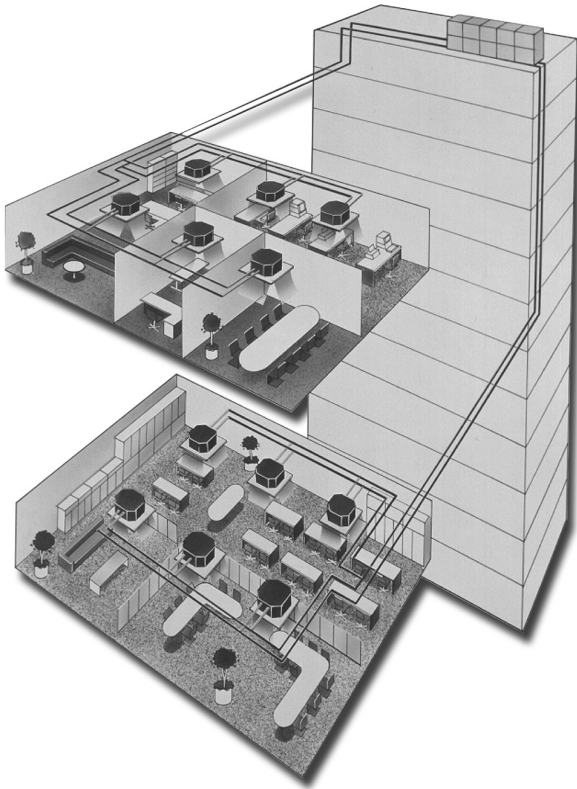


# HITACHI INVERTER-DRIVEN MULTI-SPLIT SYSTEM HEAT PUMP AIR CONDITIONERS

**SET FREE FSG(1)/FS3, FS5 SERIES  
AND  
SET FREE FXG/FX3 SERIES**

## SERVICE MANUAL



This service manual provides the technical information for the HITACHI Inverter-Driven Multi-Split System Heat Pump Air Conditioners, "SET FREE, FSG(1)/FS3, FS5 and FXG/FX3 Series".  
Read this manual carefully before starting service activities.

### Models

#### <Indoor Units>

##### • In-the-Ceiling Type

RPI-0.8FSG1	RPI-2.5FSG1	RPI-8FSG1
RPI-1.0FSG1	RPI-3.0FSG1	RPI-10FSG1
RPI-1.5FSG1	RPI-4.0FSG1	
RPI-2.0FSG1	RPI-5.0FSG1	

##### • 4-Way Cassette Type

RCI-1.0FSG2	RCI-2.5FSG2	RCI-5.0FSG2
RCI-1.5FSG2	RCI-3.0FSG2	
RCI-2.0FSG2	RCI-4.0FSG2	

##### • 2-Way Cassette Type

RCD-1.0FSG1	RCD-2.5FSG1	RCD-5.0FSG1
RCD-1.5FSG1	RCD-3.0FSG1	
RCD-2.0FSG1	RCD-4.0FSG1	

##### • Wall Type

RPK-1.0FSGM*	RPK-2.0FSGM*	
RPK-1.5FSGM*	RPK-2.3FSGM*	

##### • Floor Type

RPF-1.0FSG(E)	RPF-1.5FSG(E)	
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##### • Floor Concealed Type

RPFI-1.0FSG(E)	RPFI-1.5FSG(E)	
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##### • Ceiling Type

RPC-2.0FSG1	RPC-3.0FSG1	RPC-5.0FSG1
RPC-2.5FSG1	RPC-4.0FSG1	

#### <Outdoor Units>

##### • FSG(1) Series

RAS-5FSG	RAS-16FSG	RAS-24FSG1
RAS-8FSG	RAS-20FSG	RAS-30FSG1
RAS-10FSG		

##### • FS3, FS5 Series

RAS-5FS3	RAS-16FS3	RAS-24FS5
RAS-8FS3	RAS-20FS3	RAS-30FS5
RAS-10FS3		

##### • FXG Series

RAS-8FXG	RAS-10FXG	
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##### • FX3 Series

RAS-8FX3	RAS-10FX3	
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#### <System Equipment>

##### • Total Heat Exchangers

KPI-2521	KPI-5021	KPI-8021	KPI-10021
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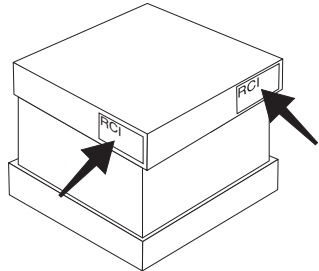
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There are some alterations (mainly in PCB) in the indoor unit, and the distinction of the alterations are partly outlined in this manual.  
See the following table for the details.

Model	Before Alteration		After Alteration	
	CODE	Production Shift	CODE	Production Shift
RPC-2.0FSG1	60277344		60277631	From U4UH7706
RPC-2.5FSG1	60277345		60277632	From U4UH7711
RPC-3.0FSG1	60277346		60277633	From U4UR7514
RPC-4.0FSG1	60277347		60277634	From U4UK7994
RPC-5.0FSG1	60277348		60277635	From U4UT2827
RCD-1.0FSG1	60277510		60277571	From U4UR7004
RCD-1.5FSG1	60277511		60277572	From U4UN0462
RCD-2.0FSG1	60277512		60277573	From U4UN0507
RCD-2.5FSG1	60277513		60277574	From U4US3677
RCD-3.0FSG1	60277514		60277575	From U4UT2126
RCD-4.0FSG1	60277515		60277576	From U4UT2131
RCD-5.0FSG1	60277516		60277577	From U4UT2136
RPI-0.8FSG1	60277401		60277591	From U4UH8281
RPI-1.0FSG1	60277402		60277592	From U4UH8301
RPI-1.5FSG1	60277403		60277593	From U4UD3950
RPI-2.0FSG1	60277339		60277594	From U4UH8341
RPI-2.5FSG1	60277340		60277595	From U4UH8361
RPI-3.0FSG1	60277341		60277596	From U4UH8381
RPI-4.0FSG1	60277342		60277597	From U4UH8431
RPI-5.0FSG1	60277343		60277598	From U4UH8451
RPI-8FSG1	60277485	From First Production	-	-
RPI-10FSG1	60277486	From First Production	-	-
RPK-1.0FSGM	60277412		60277699	*1) From U4UR1494
RPK-1.5FSGM	60277413		60277700	*1) From U4UR1514
RPK-2.0FSGM	60277414		60277701	*1) From U4UR1578
RPK-2.3FSGM	60277415		60277702	*1) From U4UR1588
RPF-1.0FSG	60277305	From First Production	-	-
RPF-1.5FSG	60277306	From First Production	-	-
RPFI-1.0FSG	60277307	From First Production	-	-
RPFI-1.5FSG	60277308	From First Production	-	-
RCI-1.0FSG2	-	-	60277611	From First Production [Full Model Change]
RCI-1.5FSG2	-	-	60277612	
RCI-2.0FSG2	-	-	60277613	
RCI-2.5FSG2	-	-	60277614	
RCI-3.0FSG2	-	-	60277615	
RCI-4.0FSG2	-	-	60277616	
RCI-5.0FSG2	-	-	60277617	
COMMON			<p>1. The indication "USE PC-P1H" is shown in the indication label of the packing.</p>  <p>2. The indication "USE PC-P1H" is shown on the electrical box cover.</p>	

\*1): The model name is indicated as shown when after alteration. (RPK Models Only)  
ex.) RPK-1.0FSGM\*

# 1. TROUBLESHOOTING

## 1.1 Initial Troubleshooting

### 1.1.1 Rotary Switch and Dip Switch Setting

#### (1) Indoor Unit

The PCB in the indoor unit is equipped with 7 types of dip switches and rotary switch. Before testing unit, set these dip switches according to the following instructions. Unless these dip switches are set in the field, the unit can not be operated.

## ! CAUTION

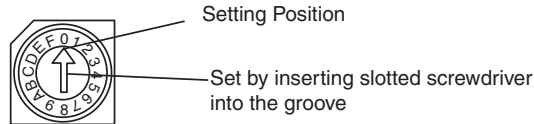
**Before setting dip switches, firstly turn OFF power source and set the position of the dip switches. If the switches are set without turning OFF the power source, the switches can not function.**

### NOTE

The "■" mark indicates position of dip switches. Figures show the setting before shipment.

#### a. Unit No. Setting (RSW)

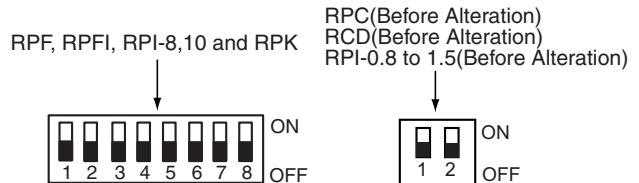
Setting is required. Set the unit No. of all indoor units respectively and serially, by following setting position shown in the table below. Numbering must start from "0" for every outdoor unit.



	No. 0 Unit	No. 1 Unit	No. 2 Unit	No. 3 Unit	No. 4 Unit	No. 5 Unit	No. 6 Unit	No. 7 Unit
Rotary Switch Setting								
	No. 8 Unit	No. 9 Unit	No. 10 Unit	No. 11 Unit	No. 12 Unit	No. 13 Unit	No. 14 Unit	No. 15 Unit
Rotary Switch Setting								

#### b. Optional Function Setting (DSW2)

No setting is required.  
Setting position before shipment is all OFF.



#### c. Capacity Code Setting (DSW3)

No setting is required, due to setting before shipment. This switch is used for setting the capacity code which corresponds to the Horse-Power of the indoor unit.

	0.8	1.0	1.5	2.0	2.3	2.5	3.0	4.0	5.0	8.0	10.0
RCI		●	●	●		●	●	●	●		
RPI	●	●	●	●		●	●	●	●	●	●
RCD		●	●	●		●	●	●	●		
RPF and RPFI		●	●								
RPK		●	●	●	●						

● : Available

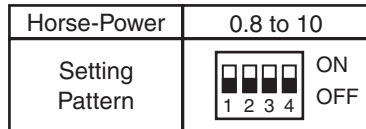
Horsepower	0.8	1.0	1.3	1.5	1.8	2.0	2.3
Setting Position							
Horsepower	2.5	2.8	3.0	4.0	5.0	8.0	10.0
Setting Position							

## TROUBLESHOOTING






- d. Capacity Adjustment Setting (DSW4: for RPF, RPF1, RPI-8,10 and RPC(Before Alteration))  
No setting is required. Setting position before shipment is all OFF.



- e. Refrigerant Cycle No. Setting (DSW5)  
Setting is required. Setting position before shipment is all OFF.



- f. Unit Code Setting (DSW6; Except for RCI and RPK Model)  
No setting is required. Setting positions of the model code for indoor units are shown below.

Model Code	a	b	c
Setting Position	 ON OFF	 ON OFF	 ON OFF
Model Code	d	e	
Setting Position	 ON OFF	 ON OFF	

RPI-0.8FSG1

↑  
Model Code

<Model Code>

- (a) RPI-0.8FSG1 to RPI-10FSG1
- (b) RCD-1.0FSG1 to RCD-5.0FSG1
- (c) RPC-2.0FSG1 to RPC-5.0FSG1
- (d) RPF-1.0FSG(E) and RPF1-1.0 FSG(E)
- (e) RPF-1.5FSG(E) and RPF1-1.5FSG(E)

- g. Fuse Recover (DSW7) (for Auxiliary use)  
No setting is required. Setting position before shipment is all OFF.



### (2) Outdoor Unit

TURN OFF all power sources before setting. Without turning OFF, the switches do not work and the contents of the setting are invalid. Mark of "■" indicates the position of dip switches. Set the dip switches according to the figure below.

## CAUTION

Check to ensure that the #8 pin of DSW5 is correctly set according to the power supply of the unit. If the setting is different from the power supply of the unit, it may cause the unit stoppage due to alarm or the breakdown of the compressor.

## NOTE

- By using switch DSW4, 7 and 8 the unit is started or stopped after 10 to 20 seconds after the switch is operated.
- Make the outdoor unit No. clear to distinguish from other outdoor units for service and maintenance.



<In Case of 5 to 20HP>

<DSW1 to 3: for FSG/FS3 Series>

<p><b>DSW1</b> Ref. System No. Setting</p> <p><b>SR</b> When H-Link is used, setting is required.</p> <div style="text-align: center;"> </div> <p>No.0 Unit Setting Condition</p> <p>Set the unit number of outdoor unit at each refrigerant cycle. (Setting before shipment is unit 0.)</p>	<p><b>DSW2</b> Capacity Setting</p> <p><b>NSR</b> Each outdoor unit is set as shown below before shipment.</p> <table style="width:100%; text-align: center;"> <tr> <td>5HP O.U. </td> <td>8HP O.U. </td> <td>10HP O.U. </td> </tr> <tr> <td>16HP O.U. </td> <td>20HP O.U. </td> <td></td> </tr> </table>	5HP O.U. 	8HP O.U. 	10HP O.U. 	16HP O.U. 	20HP O.U. 		<p><b>DSW3</b> Height Difference</p> <p><b>SR</b></p> <p>B.S. </p> <p>* The O.U. is located higher than I. U. (0 to 50m) * The O.U. is located lower than I.U. (0 to 20m)</p> <p></p> <p>* The O.U. is located lower than I.U. (20 to 40m)</p>
5HP O.U. 	8HP O.U. 	10HP O.U. 						
16HP O.U. 	20HP O.U. 							

<DSW1 to 3: for FXG/FX3 Series>

<p><b>DSW1</b> Ref. System No. Setting</p> <p><b>SR</b> When H-Link is used, setting is required.</p> <div style="text-align: center;"> </div> <p>No.0 Unit Setting Condition</p> <p>Set the unit number of outdoor unit at each refrigerant cycle. (Setting before shipment is unit 0.)</p>	<p><b>DSW2</b> Capacity Setting</p> <p><b>NSR</b></p> <table style="width:100%; text-align: center;"> <tr> <td>RAS-8FXG </td> <td>RAS-10FXG </td> </tr> <tr> <td>RAS-8FX3 </td> <td>RAS-10FX3 </td> </tr> </table>	RAS-8FXG 	RAS-10FXG 	RAS-8FX3 	RAS-10FX3 	<p><b>DSW3</b> Height Difference</p> <p><b>SR</b></p> <p>&lt;Setting Before Shipment&gt;</p> <table style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;">                   * The O.U. is located higher than I. U. (0 to 20m)             </td> <td style="width:50%; vertical-align: top;">                   * The O.U. is located lower than I. U. (0 to 20m)             </td> </tr> <tr> <td style="vertical-align: top;">                   * The O.U. is located higher than I. U. (20 to 50m)             </td> <td style="vertical-align: top;">                   * The O.U. is located lower than I. U. (20 to 40m)             </td> </tr> </table>	 * The O.U. is located higher than I. U. (0 to 20m)	 * The O.U. is located lower than I. U. (0 to 20m)	 * The O.U. is located higher than I. U. (20 to 50m)	 * The O.U. is located lower than I. U. (20 to 40m)
RAS-8FXG 	RAS-10FXG 									
RAS-8FX3 	RAS-10FX3 									
 * The O.U. is located higher than I. U. (0 to 20m)	 * The O.U. is located lower than I. U. (0 to 20m)									
 * The O.U. is located higher than I. U. (20 to 50m)	 * The O.U. is located lower than I. U. (20 to 40m)									

<Common for FSG/FS3 and FXG/FX3 Series>

<p><b>DSW4</b> Trial/Service 1</p> <p><b>SR</b> This dip switch is used when trial or servicing operation is performed.</p> <p>B.S. </p> <p>Cooling </p> <p>Heating </p> <p>Enforced Comp. Stop </p>	<p><b>DSW5</b> Option Function 1</p> <p><b>SR</b> Set the dip switch according to your requirements.</p> <p>B.S. </p> <table border="1" style="width:100%; text-align: center;"> <tr> <th>Power Supply</th> <th>#7</th> <th>#8</th> </tr> <tr> <td>380V/50Hz</td> <td>-</td> <td>-</td> </tr> <tr> <td>415V/50Hz</td> <td>O</td> <td>-</td> </tr> <tr> <td>380V/60Hz</td> <td>-</td> <td>-</td> </tr> <tr> <td>220V/60Hz</td> <td>-</td> <td>O</td> </tr> </table> <p>O : ON - : OFF</p> <table border="1" style="width:100%; text-align: center;"> <tr> <th>Setting Item</th> <th>Pin No.</th> </tr> <tr> <td>Circulator Function of Heating Thermo-OFF</td> <td>#1</td> </tr> <tr> <td>Night Shift (Low Noise)</td> <td>#2</td> </tr> <tr> <td>Cancellation of Outdoor Ambient Temp. Limit of Heating</td> <td>#3</td> </tr> <tr> <td>Cancellation of Outdoor Ambient Temp. Limit of Cooling</td> <td>#4</td> </tr> <tr> <td>Defrosting Condition Change for Cold Area</td> <td>#5</td> </tr> </table>	Power Supply	#7	#8	380V/50Hz	-	-	415V/50Hz	O	-	380V/60Hz	-	-	220V/60Hz	-	O	Setting Item	Pin No.	Circulator Function of Heating Thermo-OFF	#1	Night Shift (Low Noise)	#2	Cancellation of Outdoor Ambient Temp. Limit of Heating	#3	Cancellation of Outdoor Ambient Temp. Limit of Cooling	#4	Defrosting Condition Change for Cold Area	#5	<p><b>DSW6</b> Piping Length</p> <p><b>SR</b></p> <p>B.S. 0 to 25m </p> <p>25 to 50m </p> <p>50 to 75m </p> <p>75 to 100m </p>
Power Supply	#7	#8																											
380V/50Hz	-	-																											
415V/50Hz	O	-																											
380V/60Hz	-	-																											
220V/60Hz	-	O																											
Setting Item	Pin No.																												
Circulator Function of Heating Thermo-OFF	#1																												
Night Shift (Low Noise)	#2																												
Cancellation of Outdoor Ambient Temp. Limit of Heating	#3																												
Cancellation of Outdoor Ambient Temp. Limit of Cooling	#4																												
Defrosting Condition Change for Cold Area	#5																												

<p><b>DSW7</b> Comp. Emergency Operation</p> <p><b>NSR</b></p> <p>B.S. </p> <p>Set the pin at the ON side at emergency operation.</p> <table border="1" style="width:100%; text-align: center;"> <tr> <th>Setting Item</th> <th>Pin No.</th> </tr> <tr> <td>Except No.1 Comp. Operation</td> <td>#1</td> </tr> <tr> <td>Except No.2 Comp. Operation</td> <td>#2</td> </tr> <tr> <td>Except No.3 Comp. Operation</td> <td>#3</td> </tr> <tr> <td>Except No.4 Comp. Operation</td> <td>#4</td> </tr> </table>	Setting Item	Pin No.	Except No.1 Comp. Operation	#1	Except No.2 Comp. Operation	#2	Except No.3 Comp. Operation	#3	Except No.4 Comp. Operation	#4	<p><b>DSW8</b> Trial/Service 2</p> <p><b>NSR</b></p> <p>B.S. Exchanged Compressor Operation </p>	<p><b>DSW9</b> Option Function 2</p> <p><b>NSR</b></p> <p></p>
Setting Item	Pin No.											
Except No.1 Comp. Operation	#1											
Except No.2 Comp. Operation	#2											
Except No.3 Comp. Operation	#3											
Except No.4 Comp. Operation	#4											
<p><b>DSW10</b> Transmitting</p> <p><b>SR</b></p> <table style="width:100%;"> <tr> <td style="width:33%; vertical-align: top;">                 B.S.  </td> <td style="width:33%; vertical-align: top;">                 Cancellation of Terminal Resistance  </td> <td style="width:33%; vertical-align: top;">                 when fuse is melted  </td> </tr> </table>			B.S. 	Cancellation of Terminal Resistance 	when fuse is melted 							
B.S. 	Cancellation of Terminal Resistance 	when fuse is melted 										


<p><b>Push Switch</b></p> <p><b>PSW1</b> Manual Defrosting</p> <p><b>PSW2</b> <b>PSW3</b> for Checks</p>	<p><b>Dip Switch Arrangement</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">DSW1</div> <div style="border: 1px solid black; padding: 2px;">DSW2</div> <div style="border: 1px solid black; padding: 2px;">DSW3</div> <div style="border: 1px solid black; padding: 2px;">DSW4</div> <div style="border: 1px solid black; padding: 2px;">DSW5</div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px;">DSW6</div> <div style="border: 1px solid black; padding: 2px;">DSW7</div> <div style="border: 1px solid black; padding: 2px;">DSW8</div> <div style="border: 1px solid black; padding: 2px;">DSW9</div> <div style="border: 1px solid black; padding: 2px;">PSW1</div> <div style="border: 1px solid black; padding: 2px;">PSW2</div> <div style="border: 1px solid black; padding: 2px;">PSW3</div> </div> <div style="display: flex; justify-content: center; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px; margin-right: 20px;">DSW10</div> <div style="text-align: center;"> <p>SEG2</p> </div> <div style="text-align: center;"> <p>SEG1</p> </div> </div>
--	--

B.S.: Before Shipment, NSR: No Setting is Required, SR: Setting Required

<In Case of 24 and 30HP>

**DSW1** Ref. System No. Setting

**SR** When H-Link is used, setting is required.

ON  
  
 1 2 3 4


No.0 Unit Setting Condition

Set the unit number of outdoor unit at each refrigerant cycle. (Setting before shipment is unit 0.)

**DSW2** Capacity Setting


**NSR** Each outdoor unit is set as shown below before shipment.

RAS-24FSG1 RAS-30FSG1  
 RAS-24FS5 RAS-30FS5


ON ON  
  
 1 2 3 4 1 2 3 4

**DSW3** Height Difference

**SR**

B.S.  
  
 1 2


\* The O.U. is located higher than I. U. (0 to 50m)  
 \* The O.U. is located lower than I.U. (0 to 20m)

  
 1 2


\* The O.U. is located lower than I.U. (20 to 40m)

**DSW4** Trial/Service 1

**SR** This dip switch is used when trial or servicing operation is performed.


B.S. Cooling Heating  
  
 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6

Enforced Compressor Stop Except No.1 Compressor Operation

ON ON  
  
 1 2 3 4 5 6 1 2 3 4 5 6

**DSW5** Option Function 1


**SR** Set the dip switch according to your requirements.


B.S.  
  
 1 2 3 4 5 6 7 8

Setting Item	Pin No.
Circulator Function of Heating Thermo-OFF	#1
Night Shift (Low Noise)	#2
Cancellation of Outdoor Ambient Temp. Limit of Heating	#3
Cancellation of Outdoor Ambient Temp. Limit of Cooling	#4
Defrosting Condition Change for Cold Area	#5
Combination of Indoor Units are more than 16	#8

**DSW6** Piping Length


**SR**

B.S. 0 to 25m 25 to 50m  
  
 1 2 1 2

50 to 75m 75 to 120m  
  
 1 2 1 2

**DSW7** Comp. Emergency Operation

**NSR**


B.S.  
  
 1 2 3 4

Set the pin at the ON side at emergency operation.

Setting Item	Pin No.
Except No.2 Comp. Operation	#1
Except No.3 Comp. Operation	#2
Except No.4 Comp. Operation	#3
Except No.5 Comp. Operation	#4


**DSW8** Trial/Service 2

**NSR**

B.S. Exchanged Compressor Operation  
  
 1 2 1 2

**DSW9** Optional Function 2


**SR** Set the dip switch according to your requirements.

B.S.  
  
 1 2 3 4

Setting Item	Pin No.
Power Supply (415V: ON, 380V and 220V: OFF)	#2
Power Supply (220V: ON, 380V and 415V: OFF)	#3

**DSW10** Transmitting

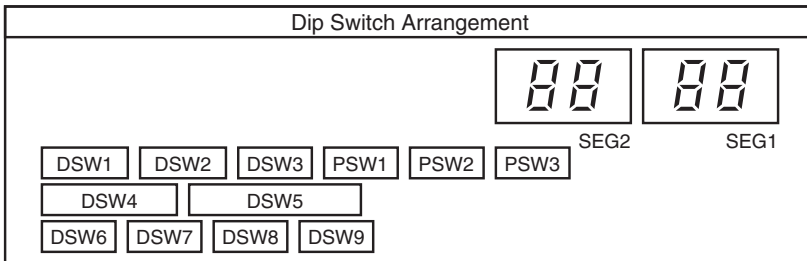
**SR**

B.S. Cancellation of End Resistance Short Circuit of Fuse  
  
 1 2 1 2 1 2

**Push Switch**

**PSW1** Manual Defrosting

**PSW2** **PSW3** for Checks



B.S.: Before Shipment, NSR: No Setting is Required, SR: Setting Required

## (3) CH Unit (For FX Series Only)

**CAUTION**

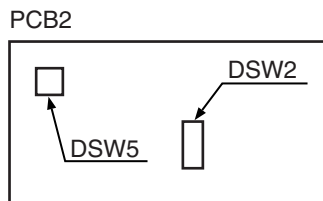
Before setting dip switches, firstly turn OFF power source and set the position of the dip switches. If the dip switches are set without turning OFF the power source, the switches can not function.

**NOTE**

The “■” mark indicates position of dip switches. The figures below show the setting before shipment.

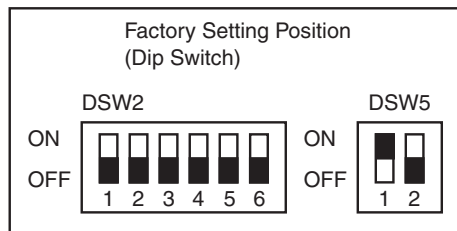
## a. Position of Dip Switches

The PCB2 in the electrical box of CH unit is equipped with 2 types of dip switches (DSW2, DSW5), as shown in the figure below.



## b. Setting of Dip Switches

The dip switches are set before shipment and no setting in the field is required. These are utilized for the self-diagnosis of PCB.



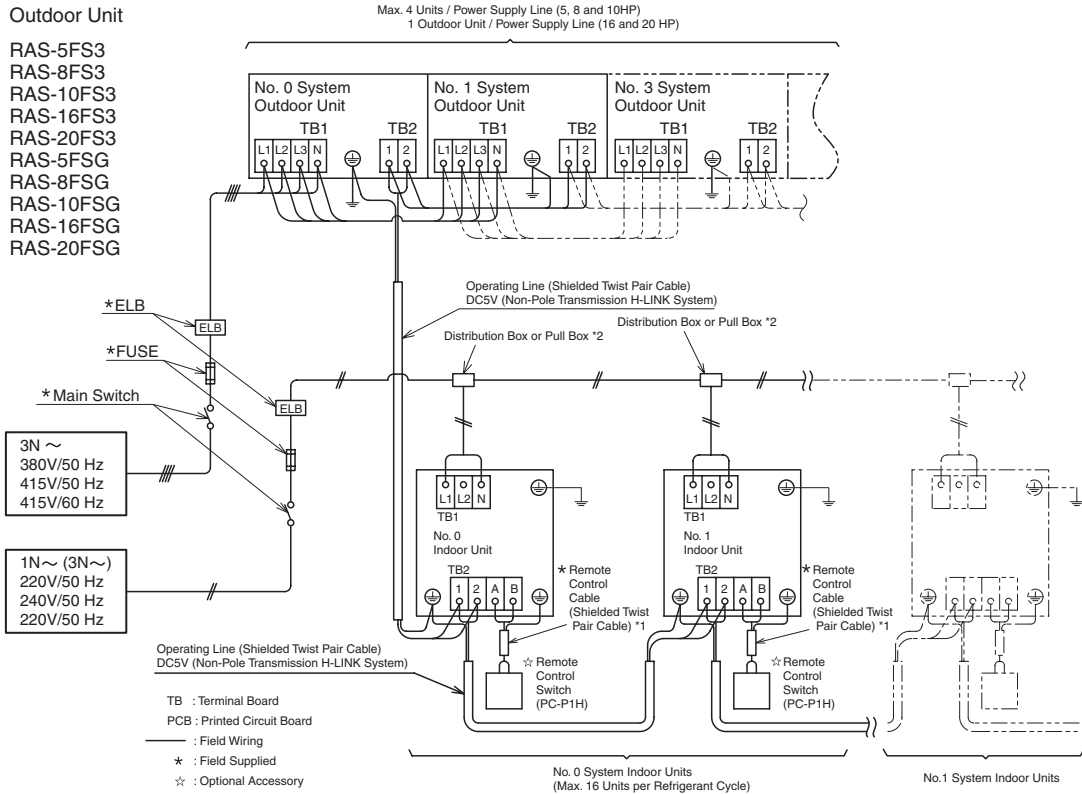
## 1.1.2 Checking of Electrical Wiring

- Check to ensure that the terminal for power source wiring (terminals “L1” to “L1” and “N” to “N” of each terminal board: AC380-415V, terminals “R” to “R” and “T” to “T” of each terminal board: AC220V) and intermediate wiring (Operating Line: terminals “1” to “1” and “2” to “2” of each terminal board: DC5V) between the indoor unit and the outdoor unit coincide correctly, as figure below. If not, some component will be damaged.
- Check to ensure that the twist pair cable with shield ( $\geq 0.75\text{mm}^2$ ) are used for intermediate wiring to protect noise obstacle at total length of less than 1000m and size complied with local code.
- Check to ensure that the wirings and the breakers are chosen correctly, as shown in Table 1.1. and 1.2.
- All the field wiring and equipment must comply with local code.

**Example for Electrical Wiring Connection of FSG, FS3, FSG1 and FS5 System**

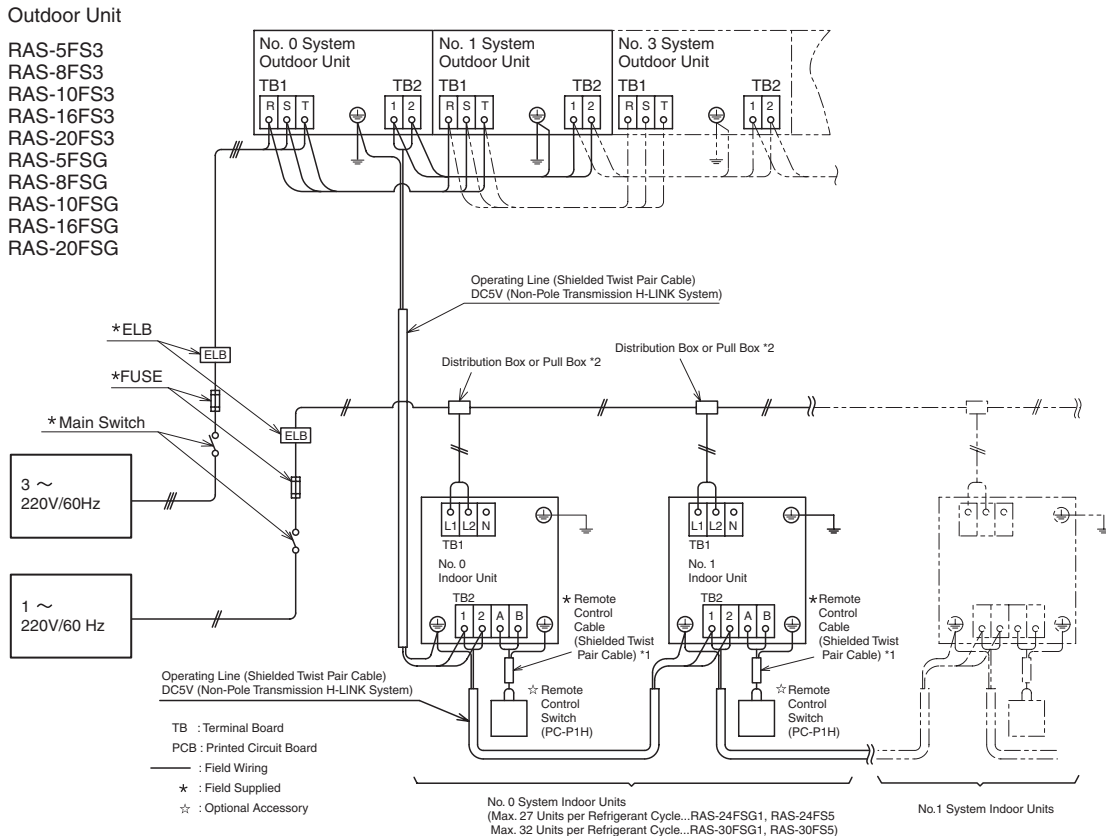
Outdoor Unit (5 to 20HP)

<380-415V/50Hz, 380V/60Hz>



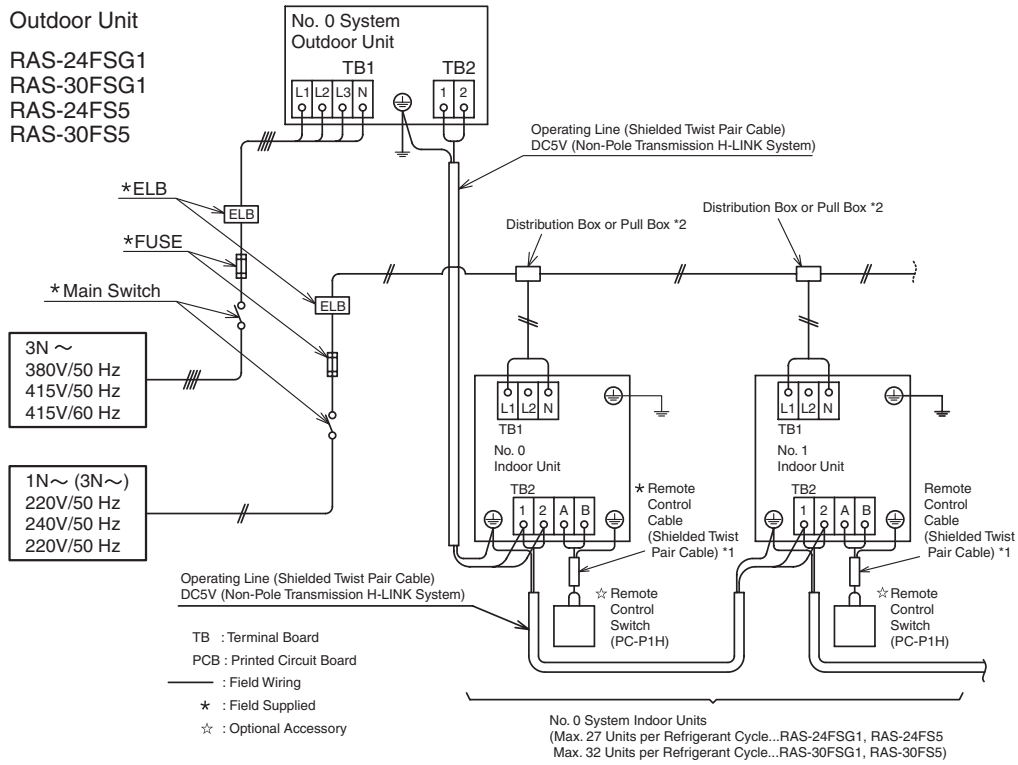
\*1: When installing PC-P1H remote control switch in Australia, connect the both ends of shield tube to earth.  
\*2: It is need for China and Australia only.

<220V/60Hz>



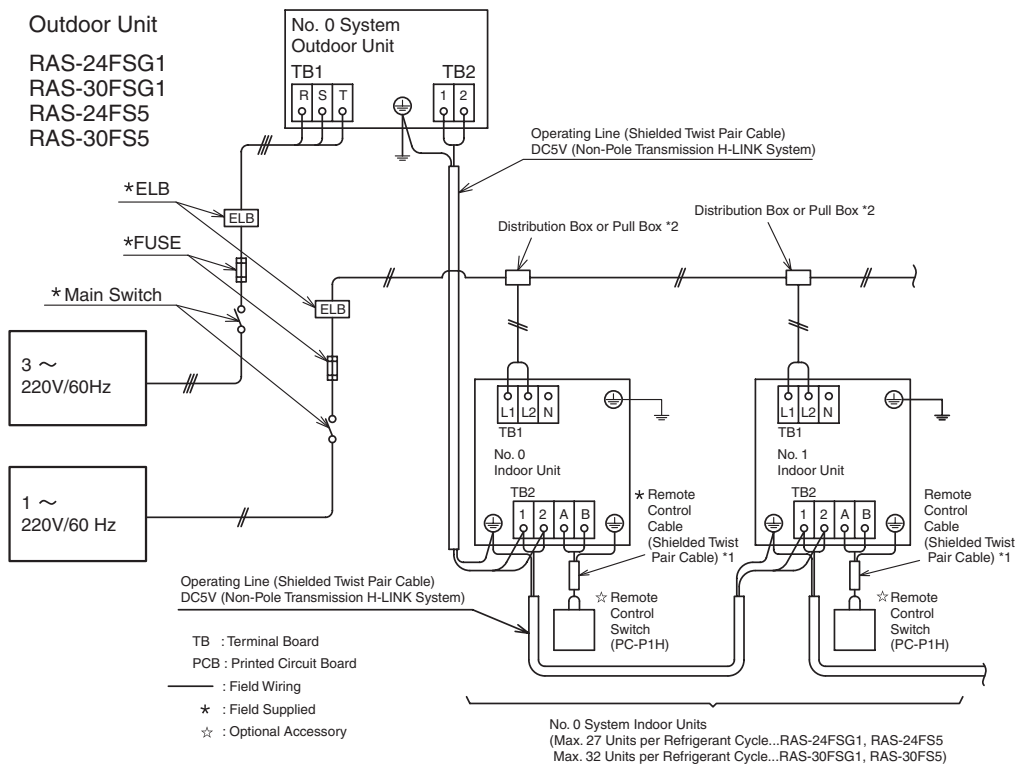
\*1: When installing PC-P1H remote control switch in Australia, connect the both ends of shield tube to earth.  
\*2: It is need for China and Australia only.

Outdoor Unit (24 and 30HP)  
 <380-415V/50Hz, 380V/60Hz>



\*1: When installing PC-P1H remote control switch in Australia, connect the both ends of shield tube to earth.  
 \*2: It is need for China and Australia only.

<220V/60Hz>



\*1: When installing PC-P1H remote control switch in Australia, connect the both ends of shield tube to earth.  
 \*2: It is need for China and Australia only.

## TROUBLESHOOTING

Table 1.1 Electrical Data and Recommended Wiring, Breaker Size/1 Outdoor Unit <FS Series>

Model	Power Supply	Max. Running Current (A)	Power Supply Line (φmm)	ELB		Fuse (A)
				Nominal Current (A)	Nominal Sensitive Current (mA)	
RAS-5FSG RAS-5FS3	380-415V /50Hz	18	MLFC 0.75SQ	20	30	20
RAS-8FSG RAS-8FS3		28	MLFC 2SQ	40		40
RAS-10FSG RAS-10FS3		35	MLFC 3.5SQ			
RAS-16FSG RAS-16FS3		57	MLFC 5.5SQ	>57 (Ex. 100)		100
RAS-20FSG RAS-20FS3		71	MLFC 8SQ	>71 (Ex. 100)	100	
RAS-24FSG1 RAS-24FS5		74	MLFC 8SQ	100	100	80
RAS-30FSG1 RAS-30FS5		87	MLFC 14SQ	120		100
RAS-5FSG RAS-5FS3	380V/60Hz	18	MLFC 0.75SQ	20	30	20
RAS-8FSG RAS-8FS3		30	MLFC 2SQ	30		30
RAS-10FSG RAS-10FS3		36	MLFC 3.5SQ	40		40
RAS-16FSG RAS-16FS3		58	MLFC 5.5SQ	60		60
RAS-20FSG RAS-20FS3		72	MLFC 8SQ	75	75	
RAS-24FSG1 RAS-24FS5		77	MLFC 8SQ	100	100	80
RAS-30FSG1 RAS-30FS5		90	MLFC 14SQ	120		100
RAS-5FSG RAS-5FS3	220V/60Hz	27	MLFC 2SQ	30	30	30
RAS-8FSG RAS-8FS3		45	MLFC 3.5SQ	50		60
RAS-10FSG RAS-10FS3		55	MLFC 5.5SQ	60		
RAS-16FSG RAS-16FS3		88	MLFC 14SQ	100		100
RAS-20FSG RAS-20FS3		112	MLFC 14SQ	120	125	
RAS-24FSG1 RAS-24FS5		132	MLFC 22SQ	150	100	150
RAS-30FSG1 RAS-30FS5		141	MLFC 22SQ	150		150

ELB: Earth Leakage Breaker

MLFC: Flame Retardant Polyflex Wire

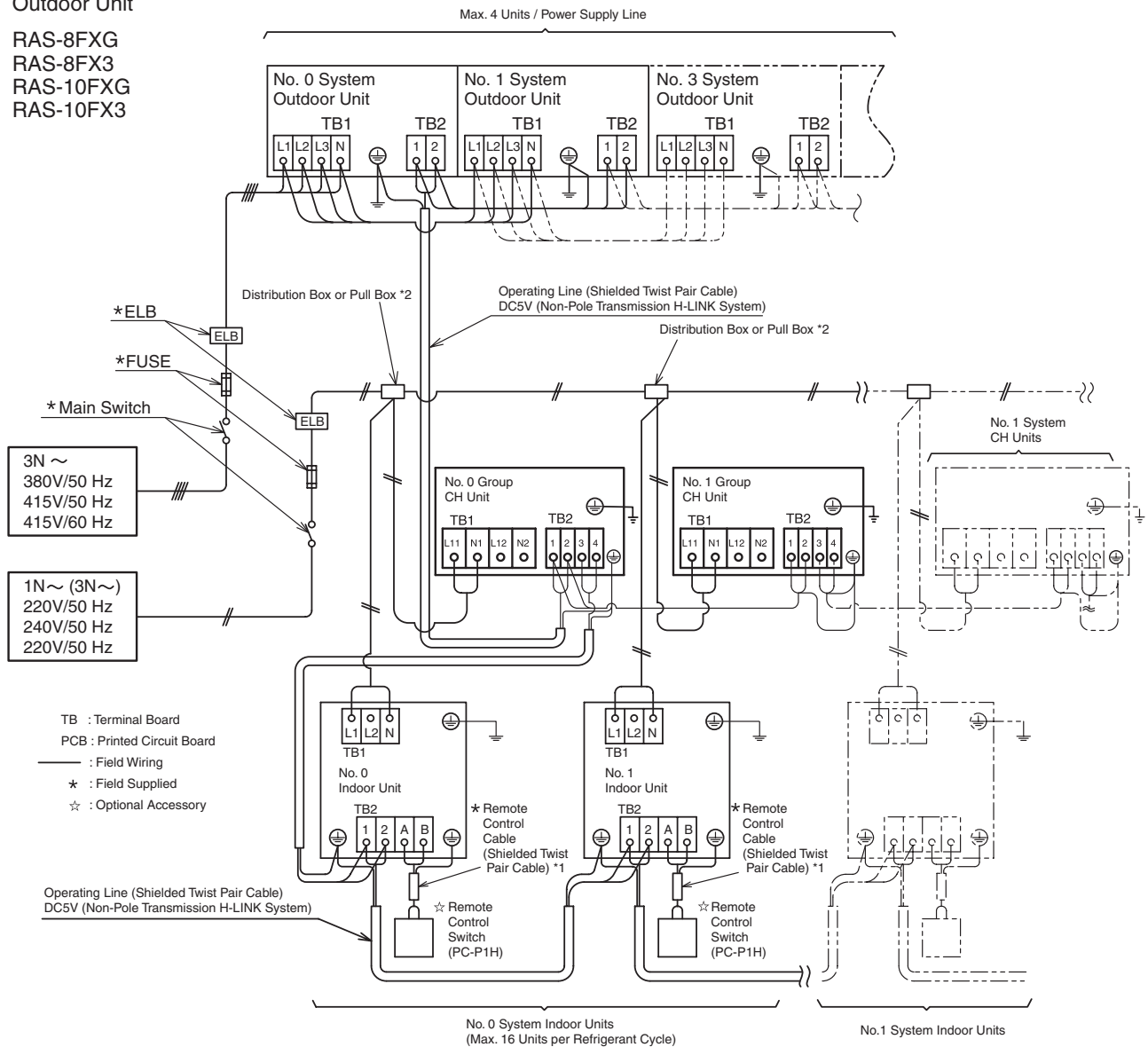
**NOTE:**

Regarding the wiring or breakers, follow to the local code.

**Example for Electrical Wiring Connection of FXG and FX3 System**

Outdoor Unit

- RAS-8FXG
- RAS-8FX3
- RAS-10FXG
- RAS-10FX3



\*1: When installing PC-P1H remote control switch in Australia, connect the both ends of shield tube to earth.  
\*2: It is need for China and Australia only.

Table 1.2 Electrical Data and Recommended Wiring, Breaker Size/1 Outdoor Unit <FX Series>

Model	Power Supply	Max. Running Current (A)	Power Supply Line (φmm)	ELB		Fuse (A)
				Nominal Current (A)	Nominal Sensitive Current (mA)	
RAS-8FXG RAS-8FX3	380-415V /50Hz	32	MLFC 2SQ	40	30	40
RAS-10FXG RAS-10FX3		35	MLFC 3.5SQ			

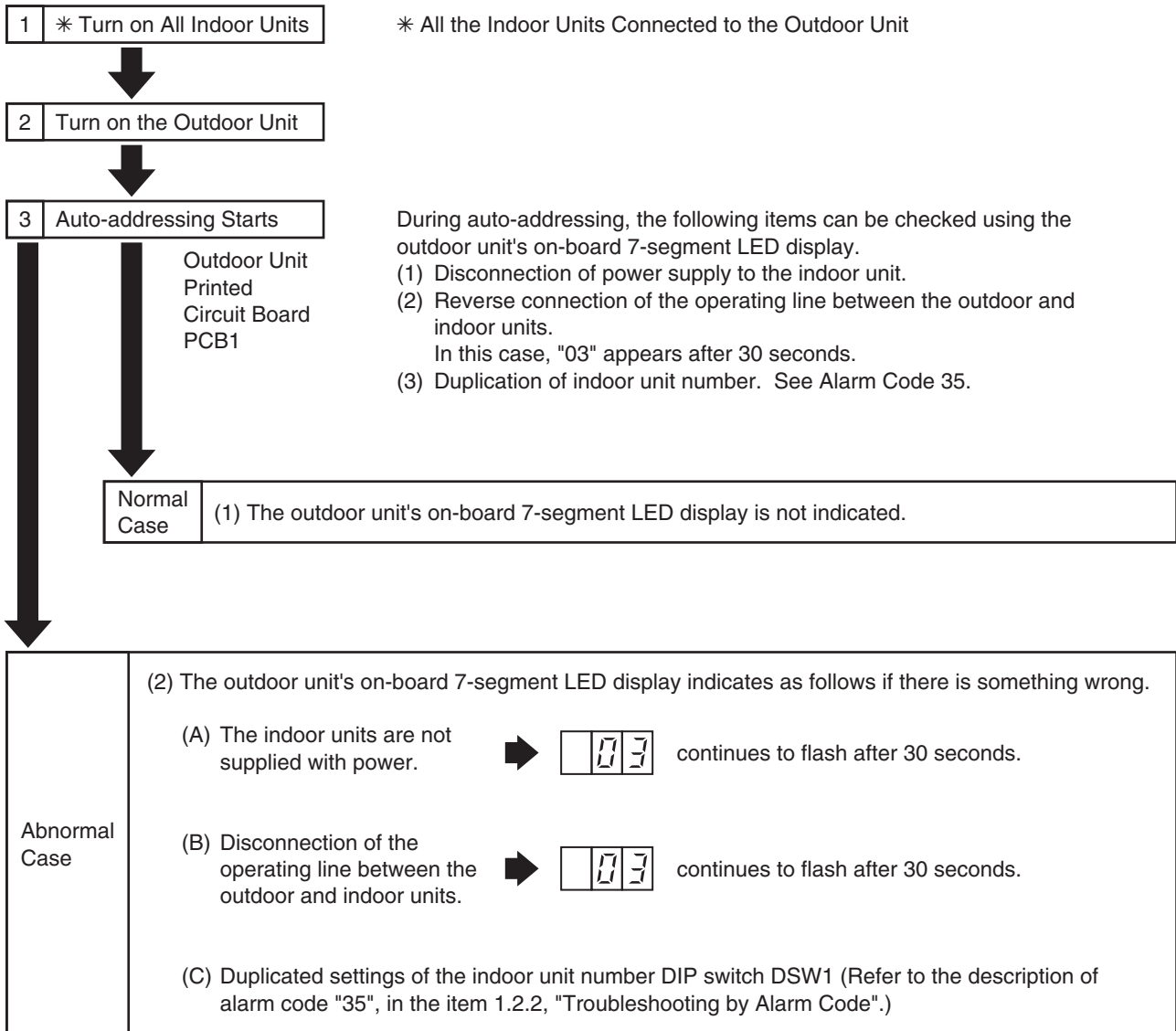
ELB: Earth Leakage Breaker  
MLFC: Flame Retardant Polyflex Wire

**NOTE:**  
Regarding the wiring or breakers, follow to the local code.

## TROUBLESHOOTING

### 1.1.3 Checking by 7-Segment Display

#### (1) Simple Checking by 7-Segment Display





### 1.1.4 Emergency Operation when Inverter Compressor is Damaged

#### (1) Failure of Inverter Compressor

##### a. Contents of Operation

(Applied Models: RAS-8FSG(3), 10FSG(3), 16FSG(3), 20FSG(3), 24FSG1(5), 30FSG1(5) / RAS-8FXG(3), 10FXG(3))

- \* This operation is an emergency operation by a constant compressor, when the inverter compressor is failed.
- \* By turning ON “#1” of DSW7 on PCB1 and “#1” of DSW1 on PCB3, emergency operation is started. (In Case of 5 to 20HP)
- \* By turning ON “#6” of DSW4 on PCB1 and “#1” of DSW1 on ISPM, emergency operation is started. (In Case of 24 and 30HP)
- \* Control of the emergency operation is same with normal control except the inverter compressor stoppage.

##### b. Operating Condition

The constant speed compressor is forced to be stopped for compressor protection under the condition below.

Total Capacity of Thermo-ON indoor units < 50% of Outdoor Unit Capacity

In case of the above condition, the compressor is operated and stopped repeatedly, and it may cause the compressor failure. Therefore, the compressor is forced to be stopped to protect it.

##### NOTE:

If the printed circuit board for inverter (PCB3) is damaged, this is not available.

Setting airflow of indoor unit is keeping during enforced stoppage.

Therefore, it is recommended that setting airflow is “Lo” to avoid the person in the room feels cold.

##### c. Method of Emergency Operation

Checking Before Emergency Operation.

- \* Measure insulation resistance of the inverter compressor.  
Do not perform the emergency operation when the insulation resistance is  $0\Omega$ .  
There is a possibility that refrigerant oil may be oxidized, if the emergency operation is performed, the other compressor is damaged.
- \* In case of total capacity of Thermo-ON indoor units are more than 50% of outdoor unit capacity, emergency operation is available.
- \* In this emergency operation, frequency of the compressor is not controlled at each 1Hz.  
Therefore, alarm code “07”, “43”, “44”, “45” or “47” may be indicated on LCD. Details of alarm codes are shown in the alarm code table (page 1-23).
- \* This emergency operation does not provide sufficient cooling and heating capacity.
- \* This method is an emergency operation temporarily when the inverter compressor is damaged.  
Therefore, change the new one as soon as possible.
- \* Turn OFF “#1” of DSW7 on PCB1 and “#1” of DSW1 on PCB3 after changing the new compressor. (In Case of 5 to 20HP)  
Turn OFF “#6” of DSW4 on PCB1 and “#1” of DSW1 on ISPM after changing the new compressor. (In Case of 24 and 30HP)  
If this setting is not performed, the inverter compressor will be damaged.

##### d. Emergency Operation

- \* Turn OFF all the power source switches.
- \* Disconnect the wiring from the inverter compressor. Insulate the faston terminals for inverter compressor wires by insulation tape.
- \* Set the No.1 of DSW7 on the PCB1 and No.1 of DSW1 on the PCB3 at the “ON” side.  
(In Case of 5 to 20HP)  
Set “#6” of DSW4 on PCB1 and “#1” of DSW1 on ISPM at the “ON” side.  
(In Case of 24 and 30HP)
- \* Turn ON all the power source switches.
- \* Operate the system by remote control switches.
- \* The system is stopped by turning OFF all the remote control switches or turning OFF all the power source switches.

**(2) Failure of Constant Speed Compressor****a. Contents of Operation**

(Applied Models: RAS-8FSG(3), 10FSG(3), 16FSG(3), 20FSG(3), 24FSG1(5), 30FSG1(5) / RAS-8FXG(3), 10FXG(3))

\* This operation is an emergency operation by the inverter compressor, when the constant speed compressor is failed.

\* This operation is controlled by a normal control.

**b. Operating Condition**

\* Set the No.2, 3 or 4 of DSW7 on the PCB1 at the "ON" side. (In case of 5 to 20HP)

\* Set the No.1, 2, 3 or 4 of DSW7 on the PCB1 at the "ON" side. (In case of 24 and 30HP)

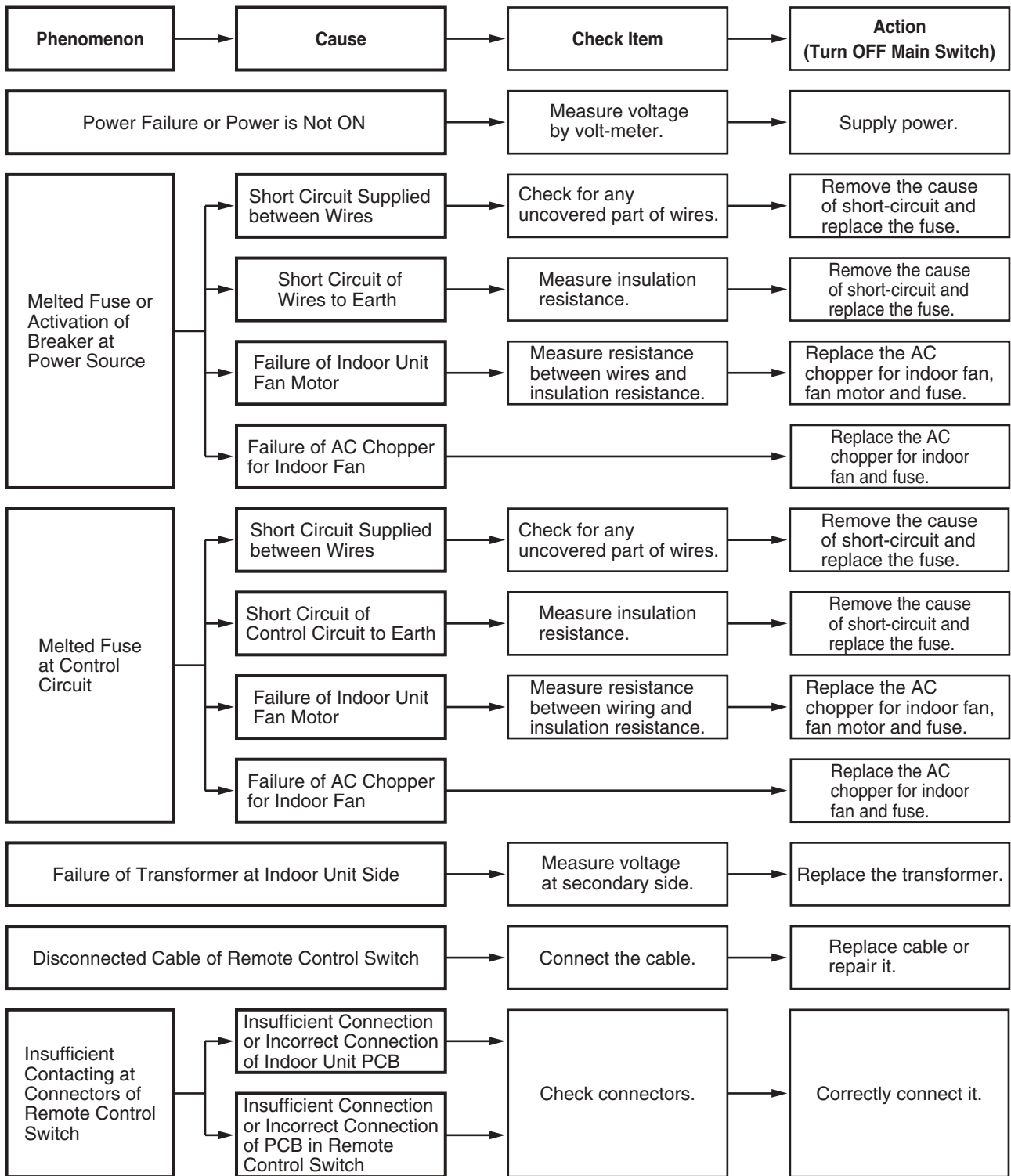
\* Temperature of THM2, THM3 and THM4 on the top of compressors are not ignored by setting DSW7.

If the thermistor is short-circuited or cut, this operation is available.

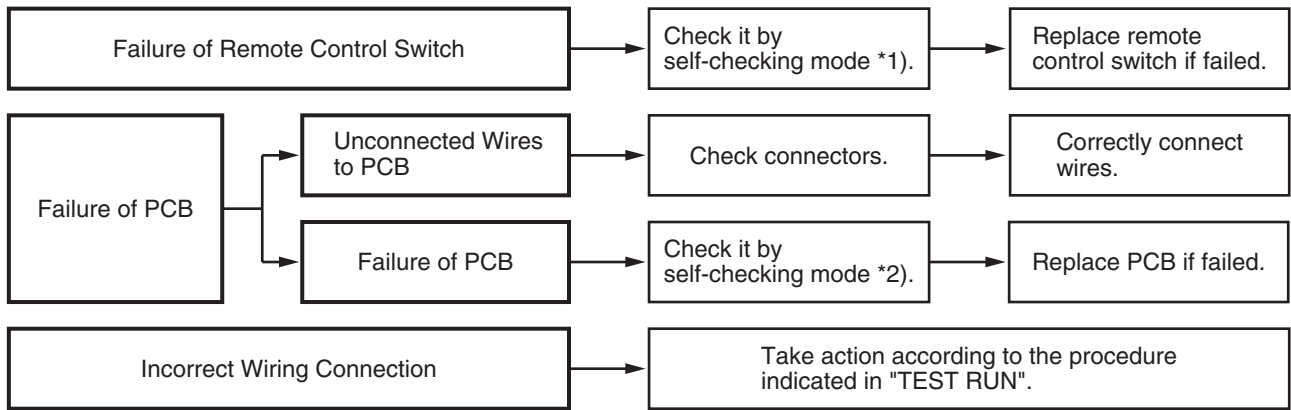
1.1.5 Failure of Power Supply to Indoor Unit and Remote Control Switch

- Lights and LCD are not Indicated.
- Not Operated

If fuses are melted or a breaker is activated, investigate the cause of over current and take necessary action.



(1.1.5 Failure of Power Supply to Indoor Unit and Remote Control Switch)

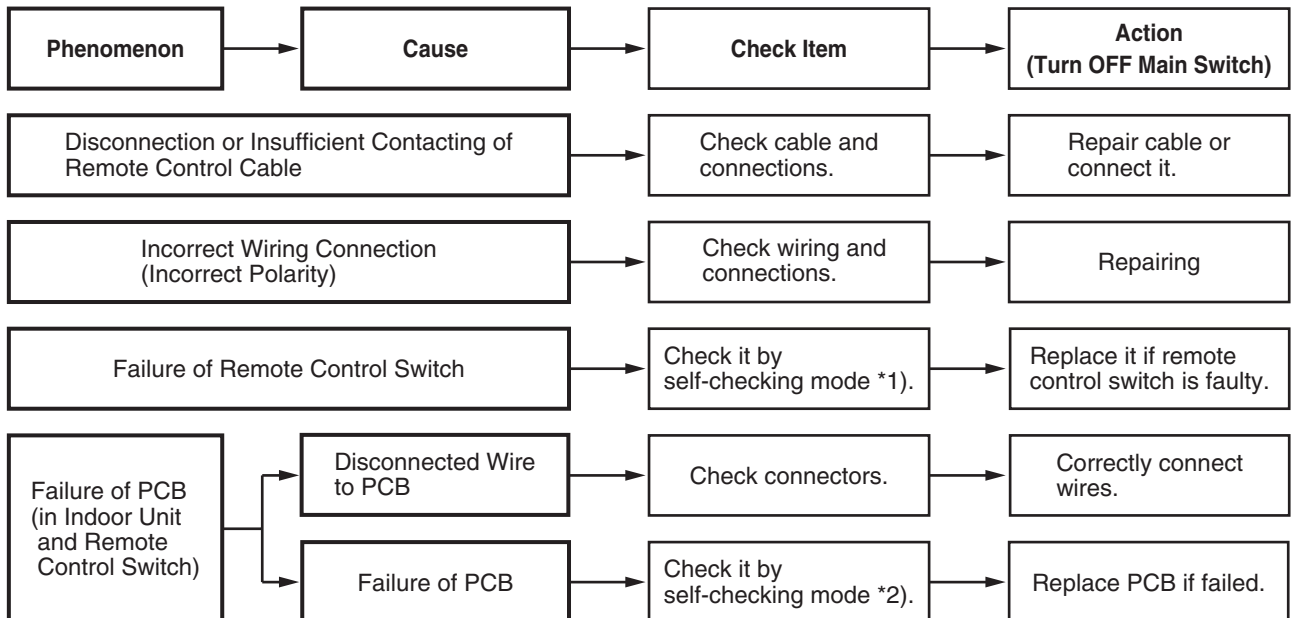


\*1): Refer to Item 1.3.2.

\*2): Refer to Item 1.3.1.

1.1.6 Abnormal Transmission between Remote Control Switch and Indoor Unit

- "RUN" Lamp on Remote Control Switch:  
Flickering every 2 seconds



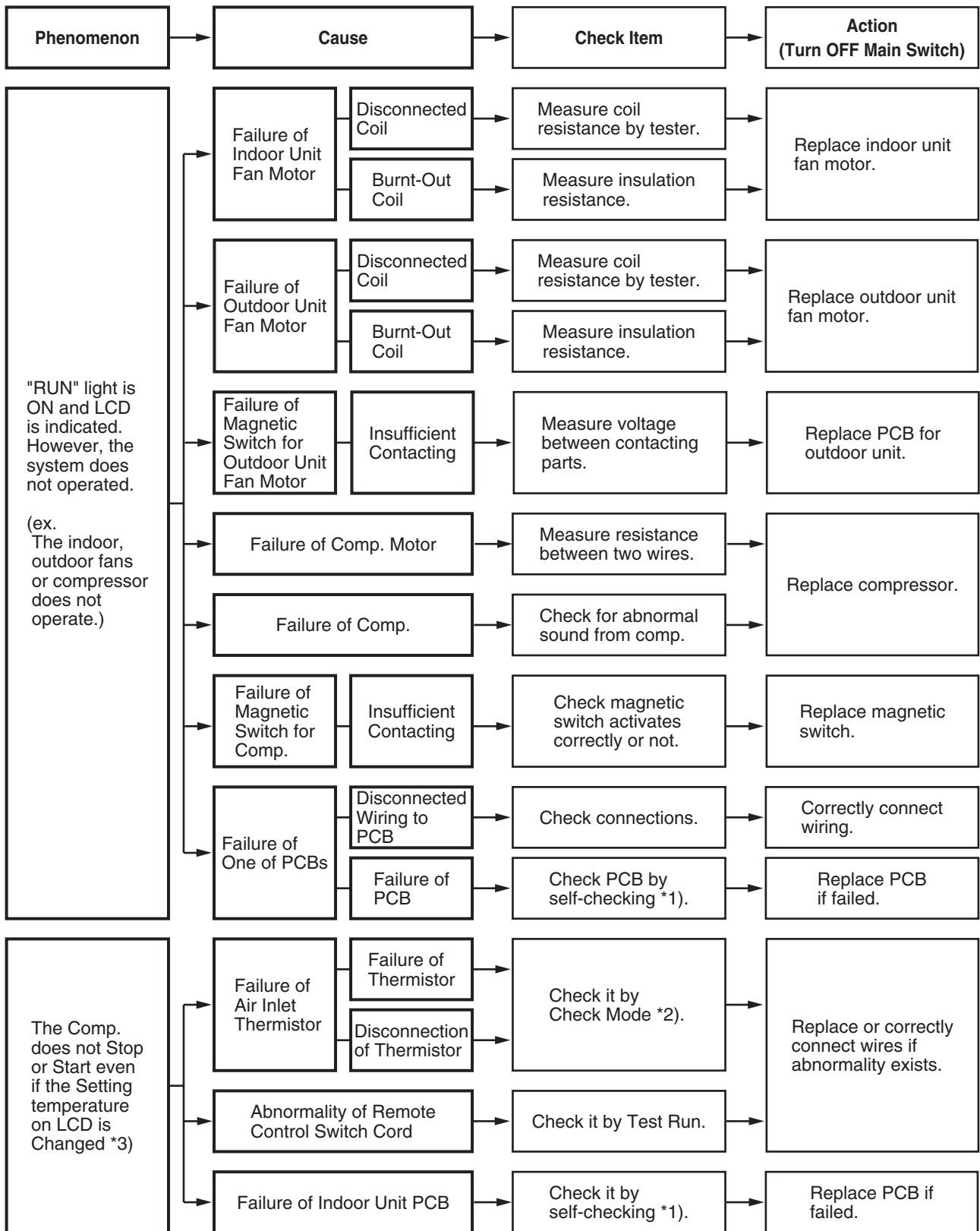
\*1): Refer to Item 1.3.2.

\*2): Refer to Item 1.3.1.

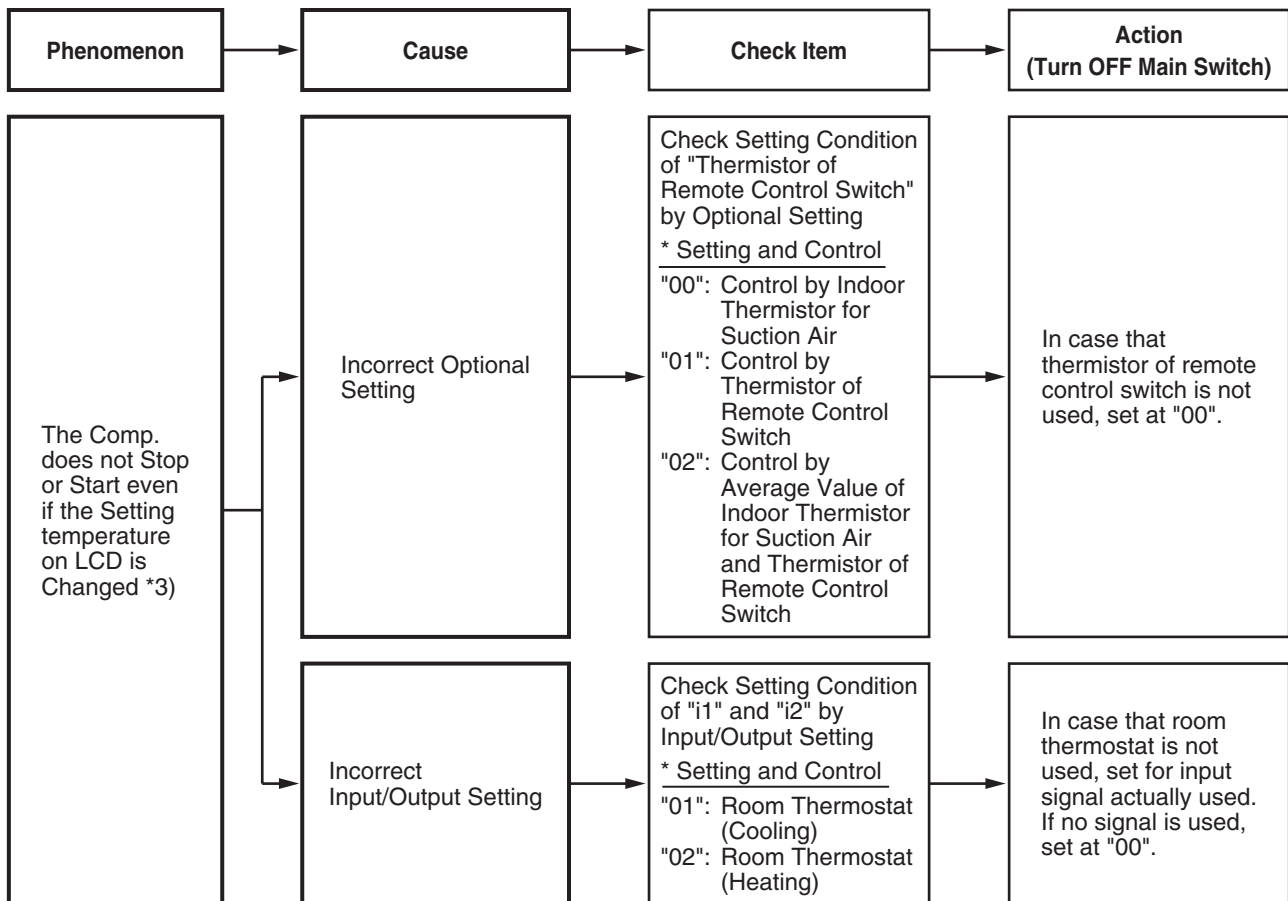
\*3): This phenomenon occurs when the system is newly installed and is started within 5 minutes after power supply, since automatic setting of unit No. is performed during this period.

1.1.7 Abnormalities of Devices

In the case that no abnormality (Alarm Code) is indicated on the remote control switch, and normal operation is not available, take necessary action according to the procedures mentioned below.



(1.1.7 Abnormalities of Devices)



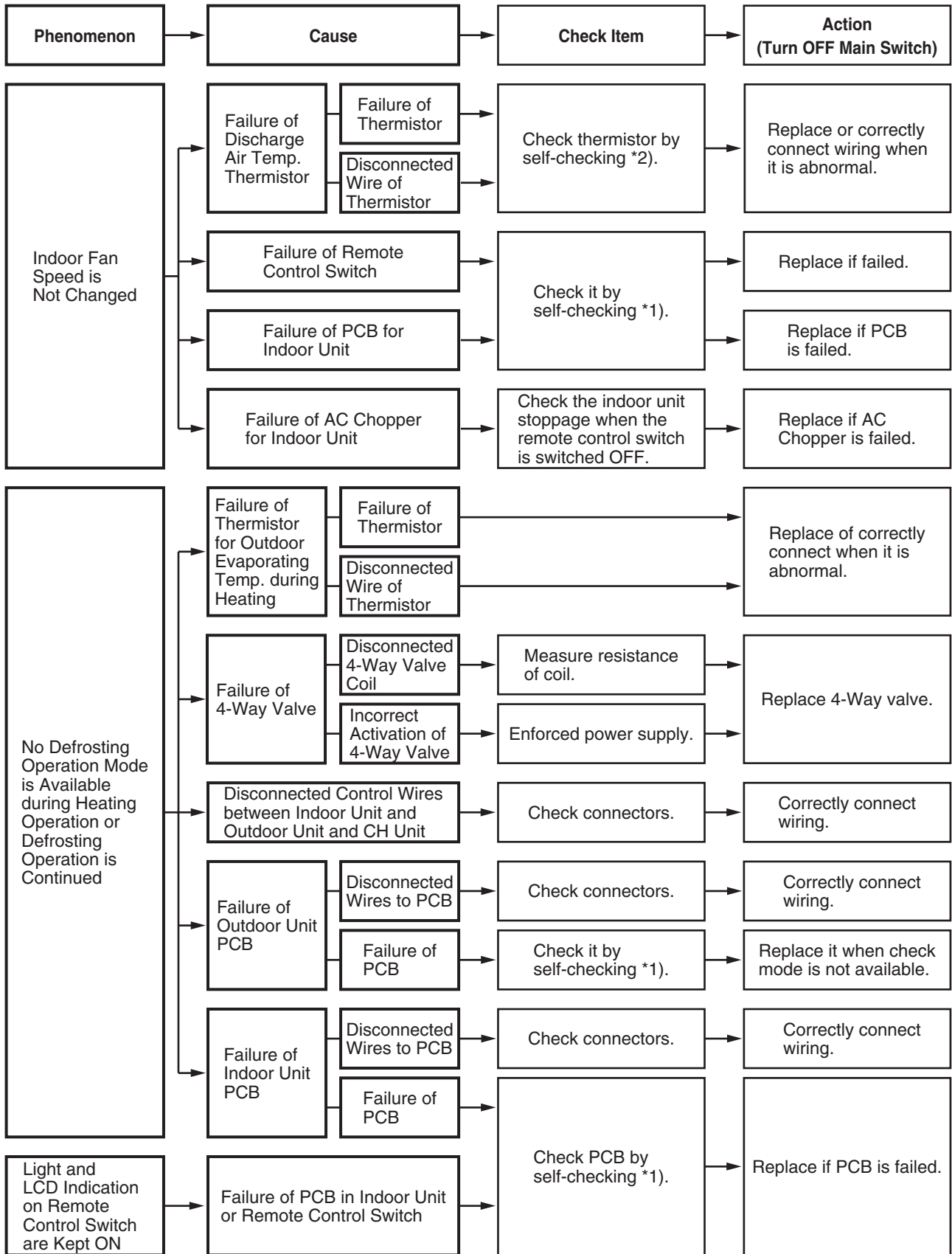
\*1): Refer to Item 1.3.1 to 1.3.4.

\*2): Refer to Item 1.2.3.

\*3): Even if controllers are normal, the compressor does not operate under the following conditions.

- \* Indoor Air Temp. is lower than -21°C or Outdoor Air Temp. is lower than -5°C during cooling operation.
- \* Indoor Air Temp. is higher than 30°C or Outdoor Air Temp. is higher than 23°C during heating operation.
- \* When a cooling (or heating) operation signal is given to the outdoor unit and a different mode as heating (or cooling) operation signal is given to indoor units.
- \* When an emergency stop signal is given to outdoor unit.

(1.1.7 Abnormalities of Devices)

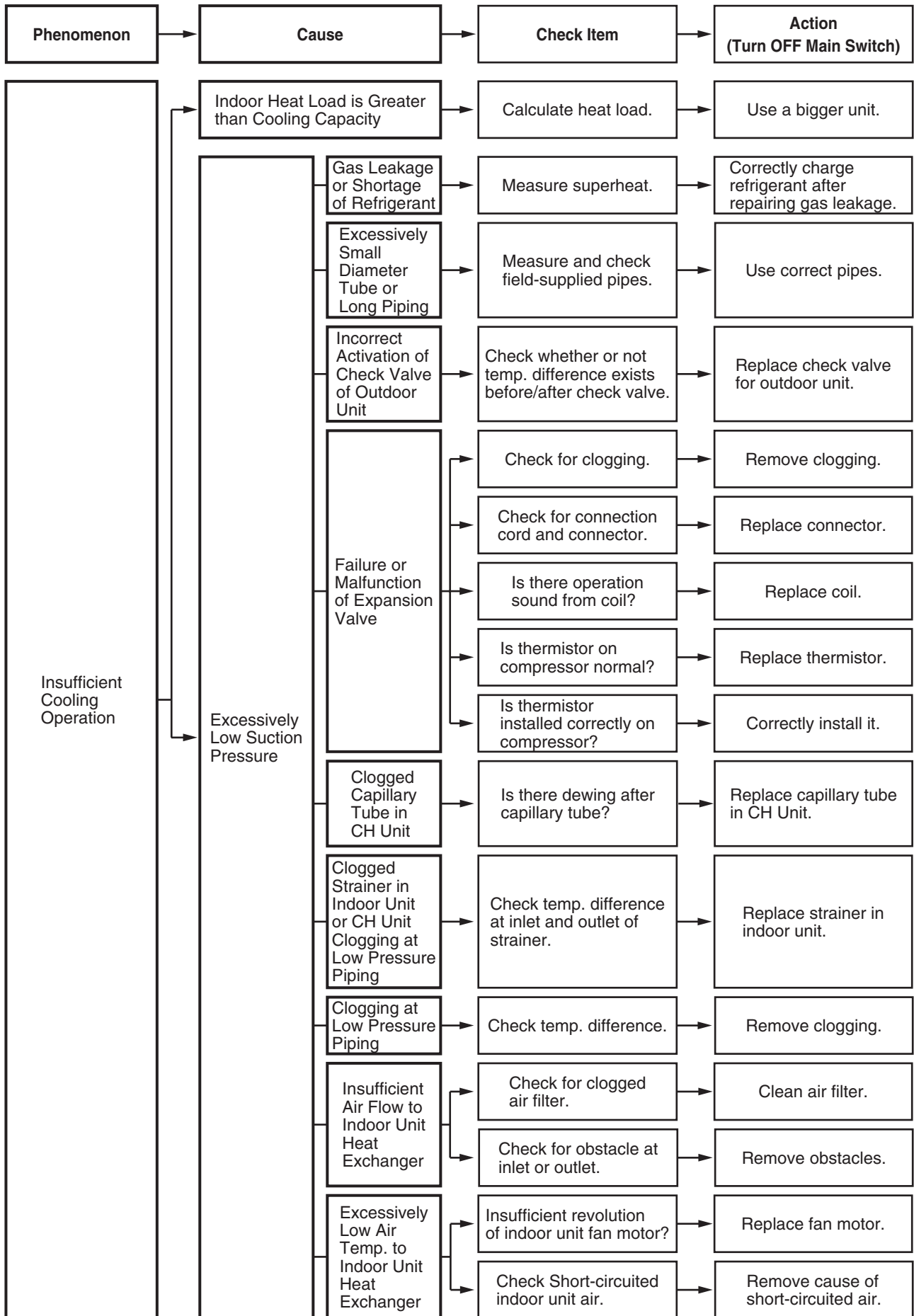


\*1): Refer to Item 1.3.1 to 1.3.4.

\*2): Refer to Item 1.3.1.

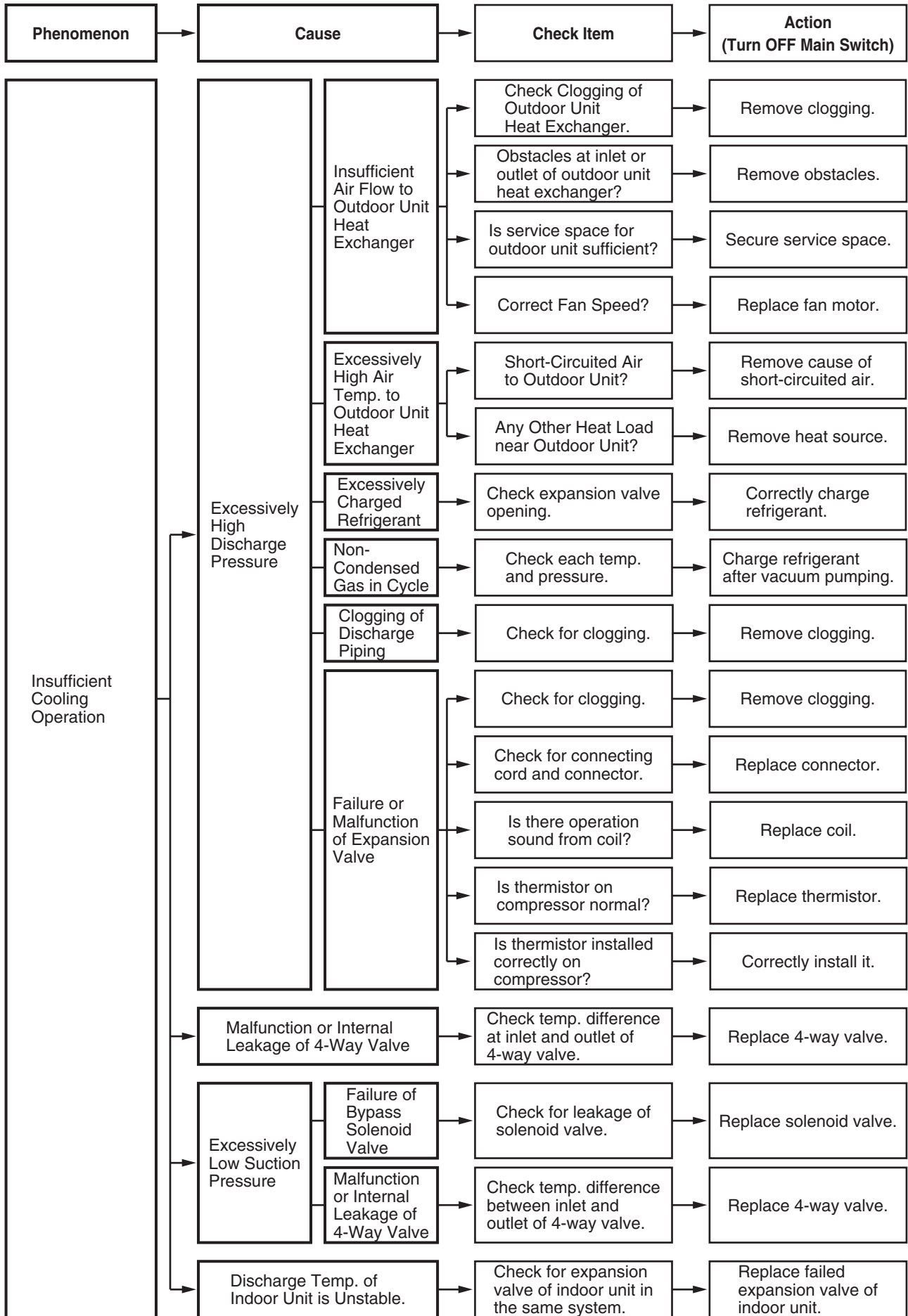
# TROUBLESHOOTING

## (1.1.7 Abnormalities of Devices)



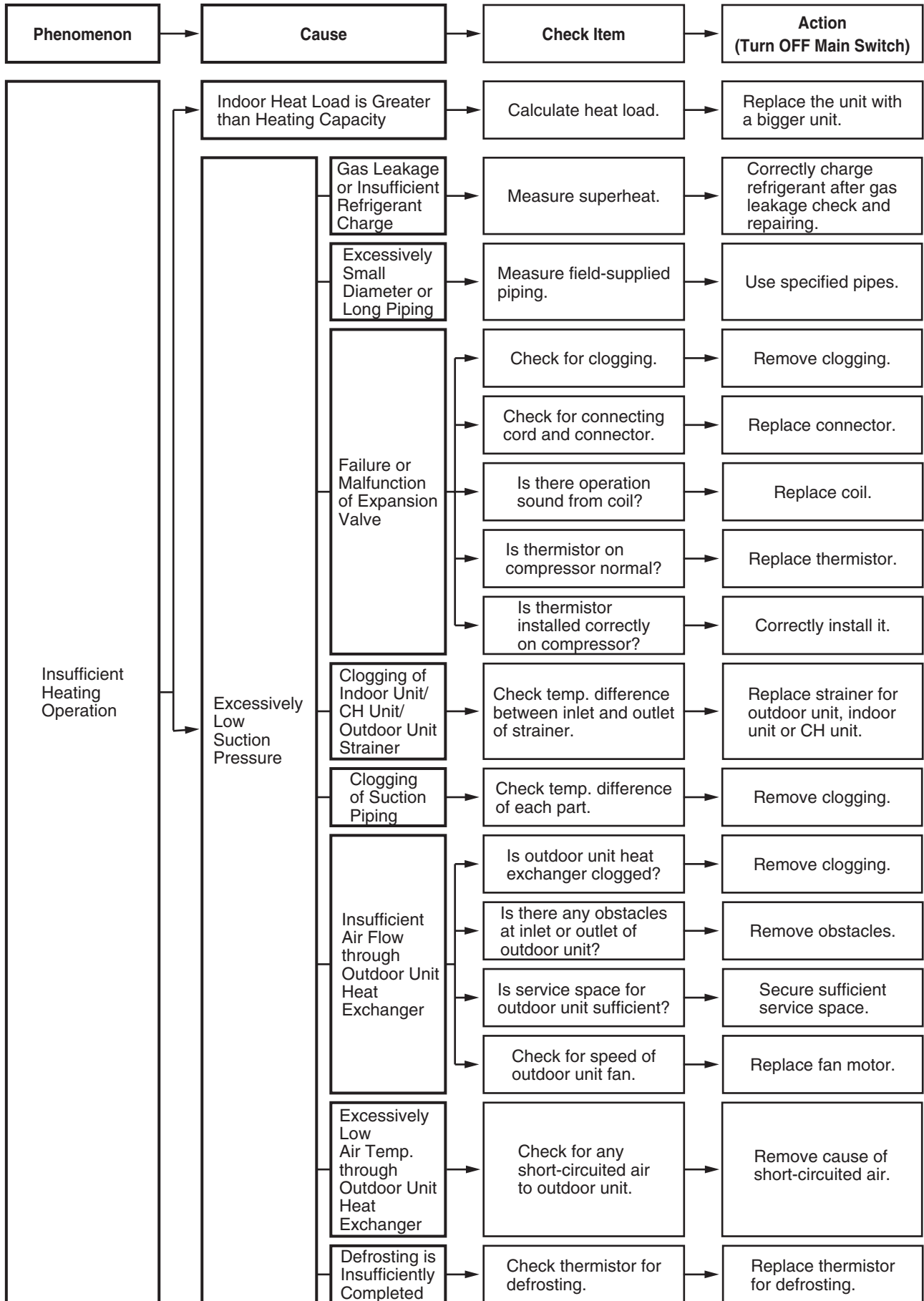


(1.1.7 Abnormalities of Devices)

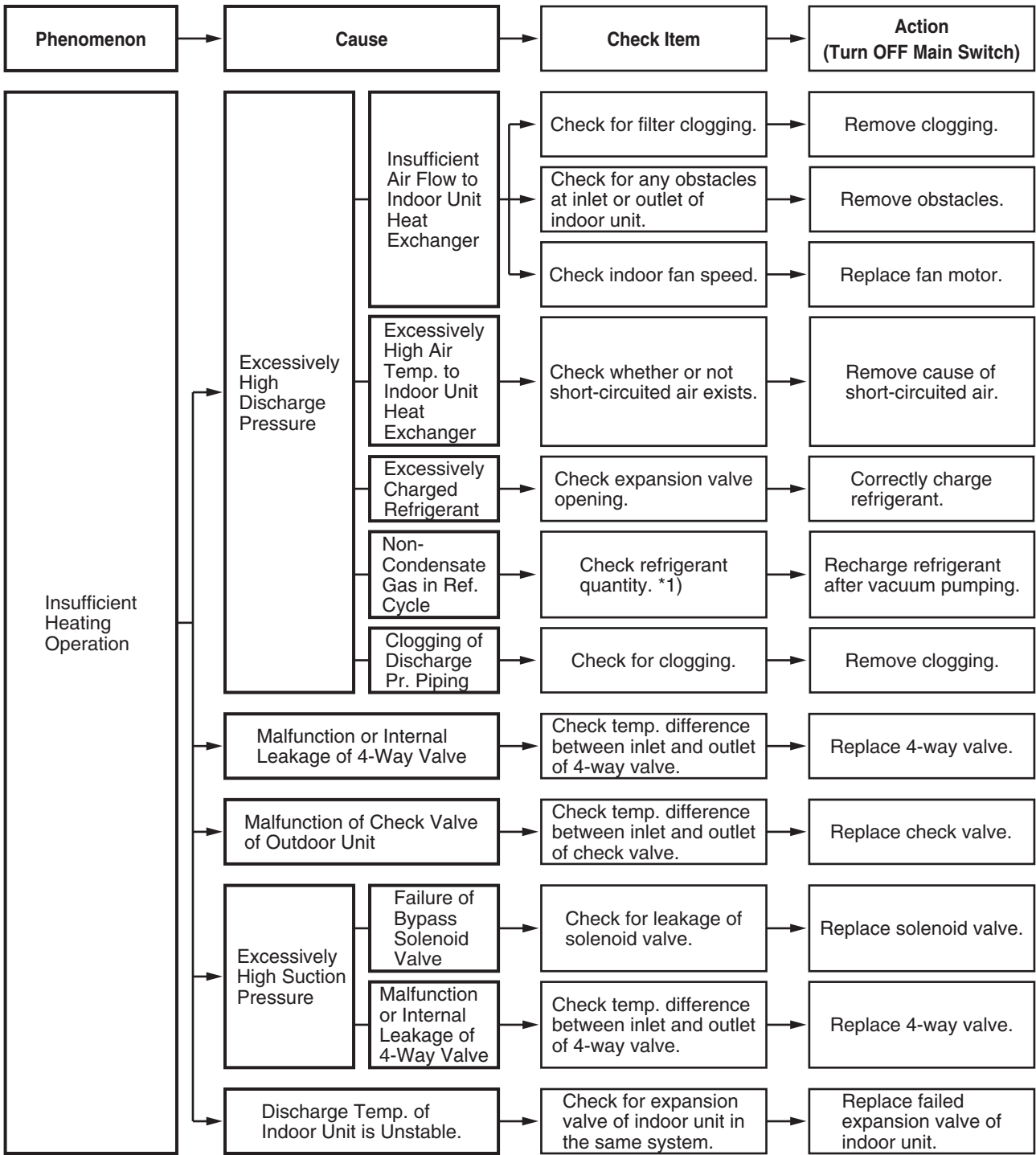


# TROUBLESHOOTING

## (1.1.7 Abnormalities of Devices)



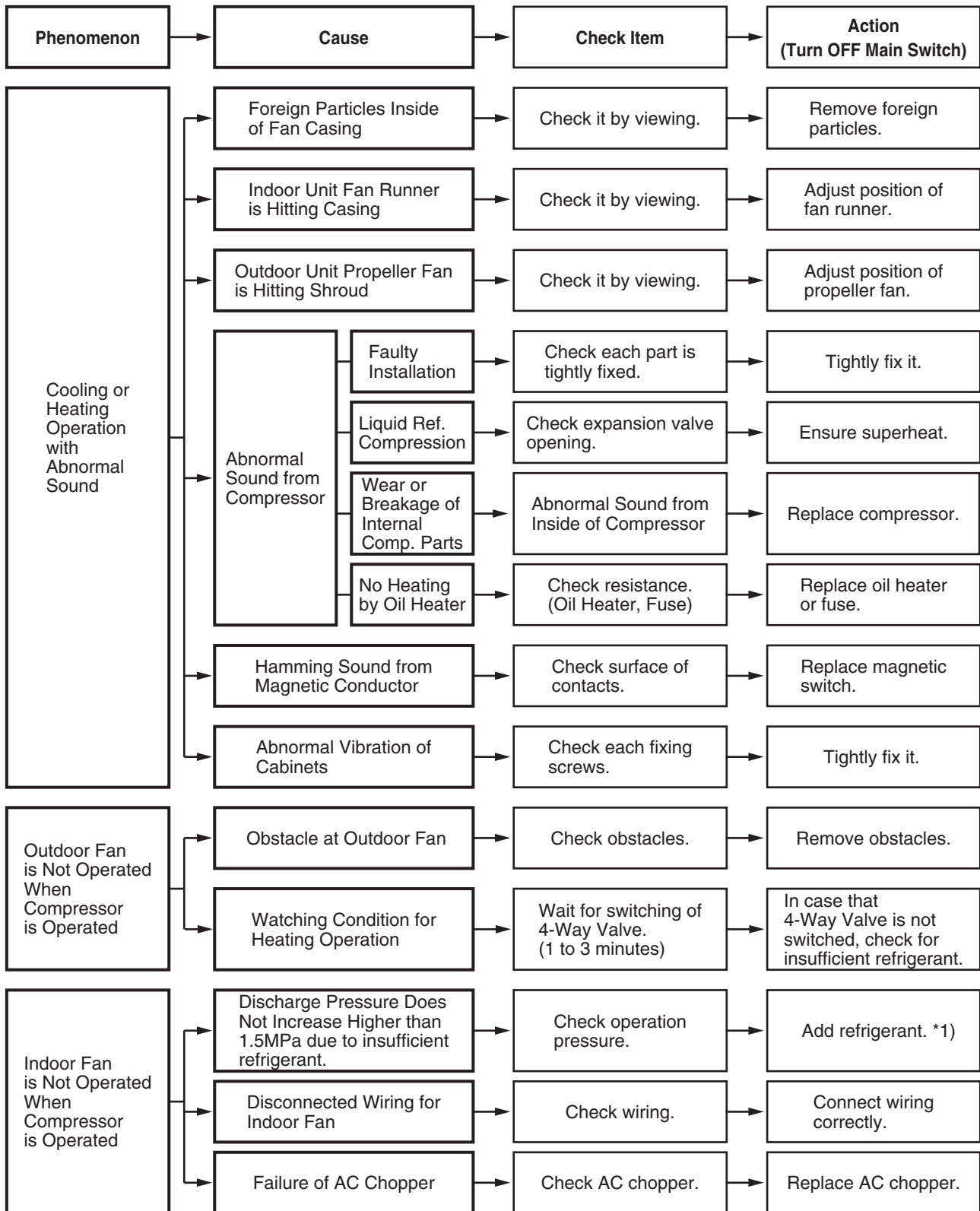
(1.1.7 Abnormalities of Devices)



\*1): Refer to TCII, SP2-K03 and SP2-L01.

# TROUBLESHOOTING

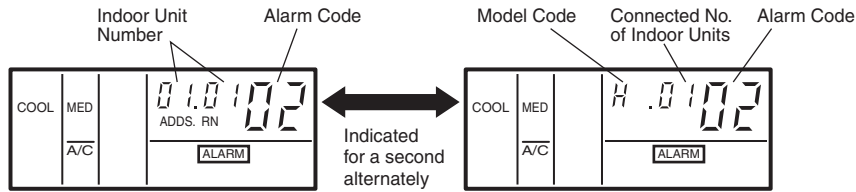
## (1.1.7 Abnormalities of Devices)



\*1): Refer to TCII, SP2-K03 and SP2-L01.

**1.2 Troubleshooting Procedure**

● **Alarm Code Indication of Remote Control Switch**



**1.2.1 Alarm Code Table**

Code No.	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Tripping of Protection Device	Failure of Fan Motor, Drain Discharge, PCB, Relay
02	Outdoor Unit	Tripping of Protection Device	Activation of PSH
03	Transmission	Abnormality between Indoor (or outdoor) and Outdoor (or Indoor)	Incorrect Wiring. Failure of PCB. Tripping of Fuse. Power Supply OFF.
04	Inverter	Abnormality between Inverter and Control PCB	Failure in Transmission between PCBs
05	Transmission	Abnormality of Power Source Wiring	Reverse Phase Incorrect Wiring
06	Voltage Drop	Voltage Drop by Excessively Low or High Voltage to Outdoor Unit	Voltage Drop of Power Supply, Incorrect Wiring or Insufficient Capacity of Power Supply Wiring
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge, Expansion Valve Open Lock
08		Increase in Discharge Gas Temperature	Insufficient Refrigerant. Ref. Leakage, Clogging or Expansion Valve Close Lock
09	Outdoor Unit	Tripping of Protection Device	Failure of Fan Motor
11	Sensor on Indoor Unit	Inlet Air Thermistor	Failure of Thermistor, Sensor, Connection
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
19		Tripping of Protection Device for Fan Motor	Failure of Fan Motor
21	Sensor on Outdoor Unit	High Pressure Sensor	Failure of Thermistor, Sensor, Connection
22		Outdoor Air Thermistor	
23		Discharge Gas Thermistor on Comp.	
24		Evaporating Thermistor	
29		Low Pressure Sensor	
30 *	System	Incorrect Wiring Connection	Incorrect Wiring Connection between Outdoor Unit, CH Unit and Indoor Unit
31		Incorrect Setting of Outdoor and Indoor Unit	Incorrect Setting of Capacity Code.
32		Abnormal Transmission of Other Indoor Unit	Failure of Power Supply, PCB in Other Indoor Unit. Failure of Other Indoor Unit of the Same Refrigerant Cycle.
35		Incorrect Setting in Indoor/Outdoor Unit No.	Existence of the same Indoor Unit No. in the same refrigerant cycle.
38		Abnormality of Protective Circuit in Outdoor Unit	Failure of Indoor Unit PCB. Incorrect Wiring Connection to PCB in Outdoor Unit
39		Abnormality of Running Current at Constant Compressor	Overcurrent, Melted Fuse of Failure of Current Sensor
43	Pressure	Pressure Ratio Decrease Protection Activating	Failure of Compressor, Inverter
44		Low Pressure Increase Protection Activating	Overload to Indoor in Cooling, High Temperature of Outdoor Air in Heating Expansion Valve Open Lock
45		High Pressure Increase Protection Activating	Overload Operation. Excessive Refrigerant Clogging of Heat Exchanger
46		High Pressure Decrease Protection Activating	Insufficient Refrigerant
47		Low Pressure Decrease Protection Activating	Insufficient Refrigerant. Expansion Valve Close Lock. Refrigerant Leakage.
51	Inverter	Abnormality of Current Sensor for Inverter	Failure of Sensor on Inverter PCB
52		Overcurrent Protection Activating	Overload, Overcurrent, Locked to Compressor
53		IPM Protection Activating	Automatic Stoppage of IPM (Overcurrent, Low Voltage or Overheating)
54 **		Increase in Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Abnormal Outdoor Fan
56 **	Outdoor Fan	Abnormality of Detection for Fan Motor Position	Abnormal Detection Circuit of Transmission
57 **		Fan Controller Protection Activating	Abnormal Fan Speed
58 **		Abnormality of Fan Controller	Overcurrent, Abnormal Fan Controller Fin
59	AC Chopper	AC Chopper Circuit Protection	Failure of FET, Power Supply, CT for Fan Motor
EE	Compressor	Compressor Protection	3 Time Occurrence of Alarm Giving Damage to Compressor within 6 hours
dd ***	Transmission	Incorrect Wiring between Indoor Units	Incorrect Wiring between Indoor Units and Remote Control Switch

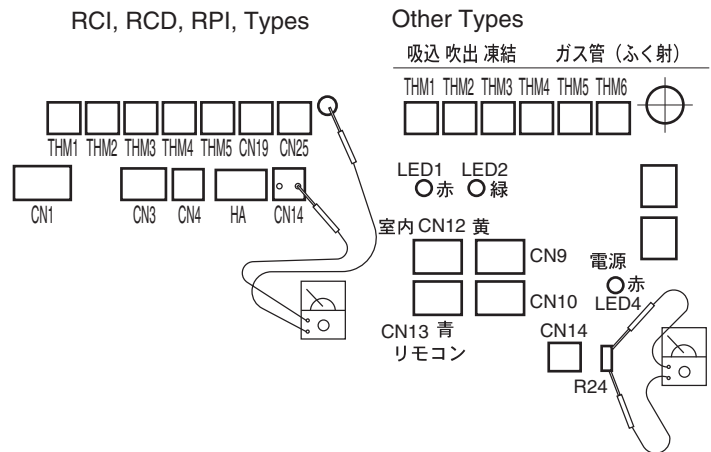
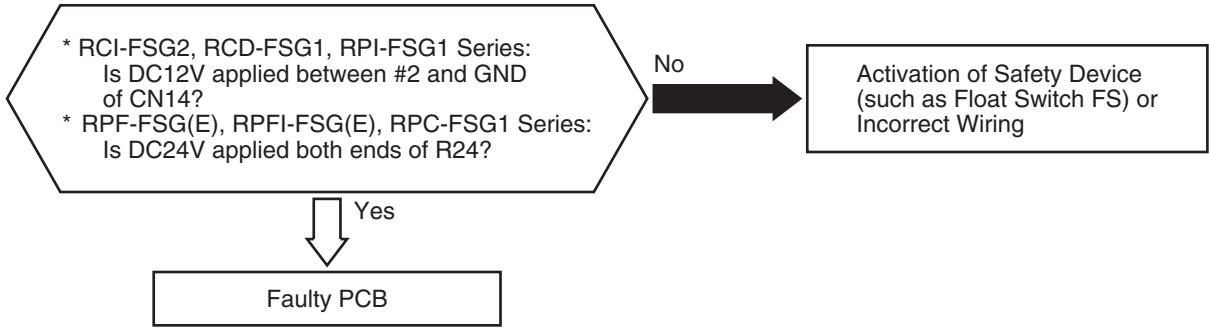
\* : For only FXG and FX3 series. Other code Nos. are common with FSG and FS3 series.

\*\* : For only 24, 30FSG1/FSG5 (220V 60Hz), \*\*\* : In case of PC-2H2

1.2.2 Troubleshooting by Alarm Code

Alarm Code	01	Activation of Safety Device in Indoor Unit
------------	----	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the contact between #1 and #2 of CN14 is not closed over 120 seconds during the cooling, fan or heating operation.



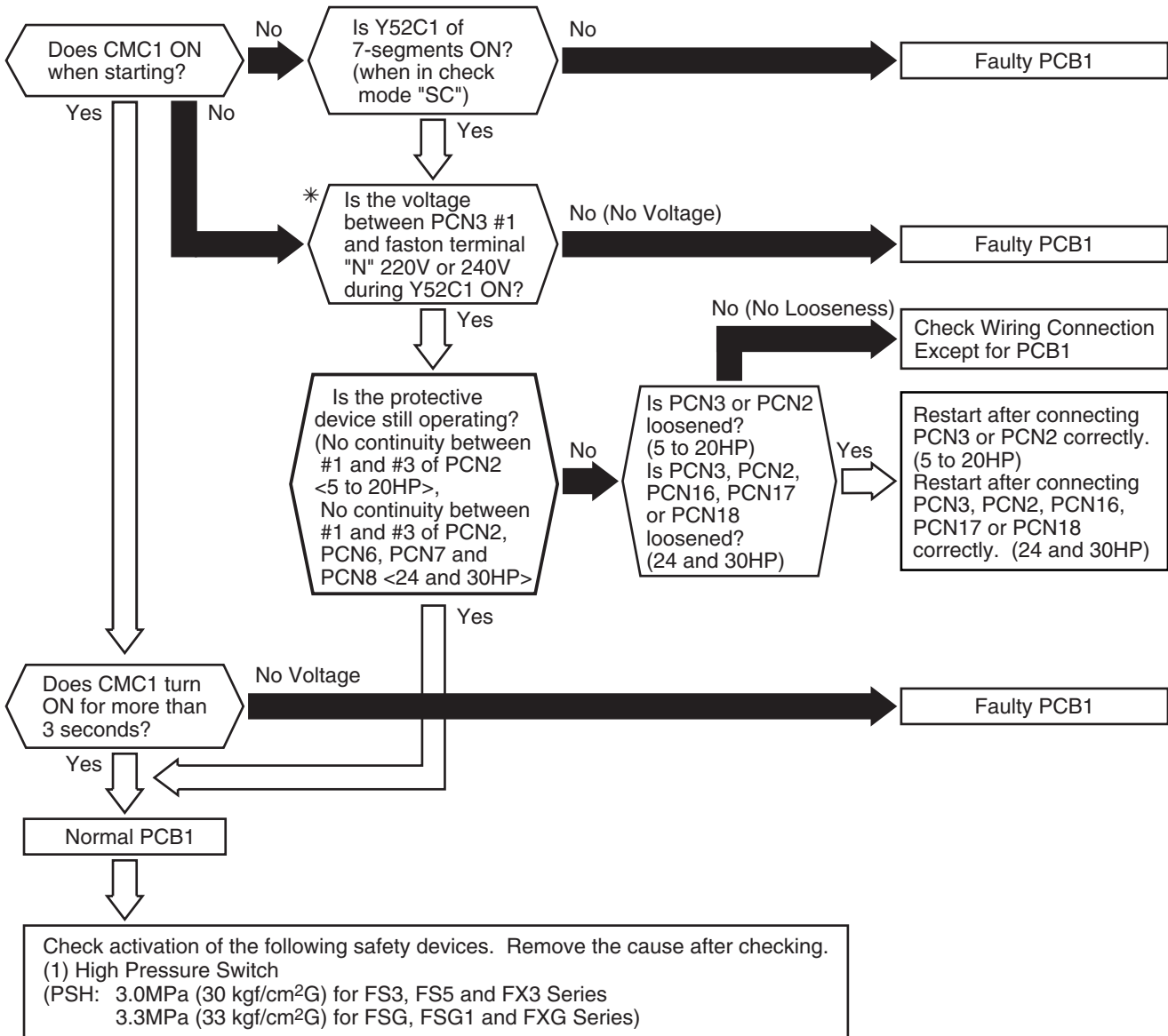
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Activation of Float Switch	High Drain Level	Clogging of Drainage	Check drain pan. → Remove clogged foreign particles.
	Faulty Float Switch	Fault	Check continuity when drain level is low. → Replace float switch if faulty.
		Faulty Contacting	Measure resistance by tester. → Repair looseness and replace connector.
		Faulty Connection	Check connections. → Repair connection.
Faulty Indoor Unit PCB		Check PCB by self-checking *1). → Replace it if faulty.	

\*1): Refer to TCII, SP2-K03 and SP2-L01.

Alarm Code <span style="font-size: 2em; font-family: monospace;">02</span>	<b>Activation of Safety Device in Outdoor Unit</b>
--	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

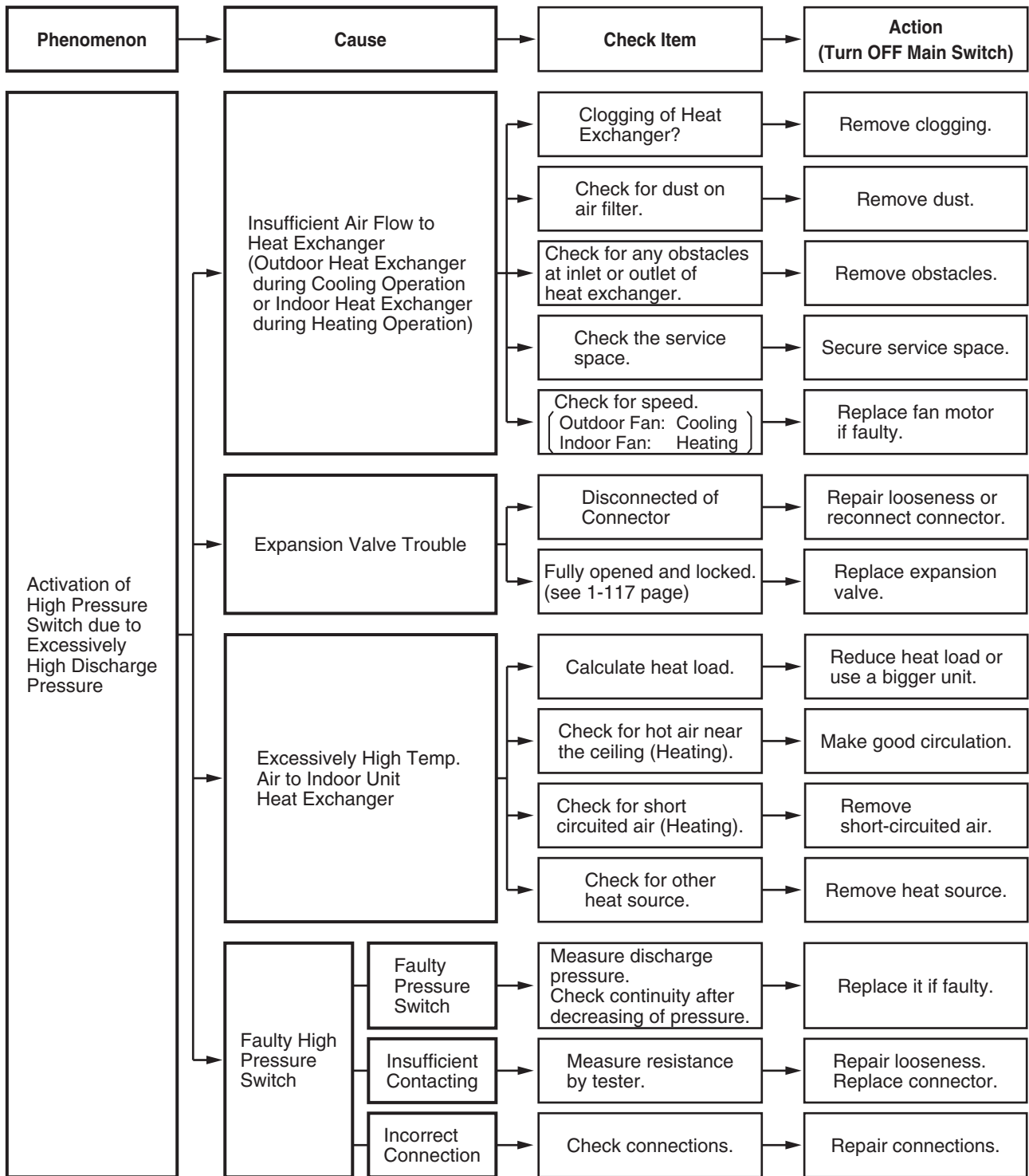
★ This alarm is indicated when one of safety devices is activated during compressor running.



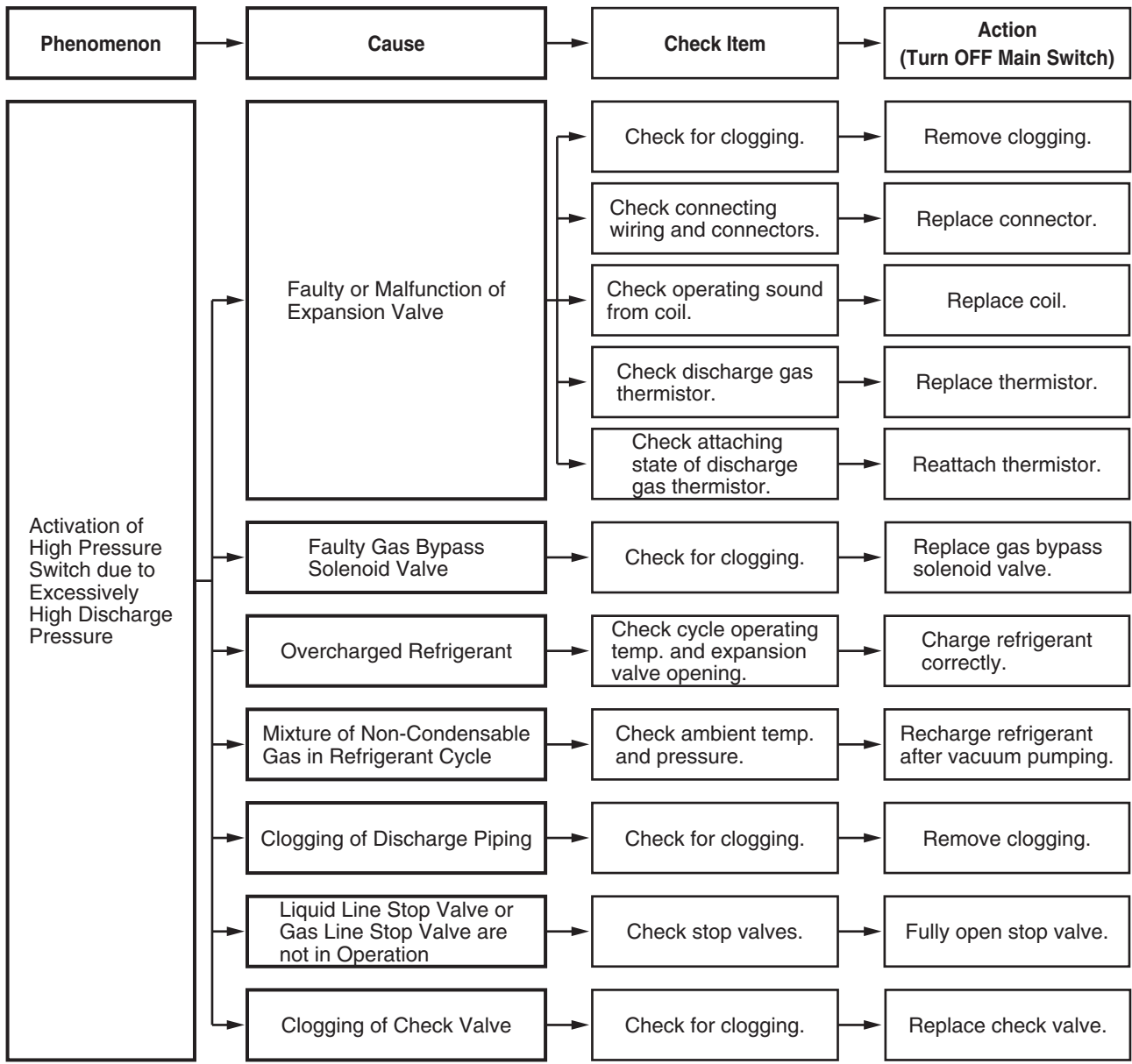
\* Check Item

Power Supply	Connector for CMC1	Faston Terminal
380-415V/50Hz	PCN3	N
380V/60Hz	PCN3	N
220V/60Hz	PCN3	S1

# TROUBLESHOOTING





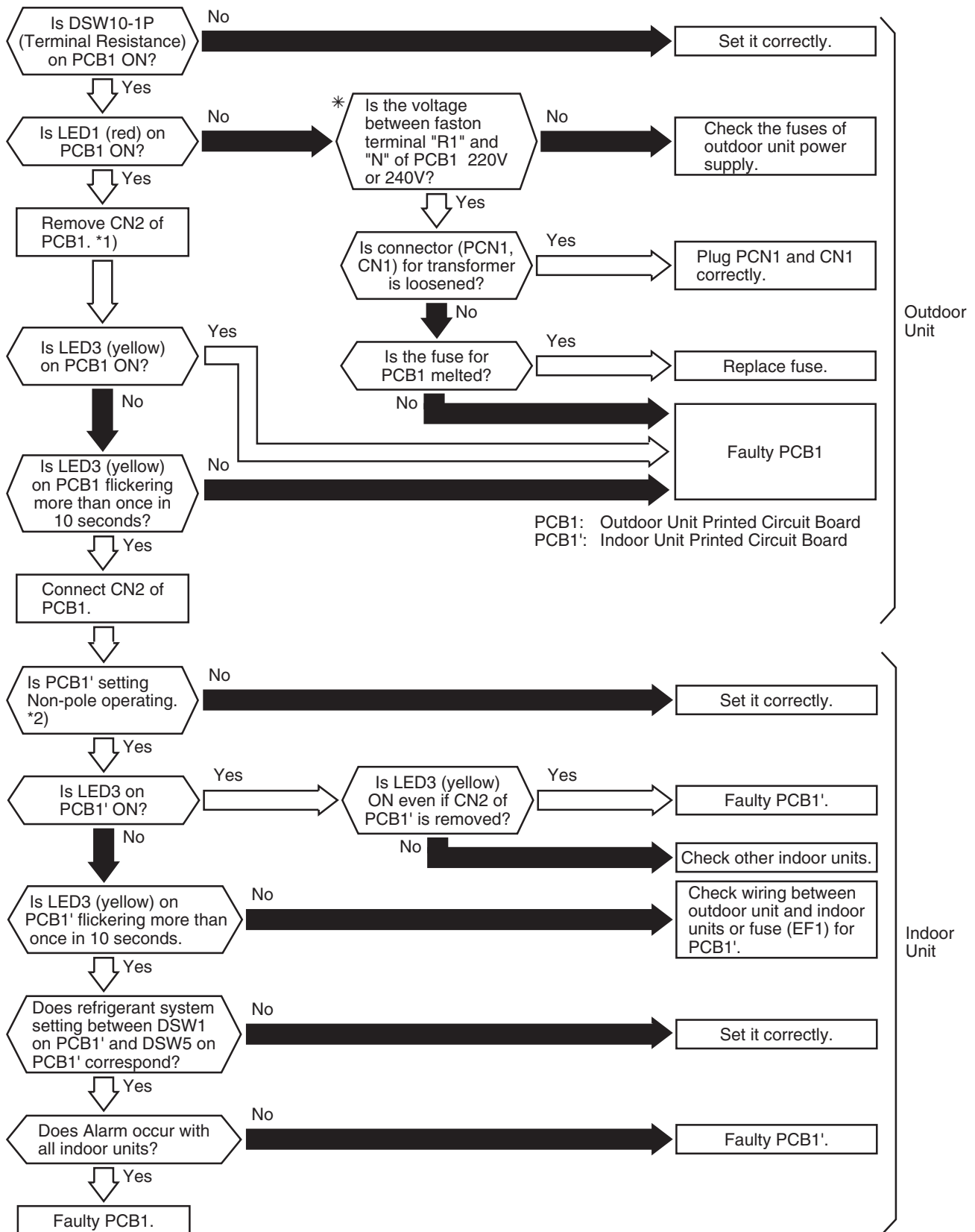


Alarm  
Code

03

## Abnormal Transmitting between Indoor Units and Outdoor Unit

- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, or the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
  - This alarm is indicated when abnormality is maintained for 3 minutes after normal transmitting between indoor units and outdoor unit, and also abnormality is maintained for 30 seconds after the micro-computer is automatically reset.  
The alarm is indicated when the abnormal transmitting is maintained for 30 seconds from starting of the outdoor unit.
- 
- ★ Investigate the cause of overcurrent and take necessary action when fuses are melted or the breaker for the outdoor unit are activated.
  - ★ Regarding RCI-FSG2, RCD-FSG1, RPI-FSG1 and RPK-FSGM\* Series, non-pole checking is not required.



\*1): In case that terminal resistance (DSW10-1P) is OFF when H-Link Connection is performed.  
 Set the terminal resistance to ON when CN2 is removed.  
 Set the terminal resistance to OFF when CN2 is reconnected.

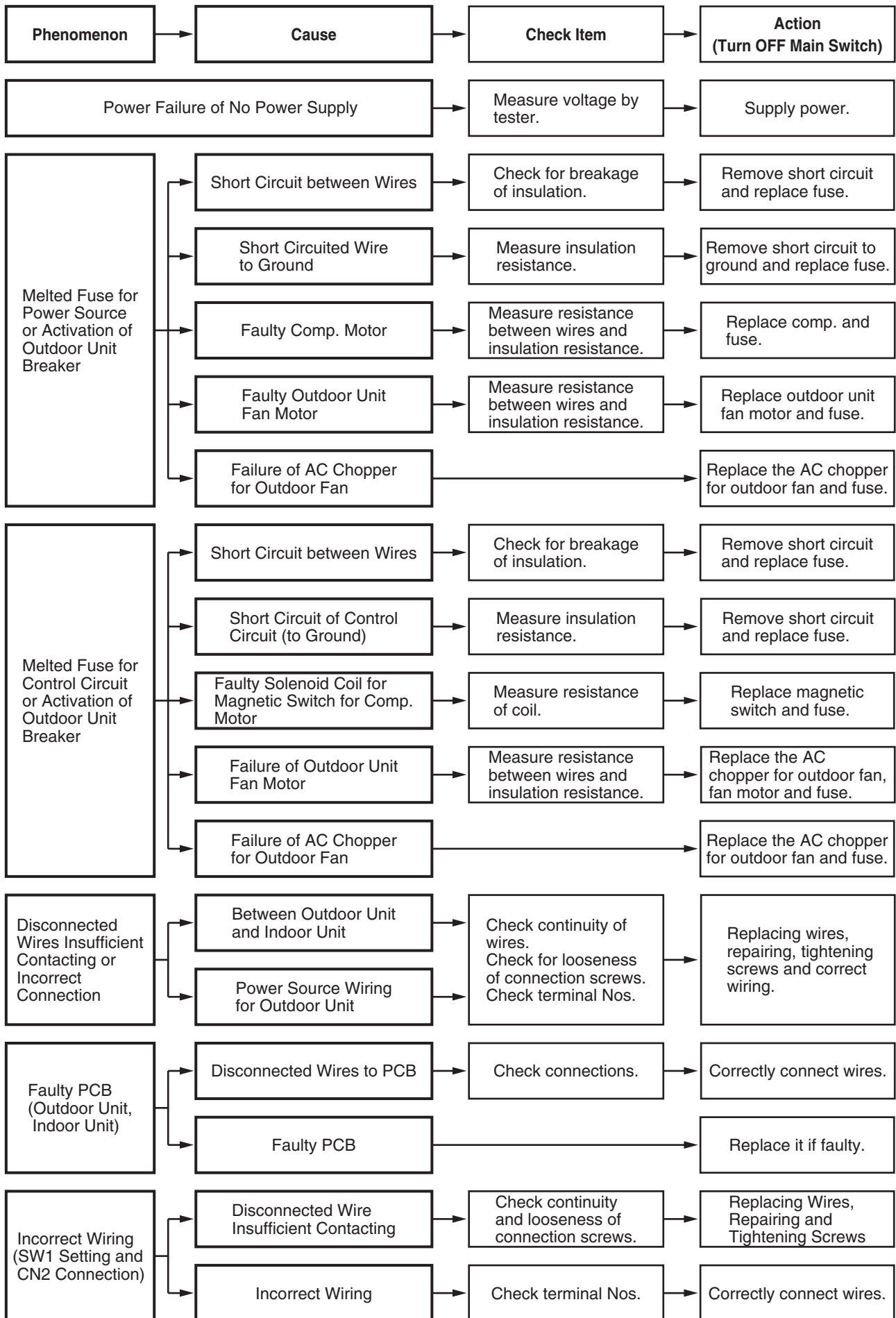
\*2): PCB1' Factory Setting for Non-Pole Transmitting

**\* Check Item**

Item	Setting Position
SW2	Left Side (New Transmission Side)
JP1	Short Circuited
CN2	Transmission Wire Connecting
CN18	Non-Occupied

Power Supply	Faston Terminal
380-415V/50Hz	between R1 and N
380V/60Hz	
220V/60Hz	between R1 and S1

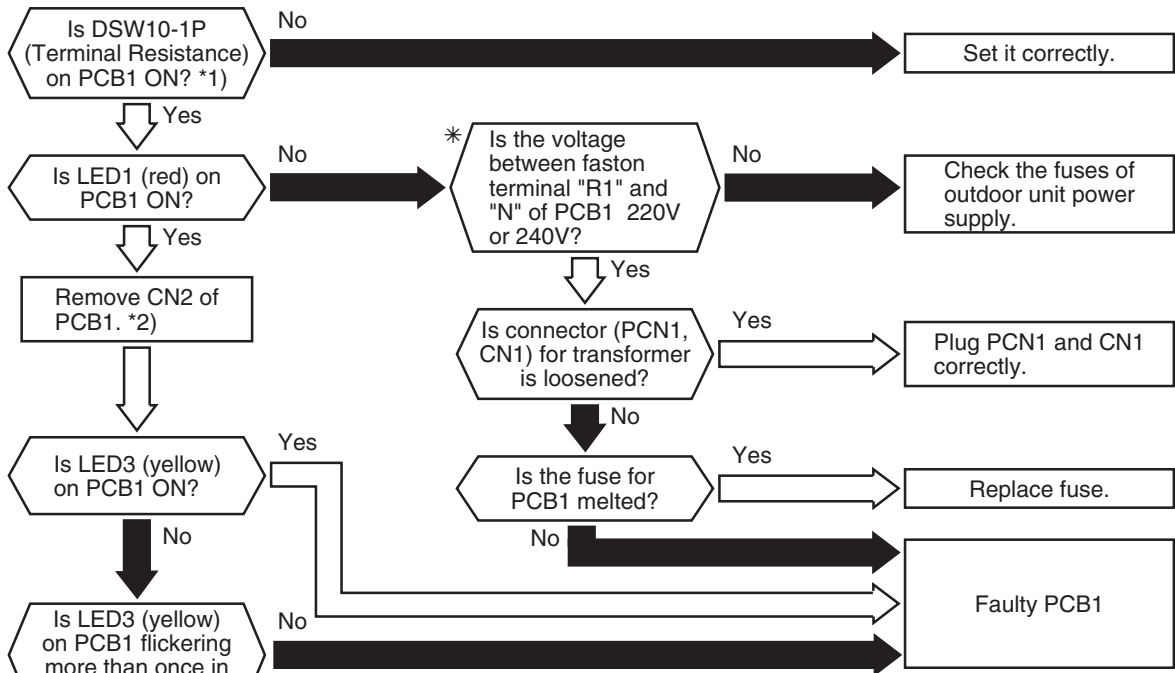
# TROUBLESHOOTING



Alarm Code	03	Abnormal Transmitting between Indoor Units and Outdoor Unit
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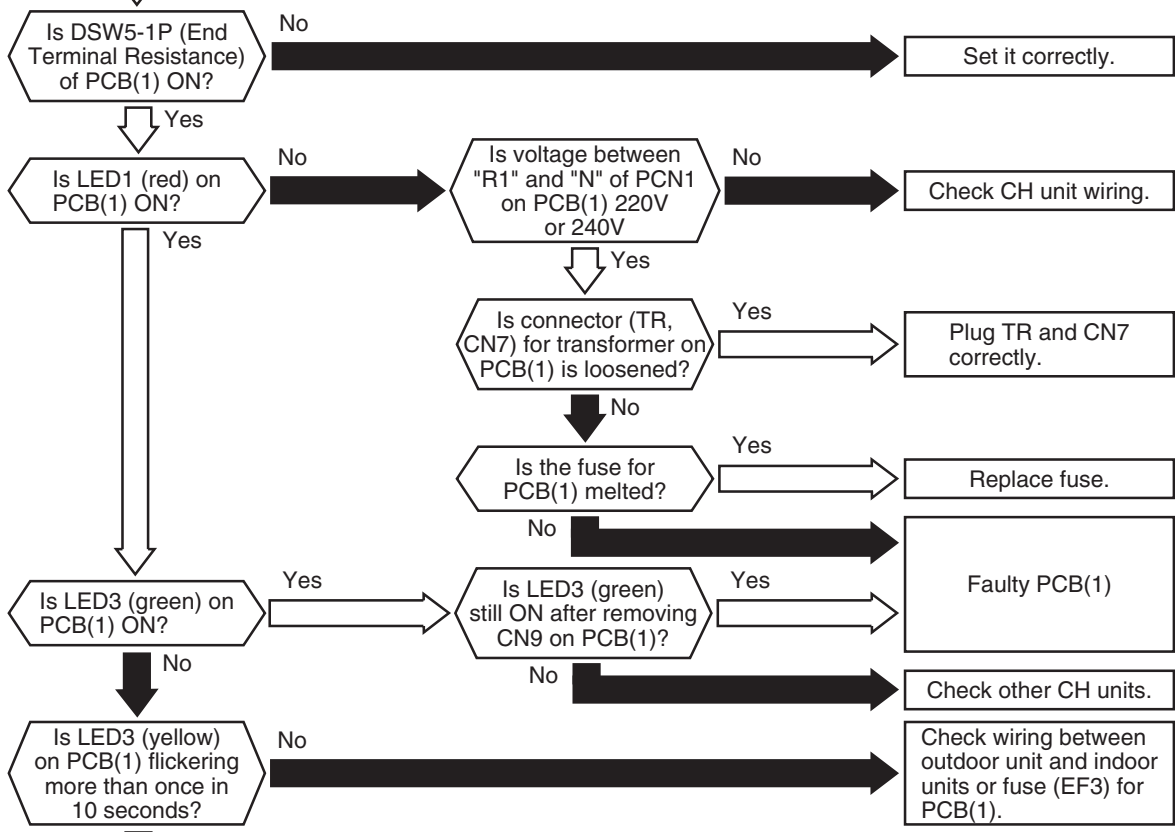
- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, or the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm is indicated when abnormality is maintained for 3 minutes after normal transmitting between indoor units, CH units and outdoor unit, and also abnormality is maintained for 30 seconds after the micro-computer is automatically reset.  
The alarm is indicated when the abnormal transmitting is maintained for 30 seconds from starting of the outdoor unit.
- ★ Investigate the cause of overcurrent and take necessary action when fuses are melted or the breaker for the outdoor unit are activated.
- ★ Regarding RCI-FSG2, RCD-FSG1, RPI-FSG1 and RPK-FSGM\* Series, non-pole checking is not required.

# TROUBLESHOOTING



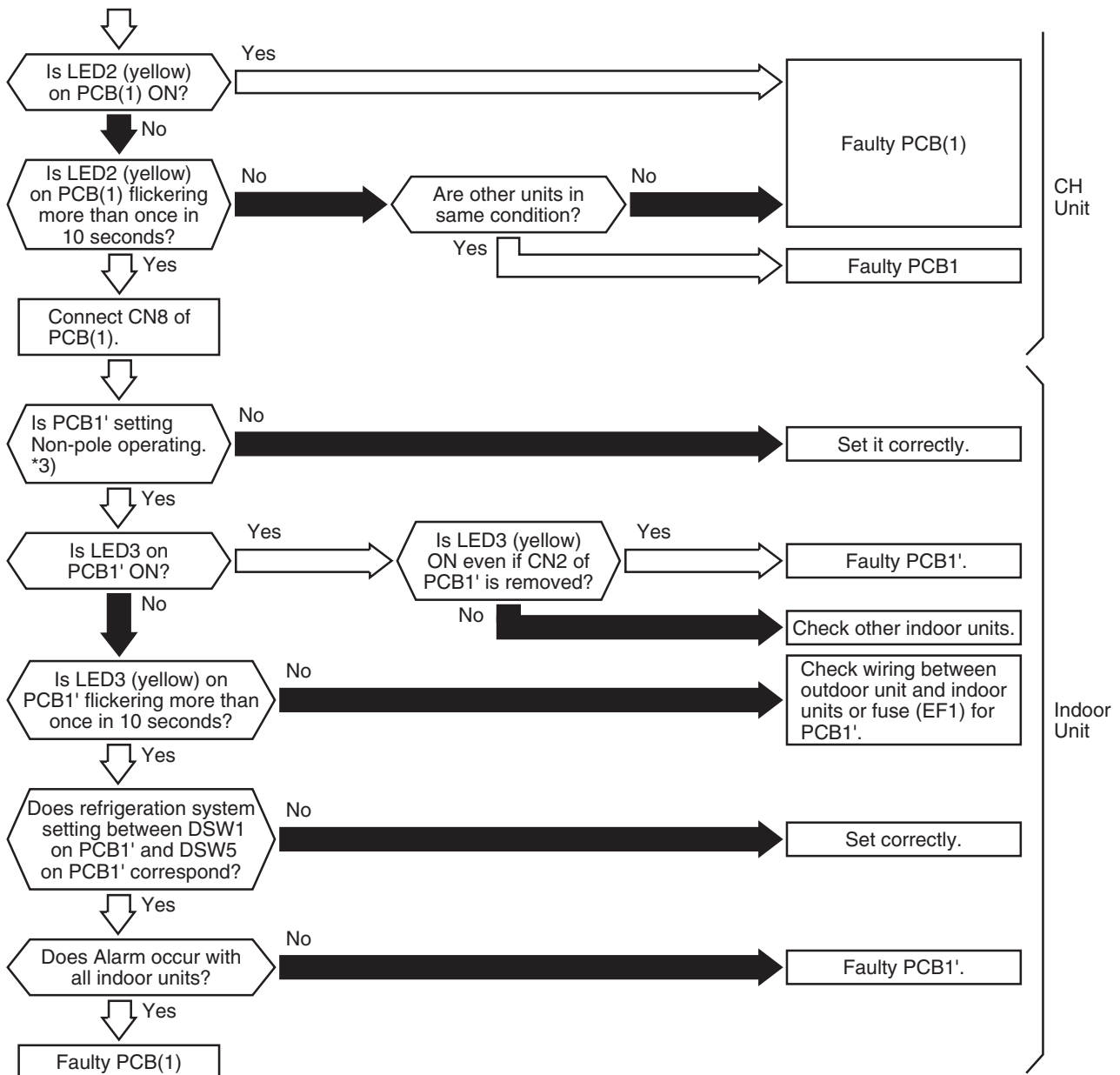
PCB1: Outdoor Unit Printed Circuit Board  
 PCB1': Indoor Unit Printed Circuit Board

Outdoor Unit



CH Unit

To Next Page



\*1): PCB1 Factory Setting for Non-Pole Transmitting

Item	Setting Position
SW1	Right Side (New Transmission Side)
DSW9-2P	ON
DSW10-1P	ON
CN101	Transmission Wire Connecting
CN19	Non-Occupied

\*2): In case that terminal resistance (DSW10-1P) is OFF when H-Link Connection is performed.  
 Set the terminal resistance to ON when CN2 is removed.  
 Set the terminal resistance to OFF when CN2 is reconnected.

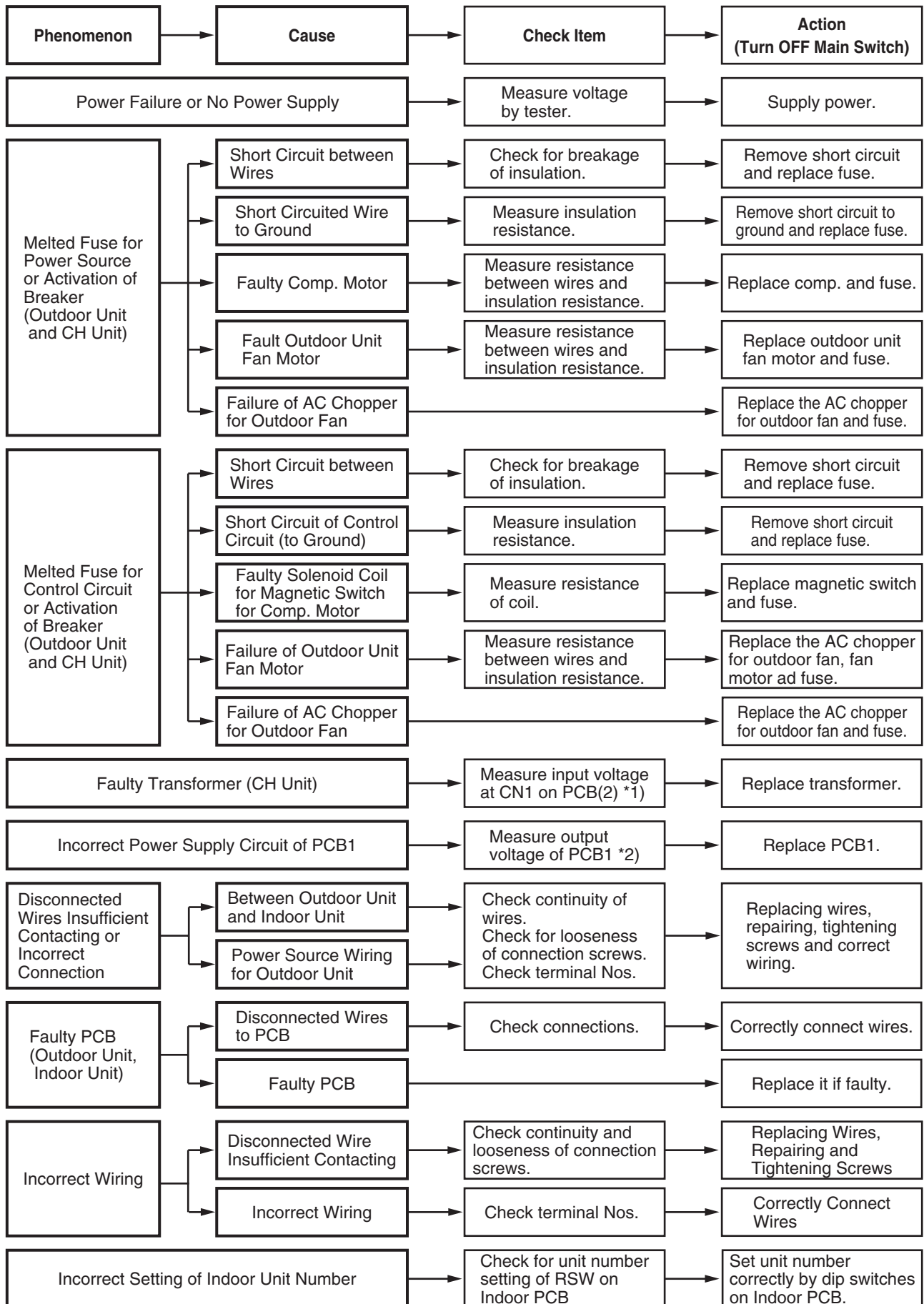
\*3): PCB1' Factory Setting for Non-Pole Transmitting

Item	Setting Position
SW2	Left Side (New Transmission Side)
JP1	Short Circuited
CN2	Transmission Wire Connecting
CN18	Non-Occupied

\* Check Item

Power Supply	Faston Terminal
380-415V/50Hz	between R1 and N
380V/60Hz	
220V/60Hz	between R1 and S1

# TROUBLESHOOTING



\*1): Input Voltage at CN1 on PCB(2).

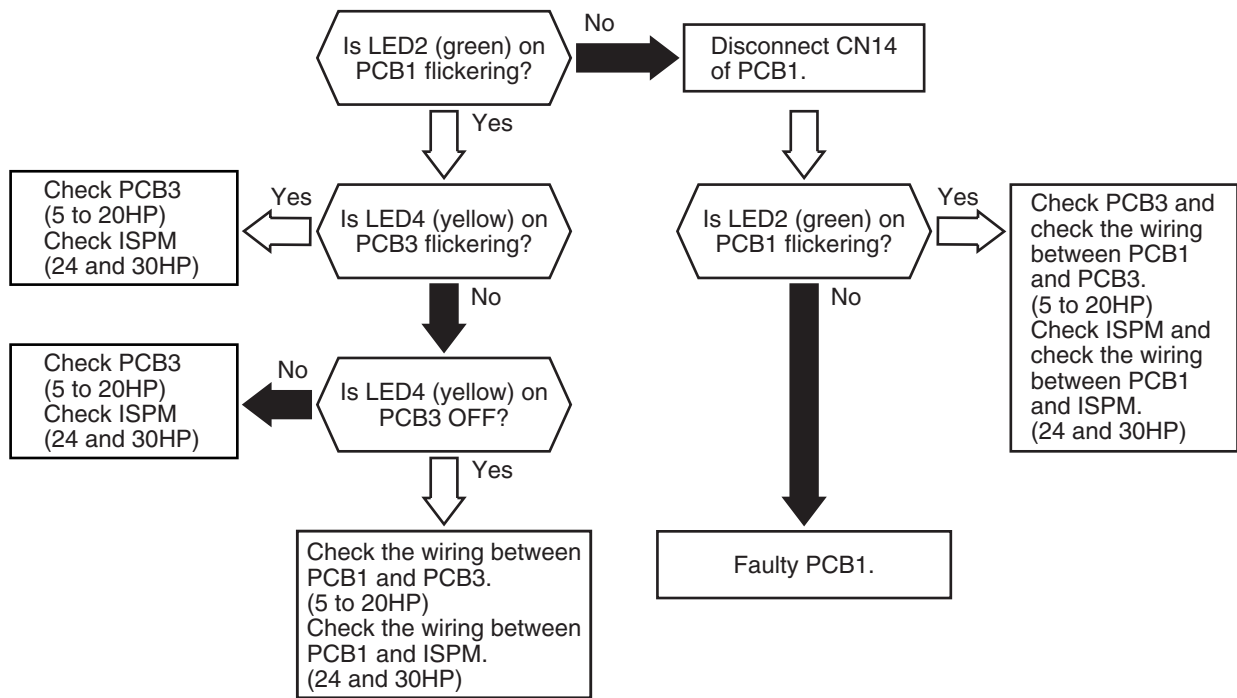
(22.2VAC between #1 and #2, 14.5VAC between #3 and #4)

\*2): 12VDC between VCC12 and GND2, 5VDC between VCC05 and GND1,  
12VDC between VCC12 and GND1, 15VDC between VCC15 and GND1,  
24VDC between VCC24 and GND1, 12VDC between VCC12T and GND1,



Alarm Code <span style="font-size: 2em; font-family: monospace;">04</span>	<b>Abnormal Transmitting between Inverter and Outdoor PCB1, 3</b>
--	---

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB1.
- ★ This alarm is indicated when abnormality is maintained for 30 seconds after normal transmitting between the outdoor unit PCB1 and inverter PCB3, and also abnormality is maintained for 30 seconds after the micro-computer is automatically reset. The alarm is indicated when the abnormal transmitting is maintained for 30 seconds from starting of the outdoor unit. (In case of 5 to 20HP)
- ★ This alarm is indicated when abnormality is maintained for 30 seconds after normal transmitting between the outdoor unit PCB1 and ISPM, and also abnormality is maintained for 30 seconds after the micro-computer is automatically reset. The alarm is indicated when the abnormal transmitting is maintained for 30 seconds from starting of the outdoor unit. (In case of 24 and 30HP)



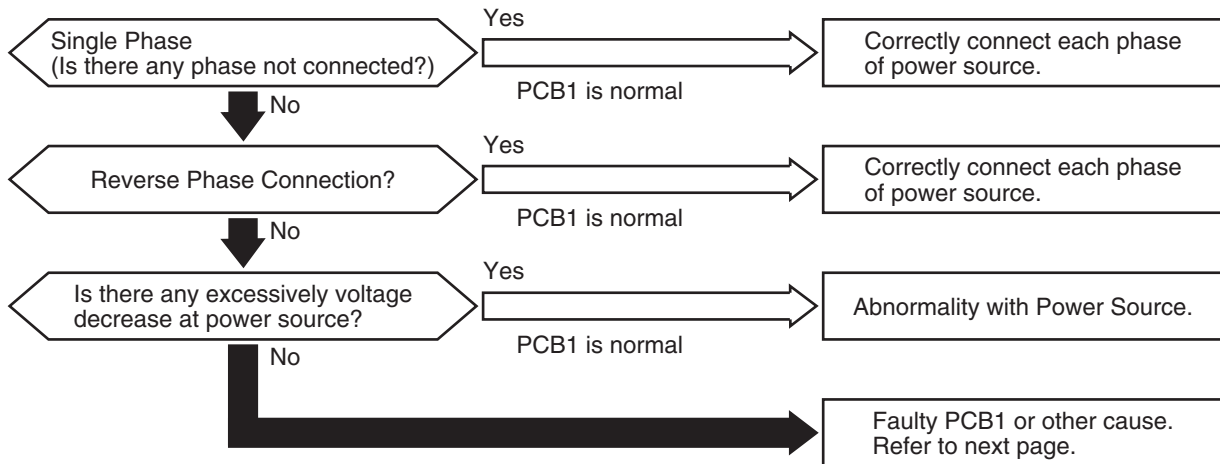
PCB1: Control PCB in Outdoor Unit  
 PCB3: Inverter PCB (High Voltage) (5 to 20HP)  
 ISPM: Inverter System Power Module (24 and 30HP)

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Disconnected Wires, Insufficient Contacting or Incorrect Connection	Between Control PCB and Inverter PCB	Check continuity of wires. Check for looseness of connection screws. Check connection No.	Replacing wires, repairing, tightening screws and incorrect wiring.
	Power Source Wiring for Outdoor Unit		
Faulty PCB (PCB1 for Control, PCB3 for Inverter) (5 to 20HP)	Disconnected Wires to PCB	Check connections.	Repair wiring connections.
	Faulty PCB		
Faulty PCB (PCB for Control, ISPM for Inverter) (24 and 30HP)	Disconnected Wires Insufficient Contacting	Check continuity. Check for looseness of connection screws.	Replacing Wires, Repairing and Tightening Screws
	Incorrect Wiring		

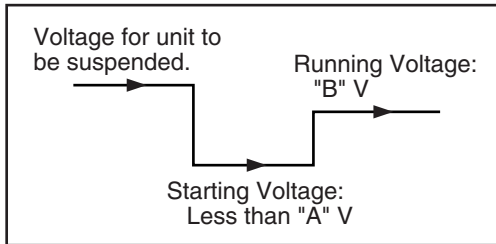
Alarm Code **05**

**Abnormality of Picking up Phase Signal**

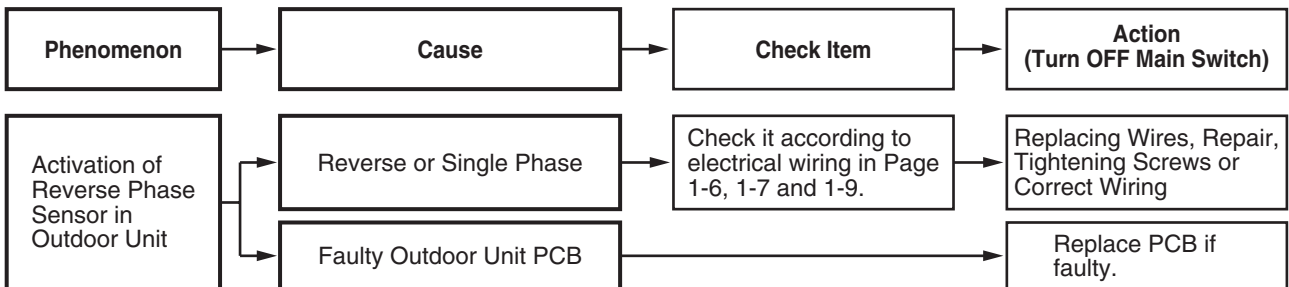
- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the main power source phase is reversely connected or one phase is not connected.



**NOTE:**  
PCB1: Outdoor Unit Printed Circuit Board

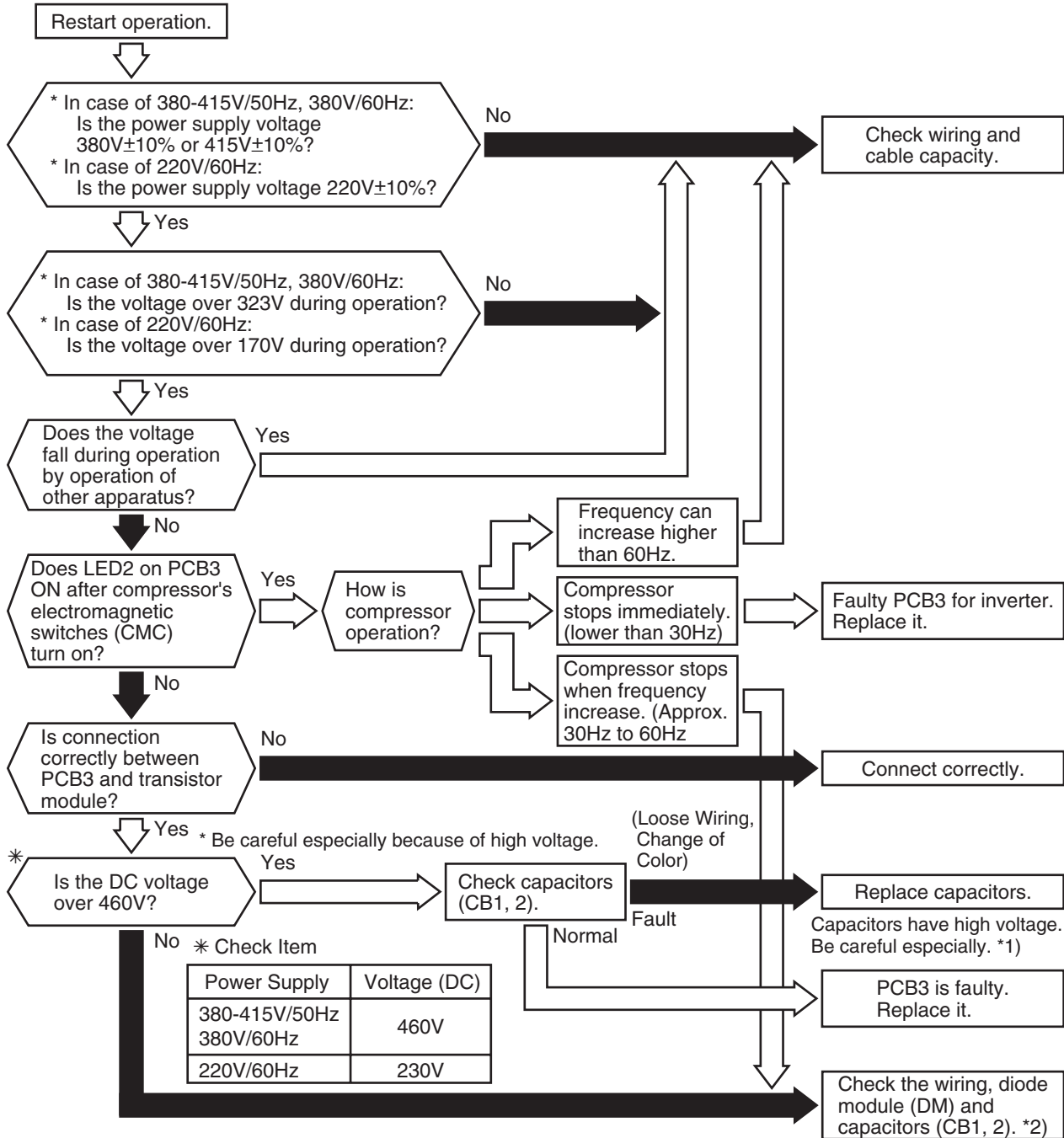


Power Supply	"A"	"B"
380-415V, 50Hz	323	342 to 456
380V, 60Hz		342 to 418
220V, 60Hz	187	198 to 242



Alarm Code	06	Excessively Low or High Voltage for Inverter (For 5 to 20HP)
------------	----	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when voltage between terminal “P” and “N” of transistor module (IPM) is insufficient and its occurrence is three times in 30 minutes. In the case that the occurrence is smaller than 2 times, retry is performed.



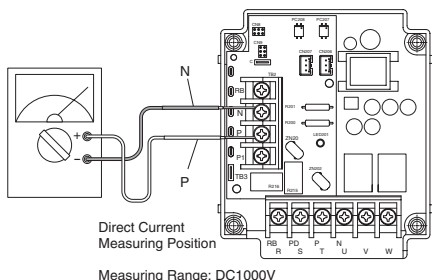
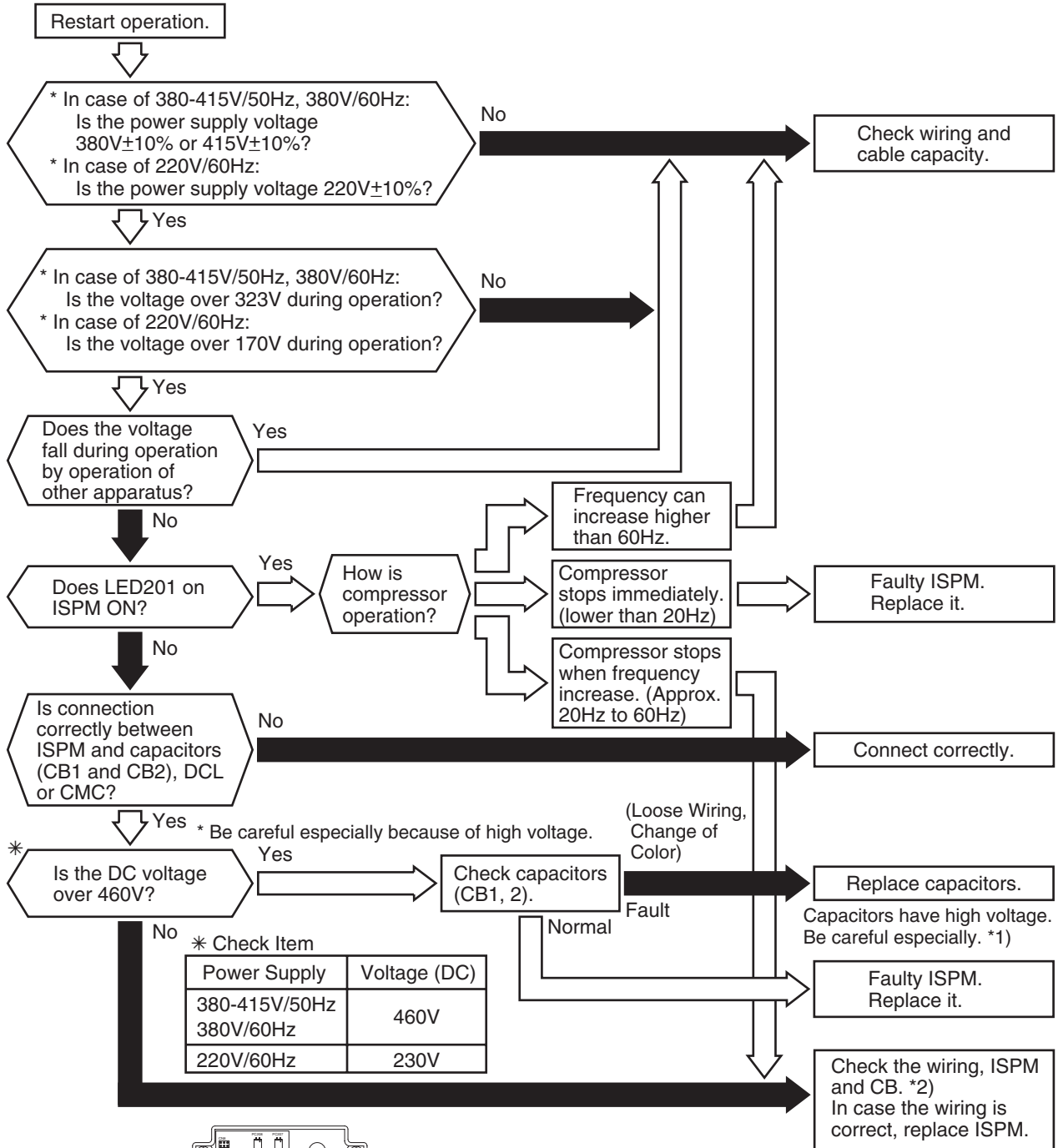
\*1): If capacitor has high voltage, perform the high voltage discharge work refer to item 1.3.6.  
 \*2): Checking procedures of diode module is indicated in item 1.3.6.  
 \*3): DC voltage measuring position:  
 IPM “P” Terminal to “+” Terminal of Tester, “N” Terminal to “-” Terminal of Tester  
 Measuring Position: DC 1000V

Alarm Code

06

**Excessively Low or High Voltage for Inverter (For 24 and 30HP)**

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the alarm code is indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when voltage between terminal “P” and “N” of inverter module (ISPM) is insufficient and its occurrence is three times in 30 minutes. In the case that the occurrence is smaller than 2 times, retry is performed.

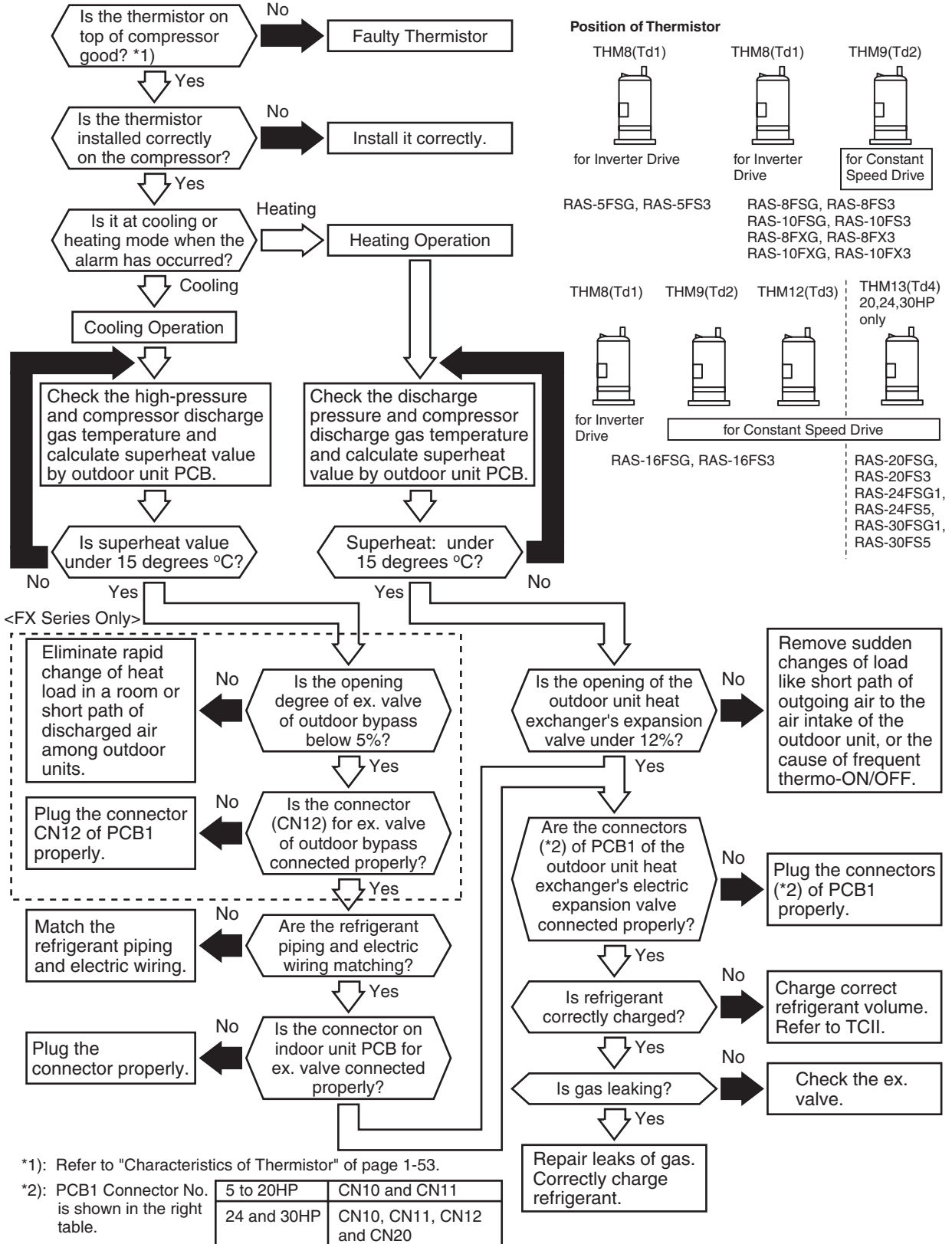


\*1): If capacitor has high voltage, perform the high voltage discharge work refer to item 1.3.6.

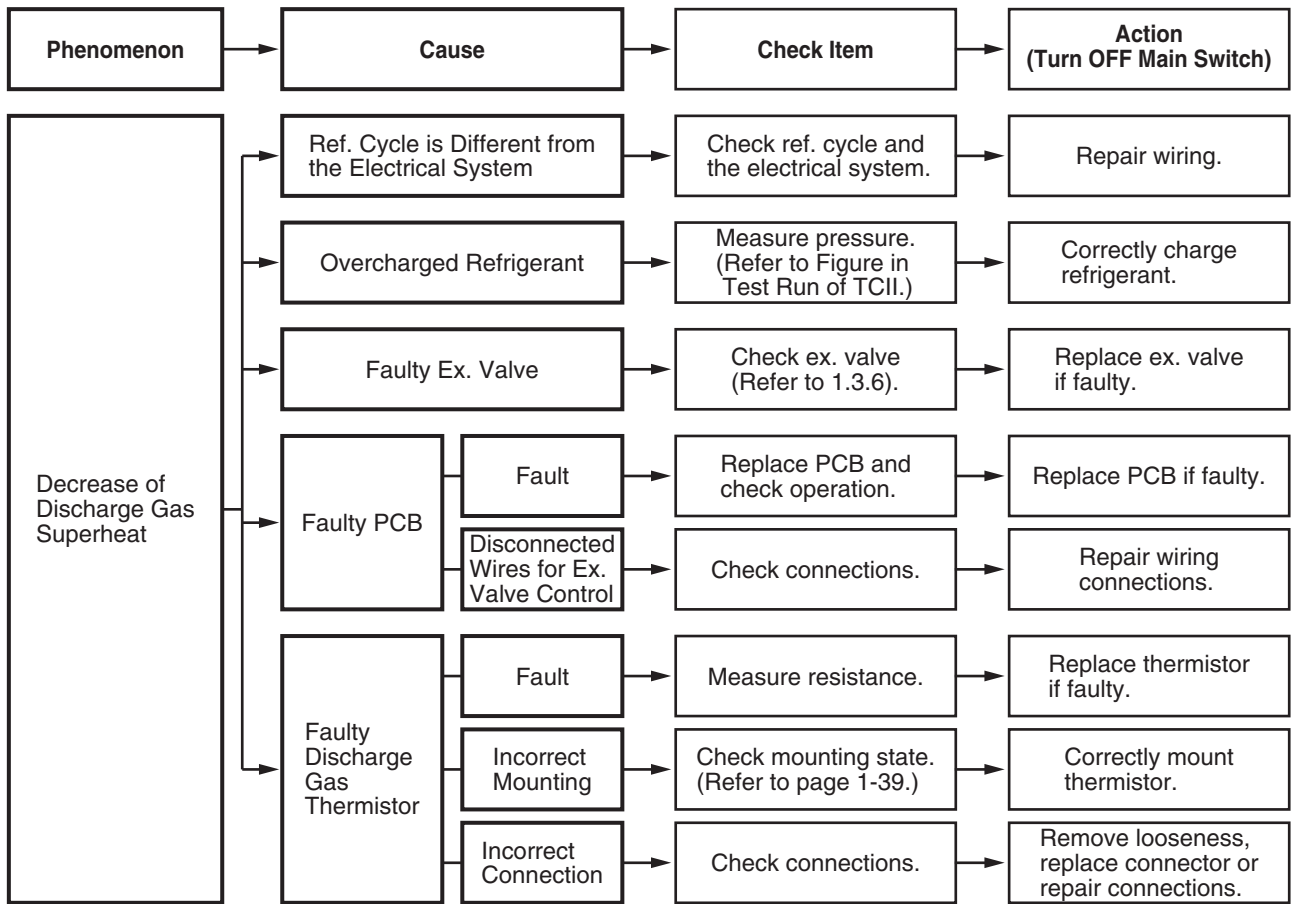
\*2): Checking procedures of ISPM is indicated in item 1.3.6.

Alarm Code <span style="font-size: 2em; font-weight: bold;">07</span>	<b>Decrease of Discharge Gas Superheat</b>
---	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ In the case that the discharge gas superheat less than 15 deg. at the top of the compressor is maintained for 30 minutes, retry operation is performed. However, when the alarm occurs again within 90 minutes, this alarm code is indicated.



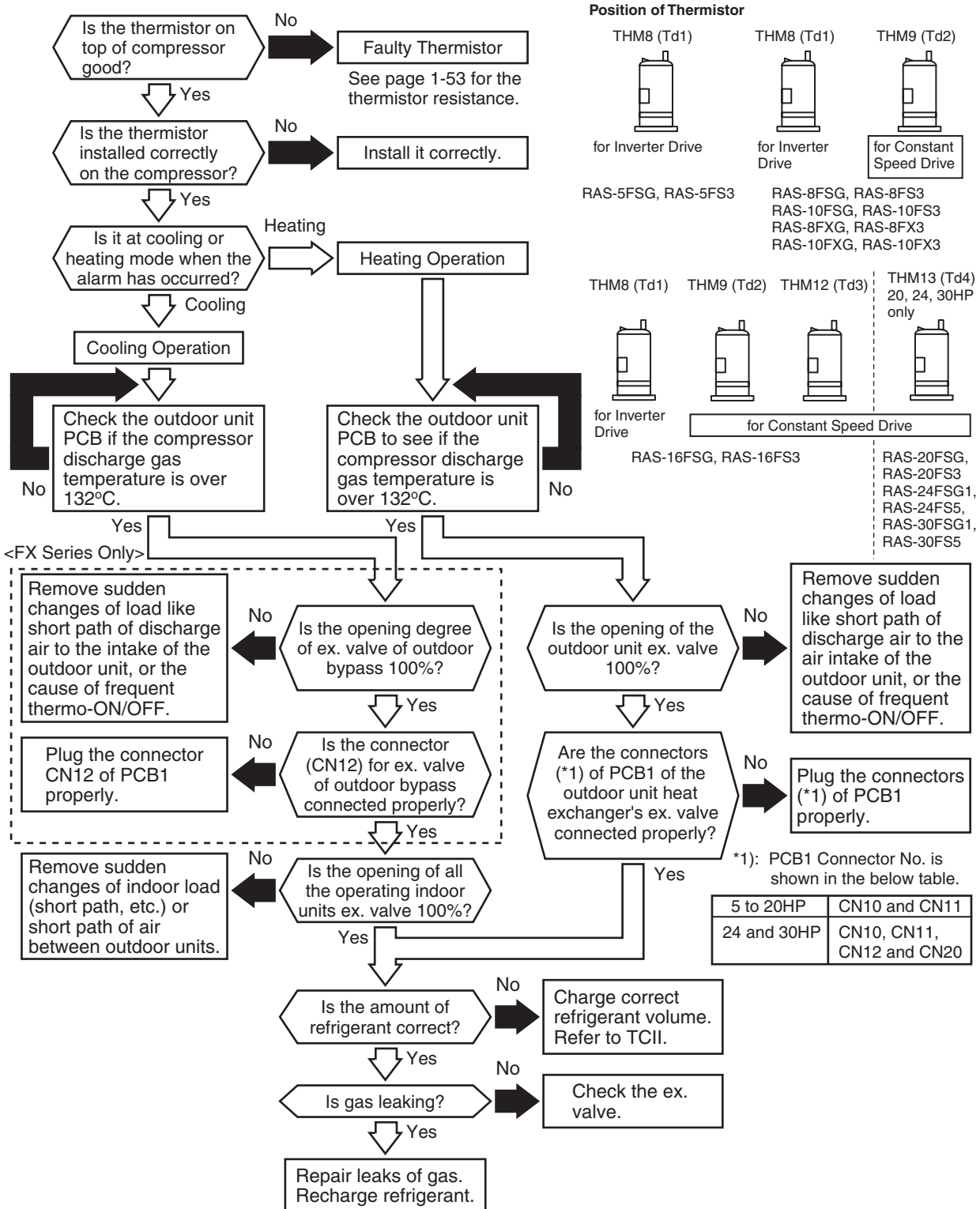
# TROUBLESHOOTING



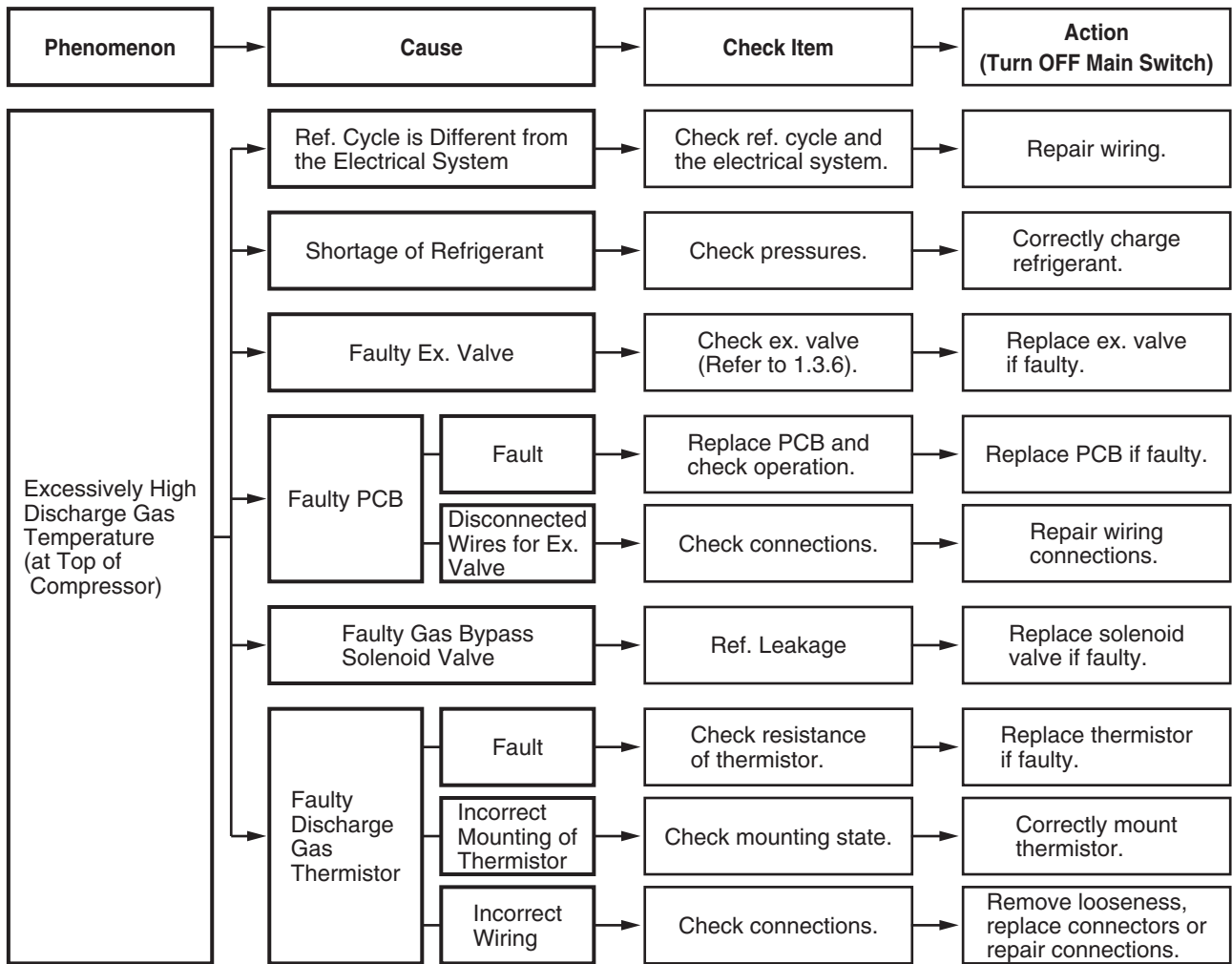
Alarm Code <span style="font-size: 2em; font-family: monospace;">00</span>	<b>Excessively High Discharge Gas Temperature at the Top of Compressor Chamber</b>
--	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ This alarm is indicated when the following conditions occurs three times within one hour;  
 (1) The temperature of the thermistor on the top of the compressor is maintained higher than 132°C for 10 minutes, or (2) The temperature of the thermistor on the top of the compressor is maintained higher than 140°C for 5 seconds.



# TROUBLESHOOTING



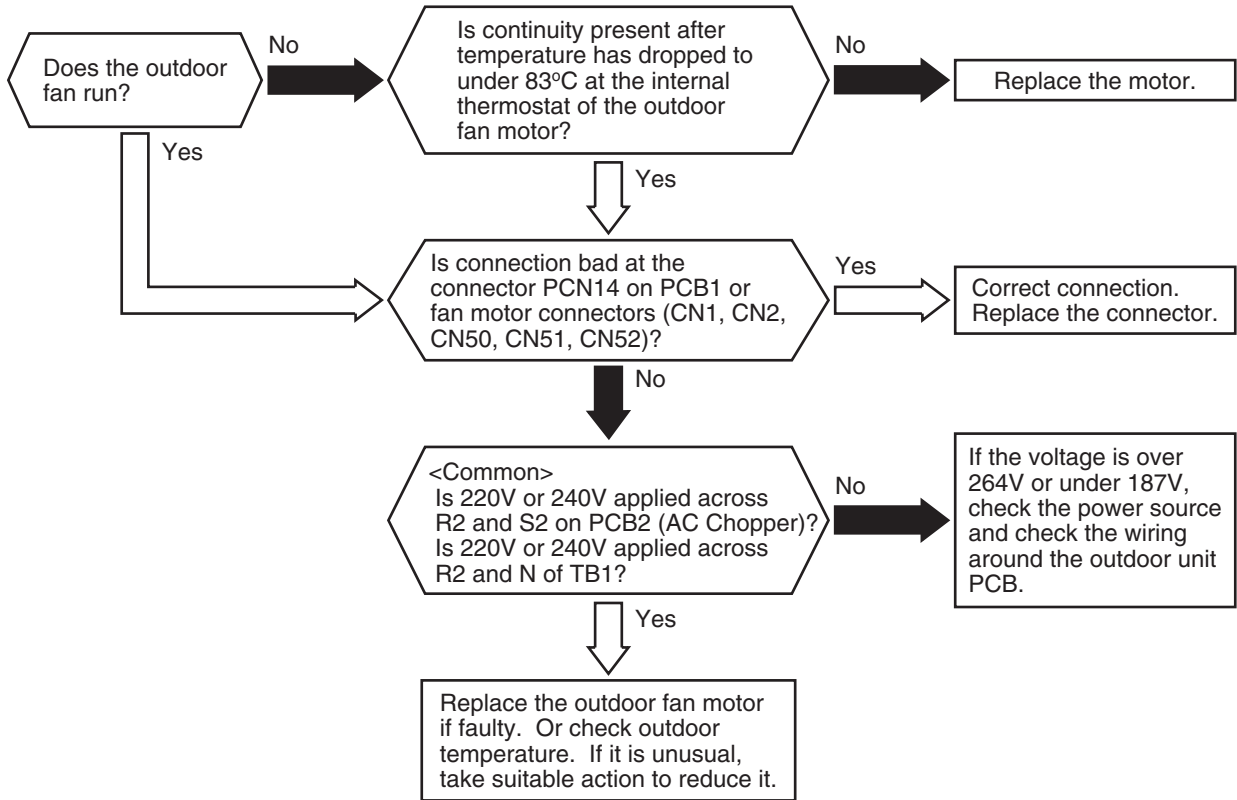


Alarm Code <span style="font-size: 2em; font-family: monospace;">09</span>	<b>Activation of Protection Device for Outdoor Fan Motor</b>
--	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the temperature of the internal thermostat (\*) for the outdoor fan motor is higher than 130°C.

\* Check Item

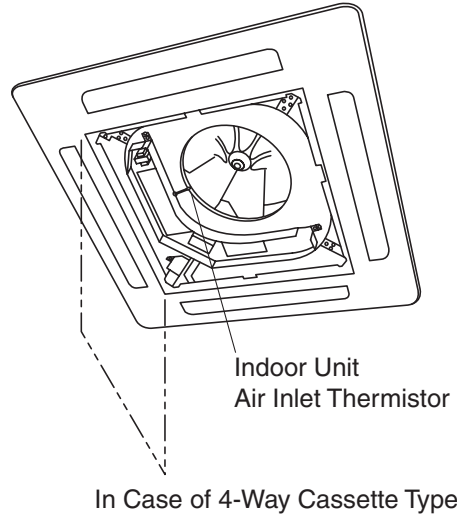
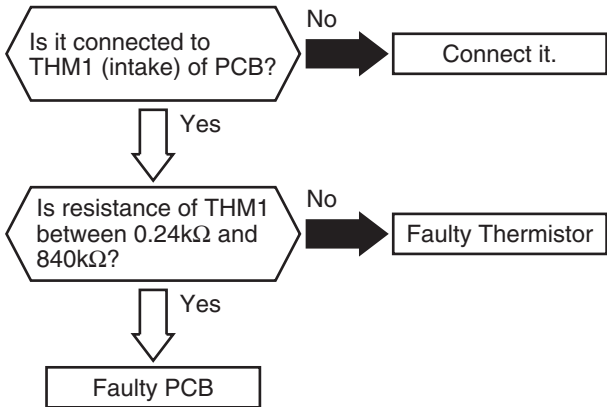
HP	Mark	Power Supply
5 to 20HP	ITO1, 2	380-415/380V, 220V 50/60Hz
24, 30HP	ITO1, 2, 3	380-415V 50Hz, 380V 60Hz
	ITO1, 3	220V 60Hz



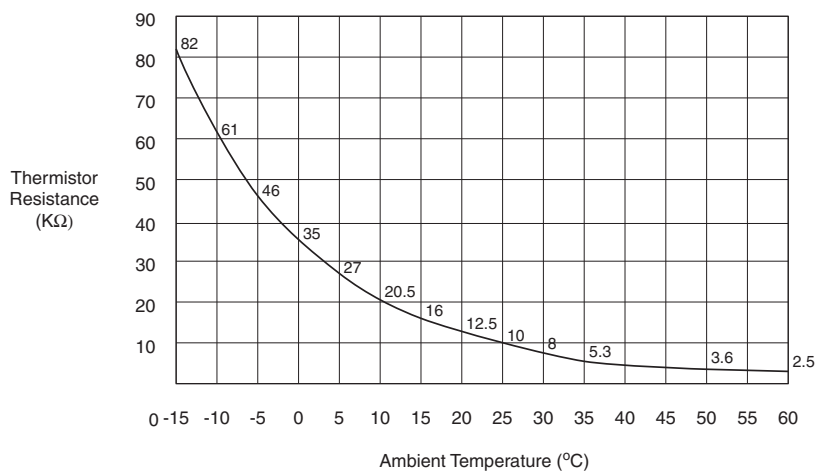
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)	
Activation of Internal Thermostat for Outdoor Unit Fan Motor	Faulty Outdoor Unit Fan Motor	Measure coil resistance and insulation resistance.	Replace motor if faulty.	
	Faulty Internal Thermostat	Fault	Check continuity after fan motor temperature decreases to room temp.	Replace fan motor if no continuity of internal thermostat under 83°C.
		Insufficient Contacting	Measure resistance by tester.	Correct looseness. Replace connectors.
		Incorrect Connection	Check connections.	Repair connections.

Alarm Code	11	<b>Abnormality of Thermistor for Indoor Unit Inlet Air Temperature (Air Inlet Thermistor)</b>
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling or heating operation. The system is automatically restarted when the fault is removed.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Intake Air Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check connection.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.



Thermistor Characteristics

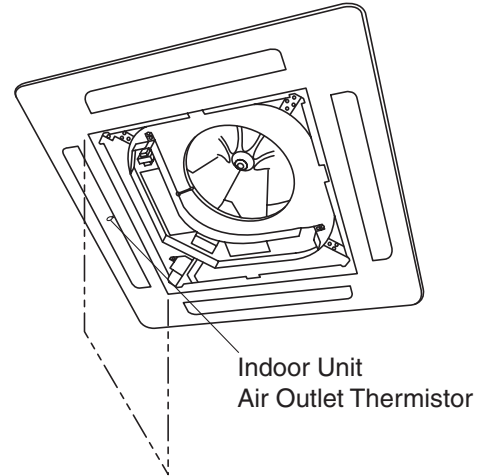
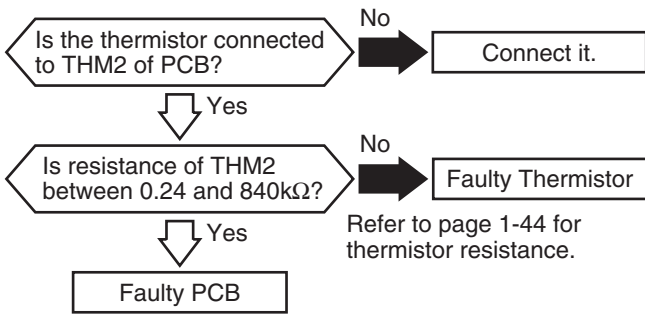
**NOTE:**

This data is applicable to the following thermistors;

1. Indoor Unit Discharge Air Temperature, 2. Indoor Unit Liquid Refrigerant Temperature, 3 Indoor Unit Intake Air Temperature, 4. Outdoor Air Temperature, 5. Outdoor Unit Evaporating Temperature, 6. Indoor Unit Gas Piping

Alarm Code	12	<b>Abnormality of Thermistor for Indoor Unit Discharge Air Temperature (Air Outlet Thermistor)</b>
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling or heating operation.

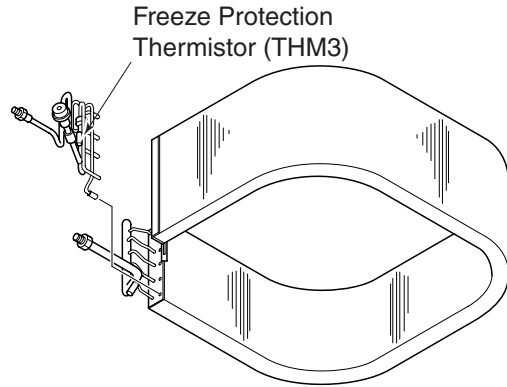
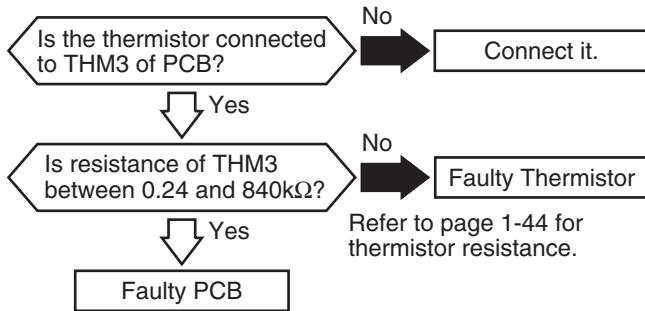


In Case of 4-Way Cassette Type

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Air Outlet Thermistor	→	→	→
	→	→	→
	→	→	→
	→	→	→
	→	→	→

Alarm Code	<b>13</b>	<b>Abnormality of Thermistor for Indoor Unit Heat Exchanger Liquid Refrigerant Pipe Temperature (Freeze Protection Thermistor)</b>
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling operation or heating operation.

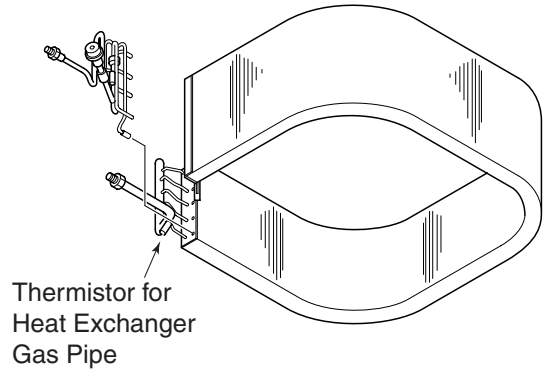
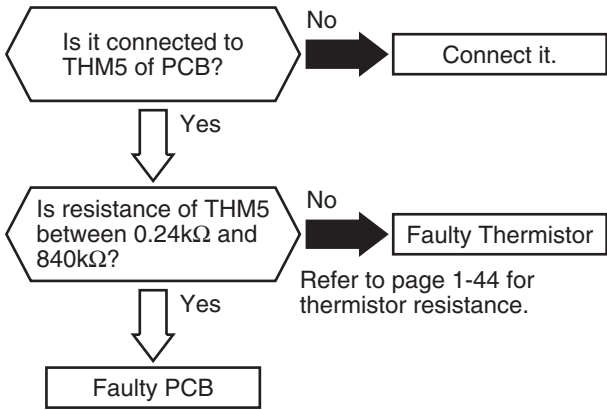


In Case of 4-Way Cassette Type

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Freeze Protection Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.

Alarm Code <span style="font-size: 2em; font-weight: bold; margin-left: 10px;">14</span>	<b>Abnormality of Thermistor for Indoor Unit Heat Exchanger Gas Refrigerant Pipe Temperature (Gas Piping Thermistor)</b>
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- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling or heating operation. The system is automatically restarted when the fault is removed.



In Case of 4-Way Cassette Type

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Thermistor for Indoor Unit Heat Exchanger Gas Pipe Temp.	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.

Alarm Code

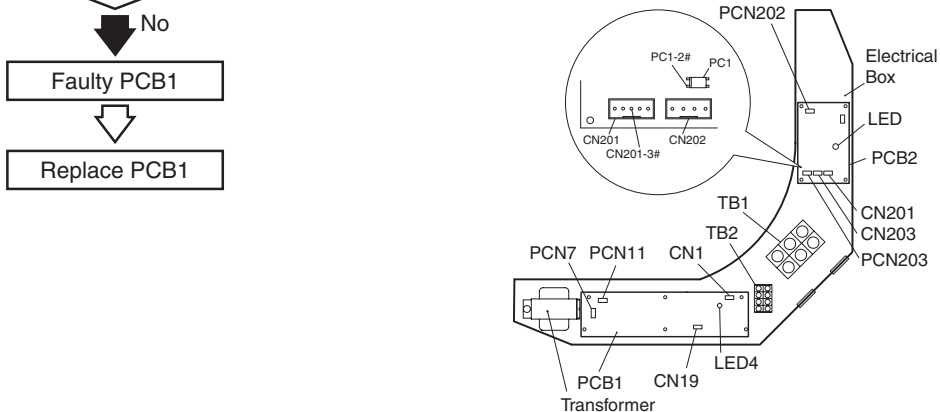
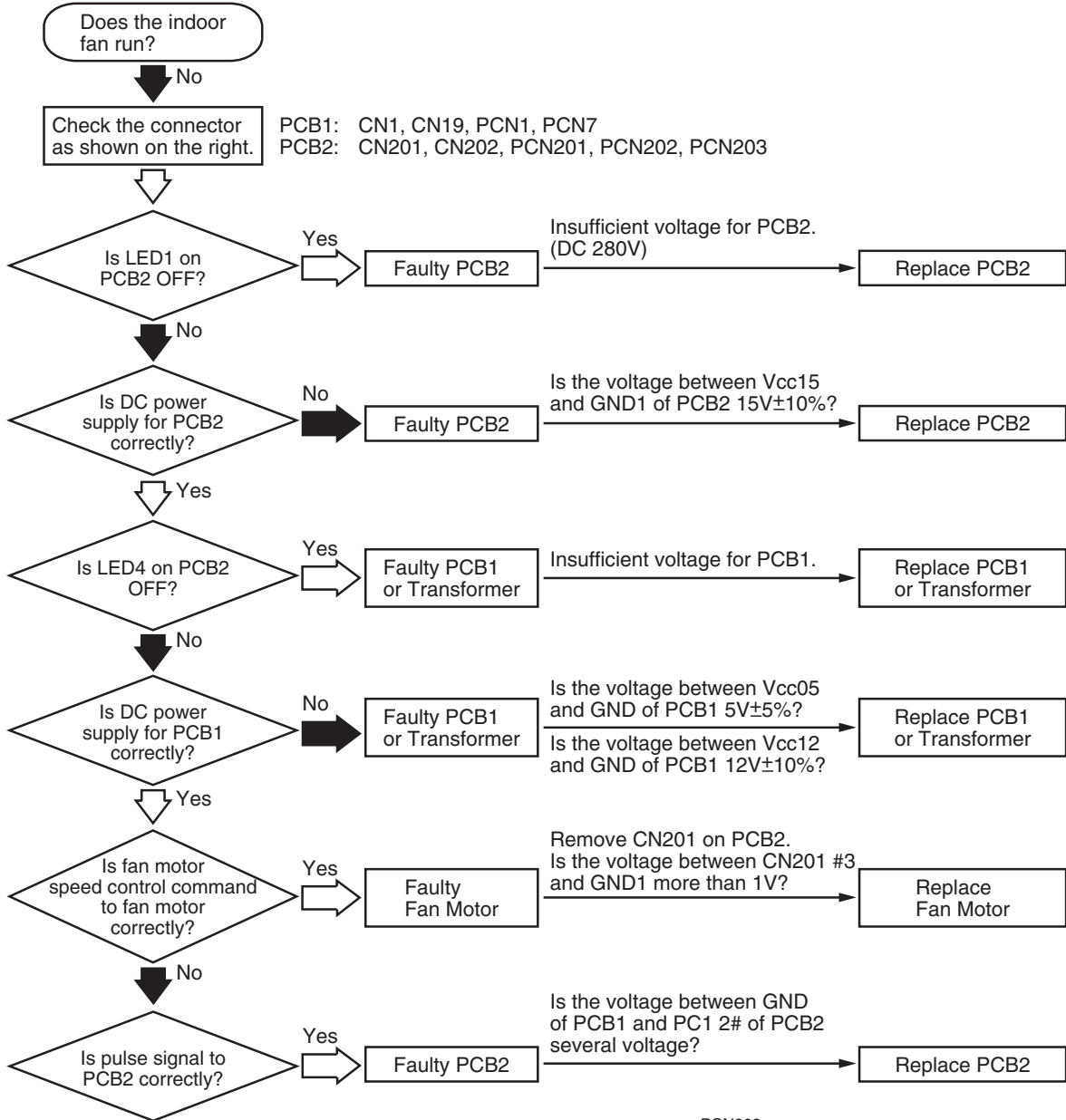
19

Activation of Protection Device for Indoor Fan Motor (RCI-Model)

- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the alarm code is indicated on the display of the outdoor unit PCB.

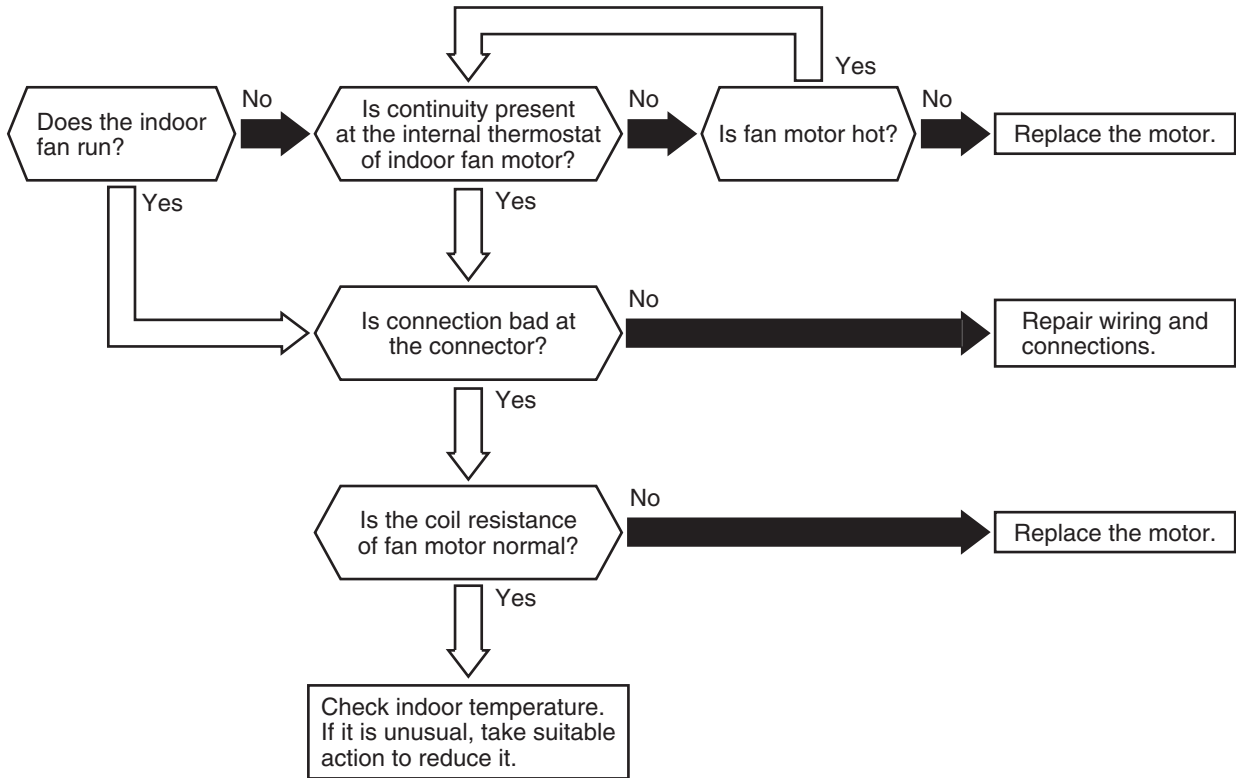
★ This alarm code is indicated when the following conditions occurs three times in 30 minutes.

\* Indoor fan rotates less than 70rpm for 5 seconds during operation.



Alarm Code <b>19</b>	<b>Activation of Protection Device for Indoor Fan Motor (except RCI and RPK Model)</b>
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
  
- ★ This alarm code is indicated when the temperature of the internal thermostat for the indoor fan motor is higher than 130°C.



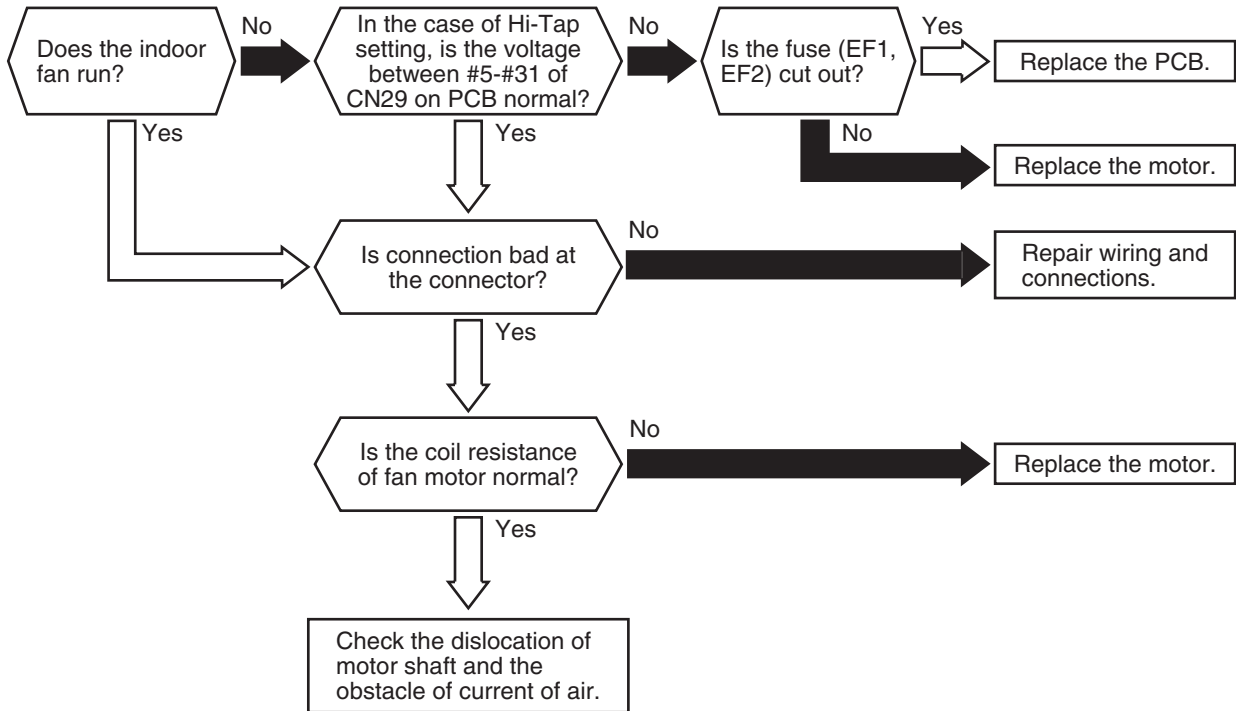
Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Activation of Internal Thermostat for Indoor Unit Fan Motor	Faulty Indoor Unit Fan Motor	Measure coil resistance and insulation resistance.	Replace motor if faulty.
	Faulty Internal Thermostat	Fault	Check continuity after fan motor temperature decreases to room temp.
		Insufficient Contacting	Measure resistance by tester.
		Incorrect Connection	Check connections.
			Replace fan motor if no continuity.
			Correct looseness. Replace connectors.
			Repair connections.

Alarm Code

**19**

**Activation of Protection Device for Indoor Fan Motor (RPK-Model)**

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the running current of the indoor fan motor is higher than 1A.

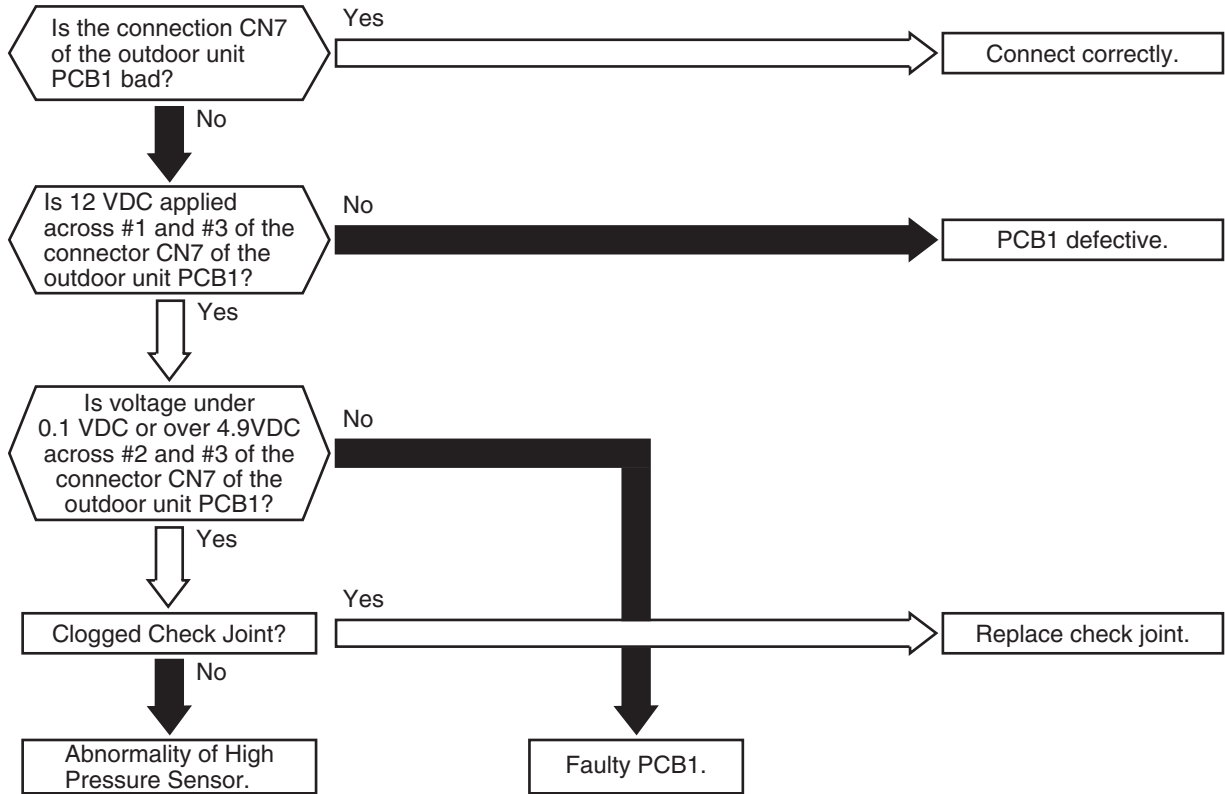


Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)	
Activation of Overcurrent Protection Device for Indoor Fan Motor	Faulty Indoor Unit Fan Motor	Measure coil resistance and insulation resistance.	Replace motor if faulty.	
	Faulty PCB	Fault	Check the output voltage and fuse in the case of Hi-Tap Setting.	Replace PCB.
		Insufficient Contacting	Measure resistance by tester.	Correct looseness. Replace connectors.
		Incorrect Connection	Check connections.	Repair connections.



Alarm Code <b>21</b>	<b>Abnormality of High Pressure Sensor for Outdoor Unit</b>
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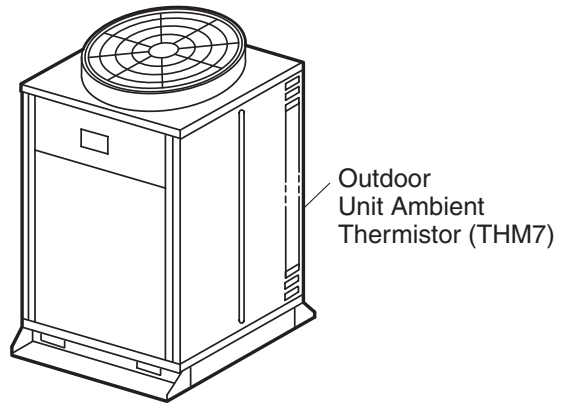
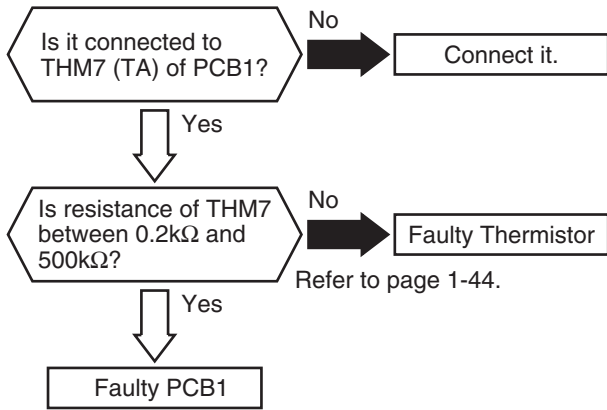
- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the pressure sensor voltage decreases lower than 0.1V or increases higher than 4.9V during running.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty High Pressure Sensor	Fault	Check output voltage is correct.	Replace pressure sensor if faulty.
	Incorrect Connection	Check connections.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.
Indicated Pressure Value is Excessively High or Low	Malfunction of Pressure Sensor due to Faulty Check Joint	Check for clogging of check joint.	Replace check joint.

Alarm Code	22	Abnormality of Thermistor for Outdoor Air Temperature (Outdoor Unit Ambient Thermistor)
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the thermistor is short-circuited (less than 0.2 kΩ) or cut (greater than 500 kΩ) during running. However, this alarm occurs during test running mode only. In the case that the thermistor is abnormal during running, operation continues based on the assumption that the outdoor temperature, is 35°C (Cooling) / 6°C (Heating).



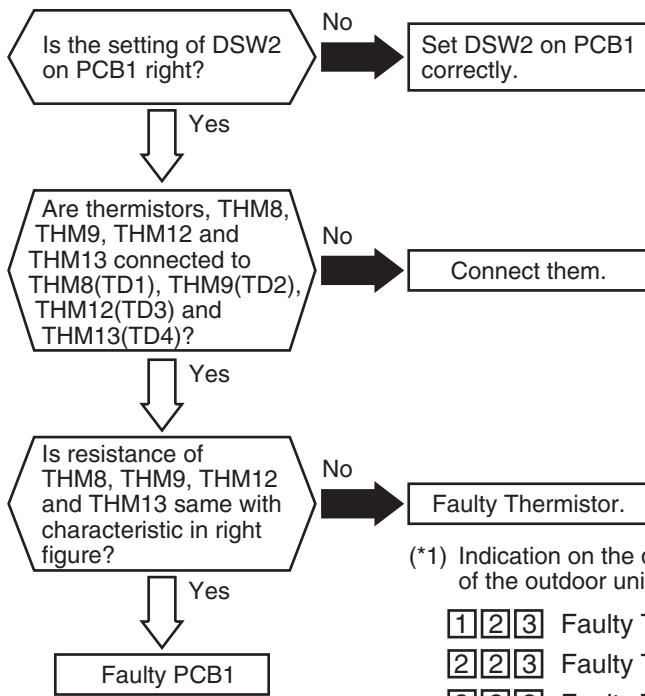
Refer to page 1-44 for thermistor resistance.

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Thermistor for Outdoor Unit Ambient	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.

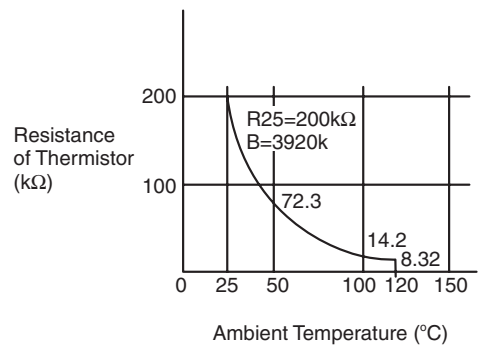
Alarm Code <span style="font-size: 2em; font-weight: bold;">23</span>	<b>Abnormality of Thermistor for Discharge Gas Temperature on the Top of Compressor Chamber</b>
---	---

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, or the unit No. and alarm code are indicated on the display of the outdoor unit PCB. (\*1)  
If abnormality with the thermistor is found, check all the thermistors as shown below.

★ This alarm code is indicated when the thermistor is short-circuited (less than 0.9 kΩ) or cut (greater than 2,350 kΩ) during running.



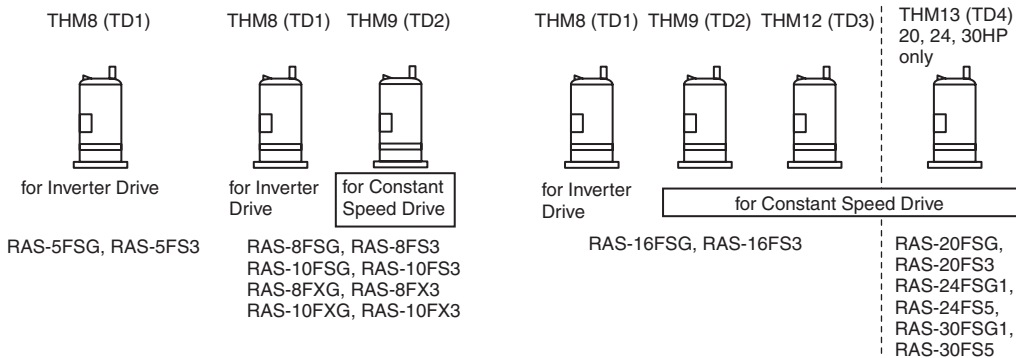
Characteristics of Thermistor



(\*1) Indication on the display of the outdoor unit PCB.

- 123 Faulty TD1
- 223 Faulty TD2
- 323 Faulty TD3
- 423 Faulty TD4

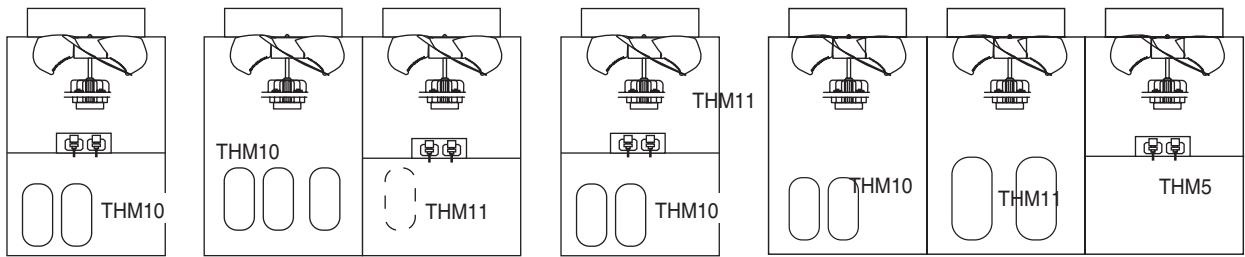
Position of Thermistor



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Discharge Gas Thermistor	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.
Incorrect Setting of DSW2 on PCB1		Check setting of DSW2 on PCB1.	Correctly set DSW2 on PCB1.

Alarm Code <span style="font-size: 2em; font-weight: bold;">24</span>	<b>Abnormality of Thermistor for Evaporating Temperature during Heating Operation (Outdoor Unit)</b>
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and or the unit No. and alarm code are indicated on the display of the outdoor unit PCB. (\*1)  
If abnormality with the thermistor is found, check all the thermistors as shown below.
- ★ The evaporating thermistor during the heating operation is attached to the heat exchanger as shown below figure.  
If this thermistor is faulty, this alarm is indicated. The position is indicated below.

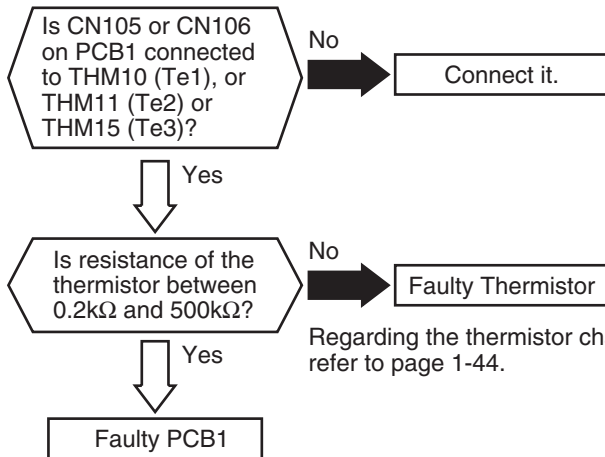


RAS-5FSG, 5FS3  
RAS-8FSG, 8FS3  
RAS-10FSG, 10FS3

RAS-16FSG, 16FS3  
RAS-20FSG, 20FS3

RAS-8FXG, 8FX3  
RAS-10FXG, 10FX3

RAS-24FSG1, 24FS5  
30FSG1, 30FS5



(\*1) Indication on the display of the outdoor unit PCB.

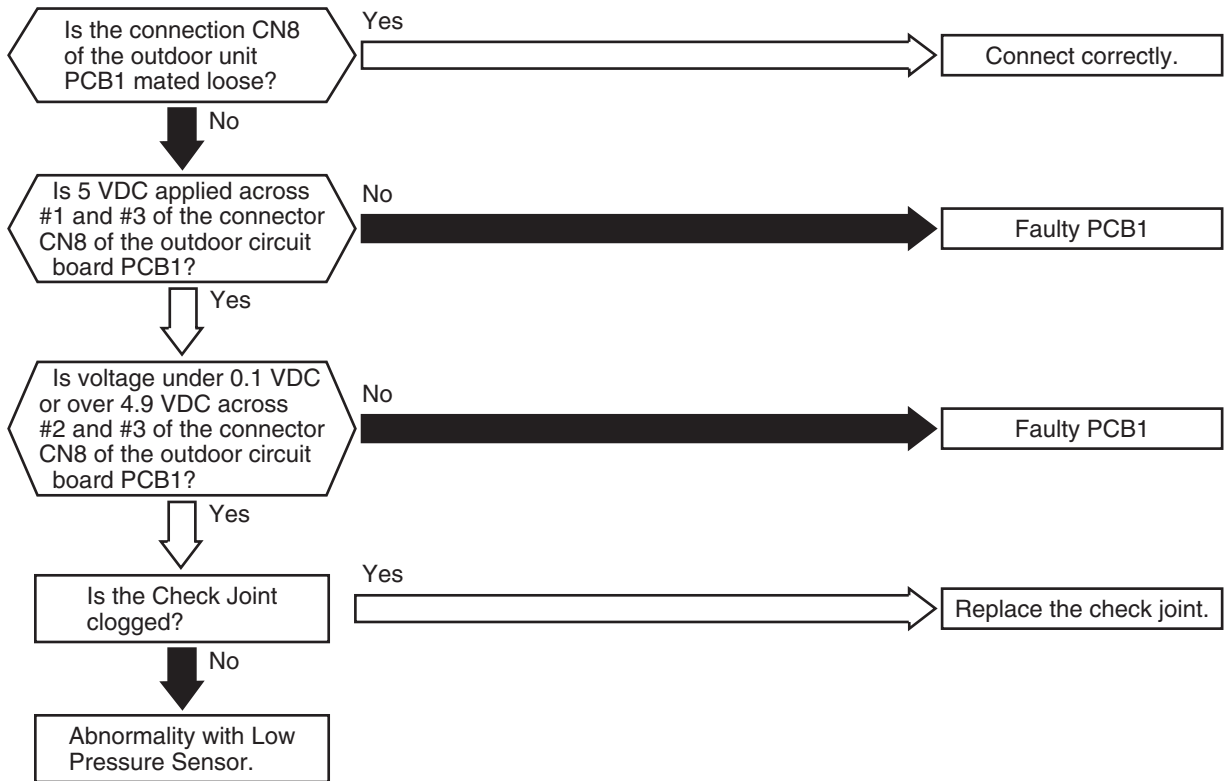
- 124 Faulty Te1
- 224 Faulty Te2
- 324 Faulty Te3

Regarding the thermistor characteristics, refer to page 1-44.

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Thermistor for Evaporating Temperature during Heating	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.

Alarm Code <span style="font-size: 2em; font-weight: bold; margin-left: 10px;">29</span>	<b>Abnormality of Low Pressure Sensor (Outdoor Unit)</b>
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the pressure sensor voltage decreases lower than 0.1V or increases higher than 4.9V during running.

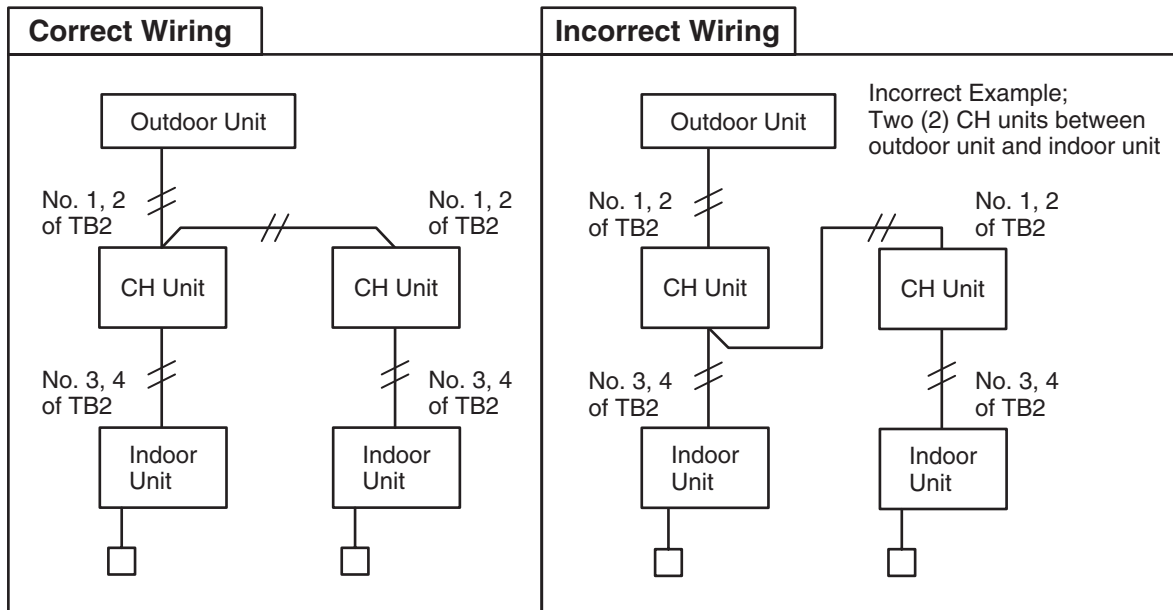
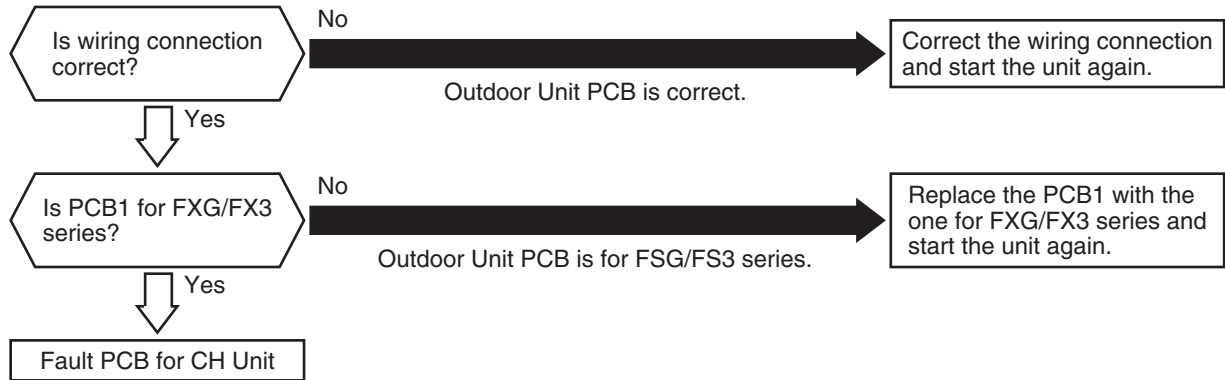


Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Faulty Low Pressure Sensor	Fault	Check output voltage is correct.	Replace pressure sensor if faulty.
	Incorrect Connection	Check connections.	Repair wiring and connections.
Faulty PCB		Replace PCB and check operation.	Replace PCB if faulty.
Indicated Pressure Value is Excessively High or Low	Malfunction of Pressure Sensor due to Faulty Check Joint	Check for clogging of check joint.	Replace check joint.

Alarm Code **30**

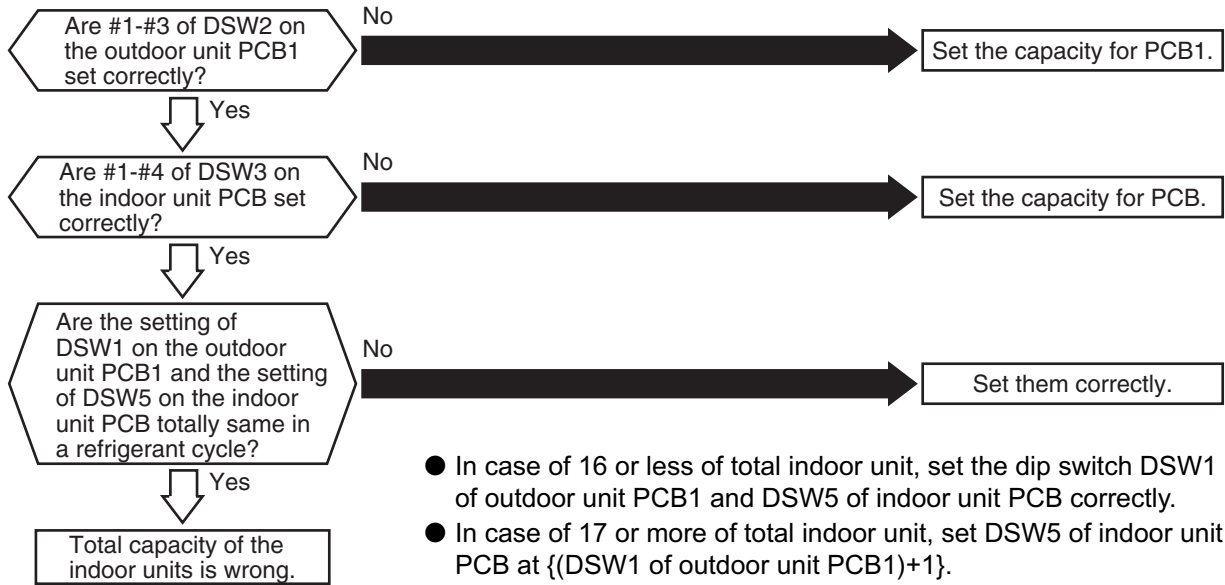
**Incorrect Wiring Connection (FX Series Only)**

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when there are more than two (2) CH units connected between outdoor unit and indoor unit due to incorrect wiring connection.
- ★ This alarm code is indicated when the outdoor unit PCB (PCB1) for FSG/FS3 series is attached incorrectly to the FXG/FX3 series outdoor unit.



Alarm Code <b>31</b>	<b>Incorrect Capacity Setting or Combined Capacity between Indoor Units and Outdoor Unit</b>
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the capacity setting dip switch, DSW2 on the outdoor unit PCB1, is not set (all the settings from #1 to #3 are OFF) or mis setting.
- ★ This alarm code is indicated when the total indoor unit capacity is smaller than 50% or greater than 150% of the combined outdoor unit capacity.



- In case of 16 or less of total indoor unit, set the dip switch DSW1 of outdoor unit PCB1 and DSW5 of indoor unit PCB correctly.
- In case of 17 or more of total indoor unit, set DSW5 of indoor unit PCB at  $\{(DSW1 \text{ of outdoor unit PCB1})+1\}$ .

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Incorrect Capacity Setting of Indoor Unit		Check combination of indoor units and capacity setting on PCB.	Correctly set dip switch, DSW3.
Incorrect Capacity Setting of Outdoor Unit		Check capacity setting on outdoor unit PCB.	Correctly set dip switch, DSW2.
Total Indoor Unit Capacity Connected to the Outdoor Unit is Beyond Permissible Range		Check outdoor unit model by calculating total indoor units capacity.	Ensure that total indoor unit capacity is from 50% to 130%.
Refrigeration Cycle Setting of Outdoor Unit and Indoor Unit is Different		Check refrigeration cycle setting on outdoor unit PCB and indoor unit PCB.	Set them correctly.

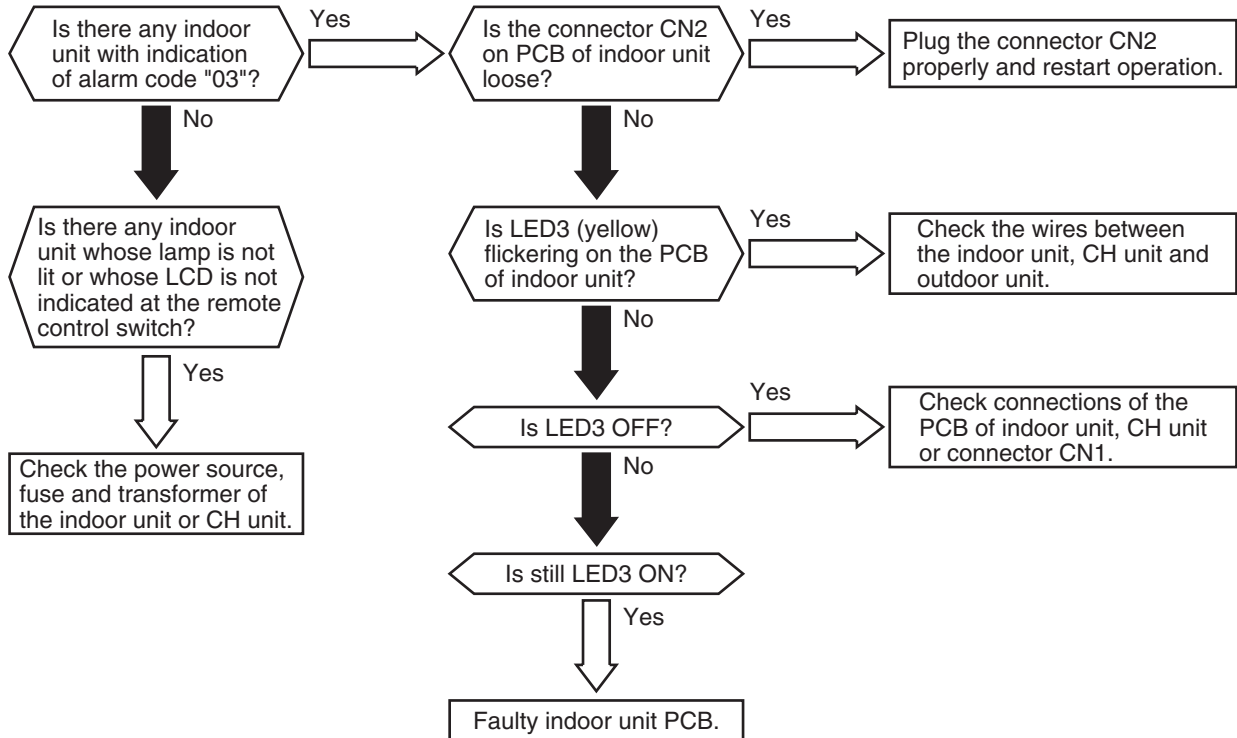
**Combination**

Outdoor Unit Model	Combined Indoor Unit		Notes
	Total Q'ty	Total Capacity (HP)	
RAS-5FSG(3)	2-8 sets *1)	2.5-6.5	*1): If the capacity of one indoor unit is the same as of the outdoor unit, the system can be operated.
RAS-8FSG(3), RAS-8FXG(3)	2-12 sets	4.0-10.4	
RAS-10FSG(3), RAS-10FXG(3)		5.0-13.0	
RAS-16FSG, RAS-16FS3	2-13 (16) sets *2)	8.0-20.8	*2): In case of changing the indoor unit capacity from 1.0HP or 1.5HP to 1.3HP by dip switch setting.
RAS-20FSG, RAS-20FS3	2-16 sets	10.0-26.0	
RAS-24FSG1, RAS-24FS5	2-27 sets	12.0-31.2	
RAS-30FSG1, RAS-30FS5	2-30 sets	15.0-39.0	

Alarm Code **32**

**Abnormality in Transmitting of Other Indoor Units**

- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated on the remote control switch of other indoor unit when no transmitting data is issued from a malfunctioning indoor unit for more than 60 minutes after receiving transmitting data from the indoor unit.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Abnormal Transmitting from Other Units	Abnormal Transmitting Indoor Unit → Outdoor Unit Outdoor Unit → Indoor Unit	Check indoor unit showing alarm code "03".	Take action according to pages 1-28 to 34.
	Incorrect Power Supply (to Indoor Unit or CH Unit) *1)	Check indoor unit showing no light ON on remote control switch.	Take action according to pages 1-13 to 14.
	Faulty Indoor Unit PCB or CH Unit PCB	If all indoor unit show alarm code 32, check PCB by self-checking mode for all indoor unit or CH unit.	Replace PCB if faulty.

\*1): This abnormality is indicated on an indoor unit which is normal, since this is due to abnormality of transmitting of the indoor units or power source abnormality in the same refrigeration cycle and electrical system. If the power source is abnormal, abnormality can not be indicated by its indoor unit, so, this alarm is indicated on the remote control switch of other indoor unit.



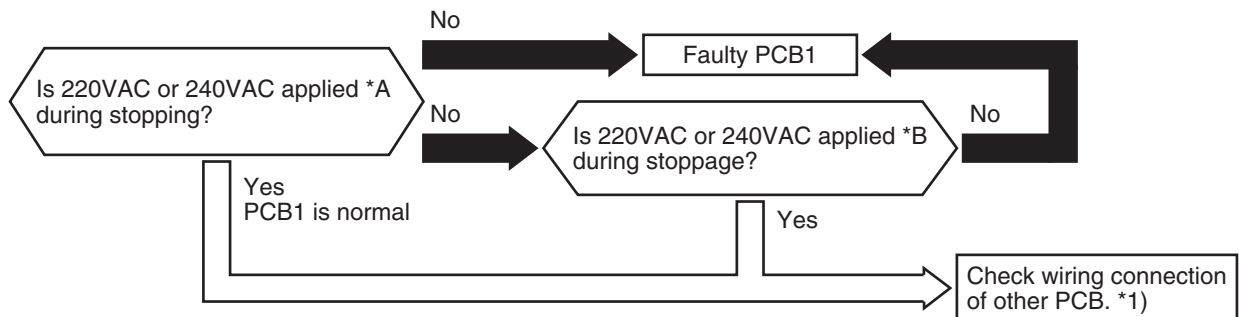
Alarm Code	35	Incorrect Indoor Unit No. Setting
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated 3 minutes after power is supplied to the outdoor unit when the indoor unit No. connected to the outdoor unit is duplicated by setting of RSW.

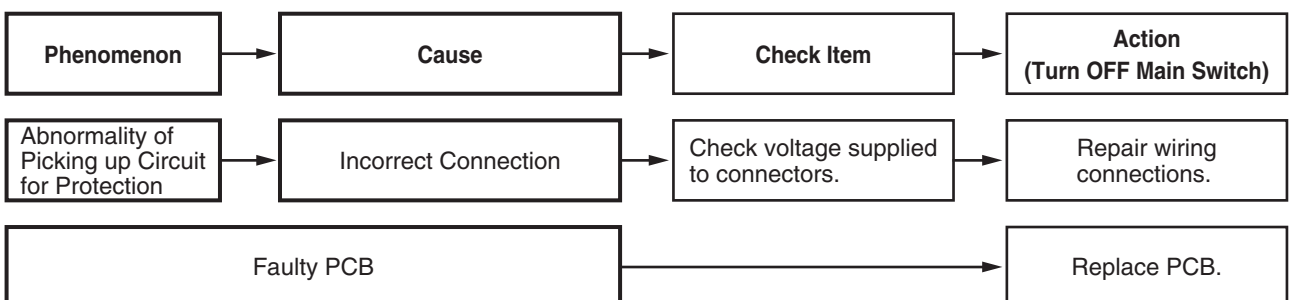
In the case of H-Link System, this alarm code is indicated when DSW1 of the outdoor unit PCB and DSW5 of the indoor unit PCB are incorrectly set.  
 In this case, set correctly DSW1 and DSW5 after turning off Main Switch.

Alarm Code	38	Abnormality of Picking up Circuit for Protection (Outdoor Unit)
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when AC 220V or 240V is supplied to voltage \*A or \*B on PCB1 in the outdoor unit during inverter compressor stoppage.



Power Supply	*A	*B
380-415V/50Hz 380V/60Hz	Between terminal #3 of PCN14 on PCB1 and faston terminal "N" on PCB1	Between terminal #3 of PCN2 on PCB1 and faston terminal "N" on PCB1
220V/60Hz	Between terminal #3 of PCN14 on PCB1 and faston terminal "S" on PCB1	Between terminal #3 of PCN2 on PCB1 and faston terminal "S" on PCB1



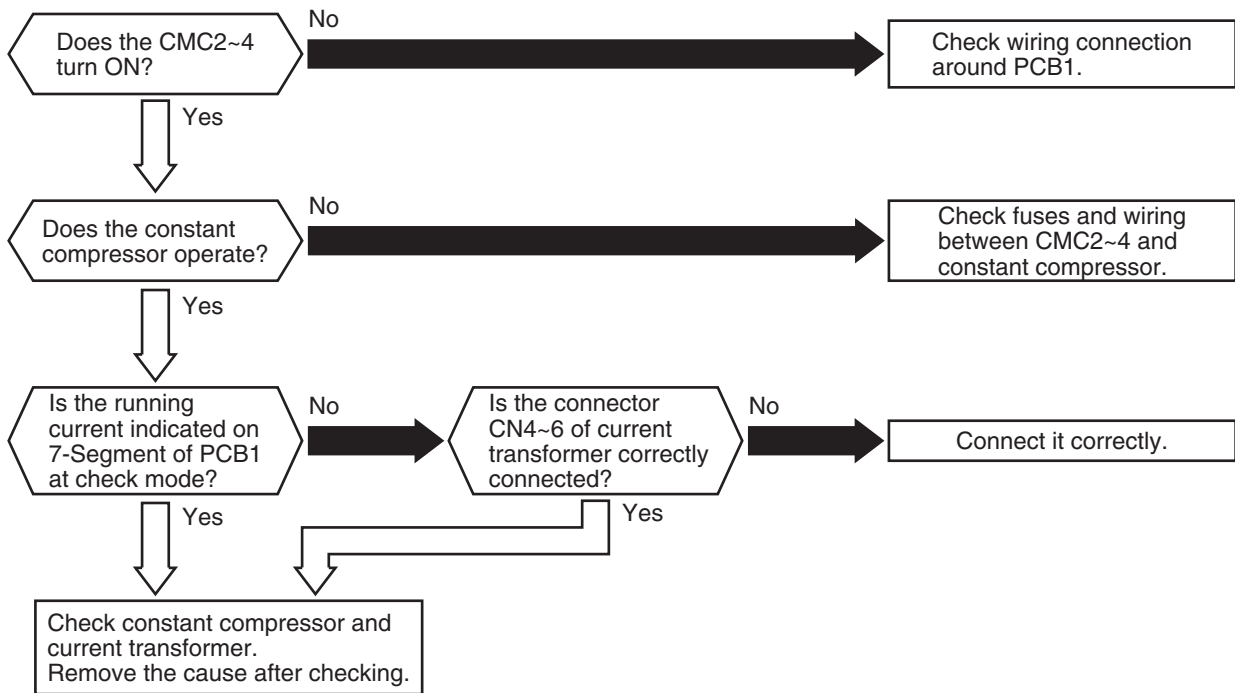
\*1): Check wiring system connecting to PCN14 and PCN2 on PCB1.

Alarm Code

39

**Abnormality of Running Current at Constant Compressor**

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the following conditions occurs;
- The running current of the constant compressor exceeds the value of overcurrent limitation during operating.
  - The running current of the constant compressor is detected 0A and retry when 3 minutes are passed after all compressors are stopped, and this phenomenon occurs three times within 30 minutes.

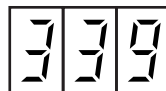


Indication of 7-Segment

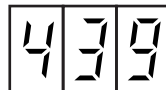


Abnormality of Constant Compressor

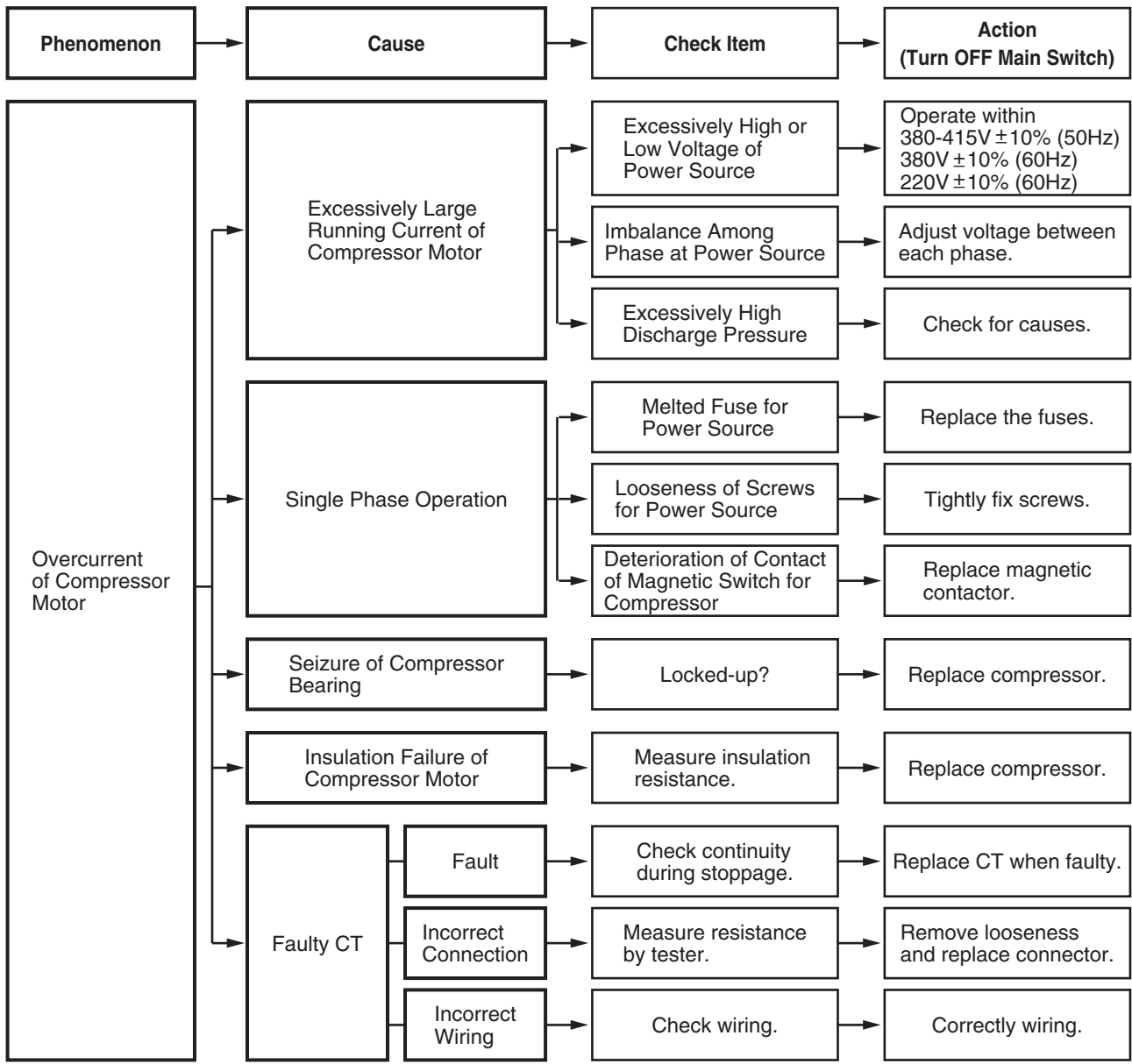
MC2



MC3



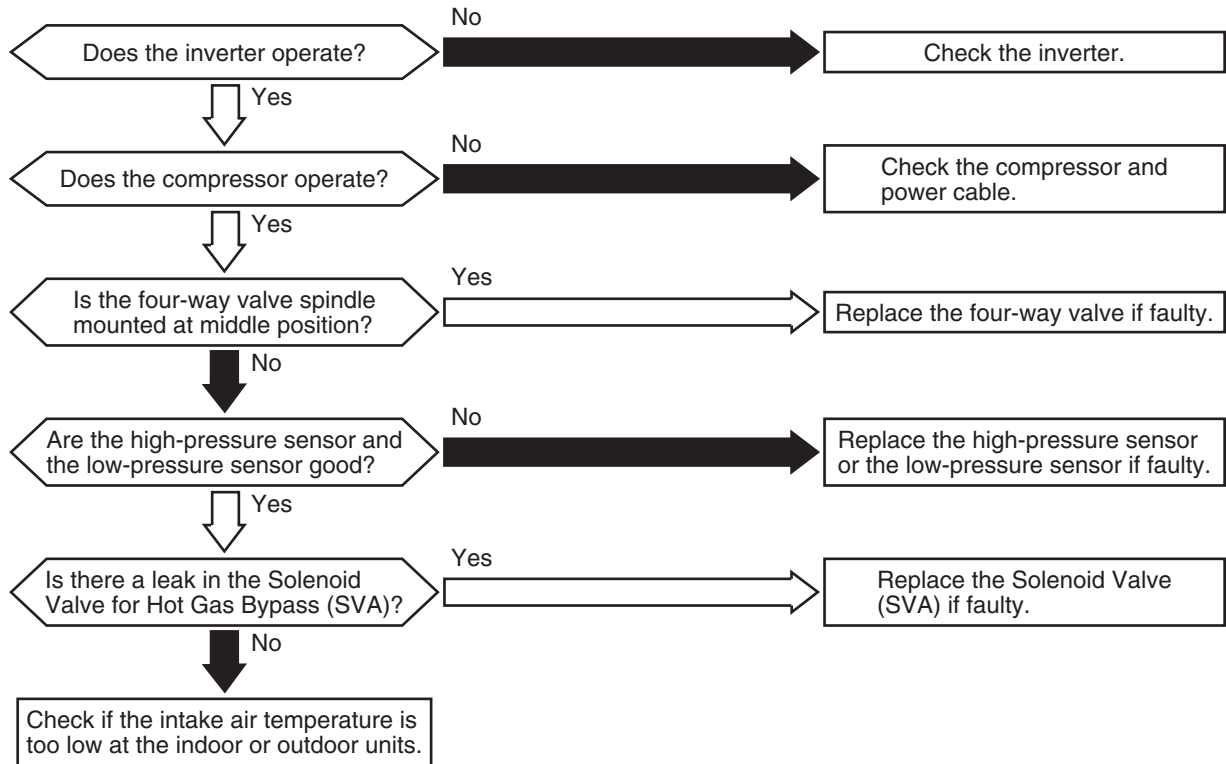
MC4



Alarm Code **43**

**Activation to Protect System from Low Compression Ratio**

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when a compression ratio,  $\epsilon = \{(Pd + 0.1) / (Ps + 0.1)\}$  is calculated from a discharge pressure (MPa) and suction pressure (MPa) and the condition lower than  $\epsilon = 1.8$  occurs more than 3 times including 3 in one hour.

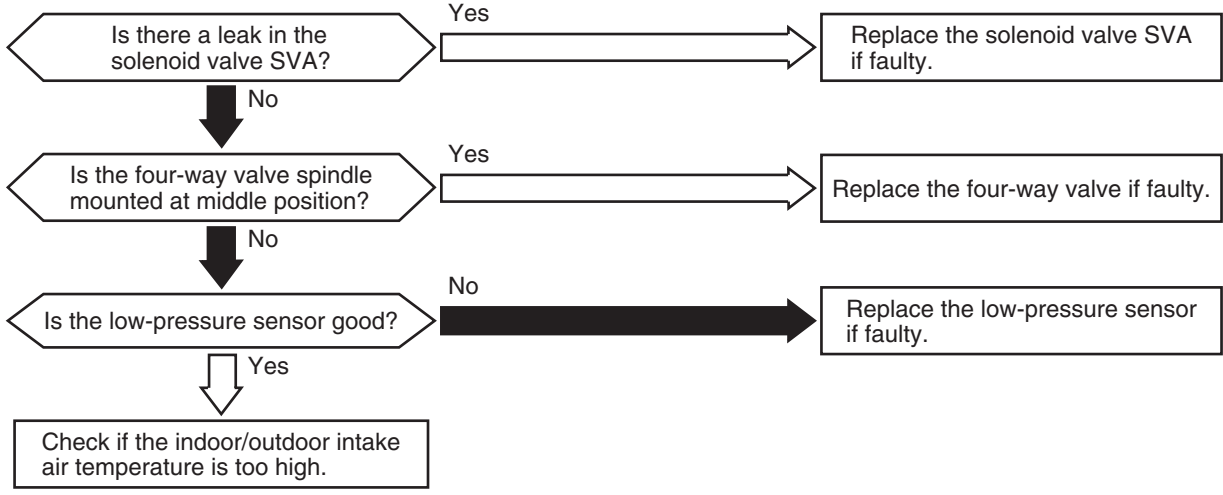


Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Excessively Low Compression Ratio	Inverter is not Functioning	Check inverter.	Repair faulty part.
	Compressor is not Operating	Check compressor.	Replace comp. if faulty.
	Valve Stoppage at Medium Position of 4-Way Valve	Measure suction pipe temp. of 4-way valve.	Replace 4-way valve if faulty.
	Abnormality of High or Low Pressure Sensor	Check connector for PCB, power source and pressure indication.	Replace sensor if faulty.
	Excessively Low Indoor Intake Air Temperature	Check indoor unit and outdoor unit air temp. thermistor.	Replace thermistor if faulty.
	Leakage from Solenoid Valve: SVA Outdoor Unit	Check Solenoid Valve.	Replace SVA if leaking.
	Leakage from Solenoid Valve: SVD1, SVS1 of CH Unit	Check Solenoid Valve.	Replace SVD1 and SVS1 if leaking.

<FX Series Only>

Alarm Code	44	Activation to Protect System from Excessively Low Suction Pressure
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the compressor is operated under the conditions higher than 0.9 MPa of suction pressure and its occurrence is more than 3 times including 3 in one hour.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Excessively Low Suction Pressure	Leakage of Solenoid Valve SVA	Check outlet pipe temp. of solenoid valve, SVA.	Check connecting wires. Replace solenoid valve, SVA if faulty.
	Valve Stoppage at Medium Position of 4-Way Valve	Measure suction gas pipe temp. of 4-way valve.	Replace 4-way valve if faulty.
	Abnormal Suction Pressure Sensor	Check connectors of PCB and power source.	Replace sensor if faulty.
	Excessively High Indoor Unit and Outdoor Unit Suction Air Temperature	Check indoor unit and outdoor unit suction air temp. thermistor.	Replace thermistor if faulty.
	Leakage from Solenoid Valve: SVD1, SVS1 of CH Unit	Check Solenoid Valve.	Replace SVD1 and SVS1 if leaking.

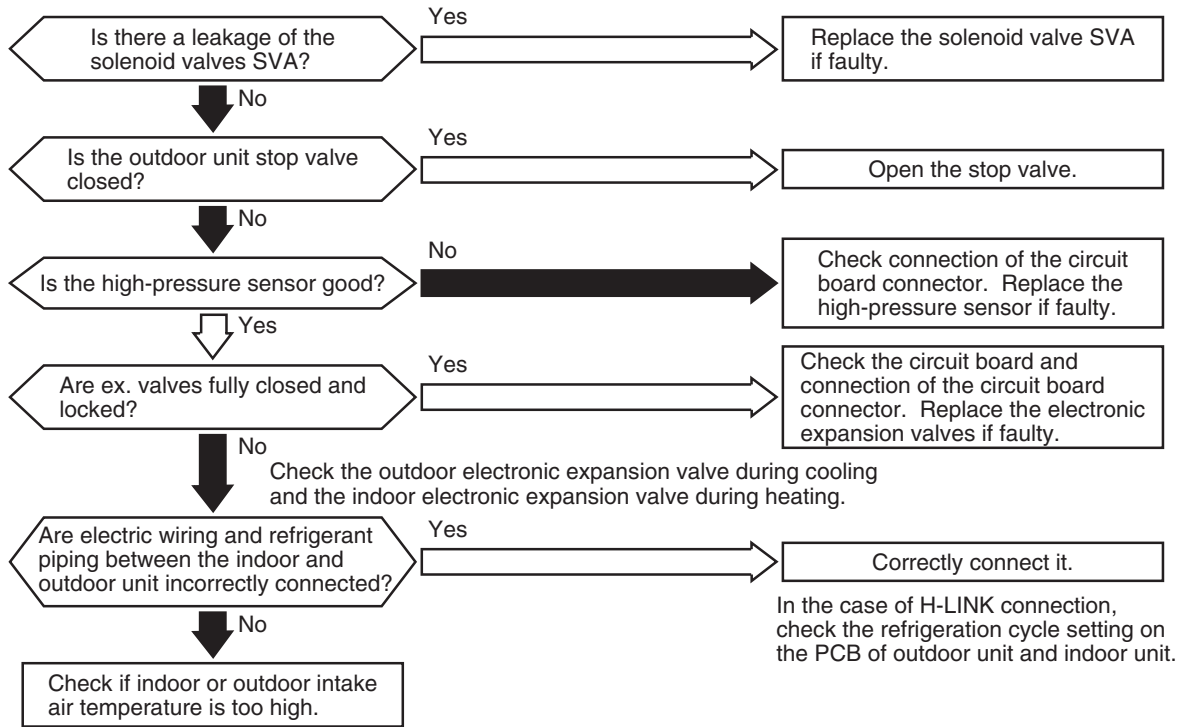
<FX Series Only>

Alarm Code

**45**

**Activation to Protect System from Excessively High Discharge Pressure**

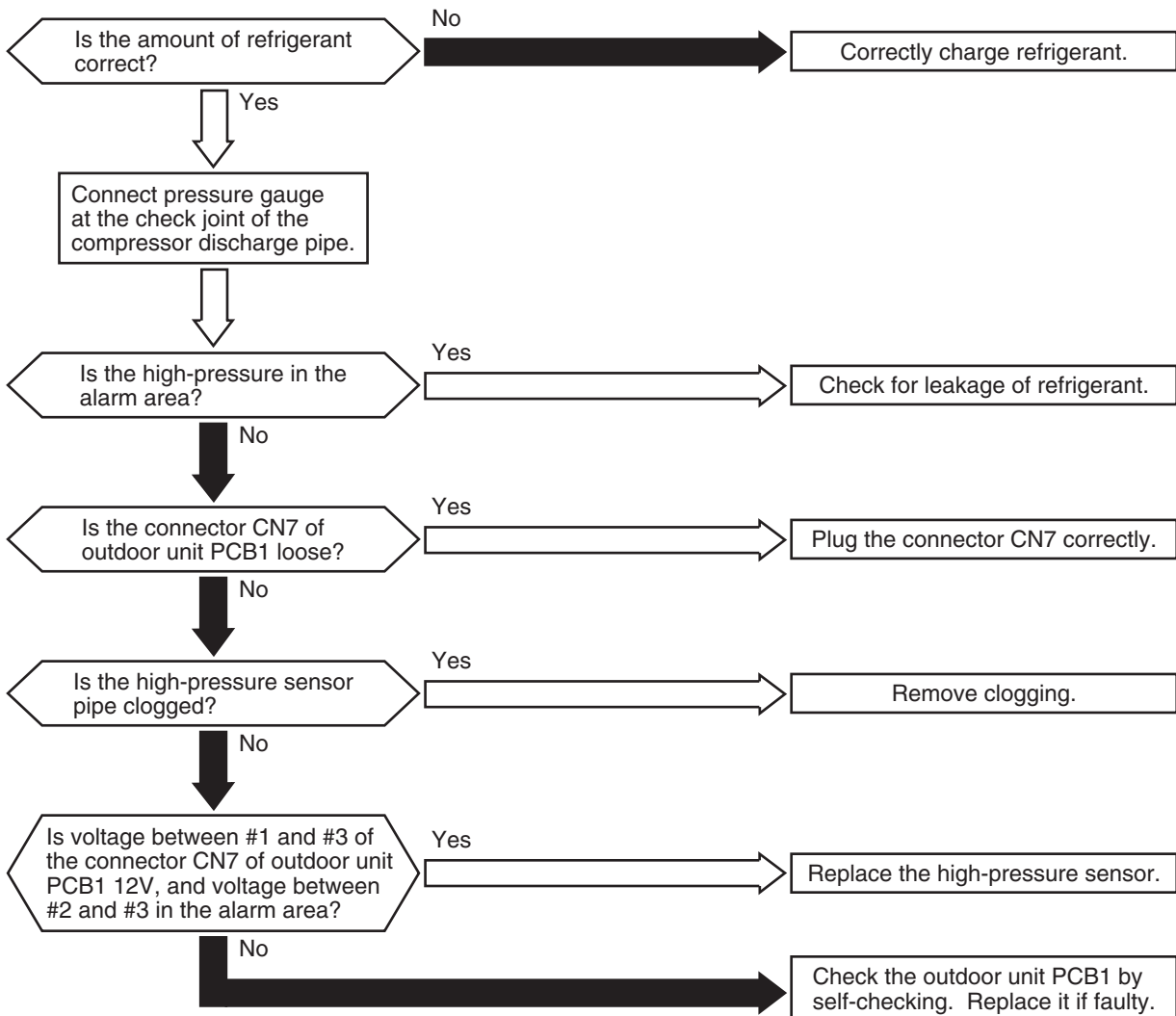
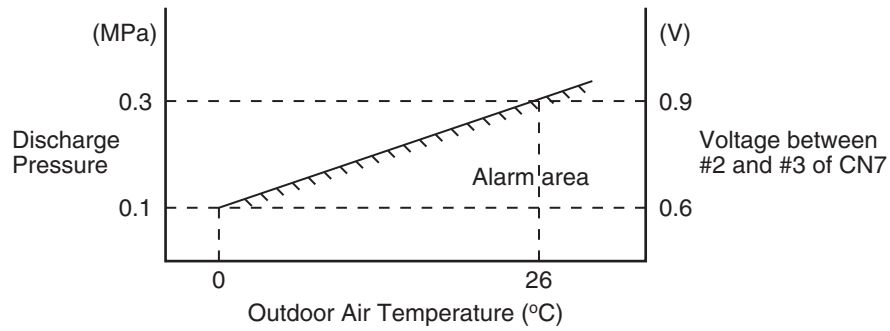
- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the compressor is operated under the conditions higher than 2.65 MPa (26.5 kg/cm<sup>2</sup>G) of discharge pressure [ in case of FSG, FSG1 and FXG models, Pd is higher than 2.84 MPa (28.4 kg/cm<sup>2</sup>G)] and its occurrence is more than 3 times including 3 in one hour.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Excessively High Discharge Pressure	Leakage of Solenoid Valve SVA (Outdoor Unit)	Check outlet temp. of solenoid valve, SVA.	Check connection. Replace solenoid valve SVA if faulty.
	Closed Stop Valve	Check stop valve.	Open stop valve.
	Abnormal High Pressure Sensor	Check connectors for PCB.	Replace pressure sensor if faulty.
	Excessively High Indoor Unit and Outdoor Unit Inlet Air Temp.	Check thermistor for indoor unit and outdoor unit inlet air temp.	Replace thermistor if faulty.
	Incorrect Connection between Indoor Unit and Outdoor Unit	Check electrical system and ref. cycle.	Correctly connect.
	Locked Ex. Valve with Fully Closed	Check connector for PCB.	Repair connector for PCB or ex. valve. Replace it if faulty.
	Fully Closed Solenoid Valve SVD1 (CH Unit)	Check solenoid valve SVD1 opening in heating.	Replace coil or CH unit if faulty.
<FX Series Only>			
Stoppage of Indoor Fan <Wall Type Only>	Melted Fuses	Check continuity of fuses.	Replace fuses.
	Faulty PCB	Replace PCB and check operation.	Replace PCB if faulty.

Alarm Code	<b>46</b>	Activation to Protect System from Excessively Low Discharge Pressure (for Protection of Refrigerant Shortage)
------------	-----------	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when the compressor is operated under the conditions lower than 0.6MPa (6kgf/cm<sup>2</sup>G) for an hour.

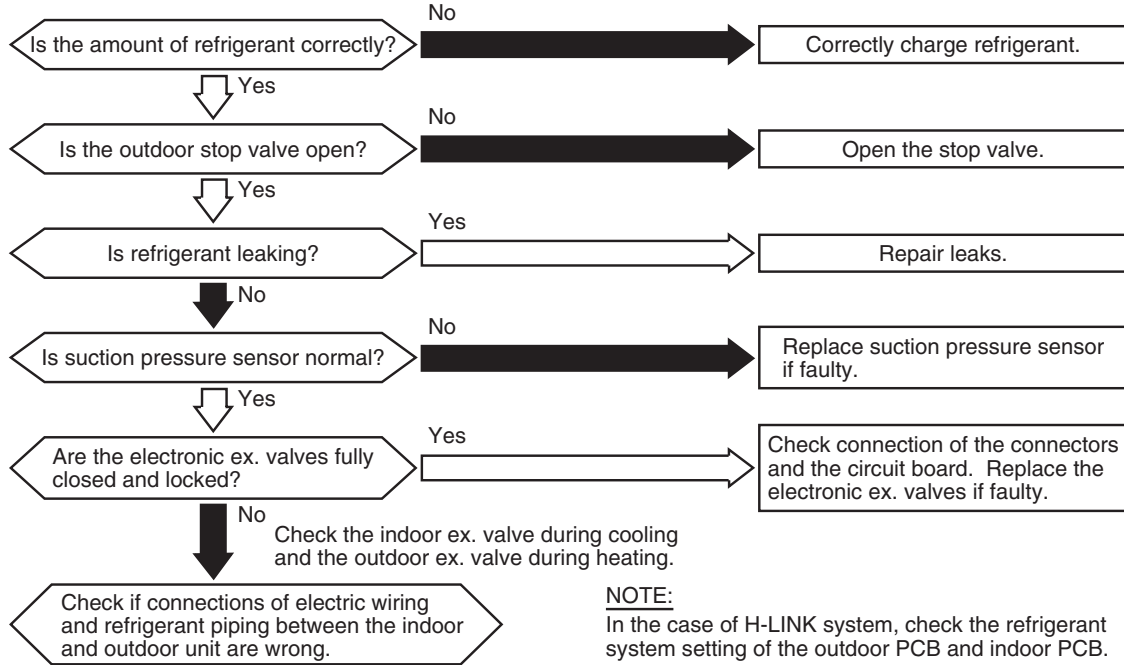


Alarm Code

**47**

**Activation to Protect System from Excessively Low Suction Pressure (Protection from Vacuum Operation)**

- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when a suction pressure is lower than 0.02 MPa (0.2 kg/cm<sup>2</sup>G) for over 12 minutes and its state occurs more than 3 times including 3 in one hour.



Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)	
Excessively Low Suction Pressure (in Vacuum)	Shortage of Ref.	Check ref. charged volume or check for leakage.	Repair leakage and correctly charge.	
	Closed Stop Valve	Check stop valve.	Open stop valve.	
	Abnormal Low or High Pressure Sensor	Check connector for PCB.	Replace pressure sensor if faulty.	
	Incorrect Connection between Indoor Unit and Outdoor Unit	Check electrical system and ref. cycle.	Correctly connect between indoor unit and outdoor unit.	
	Locked Ex. Valve	Check connector for PCB.	Repair or replace connector of PCB or ex. valve.	
	Closed Ex. Valve by Disconnecting Td Thermistor	Check Td thermistors for compressors and measure Td thermistor resistance.	Repair or replace Td thermistor.	
Internal Thermostat for Outdoor Fan is Activated in Heating Operation	Faulty Outdoor Fan Motor	Measure coil resistance and insulation resistance.	Replace outdoor fan motor if faulty.	
	Faulty Internal Thermostat	Fault	Check for conduction after temperature of outdoor fan motor is decreased.	Replace outdoor fan motor.
		Incorrect Contact	Measure resistance by tester.	Remove looseness and replace connector.
		Incorrect Connection	Check connection.	Connect correctly.

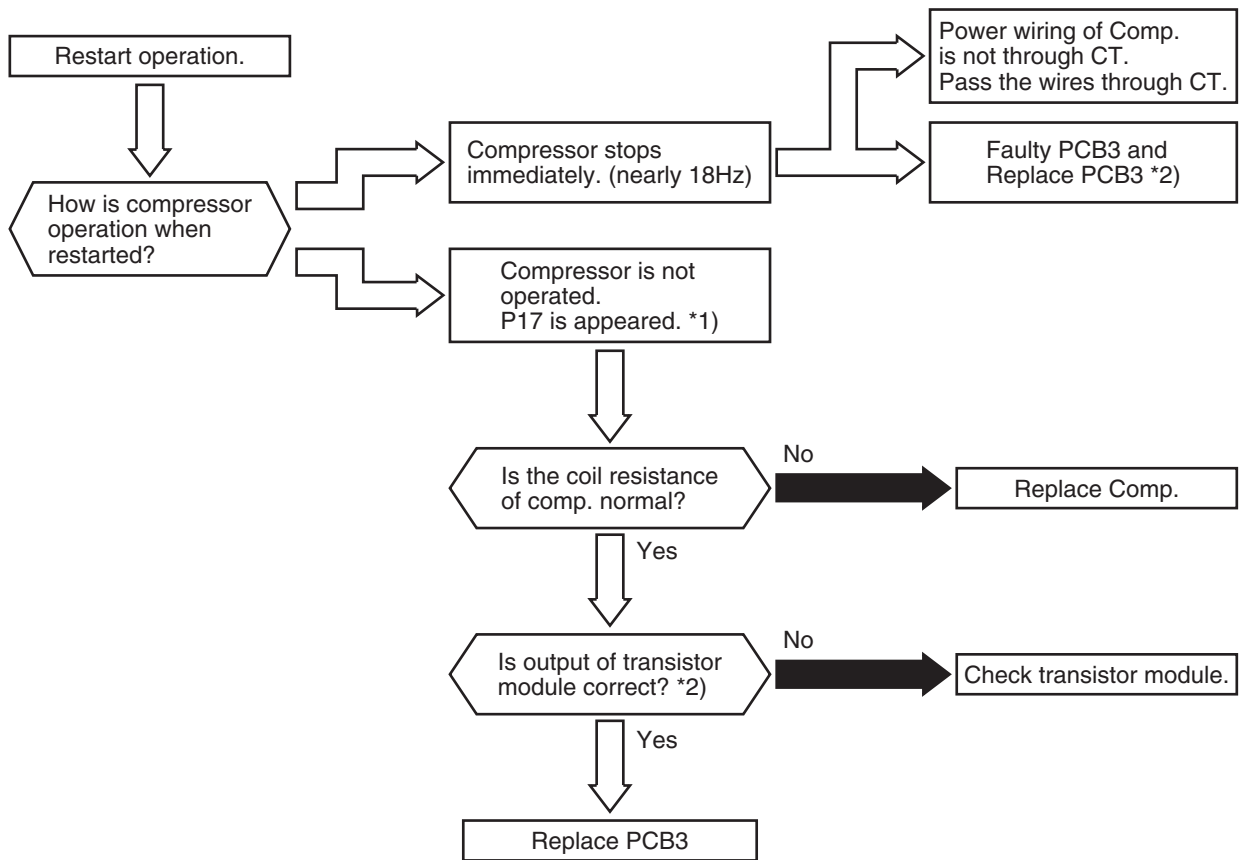


Alarm Code	51	Abnormality of Current Transformer (0A Detection) (For 5HP to 20HP)
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ This alarm code is indicated when the current transformer is abnormal (0A detection) and its state occurs more than 3 times in 30 minutes.

Condition of Activation: When the frequency of compressor is maintained at 15 to 18Hz after compressor is started, one of the absolute value of running current at each phase U+, U-, V+ and V- is less than 0.5A (including 0.5A).



\*1): P17 is shown at 7-segment on the outdoor unit PCB.

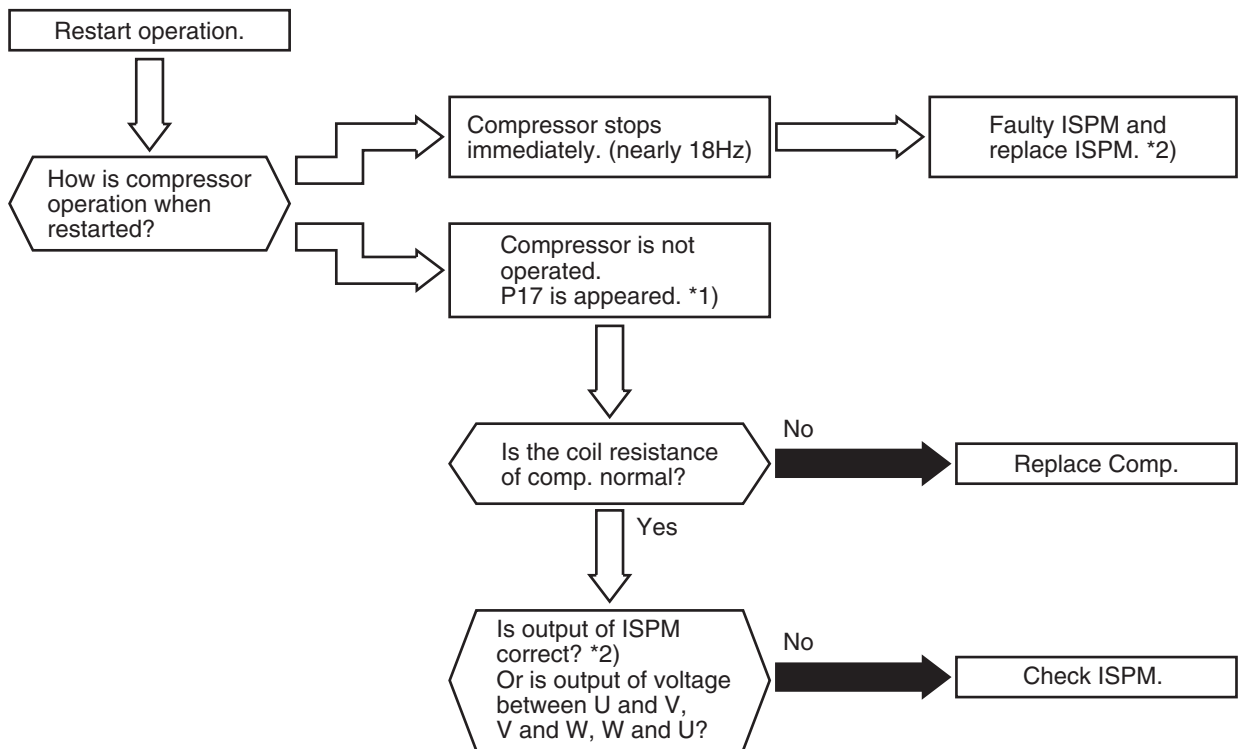
\*2): Perform the high voltage discharge work by referring to 1.3.6 before checking and replacing the inverter parts.

Alarm Code	<b>51</b>	Abnormality of Current Transformer (For 24 and 30HP)
------------	-----------	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ In case that the abnormality of alarm code 51, 52, 53 or 54 occurs three times within 30 seconds, the alarm code of abnormality occurred for the third time is indicated. Retry operation is performed up to second time of abnormality occurrence.

Condition of Activation: When the frequency of compressor is maintained at 15 to 18Hz after compressor is started, one of the absolute value of running current at each phase U+, U-, V+ and V- is less than 0.5A (including 0.5A).



\*1): P17 is shown at 7-segment on the outdoor unit PCB.

\*2): Perform the high voltage discharge work by referring to 1.3.6 before checking and replacing the inverter parts.

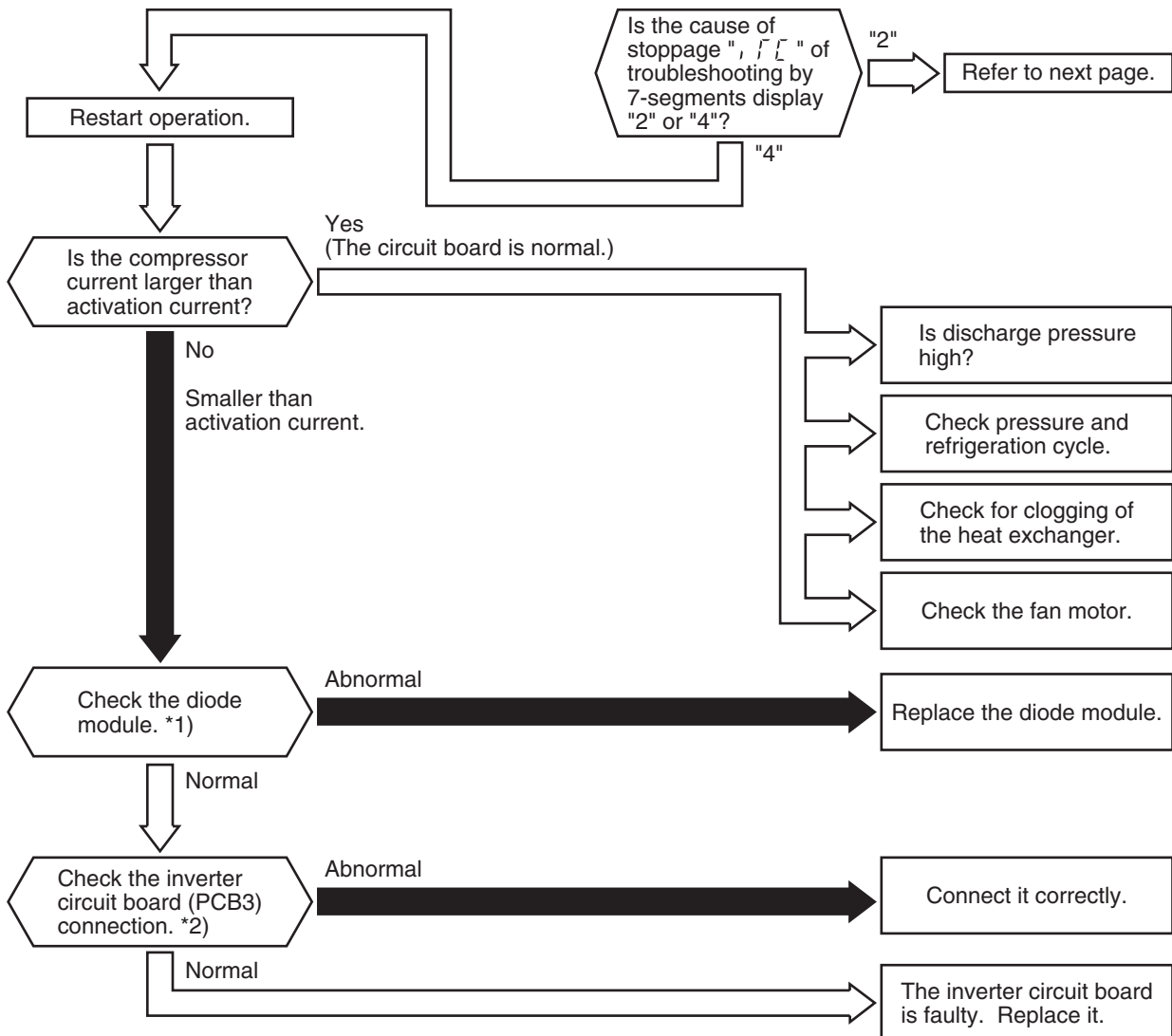
Alarm Code	<b>52</b>	Protection Activation Against Instantaneous Overcurrent of Inverter (1) (For 5 to 20HP)
------------	-----------	--

- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ This alarm code is indicated when the electronic thermal relay for the inverter is activated 3 times including 3 in 30 minutes. Retry operation is performed up to the occurrence of 2 times.

Conditions: Inverter current with 105% of the rated current, (1) runs continuously for 30 seconds or (2) runs intermittently and the accumulated time reaches up to 3.5 minutes, in 10 minutes.

Model	Rated Current	
	380-415V 50Hz 380V 60Hz	220V 60Hz
RAS-5FSG(3), RAS-8FSG(3), RAS-10FSG(3)	14.0	25.0
RAS-16FSG(3), RAS-20FSG(3)	16.5	30.0
RAS-8FXG(3), RAS-10FXG(3)	14.0	25.0



\*1): Regarding the checking method for diode module, refer to page 1-113.

\*2): Regarding replacing or the checking of inverter components, refer to page 1-111 regarding electrical discharge.

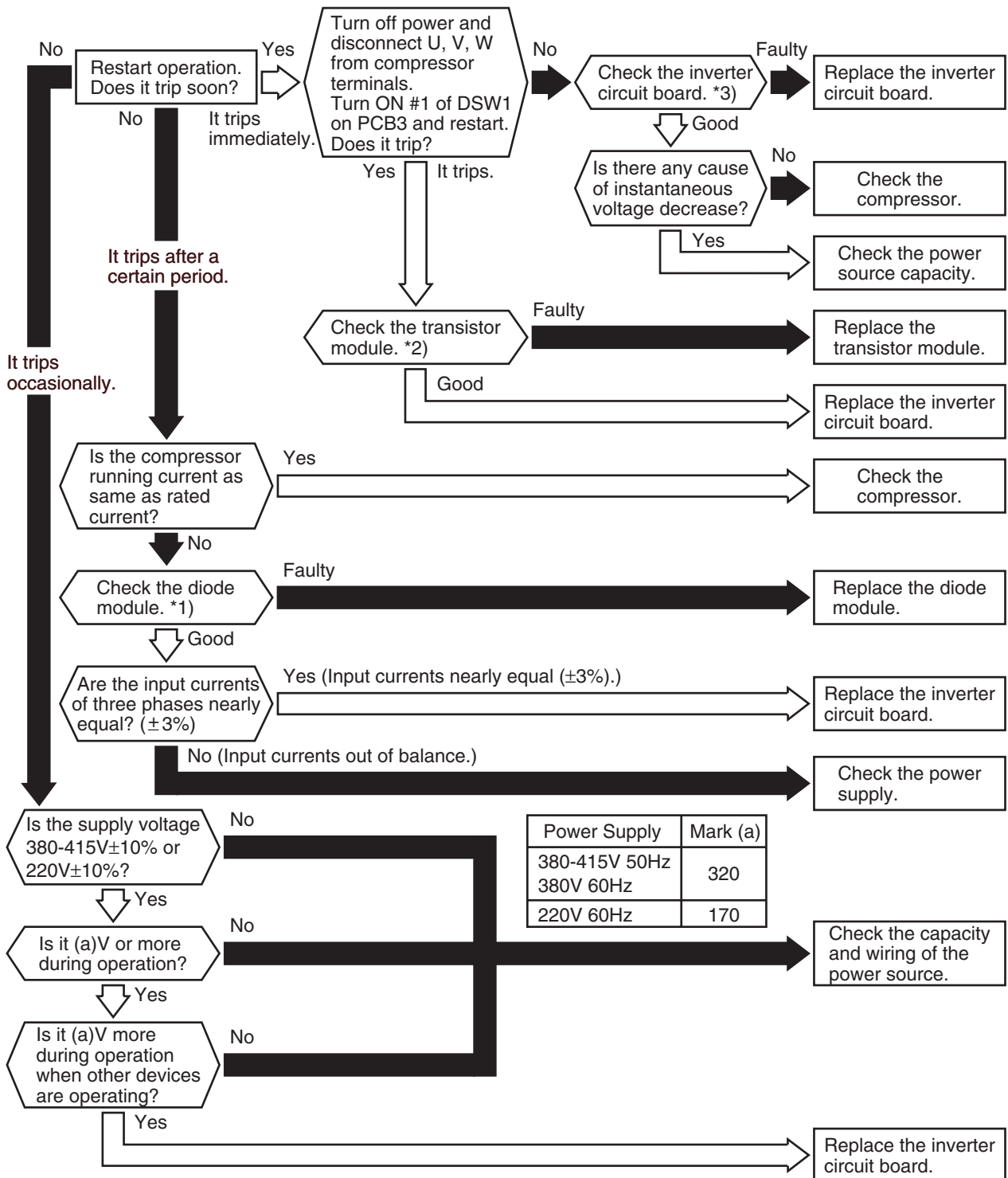
Alarm Code **52**

**Protection Activation Against Instantaneous Overcurrent of Inverter (2)  
(For 5 to 20HP)**

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ This alarm code is indicated when the instantaneous overcurrent tripping occurs 3 times including 3 in 30 minutes. Retry operation is performed up to the occurrence of 2 times.

Conditions: Inverter current is 150% of the rated current.



1\*): Regarding replacing or the checking method for the diode module, refer to page 1-113.  
 2\*): Regarding the checking method for transistor module, refer to page 1-112.  
 3\*): Regarding the checking of inverter components, refer to page 1-111 regarding electrical discharge.

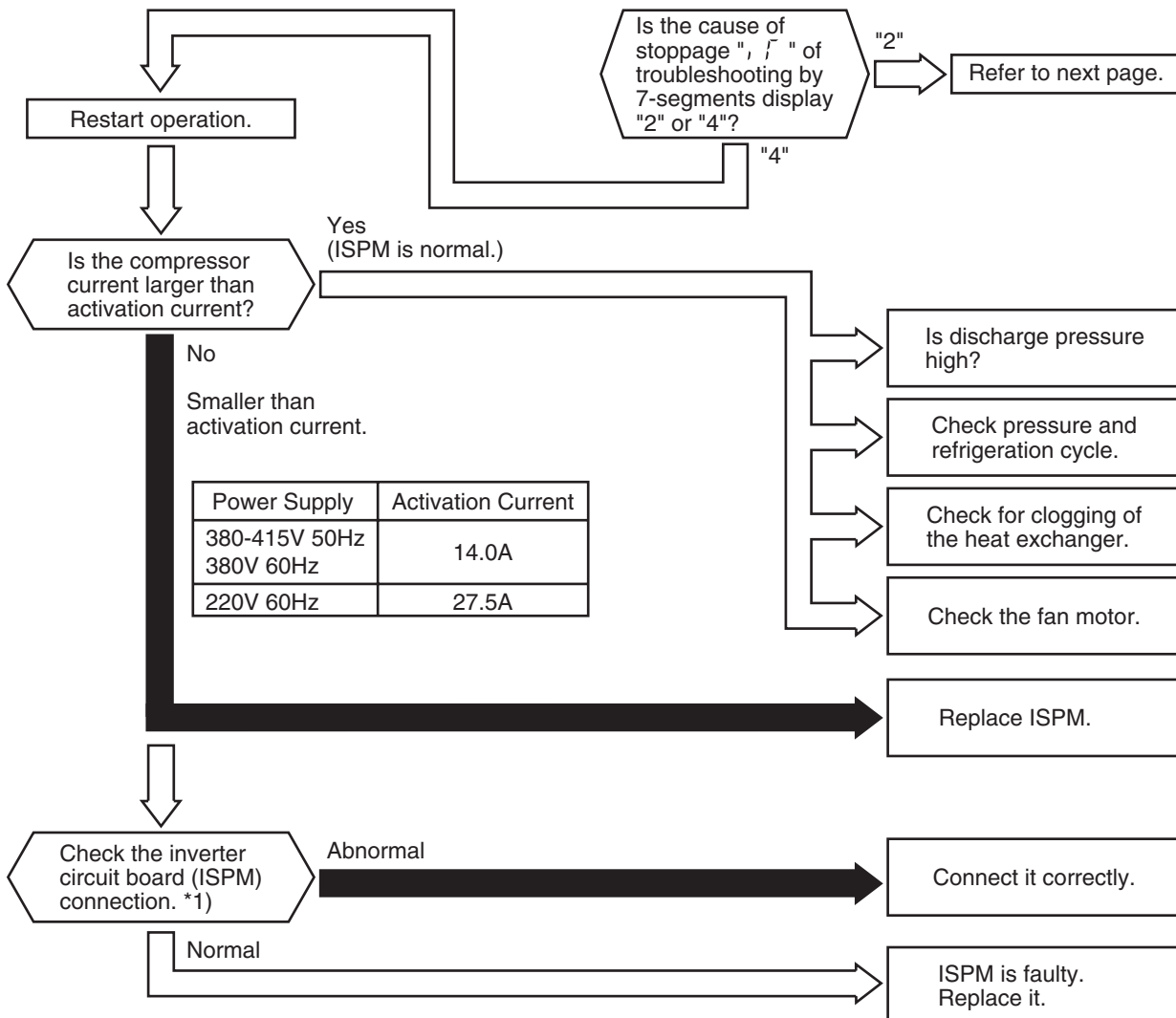
Alarm Code	52	Protection Activation Against Instantaneous Overcurrent of Inverter (1) (For 24 and 30HP)
------------	----	--

- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ In case that the abnormality of alarm code 51, 52, 53 or 54 occurs three times within 30 seconds, the alarm code of abnormality occurred for the third time is indicated. Retry operation is performed up to second time of abnormality occurrence.

Conditions: Inverter current with 105% of the rated current, (1) runs continuously for 30 seconds or (2) runs intermittently and the accumulated time reaches up to 3.5 minutes, in 10 minutes.

Model	Rated Current	
	380-415V 50Hz 380V 60Hz	/ 220V 60Hz
RAS-24FSG1, RAS-30FSG1, RAS-24FS5, RAS-30FS5	14.0 / 27.5	



\*1): Regarding replacing or the checking of ISPM, refer to page 1-114 regarding electrical discharge.

Alarm Code

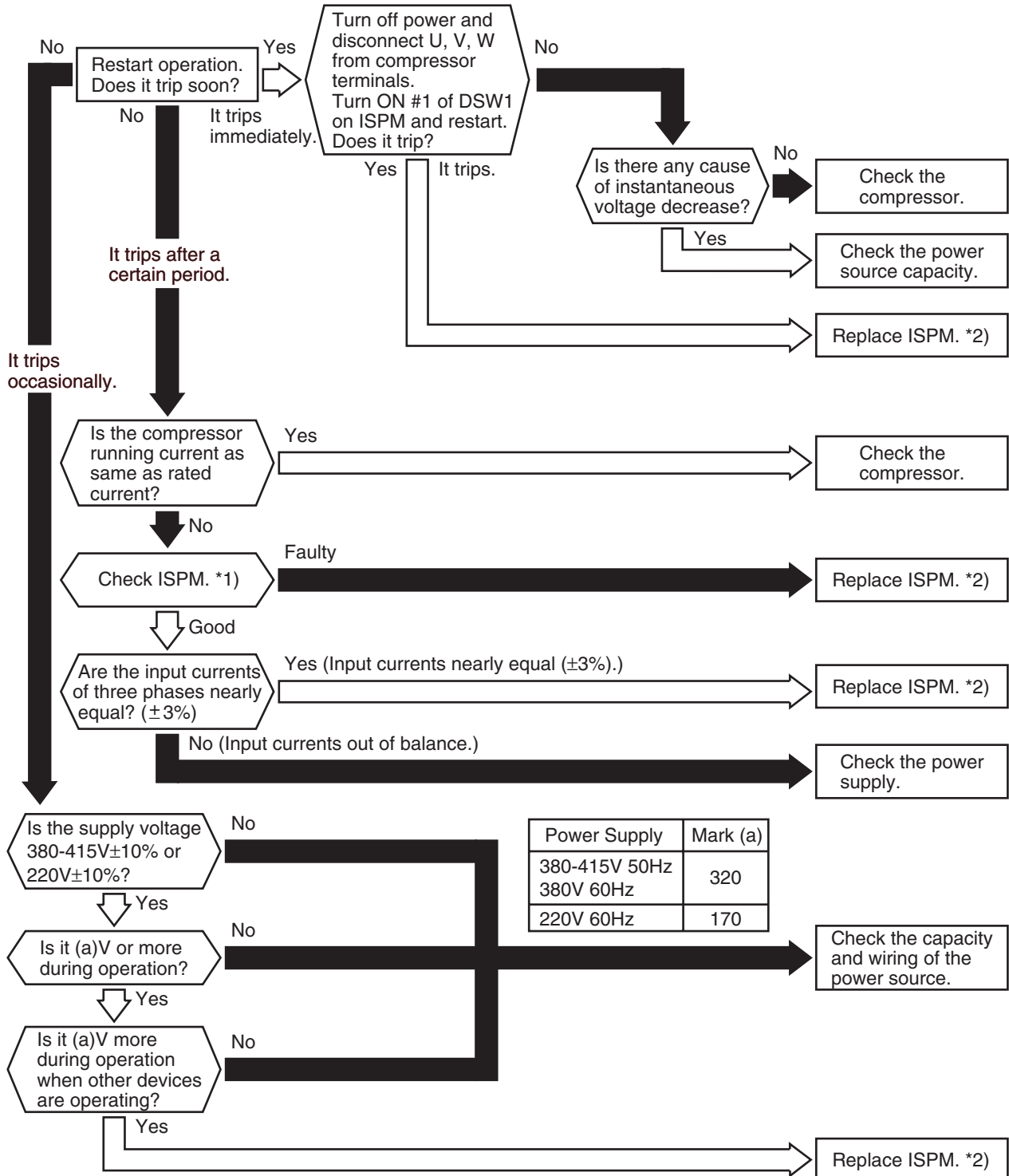


**Protection Activation Against Instantaneous Overcurrent of Inverter (2)  
(For 24 and 30HP)**

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ In case that the abnormality of alarm code 51, 52, 53 or 54 occurs three times within 30 seconds, the alarm code of abnormality occurred for the third time is indicated. Retry operation is performed up to second time of abnormality occurrence.

Conditions: Inverter current is 150% of the rated current.



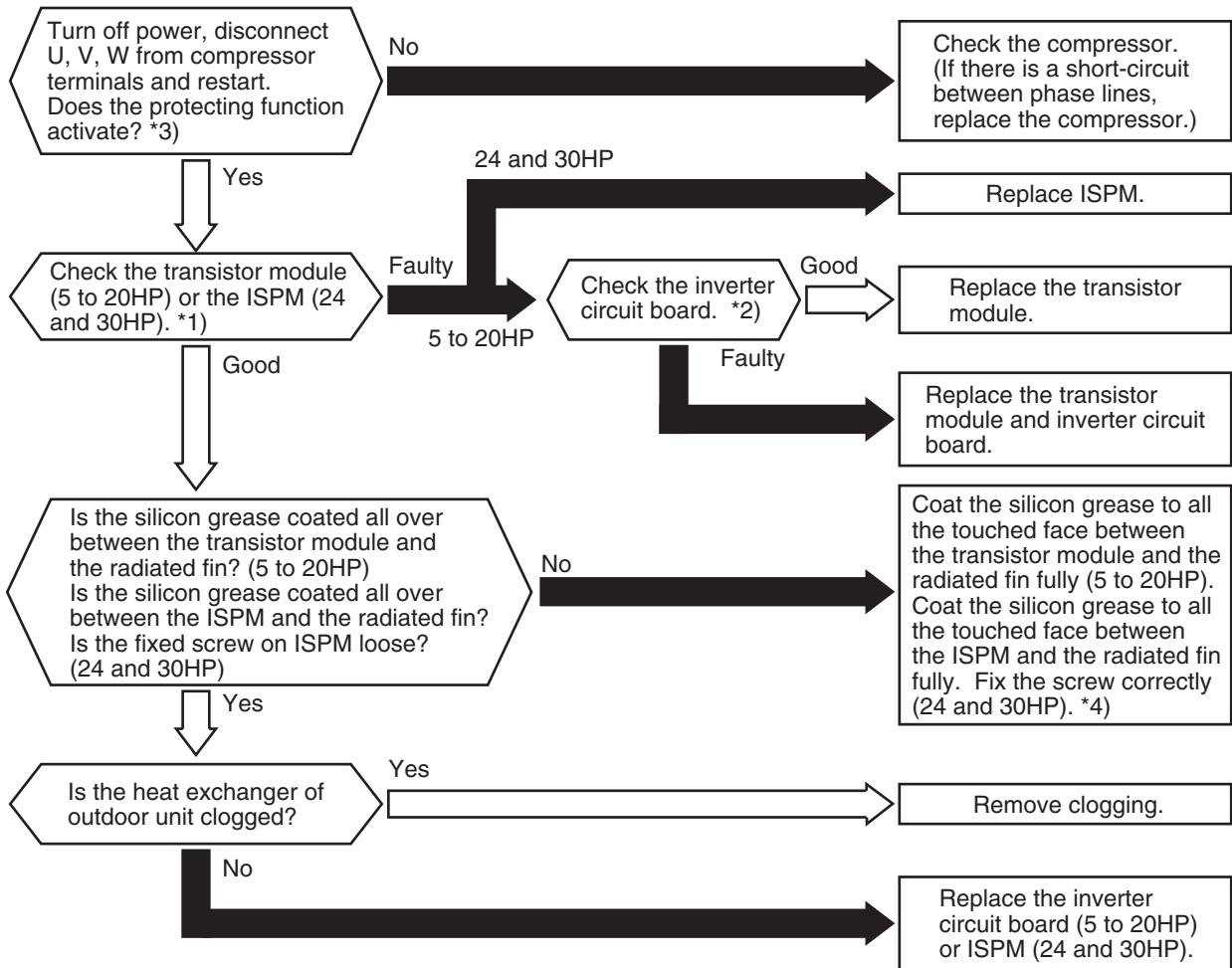
1\*): Regarding replacing or the checking method for ISPM, refer to page 1-114.

2\*): Before the checking of ISPM, refer to page 1-111 regarding electrical discharge.

Alarm Code <span style="font-size: 2em; font-weight: bold;">53</span>	<b>Protection Activation of Transistor Module (5 to 20HP) or ISPM (24 and 30HP)</b>
---	---

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ Transistor module (5 to 20HP) or ISPM (24 and 30HP) have detecting function of abnormality. This alarm is indicated when the transistor module detect the abnormality 3 times in 30 minutes including 3. Retry operation is performed up to the occurrence of 2 times. (In Case of 5 to 20HP) In case that the abnormality of alarm code 51, 52, 53 or 54 occurs three times within 30 seconds, the alarm code of abnormality occurred for the third time is indicated. Retry operation is performed up to second time of abnormality occurrence. (In Case of 24 and 30HP)

Conditions: Abnormal Current to the Transistor Module (5 to 20HP) or ISPM (24 and 30HP) such as Short Circuited or Grounded  
or  
Abnormal Temperature of the Transistor Module (5 to 20HP) or ISPM (24 and 30HP)  
or  
Control Voltage Decrease



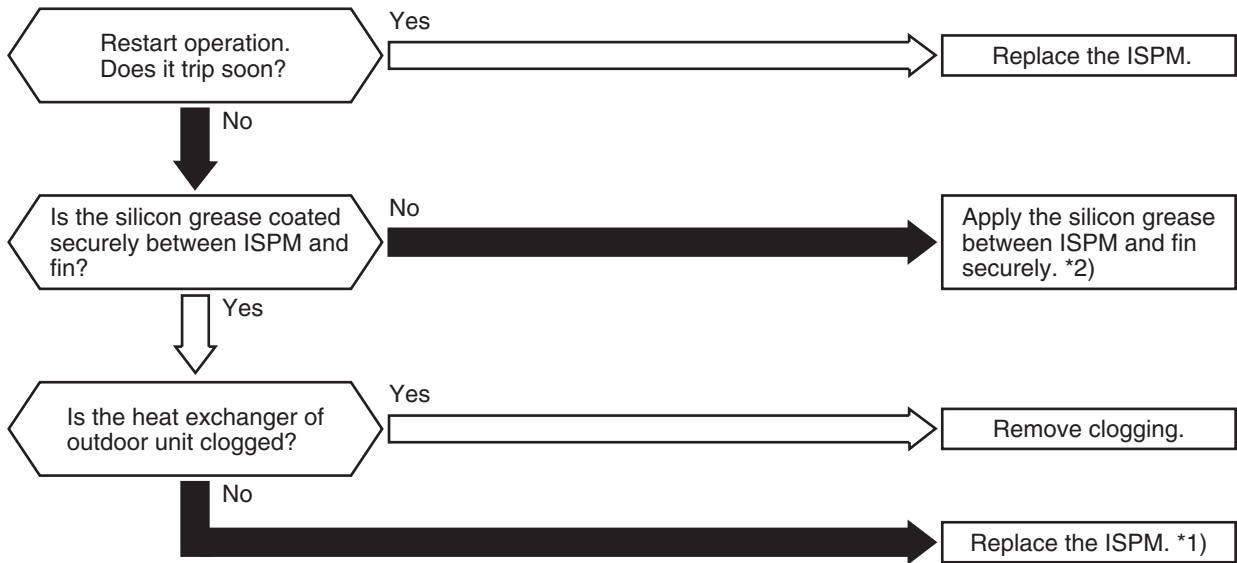
1\*): Regarding replacing or checking method for the transistor module (5 to 20HP) and the inveter components (24 and 30HP), refer to pages 1-112 and 1-114.  
 2\*): Before the checking of inverter components, refer to page 1-111 regarding electrical discharge.  
 3\*): Turn ON the No.1 switch of the dip switch DSW1 on PCB3/ISPM when restarting with disconnecting the terminals of the compressor. After troubleshooting, turn OFF the No.1 switch of the dip switch DSW1 on PCB3/ISPM (5 to 20HP/24 and 30HP).  
 4\*): Use the silicon grease provided as accessory (Service Parts No.: P22760).

Alarm Code	54	Increase in Inverter Fin Temperature (Only 24 and 30HP)
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- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.

★ In case that the abnormality of alarm code 51, 52, 53 or 54 occurs three times within 30 seconds, the alarm code of abnormality occurred for the third time is indicated. Retry operation is performed up to second time of abnormality occurrence.

Conditions: This alarm is indicated when the temperature of the internal thermostat for ISPM is higher than 100°C.



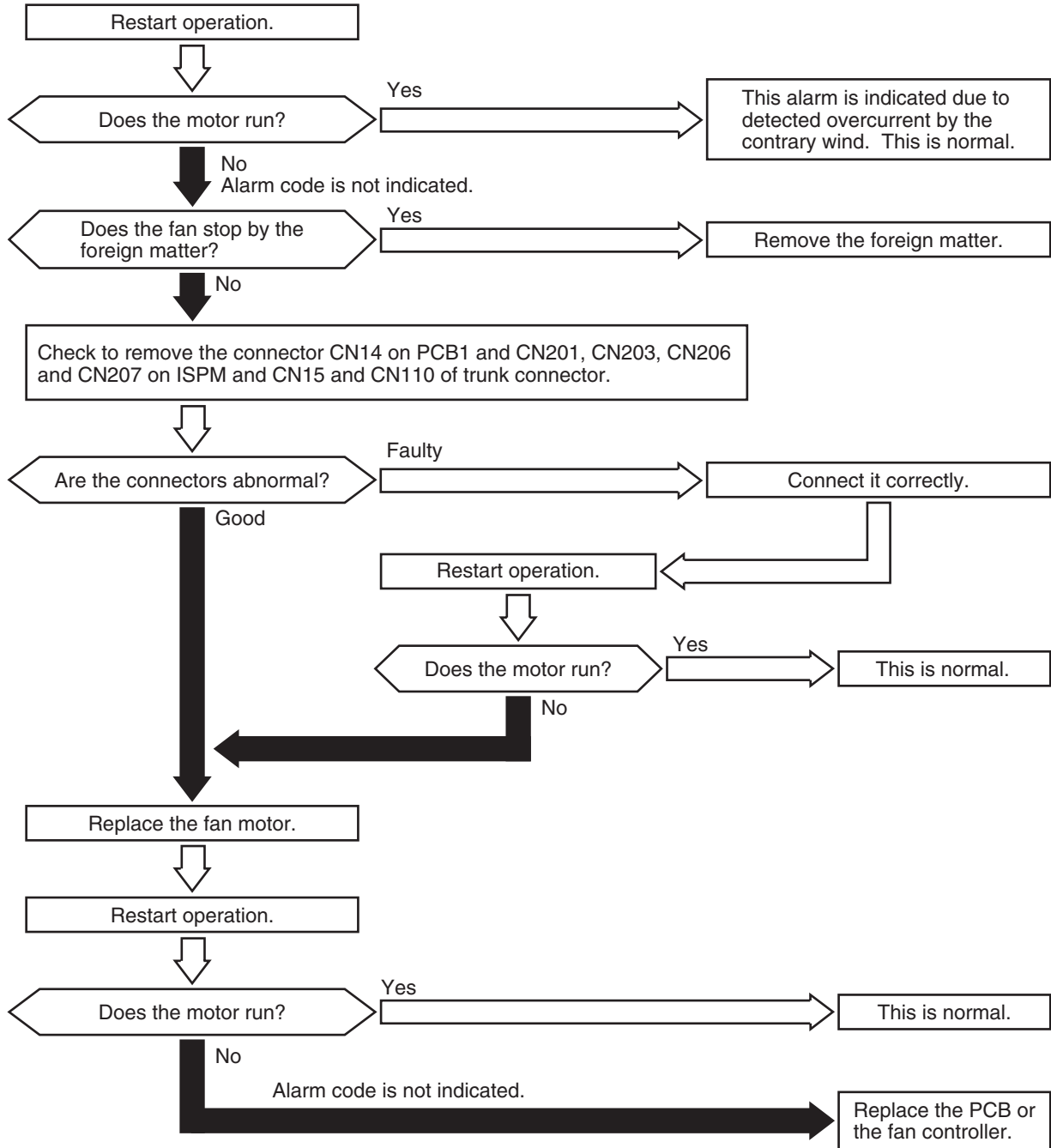
1\*): Regarding replacing or checking method for ISPM, refer to page 1-114.

2\*): Use the silicon grease provided as accessory (Service Parts No.: P22760).



Alarm Code <span style="font-size: 2em; font-family: monospace;">56 57 58</span>	<b>Abnormality of Fan Motor Protection</b> (Only 24 and 30HP 220V/60Hz)
--	--

- “RUN” light flickers and “ALARM” is indicated on the remote control switch.
- The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm is indicated when the revolution pulse output from the fan motor is 10rpm or less and the reverse revolution signal is detected. The fan motor is stopped once, and restarted after 10 seconds. It occurs more than 10 times in 30 minutes, this alarm is indicated. The abnormality occurs when the fan motor is stopped.

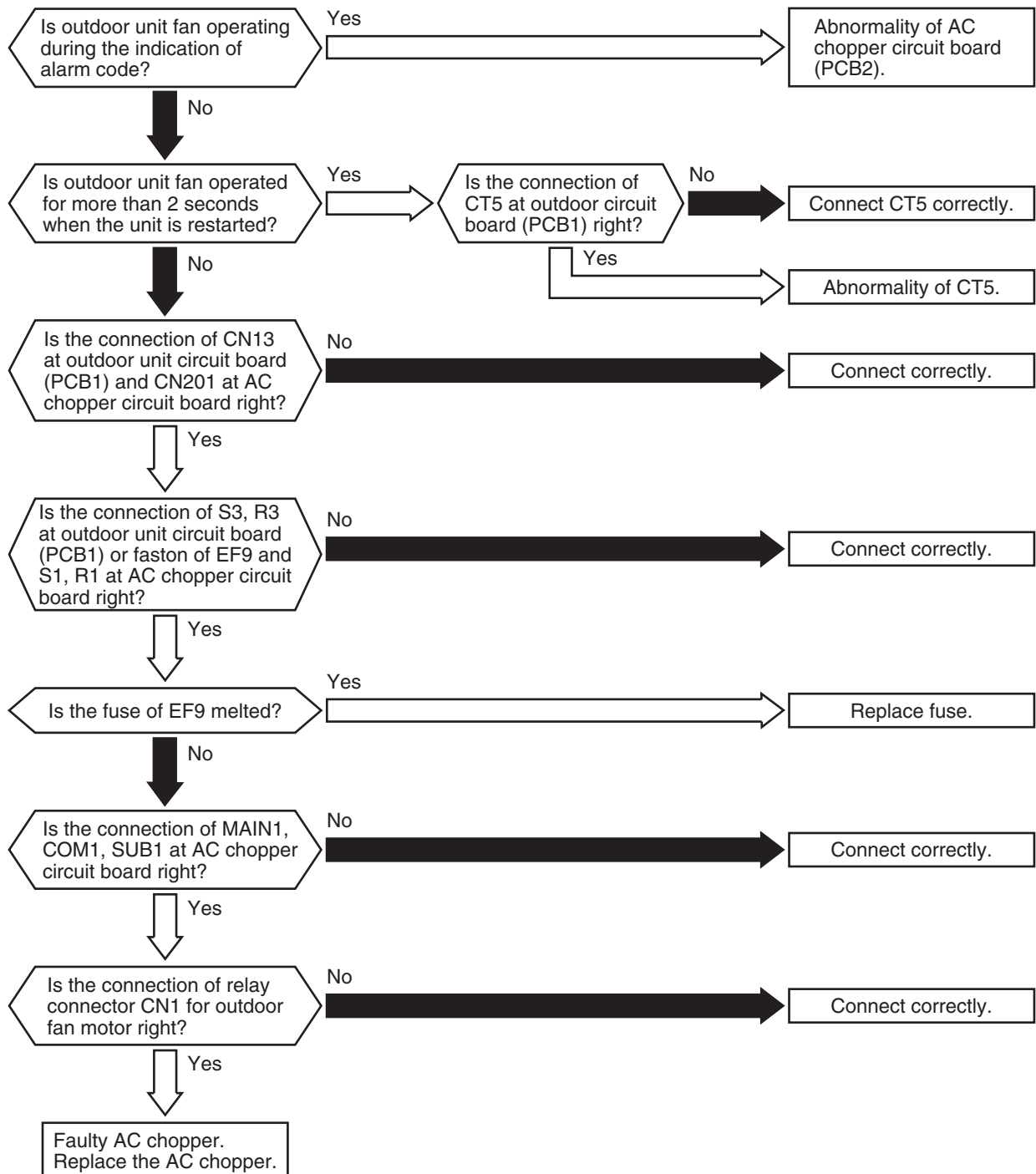


In the case that the fan motor does not run even the PCB is replaced, replace ISPM.

Alarm Code **59**

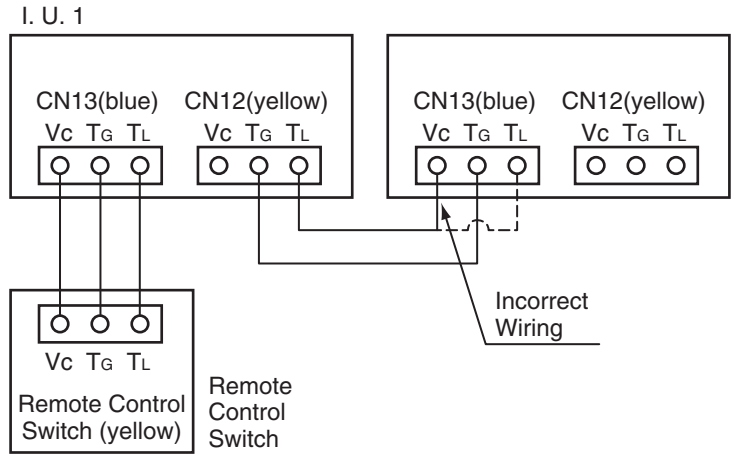
**Abnormality of AC Chopper Circuit Board**  
(Only for 5 to 20HP & 24, 30HP 380-415/380V 50/60Hz)

- "RUN" light flickers and "ALARM" is indicated on the remote control switch.
  - The unit No., alarm code and the unit code is alternately indicated on the set temperature section, and the unit No. and alarm code are indicated on the display of the outdoor unit PCB.
- ★ This alarm code is indicated when a current value of AC chopper becomes (1) less than 0.5A when outdoor unit fan is operating, or (2) more than 2A while outdoor unit fan stops.



Alarm Code <b>dd</b>	<b>Incorrect Wiring Among Indoor Units</b>
----------------------	--

- ★ This alarm code is indicated only when remote control switch PC-2H2 is used being connected to indoor unit.
- ★ This alarm occurs in the case of incorrect connection like that T<sub>L</sub> terminal is connected to V<sub>c</sub> terminal as below when indoor units are wired.



The unit No. and unit code are as below regardless of the indoor unit being connected to the remote control switch.

Indoor Unit No. **00**  
 Cycle System **00**  
 Unit Code **E.00**

```

    graph TD
        A{Is wiring among indoor units right?} -- No --> B[Repair the wiring among indoor units.]
        A -- Yes --> C[Turn off the main power switch and cut the wire JP4 at remote control switch, then turn on the main power switch again.]
        C --> D
    
```

Phenomenon	Cause	Check Item	Action (Turn OFF Main Switch)
Wiring Trouble	Incorrect Wiring	Check the wiring No.	Repair the wiring correctly.

Alarm  
Code

EE

## Compressor Protection

- ★ This alarm code appears when one of the following alarms occurs three times within 6 hours, which may result in serious compressor damages, if the outdoor unit is continuously operated without removing the cause.

<i>Alarm Code:</i>	<i>Content of Abnormality</i>
02	<i>Tripping of Protection Device in Outdoor Unit</i>
07	<i>Decrease in Discharge Gas Superheat</i>
08	<i>Increase in Discharge Gas Temperature</i>
39	<i>Abnormality of Running Current at Constant Comp.</i>
43	<i>Pressure Ratio Decrease Protection Activating</i>
44	<i>Low Pressure Increase Protection Activating</i>
45	<i>High Pressure Increase Protection Activating</i>
46	<i>High Pressure Decrease Protection Activating</i>
47	<i>Low Pressure Decrease Protection Activating</i>

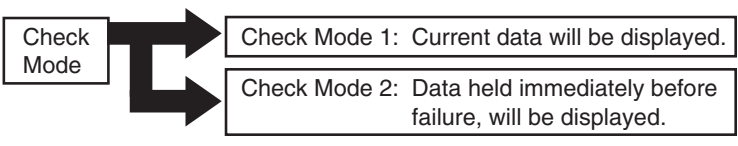
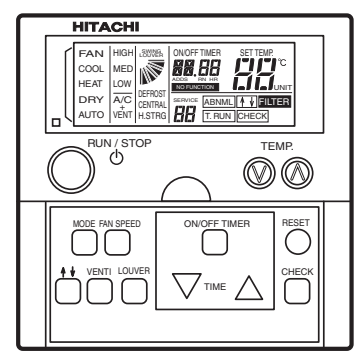
These alarms are able to be checked by the CHECK Mode 1. Follow the action indicated in each alarm chart.

These alarms are cleared only by turning OFF the main power switch to the system. **However, careful attention is required before starting, since there is a possibility which will result in serious damages to the compressors.**

1.2.3 Troubleshooting in Check Mode by Remote Control Switch

(PC-P1H)

- Use the remote control CHECK switch in the following cases.
  - (1) When the RUN lamp is flashing.
  - (2) To trace back the cause of trouble after restarting from stoppage with the RUN lamp flashing.
  - (3) To check during normal operation or stoppage.
  - (4) To monitor the temperatures of intake and discharge air.

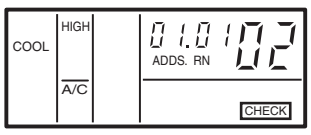


Normal Mode

CHECK  Press for more than 3 seconds.

- Indication will delay as transmission between the remote control switch and indoor unit takes about 10 seconds.
- All data may be displayed as "FF" or "-1" or "255". These transient data produced temporarily by software do not affect device functions at all. (The alarm code may also be indicated as "FF".)

Unit Number and Alarm Code Displayed

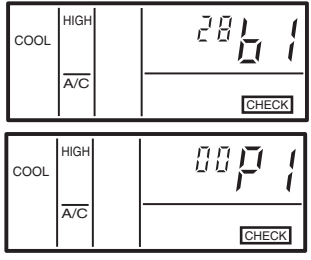


- Alarm Code Identifying the Last Fault that has Occurred in the Indicated Unit.
- Unit number of connected unit or unit number for which checking mode was selected previously.

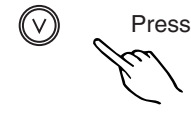
(A) Perform within 7 seconds to check another unit.

- Forward: Press the ^ switch to rise from 00 to 01 to 02 ...
- Backward: Press the v switch to descend from 15 to 14 to 13 ...

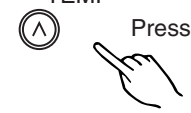
Check Mode 1 (See page 1-80 for details.)



To View the Previous Indication TEMP

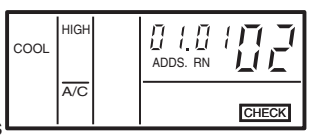


To View the Next Indication TEMP



CHECK  Press for more than 3 seconds.

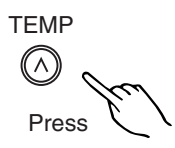
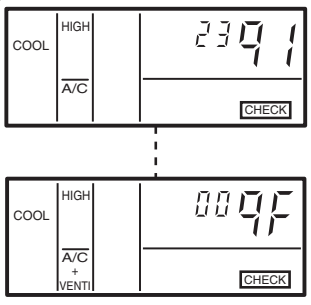
Unit Number and Alarm Code Displayed



Press ^ to view the next data. Press v to view the previous data.

See (A) After 7 seconds

Check Mode 2 (See page 1-83 for details.)



- In Check Mode 2, Data of the first three units connected serially to a remote control switch are available.
- You can press the CHECK switch to release Check Mode 2. Check Mode 1 cannot be released even if you press the CHECK switch.

Check Mode Released

CHECK  Press

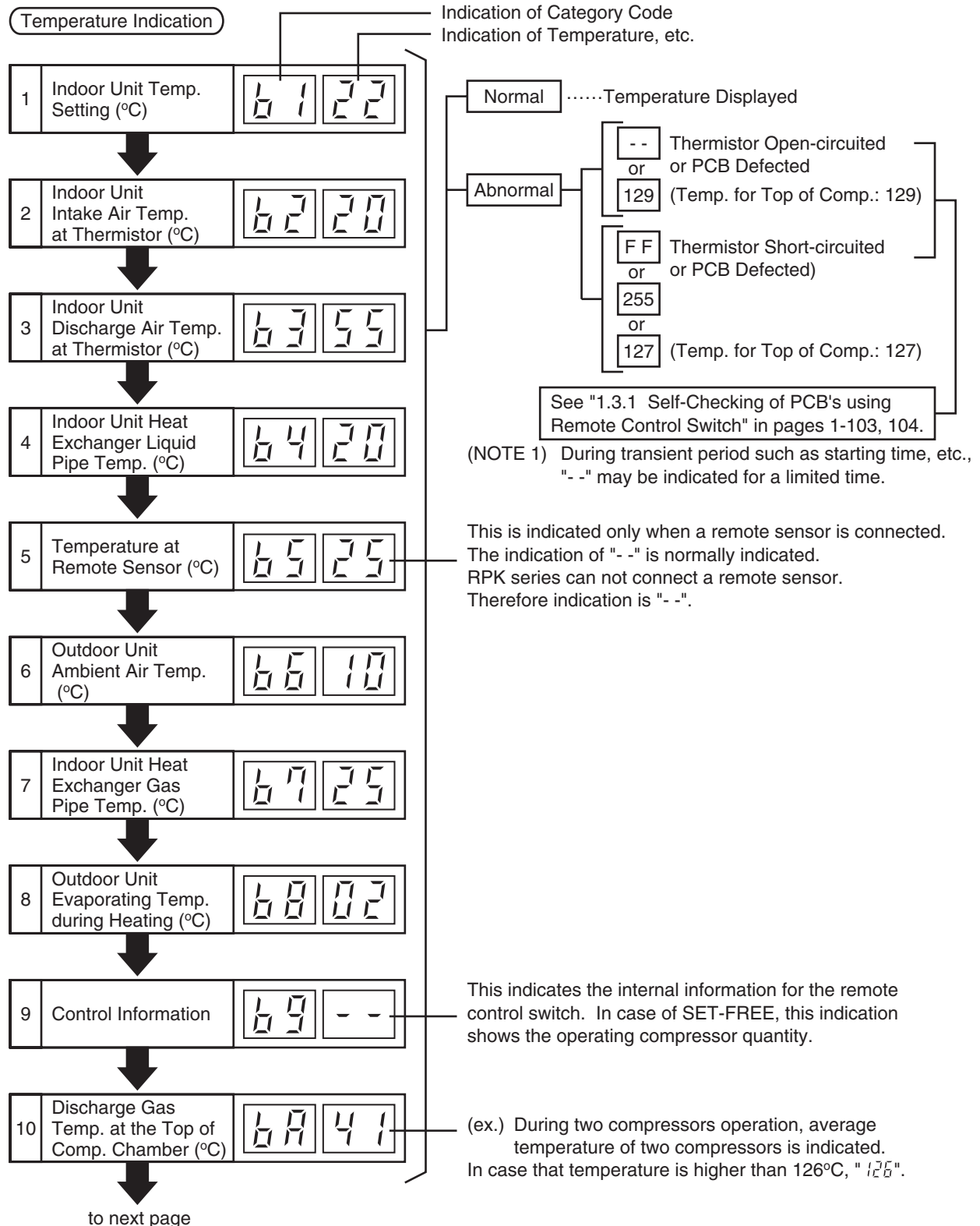
Although the wireless remote controller is used for wall type indoor unit with built-in receiver part, the alarm code can be checked by connecting PC-P1H to the connector (Blue) of the unit as shown below and pressing the operation switch.

**NOTES:**

1. The unit is not operated by pressing operation switch.
2. The above function is available only when alarm occurs.
3. The PCB check by remote controller is not available.
4. The indication is the data when connecting PC-P1H, not the data before the alarm occurs.

(1) Contents of Check Mode 1

The next indication is shown by pressing **Λ** the part of "TEMP" switch. If the **∇** part of "TEMP" switch is pressed the previous indication is shown.

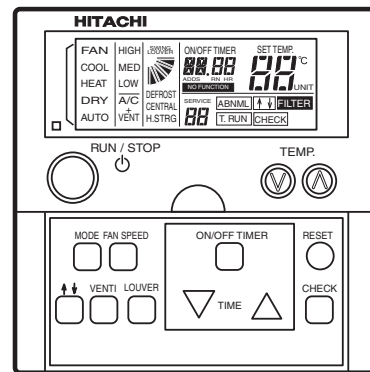
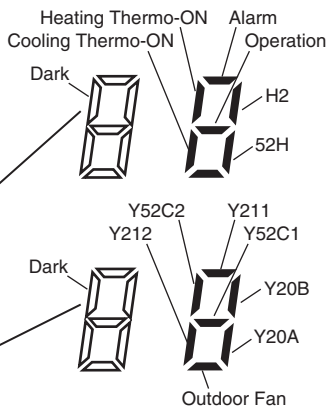


11 Thermo Temp. of Remote Control Switch bb 23

Indication on Micro-Computer Input/Output

12 Micro-Computer Input/Output in Indoor Unit E1 4

13 Micro-Computer Input/Output in Outdoor Unit E2 -



Indication of Unit Stoppage Cause

14 Cause of Stoppage d1 01

Abnormality Occurrence Counter

15 Abnormality Occurrence Times E1 01

16 Instantaneous Power Failure Occurrence Times in Indoor Unit E2 00

17 Transmission Error Occurrence Times between Remote Control Switch and Indoor Unit E3 00

18 Abnormality Occurrence Times on Inverter E4 00

Indication of Automatic Louver Condition

19 Louver Sensor F1 00

to next page

Symbols with a letter Y are relays on PCB

00	Operation OFF, Power OFF
01	Thermo-OFF (NOTE 1)
02	Alarm (NOTE 2)
03	Freeze Protection, Overheating Protection
05	Instantaneous Power Failure at Outdoor Unit, Reset (NOTE 3)
06	Instantaneous Power Failure at Indoor Unit, Reset (NOTE 4)
07	Stoppage of Cooling Operation due to Low Outdoor Air Temperature, Stoppage of Heating Operation due to High Outdoor Air Temperature
08	Compressor Quantity Changeover, Stoppage (HP ≥ 8)
09	Demand of 4-Way Valve Changeover Stoppage (FX Only)
10	Demand, Enforced Stoppage
11	Retry due to Pressure Ratio Decrease
12	Retry due to Low Pressure Increase
13	Retry due to High Pressure Increase
14	Retry due to Abnormal Current of Constant Compressor (HP ≥ 8)
15	Retry due to Abnormal High Temperature of Discharge Gas, Excessively Low Suction Pressure
16	Retry due to Decrease of Discharge Gas Superheat
17	Retry due to Inverter Tripping
18	Retry due to Voltage Decrease
19	Expansion Valve Opening Change Protection
20	Operation Mode Changeover of Indoor Unit (NOTE 5)

(NOTE 1) Explanation of Term,

Thermo-ON: A condition that an indoor unit is requesting compressor to operate.  
Thermo-OFF: A condition that an indoor unit is not requesting compressor to operate.

(NOTE 2) Even if stoppage is caused by "Alarm", "02" is not always indicated.

(NOTE 3) If transmission between the inverter printed circuit board and the control printed circuit board is not performed during 30 seconds, the outdoor unit is stopped. In this case, stoppage is d1-05 cause and the alarm code "04" may be indicated.

(NOTE 4) If transmission between the indoor unit and the outdoor unit is not performed during 3 minutes, indoor units are stopped. In this case, stoppage is d1-06 cause and the alarm code "03" may be indicated.

(NOTE 5) In the FSG and FS3 system "20" will be indicated at the difference mode between indoor units.

Countable up to 99.

Over 99 times, "99" is always indicated.

(NOTE 1) If a transmitting error continues for 3 minutes, one is added to the occurrence times.

(NOTE 2) The memorized data can be canceled by the method indicated in 1.3.1 "Self-checking of PCBs using Remote Control Switch" in pages 1-103, 104.

# TROUBLESHOOTING

## Compressor Pressure/Frequency Indication

20 Discharge Pressure (High) (x 0.1 MPa) H1 18

21 Suction Pressure (Low) (x 0.01 MPa) H2 04

22 Control Information H3 44

This is an indication for internal information for the remote control switch. This does not have any specific meaning.

23 Operation Frequency (Hz) H4 44

The total frequency is indicated when two compressors are running.

## Indoor Unit Capacity Indication

24 Indoor Unit Capacity J1 08

The capacity of the indoor unit is indicated as shown in the table below.

Capacity Code of Indoor Unit

Indication Code	Equivalent Capacity (HP)
06	0.8
08	1.0
10	1.3
13	1.5
14	1.8
16	2.0
18	2.3
20	2.5
22	2.8
26	3.0
32	4.0
40	5.0
64	8.0
80	10.0

25 Outdoor Unit Code J2 F.n

26 Refrigerant Cycle Number J3 01

27 Refrigerant Cycle Number J4 00

"n" indicates total number of indoor units;

n = 1~9, A, b, C, d, E, F, U  
(10) (11) (12) (13) (14) (15) (16)

## Expansion Opening Indication

28 Indoor Unit Expansion Valve Opening (%) L1 20

J3: 01~16  
(01: when shipment (DSW5), Decimal Indication)  
J4: 00~0F  
(00: when shipment (DSW5), Indication with 16 numbers)

29 Outdoor Unit Expansion Valve MV1 Opening (%) L2 99

In case of models without Expansion Valve (MV2), the same figure is indicated.

30 Outdoor Unit Expansion Valve MV2 Opening (%) L3 99

31 Outdoor Unit Expansion Valve MVB Opening (%) L4 00

FX Series Only

## Estimated Electric Current Indication

32 Compressor Running Current (A) P1 25

The total current is indicated when several compressors are running.  
In case of inverter compressor, the running current of primary side of inverter is indicated.

Returns to Temperature Indication

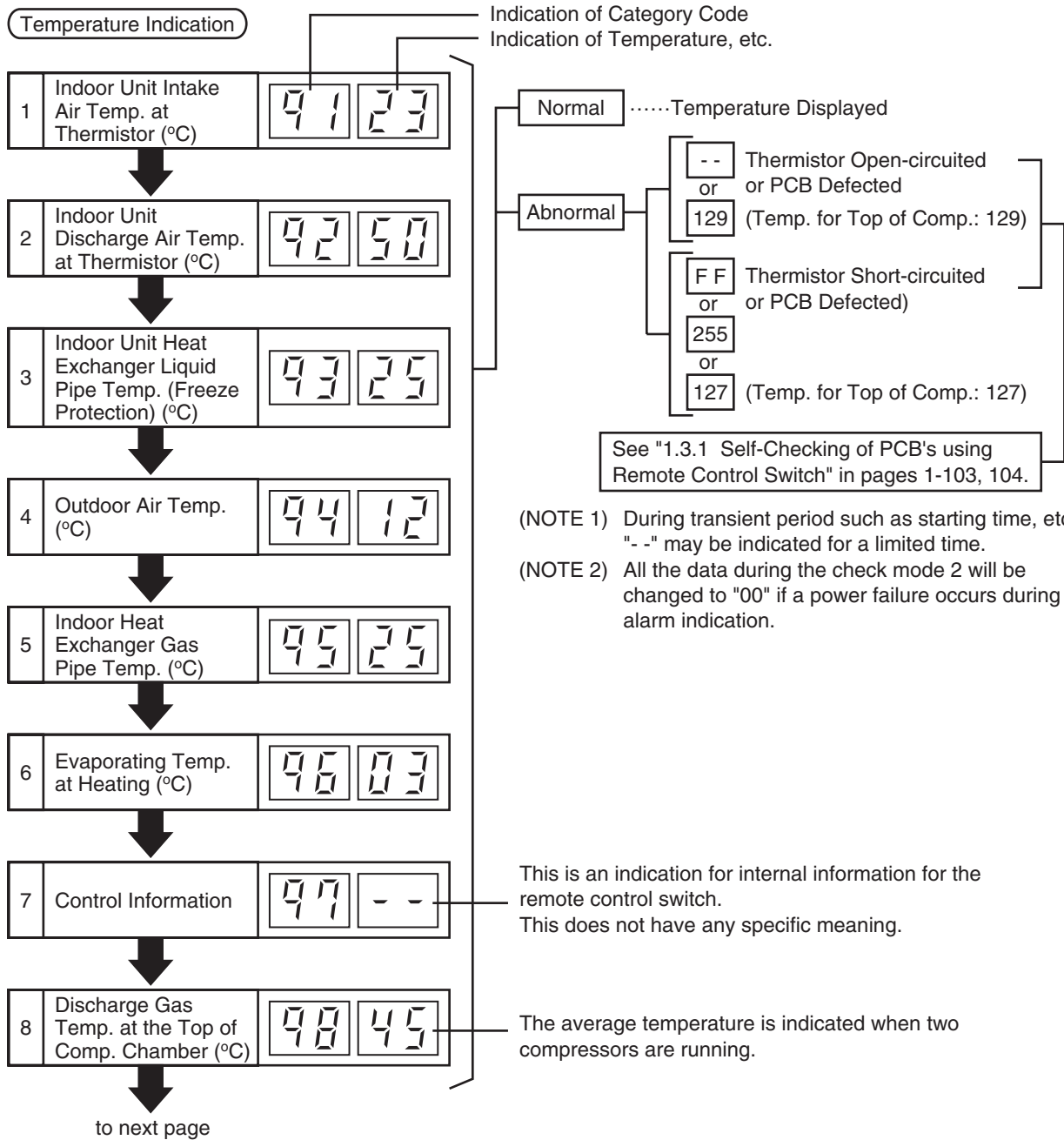
## Temperature Indication



(2) Contents of Check Mode 2

The latest data of the first three indoor units only connected serially are indicated when more than three indoor units are connected to one remote control switch.

By pressing the **Λ** part of "TEMP" switch, the next display is indicated, If the **V** part of "TEMP" switch is pressed, the previous display is indicated.



## TROUBLESHOOTING

### Compressor Pressure/Frequency Indication

9	Discharge Pressure (High) (x 0.1 MPa)	99	18
---	---------------------------------------	----	----



10	Suction Pressure (Low) (x 0.01 MPa)	9A	04
----	-------------------------------------	----	----



11	Control Information	9b	44
----	---------------------	----	----

This is an indication for internal information for the remote control switch. This does not have any specific meaning.



12	Operating Frequency (Hz)	9f	44
----	--------------------------	----	----

The total frequency is indicated when plural compressor are running.



### Expansion Opening Indication

13	Indoor Unit Expansion Valve Opening (%)	9d	20
----	---	----	----



14	Outdoor Unit Expansion Valve MV1 Opening (%)	9E	99
----	--	----	----



### Estimated Electric Current Indication

15	Compressor Running Current (A)	9f	20
----	--------------------------------	----	----

The total value is indicated when plural compressors are running.



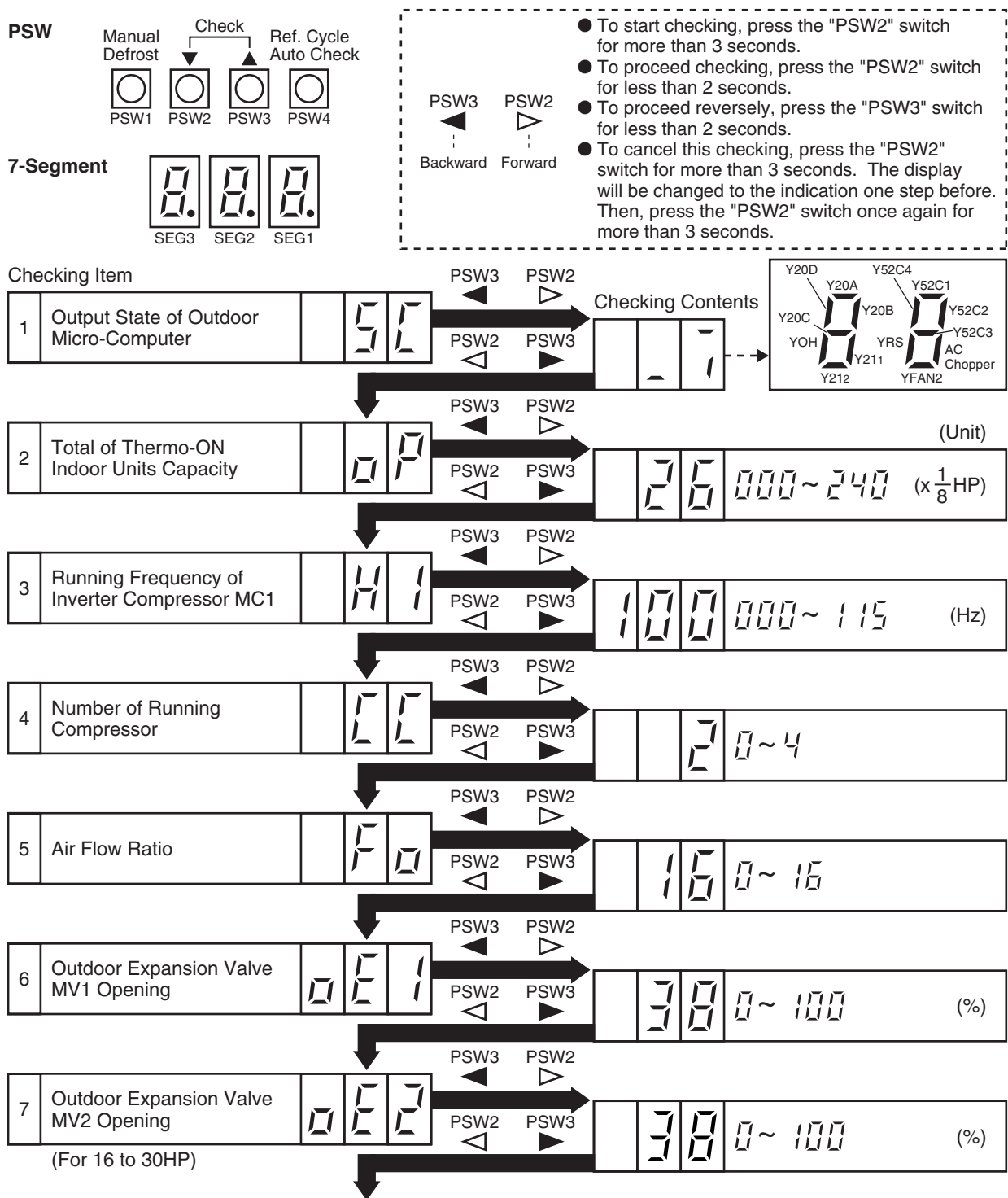
Returns to Temperature Indication

### Temperature Indication

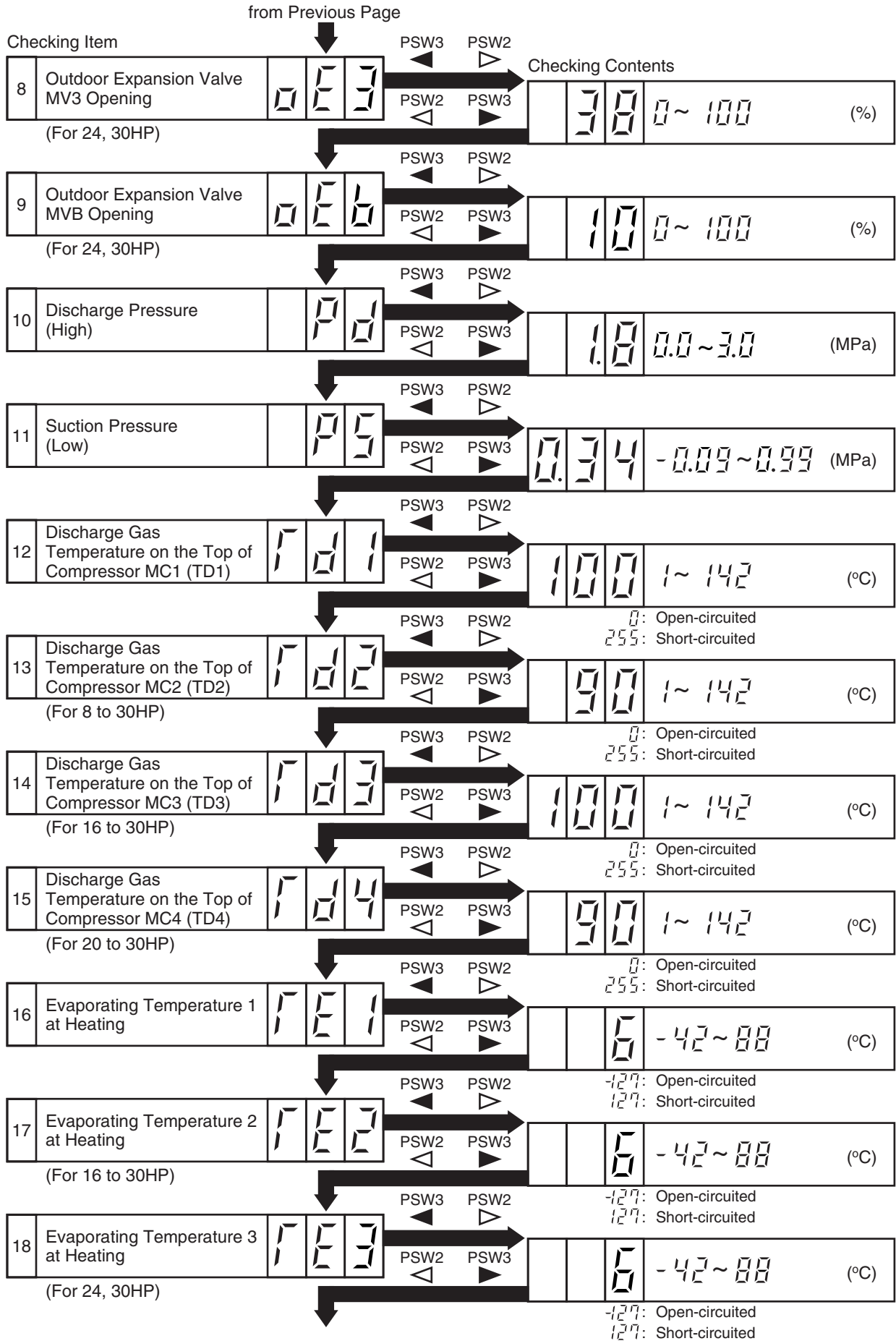
**1.2.4 Troubleshooting by 7-Segment Display**

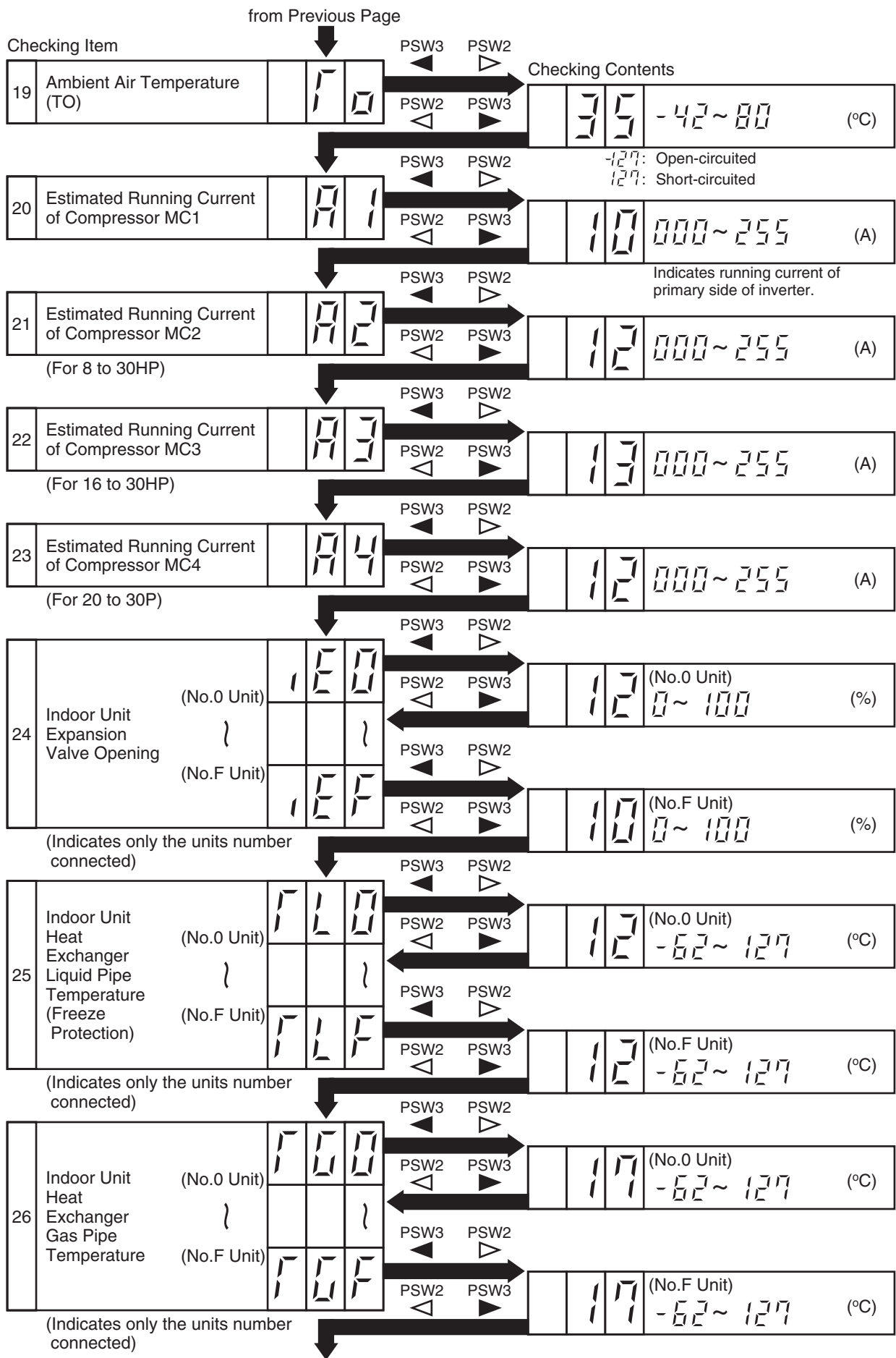
(1) Checking Method by 7-Segment Display

By using the 7-segments and check switch (PSW) on the PCB1 in the outdoor unit, total quantity of combined indoor units, 7-segments operation conditions and each part of refrigeration cycle, can be checked.

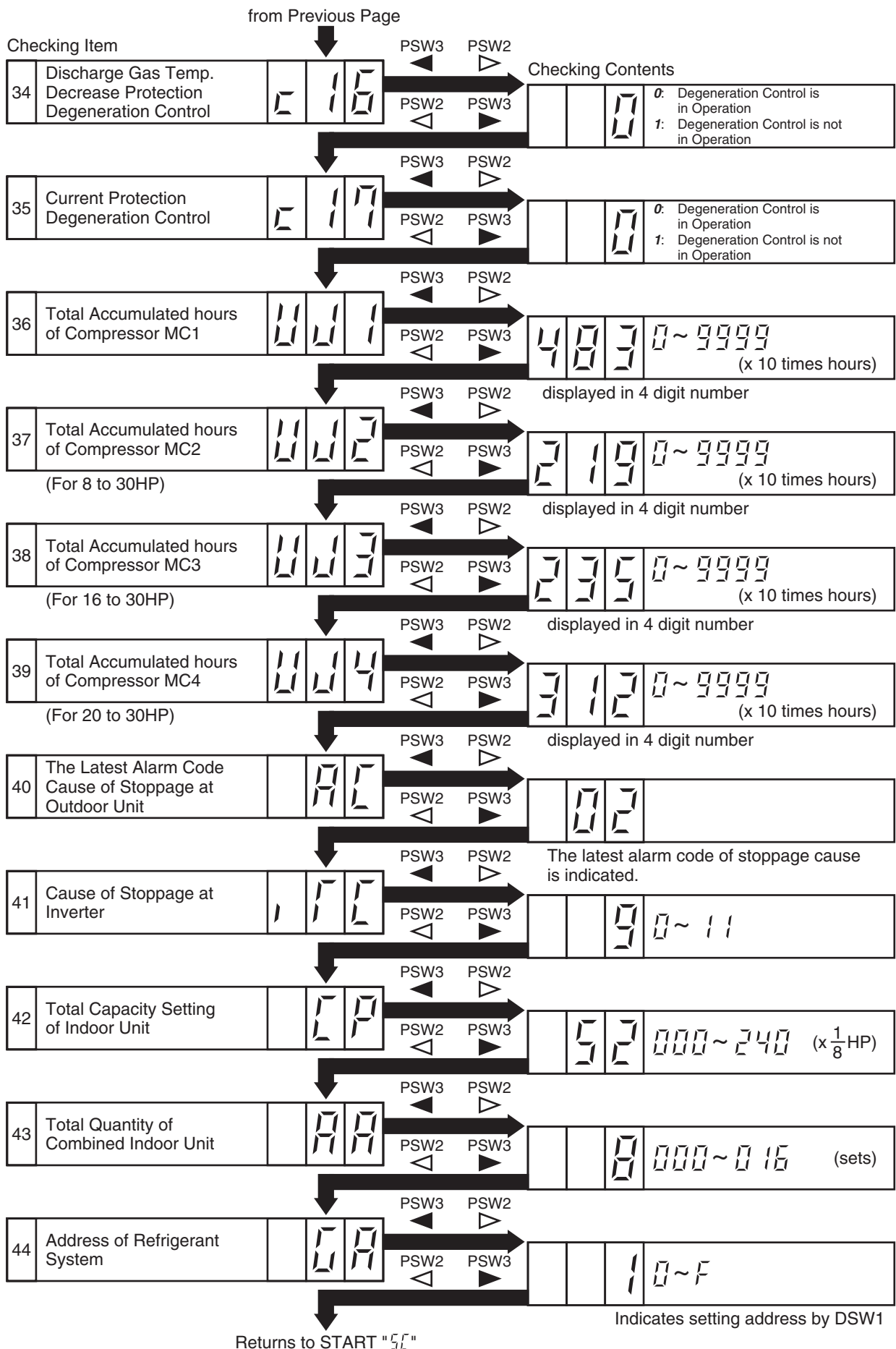


# TROUBLESHOOTING







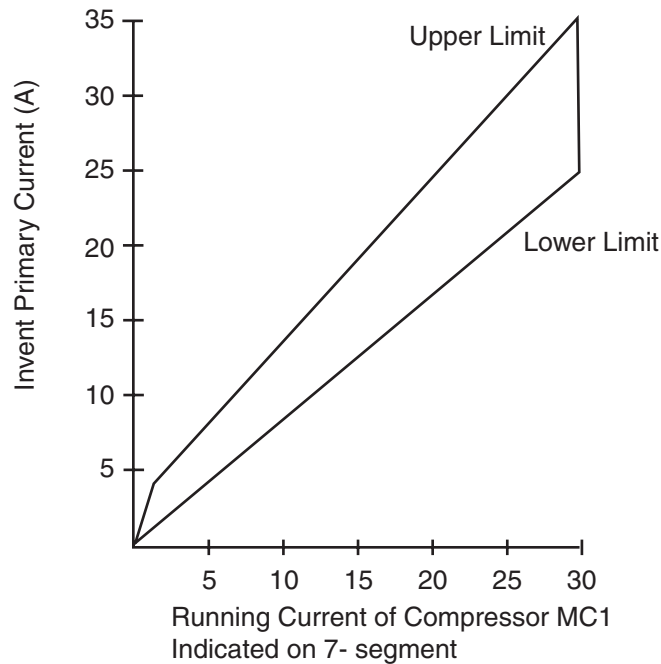


## TROUBLESHOOTING

### (2) Running Current of Compressor

#### ● Inverter Primary Current

The inverter primary current is estimated from the running current of the compressor MC1 indicated on 7-segments, as chart below.



#### ● Indicated Running Current of Compressor MC2, MC3, MC4

The running current of the compressor MC2, MC3, MC4 is detected by current sensor. (CT2 to CT4)

#### ● Cause of Stoppage for Inverter (Content of Check Item " $\overline{I}$ ")

Code	Cause	Cause of Stoppage for Corresponding Unit	Remark	
			Indication during Retry	Alarm Code
1	Automatic Stoppage of Transistor Module (IPM Error) (Over Current, Decrease Voltage, Increase Temperature)	17	P 17	53
2	Instantaneous Over Current	17	P 17	52
3	Abnormal Inverter Fin Thermistor	17	P 17	54
4	Electronic Thermal Activation	17	P 17	52
5	Inverter Voltage Decrease	18	P 18	06
6	Increase Voltage	18	P 18	06
8	Abnormal Current Sensor	17	P 17	51
9	Instantaneous Power Failure Detection	18	-	-
11	Reset of Micro-Computer for Inverter	18	-	-
12	Earth Fault Detection for Compressor (Only Starting)	17	P 17	53
13	Abnormal Power Source Phase	18	-	-



- Protection Control Code on 7-Segment Display
  - (a) The protection control indication can be seen on 7-segments when a protection control is activated.
  - (b) The 7-segment continues ON while function is working, and goes out when released.
  - (c) When several protection controls are activated, code number with higher priority will be indicated (see below for the priority order).
    - Higher priority is given to protection control related to frequency control than the other.
    - <Priority Order>
      - \* Pressure Ratio Control
      - \* High-Pressure Rise Protection
      - \* Current Protection
      - \* Discharge Gas Temperature Rise Protection
      - \* Low-Pressure Fall Protection
      - \* Reversing Valve Switching Control (For 16, 20HP and FX Series)
      - \* High-Pressure Decrease Protection
      - \* Oil Return Control
    - In relation to retry control, the latest retrial will be indicated unless a protection control related to frequency control is indicated.

Code	Protection Control	Code	Protection Control
P 0 1	Pressure Ratio Control (*)	P 0 A	Running Current Limit Control (For 24, 30HP)
P 0 2	High-Pressure Increase Protection (*)	P 1 1	Pressure Ratio Decrease Retry
P 0 3	Current Protection (*)	P 1 2	Low-Pressure Increase Retry
P 0 4	Inverter Fin Temperature Increase Protection (For 24, 30HP)	P 1 3	High-Pressure Increase Retry
P 0 5	Discharge Gas Temperature Increase Protection (*)	P 1 4	Over Current Retry of Constant Compressor
P 0 6	Low-Pressure Decrease Protection	P 1 5	Vacuum/Discharge Gas Temperature Increase Retry
P 0 7	4-Way Valve Switching Control (For 16, 20HP)	P 1 6	Discharge Gas SUPERHEAT Decrease Retry
P 0 8	Oil Return Control	P 1 7	Inverter Trip Retry
P 0 9	High-Pressure Decrease Protection	P 1 8	Insufficient Voltage/ Excessive Voltage Retry

↑  
In the case that degeneration control is activated, **c** is indicated in stead of **0**. (\*mark)

- Retry indication continues for 30 minutes unless a protection control is indicated.
- Retry indication disappears if the stop signal comes from all indoor units.

**NOTE:**

The protection control code being indicated on 7-segment display is changed to an alarm code when the abnormal operation occurs. Also, the same alarm code is indicated on the remote control switch.

**■ Activating Condition of Protection Control Code**

For following the conditions as the temperature change, etc., the control of frequency, etc. is performed to prevent the abnormal conditions by the protection control.

The activating conditions of protection control are shown in the table below.

Code	Protection Control		Activating Condition	Remarks
P01	Pressure Ratio Control		Compression Ratio $\geq 9 \Rightarrow$ Frequency Decrease (Pd/(Ps+1.3)) $\leq 2.2 \Rightarrow$ Frequency Increase	Ps: Suction Pressure of Compressor
P02	High-Pressure Increase Protection		Pd $\geq 2.4$ MPa $\Rightarrow$ Frequency Decrease	Pd: Discharge Pressure of Compressor
P03	Current Protection		Inverter Output Current $\geq 25$ A (220V), 14A (380, 415V) $\Rightarrow$ Frequency Decrease	-
P04	Inverter Fin Temperature Increase Protection		Inverter Fin Temperature $\geq 94^{\circ}$ C $\Rightarrow$ Frequency Decrease	-
P05	Discharge Gas Temperature Increase Protection		Temperature at the top of compressor is high $\Rightarrow$ Frequency Increase (Maximum temperature is different depending on the frequency.)	-
P06	Low-Pressure Decrease Protection		Low-Pressure is Excessively Low $\Rightarrow$ Frequency Increase (Minimum pressure is different depending on the ambient temperature.)	-
P07	4-Way Valve Switching Control	For 16, 20HP	When Switching $\Delta P < 0.5$ MPa $\Rightarrow$ Frequency Increase $\Delta P > 1.3$ MPa $\Rightarrow$ Frequency Decrease	$\Delta P = P_d - P_s$
		For 24, 30HP	When Switching $\Delta P < 1.0$ MPa $\Rightarrow$ Frequency Increase $\Delta P > 2.1$ MPa $\Rightarrow$ Frequency Decrease	
P08	Oil Return Control	For 5 to 20HP	Frequency less than 40Hz is maintained for more than 1 hour. $\Rightarrow$ Frequency $\geq 40$ Hz	-
		For 24, 30HP	Frequency less than 120Hz at cooling (150Hz at heating) is maintained for more than 1 hour $\Rightarrow$ Frequency $\geq 120$ Hz at cooling (150Hz at heating)	
P09	High-Pressure Decrease Protection		Pd $\leq 0.69$ MPa $\Rightarrow$ Frequency Increase (When Cooling Operation) Pd $\leq 1.57$ MPa $\Rightarrow$ Frequency Increase (When Heating Operation)	Pd: Discharge Pressure of Compressor
P0A	Running Current Limit Control (For 24, 30HP)		Running Current for Comp. $\geq$ Setting Value $\Rightarrow$ Frequency Decrease	Setting Value: Upper limit of total running current is set 80%, 70% and 60% at normal operation using input on PCB.
P11	Pressure Ratio Decrease Retry		Compression Ratio (Pd/(Ps+1.3)) $< 1.8$	When activating 3 times in an hour, "43" alarm is indicated.
P12	Low-Pressure Increase Retry		Ps $> 0.9$ MPa	When activating 3 times in an hour, "44" alarm is indicated.
P13	High-Pressure Increase Retry	For 5 to 20HP	Ps $> 2.7$ MPa (In case of 20 to 30Hz: Pd $> 2.5$ MPa)	When activating 3 times in an hour, "45" alarm is indicated.
		For 24, 30HP	Ps $> 2.7$ MPa	
P14	Overcurrent Retry of Constant Compressor		Current $\geq$ Maximum Value(*1), or Current $< 0.9$ A	When activating 3 times in an hour, "39" alarm is indicated.
P15	Vacuum/Discharge Gas Temperature Increase Retry		In Case of Ps $> 0.02$ MPa over 12 minutes, Discharge Gas Temperature $\geq 132^{\circ}$ C over 10 minutes or Discharge Gas Temperature $\geq 140^{\circ}$ C over 5 seconds	When activating 3 times in 30 minutes, "47"(Ps) or "08" (Discharge Gas) alarm is indicated.
P16	Discharge Gas SUPERHEAT Decrease Retry	For 5 to 20HP	Discharge Gas SUPERHEAT less than 10 deg. is maintained for an hour.	When activating 2 times in 2 hours (90min. For 24, 30HP), "07" alarm is indicated.
		For 24, 30HP	Discharge Gas SUPERHEAT less than 10 deg. is maintained for 30 minutes.	
P17	Inverter Trip Retry		Automatic Stoppage of Transistor Module, Activation of Electronic Thermal or Abnormal Current Sensor	When activating 3 times in 30 minutes, "51", "52" and "53" alarm is indicated.
P18	Insufficient Voltage /Excessive Voltage Retry		Insufficient/Excessive Voltage at Inverter Circuit or CB Connector Part	When activating 3 times in 30 minutes, "06" alarm is indicated.

**NOTES:**

1. During protection control (except during alarm stoppage), the protection control code is indicated.
2. The protection control code is indicated during protection control and turns off when canceling the protection control.
3. After retry control, the condition of monitoring is continued for 30 minutes.
4. The maximum value (\*1) is as follows.

	380-415V 50Hz	380V 60Hz	220V 60Hz
8HP	12.1A	12.6A	23.9A
10HP	15.0A	15.8A	30.5A
16HP	17.8A	18.8A	36.2A
20HP	17.8A	18.8A	36.2A

	380-415V 50Hz		380V 60Hz		220V 60Hz	
	Comp.2	Comp.3, 4	Comp.2	Comp.3, 4	Comp.2	Comp.3, 4
24HP	17.8A	21.6A	18.8A	22.8A	36.2A	43.9A
30HP	17.8A	31.7A	18.8A	33.4A	36.2A	64.5A

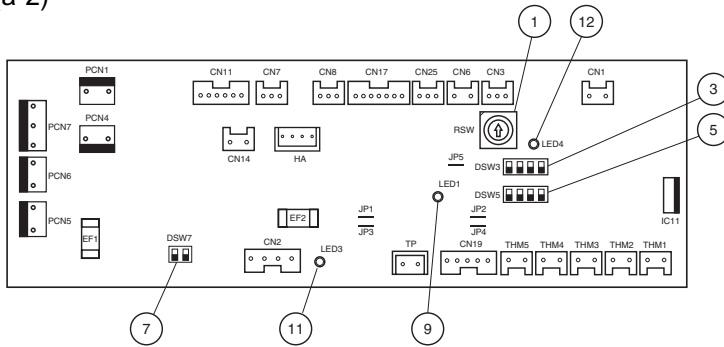
1.2.5 Function of RSW, DSWs and LEDs

(1) Printed Circuit Board in Indoor Unit

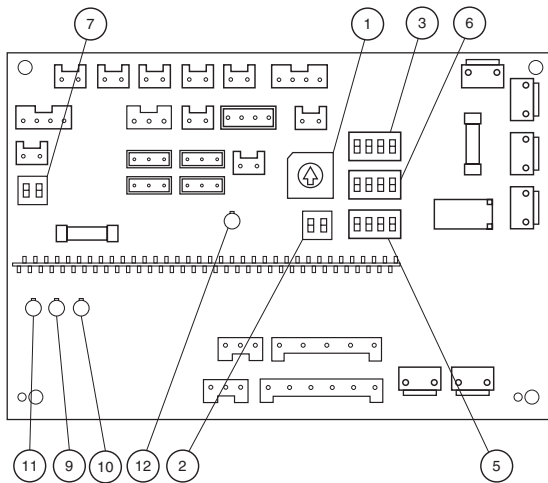
(\* Following figure shows a separated-board type PCB.)

		1 Before Alteration	2 After Alteration
a	RCI	-	a-2
b	RPI (0.8 to 5.0HP)	b-1	b-2
c	RCD	c-1	c-2
d	RPC	d-1	d-2
e	RPK	e-1	e-2
f	RPF, RPI	f-1	-
g	RPI (8, 10HP)	g-1	-
h	KPI	-	h-2

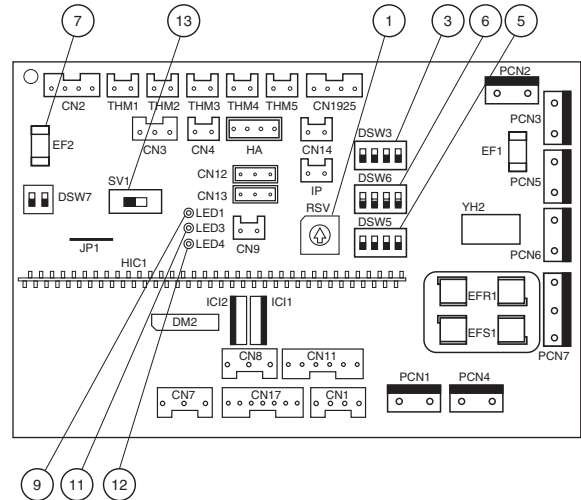
(a-2)



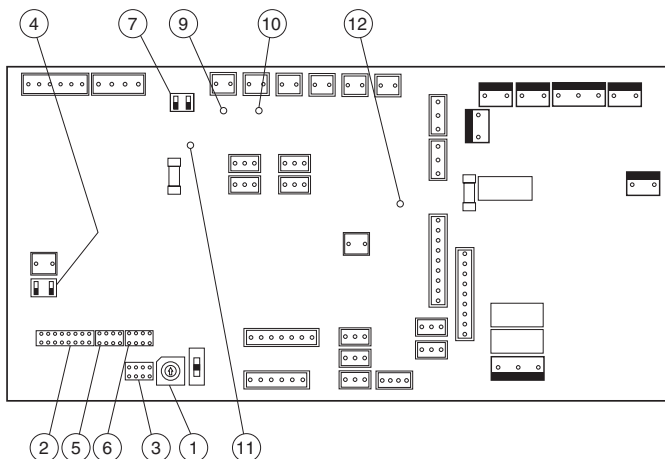
(b-1) (c-1)



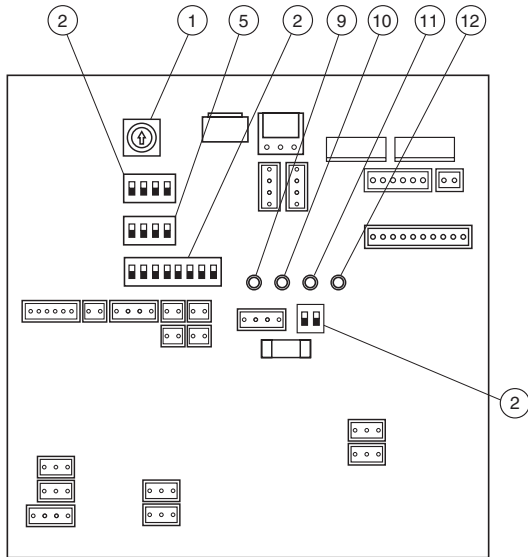
(b-2) (c-2) (d-2) (h-2)



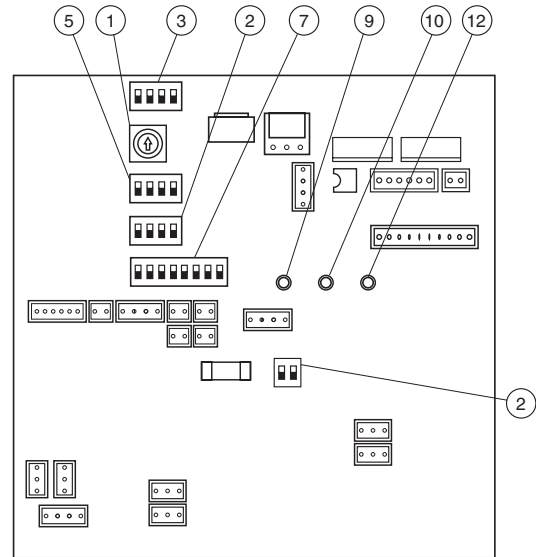
(d-1) (f-1) (g-1)



(e-1)



(e-2)



■ Dip Switch and LED Functions on Indoor Unit Printed Circuit Board (Dip Switch/ ●: With, X: Without)

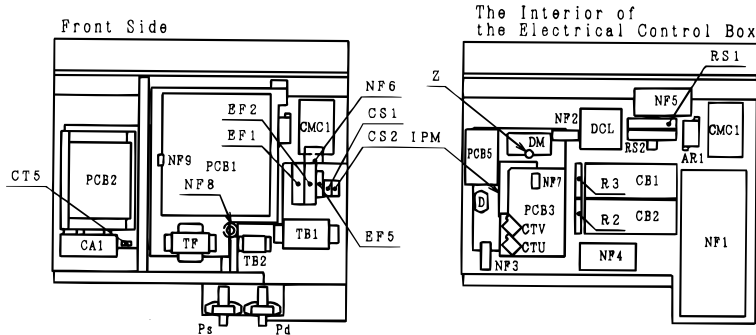
Part Name	Contents of Functions	Dip Switch						Remarks
		a-2	b-1 c-1	b-2 c-2 d-2 h-2	d-1 f-1 g-1	e-1	e-2	
1 RSW	Setting of Indoor Unit Number	●	●	●	●	●	●	-
2 DSW2	Setting of Optional Functions A. Self-Diagnosis B. Remote ON/OFF Control C. Automatic Restart after Short Power Failure D. Control by Field-Supplied Room Thermostat	X	X	X	●	●	●	A. a-2, b-1, b-2, c-1, c-2, d-2: No Function B. a-2, b-1, b-2, c-1, c-2, d-2: Dip Switch Setting is Not Required. (The Setting of Remote Control Switch is Required.) C. a-2, b-1, b-2, c-1, c-2, d-2: Same as B D. a-2, b-1, b-2, c-1, c-2, d-2: Same as B h-2: No Function
3 DSW3	Setting of Indoor Unit Capacity Code	●	●	●	●	●	●	-
4 DSW4	Setting of Capacity Adjustment	X	X	X	●	X	X	-
5 DSW5	Setting of Refrigerant Cycle No. Setting	●	●	●	●	●	●	h-2: For Option Setting
6 DSW6	Setting of Unit Code	X	●	●	●	X	X	h-2: For Refrigerant Cycle Setting (In Case of Using H-LINK)
7 DSW7	Setting of Fuse Recover	●	●	●	●	●	●	-
9 LED1 (Red)	This LED1 indicates the transmission state between the indoor unit and remote control switch. Normal Condition: Flickering Abnormal Condition: Activated or Deactivated	●	●	●	●	●	●	-
10 LED2 (Green)	This LED2 indicates the transmission state between the indoor unit and central station. (When Disconnected: Deactivated) Normal Condition: Flickering Abnormal Condition: Activated or Deactivated	X	●	X	●	●	X	-
11 LED3 (Yellow)	This LED3 indicates the transmission state between the indoor unit and outdoor unit. Normal Condition: Flickering one time/ some seconds Abnormal Condition: Activated or Deactivated more than 30 seconds or Flickering (30 times/1 second)	●	●	●	●	●	●	-
12 LED4 (Red)	This LED4 indicates the power supply (5V) for micro-computer. Normal Condition: Activated Abnormal Condition: Deactivated	●	●	●	●	●	●	-
13 SW1	Setting of Transmission	X	X	●	X	X	X	-

(2) Printed Circuit Board in Outdoor Unit

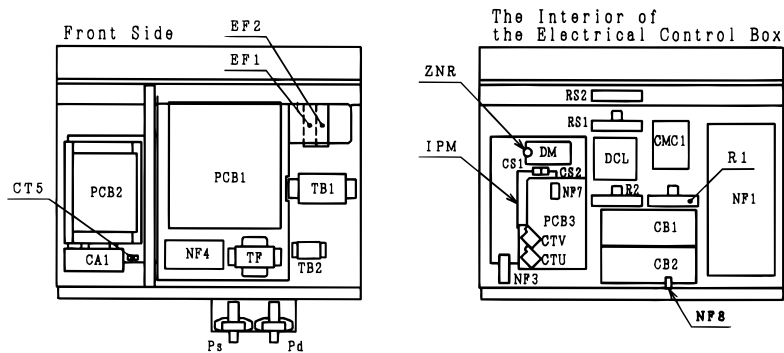
- Arrangement  
Inside of Main Electrical Box (380-415V/50Hz, 380V/60Hz)

**RAS-5FSG, RAS-5FS3**

Before Manufacturing # U4MV0196

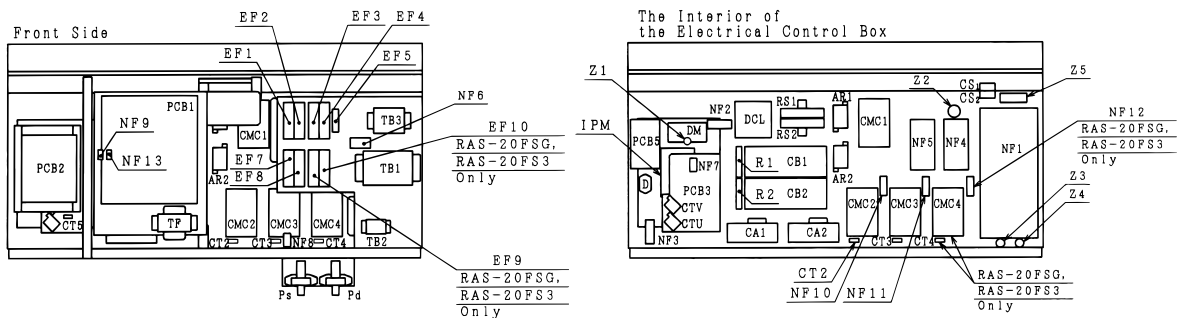


After Manufacturing # U4MV0197



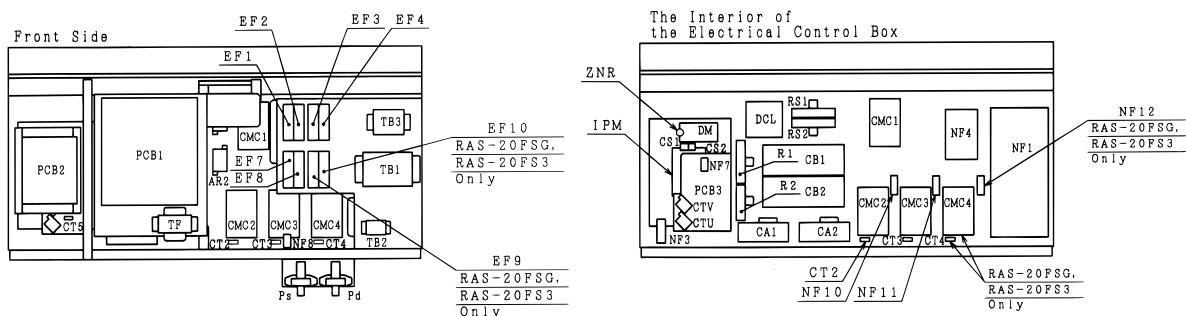
**RAS-8~20FSG, RAS-8~20FS3, RAS-8 and 10FXG, RAS-8 and 10FX3**

Before Manufacturing # U4NG1001 (FSG/FS3 Series)



EF7, EF8, CT3, CMC3, NF11: Only for RAS-16FSG, RAS-16FS3, RAS-20FSG and RAS-20FS3

After Manufacturing # U4NG1002 (FSG/FS3 Series) / From First Production (FXG/ FX3 Series)

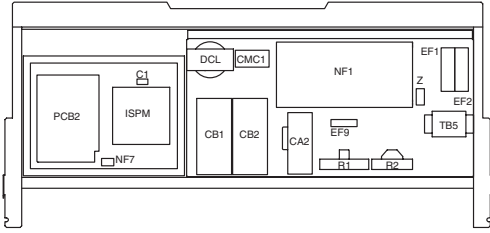


EF7, EF8, CT3, CMC3, NF11: Only for RAS-16FSG, RAS-16FS3, RAS-20FSG and RAS-20FS3

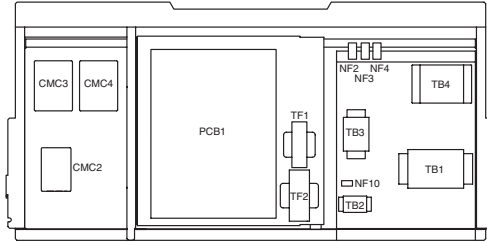
**RAS-24FSG1, RAS-24FS5, RAS- 30FSG1 and RAS-30FS5**

Electrical Control Box of Outdoor Unit

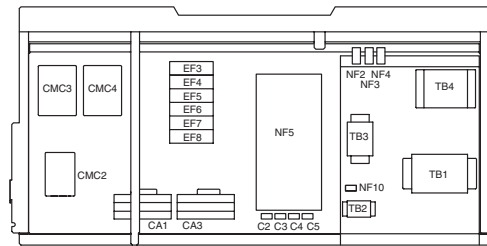
Front Side (For Inverter)



Front Side (For Control)



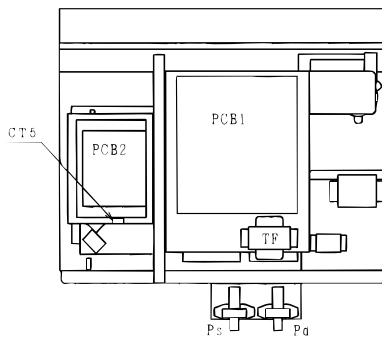
The Interior of the Electrical Control Box



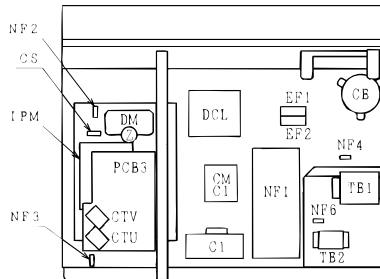
Inside of Main Electrical Box (220V/60Hz)

**RAS-5FSG, RAS-5FS3**

Front Side

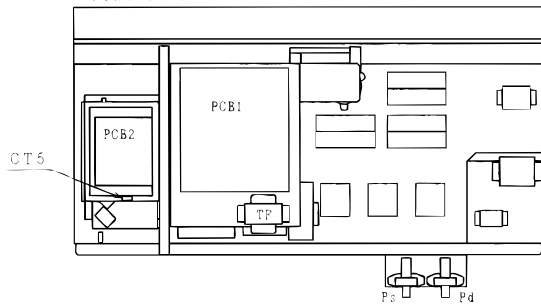


The Interior of the Electrical Control Box

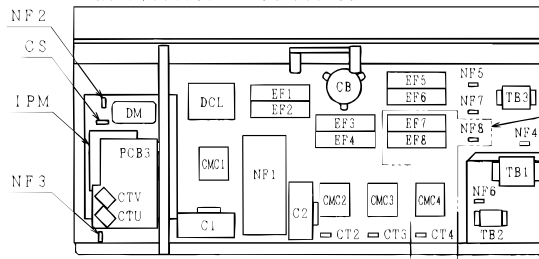


**RAS-8~20FSG, RAS-8~20FS3**

Front Side



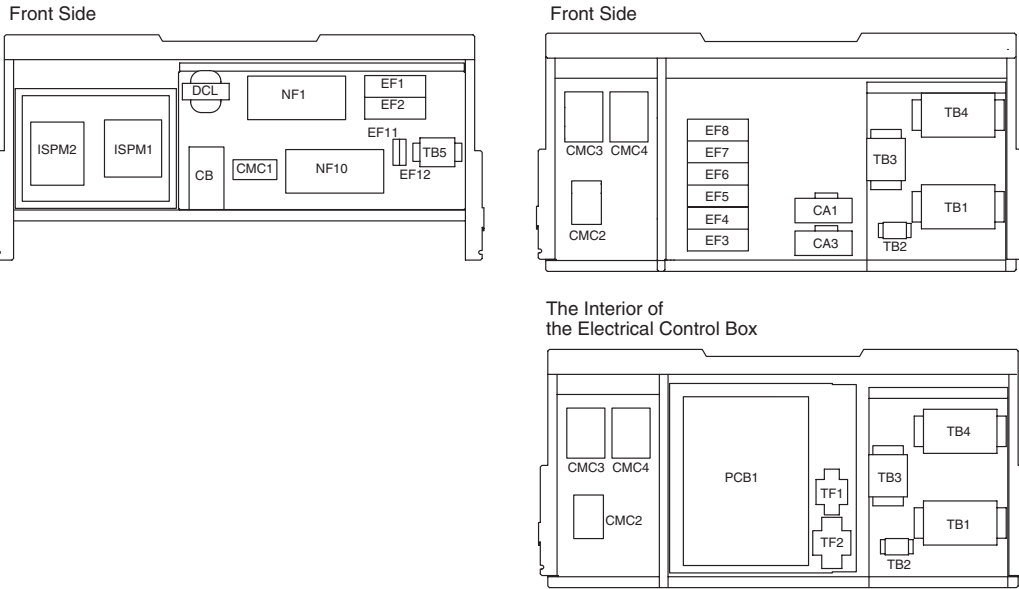
The Interior of the Electrical Control Box



RAS-20FSG,  
RAS-20FS3  
Only

**RAS-24FSG1, RAS-24FS5, RAS- 30FSG1 and RAS-30FS5**

Electrical Control Box of Outdoor Unit



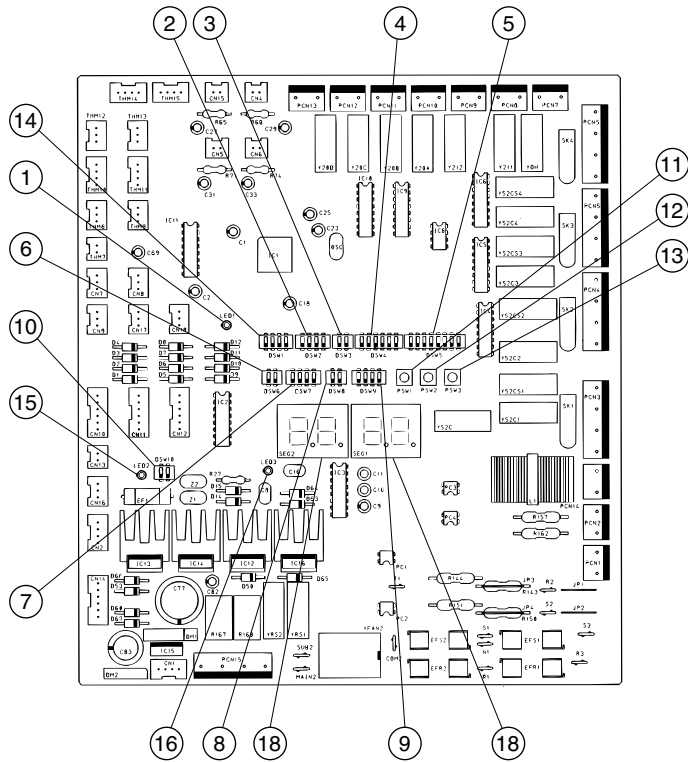
● Purpose

Symbol	PCB	Purpose
PCB1	for Control	<ol style="list-style-type: none"> <li>1. Transmitting between Indoor Unit and Outdoor Unit</li> <li>2. Processing for Sensor Input</li> <li>3. Processing for Dip Switch Input</li> <li>4. Operation Control for Above Items 1 to 3. Compressor Operation Control, Bypass Valve Control, Fan Control and Overcurrent Control</li> <li>5. 7-Segment Indication</li> <li>6. Processing of Safety Device Input</li> <li>7. Processing of Relay Output</li> <li>8. Reverse Phase Detection for Power Source</li> </ol>
PCB2	for Fan	Fan Speed Control
PCB3	for Inverter	<ol style="list-style-type: none"> <li>1. Inverter power part is driven by instruction of PCB1 and compressor is driven.</li> <li>2. Overcurrent Control</li> <li>3. Protection Control for Inverter Part</li> </ol>
PCB5	for "SNUBBER"	<ol style="list-style-type: none"> <li>1. Restraining of Surge Voltage added to Transistor Module (IPM)</li> <li>2. Absorbing for Switching Noise of Transistor Module (IPM)</li> </ol>

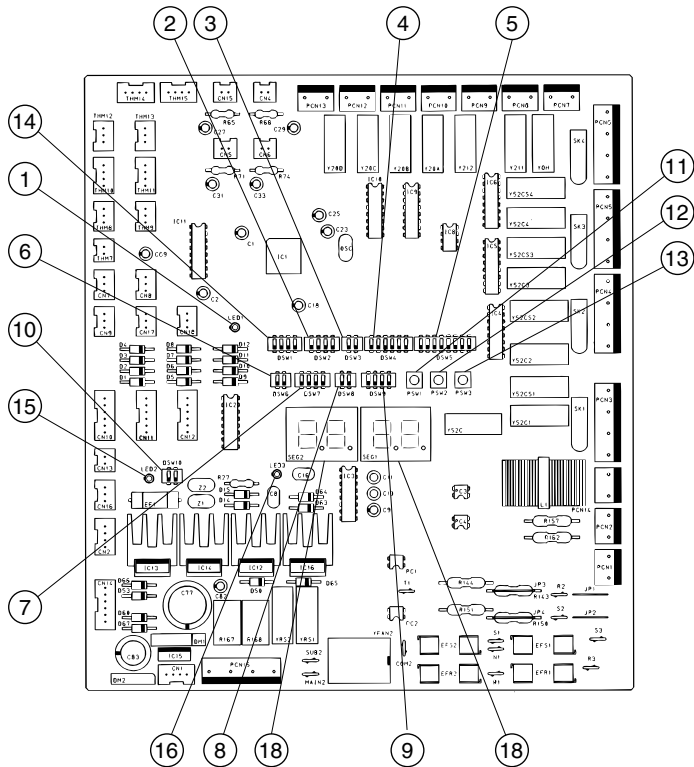


a. Control Printed Circuit Board: PCB1

● 5HP to 20HP



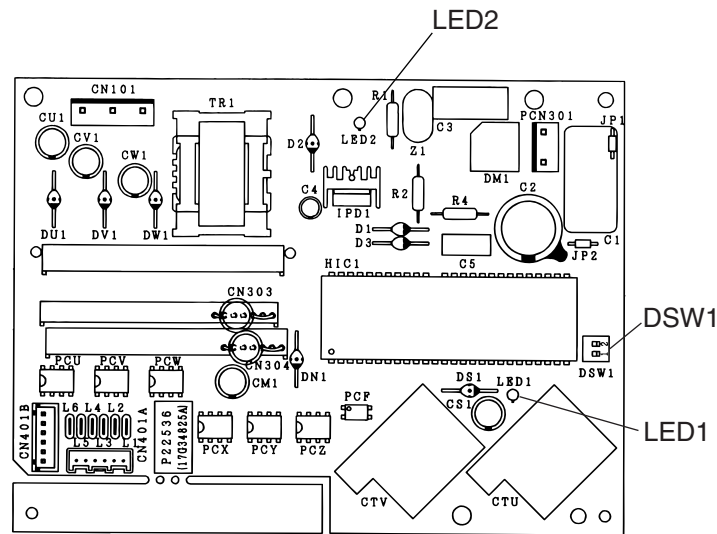
● 24HP and 30HP



■ Dip Switches and LED Functions on Outdoor Unit Printed Circuit Boards

Name of Internal Circuit Board	Part Name	Contents of Functions
Controlling Board: PCB1	1 DSW1	Setting of Outdoor Unit Number
	2 DSW2	Setting of Capacity Code Outdoor unit capacity is set according to nominal capacity (HP).
	3 DSW3	Setting of Height Difference The height difference between outdoor and indoor units is set.
	4 DSW4	A. Test Running for Cooling or Heating An outdoor unit can be run for testing. When testing has been finished, reset the function. B. Forced Stoppage of Compressor When performing test running or inspection, compressors can be forcedly stopped to ensure safety.
	5 DSW5 (Optional Function)	A. Changeover of Defrosting Condition The defrosting operation for normal areas or cold areas can be changed over. B. #7 of Pin: 380V OFF, 415V ON #8 of Pin: 220V ON
	6 DSW6	Setting of Piping Length The total piping length between the outdoor unit and indoor unit is set.
	7 DSW7	Setting of Emergency Operation
	8 DSW8	Test Operation and Service Setting II No setting is required.
	9 DSW9	Optional Function 2
	10 DSW10	Transmitting Setting
	11 PSW1	Manual Defrosting Switch The defrosting operation is manually available under the forced defrosting area.
	12 PSW2	Check Switches When checking units, checking items can be selected by these switches.
	13 PSW3	
	14 LED1 (Red)	Power Source for PCB1 Normal Condition: Activated Abnormal Condition: Deactivated
	15 LED2 (Green)	This LED2 indicates the transmission state between the PCB1 and PCB3. Normal Condition: Flickering Abnormal Condition: Activated or Deactivated
	16 LED3 (Yellow)	This LED3 indicates the transmission state between the indoor unit and outdoor unit. Normal Condition: Flickering Abnormal Condition: Activated or Deactivated
	18 SGE1 SGE2	These indicate the following: "alarm", "protective safety device has tripped" or "checking items".

b. Inverter Printed Circuit Board: PCB3



• Dip Switch and LED Functions on Outdoor Unit Inverter Printed Circuit Board

Switch Name	Function
DSW1	
<p>ON OFF </p>	<p>Normal: No.1 and No.2 of DSW1 are OFF.                      Emergency Operation or Troubleshooting:                      No.1 of DSW1 is ON.                      No.2 of DSW1 is OFF.                      The above setting aims not to trip even if the CT detects 0A.</p>

Name of Printed Circuit Board	Function
LED1 (Red)	<p>This indicates the state of transmission.                      Flickering: Normal Transmission                      Activated or Deactivated: Abnormality in Transmission Circuit</p>
* LED2 (Red)	<p>This indicates the voltage between both terminal of capacitor CB1 and CB2 for inverter part.                      Activated: The voltage between both terminals of capacitor, CB is 50V±20V or greater.                      Deactivated: The voltage between both terminals of capacitor, CB is 50V±20V or smaller.</p>

\*: Applied to the following products;

- 1) RAS-8 to 20FSG/FS3  
 380-415V, 50Hz Model and 380V, 60Hz Model (After Manufacturing # U4NG1002)  
 220V, 60Hz Model (From The First Production)
- 2) RAS-5FSG/FS3  
 380-415V, 50Hz Model and 380V, 60Hz Model (After Manufacturing # U4MV0197)
- 3) RAS-8, 10FXG/FX3  
 From First Production

## TROUBLESHOOTING

c. "SNUBBER" Board: PCB5

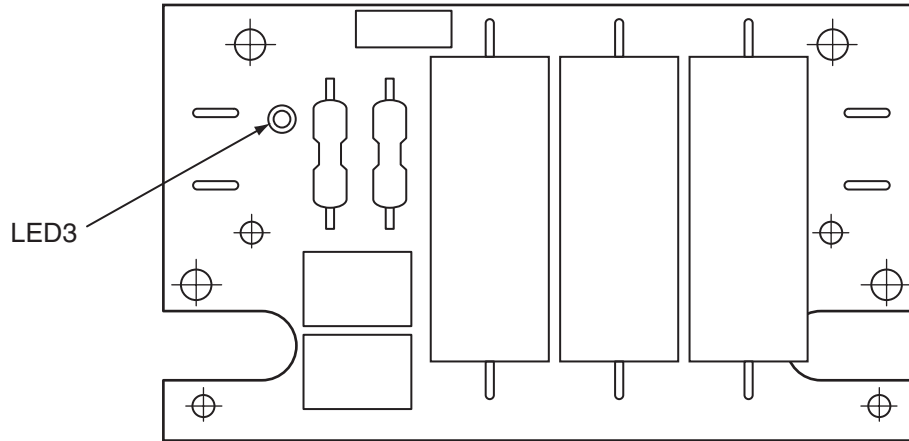
This PCB is applied to the following products only;

1) RAS-5FSG/FS3

380-415V, 50Hz Model and 380V, 60Hz Model (Before Manufacturing # U4MV0196)

2) RAS-8 to 20FSG/FS3

380-415V, 50Hz Model and 380V, 60Hz Model (Before Manufacturing # U4NG1001)



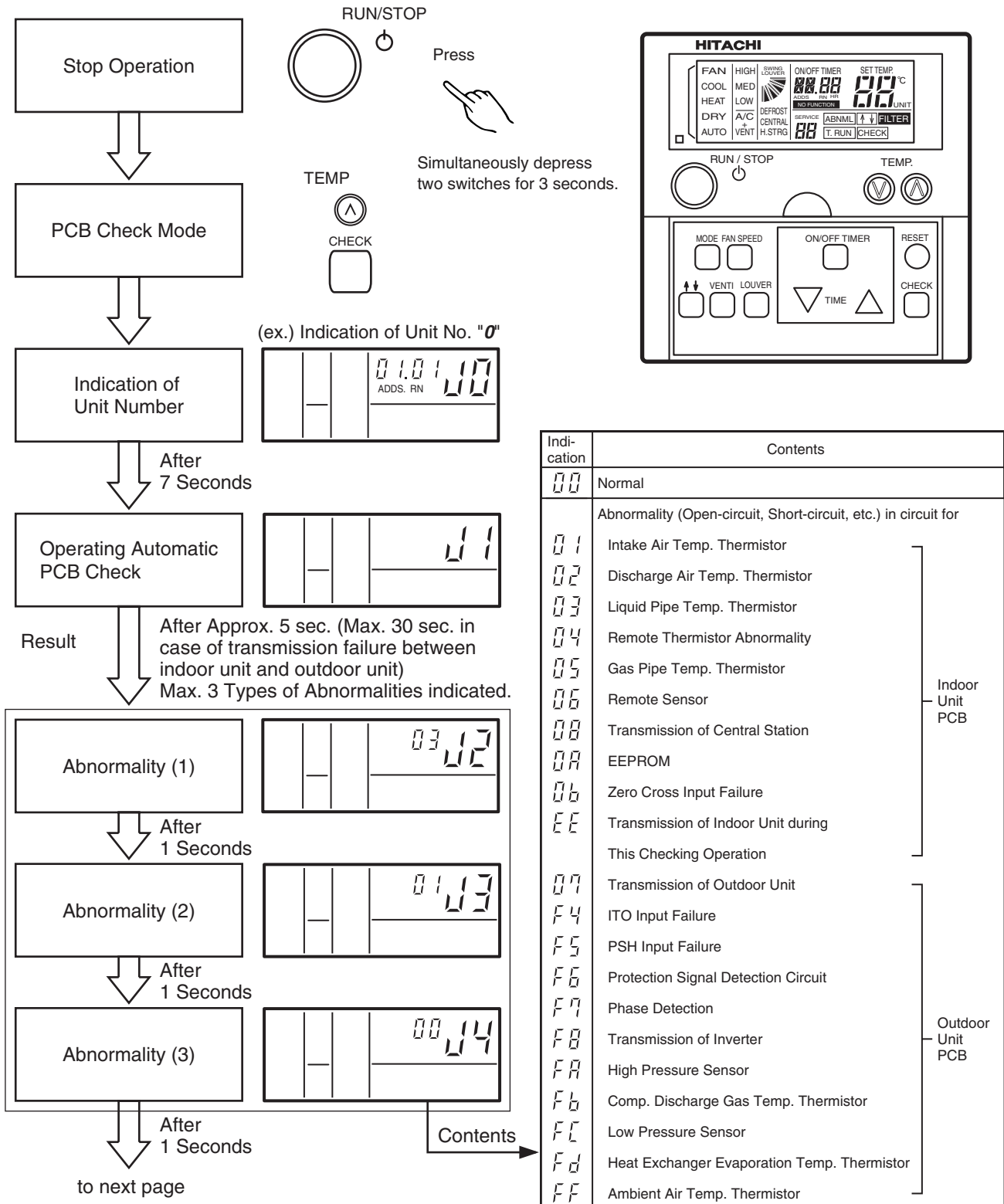
• LED Function on Outdoor Unit Printed Circuit Board

Name of Printed Circuit Board	Function
LED3 (Red)	<p>This indicates the voltage between both terminal of capacitor CB1 and CB2 for inverter part.</p> <p>Activated: The voltage between both terminals of capacitor, CB is 50V+20V or greater.</p> <p>Deactivated: The voltage between both terminals of capacitor, CB is 50V+20V or smaller.</p>

### 1.3 Procedure of Checking Each Main Parts

#### 1.3.1 Self-Checking of PCBs using Remote Control Switch

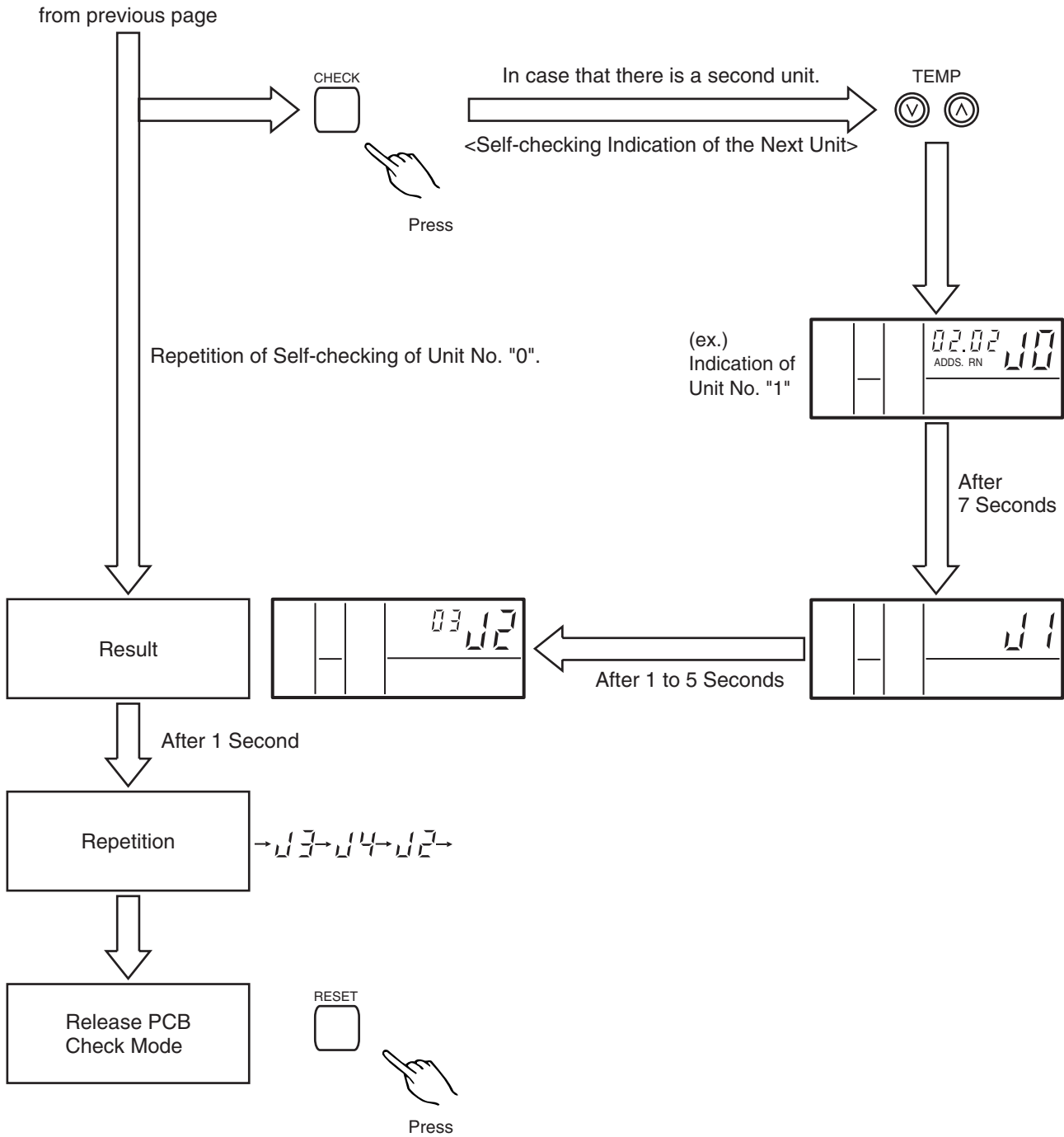
The following troubleshooting procedure is utilized for function test of PCBs in the indoor unit and outdoor unit.



For performing the above checking in the case that the wireless remote control switch is used with the built-in receiver part of the RPK type indoor unit, perform the following procedures;

- (1) Turn OFF the power supply.
- (2) Disconnect the connector (CN25) on PCB(M).
- (3) Connect PC-P1H to the Connectors CN12 or CN13.
- (4) Turn ON the power supply.

After completion of checking, turn OFF the power supply again and make connectors as before checking.



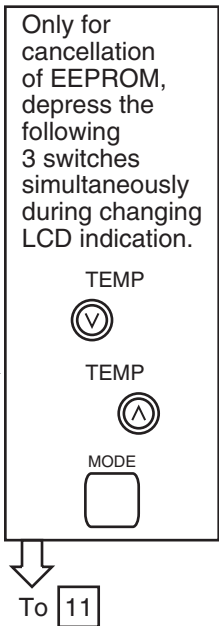
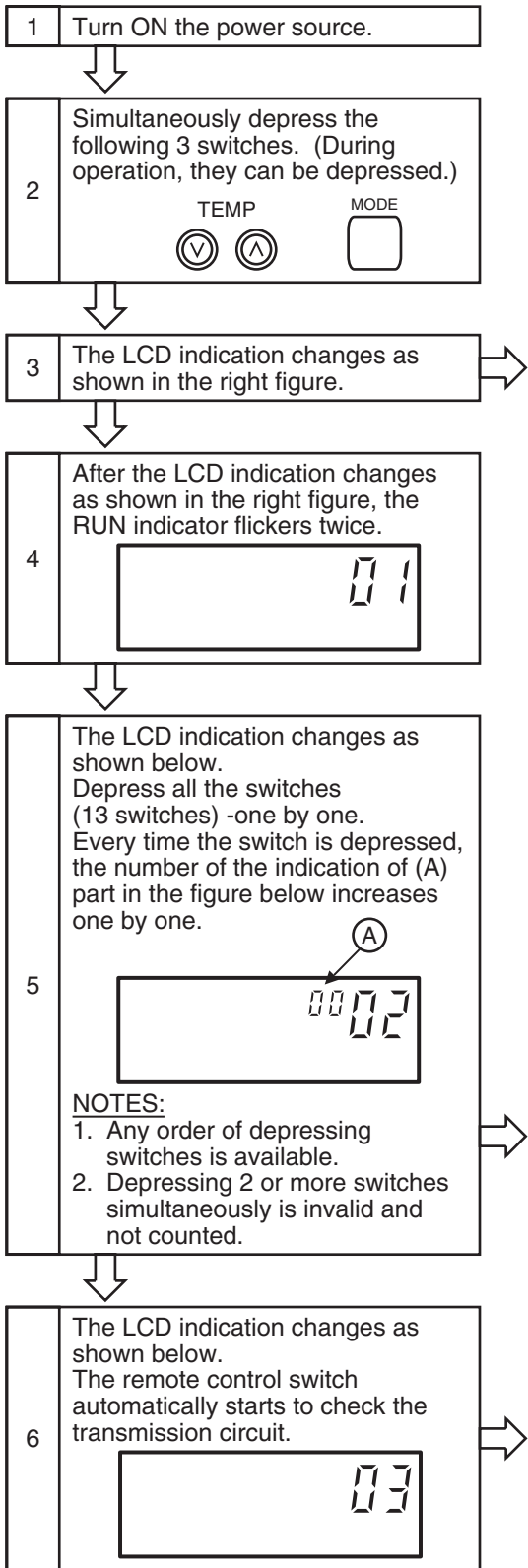
**NOTES:**

- (1) If this indication is continued and "J1" is not shown, this indicates that each one of indoor units is not connected to the remote control switch. Check the wiring between the remote control switch and indoor unit.
- (2) In this troubleshooting procedure, checking of the following part of the PCB's is not available.  
PCB in Indoor Unit: Relay Circuit, Dip Switch, Option Circuit, Fan Circuit, Protection Circuit  
PCB in Outdoor Unit: Relay Circuit, Dip Switch, Option Circuit
- (3) In the case that this troubleshooting is performed in the system using the central station, indication of the central station may change during this procedure. However, this is not abnormal.
- (4) After this troubleshooting, the memory of abnormality occurrence times described on page 1-81 will be deleted.

**1.3.2 Self-Checking of Remote Control Switch**

Cases where CHECK switch is utilized.

1. If the remote control switch readouts malfunction.
2. For regular maintenance check.



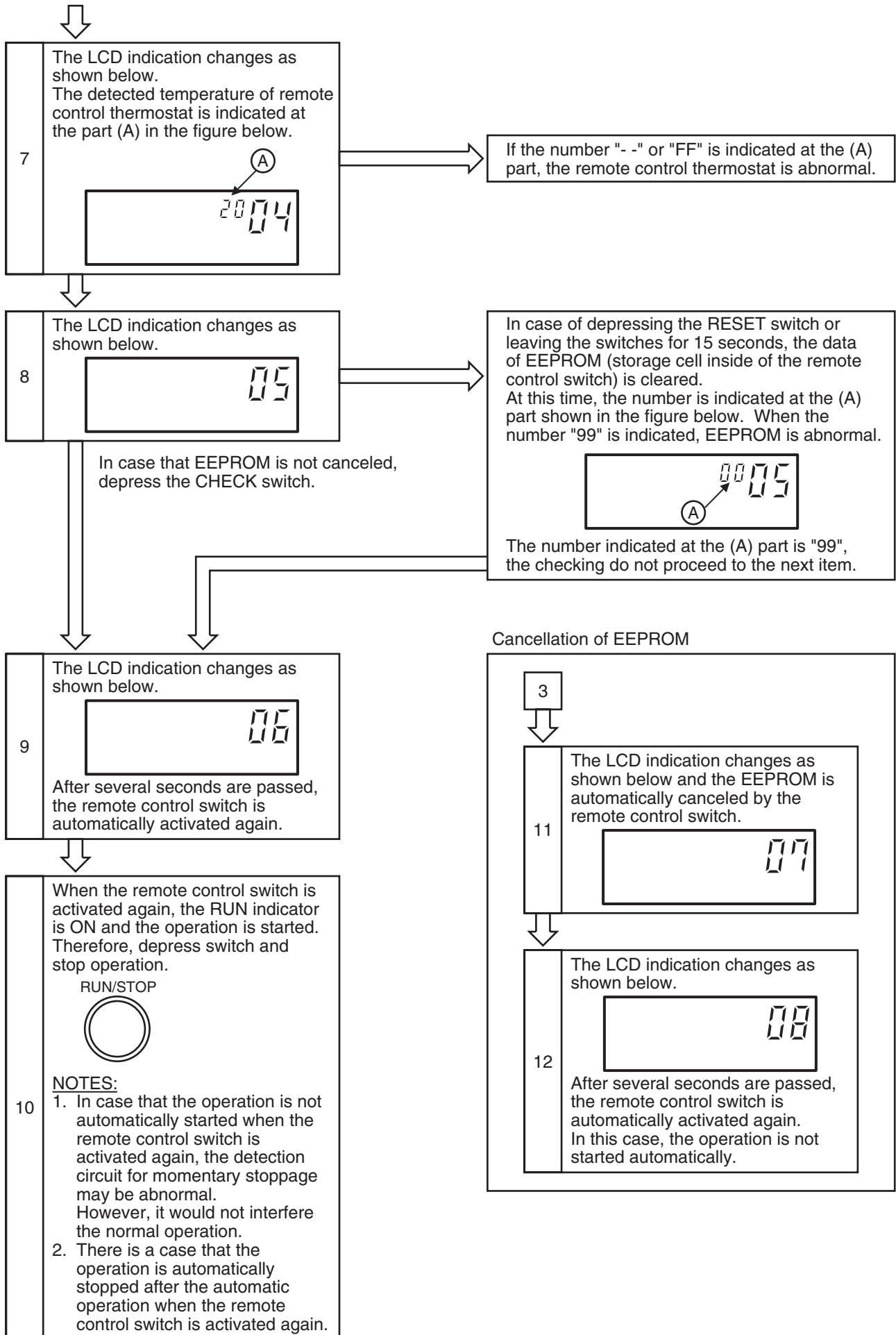
Changing of LCD Indication

No.	LCD Indication	Indicating Period (sec.)
1		For 1 second
2		For 1 second
3		For 1 second
4		For 1 second
5		For 3 seconds

Unless all the switches are depressed, the checking do not proceed to the next item.

In case that the transmission circuit is abnormal, the LCD indication remains as the left figure and the checking do not proceed to the next item.

To the next page





### 1.3.3 Self-Checking of Indoor Unit PCB

(Except for: RCI, RCD, RPI (0.8 to 5.0HP), RPC (After Alteration) and KPI)

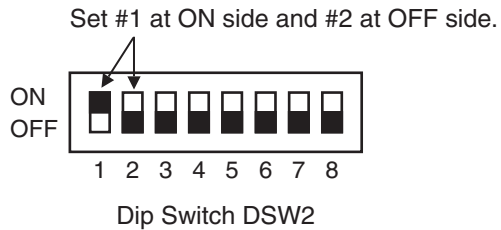
#### (1) Self-Checking by Relays on Indoor Unit PCB

- To Check Abnormality on Indoor Unit PCB due to Malfunction
- To check Abnormality on Indoor Unit PCB Based on Results of Checking by CHECK switch on the remote control switch and Self-Checking Function

#### ■ Procedure

Refer to pages 1-94, 95 for location and function of DSW and LED.

- Turn OFF the main power switch.
- Disconnect connectors CN5 and CN8, and set dip switch DSW2 as shown below.



**NOTE:** Before turning ON the power, see checking procedure mentioned in next page.

- Turn ON the main power switch.  
Check Mode starts. (See next page.)
  - \* Analog Test
  - \* Relay Test
- After completion of self-checking, turn OFF the power and reset the dip switch as before.

## TROUBLESHOOTING

### (2) Self-Checking Procedures in Check Mode

\* for RPC (Before Alteration), RPF(I) and RPC (8, 10HP)

Check Item	State of Mode	Confirmation Method
(A) Initialize Exp. Valve and Auto Louver	Exp. Valve fully open => fully close Auto Louver is horizontally stopped.	
(B) Analog Test	If each thermistor for intake air, discharge air and freeze protection is normal, proceed to the next step.	If FAN operation is available, it is normal.
(C) Each Relay Test	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">Repeatedly Perform</div> </div>	Check ON/OFF sound of relays and LED lamp.
Termination	Turn OFF and reset all dip switches as they were.	

\* for RPK

Check Item	State of Mode	Confirmation Method
(A) Initialize Exp. Valve and Auto Louver	Exp. Valve fully open => fully close Auto Louver is horizontally stopped.	
(B) Analog Test	If each thermistor for intake air, discharge air and freeze protection is normal, proceed to the next step.	
(C) Each Relay Test	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">Repeatedly Perform</div> </div>	Check ON/OFF sound of relays.
Termination	Turn OFF and reset all dip switches as they were.	

**1.3.4 Self-Checking of 7-Day Timer (PSC-3T)**

This procedure is utilized for regular maintenance check, and if the 7-day timer is malfunction.

① Turn ON the main power switch.

② Checking of LCD and Indicating Circuit:  
 Simultaneously depress the following 4 switches, [HOUR] of "PRESENT TIME"  
 [PRESENT DAY] of "DAY OF WEEK" [ON TIME] [OFF TIME] of "MONITOR".  
 During operation, they can be depressed.

All the LCD indications activated, for 5 seconds.

All the LCD indications deactivated, for 1 second.

NORMAL:

All the LCD indications activated, for 5 seconds.

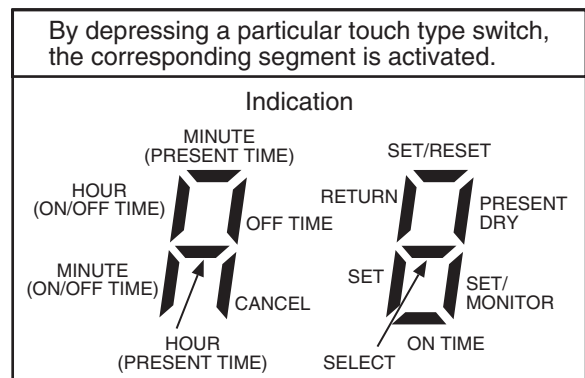
All the LCD indications deactivated, for 1 second.

③ Checking of Touch Type Switch Function:  
 Depress all the touch type switches one by one.  
 Any one of the switches can be depressed.

NORMAL:



After 15 Seconds



④ Completion of self-checking, "77" is indicated, for 3 seconds.



⑤ Return to the indication before the self-checking.

# TROUBLESHOOTING

## 1.3.5 Self-Checking of Central Station (PSC-3S1)

This procedure is utilized for regular maintenance check, and if the central station is malfunction.

① Turn ON the main power switch.

② Checking of LCD and Indicating Circuit:

Simultaneously depress the following 4 switches, [FAN] [COOL] and [▽] [△] of "UNIT".  
During operation, they can be depressed.

All the LCD indications activated, for 5 seconds.

All the LCD indications deactivated, for 1 second.

NORMAL:

All the LCD indications activated, for 5 seconds.

All the LCD indications deactivated, for 1 second.

③ Checking of Touch Type Switch Function:

Depress all the touch type switches one by one.  
Any one of the switches can be depressed.

NORMAL:



After 15 Seconds

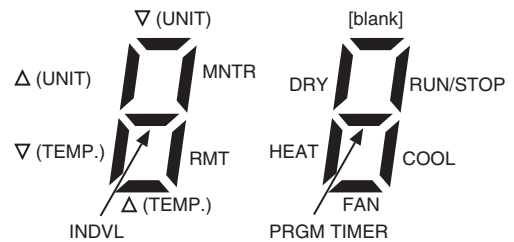
④ Checking of Transmission Circuit:

Automatically checked, and the result will be indicated as figure right, for 3 seconds.

⑤ Return to the indication before the self-checking.

By depressing a particular touch type switch, the corresponding segment is activated.

Temp. Indication Part



NORMAL	ABNORMAL

1.3.6 Procedure of Checking Other Main Parts

(1) High Voltage Discharge Work for Replacing Parts

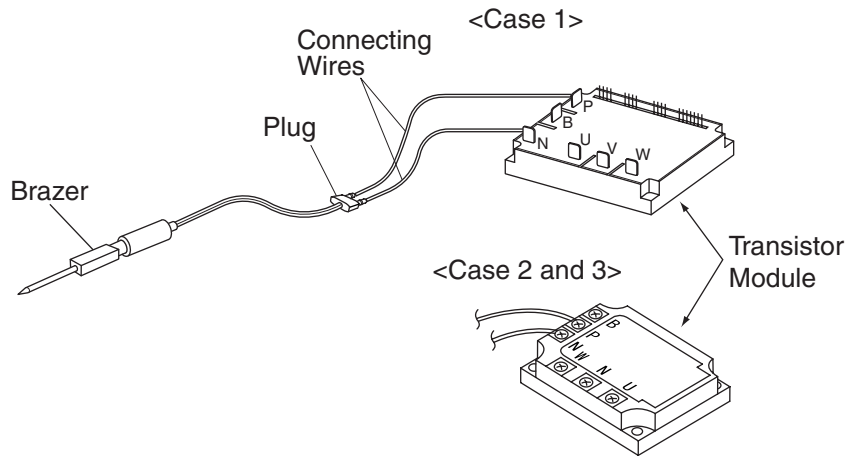
**<Perform this high voltage discharge work to avoid an electric shock.>**

**Procedure**

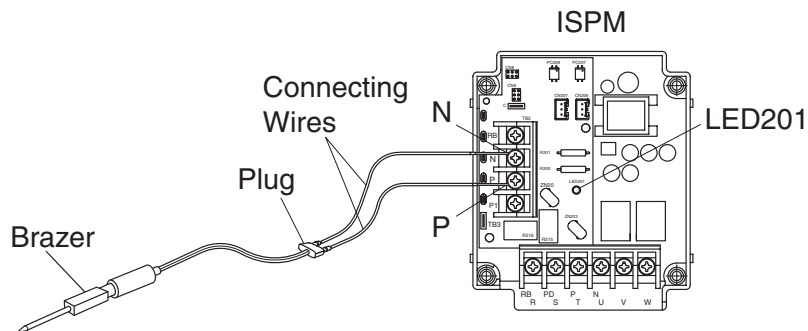
- (a) Turn OFF the main switches and wait for three minutes. Check to ensure that no high voltage exists. If LED3 (5 to 20HP) or LED201 (24 and 30HP) is ON after start-up and LED3 (5 to 20HP) or LED201 (24 and 30HP) is OFF after turning OFF power source, the voltage will decrease lower than DC50V.
- (b) Connect connecting wires to an electrical brazer.
- (c) Connect the wires to terminals, P and N on transistor module (5 to 20HP) or ISPM (24 and 30HP). => Discharging is started, resulting in hot brazer. Pay attention not to short-circuit between terminal P and N .

In Case of 5 to 20HP

Power Supply	Manufacturing #	"A"	Case
380-415V/50Hz 380V/60Hz	Before U4NG1001 (FSG/FS3)	LED3 on PCB5	1
	After U4NG1002 (FSG/FS3) From the First Production (FXG/FX3)	LED2 on PCB3	2
220V/60Hz	From the First Production (FSG/FS3)	LED2 on PCB3	3



In Case of 24 and 30HP

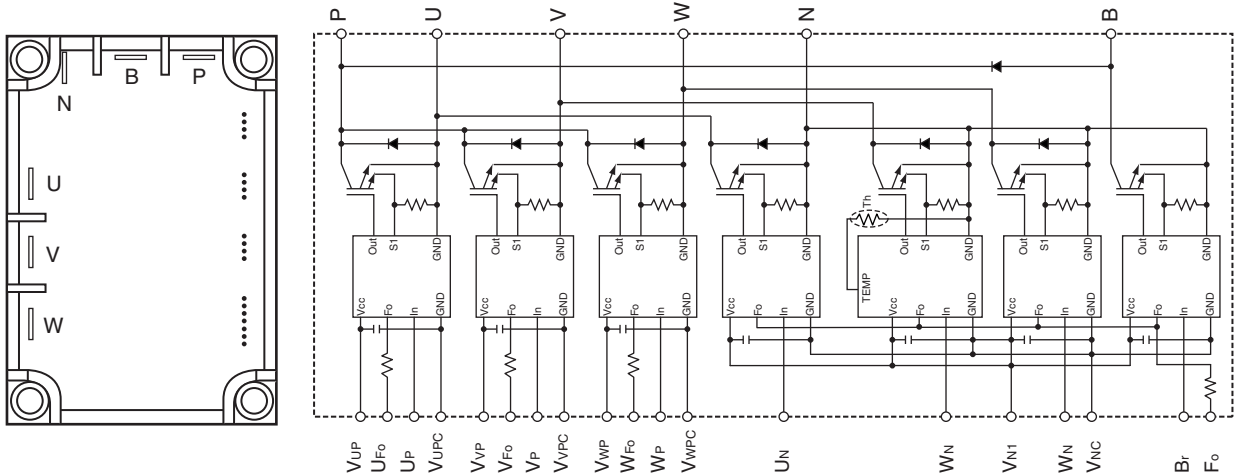


- (d) Wait for 2 or 3 minutes and measure the voltage once again. Check to ensure that no voltage is charged.

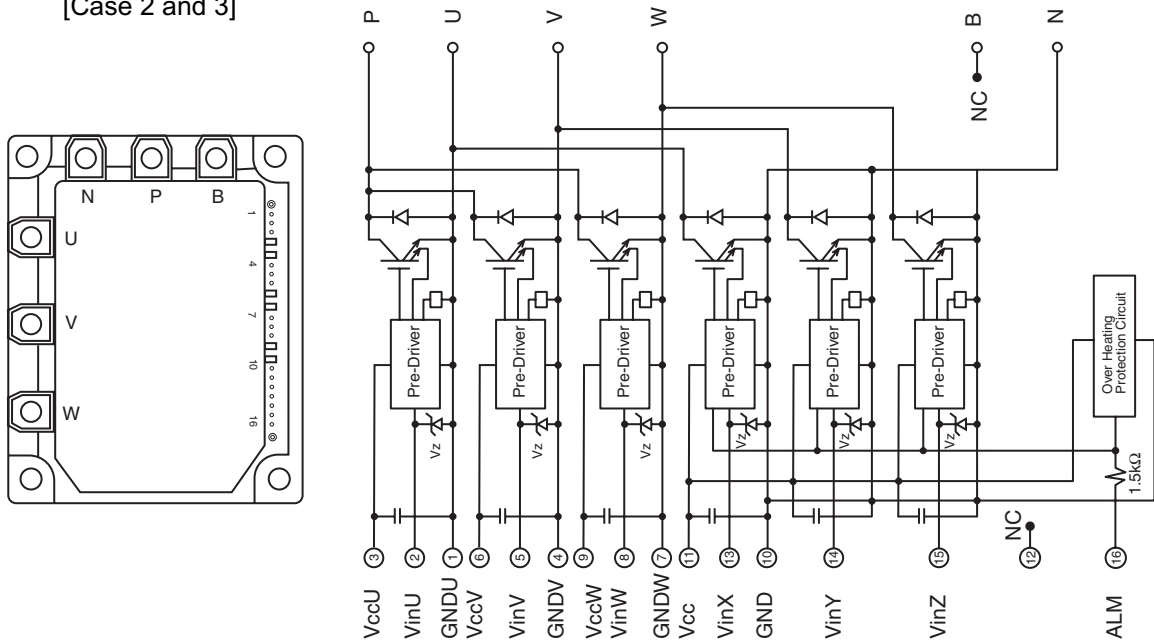
(2) Checking Procedures Transistor Module (In Case of 5 to 20HP)

Outer Appearance and Internal Circuit of Transistor Module

[Case 1]



[Case 2 and 3]

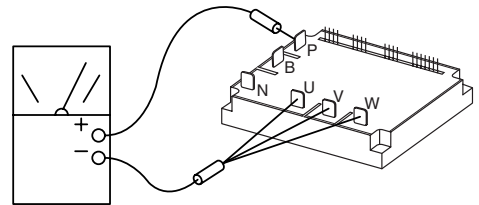


Remove all the terminals of the transistor module before check.

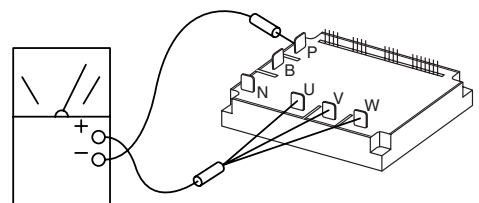
If items (a) to (e) are performed and the results are satisfactory, the transistor module is normal.

Measure it under 1 kΩ range of a tester. Do not use a digital tester.

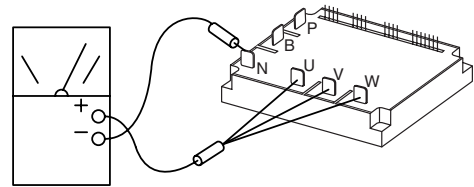
- (a) By touching the + side of the tester to the P terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5 kΩ, it is normal.



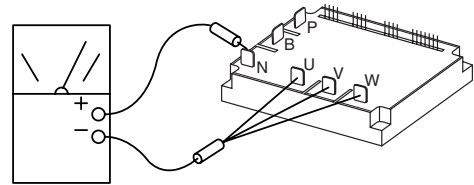
- (b) By touching the - side of the tester to the P terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100 kΩ, it is normal.



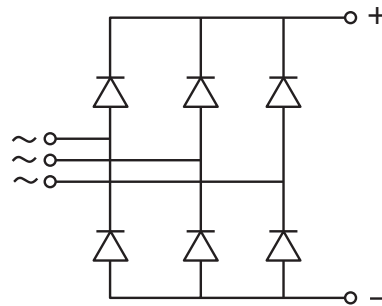
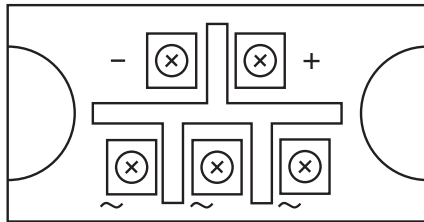
- (c) By touching the - side of the tester to the N terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5 kΩ, it is normal.



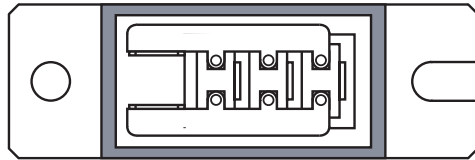
- (d) By touching the + side of the tester to the N terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100 kΩ, it is normal.



(3) Checking Procedures on Diode Module (In Case of 5 to 20HP)  
Outer Appearance and Internal Circuit of Diode Module  
[Case 1]

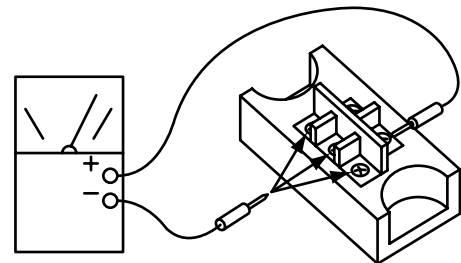


[Case 2 and 3]

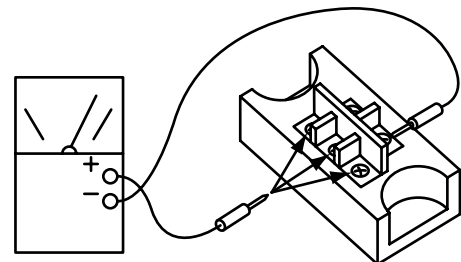


If items (a) to (d) are performed and the results are satisfactory, the diode module is normal. Measure it under 1 kΩ range of a tester. Do not use a digital tester.

- (a) By touching the + side of the tester to the + terminal of the diode module and the - side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are from 5 to 50 kΩ, it is normal.

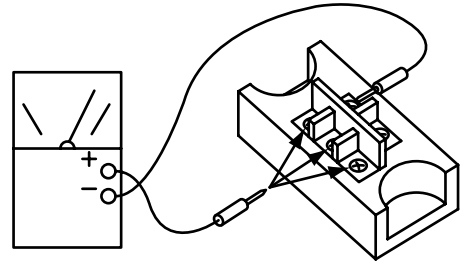


- (b) By touching the - side of the tester to the + terminal of the diode module and the + side of tester to the ~ terminals (3 Nos.) of the diode module, measure the resistance. If all the resistances are greater than 500 kΩ, it is normal.

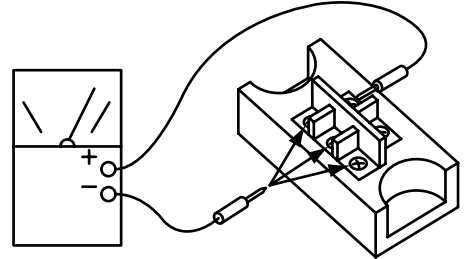


## TROUBLESHOOTING

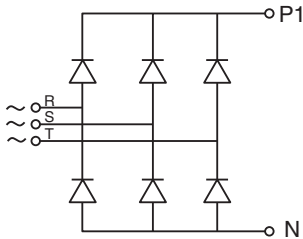
- (c) By touching the - side of the tester to the - terminal of the diode module and the + side of tester to the ~ terminals (3 Nos.) of the diode module, measure the resistance. If all the resistances are from 5 to 50 k $\Omega$ , it is normal.



- (d) By touching the + side of the tester to the - terminal of the diode module and the - side of tester to the ~ terminals (3 Nos.) of the diode module, measure the resistance. If all the resistances are greater than 500 k $\Omega$ , it is normal.

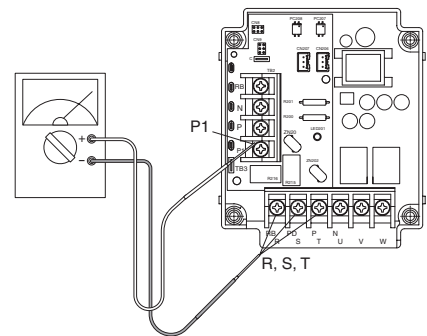


### (4) Checking Procedures ISPM (In Case of 24 and 30HP) Internal Circuit of ISPM

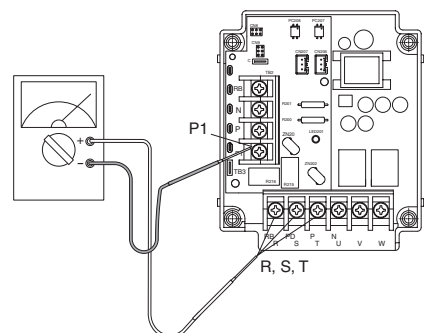


Remove all the terminals of the ISPM before check. If items (a) to (h) are performed and the results are satisfactory, ISPM is normal. Measure it under 1 k $\Omega$  range of a tester. Do not use a digital tester.

- (a) By touching the + side of the tester to the P1 terminal of ISPM and the - side of tester to R, S and T of ISPM, measure the resistance. If all the resistances are more than 100 k $\Omega$ , it is normal.

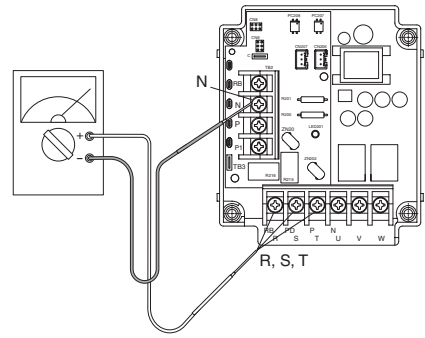


- (b) By touching the - side of the tester to the P1 terminal of ISPM and the + side of tester to R, S and T of ISPM, measure the resistance. If all the resistances are more than 1 k $\Omega$ , it is normal.

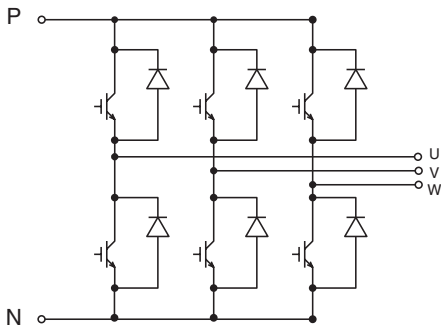
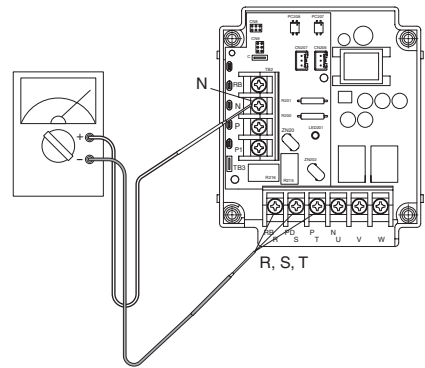




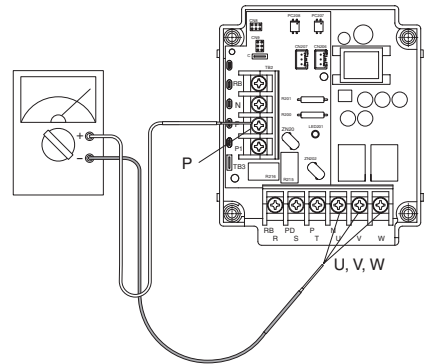
- (c) By touching the - side of the tester to the N terminal of ISPM and the + side of tester to R, S and T of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.



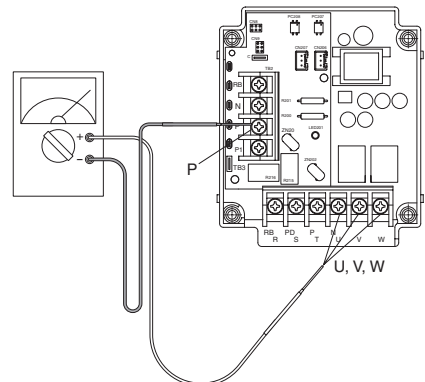
- (d) By touching the + side of the tester to the N terminal of ISPM and the - side of tester to R, S and T of ISPM, measure the resistance. If all the resistances are more than 1 kW, it is normal.



- (e) By touching the + side of the tester to the P terminal of ISPM and the - side of tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.

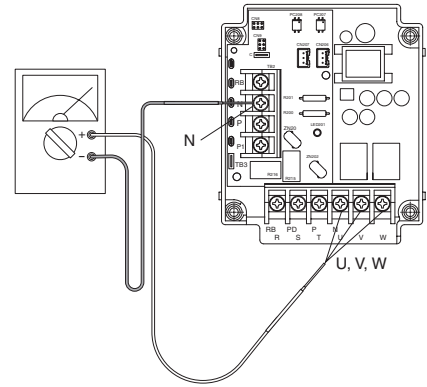


- (f) By touching the - side of the tester to the P terminal of ISPM and the + side of tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.

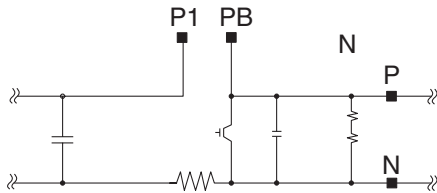
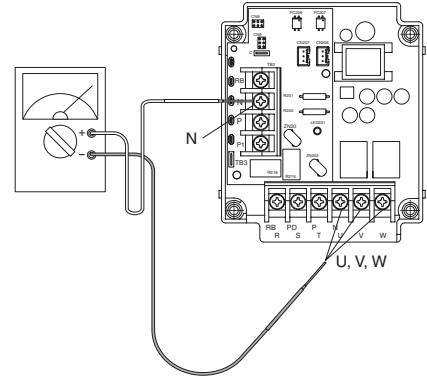


## TROUBLESHOOTING

- (g) By touching the - side of the tester to the N terminal of ISPM and the + side of tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 100 k $\Omega$ , it is normal.

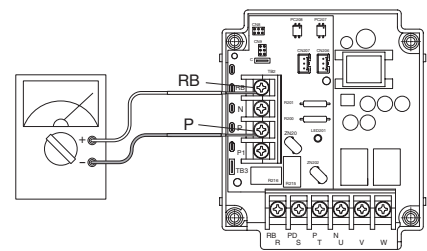


- (h) By touching the + side of the tester to the N terminal of ISPM and the - side of tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 1 k $\Omega$ , it is normal.

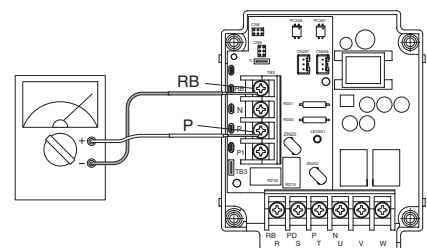


If item (i) to (m) are performed and the results are satisfactory, ISPM is normal. Measure it under 1 k $\Omega$  range of a tester. Do not use a digital tester.

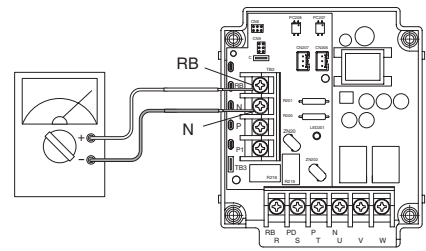
- (i) Perform the item (a) to (h).
- (j) By touching the + side of the tester to the RB terminal of ISPM and the - side of tester to P terminal of ISPM. If the resistance is more than 1 k $\Omega$ , it is normal.



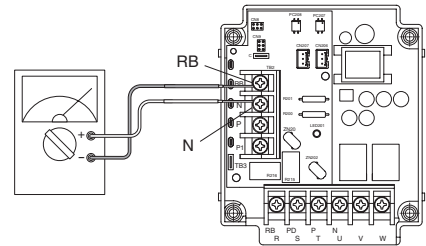
- (k) By touching the - side of the tester to the RB terminal of ISPM and the + side of tester to P terminal of ISPM. If the resistance is more than 100 k $\Omega$ , it is normal.



- (l) By touching the + side of the tester to the RB terminal of ISPM and the - side of tester to N terminal of ISPM. If the resistance is more than 90 kΩ, it is normal.



- (m) By touching the - side of the tester to the RB terminal of ISPM and the + side of tester to N terminal of ISPM. If the resistance is more than 90 kΩ, it is normal.



(5) Checking Method of Electronic Expansion Valve

	Indoor Unit Electronic Expansion Valve	Outdoor Unit Electronic Expansion Valve
Locked with Fully Closed	Check for the liquid pipe temperature during heating operation. It is abnormal if the temperature does not increase.	It is abnormal if the liquid pipe pressure does not increase during cooling operation.
Locked with Slightly Open	It is abnormal under the following conditions; The temperature of freeze protection thermistor becomes lower than the suction air temperature when the unit under checking is stopped and other units are under cooling operation.	It is abnormal if the liquid pipe pressure does not increase and the outlet temperature of the expansion valve decreases after the cooling operation is started.
Locked with Fully Open		It is abnormal under the following conditions; After heating operation for more than 30 min., the discharge gas temperature of compressor is not 10°C higher than the condensing temperature and there is no other faults such as excessive charge of refrigerant, etc.

(6) Checking of Electrical Coil Parts

Name of Parts	Model	Electrical Wiring Diagram	Wiring No.	Resistance (Ω)
Fan Motor for Indoor Unit for RPI-0.8FSG1, 1.0FSG1, 1.5FSG1	SF-200-60-4U 60W		BL "1" - "3" R R "3" - "5" W	21.1±10% 32.2±10% at 20°C
Fan Motor for Indoor Unit for RPI-2.0FSG1, 2.5FSG1	SF-200-75-4U 75W		BL "1" - "3" R R "3" - "5" W	
Fan Motor for Indoor Unit for RPI-3.0FSG1, 4.0FSG1	SF-200-290-4RC 290W		BL "1" - "3" R R "3" - "5" W	5.06±10% 6.61±10% at 20°C
Fan Motor for Indoor Unit for RPI-5.0FSG1	SF-200-290-4RB 290W		BL "1" - "3" R R "3" - "5" W	
Fan Motor for Indoor Unit for RCI-1.0 to 3.0FSG2	SIC-72FV-D856 56W	DC Motor	-	-
Fan Motor for Indoor Unit for RCI-4.0FSG2, 5.0FSG2	SIC-81F-D8108 108W		-	-
Fan Motor for Indoor Unit for RCD-1.0 to 2.0FSG1	CCC6719AH 35W		BL "1" - "3" R R "3" - "5" W	159.0±10% 92.0±10% at 20°C
Fan Motor for Indoor Unit for RCD-2.5FSG1, 3.0FSG1	CCC6720AH 55W		BL "1" - "3" R R "3" - "5" W	70.9±10% 51.7±10% at 20°C
Fan Motor for Indoor Unit for RCD-4.0FSG1	CCC6719BH CCC6719CH 35W x 2		BL "1" - "2" R R "2" - "3" W	159.0±10% 92.0±10% at 20°C
Fan Motor for Indoor Unit for RCD-5.0FSG1	CCC6720BH CCC6720CH 55W x 2		BL "1" - "2" R R "2" - "3" W	70.9±10% 51.7±10% at 20°C

Name of Parts	Model	Electrical Wiring Diagram	Wiring No.	Resistance (Ω)
Fan Motor for Indoor Unit for RPK-1.0FSGM, 1.5FSGM 2.0FSGM, 2.3FSGM	EHO2M2P4P30 30W	DC Motor	-	-
Fan Motor for Indoor Unit for RPF-1.0FSG, RPF-1.0FSG	TNO-KPPA 75W		BL "1" - "3" R R "3" - "5" W	127.9 102.7 at 20°C
Fan Motor for Indoor Unit for RPF-1.5FSG, RPF-1.5FSG	TNO-KPPA 35W		BL "1" - "3" R R "3" - "5" W	127.9 102.7 at 20°C
Fan Motor for Indoor Unit for RPC-2.0FSG1 (Before Alteration)	TNO-KPPA 35W		BL "1" - "3" R R "3" - "5" W	112±10% 77±10% at 20°C
Fan Motor for Indoor Unit for RPC-2.5FSG1, 3.0FSG1 (Before Alteration)	TNO-KPPA 50W		BL "1" - "3" R R "3" - "5" W	113±10% 91±10% at 20°C
Fan Motor for Indoor Unit for RPC-4.0FSG1 (Before Alteration)	TNO-KPPA 95W		BL "1" - "3" R R "3" - "5" W	40±10% 54±10% at 20°C
Fan Motor for Indoor Unit for RPC-5.0FSG1 (Before Alteration)	TNO-KPPA 135W		BL "1" - "3" R R "3" - "5" W	25±10% 40±10% at 20°C
Fan Motor for Indoor Unit for RPC-2.0FSG1 (After Alteration)	SF-200-35-4T 35W		BL "1" - "3" R R "3" - "5" W	81.4±10% 99.0±10% at 20°C
Fan Motor for Indoor Unit for RPC-2.5FSG1, 3.0FSG1 (After Alteration)	SF-200-50-4W 50W		BL "1" - "3" R R "3" - "5" W	93.7±10% 89.9±10% at 20°C
Fan Motor for Indoor Unit for RPC-4.0FSG1 (After Alteration)	SF-200-95-4A 95W		BL "1" - "3" R R "3" - "5" W	20.9±10% 31.6±10% at 20°C
Fan Motor for Indoor Unit for RPC-5.0FSG1 (After Alteration)	SF-200-135-4C 135W		BL "1" - "3" R R "3" - "5" W	23.2±10% 27.1±10% at 20°C

**TROUBLESHOOTING**

Name of Parts	Model	Electrical Wiring Diagram	Wiring No.	Resistance (Ω)
Fan Motor for Outdoor Unit  for RAS-5FSG, RAS-5FS3	NF4501  160W		"4" - "1" "1" - "3"	8.17 7.97
Fan Motor for Outdoor Unit  for RAS-8FSG, RAS-8FS3, RAS-10FSG, RAS-10FS3, RAS-8FXG, RAS-8FX3, RAS-10FXG, RAS-10FX3 for Right Side of RAS-16FSG, RAS-16FS3, RAS-20FSG, RAS-20FS3 for Center of RAS-24FSG1, RAS-24FS5, RAS-30FSG1, RAS-30FS5 (380-415/380V, 50/60Hz)	NF7001/ NF7001K  275W		"4" - "1" "1" - "3"	5.28/6.50 4.85/6.91
Fan Motor for Outdoor Unit  for Left Side of RAS-16FSG, RAS-16FS3, RAS-20FSG, RAS-20FS3 for Right and Left Side of RAS-24FSG1, RAS-24FS5, RAS-30FSG1, RAS-30FS5	NF7011  275W		"4" - "1" "1" - "3"	6.74 5.91
Fan Motor for Outdoor Unit  for Center of RAS-24FSG1, RAS-24FS5, RAS-30FSG1, RAS-30FS5 (220V, 60Hz)	KNF5501  380W		"1" - "2" "2" - "3" "3" - "1"	5.37 5.37 5.37

Name of Parts	Model		Resistance ( $\Omega$ )
Drain-up Motor for RCI-1.0FSG2, 1.5FSG2, 2.0FSG2, 2.5FSG2, 3.0FSG2, 4.0FSG2, 5.0FSG2	ADP-1403		256 at 20°C
Drain-up Motor for RCD-1.0FSG1, 1.5FSG1, 2.0FSG1, 2.5FSG1, 3.0FSG1, 4.0FSG1, 5.0FSG1	KJV-1004		347 at 20°C
Drain-up Motor for RPI-0.8FSG1, 1.0FSG1, 1.5FSG1	PJD-05230HS		447 at 20°C
Solenoid Valve for Gas Bypass for RAS-5FSG, 8FSG, 10FSG, 8FXG, 10FXG RAS-5FS3, 8FS3, 10FS3, 8FX3, 10FX3	ST10PA		2,018/1,245 at 20°C (50/60Hz)
Solenoid Valve for Gas Bypass for RAS-16FSG, 20FSG, 16FS3, 20FS3	ST10PA		2,018/1,245 at 20°C (50/60Hz)
4-Way Valve for RAS-5FSG, 8FSG, 10FSG, 8FXG, 10FXG RAS-5FS3, 8FS3, 10FS3, 8FX3, 10FX3	RAS-5FSG RAS-5FS3	CHV-0407 + CHV-01AJ503C1	1,435 at 20°C
	RAS-8FSG, 8FXG RAS-8FS3, 8FX3 RAS-10FSG, 10FXG RAS-10FS3, 10FX3	CHV-0717 + CHV-01AJ503H1	1,435 at 20°C
4-Way Valve for RAS-16FSG, 20FSG, 16FS3, 20FS3	CHV-0717 + CHV-01AJ503H1		1,435 at 20°C
Compressor Motor for RAS-5FS3	401DHV		*1.436/1.436/0.395 at 20°C
Compressor Motor for RAS-8FS3, 10FS3, 16FS3, 20FS3 8FX3, 10FX3	401DHVM		*1.436/1.436/0.395 at 20°C
Compressor Motor for RAS-8FS3, 8FX3	400DHM		*3.29/2.68/0.74 at 20°C
Compressor Motor for RAS-10FS3, 10FX3	500DHM		*2.73/2.22/0.572 at 20°C
Compressor Motor for RAS-16FS3, 20FS3	600DHM		*2.28/1.68/0.507 at 20°C

**TROUBLESHOOTING**

Name of Parts	Model	Resistance (Ω)
Compressor Motor for RAS-5FSG	G402DHV	*1.436/1.436/0.395 at 20°C
Compressor Motor for RAS-8FSG, 10FSG, 16FSG, 20FSG, 8FXG, 10FXG	G402DHVM	*1.436/1.436/0.395 at 20°C
Compressor Motor for RAS-8FSG, 8FXG	G401DHM	*3.29/2.68/0.74 at 20°C
Compressor Motor for RAS-10FSG, 10FXG	G501DHM	*2.73/2.22/0.572 at 20°C
Compressor Motor for RAS-16FSG, 20FSG	G601DHM	*2.28/1.68/0.507 at 20°C
Contactora for Compressor Motor for RAS-5FSG, 8FSG, 10FSG, 8FXG, 10FXG RAS-5FS3, 8FS3, 10FS3, 8FX3, 10FX3	A25/FC-1S	A25: 501/401 FC-1S: 656/460 at 20°C (50/60Hz)
Contactora for Compressor Motor for RAS-16FSG, 20FSG, RAS-16FS3, 20FS3	A35/FC-1S	A35: 501/401 FC-1S: 656/460 at 20°C (50/60Hz)
Compressor Motor for RAS-24FS5, 30FS5	404DHD	*0.944/0.944/0.211 at 20°C
Compressor Motor for RAS-24FS5, 30FS5	603DH	*2.48/2.06/0.53 at 20°C
Compressor Motor for RAS-24FS5	750EH	*1.47/1.32/0.35 at 20°C
Compressor Motor for RAS-30FS5	1200EH	*1.07/0.90/0.25 at 20°C
Compressor Motor for RAS-24FSG1, 30FSG1	G404DHD	*0.944/0.944/0.211 at 20°C
Compressor Motor for RAS-24FSG1, 30FSG1	G603DH	*2.48/2.06/0.53 at 20°C
Compressor Motor for RAS-24FSG1	G750EH	*1.47/1.32/0.35 at 20°C
Compressor Motor for RAS-30FSG1	G1200EH	*1.07/0.90/0.25 at 20°C

\*: 380-415V, 50Hz / 380V, 60Hz / 220V, 60Hz



## (7) Checking of Compressor

## CHECK LIST ON COMPRESSOR

CLIENT: \_\_\_\_\_  
Serial No.: \_\_\_\_\_

MODEL: \_\_\_\_\_  
Production Date: \_\_\_\_\_

DATE: \_\_\_\_\_  
Checker: \_\_\_\_\_

No.	Check Item	Check Method	Result	Remarks
1	Are THM8, THM9, THM12 and THM13 correctly connected? THM8, THM9, THM12, THM13: Discharge Gas Thermistor	(1) Are wires of each thermistor correctly connected by viewing? (2) Check to ensure that 7-segment indication of Td1 is higher than Td2, Td3, Td4 when No.1 comp. is operating. Td1: Temperature of THM8 Td2: Temperature of THM9 Td3: Temperature of THM12 Td4: Temperature of THM13		
2	Are thermistor, THM8, THM9, THM12 and THM13 disconnected?	(1) Check to ensure that thermistor on the top of comp. is correctly mounted by viewing? (2) Check to ensure that actually measured temp. are greatly different from the indication (Td1, Td2, Td3, Td4) during check mode.		
3	Are connectors for current sensor correctly connected?	(1) Check to ensure that indication A1, A2, A3 and A4 are 0 during compressor stopping.		
4	Is current sensor faulty?	(2) Check to ensure that indication A1, A2, A3 and A4 are not 0 during compressor running. (However, A2, A3 and A4 are 0 during stopping of No.2, No.3 and No.4 comp.)		
5	Is current sensing part on PCB3 faulty?			
6	Is the direction of current sensor (CTU, CTV) reverse?	Check the direction => by viewing.		
7	Are power source wires, U and V inserted correctly into current sensor?	Check to ensure that wires are correctly inserted.		
8	Are ex. valves (MV1, MV2 and MVB) correctly connected?	Check to ensure that MV1 to CN10 and MV2 to CN11 are correctly connected.		
9	Are ex. valve coils (MV1, MV2 and MVB) correctly mounted?	Check to ensure that each coil is correctly mounted on the valve.		
10	Are the refrigeration cycle and electrical wiring system incorrectly connected?	Check to ensure that refrigerant is flowing into indoor units by operating one refrigerating cycle only from the outdoor unit.		
11	Is opening of ex. valve completely closed (locked)?	Check the following by the check mode of outdoor units. (1) Liquid Pipe Temp. (TL) < Air Intake Temp. (Ti) during Cooling Operation (2) Liquid Pipe Temp. (TL) > Air Intake Temp. (Ti) during Heating Operation		
12	Is opening of ex. valve fully opened (locked)?	Check to ensure that liquid pipe temp. is lower than air intake temp. of stopping indoor unit when other indoor units are operating under cooling operation.		
13	Are the contacts for comp. magnetic switch CMC faulty?	Check the surface of each contact (L1, L2 and L3) by viewing.		
14	Is there any voltage abnormality among L1-L2, L2-L3 and L3-L1?	Check to ensure that voltage imbalance is smaller than 3%. Please note that power source voltage must be within 380V or 415V±10%, 220V±10%.		
15	Is the comp. oil acidified during compressor motor burning?	Check to ensure that the oil color is not black.		

Additional Information for “CHECK LIST ON COMPRESSOR”

Check Item	Additional Information (Mechanism of Compressor Failure)
1 & 2	The liquid refrigerant return volume to the compressor is controlled by the discharge gas temperature Td1 when only No.1 compressor is operating. If Td1 and Td2 are reversely connected, the liquid refrigerant return volume will become small by detecting the temperatures even if the actual discharge gas temperature is high. Therefore, this abnormal overheating operation will result in insulation failure of the motor winding.
3, 4 & 5	Overcurrent control (operating frequency control) is performed by detecting current by the current sensor. In this case, winding insulation failure will occur, since control is not available in spite of actually high current.
6 & 7	The current sensor checks phase and adjusts output electrical wave in addition to the above mentioned items. If fault occurs, the output electrical wave becomes unstable giving stress to the motor winding, resulting in winding insulation failure.
8 & 9	During a cooling operation, Pd is controlled by fan revolution of outdoor unit, and Td and SH are controlled by MV of each indoor units or MVB for FX series. During a heating operation, Td and SH are controlled by MV1 and MV2. If expansion valves are incorrectly connected, correct control is not available, resulting in compressor seizure depending on liquid refrigerant returning conditions or motor winding insulation failure depending on overheating conditions.
10	If the refrigeration cycle and electrical system are incorrectly connected, abnormally low suction pressure operation is maintained or abnormally high discharge pressure operation is maintained, resulting in giving stress to the compressor, since their correct control is not available.
11	ditto
12	The compressor may be locked due to the liquid return operation during the cooling operation.
13	In the case that the contacting resistance becomes big, voltage imbalance among each phase will cause abnormal overcurrent.
14	In this case, overcurrent will occur, efficiency will decrease or the motor winding will be excessively heated.
15	In the case, it will result in motor burning or compressor seizure.

**1.4 Test Run**

**1.4.1 Test Run Mode by Remote Control Switch**

- (1) Turn ON the power source of the indoor and outdoor units.
- (2) Set the TEST RUN mode by the remote control switch.

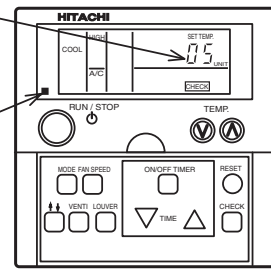
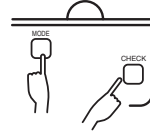
Depress the "MODE" and the "CHECK" switches simultaneously for more than 3 second.

If "TEST RUN" and the counting number of the connected units to the remote control switch (for example "01") are indicated on the remote control switch, the connection of remote control cable is correct.

If no indication or "00" appears or the number of the units indicated is smaller than the actual number of the units, some abnormalities exist.

Counting Number of Connected Units

Operation Lamp



Remote Control Switch

(3)

Remote Control Switch Indication	Fault	Inspection Points after the Power Source OFF
No Indication	<ul style="list-style-type: none"> <li>* The power source is not turned ON.</li> <li>* The connection of the remote control cable is incorrect.</li> <li>* The connecting wires of power supply line are incorrect or loosened.</li> </ul>	<ol style="list-style-type: none"> <li>1. Connection between the connector and the wires: Red Wire - No.1, Black Wire - No.2, White Wire - No.3</li> <li>2. Connecting Points of Remote Control Cable</li> <li>3. Contact of Connectors of Remote Control Cable</li> <li>4. Connection Order of each Terminal Boards</li> <li>5. Screw Fastening of each Terminal Boards</li> </ol>
Counting number of connected units is incorrect.	<ul style="list-style-type: none"> <li>* The setting of unit number is incorrect.</li> <li>* The connection of control cables between each indoor units are incorrect. (When one remote control switch controls multiple units.)</li> </ul>	<ol style="list-style-type: none"> <li>6. Dip Switch Setting on Printed Circuit Board</li> <li>7. Wire Connecting Order of Bridge Cable</li> <li>8. Connecting Points of Bridge Cable</li> <li>9. Contact of Connectors of Bridge Cable</li> </ol>

Back to (1) after checking

(4) Select TEST RUN MODE by depressing MODE switch. (COOL or HEAT)

(5) Depress RUN/STOP switch.

The "TEST RUN" operation will be started. (The "TEST RUN" operation will be finished after 2 hours unit operation or by depressing the RUN/STOP switch again.)

If the units do not start or the operation lamp on the remote control switch is flickered, some abnormalities exist.

(6)

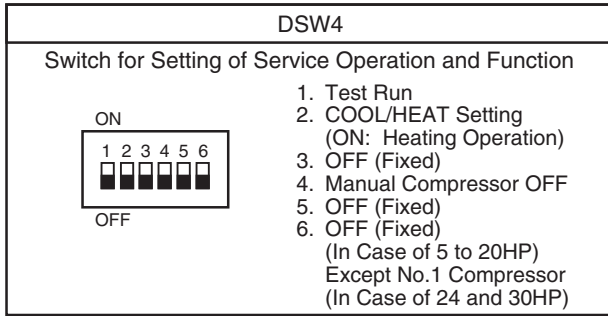
Remote Control Switch Indication	Unit Condition	Fault	Inspection Points after the Power Source OFF														
The operation lamp flickers. (1 time/1 sec.) And the Unit No. and Alarm Code "03" flicker.	The unit does not start.	The connecting wires of operating line are incorrect or loosened.	<ol style="list-style-type: none"> <li>1. Connecting Order of each Terminal Boards. The fuse on the PCB may be blown out due to miswiring. (Can be recovered only once by the DSW on the PCB)</li> </ol> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">Procedures for Recovery When Transmitting Circuit Fuse is Blown Out</p> <ol style="list-style-type: none"> <li>1. Correct the wiring for the terminal board.</li> <li>2. Setting position of the model code are shown below.</li> </ol> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>Indoor PCB DSW7</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">RPC (Before Alteration) RPF, RPF1, RPI-8,10, RPK</td> <td style="width: 50%;">ON OFF </td> </tr> <tr> <td style="text-align: center;">1 2</td> <td></td> </tr> <tr> <td style="width: 50%;">RCI-FSG2, RCD, RPI-0.8 to 5.0 RPC (After Alteration)</td> <td style="width: 50%;">ON OFF </td> </tr> <tr> <td style="text-align: center;">1 2</td> <td></td> </tr> </table> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Outdoor PCB DSW10</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">ON OFF </td> <td style="width: 50%;">ON OFF </td> </tr> <tr> <td style="text-align: center;">1 2</td> <td style="text-align: center;">1 2</td> </tr> </table> </td> </tr> </table> </div> <ol style="list-style-type: none"> <li>2. Screw Fastening of each Terminal Boards.</li> <li>3. Connecting Order of Power Line Between Indoor Units and Outdoor Unit.</li> </ol>	<p><b>Indoor PCB DSW7</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">RPC (Before Alteration) RPF, RPF1, RPI-8,10, RPK</td> <td style="width: 50%;">ON OFF </td> </tr> <tr> <td style="text-align: center;">1 2</td> <td></td> </tr> <tr> <td style="width: 50%;">RCI-FSG2, RCD, RPI-0.8 to 5.0 RPC (After Alteration)</td> <td style="width: 50%;">ON OFF </td> </tr> <tr> <td style="text-align: center;">1 2</td> <td></td> </tr> </table>	RPC (Before Alteration) RPF, RPF1, RPI-8,10, RPK	ON OFF	1 2		RCI-FSG2, RCD, RPI-0.8 to 5.0 RPC (After Alteration)	ON OFF	1 2		<p><b>Outdoor PCB DSW10</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">ON OFF </td> <td style="width: 50%;">ON OFF </td> </tr> <tr> <td style="text-align: center;">1 2</td> <td style="text-align: center;">1 2</td> </tr> </table>	ON OFF	ON OFF	1 2	1 2
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RPC (Before Alteration) RPF, RPF1, RPI-8,10, RPK	ON OFF																
1 2																	
RCI-FSG2, RCD, RPI-0.8 to 5.0 RPC (After Alteration)	ON OFF																
1 2																	
ON OFF	ON OFF																
1 2	1 2																
The operation lamp flickers. (1 time/2 sec.)	The unit does not start.	The connection of remote control cable is incorrect.	This is the same as item (3)-1, 2 and 3.														
Indication of Flicker different to above.	The unit does not start, or starts once and then stops.	The connection of the thermistors or other connectors are incorrect. Tripping of protector exists, or else.	Check by the alarm code table in the service manual. (Do it by service people.)														
Normal	The outdoor fans rotate reversely.	The connecting order of power supply line is incorrect.	Connecting Order of the Terminal Board: TB1 in the Outdoor Unit														
Normal	The outdoor fans do not start.	Some wires of power supply line is disconnected.	Connecting Point of Power Supply Line. Contact Outdoor Fan Motor Connector.														

Back to (1) after checking

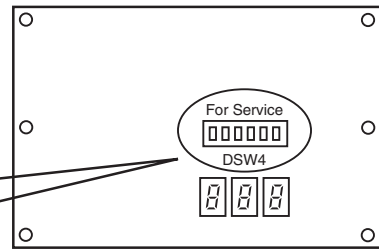
1.4.2 Test Run Mode by Outdoor Unit

The procedure of test run from the outdoor unit side is indicated below. Setting of this dip switch is available with the power source ON.

**Setting of Dip Switch (Before Shipment)**



Outdoor Unit Printed Circuit Board (PWB1)



**! WARNING**

- Do not touch any other electrical parts when operating switches on the PCB.
- Do not attach or detach service cover when the power source for the outdoor unit is ON and the outdoor unit is operated.
- Turn all the dip switches of DSW4 OFF when the test run operation is completed.

	Dip Switch Setting	Operation	Remarks
Test Run	<p>1. Setting of Operation Mode Cooling: Set DSW4-2 OFF.</p> <p>ON </p> <p>OFF </p> <p>Heating: Set DSW4-2 ON.</p> <p>ON </p> <p>OFF </p> <p>2. Starting Test Run Set DSW4-1 ON and the operation is started after a few~20 seconds.</p> <p>When heating operation, leave DSW4-2 at ON.</p> <p>↓</p> <p>ON </p> <p>OFF </p>	<p>1. The indoor unit automatically start to operate when the test run of the outdoor unit is set.</p> <p>2. The ON/OFF operation can be performed from the remote control switch or DSW4-1 of the outdoor unit.</p> <p>3. Continuous operation during 2 hours is performed without Thermo-OFF.</p>	<p>★ Take care that the indoor units operate in accordance with the test run operation of the outdoor unit.</p> <p>★ The test run is started from the outdoor unit and stopped from the remote control switch, the test run function of the remote control switch is cancelled. However, the test run function of the outdoor unit is not cancelled.</p> <p>★ In case that the plural indoor units are connected with one remote control switch, all the units start test run operation at the same time, therefore, turn the power source OFF for the indoor units not to operate test run. In this case, the "TEST RUN" indication of the remote control switch may flicker, and this is not abnormal.</p> <p>★ The setting of DSW4 is not required for the test run from the remote control switch.</p>
Manual OFF of Compressor	<p>1. Setting * Compressor Manual OFF: Set DSW4-4 ON.</p> <p>ON </p> <p>OFF </p> <p>* Compressor ON: Set DSW4-4 OFF.</p> <p>ON </p> <p>OFF </p>	<p>1. When DSW4-4 is ON during compressor operation, the compressor stops to operate immediately and the indoor unit is under the condition of Thermo-OFF.</p> <p>2. When DSW4-4 is OFF, the compressor starts to operate after the cancellation of 3-minutes guard.</p>	<p>★ Do not repeat compressor ON/OFF frequently.</p>
Manual Defrost	<p>1. Manual Defrost Operation Starts Press PSW1 for more than 3 seconds during heating operation, the defrost operation is started after 2 minutes. This function is not available within 5 minutes after starting heating operation.</p> <p>2. Manual Defrost Operation Finishes Defrost operation is automatically ended and the heating operation is started.</p>	<p>1. Defrost operation is available regardless of frosting condition and total time of heating operation.</p> <p>2. Defrost operation is not performed when the temperature of outdoor heat exchanger is higher than 10°C, high pressure is higher than 2.0MPa (20 kgf/cm<sup>2</sup>G) or Thermo-OFF.</p>	<p>★ Do not repeat defrost operation frequently.</p> <p>★ When manual defrost operation is accepted by PSW1, the time left before starting defrost operation is indicated at the 7-segment indicator on the PCB.</p> <p></p> <p>Time left (every 4 seconds)</p>

1.4.3 Checking List (FSG and FS3 Series)

### CHECK LIST ON TEST OPERATION

CLIENT: \_\_\_\_\_  
O.U. MODEL: \_\_\_\_\_

INSTALLER: \_\_\_\_\_  
O.U. Serial No.: \_\_\_\_\_

DATE: \_\_\_\_\_  
Checker: \_\_\_\_\_

I.U. Model								
I.U. Serial No.								

I.U. Indoor Unit, O.U.: Outdoor Unit

Piping Length: \_\_\_\_\_ m      Additional Refrigerant Charge: \_\_\_\_\_ kg

(1) General

No.	Check Item	Result
1	Was the dip switch, DSW6 for piping length in O.U. set?	
2	Was the dip switch, DSW3 for piping lift in O.U. set?	
3	Is the transmitting wire contacting to power lines?	
4	Was an earth wire connected?	
5	Is there any short circuit?	
6	Is there any voltage abnormality among each phase (L1-L2, L2-L3, L3-L1, L1-N)?	

(2) Refrigerant Cycle

a. Operation (Cooling/Heating)

No.	Check Item	Result
1	Operate all the indoor units ("TEST RUN" mode).	
2	Operate all the indoor units at "HIGH" speed.	
3	In case that the constant compressor is turned ON and OFF repeatedly, stop one indoor unit (small capacity one).	

b. Sampling Data

No.	Check Item	Result
1	After the operation for more than 20 min.	
2	Check $P_d$ and $T_d$ . Is $T_d$ -SH 20 to 40 deg.? (In Case of 24 and 30HP, $T_d$ -SH is 25 to 50 deg.)	
3	Is $P_s$ 0.2 to 0.5? (In Case of 24 and 30HP, $P_s$ is 0.2 to 0.6)	
4	Is $P_d$ 1.2 to 2.2? (If the outdoor temperature is high, $P_d$ becomes high.)	

## TROUBLESHOOTING

### (3) Check Item after Sampling Data

a. Cooling Operation (It is applicable when outdoor temperature is higher than 15°C.)

No.	Check Item	Standard	Causes	Result
1	Is $H1$ (Compressor Frequency) + $(CC)$ (Numbers of Running Compressor) -1) X (*) abnormally low or high? (It is applicable when Intake Air Temp. is 3 deg. higher than Setting Temp.)	Running Horsepower of Indoor Units X 15Hz	* Low: Insufficient Refrigerant * High: Excessive Refrigerant * DSW for I.U. Capacity; Incorrect Setting	
2	Is fan actually running at "HIGH" speed when $Fo$ (Air Flow Rate of Fan) is "15" (5 to 20HP) or "16" (24 and 30HP)?	-	* Fan Motor; Failure * PCB; Failure * Condenser; Failure	
3	Is $Td1$ higher than $Td2$ when only No. 1 compressor is running (when $CC$ (Numbers of Running Compressor) is "1")?	-	* $Td$ Thermistor; Incorrect Connection or Incorrect Mounting	
4	Is the total of $iE$ (Indoor Ex. Valves Opening) abnormally low or high?	Total of $iE$ : Horsepower of Outdoor Unit X (5 to 30)	* Low: Excessive Refrigerant * High: Insufficient Refrigerant,	
5	Is $TL$ (Liquid Pipe Temp. of I.U. Heat Exchanger) lower than $Ti$ (Intake Air Temp. of I.U.)?	It is normal when $TL-Ti < -5$ .	* $TL$ Thermistor; Failure * Ex. Valve; Fully Closed * Short-Circuit	
6	Is $TG$ (Gas Pipe Temp. of I.U. Heat Exchanger) lower than $Ti$ (Intake Air Temp. of I.U.)?	It is normal when $TG-Ti < -5$ .	* $TG$ Thermistor; Failure * Ex. Valve; Fully Closed or Slightly Open * Short-Circuit	
7	Is there any excessive difference among I.U. at $SHTG-TL$ of I.U. heat exchanger? (It is applicable when Intake Air Temp. is 3deg. higher than Setting Temp.)	It is normal if the difference among units is within 7 deg.	* $TL/TG$ Thermistor; Failure * Ex. Valve; Fully Open, Slightly Open or Fully Closed	
8	Is there any I.U. with the I.U. heat exchanger $SHTG-TL$ excessively different from other units' value and is $iE$ lower than "7"? (It is applicable when Intake Air Temp. is 3 deg. higher than Setting Temp.)	It is normal if $SH$ is within 3 deg. lower than other units.	* Ex. Valve; Locked with Fully Open * Mismatched between Wiring and Piping	
9	Is there any I.U. with $SH$ excessively lower than other units' value, under the condition of $iE$ (I.U. Ex. Value) "100"?	It is normal if $SH$ is within 3 deg. higher than other units.	* Ex. Valve; Locked with Slightly Open or Closed * Mismatched between Wiring and Piping	
10	Is the difference between Discharge Air Temp. And Intake Air Temp. more than 7 deg.?	-	-	

b. Heating Operation (It is applicable when outdoor temperature is higher than 0°C.)

No.	Check Item	Standard	Causes	Result
1	Is oE1 (O.U. Ex. Valves Opening) abnormally low or high when Td - SH is 15 to 30 deg.?	oE1 = 30 to 70%	* Low: Insufficient Refrigerant * High: Excessive Refrigerant	
2	Is Pd "1.6" to "2.2"? (Pd is high when the indoor temperature is high.)	-	* Low: Solenoid Valve SVA Leakage * High: Excessive Gas Pipe Resistance	
3	Is <u>H1</u> (Compressor Frequency) + <u>CC</u> (Numbers of Running Compressor) - 1) x (*) abnormally low or high? (The lower is the room temp. and outdoor temp., the higher is the above value.)	-	* Low: Excessive Refrigerant * High: Insufficient Refrigerant, Excessive Pipe Resistance	
4	Is Pd "0.2" to "0.5"? (Only under the condition that electrical expansion valve SVA is OFF.)	-	* Low: O.U. Short-circuit * Low/High: O.U. Fan Thyristor Failure or Outdoor Air Sensor; Failure	
5	Is the temperature difference between I.U.* more than 15 deg. when iE (I.U. Ex. Valve) is 100? * The temperature difference between I.U. means the following; b3 (Discharge Gas Temp.) - b2 (Intake Air Temp.) indicated on the remote control switch by check mode. However, this is applicable only when b2 (Intake Air Temp.) - b1 (Setting Temp.) is higher than 3 deg.	-	* Failure such as P.C.B., Wiring, Coil, Valve * Excessive Pipe Resistance * Thermistor Failure for Discharge Air	

**NOTES:**

1. The symbol with an underline \_\_\_ indicates checking item and the mark “ ” indicates checking data.
2. Regarding (\*), the following value should be applied.

Power Supply	Mark (*)		
	8HP	10HP	16, 20HP
380-415V/50Hz	50	62	70
380V/60Hz 220V/60Hz	60	75	84





**2. SERVICING**

2.1 Outdoor Unit

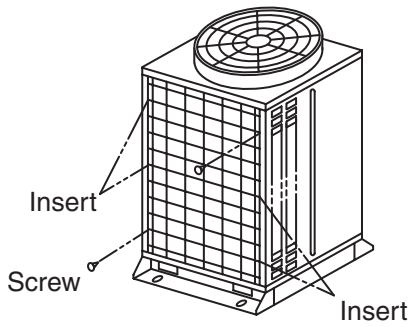
**! WARNING**

**TURN OFF all power source switches.**

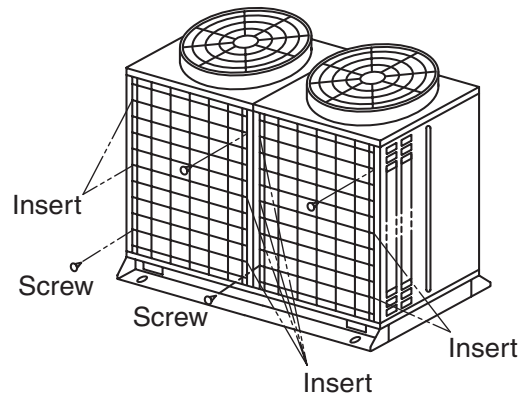
2.1.1 Removing Air Intake Grille

- (1) Remove screws for the air intake grille at the rear side of the unit.
- (2) Remove the air intake grille by pulling and unhooking each hook.

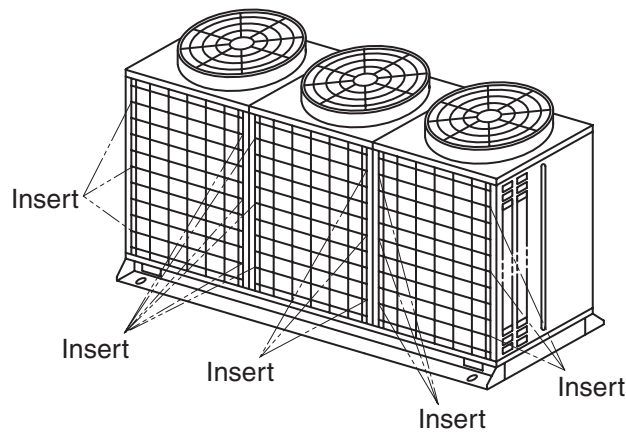
Tool	Phillips Screwdriver
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RAS-5FSG to RAS-10FSG,  
RAS-5FS3 to RAS-10FS3,  
RAS-8FXG, RAS-10FXG,  
RAS-8FX3, RAS-10FX3



RAS-16FSG, RAS-20FSG,  
RAS-16FS3, RAS-20FS3



RAS-24FSG1, RAS-30FSG1,  
RAS-24FS5, RAS-30FS5

## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

**TURN OFF all power source switches.**

#### 2.1.2 Removing Front Service Panel

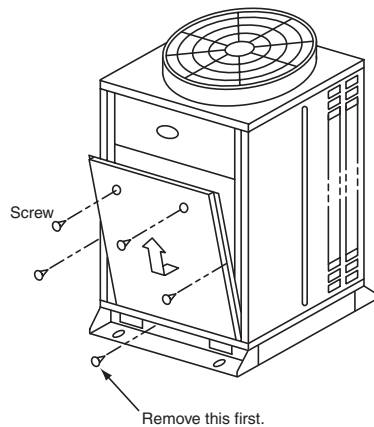
Remove five (5) screws per each panel.  
Slightly lift the panels upward and remove them.

Tool

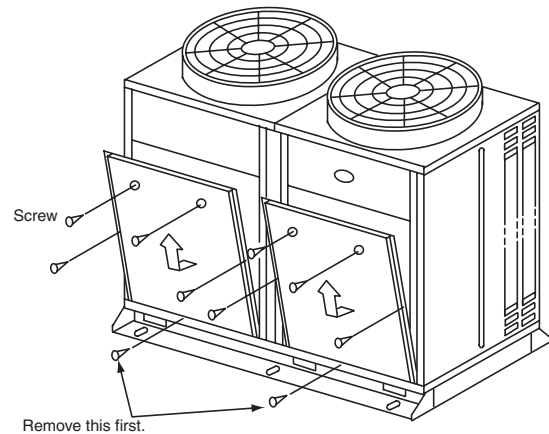
Phillips Screwdriver

#### NOTE:

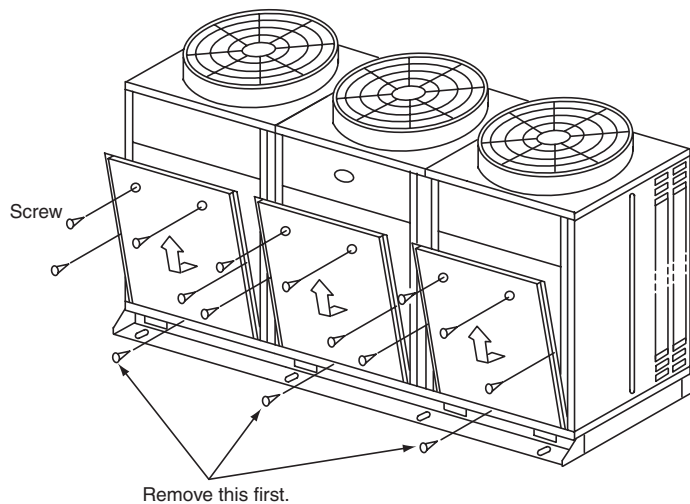
When removing screws for front service panel, remove the screw at the lower part of panel firstly.



RAS-5FSG to RAS-10FSG,  
RAS-5FS3 to RAS-10FS3,  
RAS-8FXG, RAS-10FXG,  
RAS-8FX3, RAS-10FX3



RAS-16FSG, RAS-20FSG,  
RAS-16FS3, RAS-20FS3



RAS-24FSG1, RAS-30FSG1,  
RAS-24FS5, RAS-30FS5

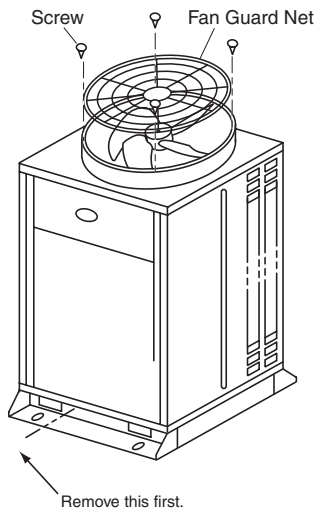
**! WARNING**

**TURN OFF all power source switches.**

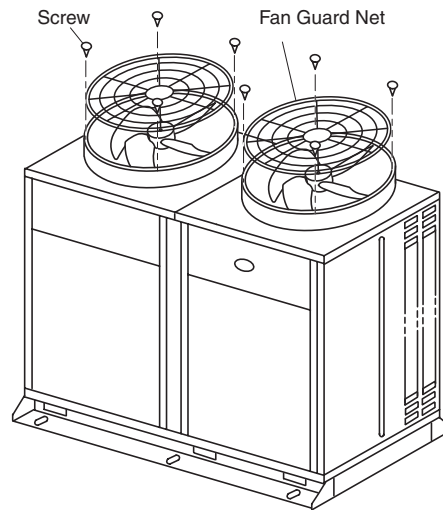
**2.1.3 Removing Fan Guard Nets**

Remove four (4) screws per each fan guard net and remove the one.

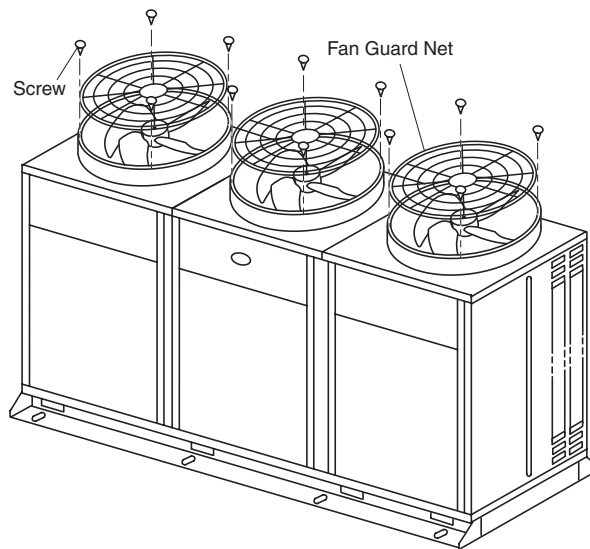
Tool	Phillips Screwdriver
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RAS-5FSG to RAS-10FSG,  
RAS-5FS3 to RAS-10FS3,  
RAS-8FXG, RAS-10FXG,  
RAS-8FX3, RAS-10FX3



RAS-16FSG, RAS-20FSG,  
RAS-16FS3, RAS-20FS3



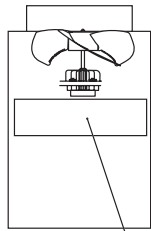
RAS-24FSG1, RAS-30FSG1,  
RAS-24FS5, RAS-30FS5

**! WARNING****TURN OFF all power source switches.**

## 2.1.4 Removing Outdoor Fan

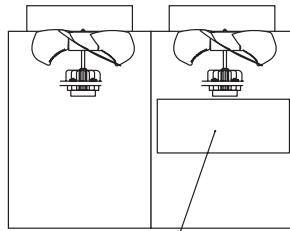
- (1) Remove the fan guard nets according to the item 2.1.3 "Removing Fan Guard Nets".
- (2) Remove the fans by removing the cap nuts and flat washers fixing the propeller fans onto the motor shafts. If it is difficult to remove the fan, use a puller.

Tool	Spanner, Adjustable Wrench or Puller
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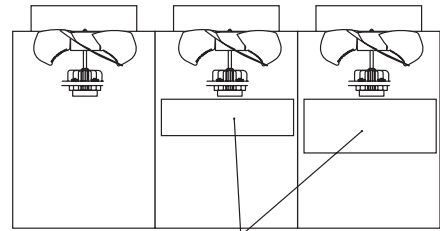
Electrical Box

RAS-5FSG to RAS-10FSG,  
RAS-5FS3 to RAS-10FS3,  
RAS-8FXG, RAS-10FXG,  
RAS-8FX3, RAS-10FX3



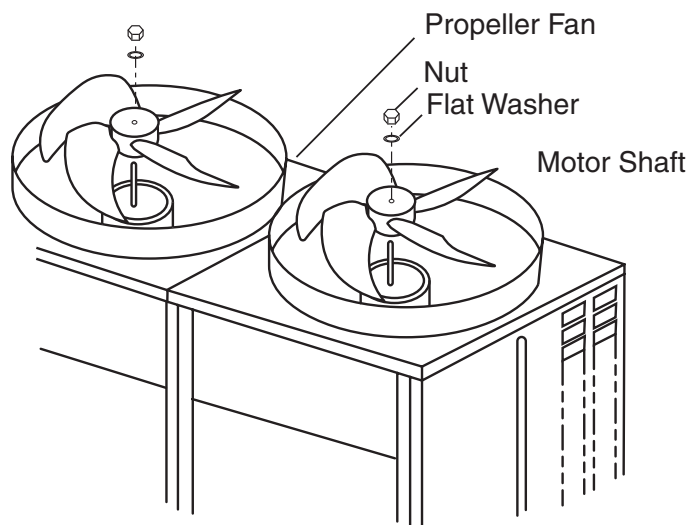
Electrical Box

RAS-16FSG, RAS-20FSG,  
RAS-16FS3, RAS-20FS3



Electrical Box

RAS-24FSG1, RAS-30FSG1,  
RAS-24FS5, RAS-30FS5

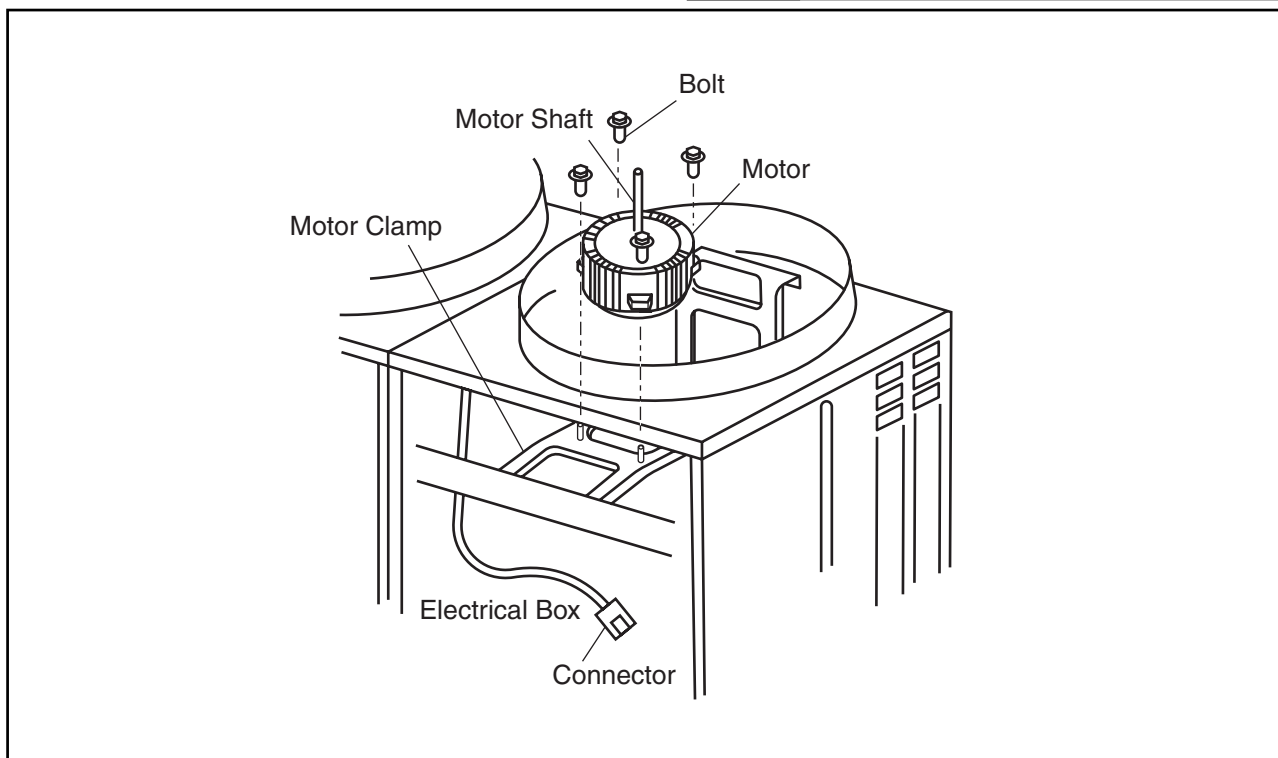



**! WARNING****TURN OFF all power source switches.****(3) Removing Wires**

- (a) Remove two (2) screws fixing the electrical box cover and remove the electrical box cover.
- (b) Disconnect the connectors for the motors in the electrical box.
- (c) Remove the motors by removing four (4) fixing bolts for the motors.

Tool

Phillips Screwdriver, Adjustable Wrench, Spanner, Cutter, Stick

**NOTES:**

1. Make the cord outlet of the motor directing downward when mounting the motor.
2. Firmly fix the motor wires onto the motor clamp with the plastic tie, not to touch the propeller fans.
3. Mounting Propeller Fan  
Put and push the propeller fan by identifying the  mark with the cut part of the motor shaft.  
Firmly fix the propeller fan twice with a tightening torque from 14.55 N·m to 15.0 N·m after the head of the fan shaft comes up.
4. Connect the motor wires to the electrical connecting part at the upper part of the electrical box.

**! WARNING****TURN OFF all power source switches.****2.1.5 Removing Compressor (RAS-5FSG and RAS-5FS3)**

- Do not expose the inner refrigeration cycle to the atmosphere for a long period of time when replacing a compressor to protect the cycle from mixing water or foreign particles. If exposed for a long time, seal pipe ends using caps or tape certainly.
- Remove the caps for the compressor just before replacing the compressor.
- Check to ensure each terminal No. when connecting compressor power wires. If incorrectly connected, the compressor will fail due to reverse rotation.

Before starting this work, collect refrigerant into a cylinder from the cycle.

- (1) Remove front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Release the lace for top cap of the compressor and remove the top cap.
- (3) Remove the Td thermistor on the top of the compressor.

**NOTE:**

The thermostat fixer, holder, thermostat holder are used again when reassembling.

Keep them in a box so that the parts are stored correctly.

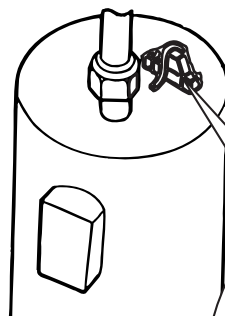
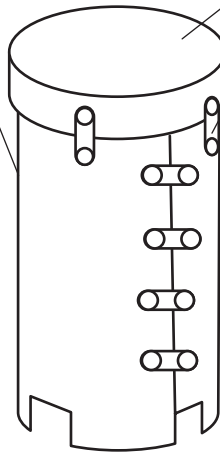
Tool

Phillips Screwdriver, Charge-Hose,  
Adjustable Wrench or Spanner

Water-proof Cover

Cap

Lace

Thermostat  
Holder

Holder

Td  
ThermistorThermostat  
Fixer

## ! WARNING

**TURN OFF all power source switches.**

- (4) Release the lace for the water-proof cover, open the water-proof cover from the front side.

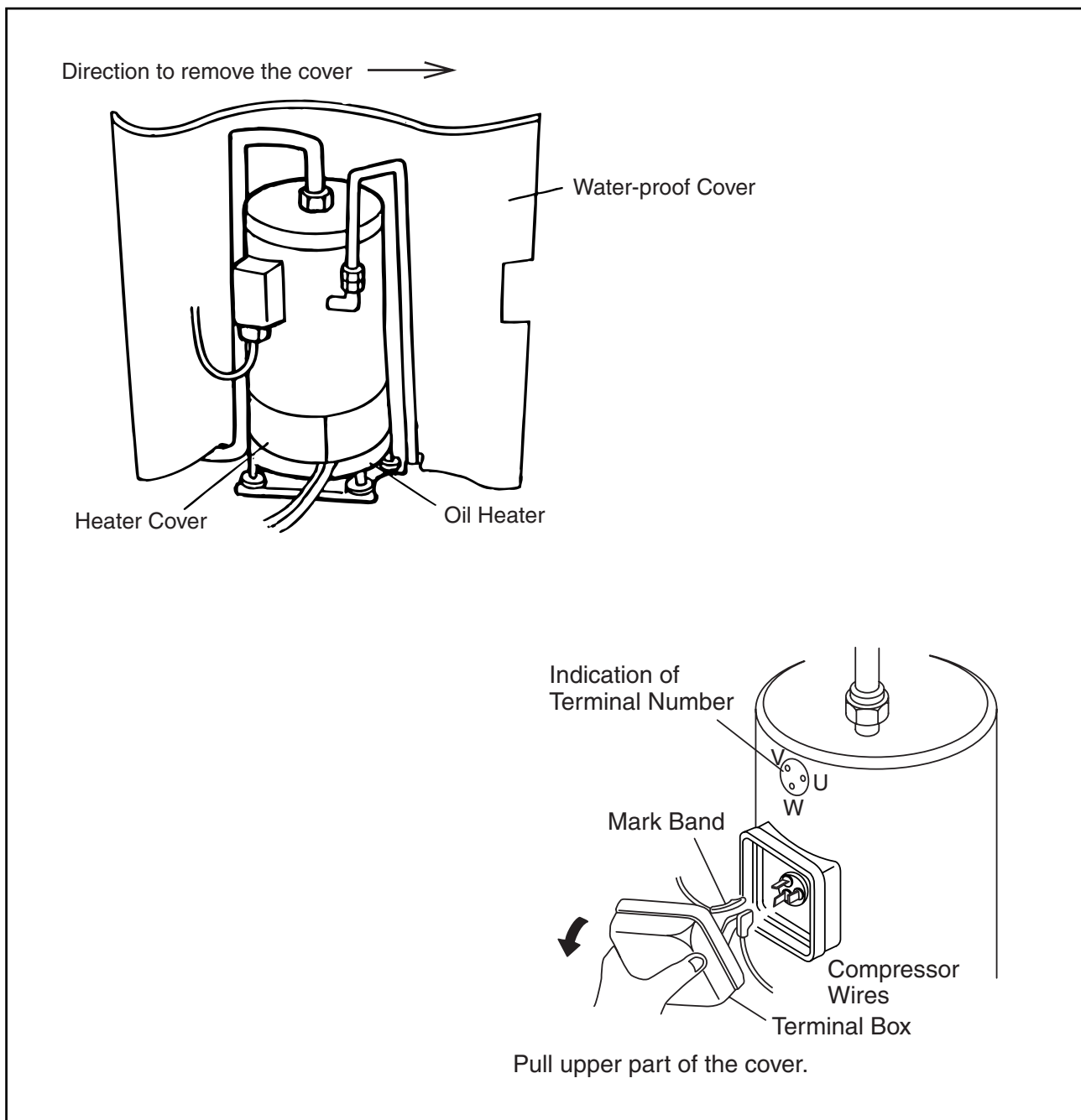
**NOTE:**

Remove the water-proof cover in the arrow mark direction as shown by paying attention to the cut part of the water-proof cover in order to avoid any damages.

- (5) Remove the terminal cover for the compressor and disconnect the wiring to the compressor terminals. Check to ensure that the terminals Nos. are indicated. If the terminal Nos. are not identified, at reassembling, the compressor will fail due to reverse rotation.

**NOTES:**

1. Check to ensure that the faston terminals for the compressor are normal. When a pulling force of 20N or more is required, it is normal. If abnormal, replace the faston terminals with new ones.
2. Check to ensure that wires are firmly fixed.
3. It is recommended that the faston terminals be clamped to increase a contacting force after replacing the compressor.



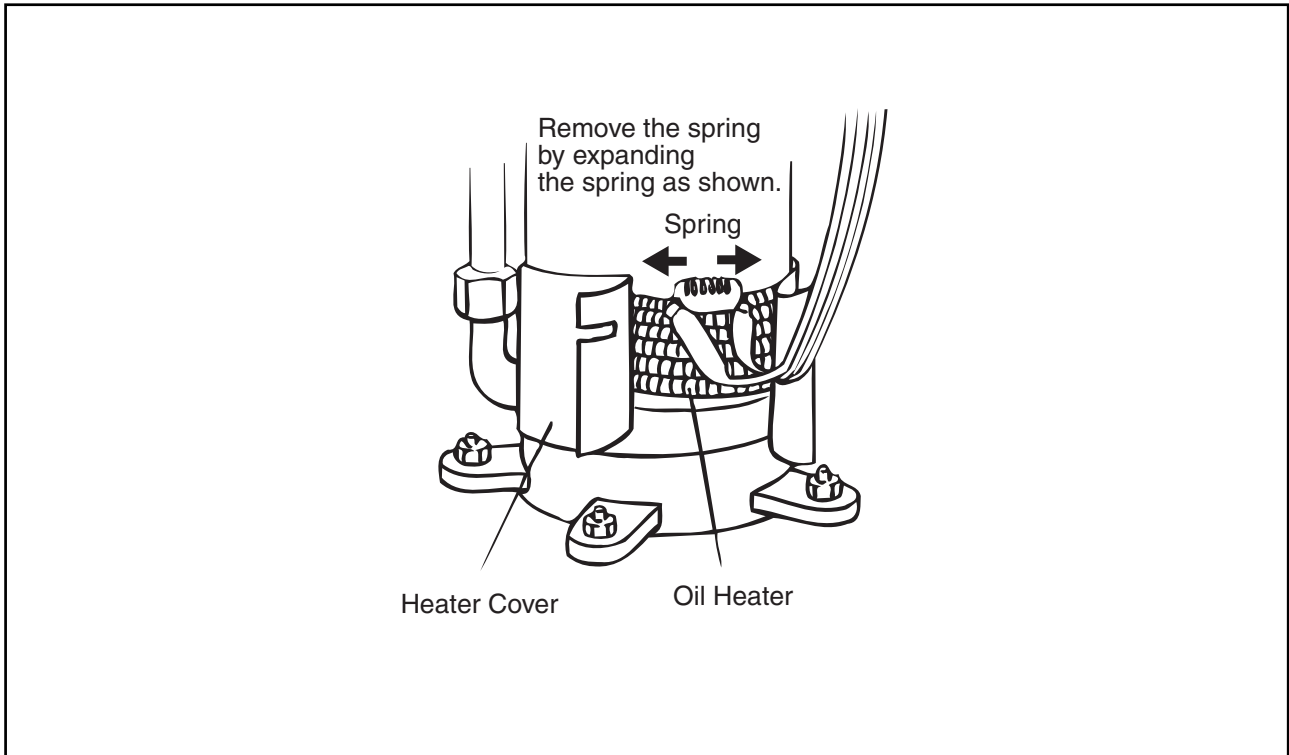
## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

**TURN OFF all power source switches.**

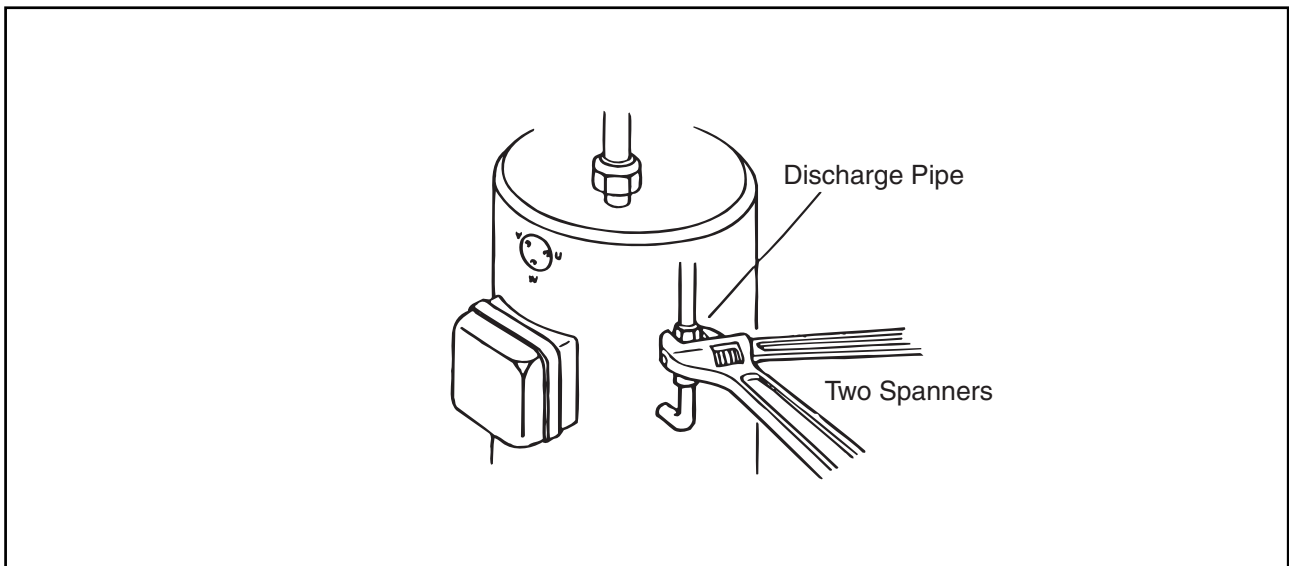
- (6) Remove the heater cover and the spring for the oil heater, and release the oil heater.



- (7) Disconnect the discharge pipe of the compressor.  
Use two spanners when disassembling the flare-nuts.

Tool

Adjustable Wrench or Spanner





**! WARNING**

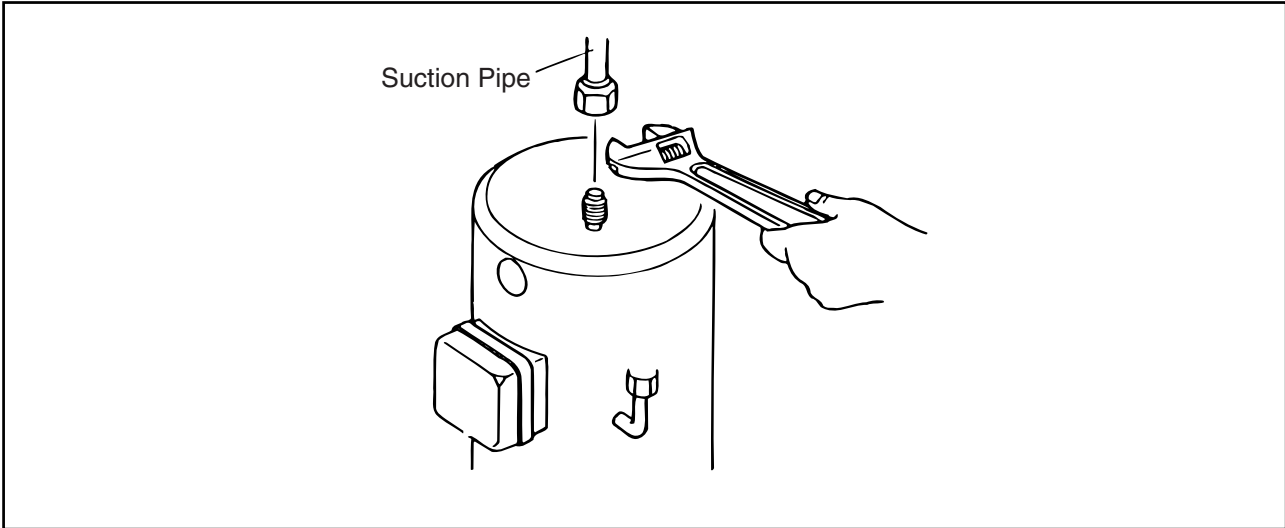
**TURN OFF all power source switches.**

- (8) Disconnect the suction pipe of the compressor.

**NOTES:**

1. Completely wipe off the oil if the oil is spread to the other parts such as the compressor cover, wiring, bottom base, etc. If not, this will cause many problems to the unit.
2. If the oil is spilt, charge new oil equivalent to the spilt oil.
3. Check to ensure that the oil is not foul.  
If foul, replace it with new one.

Tool	Adjustable Wrench or Spanner
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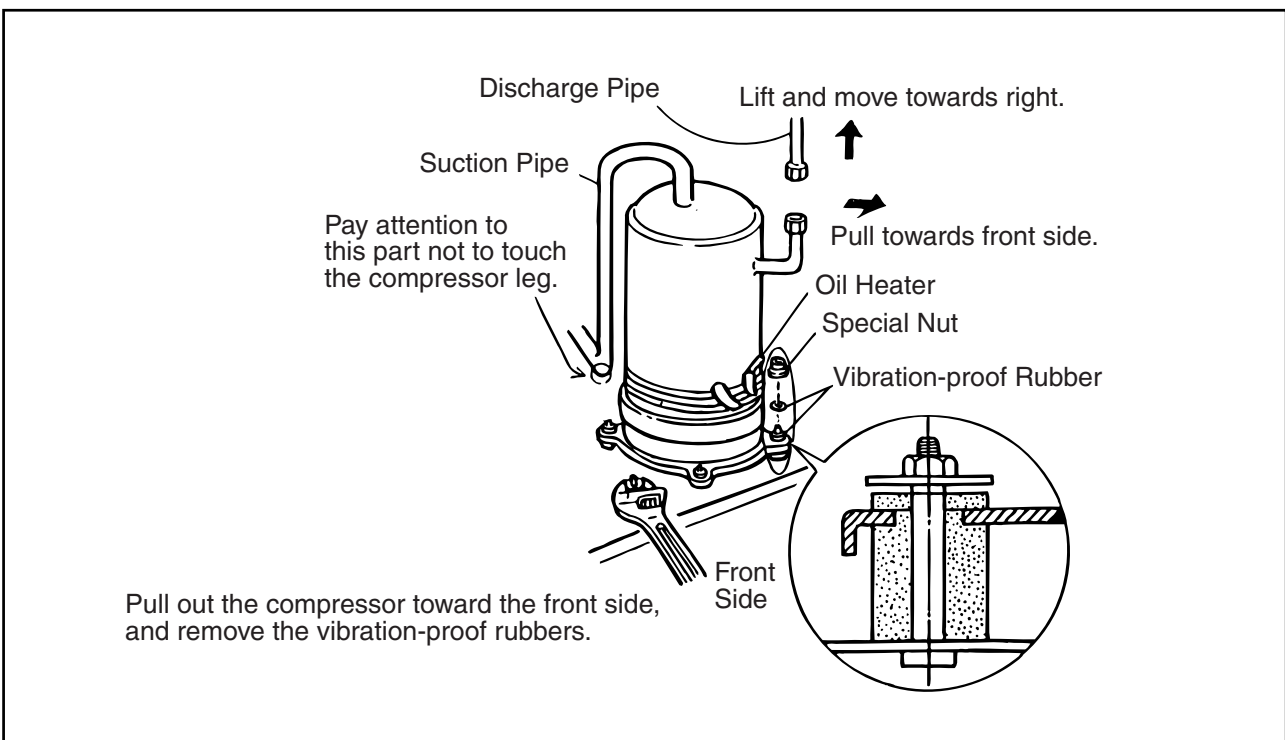
- (9) Remove three nuts fixing the compressor and remove the compressor.

**NOTE:**

When lifting the compressor, hold the discharge pipe vertically and turn it to the right, and pull the compressor towards the front side by paying attention to the compressor leg not to touch the suction pipe.

- (10) Regarding remounting the compressor work, perform the above work in the reverse processes.

Tool	Adjustable Wrench or Spanner, Phillips Screwdriver
------	--



**! WARNING**

**TURN OFF all power source switches.**

2.1.6 Removing Compressors (RAS-8FSG, RAS-10FSG, RAS-16FSG, RAS-20FSG, RAS-8FS3, RAS-10FS3, RAS-16FS3, RAS-20FS3, RAS-8FXG, RAS-10FXG, RAS-8FX3 and RAS-10FX3)

- Do not expose the inner refrigeration cycle to the atmosphere for a long period of time when replacing a compressor to protect the cycle from mixing water or foreign particles. If exposed for a long time, seal pipe ends using caps or tape certainly.
- Remove the caps for the compressor just before replacing the compressor.
- Check to ensure each terminal No. when connecting compressor power wires. If incorrectly connected, the compressor will fail due to reverse rotation.

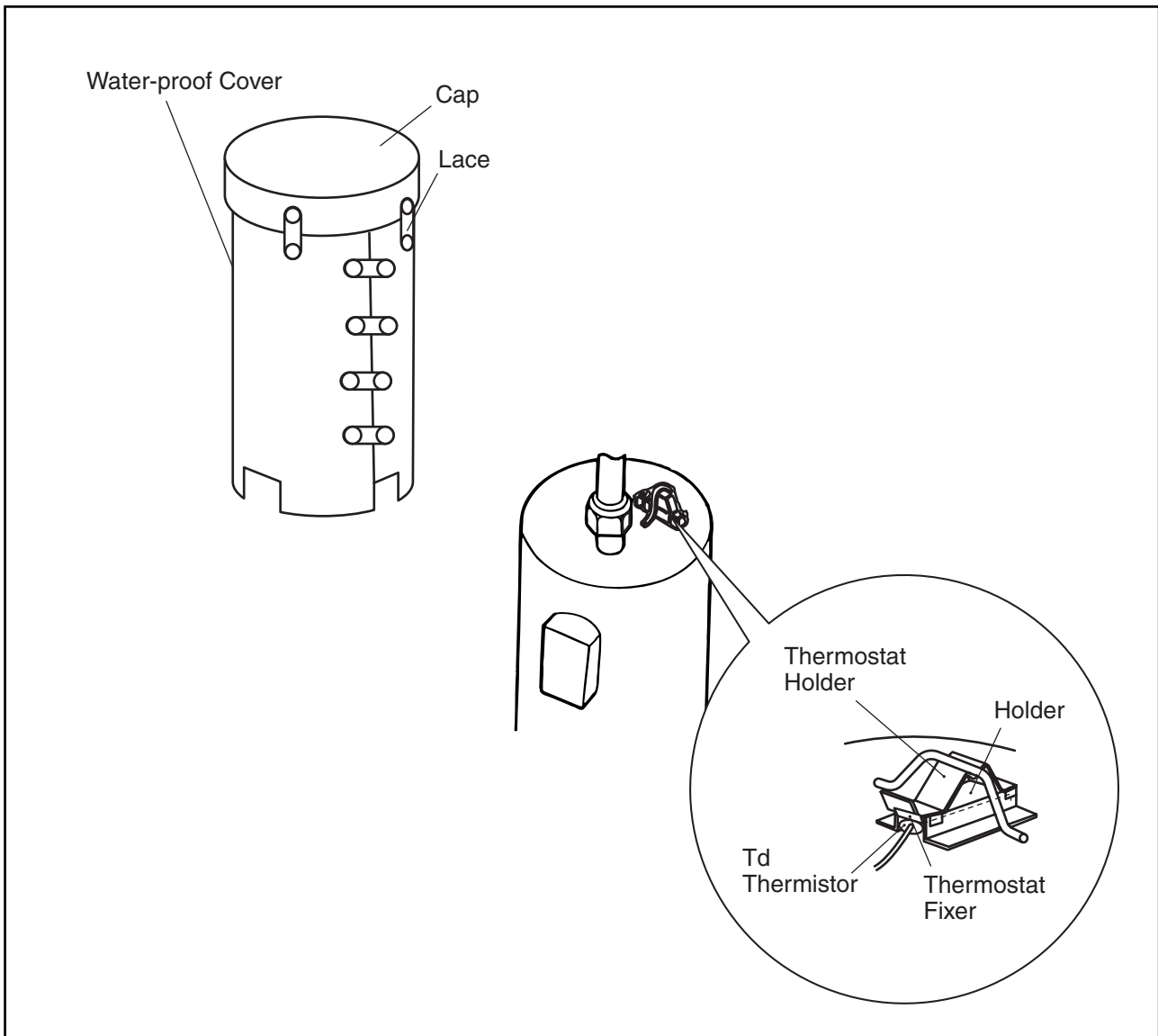
Before starting this work, collect refrigerant into a cylinder from the cycle.

- (1) Remove front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Release the lace for top cap of the compressor and remove the top cap.
- (3) Remove the Td thermistor on the top of the compressor.

**NOTE:**

The thermostat fixer, holder, thermostat holder are used again when reassembling. Keep them in a box so that the parts are stored correctly.

Tool	Phillips Screwdriver, Charge-Hose, Adjustable Wrench or Spanner
------	---



**! WARNING**

**TURN OFF all power source switches.**

- (4) Release the lace for the water-proof cover, open the water-proof cover from the front side.

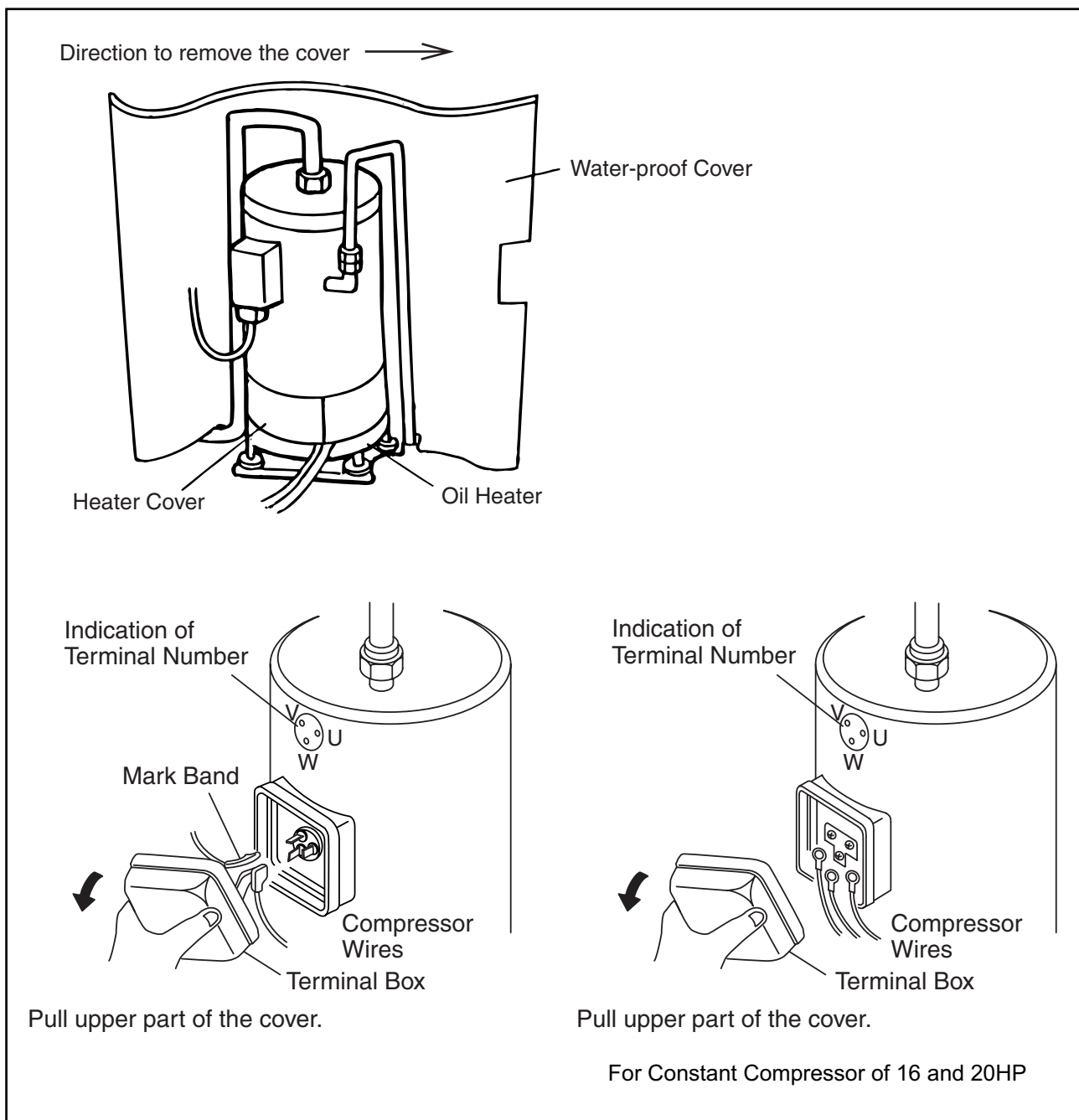
NOTE:

Remove the water-proof cover in the arrow mark direction as shown by paying attention to the cut part of the water-proof cover in order to avoid any damages.

- (5) Remove the terminal cover for the compressor and disconnect the wiring to the compressor terminals. Check to ensure that the terminals Nos. are indicated. If the terminal Nos. are not identified, at reassembling, the compressor will fail due to reverse rotation.

NOTES:

1. Check to ensure that the faston terminals for the compressor are normal. When a pulling force of 20N or more is required, it is normal. If abnormal, replace the faston terminals with new ones.
2. Check to ensure that wires are firmly fixed.
3. It is recommended that the faston terminals be clamped to increase a contacting force after replacing the compressor.



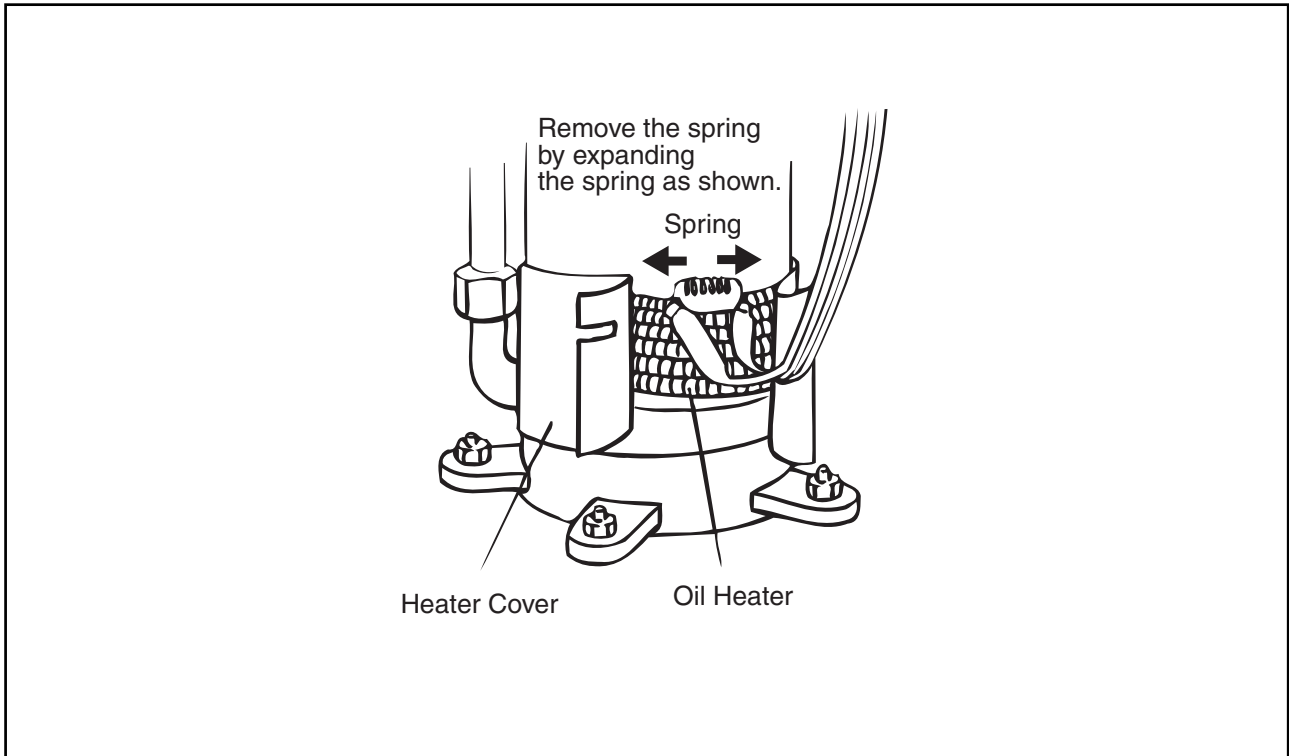
## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

**TURN OFF all power source switches.**

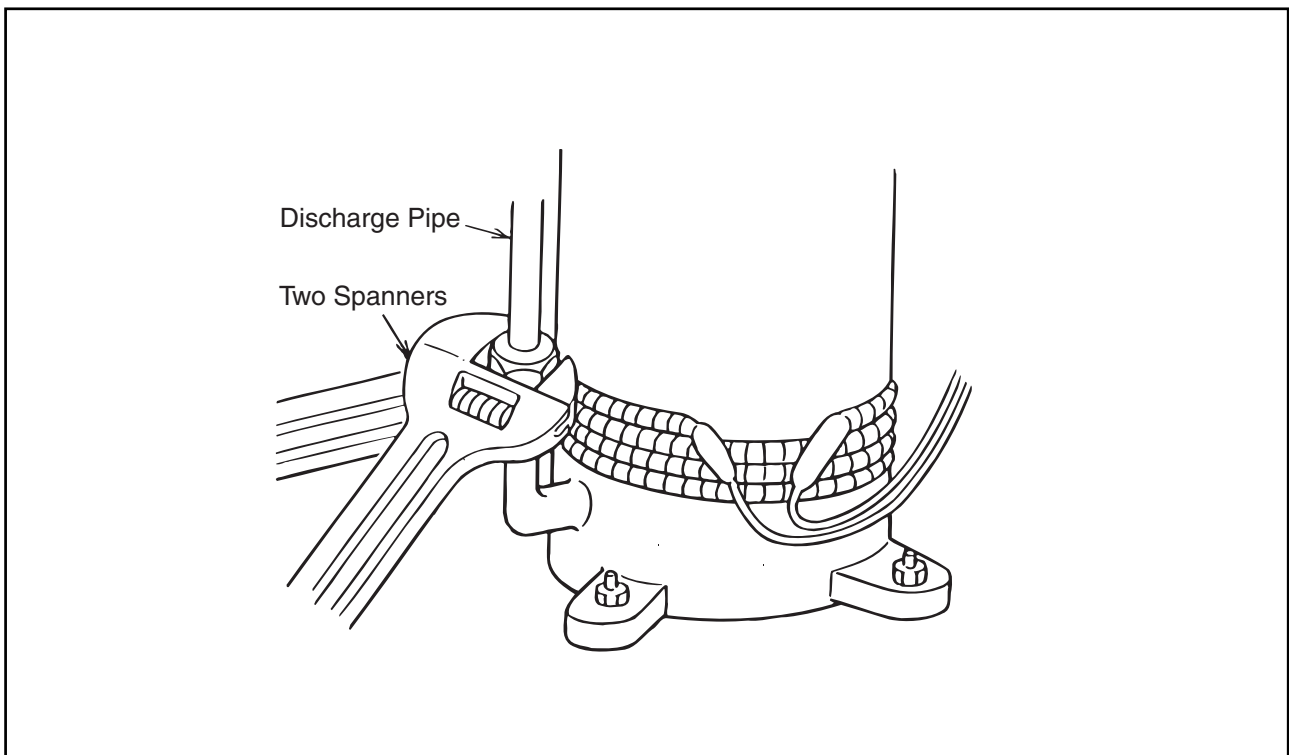
- (6) Remove the heater cover and the spring for the oil heater, and release the oil heater.



- (7) Disconnect the discharge pipe of the compressor.  
Use two spanners when disassembling the flare-nuts.

Tool

Adjustable Wrench or Spanner



**! WARNING**

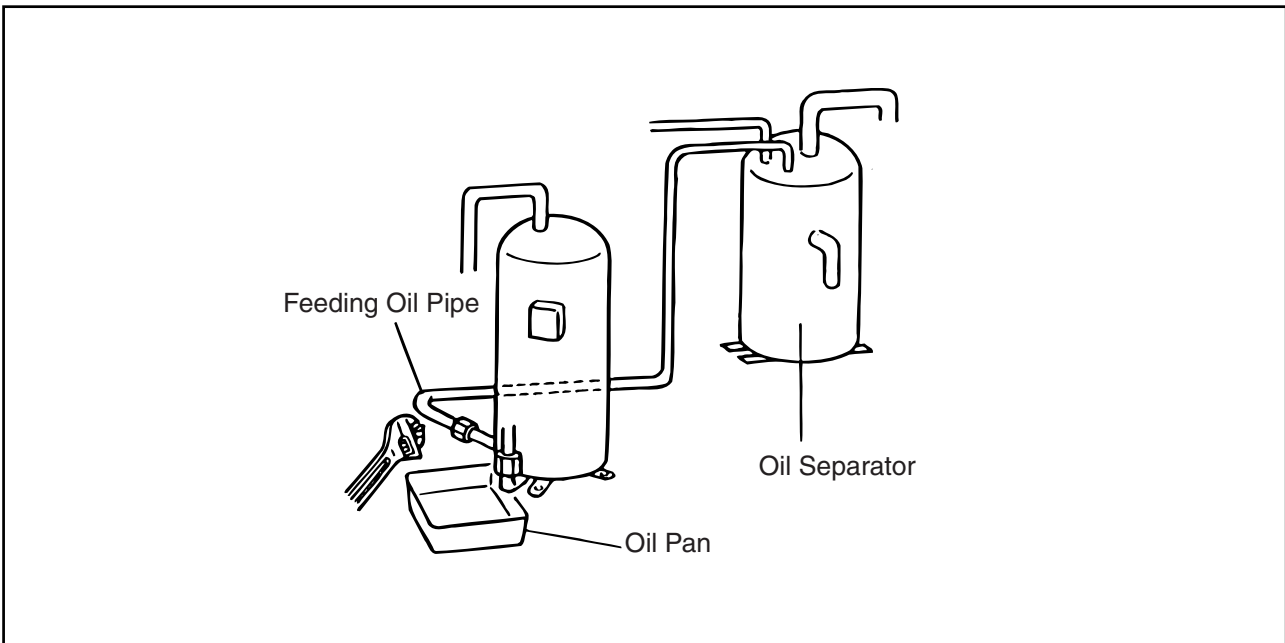
**TURN OFF all power source switches.**

- (8) Remove the flare-nut at the compressor side, and disconnect the feeding oil pipe. There is a possibility that the oil may flow from the inside of the feeding oil pipe. Therefore, prepare an oil pan, etc. to collect the oil.

**NOTES:**

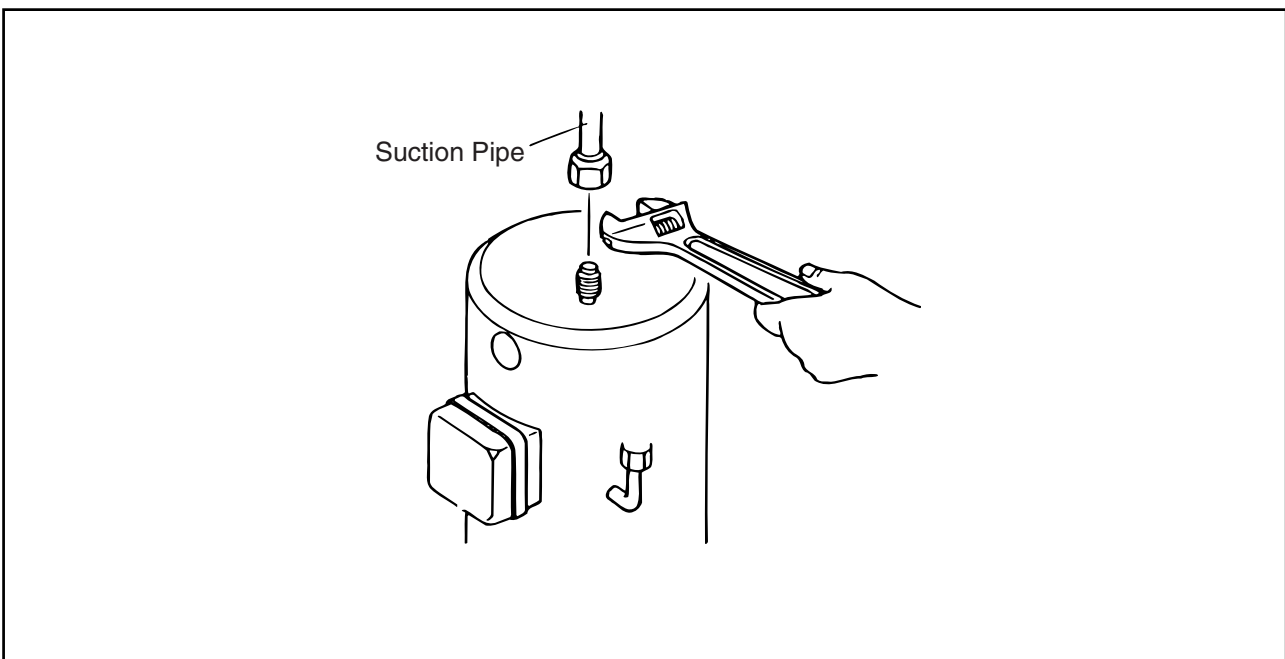
1. Completely wipe off the oil if the oil is spread to the other parts such as the compressor cover, wiring, bottom base, etc. If not, this will cause many problems to the unit.
2. If the oil is spilt, charge new oil equivalent to the spilt oil.
3. Check to ensure that the oil is not foul. If foul, replace it with new one.

Tool	Adjustable Wrench or Spanner
------	------------------------------



- (9) Remove the suction pipe of the compressor.

Tool	Adjustable Wrench or Spanner
------	------------------------------



## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

**TURN OFF all power source switches.**

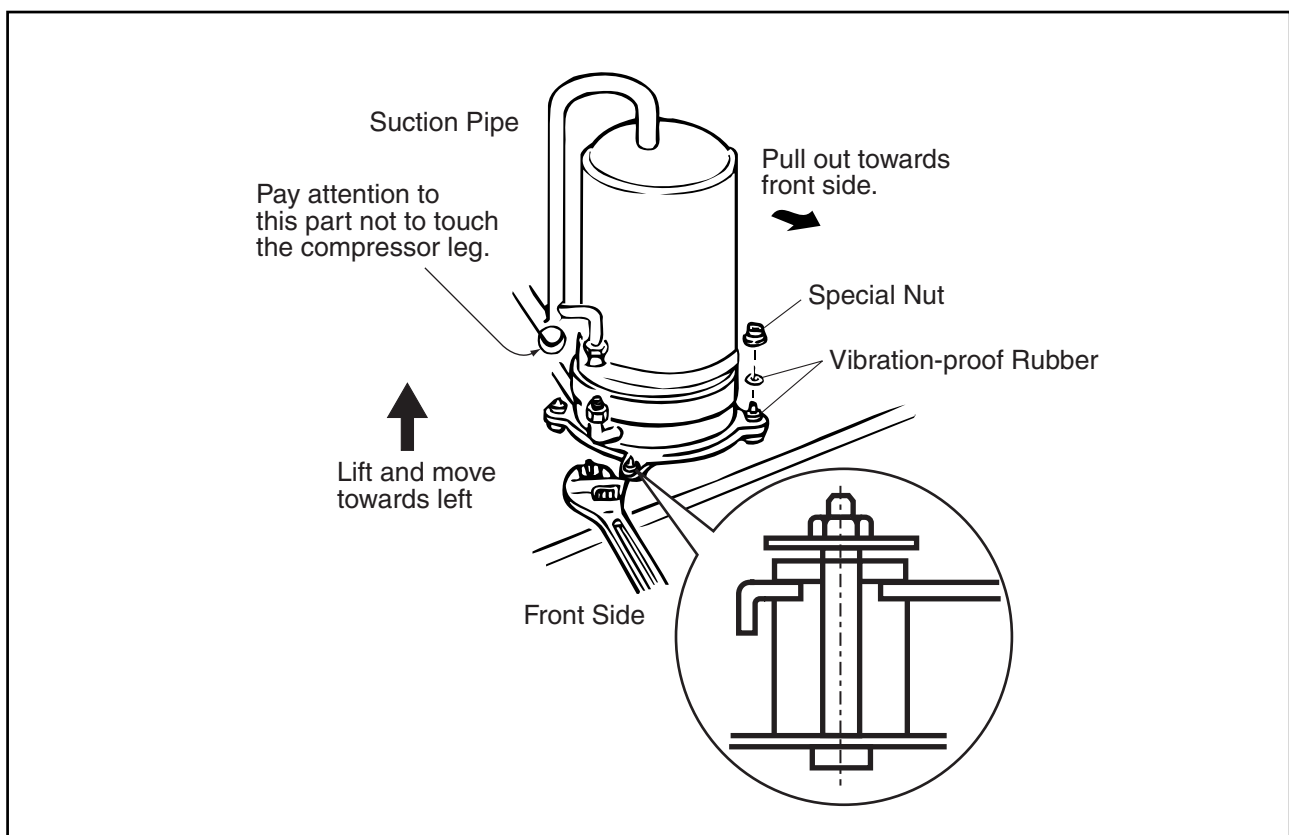
- (10) Remove three nuts fixing the compressor and remove the compressor.  
There is no nut at the left rear side.

**NOTES:**

1. Pull out the compressor without removing the oil heater.  
Remove the oil heater after the compressor is put outside the unit. (Constant Comp. Only)
  2. When lifting the compressor, hold the discharge pipe vertically and turn it to the left and pull the compressor towards the front side by paying attention to the compressor leg not to touch the suction pipe.
- (11) Regarding remounting the compressor work, perform the above work in the reverse processes.

Tool

Adjustable Wrench or Spanner,  
Phillips Screwdriver



**! WARNING**

**TURN OFF all power source switches.**

2.1.7 Removing Compressors for MC1 and MC2

(RAS-24FSG1, RAS-30FSG1, RAS-24FS5 and RAS-30FS5)

- Do not expose the inner refrigeration cycle to the atmosphere for a long period of time when replacing a compressor to protect the cycle from mixing water or foreign particles. If exposed for a long time, seal pipe ends using caps or tape certainly.
- Remove the caps for the compressor just before replacing the compressor.
- Check to ensure each terminal No. when connecting compressor power wires. If incorrectly connected, the compressor will fail due to reverse rotation.

Before starting this work, collect refrigerant into a cylinder from the cycle.

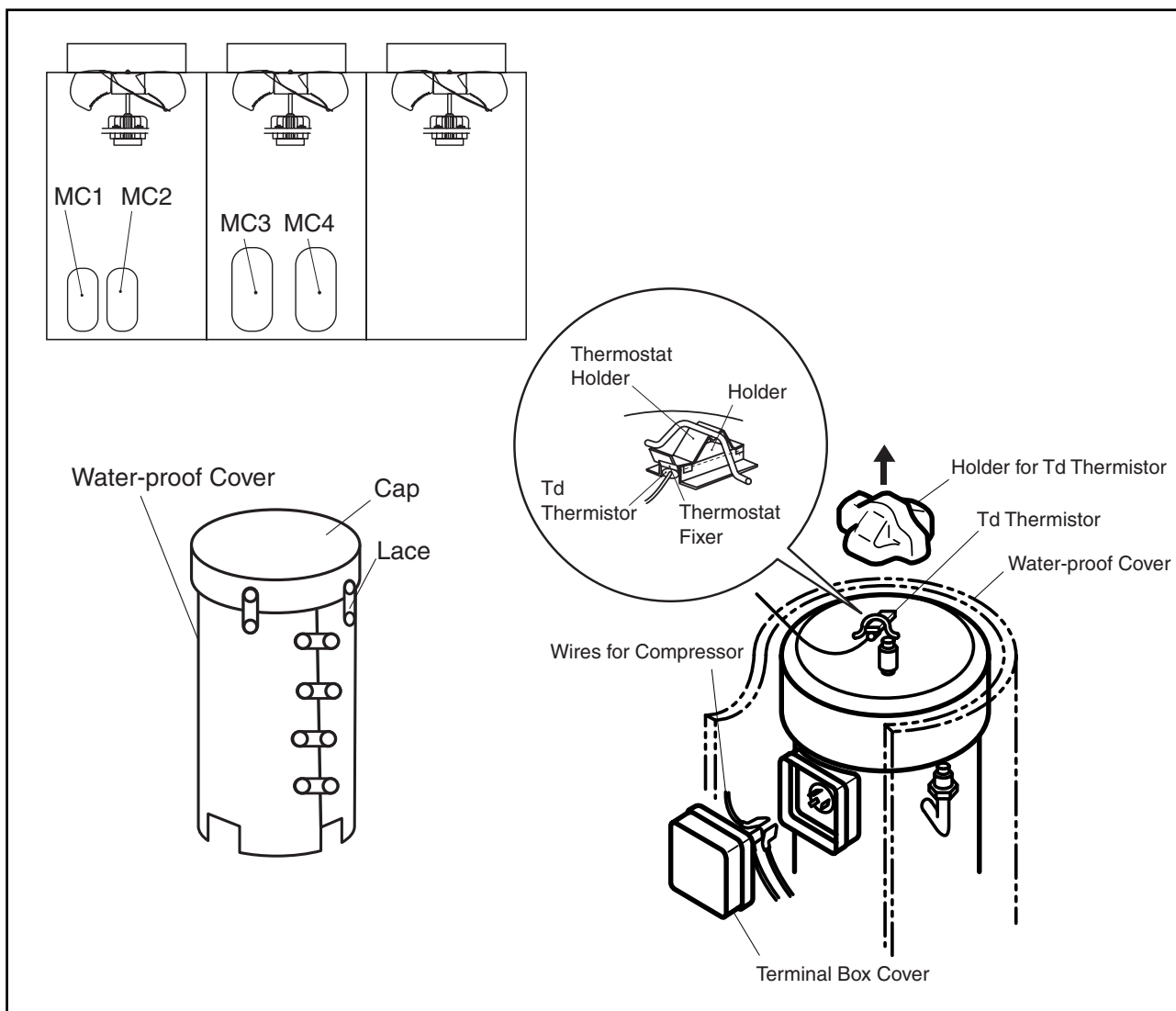
- (1) Remove front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Release the lace for top cap of the compressor and remove the top cap.
- (3) Remove the holder for Td thermistor on the compressor.
- (4) Remove the Td thermistor on the top of the compressor.

**NOTE:**

The thermostat fixer, holder, thermostat holder and holder for Td thermistor are used again when reassembling.

Keep them in a box so that the parts are stored correctly.

Tool	Phillips Screwdriver, Charge-Hose, Adjustable Wrench or Spanner
------	---



## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

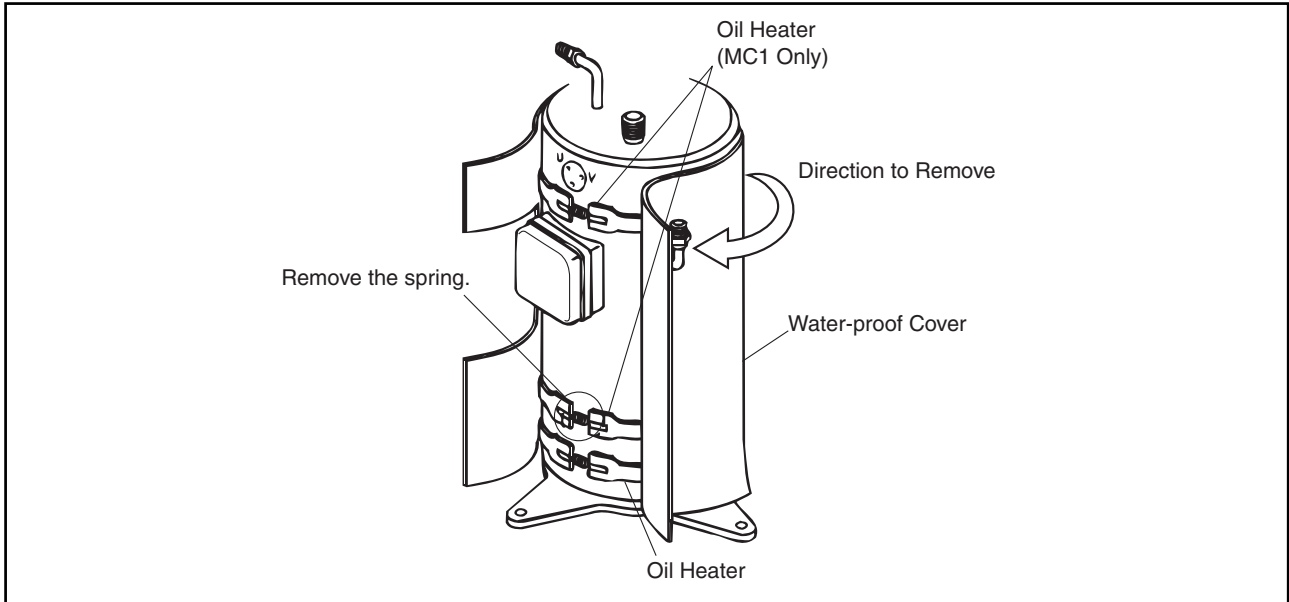
**TURN OFF all power source switches.**

- (5) Release the lace for the water-proof cover, open the water-proof cover from the front side.

**NOTE:**

Remove the water-proof cover in the arrow mark direction as shown by paying attention to the cut part of the water-proof cover in order to avoid any damages.

- (6) Remove the spring for the oil heater.

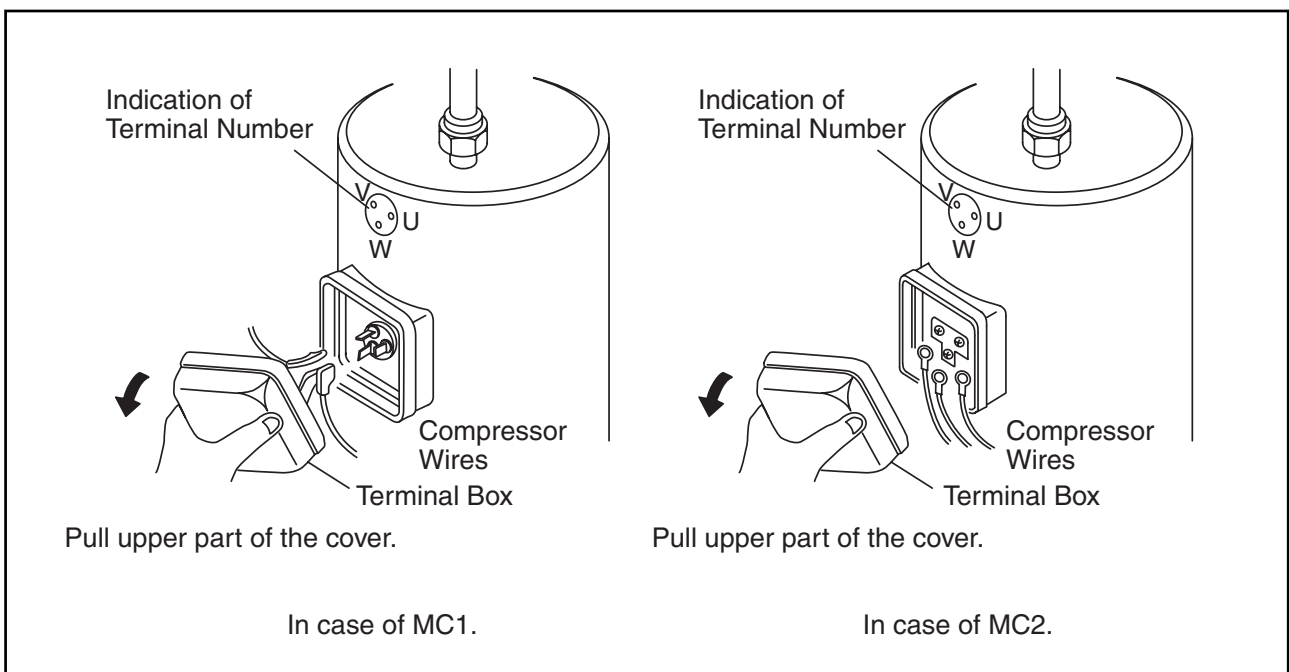


- (7) Remove the terminal cover for the compressor and disconnect the wiring to the compressor terminals. Check to ensure that the terminals Nos. are indicated. If the terminal Nos. are not identified, at reassembling, the compressor will fail due to reverse rotation.

**NOTES:**

1. Check to ensure that the faston terminals for the compressor are normal. When a pulling force of 20N or more is required, it is normal. If abnormal, replace the faston terminals with new ones.
2. Check to ensure that wires are firmly fixed.
3. It is recommended that the faston terminals be clamped to increase a contacting force after replacing the compressor.

Tool	Adjustable Wrench or Spanner
------	------------------------------

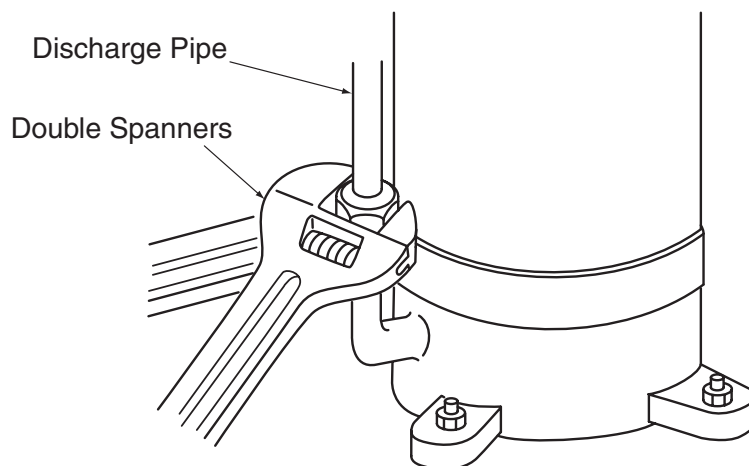




**! WARNING****TURN OFF all power source switches.**

- (8) Disconnect the discharge pipe of the compressor.  
Use two spanners when disassembling the flare-nuts.

Tool	Adjustable Wrench or Spanner
------	------------------------------

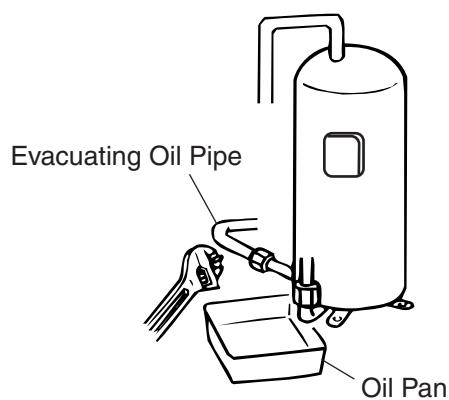


- (9) Remove the flare-nut at the compressor side, and disconnect the evacuating oil pipe.  
There is a possibility that the oil may flow from the inside of the evacuating oil pipe.  
Therefore, prepare an oil pan, etc. to collect the oil.

**NOTES:**

1. Completely wipe off the oil if the oil is spread to the other parts such as the compressor cover, wiring, bottom base, etc. If not, this will cause many problems to the unit.
2. If the oil is spilt, charge new oil equivalent to the spilt oil.
3. Check to ensure that the oil is not foul.  
If foul, replace it with new one.

Tool	Adjustable Wrench or Spanner
------	------------------------------



## SERVICING

### (2.1 Outdoor Unit)

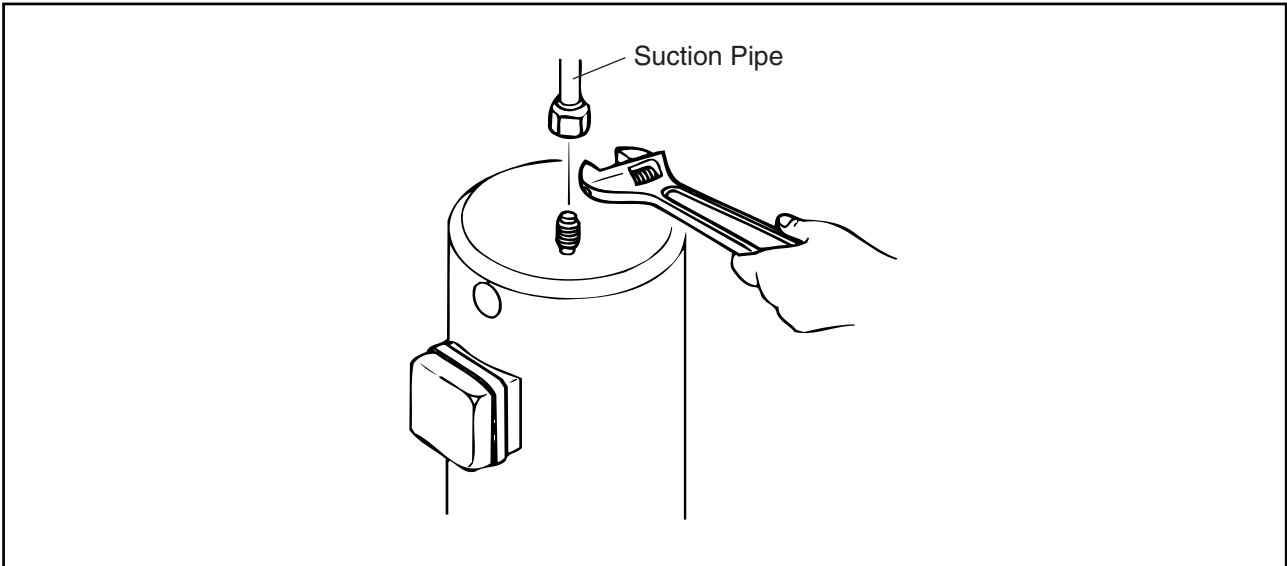
# ! WARNING

**TURN OFF all power source switches.**

(10) Remove the suction pipe of the compressor.

Tool

Adjustable Wrench or Spanner



(11) Remove three nuts fixing the compressor and remove the compressor.  
There is no nut at the left rear side.

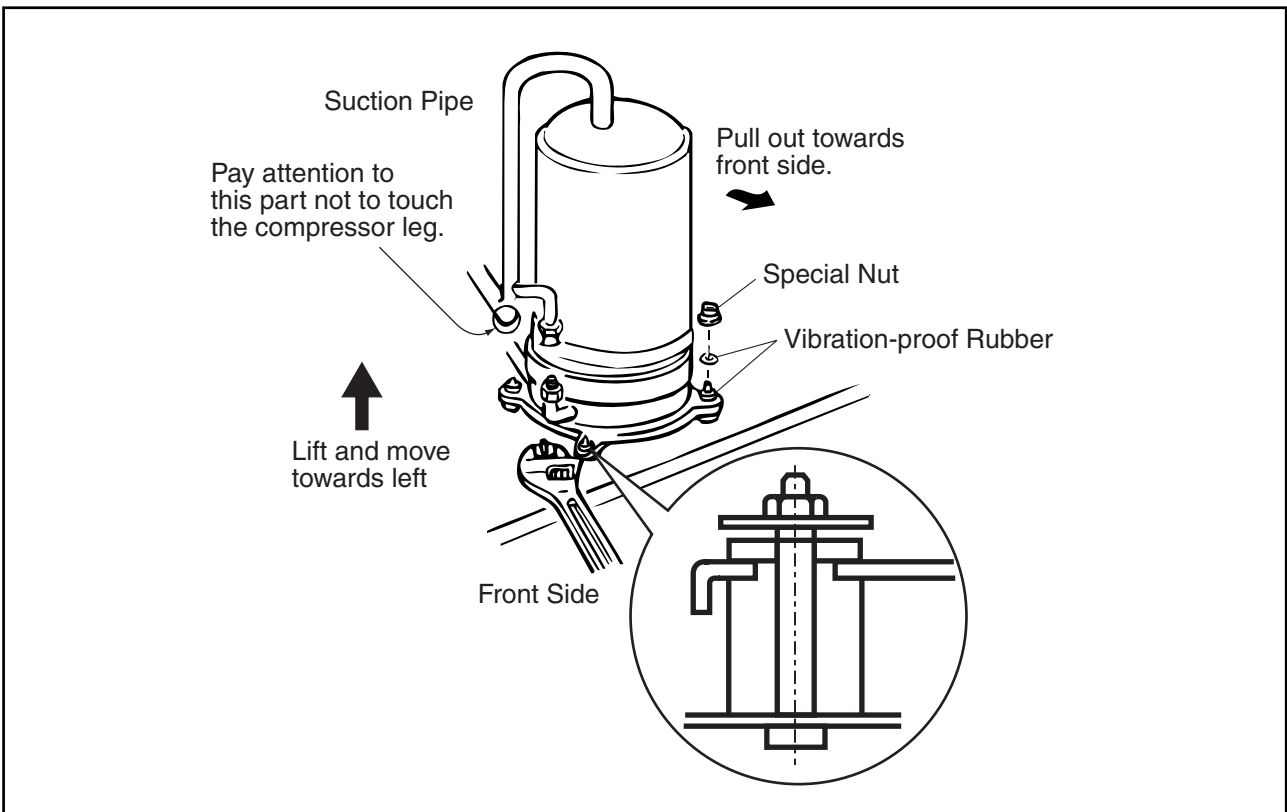
#### NOTES:

1. Pull out the compressor without removing the oil heater.  
Remove the oil heater after the compressor is put outside the unit. (Constant Comp. Only)
2. When lifting the compressor, hold the discharge pipe vertically and turn it to the left and pull the compressor towards the front side by paying attention to the compressor leg not to touch the suction pipe.

(12) Regarding remounting the compressor work, perform the above work in the reverse processes.

Tool

Adjustable Wrench or Spanner,  
Phillips Screwdriver



**! WARNING****TURN OFF all power source switches.**

## 2.1.8 Removing Compressors for MC3 and MC4

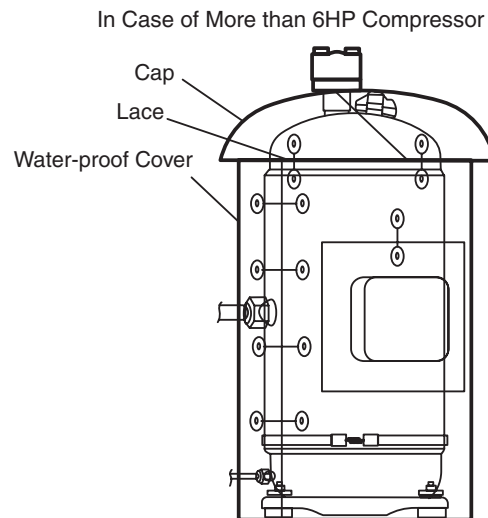
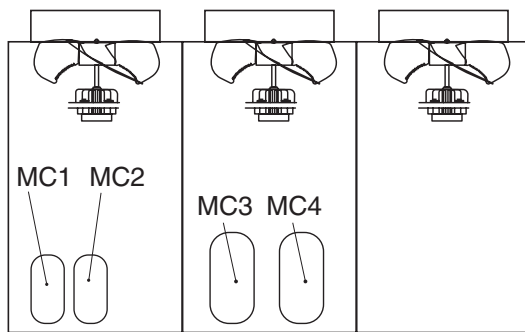
(RAS-24FSG1, RAS-30FSG1, RAS-24FS5 and RAS-30FS5)

- Do not expose the inner refrigeration cycle to the atmosphere for a long period of time when replacing a compressor to protect the cycle from mixing water or foreign particles.  
If exposed for a long time, seal pipe ends using caps or tape certainly.
- Remove the caps for the compressor just before replacing the compressor.
- Check to ensure each terminal No. when connecting compressor power wires.  
If incorrectly connected, the compressor will fail due to reverse rotation.

Before starting this work, collect refrigerant into a cylinder from the cycle.

- (1) Remove front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Release the lace for top cap of the compressor and remove the top cap.

Tool

Phillips Screwdriver, Charge-Hose,  
Adjustable Wrench or Spanner

## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

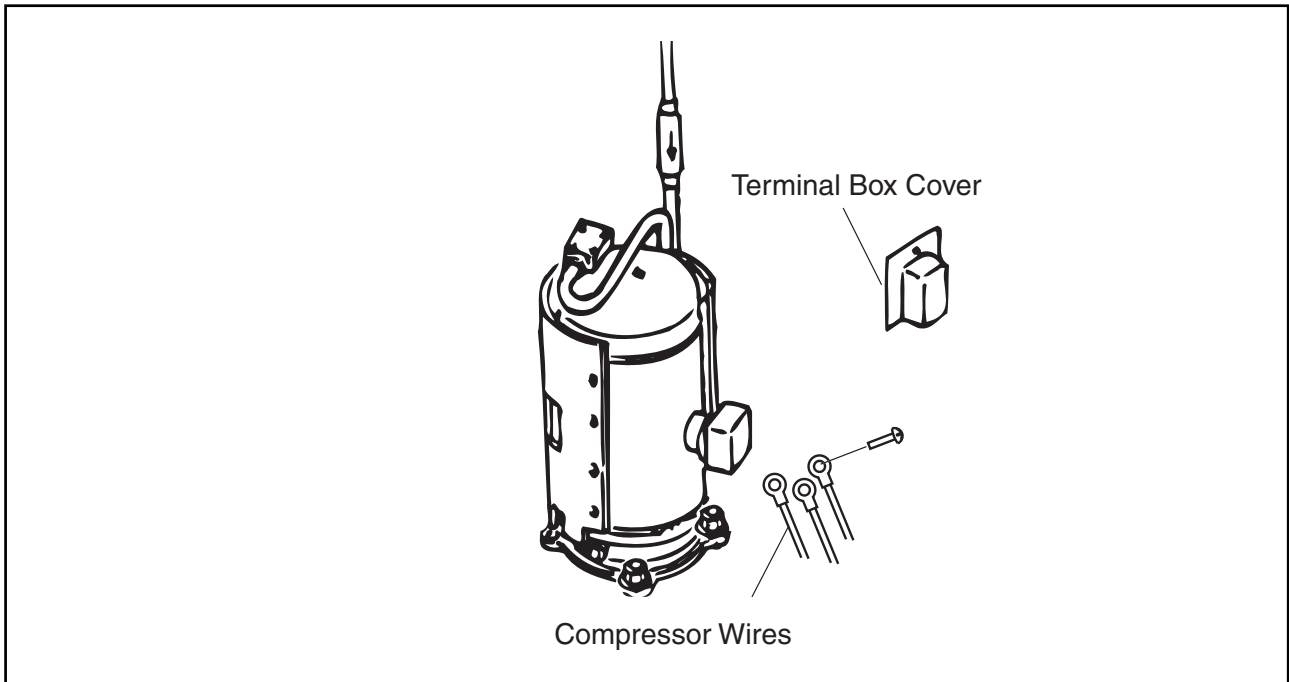
**TURN OFF all power source switches.**

- (3) Remove the electrical box cover according to the item 2.1.15 "Removing Electrical Components".
- (4) Disconnect the connectors (CN57 and CN58) of oil heaters.
- (5) Remove the terminal box cover of the compressor and disconnect the compressor wires.

**NOTE:**

Check the terminal No. and mark band at disconnecting work.

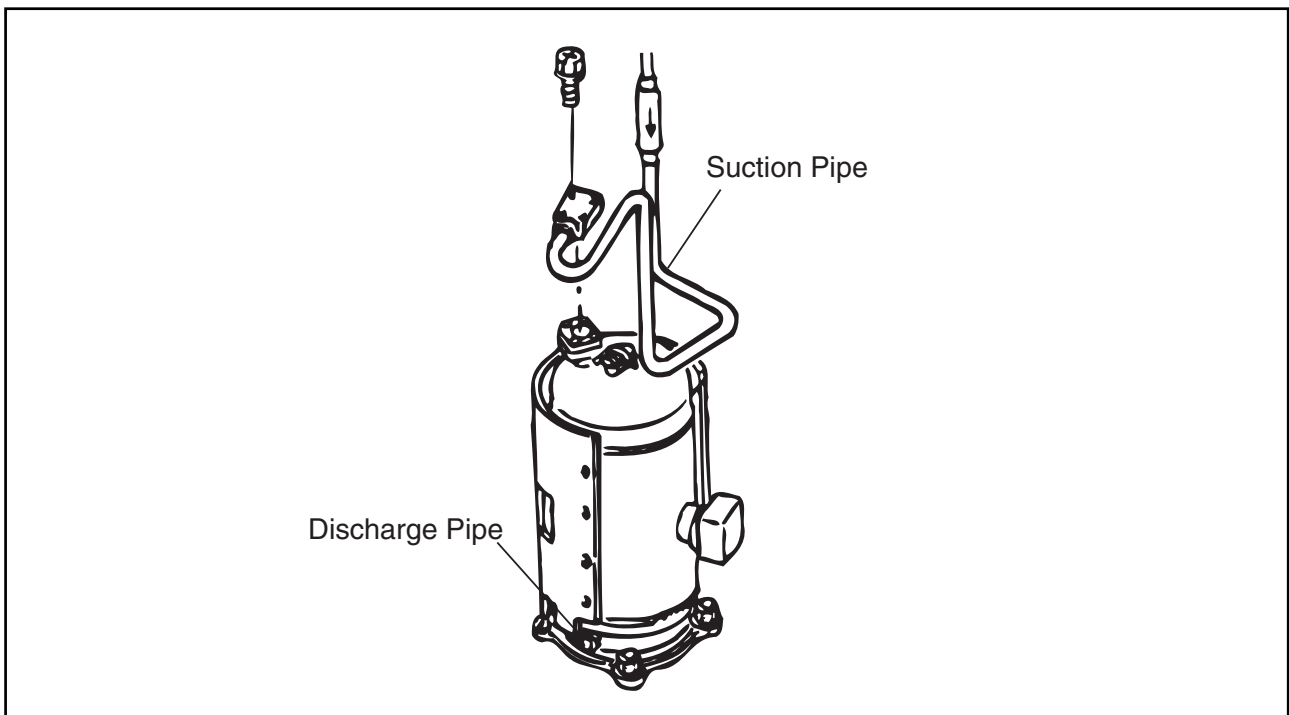
If wired wrong when reassembling, the compressor will be damaged due to reverse rotation.



- (6) Remove the suction pipe (connecting flange with four bolts) and discharge pipe (connecting with flare nut).

Tool

Adjustable Wrench or Spanner,  
Phillips Screwdriver



**! WARNING**

**TURN OFF all power source switches.**

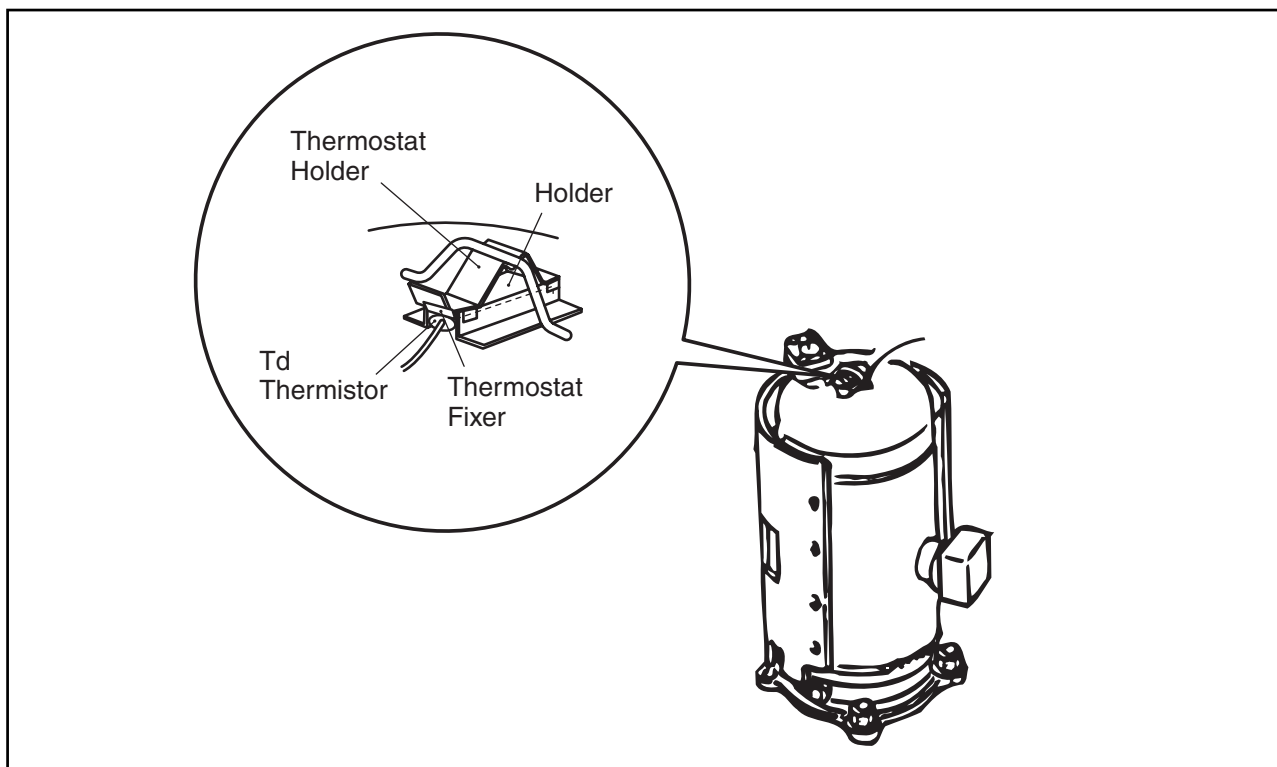
- (7) Remove Td thermistor on the top of compressor.  
Td thermistor is inside of the compressor cover.

**NOTE:**

The thermostat fixer, holder, thermostat holder and holder for Td thermistor are used again when reassembling.

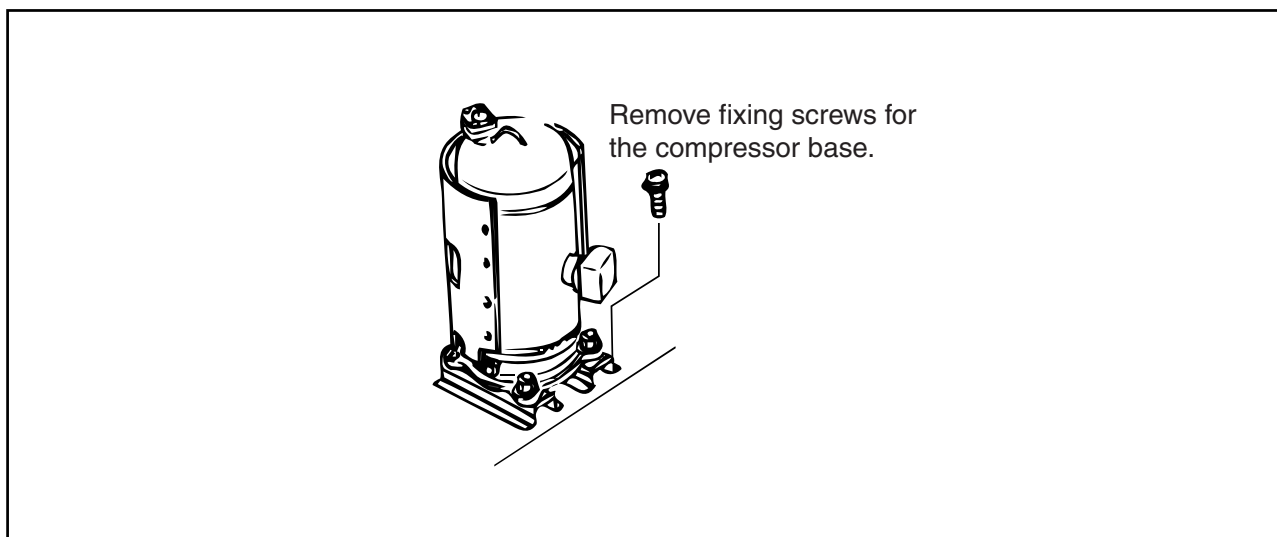
Keep them in a box so that the parts are stored correctly.

Tool	Adjustable Wrench or Spanner, Phillips Screwdriver
------	---



- (8) Remove the 2 screws fixing the compressor base.  
(The compressor base is fixed by 2 screws at front of the unit.)

Tool	Adjustable Wrench or Spanner, Phillips Screwdriver
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## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

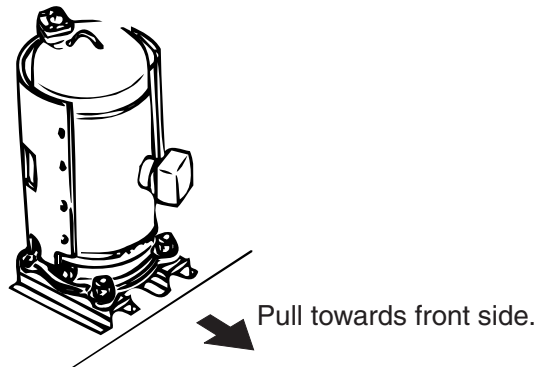
**TURN OFF all power source switches.**

- (9) Draw the compressor and remove it.  
Check to ensure that the compressor dose not come off the fixing base at this work.

**NOTE:**

Do not remove the water-proof cover, oil heater and slide base from the compressor when drawing work.

Tool	Adjustable Wrench or Spanner, Phillips Screwdriver
------	---



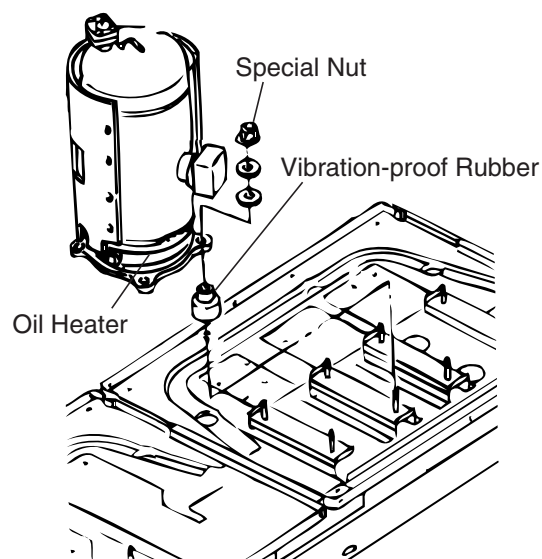
- (10) Remove the 4 special nuts, 4 vibration proof rubbers, water-proof cover, oil heater and slide bases from the compressor.

**NOTE:**

The special nuts, vibration proof rubbers, slide bases, oil heater and water-proof cover are used again when reassembling.

Keep them in a box so that the parts are stored correctly.

Tool	Adjustable Wrench or Spanner, Phillips Screwdriver
------	---



**! WARNING**

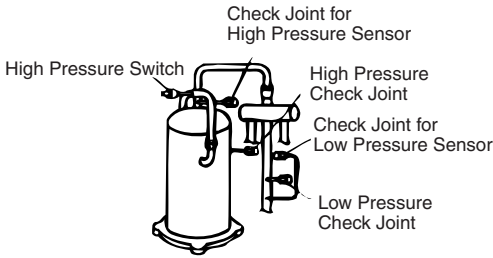
**TURN OFF all power source switches.**

**2.1.9 Removing High Pressure Switch, High Pressure Sensor and Low Pressure Sensor**

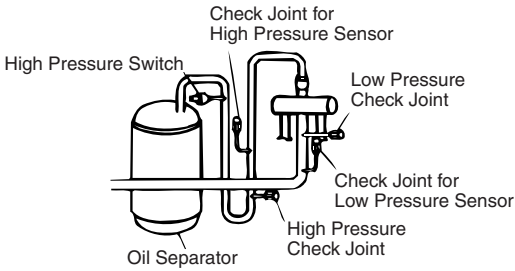
- (1) Remove the front service panel according to item 2.1.2 "Removing Front Service Panel".
- (2) Collect all refrigerant from the low pressure side check joint when the high pressure switch is removed. Use two spanners when removing the pressure sensor.

Tool	Adjustable Wrench or Spanner and Charge-Hose
------	--

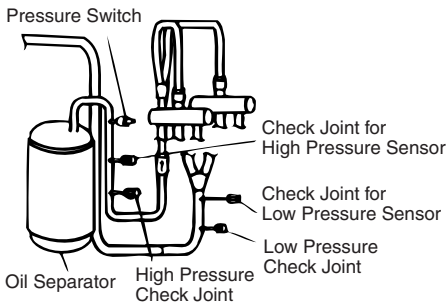
● RAS-5FSG and RAS-5FS3



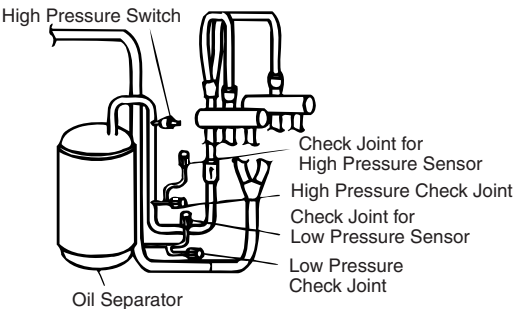
● RAS-8FSG, RAS-10FSG, RAS-8FS3 and RAS-10FS3



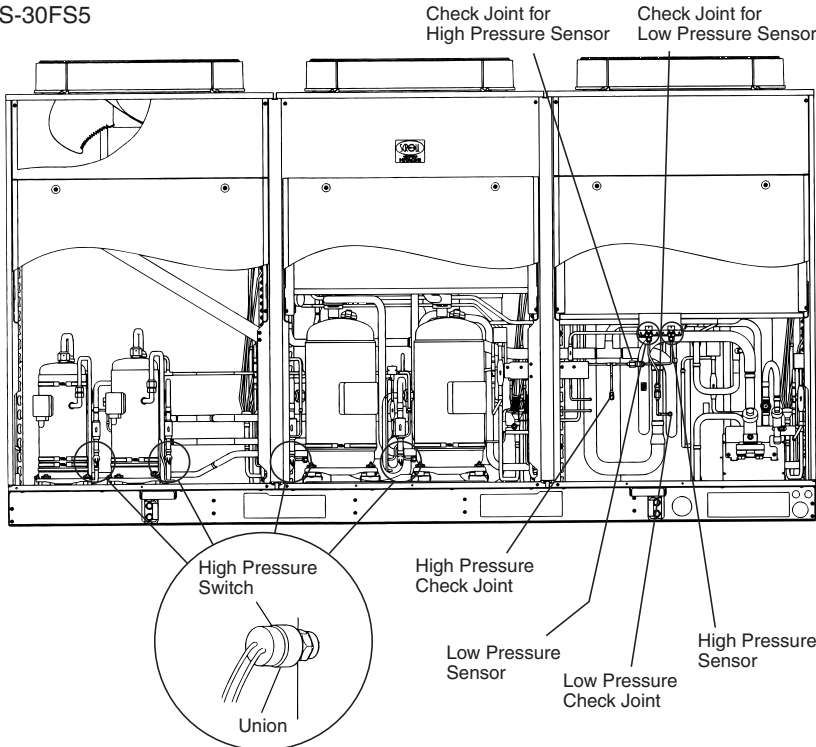
● RAS-16FSG, RAS-20FSG, RAS-16FS3 and RAS-20FS3



● RAS-8FXG, RAS-10FXG, RAS-8FX3 and RAS-10FX3



● RAS-24FSG1, RAS-30FSG1, RAS-24FS5 and RAS-30FS5



## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

**TURN OFF all power source switches.**

A-1. Removing High Pressure Switch (RAS-5FSG, RAS-8FSG, RAS-10FSG, RAS-5FS3, RAS-8FS3, RAS-10FS3, RAS-8FXG, RAS-10FXG, RAS-8FX3 and RAS-10FX3)

- (1) Disconnect the faston terminals.
- (2) Remove the high pressure switch from the brazing part of the discharge pipe by a burner.

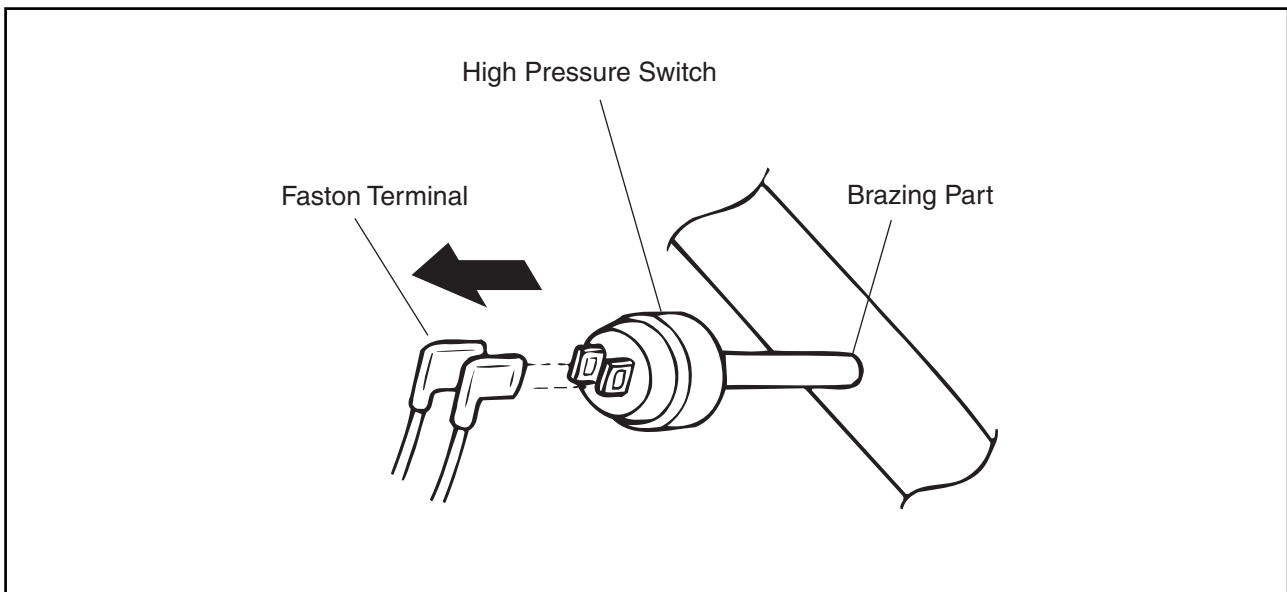
**NOTE:**

Do not expose the refrigeration cycle to the atmosphere for a long period to avoid mixing of water and foreign particles into the refrigeration cycle.

If exposed for a long period, seal the hole.

Tool

Adjustable Wrench or Spanner,  
Phillips Screwdriver



A-2. Removing High Pressure Switch (RAS-16FSG, RAS-20FSG, RAS-16FS3, RAS-20FS3, RAS-24FSG1, RAS-30FSG1, RAS-24FS5 and RAS-30FS5)

- (1) Disconnect the high pressure switch from the union.

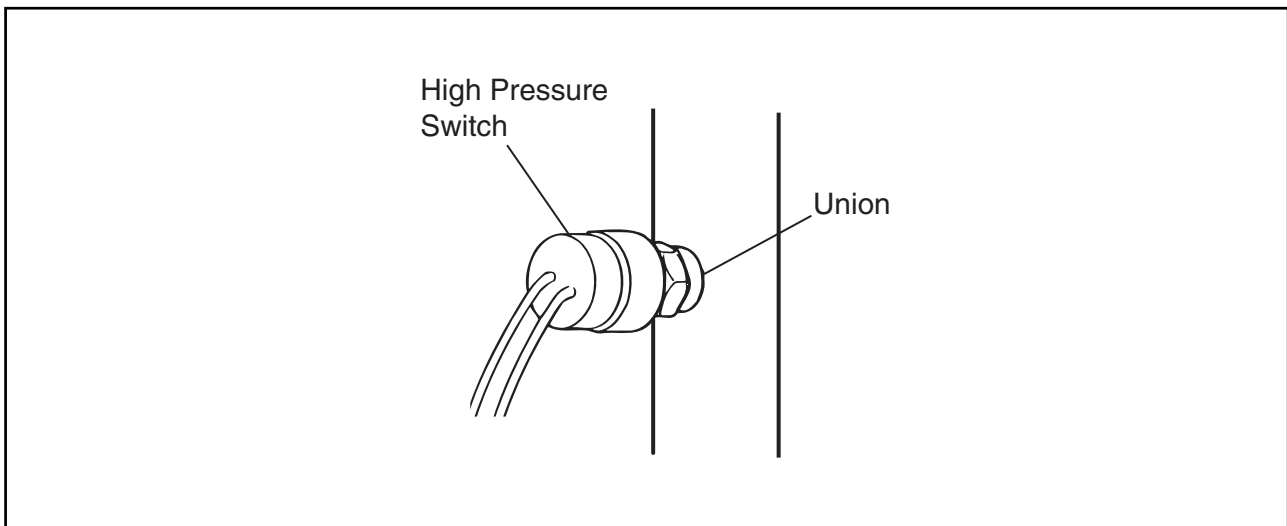
**NOTE:**

Do not expose the refrigeration cycle to the atmosphere for a long period to avoid mixing of water and foreign particles into the refrigeration cycle.

If exposed for a long period, seal the hole.

Tool

Adjustable Wrench or Spanner,  
Phillips Screwdriver





**! WARNING**

**TURN OFF all power source switches.**

**B. Removing High Pressure Sensor and Low Pressure Sensor**

- (1) Remove the water-proof caps.

**NOTE:**

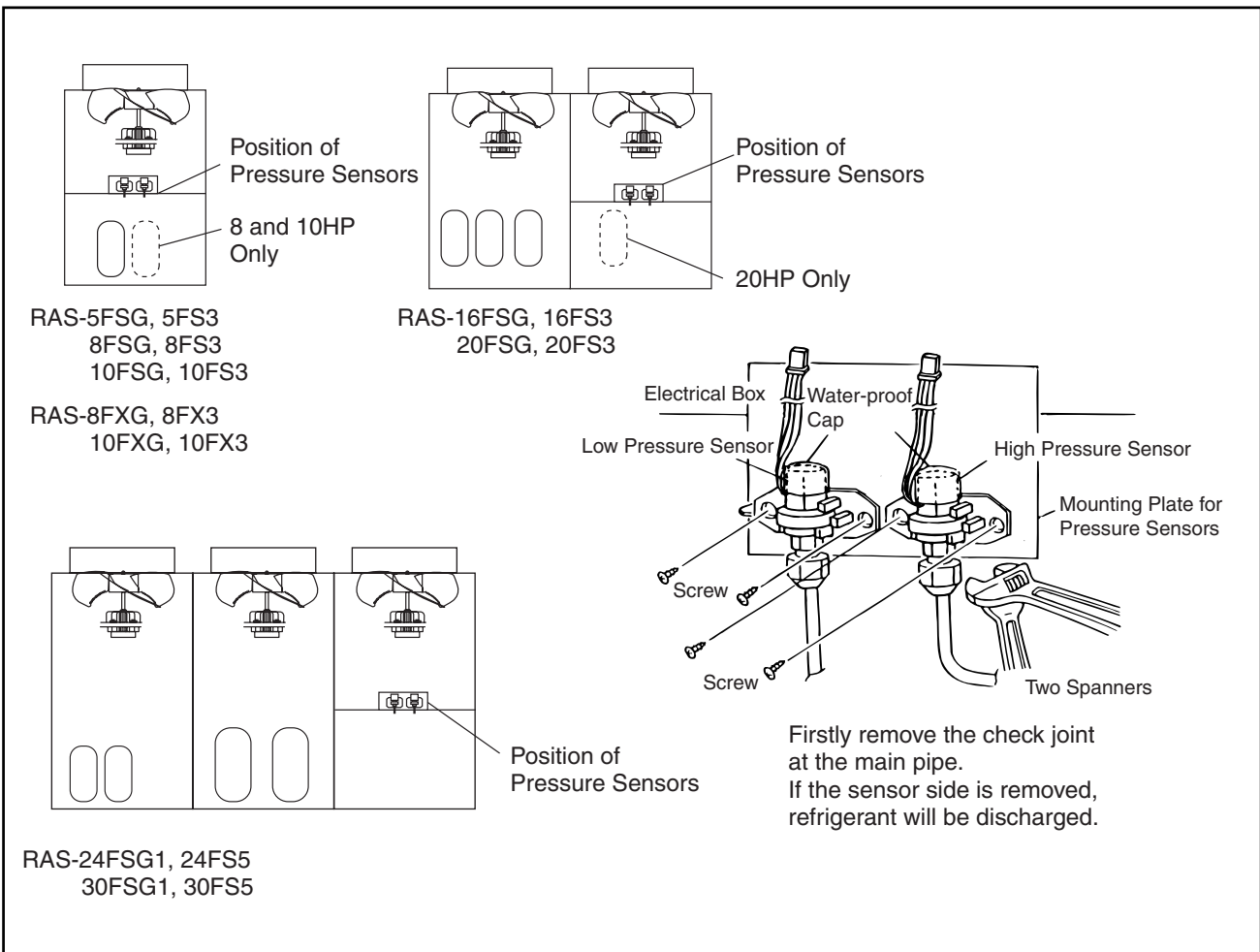
The water-proof caps are used after replacing pressure sensors.

- (2) Remove the pipe of the high pressure sensor or low pressure sensor using two spanners. Firstly, remove the check joint at the main pipe side as shown figure in 2.1.9.
- (3) Remove the connector for the pressure sensors.
- (4) Remove the high pressure sensor or low pressure sensor after removing each two (2) fixing screws for the pressure sensors.

**NOTE:**

Put the water-proof caps on the pressure sensors again after replacing pressure sensors.

Tool	Adjustable Wrench or Spanner, Phillips Screwdriver
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## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

**TURN OFF all power source switches.**

#### 2.1.10 Removing Coil for Reversing Valve Coil

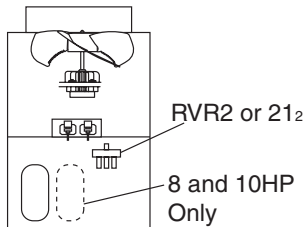
# ! DANGER

**Do not touch the electrical parts when the LED3 (Red) on the SNUBBER PCB (PCB5) or the LED2 (Red) on the Inverter PCB (PCB3) is lit, since the voltage is higher than 50V.**

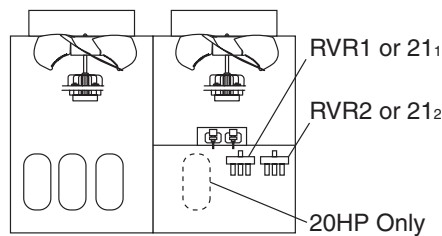
- (1) Remove the front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Remove the coil for the reversing valve as shown below.

Tool

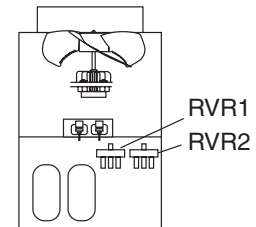
Adjustable Wrench, Spanner,  
Phillips Screwdriver



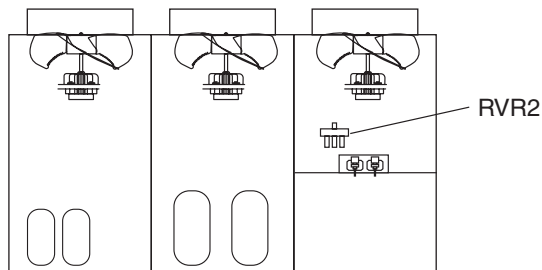
RAS-5FSG, 5FS3  
8FSG, 8FS3  
10FSG, 10FS3



RAS-16FSG, 16FS3  
20FSG, 20FS3

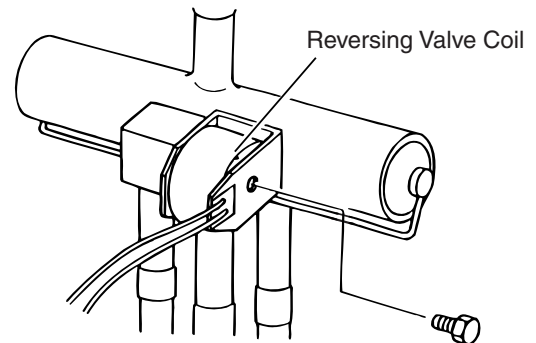


RAS-8FXG, 8FX3  
10FXG, 10FX3



RAS-24FSG1, 24FS5  
30FSG1, 30FS5

The arrow mark ( ) indicates the position of the reversing valve coil.  
The figure is the front view one.



**! WARNING**

**TURN OFF all power source switches.**

2.1.11 Removing Coil for Solenoid Valve Coil

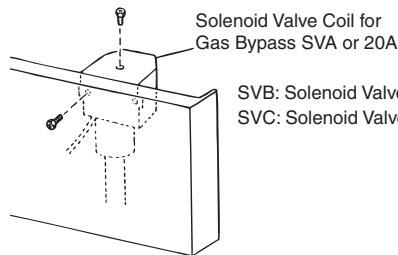
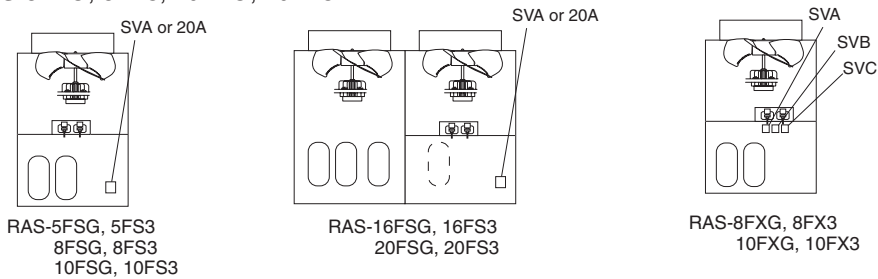
**! DANGER**

**Do not touch the electrical parts when the LED3 (Red) on the SNUBBER PCB (PCB5) or the LED2 (Red) on the Inverter PCB (PCB3) is lit, since the voltage is higher than 50V.**

- (1) Remove the front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Remove the fixing screw (1 piece) for solenoid valve coil.
- (3) Remove the solenoid valve coil after removing the fixing screw (1 piece) for the solenoid valve.

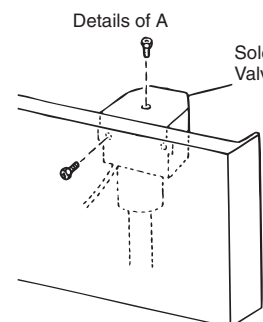
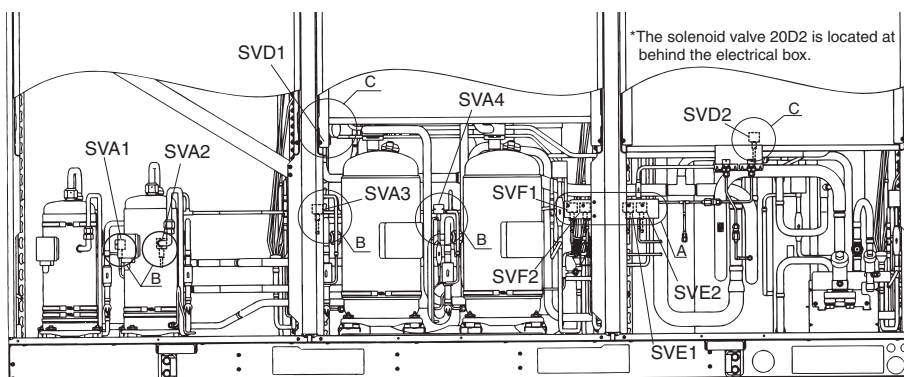
Tool	Adjustable Wrench, Spanner, Phillips Screwdriver
------	--

- RAS-5FSG, 5FS3, 8FSG, 8FS3, 10FSG, 10FS3, 16FSG, 16FS3, 20FSG and 20FS3  
RAS-8FXG, 8FX3, 10FXG, 10FX3

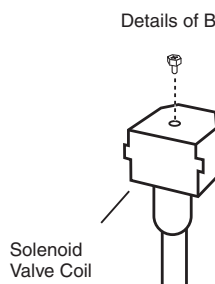


SVB: Solenoid Valve Coil for Liquid Bypass (Only for FX Series)  
SVC: Solenoid Valve Coil for Liquid Bypass (Only for FX Series)

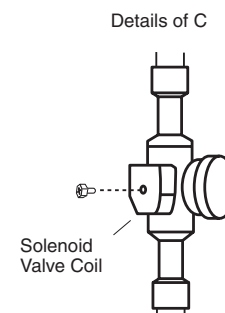
- RAS-24FSG1, 30FSG1, 24FS5 and 30FS5



SVF1, SVF2...for Oil Return  
SVE1, SVE2...for Heat Exchanger



SVA1 to SVA4...for Gas Bypass



SVD1, SVD2...for Heat Exchanger Change

## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

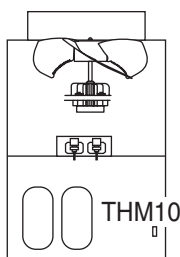
**TURN OFF all power source switches.**

#### 2.1.12 Removing Thermistor for Liquid Pipe

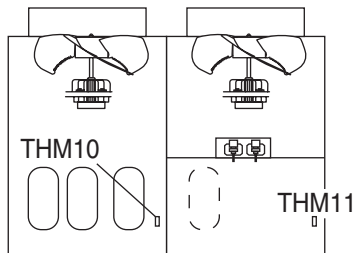
# ! DANGER

**Do not touch the electrical parts when the LED3 (Red) on the SNUBBER PCB (PCB5) or the LED2 (Red) on the Inverter PCB (PCB3) is lit, since the voltage is higher than 50V.**

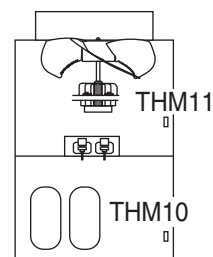
- (1) Remove the front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Remove two (2) screws fixing the electrical box cover and remove the electrical box cover.
- (3) Pull out the fixing plate for the thermistor from the pipe after detaching the CORK TAPE, and remove the thermistor for the liquid pipe.



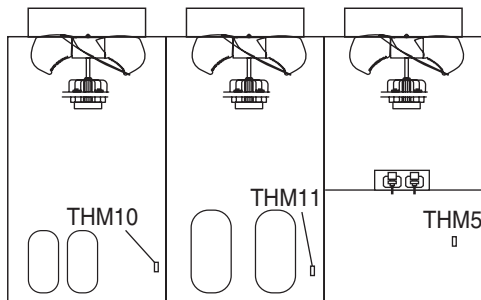
RAS-5FSG, 5FS3  
8FSG, 8FS3  
10FSG, 10FS3



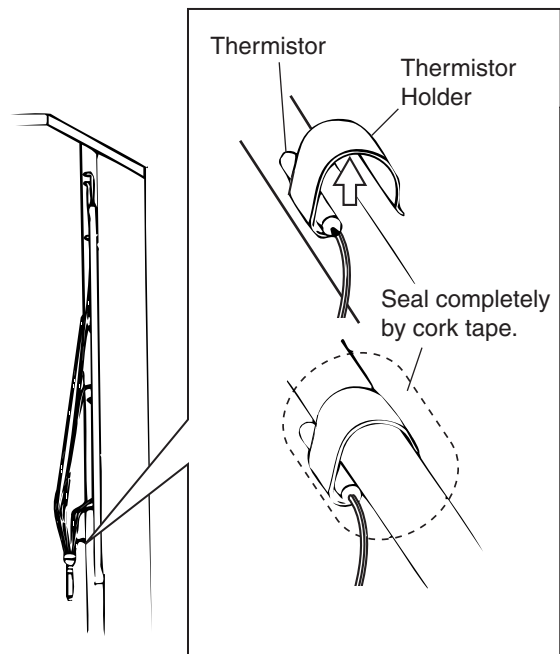
RAS-16FSG, 16FS3  
20FSG, 20FS3



RAS-8FXG, 8FX3  
10FXG, 10FX3



RAS-24FSG1, 24FS5  
30FSG1, 30FS5



**! WARNING**

**TURN OFF all power source switches.**

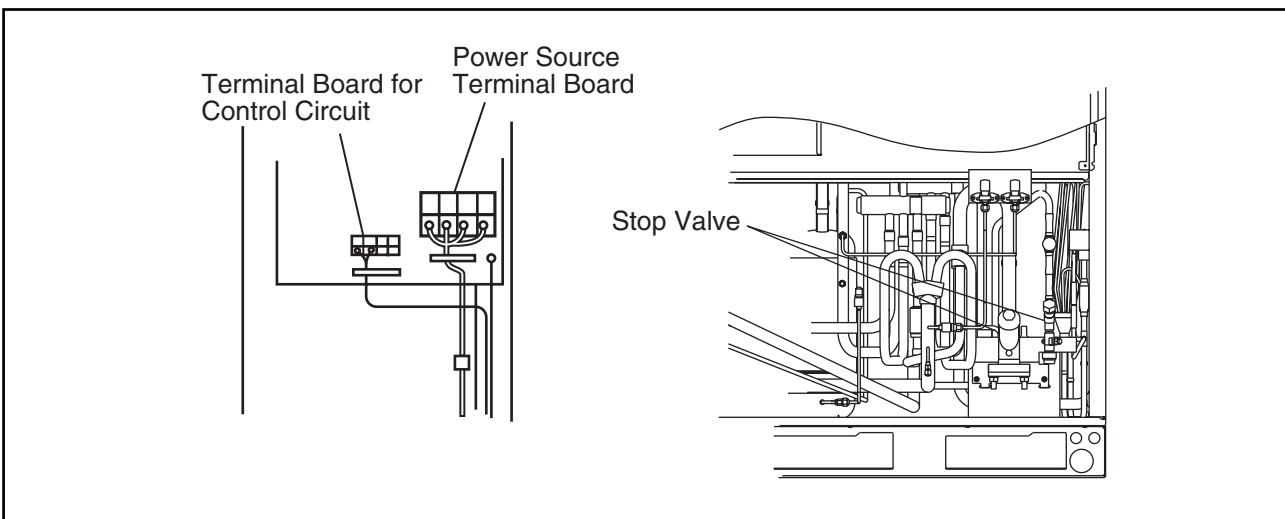
2.1.13 Removing Reversing Valve

(RAS-5FSG, RAS-8FSG, RAS-10FSG, RAS-16FSG, RAS-20FSG, RAS-5FS3, RAS-8FS3, RAS-10FS3, RAS-16FS3, RAS-20FS3, RAS-8FXG, RAS-10FXG, RAS-8FX3 and RAS-10FX3)

Before starting this work, collect refrigerant into a cylinder from the cycle and turn off all power source switches.

- (1) Remove the front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Remove the electrical box cover according to the item 2.1.15 "Removing Electrical Components".
- (3) Remove all the field wiring at the terminal board for control between the indoor and outdoor units, and power source terminal board.
- (4) Disconnect the wiring connections and check to ensure that all stop valves are open.

Tool	Phillips Screwdriver, Spanner, Hexagon Wrench, Wet Cloth, Burner, Pliers
------	--

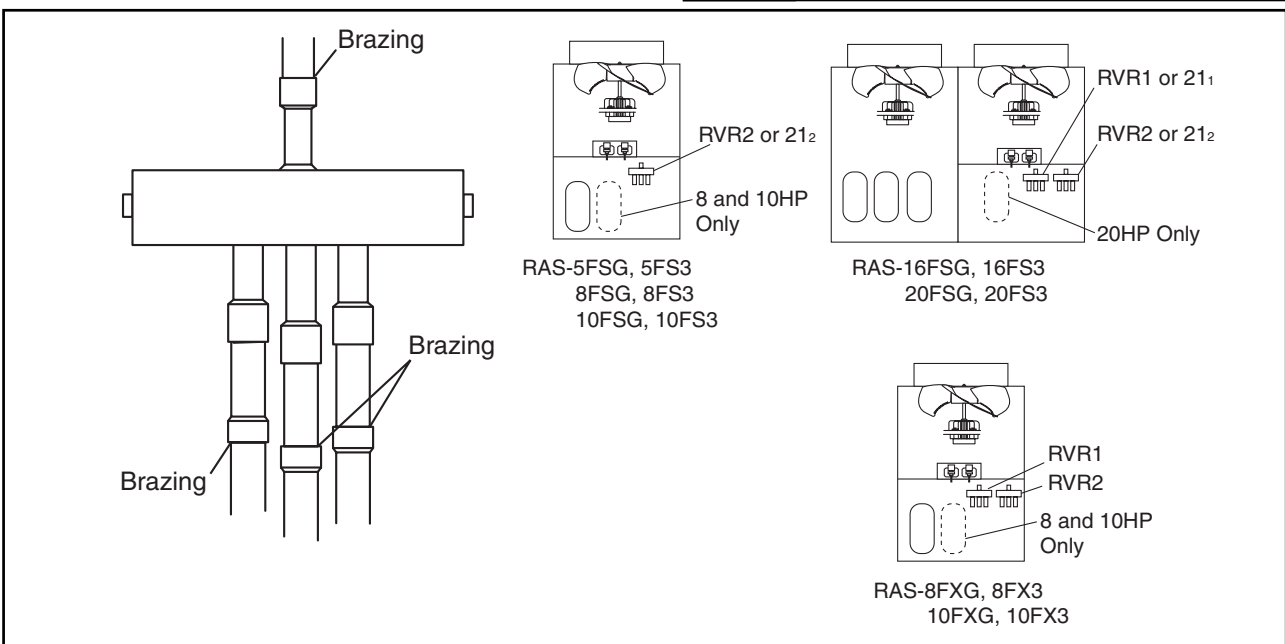


- (5) Disconnect the following to remove the reversing valve.
  - (a) Brazing Portion between Reversing Valve and Discharge Pipe.
  - (b) Brazing Portion of the Right and the Left Pipes of Three Pipes from the Reversing Valve.
  - (c) Brazing Portion of the Center Pipe of Three Pipes from the Reversing Valve

**NOTE:**

Cover the reversing valve with wet cloth to protect it from excessively high temperature by a burner.

Tool	Phillips Screwdriver, Spanner, Hexagon Wrench, Wet Cloth, Burner, Pliers
------	--



**! WARNING**

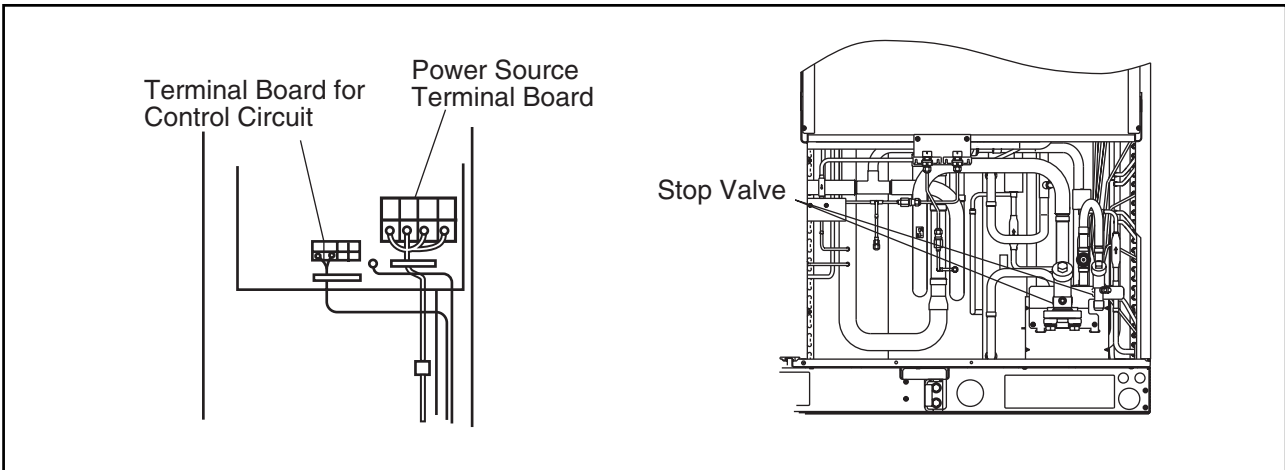
**TURN OFF all power source switches.**

**2.1.14 Removing Reversing Valve (RAS-24FSG1, RAS-30FSG1, RAS-24FS5 and RAS-30FS5)**

Before starting this work, collect refrigerant into a cylinder from the cycle and turn off all power source switches.

- (1) Remove the front service panel according to the item 2.1.2 "Removing Front Service Panel".
- (2) Remove the electrical box cover according to the item 2.1.15 "Removing Electrical Components".
- (3) Remove all the field wiring at the terminal board for control between the indoor and outdoor units, and power source terminal board.
- (4) Disconnect the wiring connections and check to ensure that two stop valves are open.

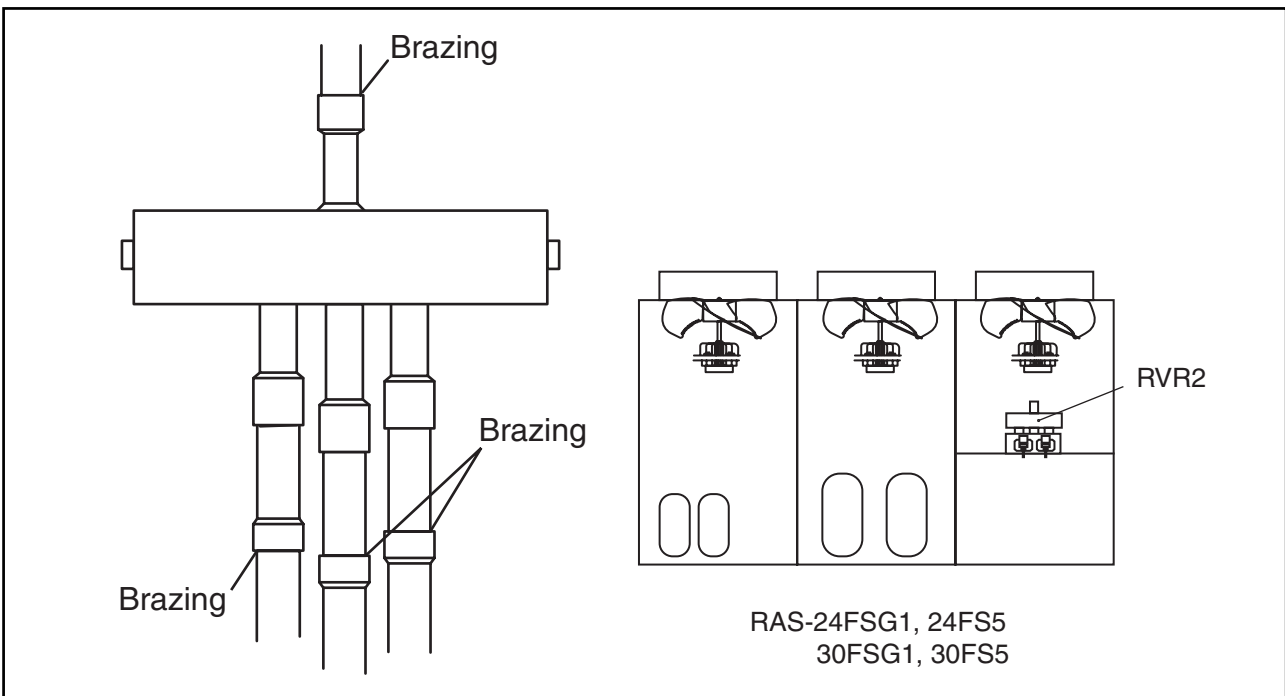
Tool	Phillips Screwdriver, Spanner, Hexagon Wrench, Wet Cloth, Burner, Pliers
------	--



- (5) Disconnect the following to remove the reversing valve.
  - (a) Brazing Portion between Reversing Valve and Discharge Pipe.
  - (b) Brazing Portion of the Right and the Left Pipes of Three Pipes from the Reversing Valve.
  - (c) Brazing Portion of the Center Pipe of Three Pipes from the Reversing Valve

**NOTE:**  
Cover the reversing valve with wet cloth to protect it from excessively high temperature by a burner.

Tool	Phillips Screwdriver, Spanner, Hexagon Wrench, Wet Cloth, Burner, Pliers
------	--



**! WARNING**

**TURN OFF all power source switches.**

2.1.15 Removing Electrical Components

(RAS-5FSG, RAS-8FSG, RAS-10FSG, RAS-16FSG, RAS-20FSG, RAS-5FS3, RAS-8FS3, RAS-10FS3, RAS-16FS3, RAS-20FS3, RAS-8FXG, RAS-10FXG, RAS-8FX3 and RAS-10FX3)

**! DANGER**

**Do not touch the electrical parts when the LED3 (Red) on the SNUBBER PCB (PCB5) or the LED2 (Red) on the Inverter PCB (PCB3) is lit, since the voltage is higher than 50V.**

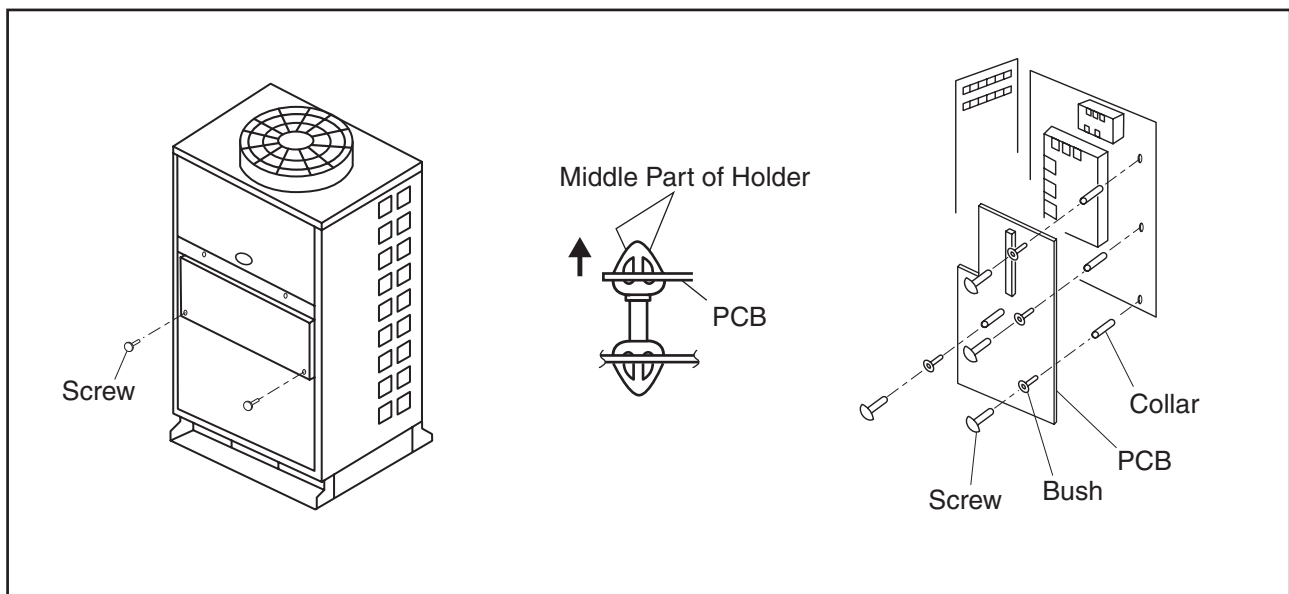
**! WARNING**

1. When replacing transistor module (IPM) and diode module (DM) on heat radiation fins, spread silicone grease (made by Shinetsu Chemical Co., G746) lightly over the surface touching fins.
2. Identify terminals Nos. with the mark band Nos. when reassembling. If incorrectly connected, malfunctions or damages of electric components will occur.
3. Correctly insert two wires of U and V phases for the power cable of Inv. Comp. into the current sensor, CTU and CTV on PCB3. Connect the U phase of the power cable and U phase of the current sensor as a combination, and the V phase of the power cable and V phase of the current sensor as a combination respectively. If incorrectly connected, malfunction or damages will occur.
4. Do not clamp electrical wires between a mounting electric component and plates or electric parts when a PCB is remounted.
5. Screws, bushes and collars are used to fix the inverter PCB. Check to ensure that the bushes and collars are used when fixing the inverter PCB again. If not used, it may cause malfunction.
6. In the case that the control PCB is replaced, set all the dip switch at the same position as the original ones were. If not set, malfunction may occur.
7. Do not apply a strong force to electric components and PCBs to avoid damages.

(1) Removing PCBs

- (a) Remove two (2) screws fixing the electrical box cover and remove the electrical box cover.
- (b) Disconnect the connector connected to the PCB and clamp the middle portion of the holder by pinchers and pull it out. Pull the PCB by applying a force by finger to the portion near the holder of the PCB from the rear side.
- (c) Replacing Inverter PCB (PCB3)  
After removing four (4) M3 screws and remove bushes and collars from the PCB.  
When remounting, firmly mount the bushes and collars.

Tool	Phillips Screwdriver, Pincher
------	-------------------------------



**! WARNING**

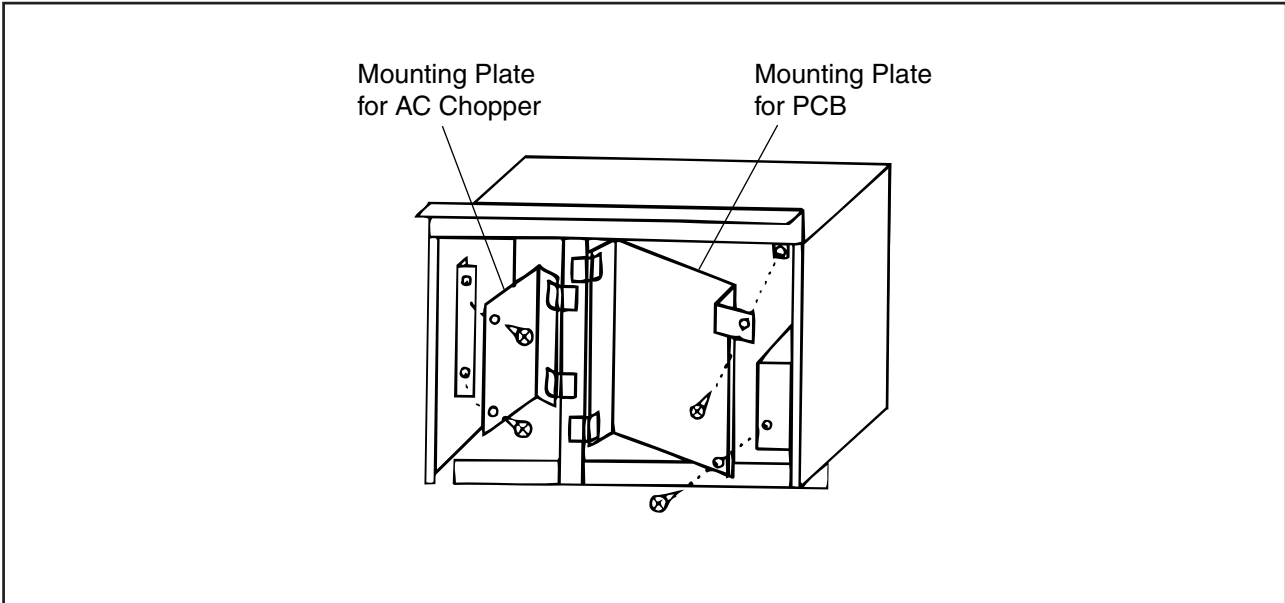
**TURN OFF all power source switches.**

(2) Others

Other parts located at the rear side of PCB mounting plate and AC chopper mounting plate should be replaced as follows.

- (a) Remove two (2) screws fixing the mounting plate for the PCB and turn the plate towards the front side.
- (b) Remove two (2) screws fixing the mounting plate for the AC chopper and turn the plate towards the front side.

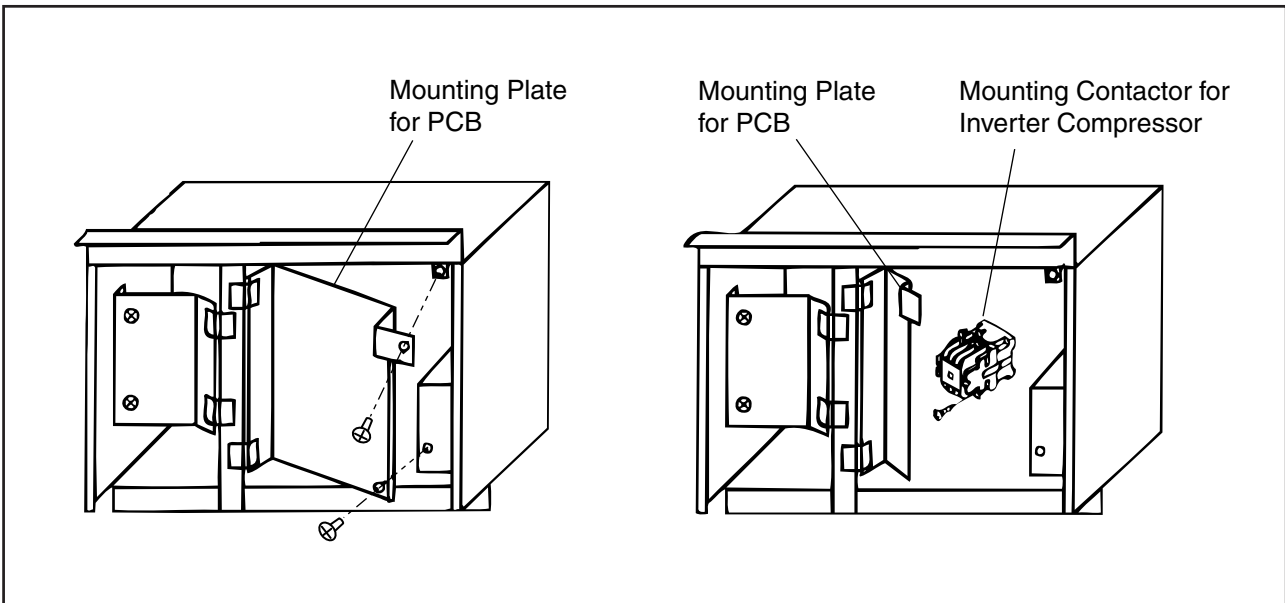
Tool	Phillips Screwdriver
------	----------------------



(3) Removing Magnetic Contactor for Inverter Compressor

- (a) Remove two (2) screws fixing the mounting plate for the PCB and turn the plate towards the front side.
- (b) Remove two (2) screws fixing the magnetic contactor for inverter compressor.

Tool	Phillips Screwdriver
------	----------------------





**! WARNING**

**TURN OFF all power source switches.**

## 2.1.16 Removing Electrical Components (RAS-24FSG1, RAS-30FSG1, RAS-24FS5 and RAS-30FS5)

**! DANGER**

**Do not touch the electrical parts when the LED201 (Red) on the ISPM(1) is lit, since the voltage is higher than 50V.**

**! WARNING**

1. When replacing inverter system power module (ISPM for 380-415/380V 50/60Hz, ISPM1 and ISPM2 for 220V 60Hz) on heat radiation fins, spread silicone grease (made by Shinetsu Chemical Co., G746) lightly over the surface touching fins.
2. Identify terminals Nos. with the mark band Nos. when reassembling. If incorrectly connected, malfunctions or damages of electric components will occur.
3. Connect the cables of the inverter compressor correctly to ISPM(1). If incorrectly connected, malfunction or damages will occur.
4. Do not clamp electrical wires between a mounting electric component and plates or electric parts when a ISPM(1) is remounted.
5. In the case that the control PCB is replaced, set all the dip switch at the same position as the original ones were. If not set, malfunction may occur.
6. Do not apply a strong force to electric components and PCBs to avoid damages.

## (1) Removing Electrical Box

Before this work, remove the service panel according to the item 2.1.2 "Removing Front Service Panel".

- (a) Loosen two (2) screws fixing the electrical box cover and remove it.

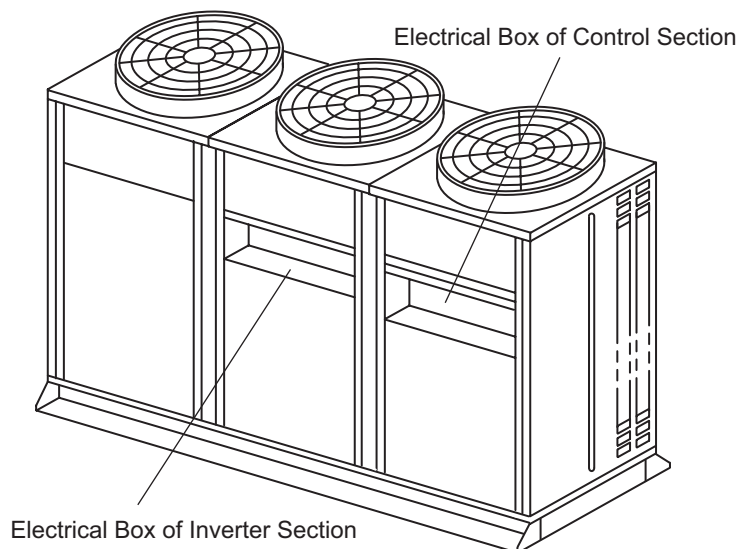
**NOTE:**

Do not remove screws for the electrical box cover so that it does not fall off.

- (b) Loosen clamps for the electrical wiring.
- (c) Disconnect the connectors connected to the PCB.
- (d) Remove the compressor cables, power source cables and operation wires from electrical box.
- (e) Disconnect the connectors for fan motor.
- (f) Lift up the electrical box and unhook it from the side cover. Draw the electrical box forwards.  
(Check to ensure that the cables does not pull with a great force.)

Tool

Phillips Screwdriver, Pincher



**! WARNING**

**TURN OFF all power source switches.**

(2) Removing PCB (Electrical Box for Control)

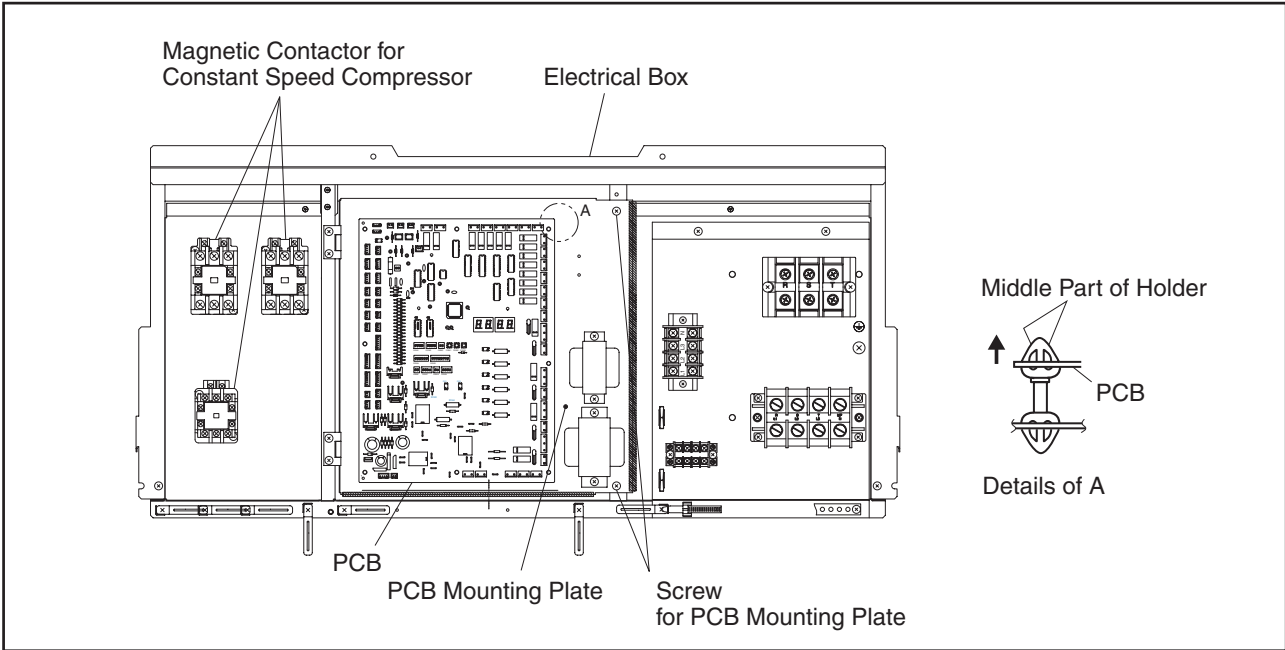
Before this work, remove the right side front cover according to the item 2.1.2 "Removing Front Service Panel".

- (a) Disconnect the connectors connected to the PCB and clamp the middle portion of the holder by pinchers and pull it out.

NOTES:

1. Do not touch the electrical part of the PCB.
2. Do not apply a great force to the PCB.

Tool	Phillips Screwdriver, Pincher, Nippers
------	--

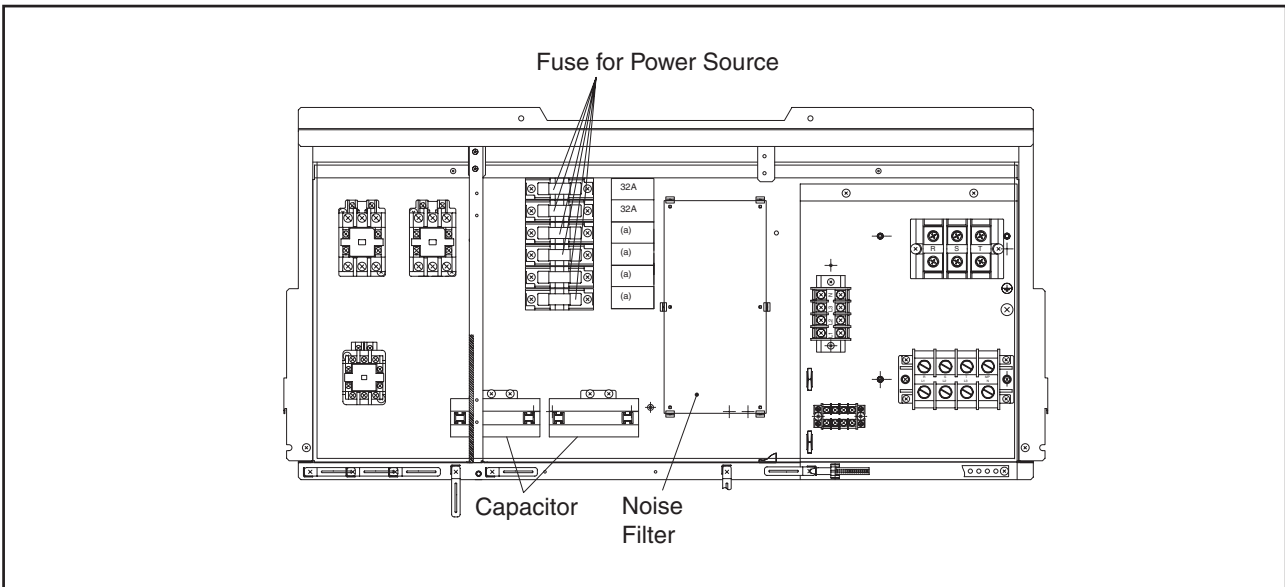


(3) Removing Other Electrical Parts (Electrical Box for Control)

Before this work, remove the right side front cover according to the item 2.1.2 "Removing Front Service Panel".

- (a) Disconnect the cables connected to each electrical part.
- (b) Remove screws for the electrical parts mounting.
- (c) When replace the electrical box behind the PCB mounting plate, remove two (2) screws for the PCB mounting plate and turn the plate towards the front side.

Tool	Phillips Screwdriver, Pincher, Nippers
------	--



**! WARNING**

**TURN OFF all power source switches.**

(4) Removing Other

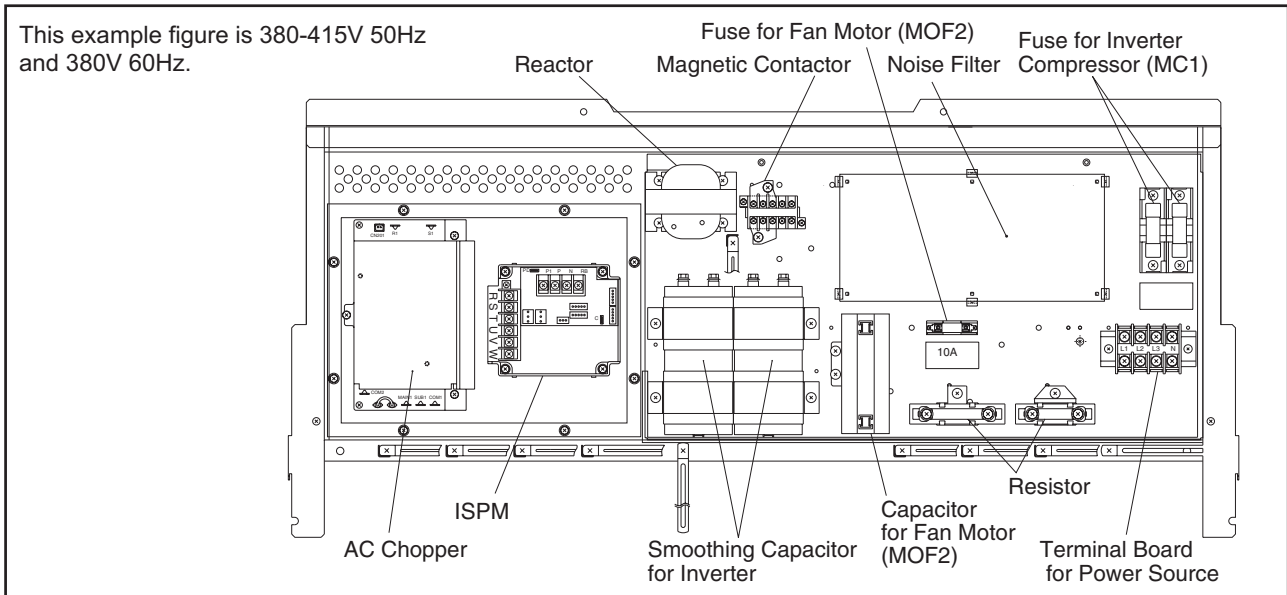
Before this work, remove the center front panel cover according to the item 2.1.2 "Removing Front Service Panel".

- (a) Disconnect the cables connected to each electrical part.
- (b) Remove screws for the electrical parts mounting.

**NOTES:**

- 1. Do not touch the electrical part of the PCB.
- 2. Do not apply a great force to the PCB.

Tool	Phillips Screwdriver, Nippers
------	-------------------------------



(5) Removing ISPM(1)

Before this work, remove the service panel according to the item 2.1.2 "Removing Front Service Panel". Check to ensure that LED201 (Red) of the ISPM(1) is off.

- (a) Loosen two (2) screws fixing the inverter electrical box cover and remove it.

**NOTE:**

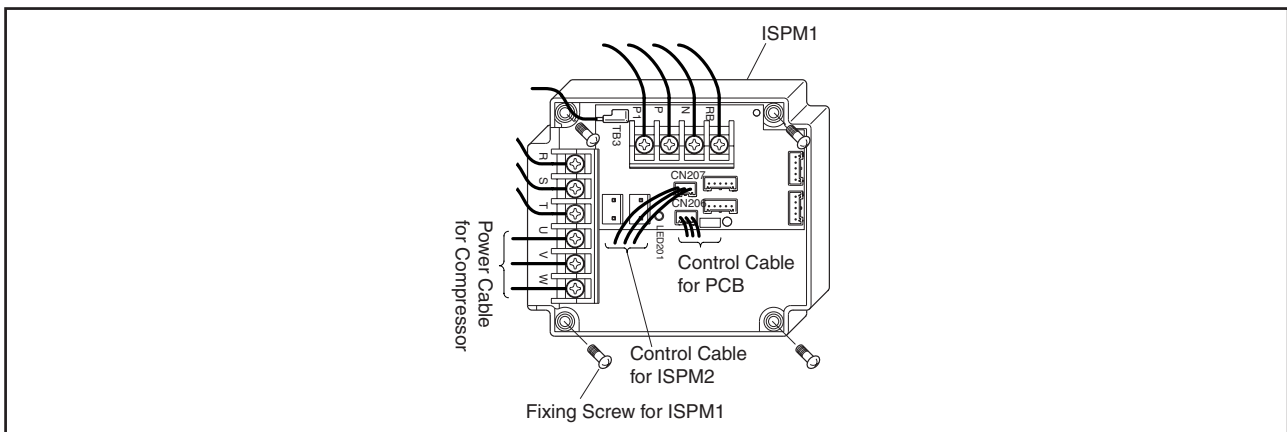
Do not remove screws for the inverter electrical box cover so that it does not fall off.

- (b) Disconnect the connectors and cables connected to the ISPM(1).
- (c) Remove four (4) screws fixing the ISPM(1) and remove it.

**NOTE:**

Do not apply a great force to the PCB otherwise the ISPM(1) will be damaged.

Tool	Phillips Screwdriver, Pincher
------	-------------------------------



**! WARNING**

**Do not touch the any electrical parts during LED201 (Red) on ISPM(1) is ON.  
If touched, electric shock will occur.**

## SERVICING

### (2.1 Outdoor Unit)

# ! WARNING

**TURN OFF all power source switches.**

(6) Removing ISPM2 (In the case of 220V/60Hz)

Before this work, remove the service cover panel according to the item 2.1.2 "Removing Front Service Panel".

- (a) Loosen two (2) screws fixing the inverter electrical box cover and remove it.

NOTE:

Do not remove screws for the inverter electrical box cover so that it does not fall off.

- (b) Disconnect the connectors and cables to the ISPM2.

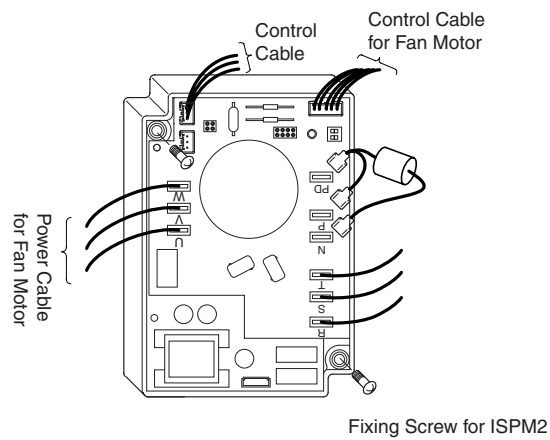
- (c) Remove two (2) screws fixing the ISPM2 and remove it.

NOTE:

Do not apply a great force to the PCB otherwise the ISPM2 will be damaged.

Tool

Phillips Screwdriver, Pincher



# ! WARNING

**Do not touch the any electrical parts during LED201 (Red) on ISPM(1) is ON.  
If touched, electric shock will occur.**

## 2.2 In-the-Ceiling Type (RPI-0.8FSG1 to RPI-5.0FSG1)

**! WARNING****TURN OFF all power source switches.**

## 2.2.1 Removing Long Life Filter

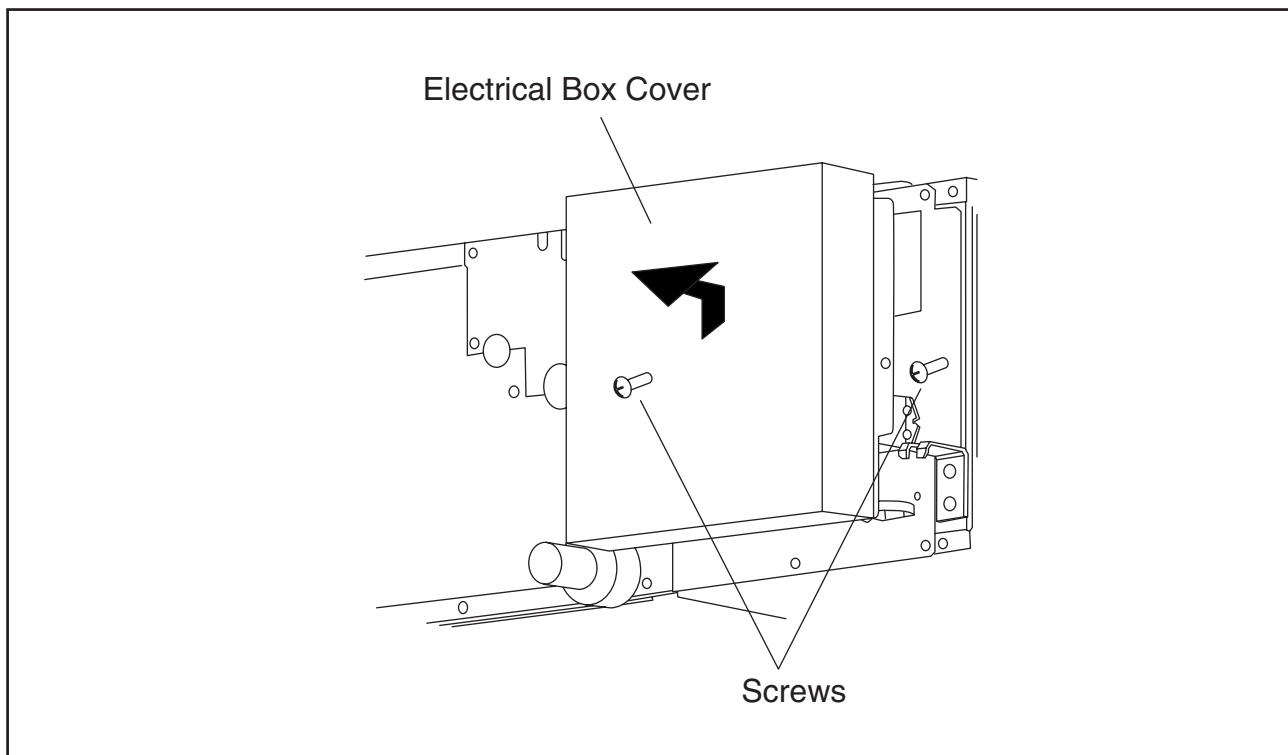
The air intake grilles are field-supplied. Therefore, there is a case that the replacement of the long life filter is not easily performed depending on the installation manners. Check it carefully.

## 2.2.2 Removing Printed Circuit Board (PCB)

- (1) Loosen two (2) M4 screws fixing the electrical box cover and remove the electrical box cover by lifting it upwards.

Tool

Phillips Screwdriver



## SERVICING

(2.2 In-the-Ceiling Type)

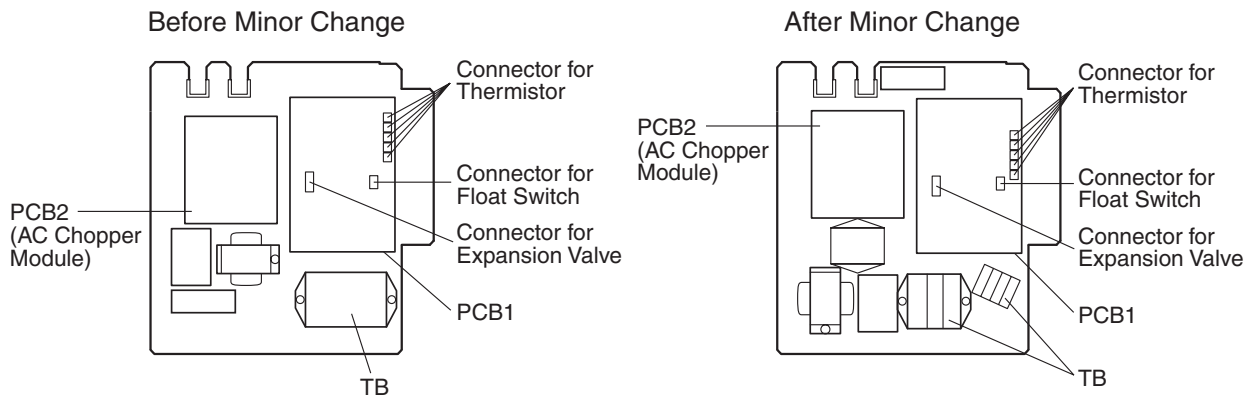
# ! WARNING

**TURN OFF all power source switches.**

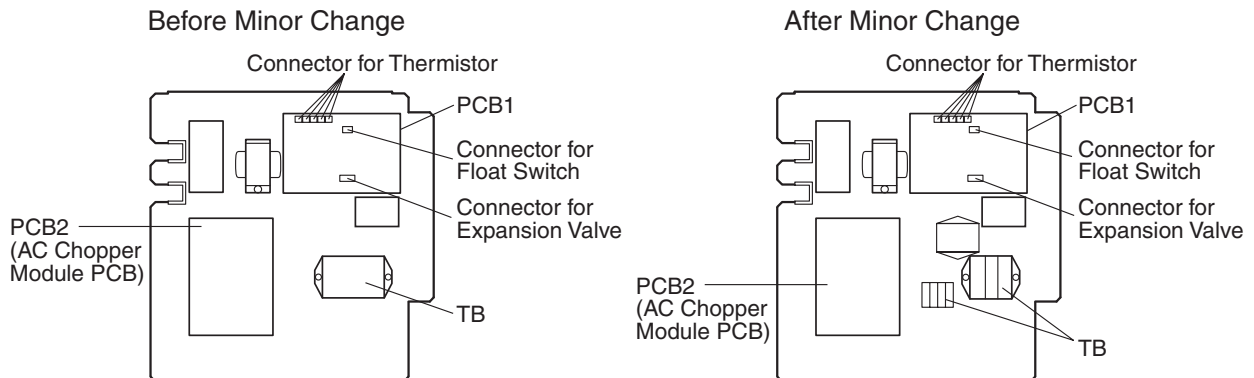
- (2) There are three (3) PCBs. The control PCB is fixed with four (4) PCB holders. Clamp the center of the PCB holders by a long-nose plier and pull out the PCB.
- (3) Remove three (3) M4 screws and remove the AC chopper module PCB.

Tool	Phillips Screwdriver, Long-nose Pliers
------	--

### ● RPI-0.8FSG1 to RPI-2.5FSG1



### ● RPI-3.0FSG1 to RPI-5.0FSG1



### **ATTENTION:**

**Do not touch any components on the PCB.**

**Do not apply excessive forces to the PCB or it will cause a malfunction.**

**! WARNING****TURN OFF all power source switches.****2.2.3 Removing Indoor Fan and Fan Motor**

The indoor fan and the fan motor for RPI-0.8 to 2.5FSG1 can be removed only from the bottom side.  
The indoor fan and the fan motor for RPI-3.0 to 5.0FSG1 can be removed from the side (electrical box side) and the bottom side.

- (1) Remove the electrical box cover according to the item 2.2.2 "Removing Printed Circuit Board (PCB)".
- (2) Free the cables inside of the electrical box.  
Disconnect the connector for the float switch electrical wiring. Disconnect the connectors for the electronic expansion valve, the gas pipe thermistor, liquid pipe thermistor, discharge gas thermistor and the fan motor from the PCB.  
(There are two (2) connectors for the fan motor. One is located on the AC chopper module PCB, and remove it.)

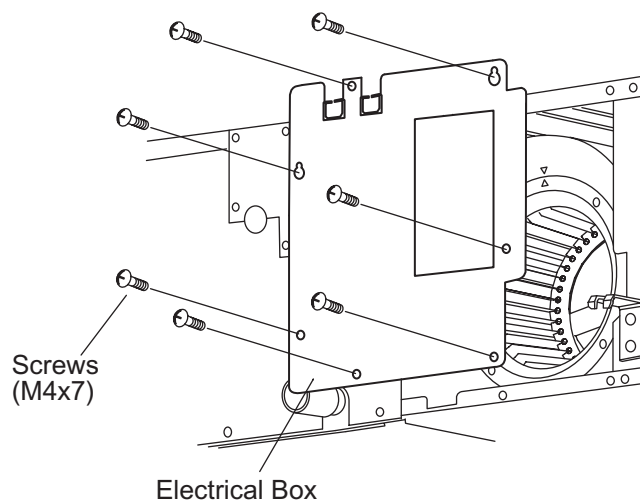
**< Removing Indoor Fan and Fan Motor from Side (Electrical Box Side) of Unit  
(Only for RPI-3.0 to 5.0FSG1)>**

Q'ty of Casing and Runner: Each 2 / Q'ty of Fan Motor: 1  
Removing them according to the following items (3) to (10).

- (3) Remove seven (7) screws fixing the electrical box and remove the electrical box.

Tool

Phillips Screwdriver



## SERVICING

(2.2 In-the-Ceiling Type)

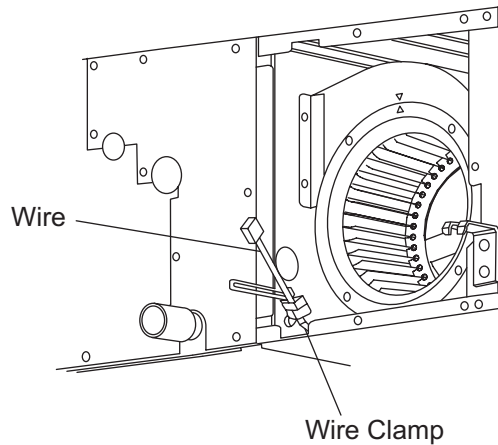
# ! WARNING

**TURN OFF all power source switches.**

- (4) Remove the electrical box and the fan motor assembly can be seen.  
Remove the wires fixed by the wire clamp on the fan motor fixing plate.

Tool

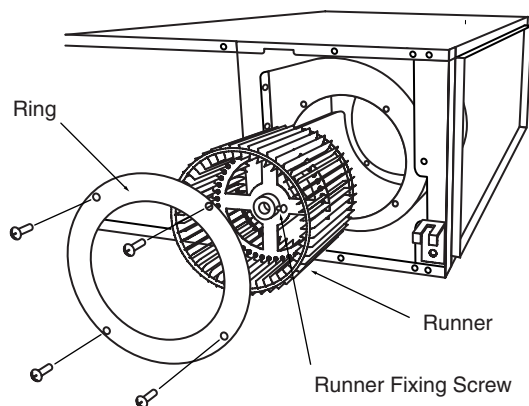
Phillips Screwdriver



- (5) Remove four (4) M4 screws fixing the casing at the side of the casing and remove the ring of the casing.

Tool

Phillips Screwdriver



- (6) Loosen the screw fixing the fan runner onto the fan motor shaft by the adjustable wrench and pull out the fan runner.

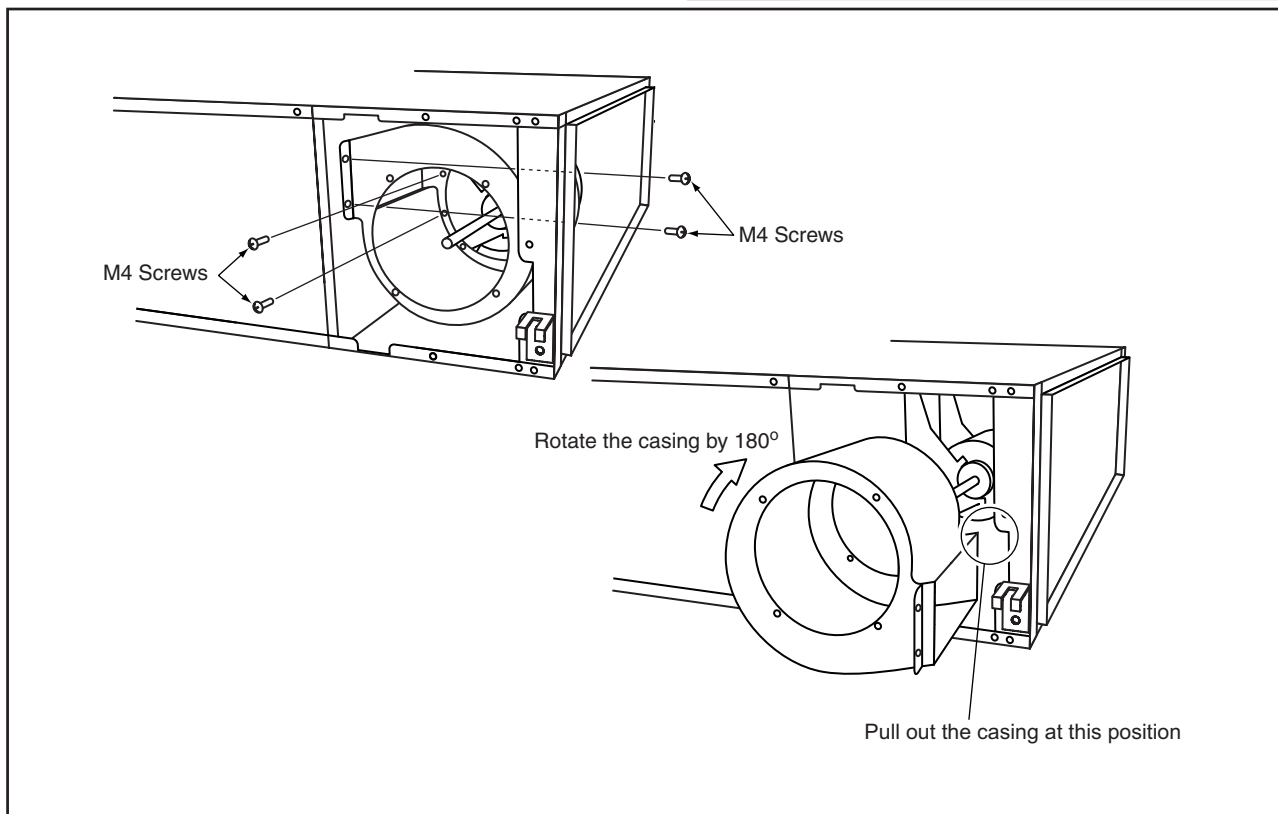


**! WARNING****TURN OFF all power source switches.**

- (7) Remove four (4) screws fixing the casing onto the motor fixing plate and pull out the casing. When pulling out the casing, turn the casing by an angle of 180°.

Tool

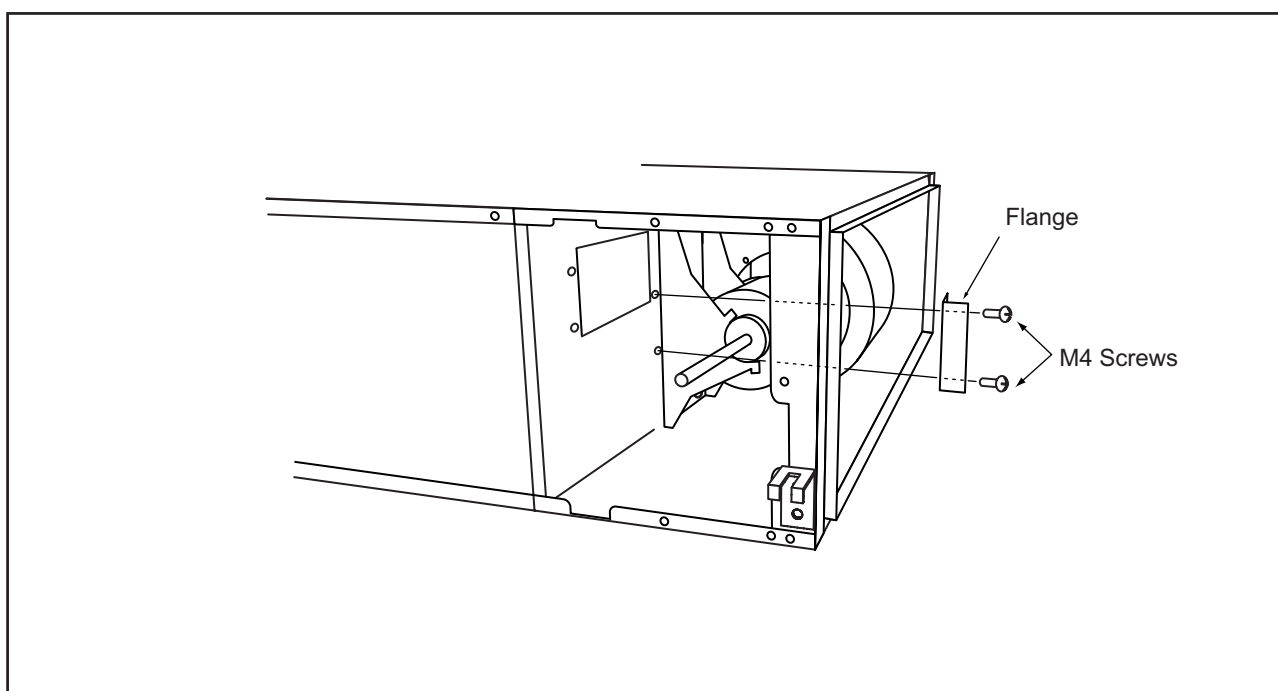
Phillips Screwdriver



- (8) Remove two (2) M4 screws fixing the flange in front of the fan motor and remove the flange.

Tool

Phillips Screwdriver



## SERVICING

(2.2 In-the-Ceiling Type)

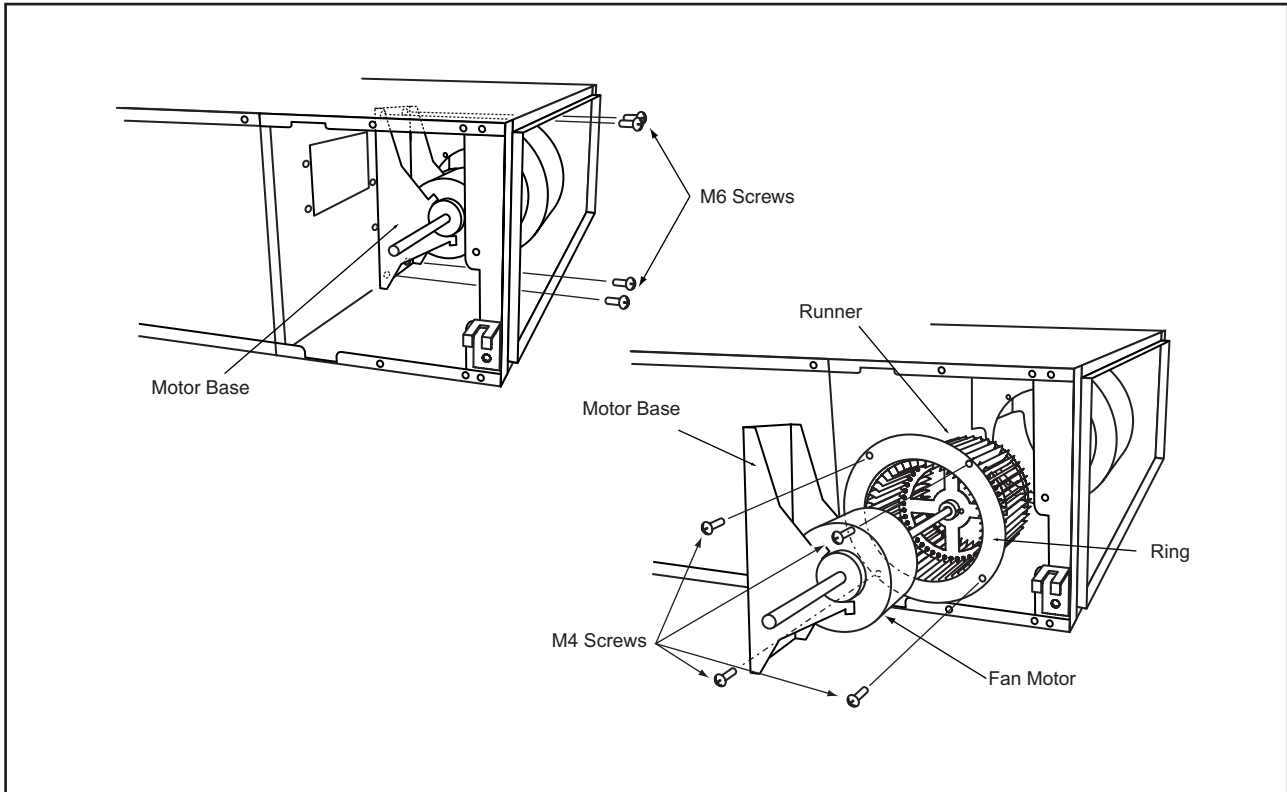
# ! WARNING

**TURN OFF all power source switches.**

- (9) Remove two (2) lower M6 screws fixing the motor base and loosen the upper two (2) M6 screws.  
(10) Remove four (4) M4 screws fixing the ring of the casing at the rear side of the fan motor and remove the motor base, the ring and the runner at the same time.

Tool

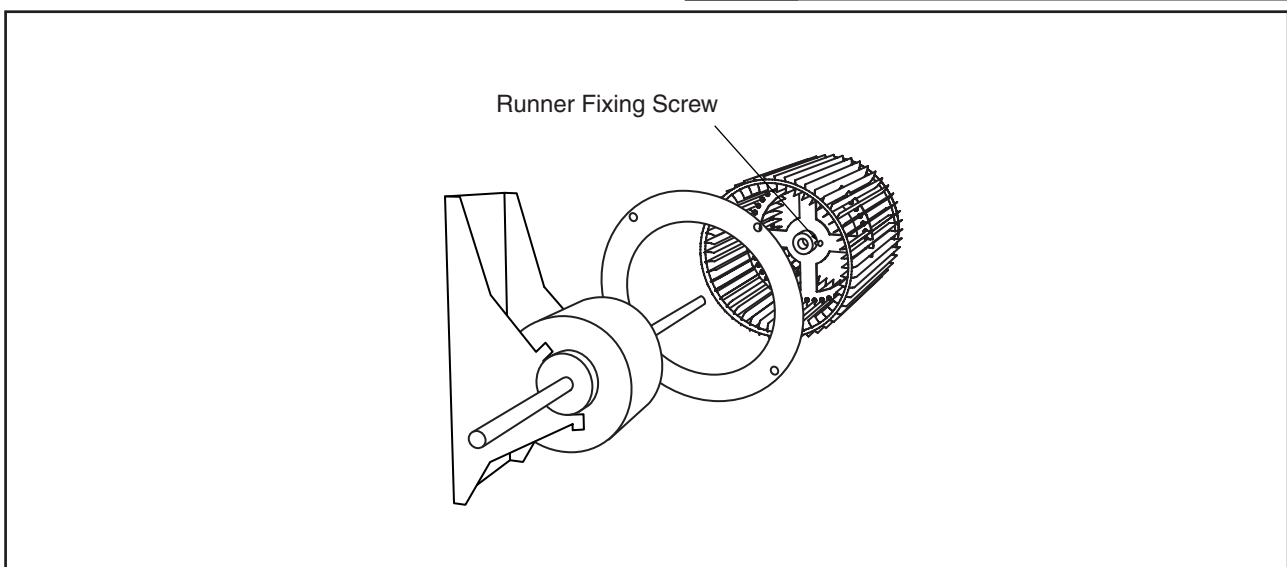
Phillips Screwdriver



- (11) Loosen the screw fixing the runner onto the fan motor by the adjustable wrench and pull out the runner.

Tool

Phillips Screwdriver, Adjustable Wrench



### ATTENTION:

The total weight of the motor base, the fan motor, the ring and the runner is approximately 15kg. Carefully perform the above removing work.

**! WARNING**

**TURN OFF all power source switches.**

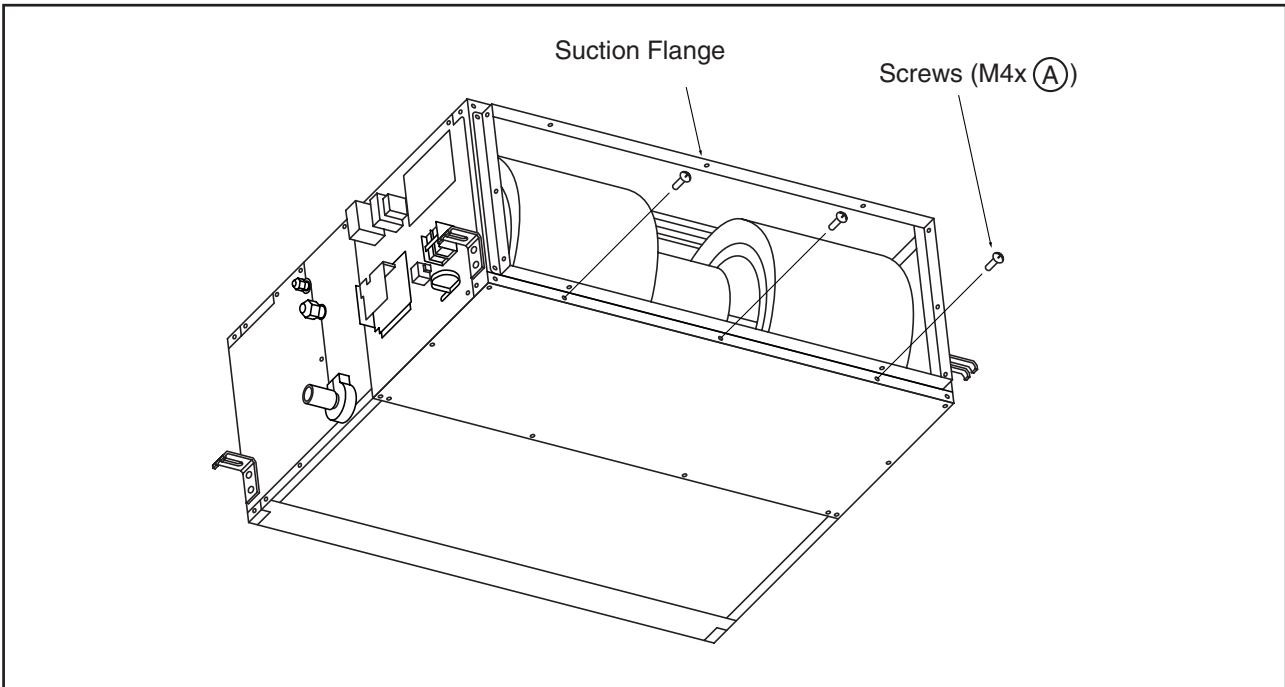
**< Removing Indoor Fan and Fan Motor from Bottom Side (For All Models)>**

Disconnect the connector for the fan motor wires according to the procedures (1) and (2) in page 2-39.

(3) Remove the lower M4 screws (Q'ty: A) fixing the suction flange.

- Q'ty of Screws (A): 2 (For RPI-0.8 to 1.5FSG1)
- 3 (For RPI-2.0 to 4.0FSG1)
- 4 (For RPI-5.0FSG1)

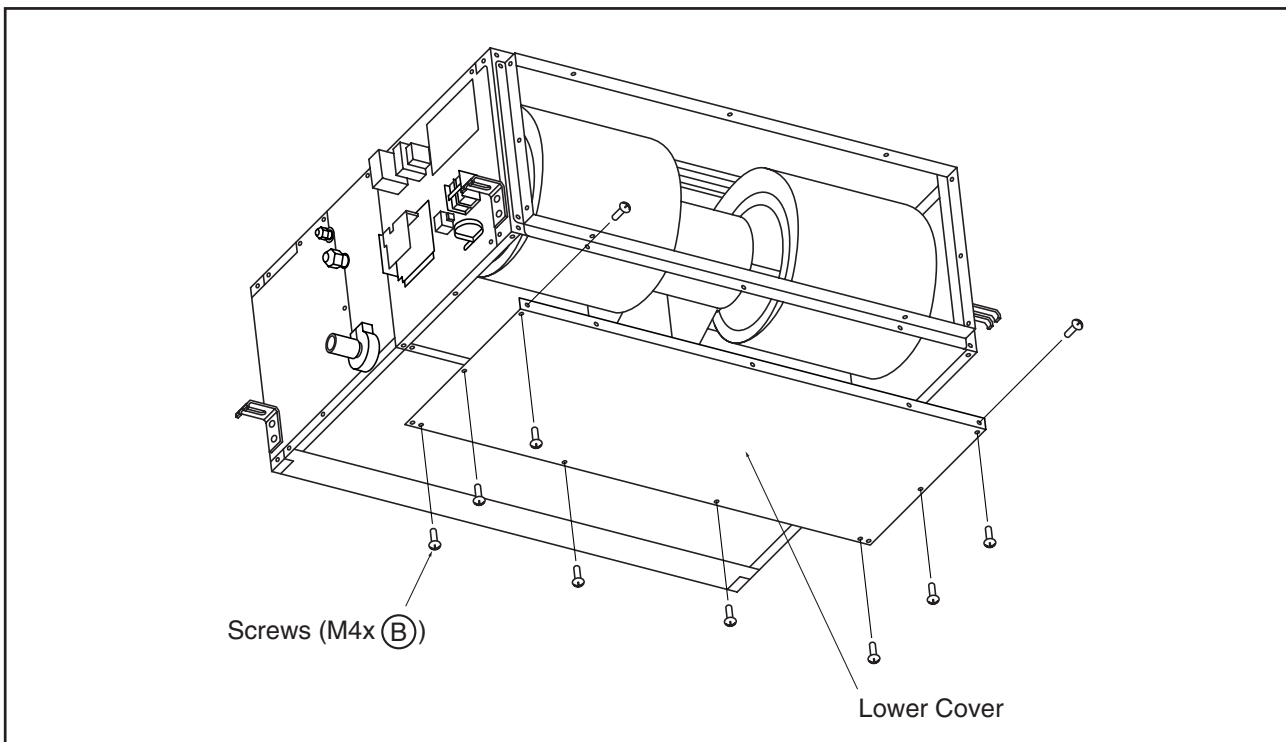
Tool	Phillips Screwdriver
------	----------------------



(4) Remove the lower M4 screws (Q'ty: B) fixing the lower cover at the indoor fan side and remove the lower cover.

- Q'ty of Screws (B): 11 (For RPI-0.8 to 1.5FSG1)
- 12 (For RPI-2.0 to 5.0FSG1)

Tool	Phillips Screwdriver
------	----------------------



## SERVICING

(2.2 In-the-Ceiling Type)

# ! WARNING

**TURN OFF all power source switches.**

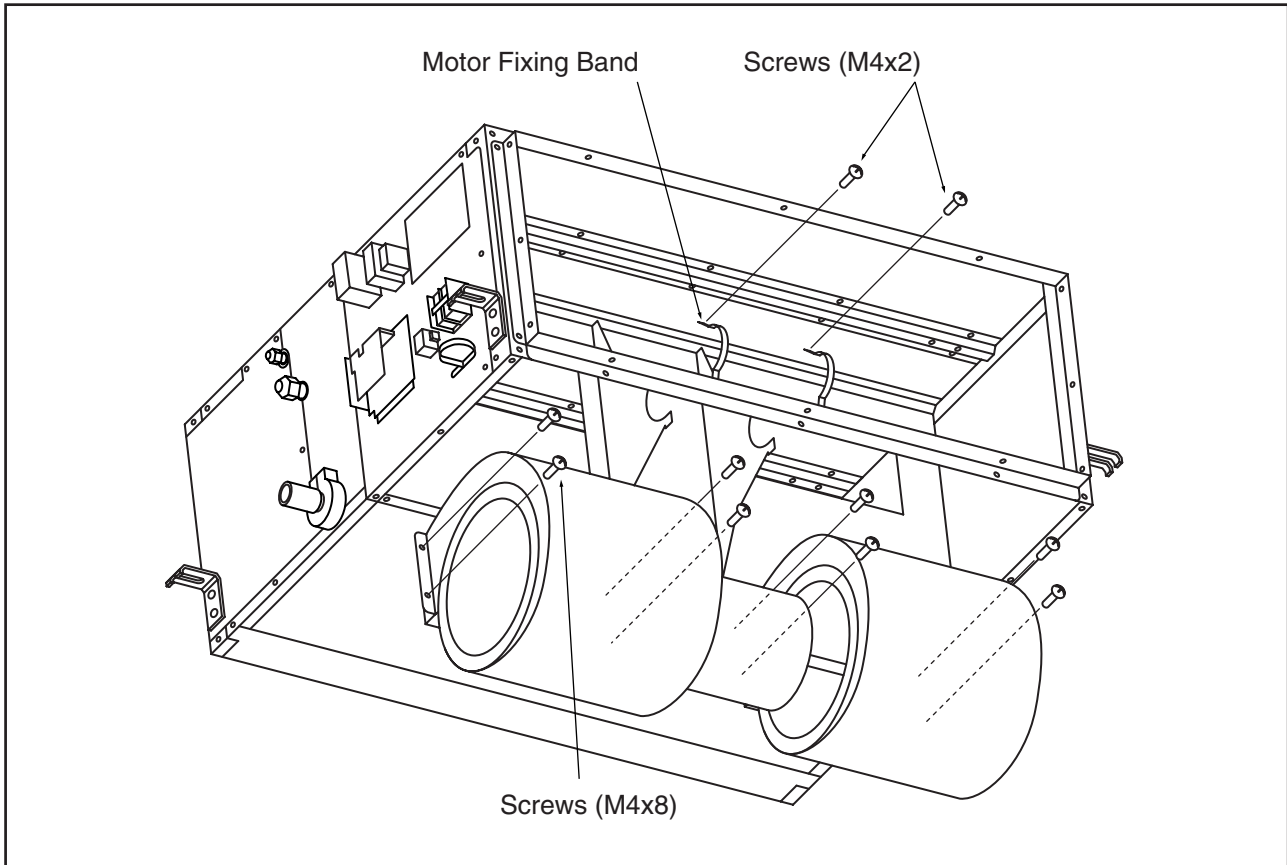
- (5) Remove the lower cover and the fan assembly can be seen.  
Remove the wires for the motor fixed by the cord clamp of the fan motor fixing plate.

● **For RPI-3.0FSG1 to RPI-5.0FSG1**

- (6) Remove eight (8) M4 screws fixing the casing onto the fan fixing plate and move the casing slightly.  
(7) Remove two (2) M4 screws fixing the motor fixing band to the motor base and remove the motor, the casing and the runner at the same time.

Tool

Phillips Screwdriver



**ATTENTION:**

The total weight of the motor base, the fan motor, the ring and the runner is approximately 15kg.  
Carefully perform the above removing work.

**! WARNING**

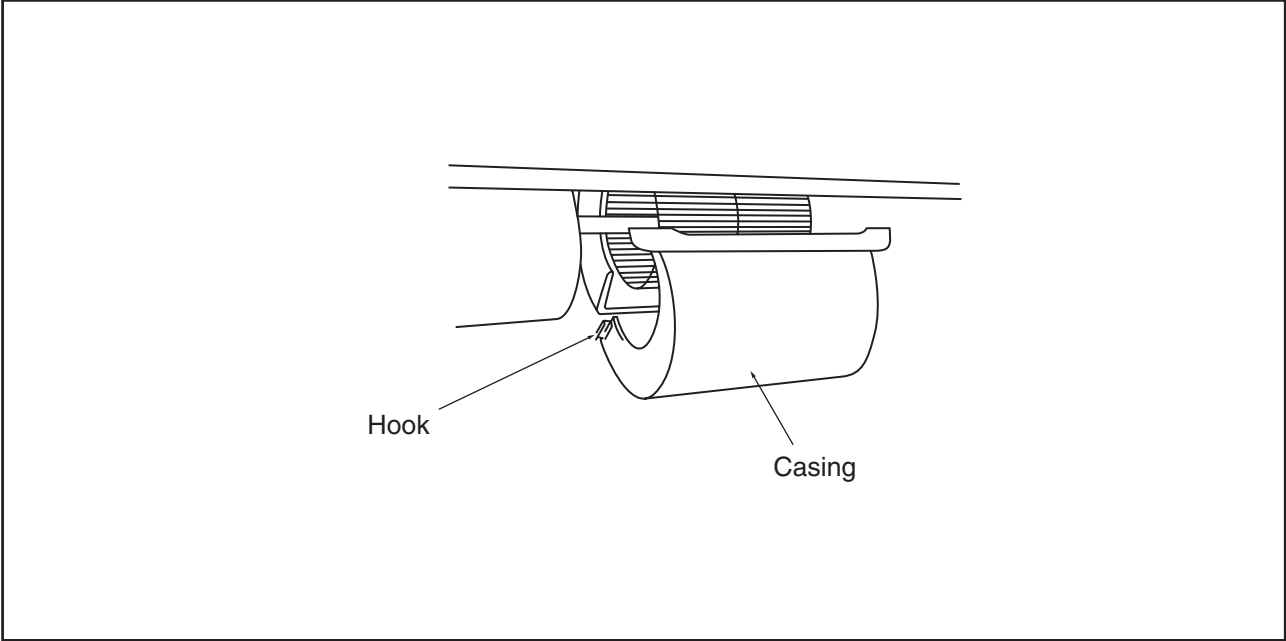
**TURN OFF all power source switches.**

● **For RPI-0.8FSG1 to RPI-2.5FSG1**

- (6) Remove the lower M4 screws (Q'ty: C) fixing the casing onto the fan fixing plate, push the hooks at both sides of the casing and remove the lower part of the casing.

Q'ty of Screws (C): 2 (For RPI-0.8 to 1.5FSG1)  
4 (For RPI-2.0 to 2.5FSG1)

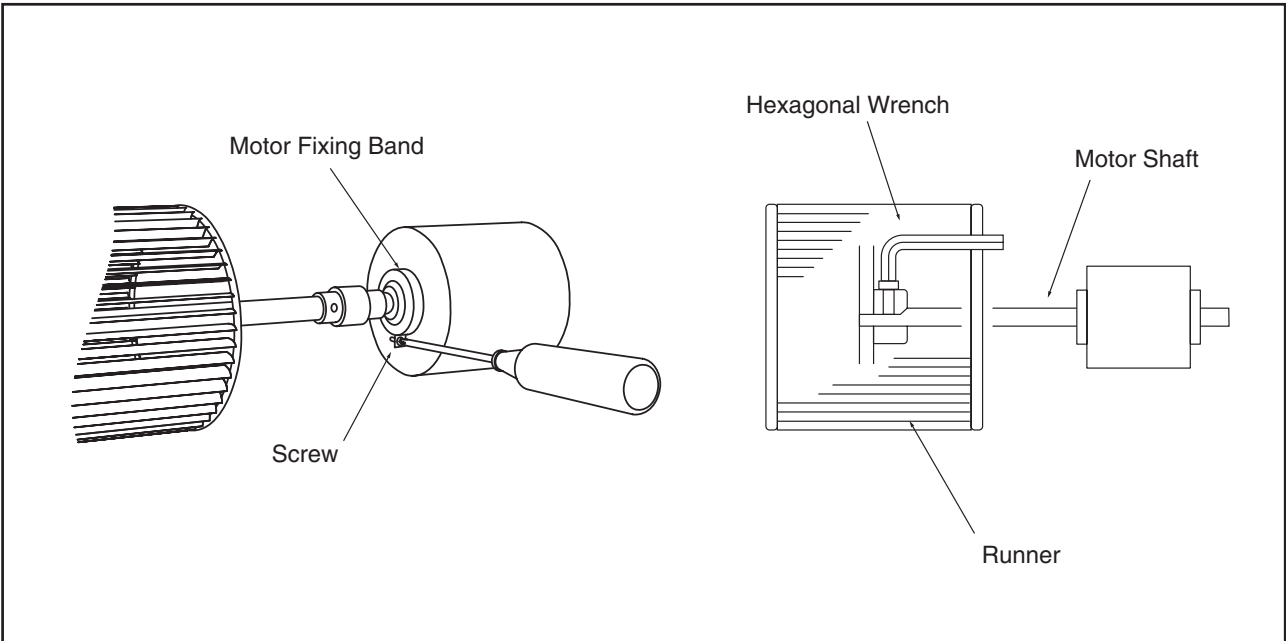
Tool	Phillips Screwdriver
------	----------------------



- (7) Remove two (2) screws fixing the motor fixing band to the motor base and remove the runner with the motor shaft.

- (8) Loosen the screws fixing the fan motor and the runner by the hexagonal wrench (for M6 screw) and pull out remove the runner.

Tool	Phillips Screwdriver, Hexagonal Wrench
------	--



**ATTENTION:**

The total weight of the motor base, the fan motor, the ring and the runner is approximately 15kg. Carefully perform the above removing work.

## SERVICING

(2.2 In-the-Ceiling Type)

# WARNING

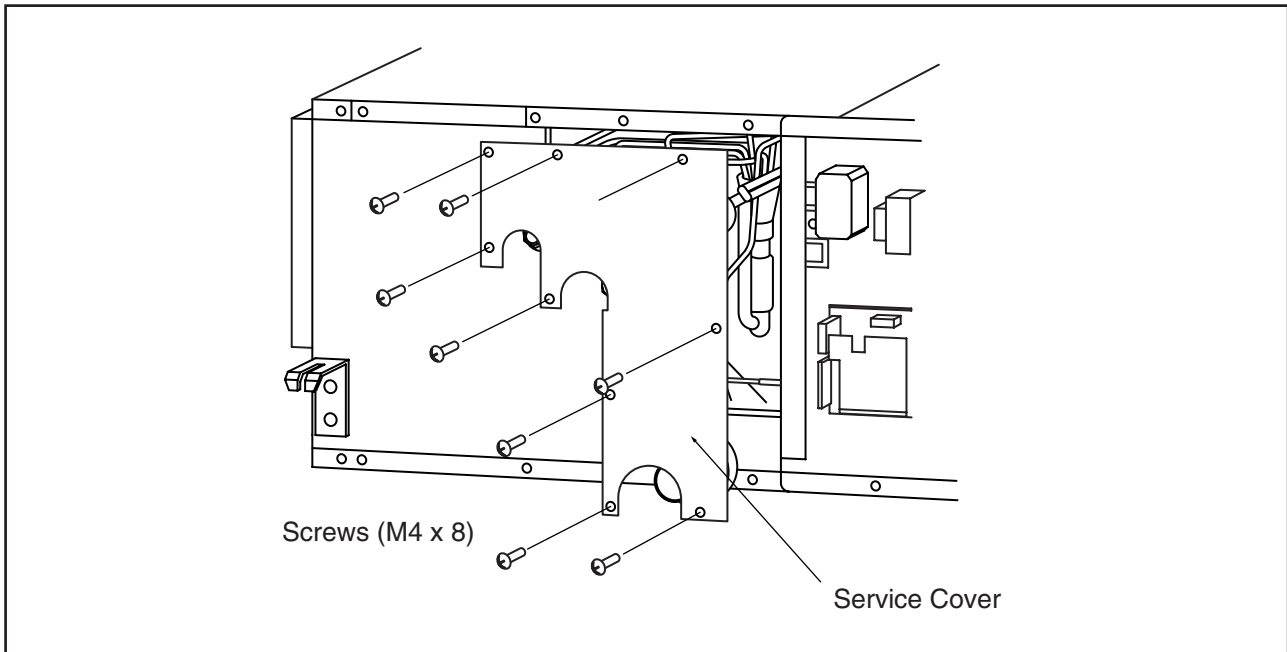
**TURN OFF all power source switches.**

### 2.2.4 Removing Thermistor for Liquid Piping and Gas Piping

- (1) Remove eight (8) M4 screws fixing the service cover and remove the service cover.

Tool

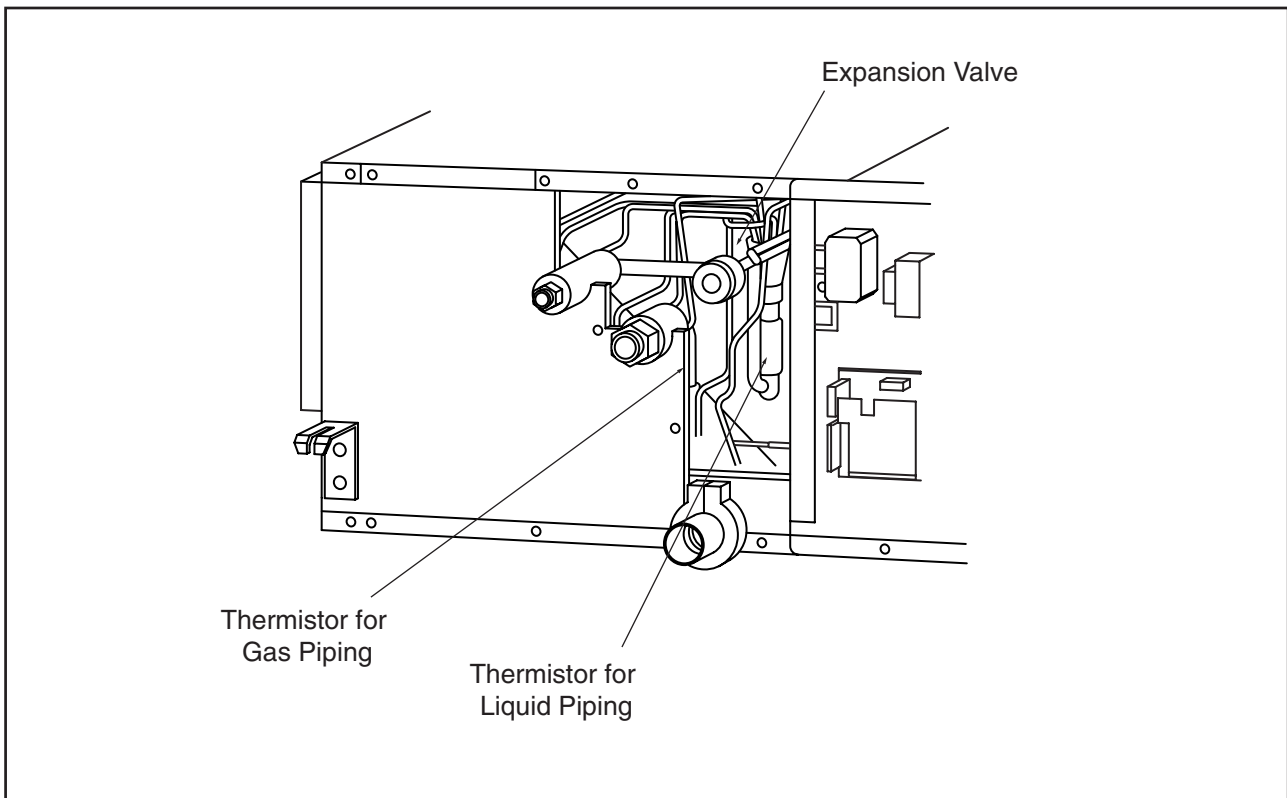
Phillips Screwdriver



- (2) Remove the cork tape, pipe insulations and the thermistor holder, the thermistors for pipes can be removed.

Tool

Phillips Screwdriver



**! WARNING****TURN OFF all power source switches.****2.2.5 Removing Electronic Expansion Valve Coil**

- (1) Remove the service cover according to the item 2.2.4 "Removing Thermistor for Liquid Piping and Gas Piping".
- (2) The following procedures are the same with other models.

Tool

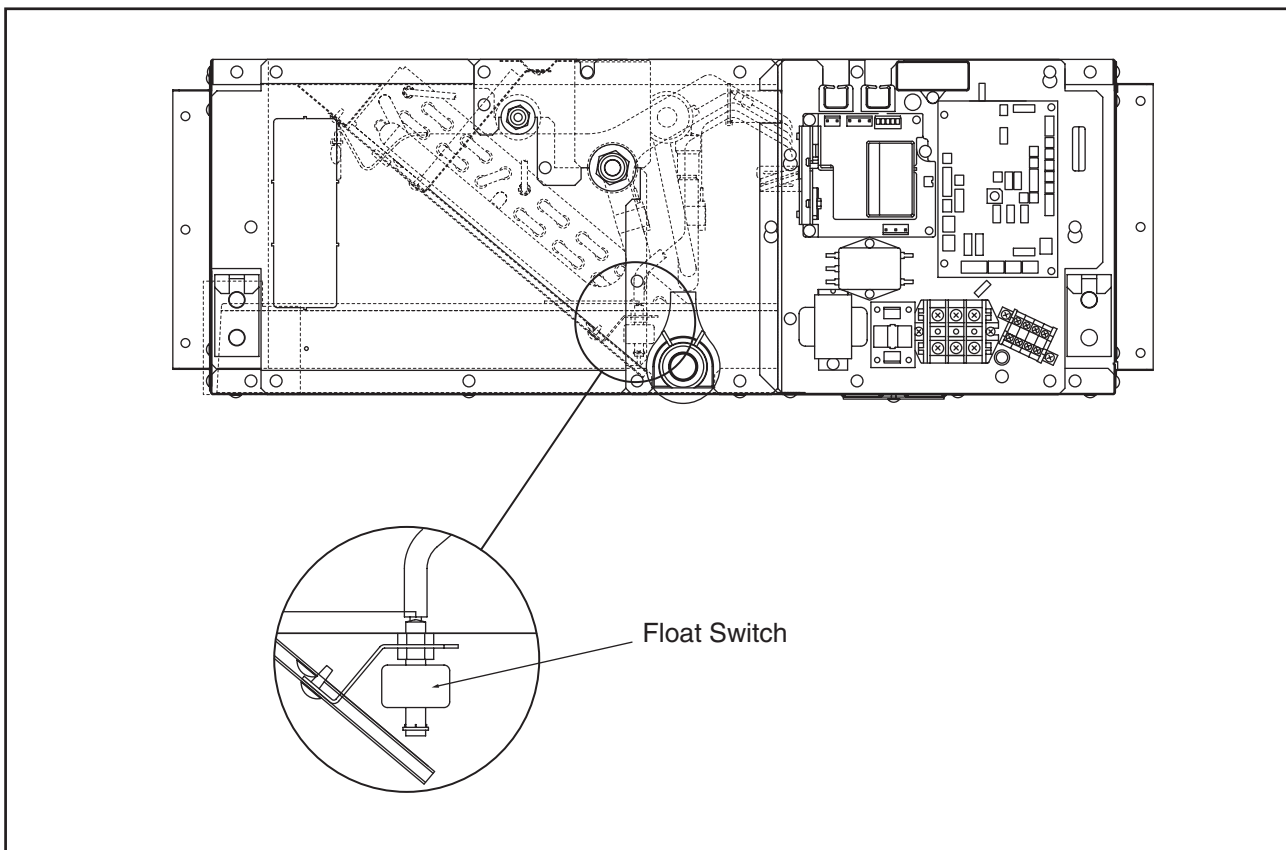
Phillips Screwdriver

**2.2.6 Removing Float Switch**

- (1) Remove the service cover according to the item 2.2.4 "Removing Thermistor for Liquid Piping and Gas Piping".
- (2) The float switch is fixed on the heat exchanger fixing plate. Remove the float switch by using two spanners.

Tool

Phillips Screwdriver, Spanner

**ATTENTION:****When reassembling, handle the float switch carefully.****(Tightening Torque: Approx. 0.3N-m)****If the float switch is dropped, malfunction will occur.**

## SERVICING

(2.2 In-the-Ceiling Type)

# ! WARNING

**TURN OFF all power source switches.**

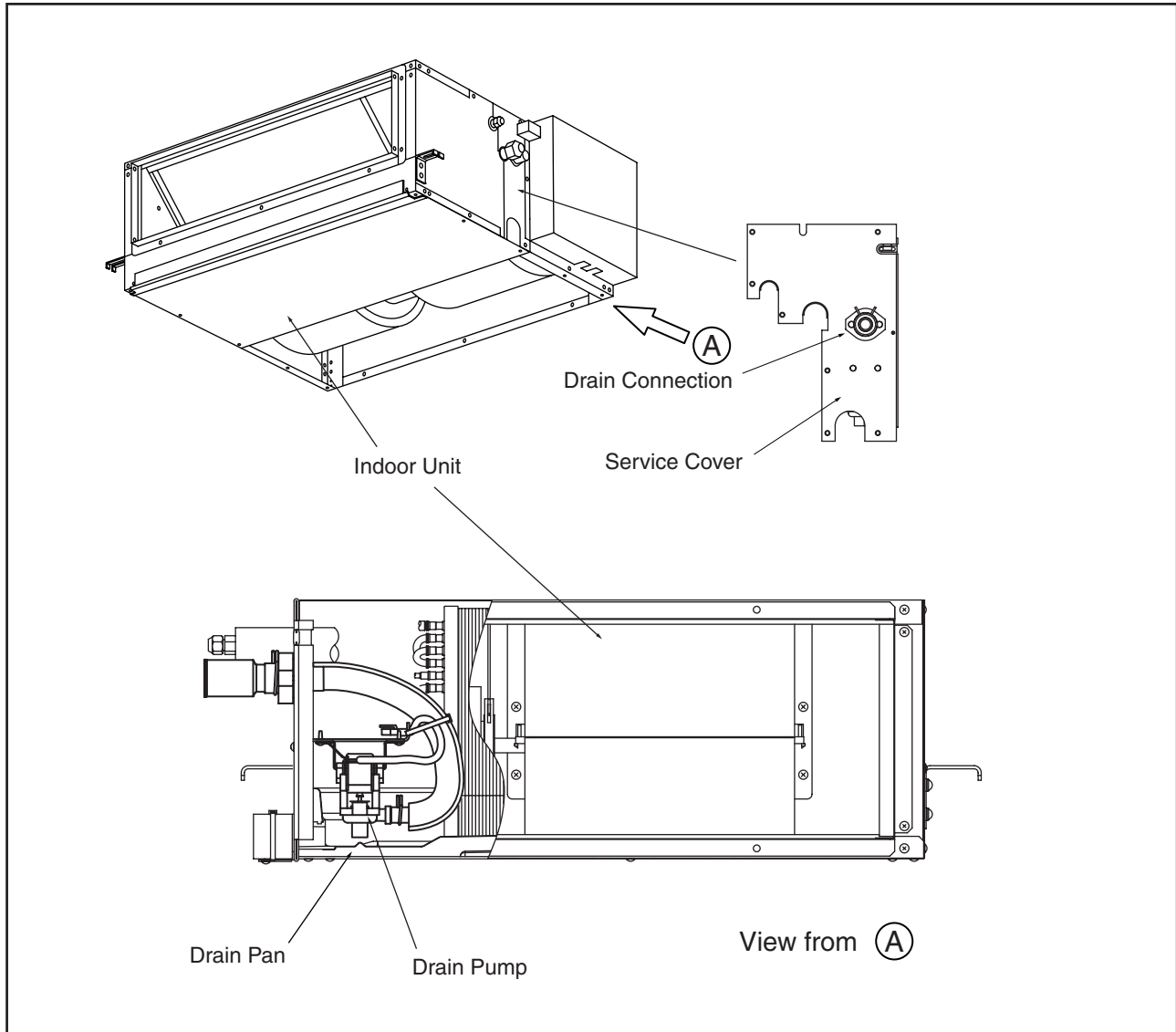
### 2.2.7 Removing Drain Pump

In case of the units with the drain pump (RPI-0.8 to 1.5FSG1), the drain pump is fixed on the service cover.

Remove the fixing screws and remove the drain pump.

Tool

Phillips Screwdriver, Spanner





**! WARNING**

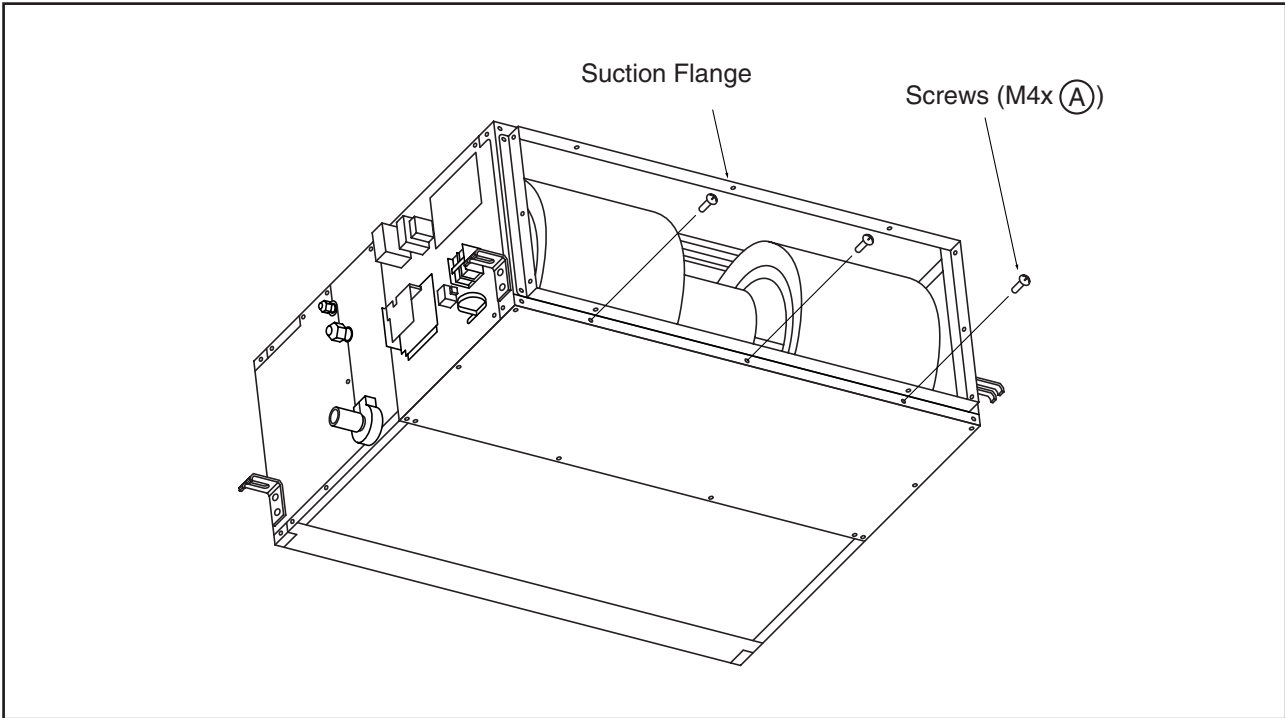
**TURN OFF all power source switches.**

2.2.8 Removing Drain Pan

- (1) Remove the lower M4 screws (Q'ty: A) fixing the suction flange.

\* Q'ty of Screws (A): 2 (For RPI-0.8 to 1.5FSG1)  
 3 (For RPI-2.0 to 4.0FSG1)  
 4 (For RPI-5.0FSG1)

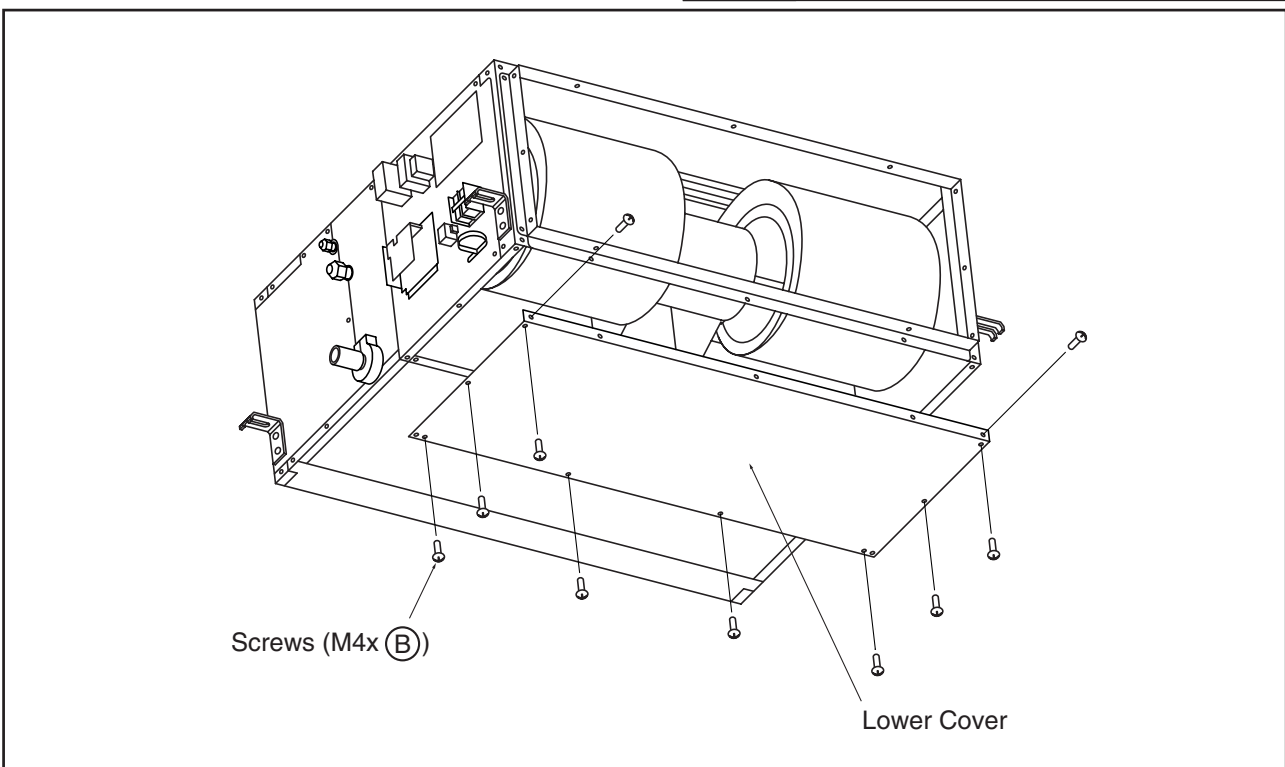
Tool	Phillips Screwdriver
------	----------------------



- (2) Remove the lower M4 screws (Q'ty: B) fixing the lower cover at the indoor fan side and remove the lower cover.

\* Q'ty of Screws (B): 11 (For RPI-0.8 to 1.5FSG1)  
 12 (For RPI-2.0 to 5.0FSG1)

Tool	Phillips Screwdriver
------	----------------------



## SERVICING

(2.2 In-the-Ceiling Type)

# ! WARNING

**TURN OFF all power source switches.**

(3) Remove the lower M4 screws (Q'ty: D) fixing the discharge flange.

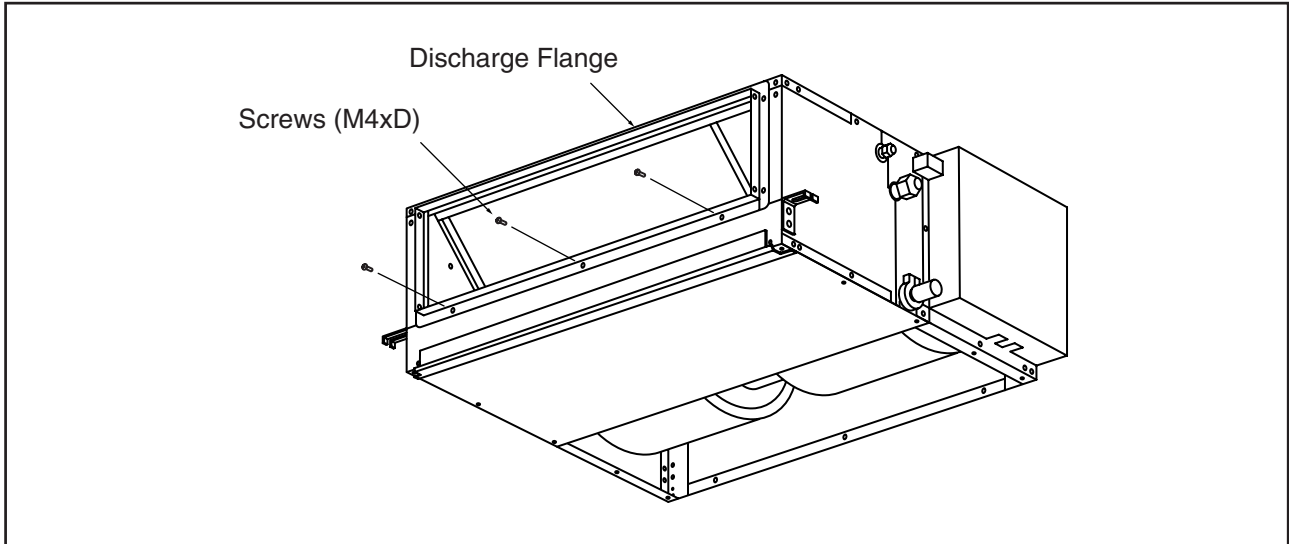
\* Q'ty of Screws (D): 2 (For RPI-0.8 to 1.5FSG1)

3 (For RPI-2.0 to 4.0FSG1)

4 (For RPI-5.0FSG1)

Tool

Phillips Screwdriver



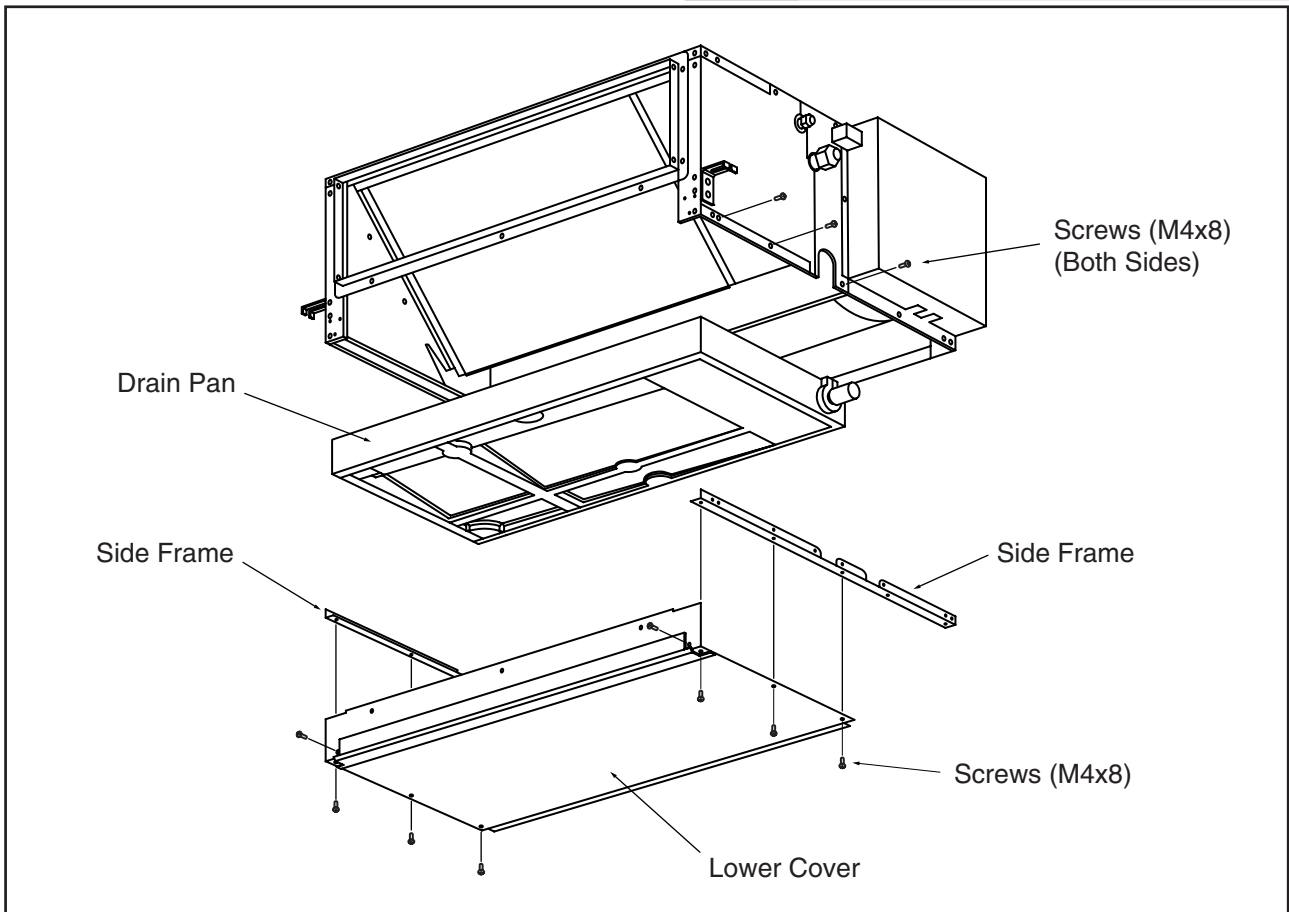
(4) Remove eight (8) M4 screws fixing the lower cover at the indoor heat exchanger side and remove the lower cover.

(5) Remove M4 screws (eight (8) for each side) fixing the side frames at both sides and remove the side frames.

(6) Pull the drain pan downward.

Tool

Phillips Screwdriver,  
Bucket (approx. 5 liters content)



## 2.3 In-the-Ceiling Type (RPI-8FSG1 and RPI-10FSG1)

**! WARNING****TURN OFF all power source switches.**

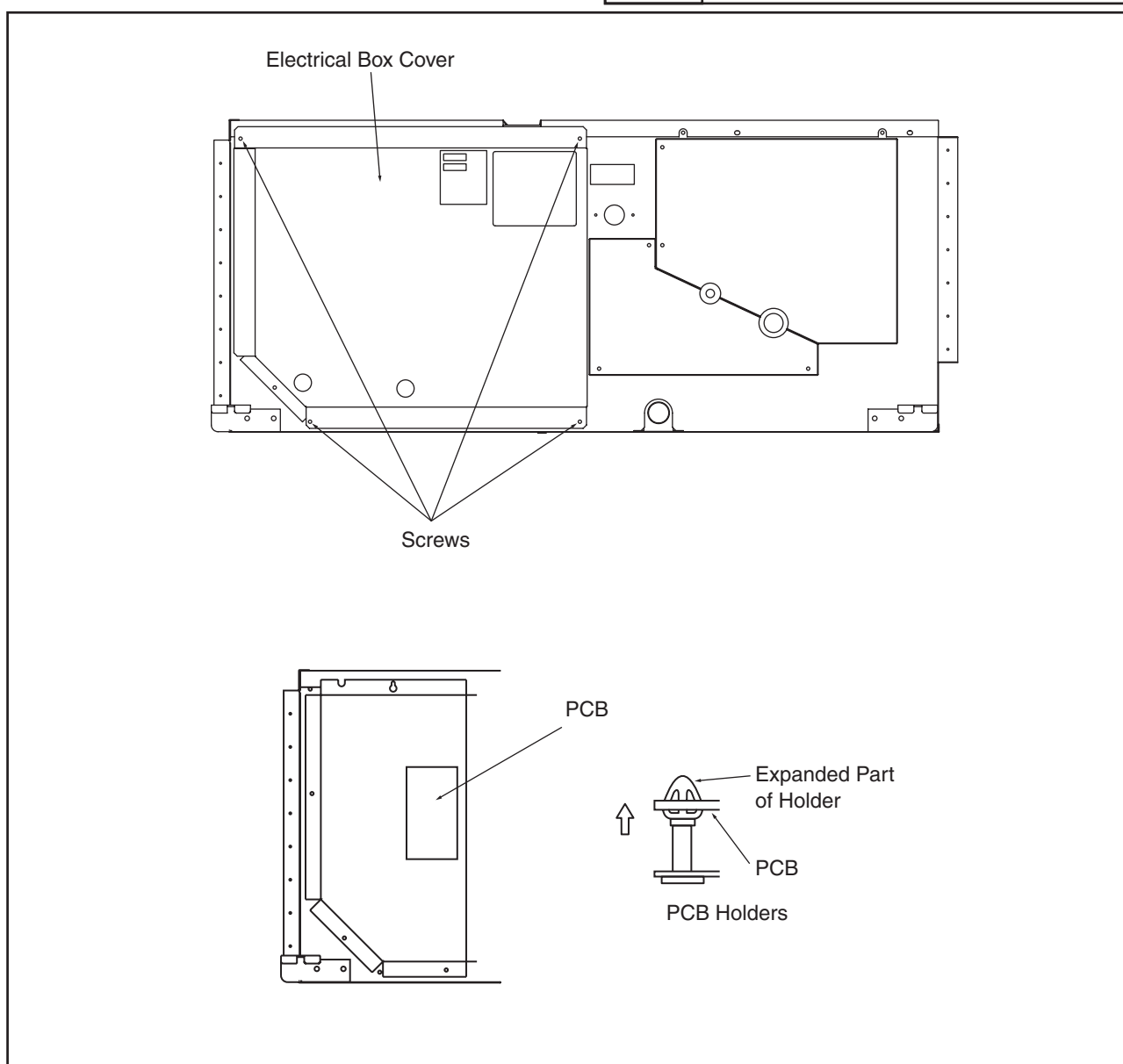
## 2.3.1 Removing Long Life Filter

The air intake grilles are field-supplied. Therefore, there is a case that the replacement of the long life filter is not easily performed depending on the installation manners. Check it carefully.

## 2.3.2 Removing Printed Circuit Board (PCB)

- (1) Loosen four (4) screws fixing the electrical box cover and remove the electrical box cover by lifting it upwards.
- (2) The PCB is fixed with four (4) PCB holders. Clamp the center of the PCB holders by a long-nose plier and pull out the PCB.

Tool	Phillips Screwdriver, Long-nose Pliers
------	--

**ATTENTION:**

**Do not touch any parts on the PCB.**

**Do not apply a strong force to the PCB, or it will cause malfunction of the PCB.**

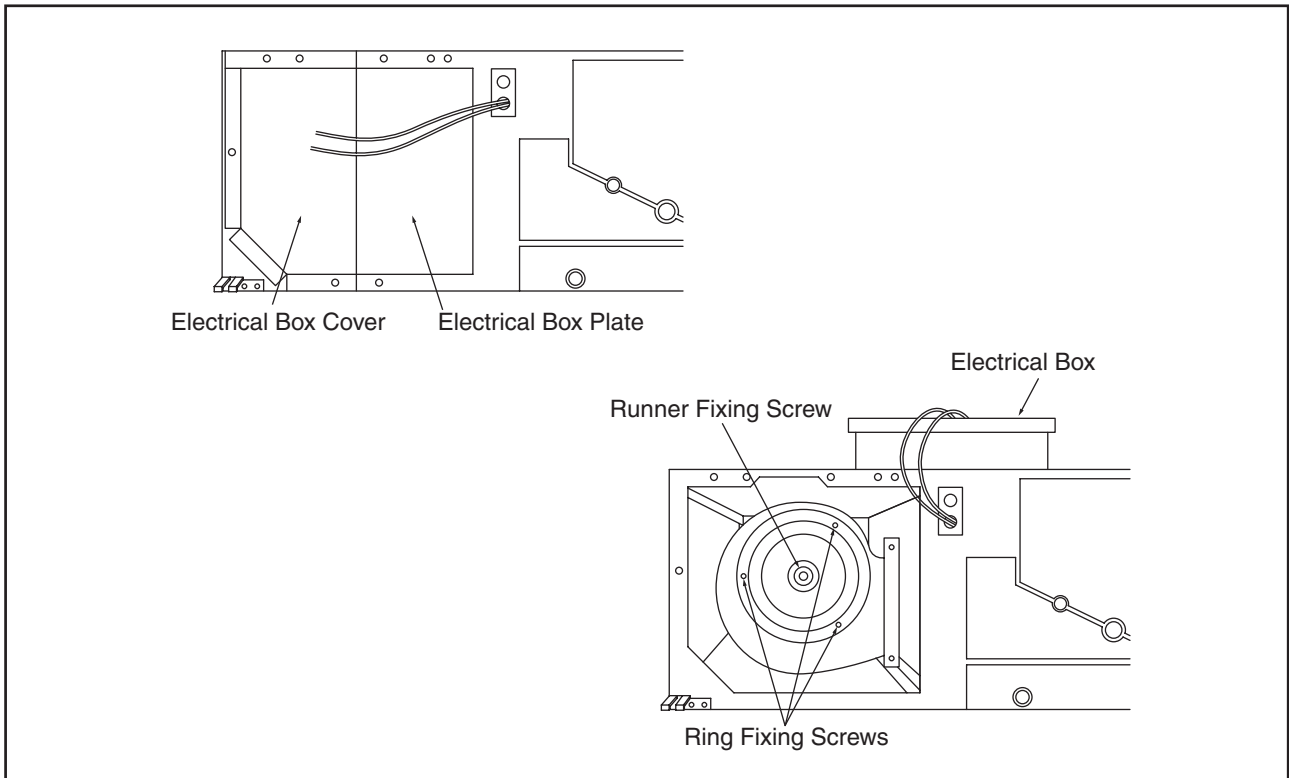
**! WARNING**

**TURN OFF all power source switches.**

2.3.3 Removing Indoor Fan and Fan Motor

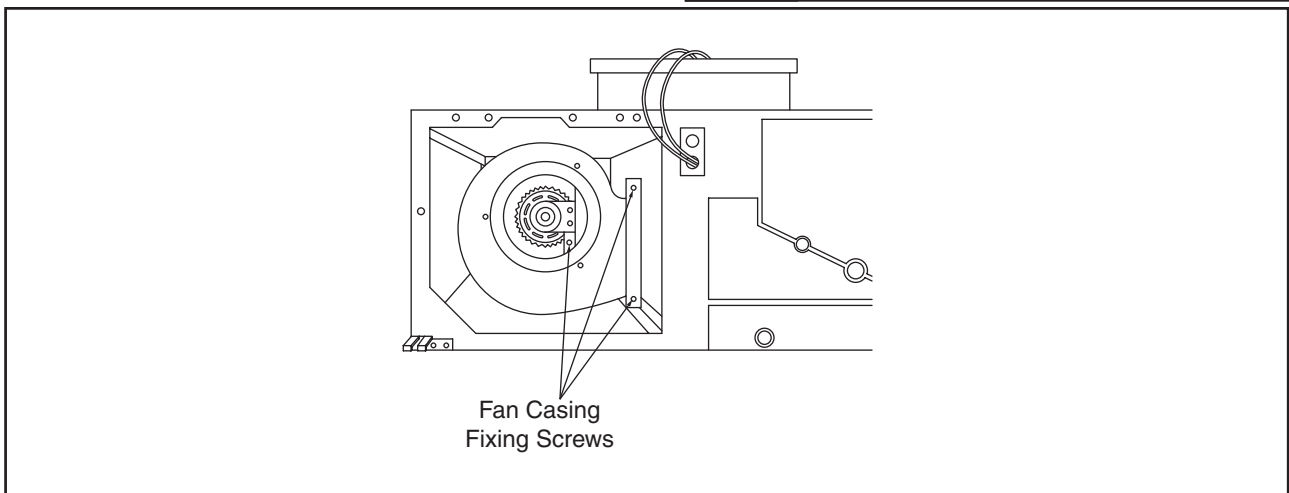
- (1) Remove the electrical box cover according to the item 2.3.2 "Removing Printed Circuit Board (PCB)".
- (2) Remove four (4) screws fixing the electrical box plate and remove the electrical box plate.
- (3) Disconnect the connector for the fan motor.
- (4) Remove three (3) screws fixing the electrical box and remove the electrical box on the unit as shown.

Tool	Phillips Screwdriver
------	----------------------



- (5) Remove three (3) screws fixing the ring and remove the ring.
- (6) Loosen the screw fixing the fan runner onto the fan motor shaft and remove the near side fan runner.
- (7) Remove the screw fixing the fan casing and pull out the near side fan casing.

Tool	Phillips Screwdriver, Hexagonal Wrench (M8)
------	--

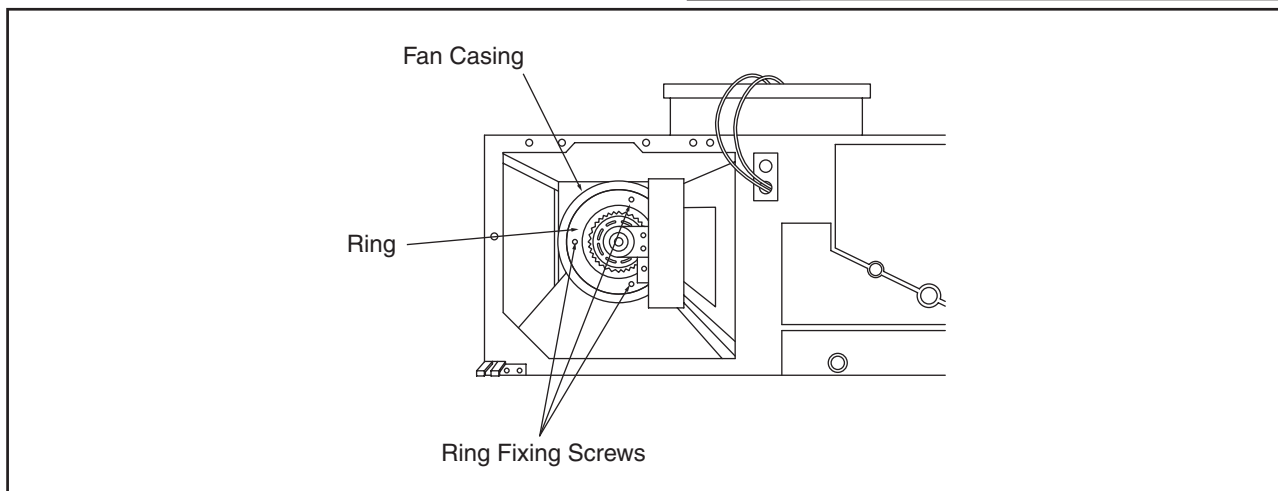


**! WARNING****TURN OFF all power source switches.**

- (8) Remove three (3) screws fixing the ring onto the rear side fan casing and remove the ring.

Tool

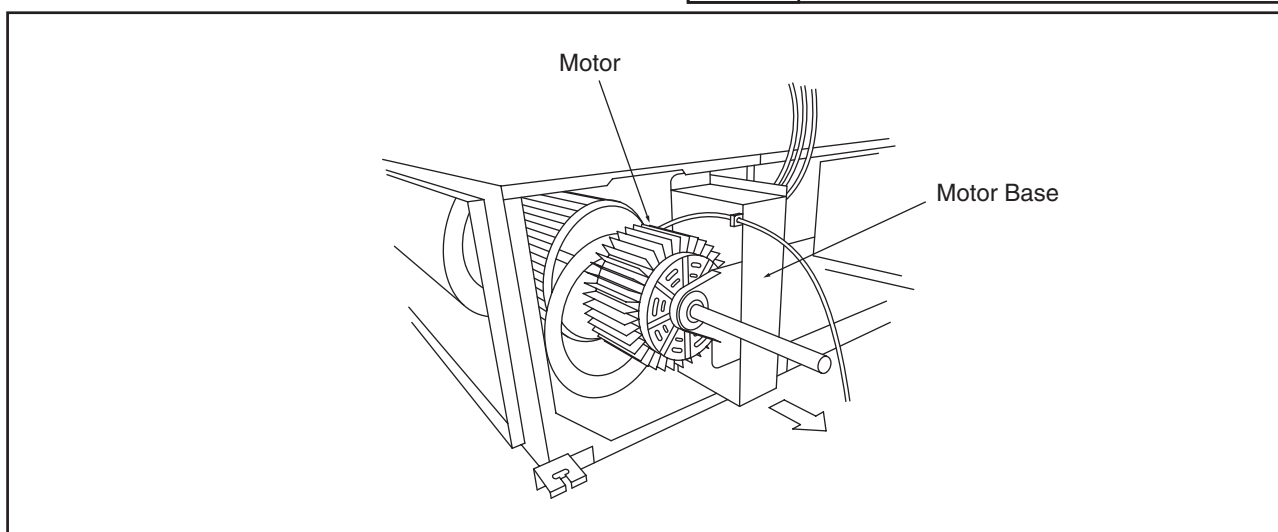
Phillips Screwdriver



- (9) Remove four (4) screws fixing the motor base.  
(10) Pull out the fan motor with motor base.  
Do not pull out the rear side fan casing.

Tool

Phillips Screwdriver



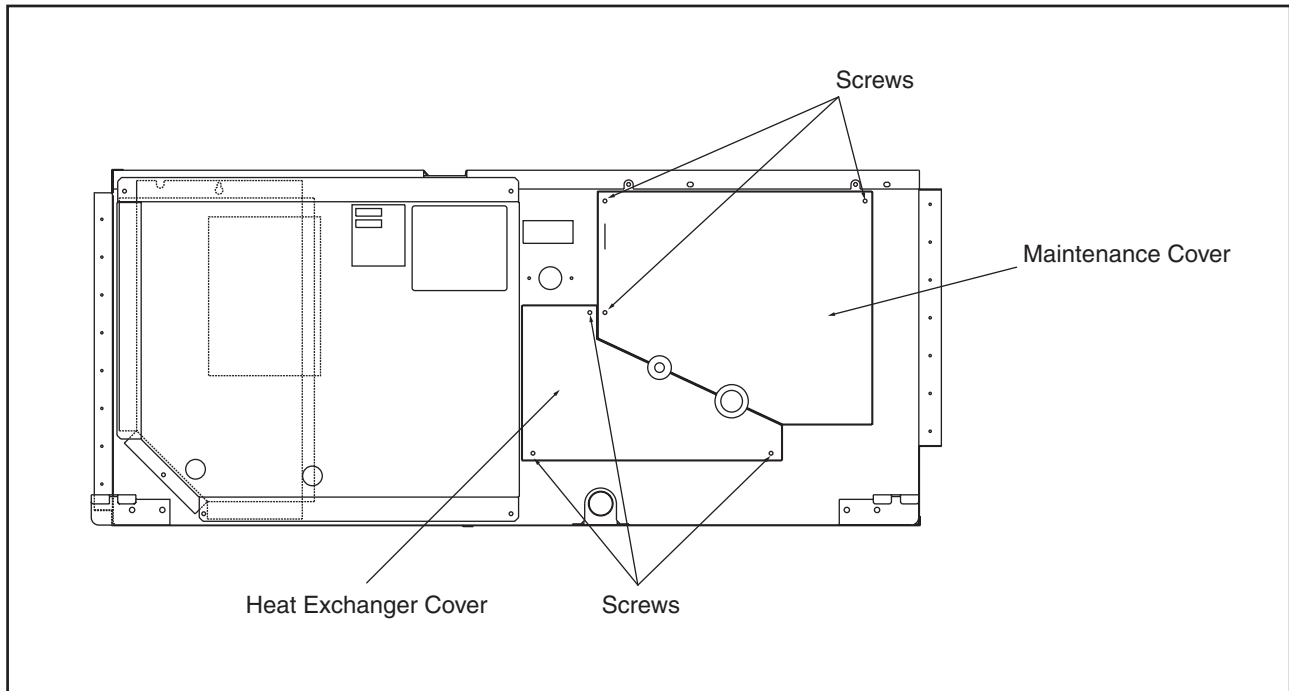
**! WARNING****TURN OFF all power source switches.**

## 2.3.4 Removing Electronic Expansion Valve and Thermistors

- (1) Remove three (3) screws fixing the heat exchanger cover and remove the heat exchanger cover.
- (2) Remove four (4) screws fixing the maintenance cover and remove the maintenance cover.

Tool

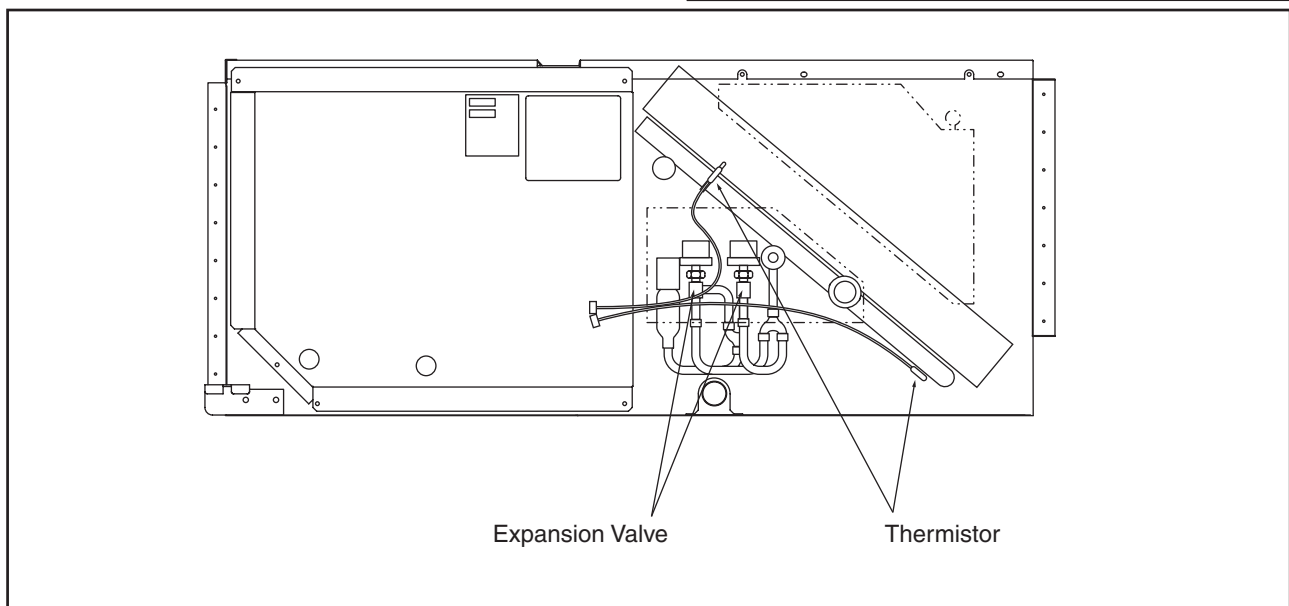
Phillips Screwdriver



- (3) Remove the electronic expansion valve by using two (2) spanners.
- (4) Remove the thermistors attaching the pipe of heat exchanger.

Tool

Phillips Screwdriver, Spanner

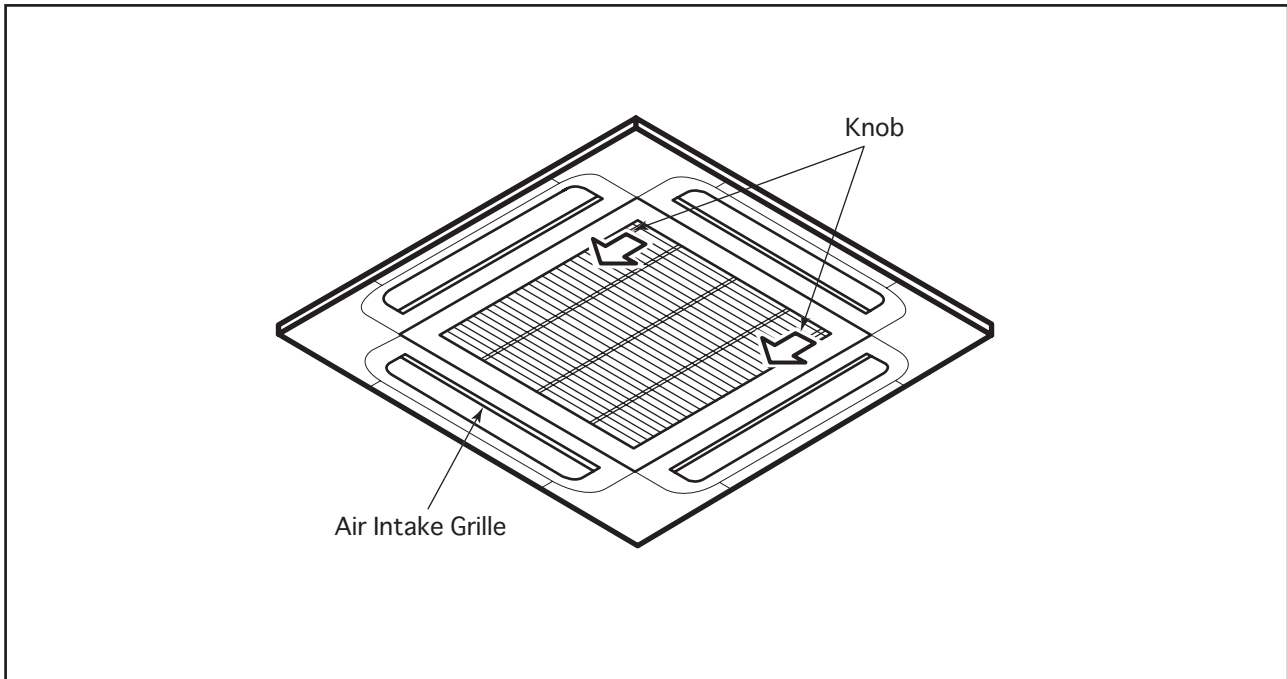


## 2.4 4-Way Cassette Type

**! WARNING****TURN OFF all power source switches.**

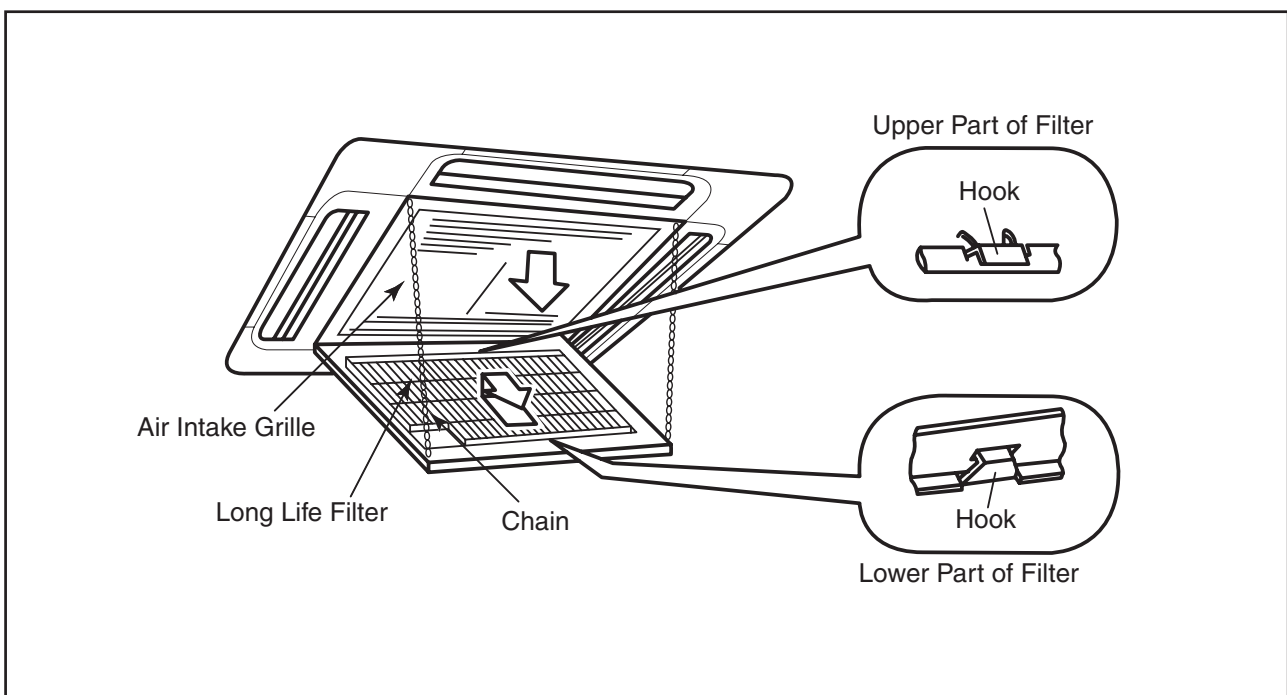
## 2.4.1 Removing Long Life Filter

- (1) The long life filter is located inside of the air intake grille. Detach the filter after opening the air intake grille. By pushing the knob in the arrow mark direction, the air intake grille can be opened.
- (2) The filter can be removed from the air intake grille by supporting the lower side of the air intake grille and filter, and unhooking it from the extrusion part.



## 2.4.2 Removing Air Intake Grille

By lifting the air intake grille at an angle of approximately 30° and releasing its chain, the air intake grille can be removed by holding it upwards and then towards you. If the chain is released and the angle is 90°, the air intake grille can not be removed.



## SERVICING

(2.4 4-Way Cassette Type)

# ! WARNING

**TURN OFF all power source switches.**

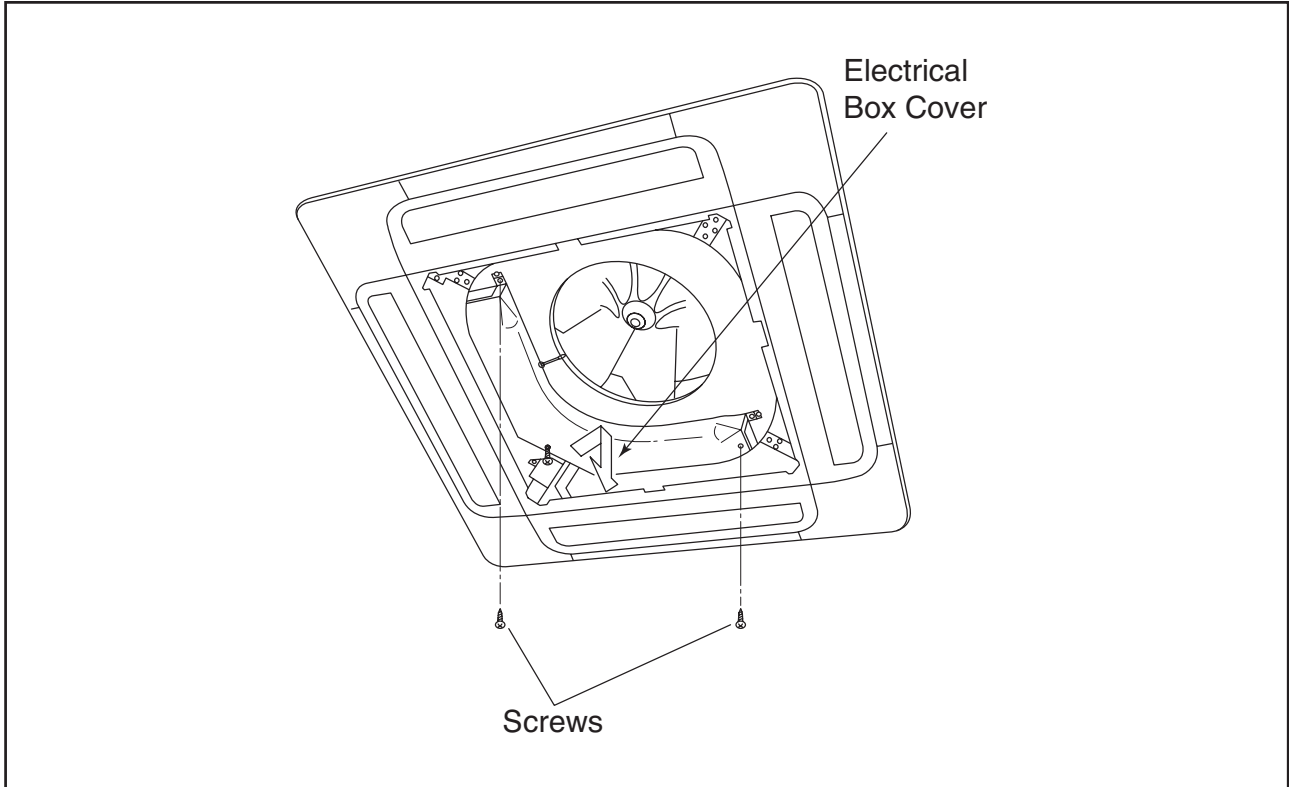
### 2.4.3 Removing Electrical Box Cover

By opening the air intake grille, the electrical box can be seen.

Remove two (2) screws fixing the electrical box cover and remove the cover.

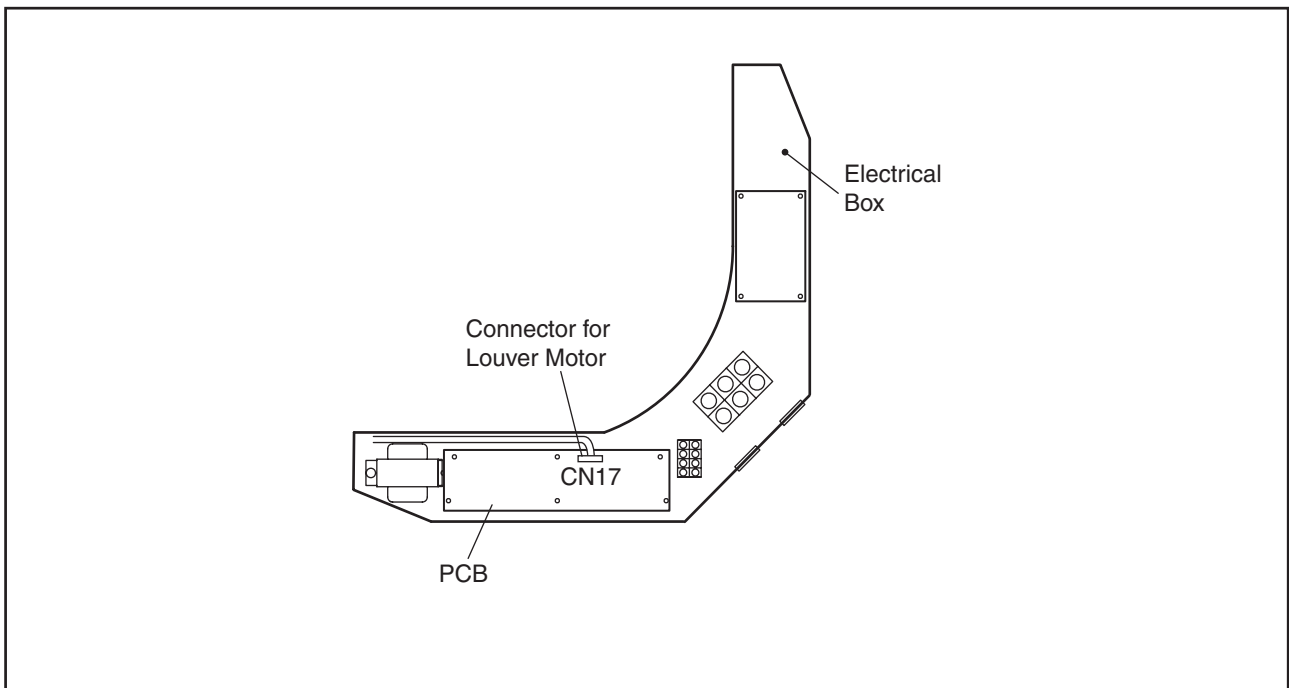
Tool

Phillips Screwdriver



### 2.4.4 Removing Optional Air Panel

- (1) Remove the electrical box cover according to the item 2.4.3 "Removing Electrical Box Cover". Disconnect the connector CN17 for louver motor on the indoor PCB.



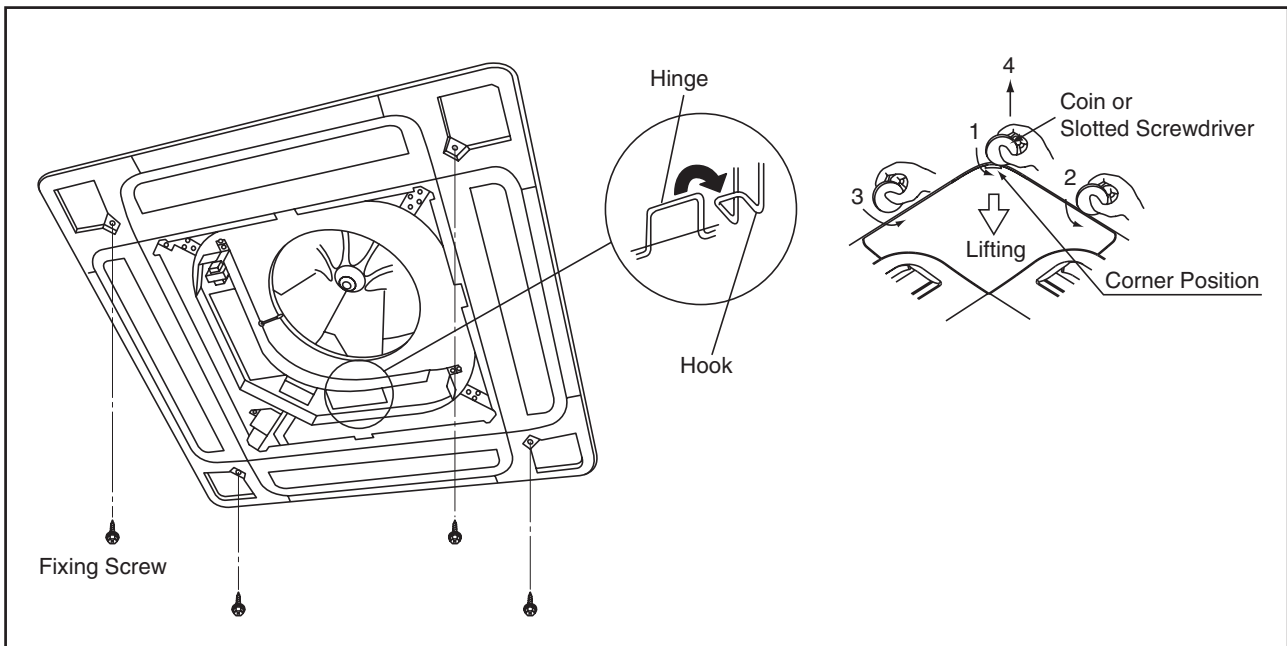


**! WARNING**

**TURN OFF all power source switches.**

- (2) Remove the air intake grille from the optional air panel.
- (3) Remove the four (4) corner pockets as below.  
Insert slotted screwdriver or coin into the slot of corner pocket and unhook the hook of corner pocket in number order of 1 to 4.
- (4) Remove four (4) screws of the optional air panel and hook it by using the hinge to the hook of the drain pan as shown in the figure.  
Remove the optional air panel from the unit.

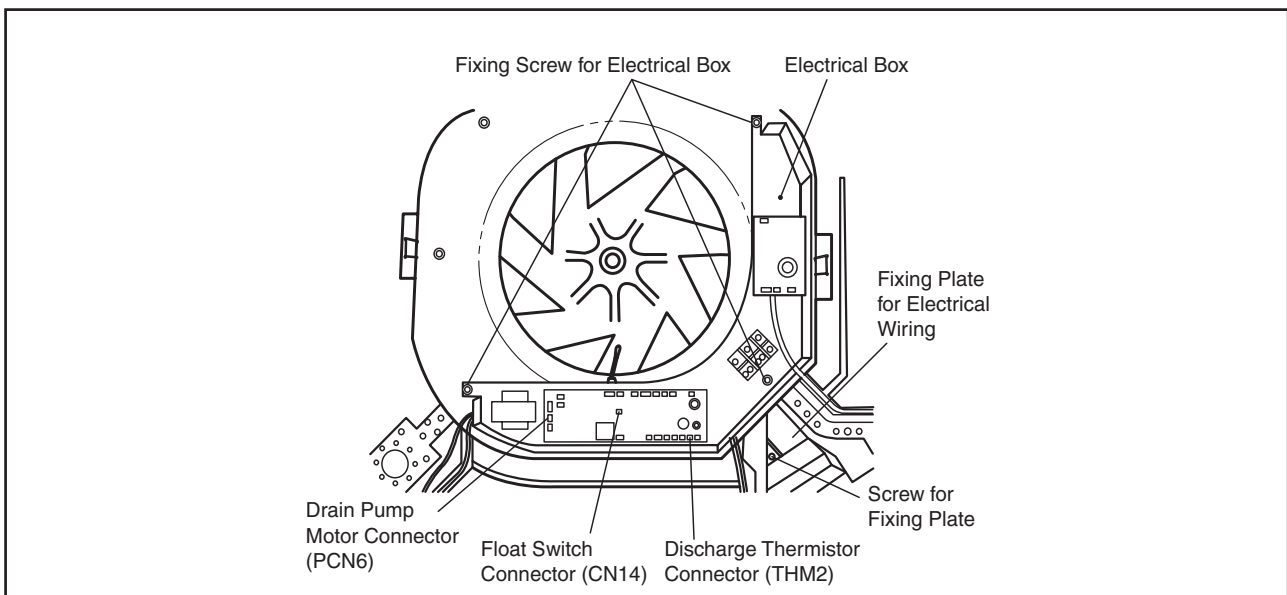
Tool	Phillips Screwdriver
------	----------------------



**2.4.5 Removing Fan Runner and Fan Motor**

- (1) Remove the air intake grille according to the item 2.4.2 "Removing Air Intake Grille".
- (2) Drawing Electrical box
  - (a) Disconnect the thermistors, drain motor connector (PCN6) and float switch connector from the PCB.
  - (b) Loosen screw of the wire clamp and remove the wire clamp.
  - (c) Remove three (3) screws fixing the electrical box and hang the electrical box.

Tool	Phillips Screwdriver
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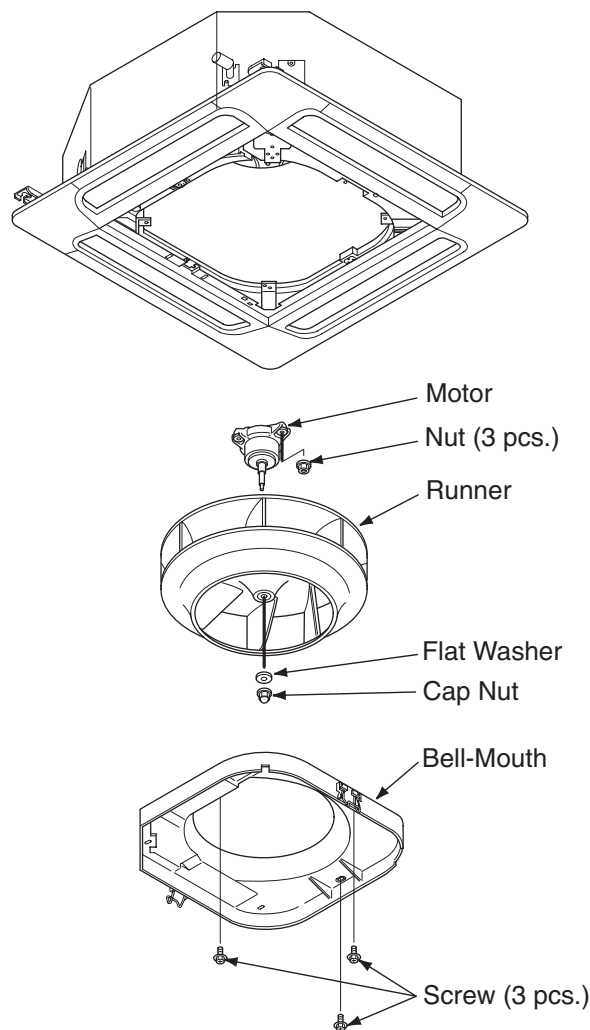


**! WARNING****TURN OFF all power source switches.****2.4.6 Removing Bell-Mouth**

- (1) Remove three (3) screws fixing the bell-mouth onto the drain pan and remove the bell-mouth.
- (2) Remove nut and washer fixing the runner and remove the runner.
- (3) Remove the earth wire for the fan motor. (Only for 4 and 5HP)
- (4) Disconnect the fan motor connector.
- (5) Remove three (3) nuts fixing the fan motor and remove the fan motor. (When reassembling the fan motor, tightening torque of the nut for the fan motor is approximately 8N-m.)

Tool

Phillips Screwdriver



**! WARNING****TURN OFF all power source switches.****2.4.7 Removing Printed Circuit Board (PCB)**

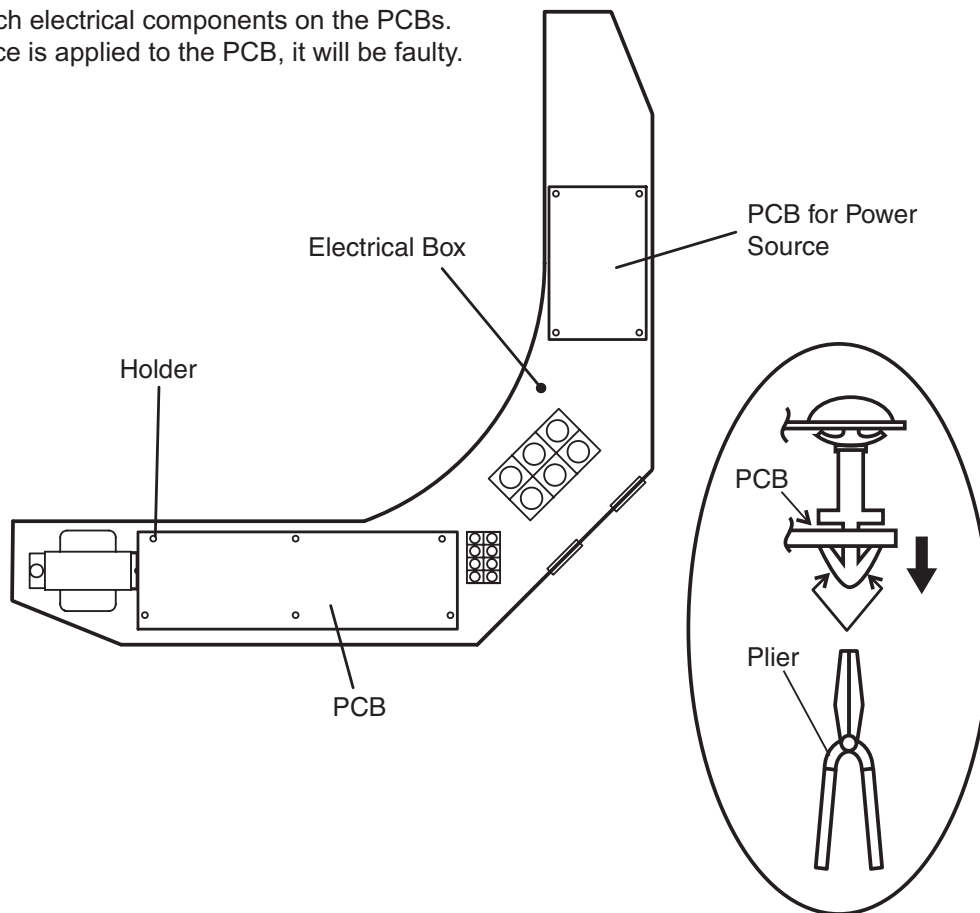
- (1) Remove the air intake grille according to the item 2.4.2 "Removing Air Intake Grille".
- (2) Remove the electrical box cover according to the item 2.4.3 "Removing Electrical Box Cover".
- (3) Disconnect the all wiring connectors of the PCBs.
- (4) Remove the PCBs by holding the expanded part of the holders using long-nose pliers.

Tool

Phillips Screwdriver, Long-nose Plier

**NOTE:**

Do not touch electrical components on the PCBs.  
If great force is applied to the PCB, it will be faulty.

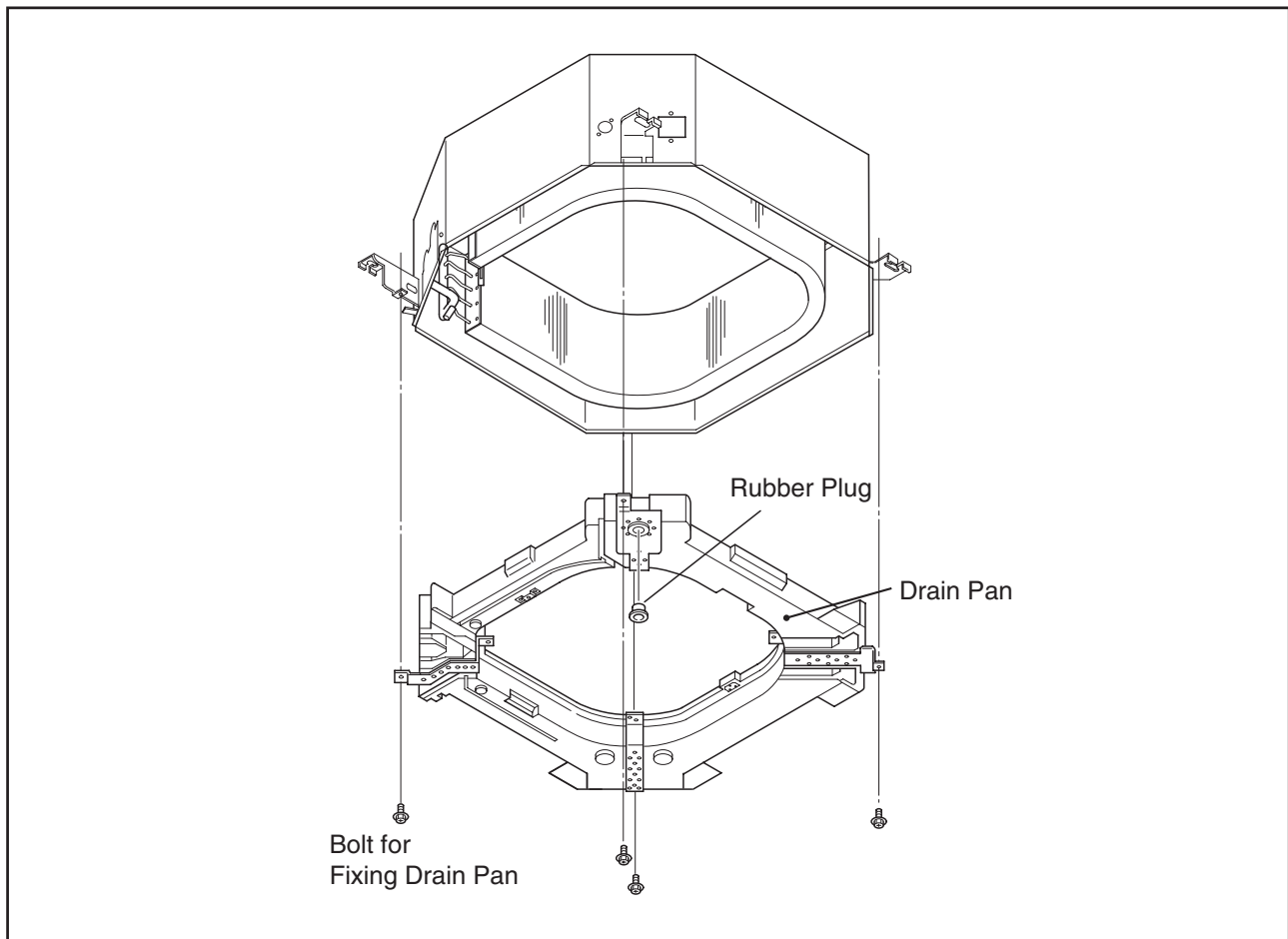


**! WARNING****TURN OFF all power source switches.****2.4.8 Removing Drain Pan**

- (1) Remove the optional air panel according to the item 2.4.4 "Removing Optional Air Panel".
- (2) Remove the electrical box cover according to the item 2.4.3 "Removing Electrical Box Cover". Disconnect the connectors of the air outlet thermistor, piping thermistors (2), electronic expansion valve, drain pump, float switch and fan motor.
- (3) Remove the fan runner and fan motor according to the item 2.4.5 "Removing Fan Runner and Fan Motor".
- (4) Drain the drain water by pulling the rubber plug.  
Check clogging at the drain hole.  
(Do not use a cutter when removing the rubber plug. If used, the rubber plug will be damaged.)
- (5) Remove four (4) bolts for fixing the drain pan and remove the drain pan.

Tool

Phillips Screwdriver



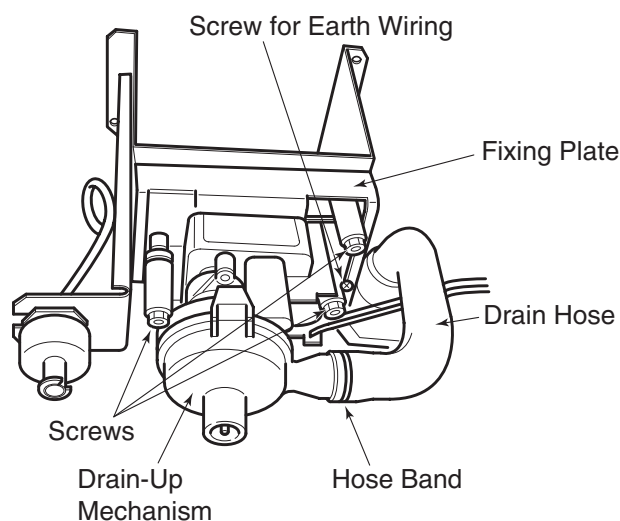
**! WARNING****TURN OFF all power source switches.**

## 2.4.9 Removing Drain-Up Mechanism

- (1) Remove the drain pan according to the item 2.4.8 "Removing Drain Pan".
- (2) Remove the hose band and remove the drain hose.
- (3) Remove screw of earth wiring.
- (4) Hold the drain-up mechanism and remove three (3) screws of the fixing plate for the drain-up mechanism.
- (5) Remove the drain-up mechanism with the fixing plate.

Tool

Phillips Screwdriver

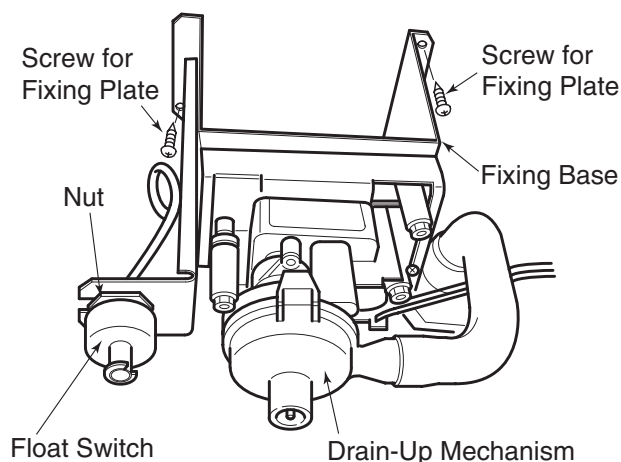


## 2.4.10 Removing Float Switch

- (1) Remove the drain pan according to the item 2.4.8 "Removing Drain Pan".
- (2) Loosen the resin nut for fixing the float switch and remove the float switch. Remove two (2) screws of fixing base for fixing the drain-up mechanism when removing the drain-up mechanism.

Tool

Phillips Screwdriver

**NOTE:**

Carefully handle the float switch.

Do not drop it on the floor. If dropped, malfunction may occur.

When mounting, attach the float switch to the fixing plate by hand.

(Do not use a motor-driven screwdriver.)

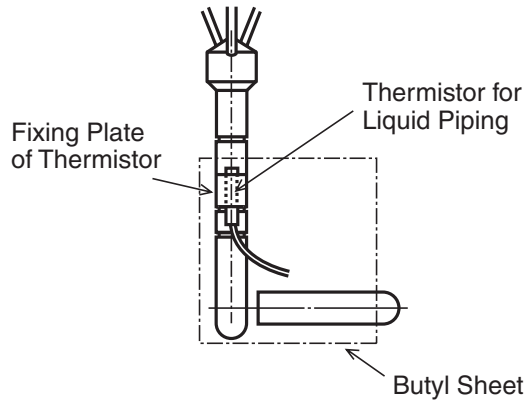
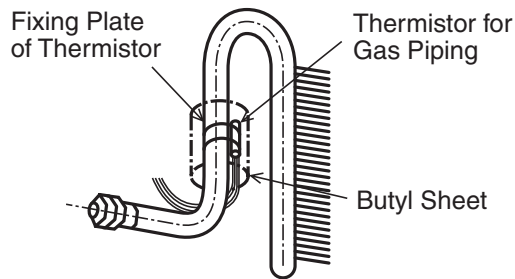
**! WARNING**

**TURN OFF all power source switches.**

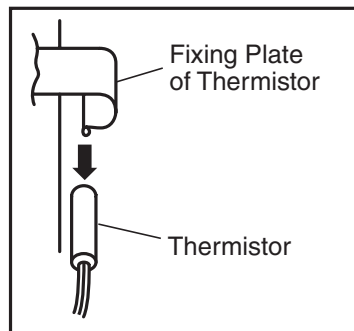
2.4.11 Removing Thermistors for Liquid Pipe and Gas Pipe

- (1) Remove the optional air panel according to the item 2.4.4 "Removing Optional Air Panel".
- (2) Remove the bell-mouth according to No.3 of the item 2.4.5 "Removing Fan Runner and Fan Motor".
- (3) Remove the drain pan according to the item 2.4.8 "Removing Drain Pan".
- (4) Remove the butyl sheet, pull out the fixing plate for the thermistor from the gas pipe, where the thermistor is located, and then pull out the thermistor.
- (5) Remove the butyl sheet, pull out the fixing plate for the thermistor from the liquid pipe, where the thermistor is located, and then pull out the thermistor.

Tool	Phillips Screwdriver, Bucket (approx. 5 liters content)
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Up-Close View of Thermistor Installation



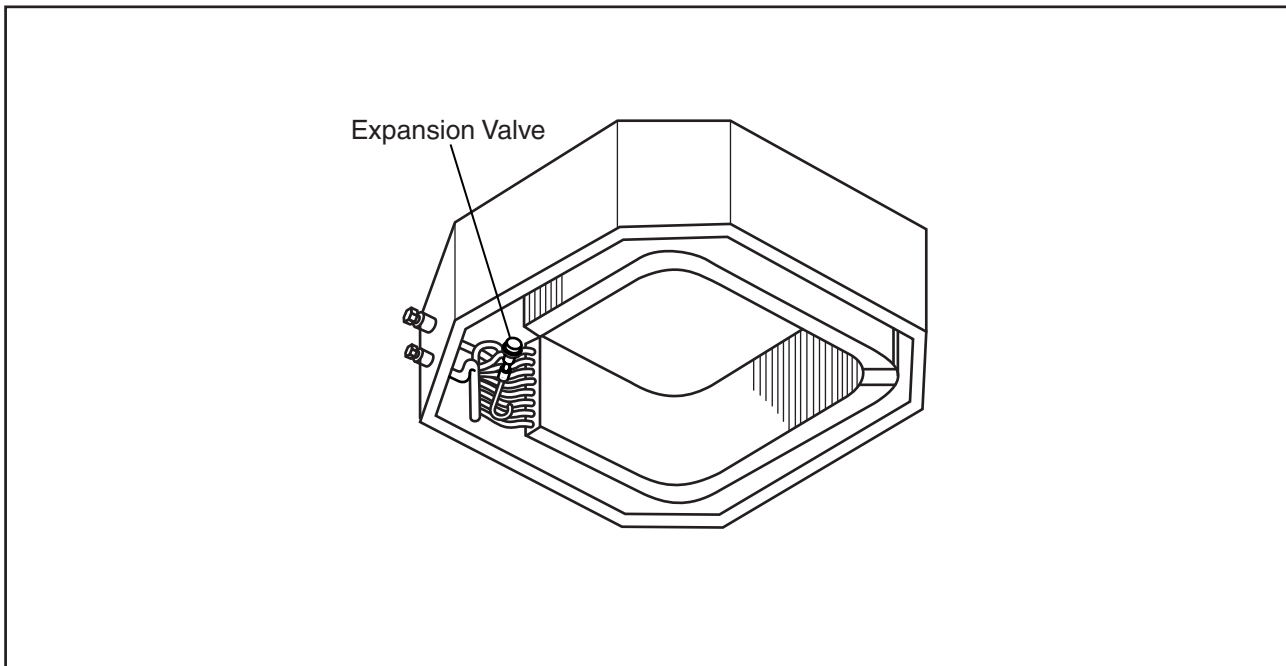
**! WARNING****TURN OFF all power source switches.**

## 2.4.12 Removing Electronic Expansion Valve Coil

- (1) Remove the optional air panel according to the item 2.4.4 "Removing Optional Air Panel".
- (2) Remove the bell-mouth according to No.3 of item 2.4.5 "Removing Fan Runner and Fan Motor".
- (3) Remove the drain pan according to the item 2.4.8 "Removing Drain Pan".

Tool

Phillips Screwdriver



- (4) Remove the butyl sheet at the electronic expansion valve.
- (5) Prepare two (2) spanners. Hold the part of the valve body with one spanner and loosen the lock nut with another spanner by turning the lock nut counterclockwise.

**NOTE:**

Do not hold the motor part when loosening the lock nut by spanner. The base of the drive part may turn idle and be broken.

- (6) Turn the lock nut by a few turn, and the drive part is separated from the screw and can be removed.
- (7) Prepare the new drive part for replacement (service part) with the position of the driver (drive screw) already adjusted.

**NOTE:**

During replacement work, pay attention to the separation part and prevent the dust, foreign particle, etc. from entering into the separation part. (The exposed part by separation is the mechanical part of the valve.)

Do not hurt the junction part of the valve with the tools.

- (8) Put the drive part onto the valve body, hold them with their axes matching and attach the lock nut to the screw part of the valve body.

## SERVICING

### (2.4 4-Way Cassette Type)

# ! WARNING

**TURN OFF all power source switches.**

- (9) Tighten the lock nut with spanner after tightening lightly by hand.  
The tightening torque shall be within the range of 12Nm (120kg-cm) to 15Nm (150kg-cm).

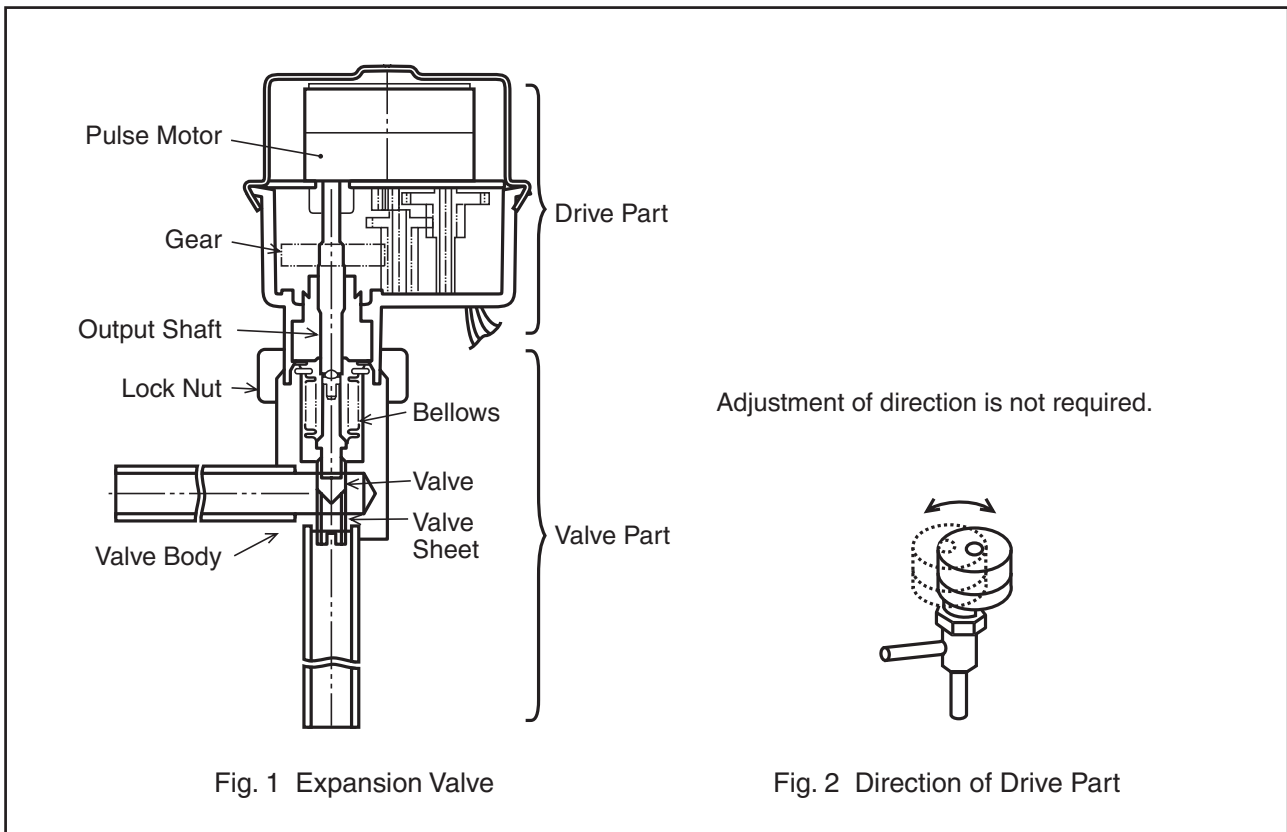
**NOTE:**

Do not apply the strong forces such as the rotating torque and the bending load to the motor by holding the motor by hand when tightening the lock nut.

The direction of the eccentric part of the motor is assembled as the eccentric part of although the motor is directed toward the counter direction of the fittings for piping at the valve body, the alteration of this direction do not affect the open/close function of the valve. Therefore, the adjustment of the direction of the motor part is not required if the position of the motor is moved toward the rotating direction after replacement as shown below.

However, pay attention to the direction of the motor for the coil of the electronic expansion valve not to touch other pipings and the side plate of the electrical box.

Tool	Phillips Screwdriver
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- (10) After completion of the replacement, attach the electronic expansion valve in the reverse procedures for removing.



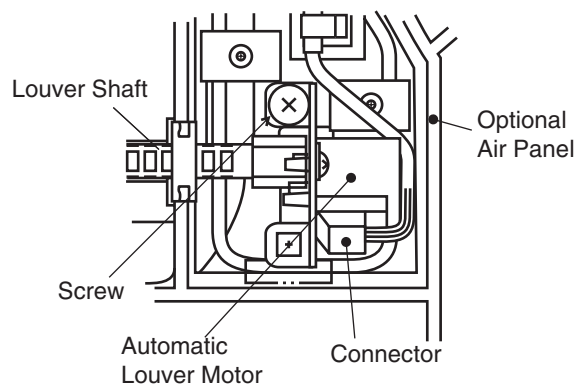
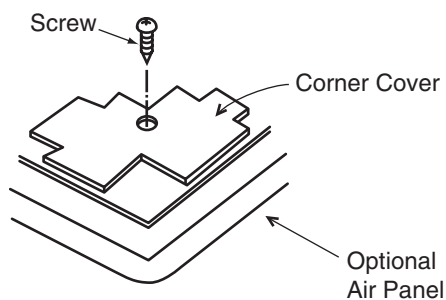
**! WARNING****TURN OFF all power source switches.**

## 2.4.13 Removing Automatic Louver Motor

- (1) Remove the optional air panel according to the item 2.4.4 "Removing Optional Air Panel".
- (2) Remove the motor cover after removing one (1) screw fixing the motor cover for the automatic louver motor.
- (3) Draw out the louver shaft from the automatic louver motor and remove the automatic louver motor with fixing plate.
- (4) Disconnect all the connectors connected to the motor.

Tool

Phillips Screwdriver



## SERVICING

### (2.5 2-Way Cassette Type)

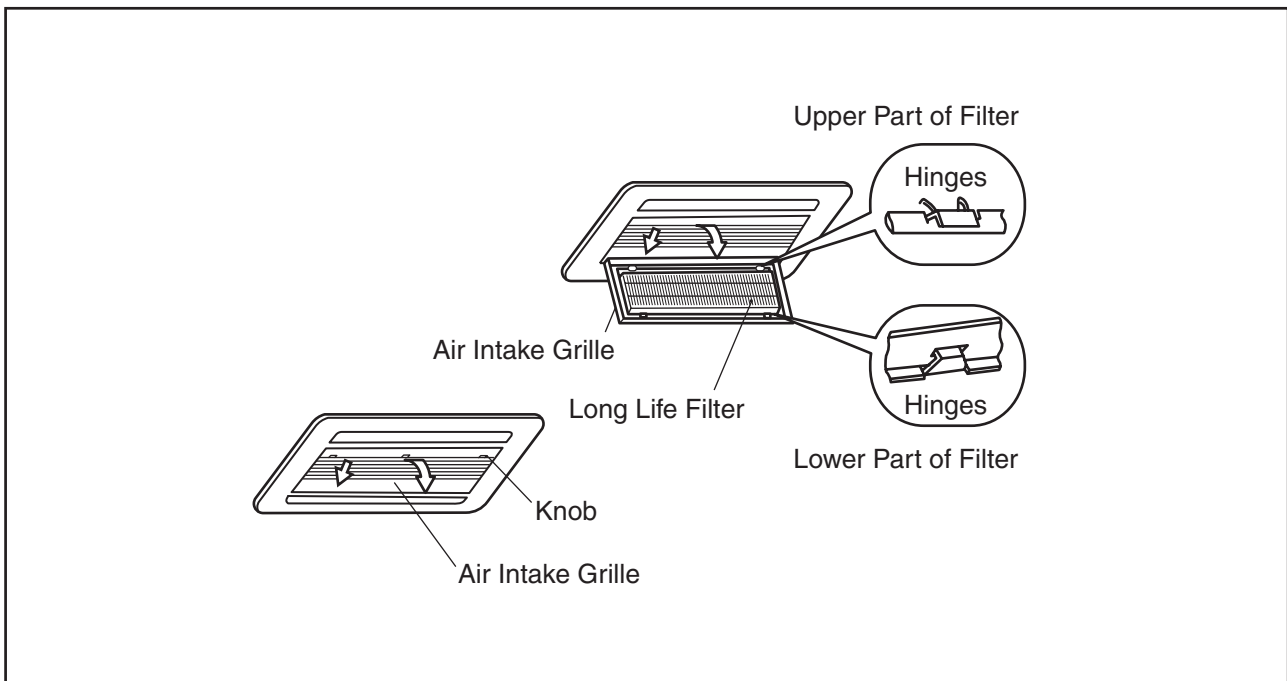
#### 2.5 2-Way Cassette Type

## ! WARNING

**TURN OFF all power source switches.**

#### 2.5.1 Removing Long Life Filter and Air Intake Grille

- (1) The long life filter is located inside of the air intake grille. The air intake grille can be opened by pushing the knob as shown below.
- (2) Detach the filter after opening the air intake grille. The filter can be removed from the air intake panel by supporting the louver side of the air intake grille and filter, and unhooking it from the extrusion part.
- (3) The air intake grille can be removed by releasing its chain, lifting it upwards and then drawing it towards you.

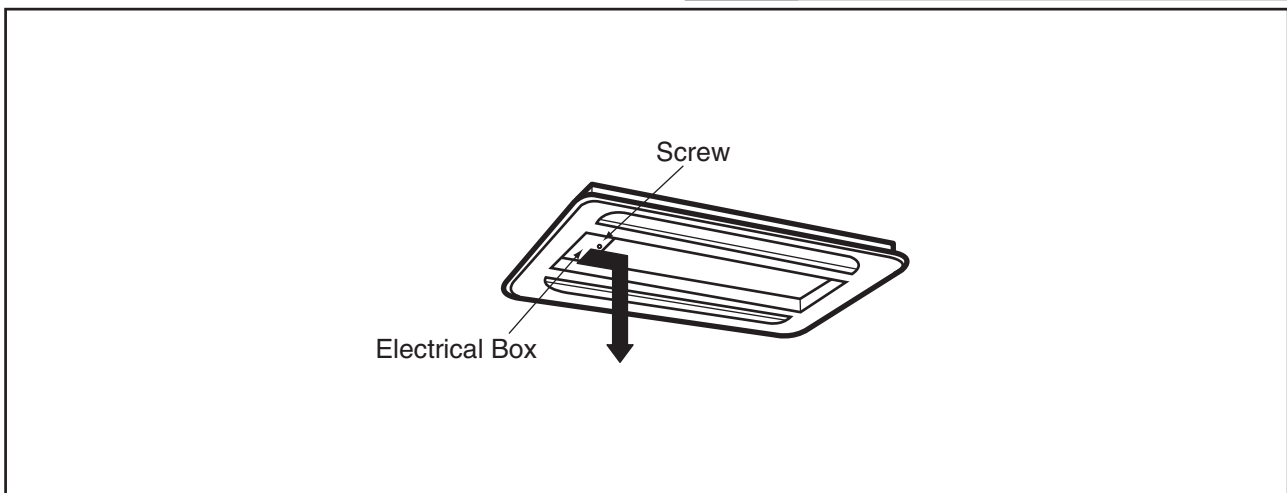


#### 2.5.2 Removing Electrical Box Cover

By opening the air intake grille, the electrical box can be seen. Loosen one (1) screw fixing the electrical box cover and remove the cover.

Tool

Phillips Screwdriver



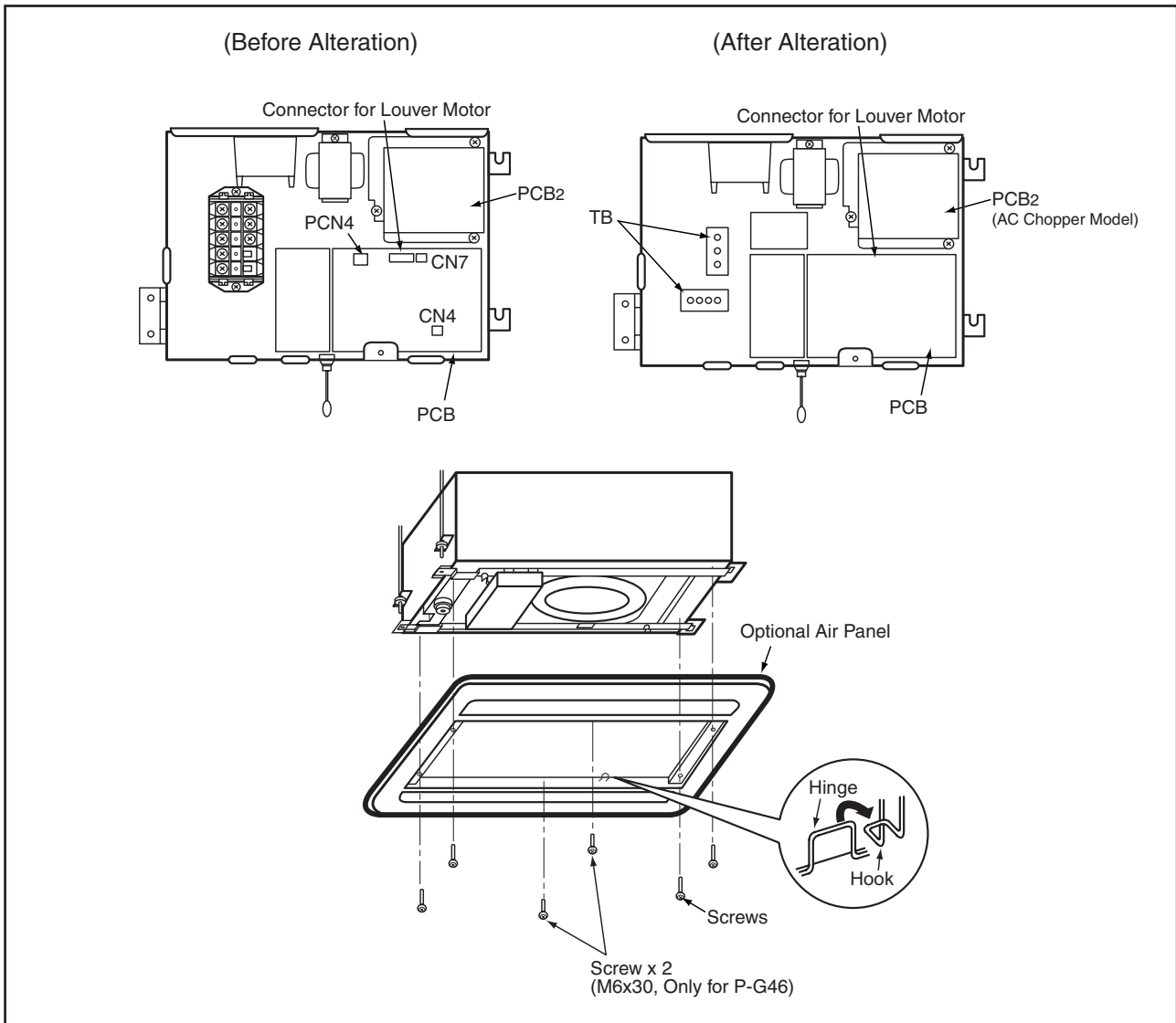
**! WARNING**

**TURN OFF all power source switches.**

2.5.3 Removing Optional Air Panel

- (1) Remove the electrical box cover by opening the air intake grille.  
Disconnect the connector (CN17) for the auto-louver on the indoor PCB.
- (2) Remove the air intake grille from the optional air panel.  
Remove four (4) screws fixing the optional air panel.
- (3) Remove the optional air panel after unhooking the hinge onto the hooks at the two positions near the drain pan.

Tool	Phillips Screwdriver
------	----------------------



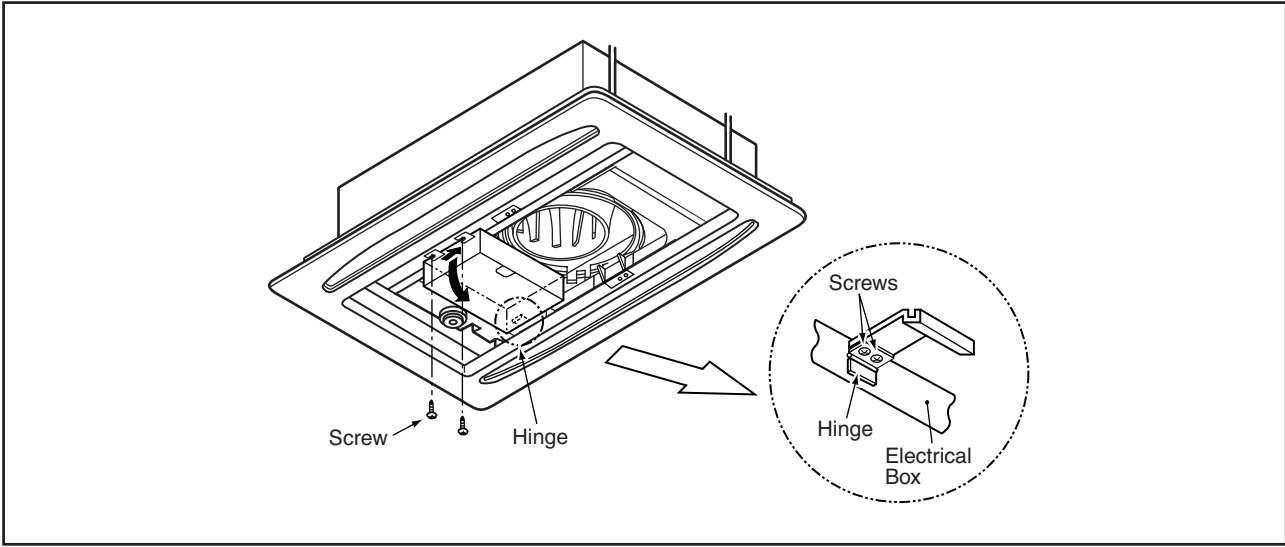
**! WARNING**

**TURN OFF all power source switches.**

2.5.4 Removing Fan Runner and Fan Motor

- (1) Remove the optional air panel according to the item 2.5.3 "Removing Optional Air Panel".
- (2) Removing Electrical Box
  - (a) Disconnect the connectors for each wire.
  - (b) Remove two (2) screws fixing the electrical box and turn the electrical box downwards by approximately 90°. (The electrical box is hung by the hinge. Do not remove the fixing screws for the hinge.)

Tool	Phillips Screwdriver
------	----------------------

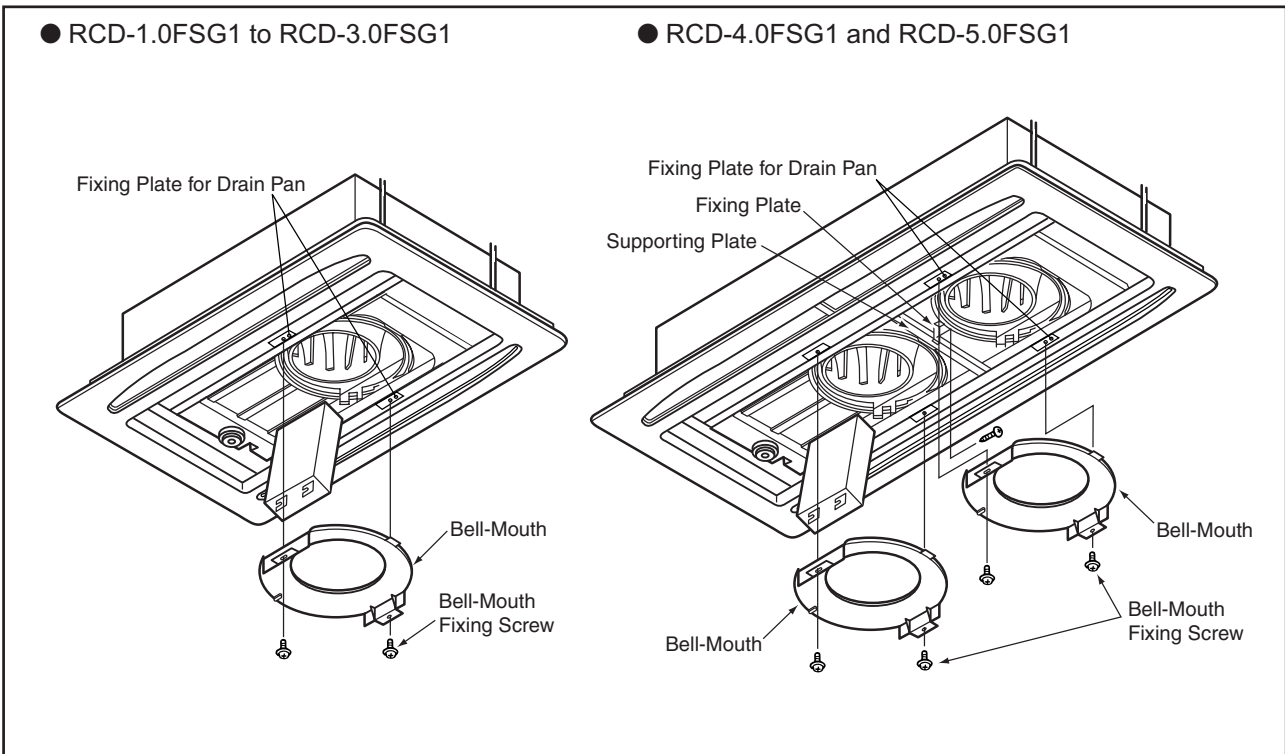


(3) Removing Bell-Mouth

Remove the fixing plate after removing one (1) screw fixing the fixing plate on the support plate of the indoor unit. (For 4.0 and 5.0HP)  
 Remove the bell-mouth by removing two (2) screws fixing the bell-mouth onto the fixing plate for the drain pan of the indoor unit.

- \* Q'ty of Bell-Mouth: 1 (RCD-1.0 to 3.0FSG1)  
 2 (RCD-4.0 to 5.0FSG1)

Tool	Phillips Screwdriver
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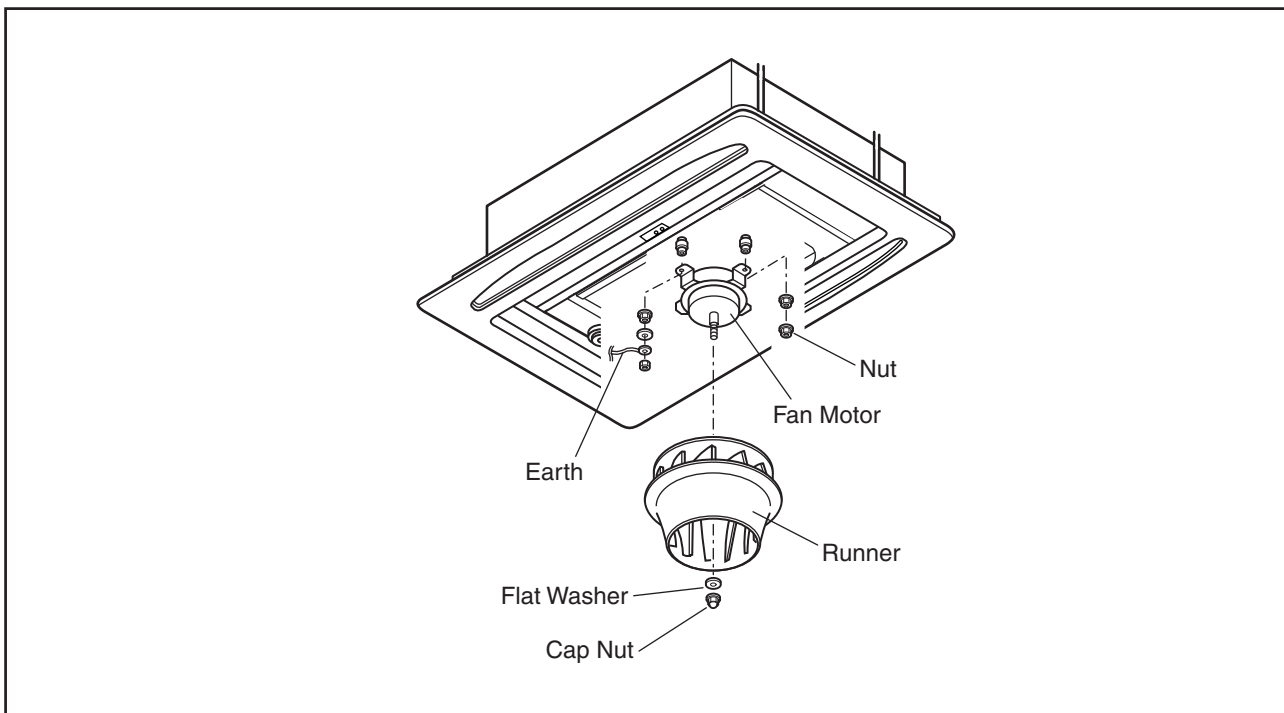


**! WARNING****TURN OFF all power source switches.**

- (4) Remove the fan runner and the fan motor.  
Remove the fan runner after removing the cap nut and the washer fixing the fan runner.
- (a) Disconnect the earth wire for the fan motor.
- (b) Remove four (4) nuts fixing the fan motor and remove the fan motor.  
(When reassembling, the required tightening torque for the cap nut is approximately 8N-m (80kg-cm).
- \* Q'ty of Fan Runner and Fan Motor: Each 1 (RCD-1.0 to 3.0FSG1)  
Each 2 (RCD-4.0 to 5.0FSG1)

Tool

Phillips Screwdriver, Spanner



**! WARNING**

**TURN OFF all power source switches.**

2.5.5 Removing Printed Circuit Board (PCB)

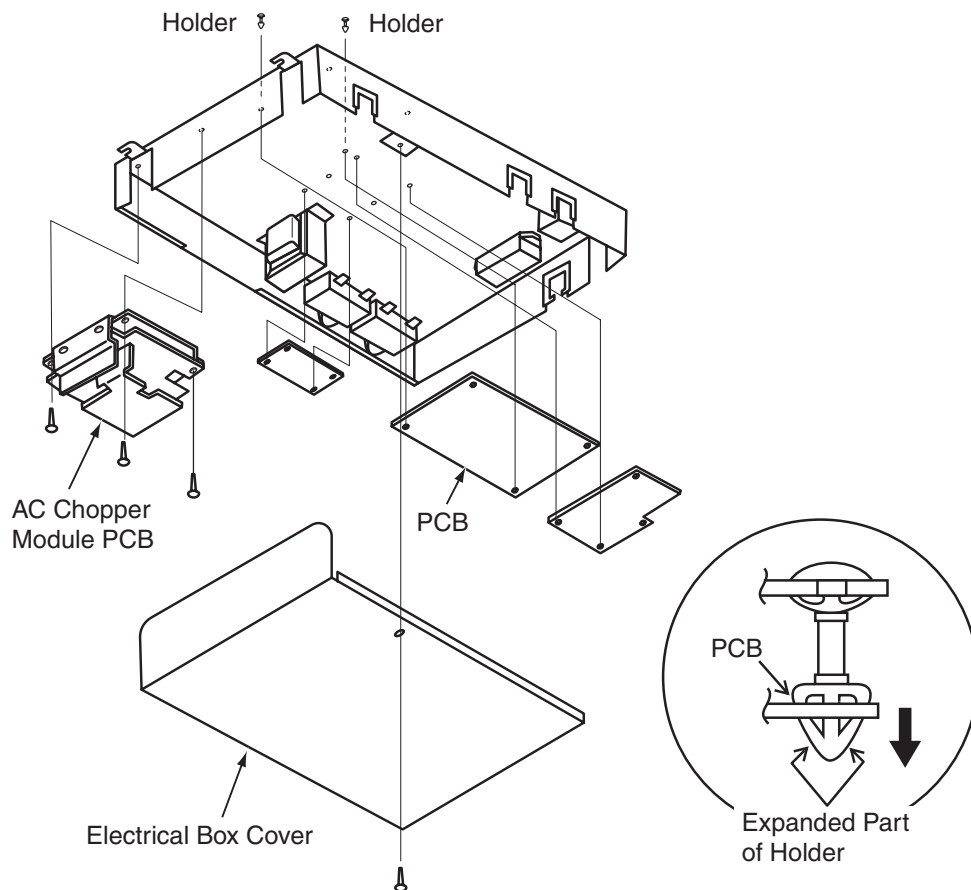
- (1) Remove the air intake grille according to the item 2.5.1 "Removing Long Life Filter and Air Intake Grille".
- (2) Remove the electrical box cover according to the item 2.5.2 "Removing Electrical Box Cover".
- (3) Pull out the PCB by pinching the expanded part of the PCB holders (holding PCB at four (4) positions) by long-nose plier.
- (4) Remove three (3) fixing screws for the AC chopper.  
(Pay attention to squeezing when reassembling, since the sealed earth wire and the transformer earth wire are commonly squeezed by one (1) screw.)

Tool

Phillips Screwdriver, Long-nose Plier

**NOTE:**

Do not touch electrical components on the PCBs.  
If great force is applied to the PCB, it will be faulty.



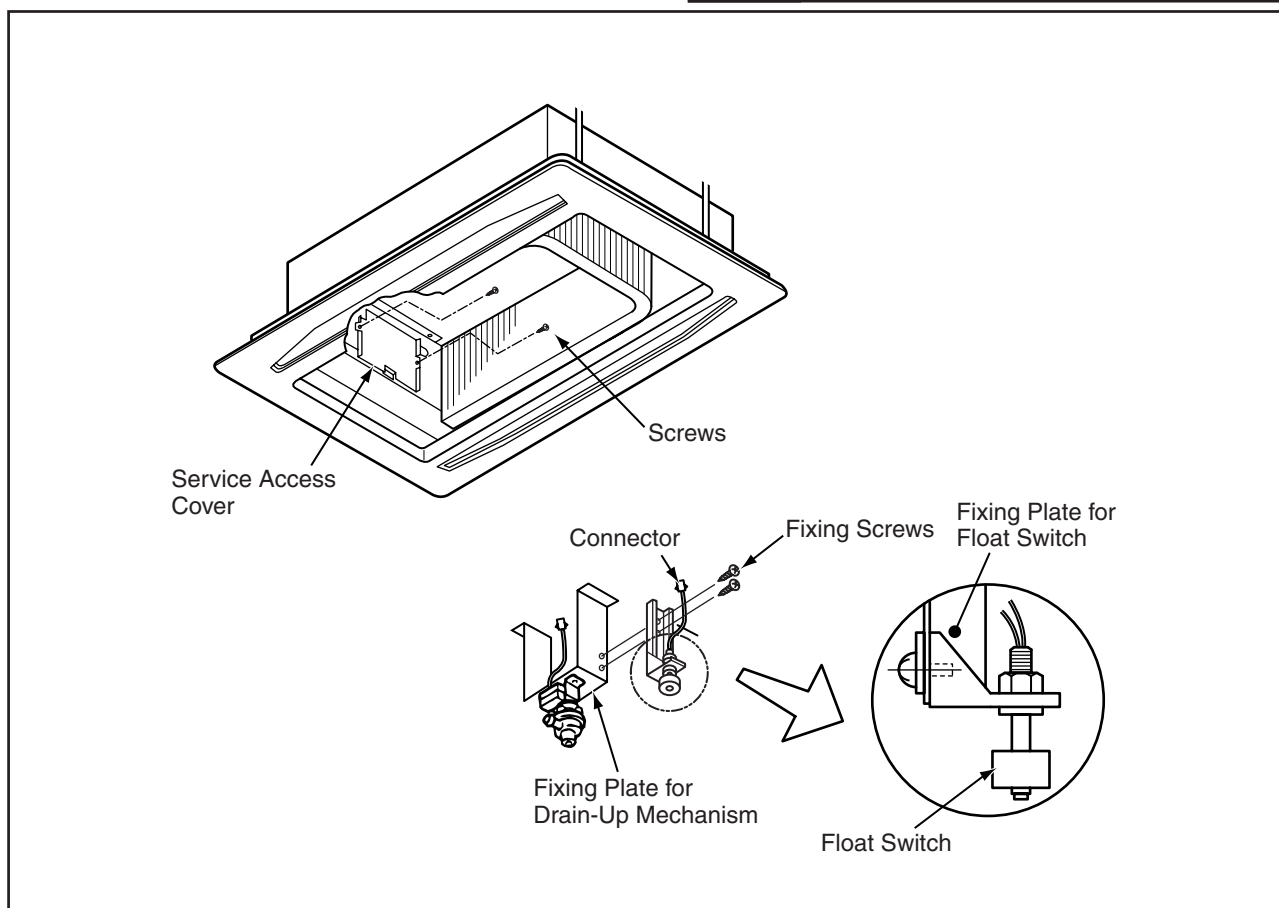
**! WARNING****TURN OFF all power source switches.**

## 2.5.6 Removing Float Switch

- (1) Remove the air intake grille according to the item 2.5.1 "Removing Long Life Filter and Air Intake Grille".
- (2) Remove the bell-mouth according to the item 2.5.4 "Removing Fan Runner and Fan Motor".
- (3) Remove the cover after removing two (2) fixing screws for the cover of the service access hole near the pipes inside the unit.
- (4) Removing Float Switch  
Disconnect the connectors and remove the float switch after removing two (2) screw fixing the fixing plate for float switch onto the fixing plate for the drain-up mechanism.

Tool

Phillips Screwdriver



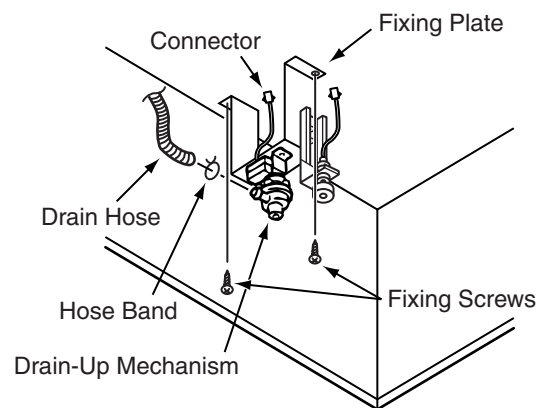
**! WARNING****TURN OFF all power source switches.**

## 2.5.7 Removing Drain-Up Mechanism

- (1) Remove the air intake grille according to the item 2.5.1 "Removing Long Life Filter and Air Intake Grille".
- (2) Remove the bell-mouth according to the item 2.5.4 "Removing Fan Runner and Fan Motor".
- (3) Remove the drain pan according to the item 2.5.8 "Removing Drain Pan".
- (4) After disconnecting the wire connector, remove two (2) fixing screws for the fixing plate for the drain-up mechanism. Firstly support the drain-up mechanism by hand so as not to drop, remove the hose band from the drain hose, disconnect the drain hose and then remove the drain-up mechanism.

Tool

Phillips Screwdriver





**! WARNING**

**TURN OFF all power source switches.**

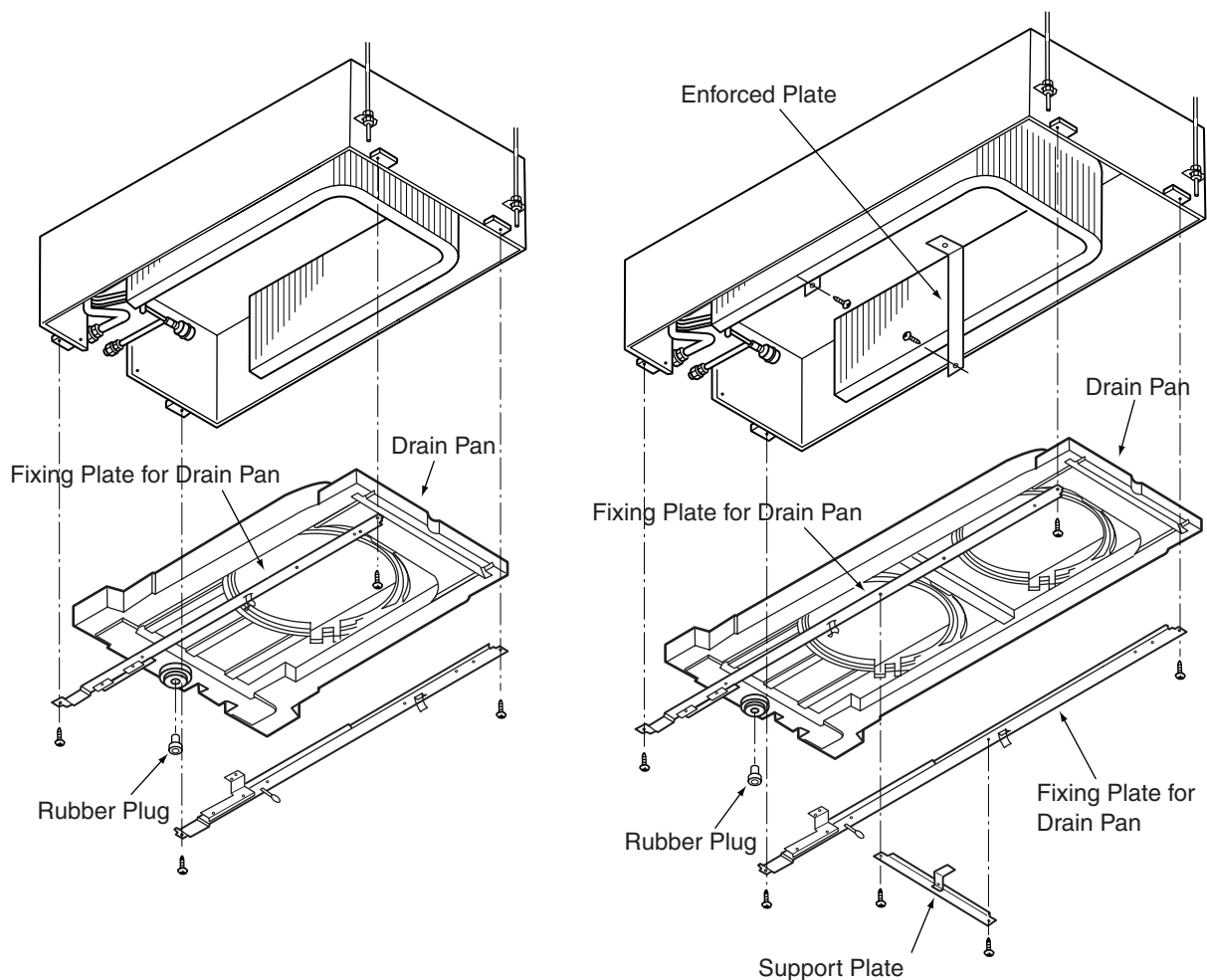
2.5.8 Removing Drain Pan

- (1) Remove the air intake grille according to the item 2.5.1 "Removing Long Life Filter and Air Intake Grille".
- (2) Open the electrical box cover according to the item 2.5.2 "Removing Electrical Box Cover". Disconnect the connecting wire between indoor unit and outdoor unit, electrical wiring for the electrical box and the connectors inside of the electrical box.
- (3) Remove the bell-mouth according to the item 2.5.4 "Removing Fan Runner and Fan Motor".
- (4) Discharge the drain water on the drain pan by removing the rubber plug. The sealing agent is used around the rubber plug. However, the rubber plug can be removed by pulling it out. Do not scratch the rubber plug by a cutter, etc. Check to ensure that the water hole is not clogged by pricking with a pencil.
- (5) Removing Drain Pan
  - (a) Remove two (2) screws fixing the enforced plate onto the fixing plate for the drain pan. Remove two (2) screws fixing the support plate onto the fixing plate for the drain pan and remove the support plate. (For RCD-4.0 and 5.0FSG1)
  - (b) Remove two (2) fixing plate for the drain pan.
  - (c) Remove the drain pan.

Tool	Phillips Screwdriver, Bucket (approx. 5 liters content)
------	--

● RCD-1.0FSG1 to RCD-3.0FSG1

● RCD-4.0FSG1 and RCD-5.0FSG1



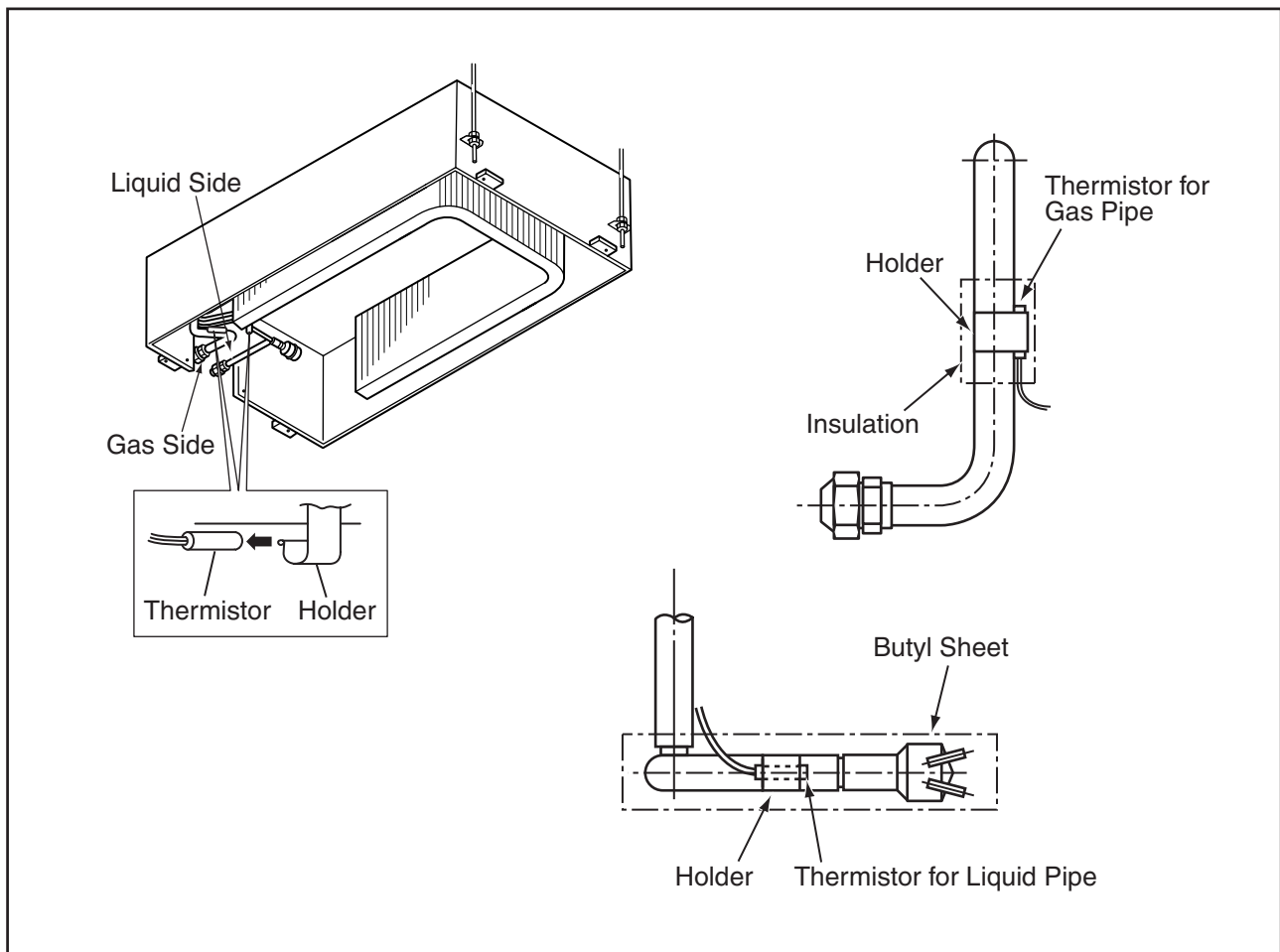
**! WARNING****TURN OFF all power source switches.**

## 2.5.9 Removing Thermistors for Liquid and Gas Pipes

- (1) Remove the optional air panel according to the item 2.5.3 "Removing Optional Air Panel".
- (2) Remove the bell-mouth according to the item 2.5.4 "Removing Fan Runner and Fan Motor".
- (3) Remove the drain pan according to the item 2.5.8 "Removing Drain Pan".
- (4) Remove the insulation for the pipe, remove the thermistor holder from the gas piping and remove the thermistor for the gas pipe.
- (5) Remove the butyl sheet, remove the thermistor holder from the liquid piping and remove the thermistor for the liquid pipe.

Tool

Phillips Screwdriver



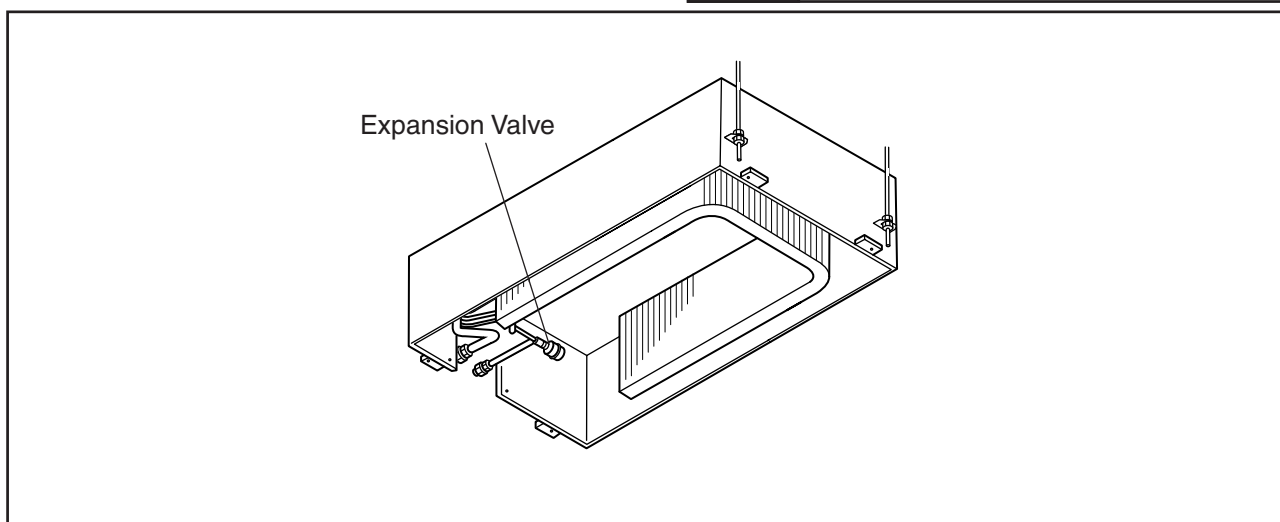
**! WARNING****TURN OFF all power source switches.**

## 2.5.10 Removing Electronic Expansion Valve Coil

- (1) Remove the optional air panel according to the item 2.5.3 "Removing Optional Air Panel".
- (2) Remove the fan assembly according to the item 2.5.4 "Removing Fan Runner and Fan Motor".
- (3) Remove the drain pan according to the item 2.5.8 "Removing Drain Pan".

Tool

Phillips Screwdriver



- (4) Remove the butyl sheet at the electronic expansion valve.
- (5) Prepare two (2) spanners (#19 and #14). Hold the part of the valve body with one spanner and loosen the lock nut with another spanner by turning the lock nut counterclockwise.
- (6) Turn the lock nut by a few turn, and the drive part is separated from the screw and can be removed.
- (7) Prepare the new drive part for replacement (service part) with the position of the driver (drive screw) already adjusted.

**NOTE:**

Do not hold the motor part when loosening the lock nut by spanner. The base of the drive part may turn idle and be broken.

- (8) Turn the lock nut by a few turn, and the drive part is separated from the screw and can be removed.
- (7) Prepare the new drive part for replacement (service part) with the position of the driver (drive screw) already adjusted.
- (8) Put the drive part onto the valve body, hold them with their axes matching and attach the lock nut to the screw part of the valve body.

**! WARNING**

**TURN OFF all power source switches.**

- (9) Tighten the lock nut with spanner after tightening lightly by hand. The tightening torque shall be within the range of 12Nm (120kg-cm) to 15Nm (150kg-cm).

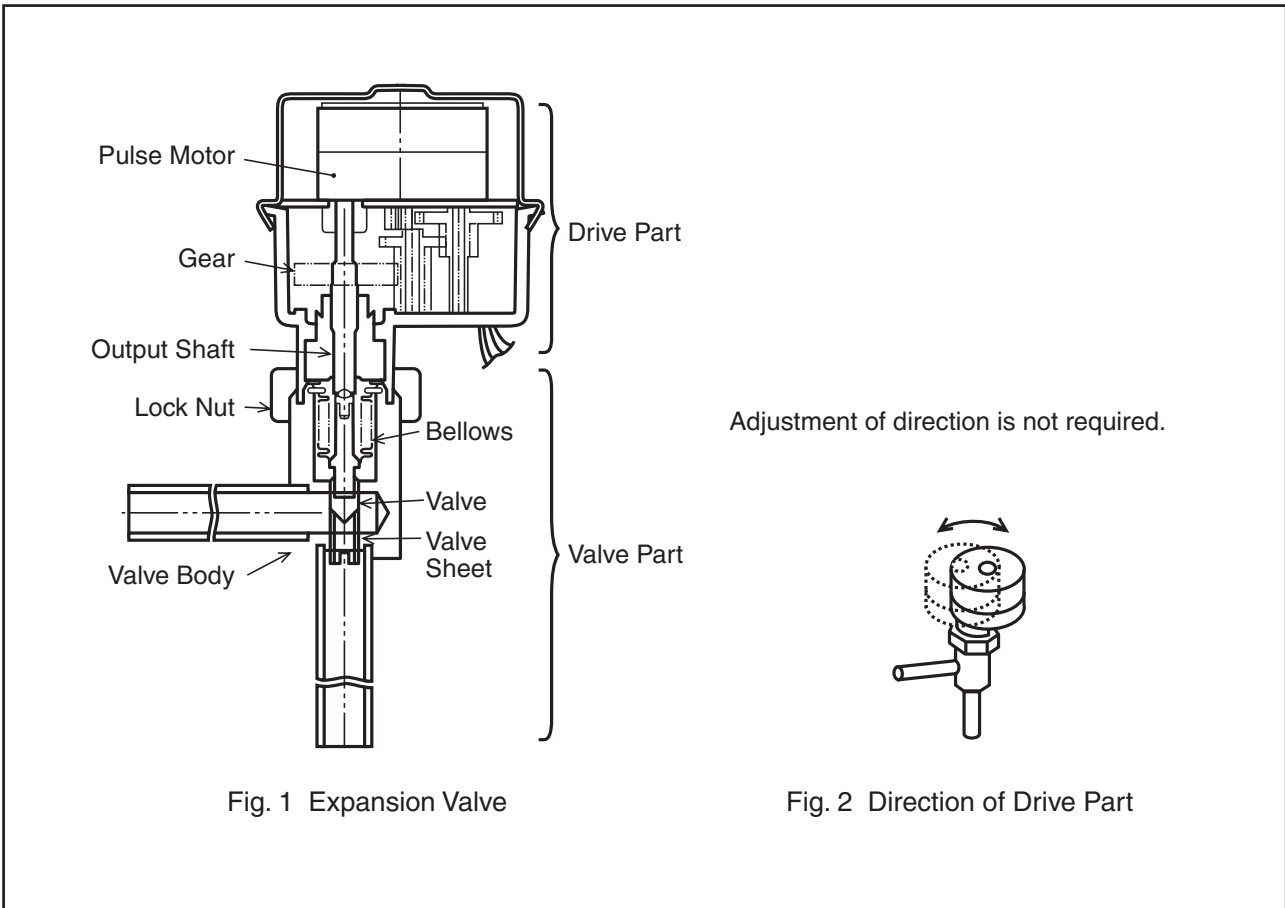
**NOTE:**

Do not apply the strong forces such as the rotating torque and the bending load to the motor by holding the motor by hand when tightening the lock nut.

The direction of the eccentric part of the motor is assembled as the eccentric part of although the motor is directed toward the counter direction of the fittings for piping at the valve body, the alteration of this direction do not affect the open/close function of the valve. Therefore, the adjustment of the direction of the motor part is not required if the position of the motor is moved toward the rotating direction after replacement as shown below.

However, pay attention to the direction of the motor for the coil of the electronic expansion valve not to touch other pipings and the side plate of the electrical box.

Tool	Phillips Screwdriver
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- (10) After completion of the replacement, attach the electronic expansion valve in the reverse procedures for removing.

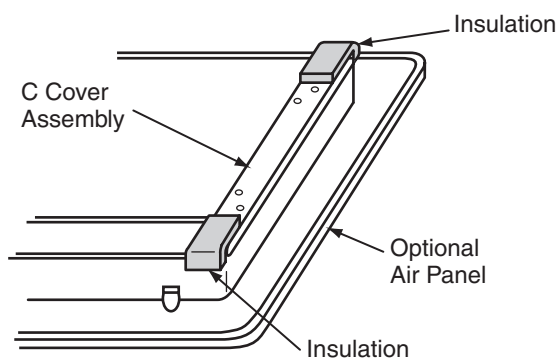
**! WARNING****TURN OFF all power source switches.**

## 2.5.11 Removing Automatic Louver Motor

- (1) Remove the optional air panel according to the item 2.5.3 "Removing Optional Air Panel".
- (2) Remove the insulation mounted with adhesive at the both sides of the C cover assembly.

Tool

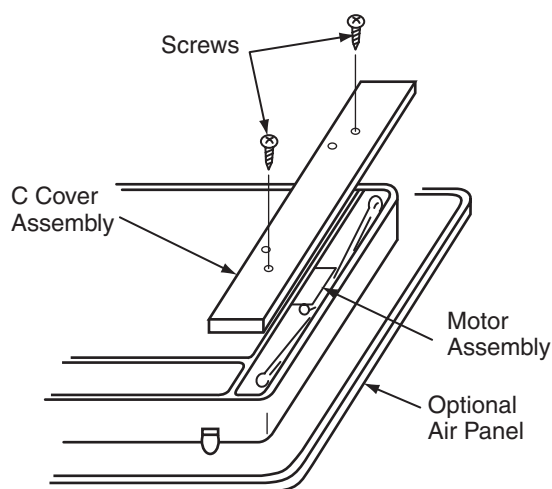
Phillips Screwdriver



- (3) Remove two (2) screws fixing the C cover assembly and remove the C cover assembly from the optional air panel.

Tool

Phillips Screwdriver



## SERVICING

(2.5 2-Way Cassette Type)

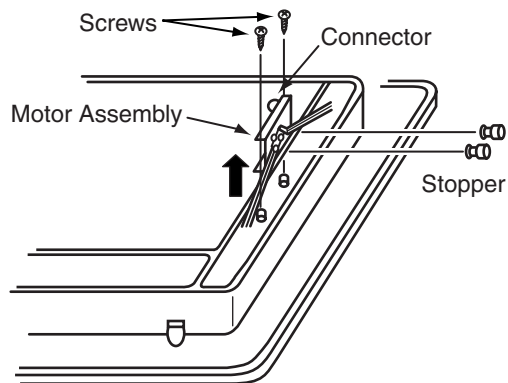
### **! WARNING**

**TURN OFF all power source switches.**

- (4) Remove two (2) screws fixing the motor assembly and remove two (2) stoppers by lifting the motor assembly upwards (to the arrow direction) by hand. The stopper can be removed by pulling. The motor assembly can be removed by removing the connector at the same time.

Tool

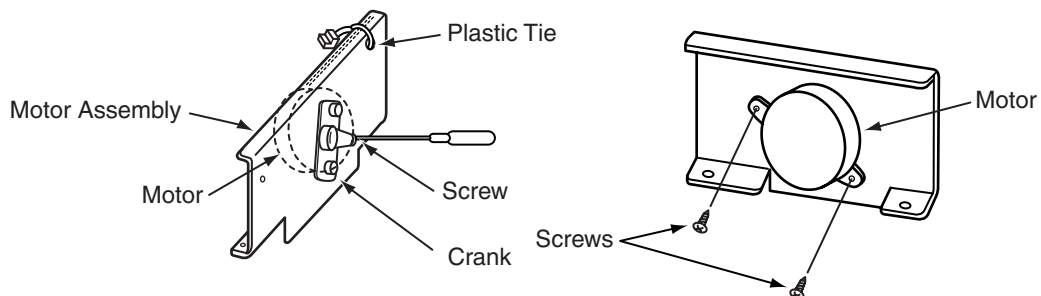
Phillips Screwdriver



- (5) Remove one (1) screw fixing the crank and cut the plastic tie fixing the motor cord. Remove the motor after removing two fixing screws.

Tool

Phillips Screwdriver

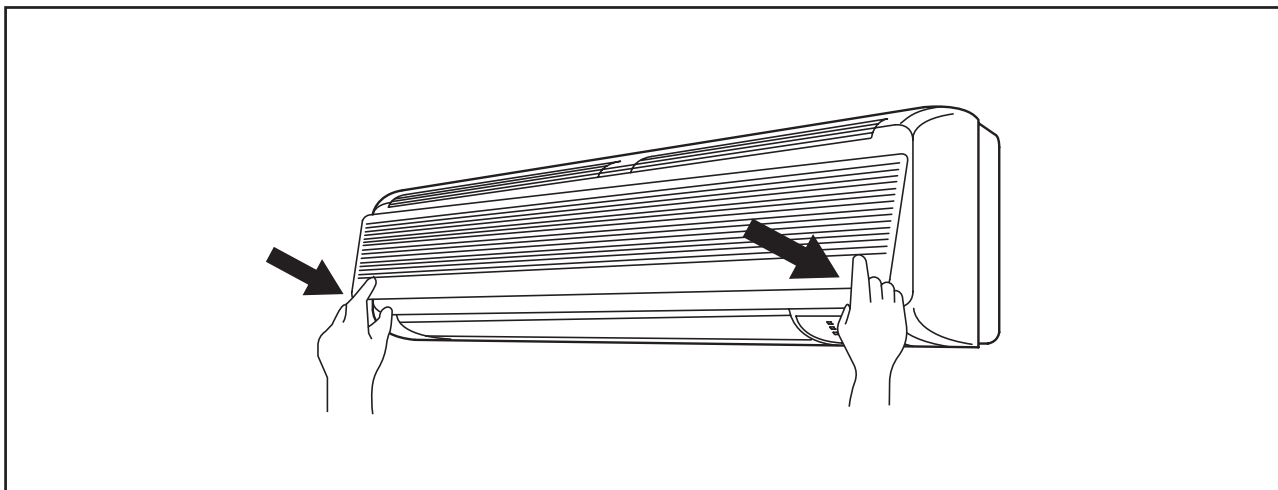


## 2.6 Wall Type

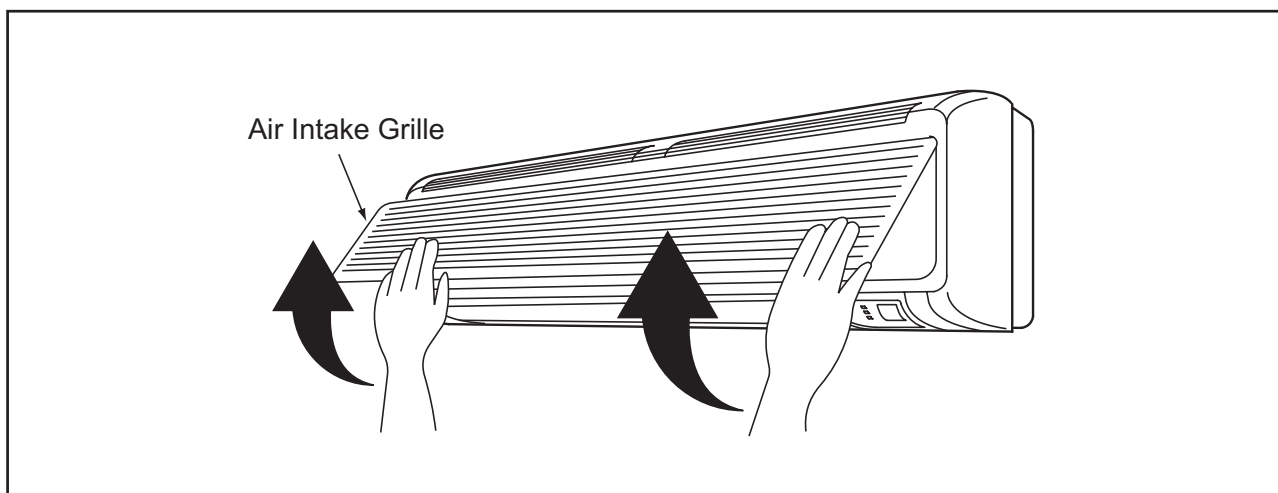
**! WARNING****TURN OFF all power source switches.**

## 2.6.1 Removing Air Filter

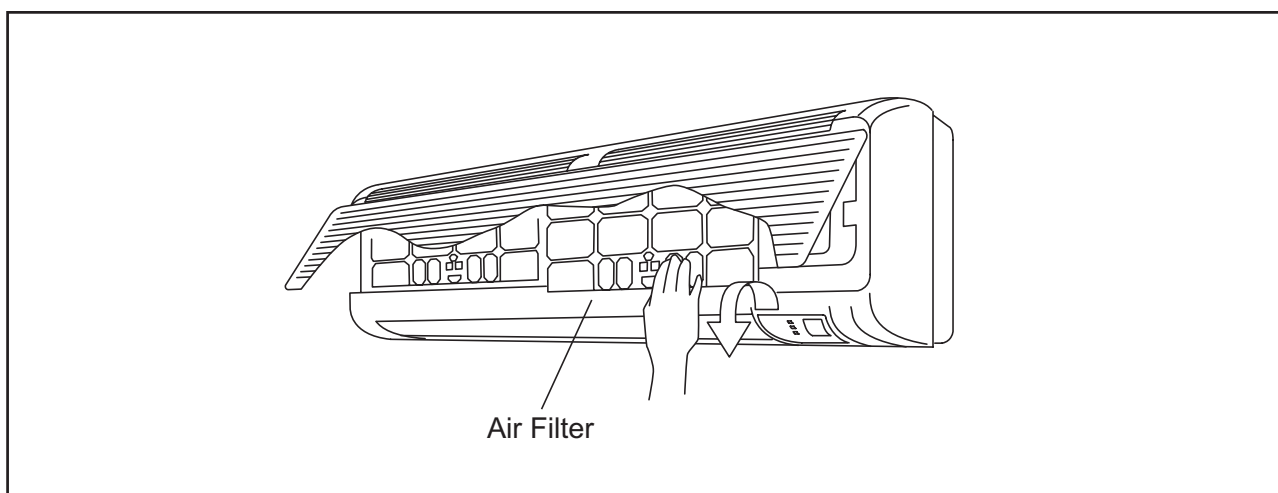
- (1) Press 2 portions (right and left) of the air intake grille as shown below.



- (2) Slowly pull the lower side of the air intake grille toward the front side.



- (3) Lift up the air filter, detach the hooks and draw the air filter downward.



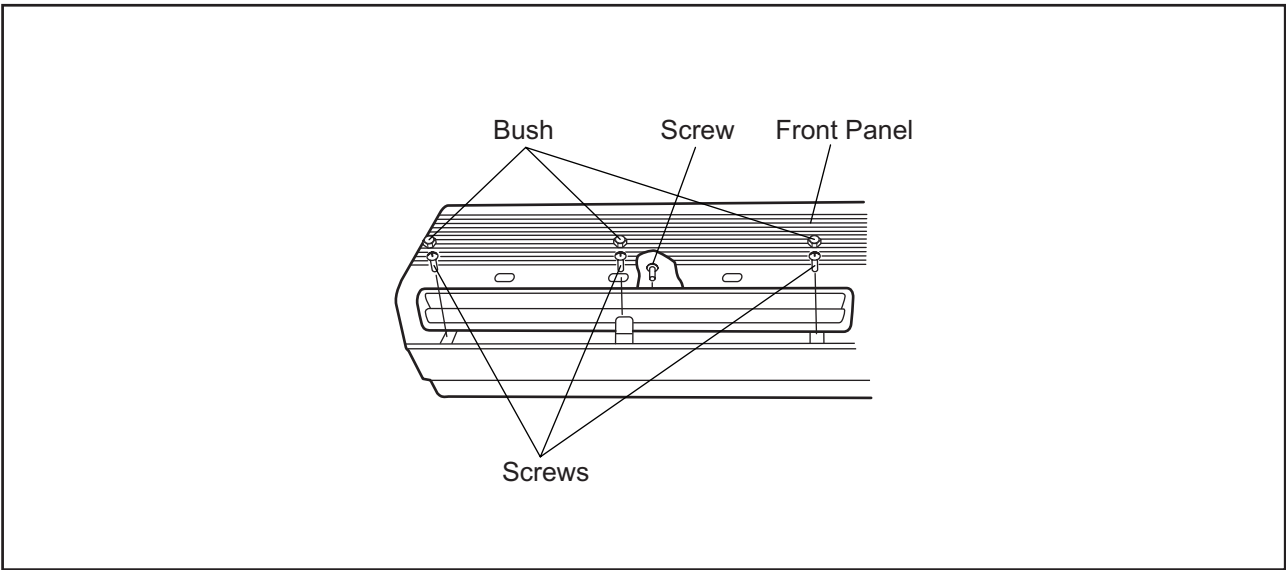
**! WARNING**

**TURN OFF all power source switches.**

2.6.2 Removing Front Panel

- (1) Press the "PUSH" marks at both ends of the front panel and open the suction grille by pulling toward the front side.
- (2) Remove one (1) screws at the center of the front panel. After removing the screw, close the front panel once.
- (3) Remove three (3) bushes at the louver part of the air outlet and remove three screws.

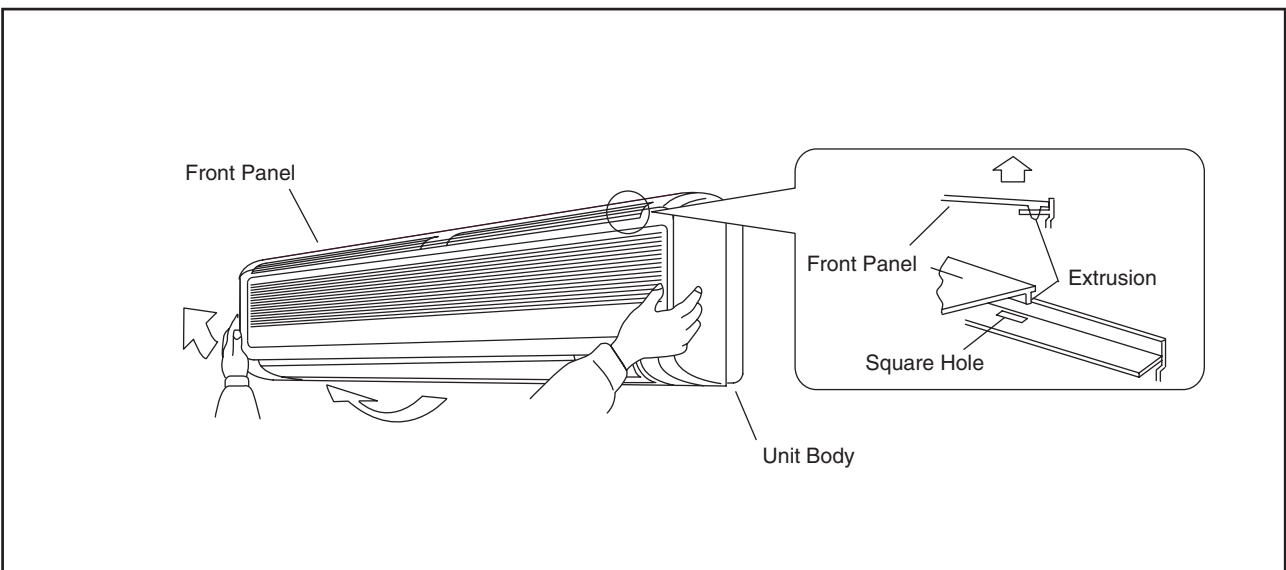
Tool	Phillips Screwdriver
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- (4) Hold both sides of the front panel, pull the front panel toward the front side slowly and lift up the front panel with paying attention not to touch the louver at the air outlet.
- (5) Lift up the front panel slightly, the three (3) catches at the upper part of the front panel are detached from the holes of the unit body and the front panel can be removed toward the front side.

**NOTE:**

Do NOT hit the front panel when removing the front panel. It may break the unit body.



- (6) For attaching the front panel, attach the front panel at the air outlet side firstly, and attach three (3) catches at the upper part of the front panel.
- (7) Open the front panel as the procedure (1), and fix the screw (1 piece) at the center of the front panel.



**! WARNING**

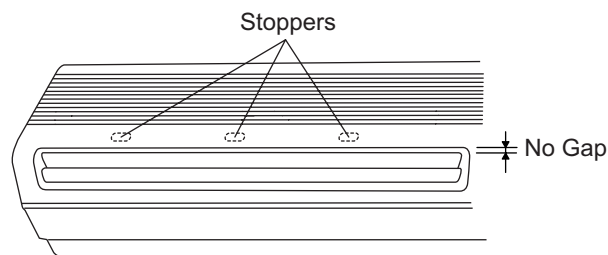
**TURN OFF all power source switches.**

- (8) There are three (3) catches at the inner side of the front panel. Press the catch part from the front side and check to ensure that there is no gap between the front panel and the unit body.

**NOTE:**

If the gap exists between the front panel and the air outlet, it may cause air leakage and dewing may occur at the front panel and the dew may drop.

- (9) After attaching the front panel, tighten three (3) screws at the lower part of the air outlet and cover them with the bushes.



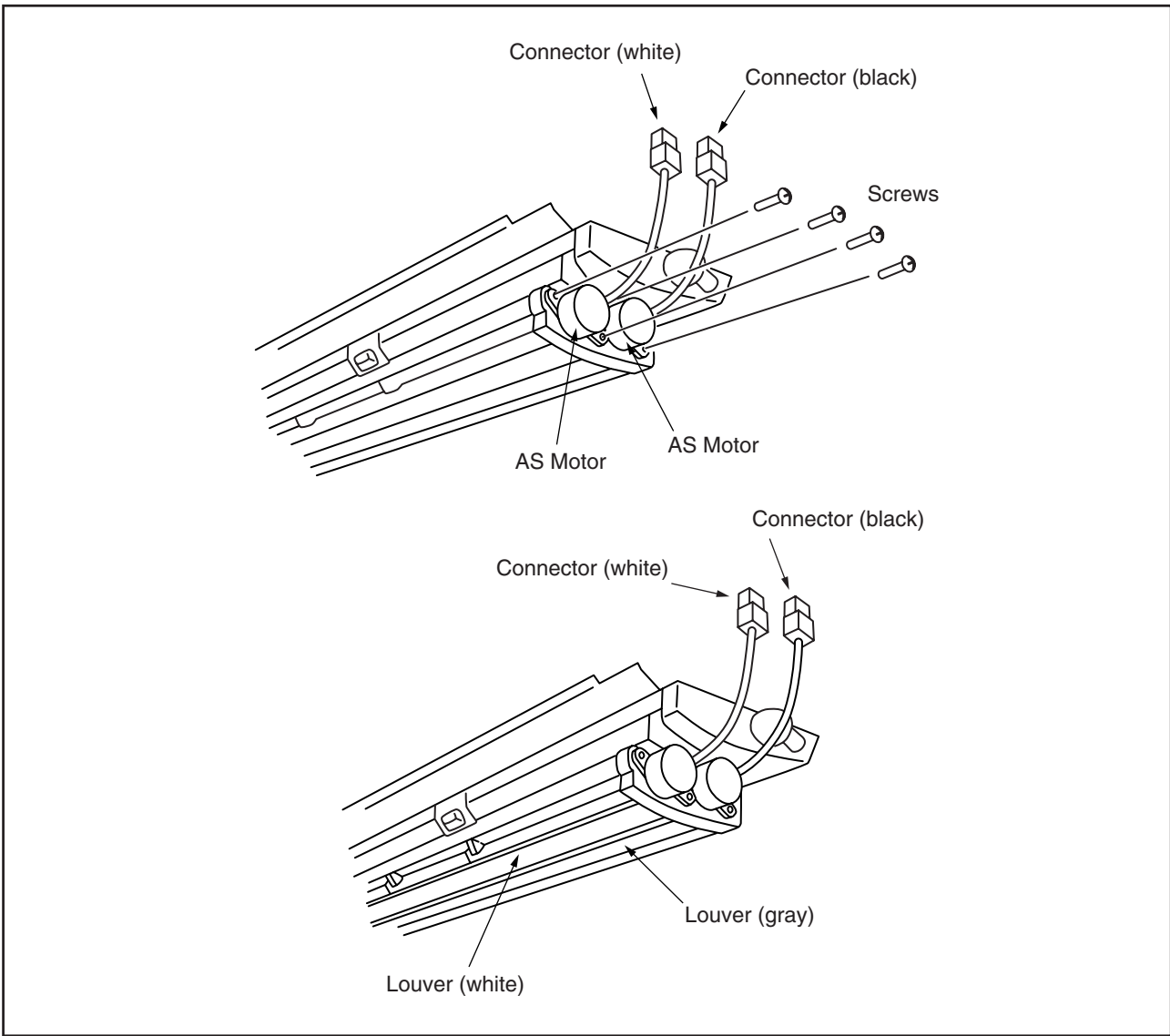
**! WARNING**

**TURN OFF all power source switches.**

2.6.3 Removing Motor for Automatic Louver

- (1) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (2) Remove the electrical box according to the item 2.6.5 "Removing Electrical Box Cover".
- (3) Remove four screws fixing the AS motor.
- (4) Draw out the AS motor horizontally, the AS motor is separated from the louver shaft.
- (5) For attaching the AS motor, insert the shaft of the AS motor into the D-cut hole of the louver, and perform the reverse procedures for removing AS motor.

Tool	Phillips Screwdriver
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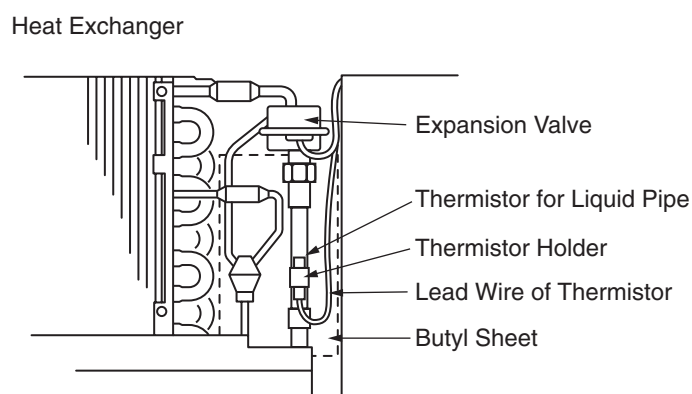
**! WARNING****TURN OFF all power source switches.**

## 2.6.4 Removing Thermistors for Liquid Pipe, Gas Pipe, Discharge Air and Suction Air

- (1) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (2) Remove the electrical box according to the item 2.6.5 "Removing Electrical Box Cover".

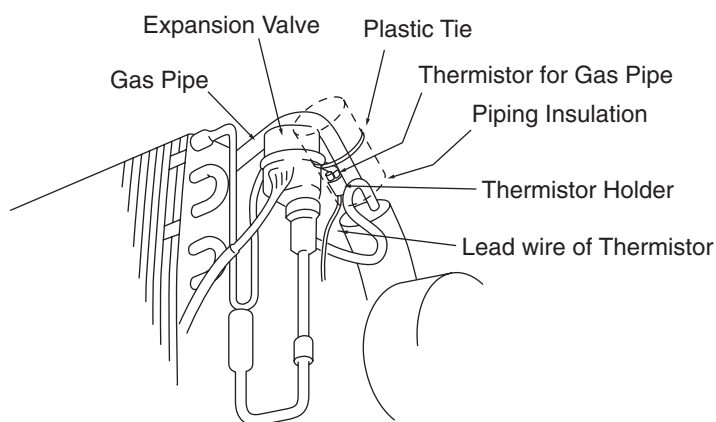
## (3) Removing Thermistor for Liquid Pipe

Remove the butyl sheet protecting the thermistor for liquid pipe and remove the thermistor from the holder.



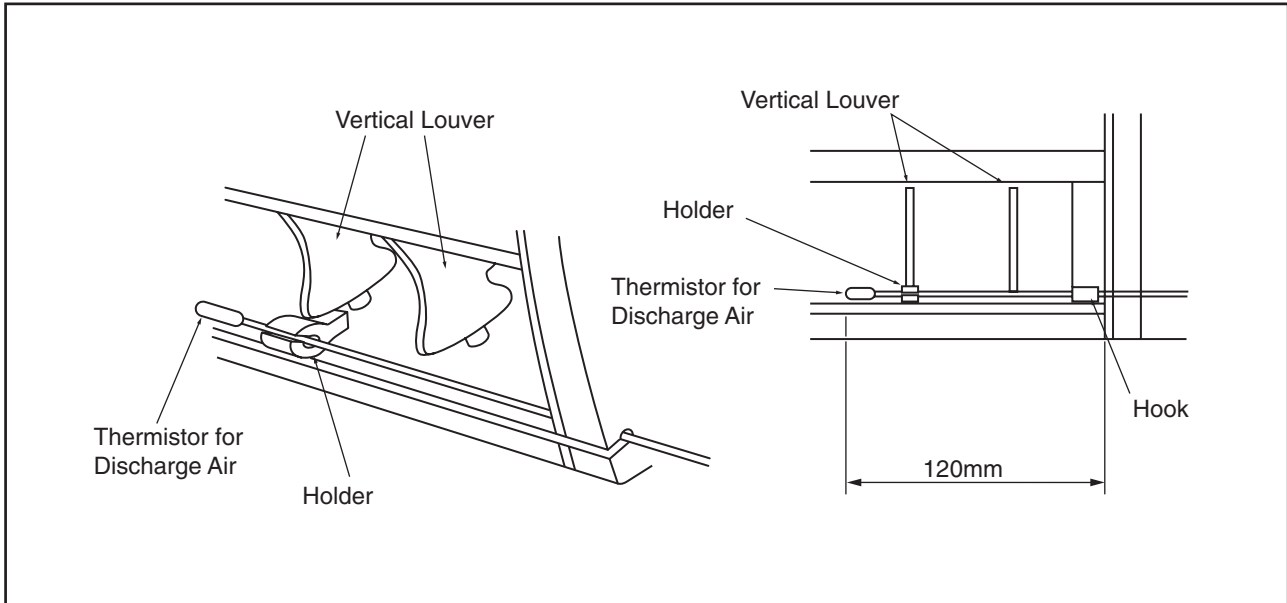
## (4) Removing Thermistor for Gas Pipe

Remove the piping insulation protecting the thermistor for gas pipe, by cutting the plastic tie and surrounding tapes and remove the thermistor from the holder.

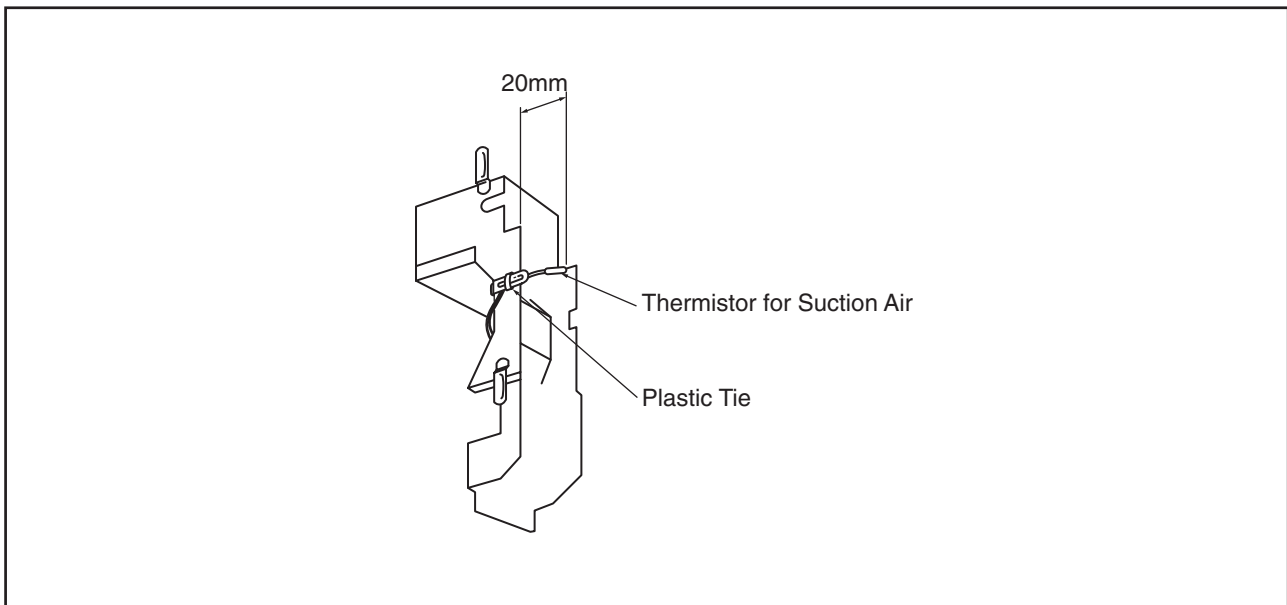


**! WARNING****TURN OFF all power source switches.**

- (5) Removing Thermistor for Discharge Air  
Remove the thermistor for discharge air from the holder of the vertical louver and the hook at the right side of the air outlet.



- (6) Removing Thermistor for Suction Air  
Remove the thermistor for suction air by cutting the plastic tie fixing the thermistor onto the right side of the electrical box.



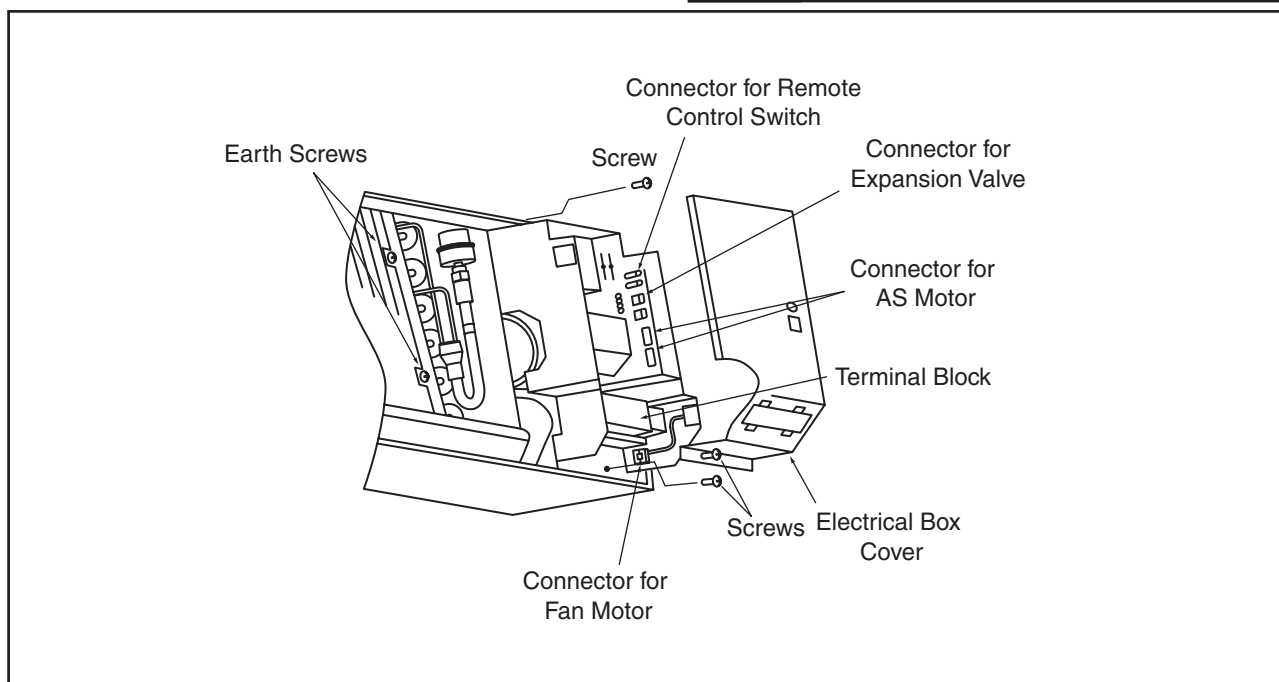
**! WARNING****TURN OFF all power source switches.**

## 2.6.5 Removing Electrical Box Cover

- (1) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (2) Remove one (1) screw for the electrical box cover.
- (3) Remove the power source wiring and wiring connection between indoor unit and outdoor unit.

Tool

Phillips Screwdriver



- (4) Remove lead wires for expansion valve, fan motor, thermistor for liquid pipe and gas pipe, AS motor (×2) and remote control switch from the connectors. And also remove earth wires (×2) of the heat exchanger.
- (5) Remove the thermistor for discharge air from the holder fixed at the vertical louver of the air outlet.
- (6) Draw out the electrical box toward the front side after removing two (2) screws fixing the electrical box.
- (7) For attaching the electrical box, set the electrical box, connect the connectors and perform the reverse procedures for removing the electrical box.

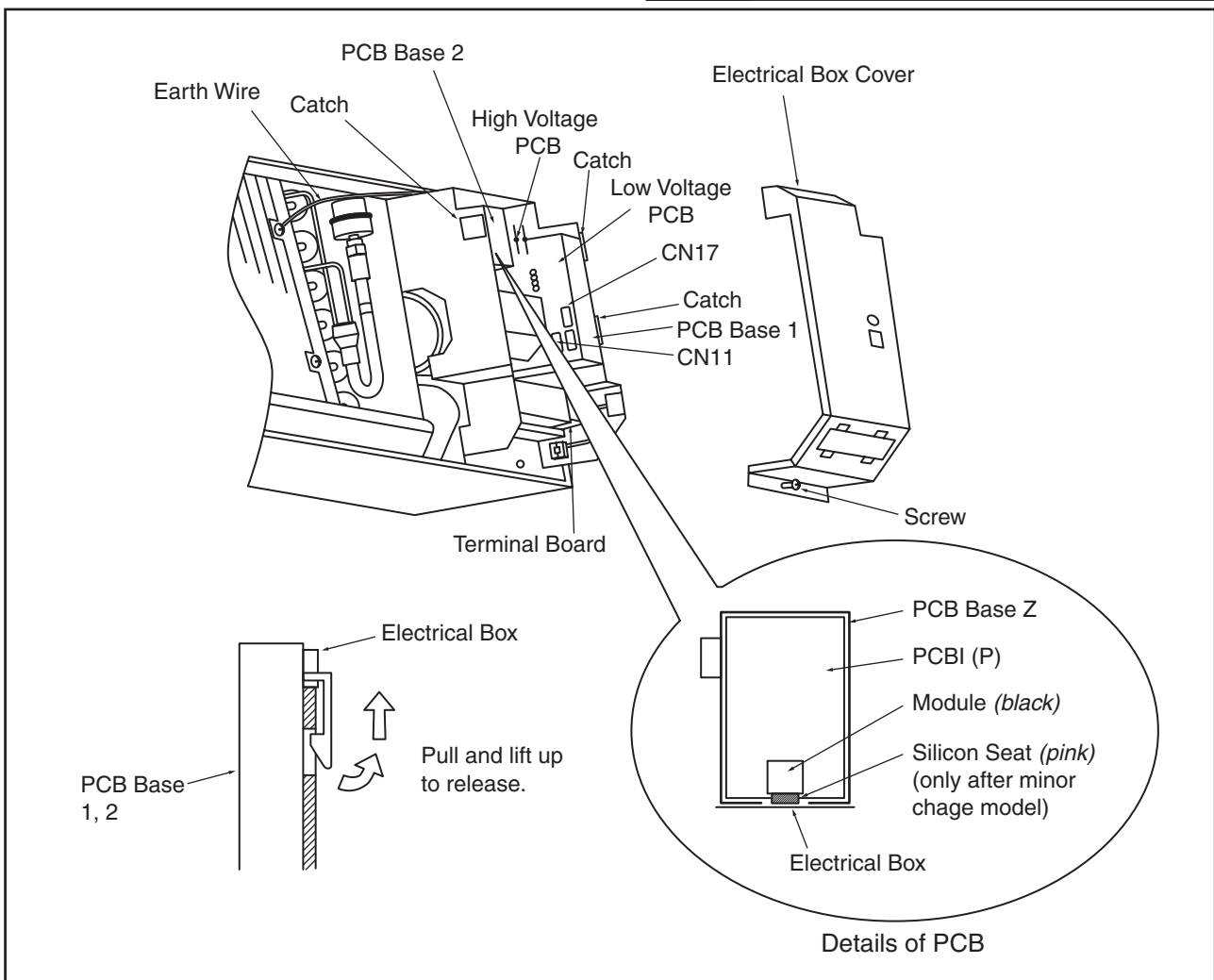
**! WARNING**

**TURN OFF all power source switches.**

2.6.6 Removing Indoor PCB

- (1) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (2) Remove one (1) screw for the electrical box cover.
- (3) Remove the connectors (CN17, CN22 and CN11) from the low voltage PCB.
- (4) Detach two (2) catches of the PCB base 1 fixing the low voltage PCB, lift the low voltage PCB and remove other connectors still connected.
- (5) Remove the earth wire from the heat exchanger, detach one (1) catch of the PCB base 2 fixing the high voltage PCB, lift the high voltage PCB and remove other connectors still connected.

Tool	Phillips Screwdriver
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- (6) After the completion of replacement of PCB, connect the connectors to the PCB in the reverse procedures of removing. And firstly set the high voltage PCB to the electrical box and then set the low voltage PCB to the electrical box.

**! WARNING****TURN OFF all power source switches.**

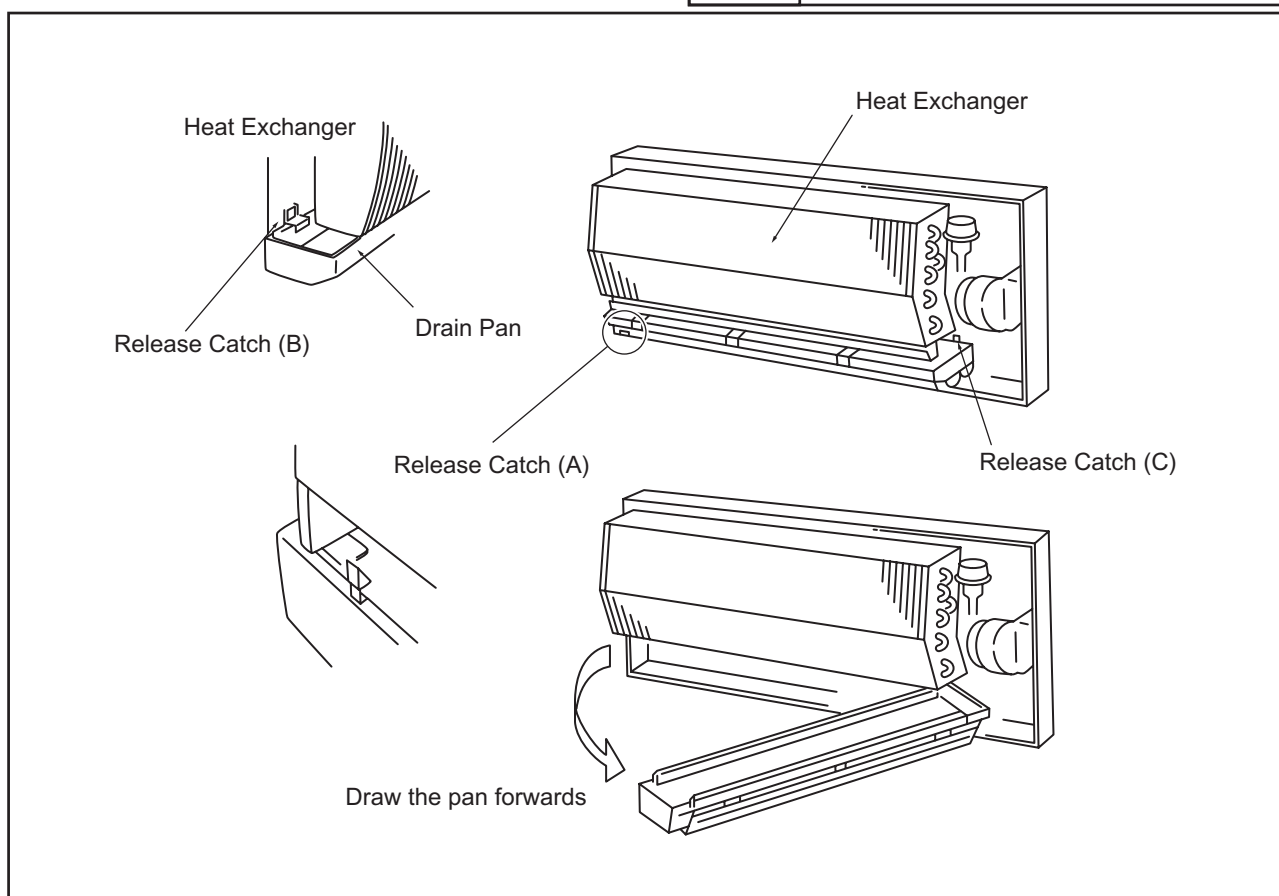
## 2.6.7 Removing Drain Pan

- (1) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (2) Remove the electrical box according to the item 2.6.5 "Removing Electrical Box Cover".
- (3) Remove the drain pan from the unit by releasing the catches (A) and (B) from the left side of the drain pan, and releasing the catch (C) by pulling the right side of the air panel toward the front side.
- (4) For attaching the drain pan, perform the reverse procedures for removing drain pan.

**NOTE:**

Check to ensure that the catches (A), (B) and (C) are snapped.

Tool

Phillips Screwdriver,  
Bucket (approx. 5 liters content)

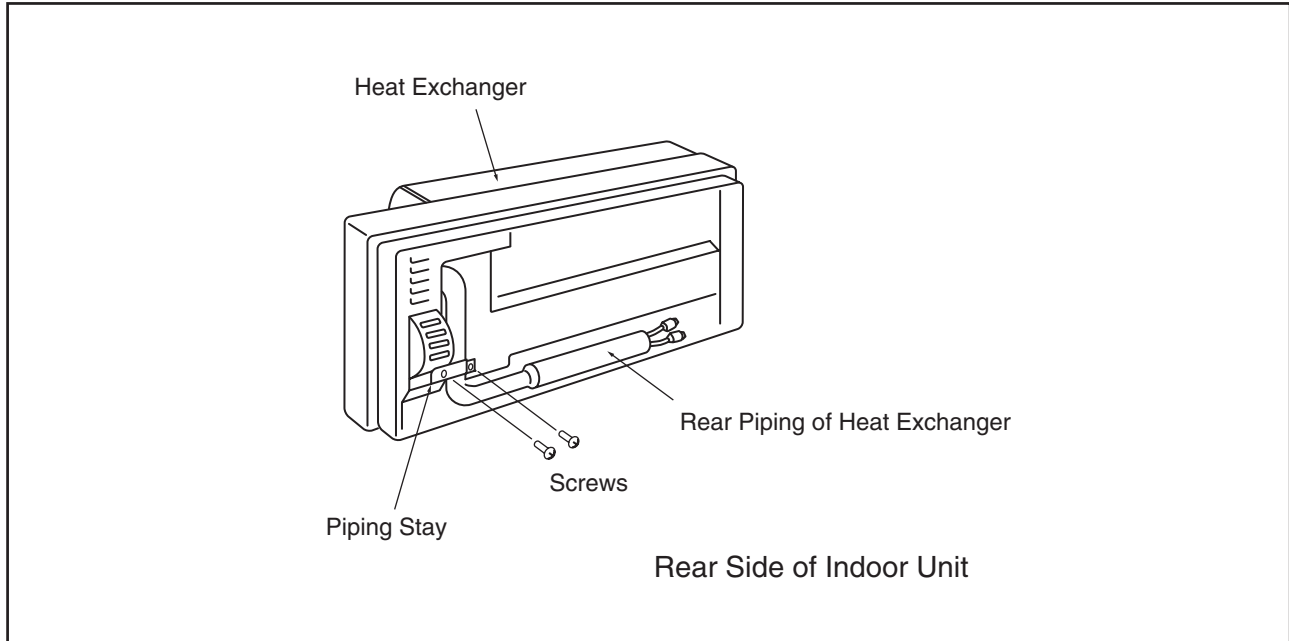
**! WARNING****TURN OFF all power source switches.**

## 2.6.8 Removing Heat Exchanger

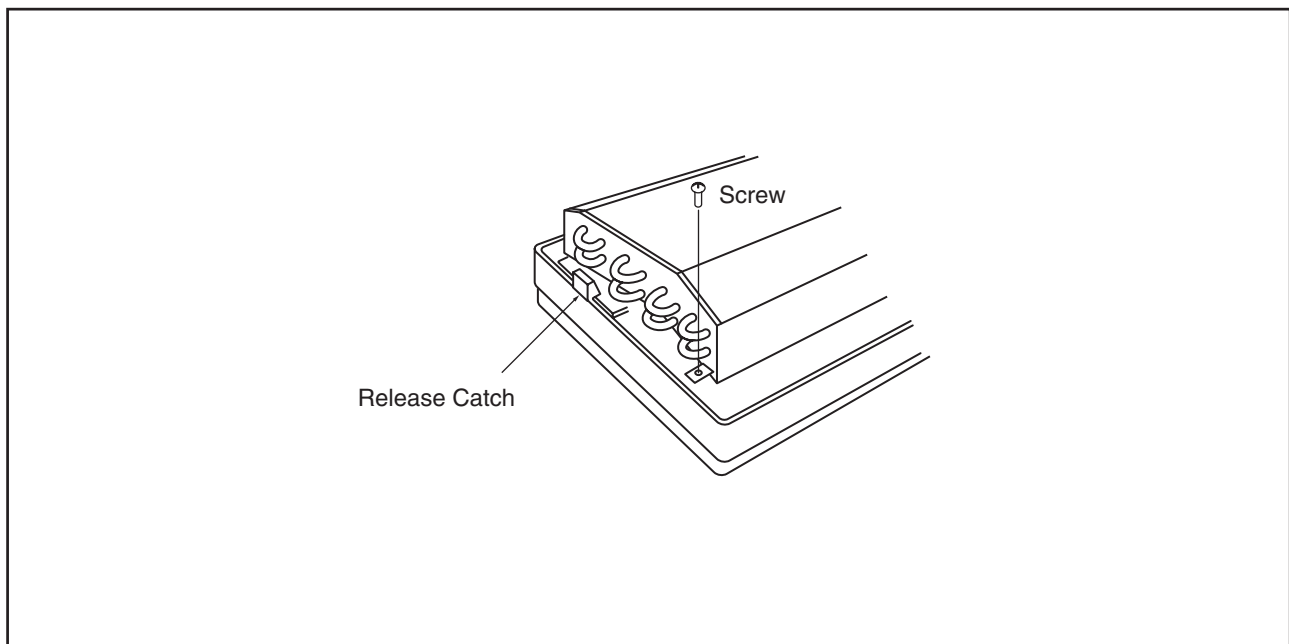
- (1) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (2) Remove the electrical box according to the item 2.6.5 "Removing Electrical Box Cover".
- (3) Remove the drain pan according to the item 2.6.7 "Removing Drain Pan".
- (4) Remove the piping stay at the rear side of the indoor unit.

Tool

Phillips Screwdriver



- (5) Release the catch holding the left side of the heat exchanger and remove one screw fixing the heat exchanger.



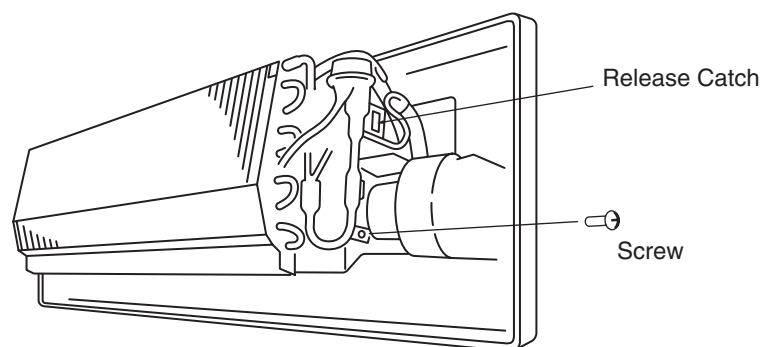


**! WARNING****TURN OFF all power source switches.**

- (6) Remove one screw fixing the heat exchanger and release the catch holding the right side of the heat exchanger.

Tool

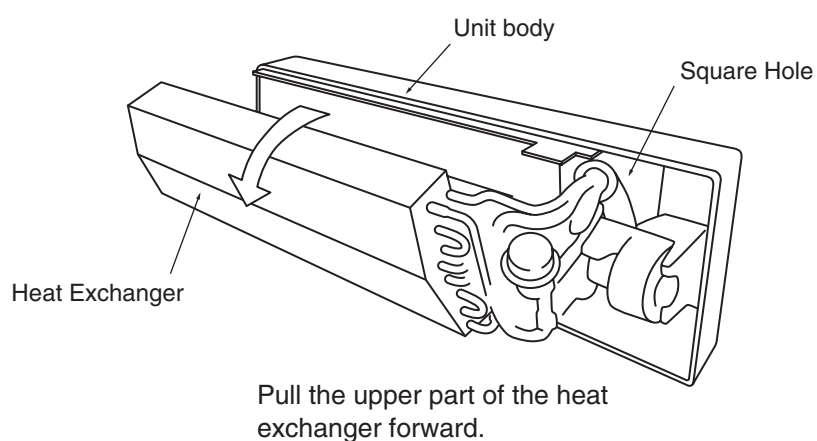
Phillips Screwdriver



- (7) Lift up the heat exchanger, draw out the rear piping of the heat exchanger from the square hole by pulling the upper part of the heat exchanger forward and remove the heat exchanger.

Tool

Phillips Screwdriver



- (8) For attaching the heat exchanger, perform the reverse procedures for removing.

**NOTE:**

After attaching the heat exchanger, check to ensure that the hooks and the screws at the right and the left sides of the heat exchanger are correctly attached.

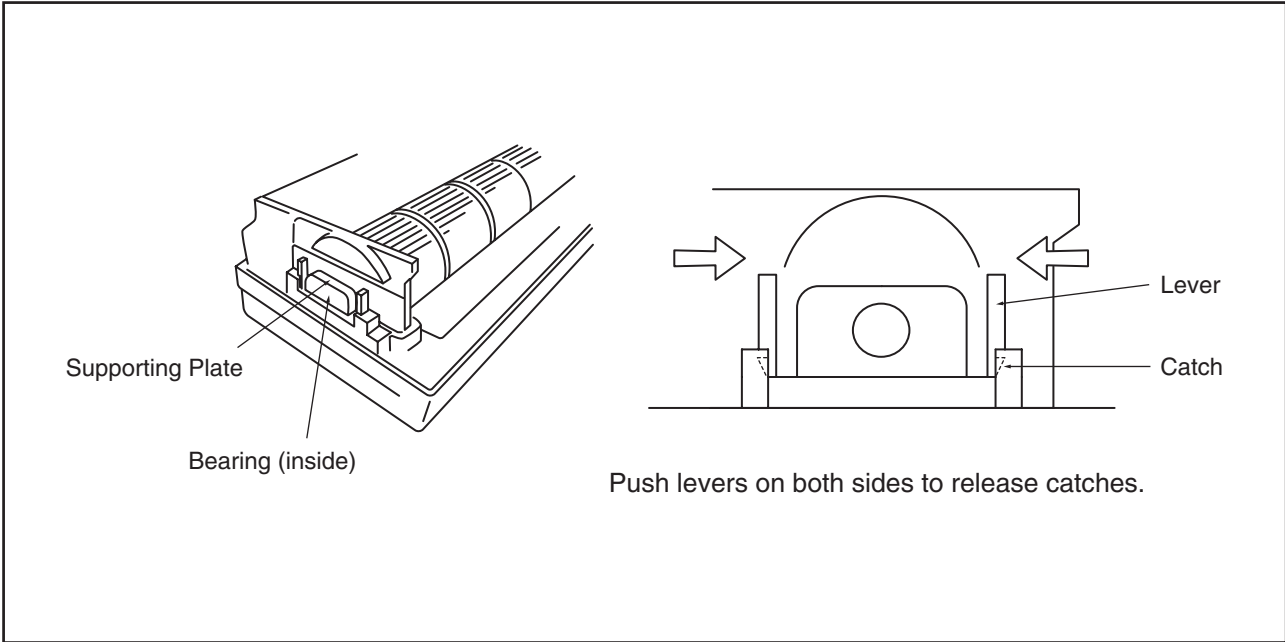
**! WARNING**

**TURN OFF all power source switches.**

2.6.9 Removing Fan and Fan Motor

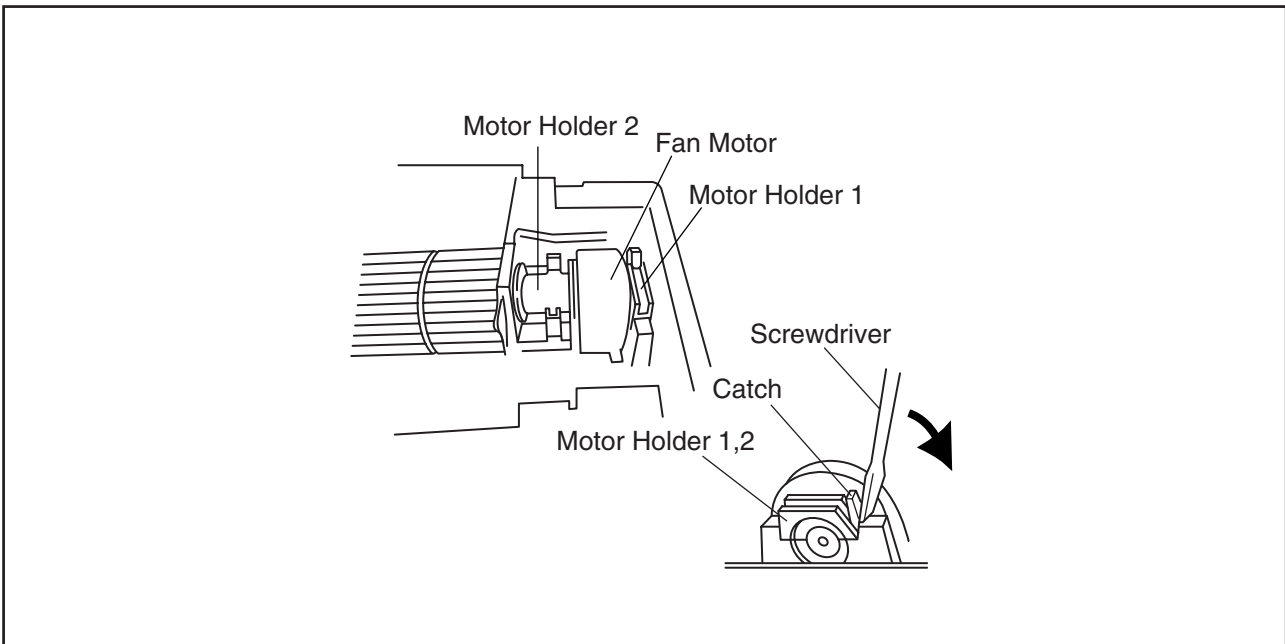
- (1) Remove the heat exchanger according to the item 2.6.5 "Removing Heat Exchanger".
- (2) Remove the supporting plate for the bearing by pushing the knobs at both sides of the supporting plate toward the inside and releasing the catches.

Tool	Phillips Screwdriver
------	----------------------



- (3) Remove the motor holders 1 and 2 fixing the fan motor.  
For removing the motor holder, insert the screwdriver at the catch part and screw it.
- (4) After removing the motor holder 1, loosen one (1) screw fixing the motor shaft and the fan.

Tool	Phillips Screwdriver
------	----------------------



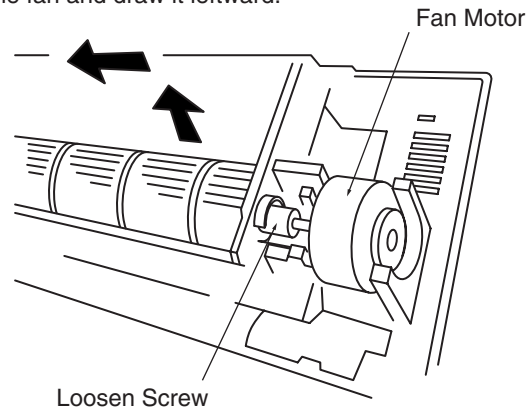
**! WARNING****TURN OFF all power source switches.**

- (5) Draw the fan leftward with lifting up the bearing side of the fan slightly, the fan and the fan motor are removed.

Tool

Phillips Screwdriver

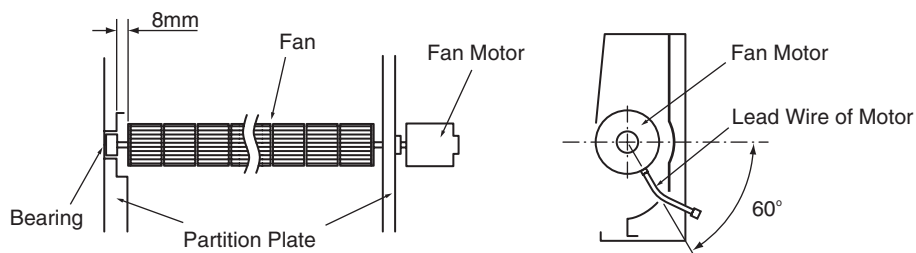
Lift up the fan and draw it leftward.



- (6) For attaching the fan motor and the fan, perform the reverse procedures for removing.  
 (7) Fix the fan at the position with 8mm clearance between the left end (bearing side) of the fan and the partition plate.  
 (8) Fix the fan motor with the outlet of the lead wire at the position as shown below.

Tool

Phillips Screwdriver



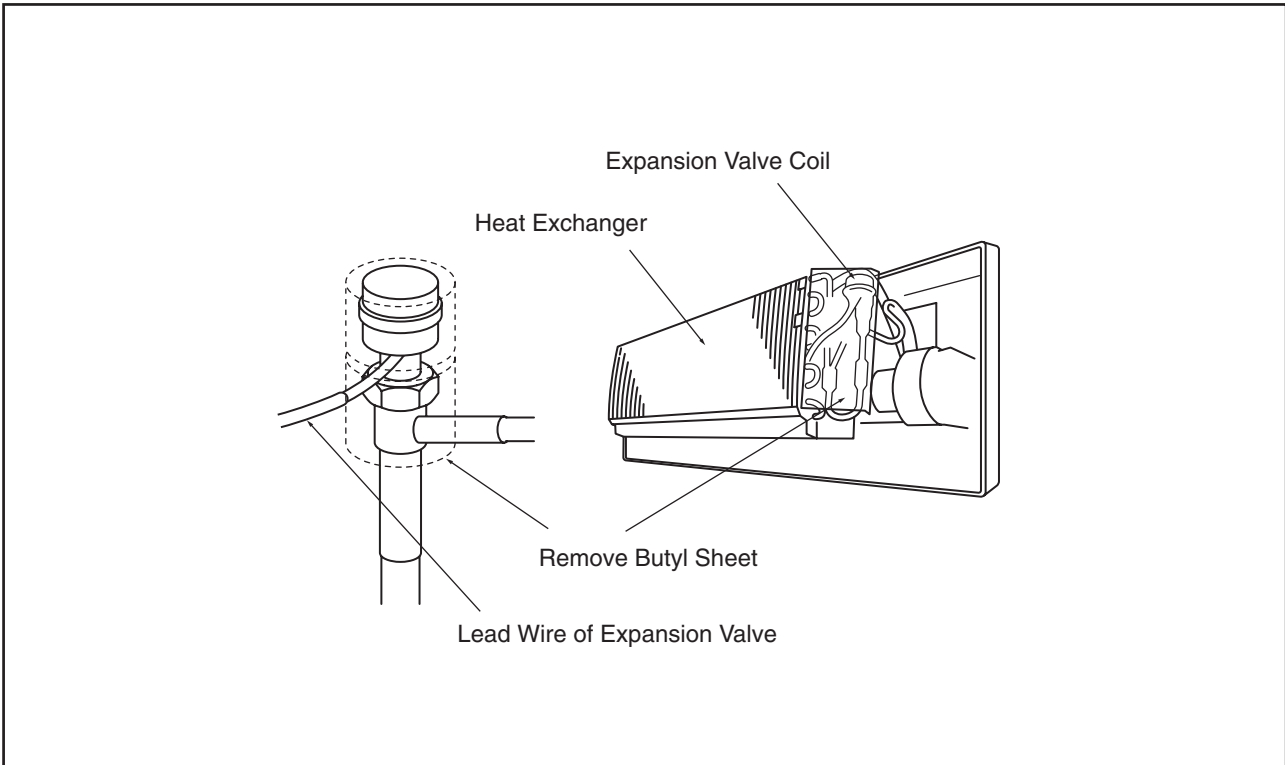
**! WARNING**

**TURN OFF all power source switches.**

2.6.10 Removing Electronic Expansion Valve Coil

- (1) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (2) Remove the electrical box according to the item 2.6.5 "Removing Electrical Box Cover".
- (3) The butyl sheet is adhered around the piping of the heat exchanger, electronic expansion valve and the inlet and outlet piping of the electronic expansion valve.

Tool	Spanners (#19 and #14)
------	------------------------



- (4) Remove the butyl sheet of the surface of the piping, the coil part of the expansion valve and the part of the valve body.
- (5) Prepare two (2) spanners. Hold the part of the valve body with one spanner and loosen the lock nut with another spanner by turning the lock nut counterclockwise.

**NOTE:**

Do not hold the motor part when loosening the lock nut by spanner. The base of the drive part may turn idle and be broken.

- (6) Turn the lock nut by a few turn, and the drive part is separated from the screw and can be removed.
- (7) Prepare the new drive part for replacement (service part) with the position of the driver (drive screw) already adjusted.

**NOTE:**

During replacement work, pay attention to the separation part and prevent the dust, foreign particle, etc. from entering into the separation part. (The exposed part by separation is the mechanical part of the valve.)

Do not hurt the junction part of the valve with the tools.

- (8) Put the drive part onto the valve body, hold them with their axes matching and attach the lock nut to the screw part of the valve body.

**! WARNING**

**TURN OFF all power source switches.**

- (9) Tighten the lock nut with spanner after tightening lightly by hand.  
The tightening torque shall be within the range of 12Nm (120kg-cm) to 15Nm (150kg-cm).

**NOTE:**

Do not apply the strong forces such as the rotating torque and the bending load to the motor by holding the motor by hand when tightening the lock nut.

The direction of the eccentric part of the motor is assembled as the eccentric part of although the motor is directed toward the counter direction of the fittings for piping at the valve body, the alteration of this direction do not affect the open/close function of the valve. Therefore, the adjustment of the direction of the motor part is not required if the position of the motor is moved toward the rotating direction after replacement as shown below.

However, pay attention to the direction of the motor for the coil of the electronic expansion valve not to touch other pipings and the side plate of the electrical box.

Tool	Spanners (#19 and #14)
------	------------------------

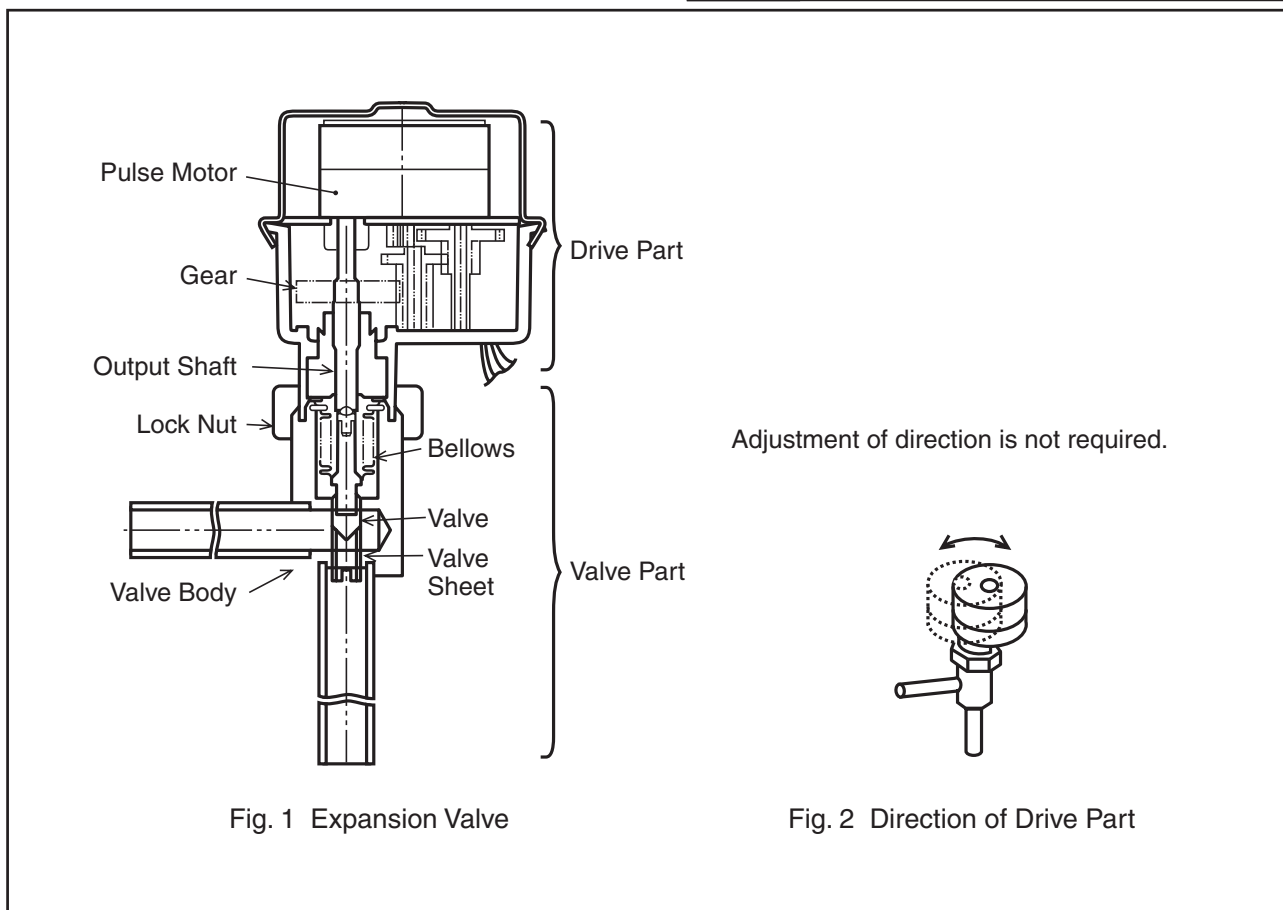


Fig. 1 Expansion Valve

Fig. 2 Direction of Drive Part

- (10) Attach the removed butyl sheet to the electronic expansion valve again.
- (11) After completion of the replacement, attach the electronic expansion valve in the reverse procedures for removing.

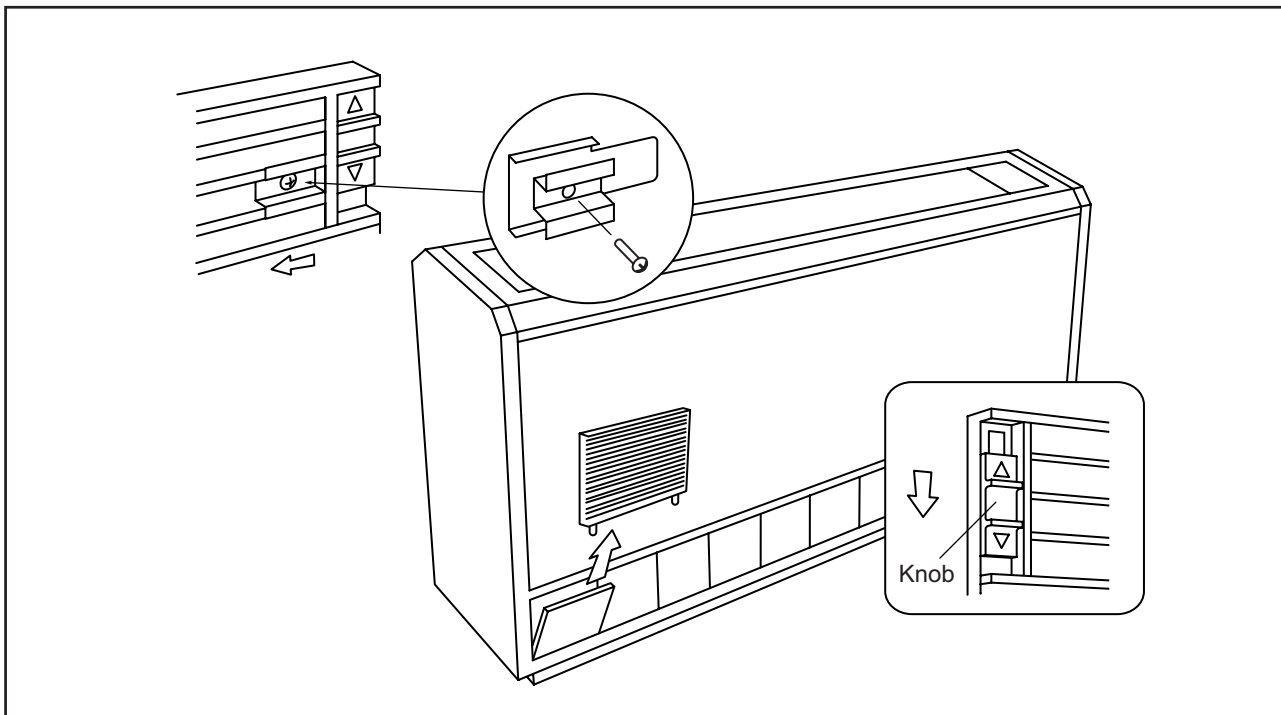
## (2.7 Floor Type)

## 2.7 Floor Type

**! WARNING****TURN OFF all power source switches.**

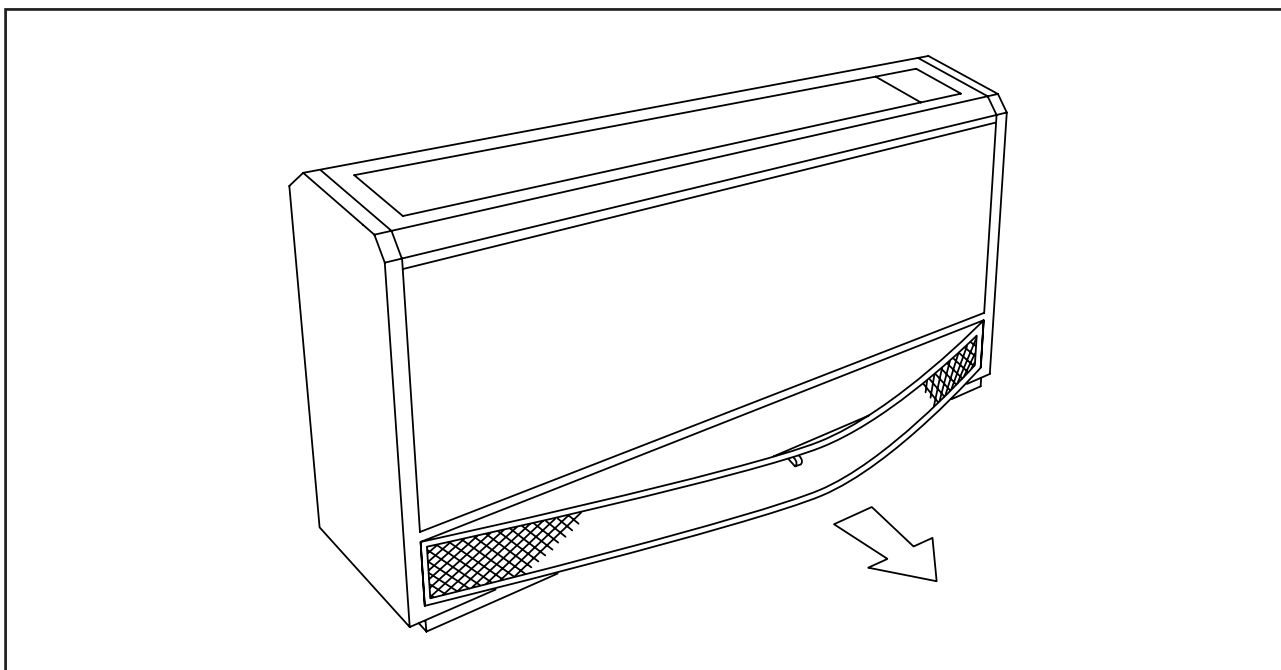
## 2.7.1 Removing Air Intake Grille

- (1) Loosen the screws for fixing plate at the right side of each air intake grille, and move the fixing plates.
- (2) By pushing the knob at both sides of the air intake grille towards the arrow mark direction, the grille can be opened with an angle 30°.
- (3) Remove it from the hinged part.



## 2.7.2 Removing Air Filter

- (1) The air filter is located at the inner side of the air intake grille. Remove all the air intake grilles.
- (2) Remove the air filter by pulling the knob of the air filter.

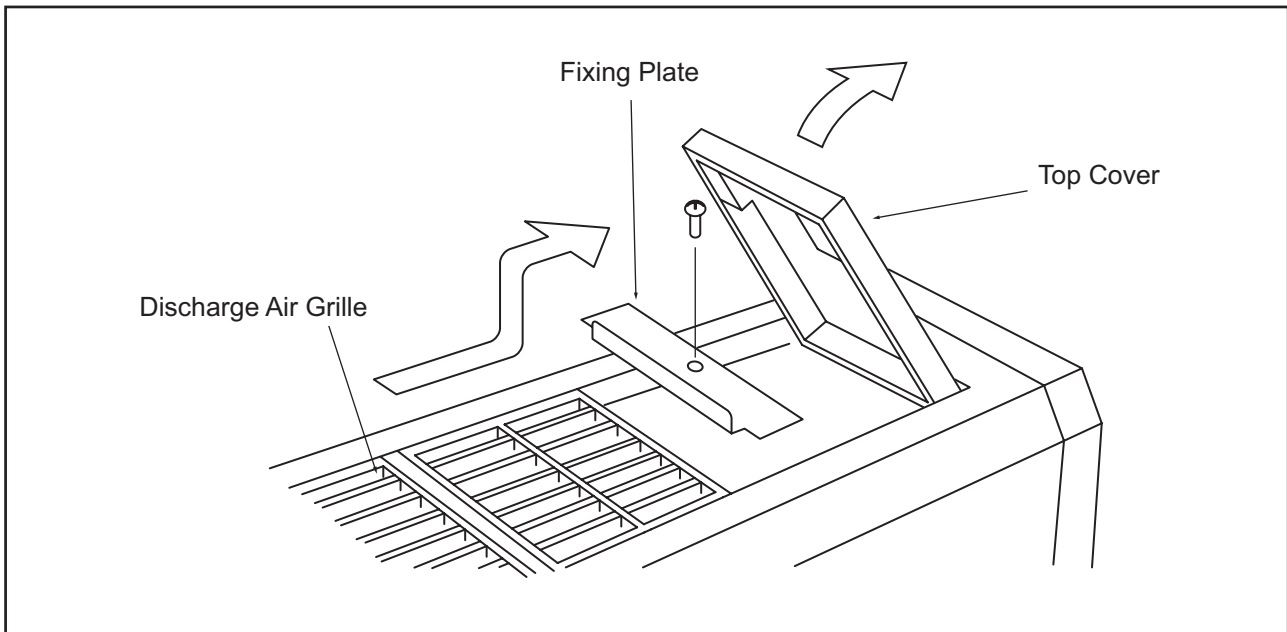


**! WARNING**

**TURN OFF all power source switches.**

**2.7.3 Removing Discharge Air Grille**

- (1) The discharge air grilles are mounted on the top by using a guide-rail.
- (2) By opening the top cover and sliding the discharge air grilles, the grilles can be removed.

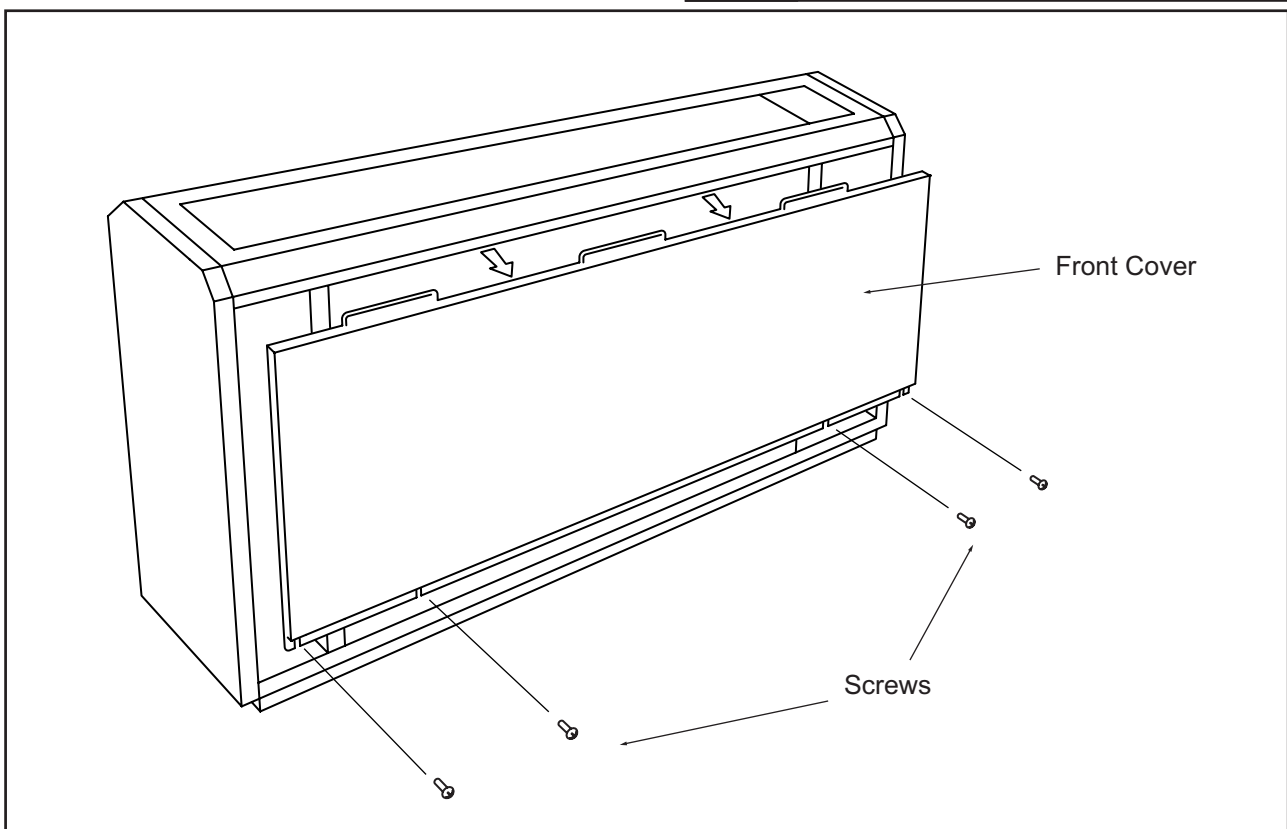


**2.7.4 Removing Front Cover**

- (1) Remove the air filter according to the item 2.7.2 "Removing Air Filter".
- (2) Remove the front cover from the slit after removing four fixing screws at the lower part and pulling it out downwards.

Tool

Phillips Screwdriver

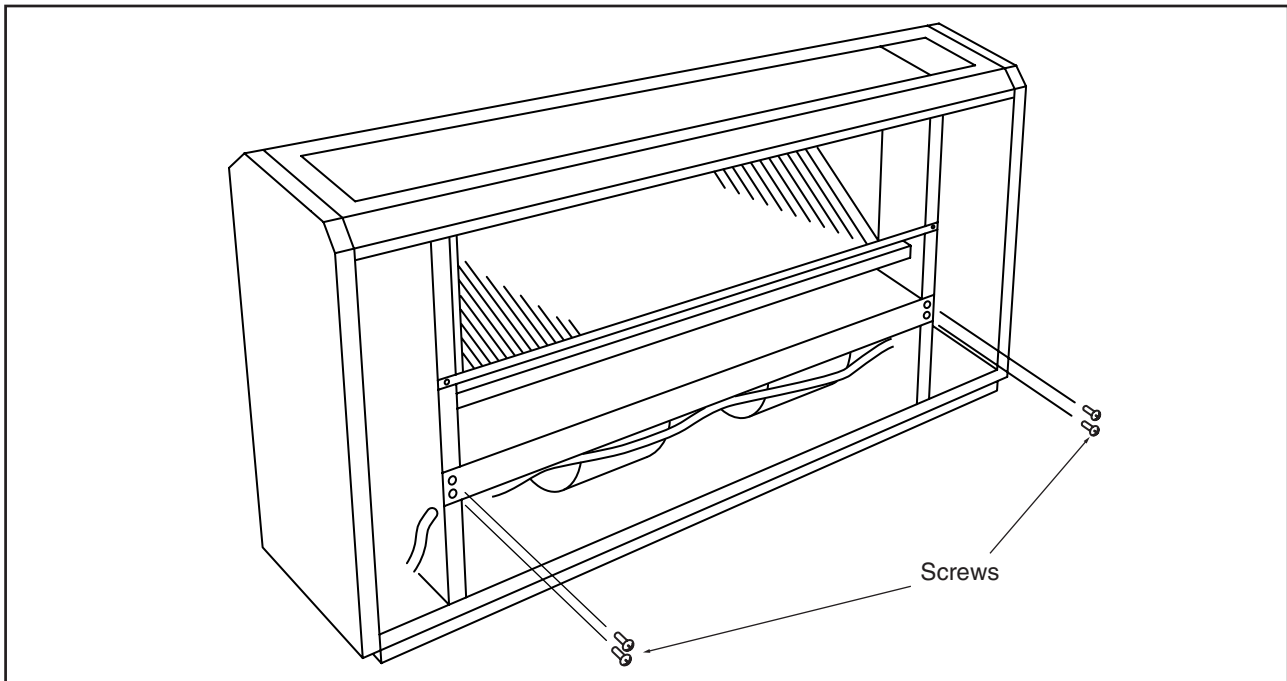


**! WARNING****TURN OFF all power source switches.****2.7.5 Removing Fan Motor**

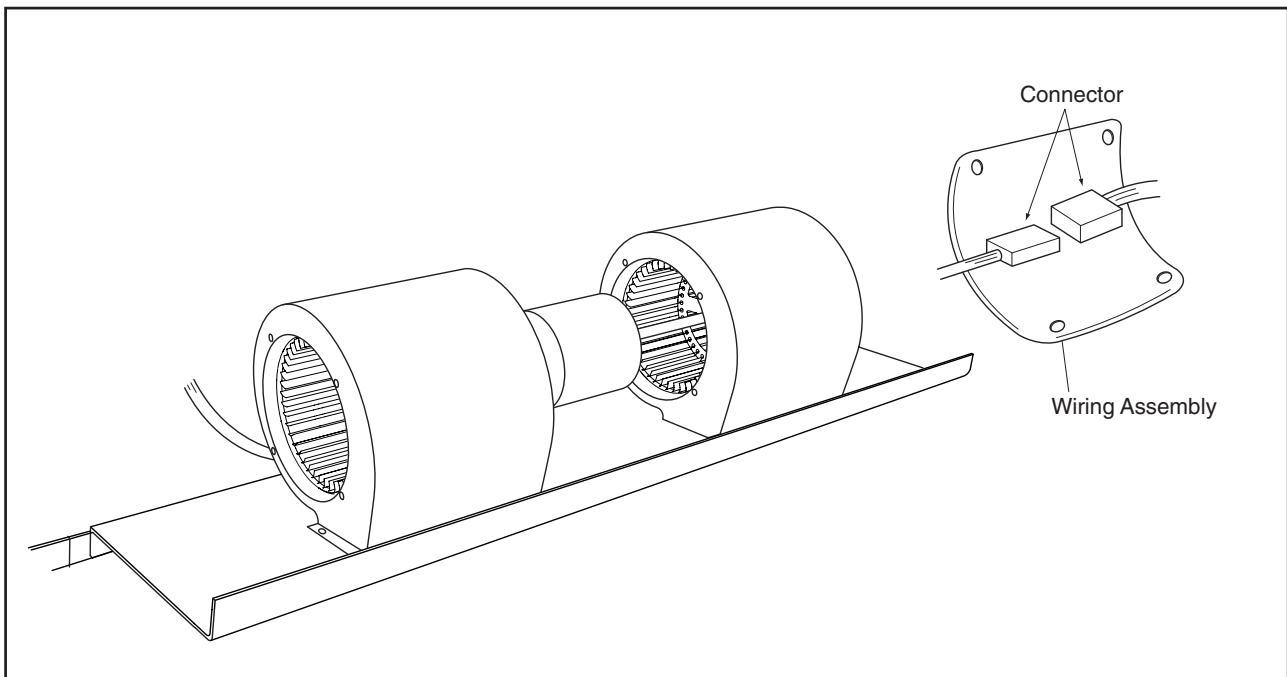
- (1) Remove the air intake grille according to the item 2.7.1 "Removing Air Intake Grille".
- (2) Remove the air filter according to the item 2.7.2 "Removing Air filter".
- (3) Remove the front cover according to the item 2.7.4 "Removing Front Cover".
- (4) Remove the mounting plate for the fan motor after removing four fixing screws.

Tool

Phillips Screwdriver



- (5) Disconnect the wiring connector for the fan motor. Remove the wiring assembly and connector.



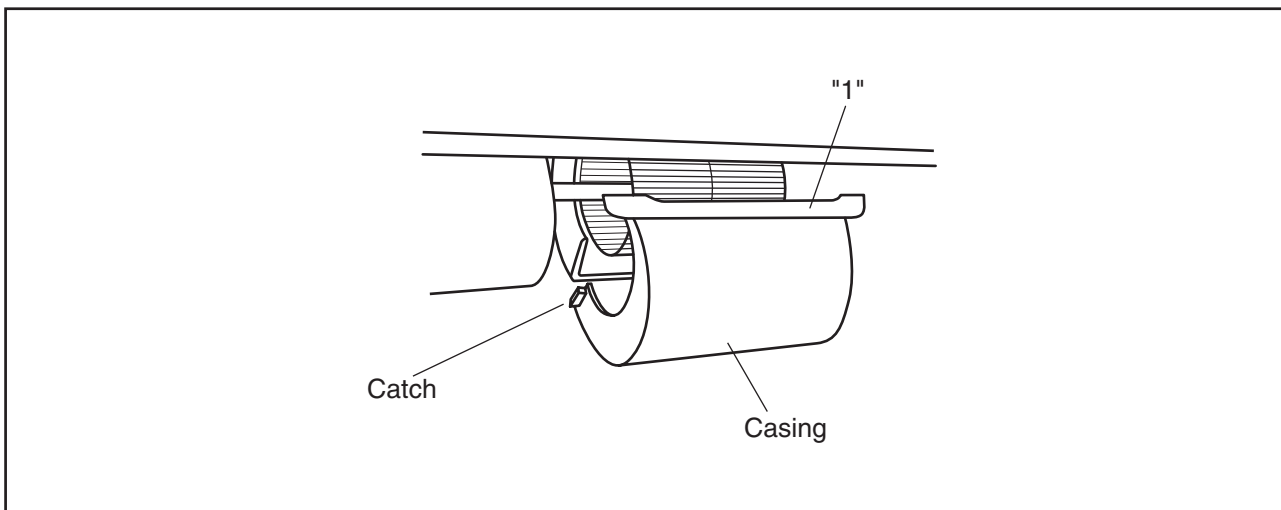


**! WARNING**

**TURN OFF all power source switches.**

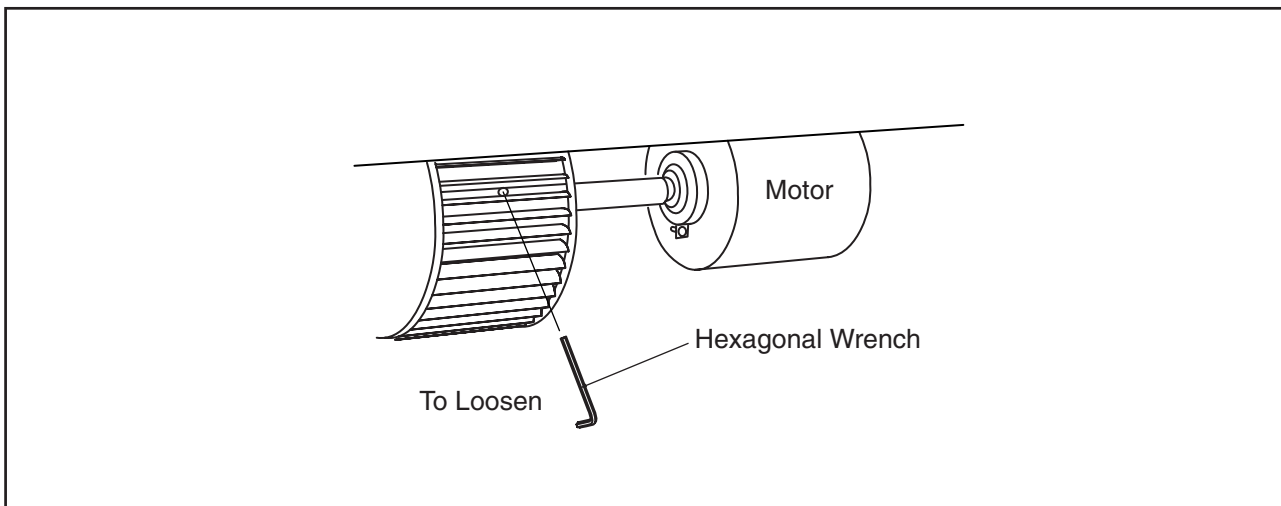
- (6) Remove the casing "1" by pushing the catch part at four positions towards the inner side.

Tool	Phillips Screwdriver
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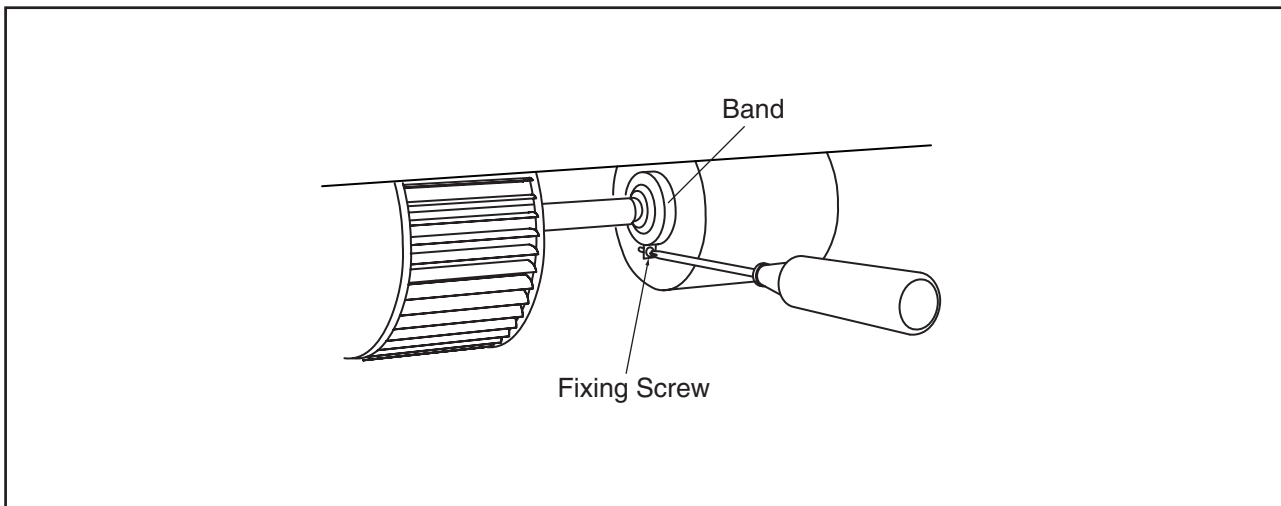
- (7) Loosen the screw by a hexagon wrench.

Tool	Hexagon Wrench
------	----------------



- (8) Remove the fan motor by sliding it backwards after removing the fixing plate. Pay attention not to drop it.

Tool	Phillips Screwdriver
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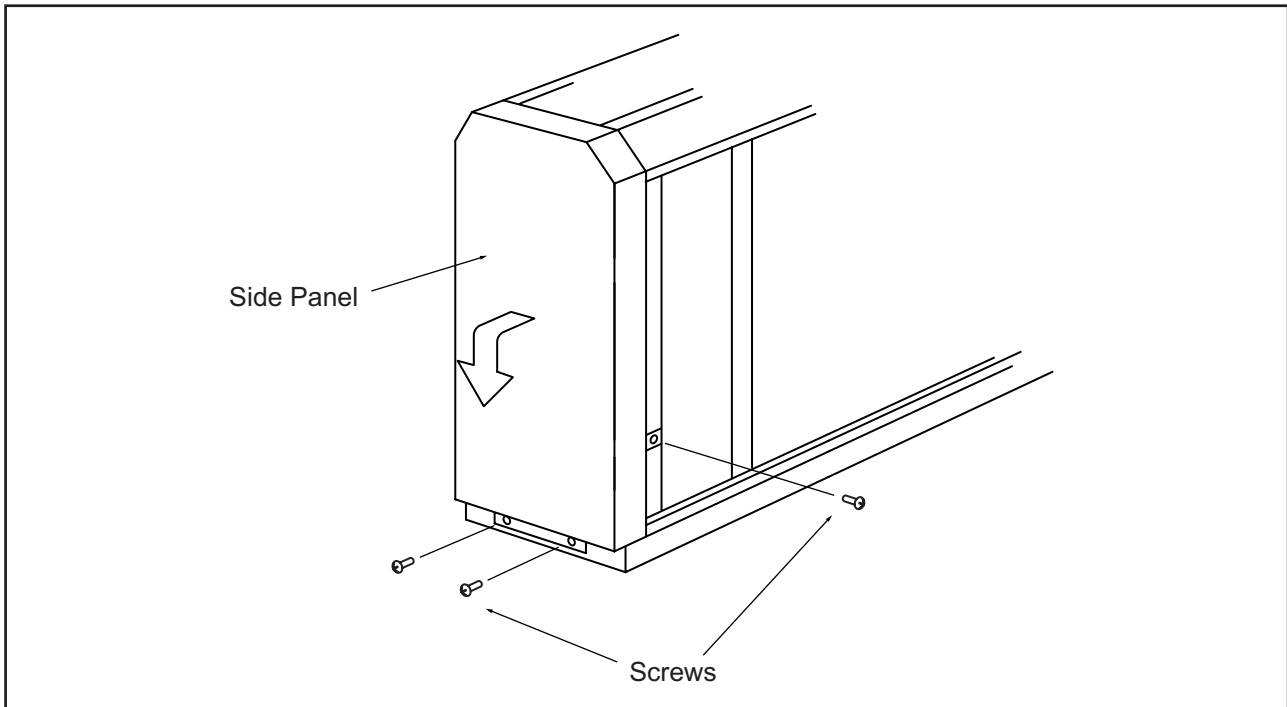


**! WARNING****TURN OFF all power source switches.****2.7.6 Removing Printed Circuit Board (PCB)**

- (1) Remove the air intake grille according to the item 2.7.1 "Removing Air Intake Grille".
- (2) Remove the air filter according to the item 2.7.2 "Removing Air Filter".
- (3) Remove the front cover according to the item 2.7.4 "Removing Front Cover".
- (4) The side cover can be removed by removing the three (3) fixing screws and pulling it downwards.

Tool

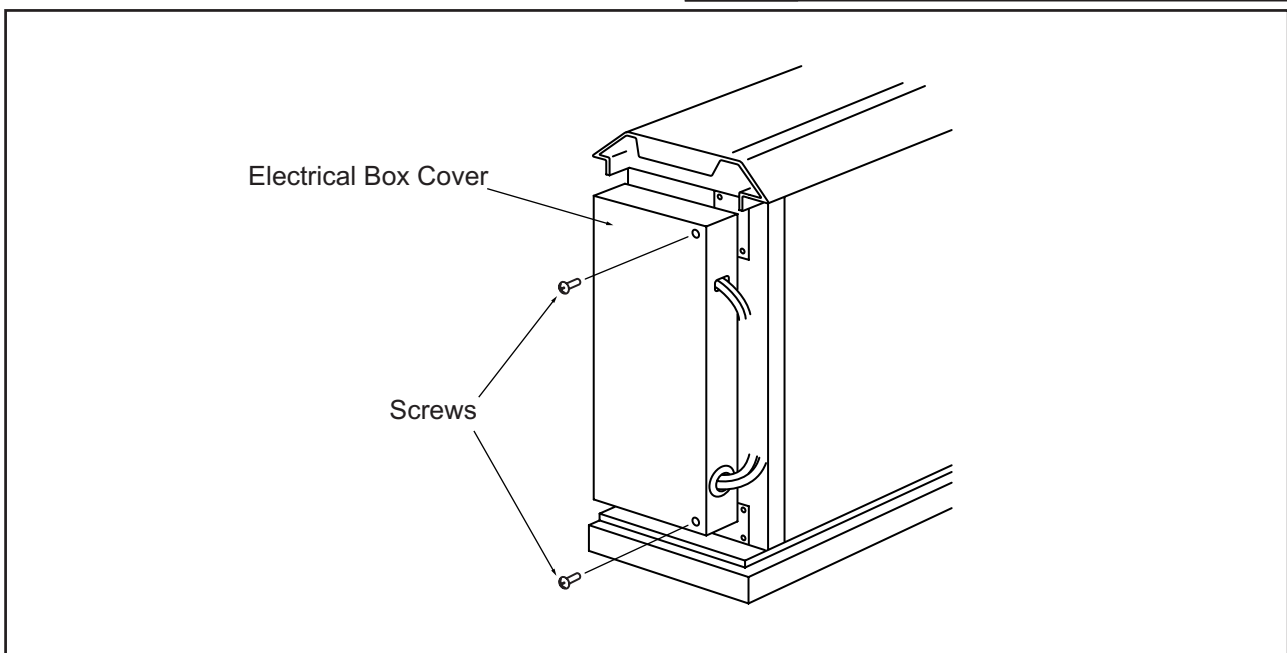
Phillips Screwdriver



- (5) Remove the electrical box cover after removing two (2) fixing screws.

Tool

Phillips Screwdriver

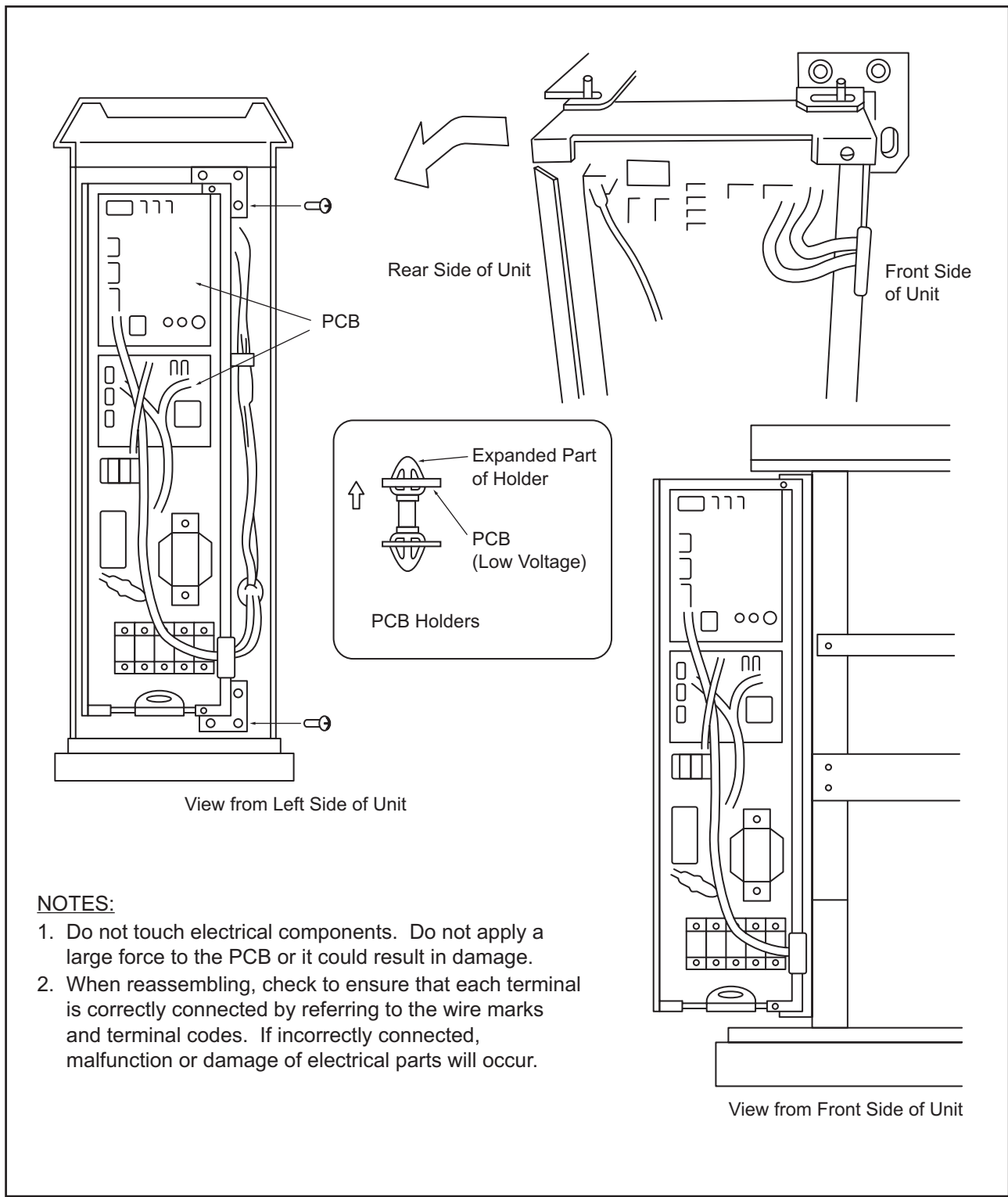


**! WARNING**

**TURN OFF all power source switches.**

- (6) The electrical box can be turned up to an angle of 90° by removing two fixing screws and unhooking the catch at the rear side of the electrical box.
- (7) The PCB is supported by four holders. Pull out the PCB from the PCB hole by pushing the expanded part of the holder using long-nose pliers and putting a finger near the hole of the PCB.

Tool	Phillips Screwdriver, Long-nose Pliers
------	--

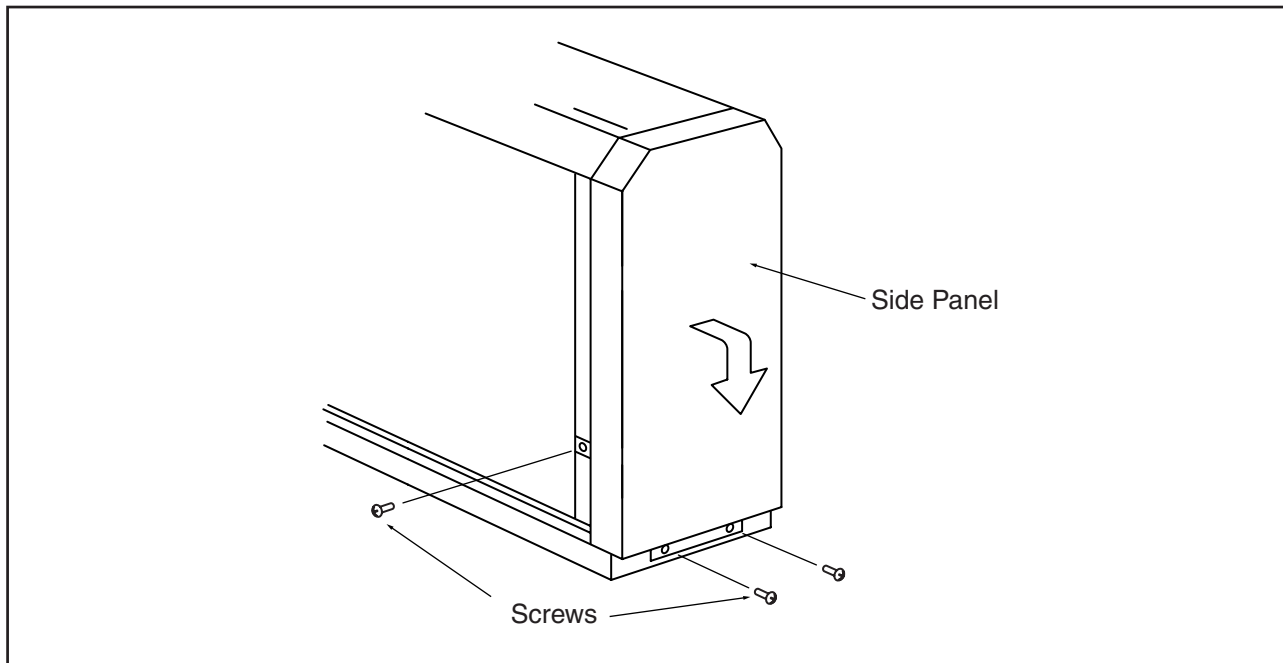


**NOTES:**

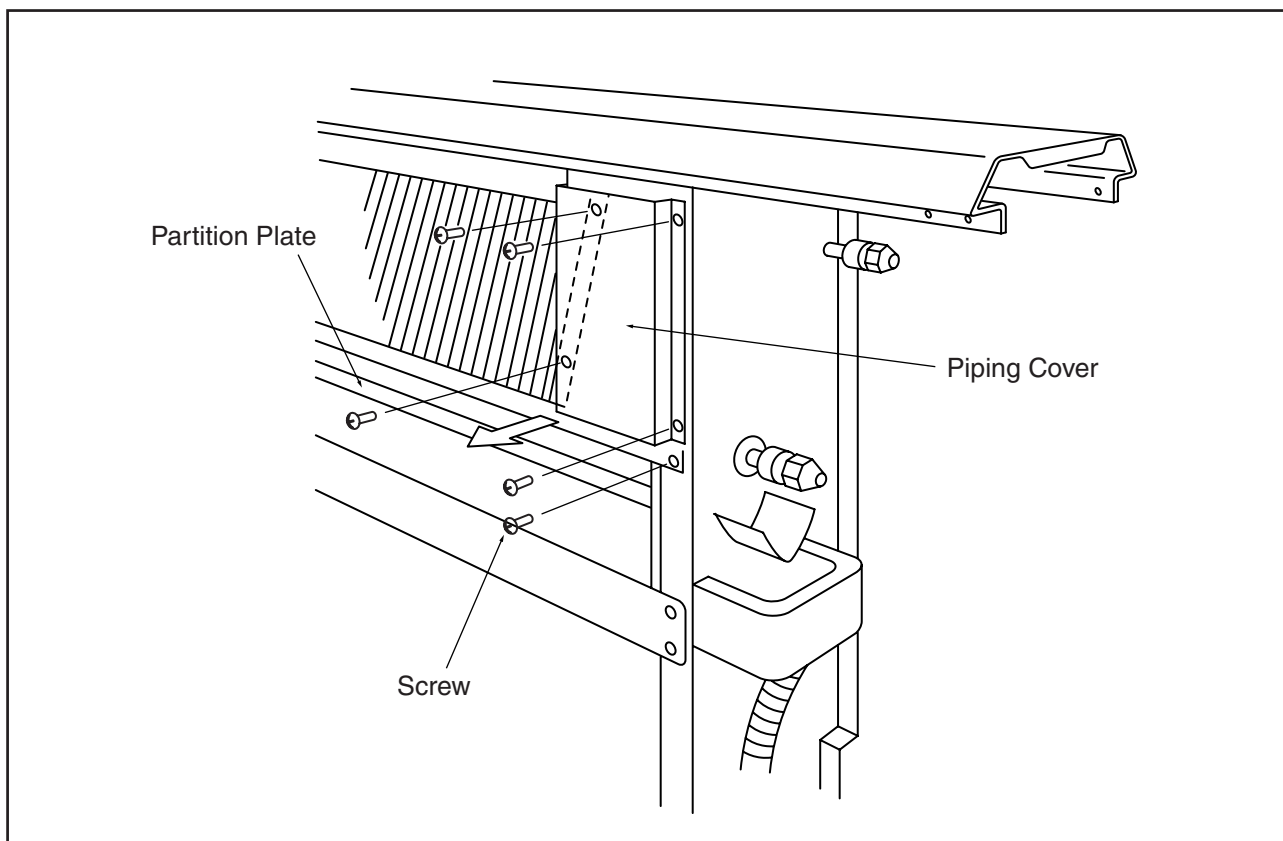
- 1. Do not touch electrical components. Do not apply a large force to the PCB or it could result in damage.
- 2. When reassembling, check to ensure that each terminal is correctly connected by referring to the wire marks and terminal codes. If incorrectly connected, malfunction or damage of electrical parts will occur.

**! WARNING****TURN OFF all power source switches.****2.7.7 Removing Thermistors for Liquid Pipe and Gas Pipe**

- (1) Remove the air intake grille according to the item 2.7.1 "Removing Air Intake Grille".
- (2) Remove the air filter according to the item 2.7.2 "Removing Air Filter".
- (3) Remove the front cover according to the item 2.7.4 "Removing Front Cover".
- (4) Remove the side cover after removing three (3) fixing screws.

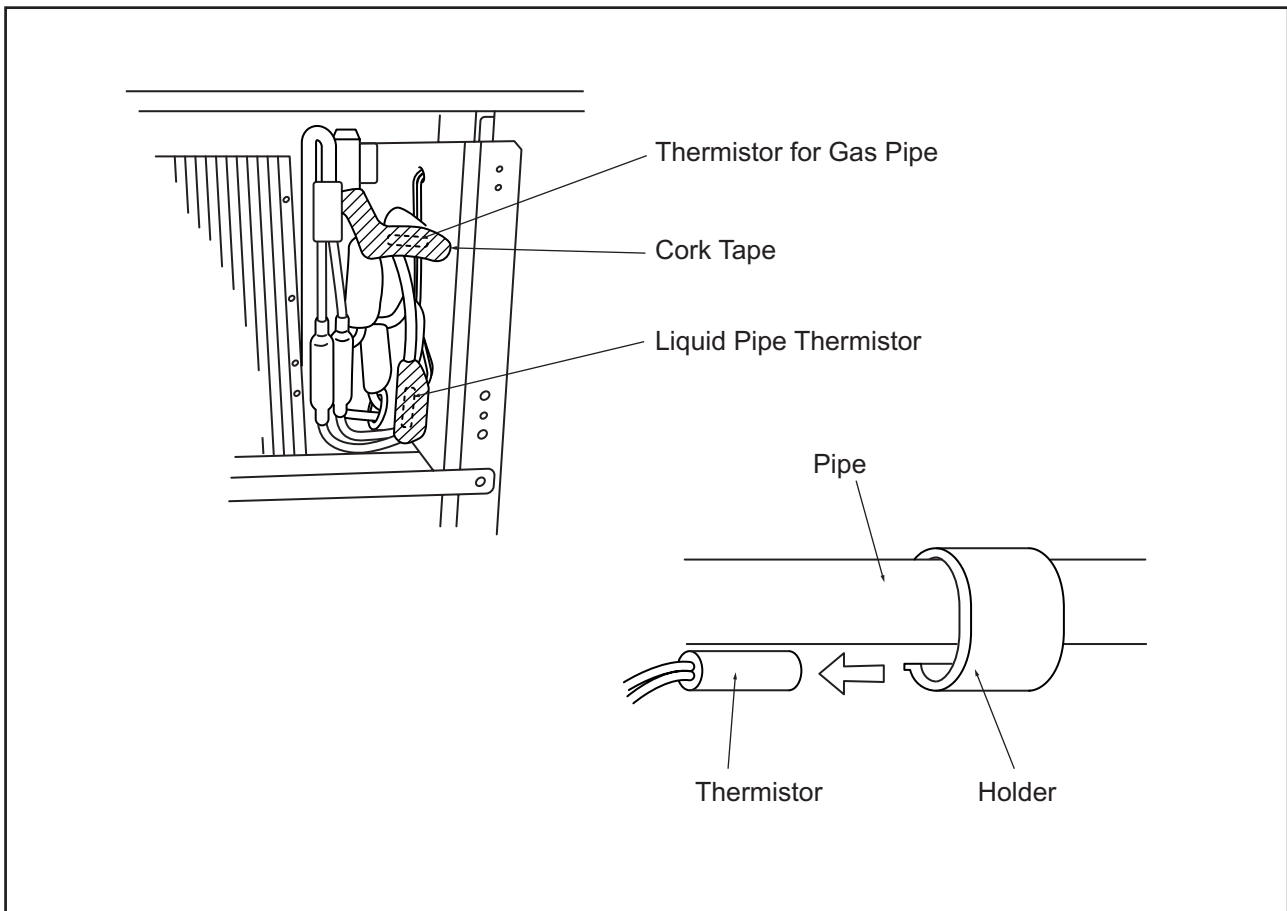


- (5) Remove the piping cover after removing two (2) fixing screws for the partition plate and four (4) fixing screws for piping cover.



**! WARNING****TURN OFF all power source switches.**

- (6) Remove CORK TAPE and pull out the thermistor after removing the fixing plate for the thermistors.



## SERVICING

### (2.8 Floor Concealed Type)

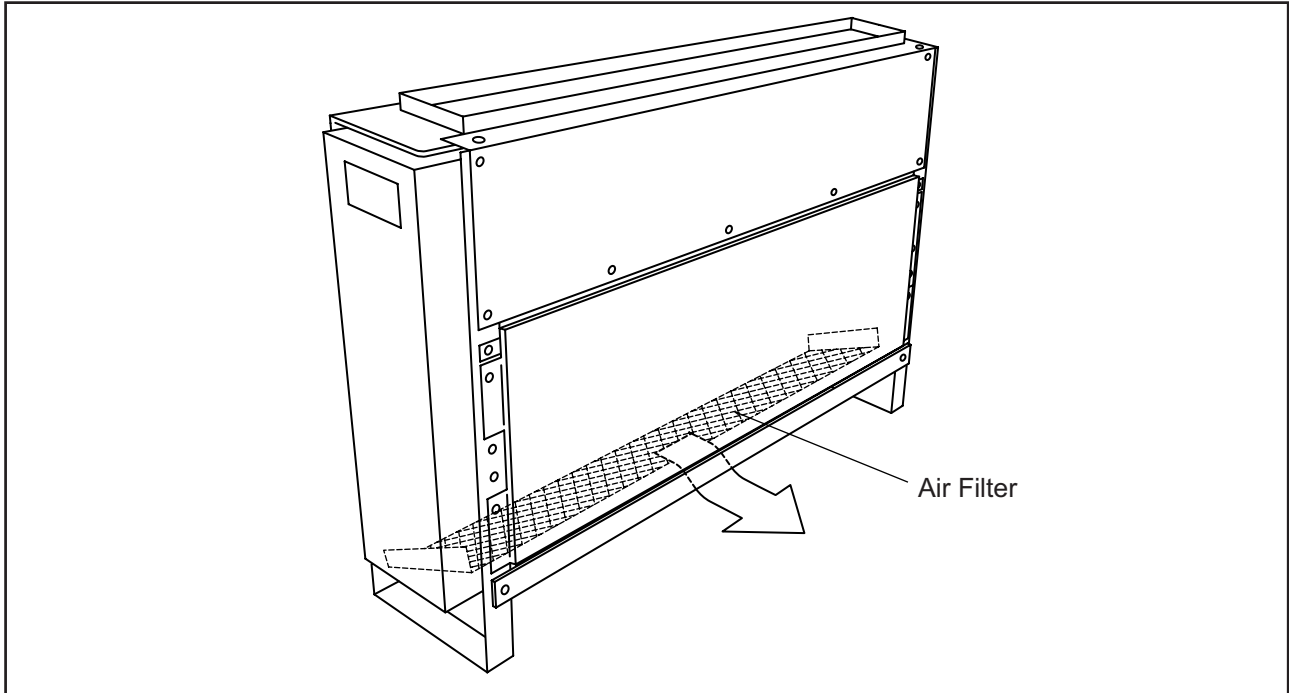
#### 2.8 Floor Concealed Type

## ! WARNING

TURN OFF all power source switches.

#### 2.8.1 Removing Air Filter

- (1) The air filter is located at the inner upper part of the inlet.
- (2) Remove the air filter by pulling the center knob and bending the filter.

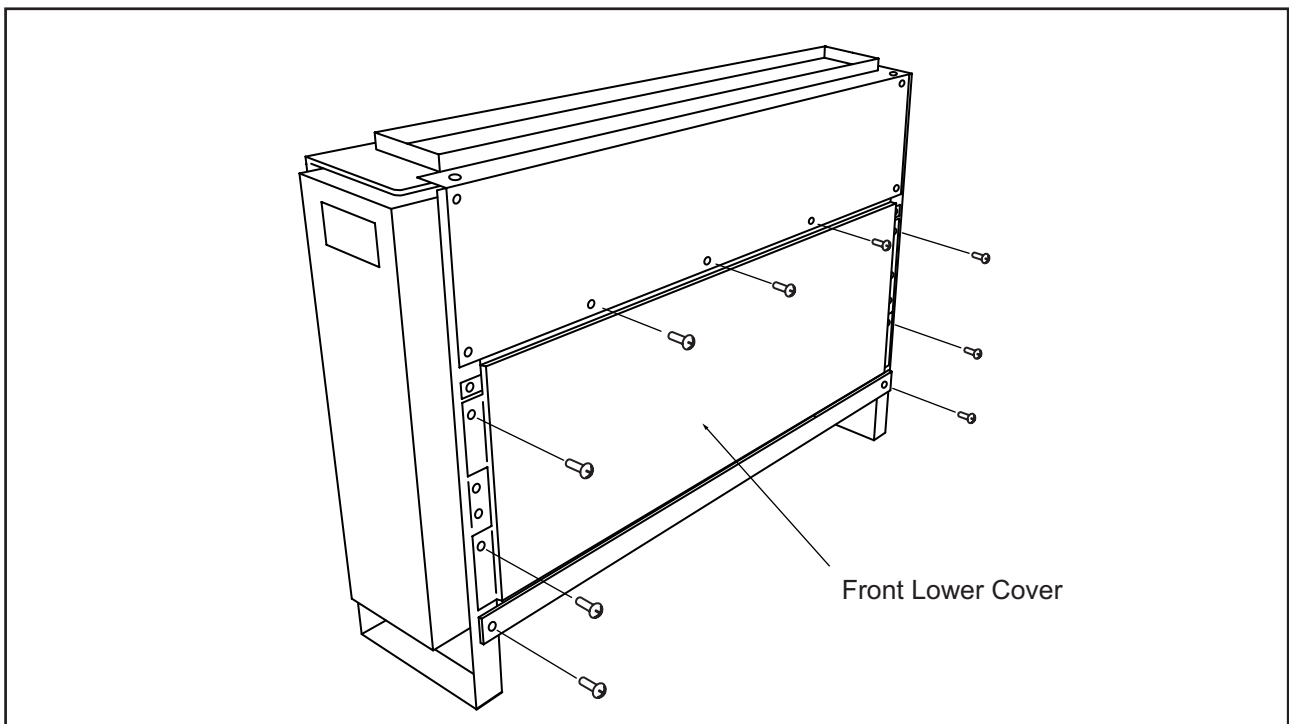


#### 2.8.2 Removing Front Covers

- (1) Remove the air filter according to the item 2.8.1 "Removing Air Filter".
- (2) Remove the front lower cover after removing ten screws at the lower part of the front cover.

Tool

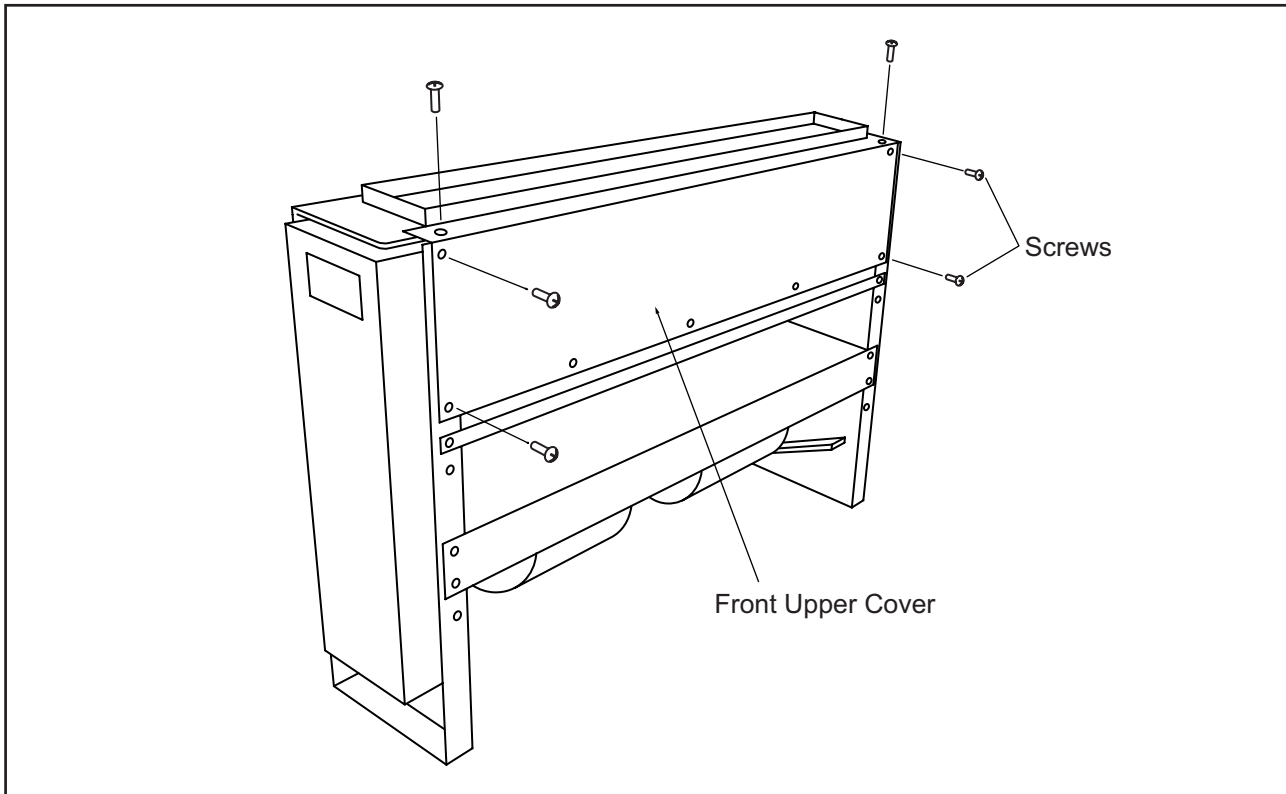
Phillips Screwdriver



**! WARNING****TURN OFF all power source switches.**

- (3) Remove the front upper cover after removing eleven (11) fixing screws.

Tool	Phillips Screwdriver
------	----------------------



### 2.8.3 Removing Fan Motor

- (1) Remove the air filter according to the item 2.8.1 "Removing Air Filter".
- (2) Remove the front covers according to the item 2.8.2 "Removing Front Covers".
- (3) Remove the fan motor as same as indicated in No.4 to No.8 of the item 2.7.5 "Removing Fan Motor".

Tool	Phillips Screwdriver, Hexagon Wrench
------	--------------------------------------

### 2.8.4 Removing Printed Circuit Board (PCB)

- (1) Remove the front covers according to the item 2.8.2 "Removing Front Covers".
- (2) Remove the PCBs as same as indicated in No.5 to No.7 of the item 2.7.6 "Removing Printed Circuit Board (PCB)".

Tool	Phillips Screwdriver, Pincers
------	-------------------------------

### 2.8.5 Removing Thermistors for Liquid Pipe and Gas Pipe

- (1) Remove the air filter according to the item 2.8.1 "Removing Air Filter".
- (2) Remove the front covers according to the item 2.8.2 "Removing Front Covers".
- (3) Remove the thermistor as same as indicated in No.4 to No.6 of the item 2.7.7 "Removing Thermistors for Liquid Pipe and Gas Pipe".

Tool	Phillips Screwdriver
------	----------------------

## SERVICING

### (2.9 Ceiling Type)

#### 2.9 Ceiling Type

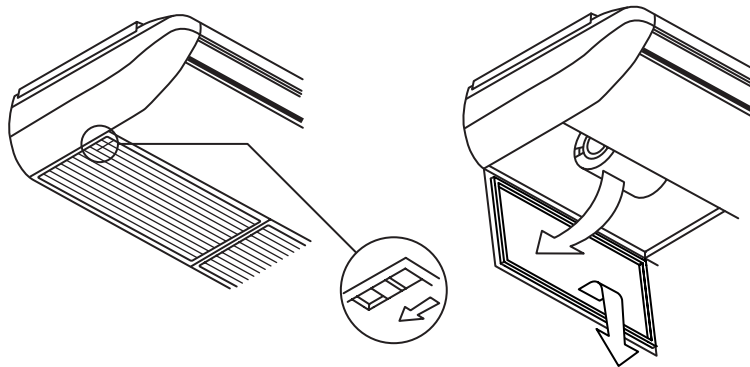
## ! WARNING

**TURN OFF all power source switches.**

#### 2.9.1 Removing Air Filter and Air Intake Grille

The air filter is located inside of the air intake grille.

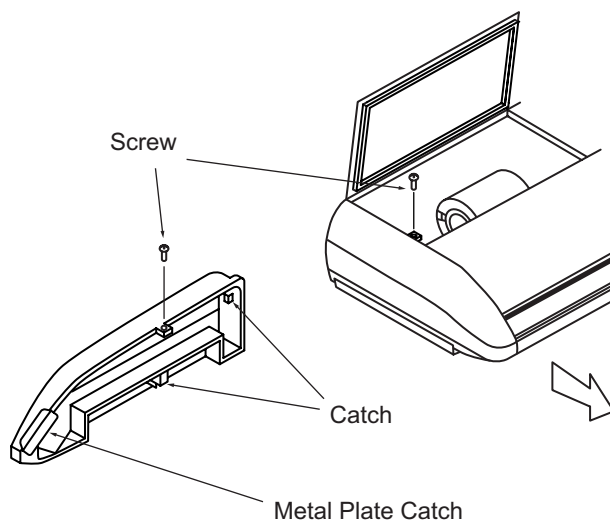
Remove the air filter after opening the air intake grilles.



- (1) Slide the catches on both sides of the air intake grille backwards.
- (2) Open the air intake grille downwards.
- (3) To remove the air filter, lift it upwards unhook it and draw it forward.

#### 2.9.2 Removing Side Cover

- (1) Open the air intake grille according to the item 2.9.1 "Removing Air Filter and Air Intake Grille".
- (2) Remove the screw fixing the side cover.
- (3) Pull the side cover forward and unhook it from two (2) catches and metal plate hook.





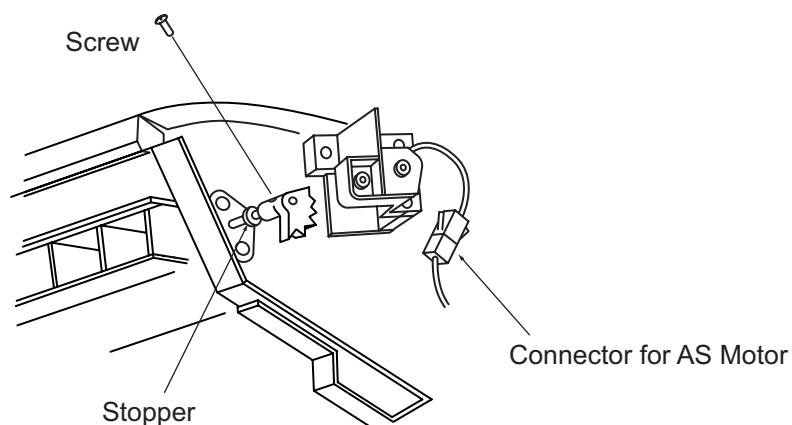
**! WARNING****TURN OFF all power source switches.**

## 2.9.3 Removing Discharge Air Grille

- (1) Remove the side covers according to the item 2.9.2 "Removing Side Cover".
- (2) Remove the screw connecting the AS motor assembly and the discharge air grille, and remove the stopper.

Tool

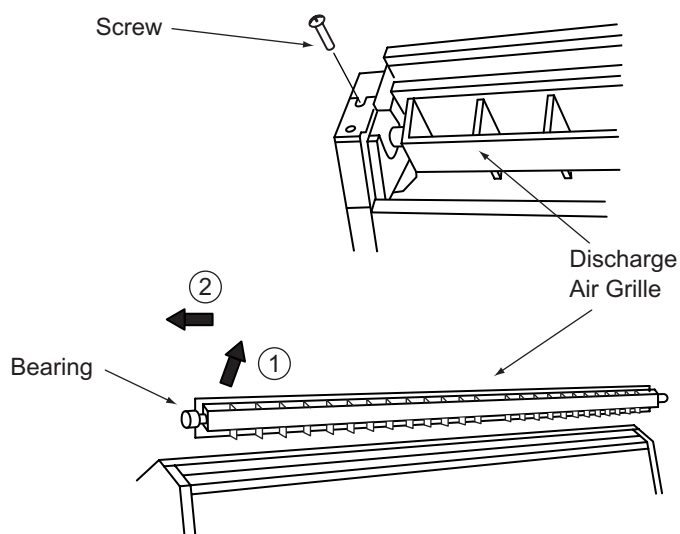
Phillips Screwdriver



- (3) Remove the screw supporting the bearing at the left side, pull out the discharge air grille including the bearing, and pull out the discharge air grille from the right side of the bearing.

Tool

Phillips Screwdriver



## SERVICING

(2.9 Ceiling Type)

# ! WARNING

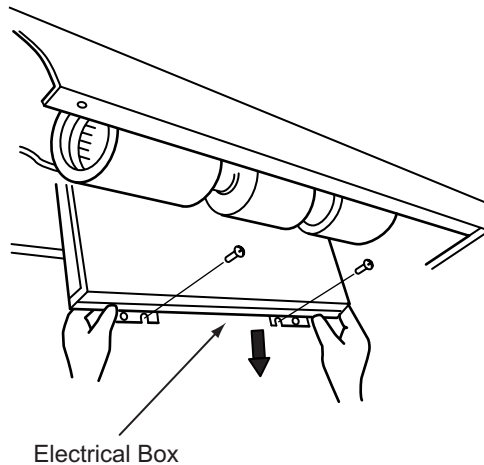
**TURN OFF all power source switches.**

### 2.9.4 Removing Fan Motor

- (1) Open the air intake grille according to the item 2.9.1 "Removing Air Filter and Air Intake Grille".
- (2) Hook the electrical box on the lower frame after removing the screws fixing the electrical box.

Tool

Phillips Screwdriver



#### NOTE:

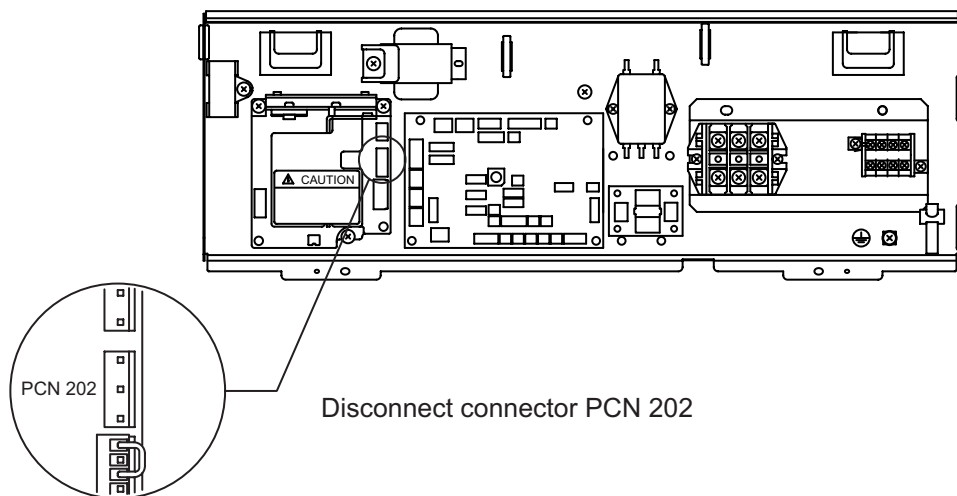
During this work, support the electrical box by hands not to drop it.

- (3) Open the electrical box cover and remove the connector of the fan motor wiring from the PCB.

Tool

Phillips Screwdriver

Ex.) After Alteration

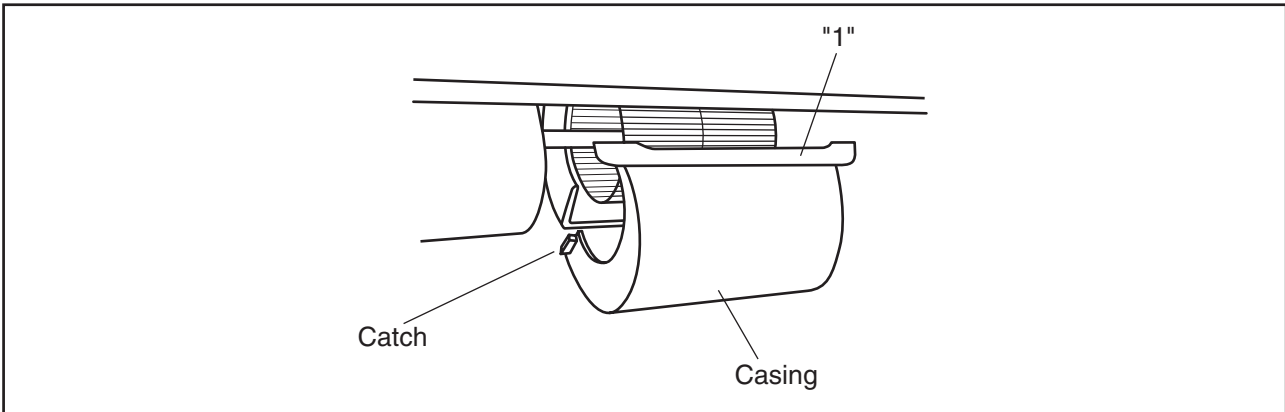


**! WARNING**

**TURN OFF all power source switches.**

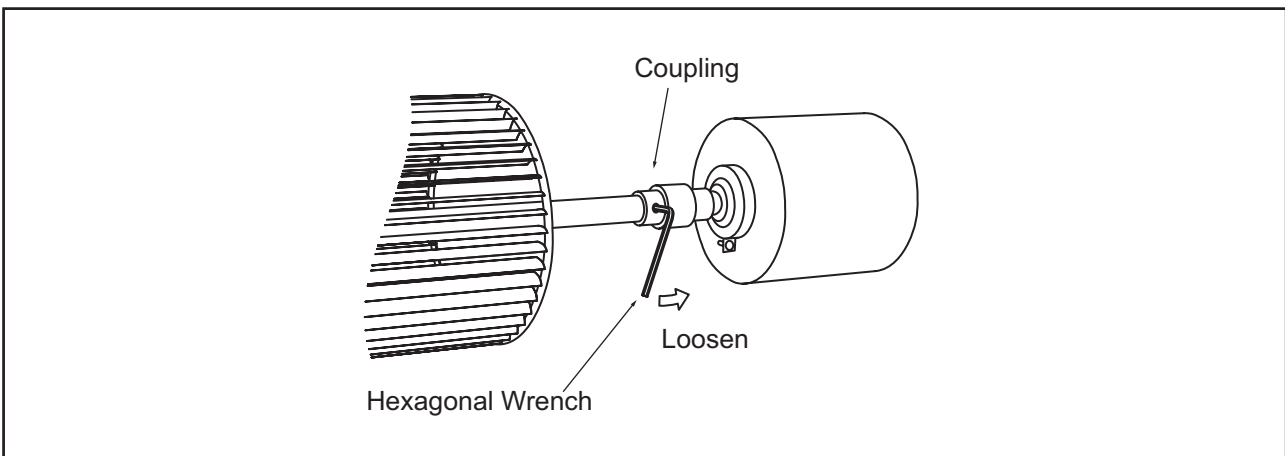
- (4) Remove the casing "1" by pushing the catch part at four positions towards the inner side.

Tool	Phillips Screwdriver
------	----------------------



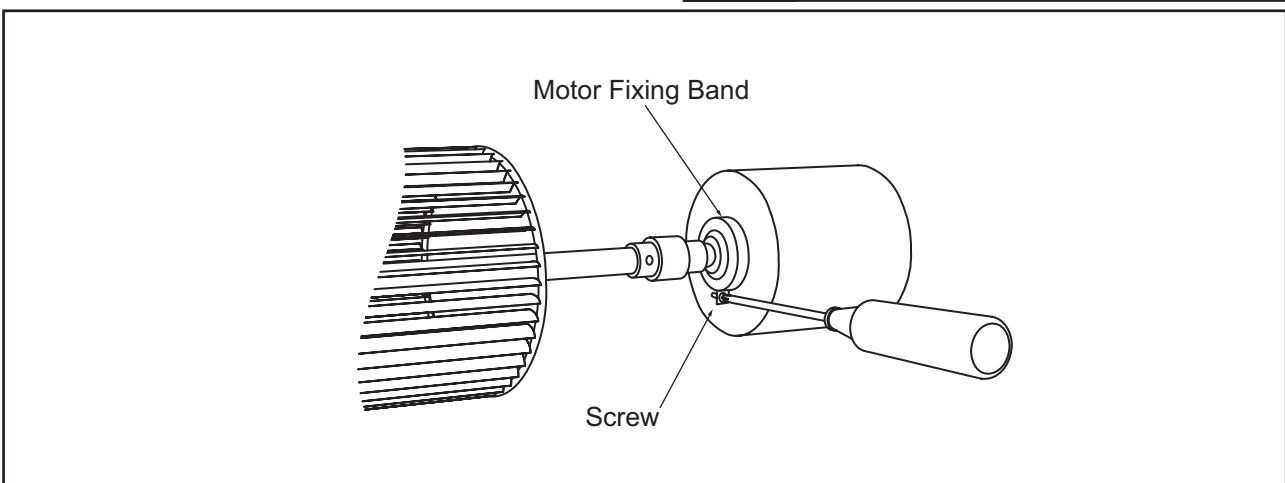
- (5) Loosen the screw for the coupling by a hexagon wrench.

Tool	Hexagon Wrench
------	----------------



- (6) Remove the fan motor by sliding it backwards after removing the fixing band. Pay attention not to drop it.

Tool	Phillips Screwdriver
------	----------------------



**NOTE:**

Pay attention to the position of the runner shaft when replacing the fan motor. In case that the resistance is big when rotating the motor shaft by hand after replacing, remove the bearing once according to the item 2.9.5 "Removing Bearing", adjust the positions of the runner shaft and the motor shaft on the straight and assemble the runner shaft again.

## SERVICING

### (2.9 Ceiling Type)

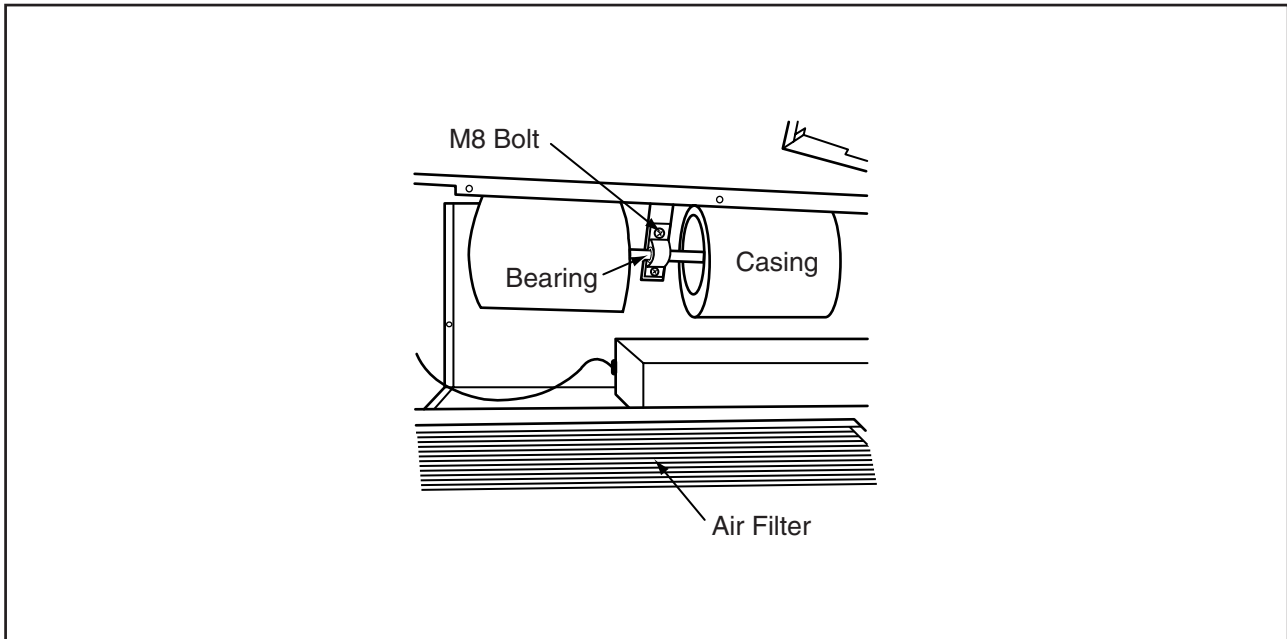
# ! WARNING

**TURN OFF all power source switches.**

#### 2.9.5 Removing Bearing

- (1) Open the air intake grille according to the item 2.9.1 "Removing Air Filter and Air Intake Grille".
- (2) Remove the lower part of the casing according to the item 2.9.4 "Removing Fan Motor".
- (3) Loosen one (1) screw for the coupling by a hexagon wrench according to the item 2.9.4 "Removing Fan Motor".
- (4) Remove two (2) M8 bolts fixing the bearing and remove the bearing including the shaft and the runner assembly.

Tool	Hexagon Wrench, Phillips Screwdriver
------	--------------------------------------



#### 2.9.6 Removing Coupling

# ! WARNING

**TURN OFF all power source switches.**

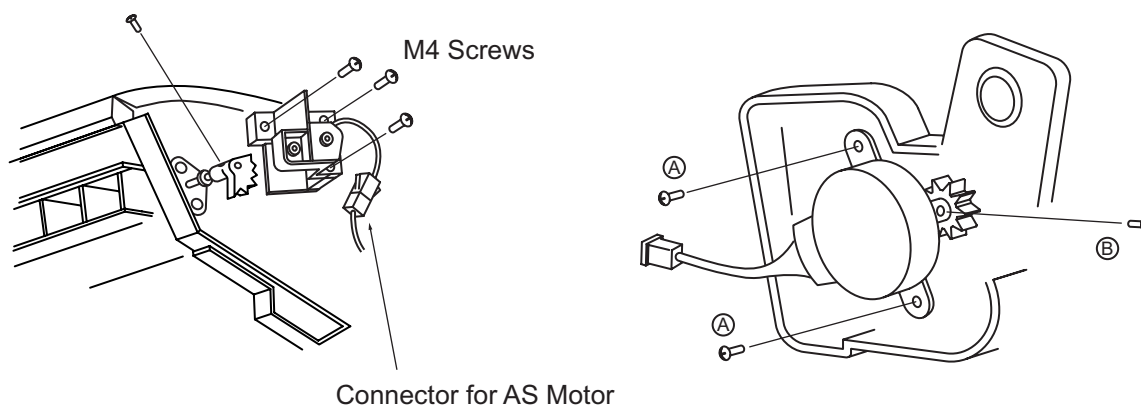
- (1) Open the air intake grille according to the item 2.9.2 "Removing Side Cover".
- (2) Remove the lower part of the casing according to the item 2.9.4 "Removing Fan Motor" and loosen two (2) screws for the coupling by a hexagon wrench.
- (3) Remove two (2) M8 screws fixing the bearing according to the item 2.9.5 "Removing Bearing".
- (4) Remove the coupling after removing the shaft and the fan runner assembly.

**! WARNING****TURN OFF all power source switches.**

## 2.9.7 Removing Automatic Louver Motor

- (1) Remove the right side cover according to the item 2.9.2 "Removing Side Cover".
- (2) Remove the M4 screws and remove the AS motor assembly from the right shaft of the discharge air grille. Pay attention not to damage the AS motor assembly.
- (3) Remove two screws (A) fixing the motor for auto louver and remove the motor from the AS motor fixing plate.  
Remove one screw (B) fixing the shaft of the motor for auto louver and pinion AS.

Tool	Phillips Screwdriver, Torque Wrench
------	-------------------------------------

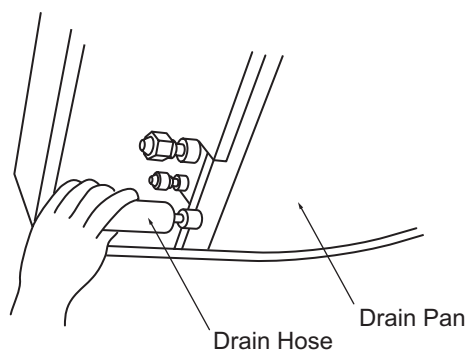
**NOTE:**

When assembling, tighten two screws (A) with a torque of 0.8Nm (8kg-cm) and one screw (B) with a torque of 0.4Nm (4kg-cm) using a torque wrench.

## 2.9.8 Removing Thermistors for Liquid Pipe and Gas Pipe, and Electronic Expansion Valve Coil

- (1) Open the air intake grille and remove the right and left side covers according to the items 2.9.1 "Removing Air Filter and Air Intake Grille" and 2.9.2 "Removing Side Cover".
- (2) Remove the drain hose from the drain pan and remove the screws fixing the drain pan to the unit.
- (3) Remove the drain pan.

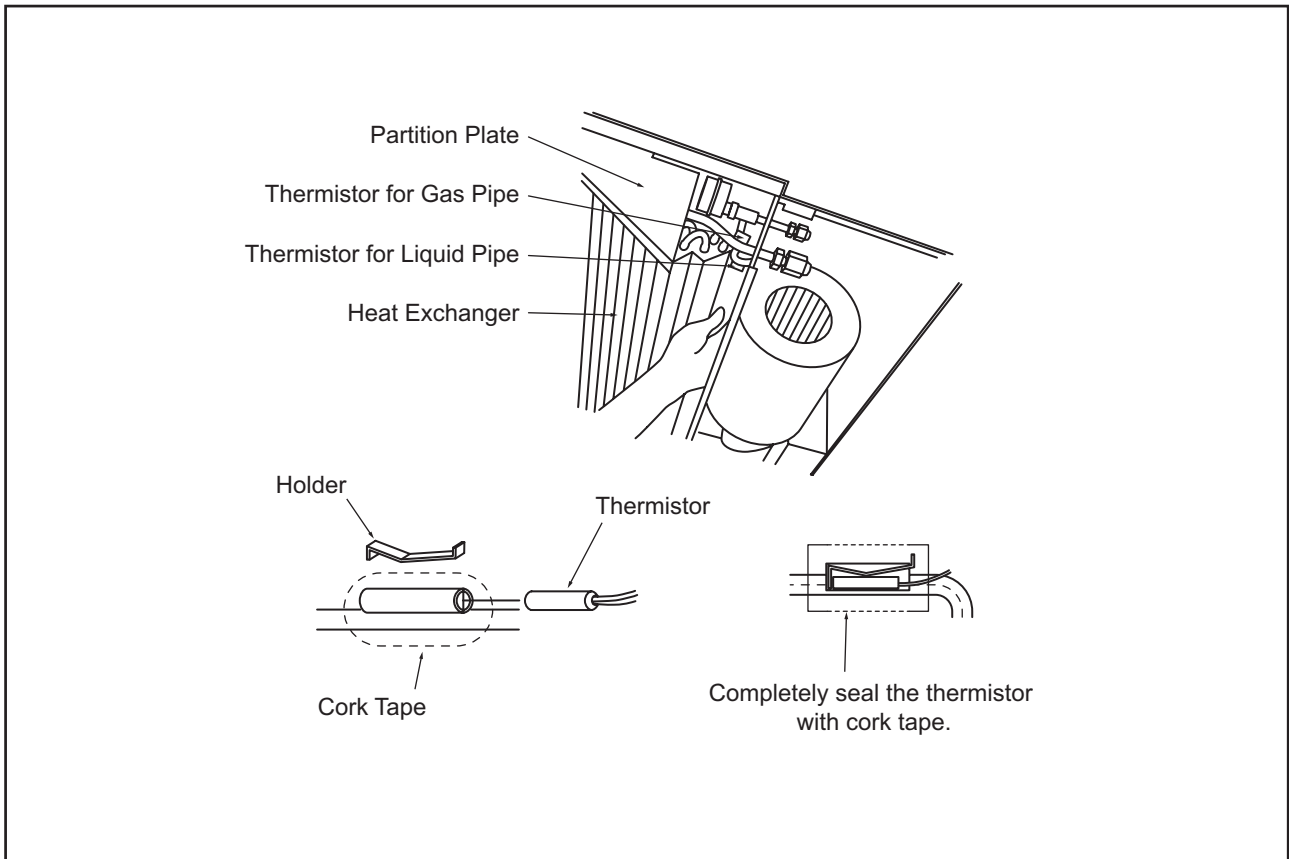
Tool	Phillips Screwdriver
------	----------------------



**! WARNING**

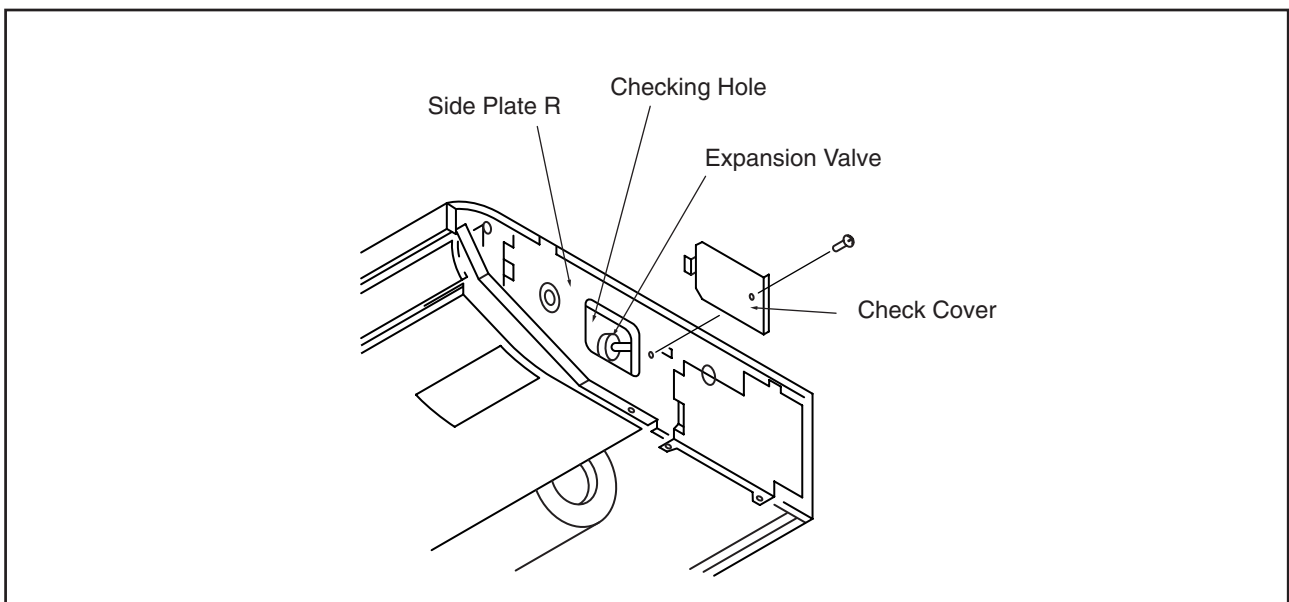
**TURN OFF all power source switches.**

- (4) Remove the thermistors for the liquid pipe and gas pipe.
- (5) Refer to the item 2.4.12 "Removing Electronic Expansion Valve Coil" in pages 2-63 and 2-64 for the procedures of removing electronic expansion valve coil.



**2.9.9 Checking Procedures for Electronic Expansion Valve Coil**

- (1) Remove the right side cover according to the item 2.9.2 "Removing Side Cover".
- (2) Remove the check cover from the side cover R.
- (3) The electronic expansion valve can be seen through the checking hole.
- (4) Check the activation of the electronic expansion valve by touching with a hand.



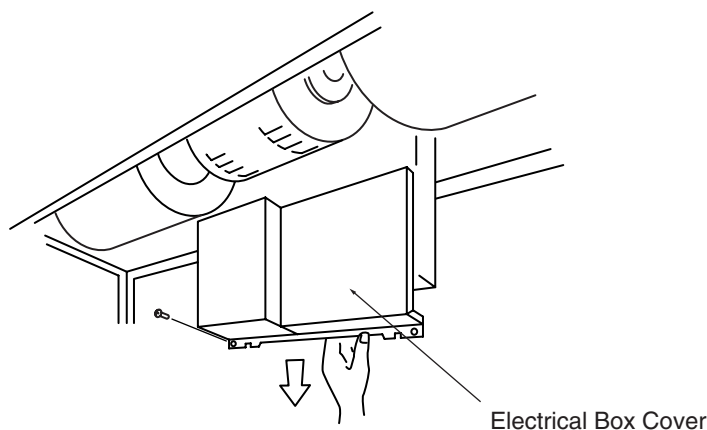
**! WARNING**

**TURN OFF all power source switches.**

2.9.10 Removing Printed Circuit Board (PCB)

- (1) Open the air intake grille according to the item 2.9.1 "Removing Air Filter and Air Intake Grille".
- (2) Turn the electrical box according to No.4 of the item 2.9.4 "Removing Fan Motor" and hook the electrical box at the lower frame.
- (3) Remove the cover after removing two (2) screws fixings electrical box cover.

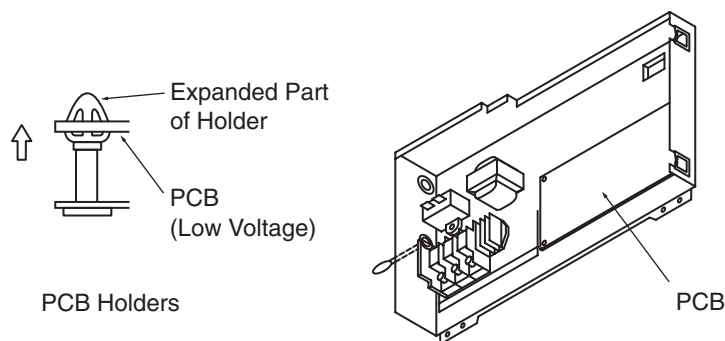
Tool	Phillips Screwdriver
------	----------------------



**NOTE:**  
During this work, support the electrical box not to drop it.

- (4) The PCB is supported by four (4) holders. Pinch the expanded part of the holder with long-nose pliers.

Tool	Long-nose Pliers
------	------------------



**NOTE:**  
Do not touch the electrical components.  
Do not apply big force to the PCB.  
If applied, the PCB will be faulty.

## SERVICING

### (2.10 Total Heat Exchanger)

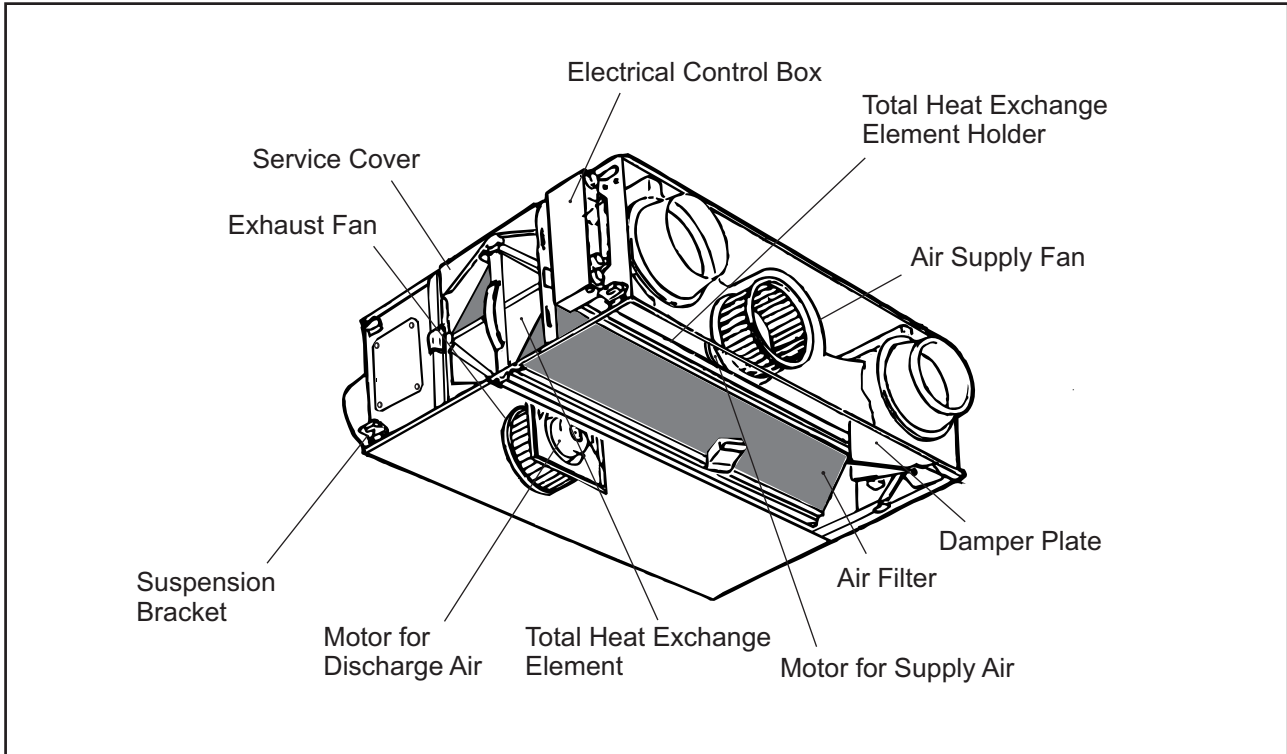
#### 2.10 Total Heat Exchanger

## ! WARNING

**TURN OFF all power source switches.**

##### 2.10.1 Structure

The structure of the total heat exchanger is as shown in the figure.  
When maintaining, use service access door of ceiling.

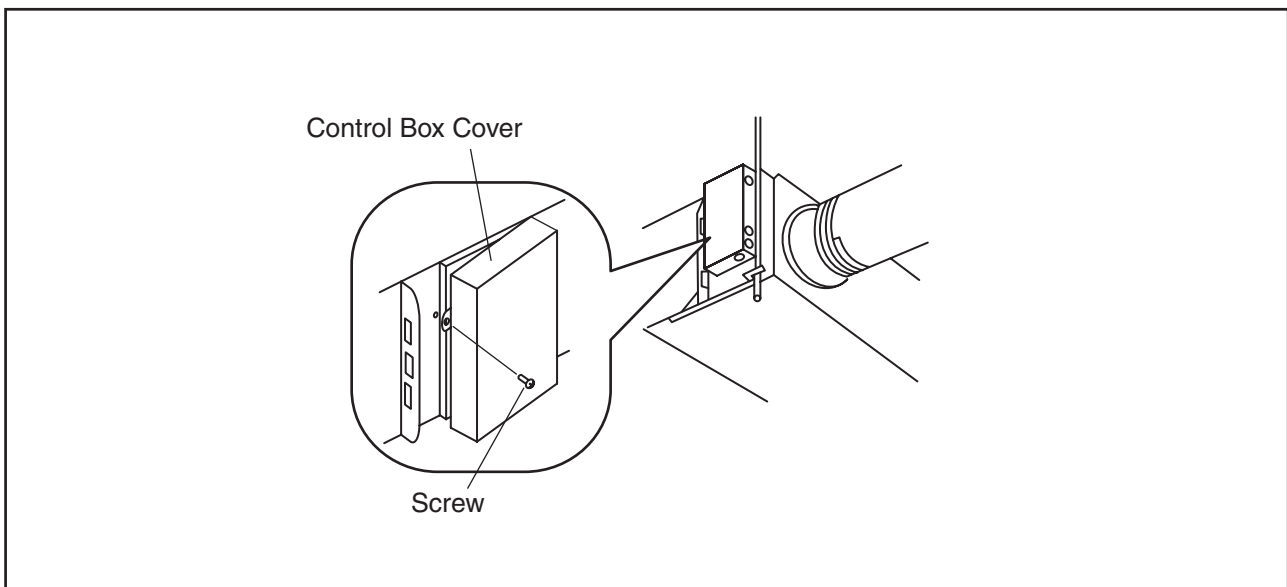


##### 2.10.2 Removing Electrical Parts

- (1) Remove screws for fixing for the electrical control box cover and remove the corresponded electrical parts.
- (2) Open the service cover by pulling the handle. Remove the total heat exchanger element or air filter.

Tool

Phillips Screwdriver





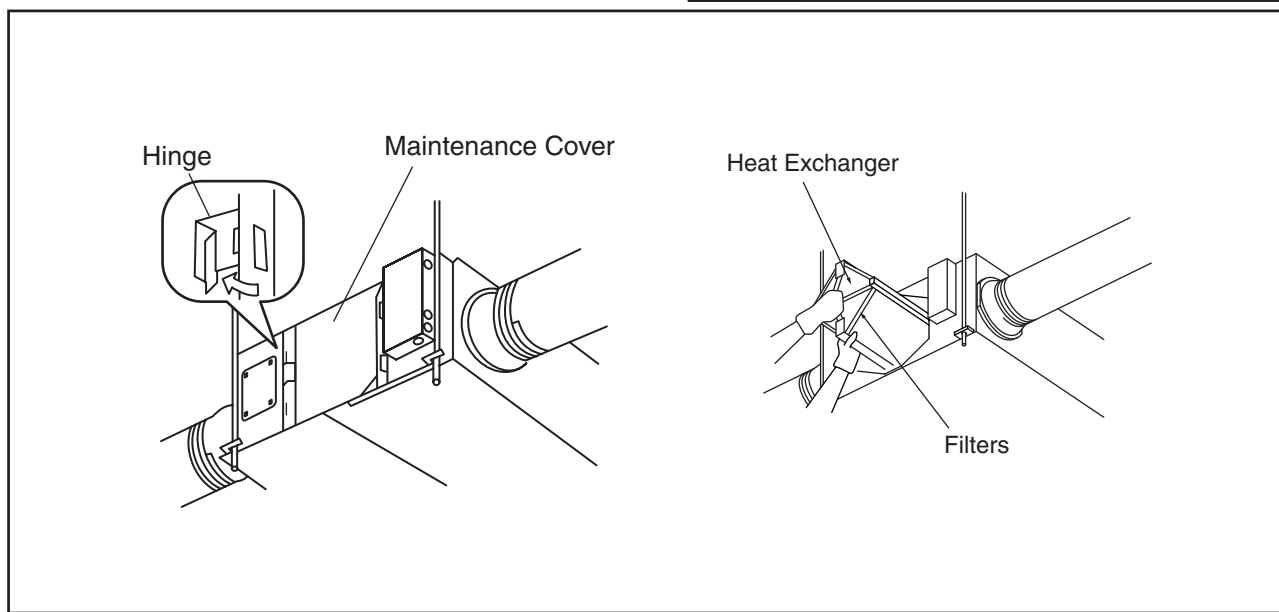
**! WARNING****TURN OFF all power source switches.**

## 2.10.3 Removing Air Filter and Total Heat Exchanger Element

- (1) Open the service cover by pulling the hinge.
- (2) Remove the air filter or total heat exchanger element.

Tool

Phillips Screwdriver



## SERVICING

### (2.10 Total Heat Exchanger)

# ! WARNING

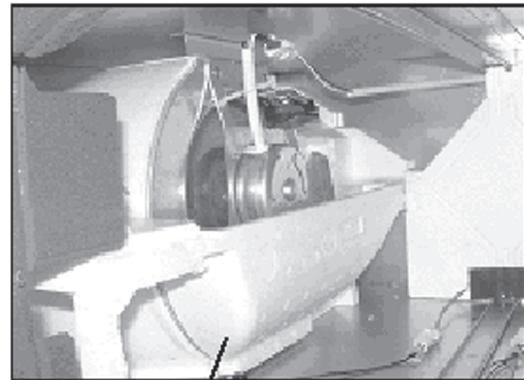
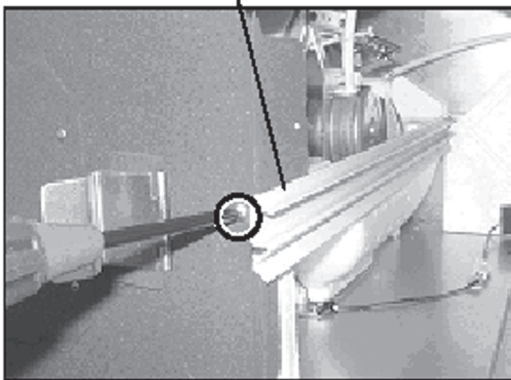
**TURN OFF all power source switches.**

#### 2.10.4 Removing Fan Motor

- (1) Open the service cover by pulling the handle according to the item 2.10.3 "Removing Air Filter and Total Heat Exchanger Element".
- (2) Remove the air filter according to the item 2.10.3 "Removing Air Filter and Total Heat Exchanger Element".
- (3) Remove the heat exchange element according to the item 2.10.3 "Removing Air Filter and Total Heat Exchanger Element".
- (4) Remove two (2) screws for fixing the total heat exchange element holder and remove the total heat exchange element holder.
- (5) Remove the fan casing.

Tool	Phillips Screwdriver
------	----------------------

Total Heat Exchange Element Holder



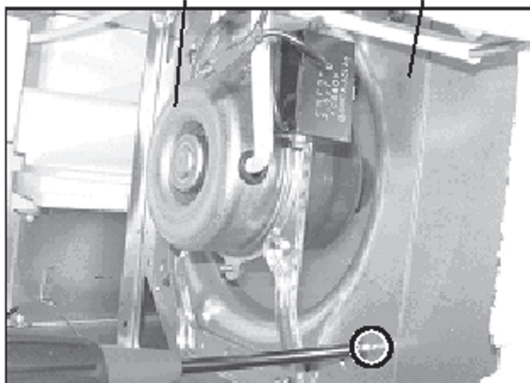
Fan Casing

- (6) Remove six (6) screws for fixing the fan motor for supply air and remove the fan motor for supply air.
- (7) Remove four (4) screws for fixing the fan motor for discharge air and remove the fan motor for supply air.

Tool	Phillips Screwdriver
------	----------------------

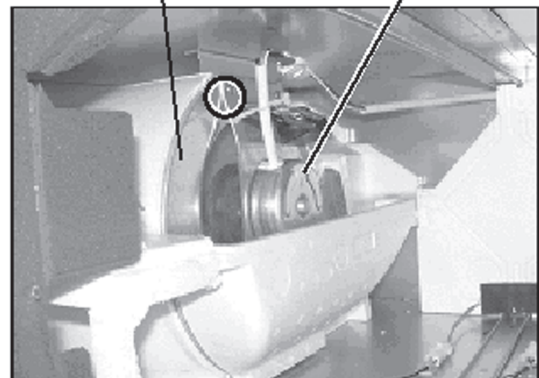
Motor (Supply Air)

Motor Fixing Plate



Motor Fixing Plate

Motor (Discharge Air)



**! WARNING**

**TURN OFF all power source switches.**

## 2.10.5 Air Filter Cleaning

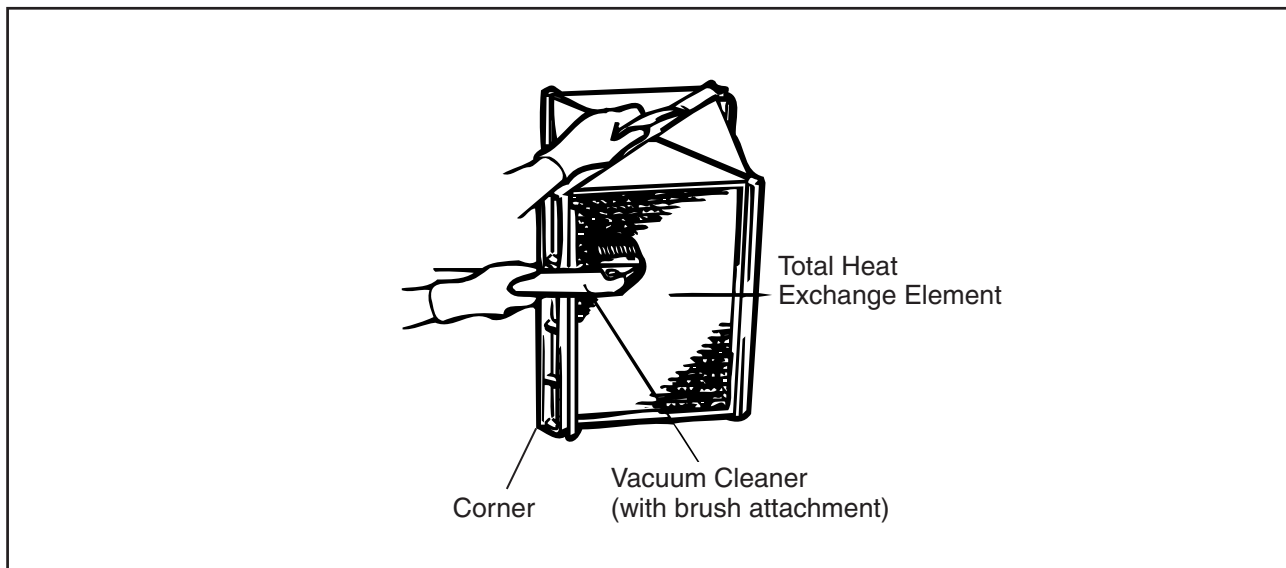
- (1) Perform cleaning of the air filter more than once a year.
- (2) Ensure to use electric vacuum cleaner to remove dust clogged.  
(Otherwise, clean with water or natural type cleaning agent.)  
To dry-out the air filter, keep out of direct sun to avoid any deformation.

## 2.10.6 Total Heat Exchanger Cleaning

- (1) Clean up the total heat exchanger element more than once two years.
- (2) Use a vacuum cleaner to suck up the dust and dirt on the exposed surfaces of the total heat exchange elements. Attach a nozzle with a brush to the vacuum cleaner for this job, and clean the elements by passing the brush lightly over their exposed surfaces.

Tool

Phillips Screwdriver

**! CAUTION**

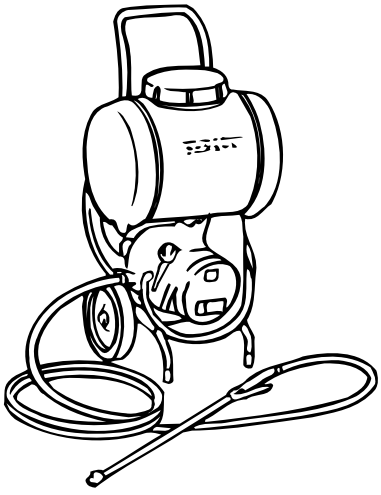
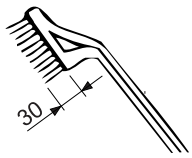
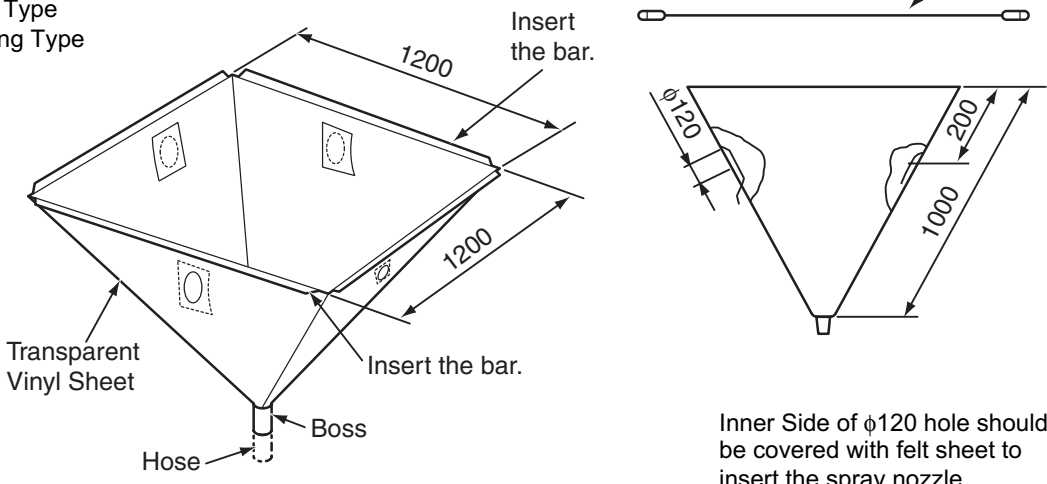
- Do NOT wash the element by water.
- Do not use the fard nozzle of the vacuum cleaner. It may damage the exposed surfaces of the total heat exchange element.
- Under no circumstances should the total heat exchange elements be washed in water.

## SERVICING

### (2.11 Cleaning Indoor Unit Heat Exchanger)

#### 2.11 Cleaning Indoor Unit Heat Exchanger

##### 2.11.1 Required Tools for Cleaning (for All Indoor Units)

No.	Remark	No.	Tool	Remark
1	Cleaning Water Pump  A water pump equipped with a tank is recommended.  	2	Water Tank Clean Water	Approx. 18 liters
		3	Nozzle	Attached with Water Pump
		4	Brush (non-metal)  	If the heat exchanger is heavily clogged with dust, remove it with this brush. The length of brush should be 25 to 35mm.
		5	Hose for Water Pan	Select a hose according to site requirements.
		6	Bucket	2 Nos. for 5 liters
		7	Phillips Screwdriver	1 No.
		8	Nipper	1 No.
		9	Adjustable Wrench	1 No.
		10	Megohm Tester	500V
		11	Cleaning Agent	Select a neutral type cleaning agent.
		12	Spray	To spray cleaning water.
		13	Tape with Adhesive	To fix the vinyl sheet to protect the room from cleaning water.
		14	Rope	1m, 4 pieces
		15	Vinyl Sheet	Select a vinyl sheet with 0.5mm thickness.
		16	Gloves	
		17	Cleaning Water Collector * In-the-Ceiling Type * 4-Way Cassette Type * 2-Way Cassette Type * Wall Type * Ceiling Type  	

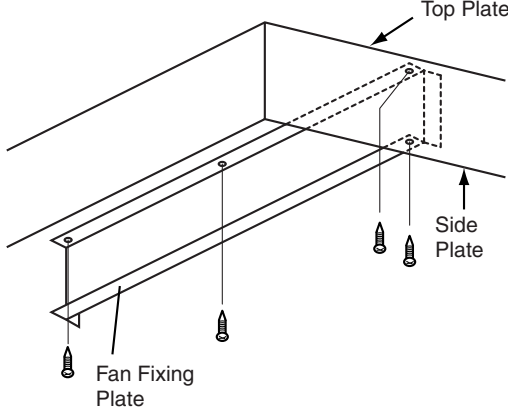
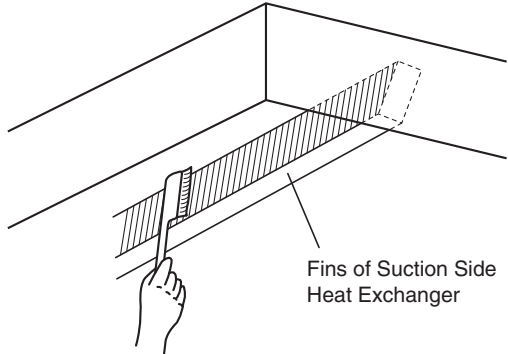
**! WARNING**

**TURN OFF all power source switches.**

2.11.2 In-the-Ceiling Type

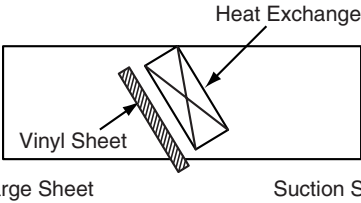
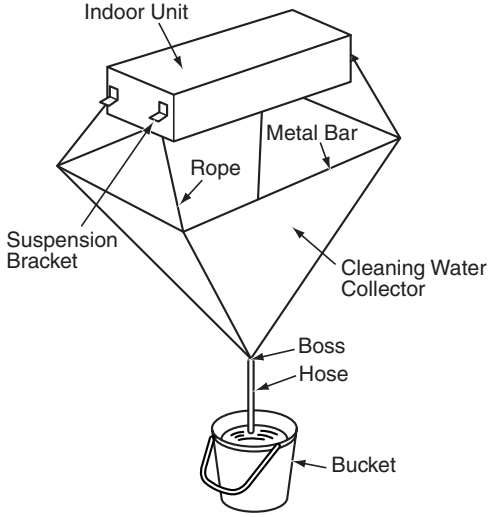
Before cleaning, cover the floor with a vinyl sheet.

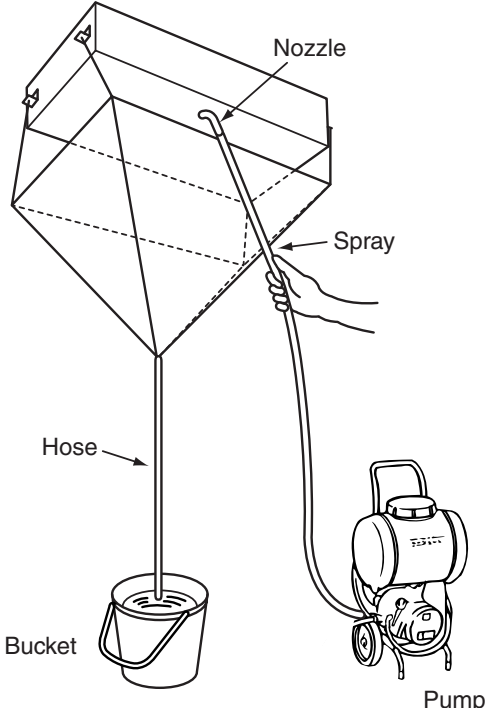
\* Refer to the item 2.11.1 "Required Tools for Cleaning" for cleaning tools.

Step	Procedure	Required Tool
1	Remove the drain pan according to the item 2.2.8 "Removing Drain Pan" and clean the drain pan.	
2	Remove the indoor fan motor and the fan runner assembly according to the item 2.3.3 "Removing Indoor Fan and Fan Motor".	
3	<p>Removing Fan Fixing Plate</p>  <p>Remove the screws fixing the fan fixing plate and then pull out the fan fixing plate downwards.</p> <p>After removing the fan fixing plate, cover the lead wire with a vinyl sheet to avoid cleaning water.</p>	* Phillips Screwdriver
4	<p>Removing Dust Clogged in Heat Exchanger</p>  <p>Scratch and remove the dust clogged in fins of the suction side exchanger with a brush. Collect the dust in a bucket.</p>	* Brush * Bucket or Paper Board Box

## SERVICING

### (2.11 Cleaning Indoor Unit Heat Exchanger)

Step		Procedure	Required Tool
5	Protection from Cleaning Water	 <p>Cover the discharge side of the heat exchanger with a vinyl sheet to protect the insulation materials inside the unit from cleaning water. Seal the vinyl sheet properly so as to make no gaps with the adhesive tape.</p> <p><b>NOTE:</b> Perform the work by wearing gloves to prevent any injuries from touching the fins of the heat exchanger. Attach the vinyl sheet to protect the insulation materials from the cleaning water. (A transparent board is also applicable instead of the vinyl sheet.)</p>	<ul style="list-style-type: none"> <li>* Vinyl Sheet</li> <li>* Adhesive Tape</li> <li>* Cutter</li> </ul>
6	Attaching Cleaning Water Pan	 <p>Hang a cleaning water collector from the indoor unit.</p> <ol style="list-style-type: none"> <li>(1) Attach ropes to the suspension brackets.</li> <li>(2) Put the metal bars through the holes of the cleaning water collector.</li> <li>(3) Attach the ropes to the four bars of the cleaning water collector and suspend the cleaning water collector.</li> <li>(4) Attach the hose to the boss of the cleaning water collector and set the bucket at the end of the hose.</li> </ol>	
7	Spraying the Cleaning Water	Spray the cleaning water over the fins of the heat exchanger.	* Cleaning Agent

Step	Procedure	Required Tool
8	<p>Cleaning with Clean Water</p>	<p>* Water Tank * Pump * Washer</p>
 <p>Insert the nozzle into the hole of the cleaning water collector. Operate the pump, wash the dust off on the fins with clean water thoroughly. If the cleaning agent is left on the fins, it may cause corrosion.</p> <p>Adjust the pressure of the spray at approximately 2.5 to 5.0 kg/cm<sup>2</sup> so as not to crush the fins and direct the nozzle in a straight line toward the fins.</p>		
9	<p>Make sure that there are no drops of water left after cleaning the fins and reassemble the fan assembly and the drain pan.</p>	<p>* Screwdriver * Hexagon Wrench</p>
10	<p>Measure the condition of insulation of the drain pump with a megohm-meter tester. (Check to ensure that the resistance is bigger than 1 MΩ at 500V.)</p>	
11	<p>Connect the electrical wiring as it was and attach the removed parts.</p>	<p>* Screwdriver</p>
12	<p>Neutralization Treatment after Cleaning The cleaning agent specified in the item 2.11.1, is of neutral type. However, the cleaning water after cleaning may be not neutral due to dust or other foreign particles. Collect all cleaning water and make necessary neutralization for the cleaning water.</p>	

## SERVICING

### (2.11 Cleaning Indoor Unit Heat Exchanger)

# ! WARNING

**TURN OFF all power source switches.**

#### 2.11.3 Cleaning 4-Way Cassette Type Indoor Unit

Spread a vinyl sheet over the floor to protect furnitures, etc. from cleaning water before this work.

No.	Procedure	Tool
1	Remove the optional air panel according to the item 2.4.4 "Removing Optional Air Panel".	Phillips Screwdriver
2	Remove the electrical box after opening the electrical box cover and disconnecting the connectors between the indoor and outdoor units and other connectors according to the item 2.4.3 "Removing Electrical Box Cover".	Phillips Screwdriver
3	Remove the bell-mouth and fan according to the item 2.4.5 "Removing Fan Runner and Fan Motor".	Phillips Screwdriver Adjustable Wrench
4	Remove the drain pan according to the item 2.4.8 "Removing Drain Pan".	Phillips Screwdriver
5	Remove the float switch according to the item 2.4.10 "Removing Float Switch".	Phillips Screwdriver
6	Remove the drain-up mechanism according to the item 2.4.9 "Removing Drain-up Mechanism".	Phillips Screwdriver

#### NOTES:

Remove the drain pan after removing drain water on the drain pan.

1. Remove the drain water on the drain pan after pulling out the rubber plug. Check to ensure that water can flow smoothly through the hole by pricking it with a pencil.
2. Insert the rubber plug into the hole after the above checking.
3. Remove the drain pan after removing four fixing screws. Carefully remove the drain pan, since drain water may remain at the bottom of the drain pan.
4. Clean and dry the drain pan after removing. Carefully handle the drain pan not to damage it.

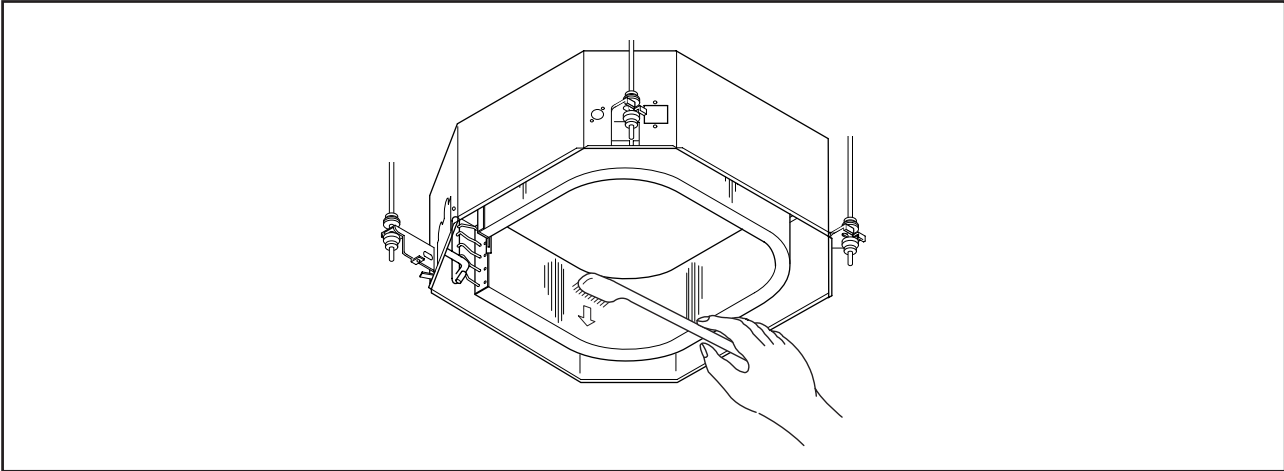


**! WARNING**

**TURN OFF all power source switches.**

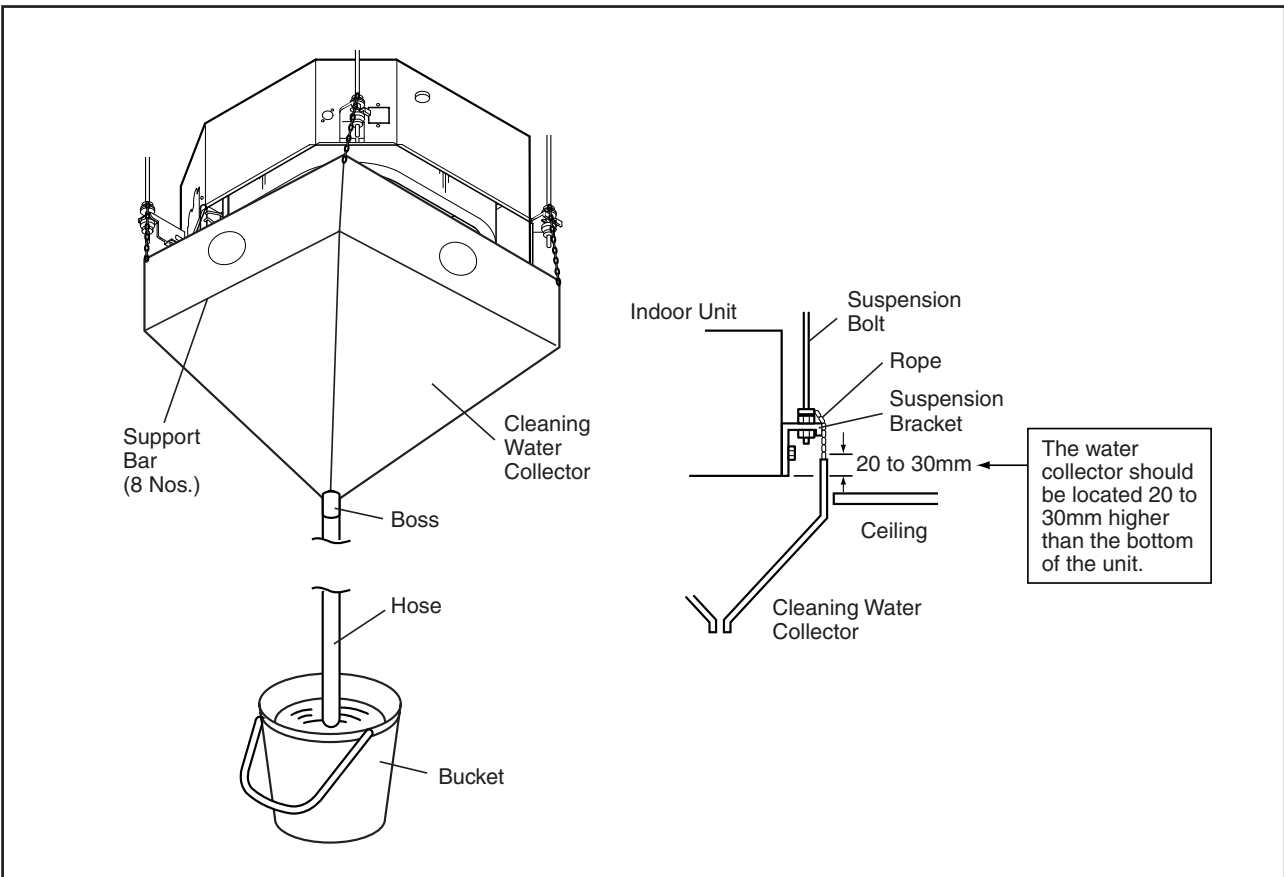
- (1) Scratch off the dust on the inner surface of the heat exchanger downwards using a brush. Collect all dust in a bucket or carton box.

Tool	Brush, Bucket (or Carton Box)
------	-------------------------------



- (2) Attach a vinyl sheet by using adhesive tape around the heat exchanger so that cleaning water will not be splashed over the insulation surface and drain-up pump. Seal the gap between vinyl sheets by using adhesive tape.
- (3) Attach ropes to the each suspension bracket.
- (4) Put the metal bars through the holes of the cleaning water collector.
- (5) Attach the ropes to the four bars of the cleaning water collector and suspend the cleaning water collector as shown in the figure.
- (6) Connect a hose to the boss and put end of hose in a bucket.

Tool	Cutter Knife, Bucket
------	----------------------



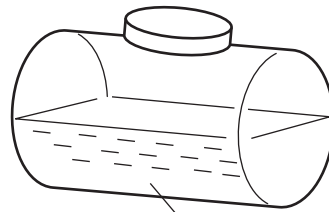
## SERVICING

### (2.11 Cleaning Indoor Unit Heat Exchanger)

# ! WARNING

**TURN OFF all power source switches.**

- (7) Put approximately 15 liters of cleaning agent for aluminum fins in a supply tank.

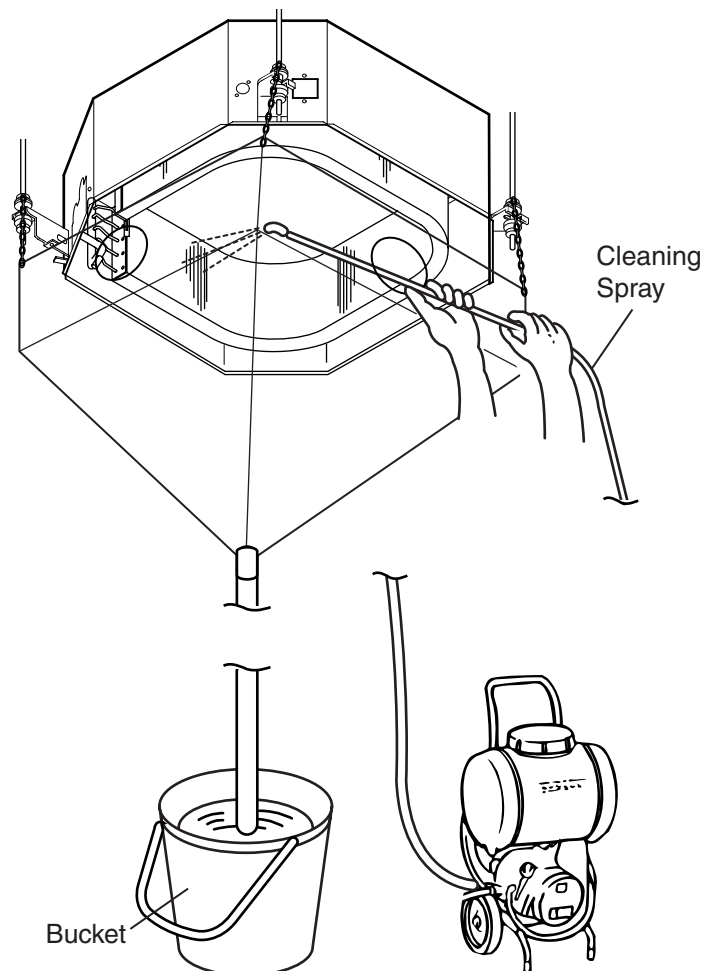


Cleaning Agent for  
Aluminum Fins

- (8) Insert the spray nozzle through the hole of the cleaning water collector. Operate the water pump and clean the dust on the heat exchanger. After cleaning, spray clean water to remove the cleaning water. Adjust the pressure of the water pump so as not to damage the fins.

Tool

Clean Water, Cleaning Agent,  
Water Pump, Cleaning Spray



#### NOTES:

1. If the cleaning water remains, fins will be corroded.
2. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm<sup>2</sup> so as not to damage fins.

**! WARNING****TURN OFF all power source switches.**

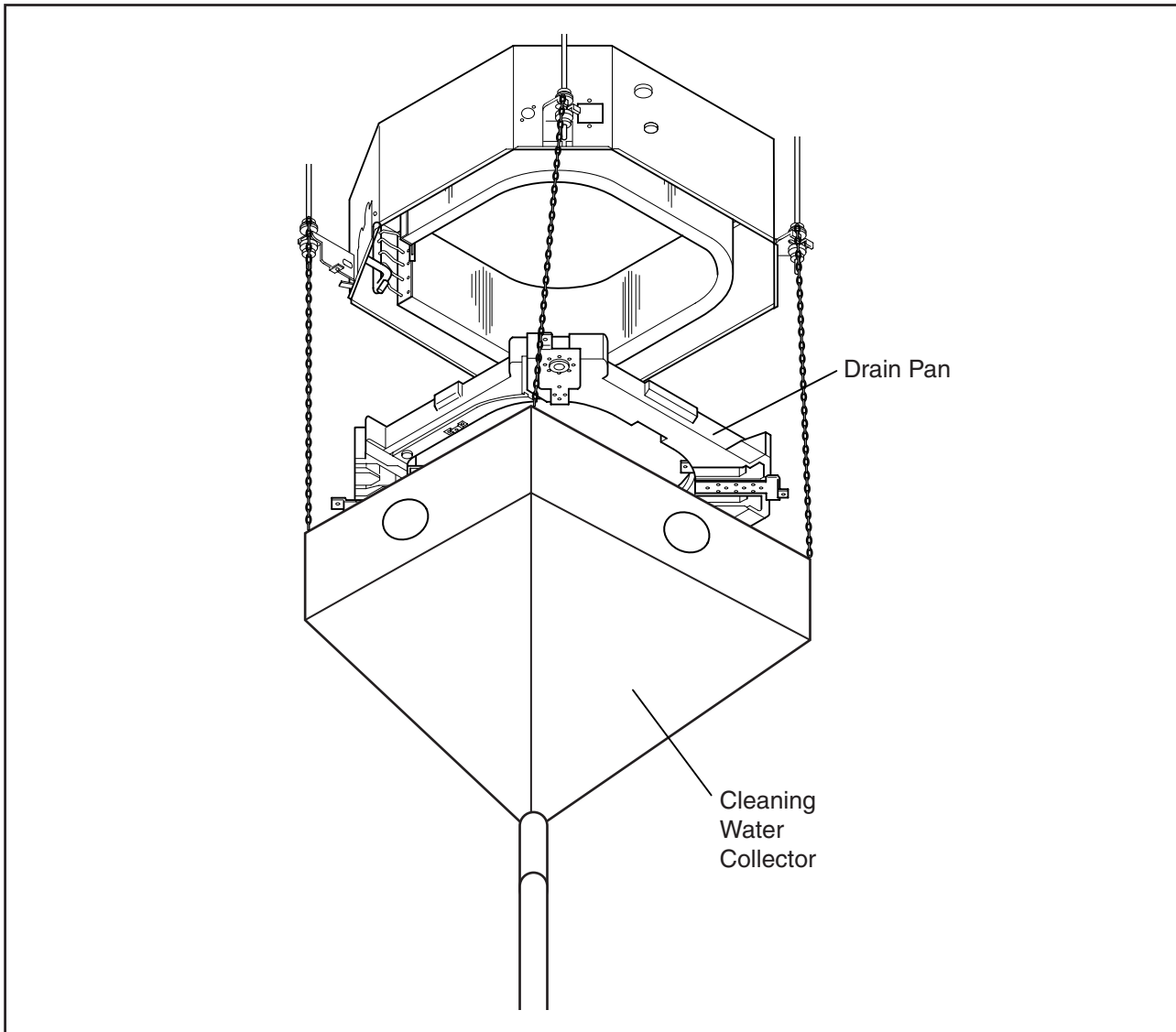
- (9) After cleaning, mount the drain pan by extending the rope downwards.

**NOTE:**

In the case that the cleaning water collector is removed, wipe off the drops from the indoor unit.

Tool

Phillips Screwdriver



- (10) Check the insulation of the drain pump with a megohm-meter. Check to ensure that the insulation is greater than 1 MΩ when 500V is applied.
- (11) Connect wiring as it was.
- (12) Neutralization Treatment after Cleaning  
The cleaning agent specified in the item 2.11.1 is of the neutral type. However, the cleaning water after use may be not neutral. Collect all cleaning water and make necessary neutralization treatment for the cleaning water.

**! WARNING**

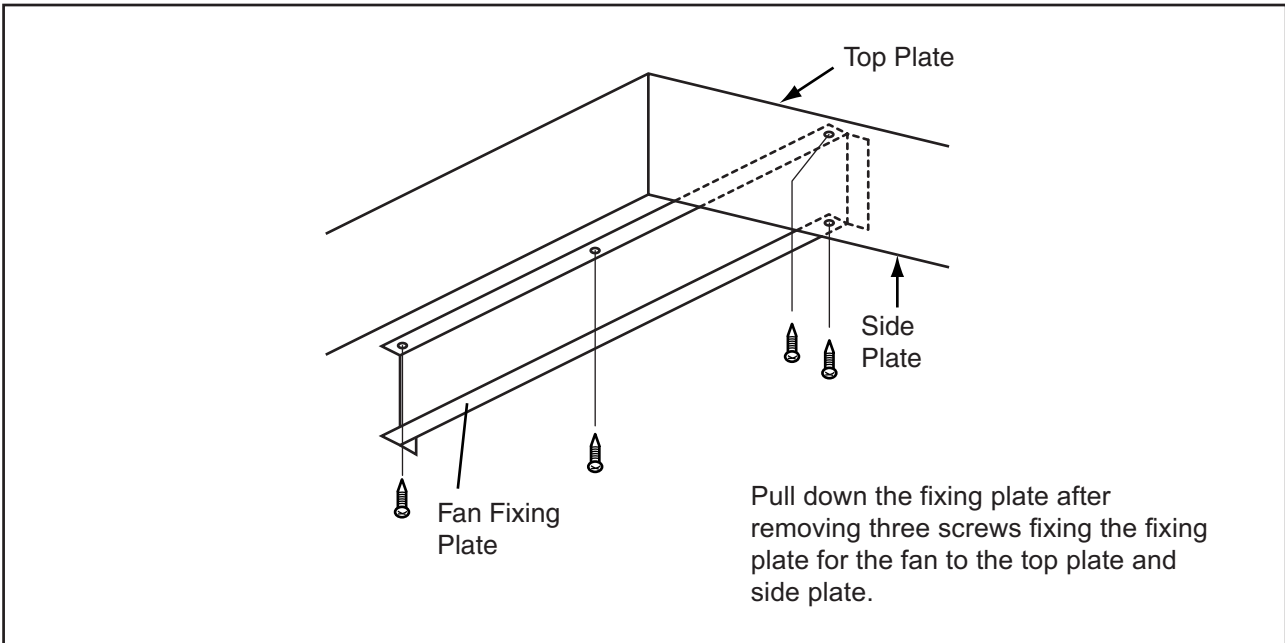
**TURN OFF all power source switches.**

2.11.4 Cleaning 2-Way Cassette Type Indoor Unit

Spread a vinyl sheet over the floor to protect furnitures, etc. from cleaning water before this work.

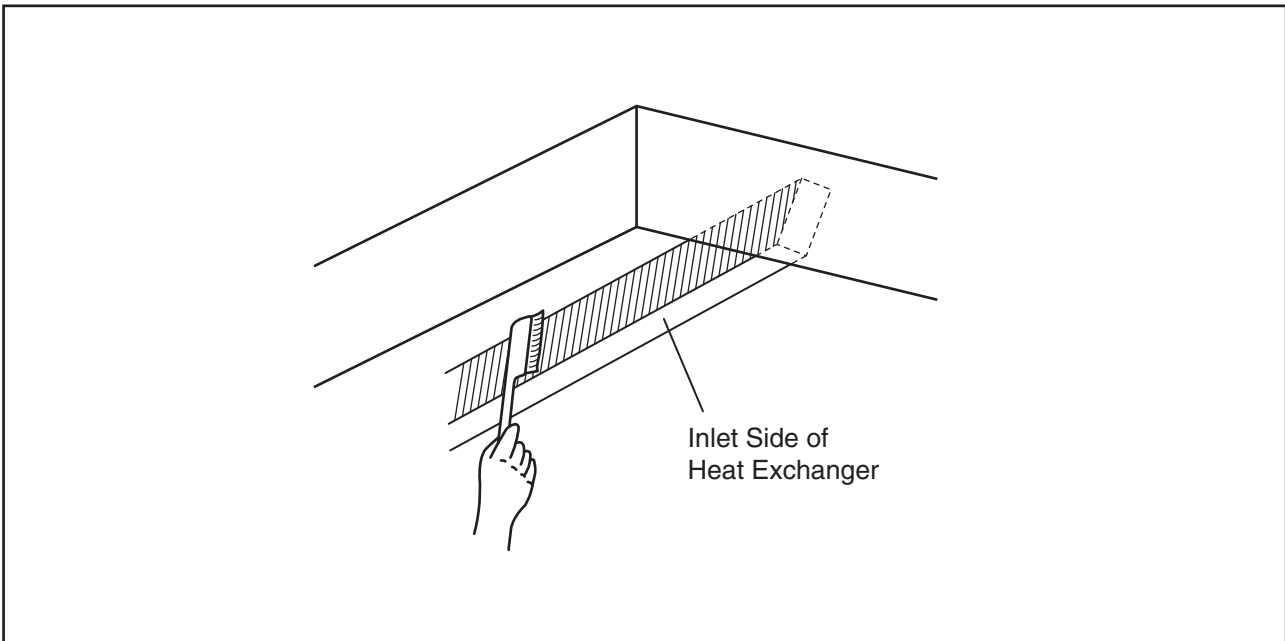
- (1) Remove the drain pan according to the item 2.5.8 "Removing Drain Pan". Clean the drain pan after removal.
- (2) Remove the indoor fan motor and fan runner assembly according to the item 2.5.4 "Removing Fan Runner and Fan Motor".
- (3) Removing Fixing Plate  
Protect the wiring from cleaning water during the cleaning after removing fixing plate for the fan.

Tool	Phillips Screwdriver
------	----------------------



- (4) Removing Dust on Heat Exchanger  
Remove dust on the fins at the inlet side of the heat exchanger by scratching off downwards. Collect all dust in a bucket or carton box.

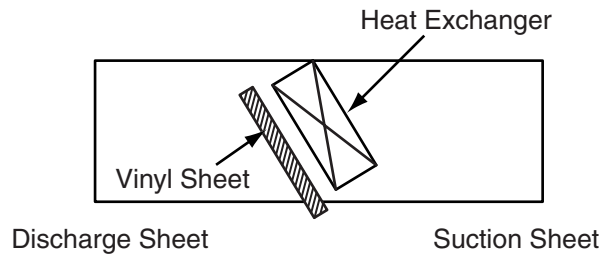
Tool	Brush, Bucket (or Carton Box)
------	-------------------------------



**! WARNING****TURN OFF all power source switches.**

- (5) Put a vinyl sheet behind the heat exchanger so that cleaning water will not be splashed on the insulation surface of the unit. Seal the gap between vinyl sheets.

Tool	Vinyl Sheet, Tape, Cutter
------	---------------------------

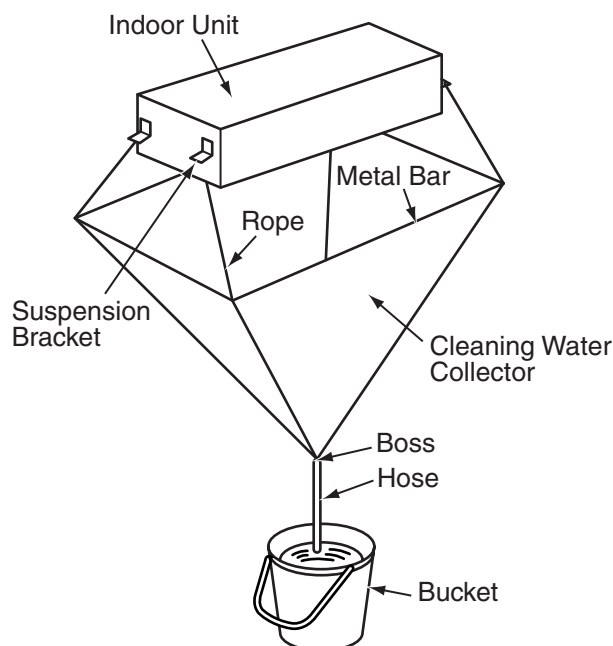
**NOTES:**

1. It is recommended that gloves be used during this work to avoid any injury.
2. Put a vinyl sheet to avoid splashed cleaning water.

- (6) Suspend the cleaning water collector from the indoor unit.
- (a) Connect a rope to the suspension bracket of the indoor unit put is downwards.
  - (b) Insert the support bar into the cleaning water collector hole.
  - (c) Suspend the cleaning water collector with the rope from the indoor unit.
  - (d) Connect a hose to the boss for the cleaning water collector and put the other end in a bucket.

- (7) Spraying Cleaning Water  
Spray the cleaning water over the fins of the heat exchanger.

Tool	Cleaning Water
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## SERVICING

### (2.11 Cleaning Indoor Unit Heat Exchanger)

# ! WARNING

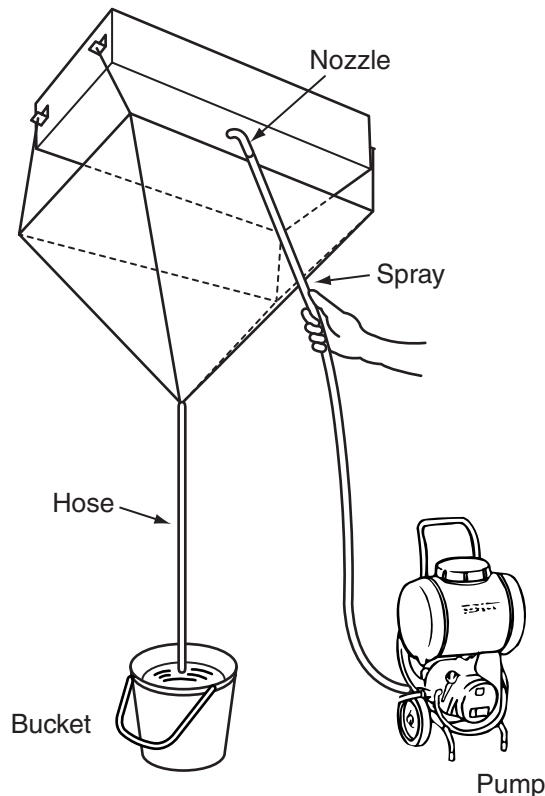
**TURN OFF all power source switches.**

#### (8) Cleaning with Clean Water

Insert the spray nozzle through the hole of the cleaning water collector.

Operate the pump and clean the fins with clean water. Adjust the water pump pressure so as not to damage the fins.

Tool	Clean Water, Pump, Spray
------	--------------------------



#### NOTES:

1. If the cleaning water remains, fins will be corroded.
2. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm<sup>2</sup> so as not to damage fins.

- (9) Attach the fan assembly and drain pan after cleaning is completed and dropping of cleaning water is stopped.

Tool	Phillips Screwdriver, Hexagon Wrench
------	--------------------------------------

- (10) Check the insulation of drain-up pump by megohm-meter. Check to ensure that the insulation is greater than 1 M $\Omega$  when 500V is applied.

- (11) Connect the wiring as it was. Mount the air distribution chamber and optional air panel.

Tool	Phillips Screwdriver, Megohm-meter
------	------------------------------------

#### (12) Neutralization Treatment after Cleaning

The cleaning agent specified in the item 2.11.1 is of the neutral type. However, the cleaning water after use may be not neutral. Collect all cleaning water and make necessary neutralization treatment for the cleaning water.

**! WARNING****TURN OFF all power source switches.**

## 2.11.5 Cleaning Wall Type Indoor Unit

Spread a vinyl sheet over the floor to protect furnitures, etc. from cleaning water before this work.

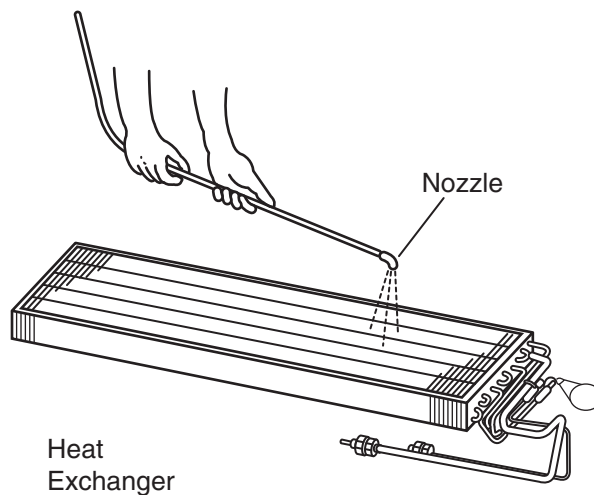
- (1) Remove each parts according to the item 2.6 "Wall Type".
- (2) Remove the front panel according to the item 2.6.2 "Removing Front Panel".
- (3) Remove the electrical box according to the item 2.6.5 "Removing Electrical Box Cover".
- (4) Remove the drain pan according to the item 2.6.7 "Removing Drain Pan".
- (5) Remove the heat exchanger according to the item 2.6.8 "Removing Heat Exchanger".
- (6) Cleaning
  - (a) Remove dust with a brush.
  - (b) Cover a vinyl sheet over the electrical components to protect them from splashed cleaning water.
  - (c) In the case that cleaning agent is used, clean the heat exchanger with clean water completely.
  - (d) Adjust the pressure of the pump so as not to damage fins.

## (7) Neutralization Treatment after Cleaning

The cleaning agent specified in the item 2.11.1 is of the neutral type. However, the cleaning water after use may be not neutral.

Collect all cleaning water and make necessary neutralization treatment for the cleaning water.

Tool

Cleaning Water, Clean Water,  
Pump, Spray**NOTES:**

1. If the cleaning water remains, fins will be corroded.
2. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm<sup>2</sup> so as not to damage fins.

## SERVICING

### (2.11 Cleaning Indoor Unit Heat Exchanger)

# ! WARNING

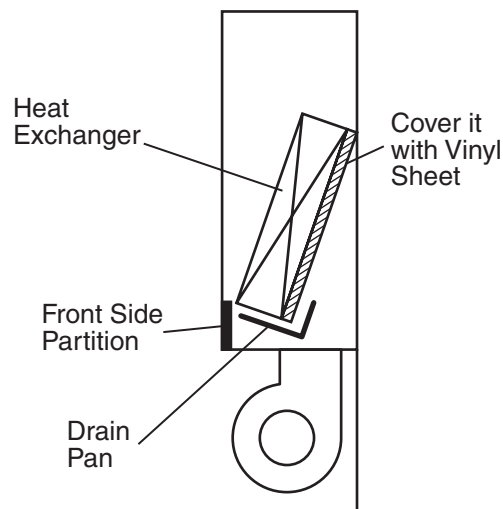
**TURN OFF all power source switches.**

#### 2.11.6 Cleaning Floor Type and Floor Concealed Type Indoor Unit

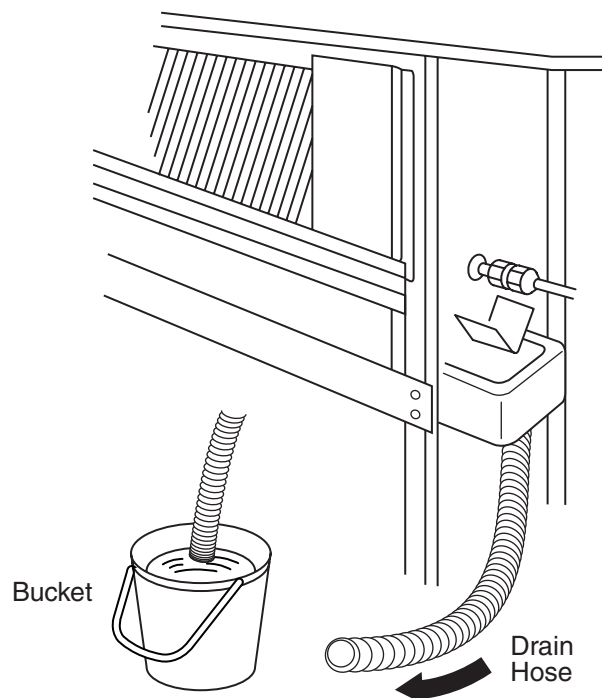
Spread a vinyl sheet over the floor to protect furnitures, etc. from cleaning water before this work.

- (1) Remove the front cover according to the item 2.7.4 and 2.8.2 "Removing Front Cover".
- (2) Disconnect the drain hose from the field-supplied pipe.
- (3) Cover the rear side of the heat exchanger with a vinyl sheet after removing front side partition and drain pan. After covering, remount the front side partition and drain pan.

Tool	Vinyl Sheet, Tape, Cutter
------	---------------------------



- (4) By lifting the drain hose and put the end in a bucket.



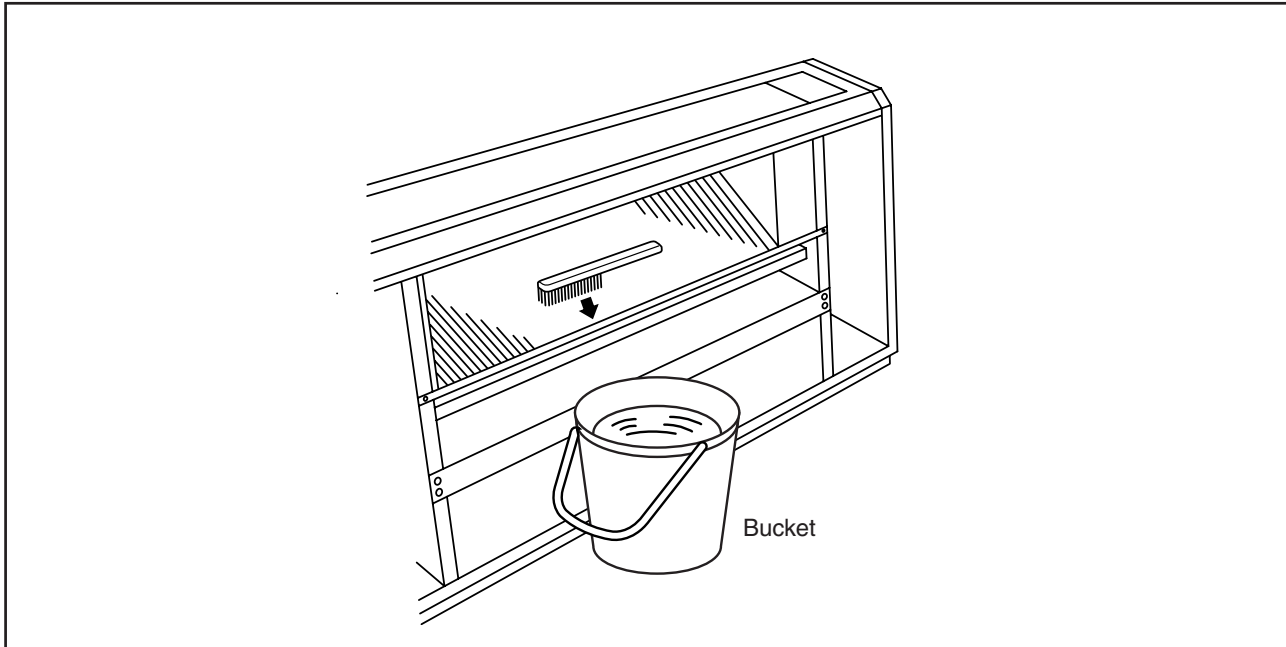


**! WARNING****TURN OFF all power source switches.****(5) Removing Dust on Heat Exchanger**

Remove the dust on the heat exchanger with a brush by scratching dust downwards.  
Collect all dust in a bucket or carton box.

Tool

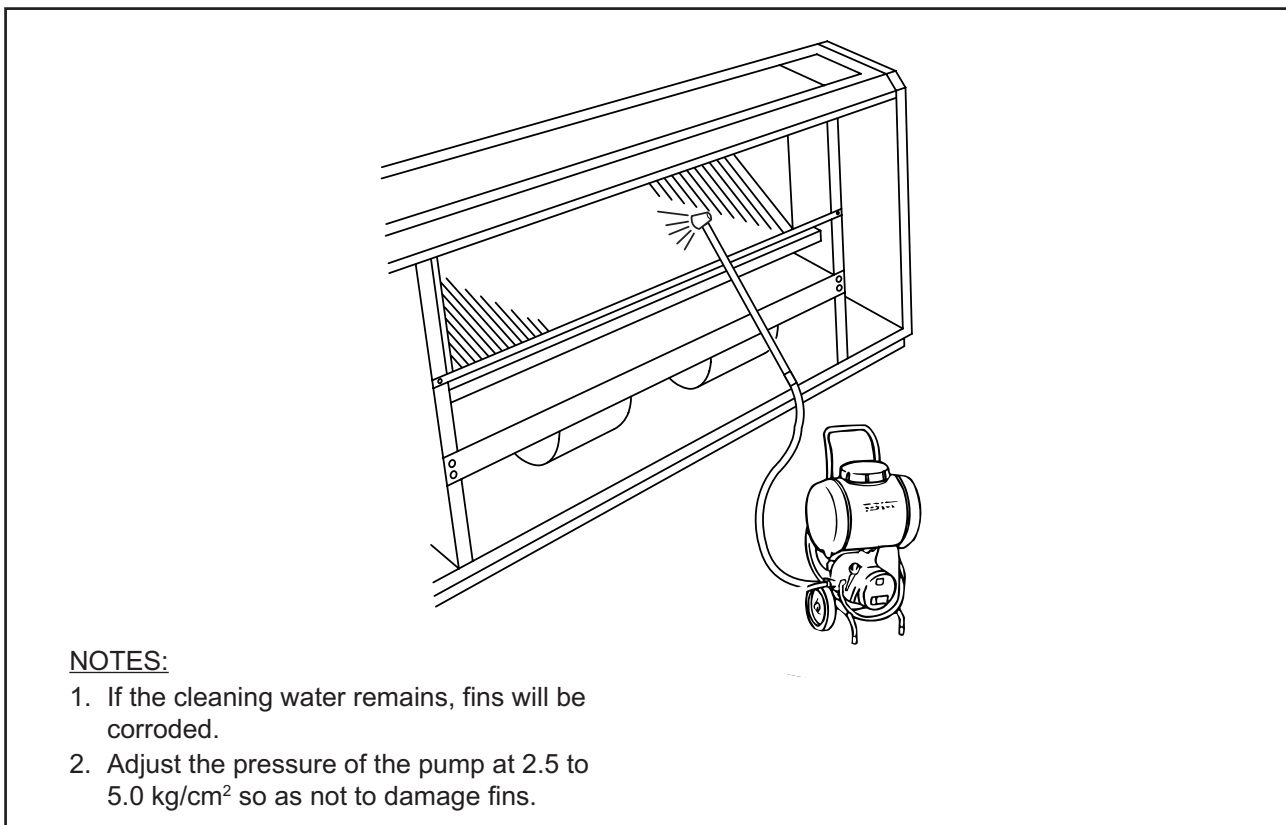
Brush, Bucket (or Carton Box)

**(6) Spray cleaning water over the fins of the heat exchanger.****(7) Cleaning with Clean Water**

Cover the wiring connectors with insulation tape. Operate the pump and clean the heat exchanger with clean water completely. Adjust the pressure of pump so as not to damage fins.

Tool

Clean Water, Pump, Spray



## (2.11 Cleaning Indoor Unit Heat Exchanger)

**! WARNING****TURN OFF all power source switches.**

- (8) After checking that no power is supplied, connect the drain pipe and remove the insulation tape for the wiring connectors and then mount the front cover correctly.
- (9) Check the insulation of the terminal board in the electrical box.

If the insulation is greater than  $1M\Omega$   
by a 500 Megohm-meter, it is normal.

Tool	Megohm-meter, Voltage-Checker, Phillips Screwdriver
------	--

- (10) Neutralization Treatment after Cleaning

The cleaning agent specified in the item 2.11.1 is of the neutral type. However, the cleaning water after use may be not neutral. Collect all cleaning water and make necessary neutralization treatment for the cleaning water.

**! WARNING**

**TURN OFF all power source switches.**

2.11.7 Cleaning Ceiling Type Indoor Unit

Spread a vinyl sheet over the floor to avoid cleaning water before this work.

(1) Remove the left and right side covers according to the item 2.9.2 "Removing Side Cover".

(2) Remove the discharge deflector according to the item 2.9.3 "Removing Discharge Air Grille".

Tool	Phillips Screwdriver
------	----------------------

(3) Open the intake air grille according to the item 2.9.1 "Removing Air Filter and Intake Air Grille".

(4) Remove the lower cover and drain pan according to the item 2.9.8 "Removing Thermistors for Liquid Pipe and Gas Pipe, and Electronic Expansion Valve Coil".

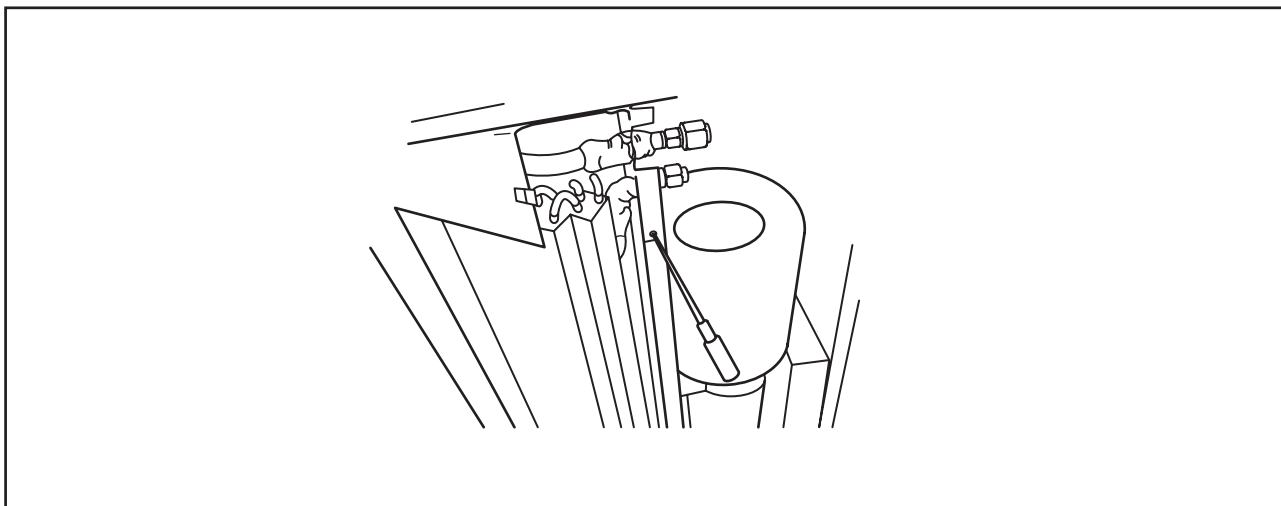
Tool	Phillips Screwdriver
------	----------------------

(5) Remove the indoor fan motor and fan assembly according to the item 2.9.4 "Removing Fan Motor".

Tool	Phillips Screwdriver
------	----------------------

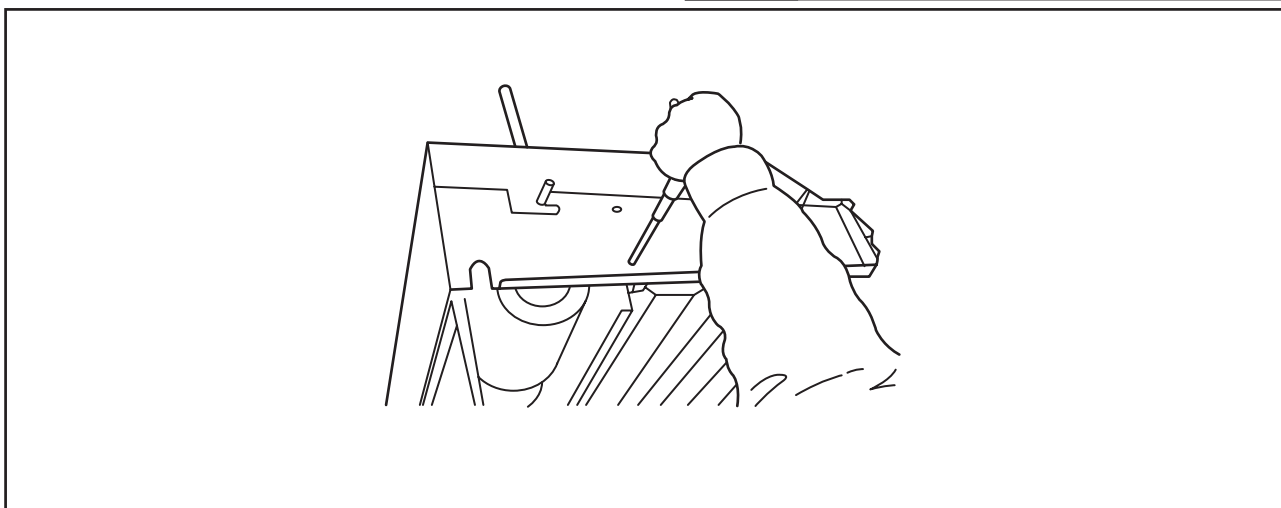
(6) Remove the partition plate 2 after removing two fixing screws.

Tool	Phillips Screwdriver
------	----------------------



(7) Remove the fixing plate for the fan after removing two screws at the left and one screw at the right side partition.

Tool	Phillips Screwdriver
------	----------------------



(8) Attach the drain pan and lower cover according to the reverse procedures in the item (4).

Tool	Phillips Screwdriver
------	----------------------

## SERVICING

### (2.11 Cleaning Indoor Unit Heat Exchanger)

# ! WARNING

**TURN OFF all power source switches.**

- (9) Cover all components except the drain pan with a vinyl sheet avoid splashed cleaning water.

**NOTE:**

Wear gloves to avoid any injury during this work due to sharp edge of fins.

Tool

Vinyl Sheet, Tape, Cutter,  
Phillips Screwdriver

- (10) Spray the cleaning water over the fins from the rear side of the heat exchanger.

If the heat exchanger is heavily covered with dust, use a brush to wipe off.

Tool

Spray, Brush

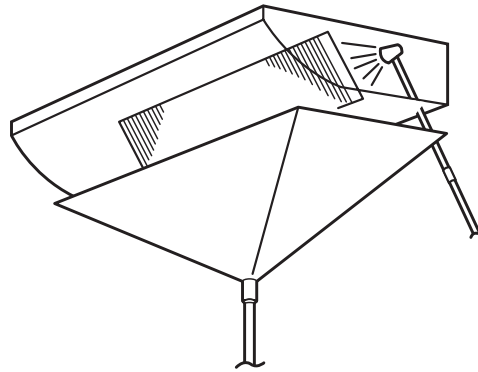
- (11) Cleaning with Clean Water

(a) Operate the pump and clean the heat exchanger with clean water completely.

(b) Adjust pressure of the pump so as not to damage fins.

Tool

Clean Water, Pump, Cleaning Water



**NOTES:**

1. If the cleaning water remains, fins will be corroded.
2. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm<sup>2</sup> so as not to damage fins.

- (12) Check the insulation of the terminal board with a megohm-meter.

Check to ensure that the insulation is greater than 1M $\Omega$  when 500V is applied.

Tool

Megohm-Meter

- (13) Check to ensure that water can flow smoothly after pouring water on the drain pan.

**NOTE:**

Pay attention to the drain pan not to overflow.

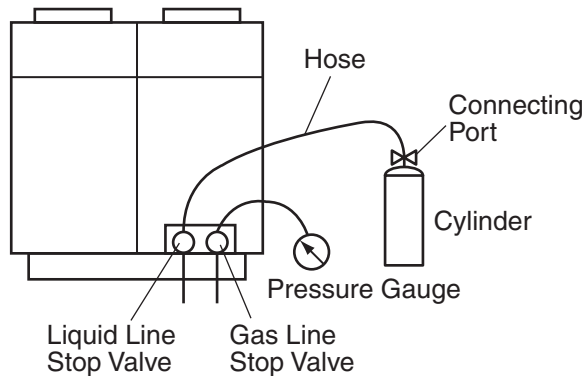
- (14) Neutralization Treatment after Cleaning

The cleaning agent specified in the item 2.11.1 is of the neutral type. However, the cleaning water after use may be not neutral. Collect all cleaning water and make necessary neutralization treatment for the cleaning water.

## (2.12 Collecting Refrigerant for Replacing Indoor Unit)

## 2.12 Collecting Refrigerant for Replacing Indoor Unit

- (1) Prepare an empty refrigerant cylinder at -760mmHg with a charging hose. Measure the empty cylinder's weight.
- (2) After shutting the stop valve on the cylinder, connect the charge hose to the liquid line stop valve. Connect a pressure gauge to the check joint on the gas line stop valve.
- (3) Air purge inside of the hose between the liquid line stop valve and cylinder by loosening connection of the liquid line stop valve and close the connecting port of the cylinder after air purging.
- (4) Operate the unit as cooling mode at a frequency of 48Hz.

NOTES:

1. The cylinder capacity shall be equivalent to half of the total refrigerant capacity.
2. In case of 8HP and 10HP outdoor units; Remove the terminals of the constant speed compressor, and cover the terminals of the cables by insulator.

- (5) Open the liquid line stop valve on the cylinder to collect refrigerant into it. The cylinder capacity shall be equivalent to half of the total refrigerant capacity. Check the refrigerant quantity by measuring the weight.
- (6) Close the liquid line stop valve on the cylinder gradually during the cooling operation.
- (7) Fix the opening of the liquid line stop valve at a slightly opened position. Continue the cooling operation.
- (8) Finally close the liquid line stop valve and then gas line stop valve and stop the units at the same time when the pressure at the liquid line stop valve reaches at -400mmHg.

NOTE:

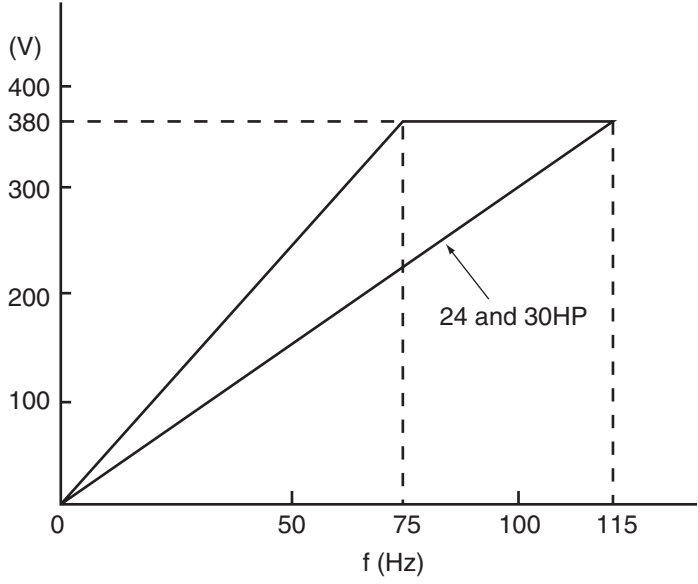
In the case that the collected refrigerant is recharged into the system, charge it by let the cylinder up side down so that refrigerant and oil can be charged together.



### 3. MAIN PARTS

#### 3.1 Inverter

##### 3.1.1 Specifications of Inverter (For 380/415V, 50Hz and 380V, 60Hz Power Source)

Applicable Model	RAS-5FSG, RAS-5FS3, RAS-8FSG, RAS-8FS3, RAS-10FSG, RAS-10FS3, RAS-16FSG, RAS-16FS3, RAS-20FSG, RAS-20FS3, RAS-8FXG, RAS-8FX3, RAS-10FXG, RAS-10FX3	RAS-24FSG1, RAS-24FS5, RAS-30FSG1, RAS-30FS5
Applicable Power Source	3 Phase 380/415V $\pm$ 10% 50/60Hz $\pm$ 5%	
Output Voltage (Maximum)	380/415V, 3 Phase	
Output Current (Maximum)	14.0A (5, 8 and 10HP), 16.5A (16 and 20HP)	14.0A
Time Rating	Continuous	
Control Method	Frequency $\leq$ 75Hz, Space Vector PWM Control 75Hz < Frequency $\leq$ 115Hz, V/F Control	Vector PWM Control
Range Output Frequency	30 to 95Hz (5HP), 30 to 115Hz (8 to 20HP)	30 to 115Hz
Accuracy of Frequency	0.005Hz, at Applicable Frequency Range	0.01Hz, at Applicable Frequency Range
Accuracy of Output Voltage	$\pm$ 10% at Applicable Frequency Range	
Output / Characteristics	<p>Conditions:                      1. Power Source Voltage AC380/415V                      2. Non-Loading (Free Output)                      3. Ammeter Type Volt-Meter (X1.1)</p>  <p style="text-align: center;">Refer to the note in next page.</p>	
Soft Start Stop	0.5Hz/S, 1Hz/S, 3Hz/S, 6Hz/S, 30Hz/S (5 Steps)	
Protection Function		
Excessive High or Low Voltage for Inverter	Excessive Low Voltage at a DC Voltage is Lower than 350V Excessive High Voltage at a DC Voltage is Higher than 750V	
Abnormality of Current Sensor	Stoppage at a current of compressor smaller than 0.5A When the frequency is 15 to 18Hz after starting. Cause of Abnormality: Failure of Current Sensor Failure of Transistor Module Failure of ISPM Failure of Compressor Disconnected Wiring	

<p>Protection Function</p> <p>Overcurrent Protection for Inverter</p>	<p>(1) Short-Circuit Trip of Arm } Internal Protection  (2) Instantaneous Overcurrent Trip } Transistor Module or ISPM  (3) Instantaneous Overcurrent Trip }  (4) Electronic Thermal Trip  Condition is maintained longer than 30 seconds or accumulated longer than 3 minutes during 10 minutes sampling time.</p>
<p>Protection of Transistor Module</p>	<p>Transistor module or ISPM has four protection function for self-protection.</p> <p>(1) Some of the output terminals between "U" and "V", "V" and "W", "W" and "U" has a short-circuit.  (2) Running current reaches the maximum rated current.  (3) Abnormal temperature is measured by internal thermistor.  (4) Control voltage decreases abnormally.</p>
<p>Overload Control</p>	<p>Overload control as a current greater than (Rated Current X105%).  Overload control release at a current smaller than (Rated Current X 88%).</p>
<p>Fin Temperature Increase</p>	<p>The unit is stopped when the ISPM temperature is higher than 100°C.  (Only for 24 and 30HP)</p>
<p>Earth Detection</p>	<p>The unit is stopped when the compressor is earthing.  (Only for 24 and 30HP)</p>

**NOTE:**

Characteristics are fluctuated by the current minimize control.



3.1.2 Specifications of Inverter (For 220V, 60Hz Power Source)

Applicable Model	RAS-5FSG, RAS-5FS3, RAS-8FSG, RAS-8FS3, RAS-10FSG, RAS-10FS3, RAS-16FSG, RAS-16FS3, RAS-20FSG, RAS-20FS3	RAS-24FSG1, RAS-24FS5, RAS-30FSG1, RAS-30FS5
Applicable Power Source	3 Phase 220V ± 10% 60Hz ±5%	
Output Voltage (Maximum)	220V, 3 Phase	
Output Current (Maximum)	25A (5, 8 and 10HP), 30A (16 and 20HP)	27.5A
Time Rating	Continuous	
Control Method	Frequency ≤ 75Hz, Space Vector PWM Control 75Hz < Frequency ≤ 115Hz, V/F Control	Vector PWM Control
Range Output Frequency	30 to 95Hz (5HP), 30 to 115Hz (8 to 20HP)	30 to 115Hz
Accuracy of Frequency	0.005Hz, at Applicable Frequency Range	0.01Hz, at Applicable Frequency Range
Accuracy of Output Voltage	+ 10% at Applicable Frequency Range	
Output / Characteristics	<p>Conditions: 1. Power Source Voltage AC220V 2. Non-Loading (Free Output) 3. Ammeter Type Volt-Meter (X1.1)</p> <p>Refer to the note in next page.</p>	
Soft Start Stop	0.5Hz/S, 1Hz/S, 3Hz/S, 6Hz/S, 30Hz/S (5 Steps)	
Protection Function		
Excessive High or Low Voltage for Inverter	Excessive Low Voltage at a DC Voltage is Lower than 194V Excessive High Voltage at a DC Voltage is Higher than 440V	
Abnormality of Current Sensor	<p>Stoppage at a current of compressor smaller than 0.5A When the frequency is 15 to 18Hz after starting.</p> <p>Cause of Abnormality: Failure of Current Sensor Failure of Transistor Module Failure of ISPM Failure of Compressor Disconnected Wiring</p>	

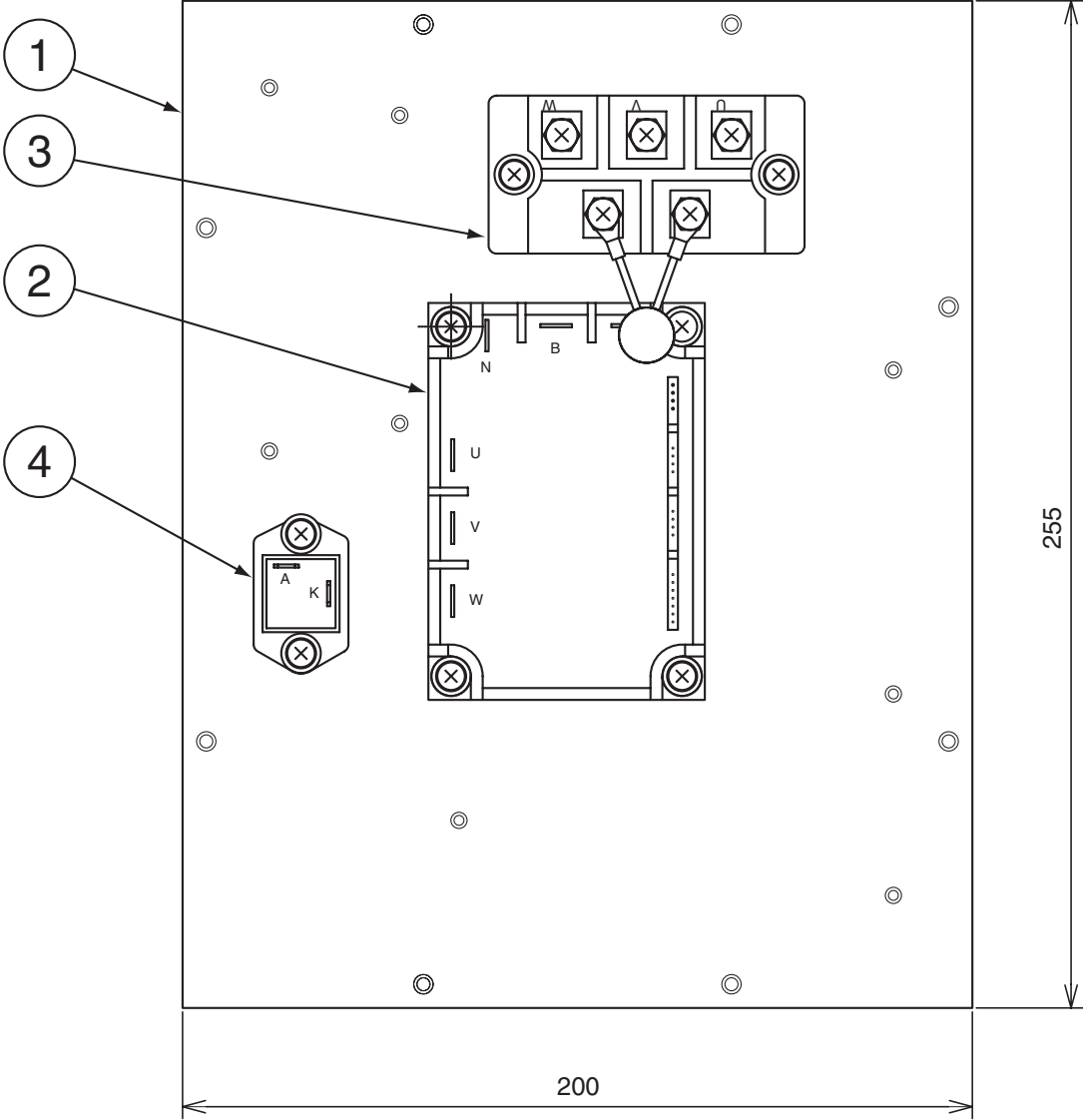
<p>Protection Function</p> <p>Overcurrent Protection for Inverter</p>	<p>(1) Short-Circuit Trip of Arm          (2) Instantaneous Overcurrent Trip } Internal Protection          (3) Instantaneous Overcurrent Trip } Transistor Module or ISPM          (4) Electronic Thermal Trip          Condition is maintained longer than 30 seconds or accumulated longer than 3 minutes during 10 minutes sampling time.</p>
<p>Protection of Transistor Module</p>	<p>Transistor module or ISPM has four protection function for self-protection.</p> <p>(1) Some of the output terminals between "U" and "V", "V" and "W", "W" and "U" has a short-circuit.          (2) Running current reaches the maximum rated current.          (3) Abnormal temperature is measured by internal thermistor.          (4) Control voltage decreases abnormally.</p>
<p>Overload Control</p>	<p>Overload control as a current greater than (Rated Current X105%).          Overload control release at a current smaller than (Rated Current X 88%).</p>
<p>Fin Temperature Increase</p>	<p>The unit is stopped when the ISPM temperature is higher than 100°C.          (Only for 24 and 30HP)</p>
<p>Earth Detection</p>	<p>The unit is stopped when the compressor is earthing.          (Only for 24 and 30HP)</p>

**NOTE:**

Characteristics are fluctuated by the current minimize control.

3.1.3 Arrangement of Inverter Power Unit

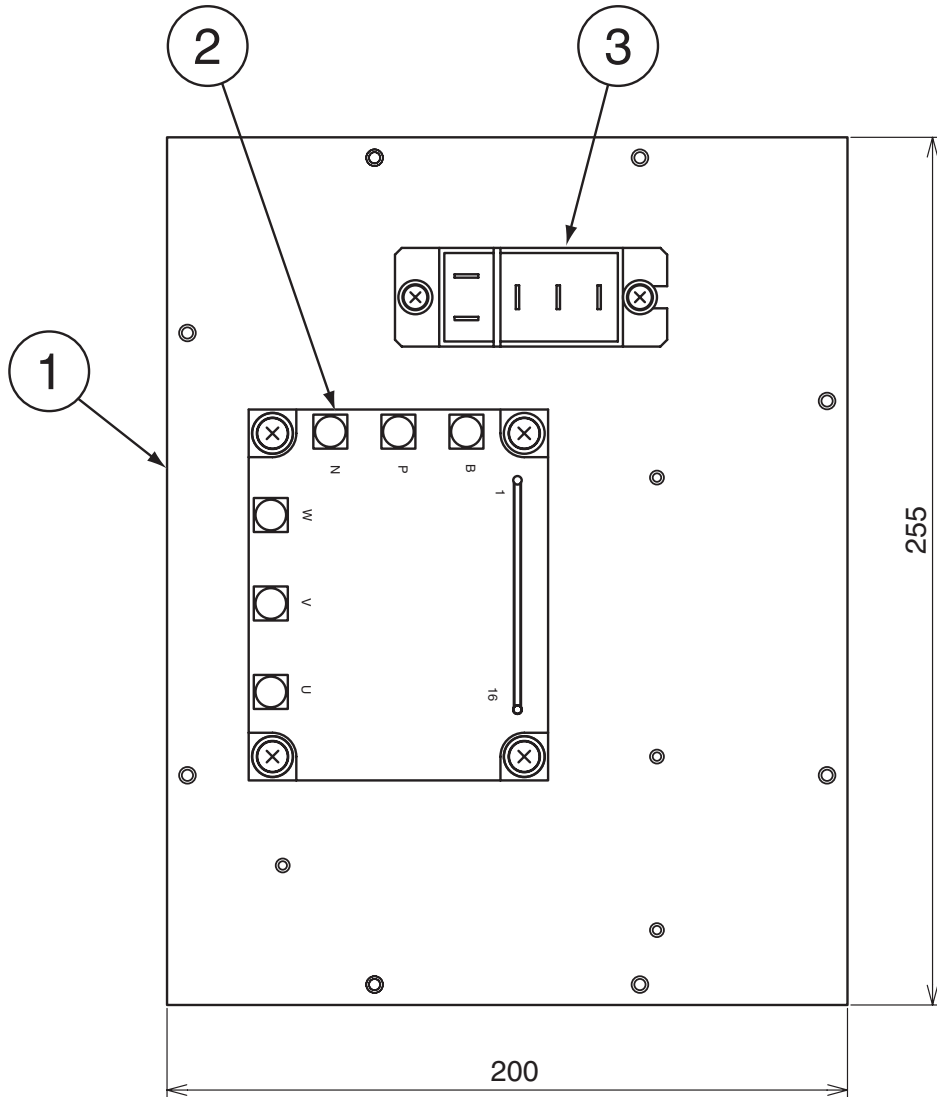
< RAS-5 to 20FSG/FS3 (380-415/380V, 50/60Hz) >  
 5HP: Before Manufacturing #U4MV0196  
 8 to 20HP: Before Manufacturing #U4NG1001



No.	Parts	Model	Name
1	Fin (mm)	200 X 255 X 50	-
2	Transistor Module	PM25RSB120	IPM
3	Diode Module	DF40AA160	DM
4	Diode Module	RM201-1A-20F	D

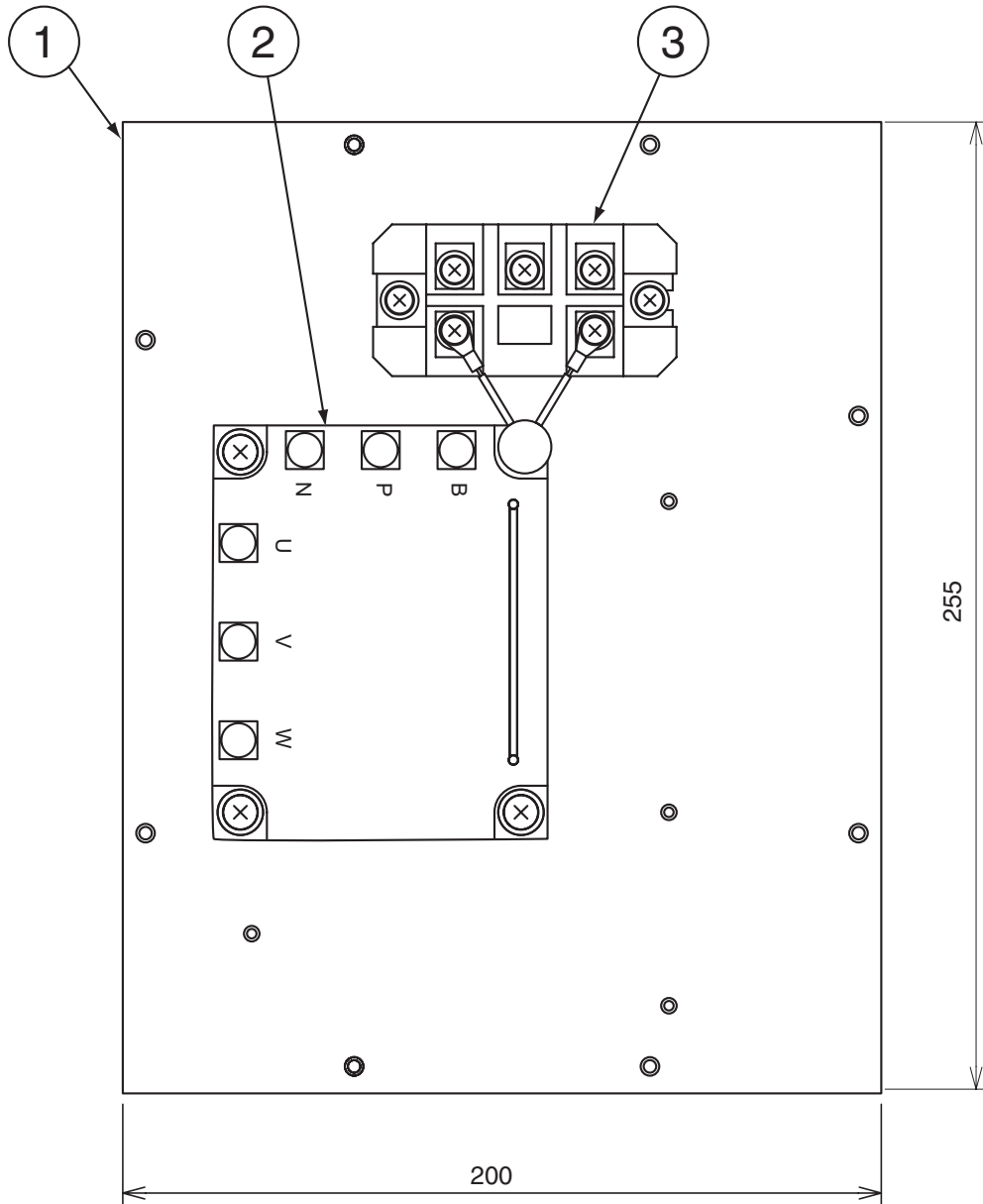
## MAIN PARTS

< RAS-5 to 20FSG/FS3 (380-415/380V, 50/60Hz) >  
 5HP: After Manufacturing #U4MV0197  
 8 to 20HP: After Manufacturing #U4NG1002



No.	Parts	Model	Name
1	Fin (mm)	200 X 255 X 50	-
2	Transistor Module	6MBP25RA120-05	IPM
3	Diode Module	6RI30G-160	DM

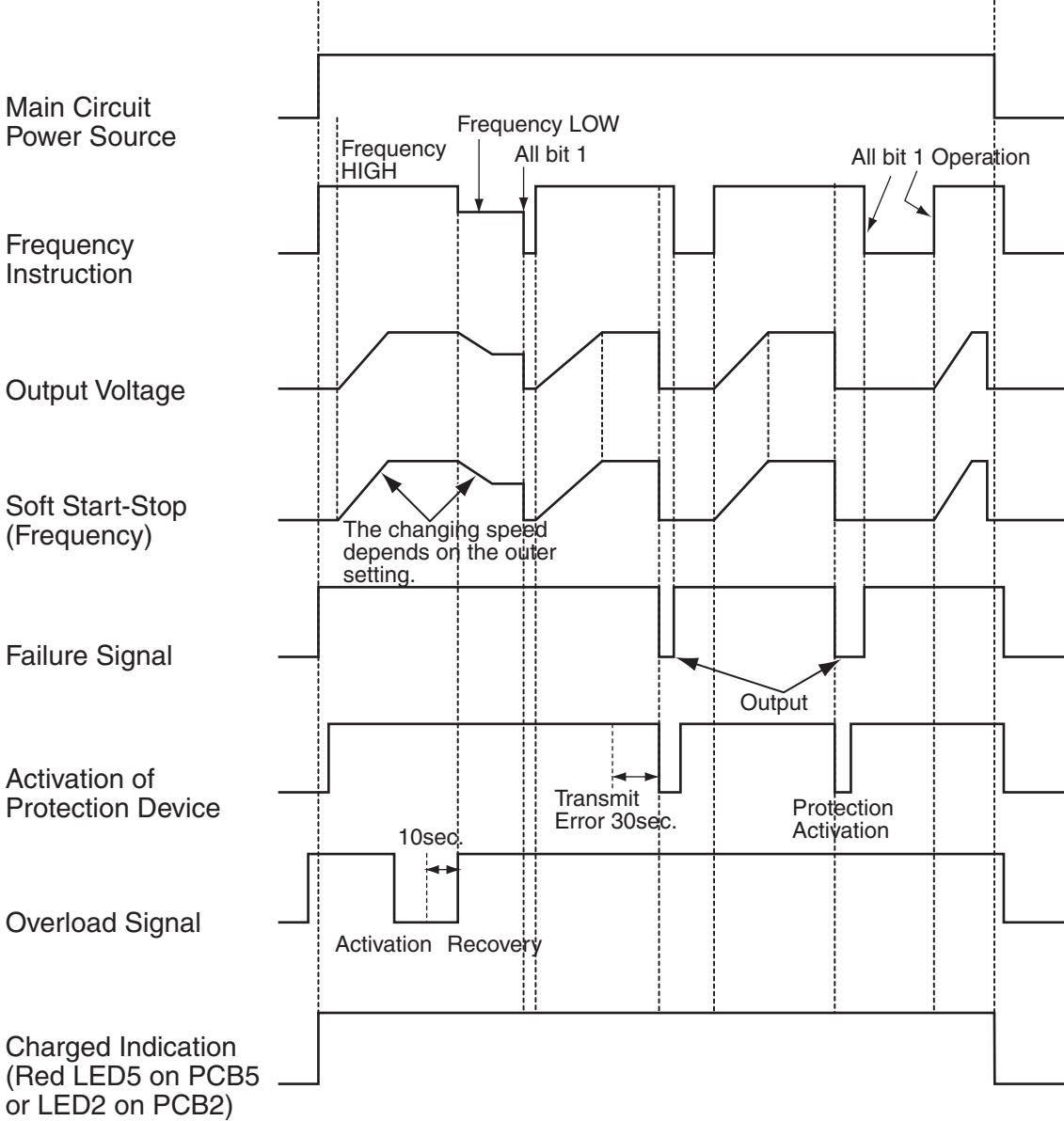
< RAS-5 to 20FSG/FS3 (220V, 60Hz) >



No.	Parts	Model	Name
1	Fin (mm)	200 X 255 X 50	-
2	Transistor Module	7MBP50JB060	IPM
3	Diode Module	6RI50E-080	DM



3.1.4 Inverter Time Chart



3.1.5 Protective Function

(1) Excessive High or Low Voltage for Inverter

(a) Level of Detection

- ① When the voltage of direct current is greater than (A) V, abnormalities are detected.
- ② When the voltage of direct current is smaller than (B) V, abnormalities are detected.

Power Supply	380 - 415V, 50Hz 380V, 60Hz	220V, 60Hz
(A)	750	440
(B)	350	194

(b) Function

When abnormalities are detected, the inverter compressor is stopped and transmit the signal code of stoppage cause to PCB1.

(c) Cancellation of Protection Function

Transmission for signal code of stoppage cause is cancelled when a stopping order is given or main power source is cut off.

(2) Abnormality of Current Sensor

(a) Level of Detection

When current of the inverter compressor decreases lower than 0.5A during the inverter compressor frequency between 15Hz and 18Hz, an abnormality is detected.

(b) Function

When abnormalities are detected, the inverter compressor is stopped, and transmit the signal code of stoppage cause to PCB1.

(c) Cancellation of Protection Function

Transmission for signal code of stoppage cause is cancelled when a stopping order is issued or main power source is cut off.

(3) Overcurrent Protection for Inverter

(a) Level of Detection

- ① When the current detected by current sensor reaches 150% of the rated current, overcurrent is detected. (Instantaneous Overcurrent)
- ② When the current detected by current sensor exceeds 105% of the rated current continuously for 30 seconds or for 3.5 minutes in total during a 10 minutes period, overcurrent is detected. (Electric Thermal Relay)

(b) Function

When abnormalities are detected, the inverter compressor is stopped and transmit the signal code of stoppage cause to PCB1.

(c) Cancellation of Protection Function

Transmission for signal code of stoppage cause is canceled by stopping order is issued or main power source is cut off.

(4) Protection of Transistor Module and ISPM

(a) Level of Detection

- ① When some of the output terminals between “U” and “V”, “V” and “W”, “W” and “U” of transistor module or ISPM are short-circuited, an abnormality is detected.
- ② When the running current of transistor module or ISPM reaches (Maximum Rated Current x 105%), an abnormality is detected.
- ③ When an internal temperature is measured by internal thermistor of transistor module or ISPM, an abnormality is detected.
- ④ When the control voltage of transistor module or ISPM decreases, an abnormality is detected.

(b) Function

When abnormalities are detected, the inverter compressor is stopped and the signal code of stoppage cause is transmitted to PCB1.

(c) Cancellation of Protection Function

Transmission for signal code of stoppage cause is canceled when a stopping order is issued or main power source is cut off.



- (5) Fin Temperature Increase (Only for 24 and 30HP)
- (a) Level of Detection  
When the temperature of internal thermistor exceeds more than 100°C, an abnormality is detected.
  - (b) Function  
When abnormalities are detected, the inverter compressor is stopped and the signal code of stoppage cause is transmitted to PCB1.
  - (c) Cancellation of Protection Function  
Transmission for signal code of stoppage cause is canceled when a stopping order is issued or main power source is cut off.
- (6) Earth Detection
- (a) Level of Detection  
When the starting current of the compressor reaches 80% of the overcurrent protection value, an abnormality is detected.
  - (b) Function  
When abnormalities are detected, the inverter compressor is stopped and the signal code of stoppage cause is transmitted to PCB1.
  - (c) Cancellation of Protection Function  
Transmission for signal code of stoppage cause is canceled when a stopping order is issued or main power source is cut off.

#### 3.1.6 Overload Control

- (a) Level of Detection  
When the output current exceeds 105% of the maximum output current, an abnormality is detected.
- (b) Function  
An overload signal is issued when output current exceeds 105% of the maximum output current, and the frequency decreases.  
For 10 seconds after the output current decreases lower than 88% of the rated current, the operation is performed with the compressor frequency limited to the upper level frequency when the output current decreases lower than 88% of the rated one.  
However, if the frequency order is smaller than the maximum value, the operation is performed according to the order.
- (c) Cancellation of Protection Function  
After the operation described in the above item b. is performed for 10 seconds, this control is canceled.

### 3.2 AC Chopper

#### Reduction of Electromagnetic Sound

#### Fan Motor Control by AC Chopper:

Lower electromagnetic sound and vibration have been achieved by AC Chopper control than thyristor control.

#### AC Chopper Control

##### Concept of Fan Speed Control

The voltage applied to the fan motor is controlled by chopping (ON/OFF) the power supply voltage at a frequency of 20kHz.

##### Features

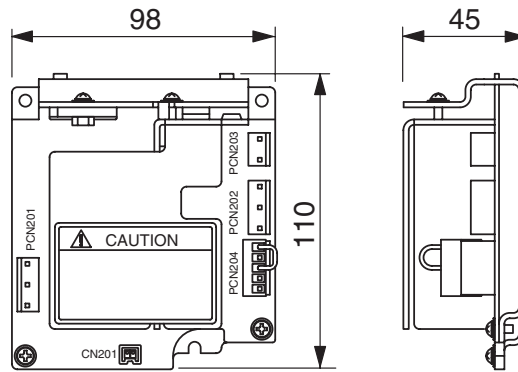
- Sinusoidal Wave Pattern and Remarkable Low Level of Electromagnetic Sound
- No Generation of Harmonic Current

#### (1) Specifications

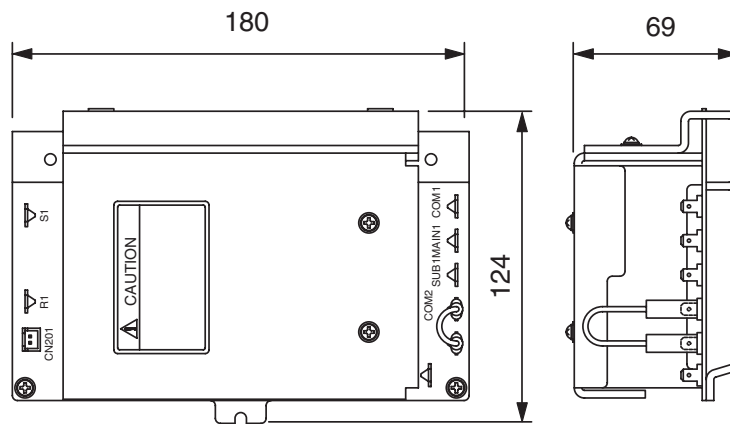
Rated Current of AC Chopper	2.1A	5.6A
Applicable Power Source	Single Phase 220/240V + 10% 50/60Hz	
Output Voltage	Single Phase 220/240V + 10%	
Output Current (Maximum)	2.1A	5.6A
Control Method	AC Chopper Control	
Chopping Frequency	20kHz ± 20%	
Input Duty Signal	100kHz ± 5% Current 2 to 8mA ± 10%	
Accuracy of Output Voltage	± 6%	
Output/Characteristics	<p>The graph shows a linear relationship between Input Duty (%) and Output Duty (%). The x-axis (Input Duty) has markers at 0, 10, and 50. The y-axis (Output Duty) has markers at 0, 100, and 50. A line starts at (0,0) and goes to (50,100). To the right, two timing diagrams illustrate the duty cycle. The first diagram shows a pulse of width 'b' within a period 'a', labeled 'Input Duty = b/a'. The second diagram shows a pulse of width 'd' within a period 'c', labeled 'Output Duty = d/c'.</p>	
Soft Start	Input Duty: 10%/s	
Overcurrent Protection Method	Current Limiter	
Overcurrent Setting (Minimum)	2.1A	5.6A
Overcurrent Protection Area	<p>The left graph shows Output Current (A) vs Input Duty (%) with a shaded 'Protection Area' starting at 30% duty. The right graph, labeled '[For 5.6A]', shows Output Current (A) vs Input Duty (%) for 50Hz and 60Hz. The 50Hz curve has a shaded protection area starting at 30% duty with a current limit of 4A. The 60Hz curve has a shaded protection area starting at 40% duty with a current limit of 3.5A. A vertical dashed line at 50% duty indicates a current of 4.75A.</p>	

(2) Structure

a. 2.1A (For Indoor Units: RCI, RCD, RPC and RPI (0.8 to 2.5HP) Models)

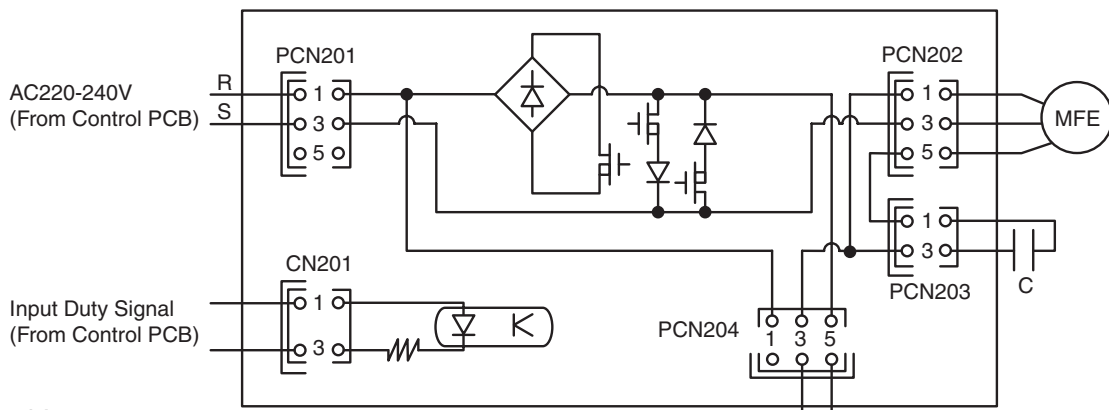


b. 5.6A (For Outdoor Units and Indoor Units: RPI (3.0 to 5.0HP) Models)

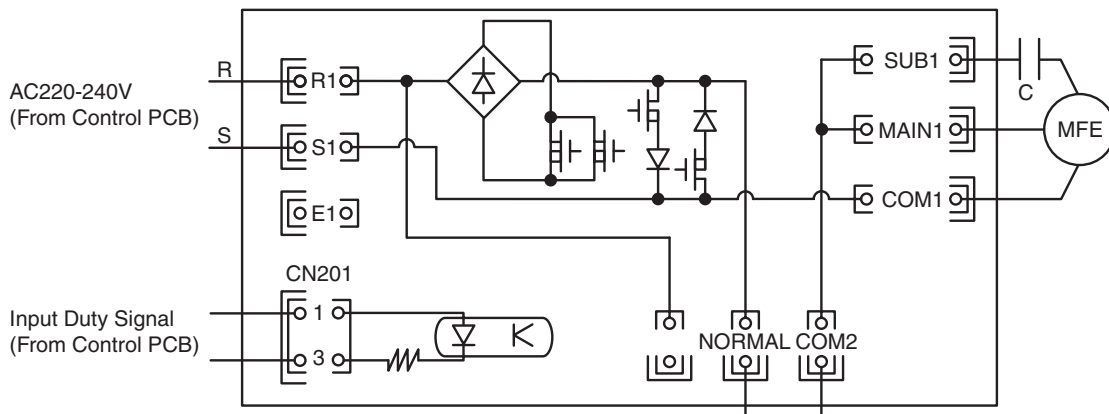


(3) Circuit Diagram (Outline)

a. 2.1A



b. 5.6A



**3.3 Auto-Louver Mechanism**

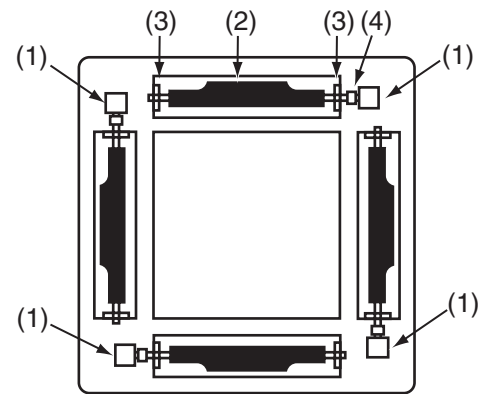
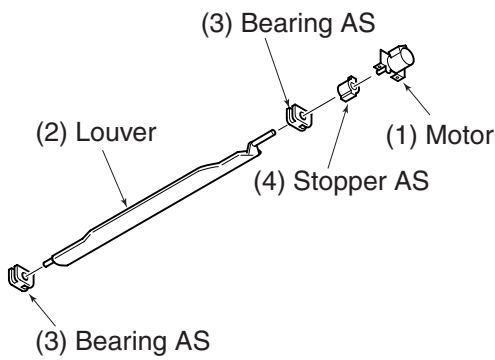
**3.3.1 4-Way Cassette Type**

**(1) Auto-Louver Operation**

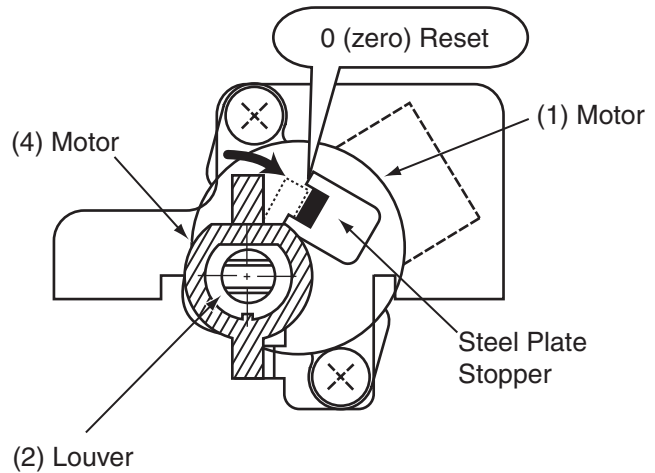
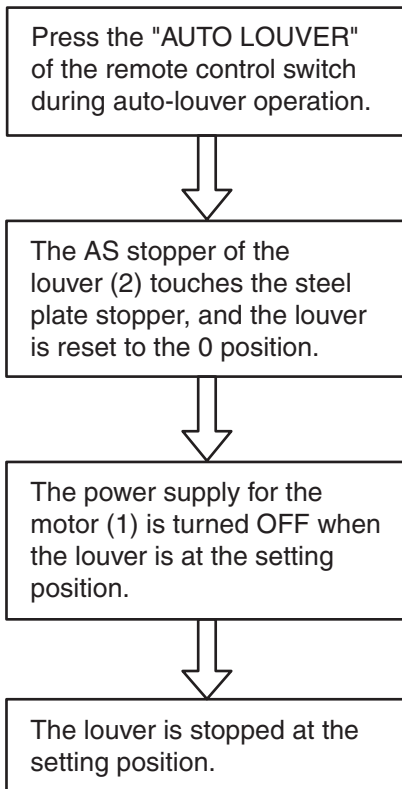
The louvers of the optional air panel with auto-louver swing simultaneously by a drive motor. The parts of the auto-louver mechanism are shown below.

The motor (1) is installed to the louver (2) directly. The louver (2) is operated by rotating the motor (1). Four pieces of the motor (1) are installed to the unit and rotated simultaneously.

No.	Part Name	No.	Part Name
1	Motor	3	Bearing
2	Louver	4	Stopper AS



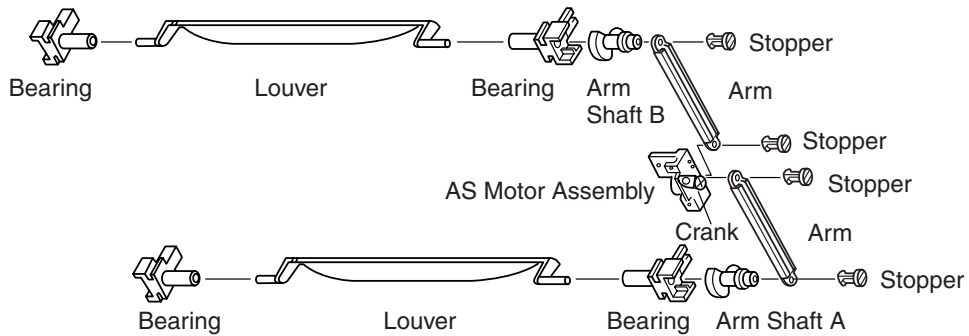
**(2) Auto-Louver Stoppage**



3.3.2 2-Way Cassette Type

(1) Auto-Louver Operation

The louvers of the optional air panel with auto-louver swing simultaneously by a drive motor. The parts of the auto-louver mechanism are shown below.



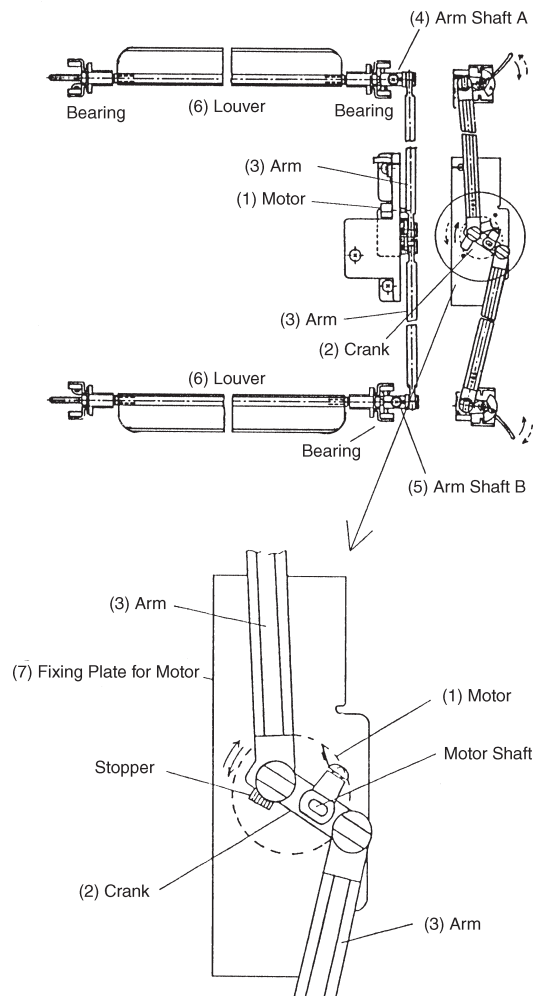
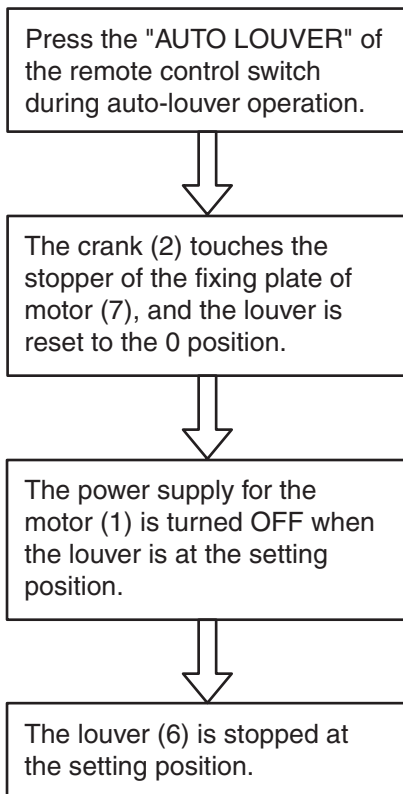
The principle of the auto-louver mechanism is as follows;

The motor (1) rotates, the crank (2) fixed to the shaft of the motor (1) rotates, the rotating torque is changed at the arm (3) and transmitted to the arm shaft A (4) and the arm shaft B (5).

The circular reciprocating force gives the driving force to the louver (6) and rotates the louver.

No.	Part Name	No.	Part Name
1	Motor	5	Arm Shaft B
2	Crank	6	Louver
3	Arm	7	Fixing Plate of Motor
4	Arm Shaft A		

(2) Auto-Louver Stoppage

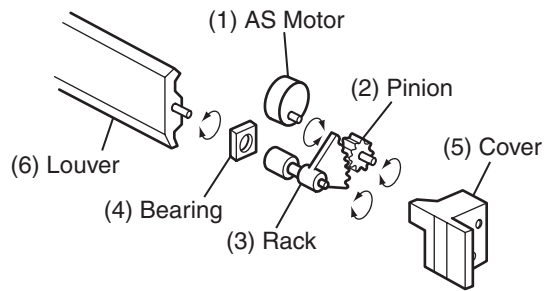


3.3.3 Ceiling Type

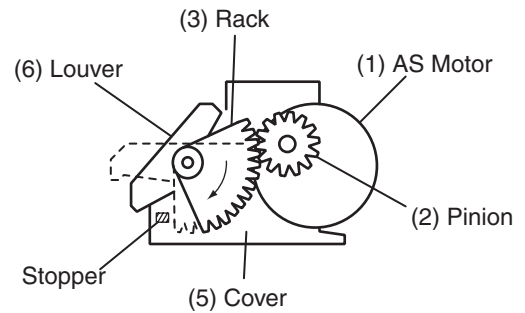
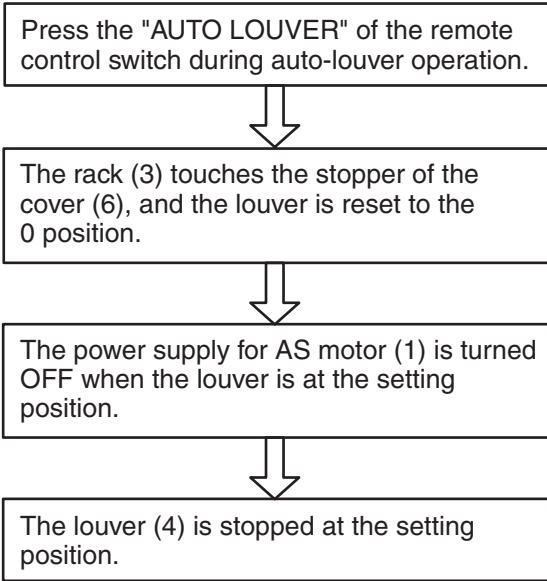
(1) Auto-Louver Operation

The louvers of the optional air panel with auto-louver swing simultaneously by a drive motor. The parts and the principle of the auto-louver mechanism are shown in the right figure.

The AS motor (1) rotates, the pinion (2) fixed to the shaft of the AS motor (1) rotates, the rotating torque is changed at the rack (3) and the circular reciprocating force gives the driving force to the louver (4) and rotates the louver.



(2) Auto-Louver Stoppage

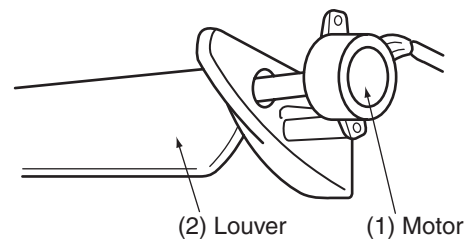


3.3.4 Wall Type

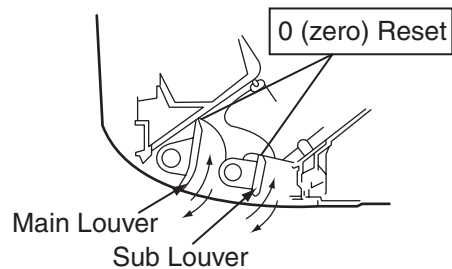
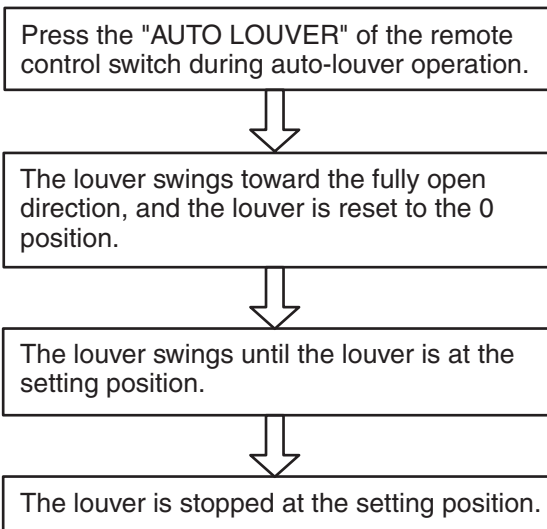
(1) Auto-Louver Operation

The louvers of the optional air panel with auto-louver swing simultaneously by two drive motors. The parts and the principle of the auto-louver mechanism are shown in the right figure.

The motor (1) rotates, the rotating torque is transmitted to the louver (4) directly and the circular reciprocating force of the motor rotates the louver.



(2) Auto-Louver Stoppage

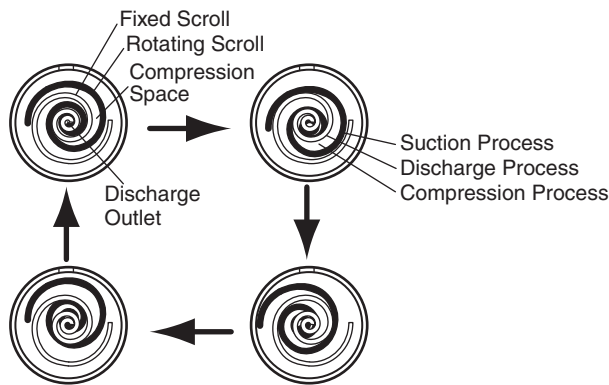
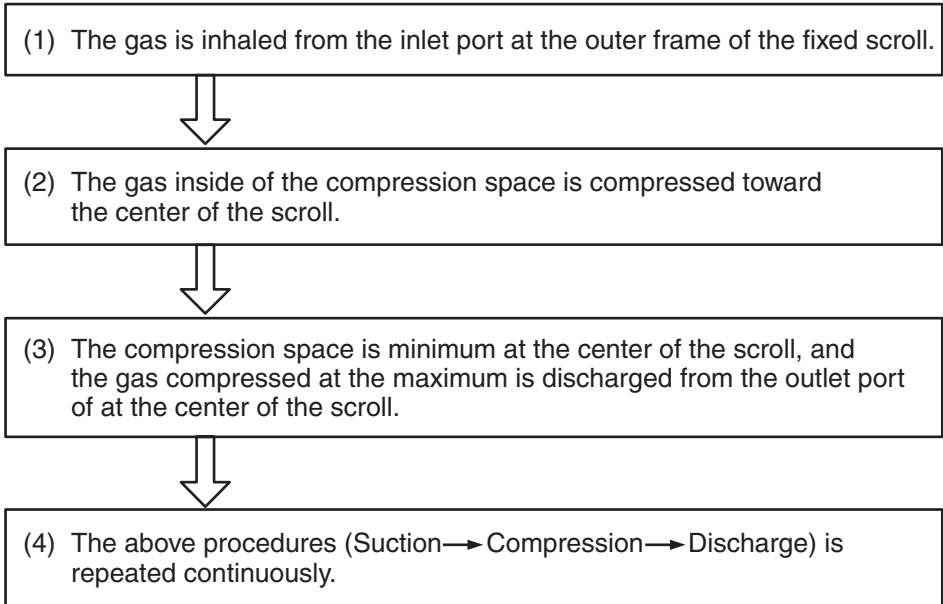


### 3.4 Scroll Compressor

#### 3.4.1 Reliable Mechanism for Low Vibration and Low Sound

- (1) The rotating direction is definite.
- (2) The pressure inside of the chamber is high pressure, and the surface temperature of the chamber is 60C° to 110C°.

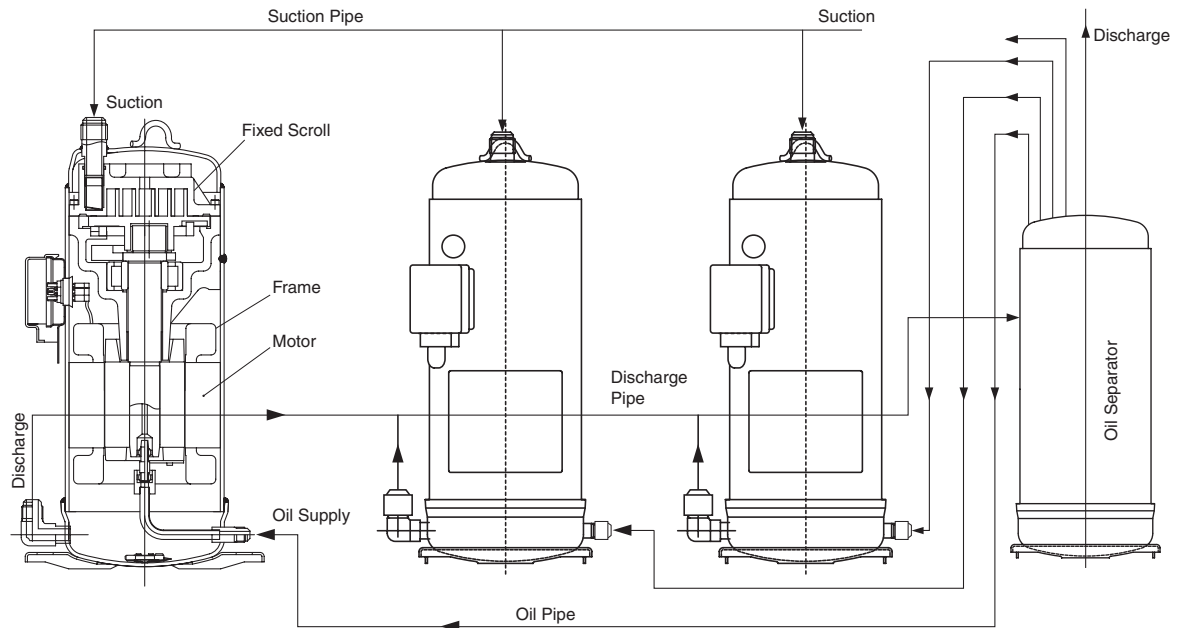
#### 3.4.2 Principle of Compression



3.4.3 Structure

The compressor has the structure for oil supply from the outer oil separator. (8 to 20HP)

The inside of the oil separator is at high pressure, and the surface temperature of the oil separator is as high (60C° to 110C°) as the compressor.



● Compressor Type

RAS-5FSG and 5FS3: Inverter Compressor x 1

RAS-8FSG, 10FSG, 8FS3, 10FS3, 8FXG, 10FXG, 8FX3 and 10FX3:

Inverter Compressor x 1 and Constant Speed Compressor x 1

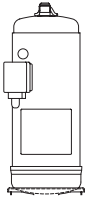
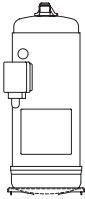
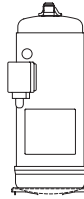
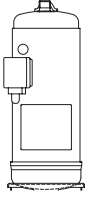
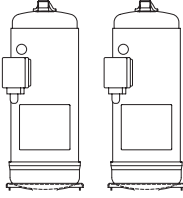
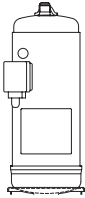
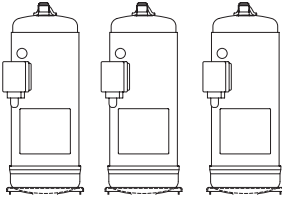
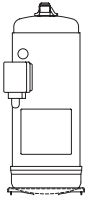
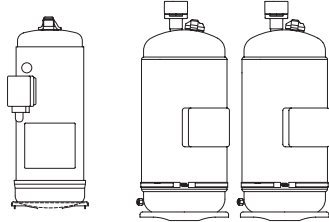
RAS-16FSG and 16FS3: Inverter Compressor x 1 and Constant Speed Compressor x 2

RAS-20FSG, 24FSG1, 30FSG1, 20FS3, 24FS5 and 30FS5:

Inverter Compressor x 1 and Constant Speed Compressor x 3

Seen from the front side of the unit, the one compressor at the left is the inverter compressor and other compressor(s) is(are) constant speed type.

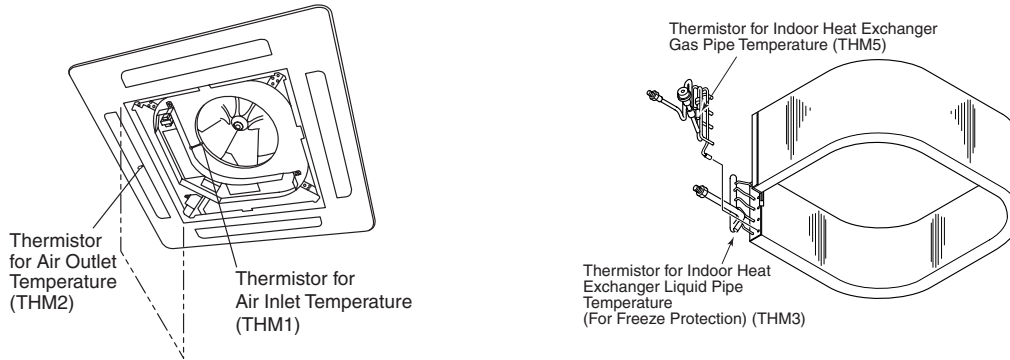


Model	Inverter Compressor	Constant Speed Compressor	Total
RAS-5FSG, RAS-5FS3	 Q'ty: 1	Without	1
RAS-8FSG, RAS-8FS3 RAS-10FSG, RAS-10FS3 RAS-10FXG, RAS-10FX3	 Q'ty: 1	 Q'ty: 1	2
RAS-16FSG, RAS-16FS3	 Q'ty: 1	 Q'ty: 2	3
RAS-20FSG, RAS-20FS3	 Q'ty: 1	 Q'ty: 3	4
RAS-24FSG1, RAS-24FS5 RAS-30FSG1, RAS-30FS5	 Q'ty: 1	 Q'ty: 1      Q'ty: 2	4

**3.5 Thermistor**

**3.5.1 Thermistor for Indoor Unit**

**(1) Position of Thermistor (In Case of 4-Way Cassette Type)**



**(2) Thermistor for Indoor Suction Air Temperature (For Room Temperature Control)**

The room temperature is controlled by the thermistor for indoor suction air temperature detecting the temperature at the suction air inlet of the indoor unit.

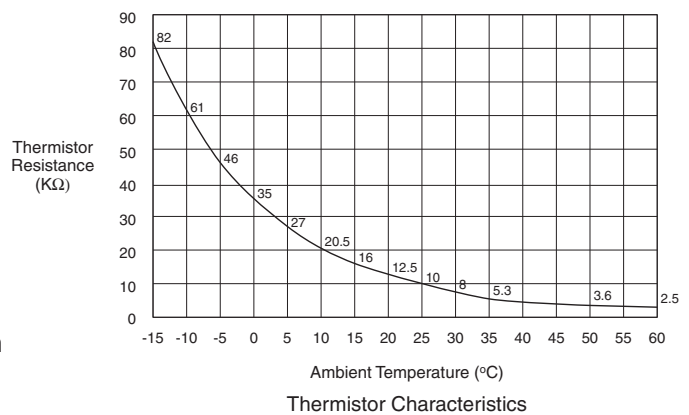
The setting temperature is indicated on the L.C.D. of the remote control switch by number.

Adjust the setting temperature for prevention from excessive cooling and heating.

It is recommended to set the temperature as follows;

Economical Cooling Operation: 27°C to 29°C / Economical Heating Operation: 18°C to 20°C

The resistance characteristics of thermistor is shown in the above figure.



**ATTENTION:**

The thermo-off valve of the indoor unit air inlet thermistor is set at the temperature higher than the valve indicated on the remote control switch by 4°C and the maximum is 30°C, because the suction air temperature during heating operation has a tendency to become higher than that of the occupied zone, intending comfortable heating operation.

**(3) Thermistor for Indoor Discharge Air Temperature (For Discharge Air Temperature Control)**

The thermistor for indoor discharge air temperature is utilized for the control of prevention from cold air discharge in heating operation, etc.

The resistance characteristics of thermistor is shown in the above figure.

**(4) Thermistor for Liquid Pipe Temperature of Indoor Heat Exchanger**

When the temperature of the heat exchanger is below 0°C, thermostat is turned OFF automatically and over 14°C, thermostat is turned ON again.	➡	Prevention from freezing onto the heat exchanger in COOL and DRY operation.
---	---	---

The resistance characteristics of thermistor is shown in the above figure.

**(5) Thermistor for Gas Pipe Temperature of Indoor Heat Exchanger**

When the temperature of the heat exchanger is below 0°C, thermostat is turned OFF automatically and over 14°C, thermostat is turned ON again.	➡	Prevention from freezing onto the heat exchanger in COOL and DRY operation.
---	---	---

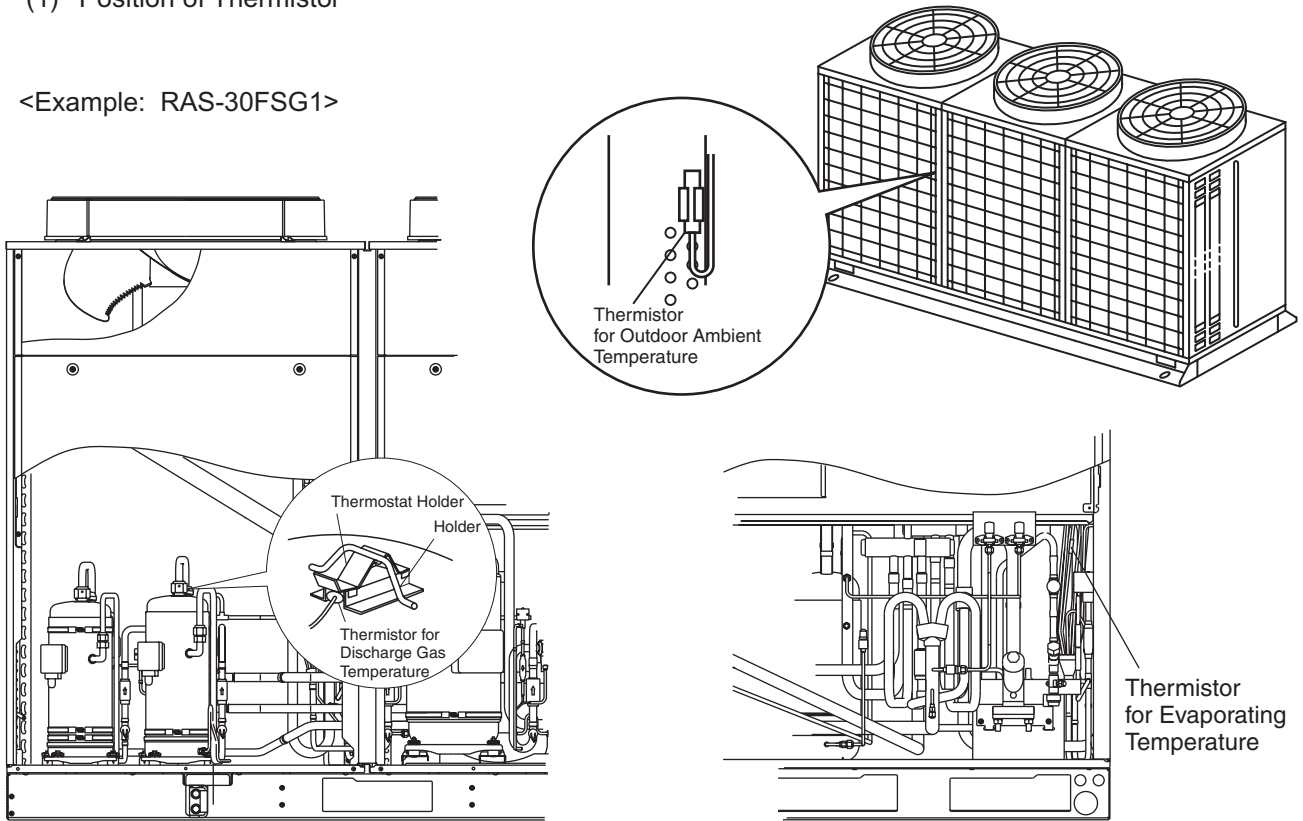
The evaporating temperature in heating operation is detected.

The resistance characteristics of thermistor is shown in the above figure.

3.5.2 Thermistor for Outdoor Unit

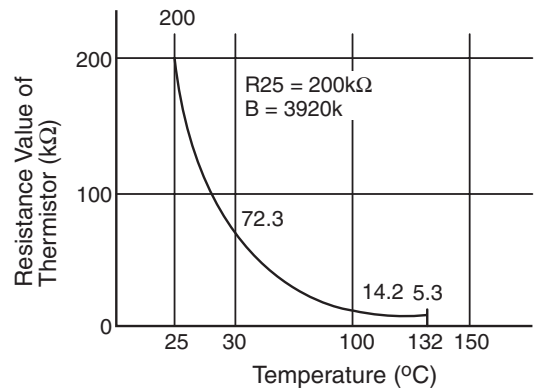
(1) Position of Thermistor

<Example: RAS-30FSG1>



(2) Thermistor for Upper Part Temperature of Compressor  
(For Prevention of Discharge Gas Overheating)

- a. A thermistor for the upper part temperature of the compressor is installed to prevent discharge gas from overheating.  
If discharge gas temperature increases excessively lubricating oil deterioration occurs and lubricating properties deteriorate, resulting in short compressor life.
- b. If discharge gas temperature increases excessively, compressor temperature increases. At the worst, compressor motor winding will be burnt out.
- c. When the upper part temperature of compressor increases during heating operation, the unit is controlled according to the following method.
  - An electronic expansion valve of outdoor units is (are) opened to return the liquid refrigerant to the compressor through the accumulator, decreasing compressor temperature.
  - If the compressor upper part temperature increases exceeding 132°C even if an electronic expansion valve opens, the compressor is stopped, in order to protect the compressor. In cooling operation, the above function is also available.



- d. If compressor upper part temperature increases excessively, the protection control is activated and the compressor is stopped according to the following method.

Operation	Upper Part Temperature of Compressor	Defecting Period
Cooling	Over 132°C	10 minutes (Continuously)
	Over 140°C	5 seconds (Continuously)
Heating	Over 132°C	10 minutes (Continuously)
	Over 140°C	5 seconds (Continuously)
Defrosting	Over 132°C	5 seconds (Continuously)

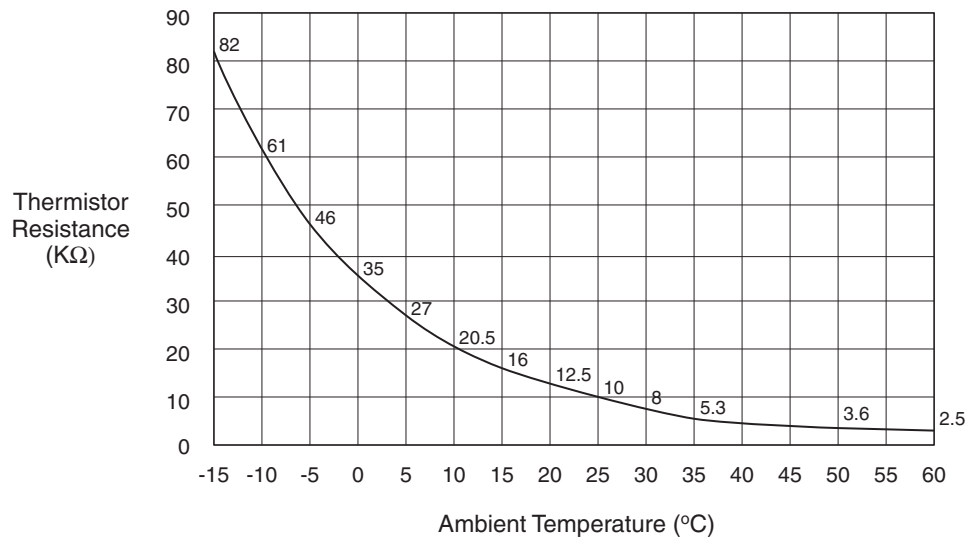
## MAIN PARTS

(3) Thermistor for Outdoor Ambient Temperature

The thermistor resistance characteristics are shown in the figure below.

(4) Thermistor for Evaporating Temperature of Outdoor Unit in Heating Operation (For Defrosting)

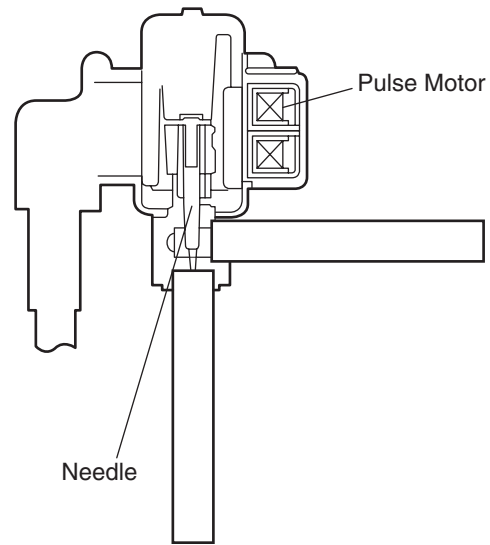
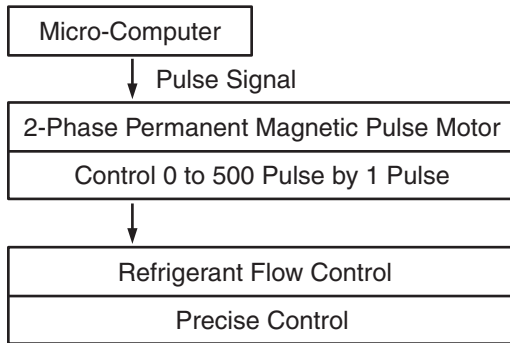
The characteristics for the thermistor is the same with the value of outdoor ambient temperature thermistor as shown in the figure below.



Thermistor Characteristics

### 3.6 Electronic Expansion Valve

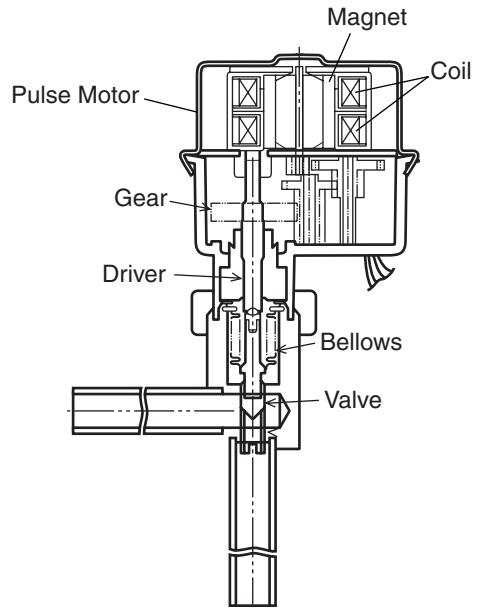
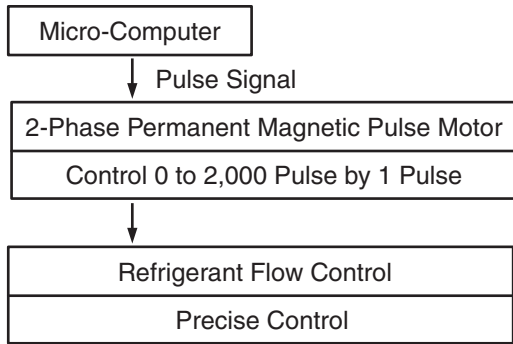
#### 3.6.1 Electronic Expansion Valve for Outdoor Units



#### Specifications

Items	Specifications
Models to be Applied	For Main Cycle of RAS-5FSG, RAS-5FS3, RAS-8FSG, RAS-8FS3, RAS-10FSG, RAS-10FS3, RAS-16FSG, RAS-16FS3, RAS-20FSG, RAS-20FS3, RAS-24FSG1, RAS-24FS5, RAS-30FSG1, RAS-30FS5, RAS-8FXG, RAS-8FX3, RAS-10FXG and RAS-10FX3
Type	EKV (10.0USRT) Series / EKV (5.0USRT) Series for FX MVB
Refrigerant Used	R22 or R407C
Working Temperature Range	-30°C to 65°C (Operating Time of Coil: less than 50%)
Mounting Direction	Drive shaft in Vertical Direction within an Angle of 45° as Maximum
Flow Direction	Reversible
Drive Method	4-Phase Pulse Motor Method
Rated Voltage	DC12V±1.8V
Drive Condition	83PPS (Pulse Width at ON: 36mm sec, OFF: 60mm sec) 1, 2 Phase Excitation
Coil Resistance (each Phase)	46Ω±10% (at 20°C)
Wiring Diagram, Drive Circuit and Activation Mode	

3.6.2 Electronic Expansion Valve for Indoor Units



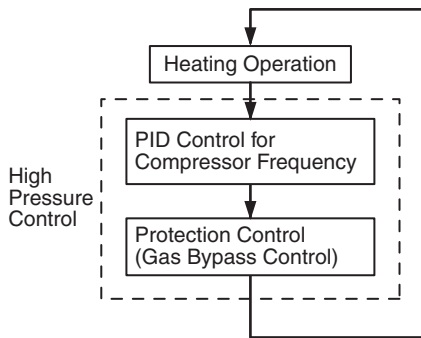
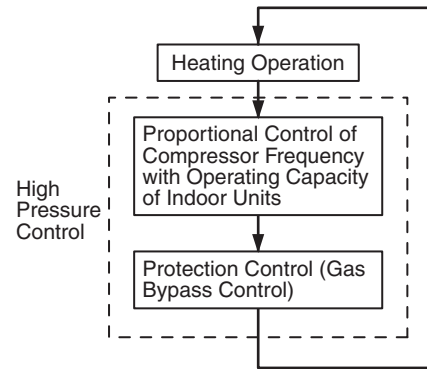
Specifications

Items	Specifications																																																
Type	EDM Type																																																
Refrigerant Used	R22 or R407C																																																
Working Temperature Range	-30°C to 70°C (With Coils Not Electrified)																																																
Mounting Direction	Drive shaft in Vertical Direction, Motor Upside and 90° in Four Direction																																																
Flow Direction	Reversible																																																
Rated Electricity																																																	
Drive Method	4-Phase Pulse Motor Method																																																
Rated Voltage	DC12V±1.2V																																																
Drive Condition	100Ω±250PPS (Pulse Width Over 3mm) 2 Phase Excitation																																																
Coil Resistance (1 Phase)	150±10% (at 20°C)																																																
Wiring Diagram, Drive Circuit and Activation Mode	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Procedure</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>1</th> </tr> </thead> <tbody> <tr> <td>Phase</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1φ</td> <td>ON OFF</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2φ</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3φ</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4φ</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Valve Activation</td> <td colspan="5" style="text-align: center;">           Close ←————→ Open         </td> </tr> <tr> <td></td> <td colspan="5" style="text-align: center;">Activation</td> </tr> </tbody> </table>	Procedure	1	2	3	4	1	Phase						1φ	ON OFF					2φ						3φ						4φ						Valve Activation	Close ←————→ Open						Activation				
Procedure	1	2	3	4	1																																												
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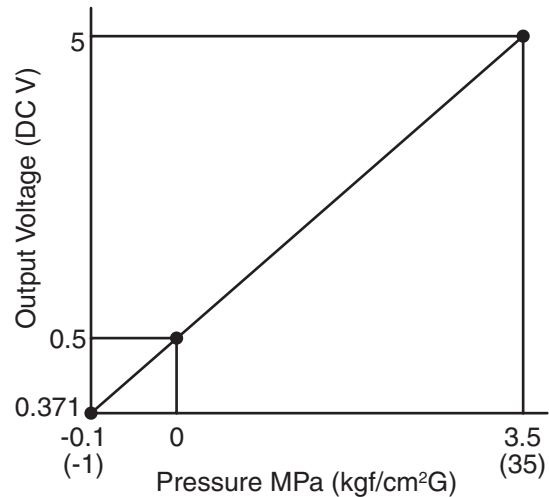
**3.7 Pressure Sensor**

**(1) High Pressure Control**

The high pressure during heating operation is detected by a high pressure sensor, and compressor frequencies are controlled by the proportional controlling method with operating capacity of indoor units (or PID Control for Compressor Frequency) so that the high pressure is controlled in an appropriate range. The output of the high pressure sensor during heating operation performs protective control; gas by-pass control.



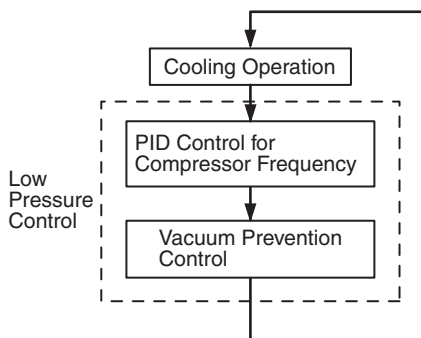
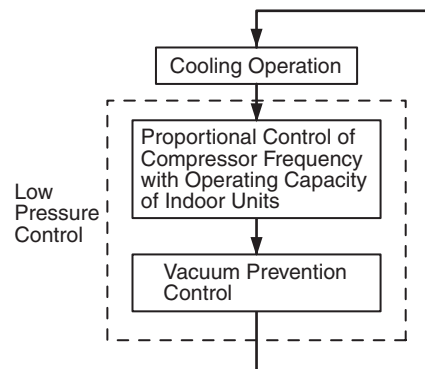
(FX Series Only)



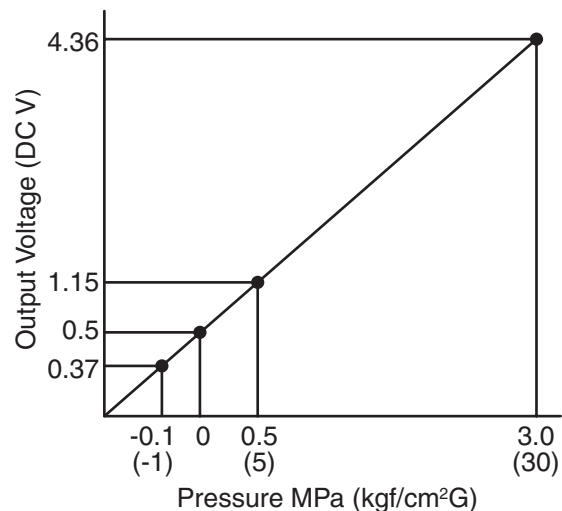
Output Characteristics of High Pressure Sensor

**(2) Low Pressure Control**

The suction pressure during cooling operation is detected by a low pressure sensor, and compressor frequencies are controlled by the proportional controlling method with operating capacity of indoor units (or PID Control for Compressor Frequency) so that the suction pressure is controlled in an appropriate range. If the suction pressure reaches excessively low, the cooling can be insufficient and parts composing the refrigeration cycle can be damaged. For this reason, if the output of the low pressure sensor indicates vacuum and the value is maintained 12 minutes or longer, the compressor is stopped for the purpose of protection.



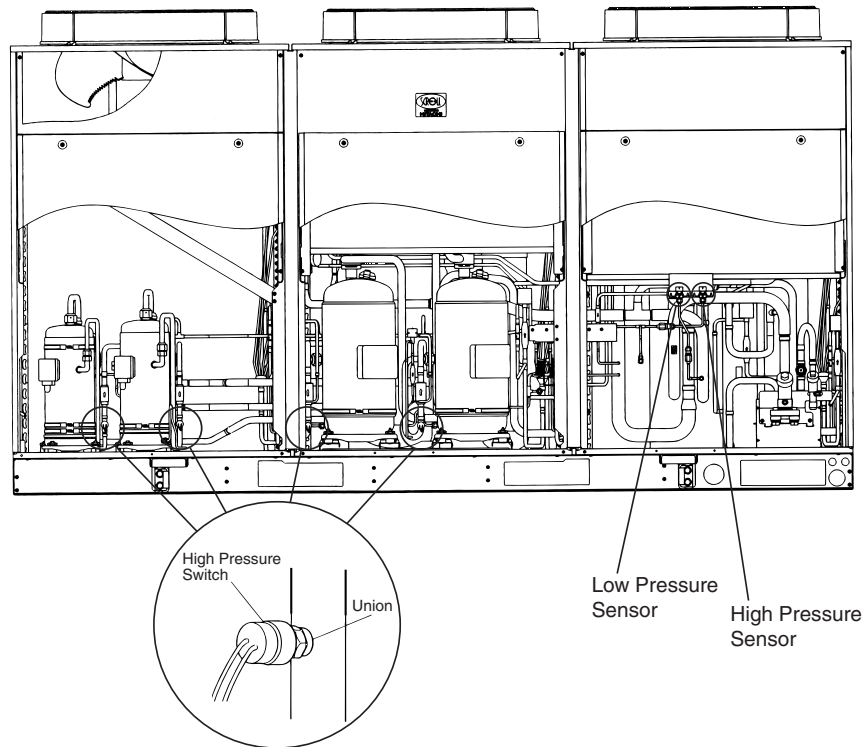
(FX Series Only)



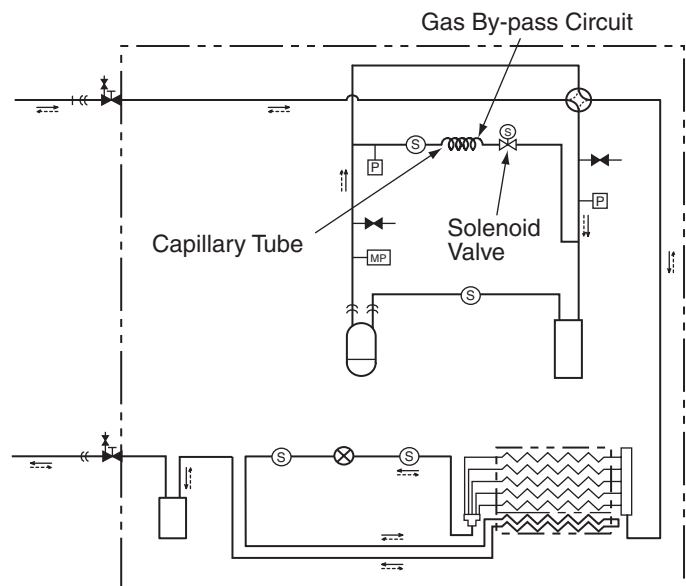
Output Characteristics of Low Pressure Sensor

### 3.8 High Pressure Protection Device

If the discharge pressure is excessively high, the compressor and the component parts of the refrigeration cycle can be damaged. Therefore, in case that the discharge pressure is higher than 3.3/3.0MPa (R407C/R22), the protection control is activated and the compressor is stopped.



- (1) For controlling the high pressure not to increase excessively during heating operation, the gas by-pass circuit and the air volume of the outdoor fan is controlled automatically.
- (2) The gas by-pass circuit, which is composed of the solenoid valve and the capillary tube for flow adjustment, control the high pressure not to increase excessively by leading the high pressure gas to the low pressure side.



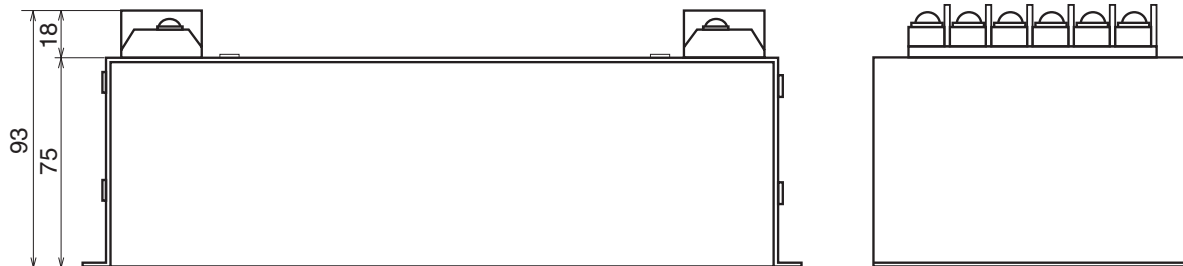
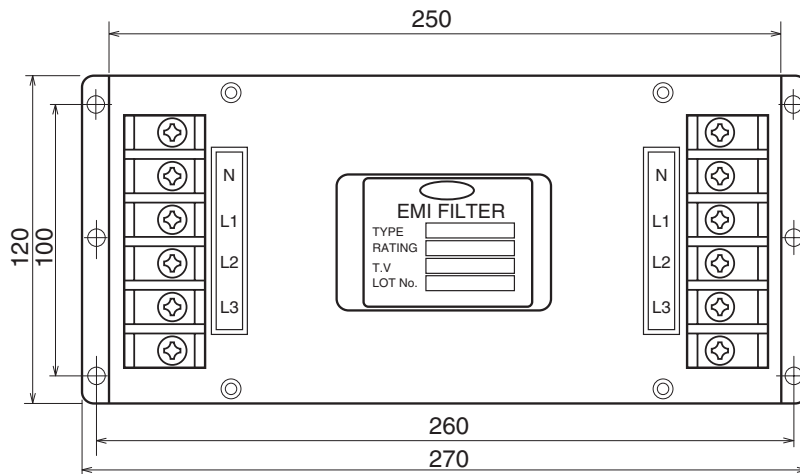


### 3.9 Noise Filter (NF)

The noise filter decreases the leakage of noise made by the inverter to the power supply side. Terminals indicated with "OUT" are connected to the inverter side and terminals indicated with "IN" to the power supply side.

For RAS-5FSG/5FS3~20FSG/FS3

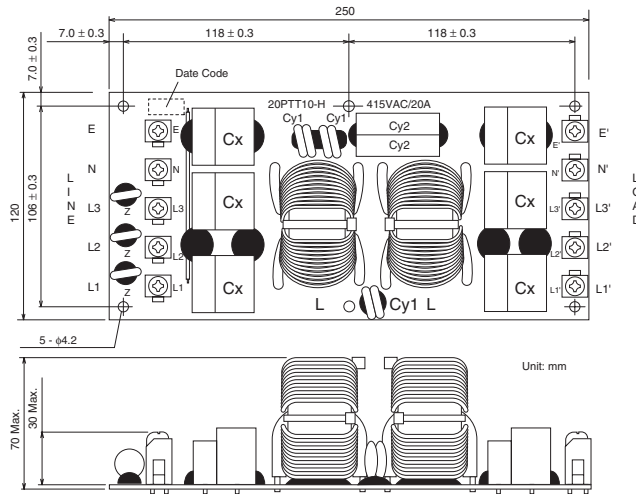
Items	Specifications
Model	HF4020C-DV
Rated Current	AC415V 20A
Permissible Temperature Range	-20°C to 65°C
Circuit Diagram	



# MAIN PARTS

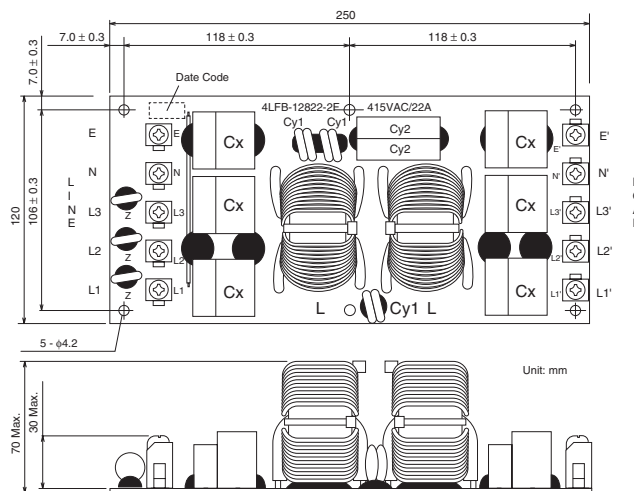
for RAS-5 to RAS-20FSG/FS3

Items	Specifications
Model	20PTT10-H
Rated Current	AC415V 20A
Permissible Temperature Range	-20°C to 85°C
Circuit Diagram	



for RAS-24 and 30FSG1/FS5

Items	Specifications
Model	4LFB-12822-2F
Rated Current	AC415V 22A
Permissible Temperature Range	-20°C to 85°C
Circuit Diagram	

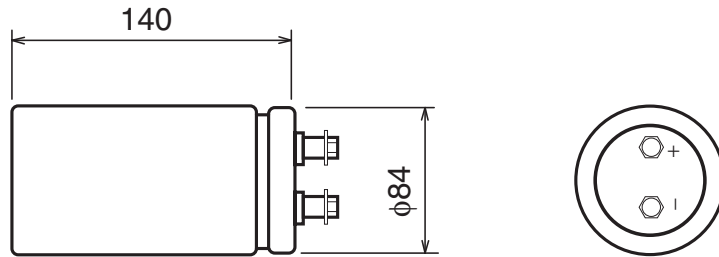


### 3.10 Capacitor (CB1, CB2)

This part is used for changing the alternative current to the direct current for the inverter. Connect two capacitor in line and used.

Specifications

Items	Specifications
Models	400LGSN2700M
Capacity of Static Electricity	2700 $\mu$ F
Rated Voltage	400V
Permissible Temperature Range	-25°C to 95°C

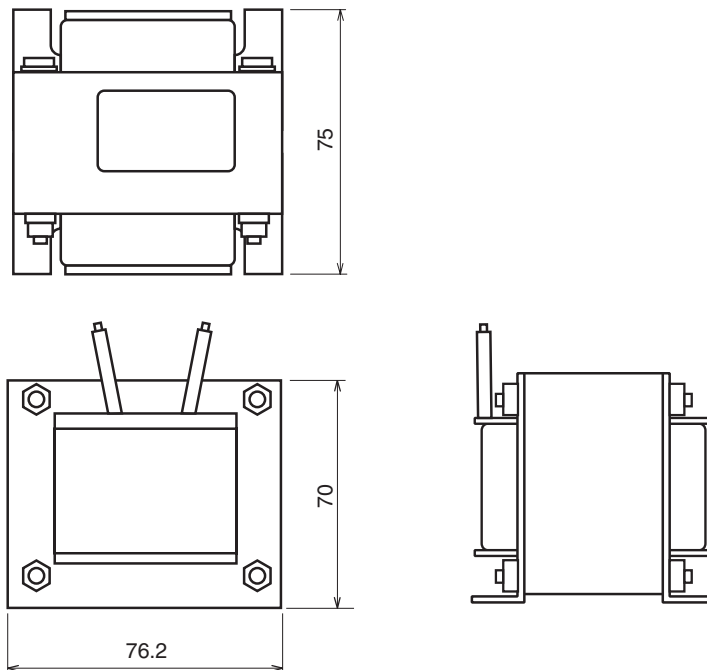


### 3.11 Reactor (DCL)

This part is used for changing the alternative current to the direct current for the inverter.

for RAS-5FSG to RAS-20FSG (380/415V)

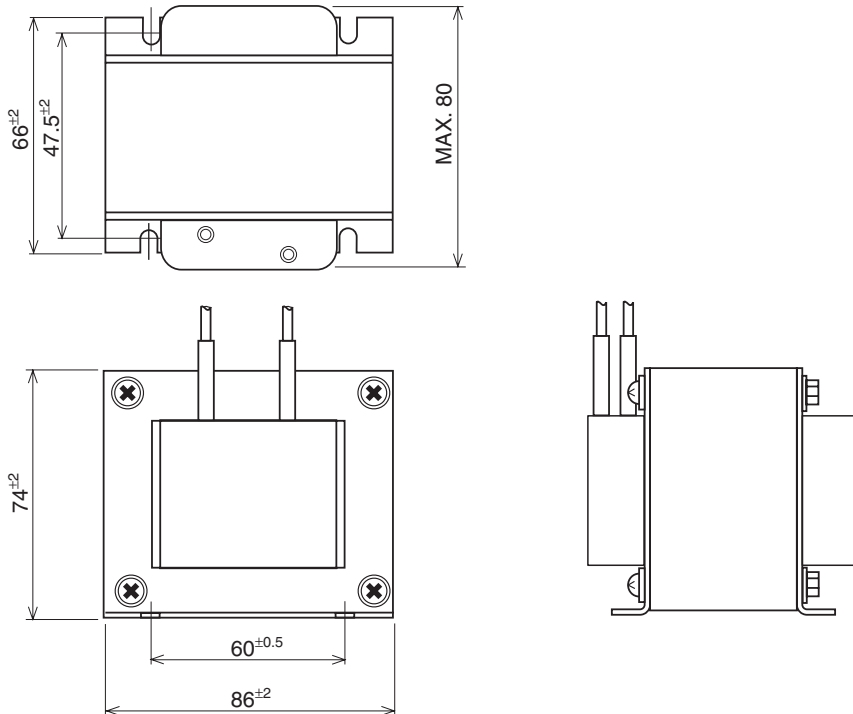
Items	Specifications
Character	1mH $\pm$ 10% (at 1kHz)
Rated Current	33A
Direct Resistance	25.1m $\Omega$ $\pm$ 20% (at 20°C)
Permissible Temperature Range	-20°C to 60°C



## MAIN PARTS

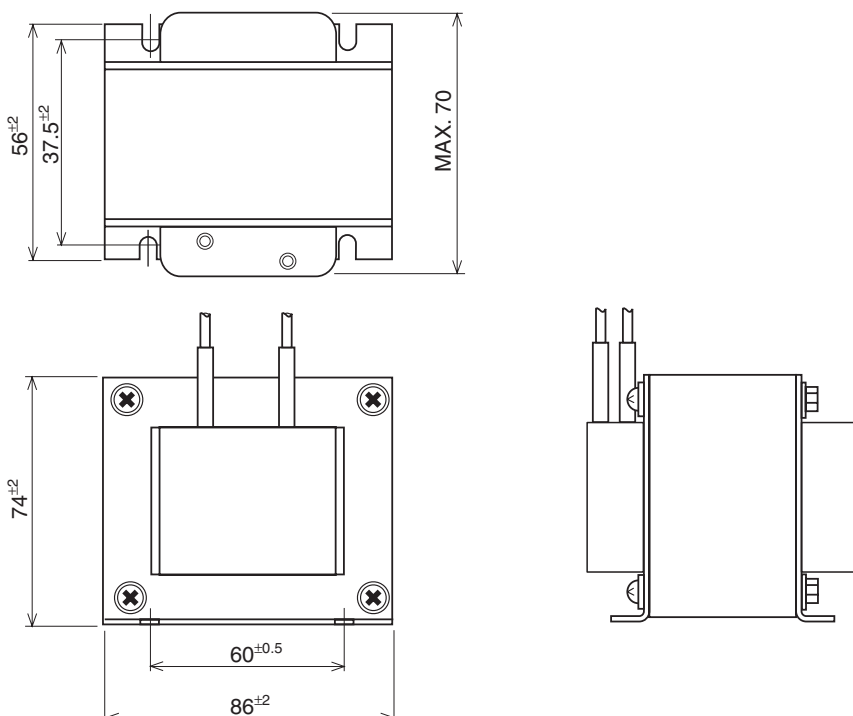
for RAS-5 to 20FSG/FS3 (220V/60Hz)

Items	Specifications
Character	0.5mH±10% (at 1kHz)
Rated Current	37A
Direct Resistance	12.2mΩ±20% (at 20°C)
Permissible Temperature Range	-20°C to 65°C



for RAS-24 and 30FSG1/FS5

Items	Specifications
Character	0.5mH±10% (at 1kHz)
Rated Current	30A
Direct Resistance	15mΩ±20% (at 20°C)
Permissible Temperature Range	-20°C to 65°C



**4. OPTIONAL FUNCTION**

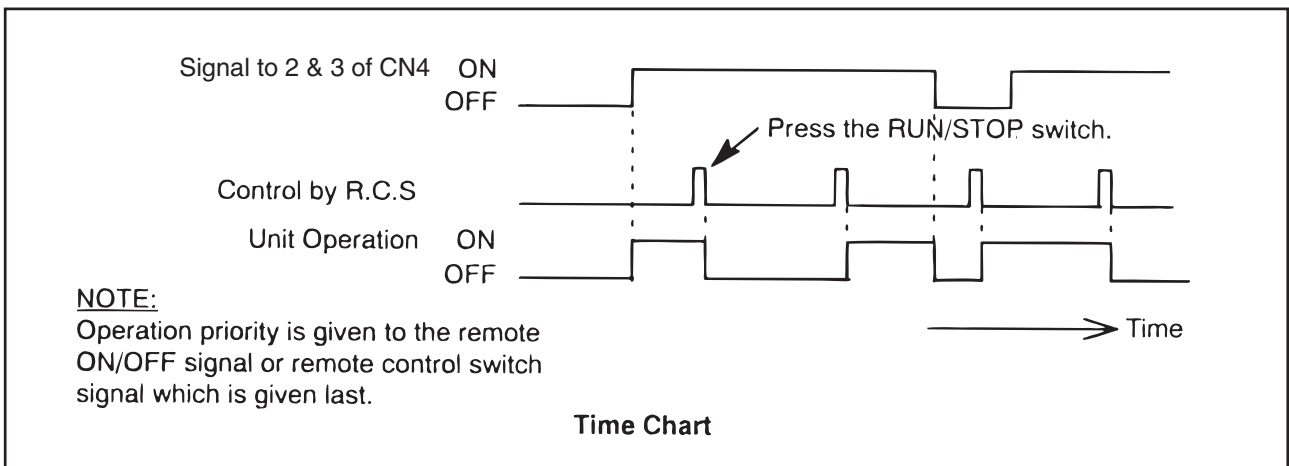
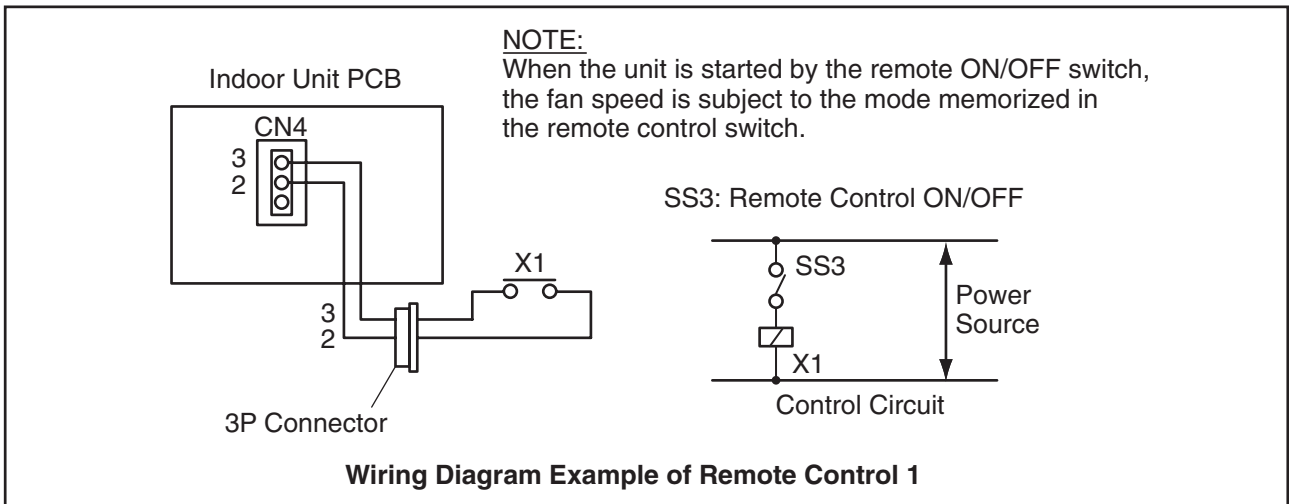
**4.1 Indoor Unit (For RPF(I)-FSG(E), RPK-FSGM(\*), RPC-FSG1 (Before Alteration) and RPI (8, 10HP) Series)**

**4.1.1 Remote Control ON/OFF Function**

This function provides a control to stop and start the system automatically from a remote place. Three methods are available by using each signal from a building management system.

**(1) Remote Control 1 (Level Signal Input)**

This is an ON/OFF function from a remote place by using level signal (or ON/OFF). The basic wiring, time chart are shown below.



**NOTES:**

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

## OPTIONAL FUNCTION

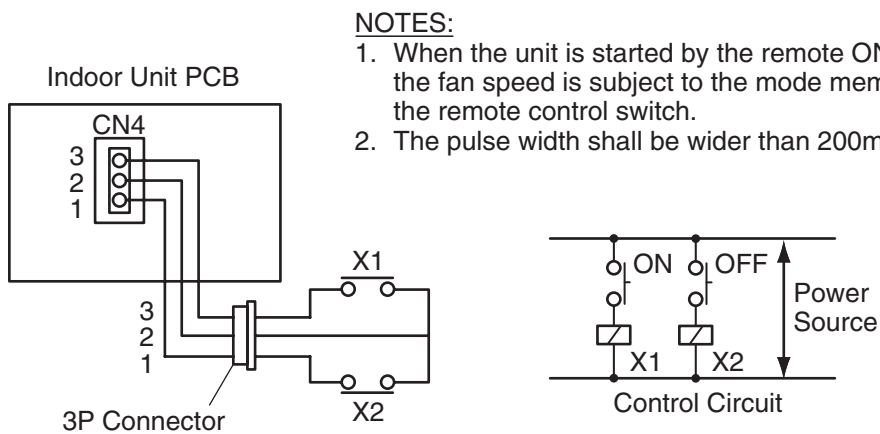
### (4.1 Indoor Unit)

#### (2) Remote Control 2 (Pulse Signal Input)

This is an ON/OFF function from a remote place by using pulse signal. The basic wiring and time chart are shown below.

## CAUTION

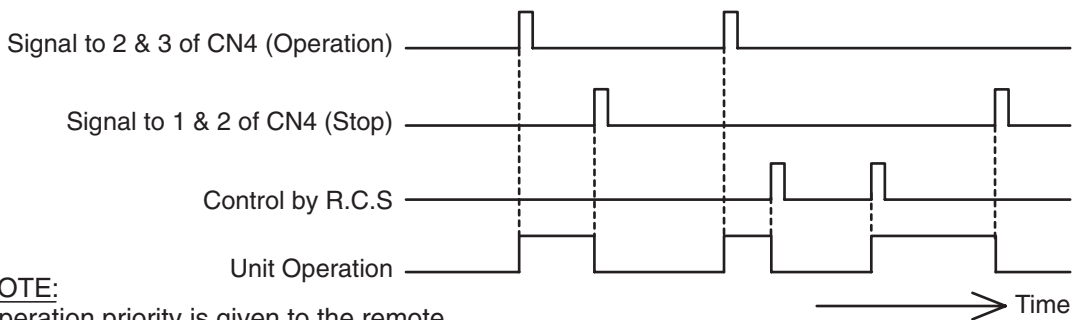
Turn OFF the power source before setting the dip switch.



#### NOTES:

1. When the unit is started by the remote ON/OFF switch, the fan speed is subject to the mode memorized in the remote control switch.
2. The pulse width shall be wider than 200ms.

Wiring Diagram Example of Remote Control 2



#### NOTE:

Operation priority is given to the remote ON/OFF signal or remote control switch signal which is given last.

Time Chart

#### NOTES:

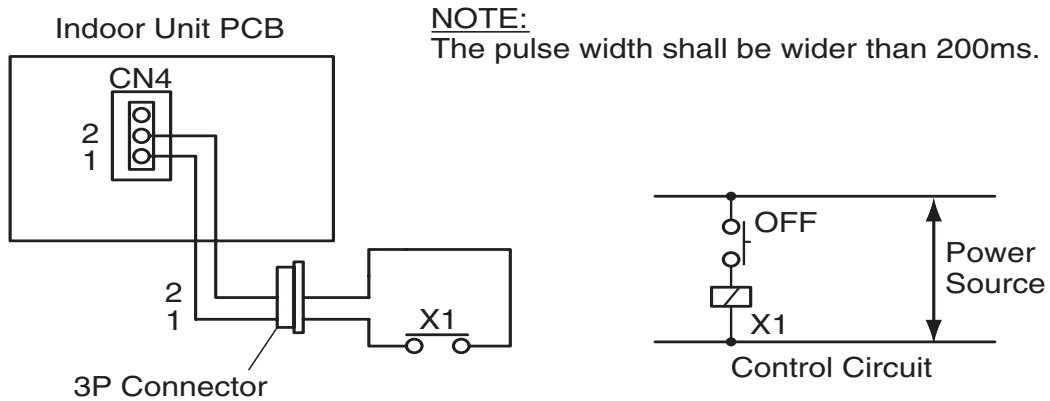
1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

(3) Remote Control 3 (Pulse Signal Input)

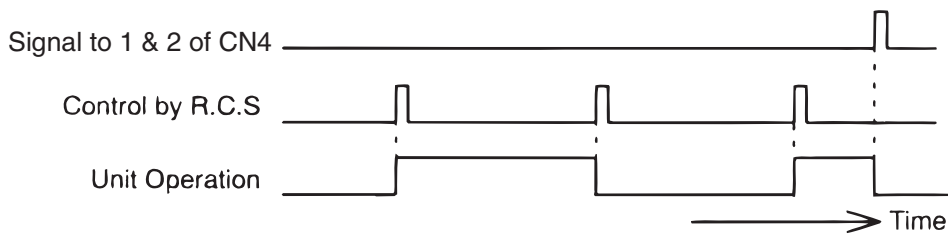
By using the signal from a building management system, the air conditioners can be stopped.  
 If a signal is input during stoppage of air conditioner, the air conditioner remains unchanged.  
 The basic wiring and time chart are shown below.

**CAUTION**

**Turn OFF the power source before setting the dip switch.**



**Wiring Diagram Example of Remote Control 3**



**Time Chart**

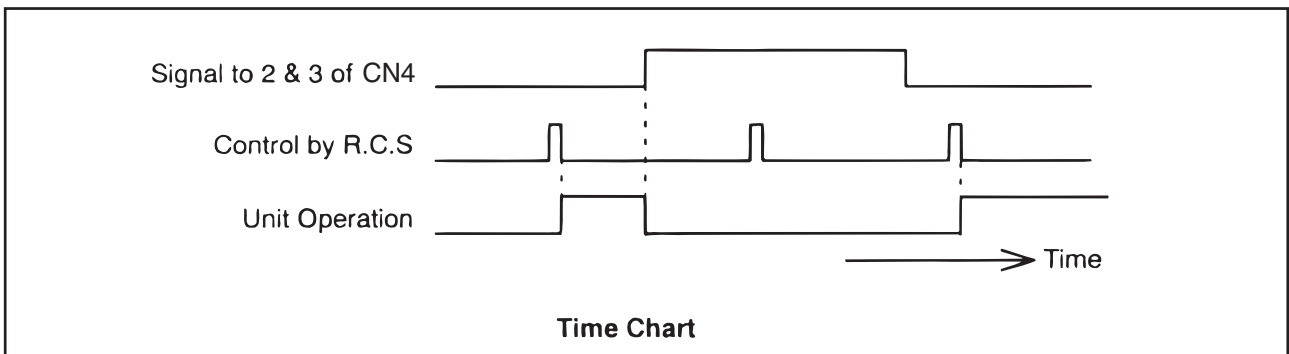
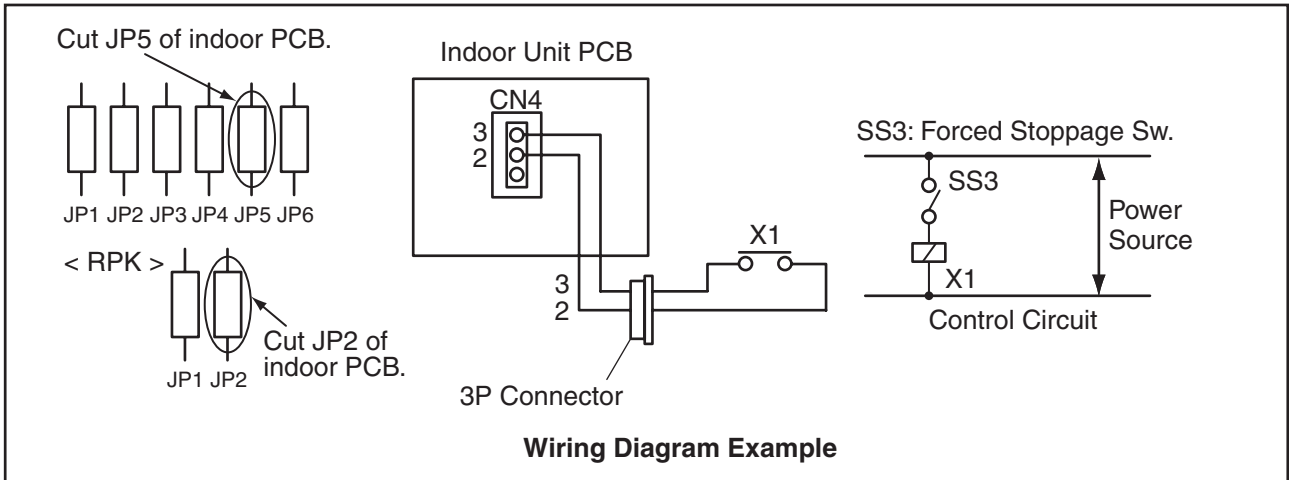
**NOTES:**

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

## OPTIONAL FUNCTION

### (4.1 Indoor Unit)

- (4) Cancellation of Commands from Remote Control Switch after Forced Stoppage (Level Signal Input)  
 By using the signal from a building management system, the air conditioners can be stopped and the individual commands from the remote control switch are canceled.  
 The basic wiring and time chart are shown below. The required parts are shown in Table 4.1.



#### NOTES:

- Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
- Remote Control Switch is required for this function.

Table 4.1 Specifications on Required Components for (1) to (4) Functions

Component		Manufacturer or Specifications	Remarks
Auxiliary Relay (X1, X2)		OMRON Mini Power Relay Model: MY1F or Equivalent	Voltage 220V or 240V
Changeover Switch (SS2, SS3)		Manual Type	
3P Connector Cord		Optional Part PCC-1 (*) (Able to Connect JST Connector XHP-3 (*))	Five Cords with Connectors as One Set
Cord (Indoor)	Low Voltage	0.3mm <sup>2</sup>	less than 24V (*)
	220V/240V Class	0.5 to 0.75mm <sup>2</sup>	
Cord (Outdoor)	Low Voltage	0.5 to 0.75mm <sup>2</sup>	less than 24V (*)
	220V/240V Class	2mm <sup>2</sup>	

(\*) Only for RPK (After Alteration): PCC-1A (Connector XARP-3), 12V

#### NOTE:

Make the wires CN4 as short as possible. Do not install the wires along the 200-400V power line. Separately install them at a distance of more than 30cm. (Intersecting as applicable.)  
 If the wires are installed along the power line, put the wires in a metal tube and connect a wire to an end for grounding. The maximum wiring length is 70m.  
 In the case that this function is used, it is recommended that safety devices such as electric leakage breaker or smoke detector, etc. be used.



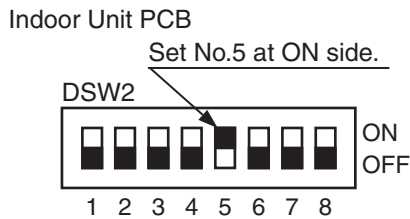
4.1.2 Power Supply ON/OFF 1 (Automatic Operation When Power Supply ON)

Set the dip switch on the PCB for the indoor unit as shown in the figure below to start and stop the system automatically according to the power supply ON/OFF.

When this function is utilized in the condition that there is no person to operate the unit, make the system with monitoring for disaster prevention.

**CAUTION**

Turn OFF the power source before setting the dip switch.



NOTES:

- The unit is started and stopped according to the power supply ON/OFF due to the power failure. When the power failure is occurred during stoppage by the remote control switch operation, the unit is started again automatically after the power supply is recovered.
- In case of RPK-FSGM\* (After Alteration) controlled by PC-P1H, set by PC-P1H. Refer to the item 4.4.4 Optional Function Setting "item d1".

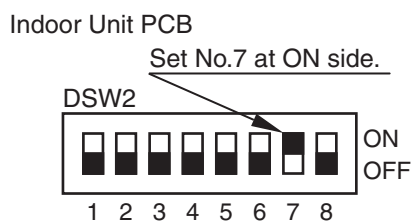
4.1.3 Power Supply ON/OFF 2 (Restarting Function After Power Failure)

Set the dip switch on the PCB for the indoor unit as shown in the figure below to restart the system automatically even if power failure continues for more than 2 seconds. The standard setting provides automatic restarting in less than 2 seconds after a power failure.

The compressor starts in 2 seconds after a 3 minute time guard after power failure.

**CAUTION**

Turn OFF the power source before setting the dip switch.



NOTES:

- The system does not start if the system is stopped before power failure.
- In case of RPK-FSGM\* (After Alteration) controlled by PC-P1H, set by PC-P1H. Refer to the item 4.4.4 Optional Function Setting "item d3".

## OPTIONAL FUNCTION

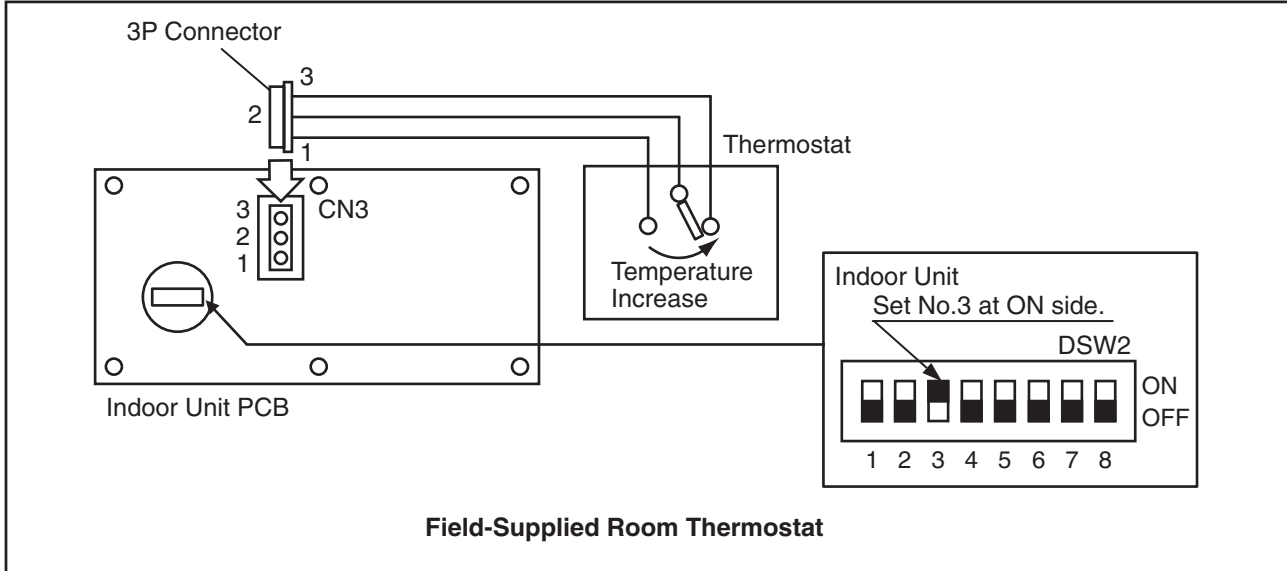
### (4.1 Indoor Unit)

#### 4.1.4 Control by Field-Supplied Room Thermostat

In the case that a field-supplied room thermostat instead of the inlet thermistor of the indoor unit is used, connect wires as shown below. The required parts are shown in Table 4.2.

## ⚠ CAUTION

**Turn OFF the power source before setting the dip switch.**



#### Operation

- Cooling Operation: Compressor is ON by closing terminals 2 and 3 at CN3  
 Compressor is OFF by opening terminals 2 and 3 at CN3
- Heating Operation: Compressor is ON by closing terminals 1 and 2 at CN3  
 Compressor is OFF by opening terminals 1 and 2 at CN3

**Table 4.2 Specifications on Required Components**

Component	Manufacturer or Specifications
Thermostat	Equivalent of YAMATAKE R7031P005, R7031Q005

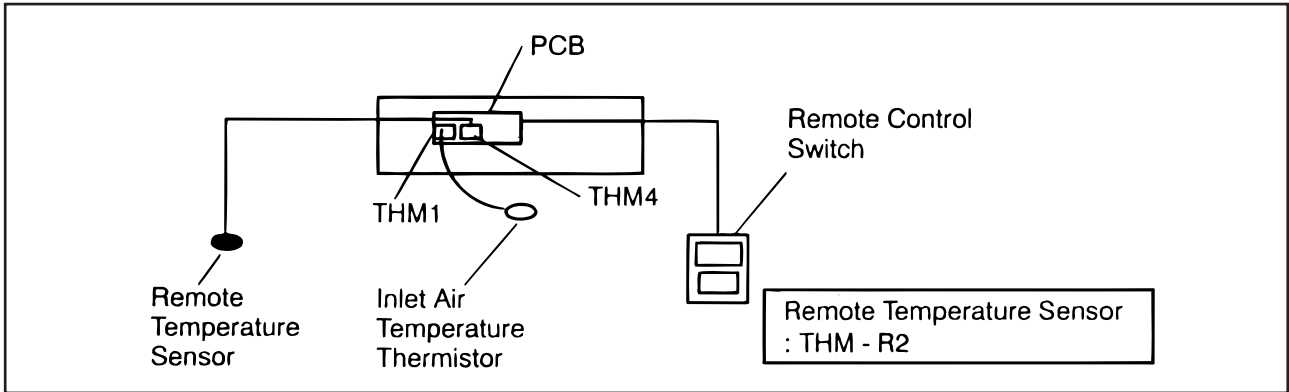
#### NOTES:

- When a field-supplied room thermostat is used, select the specified thermostat as below.  
 Contactor Load: DC24V 50 to 6 mA (\*)  
 Differential: more than 1.5 degree  
 (\*) Only for RPK (After Alteration): DC 12V
- Do not use a thermostat utilizing mercury.
- This function can be used together with "4.1.1 Remote Control ON/OFF Function".

4.1.5 Operation Control by Remote Temperature Sensor (Except for RPK-FSGM (Before Alteration) Series)

By using an optional remote temperature sensor, the followings are available.

- (1) The unit is controlled by the average temperature of the inlet air thermistor and remote temperature sensor.
- (2) In the case that the discharge air temperature exceeds 60°C, the fan speed increases from “Medium” to “High” or “ Low” to “Medium”.

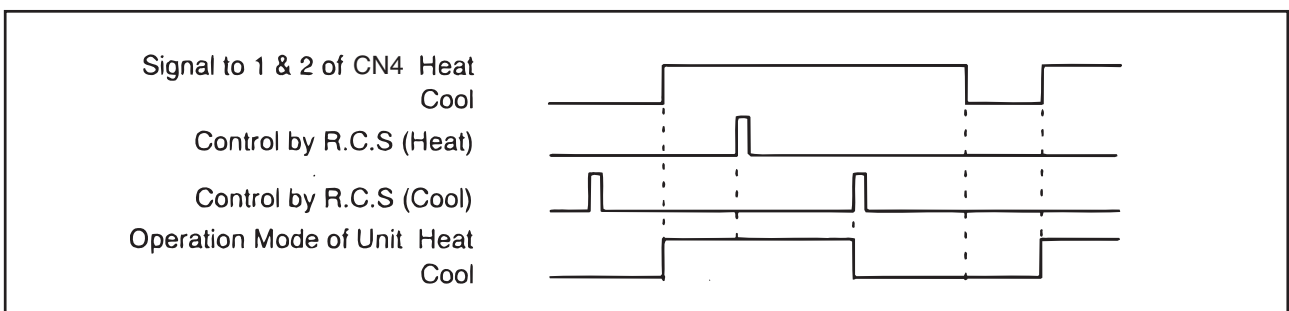
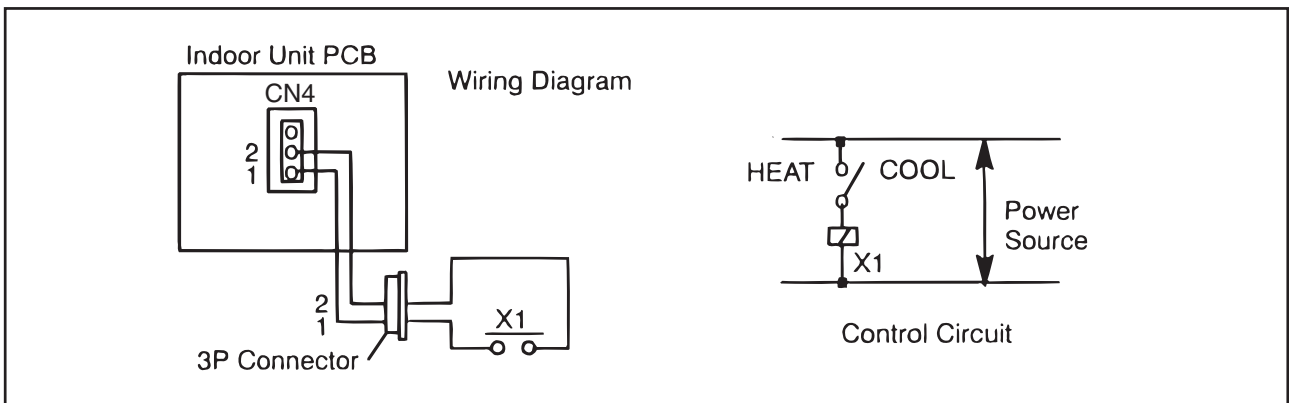


**NOTES:**

1. The remote temperature sensor can not be used together with the remote control thermistor. (Refer to the item 4.4.5 (17).)
2. During the heating operation, “Heating Temperature Calibration” is automatically cancelled. (Refer to the item 4.4.5 (1).)

4.1.6 Cooling or Heating Operation Mode Setting Change by External Input (Level Signal Input)

By utilizing this function, the cooling or heating operation mode can be changed by giving a contact signal from the outside to the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.



**NOTES:**

1. This function can not be used together with the following functions; “Remote Control 2”, “Remote Control 3” and “Cancellation of Commands from Remote Control Switch after Forced Stoppage”.
2. Remote Control Switch is required for this function.

## OPTIONAL FUNCTION

### (4.1 Indoor Unit)

#### 4.1.7 Picking Up Operation Signal

Table 4.3 Required Parts for Modification

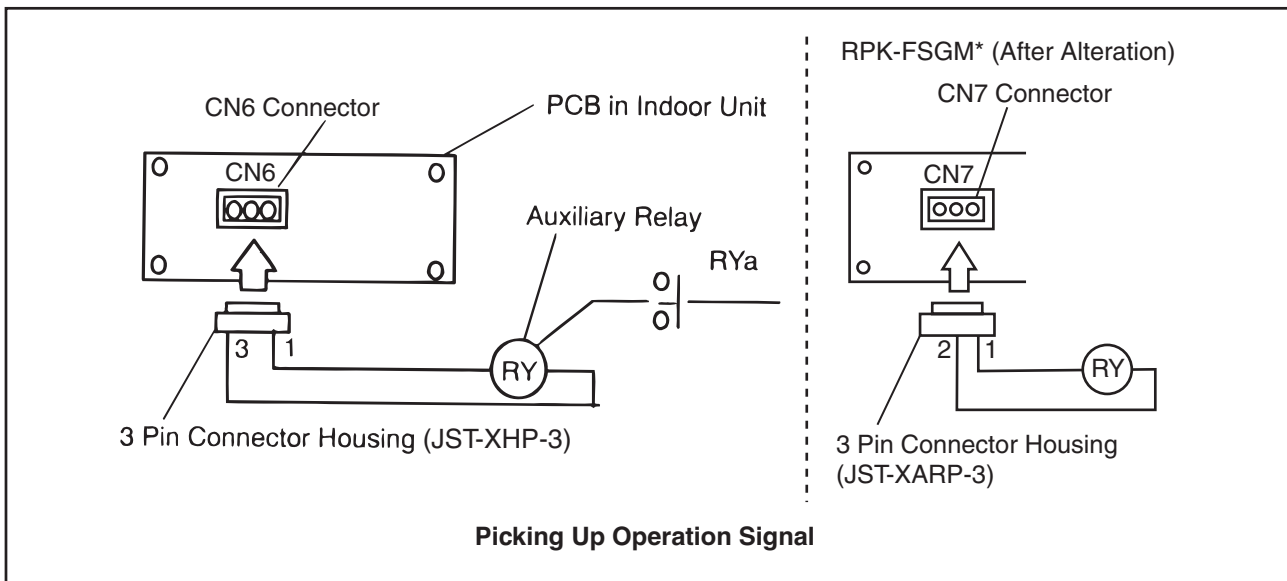
Parts Name	Specification / Model
Auxiliary Relay *	OMRON made High Power Relay Model LY2F DC24V (*)
Connector Cable	PCC-1 (3P Connector Cable) (*)

\*: Do not use the relay with diode.

(\*) Only for RPK (After Alteration): DC12V, PCC-1A

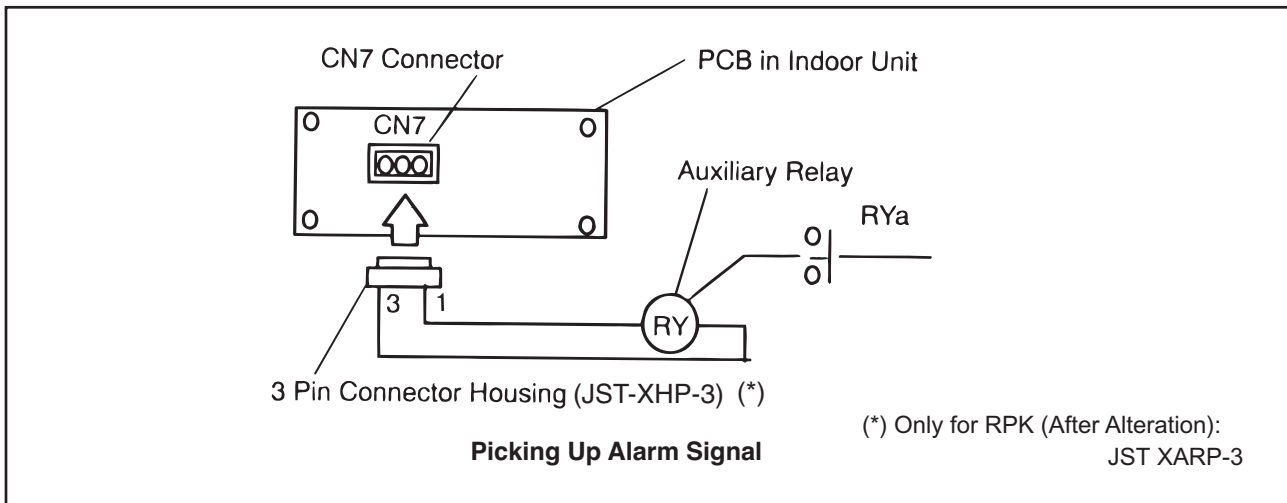
#### (1) Picking Up Operation Signal

This function is utilized to pick up the operation signal. By this function, operation signal at a remote place can be checked, or operation at the fresh air intake fan motor can be interlocked. Connect wires as shown below. The required parts are indicated in Table 4.3. Please note that the contact of the auxiliary relay "RYa" is closed when this operation signal is given.



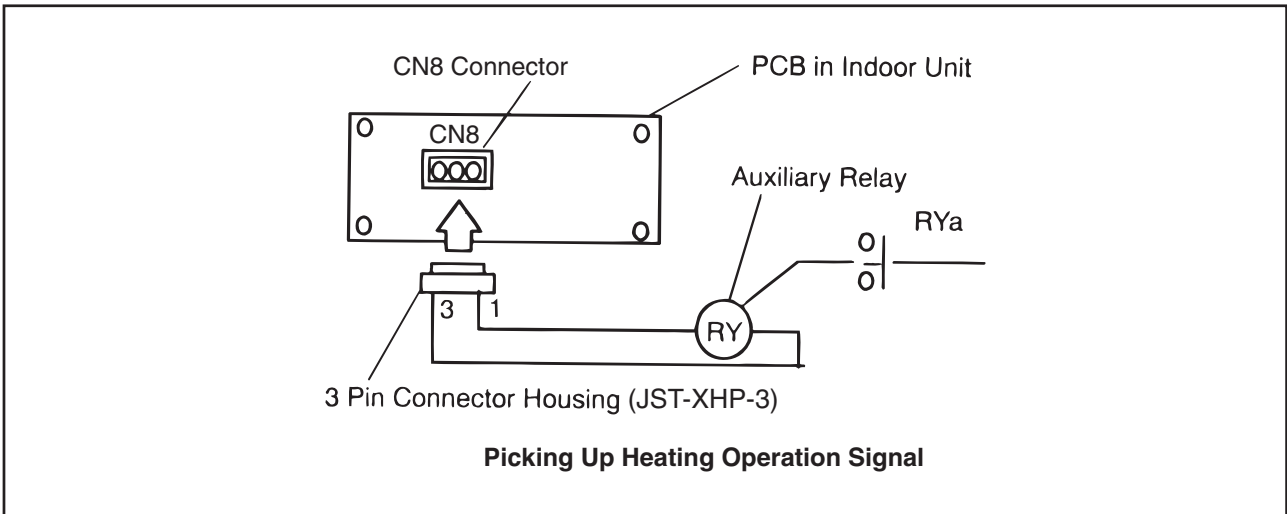
#### (2) Picking Up Alarm Signal

This signal is utilized to pick-up activation of safety devices. However, this function is not available under abnormal transmission conditions of the remote control switch. Connect the wires as shown below. The required parts are indicated in Table 4.3. Please note that the contact of auxiliary relay, RYa is closed when one of the safety devices is activated.



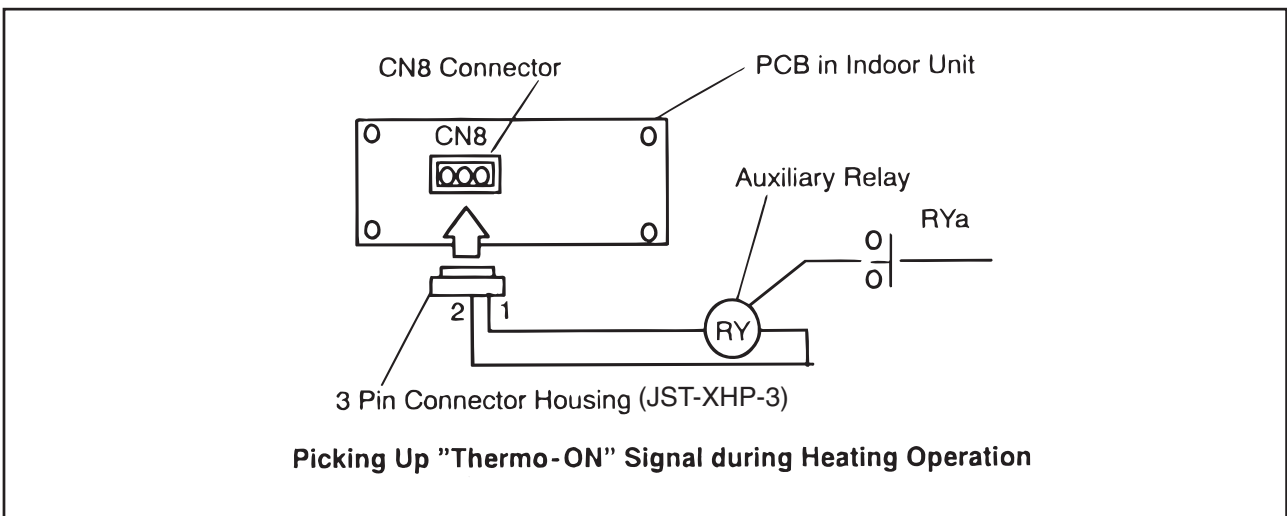
(3) Picking Up Heating Operation Signal (Except for RPK-FSGM Series)

This function is utilized to pick up the heating operation signal. The contact of RYa is closed when heating operation signal is ON despite "Thermo-ON" or "Thermo-OFF". Connect the wires as shown below.



(4) Picking Up "Thermo-ON" Signal during Heating Operation (Except for RPK-FSGM Series)

This function is utilized to pick up the heating "Thermo-ON" signal of compressor running to control a circulator or a humidifier. Connect wires as shown below. The required parts are indicated in Table 4.3. The contact of RYa is closed when "THERMOSTAT" is ON during heating operation mode.



NOTE:

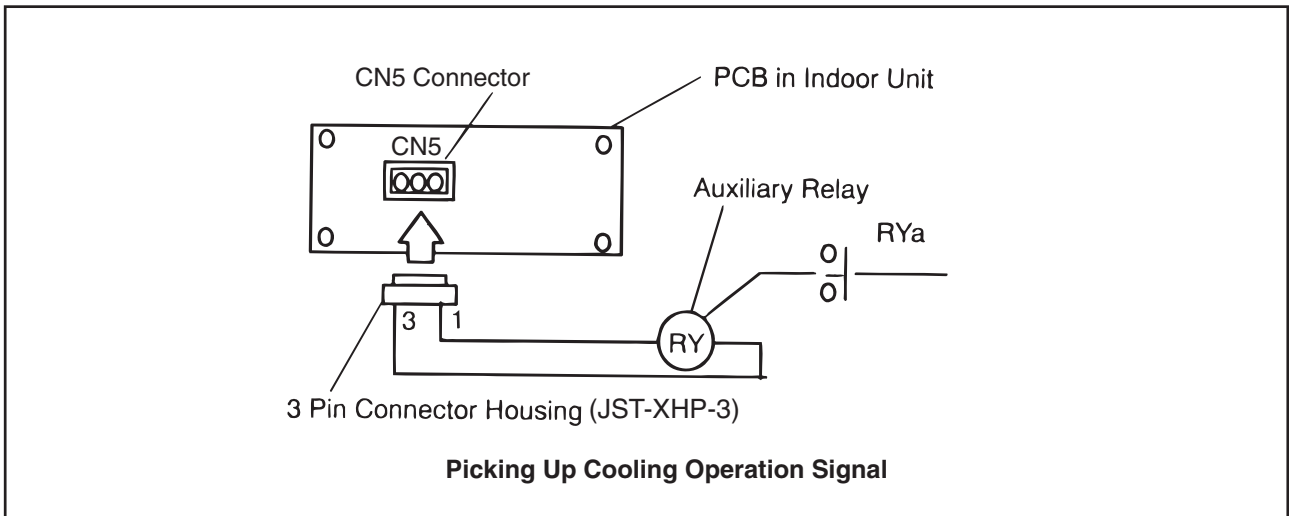
"Thermo-ON" indicates that one of the micro-computer control function "THERMOSTAT" is ON as a thermostat.

## OPTIONAL FUNCTION

### (4.1 Indoor Unit)

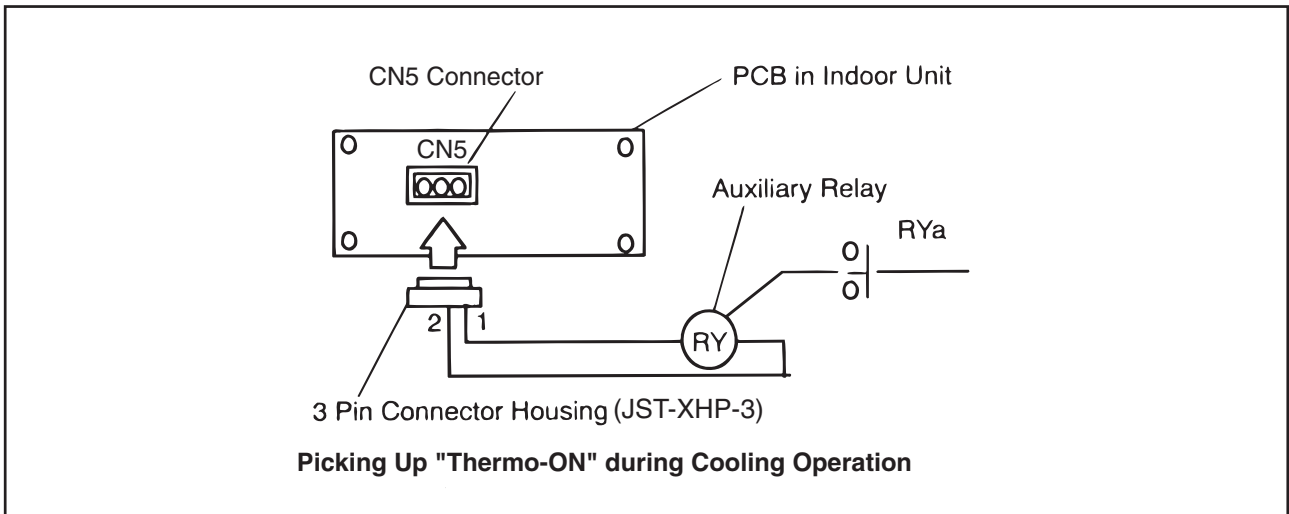
#### (5) Picking Up Cooling Operation Signal (Except for RPK-FSGM Series)

This function is utilized to pick up the cooling signal. The contact of RYa is closed when cooling operation signal is ON despite "Thermo-ON" or "Thermo-OFF". Connect the wires as shown below. The required main parts are indicated in Table 4.3.



#### (6) Picking Up "Thermo-ON" Signal during Cooling Operation (Except for RPK-FSGM Series)

This function is utilized to pick up the cooling "Thermo-ON" signal of compressor running. Connect the wires as shown below. The required parts are indicated in Table 4.3. The contact of RYa is closed when "THERMOSTAT" is ON during cooling operation mode.



#### NOTE:

"Thermo-ON" indicates that one of the micro-computer control function "THERMOSTAT" is ON as a thermostat.

4.2 Indoor Unit (For RPI (0.8 to 5.0HP), RCI, RCD, RPC (After Alteration) and KPI Series)

4.2.1 Input and Output Setting of Indoor PCB Connector

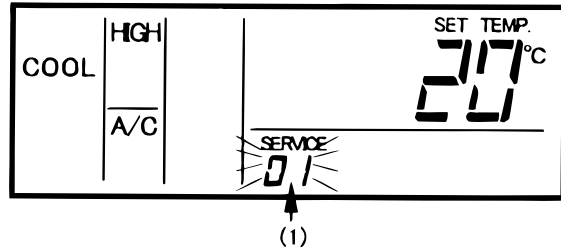
For the external input and output signal, there are two input ports (CN3) and three output ports (CN7, CN8) prepared on the indoor unit PCB.

In case of changing the setting (factory-set), perform the following procedures.

(1) Field Setting Mode

Check to ensure that the unit is stopped, press the “CHECK” switch and the “RESET” switch on the remote control switch simultaneously more than 3 seconds, and the remote control switch is changed to the field setting mode.

When the remote control switch is at the field setting mode, the “SERVICE” is indicated and the “01” is flickers below the “SERVICE” indication.



(2) Input and Output Setting Mode

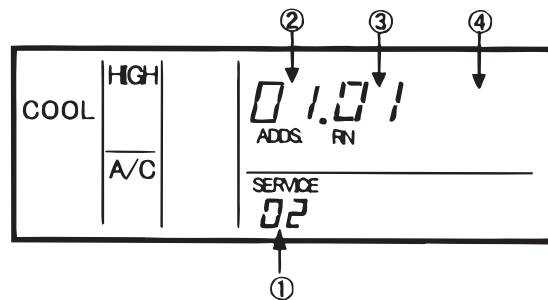
At the field setting mode as described in the above item (1), press the “TEMP V ” switch or the “TEMP Λ ” switch and the number flickering below the “SERVICE” indication is changed as (01 <=> 02).

Set the flickering number at “02”, leave this condition for 7 seconds or press the “CHECK” switch, and the remote control switch is changed to the mode for input and output setting of indoor unit.

(3) Selection of Indoor Unit

(a) At the input and output setting mode, the indication on the remote control switch is changed as shown in the right figure.

- ① The indication of “02” is turned ON.
- ② The address of the indoor unit which the optional function is to be set, is indicated at the segments for timer setting time indication, and the “ADDS” is indicated below.



- ③ The refrigerant cycle number of the indoor unit for the input and output setting is indicated at the segments for timer setting time indication, and the “RN” is indicated below.
- ④ The indication of the setting temperature is turned OFF.

(b) At the condition of the above item (a), press the “TEMP V ” switch or the “TEMP Λ ” switch of the remote control switch and the indoor unit for the input and output setting, can be changed.

**NOTES:**

1. The indoor unit can be selected among the indoor units connected to the remote control switch.
2. In case that both the indications of the address and the refrigerant cycle number is “AA”, all the indoor units connected to the remote control switch are selected. In this case, the individual setting for each indoor unit can not be performed.
- (c) After selecting the indoor unit, leave the condition for 7 seconds or press the “CHECK” switch, the remote control switch is changed to the input and output setting mode.

## OPTIONAL FUNCTION

### (4.2 Indoor Unit)

#### (4) Setting Procedures

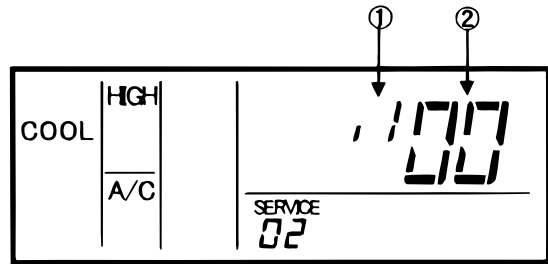
- (a) At the input and output setting mode, the indication on the remote control switch is changed as shown in the right figure.

- ① The allocated port for input and output signal is indicated at the segments for timer setting time indication.

Refer to the indicated port and the connector of the indoor PCB for the table below.

- ② The codes of the input and output signals are indicated at the segments for setting temperature indication.

Refer to the indicated code and the input and output signal for the table below.



#### Indications and Setting Connectors

Indication	Setting Port	Remarks
11	1-2 of CN3 on Indoor PCB	
12	2-3 of CN3 on Indoor PCB	
01	1-2 of CN7 on Indoor PCB	
02	1-3 of CN7 on Indoor PCB	
03	1-2 of CN8 on Indoor PCB	

#### Indications and Input and Output Signals

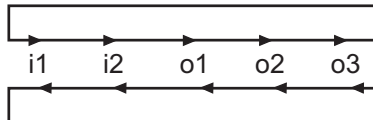
Indication ②	Input	Output
00	Not Set	Not Set
01	Control by Field-Supplied Room Thermostat (Cooling)	Operation Signal
02	Control by Field-Supplied Room Thermostat (Heating)	Alarm Signal
03	Remote Control ON/OFF Function 1	Cooling Operation Signal
04	Remote Control ON/OFF Function 2 (Operation)	Thermo-ON Signal during Cooling
05	Remote Control ON/OFF Function 2 (Stop)	Heating Signal
06	Cancellation of Commands from Remote Control Switch after Forced Stoppage	Thermo-ON Signal during Heating
07	Cooling or Heating Operation Mode Setting	Total Heat Exchanger Operation Signal
08	Input for UP/DOWN Grille (Not Available)	Output for UP/DOWN Grille (Not Available)



**Factory-Setting**

	Connector No.	Pin No. of Connector	Setting When Shipping	Indication ②
Input	CN3	#1 - #2	Remote Control ON/OFF Function 1	03
		#2 - #3	Cancellation of Commands from Remote Control Switch after Forced Stoppage	06
Output	CN7	#1 - #2	Operation Signal	01
		#1 - #3	Alarm Signal	02
	CN8	#1 - #2	Thermo-ON Signal during Heating	06

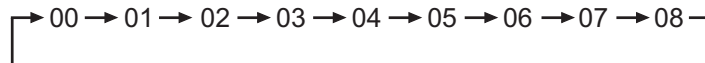
- (b) Press the “TIME ▽” switch or the “TIME △” switch, the indication of port at the segments for timer setting time indication is changed as shown below.  
Select the port for allocating the input and output signal.



When pressing the “TIME △” switch

When pressing the “TIME ▽” switch

- (c) Press the “CHECK” switch, and the code of the input and output signal at the segments for setting temperature indication is changed as shown below.  
Select the input and output signal to be allocated to the port.



(5) Selection of Other Indoor Unit

At the input and output setting mode, press the “TEMP ∨” switch or the “TEMP ∧” switch, the condition of the remote control switch is changed so that the indoor unit can be selected for the input and output setting described in the item (3).

(6) Return from Input and Output Setting Mode

Press the “RESET” switch, the input and output setting is memorized and the mode is returned to the normal condition.

4.2.2 Remote Control Thermistor Function

The temperature can be controlled by the built-in thermistor of the remote control switch (remote control thermistor) instead of the thermistor for the suction air of the indoor unit.

NOTES:

- Even in case of controlling temperature by the remote control thermistor, the detected temperature by the thermistor for the suction air of the indoor unit is applied for the activation of the protective devices in relation with the thermostat for the suction air of the indoor unit.
- In temperature control by the remote control thermistor, when the detecting temperature is abnormal due to the failure of the remote control thermistor, etc., the thermistor to be used is changed to the thermistor for suction air of the indoor unit automatically.
- In case of using this remote control thermistor function, select the location for installing the remote control thermistor as follows;
  - \* where the average temperature of the room can be detected.
  - \* where the thermistor is not exposed to the sunlight directly.
  - \* where the heat source is not near the thermistor.
  - \* where the outdoor air do not affect the room temperature by opening and closing the door, etc.
- In case of using two remote control switches (Main and Sub), this remote control thermistor function is available only for the main remote control switch.  
Refer to the item 4.4.4 “Optional Function Setting” for the setting procedures of optional functions.
- This function is not available while the remote sensor is utilizing. (Priority of Remote Sensor)

## OPTIONAL FUNCTION

### (4.2 Indoor Unit)

#### 4.2.3 Remote Control ON/OFF Function

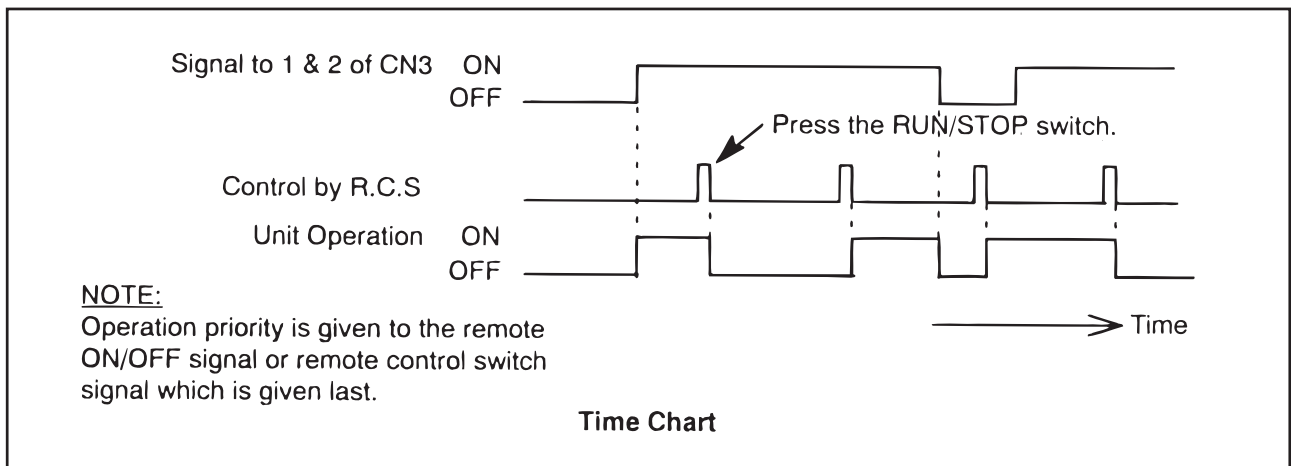
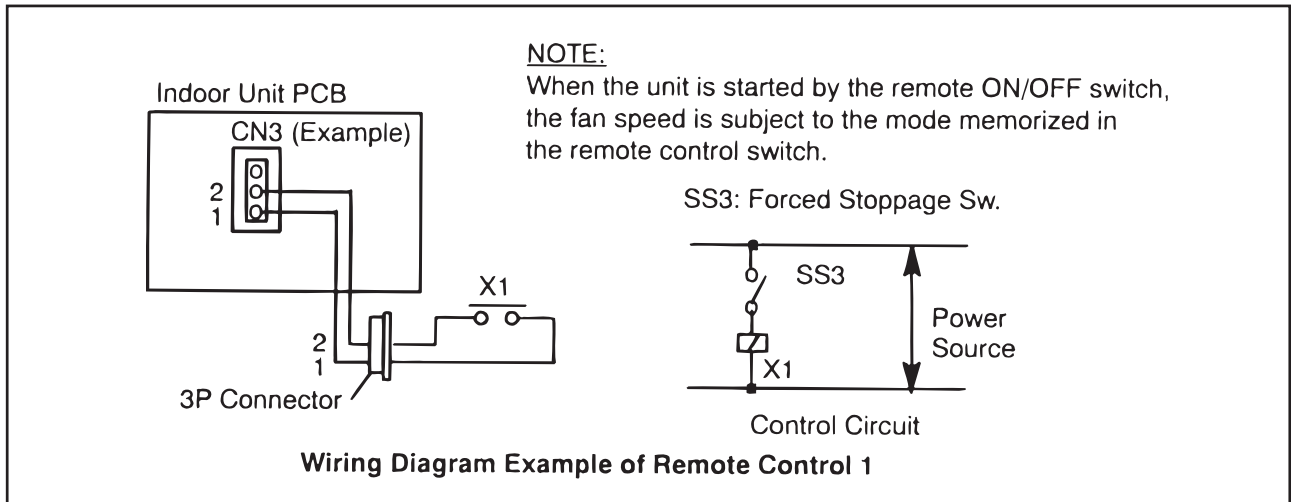
This function provides a control to stop and start the system from a remote place. Four methods are available by using each signal from a building management system.

The factory-setting is as follows; "Remote Control 1" Signal Input to 1# and 2# of CN3 (item (1)), and "Cancellation of Commands from Remote Control Switch after Forced Stoppage" Signal Input to 2# and 3# of CN3. In case of using other functions, change the contact setting according to the item 4.2.1.

##### (1) Remote Control 1 (Level Signal Input)

This is an ON/OFF function from a remote place by using level signal (or ON/OFF). The basic wiring, time chart are shown below.

(In Case of "Remote Control 1" Signal Input to 1# and 2# of CN3)



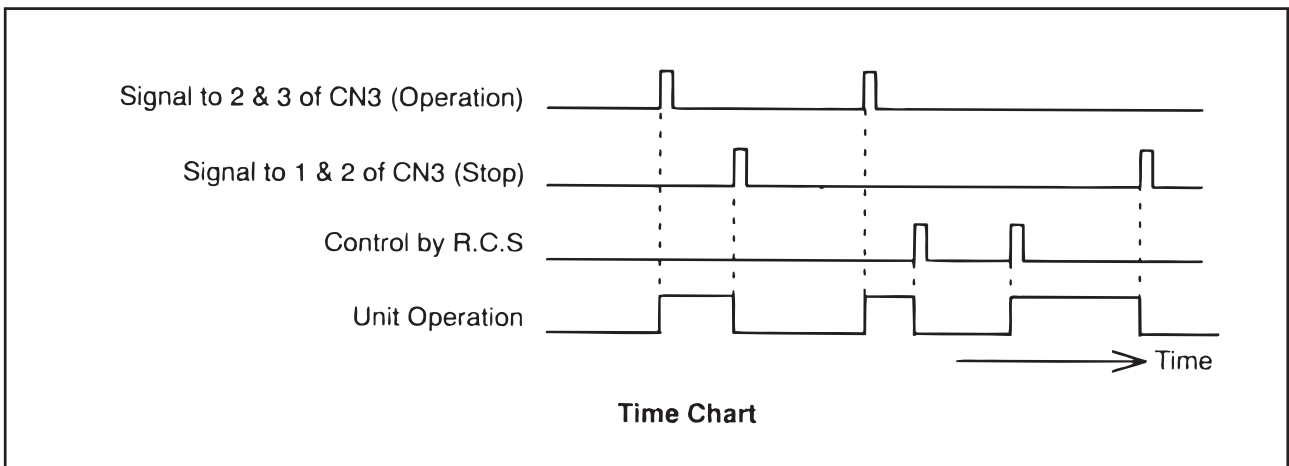
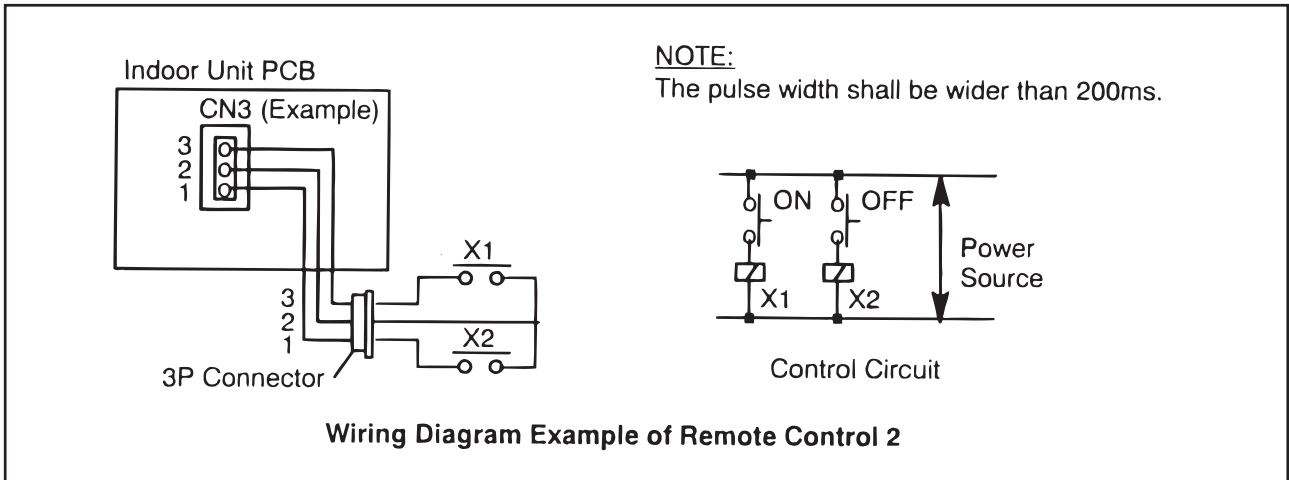
#### NOTES:

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.
3. KPI series is applicable for "A/C + VENTI Mode" only.

(2) Remote Control 2 (Pulse Signal Input)

This is an ON/OFF function from a remote place by using pulse signal. The basic wiring and time chart are shown below.

(In Case of "ON" Signal Input to 2# and 3# of CN3 and "OFF" Signal Input to 1# and 2# of CN3)



**NOTES:**

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.
3. KPI series is applicable for "A/C + VENTI Mode" only.

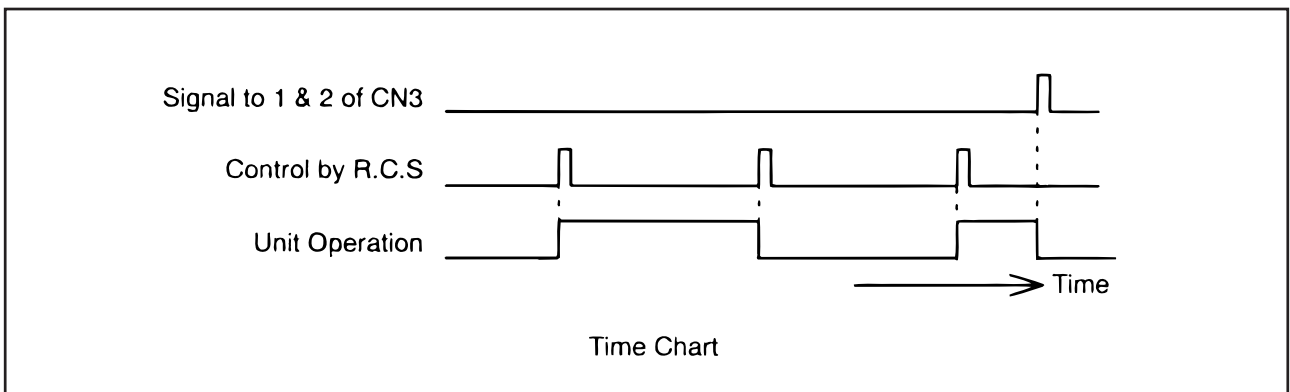
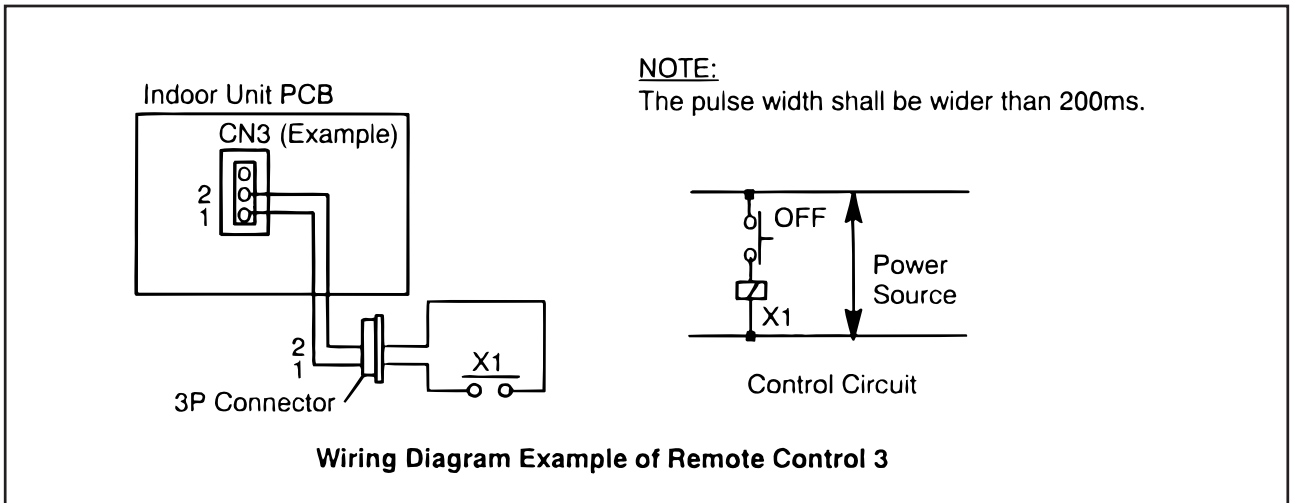
## OPTIONAL FUNCTION

### (4.2 Indoor Unit)

#### (3) Remote Control 3

By using the signal from a building management system, the air conditioners can be stopped. If a signal is input during stoppage of air conditioner, the air conditioner remains unchanged. The basic wiring and time chart are shown below.

(In Case of "Stoppage" Signal Input to 1# and 2# of CN3)



#### NOTES:

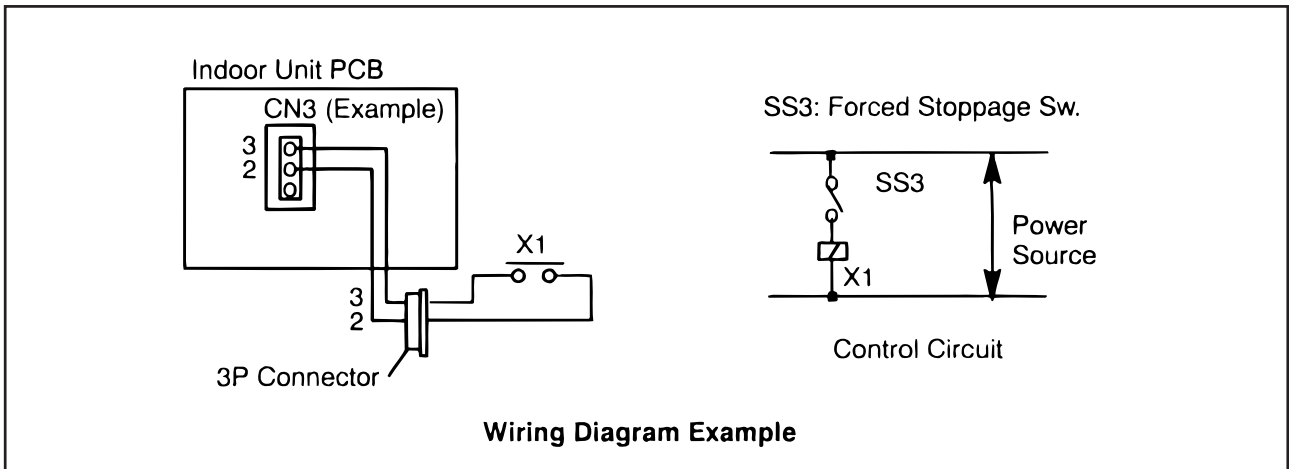
1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

(4) Cancellation of Commands from Remote Control Switch after Forced Stoppage

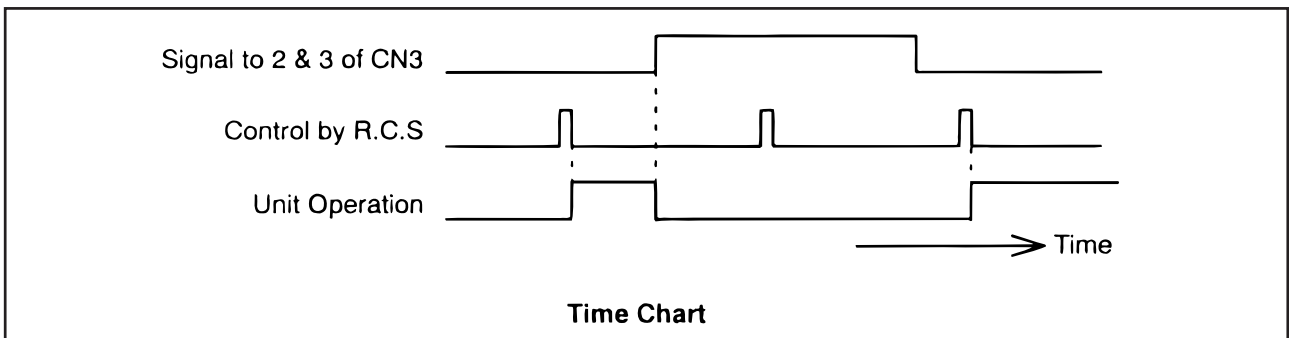
By using the signal from a building management system, the air conditioners can be stopped and the individual commands from the remote control switch are canceled.

The basic wiring and time chart are shown below. The required parts are shown in Table 4.1.

(In Case of "Cancellation of Commands from Remote Control Switch after Forced Stoppage" Input to 2# and 3# of CN3)



**Wiring Diagram Example**

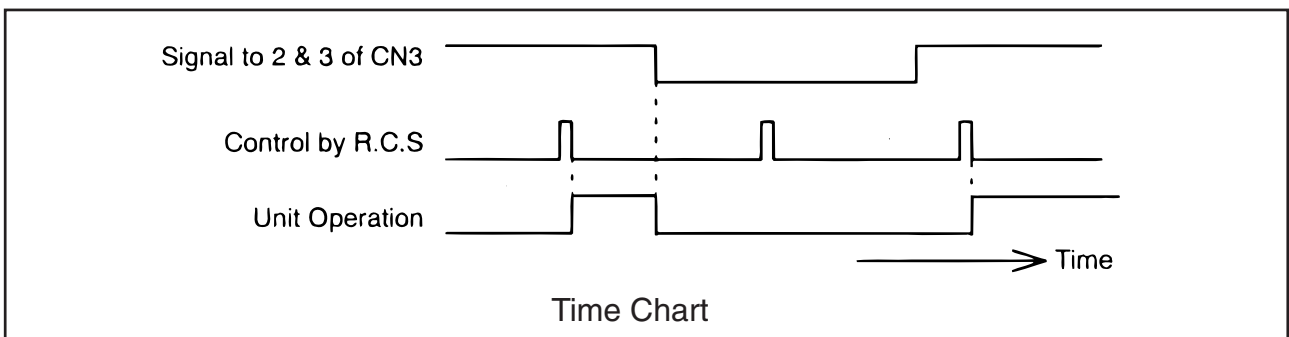


**Time Chart**

**NOTES:**

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

At this function, the B contact can be used by the optional setting (item 4.4.5 (20)) of the remote control switch. The time chart when using the B contact is shown below.



**Time Chart**

**NOTES:**

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.  
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

**OPTIONAL FUNCTION**

## (4.2 Indoor Unit)

Table 4.4 Specifications on Required Components

Component		Manufacturer or Specifications	Remarks
Auxiliary Relay (X1, X2)		OMRON Mini Power Relay Model: MY1F or Equivalent	Voltage 220V or 240V
Changeover Switch (SS2, SS3)		Manual Type	
3P Connector Cord		Optional Part PCC-1A (Able to Connect JST Connector XARP-3)	Five Cords with Connectors as one set
Cord (Indoor)	Low Voltage	0.3mm <sup>2</sup>	less than 12V
	220V/240V Class	0.5 to 0.75mm <sup>2</sup>	
Cord (Outdoor)	Low Voltage	0.5 to 0.75mm <sup>2</sup>	less than 12V
	220V/240V Class	2mm <sup>2</sup>	

**NOTE:**

Make the wires CN3 as short as possible. Do not install the wires along the 200-400V power line. Separately install them at a distance of more than 30cm. (Intersecting as applicable.)

If the wires are installed along the power line, put the wires in a metal tube and connect a wire to an end for grounding. The maximum wiring length is 70m.

In the case that this function is used, it is recommended that safety devices such as electric leakage breaker or smoke detector, etc. be used.

**4.2.4 Power Supply ON/OFF 1 (Automatic Operation When Power Supply ON)**

Set the optional function of the remote control switch as shown in the item 4.4.5 (22) to start and stop the system automatically according to the power supply ON/OFF.

When this function is utilized in the condition that there is no person to operate the unit, make the system with monitoring for disaster prevention.

**NOTE:**

The unit is started and stopped according to the power supply ON/OFF due to the power failure.

When the power failure is occurred during operation, the unit is started again automatically after the power supply is recovered.

Remote Control Switch is required for this function.

**4.2.5 Power Supply ON/OFF 2 (Restarting Function After Power Failure)**

Set the optional function of the remote control switch as shown in the item 4.4.5 (24) to restart the system automatically even if power failure continues for more than 2 seconds. Set it after the main switch is OFF.

The standard setting provides automatic restarting in less than 2 seconds after a power failure.

The compressor starts in 2 seconds after a 3 minute time guard after power failure.

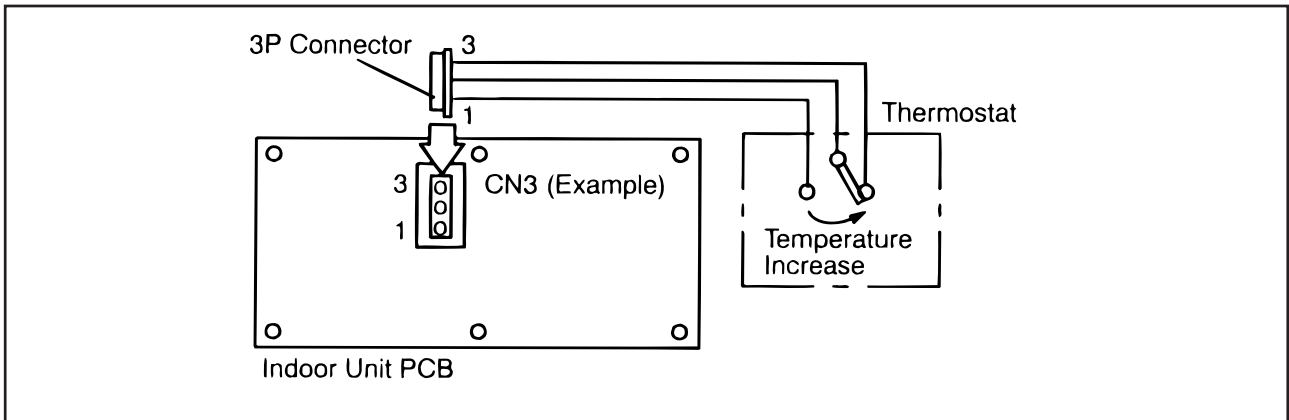
**NOTE:**

The system does not start if the system is stopped before power failure.

Remote Control Switch is required for this function.

4.2.6 Control by Field-Supplied Room Thermostat (Except for KPI Series)

In the case that a field-supplied room thermostat instead of the inlet thermistor of the indoor unit is used, connect wires as shown below. The required parts are shown in Table 4.5.  
 (In Case of "Room Thermostat (Cooling)" Input to 2# and 3# of CN3 and "Room Thermostat (Heating)" Input to 1# and 2# of CN3 according to the item 4.2.1)



Operation

- Cooling Operation: Compressor is ON by closing terminals 2 and 3 at CN3  
 Compressor is OFF by opening terminals 2 and 3 at CN3
- Heating Operation: Compressor is ON by closing terminals 1 and 2 at CN3  
 Compressor is OFF by opening terminals 1 and 2 at CN3

Table 4.5 Specifications on Required Components

Component	Manufacturer or Specifications
Thermostat	Equivalent of YAMATAKE R7031P005, R7031Q005

NOTES:

- When setting the dip switch DSW2, turn OFF power source and set the dip switch. If the dip switch is set without turning OFF the power source, it does not correctly function.
- When a field-supplied room thermostat is used, select the specified thermostat as below.  
 Contactor Load: DC12V  
 Differential: more than 1.5 degree
- Do not use a thermostat utilizing mercury.
- This function can be used together with "4.2.3 Remote Control ON/OFF Function".

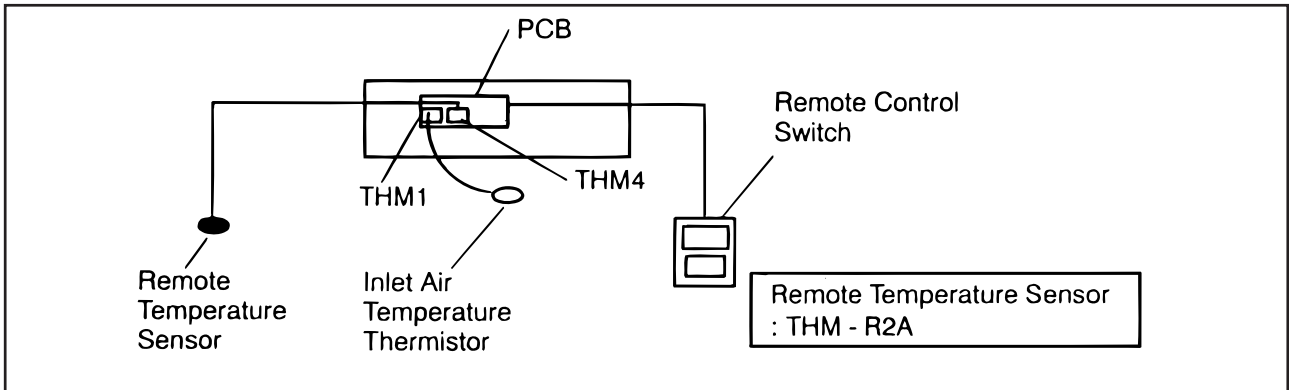
## OPTIONAL FUNCTION

### (4.2 Indoor Unit)

#### 4.2.7 Operation Control by Remote Temperature Sensor (Except for KPI Series)

By using an optional remote temperature sensor, the followings are available.

- (1) The unit is controlled by the average temperature of the inlet air thermistor and remote temperature sensor.
- (2) In the case that the discharge air temperature exceeds 60°C, the fan speed increases from “Medium” to “High” or “Low” to “Medium”.



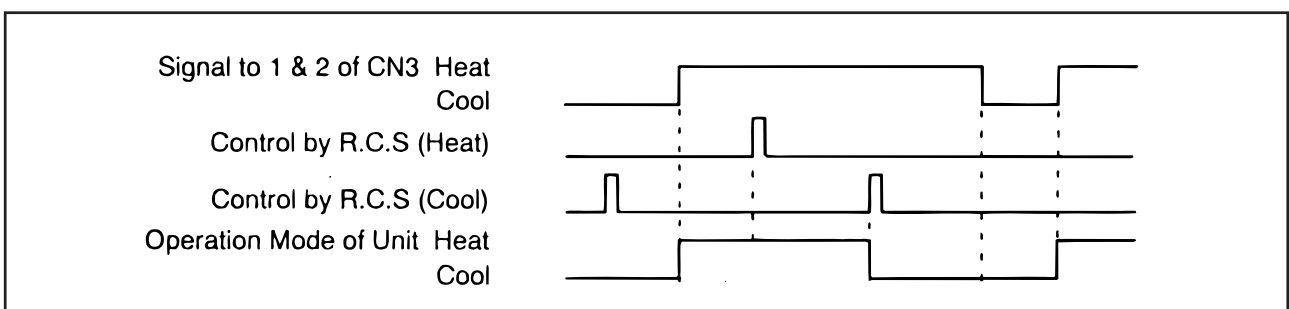
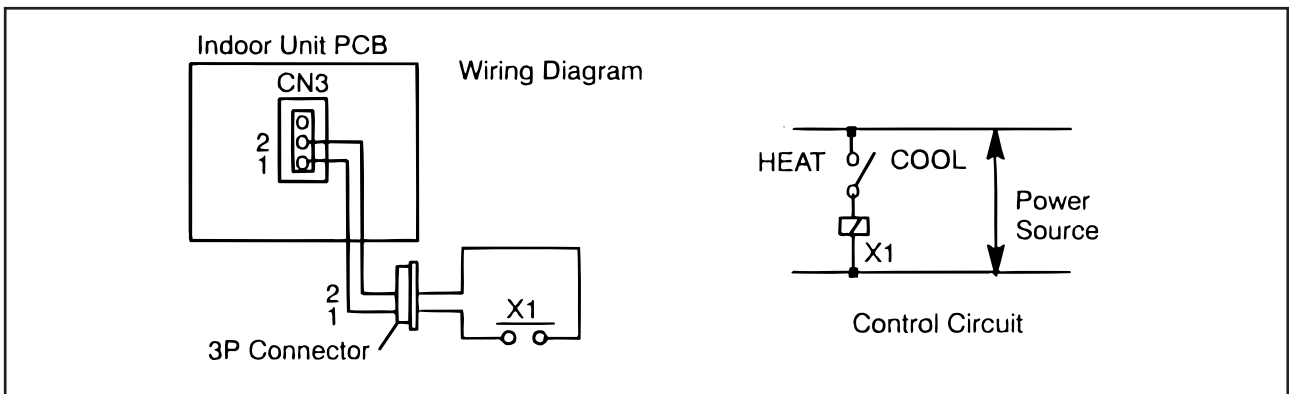
#### NOTES:

1. The remote temperature sensor can not be used together with the remote control thermistor. (Refer to the item 4.4.5 (17).)
2. During the heating operation, “Heating Temperature Calibration” is automatically cancelled. (Refer to the item 4.4.5 (1).)

#### 4.2.8 Cooling or Heating Operation Mode Setting Change by External Input (Except for KPI Series)

By utilizing this function, the cooling or heating operation mode can be changed by giving a contact signal from the outside to the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.

(In Case of “Cooling or Heating Operation Mode Setting Change by External Input” Signal Input to 1# and 2# of CN3)



#### NOTES:

1. This function can not be used together with the following functions; “Remote ON/OFF 2”, “Remote ON/OFF 3” and “Cancellation of Commands from Remote Control Switch after Forced Stoppage”.
2. Remote Control Switch is required for this function.



4.2.9 Precooling/Preheating Operation (KPI Series Only)

This function is delayed to start the total heat exchanger at interlock with air conditioner.

(1) 30 minutes Period

Total heat exchanger starts 30 minutes later after starting air conditioner.  
This function is set by optional function on remote control switch (PC-P1H).

NOTES:

1. This function is not available at ventilation setting (single operation of total heat exchanger).
2. Remote control switch is needed to set this function.

(2) 60 minutes Period

Total heat exchanger starts 60 minutes later after starting air conditioner.  
This function is set by optional function on remote control switch (PC-P1H).

NOTES:

1. This function is not available at ventilation setting (single operation of total heat exchanger).
2. Remote control switch is needed to set this function.

4.2.10 Picking Up Operation Signal

By utilizing this function, the cooling or heating operation mode can be changed by giving a contact signal from the outside to the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.

Required Parts for Modification

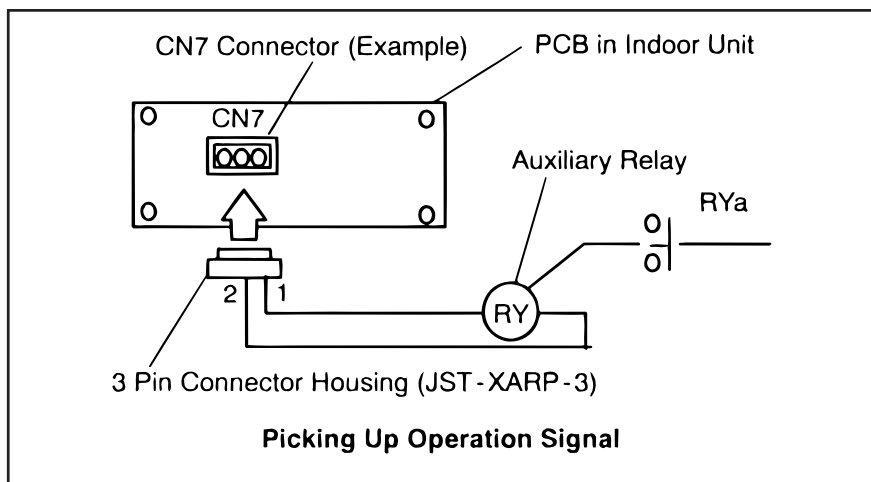
Parts Name	Specification / Model
Auxiliary Relay *	OMRON made High Power Relay Model LY2F DC12V
Connector Cable	PCC-1A (3P Connector Cable)

\*: Do not use the relay with diode.

(1) Picking Up Operation Signal

This function is utilized to pick up the operation signal. By this function, operation signal at a remote place can be checked, or operation at the fresh air intake fan motor can be interlocked. Connect wires as shown below. Please note that the contact of the auxiliary relay “RYa” is closed when this operation signal is given.

(In Case of Giving Operation Signal to 1# and 3# of CN7)



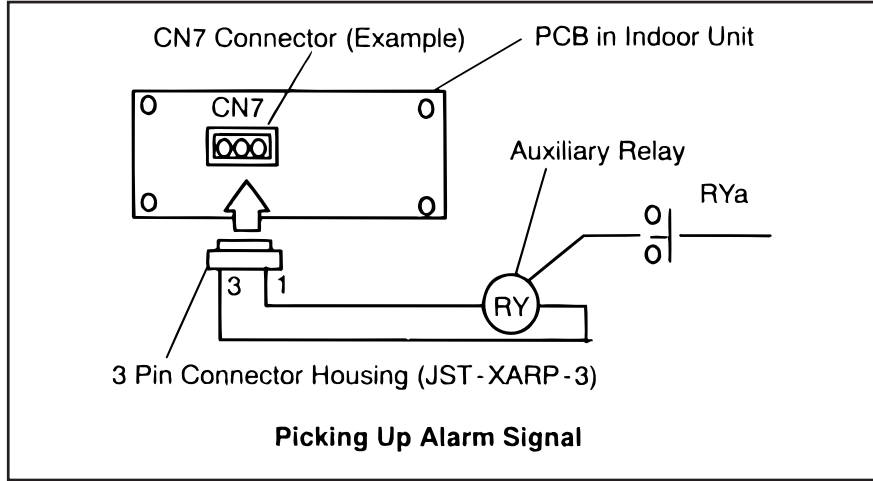
## OPTIONAL FUNCTION

### (4.2 Indoor Unit)

#### (2) Picking Up Alarm Signal

This signal is utilized to pick-up activation of safety devices and is normally indicated on the remote control switch. However, this function is not available under abnormal transmission conditions. Connect the wires as shown below. Please note that the contact of auxiliary relay, RYa is closed when one of the safety devices is activated.

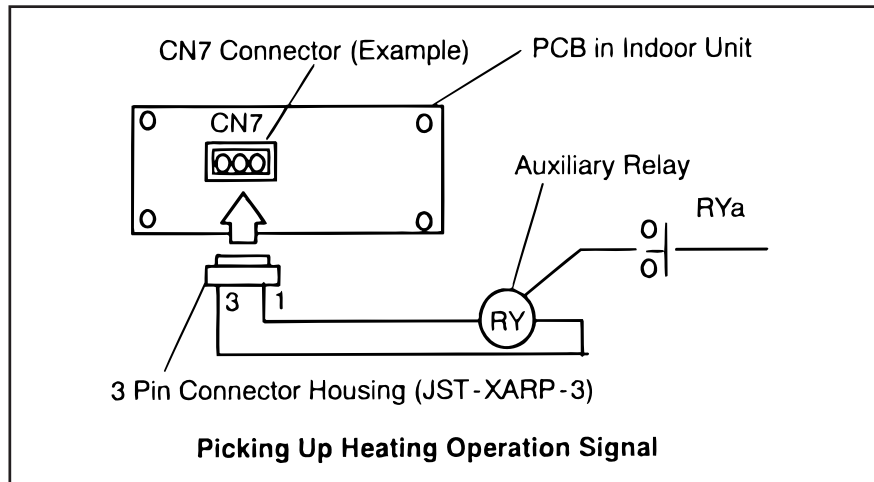
(In Case of Giving Alarm Signal to 1# and 3# of CN7)



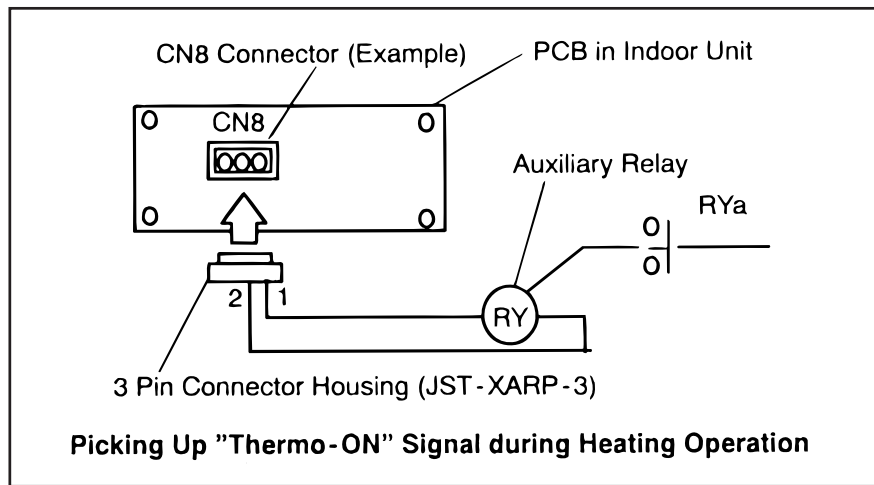
#### (3) Picking Up Heating Operation Signal (Except for KPI Series)

This function is utilized to pick up the heating operation signal. The contact of RYa is closed when heating operation signal is ON despite "Thermo-ON" or "Thermo-OFF". Connect the wires as shown below.

(In Case of Giving Heating Operation Signal to 1# and 3# of CN7)



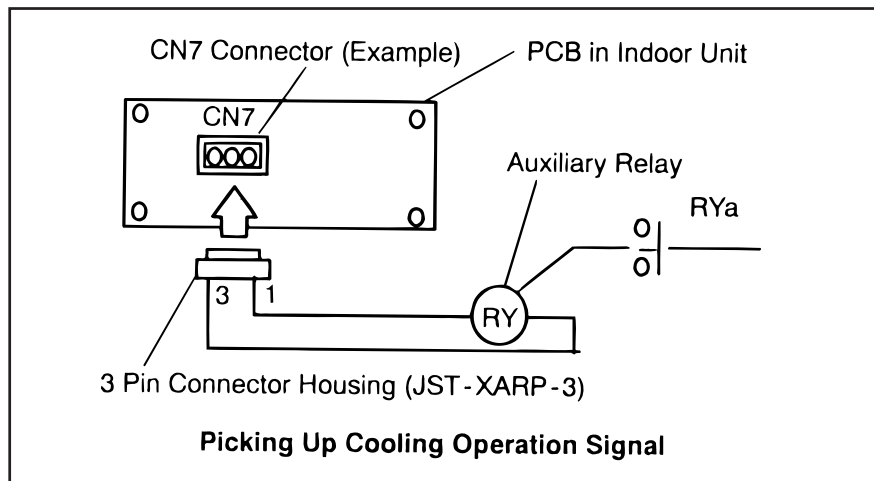
- (4) Picking Up "Thermo-ON" Signal during Heating Operation (Except for KPI Series)  
 This function is utilized to pick up the heating "Thermo-ON" signal of compressor running to control a circulator or a humidifier. Connect wires as shown below. The contact of RYa is closed when "THERMOSTAT" is ON during heating operation mode.  
 (In Case of Giving "Thermo-ON" Signal during Heating Operation to 1# and 2# of CN8)



**NOTE:**

"Thermo-ON" indicates that one of the micro-computer control function "THERMOSTAT" is ON as a thermostat.

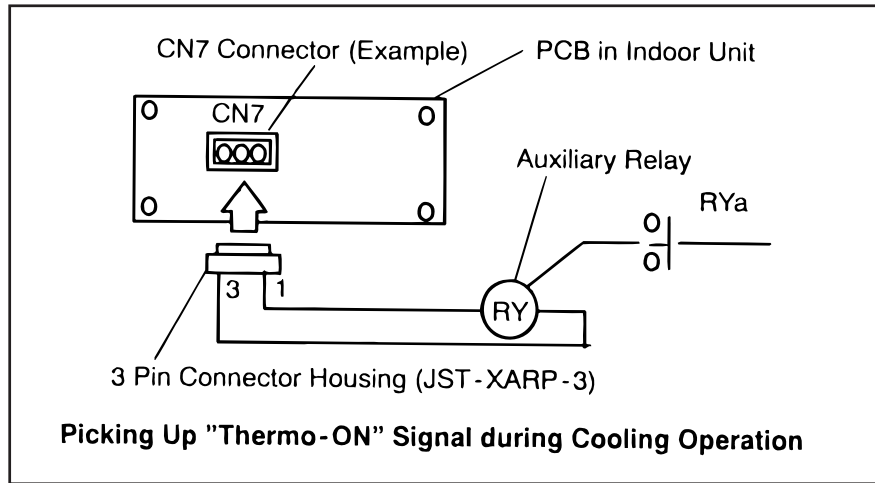
- (5) Picking Up Cooling Operation Signal (Except for KPI Series)  
 This function is utilized to pick up the cooling signal. The contact of RYa is closed when cooling operation signal is ON despite "Thermo-ON" or "Thermo-OFF". Connect the wires as shown below.  
 (In Case of Giving Cooling Operation Signal to 1# and 3# of CN7)



## OPTIONAL FUNCTION

### (4.2 Indoor Unit)

- (6) Picking Up "Thermo-ON" Signal during Cooling Operation (Except for KPI Series)  
This function is utilized to pick up the cooling "Thermo-ON" signal of compressor running. Connect the wires as shown below.  
The contact of RYa is closed when "THERMOSTAT" is ON during cooling operation mode.  
(In Case of Giving "Thermo-ON" Signal during Cooling Operation to 1# and 3# of CN7)

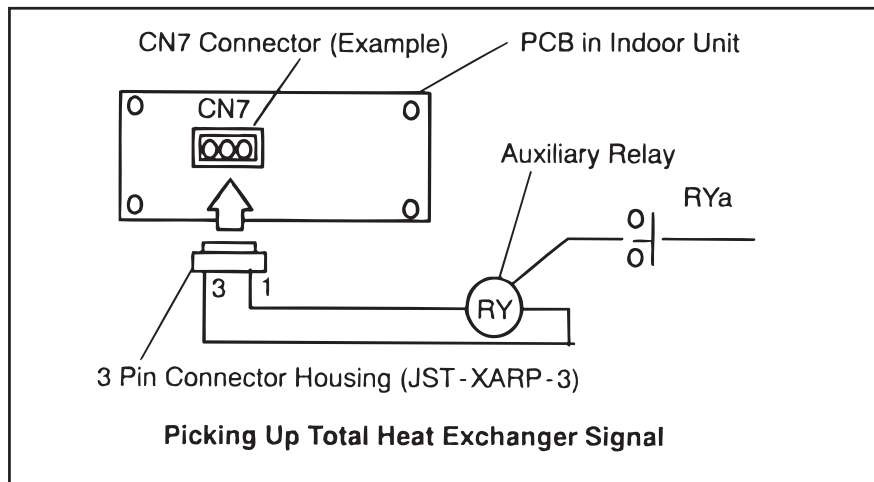


#### NOTES:

1. "Thermo-ON" indicates that one of the micro-computer control function "THERMOSTAT" is ON as a thermostat.
2. See the item 4.2.1 regarding remote control switch setting for wiring and output signal.

(7) Picking Up Total Heat Exchanger Signal

This function is utilized to pick up the total heat exchanger signal when the ventilation is operated by PC-P1H. Connect the wires as shown below.



### 4.3 Outdoor Unit

On the outdoor unit printed circuit board, there are three input terminals to receive external signals and two or five output terminals to send signals outwards. These signals are available by setting as shown below.

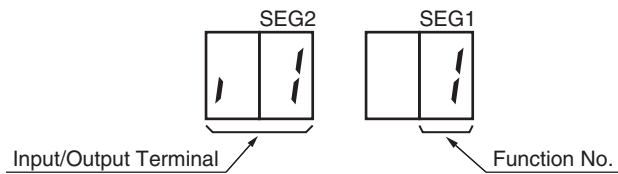
Function No.	Input	Output
1	Fixing Heating Mode	Operation Signal
2	Fixing Cooling Mode	Alarm Signal
3	Demand	Compressor ON Signal
4	Snow Sensor	Defrosting Signal
5	Enforced Stoppage	--
6	Demand Current Control 80%	Only for 24 and 30HP
7	Demand Current Control 70%	
8	Demand Current Control 60%	

Each input terminal and output terminal are set before shipment as shown below.

Input/Output Name	Connector Pin No.	Setting Function (No.)
Input 1	CN17 (1-2)	Fixed Heating Mode (1)
Input 2	CN17 (2-3)	Fixed Cooling Mode (2)
Input 3	CN18 (1-2)	Demand (3)
Output 1	CN16 (1-2)	Operation (1)
Output 2	CN16 (1-3)	Alarm (2)

In the case that the above setting change is required at site, perform the following procedures.

- (1) Set No. 1 pin on the dip-switch, DSW8 on the outdoor printed circuit board at the "ON" side while the main power to the outdoor unit is being supplied. By setting, function selection mode is available and the following appears on the 7-segment display.

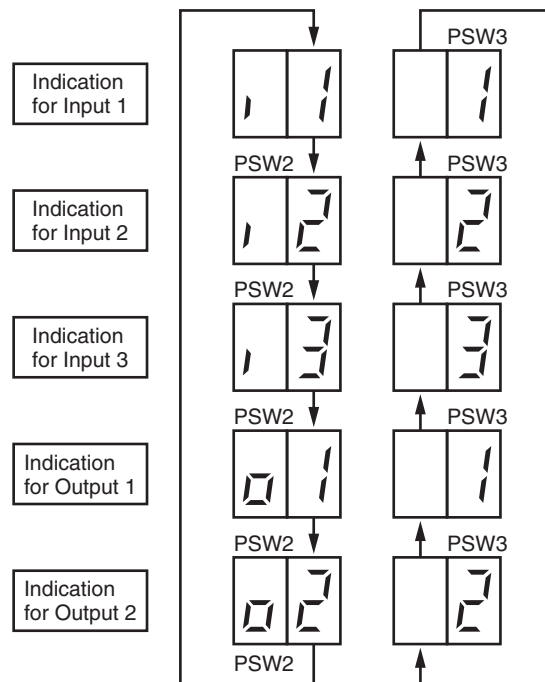


This display indicates that the function No. 1 (Fixed Heating Mode) is set at input 1.

## OPTIONAL FUNCTION

### (4.3 Outdoor Unit)

- (2) By pressing the push-switches PSW2 and PSW3, input/output terminal name is changed. The following shows the display changes when PSW2 and PSW3 are pushed.



- (3) After the input/output terminal name is selected, select your required function No. by pushing PSW2 or PSW3 while PSW1 is being pushed.

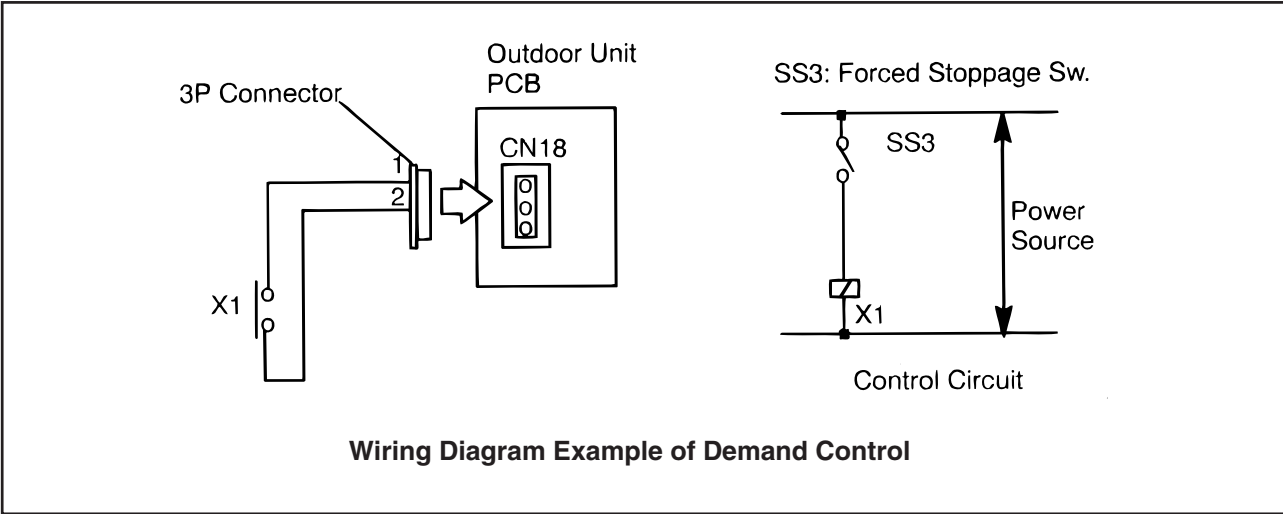


This number is increased by 1 by pushing PSW2 while PSW1 is being pushed.  
This number is decreased by 1 by pushing PSW3 while PSW1 is being pushed.

- (4) After selecting the function No., return No. 1 pin at the "OFF" side on the DSW8. The selected contents are memorized in the outdoor unit printed circuit board and the function selection mode is stopped. The memorized data is maintained even power source lines are disconnected. The connecting details of each function are described below, and the required parts are also indicated below.

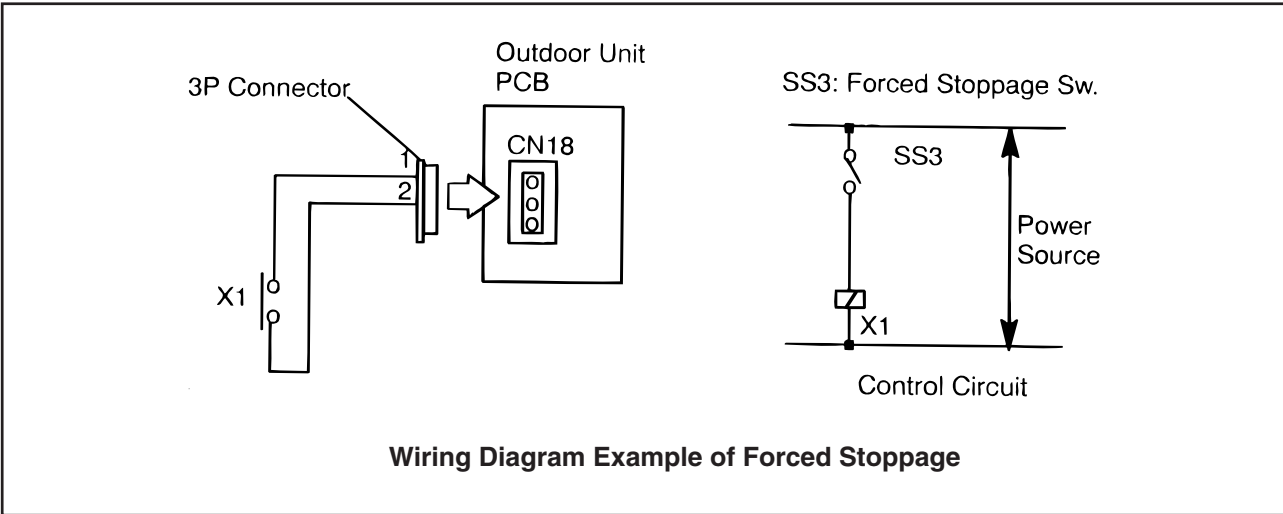
4.3.1 Demand

In the case that the demand input terminals on the outdoor unit printed circuit board are short-circuited, compressor(s) is stopped. (In this case, the indoor unit(s) is put under thermo-OFF condition.) The stoppage code No. "10" is given. By disconnecting the demand switch contact, restarting is available. The following indicates an example for Demand at input 3 (between 1 and 2 pins of CN18).



4.3.2 Forced Stoppage

The compressor is stopped and the indoor fan motor is stopped when the forced stoppage input terminals (CN18 #1 to #2) on the outdoor unit PCB is short-circuited during running. However, the remote control switch display remains at the same mode with the stoppage code No. "10". In this case, if the input terminals are opened, operation is resumed.



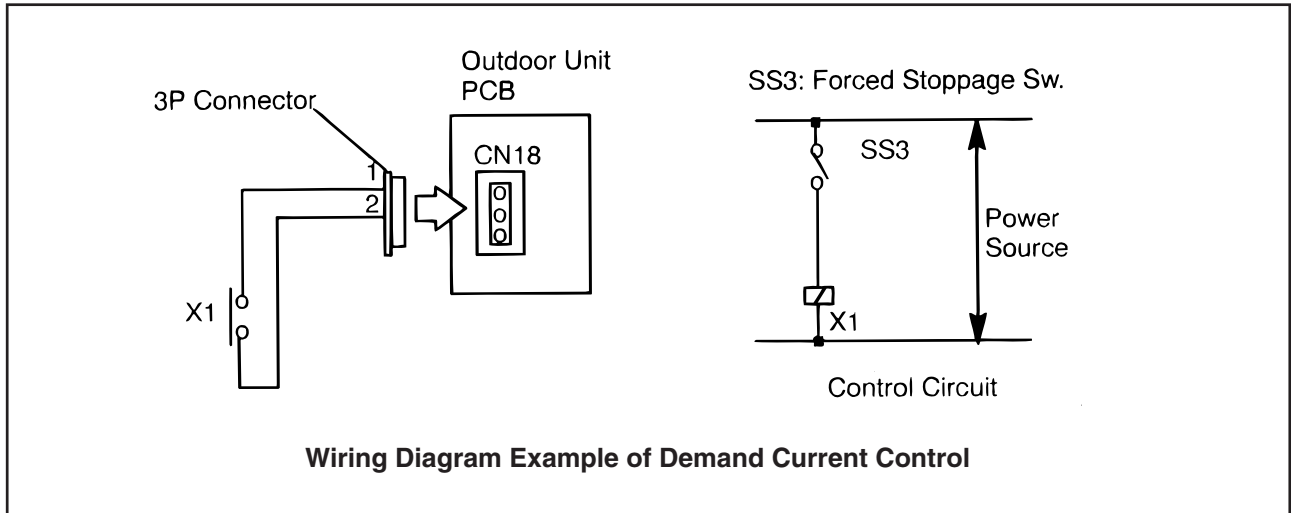
## OPTIONAL FUNCTION

### (4.3 Outdoor Unit)

#### 4.3.3 Demand Current Control (Only for 24 and 30HP)

In the case that the demand input terminals on the outdoor unit PCB are short-circuited, the compressor frequency is controlled that the maximum limit of the outdoor running current is set 80%, 70% and 60%. (The maximum limit of the outdoor unit running current can be selected according to the item "4.3 Outdoor Unit".)

If the outdoor unit running current decreases beyond the maximum limit, the indoor unit is put under thermo-OFF condition. The stoppage code No. "10" is given. When the input terminal is opened during the demand current control, its control is reset.



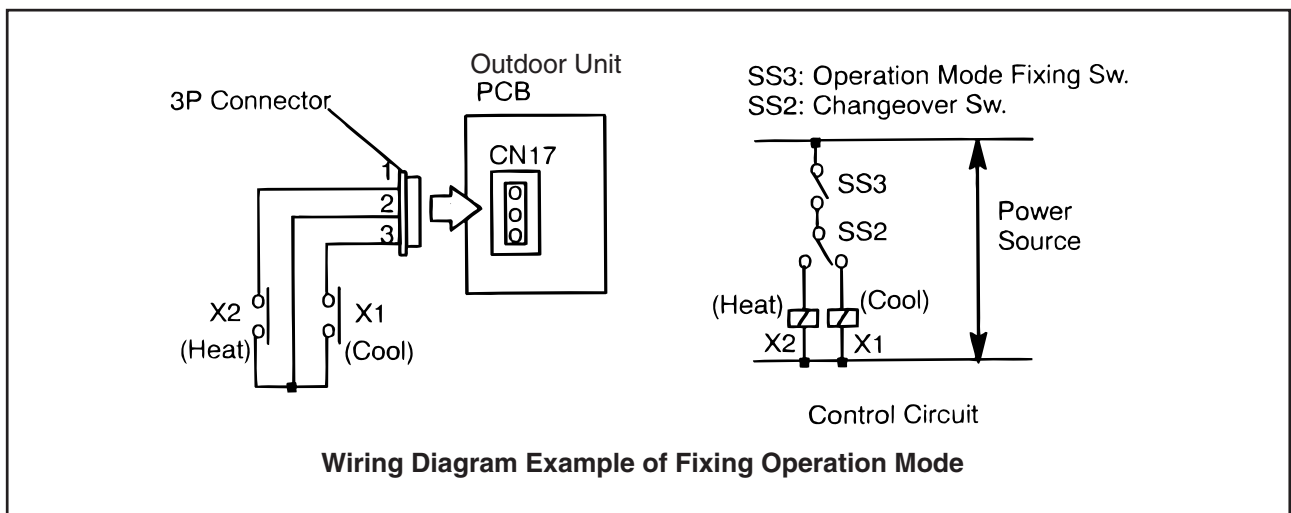
#### 4.3.4 Fixing Operation Mode

In the case that the fixing input terminals of the operation mode on the outdoor PCB are short-circuited, the operation mode can be fixed at the cooling or heating mode.

Short-circuit between Terminals 1 and 2 of CN17: Fixed Heating Mode

Short-circuit between Terminals 2 and 3 of CN17: Fixed Cooling Mode

During this fixed heating (or cooling) mode, no cooling (or heating) operation is available. The indoor units under the cooling or dry operation (or heating operation) will be changed to the Thermo-OFF condition during this mode, and an alarm code of "20" appears.





4.3.5 Snow Sensor

In the case that the input terminals of the snow sensor are short-circuited during compressor stoppage, all the outdoor fan motors are operated at the full speed. However, if the compressor is called for compressor operation, the fan operation is changed to the normal operation. If the input terminal is opened, the fan(s) is stopped. This function protects the outdoor units from a condition covered with snow.

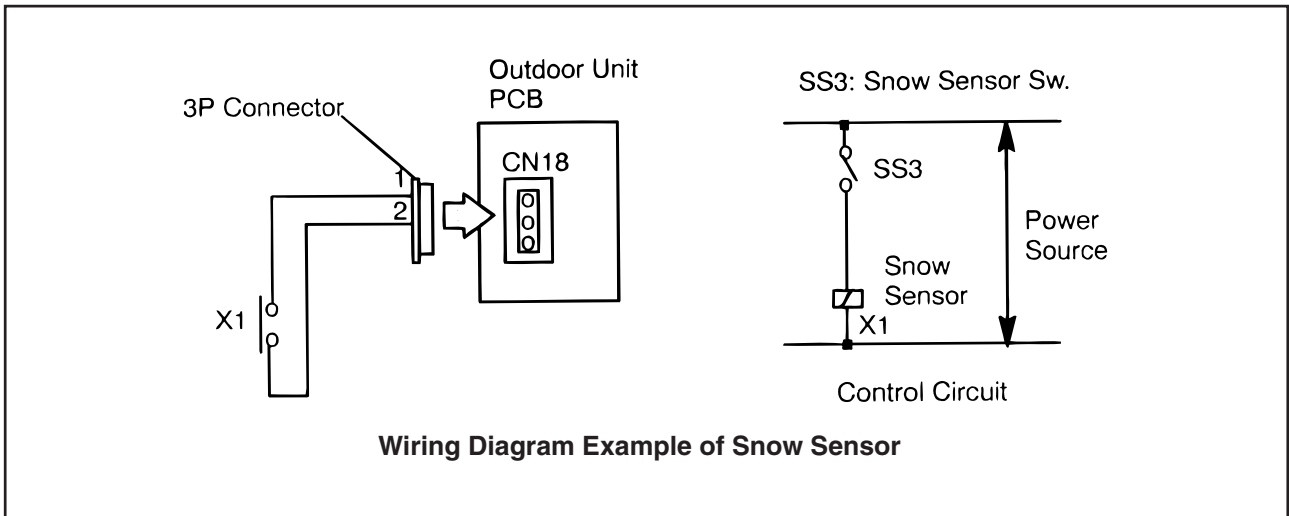


Table 4.6 Specifications of Required Main Parts

Parts		Specifications	Remarks
Auxiliary Relay (X1, X2)		Mini-Power Relay, MY1F (or 2F) made by OMRON	220/240V
Changeover Switch (SS2, SS3)		Manual Switch	220/240V
3 Pin Connector Cord		PCC-1A (Connected to JST Connector, XARP-3)	Five Cords with Connectors as One Set
Cord (Inside of Unit)	Low Volt.	0.3mm <sup>2</sup>	lower than 24V
	220/240V	0.5 to 0.75mm <sup>2</sup>	
Cord (Outside of Unit)	Low Volt.	0.5 to 0.75mm <sup>2</sup>	lower than 24V
	220/240V	2mm <sup>2</sup>	

**NOTES:**

1. Make the wire to the terminals as short as possible.
2. Do not run the wires along high voltage cable. (crossing is applicable.)  
If necessary to run wires along high voltage cable, insert the low voltage cable(s) into metal tube and ground it at one end. If sealed wires are used at the low voltage wire side, ground it at one end of shield wires. The maximum length should be 70m.

## OPTIONAL FUNCTION

### (4.3 Outdoor Unit)

#### 4.3.6 Defrosting Condition Changeover

By changing the position of No.5 on dip switch, DSW5, defrosting operation conditions can be changed.

	Standard Specifications	Cold Area Specifications
Dip Switch Setting	 ON OFF	 No.5 : ON
Temperature Conditions under Defrosting Operation		

- (1) No. 5 of DSW5 is set at OFF before shipment.
- (2) Turn OFF the main switch and set the dip switch.

#### 4.3.7 Indoor Fan Control during Thermo-OFF at Heating

By setting the dip switch as shown below, the indoor fan operates for 2 min. and stop for 6 min. as a cycle when the activation conditions are satisfied.

<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">           ON OFF         </div> <div style="text-align: center;"> <b>DSW5</b>              1 2 3 4 5 6 7 8         </div> <div style="margin-left: 10px;">           Set No.1 at "ON"         </div> </div>
--

- (1) No. 1 of DSW5 is set at OFF before shipment.
- (2) Turn OFF the main switch and set the dip switch.

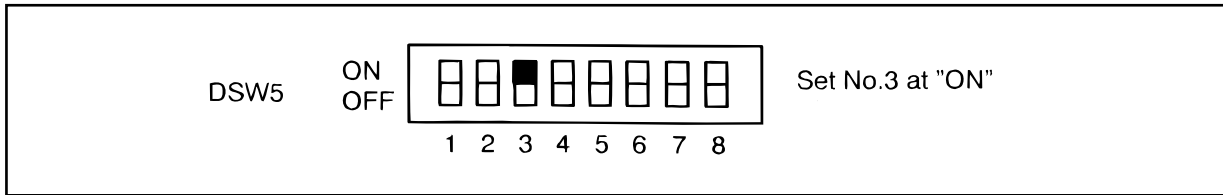
Operation Conditions	Operation
Under compressor running except defrosting operation.	When the indoor unit is at thermo-OFF during the heating operation, the indoor fan operates and stops for 6 minutes in 2 minute cycles.  <div style="text-align: center;">             Start at Random            ON            OFF            6 2 6 2 6 2 6 (min.)         </div>

**NOTE:**

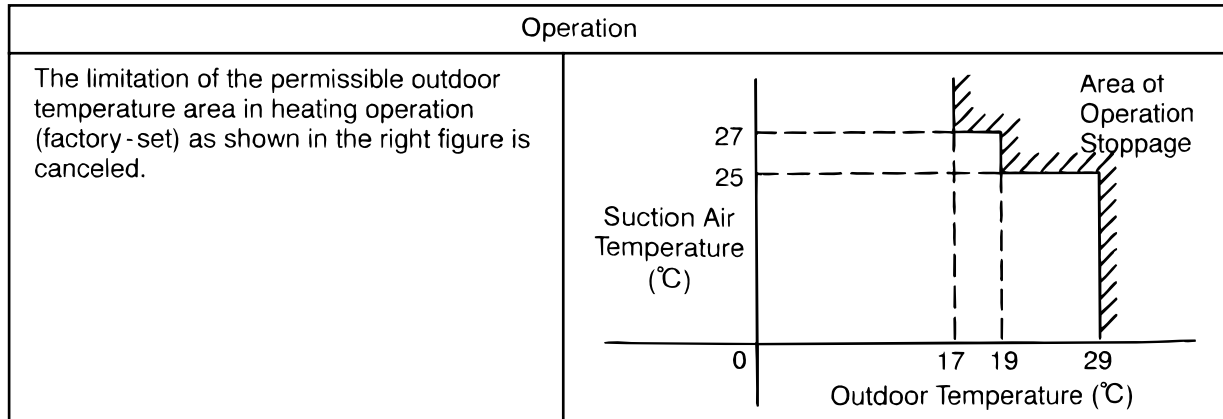
When the indoor fan is stopped by another control, it is not available to operate indoor fans.

**4.3.8 All Season Heating Operation**

By setting the dip switch, the heating operation through the year is available.  
The heating operation is continued under a high outdoor temperature.



- (1) No. 3 of DSW5 is set at OFF before shipment.
- (2) Turn OFF the main switch and set the dip switch.

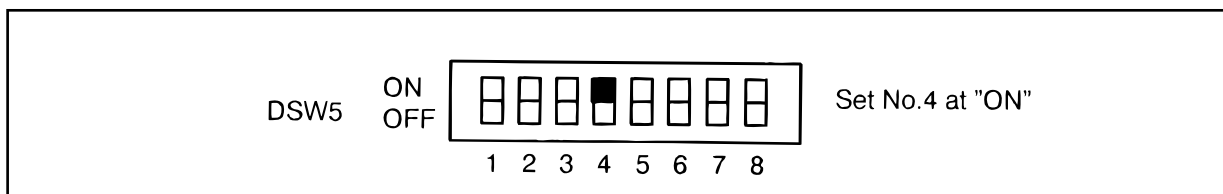


**NOTE:**

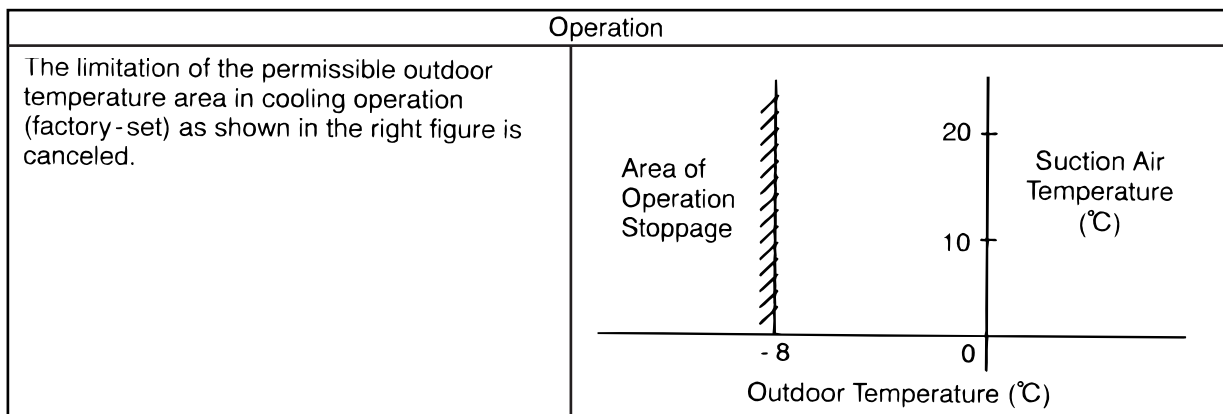
The operation may be OFF due to high outdoor temperature protection control, since protection control is not cancelled.

**4.3.9 All Season Cooling Operation**

By setting the dip switch, the cooling operation through the year is available.  
The cooling operation is continued under a low temperature.



- (1) No. 4 of DSW5 is set at OFF before shipment.
- (2) Turn OFF the main switch and set the dip switch.



**NOTE:**

The operation may be OFF due to low outdoor temperature protection control since protection control is not cancelled.

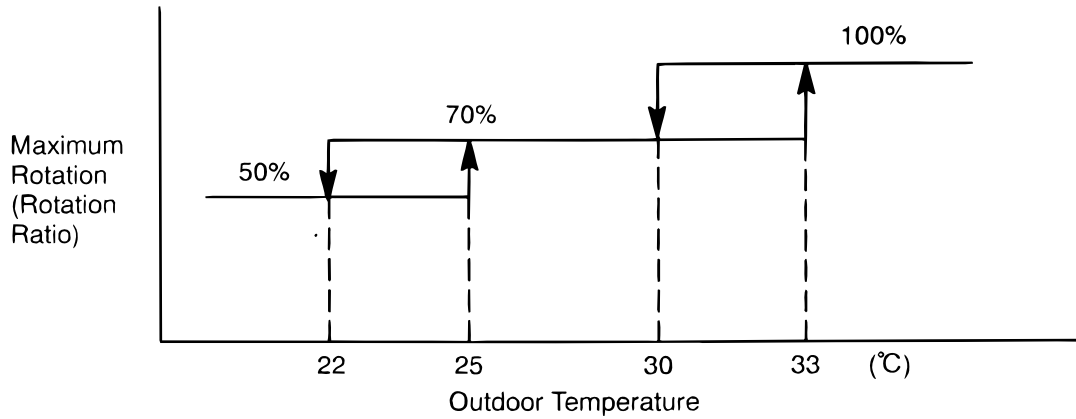
## OPTIONAL FUNCTION

### (4.3 Outdoor Unit)

#### 4.3.10 Night Shift (Low Sound) Operation

By changing No.2 of the dip switch, DSW5, the night shift (low sound) operation can be set. In case of the night shift operation, the cooling capacity is decreased down to 60%. The night shift operation shall be applied only in case that the cooling capacity has the margin to be allowed for the capacity decrease and the low sound operation is required especially in the nighttime.

#### (1) Outdoor Fan



#### NOTE:

The maximum rotation is always 100% (rotation ratio) for the standard unit.  
(No limitation of the outdoor temperature)

#### (2) Frequency Range

	Outdoor Unit Capacity (HP)	Minimum Frequency	Maximum Frequency	Conditions
When Night Shift is not Set	5	30Hz	95Hz	Except for the Conditions Below
	8		165Hz	
	10		177Hz	
	16		255Hz	
	20		325Hz	
	24		385Hz	
	30		465Hz	
When Night Shift is Set	5	30Hz	50Hz	(1) Night Shift Operation (2) Cooling Operation (3) Outdoor Fan: Below 70%
	8		100Hz	
	10		114Hz	
	16		140Hz	
	20		176Hz	
	24		211Hz	
	30		255Hz	

#### Converted Frequency of Constant Speed Compressor

Outdoor Unit Capacity (HP)	Power Supply Frequency	
	50Hz	60Hz
8	50Hz	60Hz
10	62Hz	74Hz
16	70 x 2Hz	84 x 2Hz
20	70 x 3Hz	84 x 3Hz
24	70+100 x 2Hz	84+120 x 2Hz
30	70+140 x 2Hz	84+168 x 2Hz

#### NOTE:

The maximum frequency for the 8 to 30HP outdoor unit is indicated as;  
Inverter Frequency + Converted Frequency of Constant Speed Compressor.

4.3.11 Picking Up Signals from Outdoor Unit Printed Circuit Board

The setting function of input terminal are shown to the item 4.3 “Outdoor Unit”.

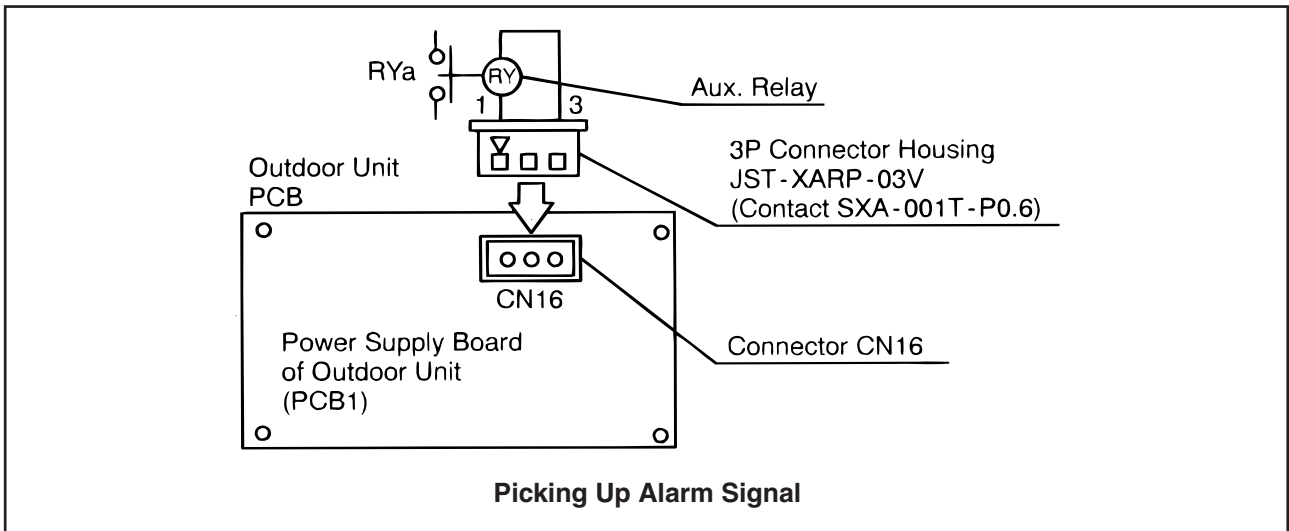
The parts applied to picking up operation signals are shown in Table 4.7.

Table 4.7 Main Required Part

Part Name	Manufacturer etc.
Auxiliary Relay	OMRON High Power Relay Model: LY2F DC12V

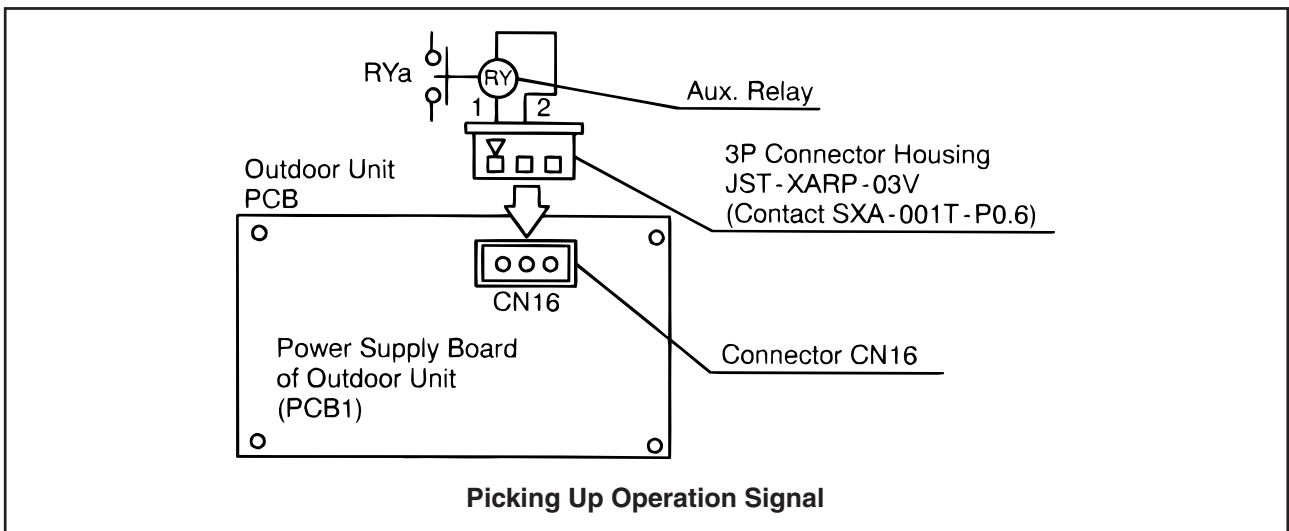
(1) Picking Up Alarm Signal

With this procedure the indoor unit alarm signals can be picked up. The method is explained in the figure below. The required part is indicated in Table 4.7. Connecting relay contactors (RYa) are closed at the time of alarm. (When either one of the units issues an alarm, an alarm signal is indicated.)



(2) Picking Up Operation Signal

With this procedure the operation signal of cooling or heating can be picked up. The method for picking up the signal is explained in the figure below. The required part is the same as in Table 4.7. Connecting relay contactors RYa are closed at the time of cooling or heating. These signals can be applied to the operation of circulators and humidifiers.

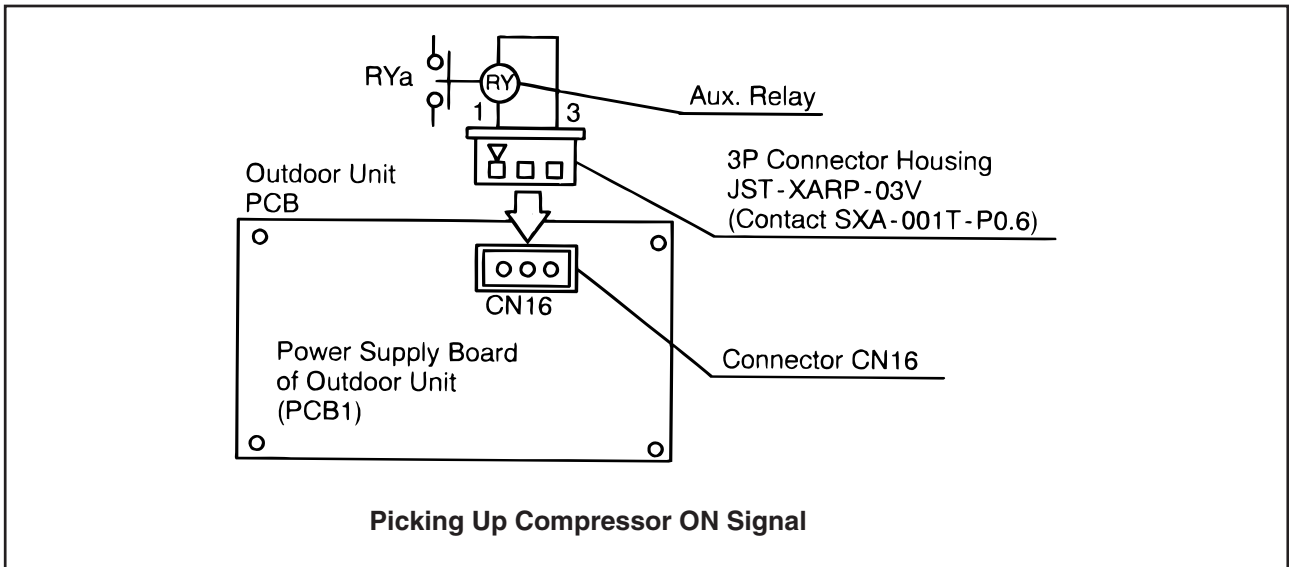


## OPTIONAL FUNCTION

### (4.3 Outdoor Unit)

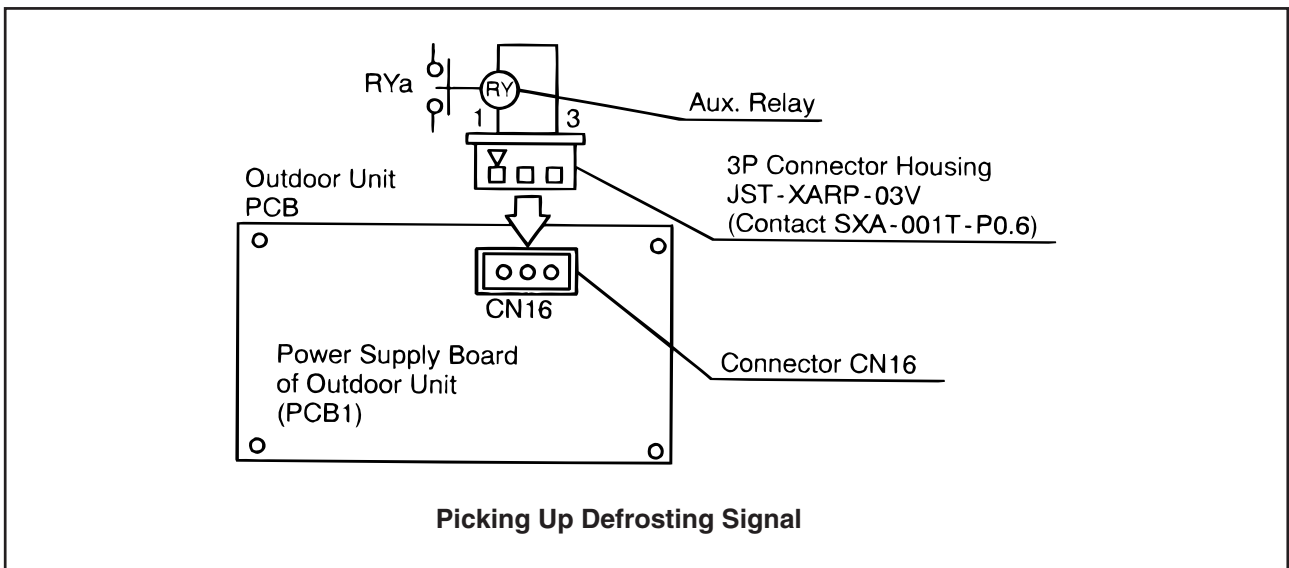
#### (3) Picking Up Compressor ON Signal

With this procedure the compressor operation signal can be picked up. The method is explained in the figure below. The required part is the same part as in Table 4.7. Connecting relay contactors RYa are closed at the time of compressor running. This signal can be applied to the check of signals at the time of remote controlling and to the fan interlock of outdoor fresh air.



#### (4) Picking Up Defrosting Signal

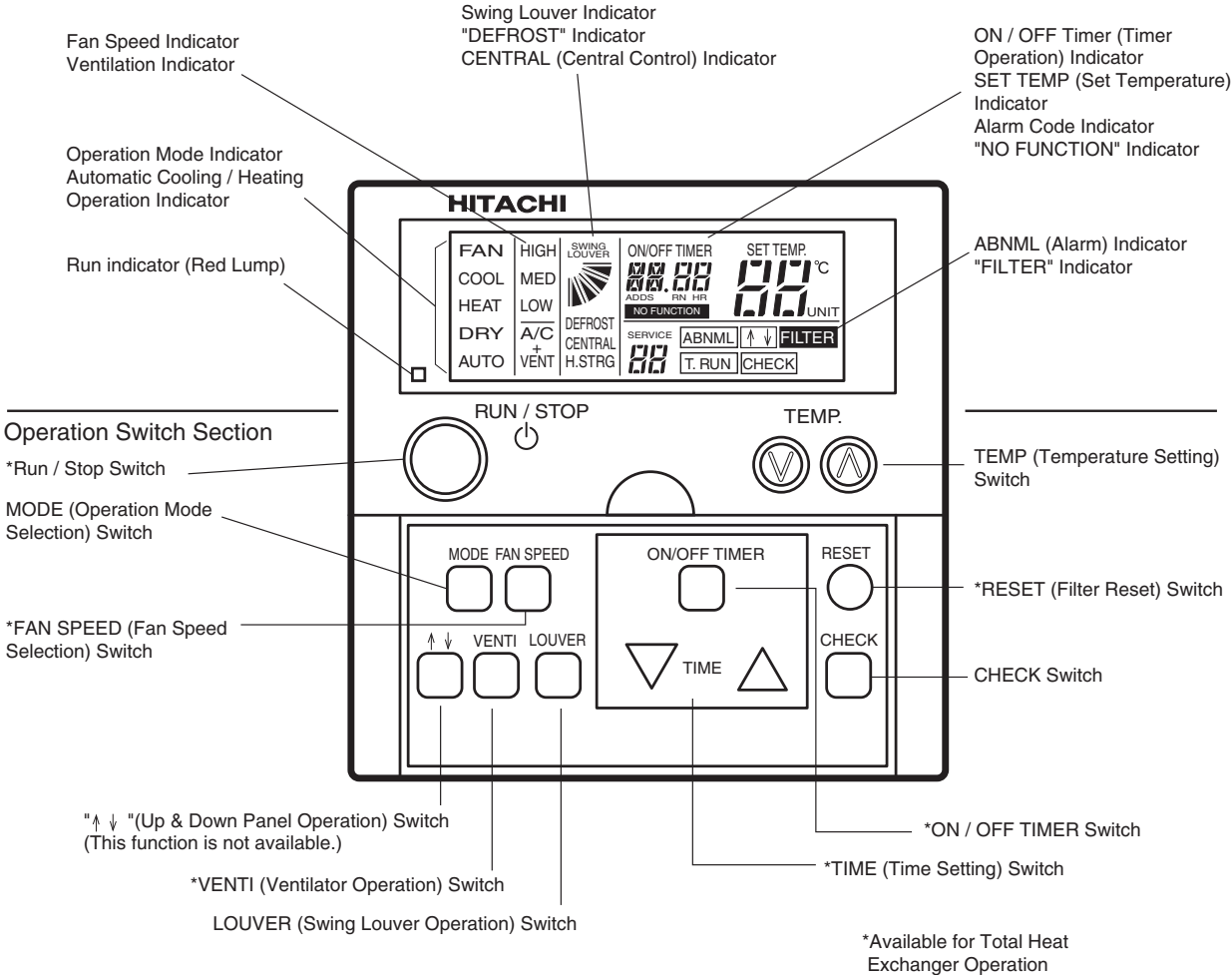
With this procedure the defrosting signal can be picked up. The method is explained in the figure below. The required part is the same as in Table 4.7. Connecting relay contactors are closed at the time of defrosting.



4.4 Remote Control Switch, PC-P1H and PC-2H2

4.4.1 Name of Part

Liquid Crystal Display (L.C.D) Section



Remote Control Switch (PC-P1H and PC-2H2: Option)

## OPTIONAL FUNCTION

### (4.4 Remote Control Switch)

#### 4.4.2 Simultaneous Operation

##### Simultaneous Indoor Unit Operation with Remote Control Switch

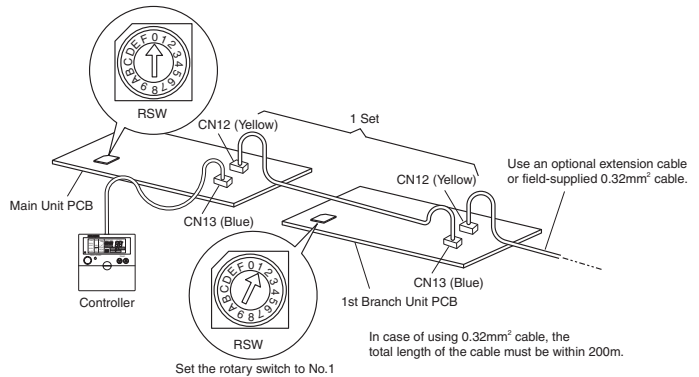
[All power sources must be turned off!!]

Up to 16 indoor units can be simultaneously controlled using one remote control switch. The operation mode such as fan, cooling or heating, the setting of air flow, the setting of temperature and the setting of run/stop can only be set uniformly for all units. However, on/off operation of each thermostat can be done individually. Defrosting, protective devices function, etc. are individually performed.

#### <PC-2H2>

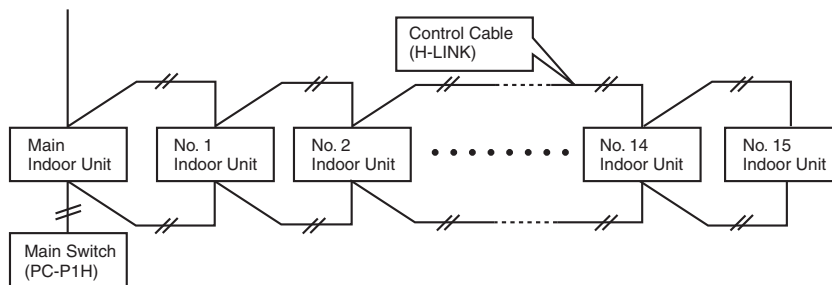
- \* The total length of the wire shall be 200m or shorter. (for 0.75mm<sup>2</sup> wire 500m or shorter)
- \* Use the following three cable wire in the system parts.

Model	PRC-10E	PRC-15E	PRC-20E
Length	10m	15m	20m

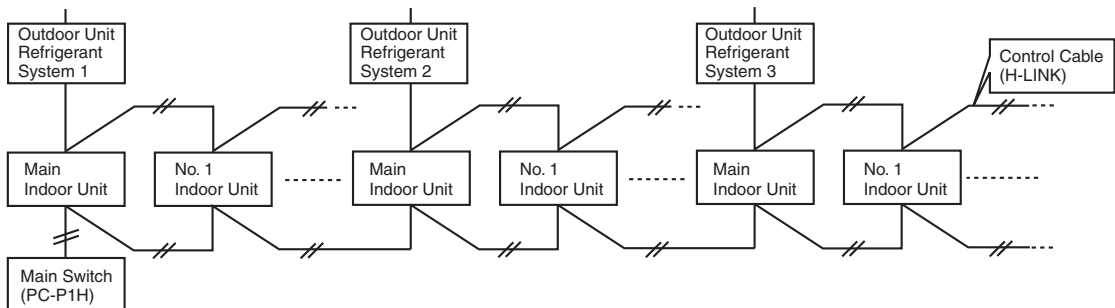


#### <PC-P1H>

- \* Simultaneous Indoor Units Operation in Same Refrigerant Piping System



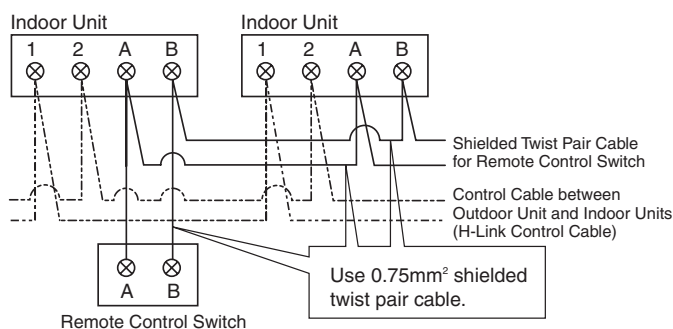
- \* Simultaneous Indoor Units Operation in Plural Refrigerant Piping Systems



#### NOTE:

Pay attention not to overlap the indoor units' addresses in case that each of indoor units have a different refrigerant system.

- (1) Perform wiring between indoor units as shown in the following figure.



#### ATTENTION:

1. Use shielded twist pair cable for indoor unit - remote control switch and indoor unit - indoor unit.
2. The total length between each indoor units, indoor unit and the remote control switch must be 500m or shorter.
3. In case the remote control switch cables connect, pay attention to check the cables lest the H-LINK control cable is connected accidentally.



(4.4 Remote Control Switch)

- (2) Connected unit control wires should not be installed parallel to 200-400V power cables. Fix them by utilizing bands. It is recommended, that cables be installed at least 30cm away from power cables or be put into grounded metal pipes.
- (3) Set rotary switches RSW on the printed circuit boards of respective units as shown in the following figure.  
[Turn off all power sources!!]

<Setting of Rotary Switches> When indoor units are connected to the same outdoor unit, it is unnecessary to set rotary switches, because they are automatically addressed.

	Main Unit ( 00 )	No. 1 Unit ( 01 )	No. 2 Unit ( 02 )	No. 3 Unit ( 03 )	No. 4 Unit ( 04 )	No. 5 Unit ( 05 )	No. 6 Unit ( 06 )	No. 7 Unit ( 07 )
Rotary Switch Setting								
	No. 8 Unit ( 08 )	No. 9 Unit ( 09 )	No.10 Unit ( 10 )	No.11 Unit ( 11 )	No.12 Unit ( 12 )	No.13 Unit ( 13 )	No.14 Unit ( 14 )	No.15 Unit ( 15 )
Rotary Switch Setting								

( ): Address Indication

**ATTENTION:**

- \* Pay attention not to overlap addresses.
- \* Check the number of connected units by using "Test Run Mode". Test run mode shall be performed after finishing wiring, refrigerant piping, additional refrigerant charge and other items required for operation.

(4) Check Method of Number of Connected Units

Perform this check after finishing wiring, refrigerant piping, additional refrigerant charge and other items required for operation.

(a) Test Running Mode

Turn ON the power sources of all units.

Depress the CHECK switch and the MODE switch on the remote control switch simultaneously for three seconds or longer, to change the unit(s) to the test running mode. (Refer to the checking procedure by the CHECK switch.)

(b) Number of Units Connected

When the number of units connected is indicated where usually the temperature is indicated, the system is functioning normally.

(c) False Number of Connected Units is Indicated

When the indicated number of connected units is smaller than the actual number or zero, presumable causes are as follows:

- 1) The power source of some units is not turned ON.
- 2) Incorrect setting of unit numbers was performed.
- 3) Control wires between units or remote control switch were incorrectly connected regarding polarity and order.

(d) Ending of Test Running Mode

- (5) When the confirmation of the number of connected units and the wiring-checking are finished, end the test running mode by depressing the "RESET" switch.

## OPTIONAL FUNCTION

### (4.4 Remote Control Switch)

#### 4.4.3 Operation System with Two Remote Control Switches

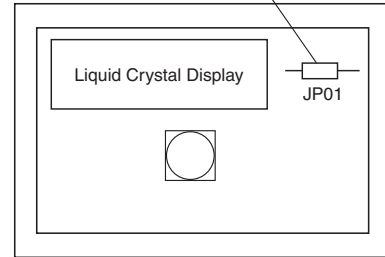
<PC-2H2>

- (1) By installing an additional remote control switch, a maximum of 16 units can be controlled from two different locations.

##### Main and Sub Control Switch

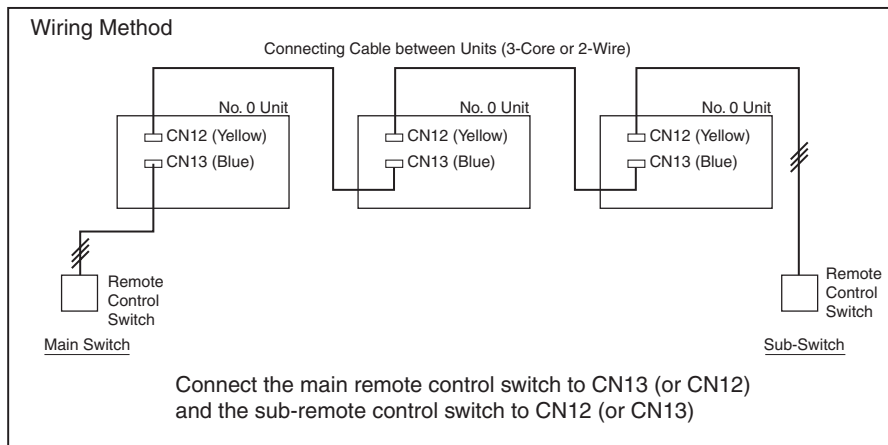
Determine one of the two remote control switches to be the main switch and the other as a sub switch. Cut the jumper wire JP01 in the sub remote control switch as shown in the right figure.

Altering Method to Sub Control Switch  
Cut Jumper Wire JP01 with Nipper.



#### (2) Wiring Method

- (a) Perform wiring between units as shown in the following figure:  
(Three Unit Case)



- (b) Decide the number of units. The method should be the same as in "Simultaneous Indoor Unit Operation with One Remote Control Switch".

#### (3) Checking the Main and Sub Remote Control Switches

Press the "CHECK" switch and the "RESET" switch simultaneously for more than 3 seconds, the main remote control switch is changed to the field setting mode, and the sub remote control switch is changed to the check mode.

#### ATTENTION:

1. When a main remote control switch malfunctions, unit operation stops. The units cannot be operated with only a sub-remote control switch.
2. When a main switch and a sub-switch are simultaneously operated, the units will operate according to either one of the modes after 30 seconds.

<PC-P1H>

- (1) By installing an additional remote control switch, a maximum of 16 units can be controlled from two different locations.

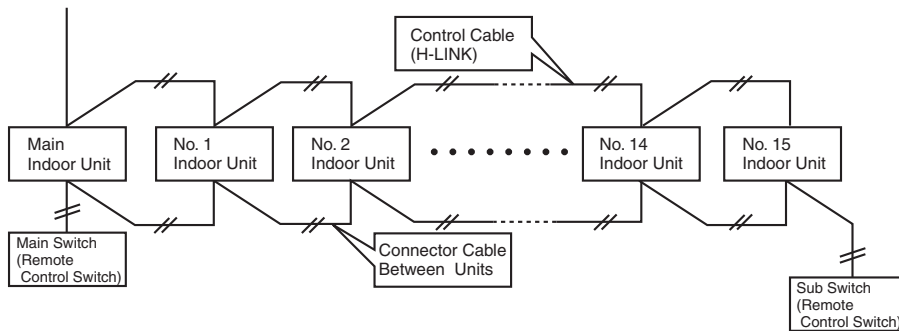
**Main and Sub Control Switch**

Determine one of the two remote control switches to be the main switch and the other as a sub switch. Set the sub remote control switch by referring to the “4.4.4 (31) Optional Function Setting”. Then turn off and on the power source.

(2) Wiring Method

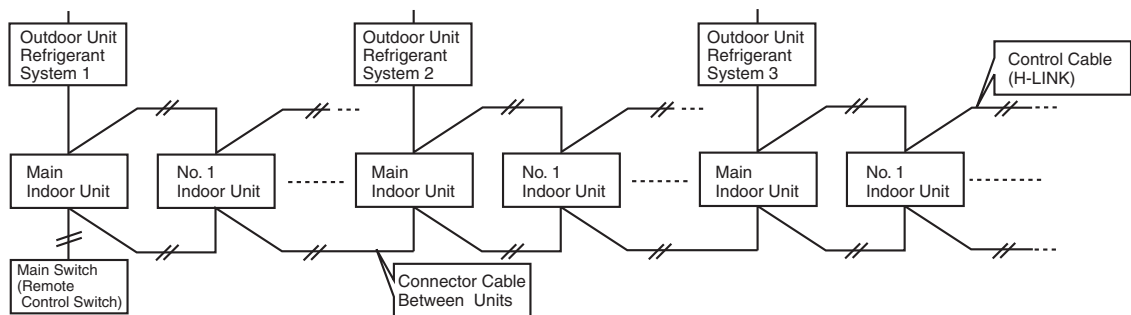
- (a) Perform wiring between units as shown in the following figure:  
(Three Unit Case)

\* Simultaneous Indoor Units Operation in Same Refrigerant Piping System



- (b) Decide the number of units. The method should be the same as in “Simultaneous Indoor Unit Operation with One Remote Control Switch”.

\* Simultaneous Indoor Units Operation in Plural Refrigerant Piping Systems



**ATTENTION:**

1. When a main remote control switch malfunctions, unit operation stops. The units cannot be operated with only a sub-remote control switch.
2. When a main switch and a sub-switch are simultaneously operated, the units will operate according to either one of the modes after 30 seconds.

## OPTIONAL FUNCTION

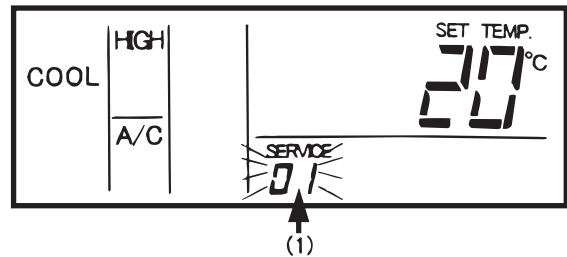
### (4.4 Remote Control Switch)

#### 4.4.4 Optional Function Setting

The remote control switch is changed to the optional setting mode by the following procedures.

##### (1) Field Setting Mode

Check to ensure that the unit is stopped, press the "CHECK" switch and the "RESET" switch on the remote control switch simultaneously more than 3 seconds, and the remote control switch is changed to the field setting mode. When the remote control switch is at the field setting mode, the "SERVICE" is indicated and the "01" is flickers below the "SERVICE" indication.



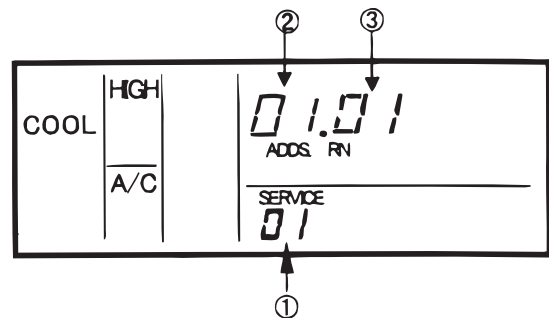
##### (2) Optional Setting Mode

At the field setting mode as described in the above item (1), press the "TEMP V" switch or the "TEMP Λ" switch and the number flickering below the "SERVICE" indication is changed (01 <=> 02). Set the flickering number at "01", leave this condition for 7 seconds or press the "CHECK" switch, and the remote control switch is changed to the optional setting mode.

##### (3) Selection of Indoor Unit

(a) At the optional setting mode, the indication on the remote control switch is changed as shown in the right figure.

- ① The indication of "01" is turned ON.
- ② The address of the indoor unit which the optional function is to be set, is indicated at the segments for time setting time indication, and the "ADDS" is indicated below.
- ③ The refrigerant cycle number of the indoor unit for which the optional function is to be set, is indicated at the segments for timer setting time indication, and the "RN" is indicated below.
- ④ The indication of the setting temperature is turned OFF.



(b) At the condition of the above item (a), press the "TEMP V" switch or the "TEMP Λ" switch of the remote control switch and the indoor unit for which the optional function is to be set, can be changed.

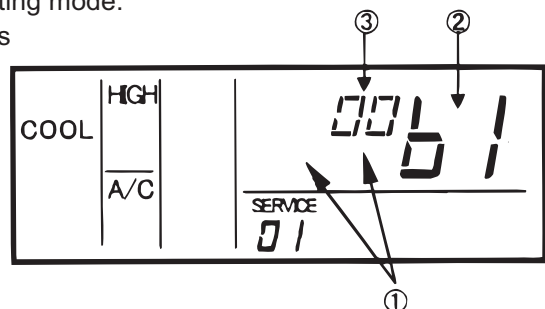
#### NOTES:

1. The indoor unit can be selected among the indoor units connected to the remote control switch.
2. In case that both the indications of the address and the refrigerant cycle number is "AA", the settings of all the indoor units is same.
- (c) After selecting the indoor unit, leave the condition for 7 seconds or press the "CHECK" switch, the remote control switch is changed to the optional setting mode.

##### (4) Changing of Optional Functions and Setting Conditions

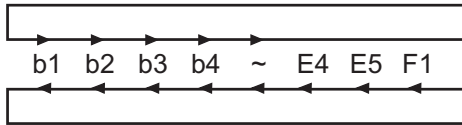
(a) At the optional setting mode, the indication on the remote control switch is changed as shown in the right figure.

- ① The indications of "ADDS" and "RN" are turned OFF.
  - ② The item number of the optional function is indicated at the segment for the setting temperature indication.
- Refer to the table in the next pages for the item numbers and the contents of the optional functions.



③ The setting condition of the optional function item is indicated at the segments for timer setting time indication. Refer to the table in the next pages and description of each items for the indication of the setting condition and the contents of the optional function.

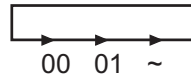
- (b) Press the “TIME ▽” switch or the “TIME △” switch, the optional function item is changed as shown below.



When pressing the “TIME △” switch

When pressing the “TIME ▽” switch

- (c) Press the “CHECK” switch, and the setting condition of the optional function is changed as shown below.



When pressing the “CHECK” switch

- (5) Selection of Other Indoor Unit

At the optional setting mode, press the “TEMP V” switch or the “TEMP ^” switch, the condition of the remote control switch is changed so that the indoor unit can be selected to set the optional function described in the item (3).

- (6) Return from Optional Function Setting Mode

Press the “RESET” switch, the optional function setting is memorized and the mode is returned to the normal condition.

● **Setting Items of Optional Functions**

No.	Items	Optional Functions	Individual Setting	Setting Condition	Contents
1	b1	Removal of Heating Temperature Compensation due to Uneven Heat Load	○	00 01	Not Available Available
2	b2	Circulator Function at Heating Thermo-OFF	○	00 01	Not Available Available
3	b3	Enforced 3 Minutes Minimum Operation Time of Compressor	○	00 01	Not Available Available
4	b4	Change of Filter Cleaning Time	○	00 01 02 03 04	Standard 100 hours 1,200 hours 2,500 hours No Indication
5	b5	Fixing of Operation Mode	×	00 01	Not Available Available
6	b6	Fixing of Setting Temperature	×	00 01	Not Available Available
7	b7	Fixing of Operation as Exclusive Cooling Unit	×	00 01	Not Available Available
8	b8	Automatic COOL/HEAT	×	00 01	Not Available Available
9	b9	Fixing of Air Volume	×	00 01	Not Available Available
10	C1	Not Prepared	—		
11	C2	Not Prepared	—		
12	C3	Not Prepared	—		
13	C4	Drain Pump in Heating	○	00 01	Not Available Available
14	C5	Hi Speed	○	00 01 02	Not Available Hi Speed 1 (*1) Hi Speed 2 (*1)

## OPTIONAL FUNCTION

### (4.4 Remote Control Switch)

15	C6	Hi Speed at Heating Thermo-OFF	○	00 01	Not Available Available
16	C7	Canceling of Enforced 3 Minutes Minimum Operation Time of Compressor	○	00 01	Not Available Available
17	C8	Thermistor of Remote Control Switch	○	00 01 02	Control by Indoor Suction Thermistor Control by Thermistor of Remote Control Switch Control by Average Value of Indoor Suction Thermistor and Thermistor of Remote Control Switch
18	C9	Not Prepared	–		
19	CA	Not Prepared	–		
20	Cb	Selection of Forced Stoppage Logic	×	00 01	Forced Stoppage Input A Contact Forced Stoppage Input B Contact
21	CC	Not Prepared	–		
22	d1	Power Supply ON/OFF 1	○	00 01	Not Available Available
23	d2	Not Prepared	–		
24	d3	Power Supply ON/OFF 2	○	00 01	Not Available Available
25	E1	Ventilation Mode	○	00 01 02	Automatic Ventilation Ventilation by Total Heat Exchanger Bypass Ventilation (No Total Heat Exchanging)
26	E2	Increasing Supply Air Volume	○	00 01	Not Available Available
27	E3	Not Prepared	–		
28	E4	Precooling/Preheating Period	○	00 01 02	Standard 30 minutes 60 minutes
29	E5	Not Prepared	–		
30	F1	Automatic Setting for OFF Timer	×	00 01 02 ⋮ 23 24	No Function OFF Timer by 1 hour OFF Timer by 2 hours  OFF Timer by 23 hours OFF Timer by 24 hours
31	F2	Remote Control Main-Sub Setting	×	00 01	Main Sub

#### NOTES:

- (\*1): This function is applicable for RCI and RCD models. In case of RPI-0.8 to 5.0FSG1 series, "Hi Speed 1" is "High External Pressure Setting" and "Hi Speed 2" is "Low External Pressure Setting".
- As for the optional functions with "X" at the individual setting, only when the "All Rooms" is selected to set the optional function, the setting condition can be changed.
- The items "C1" and "C3" are not available. Do not change the setting condition "00".
- For the models RPF(I)-FSG(E), RPI-8, 10HP, RPC-FSG1 (Before Alternation) and RPK-FSGM (Before Alternation), only the function setting of No.1 to No.9, No.17 and No.30 are available. (No.17 is settable "01" only.)

4.4.5 Optional Functions of Remote Control Switch

(1) Removal of Heating Temperature Calibration

This function is utilized when the temperature settings of the remote control switch and the suction air temperature of the indoor unit are required to be equal.

In standard heating operation, the suction air temperature is higher than the room temperature, therefore the suction air temperature is calibrated -4°C.

(Indicated Setting Temperature = Inlet Air Temperature -4°C → Return to 0°C)

This is useful when the thermistor at the suction side of an indoor unit is removed and installed in another place.

The indicated setting temperature and the suction air temperature after removal of heating temperature calibration are as shown below.

Indicated Temperature				18		20		22		24	
				ON	OFF	ON	OFF	ON	OFF	ON	OFF
Activating Temperature (°C)	When Cooling			-	-	22	20	24	22	26	24
	When Heating	For Comp.	Standard	22	24	24	26	26	28	28	30
			After Removal	18	20	20	22	22	24	24	26

Indicated Temperature				26		28		30	
				ON	OFF	ON	OFF	ON	OFF
Activating Temperature (°C)	When Cooling			28	26	30	28	32	30
	When Heating	For Comp.	Standard	30	32	30	32	30	32
			After Removal	26	28	28	30	30	32

(2) Circulator Function at Heating Thermo-OFF

In case that the fan speed is changed to “LOW” tap at heating Thermo-OFF, there is a case that the room air is stratified because warm air stagnates near the ceiling. In this case, it is recommended that the circulator function explained below be utilized.

<Circulator Function>

The function keeps the fan speed at thermo-OFF at the same level as thermo-ON. In this case, air movement in the room will be kept on the same level as thermo-ON, ensuring a homogenous air distribution. In the case that an Auto Louver is equipped, this operation will be also held on when the heating is turned thermo-OFF.

**NOTE:**

Perceptions of coolness, heat and air flow are subject to personal tastes and behaviors. It is therefore recommended to discuss this with customers thoroughly and then to set the unit accordingly.

(3) Enforced 3 Minutes Minimum Operation Time of Compressor

When a compressor frequently starts and stops in short intervals, this function should be used to guard the compressor. By setting this function, the mode of a minimum 3 minutes operation will be added. (The mode of a minimum 3 minutes stoppage is standard.)

In case of SET-FREE, this function is standard even when setting is not available.

**NOTE:**

When the safety device is activated or the “ON/OFF” switch is pressed, the compressor is stopped immediately.

## OPTIONAL FUNCTION

### (4.4 Remote Control Switch)

#### (4) Change of Filter Cleaning Time

The period for filter sign indication is set for each indoor unit model when shipping.

The filter sign is indicated according to the filter cleaning time (Factory-Setting).

However, this filter cleaning time can be changed depending on the condition of the filter as shown in the table below.

	Period for Filter Sign Indication			
	Approx. 100 hrs.	Approx. 1,200 hrs.	Approx. 2,500 hrs.	No Indication
In case of 4-Way Cassette Type	○	⊙	○	○
Liquid Crystal Display on Remote Control Switch	01 b4	02 b4 or 00 b4 *	03 b4	04 b4

⊙: Factory-Setting

○: Changed Setting Period

\* : In the case of RPK model, the factory setting is 200 hrs.

#### (5) Fixing of Operation Mode

This function is utilized when changes in operation modes are not required.

When this function is valid, the operation mode which has been set cannot be changed.

#### (6) Fixing of Setting Temperature

This function is utilized when changes in setting temperature are not required.

When this function is valid, the setting temperature which has been set cannot be changed.

#### (7) Fixing of Operation as Exclusive Cooling Unit

This function is utilized when exclusive cooling operation is required.

This function invalidates the heating operation and the automatic COOL/HEAT operation, as the operation of exclusive cooling unit.

#### (8) Automatic COOL/HEAT Operation

This function is utilized to operate the unit with changing cooling and heating operation automatically (same operation mode for indoor units in same refrigerant cycle).

This function is invalid when the outdoor unit is cooling only model or the function of "Fixing Operation as Exclusive Cooling Unit" is valid.

\* As for FXG/FX3 series, cooling and heating operation mode can be changed individually for each indoor unit in same refrigerant cycle.

#### (9) Fixing of Fan Speed

This function is utilized to fix the fan speed. When this function is valid, the fan speed is not changed by the remote control switch.

#### (10) Not Prepared

#### (11) Not Prepared

#### (12) Not Prepared

#### (13) Drain Pump in Heating (When the humidifier is installed)

This function is utilized to operate the drain pump in heating operation. However, in case of SET-FREE, the indoor units do not have humidifier.

Do not change the setting condition "00" of the item "C4".

#### (14) Hi Speed

This function is utilized to increase the fan speed due to the high ceiling.

#### (15) Hi Speed at Heating Thermo-OFF

This function is utilized to increase the fan speed when thermo-OFF in heating operation with the function (14). (The fan speed is not increased when thermo-OFF in heating operation at the function (14) setting.)

#### (16) Canceling of Enforced 3 Minutes Minimum Operation Time of Compressor

In case of SET-FREE, "Enforced 3 Minutes Minimum Operation Time of Compressor" described in the item (3) is the standard function.

This function is utilized to cancel the "Enforced 3 Minutes Minimum Operation Time of Compressor" function.



(17) Remote Control Thermistor

This function is utilized to control the unit by the built-in thermistor of the remote control switch (remote control thermistor) instead of the thermistor for suction air.

Set this function at "01" or "02" when utilizing this function.

However, even when this function is set at "01" or "02", the detecting temperature is abnormal due to the failure of the remote control thermistor, etc., the thermistor to be used is changed to the thermistor for suction air of the indoor unit automatically.



(18) Not Prepared

(19) Not Prepared

(20) Selection of Forced Stoppage Logic

This function is utilized to select the logic of the contact for forced stoppage signal input.

The setting condition and the logic of the contact are as shown below.

Setting Condition	Logic of Contact	Sequence	Activation	
			Contact "Open"	Contact "Close"
00	A Contact		Normal	Forced Stoppage
01	B Contact		Forced Stoppage	Normal

(21) Not Prepared

(22) Power Supply ON/OFF 1 (Automatic Operation When Power Supply ON for the models of RPI-0.8 to 5.0FSG1, RCI-FSG2, RCD-FSG1 and RPC-FSG1 (After Alteration). In case of other models, refer to the item 4.1.2.)

This function is utilized to start and stop the unit according to the power supply ON/OFF.

When this function is utilized in the condition that there is no person to operate the unit, make the system with monitoring for disaster prevention.

**NOTE:**

The unit is started and stopped according to the power supply ON/OFF due to the power failure.

When the power failure is occurred during stoppage by the remote control switch operation, the unit is started again automatically after the power supply is recovered.

(23) Not Prepared

(24) Power Supply ON/OFF 2 (Restarting Function After Power Failure for the models of RPI-0.8 to 5.0FSG1, RCI-FSG2, RCD-FSG1 and RPC-FSG1 (After Alteration). In case of other models, refer to the item 4.1.3.)

This function is utilized to start the unit operation again automatically when the power supply is recovered after the power failure over 2 seconds.

The standard unit is started operation again automatically with all the same operating conditions such as operation mode, etc. in case of the power failure within 2 seconds.

(The compressor is started operation again after three minutes guard in addition to 2 seconds power failure as a maximum.)

**NOTE:**

In case of the power failure during the unit stoppage, the unit is stopped after recovering the power supply.

(25) Ventilation Mode (Total Heat Exchange Model)

This function is utilized to set the ventilation mode of the total heat exchanger.

The setting condition and the ventilation mode are as shown below.

Setting Condition	Ventilation Mode	Contents
00	Automatic Ventilation	Selecting effective ventilation mode (Total Heat Exchanging Ventilation or Bypass Ventilation) for energy saving by detecting the temperature difference between the outdoor temperature and the room temperature.
01	Total Heat Exchanging Ventilation	The heat exchanging is performed continuously when the total heat exchanger is operated.
02	Bypass Ventilation	The heat exchanging is not performed continuously when the total heat exchanger is operated.

## OPTIONAL FUNCTION

### (4.4 Remote Control Switch)

#### (26) Increasing Supply Air Volume (Total Heat Exchange Model)

This function is utilized to increase the supply air volume with the one-step high tap of the fan motor for supply air during operation of the total heat exchanger, make the room pressure higher than the surrounded room with the increased supply air volume and prevent the polluted air and smell from entering into the room.

The setting air flow mode by remote control switch and the actual air flow of the total heat exchanger when setting this function are as shown below.

Setting Air Flow Mode by Remote Control Switch	Air Flow of Total Heat Exchanger
LOW	MED
MED	HIGH
HIGH	HIGH

#### NOTE:

In case that the setting air flow mode by the remote control switch is "HIGH", the air flow of the total heat exchanger is "HIGH" even when this function is set.

#### (27) With Humidifier (Only Indication) (Total Heat Exchange Model)

This function is utilized to control the total heat exchanger with the humidifier. However, in case of the total heat exchanger of SET-FREE, the humidifier is not attached. Do not set this function.

When this function is not set, the control of the humidifier is not performed.

#### (28) Precooling/Preheating Period (Total Heat Exchange Model)

This function is utilized to delay the start-up of the total heat exchanger operation.

The setting condition and the delaying period of operation start-up are as shown below.

Setting Condition	Delaying Period of Operation Start-Up
00	0 minutes
01	30 minutes
02	60 minutes

#### (29) Not Prepared

#### (30) Automatic OFF Timer Setting

This function is utilized to set the OFF timer function automatically when the unit is started by the remote control switch. During operation with the automatic OFF timer setting function, the cancellation of the OFF timer and the changing of the setting period for OFF timer can not be performed. However, the OFF timer function is canceled when the unit is stopped.

When the unit is operated again after stoppage, the setting period for OFF timer is the period set by the optional setting.

The setting condition and the setting period for OFF timer are as shown below.

Setting Condition	Setting Period for OFF Timer
00	Function Invalid
01	1 hour
02	2 hours
03	3 hours
~	~
22	22 hours
23	23 hours
24	24 hours

#### NOTE:

This function is canceled when connecting with the CS-NET, and 7-day Timer, controlled by Remote Control.

#### (31) Remote Control Main-Sub Setting

This function is utilized when two remote control switches are installed in one system.

Set one remote control switch to "Main", another remote control switch to "Sub".

4.4.6 Indication of Address (ADDS) and Refrigerant Cycle Number (RN)

The address and the refrigerant cycle number can be indicated on the liquid crystal display of the remote control switch.

(1) Model Indication Mode

During operation or stoppage in normal condition, press the “TEMP V” switch and “TEMP Λ” switch simultaneously for more than 3 seconds.

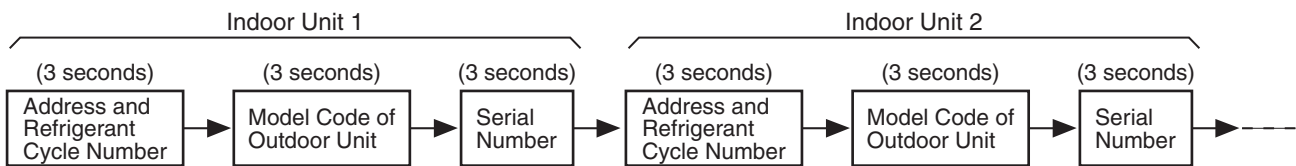
The remote control switch is changed to the model indication mode.

(2) Indication of Unit Model

(a) At the model indication mode, the following items of information about the indoor unit connected to the remote control switch are indicated for 3 seconds serially.

- ① Address and Refrigerant Cycle Number
- ② Model Code of Outdoor Unit

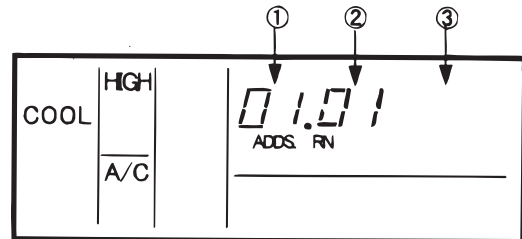
In case of group setting for the plural indoor units by the remote control switch, the above items ① ~ ② are indicated for each indoor unit.



The indication of the above items ① ~ ② for all the indoor units connected the remote control switch is completed, the remote control switch is returned to the normal condition.

(b) Indication of Address and Refrigerant Cycle Number

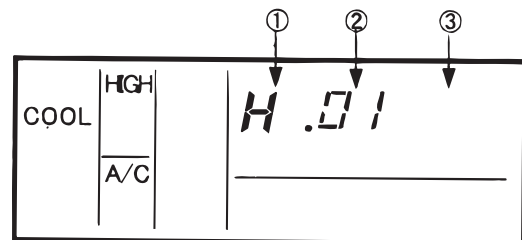
The indication of the address and the refrigerant cycle number of the indoor unit is shown in the right figure.



- ① The address of the indoor unit is indicated at the segments for timer setting time indication and the “ADDS” is indicated below the address indication.
- ② The refrigerant cycle number of the indoor unit is indicated at the segments for timer setting time indication and the “RN” is indicated below the refrigerant cycle indication.
- ③ The indication of the setting temperature is turned OFF.

(c) Indication of Model Code

The indication of the model code is shown in the right figure.

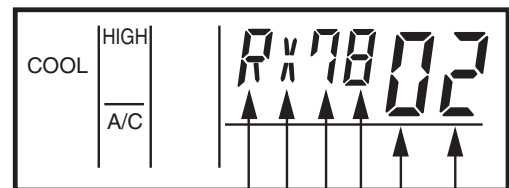


- ① The model code of the outdoor unit connected to the indoor unit indicated in the above item ① is indicated at the segments for timer setting time indication.
- \* Model Code of SET-FREE: “F”

- ② The number of the indoor units in the same refrigerant cycle of the indoor unit indicated in the above item ① at the segments for timer setting time indication.
- ③ The indication of the setting temperature is turned OFF.
- ④ Serial No. Indication

The serial No. is indicated in the liquid crystal display when mode is indoor unit serial No. indication mode as shown in the figure.

Though an actual serial No. is eight digits, the last six digits are indicated in the liquid crystal display.



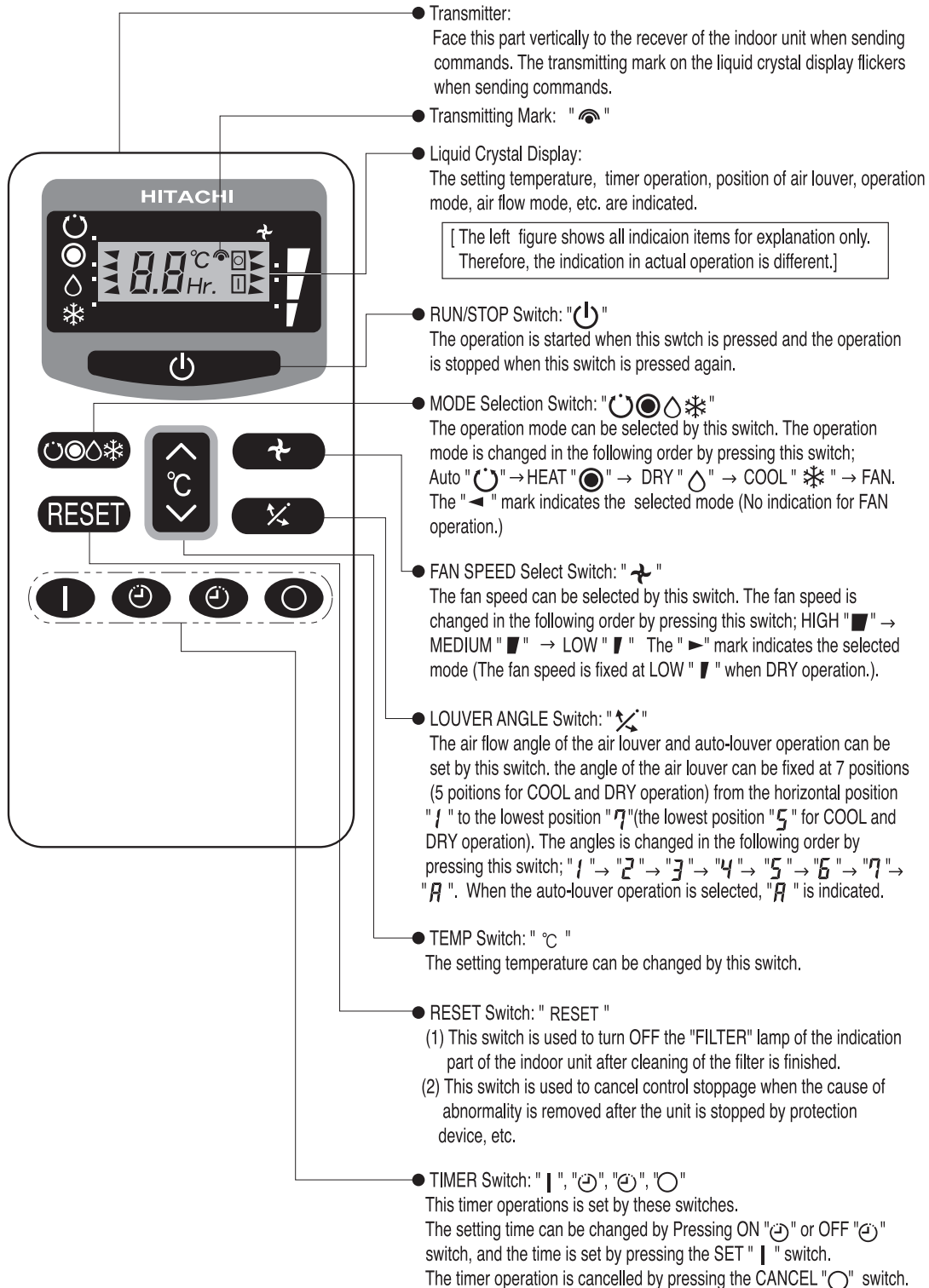
- 6th digit of Serial Number
- 5th digit of Serial Number
- 4th digit of Serial Number
- 3rd digit of Serial Number
- 2nd digit of Serial Number
- 1st digit of Serial Number

## OPTIONAL FUNCTION

### (4.5 Wireless Remote Control Switch)

#### 4.5 Wireless Remote Control Switch, PC-LH3

##### 4.5.1 Name of Part



Wireless Remote Control Switch (PC-LH3: Option)

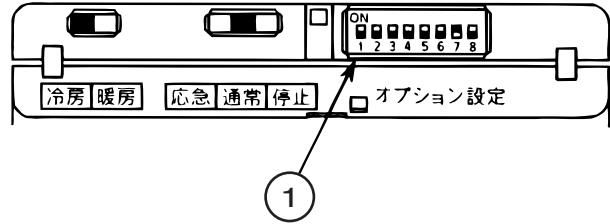
4.5.2 Identifying of Indoor Units Installed Side By Side

**NOTE:**

This function is not available in case of simultaneous operation mode.

When installing two (2) indoor units side by side, the commands from the wireless remote control switch can be received by both the indoor units.

- a. When installing two (2) indoor units (A and B) side by side, set one unit identified by the following method.



**CAUTION**

Turn OFF the power source before performing the following procedures.

- b. Open the cover of the receiver part of the indoor unit to be identified (B unit) and set the dip switch No.8 on the ON position (set at OFF position at factory).
- c. Identify the wireless remote control switch for the identified indoor unit.

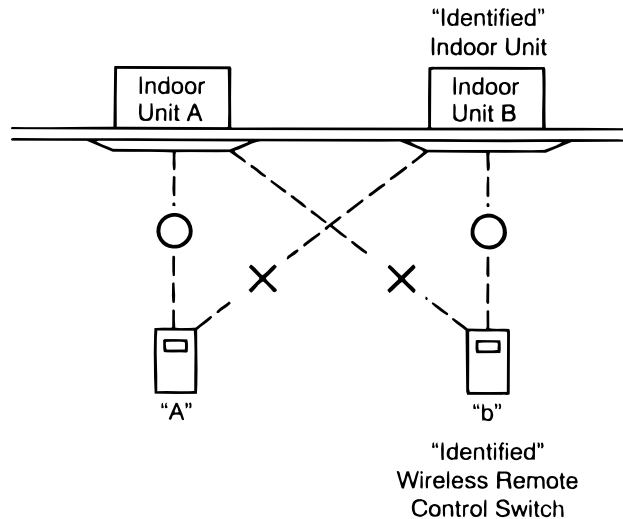
- ① Press the “☺” switch and the “☹” switch simultaneously more than 3 seconds.

When “b” is indicated on the liquid crystal display of the wireless remote control switch, the unit is identified.

- ② Press the “☺” switch and the “☹” switch simultaneously more than 3 seconds again.

When “A” is indicated on the liquid crystal display of the wireless remote control switch, the identification of the unit is canceled.

- d. Set the rotary switch (RSW) on the indoor PCB of the indoor unit B as shown in the right figure.



- e. When the above procedures b, c and d are performed, only the identified indoor unit corresponds to the commands from the identified wireless remote control switch.
- f. When canceling the identification of the unit, set the dip switches of the receiver part and the setting of the rotary switch (RSW) on the indoor PCB at the former position and cancel the identification of the unit.

## OPTIONAL FUNCTION

### (4.5 Wireless Remote Control Switch)

#### 4.5.3 Simultaneous Operation

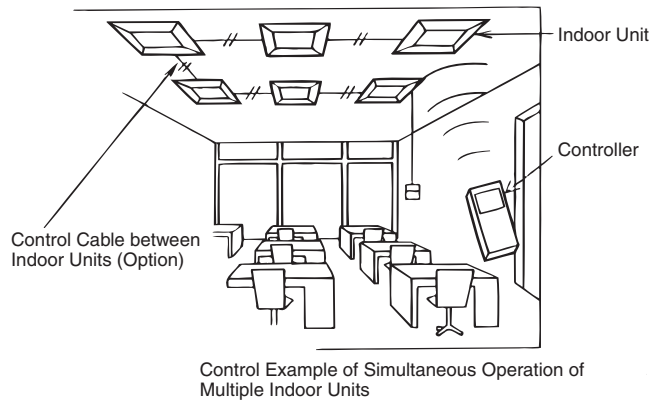
Up to 16 indoor units can be simultaneously controlled using one wireless remote control switch.

In this case, only two (2) air panels for wireless control can be connected.

Apply the simultaneous operation only in the case that the plural indoor units are installed in the same room as shown in the right figure.

\* Do not apply the simultaneous operation for the indoor units installed separately in different rooms.

Some units may be left without turning OFF the power source.

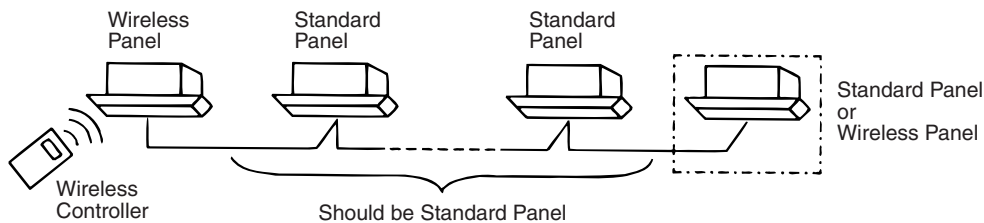


## CAUTION

Turn OFF all the power sources before wiring and setting the dip switches.

#### (1) Installation of Air Panel for Wireless Control

In case of simultaneous operation of plural (up to 16) units by the wireless remote control switch, apply the air panel for wireless control only to the unit to be operated, and apply the standard panels (for wired control) to other units. In case of applying plural air panels for wireless control, up to 2 air panels for wireless control can be used.

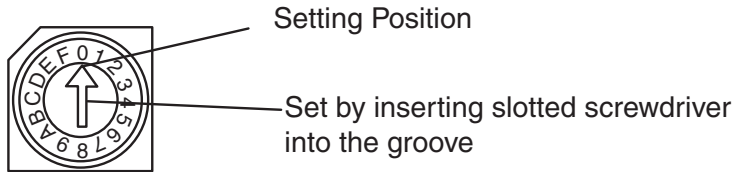


In case of applying two (2) air panels for wireless control, the setting of main and sub receiver part is required. Refer to the item 4.5.5 "Optional Function Setting" of the table for the dip switch setting procedures.

#### (2) Perform wiring between indoor units by referring to the receiver kit installation manual.

(4.5 Wireless Remote Control Switch)

- (3) Connected unit control wires should not be installed parallel to 200-400V power cables. Fix them by utilizing bands. It is recommended that cables be installed at least 30cm away from power cables or be put into grounded metal pipes.
- (4) Set the rotary switches (RSW) on the printed circuit boards of respective units as shown in the table below.

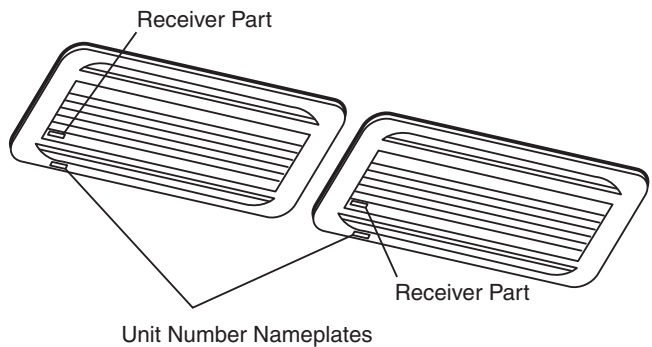


	No. 0 Unit	No. 1 Unit	No. 2 Unit	No. 3 Unit	No. 4 Unit	No. 5 Unit	No. 6 Unit	No. 7 Unit
Rotary Switch Setting								
	No. 8 Unit	No. 9 Unit	No. 10 Unit	No. 11 Unit	No. 12 Unit	No. 13 Unit	No. 14 Unit	No. 15 Unit
Rotary Switch Setting								

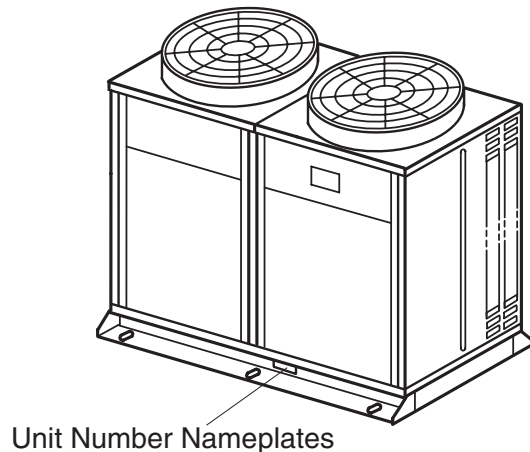
**ATTENTION:**

If the setting of the rotary switches (RSW) is not performed correctly, the operation LED (Red) on the panel flickers and the unit can not be operated due to the abnormal setting of the indoor unit number.

- (5) Identify the indoor units by attaching the nameplates of unit number (field-supplied) to the indoor units when setting the rotary switches (RSW) for each indoor unit.



- (6) Attach the nameplate of unit number for outdoor unit (field-supplied) corresponding to the unit number of the indoor unit.





## OPTIONAL FUNCTION

### (4.5 Wireless Remote Control Switch)

#### 4.5.4 Emergency Operation

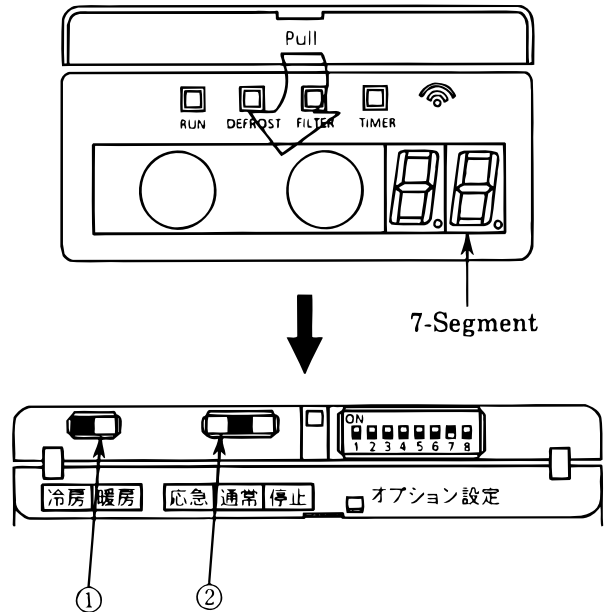
In case that the unit is required to be operated when the wireless remote control switch is out of battery and can not function, etc., the unit can be operated by the emergency operation switch. The cooling operation and the heating operation are available for the emergency operation.

## CAUTION

Turn OFF the power source of the unit before performing the emergency operation.

- Open the cover of the receiver part or the grille of panel.
- Set the switch ① to the "COOL" or "HEAT" position.
- Set the switch ② (emergency operation switch) to the "EMERGENCY" position.
- Close the cover of the receiver part and turn ON the power source of the unit.
- The unit is operated.  
<Operating Condition>

Operation	Cooling	Heating
Setting Temperature	21°C	30°C
Air Flow Mode	HIGH	HIGH



\* When operating the unit by the wireless remote control switch again, set the switch ② (emergency operation switch) to the "NORMAL" position.

#### NOTE:

For stopping the unit operated by the wireless remote control switch, the unit can be stopped by setting the switch ② (emergency operation switch) to the "STOP" position instead of turning OFF the power source of the unit.

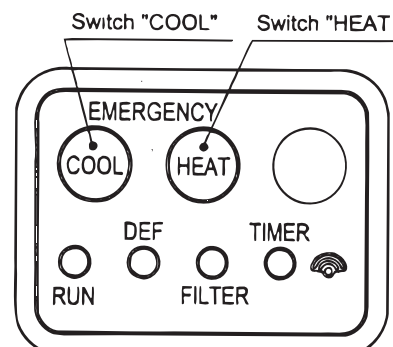
#### [In Case of PC-RLH8, 9, 10, 11]

In case that PC-LH3 is unusable by batteries shortage, etc., perform emergency operation as follows.

- Switch "COOL": Press "COOL" so that the cooling operation is started.  
Press "COOL" again so that the cooling operation is stopped.
- Switch "HEAT": Press "HEAT" so that the heating operation is started.  
Press "HEAT" again so that the heating operation is stopped.

#### NOTE:

During the emergency operation, the LED (yellow) blinks (0.5 second ON / 0.5 second OFF).





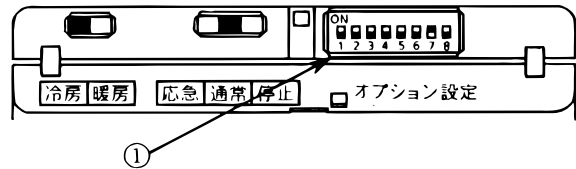
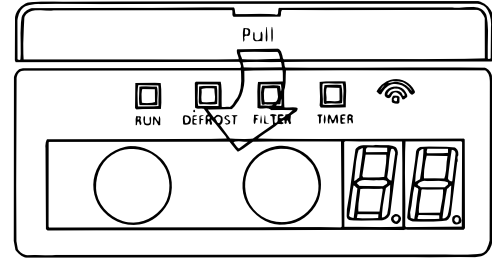
4.5.5 Optional Function Setting (In Case of PC-RLH4, PC-RLH5 and PC-RLH7)

**CAUTION**

Turn OFF all the power sources before setting the dip switches.

The following optional functions can be set by the dip switches of the receiver part.

- ① Change of Filter Cleaning Time
- ② Removal of Heating Temperature Calibration
- ③ Circulator Function at Heating Thermo-OFF
- ④ Identifying of Indoor Units Installed Side By Side
- ⑤ Setting of Main and Sub Receiver Part
- ⑥ Muffling Buzzer Sound



- a. Open the cover of the receiver part or the grille of panel.

\* Refer to the receiver kit installed in the indoor unit for the actual shape and the layout of the switches.

- b. Set the dip switches ① as shown in the table below.  
After dip switch setting, close the cover of the receiver part or the grille of panel.

Optional Function		Dip Switch							
		1	2	3	4	5	6	7	8
Filter Option	Standard	×	×	×	-	-	-	-	-
	100 hours	○	×	×	-	-	-	-	-
	1,200 hours	×	○	×	-	-	-	-	-
	2,500 hours	○	○	×	-	-	-	-	-
	No Indication	○	○	○	-	-	-	-	-
Muffling Buzzer Sound		-	-	-	○	-	-	-	-
Removal of Heating Temperature Calibration		-	-	-	-	○	-	-	-
Circulator Function at Heating Thermo-OFF		-	-	-	-	-	○	-	-
Setting of Sub Receiver Part		-	-	-	-	-	-	○	-
Identifying of Indoor Units		-	-	-	-	-	-	-	○

○ : ON, × : OFF, - : ON or OFF (both available)

## OPTIONAL FUNCTION

### (4.5 Wireless Remote Control Switch)

#### 4.5.6 Optional Functions of Wireless Remote Control Switch

(1) Change of Filter Cleaning Time

The filter sign (LED; Yellow) of the receiver part is set to turn ON after the total operation period is over 1,200 hours approximately (Factory-Setting). (In case of the RPK model, the factory-setting is 200 hrs.)

However, this filter cleaning time can be changed depending on the condition of the filter as shown in the page .

(2) Removal of Heating Temperature Calibration

Refer to 4.4.5 (1) for the details.

(3) Circulator Function at Heating Thermo-OFF

Refer to 4.4.5 (2) for the details.

(4) Identifying of Indoor Units Installed Side By Side

Refer to the item 4.5.2 "Identifying of Indoor Units Installed Side By Side".

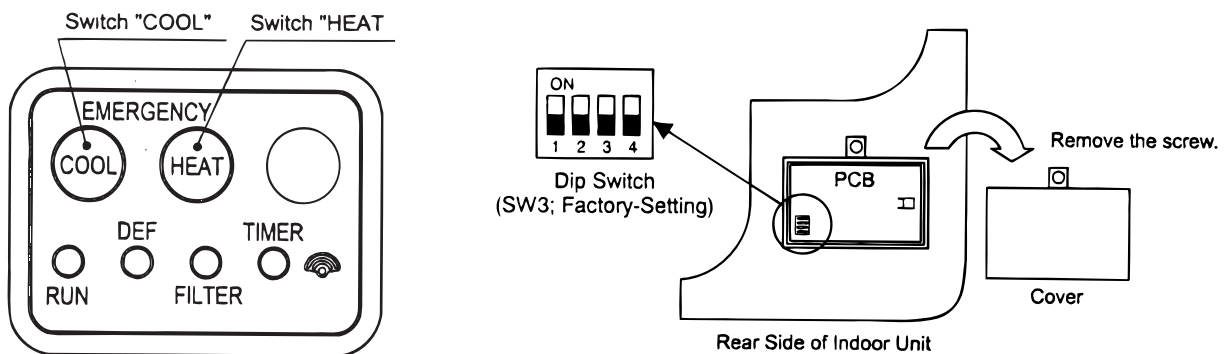
(5) Setting of Main and Sub Control Switch

Refer to the item 4.5.3 "Simultaneous Operation".

### [In Case of PC-RLH8, 9, 10, 11]

The following optional functions can be set by the dip switches of the receiver kit.

- ① Identifying of Indoor Units Installed Side by Side
- ② Setting of Main and Sub Receiver Kit



Optional Function	Dip Switch Setting ③ (SW3)			
	1	2	3	4
Setting of Sub Receiver Kit	○	×	×	×
Identifying of Indoor Units	×	○	×	×

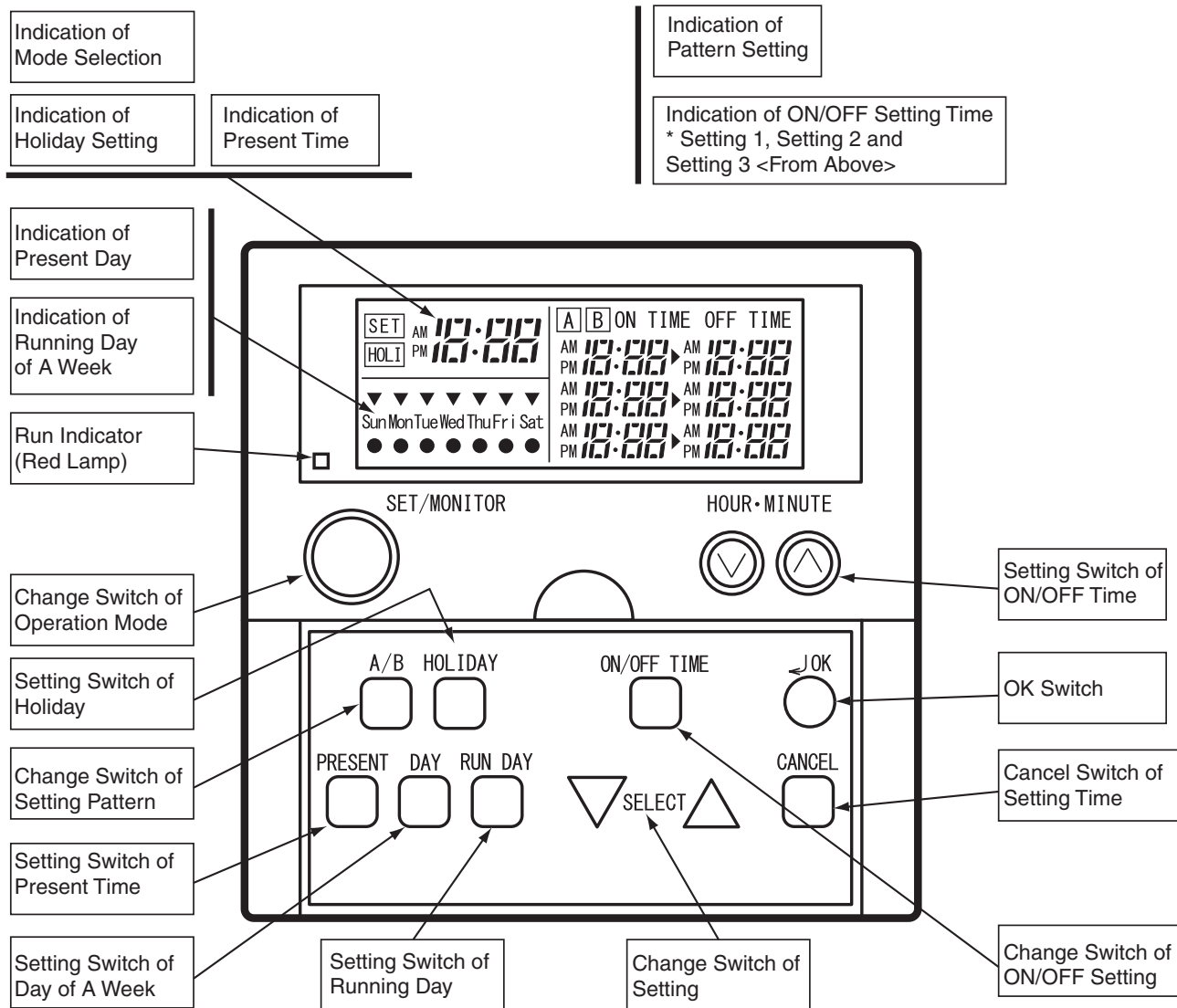
○ : ON, ×: OFF

4.6 7-Day Timer, PSC-5T

<Name of Parts>

**Liquid Crystal Display Section**

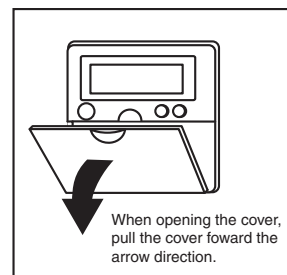
The figure below shows all the indications for reference. The actual display during operation is different.



**Operation Switch Section**

The above figure shows the control timer with the cover opened.

The present time and the ON/OFF setting time are indicated by 12 hour units (AM0:00 – 12:00, PM0:00 – 12:00).



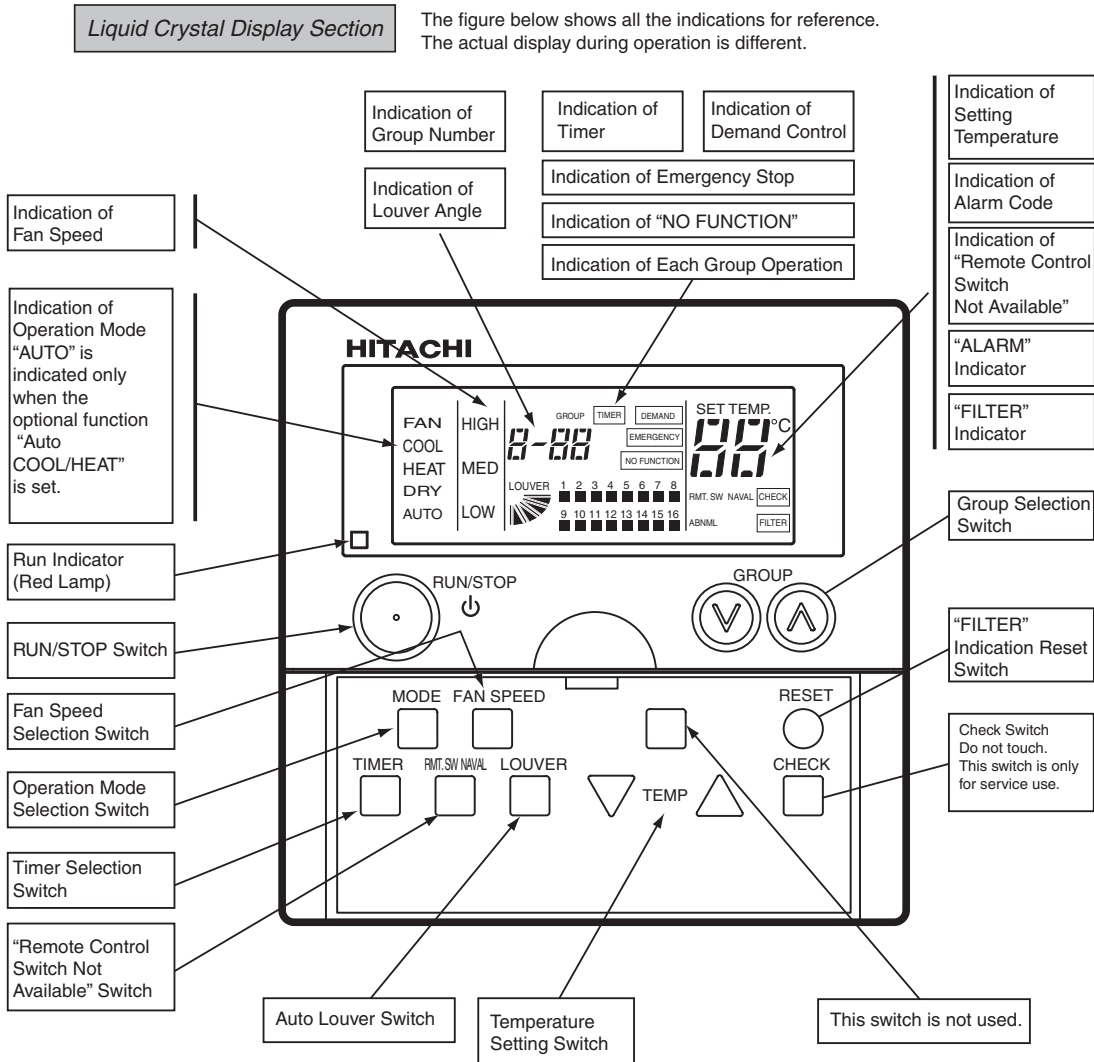
## OPTIONAL FUNCTION

### (4.7 Central Station)

#### 4.7 Central Station, PSC-5S

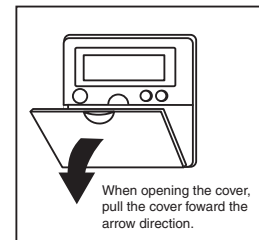
This central station is of the soft touch type. (Operation except with finger is not recommended.) Activation can be checked by referring to the liquid crystal display and LEDs.

<Name of Parts>



#### Operation Switch Section

The above figure shows the central station with the cover opened.



#### NOTE:

In the case that the unit is operated under the following conditions, "REMOTE" is indicated on the LCD and control by the remote control switch is not available.

- (1) NAVL is selected by the control station.
- (2) Two minutes after resetting of the Central Station even if AVL is selected.

## 5. FIELD WORK INSTRUCTION

### 5.1 Burnt-out Compressor due to Insufficient Refrigerant Charge

#### Question and Answer for Field Work

#### Example 1: Burnt-out Compressor due to Insufficient Refrigerant Charge

##### [Phenomenon]

After commissioning, alarm code "08" sometimes occurred and compressors were burnt out after 2 month operation.

##### [Cause]

Refrigerant piping work was performed during summer season. Additional refrigerant was not sufficiently charged from the discharge side.

This insufficient refrigerant charge resulted in discharge gas overheating and oil deterioration finally due to separated operation despite "08" alarm.

##### [Countermeasure]

1. The compressor was replaced with a new one.
2. Correct refrigerant amount was charged according to refrigerant piping length and connected indoor units.

##### [Remarks]

###### **Additional Refrigerant Charging:**

Open the liquid stop valve slightly when the additional refrigerant is charged from the check joint of the liquid stop valve (discharge side) during the cooling operation. If the liquid valve is fully open, it is difficult to charge the additional refrigerant. Do not charge refrigerant from the gas stop valve.

## 5.2 Insufficient Cooling Performance When A Long Piping Is Applied

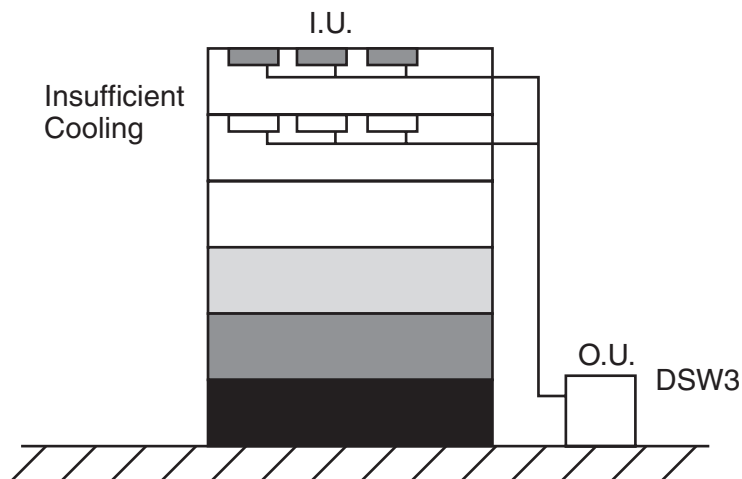
**Question and Answer for Field Work****Example 2: Insufficient Cooling Performance When A Long Piping Is Applied****[Phenomenon]**

Sufficient cooling was not available for an indoor unit which located at the farthest position.

**[Cause]**

In the case that an outdoor unit is located 20 meters lower than indoor units, resetting of the dip switch, DSW3 is required.

However, no setting was performed. Therefore, the target discharge pressure was not increased, resulting in insufficient cooling performance for the indoor.

**[Countermeasure]**

Setting for DSW3 was changed.

**[Remarks]**

Pay a special attention to the liquid pipe size if the lift between the indoor units and outdoor unit is higher than 20 meters. For details, see the "Piping Work" in TCII.

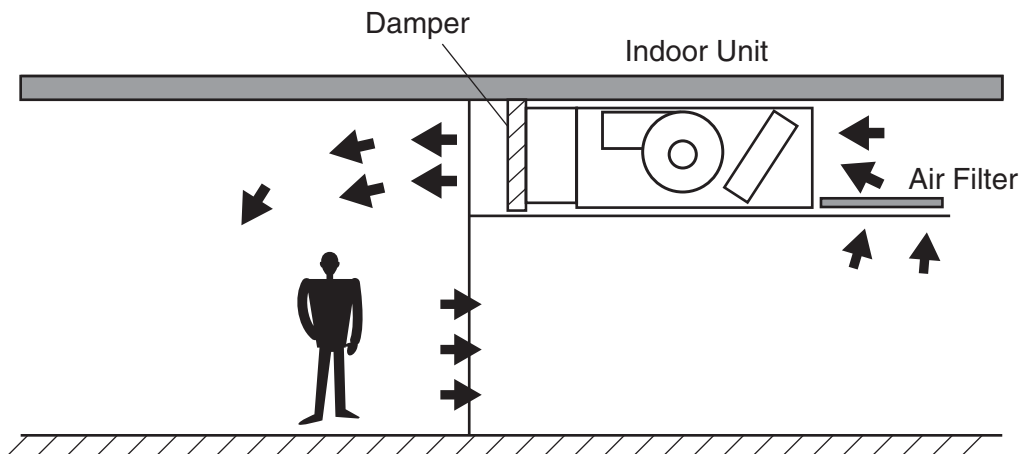
## 5.3 Abnormally High Operating Sound [In-the-Ceiling Type Indoor Unit]

**Question and Answer for Field Work****Example 3: Abnormally High Operating Sound [In-the-Ceiling Type Indoor Unit]****[Phenomenon]**

Operating sound during "Hi" speed was abnormally high.

**[Cause]**

The indoor units was installed without ducts of inlet side and outlet side. Due to almost no external static pressure, abnormally big air volume was supplied, resulting in higher air speed through the heat exchanger.

**[Countermeasure]**

In order to reduce air flow, a plate as a damper at the discharge side was added. Another solution is at inlet side and outlet side.

**[Remarks]**

Please note that running current is increased when no external pressure is given to the indoor unit, resulting in overheating.

5.4 Alarm Code “31”

**Question and Answer for Field Work**

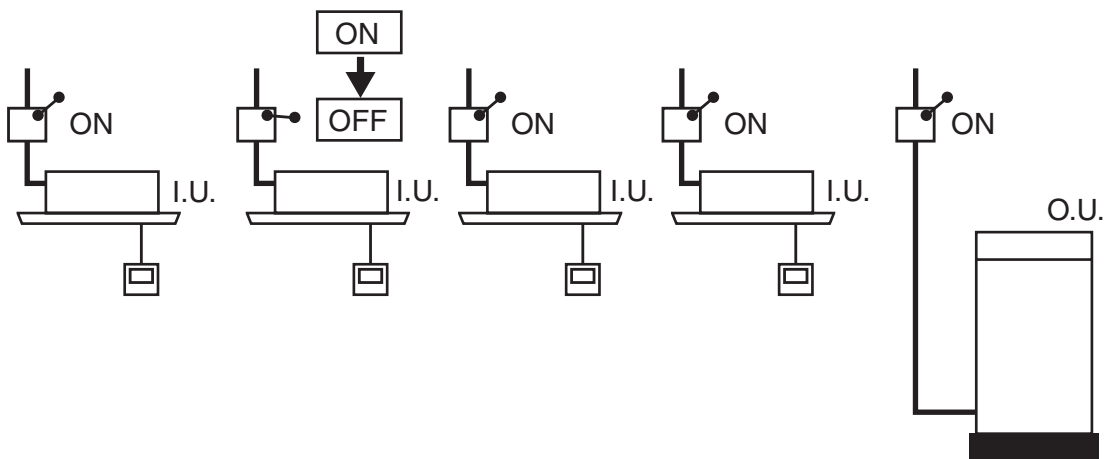
**Example 4: Alarm Code “31”**

**[Phenomenon]**

Alarm code “31” sometimes occurred and the system was stopped.

**[Cause]**

Combination of the indoor and outdoor unit was as follows.



This system was used in a tenant building.

One of tenant’s customers cut out the power switch for the indoor unit while other indoor units are running, resulting in different total indoor unit capacity setting in the same refrigerant cycle.

**[Countermeasure]**

All the main power switches for the indoor units were always ON.



## 5.5 Not Cooling Well due to Insufficient Installation Space for Outdoor Unit

**Question and Answer for Field Work****Example 5: Not Cooling Well due to Insufficient Installation Space for Outdoor Unit****[Phenomenon]**

Cooling operation was well performed through the intermediate season. However, the cooling operation was not well available when the outdoor temperature was higher than 35°C.

**[Cause]**

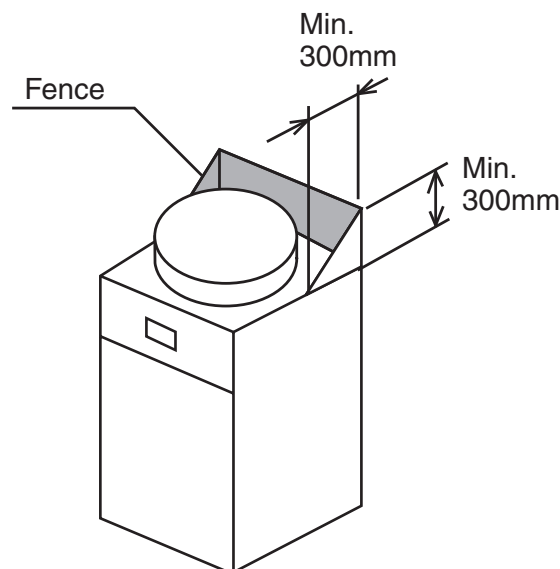
As the outdoor units were installed without a sufficient installation space, the hot discharge air from other outdoor units was circulated.

In this case, though the outdoor temperature was 35°C, the actual suction air temperature was nearly 50°C and Protection System from Excessively High Suction Pressure was activated, the frequency of the compressor was decreased and the cooling capacity was also decreased accordingly.

As the outdoor units in-line were installed back to back with a distance of 600mm between each outdoor unit's back, the hot discharged air from other outdoor units was circulated.

**[Countermeasure]**

To protect the unit from a short circuit, fences were mounted at the discharge air side as shown below.



**5.6 Attention for SET-FREE FXG/FX3 Series**

The SET-FREE FXG/FX3 series has been designed for the system to provide simultaneous cooling and heating operations during intermediate seasons and the refrigerant cycle is controlled according to heat balance of cooling and heating. Therefore, pay attention to the followings for the selection of installing sites and the installation work.

As especially, this SET-FREE FXG series is operated by mixed refrigerant R407C (FXG), special attention is required. Follow the items below.

- \* The SET-FREE FXG/FX3 series is for general office building air conditioning. Therefore, it is recommended that different air conditioning systems be selected in a place where systems are utilized for (i) machine rooms or computer rooms, providing big heat load and (ii) thermostatic chamber, requiring precise temperature control.
- \* By operating this unit with other cooling/heating equipment at the same time, thermo-ON/OFF may occur frequently or the heat load change may be big, and it may cause the decrease of the unit performance or shorten the lifetime of the unit. Do not install the unit in a place where operation with other cooling/heating equipment is required.

**<Attention for System Design of FXG/FX3 Series>**

(1) Installing Site:

Do not install the unit in such places;

- (a) where temperature difference among rooms is excessively big and the heat load when cooling and heating is excessively big during simultaneous COOL/HEAT operation.
- (b) where the heat load change of a room is big and thermo-ON/OFF may occur frequently especially during simultaneous COOL/HEAT operation.
- (c) where temporary capacity decrease according to ON/OFF operation of other rooms is not allowed.
- (d) where starting up in simultaneous COOL/HEAT operation mode is always required.

(2) Piping Work:

Do not perform the piping work as follows;

- (a) The piping length between the farthest indoor unit and the last multi-kit is excessively long.
- (b) The CH units are used individually for each indoor unit in a same room.
- (c) There is a height difference between CH units.

Refer to the followings for the attention in detail. (Observe the attentions common to FSG/FS3 series.)

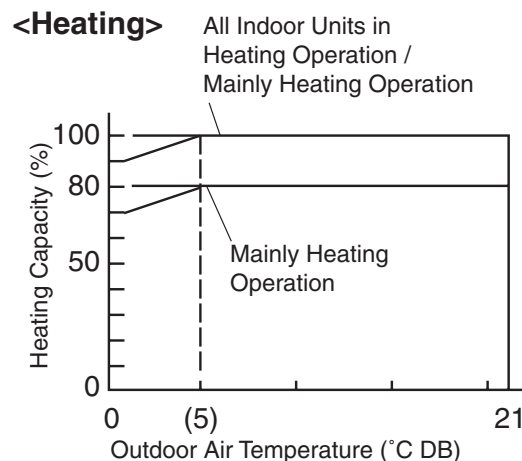
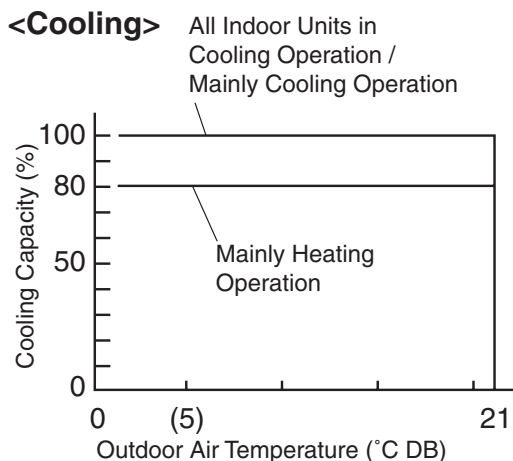
**<Attention for Simultaneous COOL/HEAT Operation>**

(1) Capacity of Simultaneous COOL/HEAT Operation:

**[Phenomenon]**

During the simultaneous cooling and heating operation, the capacity comparatively decreases when compared with the capacity whilst operating all the indoor units at the same mode.

The capacity decrease mentioned above should be taken into consideration when in actual operation, especially for the small capacity units (0.8 to 1.5HP).



**[Countermeasure]**

Perform the heat load calculation with the decreased capacity as shown in the graph in page 5-8. Do not install the unit in such a place where temperature difference among rooms is big and the heat load when cooling and heating is excessively big during simultaneous COOL/HEAT operation.

(2) Influence by ON/OFF Operation of Other Rooms:

**[Phenomenon]**

During the simultaneous cooling and heating operation, the actual capacity of the indoor units in operation is decreased for a short time due to the influence of heat balance when the cooling or heating operation when some other indoor units is started or stopped, or thermo-ON/OFF.

**[Countermeasure]**

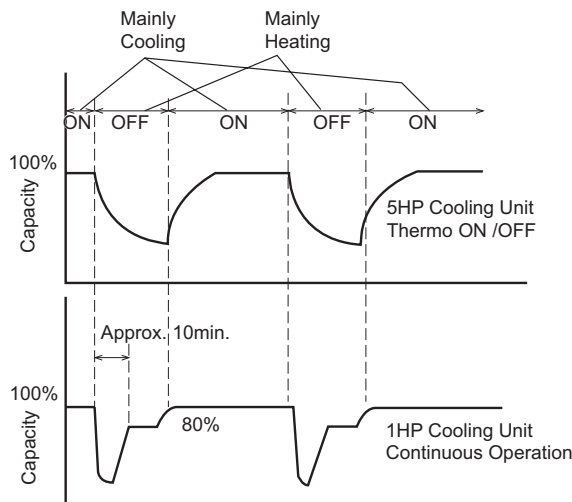
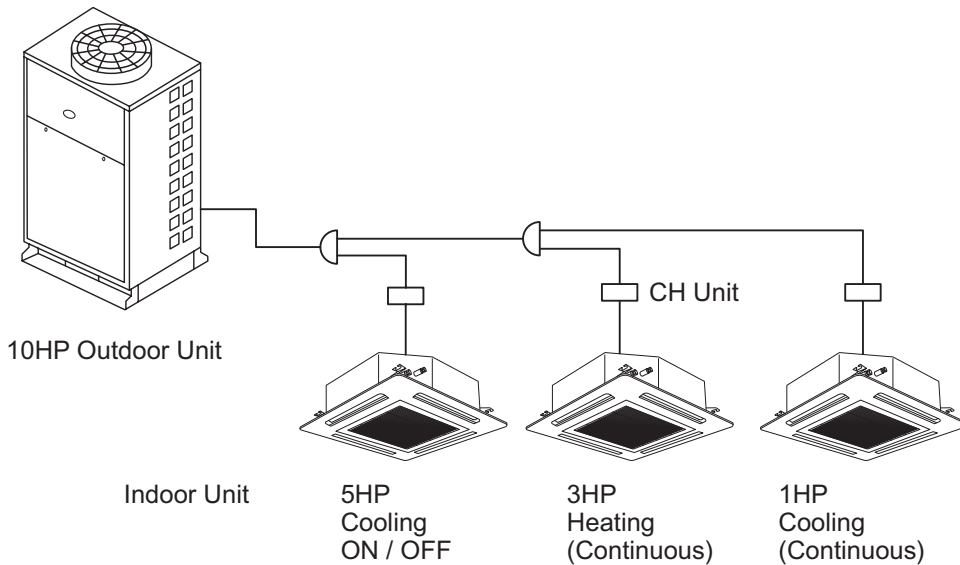
The following conditions and the system as shown below are not appropriate for FXG/FX3 series, since other indoor units may be influenced by the indoor unit.

Therefore, it is recommended that different air conditioning systems be selected.

- (a) There is a room where the heat load change is big and ON/OFF operation of indoor unit is excessively frequent.
- (b) where capacity decrease for a short time according to ON/OFF operation of other rooms is not allowed. However, this system can be applied to a room where gradual heat load change is given, such as a heating operation in the morning, cooling operation during daytime and heating operation in the evening.

**[Example]**

In case that the mainly cooling operation is changed to the mainly heating operation especially when the big capacity indoor unit (ex.: 5HP) is stopped at cooling operation or thermo-OFF, the outdoor heat exchanger is changed from condenser to evaporator functions and the cooling capacity of other indoor units in continuous cooling operation is excessively decreased.



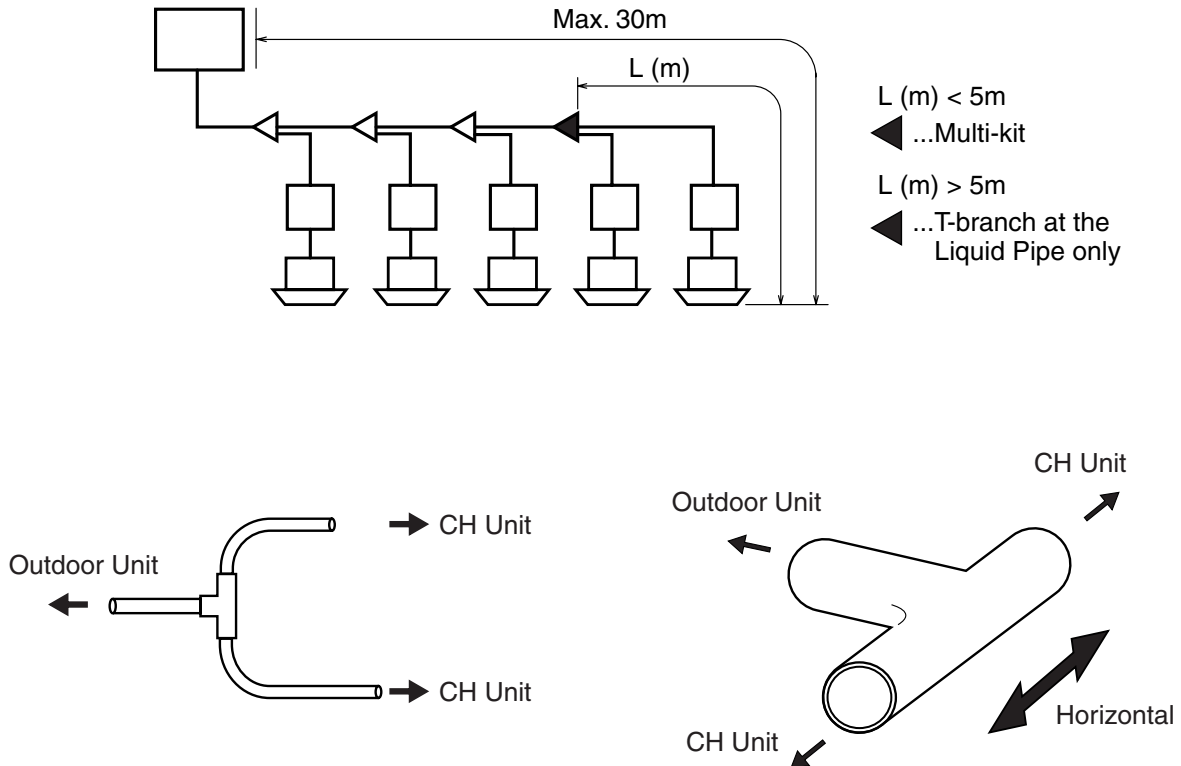
(3) Piping Length of Farthest Indoor Unit:

**[Phenomenon]**

During the simultaneous cooling and heating operation, the cooling capacity of the farthest indoor unit is decreased when the farthest indoor unit is in cooling operation and the second farthest indoor unit is in heating operation.

**[Countermeasure]**

It is recommended that the piping length between the multi-kit and the farthest indoor unit be within 5m. In case that the piping length between the multi-kit and the farthest indoor unit is longer than 5m, use the T-branch at only the liquid pipe instead of liquid multi-kit. The direction of the T-branch is as shown below. Purchase the T-branch locally for this piping work and prepare at each site. If the diameter of the pipe between the outdoor unit and CH unit is different, use a reducer.



(4) Start-Up in Simultaneous COOL/HEAT Operation Mode:

**[Phenomenon]**

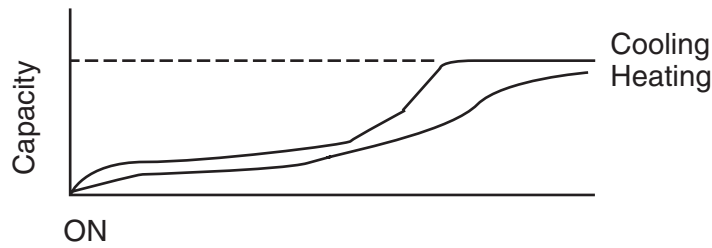
In case of starting up in the simultaneous COOL/HEAT operation mode when the outdoor temperature is low, the capacity increase time of the unit operation is longer in comparison with the only cooling or heating operation mode (especially in starting up of small capacity operation; 1HP cooling and 1HP heating [Example]).

**[Countermeasure]**

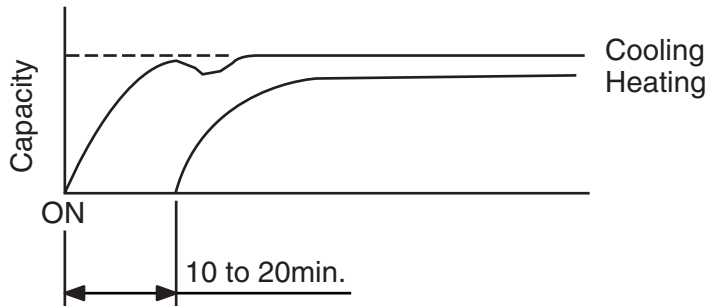
Do not install the unit where starting up in simultaneous COOL/HEAT operation mode is always required. In case that the simultaneous COOL/HEAT operation is required, it is recommended that individual refrigerant systems be applied for cooling and heating, or the starting up is performed in only cooling or heating operation mode, and change over the operation mode to the simultaneous COOL/HEAT mode when 10 to 20 minutes have passed after starting up operation.

**[Example]**

\* In Case of Start-Up in Simultaneous COOL/HEAT Operation Mode



\* In Case of Start-Up in Cooling Operation Mode (and Changeover to Simultaneous COOL/HEAT Operation Mode Afterward)



**<Attention for Automatic COOL/HEAT Operation>**

In the case that the indoor units are operated under an automatic cooling/heating operation by pressing the AUTO COOL/HEAT switch, pay attention to the followings.

(1) Interference of Cooling Unit and Heating Unit

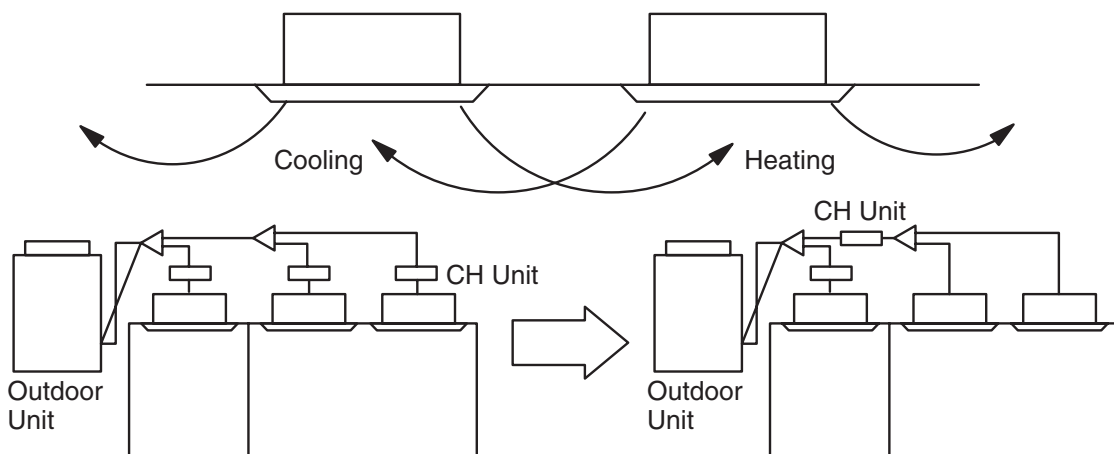
**[Phenomenon]**

In the case that more than 2 indoor units are closely installed and operated in the same room, each indoor unit interferes with the next unit, resulting in inefficient operation.

**[Countermeasure]**

Do not use CH units individually for each indoor units in a same room.

In such a case, connect the indoor units in a same room to one CH unit and operate indoor units in the same operation mode, if it is possible.



(2) Fan Operation When Changing Cooling/Heating Operation Mode

**[Phenomenon]**

In the case that room temperature rapidly increases during this automatic COOL/HEAT operation, the operation mode is changed in order, heating operation => fan operation => cooling operation.

During this mode change, the fan operation continues for more than 10 minutes in order to avoid unwanted influences to other indoor units.

**[Countermeasure]**

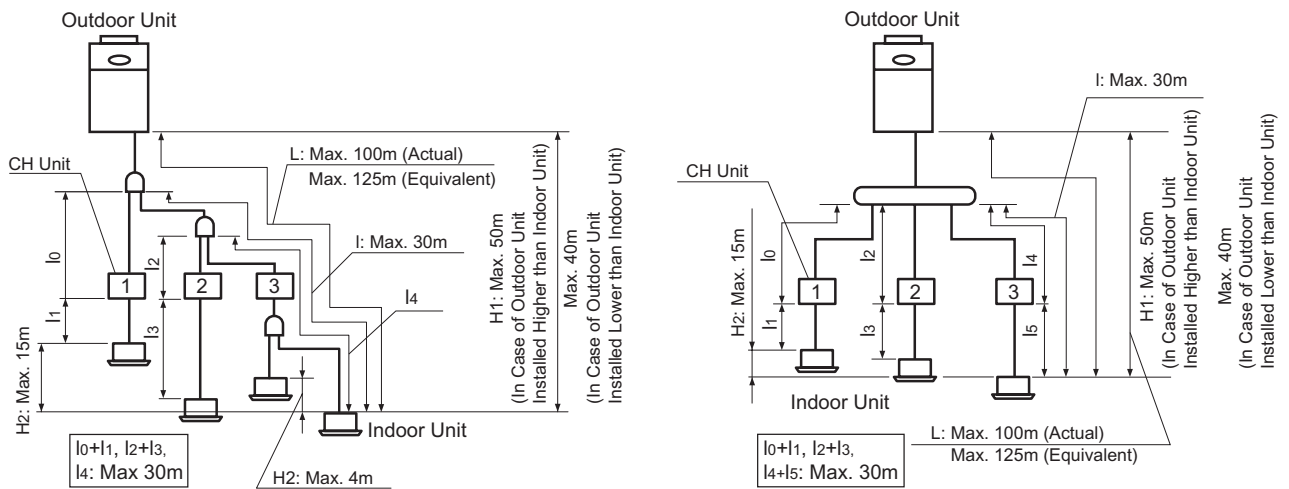
It is recommended that other systems be considered if very precise temperature control is required.

**<Attention for Installing CH Unit>**

Before installing the CH units, pay attention to the service access and sound.

- (1) The CH unit consists of mechanical components such as solenoid valves in order to change the operation mode from cooling to heating or heating to cooling respectively. Therefore, please provide a service access door (minimum of 600×600mm) beneath the CH unit.
- (2) Flowing sound of refrigerant may be heard from the CH unit when the solenoid valve in the CH unit is activated. Therefore, take the following action to minimize the sound.
  - \* Install the CH unit inside the ceiling.
  - As for the ceiling material, select a material like a plaster board which minimizes operation sound.
  - \* Do not install the CH units in near a bed room or hospital room.
- (3) Install the CH units according to the below table.

**Correct**



- \* CH units are installed according to the below table.
- \* The piping length between the 1st multi-kit and the farthest indoor unit is within 30m.
- \* The total piping length between each multi-kit and each indoor unit is within 30m.
- \* The maximum lift among indoor units is within 15m.
- \* The maximum lift between the outdoor unit and the indoor unit is within 50m (In the case that the position of the outdoor unit is higher than that of the indoor unit) / 40m (In the case that the position of the outdoor unit is lower than that of the indoor unit)

Height Difference among CH Unit

Lowest Indoor Unit Installed Higher than Outdoor Unit	Less than 15m (Max. Indoor Unit: 16 Units)	
Lowest Indoor Unit Installed Lower than Outdoor Unit	Height Difference of CH Unit	Max. Connectable CH Unit
	0 to 3m	Up to 16
	3.1 to 5m	Up to 10
	5.1 to 6m	Up to 8

5.7 Select Guide of Drain Pipe for Indoor Unit

● Selecting Method of Drain Pipe Diameter

<Step 1> Calculation of Drain Flow Volume

Calculate from that the drain flow volume is approximately 3 [ℓ/hr] per 1HP of the indoor unit nominal capacity.

For Example:

Common drain pipe for four 2HP indoor units and four 2.5HP indoor units.

- (1) Total Horse Power of Indoor Unit: 4×2HP+4×2.5HP=18HP
- (2) Total Drain Flow Volume: 18HP×3 [ℓ/hr.HP] =54 [ℓ/hr]

<Step 2> Select Drain Pipe from Table A and B

- (1) Horizontal Common Pipe with Slope 1/50: VP30 for above Example
- (2) Horizontal Common Pipe with Slope 1/100: VP30 for above Example
- (3) Vertical Common Pipe: VP30 for above Example

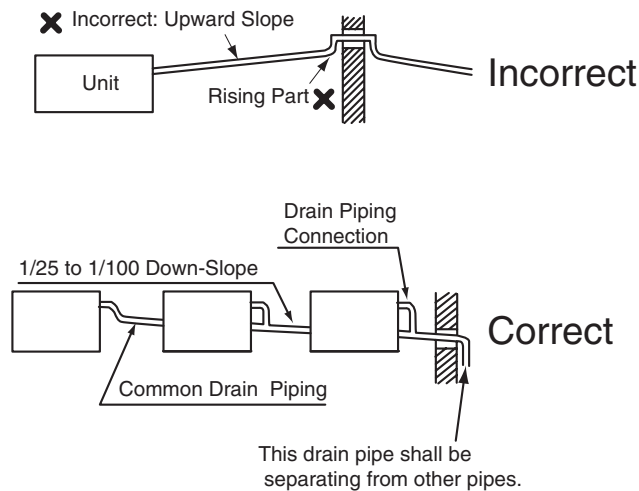
Table A. Permissible Drain Flow Volume of Horizontal Vinyl Pipe

JIS Symbol	Inner Diameter [mm]	Permissible Flow Volume [ℓ/hr]		NOTE
		Slope=1/50	Slope=1/100	
VP20	20	39	27	Not Applicable to Common Pipe
VP25	25	70	50	
VP30	31	125	88	Applicable to Common Pipe
VP40	40	247	175	
VP50	51	473	334	

Table B. Permissible Drain Flow Volume of Vertical Vinyl Pipe

JIS Symbol	Inner Diameter [mm]	Permissible Flow Volume [ℓ/hr]	NOTE
VP20	20	220	Not Applicable to Common Pipe
VP25	25	410	
VP30	31	730	Applicable to Common Pipe
VP40	40	1,440	
VP50	51	2,760	
VP65	67	5,710	
VP75	77	8,280	

● Drain Piping



5.8 Caution on Refrigerant Leakage

(1) Maximum Permissible Concentration of HCFC Gas

The refrigerant R407C (or R22), charged in the SET-FREE FSG, FS1/FS3, FS5 and FXG/FX3 system, is an incombustible and non-toxic gas. However, if leakage occurs and gas fills a room, it may cause suffocation.

The maximum permissible concentration of HCFC gas, R407C in air is 0.31 kg/m<sup>3</sup>, R22 in air is 0.3 kg/m<sup>3</sup>, according to the refrigeration and air conditioning facility standard (KHK S 0010) by the KHK (High Pressure Gas Protection Association) Japan.

Therefore, some effective measure must be taken to lower the R407C or R22 concentration in air below 0.3 kg/m<sup>3</sup>, in case of leakage.

(2) Calculation of Refrigerant Concentration

(a) Calculate the total quantity of refrigerant R (kg) charged in the system connecting all the indoor units of rooms to be air conditioned.

(b) Calculate the room volume V (m<sup>3</sup>) of each objective room.

(c) Calculate the refrigerant concentration C (kg/m<sup>3</sup>) of the room according to the following equation.

$$\frac{R: \text{Total Quantity of Charged Refrigerant (kg)}}{V: \text{Room Volume (m}^3\text{)}} = C: \text{Refrigerant Concentration} \leq 0.3 \text{ (kg/m}^3\text{)}$$

(3) Countermeasure for Refrigerant Leakage According to KHK Standards

The facility shall be arranged as follows referring to the KHK standards, so that the refrigerant concentration will be below 0.3 kg/m<sup>3</sup>.

(a) Provide a shutterless opening which will allow fresh air to circulate into the room.

(b) Provide a doorless opening of 0.15% or more size to the floor area.

(c) Provide a ventilator, linked with a gas leak detector, of 0.4 m<sup>3</sup>/min. or more ventilating capacity per Japanese Refrigeration Ton (= compressor displacement m<sup>3</sup>/h / 8.5 (R22) or 9.8 (R407C)) of the air conditioning system utilizing refrigerant R22.

<FSG, FSG1/FS3, FS5 Series>

RAS-5FSG .....	2.15 / 2.15 ton (50Hz / 60Hz)
RAS-5FS3 .....	2.48 / 2.48 ton
RAS-8FSG .....	3.74 / 3.98 ton
RAS-8FS3 .....	4.31 / 4.59 ton
RAS-10FSG .....	4.01 / 4.31 ton
RAS-10FS3 .....	4.63 / 4.97 ton
RAS-16FSG .....	5.78 / 6.44 ton
RAS-16FS3 .....	6.66 / 7.42 ton
RAS-20FSG .....	7.36 / 8.35 ton
RAS-20FS3 .....	8.49 / 9.63 ton
RAS-24FSG1 .....	8.72 / 9.96 ton
RAS-24FS5 .....	10.05 / 11.48 ton
RAS-30FSG1 .....	10.55 / 12.17 ton
RAS-30FS5 .....	12.16 / 14.03 ton

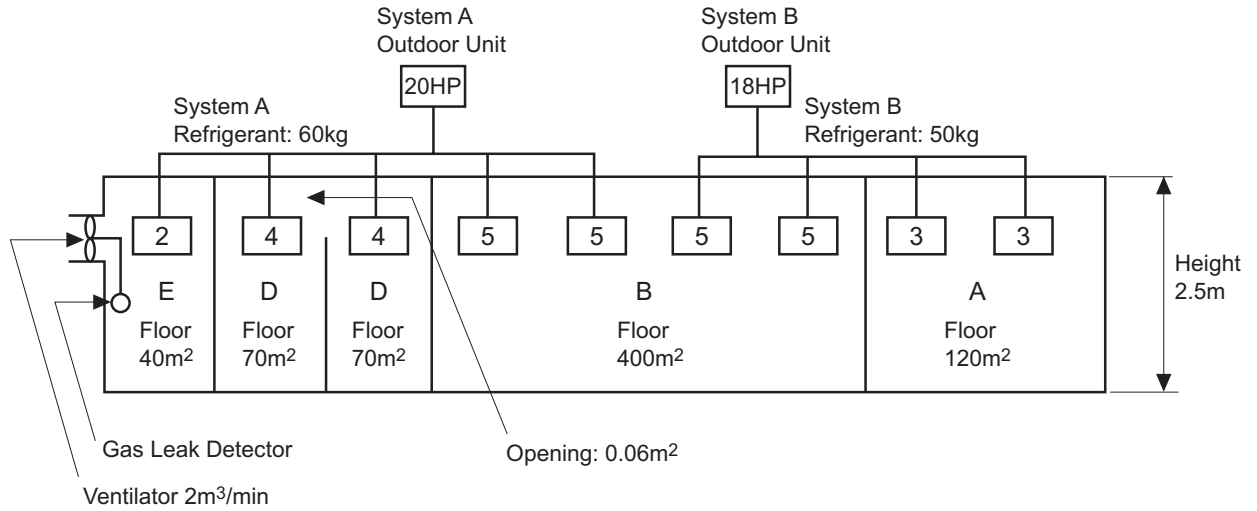
<FXG/FX3 Series>

RAS-8FXG .....	3.74 ton (50Hz)
RAS-8FX3 .....	4.31 ton
RAS-10FXG .....	4.01 ton
RAS-10FX3 .....	4.63 ton

(d) Pay a special attention to the place, such as a basement, etc., where refrigerant can stay, since refrigerant is heavier than air.



<Example>



Room	R (kg)	V (m³)	C (kg/m³)	Countermeasure
A	50	300	0.17	-
B	110	1000	0.11	-
C	60	175	0.34	0.06m² Opening
D	60	175	0.34	0.06m² Opening
C + D	60	350	0.171	-
E	60	100	0.6	2m³/min. Ventilator Linked with Gas Leak Detector

If local codes or regulations are specified, follow them.

<Example>

British Standard BS4434 1989

R22 Commercial Office Building Class D Occupancy

MR = C×V

MR: Maximum Charge or Leakage of Refrigerant (kg)

C: Maximum Allowable Concentration = 0.17 (kg/m³)

V: Volume of Space (m³)

## 5.9 Maintenance Work

### (1) For Indoor Unit and Outdoor Unit

#### (a) Fan and Fan Motor

- Lubrication - All fan motors are pre-lubricated and sealed at the factory. Therefore, no lubricating maintenance is required.
- Sound and Vibration - Inspect for abnormal sound and vibration.
- Rotation - Inspect for clockwise rotation and rotating speed.
- Insulation - Inspect for electrical insulation resistance.

#### (b) Heat Exchanger

- Clog - Inspect and remove any accumulated dirt and dust from the heat exchanger at regular intervals. As for outdoor unit, other obstacles such as growing grass and pieces of paper, which might restrict air flow, should also be removed.

#### (c) Piping Connection

- Leakage - Inspect for refrigerant leakage at piping connection.

#### (d) Cabinet

- Stain and Lubrication - Inspect and remove any stain and lubrication.
- Fixing Screw - Inspect and fix loosened or lost screws.
- Insulation - Inspect and repair peeled thermal insulation material on cabinet.

#### (e) Electrical Equipment

- Activation - Inspect for abnormal activation of the magnetic contactor, auxiliary relay, PCB and etc.
- Line Condition - Pay attention to working voltage, amperage and phase balance. Inspect for faulty contact caused by loosened terminal connections, oxidized contacts, foreign matter, and other items. Inspect for electrical insulation resistance.

#### (f) Control and Protective Devices

- Setting - Do not readjust the setting in the field unless the setting is maintained at a point other than the point listed in "11. SAFETY AND CONTROL DEVICE SETTING" of "TCII".

### (2) For Indoor Unit

#### (a) Air Filter

- Cleaning - Inspect and remove any accumulated dirt and dust according to "12.2 Filter Cleaning" of "TCII".

#### (b) Drain Pan, Drain-up Mechanism and Drain Pipe

- Drain Line - Inspect and clean the condensate drain line at least twice a year.
- Drain-up Mechanism - Inspect for activation of drain-up mechanism.

#### (c) Float Switch

- Activation - Inspect for activation of float switch.

### (3) For Outdoor Unit

#### (a) Compressor

- Sound and Vibration - Inspect for abnormal sound and vibration.
- Activation - Inspect for that the voltage drop of power supply line is within 16% at start and within 2% during operation.

#### (b) Reverse Valve

- Activation - Inspect for any abnormal activating sound.

#### (c) Strainer

- Clog - Inspect for that no temperature difference between both ends.

#### (d) Earth Wire

- Earth Line - Inspect for continuity to the earth.

#### (e) Oil Heater

- Activation - The oil heater should be activated at least 12 hours before start-up, by switching ON the main power source.

5.10 Service & Maintenance Record by 7-Segment Display

Data Sheet for Checking by 7-Segment Display

Client:

Checked by:

Date:

Outdoor Unit Model (Serial No. )	RAS- (Serial No. )	RAS- (Serial No. )	RAS- (Serial No. )	RAS- (Serial No. )	RAS- (Serial No. )
(1) Operation Model					
(2) Test Run Start Time					
(3) Data Collect Start Time					
(4) Read Out Data from 7-Segment in Outdoor Unit					
Protection Control Code					
Outdoor Microcomputer Output	SC	52C <sub>1</sub> 52C <sub>2</sub> 52C <sub>3</sub> 52C <sub>4</sub> AC Chopper	52C <sub>1</sub> 52C <sub>2</sub> 52C <sub>3</sub> 52C <sub>4</sub> AC Chopper	52C <sub>1</sub> 52C <sub>2</sub> 52C <sub>3</sub> 52C <sub>4</sub> AC Chopper	52C <sub>1</sub> 52C <sub>2</sub> 52C <sub>3</sub> 52C <sub>4</sub> AC Chopper
		FAN <sub>2</sub> RS 20A 21 <sub>1</sub> 21 <sub>2</sub> OH	FAN <sub>2</sub> RS 20A 21 <sub>1</sub> 21 <sub>2</sub> OH	FAN <sub>2</sub> RS 20A 21 <sub>1</sub> 21 <sub>2</sub> OH	FAN <sub>2</sub> RS 20A 21 <sub>1</sub> 21 <sub>2</sub> OH
Indoor Total Operating Capacity	oP				
Inverter Frequency	H1				
Compressor Running Quantity	CC				
Outdoor Fan Step	TE				
Outdoor Unit Expansion Valve Opening	oE1				
	oE2				
	oEb				
Discharge Pressure	Pd				
Suction Pressure	Ps				
Discharge Gas Temperature	Td1				
	Td2				
	Td3				
	Td4				
Heat Exchanger Liquid Pipe Temperature	TE1				
	TE2				
Outdoor Temperature	To				
Compressor Running Current	A1				
	A2				
	A3				
	A4				
Indoor Unit (Unit No.)					
Expansion Valve Opening	iE				
Heat Exchanger Liquid Temp.	TL				
Heat Exchanger Gas Temp.	TG				
Intake Air Temp.	Ti				
Outlet Air Temp.	To				
Capacity (× 1/8HP)	CA				
Indoor Unit Stoppage Cause Code	d1				
Restricted Control for Prevention of Compression Ratio Decrease	c11				
Restricted Control for Prevention of High Pressure Increase	c13				
Restricted Control for Prevention of Discharge Gas Temp. Increase	c15				
Restricted Control for Prevention of TdSH Decrease	c16				
Restricted Control for Prevention of Overcurrent	c17				
Accumulated Operation Time of Comp. 1	UJ1				
Accumulated Operation Time of Comp. 2	UJ2				
Accumulated Operation Time of Comp. 3	UJ3				
Accumulated Operation Time of Comp. 4	UJ4				
Outdoor Alarm Code	AC				
Inverter Stoppage Cause Code	iTC				
Total Indoor Unit Capacity (× 1/8HP)	CP				
Total Indoor Unit Quantity	AA				
Refrigerant System Address	GA				

R. C. Sw: Remote Control Switch, O.U.: Outdoor Unit, I.U.: Indoor Unit  
 52C<sub>1</sub>: CMC1, 52C<sub>2</sub>: CMC2, 52C<sub>3</sub>: CMC3, 52C<sub>4</sub>: CMC4  
 FAN<sub>2</sub>: Constant Speed Fan (16, 20HP Only), RS: Relay for Starting  
 20A: Solenoid Valve (SVA), 21<sub>1</sub>: Four Way Valve (RVR1), 21<sub>2</sub>: Four Way Valve (RVR2), CH: Oil Heater  
 \*: Multiply 1/8 by the code on the 7-segment.

5.11 Service & Maintenance Record by Remote Control Switch

Data Sheet for Checking by Remote Control Switch

Time	:	:	:	:	:	:	:	:	:
I.U. Model									
I.U. Serial No.									
I.U. No. / Alarm Code									
	Check Mode 1	Check Mode 2	1 • 2	1 • 2	1 • 2	1 • 2	1 • 2	1 • 2	1 • 2
<b>B Temp. Indication</b>									
Set Temp.	b1	--							
Inlet Air Temp.	b2	91							
Discharge Air Temp.	b3	92							
Liquid Pipe Temp.	b4	93							
Remote Thermistor Temp.	b5	--							
Outdoor Air Temp.	b6	94							
Gas Pipe Temp.	b7	95							
Evaporating Temp. at Heating	b8	96							
Control Information	b9	97							
Comp. Top Temp.	bA	98							
<b>C Micro-Computer State Indication</b>									
I.U. Micro-Computer	C1	--							
O.U. Micro-Computer	C2	--							
<b>D Stopping Cause State Indication</b>									
Stopping Cause State Indication	d1	--							
<b>E Alarm Occurrence</b>									
Times of Abnormality	E1	--							
Times of Power Failure	E2	--							
Times of Abnormal Transmitting	E3	--							
Times of Inverter Tripping	E4	--							
<b>F Automatic Louver State</b>									
Louver Sensor State	F1	--							
<b>H Pressure, Frequency State Indication</b>									
Discharge Pressure	H1	99							
Suction Pressure	H2	9A							
Control Information	H3	9b							
Operating Frequency	H4	9C							
<b>J I.U. Capacity Indication</b>									
I.U. Capacity (× 1/8HP)	J1	--							
O.U. Code	J2	--							
Refrigerant Cycle Number	J3	--							
Refrigerant Cycle Number	J4	--							
<b>L Opening of Ex. Valve</b>									
I.U. Ex. Valve	L1	9d							
O.U. Ex. Valve 1	L2	9E							
O.U. Ex. Valve 2	L3	--							
O.U. Ex. Valve B	L4	--							
<b>P Running Current Indication (Reference)</b>									
Comp. Current	P1	9F							

Client: \_\_\_\_\_  
 Installation Date: \_\_\_\_\_  
 System No.: \_\_\_\_\_  
 Date Checked: \_\_\_\_\_  
 Checked by: \_\_\_\_\_

Result	

5.12 Service & Maintenance Record

Service & Maintenance Record

No.	Check Item	Action	Judgement
1	Is service space sufficient?		YES or NO
2	Short Circuit of Discharge Air?		YES or NO
3	Any Heat Influence		YES or NO
4	Is earth wire connected?		YES or NO
5	Refrigeration Piping		GOOD or NOT GOOD
6	Fixing of Units		GOOD or NOT GOOD
7	Any Damage on Outer or Internal Surface?		YES or NO
8	Checking of Screw and Bolts	Tighten if loosen.	TIGHTENED or NOT TIGHTENED
9	Tightening of Terminal Screws	Tighten all terminal screws by phillips driver.	TIGHTENED or NOT TIGHTENED
10	Are compressor terminals tightly fixed?	Push all terminals.	PUSHED or NOT PUSHED
11	Insulation Resistance	Measure insulation resistance by insulation resistance-meter. Comp. and Fan Motor: greater than 3MΩ Others: greater than 3MΩ	GOOD or NOT GOOD
12	Does drain water smoothly flow?	Check for smooth flow by pouring water.	GOOD or NOT GOOD
13	Check for leakage at compressor.	Check for any leakage.	GOOD or NOT GOOD
14	Check for leakage at outdoor heat exchanger.	ditto	GOOD or NOT GOOD
15	Check for leakage at indoor heat exchanger.	ditto	GOOD or NOT GOOD
16	Check for leakage at 4-way valve.	ditto	GOOD or NOT GOOD
17	Check for leakage at check valve.	ditto	GOOD or NOT GOOD
18	Check for leakage at accumulator.	ditto	GOOD or NOT GOOD
19	Check for leakage at strainer.	ditto	GOOD or NOT GOOD
20	Check for leakage at electronic Ex. Valve.	ditto	GOOD or NOT GOOD
21	Check for leakage at piping.	ditto	GOOD or NOT GOOD
22	Check direction of fans.	by Viewing or Air Flow Volume	GOOD or NOT GOOD
23	Voltage among each Phase.	higher than 220V	GOOD or NOT GOOD
24	Vibration and Sound	Check fan, compressor, piping, etc.	GOOD or NOT GOOD
25	Activation of Each Operation Mode	Check activation of COOL, HEAT, STOP and TEMP. switches.	GOOD or NOT GOOD
26	High Pressure Cut-out Switch	Check actual activation value.	GOOD or NOT GOOD
27	Check activation of drain mechanism.	Check it during cooling operation.	GOOD or NOT GOOD
28	Indoor Inlet Air Temp. (DB/WB)		°C DB/ °C WB
29	Indoor Outlet Air Temp. (DB/WB)		°C DB/ °C WB
30	Outdoor Inlet Air Temp. (DB/WB)		°C DB/ °C WB
31	Outdoor Outlet Air Temp. (DB/WB)		°C DB/ °C WB
32	High Pressure Switch		kg/cm <sup>2</sup> G
33	Low Pressure Switch		kg/cm <sup>2</sup> G
34	Operating Voltage		V
35	Operating Current		A
36	Instruction Cleaning of Air Filter to Client		DONE or NOT YET
37	Instruction for Cleaning Method to Client		DONE or NOT YET
38	Instruction for Operation to Client		DONE or NOT YET





Specifications in this catalog are subject to change without notice, in order that HITACHI may bring the latest innovations to their customers.

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 **Hitachi Air Conditioning Systems Co., Ltd.**