

**Revision:**

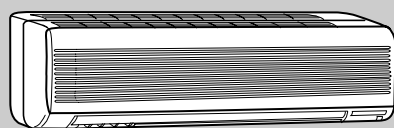
- PARTS LIST have been partially modified.
- Please void OB310.

**No. OB310**  
REVISED EDITION-A

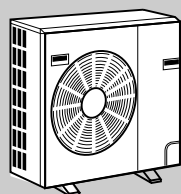
# SERVICE MANUAL

**Wireless type  
Models**

**MSH24WN <sub>(W)</sub>    ▪    MUH24WN**



↑  
INDOOR UNIT  
Indication of model name  
MSH24WN



↑  
OUTDOOR UNIT  
Indication of model name  
MUH24WN



Remote  
controller

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The Slim Line.  
From Mitsubishi Electric.

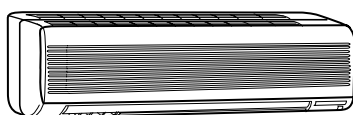


**Mr. SLIM™**

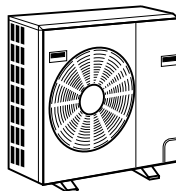
**Revision:**

- Parts No. has been changed due to the color change of outdoor unit parts. WHITE→NEW WHITE (Brighter)
- Capillary tubes have been added to parts list.

| Model   | Page | Part name                                                                   | Part number |
|---------|------|-----------------------------------------------------------------------------|-------------|
| MUH24WN | 51   | CAPILLARY TUBE (TAPER PIPE)<br>$\phi 0.17 \times \phi 0.12 \times 11-13/16$ | E02 785 936 |
| MUH24WN | 51   | CAPILLARY TUBE (TAPER PIPE)<br>$\phi 0.17 \times \phi 0.12 \times 1-31/32$  | E02 529 936 |



MSH24WN

LCD wireless  
remote controller

MUH24WN

| Model   | Cooling capacity | Heating capacity | SEER | HSPF(IV/V) |
|---------|------------------|------------------|------|------------|
| MSH24WN | 22,000 Btu/h     | 23,600 Btu/h     | 10.0 | 6.8/5.9    |

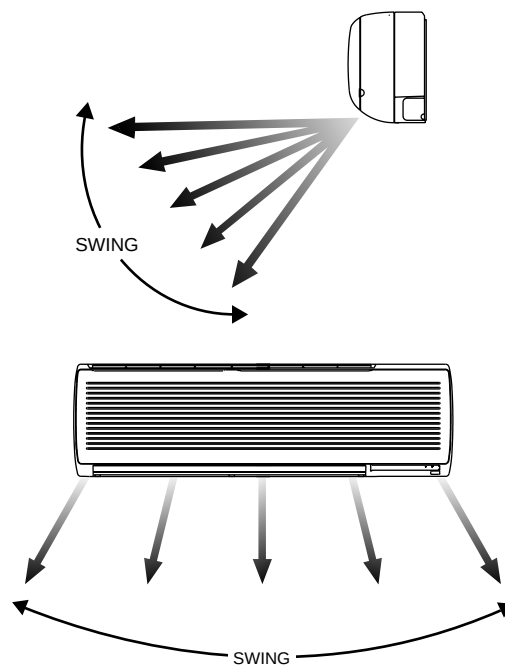
### “I FEEL CONTROL” IN OUR LCD WIRELESS REMOTE CONTROLLER WITH ON/OFF PROGRAM TIMER

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

### Select desired air flow direction.

#### REMOTE-CONTROL OPERATION MODE

Using the remote controller, you can select from five airflow settings to match room layout and the location of people. Also, you can set the vane to swing automatically.

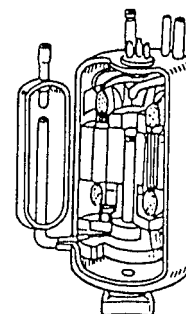


### AUTO-RESTART FUNCTION

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

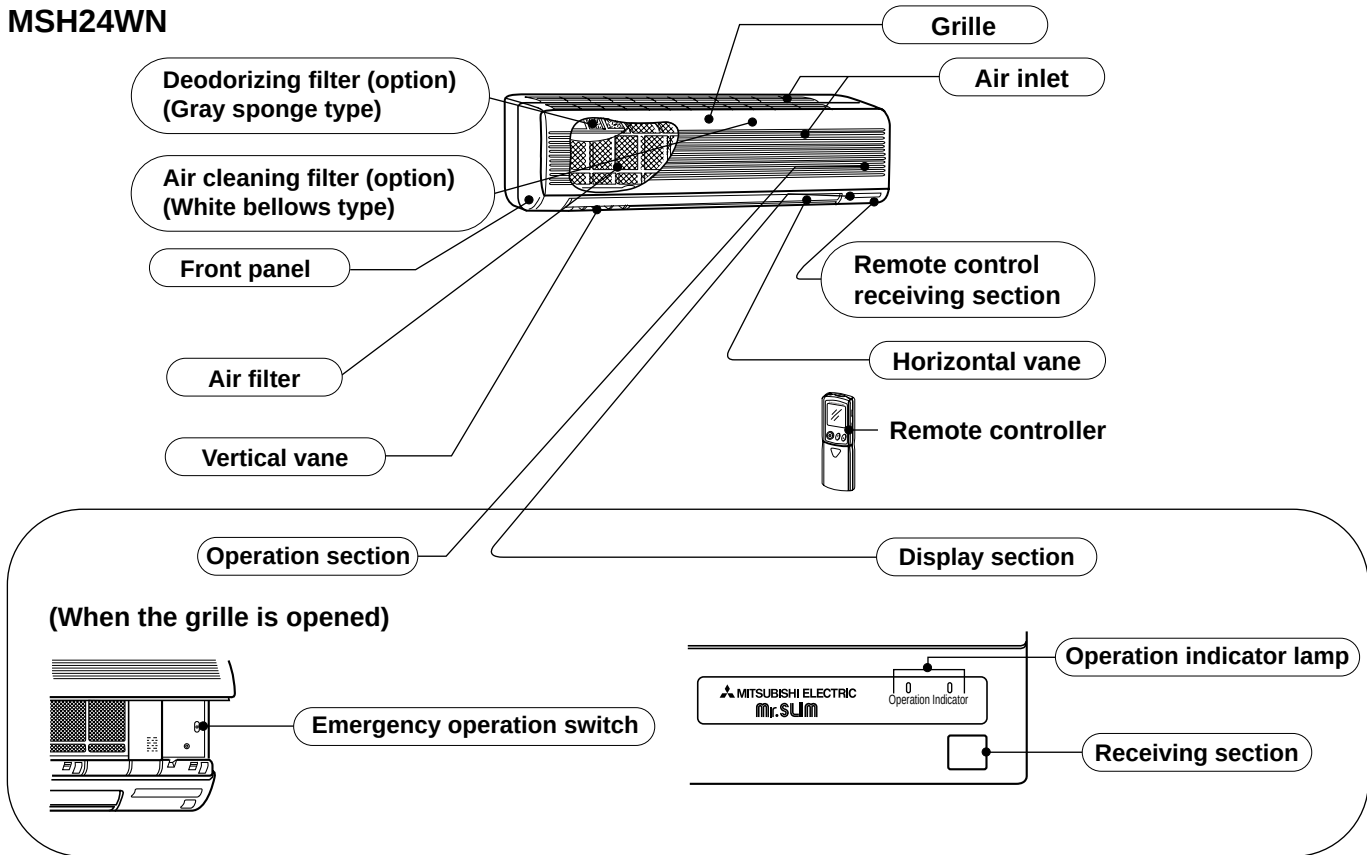
### HIGH PERFORMANCE ROTARY COMPRESSOR

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



## INDOOR UNIT

MSH24WN

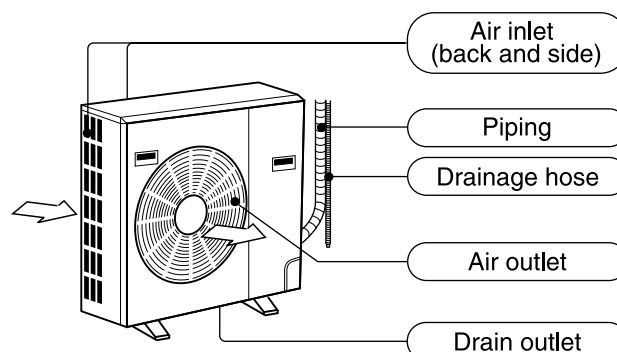


## ACCESSORIES

|   |                                                            | MSH24WN |
|---|------------------------------------------------------------|---------|
| ① | Installation plate                                         | 1       |
| ② | Installation plate fixing screw 4 x 25 mm(0.16 x 0.98 in.) | 7       |
| ③ | Remote controller holder                                   | 1       |
| ④ | Fixing screw for ③ 3.5 x 16 mm(0.14 x 0.63 in.) (Black)    | 2       |
| ⑤ | Battery (AAA) for remote controller                        | 2       |
| ⑥ | Wireless remote controller                                 | 1       |
| ⑦ | Felt tape (Used for left or left-rear piping)              | 1       |

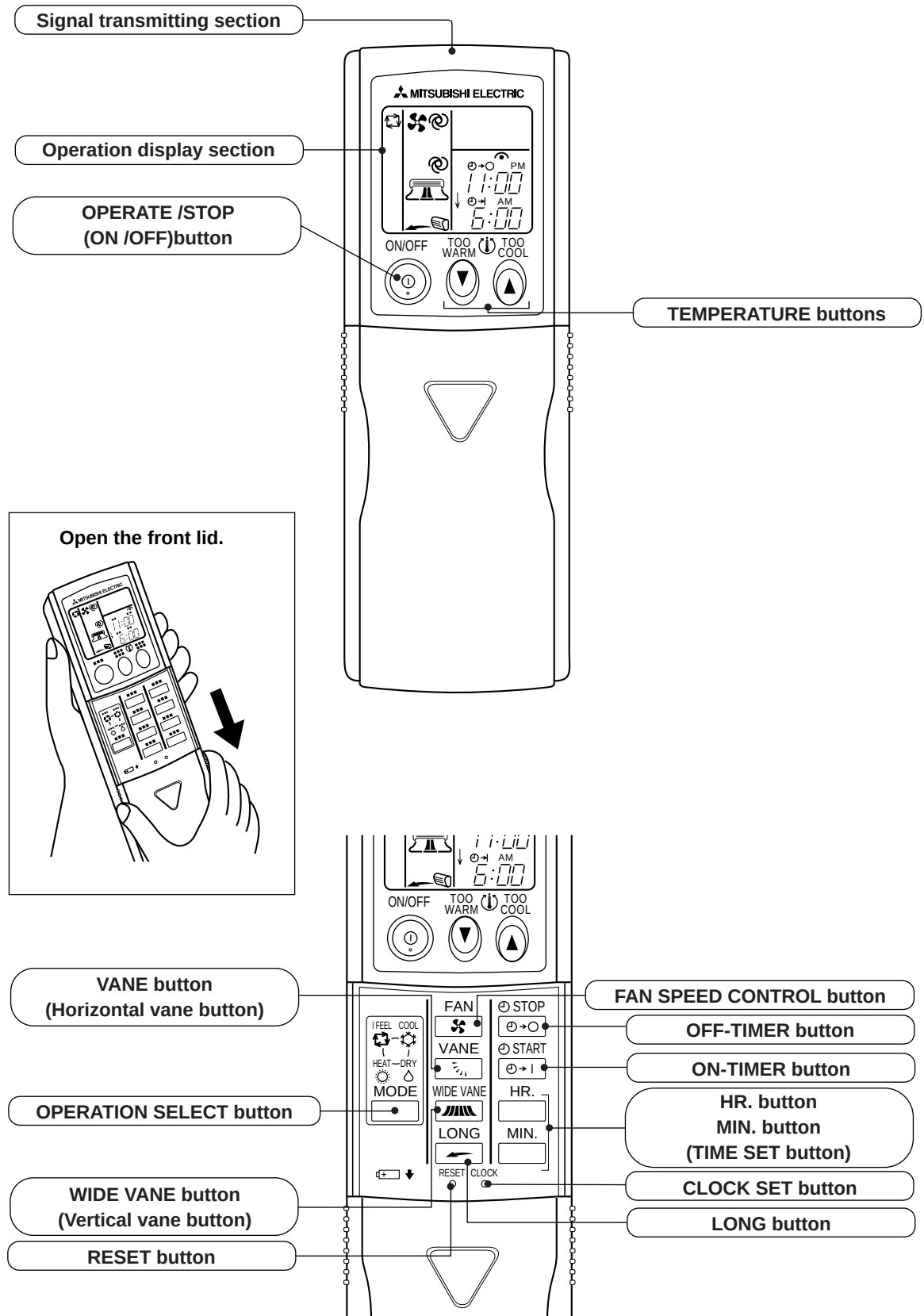
## OUTDOOR UNIT

MUH24WN



## REMOTE CONTROLLER

MSH24WN



| Item                                           |                                       | Model | MSH24WN                        |
|------------------------------------------------|---------------------------------------|-------|--------------------------------|
| Capacity                                       | Cooling <sup>※1</sup>                 | Btu/h | 22,000                         |
|                                                | Heating 47 <sup>※1</sup>              | Btu/h | 23,600                         |
|                                                | Heating 17 <sup>※2</sup>              | Btu/h | 13,500                         |
| Power consumption                              | Cooling <sup>※1</sup>                 | W     | 2,220                          |
|                                                | Heating 47 <sup>※1</sup>              | W     | 2,230                          |
|                                                | Heating 17 <sup>※2</sup>              |       | 1,730                          |
| EER <sup>※1</sup> [SEER] <sup>※3</sup>         | Cooling                               |       | 9.9 (10.0)                     |
| HSPF IV(V)                                     | Heating                               |       | 6.8 (5.9)                      |
| COP                                            | Heating <sup>※1</sup>                 |       | 3.10                           |
| INDOOR UNIT MODEL                              |                                       |       | MSH24WN                        |
| External finish                                |                                       |       | White                          |
| Power supply                                   |                                       |       | 115V 60Hz 1 $\phi$             |
| Max. fuse size (time delay)/ Disconnect switch |                                       | A     | 15                             |
| Min. circuit ampacity                          |                                       | A     | 1.1                            |
| Fan motor                                      |                                       | F.L.A | 0.82                           |
| Auxiliary heater                               |                                       | A(kW) | —                              |
| Airflow Low—Med.—High                          | HEAT Dry                              | CFM   | 431-491-565                    |
|                                                | COOL Dry(Wet)                         | CFM   | 402(346)-484(417)-565(487)     |
| Moisture removal                               |                                       | pt./h | 7.3                            |
| Sound level Low-Med.-High                      |                                       | dB(A) | 39-43-47                       |
| Cond. drain connection O.D.                    |                                       | in.   | 5/8                            |
| Dimensions                                     | W                                     | in.   | 43-5/16                        |
|                                                | D                                     | in.   | 8-15/16                        |
|                                                | H                                     | in.   | 12-13/16                       |
| Weight                                         |                                       | lb.   | 40                             |
| OUTDOOR UNIT MODEL                             |                                       |       | MUH24WN                        |
| External finish                                |                                       |       | Munsell 5Y 7/1                 |
| Power supply                                   |                                       |       | 208/230V 60Hz 1 $\phi$ 3 wires |
| Max. fuse size (time delay)                    |                                       | A     | 25                             |
| Min. circuit ampacity                          |                                       | A     | 22                             |
| Fan motor                                      |                                       | F.L.A | 0.87                           |
| Compressor                                     | Model                                 |       | PH33NPBT                       |
|                                                | Winding resistance (at 68°F) $\Omega$ |       | C-R 0.84 C-S 2.09              |
|                                                | R.L.A                                 |       | 16                             |
|                                                | L.R.A                                 |       | 58                             |
| Refrigerant control                            |                                       |       | Linear expansion valve         |
| Sound level                                    |                                       | dB(A) | 55                             |
| Defrost method                                 |                                       |       | Reverse cycle                  |
| Dimensions                                     | W                                     | in.   | 34-1/4                         |
|                                                | D                                     | in.   | 11-5/8                         |
|                                                | H                                     | in.   | 33-1/2                         |
| Weight                                         |                                       | lb.   | 154                            |
| REMOTE CONTROLLER                              |                                       |       | Wireless type                  |
| Control voltage (by built-in transformer)      |                                       |       | 12V DC                         |
| REFRIGERANT PIPING                             |                                       |       | Not supplied (optional parts)  |
| Pipe size (Min. wall thickness)                | Liquid                                | in.   | 3/8 (0.0285)                   |
|                                                | Gas                                   | in.   | 5/8 (0.0315)                   |
| Connection method                              | Indoor                                |       | Flared                         |
|                                                | Outdoor                               |       | Flared                         |
| Between the indoor & outdoor units             | Height difference                     | ft.   | Max. 25                        |
|                                                | Piping length                         | ft.   | Max. 50                        |
| Refrigerant charge (R22)                       |                                       | lb.   | 4 lb. 0 oz.                    |
| Refrigerating oil (Model)                      |                                       | oz.   | 27.9 (MS32N1)                  |

NOTE : Test conditions are based on ARI 210/240.

※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 : (heating) — Indoor : 70°FDB, 60°FWB, Outdoor : 17°FDB, 15°FWB

※3 : (cooling) — Indoor : 80°FDB, 67°FWB, Outdoor : 82°FDB, 65°FWB

## Operating Range

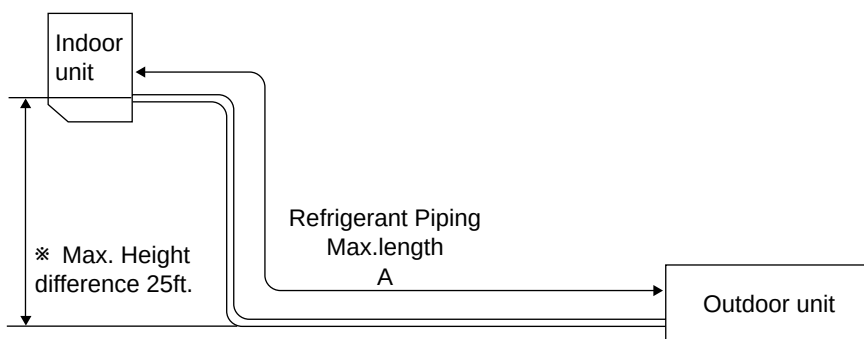
|         |         |         | Indoor intake air temperature | Outdoor intake air temperature |
|---------|---------|---------|-------------------------------|--------------------------------|
|         | Cooling | Maximum | 95°FDB, 71°FWB                | 115°FDB                        |
|         |         | Minimum | 67°FDB, 57°FWB                | 67°FDB                         |
| Heating |         | Maximum | 80°FDB, 67°FWB                | 75°FDB, 65°FWB                 |
|         |         | Minimum | 70°FDB, 60°FWB                | 17°FDB, 15°FWB                 |

## MAX. REFRIGERANT PIPING LENGTH

| Model              | Additional piping<br>Max. length : ft.<br>A | Piping size : in.   |                              |                     |                              | Length of connecting pipe : in.     |                       |
|--------------------|---------------------------------------------|---------------------|------------------------------|---------------------|------------------------------|-------------------------------------|-----------------------|
|                    |                                             | Gas                 |                              | Liquid              |                              | Indoor unit                         | Outdoor unit          |
|                    |                                             | Outside<br>diameter | Minimum<br>Wall<br>thickness | Outside<br>diameter | Minimum<br>Wall<br>thickness |                                     |                       |
| MSH24WN    MUH24WN | 50                                          | ϕ 5/8               | 0.0315                       | ϕ 3/8               | 0.0285                       | Gas : 16-15/16<br>Liquid : 19-11/16 | Gas : 0<br>Liquid : 0 |

## MAX. HEIGHT DIFFERENCE

\* Height difference should be within 25ft. regardless of which unit, indoor or outdoor position is high.



**MSH24WN MUH24WN****4-1. PERFORMANCE DATA****1) COOLING CAPACITY****(208V/ 230V)**

| Model   | Indoor air  | Outdoor intake air DB temperature(°F) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---------|-------------|---------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|         | IWB<br>(°F) | 75                                    |      |      | 85   |      |      | 95   |      |      | 105  |      |      | 115  |      |      |
|         |             | TC                                    | SHC  | TPC  | TC   | SHC  | TPC  | TC   | SHC  | TPC  | TC   | SHC  | TPC  | TC   | SHC  | TPC  |
| MSH24WN | 71          | 27.0                                  | 13.4 | 1.98 | 25.2 | 12.5 | 2.16 | 23.7 | 11.7 | 2.33 | 22.0 | 10.9 | 2.45 | 20.2 | 10.1 | 2.55 |
|         | 67          | 25.5                                  | 16.1 | 1.86 | 23.8 | 15.0 | 2.05 | 22.0 | 13.9 | 2.22 | 20.5 | 12.9 | 2.35 | 18.8 | 11.9 | 2.46 |
|         | 63          | 24.0                                  | 18.3 | 1.78 | 22.2 | 17.0 | 1.96 | 20.7 | 15.8 | 2.12 | 18.8 | 14.4 | 2.26 | 17.2 | 13.1 | 2.35 |

NOTE 1. IWB : Intake air wet-bulb temperature

TC : Total Capacity (x10<sup>3</sup> Btu/h), SHC : Sensible Heat Capacity (x10<sup>3</sup> Btu/h)

TPC : Total Power Consumption (kW)

2. SHC is based on 80°F of indoor intake air DB temperature.

**2) COOLING CAPACITY CORRECTIONS**

| Model   | Refrigerant piping length (one way) |       |       |
|---------|-------------------------------------|-------|-------|
|         | 25ft. (std.)                        | 40ft. | 50ft. |
| MSH24WN | 1.0                                 | 0.954 | 0.923 |

**3) HEATING CAPACITY****(208V/ 230V)**

| Model   | Indoor air  | Outdoor intake air WB temperature(°F) |      |      |      |      |      |      |      |      |      |      |      |
|---------|-------------|---------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
|         | IDB<br>(°F) | 15                                    |      | 25   |      | 35   |      | 43   |      | 45   |      | 55   |      |
|         |             | TC                                    | TPC  | TC   | TPC  | TC   | TPC  | TC   | TPC  | TC   | TPC  | TC   | TPC  |
| MSH24WN | 75          | 13.7                                  | 1.66 | 17.1 | 1.95 | 20.4 | 2.17 | 23.0 | 2.29 | 23.7 | 2.32 | 26.9 | 2.41 |
|         | 70          | 14.5                                  | 1.61 | 17.7 | 1.91 | 20.9 | 2.12 | 23.6 | 2.23 | 24.3 | 2.27 | 27.5 | 2.36 |
|         | 65          | 14.9                                  | 1.54 | 18.5 | 1.84 | 21.6 | 2.06 | 24.3 | 2.17 | 25.0 | 2.21 | 28.1 | 2.32 |

NOTE: 1. IDB : Intake air dry-bulb temperature

TC : Total Capacity (x10<sup>3</sup> Btu/h)

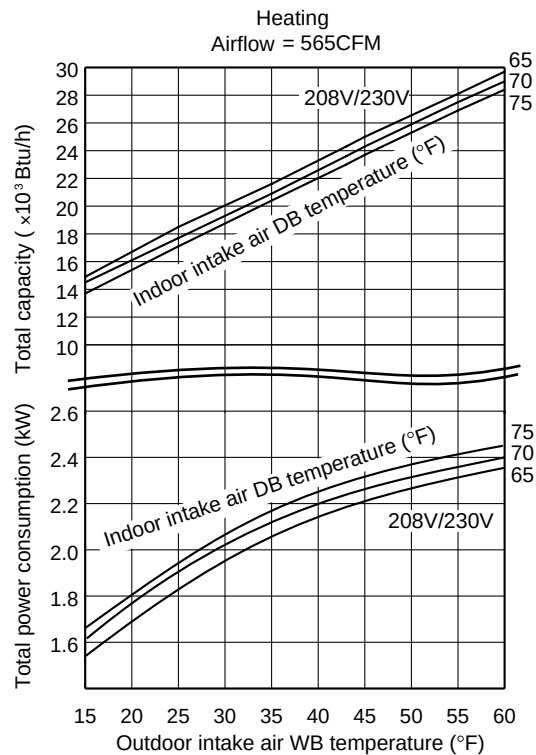
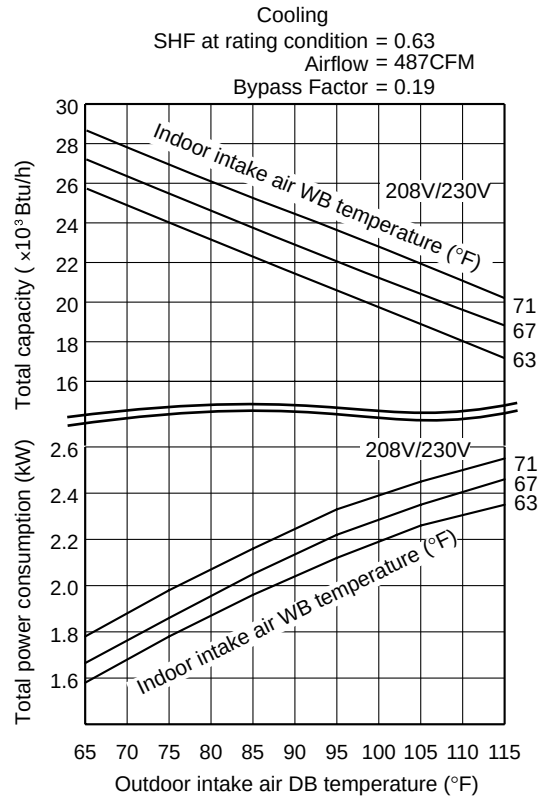
TPC : Total Power Consumption (kW)

2. Above data is for heating operation without any frost.

## 4-2. PERFORMANCE CURVE

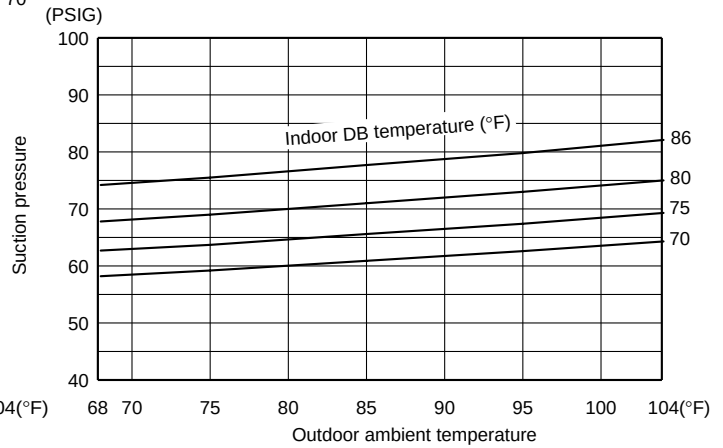
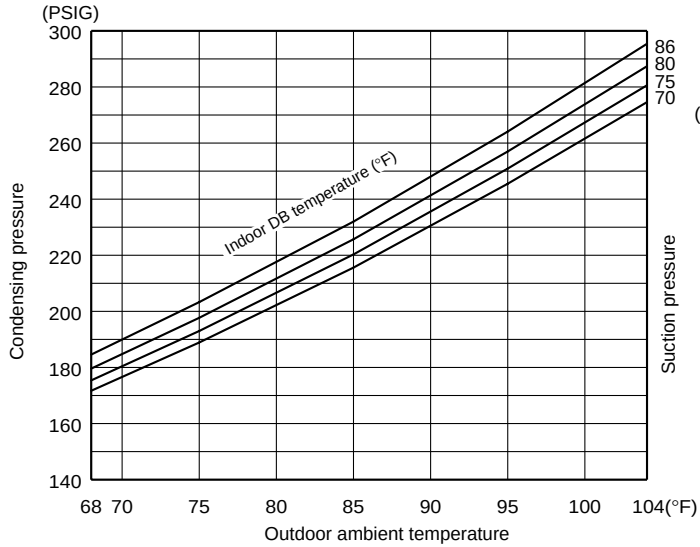
MSH24WN

MUH24WN



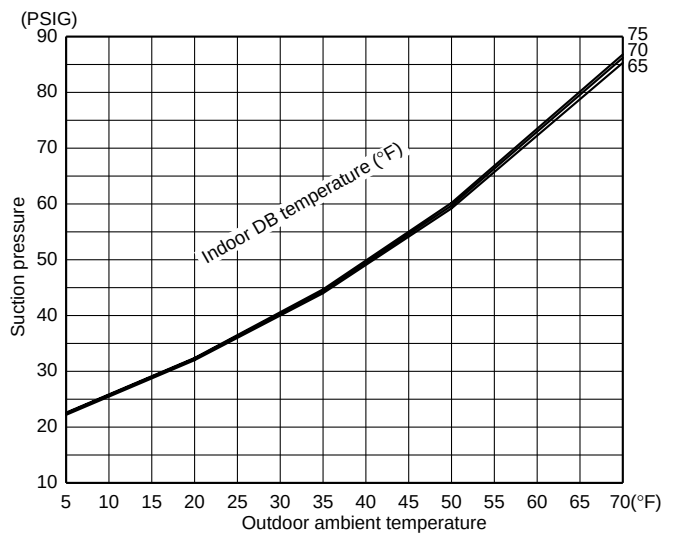
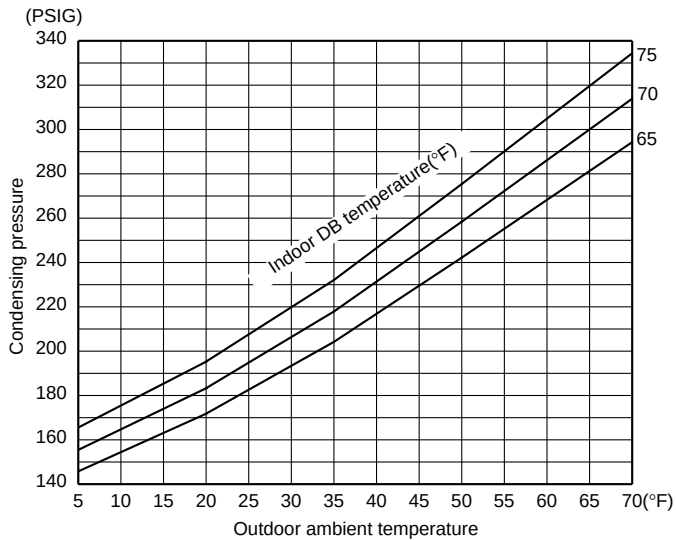
### 4-3. Condensing pressure MSH24WN (Cooling)

Data is based on the condition of indoor humidity 50%.  
Air flow should be set to High speed.



### MSH24WN (Heating)

Data is based on the condition of outdoor humidity 75%.  
Air flow should be set to High speed.  
Data is for heating operation without any frost.

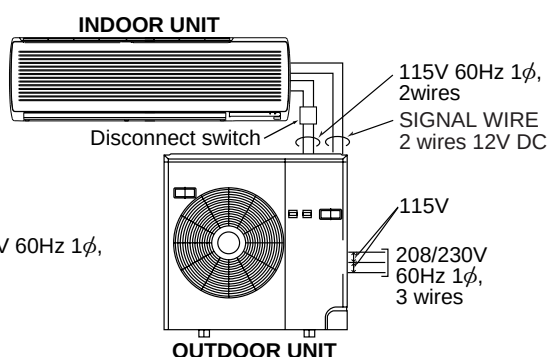
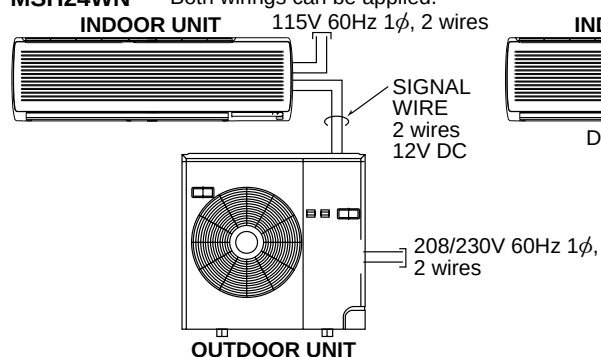


#### 4-4. STANDARD OPERATION DATA

| Model               |                           |    |                  | MSH24WN     |             |
|---------------------|---------------------------|----|------------------|-------------|-------------|
| Item                |                           |    | Unit             | Cooling     | Heating     |
| Total               | Capacity                  |    | Btu / h          | 22,000      | 23,600      |
|                     | SHF                       |    | —                | 0.63        | —           |
|                     | Input                     |    | kW               | 2.22        | 2.23        |
| Electrical circuit  | Indoor unit               |    | MSH24WN          |             |             |
|                     | Power supply              |    | 115V 60Hz 1ϕ     |             |             |
|                     | Input                     | kW | 0.071            |             |             |
|                     | Fan motor current         |    | A                | 0.62        |             |
|                     | Aux. heater current       |    | A                | —           |             |
|                     | Outdoor unit              |    | MUH24WN          |             |             |
|                     | Power supply              |    | 208/230V 60Hz 1ϕ |             |             |
|                     | Input                     | kW | 2.149            | 2.159       |             |
|                     | Comp. current             |    | A                | 9.60 / 8.52 | 9.65 / 8.56 |
|                     | Fan motor current         |    | A                | 0.67/0.71   |             |
| Refrigerant circuit | Condensing pressure       |    | PSIG             | 257         | 250         |
|                     | Suction pressure          |    | PSIG             | 73          | 56          |
|                     | Discharge temperature     |    | °F               | 180         | 185         |
|                     | Condensing temperature    |    | °F               | 116         | 115         |
|                     | Suction temperature       |    | °F               | 52          | 35          |
|                     | Comp. shell bottom temp   |    | °F               | 163         | 167         |
|                     | Ref. pipe length          |    | ft.              | 25          |             |
|                     | Refrigerant charge (R22)  |    | —                | 4 lb. 0 oz. |             |
| Indoor unit         | Intake air temperature    | DB | °F               | 80          | 70          |
|                     |                           | WB | °F               | 67          | 60          |
|                     | Discharge air temperature | DB | °F               | 53          | 109         |
|                     |                           | WB | °F               | 51          | —           |
|                     | Fan speed (High)          |    | rpm              | 1,280       | 1,280       |
|                     | Airflow (High)            |    | CFM              | 487(Wet)    | 565(Dry)    |
| Outdoor unit        | Intake air temperature    | DB | °F               | 95          | 47          |
|                     |                           | WB | °F               | —           | 43          |
|                     | Fan speed                 |    | rpm              | 750/820     |             |
|                     | Airflow                   |    | CFM              | 1,589/1,765 |             |

#### POWER SUPPLY

**MSH24WN** •Both wirings can be applied.



\* Control voltage

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

## 4-5. OPERATING RANGE

### (1) POWER SUPPLY

|              | Model   | Rating                 | Guaranteed Voltage                                       |
|--------------|---------|------------------------|----------------------------------------------------------|
| Indoor unit  | MSH24WN | 115V 60Hz 1 $\phi$     | Min. 103V 115V Max. 127V<br>----- ----- ----- -----      |
| Outdoor unit | MUH24WN | 208/230V 60Hz 1 $\phi$ | Min. 198V 208V 230V Max. 253V<br>----- ----- ----- ----- |

### (2) OPERATION

| Function | Intake air temperature | Indoor  |         | Outdoor |         |
|----------|------------------------|---------|---------|---------|---------|
|          | Condition              | DB (°F) | WB (°F) | DB (°F) | WB (°F) |
| Cooling  | Standard temperature   | 80      | 67      | 95      | —       |
|          | Maximum temperature    | 95      | 71      | 115     | —       |
|          | Minimum temperature    | 67      | 57      | 67      | —       |
|          | Maximum humidity       | 78%     |         | —       |         |
| Heating  | Standard temperature   | 70      | 60      | 47      | 43      |
|          | Maximum temperature    | 80      | 67      | 75      | 65      |
|          | Minimum temperature    | 70      | 60      | 17      | 15      |

## 4-6. OUTLET AIR SPEED AND COVERAGE RANGE

| Model   | Mode | Function | Air flow (CFM) | Air speed (ft./sec.) | Coverage range (ft.) |
|---------|------|----------|----------------|----------------------|----------------------|
| MSH24WN | HEAT | Dry      | 565            | 20.1                 | 34.2                 |
|         | COOL | Dry      | 565            | 20.1                 | 34.2                 |
|         |      | Wet      | 487            | 17.2                 | 29.4                 |

- The air coverage range is the figure up to the position where the air speed is 1 ft./sec., when air is blown out horizontally from the unit properly at the High speed position.  
The coverage range should be used only as a general guideline since it varies according to the size of the room and furniture arranged inside the room.

## 4-7. ADDITIONAL REFRIGERANT CHARGE (R22(oz.))

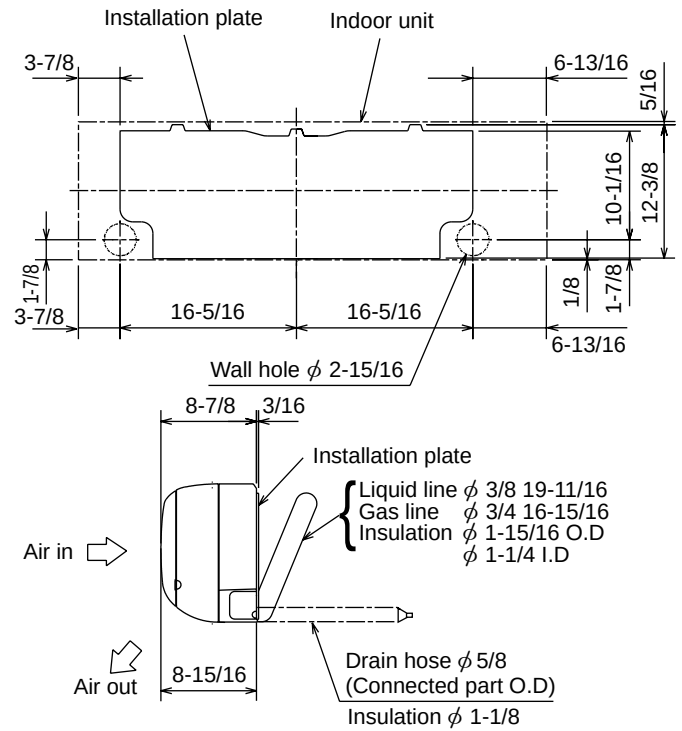
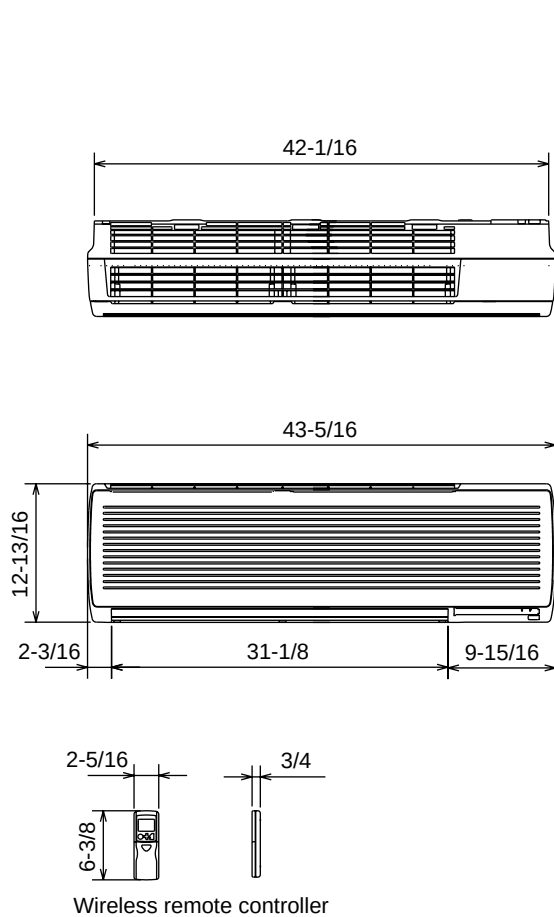
| Model           | Outdoor unit precharged (up to 25ft.) | Refrigerant piping length (one way) |       |       |       |       |       |
|-----------------|---------------------------------------|-------------------------------------|-------|-------|-------|-------|-------|
|                 |                                       | 25ft.                               | 30ft. | 35ft. | 40ft. | 45ft. | 50ft. |
| MSH24WN MUH24WN | 4 lb. 0 oz.                           | 0                                   | 1.61  | 3.22  | 4.83  | 6.44  | 8.05  |

CALCULATION : Xoz. = 1.61/ 5oz./ft. x (Additional Piping Length-25) ft.

MSH24WN

Unit: inch

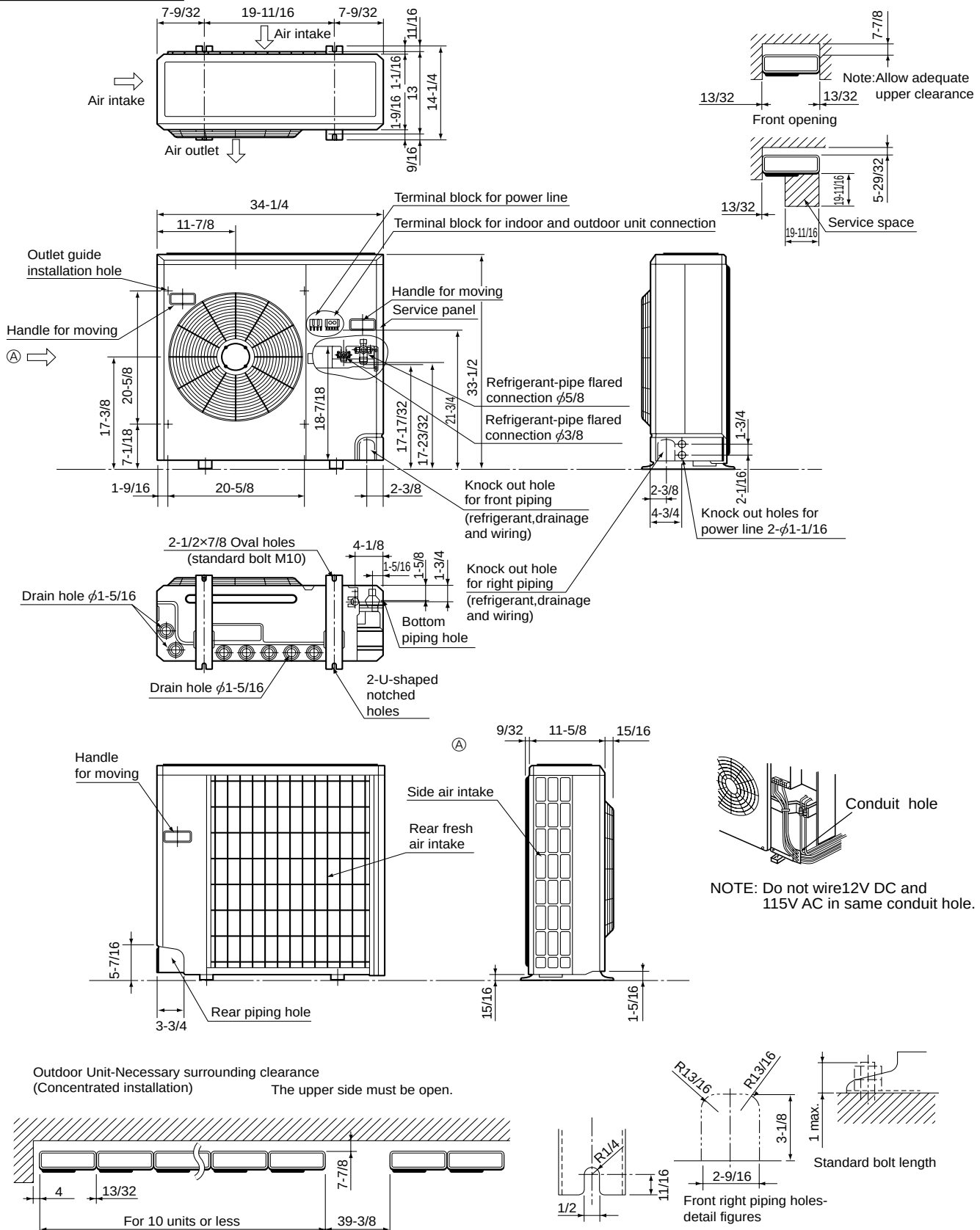
## INDOOR UNIT



# MUH24WN

Unit: inch

## OUTDOOR UNIT



## WIRING DIAGRAM

## MODEL WIRING DIAGRAM

# OR UNIT

TO OUTDOOR UNIT  
CONNECTING  
WIRES  
12V DC

FROM OUTDOOR  
UNIT  
CONNECTING  
WIRES  
(POWER  
SUPPLY)  
115V  
1 phase  
60Hz

TO OUTDOOR  
UNIT  
CONNECTING  
WIRE

3+ TB ORN

1- VLT

N BLK

L1 RED

15

3

3

1

3

4

CN201

HIC1

NR11

TRANS

TAB12

F11

SR141

C11

CN151

CN102

CN101

CN121

CN211

RT13

RT12

RT11

BLK

GRY

YLN

BRN

WHT

RED

MF

DISPLAY  
P.C. BOARD

RECEIVER  
P.C. BOARD

REMOTE  
CONTROLLER

\* A disconnect may be required by local code.

※ A disconnect may be required by local code.

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

SG79J618H02

## MODEL WIRING DIAGRAM

[illegible]

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

SG79J604H02

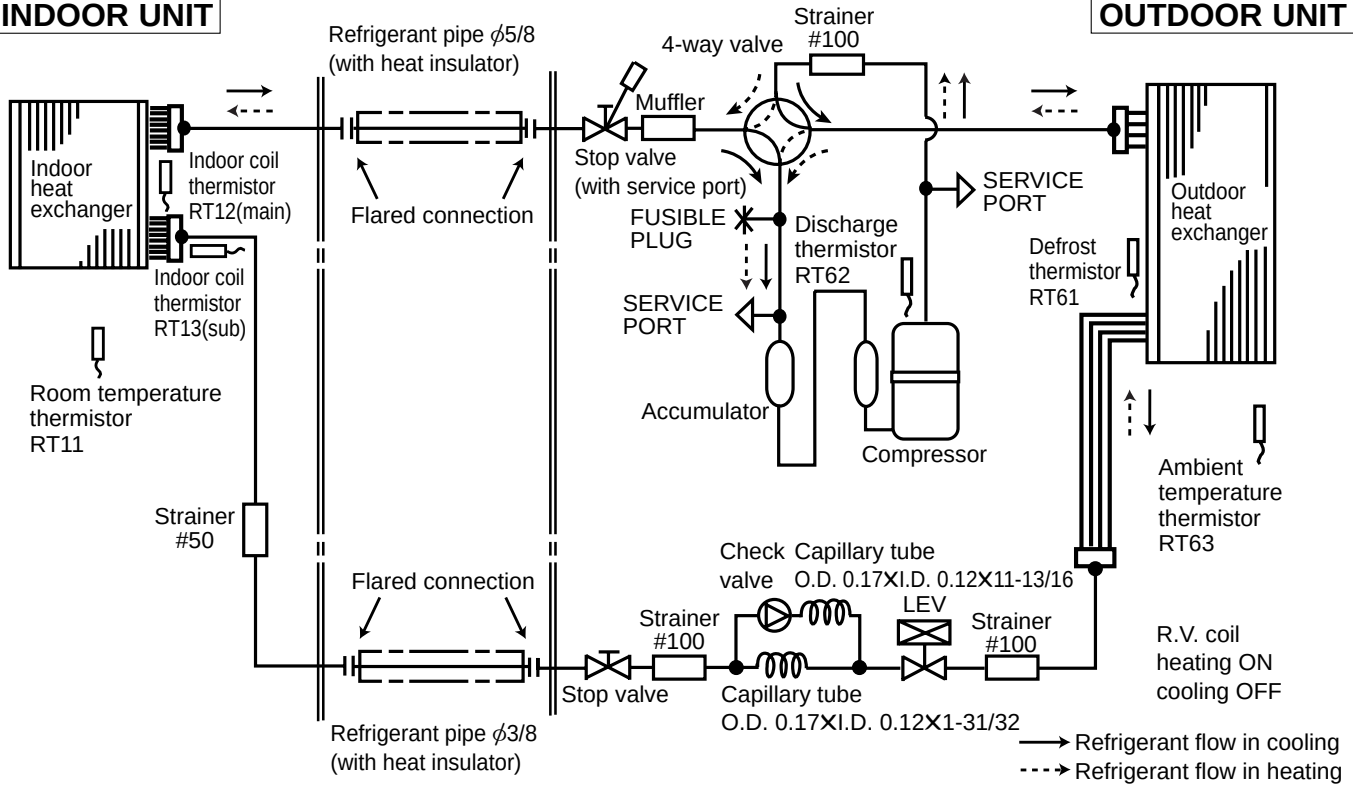
Unit: inch

MSH24WN

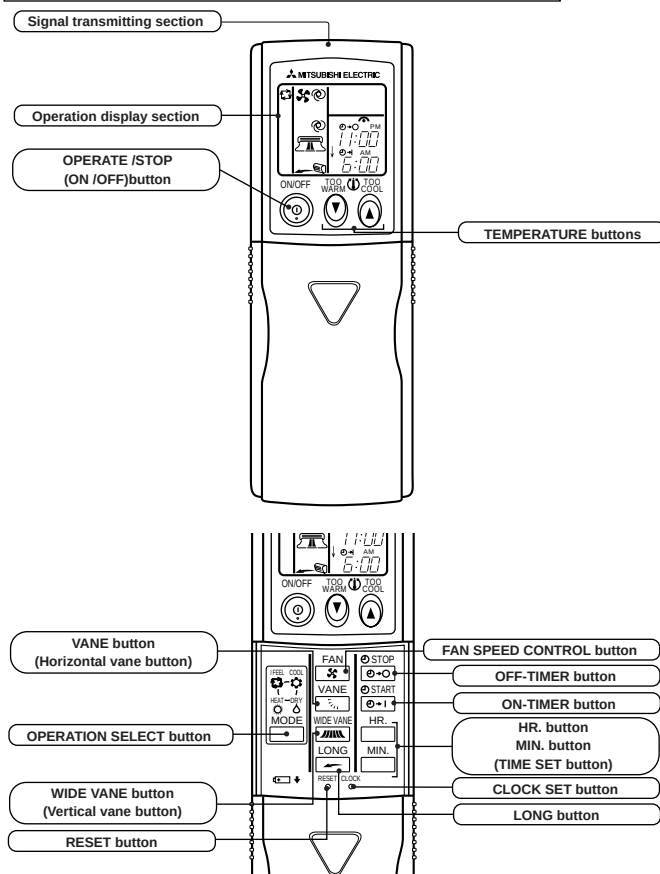
MUH24WN

INDOOR UNIT

OUTDOOR UNIT



## WIRELESS REMOTE CONTROLLER

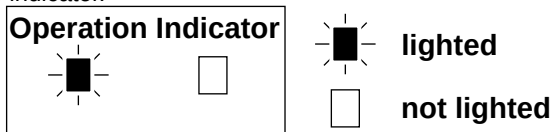


## INDOOR UNIT DISPLAY SECTION

## Operation Indicator lamp

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

- The following indication applies regardless of shape of the indicator.



| Indication | Operation state                                                                                                                         | Difference between target temperature and room temperature |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
|            | This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained. | Approx. 4°F or more                                        |
|            | This shows that the room temperature is approaching the target temperature.                                                             | Approx. 4°F or less                                        |

## MSH24WN MUH24WN

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

Indoor unit receives the signal with a beep tone.

When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

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

- Press OPERATE/STOP (ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
- Select "I FEEL CONTROL" mode with the OPERATION SELECT button.
- The operation mode is determined by the room temperature at start-up of the operation.

| Initial room temperature | Mode                          |
|--------------------------|-------------------------------|
| 77°F or more             | COOL mode of "I FEEL CONTROL" |
| 73°F to 77°F             | DRY mode of "I FEEL CONTROL"  |
| less than 73°F           | HEAT mode of "I FEEL CONTROL" |

- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (⌚→|) operation, mode is determined according to the room temperature at the set time the operation starts.
- When the system is stopped on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (□) mode, the system operates in previous mode automatically regardless of the room temperature.

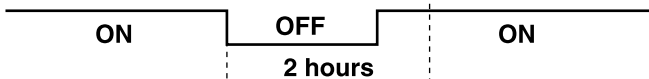
## Example

## Previous operation

COOL mode of "I FEEL CONTROL" or COOL mode

## Restart

COOL mode of "I FEEL CONTROL"



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

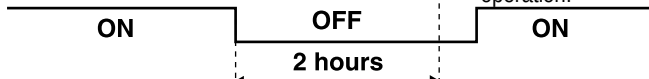
## Example

## Previous operation

COOL mode of "I FEEL CONTROL" or COOL mode

## Restart

COOL or DRY or HEAT mode of "I FEEL CONTROL" that determined by room temperature at start-up of the operation.



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

| Model                            | Initial room temperature | Initial set temperature               |    |
|----------------------------------|--------------------------|---------------------------------------|----|
| COOL mode of<br>"I FEEL CONTROL" | 79°F or more             | 75°F                                  | ✱1 |
|                                  | 77°F to 79°F             | Initial room temperature<br>minus 4°F |    |
| DRY mode of<br>"I FEEL CONTROL"  | 73°F to 77°F             | Initial room temperature<br>minus 4°F |    |
| HEAT mode of<br>"I FEEL CONTROL" | less than 73°F           | 79°F                                  |    |

✱1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of room temperature at restart.  
The set temperature is calculated by the previous set temperature.

#### (5) TEMPERATURE buttons

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

##### • Fuzzy control

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.

In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.



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



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

### 8-1-1. COOL mode of "I FEEL CONTROL"

#### 1. Indoor fan speed control

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

In AUTO the fan speed is as follows.

| Initial temperature difference                                        | Fan Speed |
|-----------------------------------------------------------------------|-----------|
| Room temperature minus set temperature : 3 degrees or more.....       | High      |
| Room temperature minus set temperature : Between 2 and 3 degrees..... | Med.      |
| Room temperature minus set temperature : less than 2 degree.....      | Low       |

Difference between room temperature and set temperature during operation

#### 2. Coil frost prevention

##### ① Temperature control

When the indoor coil thermistor RT12 or RT13 reads 30°F or below the coil frost prevention mode starts immediately. However, the coil frost prevention doesn't work for 5 minutes since the compressor has started.

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

After that, if RT12 or RT13 still reads below 30°F this mode prolonged until the RT12 or RT13 still reads over 30°F.

##### ② Time control

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

a. Compressor has been continuously operating.

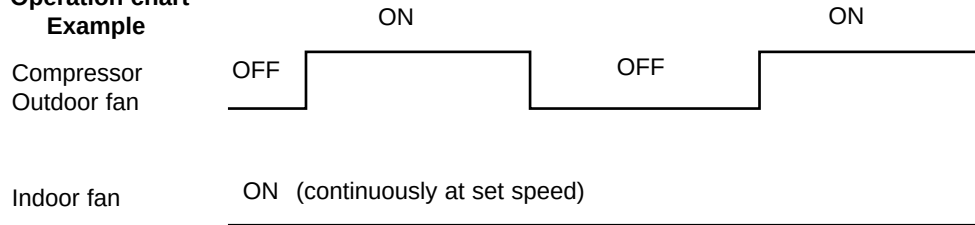
b. Indoor fan speed is Low or Med.

c. Room temperature is below 79°F.

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

Time counting also stops temporarily when the indoor fan speed becomes High or the room temperature exceeds 79°F. However, when two of the above conditions (b.and c.) are satisfied again. Time accumulation is resumed.

### Example



### 3. Discharge temperature protection

The compressor is controlled by the temperature of discharge temperature thermistor RT62 for excess rise protection of compressor discharge pressure.

- Compressor

When the temperature of discharge temperature thermistor RT62 goes to 248°F or more, the compressor is turned OFF.

After 3 minutes since the compressor has been turned OFF, if the temperature of discharge temperature thermistor RT62 becomes 212°F or less, the compressor is turned ON.

### 8-1-2. DRY mode of “I FEEL CONTROL”

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

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

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

## 1. Indoor fan speed control

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

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

## 2. The operation of the compressor and indoor/ outdoor fan

Compressor operates by room temperature control and time control.

Set temperature is controlled to fall 4°F from initial room temperature.

Indoor fan and outdoor fan operate in the same cycle as the compressor.

- When the room temperature is 73°F or over:

When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.

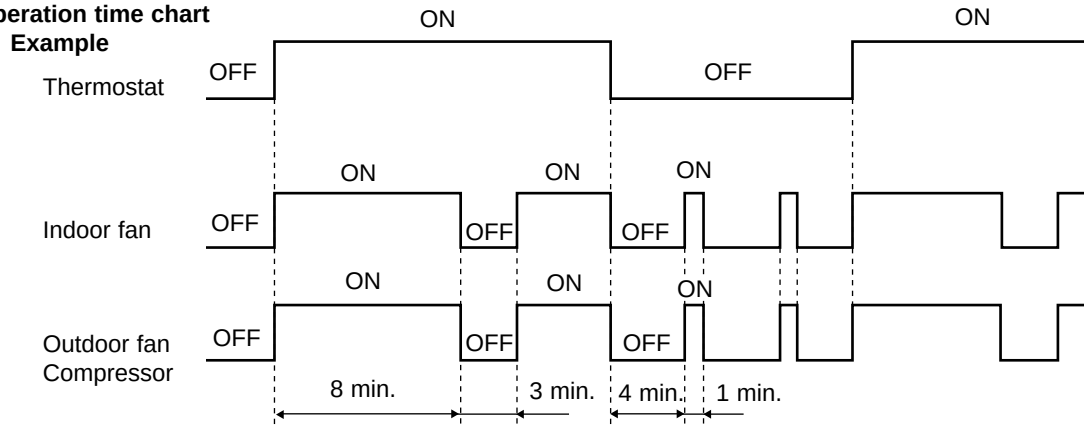
When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

- When the room temperature is under 73°F.

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

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

### Operation time chart



### 3. Coil frost prevention

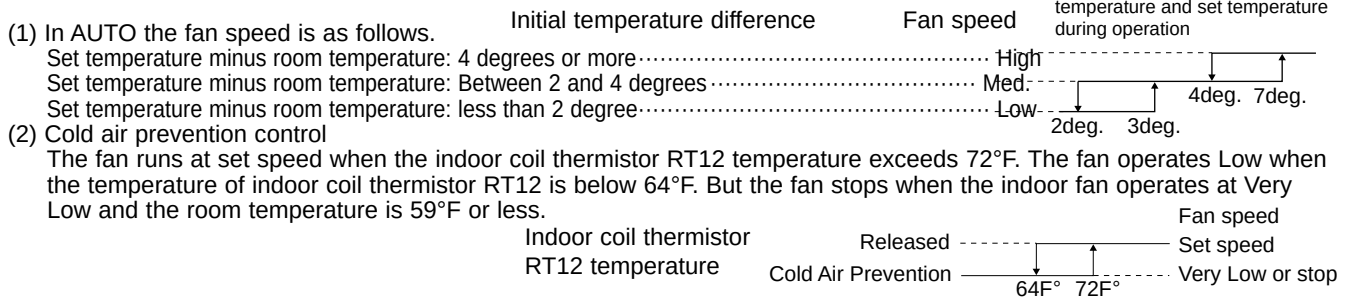
- The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL".

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

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

### 8-1-3. HEAT mode of "I FEEL CONTROL"

#### 1. Indoor fan speed control



**NOTE :** If the temperature of RT12 reads from 64°F to 72°F at the air conditioner starting and also after defrosting, this control works.

#### (3) Warm air control.

When compressor starts in heating operation or after defrosting, the fan changes the speed due to the indoor coil thermistor RT12 temperature to blow out warm air. After releasing of cold air prevention, when the indoor coil thermistor RT12 temperature is 99°F or above, the fan speed shifts to the set speed, and when the fan speed is changed by the remote controller, the fan speed is the set speed. When the indoor coil thermistor RT12 temperature is less than 99°F, the fan speed is controlled by time as below.

| <Time condition>       | <Indoor fan speed> |
|------------------------|--------------------|
| less than 2 minutes    | Low                |
| 2 minutes to 4 minutes | Med.               |
| 4 minutes or more      | High               |

The upper limit of the fan speed is the set speed.  
If the thermostat turns off, this operation changes to flow soft control.

#### (4) Flow soft control

After the thermostat turns off, the indoor fan operates at Very Low.

**NOTE :** When the thermostat turns on, the fan operates at the set speed. Due to the cold air prevention control, the fan does not start at set speed until the indoor coil thermistor RT12 reads 72°F or more.

#### 2. High pressure protection

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

##### • Outdoor fan

When the temperature of indoor coil thermistor RT12 goes to 131°F or more, the outdoor fan is turned OFF.  
When the temperature of indoor coil thermistor RT12 becomes to 126°F or less, the outdoor fan is turned ON.

##### • Compressor

When the temperature of indoor coil thermistor RT12 goes to 167°F or more, the compressor is turned OFF.  
3 minutes after the compressor is turned OFF and if the temperature of indoor coil thermistor RT12 becomes 167°F or less, the compressor is turned ON.

**NOTE :** During the high pressure protection and for 10 seconds after high pressure protection, defrosting of outdoor heat exchanger is not detected by the defrost thermistor RT61.

#### 3. Discharge temperature protection

Discharge temperature protection is as same as during COOL mode of "I FEEL CONTROL".

#### 4. Defrosting

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

##### (1) Starting conditions of defrost

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

a) Under the heat operation, the compressor cumulative operation time exceeds 40 minutes without the defrosting operation working.

b) The defrost thermistor RT61 reads 27°F or less.

c) After releasing the high pressure protection 4 minutes and 10 seconds have elapsed.

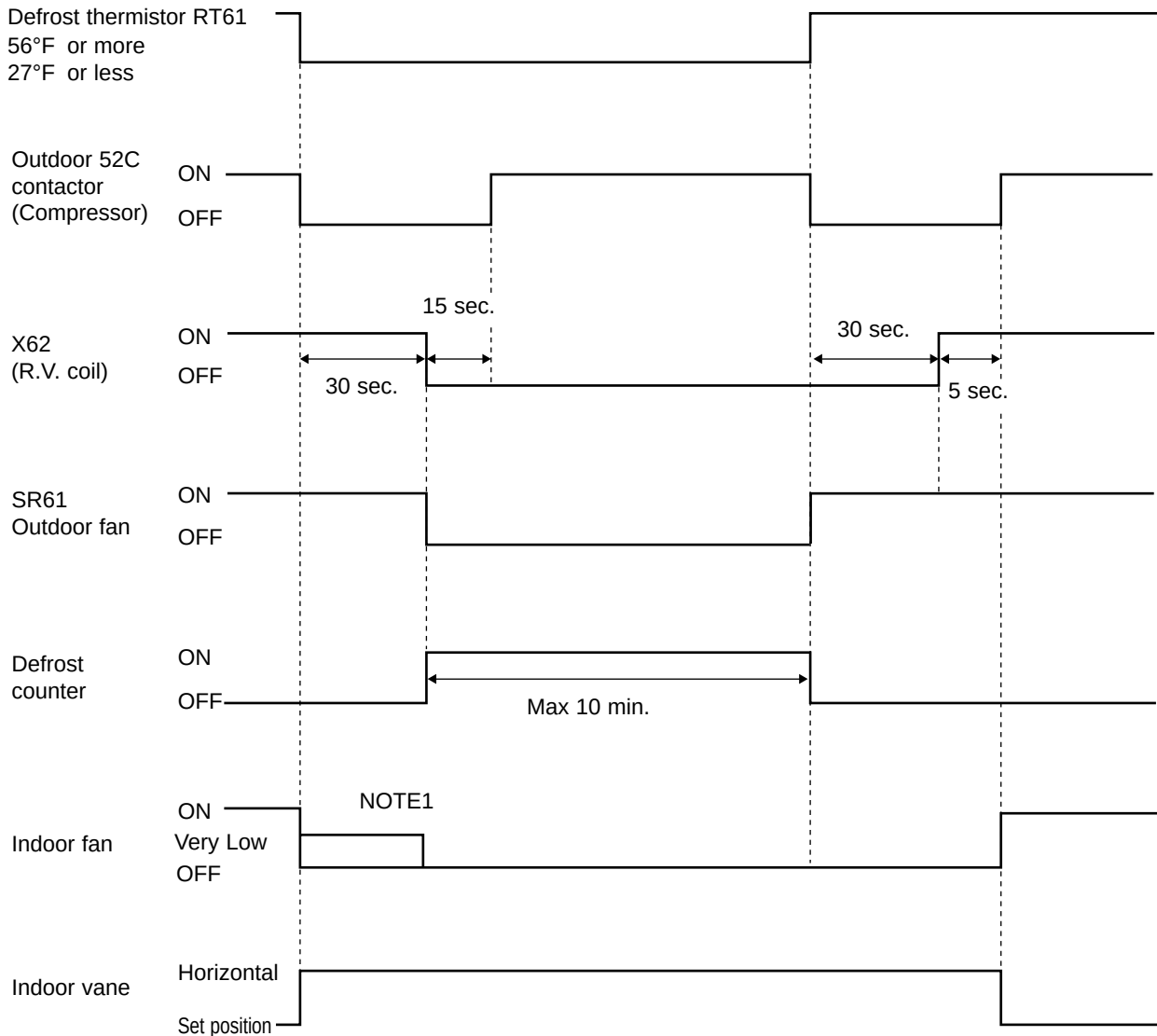
##### (2) Releasing conditions of defrost

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

d) The defrost thermistor RT61 reads 56°F or more.

e) The defrosting time exceeds 10 minutes.

##### (3) Defrosting time chart



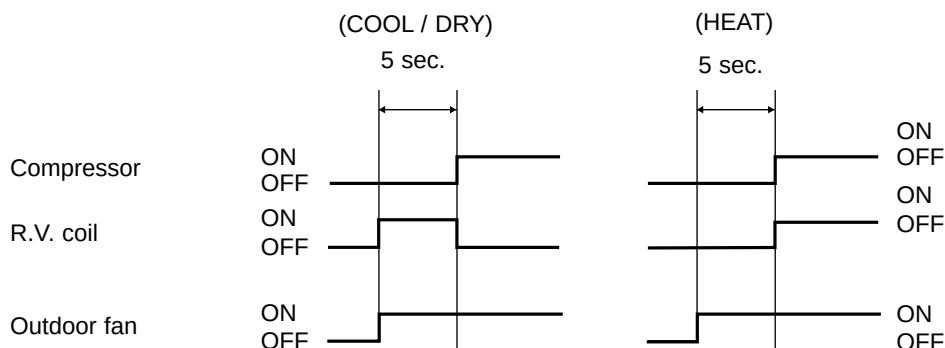
## 5. R.V. coil control

Heating . . . . . ON

Cooling . . . . . OFF

Dry . . . . . OFF

**NOTE:** The 4-way valve reverses for 5 seconds right before start-up of the compressor.



## 8-2. COOL ( ❄ ) OPERATION

- (1) Press OPERATE/STOP (ON/OFF) button.

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

- (2) Select COOL mode with the OPERATION SELECT button.

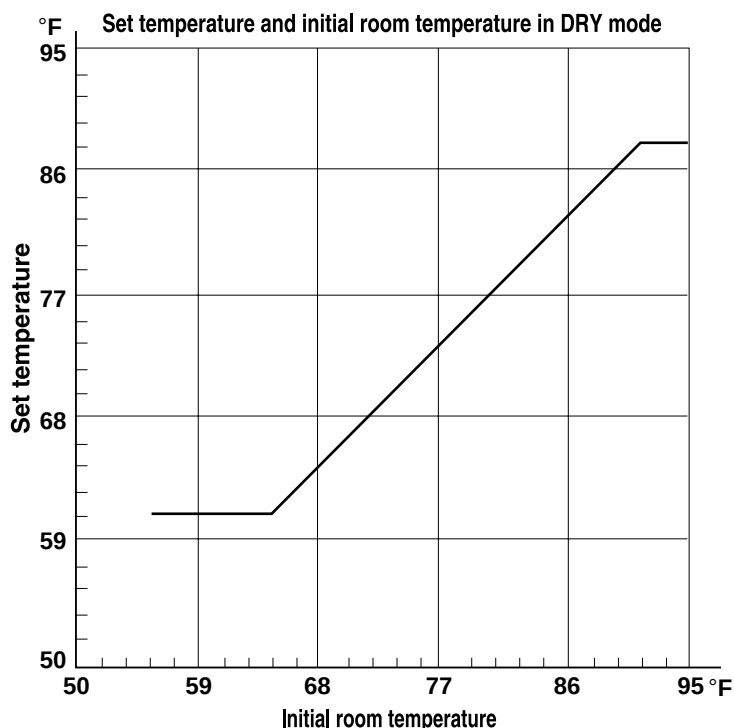
- (3) Press TEMPERATURE buttons.

(TOO WARM or TOO COOL button) to select the desired temperature.

The setting range is 59 ~ 89°F.

\* Indoor fan continues to operate regardless of thermostat's OFF-ON at set speed.

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



## 8-3. DRY ( ☹ ) OPERATION

- (1) Press OPERATE/STOP (ON/OFF) button.

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

- (2) Select DRY mode with the OPERATION SELECT button.

- (3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.

Thermostat (SET TEMP.) does not work.

The other operations are same as DRY mode of "I FEEL CONTROL".

- (4) DRY operation will not function when the room temperature is 55°F or below.

## 8-4. HEAT ( ☀ ) OPERATION

- (1) Press OPERATE/STOP (ON/OFF) button.

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

- (2) Select HEAT mode with the OPERATION SELECT button.

- (3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.

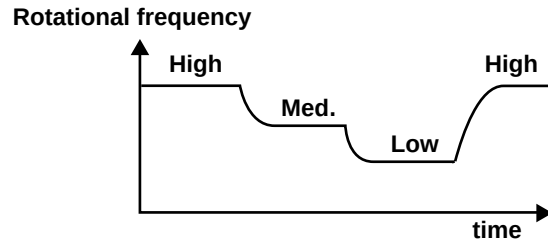
The setting range is 59 ~ 89°F.

- (4) Indoor fan speed control, high pressure protection, defrosting, R.V. coil control are the same as HEAT mode of "I FEEL CONTROL".

## 8-5. INDOOR FAN MOTOR CONTROL

### (1) Rotational frequency feedback control

The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feed back the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (High, Med., Low), the microprocessor controls SR141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



### (2) Fan motor lock-up protection

When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (Refer to page 33.)

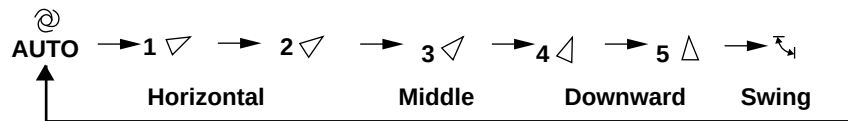
## 8-6. AUTO VANE OPERATION

### 1. Horizontal vane

#### (1) Vane motor drive

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

#### (2) The horizontal vane angle and mode changes as follows by pressing the VANE button.



### (3) Positioning

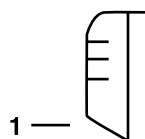
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

- When the OPERATE/STOP (ON/OFF) button is pressed.
- When the vane control is changed from AUTO to MANUAL.
- When the SWING is finished.
- When the test run starts.
- When the power supply turns ON.

### (4) VANE AUTO (⌚) mode

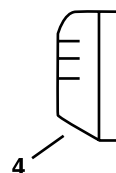
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



Vane angle is fixed to Angle 1.

② In HEAT operation



Vane angle is fixed to Angle 4.

(5) STOP (operation OFF) and ON-TIMER standby.

When the following cases occur, the horizontal vane returns to the closed position.

- (a) When the OPERATE/STOP (ON/OFF) button is pressed (POWER OFF).
- (b) When the operation is stopped by the emergency operation.
- (c) When the ON-TIMER is on standby.

(6) Dew prevention

During COOL or DRY operation at Vane Angle 4 or 5 when the cumulative operation time of compressor exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

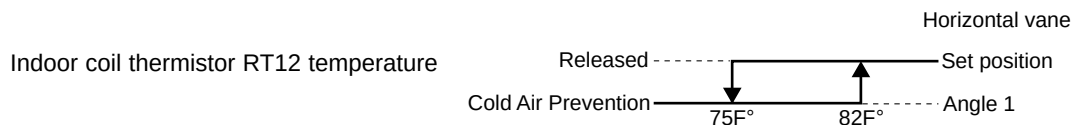
(7) SWING MODE (  )

By selecting SWING mode with the VANE button, the horizontal vane swings vertically. The remote controller displays “  ”.

(8) Cold air prevention in HEAT operation

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

- ① Compressor is not operating.
- ② Defrosting is performed.
- ③ Indoor coil thermistor RT12 reads 75°F or below.
- ④ Indoor coil thermistor RT12 temperature is raising from 75°F or below, but it does not exceed 82°F.

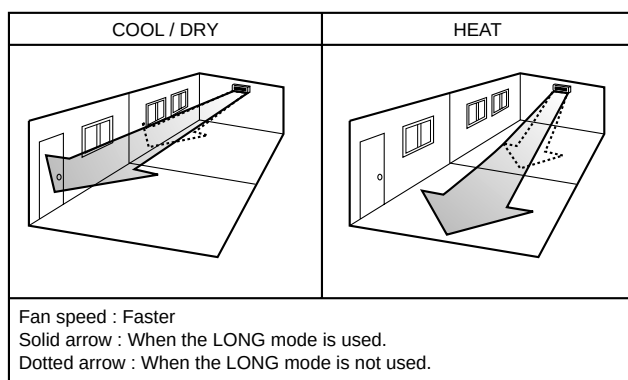


**NOTE:** If the temperature of RT12 reads from 75°F to 82°F at the air conditioner starting, this control works.

(9) LONG MODE (  )

By pressing the LONG button fan speed becomes faster than setting fan speed on the remote controller, and the horizontal vane moves to the position for LONG mode. The remote controller displays “  ”. LONG mode is cancelled when the LONG button is pressed once again or the VANE button is pressed.

- In the following example, the vertical vane is set to  (front.).

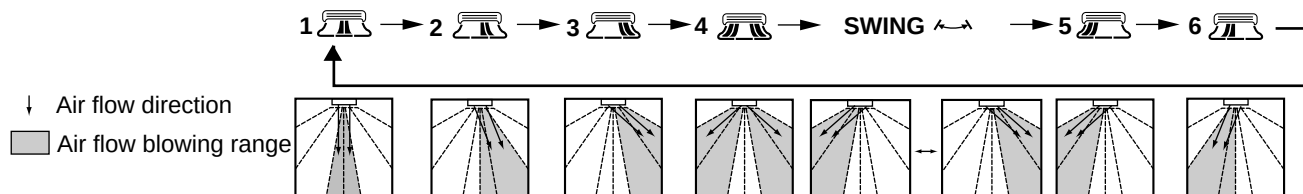


## 2. Vertical vane

(1) Vane motor drive

This model is equipped with a stepping motor for the vertical vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from microprocessor.

(2) The vertical vane angle and mode change as follows by pressing the WIDE VANE button.



(3) Positioning

The vane is once pressed to the vane stopper to confirm the standard position and then set to the desired angle.

Confirming of standard position is performed under following conditions.

(a) When the OPERATE/STOP(ON/OFF) button is pressed (POWER ON/OFF).

(b) When the SWING is started or finished.

(c) When the power supply turns ON.

(4) SWING MODE (↔)

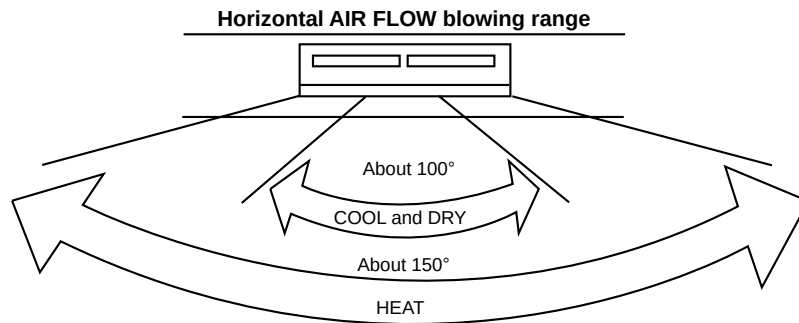
By selecting SWING mode with the WIDE VANE button, the vertical vane swings horizontally. The remote controller displays “↔”. The vane moves right and left in the width of Angle 4 repeatedly.

(5) WIDE MODE (🌀)

By selecting WIDE mode with the WIDE VANE button, indoor fan speed becomes faster than setting fan speed on the remote controller (\*). The remote controller displays “🌀”.

**NOTE :** The position of vane angle 3, angle 4 and angle 5 are different in COOL operation and HEAT operation.

\* Indoor fan speed becomes faster than setting fan speed on the remote controller even when 🌀 or 🌀 is selected.



## 8-7. TIMER OPERATION

### 1. How to set the timer

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

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

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

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

“ON-TIMER” button... AUTO START operation (ON timer)

“OFF-TIMER” button... AUTO STOP operation (OFF timer)

(4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when “⌚→|” or “⌚→○” mark is flashing.

These marks disappear in 1 minute.

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

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

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

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

### 2. Cancel

TIMER setting can be cancelled with the ON/OFF TIMER buttons.

To cancel the ON timer, press the “ON-TIMER” button.

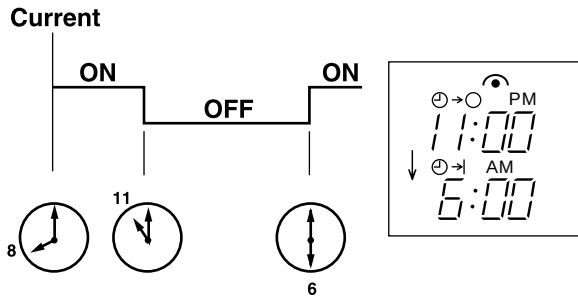
To cancel the OFF timer, press the “OFF-TIMER” button.

TIMER is cancelled and the display of set time disappears.

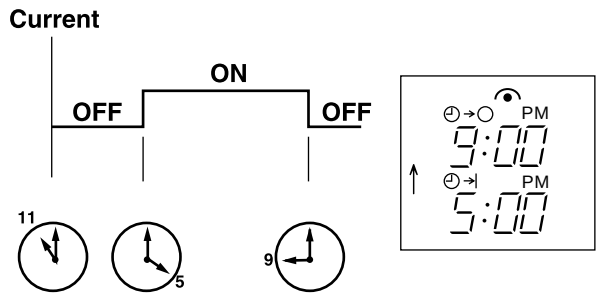
## PROGRAM TIMER

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

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



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



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

### 8-8. EMERGENCY-TEST OPERATION

In case of test run operation or emergency operation, use the EMERGENCY OPERATION switch on the front of the indoor unit. Emergency operation is available when the remote controller is missing, has failed or the batteries of remote controller run down. The unit will start and the OPERATION INDICATOR lamp will light.

The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at High speed and the system is in continuous operation. (The thermostat is ON.)

After 30 minutes of test run operation the system shifts to EMERGENCY COOL / HEAT MODE with a set temperature of 75°F.

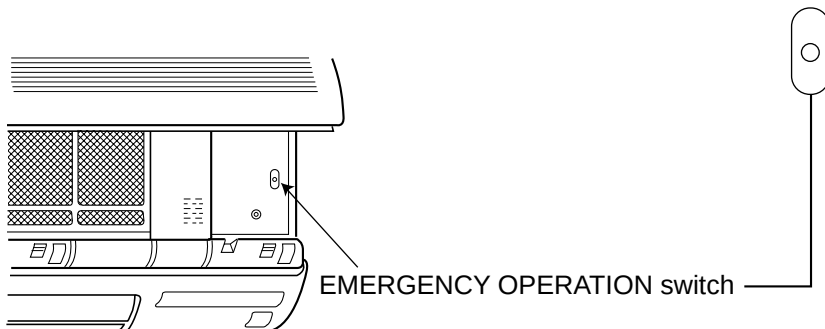
The fan speed shifts to Med. speed.

The coil frost prevention works even in emergency operation, and defrosting too.

In the test run or emergency operation, the horizontal vane operates in VANE AUTO ( @ ) mode.

Emergency operation continues until the EMERGENCY OPERATION switch is pressed once or twice or the unit receives any signal from the remote controller. In case of latter normal operation will start.

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



- The following indication applies regardless of shape of the indicator.

#### OPERATION INDICATOR lamp

|                  |        |                          |                          |
|------------------|--------|--------------------------|--------------------------|
| Press once       | <Cool> |                          | <input type="checkbox"/> |
| Press again      | <Heat> | <input type="checkbox"/> |                          |
| Press once again | <Stop> | <input type="checkbox"/> | <input type="checkbox"/> |

## 8-9. LEV control

LEV (Expansion valve) is controlled by "Thermostat ON" commands given from the unit.

|                     |                                                                                                     |                                                                                                                                                                                                                                                                                                                                    |
|---------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic specification | Controlled range                                                                                    | Minimum : 54 pulse, Maximum : 500 pulse                                                                                                                                                                                                                                                                                            |
|                     | Drive speed                                                                                         | 30 ~ 90 pulse / second                                                                                                                                                                                                                                                                                                             |
|                     | Opening set                                                                                         | The setting is always in opening direction.<br>(To close the LEV, it is closed to the pulse smaller than the one which is set finally. Then the LEV is opened to the final setting pulse.)                                                                                                                                         |
| General operation   | Stop of indoor unit                                                                                 | Opening in stop : 150 pulse → LEV opening is set to becomes 500 pulse after 3 minutes passed.                                                                                                                                                                                                                                      |
|                     | Remote controller ON                                                                                | LEV positioning (LEV is closed completely at once)                                                                                                                                                                                                                                                                                 |
|                     | Power ON (Breaker ON)                                                                               | LEV is positioned. However, afterwards, LEV is not positioned at the first remote controller ON.                                                                                                                                                                                                                                   |
|                     | Approximate for 2 minutes since compressor has started.                                             | Opening is set by the initial opening.<br>(Initial opening is set according to each operation modes and outer temperature conditions.)                                                                                                                                                                                             |
|                     | From approximate 2 minutes to approximate 13 minutes (for 11 minutes) since compressor has started. | Opening is set by standard opening.<br>(Standard opening is set according to each operation modes and outer temperature conditions.)                                                                                                                                                                                               |
|                     | After 13 minutes passed since compressor has started.                                               | LEV opening is corrected to be once every 2 minutes so that discharge temperature becomes the target discharge temperature.<br>(When the discharge temperature is lower than target one : LEV is corrected in closed direction, when the discharge temperature is higher than target one : LEV is corrected in opening direction.) |
|                     | At thermostat OFF                                                                                   | Opening in stop : 150 pulse → LEV is set to the initial opening after about 3 minutes passed.                                                                                                                                                                                                                                      |
|                     | At thermostat ON                                                                                    | Same as the starting of compressor operation                                                                                                                                                                                                                                                                                       |
|                     | At remote controller OFF                                                                            | Opening in stop : 150 pulse → LEV is set so that the opening is opened completely at the speed of 4 pulse every 5 seconds in opening after about 3 minutes passed.                                                                                                                                                                 |

### (1) LEV opening correction by discharge temperature

The LEV opening is corrected according to the temperature difference between target discharge temperature (Tb) and actual discharge temperature (Ta).

① The LEV correction is used properly for two kinds according to the LEV opening status at operation off.

| Rank            | Opening immediately before having stopped last time |                           |
|-----------------|-----------------------------------------------------|---------------------------|
|                 | 100 pulse or less (Pulse)                           | 100 pulse or more (Pulse) |
| Ta (F°)         | Cooling / Heating                                   | Cooling / Heating         |
| more than Tb+18 | 5                                                   | 20                        |
| Tb+9 to Tb+18   | 2                                                   | 10                        |
| Tb+4 to Tb+9    | 1                                                   | 2                         |
| Tb-4 to Tb+4    | 0                                                   | 0                         |
| Tb-9 to Tb-4    | -1                                                  | -2                        |
| Tb-18 to Tb-9   | -2                                                  | -5                        |
| less than Tb-18 | -5                                                  | -10                       |

**NOTE** : Discharge temperature : Ta, Target discharge temperature : Tb

- ② When the temperature difference  $\Delta RT$  between indoor coil thermistor (main) RT12 and indoor coil thermistor (sub) RT13 in the indoor unit is 4deg. or more for a fixed time at cool or dry operation, the target discharge temperature is changed. After the temperature is changed, when temperature difference  $\Delta RT$  is 6deg. or more, the target temperature is changed again. The LEV opening is controlled based on the changed target discharge temperature and the temperature difference  $\Delta RT$ .

| Ta (F°)         | $\Delta RT$                |                                              |                          |
|-----------------|----------------------------|----------------------------------------------|--------------------------|
|                 | less than 4deg.<br>(Pulse) | 4deg. or more and less than 6deg.<br>(Pulse) | 6deg. or more<br>(Pulse) |
| more than Tb+18 | 20                         | 60                                           | 60                       |
| Tb+9 to Tb+18   | 10                         | 20                                           | 20                       |
| Tb+4 to Tb+9    | 2                          | 10                                           | 10                       |
| Tb-4 to Tb+4    | 0                          | 0                                            | 0                        |
| Tb-9 to Tb-4    | -2                         | -2                                           | -2                       |
| Tb-18 to Tb-9   | -5                         | -5                                           | -5                       |
| less than Tb-18 | -10                        | -10                                          | -10                      |

**NOTE** : Discharge temperature : Ta, Target discharge temperature : Tb

The target discharge temperature (Tb) is set according to the operation mode or the unit status as follows.

| Operation mode                                                                              | Tb (°F) |
|---------------------------------------------------------------------------------------------|---------|
| HEAT                                                                                        | 180     |
| COOL (Normal)                                                                               | 176     |
| COOL ( $\Delta RT$ is less than 4deg., or $\Delta RT$ is 4deg. or more and less than 6deg.) | 144     |
| COOL ( $\Delta RT$ is 6deg. or more.)                                                       | 136     |

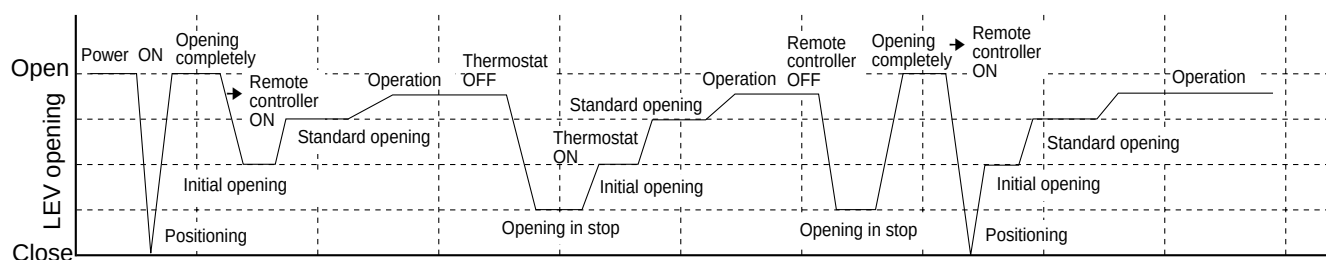
**NOTE** : Target discharge temperature : Tb

**NOTE** : When the discharge temperature (Ta) is 122°F or less on the cool operation, or is 120°F or less on heat operation, LEV opening is set in 54 pulse.

When this state continues for 20 minutes, the compressor is stopped and restarts in 3 minutes.

When the compressor is stopped, the indoor unit indicates the abnormality of refrigerant system and stops.  
(OPERATION INDICATOR lamp is 10-time flashing on and off.)

## (2) LEV time chart



**NOTE** : Opening increases and decreases to be in the target discharge temperature during operation.

Time

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### 9-1. COMPULSORY DEFROSTING MODE FOR SERVICE

By short circuit of the connector JPG1 and R871 on the outdoor deicer P.C. board, defrosting mode can be accomplished regardless of the defrost interval restriction.

Defrost thermistor RT61 must read below 27°F. (Refer to page 42.)

### 9-2. CHANGE IN DEFROST SETTING

<JRF> When the JRF wire of the deicer P.C. board is cut, the defrost interval time is changed.

<JRG> When the JRG wire of the deicer P.C. board is cut, the defrost temperature is changed. (Refer to page 42.)

| Model   | Jumper wire | Change point                                                                                               |
|---------|-------------|------------------------------------------------------------------------------------------------------------|
| MUH24WN | JRF         | Defrost interval time changes from 40 minutes to 15minutes.                                                |
|         | JRG         | Defrost start temperature does not change (27°F).<br>Defrost finish temperature changes from 56°F to 59°F. |

### 9-3. TIMER SHORT MODE

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

The time will be shortened as follows. (Refer to page 41.)

Set time : 1 minute → 1-second

Set time : 3 minute → 3-second (It takes 3 minutes for the compressor to start operation. However, the starting time is shortened by short circuit of JPG and JPS.)

### 9-4. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

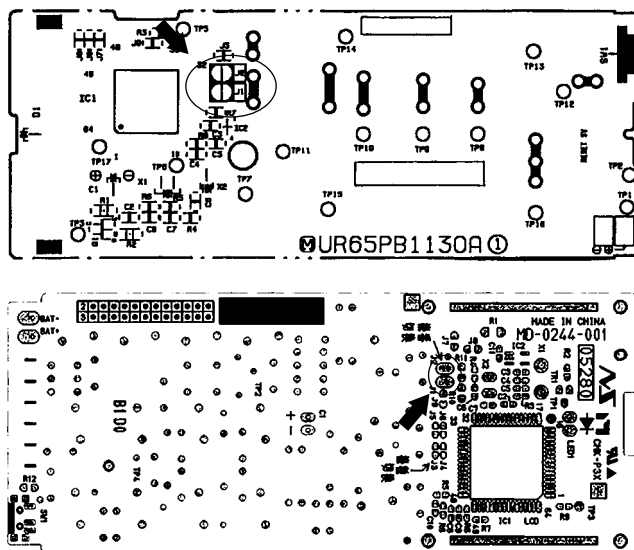
A maximum of 4 indoor units with wireless remote controllers can be used in a room.

In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the indoor unit number.

#### How to modify the remote controller P.C. board

Remove batteries before modification.

The board has a print as shown below :



**NOTE :** For remodelling, take out the batteries and press the OPERATE/STOP(ON/OFF)button twice or 3 times at first. After finish remodelling, put back the batteries then press the RESET button.

The P.C. board has the print "J1" and "J2". Solder "J1" and "J2" according to the number of indoor unit as shown in Table 1. After modification, press the RESET button.

**Table 1**

|            | 1 unit operation | 2 units operation | 3 units operation | 4 units operation     |
|------------|------------------|-------------------|-------------------|-----------------------|
| No. 1 unit | No modification  | Same as at left   | Same as at left   | Same as at left       |
| No. 2 unit | —                | Solder J1         | Same as at left   | Same as at left       |
| No. 3 unit | —                | —                 | Solder J2         | Same as at left       |
| No. 4 unit | —                | —                 | —                 | Solder both J1 and J2 |

**How to set the remote controller exclusively for particular indoor unit**

After you turn the breaker ON, the first remote controller that sends the signal to the indoor unit will be regarded as the remote controller for the indoor unit.

The indoor unit will only accept the signal from the remote controller that has been assigned to the indoor unit once they are set. The setting will be cancelled if the breaker has turned off, or the power supply has shut down.

Please conduct the above setting once again after the power has restored.

**9-5. AUTO RESTART FUNCTION**

When the indoor unit is controlled with the remote controller, the operation mode, the set temperature, and the fan speed are memorized by the indoor electronic control P.C. board.

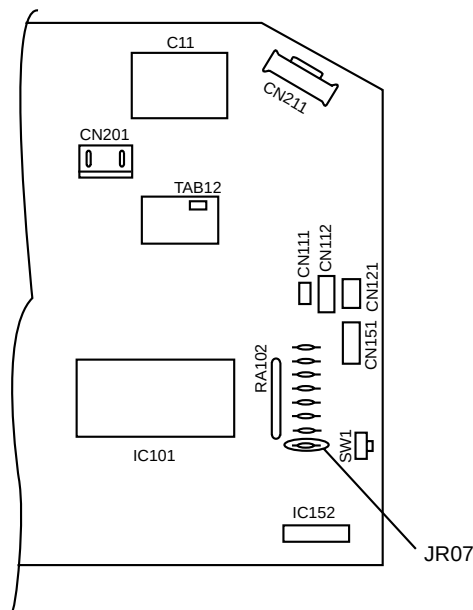
When the main power is turned off and then turned back on, the unit restarts automatically in the memorized set conditions approximately after 3 minutes.

**How to release “AUTO RESTART FUNCTION”**

- ① Turn off the main power for the unit.
- ② Pull out the indoor electronic control P.C. board and the display P.C. board. (Refer to page 44.)
- ③ Solder the Jumper wire or the Resistor 220Ω to the JR07 on the indoor electronic control P.C. board.  
(Refer to page 41.)

**Operation**

- ① If the main power (115V AC) has been cut, the operation settings remain.
- ② After the power is restored, the unit restarts automatically according to the memory. (However, it takes at least 3 minutes for the compressor to start running.)

**NOTE:**

- The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
- If the main power is turned off or a power failure occurs while AUTO START/STOP timer is active, the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
- When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart. Therefore, special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one. (time delay)

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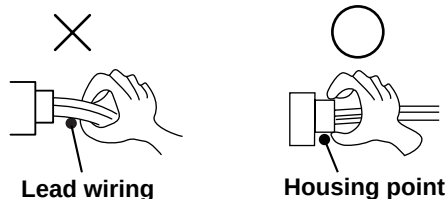
## 10-1. Cautions on troubleshooting

## 1. Before troubleshooting, check the following:

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

## 2. Take care the following during servicing.

- 1) Before servicing the air conditioner, first be sure to turn off the remote controller to stop the unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
- 2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
- 3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
- 4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



## 3. Troubleshooting procedure

- 1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
- 2) Before servicing check that the connector and terminal are connected properly.
- 3) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
- 4) When troubleshooting, refer to the flow chart on page 32 and the check table on page 33.

## 4. How to replace batteries

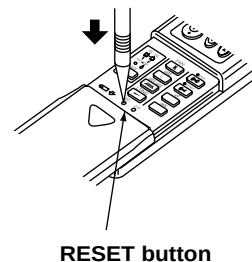
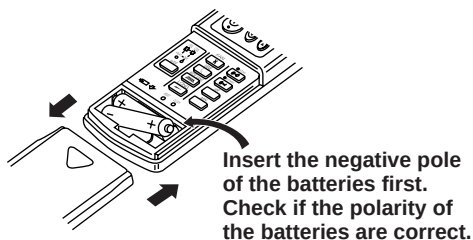
Weak batteries may cause the remote controller malfunction.

In this case, the remote controller can be repaired only by the battery replacement. To operate the remote controller normally, replace the batteries in the following order.

This remote controller has the RESET button. After refilling new batteries, press the RESET button with tip end of ball point pen or the like, and then use the remote controller.

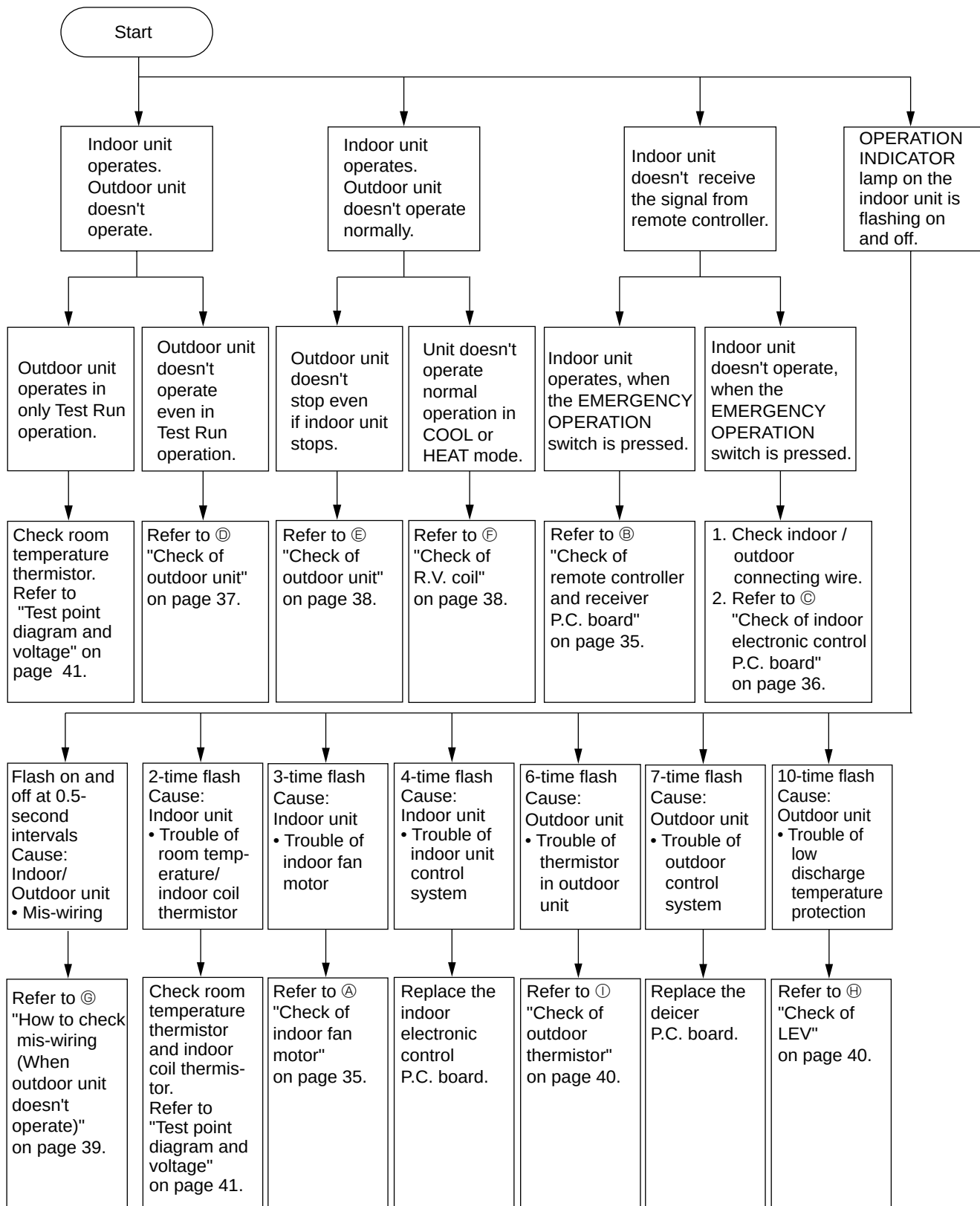
- ① Remove the front lid and insert batteries. Then reattach the front lid.

- ② Press the RESET button.



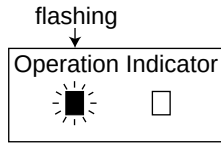
**NOTE :** If the RESET button is not pressed, the remote controller may not operate correctly.

## 10-2. Instruction of troubleshooting



## 1. Troubleshooting check table

- The following indication applies regardless of shape of the indicator.



- Flashing of the OPERATION INDICATOR lamp (on the left-hand side) indicates possible abnormalities.
- The OPERATION INDICATOR lamp (on the left-hand side) is lighting during normal operation.

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

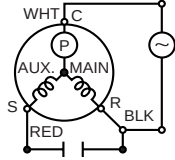
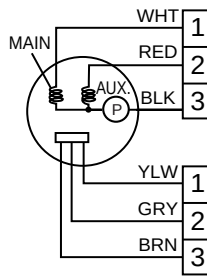
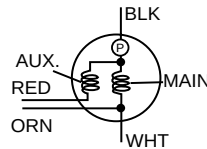
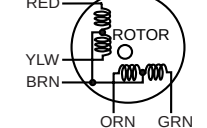
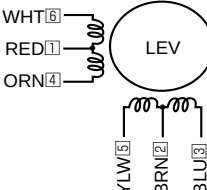
Self check table

| No. | Abnormal point                                        | Operation indicator lamp                                                          | Symptom                                                                                                 | Detection method                                                                                                                                                                                                                                                                                                            | Checkpoint                                                                                                                             |
|-----|-------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Mis-Wiring                                            | 0.5-second ON<br>● ○ ● ○ ● ○ ● ○<br>0.5-second OFF                                | Outdoor unit does not operate.                                                                          | 3 minutes after power supply turns ON, when serial signal is not received.                                                                                                                                                                                                                                                  | • Refer to ⑥ "How to check mis-wiring" on page 39.                                                                                     |
| 2   | Indoor coil thermistor<br>Room temperature thermistor | 2-time flash<br>● ○ ● ○ ○ ○ ○ ○ ● ○ ○ ○<br>2.5-second OFF                         | Outdoor unit does not operate.                                                                          | Detect Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.                                                                                                                                                                                                                      | • Refer to the characteristics of main indoor coil thermistor, sub indoor coil thermistor, and room temperature thermistor on page 41. |
| 3   | Indoor fan motor                                      | 3-time flash<br>● ○ ● ○ ● ○ ○ ○ ○ ○ ● ○ ● ○ ● ○ ○ ○<br>2.5-second OFF             | Indoor fan repeats 12 seconds ON and 3 minutes OFF. When the indoor fan breaks, the fan keeps stopping. | When rotational frequency feedback signal is not emitting during 12-second indoor fan operation.                                                                                                                                                                                                                            | • Refer to ④ "Check of indoor fan motor" on page 35.                                                                                   |
| 4   | Indoor control system                                 | 4-time flash<br>● ○ ● ○ ● ○ ● ○ ○ ○ ○ ○ ● ○ ● ○ ● ○ ● ○ ● ○<br>2.5-second OFF     | Outdoor unit does not operate.                                                                          | When it cannot properly read data in the nonvolatile memory of the indoor electronic control P.C. board.                                                                                                                                                                                                                    | • Replace the indoor electronic control P.C. board.                                                                                    |
| 5   | Outdoor thermistor                                    | 6-time flash<br>● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ○ ○ ○ ○ ● ○ ○ ○<br>2.5-second OFF         | Outdoor unit does not operate.                                                                          | <Thermistor short><br>Thermistors are abnormal when they short after compressor start-up.<br><Thermistor open><br>Thermistors are abnormal when they open after compressor start-up.<br>However, discharge temperature thermistor is abnormal when open circuit is detected more than 10 minutes after compressor start-up. | • Shortage of refrigerant<br>• Replace the deicer P.C. board.<br>Refer to ① "Check of outdoor thermistor" on page 40.                  |
| 6   | Outdoor control system                                | 7-time flash<br>● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ○ ○ ○ ○ ● ○ ○ ○ ○ ○<br>2.5-second OFF | Outdoor unit does not operate.                                                                          | When it cannot properly read data in the nonvolatile memory of the deicer P.C. board, outdoor unit stops.                                                                                                                                                                                                                   | • Replace the deicer P.C. board.                                                                                                       |
| 7   | Low discharge temperature protection                  | 10-time flash<br>● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ● ○ ○ ○ ○ ○<br>2.5-second OFF    | Outdoor unit does not operate.                                                                          | When discharge temperature has been 122°F or less on cool operation, or has been 120°F or less on heat operation for 20 minutes.                                                                                                                                                                                            | • Refer to ⑧ "Check of LEV" on page 40.<br>• Check refrigerant circuit and refrigerant amount.                                         |

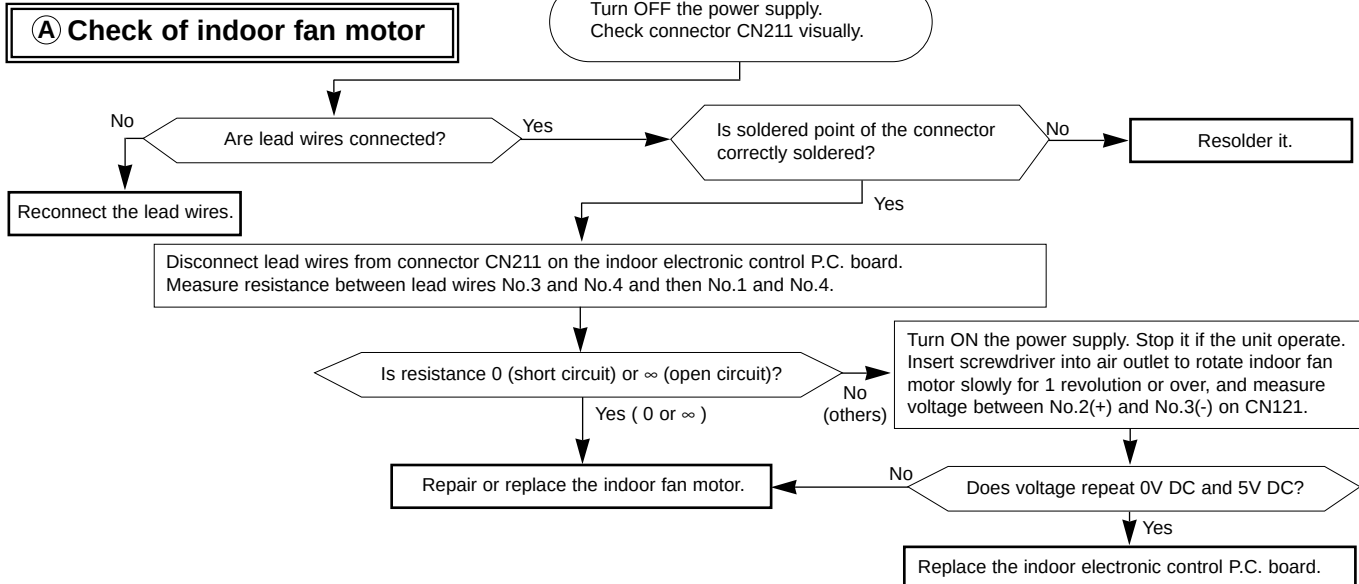
**NOTE :** When the indoor unit has started operation and the above detection method has detected an abnormality (the first detection after the power ON), the indoor electronic control P.C. board turns OFF the indoor fan motor with the OPERATION INDICATOR lamp flashing.

## 2. Trouble criterion of main parts

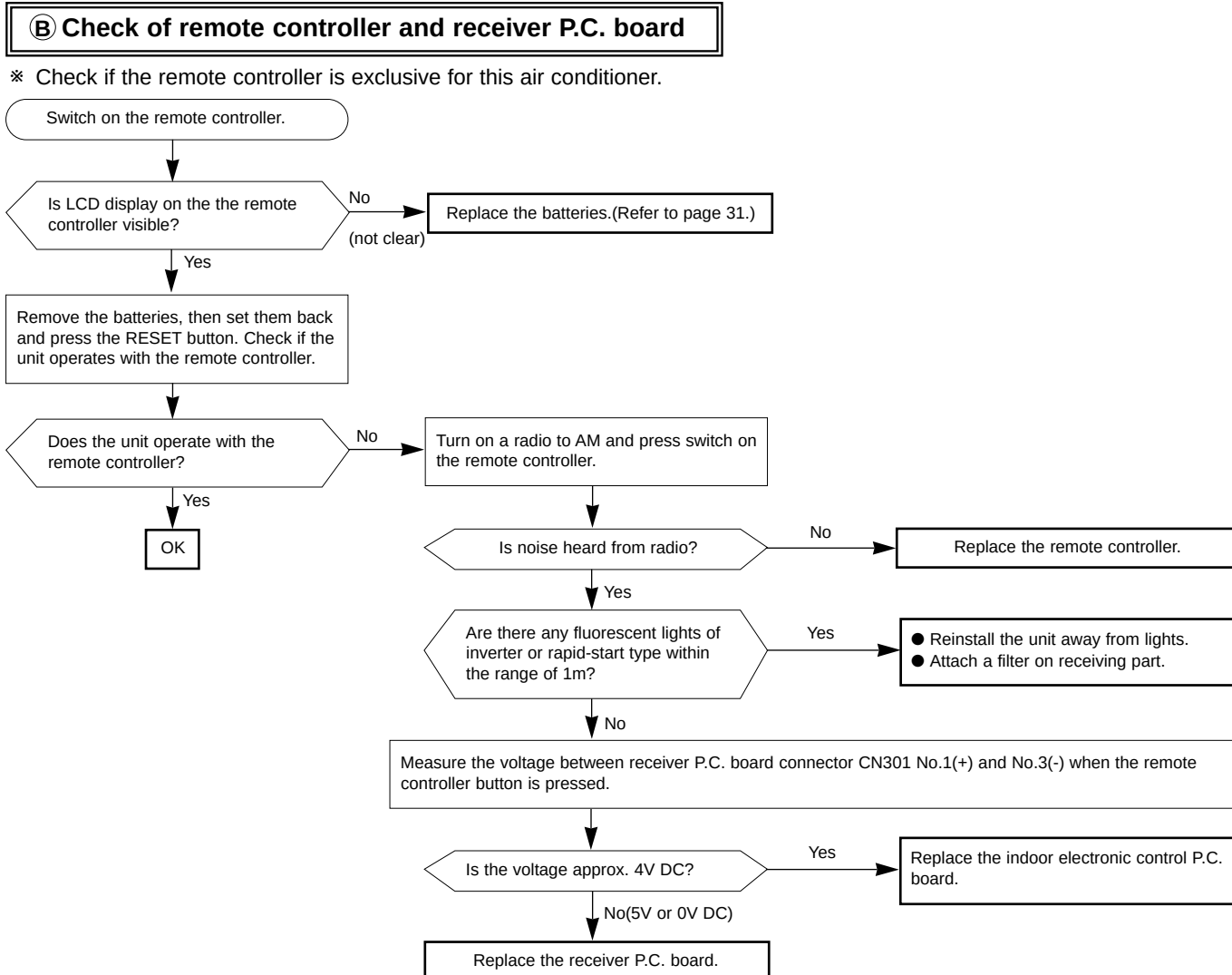
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| Part name                                              | Check method and criterion                                                                                                                         |                                                                                                |                       | Figure                                                                                |                                                                                       |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Room temperature thermistor(RT11)                      | Measure the resistance with a tester.<br>(Part temperature 50°F ~ 86°F)                                                                            |                                                                                                |                       |                                                                                       |                                                                                       |
| Indoor coil thermistor (RT12(main), RT13(sub))         | Normal<br>8 kΩ ~ 20 kΩ                                                                                                                             | Abnormal<br>Open or short-circuit                                                              |                       |                                                                                       |                                                                                       |
| Defrost thermistor (RT61)                              | Measure the resistance with a tester.<br>(Part temperature 14°F ~ 104°F)                                                                           |                                                                                                |                       |                                                                                       |                                                                                       |
|                                                        | Normal<br>5 kΩ ~ 60 kΩ                                                                                                                             | Abnormal<br>Open or short-circuit                                                              |                       |                                                                                       |                                                                                       |
| Discharge temperature thermistor(RT62)                 | Measure the resistance with a tester.<br>Before measurement, hold the thermistor with your hands to warm it up.<br>(Part temperature 32°F ~ 104°F) |                                                                                                |                       |                                                                                       |                                                                                       |
|                                                        | Normal<br>120 kΩ ~ 800kΩ                                                                                                                           | Abnormal<br>Open or short-circuit                                                              |                       |                                                                                       |                                                                                       |
| Ambient temperature thermistor(RT63)                   | Measure the resistance with a tester.<br>(Part temperature 14°F ~ 104°F)                                                                           |                                                                                                |                       |                                                                                       |                                                                                       |
|                                                        | Normal<br>5 kΩ ~ 60 kΩ                                                                                                                             | Abnormal<br>Open or short-circuit                                                              |                       |                                                                                       |                                                                                       |
| Compressor(MC)                                         | Measure the resistance between the terminals with a tester.<br>(Part temperature 14°F ~ 104°F)                                                     |                                                                                                |                       |    |                                                                                       |
| INNER PROTECTOR<br>320± 9°F OPEN<br>198±20°F CLOSE     | Terminal                                                                                                                                           | Normal                                                                                         | Abnormal              |                                                                                       |                                                                                       |
|                                                        | C – R                                                                                                                                              | 0.74 Ω ~ 0.91 Ω                                                                                | Open or short-circuit |                                                                                       |                                                                                       |
|                                                        | C – S                                                                                                                                              | 1.84 Ω ~ 2.26 Ω                                                                                |                       |                                                                                       |                                                                                       |
| Indoor fan motor(MF)                                   | Motor part                                                                                                                                         | Measure the resistance between the terminals with a tester.<br>(Part temperature 50°F ~ 86°F)  |                       |  |                                                                                       |
|                                                        |                                                                                                                                                    | Color of lead wire                                                                             | Normal                |                                                                                       | Abnormal                                                                              |
|                                                        |                                                                                                                                                    | WHT – BLK                                                                                      | 35 Ω ~ 39 Ω           |                                                                                       | Open or short-circuit                                                                 |
|                                                        | BLK – RED                                                                                                                                          | 65 Ω ~ 71 Ω                                                                                    |                       |                                                                                       |                                                                                       |
|                                                        | Sensor part                                                                                                                                        | Measure the voltage power ON.                                                                  |                       |                                                                                       | Remain 0V or 5V                                                                       |
|                                                        |                                                                                                                                                    | Color of lead wire                                                                             | Normal                |                                                                                       |                                                                                       |
| BRN – YLW                                              |                                                                                                                                                    | 4.5 ~ 5.5V<br>(When fan revolved one time)<br>0V→5V→0V (Approx.)                               |                       |                                                                                       |                                                                                       |
| Outdoor fan motor(MF)                                  | INNER PROTECTOR<br>275± 9°F OPEN<br>187±27°F CLOSE                                                                                                 | Measure the resistance between the terminals with a tester.<br>(Part temperature 14°F ~ 104°F) |                       |  |                                                                                       |
|                                                        |                                                                                                                                                    | Color of lead wire                                                                             | Normal                |                                                                                       | Abnormal                                                                              |
|                                                        |                                                                                                                                                    | WHT – BLK                                                                                      | 51 Ω ~ 62 Ω           |                                                                                       | Open or short-circuit                                                                 |
|                                                        |                                                                                                                                                    | BLK – RED                                                                                      | 50 Ω ~ 61 Ω           |                                                                                       |                                                                                       |
| Horizontal vane motor(MV1)<br>Vertical vane motor(MV2) | Measure the resistance between the terminal with a tester.<br>(Part temperature 50°F ~ 86°F)                                                       | Normal                                                                                         | Abnormal              |  |                                                                                       |
|                                                        |                                                                                                                                                    | 282Ω ~ 306 Ω                                                                                   | Open or short-circuit |                                                                                       |                                                                                       |
| R.V. coil(21S4)                                        | Measure the resistance between the terminals with a tester.<br>(Part temperature 14°F ~ 104°F)                                                     | Normal                                                                                         | Abnormal              |                                                                                       |                                                                                       |
|                                                        |                                                                                                                                                    | 2.673 kΩ ~ 3.268 kΩ                                                                            | Open or short-circuit |                                                                                       |                                                                                       |
| LEV(Expansion valve)                                   | Measure the resistance with a tester.<br>(Part temperature : 14°F ~ 104°F)                                                                         | Color of lead wire                                                                             | Normal                | Abnormal                                                                              |  |
|                                                        |                                                                                                                                                    | WHT – RED                                                                                      | 30.3 Ω ~ 37.0 Ω       | Open or short-circuit                                                                 |                                                                                       |
|                                                        |                                                                                                                                                    | RED – ORN                                                                                      |                       |                                                                                       |                                                                                       |
|                                                        |                                                                                                                                                    | YLW – BRN                                                                                      |                       |                                                                                       |                                                                                       |
|                                                        |                                                                                                                                                    | BRN – BLU                                                                                      |                       |                                                                                       |                                                                                       |
|                                                        |                                                                                                                                                    |                                                                                                |                       |                                                                                       |                                                                                       |

**When OPERATION INDICATOR lamp flashes 3-time.  
Indoor fan motor doesn't operate.**

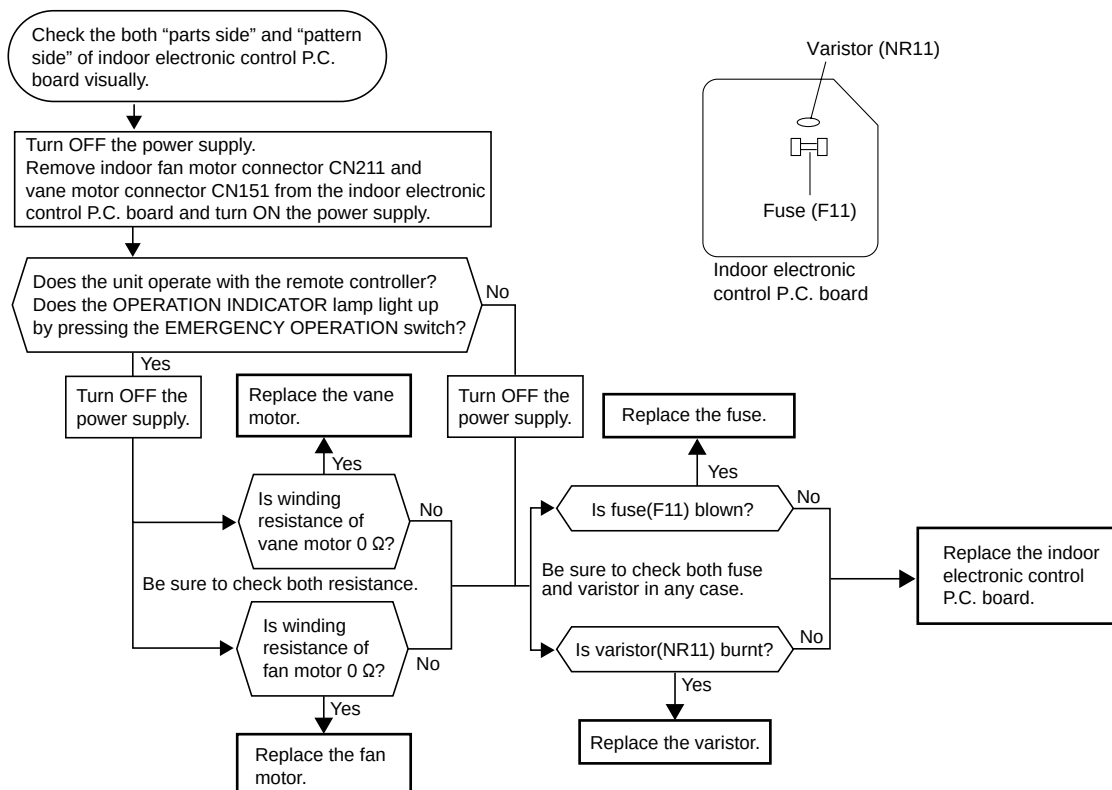


**Indoor unit operates by pressing the EMERGENCY OPERATION switch, but doesn't operate with the remote controller.**



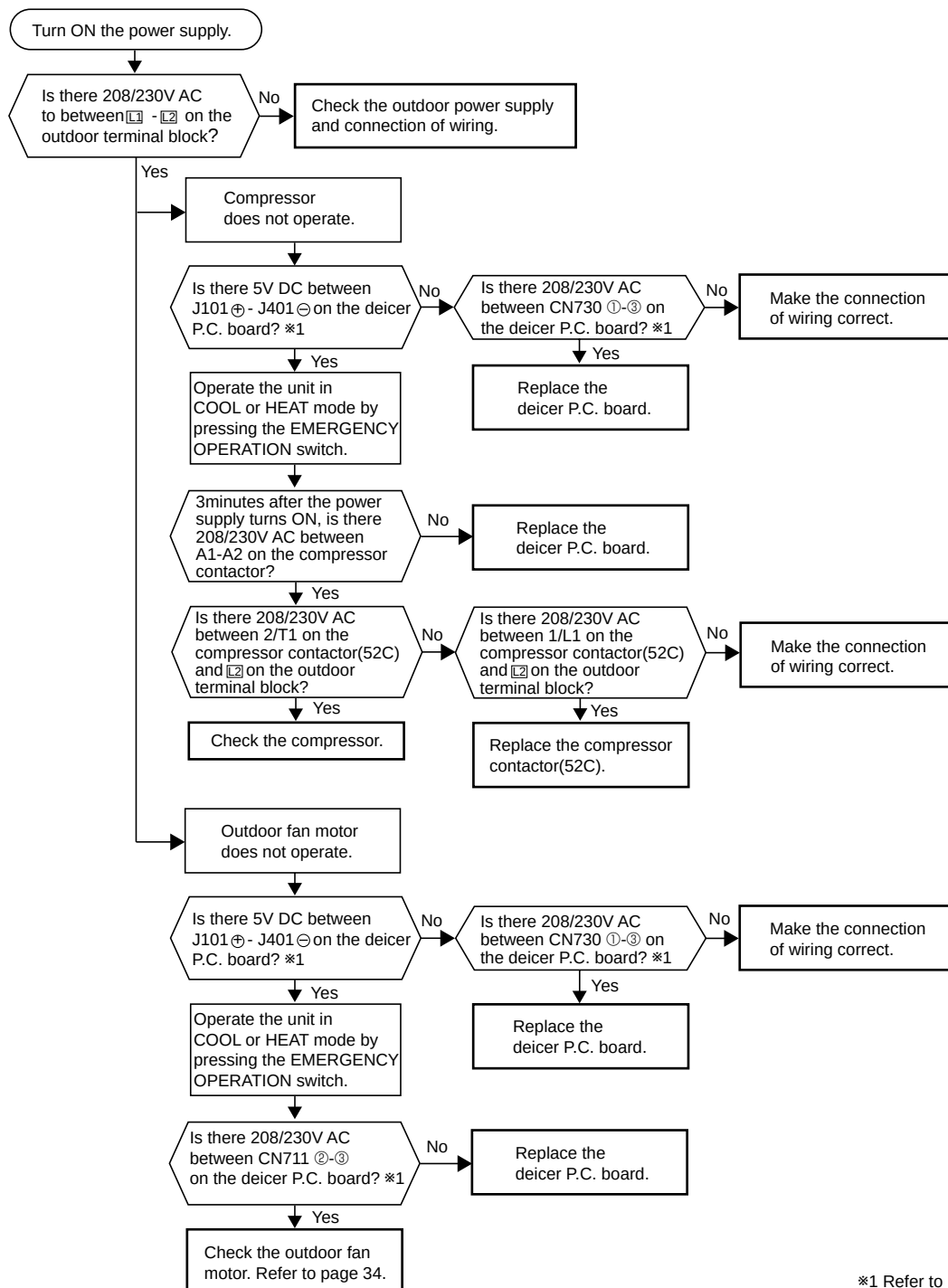
The unit doesn't operate with the remote controller. Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.

### © Check of indoor electronic control P.C. board



## Compressor and/ or outdoor fan motor doesn't operate.

### ① Check of outdoor unit

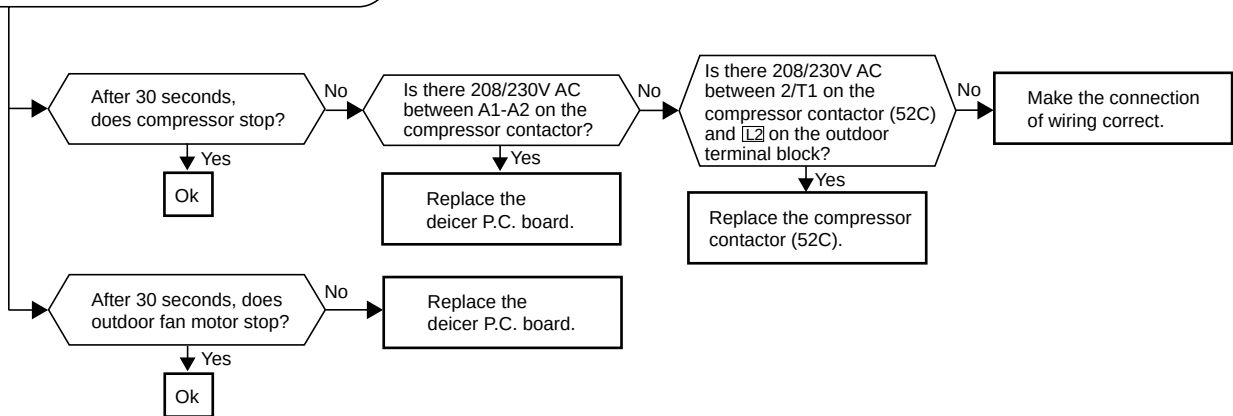


\*1 Refer to page 42.

## Compressor and / or outdoor fan motor doesn't stop.

### E Check of outdoor unit

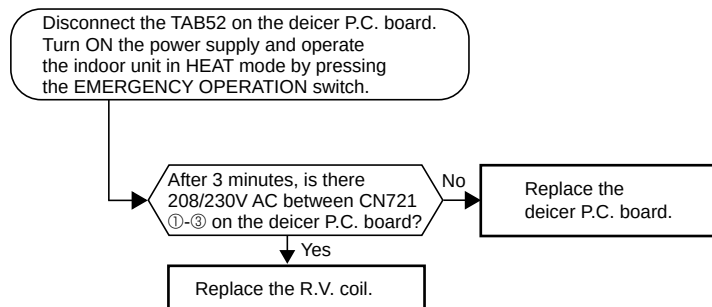
- ① Turn OFF the power supply.
- ② After 30 seconds, turn ON the power supply again.
- ③ Operate the unit in COOL or HEAT mode by pressing the EMERGENCY OPERATION switch.
- ④ Operate the unit for 1 minute or more and stop it by pressing the EMERGENCY OPERATION switch again.



## Unit operates COOL mode even if it is set to HEAT mode.

### F Check of R.V. coil

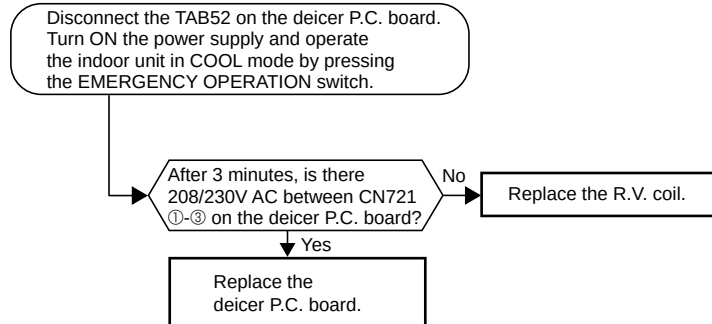
\* First, measure the resistance of R.V. coil to confirm it is disconnected or is not short-circuit.



## Unit operates HEAT mode even if it is set to COOL mode.

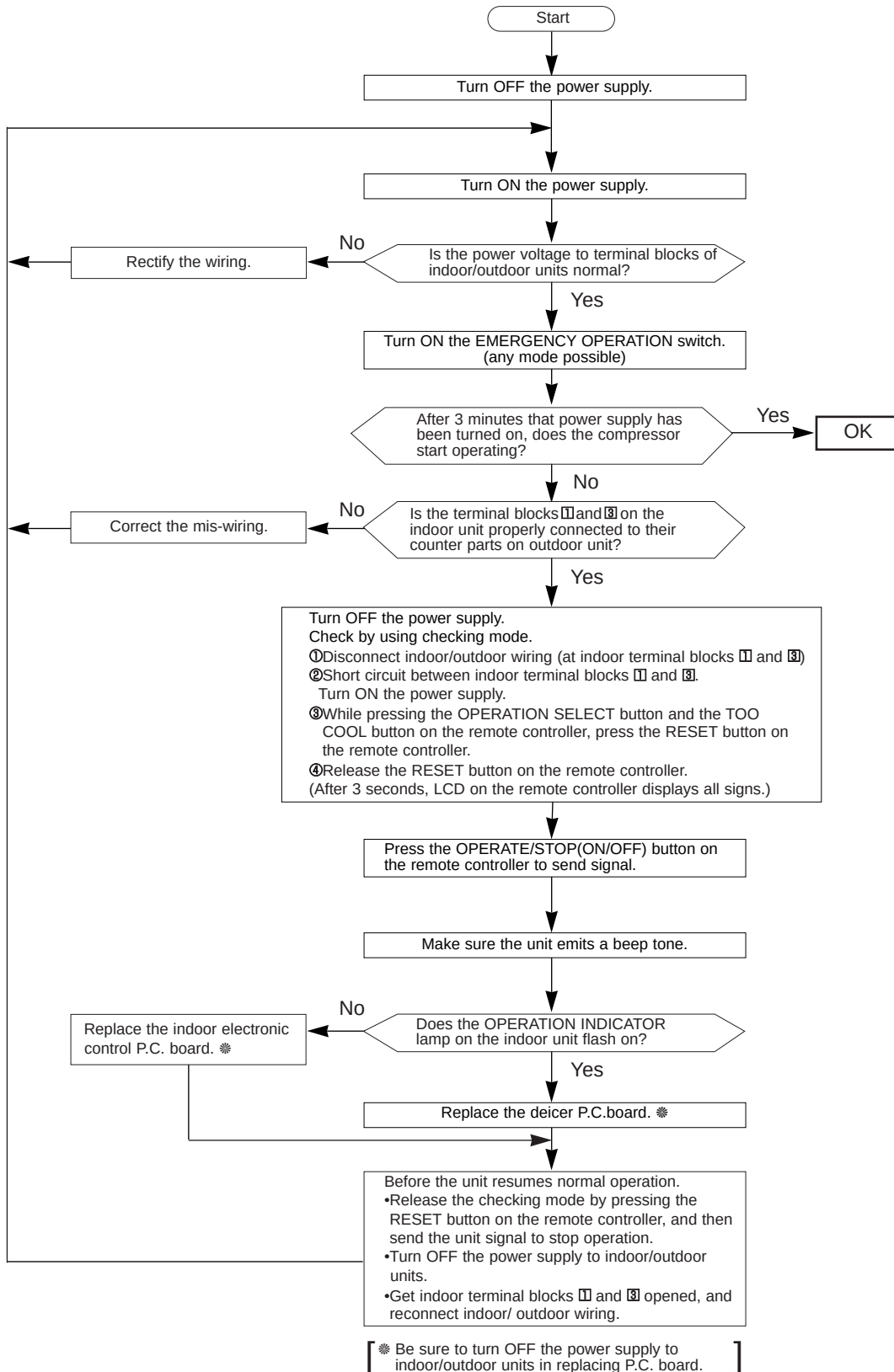
### F Check of R.V. coil

\* First, measure the resistance of R.V. coil to confirm it is disconnected or is not short-circuit.



When OPERATION INDICATOR lamp flashes ON and OFF in every 0.5-second.  
Outdoor unit doesn't operate.

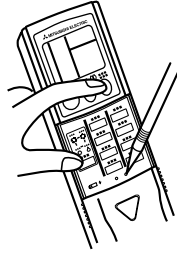
### Ⓒ How to check mis-wiring



When OPERATION INDICATOR lamp flashes 10-time. Heating/ Cooling doesn't operate.

### H Check of LEV (Expansion valve)

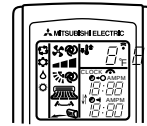
- ① During pressing the OPERATION SELECT button and the TOO COOL button on the remote controller, press the RESET button.
- ② First, release the RESET button.  
(After 3 seconds, confirm all displays of the remote controller.)
- ③ Then release the OPERATION SELECT button.



- ① During pressing the OPERATION SELECT button and the TOO COOL button on the remote the controller, press the RESET button.
- ② First, release the RESET button.

(After 3 seconds, confirm all displays of the remote controller.)

- ③ Then release the OPERATION SELECT button.



With remote controller set toward the indoor unit, press the OPERATE/ STOP(ON/ OFF) button and confirm one beep tone.

LEV operates in full-opening direction.

Do you hear LEV "click, click....."?  
Do you touch LEV and feel it vibrate?

Yes

Ok

No

Is LEV coil properly fixed to the body?

No

Properly fix LEV coil to the body.

Yes

Does the resistance of LEV coil have the characteristics?

Yes

Replace the deicer P.C. board.

No

Replace the LEV coil.

Characteristics of LEV coil

| LEV (CN724) | Resistance      |
|-------------|-----------------|
| WHT-RED     | 30.3 Ω ~ 37.0 Ω |
| RED-ORN     |                 |
| YLW-BRN     |                 |
| BRN-BLU     |                 |

NOTE : After check of LEV, do the undermentioned operations.

1. Turn OFF the power supply of the unit and turn ON again.
2. Press the RESET button on the remote controller.

When OPERATION INDICATOR lamp flashes 6-time. Thermistors in the outdoor unit are abnormal.

### I Check of outdoor thermistor

- \* Disconnect the connectors CN661 and/ or CN662 from the deicer P.C. board.  
(Check the characteristics of each thermistor.)

Defrost thermistor(RT61)

Measure resistance between CN 661 ① and ②.

Discharge temperature thermistor(RT62)

Measure resistance between CN 662 ① and ②.

Ambient temperature thermistor(RT63)

Measure resistance between CN 662 ③ and ④.

Turn OFF the power supply.

Does the resistances of thermistor have the characteristics on page 42?

Yes

No

Replace the thermistor.

Connect CN661 and CN662.  
Turn ON the power supply and press the EMERGENCY OPERATION switch.

Replace the deicer P.C. board.

No

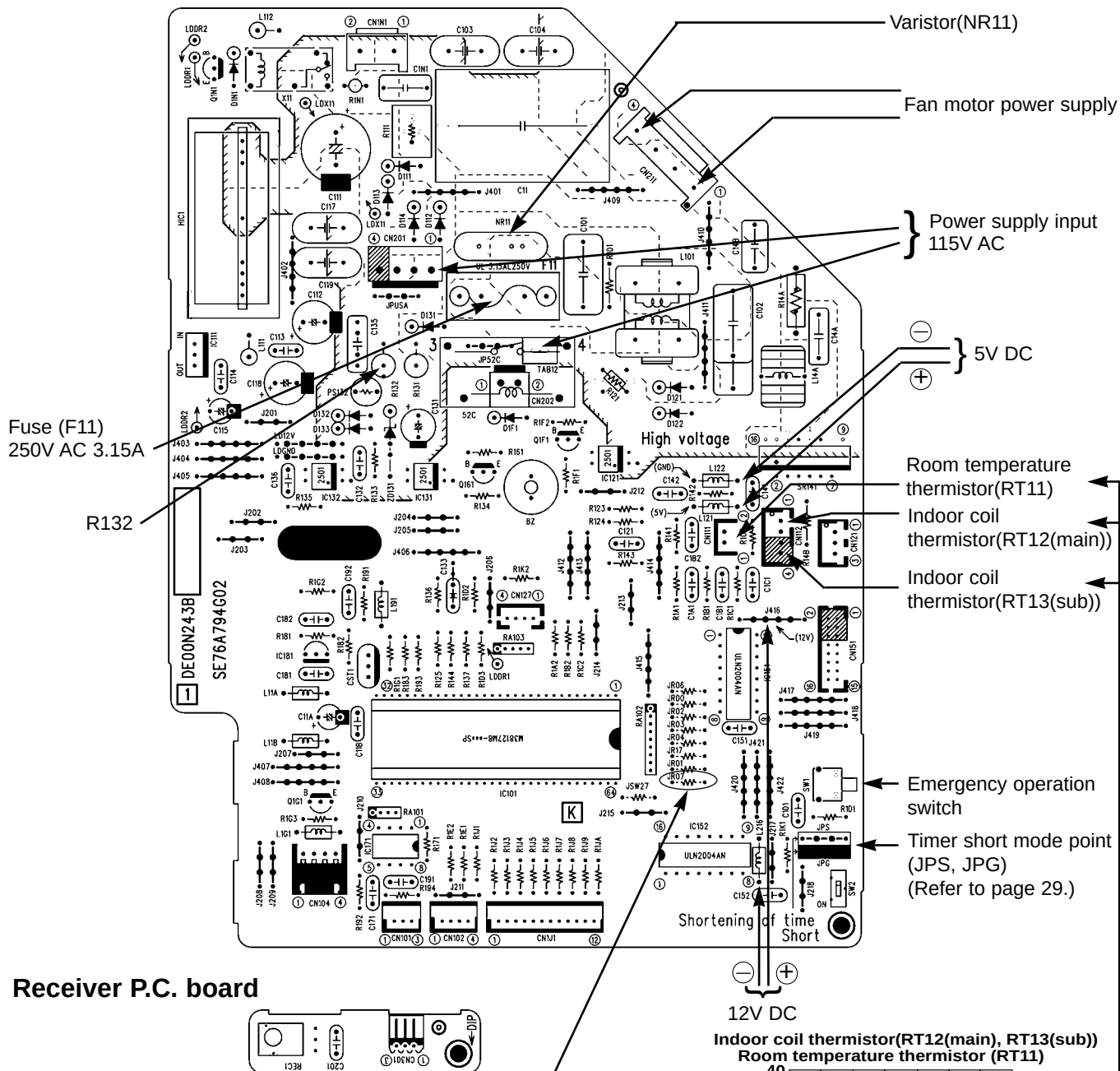
Does the unit operate 10 minutes or more?

Yes

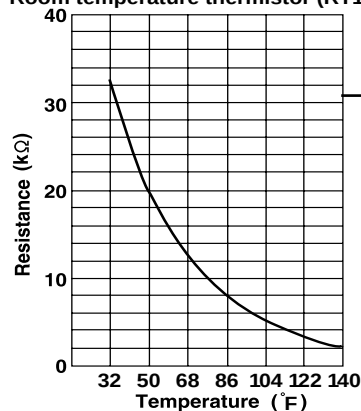
Ok \*1.

\*1. It is thought defective contact of the connector.

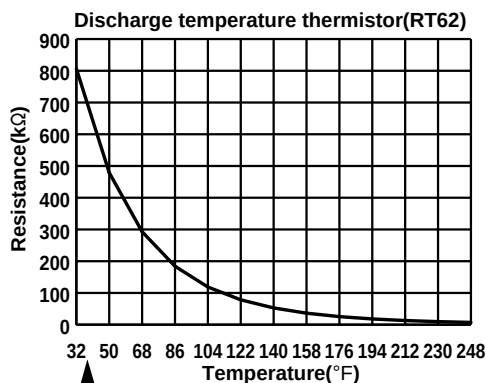
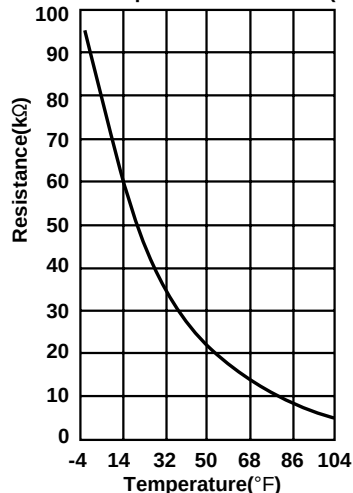
# TEST POINT DIAGRAM AND VOLTAGE MSH24WN Indoor electronic control P.C. board



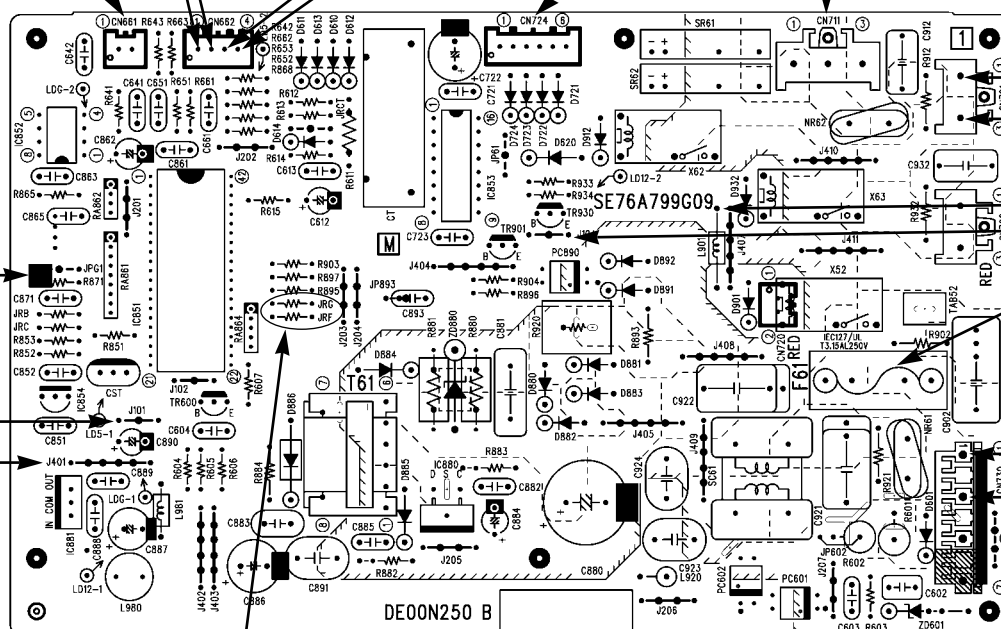
Auto restart function  
Solder the Jumper wire or the Resistor 220Ω to the JR07.  
(Refer to page 30.)



|  |
|--|
|  |
|--|



Fan motor  
connector  
(CN711)



CN730①-③  
208/230V  
AC  
(Refer to  
page 37.)

42

## RELAY OPERATION

### MSH24WN

#### COMPRESSOR CONTACTOR

- EACH MODE

| MODE                                        | THERMOSTAT | 52C CONTACTOR                                                                                                                     | INDOOR FAN SPEED                               |
|---------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| COOL &<br>COOL mode<br>of I FEEL<br>CONTROL | ON         | ON                                                                                                                                | AUTO or set speed                              |
|                                             | OFF        | OFF                                                                                                                               |                                                |
| DRY &<br>DRY mode<br>of I FEEL<br>CONTROL   | ON         | OFF for 2 min. after<br>unit starts operation.<br>Repeat of 8 min. ON/3min.<br>OFF operation or 2 min.<br>ON/3 min. OFF operation | AUTO or set speed                              |
|                                             | OFF        | Repeat of 4 min. OFF/<br>1 min. ON operation                                                                                      | AUTO or set speed links with 52C<br>contactor. |
| HEAT &<br>HEAT mode<br>of I FEEL<br>CONTROL | ON         | ON                                                                                                                                | AUTO or set speed                              |
|                                             | OFF        | OFF                                                                                                                               | OFF or Very Low speed                          |

NOTE : Once the compressor is OFF, "3-minute time delay circuit" works at next start-up.

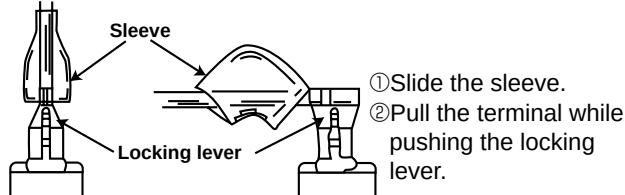
- COIL FROST PREVENTION

| MODE                                        | THERMOSTAT | 52C CONTACTOR                                                                                                            | INDOOR FAN SPEED  |
|---------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------|-------------------|
| COOL &<br>COOL mode<br>of I FEEL<br>CONTROL | ON         | OFF for 5 min. After<br>that, OFF is pro-<br>longed until indoor<br>coil thermistor<br>reads termination<br>temperature. | AUTO or set speed |
| DRY &<br>DRY mode<br>of I FEEL<br>CONTROL   |            |                                                                                                                          | AUTO or set speed |

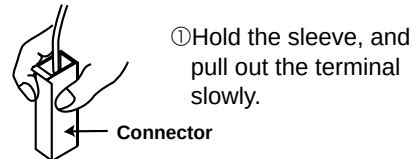
## &lt;"Terminal with lock mechanism" Detaching points&gt;

In case of terminal with lock mechanism, detach the terminal as shown below.  
There are two types ( Refer to (1) and (2)) of the terminal with lock mechanism.  
The terminal with no lock mechanism can be removed by pulling it out.  
Check the shape of the terminal and work.

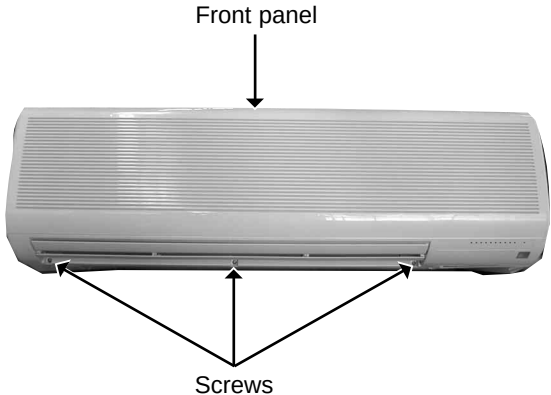
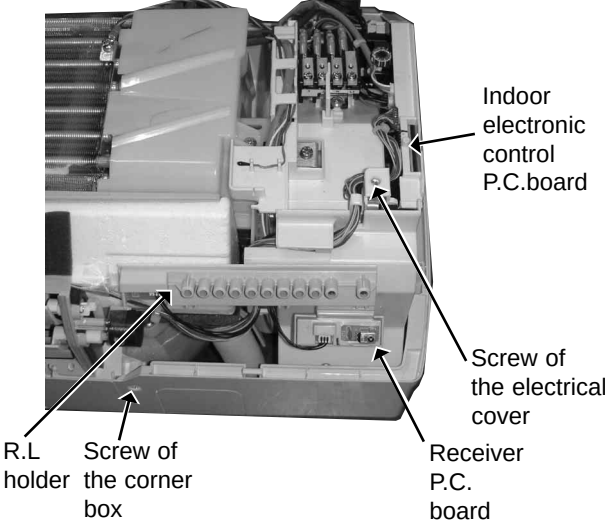
(1) Slide the sleeve and check if there is a locking lever or not.

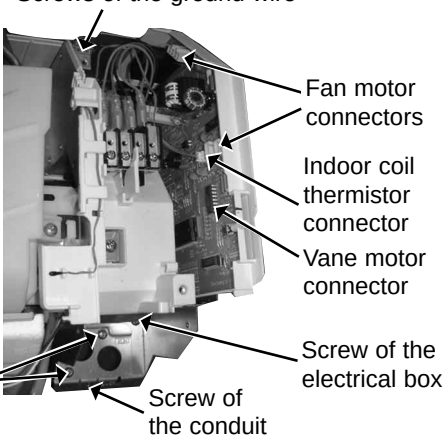
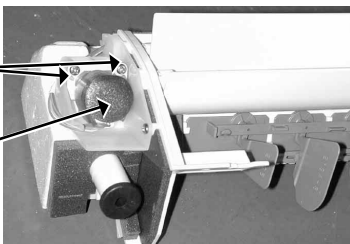
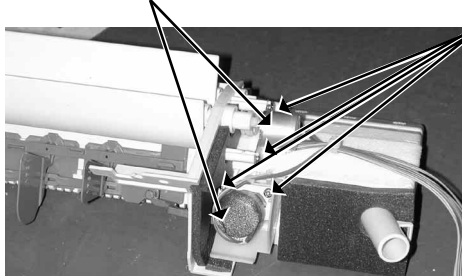
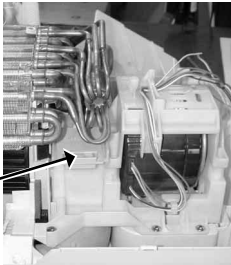
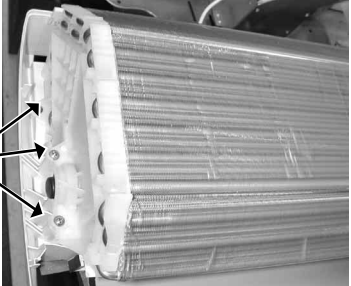
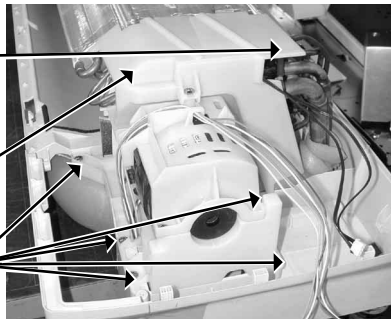


(2) The terminal with this connector is a terminal with lock mechanism

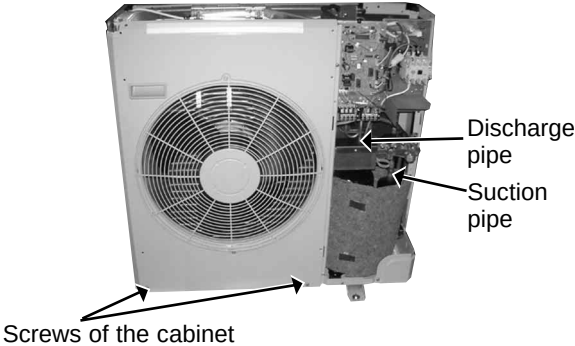
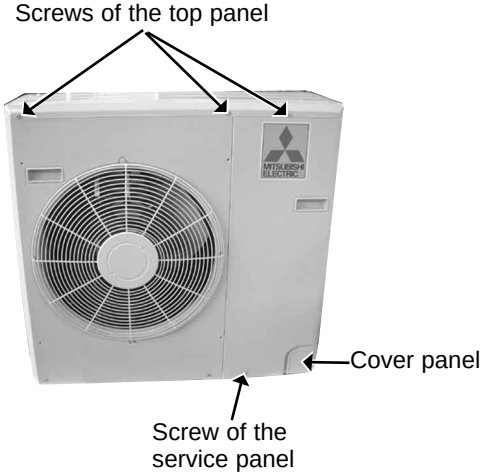
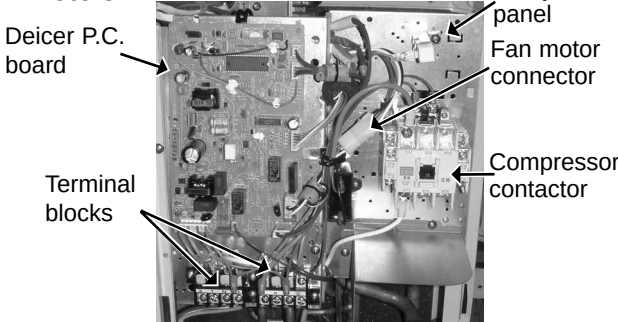
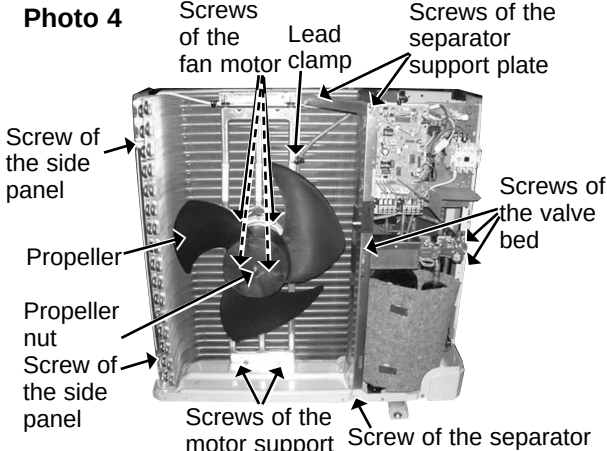


### 11-1. MSH24WN INDOOR UNIT

| OPERATING PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PHOTOS                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <p><b>1. Removing the front panel</b></p> <p>(1) Remove the screw caps of the front panel.<br/>Remove the screws.</p> <p>(2) Pull the panel down to your side slightly and unhook the catches at the top.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Photo 1</b></p>   |
| <p><b>2. Removing the electronic control P.C. board, the receiver P.C. board and the display P.C. board</b></p> <p><b>NOTE :</b> In case of removing only indoor electronic control P.C. board work (2) and (3) are not necessary.</p> <p>(1) Remove the front panel. (Refer to 1.)</p> <p>(2) Remove the R.L holder from the bottom of electrical box.</p> <p>(3) Open the R.L holder, remove the receiver P.C. board and the display P.C. board.</p> <p>(4) Remove the screw of the electrical cover and the electrical cover.</p> <p>(5) Pull out indoor electronic control P.C. board slightly.</p> <p>(6) Disconnect all the connectors on the electronic control P.C. board.</p> <p>(7) Remove the electronic control P.C. board.</p> | <p><b>Photo 2</b></p>  |

| OPERATING PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PHOTOS                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>3. Removing the electrical box</b></p> <ol style="list-style-type: none"> <li>(1) Remove the front panel. (Refer to 1.)</li> <li>(2) Remove the electrical cover. (Refer to 2.)</li> <li>(3) Disconnect the connector of the indoor coil thermistor (CN112), the fan motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board.</li> <li>(4) Remove the screw of ground wire.</li> <li>(5) Remove the fan motor lead wire, indoor coil thermistor and ground wire from the electrical box.</li> <li>(6) Remove the lead wire of vane motor from the bottom of electrical box.</li> <li>(7) Remove the screw of corner box and corner box. (Photo 2)</li> <li>(8) Remove the screw of conduit cover and conduit cover.</li> <li>(9) Remove the screws fixing the conduit plate.</li> <li>(10) Pull out the conduit plate and the indoor/ outdoor unit connecting wire.</li> <li>(11) Remove the lock nut from the connector of indoor/ outdoor connecting wire.</li> <li>(12) Remove the screw fixing the electrical box, remove the electrical box.</li> </ol> | <p><b>Photo 3</b></p>                                                                                                                |
| <p><b>4. Removing the vane motor</b></p> <ol style="list-style-type: none"> <li>(1) Remove the front panel. (Refer to 1.)</li> <li>(2) Remove the electrical cover. (Refer to 2.)</li> <li>(3) Remove the lead wire of vane motor. (Refer to 3.)</li> <li>(4) Remove the R.L. holder.</li> <li>(5) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.</li> <li>(6) Remove the screws of the vane motor, disconnect the connector.</li> <li>(7) Remove the vane motor.</li> </ol> <p><b>Photo 5</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p><b>Photo 4</b></p>                                                                                                                |
| <p><b>5. Removing the line flow fan and the indoor fan motor</b></p> <ol style="list-style-type: none"> <li>(1) Remove the front panel. (Refer to 1.)</li> <li>(2) Remove the electrical box. (Refer to 3.)</li> <li>(3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.</li> <li>(4) Remove the water cut.</li> <li>(5) Slide the hole cover, remove the hole cover.</li> <li>(6) Remove the hexagon socket set screw from the line flow fan.</li> <li>(7) Remove the screws fixing the fan motor, remove the fan motor. (Be careful not to drop the fan motor because it is heavy.)</li> <li>(8) Remove the screws fixing the left side of the heat exchanger.</li> <li>(9) Lift the left side of the heat exchanger.</li> <li>(10) Remove the line flow fan.</li> </ol> <p><b>Photo 8</b></p>                                                                                                                                                                                                      | <p><b>Photo 6</b></p>  <p><b>Photo 7</b></p>  |

## 11-2. MUH24WN OUTDOOR UNIT

| OPERATING PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PHOTOS                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>1. Removing the cabinet</b></p> <ol style="list-style-type: none"> <li>(1) Remove the screws of the top panel and the top panel.</li> <li>(2) Remove the screw of the service panel. To remove the service panel, pull it down toward you and unhook the catches on the both sides.</li> <li>(3) Remove the screw of the cover panel. To remove the cover panel.</li> <li>(4) Remove the screws of the cabinet.<br/>Open the cabinet to a 45-degree angle. Then lift it and unhook the catches to remove.</li> </ol> <p><b>Photo 2</b></p>  <p>Discharge pipe<br/>Suction pipe<br/>Screws of the cabinet</p>                           | <p><b>Photo 1</b></p>  <p>Screws of the top panel<br/>Cover panel<br/>Screw of the service panel</p>                                                                                                                                                                                            |
| <p><b>2. Removing the deicer P.C. board</b></p> <ol style="list-style-type: none"> <li>(1) Remove the top panel, the service panel and the cover panel.</li> <li>(2) Disconnect all the connectors and the terminals on the deicer P.C. board.</li> <li>(3) Remove the deicer P.C. board.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Photo 3</b></p>  <p>Deicer P.C. board<br/>Relay panel<br/>Fan motor connector<br/>Terminal blocks<br/>Compressor contactor</p>                                                                                                                                                          |
| <p><b>3. Removing the propeller and the outdoor fan motor</b></p> <ol style="list-style-type: none"> <li>(1) Remove the cabinet. (Refer to 1.)</li> <li>(2) Remove the propeller nut and the propeller.</li> </ol> <p><b>NOTE:</b> Loosen the propeller in the rotating direction for removal.<br/>When attaching the propeller, align the mark on the propeller and the motor shaft cut section.<br/>Set the propeller in position by using the cut on the shaft and the mark on the propeller.</p> <ol style="list-style-type: none"> <li>(3) Remove the lead clamps and disconnect the outdoor fan motor connector. (Photo 3)</li> <li>(4) Remove the screws of the outdoor fan motor and the outdoor fan motor.</li> </ol> | <p><b>Photo 4</b></p>  <p>Screws of the fan motor<br/>Lead clamp<br/>Screws of the separator support plate<br/>Screw of the side panel<br/>Propeller<br/>Propeller nut<br/>Screw of the side panel<br/>Screws of the valve bed<br/>Screws of the motor support<br/>Screw of the separator</p> |

## OPERATING PROCEDURE

### 4. Removing the heat exchanger and compressor

- (1) Remove the screws of the rear panel. Remove the screws of the valve bed and the valve bed. (The valve bed is fixed by the catches on the right and left sides. Lift it to remove.) Open the rear panel to the rear to remove.

#### NOTE :

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

- (2) Remove the screws of the side panel and the side panel. (Photo 4)
- (3) Remove the screws of the rear guard and the rear guard.
- (4) Remove the screws of the separator support plate and the separator support plate. (Photo 4)
- (5) Remove the screws of the motor support and the motor support. (Photo 4)
- (6) Remove the relay panel. (Photo 3)
- (7) Remove the fan motor lead wire from lead clamp. (Photo 4)
- (8) Remove the soundproof felt.
- (9) Remove the screws of the separator and the separator.
- (10) Recover gas from the refrigerant circuit.
- (11) Remove the heat exchanger.  
Detach the welded part of pipe.
- (12) Remove the nuts of the compressor and the compressor.  
Detach the welded part of the suction pipe and the discharge pipe. (Photo 2)

## PHOTOS

Photo 5

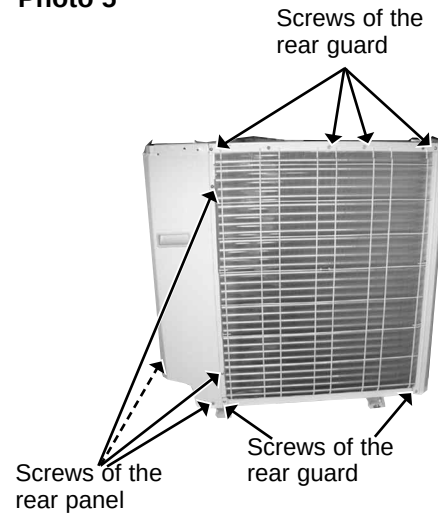


Photo 6

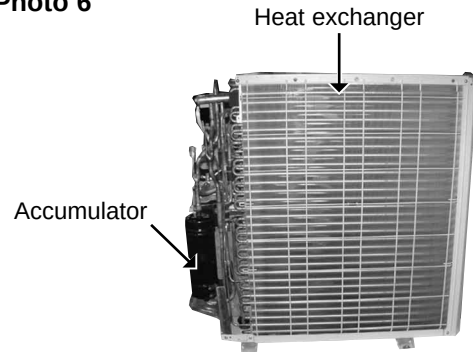
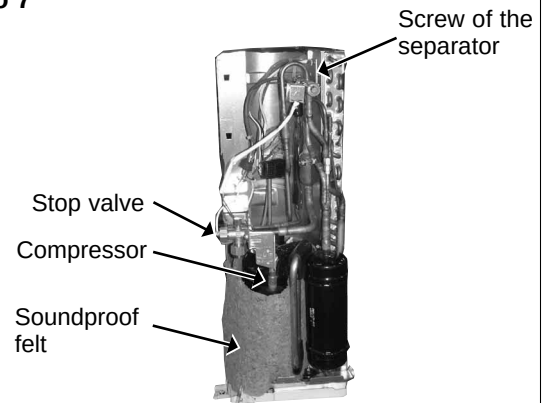


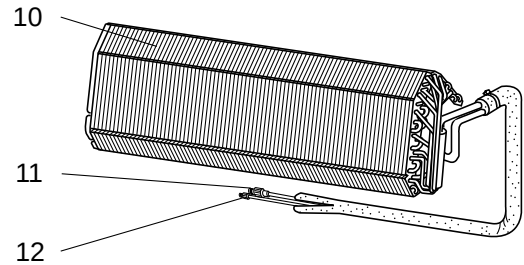
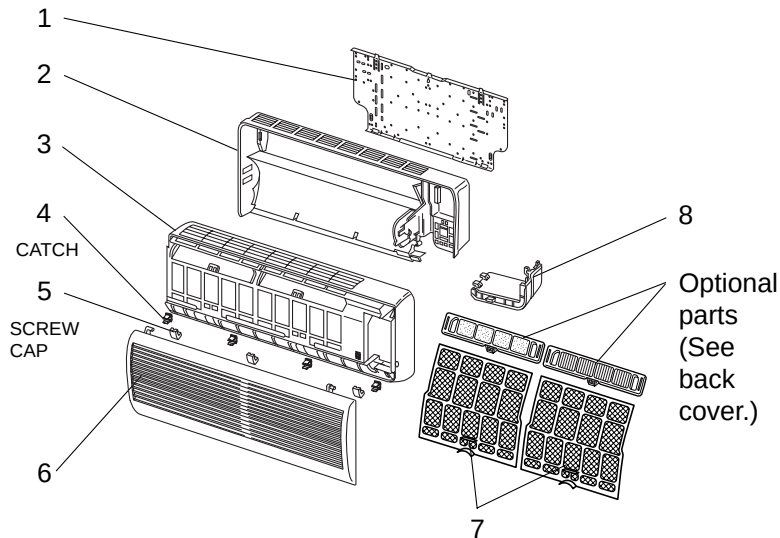
Photo 7



## MSH24WN (W)

## 12-1. INDOOR UNIT STRUCTURAL PARTS

## 12-2. INDOOR UNIT HEAT EXCHANGER



## 12-1. INDOOR UNIT STRUCTURAL PARTS

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

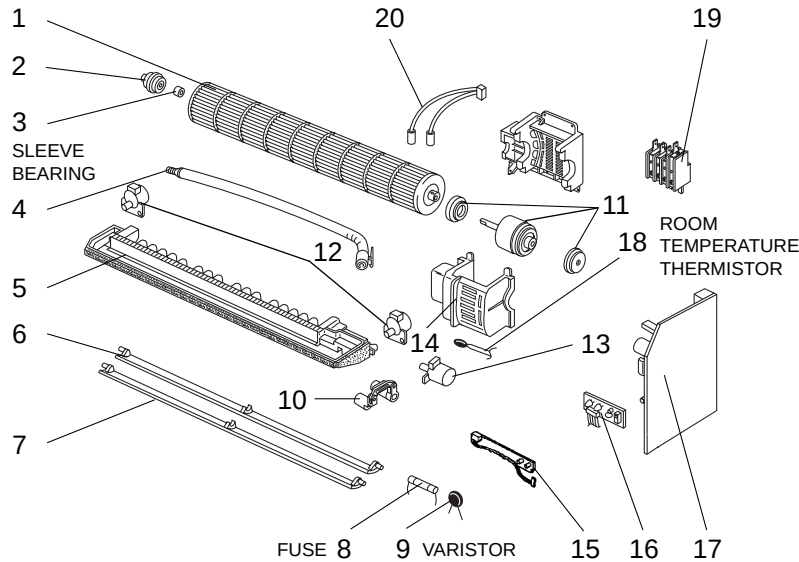
| NO. | Part No.    | Part Name               | Symbol<br>in Wiring<br>Diagram | Q'ty/unit      | Remarks            |
|-----|-------------|-------------------------|--------------------------------|----------------|--------------------|
|     |             |                         |                                | MSH24WN<br>(W) |                    |
| 1   | E02 527 970 | INSTALLATION PLATE      |                                | 1              |                    |
| 2   | E02 527 234 | BOX (W)                 |                                | 1              |                    |
| 3   | E02 527 000 | FRONT PANEL ASSEMBLY(W) |                                | 1              | Including No.4,5,6 |
| 4   | E02 408 142 | CATCH                   |                                | 4              | 4PCS/ SET          |
| 5   | E02 527 067 | SCREW CAP (W)           |                                | 3              | 3PCS/ SET          |
| 6   | E02 527 010 | GRILLE (W)              |                                | 1              |                    |
| 7   | E02 527 100 | AIR FILTER              |                                | 2              |                    |
| 8   | E02 527 975 | CORNER BOX RIGHT        |                                | 1              |                    |
| ⑨   | E02 530 007 | LAMP PANEL              |                                | 1              |                    |

## 12-2. INDOOR UNIT HEAT EXCHANGER

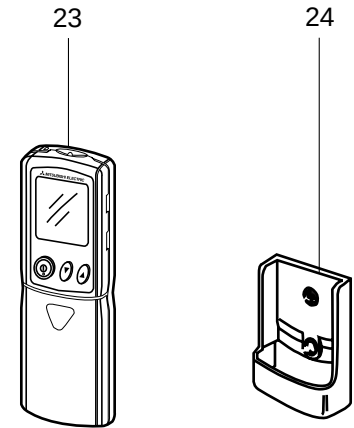
|    |             |                       |  |   |      |
|----|-------------|-----------------------|--|---|------|
| 10 | E02 527 620 | INDOOR HEAT EXCHANGER |  | 1 |      |
| 11 | E02 527 666 | UNION (GAS)           |  | 1 | φ5/8 |
| 12 | E02 527 667 | UNION (LIQUID)        |  | 1 | φ3/8 |

## MSH24WN (W)

### 12-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS



### 12-4. ACCESSORY AND REMOTE CONTROLLER



### 12-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS

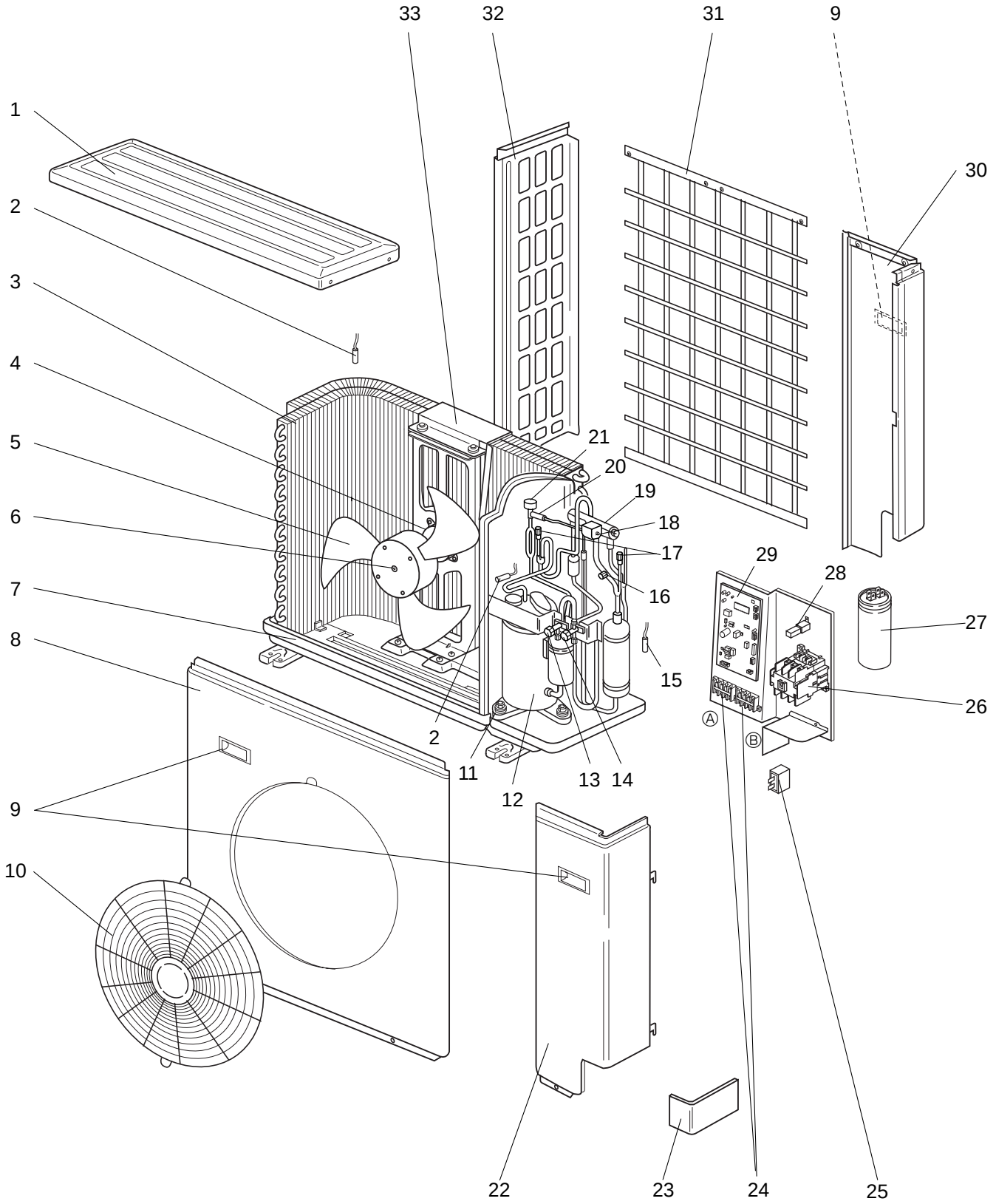
Part numbers that are circled are not shown in the illustration.

| NO. | Part No.    | Part Name                      | Symbol in Wiring Diagram | Q'ty/unit   | Remarks                               |
|-----|-------------|--------------------------------|--------------------------|-------------|---------------------------------------|
|     |             |                                |                          | MSH24WN (W) |                                       |
| 1   | E02 527 302 | LINE FLOW FAN                  |                          | 1           |                                       |
| 2   | E02 408 509 | BEARING MOUNT                  |                          | 1           |                                       |
| 3   | E02 001 504 | SLEEVE BEARING                 |                          | 1           |                                       |
| 4   | E02 408 702 | DRAIN HOSE                     |                          | 1           |                                       |
| 5   | E02 527 235 | NOZZLE ASSEMBLY                |                          | 1           |                                       |
| 6   | E02 527 040 | VANE UPPER (W)                 |                          | 1           |                                       |
| 7   | E02 527 041 | VANE LOWER (W)                 |                          | 1           |                                       |
| 8   | E02 784 382 | FUSE                           | F11                      | 1           | 3.15A                                 |
| 9   | E02 784 385 | VARISTOR                       | NR11                     | 1           |                                       |
| 10  | E02 527 034 | VANE CRANK SET                 |                          | 1           |                                       |
| 11  | E02 784 300 | INDOOR FAN MOTOR ASSEMBLY      | MF                       | 1           | RC4W33 -□□□<br>Including RUBBER MOUNT |
| 12  | E02 448 303 | VANE MOTOR (VERTICAL)          | MV2                      | 2           | RIGHT & LEFT                          |
| 13  | E02 408 303 | VANE MOTOR (HORIZONTAL)        | MV1                      | 1           | UP & DOWN                             |
| 14  | E02 527 333 | MOTOR BAND                     |                          | 1           |                                       |
| 15  | E02 528 329 | DISPLAY P.C. BOARD             |                          | 1           |                                       |
| 16  | E02 527 468 | RECEIVER P.C. BOARD            |                          | 1           |                                       |
| 17  | E02 785 452 | ELECTRONIC CONTROL P.C. BOARD  |                          | 1           | AUTO RESTART<br>Including No.16       |
| 18  | E02 527 308 | ROOM TEMPERATURE THERMISTOR    | RT11                     | 1           |                                       |
| 19  | E02 545 375 | TERMINAL BLOCK                 | TB                       | 1           |                                       |
| 20  | E02 527 307 | INDOOR COIL THERMISTOR         | RT12, RT13               | 1           |                                       |
| 21  | E02 528 034 | VANE MOTOR SUPPORT SET (RIGHT) |                          | 1           |                                       |
| 22  | E02 529 034 | VANE MOTOR SUPPORT SET (LEFT)  |                          | 1           |                                       |

### 12-4. ACCESSORY AND REMOTE CONTROLLER

|    |             |                          |  |   |  |
|----|-------------|--------------------------|--|---|--|
| 23 | E02 785 426 | REMOTE CONTROLLER        |  | 1 |  |
| 24 | E02 527 083 | REMOTE CONTROLLER HOLDER |  | 1 |  |

**MUH24WN**  
**12-5. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS**  
**AND FUNCTIONAL PARTS**



## MUH24WN

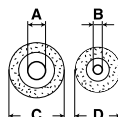
### 12-5. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

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

| NO. | Part No.    | Part Name                   | Symbol<br>in Wiring<br>Diagram | Q'ty/unit | Remarks              |
|-----|-------------|-----------------------------|--------------------------------|-----------|----------------------|
|     |             |                             |                                | MUH24WN   |                      |
| 1   | E02 813 297 | TOP PANEL                   |                                | 1         | NEW WHITE(Brighter)  |
| 2   | E02 528 309 | THERMISTOR                  | RT62, RT63                     | 1         | DISCHARGE, AMBIENT   |
| 3   | E02 529 630 | OUTDOOR HEAT EXCHANGER      |                                | 1         |                      |
| 4   | E02 784 301 | OUTDOOR FAN MOTOR           | MF                             | 1         | RA6N66- □□           |
| 5   | E02 214 501 | PROPELLER                   |                                | 1         |                      |
| 6   | E07 070 508 | PROPELLER NUT               |                                | 1         |                      |
| 7   | E02 813 290 | BASE                        |                                | 1         | NEW WHITE(Brighter)  |
| 8   | E02 813 232 | CABINET                     |                                | 1         | NEW WHITE(Brighter)  |
| 9   | E02 819 009 | HANDLE                      |                                | 3         | NEW WHITE(Brighter)  |
| 10  | E02 784 521 | FAN GUARD                   |                                | 1         | NEW WHITE(Brighter)  |
| 11  | E02 527 506 | COMPRESSOR RUBBER SET       |                                | 4         | 4RUBBERS/SET         |
| 12  | E02 784 900 | COMPRESSOR                  | MC                             | 1         | PH33NPBT             |
| 13  | E02 527 662 | STOP VALVE (LIQUID)         |                                | 1         | φ3/8                 |
| 14  | E02 527 661 | STOP VALVE (GAS)            |                                | 1         | φ5/8                 |
| 15  | E02 529 310 | DEFROST THERMISTOR          | RT61                           | 1         |                      |
| 16  | E02 474 642 | FUSIBLE PLUG                |                                | 1         |                      |
| 17  | E07 001 641 | SERVICE PORT                |                                | 2         |                      |
| 18  | E02 785 490 | R.V. COIL                   | 21S4                           | 1         |                      |
| 19  | E02 444 961 | 4-WAY VALVE                 |                                | 1         |                      |
| 20  | E02 527 640 | EXPANSION VALVE             |                                | 1         |                      |
| 21  | E02 528 493 | EXPANSION VALVE COIL        | LEV                            | 1         |                      |
| 22  | E02 813 245 | SERVICE PANEL               |                                | 1         | NEW WHITE(Brighter)  |
| 23  | E02 813 006 | COVER PANEL                 |                                | 1         | NEW WHITE(Brighter)  |
| 24  | E02 480 374 | TERMINAL BLOCK              | TB1                            | 1         | 4P FIGURE ①          |
|     | E02 481 374 | TERMINAL BLOCK              | TB2                            | 1         | 4P FIGURE ②          |
| 25  | E02 784 351 | OUTDOOR FAN CAPACITOR       | C2                             | 1         | 5.0μF/440V AC        |
| 26  | E02 784 340 | COMPRESSOR CONTACTOR        | 52C                            | 1         |                      |
| 27  | E02 544 353 | COMPRESSOR CAPACITOR        | C1                             | 1         | 35μF/370V AC         |
| 28  | E02 128 383 | SURGE ABSORBER              | DSAR                           | 1         |                      |
| 29  | E02 785 451 | DEICER P.C. BOARD           |                                | 1         |                      |
| 30  | E02 813 522 | REAR PANEL                  |                                | 1         | NEW WHITE(Brighter)  |
| 31  | E02 813 523 | REAR GUARD                  |                                | 1         | NEW WHITE(Brighter)  |
| 32  | E02 814 249 | SIDE PANEL                  |                                | 1         | NEW WHITE(Brighter)  |
| 33  | E02 527 515 | MOTOR SUPPORT               |                                | 1         |                      |
| 34  | E02 784 382 | FUSE                        | F61                            | 1         | 250V/3.15A           |
| 35  | E02 096 642 | CHECK VALVE                 |                                | 1         |                      |
| 36  | E02 785 936 | CAPILLARY TUBE (TAPER PIPE) |                                | 1         | φ0.17×φ0.12×11-13/16 |
|     | E02 529 936 | CAPILLARY TUBE (TAPER PIPE) |                                | 1         | φ0.17×φ0.12×1-31/32  |

### 13-1. REFRIGERANT PIPES

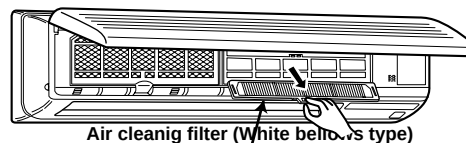
The air conditioner has flared connections its on indoor and outdoor sides.  
Please use the optional extension pipe as follows.

| Model           | Part No.  | Pipe length | Pipe size                                                                         |                  |                |                  |                |                      | Additional refrigerant charge R22(oz.) |
|-----------------|-----------|-------------|-----------------------------------------------------------------------------------|------------------|----------------|------------------|----------------|----------------------|----------------------------------------|
|                 |           |             | Cross-section                                                                     | A-Gas(in.)       |                | B-Liquid(in.)    |                | Insulation (in.)     |                                        |
|                 |           |             |                                                                                   | Outside diameter | Wall thickness | Outside diameter | Wall thickness |                      |                                        |
| MSH24WN MUH24WN | MAC-860PI | 10ft.       |  | 5/8              | 0.0315         | 3/8              | 0.0285         | C 1-7/32<br>D 1-1/16 | 0                                      |
|                 | MAC-861PI | 16ft.       |                                                                                   |                  |                |                  |                |                      | 4.29                                   |
|                 | MAC-862PI | 23ft.       |                                                                                   |                  |                |                  |                |                      | 12.86                                  |
|                 | MAC-863PI | 33ft.       |                                                                                   |                  |                |                  |                |                      |                                        |
|                 | MAC-864PI | 49ft.       |                                                                                   |                  |                |                  |                |                      |                                        |

### 13-2. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

| Model   | Part No.   |
|---------|------------|
| MSH24WN | MAC-1700FT |

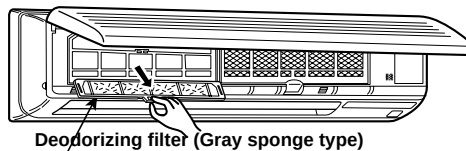


### 13-3. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
- Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
- For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
- When the filter color is still dark even after cleaning, replace the filter with a new one.  
Replace the filter at least once a year.

| Model   | Part No.   |
|---------|------------|
| MSH24WN | MAC-2200DF |

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



 **MITSUBISHI ELECTRIC CORPORATION**



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## **HVAC Advanced Products Division**

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Specifications are subject to change without notice.