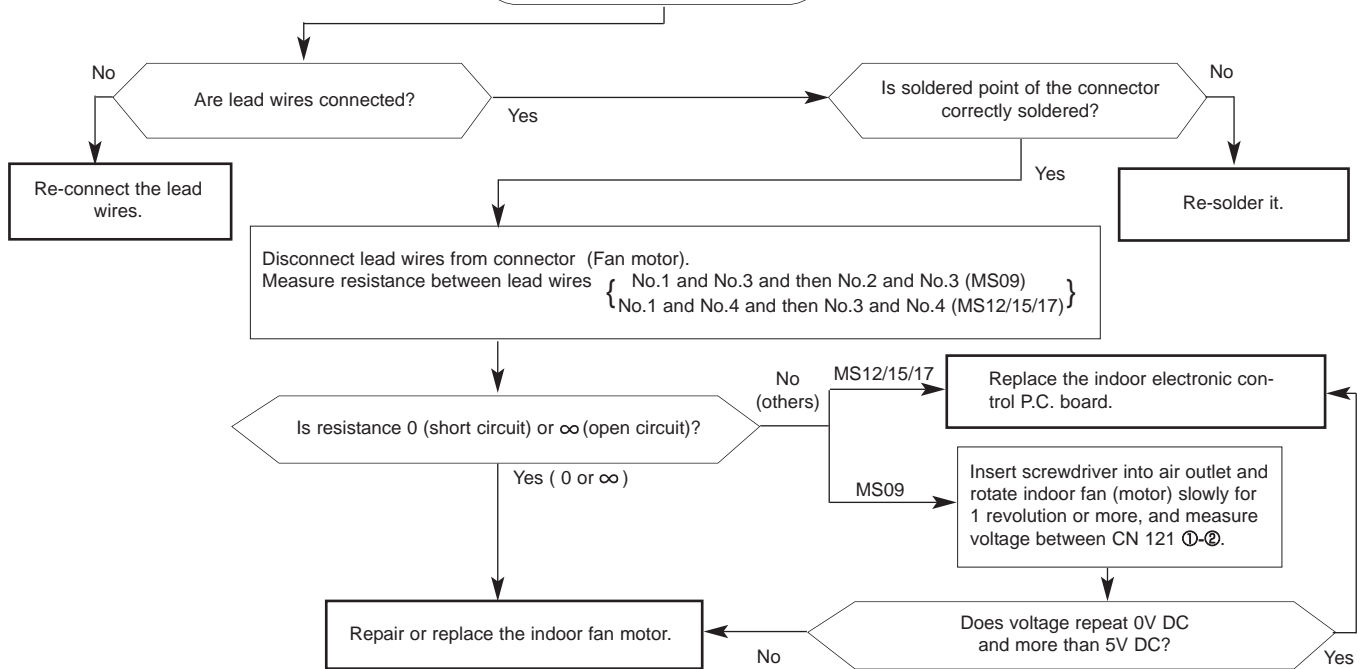
2. Trouble criterion of main parts

Part name	Check method and criterion					Figure	
Room temperature thermistor(RT11)	Measure the resistance with a tester. (Part temperature 50°F ~ 86°F)						
Indoor coil thermistor(RT12)							
Compressor (MC)	Measure the resistance between the terminals with a tester. (Part temperature 14°F ~ 104°F)						
		Normal					Abnormal
		MU09	MU12	MU15	MU17		
	C-R	0.7~1.0Ω	1.9~2.4Ω	1.4~1.9Ω	1.4~1.8Ω	Open or short-circuit	
	C-S	1.0~1.4Ω	2.7~3.4Ω	2.4~3.0Ω	2.3~2.9Ω		
Indoor fan motor(MF)	Measure the resistance between the terminals with a tester. (Part temperature 50°F ~ 86°F)						
	Motor part		Normal				Abnormal
			MS09				
		WHT-BLK	76~83 Ω				Open or short-circuit
		BLK-RED	70~76 Ω				
	Sensor part	Measure the voltage Power ON.					
		Normal			Abnormal		
		MS09					
	BRN-YLW	4.5 ~ 5.5V			Remain 0V or 5V		
	YLW-GRY	(When fan revolved one time) 0V 5V 0V (Approx.)					
Outdoor fan motor(MF)	Motor part		Normal			Abnormal	
			MS12/15		MS17		
		WHT-BLK	65~72Ω	52~57Ω		Open or short-circuit	
		BLK-YLW	8~10Ω	10~12Ω			
		YLW-BLU	4~6Ω	4~5Ω			
		BLU-BRN	5~7Ω	5~6Ω			
BRN-RED	28~31Ω	35~39Ω					
Vane motor(MV)	Measure the resistance between the terminals with a tester. (Part temperature 50°F ~ 86°F)						
	Normal		Abnormal				
	MS09	MS12/15/17	Open or short-circuit				
	BRN- other one	RED- other one					
	282 ~ 306Ω	358 ~ 388Ω					

Ⓐ Check of indoor fan motor

Indoor fan does not operate.

Turn OFF the power supply.
Check connector (Fan motor) visually.

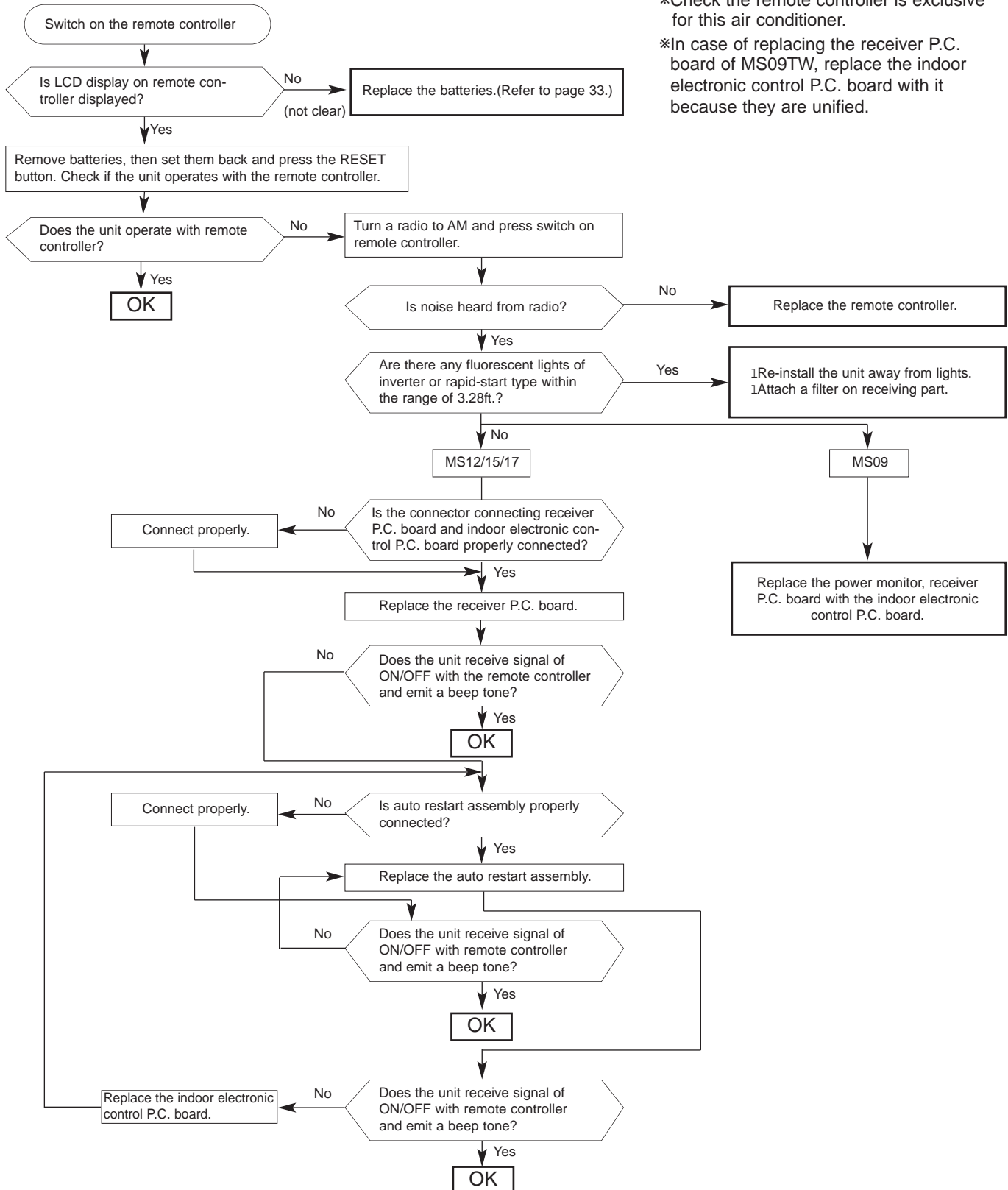


Ⓑ Check of remote controller and receiver P.C. board

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

※Check the remote controller is exclusive for this air conditioner.

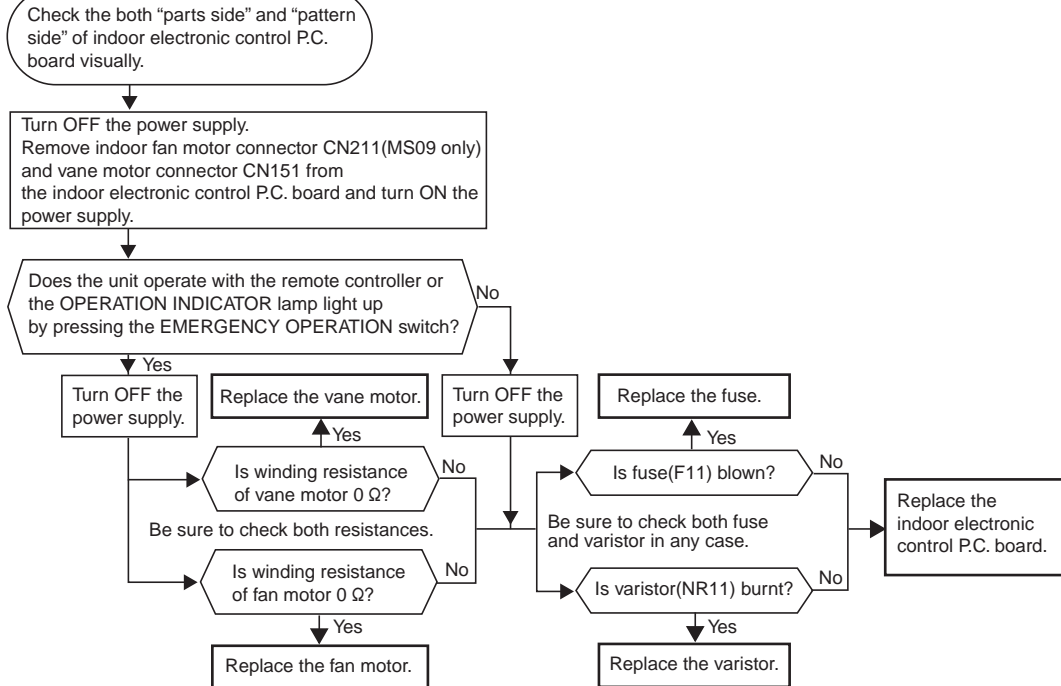
※In case of replacing the receiver P.C. board of MS09TW, replace the indoor electronic control P.C. board with it because they are unified.



C Check of indoor electronic control P.C. board

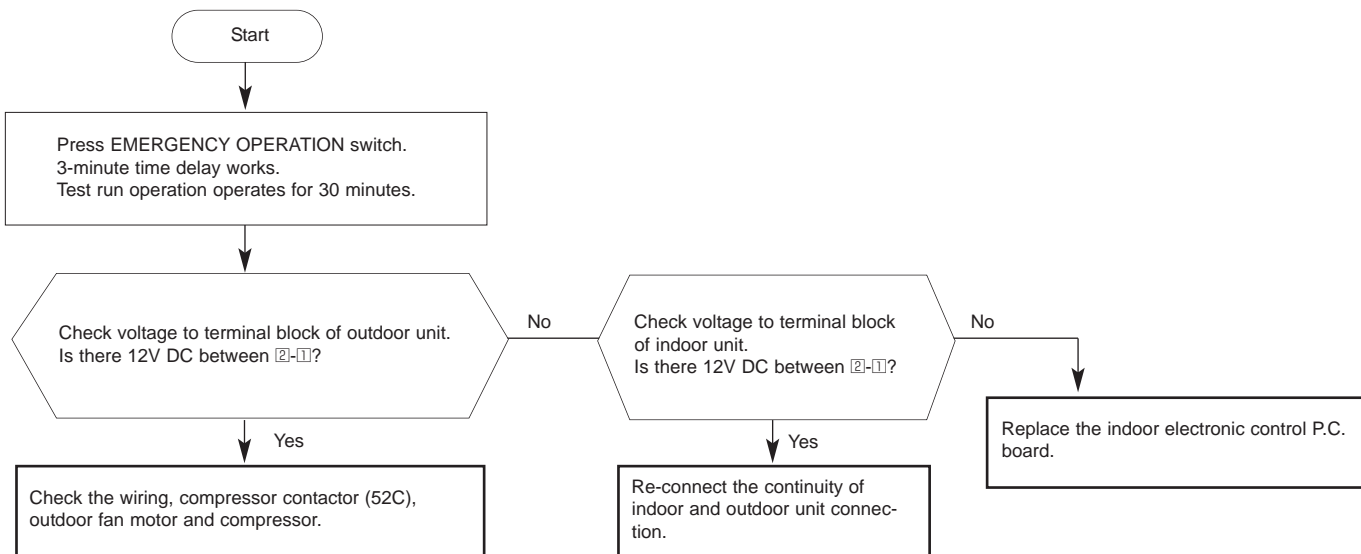
The unit doesn't operate with the remote controller.

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

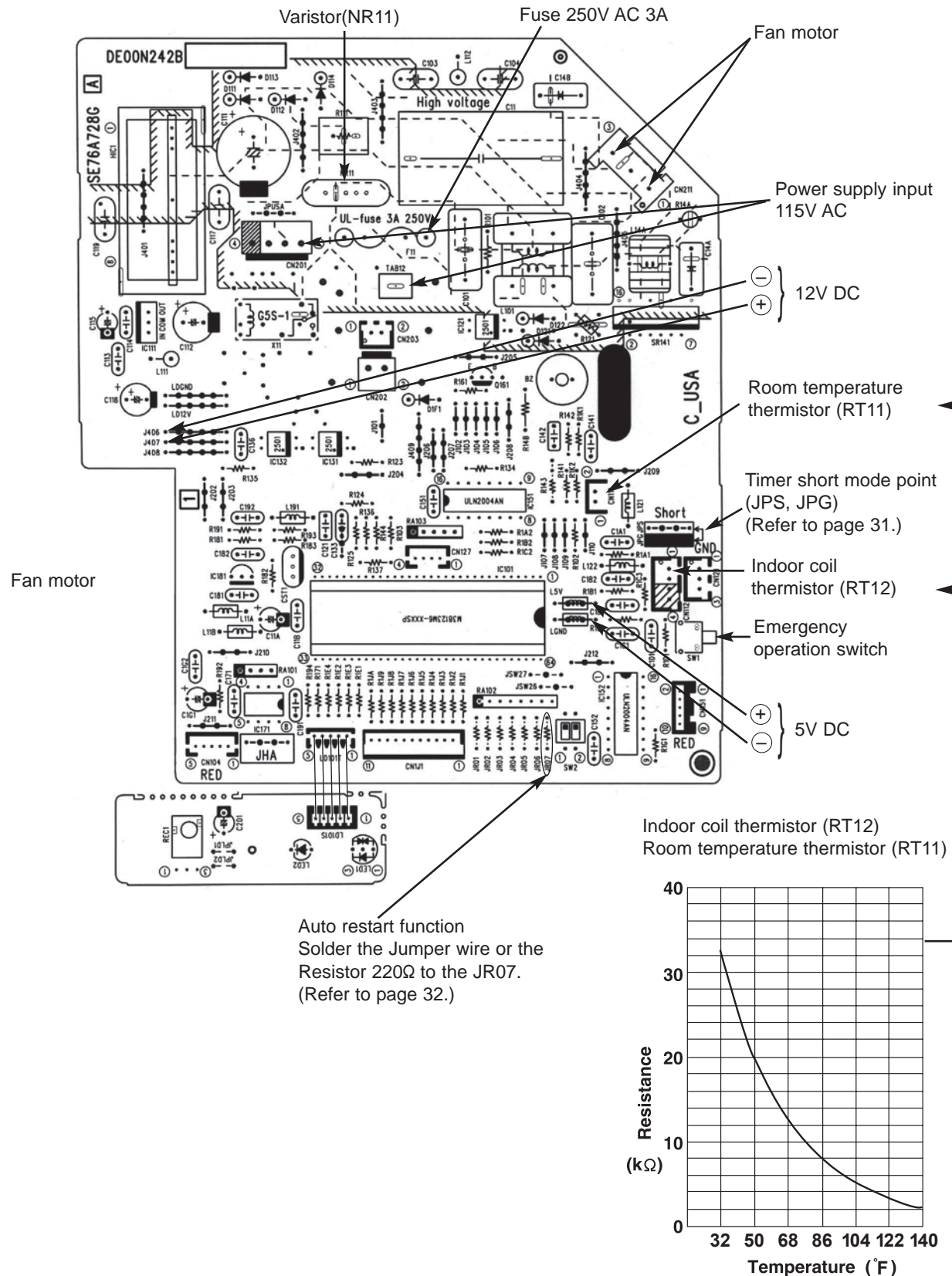


D Check of outdoor unit

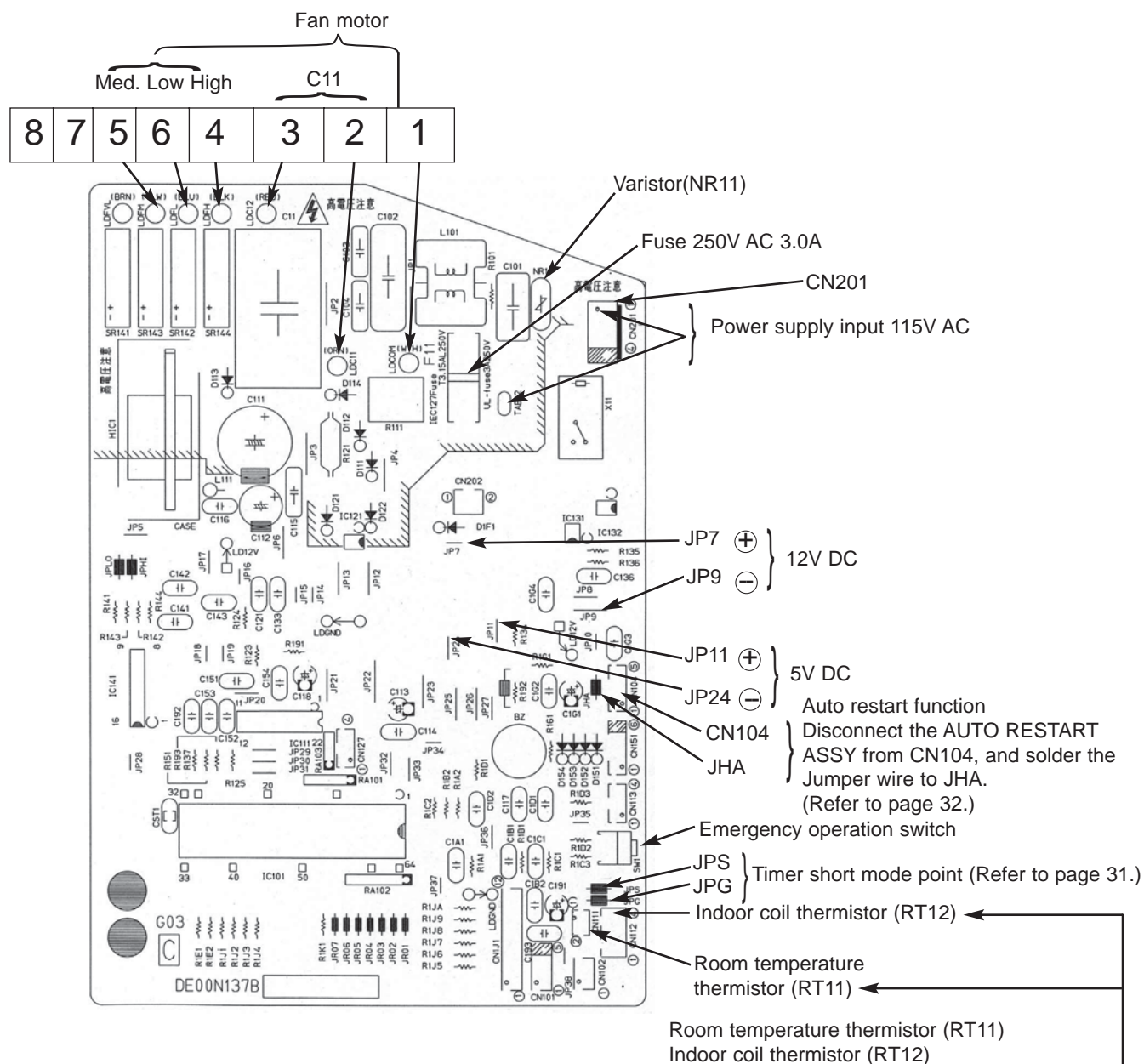
Compressor and / or outdoor fan doesn't operate.(Only indoor fan operates.)



TEST POINT DIAGRAM AND VOLTAGE **MS09TW** **Indoor electronic control P.C. board**



TEST POINT DIAGRAM AND VOLTAGE MS12TN MS15TN MS17TN Indoor electronic control P.C. board



RELAY OPERATION

MS09TW

MS12TN

MS15TN

MS17TN

1. COMPRESSOR CONTACTOR

• EACH MODE

MODE	THERMOSTAT	52C CONTACTOR	INDOOR FAN SPEED
COOL & COOL mode of I FEEL CONTROL	ON	ON	AUTO or set speed
	OFF	OFF	
DRY & DRY mode of I FEEL CONTROL	ON	OFF for 2 min. after unit starts operation	AUTO or set speed
	OFF	Repeat of 8 min. ON/ 3min. OFF operation or 2 min. ON/3 min. OFF operation	AUTO or set speed links with 52C CONTACTOR
FAN	OFF	Repeat of 4 min. OFF/ 1 min. ON operation	
FAN	OFF	OFF	AUTO or set speed

NOTE : Once the compressor is OFF, "3-minute time delay circuit" works at next start-up.

• COIL FROST PREVENTION

MODE	THERMOSTAT	52C CONTACTOR	INDOOR FAN SPEED
COOL & COOL mode of I FEEL CONTROL	ON	OFF for 5 min. After that, OFF is prolonged until indoor coil thermistor reads termination temperature.	AUTO or set speed
DRY & DRY mode of I FEEL CONTROL			AUTO or set speed <MS12/15/17> Low speed when coil frost prevention starts while COMPRESSOR OFF

2. SOLID STATE RELAY (INDOOR FAN MOTOR RELAY)

MS12TN MS15TN MS17TN

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

<"Terminal with lock mechanism" Detaching points>

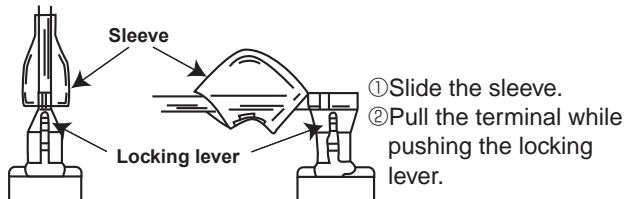
In case of terminal with lock mechanism, detach the terminal as shown below.

There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.

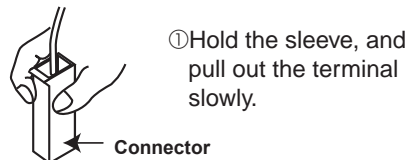
The terminal with no lock mechanism can be removed by pulling it out.

Check the shape of the terminal and work.

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



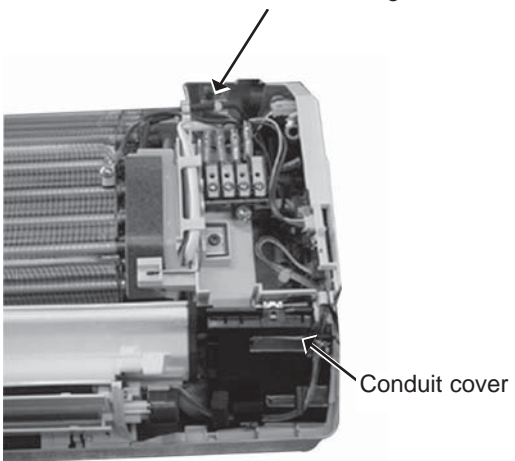
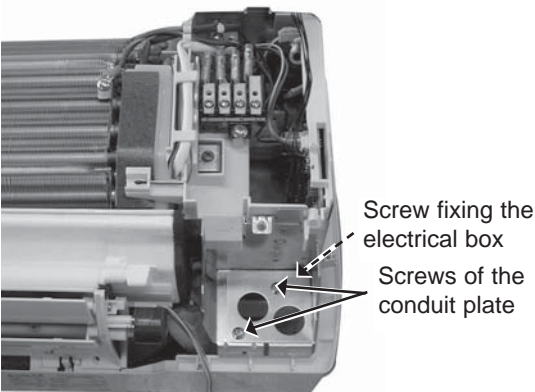
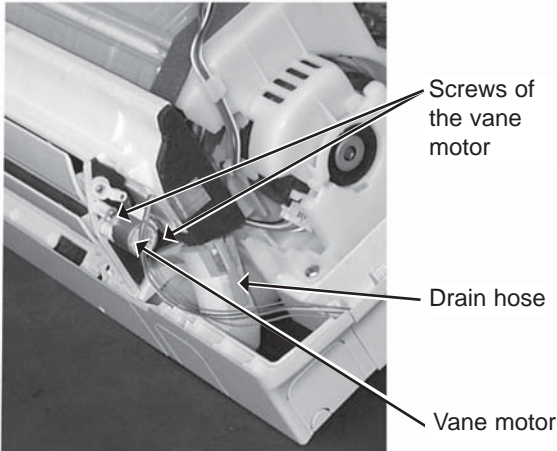
(2) The terminal with this connector is a terminal with lock mechanism.



12-1. MS09TW INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the front panel</p> <ol style="list-style-type: none"> (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. 	<p>Photo 1</p>
<p>2. Removing the electronic control P.C. board and the power monitor, receiver P.C. board</p> <ol style="list-style-type: none"> (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. 	<p>Photo 2</p>



OPERATING PROCEDURE	PHOTOS
<p>3. Removing the electrical box</p> <ol style="list-style-type: none">(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 screw of the conduit plate and remove the conduit plate.(12) Remove the screw fixing the electrical box, remove the electrical box.	<p>Photo 3</p>  <p>Photo 4</p> 
<p>4. Removing the vane motor</p> <ol style="list-style-type: none">(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.	<p>Photo 5</p> 

OPERATING PROCEDURE

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.

PHOTOS

Pt

Screws fixing the left side of the heat exchanger

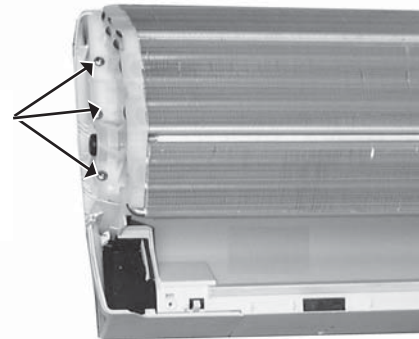
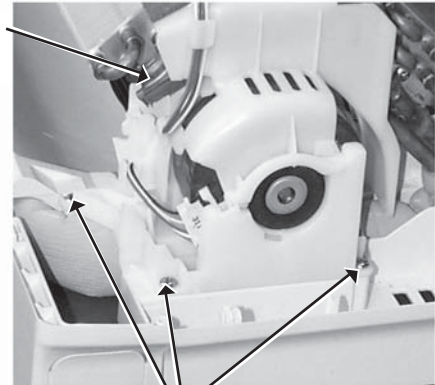


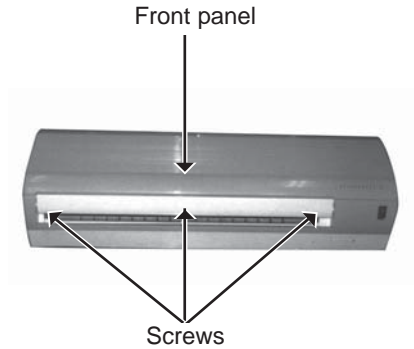
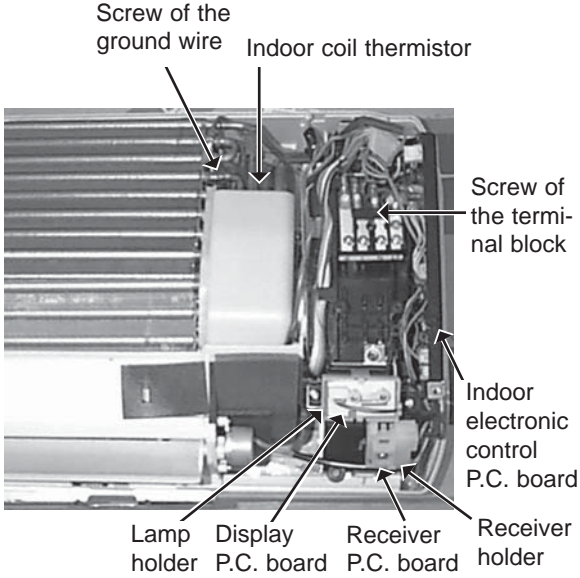
Photo 7

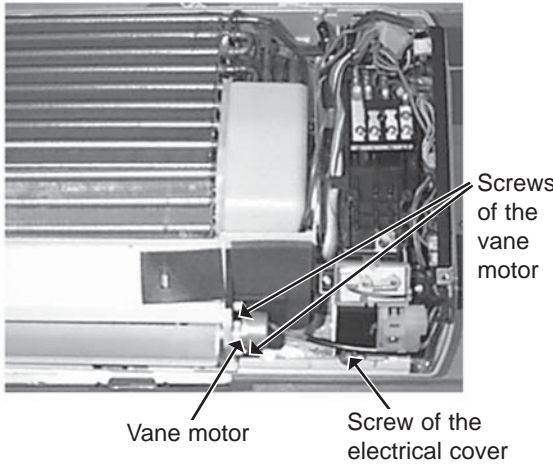
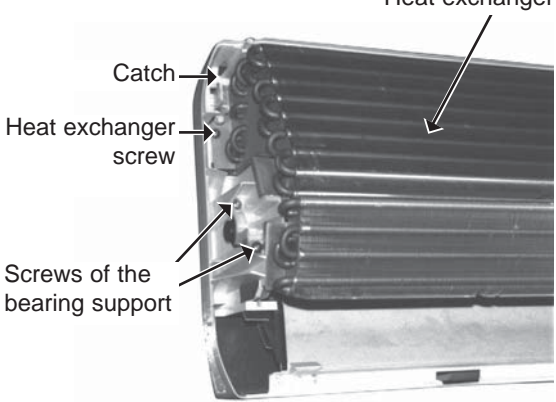
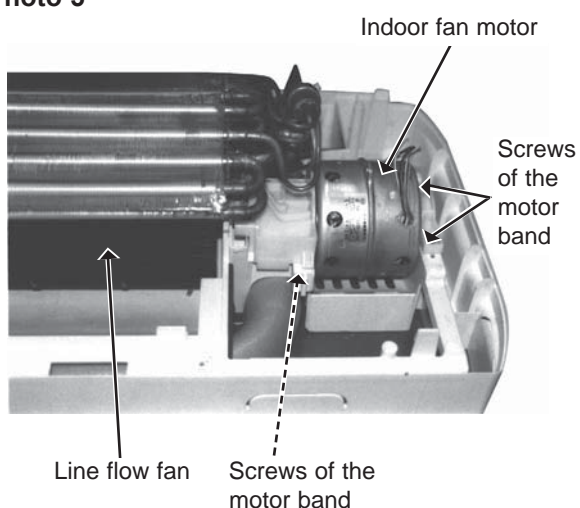
Indoor coil thermistor



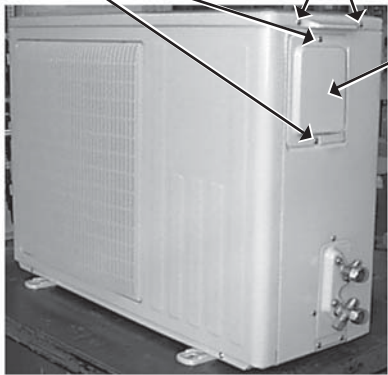
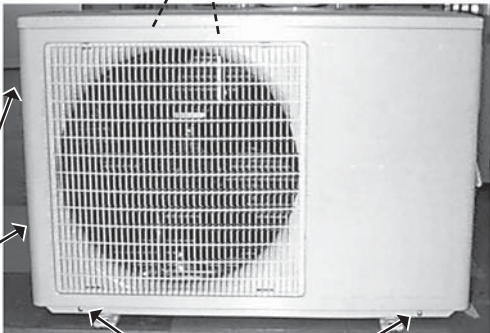
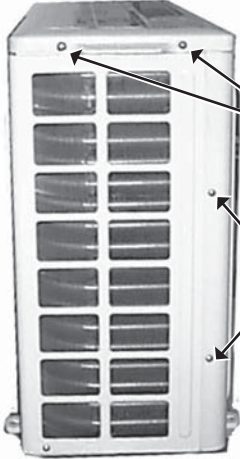
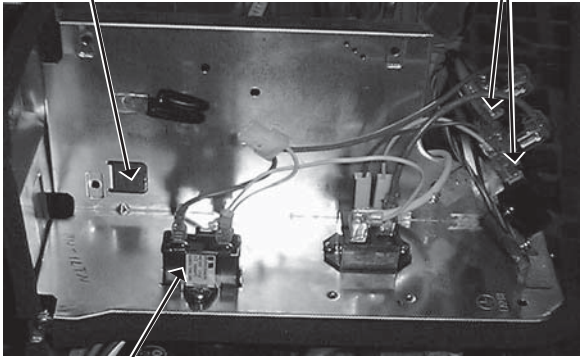
Screws of the fan motor

12-2. MS12TN MS15TN MS17TN INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the front panel</p> <ol style="list-style-type: none"> (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. 	<p>Photo 1</p>  <p>Front panel</p> <p>Screws</p>
<p>2. Removing the electronic control P.C. board, the receiver P.C. board and the display P.C. board</p> <ol style="list-style-type: none"> (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. 	<p>Photo 2</p>  <p>Screw of the ground wire</p> <p>Indoor coil thermistor</p> <p>Screw of the terminal block</p> <p>Indoor electronic control P.C. board</p> <p>Lamp holder</p> <p>Display P.C. board</p> <p>Receiver P.C. board</p> <p>Receiver holder</p>

OPERATING PROCEDURE	PHOTOS
<p>3. Removing the electrical box</p> <ol style="list-style-type: none"> (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Disconnect the connector of the indoor coil thermistor (CN112). (4) Disconnect 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. 	<p>Photo 3</p>  <p>Screws of the vane motor</p> <p>Vane motor</p> <p>Screw of the electrical cover</p>
<p>4. Removing the vane motor</p> <ol style="list-style-type: none"> (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. 	<p>Photo 4</p>  <p>Heat exchanger</p> <p>Catch</p> <p>Heat exchanger screw</p> <p>Screws of the bearing support</p>
<p>5. Removing the indoor fan motor and the line flow fan</p> <ol style="list-style-type: none"> (1) Remove the front panel. (2) Remove the electrical box. (3) Unhook the catches 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. 	<p>Photo 5</p>  <p>Indoor fan motor</p> <p>Screws of the motor band</p> <p>Line flow fan</p> <p>Screws of the motor band</p>

12-3. MU09TW MU12TN OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the cabinet</p> <ol style="list-style-type: none"> (1) Remove the screws of the top panel. (2) Remove the screws of the service panel. (3) Remove the screws of the cabinet. (4) Remove the screws of the front panel and motor support. (5) Remove the service panel, and remove the screw from the insides. (6) Remove the top panel. (7) Remove the cabinet. <p>Photo 3</p> 	<p>Photo 1</p>  <p>Photo 2</p> 
<p>2. Removing the electrical parts</p> <ol style="list-style-type: none"> (1) Remove the service panel and the cabinet.(Refer to 1) (2) Remove the following parts. <ul style="list-style-type: none"> •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block (TB1, TB2) 	<p>Photo 4</p> 

OPERATING PROCEDURE

PHOTOS

3. Removing the propeller fan and the outdoor fan motor

- (1) Remove the cabinet. (Refer to 1)
- (2) Remove the propeller fan nut.
- (3) Remove the propeller fan.

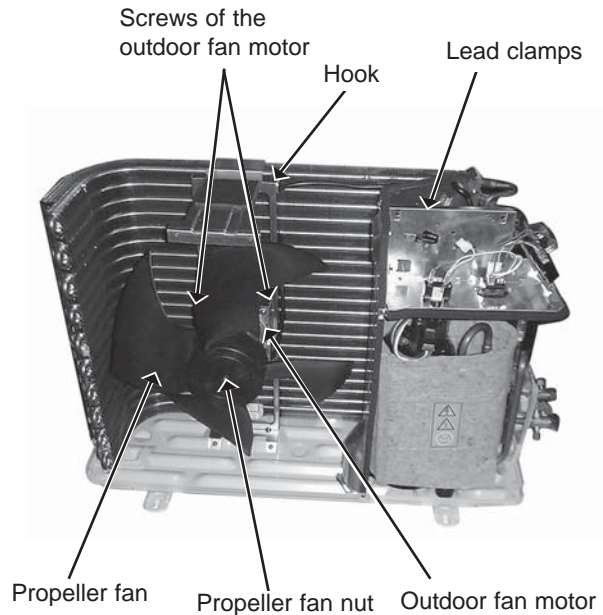
NOTE : Loose the propeller fan in the rotating direction for removal.

When attaching the propeller fan, align the mark on the propeller fan and the motor shaft cut section.

Set the propeller fan in position by using the cut on the shaft and the mark on the propeller fan.

- (4) Remove lead clamps and fan motor lead wires.
- (5) Remove screws fixing the fan motor.
- (6) Remove the outdoor fan motor.

Photo 5



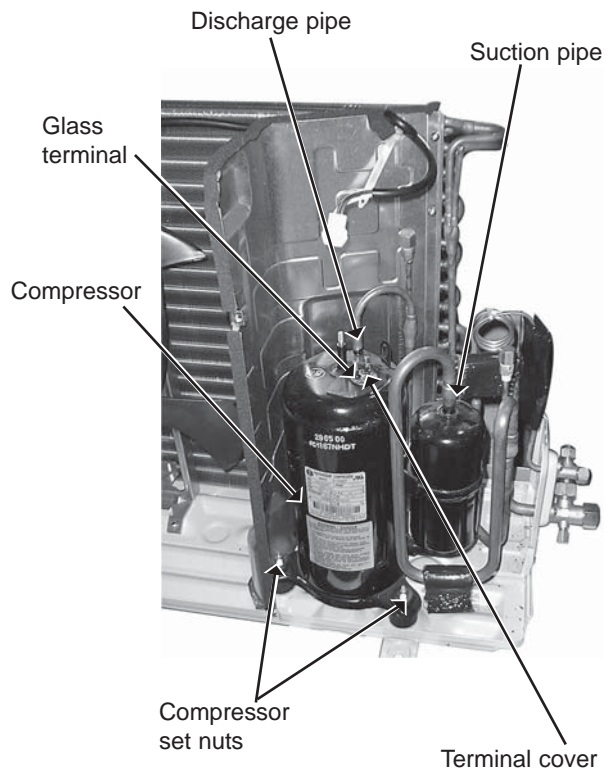
4. Removing the compressor

- (1) Remove the cabinet. (Refer to 1)
- (2) Remove the relay panel.
- (3) Remove the soundproof felt.
- (4) Remove the terminal cover on the compressor.
- (5) Disconnect lead wires from the 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.

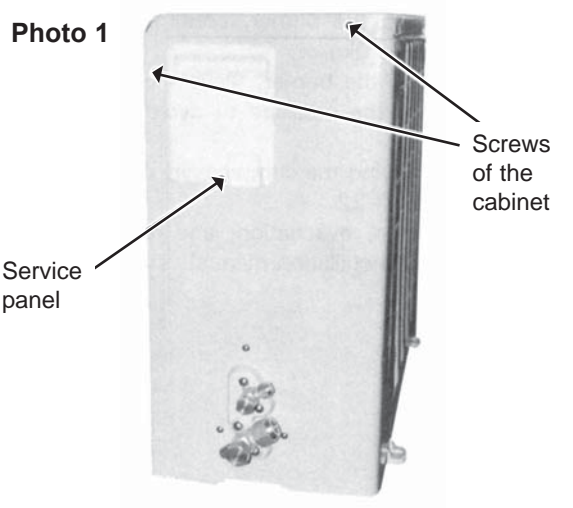
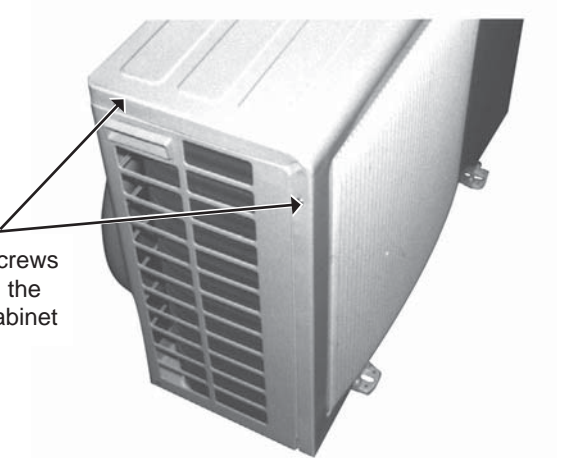
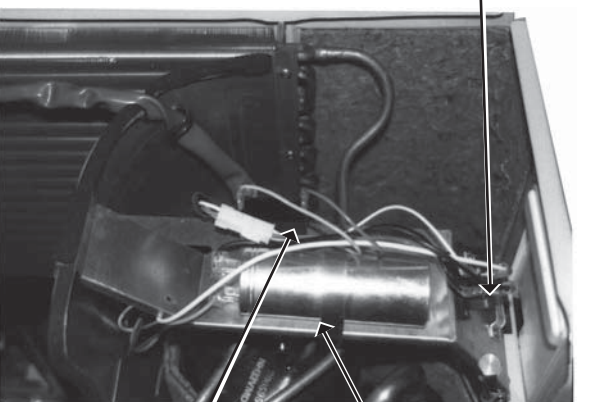
NOTE

- 1Before using the torch, reclaim gas from the pipes until the pressure gauge shows 0 PSI(GAUGE).
- 1Use the torch under the condition that gas can be released even when the inner pressure rises by heat.
- 1Reclaim all refrigerant in an environmentally acceptable manner.

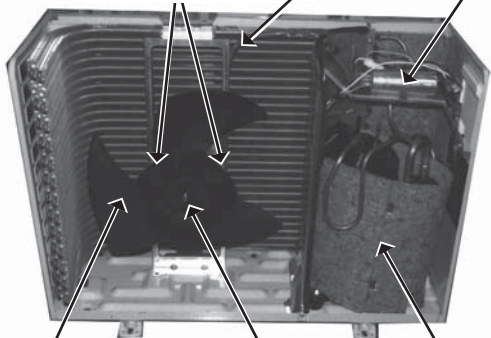
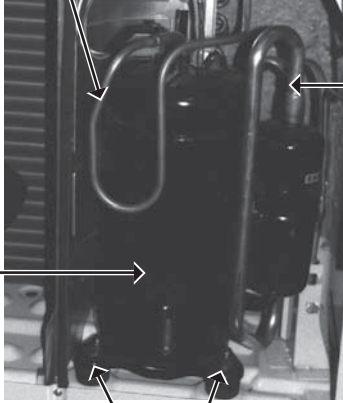
Photo 6



12-4. MU15TN MU17TN OUTDOOR UNIT

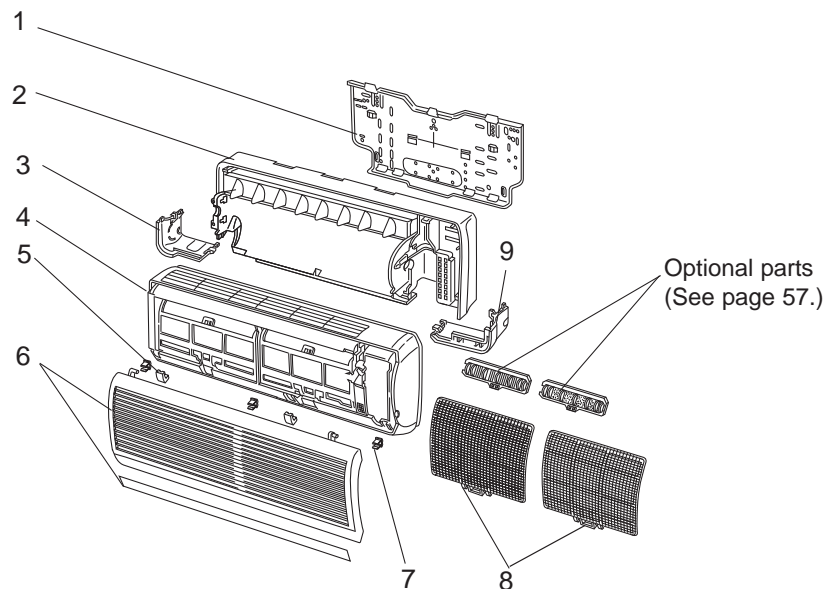
OPERATING PROCEDURE	PHOTOS
<p>1. Removing the cabinet</p> <p>(1) Remove the screws of the cabinet.</p> <p>(2) Hold the bottom of the cabinet on the both side to remove the cabinet.</p>	<p>Photo 1</p>  <p>Photo 2</p> 
<p>2. Removing the electrical parts</p> <p>(1) Remove the service panel and the cabinet.</p> <p>(2) Remove the following parts.</p> <ul style="list-style-type: none"> •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block 	<p>Photo 3</p> 



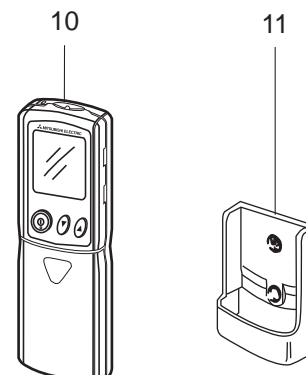
OPERATING PROCEDURE	PHOTOS
<p>3. Removing the outdoor fan motor</p> <ul style="list-style-type: none">(1) Remove the cabinet. (Refer to 1)(2) Disconnect the connector and remove the hooked lead wire from fan motor.(3) Remove the propeller fan nut and remove the propeller fan.(4) Remove screws fixing the fan motor.	<p>Photo 4 Screws of the outdoor fan motor Hook Connector</p>  <p>Propeller fan Propeller fan nut Soundproof felt</p>
<p>4. Removing the compressor</p> <ul style="list-style-type: none">(1) Remove the cabinet. (Refer to 1)(2) Remove the soundproof felt.(3) Remove the terminal cover on the compressor.(4) Disconnect lead wires from the glass terminal of the compressor.(Refer to 2)(5) Recover gas from the refrigerant circuit.(6) Disconnect the welded part of the discharge pipe.(7) Disconnect the welded part of the suction pipe.(8) Remove nuts fixing the compressor.(9) Remove the compressor. <p>NOTE</p> <ul style="list-style-type: none">1Before using the torch, reclaim gas from the pipes until the pressure gauge shows 0 PSI(GAUGE).1Use the torch under the condition that gas can be released even when the inner pressure rises by heat.1Reclaim all refrigerant in an environmentally acceptable manner.	<p>Photo 5</p>  <p>Discharge pipe Suction pipe</p> <p>Compressor</p> <p>Compressor set nuts</p>

MS09TW (W)

13-1. INDOOR UNIT STRUCTURAL PARTS



13-2. ACCESSORY AND REMOTE CONTROLLER



13-1. INDOOR UNIT STRUCTURAL PARTS

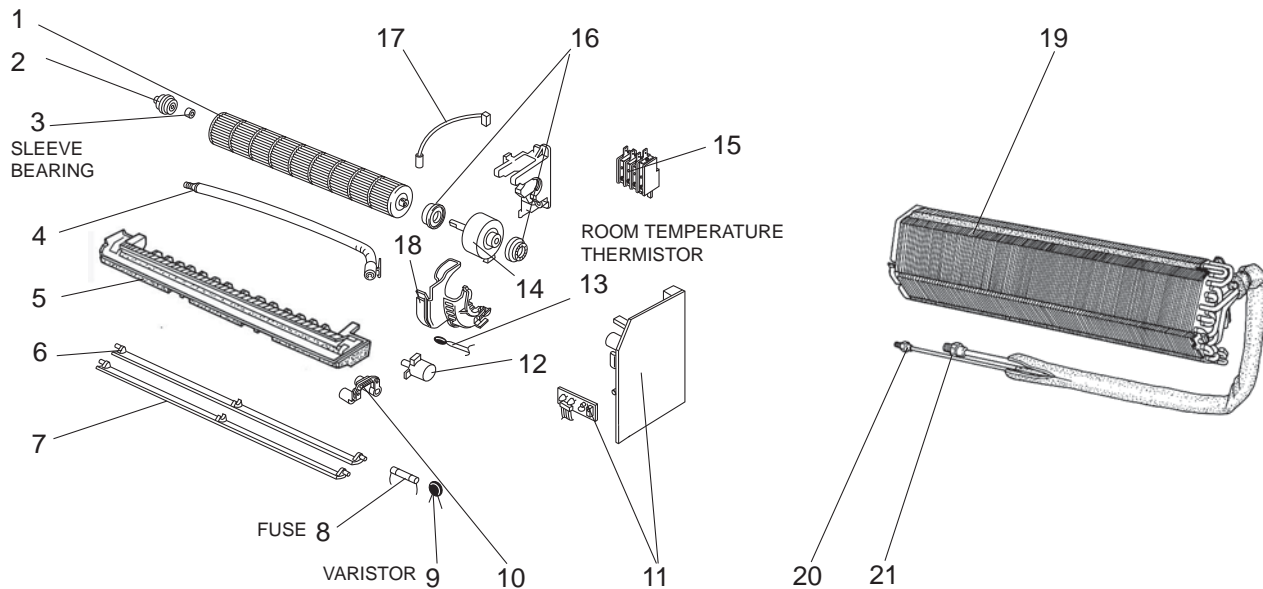
No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks
				MS09TW (W)	
1	E02 408 970	INSTALLATION PLATE		1	
2	E02 409 234	BOX(W)		1	
3	E02 409 976	CORNER BOX LEFT (W)		1	
4	E02 424 000	FRONT PANEL ASSEMBLY(W)		1	Including 5,6,7 2PCS/SET
5	E02 409 067	SCREW CAP(W)		2	
6	E02 424 010	GRILLE (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	

13-2. ACCESSORY AND REMOTE CONTROLLER

10	E02 541 426	REMOTE CONTROLLER		1	
11	E02 527 083	REMOTE CONTROLLER HOLDER		1	

MS09TW (W)

13-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS



13-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

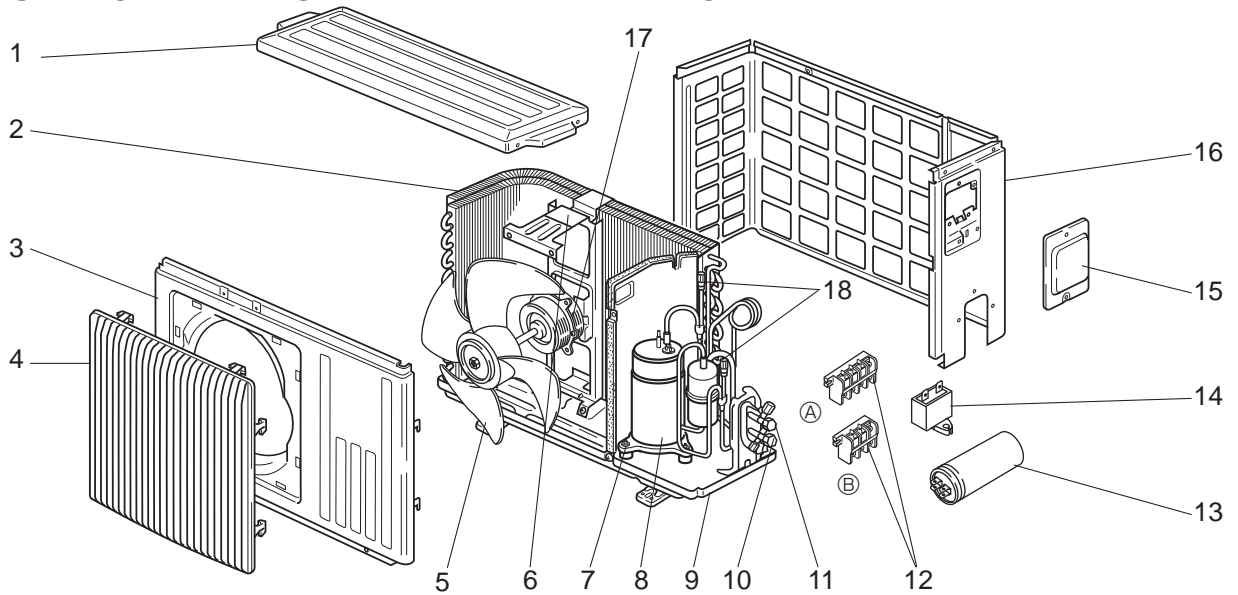
No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks
				MS09TW (W)	
1	E02 408 302	LINE FLOW FAN		1	
2	E02 408 509	BEARING MOUNT		1	
3	E02 001 504	SLEEVE BEARING		1	
4	E02 408 702	DRAIN HOSE		1	
5	E02 409 235	NOZZLE (W)		1	
6	E02 409 040	VANE UPPER (W)		1	
7	E02 409 041	VANE LOWER (W)		1	
8	E02 268 382	FUSE	F11	1	250V/3.0A
9	E02 268 385	VARISTOR	NR11	1	
10	E02 408 034	VANE CRANK SET		1	
11	E02 541 452	ELECTRONIC CONTROL P.C.BOARD		1	AUTO RESTART
12	E02 408 303	VANE MOTOR	MV	1	
13	E02 541 308	ROOM TEMPERATURE THERMISTOR	RT11	1	
14	E02 268 300	INDOOR FAN MOTOR	MF	1	RC4W19-□□
15	E02 541 375	TERMINAL BLOCK	TB	1	
16	E02 151 505	FAN MOTOR RUBBER MOUNT		2	2PCS/SET
17	E02 408 307	INDOOR COIL THERMISTOR	RT12	1	
18	E02 408 333	MOTOR BAND		1	

13-4. INDOOR UNIT HEAT EXCHANGER

19	E02 462 620	INDOOR HEAT EXCHANGER		1	
20	E02 151 667	UNION(LIQUID)		1	φ1/4
21	E02 151 666	UNION(GAS)		1	φ3/8

MU09TW MU12TN

13-5. OUTDOOR UNIT STRUCTURAL PARTS, FUNCTIONAL PARTS AND ELECTRICAL PARTS



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

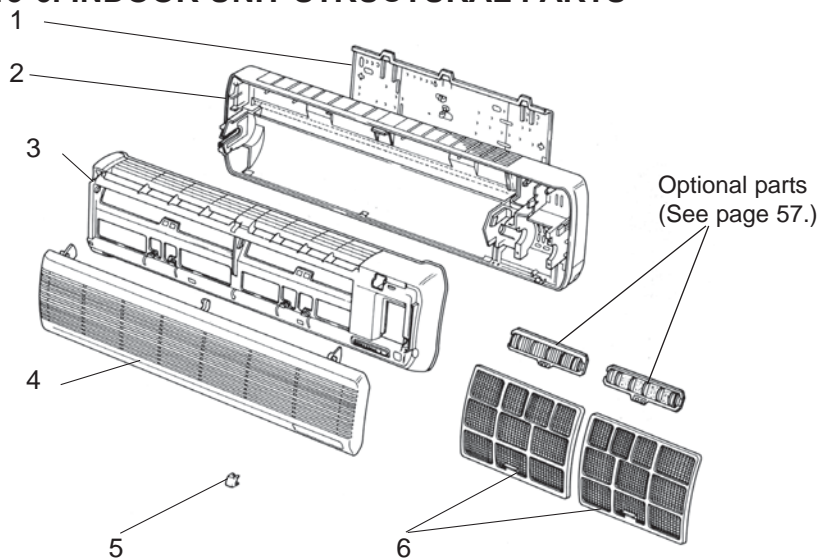
No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set		Remarks
				MU09TW	MU12TN	
1	E02 336 297	TOP PANEL		1	1	
2	E02 336 630	OUTDOOR HEAT EXCHANGER		1		
2	E02 498 630	OUTDOOR HEAT EXCHANGER			1	
3	E02 336 232	CABINET		1	1	
4	E02 336 521	GRILLE		1	1	
5	E02 336 501	PROPELLER FAN		1	1	
6	E02 336 515	MOTOR SUPPORT		1		
6	E02 442 515	MOTOR SUPPORT			1	
7	E02 336 506	COMPRESSOR RUBBER SET		3		3RUBBERS/SET
7	E02 075 506	COMPRESSOR RUBBER SET			3	3RUBBERS/SET
8	E02 541 900	COMPRESSOR	MC	1		RH130WGJT
8	E02 270 900	COMPRESSOR	MC		1	RH167NHDT
9	E02 339 290	BASE		1		
9	E02 340 290	BASE			1	
10	E02 339 661	STOP VALVE(GAS)		1		φ 3/8
10	E02 340 661	STOP VALVE(GAS)			1	φ 1/2
11	E02 339 662	STOP VALVE(LIQUID)		1	1	φ 1/4
12	E02 541 374	TERMINAL BLOCK	TB2	1		4P FIGURE(A)
12	E02 541 377	TERMINAL BLOCK	TB1	1		3P FIGURE(B)
12	E02 475 374	TERMINAL BLOCK	TB2		1	4P FIGURE(A)
12	E02 476 374	TERMINAL BLOCK	TB1		1	4P FIGURE(A)
13	E02 541 353	COMPRESSOR CAPACITOR	C1	1		75μF/180VAC
13	E02 542 353	COMPRESSOR CAPACITOR	C1		1	25μF/370VAC
14	E02 541 351	OUTDOOR FAN CAPACITOR	C2	1		6.0μF/250VAC
14	E02 542 351	OUTDOOR FAN CAPACITOR	C2		1	1.5μF/440VAC
15	E02 541 245	SERVICE PANEL		1	1	
16	E02 541 233	BACK PANEL		1	1	
17	E02 541 301	OUTDOOR FAN MOTOR	MF	1		RA6W21 - □□
17	E02 542 301	OUTDOOR FAN MOTOR	MF		1	RA6N32 - □□
18	E07 001 641	SERVICE PORT		2	2	
19	E02 339 936	CAPILLARY TUBE		1		φ0.12 × φ0.055 × 23-5/8
19	E02 542 936	CAPILLARY TUBE			1	φ0.12 × φ0.071 × 23-5/8
20	E02 474 642	FUSIBLE PLUG		1	1	
21	E02 466 340	COMPRESSOR CONTACTOR	52C	1	1	

MS12TN (W)

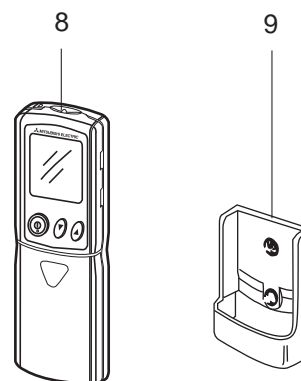
MS15TN (W)

MS17TN (W)

13-6. INDOOR UNIT STRUCTURAL PARTS



13-7. ACCESSORY AND REMOTE CONTROLLER



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

13-6. INDOOR UNIT STRUCTURAL PARTS

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set			Remarks
				MS12TN (W)	MS15TN (W)	MS17TN (W)	
1	E02 141 970	INSTALLATION PLATE		1	1	1	
2	E02 143 234	BOX(W)		1	1	1	
3	E02 138 000	FRONT PANEL ASSEMBLY(W)		1	1	1	Including 4,5
4	E02 138 010	GRILLE(W)		1	1	1	
5	E02 143 067	SCREW CAP(W)		3	3	3	3PCS/SET
6	E02 141 100	AIR FILTER		2	2	2	
⑦	E02 470 007	LAMP PANEL		1	1	1	

13-7. ACCESSORY AND REMOTE CONTROLLER

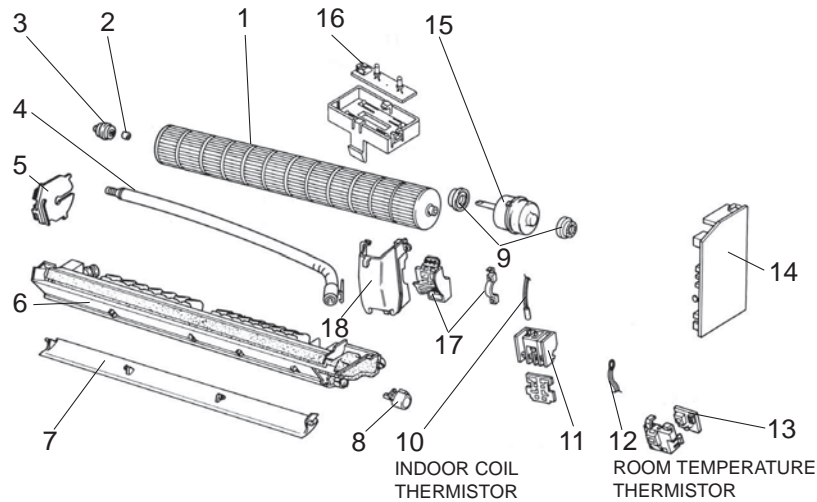
8	E02 541 426	REMOTE CONTROLLER		1	1	1	
9	E02 527 083	REMOTE CONTROLLER HOLDER		1	1	1	

MS12TN (W)

MS15TN (W)

MS17TN (W)

13-8. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

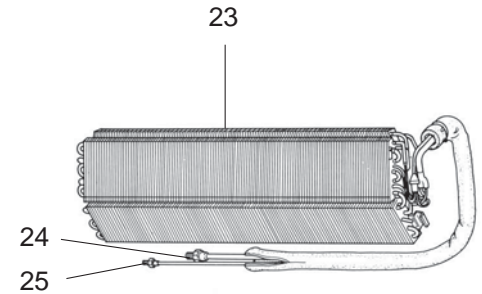


Part numbers that are circled are not shown in the illustration.

13-8. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set			Remarks
				MS12TN (W)	MS15TN (W)	MS17TN (W)	
1	E02 141 302	LINE FLOW FAN		1	1	1	
2	E02 001 504	SLEEVE BEARING		1	1	1	
3	E02 141 509	BEARING MOUNT		1	1	1	
4	E02 408 702	DRAIN HOSE		1	1	1	
5	E02 494 512	BEARING SUPPORT		1	1	1	
6	E02 143 235	NOZZLE (W)		1	1	1	
7	E02 143 040	VANE (W)		1	1	1	
8	E02 141 303	VANE MOTOR	MV	1	1	1	
9	E02 001 505	FAN MOTOR RUBBER MOUNT		2	2	2	2PCS/SET
10	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	1	1	
11	E02 268 375	TERMINAL BLOCK	TB	1	1	1	
12	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	
13	E02 141 468	RECEIVER P. C. BOARD		1	1	1	
14	E02 542 450	ELECTRONIC CONTROL P.C. BOARD		1	1	1	
15	E02 270 300	INDOOR FAN MOTOR	MF	1	1		RA4W18 - □□
	E02 272 300	INDOOR FAN MOTOR	MF			1	RA4W23 - □□
16	E02 138 329	DISPLAY P.C. BOARD		1	1	1	
17	E02 138 333	MOTOR BAND ASSEMBLY		1	1	1	
18	E02 542 541	WATER CUT		1	1	1	
19	E02 270 452	AUTO RESTART ASSEMBLY		1	1	1	
20	E02 268 385	VARISTOR	NR11	1	1	1	
21	E02 268 382	FUSE	F11	1	1	1	250V 3.0A
22	E02 475 383	SURGE ABSORBER	DSAR	1	1	1	

13-9. INDOOR UNIT HEAT EXCHANGER



13-9. INDOOR UNIT HEAT EXCHANGER

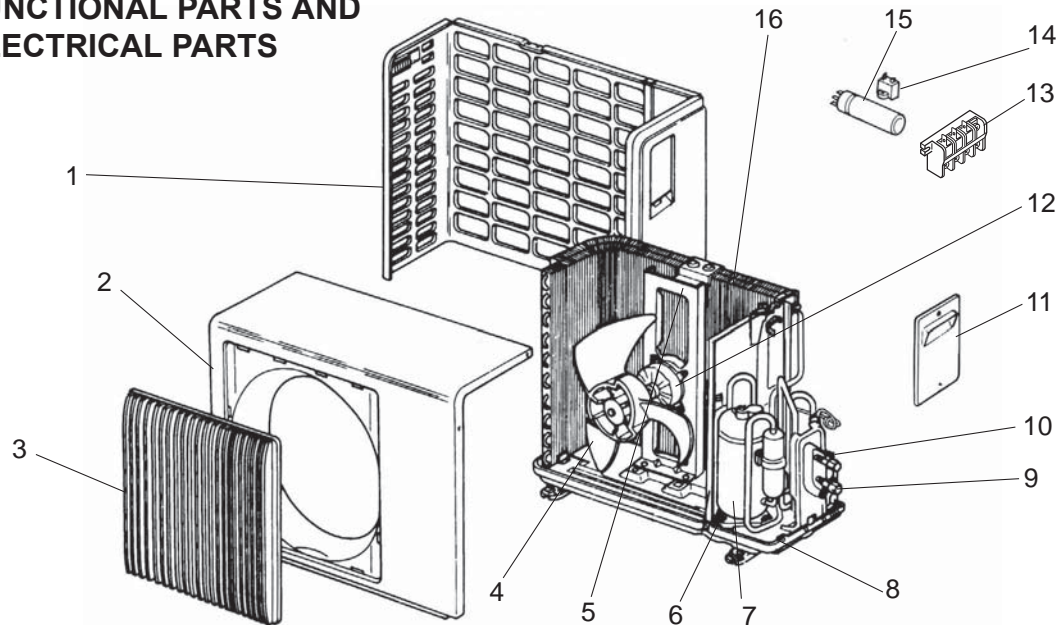
23	E02 141 620	INDOOR HEAT EXCHANGER		1	1	1	
24	E02 179 667	UNION(GAS)		1			φ1/2
	E02 138 666	UNION(GAS)			1	1	φ5/8
25	E02 138 667	UNION(LIQUID)		1	1	1	φ1/4

MU15TN

MU17TN

13-10. OUTDOOR UNIT

STRUCTURAL PARTS, FUNCTIONAL PARTS AND ELECTRICAL PARTS

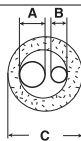
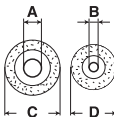


Part numbers that are circled are not shown in the illustration.

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set		Remarks
				MU15TN	MU17TN	
1	E02 475 233	BACK PANEL		1	1	
2	E02 141 232	CABINET		1	1	
3	E02 141 521	GRILLE		1	1	
4	E02 141 501	PROPELLER FAN		1	1	
5	E02 490 515	MOTOR SUPPORT		1		
	E02 496 515	MOTOR SUPPORT			1	
6	E02 075 506	COMPRESSOR RUBBER SET		3	3	3RUBBERS/SET
7	E02 271 900	COMPRESSOR	MC	1		RH207NHDT
	E02 272 900	COMPRESSOR	MC		1	RH231NHDT
8	E02 270 290	BASE		1		
	E02 156 290	BASE			1	
9	E02 150 661	STOP VALVE(GAS)		1	1	φ5/8
10	E02 139 662	STOP VALVE(LIQUID)		1	1	φ1/4
11	E02 270 245	SERVICE PANEL		1	1	
12	E02 270 301	OUTDOOR FAN MOTOR	MF	1	1	RA6N50- □ □
13	E02 475 374	TERMINAL BLOCK	TB2	1	1	4P
	E02 476 374	TERMINAL BLOCK	TB1	1	1	4P
14	E02 270 351	OUTDOOR FAN CAPACITOR	C2	1	1	3.0μF/440VAC
15	E02 543 353	COMPRESSOR CAPACITOR	C1	1		30μF/370VAC
	E02 544 353	COMPRESSOR CAPACITOR	C1		1	35μF/370VAC
16	E02 138 630	OUTDOOR HEAT EXCHANGER		1		
	E02 147 630	OUTDOOR HEAT EXCHANGER			1	
17	E02 271 936	CAPILLARY TUBE		1		φ0.12 × φ0.071 × 21-5/8
	E02 138 936	CAPILLARY TUBE			1	φ0.12 × φ0.079 × 27-9/16
18	E02 282 340	COMPRESSOR CONTACTOR	52C	1	1	
19	E07 001 641	SERVICE PORT		2	2	
20	E02 474 642	FUSIBLE PLUG		1	1	

14-1. REFRIGERANT PIPES

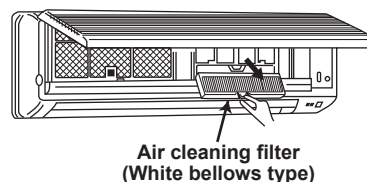
The air conditioner has flared connections its on indoor and outdoor sides.
Please use the optional extension pipe as follows.

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		
MS09TW MU09TW	MAC-645PI	10ft.		3/8	0.03			C 1-3/8	0
	MAC-646PI	16ft.							4/5
	MAC-647PI	23ft.							5/2
	MAC-648PI	33ft.							
	MAC-649PI	49ft.							
MS12TN MU12TN	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.							4/5
	MAC-662PI-US	23ft.							5/2
	MAC-663PI-US	33ft.							
	MAC-664PI-US	49ft.							
MS15TN MU15TN MS17TN MU17TN	MAC-725PI	10ft.		5/8				C 1-11/32 D 1-1/16	0
	MAC-726PI	16ft.							4/5
	MAC-727PI	23ft.							5/2
	MAC-728PI	33ft.							
	MAC-729PI	49ft.							

14-2. AIR CLEANING FILTER

- 1AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- 1Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
- 1Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- 1DO NOT reuse AIR CLEANING FILTER even if it is washed.
- 1DO NOT remove or attach AIR CLEANING FILTER during unit operation.

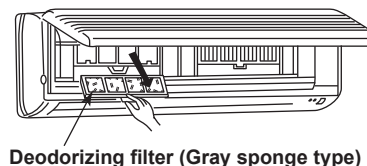
Model	Part No.
MS09TW	MAC-1300FT
MS12TN MS15TN MS17TN	MAC-1100FT



14-3. DEODORIZING FILTER

- 1DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
- 1Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
- 1For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
- 1When 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.
MS09TW	MAC-1800DF
MS12TN MS15TN MS17TN	MAC-1600DF



1DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.

Mr.SLIM™



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Distributed in May 2001 NO. OB274 22
Made in Japan

New publication, effective May 2001.
Specifications subject to change without notice.