



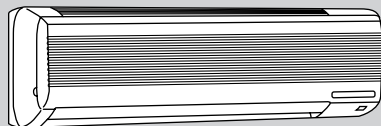
SPLIT-TYPE AIR CONDITIONERS

No. OB192

SERVICE MANUAL

**Wireless type
Models**

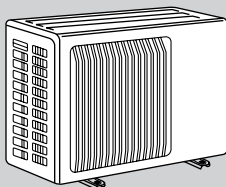
MS09NW^(WH) ▪ MU09NW
MS12NN^(WH) ▪ MU12NN
MS15NN^(WH) ▪ MU15NN
MS17NN^(WH) ▪ MU17NN



MS12NN
MS15NN
MS17NN
INDOOR UNIT



Remote
controller



MU12NN
MU15NN
MU17NN
OUTDOOR UNIT

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The Slim Line.
From Mitsubishi Electric.

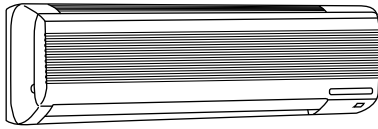


Mr. SLIM

Refer to our Service Manual OB202 when the indoor unit is used in the multi-system operation.
Applied models are MS09NW and MS15NN.

1

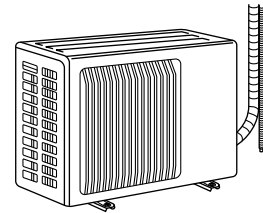
FEATURES



MS12NN, MS15NN, MS17NN



LCD wireless
remote controller



MU12NN, MU15NN, MU17NN

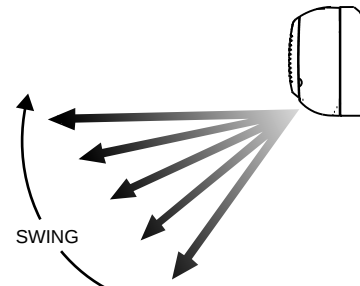
Models	Cooling capacity	SEER
MS09NW	8,500Btu/h	10.2
MS12NN	12,300/12,600Btu/h	11.3/11.3
MS15NN	14,300/14,600Btu/h	10.5/10.5
MS17NN	15,900/16,100Btu/h	10.2/10.2

NEW "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 time. 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. And what's more, the new controller has been made more redesigned and easier to handle than before.

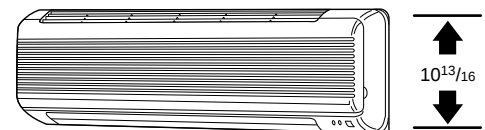
Select desired air flow direction. REMOTE-CONTROL OPERATION MODE

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.



Small in size, big on cooling. COMPACT INDOOR UNIT

The sleek design of the NW/NN Series matches virtually any room layout. For instance, MS09NW is $10\frac{13}{16} \times 32\frac{1}{16} \times 7\frac{3}{16}$ (H x W x D), which used to be $14\frac{3}{16} \times 31\frac{1}{8} \times 5\frac{3}{8}$.



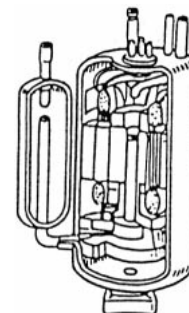
MS09NW

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.



MS09EW → MS09NW

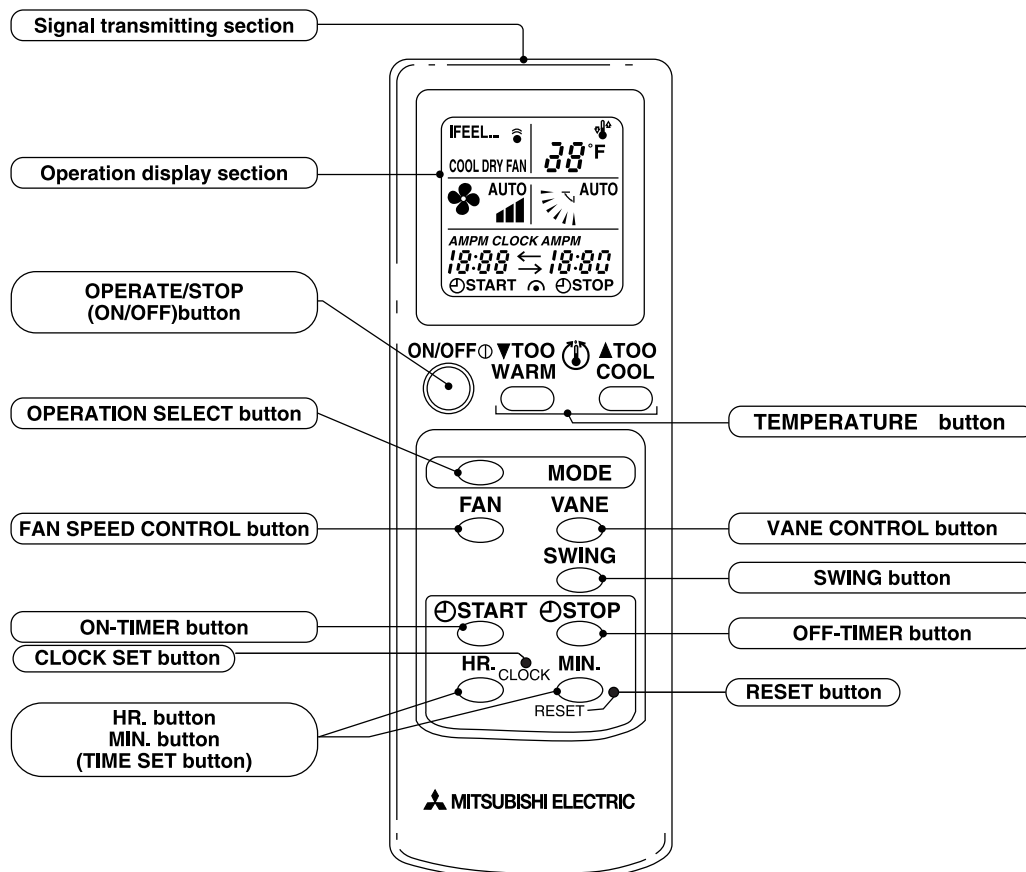
- Indoor unit has changed.
(Outline dimension changes. 31-1/8"×5-3/8"×14-3/16"(W×D×H)→32-1/16"×7-3/16"×10-13/16"(W×D×H))
- Outdoor unit has changed.
(Outline dimension changes. 29-15/16"×9-1/16"×21-1/4"(W×D×H)→30-11/16"×10-1/16"×21-1/4"(W×D×H))
(Capillary tube, refrigerant and pipe had changed.)
- Remote controller has changed. (The timer function was changed to the clock timer function.)
- Indoor auto vane has been adopted.

MS12EN, MS15EN → MS12NN, MS15NN

- Indoor unit has changed.
(Outline dimension changes. 39-3/8"×7"×14-3/16"(W×D×H)→39-15/16"×7-1/2"×12-5/8"(W×D×H))
- Outdoor unit has changed.
(Outline dimension changes. 33-1/2"×11-7/16"×23-7/8"(W×D×H)→33-7/16"×11-7/16"×23-13/16"(W×D×H))
(Capillary tube, refrigerant and pipe had changed.)
- Remote controller has changed. (The timer function was changed to the clock timer function.)
- The swing mode was added to indoor auto vane.

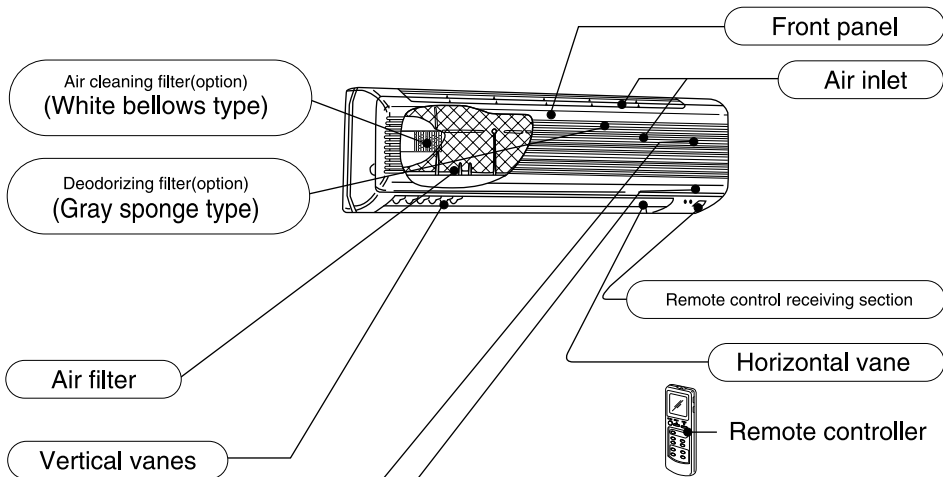
MS17NN

- New Model

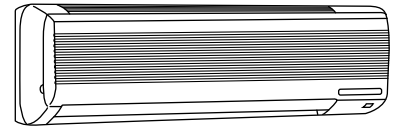
MS09NW, MS12NN, MS15NN, MS17NN**REMOTE CONTROLLER**

INDOOR UNIT

MS09NW



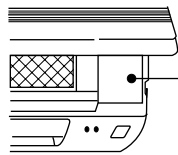
MS12NN MS15NN MS17NN



Operation section

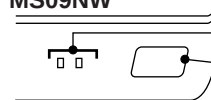
(When the front panel is opened)

MS09NW



Emergency operation switch

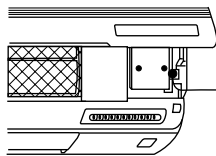
MS09NW



Operation Indicator lamp

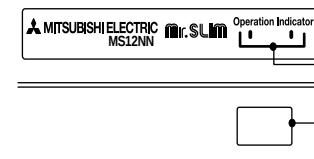
Receiving section

MS12NN, MS15NN, MS17NN



Emergency operation switch

MS12NN, MS15NN, MS17NN

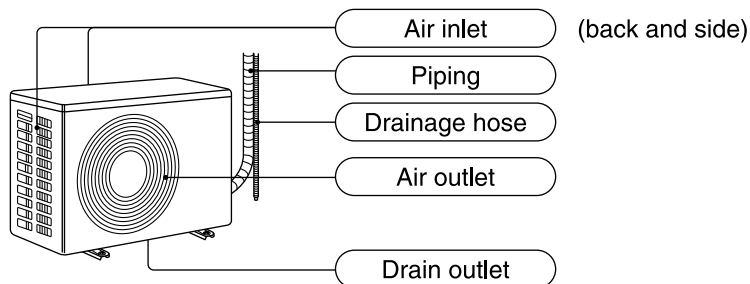


Operation Indicator lamp

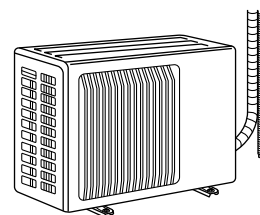
Receiving section

OUTDOOR UNIT

MU09NW



MU12NN MU15NN MU17NN



When MS09NW indoor unit is operating with MUM18NW and MUM30NN outdoor unit connected.
(Please refer to the manual No.OB202 for MUM18NW and MUM30NN.)

ITEM		MODELS	MS09NW	MS12NN
Cooling capacity	*1	Btu/h	8,500	12,300/12,600
Power consumption	*1	W	840	1,100/1,130
EER [SEER]	*1		10.1 (10.2)	11.2/11.2 (11.3/11.3)
INDOOR UNIT MODEL			MS09NW	MS12NN
External finish			White	
Power supply		V, phase, Hz	115, 1, 60	
Max. fuse size (time delay)		A	15	
Min. ampacity		A	0.5	0.6
Fan motor		F.L.A	0.37	0.43
Airflow Lo—Me—Hi	Dry	CFM	208-265-328	360-395-452
	Wet	CFM	177-226-279	314-342-392
Moisture removal		Pints/h	2.3	3.2
Sound level Lo-Me-Hi		dB(A)	31-37-42	36-39-42
Cond. drain connection O.D.		in.	5/8	
Dimensions	W	in.	32-1/16	39-15/16
	D	in.	7-3/16	7-1/2
	H	in.	10-13/16	12-5/8
Weight		lbs	18	31
OUTDOOR UNIT MODEL			MU09NW	MU12NN
External finish			Munsell 5Y6.5/1	
Power supply		V, phase, Hz	115, 1, 60	208/230, 1, 60
Max. fuse size (time delay)		A	15	
Min. ampacity		A	14	12
Fan motor		F.L.A	0.66	0.52
Compressor	Model		KH122WES	RH167NHDT
	Winding resistance (at 68°F) Ω		C-R 0.98 C-S 2.21	C-R 2.16 C-S 3.11
	R.L.A		10	9
	L.R.A		37	29
Refrigerant control			Capillary tube	
Sound level		dB(A)	46	52
Dimensions	W	in.	30-11/16	33-7/16
	D	in.	10-1/16	11-7/16
	H	in.	21-1/4	23-13/16
Weight		lbs	64	92
REMOTE CONTROLLER			Wireless type	
Control voltage (by built-in transformer)			12V DC	
REFRIGERANT PIPING			Not supplied (optional parts)	
Pipe size	Liquid	in.	1/4	
	Gas	in.	3/8	5/8
Connection method	Indoor		Flared	
	Outdoor		Flared	
Between the indoor & outdoor units	Height difference	ft	Max. 25	
	Piping length	ft	Max. 49	

Notes *1 : Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, 75°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

When MS15NN indoor unit is operating with MUM30NN outdoor unit connected.
(Please refer to the manual No.OB202 for MUM30NN.)

ITEM			MODELS	MS15NN	MS17NN
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 [SEER]			*1	10.4/10.4 (10.5/10.5)	10.1/10.1 (10.2/10.2)
INDOOR UNIT MODEL				MS15NN	MS17NN
External finish				White	
Power supply			V, phase, Hz	115, 1, 60	
Max. fuse size (time delay)			A	15	
Min. ampacity			A	0.6	0.7
Fan motor			F.L.A	0.43	0.51
Airflow Lo—Me—Hi	Dry	CFM		360-395-452	406-441-491
	Wet	CFM		293-321-367	346-374-417
Moisture removal			Pints/h	4.7	5.1
Sound level Lo-Me-Hi			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			lbs	31	
OUTDOOR UNIT				MU15NN	MU17NN
External finish				Munsell 5Y6.5/1	
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	11
			L.R.A	35	38
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			lbs	92	97
REMOTE CONTROLLER				Wireless type	
Control voltage (by built-in transformer)				12V DC	
REFRIGERANT PIPING				Not supplied (optional parts)	
Pipe size	Liquid	in.		1/4	
	Gas	in.		5/8	
Connection method	Indoor			Flared	
	Outdoor			Flared	
Between the indoor & outdoor units	Height difference	ft		Max. 25	
	Piping length	ft		Max. 49	

Notes *1 : Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, 75°FWB

Operating Range

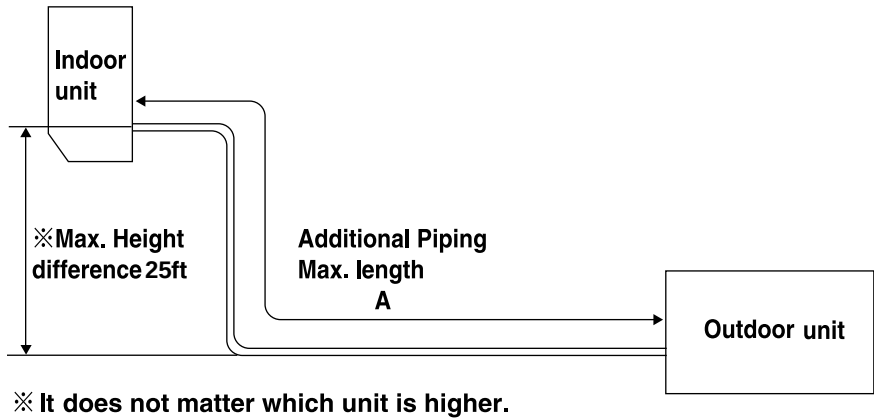
		Indoor intake air temperature	Outdoor intake air temperature
Cooling	Maximum	95°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	67°FDB



MAX. REFRIGERANT PIPING LENGTH

Models	Additional piping Max. length : ft A	Piping size O.D. : in.		Length of connecting pipe : in.	
		Gas	Liquid	Indoor unit	Outdoor unit
MS09NW	49	ϕ 3/8	ϕ 1/4	16-15/16	0
MS12NN MS15NN MS17NN		ϕ 5/8			

MAX. HEIGHT DIFFERENCE



MS09NW, MS12NN, MS15NN, MS17NN**1. PERFORMANCE DATA****1) COOLING CAPACITY**

Models	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
MS09NW	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
MS12NN	71	15.4	11.6	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	8.9	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
MS15NN	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
MS17NN	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.

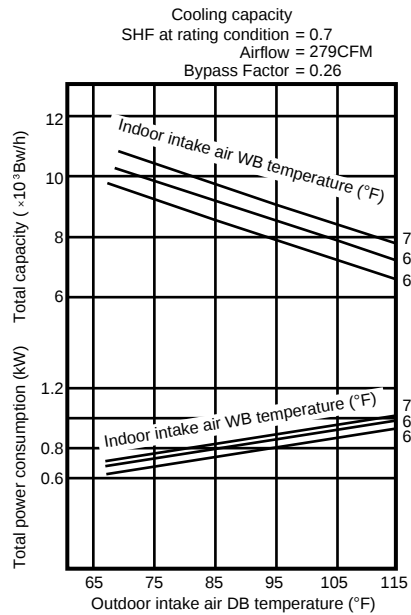
2) COOLING CAPACITY CORRECTIONS

Models	Refrigerant piping length (one way)		
	25ft (std)	40ft	49ft
MS09NW	1.0	0.954	0.927
MS12NN	1.0	0.954	0.927
MS15NN	1.0	0.954	0.927
MS17NN	1.0	0.954	0.927

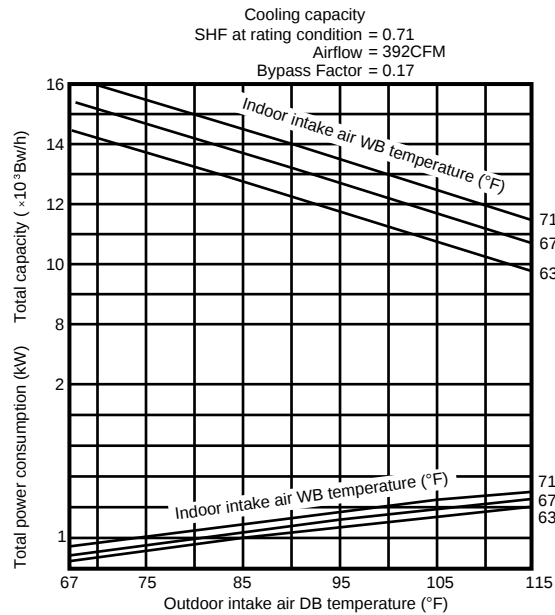
2. PERFORMANCE CURVE

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

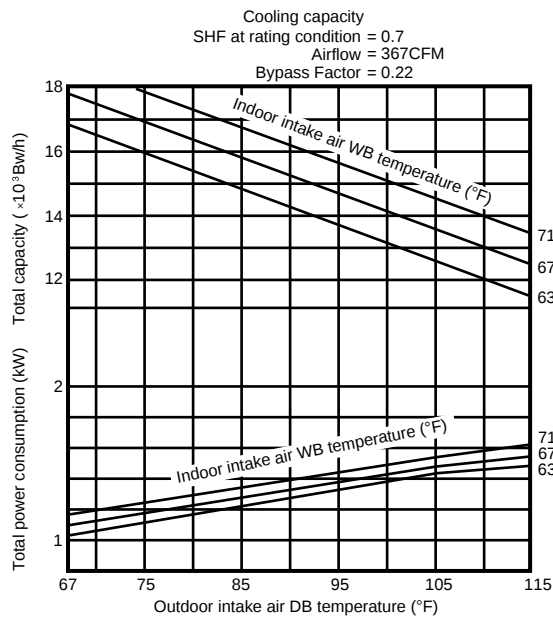
MS09NW
MU09NW



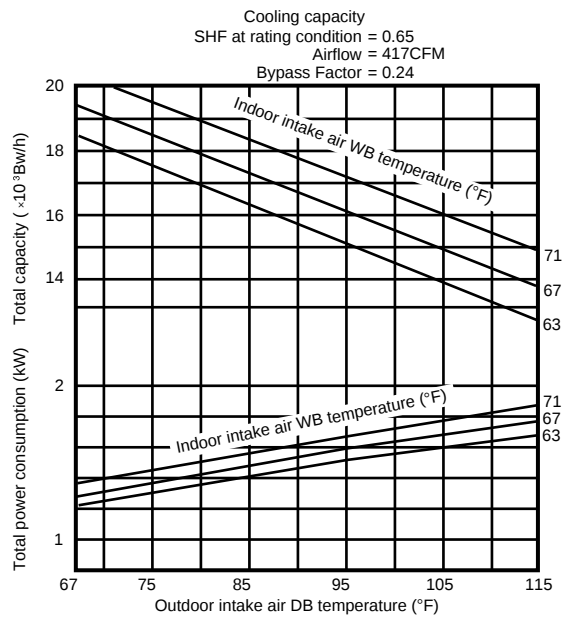
MS12NN
MU12NN



MS15NN
MU15NN



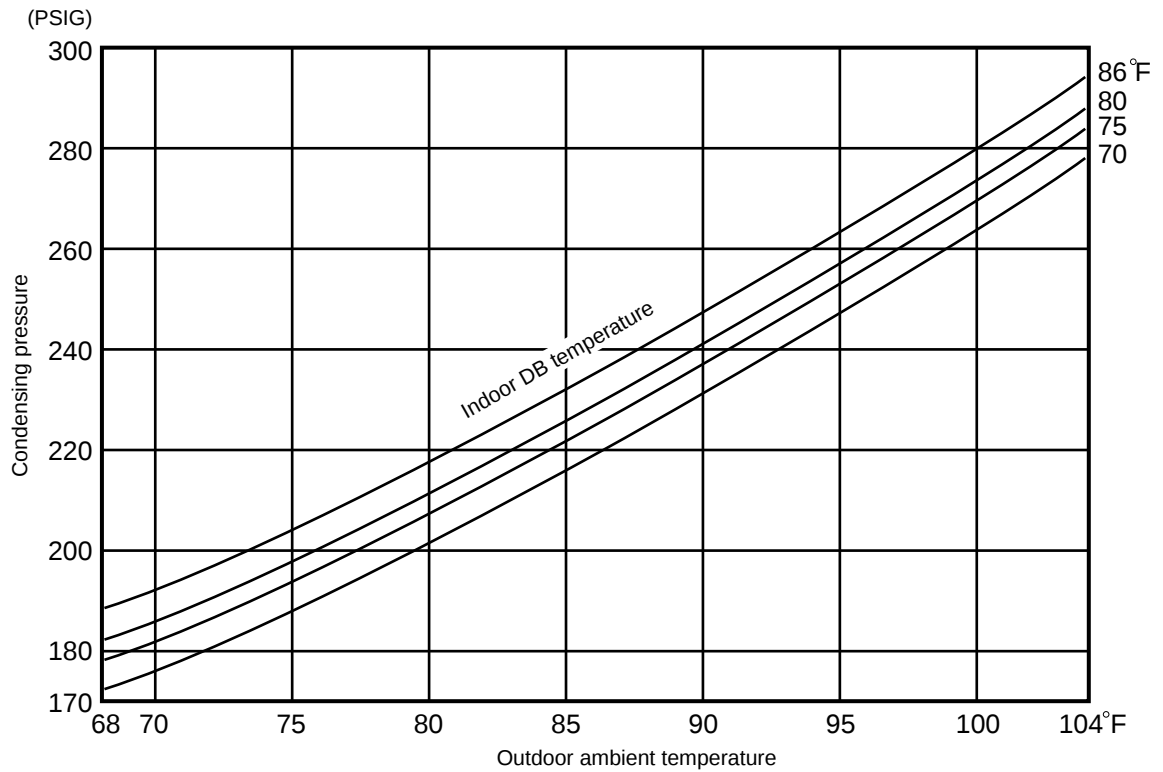
MS17NN
MU17NN



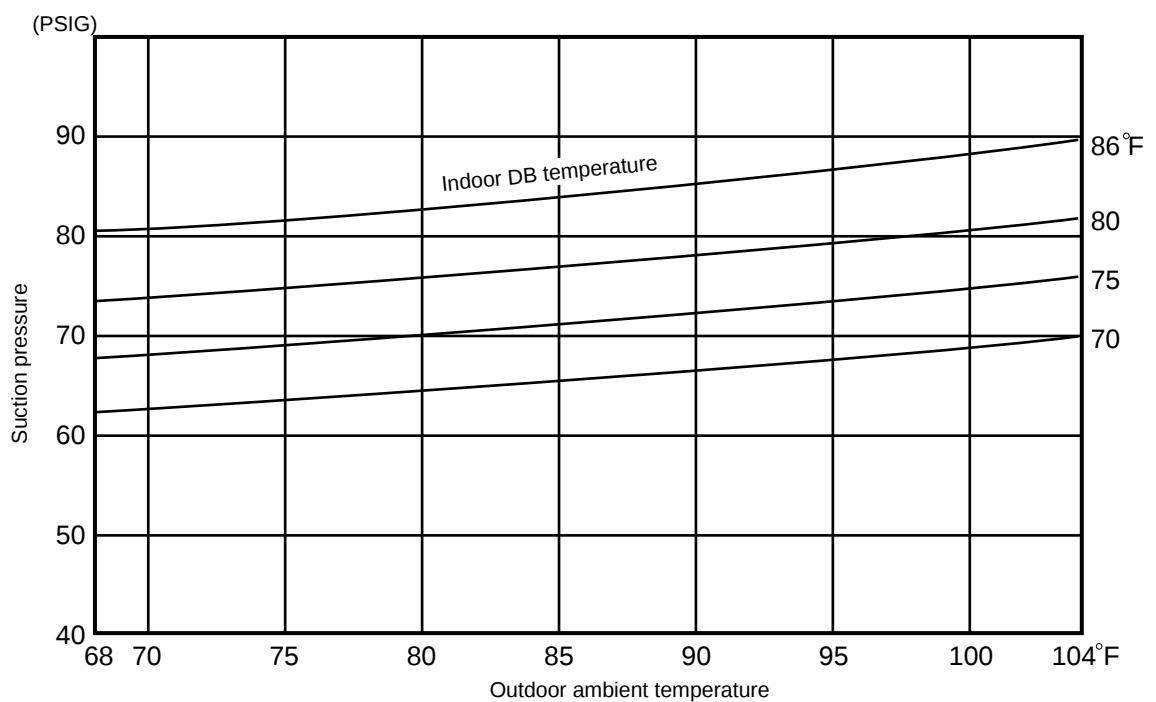
3. CONDENSING PRESSURE AND SUCTION PRESSURE

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

MU09NW

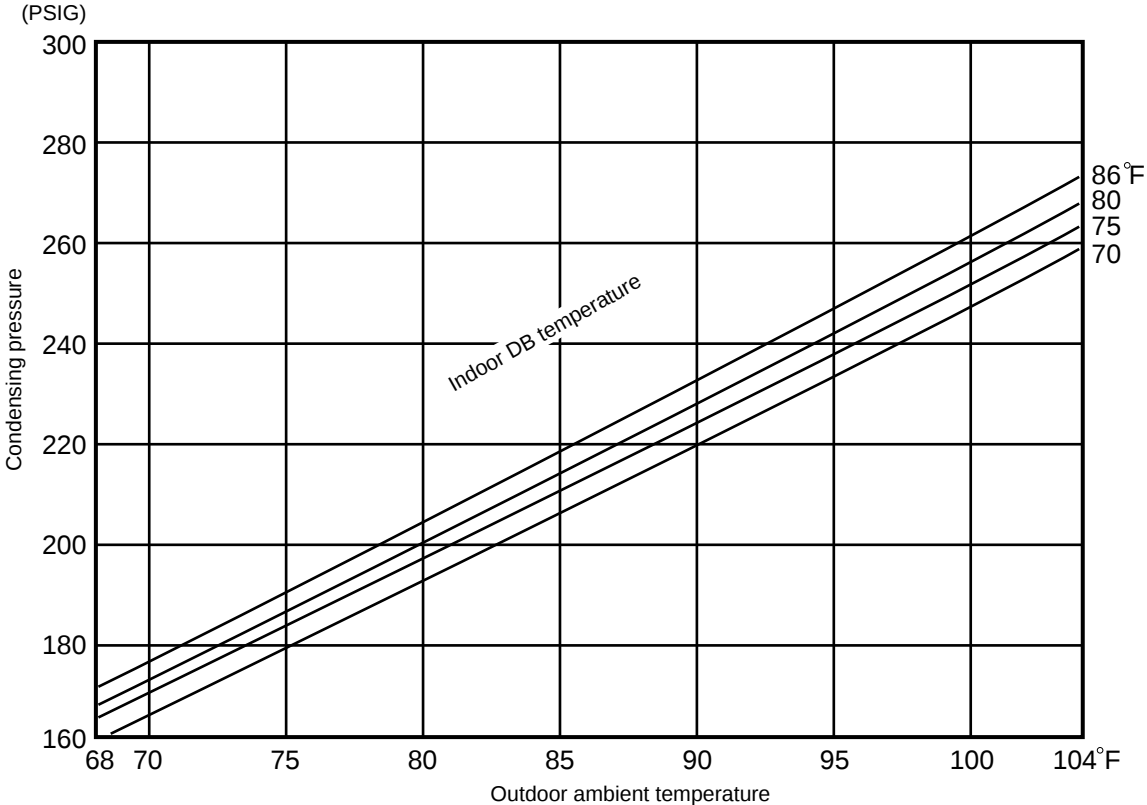


MU09NW

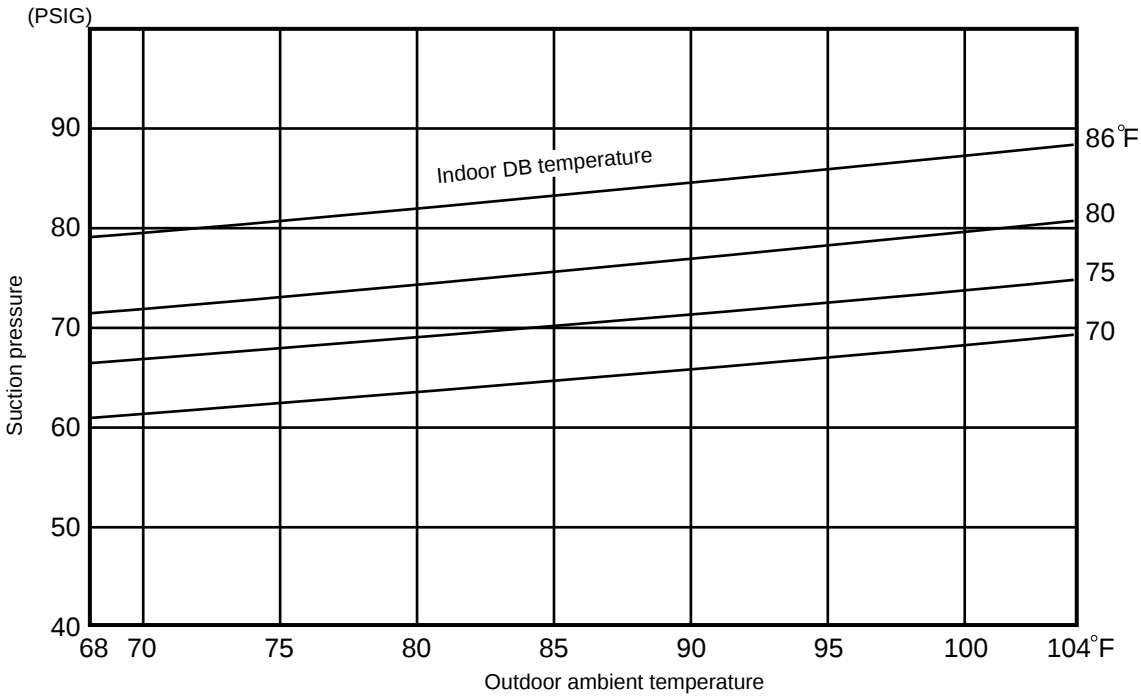


Data is based on the condition of indoor humidity 50%. Air flow should be set at Hi. A point on the curve shows the reference point

MU12NN

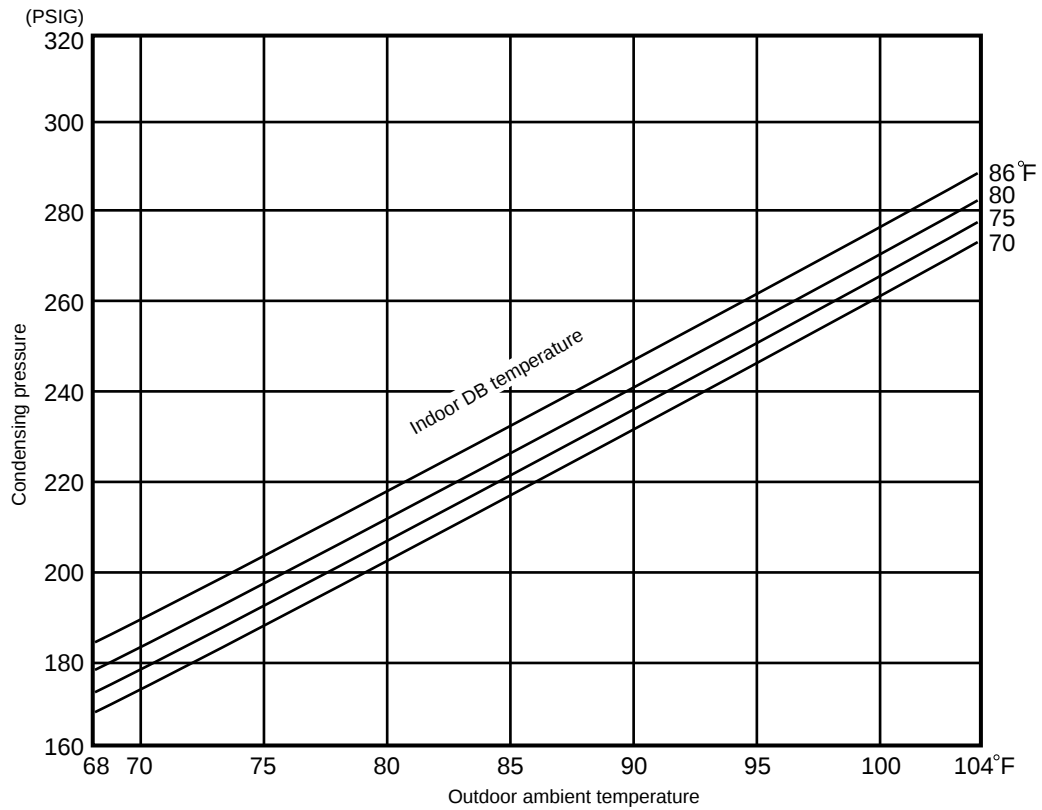


MU12NN

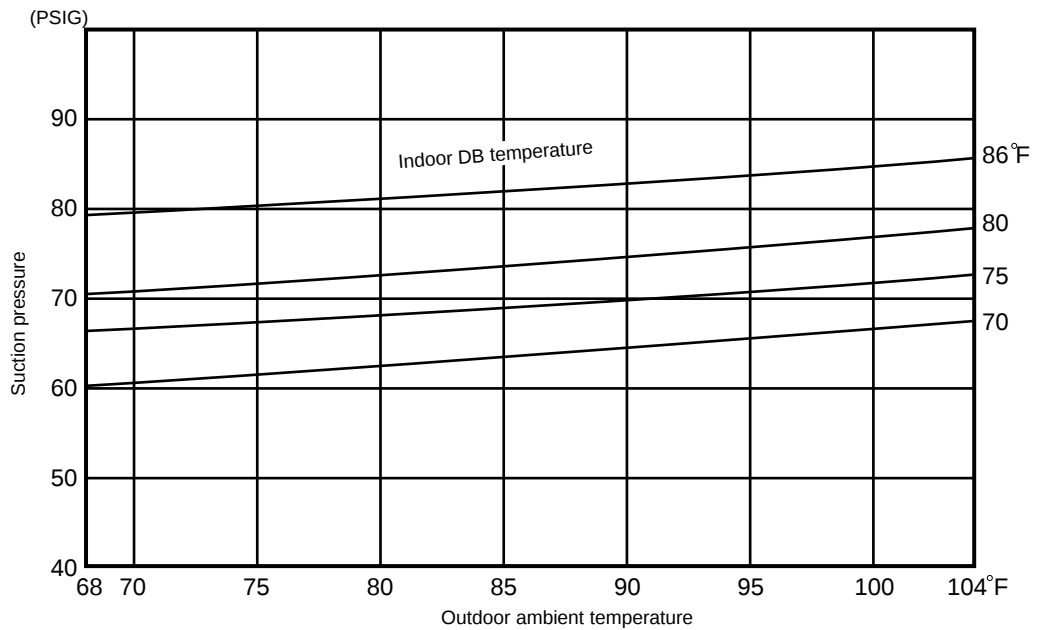


Data is based on the condition of indoor humidity 50%. Air flow should be set at Hi. A point on the curve shows the reference point

MU15NN

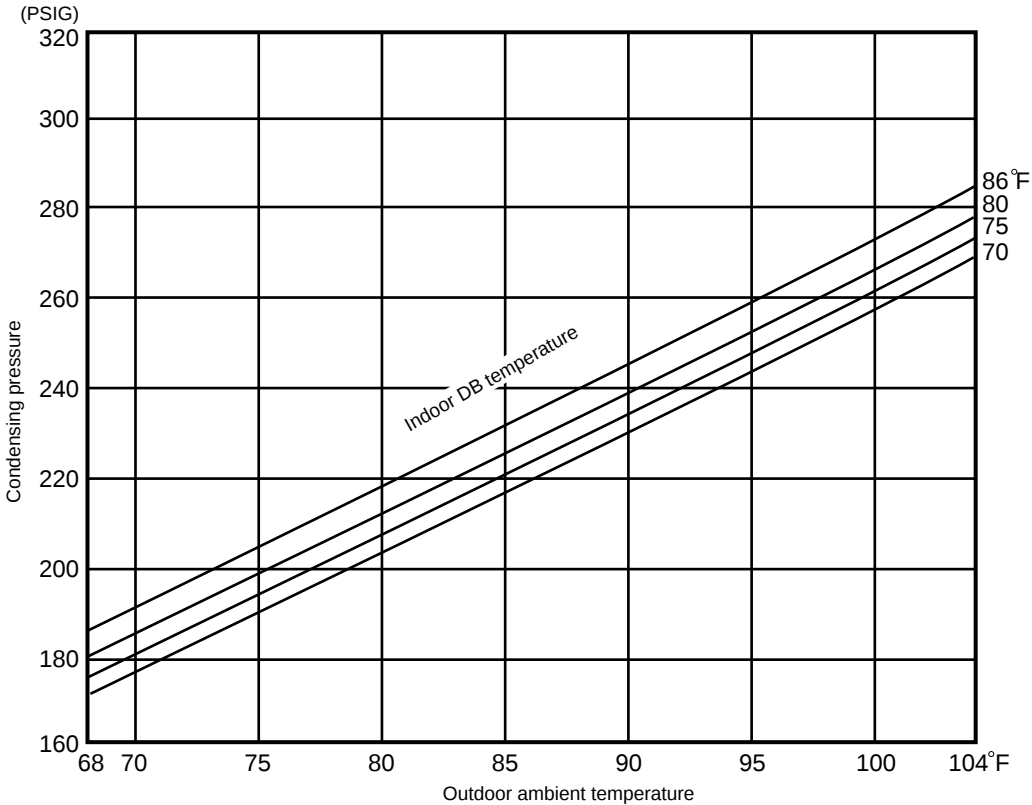


MU15NN

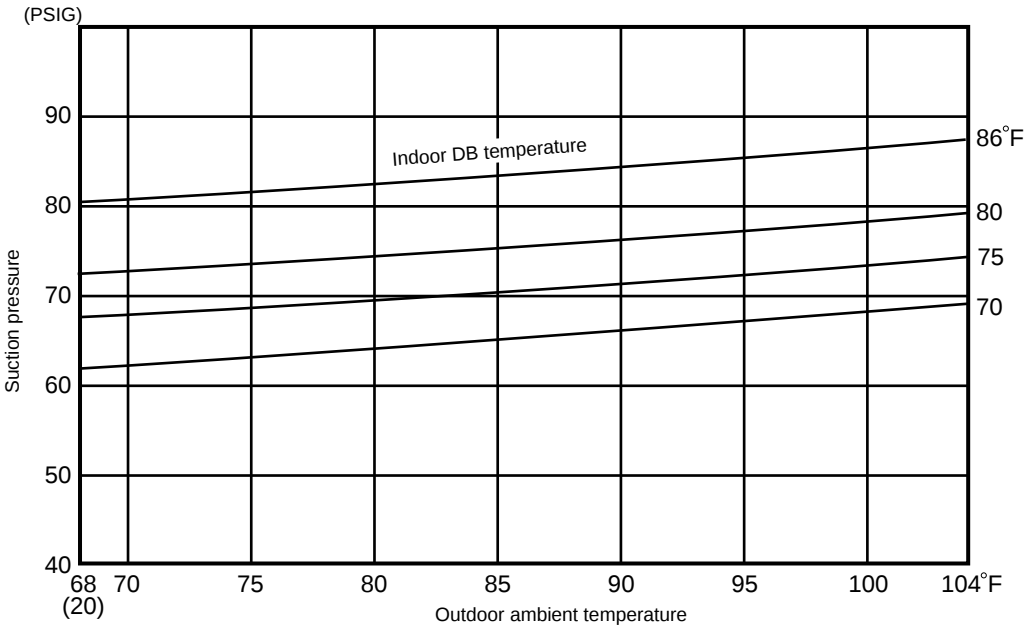


Data is based on the condition of indoor humidity 50%. Air flow should be set at Hi. A point on the curve shows the reference point

MU17NN



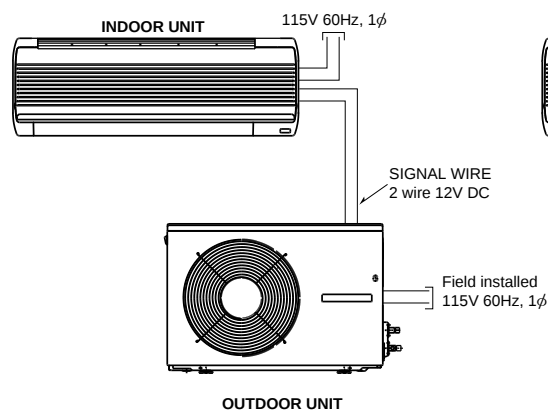
MU17NN



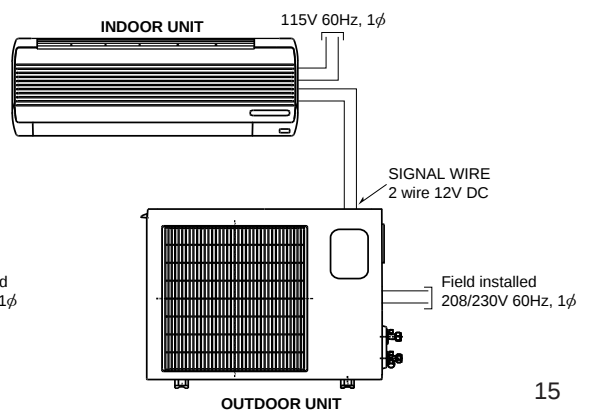
4. STANDARD OPERATION DATA

Model			MS09NW	MS12NN	MS15NN	MS17NN
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	—	0.7	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		MS09NW	MS12NN	MS15NN	MS17NN
	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 current	A	0.34	0.41	0.41	0.47
	OUTDOOR UNIT MODEL		MU09NW	MU12NN	MU15NN	MU17NN
	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	6.49	4.71/4.31	6.01/5.51	7.01/6.41
	Fan current	A	0.66	0.49	0.49	0.49
Refrigerant circuit	Condensing pressure	psi-G	259	243	256	252
	Suction pressure	psi-G	80	78	77	77
	Discharge temperature	°F	161	157	166	174
	Condensing temperature	°F	117	112	116	114
	Suction temperature	°F	49	48	48	46
	Comp. shell bottom temp	°F	137	140	154	160
	Ref. pipe length	ft	25	25	25	25
	Refrigerant charge	—	2 lbs 2oz	2 lbs 14 oz	2 lbs 14 oz	lbs oz
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	rpm	1,230	1,200	1,200	1,290
	Airflow (Hi)	CFM	279	392	367	417
Outdoor unit	Intake air temperature	DB	°F	95	95	95
		WB	°F	—	—	—
	Fan speed High / Low	rpm	780	830/900	830/900	830/900
	Airflow	CFM	1,024	1,324/1,430	1,324/1,430	1,288/1,394

POWER SUPPLY MS09NW



MS12/15/17NN



5. OPERATING RANGE

(1) POWER SUPPLY

	Models	Rating	Guaranteed Voltage
Indoor unit	MS09NW MS12NN MS15NN MS17NN	115V 60Hz 1 ϕ	Min. 103V — Max. 127V
Outdoor unit	MU09NW		
	MU12NN MU15NN MU17NN	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%		—	

6. OUTLET AIR SPEED AND COVERAGE RANGE

Model	Function	Air flow (CFM)	Air speed (ft/sec.)	Coverage range (ft)
MS09NW	Dry	328	0.1	25.6
	Wet	279	0.1	21.8
MS12NN	Dry	452	0.1	29.2
	Wet	392	0.1	25.5
MS15NN	Dry	452	0.1	29.2
	Wet	367	0.1	23.9
MS17NN	Dry	491	0.1	31.7
	Wet	417	0.1	27.0

- The air coverage range is the value 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.

7. ADDITIONAL REFRIGERANT CHARGE (R-22(oz))

Model	Outdoor unit precharged (up to 25ft)	Refrigerant piping length (one way)					
		25ft	30ft	33ft	40ft	45ft	49ft
MS09NW MU09NW	2 lbs 2 oz	0	1	1	2	2	3
MS12NN MU12NN	2 lbs 14 oz						
MS15NN MU15NN	2 lbs 14 oz						
MS17NN MU17NN	3lbs						

INDOOR UNIT

INDOOR UNIT

30-13/16

10-13/16

2-3/8

24-5/8

5-1/8

32-1/16

10-13/16

3-5/16

8-7/8

8-7/8

5-1/4

3/8

7-3/8

1-5/8

12-11/16

12-3/8

3-11/16

1/8

1-13/16

8-11/16

10-3/8

7-3/16

Installation plate

Indoor unit

Wall hole ϕ 2-9/16

7-3/16

3/16

Installation plate

Air in

1/4 or more

3-15/16

2-13/16

3-9/16

1/4

Liquid line ϕ 1/4-19-11/16

Gas line ϕ 3/8-16-15/16

Insulation ϕ 1-3/8 O.D.
 ϕ 3/4 I.D.

Drain hose ϕ 5/8

Insulation ϕ 1-1/8

Air out

2-3/16

11/16

6-5/16

Wireless remote controller

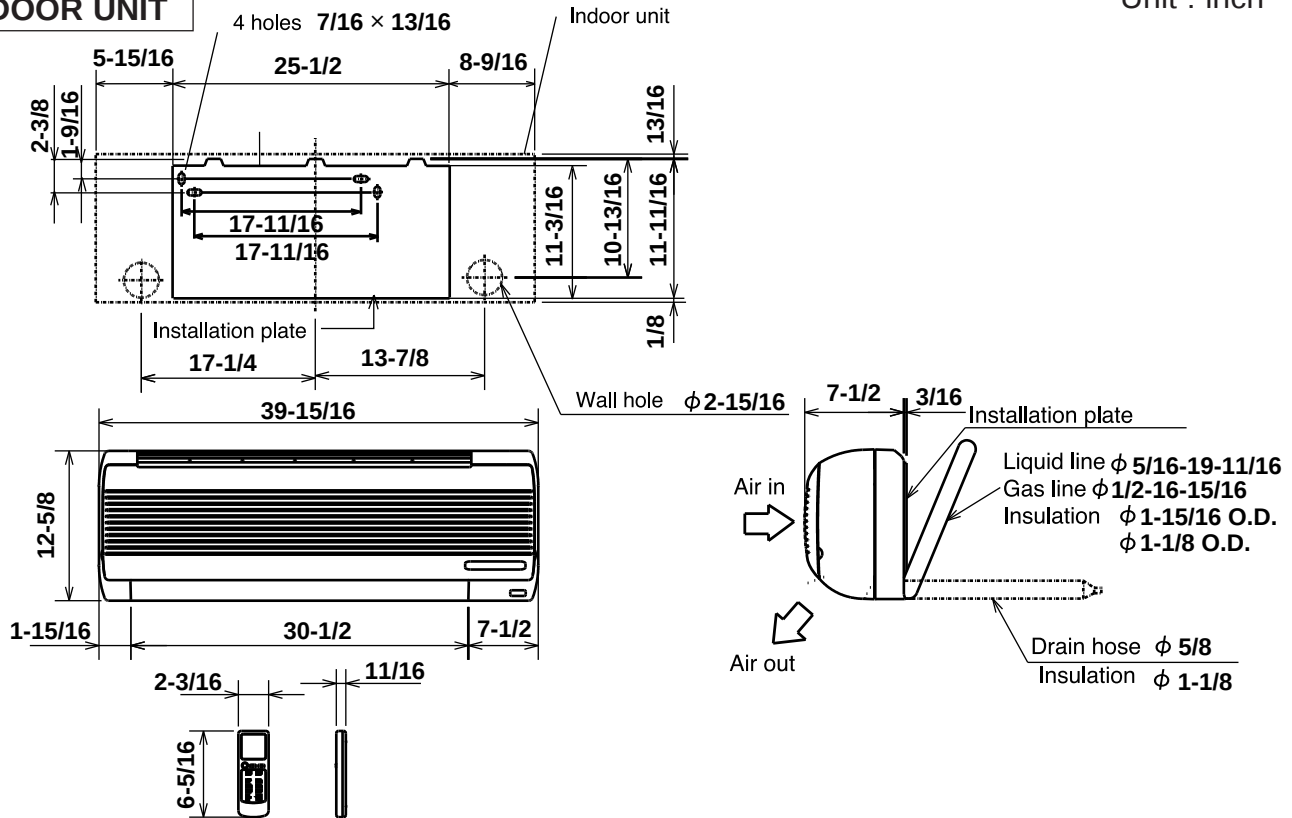
OUTDOOR UNIT



MS12NN, MS15NN, MS17NN

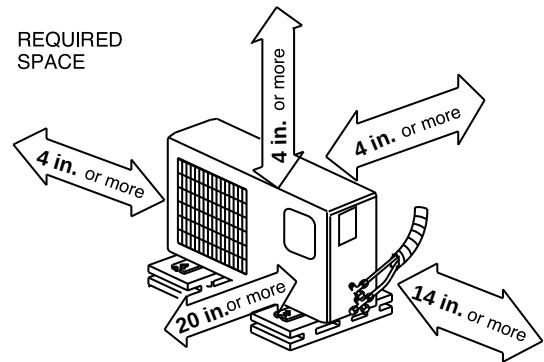
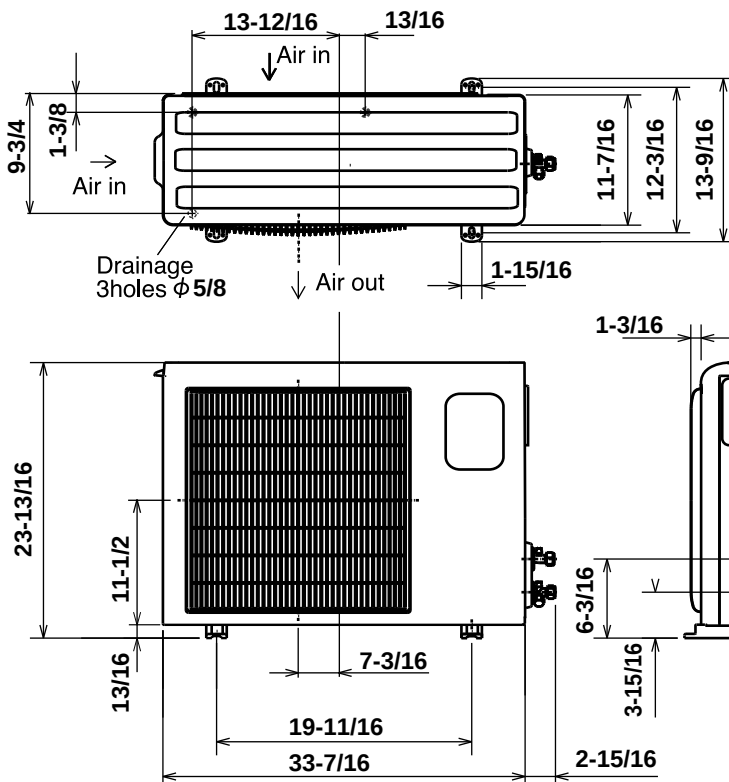
INDOOR UNIT

Unit : inch



MU12NN, MU15NN, MU17NN

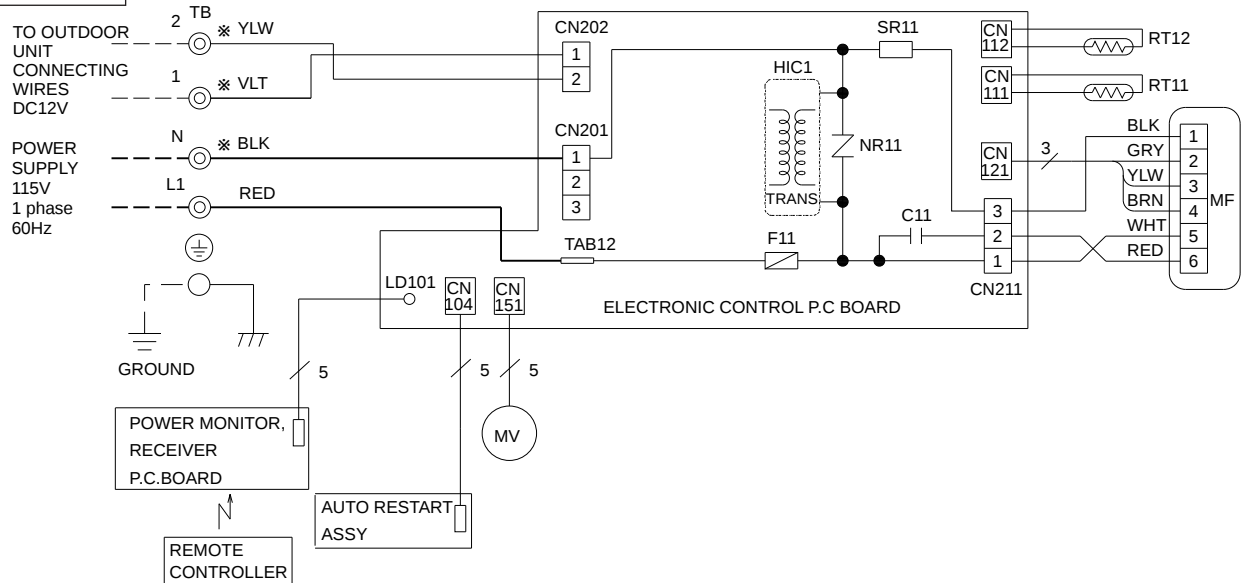
OUTDOOR UNIT



MS09NW

MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
HIC1	DC/DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR	MV	VANE MOTOR
F11	FUSE(3.0A)	RT12	INDOOR COIL THERMISTOR	SR11	SOLID STATE RELAY
MF	INDOOR FAN MOTOR				

NOTE:1. For the outdoor electric wiring, refer to the outdoor unit electric wiring diagram .

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

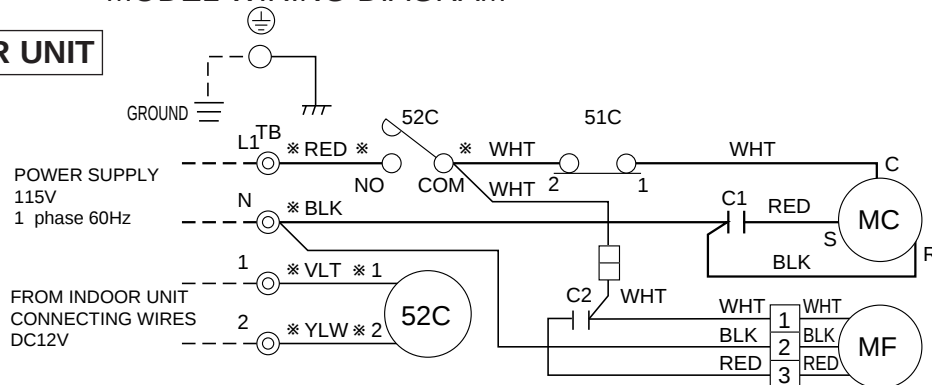
3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

MU09NW

MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB1	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR(INNER THERMOSTAT)		
51C	OVERCURRENT RELAY	52C	COMPRESSOR CONTACTOR		

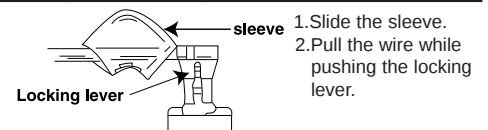
NOTE:1. Use copper conductors only.(For field wiring)

2. "*"show the terminals with a lock mechanism, so they can not be removed when you pull the lead wire.

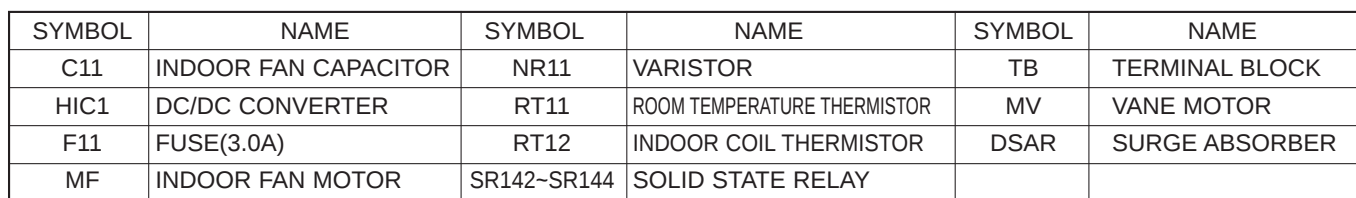
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.

3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

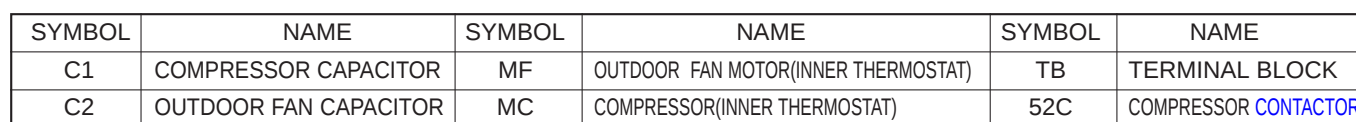


INDOOR UNIT

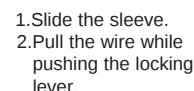


⊙: Terminal block, □□□□: Connector

OUTDOOR UNIT



⊙: Terminal block, □□□□: Connector

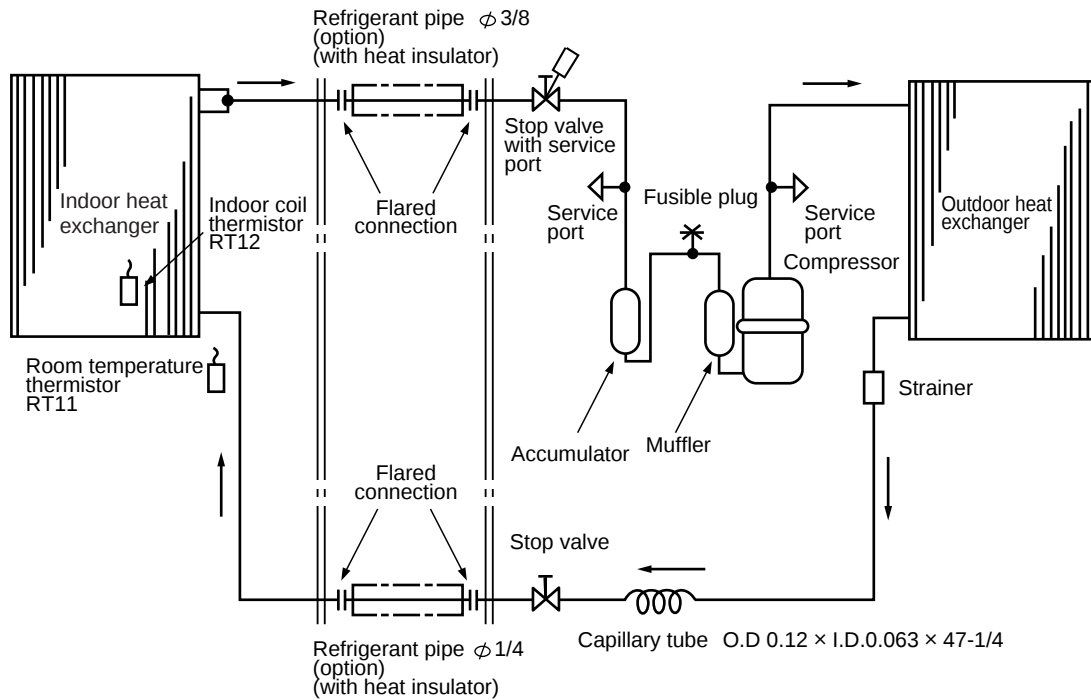


MS09NW / MU09NW

Unit:inch

INDOOR UNIT

OUTDOOR UNIT



MS12NN / MU12NN

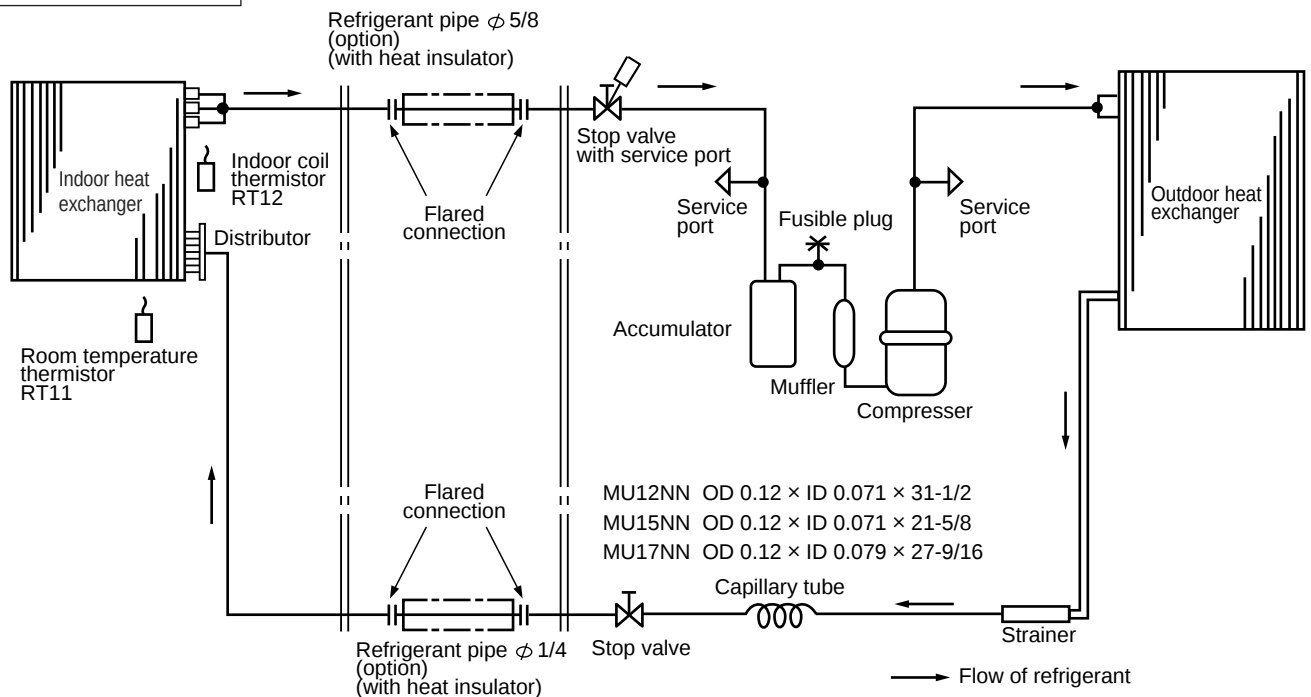
MS15NN / MU15NN

MS17NN / MU17NN

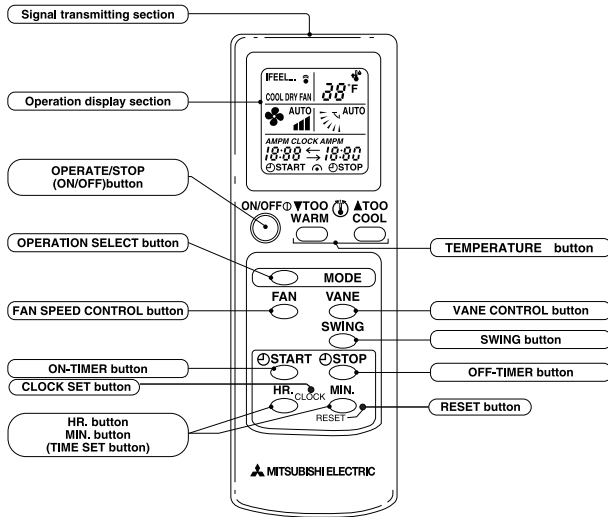
Unit:inch

INDOOR UNIT

OUTDOOR UNIT



Wireless remote controller



INDOOR UNIT DISPLAY SECTION



MS09NW, MS12NN, MS15NN, MS17NN

Once the controls are set, the same operation mode can be repeated by simply turning the OPERATE/STOP button ON. Indoor unit receives the signal with a beep tone.

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

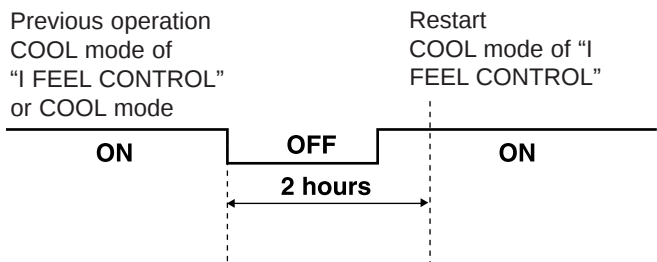
1. "I FEEL CONTROL" OPERATION

- (1) Press OPERATE/STOP 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 initial 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"

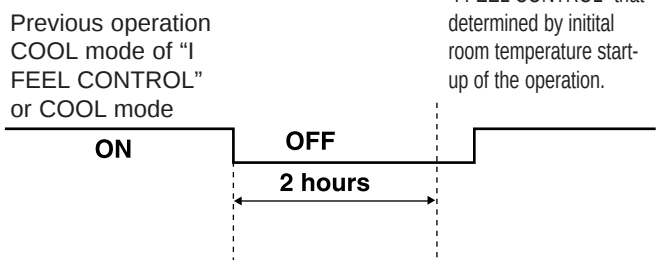
- Once the mode is fixed, the mode will not change by room temperature afterwards.
- Under the ON-TIMER operation, the mode is determined according to the room temperature when the operation starts.
- When the system is stopped with the OPERATE/STOP button on the remote controller, and restarted within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

Example



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

Example



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

Model	Initial room temperature	Initial set temperature	
COOL mode of “I FEEL CONTROL”	79°C or more	75°F	※ 1
	79°F or more	Initial room temperature minus 4°F	
DRY mode of “I FEEL CONTROL”	55°F to 77 °F	Initial room temperature minus 4°F	

※1 After the system restarts by the remote controller, the system operates with the previous set temperature regardless of the initial set temperature.

The set temperature is calculated by the previous set temperature.

(5) TEMPERATURES 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.

● 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.

▲ TOO

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

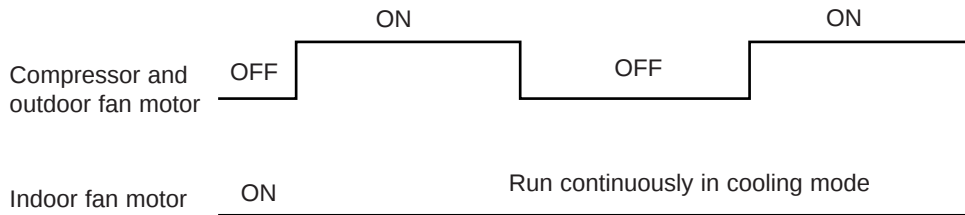


▼ TOO

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



— COOL mode of “I FEEL CONTROL” —



NOTE : Coil frost prevention during COOL mode of “I FEEL CONTROL”

There are two types of controls in coil frost prevention.

① Temperature control

<MS09NW> When the indoor coil thermistor RT12 reads 39°F or below for 5 minutes, the coil frost prevention mode starts.

<MS12/15/17NN> When the indoor coil thermistor RT12 reads 30°F or below, the coil frost prevention mode starts immediately.

However, the coil frost prevention only works after 5 minutes from the compressor starts.

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

After that, if RT12 still reads below 39°F (MS09NW) or below 30°F (MS12/15/17NN) this mode is prolonged until the RT12 reads over 39°F (MS09NW) or 30°F (MS12/15/17NN) .

② Time control

When the three conditions below 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 Lo or Me.

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 Hi or the room temperature exceeds 79°F. However, when two of the above conditions (b. and c.) are satisfied again, time accumulation is resumed.

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

Followings are the fan speed in AUTO.

Initial temperature difference

Room temperature minus set temperature : 4 degrees or more.....	Hi
Room temperature minus set temperature : 2 degree or more and less than 2 degrees.....	Me
Room temperature minus set temperature : less than 2 degree.....	Lo

2 deg. 3 deg. 4 deg. 7 deg.

— 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 and the microprocessor.

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

The operation of the compressor and indoor fan is as follows.

1. When the room temperature is 73°F or over:

Compressor operates by temperature control and time control.

① Set temperature is controlled to fall 4°F as initial set temperature.

② 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.

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

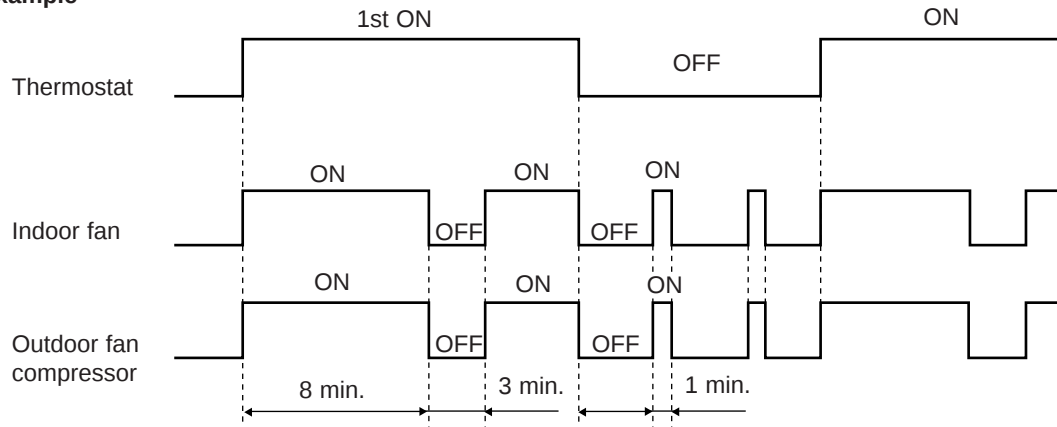
2. When the room temperature is under 73°F.

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



NOTE ● Coil frost prevention during DRY mode of "I FEEL CONTROL"

The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL" excepting the indoor fan is OFF.

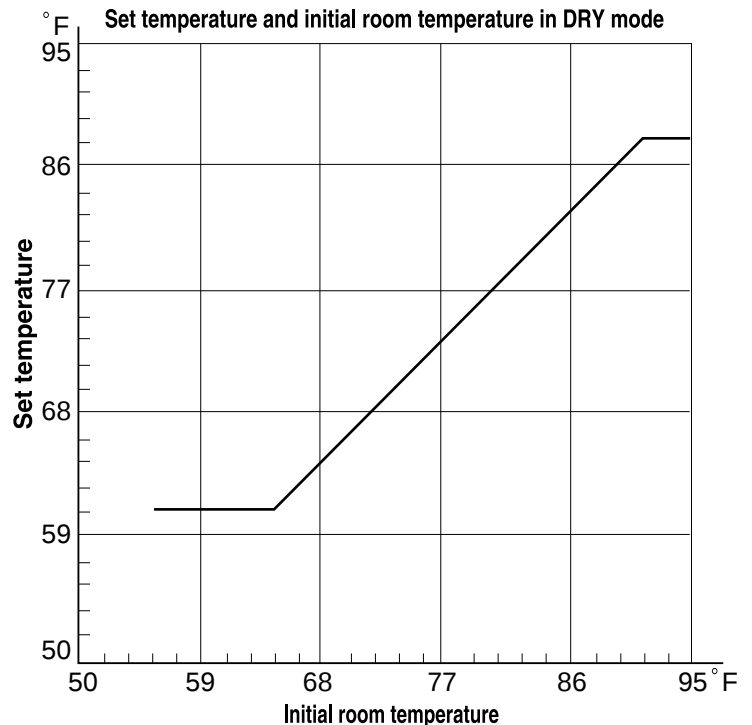
- During coil frost prevention the indoor fan speed becomes Lo and the outdoor fan is OFF.
(Because the coil frost prevention has priority.)

2. COOL OPERATION

- (1) Press OPERATE/STOP button.
OPERATION INDICATOR of the indoor unit turns on with a beep tone.
- (2) Select COOL mode.
- (3) Set the TEMPERATURE button.
(TOO WARM or TOO COOL button)
The setting range is 59 ~ 89°F
 * Indoor fan continues to operate regardless of thermostat's OFF-ON
 * Coil frost prevention is as same as COOL mode of "I FEEL CONTROL"

3. DRY OPERATION

- (1) Press OPERATE/STOP button.
OPERATION INDICATOR of the indoor unit turns on with a beep tone.
- (2) Select DRY mode.
- (3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
Thermostat (SET TEMP.) is not working.
The other operations are as same as DRY mode of "I FEEL CONTROL".
- (4) DRY operation will not function when the room temperature is 55°F or below.
- (5) When DRY operation functions, the fan speed is lower than cool operation.



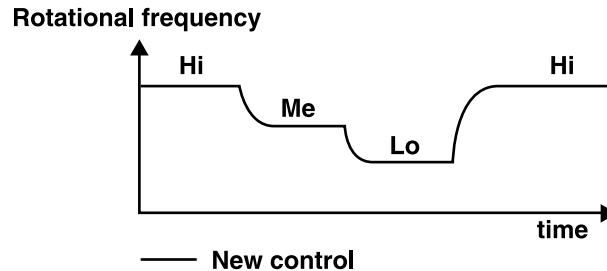
4.FAN OPERATION

- (1) Press POWER ON/OFF button.
- (2) Select FAN mode.
- (3) Select the desired fan speed. When AUTO, it becomes Lo. (Only DRY operation.)
Only indoor fan operates. Outdoor unit does not operate.

5. FAN MOTOR CONTROL (MS09NW only)

- (1) Rotational frequency feedback control

The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (Hi, Me, Lo) the microprocessor controls SR11 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

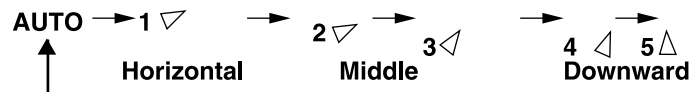
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the operation indicator flashes to show the fan motor abnormality. (See page 32.)

6. AUTO VANE OPERATION

- (1) Vane motor drive

MS series is equipped with a stepping motor for the vane. The rotating direction, speed, and angle of the motor are controlled by plus signals (approx. 12V) transmitted from indoor microprocessor.

- (2) The auto vane angle changes as follows by pressing the VANE CONTROL button.



(3) Positioning

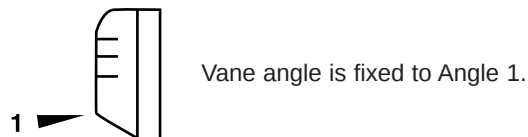
The vane will once swings to the vane stopper as below to confirm the standard position and then set to the desired angle. The positioning is decided as follows.

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

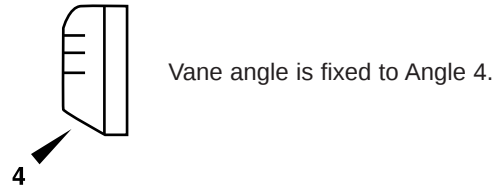
(4) VANE AUTO mode

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



② In FAN operation



(5) Dew prevention

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

(6) SWING MODE

By pressing the SWING button vane swings vertically. The remote controller displays SWING mode is cancelled when the SWING button is pressed again or the operation stops or changes to other mode or VANE button is pressed.

7. TIMER OPERATION

1. How to set the timer.

(1) Press OPERATE/STOP 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 CLOCKSETTING button.

(3) Press TIMER CONTROL button to select the operation.

"⌚START" button... AUTO START operation (ON timer) Ascertain the OPERATION INDICATOR on the indoor unit lights.

"⌚STOP" button... AUTO STOP operation (OFF timer)

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

HR. and MIN. button will work when "⌚START" or "⌚STOP" mark is flashing.

These marks disappear in 1 minute.

When setting the ON timer, check that OPERATION INDICATOR 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 TIMER CONTROL buttons. ("⌚START" or "⌚STOP")

To cancel the ON timer, press the "⌚START" button.

To cancel the OFF timer, press the "⌚STOP" button.

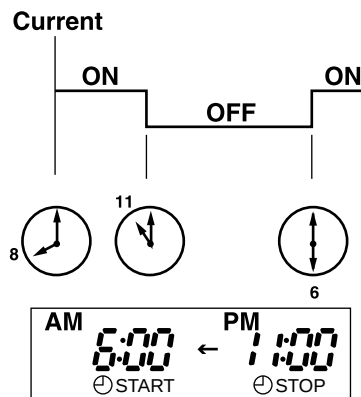
Timer is cancelled and the display of set time disappears.

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.

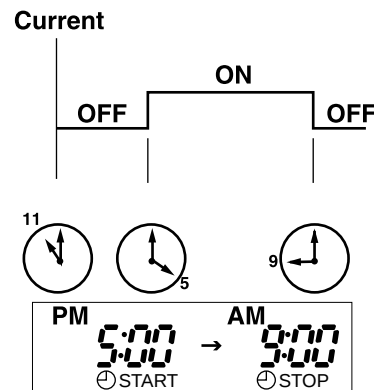
(Example 1) The current time is 8:00 PM.

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. EMERGENCY-TEST OPERATION

When the remote controller is missing, has failed or the batteries run down, press the EMERGENCY OPERATION switch on the front of the indoor unit. The unit will start and the OPERATION INDICATOR lamp will light.

The first 30 minutes of operation will be the test run operation. This operation is for servicing. The indoor fan runs at high speed and the system is in continuous operation. The thermostat is ON and the timer is reset to normal.

After 30 minutes of test run operation the system shifts to EMERGENCY COOL MODE with a set temperature of 75°F. The fan shifts to MED speed.

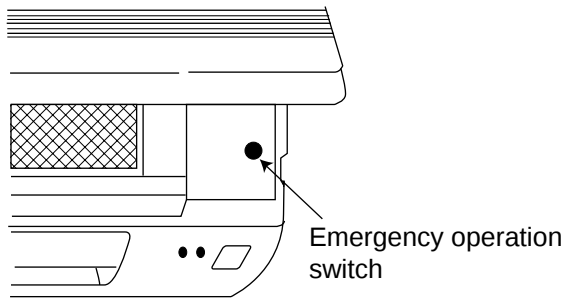
This operation continues until the EMERGENCY OPERATION switch is pressed again or any button on the remote controller is pressed, and after that normal operation will start.

The coil frost prevention circuit operates in this mode.

In the test run or Emergency operation, auto vane operates in AUTO mode with the set temperature 75°F.

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

MS09NW

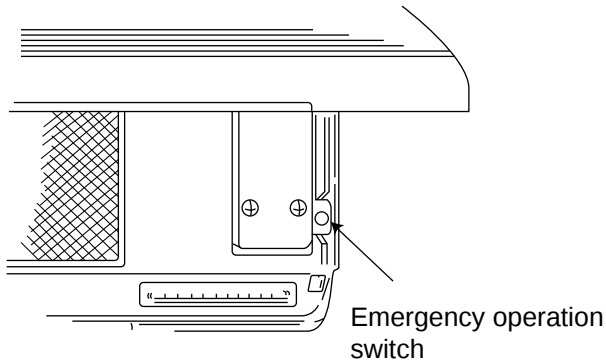


Press once  ☐
<Cool>
Press again ☐ ☐
<Stop>

MS12NN

MS15NN

MS17NN



MS09NW, MS12NN, MS15NN, MS17NN**1. 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 seconds.

NOTE:

- a) When the unit operation is stopped with the Emergency Operation Switch, the unit does not restart after the power is restored, since the signal of "Operation Stop" is memorized in the auto restart assy.
- b) Operation details may not be memorized in case the signal is transmitted by the remote controller to turn the main power OFF within 10 seconds after the power ON. .
- c) When the unit operation is stopped with the remote controller before power failure, the unit does not restart until the OPERATE/STOP (ON/OFF) button on the remote controller is pressed.

2. TIMER SHORT MODE

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

The time will be shortened as follows.

3-minute delay : 3-minute → 3-second.

AUTO START : 1 hour → 1-minutes

AUTO STOP : 1 hour → 1-minutes } Short the connector during the timer mode.

3. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

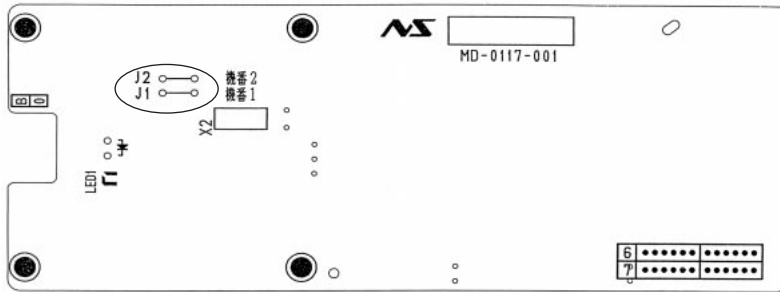
A maximum of 4 indoor units with wireless remote controllers can be used in a room.

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 remodeling, take out the batteries first.
After finish remodeling, put back the batteries then push the RESET-button.

The P.C.board has the print "J1" and "J2". Jumper wires are mounted to each "J1" and "J2". Cut "J1" and "J2" according to the number of indoor unit as shown in Table 1.

After modification, push the RESET button near the MIN-button on the remote controller.

Table.1

	1 unit operation	2 unit operation	3 unit operation	4 unit operation
No.1 unit	No modification	Same as at left	Same as at left	Same as at left
No.2 unit	_____	Cut J1	Same as at left	Same as at left
No.3 unit	_____	_____	Cut J2	Same as at left
No.4 unit	_____	_____	_____	Cut both J1 and J2

Note : At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.

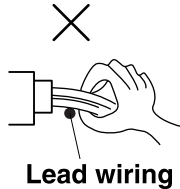
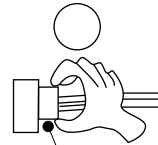
At setting-error, turn the power supply off to cancel the individual operation, and then turn the power supply on to restart the setting.

MS09NW, MS12NN, MS15NN, MS17NN**11-1 Cautions on troubleshooting****11-1-1 Before troubleshooting, check the followings:**

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

11-1-2 Take care the followings during servicing.

- 1) Be sure to unplug the power cord before removing the front panel, the cabinet, the top panel, and the P.C. boards.
- 2) When removing the P.C. board, hold the edge of the board with care NOT to apply stress on the components.
- 3) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.

**Lead wiring****Housing point****11-1-3 Troubleshooting procedure**

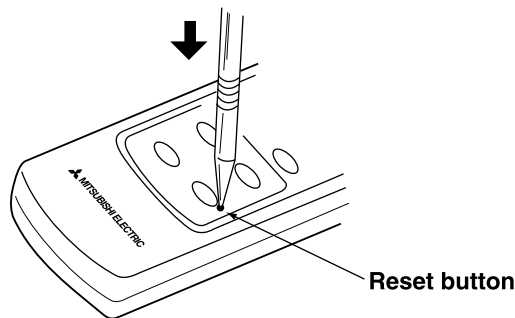
- 1) First, check if the Operation Indicator lamp on the indoor unit is flashing to indicate an abnormality. To make sure, check the abnormality indication for 2 or 3 times before starting service work.
- 2) If the P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
- 3) When troubleshooting, refer to the flow chart and the check table on page 32.

11-1-4 How to replace batteries

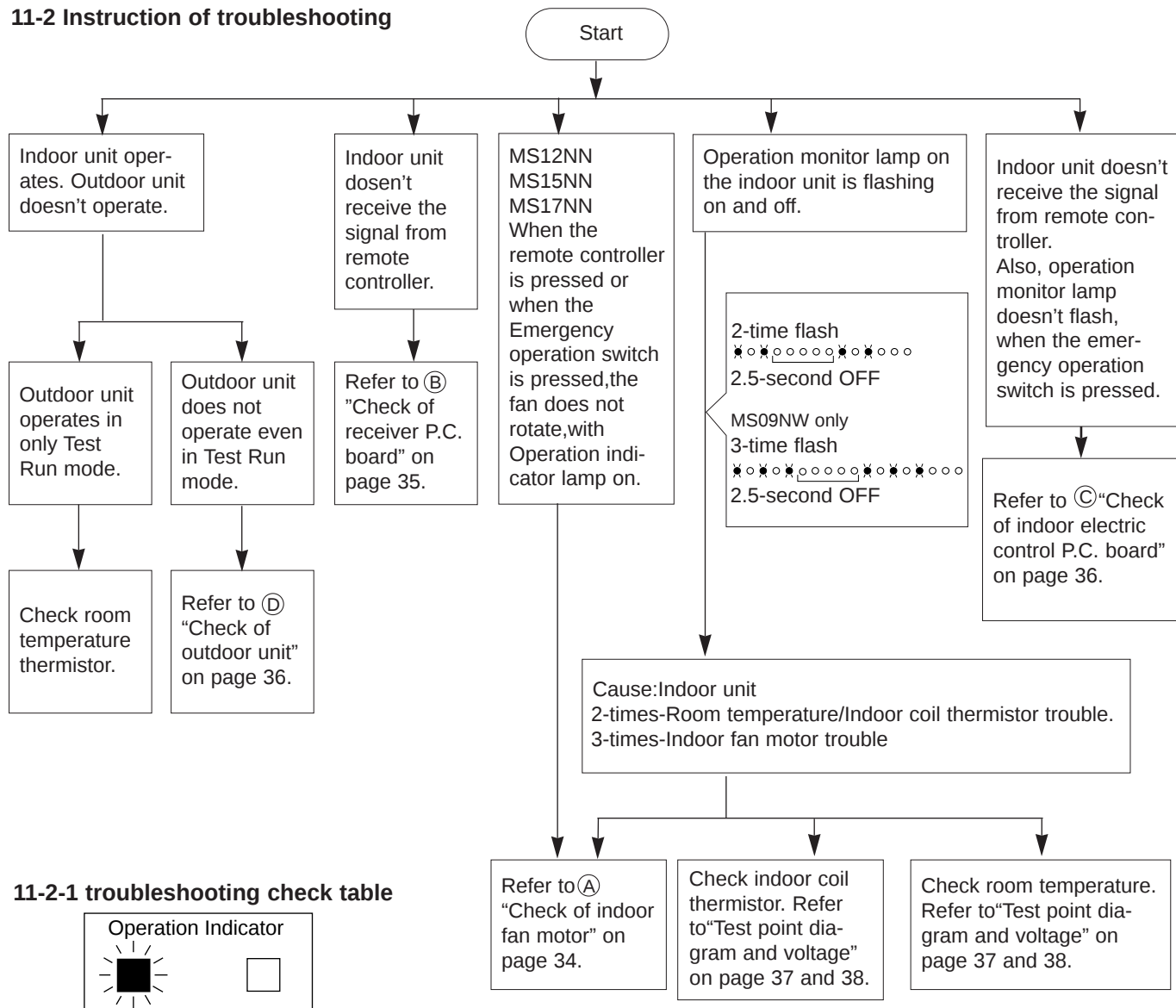
Weak batteries may cause the remote controller malfunction.

In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, discharge the remote controller in the following order.

The remote controller has a reset button. After installing new batteries, press the reset button with tip end of ball point pen or the like, and then use the remote controller.



11-2 Instruction of troubleshooting



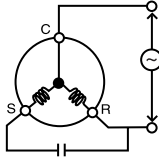
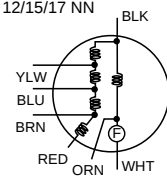
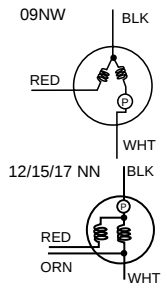
* Before taking measures make sure that the symptom reappears, for accurate troubleshooting.

Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Repair
1	Indoor coil thermistor	2-time flash ●○●○○○○○●○●○○○	Outdoor unit does not run.	Detects Indoor coil/room temperature thermistor short or open circuit every 2 seconds during operation.	● Check thermistor calibration ● Reconnect connector ● Check indoor board
	Room temperature thermistor	2.5-second OFF			
2	Indoor fan motor	MS09NW only 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 emitted during 12-second indoor fan operation	● Disconnect connector CN211 and then check connector CN121②-③ to make sure rotational frequency feedback signal of 1.5V or over exists. ● Check indoor electronic control P.C. board. ● Check indoor fan motor ● Reconnect connector

MS09NW, MS12NN, MS15NN, MS17NN

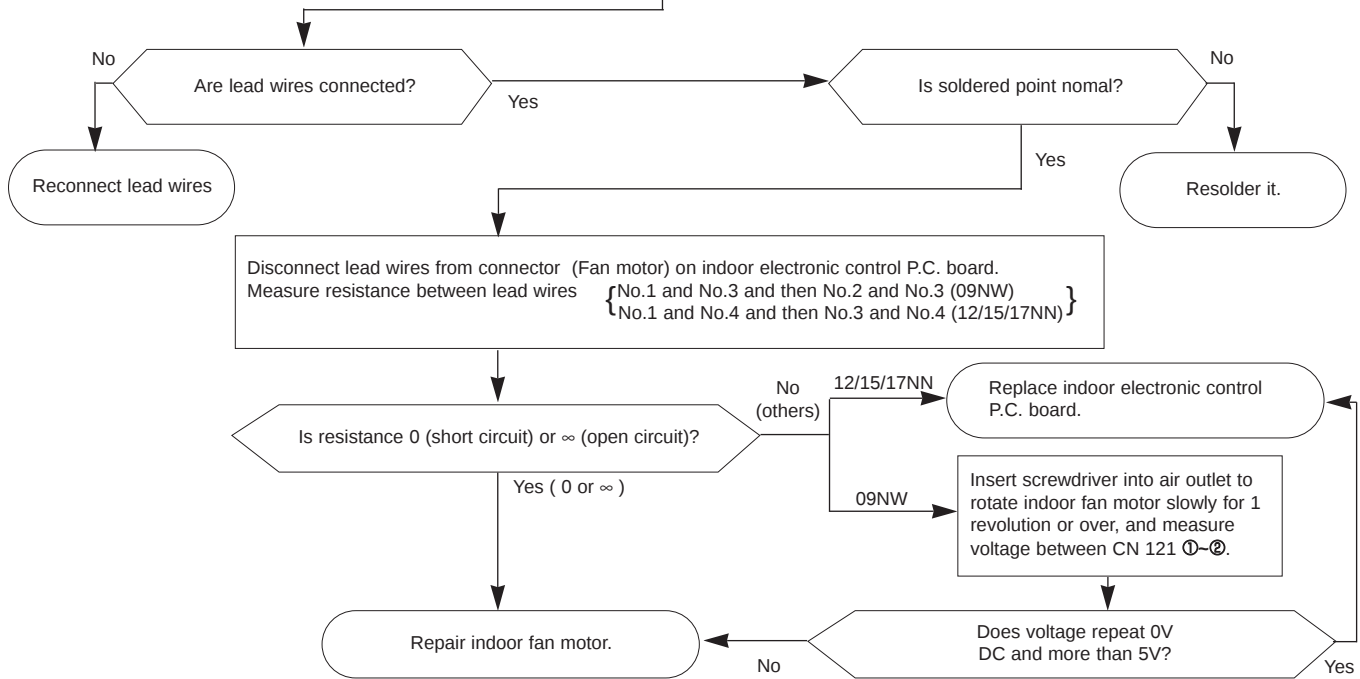
11-2-2 Trouble criterion of main parts

Part name		Check method and criterion					Figure	
Room temperature thermistor		Measure the resistance with a tester. (Part temperature 50°F ~ 86°F)						
Indoor coil thermistor								
		Normal		Abnormal				
		8kΩ ~ 20kΩ		Opened or short-circuited				
Compressor		Measure the resistance between the terminals with a tester. (Coil wiring temperature14°F ~ 104°F)						
			Normal			Abnormal		
			09NW	12NN	15NN	17NN		
		C-R	0.8~1.1Ω	1.9~2.4Ω	1.4~1.9Ω	1.4~1.8Ω		Opened or short-circuited
		C-S	1.9~2.4Ω	2.7~3.4Ω	2.4~3.0Ω	2.3~2.9Ω		
Indoor fan motor	Motor part	Measure the resistance between the terminals with a tester. (Coil wiring temperature50°F ~ 86°F)					Abnormal	
								Normal
		09NW						
		WHT-BLK	76~83 Ω			Opened or short-circuited		
	BLK-RED	70~76 Ω						
	Sensor part	Measure the voltage Power ON.					Abnormal	
								Normal
		09NW						
		BRN-YLW	4.5 ~ 5.5V			Remain 0V or 5V		
	YLW-GRY	(When fan revolved one time) 0V→5V→0V (Approx.)						
Motor part			Normal		Abnormal			
			12/15NN	17NN				
	WHT-BLK	67~73Ω	53~59Ω		Opened or short-circuited			
	BLK-YLW	9~9.8Ω	10~12Ω					
	YLW-BLU	4.9~5.5Ω	4.6~5.0Ω					
	BLU-BRN	5.8~6.4Ω	5.4~6.0Ω					
	BRN-RED	28~32Ω	36~40Ω					
								
Outdoor fan motor	Measure the resistance between the terminals with a tester. (Coil wiring temperature14°F ~ 104°F)					Abnormal		
							Normal	
	09NW		12/15/17NN					
	WHT-BLK	55~68Ω	102~126Ω		Opened or short-circuited			
BLK-YLW	114~141Ω	97~120Ω						
Vane motor	Measure the resistance between the terminals with a tester. (Part temperature 50°F ~ 86°F)					Abnormal		
							Normal	
	09NW	12/15/17NN	Opened or short-circuited					
	282 ~ 305Ω	358 ~ 387Ω						
								

A Check of indoor fan motor

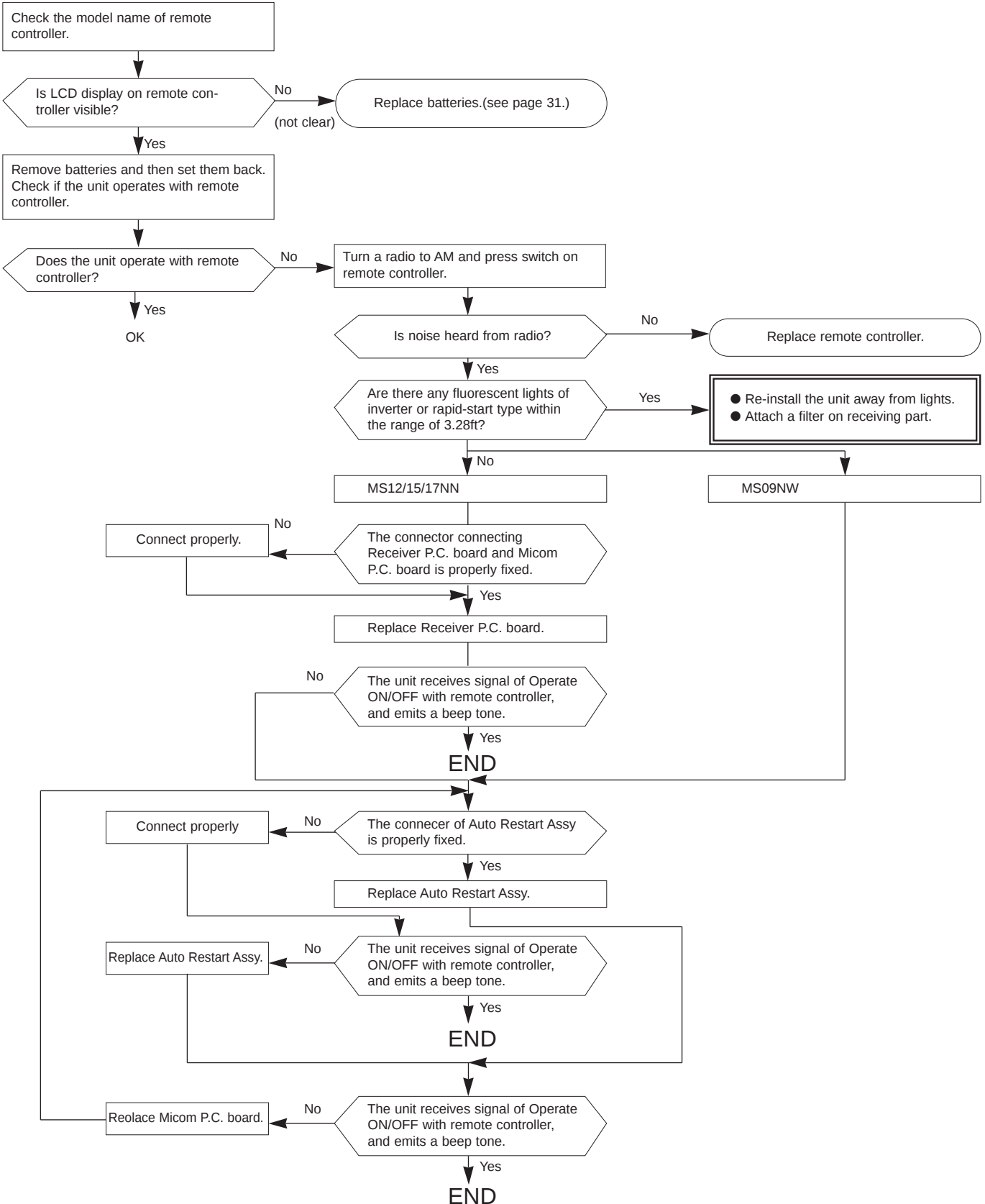
Indoor fan does not operate.

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



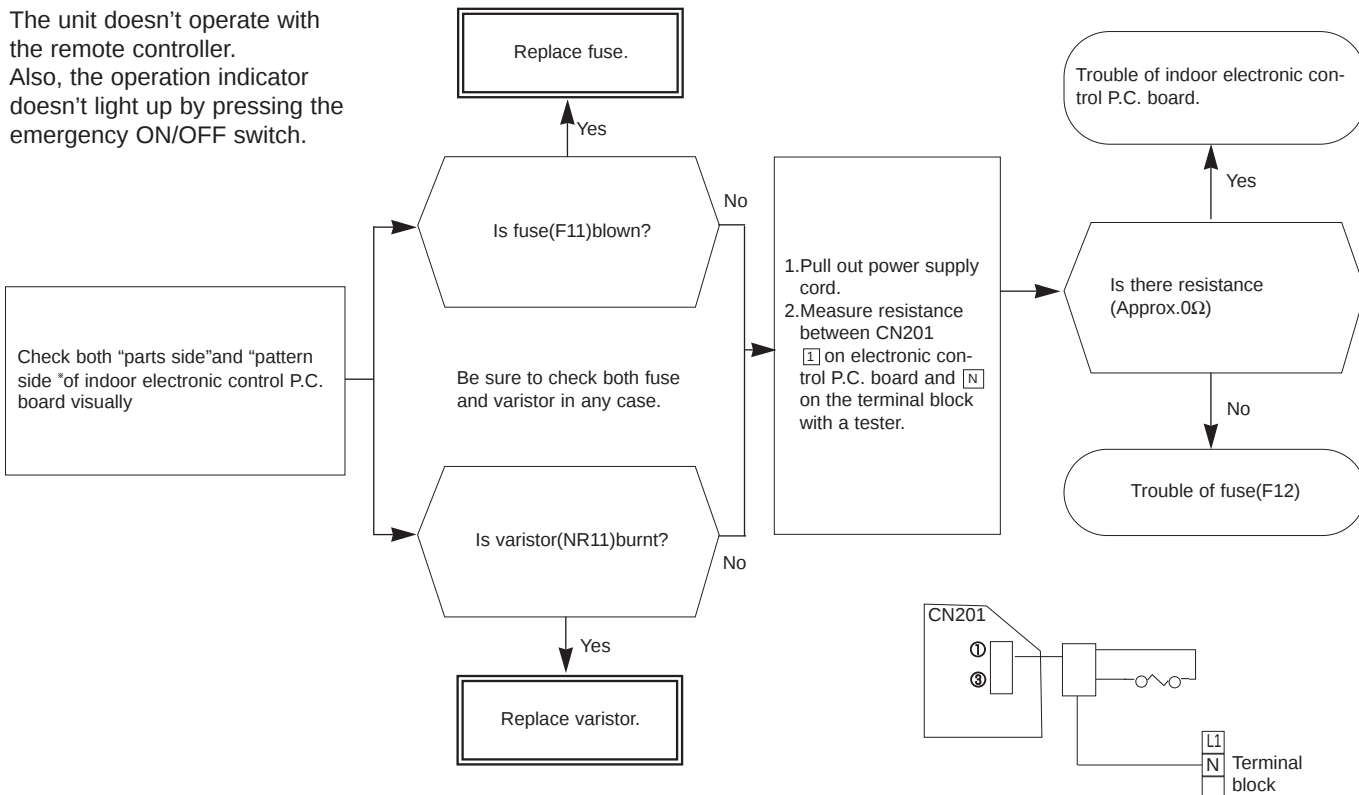
B Check of receiver P.C. board

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



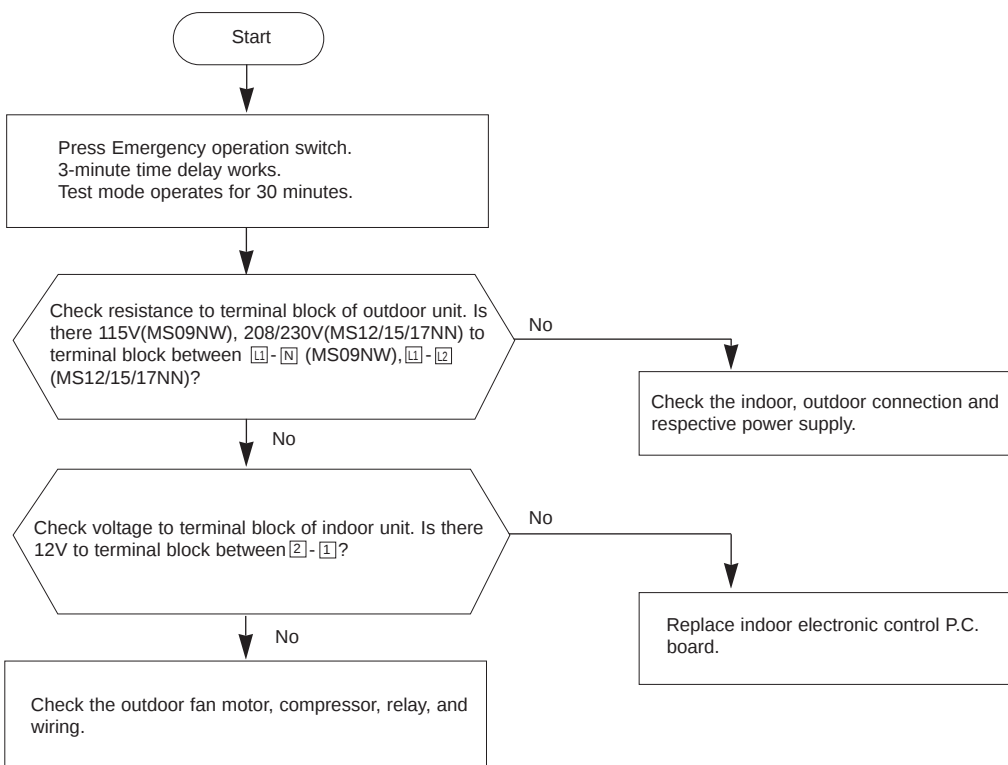
© Check of indoor electronic control P.C. board

The unit doesn't operate with the remote controller.
Also, the operation indicator doesn't light up by pressing the emergency ON/OFF switch.

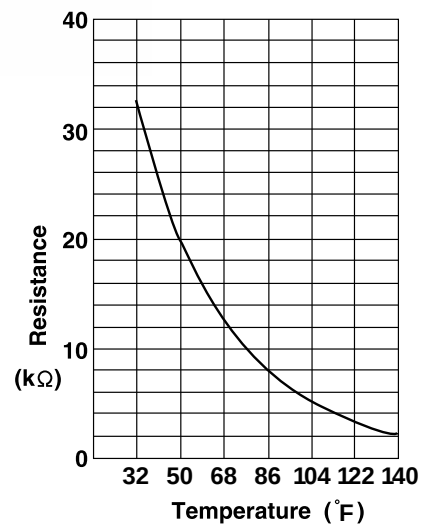
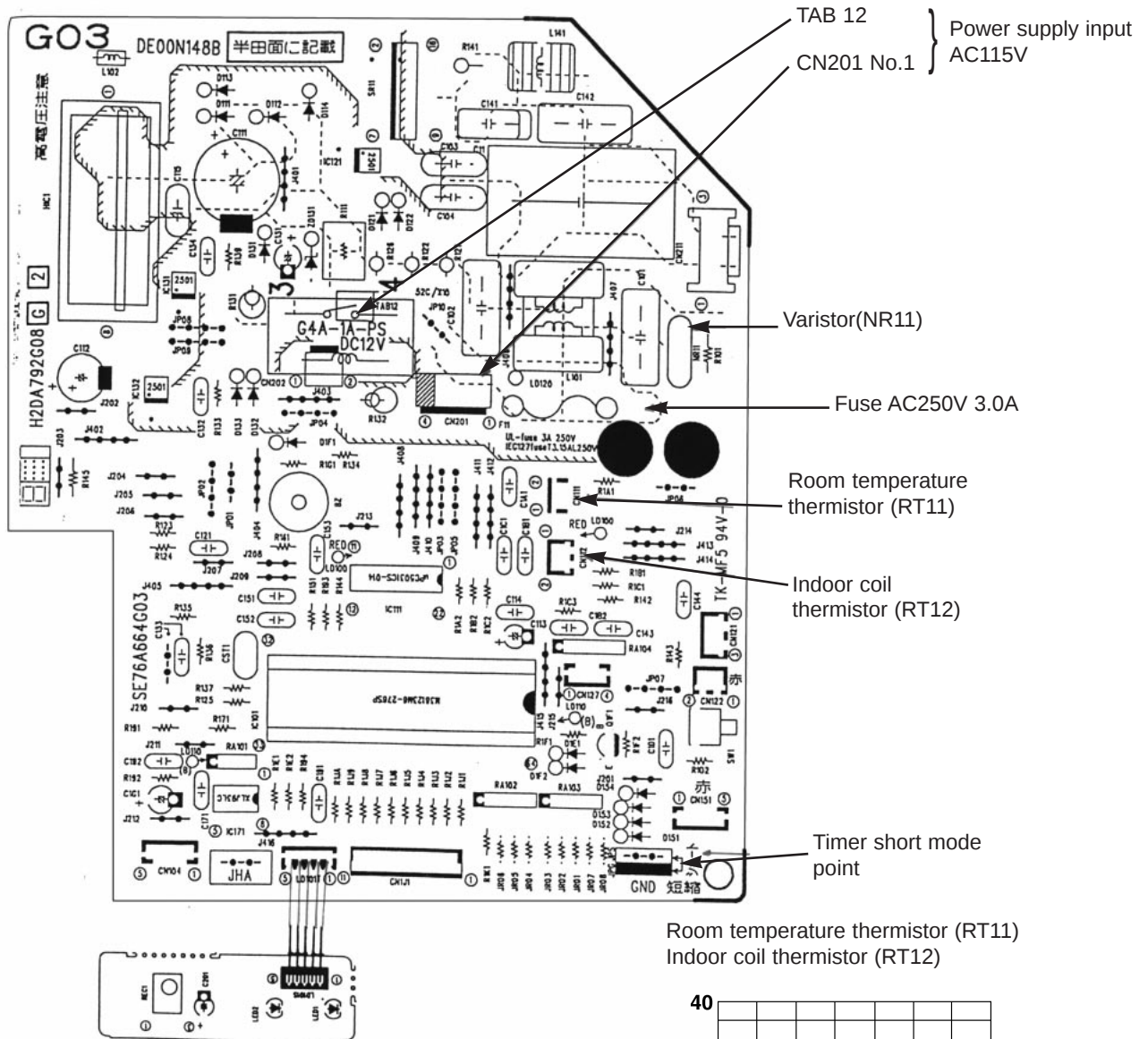


④ Check of outdoor unit

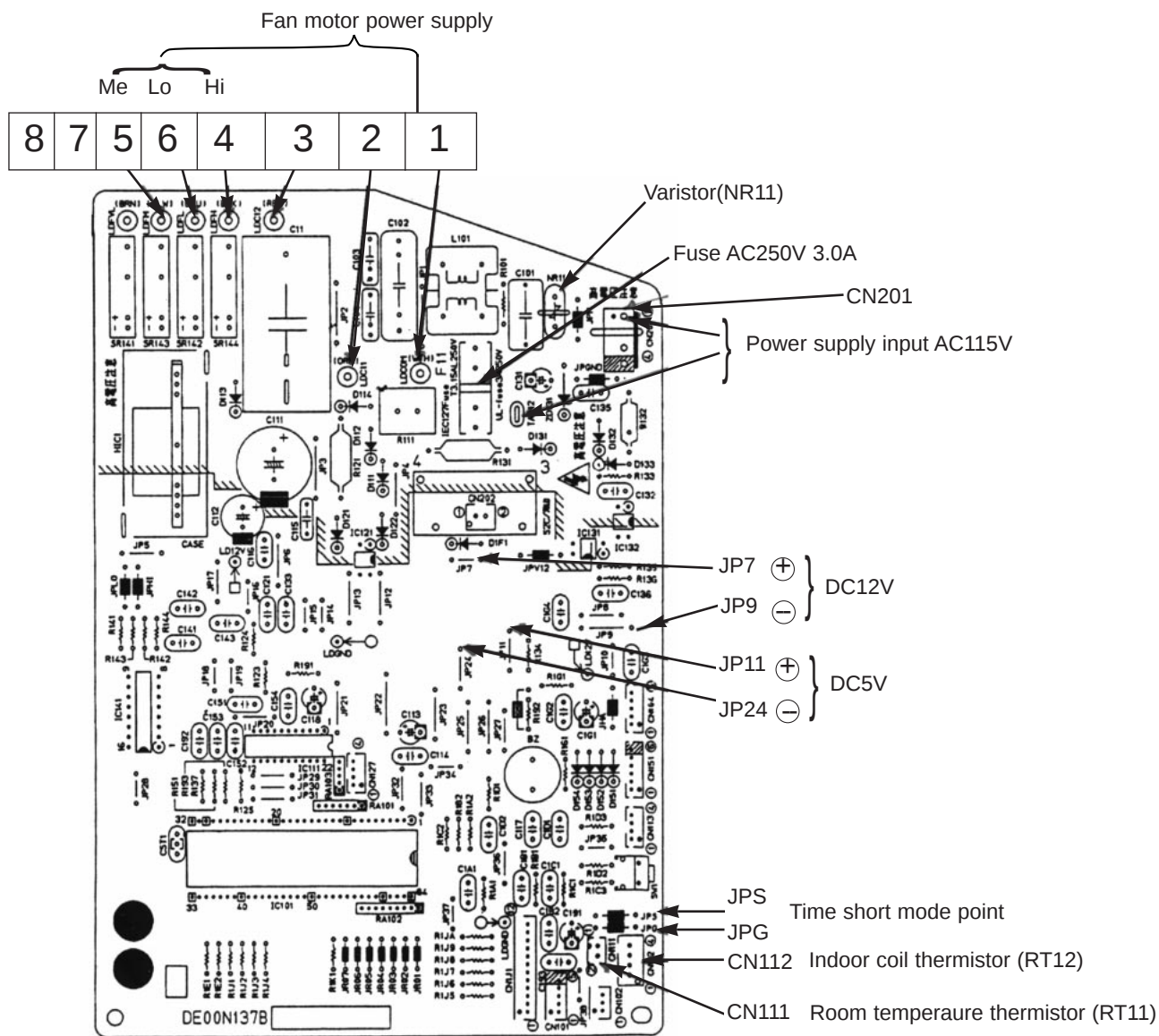
Compressor and outdoor fan do not operate.(Only indoor fan operates.)



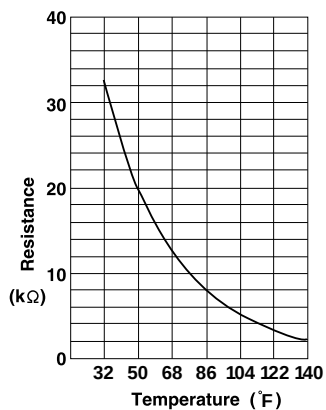
TEST POINT DIAGRAM AND VOLTAGE MS09NW Indoor electronic control P.C. board



TEST POINT DIAGRAM AND VOLTAGE MS12NN, MS15NN, MS17NN Indoor electronic control P.C. board

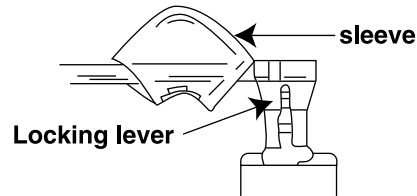


Room temperature thermistor (RT11)
Indoor coil thermistor (RT12)



NOTE:

* on the wiring diagram shows the terminals with a lock mechanism, so it cannot be removed when you pull the lead wire. Be sure to pull the wire by pushing the locking lever (projected part) of the terminal with a finger.

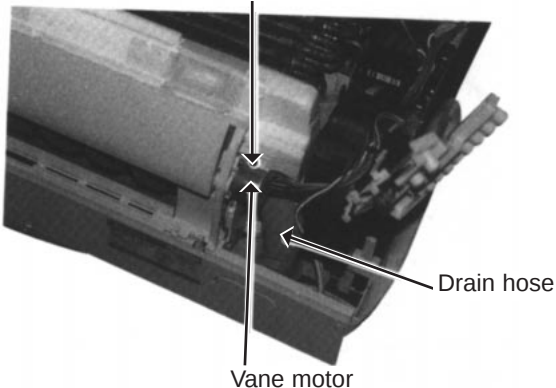
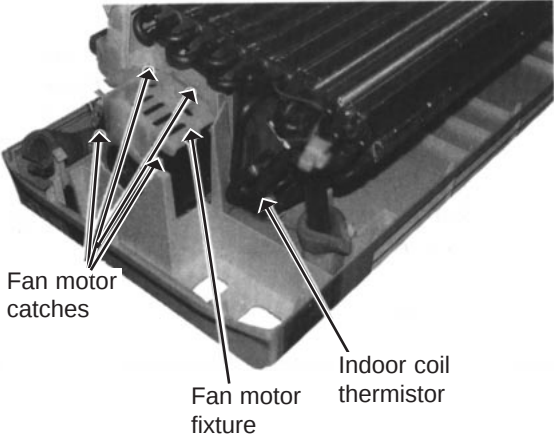


- ① Slide the sleeve.
- ② Pull the wire while pushing the locking lever.

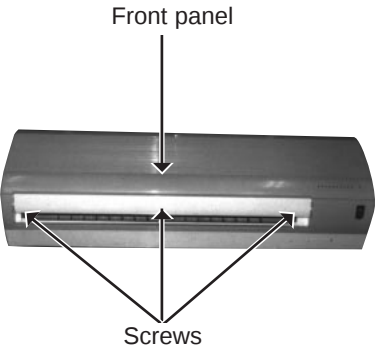
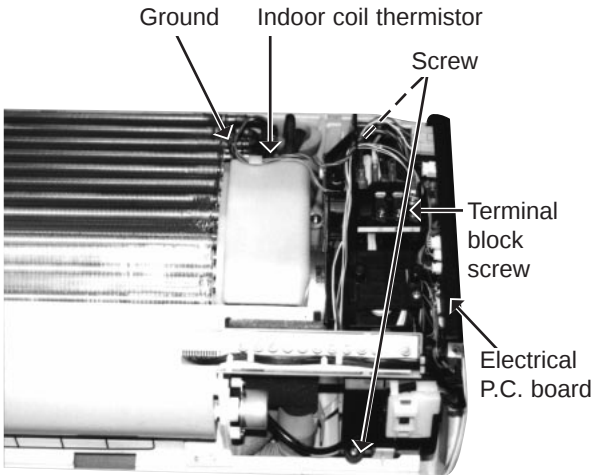
12-1 MS09NW INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screws caps 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 Screw
2. Removing the electronic control P.C. board and the display P.C. board. (1) Remove the front panel. (Refer to 1) (2) Remove the screw of the electrical cover. Remove the electrical cover. (3) Disconnect the room temperature thermistor and the connector from the indoor coil thermistor. (4) Remove the terminal cover. Remove the screw of the terminal block. (5) Disconnect all the connectors on the electronic control P.C. board. (6) Disconnect the white lead wire and the black lead wire from 52C relay. (7) Remove the electronic control P.C. board and the display P.C. board.	Photo 2 Room temperature thermistor connector Indoor electronic control P.C. board Terminal block cover Terminal block cover screw



OPERATING PROCEDURE	PHOTOS
3. Removing the electrical box (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Disconnect the connector of the indoor coil thermistor. (4) Disconnect the motor connector (CN211) and the vane motor connector (CN151) on the electronic control P.C. board. (5) Unhook the catches (both upper and lower), remove the electrical box.	
4. Removing the vane motor (1) Remove the front panel. (2) Remove the screw of the vane motor, disconnect the connector. (3) Remove the vane motor.	Photo 3 
5. Removing the line flow fan and the indoor fan motor (1) Remove the front panel. (Refer to 1) (2) Disconnect the connector from the vane motor. (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly. (4) Lifting the left side of the heat exchanger, remove the electrical box. (5) Remove the fixture of the fan motor. (6) Remove the line flow fan and the fan motor.	Photo 4 

12-2 MS12NN, MS15NN, MS17NN 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 down of the front panel to your side slightly and unhook the catches at the top of the front panel.	Photo 1 
2. Removing the electronic control P.C. board (1) Remove the front panel. (Refer to 1) (2) Remove the screw, remove the electrical cover. (3) Remove the elect cover. (4) Remove the screw on the terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder. (7) Disconnect the connectors and the lead wire from 52C relay on the electronic control P.C. board and remove the ground and the indoor coil thermistor. (8) Remove the electronic P.C. board.	Photo 2 

OPERATING PROCEDURE

3. Removing the indoor fan motor and the line flow fan

- (1) Remove the front panel.
- (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) Remove the motor support.
- (9) Loose the screw fixing the line flow fan, remove the line flow fan.
- (10) Remove the screws of the side cover, remove the fan motor.

PHOTOS

Photo 3

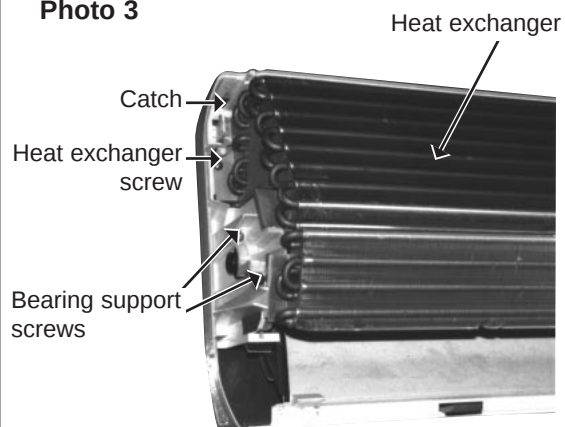
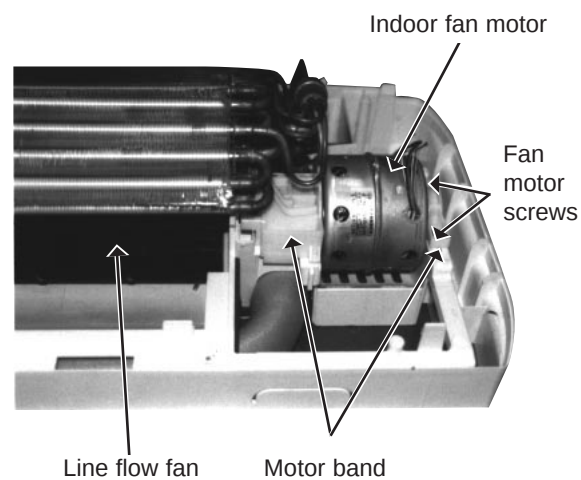
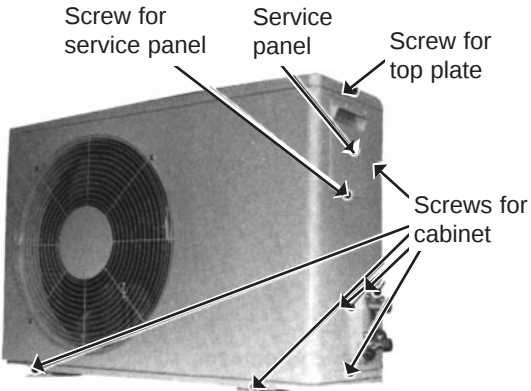
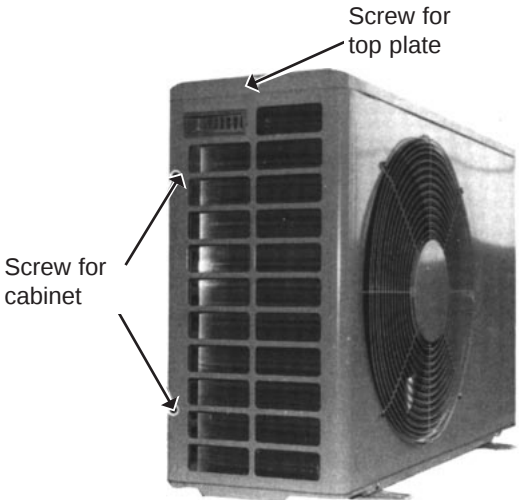
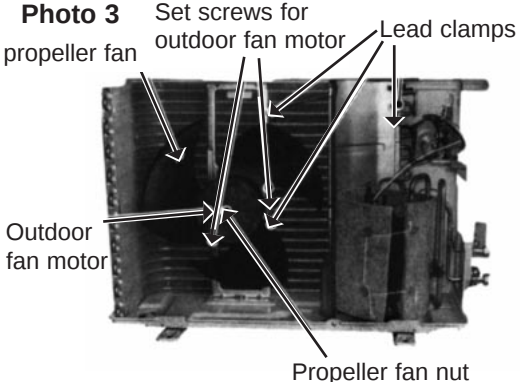


Photo 4



12-3 MU09NW OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove screws securing the top panel. (2) Remove the screw securing the service panel. (3) Remove screws securing the cabinet. (4) Remove the service panel, and remove the screw from the insides. (5) Remove the top panel. (6) Remove the cabinet.	Photo 1  Screw for service panel Service panel Screw for top plate Screws for cabinet Photo 2  Screw for top plate Screw for cabinet
2. Removing the propeller fan and the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Remove the propeller fan nuts. (3) Remove the propeller fan. NOTE: Loosen 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 fan in position by using the cut on the shaft and the mark on the fan. (4) Remove lead clamps and disconnect the outdoor fan motor lead wires. (5) Remove screws fixing the fan motor. (6) Remove the outdoor fan motor.	Photo 3  Set screws for outdoor fan motor Lead clamps propeller fan Outdoor fan motor Propeller fan nut

OPERATING PROCEDURE

3. Removing the compressor

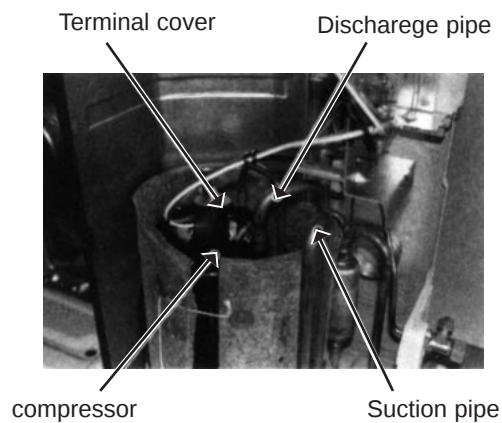
- (1) Remove the lead clamps.
- (2) Remove the screws fixing the relay panel.
- (3) Remove the screw fixing the service port.
- (4) Remove the terminal cover.
- (5) Pull out the lead from the compressor terminal.
- (6) Remove the overcurrent relay.
- (7) Remove the compressor nuts.
- (8) Detach the suction pipe welded section and discharge pipe welded section .

NOTE

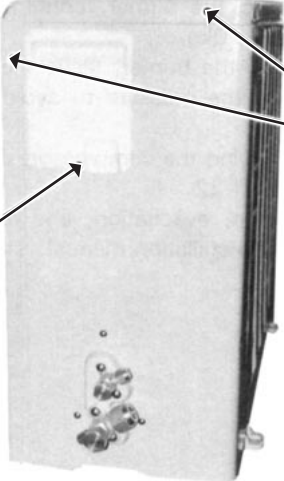
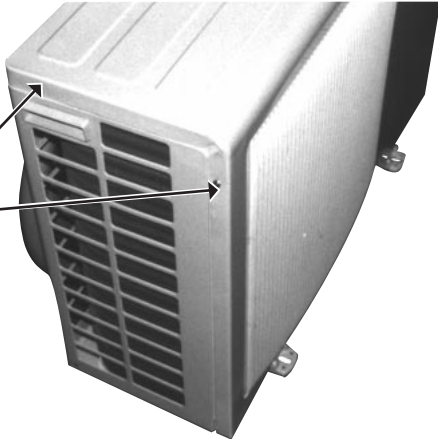
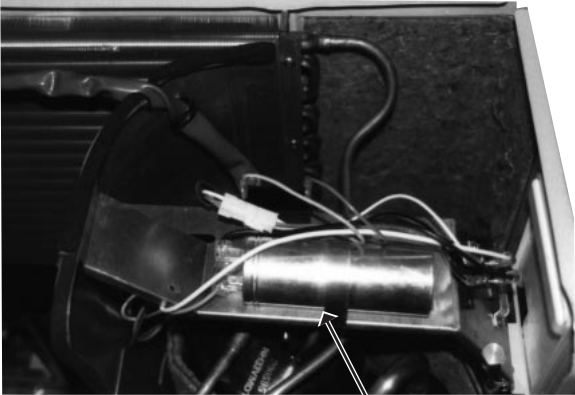
- Before using a torch, reclaim gas from the pipes until the pressure gauge shows 0 PSIG.
- Use the torch under the condition that gas can be released even when the inner pressure rises by heat.
- Reclaim all refrigerant in an environmentally acceptable manner.

PHOTOS

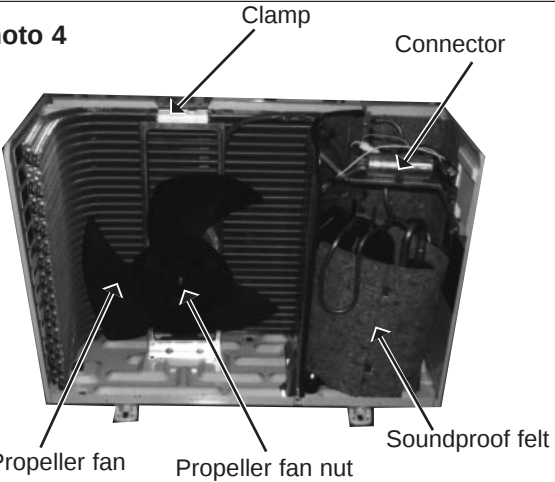
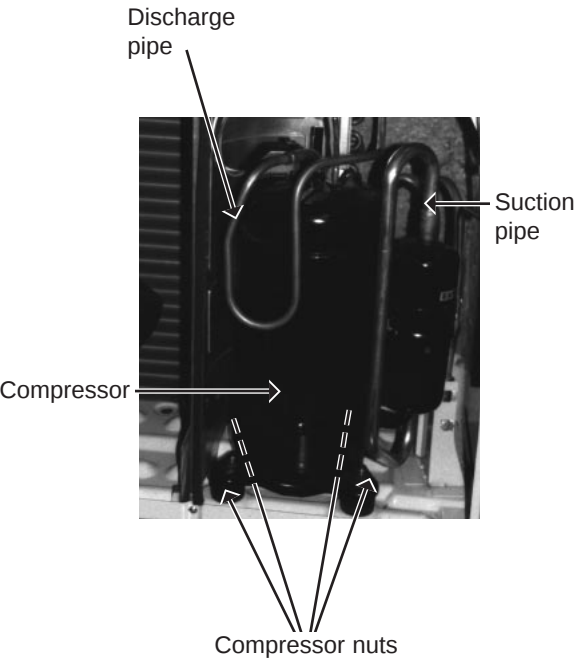
Photo 4



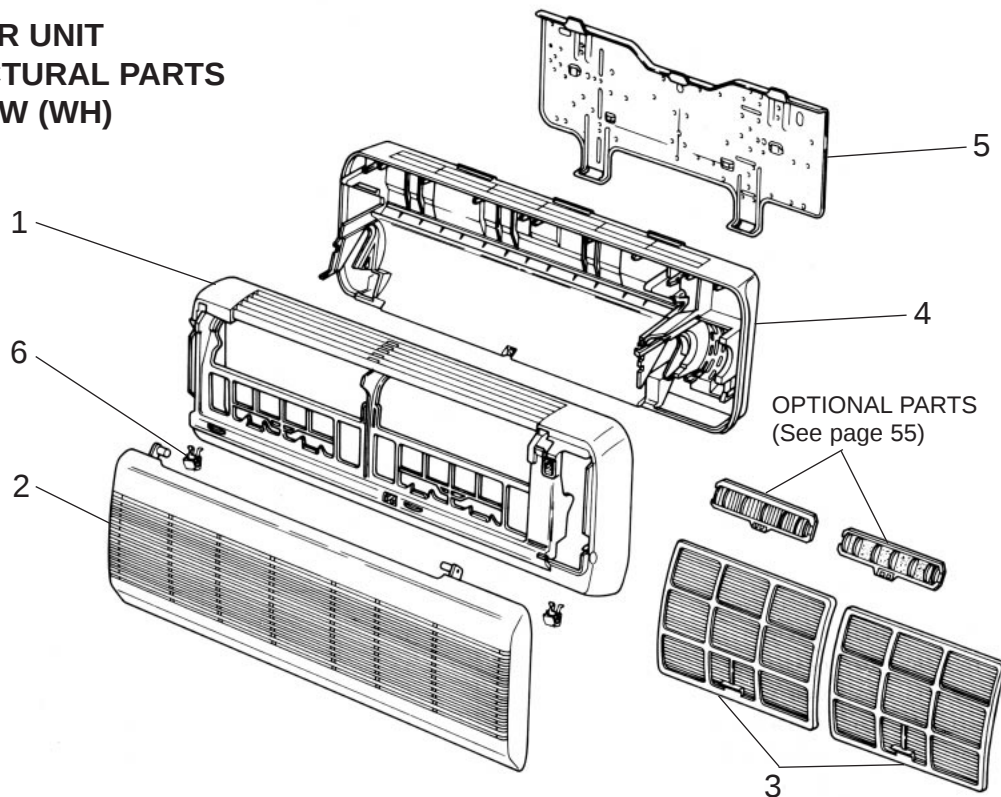
12-4 MU12NN, MU15NN, MU17NN OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the bottom of the cabinet on the both side to remove the cabinet.	Photo 1  Photo 2 
2. Removing the electrical parts (1) Remove the service panel and the cabinet. (2) Remove the following parts. •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block	Photo 3  Compressor capacitor



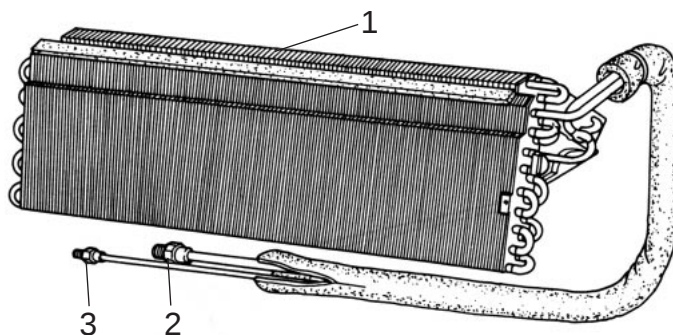
OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Disconnect the connector and remove the clamp of fan motor lead wire. (3) Remove the propeller nut and remove the propeller fan. (4) Remove screws securing the fan motor.	Photo 4  Clamp Connector Propeller fan Propeller fan nut Soundproof felt
4. Removing the compressor (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) Release 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 securing the compressor. (9) Remove the compressor. NOTE ●Reclaim all refrigerant in an environmentally acceptable manner.	Photo 5  Discharge pipe Suction pipe Compressor Compressor nuts

**INDOOR UNIT
STRUCTURAL PARTS
MS09NW (WH)**



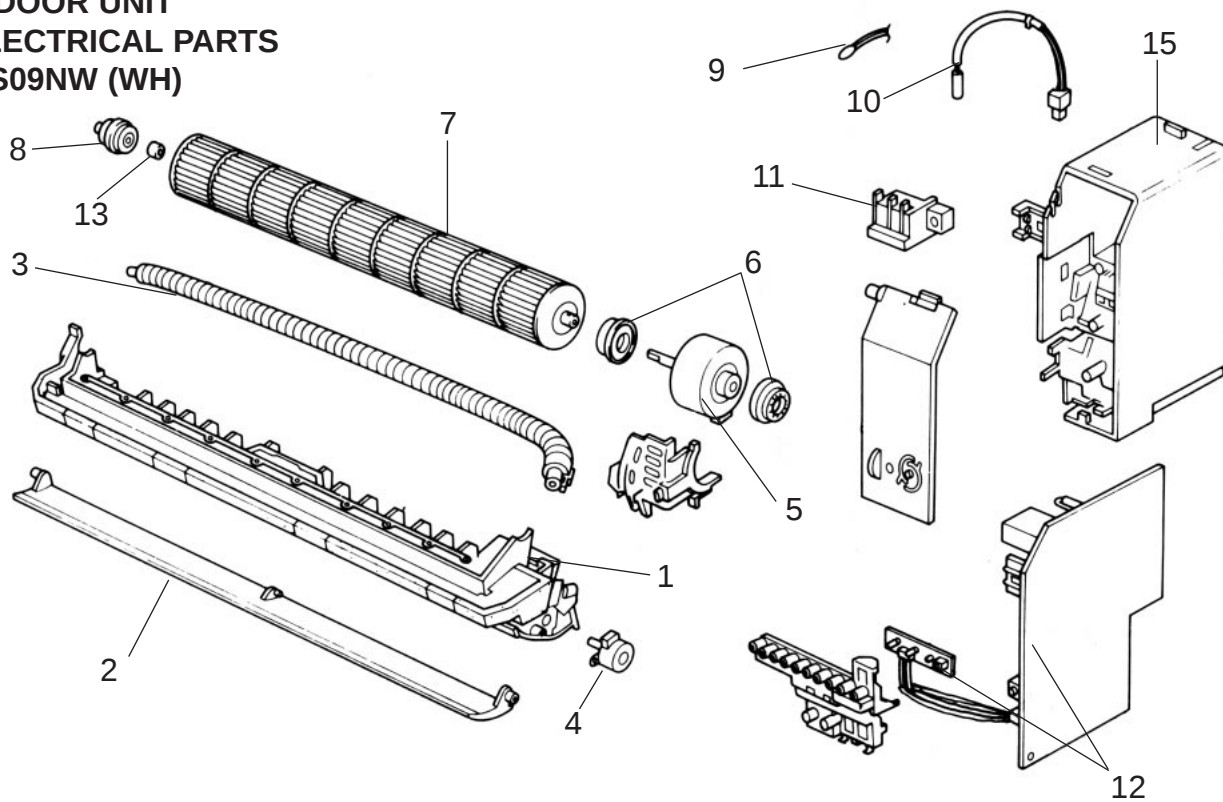
No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks (Drawing No.)
				MS09NW (WH)	
1	E02 268 000	FRONT PANEL(WH)		1	
2	E02 151 010	GRILLE(WH)		1	
3	E02 164 100	AIR FILTER		2	1PC/SET
4	E02 166 234	BOX(WH)		1	
5	E02 151 970	INSTALLATION PLATE		1	
6	E02 166 067	SCREW CAP(WH)		2	2PCS/SET

**INDOOR UNIT
HEAT EXCHANGER
MS09NW (WH)**



No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks (Drawing No.)
				MS09NW (WH)	
1	E02 155 620	INDOOR HEAT EXCHANGER		1	
2	E02 151 666	UNION(GAS)		1	φ3/8
3	E02 151 667	UNION(LIQUID)		1	φ1/4

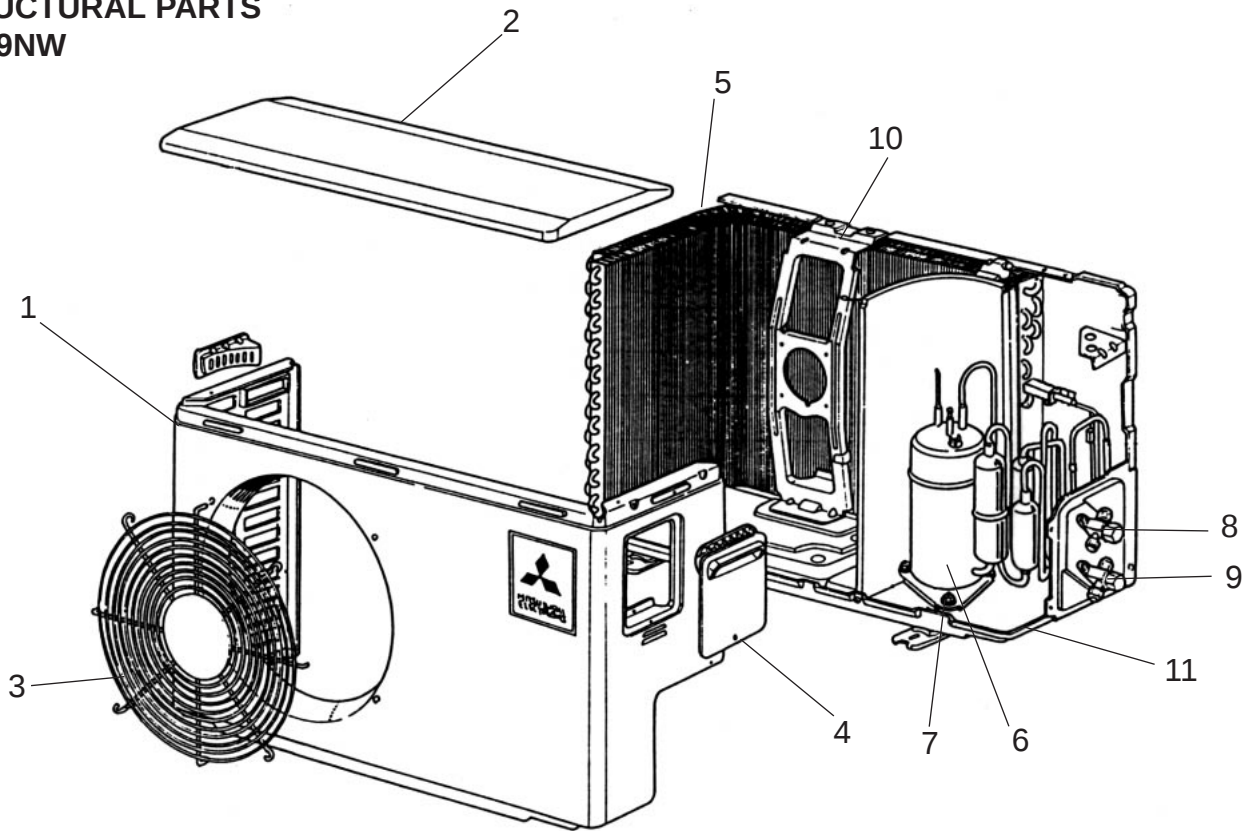
**INDOOR UNIT
ELECTRICAL PARTS
MS09NW (WH)**



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

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks (Drawing No.)
				MS09NW (WH)	
1	E02 199 520	NOZZLE(WH)		1	FAN GUARD
2	E02 166 040	VANE(WH)		1	
3	E02 141 702	DRAIN HOSE		1	
4	E02 151 303	VANE MOTOR	MV	1	
5	E02 268 300	INDOOR FAN MOTOR	MF	1	RC 4W19-□□
6	E02 151 505	RUBBER MOUNT		2	2PCS/SET
7	E02 151 302	LINE FLOW FAN		1	
8	E02 151 509	BEARING MOUNT		1	
9	E02 151 308	ROOM TEMPERATURE THERMISTOR	RT11	1	
10	E02 151 307	INDOOR COIL THERMISTOR	RT12	1	
11	E02 268 375	TERMINAL BLOCK	TB	1	
12	E02 268 450	ELECT CONTROL P.C.BOARD		1	
13	E02 001 504	SLEEVE BEARING		1	
14	E02 268 382	FUSE	F11	1	250V/3.0A
15	E02 164 081	ELECTRICAL BOX		1	
16	E02 268 350	INDOOR FAN CAPACITOR	C11	1	5.0μF / 250VAC
17	E02 268 385	VARISTOR	NR11	1	
18	E02 151 468	RECEIVER		1	
19	E02 268 452	AUTO RESTART		1	

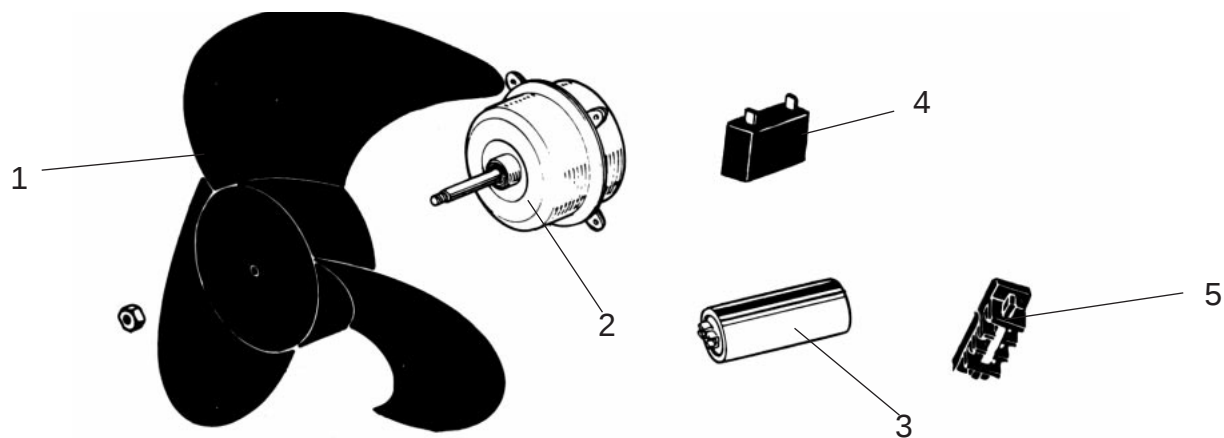
**OUTDOOR UNIT
STRUCTURAL PARTS
MU09NW**



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

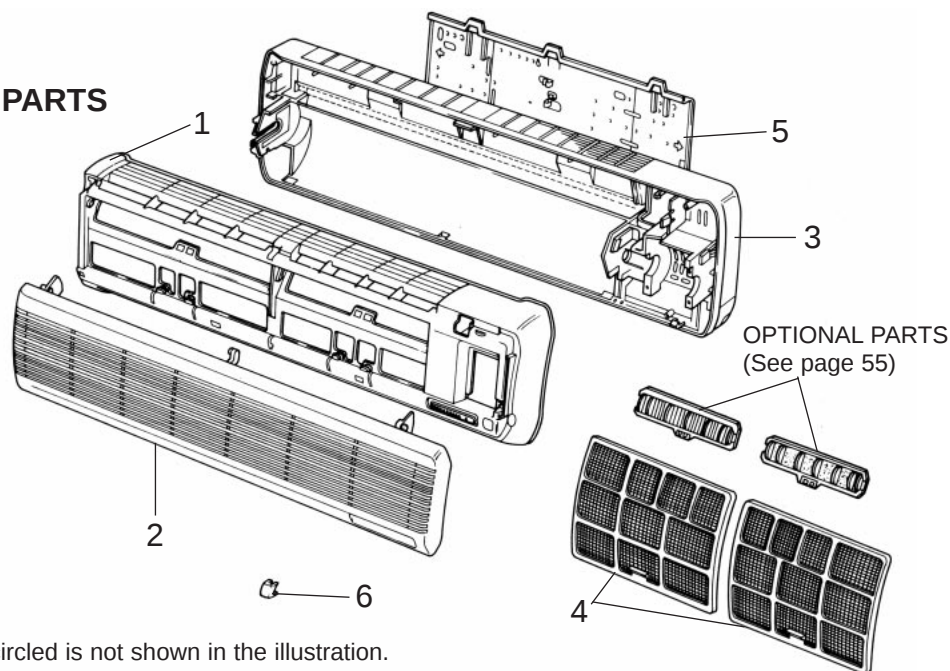
No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks (Drawing No.)
				MU09NW	
1	E02 096 232	CABINET		1	
2	E02 085 297	TOP PANEL		1	
3	E02 085 521	FAN GUARD		1	
4	E02 085 245	SERVICE PANEL		1	
5	E02 085 630	OUTDOOR HEAT EXCHANGER		1	
6	E02 268 900	COMPRESSOR	MC	1	KH122WES
7	E02 268 506	COMPRESSOR RUBBER SET		3	3RUBBER
8	E02 096 662	STOP VALVE(LIQUID)		1	φ 1/4
9	E02 096 661	STOP VALVE(GAS)		1	φ 3/8
10	E02 085 515	MOTOR SUPPORT		1	
11	E02 268 290	BASE		1	
⑫	E02 158 936	CAPILLARY TUBE		1	φ0.12 × φ0.063 × 47-1/4
⑬	E02 097 933	MUFFLER		1	
⑭	E02 124 340	CONTACTOR	52C	1	

OUTDOOR UNIT **FUNCTIONAL PARTS AND ELECTRICAL PARTS** **MU09NW**



No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks (Drawing No.)
				MU09NW	
1	E02 085 501	PROPELLER FAN		1	
2	E02 268 301	OUTDOOR FAN MOTOR	MF	1	RA6W23 - □□
3	E02 268 353	COMPRESSOR CAPACITOR	C1	1	55 μ F/220VAC
4	E02 268 351	OUTDOOR FAN CAPACITOR	C2	1	5.0 μ F/250VAC
5	E02 268 374	TERMINAL BLOCK	TB1	1	

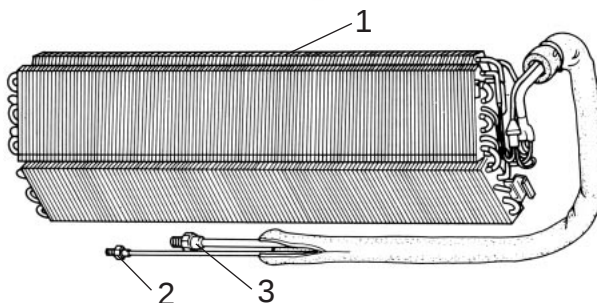
**INDOOR UNIT
STRUCTURAL PARTS
MS12NN (WH)
MS15NN (WH)
MS17NN (WH)**



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

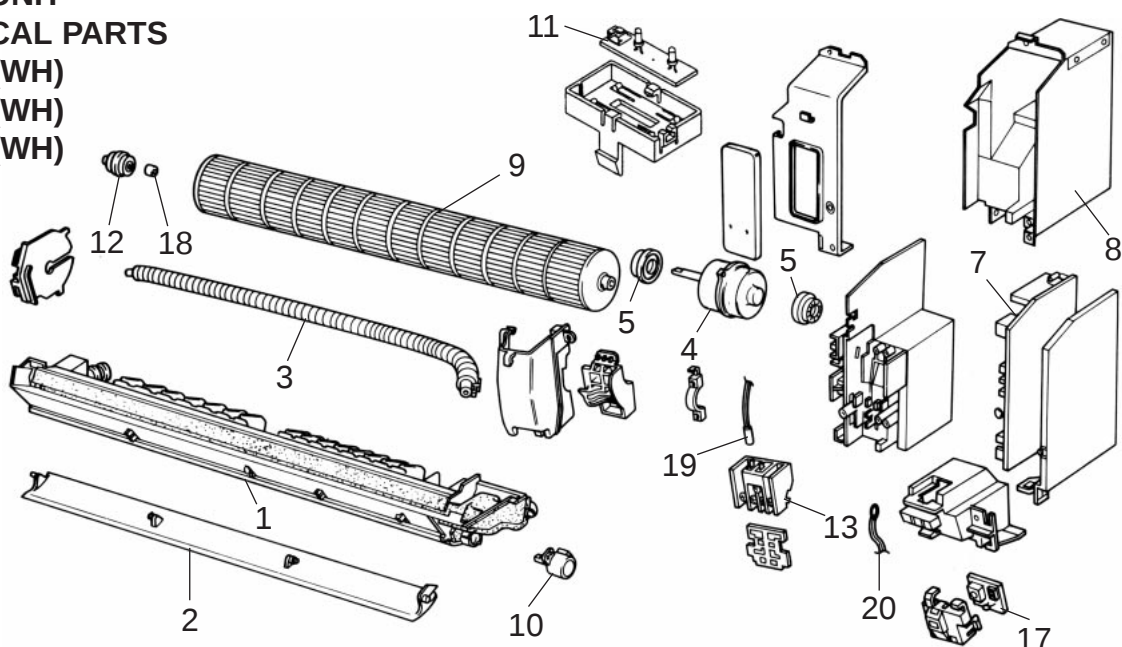
No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set			Remarks (Drawing No.)
				MS			
				12NN(WH)	15NN(WH)	17NN(WH)	
1	E02 270 000	FRONT PANEL(WH)		1			
	E02 271 000	FRONT PANEL(WH)			1		
	E02 272 000	FRONT PANEL(WH)				1	
2	E02 138 010	GRILLE(WH)		1	1	1	
3	E02 143 234	BOX(WH)		1	1	1	
4	E02 141 100	AIR FILTER		2	2	2	1PC/SET
5	E02 141 970	INSTALLATION PLATE		1	1	1	
6	E02 143 067	SCREW CAP(WH)		3	3	3	3PCS/SET
⑦	E02 270 007	LAMP PANEL		1			
	E02 271 007	LAMP PANEL			1		
	E02 272 007	LAMP PANEL				1	

**INDOOR UNIT
HEAT EXCHANGER PARTS
MS12NN (WH)
MS15NN (WH)
MS17NN (WH)**



No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks (Drawing No.)
				MS12NN, MS15NN, MS17NN	
				(WH)	
1	E02 141 620	INDOOR HEAT EXCHANGER		1	
2	E02 138 667	UNION(LIQUID)		1	ϕ1/4
3	E02 138 666	UNION(GAS)		1	ϕ5/8

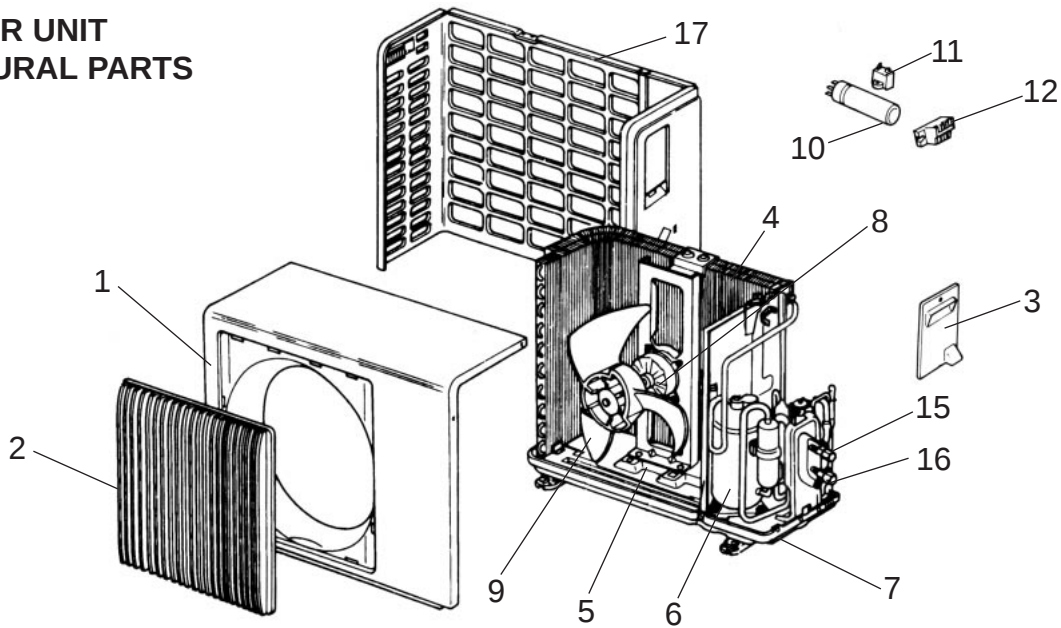
**INDOOR UNIT
ELECTRICAL PARTS
MS12NN (WH)
MS15NN (WH)
MS17NN (WH)**



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

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set			Remarks (Drawing No.)
				MS			
				12NN(WH)	15NN(WH)	17NN(WH)	
1	E02 138 520	NOZZLE(WH)		1	1	1	FAN GUARD
2	E02 143 040	VANE(WH)		1	1	1	
3	E02 141 702	DRAIN HOSE		1	1	1	
4	E02 270 300	INDOOR FAN MOTOR	MF	1	1		RA4W18 - □□
	E02 272 300	INDOOR FAN MOTOR	MF			1	RA4W23 - □□
5	E02 001 505	RUBBER MOUNT		2	2	2	2PCS/SET
⑥	E02 268 452	AUTO RESTART		1	1	1	
7	E02 270 450	ELECTRONIC CONTROL P.C. BOARD		1			
	E02 271 450	ELECTRONIC CONTROL P.C. BOARD			1		
	E02 272 450	ELECTRONIC CONTROL P.C. BOARD				1	
8	E02 270 081	ELECTRICAL BOX		1	1	1	
9	E02 141 302	LINE FLOW FAN		1	1	1	
10	E02 141 303	VANE MOTOR	MV	1	1	1	
11	E02 138 329	DISPLAY P.C. BOARD		1	1	1	
12	E02 141 509	BEARING MOUNT		1	1	1	
13	E02 268 375	TERMINAL BLOCK	TB	1	1	1	
⑭	E02 268 385	VARISTOR	NR11	1	1	1	
⑮	E02 270 350	INDOOR FAN CAPACITOR	C11	1	1	1	6.0μF/250V
⑯	E02 268 382	FUSE	F11	1	1	1	250V 3.0A
17	E02 141 468	RECEIVER P. C. BOARD		1	1	1	
18	E02 001 504	SLEEVE BEARING		1	1	1	
19	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	1	1	
20	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	

**OUTDOOR UNIT
STRUCTURAL PARTS
MU12NN
MU15NN
MU17NN**



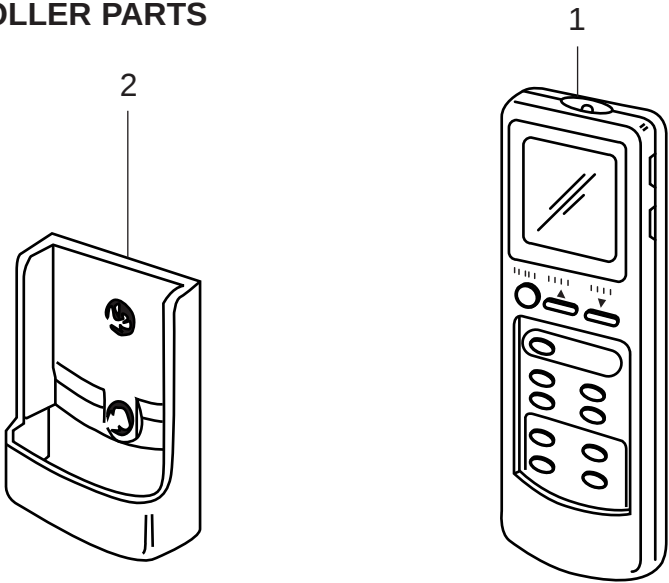
Part numbers that are circled are not shown in the illustration.

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set			Remarks (Drawing No.)
				MU			
				12NN	15NN	17NN	
1	E02 141 232	CABINET		1	1	1	
2	E02 141 521	GRILLE		1	1	1	
3	E02 270 245	SERVICE PANEL		1	1	1	
4	E02 138 630	OUTDOOR HEAT EXCHANGER		1	1		
	E02 147 630	OUTDOOR HEAT EXCHANGER				1	
5	E02 138 515	MOTOR SUPPORT		1	1		
	E02 139 515	MOTOR SUPPORT				1	
6	E02 270 900	COMPRESSOR	MC	1			RH167NHDT
	E02 271 900	COMPRESSOR	MC		1		RH207NHDT
	E02 272 900	COMPRESSOR	MC			1	RH231NHDT
7	E02 270 290	BASE		1	1		
	E02 156 290	BASE				1	
8	E02 270 301	OUTDOOR FAN MOTOR	MF	1	1	1	
9	E02 141 501	PROPELLER FAN		1	1	1	
10	E02 270 353	COMPRESSOR CAPACITOR	C1	1			25μF/370V
	E02 271 353	COMPRESSOR CAPACITOR			1		30μF/370V
	E02 272 353	COMPRESSOR CAPACITOR				1	35μF/370V
11	E02 270 351	OUTDOOR FAN CAPACITOR	C2	1	1	1	3.0μF/440V
12	E02 270 374	TERMINAL BLOCK	TB	1	1	1	
⑬	E02 140 936	CAPILLARY TUBE		1			ϕ0.12 × ϕ0.071 × 31-1/2
	E02 176 936	CAPILLARY TUBE				1	ϕ0.12 × ϕ0.079 × 27-9/16
	E02 077 937	CAPILLARY TUBE			1		ϕ0.12 × ϕ0.071× 21-5/8
⑭	E02 075 506	COMPRESSOR RUBBER SET		3	3	3	3RUBBER
15	E02 139 662	STOP VALVE(LIQUID)		1	1	1	ϕ1/4
16	E02 150 661	STOP VALVE(GAS)		1	1	1	ϕ5/8
17	E02 270 233	BACK PANEL		1	1	1	
⑮	E02 096 932	ACCUMULATOR		1	1	1	
⑯	E02 138 340	CONTACTOR	52C	1	1	1	



ACCESSORY AND REMOTE CONTROLLER PARTS

- MS09NW (WH)
- MS12NN (WH)
- MS15NN (WH)
- MS17NN (WH)

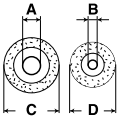
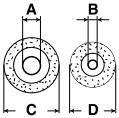


No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set	Remarks (Drawing No.)
				MS09NW, MS12NN MS15NN, MS17NN	
				(WH)	
1	E02 268 426	REMOTE CONTROLLER		1	
2	E02 141 083	REMOTE CONTROLLER HOLDER		1	

1. REFRIGERANT PIPES

The air conditioner has flared connections its on indoor and outdoor sides.

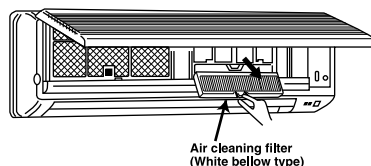
Please use the optional extension pipe as follows.

Model	Part No.	Pipe length	Pipe size O.D				Additional refrigerant charge R-22(Oz)
			Cross-section	A-Gas	B-Liquid	Insulation	
MS09NW	MAC - 440PI	10ft		3/8	1/4	C 13/16 D 1-1/16	0
	MAC - 441PI	16ft					1
	MAC - 442PI	23ft				C 1-7/32 D 1-1/16	0
	MAC - 443PI	33ft					1
MS12NN	MAC - 670PI	10ft		5/8	1/4	C 1-7/32 D 1-1/16	0
MS15NN	MAC - 671PI	16ft					1
MS17NN	MAC - 672PI	23ft					3
	MAC - 673PI	33ft					
	MAC - 674PI	49ft					

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 3 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.

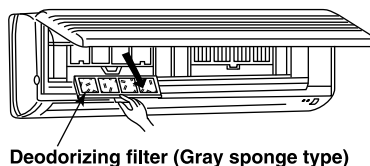
Part No.	Model
MAC-1000FT	MS09NW
MAC-1100FT	MS12NN,MS15NN,MS17NN



3. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odors 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.

Part No.	Model
MAC-1500DF	MS09NW
MAC-1600DF	MS12NN,MS15NN,MS17NN



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

Mr.SLIM

 **mitsubishi electric corporation**



MITSUBISHI ELECTRIC

HVAC Advanced Products Division

3400 Lawrenceville Suwanee Road • Suwanee, Georgia 30024
Toll Free: 800-433-4822 • Toll Free Fax: 800-889-9904
www.mrslim.com

Specifications are subject to change without notice.