

**1991**

No. OB-076

TECHNICAL & SERVICE MANUAL

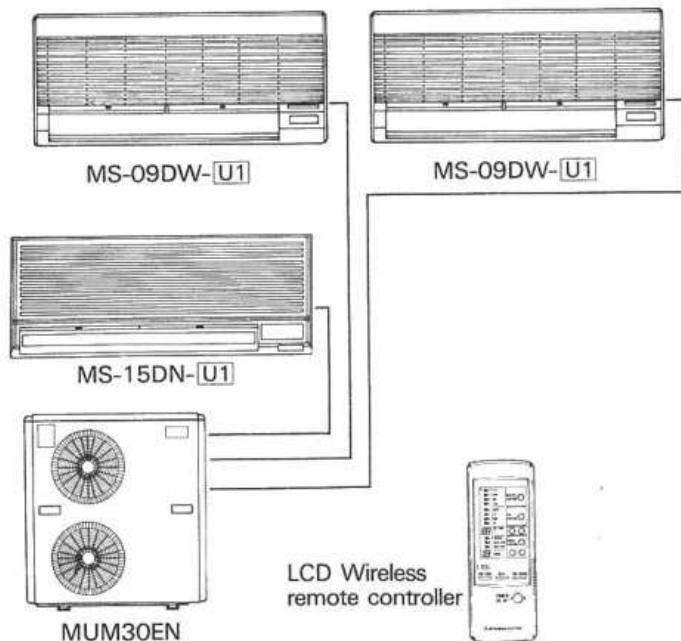
Wireless type

Models

INDOOR UNIT

MS-09DW-U1**MS-15DN-U1****MF15EN**

OUTDOOR UNIT

MUM30EN

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NOTE: For parts list, please refer to the following manuals.

MS-09DW-U1 → OB-036

MS-15DN-U1 → OB-036

MF15EN → OB-075

MUM30EN → OB-077



The Slim Line.
From Mitsubishi Electric.

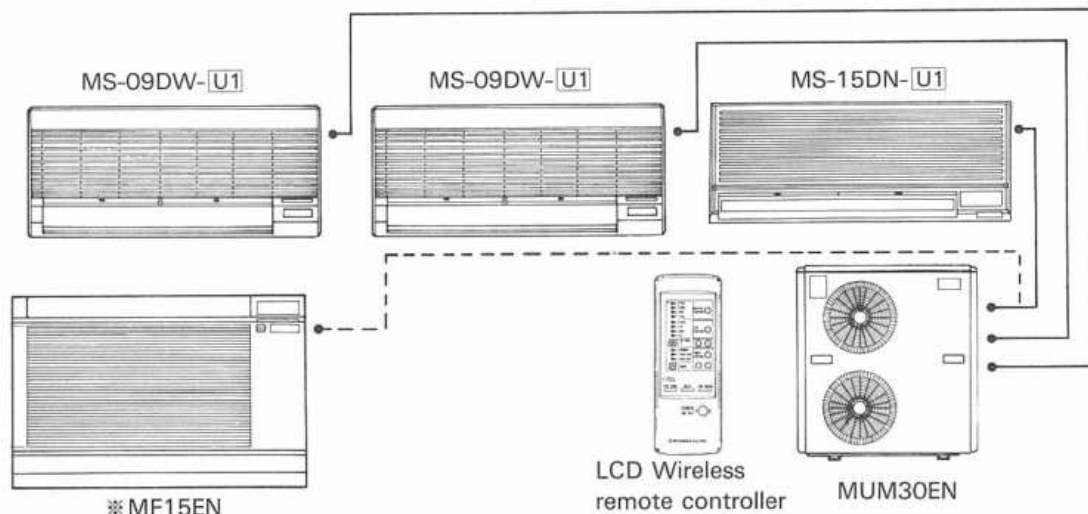


Mr. SLIM

1

FEATURES

This "3 to 1" Multi system (MSM30EN) consists of a single outdoor unit with three compressors that permit up to three indoor units to be installed in separate rooms, each with its own controller.



Cooling Capacity (BTU/h)

Indoor unit	MS-09DW-U1	MS-09DW-U1	※MS-15DN-U1 or MF15EN
Operation	8,200	—	—
1 Indoor Unit Operation	—	8,200	—
	—	—	12,400
2 Indoor Unit Operatin	8,200	8,200	—
	8,200	—	12,400
	—	8,200	12,400
3 Indoor Unit Operation	8,100	8,100	12,200

※MF15EN can be connected instead of MS-15DN-U1.

1. SPACE-SAVING LAYOUT

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

2. FLEXIBLE INSTALLATION OF INDOOR UNITS

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

3. NEW "I FEEL CONTROL" ON 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: "Too Cool", "Too Warm", or "Okay". The optimum temperature set this way is then memorized for immediate recall whenever the air conditioner is used again.

4. A VARIETY OF MICROPROCESSOR-CONTROLLED FUNCTION

Automatic ON/OFF Timer

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

Auto Stop (Night Setback) Mode.

This mode raises the temperature set by 1°F after one hour, and by another 1°F the next half hour. When 1-1/2 hours have passed, the air conditioner is running at a setting that is 2°F higher, thus preventing excessive cooling.

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.

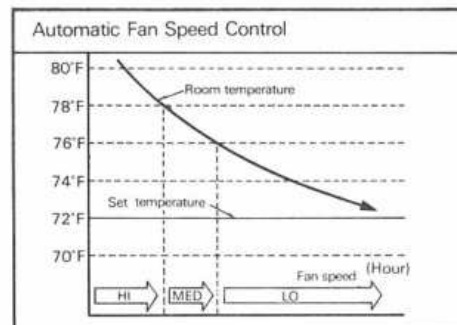
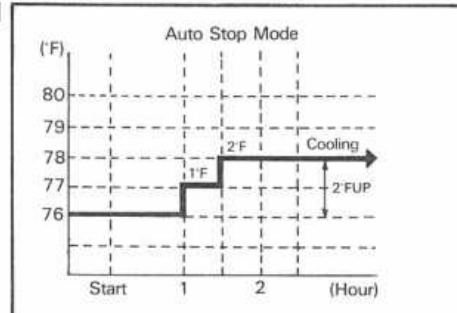
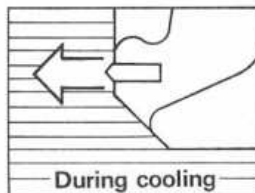
As the temperature differential decreases, the Fan speed shifts down automatically to MED and LO. Operation is almost whisper quiet.

Adjustable Change Vane System

(MS-09DW-U1, MS-15DN-U1)

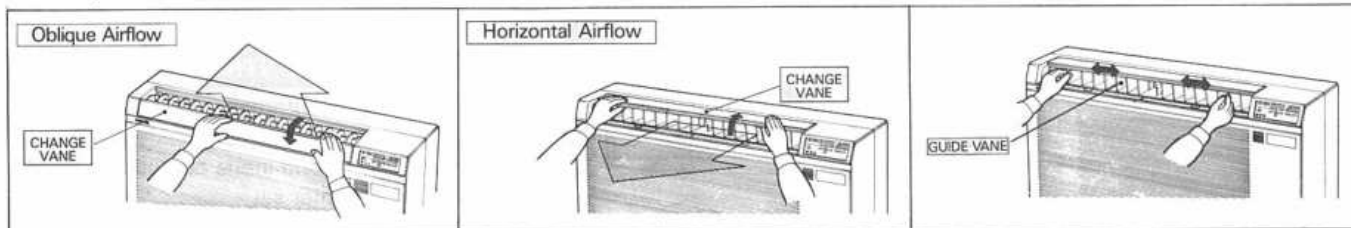
Choose the air direction that suits your needs.

Keep it in a horizontal position to achieve uniform airflow.



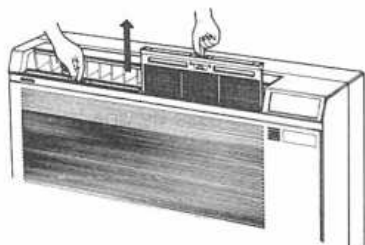
Four-Direction Airflow Adjustment (MF15EN)

Four-direction airflow adjustment is easy with CHANGE VANE and GUIDE VANE that allow you to direct an air stream into any area you choose.



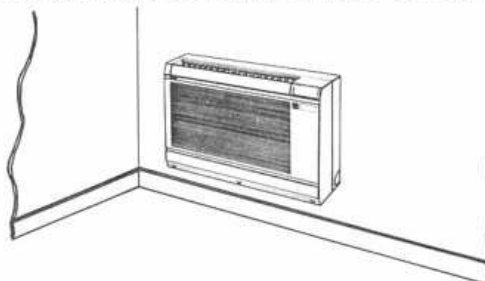
One-Step Air Filter Removal (MF15EN)

This convenient air filter slides out for easy rinse-and-shake cleaning to keep the airflow smooth.



Two-way Installation (On-the-wall installation) (MF15EN)

Indoor unit can be also installed on the wall using the optional WALL MOUNT. (Parts # MAC-761WS)



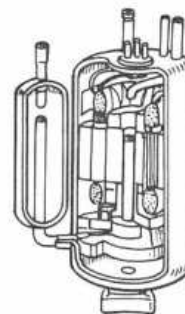
Restart Function (Optional)

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

※MF15EN equip with the Restart Function as standard.

High Performance Rotary Compressor

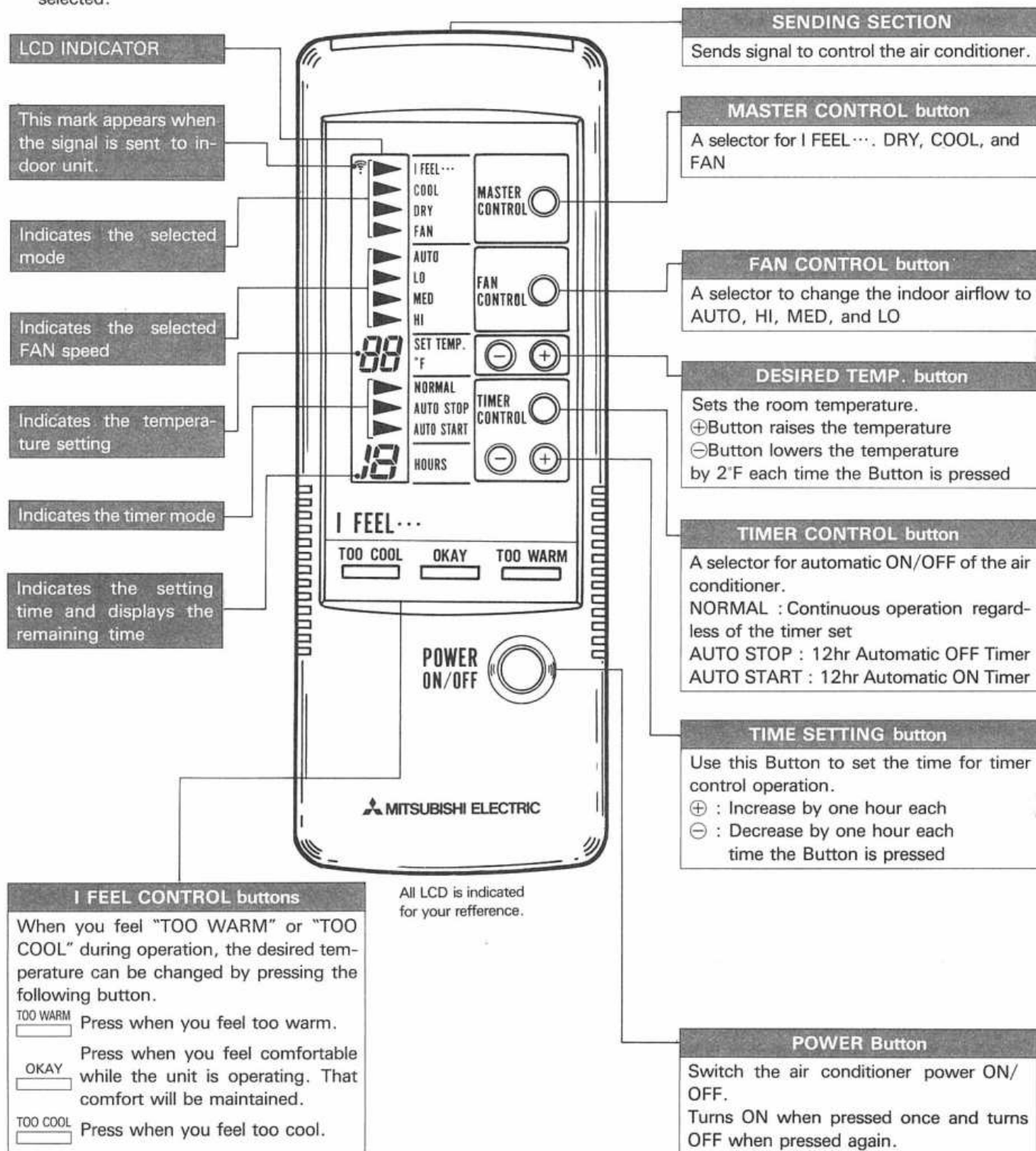
The advanced design of Mitsubishi Electric's powerful and energy-efficient rotary compressor results in lower operating costs and longer service life.



5. 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 ..." mode is automatically selected.



2

SPECIFICATIONS

Model			MSM30EN				
			Triple-Unit	Double-Unit		Single-Unit	
			A + B + C	A + B	A + C or B + C	A or B	C
Items							
Cooling capacity	* 1 BTU/h	28,400	16,400	20,600	8,200	12,400	
Power consumption	* 1 W	2,870	1,830	2,060	980	1,220	
EER (Triple unit operation)		9.9					
SEER (Triple unit operation)		10.0					
INDOOR UNIT MODEL		A & B: MS-09DW-U1	C: MS-15DN-U1		C: MF15EN		
External finish		White or Brown	White		White or Brown		
Power Supply		V, Hz, Phase	115,60,1				
Max. fuse size (time delay)		A	15.0	15.0	15.0		
Min. ampacity			0.5	0.5	0.5		
Fan motor		F.L.A	0.4	0.4	0.4		
Airflow Lo-Me-Hi	Dry	CFM	170-220-265	280-340-400	280-340-370		
	Wet	CFM	150-190-235	250-300-360	250-300-330		
Moisture removal		(Pints/h)	3.0	5.5	3.6		
Cond. drain connection OD		in.	5/8	5/8	5/8		
Dimensions	W	in.	33-1/2	39-3/8	36-1/4		
	D	in.	5-1/8	7	8-1/8		
	H	in.	15	14-3/16	23-7/16		
Weight		lbs.	26	35	59		
OUTDOOR UNIT MODEL		MUM30EN					
External finish		Munsell 5Y 7/1					
Power supply		V, Hz, Phase	208/230,60,1(3-wire)				
Max. fuse size (time delay)		A	30				
Min. ampacity			25				
Fan motor		F.L.A.	0.8+0.7				
Compressor	Model		KH122WEV<115V>	KH122WEV<115V>	RH167NAB<208/230V>		
	Winding resistance (at 68°F) Ω		C-R 0.97 C-S 4.81	C-R 0.97 C-S 4.81	C-R 2.47 C-S 4.62		
	R.L.A		10	10	8		
	L.R.A		37	37	29		
Refrigerant control		Capillary tube					
Dimensions	W	in.	37-7/16				
	D	in.	15-3/8				
	H	in.	45-5/16				
Weight		lbs	240				
REMOTE CONTROLLER		Wireless type					
Control voltage (be built-in transformer)		DC12V					
REFRIGERANT PIPING		Not supplied (optional parts)					
Pipe size	Liquid	in.	1/4	1/4	1/4		
	Gas	in.	3/8	3/8	1/2		
Connection method	Indoors		Flared	Flared	Flared		
	Outdoors		Flared	Flared	Flared		
Between the indoor & outdoor units	Height difference	ft	Max. 25	Max. 25	Max. 25		
	Piping length	ft	Max. 65	Max. 65	Max. 65		

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

Operating Range

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

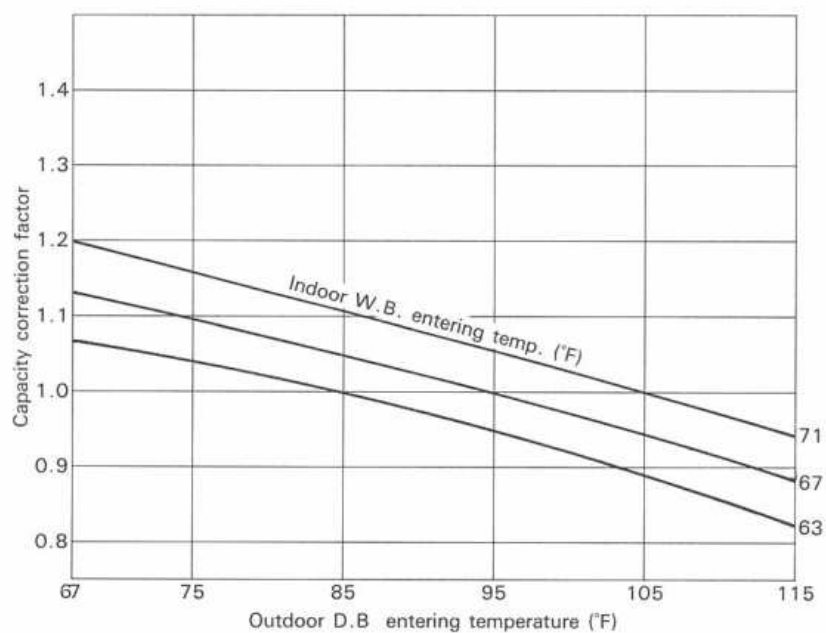
3

DATA

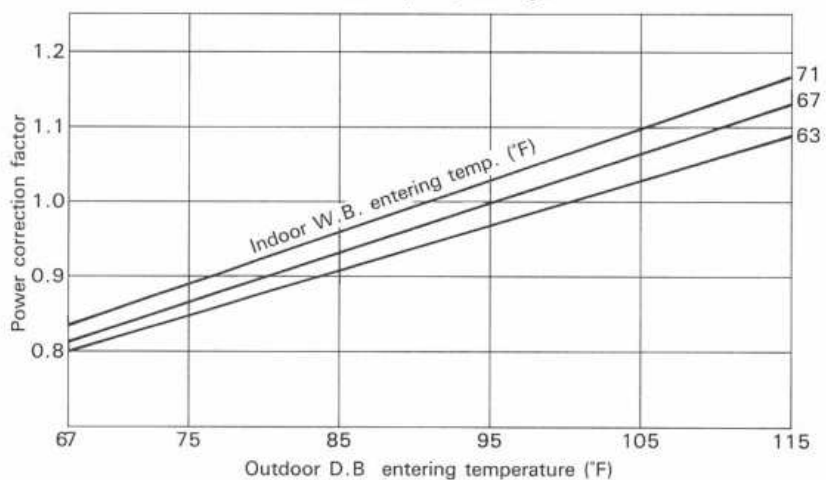
2 SPECIFICATIONS

1. PERFORMANCE CURVE

MUM30EN



Total input (cooling)



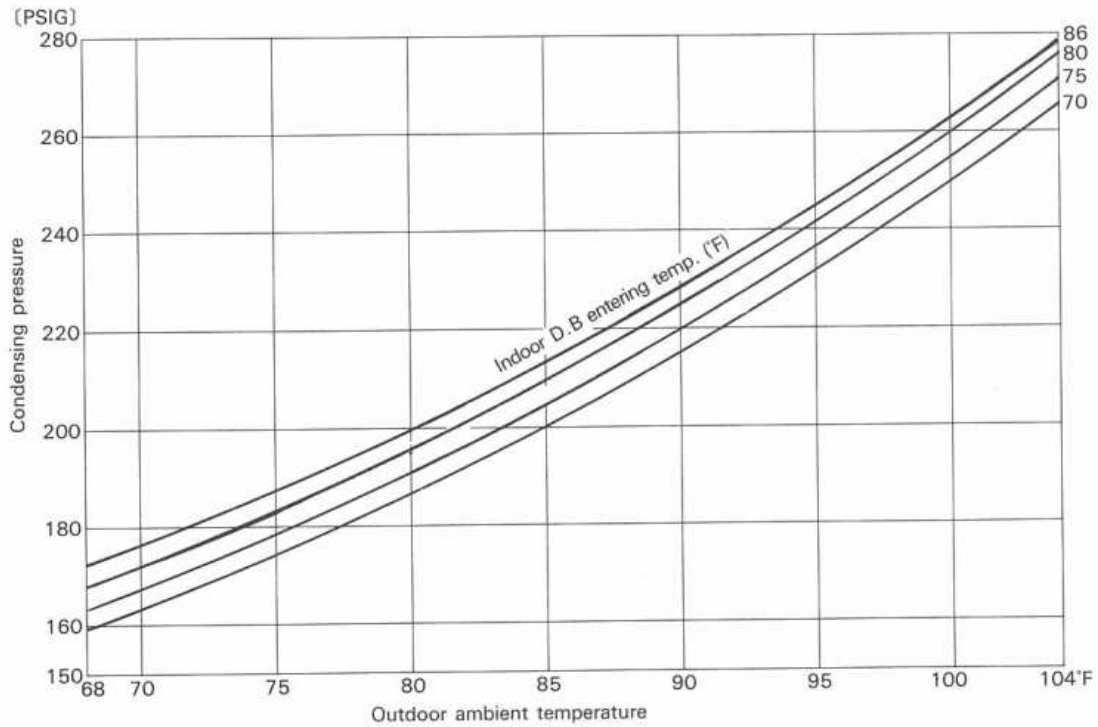
NOTE:

Total capacity = multiply cooling capacity in specifications table on page 3 by capacity correction factor on this page.
 Total power consumption = multiply power consumption in specifications table on page 3 by power correction factor on this page.

CONDENSING PRESSURE—Cooling mode

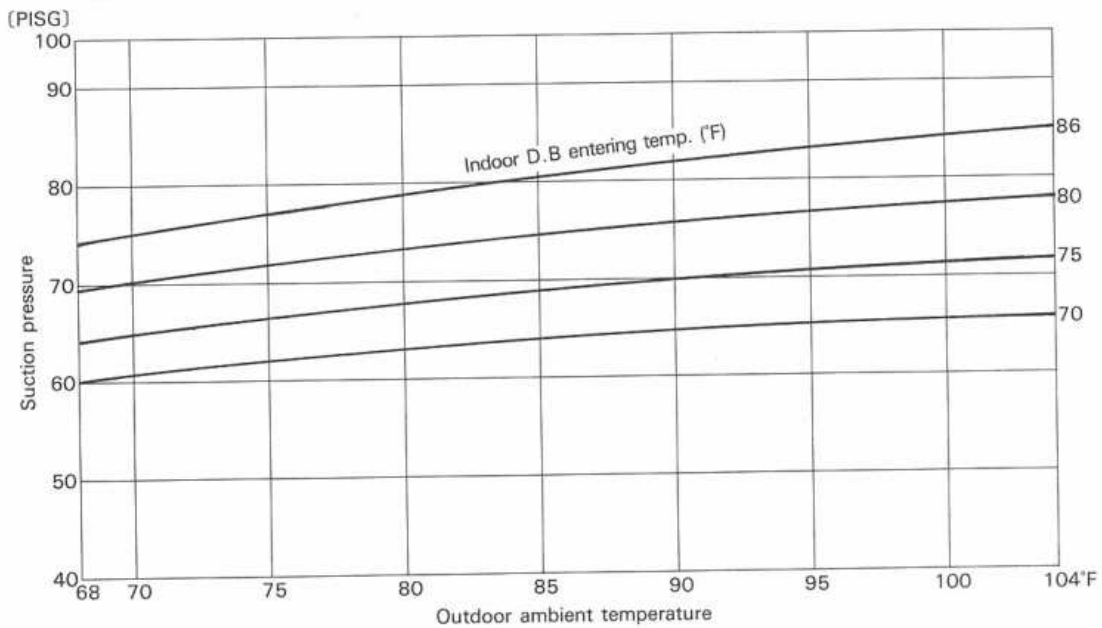
Data is based on the condition of indoor humidity 50%. Indoor air flow should be set at HI.

For MS-09DW-U1



SUCTION PRESSURE—Cooling mode

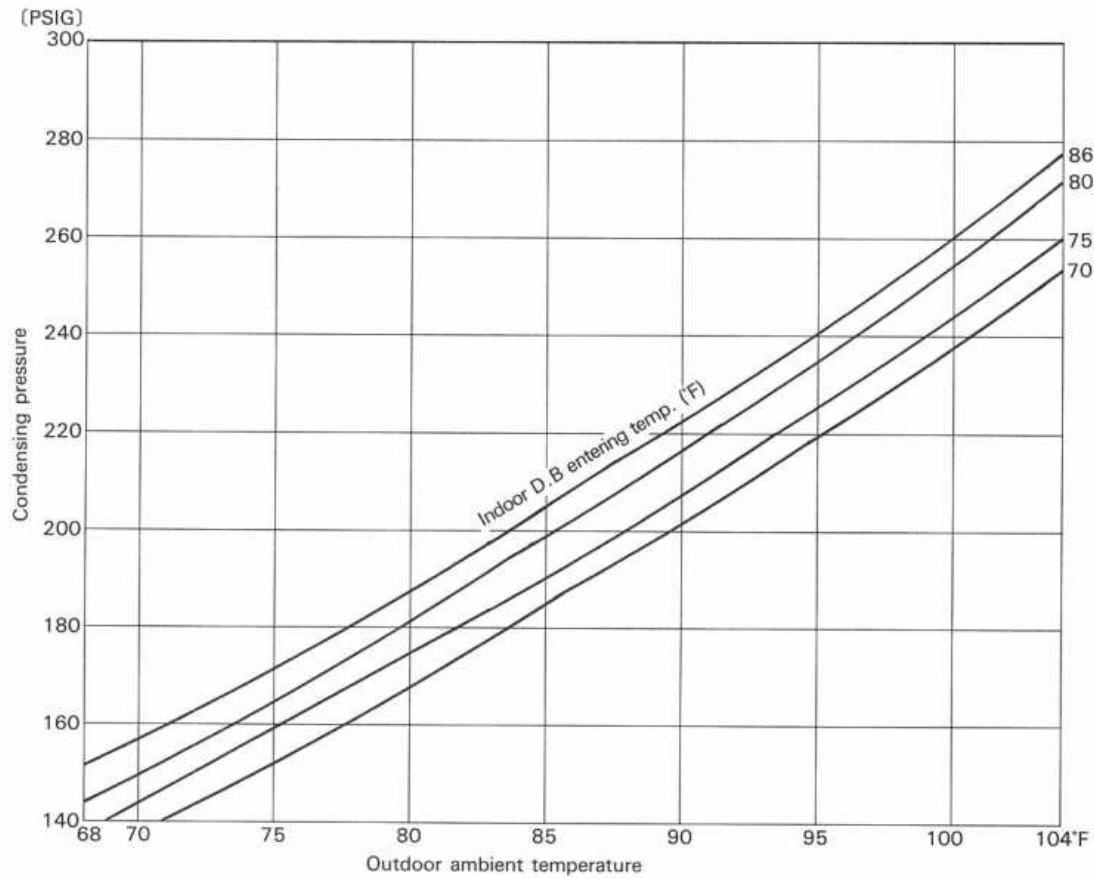
For MS-09DW-U1



CONDENSING PRESSURE—Cooling mode

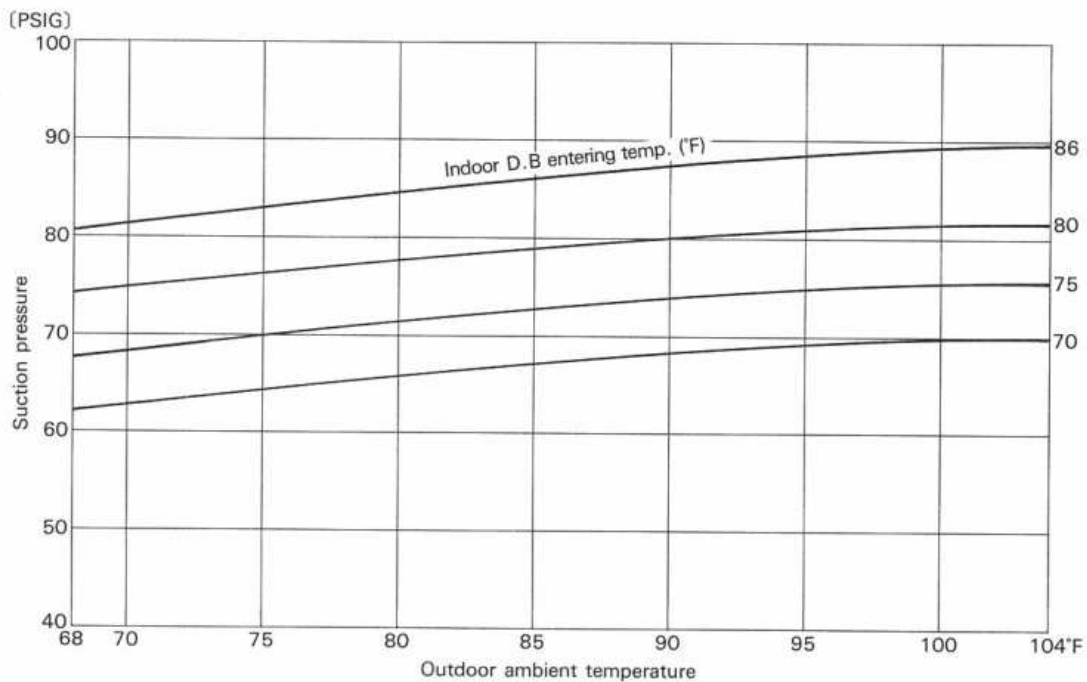
Data is based on the condition of indoor humidity 50%. Air flow should be set at HI.

For MS-15DN-U1



SUCTION PRESSURE—Cooling mode

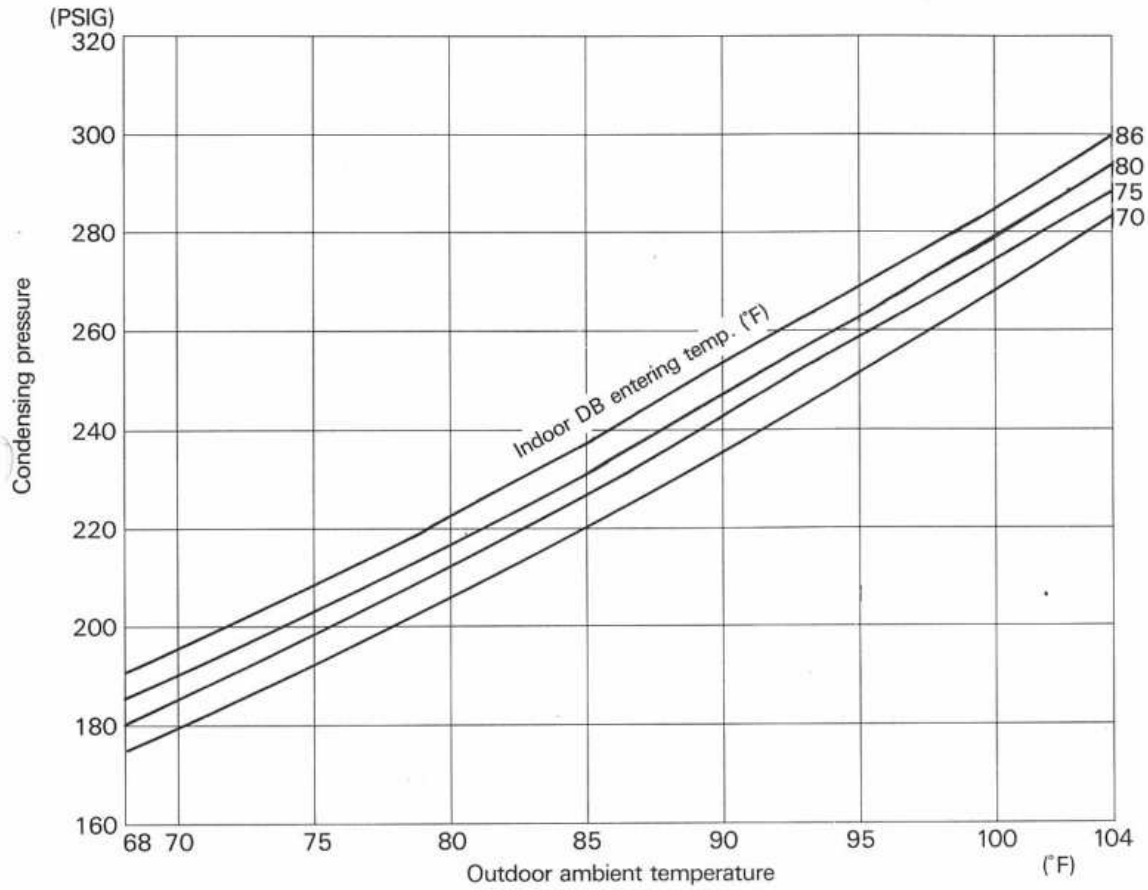
For MS-15DN-U1



CONDENSING PRESSURE—Cooling mode

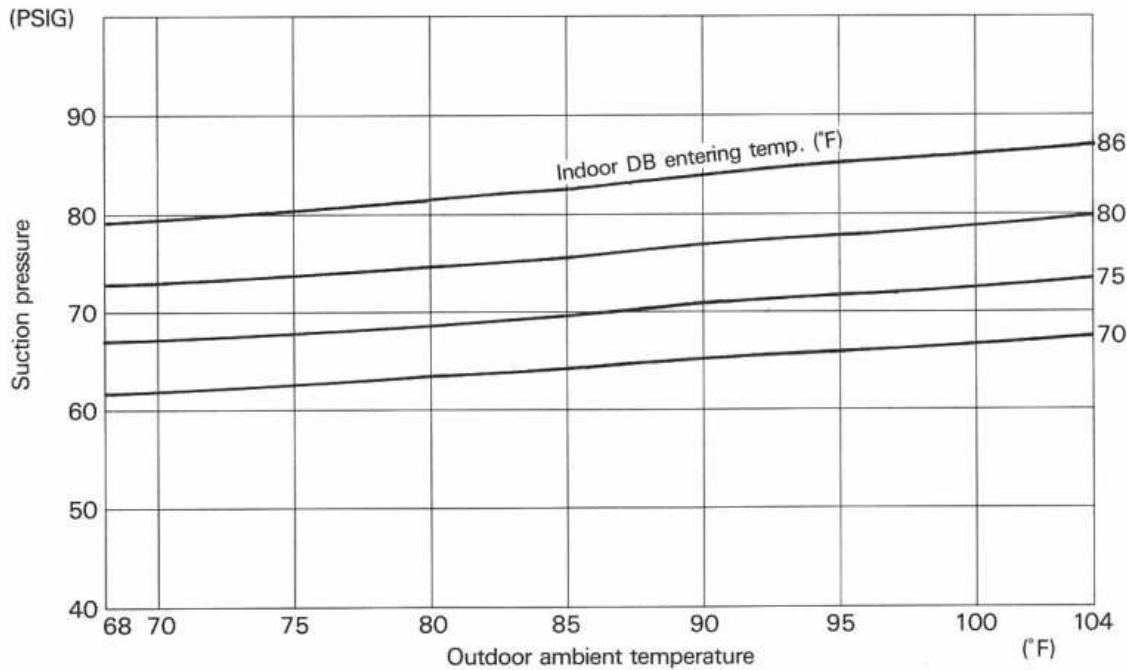
Data is based on the condition of indoor humidity 50%. Air flow should be set at HI.

MF15EN



SUCTION PRESSURE—Cooling mode

MF15EN



2. OPERATING RANGE

(1) POWER SUPPLY

	Models	Rating	Guaranteed Voltage
Indoor unit	MS-09DW- <u>U1</u> MS-15DN- <u>U1</u> MF15EN	115V 60Hz 1 ϕ	Min. 103V—Max.127V
Outdoor unit	MUM30EN	208/230V 60Hz 1 ϕ (3 wires)	Min.198V 208V 230V 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%		—	

3. OUTLET AIR SPEED AND COVERAGE RANGE

Model	Function	Airflow (CFM)	Air speed (ft/sec)	Coverage range (ft)
MS-09DW- <u>U1</u>	Dry	265	13	20
	Wet	235	11	16
MS-15DN- <u>U1</u>	Dry	400	15	26
	Wet	360	14	24
MF15EN	Dry	370	13.4	22.9
	Wet	330	11.9	20.5

● 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)						
			25ft	30ft	33ft	40ft	45ft	49ft	65ft
MUM30EN	MS-09DW- <u>U1</u>	2 lbs 12 oz	0	1oz	1oz	2oz	2oz	3oz	5oz
	MS-15DN- <u>U1</u>	2 lbs 12 oz							
	MF15EN	3 lbs 10 oz							

STANDARD OPERATION DATA

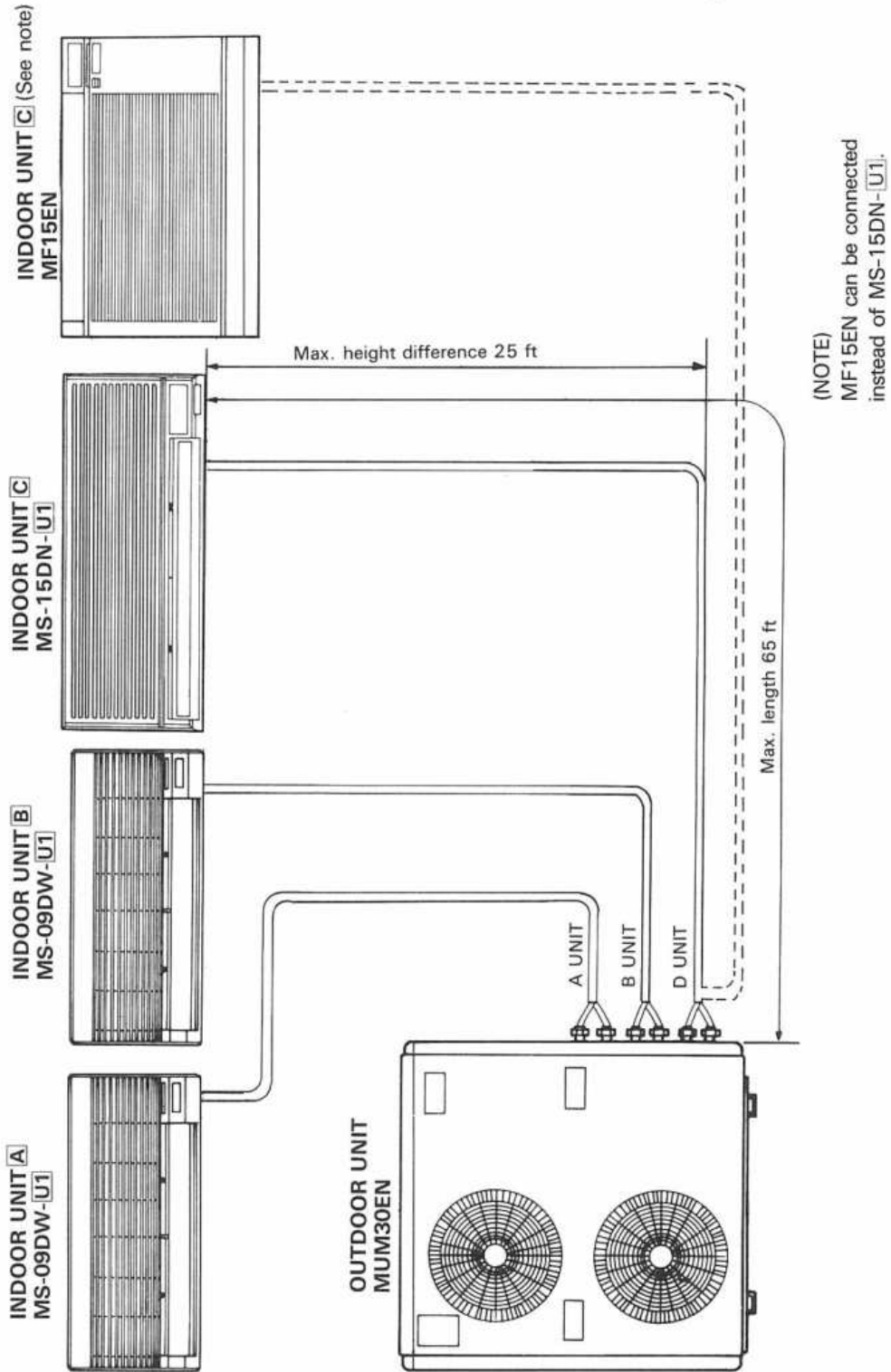
MODEL			MSM30EN									
			Triple			Double				Single		
			A+B+C			A+B		A+C or B+C		09A or 09B	C	
Item		Unit	Cooling									
Total	Capacity	BTU/h	28,400			16,400		20,600		8,200	12,400	
	SHF	—	0.71			0.71		0.71		0.71	0.71	
	Input	kW	2.87			1.83		2.06		0.98	1.22	
	Indoor unit model		MS-09DW-[UT]	MS-09DW-[UT]	MS-15DN-[UT] or MF15EN	MS-09DW-[UT]	MS-09DW-[UT]	MS-09DW-[UT]	MS-15DN-[UT] or MF15EN	MS-09DW-[UT]	MS-15DN-[UT] or MF15EN	
Electrical circuit	Power supply (V,H _z ,ϕ)		115,60,1			115,60,1			115,60,1			
	Input	kW	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
	Fan current	A	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
	Outdoor unit model		MUM30EN									
	Power supply (V,H _z ,ϕ)		208/230,60,1(3-wire)									
	Input	kW	2.75			1.75		1.98		0.94	1.18	
	Comp. current	A	7.0	7.0	3.8	7.0	7.0	7.0	3.8	7.0	3.8	
	Fan current	A	0.7+0.8			0.65+0.75			0.6+0.7			
	Refrigerant circuit	Condensing pressure	PSIG	247	244	235	237	233	242	235	226	233
Suction pressure		PSIG	77	75	81	75	74	77	81	78	84	
Discharge temp.		°F	182	178	182	181	170	171	171	204	174	
Condensing temp.		°F	120	121	116	111	109	112	107	108	111	
Suction temp.		°F	47	69	69	53	68	47	57	72	62	
Comp.shell bottom temp.		°F	159	174	159	162	172	149	147	177	149	
Ref.pipe length		ft	25	25	25	25	25	25	25	25	25	
Refrigerant charge		—	2 lbs 10 oz	2 lbs 10 oz	3 lbs 10 oz	2 lbs 10 oz	2 lbs 10 oz	2 lbs 10 oz	3 lbs 10 oz	2 lbs 10 oz	3 lbs 10 oz	
Indoor side	Entering air temp.	DB	°F	80	80	80	80	80	80	80	80	
		WB	°F	67	67	67	67	67	67	67	67	
	Discharge air temp.	DB	°F	59	58	57	59	58	59	58	59	57
		WB	°F	52	52	55	52	52	52	52	52	55
	Fan speed	R.P.M.	1,680	1,680	1,500	1,680	1,680	1,680	1,500	1,680	1,500	
	Airflow (Hi)	CFM	265	265	360	265	265	265	360	265	360	
Outdoor side	Entering air temp.	DB	°F	95			95			95		
		WB	°F	—			—			—		
	Fan speed	R.P.M.	850/940			750/840			640/700			
	Airflow	CFM	2,720			2,360			2,080			

MSM30EN

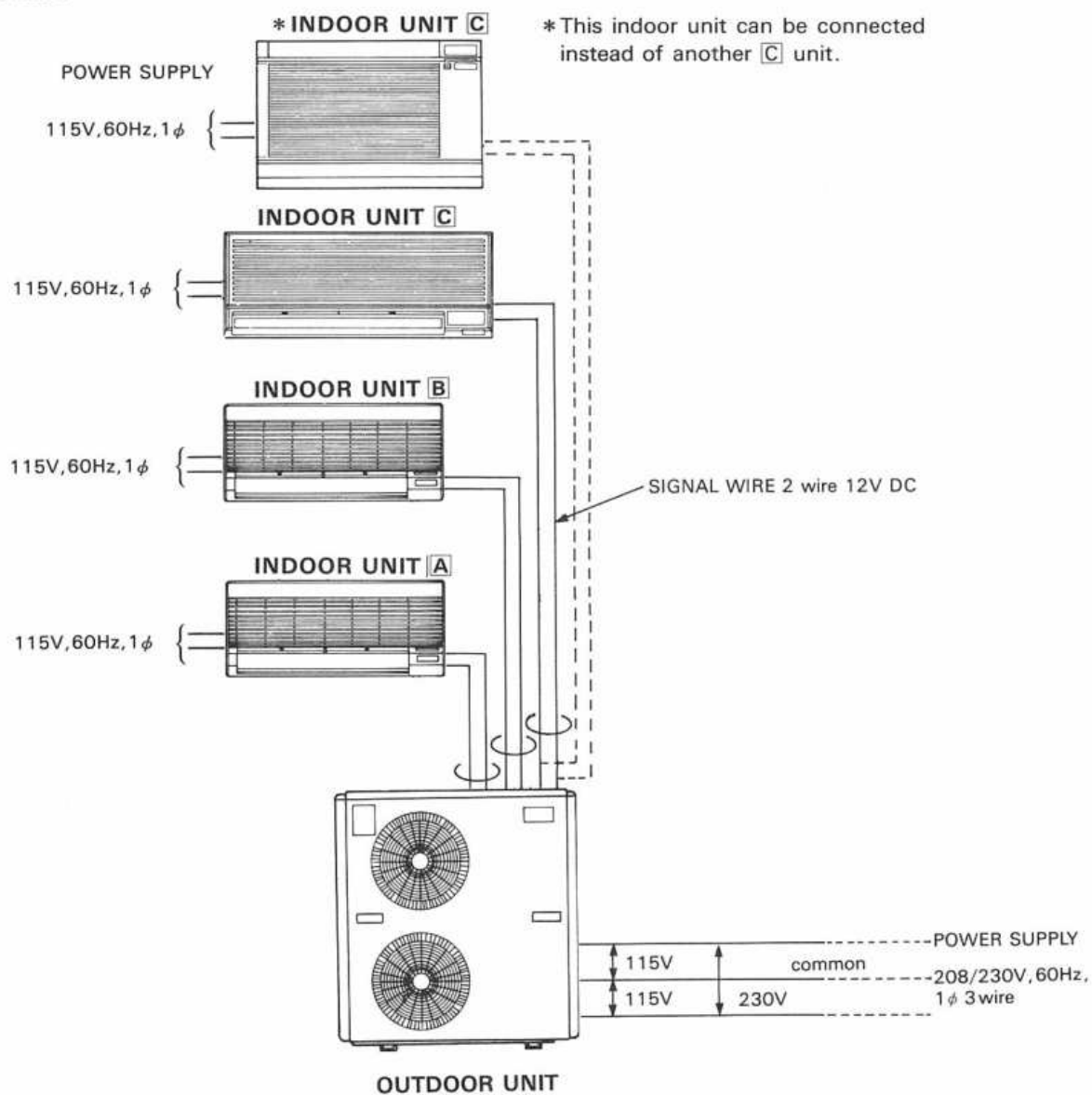
Between outdoor unit and each indoor unit, max. refrigerant piping length is 65ft and max. height differences is 25ft.

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

6. MAX. REFRIGERANT PIPING LENGTH/MAX. HEIGHT DIFFERENCE



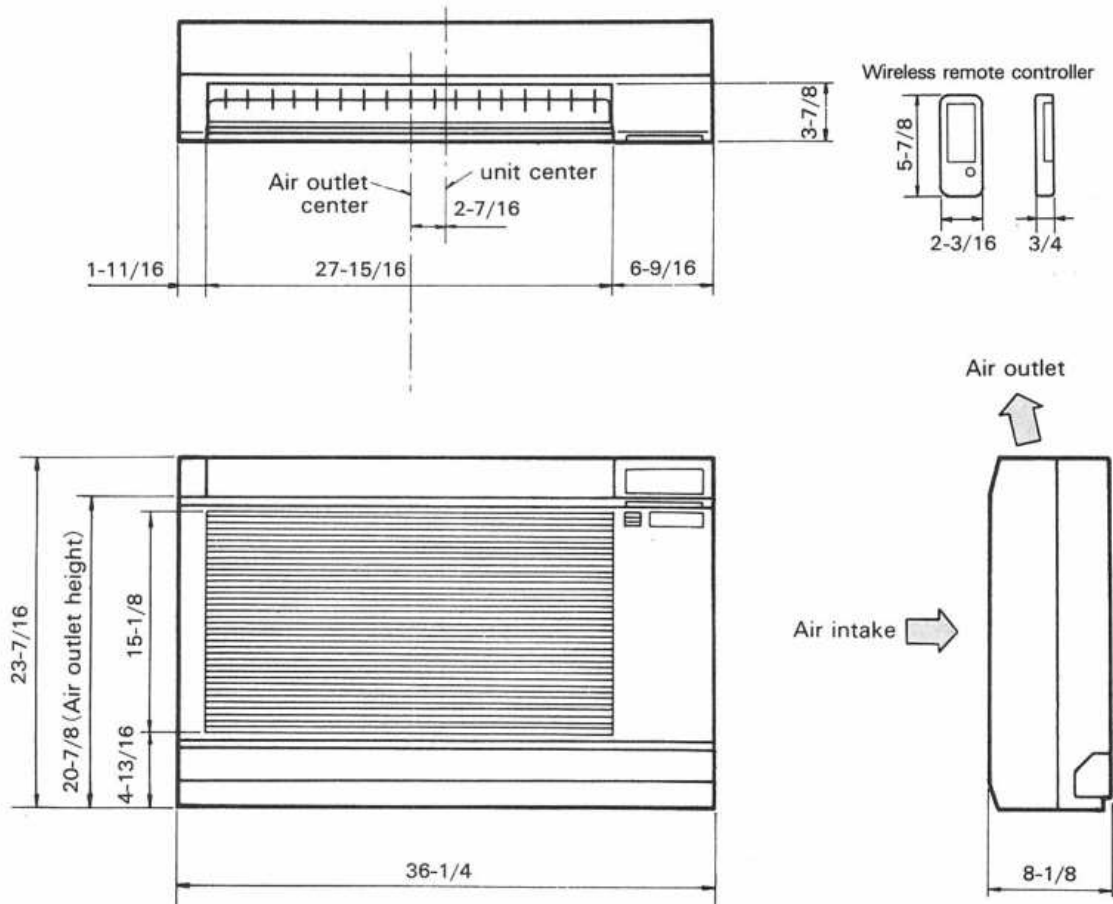
7. POWER SUPPLY MSM30EN



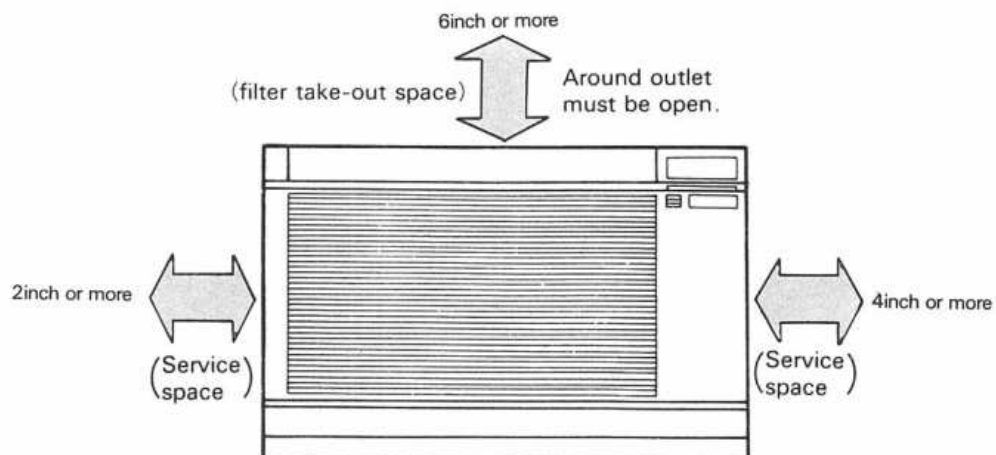
MODEL : MF15EN

Unit : inch

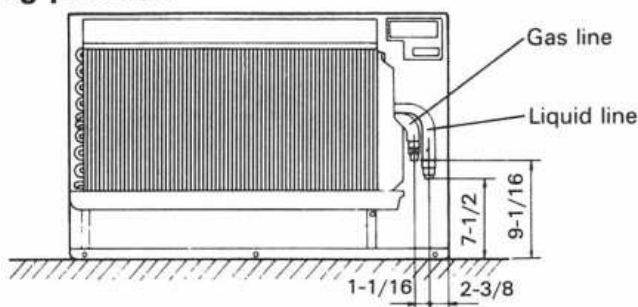
(NOTE) This figure shows when blowing direction is upward.



REQUIRED SPACE

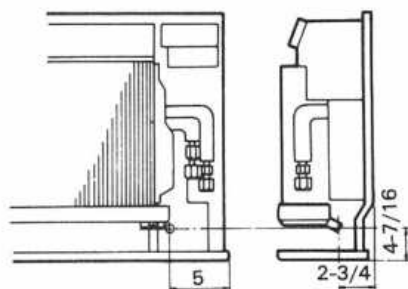


MF15EN Piping position



Drain hose set position

Unit : inch

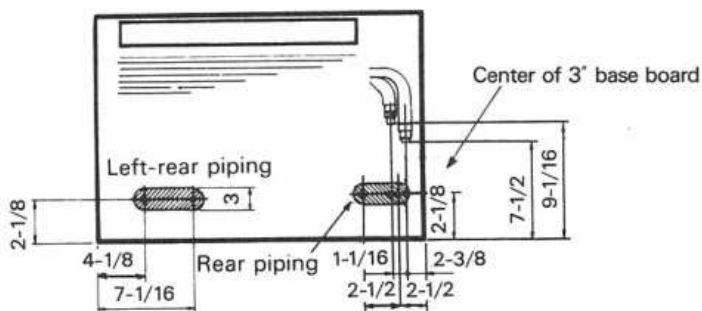


Drain hose O.D. $\phi 5/8$
Insulation O.D. $\phi 1-3/16$
Length 43-5/16

Model			MF15EN
Indoor piping	Insulation O.D.		$\phi 2-1/2$
	Liquid line	O.D.	$\phi 5/16$
		Flare joint	1/4F
	Gas line	O.D.	$\phi 3/8$
		Flare joint	1/2F

For rear and left-rear piping

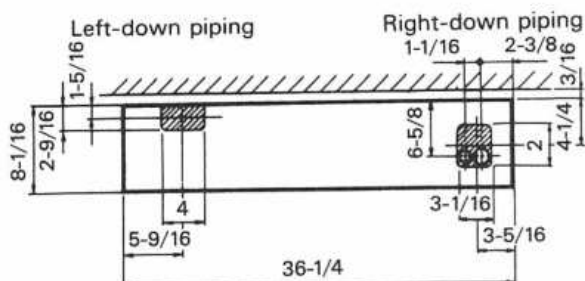
- Diagonally hatched sections in the figure below indicate where piping can be arranged. (Figure below is a frontview of the unit).



Rear piping installation is possible using 80 mm (3") height baseboard. If the baseboard is more than 3", use optional WALL MOUNT MAC-761WS for the wall installation, or arrange a platform in the field for floor standing.

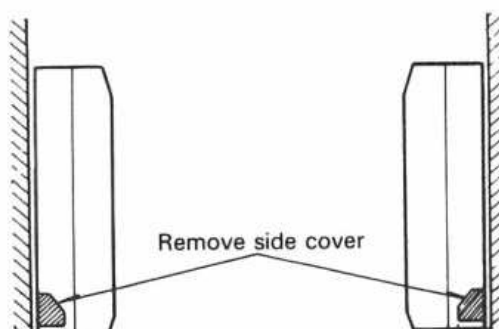
For right-down and left-down piping

(Figure below is a bottom view of the unit)



For left piping

For right piping

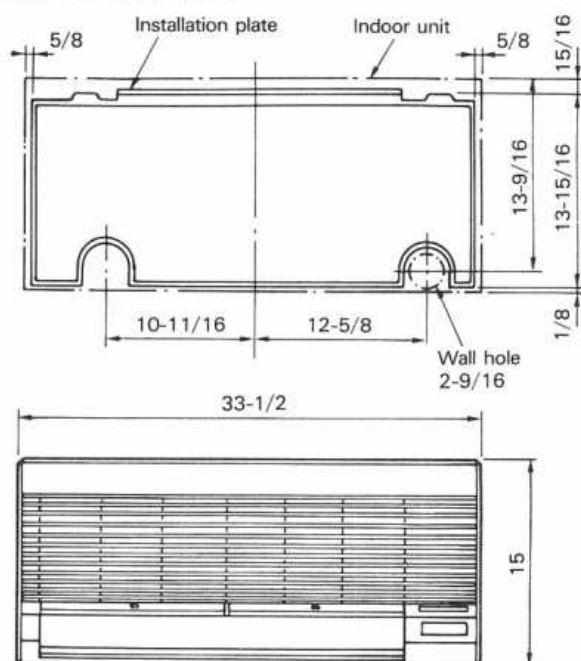


4 OUTLINES AND DIMENSIONS

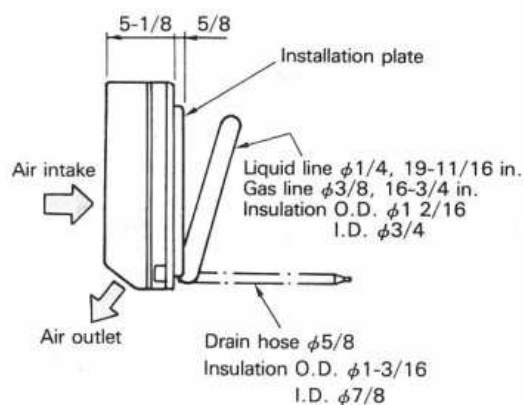
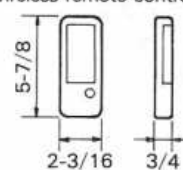
INDOOR UNIT

MODEL : MS-09DW- [U1]

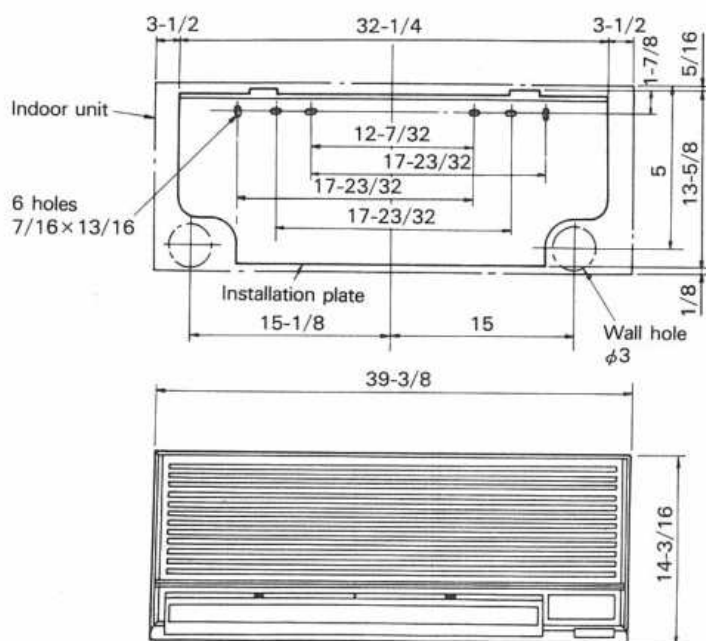
Unit : inch



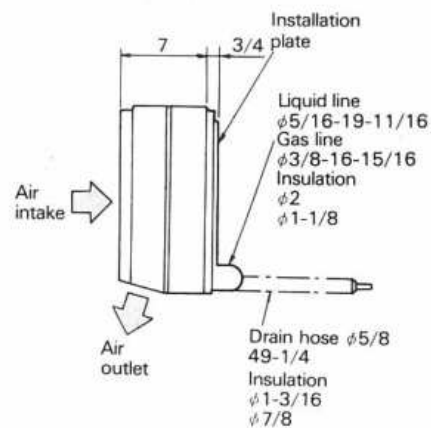
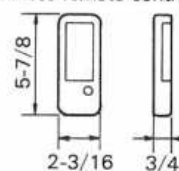
Wireless remote controller



MODEL : MS-15DN-[U1]

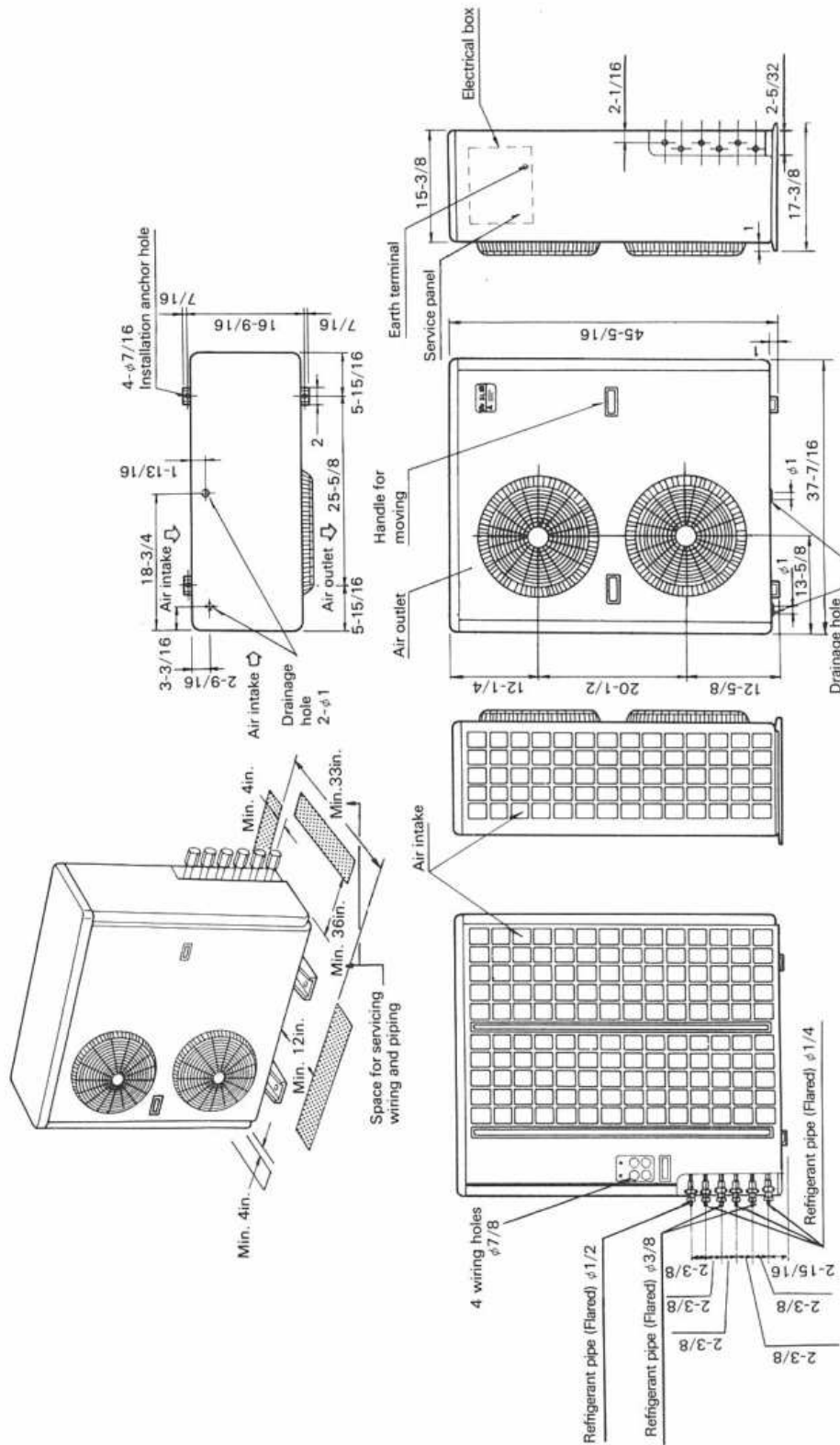


Wireless remote controller



MODEL : MUM-30EN
OUTDOOR UNIT

UNIT : inch



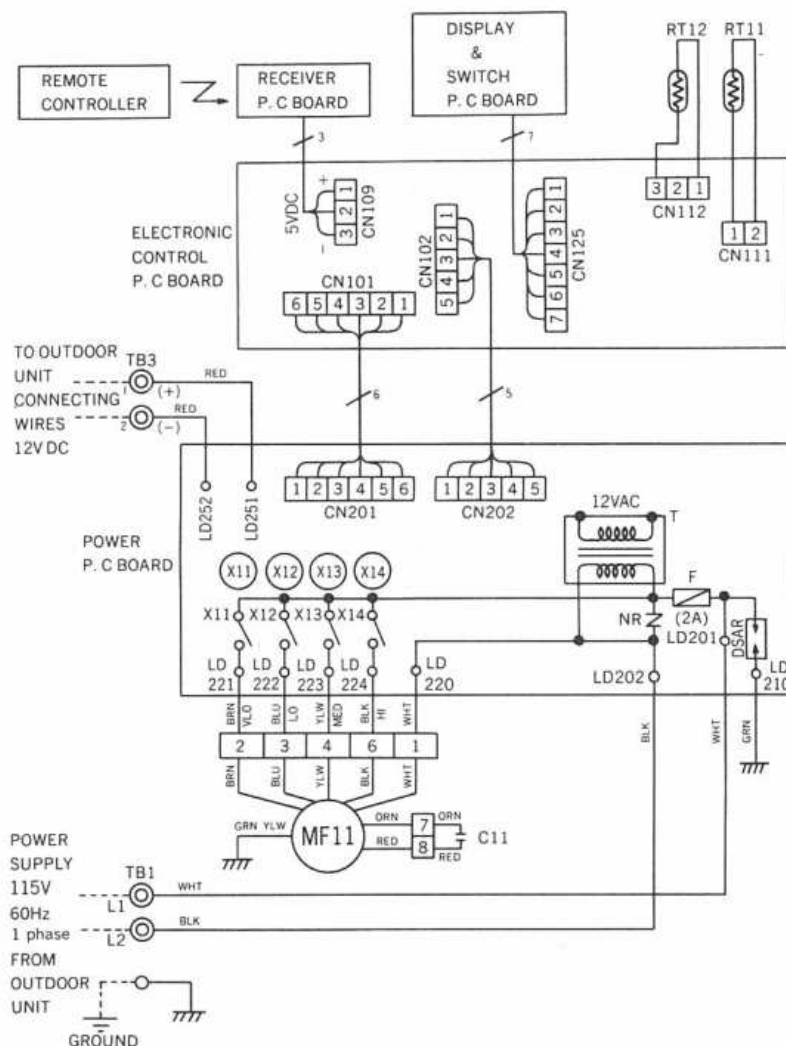
NOTE : The symbol ϕ indicates the diameter.

5

WIRING DIAGRAM

INDOOR UNIT

MODEL MS-09DW- U1 WIRING DIAGRAM



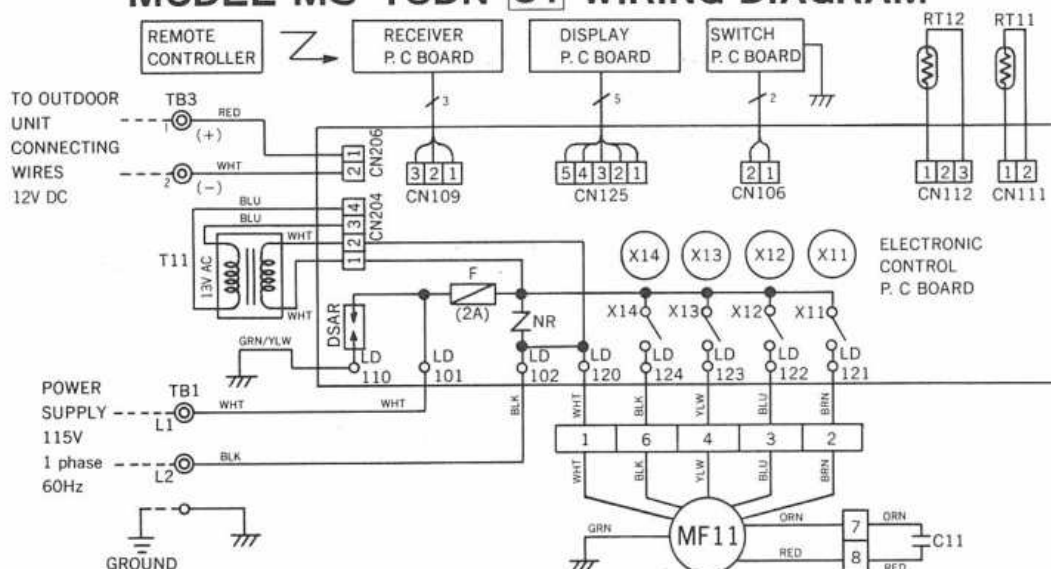
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR	VARIATOR	T	TRANSFORMER
DSAR	SURGE ABSORBER	RT11	ROOM TEMP. THERMISTOR	X11~X14	INDOOR FAN RELAY
F	FUSE (2A)	RT12	INDOOR COIL THERMISTOR		
MF11	INDOOR FAN MOTOR (INNER FUSE)	TB1,3	TERMINAL BLOCK		

NOTES:

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

INDOOR UNIT

MODEL MS-15DN-U1 WIRING DIAGRAM



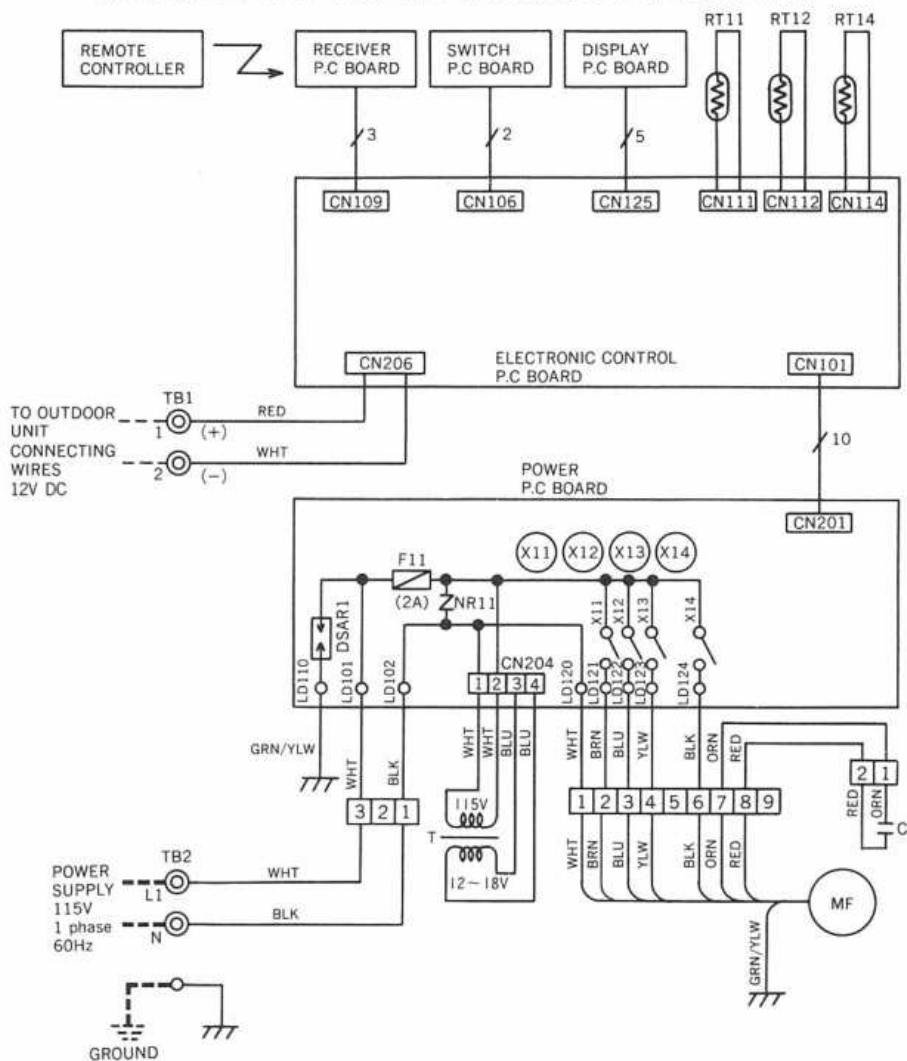
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR	VARISTOR	TB1,3	TERMINAL BLOCK
DSAR	SURGE ABSORBER	RT11	ROOM TEMP. THERMISTOR	T11	TRANSFORMER
F	FUSE (2A)	RT12	INDOOR COIL THERMISTOR	X11~X14	INDOOR FAN RELAY
MF11	INDOOR FAN MOTOR (INNER FUSE)	RT14	INDOOR COIL THERMISTOR		

NOTES:

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

--

MODEL MF15EN WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C	INDOOR FAN CAPACITOR	NR11	VARISTOR	T	TRANSFORMER
DSAR1	SURGE ABSORBER	RT11	ROOM TEMP. THERMISTOR	TB1,2	TERMINAL BLOCK
F11	FUSE (2A)	RT12	INDOOR COIL THERMISTOR	X11~14	AUXILIARY RELAY
MF	FAN MOTOR (INNER PROTECTOR)	RT14	INDOOR COIL THERMISTOR		

NOTE

1. Refer to the outdoor side wiring diagram for the outdoor unit service.
2. Use copper conductors only (For field wiring).
3. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (1 and 2).
4. Symbols below indicate,

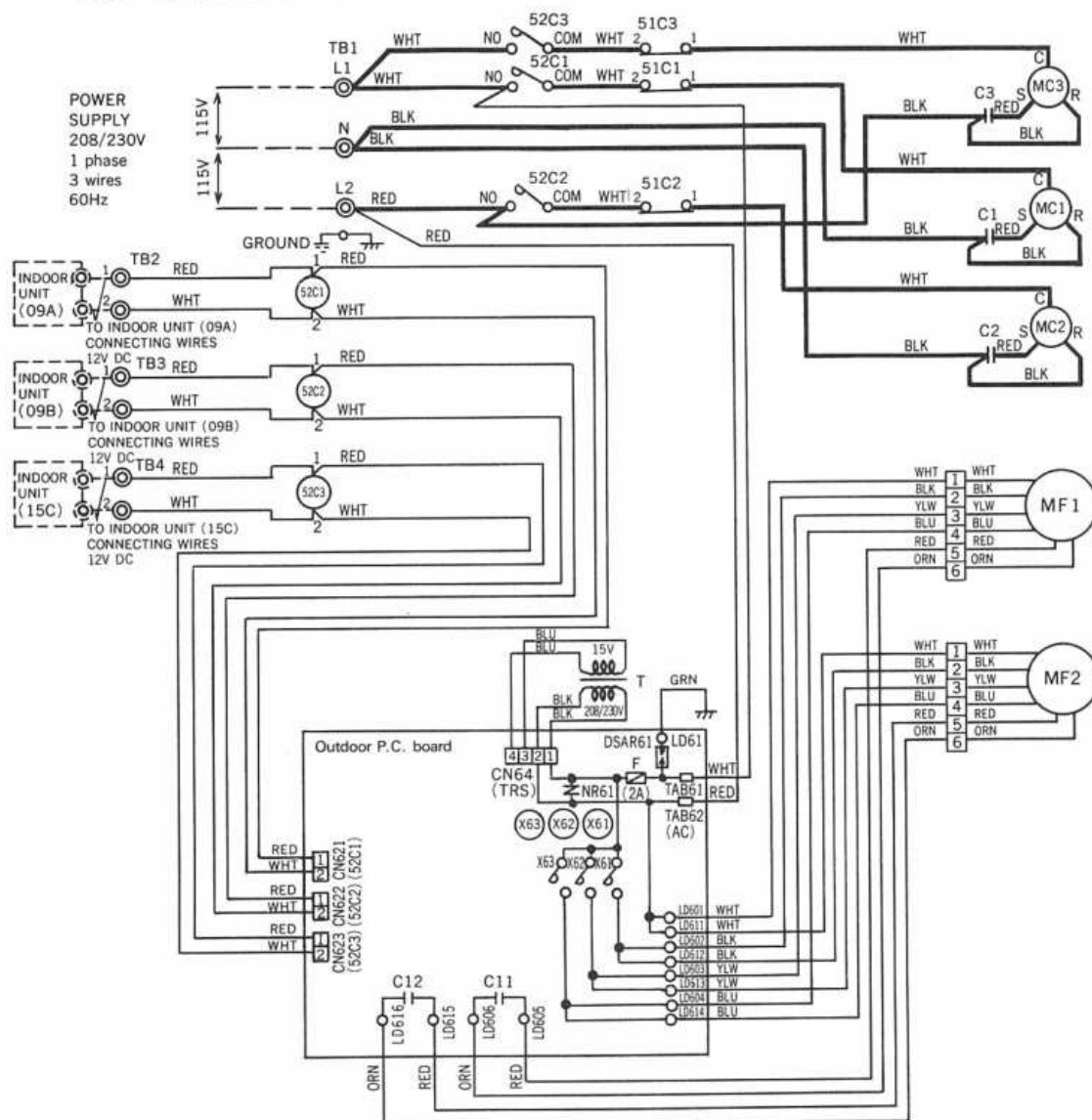
⊙ : Terminal block,

--	--	--	--	--

 : Connector

OUTDOOR UNIT

MODEL MUM30EN WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	MC1 CAPACITOR	MC1	09A UNIT COMPRESSOR	X61~X63	FAN MOTOR RELAY
C2	MC2 CAPACITOR	MC2	09B UNIT COMPRESSOR	51C1	09A UNIT OVERCURRENT RELAY
C3	MC3 CAPACITOR	MC3	15C UNIT COMPRESSOR	51C2	09B UNIT OVERCURRENT RELAY
C11	MF1 CAPACITOR	MF1,2	FAN MOTOR (INNER THERMOSTAT)	51C3	15C UNIT OVERCURRENT RELAY
C12	MF2 CAPACITOR	NR61	VARIATOR	52C1	MC1 CONTACTOR
DSAR61	SURGE ABSORBER	T	TRANSFORMER	52C2	MC2 CONTACTOR
F	FUSE (2A)	TB1~TB4	TERMINAL BLOCK	52C3	MC3 CONTACTOR

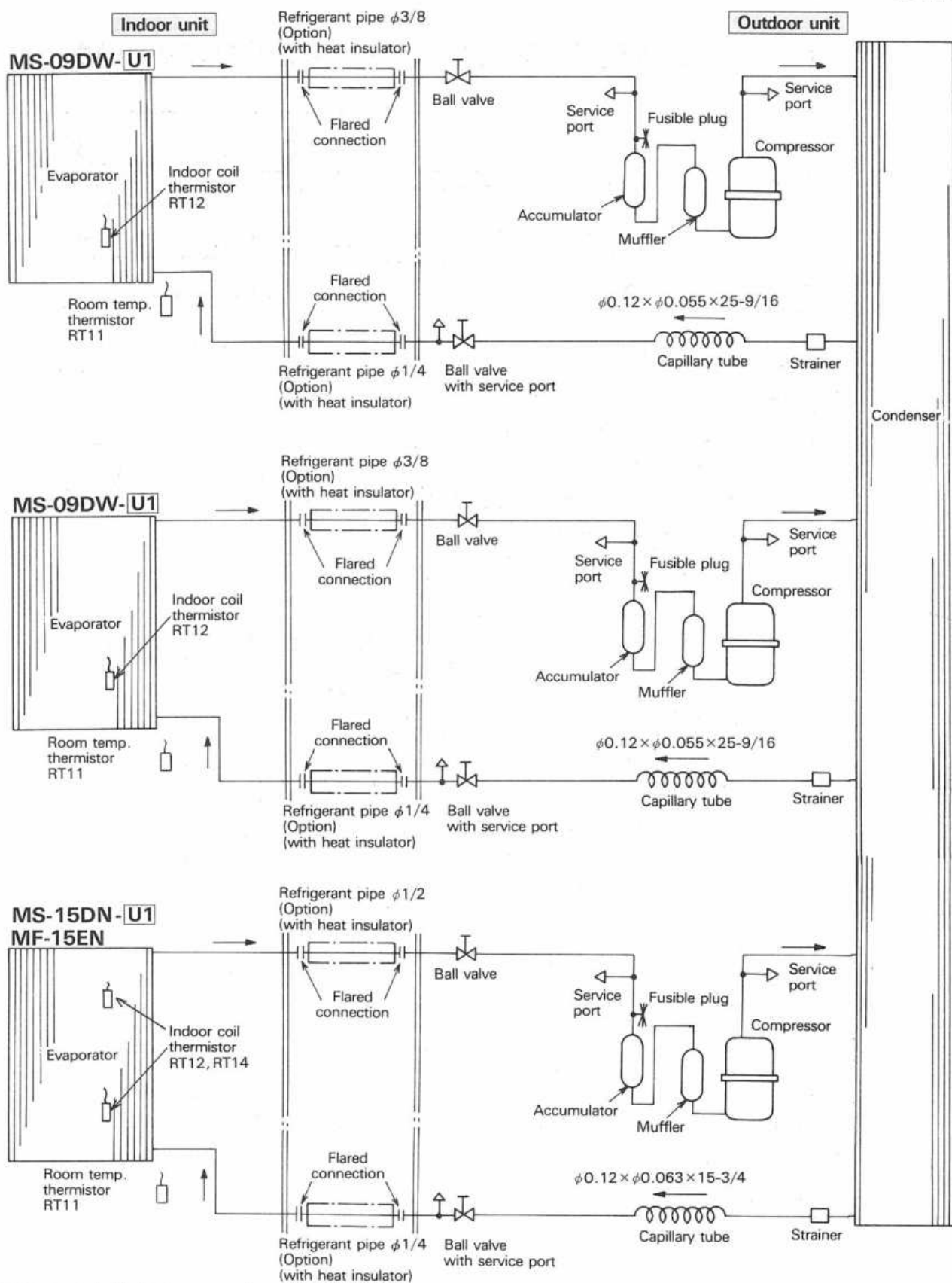
NOTES:

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 (1 and 2).
3. Symbols below indicate.
 ○ : Terminal block. □ : Connector. □ : PC board insertion tab.

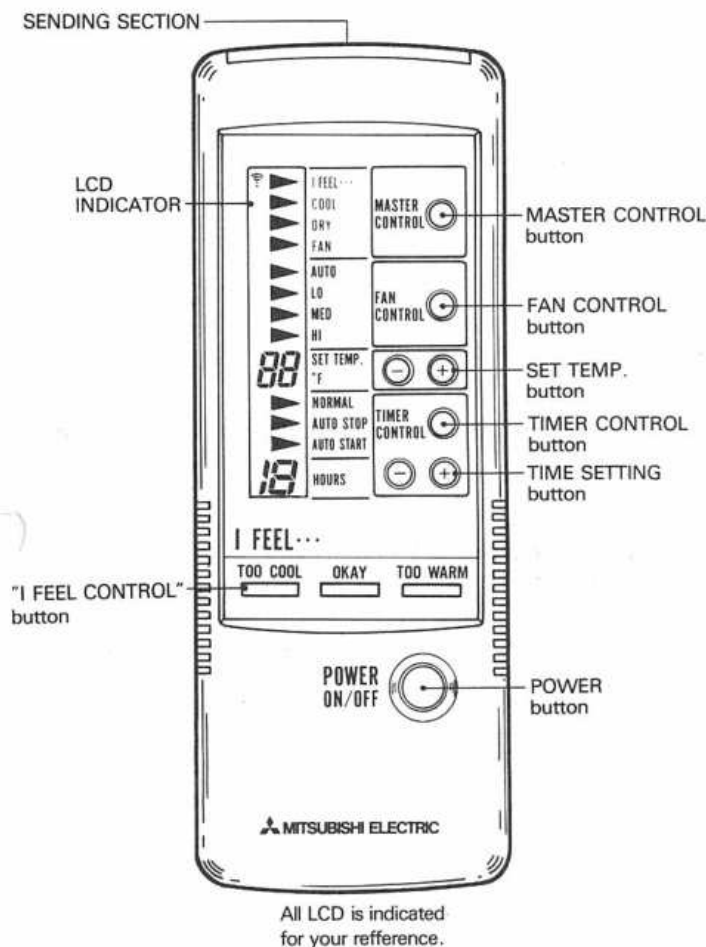
6

REFRIGERANT SYSTEM DIAGRAM

Unit: inch

Note: The symbol ϕ indicates outer diameter.

Wireless Remote Controller



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 will not restart for 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) Press the MASTER CONTROL button to set "I FEEL ...". 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.

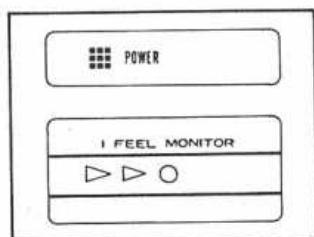
Initial Room Temp.	Mode
more than 76°F	COOL mode of "I FEEL CONTROL"
less than 76°F	DRY mode of "I FEEL CONTROL"

- 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.

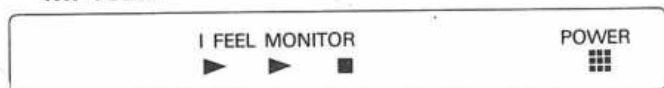
When the system is restarted after 1 hour, the operation mode is decided by the initial room temp. at starting up the operation.

INDOOR UNIT DISPLAY SECTION

MS-09DW-U1
MS-15DN-U1

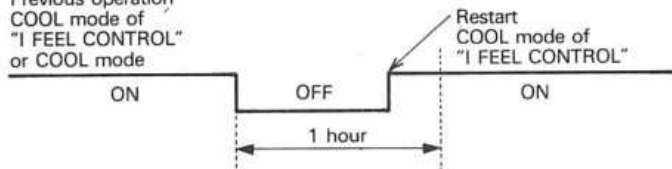


MF15EN



Example

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



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

Model	Initial Room Temp.	Initial set temp.	
COOL mode of "I FEEL CONTROL"	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 "I FEEL CONTROL"	Less than 76°F	Initial room temp. minus 2deg(°F)	

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

(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 buttons when you feel too cool or too warm, and when you feel comfortable the  button fixes the comfortable temp.

When the I FEEL 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. ~ 3 deg.(°F)

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

 ...To lower the set temp. 2 deg. ~ 3 deg.(°F)

— 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. has almost reached Set temp. The difference is less than 2 deg. (°F)

The buttons are available.

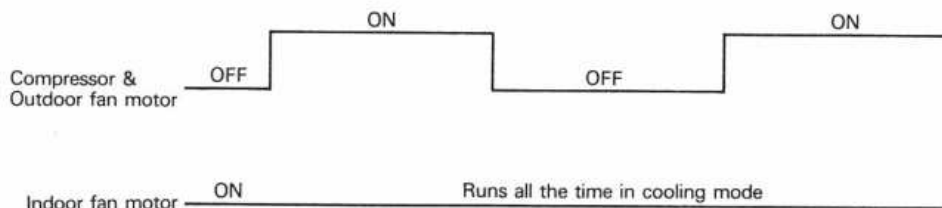
NOTE ● During "I FEEL CONTROL" operation, thermostat (SET TEMP.) is not available. Use "I FEEL CONTROL" buttons to set temp.

● 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 mode of "I FEEL CONTROL".

● When the main power is turned off, the settings are canceled. Initial set temp. will be decided as shown in the above table.

— COOL mode of "I FEEL CONTROL" —



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

There are two type of controls in coil frost prevention.

①Temperature & time control

When the indoor coil thermistor RT12 or RT14 is below 47°F for 5 minutes, the coil frost prevention mode starts. The compressor stops for 5 minutes and the indoor fan runs at set speed or AUTO speed.

5 minutes later, if the indoor coil thermistor RT12 or RT14 exceeds 50°F, the coil frost prevention mode terminates.

If the RT12 or RT14 is below 50°F at this time, the coil frost prevention continues until the thermistor RT12 or RT14 reaches to 50°F. In case of MS-09DW-U1, the coil frost prevention mode starts when the indoor coil thermistor RT12 is below 51°F for 5 min, and this mode terminates when RT12 exceeds 47°F.

The first 5 minutes, termination of the coil frost prevention is controlled by the time regardless of the indoor coil thermistor temperature. After that, the termination of the prevention mode is controlled by the temperature of the indoor coil thermistor.

Therefore, the coil frost prevention continues at least 5 minutes even if the temperature of RT12 or RT14 reaches the termination point within 5 minutes.

②Time control

Only MF15EN has this function. When the three conditions below have been satisfied for 1 hour and 45 minutes, the compressor stops for 3 minutes and the coil frost prevention mode starts.

- (a)The compressor is on continuously.
- (b)The indoor fan speed is LO or MED.
- (c)The room temperature is below 79°F.

If the compressor turns off before 1 hour and 45 minutes the accumulated time is cancelled.

In this case, time counting starts from the beginning when the above three conditions are satisfied again.

If the indoor fan speed becomes HI or the room temperature exceeds 79°F, time counting stops temporarily.

In this case, time counting restarts from the stop point when the above three conditions are satisfied again.

The indoor fan operates at the set speed.

●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. : 2 ~ 7 deg.(°F).....MED	-----
Room temp. minus Set temp. : less than 2 ~ 3 deg. (°F) LO	-----
	2 deg. 3 deg. 4 deg. 7 deg.

— 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 both temp. and 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 set for 2 deg. lower than the initial set temp.

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

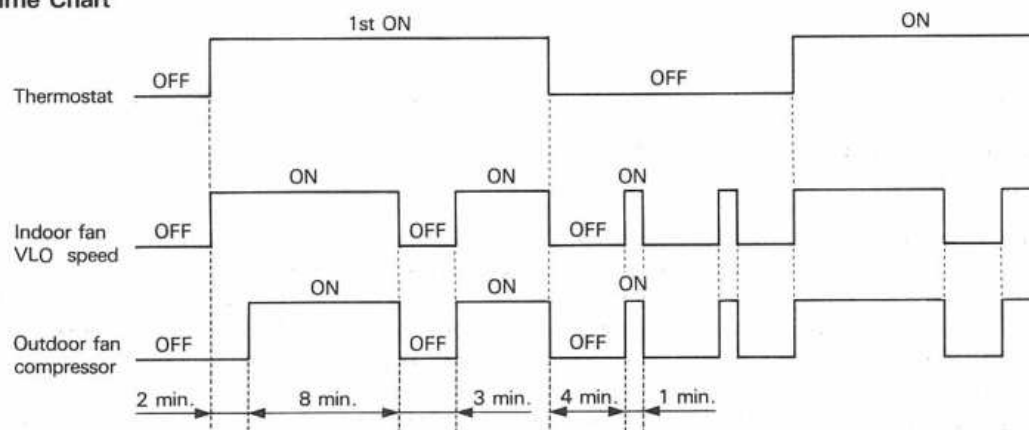
When the thermostat is OFF, the compressor repeats 4 min. OFF/1 min. ON cycle operation.

Indoor fan and outdoor fan operate in same cycle with compressor except the first 2min.

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.

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 61~88°F.

*"I FEEL CONTROL" buttons are not available.

(4) The indoor fan runs continuously to provide ventilation and prevent air stratification.

3. DRY operation

(1) Press POWER ON/OFF button.

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

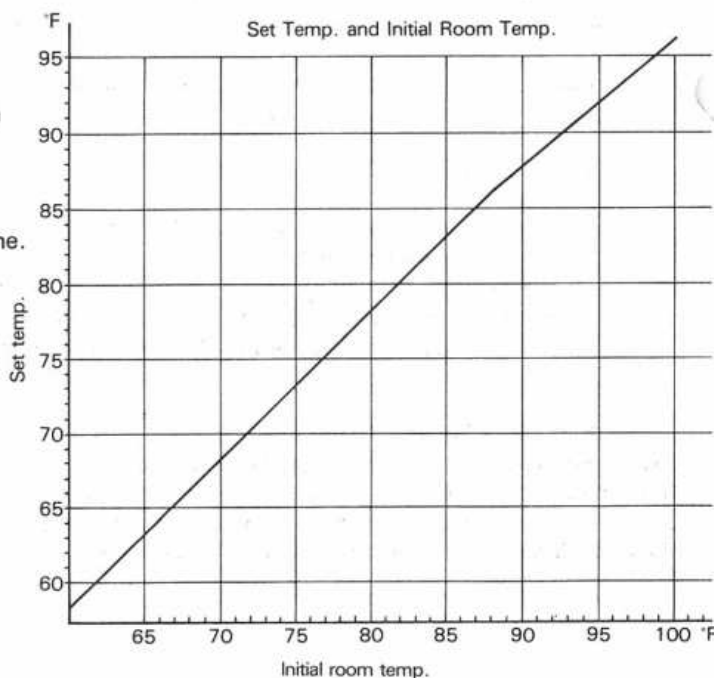
(2) Select DRY mode.

(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. FAN operation

(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.(°F) HI -----
 Room temp. minus set temp. : 2~7 deg.(°F) MED -----
 Room temp. minus set temp. : -2~3 deg.(°F) LO -----
 Room temp. minus set temp. : less than -2~0 deg.(°F).....STOP -----

Only indoor fan operates.

Outdoor unit does not operate.

5. TIMER

1. AUTO STOP operation

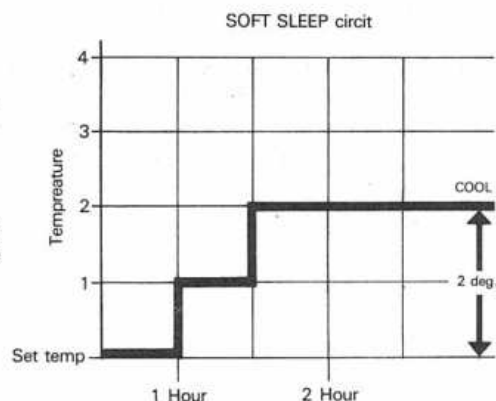
AUTO STOP mode has "SOFT SLEEP" circuit which provides comfortable temperature control for sleeping.

(1) Set the TIMER CONTROL to AUTO STOP.

(2) Set the time. Time setting is in 1 hour units for up to 12 hours.

(3) "SOFT SLEEP" circuit operates in COOL 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.

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 in 1 hour units for up to 12 hours.

NOTE TIMER setting will be canceled by power failure or breaker fuctioning.

6. EMERGENCY-TEST operation

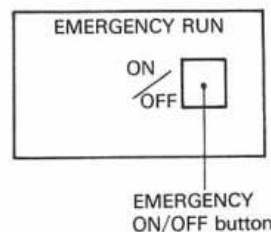
When the remote controller is missing, has failed or the batteries run down, press the emergency run on/off switch on the front of the indoor unit. The unit will start and the operation lamp will light.

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 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.



7. AUTO RESTART FUNCTION (MF15EN)

When the indoor unit is controlled by the remote controller for more than 10 minutes, the operation mode, set temperature, and the fan speed are memorized by the indoor electronic control P.C. board. After power failure, the unit operates automatically when power is restored. However, if units were operated in "I FEEL CONTROL" mode before power failure, the board does not memorize the operation mode.

When power is restored, the mode is decided by the initial temperature. Refer to page 23.

How to set "AUTO RESTART FUNCTION"

Cut the jumper wire of SW1A0.

See the TEST POINT DIAGRAM on page 40.

Operation

- a. If main power (AC115V) is cut, the operation settings remain.
- b. When power is restored, the unit restarts in the previous mode 3 minutes later without remote control.
- c. If main power is cut while AUTO START/STOP timer is set, the timer setting is cancelled and auto restart function works.
- d. Even if power is cut for about 0.5 seconds, auto restart works.

NOTE:

- a. If operation setting is changed by the remote controller in the first 10 minutes, the accumulated time is cancelled and counting starts from zero.
- b. When the unit was off by the remote controller before power failure:
If power is restored within 10 minutes, the unit operates by auto restart function even the power button of the remote controller is still off.

Usually auto restart function does not work when the power button of the remote controller is off.

8

TROUBLESHOOTING

1. SELF CHECK FUNCTION

This function is to show defective point by lighting or flashing of the indoor unit power 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 is reset 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

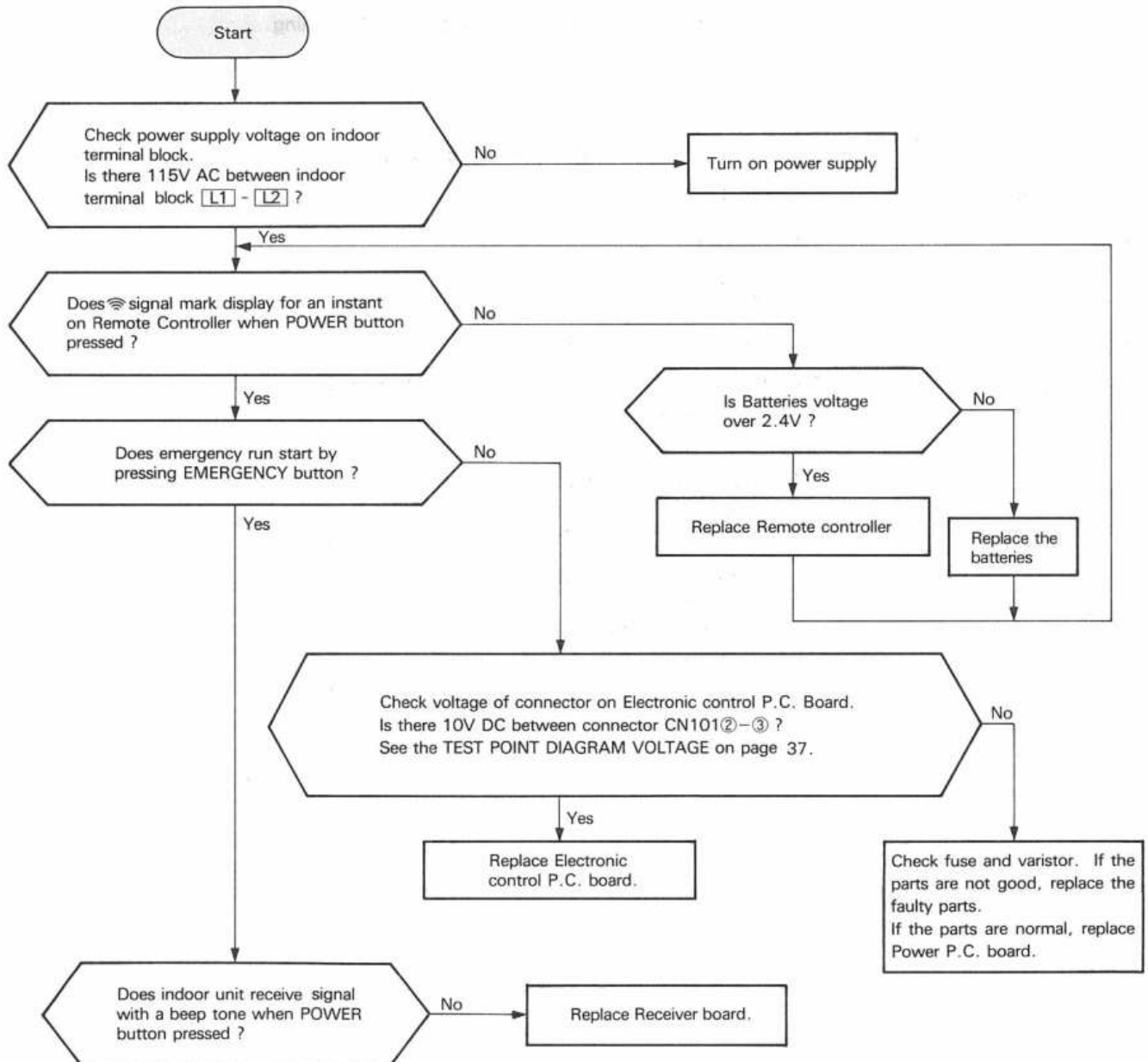
 Flash
  Steady
  OFF

Abnormal point	Indoor coil thermistor.
Indication	 POWER  I FEEL MONITOR
Symptom	Indoor unit power turns off.
Detect method	Detects Indoor coil thermistor short or open circuit every 2 sec. during operation.
Cause	● Thermistor defect ● Connector disconnecting ● Connector misconnecting ● Indoor control P.C. board defect
Repair	● Check thermistor calibration. ● Reconnect connector. ● Reconnect connector. ● Check indoor board.

2. TROUBLESHOOTING

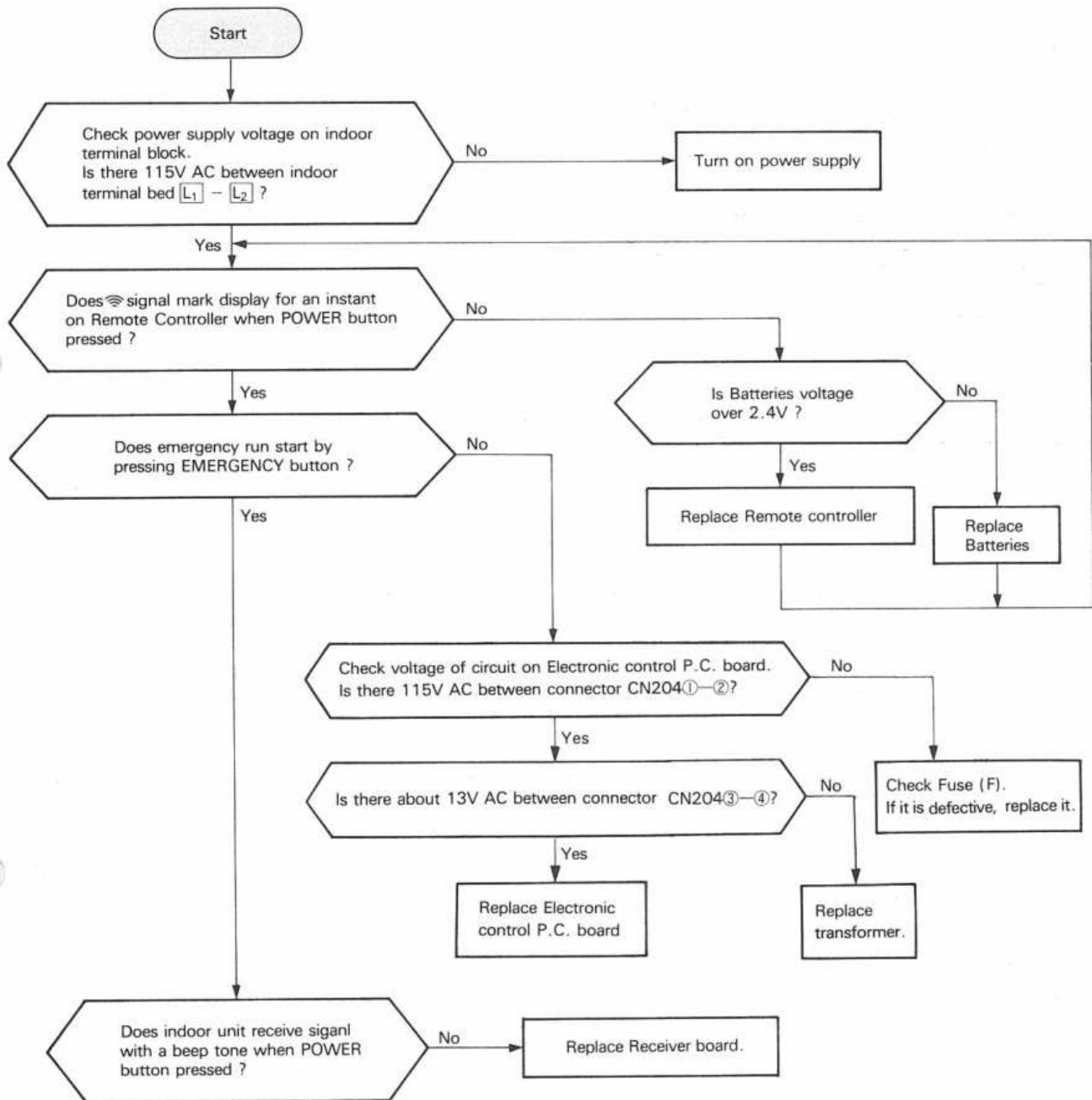
(1) Operation does not start.

MS-09DW-**U1**



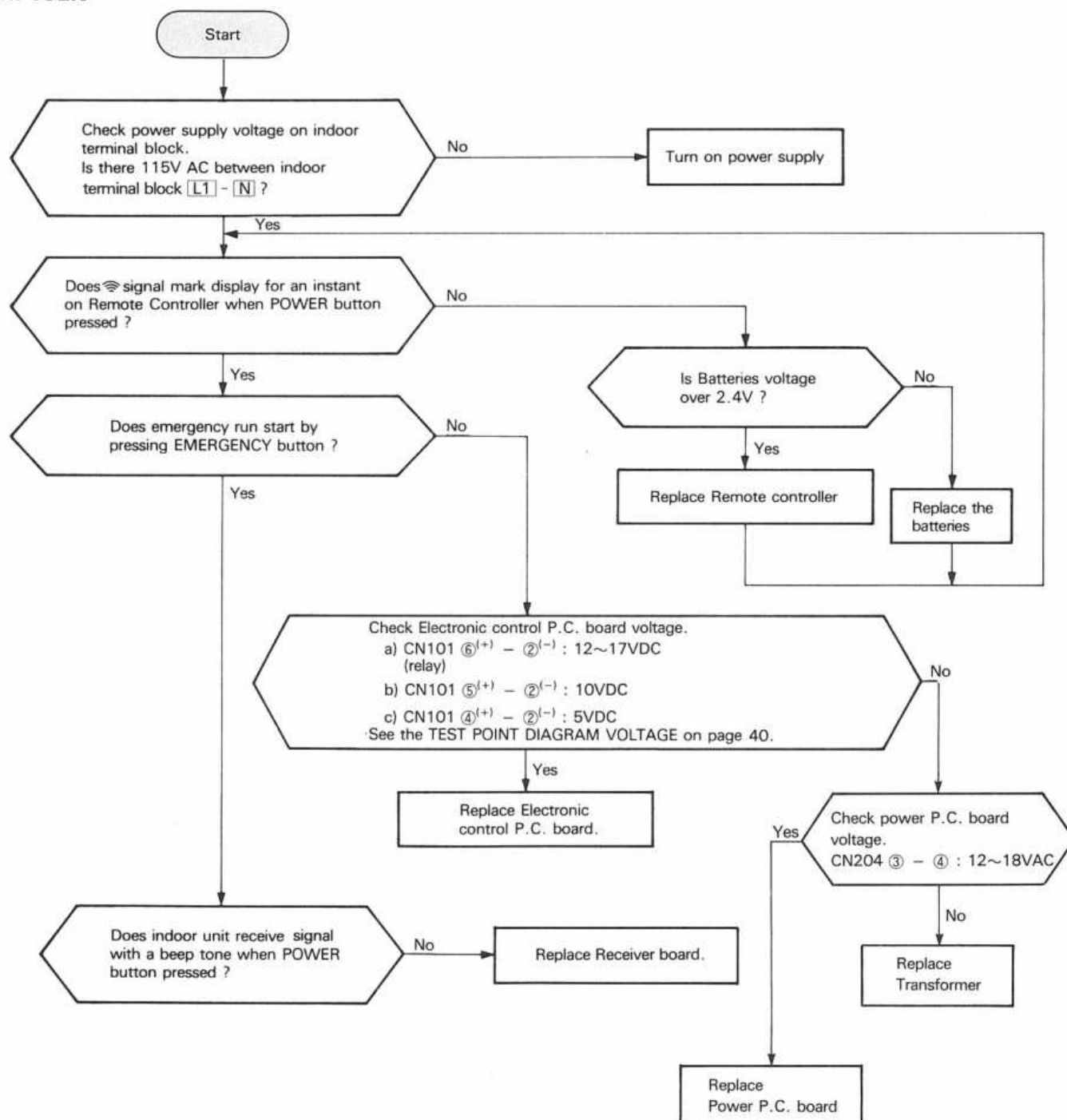
(1) Operation does not start.

MS-15DN-U1



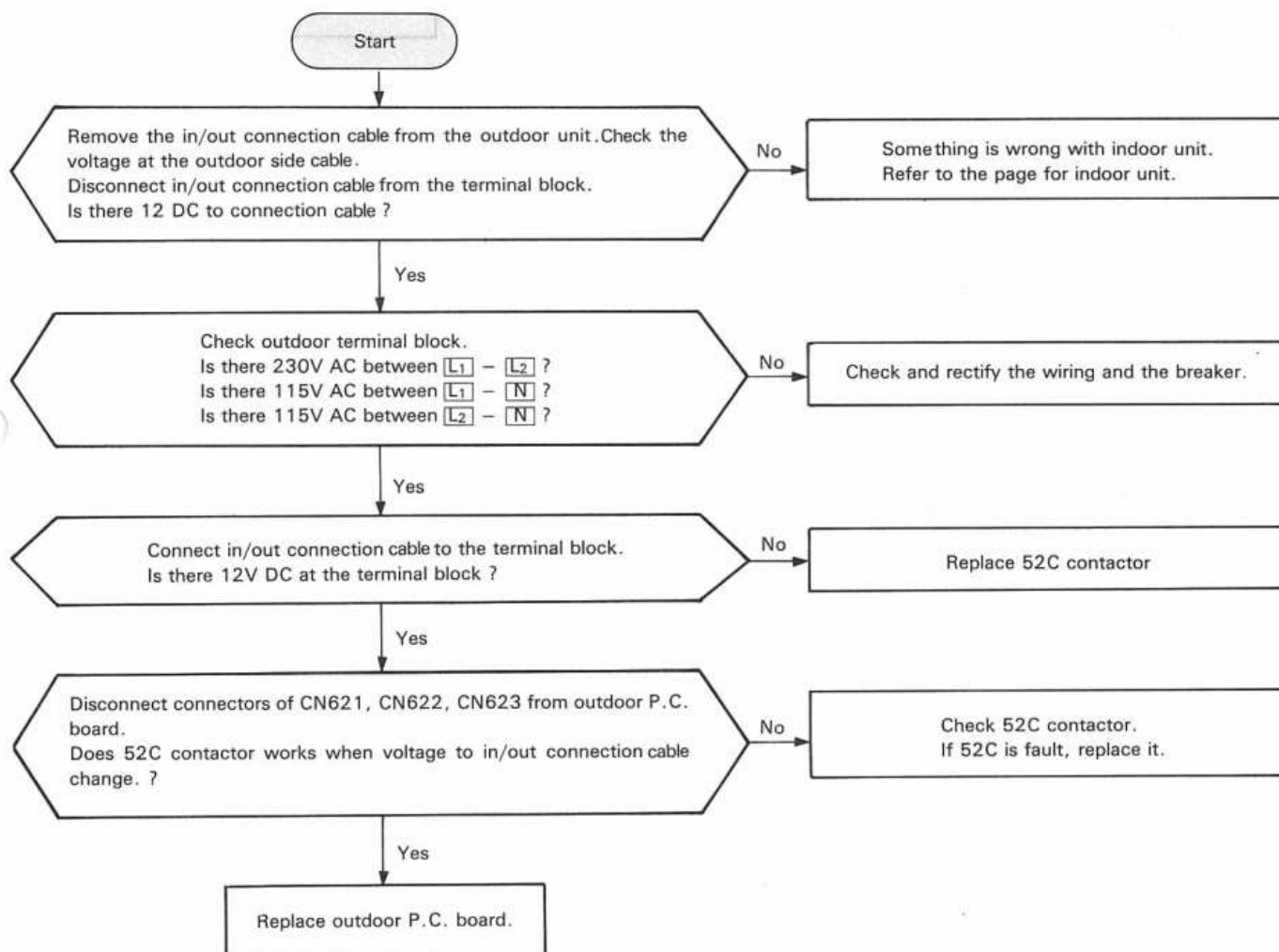
(1) Operation does not start.

MF15EN

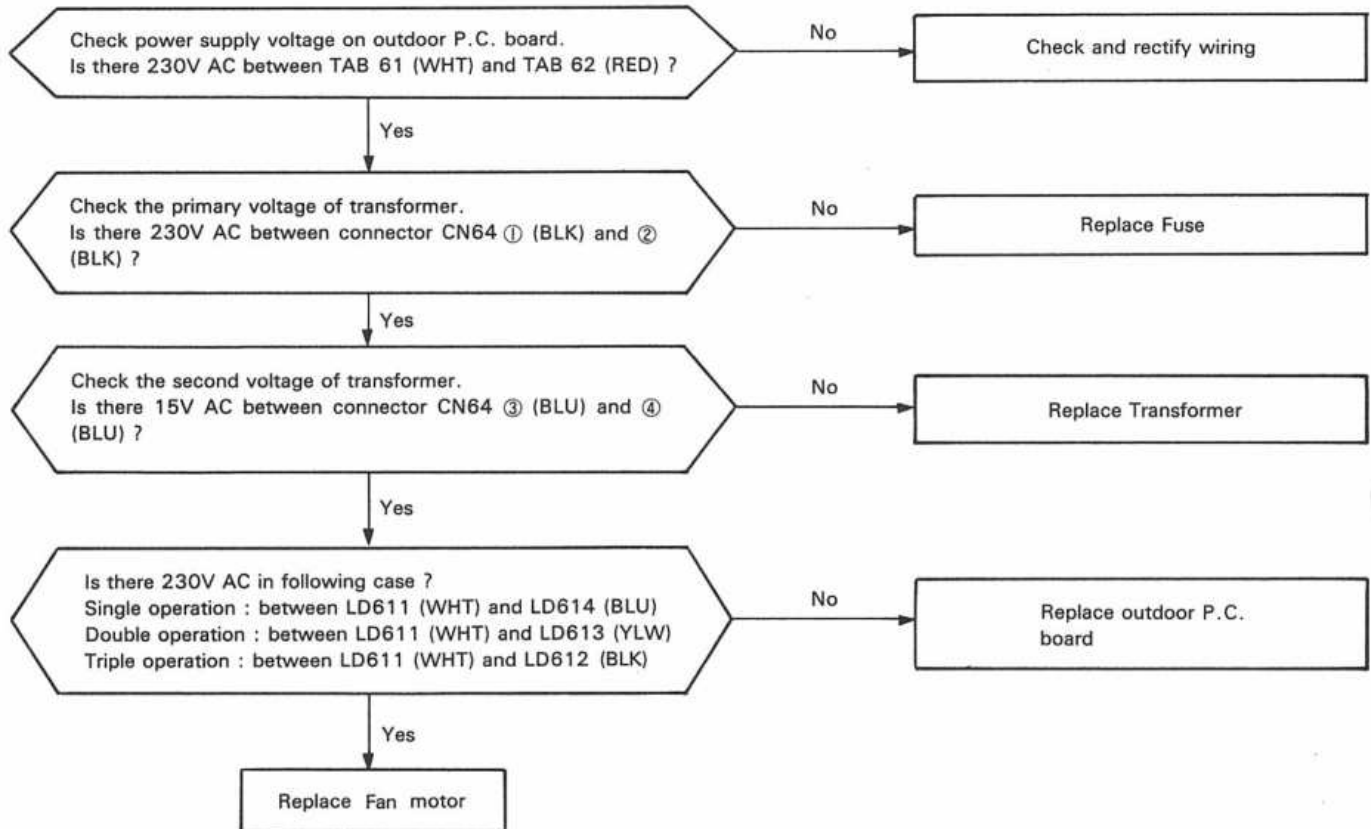


(1) Operation does not start .

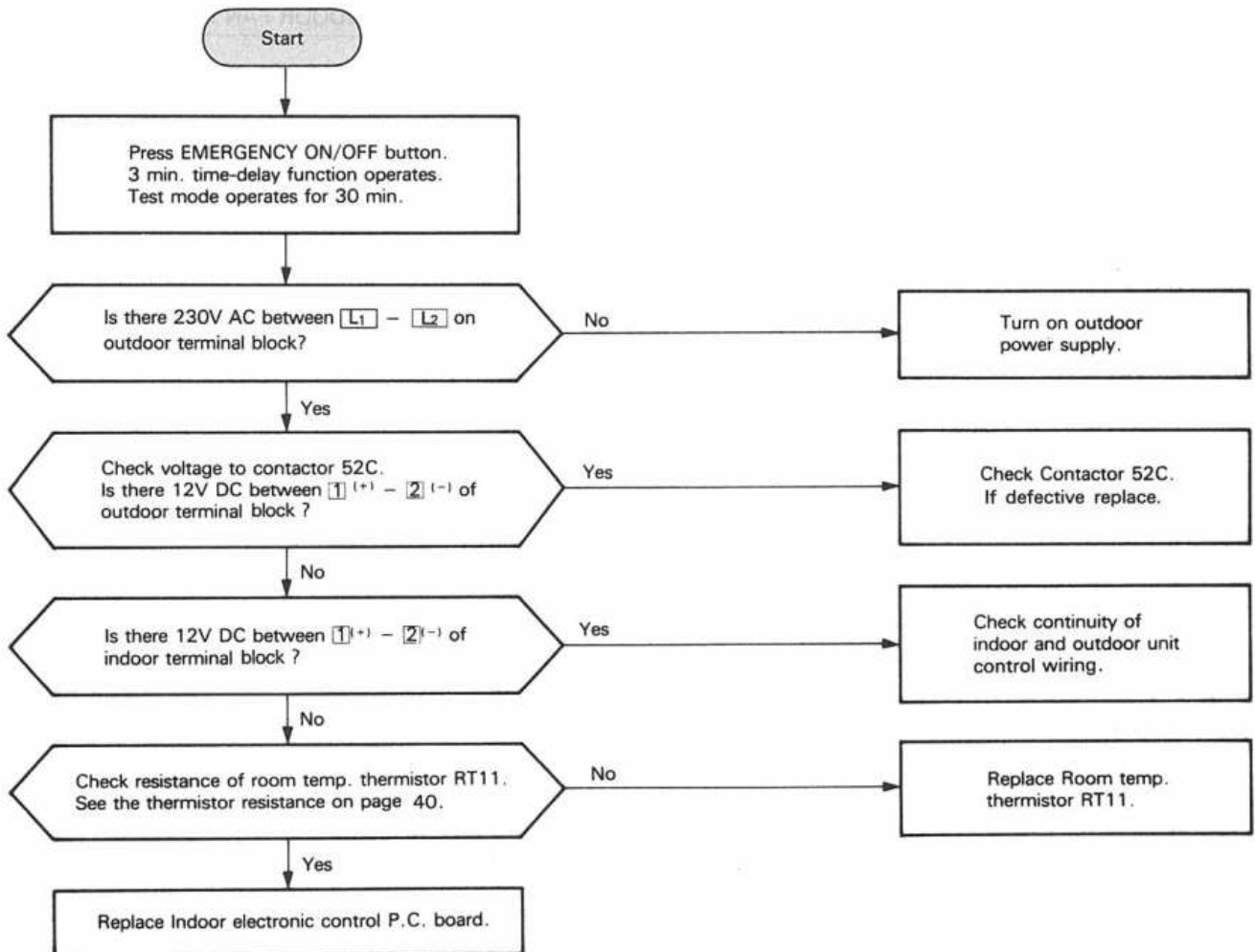
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(2) Only outdoor fan does not operate. (Compressor operates)



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



RELAY OPERATION

MS-09DW-**U1**

MS-15DN-**U1**

MF15EN

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 CON- TROL	ON	Delays compressor start for 2 min. at initial stat to determine set temp.	VLO speed.
		Repeats 8 min. ON 3 min. OFF operation	VLO links with 52C contactor.
	OFF	Repeats 4 min. OFF 1 min. ON operation	
FAN	ON	OFF	AUTO or set speed
	OFF		OFF

NOTE : When the compressor is OFF, "3 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	52C is dormant for the first 5 min. After 5min. past, 52C will remain off, until the indoor coil thermistor temp. reaches the ter- mination temp. At this point 52C will be activated.	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
MED	X13
LO	X12
VLO	X11
OFF	All fan relays are off

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SYSTEM	52C CONTACTOR	OUTDOOR FAN RELAY
Triple	All three : ON	Hi speed
Double	Two of them : ON	Me speed
Single	One of them : ON	Lo speed

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

NOTE

1: Compressor is on while 52C is on.

2: Compressor is off while 52C is off.

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

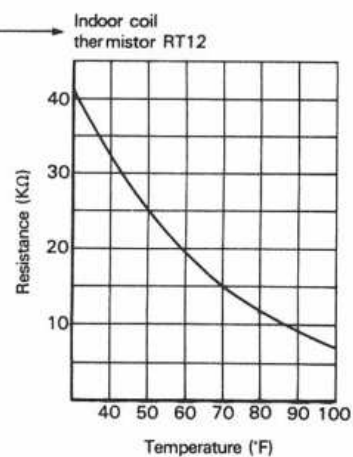
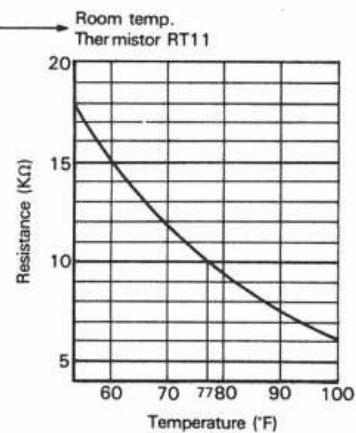
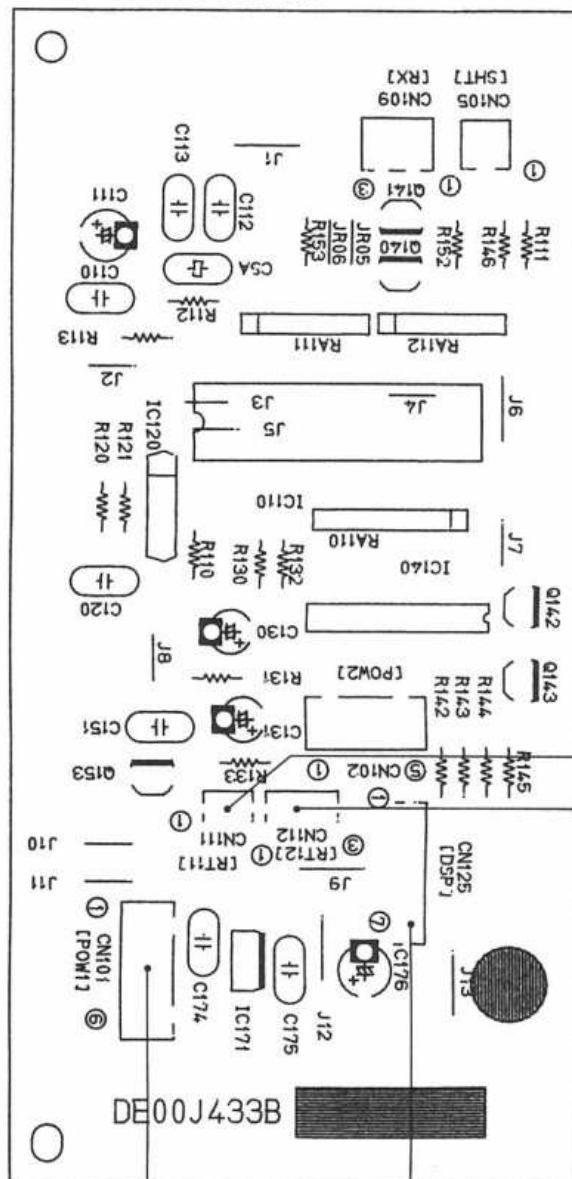
52C1	52C2	52C3	X61	X62	X63
OFF	OFF	OFF	OFF	OFF	OFF
OFF	OFF	ON	OFF	OFF	ON
OFF	ON	OFF	OFF	OFF	ON
OFF	ON	ON	OFF	ON	OFF
ON	OFF	OFF	OFF	OFF	ON
ON	OFF	ON	OFF	ON	OFF
ON	ON	OFF	OFF	ON	OFF
ON	ON	ON	ON	OFF	OFF

FAN RELAY/FAN SPEED/APPLIED VOLTAGE

FAN MOTOR RELAY	OUTDOOR FAN SPEED	APPLIED VOLTAGE TO FAN
X61 is ON	Hi	230V AC between WHT and BLK
X62 is ON	Me	230V AC between WHT and YLW
X63 is ON	Lo	230V AC between WHT and BLU

TEST POINT DIAGRAM AND VOLTAGE MS-09DW-U1

Electronic control P.C. board

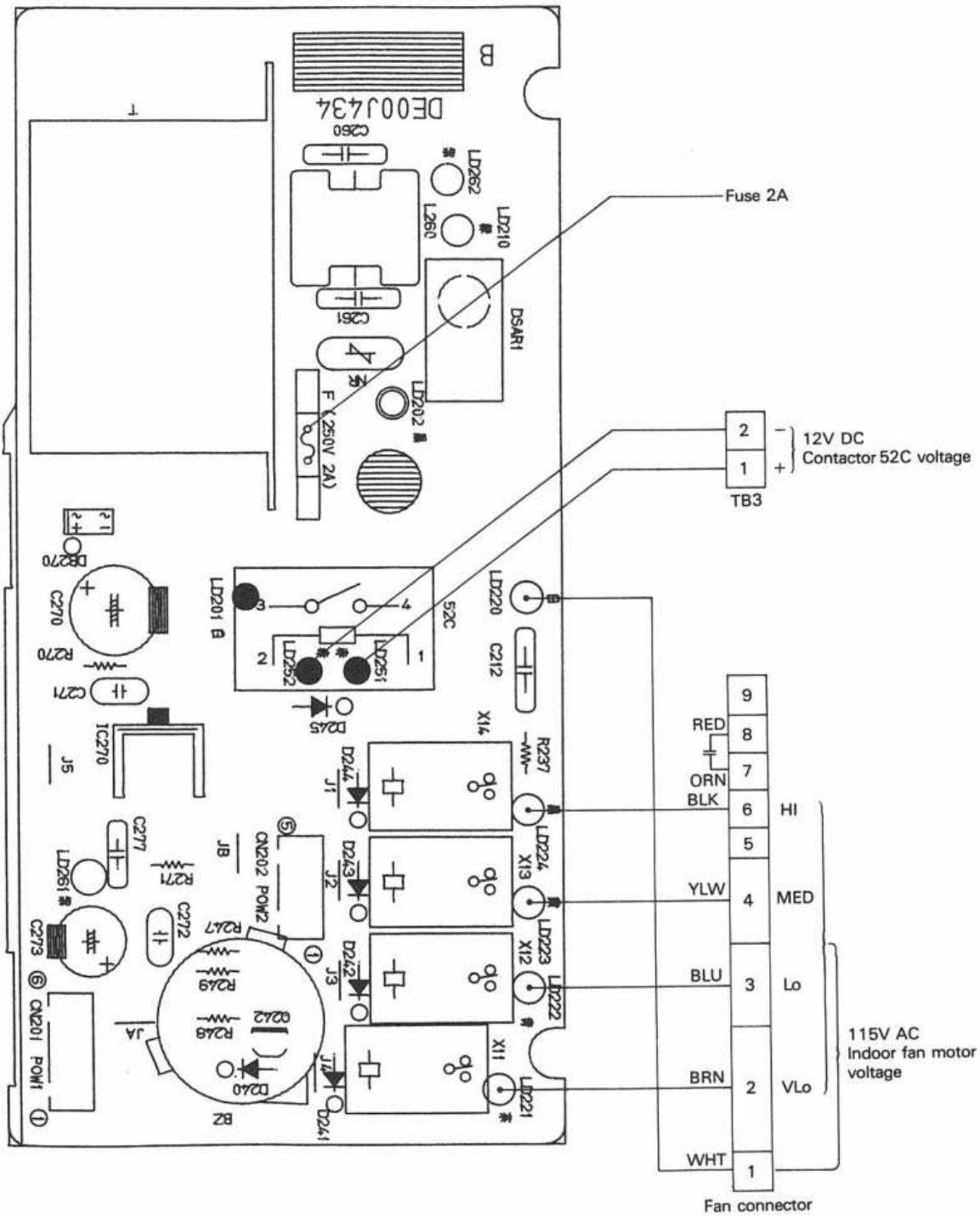


CN101
POW1

- | | | |
|---|--|---|
| 1 | ----- Buzzer circuit | |
| 2 | + } 10V DC power supply of control circuit | |
| 3 | | - |
| 4 | | - |
| 5 | + } 5V DC reference voltage | |
| 6 | | - |
| 6 | ----- clock signal circuit | |

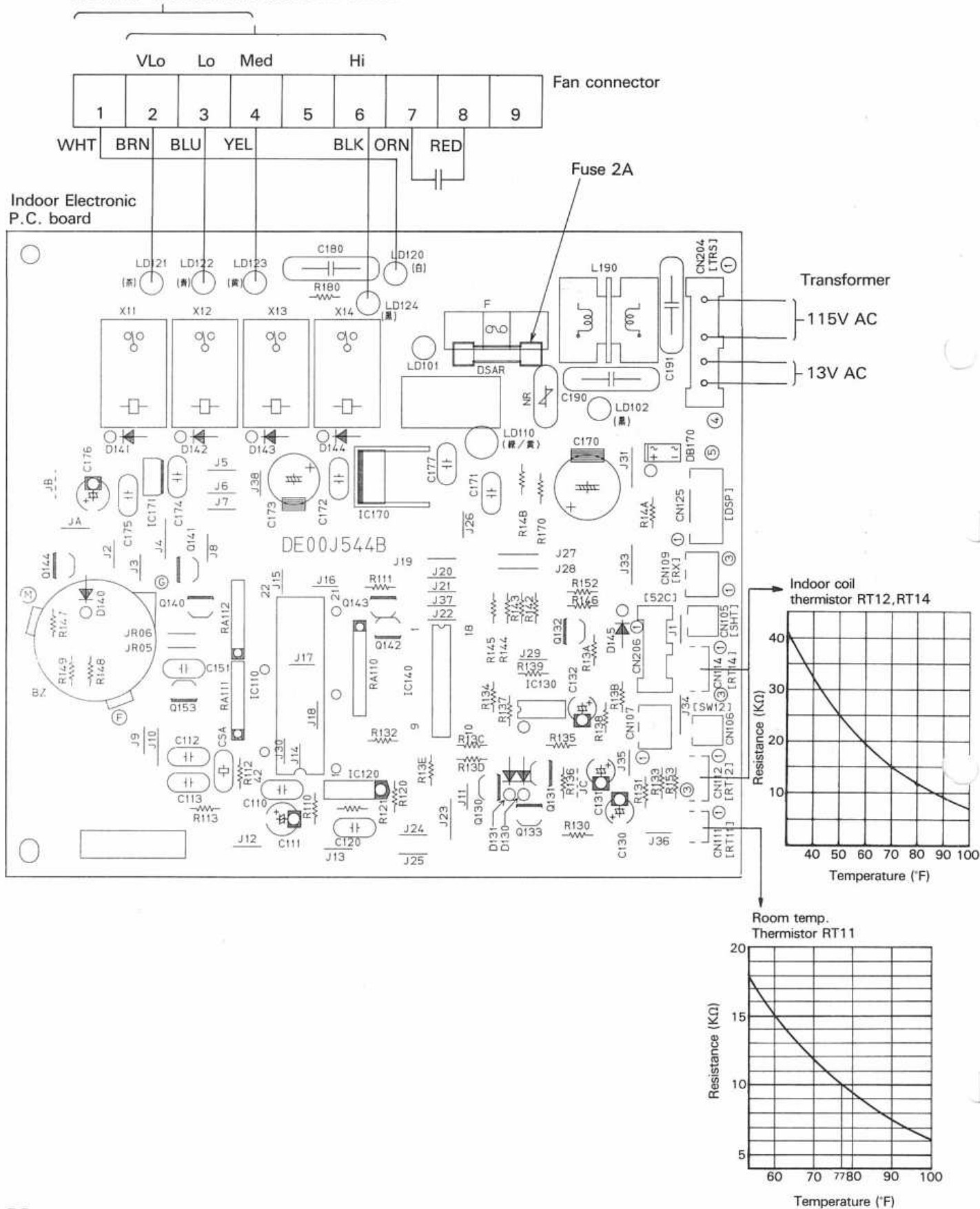
Auto restart connector
Short the connector CN125
between ⑤ - ⑦

Power P.C. board

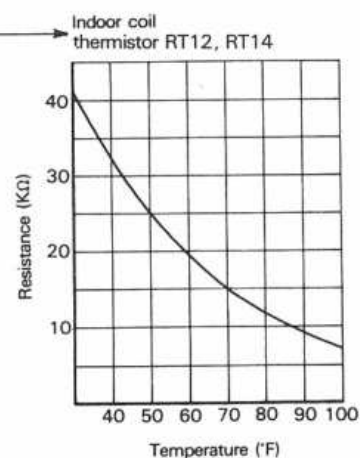


MS-15DN- U1

115V AC INDOOR FAN MOTOR VOTAGE

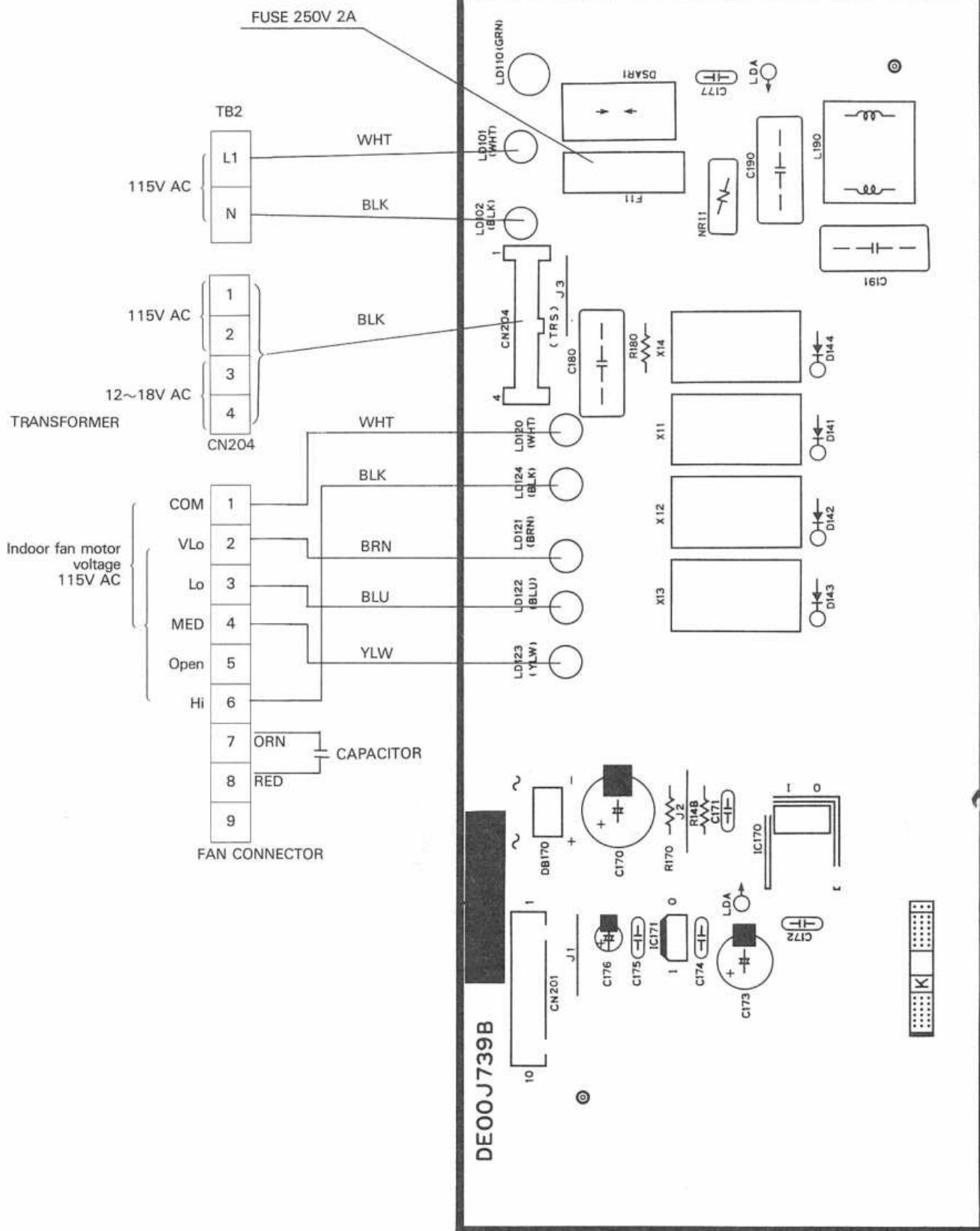


Electronic control P.C. board

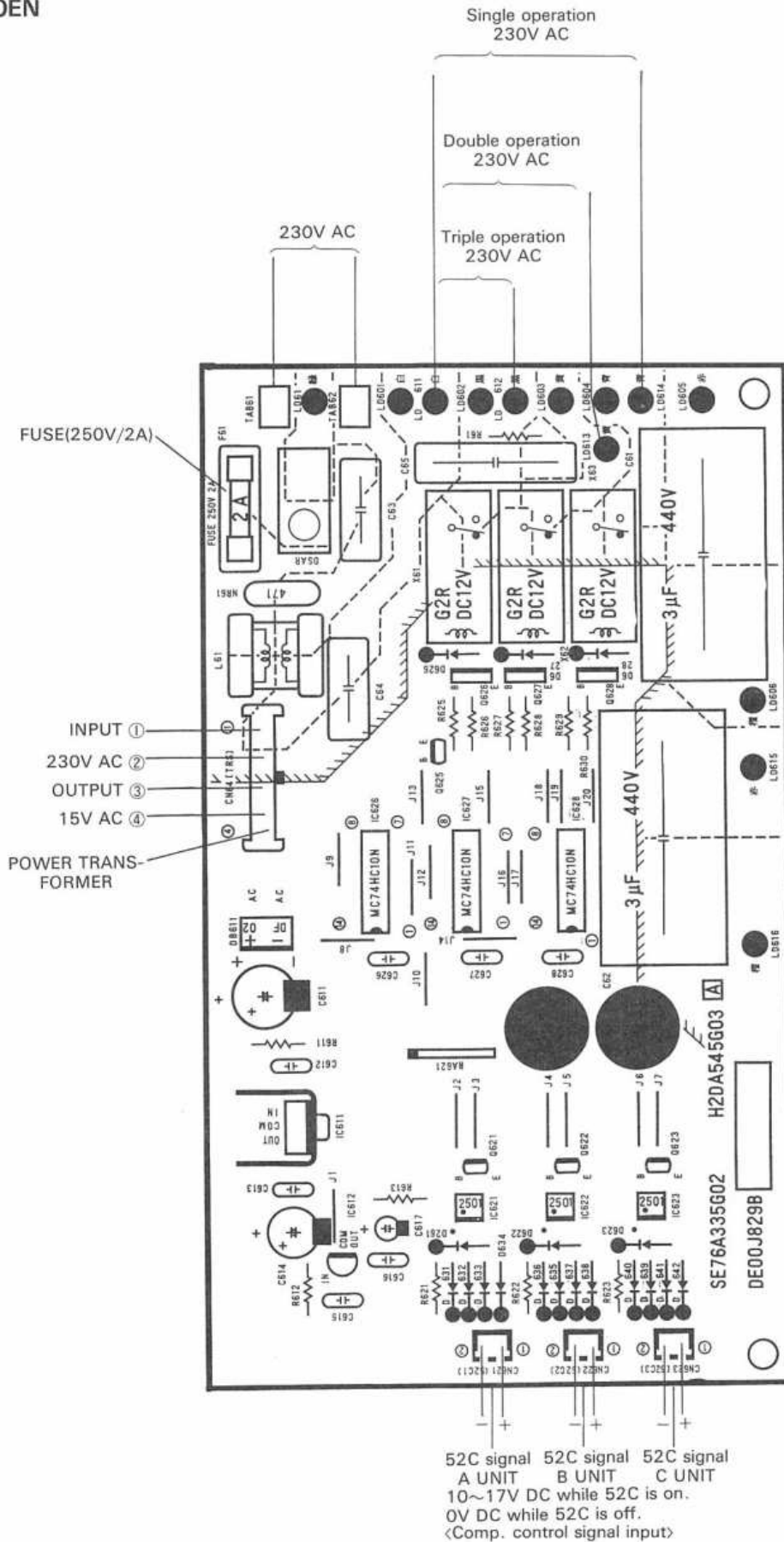


MF15EN

Power P.C. board



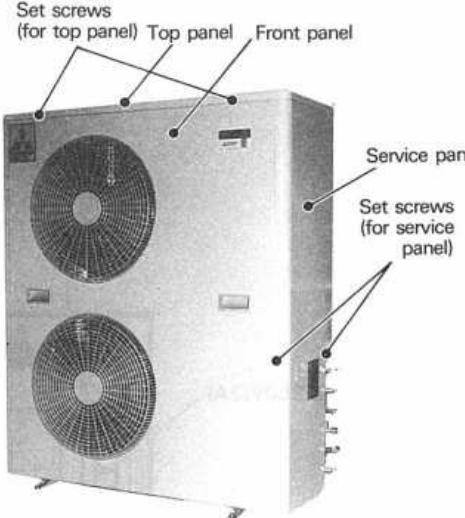
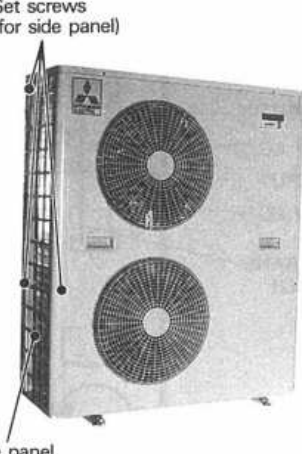
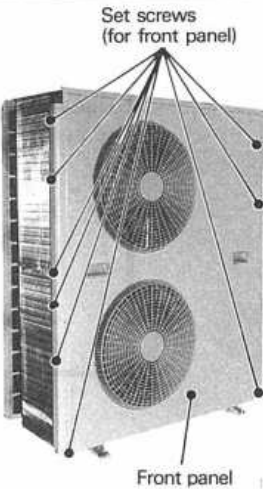
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9

DISASSEMBLY INSTRUCTIONS

OUTDOOR UNIT MUM30EN

OPERATING PROCEDURE	PHOTOS
REMOVING PANELS 1. Removing of the top panel (1) Remove 4 screws. (2) Remove the top panel.	Photo 1  Set screws (for top panel) Top panel Front panel Service panel Set screws (for service panel)
2. Removing of the service panel (1) Remove 2 screws. (2) Remove the service panel pulling to your side.	Photo 2  Set screws (for side panel) Side panel
3. Removing of the side panel (Left) (1) Remove 3 screws. (2) Remove the side panel (Left) pulling to your side.	Photo 3  Set screws (for front panel) Front panel
4. Removing of the front panel (1) Remove 10 screws. (4 screws for each side) (2) Remove the front panel holding the catches.	

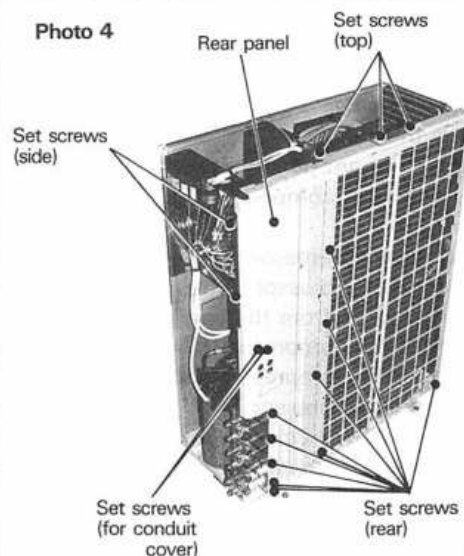
OPERATING PROCEDURE

5. Removing of the rear panel

- (1) Remove 3 screws on the top.
- (2) Remove 2 screws on the service panel sides.
- (3) Remove 10 screws on the rear side.
- (4) Remove 2 screws of the conduit cover.
- (5) Disconnect connecting wires from the terminal block of In/Out door unit.
- (6) Remove the rear panel.

PHOTOS

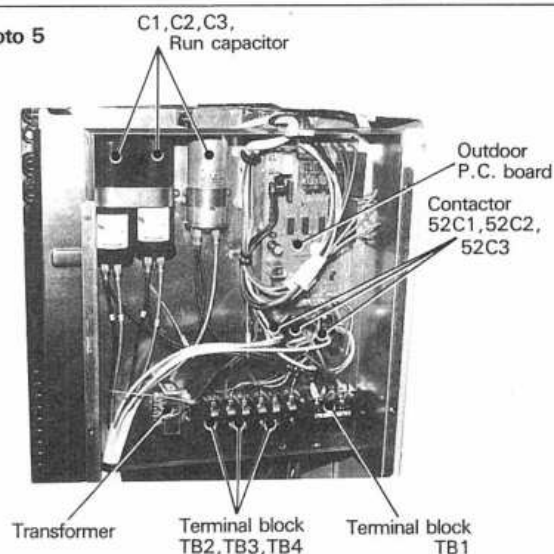
Photo 4



6. Removing of electrical parts

- (1) Remove the service panel.
Remove 2 set screws.
Remove the service panel pulling to your side.
- (3) Electrical parts can be removed.

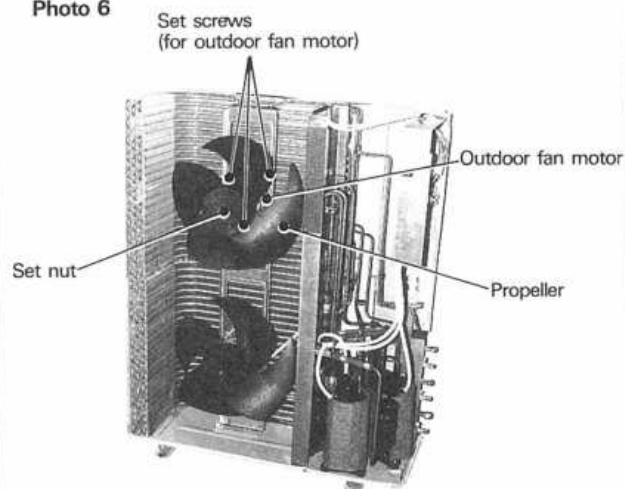
Photo 5



7. Removing of the outdoor fan motor

- (1) Remove the top panel, service panel, side panel and front panel.
- (2) Remove the propeller set nut.
- (3) Remove the propeller.
- (4) Disconnect the connecting wires of the outdoor fan motor.
- (5) Remove the set screws of the outdoor fan motor.
- (6) Remove the outdoor fan motor.

Photo 6



OPERATING PROCEDURE

8. Removing of the compressor

- (1) Remove the top panel
- (2) Remove the service panel.
- (3) Remove the side panel.
- (4) Remove the front panel.
- (5) Disconnect the compressor lead wires from the clamp.
- (6) Remove the compressor terminal cover.
- (7) Remove the compressor lead wires and the thermal overcurrent 51C from the compressor terminals.
- (8) Disconnect the compressor discharge pipe.
- (9) Disconnect the compressor suction pipe.
- (10) Remove the compressor.

To remove MC3 comp., remove the separator.

The separator can be removed by removing 6 set screws.

PHOTOS

Photo 7

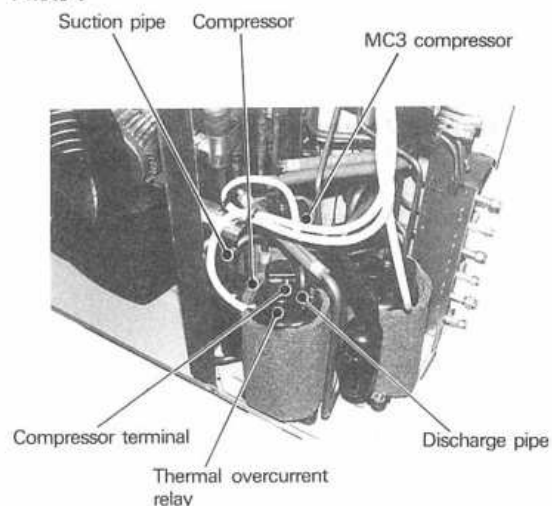
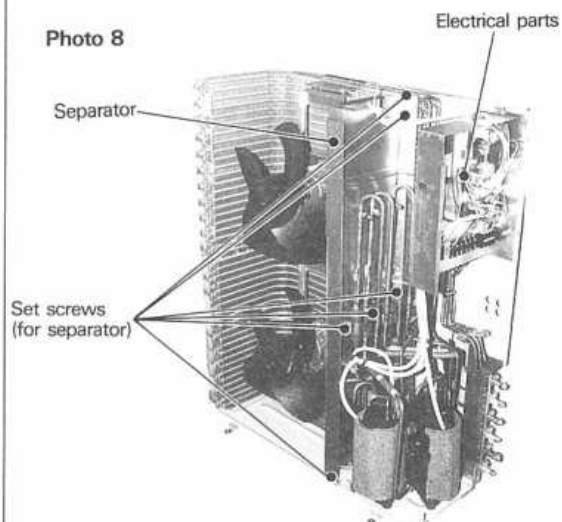


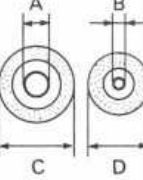
Photo 8



10 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	MAC-850PI-US	10 ft		3/8	1/4	C 1-3/8	0
	MAC-851PI-US	16 ft					1
	MAC-852PI-US	23 ft					
	MAC-853PI-US	33 ft					
MS-15DN MF-15EN	MAC-660PI-US	10 ft		1/2	1/4	C 1-1/4 D 1	0
	MAC-661PI-US	16 ft					1
	MAC-662PI-US	23 ft					
	MAC-663PI-US	33 ft					3
	MAC-664PI-US	49 ft					

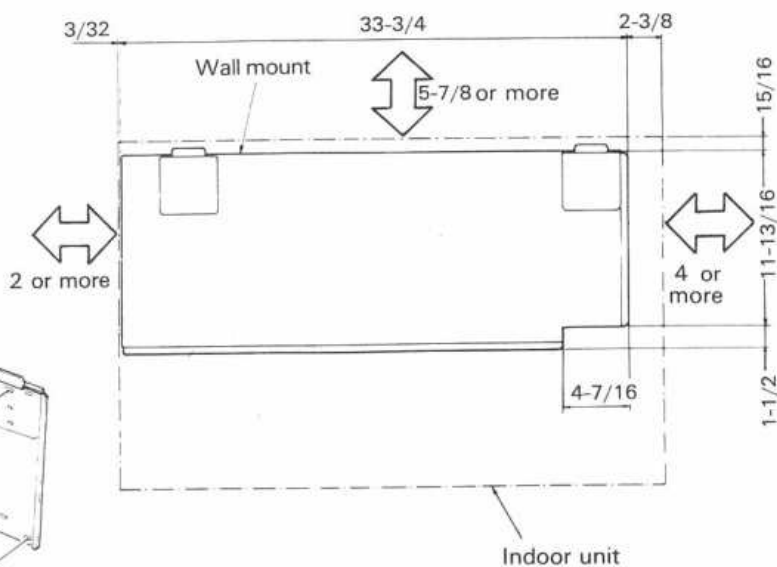
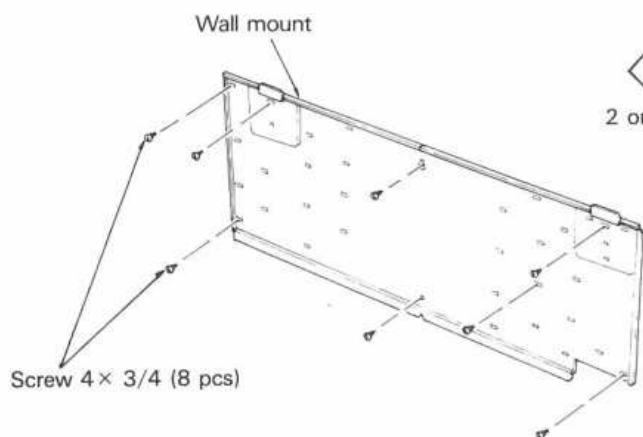
2. WALL MOUNT (MF15EN)

When you install the indoor unit on the wall, and the baseboard is over 3 1/8 inch high, use the optional WALL MOUNT.

Models	Parts No.
MF15EN	MAC-761WS

REQUIRED SPACE

Unit (inch)



Mr. SLIM

 **mitsubishi electric corporation**
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