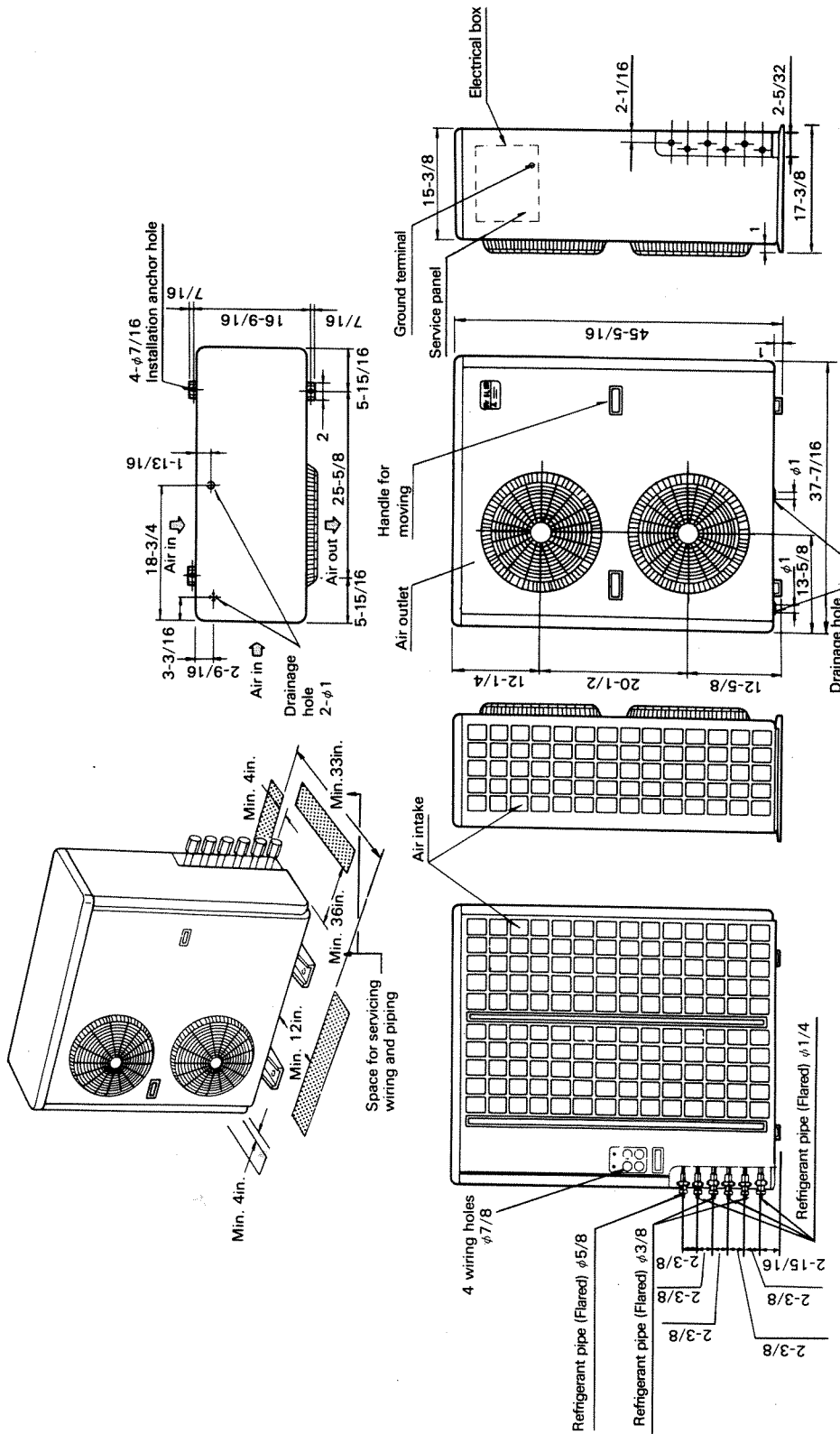


OUTDOOR UNIT MUM30EN2

UNIT:inch



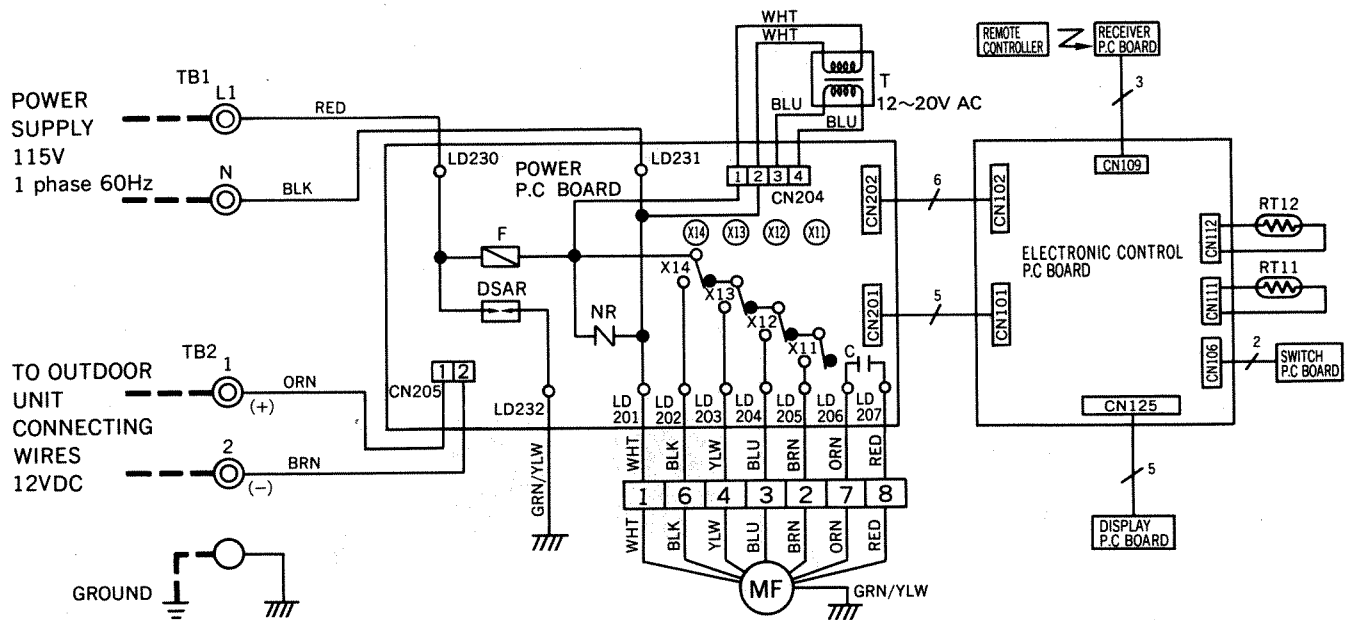
NOTE : The symbol ϕ indicates the diameter.

6

WIRING DIAGRAM

INDOOR

MODEL MS09EW WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME
C	INDOOR FAN CAPACITOR	RT11	ROOM TEMPERATURE THERMISTOR
DSAR	SURGE ABSORBER	RT12	INDOOR COIL THERMISTOR
F	FUSE (2A)	T	TRANSFORMER
MF	INDOOR FAN MOTOR (INNER THERMOSTAT)	TB1,2	INDOOR TERMINAL BLOCK
NR	VARIATOR	X11~14	INDOOR FAN RELAY

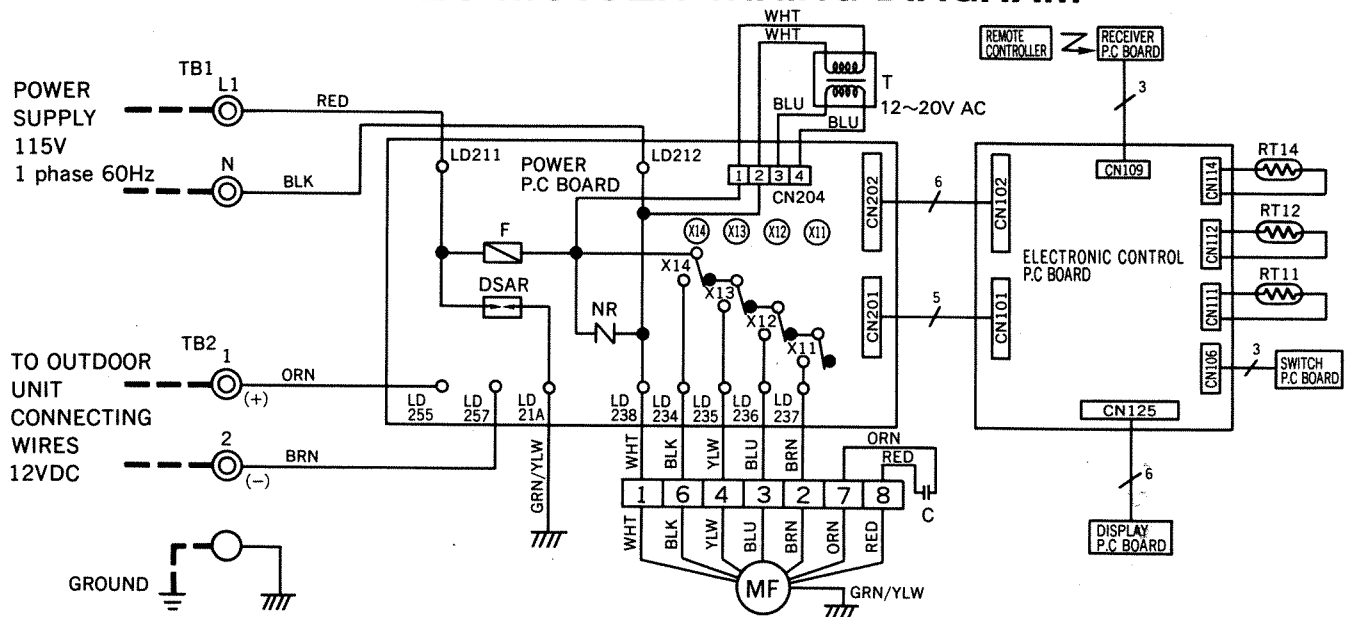
NOTES :

1. For outdoor electric wiring refer to the outdoor unit electric wiring diagram.
2. Use copper conductors only. (For field wiring)
3. Symbols below indicate.

○ : Terminal block, □ : Connector.

INDOOR

MODELS MS15EN WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME
C	INDOOR FAN CAPACITOR	RT11	ROOM TEMPERATURE THERMISTOR
DSAR	SURGE ABSORBER	RT12, 14	INDOOR COIL THERMISTOR
F	FUSE (2A)	T	TRANSFORMER
MF	INDOOR FAN MOTOR	TB1, 2	INDOOR TERMINAL BLOCK
NR	VARISTOR	X11~14	INDOOR FAN RELAY

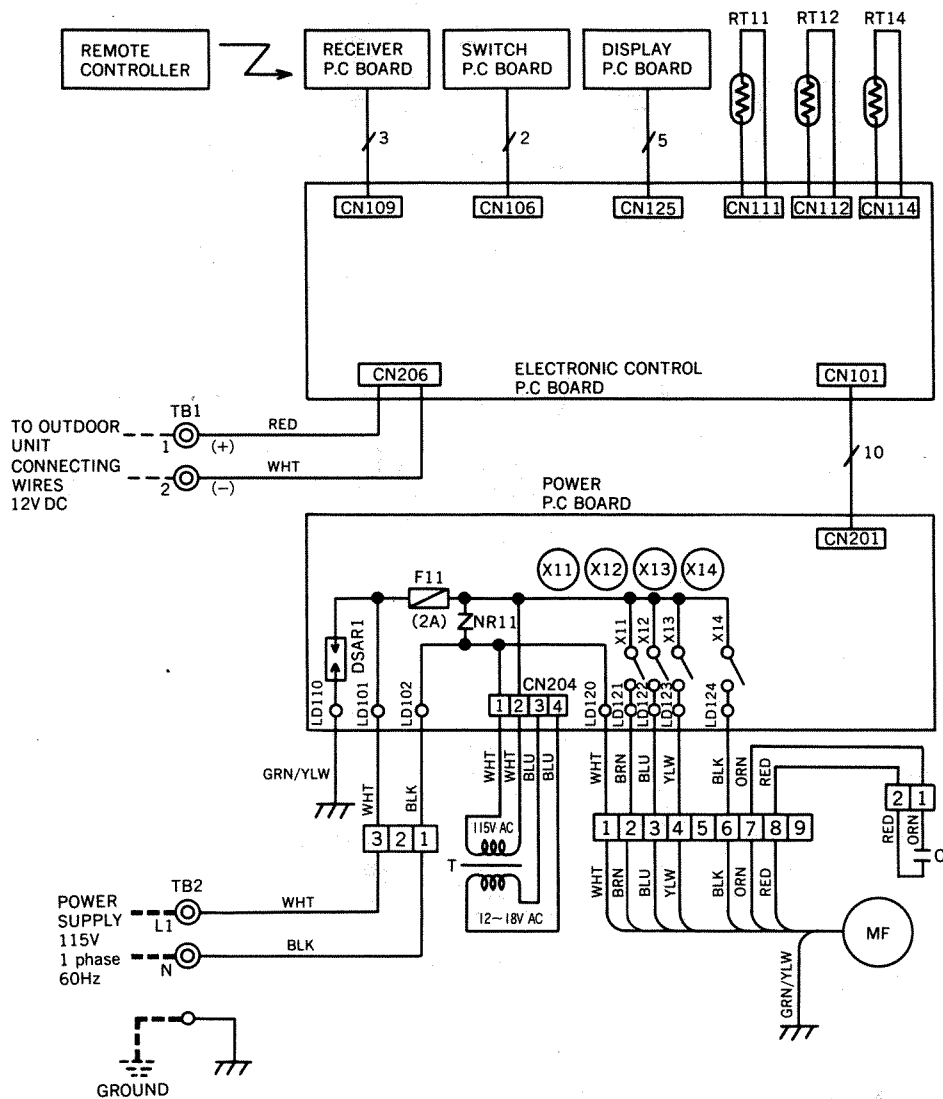
NOTES :

1. For outdoor electric wiring refer to the outdoor unit electric wiring diagram.
2. Use copper conductors only. (For field wiring)
3. Symbols below indicate.

○ : Terminal block, □ : Connector.

INDOOR UNIT

MODEL MF15EN WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C	INDOOR FAN CAPACITOR	NR11	VARISTOR	T	TRANSFORMER
DSAR1	SURGE ABSORBER	RT11	ROOM TEMPERATURE THERMISTOR	TB1,2	TERMINAL BLOCK
F11	FUSE (2A)	RT12	INDOOR COIL THERMISTOR	X11~14	FAN RELAY
MF2	INDOOR FAN MOTOR (INNER THERMOSTAT)	RT14	INDOOR COIL THERMISTOR		

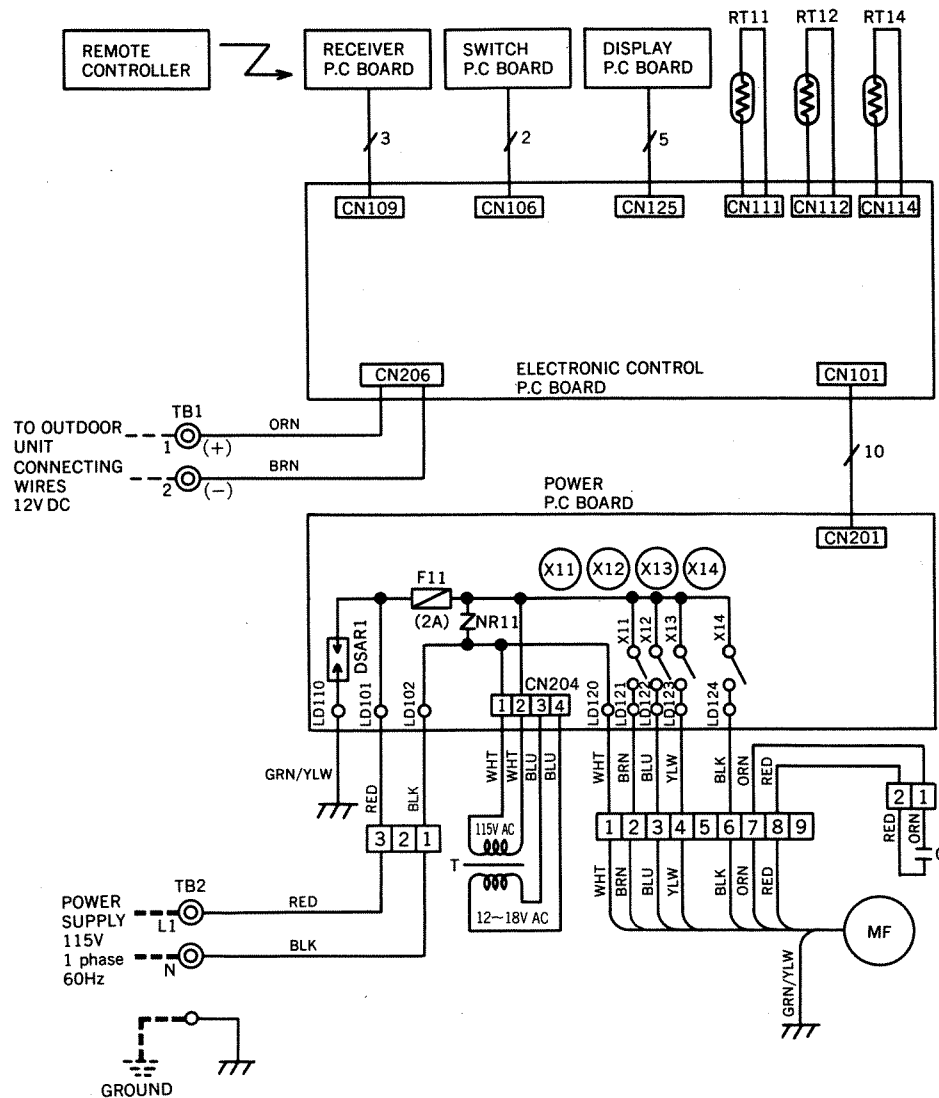
NOTE

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

MODEL MF15EN2 WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C	INDOOR FAN CAPACITOR	NR11	VARISTOR	T	TRANSFORMER
DSAR1	SURGE ABSORBER	RT11	ROOM TEMPERATURE THERMISTOR	TB1,2	TERMINAL BLOCK
F11	FUSE (2A)	RT12	INDOOR COIL THERMISTOR	X11~14	FAN RELAY
MF2	INDOOR FAN MOTOR (INNER THERMOSTAT)	RT14	INDOOR COIL THERMISTOR		

NOTE

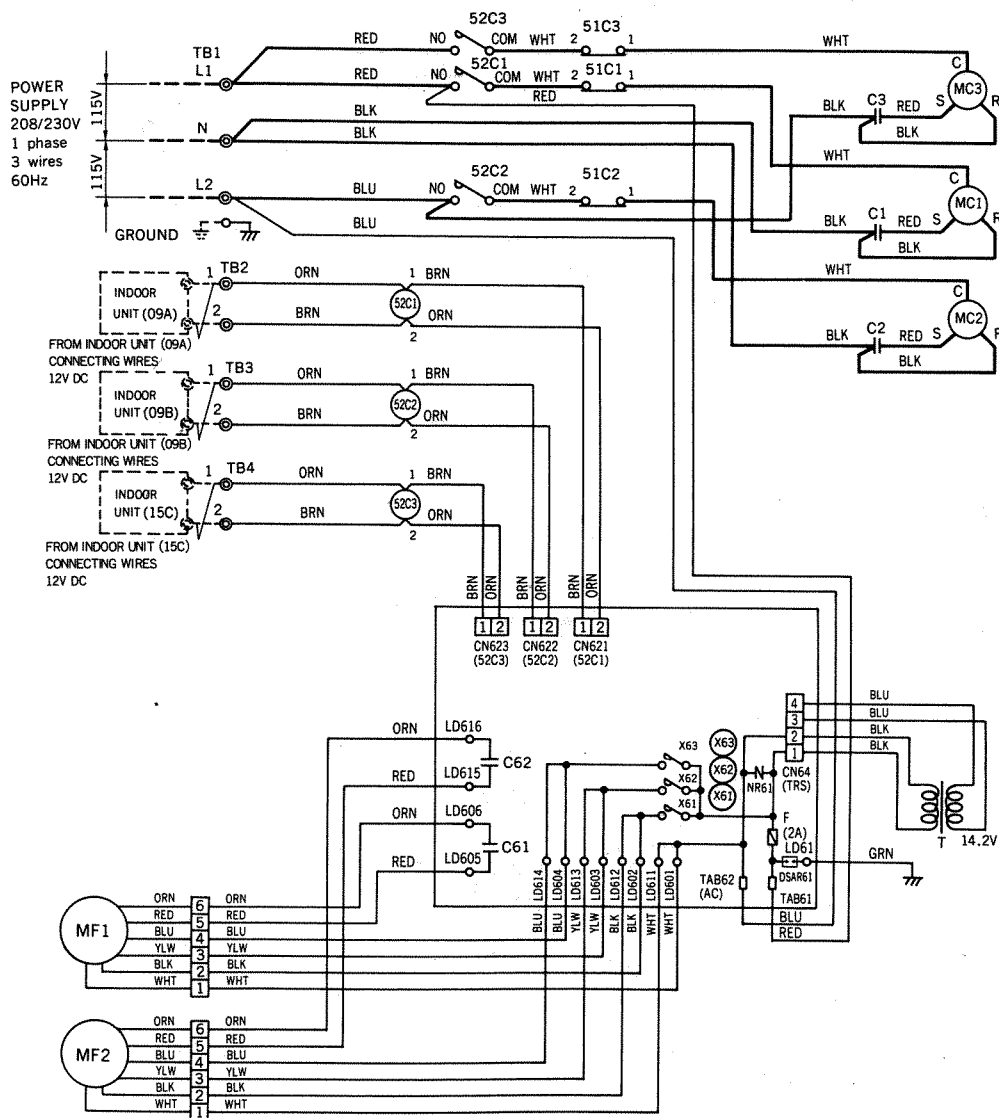
1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram.
2. Use copper conductors only (For field wiring).
3. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (1 and 2).
4. Symbols below indicate,
 ◎ : Terminal block,

--	--	--	--	--

 : Connector

OUTDOOR UNIT

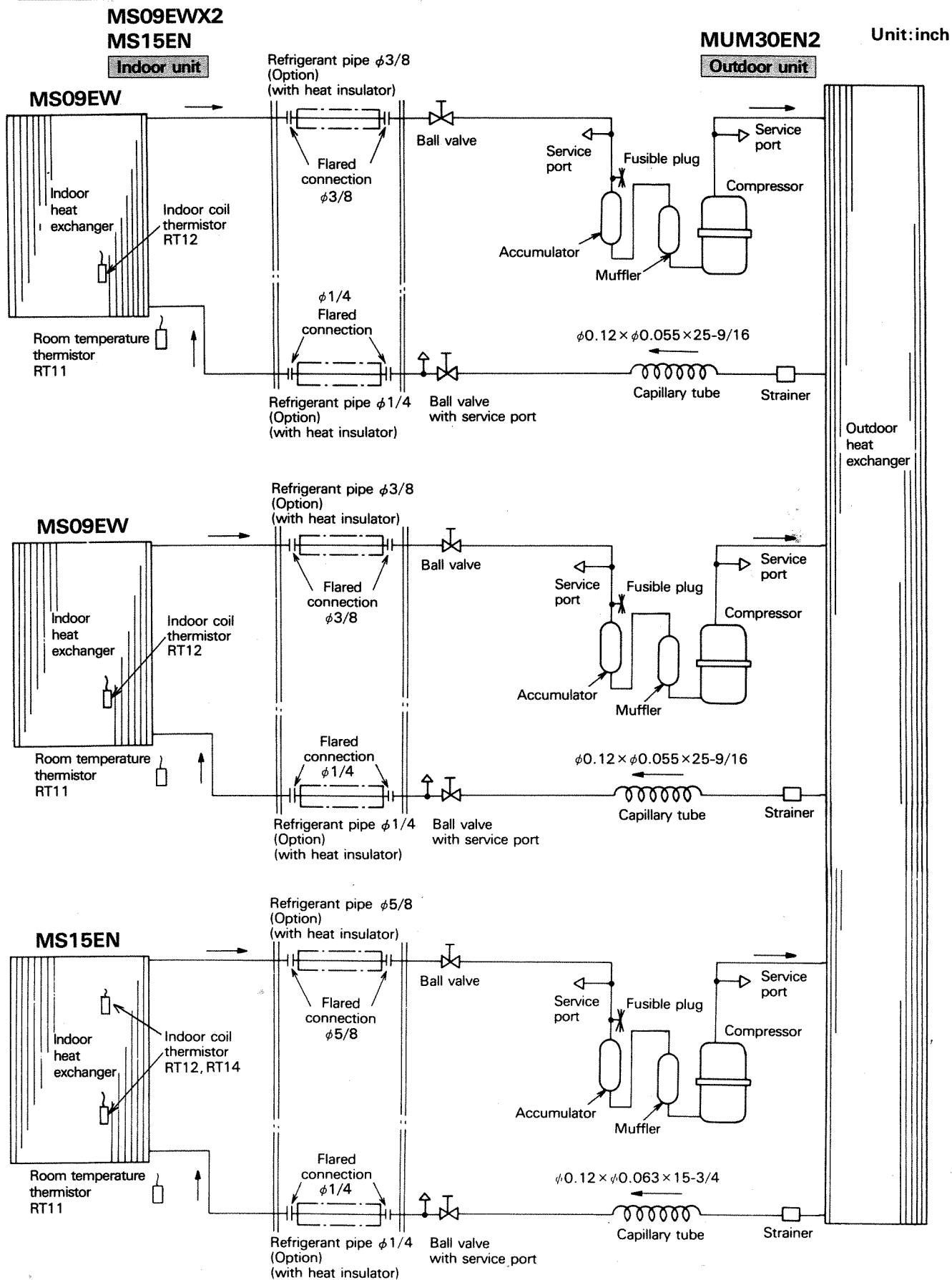
MODEL MUM30EN2 WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1~C3	COMPRESSOR CAPACITOR	MC1~MC3	COMPRESSOR (INNER THERMOSTAT)	TB1~TB4	TERMINAL BLOCK
C61,62	FAN CAPACITOR	MF1,2	OUTDOOR FAN MOTOR (INNER THERMOSTAT)	X61~X63	FAN RELAY
DSAR61	SURGE ABSORBER	NR61	VARIATOR	51C1~51C3	COMPRESSOR THERMAL SWITCH
F	FUSE (2A)	T	TRANSFORMER	52C1~52C3	CONTACTOR

NOTES:

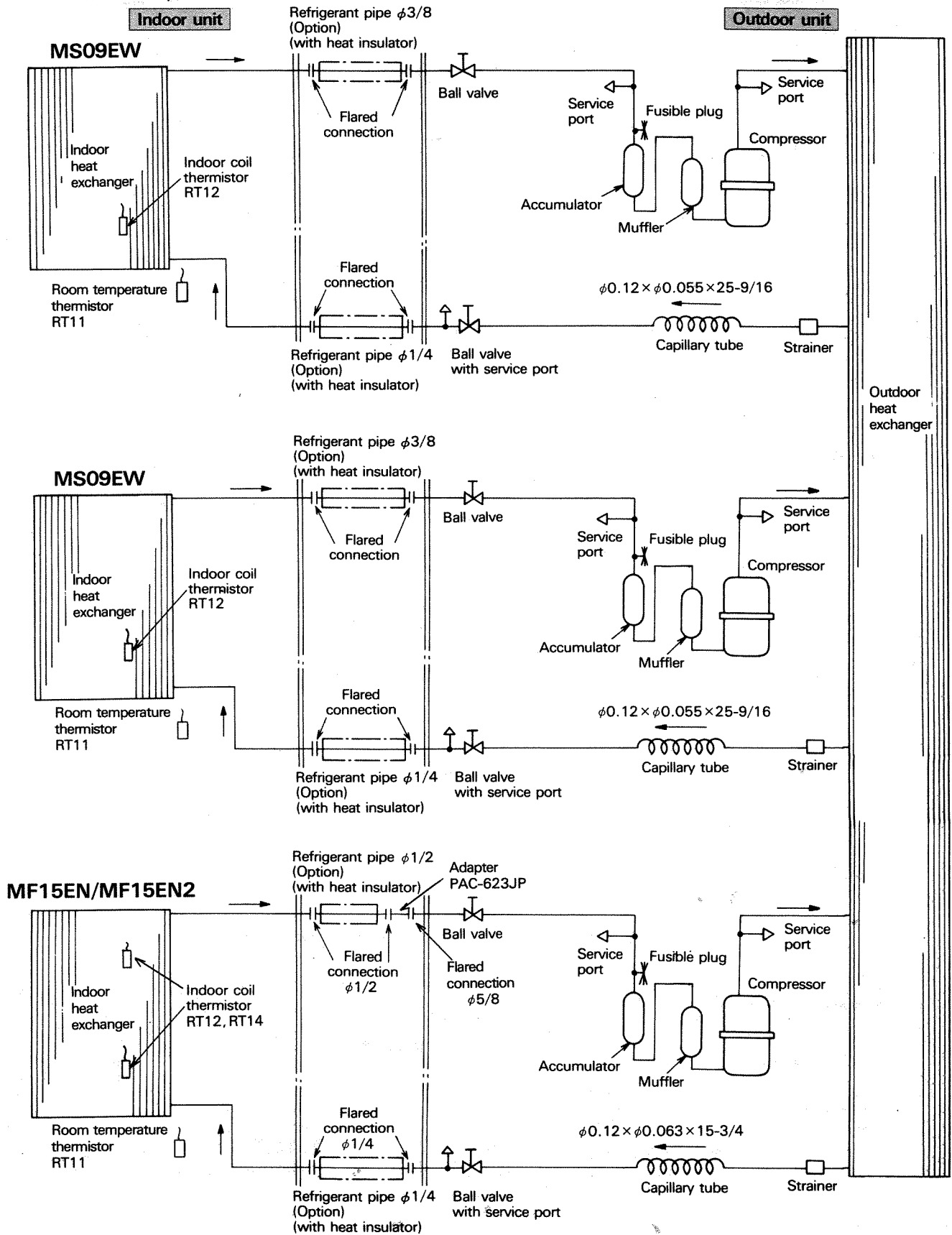
1. Use copper conductors only. (For field wiring)
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (1 and 2).
3. Symbols below indicate.
 ◎ : Terminal block, □ : Connector, □ : PC board insertion tab.



**MS09EWX2
MF15EN/MF15EN2**

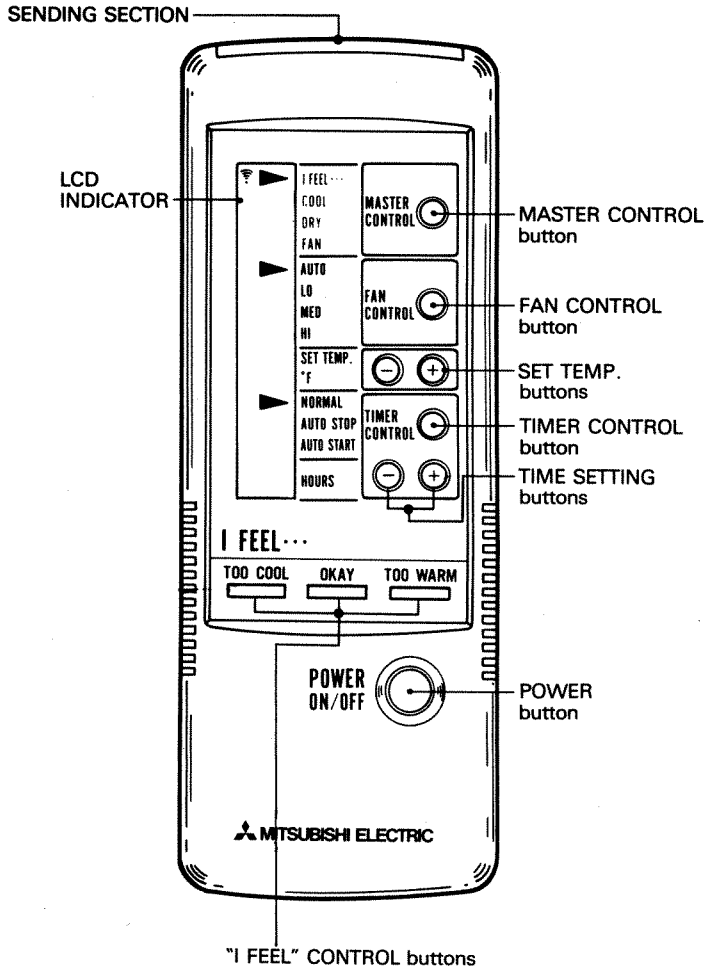
MUM30EN2

Unit: inch



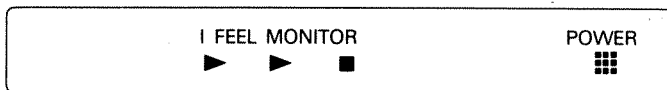
Note: The symbol ϕ indicates outer diameter.

Wireless Remote Controller



This figure shows
I FEEL CONTROL mode display.

INDOOR UNIT DISPLAY 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 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 a beep tone.
- (2) Press the MASTER CONTROL button to set "I FEEL ...". And I FEEL MONITOR lamp lights with a beep tone.
- (3) The operation mode is decided by the initial room temp. at starting up the operation.

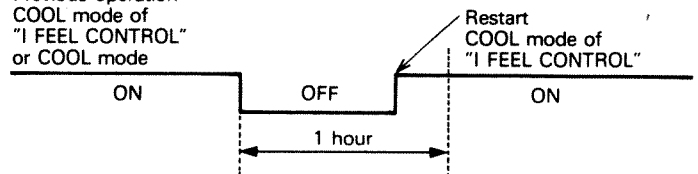
Initial Room Temp.	Mode
more than 76°F	COOL mode of "I FEEL CONTROL"
55°F to 76°F	DRY mode of "I FEEL CONTROL"

- Once the mode is fixed, the mode will not change by room temperature 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 temperature at start-up of the operation.

Example

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



(4) The initial set temperature is decided by the initial room temperature for the first 2 min. after the system starts.

Model	Initial room temperature	Initial set temperature	
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 temperature minus 2 deg(°F)	

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

(5) I FEEL CONTROL buttons

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

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

● Variable control

When the  or  button is pressed, the set temperature is changed based on the room temperature. As the set temperature 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 temperature range is fixed ± 2 deg (°F).

 ...To raise the set temperature by 2 deg. ~ 3 deg.(°F)

 ...To fix and memorize the comfortable present temperature

 ...To lower the set temperature 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 flickers with beeps and shows the temperature control condition.

I FEEL MONITOR lamp

 Shows difference between set temperature and room temperature is more than 3 deg. (°F)
During this condition, I FEEL button is not available.
Wait for about 15 min.

 Shows difference between set temperature and room temperature is 2 deg. ~3 deg. (°F)
The buttons are available.

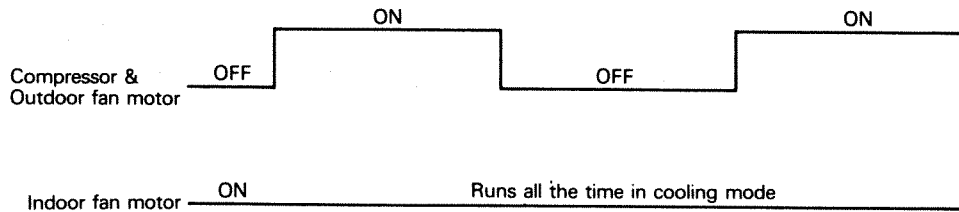
 Shows room temperature has almost reached set temperature. The difference is less than 2°F.
The buttons are available.

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

● Once the set temperature is set, the microprocessor memorizes the temperature and the system restarts at the same set temperature.

● The set temperature range is 61 to 88°F in COOL · DRY mode of "I FEEL CONTROL".

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



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

There are two types of controls in coil frost prevention.

① Temperature control

<MS09>

When the indoor coil thermistor RT12 reads 47°F or below for 5 min., the coil frost prevention starts. The compressor stops and the indoor fan operates at set speed or AUTO speed for 5 min. After that if RT12 still reads 47°F or below, this function is prolonged until RT12 reads over 47°F.

<MS15><MF15>

MS15 and MF15 have two indoor coil thermistors RT12 and RT14. When RT12 (or RT14) reads 50°F or below for 5 min., the coil frost prevention starts. The compressor stops and the indoor fan operates at set speed or AUTO speed for 5 min. After that, if RT12 (or RT14) still read(s) 50°F or below, this function is prolonged until RT12 (or RT14) read(s) over 50°F.

② Time control

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 half way, the accumulated time is cancelled.

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.

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 temperature minus set temperature : 4 to 7 deg.(°F) or over.....HI -----
 Room temperature minus set temperature : 2 to 7 deg.(°F) MED -----
 Room temperature minus set temperature : 2 to 3 deg.(°F) or below LO -----

4 deg. 7 deg.
 2 deg. 3 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 temperature and the microprocessor.

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

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

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

Compressor operates by temperature control and time control.

For the first 2 min. the system is FAN mode and the indoor fan operates at very low speed.

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

- ①Set temperature is controlled to fall by 2°F as initial set temperature.

- 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 and outdoor fans operate in the same cycle with compressor.
Indoor fan speed is very low.

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

〈MS09EW, MS15EN〉

Compressor works in 2 min. ON/3 min. OFF cycle while the thermostat is on.

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

Indoor and outdoor fans operate in the same cycle with compressor.

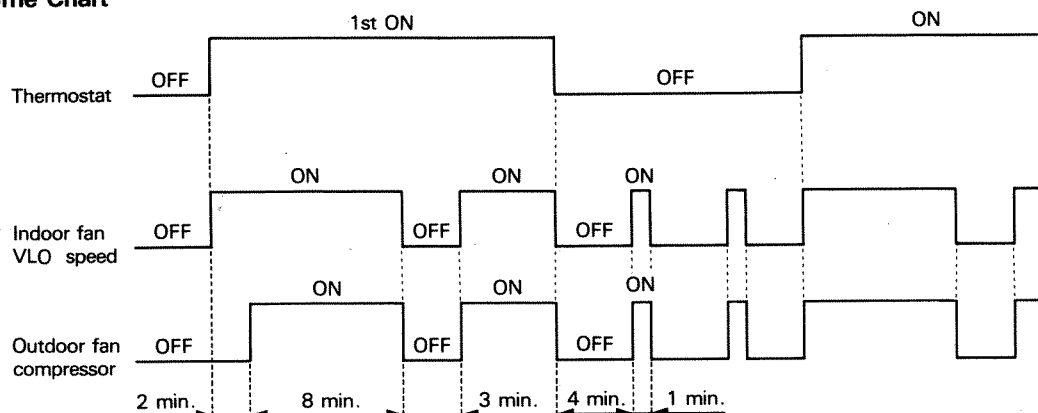
Indoor fan speed is very low.

〈MF15EN, MF15EN2〉

The control is the same as when the room temperature is 73°F or over.

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 the same as COOL mode of "I FEEL CONTROL".

- (2) Select COOL mode.

- (3) Set the SET TEMP. button.

The setting range is 61 to 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.

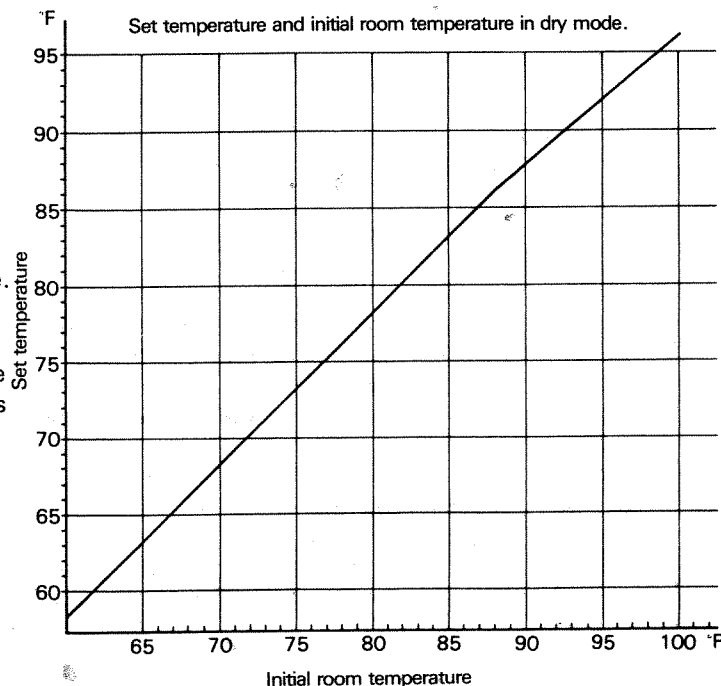
- (2) Select DRY mode.

- (3) Indoor fan operates at VLO speed.

- (4) After 2 min. the microprocessor reads the room temperature and decides the set temperature. Set temperature will be as shown on the chart.

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 temperature.

(4) Select the desired fan speed.

Followings are the fan speed in AUTO.

Room temperature minus set temperature : 4 to 7 deg.(°F) or over.....HI

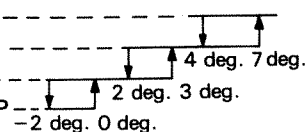
Room temperature minus set temperature : 2 to 7 deg.(°F) MED

Room temperature minus set temperature : -2 to 3 deg.(°F) LO

Room temperature minus set temperature : -2 to 0 deg.(°F) or below STOP

Only indoor fan operates.

Outdoor unit does not operate.



5. TIMER

1. AUTO STOP operation

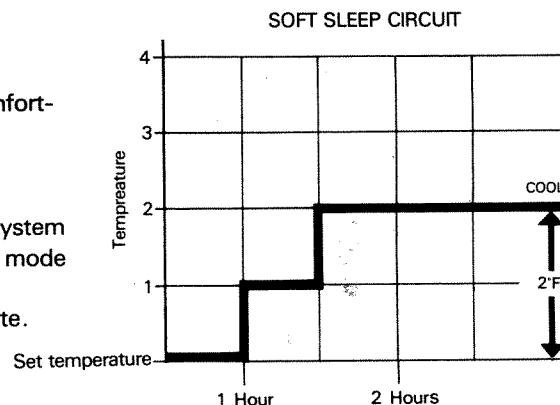
AUTO STOP mode has "SOFT SLEEP" circuit which provides comfortable temperature control for sleeping.

(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 temperature for the first 1 hour. Then, in COOL mode the set temperature rises 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) Set 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 functioning.

6. EMERGENCY-TEST operation

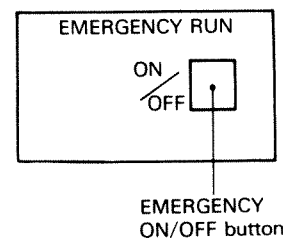
When the remote controller is missing, has failed or the batteries run down, press the emergency run on/off switch on the front of the indoor unit. The unit will start and the operation lamp will light.

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.



1. AUTO RESTART FUNCTION (MS09EW, MS15EN)

When the indoor unit is controlled by the remote controller, 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. When unit operated in "I FEEL CONTROL" mode before power failure, the operation is not memorized. In "I FEEL CONTROL" mode, the operation is decided by the initial temperature. Refer to page 26.

How to set AUTO RESTART FUNCTION

Cut the jumper wire JR84. See the TEST POINT DIAGRAM on page 41.

Operation

- If main power (AC115V) is cut, the operation settings remain.
- When power is restored, the unit restarts in previous mode 3 minutes later without remote controller.
- Even if power is cut for about 0.5 seconds, auto restart works.

Note

- If main power is cut while AUTO START/STOP timer is set, the timer setting is cancelled when auto restart function works.
- If the unit was off by the remote controller before power failure, auto restart function does not work as the power button of the remote controller is off.

2. AUTO RESTART FUNCTION (MF15EN, MF15EN2)

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 26.

How to set "AUTO RESTART FUNCTION"

Cut the jumper wire of SW1A0.

See the TEST POINT DIAGRAM on page 44.

Operation

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

NOTE:

- If operation setting is changed by the remote controller in the first 10 minutes, the accumulated time is cancelled and counting starts from zero.
- 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.

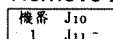
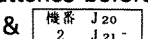
3. How to reconstruct for individual operation

A maximum of 4 units with wireless remote controllers can be used in a room. In this case, reconstruction of P.C. boards is needed to operate each unit individually by each remote controller.

The transmission code is changed by the reconstruction.

1. Reconstruction of the remote controller P.C. board.

Remove batteries before reconstruction.

 &  are printed on the board.

Originally, chip parts are fitted on J10/J20 side and there is no chip parts on the other side.

Remove the chip parts of J10/J20 side and connect Jumper wire to J11/J21 side according to the number of the individual control.

Either J10 or J11/J20 or J21 should be attached for normal operation.

Standard reconstruction table

	1 unit operation	2 units operation	3 units operation	4 units operation
No.1 unit	No construction	Same as left	Same as left	Same as left
No.2 unit	—	Remove J20 Connect to J21	Same as left	Same as left
No.3 unit	—	—	Remove J10 Connect to J11	Same as left
No.4 unit	—	—	—	Remove J10, J20 Connect to J11, J21

2. Reconstruction of the indoor electronic control P.C. board.

^{JR05}
^{JR06} is printed on the board. Refer to TEST POINT VOLTAGE in the manual for the print point.

Jumper wire are fitted to JR05 and JR06.

Reconstruct JR05 and JR06 to correspond to the remote controller board.

<MS09EW, MS15EN>

	1 unit operation	2 units operation	3 units operation	4 units operation
No.1 unit	No construction	Same as left	Same as left	Same as left
No.2 unit	—	Remove JR05	Same as left	Same as left
No.3 unit	—	—	Remove JR06	Same as left
No.4 unit	—	—	—	Remove JR05, JR06

<MF15EN, MF15EN2>

	1 unit operation	2 units operation	3 units operation	4 units operation
No.1 unit	No construction	Same as left	Same as left	Same as left
No.2 unit	—	Remove JR06	Same as left	Same as left
No.3 unit	—	—	Remove JR05	Same as left
No.4 unit	—	—	—	Remove JR05, JR06

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 trouble written in the below table occurs during operation, the self check result is indicated. The abnormal cation indication is reset 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

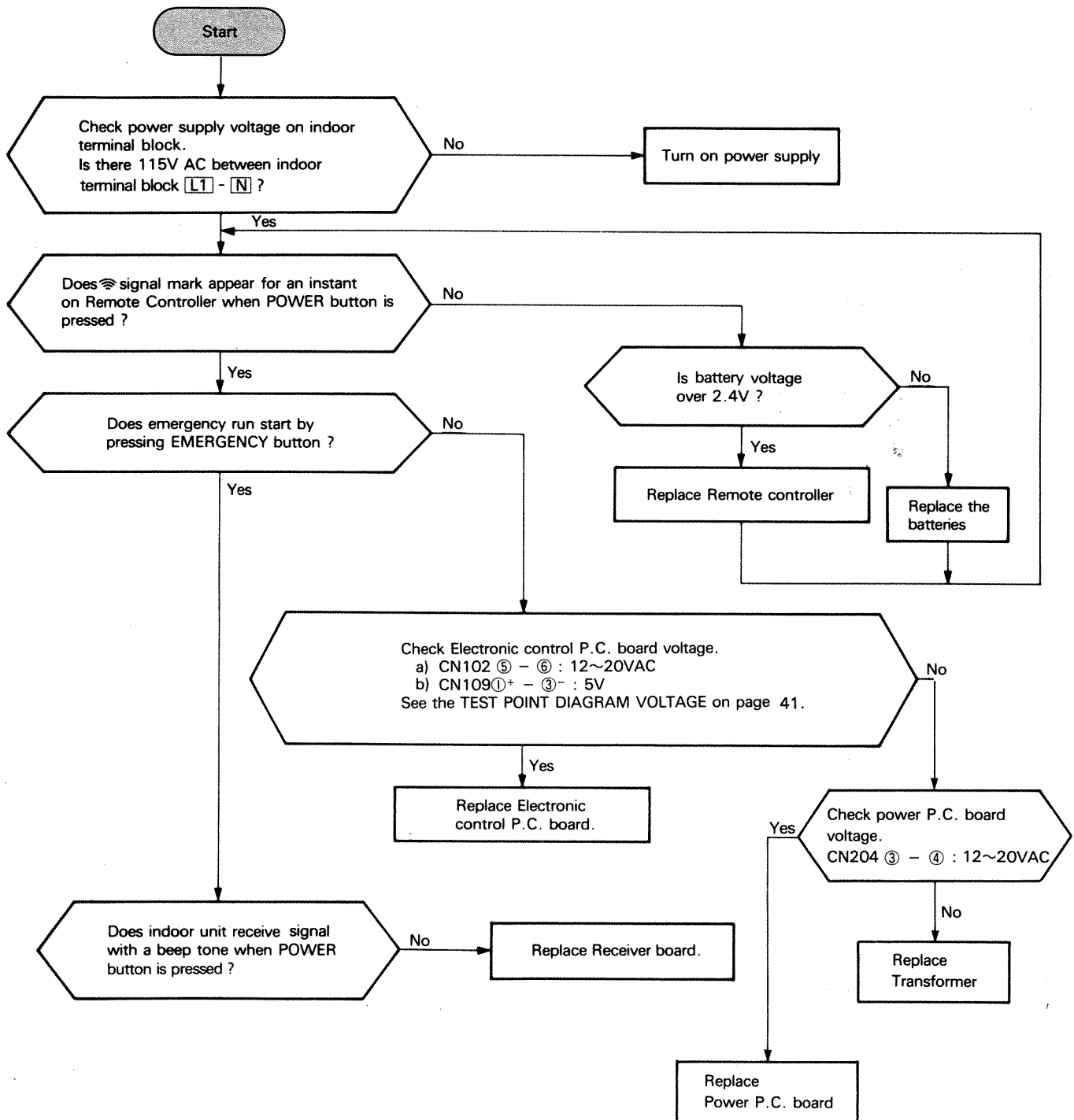
■ Steady ▣ Flash □ OFF

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. ● Check indoor board.

(1) Operation does not start

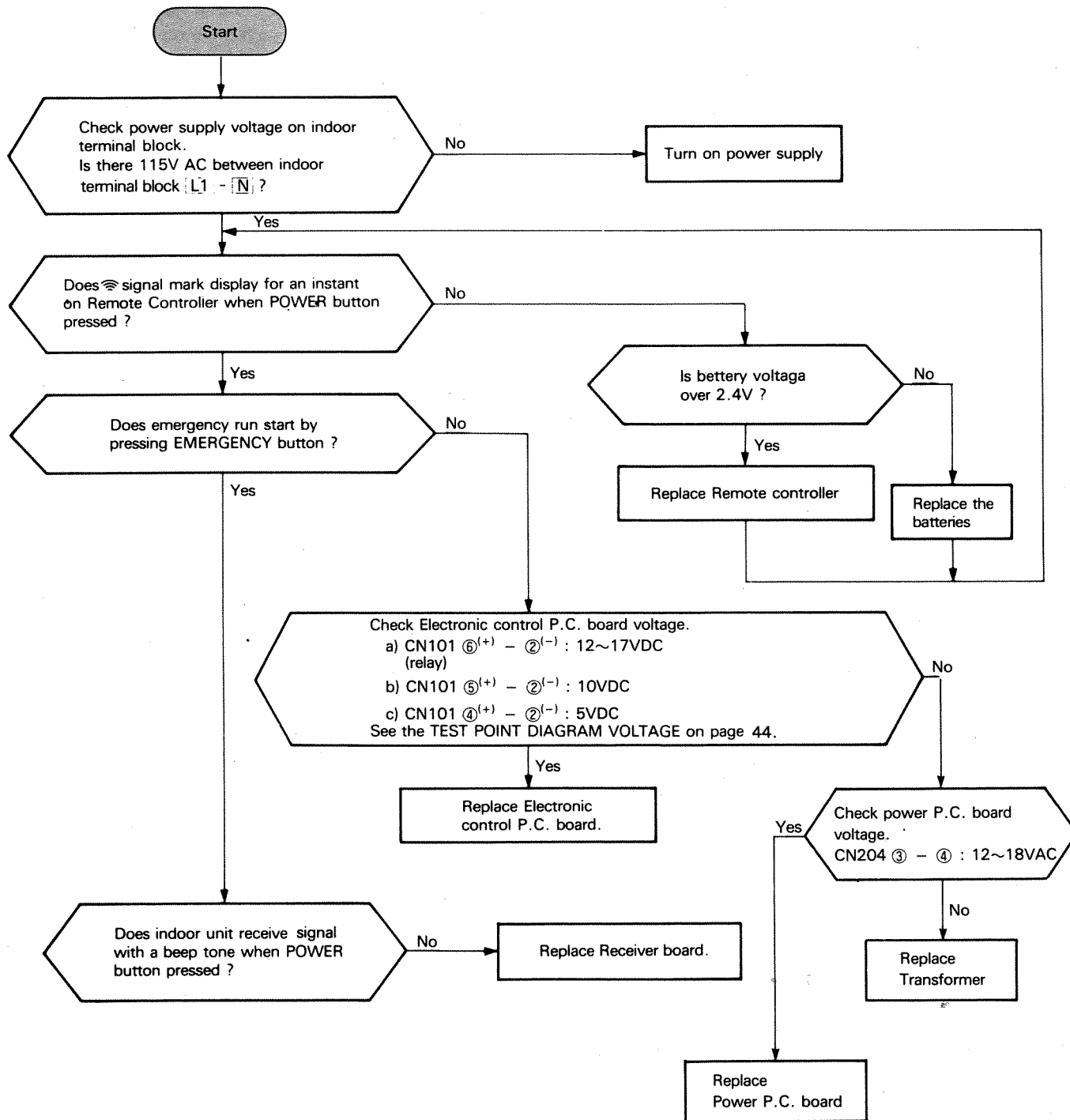
MS09EW

MS15EN



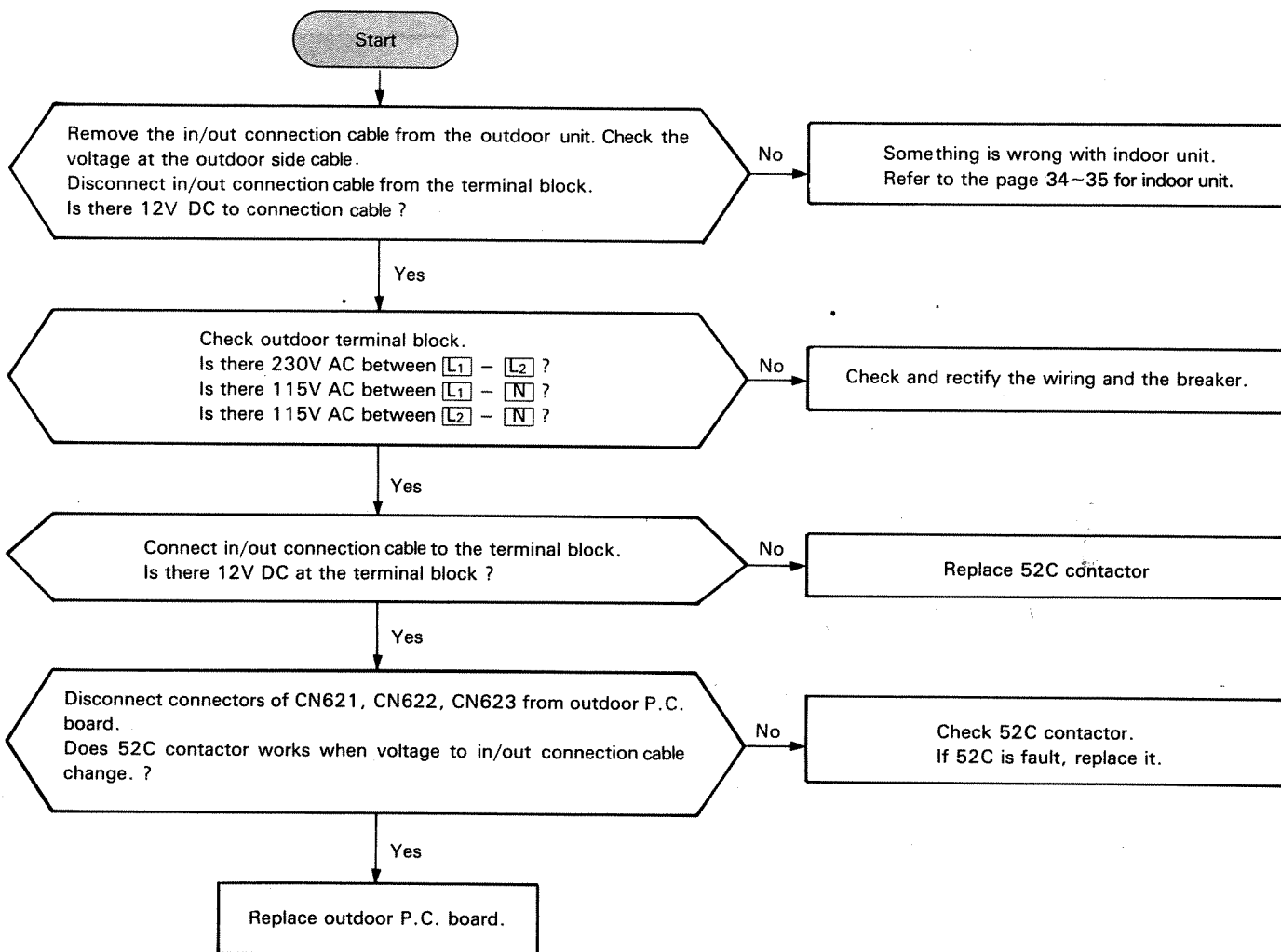
(1) Operation does not start.

MF15EN, MF15EN2

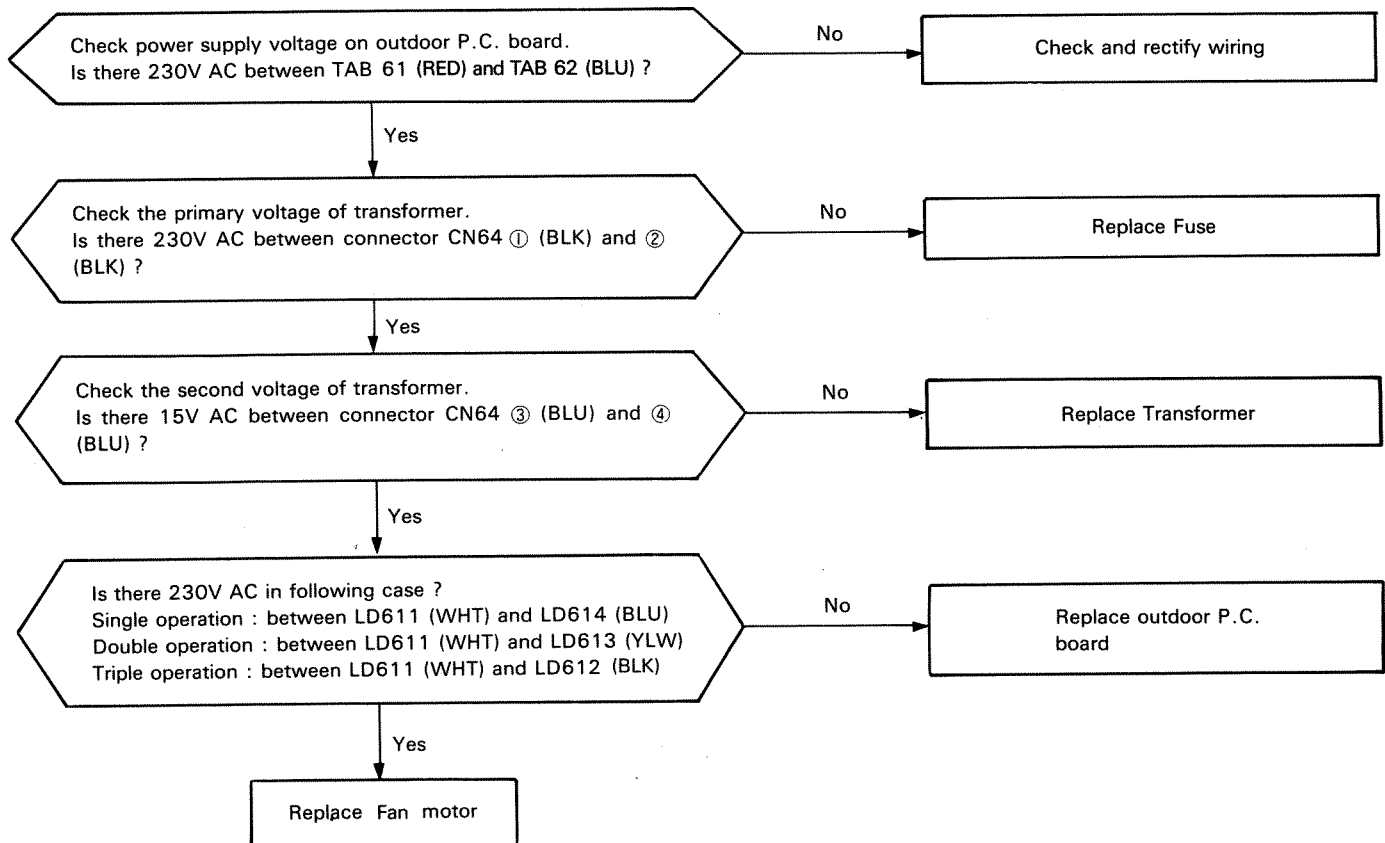


(1) Operation does not start .

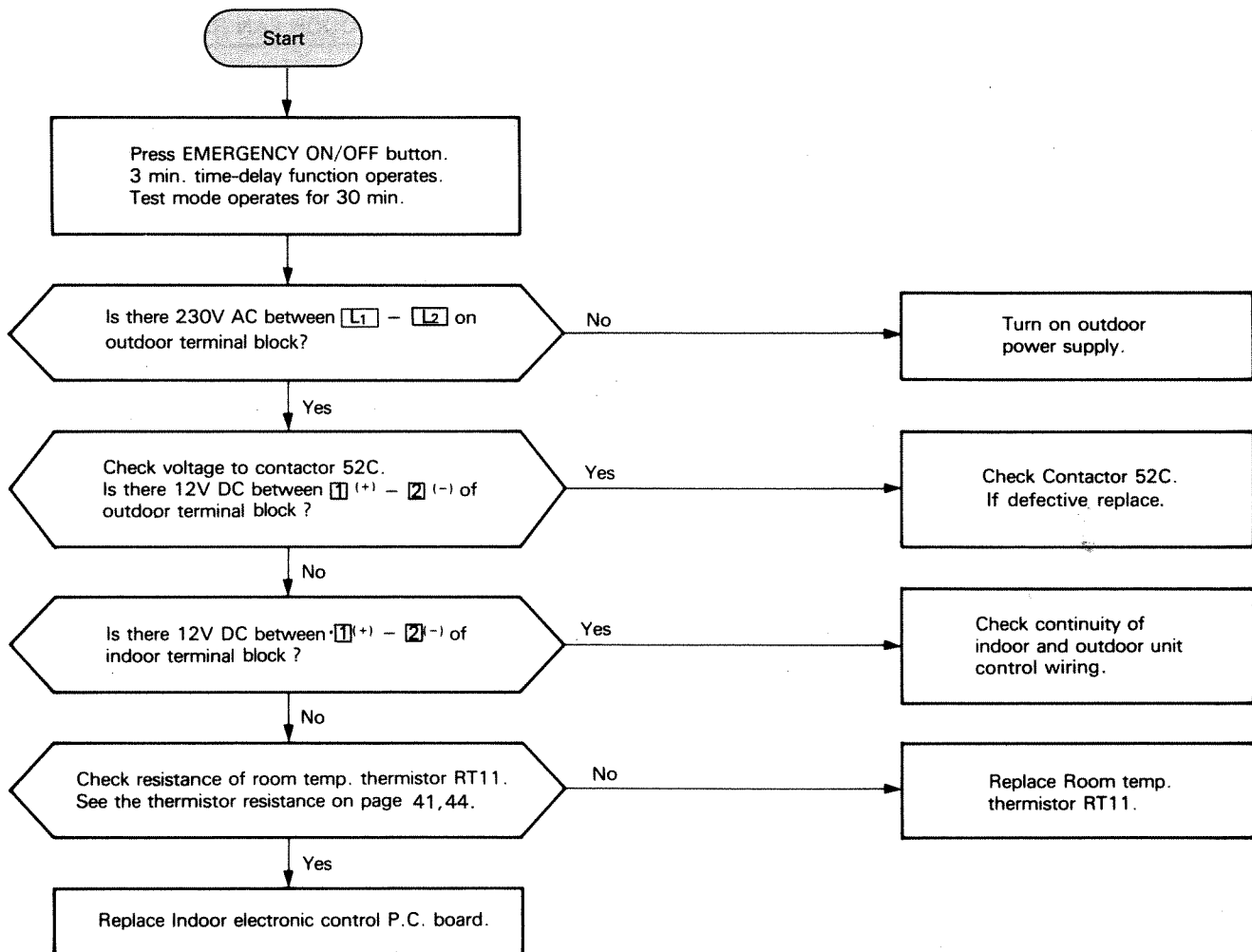
MUM30EN2



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



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



RELAY OPERATION

MS09EW MF15EN
MS15EN MF15EN2

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.	Very low speed.
		※Repeats 8 min. ON and 3 min. OFF operation or 2 min. ON and 3 min. OFF. (MS09EW, MS15EW)	Very low links with 52C contactor.
	OFF	Repeats 4 min. OFF 1 min. ON.	
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	OFF for 5 min. After that, OFF is prolonged until indoor coil thermostat reads termination temperature.	Auto or set speed
DRY & DRY mode of I FEEL CONTROL			Very low 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

※In case of MF15EN and MF15EN2,
52C contactor repeats 8 min. ON
and 3 min. OFF.

MUM30EN2

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.

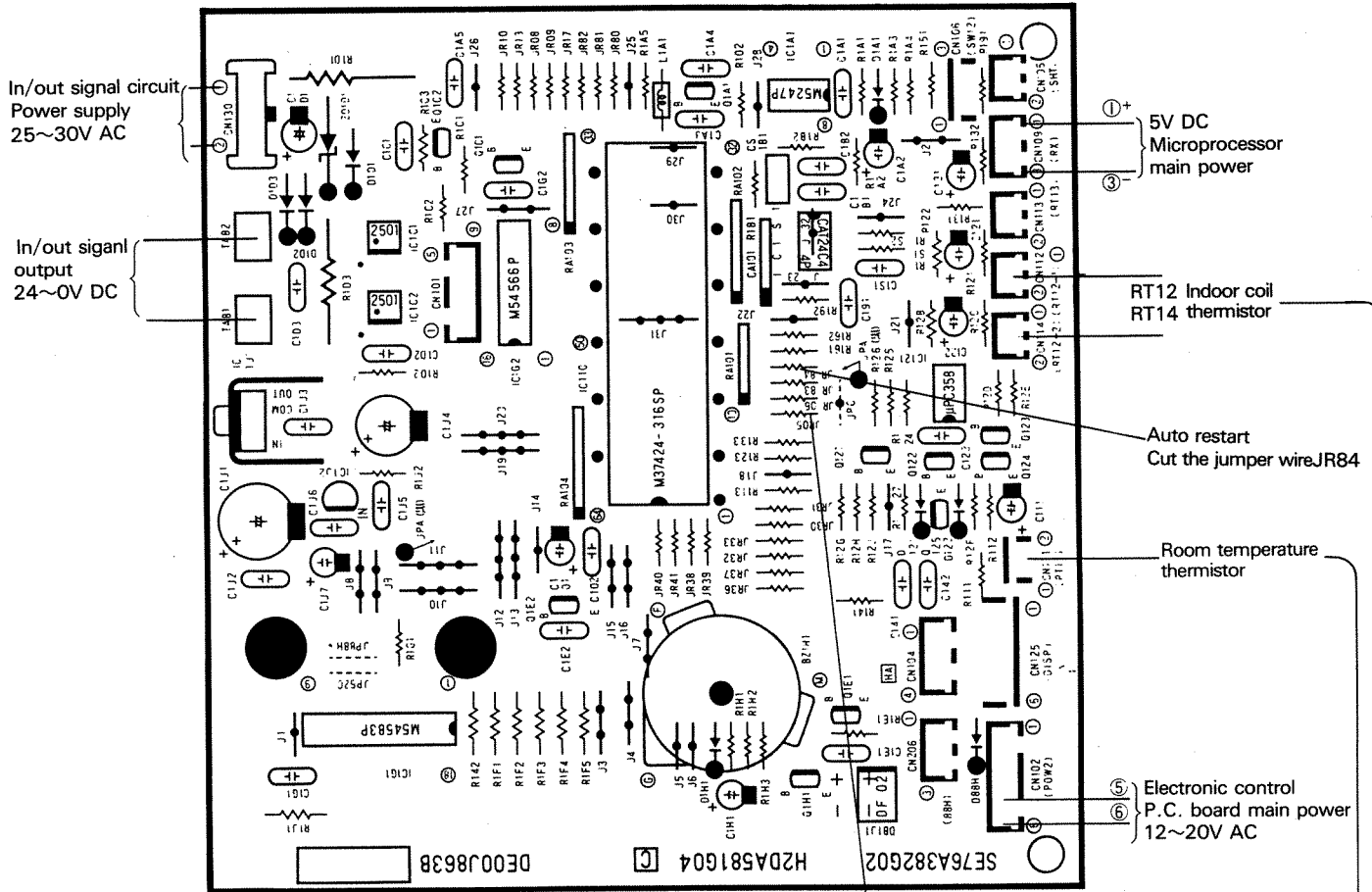
52C1	52C2	52C3	X61	X62	X63
OFF	OFF	OFF	OFF	OFF	OFF
OFF	OFF	ON	OFF	OFF	ON
OFF	ON	OFF	OFF	OFF	ON
OFF	ON	ON	OFF	ON	OFF
ON	OFF	OFF	OFF	OFF	ON
ON	OFF	ON	OFF	ON	OFF
ON	ON	OFF	OFF	ON	OFF
ON	ON	ON	ON	OFF	OFF

FAN RELAY/FAN SPEED/APPLIED VOLTAGE

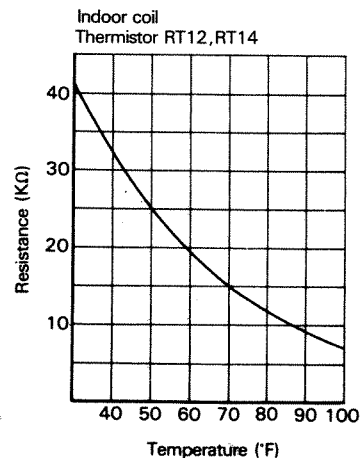
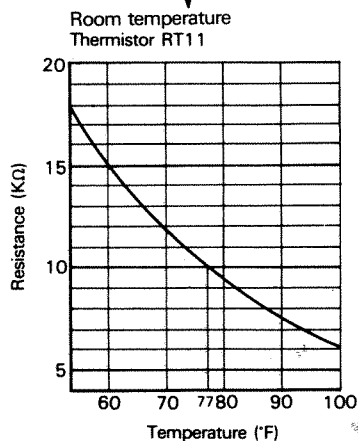
FAN MOTOR RELAY	OUTDOOR FAN SPEED	APPLIED VOLTAGE TO FAN
X61 is ON	Hi	230V AC between WHT and BLK
X62 is ON	Me	230V AC between WHT and YLW
X63 is ON	Lo	230V AC between WHT and BLU

TEST POINT DIAGRAM AND VOLTAGE MS09EW MS15EN

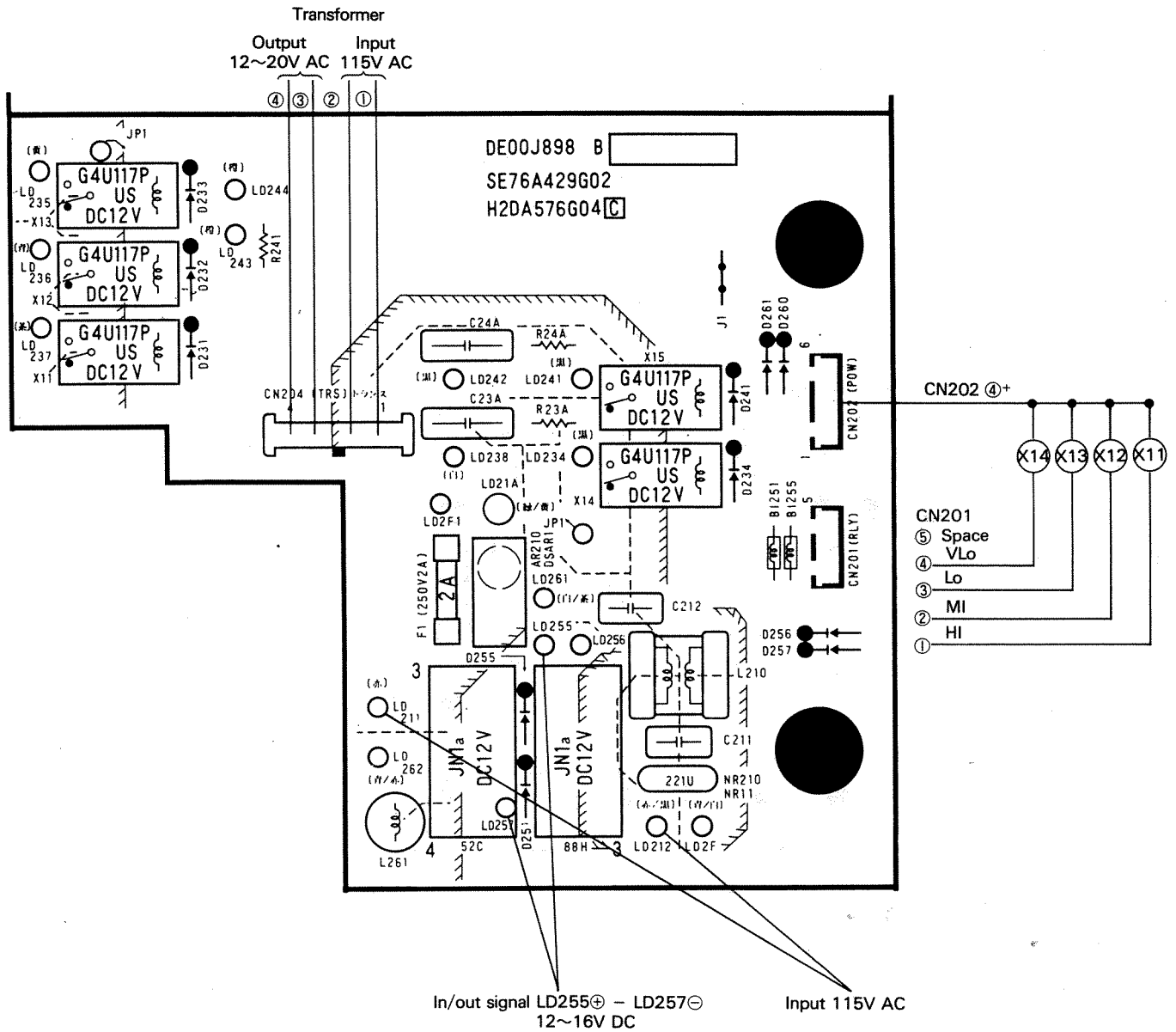
Indoor electronic control P.C. board



Reconstruction of indoor electronic control P.C. board

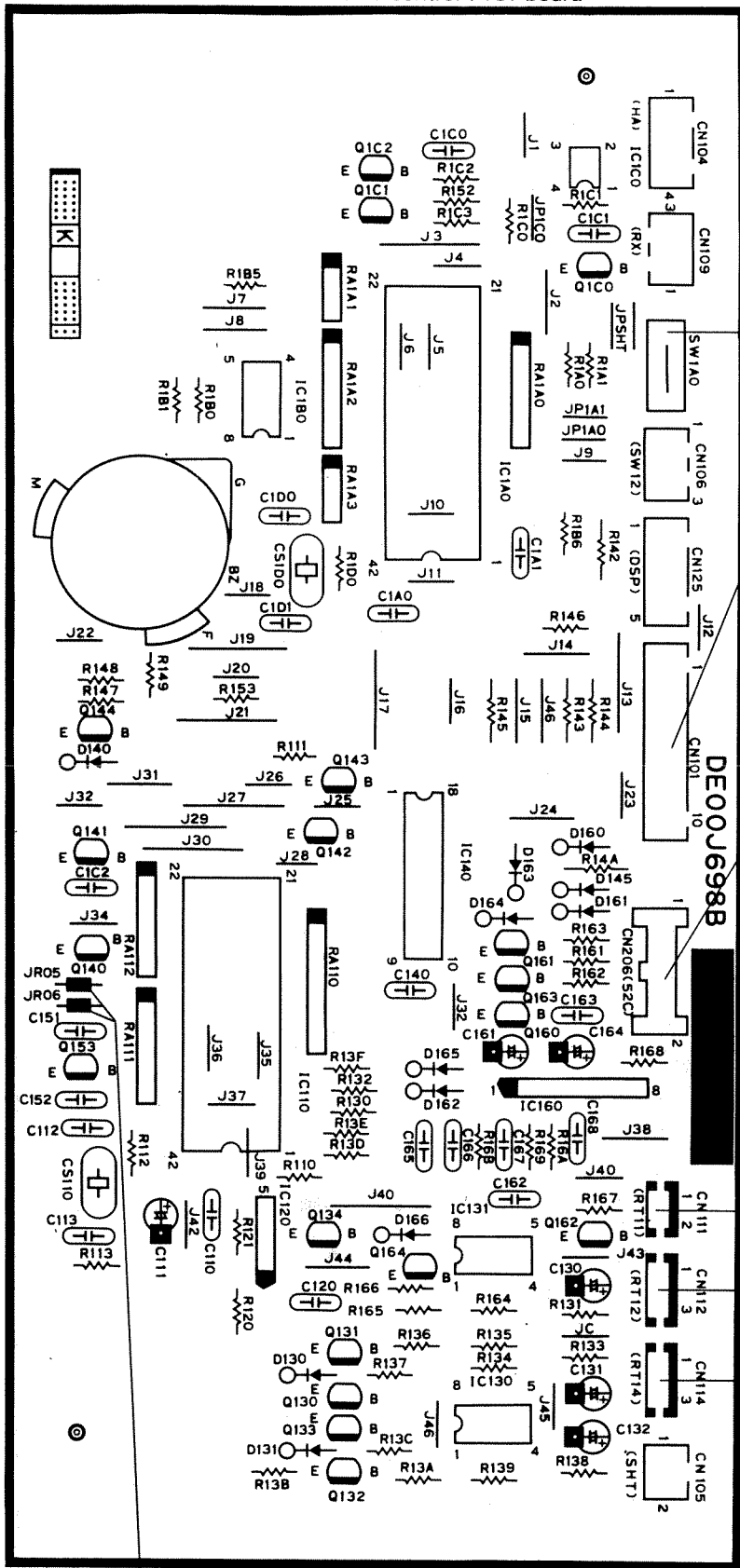


MS15EN Power P.C. board



MF15EN, MF15EN2

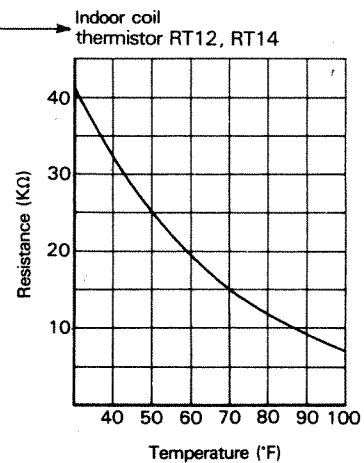
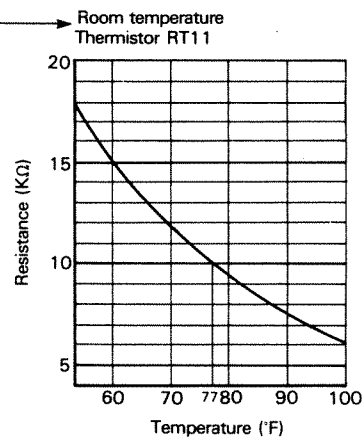
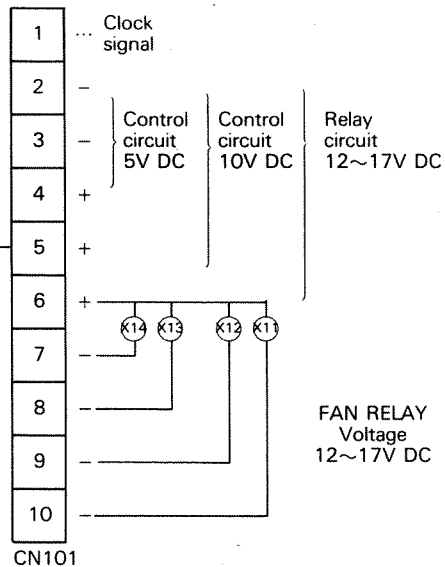
Electronic control P.C. board



Reconstruction of indoor electronic control P.C. board

-AUTO RESTART

Cut jumper wire SW1A0



Power P.C. board

