This Servise Manual OB207 deals with MSH-07/09/12/18/24NV-E1, MUH-07/09/12/18/24NV-E1, MSH-18NV-E2, and MUH-18NV-E2 in OB176 REVISED EDITION-A issued in July in1997.
Therefore, please refer to OB207, not to OB176 REVISED EDITION-A, for the above models.

MITSUBISHI ELECTRIC

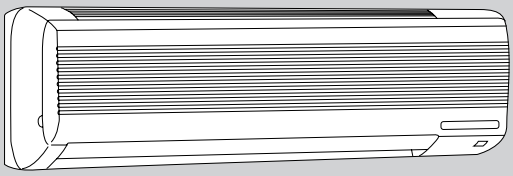
SPLIT-TYPE,HEAT PUMP AIR CONDITIONERS

No. OB207

SERVICE MANUAL

Wireless type
Models

MSH-07NV - E1 (WH) · MUH-07NV - E1
MSH-09NV - E1 (WH) · MUH-09NV - E1
MSH-12NV - E1 (WH) · MUH-12NV - E1
MSH-18NV - E1 (WH) · MUH-18NV - E1
MSH-24NV - E1 (WH) · MUH-24NV - E1
MSH-07NV - E2 (WH) · MUH-07NV - E2
MSH-09NV - E2 (WH) · MUH-09NV - E2
MSH-12NV - E2 (WH) · MUH-12NV - E2
MSH-18NV - E2 (WH) · MUH-18NV - E2
MSH-24NV - E2 (WH) · MUH-24NV - E2
MSH-18NV - E3 (WH) · MUH-18NV - E3



MSH-18NV - E1
MSH-18NV - E2
MSH-18NV - E3

CONTENTS

Refer to the Service Manual OB185 when MSH-07/09/12NV-E1, MSH-07/09/12/18NV-E2, and MSH-18NV-E3 are connected with MXZ-32NV-E1 as multi system units.

1 TECHNICAL CHANGES

MSH-17NV -E1→MSH-07NV -E2

1. Indoor electronic control P.C.board has changed.
   However, it is compatible between E1 and E2 models.
2. Auto restart function is added.

MSH-09NV -E1→MSH-09NV -E2

1. Indoor electronic control P.C.board has changed.
   However, it is compatible between E1 and E2 models.
2. Auto restart function is added.

MSH-12NV -E1→MSH-12NV -E2

1. Indoor electronic control P.C.board has changed.
   However, it is compatible between E1 and E2 models.
2. Auto restart function is added.

MSH-18NV -E2→MSH-18NV -E3

1. Indoor electronic control P.C.board has changed.
   However, it is compatible between E2 and E3 models.
2. Auto restart function is added.

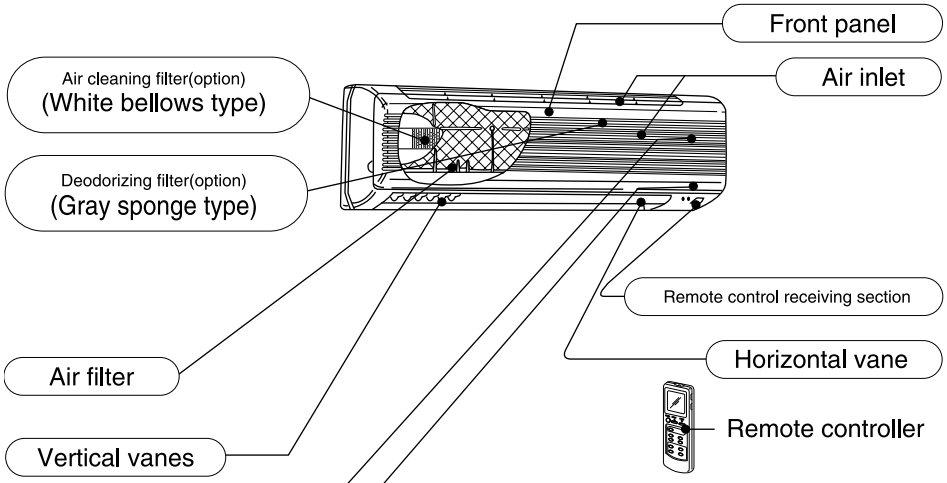
MSH-24NV -E1→MSH-24NV -E2

1. Indoor electronic control P.C.board has changed.
   However, it is compatible between E1 and E2 models.
2. Auto restart function is added.

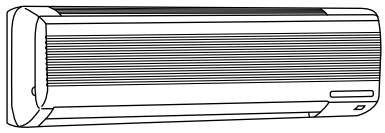
2 PART NAMES AND FUNCTIONS

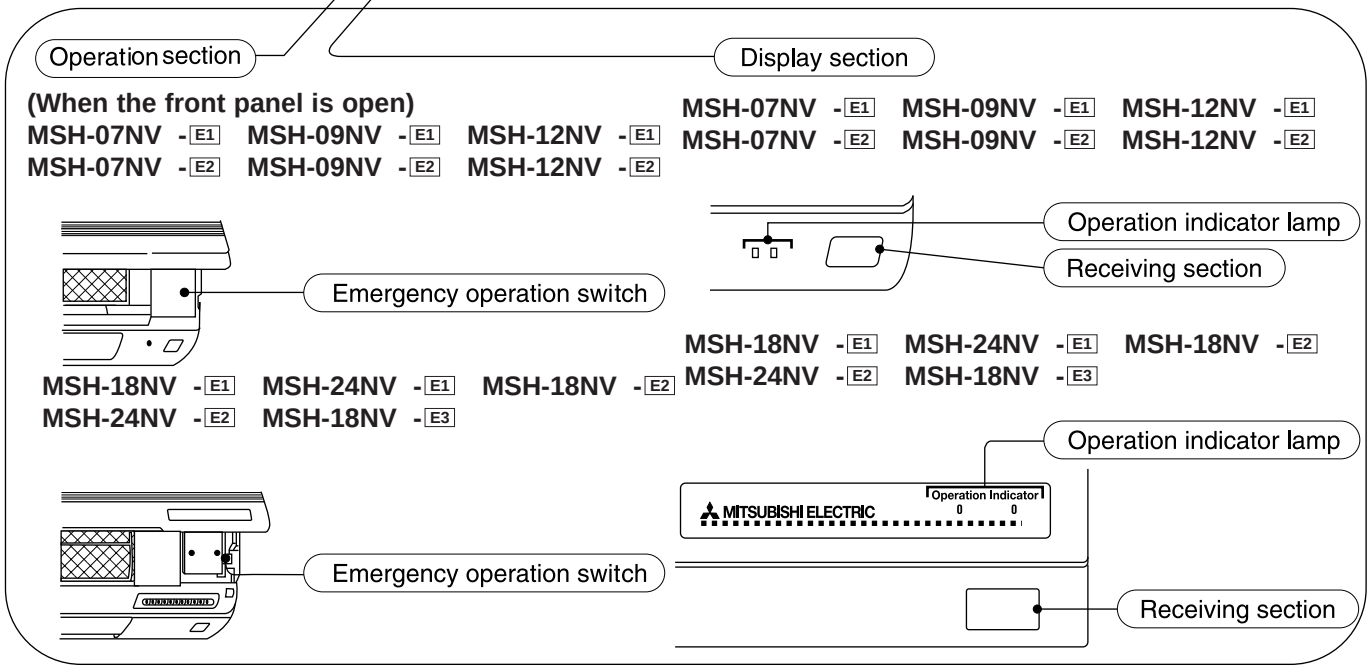
INDOOR UNIT

MSH-07NV -E1 **MSH-07NV -E2**
MSH-09NV -E1 **MSH-09NV -E2**
MSH-12NV -E1 **MSH-12NV -E2**



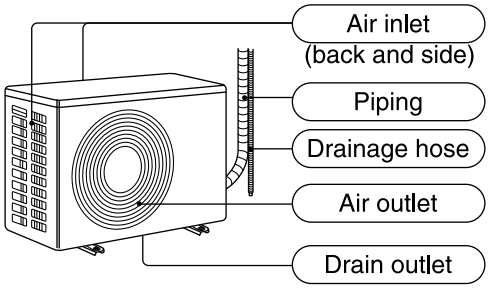
MSH-18NV -E1
MSH-24NV -E1
MSH-18NV -E2
MSH-24NV -E2
MSH-18NV -E3



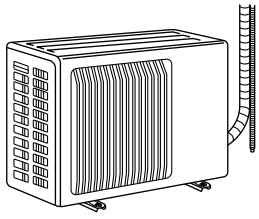


OUTDOOR UNIT

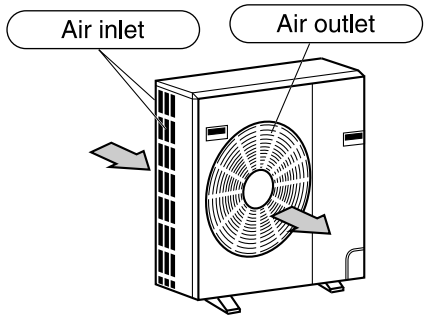
MUH-07NV -E1
MUH-09NV -E1
MUH-07NV -E2
MUH-09NV -E2



MUH-12NV -E1
MUH-18NV -E1
MUH-18NV -E2
MUH-18NV -E3

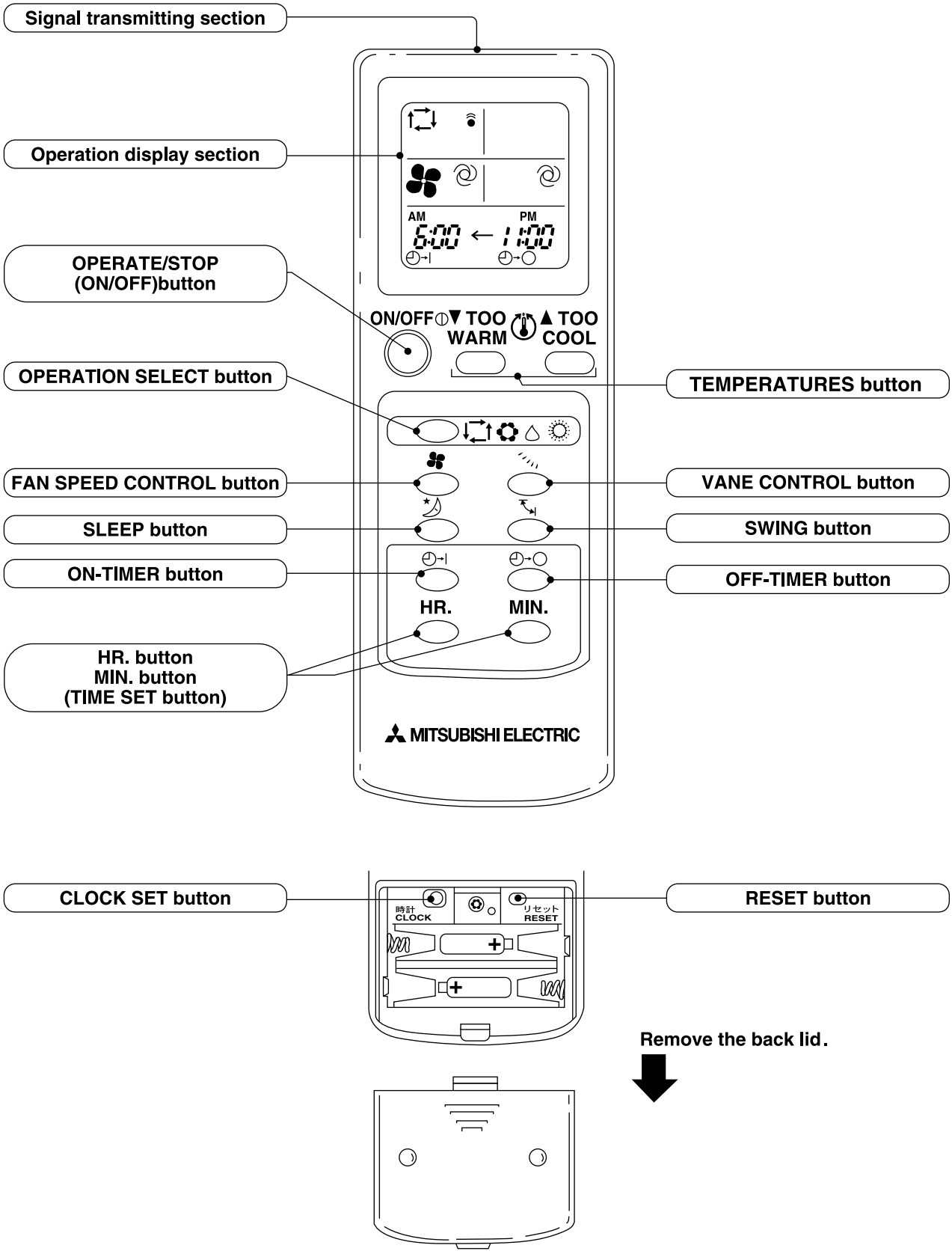


MUH-24NV -E1
MUH-24NV -E2

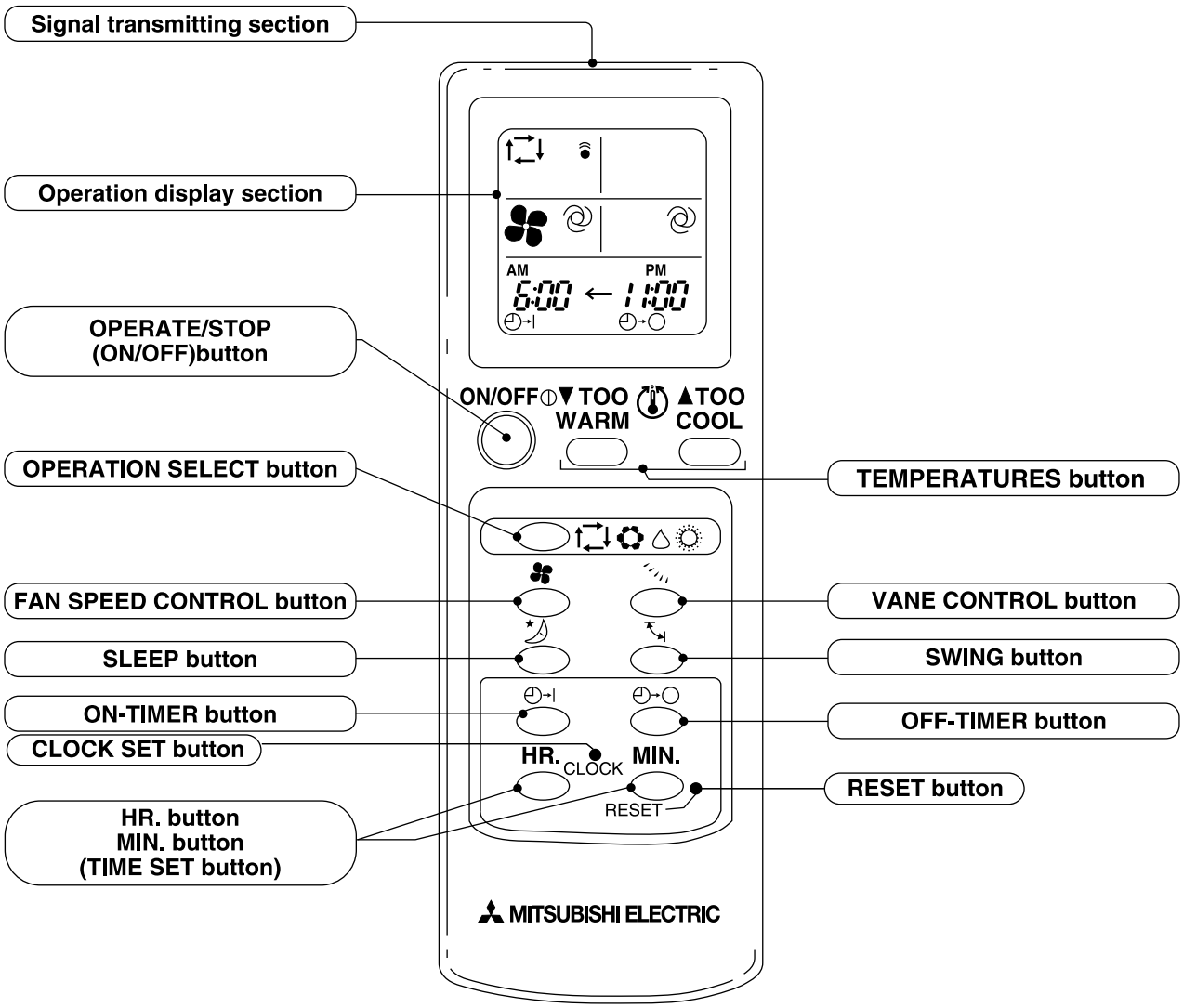


MSH-07NV -E1 MSH-09NV -E1 MSH-12NV -E1 MSH-18NV -E1 MSH-18NV -E2

REMOTE CONTROLLER



MSH-07NV -E1 (Serial number 7000201T~)
MSH-12NV -E1 (Serial number 7000001T~)
MSH-07NV -E2
MSH-12NV -E2
MSH-24NV -E2
MSH-09NV -E1 (Serial number 7000201T~)
MSH-24NV -E1
MSH-09NV -E2
MSH-18NV -E2 (Serial number 7000001T~)
MSH-18NV -E3



3 SPECIFICATION

Model				MSH-07NV - E1 E2		MSH-09NV - E1 E2	
Function				Cooling	Heating	Cooling	Heating
Power supply				Single phase,220-240V,50Hz		Single phase,220-240V,50Hz	
Capacity	Capacity		kW	2.2	2.5	2.5	3.1
	Dehumidification		ℓ /h	0.8	—	1.1	—
	Air flow		m³ /h	INDOOR 492 OUTDOOR 1620		INDOOR 492 OUTDOOR 1620	
Electrical data	Power outlet		A	10		10	
	Running current		A	3.30-3.20	3.15-3.05	4.10-4.00	4.30-4.10
	Power input		W	710-750	680-720	880-920	920-940
	Auxiliary heater		A(kW)	—	—	—	—
	Power factor		%	98-98		98-96	97-96
	Starting current		A	25		25	
	Compressor motor current		A	2.80-2.70	2.65-2.55	3.60-3.50	3.80-3.60
	Fan motor current		A	INDOOR 0.17 OUTDOOR 0.33		INDOOR 0.17 OUTDOOR 0.33	
Coefficient of performance(C.O.P)				3.10-2.93	3.68-3.47	2.84-2.72	3.37-3.30
Compressor	Model			RH-135VGHT		RH-174VGHT	
	Output		W	650		800	
	Winding resistance(at20℃)		Ω	C-R4.17 C-S5.75		C-R3.26 C-S5.82	
Indoor fan motor	Model			RC4V19-AA		RC4V19-AA	
	Winding resistance(at20℃)		Ω	WHT-BLK292 BLK-RED324		WHT-BLK292 BLK-RED324	
Outdoor fan motor	Model			RA6V29-CB		RA6V29-CB	
	Winding resistance(at20℃)		Ω	WHT-BLK218.0 BLK-RED423.7		WHT-BLK218.0 BLK-RED423.7	
Dimensions	Indoor unit	Width	mm	815		815	
		Height	mm	275		275	
		Depth	mm	183		183	
	Outdoor unit	Width	mm	780		780	
		Height	mm	540		540	
		Depth	mm	255		255	
Weight	Indoor unit		kg	8		8	
	Outdoor unit		kg	34		34	
Special remarks	Air direction			5		5	
	Sound level (Hi)	Indoor unit	dB	37		37	
		Outdoor unit	dB	47		48	
	Fan speed (Hi)	Indoor unit	rpm	1,100		1,100	
		Outdoor unit	rpm	790-820		790-820	
	Fan speed regulator	Indoor unit		4		4	
		Outdoor unit		1		1	
	Refrigerant filling capacity(R-22)		kg	0.85		0.85	
	Thermistor	RT11(at25℃)	kΩ	10		10	
		RT12(at25℃)	kΩ	10		10	
		RT61(at0℃)	kΩ	33.18		33.18	

NOTE:Test conditions

Cooling : Indoor DB27°C / WB19°C
Outdoor DB35°C / WB24°C
Heating : Indoor DB20°C /WB15.5°C
Outdoor DB 7°C / WB 6°C

Model				MSH-12NV - E1 E2		MSH-18NV - E1 E2 E3	
Function				Cooling	Heating	Cooling	Heating
Power supply				Single phase,220-240V,50Hz		Single phase,220-240V,50Hz	
Capacity	Capacity		kW	3.4	4.0	5.1	5.4
	Dehumidification		ℓ /h	1.6	—	2.5	—
	Air flow		m³ /h	INDOOR 558 OUTDOOR 2130-2244		INDOOR 756 OUTDOOR 2142	
Electrical data	Power outlet		A	10		15	
	Running current		A	5.75-5.90	5.95-6.10	9.4-9.2	9.2-9.0
	Power input		W	1220-1300	1260-1350	2030-2120	1980-2070
	Auxiliary heater		A(kW)	—	—	—	—
	Power factor		%	96-92	96-92	98-96	98-96
	Starting current		A	35		52-58	
	Compressor motor current		A	5.21-5.36	5.41-5.56	8.76-8.56	8.56-8.36
	Fan motor current		A	INDOOR 0.17 OUTDOOR 0.37		INDOOR 0.25 OUTDOOR 0.39	
Coefficient of performance(C.O.P)				2.78-2.61	3.17-2.96	2.51-2.41	2.73-2.61
Compressor	Model			RH-231VHAT		NH-36VMDT	
	Output		W	1100		1700	
	Winding resistance(at20℃)		Ω	C-R2.1 C-S3.9		C-R1.2 C-S2.7	
Indoor fan motor	Model			RC4V19-AA		RA4V27-EA	
	Winding resistance(at20℃)		Ω	WHT-BLK292 BLK-RED324		WHT-BLK183.8 BLK-RED250.5	
Outdoor fan motor	Model			RA6V40-EC or EE		RA6V50-OD or OF	
	Winding resistance(at20℃)		Ω	WHT-BLK130 BLK-RED134.6		WHT-BLK116.4 BLK-RED111.0	
Dimensions	Indoor unit	Width	mm	815		1015	
		Height	mm	275		320	
		Depth	mm	183		190	
	Outdoor unit	Width	mm	850		850	
		Height	mm	605		605	
		Depth	mm	290		290	
Weight	Indoor unit		kg	8		14	
	Outdoor unit		kg	43		59	
Special remarks	Air direction			5		5	
	Sound level (Hi)	Indoor unit	dB	42		42	
		Outdoor unit	dB	50		52	
	Fan speed (Hi)	Indoor unit	rpm	1230		1180	
		Outdoor unit	rpm	780-820		810-845	
	Fan speed regulator	Indoor unit		4		4	
		Outdoor unit		1		1	
	Refrigerant filling capacity(R-22)		kg	1.15		1.8	
	Thermistor	RT11(at25℃)	kΩ	10		10	
		RT12(at25℃)	kΩ	10		10	
		RT61(at0℃)	kΩ	33.18		33.18	

NOTE:Test conditions

Cooling : Indoor DB27°C / WB19°C

Outdoor DB35°C / WB24°C

Heating : Indoor DB20°C /WB15°.5C

Outdoor DB 7°C / WB 6°C

Model				MSH-24NV - E1 E2	
Function				Cooling	Heating
Power supply				Single phase,220-240V,50Hz	
Capacity	Capacity		kW	6.0	6.2
	Dehumidification		ℓ /h	3.1	—
	Air flow		m³ /h	816	
Electrical data	Power outlet		A	25	
	Running current		A	12.6-11.7	11.5-11.0
	Power input		W	2720-2750	2470-2580
	Auxiliary heater		A(kW)	—	
	Power factor		%	98	
	Starting current		A	59	
	Compressor motor current		A	11.73-10.83	10.63-10.13
	Fan motor current		A	INDOOR 0.29 OUTDOOR 0.58	
Coefficient of performance(C.O.P)				2.21-2.18	2.51-2.40
Compressor	Model			NH-47VMDT	
	Output		W	2200	
	Winding resistance(at20℃)		Ω	C-R 0.96 C-S 2.07	
Indoor fan motor	Model			RA4V27-EC	
	Winding resistance(at20℃)		Ω	WHT-BLK183.8 BLK-RED250.5	
Outdoor fan motor	Model			RA6V85-AA	
	Winding resistance(at20℃)		Ω	WHT-BLK62.7 BLK-YLW30.2 YLW-RED62.9	
Dimensions	Indoor unit	Width	mm	1015	
		Height	mm	320	
		Depth	mm	190	
	Outdoor unit	Width	mm	870	
		Height	mm	850	
		Depth	mm	295	
Weight	Indoor unit		kg	14	
	Outdoor unit		kg	72	
Special remarks	Air direction			5	
	Sound level (Hi)	Indoor unit	dB	45	
		Outdoor unit	dB	53	
	Fan speed (Hi)	Indoor unit	rpm	1,260	
		Outdoor unit	rpm	720-750	
	Fan speed regulator	Indoor unit		4	
		Outdoor unit		2	
	Refrigerant filling capacity(R-22)		kg	2.4	
	Thermistor	RT11(at25℃)	kΩ	10	
		RT12(at25℃)	kΩ	10	
		RT61(at0℃)	kΩ	33.18	

NOTE:Test conditions

Cooling : Indoor DB27°C / WB19°C
Outdoor DB35°C / WB24°C
Heating : Indoor DB20°C /WB15.5°C
Outdoor DB 7°C / WB 6°C

Refer to the Service Manual OB185 when MSH-07/09/12NV-E1, MSH-07/09/12/18NV-E2, and MSH-18NV-E3 are connected with MXZ-32NV-E1 as multi system units.

Model				MSH-07NV-E1E2(INDOOR UNIT)		MSH-09NV-E1E2(INDOOR UNIT)	
Function				Cooling	Heating	Cooling	Heating
Power supply				Single phase,220-240V,50Hz		Single phase,220-240V,50Hz	
Capacity	Capacity ※		kW	—	—	—	—
	Dehumidification		ℓ /h	—	—	—	—
	Air flow		m³ /h	492		492	
Electrical data	Power outlet		A	10		10	
	Running current		A	0.17		0.17	
	Power input		W	35		35	
	Auxiliary heater		A(kW)	—		—	
	Power factor		%	94-86		94-86	
	Starting current		A	—		—	
	Compressor motor current		A	—		—	
	Fan motor current		A	0.17		0.17	
Coefficient of performance(C.O.P)				—		—	
Compressor	Model			—		—	
	Output		W	—		—	
	Winding resistance(at20℃)		Ω	—		—	
Indoor fan motor	Model			RC4V19-AA		RC4V19-AA	
	Winding resistance(at20℃)		Ω	WHT-BLK292 BLK-RED324		WHT-BLK292 BLK-RED324	
Outdoor fan motor	Model			—		—	
	Winding resistance(at20℃)		Ω	—		—	
Dimensions	Indoor unit	Width	mm	815		815	
		Height	mm	275		275	
		Depth	mm	183		183	
	Outdoor unit	Width	mm	—		—	
		Height	mm	—		—	
		Depth	mm	—		—	
Weight	Indoor unit		kg	8		8	
	Outdoor unit		kg	—		—	
Special remarks	Air direction			5		5	
	Sound level	Indoor unit	dB	37		37	
	(Hi)	Outdoor unit	dB	—		—	
	Fan speed	Indoor unit	rpm	1,100		1,100	
	(Hi)	Outdoor unit	rpm	—		—	
	Fan speed	Indoor unit		4		4	
	regulator	Outdoor unit		—		—	
	Refrigerant filling capacity(R-22)		kg	—		—	
	Thermistor	RT11(at25℃)	kΩ	10		10	
		RT12(at25℃)	kΩ	10		10	
		RT61(at0℃)	kΩ	—		—	

NOTE:Test conditions

Cooling : Indoor DB27°C / WB19°C
Outdoor DB35°C / WB24°C
Heating : Indoor DB20°C /WB15.5°C
Outdoor DB 7°C / WB 6°C

※Please refer to Service manual OB185 for capacity.

Refer to the Service Manual OB185 when MSH-07/09/12NV-E1, MSH-07/09/12/18NV-E2, and MSH-18NV-E3 are connected with MXZ-32NV-E1 as multi system units.

Model				MSH-12NV-E1E2(INDOOR UNIT)		MSH-18NV-E2E3(INDOOR UNIT)	
Function				Cooling	Heating	Cooling	Heating
Power supply				Single phase,220-240V,50Hz		Single phase,220-240V,50Hz	
Capacity	Capacity ※		kW	—	—	—	—
	Dehumidification		ℓ /h	—		—	
	Air flow		m³ /h	558		756	
Electrical data	Power outlet		A	10		10	
	Running current		A	0.17		0.28	
	Power input		W	35		60	
	Auxiliary heater		A(kW)	—		—	
	Power factor		%	94-86		97-89	
	Starting current		A	—		—	
	Compressor motor current		A	—		—	
	Fan motor current		A	0.17		0.25	
Coefficient of performance(C.O.P)				—		—	
Compressor	Model			—		—	
	Output		W	—		—	
	Winding resistance(at20℃)		Ω	—		—	
Indoor fan motor	Model			RA4V19-AA		RA4V27-EA	
	Winding resistance(at20℃)		Ω	WHT-BLK292 BLK-RED324		WHT-BLK184 BLK-RED251	
Outdoor fan motor	Model			—		—	
	Winding resistance(at20℃)		Ω	—		—	
Dimensions	Indoor unit	Width	mm	815		1015	
		Height	mm	275		320	
		Depth	mm	183		190	
	Outdoor unit	Width	mm	—		—	
		Height	mm	—		—	
		Depth	mm	—		—	
Weight	Indoor unit		kg	8		14	
	Outdoor unit		kg	—		—	
Special remarks	Air direction			5		5	
	Sound level (Hi)	Indoor unit	dB	42		42	
		Outdoor unit	dB	—		—	
	Fan speed (Hi)	Indoor unit	rpm	1,230		1,180	
		Outdoor unit	rpm	—		—	
	Fan speed regulator	Indoor unit		4		4	
		Outdoor unit		—		—	
	Refrigerant filling capacity(R-22)		kg	—		—	
	Thermistor	RT11(at25℃)	kΩ	10		10	
		RT12(at25℃)	kΩ	10		10	
		RT61(at0℃)	kΩ	—		—	

NOTE:Test conditions
Cooling : Indoor DB27°C / WB19°C
Outdoor DB35°C / WB24°C
Heating : Indoor DB20°C /WB15.5°C
Outdoor DB 7°C / WB 6°C

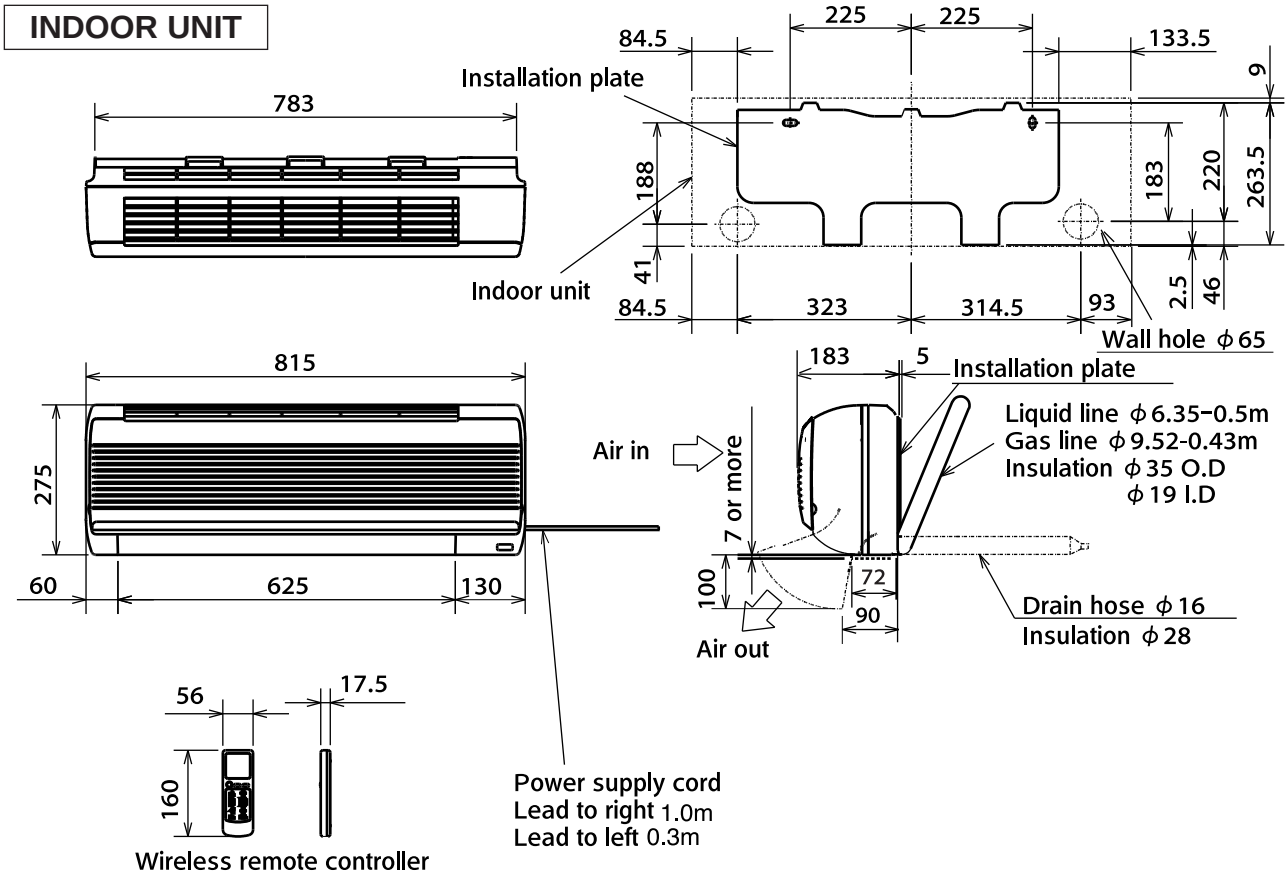
※Please refer to Service manual OB185 for capacity.

4 OUTLINES AND DIMENSIONS

Unit: mm

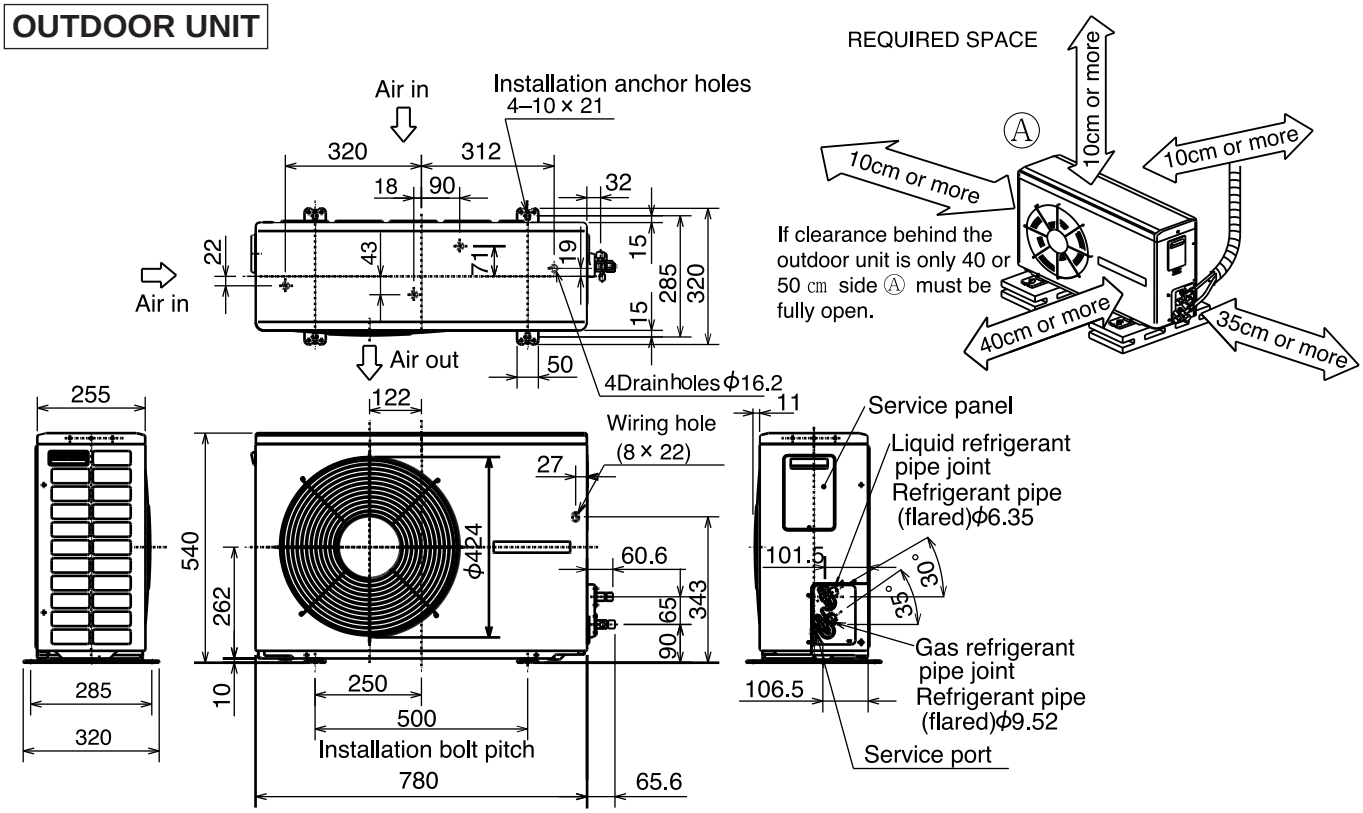
MSH-07NV -E1 MSH-09NV -E1 MSH-07NV -E2 MSH-09NV -E2

INDOOR UNIT



MUH-07NV -E1 MUH-09NV -E1 MUH-07NV -E2 MUH-09NV -E2

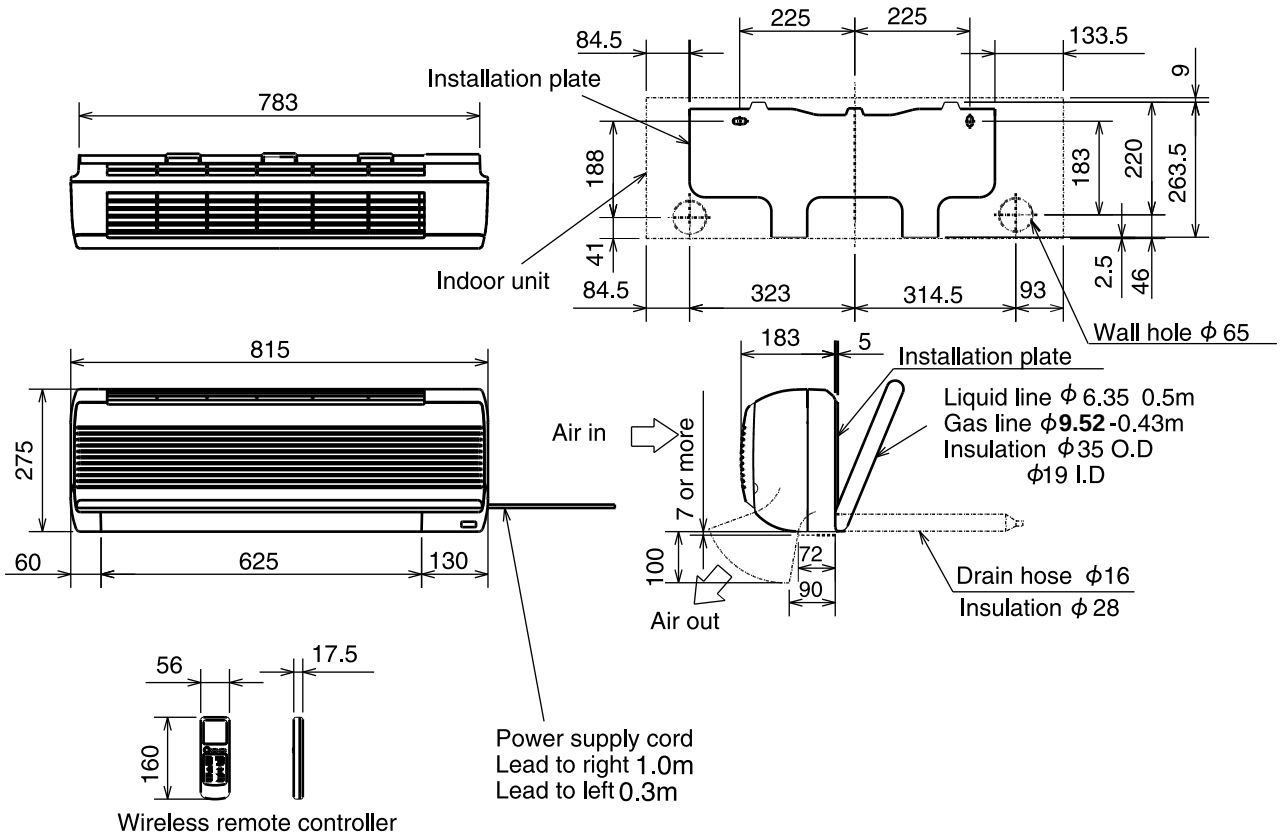
OUTDOOR UNIT



Unit: mm

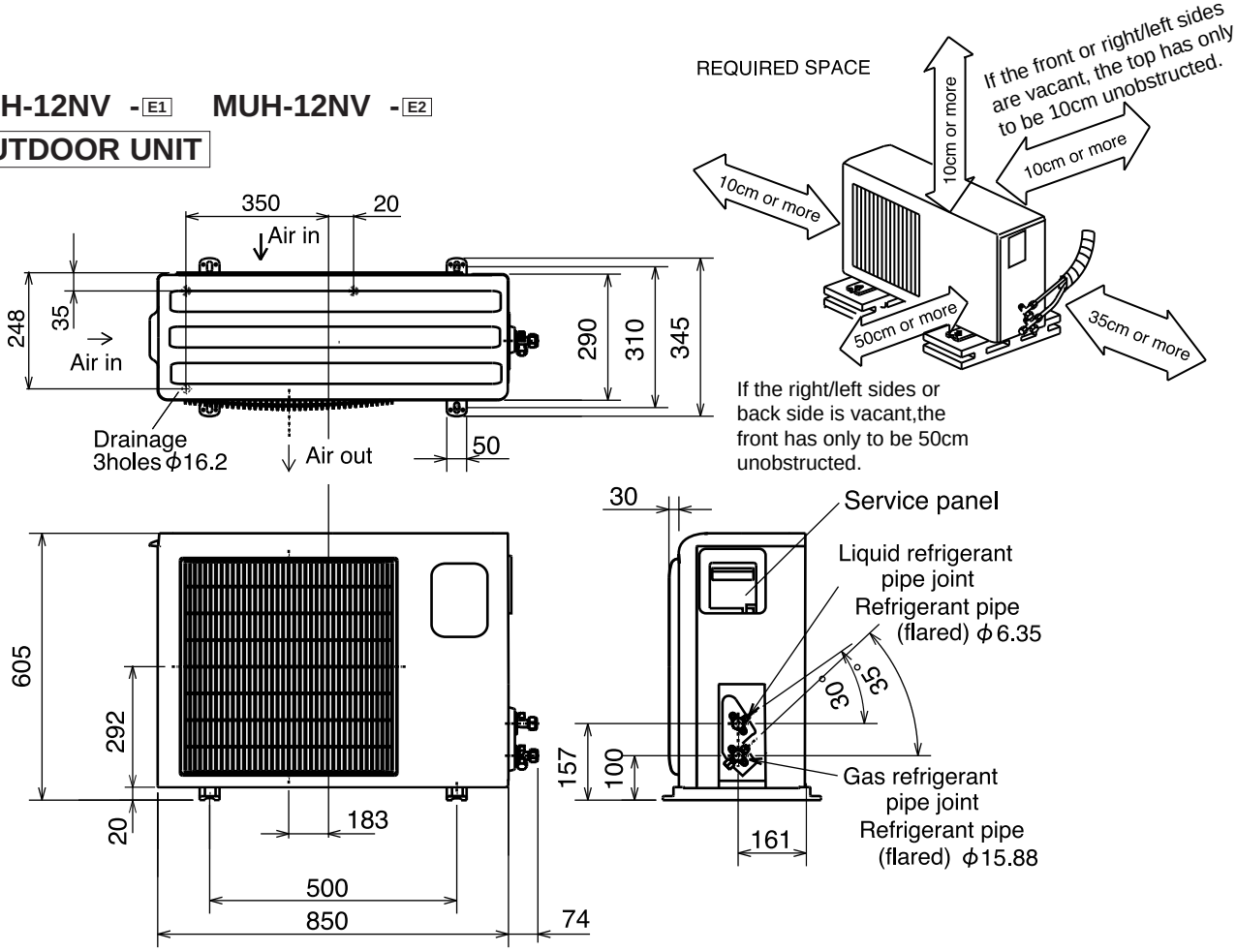
MSH-12NV -E1 MSH-12NV -E2

INDOOR UNIT



MUH-12NV -E1 MUH-12NV -E2

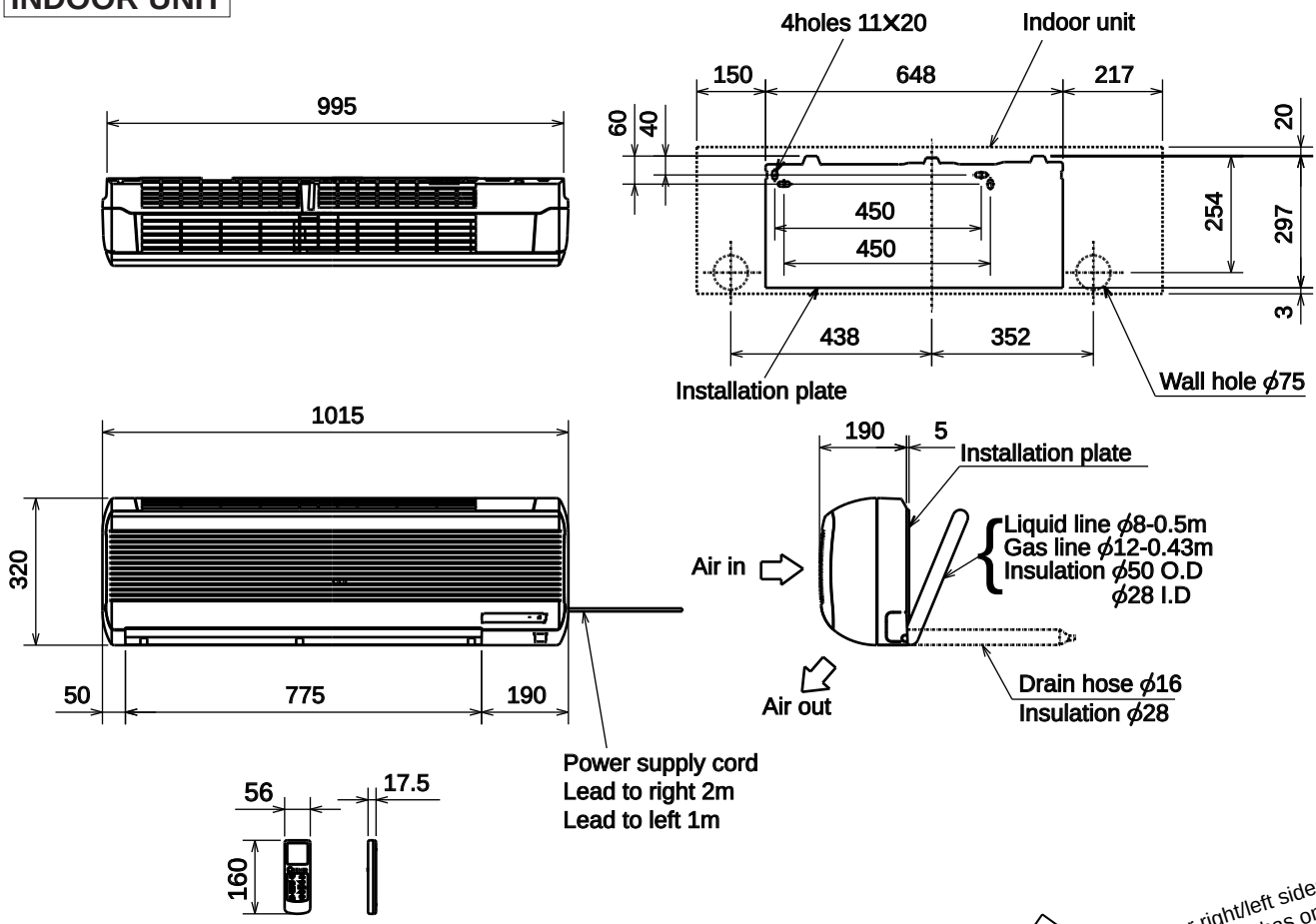
OUTDOOR UNIT



Unit: mm

MSH-18NV -E1 MSH-24NV -E1 MSH-18NV -E2 MSH-24NV -E2 MSH-18NV -E3

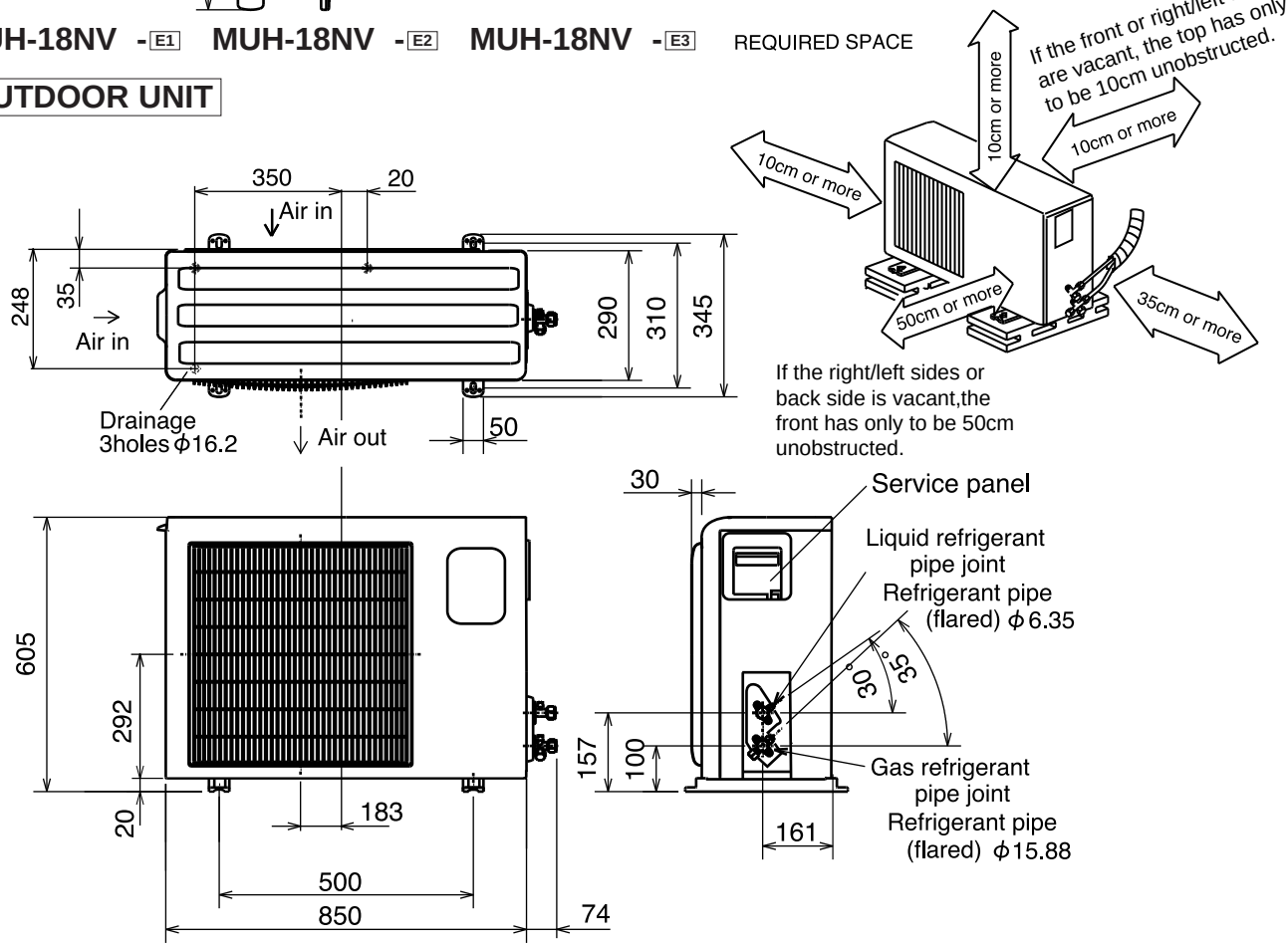
INDOOR UNIT



MUH-18NV -E1 MUH-18NV -E2 MUH-18NV -E3

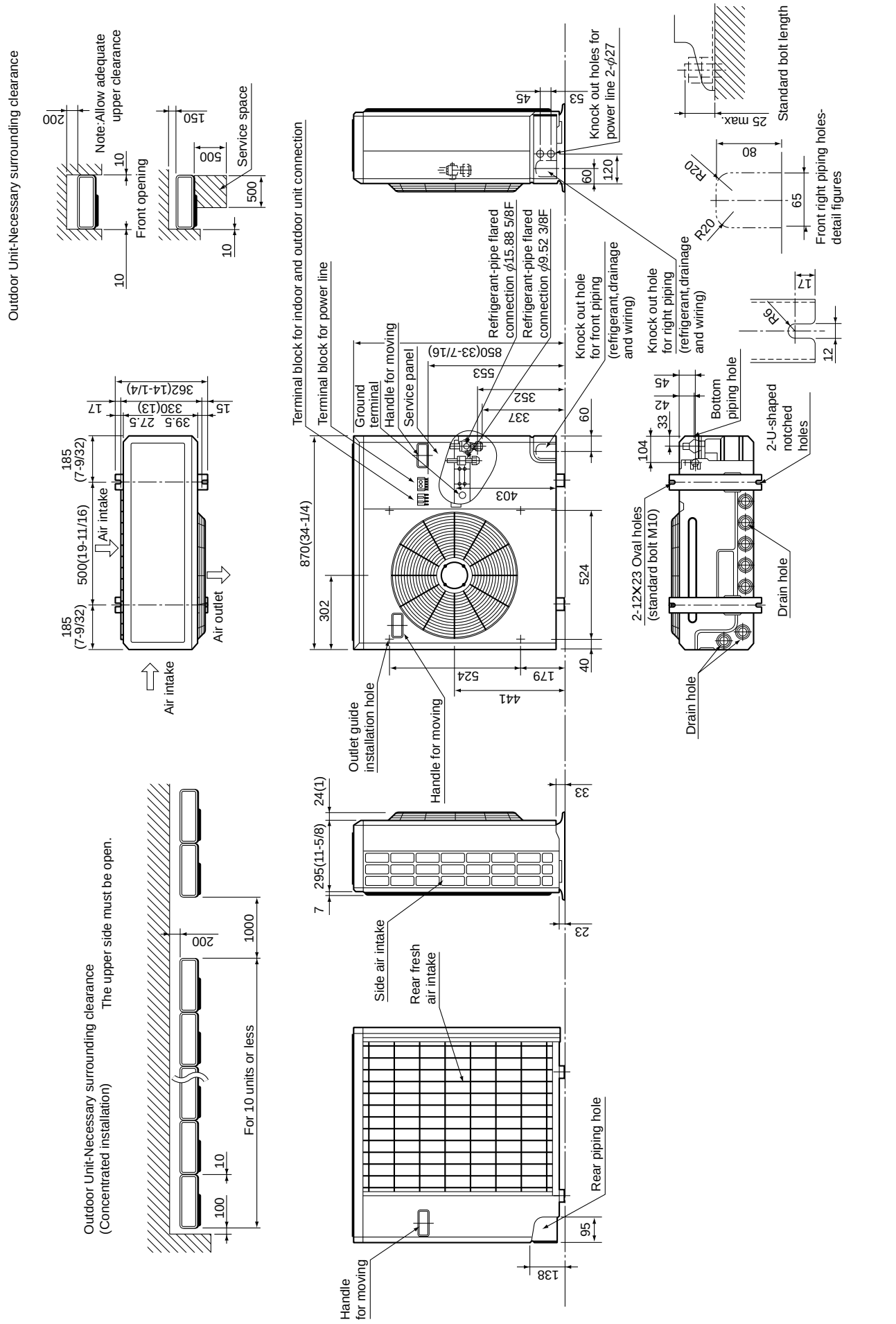
REQUIRED SPACE

OUTDOOR UNIT



MUH-24NV-E1 MUH-24NV-E2

Unit : mm (inch)

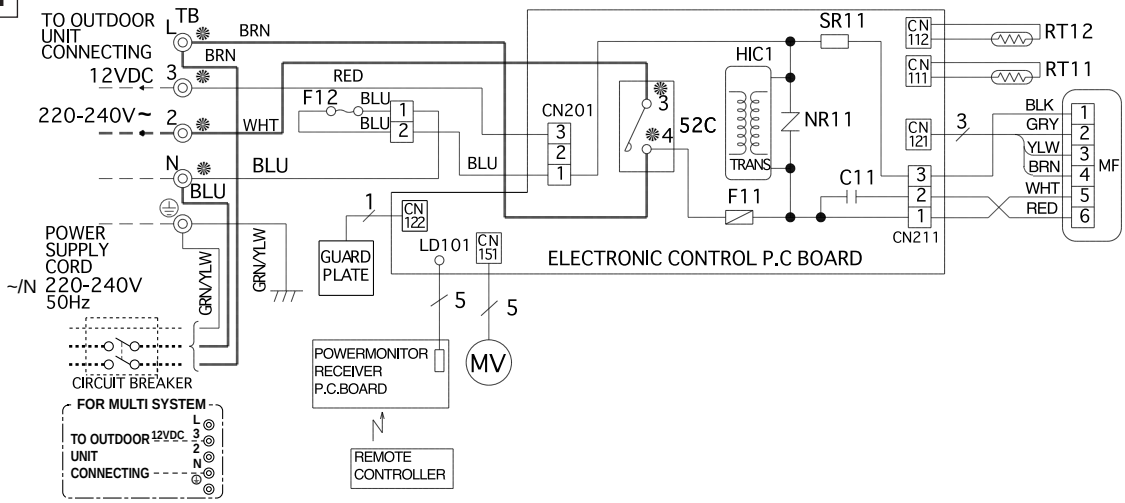


5 WIRING DIAGRAM

MSH-07NV -E1
MSH-09NV -E1

MODELS WIRING DIAGRAM

INDOOR UNIT



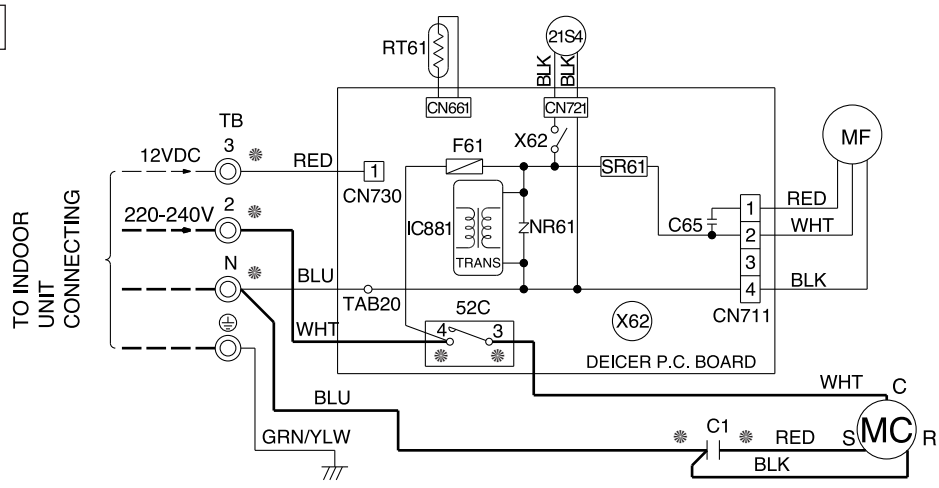
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	MV	VANE MOTOR
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	SR11	SOLID STATE RELAY
MF	INDOOR FAN MOTOR	52C	CONTACTOR		

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

MUH-07NV -E1
MUH-09NV -E1

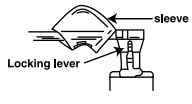
MODELS WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	X62	REVERSING VALVE COIL RELAY
C65	OUTDOOR FAN MOTOR CAPACITOR	NR61	VARISTOR	21S4	REVERSING VALVE COIL
52C	CONTACTOR	RT61	DEFROST THERMISTOR	IC881	DC/DC CONVERTER
F61	FUSE(2A)	SR61	SOLID STATE RELAY		
MC	COMPRESSOR(INNER THERMOSTAT)	TB	TERMINAL BLOCK		

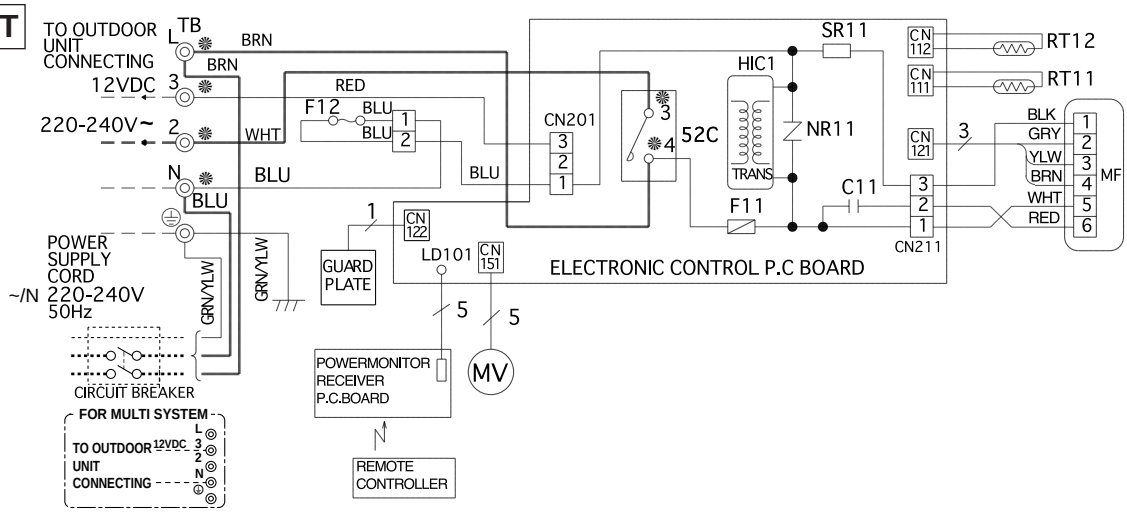
NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector
4. "✵"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.



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

MSH-12NV -E1 MODEL WIRING DIAGRAM

INDOOR UNIT

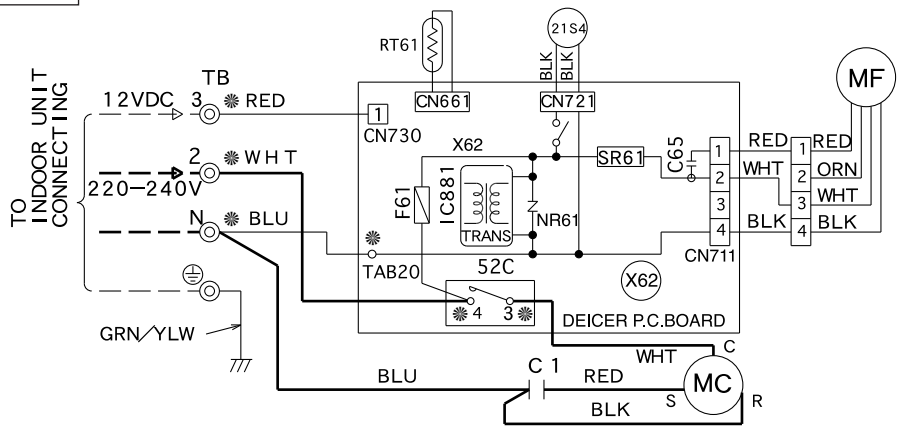


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	MV	VANE MOTOR
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	SR11	SOLID STATE RELAY
MF	INDOOR FAN MOTOR	52C	CONTACTOR		

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

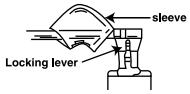
MUH-12NV -E1 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	X62	REVERSING VALVE COIL RELAY
C65	OUTDOOR FAN MOTOR CAPACITOR	NR61	VARISTOR	21S4	REVERSING VALVE COIL
52C	CONTACTOR	RT61	DEFROST THERMISTOR	IC881	DC/DC CONVERTER
F61	FUSE(2A)	SR61	SOLID STATE RELAY		
MC	COMPRESSOR(INNER THERMOSTAT)	TB	TERMINAL BLOCK		

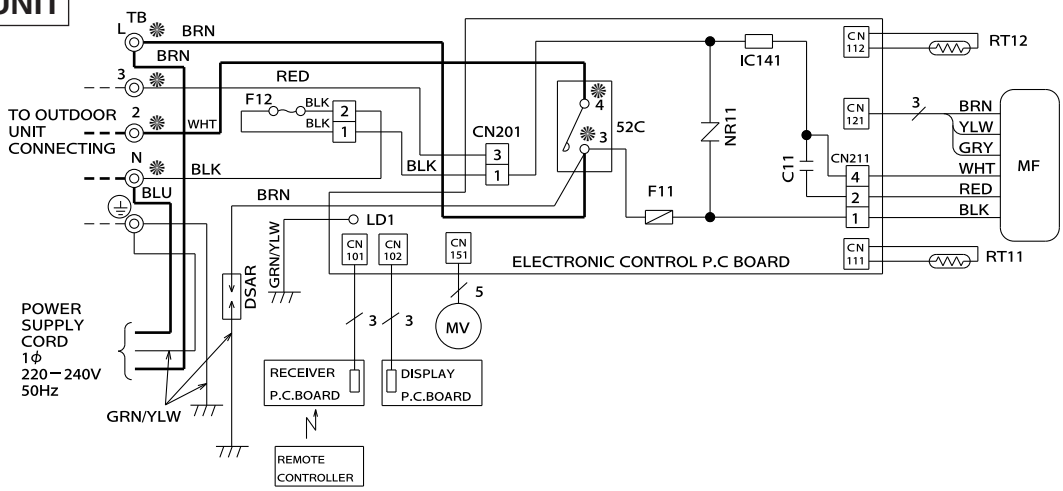
NOTE:1. Use copper conductors only.(For field wiring)
2. "❋"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.
3. Symbols below indicate.
◎: Terminal block,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



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

MSH-18NV -E1 MODEL WIRING DIAGRAM

INDOOR UNIT

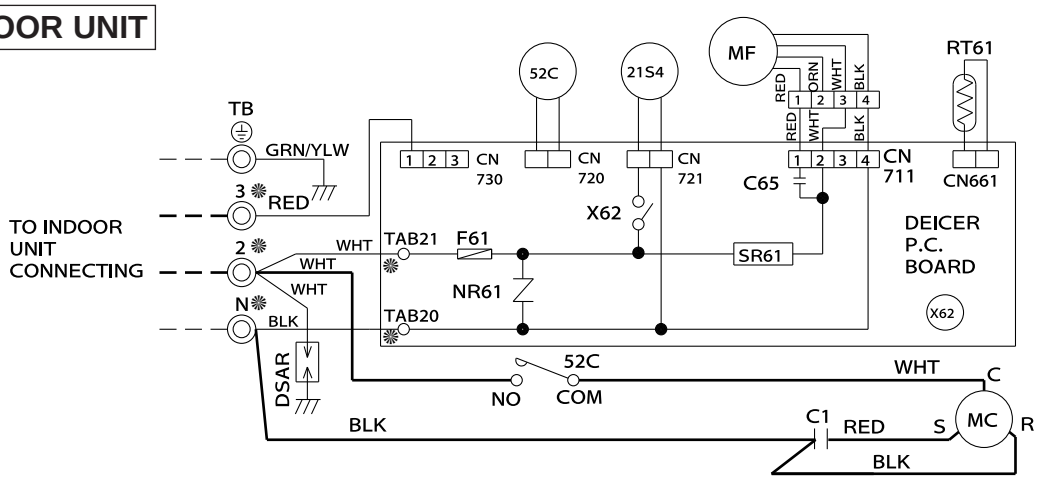


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC/DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

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

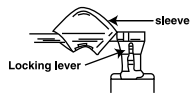
MUH-18NV -E1 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	X62	REVERSING VALVE COIL RELAY
C65	OUTDOOR FAN MOTOR CAPACITOR	NR61	VARISTOR	21S4	REVERSING VALVE COIL
DSAR	SURGE ABSORBER	RT61	DEFROST THERMISTOR	52C	CONTACTOR
F61	FUSE(2A)	SR61	SOLID STATE RELAY		
MC	COMPRESSOR<INNER THERMOSTAT>	TB	TERMINAL BLOCK		

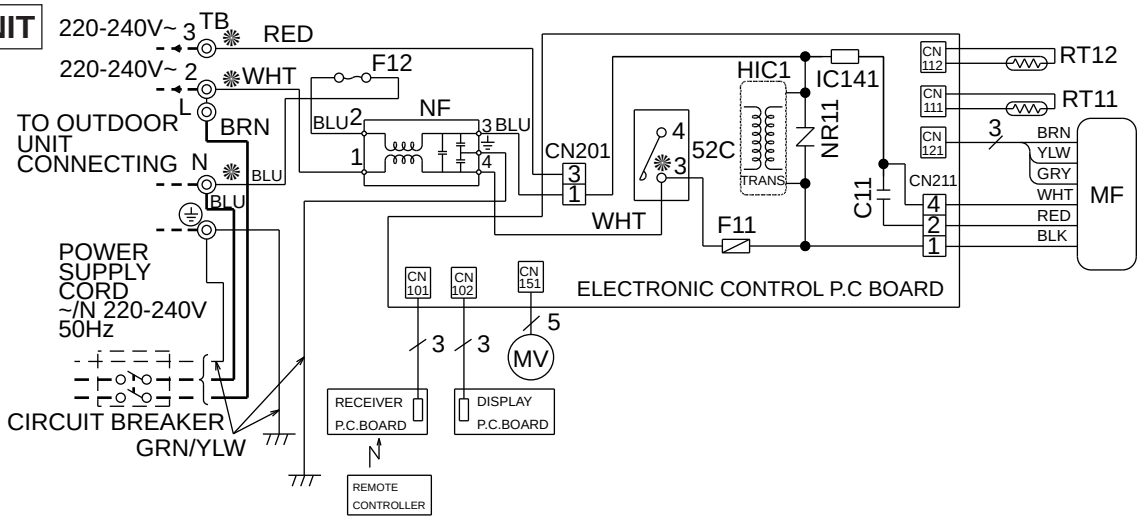
NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector
4. "❋"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.



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

MSH-24NV -E1 MODEL WIRING DIAGRAM

INDOOR UNIT

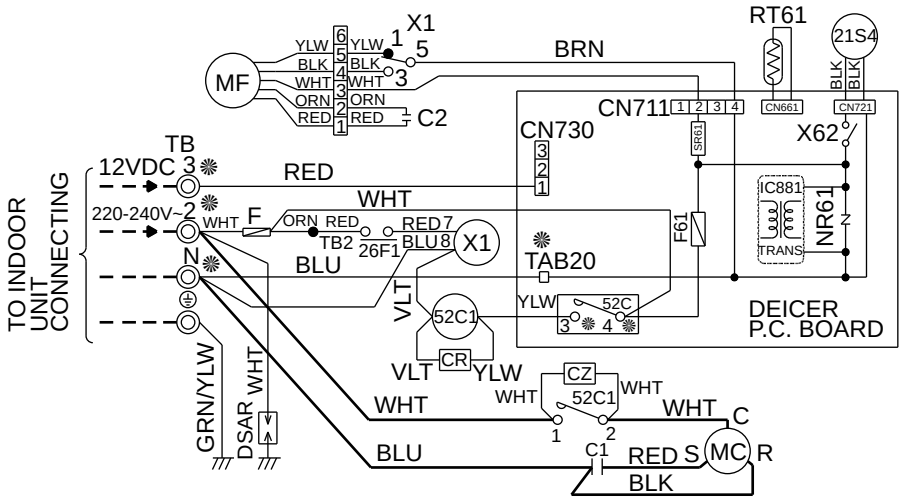


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN MOTOR CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	HIC1	DC/DC CONVERTER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	NF	NOISE FILTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

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

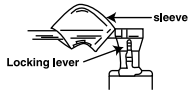
MUH-24NV -E1 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR <INNER THERMOSTAT>	X62	REVERSING VALVE COIL RELAY	F	FUSE(2A)
C2	OUTDOOR FAN MOTOR CAPACITOR	NR61	VARISTOR	21S4	REVERSING VALVE COIL	26F1	THERMOSTAT (AIR FLOW CONTROL)
DSAR	SURGE ABSORBER 1	RT61	DEFROST THERMISTOR	52C	CONTACTOR	IC881	DC/DC CONVERTER
F61	FUSE(2A)	SR61	SOLID STATE RELAY	52C1	COMPRESSOR CONTACTOR	CR	SURGE ABSORBER 2
MC	COMPRESSOR<INNER THERMOSTAT>	TB. TB2	TERMINAL BLOCK	X1	FAN MOTOR RELAY	CZ	SURGE ABSORBER 3

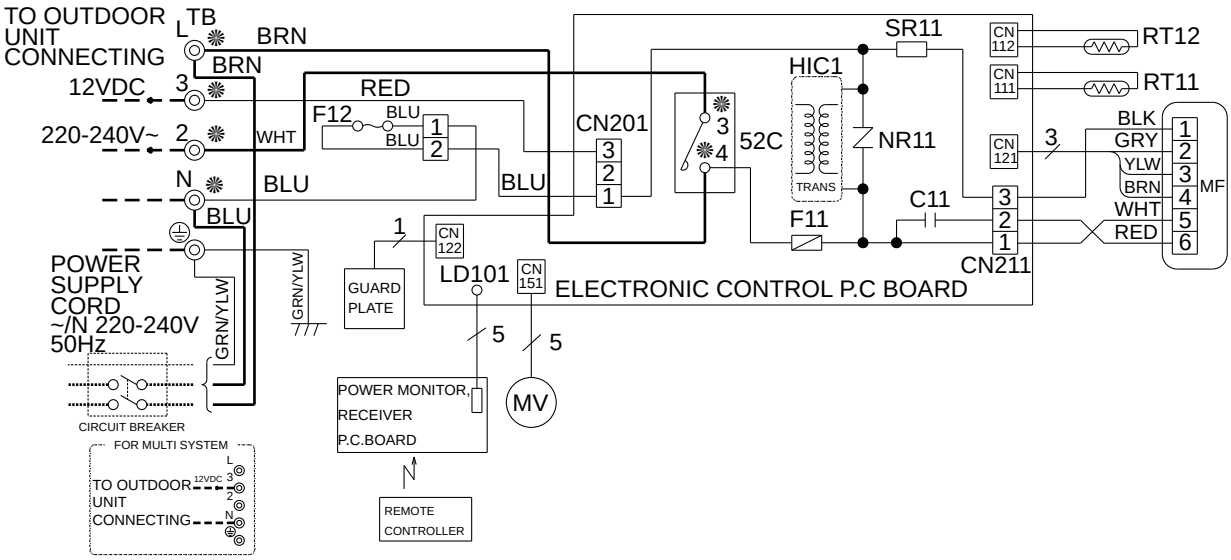
NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector
4. "❋"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.



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

MSH-07NV -E2 MSH-09NV -E2 MSH-12NV -E2 MODELS WIRING DIAGRAM

INDOOR UNIT

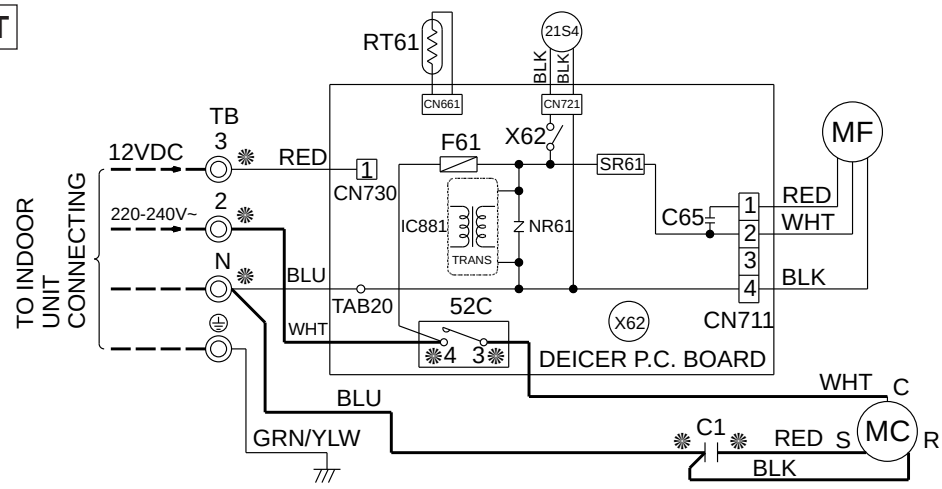


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN MOTOR CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	HIC1	DC/DC CONVERTER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	SR11	SOLID STATE RELAY
MF	INDOOR FAN MOTOR	52C	CONTACTOR	MV	VANE MOTOR

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

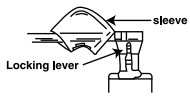
MUH-07NV -E2 MUH-09NV -E2 MODELS WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR <INNER THERMOSTAT>	X62	REVERSING VALVE COIL RELAY	C65	FAN MOTOR CAPACITOR
F61	FUSE(2A)	NR61	VARISTOR	21S4	REVERSING VALVE COIL	IC881	DC/DC CONVERTER
MC	COMPRESSOR<INNER THERMOSTAT>	RT61	DEFROST THERMISTOR	52C	CONTACTOR	TB	TERMINAL BLOCK
SR61	SOLID STATE RELAY						

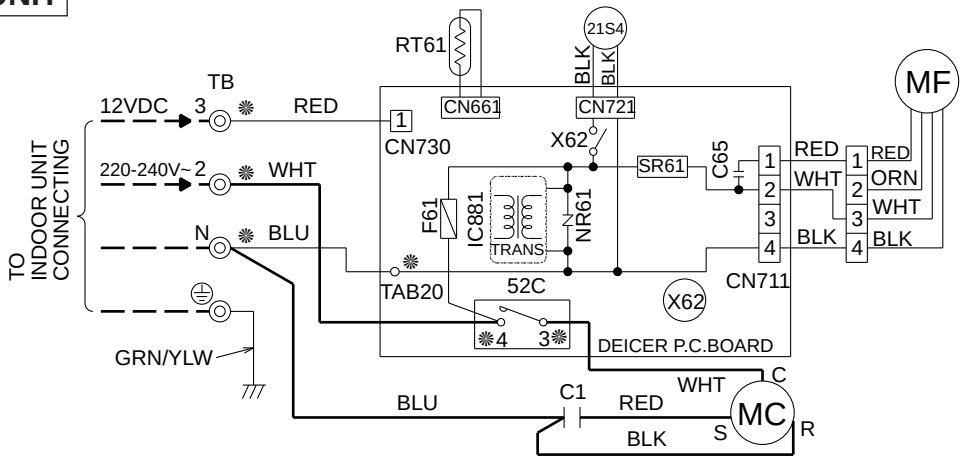
NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector
4. "❋"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.



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

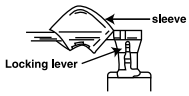
MUH-12NV -E2 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR <INNER THERMOSTAT>	X62	REVERSING VALVE COIL RELAY	C65	FAN MOTOR CAPACITOR
F61	FUSE(2A)	NR61	VARISTOR	21S4	REVERSING VALVE COIL	IC881	DC/DC CONVERTER
MC	COMPRESSOR<INNER THERMOSTAT>	RT61	DEFROST THERMISTOR	52C	CONTACTOR	TB	TERMINAL BLOCK
SR61	SOLID STATE RELAY						

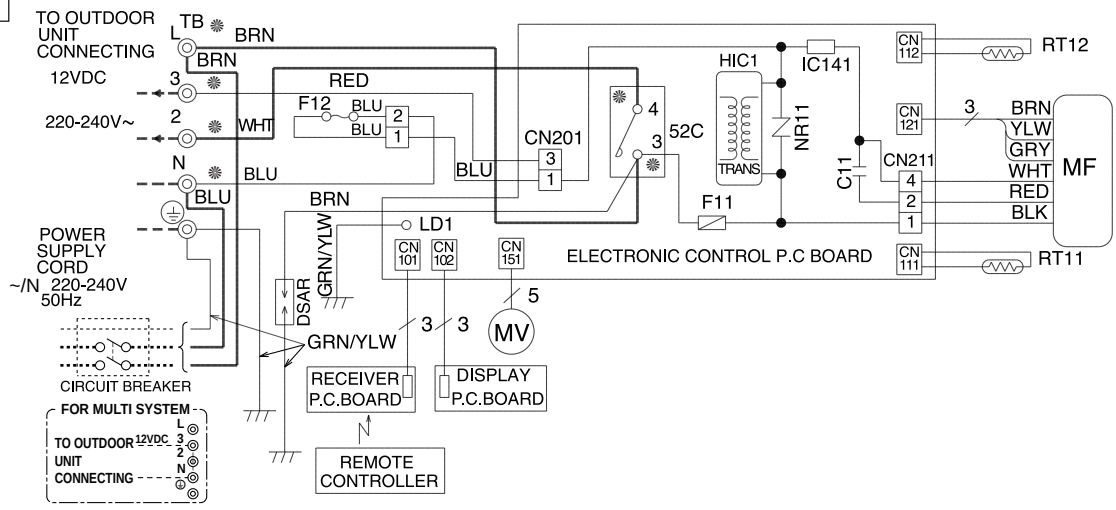
NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector
4. "✵"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.



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

MSH-18NV -E2 MODEL WIRING DIAGRAM

INDOOR UNIT

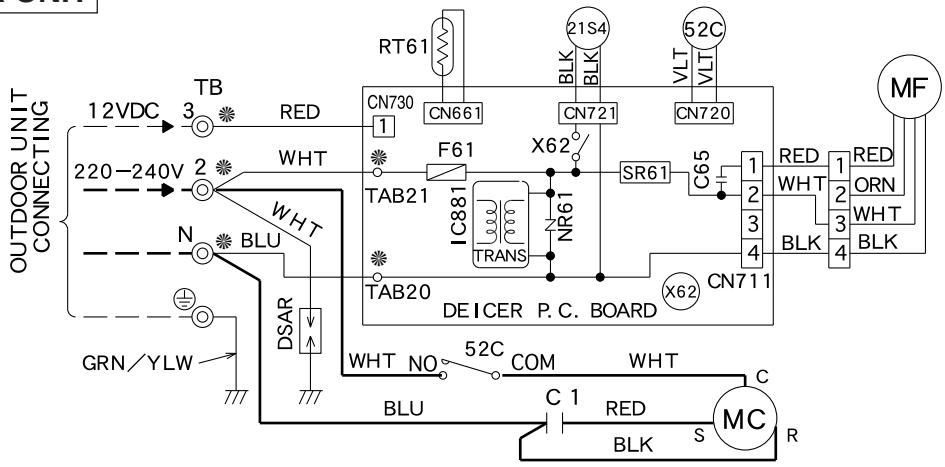


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC/DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

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

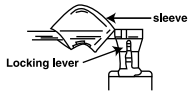
MUH-18NV -E2 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	X62	REVERSING VALVE COIL RELAY
C65	OUTDOOR FAN MOTOR CAPACITOR	NR61	VARISTOR	21S4	REVERSING VALVE COIL
DSAR	SURGE ABSORBER	RT61	DEFROST THERMISTOR	52C	CONTACTOR
F61	FUSE(2A)	SR61	SOLID STATE RELAY	IC881	DC/DC CONVERTER
MC	COMPRESSOR<INNER THERMOSTAT>	TB	TERMINAL BLOCK		

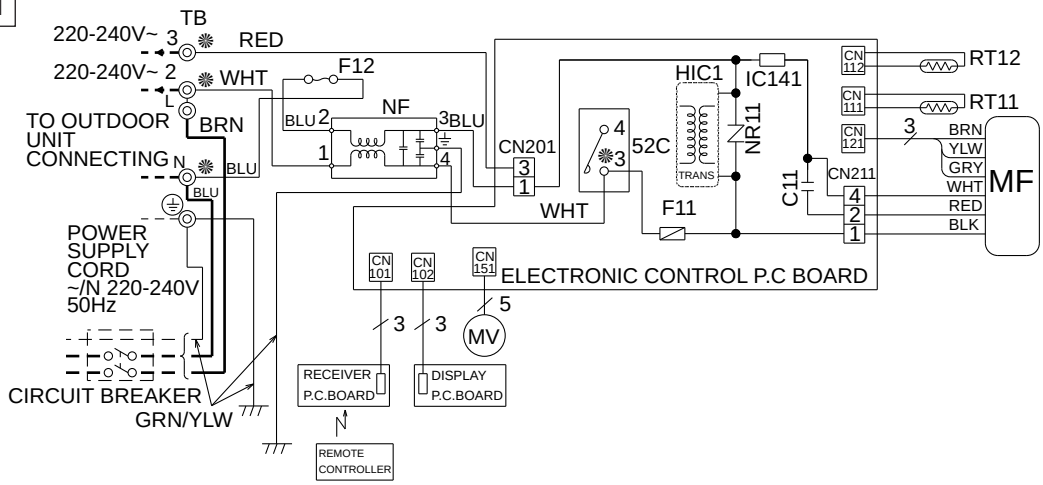
NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎ : Terminal block, □□□□: Connector
4. "❋"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.



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

MSH-24NV -E2 MODEL WIRING DIAGRAM

INDOOR UNIT

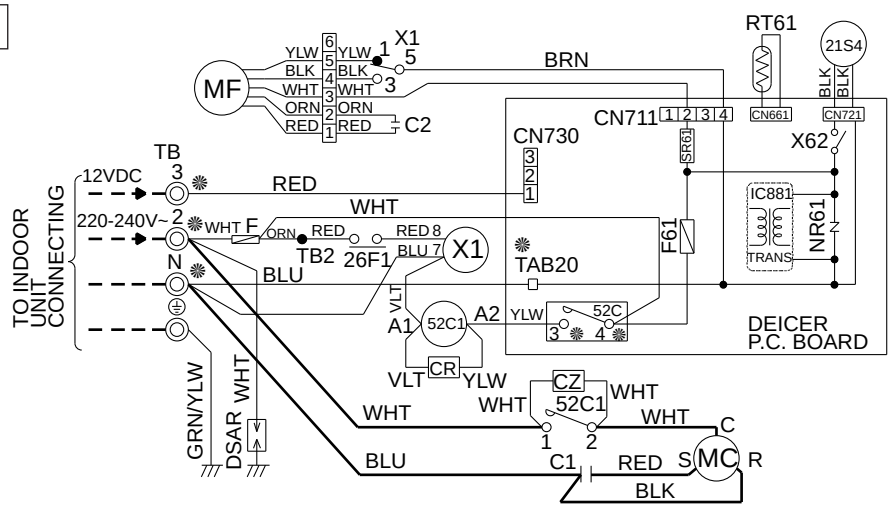


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	NF	NOISE FILTER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC/DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

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

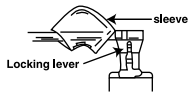
MUH-24NV -E2 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	X62	REVERSING VALVE COIL RELAY
C2	FAN MOTOR CAPACITOR	NR61	VARISTOR	21S4	REVERSING VALVE COIL
DSAR	SURGE ABSORBER 1	RT61	DEFROST THERMISTOR	52C	CONTACTOR
CR	SURGE ABSORBER 2	SR61	SOLID STATE RELAY	52C1	COMPRESSOR CONTACTOR
CZ	SURGE ABSORBER 3	TB,TB2	TERMINAL BLOCK	IC881	DC/DC CONVERTER
F61	FUSE(2A)	F	FUSE(2A)	X1	FAN MOTOR RELAY
MC	COMPRESSOR<INNER THERMOSTAT>	26F1	THERMOSTAT (AIR FLOW CONTROL)		

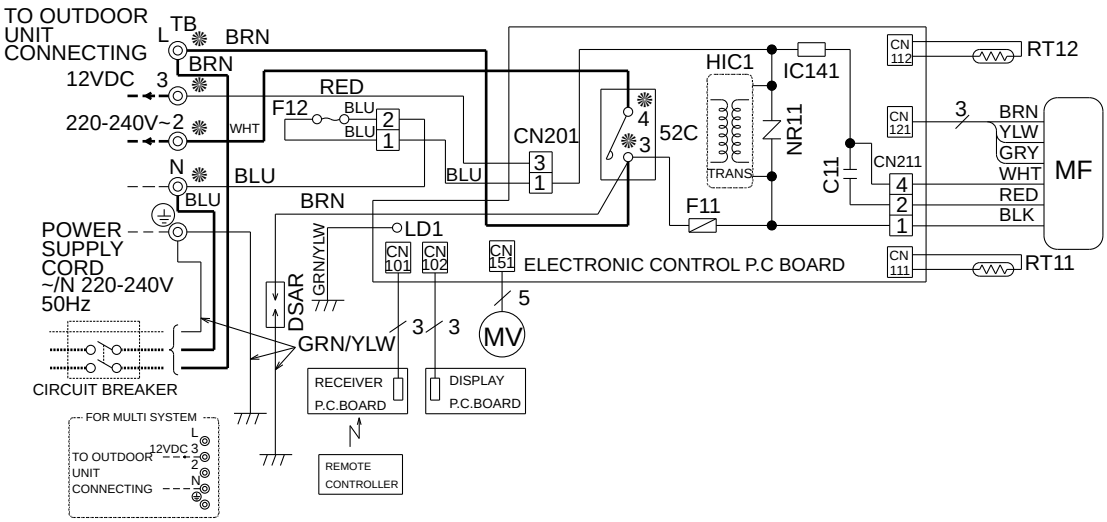
NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎ : Terminal block, □□□□: Connector
4. "❋"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.



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

MSH-18NV -E3 MODEL WIRING DIAGRAM

INDOOR UNIT

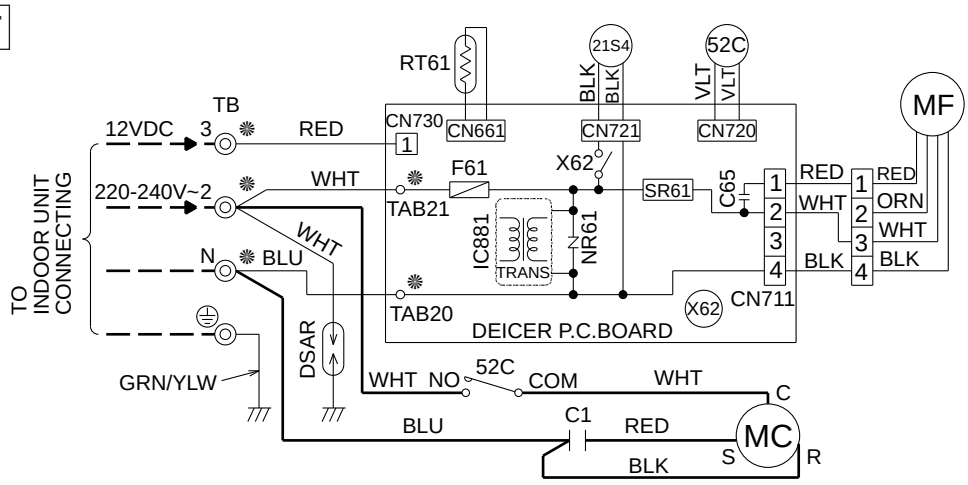


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC/DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

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

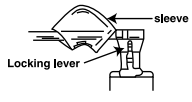
MUH-18NV -E3 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	X62	REVERSING VALVE COIL RELAY
C65	OUTDOOR FAN MOTOR CAPACITOR	NR61	VARISTOR	21S4	REVERSING VALVE COIL
DSAR	SURGE ABSORBER	RT61	DEFROST THERMISTOR	52C	CONTACTOR
F61	FUSE(2A)	SR61	SOLID STATE RELAY	IC881	DC/DC CONVERTER
MC	COMPRESSOR<INNER THERMOSTAT>	TB	TERMINAL BLOCK		

NOTE:1. Use copper conductors only.(For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers.
3. Symbols below indicate.
◎ : Terminal block, □□□□: Connector
4. "❋"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.



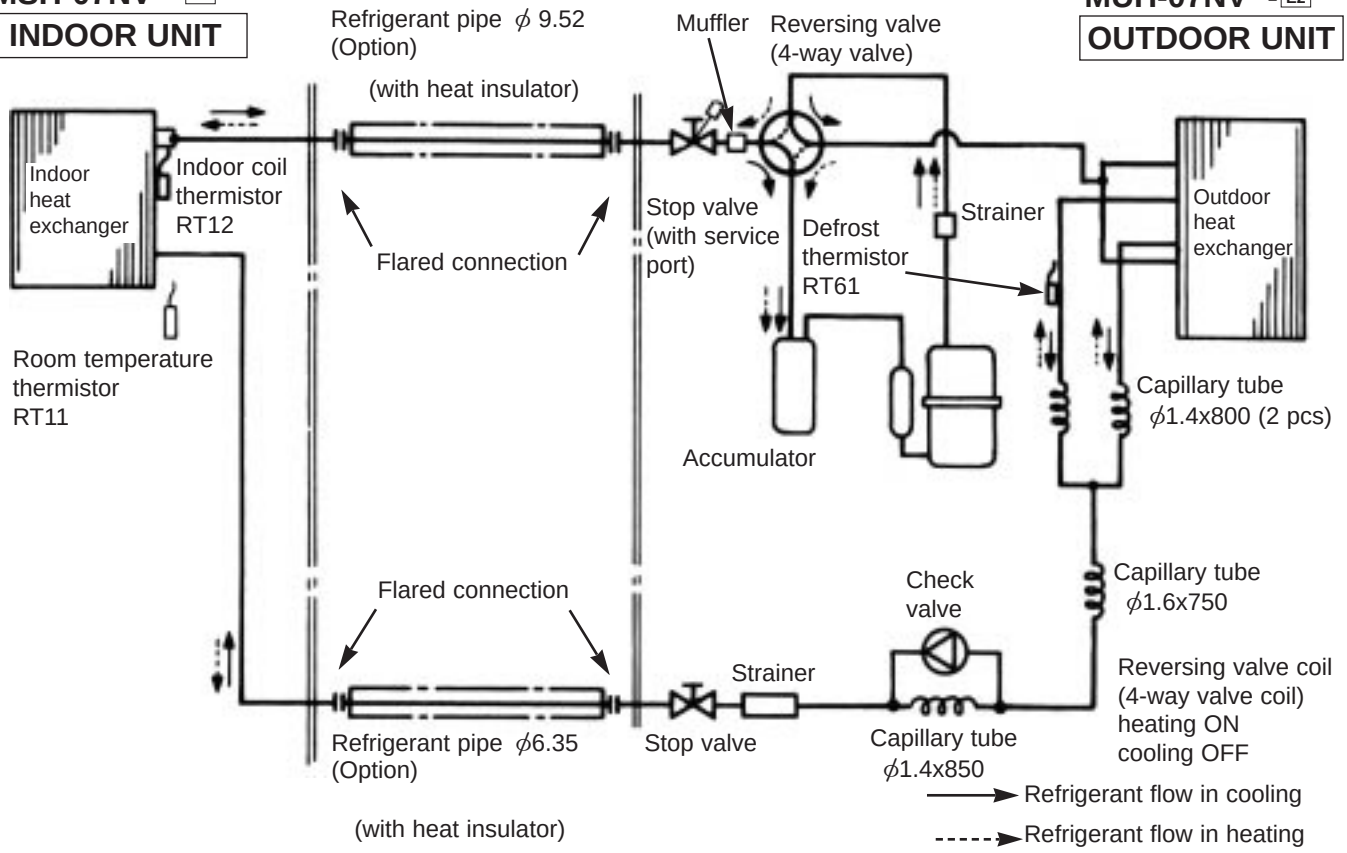
1.Slide the sleeve.
2.Pull the wire while pushing the locking lever.

6 REFRIGERANT SYSTEM DIAGRAM

Unit:mm

MSH-07NV -E1
MSH-07NV -E2
INDOOR UNIT

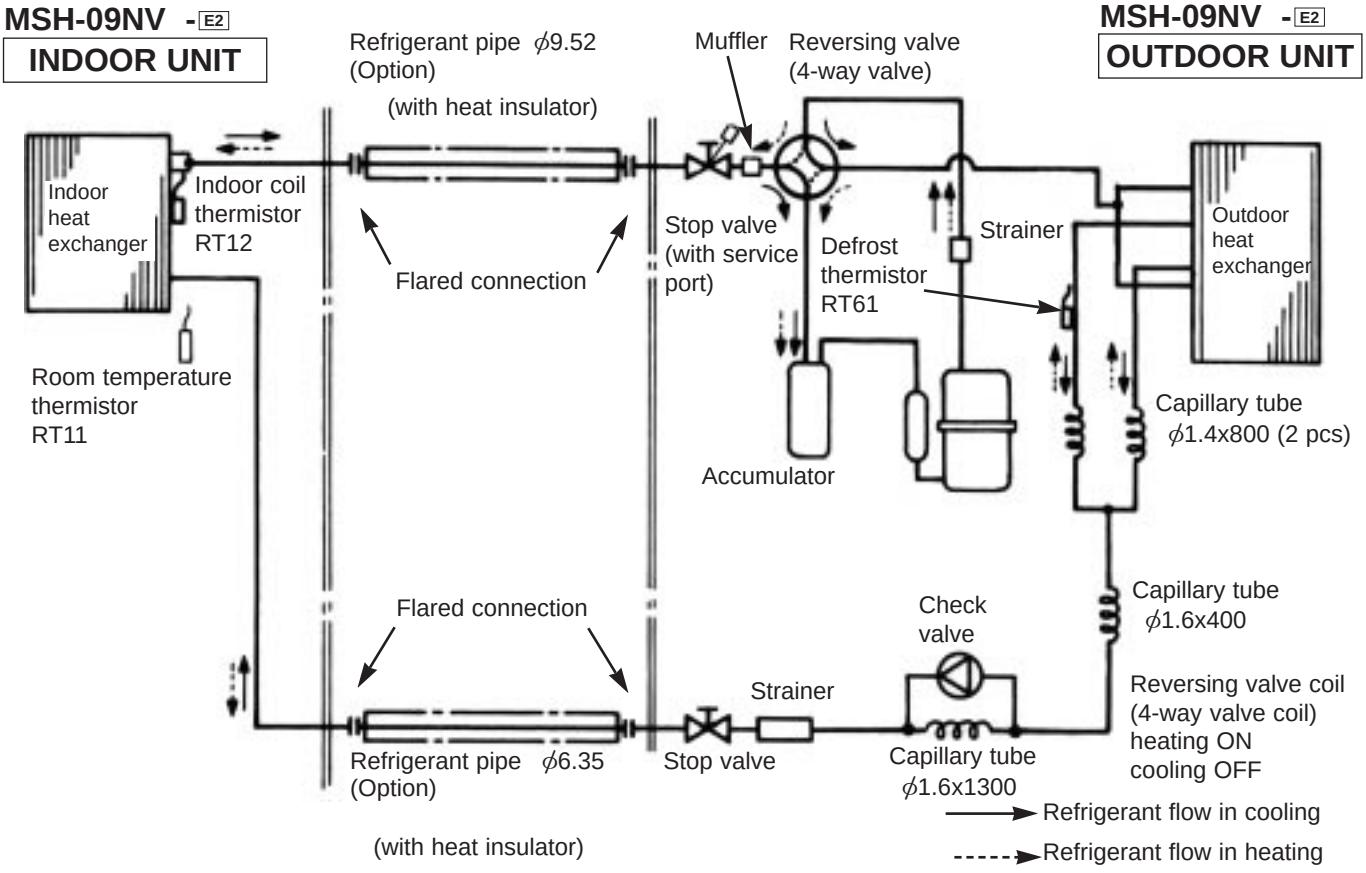
MUH-07NV -E1
MUH-07NV -E2
OUTDOOR UNIT



Unit:mm

MSH-09NV -E1
MSH-09NV -E2
INDOOR UNIT

MUH-09NV -E1
MSH-09NV -E2
OUTDOOR UNIT



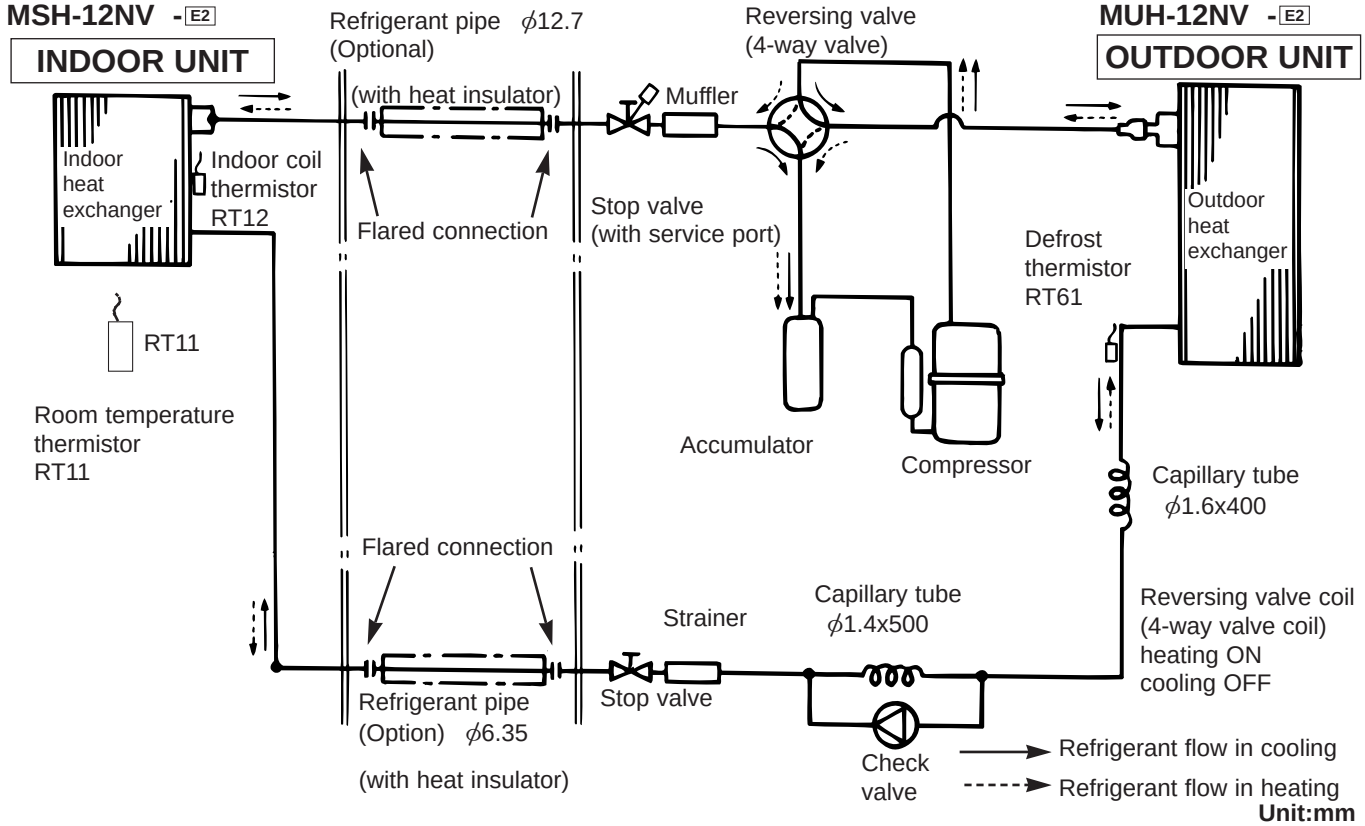
Unit:mm

MSH-12NV -E1
MSH-12NV -E2

INDOOR UNIT

MUH-12NV -E1
MUH-12NV -E2

OUTDOOR UNIT



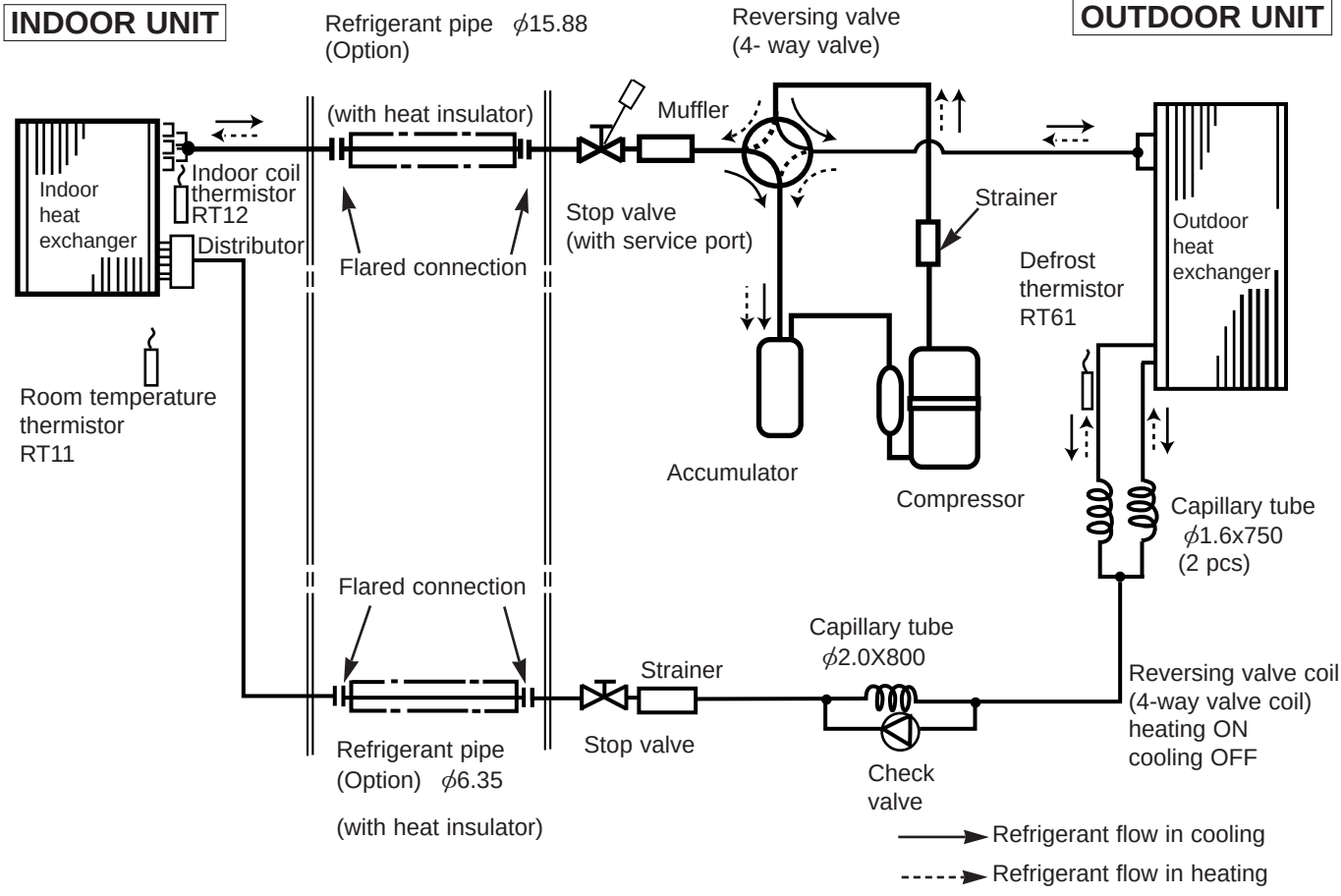
Unit:mm

MSH-18NV -E1
MSH-18NV -E2
MSH-18NV -E3

INDOOR UNIT

MUH-18NV -E1
MUH-18NV -E2
MUH-18NV -E3

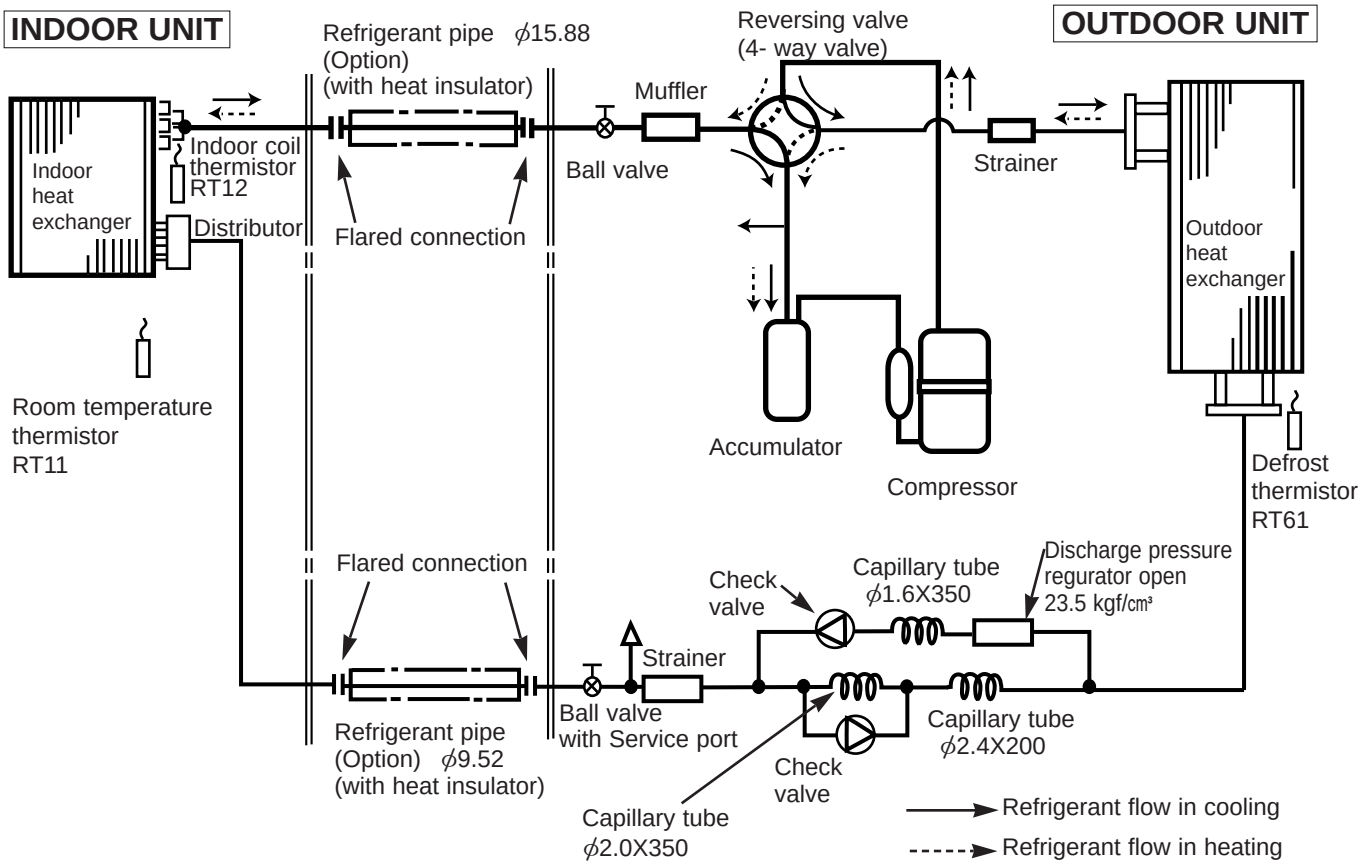
OUTDOOR UNIT



Unit:mm

MSH-24NV -E1
MSH-24NV -E2
INDOOR UNIT

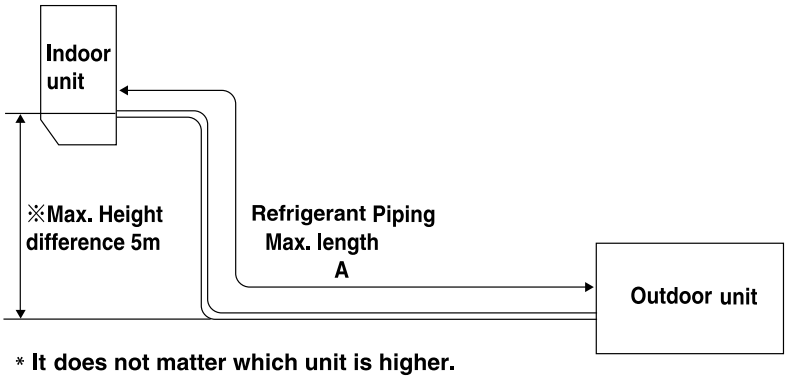
MUH-24NV -E1
MUH-24NV -E2
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Models	Refrigerant piping Max. length : m A	Piping size O.D : mm		Length of connecting pipe : m	
		Gas	Liquid	Indoor unit	Outdoor unit
MSH-07NV - E1 MSH-09NV - E1 MSH-07NV - E2 MSH-09NV - E2	10	9.52	6.35	0.43	0
MSH-12NV - E1 MSH-12NV - E2	15	12.7			
MSH-18NV - E1 MSH-18NV - E2 MSH-18NV - E3		15.88			
MSH-24NV - E1 MSH-24NV - E2			9.52		

MAX. HEIGHT DIFFERENCE



* It does not matter which unit is higher.

ADDITIONAL REFRIGERANT CHARGE(R-22 : g)

Models	Outdoor unit precharged (up to 7m)	Refrigerant piping length (one way)		
		7m	10m	15m
MSH-07NV - E1 MSH-09NV - E1 MSH-07NV - E2 MSH-09NV - E2	850	0	150	
MSH-12NV - E1 MSH-12NV - E2	1150			400
MSH-18NV - E1 MSH-18NV - E2 MSH-18NV - E3	1800			

Calculation : Xg=50g/m X (A-7)m

Models	Outdoor unit precharged (up to 7m)	Refrigerant piping length (one way)		
		7m	10m	15m
MSH-24NV - E1 MSH-24NV - E2	2400	0	195	520

Calculation : Xg=65g/m X (A-7)m

EVACUATION PROCEDURES(AIR PURGE)

Connect the refrigerant pipes (both the liquid and gas pipes) between the indoor and the outdoor units.

Remove the service port cap of the stop valve on the side of the outdoor unit gas pipe.(The stop valve will not work in its initial state fresh out of the factory (totally closed with cap on))

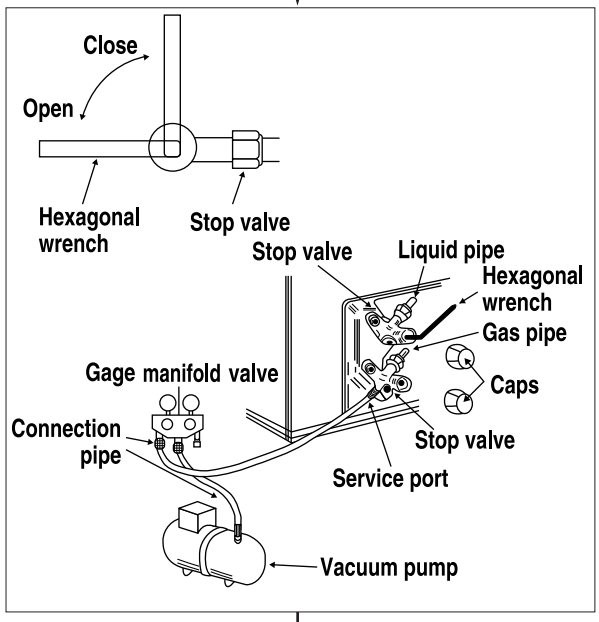
When vacuuming

Connect the gage manifold valve and the vacuum pump to the service port of the stop valve on the liquid pipe side of the outdoor unit.

Run the vacuum pump for more than 15 minutes and at this time confirm that the pressure gage indicates –0.1 Mpa.

Check the vacuum with the gage manifold valve, then close the gage manifold valve, and stop the vacuum pump.

Leave it as it is for one or two minutes. Make sure the pointer of the gage manifold valve remains in the same position.



Remove the gage manifold valve quickly from the service port of the stop valve.

After refrigerant pipes are connected and evacuated, fully open all stop valves on gas and liquid pipe sides. Operating without fully opening lowers the performance and causes trouble.

Pipe length : 7m maximum No gas charge is needed

Pipe length exceeding 7m Charge the prescribed amount of gas

Tighten the cap to the service port to obtain the initial status.

Retighten the cap.

Leak test

7 PERFORMANCE CURVES

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

(1) GUARANTEED VOLTAGE

Rated voltage : ±10% (198 ~ 264V),50Hz

(2) AIR FLOW

Air flow should be set at MAX.

(3) MAIN READINGS

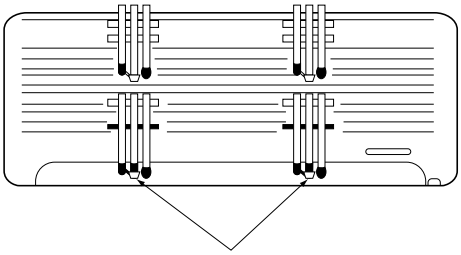
(1) Indoor intake air wet-bulb temperature :	°CWB	
(2) Indoor outlet air wet-bulb temperature :	°CWB	Cooling
(3) Outdoor intake air dry-bulb temperature :	°CDB	Cooling
(4) Total input:	W	Cooling
(5) Indoor intake air dry-bulb temperature :	°CDB	
(6) Outdoor intake air wet-bulb temperature :	°CWB	Heating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

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

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

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

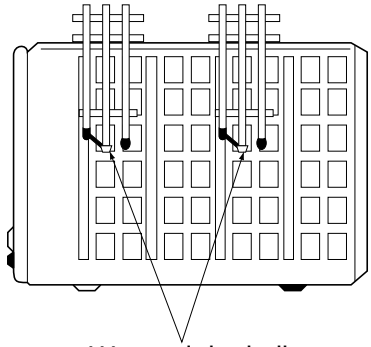
INDOOR UNIT



Wet-and dry-bulb thermometers

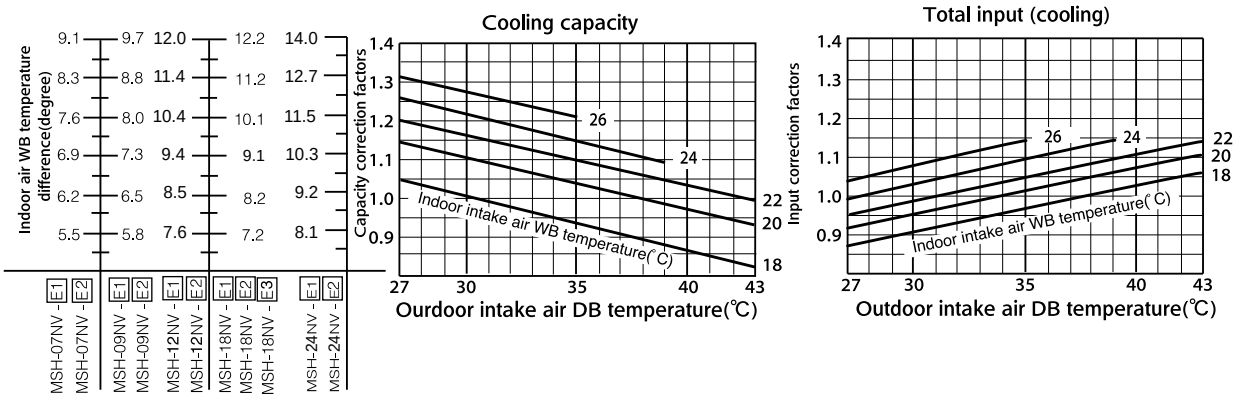
FRONT VIEW

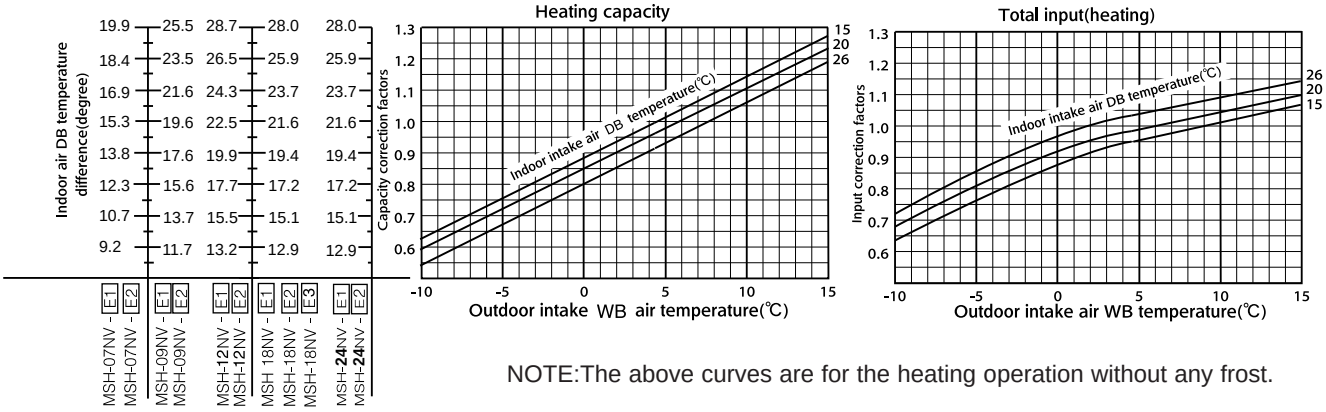
OUTDOOR UNIT



Wet-and dry-bulb thermometers

BACK VIEW





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

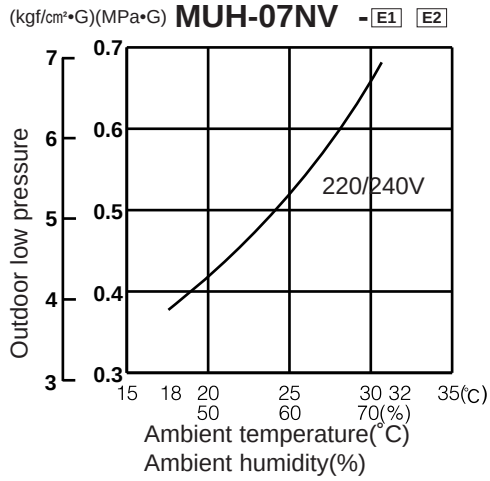
OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT
COOL operation

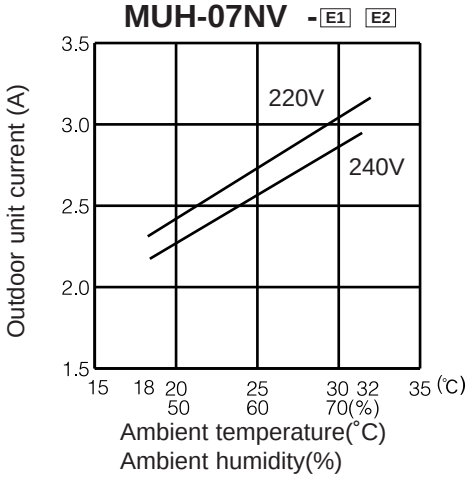
① Both indoor and outdoor unit are under the same temperature/humidity condition.

Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

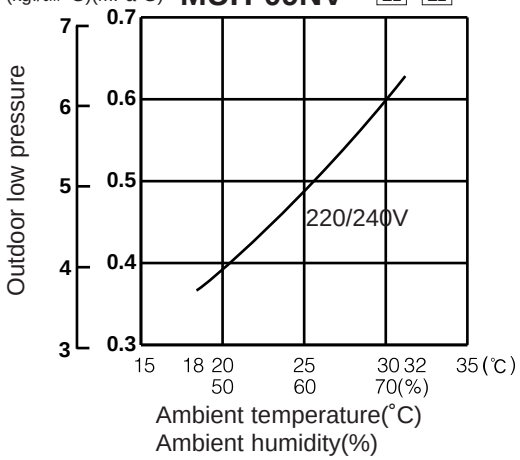
② Air flow should be set at MAX.

③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa • G) =10.2(kgf/㎠ • G)**



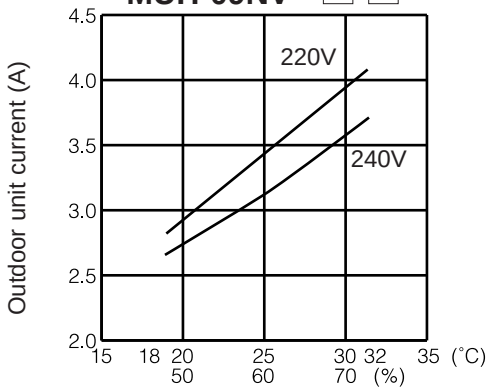


(kgf/cm²•G)(MPa•G) **MUH-09NV - E1 E2**



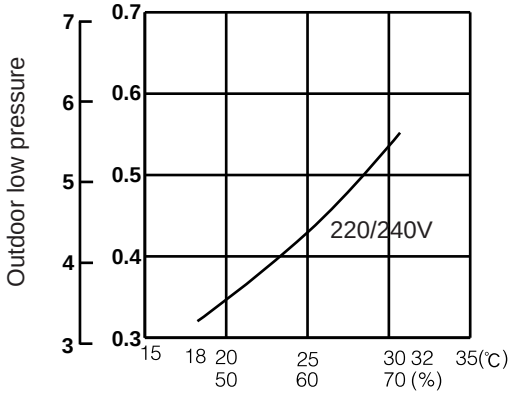
Ambient temperature(˚C)
Ambient humidity(%)

MUH-09NV - E1 E2



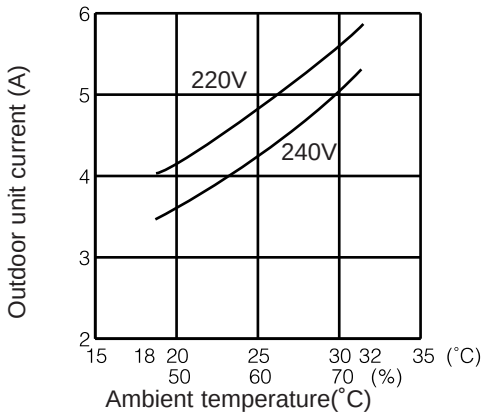
Ambient temperature(˚C)
Ambient humidity(%)

(kgf/cm²•G)(MPa•G) **MUH-12NV - E1 E2**



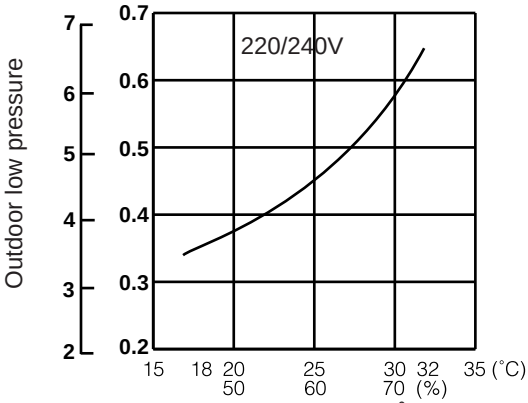
Ambient temperature(˚C)
Ambient humidity(%)

MUH-12NV - E1 E2



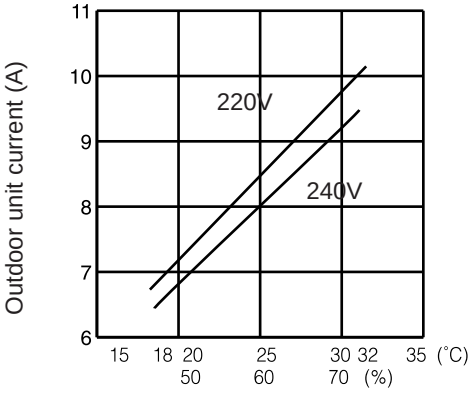
Ambient temperature(˚C)
Ambient humidity(%)

(kgf/cm²•G)(MPa•G) **MUH-18NV - E1 E2 E3**



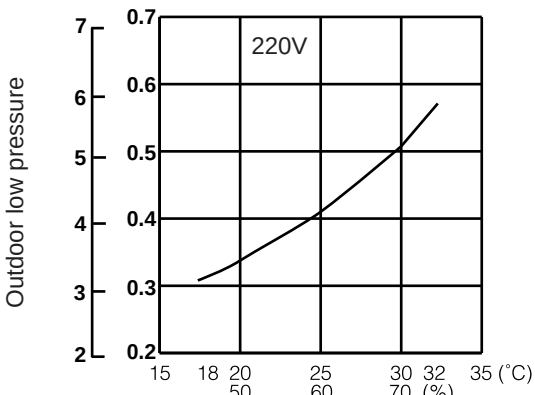
Ambient temperature(˚C)
Ambient humidity(%)

MUH-18NV - E1 E2 E3



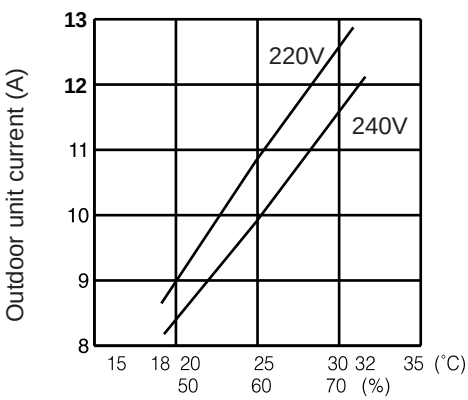
Ambient temperature(˚C)
Ambient humidity(%)

(kgf/cm²•G)(MPa•G) **MUH-24NV - E1 E2**



Ambient temperature(˚C)
Ambient humidity(%)

MUH-24NV - E1 E2



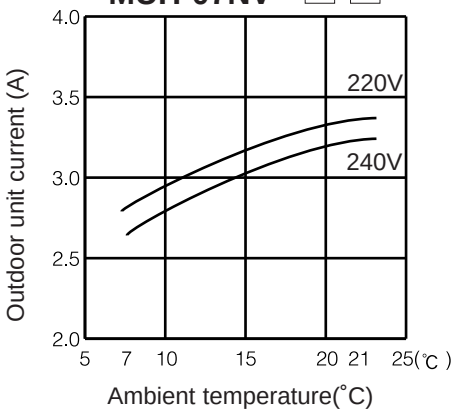
Ambient temperature(˚C)
Ambient humidity(%)

HEAT operation

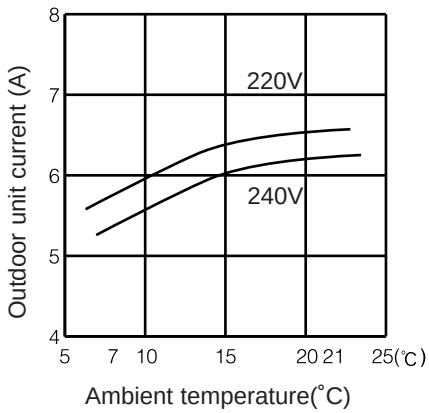
Condition indoor:Dry bulb temperature 20.0°C
Wet bulb temperature 14.5°C

Outdoor:Dry bulb temperature 7,15,20°C
Wet bulb temperature 6,12,14.5°C

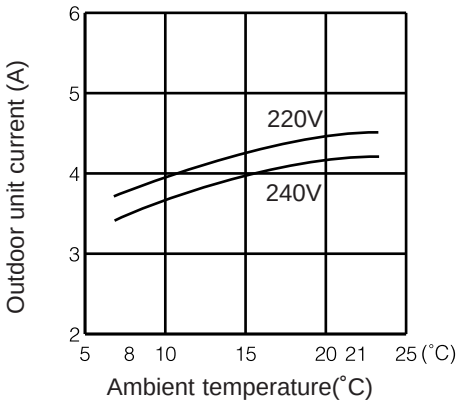
MUH-07NV -E1 E2



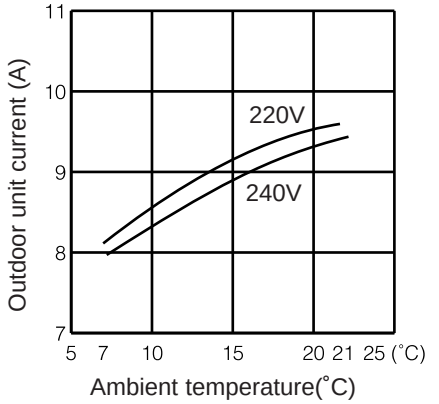
MUH-12NV -E1 E2



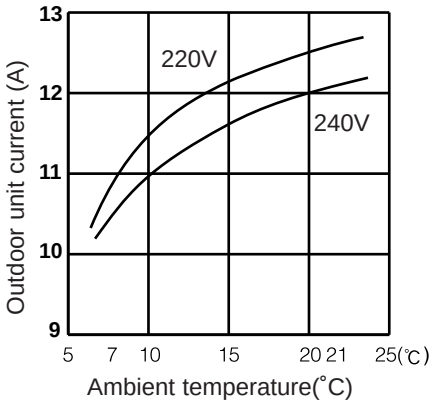
MUH-09NV -E1 E2



MUH-18NV -E1 E2 E3

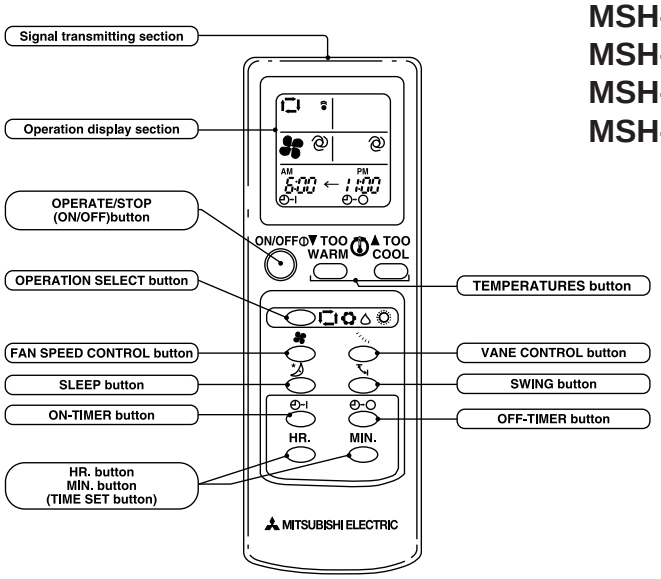


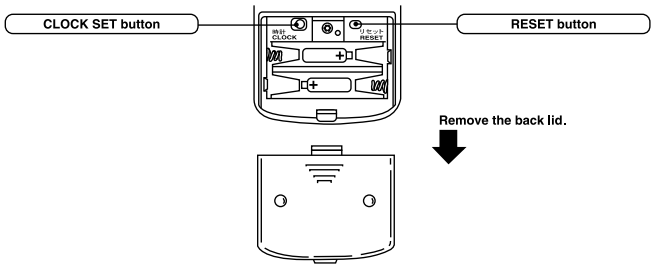
MUH-24NV -E1 E2

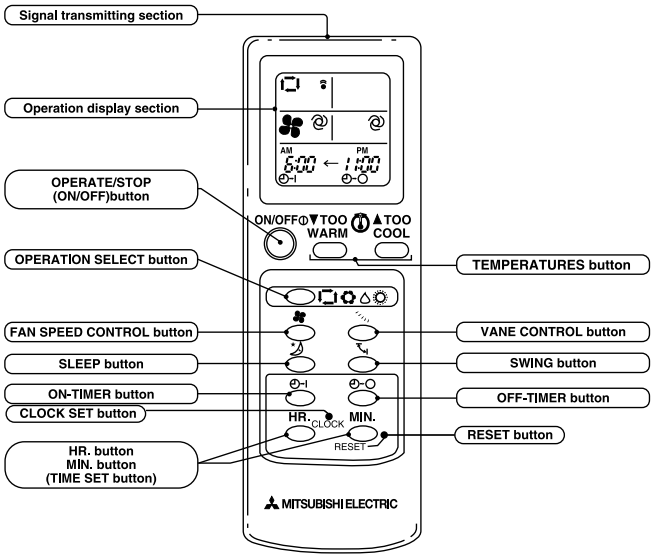


8 MICROPROCESSOR CONTROL

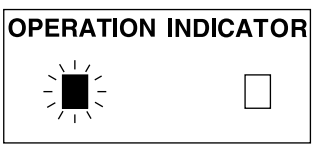
Wireless remote controller







INDOOR UNIT DISPLAY SECTION



MSH-07NV -E1 MSH-09NV -E1 MSH-12NV -E1
MSH-18NV -E1 MSH-24NV -E1
MSH-07NV -E2 MSH-09NV -E2 MSH-12NV -E2
MSH-18NV -E2 MSH-24NV -E2 MSH-18NV -E3

Once the controls are set, the same operation mode can be repeated by simply turning the OPERATE/STOP button ON. Indoor unit receives the signal with a beep tone.
When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

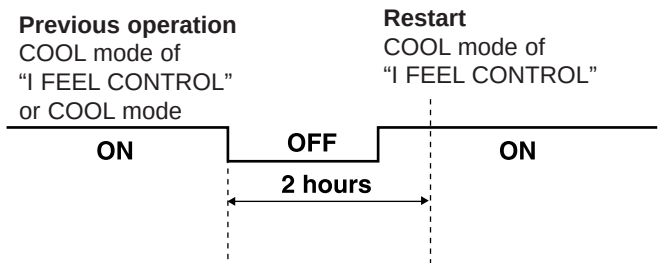
8-1. "I FEEL CONTROL" ( ) OPERATION

(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 25℃	COOL mode of "I FEEL CONTROL"
23℃ to 25℃	DRY mode of "I FEEL CONTROL"
less than 23℃	HEAT mode of "I FEEL CONTROL"

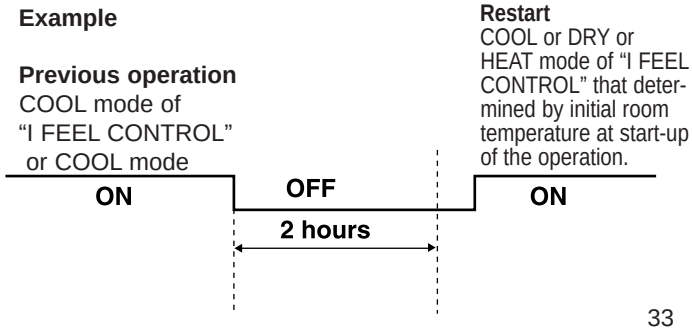
- Once the mode is fixed, the mode will not change by room temperature afterwards.
- Under the ON-TIMER ( ) operation, mode is determined according to the room temperature as the operation starts.
- When the system is stopped with the OPERATE/STOP button on the remote controller, and restarted within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

Example



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

Example



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

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	**26℃ or more**	**24℃**	**✵1**
	26℃ or less	**Initial room temperature minus 2℃**	
DRY mode of "I FEEL CONTROL"	**23℃ or 25℃**	**Initial room temperature minus 2℃**	
HEAT mode of "I FEEL CONTROL"	**23℃ or less**	**26℃**	

✵1 After the system restarts by the remote controller, the system operates with the previous set temperature regardless of the initial set temperature.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURES buttons

In "I FEEL CONTROL" (▭) mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature is controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm. Each time the TOO WARM or TOO COOL button is pressed,the indoor unit receives the signal and emits a beep tone.

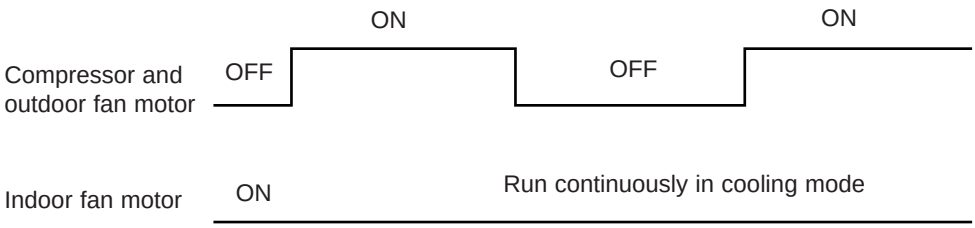
● **Fuzzy control**

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.
In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.

▲ TOO
COOL ⋯ To raise the set temperature 1~2 degrees(°C)

▼ TOO
WARM ⋯ To lower the set temperature 1~2 degrees(°C)

— COOL mode of “I FEEL CONTROL” —



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

There are two types of controls in coil frost prevention.

① Temperature control

<MSH-07/09/12> When the indoor coil thermistor RT12 reads 4°C or below for 5 minutes, the coil frost prevention mode starts.

<MSH-18/24>When the indoor coil thermistor RT12 reads 3°C or below, the coil frost prevention mode starts immediately. However the coil frost prevention will not work for 5 minutes after the compressor starts.

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

After that, if RT12 still reads below 4°C (MSH-07/09/12) or below 3°C (MSH-18/24) this mode prolonged until the RT12 reads over 4°C (MSH-07/09/12) or 3°C (MSH-18/24).

② Time control

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

a. Compressor has been continuously operating.

b. Indoor fan speed is Lo or Me.

c. Room temperature is below 26°C.

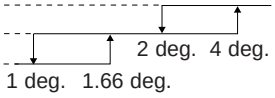
When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes Hi or the room temperature exceeds 26°C.However, when two of the above conditions (b.and c.) are satisfied again.Time accumulation is resumed.

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

Followings are the fan speed in AUTO.

Initial temperature difference	Fan Speed
Room temperature minus set temperature : 2 degrees or more	Hi
Room temperature minus set temperature : 1 degree or more and less than 2 degrees	Me
Room temperature minus set temperature : less than 1 degree	Lo



—DRY mode of “I FEEL CONTROL”—

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

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

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

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

1. When the room temperature is 23°C or over:

Compressor operates by temperature control and time control.

① Set temperature is controlled to fall 2°C as initial set temperature.

② When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.
When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.
Indoor fan and outdoor fan operate in the same cycle as the compressor.

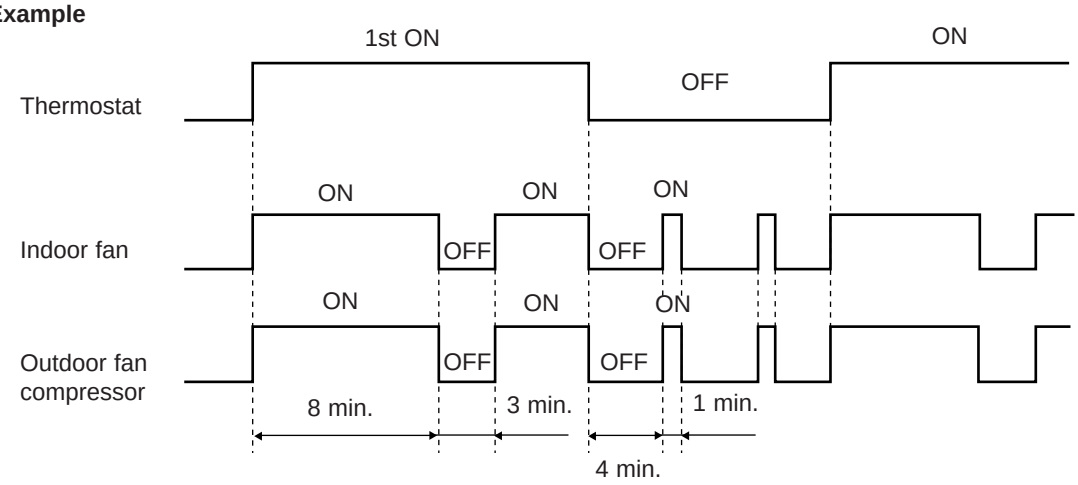
2. When the room temperature is under 23°C.

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

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

Operation time chart

Example



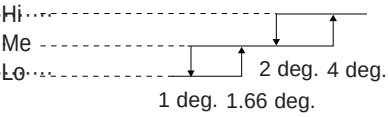
NOTE ● Coil frost prevention during DRY mode of “I FEEL CONTROL”
The operation is as same as coil frost prevention during COOL mode of “I FEEL CONTROL”.
However the indoor fan speed becomes the set speed or Lo.

— HEAT mode of “I FEEL CONTROL” —

1. Indoor fan speed control

(1) Followings are the fan speed in AUTO.

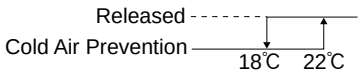
Initial temperature difference	Fan speed
Set temperature minus room temperature: 2 degrees or more	Hi
Set temperature minus room temperature: 1 degree or more and less than 2 degrees	Me
Set temperature minus room temperature: less than 1 degree	Lo



(2) Cold air prevention control

The fan runs at set speed when the indoor coil thermistor RT12 temperature exceeds 22°C. The fan operates at VLo when the temperature is below 18°C. But the fan stops when the indoor fan operates at VLo and the temperature is 15°C or less.

NOTE : At initial in hysteresis this control works.



(3) New warm air control.

When compressor starts in heating operation or after defrosting, the fan changes the speed due to the indoor coil thermistor RT12 temperature to blow out warm air.

After releasing of cold air prevention, when the indoor coil temperature is 37°C or above, the fan speed shifts to the set speed, and when the fan speed is changed by the remote controller, the fan speed is the set speed.

When the indoor coil temperature is less than 37°C, the fan speed is controlled by time as below.

<Time condition> <Indoor fan speed>

less than 2 minutes ····· Lo

2 minutes to 4 minutes ····· Me

4 minutes or more ····· Hi

The upper limit of the fan speed is the set speed.

If the thermostat turns off, this operation changes to flow soft control.

(4) Flow soft control

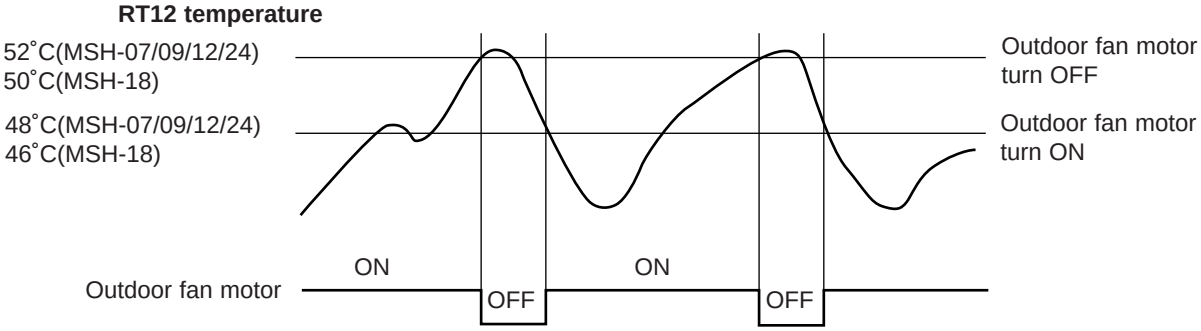
After the thermostat turns off, the indoor fan operates at VLo.

NOTE : When the thermostat turns on, the fan operates at the set speed. Due to the cold air prevention control, the fan does not start until the indoor coil thermistor RT12 reads 22°C or more.

2. High pressure protection

During heating operation, the outdoor fan motor is controlled by the indoor coil thermistor RT12 temperature for excess rise protection of compressor discharge pressure.
Outdoor fan OFF : 52°C (MSH-07/09/12/24), 50°C (MSH-18)
Outdoor fan ON : 48°C (MSH-07/09/12/24), 46°C (MSH-18)

High pressure protection time chart



NOTE 1 :When the outdoor fan is OFF in heating, defrosting of outdoor heat exchanger is not detected by the defrost thermistor RT61.

NOTE 2 :When connected to MXZ-32NV- E1 outdoor unit,the MSH-07/09/12NV-E1, MSH-07/09/12/18NV-E2 and MSH-18NV-E3 indoor unit sends the data for the temperature to the outdoor unit according to the indoor coil temperature.For the further information,refer to the service manual No.OB185.

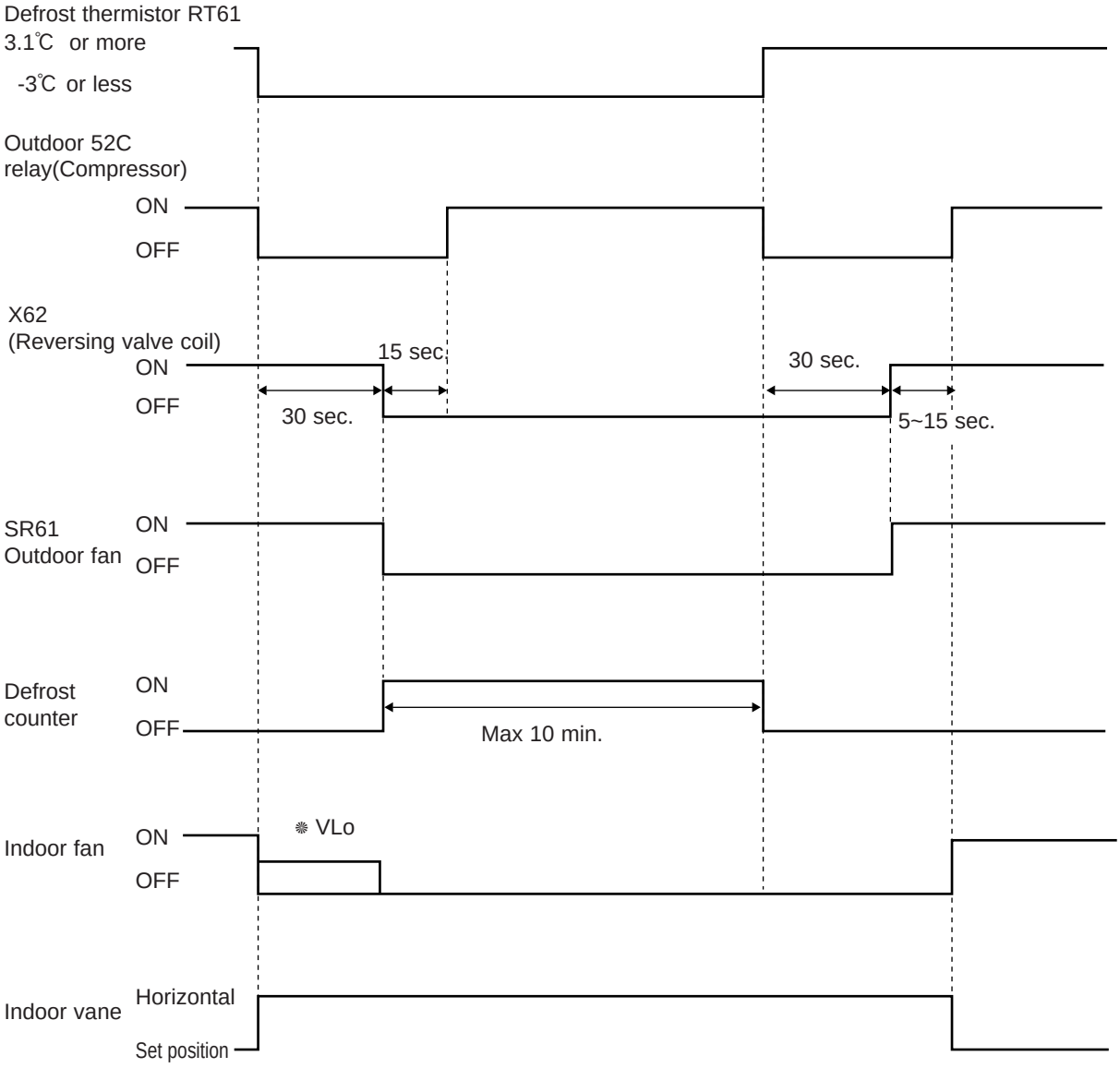
3. Defrostings

Defrostings of outdoor heat exchanger is controlled by DEICER P.C. board, with detection by the defrost thermistor RT61.

(1) Defrost starting conditions
When all conditions of a) ~ c) are satisfied, the defrosting operation starts.
a) Under the heat operation, the compressor cumulative operation time exceeds 40 minutes without the defrosting operation working.
b) The defrost thermistor RT61 reads - 3°C or less.
c) After releasing the high pressure protection 4 minutes and 15 seconds have elapsed.

(2) Defrost terminating conditions
When the condition d) or e) is satisfied, the defrosting operation stops.
d) The defrost thermistor RT61 reads 3.1°C or more.
e) The defrosting time exceeds 10 minutes.

(3) Defrosting time chart



NOTE1 ● When the indoor coil thermistor reads above 18°C, indoor fan operates at VLo for 30 seconds.
● When the indoor coil thermistor reads 18°C or less, the indoor fan stops.

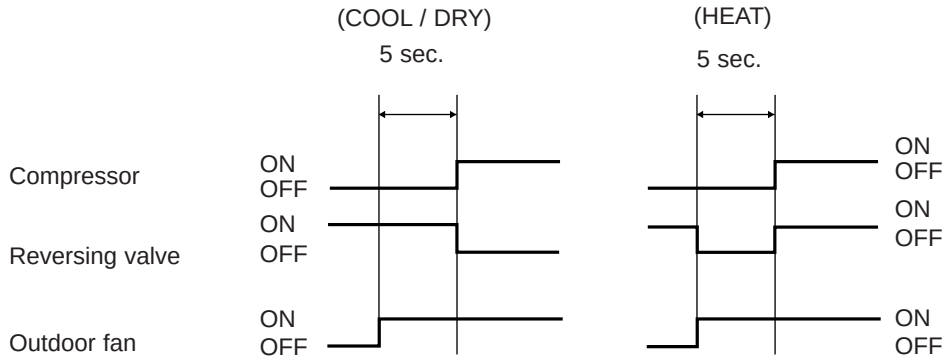
NOTE2: Refer to the Service Manual OB185 when MSH-07/09/12NV-E1, MSH-07/09/12/18NV-E2, and MSH-18NV-E3 are connected with MXZ-32NV-E1 as multi system units.

4. Reversing valve control

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

NOTE1: The Reversing valve reverses for 5 seconds right before start-up of the compressor.

NOTE2: Refer to the Service Manual OB185 when MSH-07/09/12NV-E1, MSH-07/09/12/18NV-E2, and MSH-18NV-E3 are connected with MXZ-32NV-E1 as multi system units.

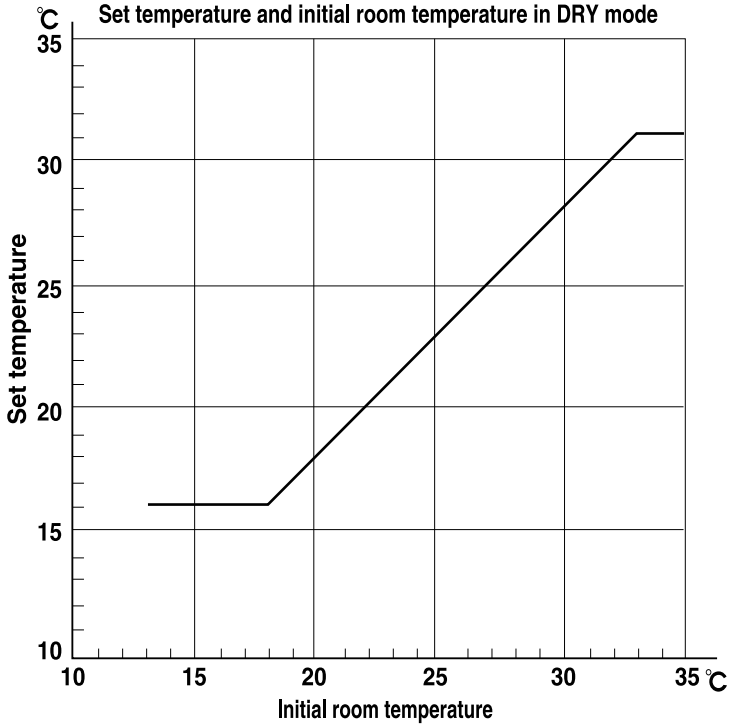


8-2. COOL (✿) OPERATION

(1) Press OPERATE/STOP button.
OPERATION INDICATOR of the indoor unit turns on with a beep tone.
(2) Select COOL mode.
(3) Set the TEMPERATURES button.
(TOO WARM or TOO COOL button)
The setting range is 16 ~ 31°C
* Indoor fan continues to operate regardless of thermostat's OFF-ON
* Coil frost prevention is as same as COOL mode of "I FEEL CONTROL"

8-3. DRY (△) OPERATION

(1) Press OPERATE/STOP button.
OPERATION INDICATOR of the indoor unit turns on with a beep tone.
(2) Select DRY mode.
(3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
Thermostat (SET TEMP.)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 13°C or below.
(5) When DRY operation functions, the fan speed is lower than cool operation.



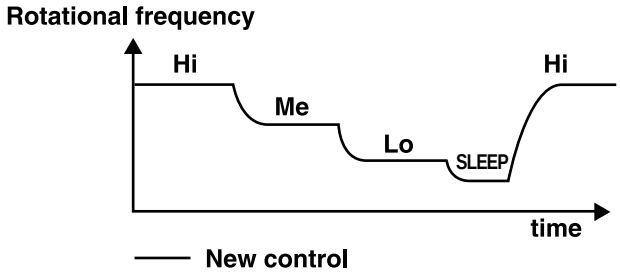
8-4. HEAT (☼) OPERATION

(1) Press OPERATE/STOP button.
OPERATION INDICATOR on the indoor unit turns on with a beep tone.
(2) Select HEAT mode.
(3) Press TEMPERATURES button (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
(4) Indoor fan speed control, high pressure protection, defrosting, heater control are the same as HEAT mode of "I FEEL CONTROL".

8-5. FAN MOTOR CONTROL

(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,SLEEP), the microprocessor controls SR11 (MSH-07/09/12), IC141 (MSH-18/24) 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

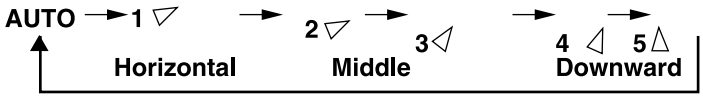
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (See page 49.)

8-6. AUTO VANE OPERATION

(1) Vane motor drive

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

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



(3) Positioning

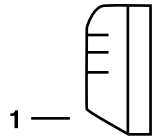
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. The positioning is decided as follows.

(a) When the OPERATE/STOP button is pressed. (POWER ON/OFF)
(b) When the vane control is changed from 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

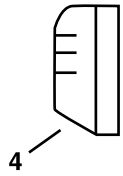
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



Vane angle is fixed to Angle 1.

② In HEAT operation



Vane angle is fixed to Angle 4.

(5) 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.

(6) SWING MODE ( )

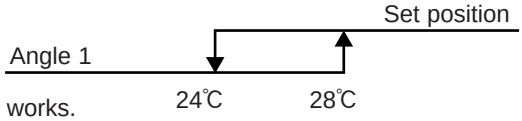
By pressing the SWING button ( ) vane swings vertically. The remote controller displays " ". SWING mode is cancelled when the SWING button or VANE CONTROL button ( ) is pressed or the operation stops or changes to other mode.

(7) Cold air prevention in HEAT operation

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

① Compressor is not operating.
② Defrosting is performed.
③ Indoor coil thermistor RT12 reads 24℃ or below.
④ Indoor coil thermistor RT12 temperature is raising from 24°C or below, but it does not exceed 28℃.

Indoor coil thermistor RT12 temperature



NOTE:At initial in hysteresis this control works.

8-7. SLEEP MODE ( )

- When the SLEEP button ( ) is pressed, the indoor fan speed drops and the air flow sound from the indoor unit is decreased.
- The indications of the remote controller are " " and " ".
- When the FAN SPEED CONTROL button ( ) is pressed during the SLEEP mode, the SLEEP mode is released.

8-8. TIMER OPERATION

1. How to set the timer

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

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

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

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

“◴→| ” button... AUTO START operation (ON timer)

“◴→◯ ” 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 “ ◴→| ” or “ ◴→◯ ” mark is flashing.
These marks disappear in 1 minute.
When 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

TIME setting can be cancelled with the TIMER CONTROL buttons. (“◴→| ” or “◴→◯ ”)

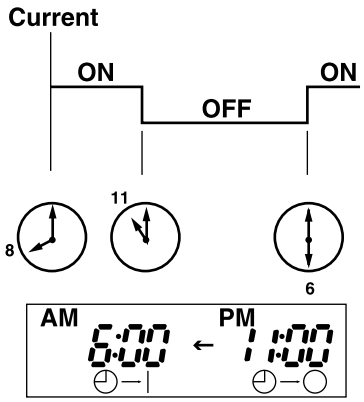
To cancel the ON timer, press the “◴→| ” button.

To cancel the OFF timer, press the “◴→◯ ” button.
TIME is cancelled and the display of set time disappears.

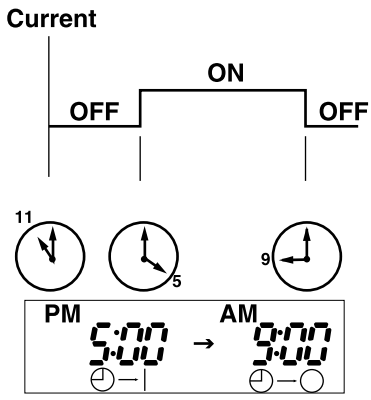
PROGRAM TIMER

- The OFF timer and ON timer can be used in combination.
- “ → ” and “ ←” display shows the order of the OFF timer and ON timer operation.

(Example 1) The current time is 8:00 PM.
The unit turns off at 11:00 PM, and on at 6:00 AM.



(Example 2) The current time is 11:00 AM.
The unit turns on at 5:00 PM, and off at 9:00 PM.



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

8-9. EMERGENCY-TEST OPERATION

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

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

After 30 minutes of test run operation the system shifts to EMERGENCY COOL/HEAT MODE with a set temperature of 24°C. The fan shifts to Me speed.

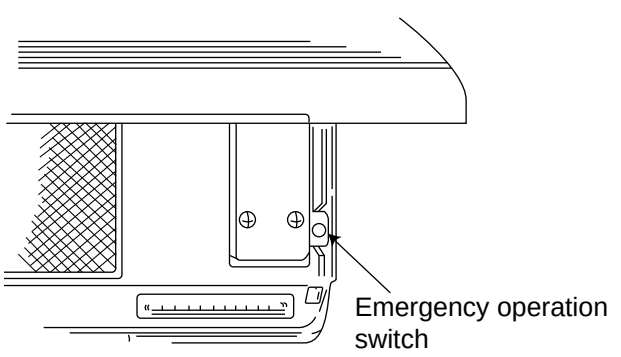
This operation continues until the EMERGENCY OPERATION switch is pressed or a button on the remote controller is pressed, then normal operation will start.

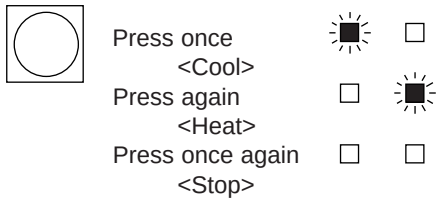
The coil frost prevention circuit operates in this operation, and defrosting operates too.

In the test run or emergency operation, the horizontal vane operates in AUTO mode with a set temperature of 24°C.

Defrosting of outdoor heat exchanger works in EMERGENCY HEAT MODE.

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





9 SERVICE FUNCTIONS

1. COMPULSORY DEFROSTING MODE FOR SERVICE

By short circuit of the connector JP607 and R853 on the outdoor deicer P.C. board, defrosting mode can be accomplished regardless of the defrost interval restriction. See Page 56 and 59.
Defrost thermistor RT61 must read below -3°C

2. DEFROST TERMINATION CHANGE

<JPC> when the JPC wire of the deicer P.C. board is cut, the defrost interval time will be changed. (See page 56 and 59.)
<JPE> when the JPE wire of the deicer P.C. board is cut, the defrost temperature will be changed. (See page 56 and 59.)

MODEL	Junper wire	Change point
MSH-07/09/12NV- E1 E2 MSH-18NV- E1 E2 E3	JPC	Defrost interval time changes from 40 minutes to 15 minutes
MSH-24NV- E1 E2	JPE	Deforst start temperature changes from -3℃ to 0℃ Deforst finish temperature changes from 3.1℃ to 10.1℃.

3. TIMER SHORT MODE

For service, set time can be shortened by short circuit of JPG and JPS the electronic control P.C. board.
The time will be shortened as follows.
3-minute delay : 3-minute ➔ 3-second.
AUTO START : 1 hour ➔ 1-minutes
AUTO STOP : 1 hour ➔ 1-minutes
} Short the connector during the timer mode.

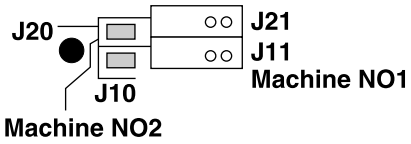
4. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

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 number of the indoor unit.

(1)<The reset button can be located on the rear side.>

MSH-07NV -E1 MSH-09NV -E1 MSH-12NV -E1 MSH-18NV -E1
MSH-18NV -E2

How to modify the remote controller P.C. board
Remove batteries before modification.
The board has a print as shown below :



NOTE : For remodeling, take out the batteries at first.
After finish remodeling, put back the batteries then push the RESET button.

Originally, chip parts are fitted on J10/J20 side and there is no chip parts on the other side.
Remove the chip parts of J10/J20 side and connect Jumper wire to J11/J21 side as shown in Table 1.
Either J1O or J11 /J20 or J21 should be attached for normal operation.

Table.1

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	–	Replace J10 with J 11	Same as at left	Same as at left
No. 3 unit	–	–	Replace J20 with J 21	Same as at left
No. 4 unit	–	–	–	Replace J10 with J11 Replace J20 with J21

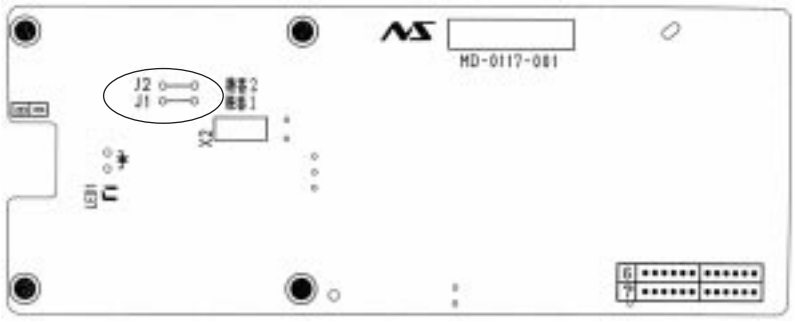
NOTE : At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.
At setting - error, turn the power supply off to cancel the individual operation and then turn the power supply on to restart the setting.

(2)<The reset button can be located on the front side.>

MSH-07NV -E1 (Serial number 7000201T~)
MSH-12NV -E1 (Serial number 7000001T~)
MSH-07NV -E2
MSH-12NV -E2
MSH-24NV -E2
MSH-09NV -E1 (Serial number 7000201T~)
MSH-24NV -E1
MSH-09NV -E2
MSH-18NV -E2 (Serial number 7000001T~)
MSH-18NV -E3

How to modify the remote controller P.C. board

Remove batteries before modification.
The board has a print as shown below :



NOTE : For remodeling, take out the batteries at first.
After finish remodeling, put back the batteries then push the RESET button.

The P.C.board has the print “J1” and “J2”.Jumper wires are mounted to each “J1” and “J2”.Cut J1 and J2 according to the number of indoor unit as shown in Table 1.
After modification,push the reset button.

Table.1

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

NOTE : At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.
At setting - error, turn the power supply off to cancel the individual operation and then turn the power supply on to restart the setting.

5. AUTO RESTART FUNCTION

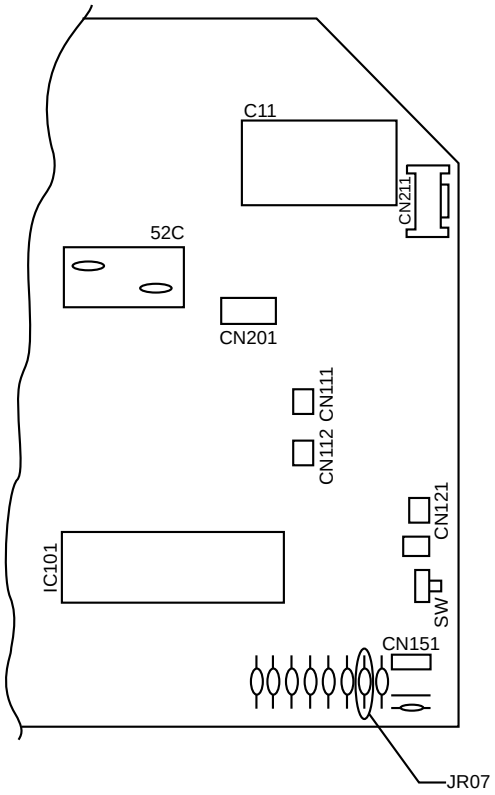
MSH-07NV -E2
MSH-12NV -E2
MSH-18NV -E3
MSH-09NV -E2
MSH-24NV -E2

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor electronic control P.C.board. The “AUTO RESTART FUNCTION” sets to work the moment power has restored after power failure.Then, the unit will restart automatically. However if the unit is operated in “I FEEL CONTROL.” mode before power failure, the operation is not memorized. In “I FEEL CONTROL.” mode, the operation is decided by the initial room temperature.

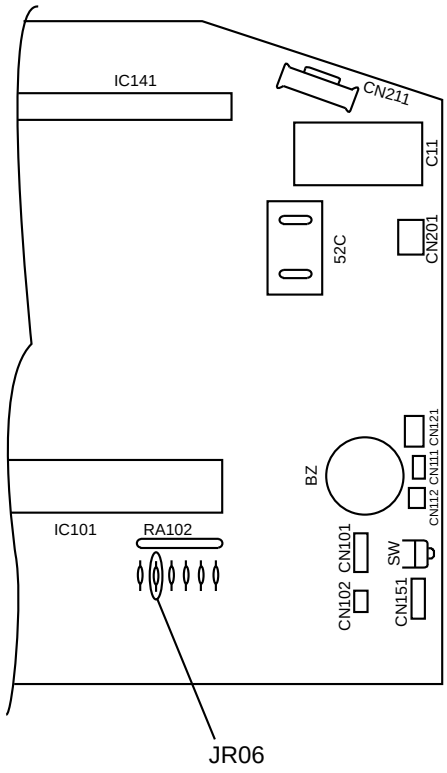
How to set “AUTO RESTART FUNCTION”

①Turn off the main power for the unit.
②Removed the electronic control P.C. board and the display P.C.board. (See page 60 and 62.)
③Cut the RESISTOR JR07 (MSH-07/09/12) or JR06(MSH-18/24) on the indoor electronic control P.C.board.

MSH-07/09/12



MSH-18/24



Operation

①If the main power (220/240V AC) has been cut, the operation settings remain.
②After the power is restored, the unit restarts automatically according to the memory.(However, it takes at least 3 minutes for the compressor to start running.)

Note:

- The operation settings are memorized when 10 seconds have passed after the remote controller was operated.
- If main power is cut while AUTO START/STOP timer is active ,the timer setting is cancelled when auto restart function works.
- If the unit has been off with the remote controller before power failure, the auto restart function does not works as the power button of the remote controller is off.
- To prevent breaker off due to the rush of startting current, systematize other home appliance not to turn on at the same time.
- When more than one air conditioners are connected under the same power system,compressor starting current as large as that for all the compressors used flows at a time as soon as the units restart automatically.

Therefore, the specific counter-measures are required to prevent main voltage drop or the rush of starting current after power failure by providing the system to allow the units to start in regular succession.

10 TROUBLESHOOTING

MSH-07NV -E1 MSH-09NV -E1 MSH-12NV -E1
MSH-18NV -E1 MSH-24NV -E1 MSH-07NV -E2
MSH-09NV -E2 MSH-12NV -E2 MSH-18NV -E2
MSH-24NV -E2 MSH-18NV -E3

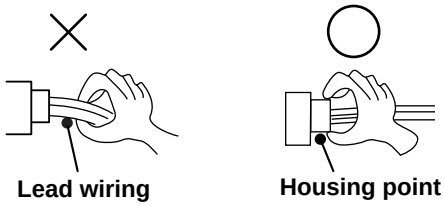
10-1 Cautions on troubleshooting

10-1-1 Before troubleshooting, check the followings:

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

10-1-2 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.
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.



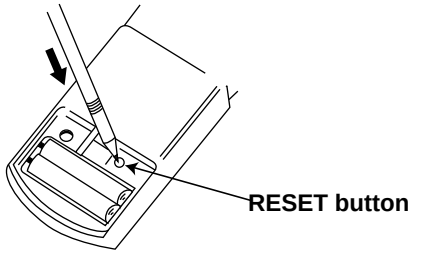
10-1-3 Troubleshooting procedure

1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
2) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
3) When troubleshooting, refer to the flow chart on page 48 and the check table on page 49.

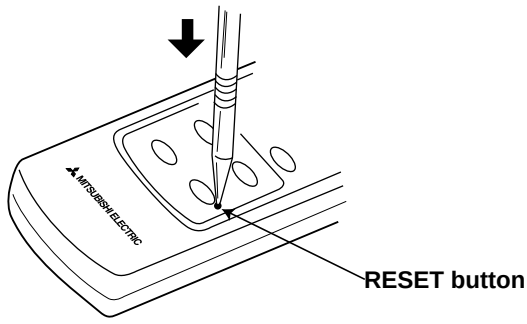
10-1-4 How to replace batteries

Weak batteries may cause the remote controller malfunction.
In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, discharge the remote controller in the following order.
This remote controller has the reset button. After refilling new batteries, press the reset button with tip end of ball point pen or the like, and then use the remote controller.

Ⓐ

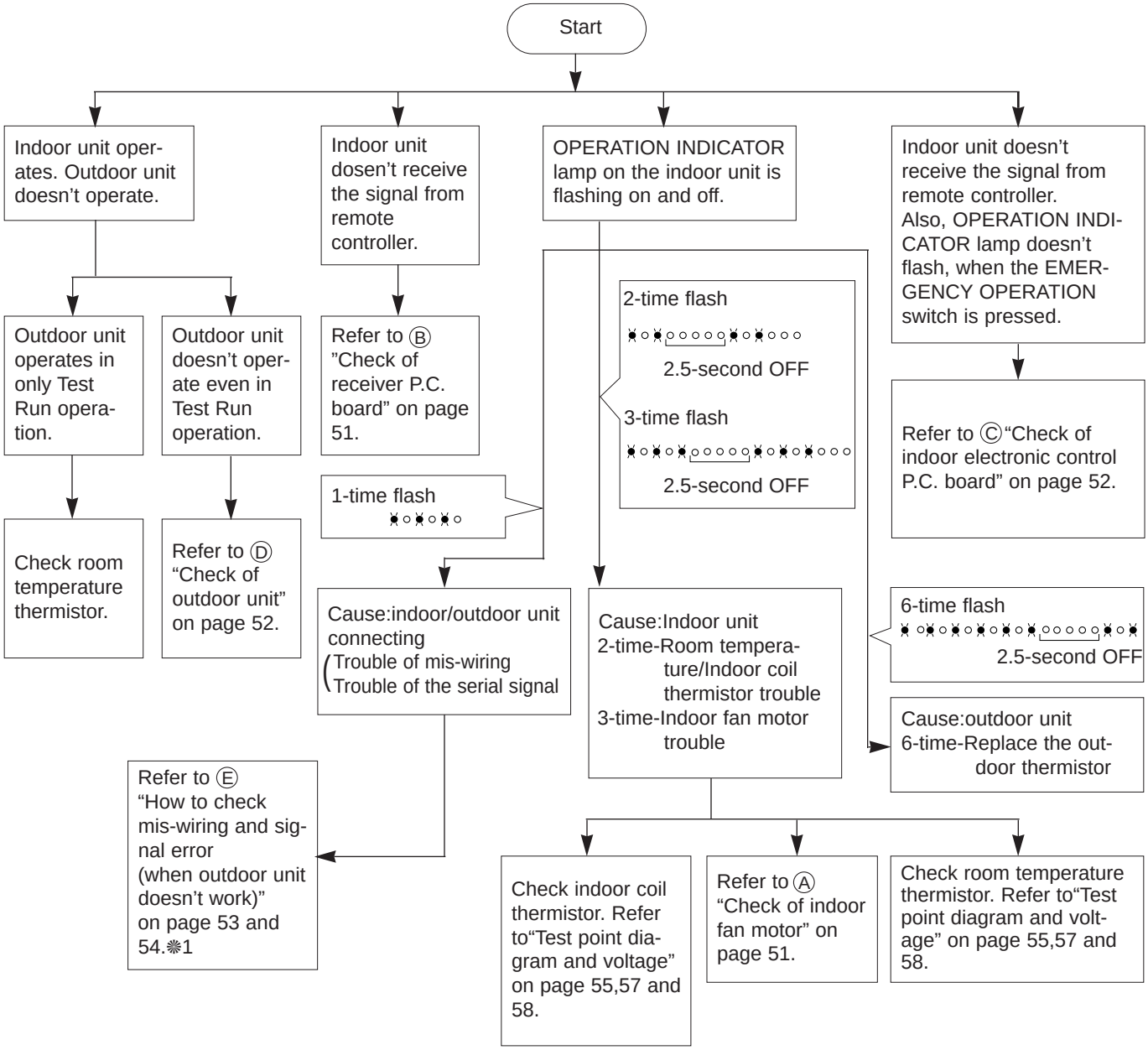


Ⓑ



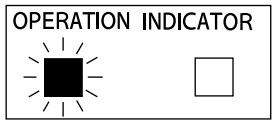
There are two kind of remote controllers. Ⓐ type has the RESET button at the back, and Ⓑ type does it on the front. How to use the two buttons are given in the Instruction Manual.

10-2 Instruction of troubleshooting



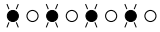
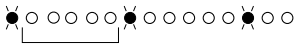
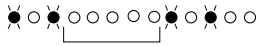
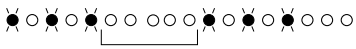
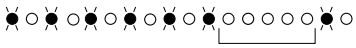
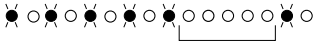
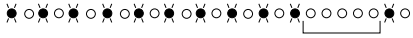
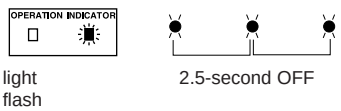
✵1<The case of the trouble of the serial signal>
When turn off the power and then turn on the power again, the indication shows "the trouble of mis-wiring."

10-2-1 troubleshooting check table



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

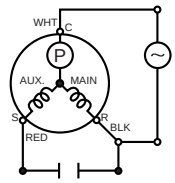
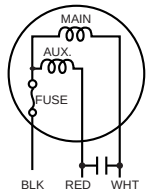
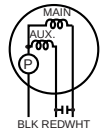
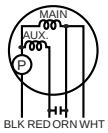
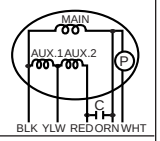
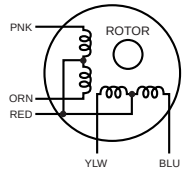
Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Check point
1	Mis-wiring	0.5-second ON  0.5-second OFF	Outdoor unit does not run.	When serial signal stops for 4 to 5 seconds after 1st on of 52C relay by POWER turning on.	● Check wiring (visual check and conductivity check). ● Check indoor electronic control P.C.board. ● Check outdoor DEICER P.C. board. ● Check electrical parts.
	Serial signal	1-time flash  2.5-second OFF		When serial signal from outdoor unit stops for 4 to 5 seconds.	
2	Indoor coil thermistor Room temperature thermistor	2-time flash  2.5-second OFF	Outdoor unit does not run.	Detect Indoor coil/room temperature thermistor short or open circuit every 2 seconds during operation.	● Check thermistor calibration. ● Reconnect connector. ● Check indoor electronic control P.C.board.
3	Indoor fan motor	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.	● Disconnect connector CN211 and then check connector CN121②-③to make sure rotational frequency feedback signal of 1.5V or over exists. ● Check indoor electronic control P.C. board. ● Check indoor fan motor. ● Reconnect conector.
4	Outdoor thermistor	6-time flash  2.5-second OFF	Outdoor unit does not run	When the outdoor thermistor shorts or opens after the compressor start-up.	● Shortage of refrigerent. ● Check outdoor DEICER P.C. board.
✵ 5	Outdoor power system	5-time flash  2.5-second OFF	Outdoor unit does not run	When the compressor operation is continuosly three times interruped by overcurrent protection within 1 minute after start-up , it stops operation.	● Check the inverter output. ● Check the compressor.
✵ 6	Outdoor control P.C. board	7-time flash  2.5-second OFF	Outdoor unit does not run	The outdoor unit stops operation when it cannot properly read data in the nonvolatile memory of the outdoor control P.C.board.	● Check the outdoor control P.C.board.
✵ 7	Outdoor control P.C. board	10-time flash  2.5-second OFF	Outdoor unit does not run	When the indoor unit detects drain abnormality and the indoor coil temperature is too low.	● Check the drain punp. ● Check the drain sensor. ● Check LEV.
✵ 8	Outdoor control P.C. board		Outdoor unit runs but the indoor unit does not run.	When the operation mode of each rooms is setted COOL(includes DRY) and HEAT at same time, it take precedence the operation mode runs first.	●Adjust the operation mode.

✵ The indication is shown only when the indoor unit connects with the outdoor unit MXZ-32NV-E1.

10-2-2 Trouble criterion of main parts

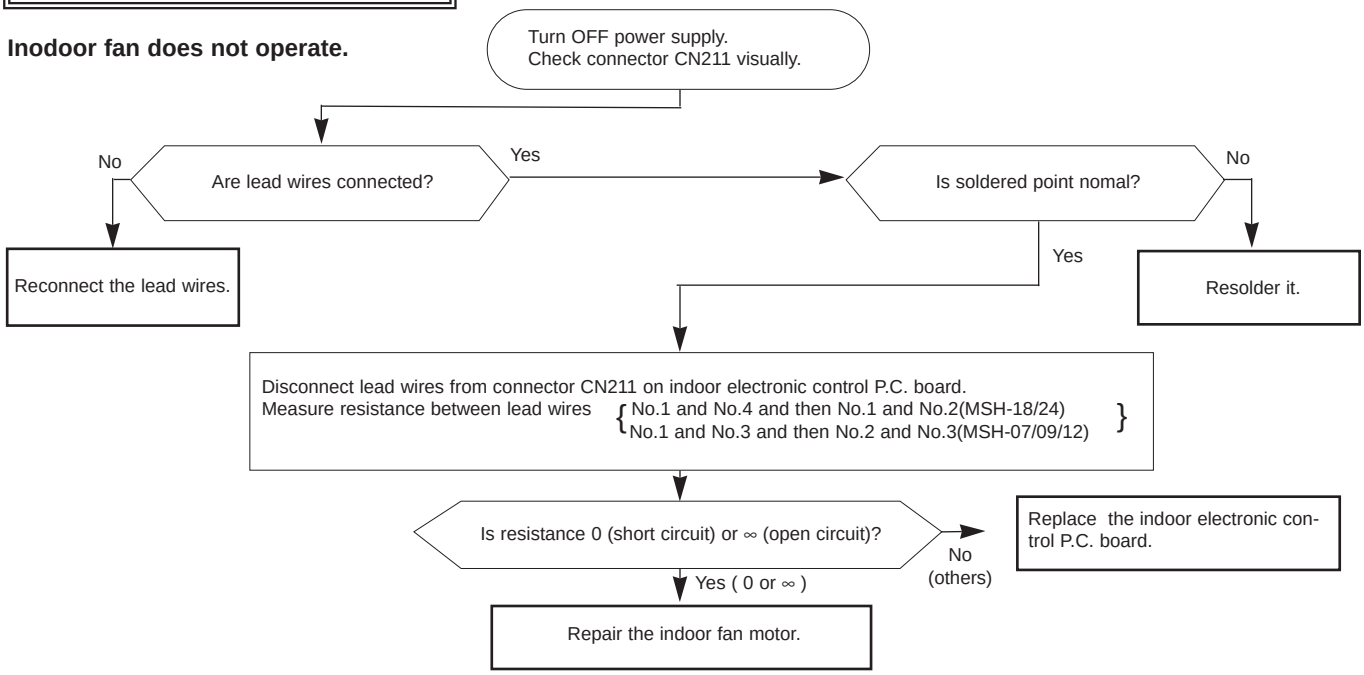
MSH-07NV-E1 MSH-09NV-E1 MSH-12NV-E1
MSH-18NV-E1 MSH-24NV-E1
MSH-07NV-E2 MSH-09NV-E2 MSH-12NV-E2
MSH-18NV-E2 MSH-24NV-E2 MSH-18NV-E3

<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Room temperature thermistor
Indoor coil thermistor</td><td>Measure the resistance with a tester.
(Part temperature 10°C ~ 30°C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>8kΩ ~ 20kΩ</td><td>Opened or short-circuited</td></tr></table></td><td></td></tr>
<tr><td>Defrost thermistor</td><td>Measure the resistance with a tester.
(Part temperature –10°C ~ 40°C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5kΩ ~ 60kΩ</td><td>Opened or short-circuited</td></tr></table></td><td></td></tr>
<tr><td>Compressor</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature –10°C ~ 40°C)
<table><tr><th></th><th colspan="5">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th></th><th>07NV</th><th>09NV</th><th>12NV</th><th>18NV</th><th>24NV</th></tr><tr><td>C-R</td><td>3.67~4.50Ω</td><td>2.88~3.52Ω</td><td>1.85~2.28Ω</td><td>1.05~1.30Ω</td><td>0.85~1.04Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>C-S</td><td>5.07~6.20Ω</td><td>5.13~6.28Ω</td><td>3.44~4.21Ω</td><td>2.38~2.91Ω</td><td>1.83~2.23Ω</td></tr></table></td><td>  </td></tr>
<tr><td rowspan="2">Indoor fan motor</td><td>Motor part
Measure the resistance between the terminals with a tester.
(Coil wiring temperature10°C ~ 30°C)
<table><tr><th></th><th colspan="2">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th></th><th>07/09/12NV</th><th>18/24NV</th></tr><tr><td>WHT-BLK</td><td>280 ~ 303Ω</td><td>176 ~ 192Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>BLK-RED</td><td>313 ~ 336Ω</td><td>240 ~ 261Ω</td></tr></table></td><td rowspan="2">  </td></tr>
<tr><td>Sensor part
Measure the voltage Power ON.
<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>BRN-YLW</td><td>4.5 ~ 5.5V</td><td rowspan="2">Remain 0V or 5V</td></tr><tr><td>YLW-GRY</td><td>(When fan revolved one time)
0V➔5V➔0V
(Approx.)</td></tr></table></td></tr>
<tr><td>Outdoor fan motor</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature –10°C ~ 40°C)
<table><tr><th></th><th colspan="4">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th></th><th>07/09NV</th><th>12NV</th><th>18NV</th><th>24NV</th></tr><tr><td>WHT-BLK</td><td>192~236Ω</td><td>114 ~ 141Ω</td><td>102 ~ 126Ω</td><td>55.3 ~ 67.6Ω</td><td rowspan="4">Opened or short-circuited</td></tr><tr><td>BLK-RED</td><td>373~458Ω</td><td>118 ~ 146Ω</td><td>97.9 ~ 120Ω</td><td>–</td></tr><tr><td>BLK-YLW</td><td>–</td><td>–</td><td>–</td><td>26.6 ~ 32.6Ω</td></tr><tr><td>YLW-RED</td><td>–</td><td>–</td><td>–</td><td>55.5 ~ 67.8Ω</td></tr></table></td><td>07NV
09NV
 
12NV
18NV
 
24NV
  </td></tr>
<tr><td>Vane motor</td><td>Measure the resistance between the terminals with a tester.
(Part temperature10°C ~ 30°C)
<table><tr><th colspan="2">Normal</th><th>Abnormal</th></tr><tr><td>07/09/12NV</td><td>282 ~ 305Ω</td><td rowspan="2">Opened or short-circuited</td></tr><tr><td>18/24NV</td><td>358 ~ 388Ω</td></tr></table></td><td>Vane motor
  </td></tr>
</table>

P INNER PROTECTOR

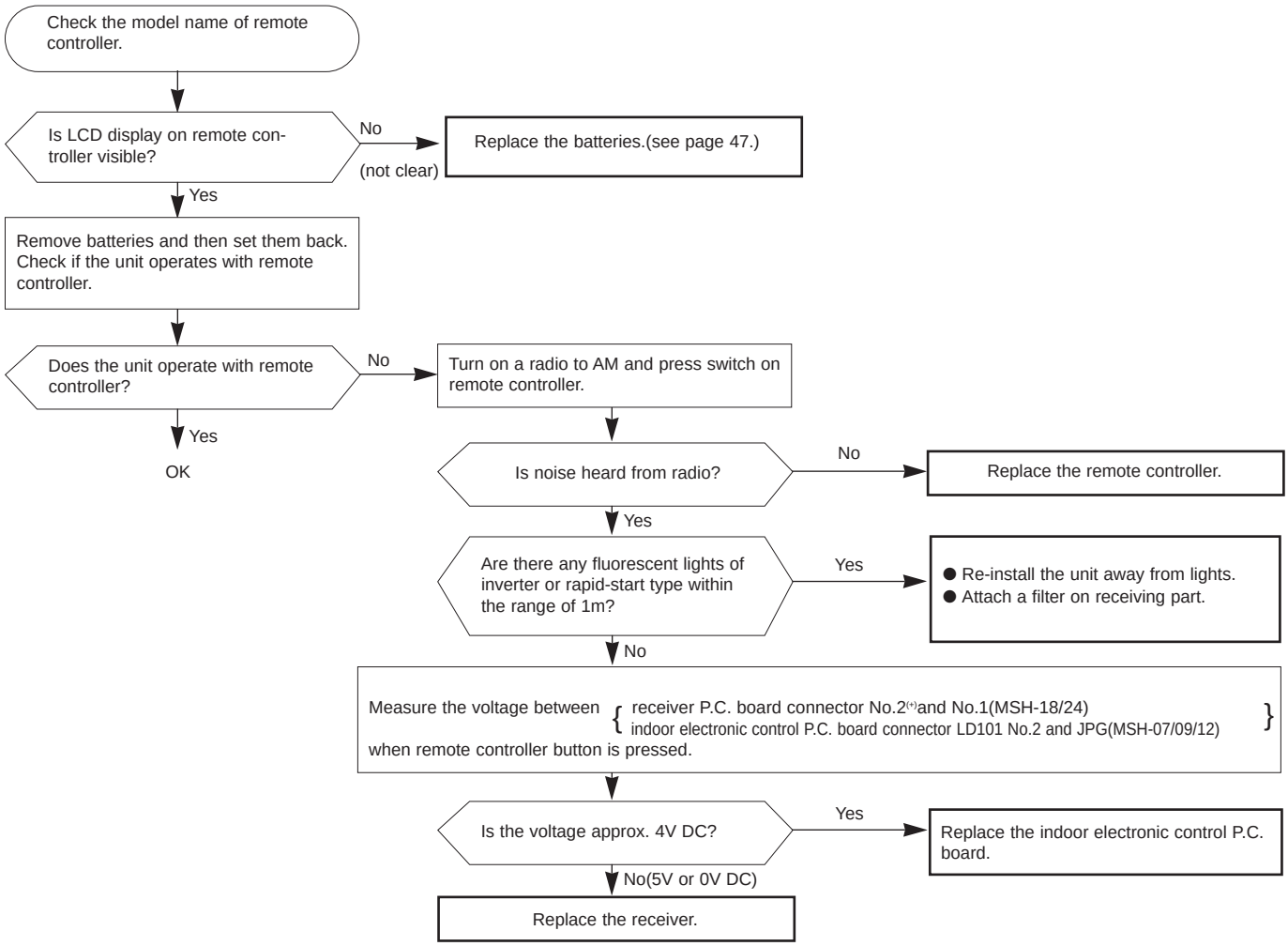
Ⓐ Check of indoor fan motor

Inodoor fan does not operate.



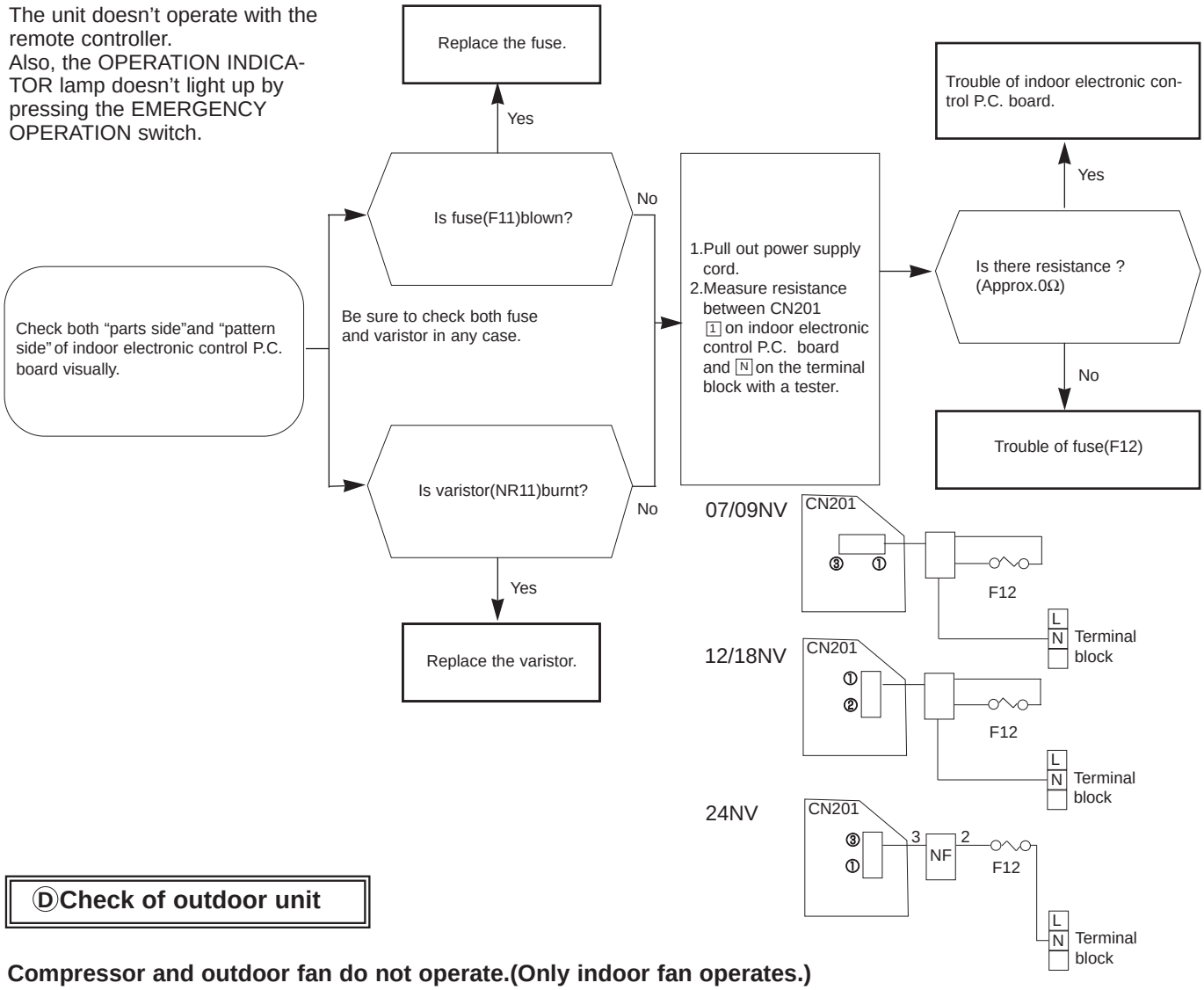
Ⓑ Check of receiver P.C. board

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



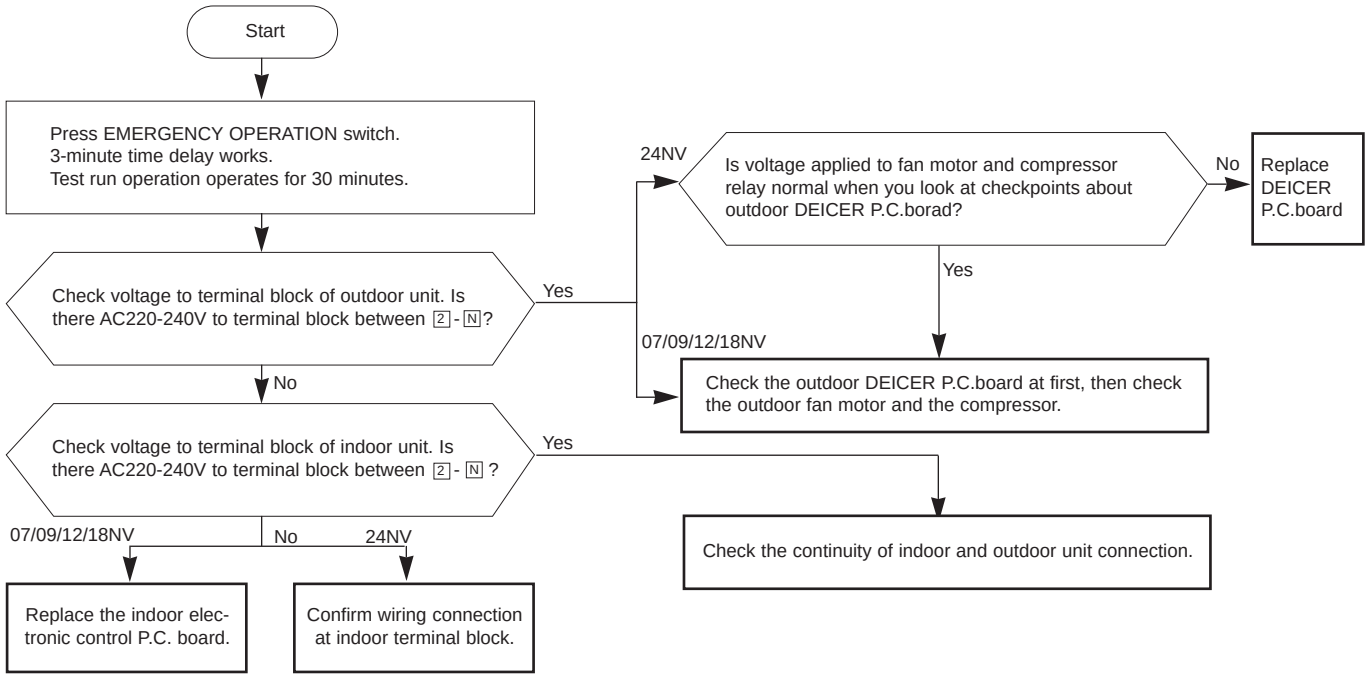
ⓒCheck of indoor electronic control P.C. board

The unit doesn't operate with the remote controller.
Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.



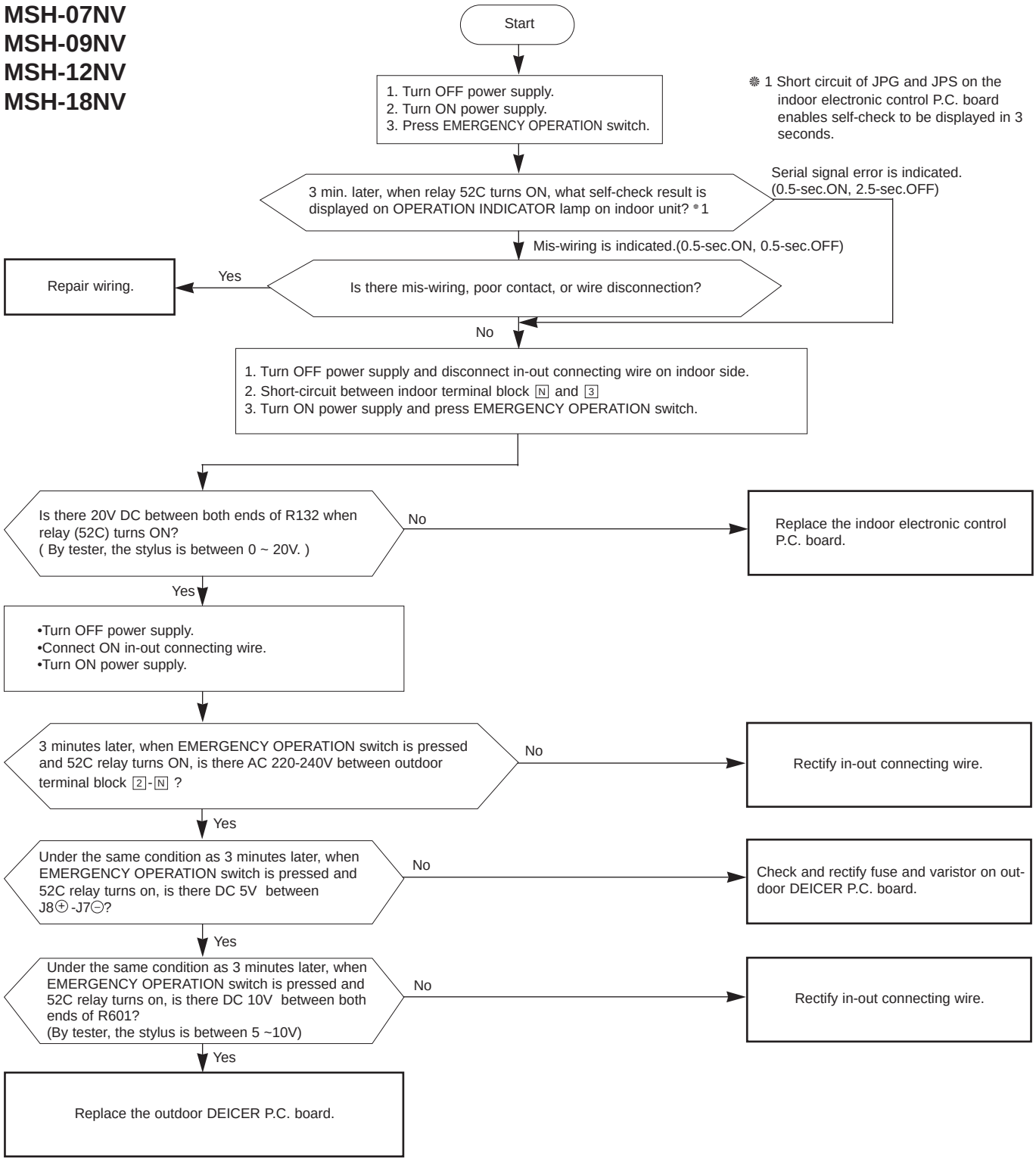
ⓓCheck of outdoor unit

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



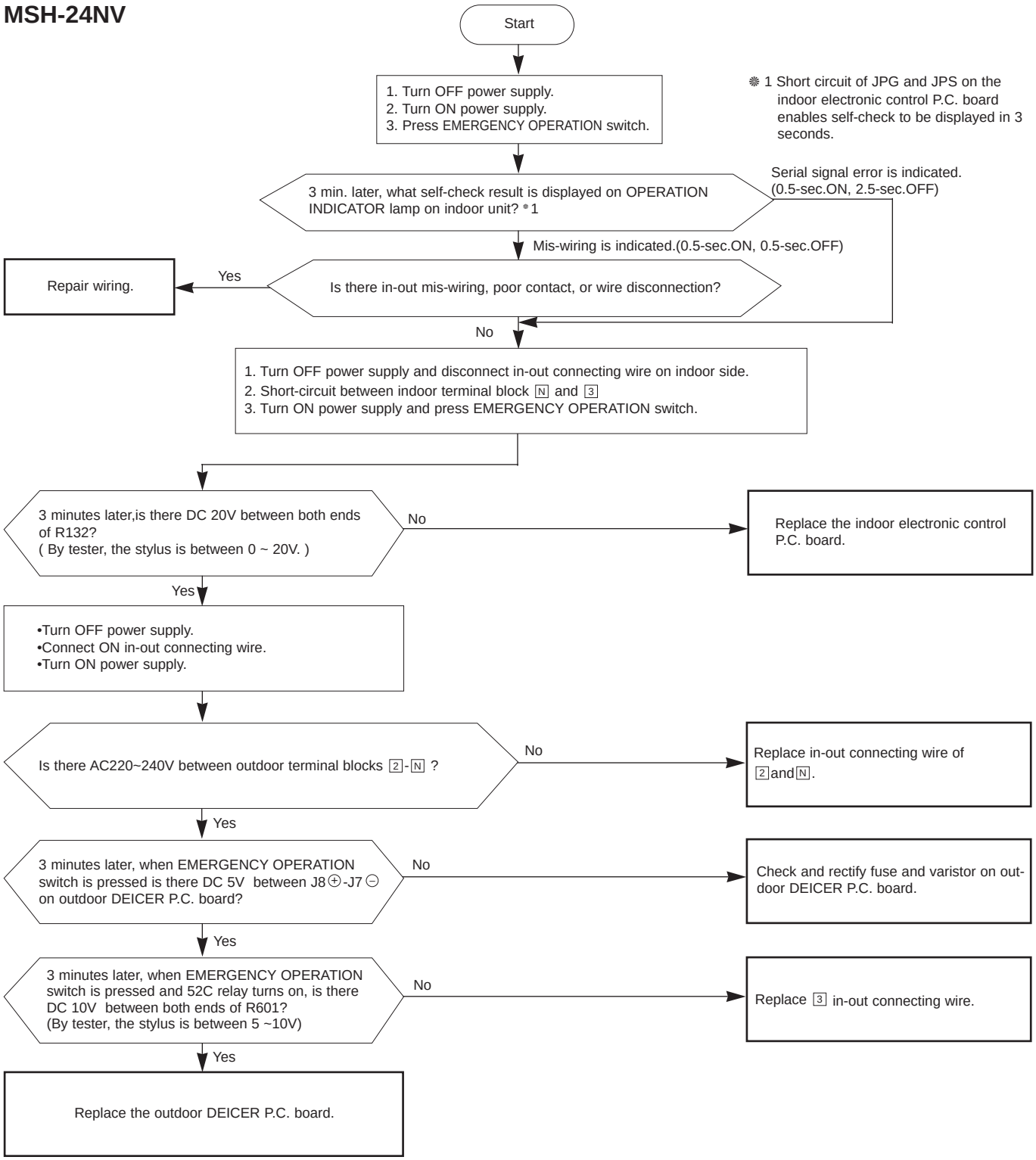
Ⓔ How to check mis-wiring and serial signal error (when outdoor unit does not work)

MSH-07NV
MSH-09NV
MSH-12NV
MSH-18NV

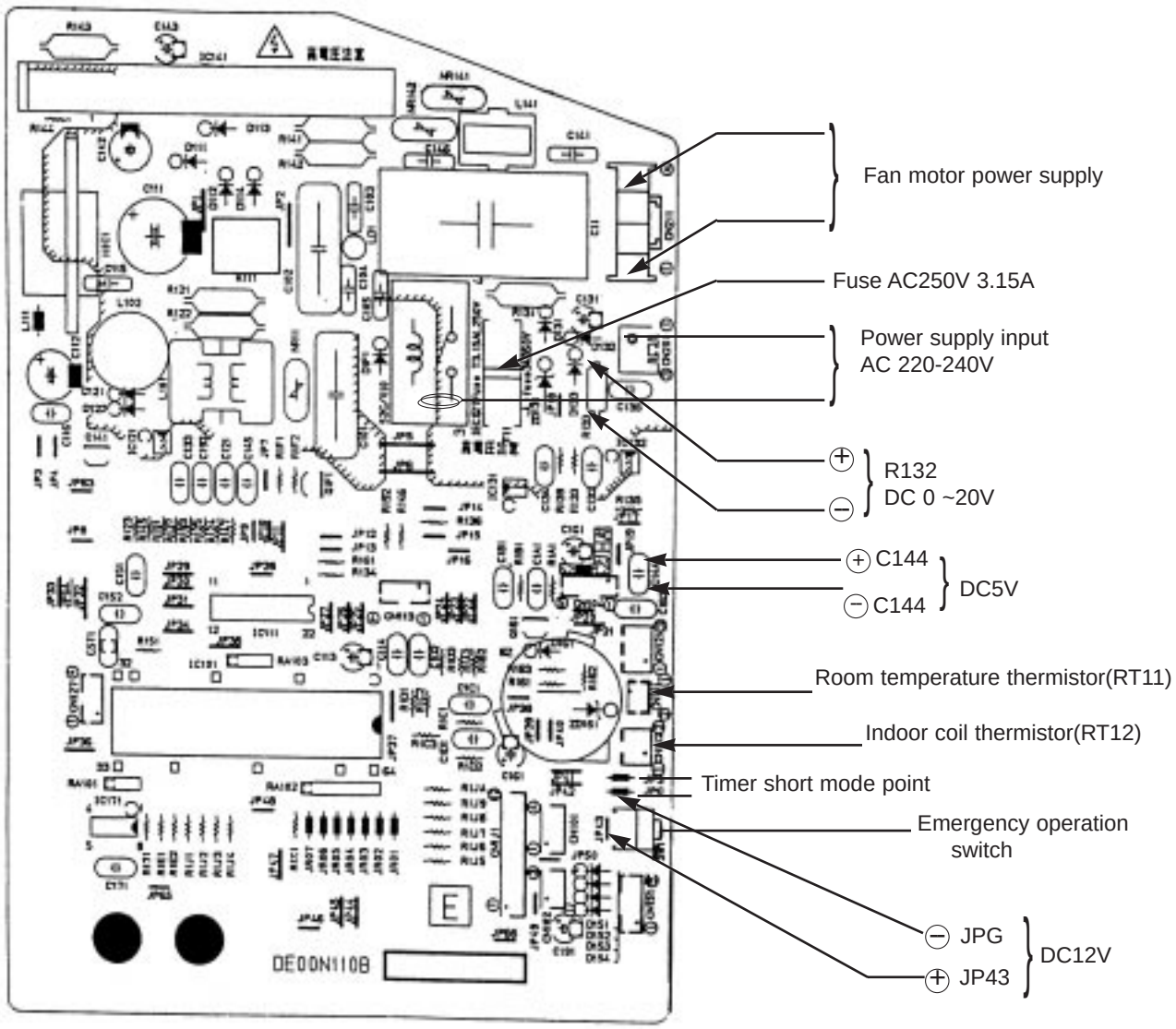


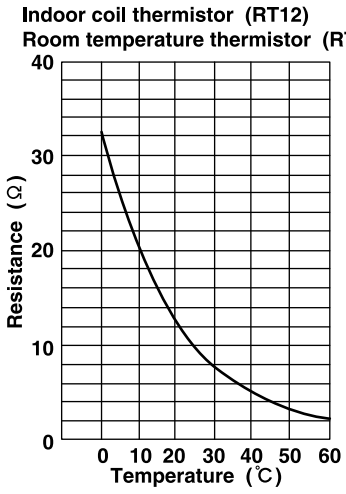
Ⓔ How to check mis-wiring and serial signal error (when outdoor unit does not work)

MSH-24NV

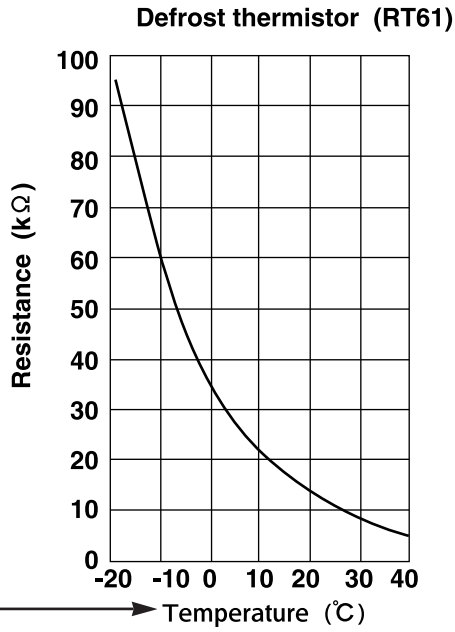


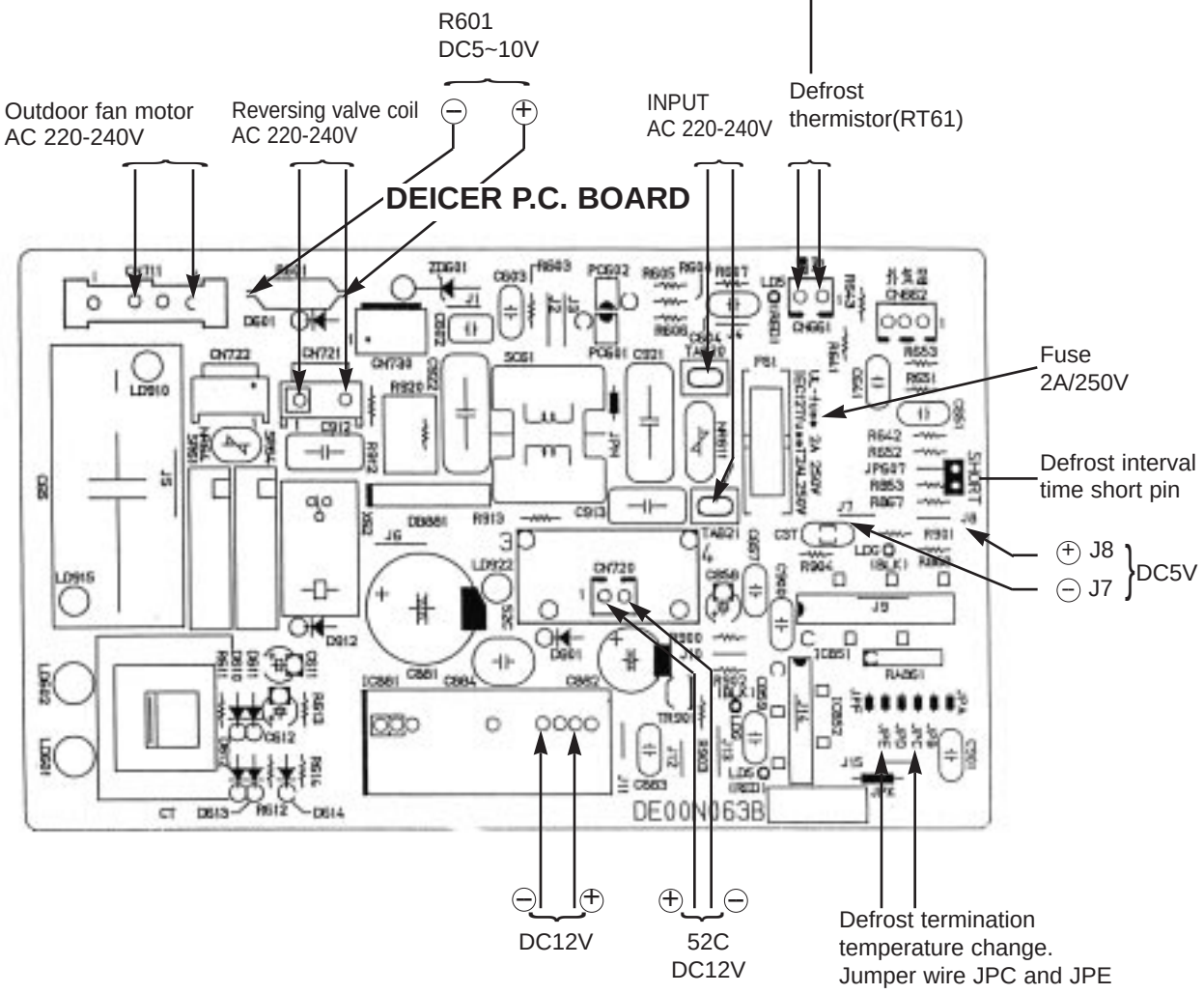
TEST POINT DIAGRAM AND VOLTAGE
MSH-18NV -E1
Indoor electric control P.C.board





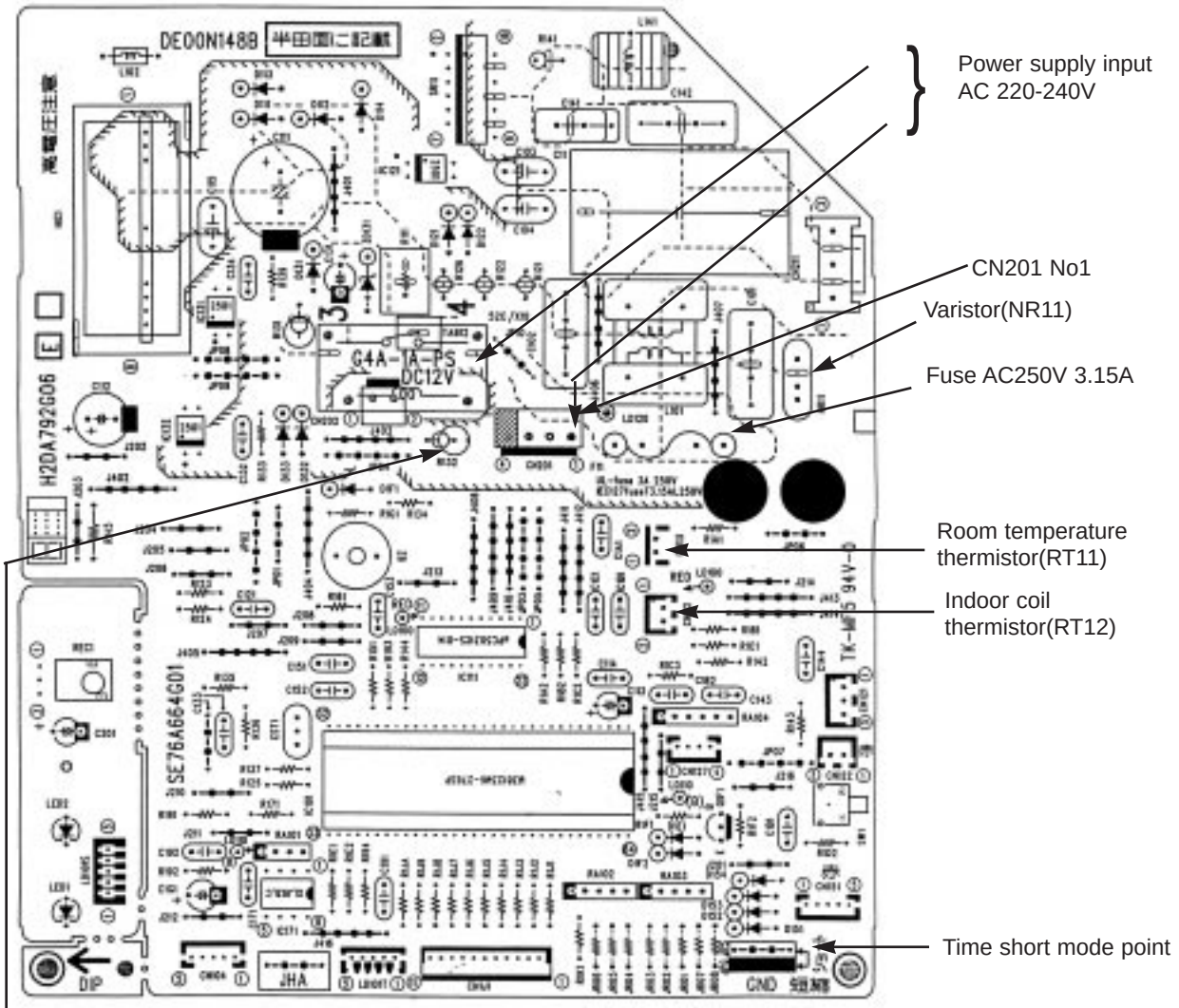
MUH-18NV -E1
Outdoor deicer P.C. board

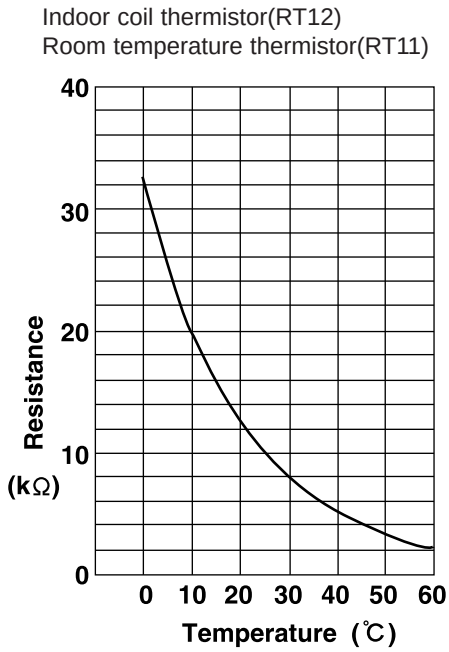




TEST POINT DIAGRAM AND VOLTAGE

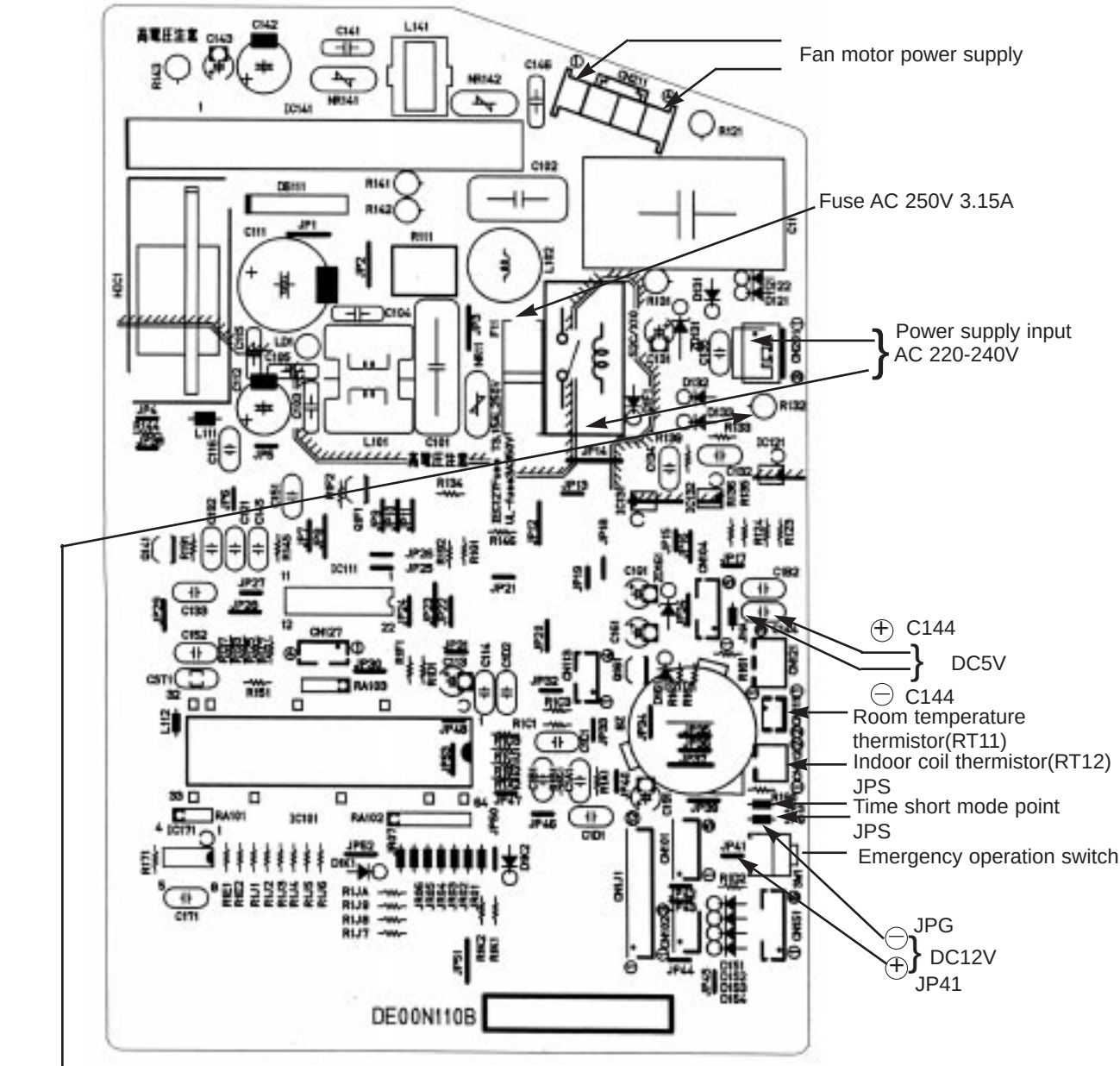
MSH-07NV -E1 MSH-09NV -E1 MSH-12NV -E1
MSH-07NV -E2 MSH-09NV -E2 MSH-12NV -E2
Indoor electronic control P.C. board

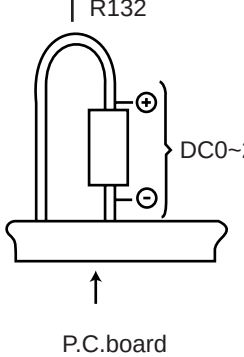


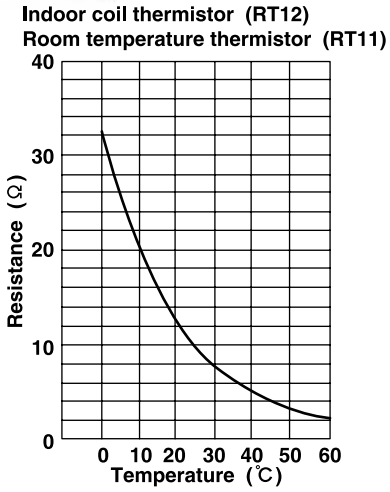


TEST POINT DIAGRAM AND VOLTAGE

MSH-24NV -E1 MSH-18NV -E2
MSH-24NV -E2 MSH-18NV -E3

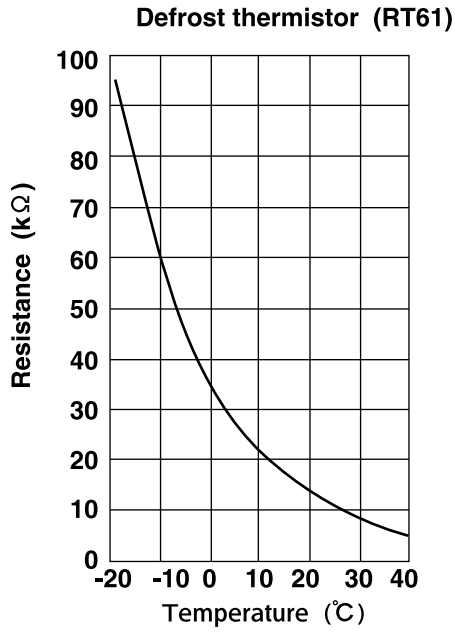


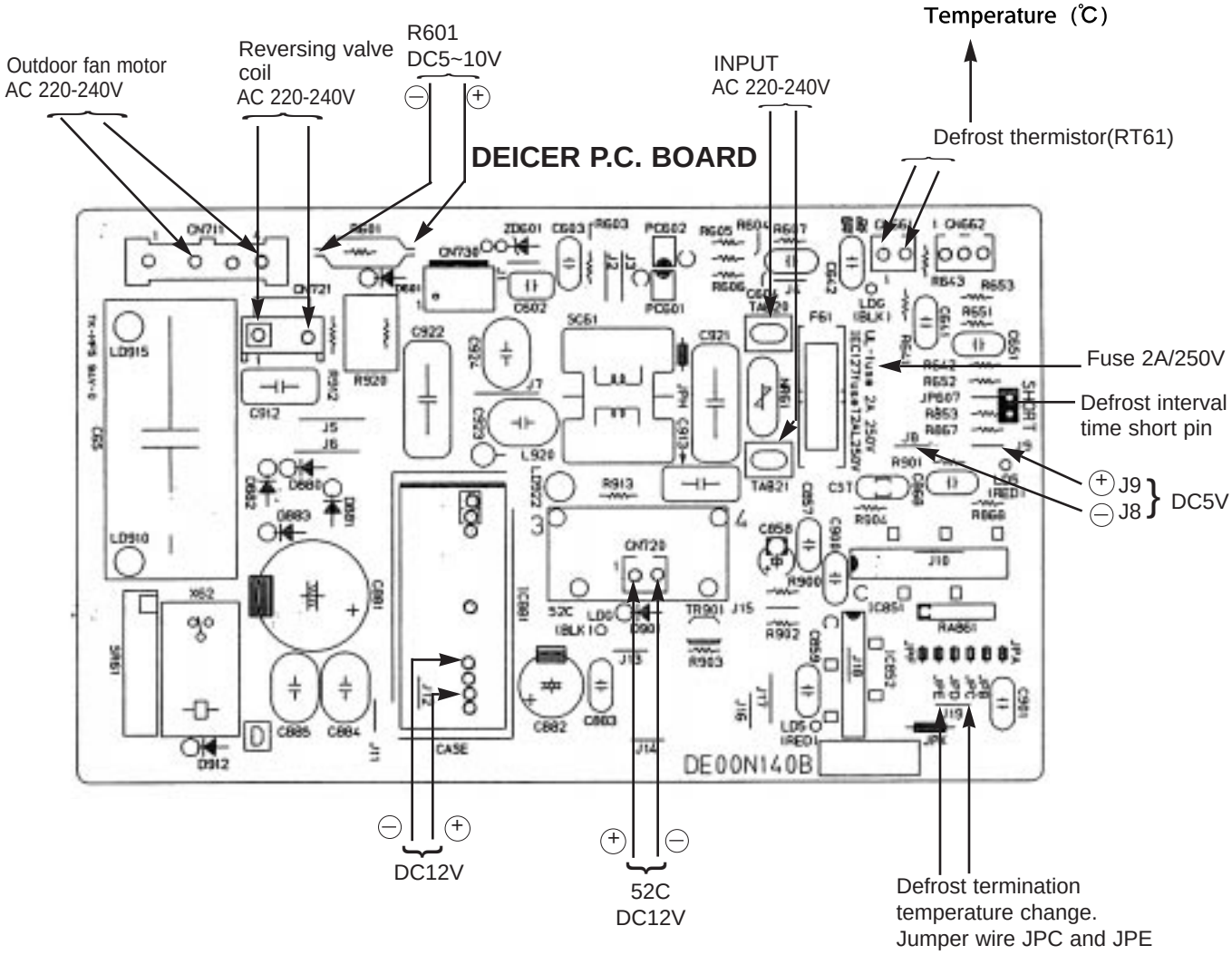




MUH-07NV -E1 MUH-09NV -E1 MUH-12NV -E1
MUH-24NV -E1 MUH-07NV -E2 MUH-09NV -E2
MUH-12NV -E2 MUH-18NV -E2 MUH-24NV -E2
MUH-18NV -E3

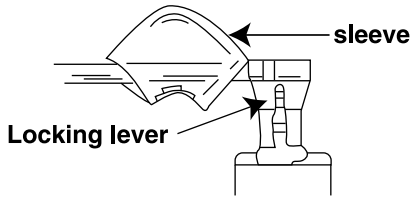
Outdoor deicer P.C. board





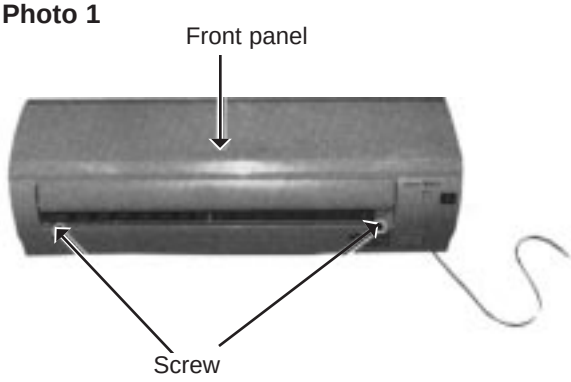
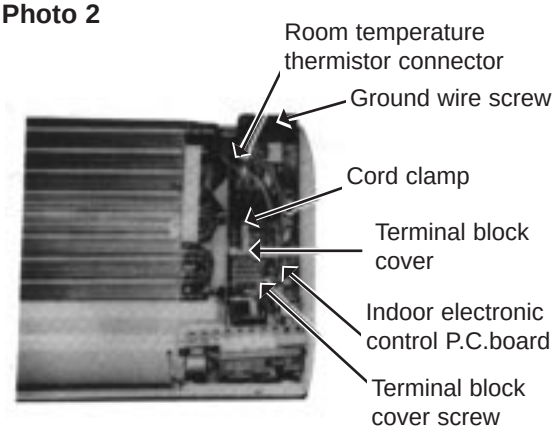
11 DISASSEMBLY INSTRUCTIONS

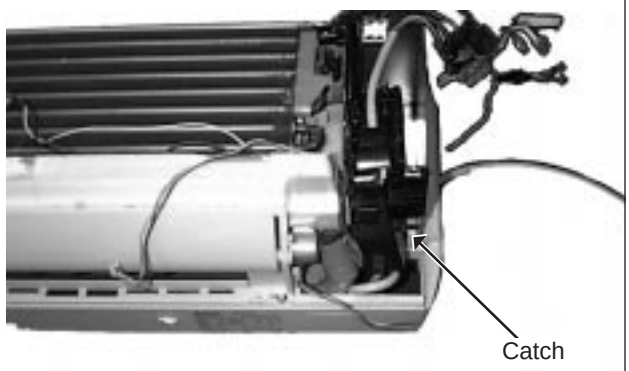
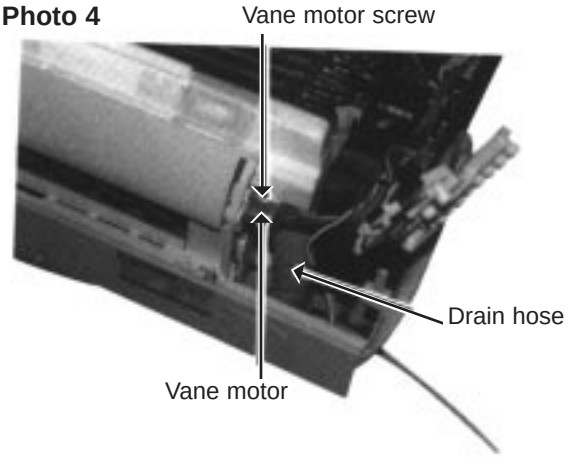
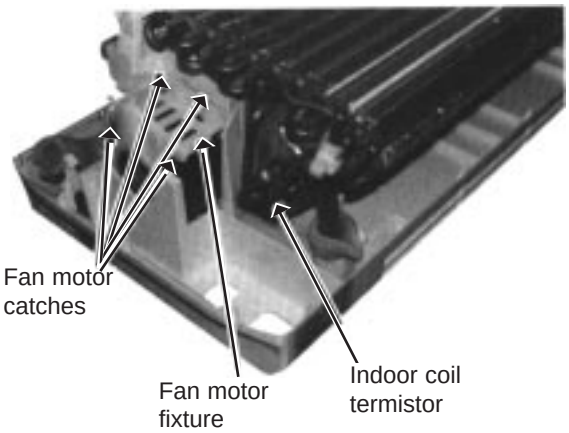
NOTE:
❋ On the wiring diagram shows the terminals with a lock mechanism, so it cannot be removed when you pull the lead wire Be sure to pull the wire by pushing the locking lever (projected part) of the terminal with a finger.



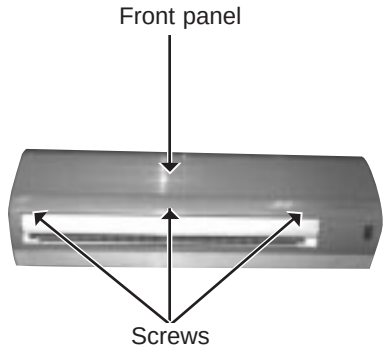
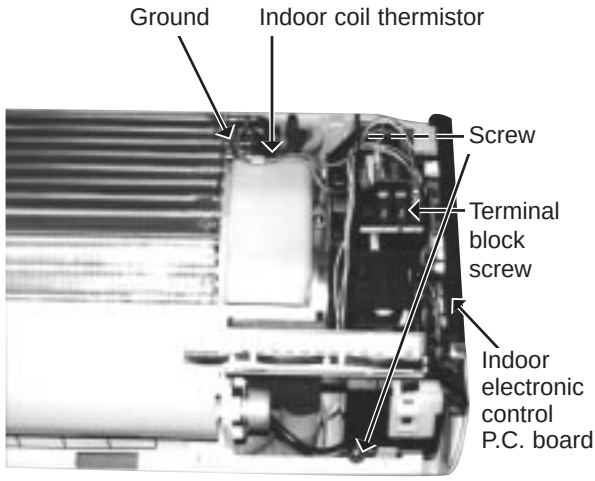
① Slide the sleeve.
② Pull the wire while pushing the locking lever.

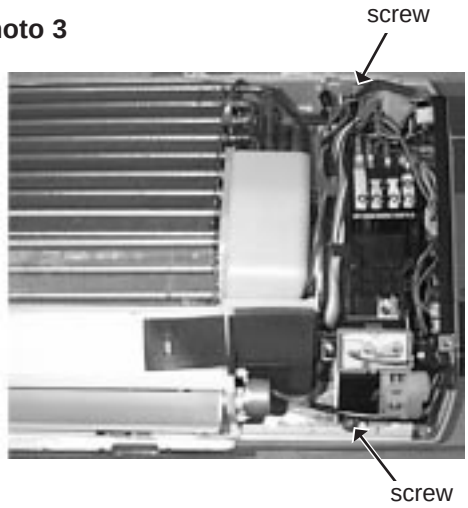
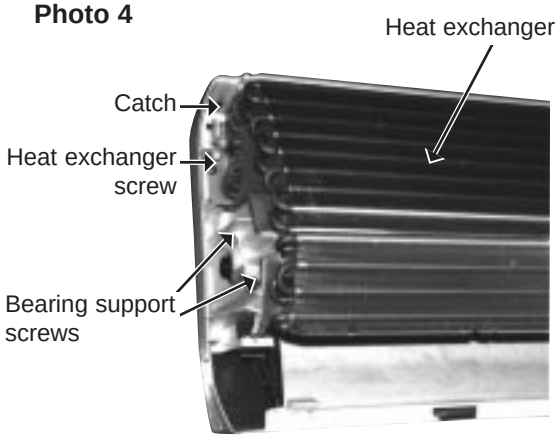
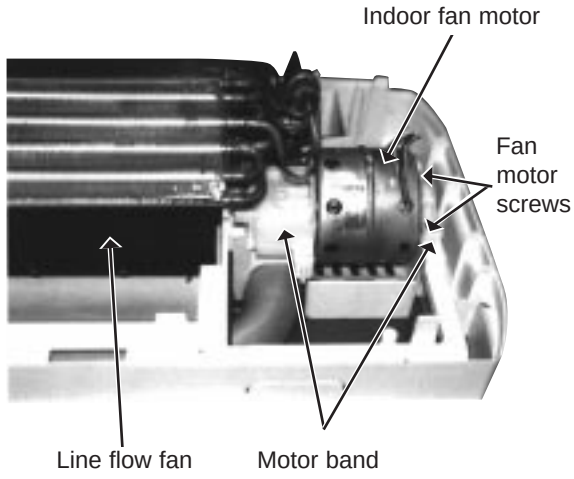
11-1 MSH-07NV -E1 MSH-09NV -E1 MSH-12NV -E1 MSH-07NV -E2 MSH-09NV -E2 MSH-12NV -E2 INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screws caps of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	**Photo 1** 
2. Removing the electronic control P.C. board and the display P.C. board. (1) Remove the front panel. (Refer to 1) (2) Remove the screw of the electrical cover. Remove the electrical cover. (3) Disconnect the room temperature thermistor and the connector from the indoor coil thermistor. (4) Remove the terminal cover. Remove the screw of the terminal block. (5) Remove the cord clamp. (6) Disconnect all the connectors on the electronic control P.C. board. (7) Remove the screw of the ground wire. (8) Disconnect the white lead wire and the brown lead wire from 52C relay. (9) Remove the electronic control P.C. board and the display P.C. board.	**Photo 2** 

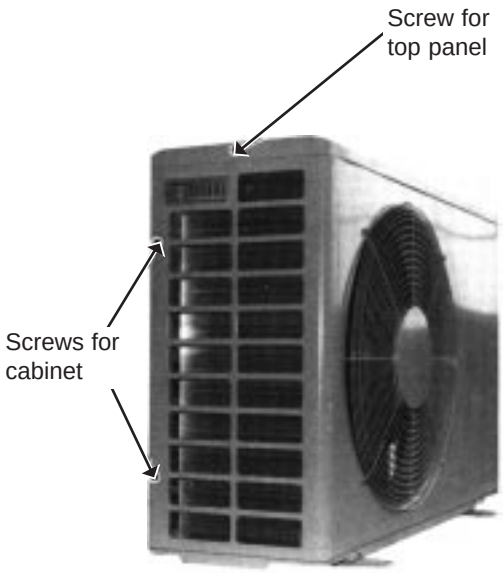
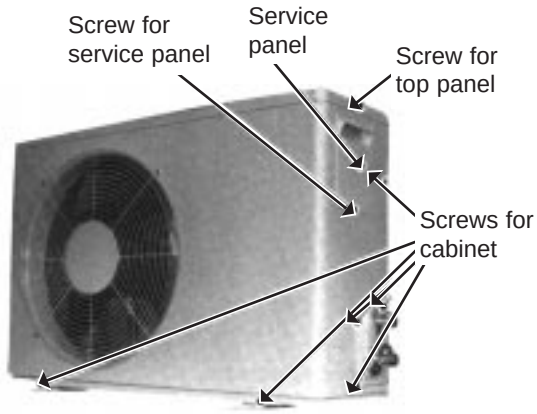
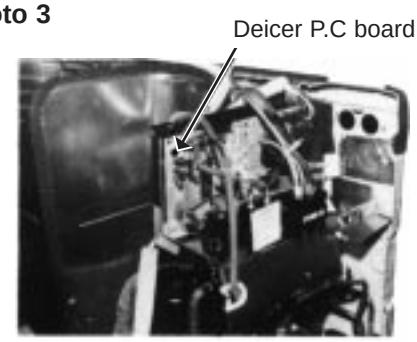
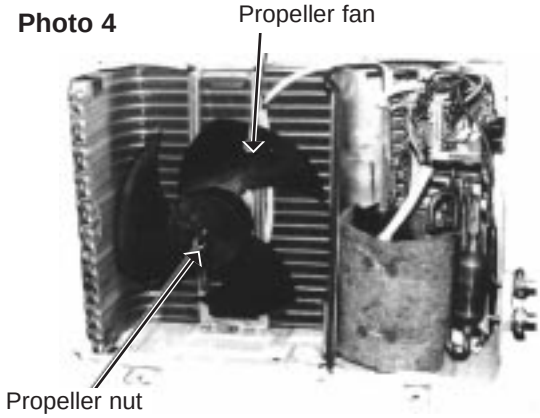
OPERATING PROCEDURE	PHOTOS
3. Removing the electrical box (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Disconnect the connector of the indoor coil thermistor. (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board. (5) Unhook the catches (both upper and lower), remove the electrical box.	**Photo 3** 
4. Removing the vane motor (1) Remove the front panel. (2) Remove the screw of the vane motor, disconnect the connector. (3) Remove the vane motor.	**Photo 4** 
5. Removing the line flow fan and the indoor fan motor (1) Remove the front panel. (Refer to 1) (2) Disconnect the connector from the vane motor. (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly. (4) Lifting the left side of the heat exchanger, remove the electrical box. (5) Remove the fixture of the fan motor. (6) Remove the hexagon socket set screws. (7) Remove the line flow fan and the fan motor.	**Photo 5** 

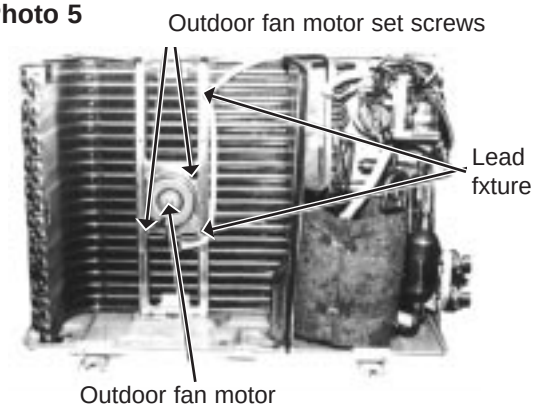
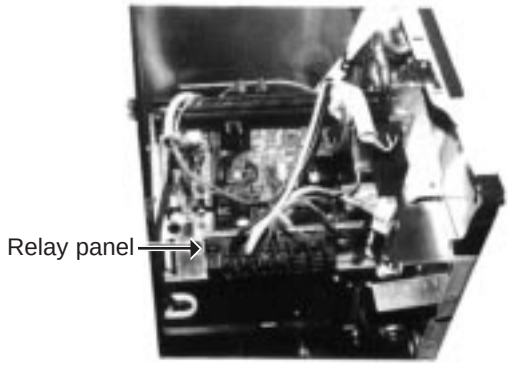
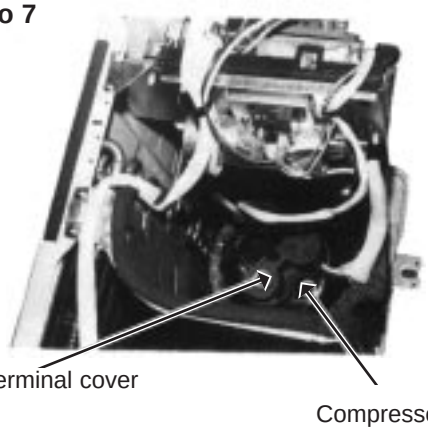
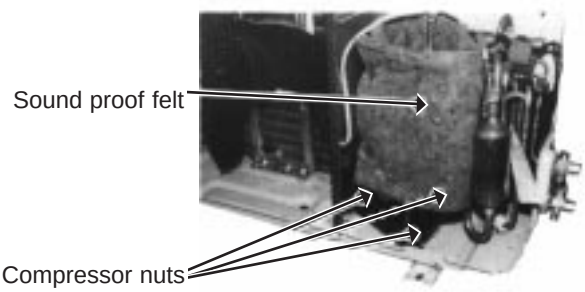
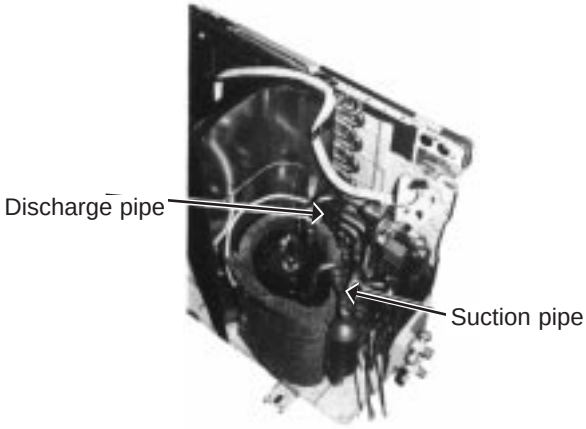
11-2 MSH-18NV -E1 MSH-24NV -E1 MSH-18NV -E2 MSH-24NV -E2 MSH-18NV -E3 INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (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.	**Photo 1** 
2. Removing the electronic control P.C. board (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Remove the screw, remove the terminal cover. (4) Remove the screw of terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder. (7) Disconnect the connectors and the lead wire from 52C relay on the electronic control P.C. board and remove the ground and the indoor coil thermistor. (8) Remove the electronic control P.C. board.	**Photo 2** 

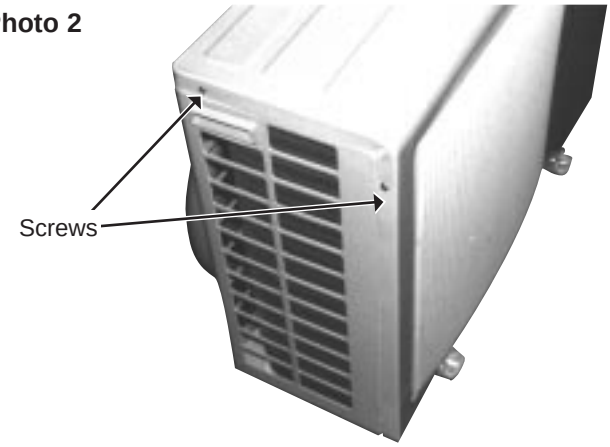
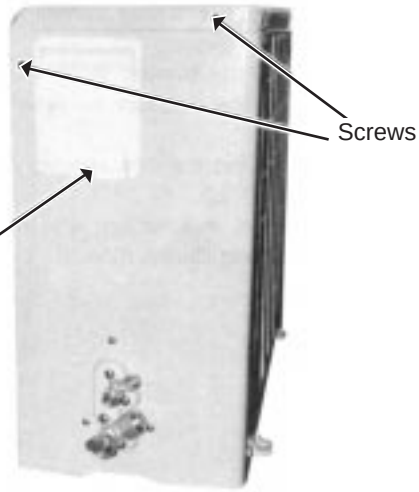
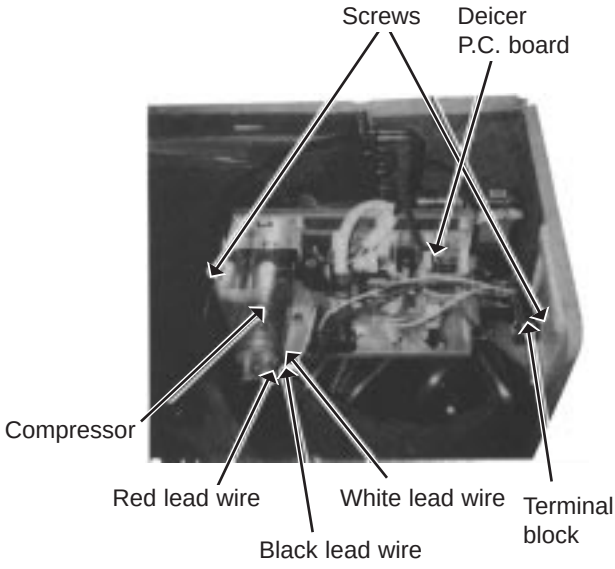
OPERATING PROCEDURE	PHOTOS
3. Removing the electrical box (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Disconnect the connector of the indoor coil thermistor. (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board. (5) Remove the screw of the electrical box, remove the electrical box.	**Photo 3** 
4. Removing the indoor fan motor and the line flow fan (1) Remove the front panel. (2) Remove the electrical box. (3) Unhook the catch on the both sides of the nozzle assembly. (4) Remove the nozzle assembly. (5) Remove the screws of the bearing support. (6) Remove the screw of the heat exchanger 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** 

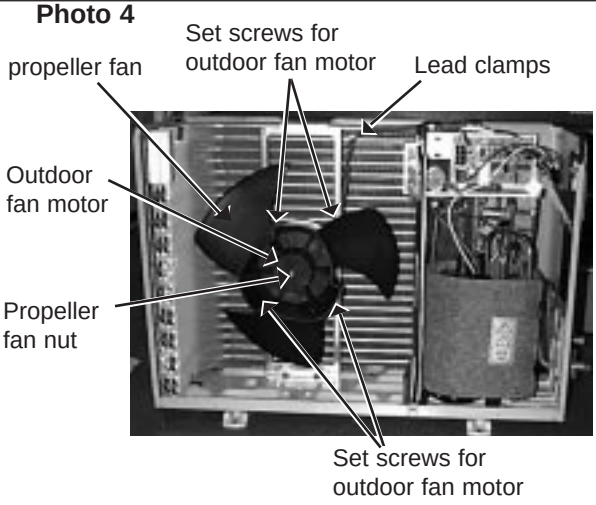
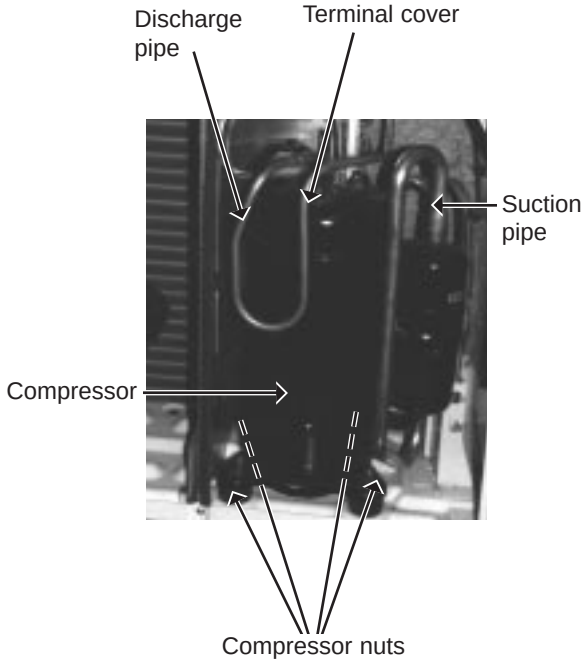
11-3 MUH-07NV -E1 MUH-09NV -E1 MUH-07NV -E2 MUH-09NV -E2 OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the top panel. (2) Remove the cabinet **Photo 2** 	**Photo 1** 
2. Remove the deicer P.C. board (1) Remove the top panel, the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 3** 
3. Removing the propeller fan (1) Turn the propeller nut clockwise to remove. (2) Pull the propeller fan toward you to remove.	**Photo 4** 

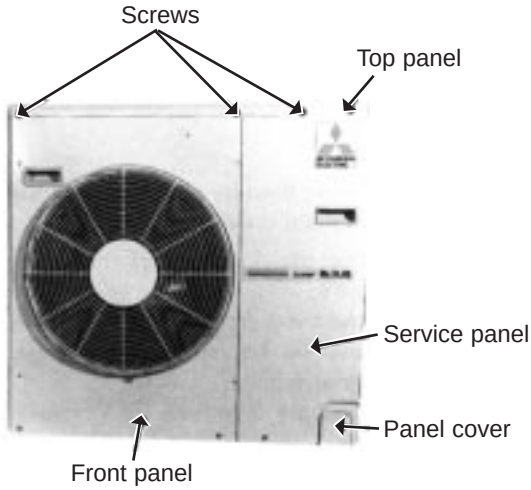
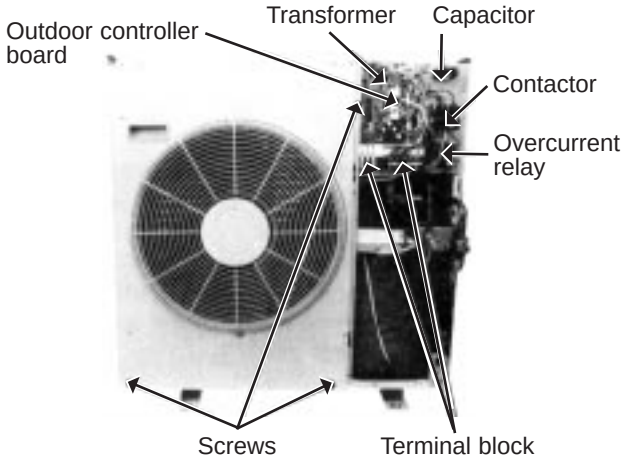
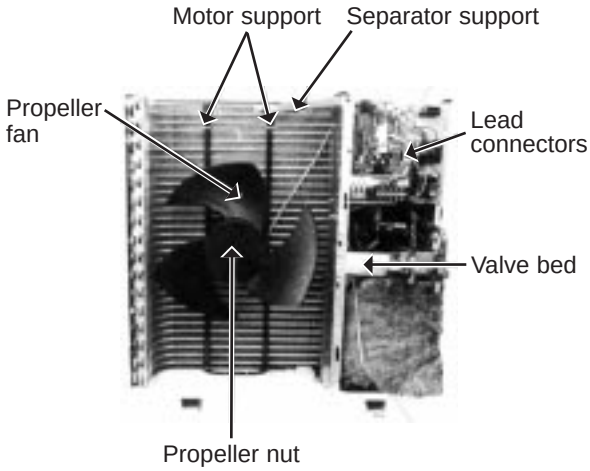
OPERATING PROCEDURE	PHOTOS
4. Removing the outdoor fan motor (1) Remove the screws securing the outdoor fan motor. (2) Remove the lead clamps. (3) Disconnect the capacitor terminal and wire of the terminal. (4) Pull out the outdoor fan motor.	**Photo 5** 
5. Removing the compressor (1) Remove the lead clamps. (2) Remove the screws securing the relay panel. (3) Remove the screw securing the service port. (4) Remove the terminal cover. (See Photo 7.) (5) Pull out the lead from the compressor terminal. (6) Remove the overcurrect relay. (7) Remove the compressor nuts. (8) Detach the suction pipe welded section and discharge pipe welded section with a burner. **NOTE** ● Before using a burner, purge gas from the pipes until the pressure gauge shows 0 kg/cm^2. ● Use the burner under the condition that gas can be released even when the inner pressure rises by heat.	**Photo 6**  **Photo 7**  **Photo 8** 
Photo 9  	

11-4 MUH-12NV -E1 MUH-18NV -E1 MUH-12NV -E2 MUH-18NV -E2 MUH-18NV -E3 OUTDOOR UNIT

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

OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Disconnect the connector remove the clamp of fan motor lead wire. (3) Remove the propeller nut and remove the propeller. (4) Remove screws securing the fan motor.	**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) Remove the electrical assembly. (Refer to 2) (5) Release gas from the refrigerant circuit. (6) Disconnect the welded part of the discharge pipe. (7) Disconnect the welded part of the suction pipe. (8) Remove nuts fixing the compressor. (9) Remove the compressor.	**Photo 5** 

11-5 MUH-24NV-E1 MUH-24NV-E2
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the electrical parts (1) Remove the screws and the top panel. (2) Remove the screw of the cover panel. To remove the cover panel, pull it toward you and unhook the catches from the side panel. (3) Remove the screw of the service panel. To remove the service panel, pull it down toward you and unhook the catches on the both sides.	**Photo 1**  **Photo 2** 
2. Removing the fan motor (1) Remove the screws of the front panel. Open the front panel to a 45-degree angle. Then lift it and unhook the catches to remove. (2) Remove the propeller nut and the propeller fan. (3) Remove the screws and the fan motor. Disconnect the lead connectors.	**Photo 3** 

OPERATING PROCEDURE

3. Removing the heat exchanger and the compressor

(1) Remove the rear panel.Remove the valve bed, and open the rear panel to the rear to remove.

NOTE :

All panels are fixed by catches, and must be removed by shifting up and down.

(2) Remove the screws of the right side panel and remove it.

(3) Remove the screws of the rear guard and remove it.

(4) Remove the screws of the separator support plate and remove it.

(5) Remove the screws of the motor support and remove it.

(6) Remove the screws of the valve bed.
The valve bed is fixed by the catches on the right and left sides.
Lift it to remove.

(7) Remove the electrical parts box.
Disconnect the connectors from the high pressure switch, crank case heater, shell thermo, and fan motor lead.

(8) Remove the screws of the separator and remove it.

(9) Remove the screws of the heat exchanger and remove it.
Detach the welded point of pipe.

(10) Remove the nuts of the compressor and remove it.
Detach the welded points of the compressor suction pipe and discharge pipe.

PHOTOS

Photo 4

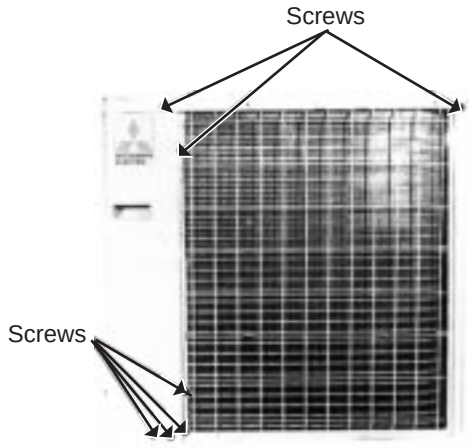


Photo 5

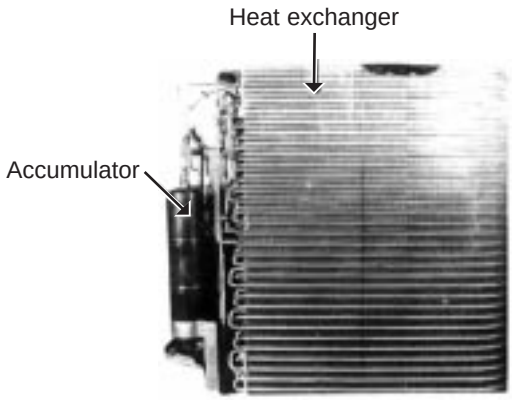
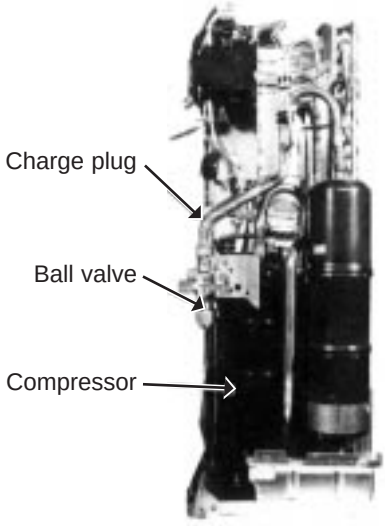


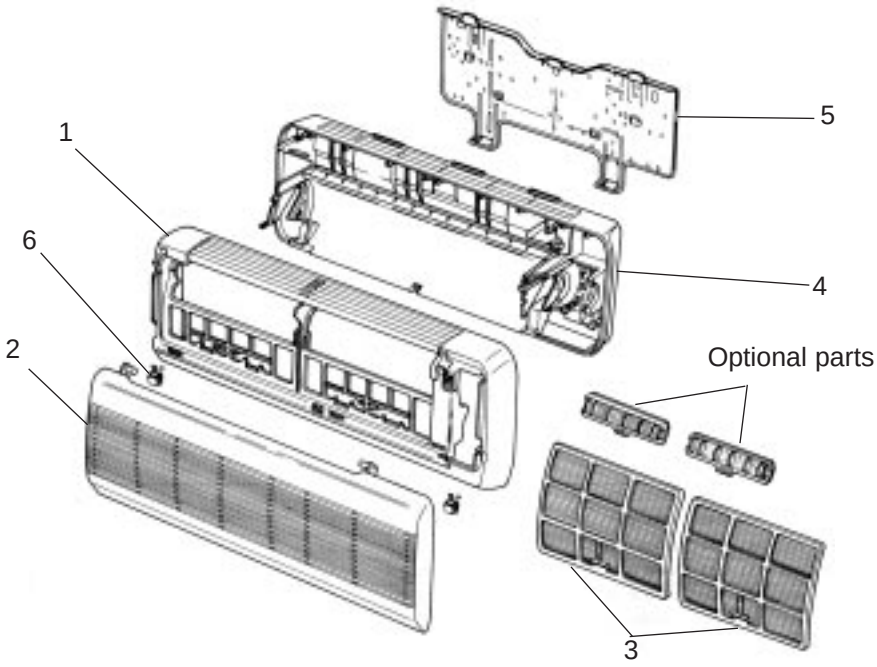
Photo 6



12 PARTS LIST

INDOOR UNIT
STRUCTURAL PARTS

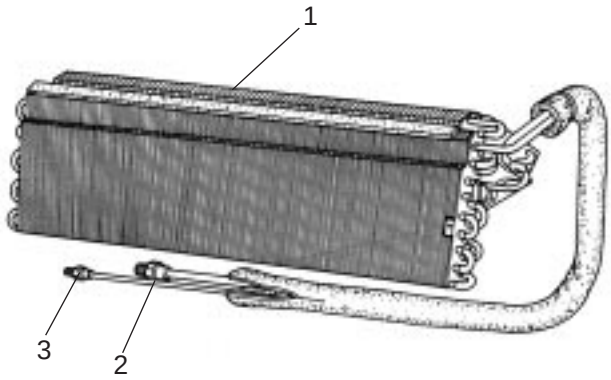
MSH-07NV -E1 (WH)
MSH-09NV -E1 (WH)
MSH-12NV -E1 (WH)
MSH-07NV -E2 (WH)
MSH-09NV -E2 (WH)
MSH-12NV -E2 (WH)



NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit						Remarks
				MSH-07NV-E1 (WH)	MSH-07NV-E2 (WH)	MSH-09NV-E1 (WH)	MSH-09NV-E2 (WH)	MSH-12NV-E1 (WH)	MSH-12NV-E2 (WH)	
1	E02 154 000	FRONT PANEL(WH)				1	1			
	E02 157 000	FRONT PANEL(WH)						1	1	
	E02 199 000	FRONT PANEL(WH)		1	1					
2	E02 151 010	GRILL(WH)		1	1	1	1	1	1	
3	E02 164 100	AIR FILTER		2	2	2	2	2	2	1PC/SET
4	E02 151 234	BOX(WH)		1		1		1		
	E02 166 234	BOX(WH)			1		1		1	
5	E02 151 970	INSTALLATION PLATE		1	1	1	1	1	1	
6	E02 166 067	SCREW CAP(WH)		2	2	2	2	2	2	2PCS/SET

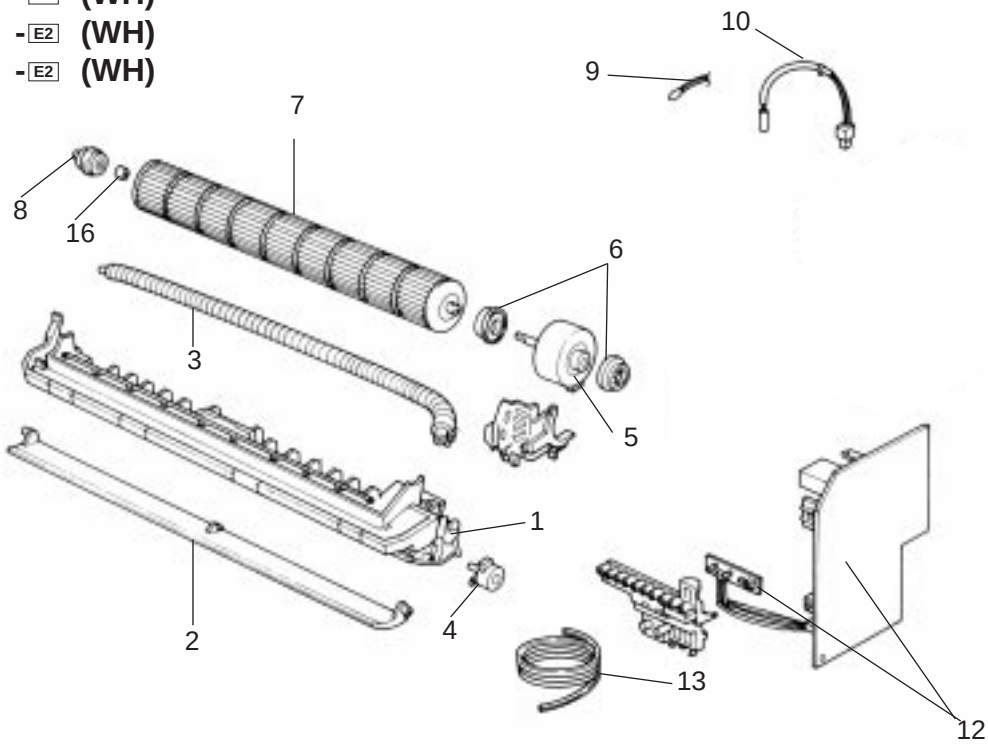
INDOOR UNIT
HEAT EXCHANGER

MSH-07NV -E1 (WH)
MSH-09NV -E1 (WH)
MSH-12NV -E1 (WH)
MSH-07NV -E2 (WH)
MSH-09NV -E2 (WH)
MSH-12NV -E2 (WH)



NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MSH-07/09NV-E1 E2 (WH)	MSH-12NV-E1 E2 (WH)	
1	E02 151 620	INDOOR HEAT EXCHANGER		1		
	E02 155 620	INDOOR HEAT EXCHANGER			1	
2	E02 151 666	UNION(GAS)		1		ϕ9.52
	E02 155 666	UNION(GAS)			1	ϕ12.7
3	E02 151 667	UNION(LIQUID)		1	1	ϕ6.35

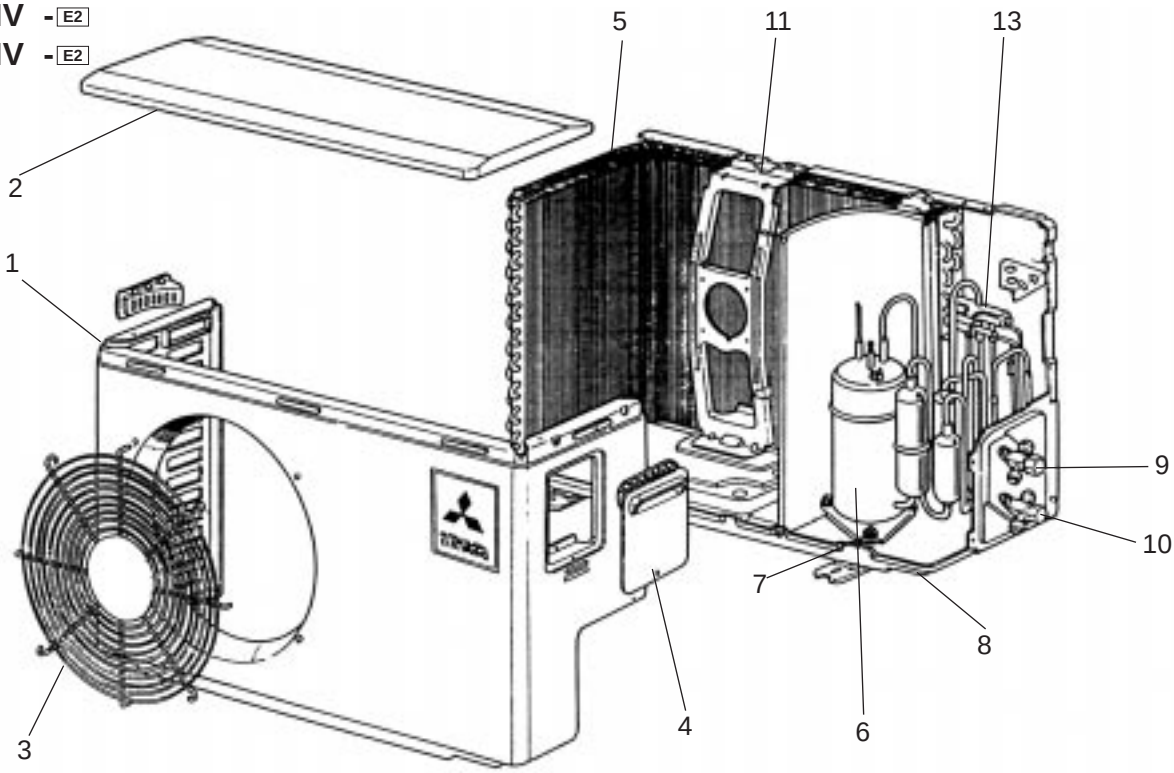
INDOOR UNIT
ELECTRICAL PARTS
MSH-07NV -E1 (WH)
MSH-09NV -E1 (WH)
MSH-12NV -E1 (WH)
MSH-07NV -E2 (WH)
MSH-09NV -E2 (WH)
MSH-12NV -E2 (WH)



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

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit			Remarks
				MSH-07NV- E1 E2 (WH)	MSH-09NV- E1 E2 (WH)	MSH-12NV- E1 E2 (WH)	
1	E02 166 235	NOZZLE(WH)		1	1	1	
2	E02 166 040	VANE(WH)		1	1	1	
3	E02 141 702	DRAIN HOSE		1	1	1	
4	E02 151 303	VANE MOTOR	MV	1	1	1	
5	E02 151 300	INDOOR FAN MOTOR	MF	1	1	1	RC4V19 -□□
6	E02 151 505	RUBBER MOUNT		2	2	2	2PCS/SET
7	E02 151 302	LINE FLOW FAN		1	1	1	
8	E02 151 509	BEARING MOUNT		1	1	1	
9	E02 151 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	
10	E02 151 307	INDOOR COIL THERMISTOR	RT12	1	1	1	
⑪	E02 198 375	TERMINAL BLOCK	TB	1	1	1	
12	E02 199 450	ELECT CONTROL P.C.BOARD		1			
	E02 200 450	ELECT CONTROL P.C.BOARD			1		
	E02 201 450	ELECT CONTROL P.C.BOARD				1	
13	E02 152 395	POWER SUPPLY CORD		1	1	1	
⑭	E02 127 382	FUSE	F11	1	1	1	3.15A
⑮	E02 085 385	VARISTOR	NR11	1	1	1	
⑯	E02 001 504	SLEEVE BEARING		1	1	1	
⑰	E02 151 468	RECEIVER		1	1	1	
⑱	E02 199 520	FAN GUARD		1	1	1	

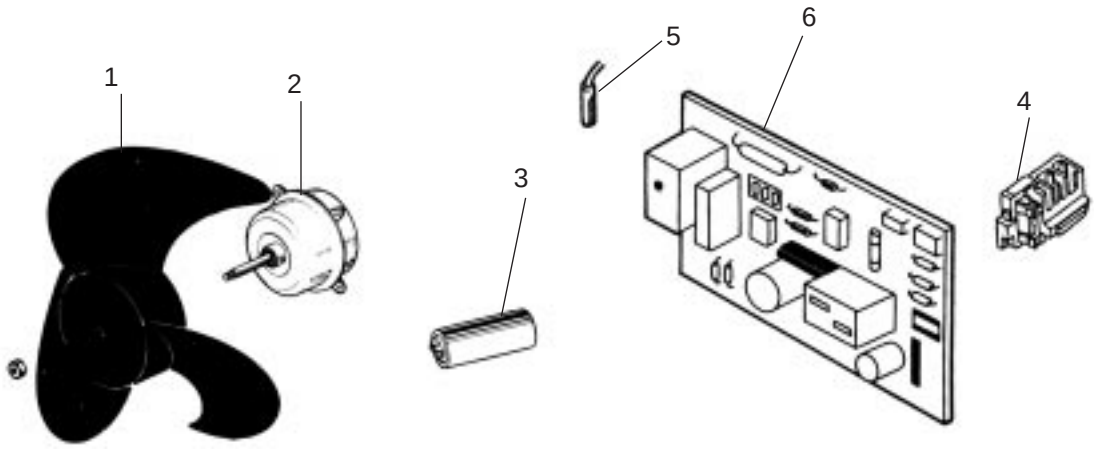
OUTDOOR UNIT
STRUCTURAL PARTS
MUH-07NV -E1
MUH-09NV -E1
MUH-07NV -E2
MUH-09NV -E2



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

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MUH-07NV - E1 E2	MUH-09NV - E1 E2	
1	E02 096 232	CABINET		1	1	
2	E02 085 297	TOP PANEL		1	1	
3	E02 199 521	FAN GUARD		1	1	
4	E02 085 245	SERVICE PANEL		1	1	
5	E02 096 630	OUTDOOR HEAT EXCHANGER		1	1	
6	E02 128 900	COMPRESSOR	MC		1	RH-174VGHT
	E02 164 900	COMPRESSOR	MC	1		RH-135VGHT
7	E02 047 506	COMPRESSOR RUBBER SET		1	1	
8	E02 096 290	BASE		1	1	
9	E02 096 662	STOP VALVE(LIQUID)		1	1	ϕ 6.35
10	E02 096 661	STOP VALVE(GAS)		1	1	ϕ 9.52
11	E02 085 515	MOTOR SUPPORT		1	1	
(12)	E02 154 642	CHECK VALVE		1	1	
13	E02 077 961	REVERSING VALVE		1	1	
(14)	E02 154 936	CAPILLARY TUBE			1	ϕ3.0 Xϕ1.6 X 1300
	E02 159 936	CAPILLARY TUBE		2	2	ϕ3.0 Xϕ1.4 X 800
	E02 134 937	CAPILLARY TUBE			1	ϕ3.0 Xϕ1.6 X 400
	E02 199 936	CAPILLARY TUBE		1		ϕ3.0 Xϕ1.4 X 850
	E02 139 936	CAPILLARY TUBE		1		ϕ3.0 Xϕ1.6 X 750

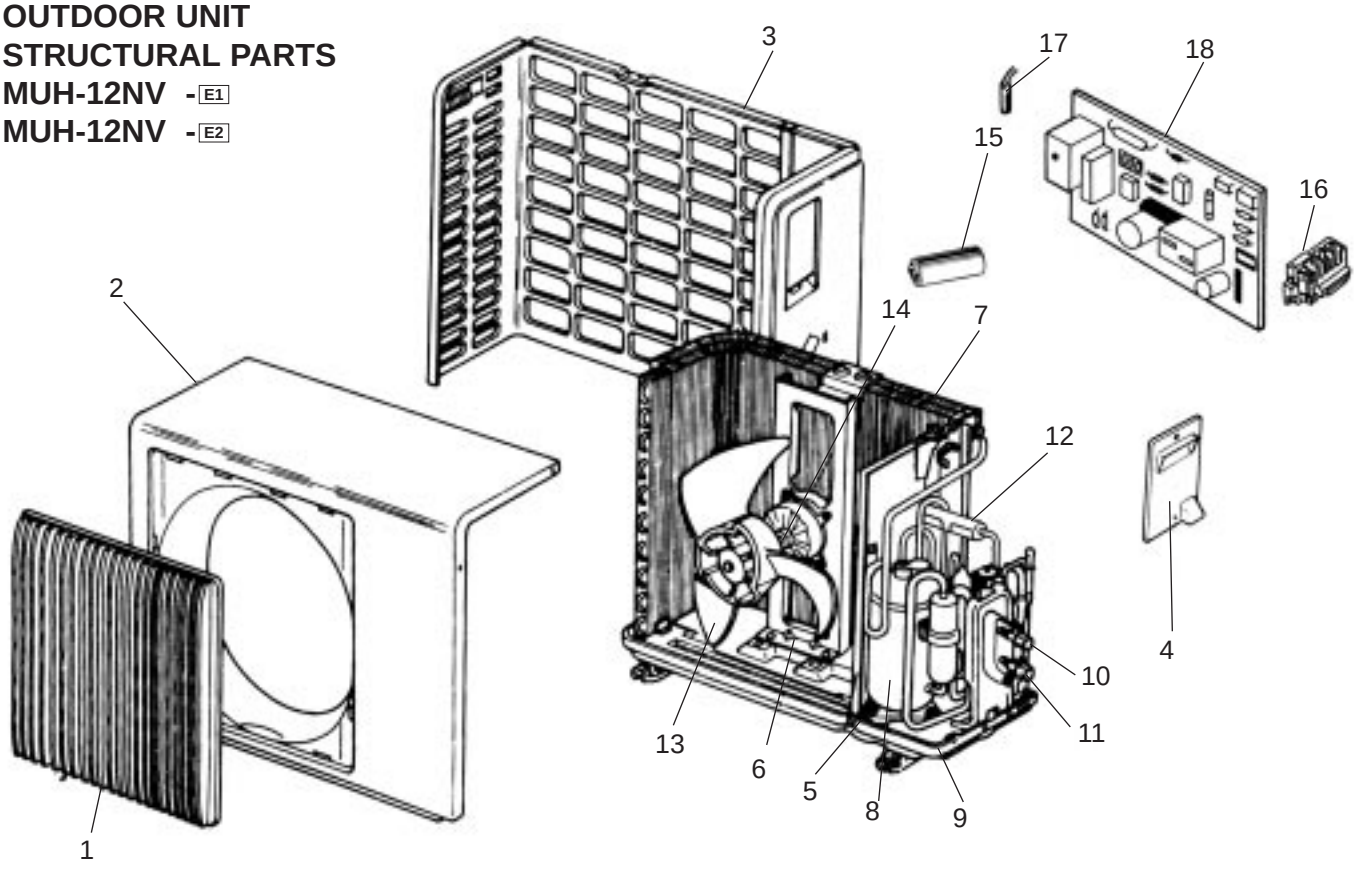
OUTDOOR UNIT
FUNCTIONAL PARTS AND ELECTRICAL PARTS
MUH-07NV -E1
MUH-09NV -E1
MUH-07NV -E2
MUH-09NV -E2



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

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MUH-07/09NV- E1 E2	Remarks
1	E02 085 501	PROPELLER FAN		1	
2	E02 096 301	OUTDOOR FAN MOTOR	MF	1	RA6V29-□□
3	E02 085 353	COMPRESSOR CAPACITOR	C1	1	25μF/440VAC
4	E02 199 374	TERMINAL BLOCK	TB	1	
5	E02 096 310	DEFROST THERMISTOR	RT61	1	
6	E02 199 451	DEICER P.C. BOARD		1	
(7)	E02 154 490	REVERSING VALVE COIL	21S4	1	

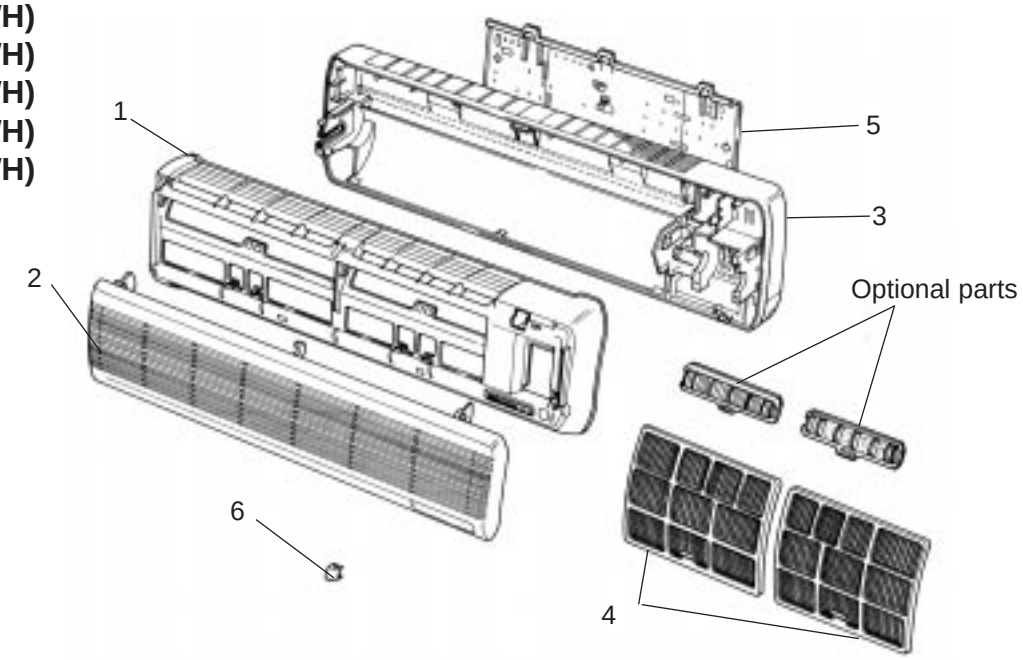
OUTDOOR UNIT
STRUCTURAL PARTS
MUH-12NV -E1
MUH-12NV -E2



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

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MUH-12NV- E1 E2	Remarks
1	E02 141 521	GRILL		1	
2	E02 141 232	CABINET ASSEMBLY		1	
3	E02 140 233	BACK PANEL		1	
4	E02 141 245	SERVICE PANEL		1	
5	E02 075 506	COMPRESSOR RUBBER SET		3	3 RUBBER
6	E02 139 515	MOTOR SUPPORT		1	
7	E02 156 630	OUTDOOR HEAT EXCHANGER		1	
8	E02 141 900	COMPRESSOR	MC	1	RH-231VHAT
9	E02 201 290	BASE		1	
10	E02 139 662	STOP VALVE(LOQUID)		1	ϕ 6.35
11	E02 140 661	STOP VALVE(GAS)		1	ϕ 12.7
12	E02 077 961	REVERSING VALVE		1	
13	E02 141 501	PROPELLER FAN		1	
14	E02 141 301	OUTDOOR FAN MOTOR	MF	1	RA6V40 -□□
15	E02 079 353	COMPRESSOR CAPACITOR	CI	1	30μF/440VAC
16	E02 201 374	TERMINAL BLOCK	TB	1	
17	E02 139 310	DEFROST THERMISTOR	RT61	1	
18	E02 201 451	DEICER P.C. BOARD		1	
(19)	E02 156 490	REVERSING VALVE COIL	21S4	1	
(20)	E02 156 936	CAPILLARY TUBE		1	ϕ3.0Xϕ1.4X 500
	E02 134 937	CAPILLARY TUBE		1	ϕ3.0Xϕ1.6X 400
(21)	E02 154 642	CHECK VALVE		1	

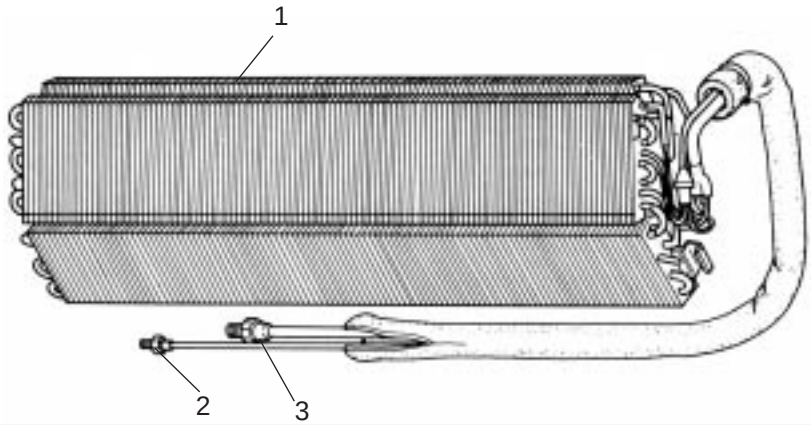
INDOOR UNIT
STRUCTURAL PARTS
MSH-18NV -E1 (WH)
MSH-24NV -E1 (WH)
MSH-18NV -E2 (WH)
MSH-24NV -E2 (WH)
MSH-18NV -E3 (WH)



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

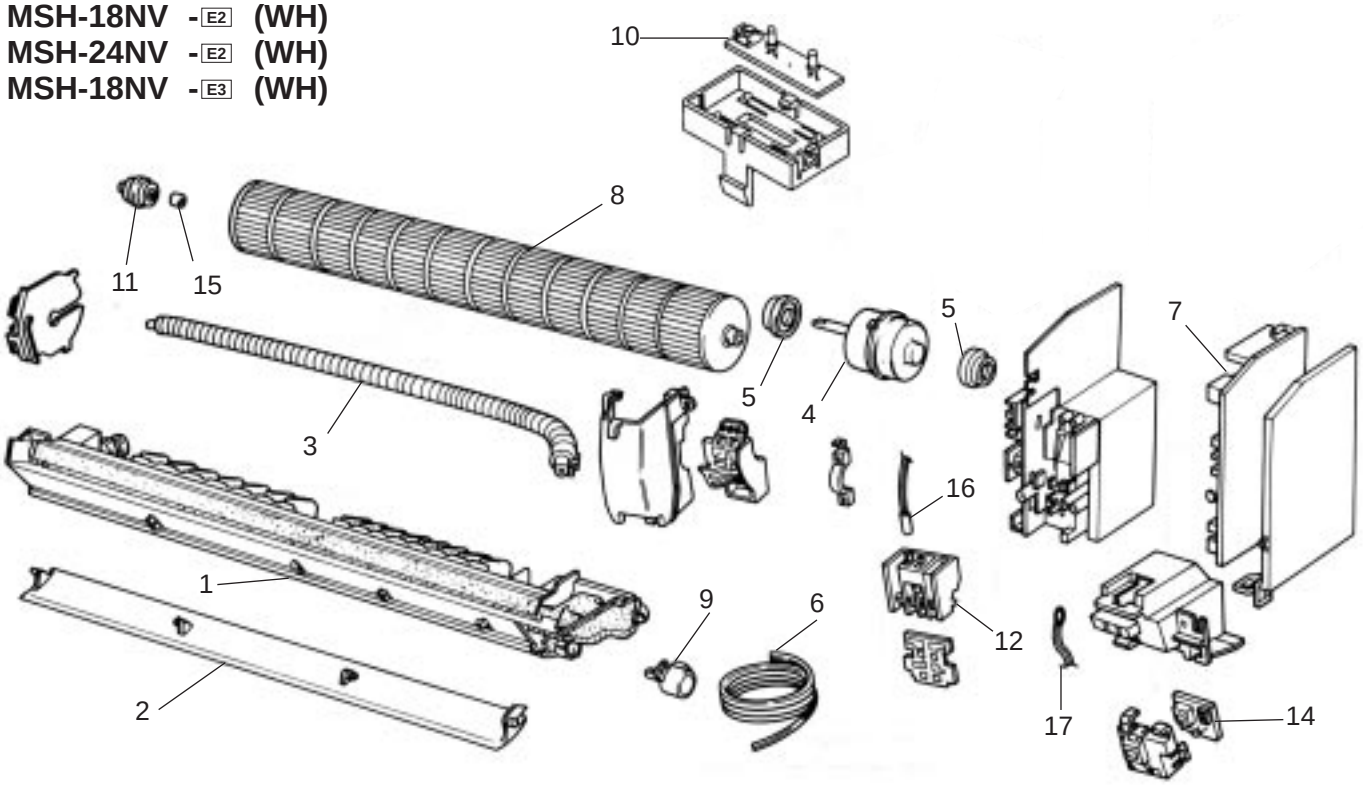
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit			Remarks
				MSH-18NV-		MSH-24NV-	
				E1 (WH)	E2 E3 (WH)	E1 E2 (WH)	
1	E02 138 000	FRONT PANEL(WH)		1	1	1	
2	E02 138 010	GRILLE(WH)		1	1	1	
3	E02 143 234	BOX(WH)		1	1	1	
4	E02 141 100	AIR FILTER		2	2	2	1PC/SET
5	E02 141 970	INSTALLATION PLATE		1	1	1	
6	E02 143 067	SCREW CAP(WH)		3	3	3	3PCS/SET
⑦	E02 168 007	LAMP PANEL(WH)		1	1		
	E02 214 007	LAMP PANEL(WH)				1	

INDOOR UNIT
HEAT EXCHANGER PARTS
MSH-18NV -E1 (WH)
MSH-24NV -E1 (WH)
MSH-18NV -E2 (WH)
MSH-24NV -E2 (WH)
MSH-18NV -E3 (WH)



NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MSH-18NV-	MSH-24NV-	
				E1 E2 E3 (WH)	E1 E2 (WH)	
1	E02 141 620	INDOOR HEAT EXCHANGER		1	1	
2	E02 138 667	UNION(LIQUID)		1		ϕ6.35
	E02 176 667	UNION(LIQUID)			1	ϕ9.52
3	E02 138 666	UNION(GAS)		1	1	ϕ15.88

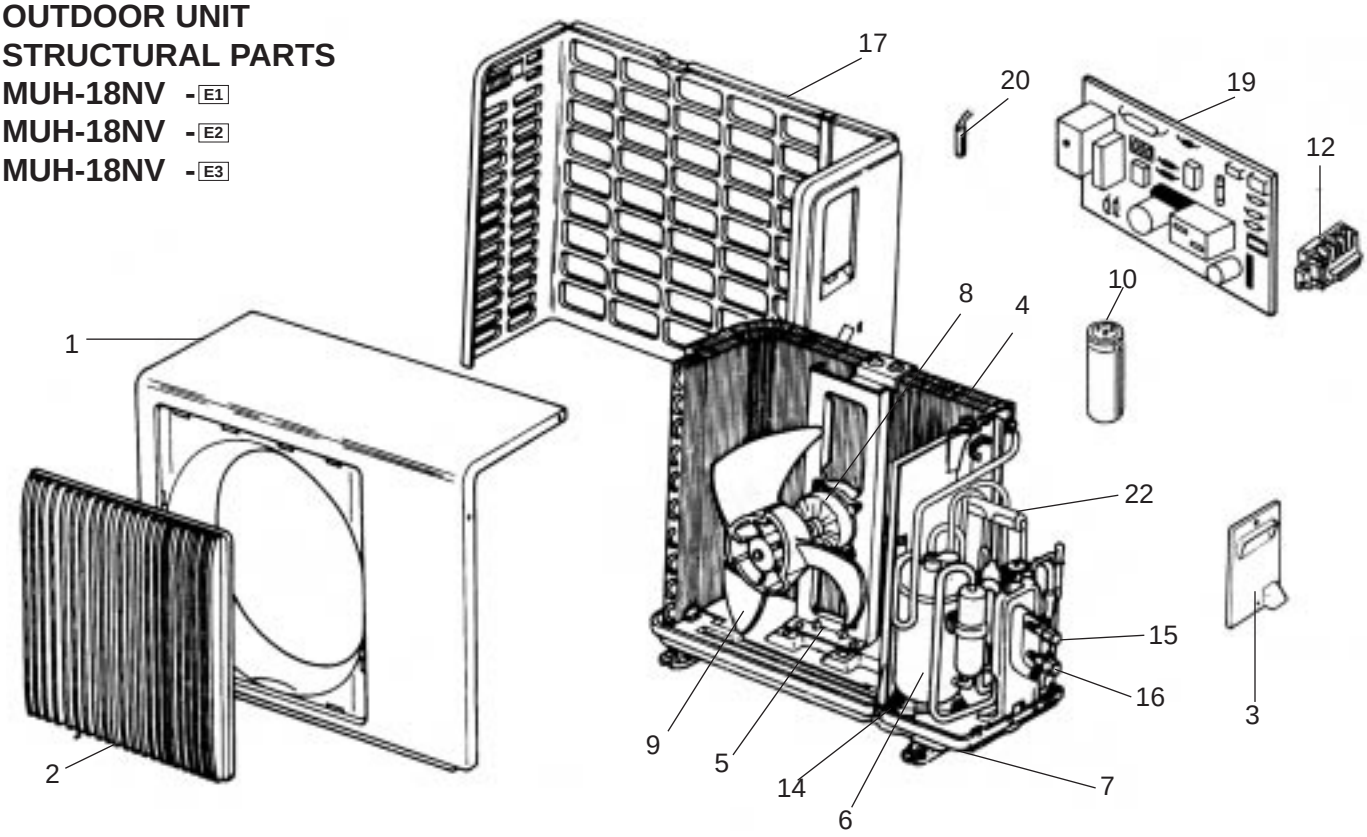
INDOOR UNIT
ELECTRICAL PARTS
MSH-18NV -E1 (WH)
MSH-24NV -E1 (WH)
MSH-18NV -E2 (WH)
MSH-24NV -E2 (WH)
MSH-18NV -E3 (WH)



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

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MSH-18NV-		MSH-24NV-		
				E1 (WH)	E2 E3 (WH)	E1 (WH)	E2 (WH)	
1	E02 143 235	NOZZLE(WH)		1	1	1	1	
2	E02 143 040	VANE(WH)		1	1	1	1	
3	E02 141 702	DRAIN HOSE		1	1	1	1	
4	E02 141 300	INDOOR FAN MOTOR	MF	1	1			RA4V27 -EA
	E02 213 300	INDOOR FAN MOTOR	MF			1	1	RA4V27 -EC
5	E02 001 505	RUBBER MOUNT		2	2	2	2	2PCS/SET
6	E02 138 395	POWER SUPPLY CORD		1	1	1		
	E02 320 395	POWER SUPPLY CORD					1	
7	E02 139 450	ELECT CONTROL P.C. BOARD		1				
	E02 198 450	ELECT CONTROL P.C. BOARD			1			
	E02 214 450	ELECT CONTROL P.C. BOARD				1	1	
8	E02 141 302	LINE FLOW FAN		1	1	1	1	
9	E02 141 303	VANE MOTOR	MV	1	1	1	1	
10	E02 138 329	DISPLAY P.C. BOARD		1	1	1	1	
11	E02 141 509	BEARING MOUNT		1	1	1	1	
12	E02 198 375	TERMINAL BLOCK	TB		1	1	1	
	E02 139 375	TERMINAL BLOCK	TB	1				
	E02 278 375	TERMINAL BLOCK	TB				1	
(13)	E02 085 385	VARISTOR	NR11	1	1	1	1	
14	E02 141 468	RECEIVER P. C. BOARD		1	1	1	1	
15	E02 001 504	SLEEVE BEARING		1	1	1	1	
16	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	1	1	1	
17	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	1	
(18)	E02 127 382	FUSE	F11	1	1	1	1	3.15A
(19)	E02 138 520	FAN GUARD		1	1	1	1	

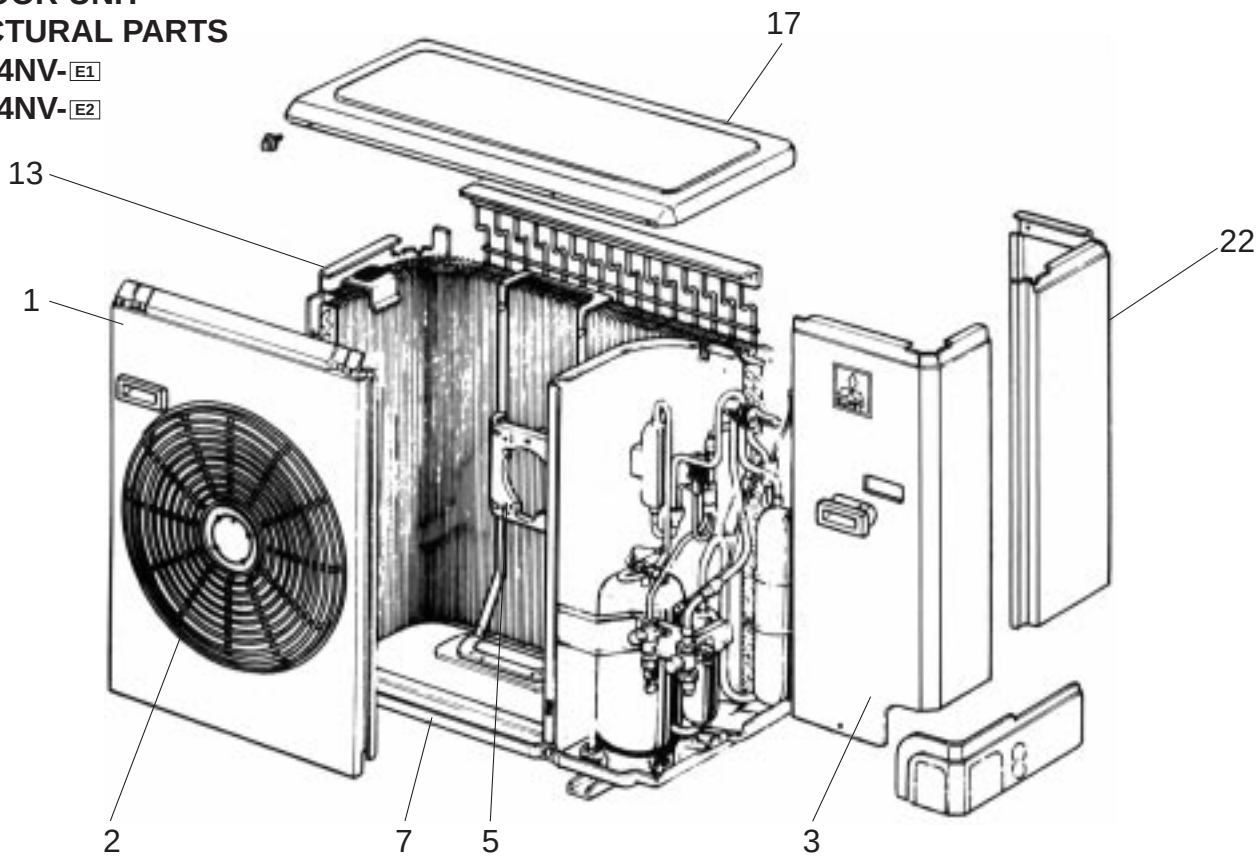
OUTDOOR UNIT
STRUCTURAL PARTS
MUH-18NV -E1
MUH-18NV -E2
MUH-18NV -E3

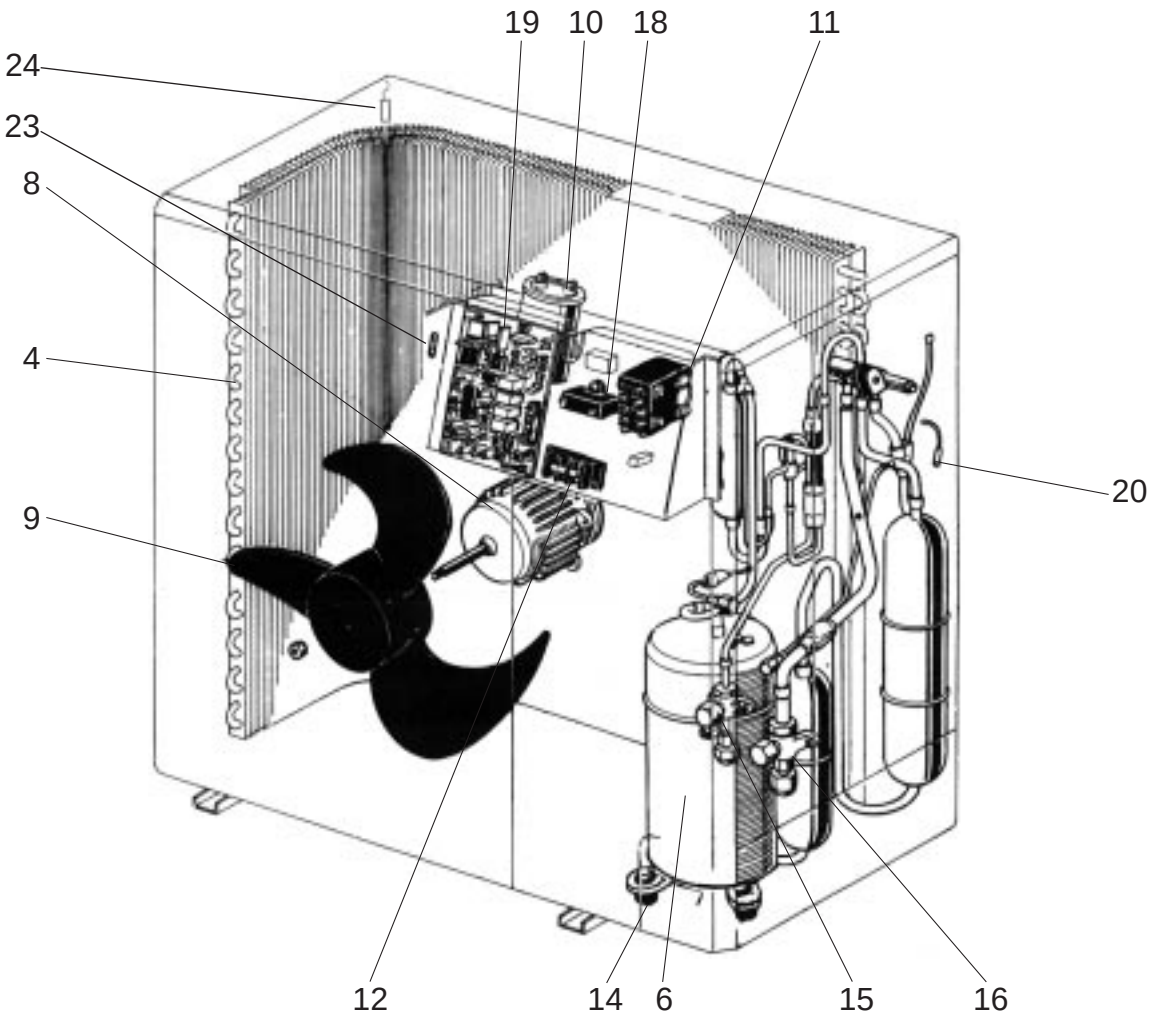


Part number that are circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MUH-18NV-			Remarks
				E1	E2	E3	
1	E02 141 232	CABINET		1	1	1	
2	E02 141 521	GRILLE		1	1	1	
3	E02 141 245	SERVICE PANEL		1	1	1	
4	E02 139 630	OUTDOOR HEAT EXCHANGER		1	1	1	
5	E02 139 515	MOTOR SUPPORT		1	1	1	
6	E02 139 900	COMPRESSOR	MC	1	1	1	NH-36VMDT
7	E02 139 290	BASE		1	1	1	
8	E02 144 301	OUTDOOR FAN MOTOR	MF	1	1	1	RA6V50 -□□
9	E02 141 501	PROPELLER FAN		1	1	1	
10	E02 082 353	COMPRESSOR CAPACITOR	C1	1	1	1	50μF/440V
⑪	E02 004 340	CONTACTOR	52C	1	1	1	
12	E02 139 374	TERMINAL BLOCK	TB	1			
	E02 198 374	TERMINAL BLOCK	TB		1	1	
⑬	E02 139 936	CAPILLARY TUBE		2	2	2	ϕ3.0Xϕ1.6X750
	E02 139 937	CAPILLARY TUBE		1	1	1	ϕ3.0Xϕ2.0X800
14	E02 138 506	COMPRESSOR RUBBER SET		4	4	4	
15	E02 139 662	STOP VALVE(LIQUID)		1	1	1	ϕ 6.35
16	E02 150 661	STOP VALVE(GAS)		1	1	1	ϕ15.88
17	E02 140 233	BACK PANEL		1	1	1	
⑱	E02 095 382	FUSE	F61	1	1	1	
19	E02 139 451	DEICER P.C. BOARD		1			
	E02 198 451	DEICER P.C. BOARD			1	1	
20	E02 139 310	DEFROST THERMISTOR	RT61	1	1	1	
㉑	E02 139 490	REVERSING VALVE COIL	21S4	1	1	1	
22	E02 077 961	REVERSING VALVE		1	1	1	
㉓	E02 128 383	SURGE ABSORBER	DSAR	1	1	1	

OUTDOOR UNIT
STRUCTURAL PARTS
MUH-24NV-E1
MUH-24NV-E2





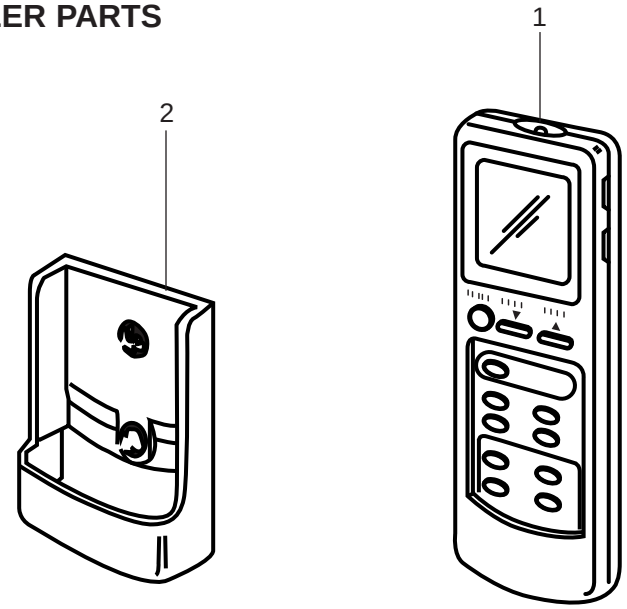
OUTDOOR UNIT
STRUCTURAL PARTS
MUH-24NV-E1
MUH-24NV-E2

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

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MUH-24NV-	MUH-24NV-	
				E1	E2	
1	E02 214 232	CABINET		1	1	
2	E02 214 521	FAN GUARD		1	1	
3	E02 214 245	SERVICE PANEL		1	1	
4	E02 214 630	OUTDOOR HEAT EXCHANGER		1	1	
5	E02 214 515	MOTOR SUPPORT		1	1	
6	E02 042 900	COMPRESSOR	MC	1	1	NH-47VMDT
7	E02 214 290	BASE		1	1	
8	E02 214 301	OUTDOOR FAN MOTOR	MF	1	1	RA6V85 -□□
9	E02 214 501	PROPELLER FAN		1	1	
10	E02 082 353	COMPRESSOR CAPACITOR	C1	1	1	50μF/440VAC
11	E02 010 342	CONTACTOR	52C1	1	1	
12	E02 198 374	TERMINAL BLOCK	TB	1	1	
13	E02 214 249	SIDE PANEL		1	1	
14	E02 138 506	COMPRESSOR RUBBER SET		4	4	
15	E02 010 662	STOP VALVE(LIQUID)		1	1	ϕ 9.52
16	E02 010 661	STOP VALVE(GAS)		1	1	ϕ15.88
17	E02 214 297	TOP PANEL		1	1	
18	E02 138 351	FAN MOTOR CAPACITOR	C11	1	1	3.0μF/440VAC
19	E02 214 451	DEICER P.C. BOARD		1	1	
20	E02 214 310	DEFROST THERMISTOR	RT61	1	1	
㉑	E02 176 936	CAPILLARY TUBE		1	1	ϕ3.0Xϕ1.6X350
	E02 256 936	CAPILLARY TUBE		1	1	ϕ3.0Xϕ2.0X350
	E02 262 936	CAPILLARY TUBE		1	1	ϕ4.0Xϕ2.4X200
22	E02 214 522	REAR PANEL		1	1	
23	E02 095 382	FUSE		1	1	2A
24	E02 214 381	THERMAL READ SWITCH	TRS	1	1	
㉕	E02 288 343	FAN MOTOR RELAY			1	

ACCESSORY AND REMOTE CONTROLLER PARTS

MSH-07NV -E1 (WH)
MSH-09NV -E1 (WH)
MSH-12NV -E1 (WH)
MSH-18NV -E1 (WH)
MSH-24NV -E1 (WH)
MSH-07NV -E2 (WH)
MSH-09NV -E2 (WH)
MSH-12NV -E2 (WH)
MSH-18NV -E2 (WH)
MSH-24NV -E2 (WH)
MSH-18NV -E3 (WH)

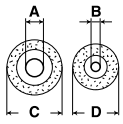


NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MSH-07/09/12/18/24NV - E1 E2 (WH) MSH-18NV - E3 (WH)	
1	E02 139 426	REMOTE CONTROLLER		1	
2	E02 141 083	REMOTE CONTROLLER HOLDER		1	

13 OPTIONAL PARTS

1. REFRIGERANT PIPES

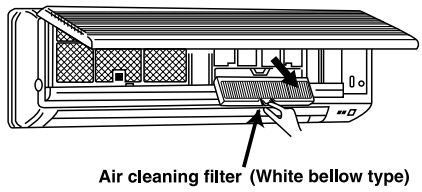
The air conditioner has flared connections its indoor and outdoor sides.
Please use the optional extension pipe as follows.

Model	Part No.	Pipe length	Pipe size O.D mm (in.)					Additional refrigerant charge R-22(g)
			Cross-section	A-Gas	B-Liquid	Insulation C	Insulation D	
MSH-07NV-E1	MAC-440PI	3m		9.52 (3/8)	6.35 (1/4)	27	21	0
MSH-09NV-E1	MAC-441PI	5m						
MSH-07NV-E2	MAC-442PI	7m						
MSH-09NV-E2	MAC-443PI	10m						150
MSH-12NV-E1 MSH-12NV-E2	MAC-660PI	3m		12.7 (1/2)		31	27	0
	MAC-661PI	5m						
	MAC-662PI	7m						
	MAC-663PI	10m						150
	MAC-664PI	15m						400
MSH-18NV-E1 MSH-18NV-E2 MSH-18NV-E3	MAC-670PI	3m		15.88 (5/8)				0
	MAC-671PI	5m						
	MAC-672PI	7m						
	MAC-673PI	10m						150
	MAC-674PI	15m						400
MSH-24NV-E1 MSH-24NV-E2	MAC-860PIE	3m			9.52 (3/8)			0
	MAC-861PIE	5m						
	MAC-862PIE	7m						
	MAC-863PIE	10m						195
	MAC-864PIE	15m						520

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.

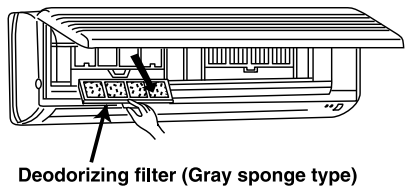
Model	Part No.
MSH-07NV-E1 MSH-07NV-E2 MSH-09NV-E1 MSH-09NV-E2 MSH-12NV-E1 MSH-12NV-E2	MAC-1000FT
MSH-18NV-E1 MSH-24NV-E1 MSH-24NV-E2 MSH-18NV-E2 MSH-18NV-E3	MAC-1100FT



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.

Model	Part No.
MSH-07NV-E1 MSH-07NV-E2 MSH-09NV-E1 MSH-09NV-E2 MSH-12NV-E1 MSH-12NV-E2	MAC-1500DF
MSH-18NV-E1 MSH-24NV-E2 MSH-24NV-E1 MSH-18NV-E3 MSH-18NV-E2	MAC-1600DF



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

MITSUBISHI ELECTRIC CORPORATION
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