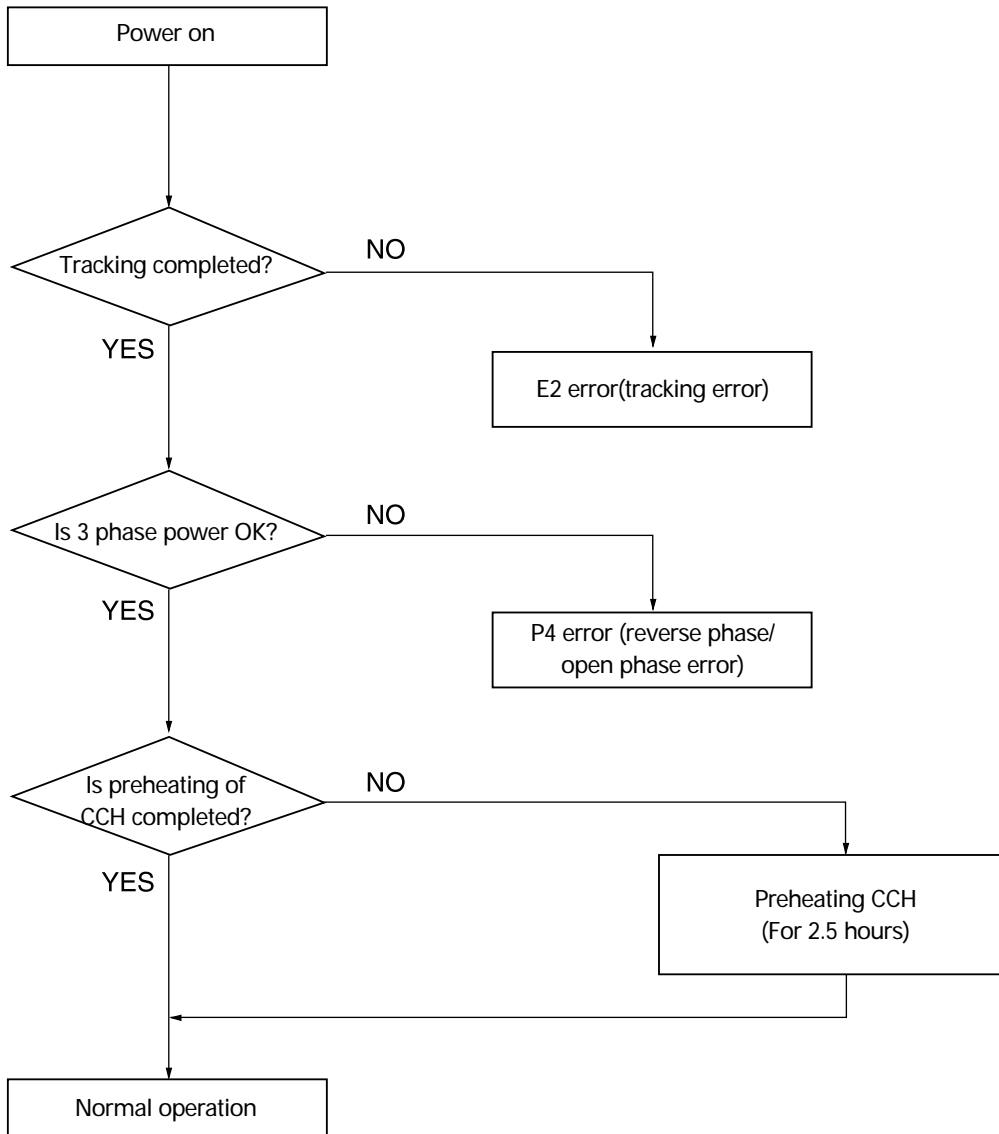




# 1. Operation flow of outdoor unit



## 1-1. Initial tracking (communication check) - E2 indicated if abnormal

(1) When the power is on, the MICOM of outdoor unit check the indoor units, wired remote controller and transmitters installed in the same system, which is called as Tracking.



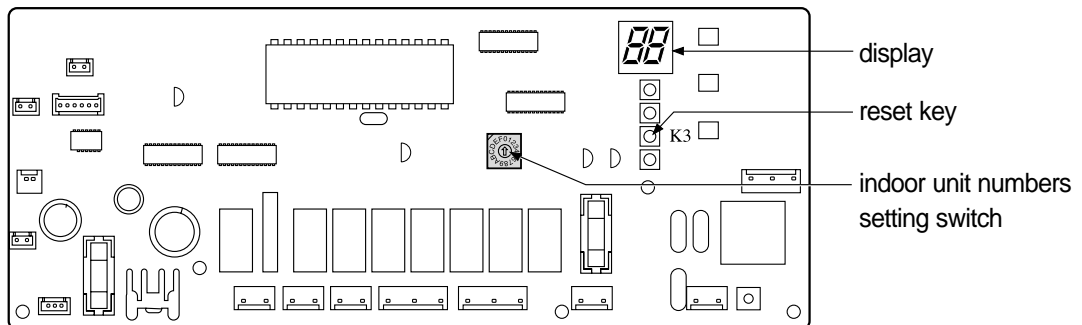
Display of outdoor unit

- 1) The left side display shows the address of indoor unit with which the outdoor unit is trying to communicate.  
(0-1-2- ... -d-E-F)
- 2) The right side display shows the address of indoor unit responding to the communication.
- 3) The right side display displays together when the related indoor unit address displays at the left side.

(For example, if there is 4 sets of indoor units having the address of 0, 1, 2, 3 at the outdoor unit, and when the left side display trying to communicate to 0-1-2- ... d-E-F, the right side displays 0-1-2-3 only when the left side is 0-1-2-3.)

(2) To check the numbers of indoor unit connected with outdoor unit by use of indoor unit numbers setting switch.

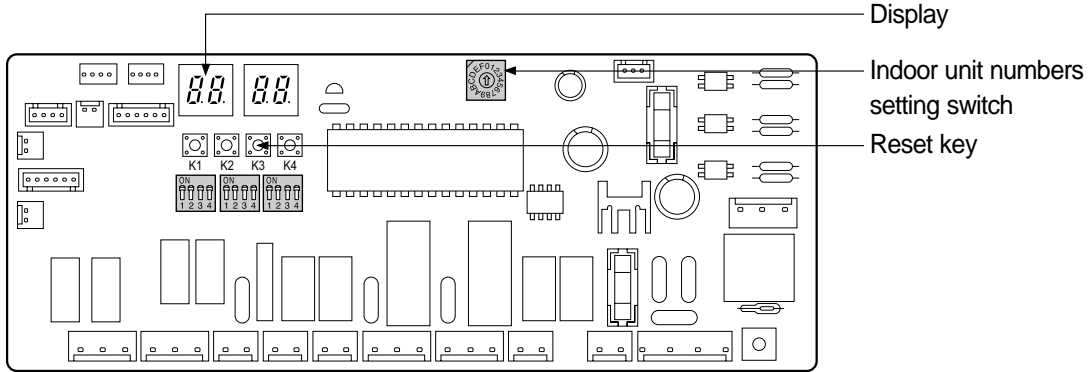
- 1) Cooling only





# 1. Operation flow of outdoor unit

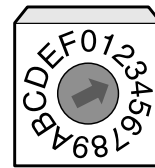
## 2) Heat pump



### ■ Installed indoor unit numbers setting switch

Example) Please adjust the arrow location set '3' as follow as figure,  
if installed indoor unit numbers is 3 ea.

Installed indoor units numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Switch arrow location	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

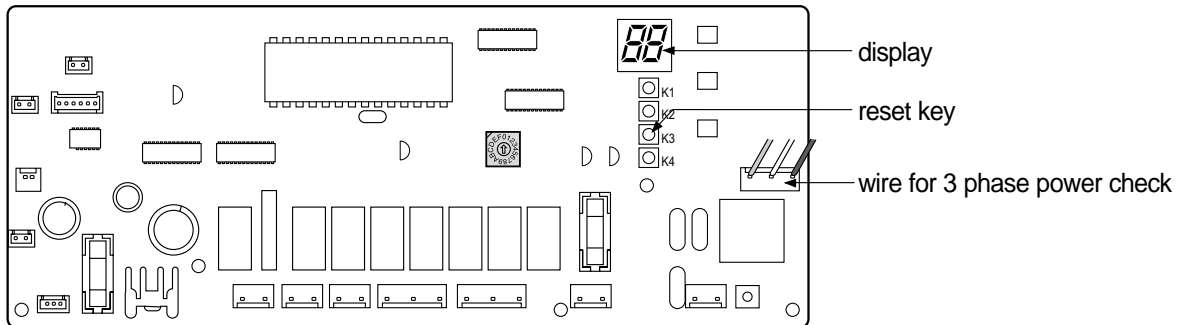


**(3) If the numbers of indoor units checked through installed indoor unit number setting switch do not match with those during tracking, the display shows Er and E2 alternately.**

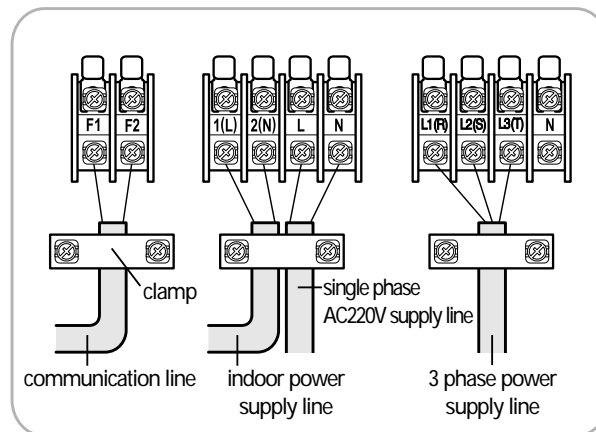
## 1-2. Reverse phase/missing phase detection - P4 indicated if abnormal

### (1) To check the power to be used for 3 phase power compressor if the power is on.

If there is any change of order for 3 phase L1(R)-L2(S)-L3(T) (reverse phase) or the power is not on, Er and P4 are indicated alternately and the air conditioner is kept to stop.



- 1) L1(R)-L2(S) phase/L1(R)-L3(T) phase/L2(S)-L3(T) phase are checked.
- 2) If there is any terminal not having the normal voltage, check the external power of air conditioner for action.
- 3) If the 3 phase power is normal, it is the phase power is changed. Change two wires of incoming of power from external side or incoming part of air conditioner.  
For example, change L1(R) with L2(S).
- 4) Press reset key (K3) after above check and check the power again.
- 5) If there is abnormal condition even after one more check, check the color of 3 phase power.  
If there is no abnormal as a result of check, replace the PCB.





# 1. Operation flow of outdoor unit

## 1-3. Compressor preheating - Ch indicated

- (1) Once the tracking is completed, check the temperature of compressor before starting the system operation. Ch is displayed at the display part at the time.
- (2) If it is the condition for compressor operation as the result of check, the flickering of Ch disappears and the indoor unit address trying to communicate with outdoor unit displays and the responding address on the right part.
- (3) If it is not the condition for the compressor operation at the moment, Ch is kept flickering on the display part and CCH (crank case heater) heats the compressor for 2 and half hours.  
The compressor cannot be operated for the time, but can be operated if Ch disappears due to the sufficient heating for 2 and half hours.
- (4) The check of operation ability by the temperature is performed only once at the initial stage. However, in case that the product is installed and operated for the first time, the power shall be put 6 hours before.

## 2. Self-diagnosis by the outdoor unit error display

Error display	Contents	Remark	Reference page
<i>Ch</i> flickering	Compressor starting delay control at the initial stage of power on (under operation of CCH)	No error	6
<i>Er</i> → <i>P0</i>	System down due to the high temperature of discharge sensor	Error about protection control of outdoor unit	9
<i>Er</i> → <i>P1</i>	System down due to the high temperature of Cond		10
<i>Er</i> → <i>P2</i>	SUMP COMP DOWN		11
<i>Er</i> → <i>P3</i>	System down due to the lower temperature switch detection		12
<i>Er</i> → <i>P4</i>	System start down due to reverse phase of the 3 phase		13
<i>Er</i> → <i>P5</i>	System down due to frozen heat exchanger		14
<i>Er</i> → <i>P6</i>	Error of momentary power failure (disappears when the unit is off/on)		15
<i>Er</i> → <i>P7</i>	Compressor down due to protection control of high pressure sensor		15
<i>Er</i> → <i>P8</i>	Compressor down due to protection control of low pressure sensor		15
<i>Er</i> → <i>P9</i>	In removing frost		16
<i>Er</i> → <i>PA</i>	Compressor down due to protection control of condensation ratio		16
<i>Er</i> → <i>t1</i>	Error of OUT TEMP sensor (OPEN/SHORT) Error level: Over 4.9V(-50°C), below 0.4V(93°C)		Outdoor unit errors
<i>Er</i> → <i>t2</i>	Error of COND TEMP sensor (OPEN/SHORT) Error level: Over 4.9V(-50°C), below 0.4V(93°C)	18	
<i>Er</i> → <i>t3</i>	Error of PWM Discharge TEMP sensor (OPEN/SHORT) Detected when the outdoor temperature is over -10°C Error level: Over 4.95V(-30°C), below 0.5V(151°C)	19	
<i>Er</i> → <i>t4</i>	Error of liquid refrigerant pipe(cond out) TEMP (OPEN/SHORT) Error level: Over 4.9V(-50°C), below 0.4V(93°C)	20	
<i>Er</i> → <i>t5</i>	Error of OIL TEMP sensor (OPEN/SHORT) Detected when the outdoor temperature is over -10°C Error level: Over 4.95V(-30°C), below 0.5V(151°C)	21	
<i>Er</i> → <i>t6</i>	Error of SUCTION TEMP sensor (OPEN/SHORT) Error level: Over 4.9V(-50°C), below 0.4V(93°C)	22	
<i>Er</i> → <i>t7</i>	Error of high pressure sensor (OPEN/SHORT) Detected when the compressor is on SHORT error when below 0.4V, OPEN error when over 4.2V	23	
<i>Er</i> → <i>t8</i>	Error of low pressure sensor (OPEN/SHORT) Detected when the compressor is on SHORT error when below 0.4V, OPEN error when over 4.7V	23	
<i>Er</i> → <i>t9</i>	Error of fixed compressor discharge sensor (OPEN/SHORT) Detected when the outdoor temperature is over -10°C Error level: Over 4.95V(-30°C), below 0.5V(151°C)	24	

\* Priority of duplicated error display : E1 → E2 → E4 → E5 → P0 → P1 → P2 → P3 → P5 → P4 → P7 → P8 → P9 → P6 → PA → G2 → t1 → t2 → t3 → t4 → t5 → t6 → t7 → t8 → t9 → tu → to → G3 → G4 → G5 → G6 → G7 → G8 → G9 → E3 → Cx → Dx → Bx → Ax → Fx → qx → rx → sx → vx → Ch

In case that the same error displays from multi-indoor units, the one having the faster address has the priority.



## 2. Self-diagnosis by the outdoor unit error display

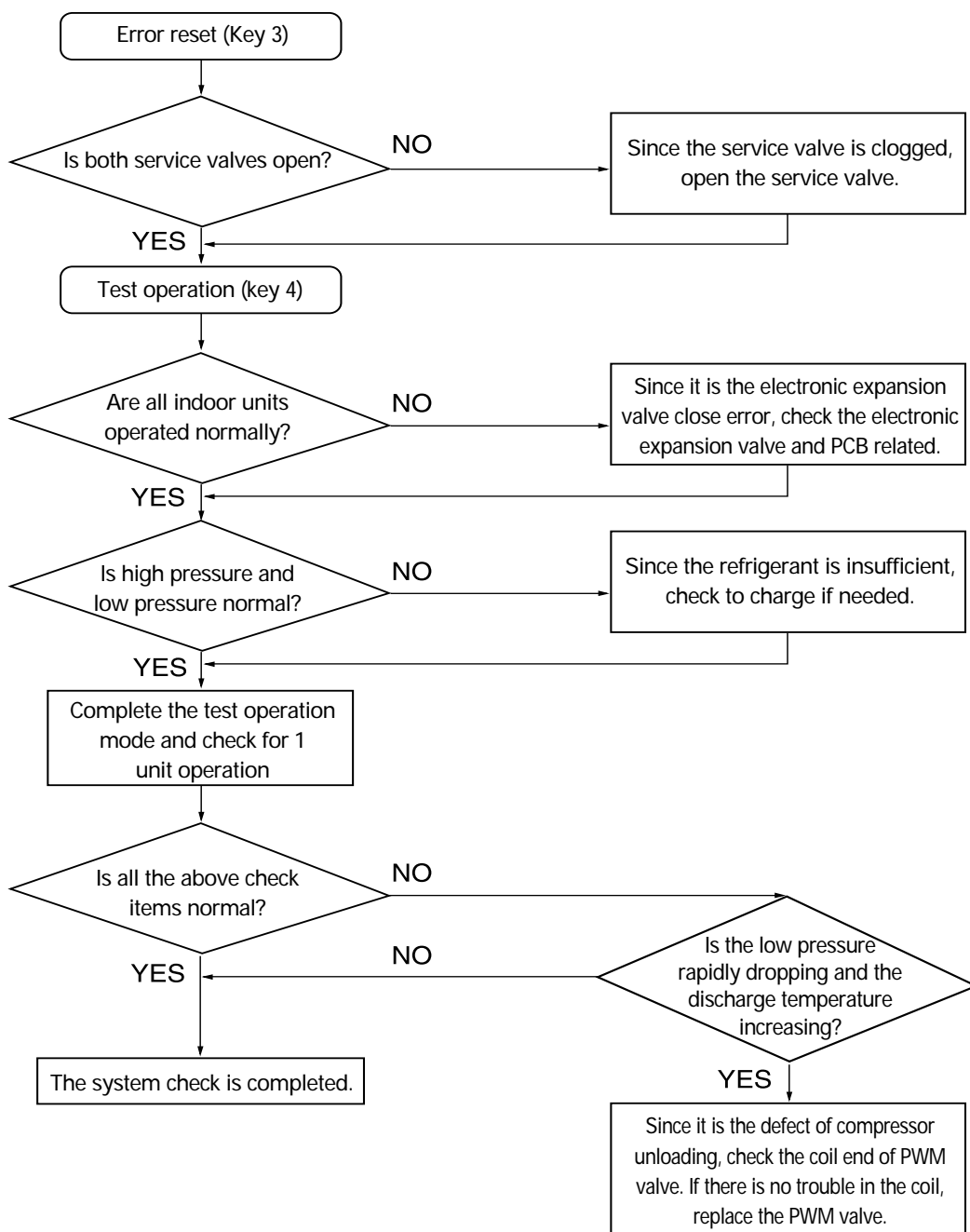
Error display	Contents	Remark	Reference page
$E_r \leftrightarrow E1$	System down due to the communication error after completion of tracking	Communication errors	25
$E_r \leftrightarrow E2$	Mismatching of the numbers of set indoor units with those of communicated numbers of indoor unit after 5 times of tracking		26
$E_r \leftrightarrow E3$	Indoor unit float switch error	Indoor unit errors	27
$E_r \leftrightarrow E5$	Setting error of option switch in indoor unit		29
$E_r \leftrightarrow A_x$	Indoor unit EVAP IN sensor breakaway		30
$E_r \leftrightarrow b_x$	Indoor unit EVAP OUT sensor breakaway		31
$E_r \leftrightarrow C_x$	Electronic expansion valve open error		32
$E_r \leftrightarrow d_x$	Electronic expansion valve close error		33
$E_r \leftrightarrow F_x$	Simultaneous breakaway of indoor unit EVAP IN and EVAP OUT sensor		34
$E_r \leftrightarrow G2$	Total leakage of refrigerant in outdoor unit/Loading failure		Outdoor unit errors
$E_r \leftrightarrow G3$	Breakaway of COND MID sensor in outdoor unit	37	
$E_r \leftrightarrow G6$	Breakaway of OIL temperature sensor (Detected once or more times)	38	
$E_r \leftrightarrow G7$	Breakaway of SUCTION sensor	38	
$E_r \leftrightarrow G8$	Breakaway of fixed compressor Discharge sensor (Detected once or more times)	39	
$E_r \leftrightarrow 9_x$	OPEN/SHORT error of room sensor in indoor unit	Indoor unit errors	40
$E_r \leftrightarrow r_x$	OPEN/SHORT error of EVAP IN sensor in indoor unit		41
$E_r \leftrightarrow 4_x$	OPEN/SHORT error of EVAP OUT sensor in indoor unit		42
$E_r \leftrightarrow u_x$	Error of fan starting		43
$t_u$ flickering	Below -5°C when cooling	Restriction of operation due to the outdoor temperature	43
$t_o$ flickering	Over 30°C when heating/Charging refrigerant in heating when the outdoor unit is over 15°C		43

\* Priority of duplicated error display : E1 → E2 → E4 → E5 → P0 → P1 → P2 → P3 → P5 → P4 → P7 → P8 → P9 → P6 → PA → G2 → t1 → t2 → t3 → t4 → t5 → t6 → t7 → t8 → t9 → tu → to → G3 → G4 → G5 → G6 → G7 → G8 → G9 → E3 → Cx → Dx → Bx → Ax → Fx → qx → rx → sx → vx → Ch

In case that the same error displays from multi-indoor units, the one having the faster address has the priority.

## 2-1. High temperature of discharge sensor

Outdoor unit display	$E_r \leftrightarrow P0$
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	<ul style="list-style-type: none"> <li>● Restart after operation stops when the discharge temperature exceeding 135°C is detected</li> <li>● System down when two times of detection is made (count is cleared when no detection is made for one hour)</li> </ul>
Causes	<ul style="list-style-type: none"> <li>● Shortage of refrigerant</li> <li>● Compressor unloading defective (unloading failure)</li> <li>● Service valve clogged</li> <li>● Electronic expansion valve clogged</li> </ul>





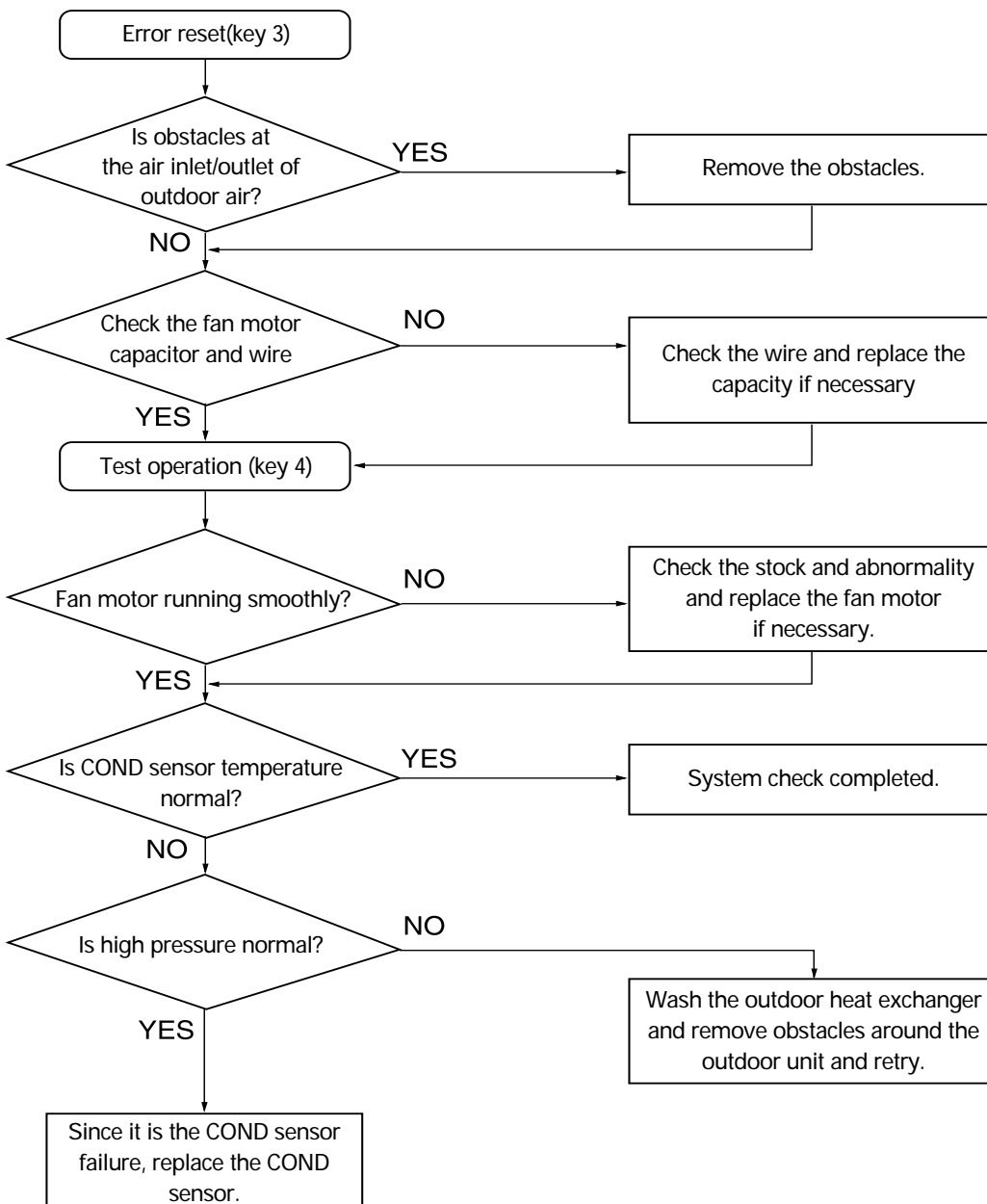


## 2. Self-diagnosis by the outdoor unit error display

### 2-2. High temperature of COND sensor

Outdoor unit display	<i>Er ↔ P1</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Stop and re-start when condensate temperature of compressor is 67°C. System down error when detection is made 6 times(counter cleared if no detection for 1 hour)
Causes	<ul style="list-style-type: none"> <li>● Outdoor fan motor trouble(stocked, defect)</li> <li>● Fan motor capacitor defect or wire open/COND sensor defect</li> <li>● Polluted outdoor heat exchanger</li> </ul>

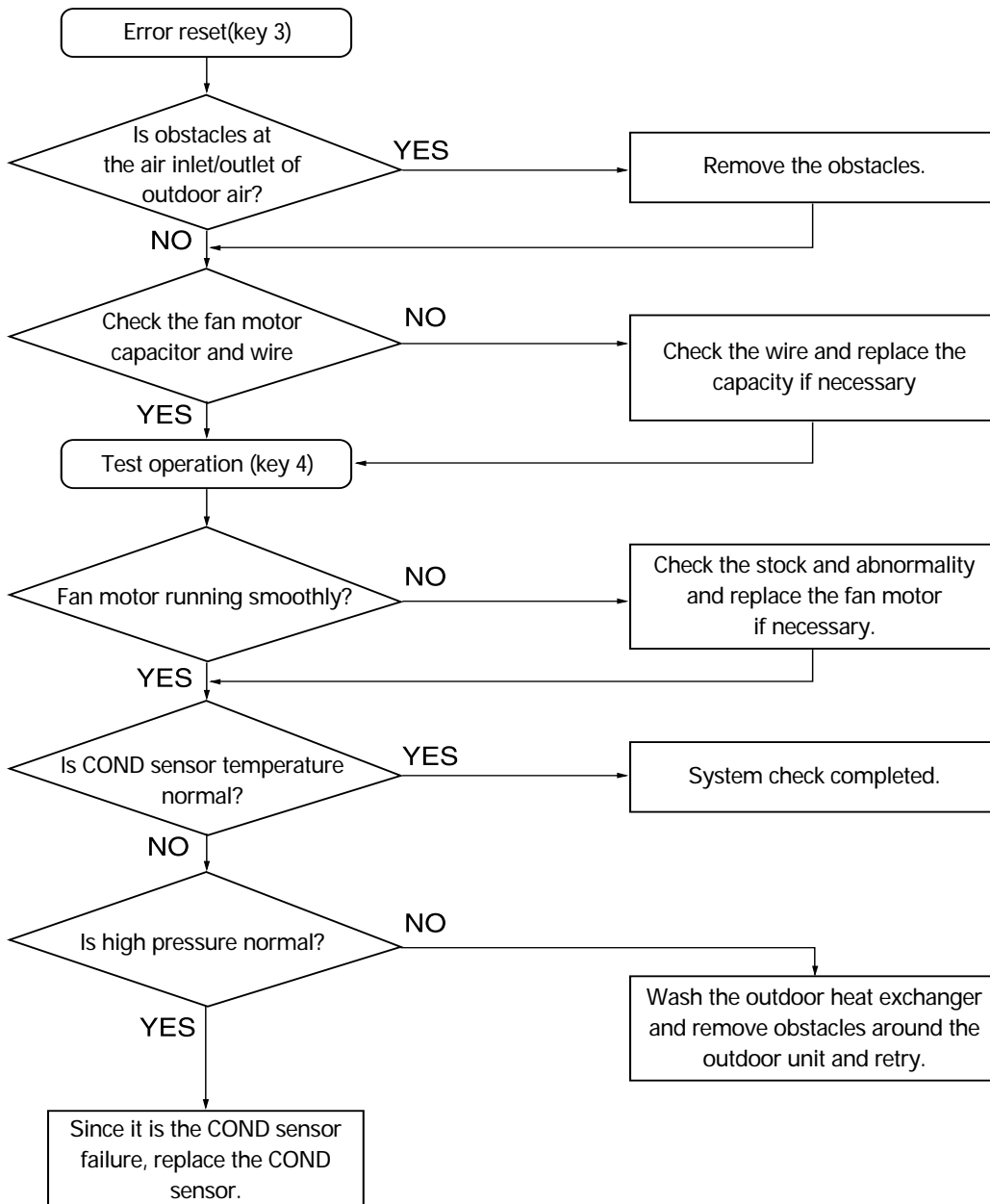
\* After leaving the outdoor unit for one hour before test operation compare COND sensor temperature with that of OATS, and if COND sensor temperature is 10°C higher, it is sensor defect. Replace the COND sensor.



### 2-3. COND DOWN due to the SUMP control

Outdoor unit display	<i>Er → P2</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Stop and re-start when condensate temperature of compressor is 67°C. System down error when detection is made 6 times(counter cleared if no detection for 1 hour)
Causes	<ul style="list-style-type: none"> <li>● Outdoor fan motor trouble(stocked, defect)</li> <li>● Fan motor capacitor defect or wire open/COND sensor defect</li> <li>● Polluted outdoor heat exchanger</li> </ul>

\* After leaving the outdoor unit for one hour before test operation compare COND sensor temperature with that of OATS, and if COND sensor temperature is 10°C higher, it is sensor defect. Replace the COND sensor.



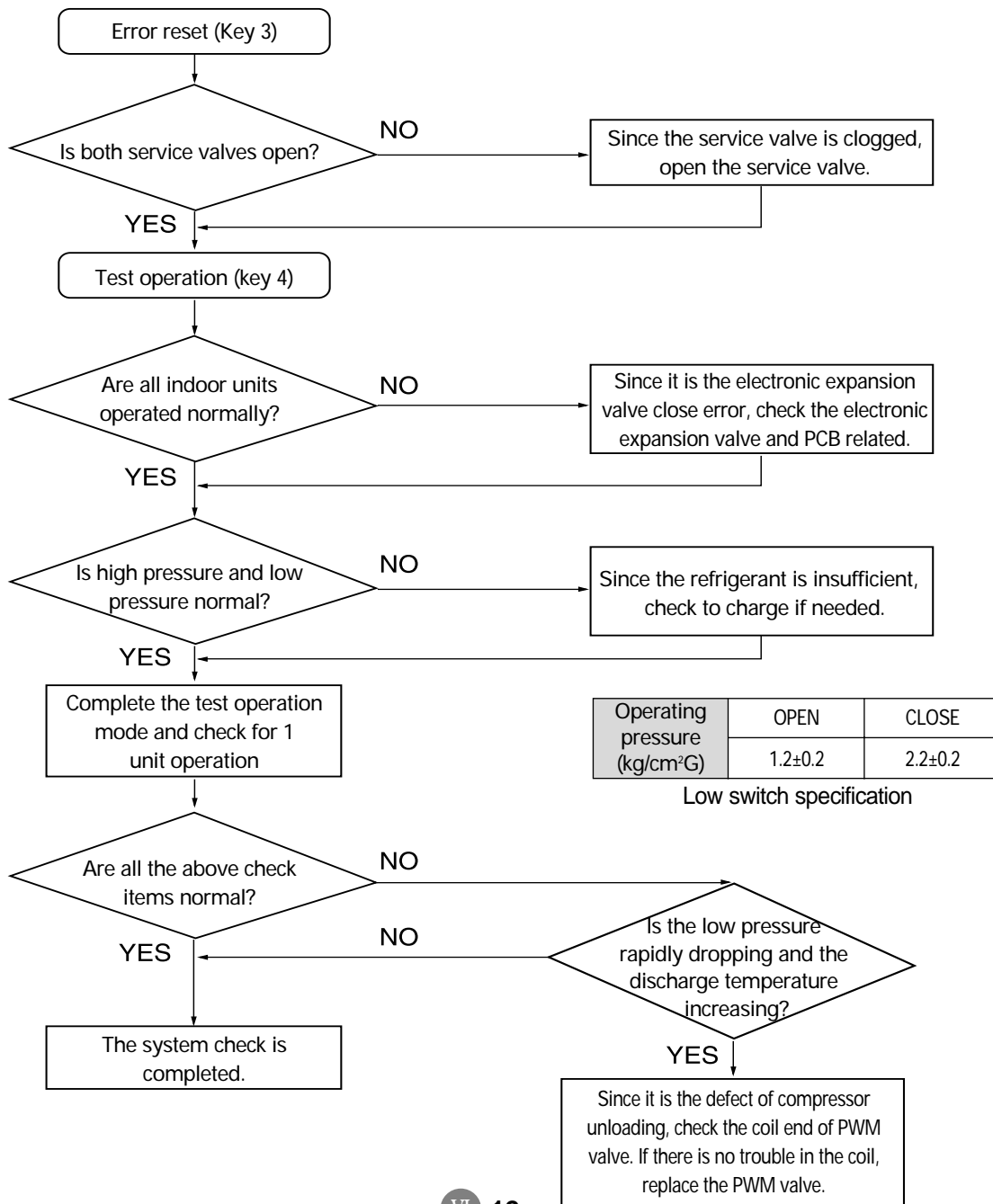


# 1. Operation flow of outdoor unit

## 2-4. Low pressure switch detection

Outdoor unit display	<i>Er → P3</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	<ul style="list-style-type: none"> <li>● Operation stop when low pressure is lower than 0.5kg/cm<sup>2</sup>G(sensor open)</li> <li>System down if the two times of the same situation occurs after restarting (Counter cleared if no defection for 1 hour)</li> </ul>
Causes	<ul style="list-style-type: none"> <li>● Low temperature start(outdoor temperature is lower than -5°C)</li> <li>● Leakage / Shortage of refrigerant</li> <li>● Compressor unloading failure</li> <li>● Service valve clogged/electronic expansion valve clogged</li> </ul>

\* The minimum applicable temperature of DVM is -5°C and the system may not operate normally below the temperature by the low pressure switch.

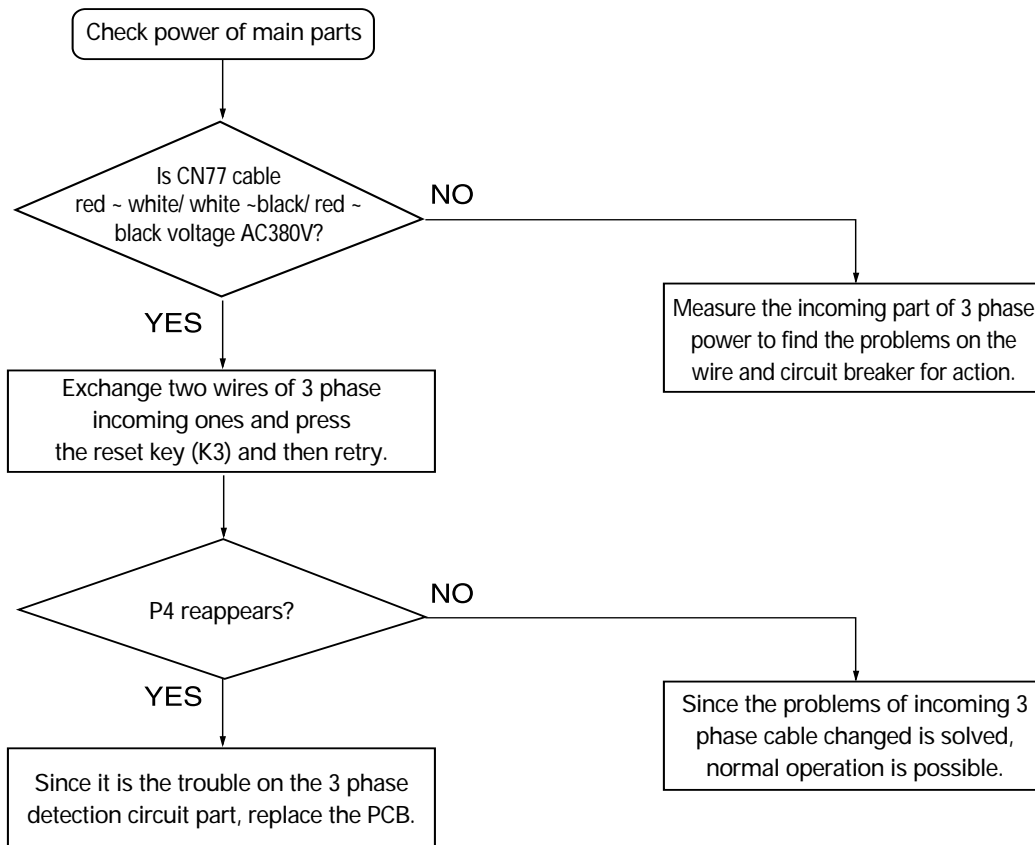
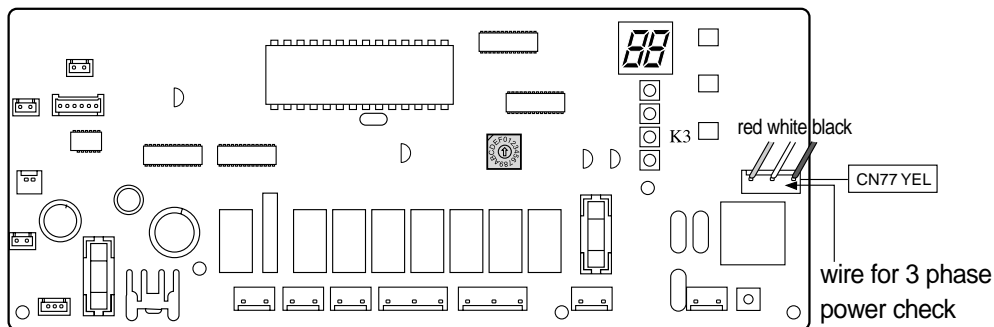


## 2-5. Reverse phase detection of 3 phase power

Outdoor unit display	<i>E<sub>r</sub>↔P4</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	<ul style="list-style-type: none"> <li>● One of the phase voltages or all of them are not incoming, comparing the sequence of 3 phase circuit wave</li> <li>(P4 error is automatically reset when the phase voltage is restored)</li> </ul>
Causes	<ul style="list-style-type: none"> <li>● Incorrect connection of 3 phase power L1 (R), L2(S) and L3(T)/ 3 phase power is not on</li> </ul>

### ■ Check items

- Check the 3 phase detection part power of outdoor unit PCB.
- Check the color of red, white and black of the cable for 3 phase detection part connectors L1(R), L2(S) and L3(T) (Take care that the color and sequence are not changed.)



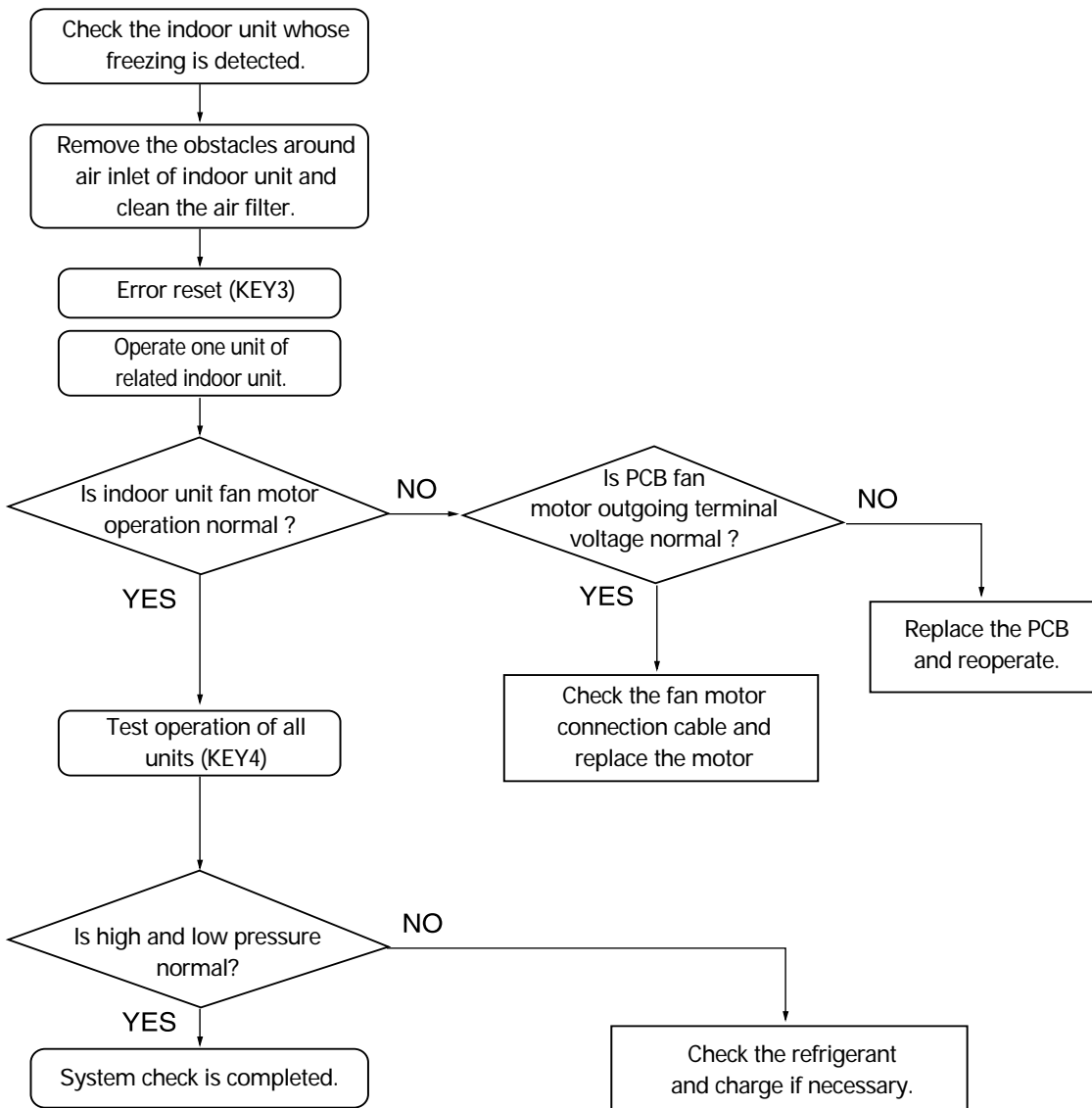


## 2. Self-diagnosis by the outdoor unit error display

### 2-6. Freezing of heat exchanger

Outdoor unit display	<i>Er</i> → <i>P5</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● When the indoor unit heat exchanger temperature is kept at -4°C for more than 40 seconds
Causes	<ul style="list-style-type: none"> <li>● Indoor fan motor stocked or bad</li> <li>● Electronic expansion valve open error</li> </ul>

\* The indoor unit may be frozen instantaneously if outdoor temperature is too low (lower than -5°C) or many indoor units are off at the same time.



## 2-7. Momentary power failure

Outdoor unit display	<i>Er</i> ↔ <i>P6</i>
Indoor unit display	-
Judgment method	● Temporary stop of the compressor due to momentary power failure
Causes	● Protection control of compressor (Not a defect)

## 2-8. Protection of high pressure sensor

Outdoor unit display	<i>Er</i> ↔ <i>P7</i>
Indoor unit display	-
Judgment method	● Condensate pressure of compressor is more than 28kg/cm <sup>2</sup> G
Causes	

\* Stop compressor when condensate pressure of the compressor is more than 28kg/cm<sup>2</sup>G and re-start the compressor after 3 minutes if the pressure is less than 21kg/cm<sup>2</sup>G.

## 2-9. Protection of low pressure sensor

Outdoor unit display	<i>Er</i> ↔ <i>P8</i>
Indoor unit display	-
Judgment method	● When the low pressure is less than 3kg/cm <sup>2</sup> G for 2 seconds in cooling before PUMP DOWN START
Causes	

\* Stop compressor when the low pressure is less than 3kg/cm<sup>2</sup>G in cooling (1.5kg/cm<sup>2</sup>G in heating) before PUMP DOWN START.



## 2. Self-diagnosis by the outdoor unit error display

### 2-10. In removing frost

Outdoor unit display	<i>Er ↔ P9</i>
Indoor unit display	○ (Operation) X (Timer) X (Fan) X (Filter) ○ (Removing frost)
Judgment method	● In removing frost
Causes	

### 2-11. Protection control of condensation ratio

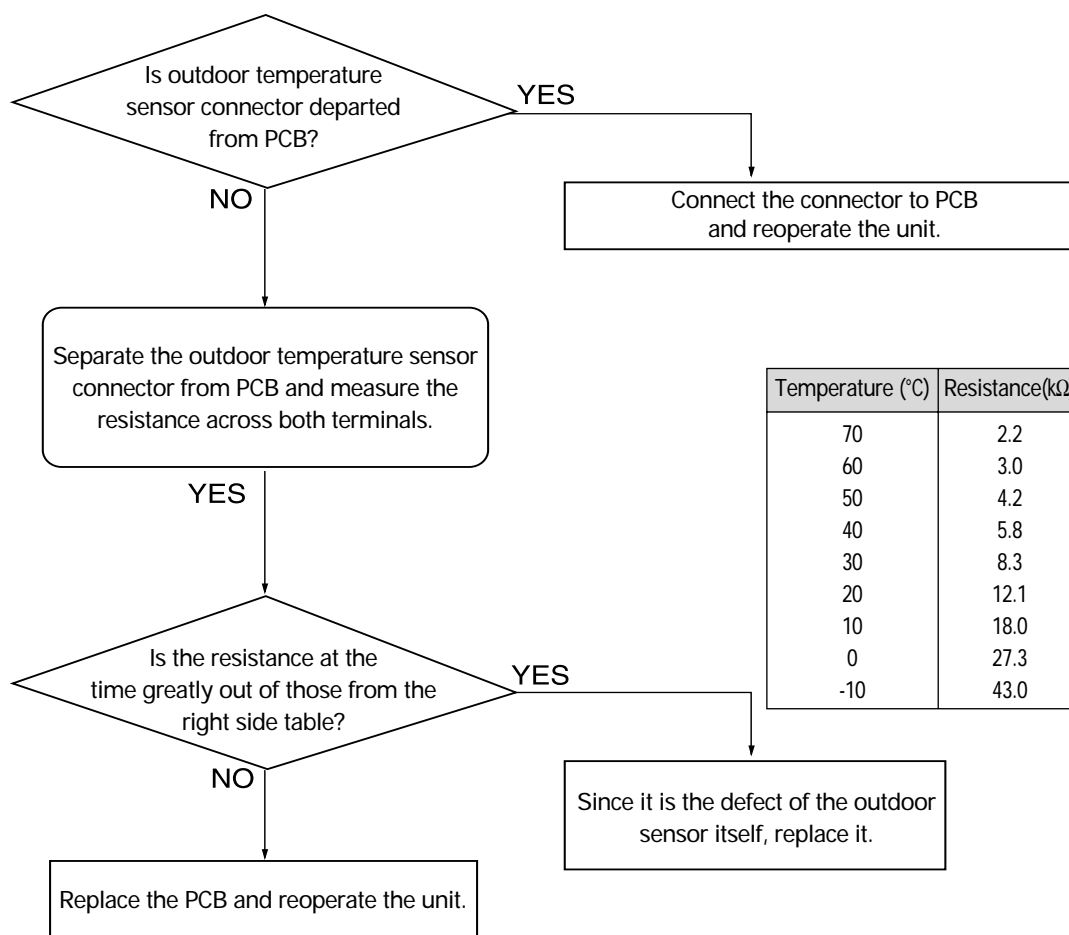
Outdoor unit display	<i>Er ↔ PA</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	
Causes	

\* Condensation ratio = (High pressure+1.03)/(Low pressure+1.03)

\* Stop the compressor when the condensation ratio is more than 8.5 for 10 minutes

## 2-12. Outdoor temperature sensor error

Outdoor unit display	<i>E r ↔ t 1</i>
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor temperature sensor
Causes	● Wire open or current leak of related sensor



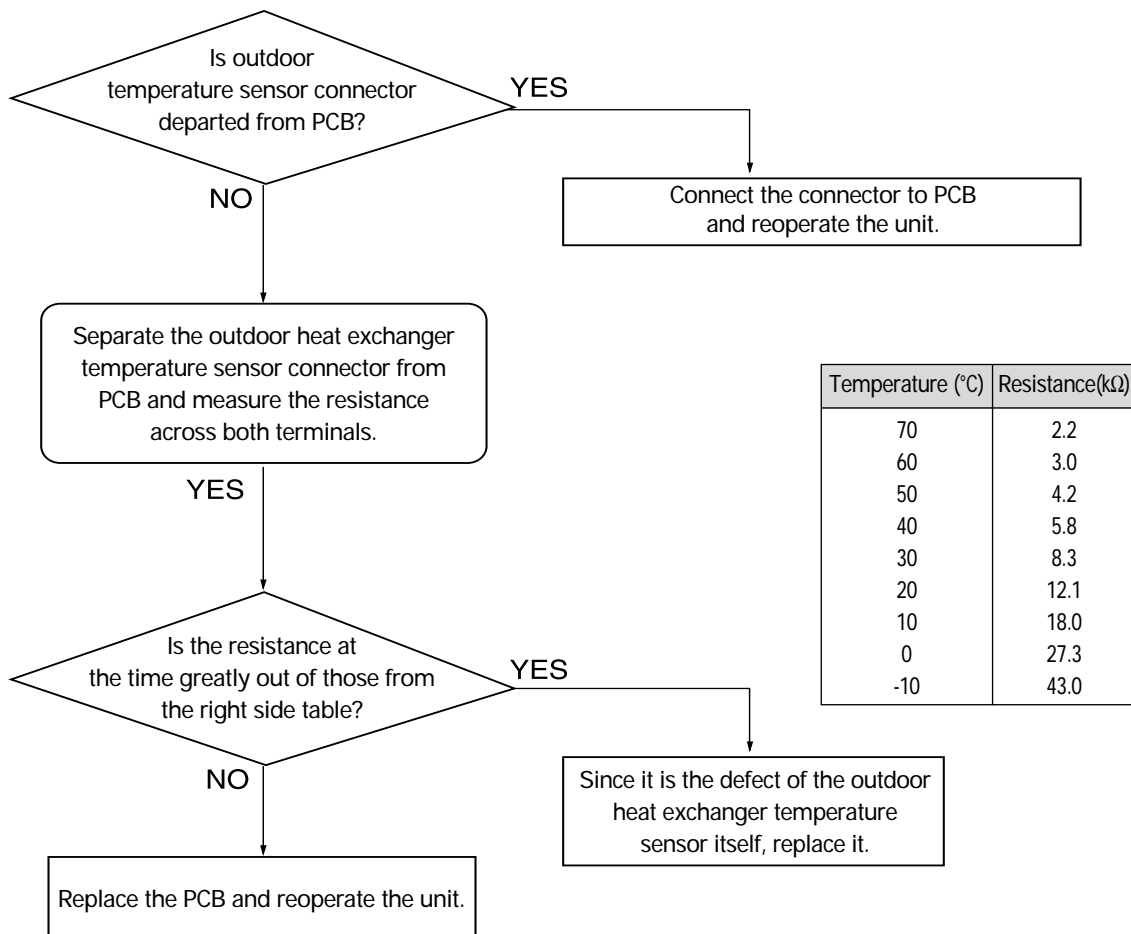




## 2. Self-diagnosis by the outdoor unit error display

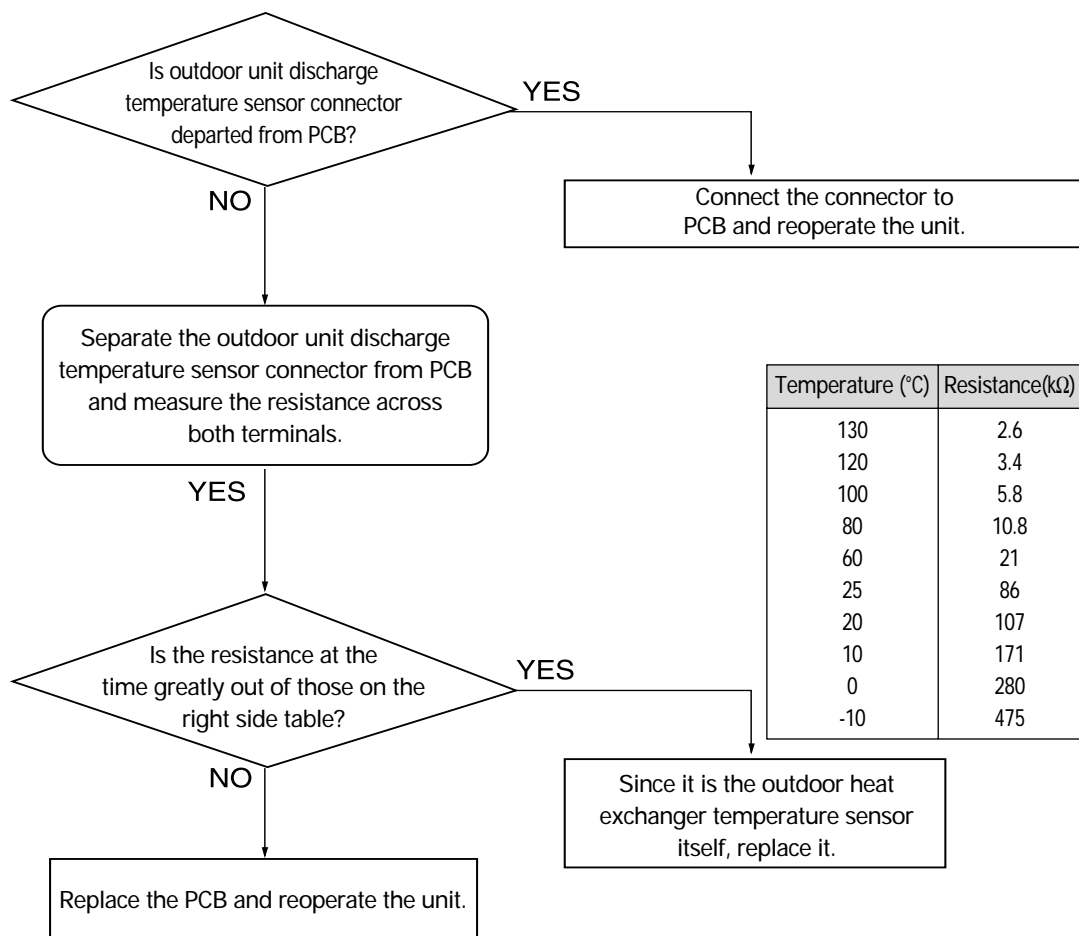
### 2-13. Outdoor unit heat exchanger temperature sensor error (open/short)

Outdoor unit display	$E_r \leftrightarrow t_2$
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor heat exchanger temperature sensor
Causes	● Wire open or current leak of related sensor



## 2-14. Discharge temperature sensor error (open/close)

Outdoor unit display	$E_r \leftrightarrow t3$
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor heat exchanger temperature sensor
Causes	● Wire open or current leak of related sensor

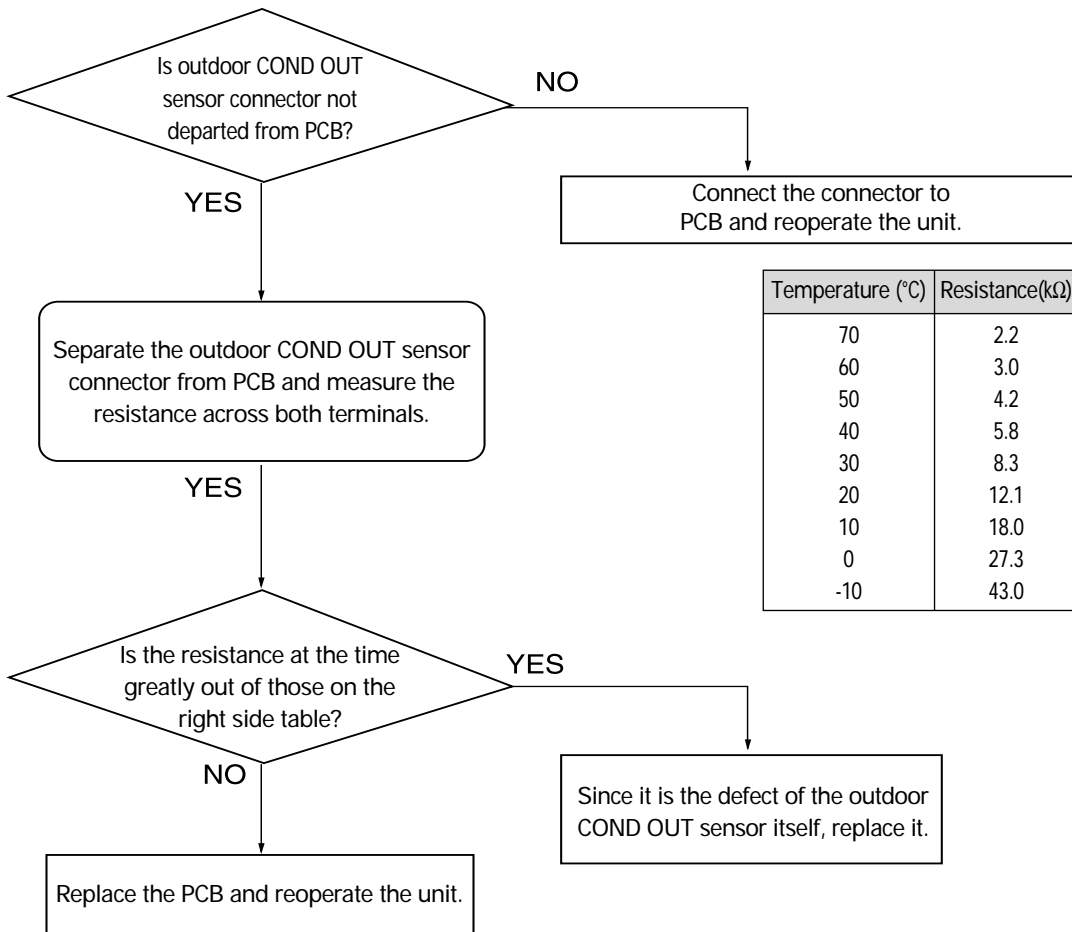




## 2. Self-diagnosis by the outdoor unit error display

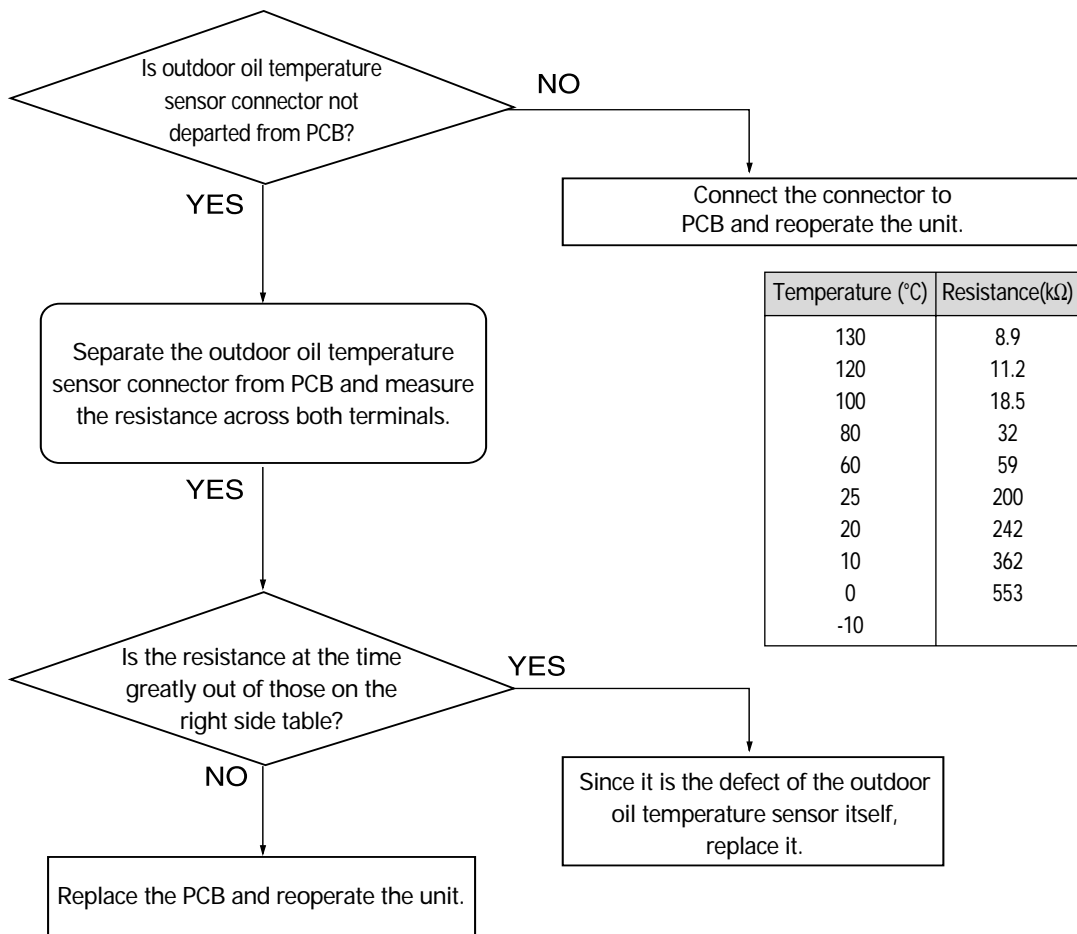
### 2-15. COND OUT temperature sensor error (open / short)

Outdoor unit display	<i>Er ↔ E4</i>
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor COND OUT sensor
Causes	● Wire open or current leak of related sensor



## 2-16. Oil temperature sensor error (open / short)

Outdoor unit display	<i>E<sub>r</sub> → t5</i>
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor oil temperature sensor
Causes	● Wire open or current leak of related sensor

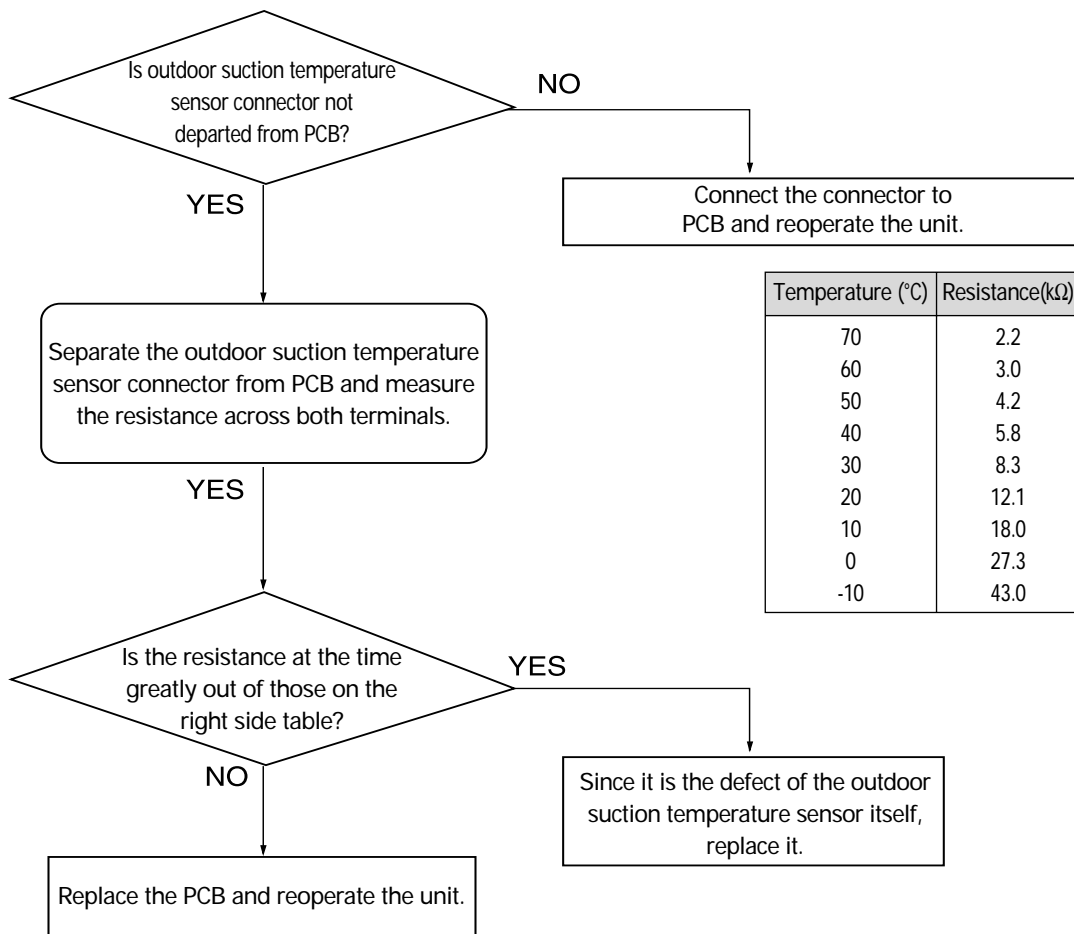




## 2. Self-diagnosis by the outdoor unit error display

### 2-17. Suction temperature sensor error (open / short)

Outdoor unit display	<i>Er ↔ t5</i>
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor COND OUT sensor
Causes	● Wire open or current leak of related sensor



## 2-18. High pressure sensor error (open/short)

Outdoor unit display	$E_r \leftrightarrow t 7$
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor high pressure
Causes	● Wire open or defect of related sensor

### ■ Detection of high/low pressure sensor error

- (1) Skips the detection during the oil recovery operation and detects again from 5 minutes after completion of the operation.
- (2) Skips the detection during the safety start operation and detects again from 5 minutes after the completion of the operation.
- (3) Skips the detection during the removing frost operation and detects again from 5 minutes after the completion of the operation.
- (4) Detection of the short error: less than 0.5V
- (5) Skips the detection of the low pressure error during charge/recovery of refrigerant

## 2-19. Low pressure sensor error (open/short)

Outdoor unit display	$E_r \leftrightarrow t 8$
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor low pressure
Causes	● Wire open or defect of related sensor

### ■ Detection of high/low pressure sensor error

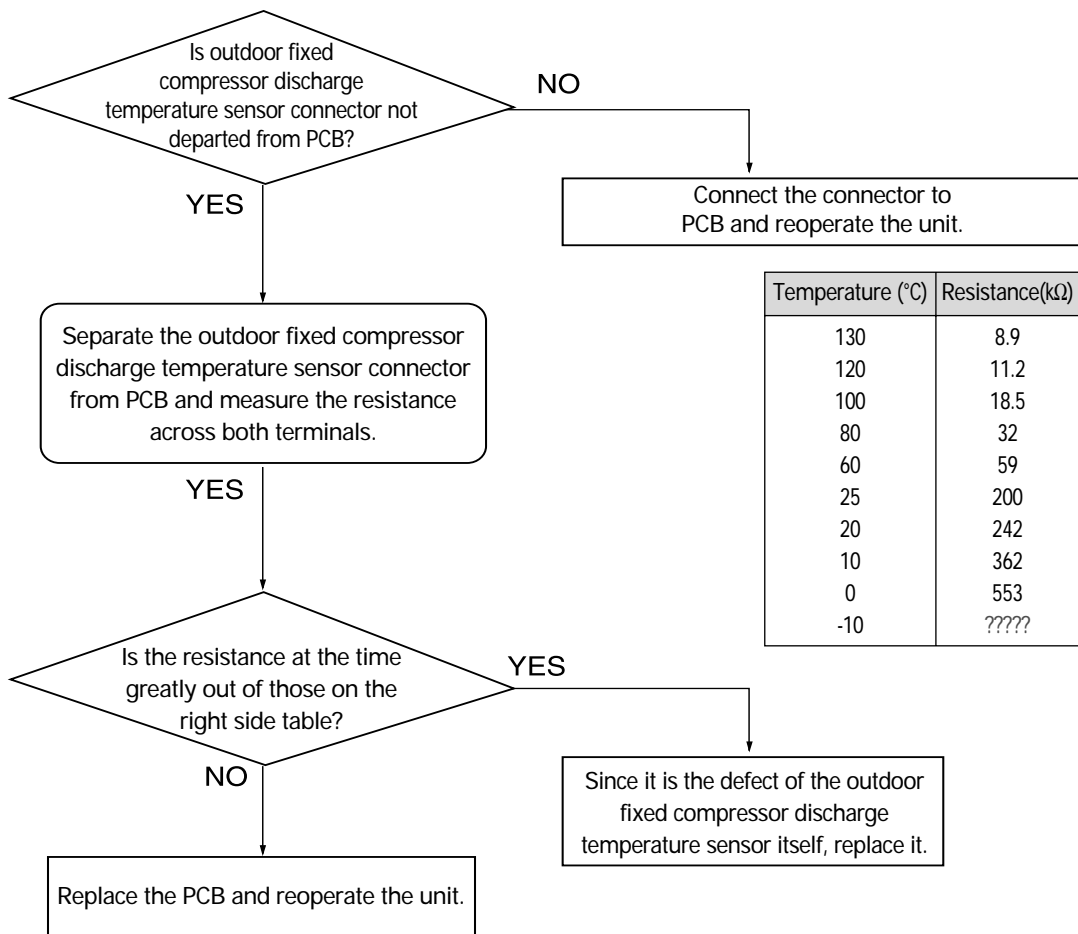
- (1) Skips the detection during the oil recovery operation and detects again from 5 minutes after completion of the operation.
- (2) Skips the detection during the safety start operation and detects again from 5 minutes after the completion of the operation.
- (3) Skips the detection during the removing frost operation and detects again from 5 minutes after the completion of the operation.
- (4) Detection of the short error: less than 0.5V
- (5) Skips the detection of the low pressure error during charge/recovery of refrigerant



## 2. Self-diagnosis by the outdoor unit error display

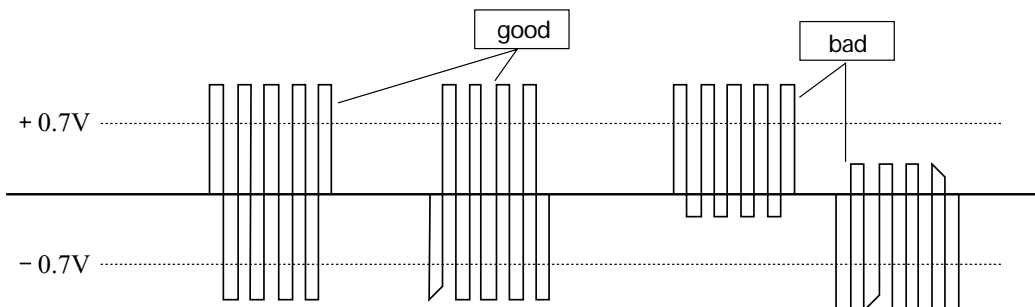
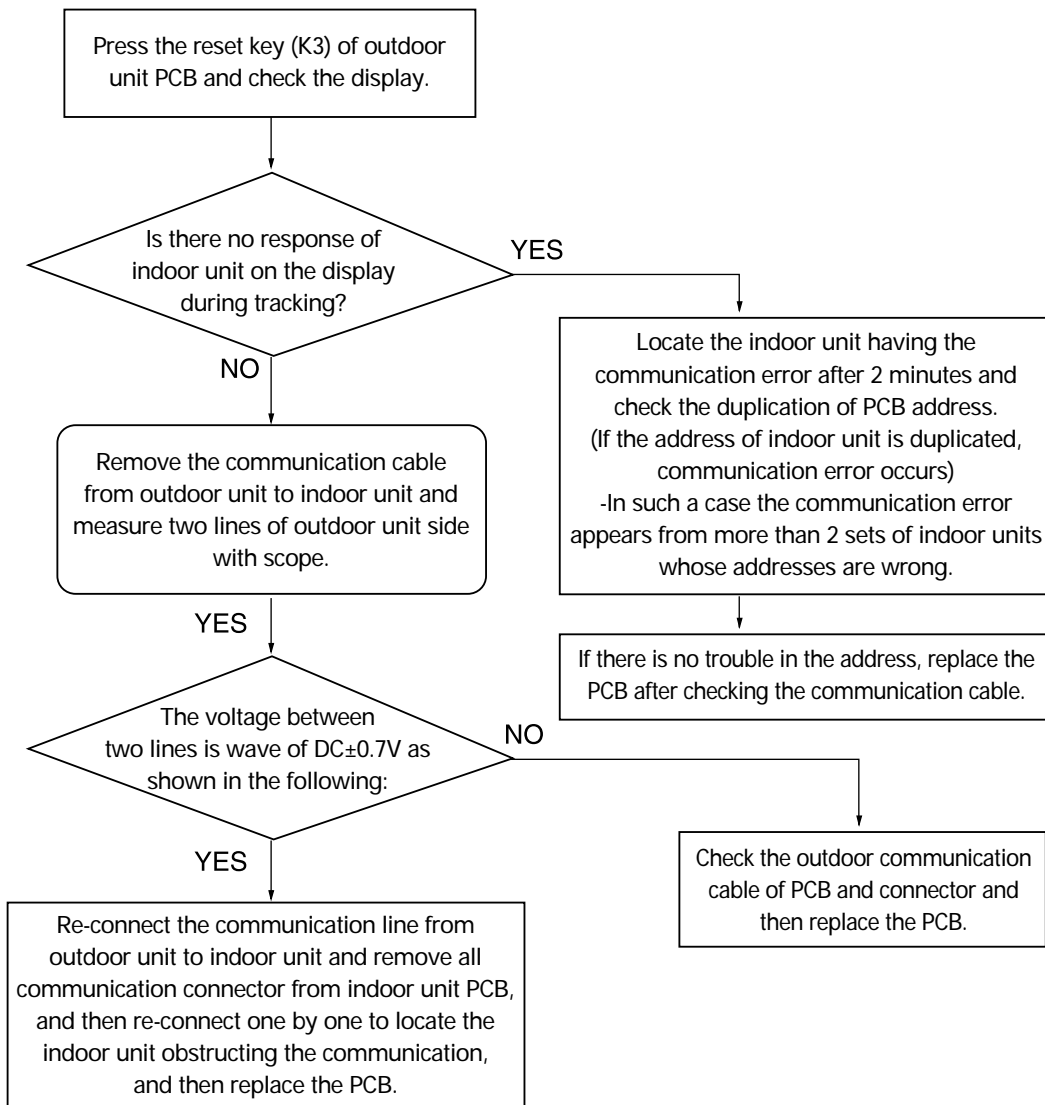
### 2-20. Fixed compressor discharge temperature sensor error (open / short)

Outdoor unit display	<i>Er</i> → <i>t9</i>
Indoor unit display	● (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Wire open or short of outdoor fixed compressor discharge temperature sensor
Causes	● Wire open or current leak of related sensor



## 2-21. Communication error after completion of tracking

Outdoor unit display	$E_r \leftrightarrow E_1$
Indoor unit display	X (Operation) ● (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● In case that the communication is not available for 2 minutes during operation between indoor and outdoor unit.
Causes	● Communication error between indoor unit and outdoor unit



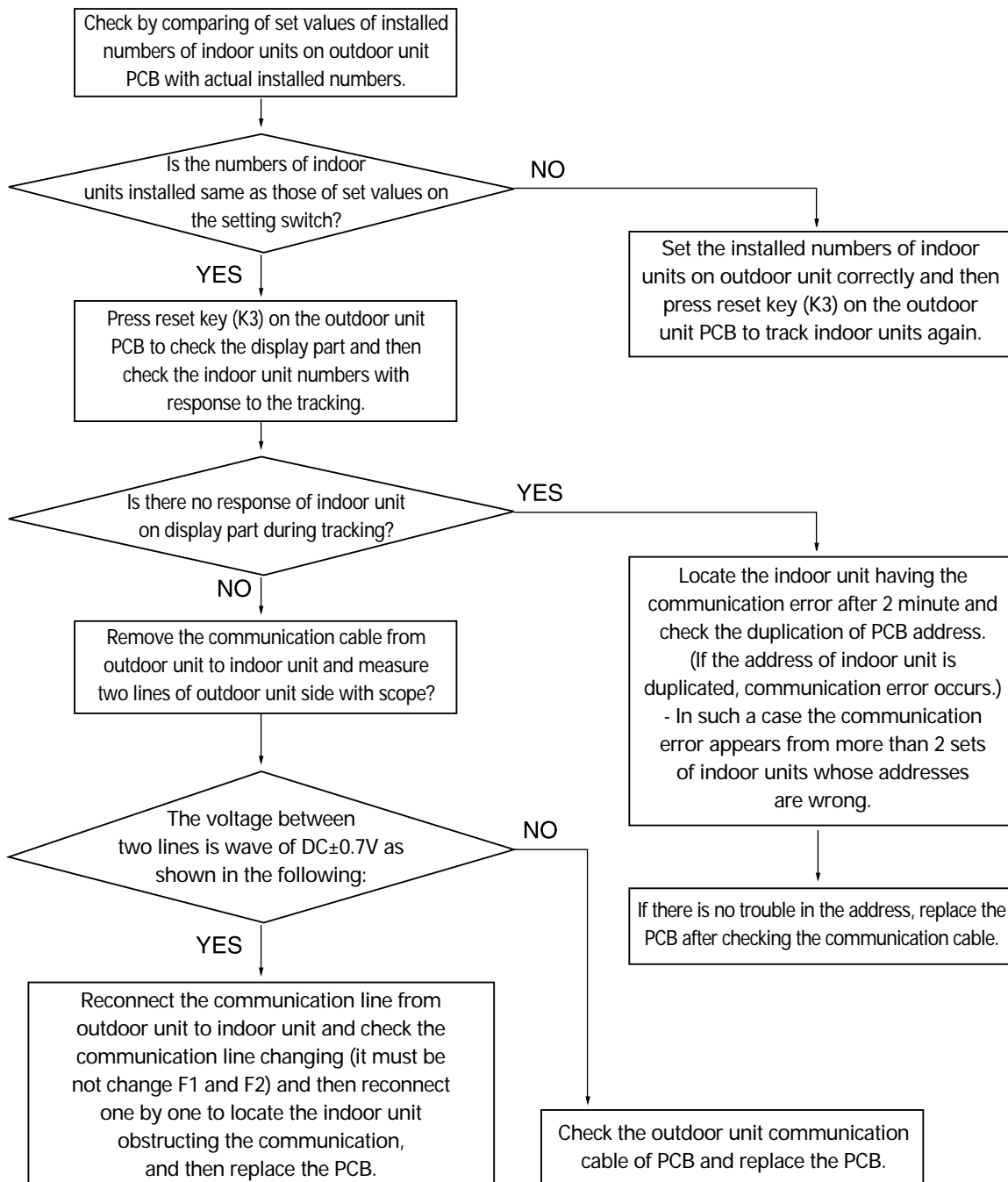




## 2. Self-diagnosis by the outdoor unit error display

### 2-22. Communication error in tracking

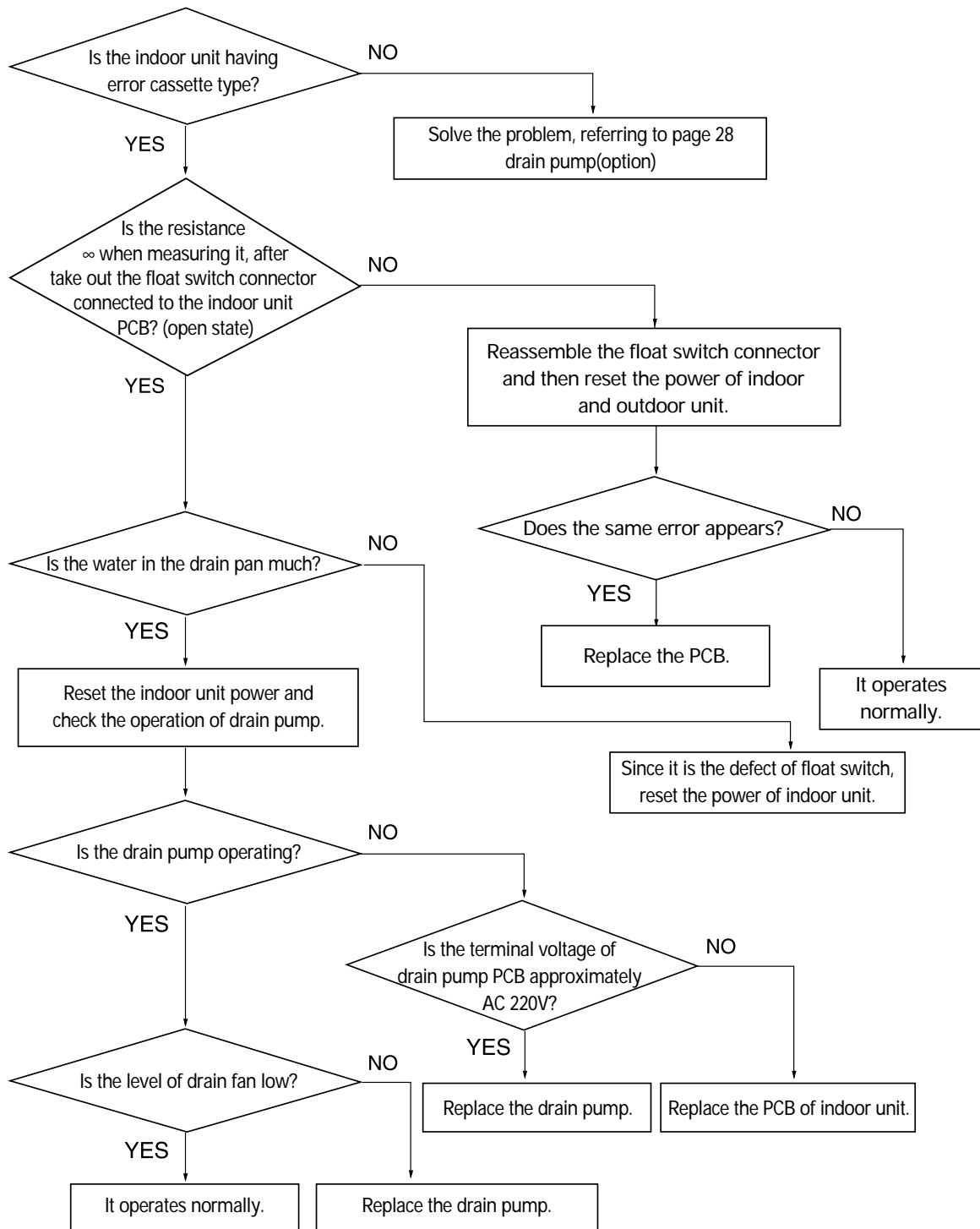
Outdoor unit display	$E_1 \rightarrow E_2$
Indoor unit display	X (Operation) ● (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Mismatching of the indoor unit numbers set with those communicated during outdoor unit tracking.
Causes	● Communication error between indoor unit and outdoor unit, and switch setting error for installed numbers.



## 2-23. Indoor unit float switch error

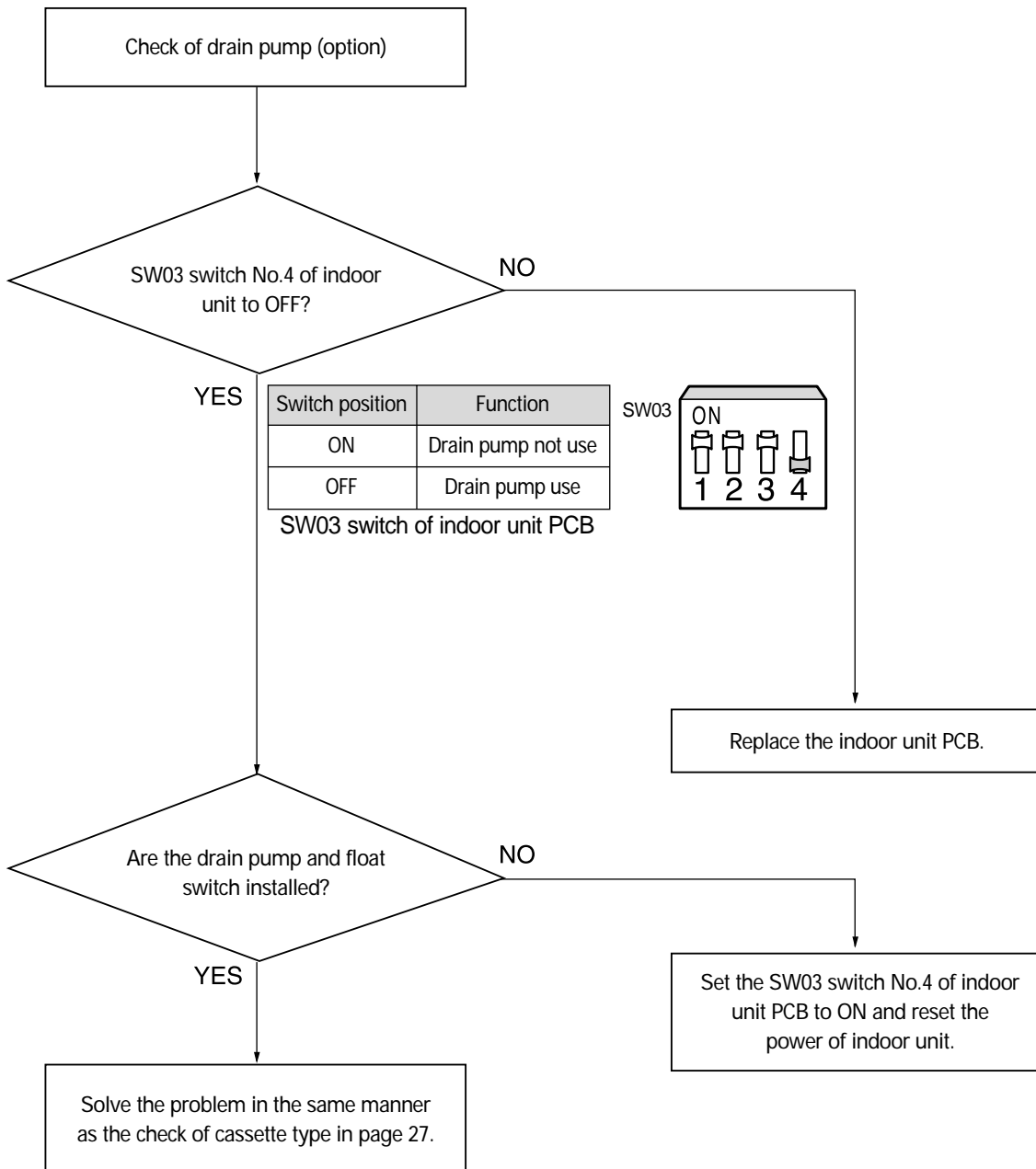
Outdoor unit display	<i>E<sub>r</sub></i> ↔ <i>E<sub>3</sub></i>
Indoor unit display	X (Operation) X (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● When the indoor unit float switch is open for longer than 1 minute
Causes	● Drain fan level increase due to the indoor unit drain pump failure, detection sensor bad

\* E3 error is reset when the power of indoor unit is reset.





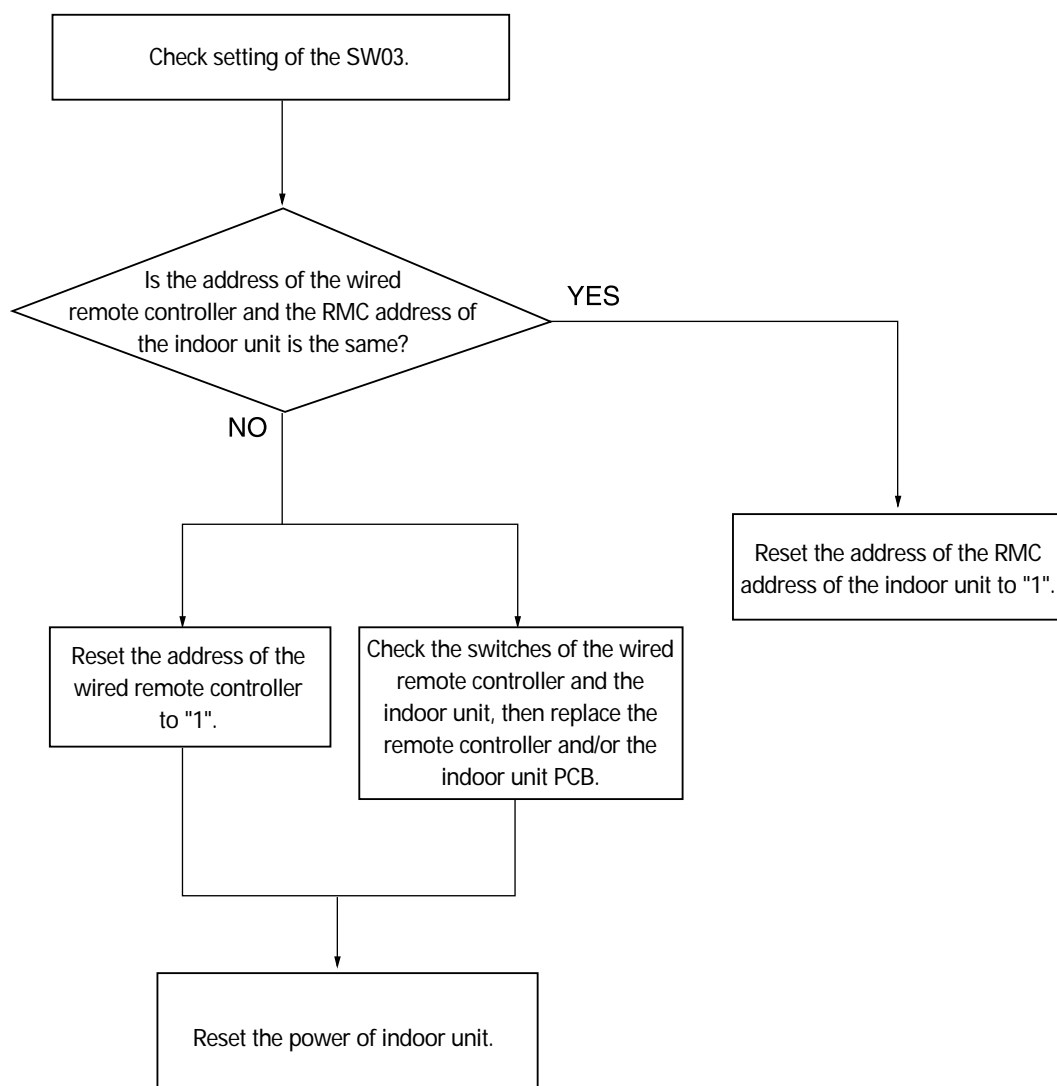
## 2. Self-diagnosis by the outdoor unit error display



## 2-24. Setting error of option switch in indoor unit

Outdoor unit display	<i>E<sub>r</sub> → E<sub>5</sub></i>
Indoor unit display	X (Operation) ● (Timer) X (Fan) ● (Filter) X (Removing frost)
Judgment method	● Switch setting error for using the wired remote controller
Causes	● Option switch setting error of indoor unit

\* The error is occurred when the option switch for using the remote controller, No.1 switch on SW03, is set and the wired remote controller address is different from the RMC address of indoor unit.





## 2. Self-diagnosis by the outdoor unit error display

### 2-25. Breakaway of indoor unit EVAP IN sensor

Outdoor unit display	$E_r \leftrightarrow A^x$ (Breakaway error of xth indoor unit EVAP IN piping sensor)
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● EVAP IN piping sensor of indoor unit departed

#### (1) Judgment method (The following conditions should be satisfied for more than 20 minutes)

##### 1) In cooling mode

Tcond, mid-Tair, out > 3°C	OK
Tcond, out - Tair, out > 3°C	OK
Tair, in - Teva, in > 4°C	NO
Tair, in - Teva, out > 4°C	OK
Compressor operating & indoor unit operating and thermo on	OK
Error contents	Breakaway of indoor unit inlet sensor

##### 2) In heating mode

Average of high pressure > 15kg/cm <sup>2</sup>	OK
Average of low pressure > 5kg/cm <sup>2</sup>	OK
Teva, in - Tair, in ≥ 3°C	NO
Teva, in - Tair, in ≥ 2°C	OK
Tcond, out - Tair, out < 2°C	OK
Compressor operating & indoor unit operating and thermo on	OK
Error contents	Breakaway of indoor unit inlet sensor

#### (2) Check method

Check the breakaway of indoor unit EVAP IN sensor and then reassemble to correct.

## 2-26. Breakaway of indoor unit EVAP OUT sensor

Outdoor unit display	$E_r \leftrightarrow b^x$ (Breakaway error of xth indoor unit EVAP OUT piping sensor)
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● EVAP out piping sensor of indoor unit departed

### (1) Judgment method (The following conditions should be satisfied for more than 20 minutes)

#### 1) In cooling mode

Tcond, mid-Tair, out > 3°C	OK
Tcond, out - Tair, out > 3°C	OK
Tair, in - Teva, in > 4°C	OK
Tair, in - Teva, out > 4°C	NO
Compressor operating & indoor unit operating and thermo on	OK
Error contents	Breakaway of indoor unit outlet sensor

#### 2) In heating mode

Average of high pressure > 15kg/cm <sup>2</sup>	OK
Average of low pressure > 5kg/cm <sup>2</sup>	OK
Teva, in - Tair, in ≥ 3°C	OK
Teva, in - Tair, in ≥ 2°C	NO
Tcond, out - Tair, out < 2°C	OK
Compressor operating & indoor unit operating and thermo on	OK
Error contents	Breakaway of indoor unit outlet sensor

### (2) Check method

Check the breakaway of indoor unit EVAP OUT sensor and then reassemble to correct.



## 2. Self-diagnosis by the outdoor unit error display

### 2-27. Electronic expansion valve open error

Outdoor unit display	$E_r \leftrightarrow \bar{L}^x$ (Open error of xth electronic expansion valve)
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Indoor unit electronic expansion valve open error

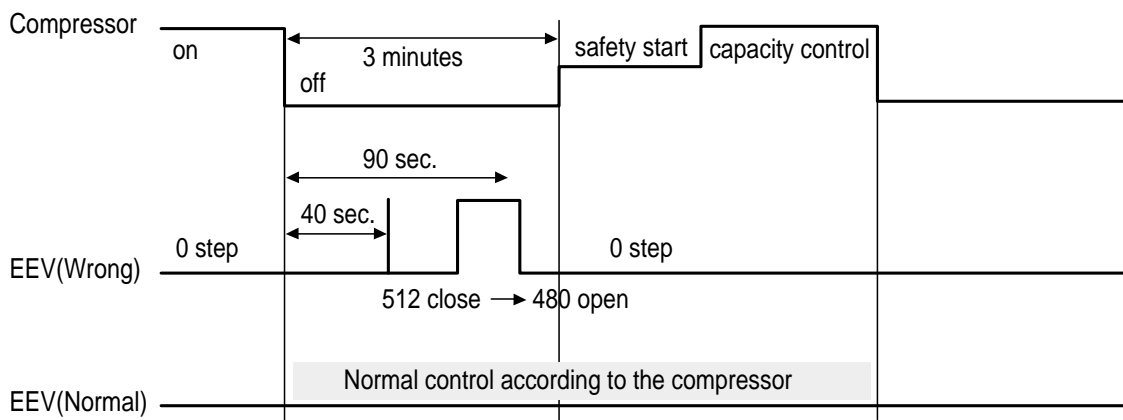
#### (1) Judgment method

Compressor is on in cooling operation & inlet/outlet temperature of stopped indoor unit is below 0°C for 2.5 minutes.

#### (2) Judgment time

Starts detecting after 5 minutes from completion of the safety start.

#### (3) Control



#### (4) Check method

- 1) Check whether the electronic expansion valve wire is connected correctly to the indoor unit PCB.
- 2) Open the electronic expansion valve kit to check whether the electronic expansion valve coil is correctly inserted.
- 3) Press the reset key (K3) of outdoor unit to check whether the same error appears.
  - If it is the close error, operate the related indoor unit.
  - If it is open error, put the related power off to check.
- 4) If there is no trouble for the above check items, replace the electronic expansion valve.
  - Since the replacement of electronic expansion valve is the inconvenient work to recover the all refrigerant in the system, be sure to check the above items before replacing it.

## 2-28. Electronic expansion valve close error

Outdoor unit display	$E_r \leftrightarrow d^x$ (Close error of xth electronic expansion valve)
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Indoor unit electronic expansion valve close error

### (1) Judgment method

1) In cooling mode (The following conditions shall be satisfied for more than 20 minutes)

Tcond, mid-Tair, out > 3°C	OK
Tcond, out - Tair, out > 3°C	OK
Tair, in - Teva, in > 4°C	NO
Tair, in - Teva, out > 4°C	NO
Compressor operating & indoor unit operating and thermo on	OK
Error contents	Electronic expansion valve close error

2) In heating mode (All following conditions should be satisfied)

- ① More than 2 indoor units are operating in THEMO ON heating mode.
- ② Average of high pressure is more than 18kg/cm<sup>2</sup>.
- ③ 5 minutes after completion of the safety start.
- ④ The condition of 'indoor unit T(EVA\_in)<T(room)+3°C and T(EVA\_out)<T(room)+3°C' is maintained for 5 minutes.

### (2) Check method

- 1) Check whether the electronic expansion valve wire is connected correctly to the indoor unit PCB.
- 2) Open the electronic expansion valve kit to check whether the electronic expansion valve coil is correctly inserted.
- 3) Press the reset key (K3) of outdoor unit to check whether the same error appears.
  - If it is the close error, operate the related indoor unit.
  - If it is open error, put the related power off to check.
- 4) If there is no trouble for the above check items, replace the electronic expansion valve.
  - Since the replacement of electronic expansion valve is the inconvenient work to recover the all refrigerant in the system, be sure to check the above items before replacing it.





## 2. Self-diagnosis by the outdoor unit error display

### 2-29. Breakaway of EVAP IN, OUT sensors

Outdoor unit display	$E_r \leftrightarrow F^x$ (Breakaway error of xth indoor unit EVAP IN, OUT piping sensor)
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● EVAP IN, OUT piping sensor of indoor unit departed

#### (1) Judgment method (The following conditions should be satisfied for more than 20 minutes)

##### 1) In cooling mode

Tcond, mid-Tair, out > 3°C	OK	OK
Tcond, out - Tair, out > 3°C	OK	OK
Tair, in - Teva, in > 4°C	NO	OK
Tair, in - Teva, out > 4°C	OK	NO
Compressor operating & indoor unit operating and thermo on	OK	OK
Error contents	Breakaway of indoor unit inlet sensor	Breakaway of indoor unit outlet sensor

##### 2) In heating mode

Average of high pressure > 15kg/cm <sup>2</sup>	OK	OK
Average of low pressure > 5kg/cm <sup>2</sup>	OK	OK
Teva, in - Tair, in ≥ 3°C	NO	OK
Teva, in - Tair, in ≥ 2°C	OK	NO
Tcond, out - Tair, out < 2°C	OK	OK
Compressor operating & indoor unit operating and thermo on	OK	OK
Error contents	Breakaway of indoor unit inlet sensor	Breakaway of indoor unit outlet sensor

#### (2) Check method

Check the breakaway of each sensor and then reassemble to correct.

## 2-30. Total leakage of outdoor refrigerant / Loading failure

Outdoor unit display	$E_r \leftrightarrow G_2$
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Leakage of outdoor unit refrigerant ● Loading failure

### (1) Judgement method (The following conditions should be satisfied for more than 20 minutes)

#### 1) In cooling mode

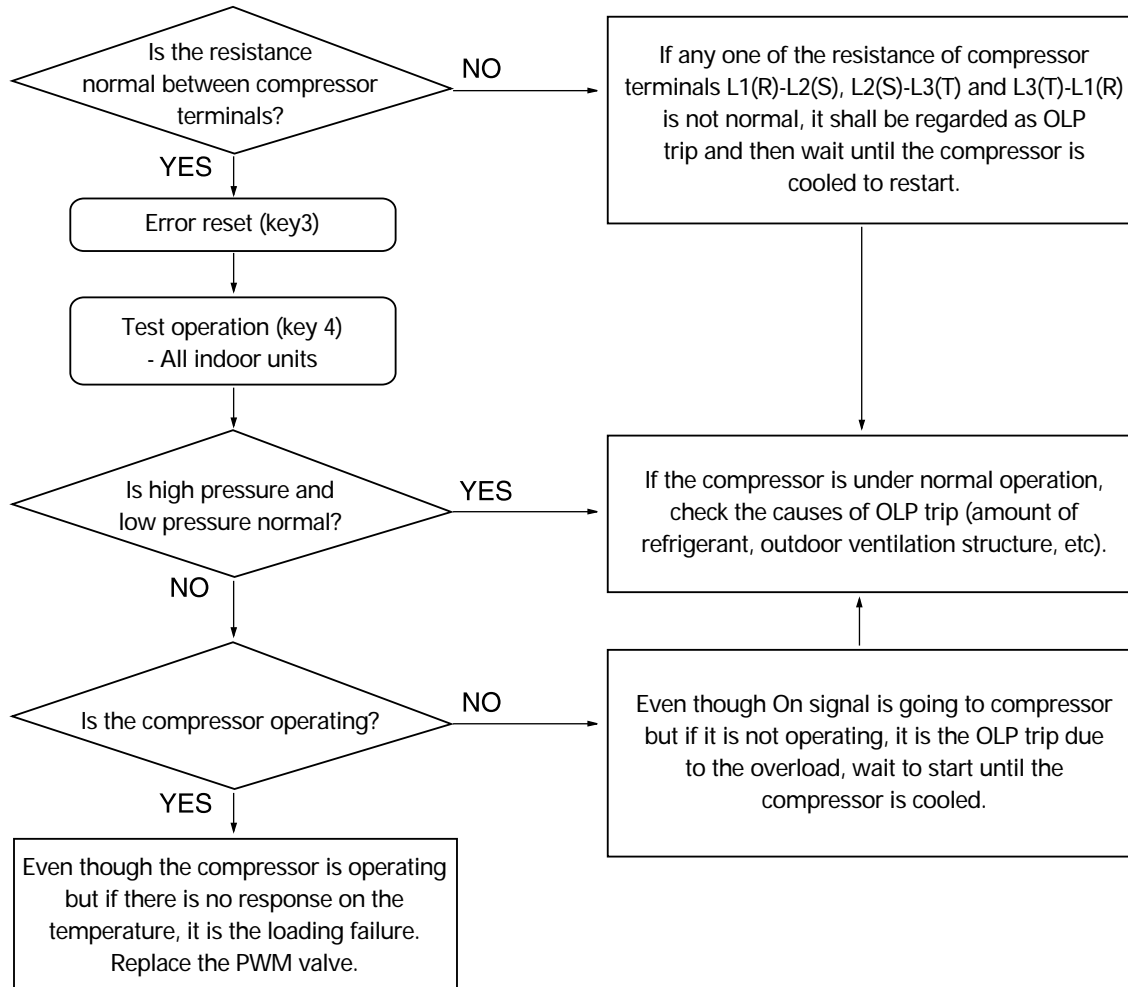
Tcond, mid-Tair, out > 3°C	NO
Tcond, out - Tair, out > 3°C	NO
Tair, in - Teva, in > 4°C	NO
Tair, in - Teva, out > 4°C	NO
Compressor operating & indoor unit operating and thermo on	OK
Error contents	● Total leakage of outdoor unit refrigerant ● Loading failure / OLP Trip

#### 2) In heating mode

Average of high pressure > 15kg/cm <sup>2</sup>	NO
Average of low pressure > 5kg/cm <sup>2</sup>	NO
Teva, in - Tair, in ≥ 3°C	NO
Teva, in - Tair, in ≥ 2°C	NO
Tcond, out - Tair, out < 2°C	NO
Compressor operating & indoor unit operating and thermo on	OK
Error contents	● Total leakage of outdoor unit refrigerant ● Loading failure / OLP Trip



## 2. Self-diagnosis by the outdoor unit error display



### (2) Caution

- 1) The replacement of PWM valve due to the loading failure is the difficult work to abolish the refrigerant in the system and recharge it, and there is little possibility to appear actually. So check the above check items carefully.
- 2) The restart is possible only when the inside temperature of compressor is down lower than 60°C, and therefore it takes about 2-3 hours.
- 3) If waiting at the state that the power is on during the temperature falling down. CCH (crank case heater) operates to delay the time to restart. Accordingly, separate the connector to the CCH (crank case heater) to block the power and reconnect the connector after the completion of final check.

## 2-31. Breakaway of outdoor unit COND sensor

Outdoor unit display	$E_r \leftrightarrow E_3$ (Breakaway error of outdoor COND sensor)
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Outdoor COND sensor departed

### (1) Judgement method (The following conditions should be satisfied for more than 20 minutes)

#### 1) In cooling mode

Tcond, mid-Tair, out > 3°C	NO
Tcond, out - Tair, out > 3°C	OK
Tair, in - Teva, in > 4°C	OK
Tair, in - Teva, out > 4°C	OK
Compressor operating & indoor unit operating and thermo on	OK
Error contents	Breakaway of outdoor unit COND OUT sensor

#### 2) In heating mode

Average of high pressure > 15kg/cm <sup>2</sup>	OK
Average of low pressure > 5kg/cm <sup>2</sup>	OK
Teva, in - Tair, in ≥ 3°C	OK
Teva, in - Tair, in ≥ 2°C	OK
Tcond, out - Tair, out < 2°C	NO
Compressor operating & indoor unit operating and thermo on	OK
Error contents	Breakaway of outdoor unit COND OUT sensor

### (2) Check method

Check the breakaway of outdoor unit COND OUT sensor and then reassemble to correct.



## 2. Self-diagnosis by the outdoor unit error display

### 2-32. Breakaway of oil temperature sensor

Outdoor unit display	<i>Er → 05</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Oil temperature sensor departed

#### (1) Judgment time

During 30 minutes from starting compressor(the same as in cooling and heating operation)

#### (2) Judgment method

When Sump temperature right before starting compressor is  $T_{\text{sump, ini}}$  and present compressor Sump temperature is  $T_{\text{sump, real}}$ , in case the gap of absolute value between  $T_{\text{sump, ini}}$  and  $T_{\text{sump, real}}$  is within  $2^{\circ}\text{C}$ , or,  $T_{\text{sump, real}} - T_{\text{sump, ini}} < 2^{\circ}\text{C}$  is met continually during early 30minutes from starting operation.

#### (3) Caution

- 1) Do not detect separation after early 30 minutes of starting compressor.
- 2) If oil temperature sensor separation is detected, error message is displayed on indoor unit, and it operated normally. But, Sump temperature is not controlled during conservative control.

### 2-33. Breakaway of suction temperature sensor

Outdoor unit display	<i>Er → 07</i>
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Suction temperature sensor departed

#### (1) Judgment time

During 30 minutes from starting compressor(the same as in cooling and heating operation)

#### (2) Judgment method

When Suction temperature right before starting compressor is  $T_{\text{suc, ini}}$  and present compressor Suction temperature is  $T_{\text{suc, real}}$ , in case the gap of absolute value between  $T_{\text{suc, ini}}$  and  $T_{\text{suc, real}}$  is within  $2^{\circ}\text{C}$ , or,  $T_{\text{suc, real}} - T_{\text{suc, ini}} < 2^{\circ}\text{C}$  is met continually during early 30minutes from starting operation.

## 2-34. Breakaway of fixed compressor discharge sensor

Outdoor unit display	$E_r \leftrightarrow \overline{E_r}$
Indoor unit display	X (Operation) ● (Timer) ● (Fan) ● (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Fixed compressor discharge sensor departed

### (1) Judgment time

After 30 minutes from start of digital compressor and general compressor

### (2) Judgment method

When digital compressor discharging temperature is  $T_{disc, digital}$ , fixed compressor discharging temperature is  $T_{disc, normal}$ , in case  $T_{disc, real} - T_{disc, ini} > 30^{\circ}\text{C}$

### (3) Caution

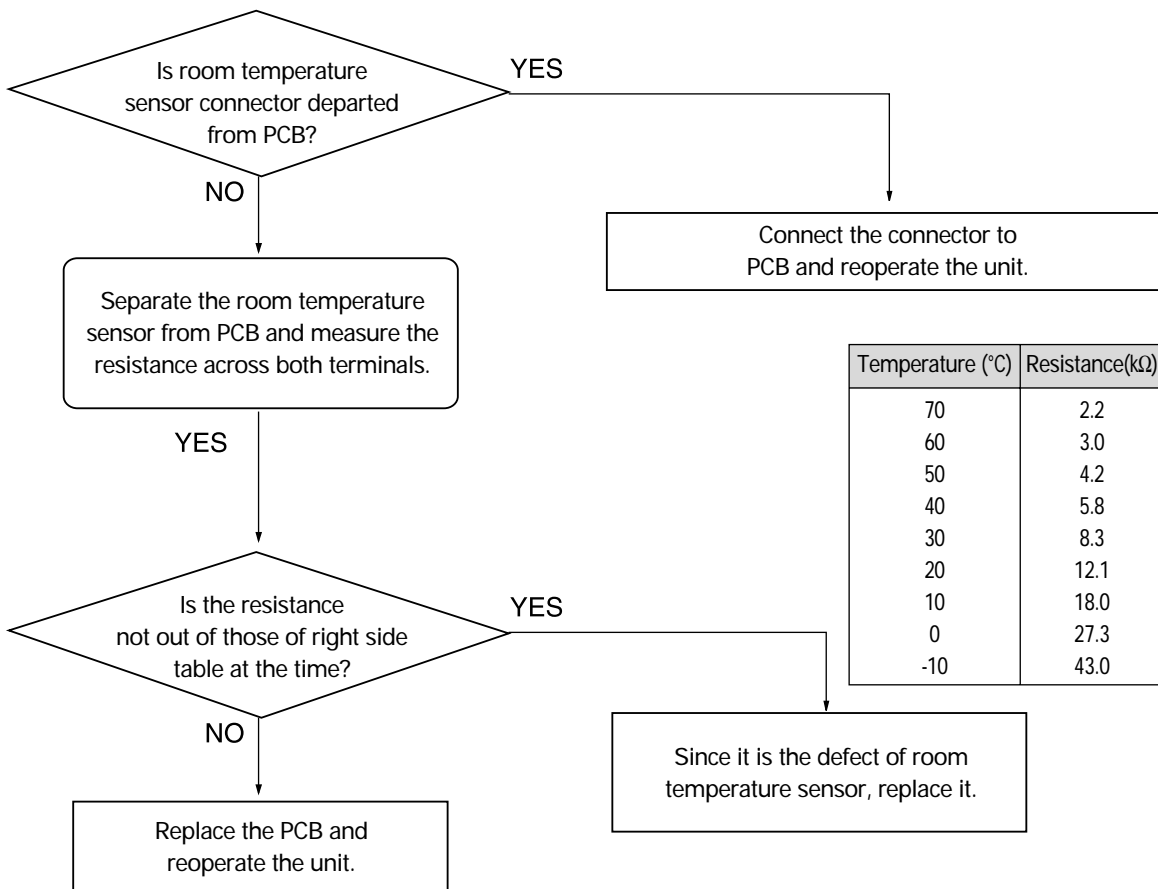
Compressor discharging temperature conservative control is done at higher one between the two, so it is operated normally. But DSH control is done at lower one between the two, so  $T_{disc, normal}$  is neglected and controlled only by  $T_{disc, digital}$ .



## 2. Self-diagnosis by the outdoor unit error display

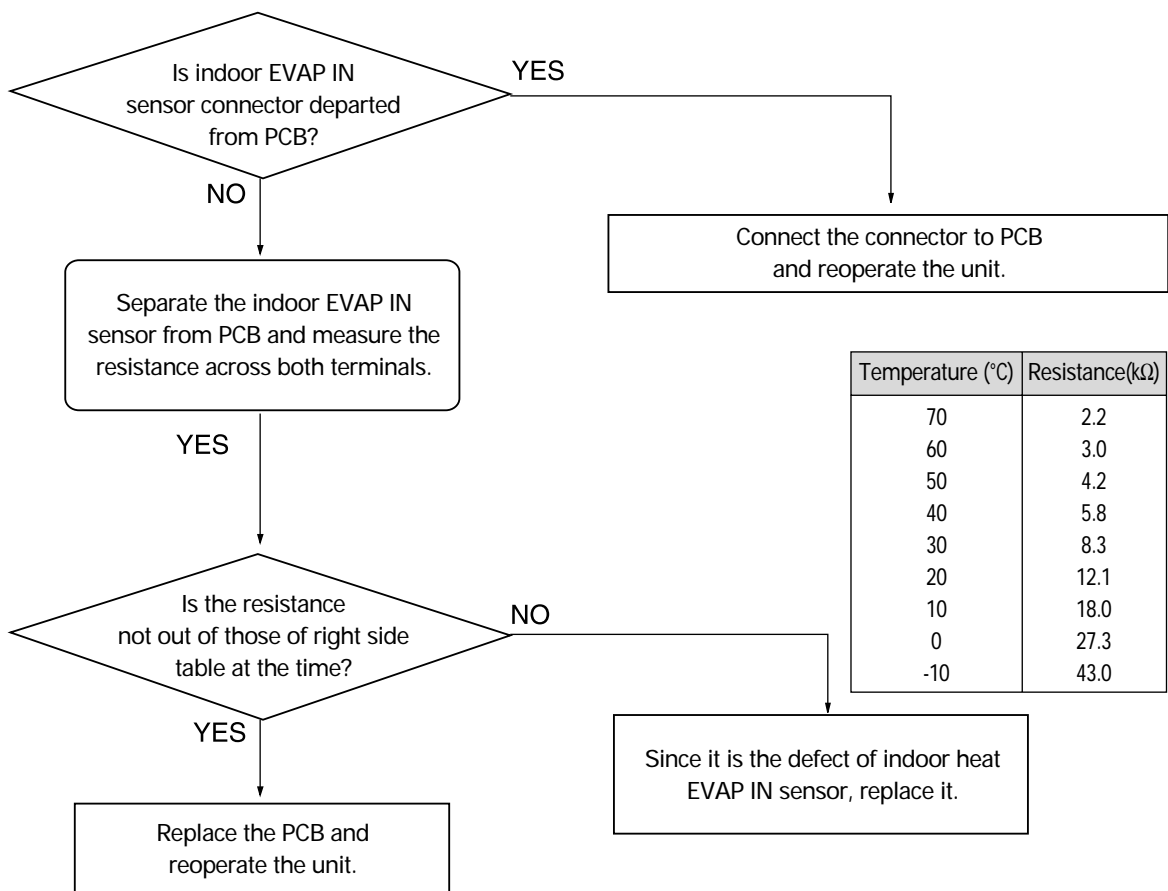
### 2-35. Indoor unit room sensor error (open/ short)

Outdoor unit display	$E_r \leftrightarrow 9^x$ (Open/short error of xth room temperature sensor)
Indoor unit display	X (Operation) ● (Timer) X (Fan) X (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Indoor unit temperature sensor open/short defect



## 2-36. Indoor unit EVAP IN sensor error (open/ short)

Outdoor unit display	$E_r \leftrightarrow r^x$ (Open/short error of xth indoor EVAP IN sensor)
Indoor unit display	● (Operation) ● (Timer) X (Fan) X (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Open/short error of xth indoor unit EVAP IN sensor



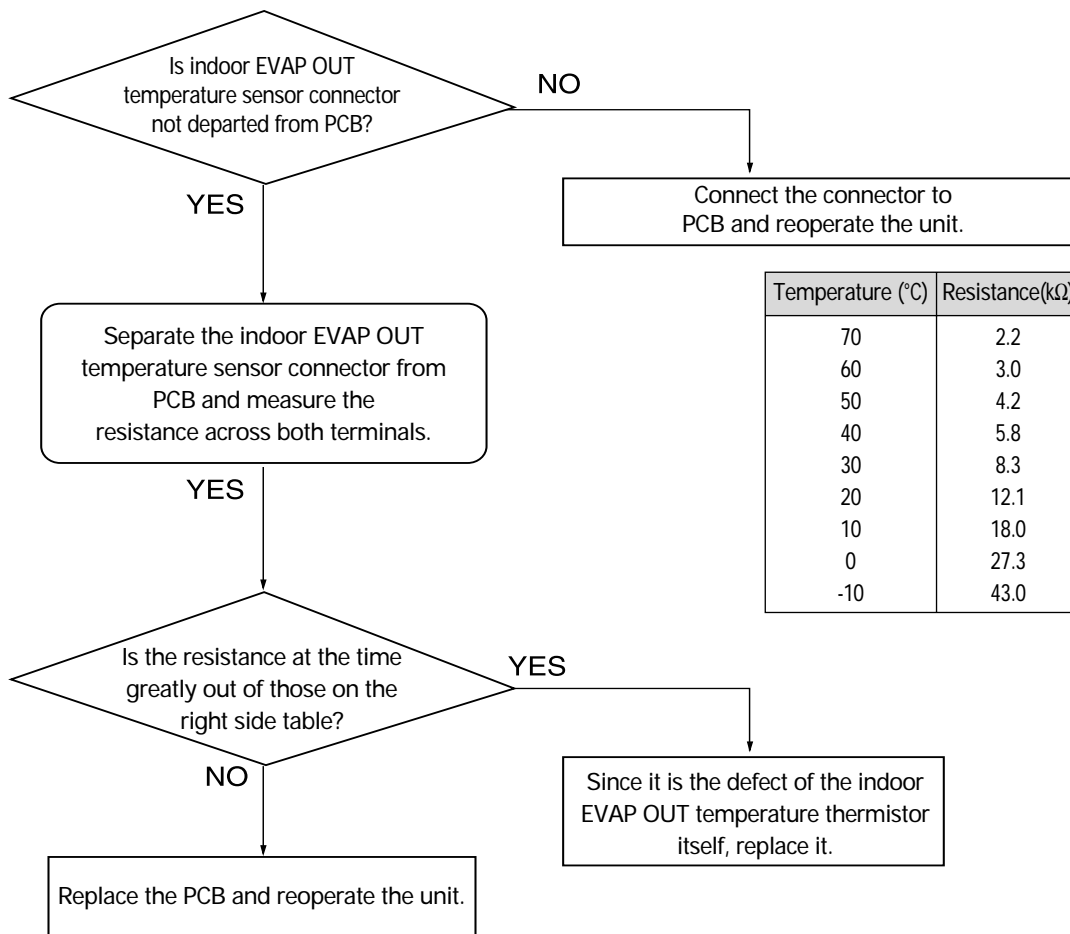




## 2. Self-diagnosis by the outdoor unit error display

### 2-37. Indoor unit EVAP OUT sensor error (open/ short)

Outdoor unit display	$E_r \leftrightarrow \text{X}$ (Open/short error of xth indoor EVAP OUT sensor)
Indoor unit display	● (Operation) ● (Timer) X (Fan) X (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● Open/short error of xth indoor unit EVAP OUT sensor



## 2-38. Indoor unit fan motor starting error

Outdoor unit display	$E_r \leftrightarrow \omega^x$ (xth indoor unit fan motor starting error)
Indoor unit display	X (Operation) X (Timer) ● (Fan) X (Filter) X (Removing frost)
Judgment method	● Refer to the following judgment method
Causes	● xth indoor unit fan motor starting error

## 2-39. No cooling operation

Outdoor unit display	$tU$
Indoor unit display	-
Judgment method	● Cooling operation is forbidden when the outdoor temperature is below -5°C
Causes	● No cooling operation

## 2-40. No heating operation

Outdoor unit display	$tO$
Indoor unit display	-
Judgment method	● Heating operation is forbidden when the outdoor temperature is over 30°C
Causes	● No heating operation



### 3. Self-diagnosis by LED indoor unit

Abnormal conditions	Indicators					Remark
	Operation	Removing frost	Timer	Fan	Filter	
Power reset	●	X	X	X	X	
Error of temperature sensor in indoor unit (OPEN/SHORT)	X	X	●	X	X	Displayed on appropriate indoor unit which is operating
Error of heat exchanger sensor in indoor unit Error of heat exchanger OUT sensor in indoor unit Error of outlet temperature sensor in indoor unit (OPEN/SHORT): For heat pump models only	●	X	●	X	X	Displayed on appropriate indoor unit which is operating
Error of mixed operation	X	●	X	●	X	
Error of outdoor temperature sensor Error of COND sensor Error of DISCHARGE sensor	●	X	X	●	X	Displayed on appropriate indoor unit which is operating Displayed on outdoor unit
1. No communication for 2 minutes between indoor unit and outdoor unit (communication error for more than 2 minutes) 2. Indoor unit receiving the communication error from outdoor unit 3. Outdoor unit tracking 3 minute error 4. When sending the communication error from outdoor unit the mismatching of the communication numbers and installed numbers after completion of tracking. (communication error for more than 2 minutes)	X	X	●	●	X	1. Error of indoor unit: Displayed on the indoor unit regardless of operation 2. Error of outdoor unit: Displayed on the indoor unit which is operating

● On ● Flickering X Off

- ◆ If you turn off the air conditioner when the LED is flickering, the LED is also turned off.
- ◆ If you re-operate the air conditioner, it operates normally at first, then detect an error again.

Abnormal conditions	Indicators					Remark
	Operation	Removing frost	Timer	Fan	Filter	
Self-diagnostic error (including the indoor unit not detected) 1. Error of electronic expansion valve close 2. Error of electronic expansion valve open 3. Breakaway of EVA OUT sensor 4. Breakaway of EVA IN sensor	X	X	●	●	●	Displayed on appropriate indoor unit which is operating Displayed on outdoor unit
5. Breakaway of COND MID sensor 6. 2nd detection of refrigerant completely leak 7. 2nd detection of high temperature COND 8. 2nd detection of high temperature DISCHARGE 9. COMP DOWN due to 2nd detection of low pressure switch 10. Error of reverse phase 11. Compressor down due to 6th detection of freezing 12. Self-diagnosis of condensation sensor (G8, G9) 13. Compressor down due to condensation ratio control	X	X	●	●	●	Displayed on appropriate indoor unit which is operating Displayed on outdoor unit
Error of float switch	X	X	X	●	●	
Error of setting option switches for optional accessories	X	X	●	X	●	
EEPROM error	●	X	●	●	X	
EEPROM option error	●	X	●	●	●	

● On ● Flickering X Off

- ◆ If you turn off the air conditioner when the LED is flickering, the LED is also turned off.
- ◆ If you re-operate the air conditioner, it operates normally at first, then detect an error again.

# VII

## Disassembly diagram

### 1

#### Outdoor unit

1-1. 2 FAN (Onward) .....	2
1-2. 2 FAN (Upward) .....	4
1-3. 1 FAN (Upward) .....	8

### 2

#### Indoor unit

2-1. 1-way cassette type (body) .....	12
2-2. 1-way cassette type (panel) .....	16
2-3. 4-way cassette type (body:5.2kW~7.2kW) .....	18
2-4. 4-way cassette type (body:10.5kW) .....	22
2-5. 4-way cassette type (panel) .....	24
2-6. Duct type (Low silhouette) .....	26
2-7. Duct type (Built-in:2.0kW~4.0kW) .....	32
2-8. Duct type (Built-in:5.2kW~7.2kW) .....	36
2-9. Duct type (High pressure) .....	38
2-10. Wall-mounted type (2.0kW~4.0kW) .....	40
2-11. Wall-mounted type (5.2kW~7.2kW) .....	44