



SPLIT-TYPE AIR CONDITIONERS

Revision:

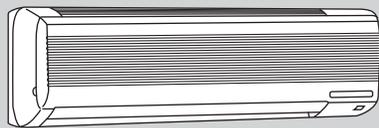
- MS09NW2, MS12NN2, MS15NN2 and MS17NN2 has been added.
- Parts List has been partially modified.
- Please void OB192 REVISED EDITION -A.

No. OB192
REVISED EDITION -B

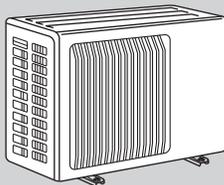
SERVICE MANUAL

Wireless type Models

- | | | |
|--------------------|------------------|-----------------|
| MS09NW (W) | ▪ MU09NW | MUM30NN |
| MS12NN (W) | ▪ MU12NN | MUM30NN2 |
| MS15NN (W) | ▪ MU15NN | |
| MS17NN (W) | ▪ MU17NN | |
| MS09NW2 (W) | ▪ MU09NW2 | |
| MS12NN2 (W) | ▪ MU12NN2 | |
| MS15NN2 (W) | ▪ MU15NN2 | |
| MS17NN2 (W) | ▪ MU17NN2 | |



MS12NN MS12NN2
MS15NN MS15NN2
MS17NN MS17NN2
INDOOR UNIT



MU12NN MU12NN2
MU15NN MU15NN2
MU17NN MU17NN2
OUTDOOR UNIT

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



The Slim Line.
From Mitsubishi Electric.



Mr. SLIM

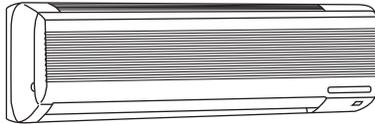
Revision:

●The following parts numbers have been modified.

1. OUTDOOR P.C. BOARD of MUM30NN (T2W 800 451 → T2W E46 451)
2. SURGE KILLER of MUM30NN (T2W E64 410 has been added)
3. CAPILLARY TUBE (for 09A, 09B) of MUM30NN (M21 463 936 → M21 195 936) (See REFRIGERANT SYSTEM)
4. CAPILLARY TUBE (for 15C) of MUM30NN (M21 987 936 → M21 G46 936) (See REFRIGERANT SYSTEM)
5. CAPILLARY TUBE (for 09A, 09B) of MUM30NN2 (M21 463 936 → M21 AP9 936) (See REFRIGERANT SYSTEM)
6. CAPILLARY TUBE (for 15C) of MUM30NN2 (M21 987 936 → M21 G46 936) (See REFRIGERANT SYSTEM)
7. HIGH PRESSURE SWITCH of MUM30NN2 (Q'ty/unit 1 → 3)
8. MC1. MC2. CAPACITOR of MUM30NN2 (T2W 738 353 → T2W 903 353)

●Please void OB192REVISED EDITION -B.

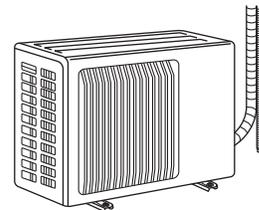
1 FEATURES



MS12NN MS15NN MS17NN
MS12NN2 MS15NN2 MS17NN2



LCD wireless
remote controller



MU12NN MU15NN MU17NN
MU12NN2 MU15NN2 MU17NN2

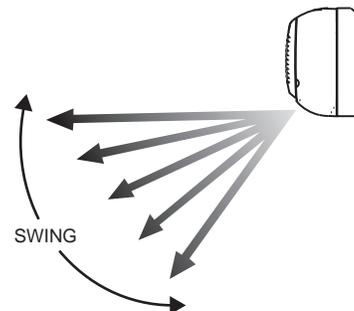
Models	Cooling capacity	SEER
MS09NW MS09NW2	8,500Btu/h	10.2
MS12NN MS12NN2	12,300/12,600Btu/h	11.3/11.3
MS15NN MS15NN2	14,300/14,600Btu/h	10.5/10.5
MS17NN MS17NN2	15,900/16,100Btu/h	10.2/10.2

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 redesigned and easier to handle than before.

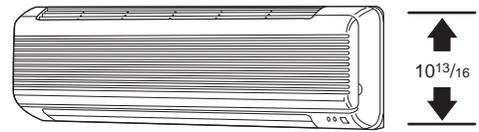
**Select desired air flow direction.
REMOTE-CONTROL OPERATION MODE**

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, MS09 is $10^{13/16} \times 32^{1/16} \times 7^{3/16}$ (H x W x D), which used to be $14^{3/16} \times 31^{1/8} \times 5^{3/8}$.



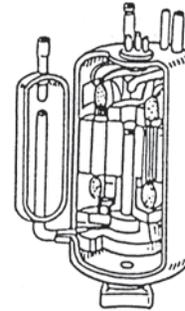
MS09NW MS09NW2

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.

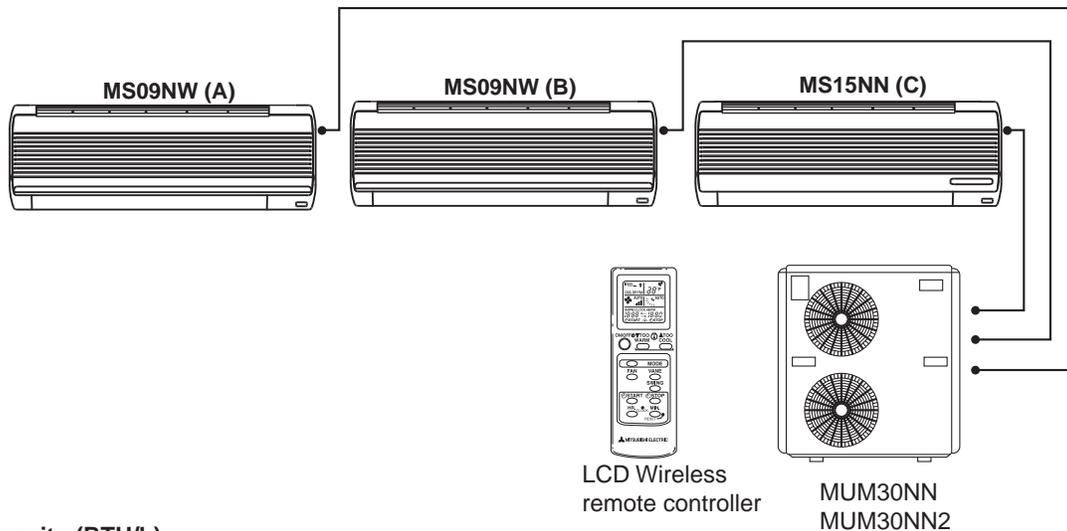
HIGH PERFORMANCE ROTARY COMPRESSOR

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



MSM30NN MSM30NN2

This "3 to 1" Multi system (MSM30NN / MSM30NN2) consists of a single outdoor unit with three compressors that permit up to three indoor units to be installed separate rooms, each with its own controller.



Cooling Capacity (BTU/h)

Operation \ Indoor unit	MS09NW	MS09NW	MS15NN
1 Indoor Unit Operation	8,200	—	—
	—	8,200	—
	—	—	12,400
2 Indoor Unit Operation	8,200	8,200	—
	8,200	—	12,400
	—	8,200	12,400
3 Indoor Unit Operation	8,100	8,100	12,200

SPACE-SAVING LAYOUT

Two or three indoor units are served by a single outdoor unit whose installation requires only minimum space. This allows equipment installed outside the house to be arranged in a neat, space-saving layout.

FLEXIBLE INSTALLATION OF INDOOR UNITS

Each indoor unit can be connected to piping up to 65 feet in length, providing plenty of freedom in determining the best locations for installation.

MS09EW → MS09NW

1. Indoor unit has been 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)
2. Outdoor unit has been 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.)
3. Remote controller has been changed. (The timer function was changed to the clock timer function.)
4. Indoor auto vane has been adopted.

MS12EN, MS15EN → MS12NN, MS15NN

1. Indoor unit has been 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))
2. Outdoor unit has been 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.)
3. Remote controller has been changed. (The timer function was changed to the clock timer function.)
4. The swing mode has been added to indoor auto vane.

MSM30EN2 → MSM30NN

1. Indoor unit has been changed.
2. Outdoor unit has been changed.
3. Remote controller has been changed. (The timer function was changed to the clock timer function.)
4. The swing mode has been added to indoor auto vane.
5. Outdoor unit fan speed control has been changed.(MF1/MF2 : 1.Lo/Lo→Stop/Hi 2.Me/Me→Me/Me 3.Hi/Hi→Hi/Hi)
6. The relay "X64" has been added to electric circuit.
7. Surge absorber has been added to electric circuit.

MSM30NN → MSM30NN2

1. Outdoor unit has changed.
2. Compressor has changed. (Compressor A,B: KH122WEV→KH122WES)
3. Outdoor unit fan speed control has changed.(MF1/MF2 : 1.Stop/Hi→Lo/Lo 2.Me/Me→Lo/Lo 3.Hi/Hi→Hi/Hi)
4. Wiring diagram has been changed.
5. Capillary tube has been changed.
6. Accumulator has been enlarged.(Refrigerant cycle A and B)
7. High-pressure switch has been added.
8. Outdoor unit heat exchanger has changed.

MS09NW → MS09NW2**MS12NN MS15NN MS17NN → MS12NN2 MS15NN2 MS17NN2**

1. Power supplied way has changed from "supply to both indoor and outdoor" to "supply to only outdoor". ("Supply to both indoor and outdoor" as before is also possible.)
2. Remote controller has changed.
(•The timer function has changed from program timer to ON/OFF timer.
NW/NN system can be used ON and OFF timer in combination.
In NW2/NN2 systems, either ON or OFF is available at a time.
•SWING button is removed, but SWING MODE function is available by VANE CONTROL button.)
3. The number of conduit holes on the outdoor unit has changed from 2 to 3.

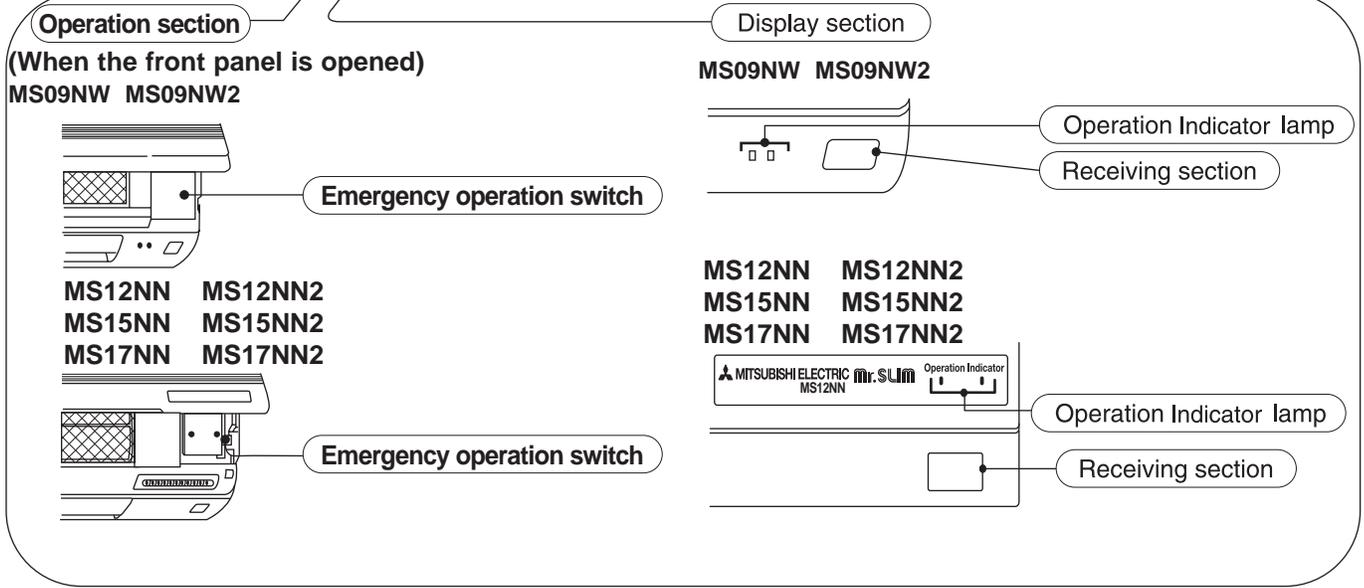
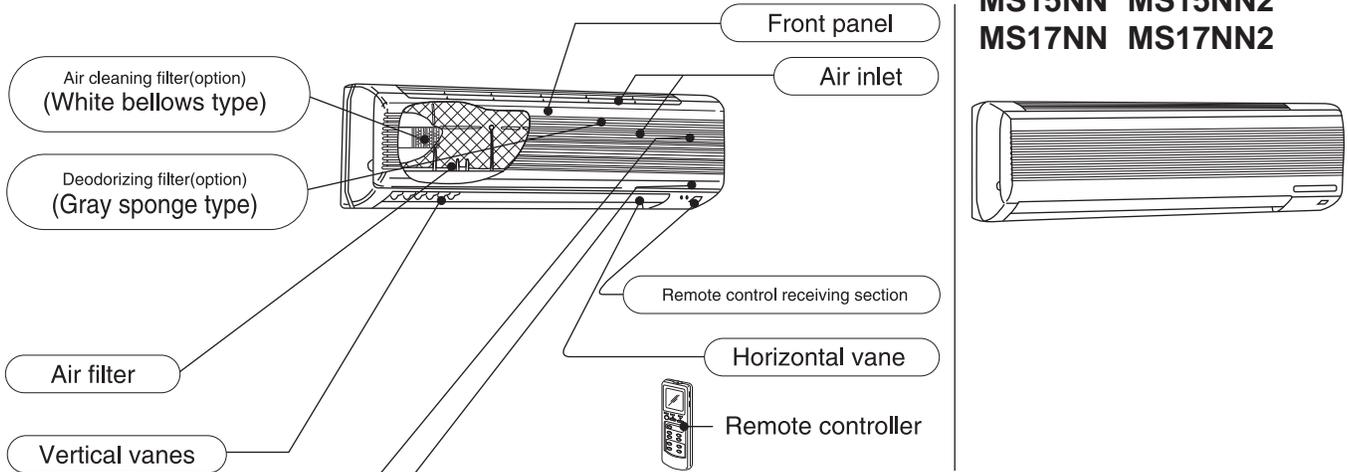
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PART NAMES AND FUNCTIONS

INDOOR UNIT

MS09NW MS09NW2

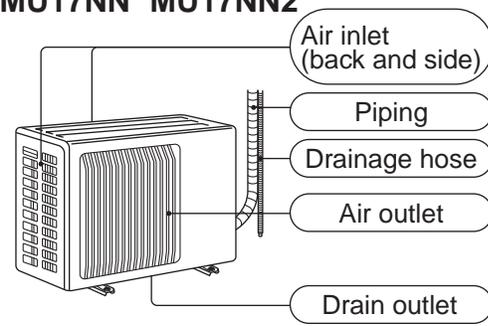
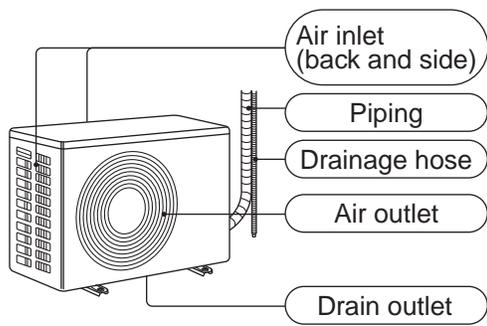
MS12NN MS12NN2
MS15NN MS15NN2
MS17NN MS17NN2



OUTDOOR UNIT

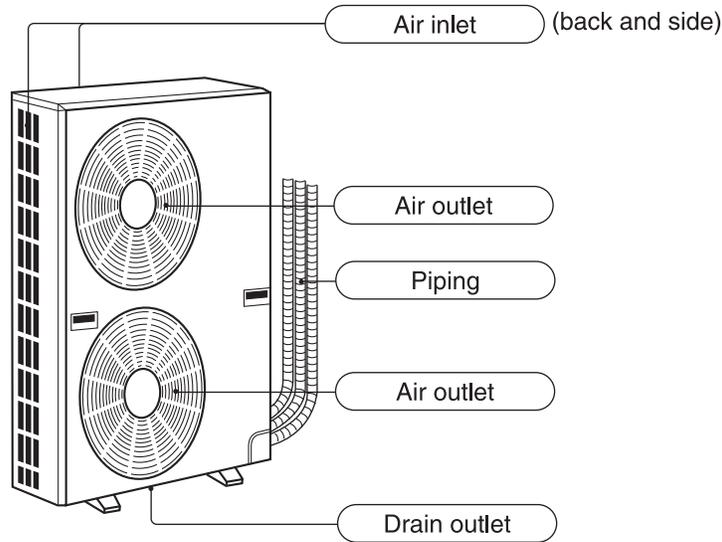
MU09NW MU09NW2

MU12NN MU12NN2
MU15NN MU15NN2
MU17NN MU17NN2



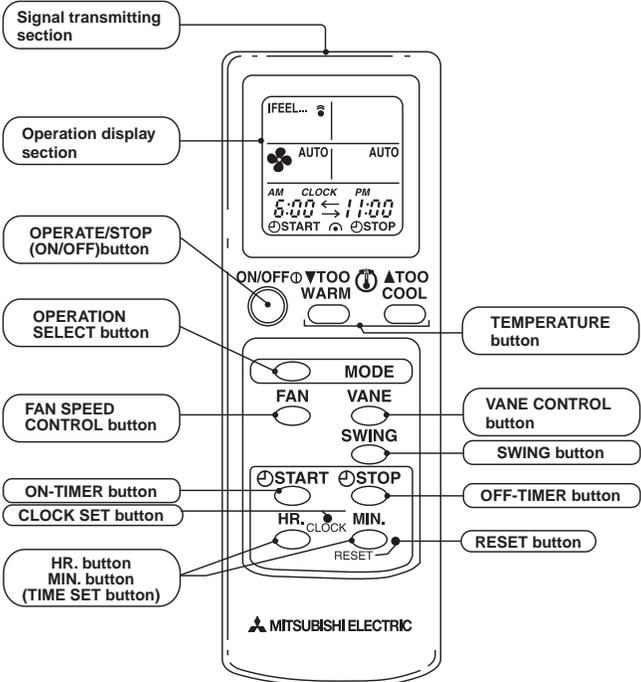
MUM30NN MUM30NN2

OUTDOOR UNIT



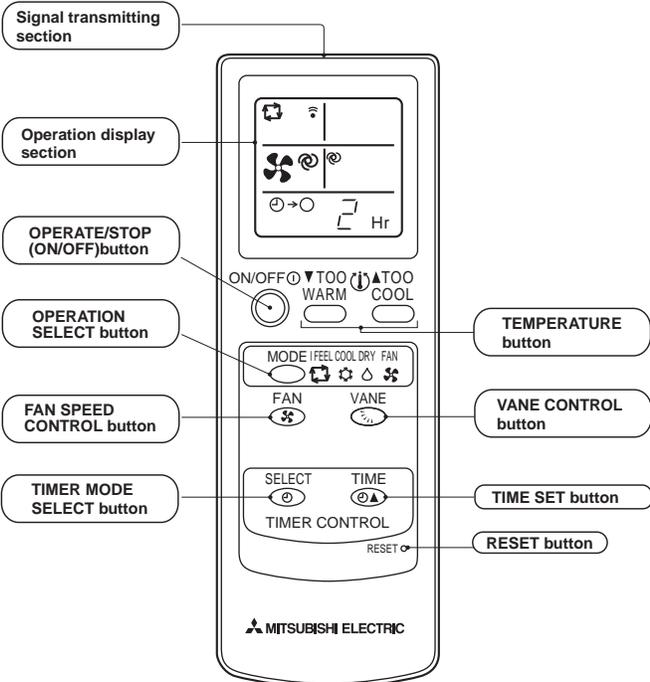
MS09NW MS12NN MS15NN MS17NN

REMOTE CONTROLLER



MS09NW2 MS12NN2 MS15NN2 MS17NN2

REMOTE CONTROLLER



4

SPECIFICATIONS

When MS09NW indoor unit is operating with MUM18NW, MUM30NN and MUM30NN2 outdoor unit connected.
(Please refer to the manual No.OB202 for MUM18NW.)

ITEM		MODELS	MS09NW	MS09NW2	MS12NN	MS12NN2
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	MS09NW2	MS12NN	MS12NN2
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			
OUTDOOR UNIT MODEL			MU09NW	MU09NW2	MU12NN	MU12NN2
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			
Refrigerant filling capacity (R-22)		lbs	2 lbs 2 oz		2 lbs 14 oz	
Refrigerant oil (Model)		cc	270 (MS56)		520 (MS56)	

Notes ※1 : Test conditions are based on ARI 210/240

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

Operating Range

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

When MS15NN indoor unit is operating with MUM30NN and MUM30NN2 outdoor unit connected.
 (Please refer to the manual No.OB202 for MUM18NW.)

Item		Model	MS15NN	MS15NN2	MS17NN	MS17NN2
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	MS15NN2	MS17NN	MS17NN2
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	MU15NN2	MU17NN	MU17NN2
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			
Refrigerant filling capacity (R-22)		lbs	2 lbs 14 oz		3 lbs	
Refrigerant oil (Model)		cc	520 (MS56)		520 (MS56)	

Notes *1 : Test conditions are based on ARI 210/240

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



Items	Model	MSM30NN				
		Triple-Unit	Double-Unit		Single-Unit	
		A+B+C	A+B	A+C or B+C	A or B	C
Cooling capacity	*1 BTU/h	28,400	16,400	20,600	8,200	12,400
Power consumption	*1 W	2,990	1,860	2,060	990	1,220
EER (Triple unit operation)		9.5				
SEER (Triple unit operation)		10.0				

		A	B	C
		MS09NW	MS09NW	MS15NN
INDOOR UNIT MODEL				
External finish		White		
Power Supply V, Hz, Phase		115,60,1		
Max. fuse size (time delay) A		15.0		
Min. ampacity		0.5	0.5	0.6
Fan motor F.L.A		0.37	0.37	0.43
Airflow	Dry CFM	208-265-328	208-265-328	360-395-452
Lo-Me-Hi	Wet CFM	177-226-279	177-226-279	314-342-392
Moisture removal (Pints/h)		2.1	2.1	3.2
Sound level dB (A)		42	42	42
Cond. drain connection OD in.		5/8	5/8	5/8
Dimensions	W in.	32-1/16	32-1/16	39-15/16
	D in.	7-3/16	7-3/16	7-1/2
	H in.	10-13/16	10-13/16	12-5/8
Weight lbs.		18	18	31
OUTDOOR UNIT MODEL		MUM30NN		
External finish		Munsell 5Y 7/1		
Sound level dB (A)		Max. 57		
Power supply V, Hz, Phase		208/230,60,1(3-wire)		
Max. fuse size (time delay) A		30		
Min. ampacity		25		
Fan motor F.L.A		0.8+0.7		
Compressor	Model	KH122WEV<115V>		RH167NAB<208/230V>
	Winding resistance (at 68°F) Ω	C-R 0.97 C-S 4.81		C-R 2.47 C-S 4.62
	R.L.A	10		8
	L.R.A	37		29
Refrigerant control		Capillary tube		
Dimensions	W in.	37-7-16		
	D in.	15-3/8		
	H in.	45-5/16		
Weight lbs.		240		
REMOTE CONTROLLER		Wireless type		
Control voltage (be built-in transformer)		DC12V		
REFRIGERANT PIPING		Not supplied (optional parts)		
Pipe size	Liquid in.	1/4		1/4
	Gas in.	3/8		5/8
Connection method	Indoors	Flared		Flared
	Outdoors	Flared		Flared
Between the indoor & outdoor units	Height difference ft	Max. 25		Max. 25
	Piping length ft	Max. 65		Max. 65
Refrigerant filling capacity (R-22) lbs.		3 lbs 3 oz		3 lbs 8 oz
Refrigerant oil (Model) cc		270 (MS56)		520 (MS56)

Notes *1. Test conditions are based on ARI 210/240
 Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, 75°FWB

Operating Range

		Indoor air intake temperature	Outdoor air intake temperature
Cooling	Maximum	90°FDB,71°FWB	115°FDB
	Maximum	67°FDB,57°FWB	67°FDB



Items	Model	MSM30NN2				
		Triple-Unit	Double-Unit		Single-Unit	
		A+B+C	A+B	A+C or B+C	A or B	C
Cooling capacity ※1	BTU/h	28,400	16,400	20,600	8,200	12,400
Power consumption ※1	W	2,870	1,830	2,060	990	1,260
EER (Triple unit operation)		9.9				
SEER (Triple unit operation)		10.0				

			A	B	C
INDOOR UNIT MODEL			MS09NW	MS09NW	MS15NN
External finish			White		
Power Supply V, Hz, Phase			115,60,1		
Max. fuse size (time delay) A			15.0		
Min. ampacity			0.5	0.5	0.6
Fan motor F.L.A			0.37	0.37	0.43
Airflow	Dry	CFM	208-265-328	208-265-328	360-395-452
	Lo-Me-Hi	Wet	CFM	177-226-279	177-226-279
Moisture removal (Pints/h)			2.1	2.1	3.2
Sound level dB (A)			42	42	42
Cond. drain connection OD in.			5/8	5/8	5/8
Dimensions	W	in.	32-1/16	32-1/16	39-15/16
	D	in.	7-3/16	7-3/16	7-1/2
	H	in.	10-13/16	10-13/16	12-5/8
Weight lbs.			18	18	31
OUTDOOR UNIT MODEL			MUM30NN2		
External finish			Munsell 5Y 7/1		
Sound level dB (A)			Max. 57		
Power supply V, Hz, Phase			208/230,60,1(3-wire)		
Max. fuse size (time delay) A			30		
Min. ampacity			25		
Fan motor F.L.A			0.8+0.7		
Compressor	Model		KH122WES<115V>		RH167NAB<208/230V>
	Winding resistance (at 68°F) Ω		C-R 0.98 C-S 2.21		C-R 2.47 C-S 4.62
	R.L.A		10		8
	L.R.A		37		29
Refrigerant control			Capillary tube		
Dimensions	W	in.	37-7/16		
	D	in.	15-3/8		
	H	in.	45-5/16		
Weight lbs.			244		
REMOTE CONTROLLER			Wireless type		
Control voltage (be built-in transformer)			DC12V		
REFRIGERANT PIPING			Not supplied (optional parts)		
Pipe size	Liquid	in.	1/4		1/4
	Gas	in.	3/8		5/8
Connection method	Indoors		Flared		Flared
	Outdoors		Flared		Flared
Between the indoor & outdoor units	Height difference	ft	Max. 25		Max. 25
	Piping length	ft	Max. 65		Max. 65
Refrigerant filling capacity (R-22) lbs.			2 lbs 14 oz		3 lbs 1 oz
Refrigerant oil (Model) cc			270 (MS56)		520 (MS56)

Notes ※1. Test conditions are based on ARI 210/240

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

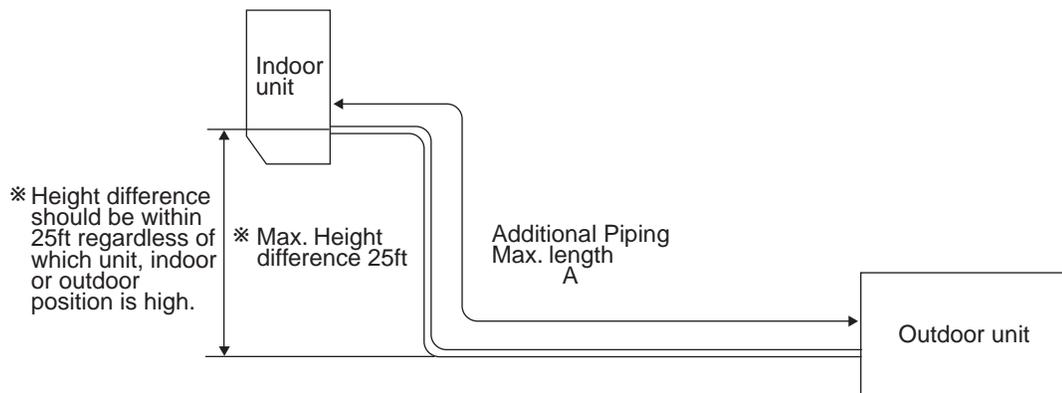
Operating Range

		Indoor air intake temperature	Outdoor air intake temperature
Cooling	Maximum	90°FDB,71°FWB	115°FDB
	Maximum	67°FDB,57°FWB	67°FDB

MAX. REFRIGERANT PIPING LENGTH & MAX. HEIGHT DIFFERENCE

Models	Additional piping Max. length : ft A	Piping size O.D. : in.		Length of connecting pipe : in.	
		Gas	Liquid	Indoor unit	Outdoor unit
MS09NW MS09NW2	49	ϕ 3/8	ϕ 1/4	16-15/16	0
MS12NN MS12NN2 MS15NN MS15NN2 MS17NN MS17NN2		ϕ 5/8			

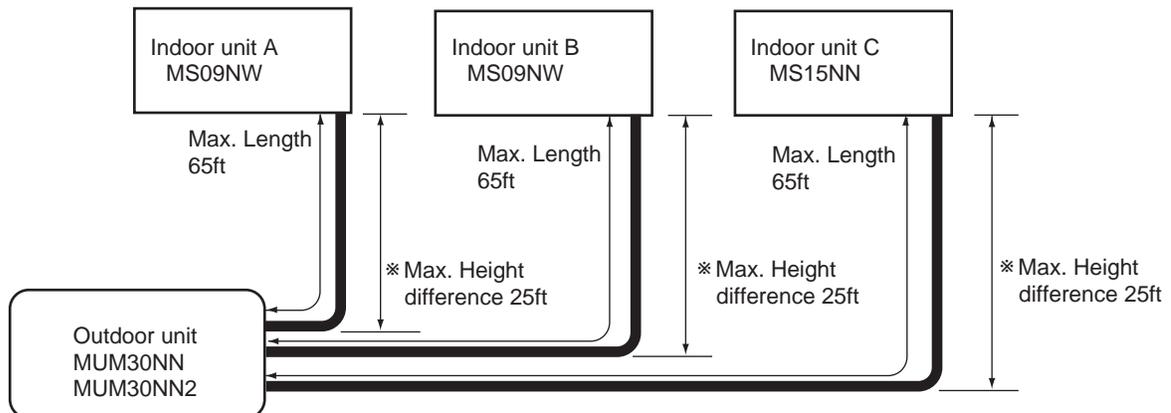
MAX. HEIGHT DIFFERENCE



MSM30NN MSM30NN2

Model	Additional piping Max. length : ft A	Piping size O.D. : in.		Length of connecting pipe : in.	
		Gas	Liquid	Indoor unit	Outdoor unit
MS09NW	65	ϕ 3/8	ϕ 1/4	16-15/16	0
MS15NN		ϕ 5/8			

MAX. HEIGHT DIFFERENCE



1. PERFORMANCE DATA

1) COOLING CAPACITY

MS09NW MS12NN MS15NN MS17NN MS09NW2 MS12NN2 MS15NN2 MS17NN2

Model	Indoor air IWB (°F)	Outdoor intake air DB temperature (°F)														
		75			85			95			105			115		
		TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC
MS09NW MS09NW2	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 MS12NN2	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 MS15NN2	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 MS17NN2	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.

MS09NW×2 MS15NN×1 MUM30NN .
PERFORMANCE DATA (ONE INDOOR UNIT WITH ONE OUTDOOR UNIT)

Model	Indoor air IWB (°F)	Outdoor intake air DB temperature (°F)														
		75			85			95			105			115		
		TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC
MS09NW	71	10.05	5.89	0.88	9.39	5.51	0.97	8.82	5.17	1.04	8.20	4.81	1.09	7.54	4.43	1.14
	67	9.51	6.85	0.83	8.86	6.38	0.92	8.20	5.90	0.99	7.63	5.49	1.05	7.01	5.05	1.10
	63	8.94	7.63	0.79	8.28	7.07	0.88	7.71	6.58	0.95	7.01	5.98	1.01	6.40	5.46	1.05
MS15NN	71	15.19	8.76	1.09	14.20	8.19	1.19	13.33	7.69	1.28	12.40	7.15	1.35	11.41	6.58	1.40
	67	14.38	10.21	1.03	13.39	9.51	1.13	12.40	8.80	1.22	11.53	8.19	1.29	10.60	7.53	1.35
	63	13.52	11.40	0.98	12.52	10.56	1.08	11.66	9.83	1.17	10.60	8.94	1.24	9.67	8.16	1.29

MS09NW×2 MS15NN×1 MUM30NN2 .
PERFORMANCE DATA (ONE INDOOR UNIT WITH ONE OUTDOOR UNIT)

Model	Indoor air IWB (°F)	Outdoor intake air DB temperature (°F)														
		75			85			95			105			115		
		TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC	TC	SHC	TPC
MS09NW	71	10.05	5.89	0.88	9.39	5.51	0.97	8.82	5.17	1.04	8.20	4.81	1.09	7.54	4.43	1.14
	67	9.51	6.85	0.83	8.86	6.38	0.92	8.20	5.90	0.99	7.63	5.49	1.05	7.01	5.05	1.10
	63	8.94	7.63	0.79	8.28	7.07	0.88	7.71	6.58	0.95	7.01	5.98	1.01	6.40	5.46	1.05
MS15NN	71	15.19	8.76	1.12	14.20	8.19	1.23	13.33	7.69	1.32	12.40	7.15	1.39	11.41	6.58	1.45
	67	14.38	10.21	1.06	13.39	9.51	1.17	12.40	8.80	1.26	11.53	8.19	1.34	10.60	7.53	1.40
	63	13.52	11.40	1.01	12.52	10.56	1.12	11.66	9.83	1.20	10.60	8.94	1.29	9.67	8.16	1.37

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.

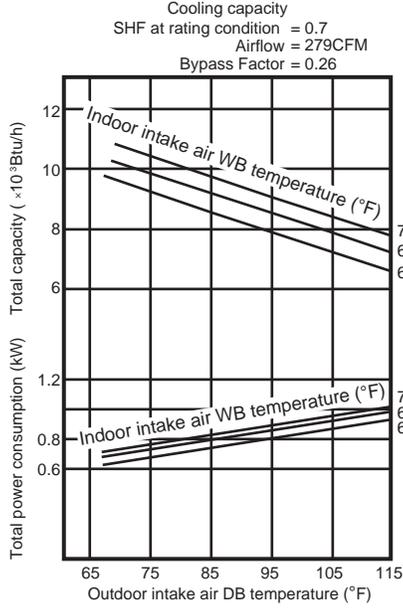
2) COOLING CAPACITY CORRECTIONS

Model	Refrigerant piping length (one way)			
	25ft (std)	40ft	49ft	65ft
MS09NW MS09NW2 MS12NN MS12NN2 MS15NN MS15NN2 MU17NN MS17NN2	1.0	0.954	0.927	-
MUM30NN MUM30NN2	1.0	0.954	0.927	0.878

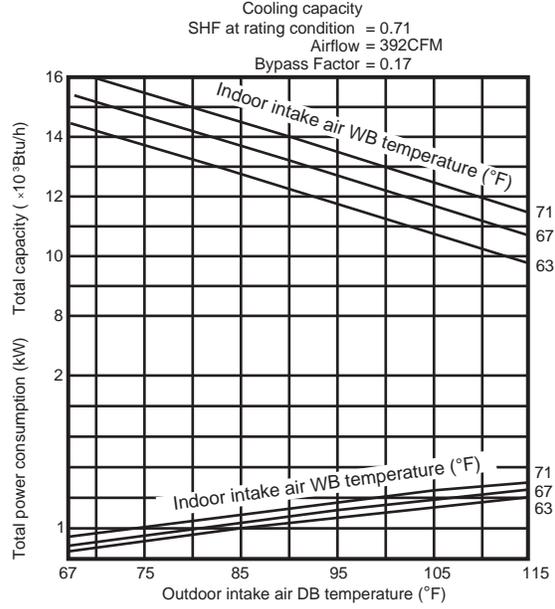
2. PERFORMANCE CURVE

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

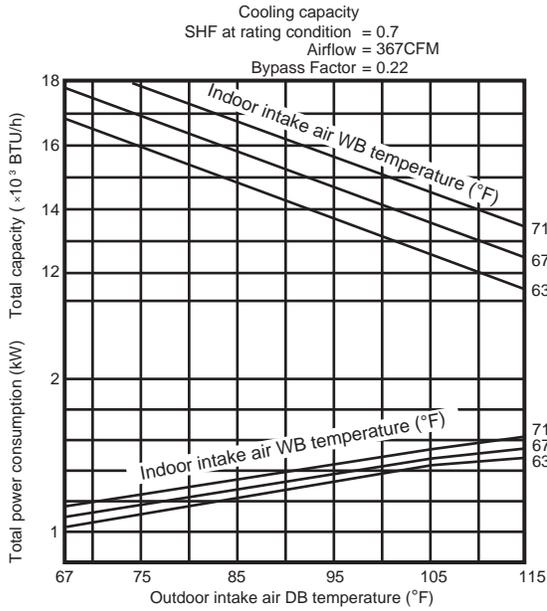
MS09NW MS09NW2
MU09NW MU09NW2



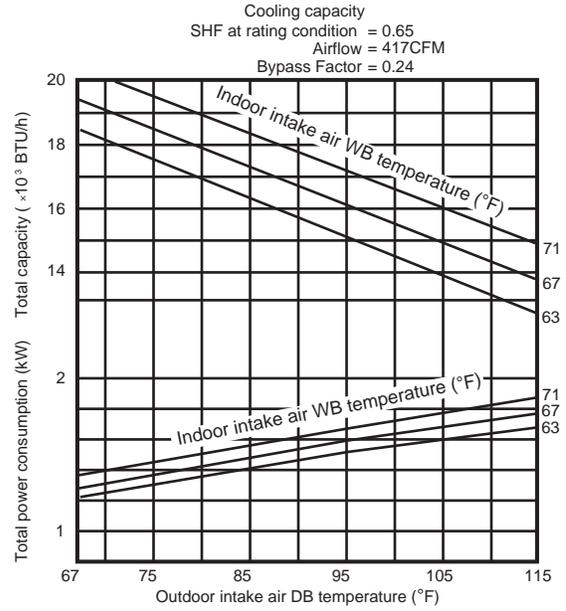
MS12NN MS12NN2
MU12NN MU12NN2



MS15NN MS15NN2
MU15NN MU15NN2



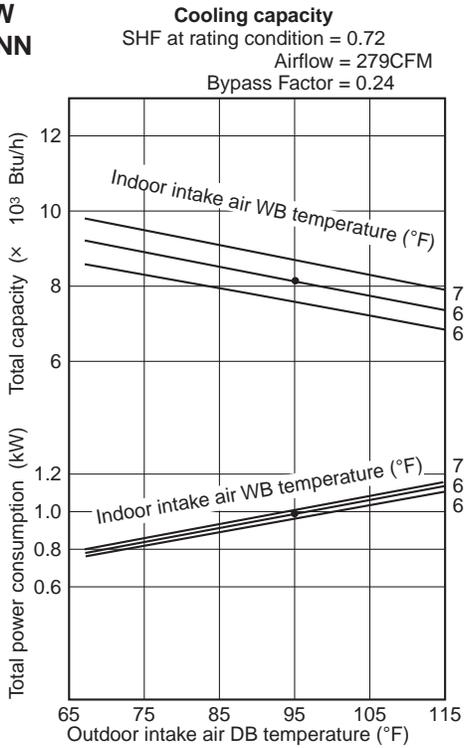
MS17NN MS17NN2
MU17NN MU17NN2



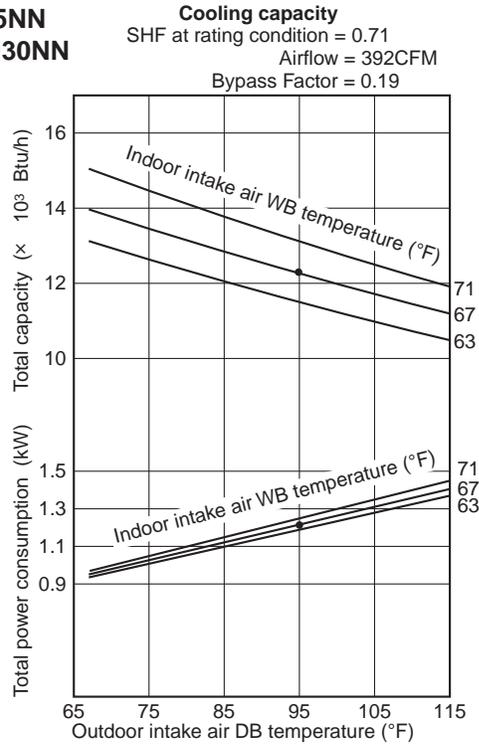
MSM30NN MSM30NN2 (ONE INDOOR UNIT WITH ONE OUTDOOR UNIT)

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

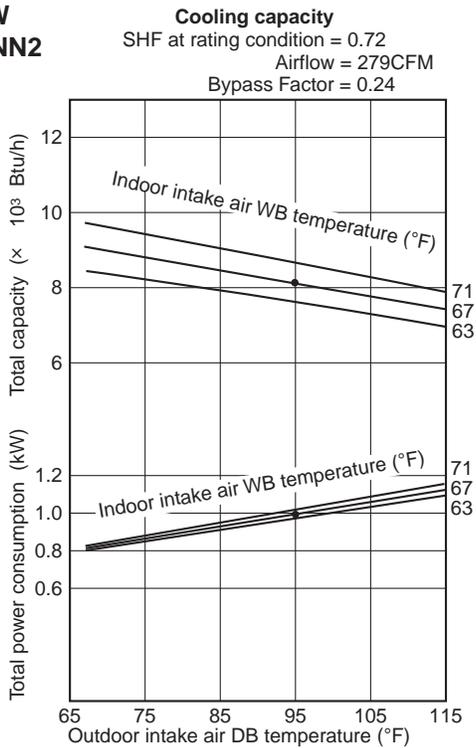
**MS09NW
MUM30NN**



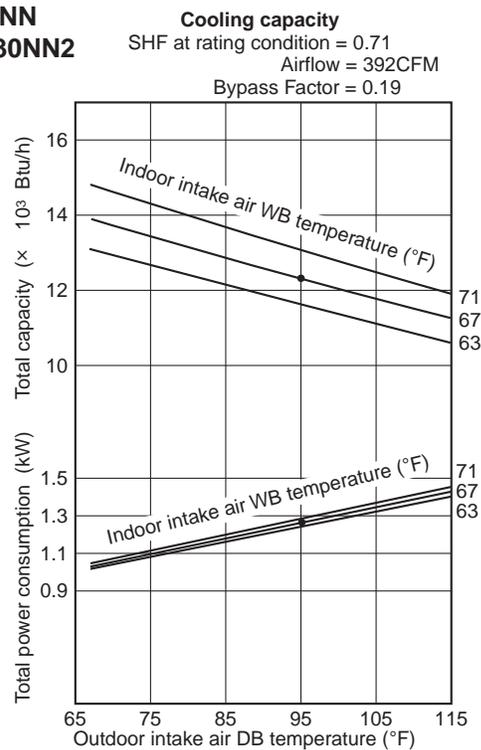
**MS15NN
MUM30NN**



**MS09NW
MUM30NN2**



**MS15NN
MUM30NN2**



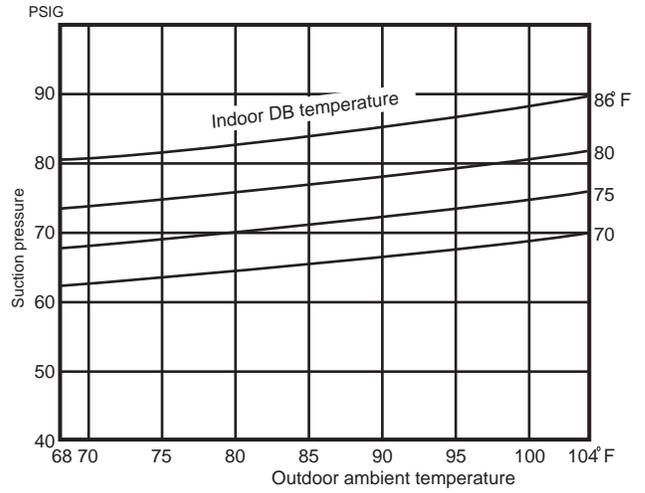
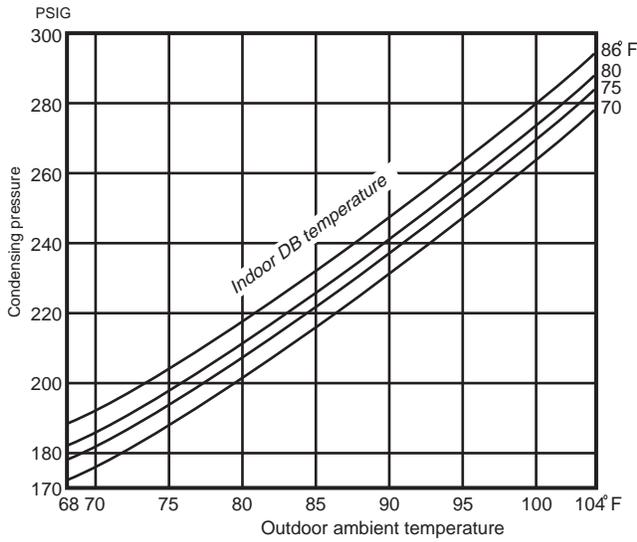
3. CONDENSING PRESSURE AND SUCTION PRESSURE

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

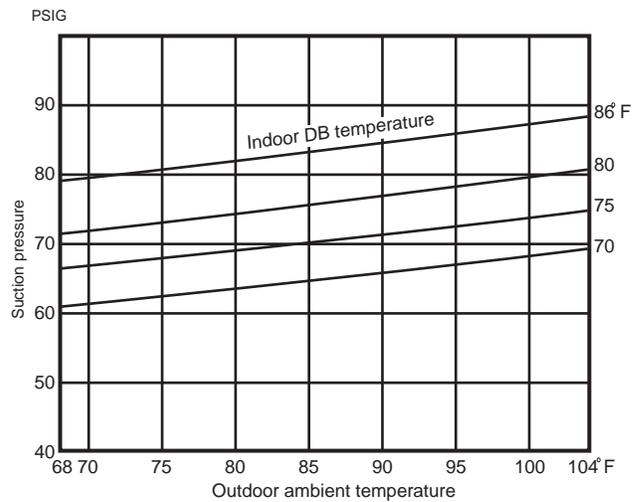
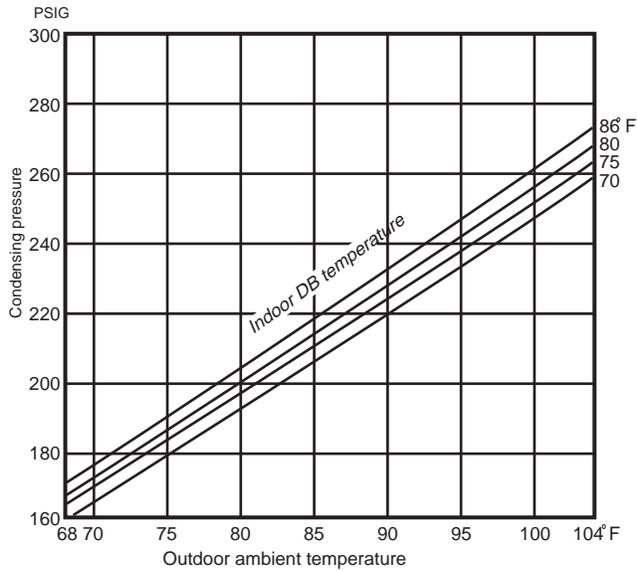
Air flow should be set at Hi.

A point on the curve shows the reference point

MU09NW MU09NW2

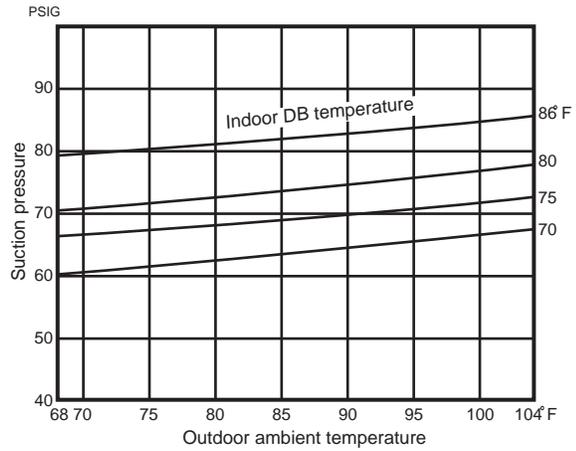
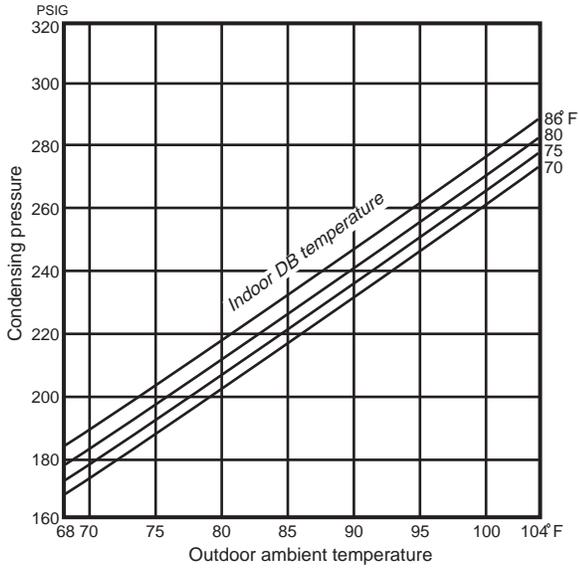


MU12NN MU12NN2

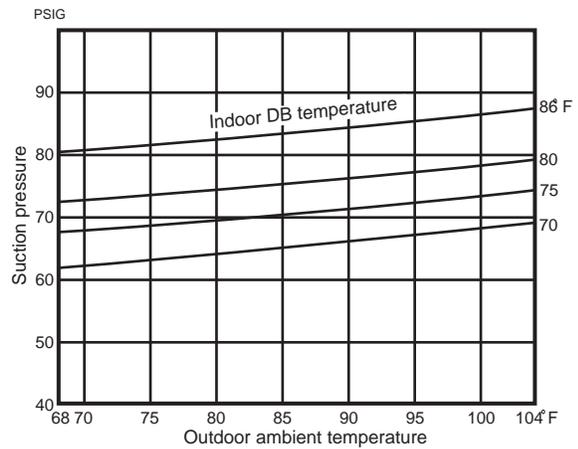
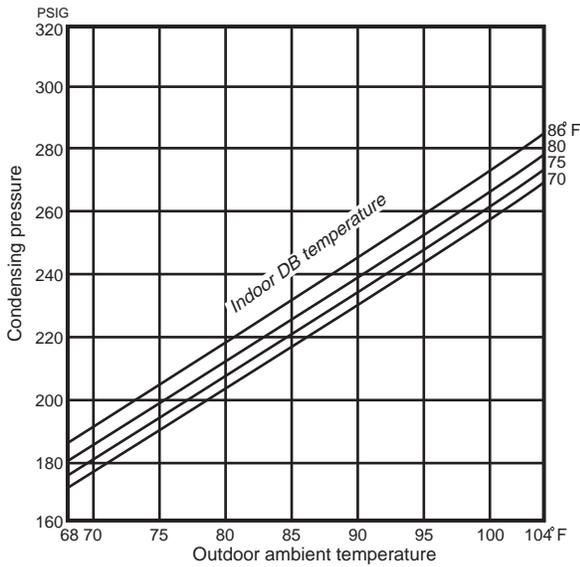


Data is based on the condition of indoor humidity 50%.
 Air flow should be set at Hi.
 A point on the curve shows the reference point

MU15NN
MU15NN2



MU17NN
MU17NN2

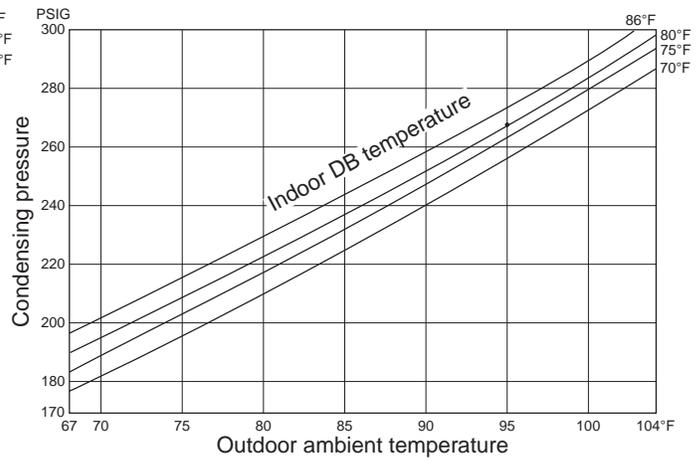
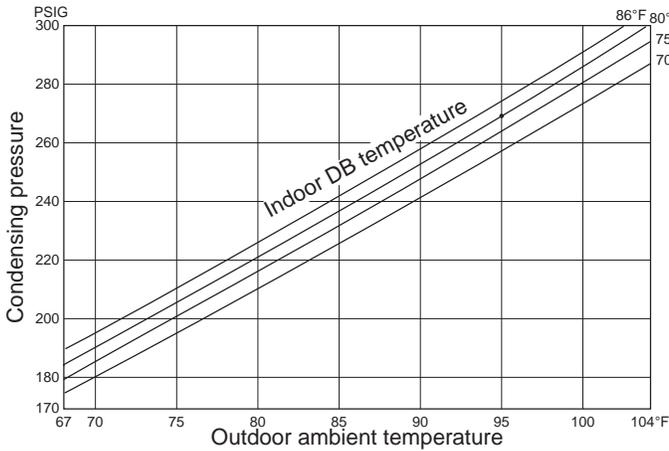


MSM30NN
(ONE INDOOR UNIT WITH ONE OUTDOOR UNIT)

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.

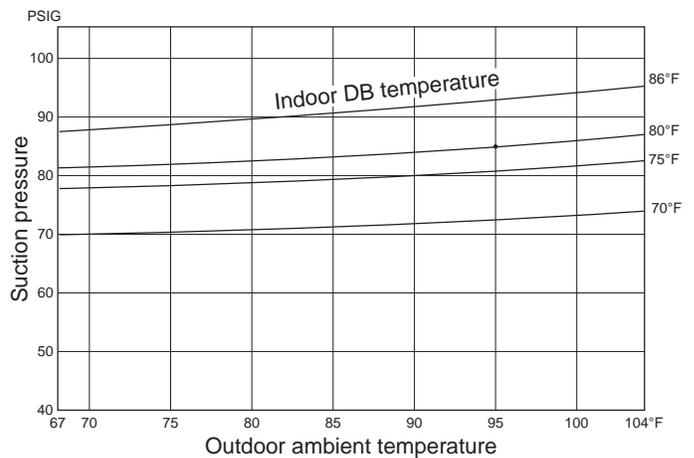
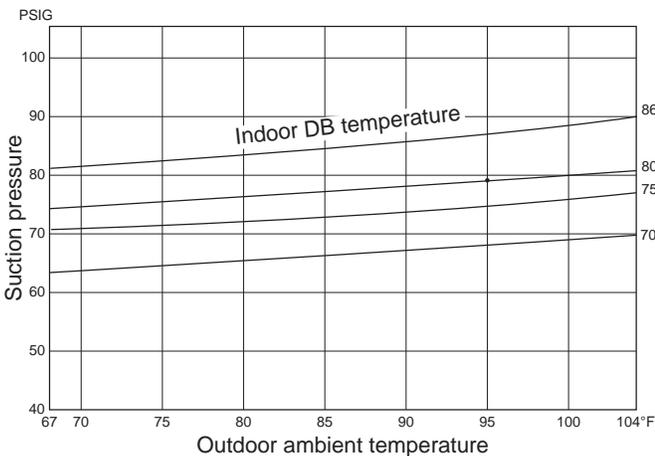
MS09NW
MUM30NN

MS15NN
MUM30NN



MS09NW
MUM30NN

MS15NN
MUM30NN

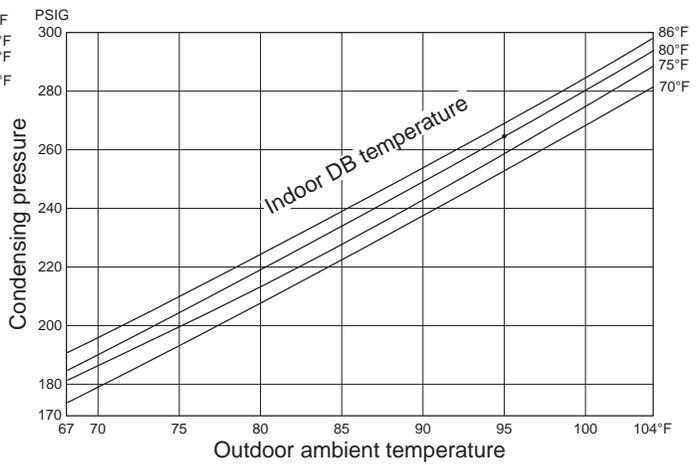
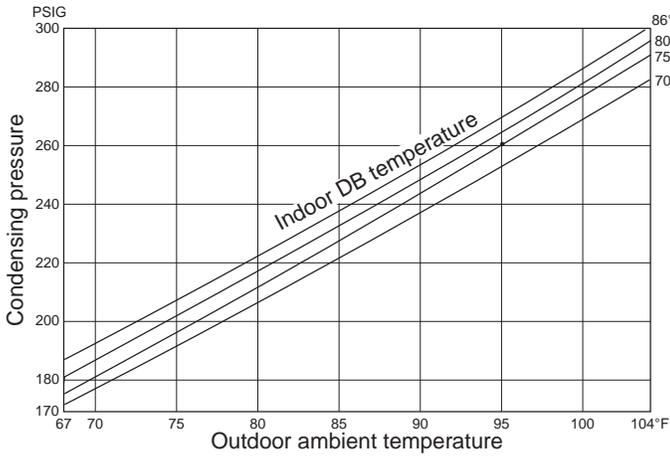


MSM30NN2
(ONE INDOOR UNIT WITH ONE OUTDOOR UNIT)

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.

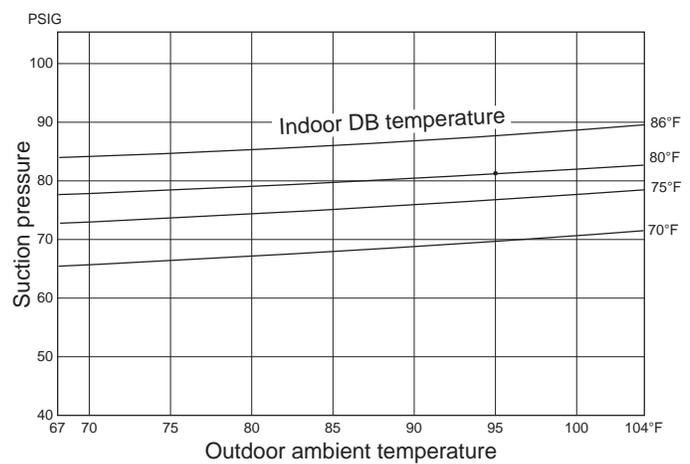
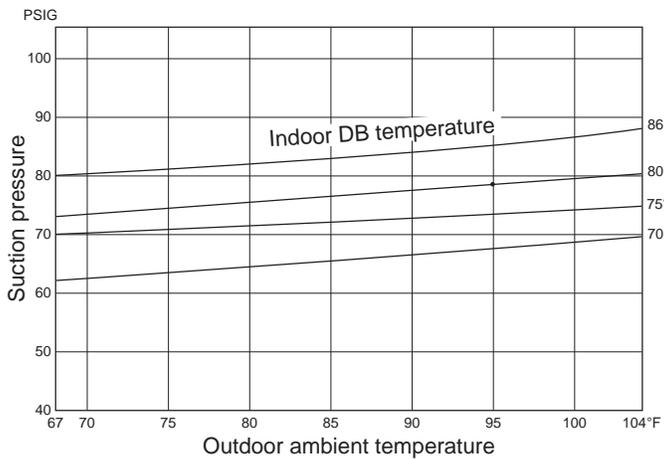
MS09NW
MUM30NN2

MS15NN
MUM30NN2



MS09NW
MUM30NN2

MS15NN
MUM30NN2

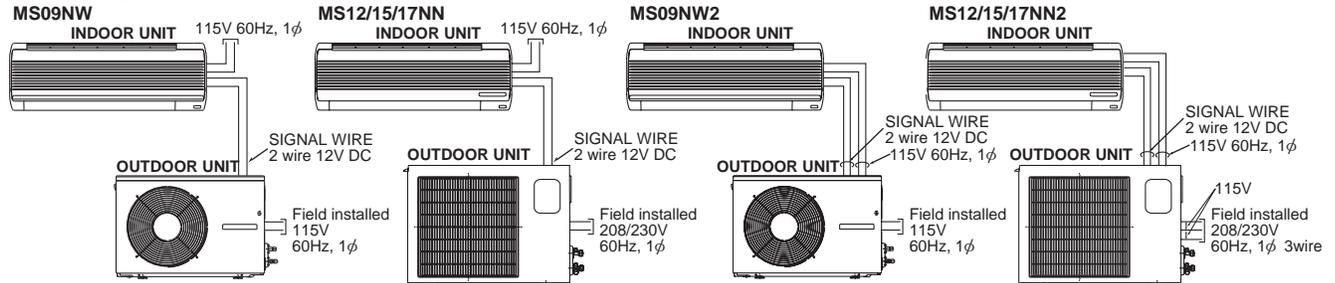


4. STANDARD OPERATION DATA

MS09NW MS12NN MS15NN MS17NN MS09NW2 MS12NN2 MS15NN2 MS17NN2

Model			MS09NW	MS09NW2	MS12NN	MS12NN2	MS15NN	MS15NN2	MS17NN	MS17NN2
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	MS09NW2	MS12NN	MS12NN2	MS15NN	MS15NN2	MS17NN	MS17NN2
	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	MU09NW2	MU12NN	MU12NN2	MU15NN	MU15NN2	MU17NN	MU17NN2
	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	PSIG	259		243		256		252	
	Suction pressure	PSIG	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		3lbs oz	
Indoor unit	Intake air temperature	DB	°F 80		°F 80		°F 80		°F 80	
		WB	°F 67		°F 67		°F 67		°F 67	
	Discharge air temperature	DB	°F 60		°F 58		°F 55		°F 56	
		WB	°F 57		°F 56		°F 54		°F 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		°F 95		°F 95		°F 95	
		WB	°F —		°F —		°F —		°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



• The following wiring can also apply to MS09NW2, MS12/15/17NN2.

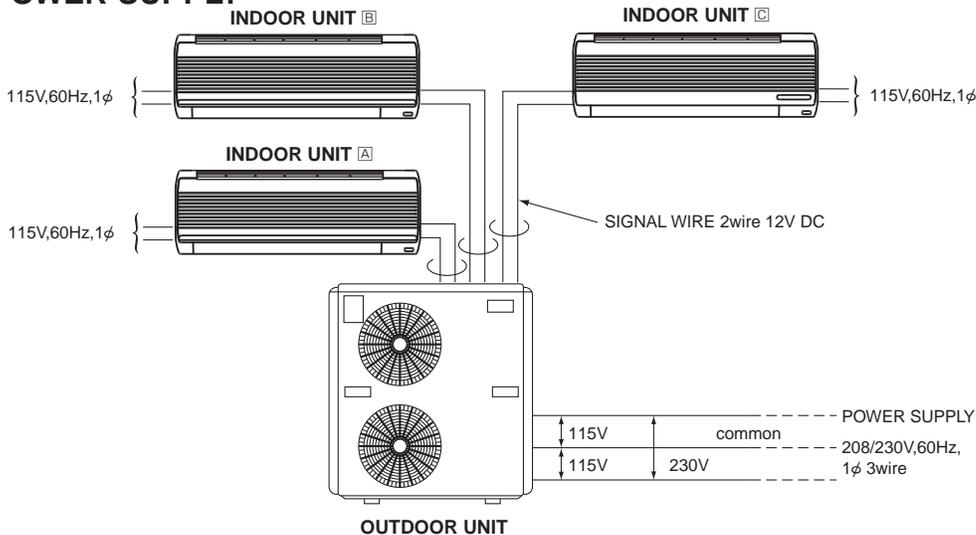
* **Control voltage**

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

STANDARD OPERATION DATA MSM30NN

MODEL		MSM30NN								
		Triple			Double			Single		
Item		A+B+C			A+B		A+C or B+C		A or B	C
Total	Capacity	28,400			16,400		20,600		8,200	12,400
	SHF	0.72			0.71		0.72		0.71	0.72
	Input	2.99			1.86		2.06		0.99	1.22
Electrical circuit	Indoor unit model	MS09NW	MS09NW	MS15NN	MS09NW	MS09NW	MS09NW	MS15NN	MS09NW	MS15NN
	Power supply (V,HZ,φ)	115,60,1			115,60,1			115,60,1		
	Input	0.035	0.035	0.047	0.035	0.035	0.035	0.047	0.035	0.047
	Fan current	0.34	0.34	0.41	0.34	0.34	0.34	0.41	0.34	0.41
	Outdoor unit model	MUM30NN								
	Power supply (V,HZ,φ)	208/230,60,1(3-wire)								
	Input	2.873			1.79		1.978		0.955	1.173
	Comp. current	7.0	7.0	3.8	7.0	7.0	7.0	3.8	7.0	3.8
	Fan current	0.7+0.8			0.65+0.75			0.6+0.7		
Refrigerant circuit	Condensing pressure	273	264	243	262	263	269	240	267	267
	Suction pressure	80	80	82	78	79	78	82	80	85
	Discharge temp.	154	157	169	197	171	151	169	143	141
	Condensing temp.	122	118	111	118	116	118	110	121	118
	Suction temp.	47	47	54	60	47	47	54	52	51
	Comp.shell botton temp.	130	130	145	171	146	124	144	129	139
	Ref.pipe length	25	25	25	25	25	25	25	25	25
	Refrigerant charge	3 lbs 3 oz	3 lbs 3 oz	3 lbs 8 oz	3 lbs 3 oz	3 lbs 3 oz	3 lbs 3 oz	3 lbs 8 oz	3 lbs 3 oz	3 lbs 8 oz
Indoor side	Entering air temp. DB	80	80	80	80	80	80	80	80	80
	Entering air temp. WB	67	67	67	67	67	67	67	67	67
	Discharge air temp. DB	60	60	58	60	60	60	58	60	58
	Discharge air temp. WB	57	57	57	57	57	57	57	57	57
	Fan speed	1,230	1,230	1,200	1,230	1,230	1,230	1,200	1,230	1,200
Airflow (Hi)	279	279	392	279	279	279	392	279	392	
Outdoor side	Entering air temp. DB	95			95			95		
	Entering air temp. WB	—			—			—		
	Fan speed	850/940			750/840			0/1030		
	Airflow	2,720			2,360			1,039		

POWER SUPPLY

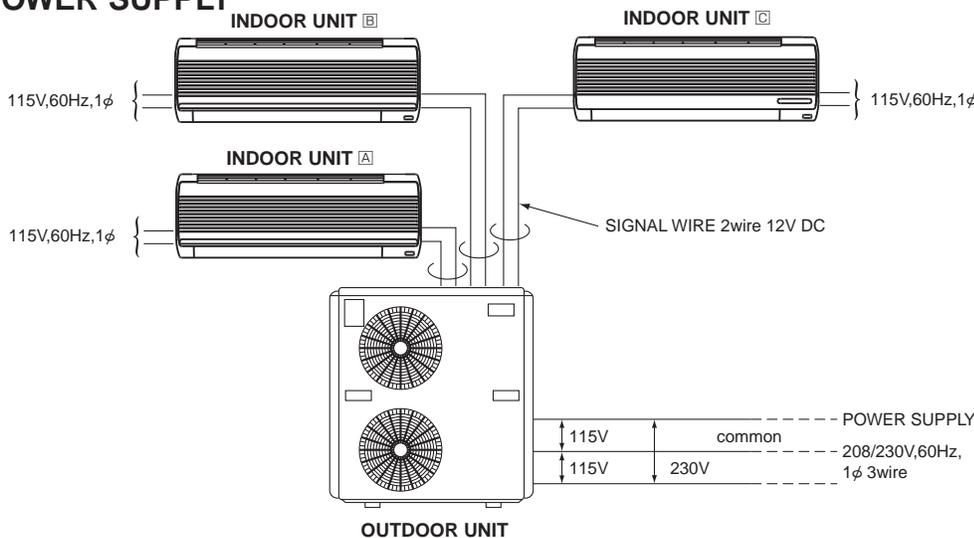


* Control voltage
Power supply voltage to serial signal circuit is 12V DC.
Between 1+ and 2- on in-out terminal block will be 12V DC peak voltage.

STANDARD OPERATION DATA MSM30NN2

MODEL			MSM30NN2									
			Triple			Double				Single		
			A+B+C			A+B		A+C or B+C		A or B	C	
Item	Unit	Cooling										
Total	Capacity	BTU/h	28,400			16,400		20,600		8,200	12,400	
	SHF	—	0.72		0.71	0.72		0.72	0.71	0.71	0.72	
	Input	kW	2.87			1.83		2.06		0.99	1.26	
Electrical circuit	Indoor unit model		MS09NW	MS09NW	MS15NN	MS09NW	MS09NW	MS09NW	MS15NN	MS09NW	MS15NN	
	Power supply (V,Hz,φ)		115,60,1			115,60,1				115,60,1		
	Input	kW	0.035	0.035	0.047	0.035	0.035	0.035	0.047	0.035	0.047	
	Fan current	A	0.34	0.34	0.41	0.34	0.34	0.34	0.41	0.34	0.41	
	Outdoor unit model		MUM30NN2									
	Power supply (V,Hz,φ)		208/230,60,1(3-wire)									
	Input	kW	2.753			1.760		1.978		0.955	1.213	
	Comp. current	A	7.0	7.0	3.8	7.0	7.0	7.0	3.8	7.0	3.8	
Fan current	A	0.6+0.7			0.45+0.55				0.45+0.55			
Refrigerant circuit	Condensing pressure	PSIG	246	247	252	266	263	264	262	263	259	
	Suction pressure	PSIG	78	78	81	78	77	77	85	77	84	
	Discharge temp.	°F	146	149	167	157	157	156	169	156	167	
	Condensing temp.	°F	112	115	112	120	119	119	117	119	116	
	Suction temp.	°F	50	48	51	47	47	47	57	47	53	
	Comp.shell botton temp.	°F	130	130	140	138	139	138	152	146	148	
	Ref.pipe length	ft	25	25	25	25	25	25	25	25	25	
Refrigerant charge	—	2 lbs 14oz	2 lbs 14oz	3 lbs 1 oz	2 lbs 14oz	2 lbs 14oz	2 lbs 14oz	3 lbs 1 oz	2 lbs 14oz	3 lbs 1 oz		
Indoor side	Entering air temp.	DB	°F	80	80	80	80	80	80	80	80	
		WB	°F	67	67	67	67	67	67	67	67	
	Discharge air temp.	DB	°F	60	60	58	60	60	60	58	60	
		WB	°F	57	57	57	57	57	57	57	57	
	Fan speed	R.P.M.	1,230	1,230	1,200	1,230	1,230	1,230	1,200	1,230	1,200	
Airflow (Hi)	CFM	279	279	392	279	279	279	392	279	392		
Outdoor side	Entering air temp.	DB	°F	95			95				95	
		WB	°F	—			—				—	
	Fan speed	R.P.M.	880/960			650/720				650/720		
	Airflow	CFM	2,789			2,047				2,047		

POWER SUPPLY



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

5. OPERATING RANGE

(1) POWER SUPPLY

	Models	Rating	Guaranteed Voltage
Indoor unit	MS09NW MS09NN2 MS12NN MS12NN2 MS15NN MS15NN2 MS17NN MS17NN2	115V 60Hz 1 ϕ	Min. 103V — Max. 127V
Outdoor unit	MU09NW MU09NW2	208/230V 60Hz 1 ϕ	Min. 198V 208V 230V Max. 253V ----- ----- ----- -----
	MU12NN MU12NN2 MU15NN MU15NN2 MU17NN MU17NN2 MUM30NN MUM30NN2		

(2) OPERATION

Function	Intake air temperature Condition	Indoor		Outdoor	
		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 MS09NW2	Dry	328	0.1	25.6
	Wet	279	0.1	21.8
MS12NN MS12NN2	Dry	452	0.1	29.2
	Wet	392	0.1	25.5
MS15NN MS15NN2	Dry	452	0.1	29.2
	Wet	367	0.1	23.9
MS17NN MS17NN2	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.

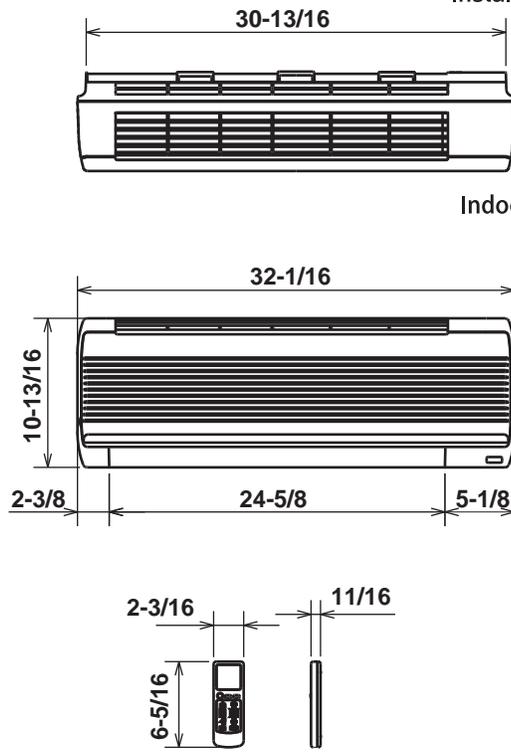
7. ADDITIONAL REFRIGERANT CHARGE (R-22(oz))

Model	Outdoor unit precharged (up to 25ft)	Refrigerant piping length (one way)						
		25ft	30ft	33ft	40ft	45ft	49ft	65ft
MS09NW MU09NW	2 lbs 2 oz	0	1	1	2	2	3	—
MS09NW2 MU09NW2								
MS12NN MU12NN								
MS12NN2 MU12NN2								
MS15NN MU15NN								
MS15NN2 MU15NN2								
MS17NN MU17NN								
MS17NN2 MU17NN2	3lbs							
MUM 30NN	MS09NW	0	1	1	2	2	3	5
	MS15NN							
MUM 30NN2	MS09NW							
	MS15NN							

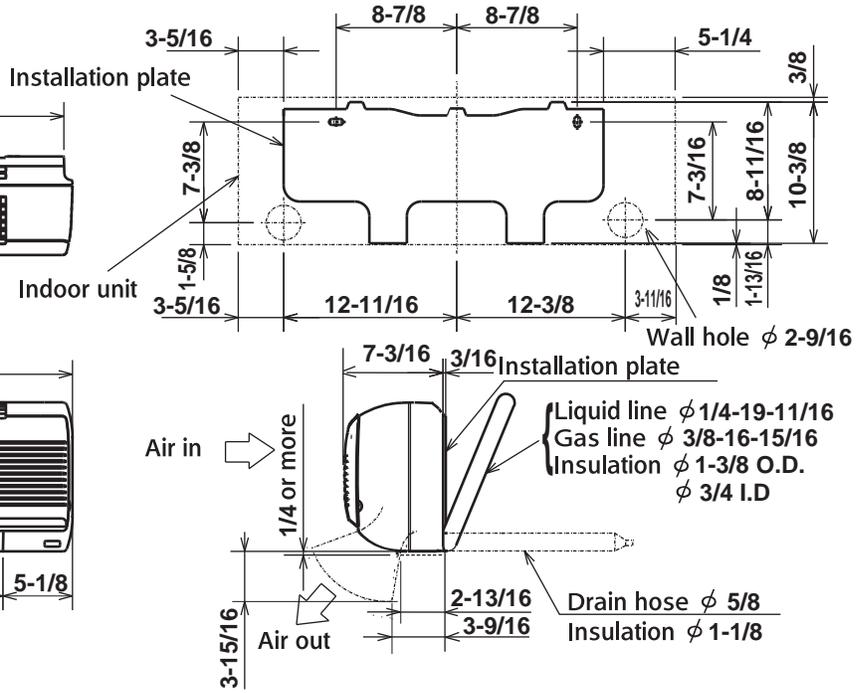
Unit : inch

MS09NW MS09NW2

INDOOR UNIT

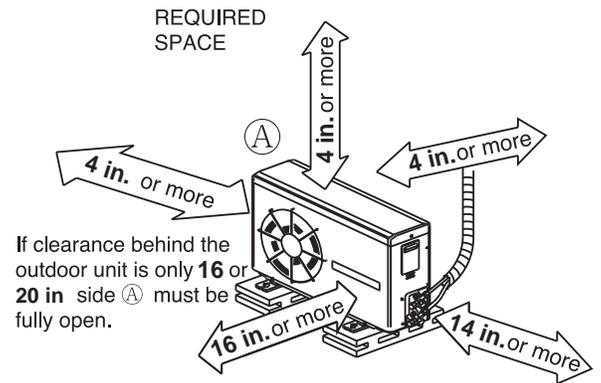
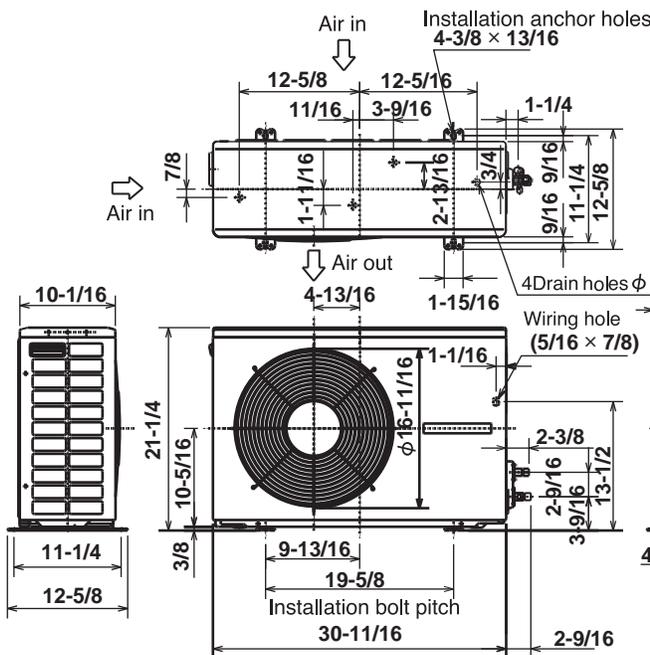


Wireless remote controller



MU09NW MU09NW2

OUTDOOR UNIT

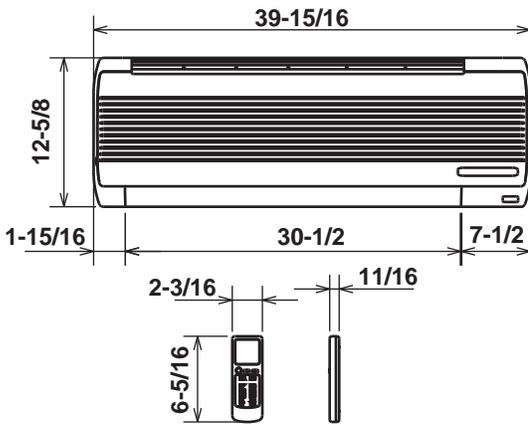
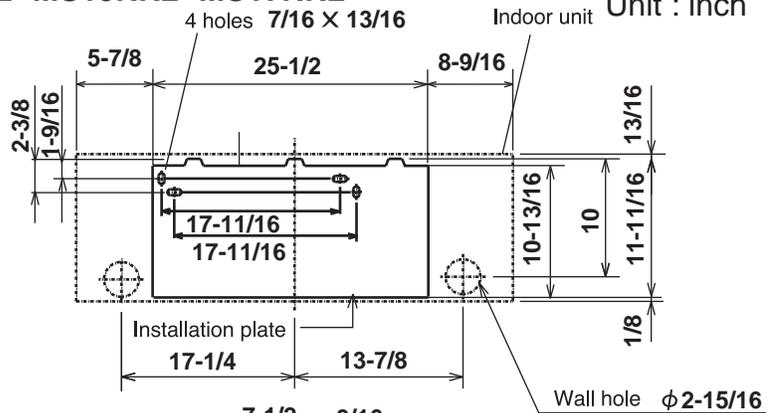
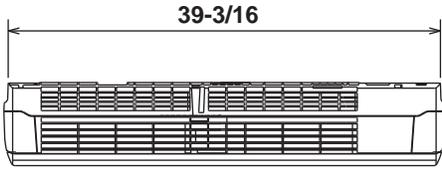


NOTE: Do not wire 12V DC and 115V AC in same conduit hole.
This figure shows about MU09NW2.

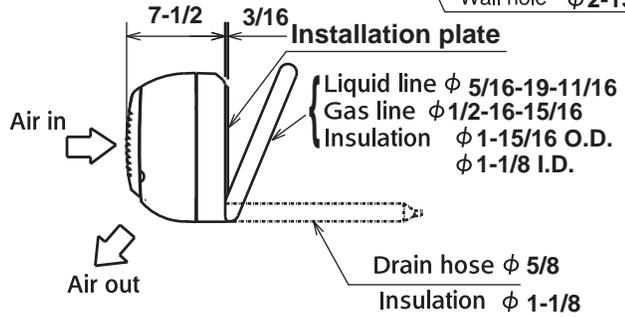
MS12NN MS15NN MS17NN MS12NN2 MS15NN2 MS17NN2

Unit : inch

INDOOR UNIT

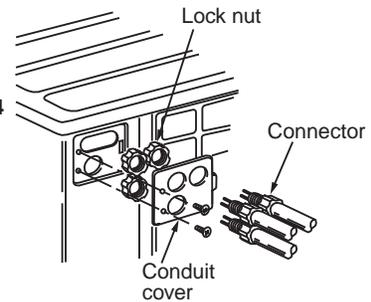
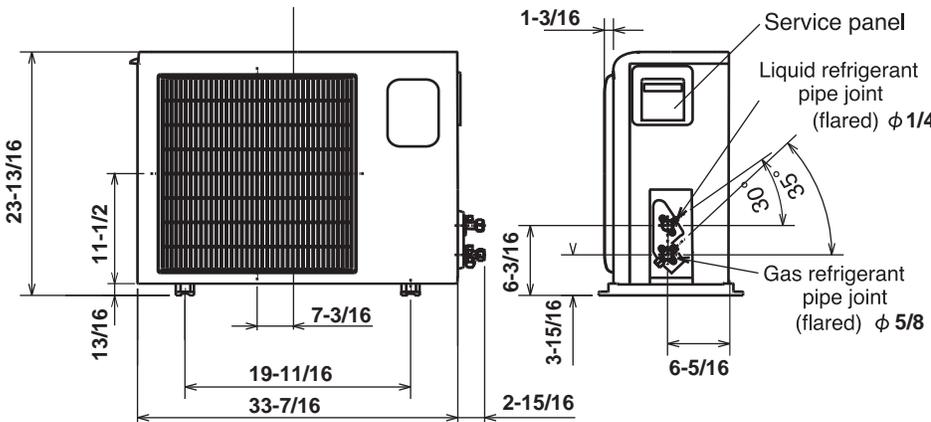
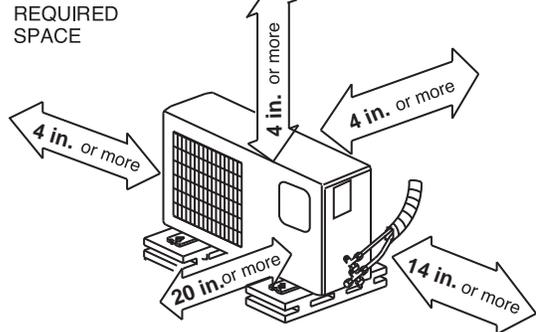
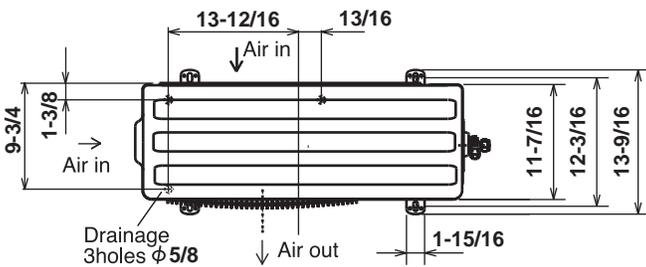


Wireless remote controller



MU12NN MU15NN MU17NN MU12NN2 MU15NN2 MU17NN2

OUTDOOR UNIT

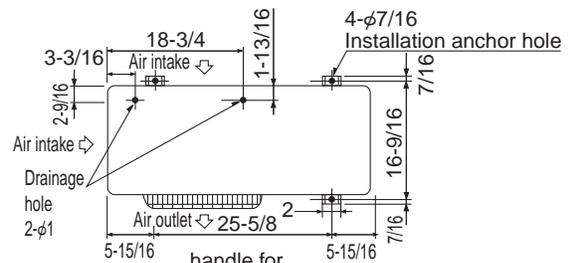
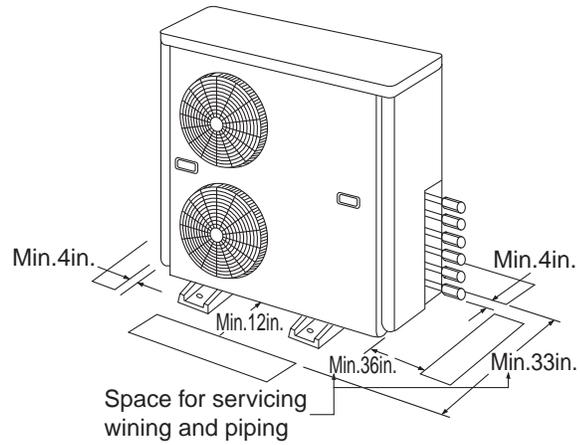


NOTE: Do not wire 12V DC and 115V AC in same conduit hole.

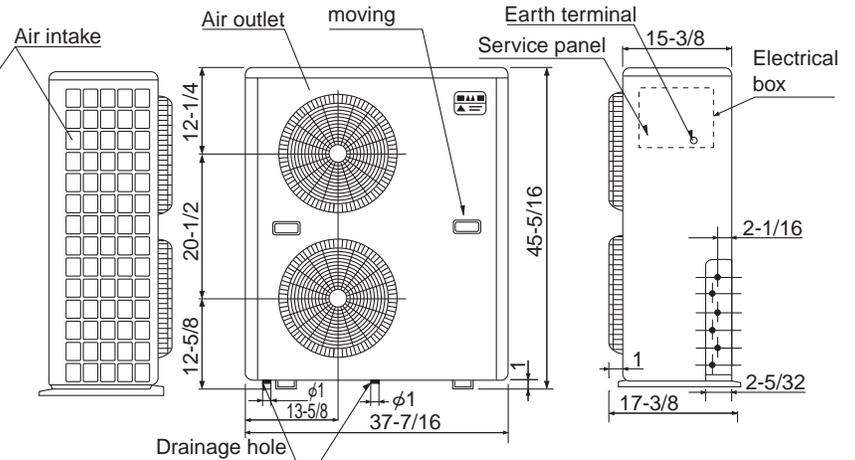
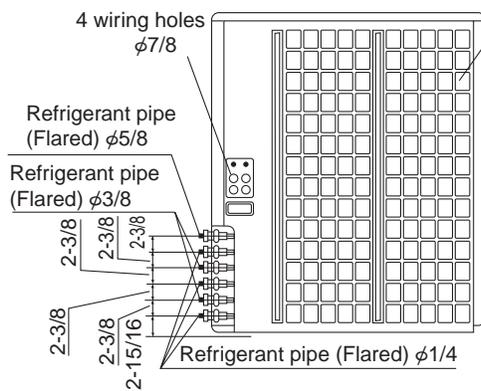
This figure shows about MU12/15/17NN2.

**MODEL : MUM30NN MUM30NN2
OUTDOOR UNIT**

Unit : inch



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

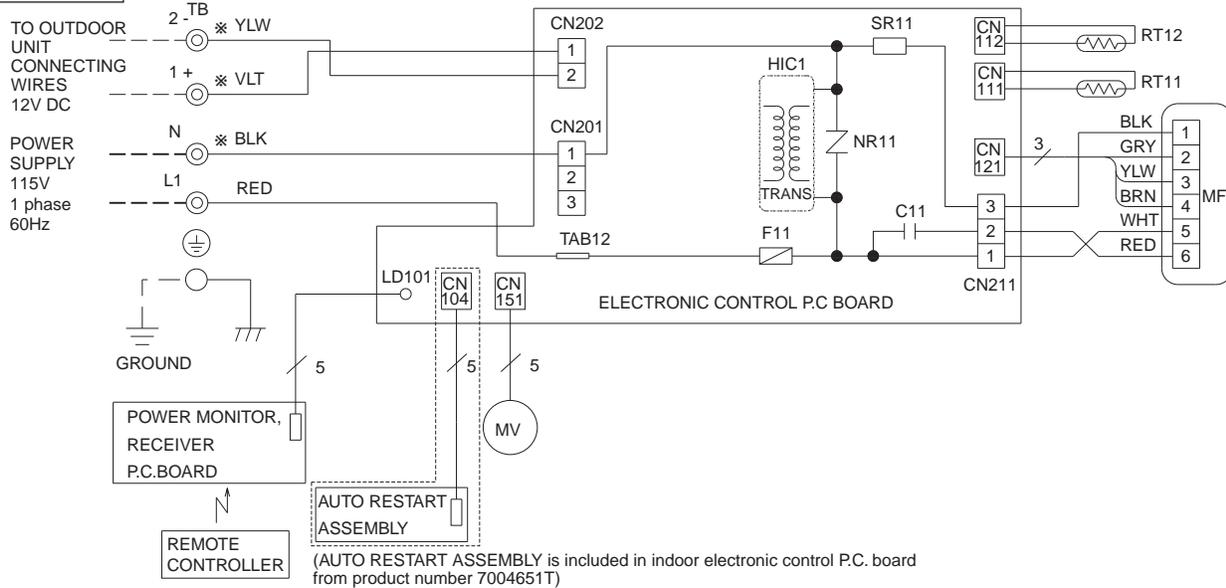


NOTE : The symbol φ indicates the diameter.

MS09NW

MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MV	VANE MOTOR	SR11	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	COIL TEMPERATURE THERMISTOR		

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

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

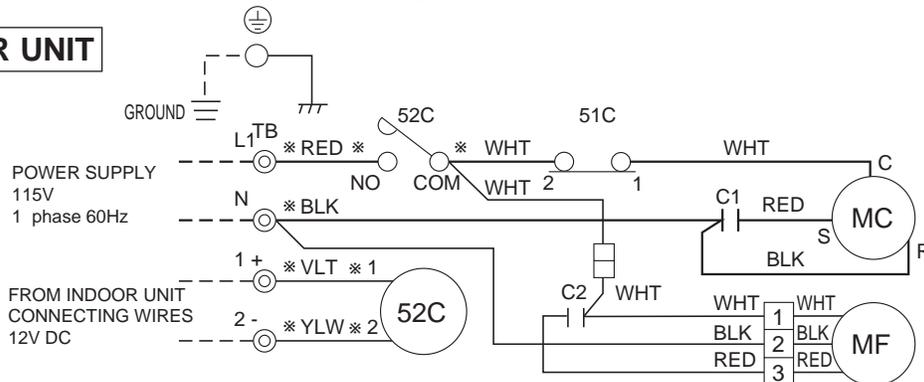
3. Symbols below indicate.

○ : Terminal block, □□□□ : Connector

MU09NW

MODEL WIRING DIAGRAM

OUTDOOR UNIT



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

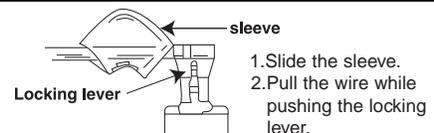
NOTE:1. Use copper conductors only.(For field wiring)

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.

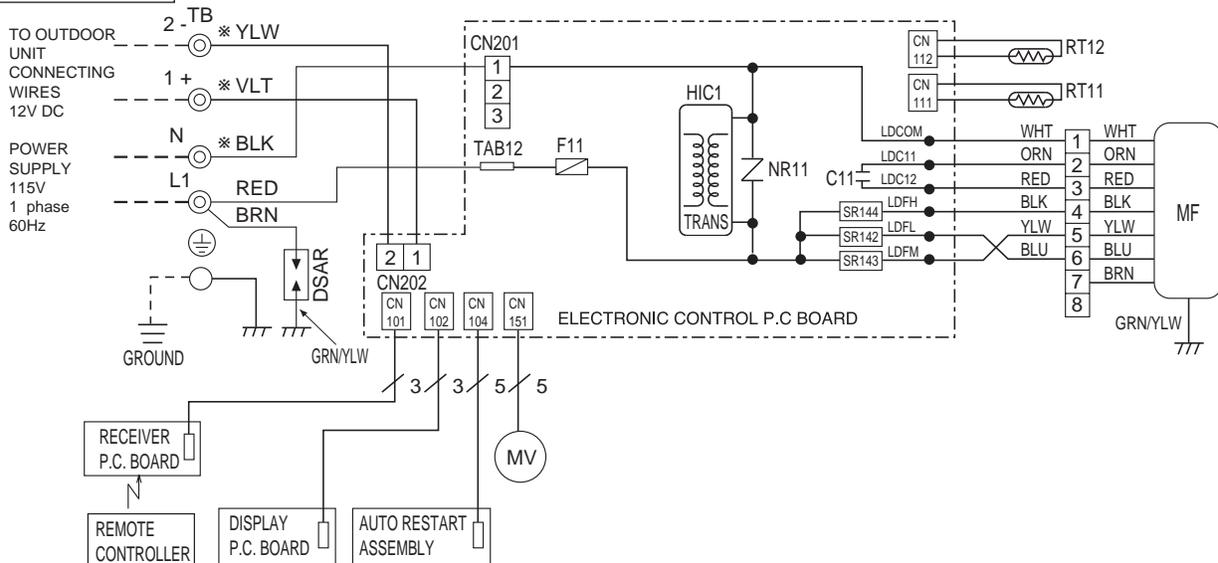
3. Symbols below indicate.

○ : Terminal block, □□□□ : Connector



MS12NN MS15NN MS17NN MODELS WIRING DIAGRAM

INDOOR UNIT

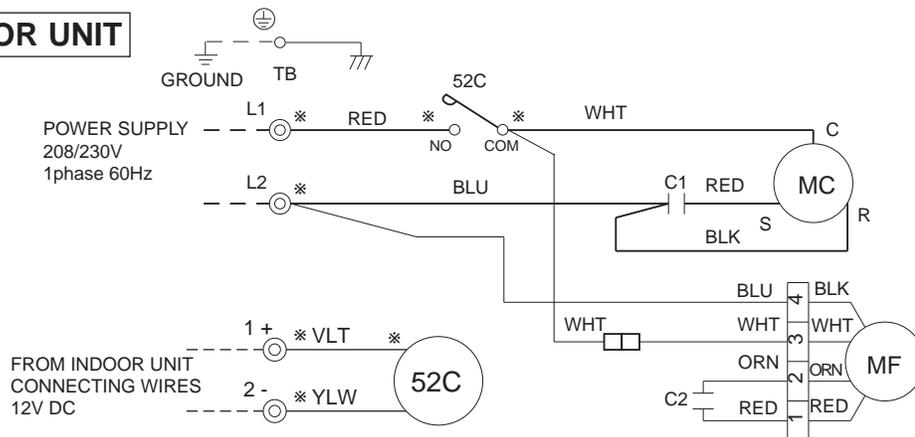


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MF	INDOOR FAN MOTOR (INNER FUSE)	RT12	COIL TEMPERATURE THERMISTOR
DSAR	SURGE ABSORBER	MV	VANE MOTOR	SR142-SR144	SOLID STATE RELAY
F11	FUSE (3A)	NR11	VARISTOR	TB	TERMINAL BLOCK
HIC1	DC / DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR		

- NOTE:1. For the outdoor 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

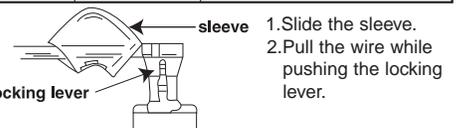
MU12NN MU15NN MU17NN MODELS WIRING DIAGRAM

OUTDOOR UNIT



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

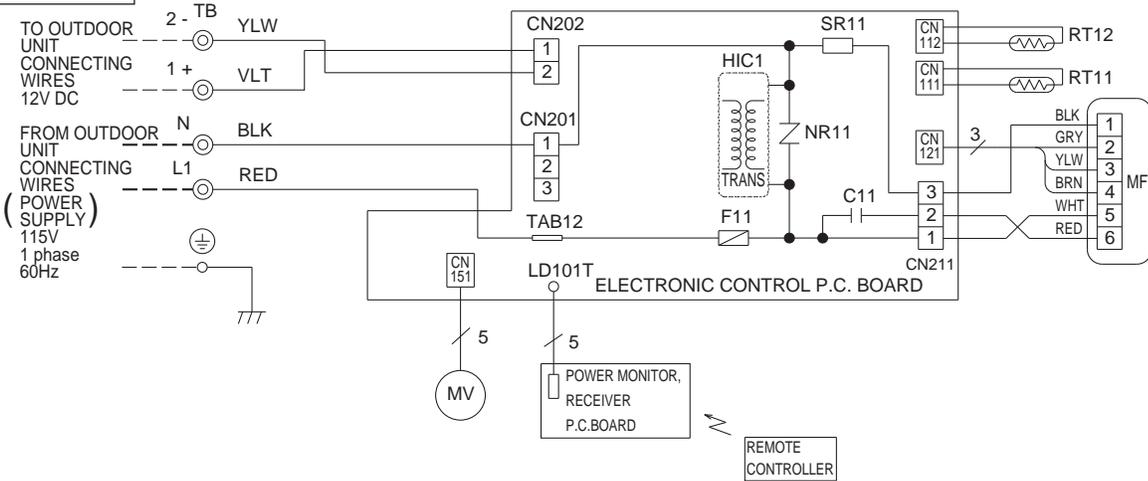
- NOTE:1. Use copper conductors only.(For field wiring)
 2. "*"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
 Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.
 3. Symbols below indicate.
 ○: Terminal block, □□□□: Connector



MS09NW2

MODEL WIRING DIAGRAM

INDOOR UNIT



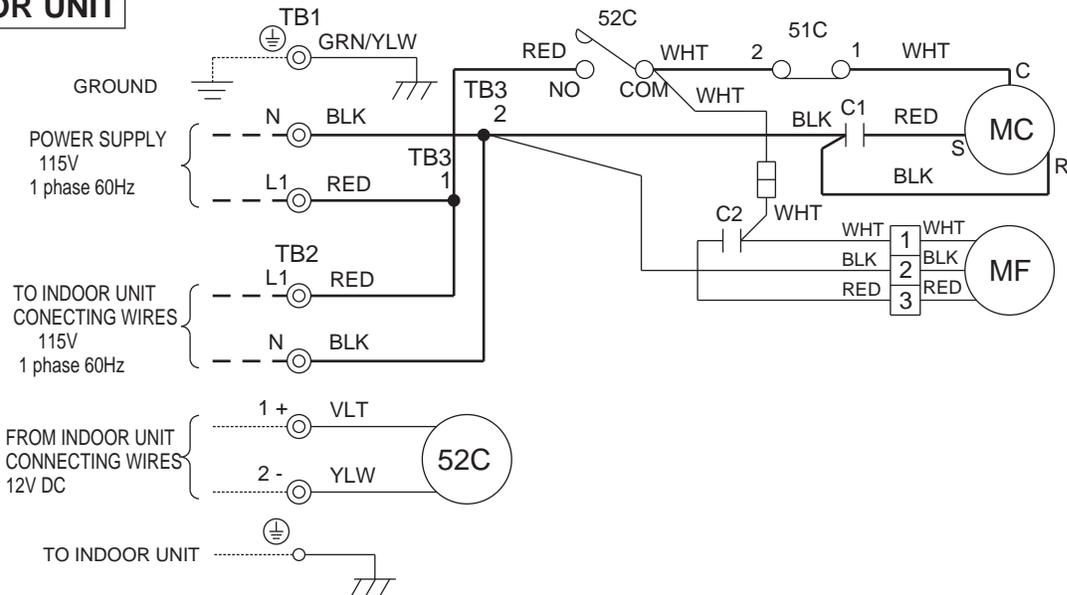
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MV	VANE MOTOR	SR11	SOLID STATE RELAY
F11	FUSE (3A)	NR11	VARIATOR	TB	TERMINAL BLOCK
HIC1	DC / DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR		
MF	INDOOR FAN MOTOR (INNER FUSE)	RT12	COIL TEMPERATURE THERMISTOR		

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

MU09NW2

MODEL WIRING DIAGRAM

OUTDOOR UNIT

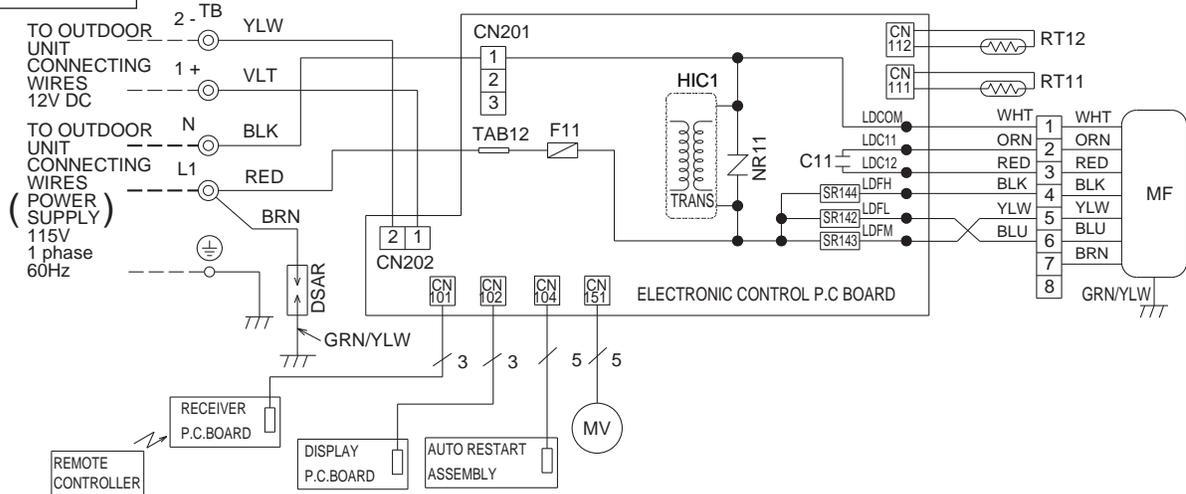


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	TB3	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	TB1	TERMINAL BLOCK	51C	OVER CURRENT RELAY
MC	COMPRESSOR	TB2	TERMINAL BLOCK	52C	CONTACTOR

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

MS12NN2 MS15NN2 MS17NN2 MODELS WIRING DIAGRAM

INDOOR UNIT

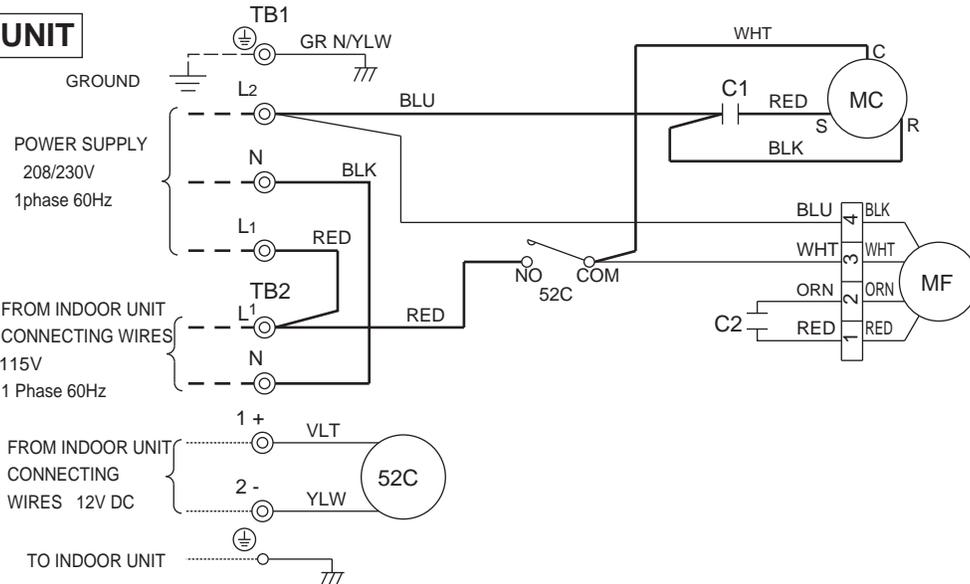


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MF	INDOOR FAN MOTOR (INNER FUSE)	RT12	COIL TEMPERATURE THERMISTOR
DSAR	SURGE ABSORBER	MV	VANE MOTOR	SR142-SR144	SOLID STATE RELAY
F11	FUSE (3A)	NR11	VARISTOR	TB	TERMINAL BLOCK
HIC1	DC / DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR		

- 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

MU12NN2 MU15NN2 MU17NN2 MODELS WIRING DIAGRAM

OUTDOOR UNIT

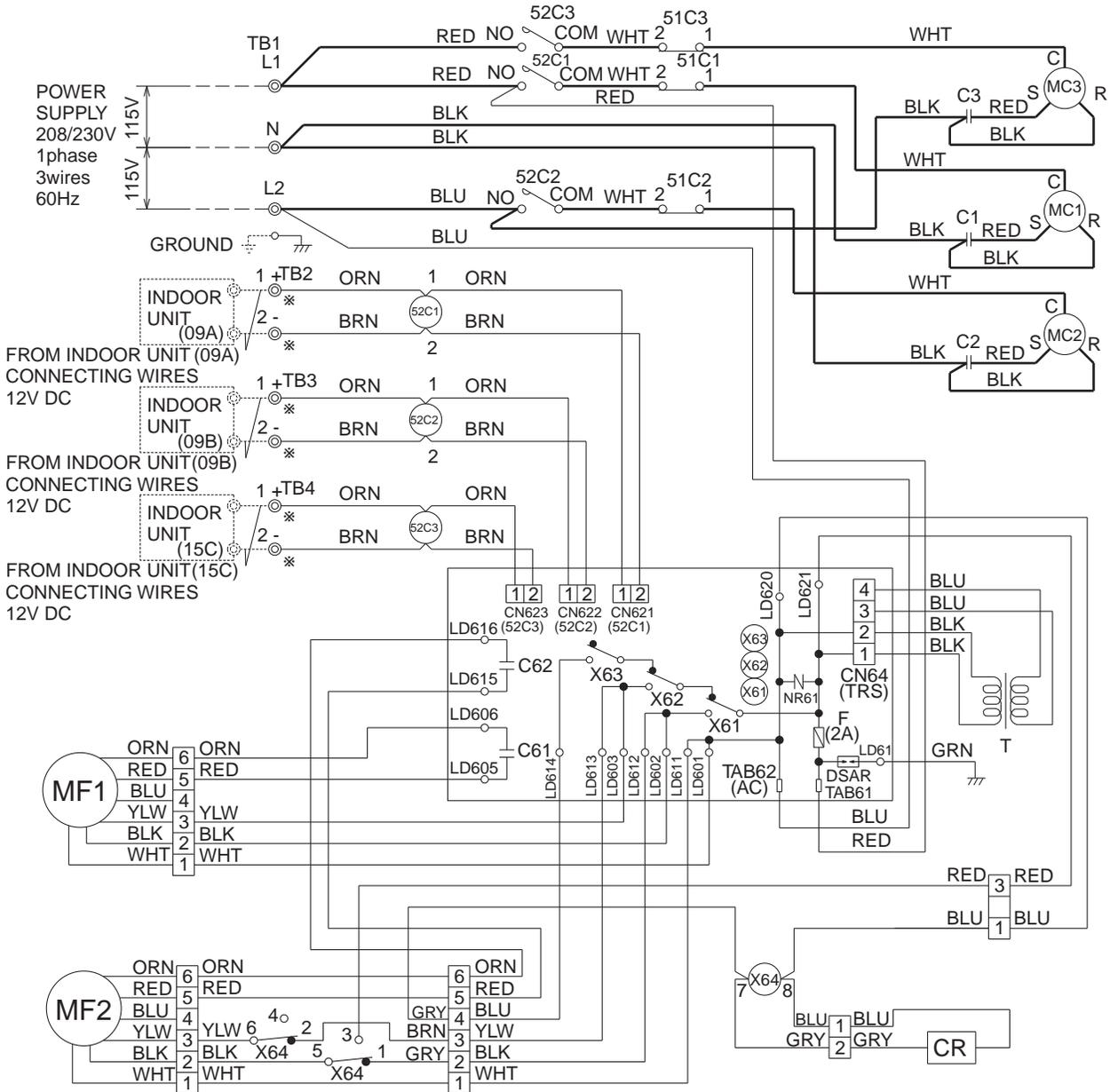


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	52C	CONTACTOR
C2	OUTDOOR FAN CAPACITOR	TB1	TERMINAL BLOCK		
MC	COMPRESSOR (INNER PROTECTOR)	TB2	TERMINAL BLOCK		

- 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

MUM30NN

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1~C3	COMPRESSOR CAPACITOR	MC1~MC3	COMPRESSOR(INNER THERMOSTAT)	TB1~TB4	TERMINAL BLOCK
C61,C62	FAN MOTOR CAPACITOR	MF1,2	FAN MOTOR(INNER THERMOSTAT)	X61~X64	FAN MOTOR RELAY
CR	SURGE KILLER	NR61	VARISTOR	51C1,2,3	OVER CURRENT RELAY
DSAR	SURGE ABSORBER	T	TRANSFORMER	52C1,2,3	COMPRESSOR CONTACTOR
F	FUSE (2A)				

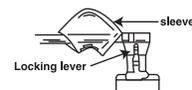
NOTE: 1. Use copper conductors only (For field wiring).

2. Symbols below indicate.

○: Terminal block, □□□□: Connector

3. "*" shows the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.

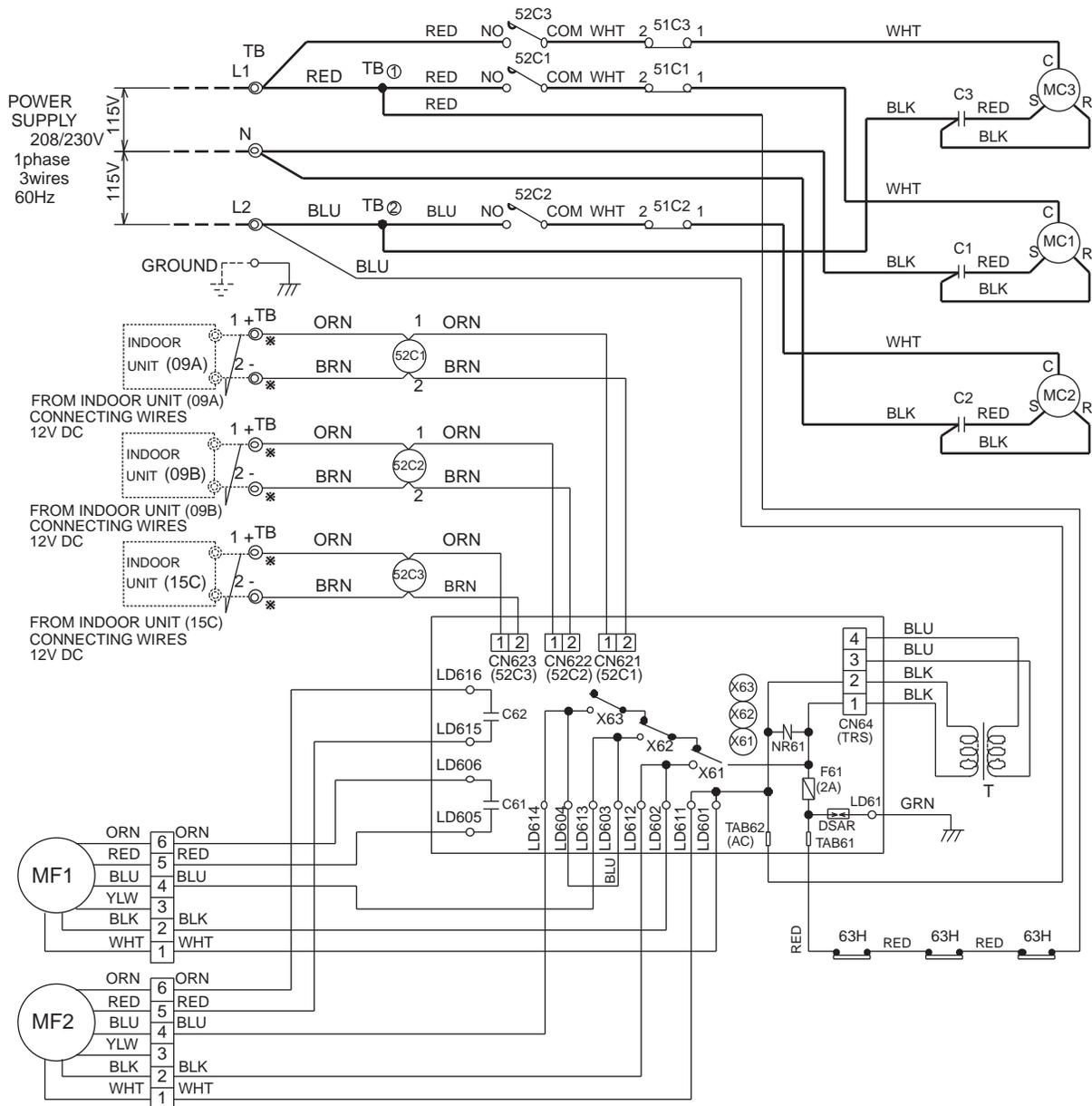
Be sure to pull the wire by pushing the locking lever (projected part) of the terminal with a finger.



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

MUM30NN2

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1~C3	COMPRESSOR CAPACITOR	MF1, MF2	FAN MOTOR(INNER THERMOSTAT)	51C1,2,3	OVER CURRENT RELAY
C61, C62	FAN MOTOR CAPACITOR	NR61	VARISTOR	52C1,2,3	COMPRESSOR CONTACTOR
DSAR	SURGE ABSORBER	T	TRANSFORMER	63H	HIGH PRESSURE SWITCH
F61	FUSE (2A)	TB	TERMINAL BLOCK		
MC1~MC3	COMPRESSOR(INNER THERMOSTAT)	X61~X63	FAN MOTOR RELAY		

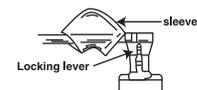
NOTE: 1. Use copper conductors only (For field wiring).

2. Symbols below indicate.

○: Terminal block, □□□□: Connector

3. "*" shows the terminals with a lock mechanism, so they 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.

REFRIGERANT SYSTEM DIAGRAM

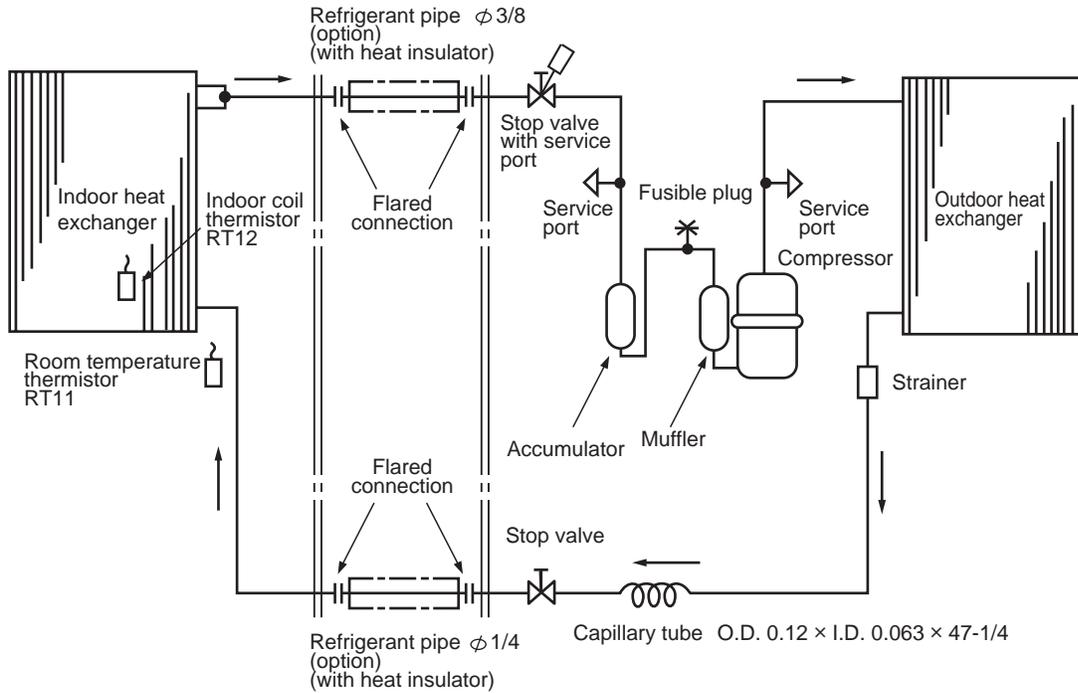
Unit:inch

MS09NW MS09NW2

MU09NW MU09NW2

INDOOR UNIT

OUTDOOR UNIT

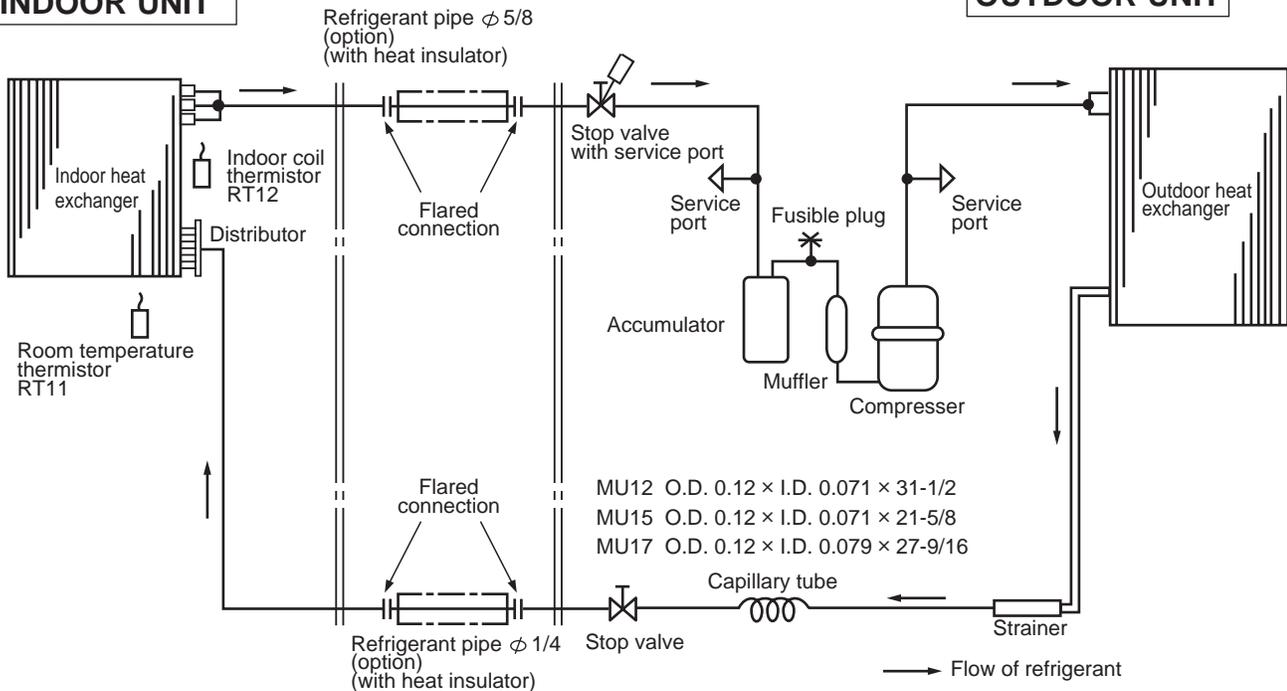


MS12NN MS12NN2
MS15NN MS15NN2
MS17NN MS17NN2

MU12NN MU12NN2
MU15NN MU15NN2
MU17NN MU17NN2

INDOOR UNIT

OUTDOOR UNIT

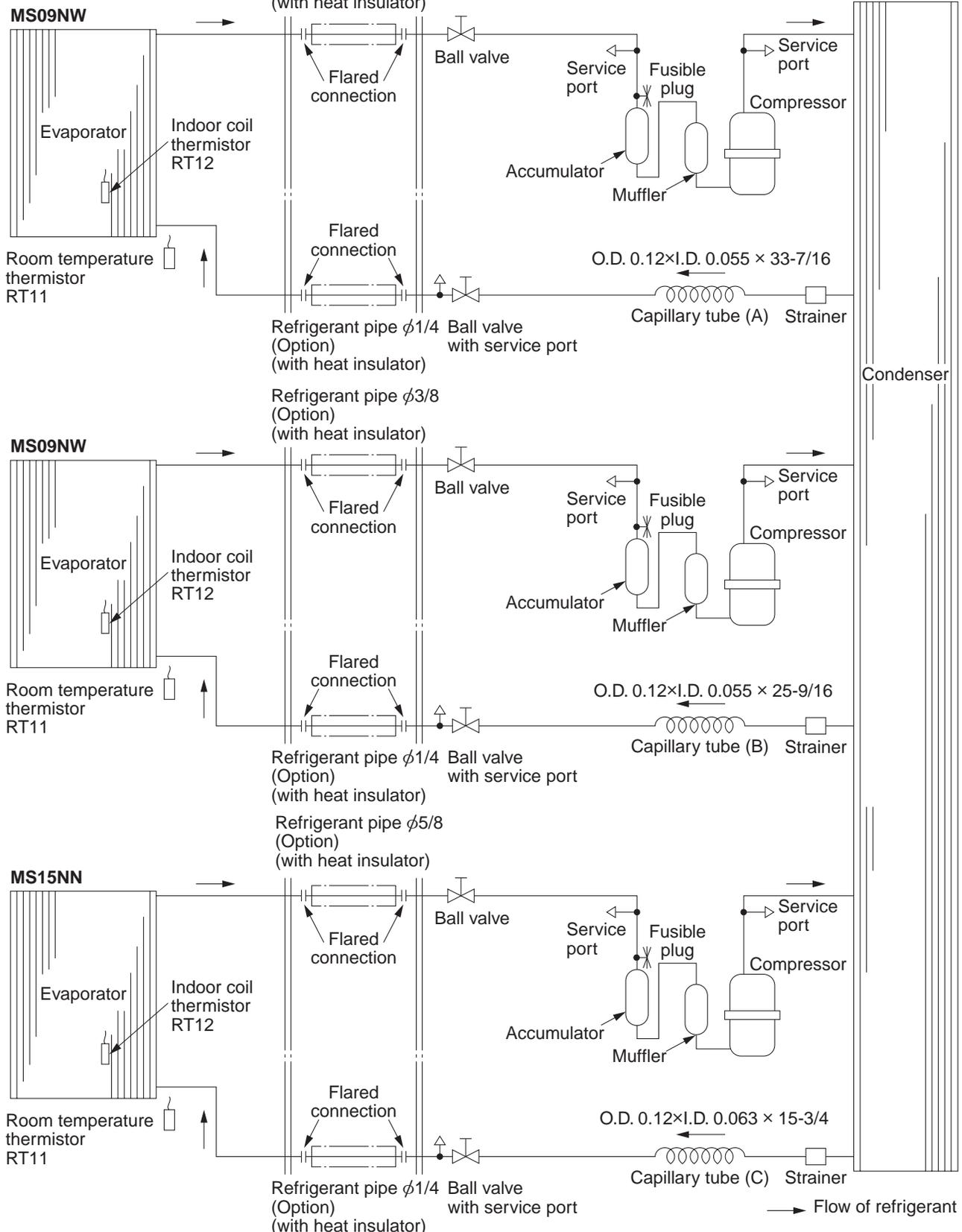


MS09NW × 2 MS15NN × 1

MUM30NN

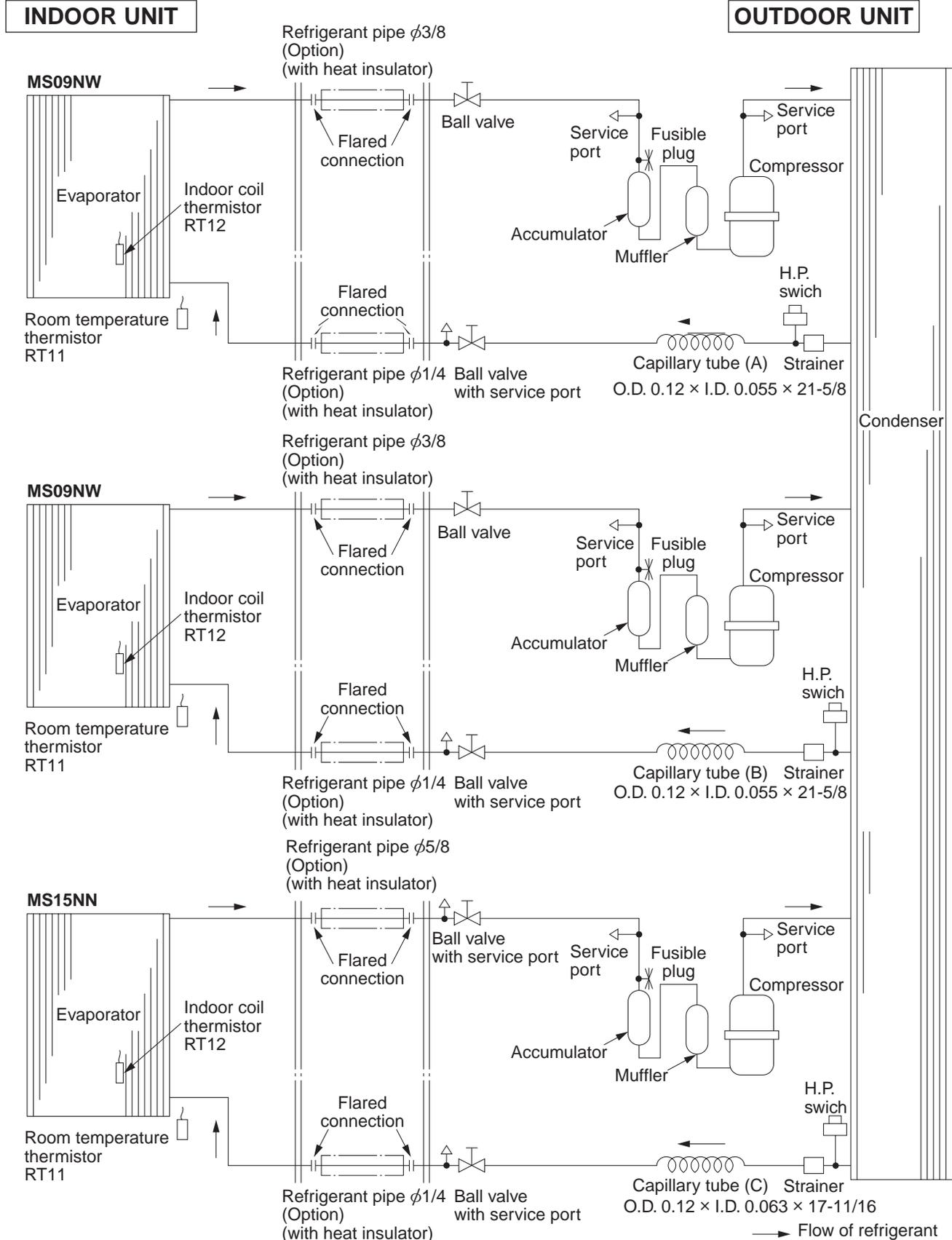
INDOOR UNIT

OUTDOOR UNIT



MS09NW × 2 MS15NN × 1

MUM30NN2



- MS09NW MS09NW2
- MS12NN MS12NN2
- MS15NN MS15NN2
- MS17NN MS17NN2

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

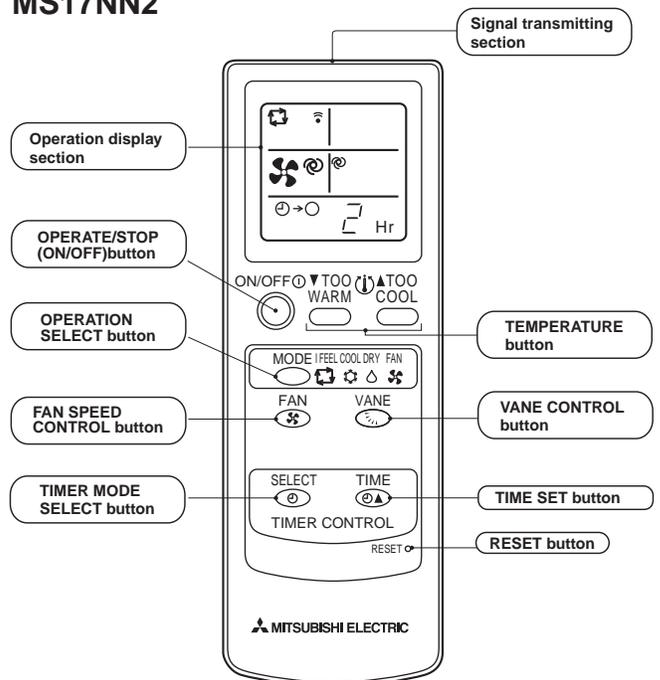
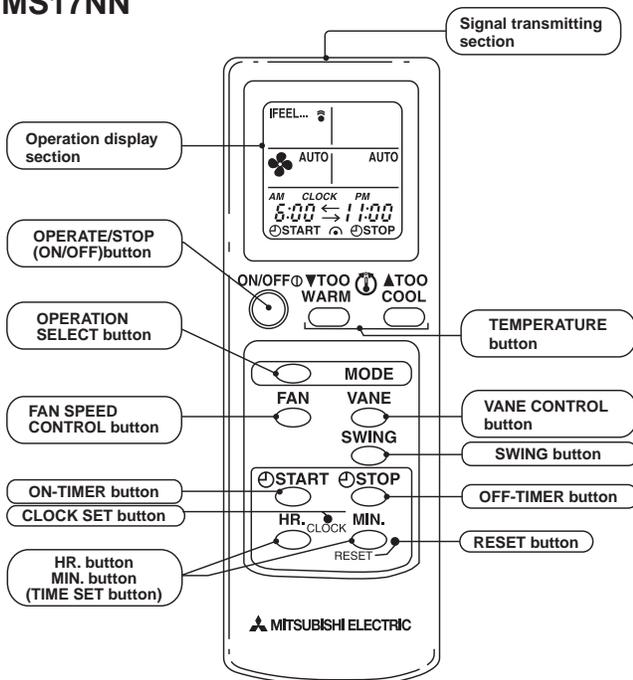
Indoor unit receives the signal with a beep tone.

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

- MS09NW
- MS12NN
- MS15NN
- MS17NN

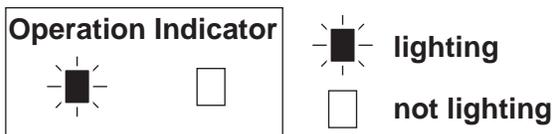
- MS09NW2
- MS12NN2
- MS15NN2
- MS17NN2



INDOOR UNIT DISPLAY SECTION

Operation Indicator lamp

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



Indication	Operation state	Difference between set 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

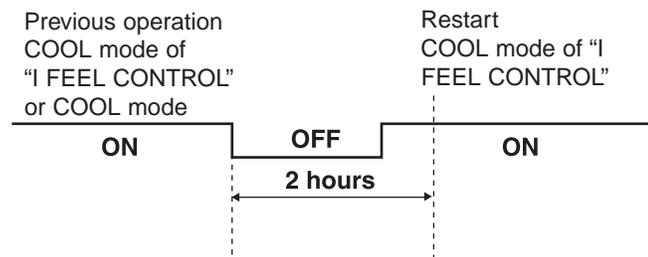
9-1. "I FEEL CONTROL" OPERATION

- (1) Press OPERATE/STOP 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"

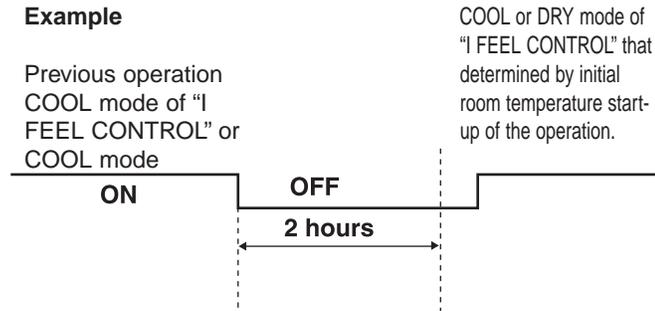
- Once the mode is fixed, the mode will not change by room temperature afterwards.
- Under the ON-TIMER operation, the mode is determined according to the room temperature when the operation starts.
- When the system is stopped with the OPERATE/STOP button on the remote controller, and restarted within 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.

Mode	Initial room temperature	Initial set temperature	
		COOL mode of "I FEEL CONTROL"	79°C or more
	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) 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

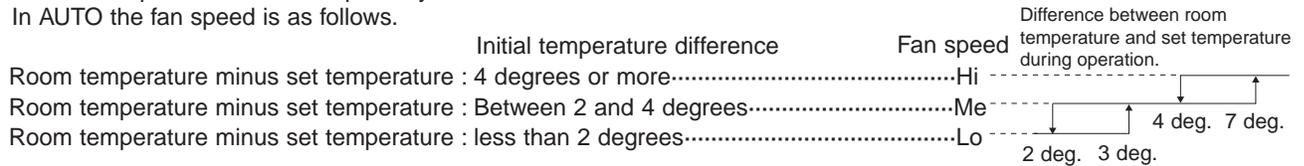
WARM ... To lower the set temperature 2~4 degrees(°F)



— **COOL mode of "I FEEL CONTROL"** —

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.



2. Coil frost prevention

① 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 37°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 37°F (MS12/15/17) this mode is prolonged until the RT12 reads over 39°F (MS09) or 37°F (MS12/15/17).

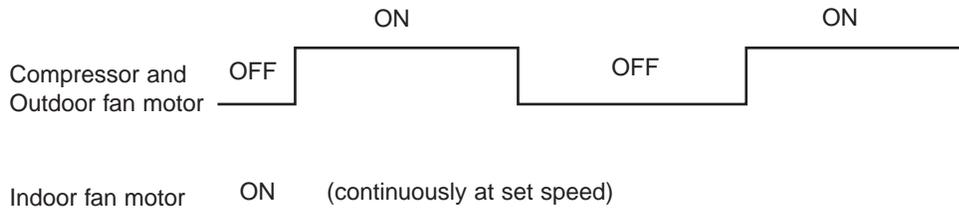
② Time control

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

- a. Compressor has been continuously operating.
- b. Indoor fan speed is 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.



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

1. Indoor fan speed control

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

However, in AUTO fan operation, fan speed becomes Lo.

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.

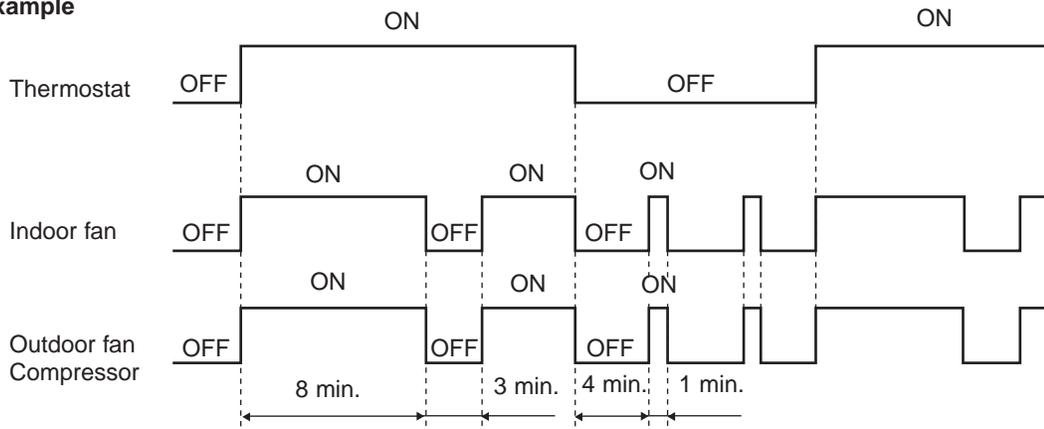
- When the room temperature is under 73°F.

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

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

Operation time chart

Example



3. Coil frost prevention

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

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

However, when coil frost prevention works while the compressor is not operating, it's speed becomes Lo.

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.

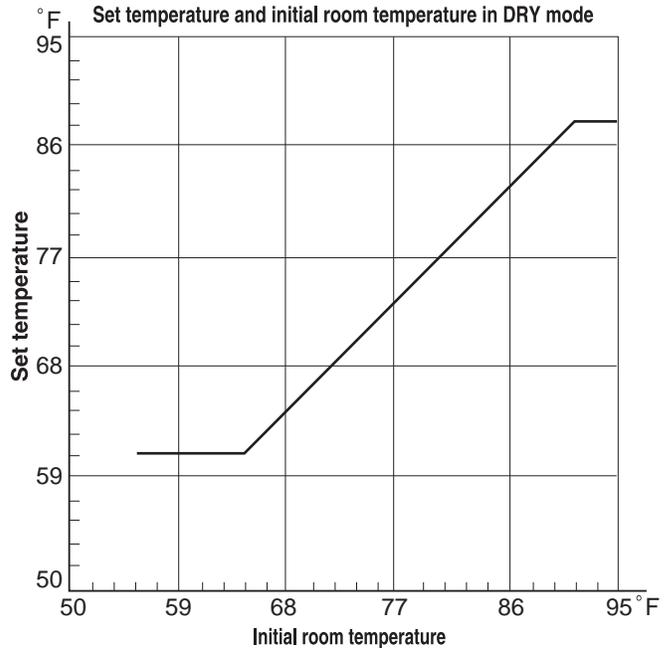
The setting range is 59 ~ 89°F

* Indoor fan continues to operate regardless of thermostat's OFF-OFF 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.
- (5) When DRY operation functions, the fan speed is lower than cool operation.

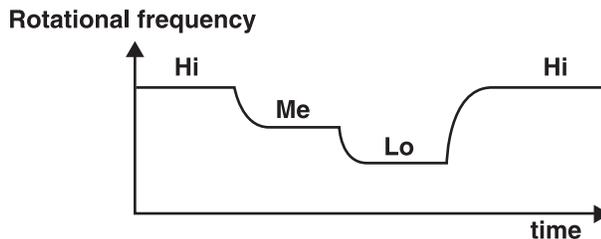


9-4. FAN OPERATION

- (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.

9-5. FAN MOTOR CONTROL<MS09>

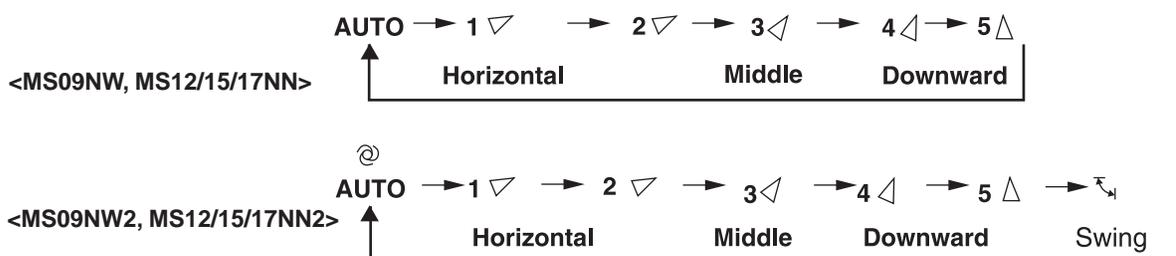
- (1) Rotational frequency feedback control
The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (Hi, Me, Lo) the microprocessor 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 lamp flashes on and off to show the fan motor abnormality. (See page 45.)

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 ( or ) button.



(3) Positioning

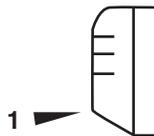
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

- (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 on 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

<MS09NW, MS12/15/17NN>

By pressing the SWING () button the horizontal vane swings vertically. The remote controller displays “”. SWING mode is cancelled when the SWING () button or the VANE CONTROL () button is pressed or the mode is changed to other mode.

<MS09NW2, MS12/15/17NN2>

By selecting SWING mode with the VANE CONTROL () button, the horizontal vane swings vertically. The remote controller displays “”. SWING mode is cancelled when the VANE CONTROL () button is pressed once again.

9-7. TIMER OPERATION

<MS09NW, MS12/15/17NN>

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 TIMER CONTROL button to select the operation.

"⊖ START" button... AUTO START operation (ON timer)

"⊖ 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.

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

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

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

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

2. Cancel

TIMER setting can be cancelled with the TIMER CONTROL buttons. ("⊖ START" or "⊖ STOP")

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

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

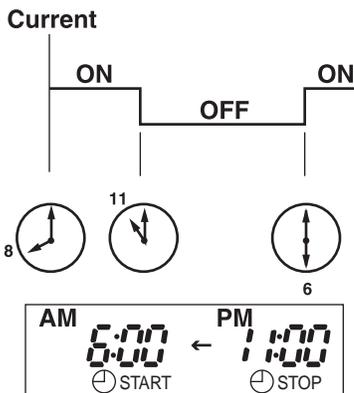
TIMER is cancelled and the display of set time disappears.

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.

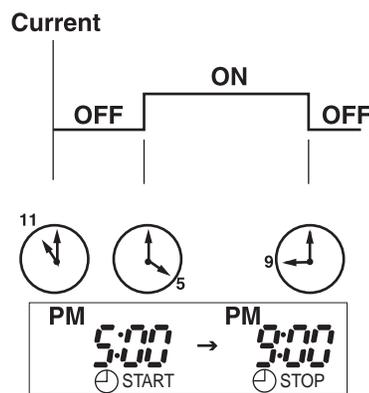
(Example 1) The current time is 8:00 PM.

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.

<MS09NW2, MS12/15/17NN2>

1. How to set the timer

- (1) Press the OPERATE/STOP (ON/OFF) button to start the air conditioner.
- (2) Press the "SELECT" button to select the operation.
 "⌚→○"(OFF TIMER) → "⌚→|"(ON TIMER) → TIMER RELEASE
 Each time this button is pressed, the timer mode is changed in sequence.
- (3) Press the "TIME" button to set the timer.
 Each time this button is pressed, the set time increases by 1 hour to 12 hours.
- (4) After setting the ON timer, check that OPERATION INDICATOR lamp of the unit lights.

NOTE 1 : 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.

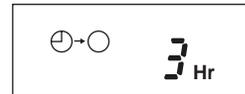
NOTE 2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

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

NOTE 3 : The OFF TIMER and ON TIMER can not be set at the same time.

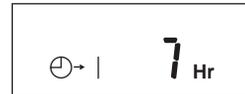
(Example 1) Setting to stop the air conditioner 3 hours later.

- ① Press the "SELECT" button to select the "⌚→○" (OFF TIMER).
- ② Press the "TIME" button to set the "3Hr".



(Example 2) Setting to operate the air conditioner 7 hours later.

- ① Press the "SELECT" button to select the "⌚→|" (ON TIMER).
- ② Press the "TIME" button to set the "7Hr".



2. Cancel

Select the TIMER RELEASE mode by pressing the "SELECT" button. (Refer to 1.(2))

9-8. 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 Hi 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 in cooling. The fan speed set to Me .

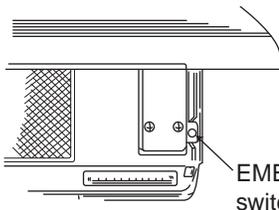
This operation continues until the EMERGENCY OPERATION switch is pressed again or any button on the remote controller is pressed, and after that normal operation will start.

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.

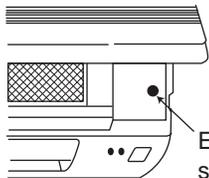
NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.

MS09NW MS09NW2



EMERGENCY OPERATION switch

MS12NN MS15NN MS17NN MS12NN2 MS15NN2 MS17NN2



EMERGENCY OPERATION switch



- Press once
- <Cool>
- Press again
- <Stop>

MS09NW MS12NN MS15NN MS17NN MS09NW2 MS12NN2 MS15NN2 MS17NN2**10-1. 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 minutes.

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 assembly.
- 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.

10-2. TIMER SHORT MODE

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

The time will be shortened as follows.(Refer to page 52 or 53.)

3-minute delay : 3-minute → 3-second.

AUTO START : 1 hour → 1-minute

AUTO STOP : 1 hour → 1-minute

} Short the connector during the timer mode.

10-3. 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 :

MS09NW MS12NN MS15NN MS17NN MS09NW2 MS12NN2 MS15NN2 MS17NN2

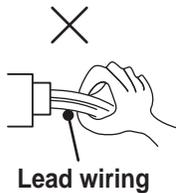
11-1. Cautions on troubleshooting

1. Before troubleshooting, check the followings:

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

2. Take care the followings during servicing.

- 1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
- 2) When removing the electronic control 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.



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 abnormality indication is flashing on and off before starting service work.
- 2) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
- 3) When troubleshooting, refer to the flow chart on page 45 and the check table on page 45.

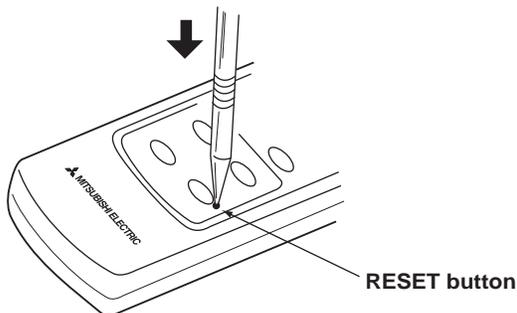
4. How to replace batteries

Weak batteries may cause the remote controller malfunction.

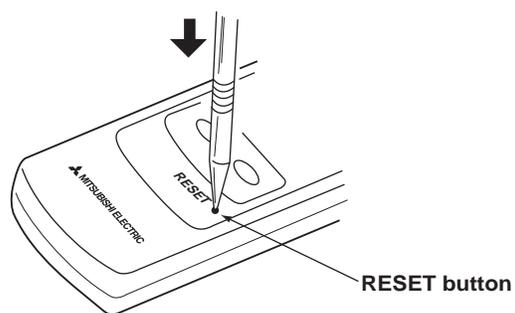
In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, replace the batteries in the following order.

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.

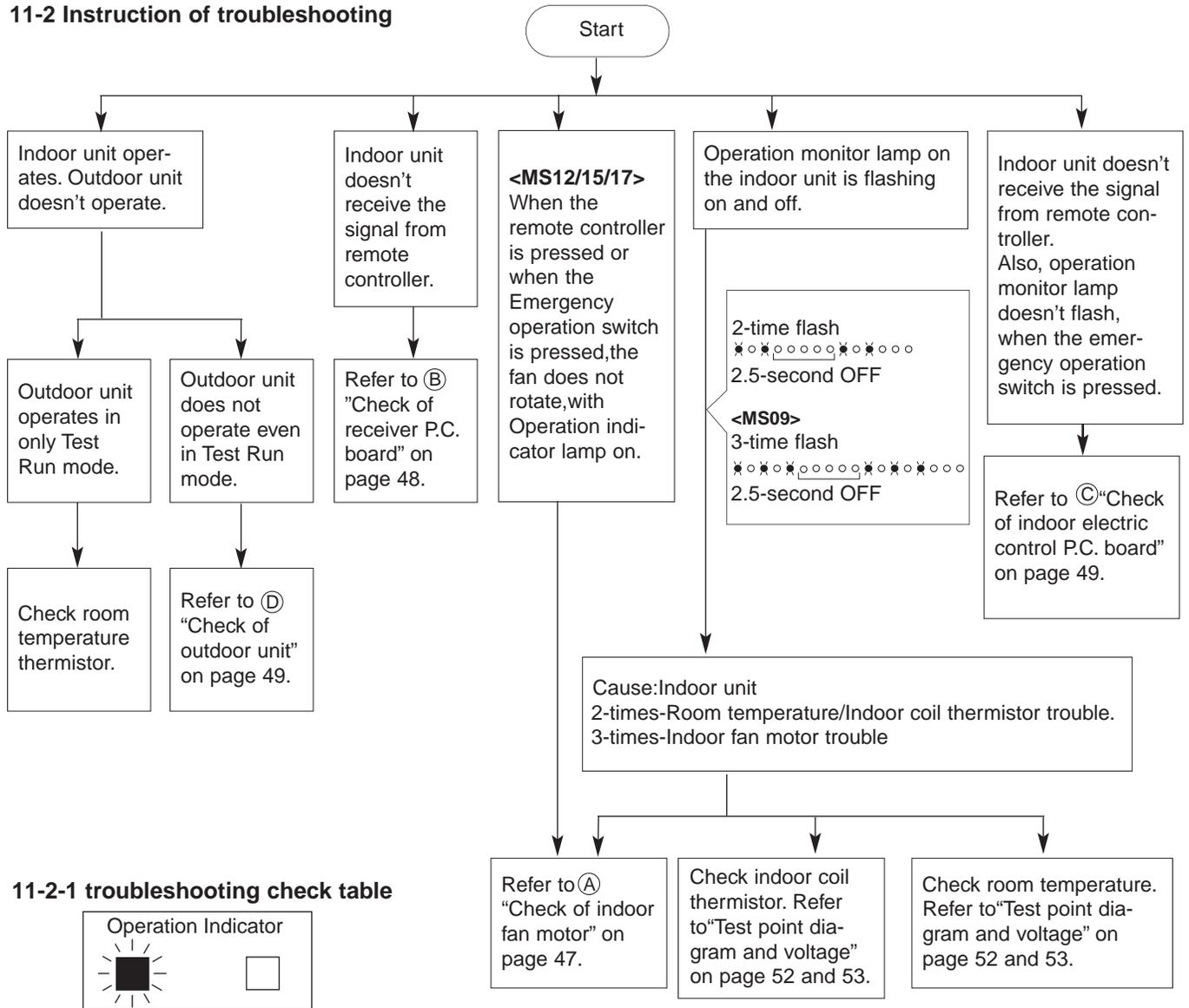
<MS09NW, MS12/15/17NN>



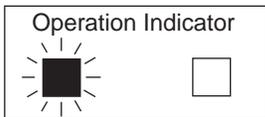
<MS09NW2, MS12/15/17NN2>



11-2 Instruction of troubleshooting



11-2-1 troubleshooting check table



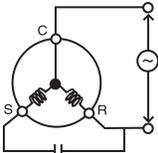
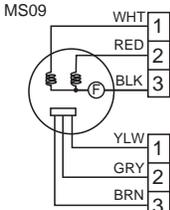
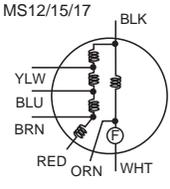
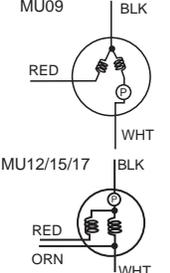
Look at the left lamp flash for the self check table.

* 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 Room temperature thermistor	2-time flash ●●○○○○○○●●○○○○ 2.5-second OFF	Outdoor unit does not run.	Detects Indoor coil/room temperature thermistor short or open circuit every 2 seconds during operation.	<ul style="list-style-type: none"> ● Check thermistor calibration ● Reconnect connector ● Check indoor electric P.C. board
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	<ul style="list-style-type: none"> ● Disconnect connector CN211 and then check connector CN121 ②-③ 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 MS09NW2 MS12NN2 MS15NN2 MS17NN2
11-2 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	<table border="1"> <thead> <tr> <th></th> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td></td> <td>8kΩ ~ 20kΩ</td> <td>Opened or short-circuit</td> </tr> </tbody> </table>		Normal	Abnormal		8kΩ ~ 20kΩ	Opened or short-circuit																
	Normal	Abnormal																					
	8kΩ ~ 20kΩ	Opened or short-circuit																					
Compressor	Measure the resistance between the terminals with a tester. (Coil wiring temperature 14°F ~ 104°F)	 <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="4">Normal</th> <th rowspan="2">Abnormal</th> </tr> <tr> <th>MU09</th> <th>MU12</th> <th>MU15</th> <th>MU17</th> </tr> </thead> <tbody> <tr> <td>C-R</td> <td>0.8~1.1Ω</td> <td>1.9~2.4Ω</td> <td>1.4~1.9Ω</td> <td>1.4~1.8Ω</td> <td rowspan="2">Opened or short-circuit</td> </tr> <tr> <td>C-S</td> <td>1.9~2.4Ω</td> <td>2.7~3.4Ω</td> <td>2.4~3.0Ω</td> <td>2.3~2.9Ω</td> </tr> </tbody> </table>		Normal				Abnormal	MU09	MU12	MU15	MU17	C-R	0.8~1.1Ω	1.9~2.4Ω	1.4~1.9Ω	1.4~1.8Ω	Opened or short-circuit	C-S	1.9~2.4Ω	2.7~3.4Ω	2.4~3.0Ω	2.3~2.9Ω
	Normal				Abnormal																		
	MU09	MU12	MU15	MU17																			
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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 temperature 50°F ~ 86°F) <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Normal</th> <th rowspan="2">Abnormal</th> </tr> <tr> <th colspan="2">MS09</th> </tr> </thead> <tbody> <tr> <td>WHT-BLK</td> <td colspan="2">76~83 Ω</td> <td rowspan="2">Opened or short-circuit</td> </tr> <tr> <td>BLK-RED</td> <td colspan="2">70~76 Ω</td> </tr> </tbody> </table>		Normal		Abnormal	MS09		WHT-BLK	76~83 Ω		Opened or short-circuit	BLK-RED	70~76 Ω										
			Normal			Abnormal																	
		MS09																					
WHT-BLK	76~83 Ω		Opened or short-circuit																				
BLK-RED	70~76 Ω																						
Sensor part Measure the voltage Power ON. <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Normal</th> <th rowspan="2">Abnormal</th> </tr> <tr> <th colspan="2">MS09</th> </tr> </thead> <tbody> <tr> <td>BRN-YLW</td> <td colspan="2">4.5 ~ 5.5V</td> <td rowspan="2">Remain 0V or 5V</td> </tr> <tr> <td>YLW-GRY</td> <td colspan="2">(When fan revolved one time) 0V→5V→0V (Approx.)</td> </tr> </tbody> </table>		Normal		Abnormal	MS09		BRN-YLW	4.5 ~ 5.5V		Remain 0V or 5V	YLW-GRY	(When fan revolved one time) 0V→5V→0V (Approx.)											
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BRN-YLW	4.5 ~ 5.5V		Remain 0V or 5V																				
YLW-GRY	(When fan revolved one time) 0V→5V→0V (Approx.)																						
Motor part <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Normal</th> <th rowspan="2">Abnormal</th> </tr> <tr> <th>MS12/15</th> <th>MS17</th> </tr> </thead> <tbody> <tr> <td>WHT-BLK</td> <td>67~73Ω</td> <td>53~59Ω</td> <td rowspan="5">Opened or short-circuit</td> </tr> <tr> <td>BLK-YLW</td> <td>9~9.8Ω</td> <td>10~12Ω</td> </tr> <tr> <td>YLW-BLU</td> <td>4.9~5.5Ω</td> <td>4.6~5.0Ω</td> </tr> <tr> <td>BLU-BRN</td> <td>5.8~6.4Ω</td> <td>5.4~6.0Ω</td> </tr> <tr> <td>BRN-RED</td> <td>28~32Ω</td> <td>36~40Ω</td> </tr> </tbody> </table>		Normal		Abnormal	MS12/15	MS17	WHT-BLK	67~73Ω	53~59Ω	Opened or short-circuit	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	
		Normal			Abnormal																		
	MS12/15	MS17																					
WHT-BLK	67~73Ω	53~59Ω	Opened or short-circuit																				
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BRN-RED	28~32Ω	36~40Ω																					
Outdoor fan motor	Measure the resistance between the terminals with a tester. (Coil wiring temperature 14°F ~ 104°F)	 <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Normal</th> <th rowspan="2">Abnormal</th> </tr> <tr> <th>MU09</th> <th>MU12/15/17</th> </tr> </thead> <tbody> <tr> <td>WHT-BLK</td> <td>55~68Ω</td> <td>102~126Ω</td> <td rowspan="2">Opened or short-circuit</td> </tr> <tr> <td>BLK-YLW</td> <td>114~141Ω</td> <td>97~120Ω</td> </tr> </tbody> </table>		Normal		Abnormal	MU09	MU12/15/17	WHT-BLK	55~68Ω	102~126Ω	Opened or short-circuit	BLK-YLW	114~141Ω	97~120Ω								
	Normal			Abnormal																			
	MU09	MU12/15/17																					
WHT-BLK	55~68Ω	102~126Ω	Opened or short-circuit																				
BLK-YLW	114~141Ω	97~120Ω																					
Vane motor	Measure the resistance between the terminals with a tester. (Part temperature 50°F ~ 86°F)	<table border="1"> <thead> <tr> <th colspan="2">Normal</th> <th rowspan="2">Abnormal</th> </tr> <tr> <th>09NW</th> <th>12/15/17NN</th> </tr> </thead> <tbody> <tr> <td>282 ~ 305Ω</td> <td>358 ~ 387Ω</td> <td>Opened or short-circuit</td> </tr> </tbody> </table>	Normal		Abnormal	09NW	12/15/17NN	282 ~ 305Ω	358 ~ 387Ω	Opened or short-circuit													
Normal		Abnormal																					
09NW	12/15/17NN																						
282 ~ 305Ω	358 ~ 387Ω	Opened or short-circuit																					

F: INNER FUSE P: INNER PROTECTOR

MUM30NN, MUM30NN2

11-2-3 Trouble criterion of main parts

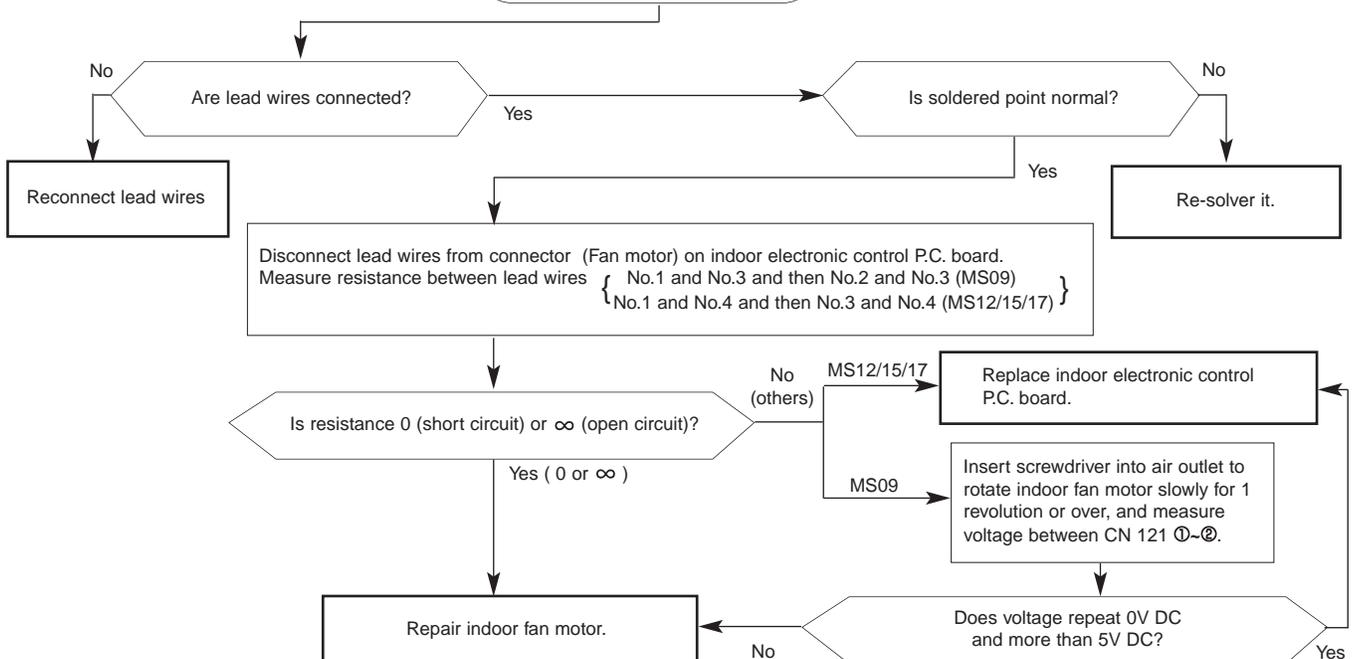
Part name	Check method and criterion	Figure			
Compressor	Measure the resistance between the terminals with a tester. (Coil wiring temperature 14°F ~ 104°F)				
	MUM30NN				
			Normal (KH122WEV)	Normal (RH167NAB)	Abnormal
	C-R		0.8~1.1Ω	2.1~2.7Ω	Opened or short-circuited
	C-S		4.8~5.2Ω	4.0~5.0Ω	
	MUM30NN2				
	Normal (KH122WES)	Normal (RH167NAB)	Abnormal		
C-R	0.8~1.1Ω	2.1~2.7Ω	Opened or short-circuited		
C-S	1.9~2.4Ω	4.0~5.0Ω			
Outdoor fan motor	Measure the resistance between the terminals with a tester. (Coil wiring temperature 14°F ~ 104°F)				
			Normal (Upper)	Normal (Lower)	Abnormal
	WHT-BLK		60~75Ω	50~65Ω	Opened or short-circuited
	BLK-YLW		15~20Ω	14~19Ω	
	YLW-BLU		12~16Ω	12~16Ω	
BLU-RED	51~64Ω	54~67Ω			
MUM30NN2 only High pressure switch (H.P.S.)	Measure the resistance between the terminals with a tester.				
			High pressure switch (H.P.SWITCH)	Normal	Abnormal
	Open		341 ± 21 PSIG	Short	In case of excepting the left description.
Short	$398 \begin{smallmatrix} +7 \\ -14 \end{smallmatrix}$ PSIG	Open			

Ⓟ : INNER PROTECTOR

Ⓐ Check of indoor fan motor

Indoor fan does not operate.

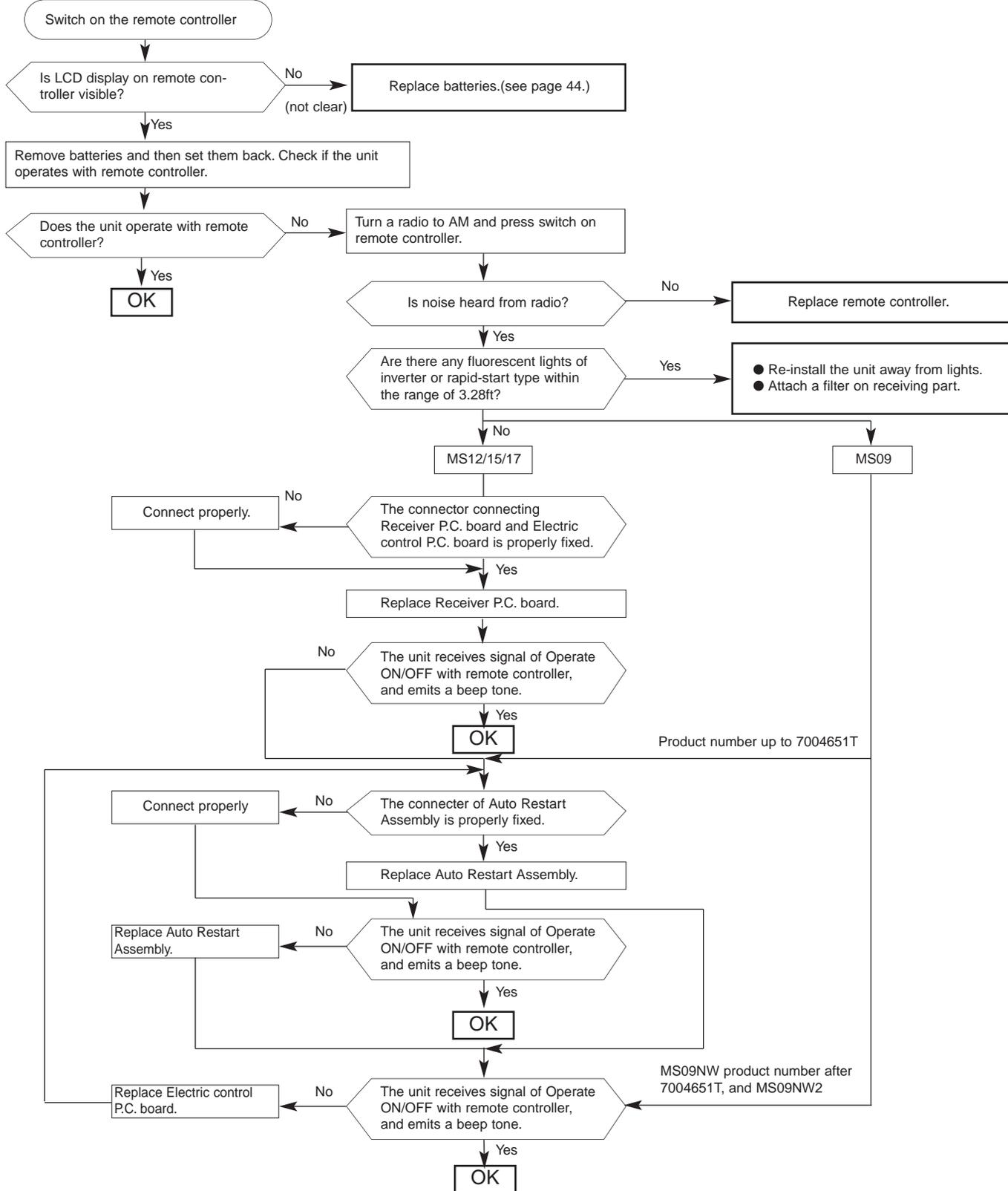
Turn OFF the power supply.
Check connector (Fan motor) visually.



B 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.

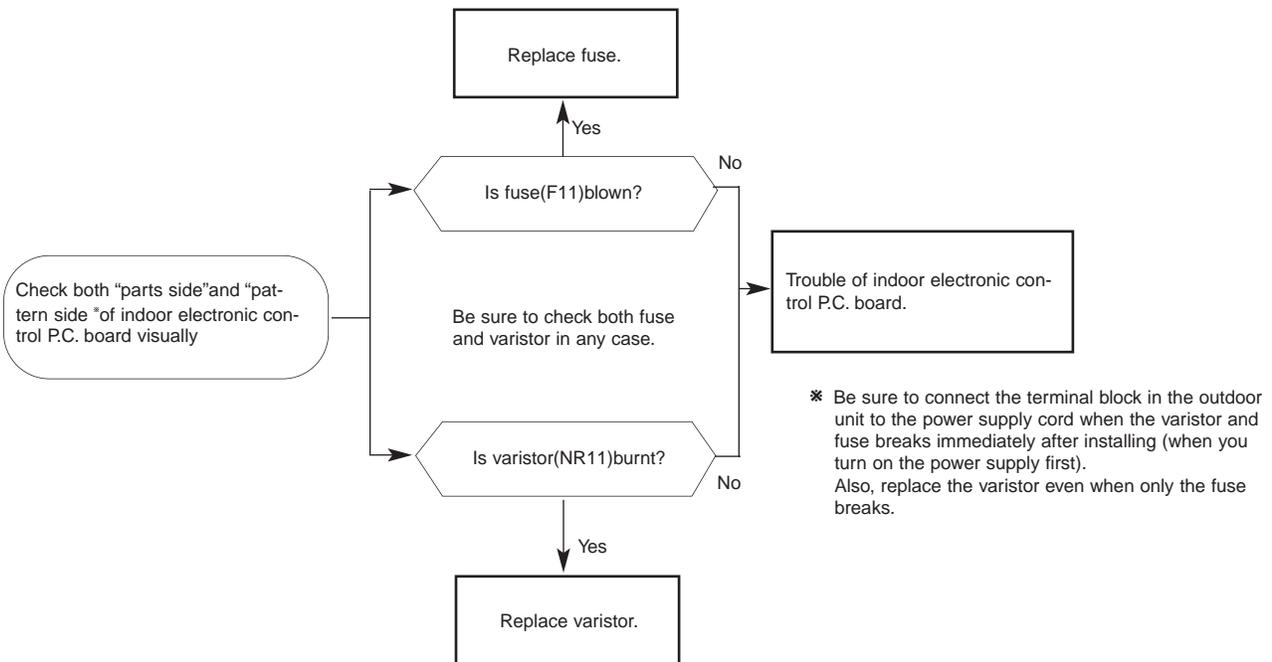
* Check if the remote controller is exclusive for this air conditioner.



Ⓒ Check of indoor electronic control P.C. board

The unit doesn't operate with the remote controller.

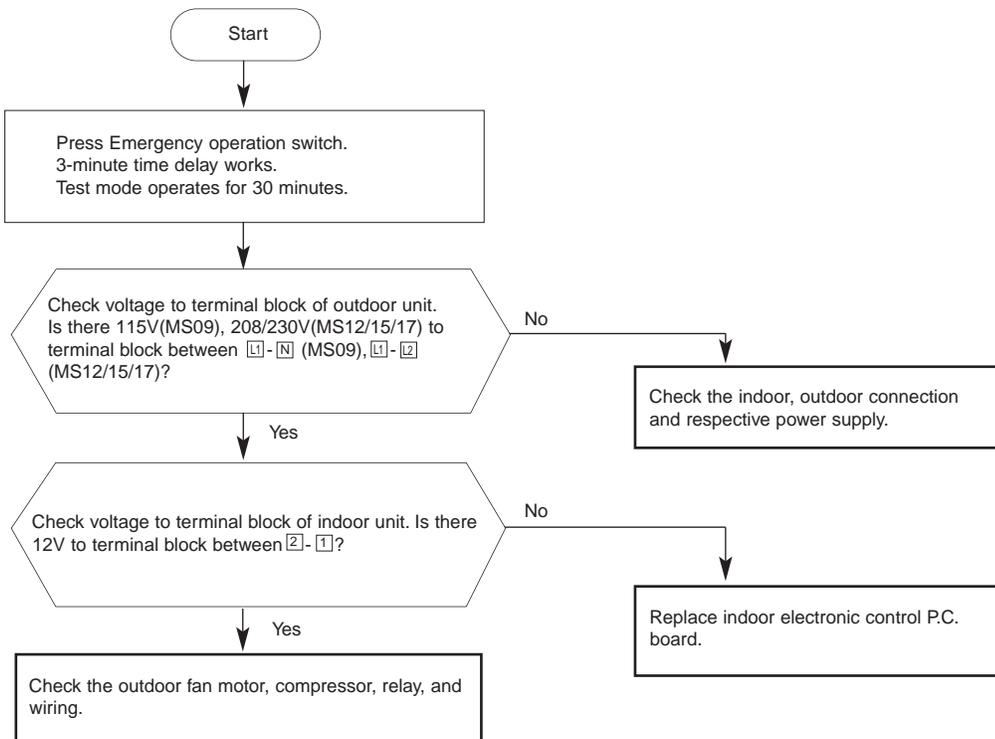
Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.



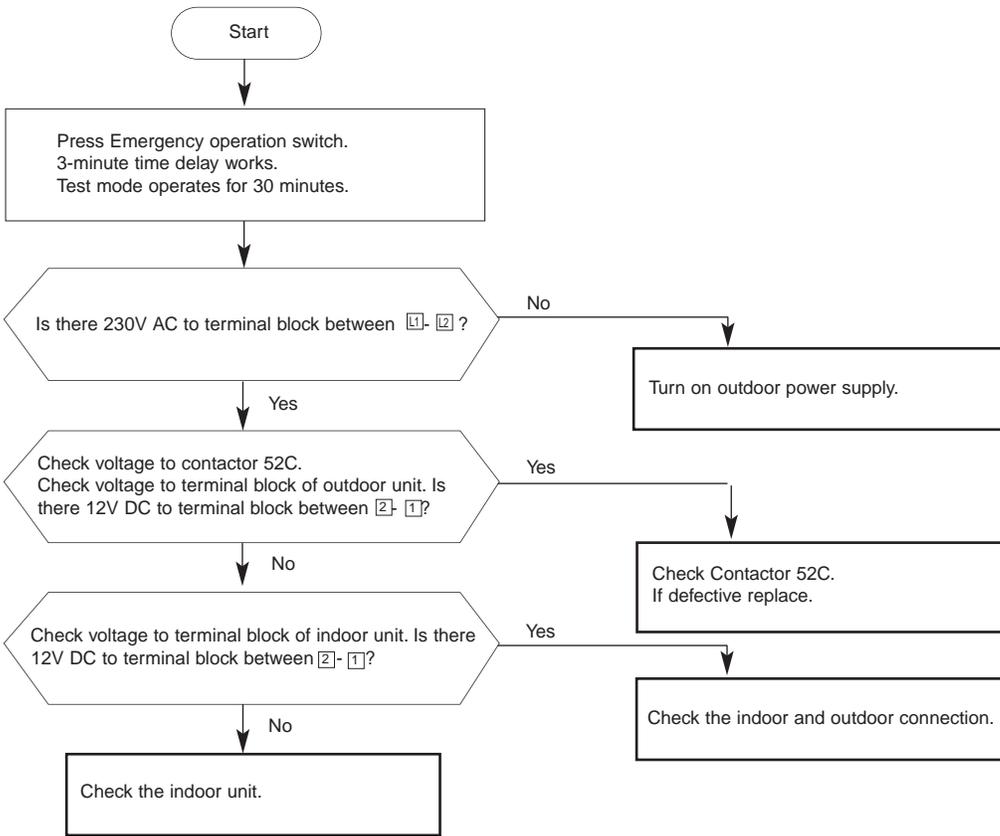
Ⓓ Check of outdoor unit

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

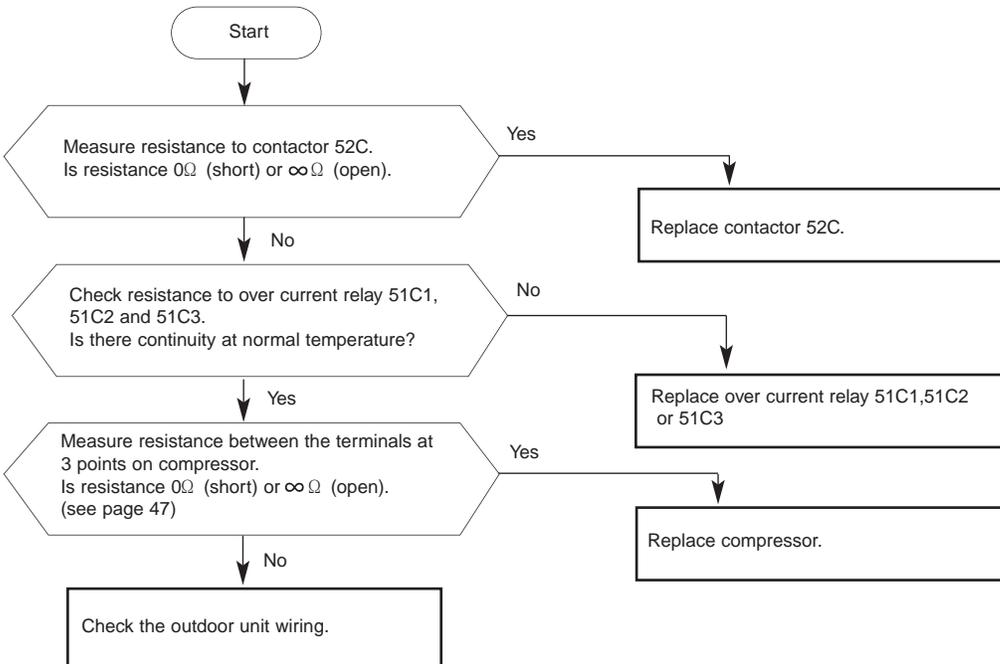
MU09NW MU12NN MU15NN MU17NN MU09NW2 MU12NN2 MU15NN2 MU17NN2



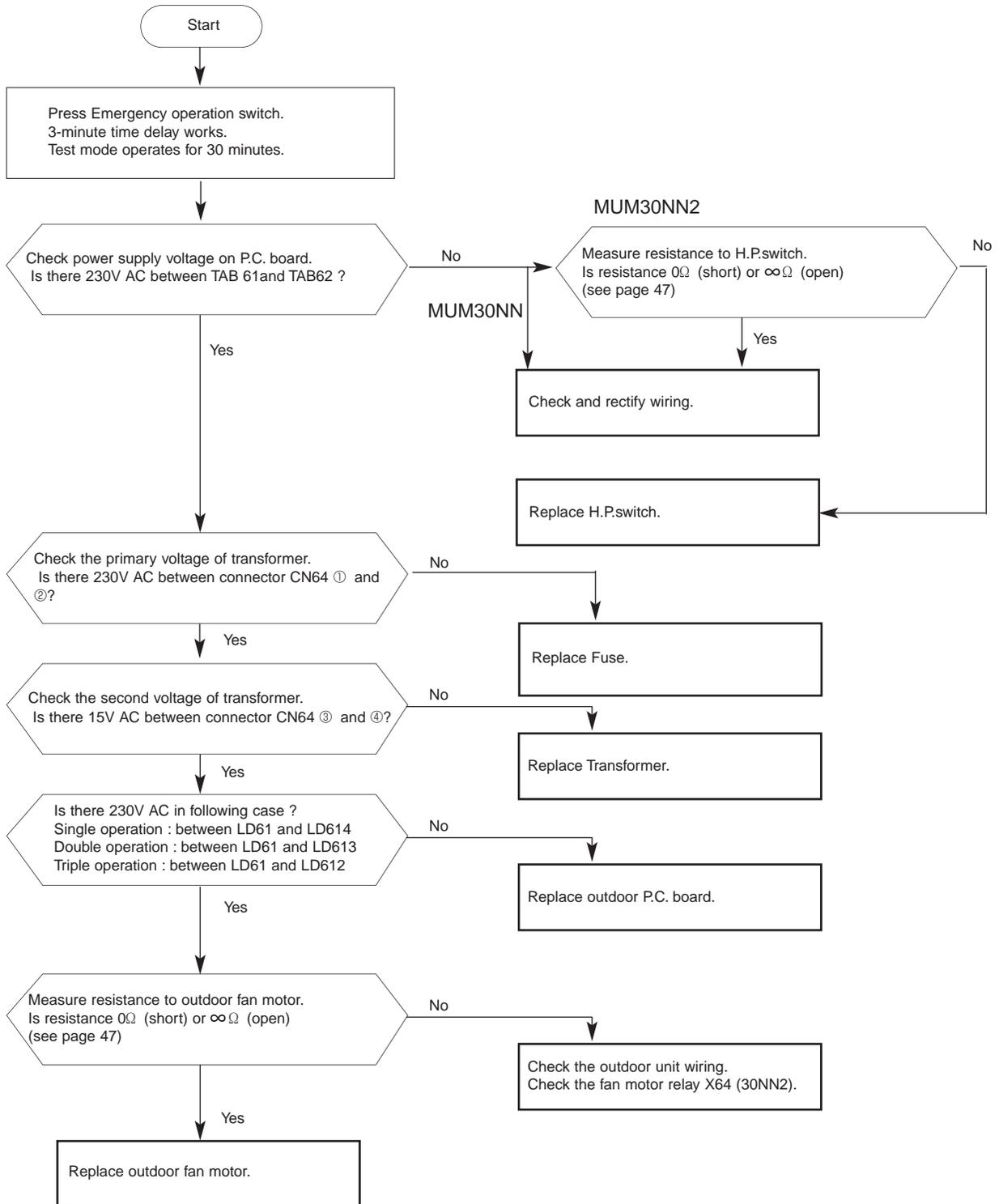
(2) Compressor and outdoor fan do not operate.(Only indoor fan operates.)
MUM30NN MUM30NN2



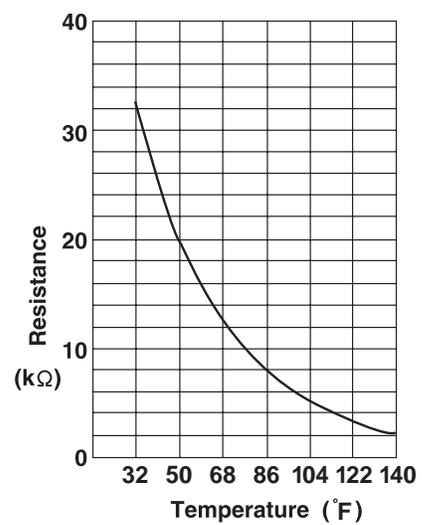
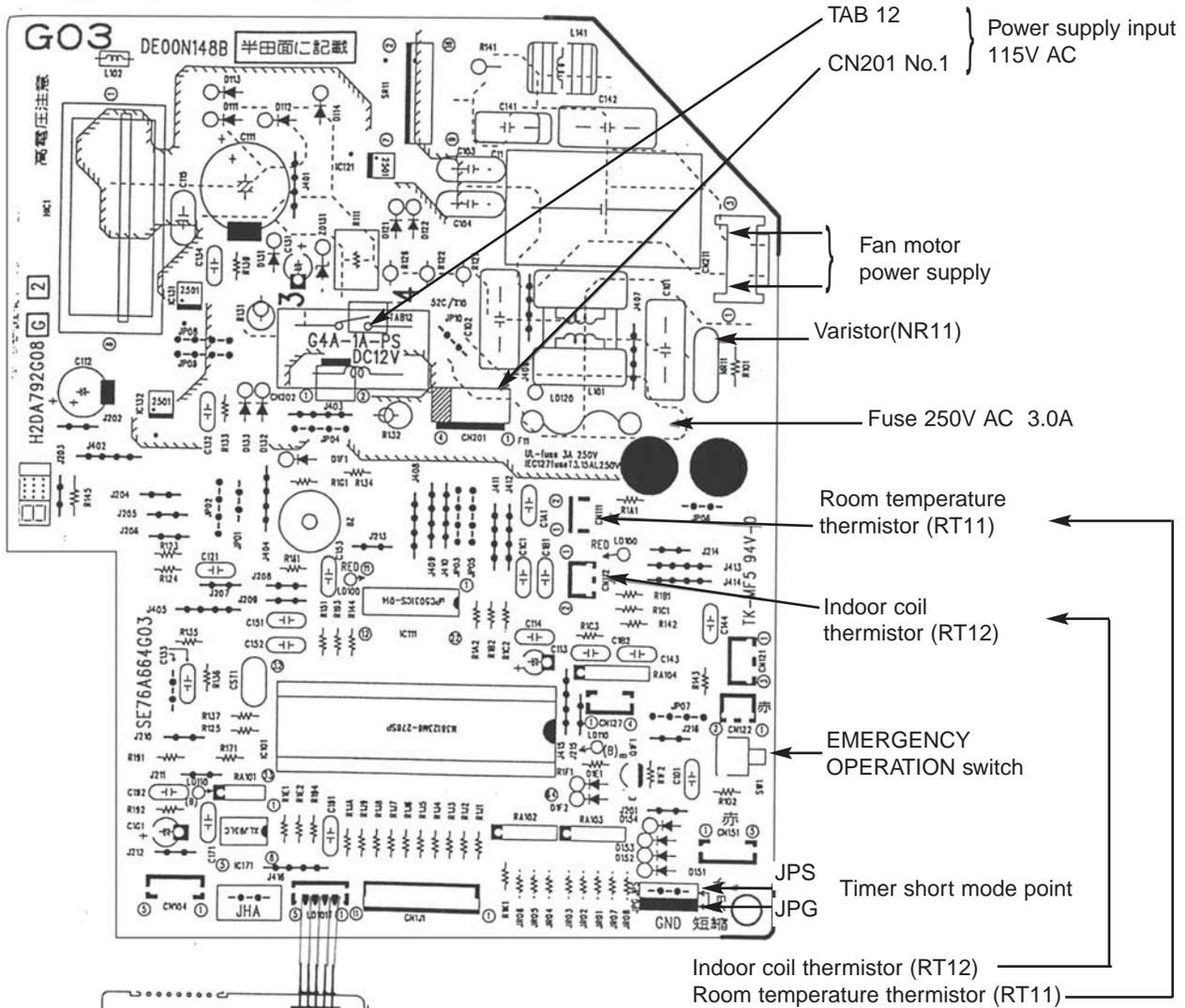
(3) Compressor does not operate.(Outdoor fan operates.)
MUM30NN MUM30NN2



(4) Only outdoor fan does not operate.(Compressor operates.)
MUM30NN MUM30NN2



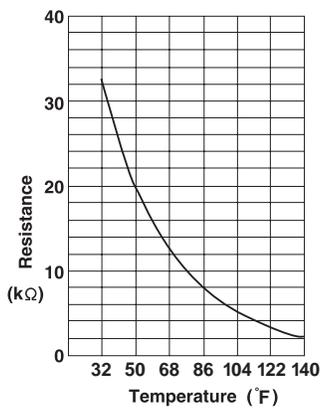
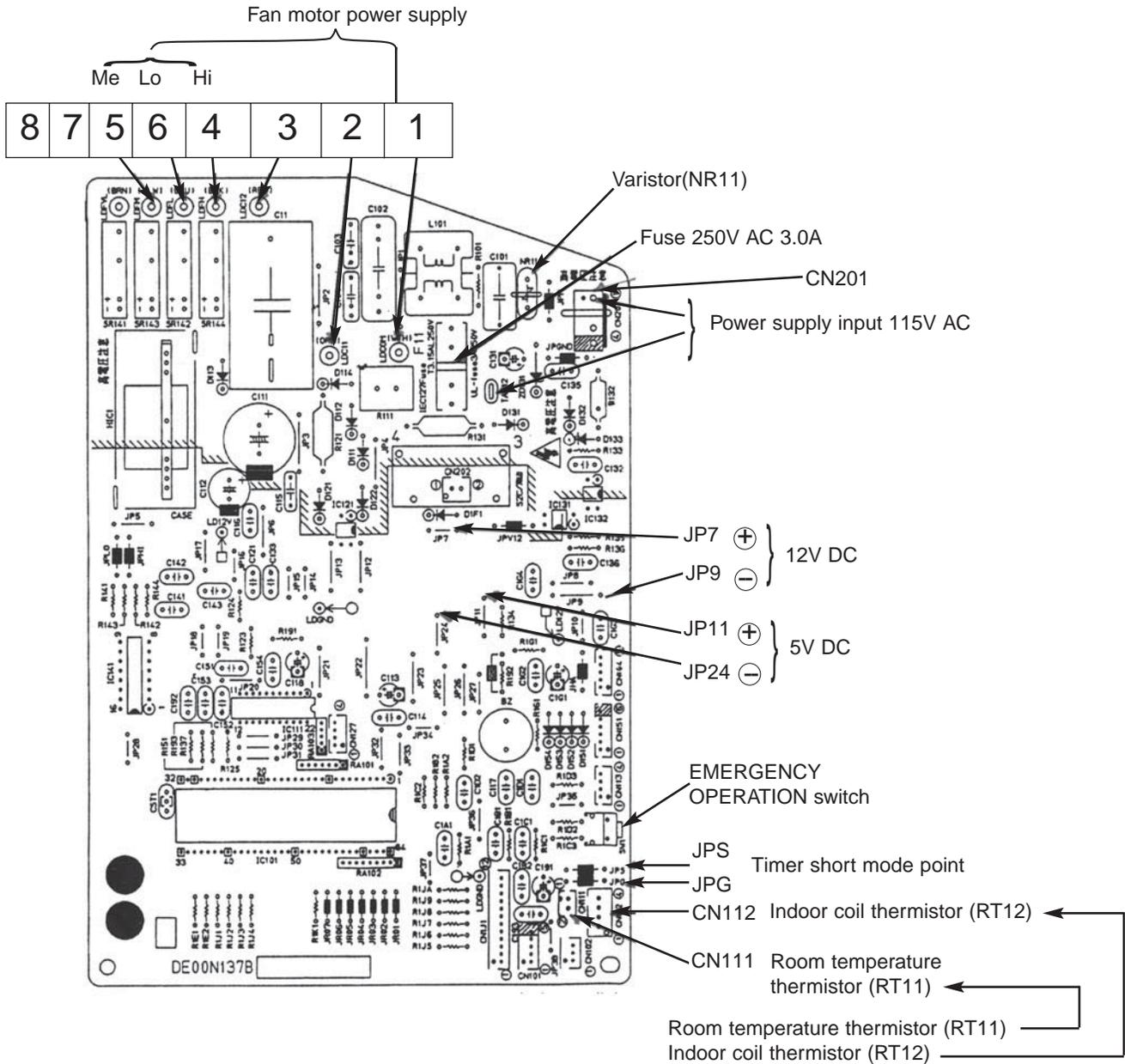
TEST POINT DIAGRAM AND VOLTAGE
MS09NW MS09NW2
Indoor electronic control P.C. board



TEST POINT DIAGRAM AND VOLTAGE

MS12NN MS15NN MS17NN MS12NN2 MS15NN2 MS17NN2

Indoor electronic control P.C. board



TEST POINT DIAGRAM AND VOLTAGE

MUM30NN

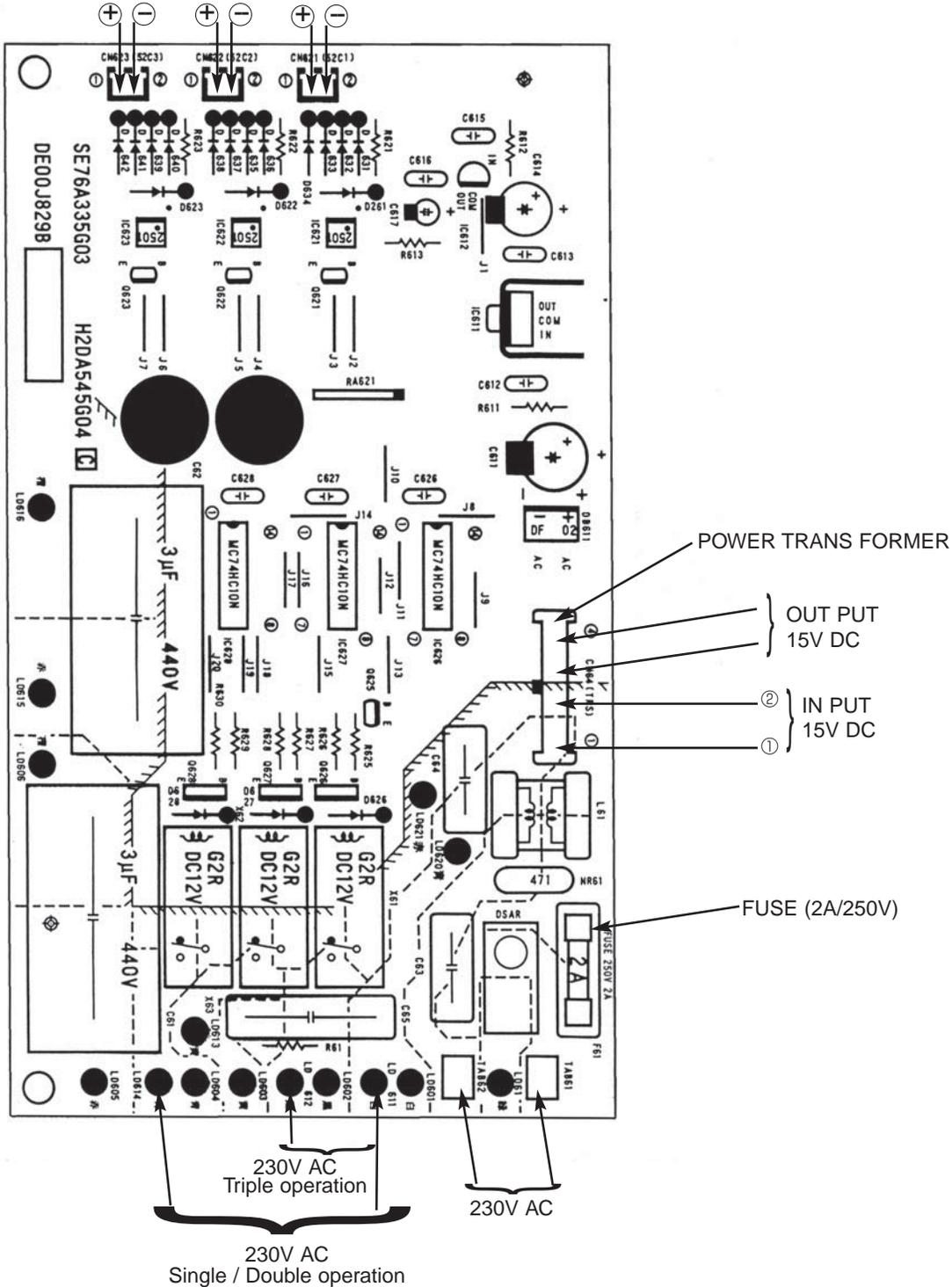
Outdoor electronic control P.C. board

10~17V DC while 52C is ON.

0V DC while 52C is OFF

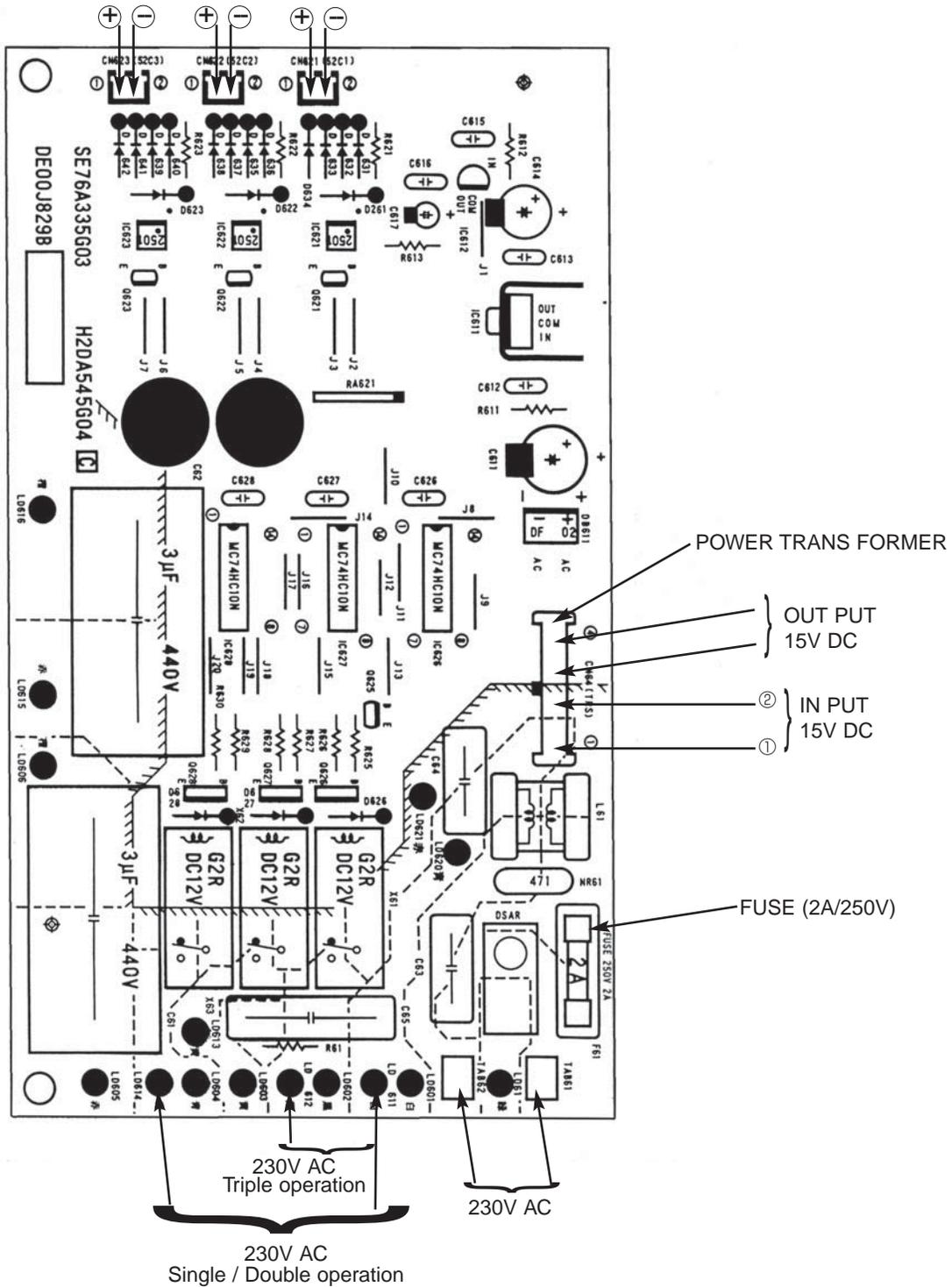
<Comp-control signal input>

52C Signal A UNIT 52C Signal B UNIT 52C Signal C UNIT



TEST POINT DIAGRAM AND VOLTAGE MUM30NN2 Outdoor electronic control P.C. board

10~17V DC while 52C is ON.
0V DC while 52C is OFF
<Comp-control signal input>
52C Signal A UNIT 52C Signal B UNIT 52C Signal C UNIT



RELAY OPERATION

MS09NW MS09NW2

MS12NN MS12NN2

MS15NN MS15NN2

MS17NN MS17NN2

MODE	THERMOSTAT	52C CONTACTOR	INDOOR FAN RELAY
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
		Repeats 8 min. ON/ 3min. OFF operation or 2 min. ON/3 min. OFF operation	AUTO or set speed links with 52C CONTACTOR
	OFF	Repeats 4 min. OFF/1 min. ON operation	
FAN	ON	OFF	AUTO or set speed
	OFF		OFF

NOTE : When the compressor is OFF, "3-minute time delay circuit" operates.

COIL FROST PREVENTION mode are as follows

MODE	THERMOSTAT	52C CONTACTOR	INDOOR FAN RELAY
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			VLo speed

Indoor fan relay mode (MS12NN, MS15NN, MS17NN, MS12NN2, MS15NN2, MS17NN2)

Indoor fan speed	Relay turning ON
Hi	SR144
Me	SR143
Lo	SR142
VLo	SR141
OFF	All fan relays are OFF

MUM30NN

SYSTEM	52C CONTACTOR	OUTDOOR FAN RELAY
Triple	All three : ON	X61 is ON
Double	Two of them : ON	X62 is ON
Single	One of them : ON	X63 is ON

OPERATION OF 52C1, 52C2, 52C3, X61, X62, X63, X64

NOTE

- 1 : Compressor is on while 52C is on.
- 2 : Compressor is off while 52C is off.
- 3: Relay of X61~X63 can not turn on at the same time.
- 4: Relay "X64" is turned on only in a single operation.

52C1	52C2	52C3	X61	X62	X63	X64
OFF	OFF	OFF	OFF	OFF	OFF	OFF
OFF	OFF	ON	OFF	OFF	ON	ON
OFF	ON	OFF	OFF	OFF	ON	ON
OFF	ON	ON	OFF	ON	OFF	OFF
ON	OFF	OFF	OFF	OFF	ON	ON
ON	OFF	ON	OFF	ON	OFF	OFF
ON	ON	OFF	OFF	ON	OFF	OFF
ON	ON	ON	ON	OFF	OFF	OFF

FAN RELAY / FAN SPEED / APPLIED VOLTAGE

FAN MOTOR RELAY	OUTDOOR FAN SPEED (MF1/MF2)	APPLIED VOLTAGE TO FAN
X61 is ON	Hi/Hi	230V AC between WHT and BLK
X62 is ON	Me/Me	230V AC between WHT and YLW
X63 is ON	Stop/Hi	230V AC between WHT and BLK(Only MF2)

MUM30NN2

SYSTEM	52C CONTACTOR	OUTDOOR FAN RELAY
Triple	All three : ON	X61 is ON
Double	Two of them : ON	X62 is ON
Single	One of them : ON	X63 is ON

OPERATION OF 52C1, 52C2, 52C3, X61, X62, X63

NOTE

1 : Compressor is on while 52C is on.

2 : Compressor is off while 52C is off.

3: Relay of X61~X63 can not turn on at the same time.

52C1	52C2	52C3	X61	X62	X63
OFF	OFF	OFF	OFF	OFF	OFF
OFF	OFF	ON	OFF	OFF	ON
OFF	ON	OFF	OFF	OFF	ON
OFF	ON	ON	OFF	ON	OFF
ON	OFF	OFF	OFF	OFF	ON
ON	OFF	ON	OFF	ON	OFF
ON	ON	OFF	OFF	ON	OFF
ON	ON	ON	ON	OFF	OFF

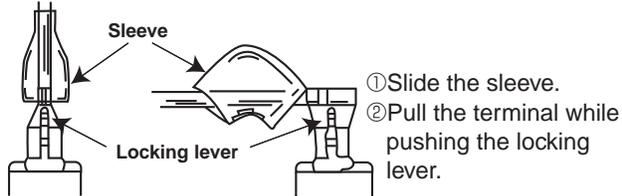
FAN RELAY / FAN SPEED / APPLIED VOLTAGE

FAN MOTOR RELAY	OUTDOOR FAN SPEED (MF1/MF2)	APPLIED VOLTAGE TO FAN
X61 is ON	Hi/Hi	230V AC between WHT and BLK
X62 is ON	Lo/Lo	230V AC between WHT and BLU
X63 is ON	Lo/Lo	230V AC between WHT and BLU

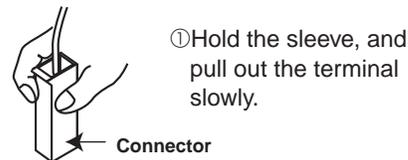
<"Terminal with lock mechanism" Detaching points>

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.

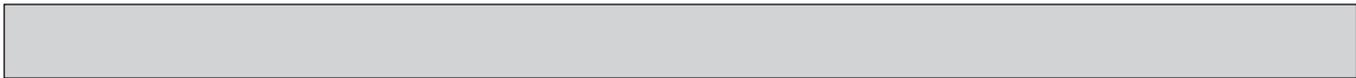


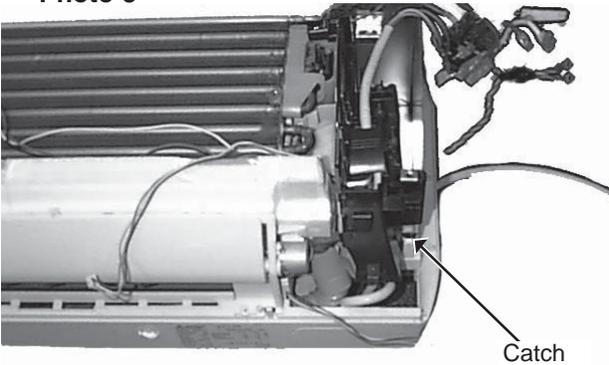
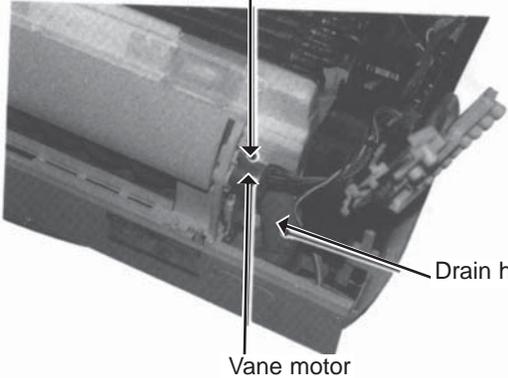
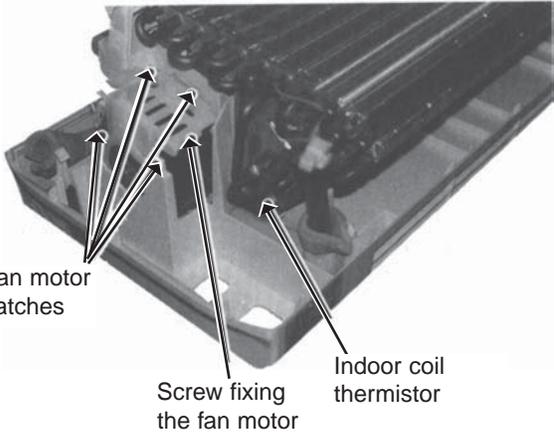
(2) The terminal with this connector is a terminal with lock mechanism



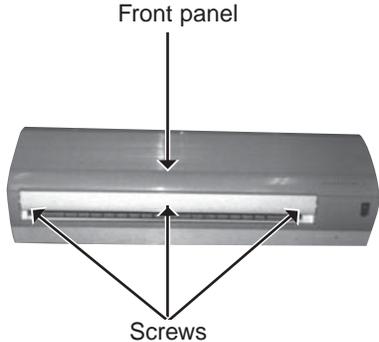
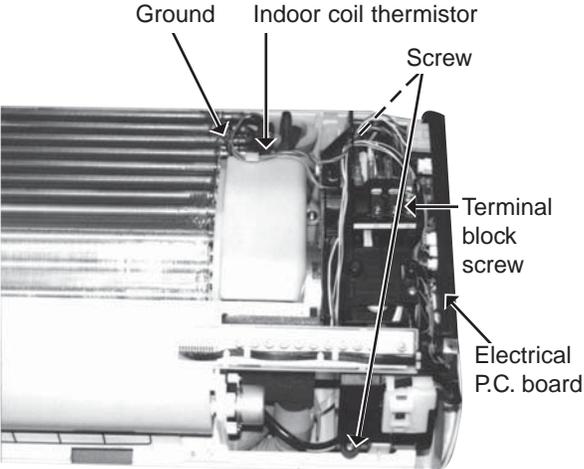
12-1 MS09NW MS09NW2 INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the front panel</p> <p>(1) Remove the screw caps at the down of the front panel. Remove the screws.</p> <p>(2) Pull the panel down to your side slightly and unhook the catches at the top.</p>	<p>Photo 1</p> <p>Front panel</p> <p>Screws</p>
<p>2. Removing the electronic control P.C. board and the display P.C. board.</p> <p>(1) Remove the front panel. (Refer to 1)</p> <p>(2) Remove the screw of the electrical cover. Remove the electrical cover.</p> <p>(3) Remove the terminal block cover. Remove the screw of the terminal block.</p> <p>(4) Remove the cord clamp.</p> <p>(5) Remove the screw of the ground wire.</p> <p>(6) Disconnect all the connectors and all the lead wires on the electronic control P.C. board.</p> <p>(7) Remove the electronic control P.C. board and the display P.C. board.</p>	<p>Photo 2</p> <p>Room temperature thermistor connector</p> <p>Screw of the ground wire</p> <p>Cord clamp</p> <p>Terminal block cover</p> <p>Electronic control P.C. board</p> <p>Screw of the terminal block cover</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.(4) Disconnect the motor connector(CN211 and CN121) 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.	<p>Photo 3</p>  <p>Catch</p>
<p>4. Removing the vane motor</p> <ol style="list-style-type: none">(1) Remove the front panel.(2) Remove the screw of the vane motor, disconnect the connector.(3) Remove the vane motor.	<p>Photo 4</p>  <p>Screw of the vane motor</p> <p>Drain hose</p> <p>Vane motor</p>
<p>5. Removing the line flow fan and the indoor fan motor</p> <ol style="list-style-type: none">(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 screw fixing the fan motor.(6) Remove the hexagon socket set screws.(7) Remove the line flow fan and the fan motor.	<p>Photo 5</p>  <p>Fan motor catches</p> <p>Screw fixing the fan motor</p> <p>Indoor coil thermistor</p>

**12-2 MS12NN, MS15NN, MS17NN
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 down 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 and display 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 cover. Remove the terminal cover. (4) Remove the screw of the terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder. (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>Ground</p> <p>Indoor coil thermistor</p> <p>Screw</p> <p>Terminal block screw</p> <p>Electrical P.C. board</p>

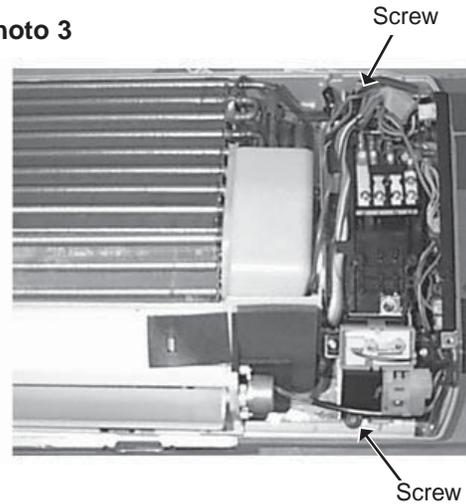
OPERATING PROCEDURE

3. Removing the electrical box

- (1) Remove the front panel.(Refer to 1)
- (2) Remove the electrical cover.
- (3) Remove the connector of the indoor coil thermistor.
- (4) Remove the motor connector and the vane motor connector (CN151) on the electronic control P.C. board.
- (5) Remove the screw of the electrical box, remove the electrical box.

PHOTOS

Photo 3



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

- (1) Remove the front panel.(Refer to 1)
- (2) Remove the electrical box.
- (3) Unhook the catch on the both sides of the nozzle assembly.
- (4) Remove the nozzle assembly.
- (5) Remove the screws of the bearing support.
- (6) Remove the screw of the heat exchanger and unhook the catch.
- (7) Lifting the heat exchanger, remove the bearing support.
- (8) Remove the motor support.
- (9) Loose the screw fixing the line flow fan, remove the line flow fan.
- (10) Remove the screws of the motor band, remove the fan motor.

Photo 4

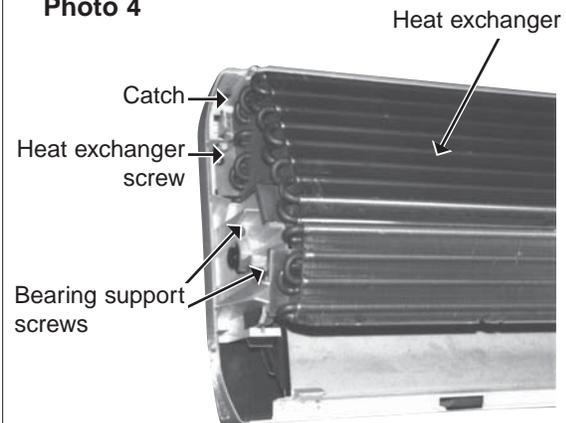
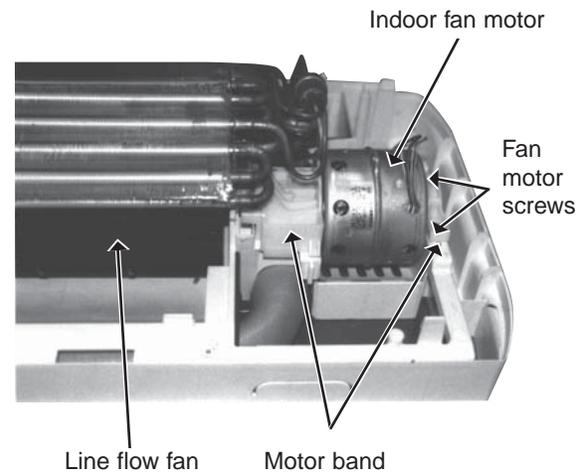
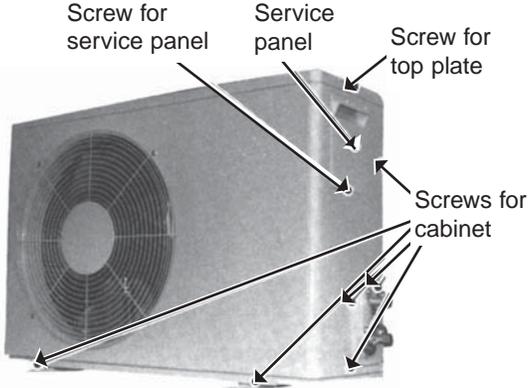
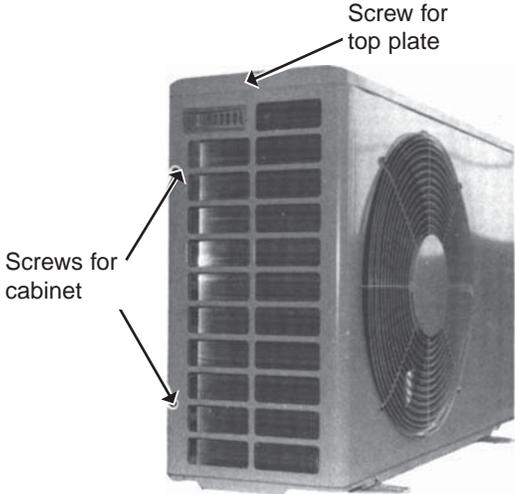
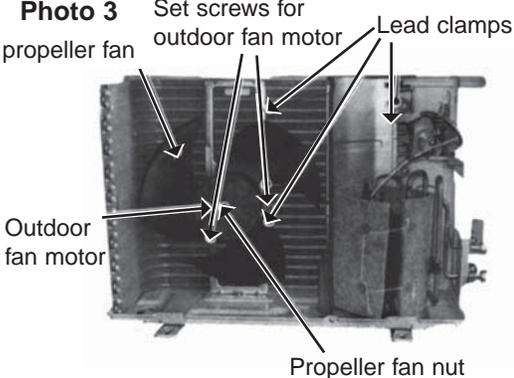


Photo 5



**12-3 MU09NW MU09NW2
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 screw of the service panel. (3) Remove the screws of the cabinet. (4) Remove the service panel, and remove the screw from the insides. (5) Remove the top panel. (6) Remove the cabinet. 	<p>Photo 1</p>  <p>Photo 2</p> 
<p>2. Removing the propeller fan and the outdoor fan motor</p> <ol style="list-style-type: none"> (1) Remove the cabinet.(Refer to 1) (2) Remove the propeller fan nuts. (3) Remove the propeller fan. <p>NOTE: Loose the propeller fan in the rotating direction for removal.</p> <p>When attaching the propeller fan,align the mark on the propeller fan and the motor shaft cut section.</p> <p>Set the fan in position by using the cut on the shaft and the mark on the fan.</p> <ol style="list-style-type: none"> (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. 	<p>Photo 3</p> 

OPERATING PROCEDURE

3. Removing the compressor

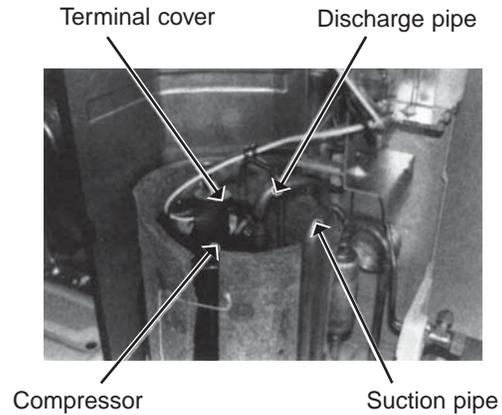
- (1) Remove the lead clamps.
- (2) Remove the screws fixing the relay panel.
- (3) Remove the screw fixing the service port.
- (4) Remove the terminal cover.
- (5) Pull out the lead from the compressor terminal.
- (6) Remove the overcurrent relay.
- (7) Remove the compressor nuts.
- (8) Detach the suction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

NOTE

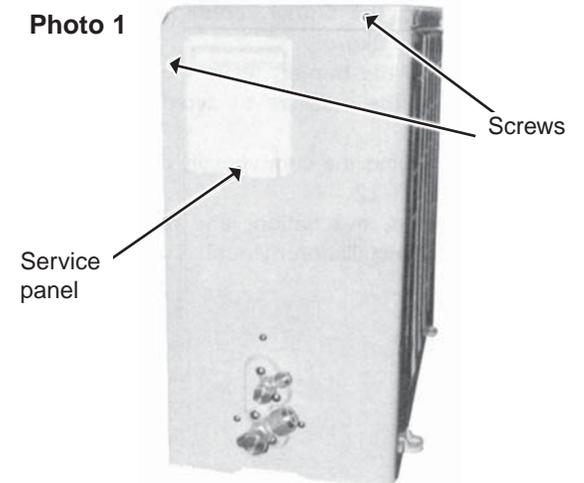
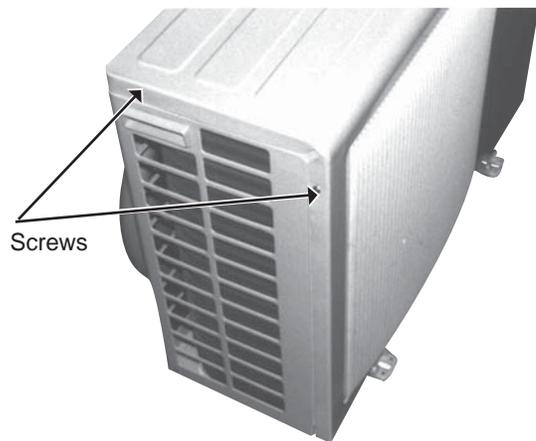
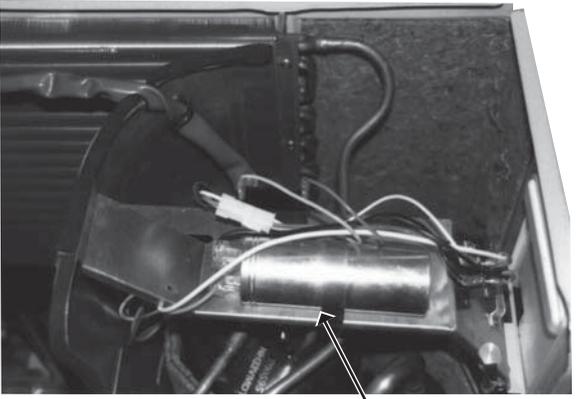
- Before using a torch, reclaim gas from the pipes until the pressure gauge shows 0 PSI(GAUGE).
- Use the torch under the condition that gas can be recovered even when the inner pressure rises by heat.
- Reclaim all refrigerant in an environmentally acceptable manner.

PHOTOS

Photo 4



**12-4 MU12NN MU15NN MU17NN MU12NN2 MU15NN2 MU17NN2
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>Service panel</p> <p>Screws</p> <p>Photo 2</p>  <p>Screws</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>  <p>Compressor capacitor</p>

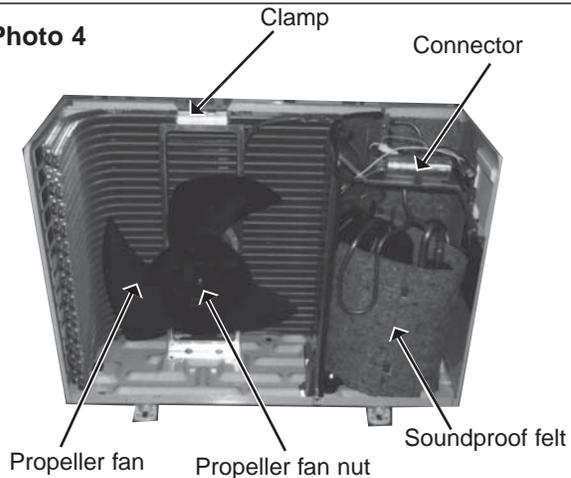
OPERATING PROCEDURE

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.

PHOTOS

Photo 4



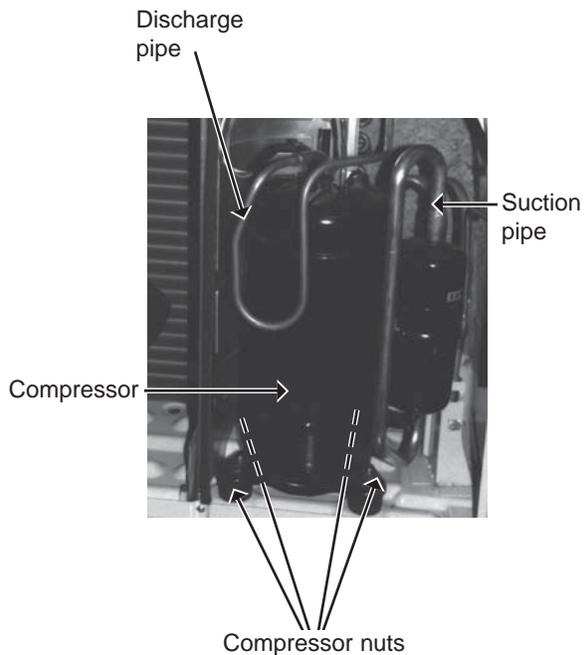
4. Removing the compressor

- (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) 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 securing the compressor.
- (9) Remove the compressor.

NOTE

- Before using the torch, reclaim gas from the pipes until the pressure gauge shows 0 PSI(GAUGE).
- 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.

Photo 5



12-5 MUM30NN MUM30NN2 OUTDOOR UNIT

OPERATING PROCEDURE

1. Removing of the cabinet

- (1) Remove the set screws of the valve cover to remove the valve cover as shown in Photo 2.
- (2) Remove the set screws of the side panel to remove the side panel and cabinet.

Photo 2



PHOTOS

Photo 1



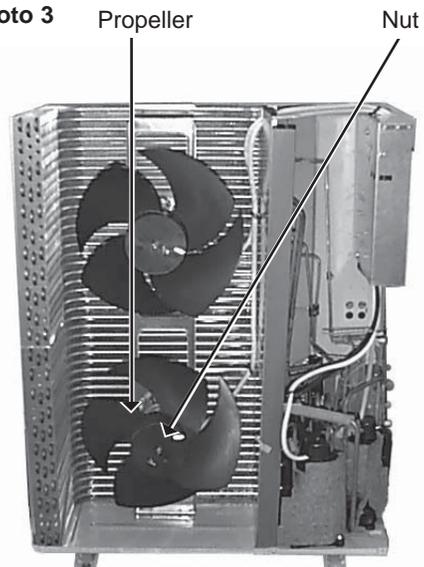
2. Removing the propeller

- (1) Remove the propeller nut.
- (2) Loosen the propeller in the rotating direction.
- (3) Pull the propeller forward.

Note:

- To set the propeller, fit the cut on the shaft to the mark on the propeller.

Photo 3



OPERATING PROCEDURE

3. Removing the outdoor fan motor.

- (1) Remove the cabinet. (Refer to 1)
- (2) Remove the propeller. (Refer to 2)
- (3) Disconnect the connector remove the clamp of outdoor fan motor lead wire.
- (4) Remove the screws fixing the outdoor fan motor.

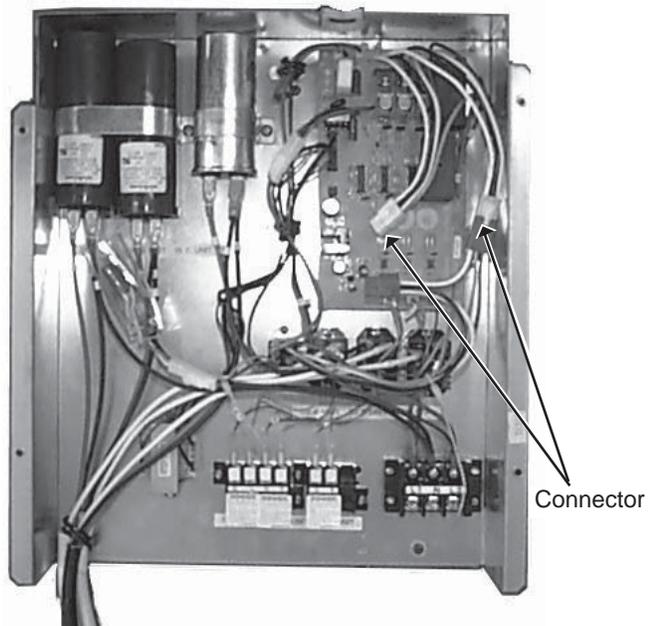
PHOTOS

Photo 4

Set screws of the relay panel



Photo 5



OPERATING PROCEDURE

4. Removing the compressor

- (1) Disconnect the cord connector. (See Phot 5)
- (2) Remove the set screws of the relay panel.
- (3) Remove the set nuts of the terminal cover.
- (4) Pull up the compressor.
- (5) Pull out the lead wires from the compressor terminal to remove overcurrent relay.
- (6) Remove set nuts of the compressor base.
- (7) Remove the low pressure side welded part and high pressure side welded part using a burner.

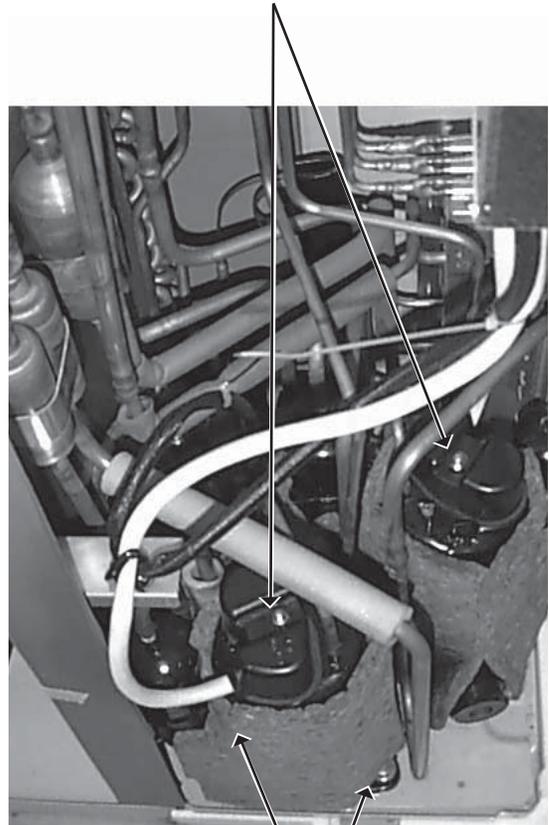
NOTE

- Before using the torch, reclaim gas from the pipes until the pressure gauge shows 0 PSI(GAUGE).
- 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 6

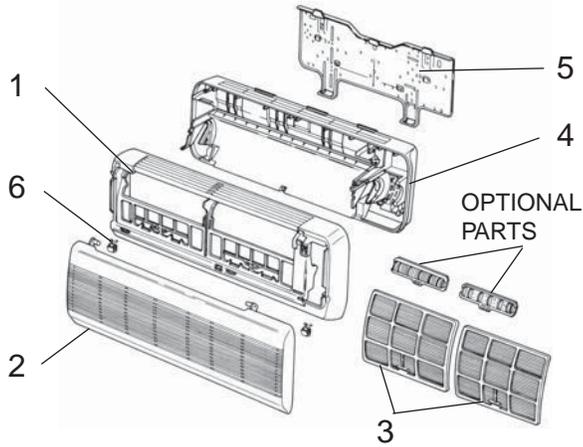
Set nuts of the terminal cover



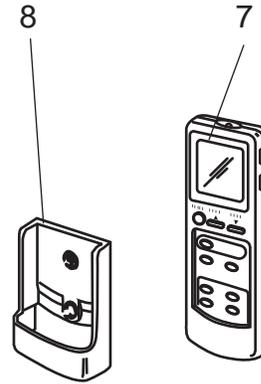
Nuts

MS09NW (W) MS09NW2 (W)

13-1. INDOOR UNIT STRUCTURAL PARTS



13-2. ACCESSORY AND REMOTE CONTROLLER



This figure shows about MS09NW2.

13-1. INDOOR UNIT STRUCTURAL PARTS

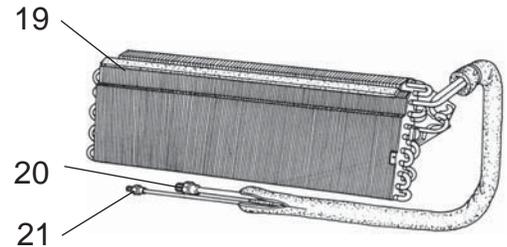
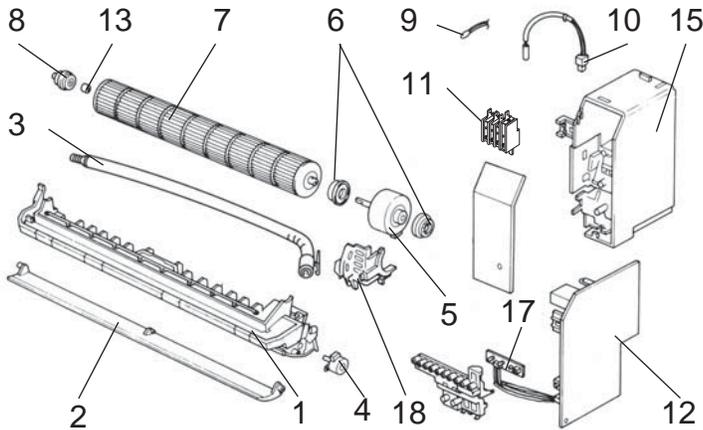
No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set		Remarks (Drawing No.)
				MS09NW (W)	MS09NW2 (W)	
1	E02 268 000	FRONT PANEL (W)		1	1	
2	E02 151 010	GRILLE (W)		1	1	
3	E02 164 100	AIR FILTER		2	2	
4	E02 166 234	BOX(W)		1	1	
5	E02 151 970	INSTALLATION PLATE		1	1	
6	E02 166 067	SCREW CAP(W)		2	2	2PCS/SET

13-2. ACCESSORY AND REMOTE CONTROLLER

7	E02 268 426	REMOTE CONTROLLER		1		
	E02 474 426	REMOTE CONTROLLER			1	
8	E02 141 083	REMOTE CONTROLLER HOLDER		1	1	

MS09NW (W) MS09NW2 (W)

13-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS



* AUTO RESTART ASSEMBLY has been deleted from the parts list.

Auto restart function can work only ELECTRONIC CONTROL P.C. BOARD.

● Shows the change of parts number.

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

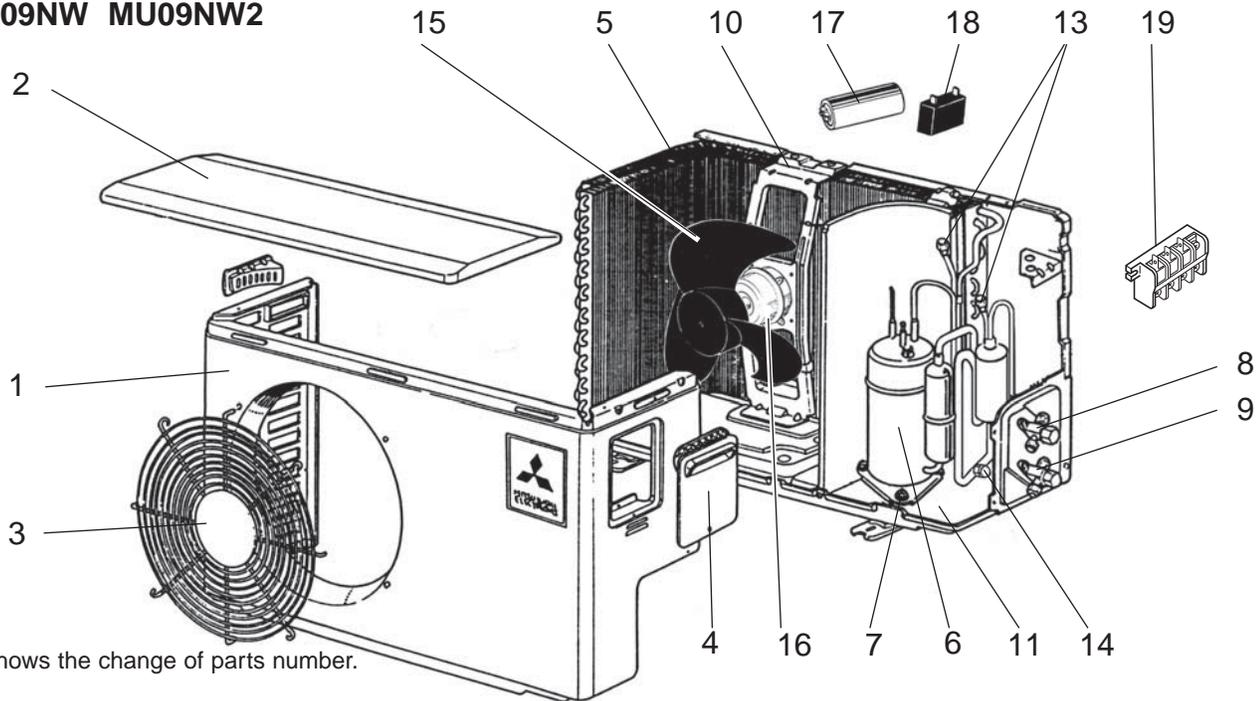
13-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set		Remarks (Drawing No.)
				MS09NW (W)	MS09NW2 (W)	
● 1	E02 199 235	NOZZLE (W)		1	1	FAN GUARD
2	E02 166 040	VANE (W)		1	1	
3	E02 408 702	DRAIN HOSE			1	
	E02 141 702	DRAIN HOSE		1		
4	E02 151 303	VANE MOTOR	MV	1	1	
5	E02 268 300	INDOOR FAN MOTOR	MF	1	1	RC 4W19-□□
6	E02 151 505	RUBBER MOUNT		2	2	2PCS/SET
7	E02 151 302	LINE FLOW FAN		1	1	
8	E02 151 509	BEARING MOUNT		1	1	
9	E02 151 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	
10	E02 151 307	INDOOR COIL THERMISTOR	RT12	1	1	
11	E02 268 375	TERMINAL BLOCK	TB	1	1	
● 12	E02 268 453	ELECTRONIC CONTROL P.C.BOARD *		1	1	
13	E02 001 504	SLEEVE BEARING		1	1	
⑭	E02 268 382	FUSE	F11	1	1	250V/3.0A
● 15	E02 268 081	ELECTRICAL BOX		1	1	
⑮	E02 268 385	VARISTOR	NR11	1	1	
17	E02 151 468	RECEIVER		1	1	
18	E02 151 333	MOTOR BAND		1	1	

13-4. INDOOR UNIT HEAT EXCHANGER

19	E02 155 620	INDOOR HEAT EXCHANGER		1	1	
20	E02 151 666	UNION(GAS)		1	1	φ3/8
21	E02 151 667	UNION(LIQUID)		1	1	φ1/4

13-5. OUTDOOR UNIT STRUCTURAL PARTS, FUNCTIONAL PARTS AND ELECTRICAL PARTS MU09NW MU09NW2



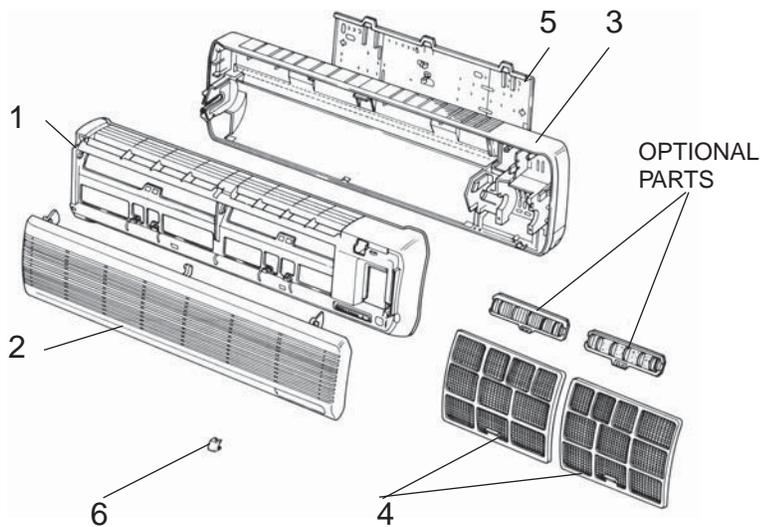
● Shows the change of parts number.

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	MU09NW2	
1	E02 096 232	CABINET		1	1	
2	E02 085 297	TOP PANEL		1	1	
3	E02 085 521	FAN GUARD		1		
	E02 199 521	FAN GUARD			1	
4	E02 085 245	SERVICE PANEL		1	1	
5	E02 085 630	OUTDOOR HEAT EXCHANGER		1	1	
6	E02 268 900	COMPRESSOR	MC	1	1	KH122WES
7	E02 065 506	COMPRESSOR RUBBER SET		3	3	3RUBBER
8	E02 096 662	STOP VALVE(LIQUID)		1	1	φ 1/4
9	E02 096 661	STOP VALVE(GAS)		1	1	φ 3/8
10	E02 085 515	MOTOR SUPPORT		1	1	
11	E02 268 290	BASE		1		
	E02 474 290	BASE			1	
12	E02 158 936	CAPILLARY TUBE		1	1	φ0.12 × φ0.063 × 47-1/4
13	E02 001 641	SERVICE PORT		2	2	
14	E02 474 642	FUSIBLE PLUG		1	1	
15	E02 085 501	PROPELLER FAN		1	1	
16	E02 268 301	OUTDOOR FAN MOTOR	MF	1	1	RA6W23 - □ □
17	E02 268 353	COMPRESSOR CAPACITOR	C1	1	1	55μF/220VAC
18	E02 268 351	OUTDOOR FAN CAPACITOR	C2	1		5.0μF/250VAC
	E02 474 351	OUTDOOR FAN CAPACITOR	C2		1	5.0μF/250VAC
19	E02 474 374	TERMINAL BLOCK	TB1		1	3P
	E02 268 374	TERMINAL BLOCK	TB/TB2	1	1	4P
	E02 023 377	TERMINAL BLOCK	TB3		1	2P
20	E02 268 330	OVER CURRENT RELAY	51C	1	1	
21	E02 268 341	CONTACTOR	52C	1		
	E02 466 340	CONTACTOR	52C		1	

MS12NN (W) MS12NN2 (W)
 MS15NN (W) MS15NN2 (W)
 MS17NN (W) MS17NN2 (W)

13-6. INDOOR UNIT STRUCTURAL PARTS

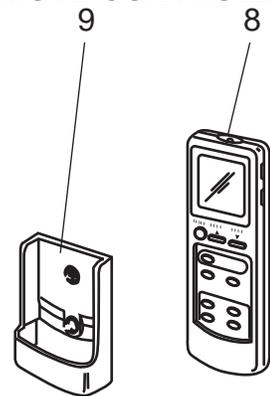


Part number that is circled is not shown in the illustration.

13-6. INDOOR UNIT STRUCTURAL PARTS

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set						Remarks (Drawing No.)
				MS 12NN (W)	MS 12NN2 (W)	MS 15NN (W)	MS 15NN2 (W)	MS 17NN (W)	MS 17NN2 (W)	
1	E02 270 000	FRONT PANEL (W)		1						
	E02 271 000	FRONT PANEL (W)				1				
	E02 272 000	FRONT PANEL (W)						1		
	E02 138 000	FRONT PANEL (W)					1	1		
2	E02 138 010	GRILLE (W)		1	1	1	1	1	1	
3	E02 143 234	BOX(W)		1	1	1	1	1	1	
4	E02 141 100	AIR FILTER		2	2	2	2	2	2	
5	E02 141 970	INSTALLATION PLATE		1	1	1	1	1	1	
6	E02 143 067	SCREW CAP (W)		3	3	3	3	3	3	3PCS/SET
⑦	E02 270 007	LAMP PANEL		1	1					
	E02 271 007	LAMP PANEL				1	1			
	E02 272 007	LAMP PANEL						1	1	

13-7. ACCESSORY AND REMOTE CONTROLLER



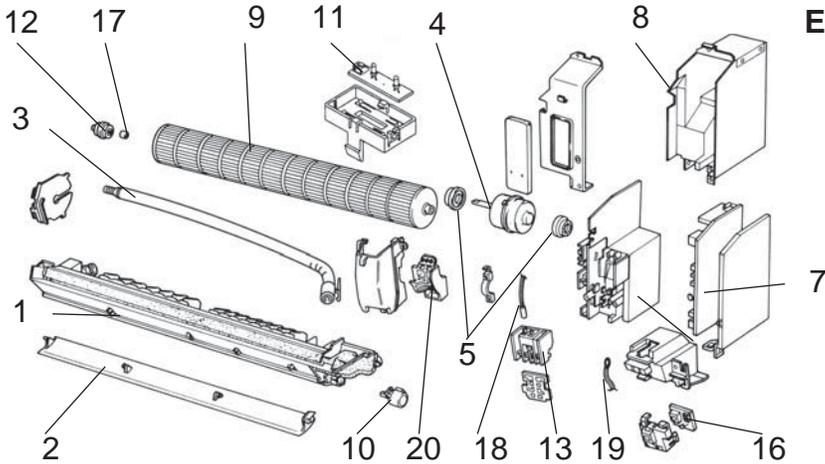
This figure shows about MS12/15/17NN2.

13-7. ACCESSORY AND REMOTE CONTROLLER

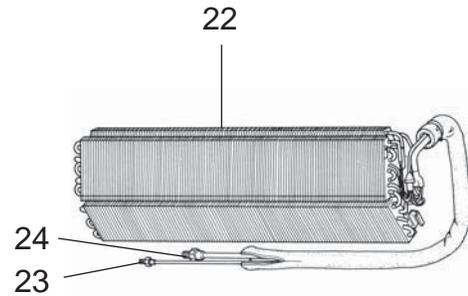
8	E02 268 426	REMOTE CONTROLLER		1		1		1		
	E02 474 426	REMOTE CONTROLLER			1		1		1	
9	E02 141 083	REMOTE CONTROLLER HOLDER		1	1	1	1	1	1	

MS12NN (W) MS12NN2 (W)
 MS15NN (W) MS15NN2 (W)
 MS17NN (W) MS17NN2 (W)

13-8. INDOOR UNIT ELECTRICAL PARTS



13-9. INDOOR UNIT HEAT EXCHANGER PARTS



● Shows the change of parts number.
 Part numbers that are circled are not shown in the illustration.

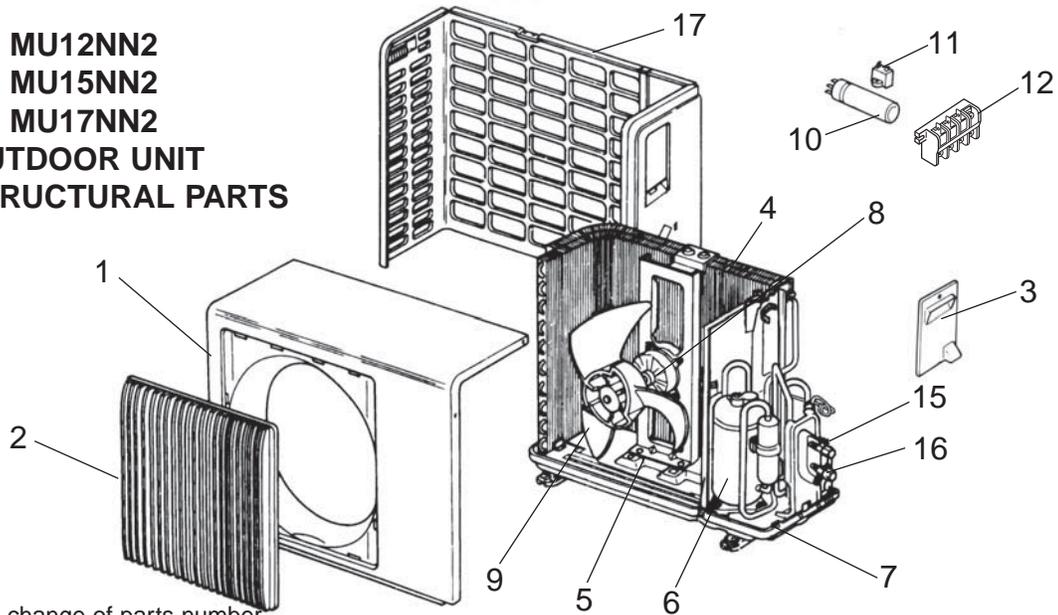
13-8. INDOOR UNIT ELECTRICAL PARTS

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set						Remarks (Drawing No.)
				MS 12NN (W)	MS 12NN2 (W)	MS 15NN (W)	MS 15NN2 (W)	MS 17NN (W)	MS 17NN2 (W)	
● 1	E02 143 235	NOZZLE (W)		1	1	1	1	1	1	FAN GUARD
2	E02 143 040	VANE (W)		1	1	1	1	1	1	
3	E02 141 702	DRAIN HOSE		1		1		1		
	E02 408 702	DRAIN HOSE			1		1		1	
4	E02 270 300	INDOOR FAN MOTOR	MF	1	1	1	1			RA4W18 - □□
	E02 272 300	INDOOR FAN MOTOR	MF					1	1	RA4W23 - □□
5	E02 001 505	RUBBER MOUNT		2	2	2	2	2	2	2PCS/SET
● ⑥	E02 270 452	AUTO RESTART ASSEMBLY		1	1	1	1	1	1	
7	E02 270 450	ELECTRONIC CONTROL P.C. BOARD		1	1					
	E02 271 450	ELECTRONIC CONTROL P.C. BOARD				1	1			
	E02 272 450	ELECTRONIC CONTROL P.C. BOARD						1	1	
8	E02 270 081	ELECTRICAL BOX		1	1	1	1	1	1	
9	E02 141 302	LINE FLOW FAN		1	1	1	1	1	1	
10	E02 141 303	VANE MOTOR	MV	1	1	1	1	1	1	
11	E02 138 329	DISPLAY P.C. BOARD		1	1	1	1	1	1	
12	E02 141 509	BEARING MOUNT		1	1	1	1	1	1	
13	E02 268 375	TERMINAL BLOCK	TB	1	1	1	1	1	1	
⑭	E02 268 385	VARISTOR	NR11	1	1	1	1	1	1	
⑮	E02 268 382	FUSE	F11	1	1	1	1	1	1	250V 3.0A
16	E02 141 468	RECEIVER P. C. BOARD		1	1	1	1	1	1	
17	E02 001 504	SLEEVE BEARING		1	1	1	1	1	1	
18	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	1	1	1	1	1	
19	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	1	1	1	
20	E02 138 333	MOTOR BAND		1	1	1	1	1	1	
⑰	E02 475 383	SURGE ABSORBER	DSAR	1	1	1	1	1	1	

13-9. INDOOR UNIT HEAT EXCHANGER

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

MU12NN MU12NN2
 MU15NN MU15NN2
 MU17NN MU17NN2
 13-10. OUTDOOR UNIT
 STRUCTURAL PARTS

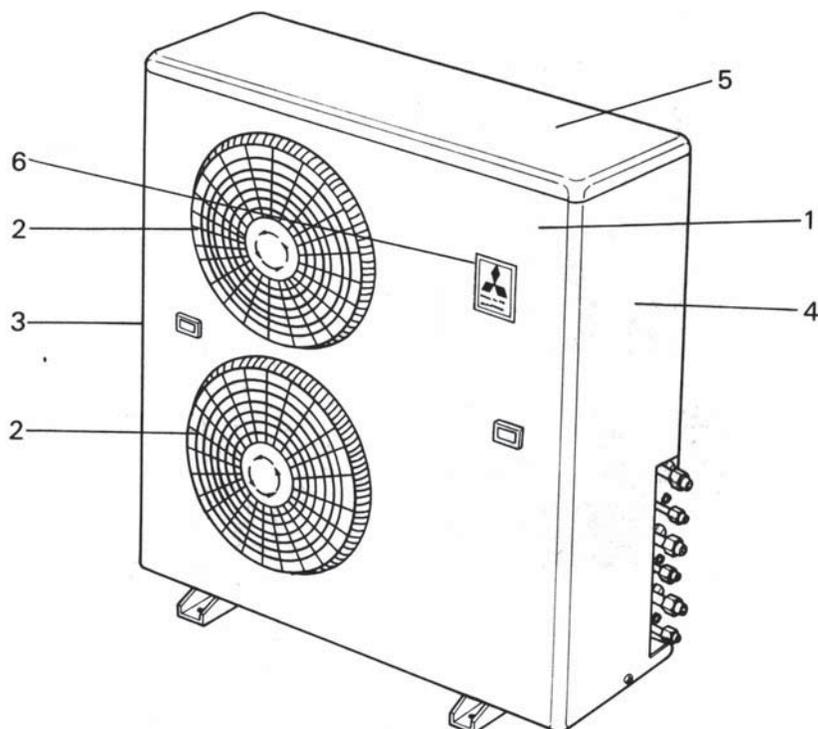


● Shows the change of parts number.
 Part numbers that are circled are not shown in the illustration.

No.	Parts No.	Parts Name	Symbol in Wiring Diagram	Q'ty / set						Remarks (Drawing No.)
				MU12 NN	MU12 NN2	MU15 NN	MU15 NN2	MU17 NN	MU17 NN2	
1	E02 141 232	CABINET		1	1	1	1	1	1	
2	E02 141 521	GRILLE		1	1	1	1	1	1	
3	E02 270 245	SERVICE PANEL		1	1	1	1	1	1	
4	E02 138 630	OUTDOOR HEAT EXCHANGER		1	1	1	1			
	E02 147 630	OUTDOOR HEAT EXCHANGER						1	1	
5	E02 138 515	MOTOR SUPPORT		1	1	1	1			
	E02 139 515	MOTOR SUPPORT						1	1	
6	E02 270 900	COMPRESSOR	MC	1	1					RH167NHDT
	E02 271 900	COMPRESSOR	MC			1	1			RH207NHDT
	E02 272 900	COMPRESSOR	MC					1	1	RH231NHDT
7	E02 270 290	BASE		1	1	1	1			
	E02 156 290	BASE						1	1	
8	E02 270 301	OUTDOOR FAN MOTOR	MF	1	1	1	1	1	1	
9	E02 141 501	PROPELLER FAN		1	1	1	1	1	1	
10	E02 270 353	COMPRESSOR CAPACITOR	C1	1	1					25μF/370VAC
	E02 271 353	COMPRESSOR CAPACITOR	C1			1	1			30μF/370VAC
	E02 272 353	COMPRESSOR CAPACITOR	C1					1	1	35μF/370VAC
11	E02 270 351	OUTDOOR FAN CAPACITOR	C2	1	1	1	1	1	1	3.0μF/440VAC
12	E02 270 374	TERMINAL BLOCK	TB	1		1		1		
	E02 475 374	TERMINAL BLOCK	TB1		1		1		1	4P
	E02 476 374	TERMINAL BLOCK	TB2		1		1		1	4P
● ⑬	E02 140 936	CAPILLARY TUBE		1	1					φ0.12 × φ0.071 × 31-1/2
	E02 138 936	CAPILLARY TUBE						1	1	φ0.12 × φ0.079 × 27-9/16
	E02 271 936	CAPILLARY TUBE				1	1			φ0.12 × φ0.071 × 21-5/8
⑭	E02 075 506	COMPRESSOR RUBBER SET		3	3	3	3	3	3	3RUBBER/SET
15	E02 139 662	STOP VALVE(LIQUID)		1	1	1	1	1	1	φ1/4
16	E02 150 661	STOP VALVE(GAS)		1	1	1	1	1	1	φ5/8
17	E02 270 233	BACK PANEL		1		1		1		
	E02 475 233	BACK PANEL			1		1		1	
● ⑮	E02 282 340	CONTACTOR	52C	1	1	1	1	1	1	
19	E02 001 641	SERVICE PORT		2	2	2	2	2	2	
20	E02 474 642	FUSIBLE PLUG		1	1	1	1	1	1	

13-11. OUTDOOR UNIT STRUCTURAL PARTS MUM30NN MUM30NN2

Refer to MS09NW,MS15NN for indoor unit.

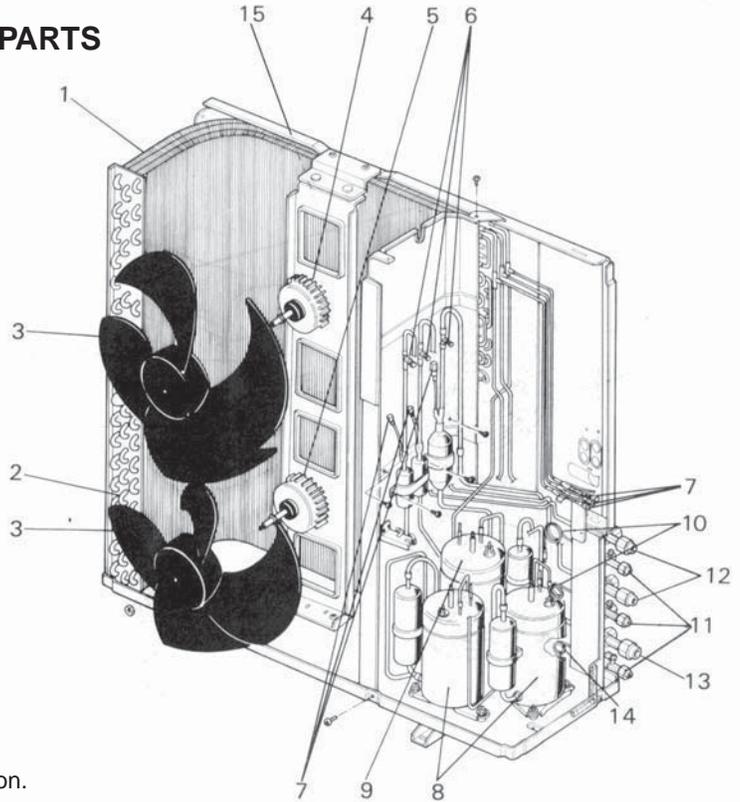


NOTE : When you order FRONT PANEL (R01 539 668), order LABEL (T2W E46 001) at the same time.

No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit		Remarks
				MUM30NN	MUM30NN2	
1	R01 539 668	FRONT PANEL		1	1	See above NOTE
2	T2W 510 509	OUTER NOZZLE		2	2	
3	R01 539 662	SIDE PANEL (L)		1	1	
4	T2W 800 662	SERVICE PANEL		1	1	
5	T2W E46 297	TOP PANEL		1	1	
6	T2W E46 001	LABEL		1	1	See above NOTE

13-12. OUTDOOR UNIT STRUCTURAL PARTS MUM30NN MUM30NN2

Refer to MS09NW,MS15NN for indoor unit.



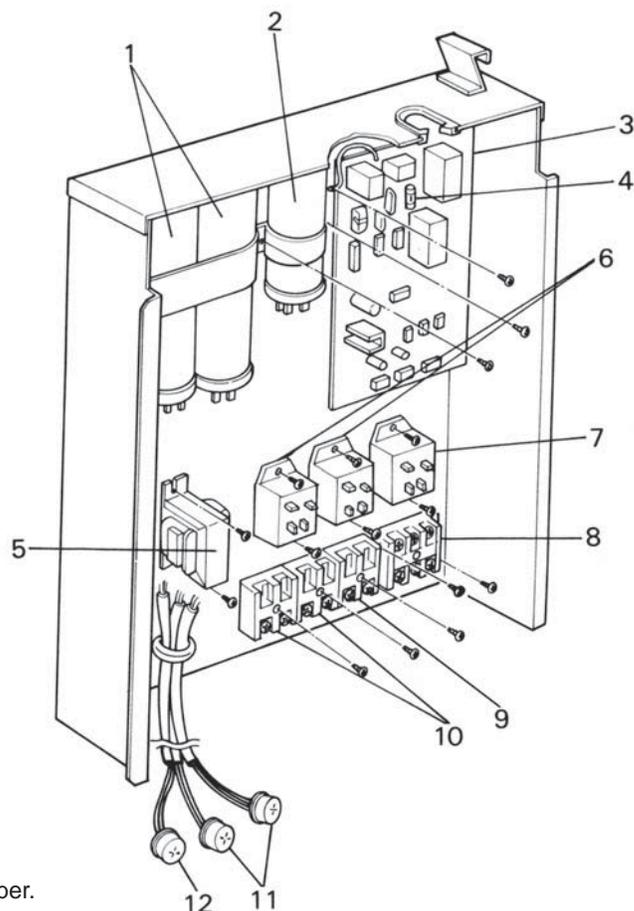
● Shows the change of parts number.

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

No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit		Remarks
				MUM30NN	MUM30NN2	
1	T2W 800 630	HEAT EXCHANGER (UPPER)		1		
	T2W E52 630	HEAT EXCHANGER (UPPER)			1	
2	T2W 800 631	HEAT EXCHANGER (LOWER)		1		
	T2W E52 631	HEAT EXCHANGER (LOWER)			1	
3	R01 093 115	PROPELLER FAN		2	2	
4	T2W E46 301	OUTDOOR FAN MOTOR (LOWER)	MF2	1	1	RA4N80-AC
5	T2W 800 302	OUTDOOR FAN MOTOR (UPPER)	MF1	1	1	RA4N55-AB
6	T2W 416 642	FUSIBLE PLUG		3	3	
7	M21 B90 641	CAHRGE PLUG		6	6	
8	T92 510 272	COMPRESSOR	MC1,MC2	2		KH-122WEV
	T92 513 200	COMPRESSOR	MC1,MC2		2	KH-122WES
9	T92 650 452	COMPRESSOR	MC3	1	1	RH-167NAB
10	M21 195 936	CAPILLARY TUBE (for 09A, 09B)		2		$\phi 0.12 \times \phi 0.055 \times 74-13/16$
	M21 AP9 936	CAPILLARY TUBE (for 09A, 09B)			2	$\phi 0.12 \times \phi 0.055 \times 74-13/16$
11	T2W 460 662	VALVE (LIQUID)		3	3	(1/4)
12	T2W 460 661	VALVE (GAS) (for 09A, 09B)		2	2	(3/8)
13	R01 L11 410	VALVE (GAS) (for 15C)		1	1	(5/8)
14	M21 G46 936	CAPILLARY TUBE (for 15C)		1	1	$\phi 0.12 \times \phi 0.063 \times 126$
15	T2W 800 523	REAR PANEL		1	1	
16	M21 B20 646	HIGH PRESSURE SWITCH	63H		3	

When servicing, cut the tube to the proper length as shown in the REFRIGERANT SYSTEM DIAGRAM see page 33 and 34.

13-18. OUTDOOR UNIT ELECTRICAL PARTS MUM30NN MUM30NN2



● Shows the change of parts number.

No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit		Remarks
				MUM30NN	MUM30NN2	
1	T2W 738 353	MC1. MC2. CAPACITOR	C1,C2	2		35 μ F 330V
	T2W 903 353	MC1. MC2. CAPACITOR	C1,C2		2	55 μ F 220V
2	T2W 500 353	MC3. CAPACITOR	C3	1	1	25 μ F 370V
3	T2W E46 451	OUTDOOR P. C. BOARD		1		
	T2W E52 451	OUTDOOR P. C. BOARD			1	
4	T2W 800 382	FUSE	F,F61	1	1	2A 250V
5	T2W 800 339	TRANSFORMER	T	1	1	
6	T2W 382 342	MC1. MC2. CONTACTOR	52C1, 52C2	2	2	G4F-11123T
7	T2W 359 340	MC3 CONTACTOR	52C3	1	1	VF-12HU
8	T2W 800 375	TERMINAL BLOCK	TB1,TB	1	1	
9	T2W E41 374	TERMINAL BLOCK	TB4,TB	1	1	UNIT 15C
10	T2W E42 375	TERMINAL BLOCK	TB2,3,TB	1	1	UNIT 09A.09B
11	T2W 464 340	MC1. MC2. THERMAL SWITCH	51C1, 51C2	2	2	MRA98881
12	T2W 394 330	MC3 THERMAL SWITCH	51C3	1	1	MRA98921
13	T2W E64 410	SURGE KILLER	CR	1		

1. REFRIGERANT PIPES

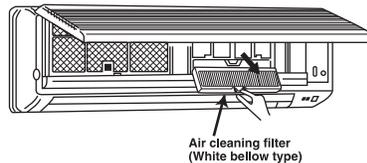
The air conditioner has flared connections its on indoor and outdoor sides.
Please use the optional extension pipe as follows.

Model	Part No.	Pipe length	Pipe size O.D			Additional refrigerant charge R-22(Oz)	
			Cross-section	A-Gas	B-Liquid		Insulation
MS09NW, MS09NW2	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, MS12NN2 MS15NN, MS15NN2 MS17NN, MS17NN2	MAC - 670PI	10ft		5/8	1/4	C 1-7/32 D 1-1/16	0
	MAC - 671PI	16ft					1
	MAC - 672PI	23ft				1	
	MAC - 673PI	33ft				3	
	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.

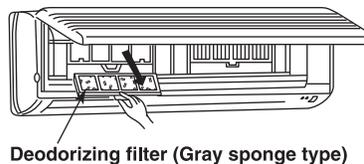
Part No.	Model
MAC-1000FT	MS09NW, MS09NW2
MAC-1100FT	MS12NN, MS15NN, MS17NN, MS12NN2, MS15NN2, MS17NN2



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, MS09NW2
MAC-1600DF	MS12NN, MS15NN, MS17NN, MS12NN2, MS15NN2, MS17NN2



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

Mr. SLIM

 **MITSUBISHI ELECTRIC CORPORATION**

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