



SPLIT-TYPE HEAT PUMP & AIR CONDITIONERS

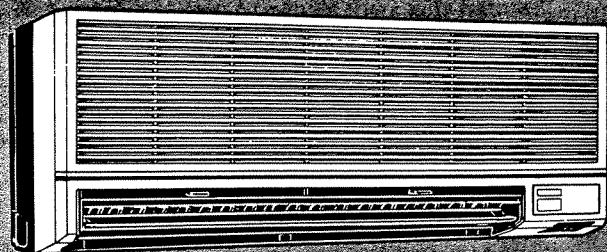
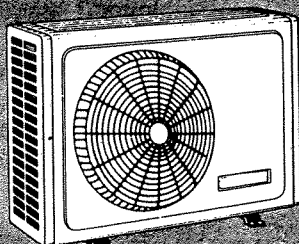
1989

No. OB-023

TECHNICAL & SERVICE MANUAL

Wireless type

Models

MS-09DW-U1 (SW,WG)**MSH-09DW-U1** (SW,WG)**MSH-12DN-U1** (SW,WG)**MSH-15DN-U1** (SW)MSH-12DN
INDOOR UNITMUH-12DN
OUTDOOR UNIT

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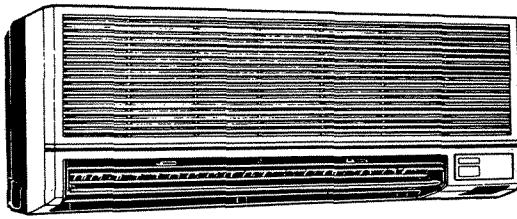
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Refer to TECHNICAL & SERVICE MANUAL 1986
04 U-04 for MSH-09CW and 1987-05 U-06
for MS/MSH-12BN

**Mr. SLIM**

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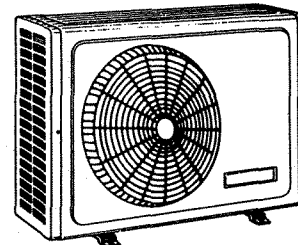
FEATURES



MSH-12DN



LCD wireless
remote controller



MUH-12DN

Models	Cooling Capacity	Heating Capacity	SEER	COP
MS-09DW	9,000 BTU/h	—	10.59	—
MSH-09DW	8,800 BTU/h	10,900 BTU/h	9.9	3.04
MSH-12DN	12,500 BTU/h	12,500 BTU/h	9.7	2.90
MSH-15DN	14,500 BTU/h	15,000 BTU/h	9.1	2.85

1. NEW "I FEEL CONTROL" IN OUR LCD WIRELESS REMOTE CONTROLLER

Mitsubishi Electric's new wireless remote controller incorporates a number of advanced features that provide even greater control and ease-of-use. It has a liquid crystal display which indicates such information as mode, fan speed and temperature selected as well as the timer setting and time remaining. It is also equipped with "I Feel Control", a unique Mitsubishi Electric feature that allows the user to adjust the temperature to exactly the level he or she wants simply by tapping the button that describes present conditions: "To Cool" "Too Warm", or "Okay". The optimum temperature set this way is then memorized for immediate recall whenever the air conditioner is used again. And what's more, the new controller has been made more compact and easy to handle than even before.

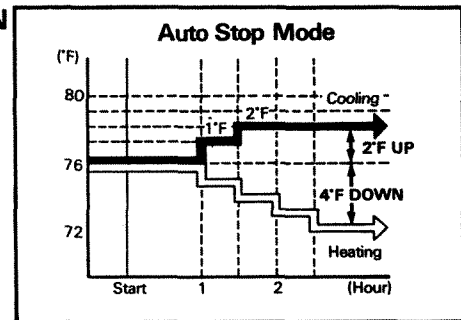
2. A VARIETY OF MICROPROCESSOR-CONTROLLED FUNCTION

Automatic ON/OFF Timer

Convenient timer function includes Auto Start, Auto Stop, both can be set 1~12 hours.

Auto Stop (Night Setback) Mode.

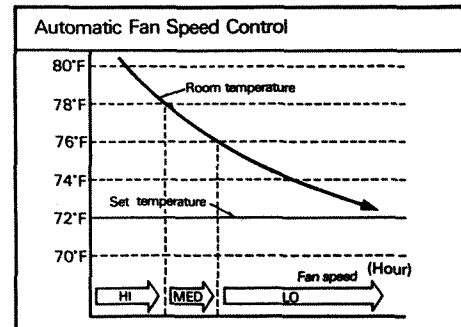
This mode raises (or lowers, when heating) the temperature setting by 1°F after one hour, and by another 1°F every half hour thereafter. When two hours have passed, the air conditioner is running at a setting that is 2°F higher, thus preventing excessive cooling. Maximum temperature difference is 4°F for heating.



Automatic Fan Speed Control

When there's a large difference between the set temperature and existing room temperature, the fan speed automatically adjusts to HI to either cool or heat the room quickly.

As the temperature differential decreases, the Fan Control shifts down automatically to MED and LO. Operation is almost whisper quiet.



Hot Start System

Heating always begins comfortably with warm air, since the Hot Start System prevents cold air from being blown out at the start of heating and during defrosting. (All heat pumps.)

Booster Heater for Fast Warm-up.

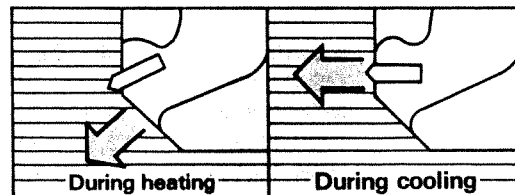
Microprocessor controlled-Booster Heater automatically hastens the heating process to quickly warm up a room, and thereby eliminates unnecessary energy use that occurs during prolonged heating. (All heat pumps.)

Automatic Change Vane System

The Automatic Change Vane System will automatically set the vane in a horizontal position for cooling. During heating when the hot air is blowing strongly enough, it will automatically adjust downward. The angle of the vane can be adjusted with the Remote Controller. (MSH-12/15DN)

Adjustable Change Vane System

Choose the air direction that suits your needs. To achieve uniform airflow for heating, adjust the louver downward. For cooling, keep it in a horizontal position. (MS(H)-09DW)

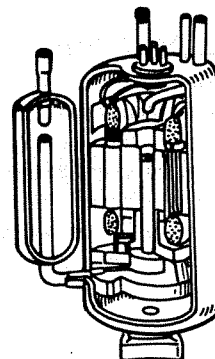


Restart Function (Optional)

The restart function restarts the equipment when power is restored following an outage, selecting as required either cooling or heating operation at a fixed temperature setting of 75°F. (MS-09DW, MSH-09DW, MSH-12/15DN)

High Performance Rotary Compressor

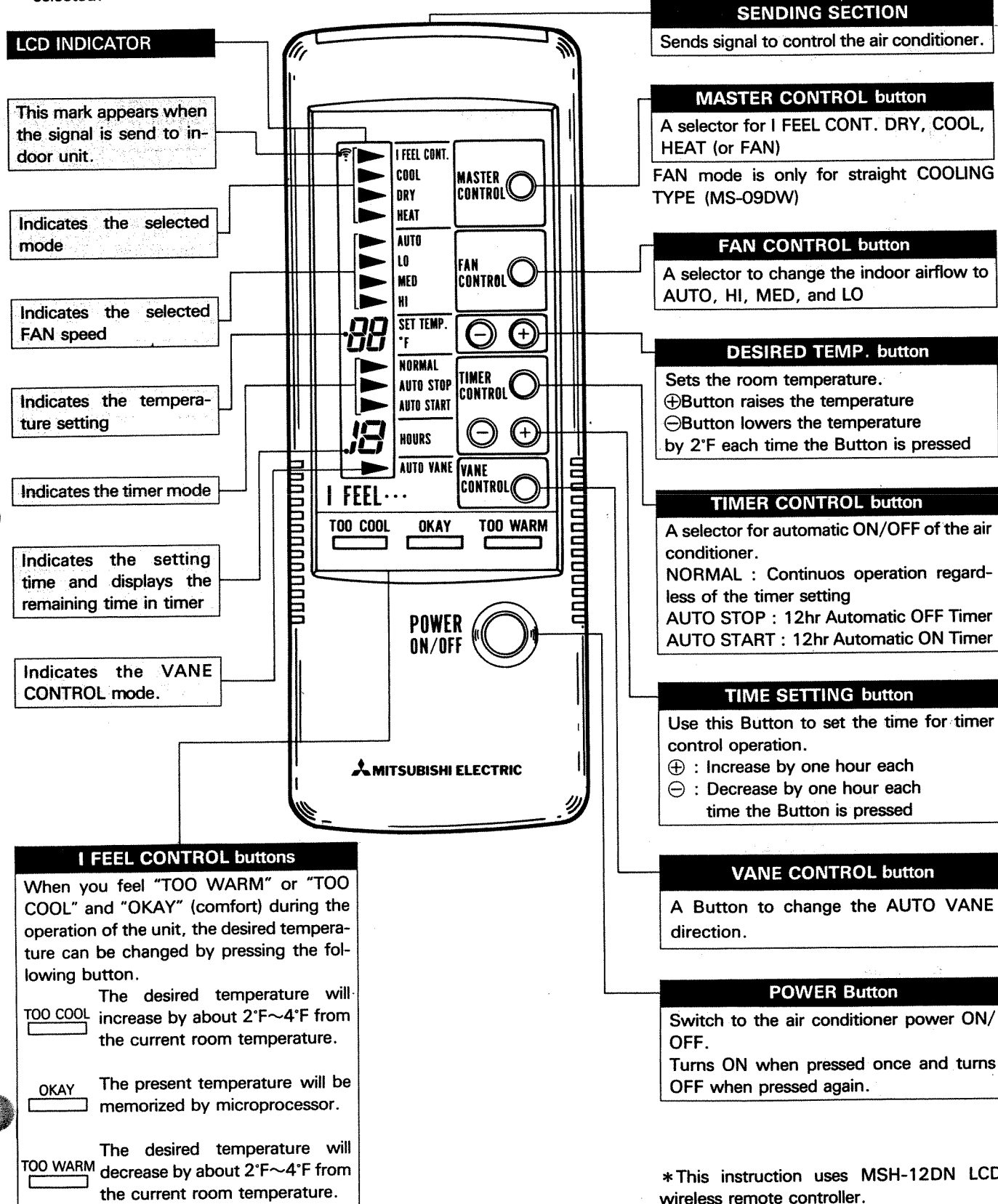
The advanced design of Mitsubishi Electric's powerful and energy-efficient rotary compressor results in lower operating costs and a longer service life.



3. EASY OPERATION BY LCD WIRELESS REMOTE CONTROLLER

Once the controls are set, the same operation mode can be repeated by simply turning the POWER SW on.

When batteries are replaced all of the controls memories should be canceled and "I FEEL CONTROL" mode is automatically selected.



*This instruction uses MSH-12DN LCD wireless remote controller.

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SPECIFICATIONS

ITEM		MODEL	MS-09DW-U1	MSH-09DW-U1
Capacities	Cooling *1	BTU/h	9,000	8,800
	Heating 47° *1	BTU/h	—	10,900 (14,300)
	Heating 17° *2	BTU/h	—	5,500 (8,900)
Power consumption	Cooling *1	W	860	900
	Heating 47° *1	W	—	1050 (2050)
	Heating 17° *2	W	—	890 (1890)
EER *1 (SEER)			10.5 (10.59)	9.8 (9.9)
COP		47° *1 (17°) *2	—	3.04 (1.81)
INDOOR UNIT			MS-09DW-U1	MSH-09DW-U1
External finish			Woodgrain or silky White	
Power supply		V, Phase, Hz	115, 1, 60	
Max. fuse size (time delay)		A	15.0	
Min. ampacity			0.5	12.0
Fan motor		F.L.A.	0.4	
Auxiliary heater		A(kW)	—	
Airflow Lo-Me-Hi	Dry	CFM	170-220-265	170-220-265
	Wet	CFM	150-190-235	150-190-235
Cond. drain conn. OD		in.	5/8	
Dimensions	W	in.	33-1/2	
	D	in.	5-1/8	
	H	in.	15	
Weight		lbs.	26	29
OUTDOOR UNIT			MU-09DW-U1	MUH-09DW-U1
External finish			Munsell 5Y 6.5/1	
Power supply		V, Phase, Hz	115, 1, 60	
Max. fuse size (time delay)		A	15.0	20.0
Min. ampacity			13.5	16.0
Fan motor		F.L.A.	0.8	
Compressor	Model		KH419WAD	RHS-135WAE
	Winding resistance (at 68°F) Ω		C-R 0.95 C-S 5.18	C-R 0.79 C-S 4.15
	R.L.A.		10	12
	L.R.A.		37	42
Refrigerant control			Capillary tube	
Defrost method			—	Reverse cycle
Dimensions	W	in.	29-15/16	
	D	in.	9-1/16	
	H	in.	21-1/4	
Weight		lbs.	73	79
REMOTE CONTROLLER			Wireless type	
Control voltage (by built in transformer)			12V DC	
REFRIGERANT PIPING			Not supplied (optional parts)	
Pipe size	Liquid	in.	1/4	
	Gas		3/8	
Connection method	Indoors		Flared	
	Outdoors		Flared	
Between the indoor & outdoor units	Height difference	ft.	Max. 16	
	Piping length	ft.	Max. 33	

Notes *1. Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, 75°FWB
(heating) — Indoor : 70°FDB, 60°FWB, Outdoor : 47°FDB, 43°FWB

*2. Rating conditions (heating) — Indoor : 70°FDB, 60°FWB, Outdoor : 17°FDB, 15°FWB

*3. Heating capacity and power consumption in () include auxiliary electric heater operation at 115V.

Operating Range

		Indoor air intake temperature	Outdoor air intake temperature
Cooling	Maximum	90°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	67°FDB
Heating	Maximum	80°FDB, 67°FWB	75°FDB, 65°FWB
	Minimum	70°FDB, 60°FWB	17°FDB, 15°FWB

MODEL			MSH-12DN-U1	MSH-15DN-U1
ITEM				
Capacity	Cooling * ¹	BTU/h	11,800/12,500	14,000/14,500
	Heating 47* ¹	BTU/h	12,000/12,500(17,100/17,600)* ³	14,400/15,000(19,500/20,100)* ³
	Heating 17* ²	BTU/h	6,240/6,500(11,340/11,600)* ³	8,600/9,000(13,700/14,100)* ³
Power consumption	Cooling* ¹	W	1,270/1,300	1,550/1,600
	Heating 47* ¹	W	1,220/1,260(2,720/2,760)	1,480/1,540(2,980/3,040)* ³
	Heating 17* ²	W	1,020/1,060(2,520/2,560)	1,280/1,340(2,780/2,840)* ³
EER* ¹ (SEER)			9.3/9.6 (9.5/9.7)	9.0/9.0 (9.1/9.1)
COP	47* ¹ (17*) * ²		2.9/2.9 (1.8/1.8)	2.85/2.85 (2.0/2.0)
INDOOR UNIT			MSH-12DN-U1	MSH-15DN-U1
External finish			Woodgrain or silky White	
Power supply		V,Phase,Hz	115,1,60	
Max. fuse size (time delay)		A	20.0	
Min. ampacity			17.0	16.8
Fan motor		F.L.A.	0.5	0.4
Auxiliary heater		A(kW)	13.0 (1.5)	
Airflow Lo-Me-Hi	Dry	CFM	310-380-470	280-340-400
	Wet	CFM	270-330-420	250-300-360
Cond. drain conn. OD		in.	5/8	
Dimensions	W	in.	39-3/8	
	D	in.	7	
	H	in.	14-3/16	
Weight		lbs.	37	37.5
OUTDOOR UNIT			MUH-12DN-U1	MUH-15DN-U1
External finish			Munsell 5Y 6.5/1	
Power supply		V,Phase,Hz	208/230,1,60	
Max. fuse size (time delay)		A	15.0	20.0
Min. ampacity			12.0	13.0
Fan motor		F.L.A.	0.4	
Compressor	Model		RH-189NAB	
	Winding resistance (at 68°F) Ω		C-R 2.07 C-S 3.84	
		R.L.A.	8.8	
		L.R.A.	30.0	
Refrigerant control			Capillary tube	
Defrost method			Reverse cycle	
Dimensions	W	in.	33-1/2	
	D	in.	11-7/16	
	H	in.	23-7/8	
Weight		lbs.	104	
REMOTE CONTROLLER			Wireless type	
Control voltage (by built in transformer)			12V DC	
REFRIGERANT PIPING			Not supplied (optional parts)	
Pipe size	Liquid	in.	1/4	
	Gas		1/2	
Connection method	Indoors		Flared	
	Outdoors		Flared	
Between the indoor & outdoor units	Height difference	ft.	Max. 16	
	Piping length	ft.	Max. 49	

Notes *1.Rating conditions (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 95°FDB, 75°FWB
(heating) — Indoor : 70°FDB, 60°FWB, Outdoor : 47°FDB, 43°FWB

*2.Rating conditions (heating) — Indoor : 70°FDB, 60°FWB, Outdoor : 17°FDB, 15°FWB

*3.Includes auxiliary electric heater operations 115V.

Operating Range

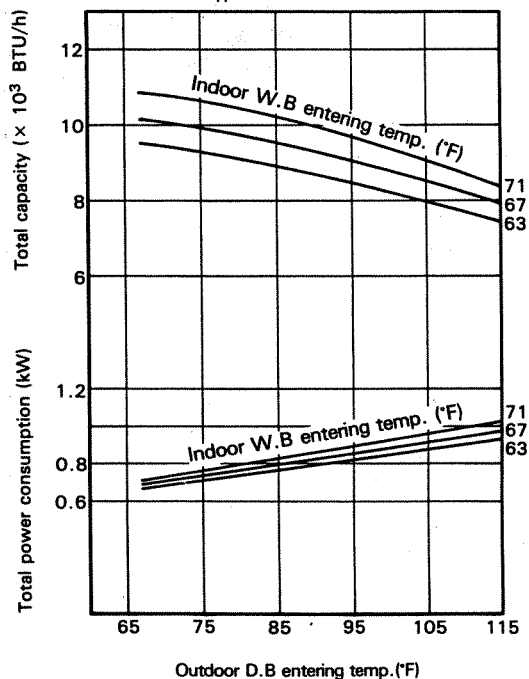
		Indoor air intake temperature	Outdoor air intake temperature
Cooling	Maximum	90°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	67°FDB
Heating	Maximum	80°FDB, 67°FWB	75°FDB, 65°FWB
	Minimum	70°FDB, 60°FWB	17°FDB, 15°FWB

1. PERFORMANCE CURVE

MS-09DW- U1

Cooling capacity

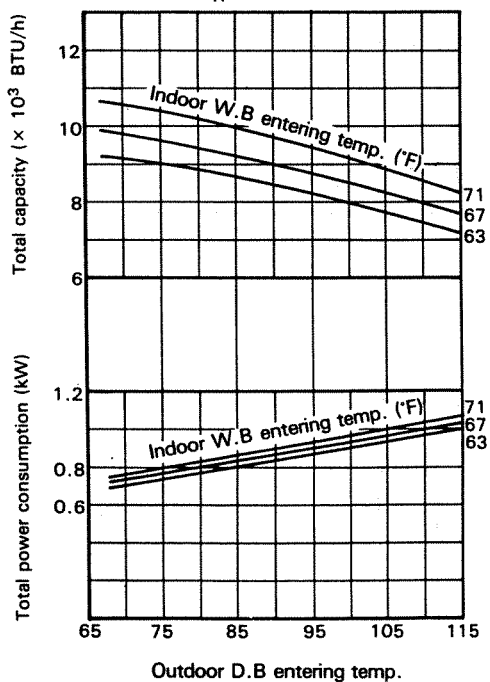
SHF at rating condition = 0.71
 Airflow = 265 CFM
 Bypass Factor = 0.115



MSH-09DW- U1

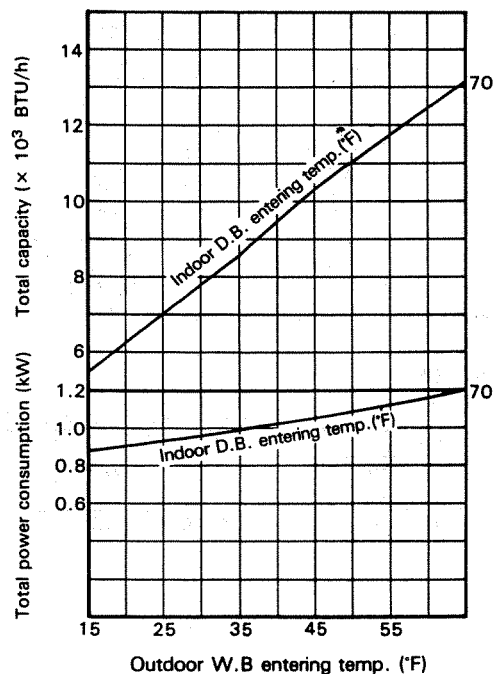
Cooling capacity

SHF at rating condition = 0.68
 Airflow = 265 CFM
 Bypass Factor = 0.11



Heating capacity

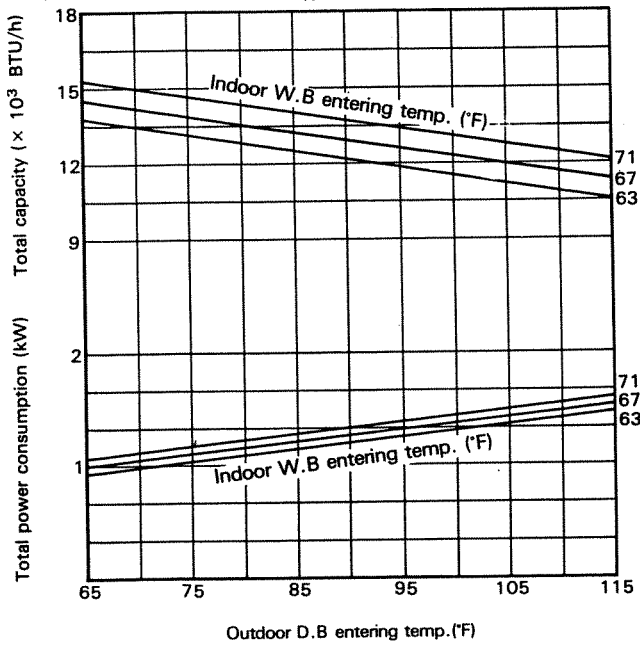
Airflow = 250 CFM



MSH-12DN- U1

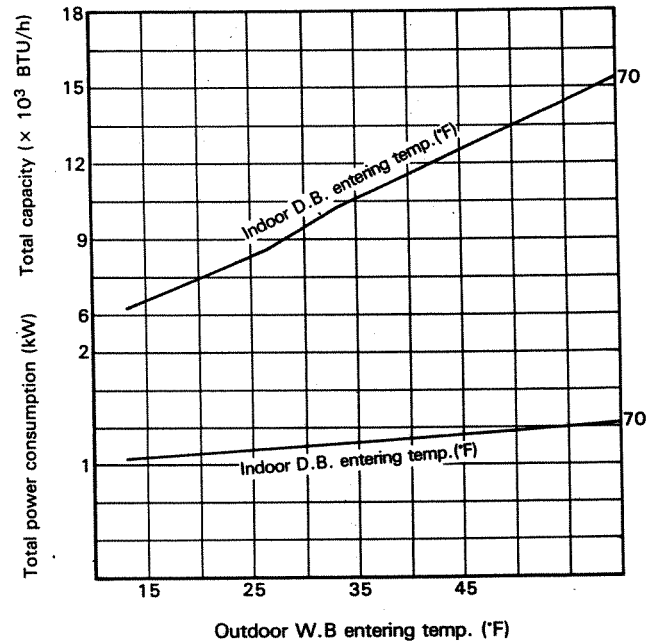
Cooling capacity

SHF at rating condition = 0.72
Airflow = 470
Bypass Factor = 0.17



Heating capacity

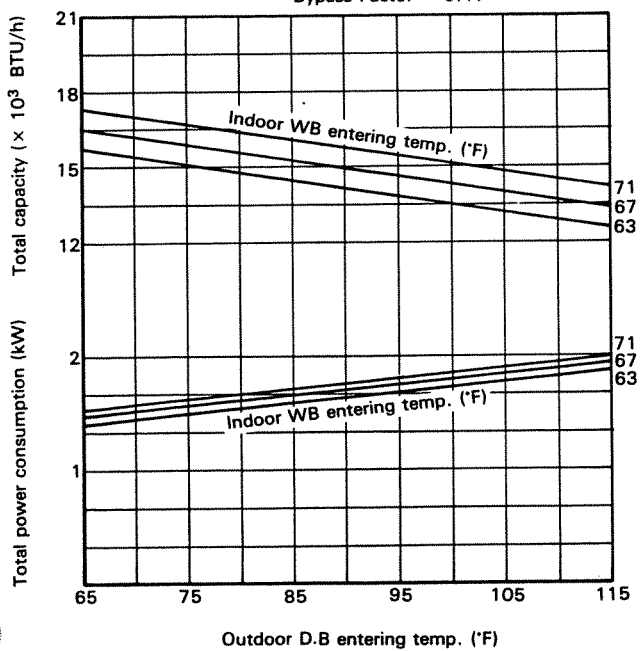
Airflow = 470



MSH-15DN- U1

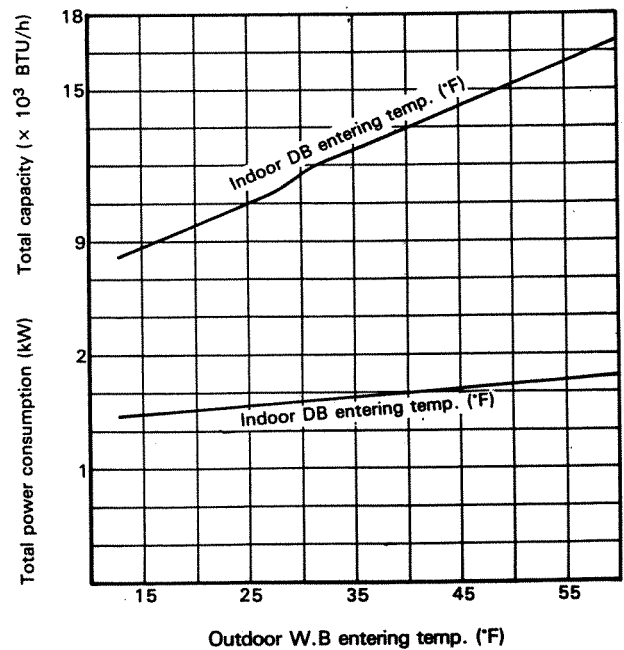
Cooling capacity

SHF at rating condition = 0.71
Airflow = 360
Bypass Factor = 0.17



Heating capacity

Airflow = 400



2. OPERATING RANGE

(1) POWER SUPPLY

	Models	Rating	Guaranteed voltage
Indoor unit	MS-09DW MSH-09DW MSH-12DN MSH-15DN	115V 1 phase 60Hz	Min. 103V — Max. 127V
Outdoor unit	MU-09DW MUH-09DW		
	MUH-12DN MUH-15DN	208/230V 1 phase 60Hz	Min. 198V — Max. 253V

(2) OPERATION

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

3. OUTLET AIR SPEED AND COVERAGE RANGE

Model	Function	Airflow (CFM)	Air speed (ft/sec)	Coverage range (ft)
MSH-09DW- U1	Dry	265	13	20
MS-09DW- U1	Wet	235	11	16
MSH-12DN- U1	Dry	470	18	30
	Wet	420	16	24
MSH-15DN- U1	Dry	400	15	26
	Wet	360	14	24

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

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

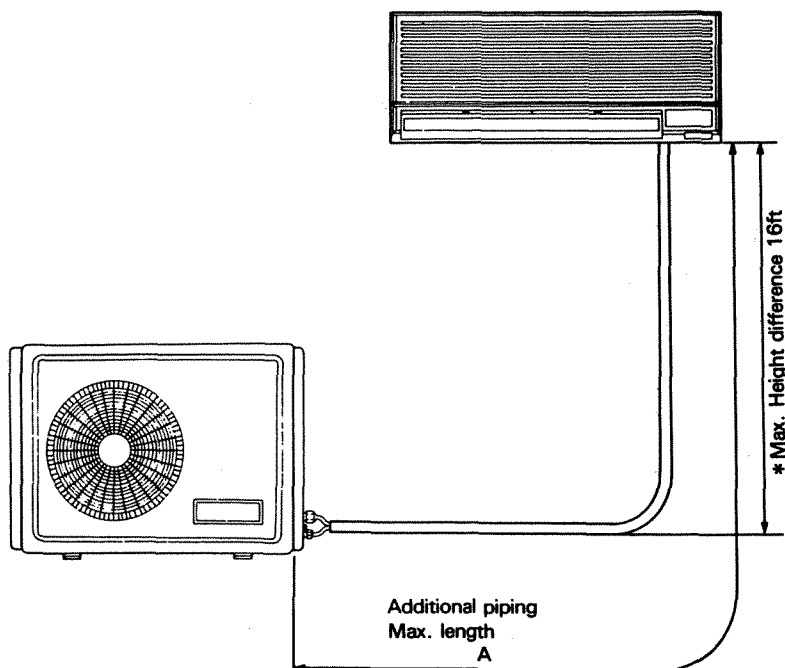
4. ADDITIONAL REFRIGERANT CHARGE (R-22 (oz))

Model	Outdoor unit precharged (up to 25 ft)	Refrigerant piping length (one way)		
		25 ft	30 ft	33 ft
MS-09DW- U1	2 lbs 12 oz	0	1	1
MSH-09DW- U1	3 lbs	0	3	5

Model	Outdoor unit precharged (up to 25 ft)	Refrigerant piping length (one way)					
		25 ft	30 ft	35 ft	40 ft	45 ft	49 ft
MSH-12DN- U1	3 lbs 12oz	0	3	5	8	11	13
MSH-15DN- U1	3 lbs 8 oz						

5. MAX. REFRIGERANT PIPING LENGTH & MAX. HEIGHT DIFFERENCE

Model	length (ft) (A)	Height difference (ft)
MS-09DW - U1	33	16
MSH-09DW - U1		
MSH-12DN - U1	49	
MSH-15DN - U1		



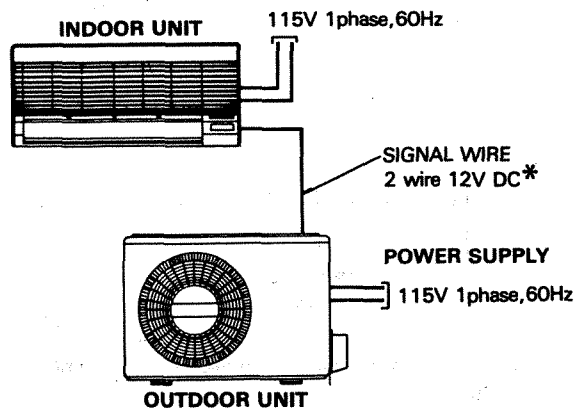
* It does not matter whether the indoor unit or outdoor unit is higher.

6. STANDARD OPERATION DATA

Model			MS-09DW-U1	MSH-09DW-U1	
	Item	Unit	Cooling	Cooling	Heating
Total	Capacity	BTU/h	9,000	8,800	10,900(14,300)
	SHF	—	0.71	0.68	—
	Input	kW	0.86	0.9	1.05(2.05)
Electrical circuit	Indoor unit		MS-09DW-U1	MSH-09DW-U1	
	Power supply (V,Phase,HZ)		115	115	115
	Input	kW	0.04	0.04	0.04(1.04)
	Fan current	A	0.4	0.4	0.4
	Aux. heater current	A	—	—	8.7
	Outdoor unit		MU-09DW-U1	MUH-09DW-U1	
	Power supply (V,Phase,HZ)		115-1-60	115-1-60	
	Input	kW	0.82	0.86	1.01
	Comp. current	A	6.5	6.7	8.1
	Fan current	A	0.8	0.8	0.8
Refrigerant circuit	Condensing pressure	PSIG	263	246	263
	Suction pressure	PSIG	80	93	60
	Discharge temp.	°F	186	192	187
	Condensing temp.	°F	102	104	110
	Suction temp.	°F	52	60	36
	Comp. shell bottom temp.	°F	163	188	174
	Ref. pipe length	ft	25	25	
	Refrigerant charge	—	2lbs 12oz	3lbs	
Indoor side	Entering air temp.	DB °F	80	80	70
		WB °F	67	67	60
	Discharge air temp.	DB °F	56	56	114
		WB °F	55	55	—
	Fan speed	R.P.M.	1,680	1,780	1,770
Outdoor side	Airflow (Hi)		CFM	265	265
	Entering air temp.	DB °F	95	95	47
		WB °F	—	—	43
	Fan speed	R.P.M.	710	710	710
	Airflow		CFM	920	920

POWER SUPPLY

MS-09DW
MSH-09DW



* Serial signal circuit voltage

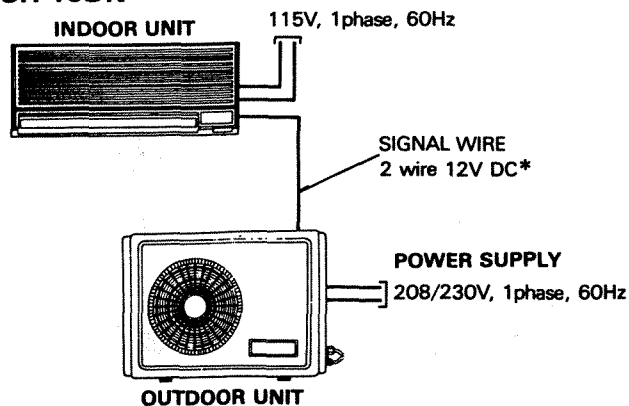
MSH-09DW
MSH-12DN
MSH-15DN

Power supply voltage to serial signal circuit is 24V DC.

Between ① and ② on in-out terminal bed should be 12V DC.

Model			MSH-12DN-U1		MSH-15DN-U1	
Item		Unit	Cooling	Heating	Cooling	Heating
Total	Capacity	BTU/h	11,800/12,500	12,000/12,500 (16,200/17,600)	14,000/14,500	14,400/15,000 (18,600/20,100)
	SHF	—	0.72	—	0.71	—
	Input	kW	1.27/1.3	1.22/1.26 (2.72/2.76)	1.55/1.6	1.48/1.54 (2.98/3.04)
Electrical circuit	Indoor unit		MSH-12DN		MSH-15DN	
	Power supply (V, Phase, Hz)		115•1•60		115•1•60	
	Input	kW	0.06	0.06(1.56)	0.04	0.04(1.54)
	Fan current	A	0.5	0.5	0.4	0.4
	Aux. heater current	A	—	13.0	—	13.0
	Outdoor unit		MUH-12DN		MUH-15DN	
	Power supply (V, Phase, Hz)		208/230•1•60		208/230•1•60	
	Input	kW	1.21/1.24	1.16/1.20	1.51/1.56	1.44/1.50
	Comp. current	A	5.5/5.0	5.3/4.9	6.9/6.5	6.6/6.3
	Fan current	A	0.4	0.4	0.4	0.4
Refrigerant circuit	Condensing pressure	PSIG	267	252	269	259
	Suction pressure	PSIG	72	60	71	54
	Discharge temp.	°F	192	190	194	186
	Condensing temp.	°F	122	118	122	120
	Suction temp.	°F	55	40	50	29
	Comp. shell bottom temp.	°F	183	179	180	169
	Ref. pipe length	ft	25		25	
	Refrigerant charge	—	3lbs 12oz		3lbs 8oz	
Indoor side	Entering air temp.	DB	°F	80	70	80
		WB	°F	67	60	67
	Discharge air temp.	DB	°F	59	96	57
		WB	°F	57	69	55
	Fan speed	R.P.M.	1,500	1,500	1,500	1,500
Outdoor side	Airflow (Hi)		CFM	470	470	360
	Entering air temp.	DB	°F	95	47	95
		WB	°F	—	43	—
	Fan speed	R.P.M.	860	860	860	860
	Airflow		CFM	1,270	1,270	1,270

POWER SUPPLY
MSH-12DN
MSH-15DN

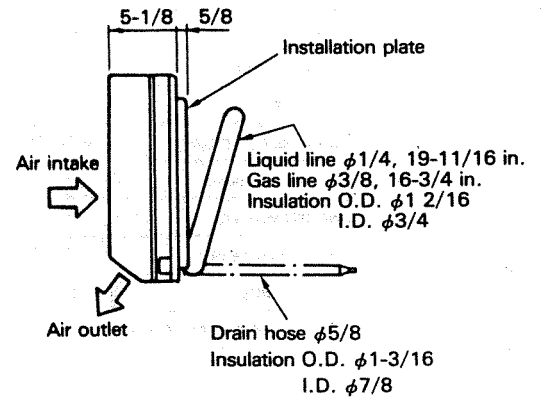
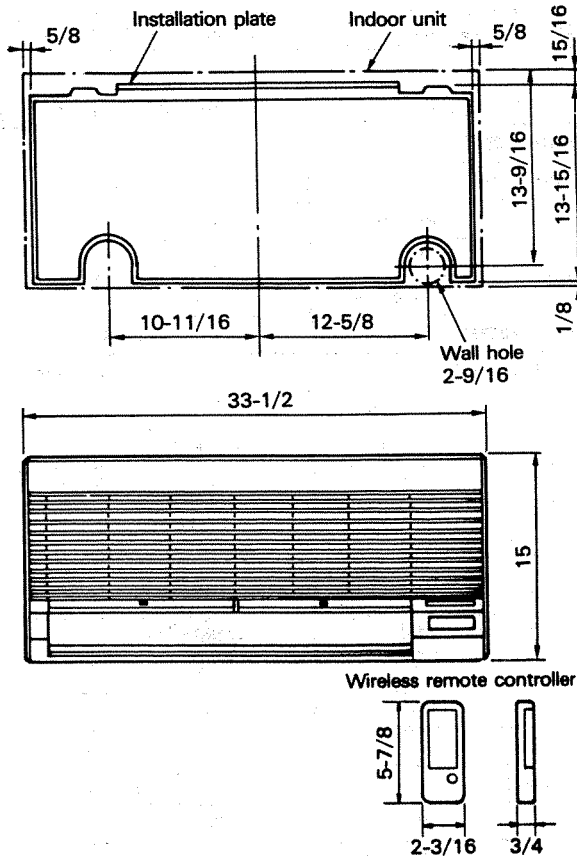


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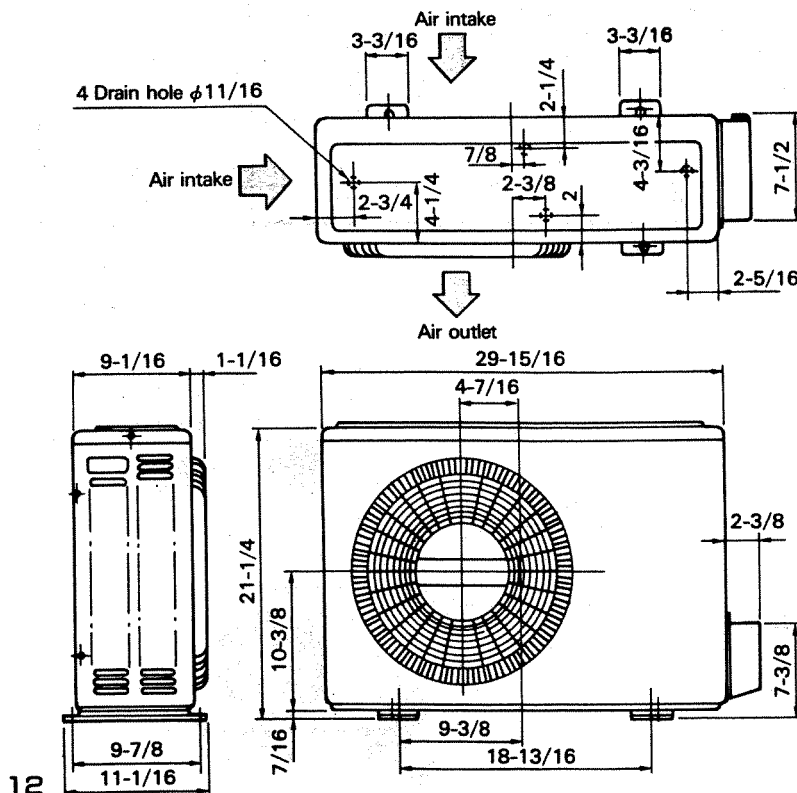
OUTLINES & DIMENSIONS

MODEL : MS(H)-09DW - **U1**
INDOOR UNIT

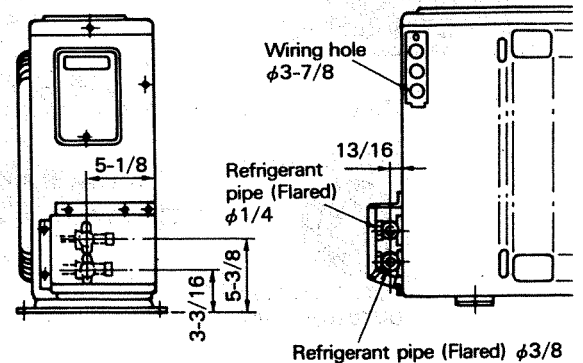
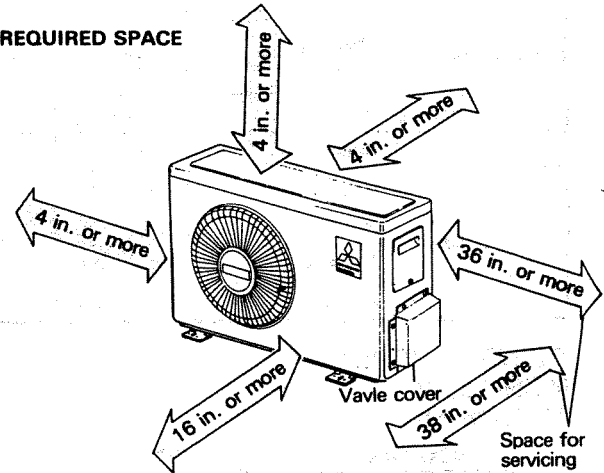
Unit : inch



MODEL : MU(H)-09DW - **U1**
OUTDOOR UNIT

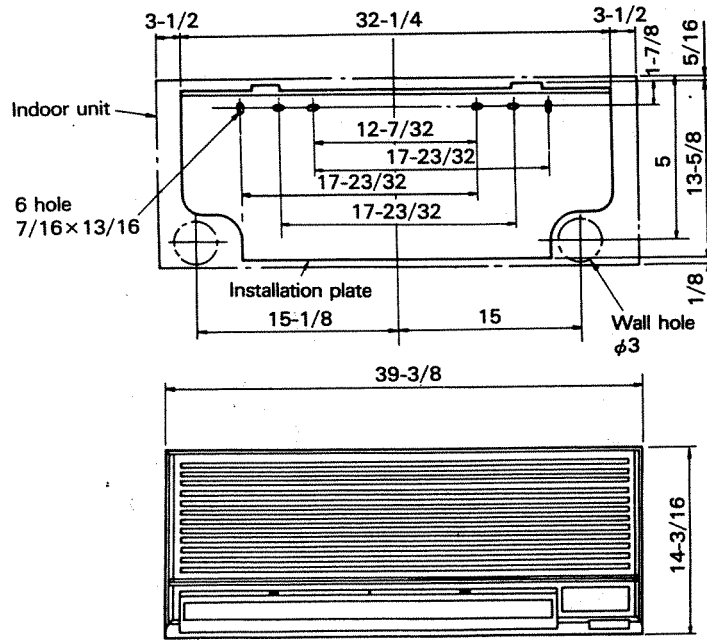


REQUIRED SPACE

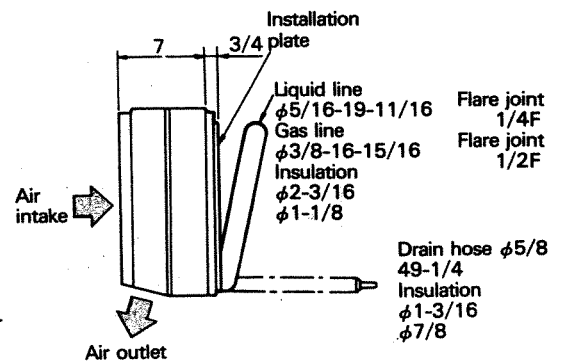
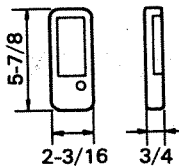


MODEL : MSH-12DN - U1
MSH-15DN - U1
INDOOR UNIT

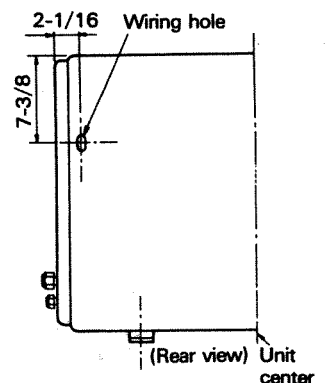
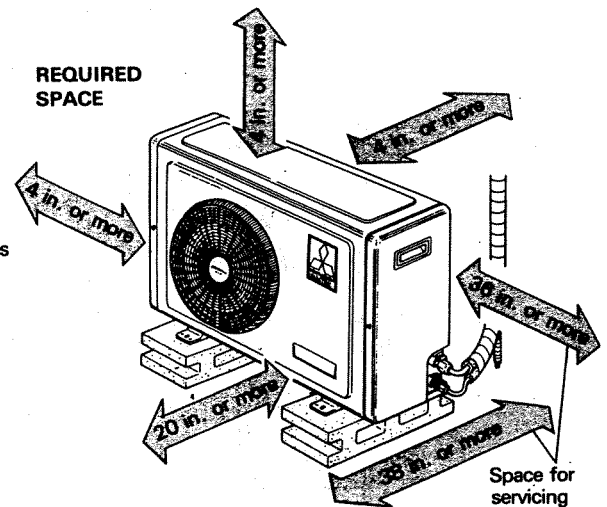
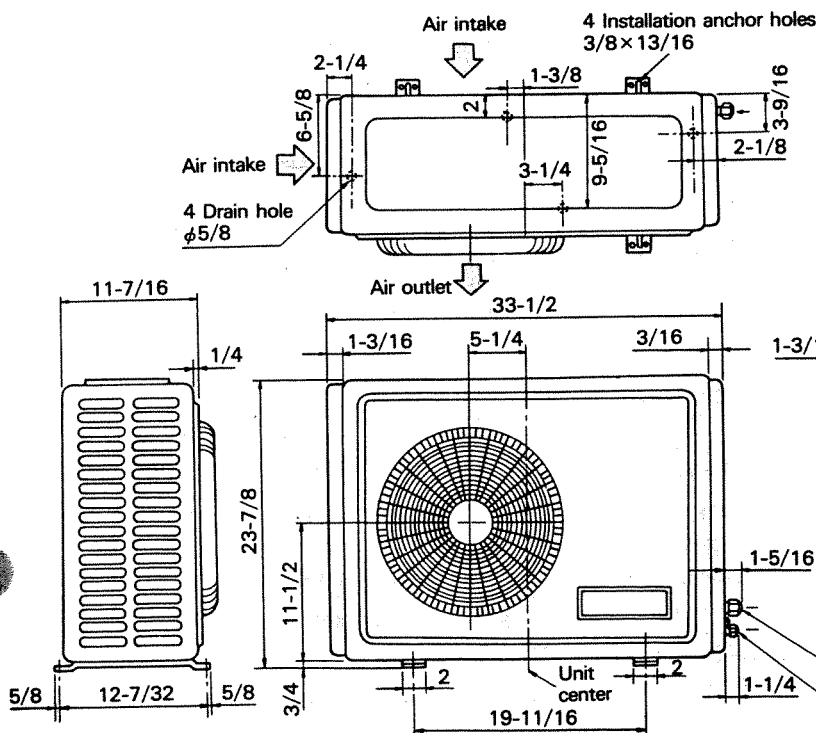
Unit : inch



Wireless remote controller



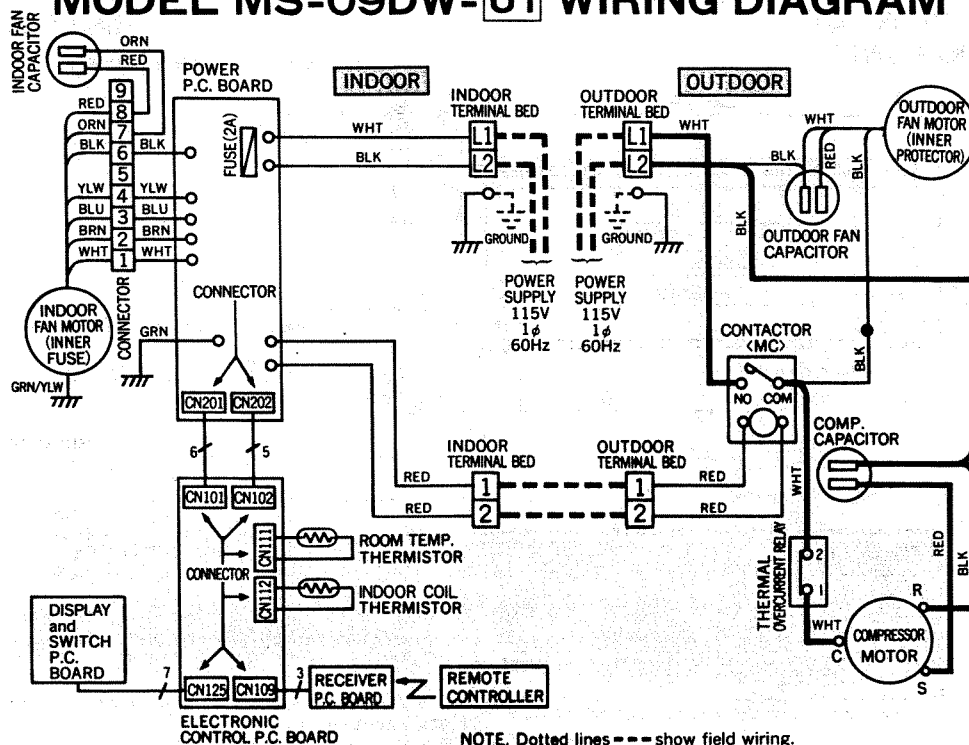
MODEL : MUH-12DN - U1
MUH-15DN - U1
OUTDOOR UNIT



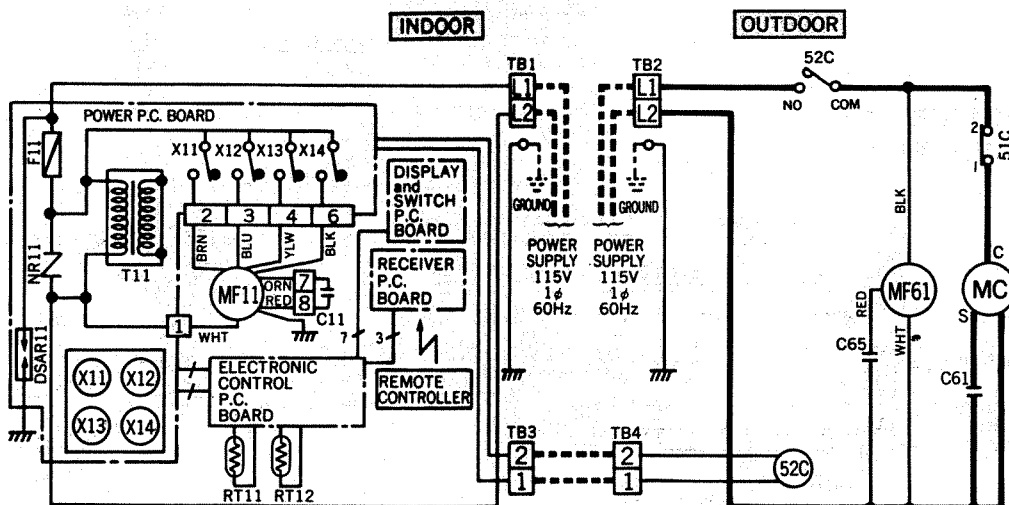
Note : The symbol ϕ indicates diameter

Ball valve 1/2F
 Ball valve 1/4F

MODEL MS-09DW-U1 WIRING DIAGRAM

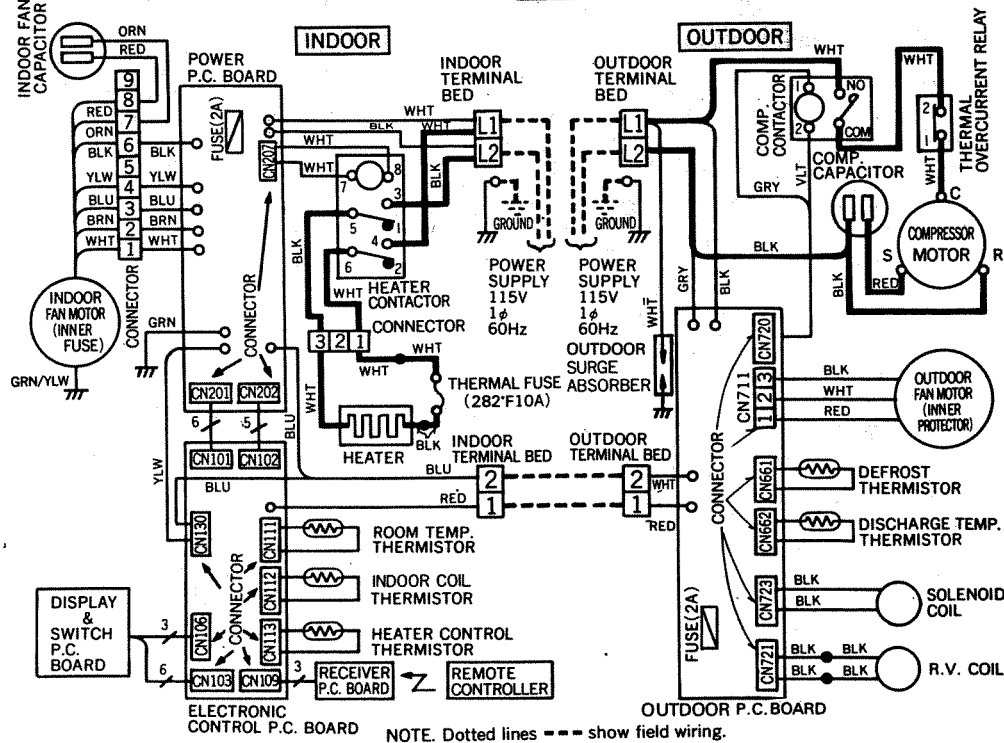


SKELETON WIRING DIAGRAM

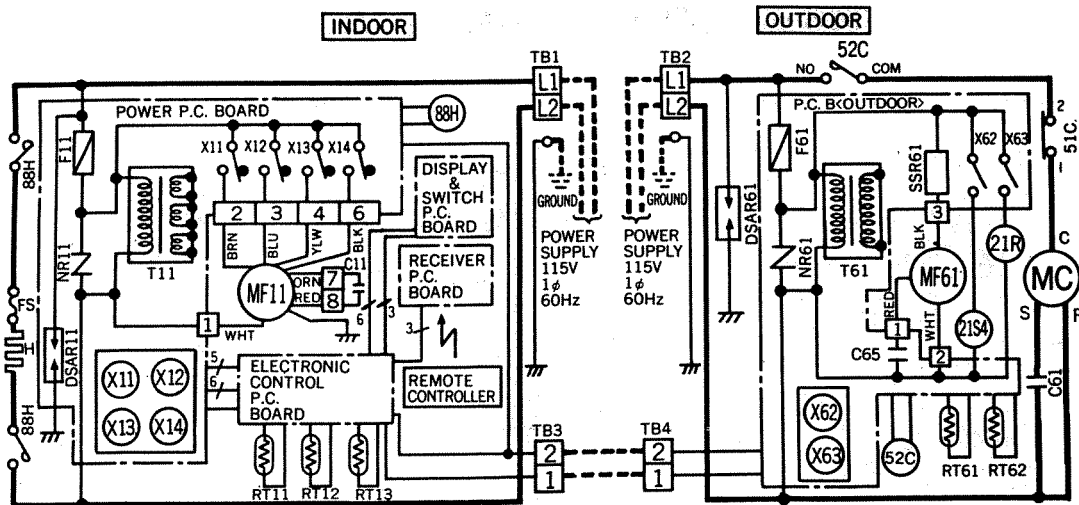


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MF11	INDOOR FAN MOTOR (INNER FUSE)	TB2 TB4	OUTDOOR TERMINAL BED
C61	COMP. CAPACITOR	MF61	OUTDOOR FAN MOTOR (INNER PROTECTOR)	T11	TRANSFORMER
C65	OUTDOOR FAN CAPACITOR	NR11	VARIATOR	X11~ 14	INDOOR FAN RELAY
DSAR11	SURGE ABSORBER	RT11	ROOM TEMP. THERMISTOR	51C	THERMAL OVERCURRENT RELAY
F11	FUSE (2A)	RT12	INDOOR COIL THERMISTOR	52C	CONTACTOR <MC>
MC	COMPRESSOR MOTOR	TB1 TB3	INDOOR TERMINAL BED		

MODEL MSH-09DW-U1 WIRING DIAGRAM

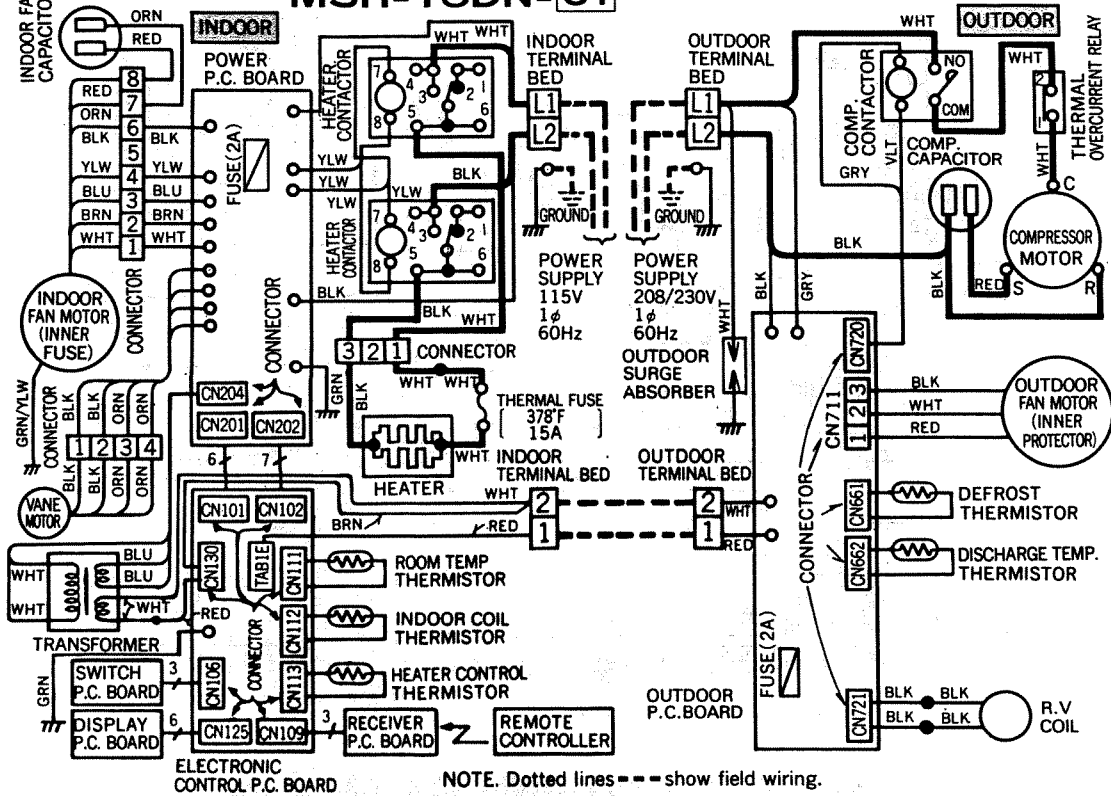


SKELETON WIRING DIAGRAM

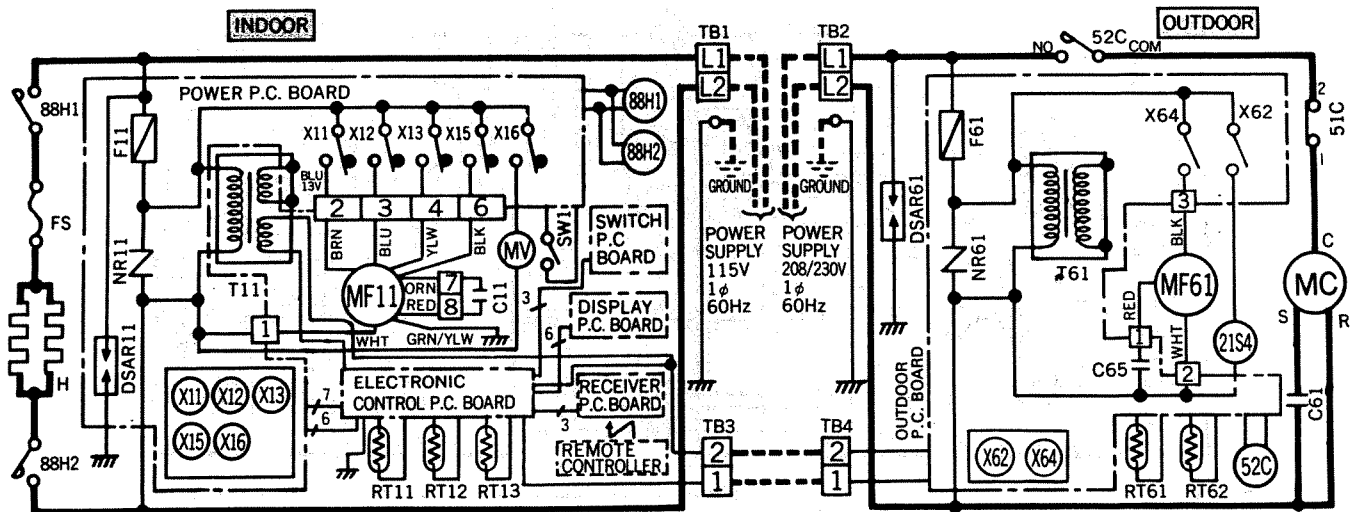


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	MF61	OUTDOOR FAN MOTOR (INNER PROTECTOR)	T11,61	TRANSFORMER
C61	COMP. CAPACITOR	NR11,61	VARIATOR	X11~14	INDOOR FAN RELAY
C65	OUTDOOR FAN CAPACITOR	RT11	ROOM TEMP. THERMISTOR	X62	R.V.COIL RELAY
DSAR 11	INDOOR SURGE ABSORBER	RT12	INDOOR COIL THERMISTOR	X63	SOLENOID COIL RELAY
DSAR 61	OUTDOOR SURGE ABSORBER	RT13	HEATER CONTROL THERMISTOR	21R	SOLENOID COIL
FS	THERMAL FUSE (282°F 10A)	RT61	DEFROST THERMISTOR	21S4	R.V. COIL
F11,61	FUSE (2A)	RT62	DISCHARGE TEMP. THERMISTOR	51C	THERMAL OVERCURRENT RELAY
H	HEATER	SSR61	OUTDOOR FAN SEMI CONDUCTOR RELAY	52C	COMP. CONTACTOR
MC	COMPRESSOR MOTOR	TB1,3	INDOOR TERMINAL BED	88H	HEATER CONTACTOR
MF11	INDOOR FAN MOTOR (INNER FUSE)	TB2,4	OUTDOOR TERMINAL BED		

MODEL MSH-12DN-U1 MSH-15DN-U1 WIRING DIAGRAM



SKELETON WIRING DIAGRAM

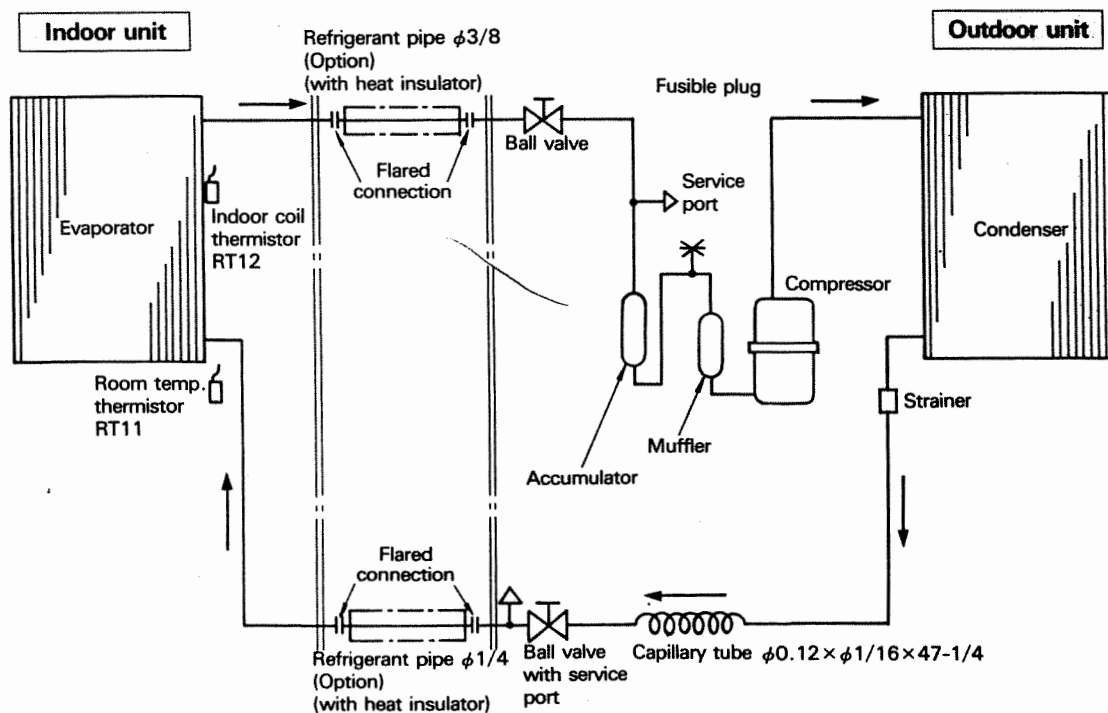


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	F61	OUTDOOR FUSE (2A)	NR61	OUTDOOR VARISTOR	SW1	VANE SWITCH	X64	OUTDOOR FAN RELAY
C61	COMP. CAPACITOR	H	HEATER	RT11	ROOM TEMP. THERMISTOR	TB1,3	INDOOR TERMINAL BED	21S4	R.V. COIL
C65	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR MOTOR	RT12	INDOOR COIL THERMISTOR	TB2,4	OUTDOOR TERMINAL BED	51C	THERMAL OVERCURRENT RELAY
DSAR11	INDOOR SURGE ABSORBER	MF11	INDOOR FAN MOTOR (INNER FUSE)	RT13	HEATER CONTROL THERMISTOR	T11,61	TRANSFORMER	52C	COMP. CONTACTOR
DSAR61	OUTDOOR SURGE ABSORBER	MF61	OUTDOOR FAN MOTOR (INNER PROTECTOR)	RT61	DEFROST THERMISTOR	X11~13,X15	INDOOR FAN RELAY	88H1, 88H2	HEATER CONTACTOR
FS	THERMAL FUSE (378°F 15A)	MV	VANE MOTOR	RT62	DISCHARGE TEMP. THERMISTOR	X16	VANE MOTOR RELAY		
F11	INDOOR FUSE (2A)	NR11	INDOOR VARISTOR	SSR61	OUTDOOR FAN SEMI CONDUCTOR RELAY	X62	R.V. COIL RELAY		

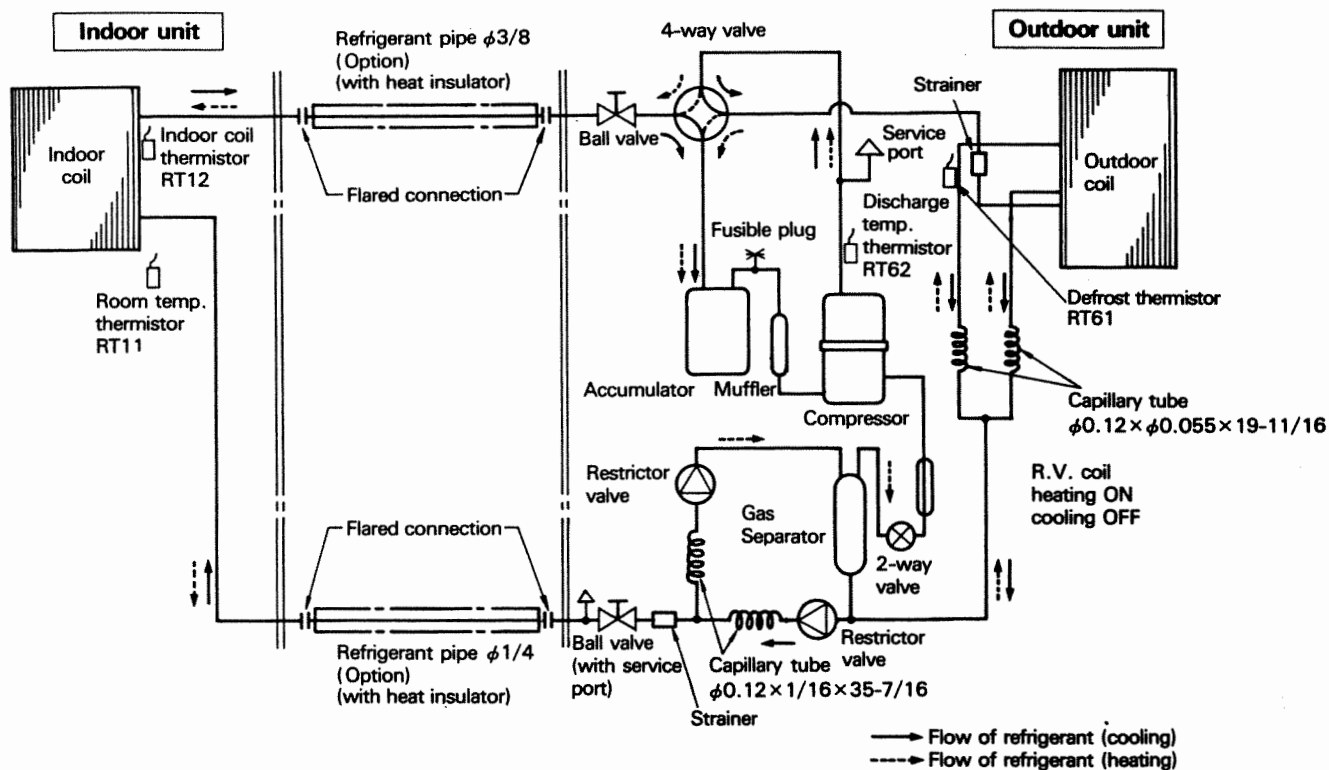
6

REFRIGERANT SYSTEM DIAGRAM

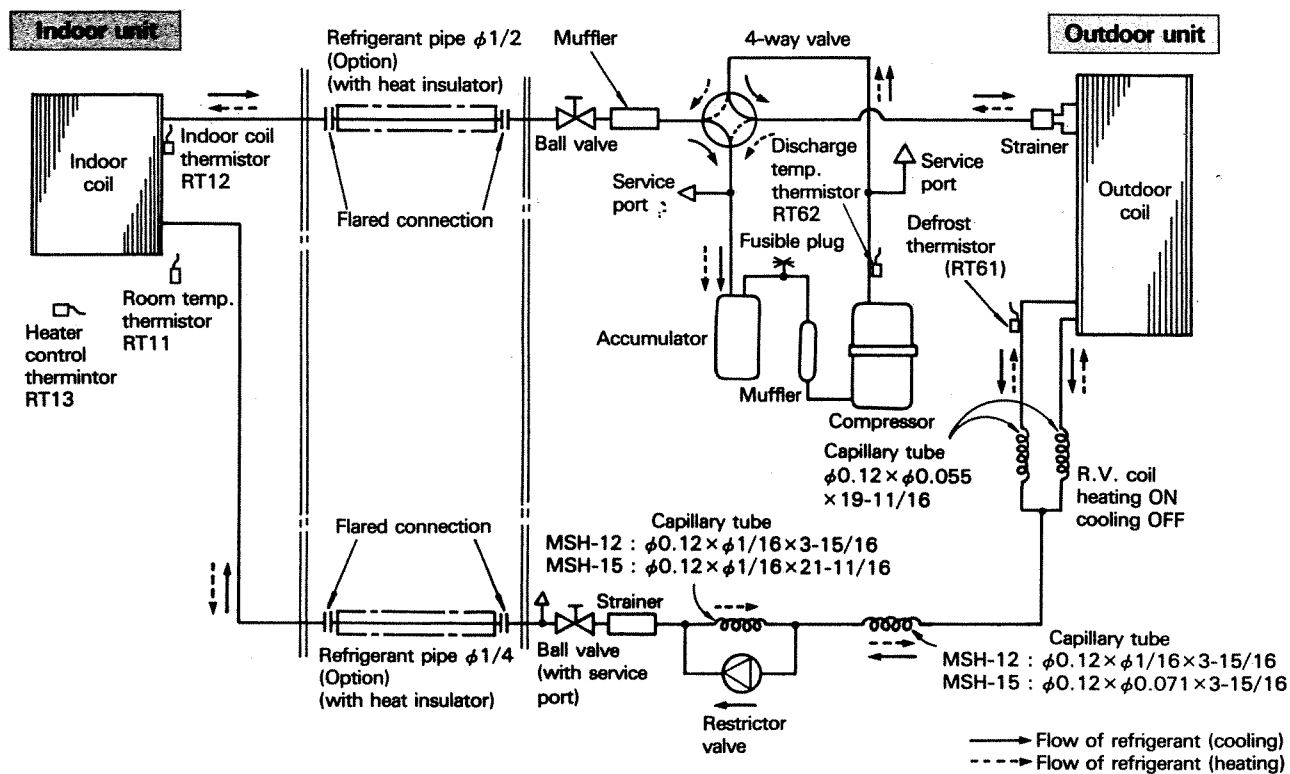
MS-09DW- U1



MSH-09DW- U1



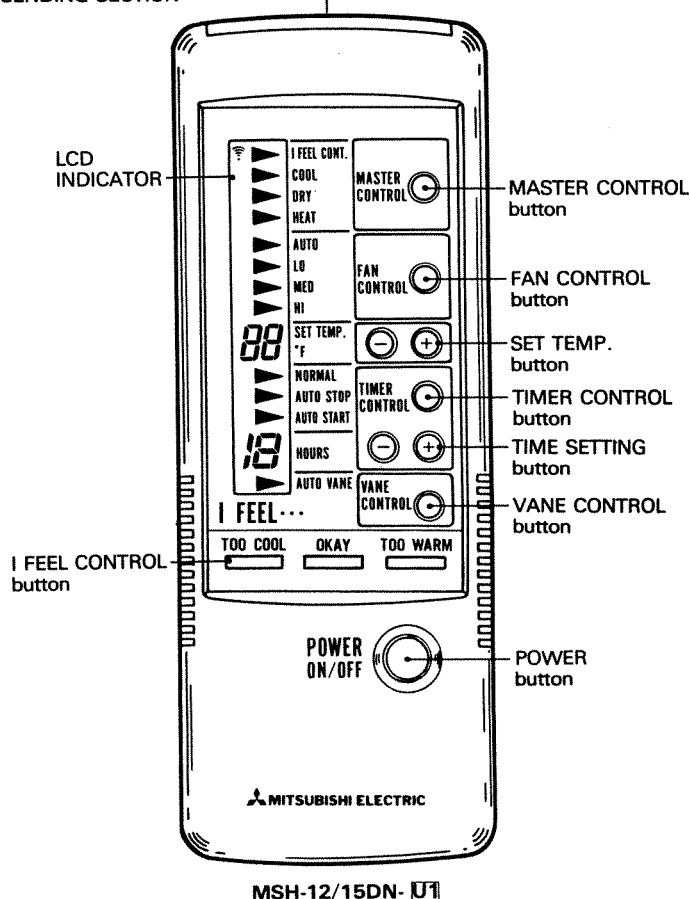
MSH-12DN - U1
MSH-15DN - U1



Wireless Remote Controller

MS-09DW- U1
 MSH-09DW- U1
 MSH-12DN- U1
 MSH-15DN- U1

SENDING SECTION



Once the controls are set, the same operation mode can be repeated by simply turning the POWER switch ON. Indoor unit receives the signal with a beep tone. When the system turns off, "3 min. time-delay function" will operate to protect system from over load and compressor does not restart before 3 minutes.

1. "I FEEL CONTROL" operation

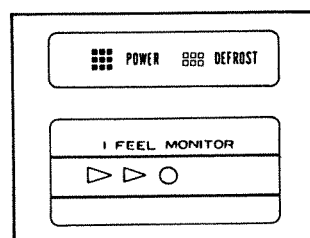
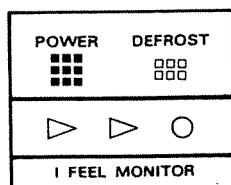
- (1) Press POWER button on the remote controller. Power lamp of the indoor unit will turn on with beep tone.
- (2) Select the MASTER CONTROL button to "I FEEL CONTROL". And I FEEL MONITOR lamp lights with beep tone.
- (3) The operation mode is decided by the initial room temp. at starting up the operation.

Initial Room Temp.	Mode
more than 76°F	COOL mode of "I FEEL CONTROL"
73°F to 76°F MS-09DW: 55°F to 76°F	DRY mode of "I FEEL CONTROL"
less than 73°F MSH-09, 12, 15	HEAT mode of "I FEEL CONTROL"

- Once the mode is fixed, the mode will not change by room temp. afterwards.
- Under the AUTO START timer operation, the mode is determined according to the room temperature 1 hour before the set time.
- When the system is stopped with the POWER button on the remote controller, and restarted within 1 hour in "I FEEL CONTROL" mode, the system operates in previous mode automatically regardless of the room temp.

When the system is restarted after 1 hour, the operation mode is decided by the initial room temp. at starting up the operation.

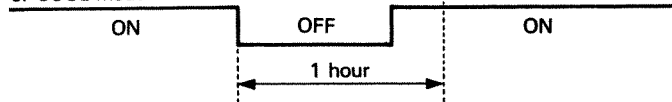
INDOOR UNIT DISPLAY SECTION



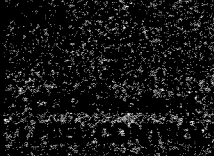
Example

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

Restart
 COOL mode of
 "I FEEL CONTROL"



(4) The initial set temp. is decided by the initial room temp. within 2 min. after starting-up the system.

Mode	Initial Room Temp.	Initial set temp.	
	More than 88°F	81°F	※1
	84°F to 88°F	79°F	
	81°F to 84°F	77°F	
	76°F to 81°F	75°F	
DRY mode of "1 FEEL CONTROL"	73°F to 76°F	Initial room temp. minus 2°F	
MS-09DW : Less than 76°F			
HEAT mode of "1 FEEL CONTROL" MSH-09, 12, 15	Less than 73°F	79°F	※2

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

※2 By room temperature compensation of 4 deg, room temperature of a living space is 75°F.

(5) I FEEL CONTROL buttons

In "I FEEL CONTROL" mode, set temp. is decided by the microprocessor based on the room temp. In addition, set temp. is controlled by I FEEL CONTROL buttons when you feel too cool or too warm, and when you feel comfortable the  button fixes the comfortable temp.

When the I FEEL CONTROL button is pressed, I FEEL MONITOR lamp on the indoor unit pulsates for a second with beeps.

● Variable control

When the  or  button is pressed, the set temp. is changed based on the room temp. As the set temp. range is variable, this is called "Variable control". The variable control operates only in "I FEEL CONTROL" mode. In DRY mode of "I FEEL CONTROL". the set temp. range is fixed ± 2 deg (°F).

 ...To raise the set temp 2 deg. ~ 5 deg. (°F)

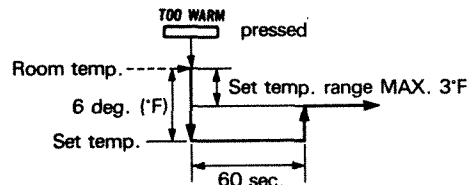
 ...To fix and memorize the comfortable present temp.

 ...To lower the set temp. 2 deg. ~ 5 deg. (°F)

● Over shoot control

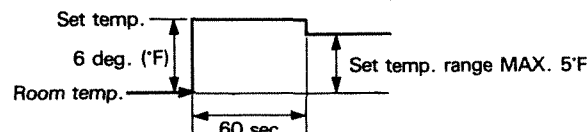
When  button (or  button, when heating) is pressed one or two I FEEL MONITOR lamps light, the indoor unit operates to get lower (or higher, when heating) temp. than the set temp. temporarily (60 sec.) by the microprocessor control. This is called "Over shoot control".

When  button is pressed during COOL mode of "I FEEL CONTROL", the temperature change is as follows.



MSH-09,12,15

When  button is pressed during HEAT mode of "I FEEL CONTROL" the temperature change is as follows.



The over shoot control does not operate when  button is pressed during COOL mode of "I FEEL CONTROL" and  button is pressed during HEAT mode of "I FEEL CONTROL".

— I FEEL MONITOR lamp on the indoor unit —

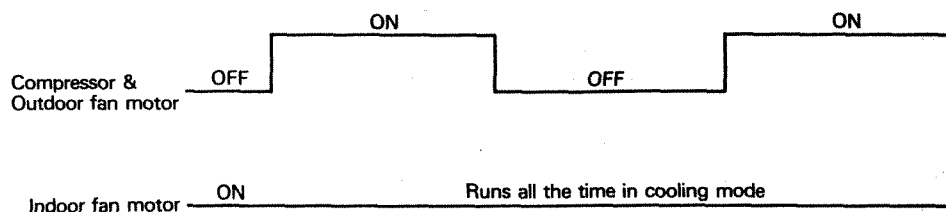
When I FEEL CONTROL button is pressed, I FEEL MONITOR lamp on the indoor unit pulsates with beeps and shows the temp. control condition.

I FEEL MONITOR lamp

- ▶▶▶● Shows difference between Set temp. and Room temp. is more than 3 deg. (°F)
During this condition, I FEEL button is not available.
Wait for about 15 min.
- ▶▶● Shows difference between Set temp. and Room temp. is 2 deg. ~ 3 deg. (°F)
The buttons are available.
- ▶● Shows Room temp. is almost Set temp. The difference is less than 2 deg. (°F)
The buttons are available.

- NOTE**
- During "I FEEL CONTROL" operation, thermostat (SET TEMP.) is not available. Use "I FEEL CONTROL" buttons to set temp.
 - Once the set temp. is set, the microprocessor memorizes the temp. and the system restarts at the same set temp.
 - The set temp. range is 61 ~ 88°F in COOL • DRY • HEAT mode of "I FEEL CONTROL".
 - When the main power is turned off, the settings are canceled. Set temp. will be initial set temp. again. See page 20.

— COOL mode of "I FEEL CONTROL" —



NOTE Coil frost prevention during COOL mode of "I FEEL CONTROL"

- When the indoor coil thermistor RT12 is below 47°F for MS-09, 37°F for MSH-09, 27°F for MSH-12/15 for 5 min. the coil frost prevention mode starts. The compressor stops for 5 min. and the indoor fan runs at set speed. The coil frost prevention mode may continue past 5 min. until the indoor coil thermistor RT12 exceeds 47°F for MS-09, 37°F for MSH-09, 27°F for MSH-12/15.
The first 5 minutes, termination of Coil Frost Prevention is controlled by time regardless of the termination temperature. After that the termination is controlled by the temperature regardless of time.
Therefore, Coil Frost Prevention continues at least 5 minutes even if the temperature reaches termination point within 5 minutes. After 5 minutes, Coil Frost Prevention terminates if the temperature reaches to termination point, or the mode will be prolonged until the temperature reaches to the termination point.
- Indoor fan operates at the set speed by FAN CONTROL switch.
Followings are the fan speed in AUTO.
 - Room temp. minus Set temp. : more than 4 ~ 7 deg. (°F) ...HI
 - Room temp. minus Set temp. : 4 deg. (°F) to 7 deg. (°F) MED
 - Room temp. minus Set temp. : less than 2 ~ 3 deg. (°F) LO

— DRY mode of "I FEEL CONTROL" —

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

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

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temp. decrease.
The operation of the comp. and indoor fan is as follows on the next page.

Compressor operates by temperature control and time control.

In the first 2 min. the system is FAN mode and the indoor fan operates at VLO speed.

Then 2 min. later, the room temperature is read as the initial temperature.

①Set temp. is controlled to minus 2°F as initial set temp.

②When the thermostat is ON, the compressor repeats 8 min. ON/3 min. OFF cycle operation.

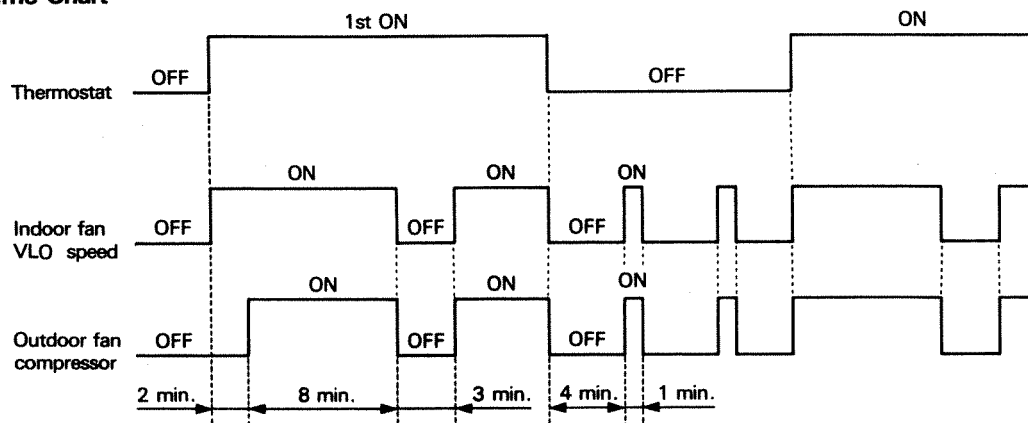
When the thermostat is OFF, the compressor repeats 4 min. OFF/1 min. ON cycle operation.

Indoor fan and outdoor fan operate in same cycle with compressor.

Indoor fan speed is VLO.

Operation Time Chart

Example



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

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

●In DRY mode of "I FEEL CONTROL", FAN CONTROL switch is not available.

— HEAT mode of "I FEEL CONTROL" —

1. Indoor fan speed control

(1) Following are the fan speed in AUTO.

Temperature condition	Fan speed
Room temp. minus set temp. : more than 4 ~ 7 deg.	HI
Room temp. minus set temp. : 2 ~ 7 deg.	MED
Room temp. minus set temp. : less than 2 ~ 3 deg.	LO

(2) Cold air prevention control

The defrost lamp lights by the fan control.

The fan runs when the indoor coil thermistor RT12 temp. exceeds 72°F, when the temp. is below 64°F, the fan stops.

(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 temp. to blow out warm air.

After releasing of cold air prevention, when the indoor coil thermistor RT12 is 113°F or above, the fan speed shifts to the set speed.

When the indoor coil thermistor RT12 is less than 113°F, the fan speed is controlled by time as below.

Time condition	Indoor fan speed
less than 4 min.	LO
4 min. to 8 min.	MED
more than 8 min.	HI

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

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

(4) Flow soft control

After a compressor turn off by the thermostat, the indoor fan operates at a lower speed than LO.

NOTE : This speed is called Very Low (VLO) in this manual. When the compressor runs, the fan operates at the setting speed. Due to the cold air prevention control, the fan does not start until the indoor coil thermistor RT12 temp. exceeds 72°F.

(5) If turn off the POWER button during heat operation, the indoor fan operates for 30 sec. LO speed to eliminate heat.

2. High pressure protection

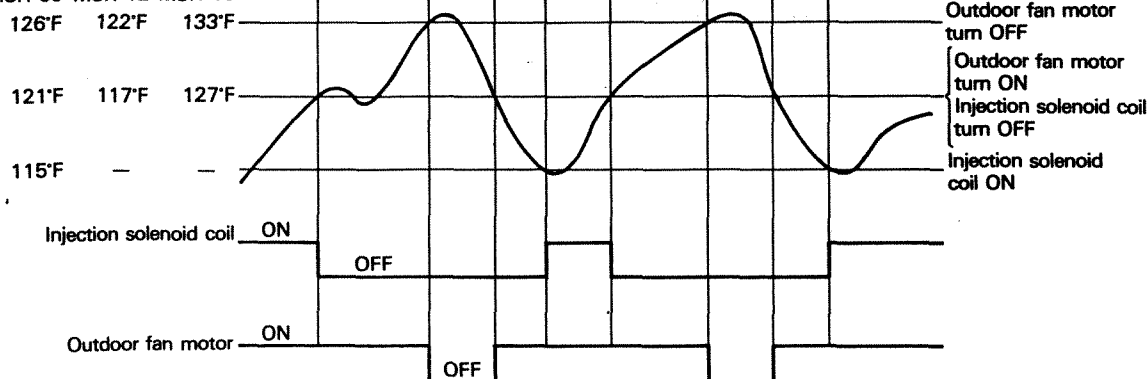
During heating operation the solenoid valve for injection and the outdoor fan motor are controlled by the temperature of the indoor coil thermistor RT12 for excess rise protection of compressor discharge pressure.

This high pressure protection control is as below.

Outdoor fan		Model	Magnet valve for injection		Model
ON	OFF		ON	OFF	
121°F	126°F	MSH-09DW	115°F	121°F	MSH-09DW
117°F	122°F	MSH-12DN	There is no injection		MSH-12DN
127°F	133°F	MSH-15DN			MSH-15DN

High pressure protection time chart

Indoor coil thermistor
RT12 MSH-09 MSH-12 MSH-15



NOTE : When the outdoor fan is off, the heating defrost is not detected by the defrost thermistor RT61.

3. Defrosting

Outdoor unit defrosting is controlled by outdoor P.C. board, it is detected by the defrost thermistor RT61 and discharge temp. thermistor RT62.

Defrost starting conditions

When all conditions of a) ~ d) are satisfied, the defrosting operation starts.

- Under heat mode of "I FEEL CONTROL" and heat operation, the compressor cumulative time exceeds the defrost interval.
- The defrost thermistor RT61 is below 27°F.
- After releasing the high pressure protection of the outdoor fan operation, 180 sec : MSH-09DW or 256 sec : MSH-12/15DN elapsed.
- Regarding MSH-12/15DN, discharge temp. thermistor RT62 is below 185°F.

Defrost stopping conditions

When the condition e) or f) is satisfied, the defrosting operation stops.

- The defrost thermistor RT61 is above 37°F.
- The defrosting time exceeds 10 min.

The defrosting operation stops forcibly by timer.

Defrost interval

The defrost interval is calculated by defrosting time.

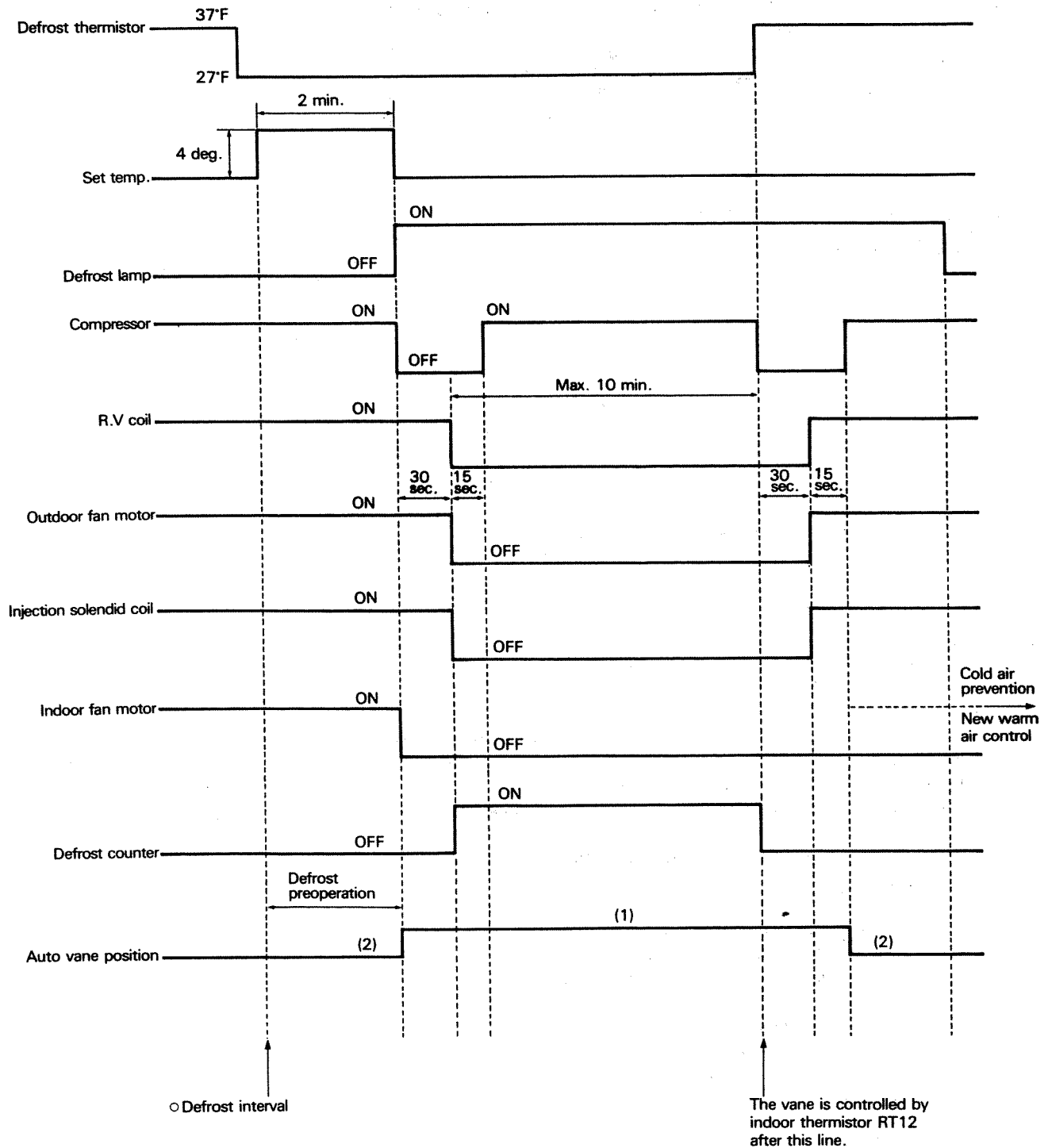
- After starting of heating operation, the first and second defrost interval are fixed to 60 min.
- From the third interval, it is calculated so as that defrost time is 2 min.

Defrost Time	Defrost Interval
under 2 min.	Previous interval plus 10 min.
2 ~ 3 min.	Same as previous
3 ~ 4 min.	Previous interval minus 10 min.
over 4 min.	Previous interval minus 20 min.

3. Max. and Min. of Defrost Interval

Mode	Max.	Min.
MSH-09DW	120 min.	40 min.
MSH-12DN		20 min.
MSH-15DN		

Defrost time chart



4. Heater control

(1) When all listed conditions are satisfied and 30 sec. elapsed, power is supplied to the heater.

- ① In heating mode
- ② Indoor fan speed is faster than LO.
- ③ Room temp. thermostat is on.
- ④ By temperature of Heater control thermistor RT13

	ON	OFF (Heater ON/OFF)
MSH-09DW	131°F	140°F
MSH-12/15DN	142°F	151°F

⑤ By differential between set temp. and room temp.

5 deg. (°F) : ON, below 4 deg. (°F) : OFF

⑥ Not in heating defrost mode

(2) If one of above conditions are not satisfied, the heater turns off.

- When system is stopped by pressing the power button, the indoor fan operates for 30 sec. in LO speed to eliminate the remaining heat.
- When the room temp. thermostat is off, the indoor fan operates at VLO (Very LO) speed.

(3) Power is not supplied to the heater under following condition even if all above conditions are satisfied.

- When the indoor coil. thermistor RT12 is over 104°F and the heater control thermistor RT13 is disconnected.

5. Discharge Protection

When the discharge temp. is too high because of unit gas leakage or other reason, the discharge temp. thermistor RT62 stops compressor in order to protect compressor from burning.

Models	ON	OFF
MSH09-DW	185°F	248°F
MSH-12DN		
MSH-15DN		

Discharge protection operates in "I FEEL CONTROL", COOL, DRY, and HEAT mode.

2. COOL operation

(1) Press POWER button.

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

Indoor fan continues to operate regardless of thermostat's OFF-ON.

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

(2) Select COOL mode.

(3) Set the SET TEMP. button.

The setting range is 59 ~ 89°F.

*"I FEEL CONTROL" buttons are not available.

3. DRY operation

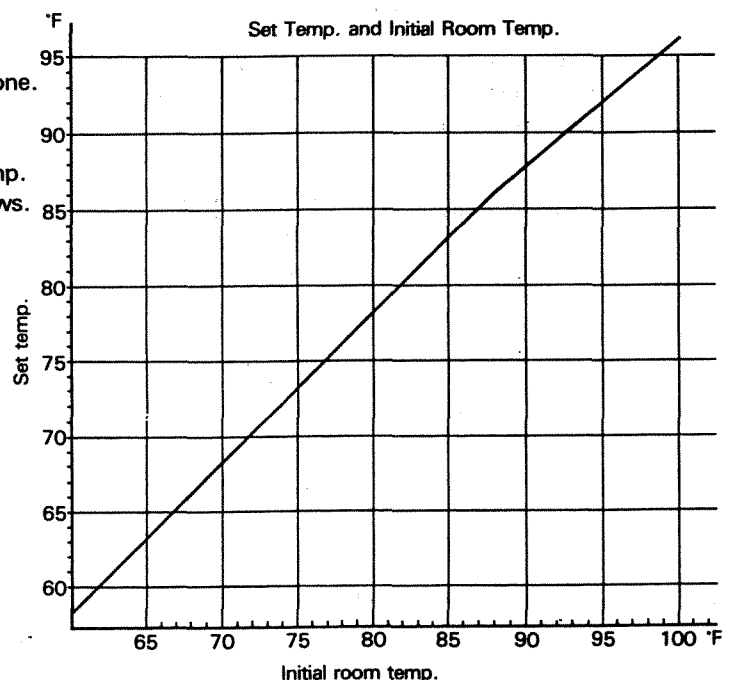
(1) Press POWER ON/OFF button.

Power lamp of the indoor unit turns on with beep tone.

(2) Select DRY mode.

(3) Indoor fan operates at VLO speed.

(4) After 2 min. the microprocessor reads the room temp. and decides the set temp. Set temp. will be as follows.



Thermostat (SET TEMP.) is not available. The other operations are same as DRY mode of "I FEEL CONTROL".

4. HEAT operation

- (1) Press POWER button
POWER lamp on the indoor unit turns on with a beep tone.
- (2) Select HEAT mode.
DEFROST lamp on the unit lights during the cold air prevention control.
- (3) Press SET TEMP. button to select the desired temperature.
The setting range is 59 ~ 89°F.
"I FEEL CONTROL" button are not available.
- (4) Indoor fan speed control, high pressure protection, defrosting, heater control are same as HEAT mode of "I FEEL CONTROL".

5. FAN operation MS-09DW

- (1) Press POWER ON/OFF button.
- (2) Select FAN mode.
- (3) Press SET TEMP. button to select the desired temperature.
The indoor fan stops when room temperature is lower than the set temp.
- (4) Select the desired fan speed.
Followings are the fan speed in AUTO.
Room temp. minus set temp. : more than 4 ~ 7 deg. HI
Room temp. minus set temp. : 2 ~ 7 deg. MED
Room temp. minus set temp. : -2 ~ 3 deg. LO
Room temp. minus set temp. : less than -2 ~ 0 deg. STOP
Only indoor fan operates.
Outdoor unit does not operate.

6. TIMER

1. AUTO STOP operation

AUTO STOP mode has "SOFT SLEEP" circuit which provides comfortable temperature control for sleeping.

- (1) Select the TIMER CONTROL to AUTO STOP.
- (2) Set the time. Time setting is 1 hour unit for 12 hours
- (3) "SOFT SLEEP" circuit operates in COOL and HEAT mode. By this circuit, system operates at the set temp. for the first 1 hour. Then, in COOL mode the set temp. raises by 1 deg. half-hourly to 2 deg. range and in heat mode the set temp. falls by 1 deg. half-hourly to 4 deg. range.
In "I FEEL CONTROL" and DRY mode, the circuit does not operate.

2. AUTO START operation

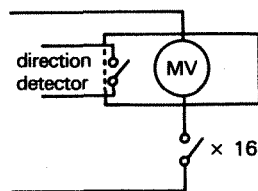
- (1) Select the TIMER CONTROL button to AUTO START.
- (2) Set the time. Time setting is 1 hour unit for 12 hours.
- (3) In HEAT mode, warming up circuit operates.

NOTE TIMER setting will be canceled by power failure

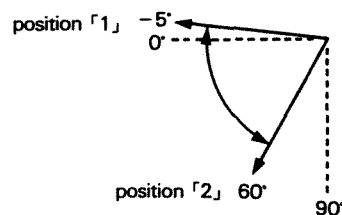
- Breaker Functioning.

7. AUTO VANE adjustment MSH-12DN MSH-15DN

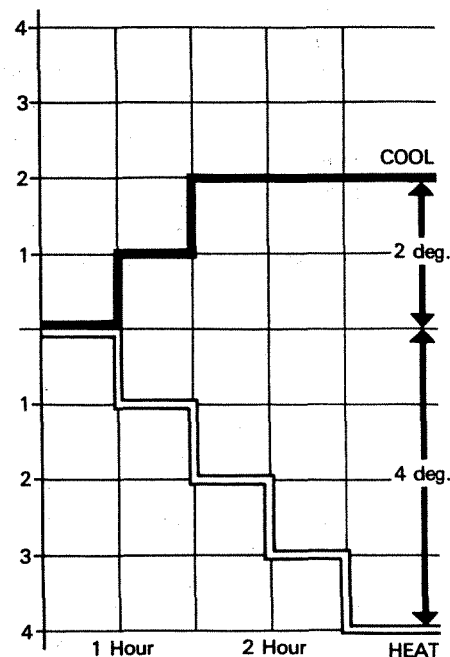
- (1) The vane circuit / Auto vane direction



The vane motor circuit



Auto vane direction



MSH-09,12,15

(2) Vane control

1 Automatic control (Auto vane lamp is on.)

- During COOL operation

The vane is at position 「1」 initially → power ON → moves to position 「2」 returns to 「1」 → fixes on 「1」

- During HEAT operation

Power ON → the vane moves to position 「2」 → moves to 「1」

- Until the temp. of Indoor coil thermistor RT12 rises to 97°F : position 「1」
(on the indoor heat exchanger)

- When the thermistor temp is 97°F : changes position 「1」 → 「2」

- Until the temp. of Indoor coil thermistor RT12 falls to 86°F : position 「2」
(on the indoor heat exchanger)

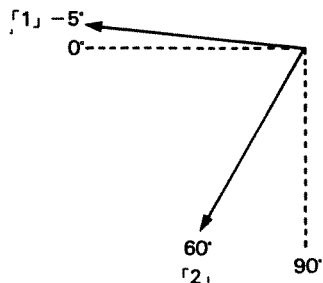
- When the thermistor temp is less than 86°F : changes position 「2」 → 「1」

When contactor (52C) is off : position 「1」

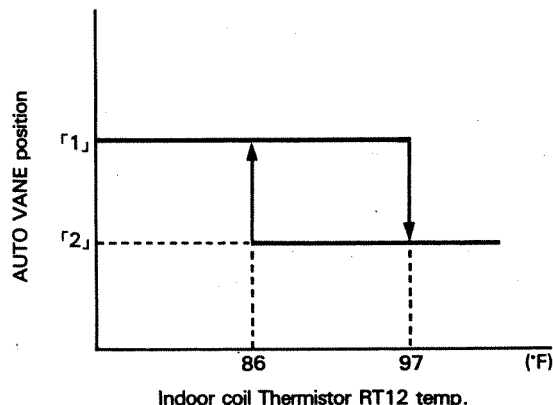
- During defrosting : the vane is forced to return to position 「1」

The indoor fan speed is VLO while the vane is working.

When thermistor (RT12) is 86°F or below
Comp. contactor (52C) is off.



When Thermistor (RT12) is 97°F
or above.



8. EMERGENCY-TEST operation

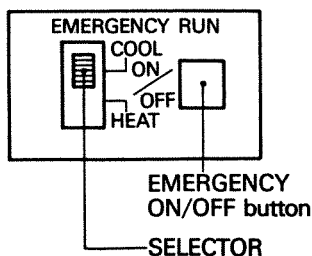
When the remote controller is missing, has failed or the batteries run down, set the emergency run selector switch on the front of the indoor unit to heat or cool and press the emergency run on/off switch. The unit will start and the operation lamp will light.

The first 30 min. 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 does not operate and the timer is reset to normal.

After 30 min. of test run operation the system shifts to emergency run operation with a set temperature of 75°F in heating or cooling. The fan shifts to MED speed.

This operation continues until the emergency run on/off button is pressed or a button on the remote control is pressed, then normal operation will start.

The coil frost prevention circuit operates in this mode.



9. AUTO RESTART FUNCTION (Optional)

How to restart units after power failure by Auto Restart.

Model	CONNECTOR NO.	METHOD
MS-09DW- U1	CN125	Short the connector 5 — 7 on the electronic control P.C. board for connector position, refer to page 38.
MSH-09DW- U1	CN105	Short the connector 1 — 3 on the electronic control P.C. board. For connector position, refer to page 40 for model MSH-09DW- U1 or page 43 for model MSH-12/15DN- U1.
MSH-12DN- U1 MSH-15DN- U1	CN107	Set the emergency run switch to "COOL" or "HEAT"

Operation

When power is restored the unit will operate in the emergency-test run mode. Even if the unit is turned off at the thermostat, it will come on after a power failure. The heat or cool mode will be determined by the position of the emergency-test run selector switch. When a button on the remote controller is pressed the unit will return to normal operation as the controller has priority. See page 27 for emergency-test run operation.

10. COMPULSORY DEFROSTING MODE FOR SERVICE

Defrosting mode can be accomplished regardless of the defrost interval restriction by short-circuiting the connector (CN606) on the outdoor P. C. board which is located in outdoor unit.

This compulsory defrosting mode should be started by the pulse based on the temperature sensed at the defrost thermistor * (RT61). Therefore,

as far as RT61 senses higher than 27°F, the compulsory defrosting mode cannot be achieved.

* RT61 is attached to the outdoor heat exchanger. See page 42 and 45 for the position of the connector CN606.

MS-09DW- U1
 MSH-09DW- U1
 MSH-12DN- U1
 MSH-15DN- U1

Self check function

This function is to show defective point by lighting or flickening of the indoor unit power lamp, defrost lamp, or "I FEEL" monitor lamp (monitor LED). If troubles written in the below table occur during operation, the self check result indicated. The abnormal point indication disappears by pressing the power on/off button of the remote controller and when the unit is on.

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

Self Check Table

Flash

Steady

OFF

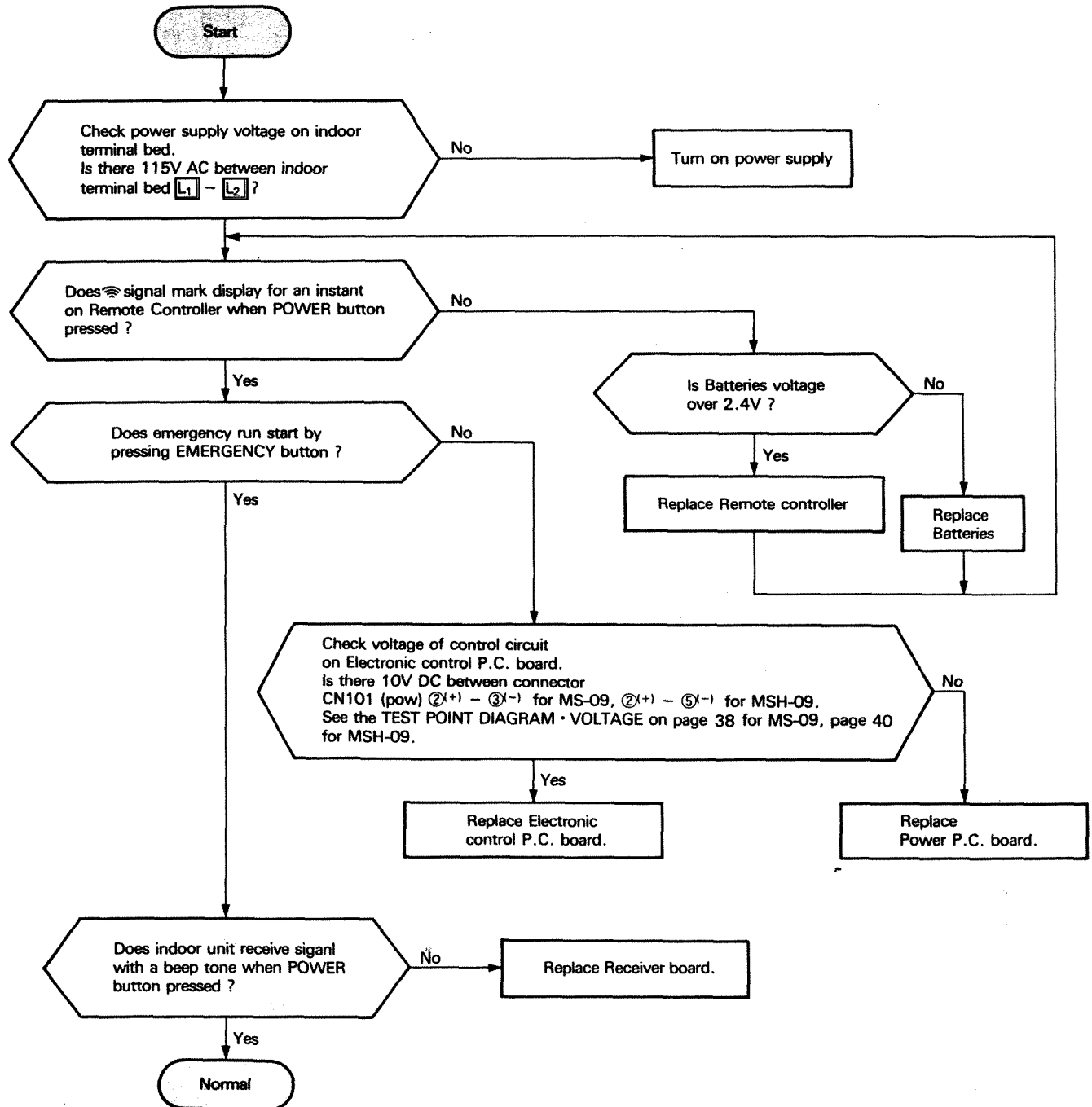
No.	Abnormal point	Indication	Symptom	Detect method	Cause	Measures
1	Serial signal	POWER DEFROST Flash Flash	Outdoor unit does not run	1. When serial signal from outdoor unit stops for 4 ~ 5 sec.	- Indoor Outdoor connection mis-wiring - Indoor Outdoor connection disconnecting - Connector misconnecting - Indoor electronic control P.C. board defect - Outdoor P.C. board defect - Electrical parts defect	- Check wiring (Visual check and conductivity check) - Check indoor board - Check outdoor board - Check electrical parts
	Mis-wiring	I FEEL MONITOR Flash Flash		When serial signal stops for 4 ~ 5 sec. after 1st on of 52C relay by POWER turning on.		
2	Indoor coil temp. thermistor	Flash OFF Flash Flash	Indoor unit power turns off.	2. Detects Indoor coil thermistor short or open circuit every 2 sec. during operation.	- Thermistor defect - Connector disconnecting - Connector misconnecting - Indoor control P.C. board defect	- Check thermistor character - Reconnect connector - Reconnect connector - Check indoor board
3	Outdoor thermistor (Discharge RT62)	Flash Steady Flash Flash	- Compressor not rotating - Indoor unit power turns off	3. Detects Discharge thermistor open : more than 10 min. later from compressor starting up. Detects Discharge thermistor short : During Compressor operation.	- Thermistor defect - Connector misconnecting - Outdoor P.C. board defect	- Check thermistor character - Reconnect connector - Check outdoor board

MS-09 has only NO.2 check function.

(1) Operation does not start

MS-09DW - U1

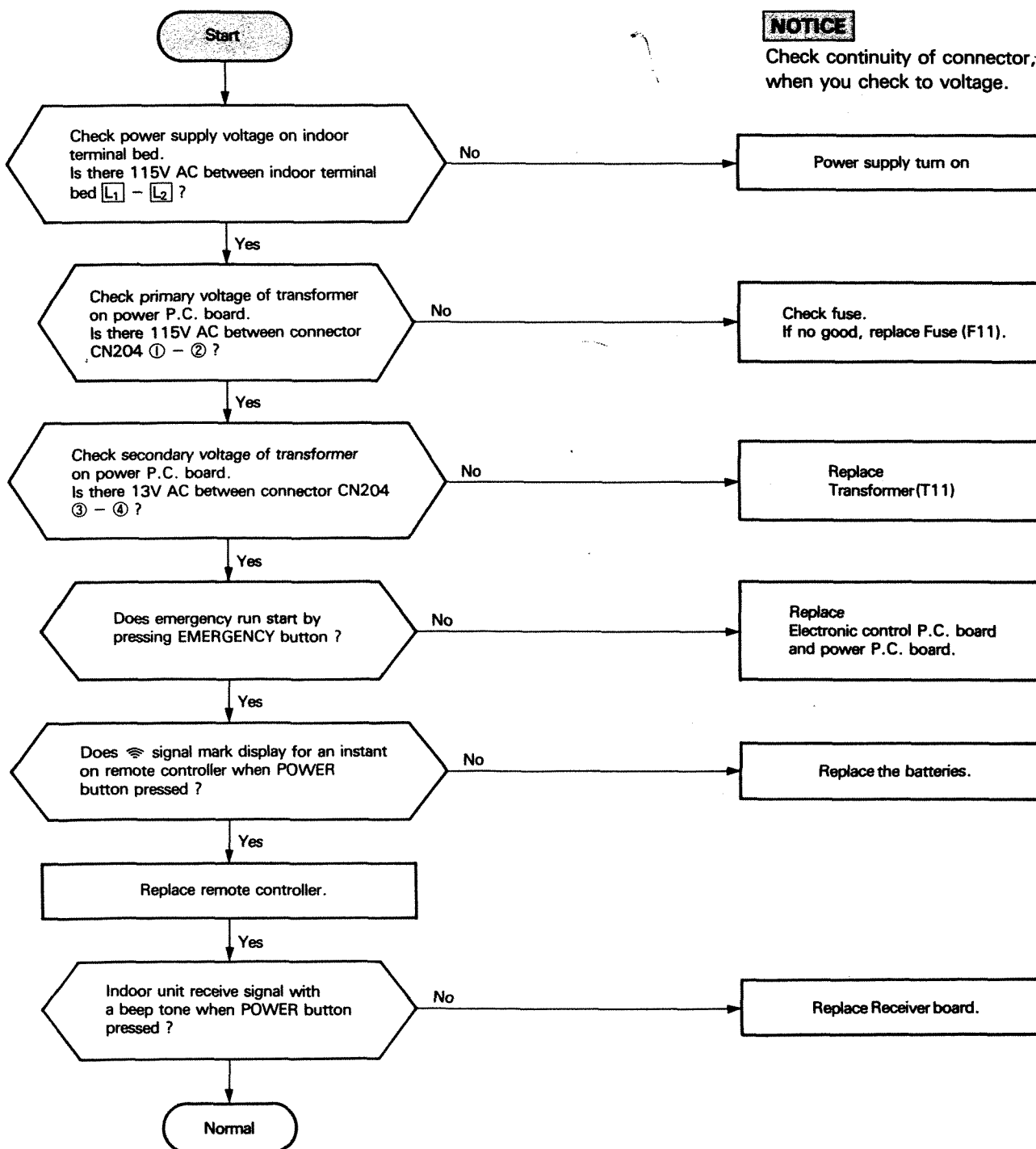
MSH-09DW - U1



(2) Operation does not start.

MSH-12DN - U1

MSH-15DN - U1



(2) Outdoor fan does not operate (compressor operates)

MSH-09DW - U1

MSH-12DN - U1

MSH-15DN - U1

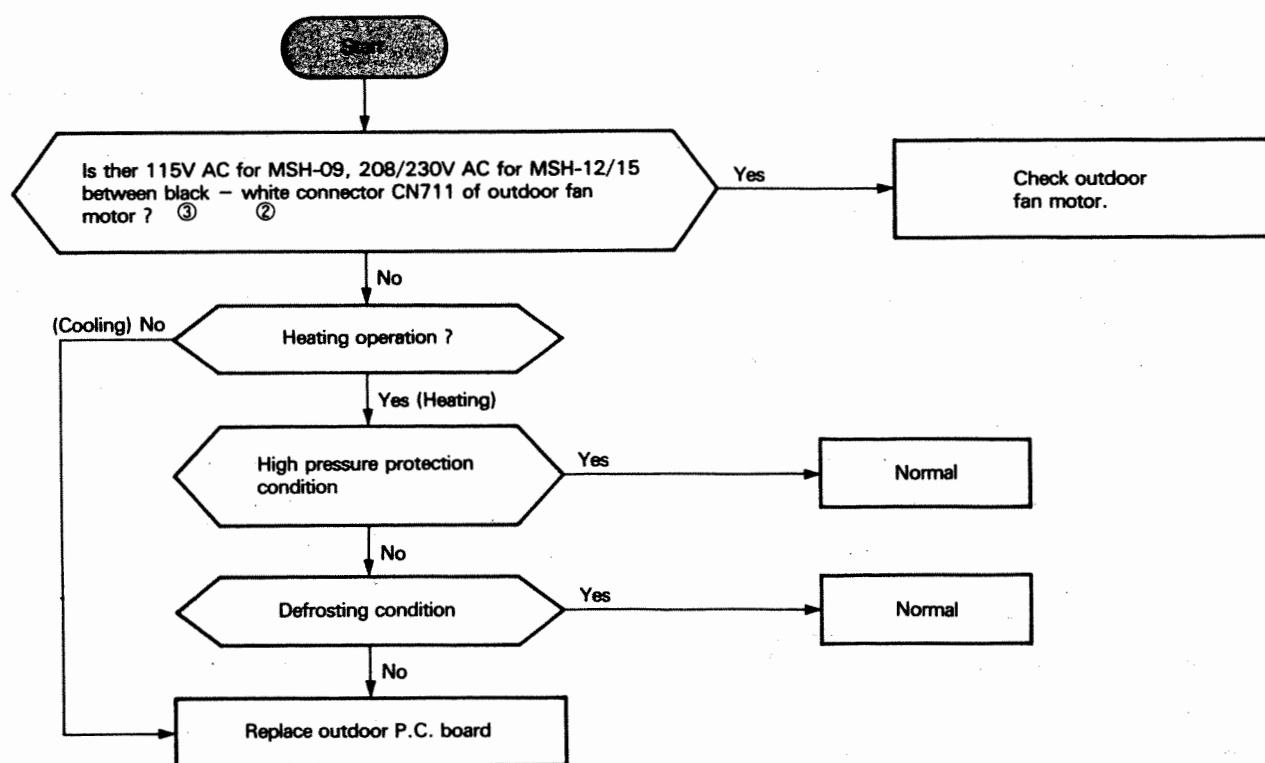
Below listed are not troubles

1. Heating defrost

During heating defrost operation, the outdoor fan stops. Refer to defrost time chart on page 24.

2. High pressure protection

During heating operation, when high pressure protection works the outdoor fan stop. Refer to high pressure protection time chart on page 23.

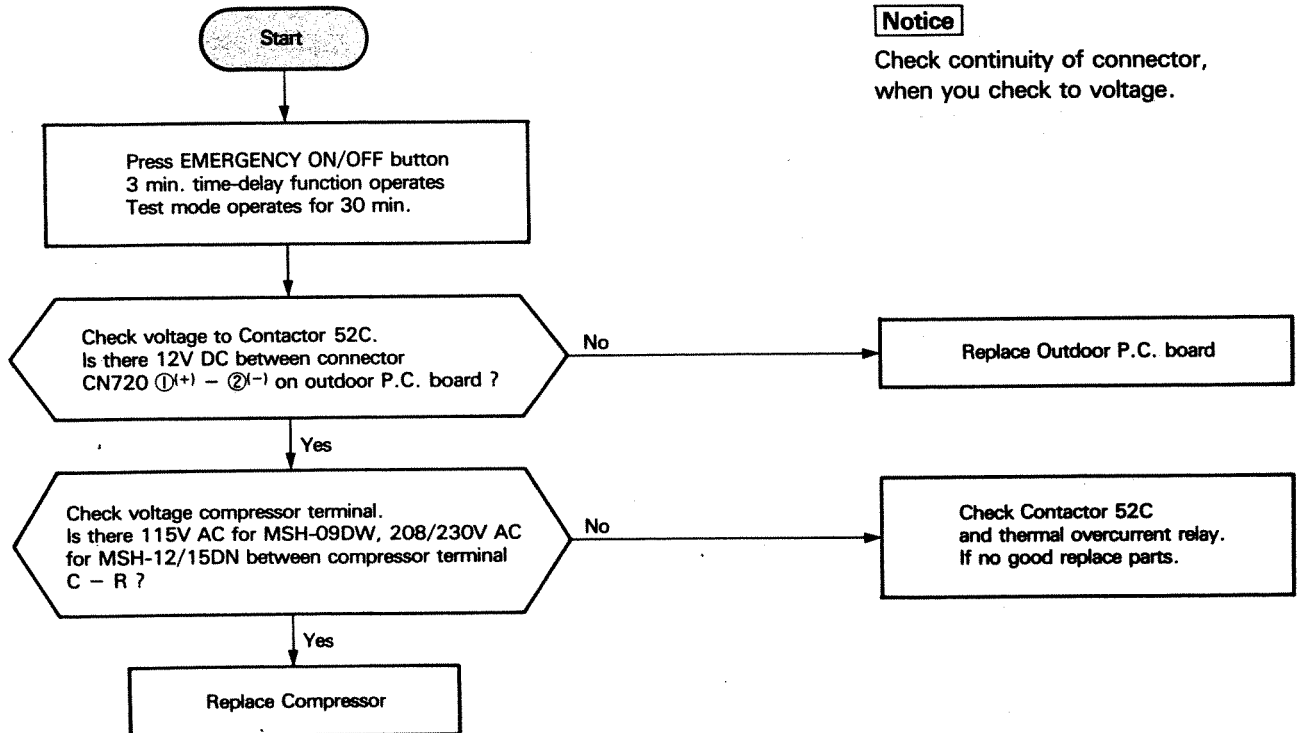


3. Compressor does not operate (Indoor and outdoor fan operates)

MSH-09DW - U1

MSH-12DN - U1

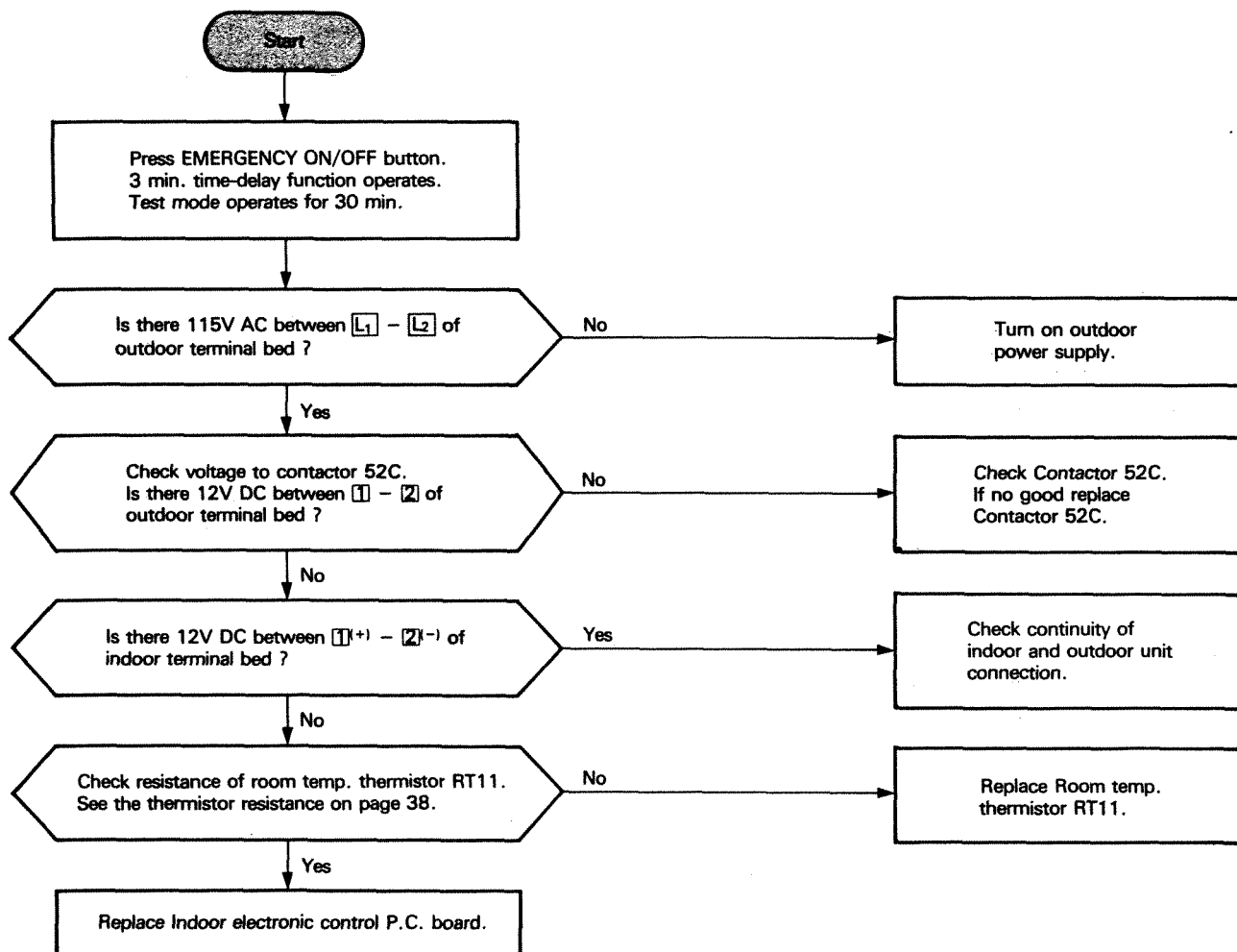
MSH-15DN - U1



Notice

Check continuity of connector,
when you check to voltage.

Compressor and outdoor fan do not operate (Only indoor fan operates)
MS-09DW- U1

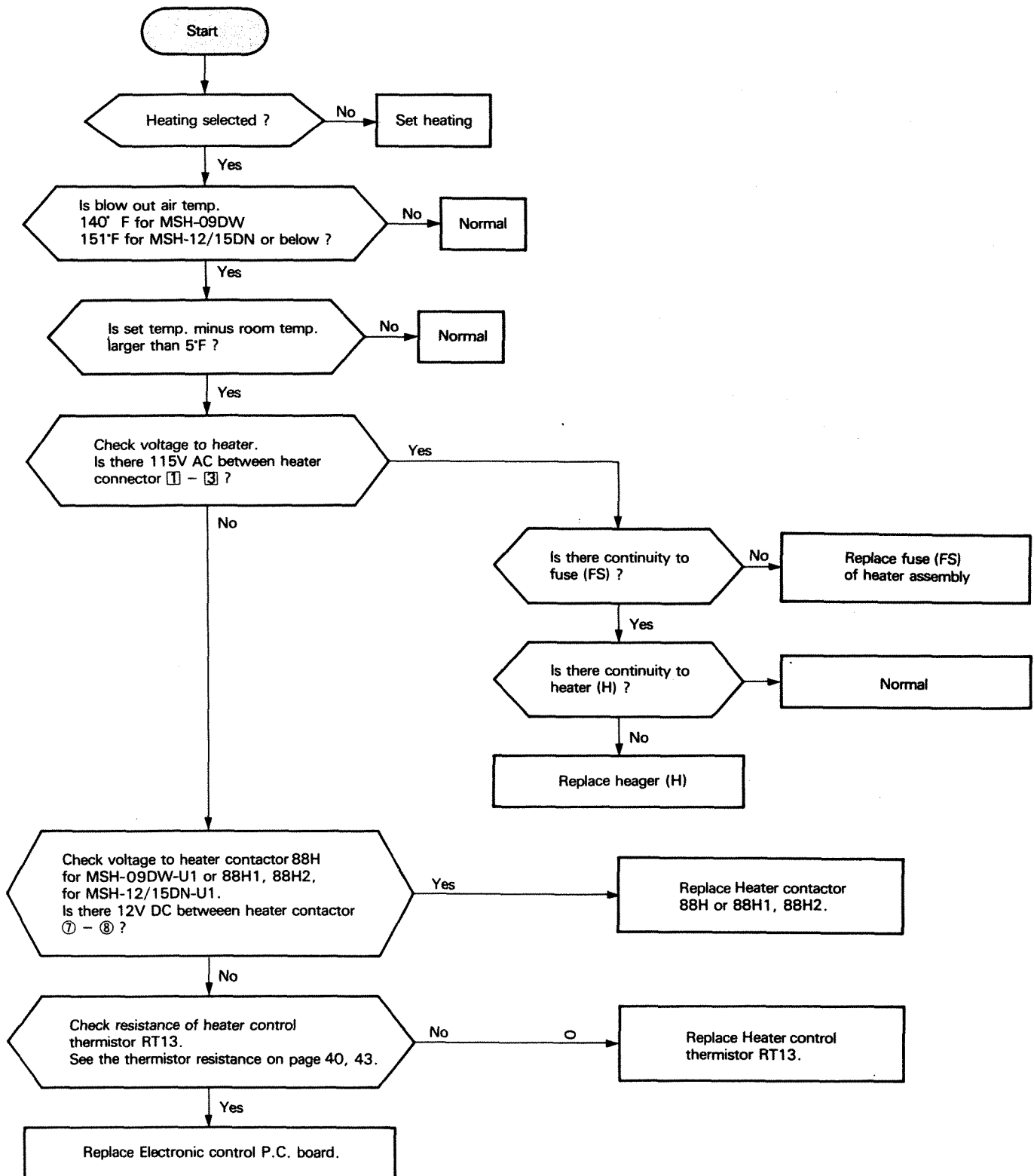


4. Heater does not work. (compressor and fan operate)

MSH-09DW - U1

MSH-12DN - U1

MSH-15DN - U1

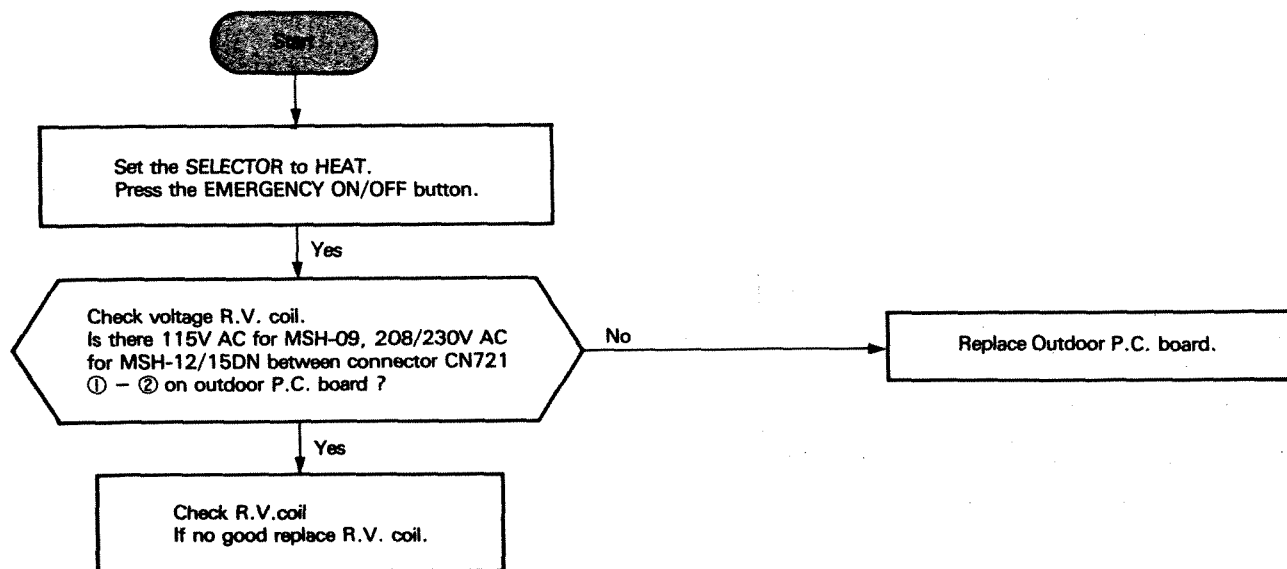


5. Heating operation does not work. (Cooling operation works)

MSH-09DW - U1

MSH-12DN - U1

MSH-15DN - U1



RELAY OPERATION

MS-09DW- U1

MSH-09DW- U1

MSH-12DN- U1

MSH-15DN- U1

MODE	THERMOSTAT	52C CONTACTOR	INDOOR FAN RELAY
COOL & COOL mode of I FEEL CONTROL	ON	ON	AUTO or set speed
	OFF	OFF	
DRY & DRY mode of I FEEL CONTROL	ON	For 2 min. is OFF, when system turn on first.	VLO speed.
		Repeats 8 min. ON 3 min. OFF operation	VLO links with 52C contactor.
	OFF	Repeats 4 min. OFF 1 min. ON operation	
HEAT & HEAT mode of I FEEL CONTROL MSH-09/12/15	ON	ON	AUTO or set speed.
	OFF	OFF	VLO speed
FAN MS-09	ON	OFF	AUTO or set speed
	OFF		OFF

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

COIL FROST PREVENTION mode are as follows

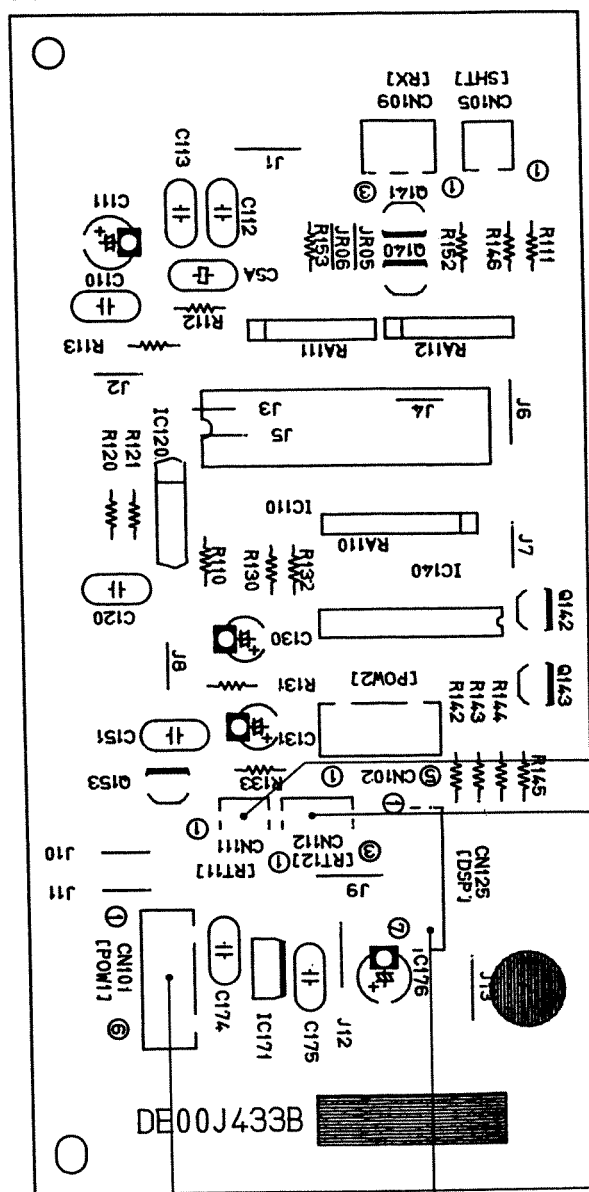
MODE	THERMOSTAT	52C CONTACTOR	INDOOR FAN RELAY
COOL & COOL mode of I FEEL CONTROL	ON	OFF for minimum 5 min. after 5 min. passed, remains off until indoor coil thermistor termination temp. When indoor coil thermistor temp. reach termination temp. it turns on.	Auto or set speed
DRY & DRY mode of I FEEL CONTROL			VLO speed

Indoor fan relay mode

Indoor fan speed	Relay turning ON
HI	X14 for MS-09 and MSH-09 X15 for MSH-12/15
MED	X13
LO	X12
VLO	X11
OFF	All fan relays are turn off

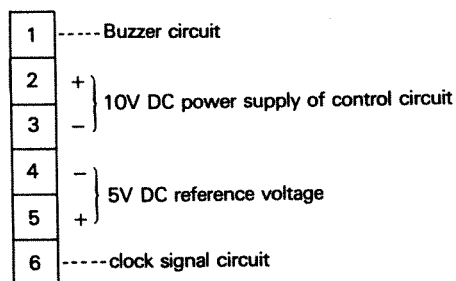
TEST POINT DIAGRAM AND VOLTAGE MS-09DW-U1

Electronic control P.C. board

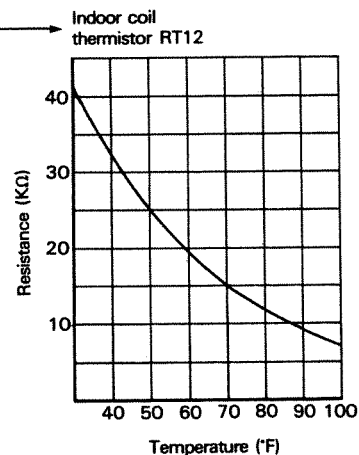
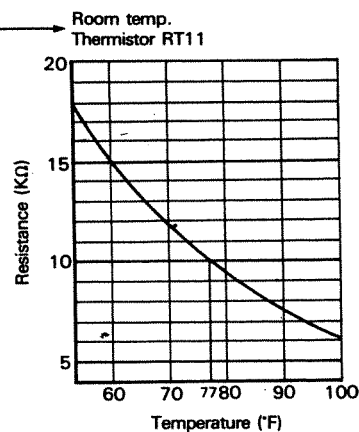


DE00J433B

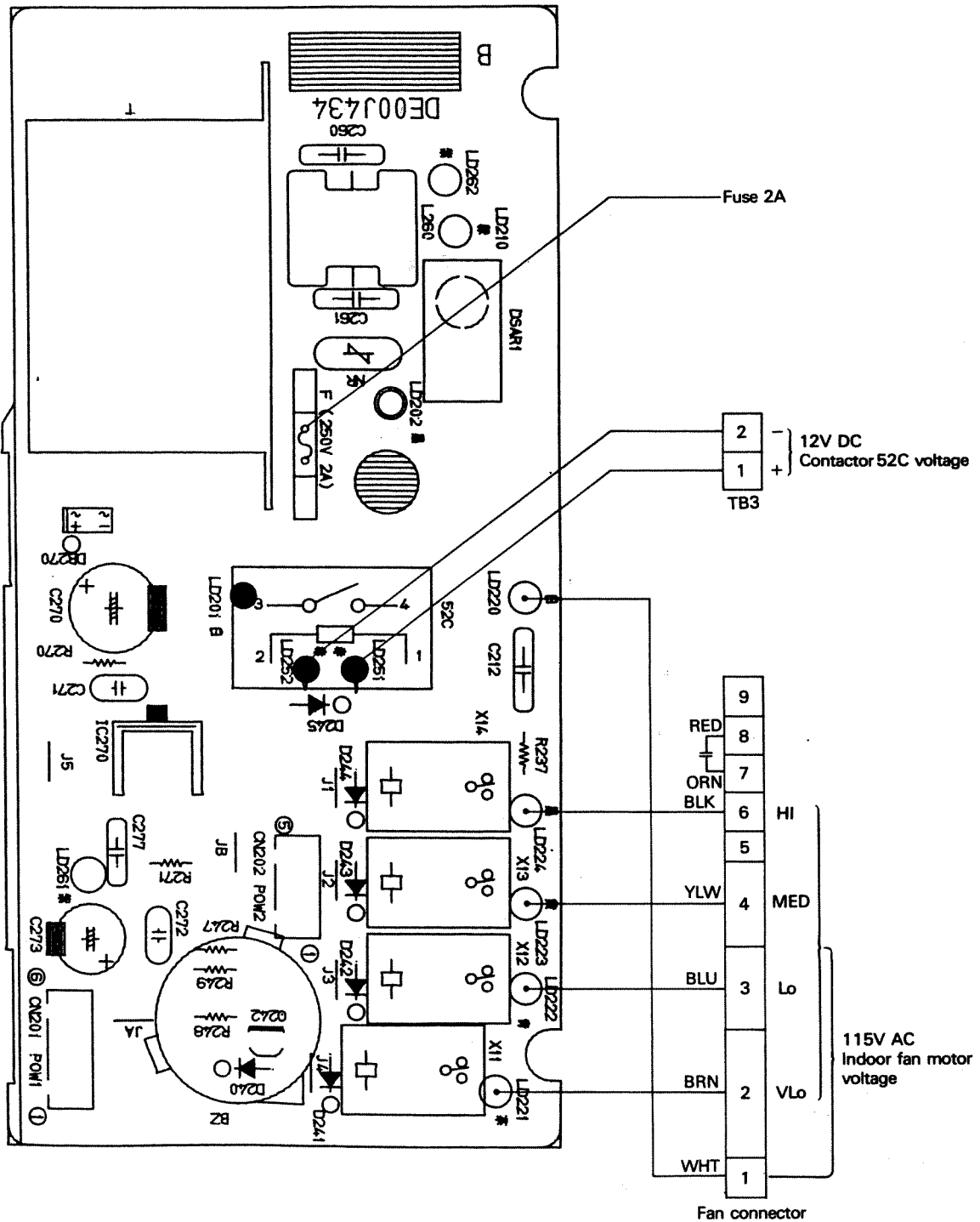
CN101
POW1



Auto restart connector
Shorten the connector CN125
between ⑤ - ⑦

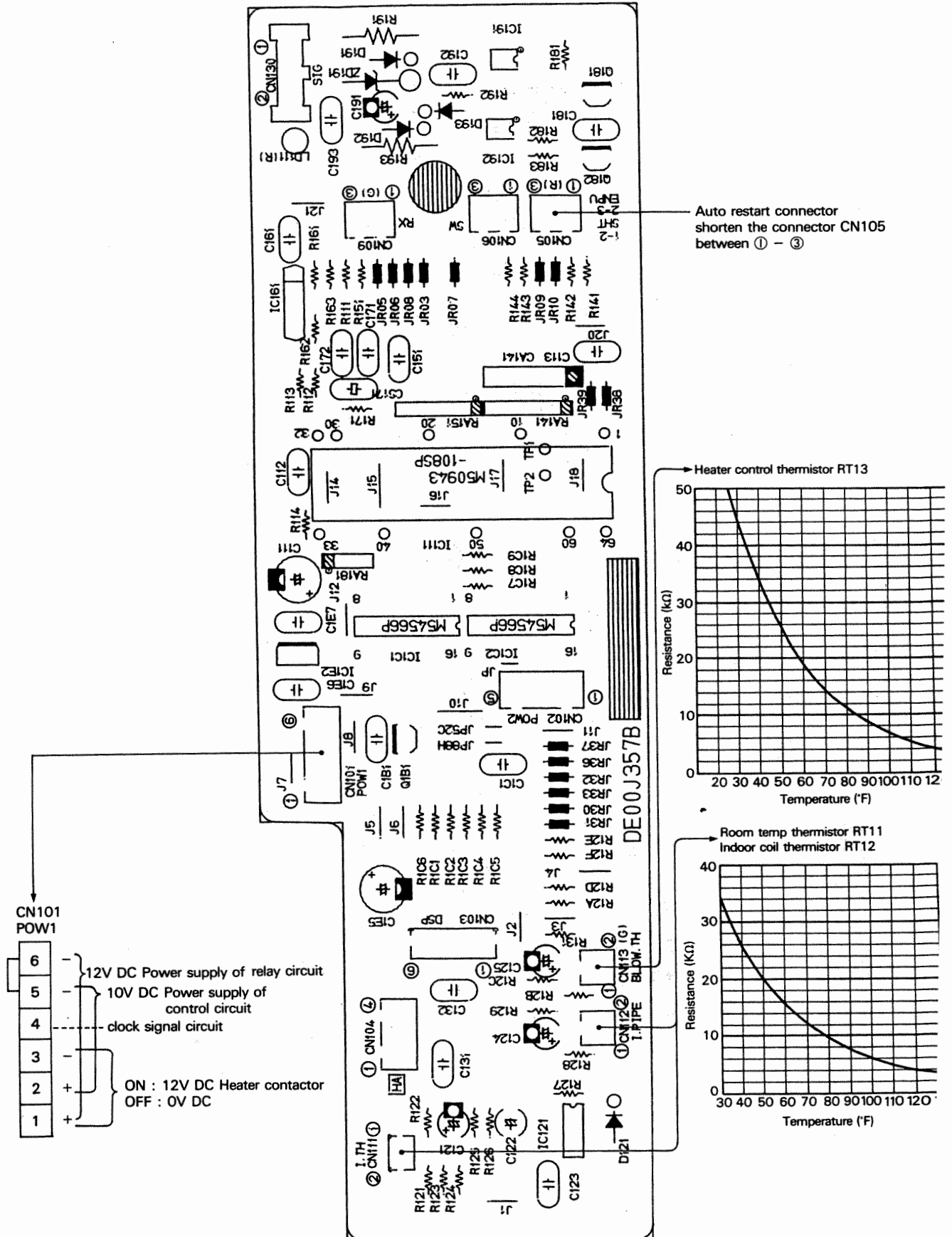


Power P.C. board

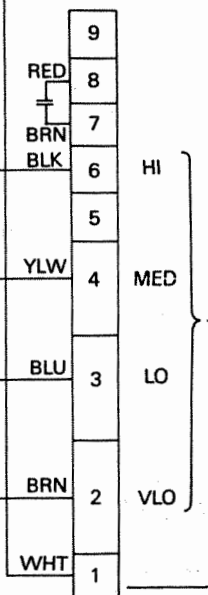


MSH-09DW- U1

Electronic control P.C. board



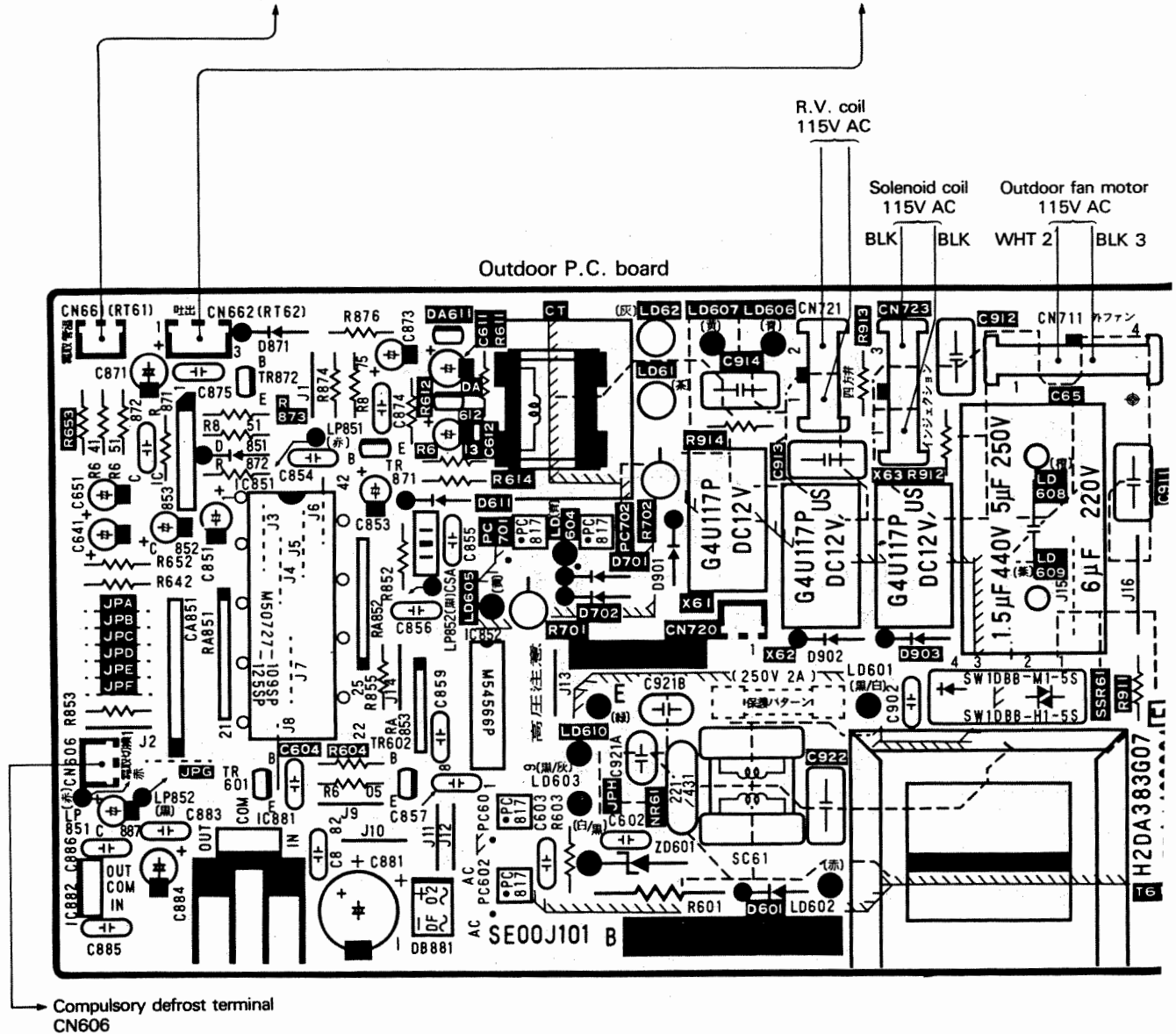
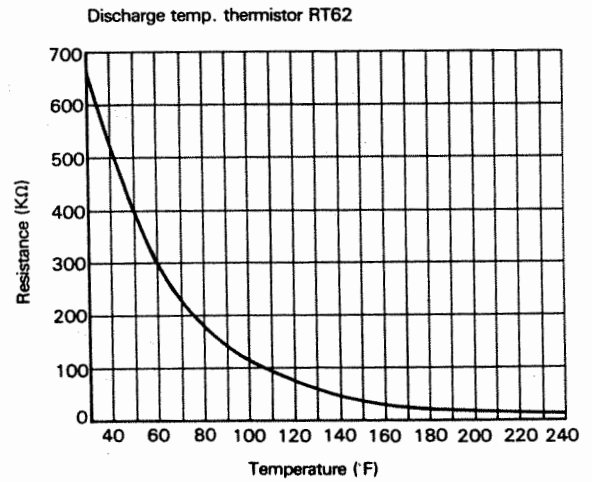
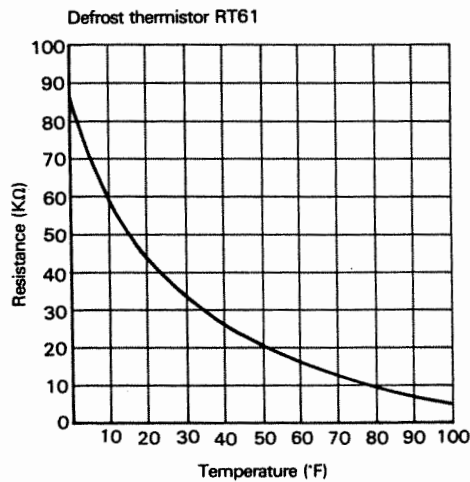
WHT -  Heater contactor
ON 12V DC
OFF 0V DC



Fan connector

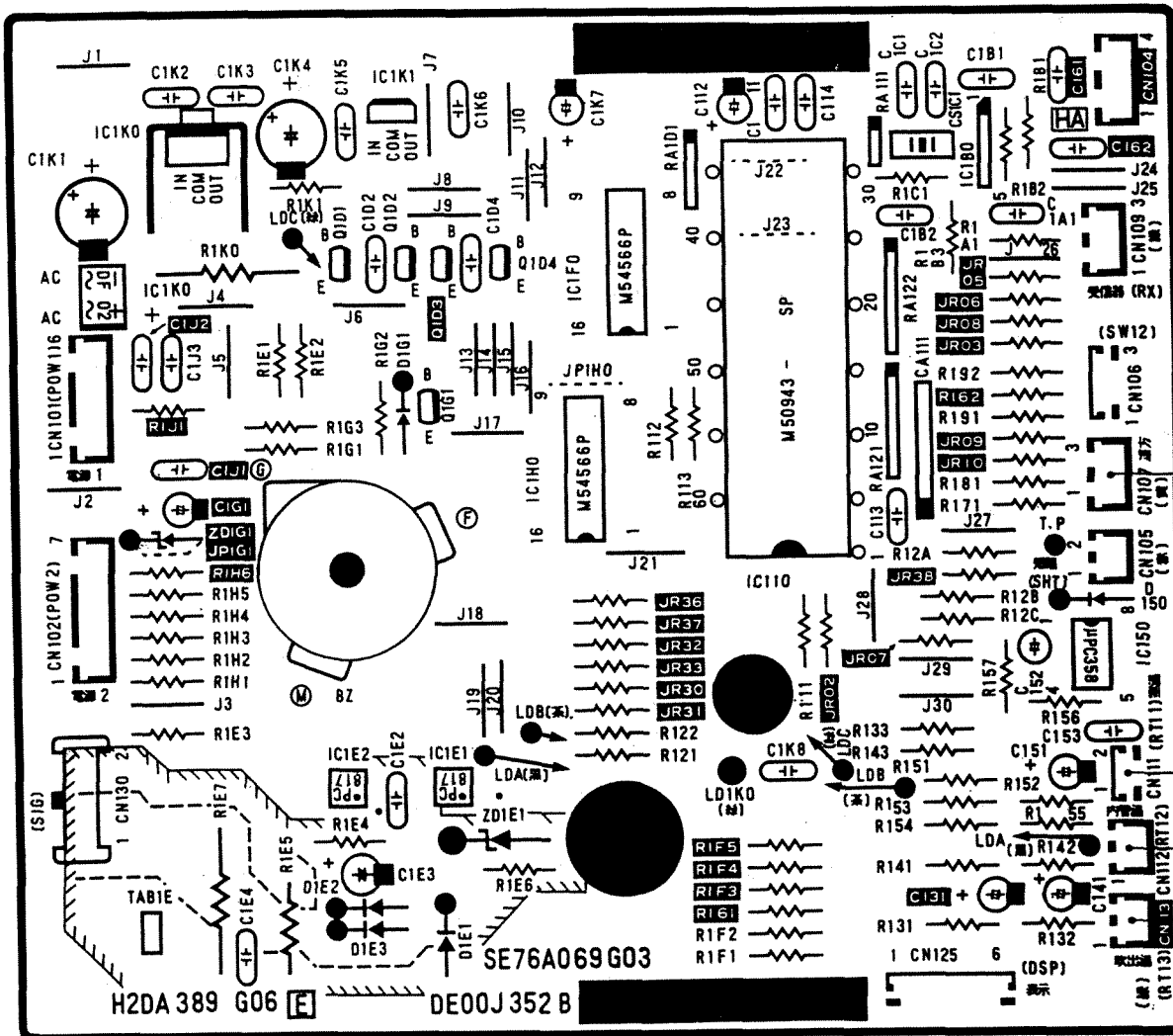
115V AC
Indoor fan motor
voltage

MUH-09DW- U1



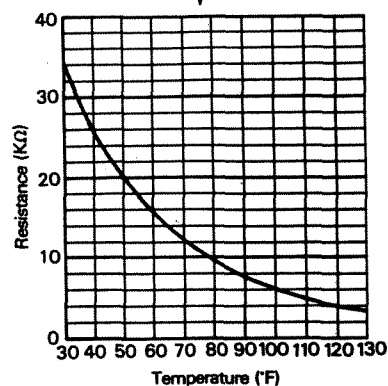
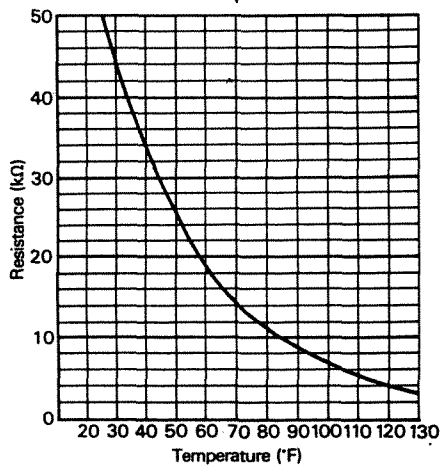
MSH-12DN- U1
MSH-15DN- U1

Electronic control P.C. board



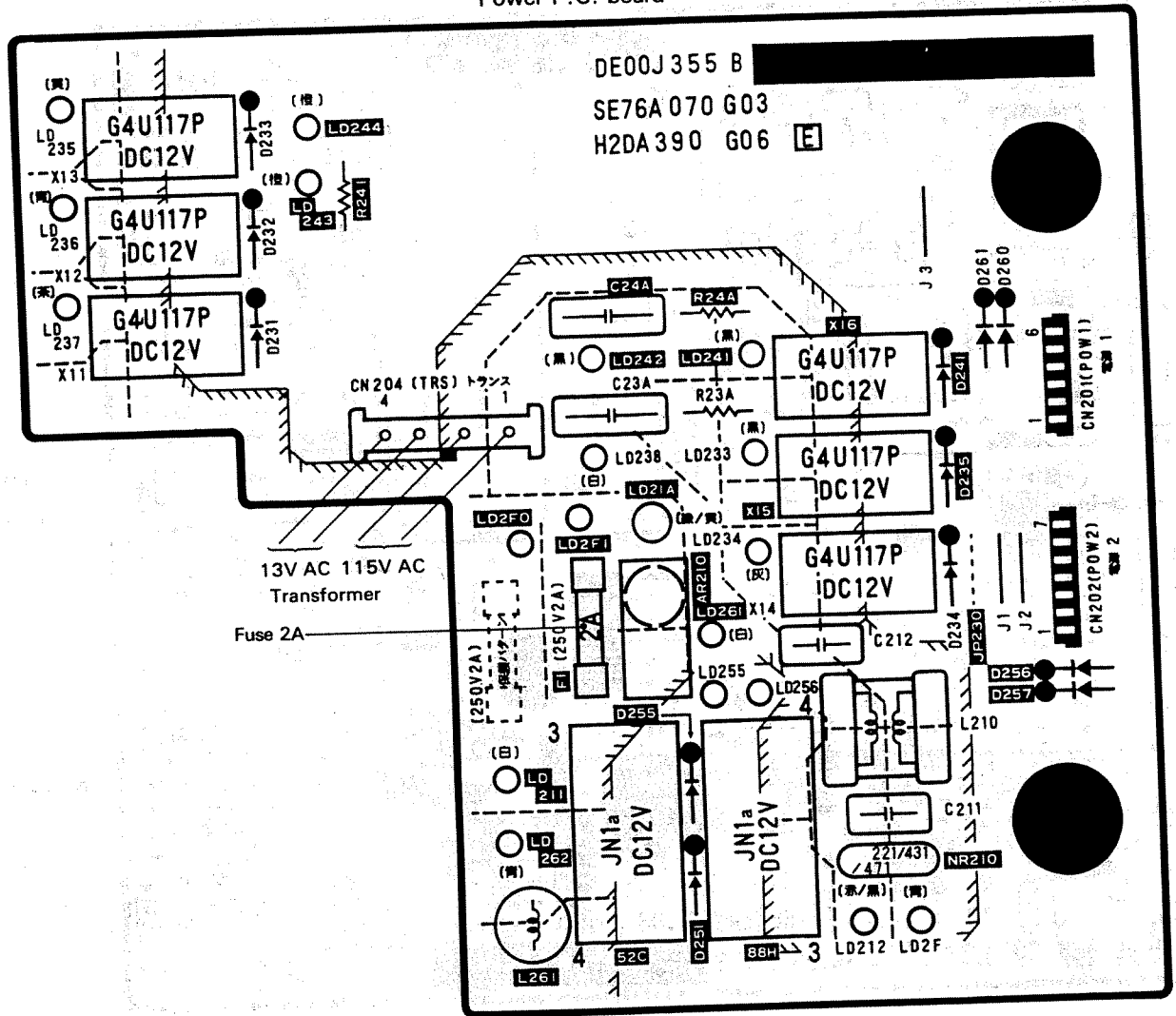
Auto restart
connector CN107
shorten the connector
① - ③

Room temp.
thermistor RT11
Indoor coil
thermistor RT12
Heater control
thermistor RT13

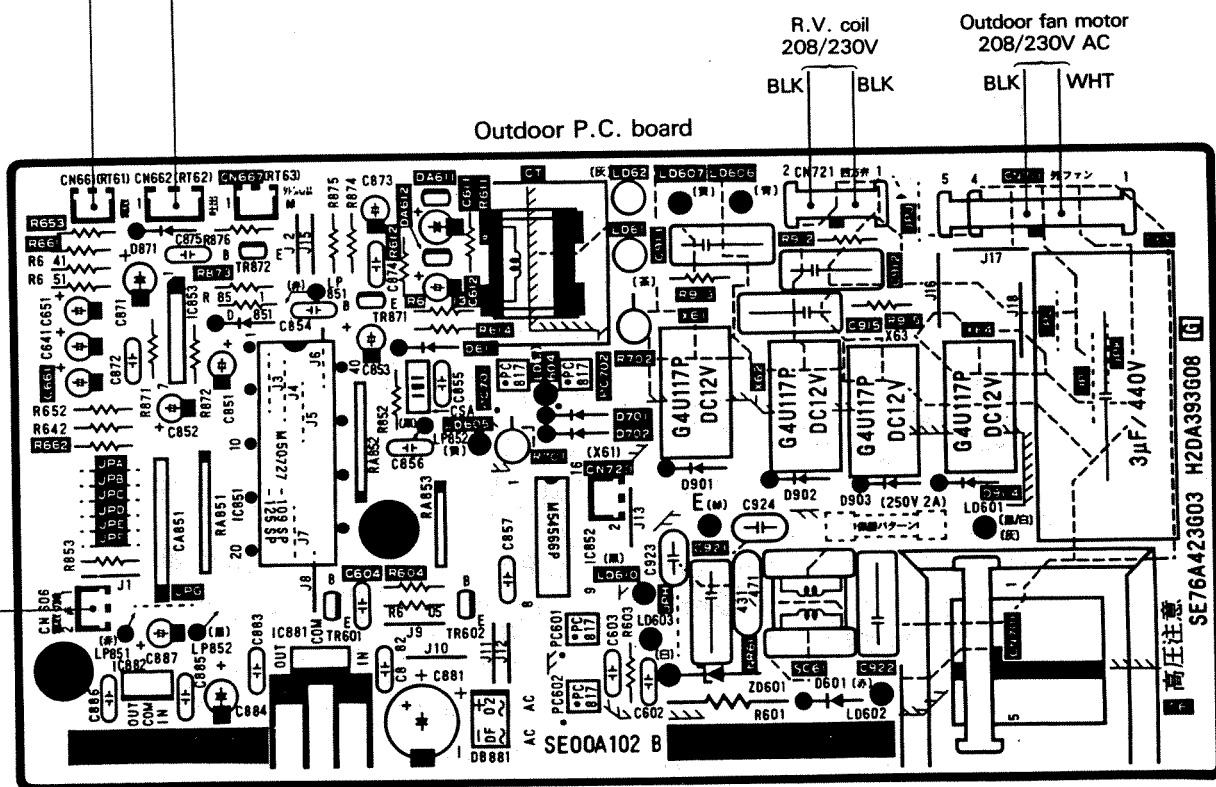
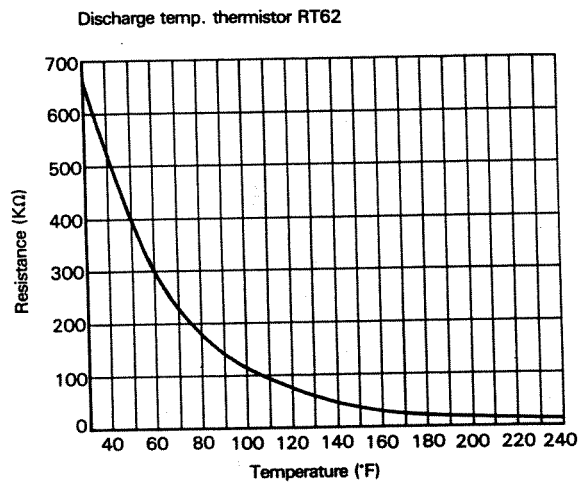
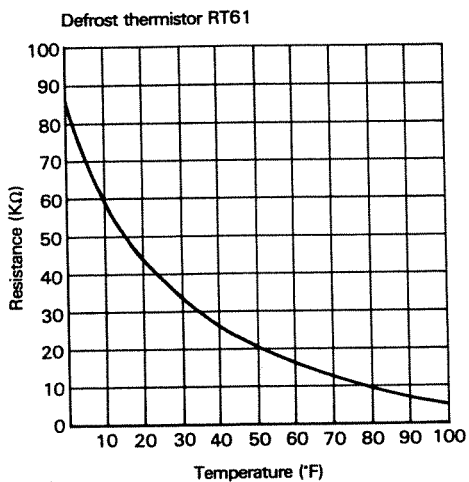


MSH-12DN- U1
MSH-15DN- U1

Power P.C. board



MSH-12DN- U1
MSH-15DN- U1

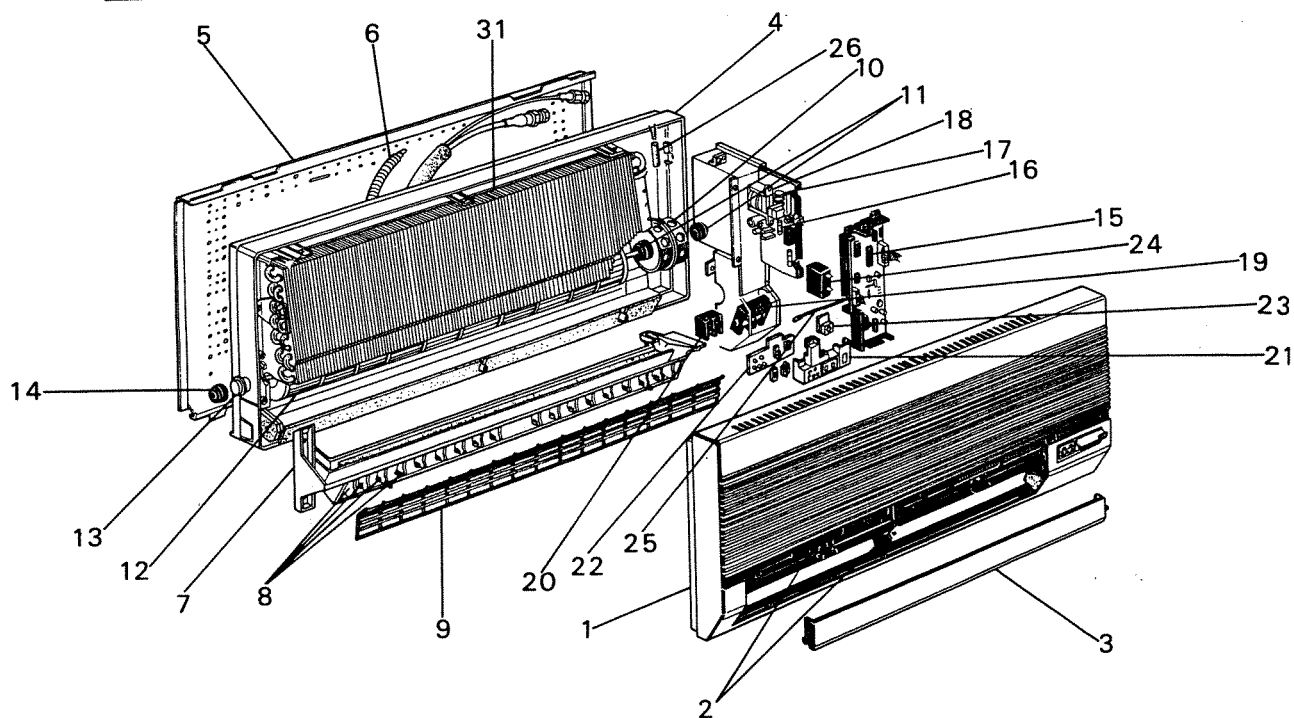


- Compulsory defrost terminal

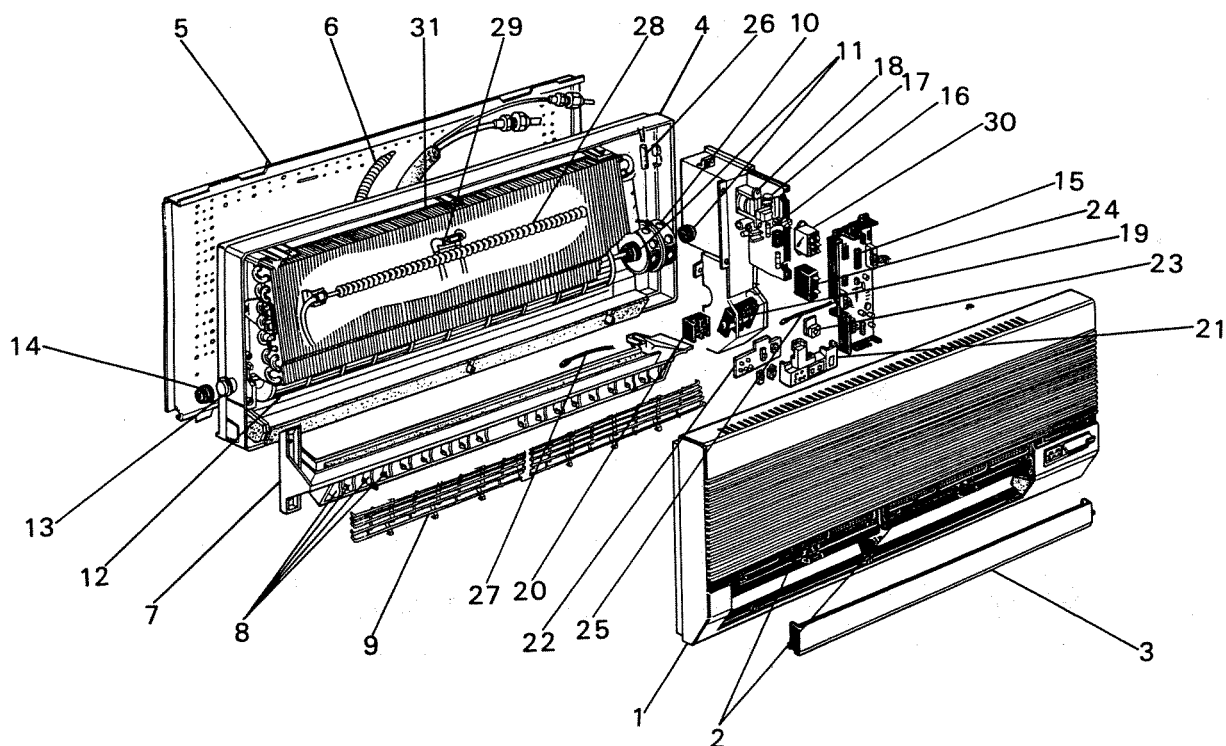
9

PARTS LIST

INDOOR UNIT PARTS MS-09DW- U1 (WG,SW)

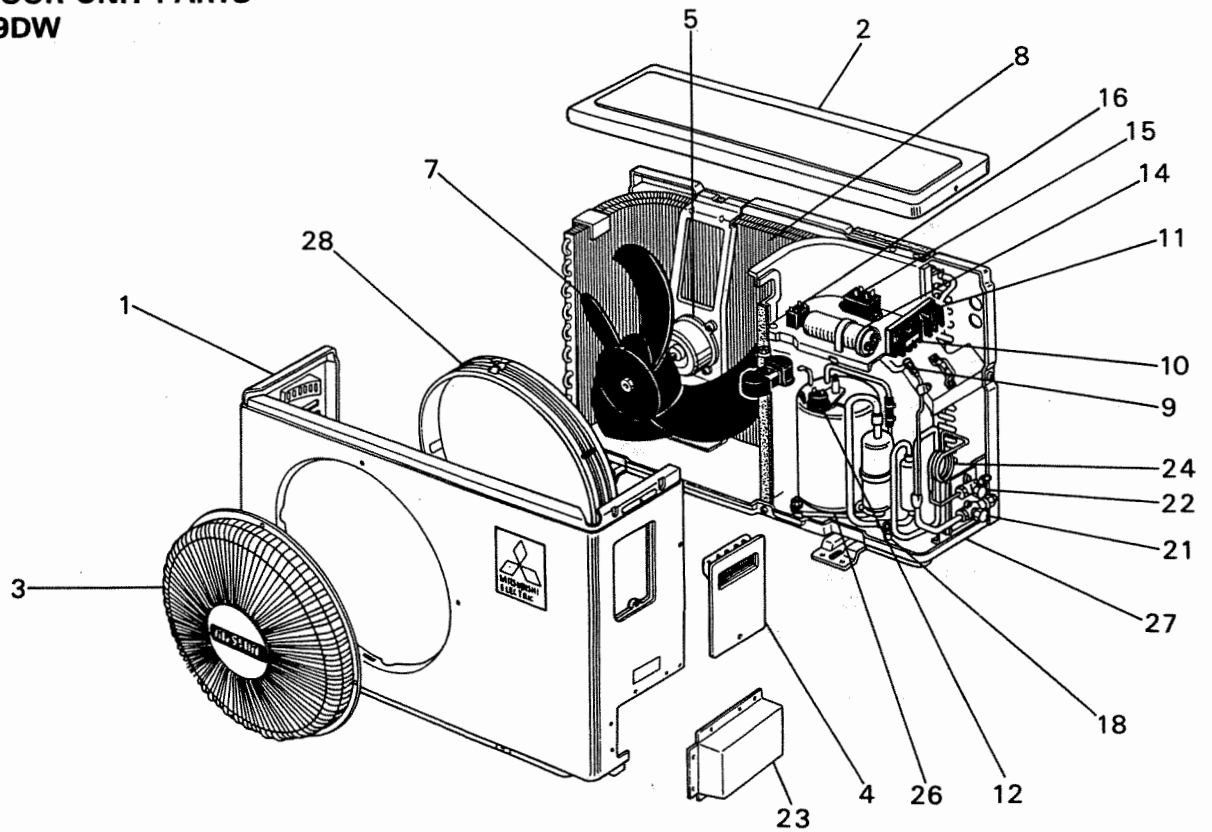


MSH-09DW- U1 (WG,SW)

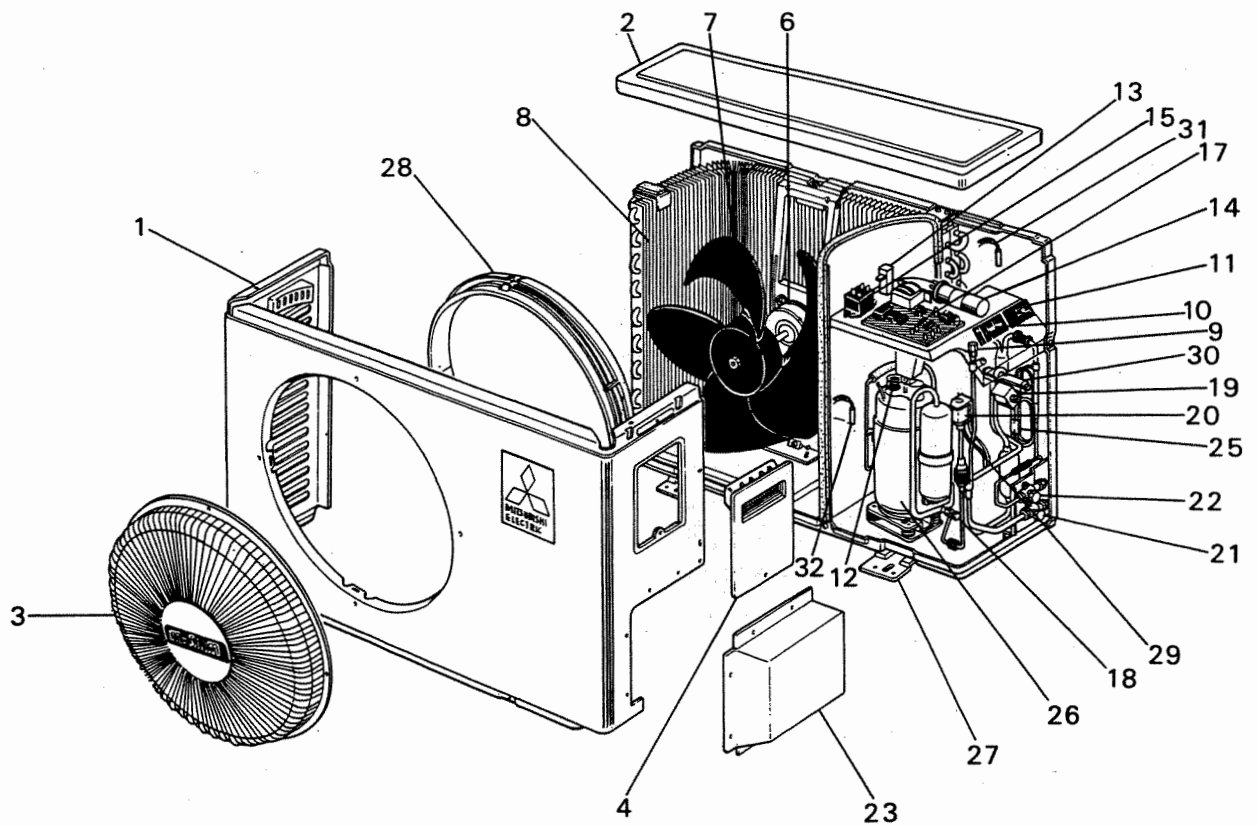


No.	Parts No.	Parts Name	Symbol in Skelton Wiring Diagram	Q'ty/unit			Remarks
				MS-09DW U1	MSH-09DW U1	SW	
1	T2W 680 000	FRONT PANEL ASSEMBLY (WG)		1			
	T2W 679 000	FRONT PANEL ASSEMBLY (SW)			1		
	T2W 636 000	FRONT PANEL ASSEMBLY (WG)			1		
2	T2W 416 100	FILTER		2	2	2	
	T2W 416 040	CHANGE VANE (WG)		1			
3	T2W 417 040	CHANGE VANE (SW)			1		
	T2W 679 234	BOX ASSEMBLY			1		
4	T2W 679 234	BOX ASSEMBLY		1			
	T2W 635 234	BOX ASSEMBLY			1		
5	M21 370 970	INSTALLATION PLATE		1	1	1	
	M21 478 703	DRAIN HOSE		1	1	1	
6	T2W 464 235	NOZZLE ASSEMBLY		1			
	T2W 636 235	NOZZLE ASSEMBLY			1		
7	T2W 635 040	GUIDE VANE (SET)		14	14	14	
	T2W 500 041	FAN GUARD		1	1	1	
10	T2W 679 300	INDOOR FAN MOTOR	MF11	1	1		SZW-12BBA
	T2W 635 300	INDOOR FAN MOTOR	MF11		1		SZW-12BAA
11	M21 036 505	RUBBER MOUNT		2	2	2	
	M21 480 302	LINE FLOW FAN		1			
12	M21 370 302	LINE FLOW FAN			1		
	M21 822 504	SLEEVE BEARING		1	1	1	
13	M21 822 504	SLEEVE BEARING		1	1	1	
	M21 036 509	BEARING MOUNT		1			
15	T2W 679 450	ELECT CONTROL P.C. BOARD			1		
	T2W 635 450	ELECT CONTROL P.C. BOARD			1		
16	T2W 416 382	INDOOR FUSE (2A)	F11	2	2	2	
	T2W 460 465	VARISTOR		1	1	1	
17	T2W 679 440	POWER P.C. BOARD	X11,X12,X13,X14 T11,DSAR11				
	T2W 635 440	POWER P.C. BOARD	X11,X12,X13,X14 T11,DSAR11	1	1		
18	T2W 679 375	TERMINAL BED (INDOOR)	TB1	1			
	T2W 626 374	TERMINAL BED (INDOOR)	TB1		1		
19	T2W 534 375	TERMINAL BED (INDOOR)	TB3	1	1	1	
	T2W 636 329	LAMP BOX		1	1	1	
22	T2W 679 329	DISPLAY & SWITCH P.C. BOARD			1		
	T2W 635 329	DISPLAY & SWITCH P.C. BOARD			1		
23	M21 N00 468	RECEIVER P.C. BOARD		1	1	1	
	T2W 635 350	INDOOR FAN CAPACITOR	C11	1	1	1	
24	T2W 679 307	ROOM TEMP. THERMISTOR	RT11	1			
	T2W 638 308	ROOM TEMP. THERMISTOR	RT11		1		
25	T2W 679 308	INDOOR COIL THERMISTOR	RT12	1			
	T2W 638 307	INDOOR COIL THERMISTOR	RT12		1		
26	T2W 635 308	HEATER CONTROL THERMISTOR	RT13		1		
	T2W 460 380	HEATER	H		1		
29	T2W 460 382	THERMAL FUSE	FS		1		282°F 10A
	T2W 359 342	HEATER CONTACTOR	88H				
30	T2W 416 620	INDOOR HEAT EXCHANGER		1			
	T2W 460 620	INDOOR HEAT EXCHANGER			1		
31	T2W 460 620	INDOOR HEAT EXCHANGER					

OUTDOOR UNIT PARTS **MU-09DW**



MUH-09DW



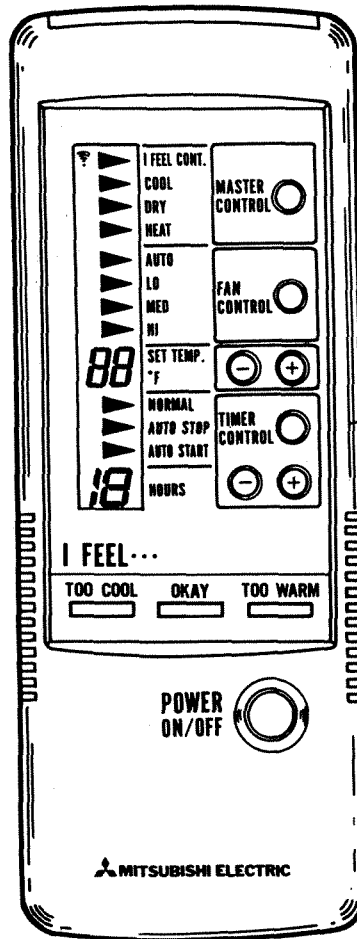
No.	Parts No.	Parts Name	Symbol in Skeleton wiring Diagram	Q'ty/unit		Remarks
				MU-09 DW-U1	MUH-09 DW-U1	
1	T2W 464 232	CABINET		1	1	
2	M21 478 297	TOP PANEL		1	1	
3	T2W 416 521	FAN GUARD		1	1	
4	M21 A00 245	SERVICE PANEL		1	1	
5	T2W 679 301	OUTDOOR FAN MOTOR	MF61	1		
6	T2W 635 301	OUTDOOR FAN MOTOR	MF61		1	
7	M21 601 501	PROPELLER		1	1	
8	M21 416 630	OUTDOOR HEAT EXCHANGER		1		
	M21 616 630	OUTDOOR HEAT EXCHANGER			1	
9	T2W 457 641	CHARGE PLUG		1	1	
10	T2W 460 374	OUTDOOR TERMINAL BED	TB2	1	1	
11	M21 534 375	OUTDOOR TERMINAL BED	TB4	1	1	
12	T2W 464 340	THERMAL OVERCURRENT RELAY	51C	1		
	T2W 460 340	THERMAL OVERCURRENT RELAY	51C		1	
13	T2W 635 465	OUTDOOR SURGE ABSORBER	DSAR61		1	
14	T2W 680 353	COMP. CAPACITOR	C61	1	1	30 μ F 330V
15	T2W 382 342	COMP. CONTACTOR	52C	1	1	
16	T2W 679 350	OUTDOOR MOTOR CAPACITOR	C65	1		5 μ F 250V
17	T2W 636 451	OUTDOOR P.C. BOARD	X62,X63,SSR61 T61,NR61,F61		1	
18	T2W 416 642	FUSIBLE PLUG		1	1	
19	T2W 636 389	R.V. COIL	21S4		1	
20	T2W 636 488	SOLENOID COIL	21R		1	
21	T2W 460 661	VALVE (GAS)		1	1	
22	T2W 460 662	VALVE (LIQUID)		1	1	
23	T2W 460 246	VALVE COVER		1	1	
24	M21 987 936	CAPILLARY TUBE*		1		
25	T2W 460 645	RESTRICTOR VALVE ASSEMBLY*			1	Included: capillary tube
26	T92 504 272	COMPRESSOR	MC	1		KH-419 WAD
	T92 502 453	COMPRESSOR	MC		1	RHS-135 WAE
27	T2W 464 290	BASE ASSEMBLY		1		
	T2W 460 290	BASE ASSEMBLY			1	
28	T2W 416 509	OUTER NOZZLE		1	1	
29	M21 478 644	SOLENOID VALVE			1	
30	T2W 460 961	4 WAY VALVE			1	
31	T2W 636 307	DEFROST THERMISTOR	RT61		1	
32	T2W 636 308	DISCHARGE THERMISTOR	RT62		1	

*When servicing, cut the tube according to the length specified in the REFRIGERANT SYSTEM DIAGRAM. See page 17.

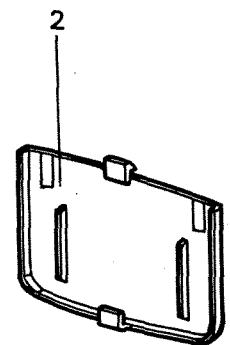
REMOTE CONTROLLER

MS-09DW- U1

MSH-09DW- U1



MSH-09DW-U1

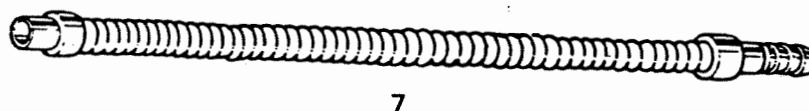
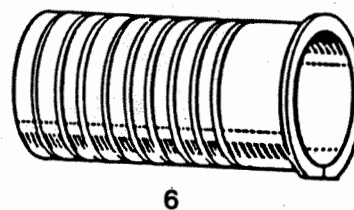
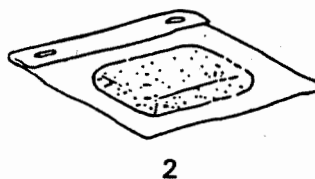
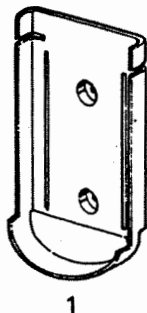


No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit		Remarks
				MS-09 DW-U1	MSH-09 DW-U1	
1	T2W 679 426	WIRELESS REMOTE CONTROLLER		1		
	T2W 635 426	WIRELESS REMOTE CONTROLLER			1	
2	M21 N28 017	BATTERY COVER		1	1	

ACCESSORY PARTS

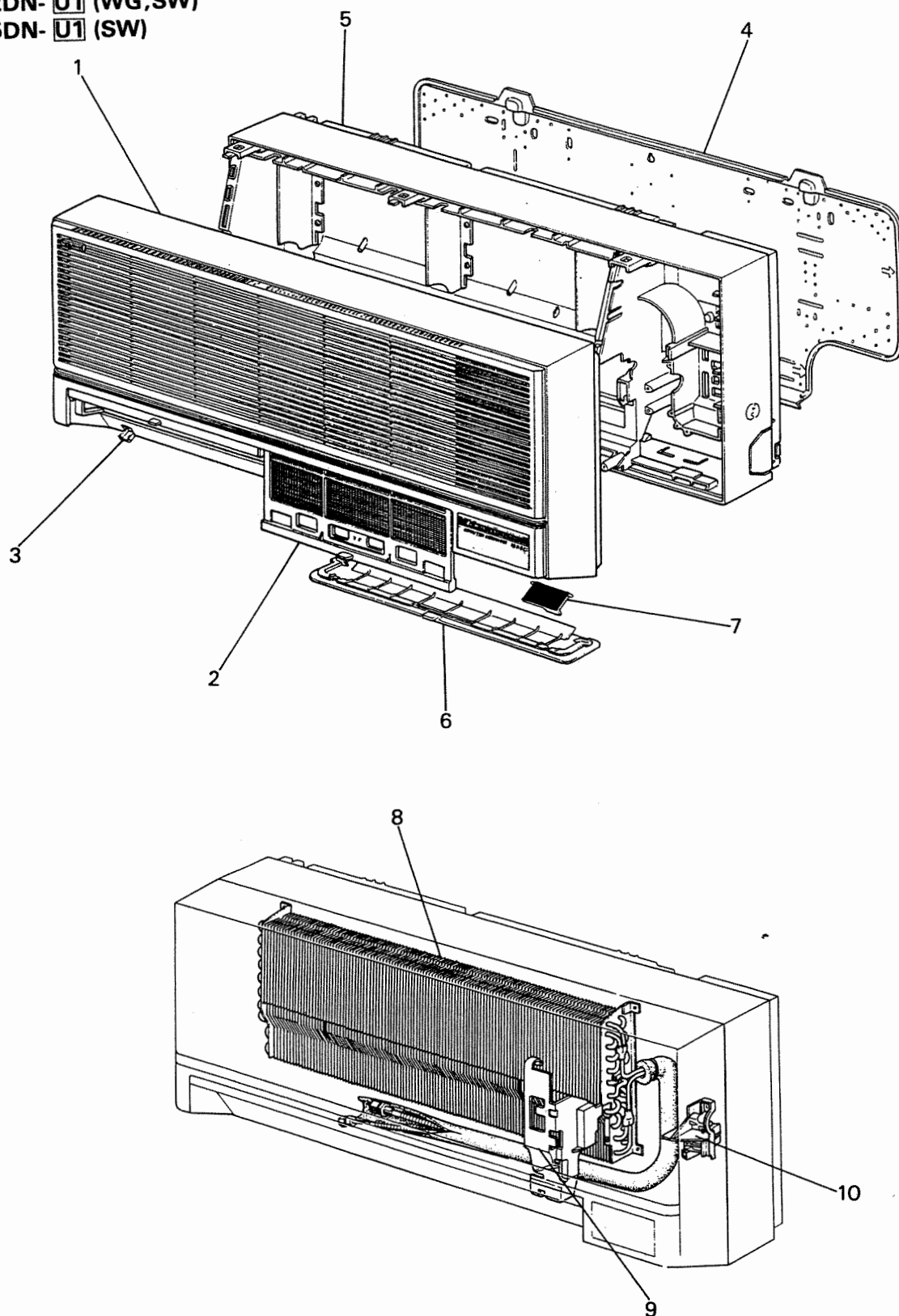
MS-09DW- U1

MSH-09DW- U1



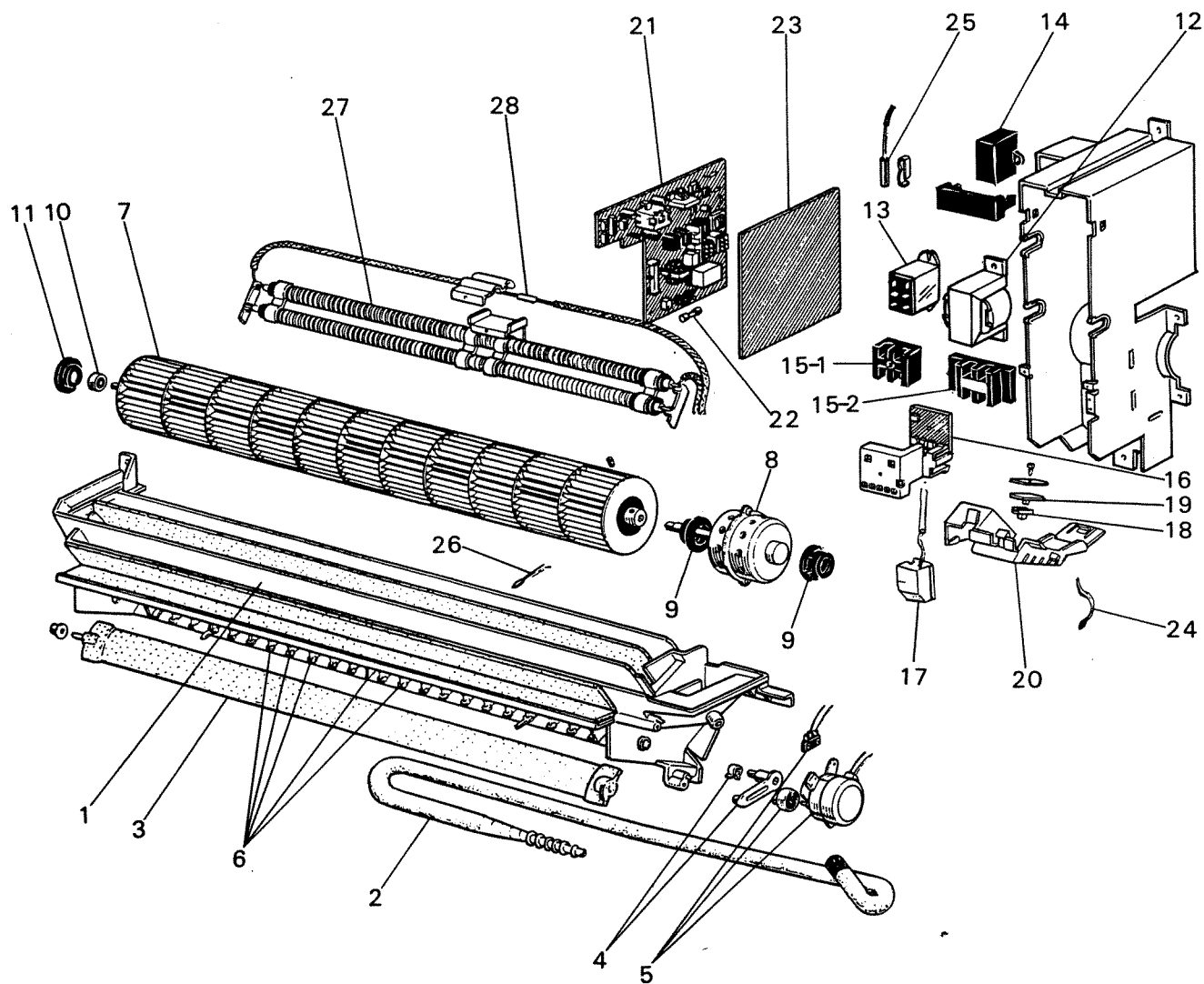
No.	Parts No.	Parts Name	Symbol in Skeleton wiring Diagram	Q'ty/unit		Remarks
				MS-09 DW-U1	MSH-09 DW-U1	
1	M21 N28 083	REMOTE CONTROLLER MOUNTING HARDWARE		1	1	
2	M21 478 919	PUTTY		1	1	
3	M21 478 917	PIPING TAPE		1	1	
4	M21 480 708	PIPE FIXING BAND		3	3	
5	M21 480 973	PIPE HOLE COVER		1	1	
6	M21 480 977	WALL HOLE SLEEVE		1	1	
7	M21 480 703	DRAIN HOSE		1	1	

INDOOR UNIT PARTS
MSH-12DN- U1 (WG,SW)
MSH-15DN- U1 (SW)



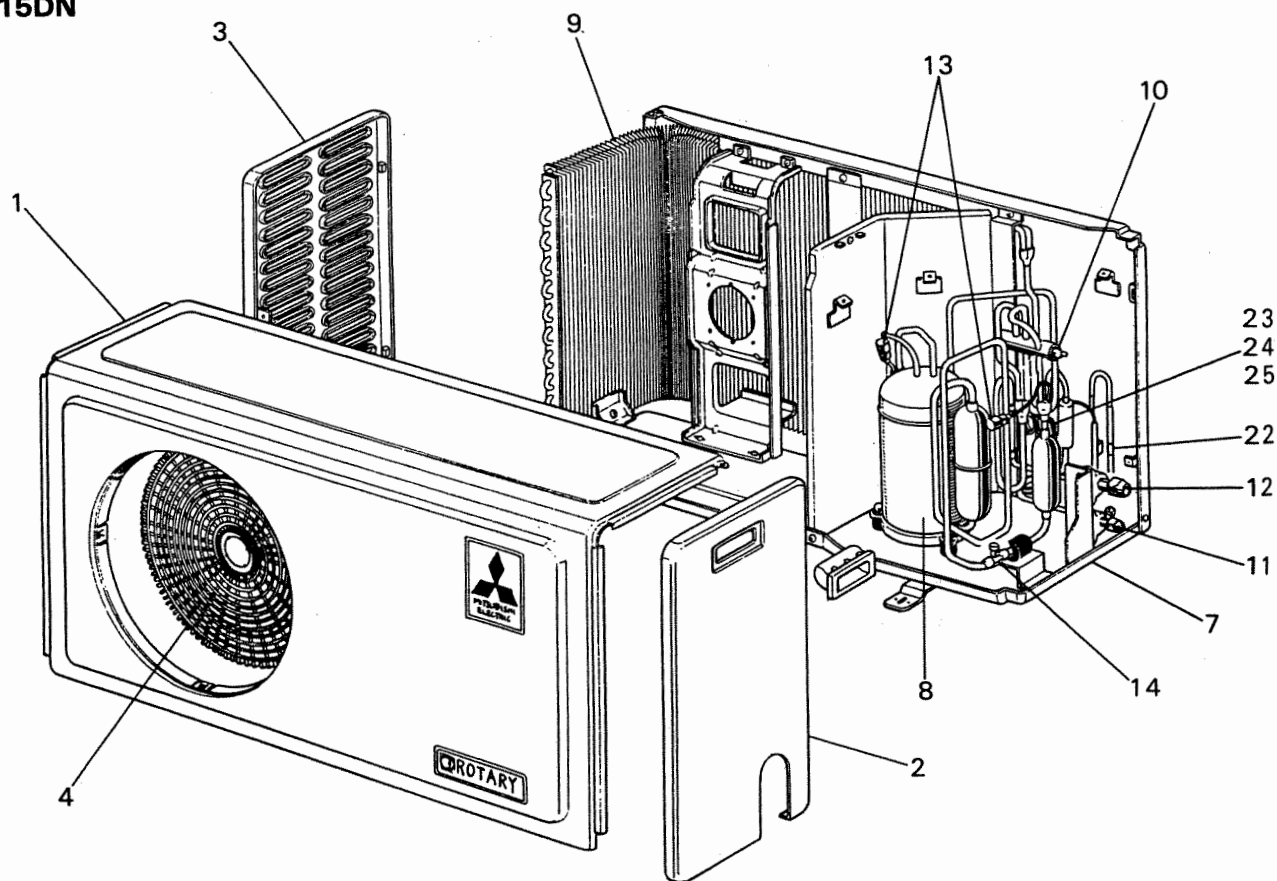
No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit				Remarks
				MSH-12DN U1		MSH-15DN U1		
				SW	WG	SW		
1	T2W 659 000	FRONT PANEL ASSEMBLY (SW)		1		1		
	T2W 660 000	FRONT PANEL ASSEMBLY (WG)			1			
2	T2W 516 100	FILTER (SW)		1		1		
	T2W 517 100	FILTER (WG)			1			
3	T2W 510 067	SCREW CAP (SW)		3		3		3PCS set
	T2W 511 067	SCREW CAP (WG)			3			3PCS set
4	T2W 516 970	INSTALLATION PLATE		1	1	1		
5	T2W 521 234	BOX ASSEMBLY (SW)		1		1		
	T2W 522 234	BOX ASSEMBLY (WG)			1			
6	T2W 521 975	UNDER COVER (SW)		1		1		
	T2W 522 975	UNDER COVER (WG)			1			
7	T2W 595 004	PANEL COVER		1	1	1		
8	T2W 516 620	INDOOR HEAT EXCHANGER		1	1			
	T2W 538 620	INDOOR HEAT EXCHANGER				1		
9	M21 B19 750	WATER SHIELD		1	1	1		
10	T2W 521 911	PIPE SUPPORT		1	1	1		

INDOOR UNIT PARTS
MSH-12DN- U1 (WG,SW)
MSH-15DN- U1 (SW)

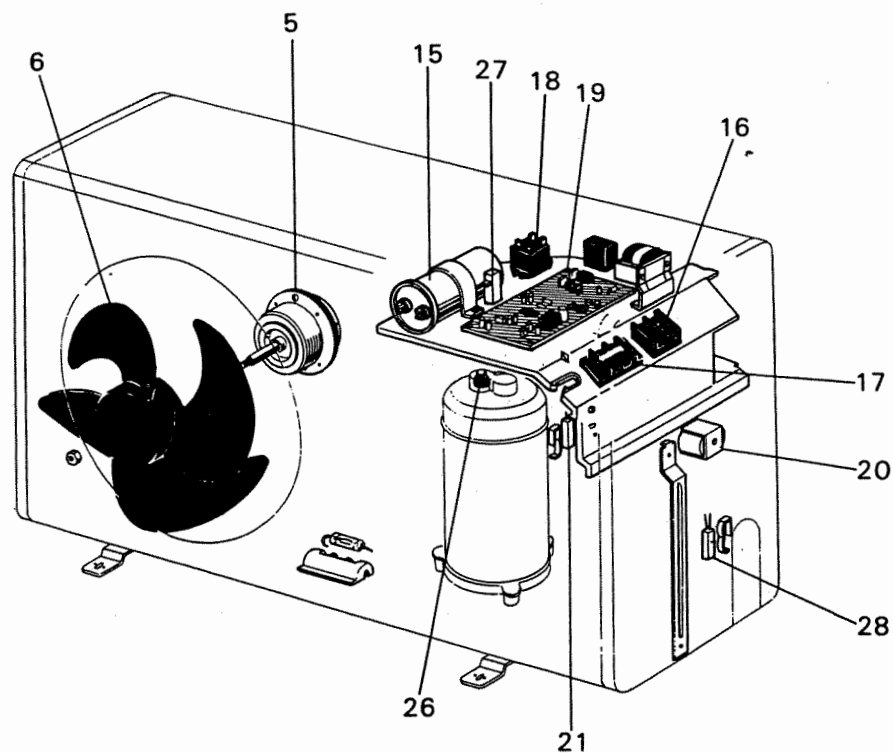


No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit				Remarks
				MSH-12DN U1		MSH-15DN U1		
				SW	WG	SW		
1	T2W 659 235	NOZZLE ASSEMBLY (SW)		1		1		
	T2W 660 235	NOZZLE ASSEMBLY (SW)			1			
2	T2W 521 703	DRAIN HOSE		1	1	1		
3	T2W 516 040	VANE ASSEMBLY (SW)		1		1		
	T2W 517 040	VANE ASSEMBLY (SW)			1			
4	T2W 516 041	VANE SPRING ARM HOLDER SET		1	1	1		
5	T2W 659 303	VANE MOTOR	MV	1	1	1		with micro sw and cam
6	T2W 521 042	GUIDE VANE SET (SW)		1		1		
	T2W 522 042	GUIDE VANE SET (WG)			1			
7	T2W 521 302	LINE FLOW FAN		1	1	1		
8	T2W 659 300	INDOOR FAN MOTOR	MF11	1	1			S4W-26B-AA
	T2W 661 300	INDOOR FAN MOTOR	MF11			1		S4W-23B-AA
9	M21 453 505	RUBBER MOUNT (MOTOR)		2	2	2		
10	M21 B00 504	SLEEVE BEARING		1	1	1		
11	M21 B00 509	BEARING MOUNT		1	1	1		
12	T2W 659 339	TRANSFORMER	T11	1	1	1		
13	R01 479 215	HEATER CONTACTOR	88H1	2	2	2		
14	T2W 635 350	INDOOR FAN CAPACITOR	C11	1	1	1		
15-1	M21 534 375	INDOOR TERMINAL BED	TB3	1	1	1		
15-2	T2W 659 374	INDOOR TERMINAL BED	TB1	1	1	1		
16	T2W 659 329	DISPLAY P.C. BOARD		1	1	1		
17	M21 N00 468	RECEIVER P.C. BOARD		1	1	1		
18	T2W 521 320	SLIDE KNOB		1	1	1		
19	T2W 659 443	SWITCH P.C. BOARD		1	1	1		
20	T2W 659 782	SWITCH HOLDER		1	1	1		
21	T2W 659 440	POWER P.C. BOARD		1	1	1		
22	T2W 416 382	INDOOR FUSE	F11	1	1	1		2A
23	T2W 659 450	ELECTRONIC CONTROL P.C. BOARD		1	1			
	T2W 661 450	ELECTRONIC CONTROL P.C. BOARD				1		
24	M21 N28 307	ROOM TEMP. THERMISTOR	RT11	1	1	1		
25	M21 N29 307	INDOOR COIL THERMISTOR	RT12	1	1	1		
26	T2W 659 307	HEATER CONTROL THERMISTOR	RT13	1	1	1		
27	T2W 659 380	HEATER	H	2	2	2		
28	T2W 659 383	THERMAL FUSE	FS	1	1	1		378°F 15A

OUTDOOR UNIT PARTS
MUH-12DN
MUH-15DN



MUH-12DN
MUH-15DN



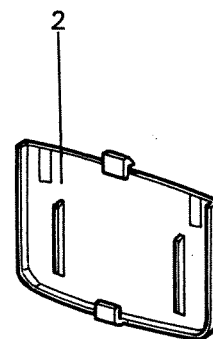
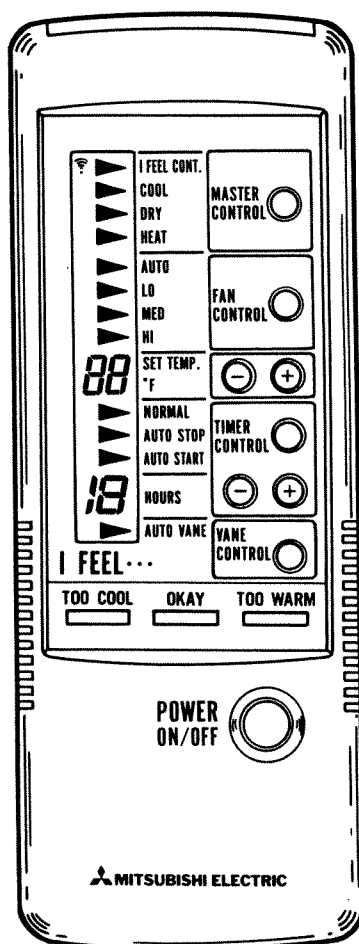
No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit		Remarks
				MUH-12 DN-U1	MUH-15 DN-U1	
1	T2W 510 232	CABINET		1	1	
2	T2W 521 245	SERVICE PANEL		1	1	
3	T2W 521 249	SIDE PANEL		1	1	
4	T2W 521 509	OUTER NOZZLE		1	1	
5	T2W 659 301	OUTDOOR FAN MOTOR	MF61	1	1	S6N-50F-DA
6	R01 093 115	PROPELLER		1	1	
7	T2W 659 290	BASE ASSEMBLY		1	1	
8	T92 542 452	COMPRESSOR	MC		1	RH-231NAB
	T92 660 452	COMPRESSOR	MC	1		RH-189NAB
9	T2W 521 630	OUTDOOR HEAT EXCHANGER		1	1	
10	M21 975 961	4 WAY VALVE		1	1	
11	T2W 460 662	VALVE (LIQUID)		1	1	
12	T2W 521 661	VALVE (GAS)		1	1	
13	T2W 457 641	CHARGE PLUG		2	2	
14	T2W 416 642	FUSIBLE PLUG		1	1	
15	T2W 572 353	COMP. CAPACITOR	C61		1	30 μ F380V
	T2W 500 353	COMP. CAPACITOR	C61	1		25 μ F370V
16	T2W 659 375	OUTDOOR TERMINAL BED	TB2	1	1	
17	T2W 534 375	OUTDOOR TERMINAL BED	TB4	1	1	
18	T2W 359 340	COMP. CONTACTOR	52C	1	1	VF-12HU DC12V25A
19	T2W 659 451	OUTDOOR P.C. BOARD		1	1	
20	T7W 867 242	R.V COIL	21S4	1	1	
21	M21 N29 308	DISCHARGE TEMP. THERMISTOR	RT62	1	1	
22	M21 275 642	RESTRICTOR VALVE		1	1	
23	M21 195 936	CAPILLARY TUBE		2	2	$\phi 0.12 \times \phi 0.055$ $l=29-17/32$
24	M21 987 936	CAPILLARY TUBE		1	1	$\phi 0.12 \times \phi 1/16$ $l=126$
25	M21 988 936	CAPILLARY TUBE			1	$\phi 0.12 \times \phi 0.071$ $l=138$
26	M21 657 330	THERMAL OVERCURRENT RELAY	51C		1	MRA-98922
	M21 394 330	THERMAL OVERCURRENT RELAY	51C	1		MRA-9892
27	T2W 635 465	OUTDOOR SURGE ABSORBER	DSAR61	1	1	
28	M21 N28 308	DEFROST THERMISTOR	RT61	1	1	

When servicing, cut the tube according to the length specified in the REFRIGERANT SYSTEM DIAGRAM. See page 18.

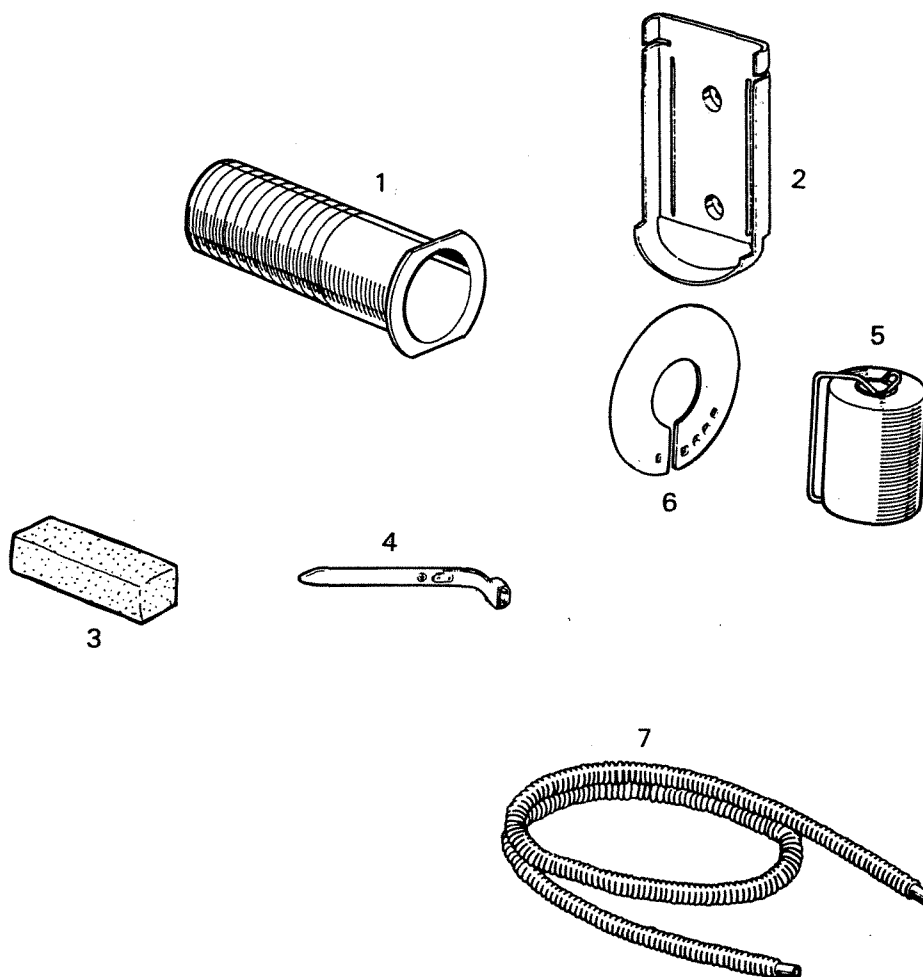
REMOTE CONTROLLER

MSH-12DN- **U1**

MSH-15DN- **U1**



No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit		Remarks
				MSH-12 DN-U1	MSH-15 DN-U1	
1	T2W 659 426	WIRELESS REMOTE CONTROLLER		1	1	
2	M21 N28 017	BATTERY COVER		1	1	



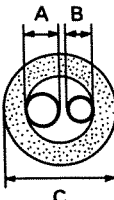
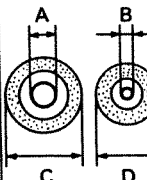
No.	Parts No.	Parts Name	Symbol in Skeleton Wiring Diagram	Q'ty/unit		Remarks
				MSH-12 DN-U1	MSH-15 DN-U1	
1	M21 K50 977	WALL HOLE SLEEVE		1	1	
2	M21 N28 083	REMOTE CONTROLLER MOUNTING HARD WARE		1	1	
3	M21 478 919	PUTTY		1	1	
4	M21 480 708	PIPE FIXING BAND		3	3	
5	M21 478 917	PIPING TAPE		1	1	
	M21 480 973	WALL HOLE COVER		1	1	
7	M21 480 703	DRAIN HOSE		1	1	

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OPTIONAL PARTS

1. REFRIGERANT PIPES

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

Applicable models	Parts No.	Pipe length	Pipe Size O.D				Additional refrigerant charge R-22 (OZ)
			Cross-section	A. Gas (in.)	B. Liquid (in.)	Insulation (in.)	
MS-09DW MSH-09DW	MAC-850PI-US	10 ft		3/8	1/4	1-3/8	0
	MAC-851PI-US	16 ft					
	MAC-852PI-US	23 ft					1 for MS-09 5 for MSH-09
	MAC-853PI-US	33 ft					
MSH-12DN MSH-15DN	MAC-660PI-US	10 ft		1/2		C 1-7/32 D 1-1/16	0
	MAC-661PI-US	16 ft					
	MAC-662PI-US	23 ft					5
	MAC-663PI-US	33 ft					
	MAC-664PI-US	49 ft					

Mr. SLIM



MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE MITSUBISHI DENKI BLDG. MARUNOUCHI TOKYO 100 TELEX J24532 CABLE MELCO TOKYO



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www.mrslim.com

Specifications are subject to change without notice.