



Internal Use Only

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MULTI VTM IV **PRO**

Outdoor Unit **R410A**

SERVICE MANUAL

MODEL : A(C)RUN*LLS4 / LLN4**
ARUV*LLS4 / LLN4**

CAUTION

Before Servicing the unit, read the safety precautions in General SVC manual.
Only for authorized service personnel.

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Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

⚠ WARNING This symbol indicates the possibility of death or serious injury.

⚠ CAUTION This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

	Be sure not to do.
	Be sure to follow the instruction.

⚠ WARNING

■ Installation

Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.

- If the power source capacity is inadequate or electric work is performed improperly, electric shock or fire may result.

Always ground the product.

- There is risk of fire or electric shock.

For re-installation of the installed product, always contact a dealer or an Authorized Service Center.

- There is risk of fire, electric shock, explosion, or injury.

Ask the dealer or an authorized technician to install the air conditioner.

- Improper installation by the user may result in water leakage, electric shock, or fire.

Always install a dedicated circuit and breaker.

- Improper wiring or installation may cause fire or electric shock.

Do not install, remove, or re-install the unit by yourself (customer).

- There is risk of fire, electric shock, explosion, or injury.

Do not store or use flammable gas or combustibles near the air conditioner.

- There is risk of fire or failure of product.

Prepare for strong wind or earthquake and install the unit at the specified place.

- Improper installation may cause the unit to topple and result in injury.

When installing and moving the air conditioner to another site, do not charge it with a different refrigerant from the refrigerant specified on the unit.

- If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.

Ventilate before operating air conditioner when gas leaked out.

- It may cause explosion, fire, and burn.

If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit when the refrigerant leaks.

- Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result

Use the correctly rated breaker or fuse.

- There is risk of fire or electric shock.

Do not install the product on a defective installation stand.

- It may cause injury, accident, or damage to the product.

Do not reconstruct to change the settings of the protection devices.

- If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by LGE are used, fire or explosion may result.

Securely install the cover of control box and the panel.

- If the cover and panel are not installed securely, dust or water may enter the outdoor unit and fire or electric shock may result.

Use a vacuum pump or inert(nitrogen) gas when doing leakage test or air purge. Do not compress air or Oxygen and do not use flammable gas es. Otherwise, it may cause fire or explosion.

- There is the risk of death, injury, fire or explosion.

■ Operation

Do not damage or use an unspecified power cord.

- There is risk of fire, electric shock, explosion, or injury.

Be cautious that water could not enter the product.

- There is risk of fire, electric shock, or product damage.

When the product is soaked (flooded or submerged), contact an Authorized Service Center.

- There is risk of fire or electric shock.

Take care to ensure that nobody could step on or fall onto the outdoor unit.

- This could result in personal injury and product damage.

Use a dedicated outlet for this appliance.

- There is risk of fire or electrical shock.

Do not touch the power switch with wet hands.

- There is risk of fire, electric shock, explosion, or injury.

Be cautious not to touch the sharp edges when installing.

- It may cause injury.

Do not open the inlet grille of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)

- There is risk of physical injury, electric shock, or product failure.

CAUTION

■ Installation

Always check for gas (refrigerant) leakage after installation or repair of product.

- Low refrigerant levels may cause failure of product.

Keep level even when installing the product.

- To avoid vibration or water leakage.

Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

- It may cause a problem for your neighbors.

Do not install the unit where combustible gas may leak.

- If the gas leaks and accumulates around the unit, an explosion may result.

Safety Precautions

Use power cables of sufficient current carrying capacity and rating.

- Cables that are too small may leak, generate heat, and cause a fire.

Keep the unit away from children. The heat exchanger is very sharp.

- It can cause the injury, such as cutting the finger. Also the damaged fin may result in degradation of capacity.

Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.

- There is risk of damage or loss of property.

When installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.

- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.

Do not install the product where it is exposed to sea wind (salt spray) directly.

- It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

■ Operation

Do not use the air conditioner in special environments.

- Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.

Do not block the inlet or outlet.

- It may cause failure of appliance or accident.

Make the connections securely so that the outside force of the cable may not be applied to the terminals.

- Inadequate connection and fastening may generate heat and cause a fire.

Be sure the installation area does not deteriorate with age.

- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, or personal injury.

Install and insulate the drain hose to ensure that water is drained away properly based on the installation manual.

- A bad connection may cause water leakage.

Be very careful about product transportation.

- Only one person should not carry the product if it weighs more than 20 kg.
- Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
- Do not touch the heat exchanger fins. Doing so may cut your fingers.
- When transporting the outdoor unit, suspending it at the specified positions on the unit base. Also support the outdoor unit at four points so that it cannot slip sideways.

Safely dispose of the packing materials.

- Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
- Tear apart and throw away plastic packaging bags so that children may not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.

Turn on the power at least 6 hours before starting operation.

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

Do not touch any of the refrigerant piping during and after operation.

- It can cause a burn or frostbite.

Do not operate the air conditioner with the panels or guards removed.

- Rotating, hot, or high-voltage parts can cause injuries.

Do not directly turn off the main power switch after stopping operation.

- Wait at least 5 minutes before turning off the main power switch. Otherwise it may result in water leakage or other problems.

Auto-addressing should be done in condition of connecting the power of all indoor and outdoor units. Auto-addressing should also be done in case of changing the indoor unit PCB.

Use a firm stool or ladder when cleaning or maintaining the air conditioner.

- Be careful and avoid personal injury.

Do not insert hands or other objects through the air inlet or outlet while the air conditioner is plugged in.

- There are sharp and moving parts that could cause personal injury.

Part 1

General Information

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1. Model Names

1.1 Indoor Unit

Category		Chassis Name	Capacity(Btu/h(kW))															
			5 k (1.6)	7 k (2.2)	9 k (2.8)	12 k (3.6)	15 k (4.5)	18 k (5.6)	21 k (6.2)	24 k (7.1)	28 k (8.2)	36 k (10.6)	42 k (12.3)	48 k (14.1)	54 k (15.8)	76 k (22.4)	96 k (28.0)	
Wall Mounted	General	S5						○		○								
	Libero	SB		○	○	○	○											
SC								○		○								
ART COOL	Mirror	SE		○	○	○	○											
		S8							○		○							
	Gallery	SF		○	○	○												
Ceiling Cassette	1 Way	TU		○	○	○												
		TT							○		○							
	2 Way	TL							○		○							
		4 Way	TR	○	○	○	○											
	TQ							○	○									
	TP										○	○						
	TN												○					
TM												○	○					
Ceiling Concealed Duct	High Static	BH		○	○	○	○	○			○							
		BG									○	○	○					
		BR												○	○			
		B8															○	○
	Low Static	L1	○	○	○													
		L2				○	○	○										
		L3									○	○						
Built In (Low Static)	B3		○	○	○	○												
	B4							○		○								
Ceiling & Floor		VE			○	○												
Ceiling Suspended		VJ							○		○							
		VK										○						
		VL												○				
Floor Standing	With Case	CE		○	○	○	○											
		CF							○		○							
	Without Case	CE		○	○	○	○											
		CF							○		○							
Console		QA		○	○	○	○											
Fresh Air Intake Unit		BR												○				
		B8															○	○

※ In matters of combination with Outdoor unit system, refer the PDB of that outdoor units.
 ※ *ART COOL- SE/S8(* R:Mirror, V:Silver), SF(* E:Red, V:Silver, G:Gold , 1: Kiss (Photo changeable))
 *Wall Mounted- A: Basic, L:Plasma, *Ceiling Cassette- A: Basic, C:Plasma

1.2 Outdoor Unit

Power Supply	*8 HP	10 HP	12 HP	14 HP	16 HP	18 HP	20 HP	22 HP
380 - 415 V, 50 Hz 380 V, 60 Hz	080LLS4	100LLS4	120LLS4	140LLS4	160LLS4	180LLS4	200LLS4	220LLS4 220LLN4

Power Supply	24 HP	26 HP	28 HP	30 HP	32 HP	34 HP	36 HP	38 HP
380 - 415 V, 50 Hz 380 V, 60 Hz	240LLS4	260LLS4	280LLS4	300LLS4	320LLS4	340LLS4	360LLS4	380LLS4

Power Supply	40 HP	42 HP	44 HP	46 HP	48 HP	50 HP	52 HP	54 HP
380 - 415 V, 50 Hz 380 V, 60 Hz	400LLS4	420LLS4 420LLN4	440LLS4 440LLN4	460LLS4	480LLS4	500LLS4	520LLS4	540LLS4

Power Supply	56 HP	58 HP	60 HP	62 HP	64 HP	66 HP	68 HP	70 HP
380 - 415 V, 50 Hz 380 V, 60 Hz	560LLS4	580LLS44	600LLS4	620LLS4 620LLN4	640LLS4 640LLN4	660LLS4 660LLN4	680LLS4	700LLS4

Power Supply	72 HP	74 HP	76 HP	78 HP	80 HP	82 HP	84 HP	86 HP	88 HP
380 - 415 V, 50 Hz 380 V, 60 Hz	720LLS4	740LLS4	760LLS4	780LLS4	800LLS4	820LLN4	840LLN4	860LLN4	880LLN4

Heat Pump	A(C)RUN
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Cooling only	ARUV
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* : There is no cooling only model

2. External Appearance

2.1 Indoor Unit

<p>Ceiling Cassette- 1Way</p> <p>ARNU07GTU*2 ARNU09GTU*2 ARNU12GTU*2</p> <p>ARNU18GTT*2 ARNU24GTT*2 * A:Basic, C:Plasma</p> 	<p>Ceiling Concealed Duct - High Static</p> <p>ARNU07GBHA2 ARNU36GBGA2 ARNU09GBHA2 ARNU42GBGA2 ARNU12GBHA2 ARNU48GBRA2 ARNU15GBHA2 ARNU54GBRA2 ARNU18GBHA2 ARNU76GB8A2 ARNU24GBHA2 ARNU96GB8A2 ARNU28GBGA2</p> 
<p>Ceiling Cassette- 4Way</p> <p>ARNU05GTR*2 ARNU24GTP*2 ARNU07GTR*2 ARNU28GTP*2 ARNU09GTR*2 ARNU36GTN*2 ARNU12GTR*2 ARNU42GTM*2 ARNU15GTQ*2 ARNU48GTM*2 ARNU18GTQ*2 * A:Basic, C:Plasma</p> 	<p>Wall mounted (Libero)</p> <p>ARNU07GSB*2 ARNU15GSB*2 ARNU09GSB*2 ARNU18GSC*2 ARNU12GSB*2 ARNU24GSC*2</p> <p>* A:Basic, L:Plasma</p> 
<p>Ceiling Concealed Duct - Low Static</p> <p>ARNU05GL1G2 ARNU15GL2G2 ARNU07GL1G2 ARNU18GL2G2 ARNU09GL1G2 ARNU21GL3G2 ARNU12GL2G2 ARNU24GL3G2</p> 	<p>ART COOL Gallery</p> <p>ARNU07GSF*2 ARNU09GSF*2 ARNU12GSF*2 * E:Red V:Silver G:Gold 1: Kiss (Photo changeable)</p> 
<p>Ceiling Concealed Duct – Built-in (Low Static)</p> <p>ARNU07GB3G2 ARNU15GB3G2 ARNU09GB3G2 ARNU18GB4G2 ARNU12GB3G2 ARNU24GB4G2</p> 	<p>Floor Standing With case</p> <p>ARNU07GCEA2 ARNU15GCEA2 ARNU09GCEA2 ARNU18GCF A2 ARNU12GCEA2 ARNU24GCF A2</p>  <p>Without case</p> <p>ARNU07GCEU2 ARNU15GCEU2 ARNU09GCEU2 ARNU18GCFU2 ARNU12GCEU2 ARNU24GCFU2</p> 
<p>ART COOL Mirror</p> <p>ARNU07GSE*2 ARNU15GSE*2 ARNU09GSE*2 ARNU18GS8*2 ARNU12GSE*2 ARNU24GS8*2</p> <p>* R:Mirror, V:Silver</p> 	<p>Console</p> <p>ARNU07GQAA2 ARNU12GQAA2 ARNU09GQAA2 ARNU15GQAA2</p> 
<p>Ceiling & Floor</p> <p>ARNU09GVEA2 ARNU12GVEA2</p> <p>Ceiling Suspended</p> <p>URNU18GVJA2 URNU36GVKA2 URNU24GVJA2 URNU48GVLA2</p> 	<p>Fresh Air Intake Unit</p> <p>ARNU48GBRZ2 ARNU76GB8Z2 ARNU96GB8Z2</p> 
<p>Ceiling Cassette -2Way</p> <p>ARNU18GTL*2 ARNU24GTL*2</p> <p>* A:Basic, C:Plasma</p> 	

* In matters of combination with Outdoor unit system, refer the PDB of that outdoor units.

2.2 Outdoor Unit

2.2.1 Heat Pump

CHASSIS	Model Name	Model
UX5	A(C)RUN080LLS4 A(C)RUN100LLS4 A(C)RUN120LLS4 A(C)RUN140LLS4	
UX6	A(C)RUN160LLS4 A(C)RUN180LLS4 A(C)RUN200LLS4 A(C)RUN220LLN4	
UX5 UX5	A(C)RUN220LLS4 A(C)RUN240LLS4 A(C)RUN260LLS4	
UX5 UX6	A(C)RUN280LLS4 A(C)RUN300LLS4 A(C)RUN320LLS4 A(C)RUN340LLS4	
UX6 UX6	A(C)RUN360LLS4 A(C)RUN380LLS4 A(C)RUN400LLS4 A(C)RUN420LLN4 A(C)RUN440LLN4	
UX5 UX5 UX6	A(C)RUN420LLS4 A(C)RUN440LLS4	
UX5 UX6 UX6	A(C)RUN460LLS4 A(C)RUN480LLS4 A(C)RUN500LLS4 A(C)RUN520LLS4 A(C)RUN540LLS4	
UX6 UX6 UX6	A(C)RUN560LLS4 A(C)RUN580LLS4 A(C)RUN600LLS4 A(C)RUN620LLN4 A(C)RUN640LLN4 A(C)RUN660LLN4	
UX5 UX5 UX6 UX6	A(C)RUN620LLS4 A(C)RUN640LLS4 A(C)RUN680LLS4	
UX5 UX6 UX6 UX6	A(C)RUN660LLS4 A(C)RUN700LLS4 A(C)RUN720LLS4	
UX6 UX6 UX6 UX6	A(C)RUN740LLS4 A(C)RUN820LLN4 A(C)RUN760LLS4 A(C)RUN840LLN4 A(C)RUN780LLS4 A(C)RUN860LLN4 A(C)RUN800LLS4 A(C)RUN880LLN4	

2.2.2 Cooling Only

CHASSIS	Model Name	Model
UX5	ARUV100LLS4 ARUV120LLS4 ARUV140LLS4	
UX6	ARUV160LLS4 ARUV180LLS4 ARUV200LLS4 ARUV220LLN4	
UX5 UX5	ARUV220LLS4 ARUV240LLS4 ARUV260LLS4	
UX5 UX6	ARUV280LLS4 ARUV300LLS4 ARUV320LLS4 ARUV340LLS4	
UX6 UX6	ARUV360LLS4 ARUV380LLS4 ARUV400LLS4 ARUV420LLN4 ARUV440LLN4	
UX5 UX5 UX6	ARUV420LLS4 ARUV440LLS4	
UX5 UX6 UX6	ARUV460LLS4 ARUV480LLS4 ARUV500LLS4 ARUV520LLS4 ARUV540LLS4	
UX6 UX6 UX6	ARUV560LLS4 ARUV580LLS4 ARUV600LLS4 ARUV620LLN4 ARUV640LLN4 ARUV660LLN4	
UX5 UX5 UX6 UX6	ARUV620LLS4 ARUV640LLS4 ARUV680LLS4	
UX5 UX6 UX6 UX6	ARUV660LLS4 ARUV700LLS4 ARUV720LLS4	
UX6 UX6 UX6 UX6	ARUV740LLS4 ARUV760LLS4 ARUV780LLS4 ARUV800LLS4 ARUV820LLN4 ARUV840LLN4 ARUV860LLN4 ARUV880LLN4	

3. Combination of Outdoor Units

3.1 Heat Pump

■ Standard Model

Model Name	Number of Units	Module(HP)							
		8	10	12	14	16	18	20	22
A(C)RUN080LLS4	1	1							
A(C)RUN100LLS4	1		1						
A(C)RUN120LLS4	1			1					
A(C)RUN140LLS4	1				1				
A(C)RUN160LLS4	1					1			
A(C)RUN180LLS4	1						1		
A(C)RUN200LLS4	1							1	
A(C)RUN220LLS4	2		1	1					
A(C)RUN240LLS4	2			2					
A(C)RUN260LLS4	2			1	1				
A(C)RUN280LLS4	2			1		1			
A(C)RUN300LLS4	2			1			1		
A(C)RUN320LLS4	2			1				1	
A(C)RUN340LLS4	2				1			1	
A(C)RUN360LLS4	2					1		1	
A(C)RUN380LLS4	2						1	1	
A(C)RUN400LLS4	2							2	
A(C)RUN420LLS4	3		1		1		1		
A(C)RUN440LLS4	3		1		1			1	
A(C)RUN460LLS4	3		1			1		1	
A(C)RUN480LLS4	3		1				1	1	
A(C)RUN500LLS4	3		1					2	
A(C)RUN520LLS4	3			1				2	
A(C)RUN540LLS4	3				1			2	
A(C)RUN560LLS4	3					1		2	
A(C)RUN580LLS4	3						1	2	
A(C)RUN600LLS4	3							3	
A(C)RUN620LLS4	4				2	1	1		
A(C)RUN640LLS4	4				2		2		
A(C)RUN660LLS4	4				1	1	2		
A(C)RUN680LLS4	4				2			2	
A(C)RUN700LLS4	4				1	1		2	
A(C)RUN720LLS4	4				1		1	2	
A(C)RUN740LLS4	4					1	1	2	
A(C)RUN760LLS4	4						2	2	
A(C)RUN780LLS4	4						1	3	
A(C)RUN800LLS4	4							4	

■ Space Saving Model

Model Name	Number of Units	Module(HP)							
		8	10	12	14	16	18	20	22
A(C)RUN220LLN4	1								1
A(C)RUN420LLN4	2							1	1
A(C)RUN440LLN4	2								2
A(C)RUN620LLN4	3							2	1
A(C)RUN640LLN4	3							1	2
A(C)RUN660LLN4	3								3
A(C)RUN820LLN4	4							3	1
A(C)RUN840LLN4	4							2	2
A(C)RUN860LLN4	4							1	3
A(C)RUN880LLN4	4								4

3.2 Cooling Only

■ Standard Model

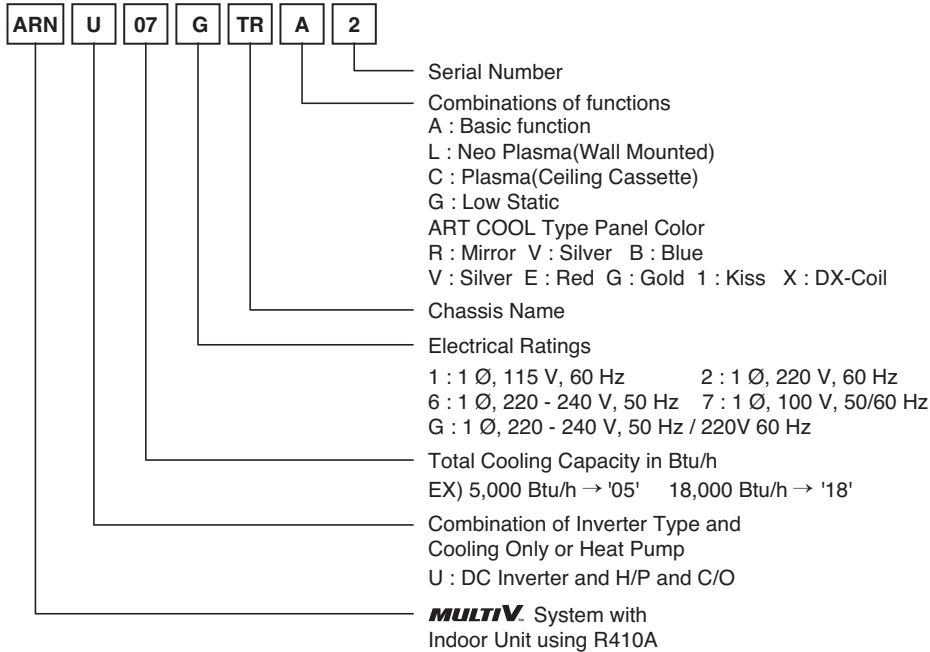
Model Name	Number of Units	Module(HP)						
		10	12	14	16	18	20	22
ARUV080LLS4	1							
ARUV100LLS4	1	1						
ARUV120LLS4	1		1					
ARUV140LLS4	1			1				
ARUV160LLS4	1				1			
ARUV180LLS4	1					1		
ARUV200LLS4	1						1	
ARUV220LLS4	2	1	1					
ARUV240LLS4	2		2					
ARUV260LLS4	2		1	1				
ARUV280LLS4	2		1		1			
ARUV300LLS4	2		1			1		
ARUV320LLS4	2		1				1	
ARUV340LLS4	2			1			1	
ARUV360LLS4	2				1		1	
ARUV380LLS4	2					1	1	
ARUV400LLS4	2						2	
ARUV420LLS4	3	1		1		1		
ARUV440LLS4	3	1		1			1	
ARUV460LLS4	3	1			1		1	
ARUV480LLS4	3	1				1	1	
ARUV500LLS4	3	1					2	
ARUV520LLS4	3		1				2	
ARUV540LLS4	3			1			2	
ARUV560LLS4	3				1		2	
ARUV580LLS4	3					1	2	
ARUV600LLS4	3						3	
ARUV620LLS4	4			2	1	1		
ARUV640LLS4	4			2		2		
ARUV660LLS4	4			1	1	2		
ARUV680LLS4	4			2			2	
ARUV700LLS4	4			1	1		2	
ARUV720LLS4	4			1		1	2	
ARUV740LLS4	4				1	1	2	
ARUV760LLS4	4					2	2	
ARUV780LLS4	4					1	3	
ARUV800LLS4	4						4	

■ Space Saving Model

Model Name	Number of Units	Module(HP)						
		10	12	14	16	18	20	22
ARUV220LLN4	1							1
ARUV420LLN4	2						1	1
ARUV440LLN4	2							2
ARUV620LLN4	3						2	1
ARUV640LLN4	3						1	2
ARUV660LLN4	3							3
ARUV820LLN4	4						3	1
ARUV840LLN4	4						2	2
ARUV860LLN4	4						1	3
ARUV880LLN4	4							4

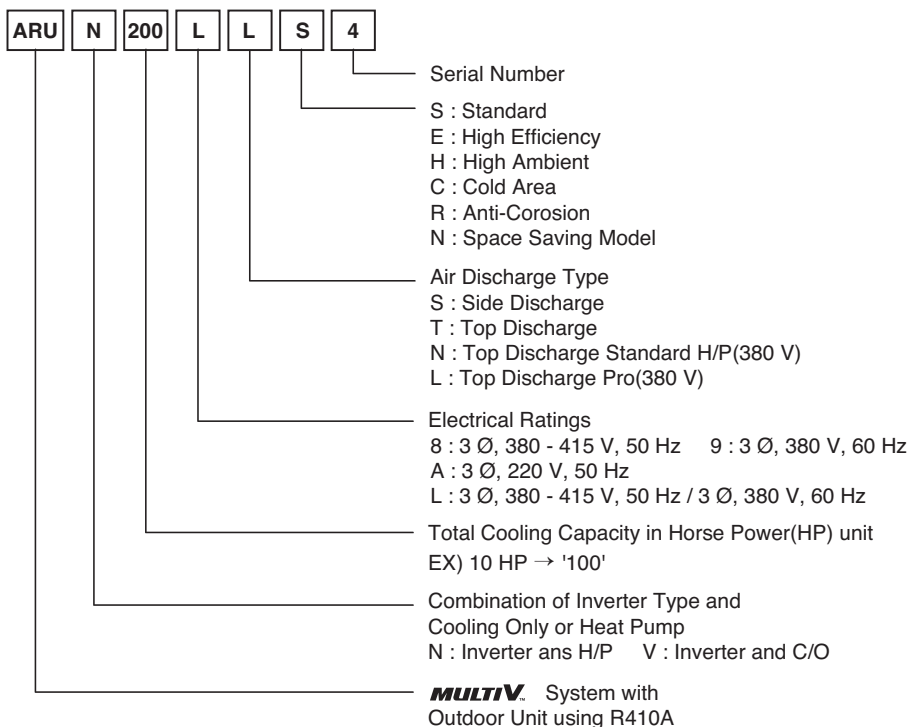
4. Nomenclature

4.1 Indoor Unit



※ Heat recovery ventilator refer to the DX-Coil manual

4.2 Outdoor Unit



Part 2

Outdoor Units

ARUN Series

- **Function19**

Function

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1. Basic control

1.1 Normal operation

Actuator	Cooling operation	Heating operation	Stop state
Compressor	Fuzzy control	Fuzzy control	Stop
Fan	Fuzzy control	Fuzzy control	Stop
Main EEV	Full open	Fuzzy control	Min. pulse
Subcooling EEV	Fuzzy control	<ul style="list-style-type: none"> Fuzzy control Avoiding control of high discharge temperature 	Min. pulse
Indoor Unit EEV	Superheat fuzzy control	Subcooling fuzzy control	Min. pulse

Note : Heating operation is not functional at an outdoor air temperature of 27 °C or more.
 Cooling operation is not functional at an outdoor air temperature of 2 °C or less with indoor unit combination of 10 % or less

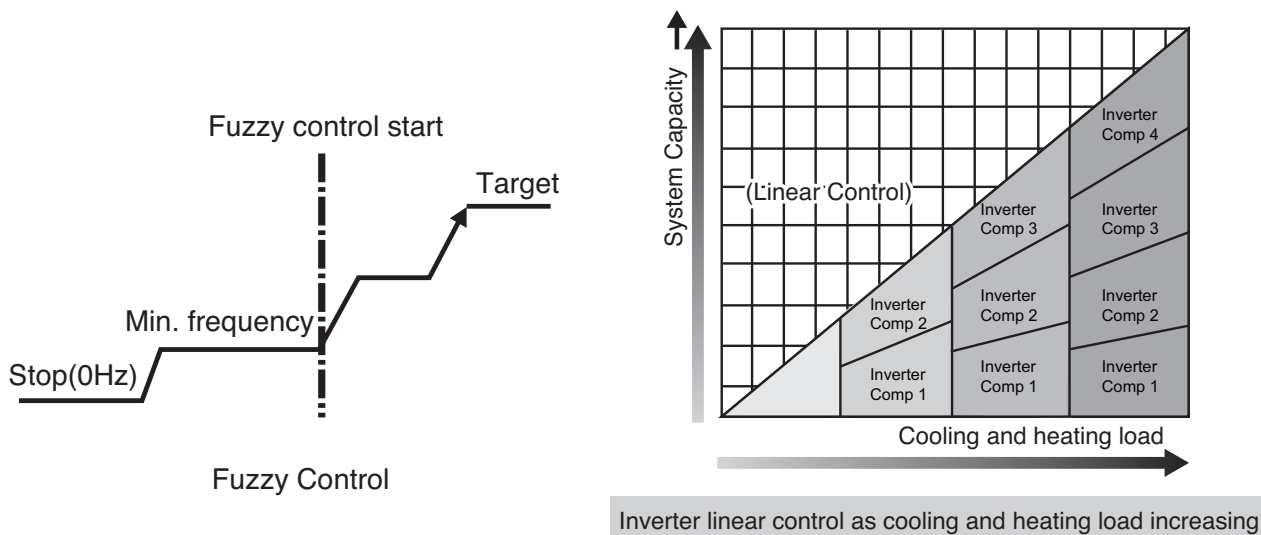
※ Cooling only models (ARUV***LLS4/LLN4) do not have Main EEV.

1.2 Compressor control

Fuzzy control : Maintain evaporating temperature(T_e) to be constant on cooling mode and condensing temperature(T_c) on heating mode by Fuzzy control to ensure the stable system performance.
 (T_c :47 ~51 °C, T_e :2 ~ 5 °C)

- (1) Cooling mode
 T_e can be set various step at installation mode.
- (2) Heating mode
 T_c can be set various step at installation mode.

Note: By setting dip switch, T_e and T_c are decided simultaneously.



1.3 Master and slave Unit's EEV control

(1) Main EEV control

Main EEV operates with fuzzy control rules to keep the degree of super Heat(Superheat) (about 3 °C) at the evaporator outlet stable during heating mode

The degree of Superheat = $T_{\text{suction}} - T_{\text{evaporation}}$

T_{suction} : temperature at suction pipe sensor(°C)

$T_{\text{evaporation}}$: evaporation temperature equivalent to low pressure(°C)

(2) Subcooling EEV control(about 15 °C)

Subcooling EEV works with fuzzy rules to keep the degree of Subcool at the outlet of subcooler during cooling mode

The degree of Subcool = $T_{\text{condensation}} - T_{\text{liquid}}$

T_{liquid} : temperature at outlet of subcooler(°C)

$T_{\text{condensation}}$: condensation temperature equivalent to high pressure(°C)

(3) Avoiding excessive high discharge temperature : when main EEV opens some given opening (R410A : 800 pls) and discharge temperature is above 85 °C in heating operation, subcooling EEV may control the "subcooling out temperature-evaporating temperature" to be some given difference.

2. Special control

2.1 Oil return control

2.1.1 Oil return control on cooling mode

Oil return operation recovers Oil level in compressor by collecting oil accumulated in pipe. Each cycle component operates as shown on the below table during oil return operation.

Outdoor Unit

Component	Starting	Running	Ending
Inverter Compressor	30Hz	Setting Value	30 Hz
Fan	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Normal control
Subcooling EEV	Min. pulse	20 pulse	80 pulse
4way valve	OFF	OFF	OFF

Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	OFF	Normal control
Thermo on unit EEV	Normal control	Normal control	Normal control
Thermo off unit EEV	40 pulse	400 pulse	40 pulse
Oil return signal	OFF	ON	OFF

- Oil return operation time : 3 min for running step
- Starting condition : When low oil level which is measured by oil level sensor is kept continuously then oil return operation will be start.
- Oil return process ends if compressor protection control starts

※ Cooling only models (ARUV***LLS4/LLN4) do not have Main EEV and 4 Way valve.

2.1.2 Oil return control on heating mode

Outdoor Unit

Component	Starting	Running	Ending
Inverter Compressor	30 Hz	Setting Value	40 Hz
Fan	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Normal control
Subcooling EEV	Min. pulse	20 pulse	80 pulse
4way valve	ON	OFF	ON

Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	OFF	Normal control
Thermo on unit EEV	Normal control	400~800 pulse	Normal control
Thermo off unit EEV	80~130 pulse	400~800 pulse	80~130 pulse

- Oil return operation time : 3 min for running step
- Starting condition:same as cooling mode
- Oil return process ends if compressor protection control starts

2.2 Defrost control

Defrost operation eliminates ice accumulated on heat exchanger, recovering performance of heat exchanger. Each cycle component operates as following table during defrost operation.

Outdoor Unit

Component	Starting	Running	Ending
Inverter Compressor	30 Hz	Setting Value	40 Hz
Fan	Stop	High pressure control	Normal control
Main EEV	Normal control	Max. pulse	Normal control
Subcooling EEV	Normal control	Max. pulse	Normal control
4way valve	On → OFF	OFF	ON

Indoor Unit

Component	Starting	Running	Ending
Fan	OFF	OFF	OFF
Thermo on unit EEV	Normal control	200~800 pulse	Normal control

■ Ending condition

- 1) All heat exchanger pipe temperature are above setting temperature for 30 sec.
- 2) The running time of defrost operation is over 30% of the total heating time
- 3) If compressor protection control starts by high discharge temperature of compressor etc.

※ “Defrost control” function is not applied in ARUV***LLS4/LLN4.

2.3 Stop operation

2.3.1 Stop operation on cooling mode

Component	Operation	Note
Inverter Compressor	OFF	-
Fan	Stop	-
Main EEV	32 pulse	-
Subcooling EEV	16 pulse	Stop(Min. pulse)
4way valve	OFF	-

2.3.2 Stop operation on heating mode

Component	Operation	Note
Inverter Compressor	OFF	-
Fan	Stop	-
Main EEV	32 pulse	-
Subcooling EEV	16 pulse	Stop(Min. pulse)
4way valve	ON	OFF over 30 °C air temperature

3. Protection control

3.1 Pressure protection control

3.1.1 Pressure control on cooling mode

■ High pressure control

Pressure Range	Compressor
$P_d \geq 4000$ kPa	Stop
$P_d > 3775$ kPa	-15 Hz/10 sec.
$P_d \geq 3578$ kPa	Frequency holding
$P_d \geq 3480$ kPa	+2 Hz or less/10 sec.
$P_d < 3480$ kPa	Normal control

■ Low pressure control

Pressure Range	Compressor
$P_s \leq 98$ kPa, 1 minute later operation	Stop
$P_s \leq 124$ kPa, 1 minute before operation	-15 Hz/10 sec.

* Frequency holding : frequency (or RPM) is not increasing (can decrease)

3.1.2 Pressure control on heating mode

■ High pressure control

Pressure Range	Compressor
$P_d \geq 4003$ kPa	Stop
$P_d > 3415$ kPa	-15 Hz/10 sec.

■ Low pressure control

Pressure Range	Compressor
$P_s \leq 98$ kPa	Stop
$P_s \leq 124$ kPa	-15 Hz/10 sec.
$P_s \leq 137$ kPa	Frequency holding
$P_s \leq 190$ kPa	+2 Hz or less/10 sec.
$P_s \geq 190$ kPa	Normal control

* Frequency holding : frequency (or RPM) is not increasing (can decrease).

3.2 Discharge temperature control

■ Outdoor unit control

Temperature range	Compressor	Sub cooling EEV	IDU EEV
$T_{dis} > 110\text{ }^{\circ}\text{C}$	OFF	SC,SH decrease control	SH decrease control
$T_{dis} > 108\text{ }^{\circ}\text{C}$	- 5 Hz/10 sec.	SC,SH decrease control	SH decrease control
$T_{dis} \geq 105\text{ }^{\circ}\text{C}$	Frequency holding	SC,SH decrease control	SH decrease control
$T_{dis} \leq 100\text{ }^{\circ}\text{C}$	Normal control	SC,SH decrease control	SH decrease control
$T_{dis} > 100\text{ }^{\circ}\text{C}$	Normal control	SC,SH decrease control	SH decrease control

SC : Sub Cooling, SH : Super Heating

3.3 Inverter protection control

Cooling mode

Current	Normal Operation		Frequency Down		System Stop	
	JQA048MAF	JBA068MAF	JQA048MAF	JBA068MAF	JQA048MAF	JBA068MAF
AC Input Current	22 A or less	30 A or less	22 A or more	30 A or more	22 A or more	32 A or more
Compressor Current	24 A or less	35 A or less	24 A or more	35 A or more	30 A or more	41 A or more

Heating mode

Current	Normal Operation		Frequency Down		System Stop	
	JQA048MAF	JBA068MAF	JQA048MAF	JBA068MAF	JQA048MAF	JBA068MAF
AC Input Current	22 A or less	30 A or less	22 A or more	30 A or more	22 A or more	32 A or more
Compressor Current	26 A or less	35 A or less	26 A or more	35 A or more	30 A or more	41 A or more

※ AC input current is input current of inverter compressor except constant current (current pass through noise filter)

3.4 Phase detection

- If the power lines are connected incorrectly the product will not work and displays error like below.
 - Case 1) 1 or more phase lines are omitting (disconnected)
 - Case 2) Neutral (N) line connected wrongly to any phase line

Case	Terminal block				Error No.
	R	S	T	N	
Omitted Phase	X				CH50
		X			
			X		CH05
				X	CH25
Reversed Phase	N				CH50
		N			
			N		CH05
				N	No error

※ In the case of series unit if the error occurs more than a single unit at same time then only a small unit number will be displayed.

Example) Master and Slave2 occur error no. 50, '501' display on the 7segment.

* Master: ***1, Slave1:***2, Slave2:***3, Slave3:***4

3.5 Pressure switch

- Main has pressure sensing switch in series between compressor and power relay.
- The state of pressure sensing switch is normally on. It has small electric current from 220 V AC. Never touch the connecting terminal with hand nor short two wires directly.

4. Other control

4.1 Initial setup

There are 4 initial setup steps before running.
All DIP switch setting must be completed before initial setup.

1) Step 1 : factory setting value display

Factory setting value is displayed in 7 segment on PCB for 24 sec.
All dip switches must be set properly before step 1.

Power is on	
Master model code is displayed (3 sec)	20
Slave1 model code is displayed (3 sec)	20
Slave2 model code is displayed (3 sec)	20
Total capacity including sub units is displayed (2 sec)	60
Heat pump : Display 2 is default value	2
Cooling only : Display 1 is default value	1
Power type	38
Model type	9

Function

2) Step 2 : Communication check

- If all model code is displayed in 7 segment including all Slave unit, communication between outdoor units is normal.
- If 104* is displayed in 7-segment, check communication wires between outdoor units and Dip switch setting.

3) Step 3 : PCB error check

- After 40 sec, error check begins.

■ Master/ Slave unit

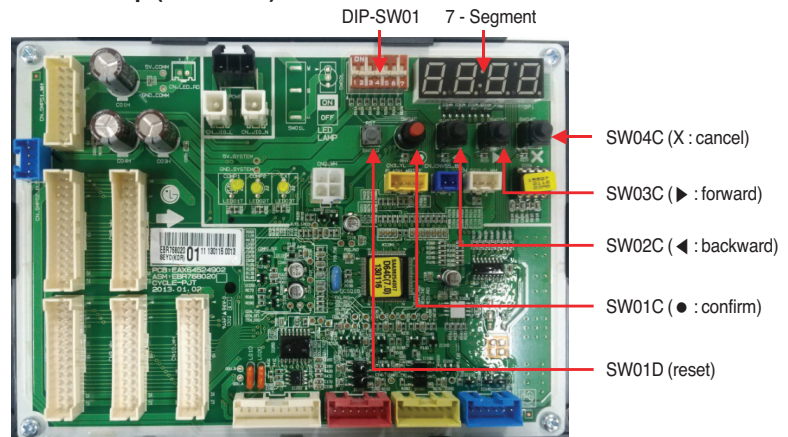
- All errors of units including Slave units are displayed in 7 segment.
- If communication between main PCB and inverter PCB isn't normal, 52* is displayed in 7-segment
- If communication between main PCB and fan PCB isn't normal, 105* is displayed in 7-segment.
- If error is displayed, check corresponding wires.

4) Step 4 : Auto addressing of indoor units

- Auto addressing begins when address(red) button in Main PCB is pressed for 6 sec.
- During auto addressing, 7 segment on main PCB displays "88"
- After auto addressing, the number of indoor units is displayed in 7 segment for 30 sec. The address of each indoor unit is displayed on each wired remote controller.

■ Heat Pump (Main PCB)

Push address(red) button for 3 sec.



Auto address starts



Auto address is in progress (max. 15 min.)



The number of indoor units is displayed for 30 sec.



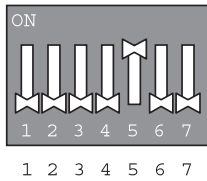
(35 indoor units found)

Auto address process is finished.
Every indoor unit displays its address on wired remote controller and the 7 segment of main PCB is off.

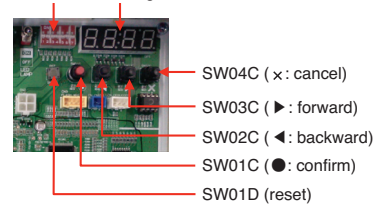


■ Setting the function

Select the mode/function/option/value using ‘▶’, ‘◀’ Button and confirm that using the ‘●’ button after dip switch No.5 is turned on.



DIP-SW01 7 - Segment



MODE		FUNCTION		OPTION			VALUE		ACTION		remarks
content	Display1	content	Display2	content	Display3	content	Display4	implement	Display5		
Install ation	Func	Cool & Heat Selector	F _n 1	oFF	op1~op2	selected the option	-	-	change the set value	blank	save in EEPROM
		Static pressure compensation	F _n 2	oFF	op1~op3	selected the option	-	-	change the set value	blank	save in EEPROM
		Night low noise	F _n 3	oFF	op1~op15	selected the option	-	-	change the set value	blank	save in EEPROM
		Overall defrost	F _n 4	on	oFF	selected the option	-	-	Always Overall defrost on	blank	save in EEPROM
		ODU address	F _n 5	-	-	-	0~254	set the value	change the set value	blank	save in EEPROM
		Snow removal & rapid defrost	F _n 6	oFF	op1~op3	selected the option	-	-	change the set value	blank	save in EEPROM
		Target pressure auto adjusting	F _n 8	oFF	op1~op6	selected the option	-	-	change the set value	blank	save in EEPROM
		High Efficiency Cooling	F _n 9	oFF	on	selected the option	-	-	change the set value	blank	save in EEPROM
		Auto dust removal	F _n 10	oFF	on	selected the option	-	-	change the set value	blank	save in EEPROM
		Low ambient kit	F _n 11	oFF	on	selected the option	-	-	change the set value	blank	save in EEPROM
		Compressor Frequency Limitation	F _n 12	oFF	op1~op9	Selected the option	-	-	change the set value	blank	save in EEPROM
		ODU fan Limitation	F _n 13	oFF	op1~op7	Selected the option	-	-	change the set value	blank	save in EEPROM
		Smart Load Control	F _n 14	oFF	op1~op3	selected the option	-	-	change the set value	blank	save in EEPROM
		SVC	S _{uc}	Pump Down	SE 1	-	-	-	-	start operation	P _d
Pump Out	SE 2			-	-	-	-	start operation	P _o	-	
Vacuum mode	SE 3			-	-	-	-	start operation	uAcc	-	
Backup	SE 4			unit	inv1~inv2	selected the option	-	-	start operation	on oFF	save in EEPROM
Cycle data view	SE 7			op1~op26	-	-	-	Show in segment	Show the each numerical value in process	-	
Refrigerant noise reduction mode	SE 8			F _n 8	-	-	-	Change the set value	oFF op1 op2	save in EEPROM	
Heating Oil return Hz setting	SE 9			F _n 8	-	-	-	Change the set value	oFF op1 op2	save in EEPROM	
SVC	Id _u	Continuous cooling	Id 6	oFF	op1~op3	-	-	change the set value	blank	-	

* Functions save in EEPROM will be kept continuously, though the system power was reset.

* Cooling only models (ARUV***LLS4/LLN4) do not work Fn4,Fn6

4.2 Emergency operation

- If a compressor is out of order, the system can be run except the defective compressor by backup function.

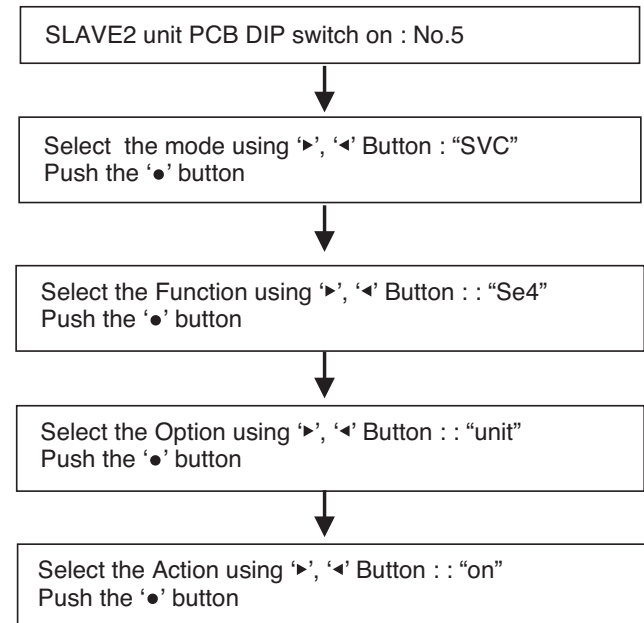
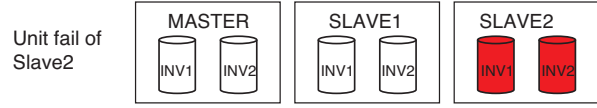
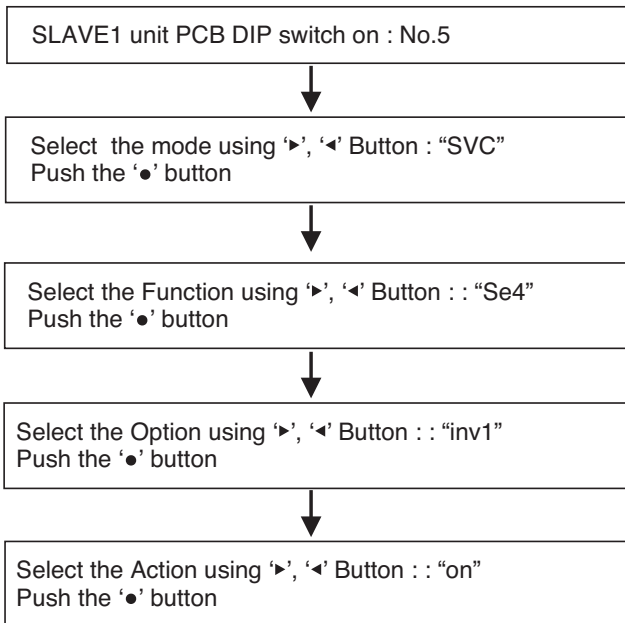
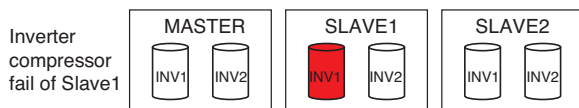
■ Automatic emergency operation(automatic backup function)

If outdoor unit detect comp defect during operation,, automatic backup mode is set.

- 1) Inverter 1 compressor automatic emergency operation.
- 2) Inverter 2 compressor automatic emergency operation.

■ Manual emergency operation(Manual backup function)

- 1) Check which compressor is broken. (refer to “Trouble Shooting Guide”)
- 2) Turn off the power.
- 3) Set the dip S/W of defective outdoor unit.
- 4) Turn on the power.



Backup mode cancellation method



CAUTION

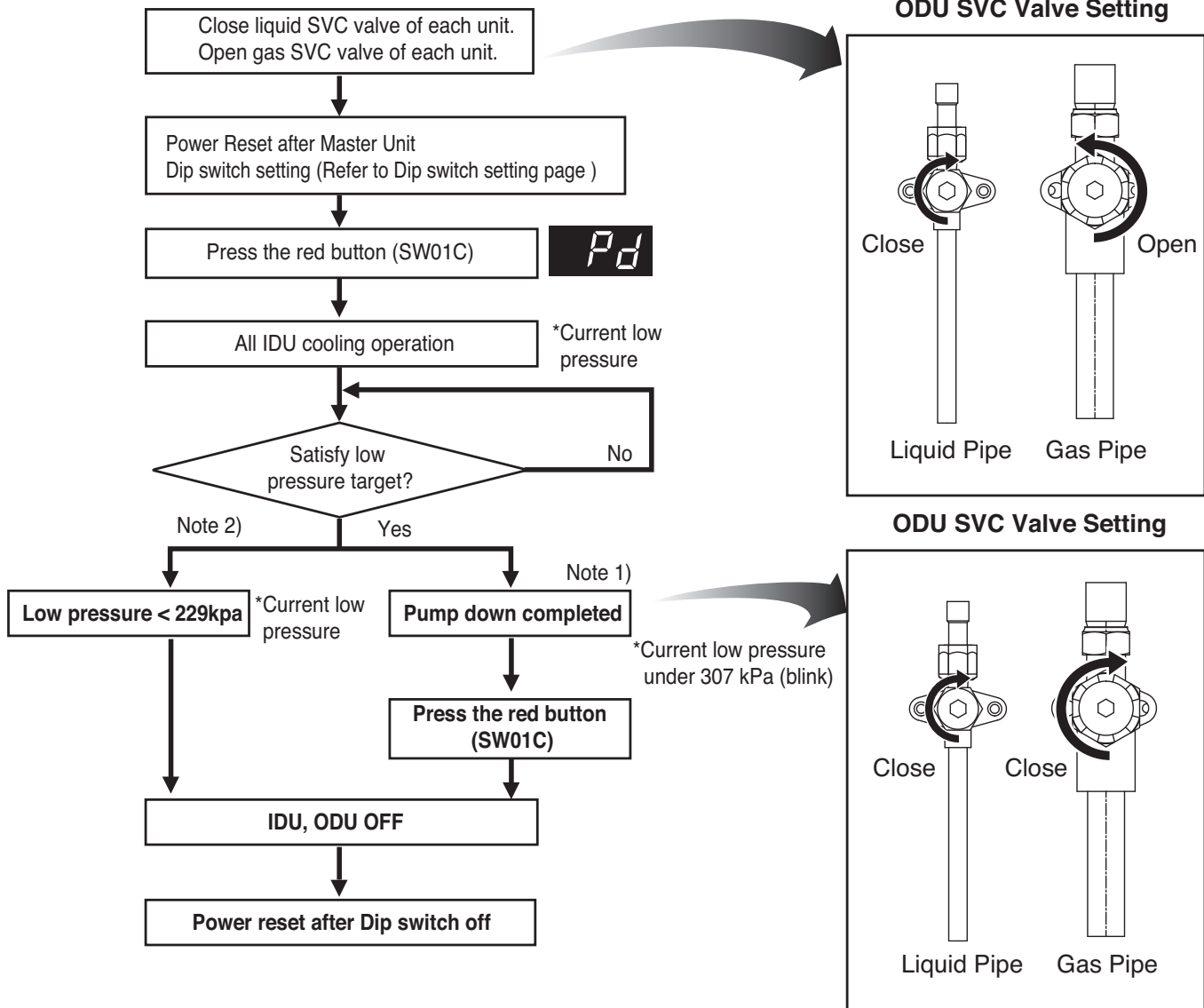
Emergency operation with inverter compressor failure should not last 48 hours. → It causes other compressor failure.

During the emergency operation, cooling/heating capacity may be lower.

4.3 Pump Down

This function gathers the refrigerant present in the system to ODU

Use this function to store refrigerant of system in ODU for leakage or IDU replacement.



[Note]

If low pressure become under 307 kPa (blink), close the gas SVC valve of all ODU immediately.

If low pressure descends below 229 kPa, the system turns off automatically. Close the gas SVC valve immediately.

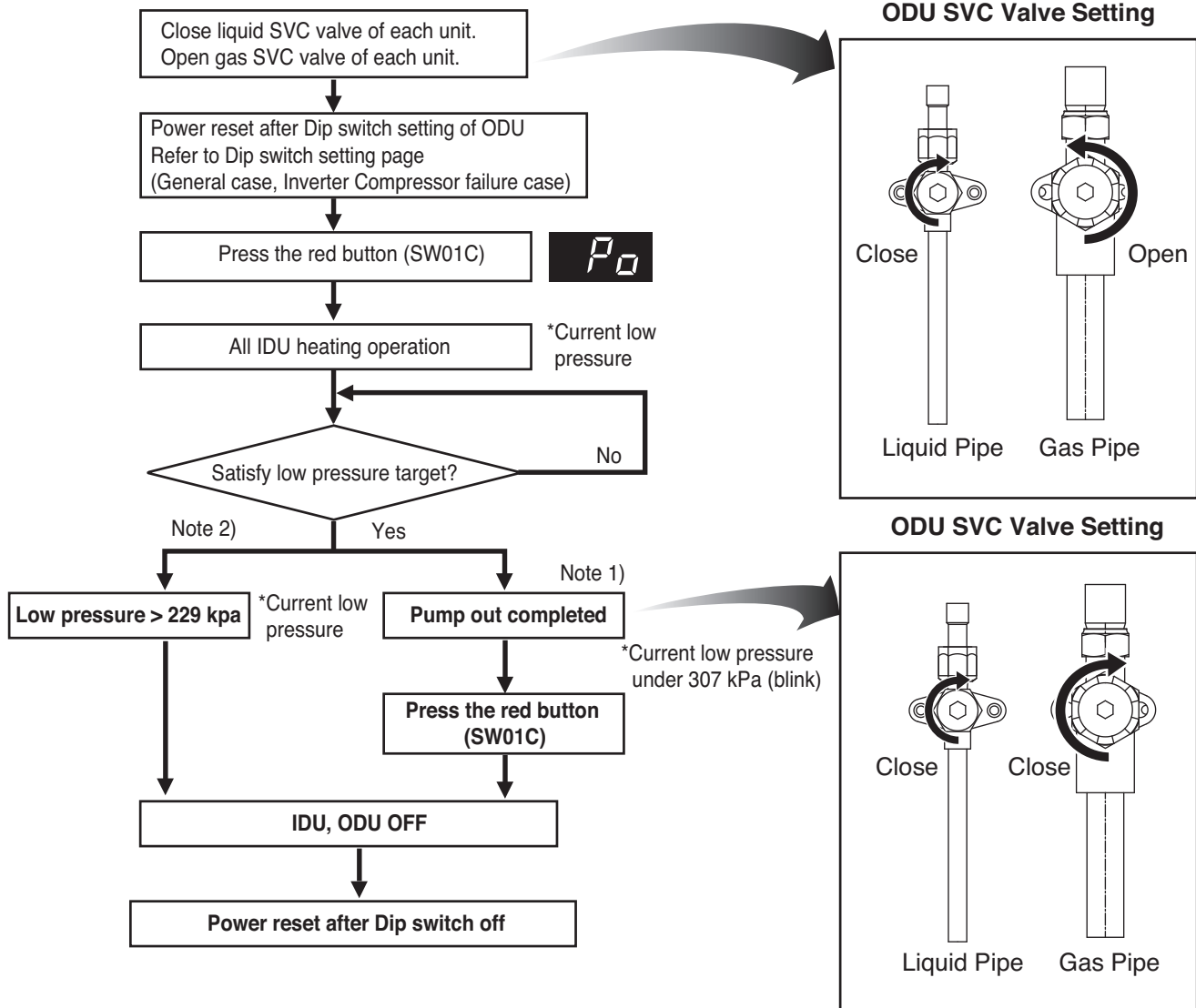
⚠ Caution

1. Use pump down function within guaranteed temperature range
 IDU : 20~32 °C
 ODU : 5~40 °C
2. Make certain that IDU doesn't run with thermo off mode during operation
3. Maximum operation time of pump down function is 30 min.
 (in case low pressure doesn't go down)

4.4 Pump Out

This function gathers the refrigerant to other ODU and IDU.

Use this function in case of compressor failure, ODU parts defect, leakage.



[Note]

If low pressure become under 307 kPa (blink), close the gas SVC valve of all ODU immediately.

If low pressure descends below 229 kPa, the system turns off automatically. Close gas SVC valve immediately.

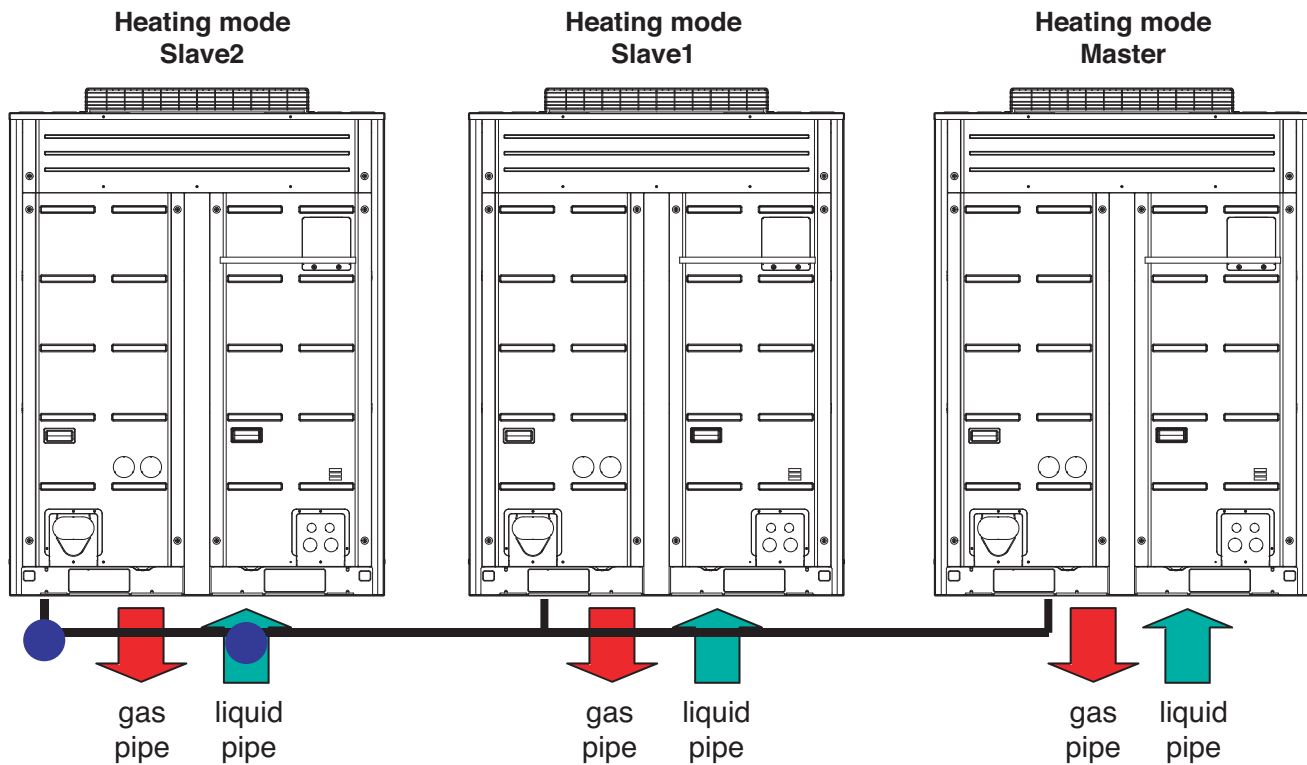
This function is operating only Heat Pump model.

Caution

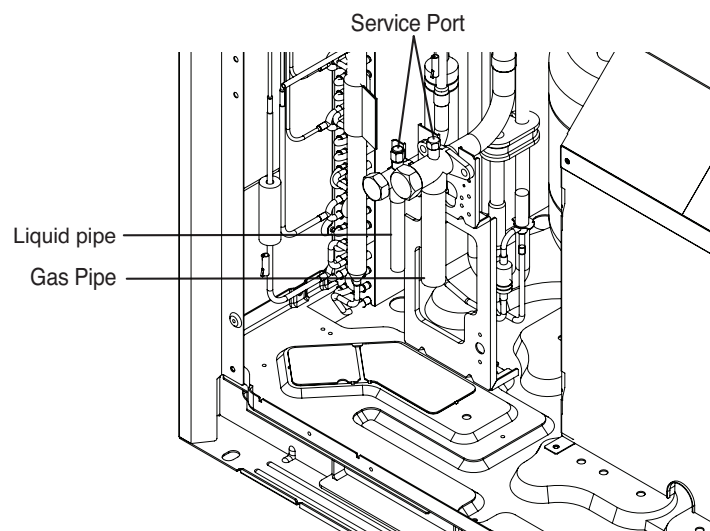
- Use pump out function within guaranteed temperature range
 IDU : 10~30 °C
 ODU : 5~40 °C
- Make certain that IDU doesn't run with thermo off mode during operation
- Pump out function takes 2~5 min. after compressor start.
 Make certain that IDU doesn't run with thermo off mode during operation
 (in case low pressure doesn't go down)

* "Pump down" function is not applied in ARUV***LLS4/LLN4.

■ Example. Slave2 ODU Inverter Compressor failure



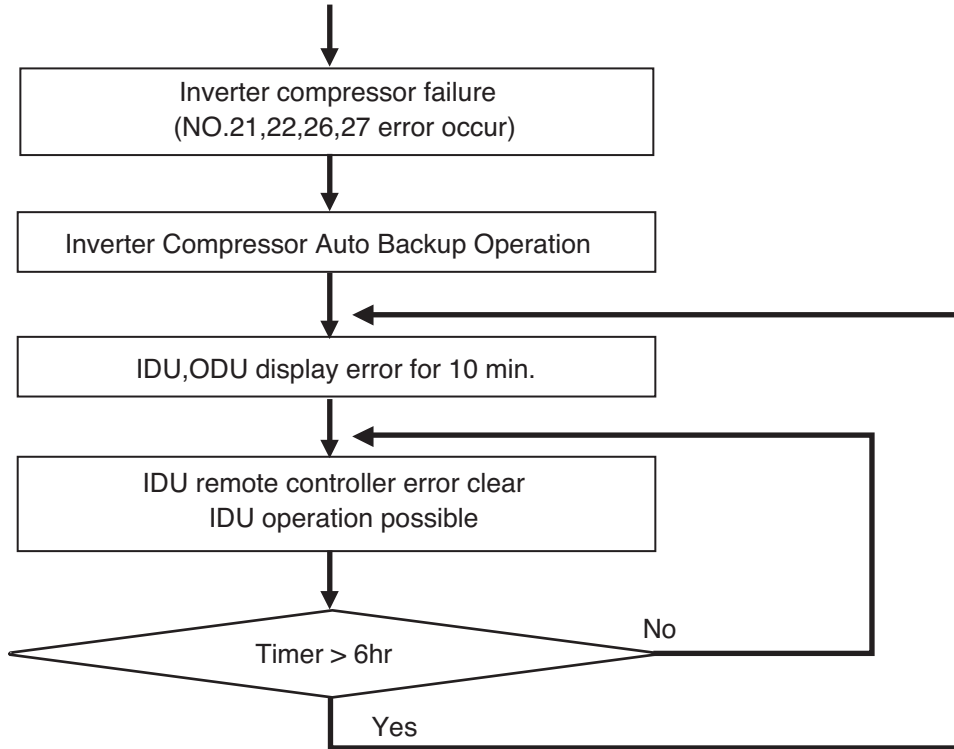
1. Close liquid pipe and common pipe of the unit for pump out operation.
2. Operate pump out
3. Close gas pipe of unit after completion
4. End pump out
5. Eliminate refrigerant in common pipe after opening the common pipe of corresponding ODU. Replace compressor and perform vacuum.
6. Add the refrigerant with auto charging function



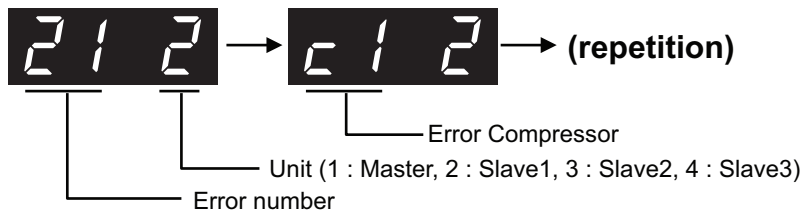
4.5 Auto Backup Function_Inverter compressor

This function allows the system to operate in case of inverter compressor failure by backing up compressor automatically.

SVC can be asked by displaying error to the customer every 6 hours.



Example) Slave1 unit Inverter Compressor 1 start failure error No. 21 occur



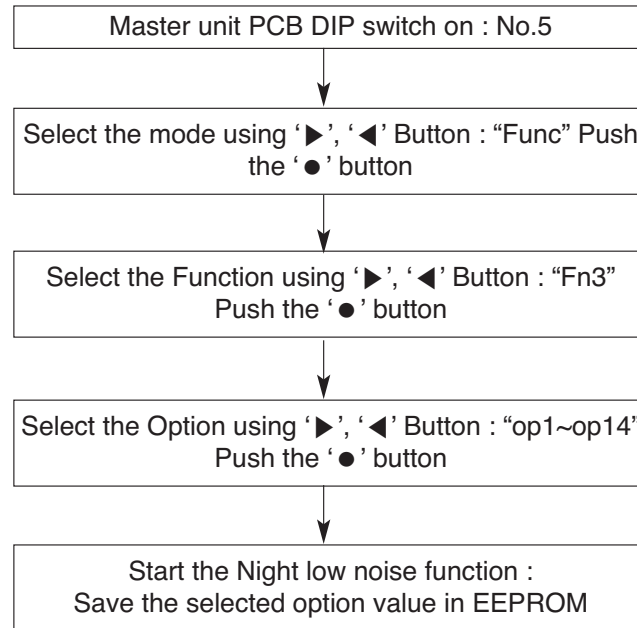
⚠ Caution

1. Request SVC immediately if error occurs.
2. Auto Backup is set up to 1 Inverter Compressor
3. If Inverter Compressor Auto Backup starts, error displays for 10 min. every 6 hours.
4. Error displays continuously at the corresponding ODU.

4.6 Night Low Noise Function

In cooling mode, this function makes the ODU fan operate at low RPM to reduce the fan noise of ODU at night which has low cooling load.

Night low noise function setting method



RPM / Time Settings

Step	Judgment Time(Hr)	Operation Time(Hr)
op1	8	9
op2	6.5	10.5
op3	5	12
op4	8	9
op5	6.5	10.5
op6	5	12
op7	8	9
op8	6.5	10
op9	5	12
op10	Continuous operation	
op11		
op12		
op13	6.5	10.5
op14		

Noise

Step	Capacity	
	UX5	UX6
op1~op3, op10	55	59
op4~op6, op11	52	56
op7~op9, op12	49	53
op13	55	55
op14	50	50

※ Reducing noise by changing ODU RPM, cooling capacity may go down.
Please refer to the following table.

※ Reference of Cooling Capacity Table

Step \ HP	8	10	12	14	16	18	20	22
	op13	100	98	87	67	60	54	48
op14	98	78	69	55	49	44	39	35

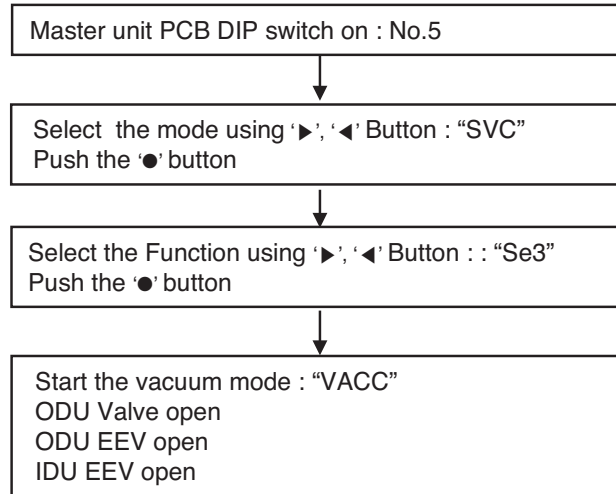
CAUTION

- Request installer to set the function during installation.
- In case the function is not used, set the dip S/W OFF and reset the power.
- If you set step op 13,14 that Capacity is drop. Please check above capacity table

4.7 Vacuum Mode

This function is used for creating vacuum in the system after compressor replacement, ODU parts replacement or IDU addition/replacement.

Vacuum mode setting method



Vacuum mode cancellation method



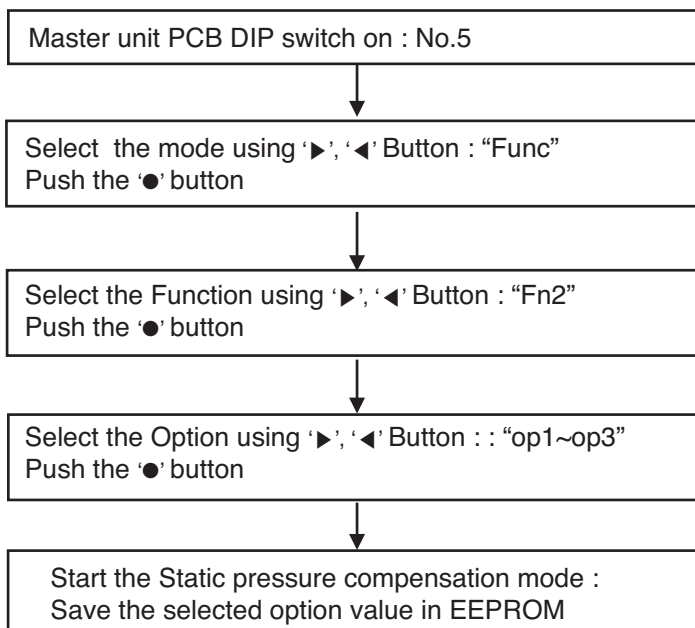
CAUTION

ODU operation stops during vacuum mode. Compressor can't operate.

4.8 Static pressure compensation mode

This function is used for creating vacuum in the system after compressor replacement, ODU parts replacement or IDU addition/replacement.

Static pressure compensation mode setting method

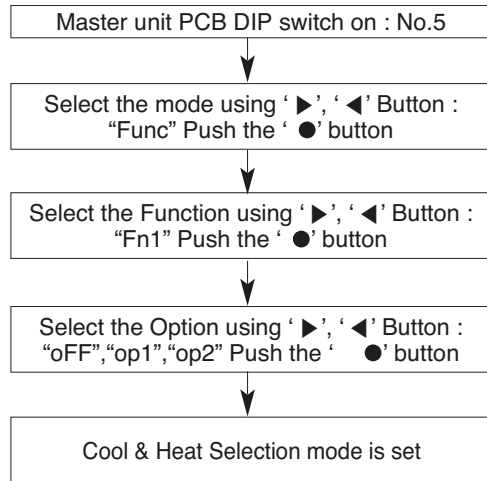


FAN Maximum RPM of each step

Capacity		UX5	UX6
Max. RPM	Standard	730	950
	Step1	800	1000
	Step2	820	1000
	Step3	850	1000

4.9 Cool & Heat selector

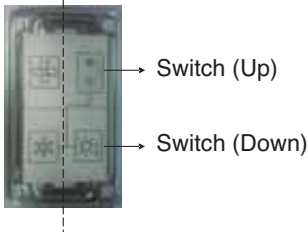
mode setting method



mode setting method

Switch Control		Function		
Switch (Up)	Switch (Down)	oFF	op1(mode)	op2(mode)
Right side (On)	Left side (On)	Not operate	Cooling	Cooling
Right side (On)	Right side (On)	Not operate	Heating	Heating
Left side (Off)	-	Not operate	Fan mode	Off

Left side | Right side



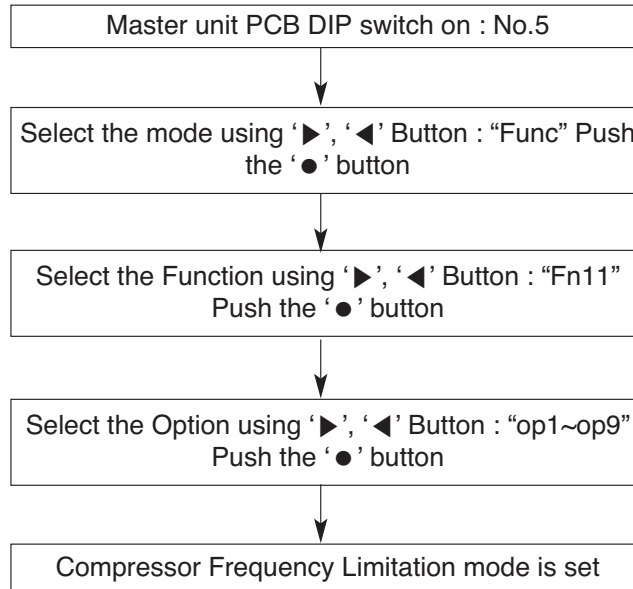
CAUTION

- Ask an authorized technician to setting a function.
- If do not use a function, set an off-mode.
- If use a function, first install a Cool & Heat selector.
- * "Heat" function is not applied in ARUV***LLS4/LLN4.

4.10 Compressor Frequency Limitation

mode setting method

By limiting Compressor Frequency, it's possible to reduce power consumption.



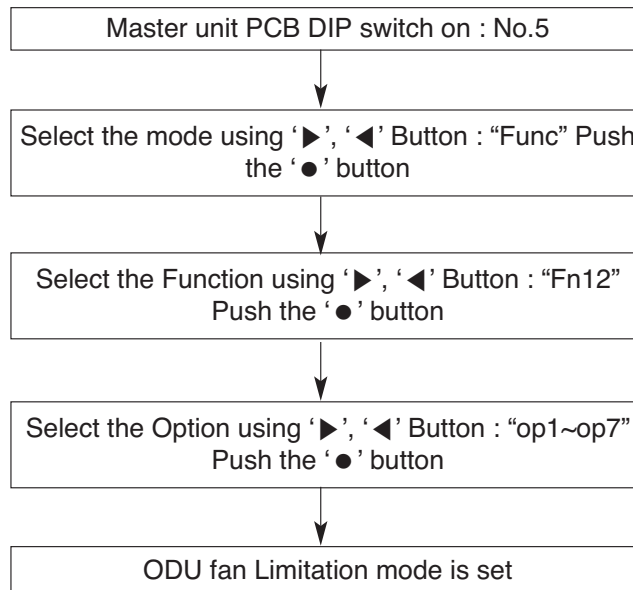
Inverter Max Hz Table

Setting	Inverter Hz
off	-
op1	143 Hz
op2	135 Hz
op3	128 Hz
op4	120 Hz
op5	113 Hz
op6	105 Hz
op7	98 Hz
op8	90 Hz
op9	83 Hz

4.11 ODU fan Limitation

mode setting method

By limiting Fan Max RPM, it's possible to reduce noise and power consumption.



Fan Max RPM Table

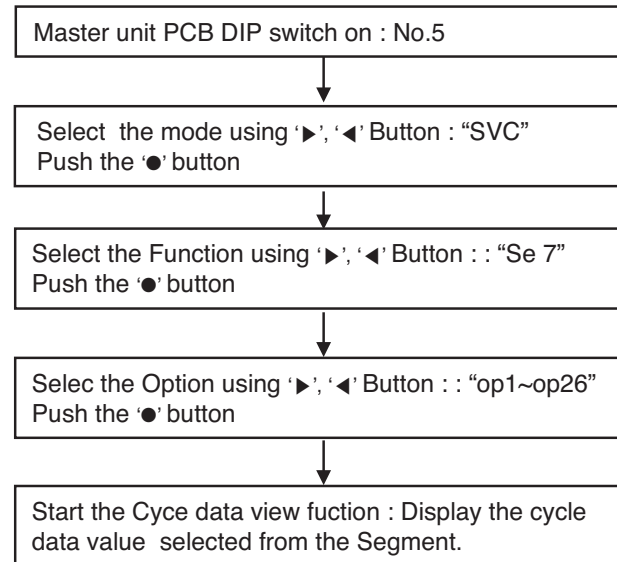
Setting	Fan RPM	
	UX5	UX6
off	-	-
op1	720 rpm	900 rpm
op2	700 rpm	850 rpm
op3	680 rpm	800 rpm
op4	660 rpm	750 rpm
op5	640 rpm	700 rpm
op6	620 rpm	650 rpm
op7	600 rpm	600 rpm

4.12 Cycle Data View

This function is intended to identify the Cycle data of ODU, which is running on.

The 7 Segment is display 26 different cycle data.

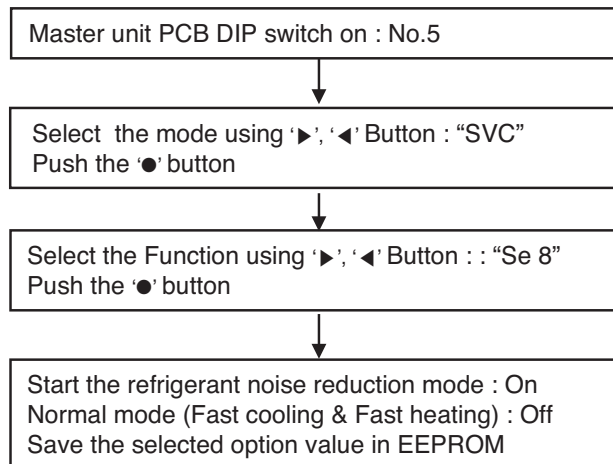
Cycle data view function setting method



step	Title	7-seg	example	seg_1	seg_2	seg_3	seg_4
op1	Current High Pressure	P1	4321kPa	4	3	2	1
op2	Current low Pressure	P2	1234kPa	1	2	3	4
op3	Inverter 1 Hz	h1	120		1	2	0
op4	Inverter 2 Hz	h2	30			3	0
op5	fan rpm	h3	110		1	1	0
op6	Subcooling degree	T1	5.3			5	3
op7	Superheating degree	T2	-4.5		-	4	5
op8	ODU temp.	T3	10		1	0	0
op9	Suction Temp.	T4	43.4		4	3	4
op10	Comp1 discharge temp.	T5	150		1	5	0
op11	Comp2 discharge temp.	T6	124		1	2	4
op12	Liquid pipe temp.	T7	10		1	0	0
op13	Sc_in	T8	-65.2 or -100	-	1	0	0
op14	Sc_out	T9	10		1	0	0
op15	hex_total	T10	10		1	0	0
op16	hex_hi	T11	-65.2 or -100	-	1	0	0
op17	hex_low	T12	-65.2 or -100	-	1	0	0
op18	Inlet pipe temp of IDU	T13	-10°	-	1	0	0
op19	main1 eev	PLS1	1940	1	9	4	0
op20	main2 eev	PLS2	0				0
op21	sc eev	PLS3	16			1	6
op22	oil eev	PLS4	0				0
op23	vi eev 1	PLS5	0				0
op24	vi eev 2	PLS6	0				0
op25	IDU running capacity	IDU1	24k			2	4
op26	Total number of IDU	IDU2	10			1	0

4.13 Refrigerant noise reduction mode

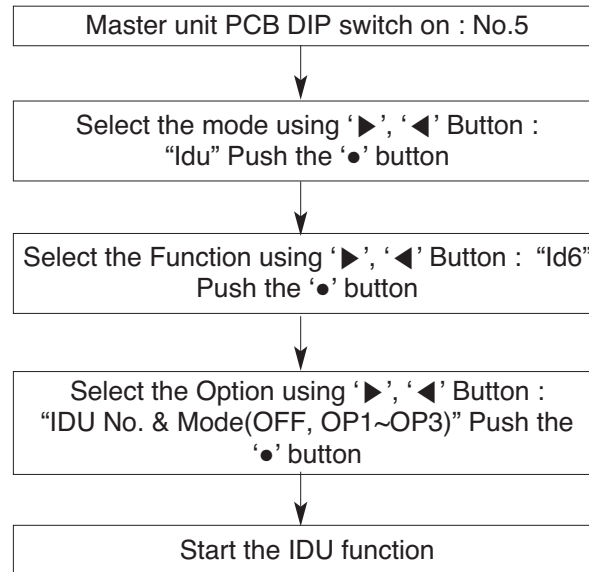
Refrigerant noise reduction mode setting method



4.14 Continuous Cooling Function

In the cooling mode, this optional function enables the IDU to operate continuously without thermo off to reduce ODU power consumption.

Continuous cooling function setting method



Mode Setting

Option	Setting
Off	Usual Operation
op1	Little low cooling, but least power consumption
op2	Medium Cooling with medium power consumption
op3	High cooling, but more power consumption



CAUTION

- Ask an authorized technician to setting a function.
- If use a function, first install a Central controller.

Part 3

PCB Setting and Test Run

Test Run

1. Checks Before Test Run

1	Check to see whether there is any refrigerant leakage, and slack of power or communication cable.
2	<p>Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less.</p> <p>NOTE: Never carry out megaohm check over terminal control board. Otherwise the control board would be broken.</p> <p>Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground may decrease to approx. 2.0 MΩ as a result of refrigerant accumulating in the internal compressor. If the insulation resistance is less than 2.0 MΩ, turning on the main power supply and energizing the crankcase heater for more than 6 hours will cause the refrigerant to evaporate, increasing the insulation resistance.</p>
3	<p>Check if high/low pressure common pipe, liquid pipe and gas pipe valves are fully opened.</p> <p>NOTE: Be sure to tighten caps.</p>
4	<p>Check if there are any problems in automatic addressing or not:</p> <p>Check and confirm that there are no error messages in the display of indoor units or remote controls and LED in outdoor units.</p>



CAUTION

when cutting main power of the Multi V

- Always apply main power of the outdoor unit during use of product (cooling season/heating season).
- Always apply power before 4 hours to heat the crank case heater where performing test run after installation of product. It may result in burning out of the compressor if not preheating the crank case with the electrical heater for more than 4 hours.(In case of the outdoor temperature below 10 °C)



CAUTION

Preheat of compressor

- Start preheat operation for 4 hours after supplying main power.
- In case that the outdoor temperature is low, be sure to supply power 4 hours before operation so that the heater is heated(insufficient heating may cause damage of the compressor.)

2. How to cope with Test Run abnormality

The phenomena from main component failure

Component	Phenomenon	Cause	Check method and Trouble shooting
Compressor	Not operating	Motor insulation broken	Check resistance between terminals and chassis
		Strainer clogged	Change strainer
		Oil leakage	Check Oil level after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	R-S-T misconnection	Check compressor R-S-T connection
Outdoor fan	High pressure error at cooling	Motor failure, bad ventilation around outdoor heat exchanger	Check the outdoor fan operation after being turned the outdoor units off for some time. Remove obstacles around the outdoor units
Outdoor EEV	Heating failure, frequent defrosting	Bad connector contact	Check connector
	No operating sound at applying power	Coil failure	Check resistance between terminals
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	Service necessary

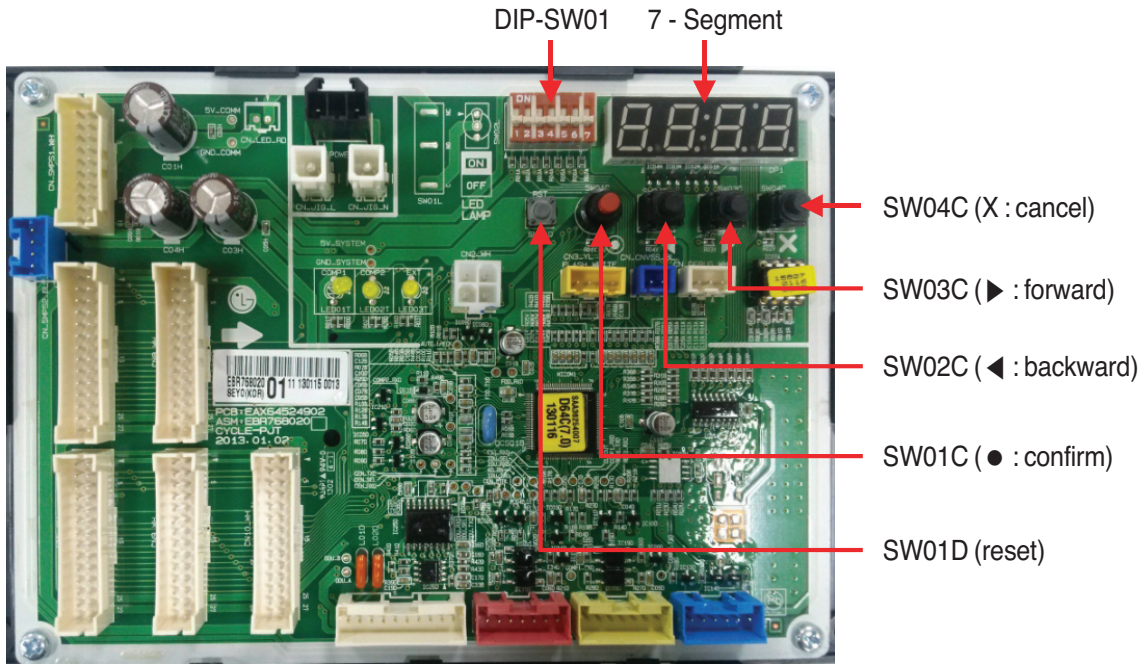
When system fault occurs, the error code is displayed at indoor unit display or remote control display, the trouble shooting guide is in the service manual

- When CH05/53/11 ERROR occurs, check if auto-addressing has done and communication wiring is ok.

3. DIP Switch Setting

■ Location of setting Switch

Heat Pump (Main PCB)



Checking the setting of outdoor units

■ Checking according to dip switch setting

1. You can check the setting values of the Master outdoor unit from the 7 segment LED.
The dip switch setting should be changed when the power is OFF.
2. It checks whether the input is properly performed without the bad contact of the dip switch or not

■ Checking the setting of outdoor units

Checking according to dip switch setting

- You can check the setting values of the Master outdoor unit from the 7 segment LED.
The dip switch setting should be changed when the power is OFF.

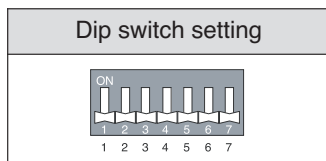
Checking the initial display

The number is sequentially appeared at the 7 segment in 5 seconds after applying the power. This number represents the setting condition.

• Initial display order

Order	No	Mean
①	8~22	Master model capacity
②	10~22	Slave 1 model capacity
③	10~22	Slave 2 model capacity
④	10~22	Slave 3 model capacity
⑤	8~88	Total capacity
⑥	1	Cooling Only
	2	Heat Pump
	3	Heat Recovery
⑦	38	380 V model
	46	460 V model
	22	220 V model
⑧	1	LTE
	2	LTS / LTN
	9	LLS / LLN

• Master Unit



• Slave Unit

Dip switch setting	ODU Setting
	Slave 1
	Slave 2
	Slave 3

Part 4

Trouble shooting guide

Trouble shooting guide

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2. Checking Method for Key Components	53
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1. The phenomena from main component failure

The phenomena from main component failure

Component	Phenomenon	Cause	Check method and Trouble shooting
Compressor	Not operating	Motor insulation broken	Check resistance between terminals and chassis
		Strainer clogged	Change strainer
		Oil leakage	Check Oil level after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	R-S-T misconnection	Check compressor R-S-T connection
Outdoor Fan	High pressure error in cooling mode operation	Motor failure, bad ventilation around outdoor heat exchanger	Check the fan operation to confirm proper motor functioning. Switch OFF the outdoor unit and remove obstacles, if any, around the HEX. Check connector
Outdoor EEV	Heating failure, frequent defrosting	Bad connector contact	Check resistance between terminals
	No operation sound after switching ON the power supply	Coil failure	Service necessary
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	

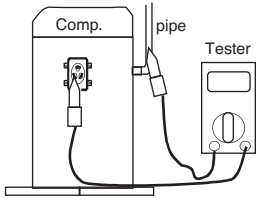
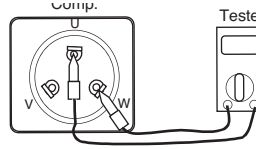
When system fault occurs, the error code is displayed on the indoor unit display or remote control display. The trouble shooting guide is available in the service manual.

- When CH05/53/11 ERROR occurs, check if auto-addressing has done and communication wiring is ok.

2. Checking Method for Key Components

2.1 Compressor

Check and ensure in following order when error related with the compressor or error related with power occurs during operation:

No.	Checking Item	Symptom	Countermeasure																								
1	Is how long power on during operation?	1) Power on for 12 hours or more	* Go to No.2.																								
		2) Power on for 12 hours or less	* Go to No.2 after applying power for designated time (12 hours).																								
2	Does failure appears again when starting operation? Method to measure insulation resistance  Figure 1. Method to measure coil resistance  Figure 2.	1) The compressor stops and same error appears again.	* Check IPM may fail.																								
		2) If output voltage of the inverter is stably output.	* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor. * Insulation resistor : 50MΩ or more * Coil resistor (below table) JQA048MAF <table border="1"> <thead> <tr> <th>Temp.</th> <th>25°C</th> <th>75°C</th> </tr> </thead> <tbody> <tr> <td>U-V</td> <td>0.178 ± 7 % Ω</td> <td>0.212 ± 7 % Ω</td> </tr> <tr> <td>V-W</td> <td>0.178 ± 7 % Ω</td> <td>0.212 ± 7 % Ω</td> </tr> <tr> <td>W-U</td> <td>0.178 ± 7 % Ω</td> <td>0.212 ± 7 % Ω</td> </tr> </tbody> </table> JBA068MAF <table border="1"> <thead> <tr> <th>Temp.</th> <th>25°C</th> <th>75°C</th> </tr> </thead> <tbody> <tr> <td>U-V</td> <td>0.163 ± 7 % Ω</td> <td>0.195 ± 7 % Ω</td> </tr> <tr> <td>V-W</td> <td>0.163 ± 7 % Ω</td> <td>0.195 ± 7 % Ω</td> </tr> <tr> <td>W-U</td> <td>0.163 ± 7 % Ω</td> <td>0.195 ± 7 % Ω</td> </tr> </tbody> </table>	Temp.	25°C	75°C	U-V	0.178 ± 7 % Ω	0.212 ± 7 % Ω	V-W	0.178 ± 7 % Ω	0.212 ± 7 % Ω	W-U	0.178 ± 7 % Ω	0.212 ± 7 % Ω	Temp.	25°C	75°C	U-V	0.163 ± 7 % Ω	0.195 ± 7 % Ω	V-W	0.163 ± 7 % Ω	0.195 ± 7 % Ω	W-U	0.163 ± 7 % Ω	0.195 ± 7 % Ω
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W-U	0.163 ± 7 % Ω	0.195 ± 7 % Ω																									
3) If output voltage of the inverter is unstable or it is 0 V. (When incapable of using a digital tester)	* Check the IPM. If the IPM is normal, replace the inverter board. * Check coil resistor and insulation resistor.																										

[Cautions when measuring voltage and current of inverter power circuit]

Measuring values may differ depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no sine waveform.

Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.

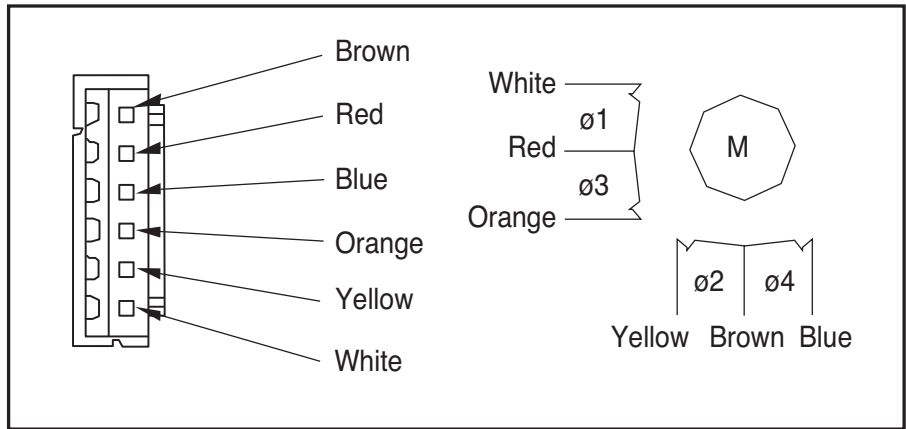
In addition, measuring values appear largely differently depending on measuring tools.

- 1) If using a movable tester when checking that output voltage of the inverter is constant (when comparing relative voltage between lines), always use an analog tester. Especially exercise particular caution if the output frequency of the inverter is low, when using a movable tester, where change of measured voltage values is large between other lines, when virtually same values appear actually or where there is danger to determine that failure of the inverter occurred.
- 2) You can use rectification voltmeter (→+) if using commercial frequency tester when measuring output values of the inverter (when measuring absolute values). Accurate measuring values cannot be obtained with a general movable tester (For analog and digital mode).

2.2 Fan Motor

Checking Item	Symptom	Countermeasure
(1) The fan motor does not operate. Does failure appears again when starting operation?	1) When power supply is abnormal	* Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition.
		* Modify the power supply voltage is beyond specified scope.
(2) Vibration of the fan motor is large.	2) For wrong wiring	* For following wiring. 1. Check connection status. 2. Check contact of the connector. 3. Check that parts are firmly secured by tightening screws. 4. Check connection of polarity. 5. Check short circuit and grounding.
	3) For failure of motor	* Measure winding resistance of the motor coils. $11.15 \Omega \pm 7 \% (@25 \text{ } ^\circ\text{C})$
	4) For defective fuse 5) For failure of circuit board	* Replace the fuse if there is defect (Fuse 800V 30A). Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.) 1. Replace only fan control boards. If starting is done, it means that the fan control board has defect. 2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect. 3. If problems continue to occur even after countermeasure of No.1 and No.2, it means that both boards has defect.

2.3 Electronic Expansion Valve



• Pulse signal output value and valve operation

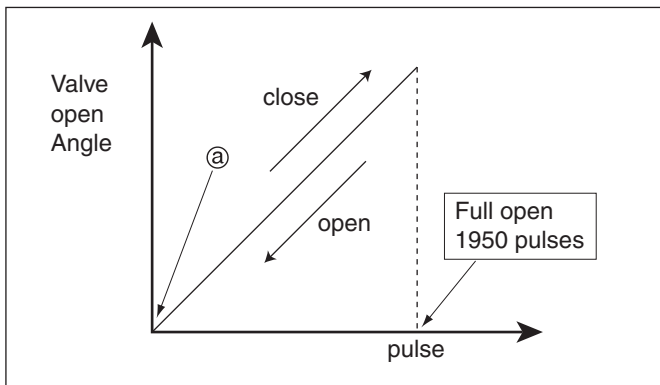
Output(ø) No.	Output state			
	1	2	3	4
ø1	ON	ON	OFF	ON
ø2	ON	ON	ON	OFF
ø3	OFF	OFF	ON	OFF
ø4	OFF	OFF	OFF	ON

• Output pulse sequence

- In valve close state: 4 → 3 → 2 → 1 → 4
- In valve open state: 1 → 2 → 3 → 4 → 1

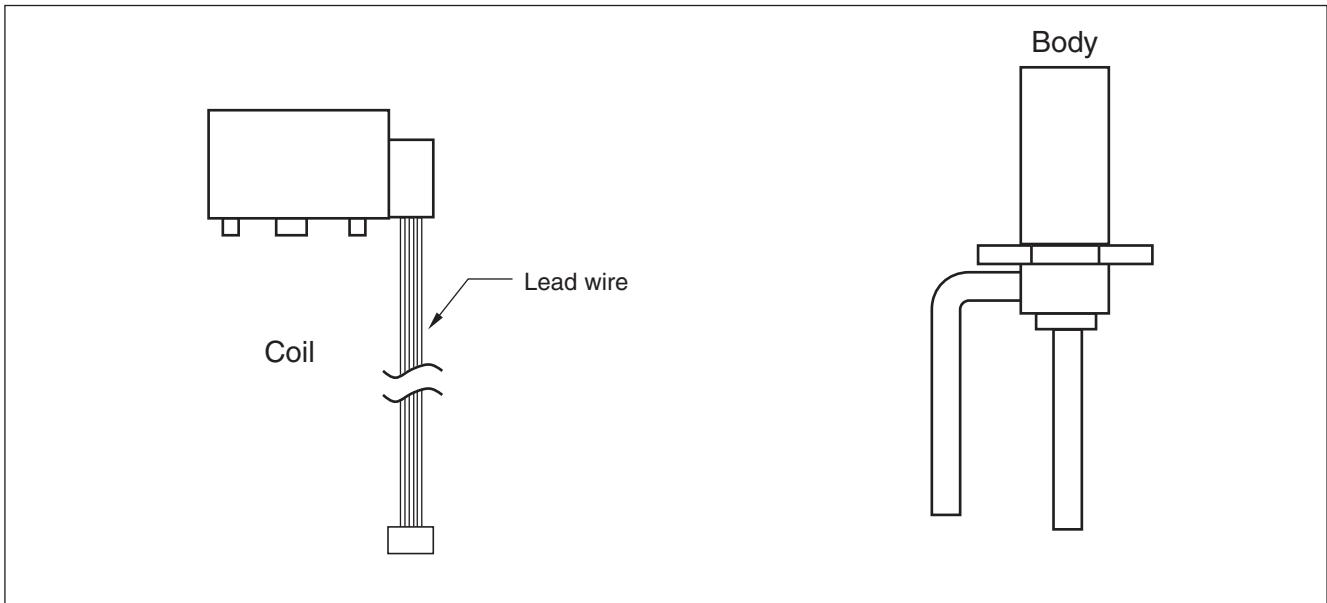
- * 1. If EEV open angle does not change, all of output phase will be OFF
- 2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

• EEV valve operation

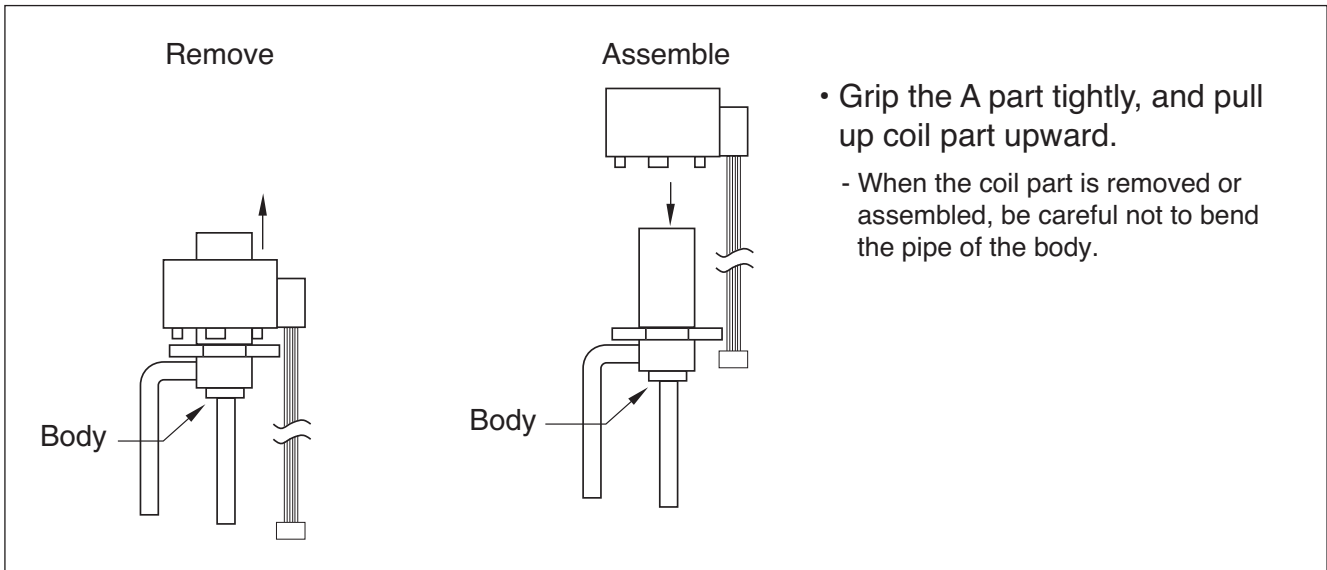


- At power ON, open angle signal of 1400 pulses output and valve position is set to @
If valve operates smoothly, no noise and vibration occurs and if valve is closed. noise occurs.
- Noise from EEV can be confirmed by touching the EEV surface with a screw driver and listening the EEV noise.
- If liquid refrigerant is in EEV, the noise is lower.

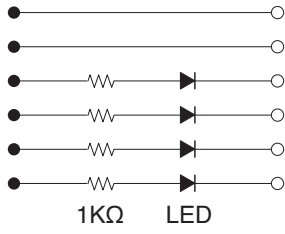
• EEV Coil and body(Outdoor unit)



• Remove and assemble the coil

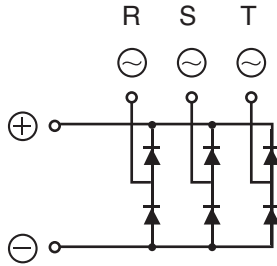


• EEV failure check method

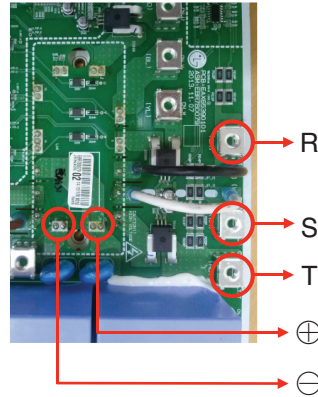
Failure mode	Diagnosis	Repair process	Unit
Microcomputer Driving circuit failure	<p>1. Disconnect the EEV connector form control board and connect testing LED</p>  <p>2. Main power ON, pulse signal is out from EEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal</p>	Check and replace Indoor unit control board	Indoor unit
EEV locking	1. If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV	Indoor / Outdoor unit
EEV Motor coil short or misconnection	<p>1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue)</p> <p>2. If the estimated resistance value is in 52 ± 3 then the EEV is normal</p>	Replace EEV	Outdoor unit
	<p>1. Check the resistance between coil terminal (brown-white, brown-yellow, brown-orange, brown-blue)</p> <p>2. If the estimated resistance value is in 150 ± 10 then the EEV is normal</p>	Replace EEV	Indoor unit
Full closing (valve leakage)	<p>1. Operate indoor unit with FAN mode and operate another indoor unit with COOLING mode</p> <p>2. Check indoor unit(FAN mode) liquid pipe temperature (from operation monitor of outdoor unit control board)</p> <p>3. When fan rotate and EEV is fully closed, if there is any leakage, then the temperature is down</p> <p>If estimated temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed</p>	If the amount of leakage is much, Replace EEV	Indoor unit

2.4 Phase Bridge Diode Checking Method

Internal circuit diagram



Appearance



1. Wait until Comp PCB DC voltage gets discharged, after the main power switch off.
2. Pull out DC_Link connector connected with Inverter PCB.
3. Set multi tester in diode mode.
4. Measured value should be 0.4~0.7 V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure. If the value is small (0 Ω) or high (hundreds MΩ), PCB needs to be replaced.

Diode terminal Tester terminal	+ terminal: black(-)	- terminal: red(+)
R(~) : red(+)	0.4 V ~ 0.7 V	-
S(~) : red(+)	0.4 V ~ 0.7 V	-
T(~) : red(+)	0.4 V ~ 0.7 V	-
R(~) : black(-)	-	0.4 V ~ 0.7 V
S(~) : black(-)	-	0.4 V ~ 0.7 V
T(~) : black(-)	-	0.4 V ~ 0.7 V

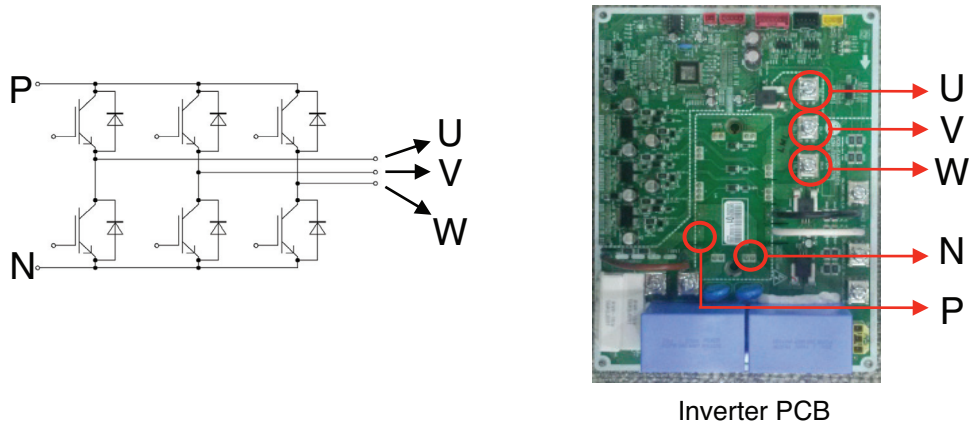
* Red(+) and black(-) are the measuring terminals of multi tester.



CAUTION

- Check the electric parts of c/box, 10 minutes after switching off the main supply and checking DC voltage is discharged. Otherwise, there is chance of getting electric shock.
- There is chance of electric shock by charged voltage.

2.5 Inverter IGBTM Checking Method



1. Wait until Comp PCB DC voltage is discharged after main power off.
2. Pull out DC_Link connector and U,V,W comp connector connected with Inverter PCB
3. Set multi tester in diode mode.
4. Measured value should be 0.2 ~ 0.6 V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure.
If the value is small(0 Ω) or high (hundreds MΩ), PCB needs to be replaced.
6. In case that IGBTM is damaged, check if comp is needed to be replaced

	P terminal : black(-)	N terminal: red(+)
U terminal : red(+)	0.2 V ~ 0.6 V	
V terminal : red(+)	0.2 V ~ 0.6 V	
W terminal : red(+)	0.2 V ~ 0.6 V	
U terminal : black(-)		0.2 V ~ 0.6 V
V terminal : black(-)		0.2 V ~ 0.6 V
W terminal : black(-)		0.2 V ~ 0.6 V

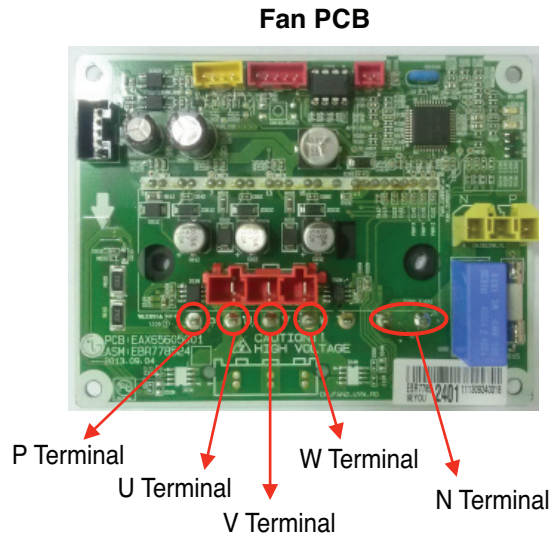
* Red(+) and black(-) are the measuring terminals of multi tester.

2.6 Fan IPM Checking Method

1. Wait until Comp PCB DC voltage gets discharged after the main power switch off.
2. Pull out DC Link connector and U,V,W fan motor connector connected with fan PCB
3. Set multi tester in diode mode.
4. Measured value should be 0.2 ~ 0.6 V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure.
If the value is small(0 Ω) or high(hundreds MΩ), PCB needs to be replaced.
6. In case that IPM is damaged, check if fan motor is needed to be replaced

	P terminal : black(-)	N terminal: red(+)
U terminal : red(+)	0.2 V ~ 0.6 V	
V terminal : red(+)	0.2 V ~ 0.6 V	
W terminal : red(+)	0.2 V ~ 0.6 V	
U terminal : black(-)		0.2 V ~ 0.6 V
V terminal : black(-)		0.2 V ~ 0.6 V
W terminal : black(-)		0.2 V ~ 0.6 V

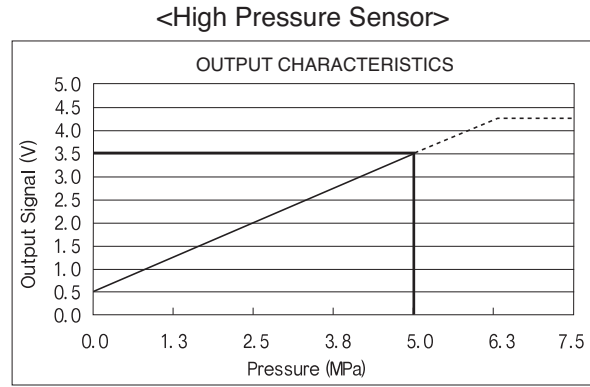
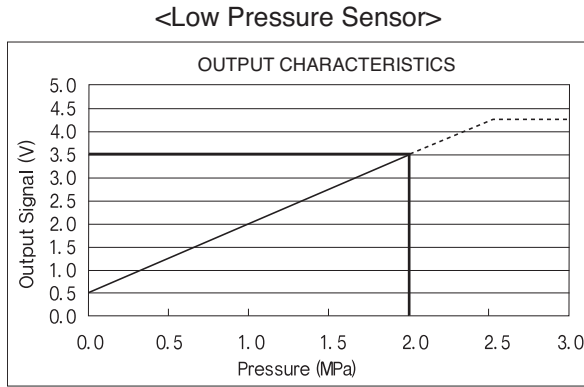
* Red(+) and black(-) are the measuring terminals of multi tester.



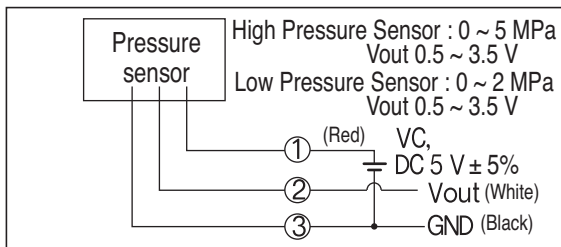
2.7 Pressure Sensor(High/Low Pressure Sensor)

Connect manifold gauge to the service valve of outdoor unit, and compare the output of high pressure sensor to the output of low pressure sensor to detect the defect.

below) Compare the output of pressure sensor to the output of manifold gauge pressure using the table below. Read the pressure clearly between black and white as the composition of pressure sensor.



- 1) If the pressure of manifold gauge is 0 ~ 1 kg/cm², it indicates the pressure got lower due to the leakage of refrigerant. Find the place of leakage and fix it.
- 2) If the difference of the outputs of high and low pressure is in the range of 1 kg/cm², the pressure sensor is normal.
- 3) If the difference of the outputs of high and low pressure is over 1 kg/cm², the pressure sensor is out of order, it need to be replaced.
- 4) The composition of pressure sensor



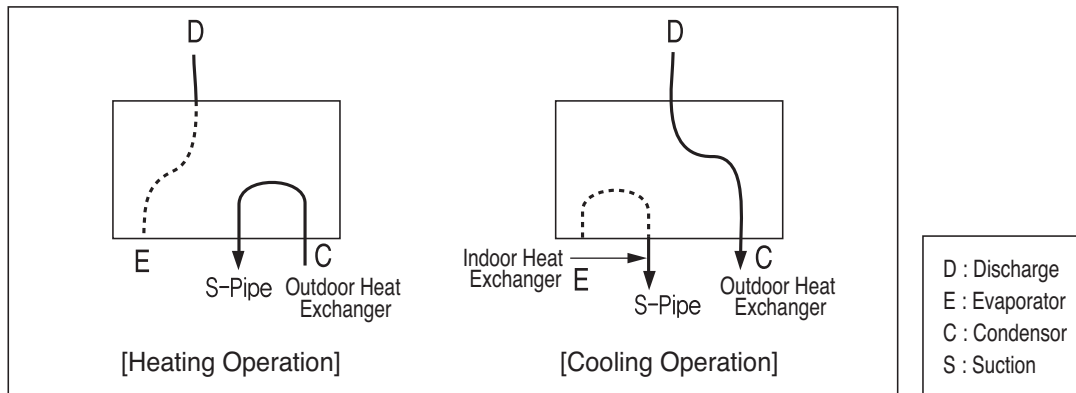
The pressure sensor is composed like the circuit picture shown above. If DC 5 V voltage flows on red and black wire, voltage would be made between the white and black wire. The pressure which is equivalent to the pressure output is shown in the table above.

2.8 Outdoor Fan

- 1) The outdoor fan is controlled by the inverter motor which can control the number of rotations.
- 2) The outdoor fan is controlled by the high/low pressure of the outdoor unit after the operation of compressor.
- 3) There is possibility that the outdoor fan does not operate due to low capacity operation or low outdoor temperature even if the compressor is operating. This does not mean breakdown of the unit, the fan will start operating if it reaches the set point.

2.9 4 Way Valve

1. Keep it off before the outdoor unit is powered on and the indoor unit is turned on.
2. Cooling, defrosting, oil recovery : OFF, heating : ON
3. When alternating cooling to heating, transform 4 way valve during re-starting for 3 minutes.
4. To check the mode of cooling/heating operation of 4 way valve, touch the piping surface of low pressure service valve.
5. Refrigerant flowchart of 4 way valve



6. Insulation resistance in the state of connecting the valve to coil should be over 100 MΩ when measure it with DC mega tester(DC 500V).

2.10 Temperature Sensor

- 1) Outdoor temperature sensor : TH1
- 2) Pipe temperature sensor : TH2
- 3) Discharge pipe(D-pipe) temperature sensor : TH3
 1. Check the condition of installation and the contact of temperature sensor.
 2. Check whether the connector contact of temperature sensor is normal.
 3. Measure the resistance of temperature sensor.

	TH1	TH2	TH3
Resistance	10 kΩ ± 1 %(25 °C)	5 kΩ ± 1 %(25 °C)	200 kΩ ± 1 %(25 °C)
	1.07 kΩ ± 3.3 %(85 °C)	535 Ω ± 3.3 %(85 °C)	28 kΩ ± 7.7 %(85 °C)

3. Self-diagnosis function

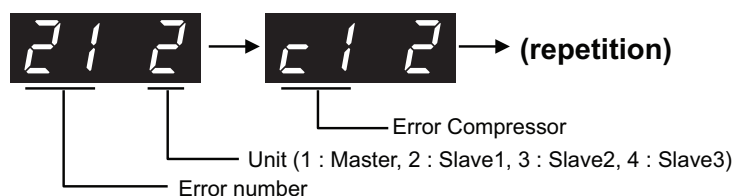
Error Indicator

- This function indicates types of failure in self-diagnosis and occurrence of failure for air condition.
- Error mark is displayed on display window of indoor units and wired remote controller, and 7-segment LED of outdoor unit control board as shown in the table.
- If more than two troubles occur simultaneously, lower number of error code is first displayed.
- After error occurrence, if error is released, error LED is also released simultaneously.

Error Display

- 1st,2nd,3rd LED of 7-segment indicates error number, 4th LED indicates unit number. Indicates unit number.

- Ex) 211 : No.21 error of master unit
 213 : No.21 error of slave2
 1051 : No.105 error of master unit



Display		Title		Cause of Error
Indoor unit related error	0	1	- Air temperature sensor of indoor unit	Air temperature sensor of indoor unit is open or short
	0	2	- Inlet pipe temperature sensor of indoor unit	Inlet pipe temperature sensor of indoor unit is open or short
	0	3	- Communication error : wired remote controller ↔ indoor unit	Failing to receive wired remote controller signal in indoor unit PCB
	0	4	- Drain pump	Malfunction of drain pump
	0	5	- Communication error : Outdoor unit ↔ indoor unit Omitting connection T power of Master Outdoor Unit, Neutral (N) line connection wrongly to T phase line	Failing to receive outdoor unit signal in indoor unit PCB
	0	6	- Outlet pipe temperature sensor of indoor unit	Outlet pipe temperature sensor of indoor unit is open or short
	0	9	- Indoor EEPROM Error	In case when the serial number marked on EEPROM of Indoor unit is 0 or FFFFFFFF
	1	0	- Poor fan motor operation	Disconnecting the fan motor connector/Failure of indoor fan motor lock
Outdoor unit related error	2	1	1 Master Outdoor Unit Inverter Compressor IPM Fault	Master Outdoor Unit Inverter Compressor Drive IPM Fault
			2 Slave1 Outdoor Unit Inverter Compressor IPM Fault	Slave1 Outdoor Unit Inverter Compressor Drive IPM Fault
			3 Slave2 Outdoor Unit Inverter Compressor IPM Fault	Slave2 Outdoor Unit Inverter Compressor Drive IPM Fault
			4 Slave3 Outdoor Unit Inverter Compressor IPM Fault	Slave3 Outdoor Unit Inverter Compressor Drive IPM Fault
	2	2	1 Inverter Board Input Over Current(RMS) of Master Outdoor Unit	Master Outdoor Unit Inverter Board Input Current excess (RMS)
			2 Inverter Board Input Over Current(RMS) of Slave1 Outdoor Unit	Slave1 Outdoor Unit Inverter Board Input Current excess (RMS)
			3 Inverter Board Input Over Current(RMS) of Slave2 Outdoor Unit	Slave2 Outdoor Unit Inverter Board Input Current excess (RMS)
			4 Inverter Board Input Over Current(RMS) of Slave3 Outdoor Unit	Slave3 Outdoor Unit Inverter Board Input Current excess (RMS)

* Refer to the Indoor manual for some Indoor Error code.

Self-diagnosis function

Display			Title	Cause of Error	
Outdoor unit related error	2	3	1	Master Outdoor Unit Inverter Compressor DC link Low/High Voltage	DC charging is not performed at Master Outdoor Unit after starting relay turn on.
			2	Slave1 Outdoor Unit Inverter Compressor DC link Low/High Voltage	DC charging is not performed at Slave1 Outdoor Unit after starting relay turn on.
			3	Slave2 Outdoor Unit Inverter Compressor DC link Low/High Voltage	DC charging is not performed at Slave1 Outdoor Unit after starting relay turn on.
			4	Slave3 Outdoor Unit Inverter Compressor DC link Low/High Voltage	DC charging is not performed at Slave3 Outdoor Unit after starting relay turn on.
	2	4	1	Master Outdoor Unit High Pressure Switch	System is turned off by Master Outdoor Unit high pressure switch.
			2	Slave1 Outdoor Unit High Pressure Switch	System is turned off by slave1 Outdoor Unit high pressure switch.
			3	Slave2 Outdoor Unit High Pressure Switch	System is turned off by slave2 Outdoor Unit high pressure switch.
			4	Slave3 Outdoor Unit High Pressure Switch	System is turned off by slave3 Outdoor Unit high pressure switch.
	2	5	1	Master Outdoor Unit Input Voltage High/ Low Voltage	Master Outdoor Unit input voltage is over 487V or below 270V
			2	Slave1 Outdoor Unit Input Voltage High/ Low Voltage	Slave1 Outdoor Unit input voltage is over 487V or below 270V
			3	Slave2 Outdoor Unit Input Voltage High/ Low Voltage	Slave2 Outdoor Unit input voltage is over 487V or below 270V
			4	Slave3 Outdoor Unit Input Voltage High/ Low Voltage	Slave3 Outdoor Unit input voltage is over 487V or below 270V
	2	6	1	Master Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Master Outdoor Unit Inverter Compressor Abnormality
			2	Slave1 Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Slave1 Outdoor Unit Inverter Compressor Abnormality
			3	Slave2 Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Slave2 Outdoor Unit Inverter Compressor Abnormality
			4	Slave3 Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Slave3 Outdoor Unit Inverter Compressor Abnormality
	2	9	1	Master Outdoor Unit Inverter Compressor Over Current	Master Outdoor Unit Inverter Compressor Fault OR Drive Fault
			2	Slave1 Outdoor Unit Inverter Compressor Over Current	Slave1 Outdoor Unit Inverter Compressor Fault OR Drive Fault
			3	Slave2 Outdoor Unit Inverter Compressor Over Current	Slave2 Outdoor Unit Inverter Compressor Fault OR Drive Fault
			4	Slave2 Outdoor Unit Inverter Compressor Over Current	Slave3 Outdoor Unit Inverter Compressor Fault OR Drive Fault

Display			Title	Cause of Error
Outdoor unit related error	3	2	1 Master Outdoor Unit Inverter Compressor1 High Discharge Temperature	System is turned off by Master Outdoor Unit Inverter Compressor High Discharge Temperature
			2 Slave1 Outdoor Unit Inverter Compressor1 High Discharge Temperature	System is turned off by Slave1 Outdoor Unit Inverter Compressor High Discharge Temperature
			3 Slave2 Outdoor Unit Inverter Compressor1 High Discharge Temperature	System is turned off by Slave2 Outdoor Unit Inverter Compressor High Discharge Temperature
			4 Slave2 Outdoor Unit Inverter Compressor1 High Discharge Temperature	System is turned off by Slave3 Outdoor Unit Inverter Compressor High Discharge Temperature
	3	3	1 Master Outdoor Unit Inverter Compressor2 High Discharge Temperature	System is turned off by Master Outdoor Unit Inverter Compressor2 High Discharge Temperature
			2 Slave1 Outdoor Unit Inverter Compressor2 High Discharge Temperature	System is turned off by Slave1 Outdoor Unit Inverter Compressor2 High Discharge Temperature
			3 Slave2 Outdoor Unit Inverter Compressor2 High Discharge Temperature	System is turned off by Slave2 Outdoor Unit Inverter Compressor2 High Discharge Temperature
			4 Slave3 Outdoor Unit Inverter Compressor2 High Discharge Temperature	System is turned off by Slave3 Outdoor Unit Inverter Compressor2 High Discharge Temperature
	3	4	1 High Pressure of Master Outdoor Unit	System is turned off by excessive increase of high pressure of Master Outdoor Unit
			2 High Pressure of Slave1 Outdoor Unit	System is turned off by excessive increase of high pressure of Slave1 Outdoor Unit
			3 High Pressure of Slave2 Outdoor Unit	System is turned off by excessive increase of high pressure of Slave2 Outdoor Unit
			4 High Pressure of Slave3 Outdoor Unit	System is turned off by excessive increase of high pressure of Slave3 Outdoor Unit
	3	5	1 Low Pressure of Master Outdoor Unit	System is turned off by excessive decrease of low pressure of Master Outdoor Unit
			2 Low Pressure of Slave1 Outdoor Unit	System is turned off by excessive decrease of low pressure of Slave1 Outdoor Unit
			3 Low Pressure of Slave2 Outdoor Unit	System is turned off by excessive decrease of low pressure of Slave2 Outdoor Unit
			4 Low Pressure of Slave3 Outdoor Unit	System is turned off by excessive decrease of low pressure of Slave3 Outdoor Unit
3	6	1 Master Outdoor Unit Low Compression Ratio Limited	Master Outdoor Unit stayed under low Compression limit for 3 minutes	
		2 Slave1 Outdoor Unit Low Compression Ratio Limited	Slave1 Outdoor Unit stayed under low Compression limit for 3 minutes	
		3 Slave2 Outdoor Unit Low Compression Ratio Limited	Slave2 Outdoor Unit stayed under low Compression limit for 3 minutes	
		4 Slave3 Outdoor Unit Low Compression Ratio Limited	Slave3 Outdoor Unit stayed under low Compression limit for 3 minutes	

Self-diagnosis function

Display			Title	Cause of Error	
Outdoor unit related error	4	0	1	Master Outdoor Unit Inverter Compressor CT Sensor Fault	Master Outdoor Unit Inverter Compressor CT Sensor open or short
			2	Slave1 Outdoor Unit Inverter Compressor CT Sensor Fault	Slave1 Outdoor Unit Inverter Compressor CT Sensor open or short
			3	Slave2 Outdoor Unit Inverter Compressor CT Sensor Fault	Slave2 Outdoor Unit Inverter Compressor CT Sensor open or short
			4	Slave3 Outdoor Unit Inverter Compressor CT Sensor Fault	Slave3 Outdoor Unit Inverter Compressor CT Sensor open or short
	4	1	1	Master Outdoor Unit Inverter Compressor1 Discharge Temperature Sensor Fault	Master Outdoor Unit Inverter Compressor Discharge Temperature Sensor open or short
			2	Slave1 Outdoor Unit Inverter Compressor1 Discharge Temperature Sensor Fault	Slave1 Outdoor Unit Inverter Compressor Discharge Temperature Sensor open or short
			3	Slave2 Outdoor Unit Inverter Compressor1 Discharge Temperature Sensor Fault	Slave2 Outdoor Unit Inverter Compressor Discharge Temperature Sensor open or short
			4	Slave3 Outdoor Unit Inverter Compressor1 Discharge Temperature Sensor Fault	Slave3 Outdoor Unit Inverter Compressor Discharge Temperature Sensor open or short
	4	2	1	Master Outdoor Unit Low Pressure Sensor Fault	Master Outdoor Unit Low Pressure Sensor open or short
			2	Slave1 Outdoor Unit Low Pressure Sensor Fault	Slave1 Outdoor Unit Low Pressure Sensor open or short
			3	Slave2 Outdoor Unit Low Pressure Sensor Fault	Slave2 Outdoor Unit Low Pressure Sensor open or short
			4	Slave3 Outdoor Unit Low Pressure Sensor Fault	Slave3 Outdoor Unit Low Pressure Sensor open or short
	4	3	1	Master Outdoor Unit High Pressure Sensor Fault	Master Outdoor Unit High Pressure Sensor open or short
			2	Slave1 Outdoor Unit High Pressure Sensor Fault	Slave1 Outdoor Unit High Pressure Sensor open or short
			3	Slave2 Outdoor Unit High Pressure Sensor Fault	Slave2 Outdoor Unit High Pressure Sensor open or short
			4	Slave3 Outdoor Unit High Pressure Sensor Fault	Slave3 Outdoor Unit High Pressure Sensor open or short
4	4	1	Master Outdoor Unit Air Temperature Sensor Fault	Master Outdoor Unit Air Temperature Sensor open or short	
		2	Slave1 Outdoor Unit Air Temperature Sensor Fault	Slave1 Outdoor Unit Air Temperature Sensor open or short	
		3	Slave2 Outdoor Unit Air Temperature Sensor Fault	Slave2 Outdoor Unit Air Temperature Sensor open or short	
		4	Slave3 Outdoor Unit Air Temperature Sensor Fault	Slave3 Outdoor Unit Air Temperature Sensor open or short	

Display			Title	Cause of Error	
Outdoor unit related error	4	5	1	Master Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Master Outdoor Unit Heat Exchanger Temperature Sensor(Front side) open or short
			2	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (Front side) open or short
			3	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor(Front side) open or short
			4	Slave3 Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Slave3 Outdoor Unit Heat Exchanger Temperature Sensor(Front side) open or short
	4	6	1	Master Outdoor Unit Suction Temperature Sensor Fault	Master Outdoor Unit Suction Temperature Sensor open or short
			2	Slave1 Outdoor Unit Suction Temperature Sensor Fault	Slave1 Outdoor Unit Suction Temperature Sensor open or short
			3	Slave2 Outdoor Unit Suction Temperature Sensor Fault	Slave2 Outdoor Unit Suction Temperature Sensor open or short
			4	Slave3 Outdoor Unit Suction Temperature Sensor Fault	Slave3 Outdoor Unit Suction Temperature Sensor open or short
	4	7	1	Master Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor Fault	Master Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor open or short
			2	Slave1 Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor Fault	Slave1 Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor open or short
			3	Slave2 Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor Fault	Slave2 Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor open or short
			4	Slave3 Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor Fault	Slave3 Outdoor Unit Inverter Compressor2 Discharge Temperature Sensor open or short
	5	0	1	Omitting connection R,S power of Master Outdoor Unit, Neutral (N) line connection wrongly to R,S phase line	Omitting connection of Master outdoor unit
			2	Omitting connection R,S power of Slave1 Outdoor Unit, Neutral (N) line connection wrongly to R,S phase line	Omitting connection of Slave1 Outdoor Unit
			3	Omitting connection R,S power of Slave2 Outdoor Unit, Neutral (N) line connection wrongly to R,S phase line	Omitting connection of Slave2 Outdoor Unit
			4	Omitting connection R,S power of Slave3 Outdoor Unit, Neutral (N) line connection wrongly to R,S phase line	Omitting connection of Slave3 Outdoor Unit

Self-diagnosis function

Display			Title	Cause of Error
Outdoor unit related error	5	1	1 Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of Outdoor Unit
	5	2	1 Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Master Outdoor Unit
			2 Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Slave1 Outdoor Unit
			3 Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Slave2 Outdoor Unit
			4 Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Slave3 Outdoor Unit
	5	3	1 Communication error : indoor unit → Main PCB of Outdoor Unit	Failing to receive indoor unit signal at main PCB of Outdoor Unit .
	5	7	1 Communication error : Main PCB → inverter PCB	Failing to receive signal main PCB at inverter PCB of Master Outdoor Unit
			2 Communication error : Main PCB → inverter PCB	Failing to receive signal main PCB at inverter PCB of Slave1 Outdoor Unit
			3 Communication error : Main PCB → inverter PCB	Failing to receive signal main PCB at inverter PCB of Slave2 Outdoor Unit
			4 Communication error : Main PCB → inverter PCB	Failing to receive signal main PCB at inverter PCB of Slave3 Outdoor Unit
	5	9	1 Wrong combination of Outdoor units	Installed combination mixed with old series model (Multi V, III, II..)
	6	0	1 Inverter PCB EEPROM Error of Master Outdoor Unit	Access Error of Inverter PCB of Master Outdoor Unit
			2 Inverter PCB EEPROM Error of Slave1 Unit	Access Error of Inverter PCB of Slave1 Outdoor Unit
			3 Inverter PCB EEPROM Error of Slave2 Unit	Access Error of Inverter PCB of Slave2 Outdoor Unit
			4 Inverter PCB EEPROM Error of Slave3 Unit	Access Error of Inverter PCB of Slave3 Outdoor Unit
	6	2	1 Master Outdoor Unit Inverter Heatsink High Temperature	System is turned off by Master Outdoor Unit Inverter Heatsink High Temperature
			2 Slave1 Outdoor Unit Inverter Heatsink High Temperature	System is turned off by Slave1 Outdoor Unit Inverter Heatsink High Temperature
3 Slave2 Outdoor Unit Inverter Heatsink High Temperature			System is turned off by Slave2 Outdoor Unit Inverter Heatsink High Temperature	
4 Slave3 Outdoor Unit Inverter Heatsink High Temperature			System is turned off by Slave3 Outdoor Unit Inverter Heatsink High Temperature	

Display			Title	Cause of Error
Outdoor unit related error	6	5	1 Master Outdoor Unit Inverter Heatsink Temperature Sensor Fault	Master Outdoor Unit Inverter Heatsink Temperature Sensor open or short
			2 Slave1 Outdoor Unit Inverter Heatsink Temperature Sensor Fault	Slave1 Outdoor Unit Inverter Heatsink Temperature Sensor open or short
			3 Slave2 Outdoor Unit Inverter Heatsink Temperature Sensor Fault	Slave2 Outdoor Unit Inverter Heatsink Temperature Sensor open or short
			4 Slave3 Outdoor Unit Inverter Heatsink Temperature Sensor Fault	Slave3 Outdoor Unit Inverter Heatsink Temperature Sensor open or short
	6	7	1 Master Outdoor Unit Fan Lock	Restriction of Master Outdoor Unit
			2 Slave1 Outdoor Unit Fan Lock	Restriction of Slave1 Outdoor Unit
			3 Slave2 Outdoor Unit Fan Lock	Restriction of Slave2 Outdoor Unit
			4 Slave3 Outdoor Unit Fan Lock	Restriction of Slave3 Outdoor Unit
	7	1	1 Converter CT Sensor Error of Master Outdoor Unit	Restriction of Master Outdoor Unit
			2 Converter CT Sensor Error of Slave1 Outdoor Unit	Restriction of Slave1 Outdoor Unit
			3 Converter CT Sensor Error of Slave2 Outdoor Unit	Restriction of Slave2 Outdoor Unit
			4 Converter CT Sensor Error of Slave2 Outdoor Unit	Restriction of Slave3 Outdoor Unit
	7	5	1 Master Outdoor Unit Fan CT Sensor Error	Master Outdoor Unit Fan CT Sensor open or short
			2 Slave1 Outdoor Unit Fan CT Sensor Error	Slave1 Outdoor Unit Fan CT Sensor open or short
			3 Slave2 Outdoor Unit Fan CT Sensor Error	Slave2 Outdoor Unit Fan CT Sensor open or short
			4 Slave3 Outdoor Unit Fan CT Sensor Error	Slave3 Outdoor Unit Fan CT Sensor open or short
7	6	1 Master Outdoor Unit Fan DC Link High Voltage Error	Master Outdoor Unit Fan DC Link High Voltage Error	
		2 Slave1 Outdoor Unit Fan DC Link High Voltage Error	Slave1 Outdoor Unit Fan DC Link High Voltage Error	
		3 Slave2 Outdoor Unit Fan DC Link High Voltage Error	Slave2 Outdoor Unit Fan DC Link High Voltage Error	
		4 Slave3 Outdoor Unit Fan DC Link High Voltage Error	Slave3 Outdoor Unit Fan DC Link High Voltage Error	

Self-diagnosis function

Display			Title	Cause of Error	
Outdoor unit related error	7	7	1	Master Outdoor Unit Fan Over Current Error	Master Outdoor Unit Fan Current is over 5A
			2	Slave1 Outdoor Unit Fan Over Current Error	Slave1 Outdoor Unit Fan Current is over 5A
			3	Slave2 Outdoor Unit Fan Over Current Error	Slave2 Outdoor Unit Fan Current is over 5A
			4	Slave3 Outdoor Unit Fan Over Current Error	Slave3 Outdoor Unit Fan Current is over 5A
	7	9	1	Master Outdoor Unit Fan Start Failure Error	Master Outdoor Unit Fan First Position Sensing Failure
			2	Slave1 Outdoor Unit Fan Start Failure Error	Slave1 Outdoor Unit Fan First Position Sensing Failure
			3	Slave2 Outdoor Unit Fan Start Failure Error	Slave2 Outdoor Unit Fan First Position Sensing Failure
			4	Slave3 Outdoor Unit Fan Start Failure Error	Slave3 Outdoor Unit Fan First Position Sensing Failure
	8	6	1	Master Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Master Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
			2	Slave1 Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Slave1 Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
			3	Slave2 Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Slave2 Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
			4	Slave3 Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Slave3 Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
	8	7	1	Master Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Master Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM
			2	Slave1 Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Slave1 Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM
			3	Slave2 Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Slave2 Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM
			4	Slave3 Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Slave3 Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM

Display				Title	Cause of Error	
Outdoor unit related error	1	0	4	1	Communication Error Between Master Outdoor Unit and Other Outdoor Unit	Failing to receive Slave Unit signal at main PCB of Master Outdoor Unit
				2	Communication Error Between Slave1 Outdoor Unit and Other Outdoor Unit	Failing to receive Master and other Slave Unit signal at main PCB of Slave1 Outdoor Unit
				3	Communication Error Between Slave2 Outdoor Unit and Other Outdoor Unit	Failing to receive Master and other Slave Unit signal at main PCB of Slave2 Outdoor Unit
				4	Communication Error Between Slave3 Outdoor Unit and Other Outdoor Unit	Failing to receive Master and other Slave Unit signal at main PCB of Slave2 Outdoor Unit
	1	0	5	1	Master Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of Master unit.
				2	Slave1 Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of Slave1 unit.
				3	Slave2 Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of Slave2 unit.
				4	Slave3 Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of Slave3 unit.
	1	0	6	1	Master Outdoor Unit FAN IPM Fault Error	Instant Over Current at Master Outdoor Unit Fan IPM
				2	Slave1 Outdoor Unit FAN IPM Fault Error	Instant Over Current at Slave1 Outdoor Unit Fan IPM
				3	Slave2 Outdoor Unit FAN IPM Fault Error	Instant Over Current at Slave2 Outdoor Unit Fan IPM
				4	Slave3 Outdoor Unit FAN IPM Fault Error	Instant Over Current at Slave3 Outdoor Unit Fan IPM
	1	0	7	1	Master Outdoor Unit Fan DC Link Low Voltage Error	Master Outdoor Unit Fan DC Link Input Voltage is under 380V
				2	Slave1 Outdoor Unit Fan DC Link Low Voltage Error	Slave1 Outdoor Unit Fan DC Link Input Voltage is under 380V
				3	Slave2 Outdoor Unit Fan DC Link Low Voltage Error	Slave2 Outdoor Unit Fan DC Link Input Voltage is under 380V
				4	Slave3 Outdoor Unit Fan DC Link Low Voltage Error	Slave3 Outdoor Unit Fan DC Link Input Voltage is under 380V
1	1	3	1	Master Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of Master Outdoor Unit is open or short	
			2	Slave1 Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of slave1 Outdoor Unit is open or short	
			3	Slave2 Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of slave2 Outdoor Unit is open or short	
			4	Slave3 Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of slave3 Outdoor Unit is open or short	

Self-diagnosis function

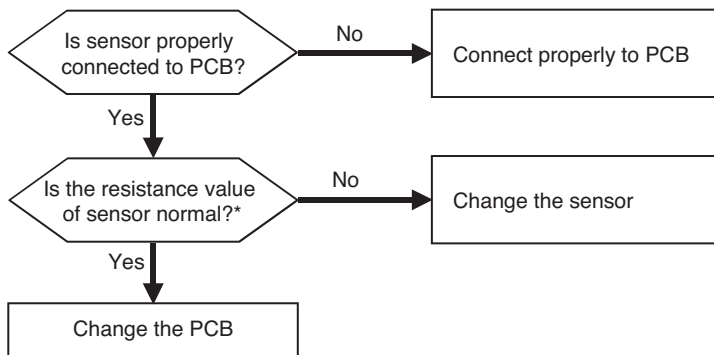
Display				Title	Cause of Error	
Outdoor unit related error	1	1	4	1	Master Outdoor Unit Subcooling Inlet Temperature Sensor Error	Master Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				2	Slave1 Outdoor Unit Subcooling Inlet Temperature Sensor Error	Slave1 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				3	Slave2 Outdoor Unit Subcooling Inlet Temperature Sensor Error	Slave2 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				4	Slave3 Outdoor Unit Subcooling Inlet Temperature Sensor Error	Slave3 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
	1	1	5	1	Master Outdoor Unit Subcooling Outlet Temperature Sensor Error	Master Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				2	Slave1 Outdoor Unit Subcooling Outlet Temperature Sensor Error	Slave1 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				3	Slave2 Outdoor Unit Subcooling Outlet Temperature Sensor Error	Slave2 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				4	Slave3 Outdoor Unit Subcooling Outlet Temperature Sensor Error	Slave3 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
	1	1	6	1	Master Outdoor Unit Oil level Sensor Error	Master Outdoor Unit Oil level Sensor Error is open or short
				2	Slave 1 Outdoor Unit Oil level Sensor Error	Slave 1 Outdoor Unit Oil level Sensor Error is open or short
				3	Slave 2 Outdoor Unit Oil level Sensor Error	Slave 2 Outdoor Unit Oil level Sensor Error is open or short
				4	Slave 3 Outdoor Unit Oil level Sensor Error	Slave 3 Outdoor Unit Oil level Sensor Error is open or short
	1	4	5	1	Master outdoor unit Main Board - External Board communication error	Master Outdoor Unit Main Board Main-Sub Micom communication failed
				2	Slave1 outdoor unit Main Board - External Board communication error	Slave1 Outdoor Unit Main Board Main-Sub Micom communication failed
				3	Slave2 outdoor unit Main Board - External Board communication error	Slave2 Outdoor Unit Main Board Main-Sub Micom communication failed
				4	Slave3 outdoor unit Main Board - External Board communication error	Slave3 Outdoor Unit Main Board Main-Sub Micom communication failed
1	5	1	1	Failure of operation mode conversion at Master Outdoor Unit	Pressure unbalance between Outdoor Units	
			2	Failure of operation mode conversion at Slave1 Outdoor Unit	Pressure unbalance between Outdoor Units	
			3	Failure of operation mode conversion at Slave2 Outdoor Unit	Pressure unbalance between Outdoor Units	
			4	Failure of operation mode conversion at Slave3 Outdoor Unit	Pressure unbalance between Outdoor Units	

Display				Title	Cause of Error	
Outdoor unit related error	1	5	3	1	Master Outdoor Unit Heat Exchanger Temperature Sensor (upper part) Fault	Master Outdoor Unit Heat Exchanger Temperature Sensor(upper part) open or short
				2	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (upper part) Fault	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (upper part) open or short
				3	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor (upper part) Fault	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor(upper part) open or short
				4	Slave3 Outdoor Unit Heat Exchanger Temperature Sensor (upper part) Fault	Slave3 Outdoor Unit Heat Exchanger Temperature Sensor(upper part) open or short
	1	5	4	1	Master Outdoor Unit Heat Exchanger Temperature Sensor (lower part) Fault	Master Outdoor Unit Heat Exchanger Temperature Sensor(lower part) open or short
				2	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (lower part) Fault	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (lower part) open or short
				3	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor (lower part) Fault	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor(lower part) open or short
				4	Slave3 Outdoor Unit Heat Exchanger Temperature Sensor (lower part) Fault	Slave3 Outdoor Unit Heat Exchanger Temperature Sensor(lower part) open or short
	1	8	2	1	Master outdoor unit External Board Main-Sub Micom communication error	Master Outdoor Unit Main Board Main-Sub Micom communication failed
				2	Slave1 outdoor unit External Board Main-Sub Micom communication error	Slave1 Outdoor Unit Main Board Main-Sub Micom communication failed
				3	Slave2 outdoor unit External Board Main-Sub Micom communication error	Slave2 Outdoor Unit Main Board Main-Sub Micom communication failed
				4	Slave3 outdoor unit External Board Main-Sub Micom communication error	Slave3 Outdoor Unit Main Board Main-Sub Micom communication failed
	1	9	3	1	Master Outdoor Unit Fan Heatsink High Temperature	System is turned off by Master Outdoor Unit Fan Heatsink High Temperature
				2	Slave1 Outdoor Unit Fan Heatsink High Temperature	System is turned off by Slave1 Outdoor Unit Fan Heatsink High Temperature
				3	Slave2 Outdoor Unit Fan Heatsink High Temperature	System is turned off by Slave2 Outdoor Unit Fan Heatsink High Temperature
				4	Slave3 Outdoor Unit Fan Heatsink High Temperature	System is turned off by Slave3 Outdoor Unit Fan Heatsink High Temperature
1	9	4	1	Master Outdoor Unit Fan Heatsink Temperature Sensor Fault	Master Outdoor Unit Fan Heatsink Temperature Sensor open or short	
			2	Slave1 Outdoor Unit Fan Heatsink Temperature Sensor Fault	Slave1 Outdoor Unit Fan Heatsink Temperature Sensor open or short	
			3	Slave2 Outdoor Unit Fan Heatsink Temperature Sensor Fault	Slave2 Outdoor Unit Fan Heatsink Temperature Sensor open or short	
			4	Slave3 Outdoor Unit Fan Heatsink Temperature Sensor Fault	Slave3 Outdoor Unit Fan Heatsink Temperature Sensor open or short	

Troubleshooting Guide

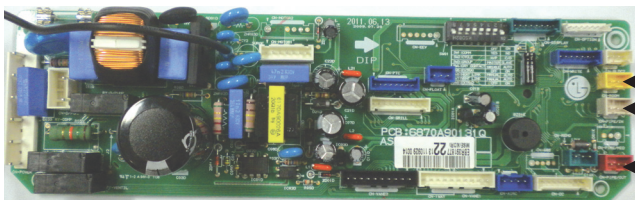
Error No.	Error Type	Error Point	Main Reasons
01	Indoor unit air sensor error	Indoor unit sensor is open/short	1. Indoor unit PCB wrong connection 2. Indoor unit PCB failure 3. Sensor problem (main reason)
02	Indoor unit pipe inlet sensor error		
06	Indoor unit pipe outlet sensor error		

■ Error diagnosis and countermeasure flow chart



** In case the value is more than 100 kΩ (open) or less than 100 Ω (short), Error occurs

Refer: Resistance value maybe change according to temperature of temp sensor,
 It shows according to criteria of current temperature(± 5% margin) → Normal
 Air temp sensor: 10 °C = 20.7 kΩ : 25 °C= 10 kΩ : 50 °C= 3.4 kΩ
 Pipe temp sensor: 10 °C = 10 kΩ : 25 °C= 5 kΩ : 50 °C= 1.8 kΩ



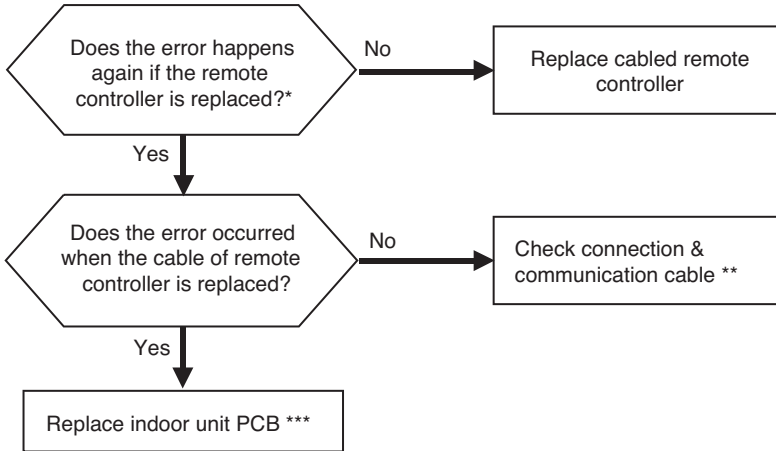
← CN-ROOM : Indoor air temp sensor
 ← CN-PIPE IN : Pipe inlet temp sensor
 ← CN-PIPE OUT : Pipe outlet temp sensor



← Measure the resistance of outlet pipe temp sensor.

Error No.	Error Type	Error Point	Main Reasons
03	No communication between cabled remote controller & indoor unit	The remote controller did not receive the signal from indoor unit during specific time	1. Remote controller fault 2. Indoor unit PCB fault 3. Connector fault, Wrong connection 4. Communication cable problem

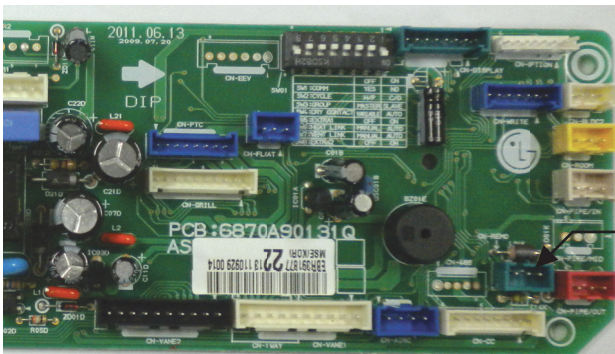
■ Error diagnosis and countermeasure flow chart



* If there is no remote controller to replace : Use another unit's remote controller doing well

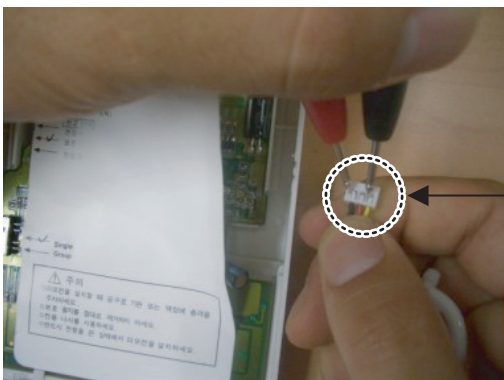
** Check cable : Contact failure of connected portion or extension of cable are main cause
 Check any surrounded noise (check the distance with main power cable)
 → make safe distance from the devices generate electromagnetic wave

*** After replacing indoor unit PCB, do Auto Addressing & input unit's address if connected to central controller.
 (All the indoor units connected should be turned on before Auto Addressing)



CN-REMO : Remote controller connection

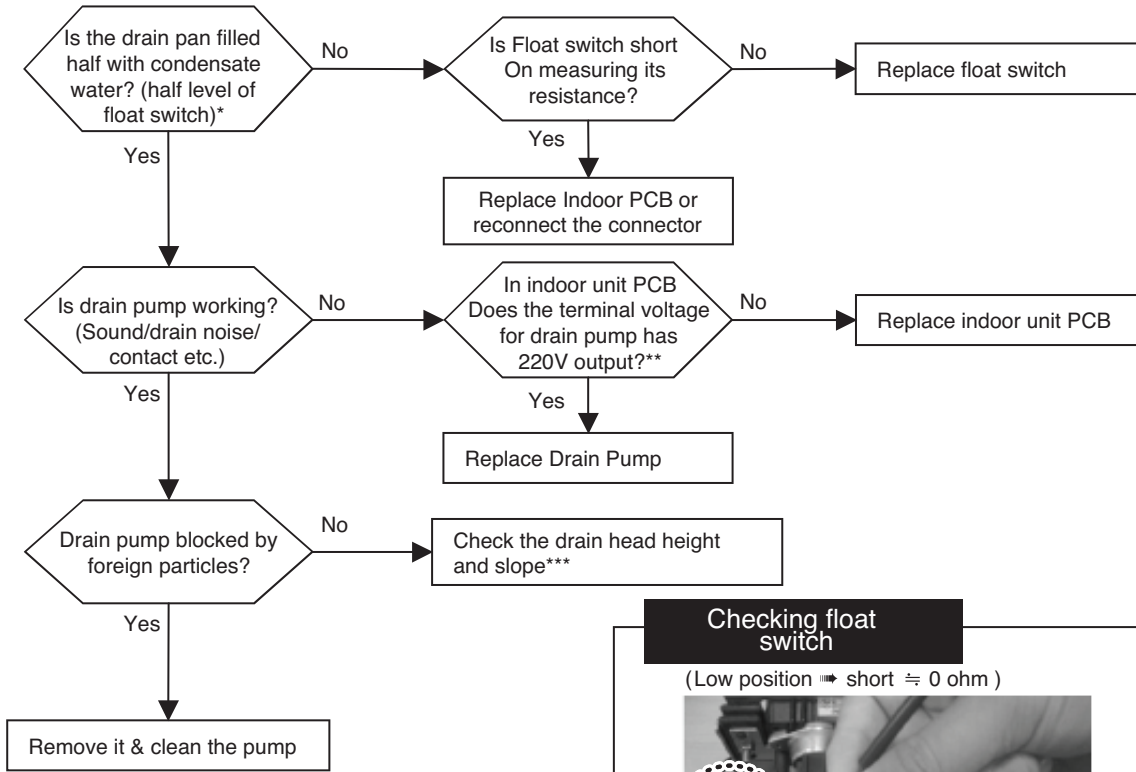
* The PCB can differ from model to model. Check from the right source.



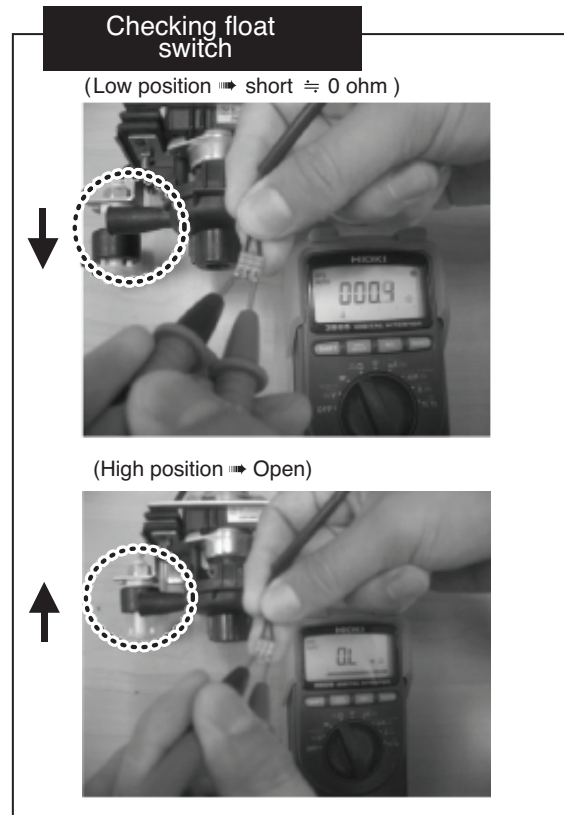
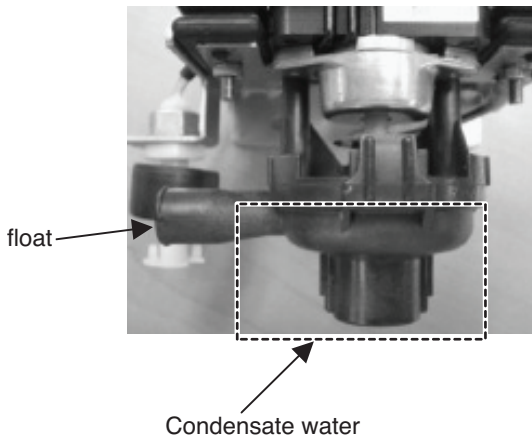
Checking communication cable connection status

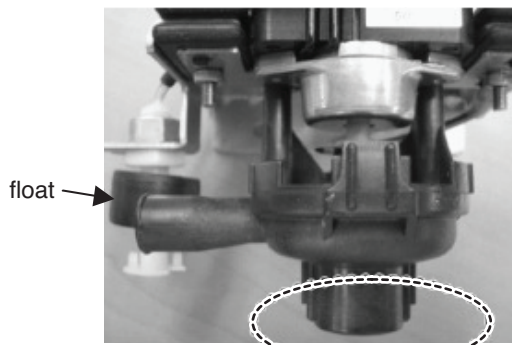
Error No.	Error Type	Error Point	Main Reasons
04	Drain pump error	Float switch is open due to rising of condensate water level because of drain pump fault or drain pipe clogging	1. Drain pump/float switch fault 2. Improper drain pipe location, clogging of drain pipe 3. Indoor unit PCB fault

■ Error diagnosis and countermeasure flow chart

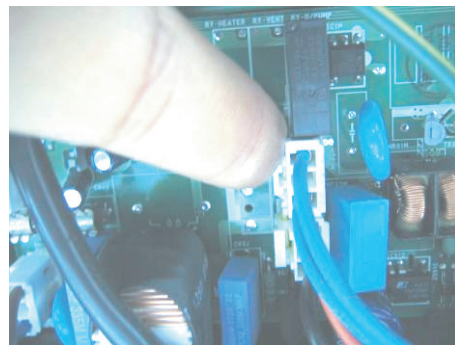


* If the float goes up higher than a half of float switch then the circuit is open & the unit is stopped automatically.

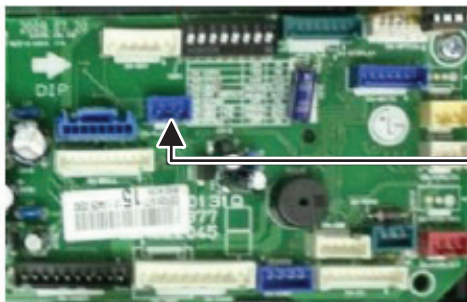




A:Point to check rotating

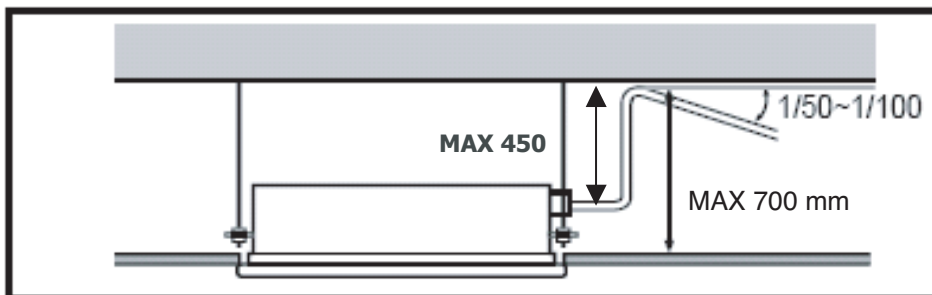


*** Indoor PCB drain pump connector
(Check input of 220 V)
(Marked as **CN-DPUMP**)



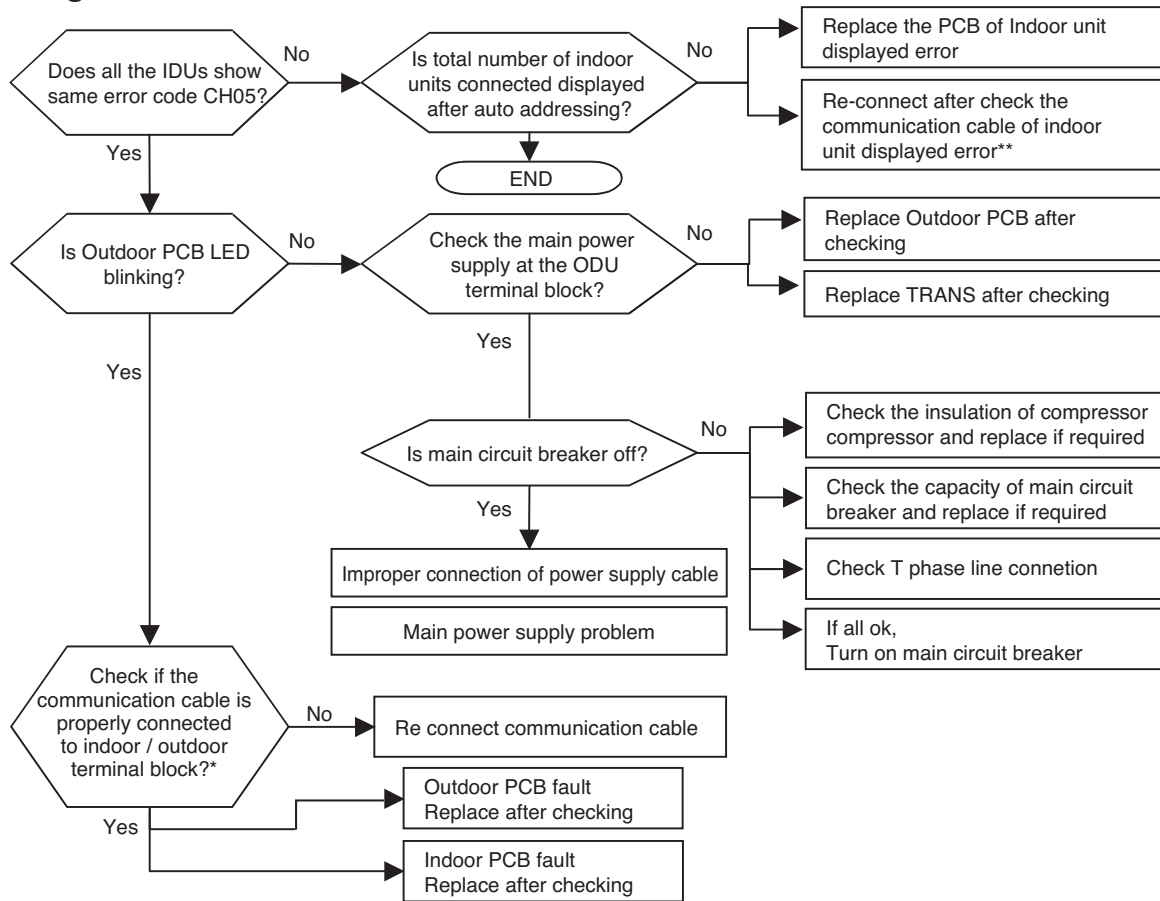
Float switch Housing (CN-FLOAT)

[***] Standard of drain pipe head height / slope



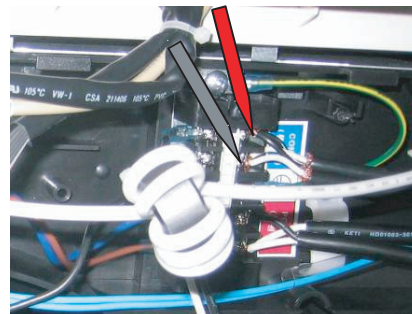
Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Outdoor unit communication error	No signal communication between Indoor & Outdoor units.	1. Auto addressing is not done 2. Communication cable is not connected 3. Short circuit of communication cable 4. Indoor unit communication circuit fault 5. Outdoor unit communication circuit fault 6. Not enough distance between power and communication cable? 7. T phase line disconnection or N phase connected.

■ Error diagnosis and countermeasure flow chart



* (Note1) communication from IDU is normal if voltage fluctuation(- 9 V ~ + 9 V) exists when checking DC voltage of communication terminal between IDU and ODU

* If the DC voltage between communication terminal A, B of indoor unit is fluctuate within (- 9 V ~ + 9 V) then communication from outdoor unit is normal



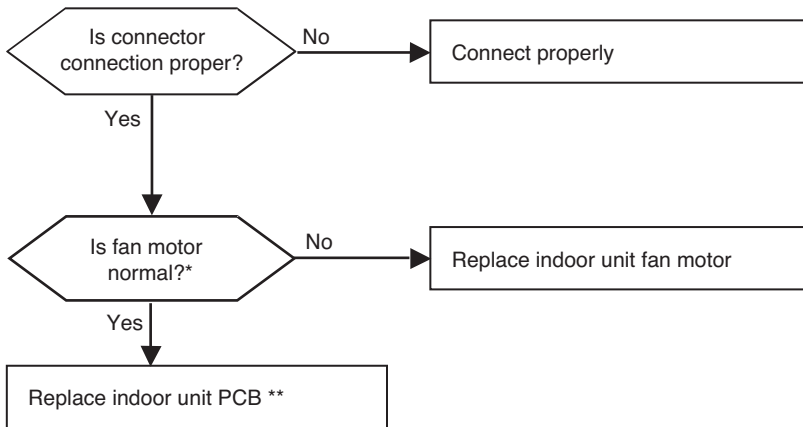
Error No.	Error Type	Error Point	Main Reasons
09	Indoor unit EEPROM error	Error occur in EEPROM of the Indoor PCB	1. Error developed in communication between the micro-processor and the EEPROM on the surface of the PCB. 2. ERROR due to the EEPROM damage

■ **Error diagnosis and countermeasure flow chart**

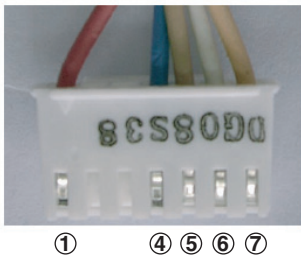
- Replace the indoor unit PCB, and then make sure to perform Auto addressing and input the address of central control

Error No.	Error Type	Error Point	Main Reasons
10	Indoor unit BLDC fan motor failure	Indoor BLDC fan motor feedback signal is absent (for 50 sec.)	1. Motor connector connection fault 2. Indoor PCB fault 3. Motor fault

■ Error diagnosis and countermeasure flow chart



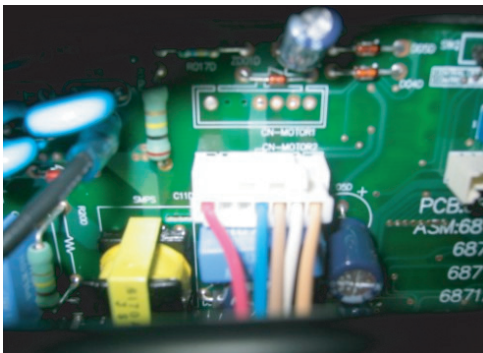
* It is normal when check hall sensor of indoor fan motor as shown below



Each terminal with the tester

Tester		Normal resistance(±10%)	
+	-	TH chassis	TD chassis
①	④	∞	∞
⑤	④	hundreds kΩ	hundreds kΩ
⑥	④	∞	∞
⑦	④	hundreds kΩ	hundreds kΩ

<Checking connection state of fan motor connector>

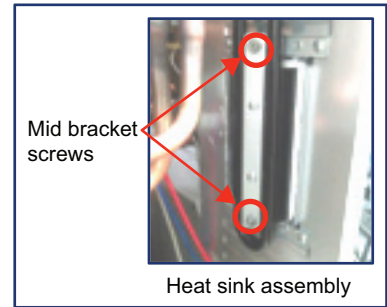


** Replace the Indoor unit PCB, and then make sure to do Auto addressing and input the address of central control
(Notice: The connection of motor connector to PCB should be done under no power supplying to PCB)

■ Control box / Inverter PCB Servicing / Dismantling Procedure.

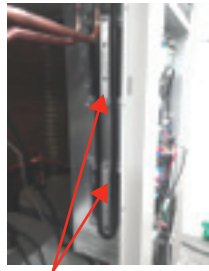
⚠ WARNING

- Do not pull out the heat sink assembly before removing the middle bracket screws.
- Do not apply heavy force on tube parts while detaching the heat sink assembly. It may damage and leads to failure of device. Gently detach total heat sink assembly.



■ Control Box assembly Servicing / Dismantling Procedure

1. Remove the control box cover.
2. Remove the middle bracket screws as shown in the figure.
3. Gently detach the Heat sink assembly from the control box



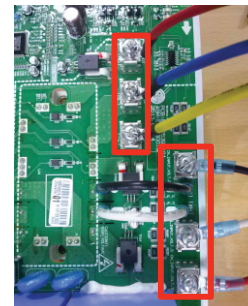
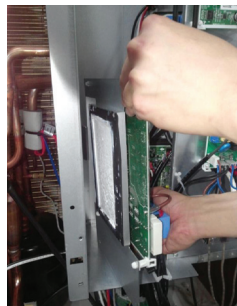
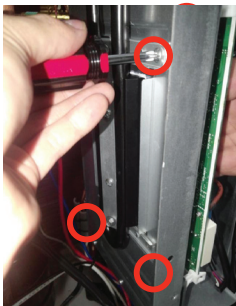
4. Detach Fan lead wire from the control box and compressor lead wires from the compressors.
5. Now the control box assembly can be removed from the outdoor unit after removing the outer screws.
6. Inversely follow above procedure (1~5) to reassemble the control box.

Note.

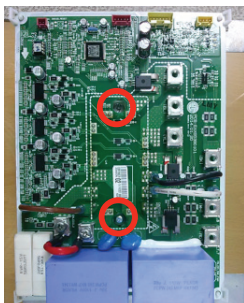
Apply thermal grease at the heat sink if necessary.

■ Inverter PCB Servicing / Dismantling Procedure

1. Remove the Thermal Pad mounting screws at the left side of the control box (4EA)
2. Carefully pull out the Inverter PCB from control box assembly.
3. Detach the Compressor (U/V/W) and the power input (R/S/T) lead wires.



4. Unscrew the middle IGBT mounting screws (2EA)
5. Finally take out the PCB from the corner supporters.
6. Follow the same procedure (1~5) inversely to reassembly the inverter PCB.

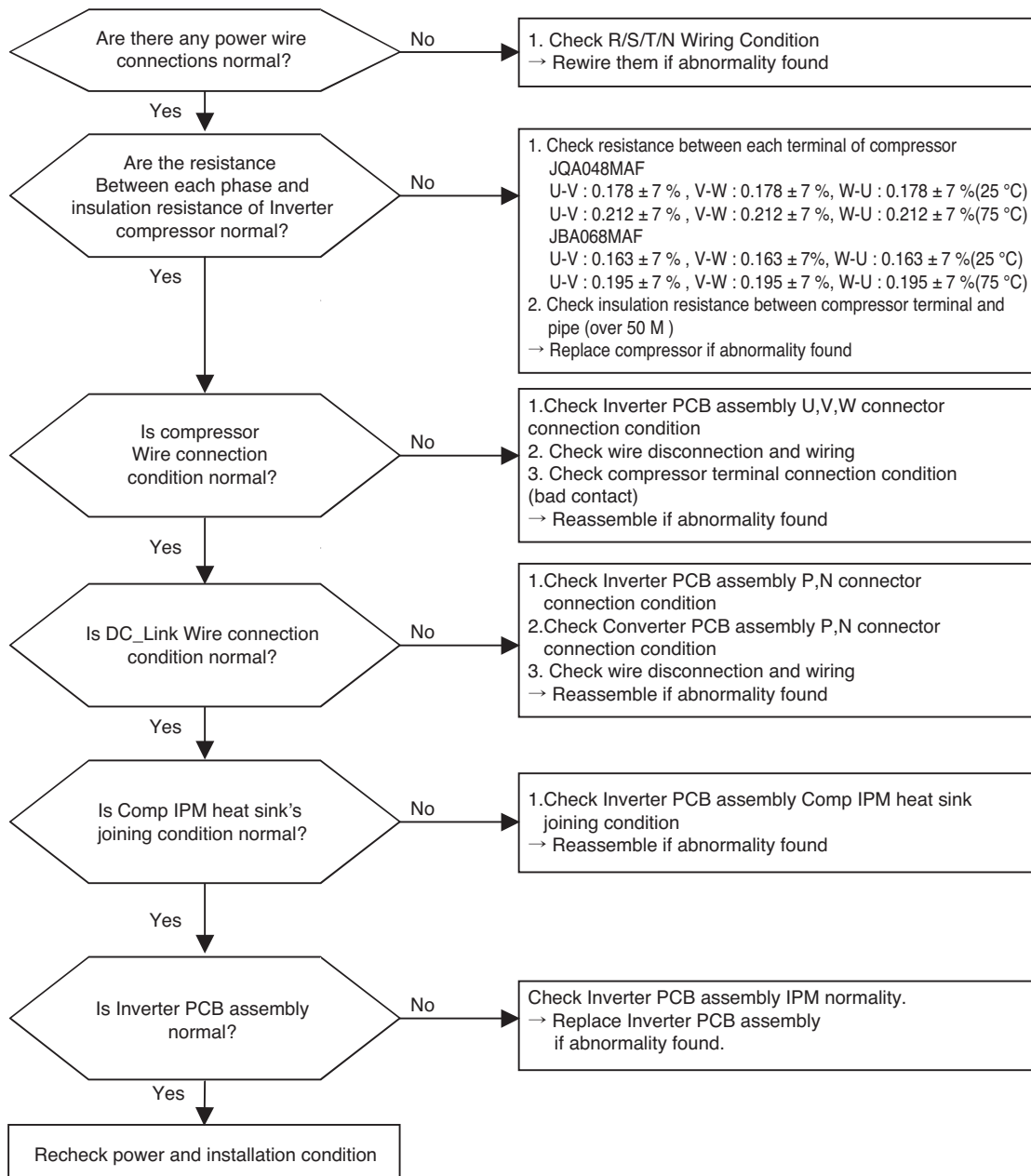


Note.

1. Apply thermal grease at heat sink if needed.
2. Carefully reconnect the wires with out interchanging the locations.

Error No.	Error Type	Error Point	Main Reasons
21* Master 211 Slave1 212 Slave2 213 Slave3 214	Inverter PCB Assy IPM Fault occur	IPM self protection circuit activation (Overcurrent/IPM overheating/Vcc low voltage)	<ol style="list-style-type: none"> Over current detection at Inverter compressor(U,V,W) Compressor damaged (insulation damaged/Motor damaged) IPM overheating (Heat sink disassembled) Inverter compressor terminal disconnected or loose Inverter PCB assembly damaged ODU input current low

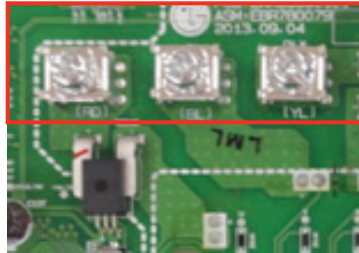
■ Error diagnosis and countermeasure flow chart



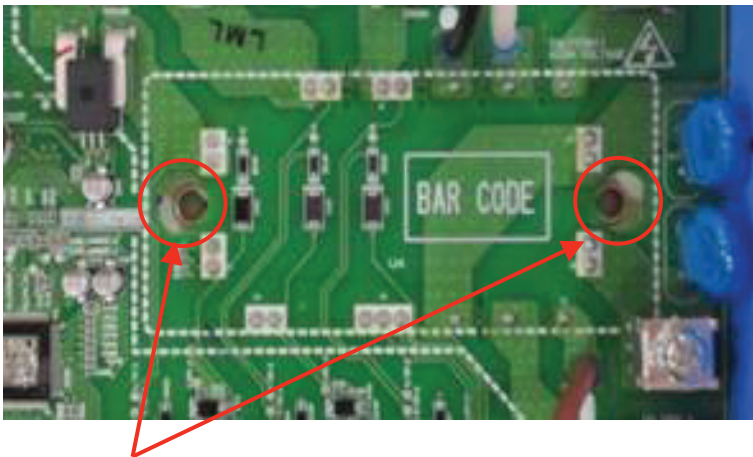
* Measuring resistance between each terminal of compressor



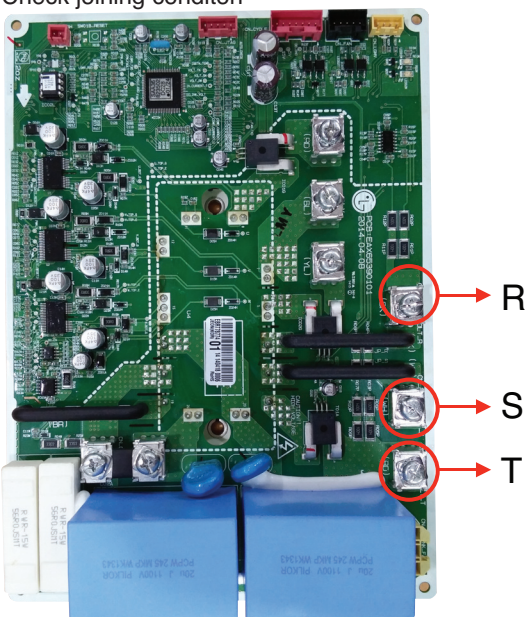
* Compressor wire connector connection point



* IPM joining point



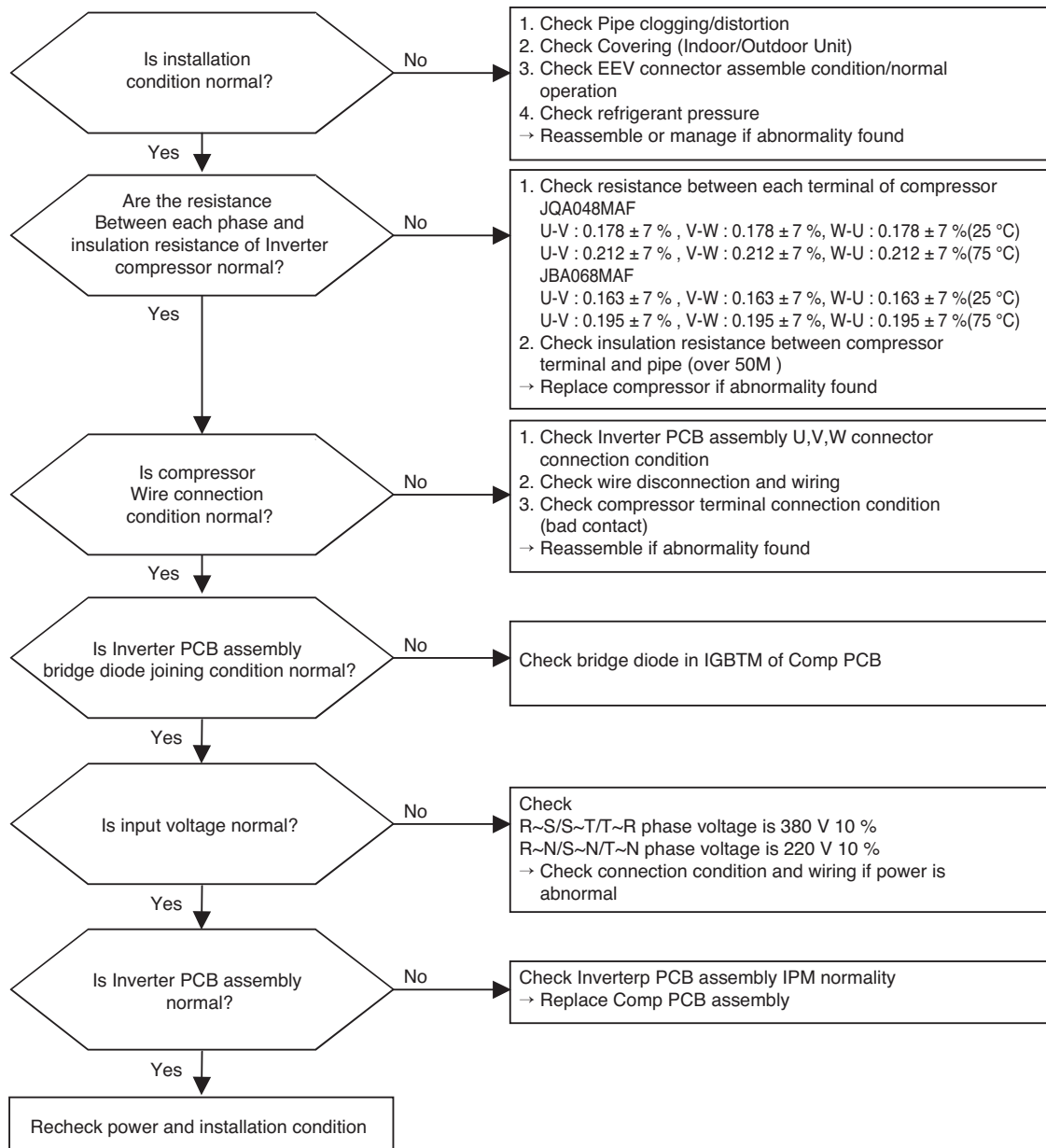
Check joining condition



Check DC_Link Connector joining condition

Error No.	Error Type	Error Point	Main Reasons
22* Master 221 Slave1 222 Slave2 223 Slave3 224	AC Input Current Over Error	Converter PCB Assembly input 3 phase power current is over limited value(24A)	<ol style="list-style-type: none"> 1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Power Line Misconnection 5. Converter PCB Assembly damage (Input current sensing part)

■ Error Diagnosis and Countermeasure Flow Chart



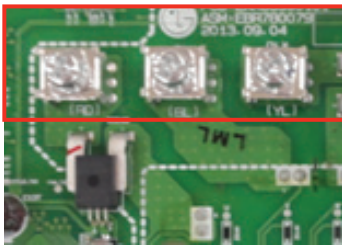
* Measuring resistance between each terminal of compressor



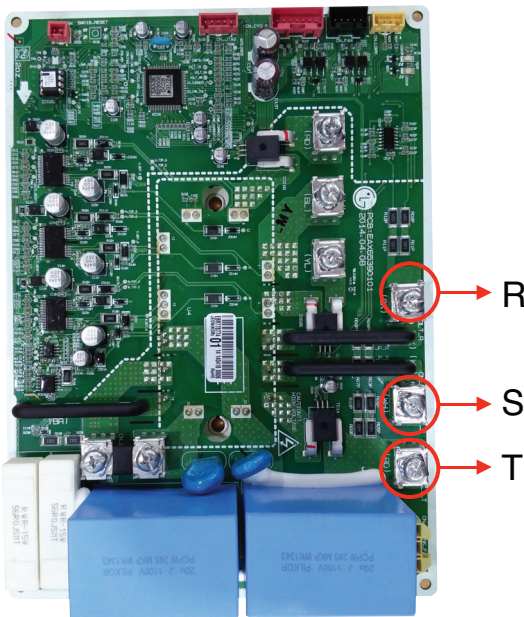
* Measuring input voltage



* Compressor wire connector connection

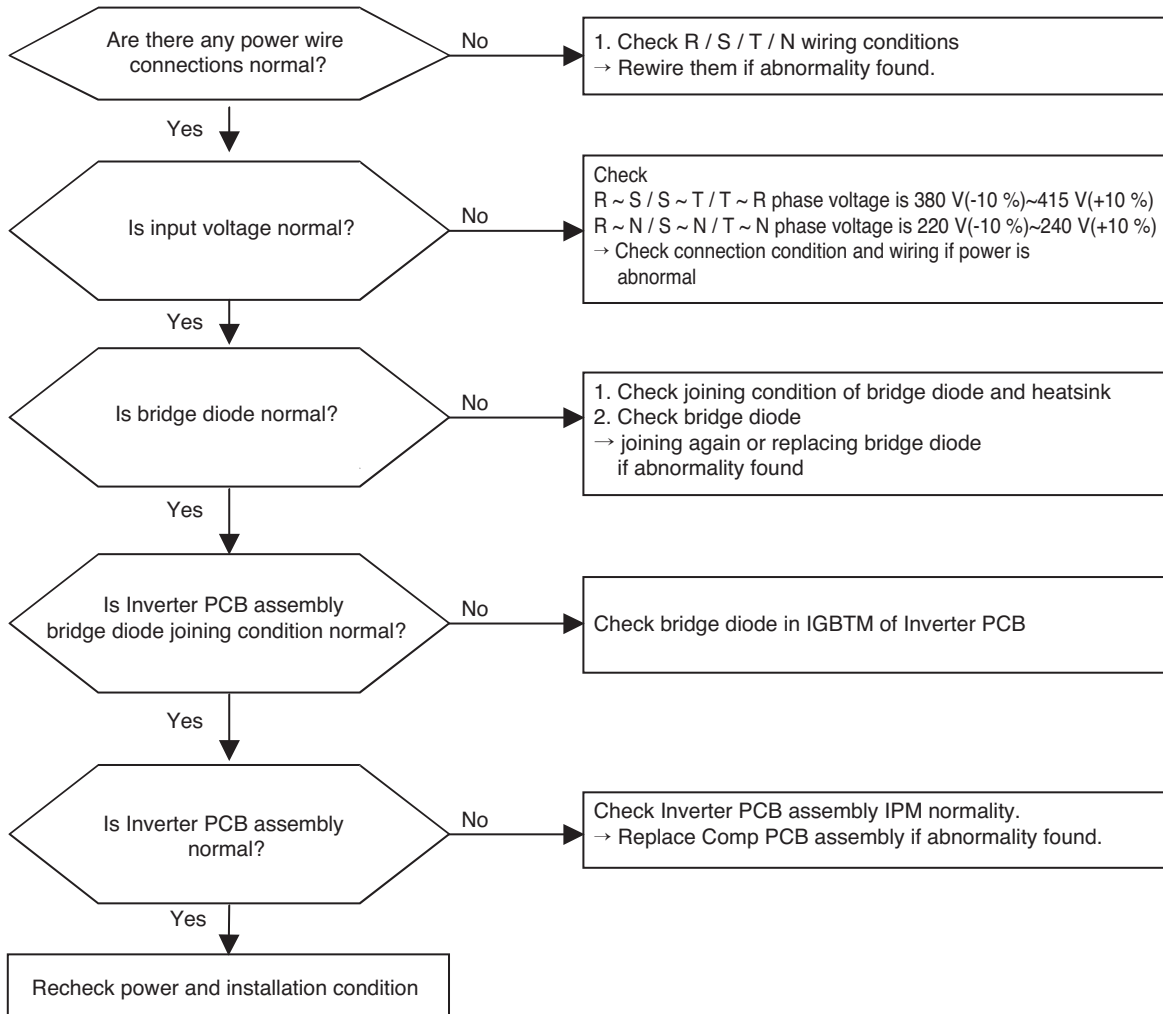


* Check DC_Link Connector joining condition

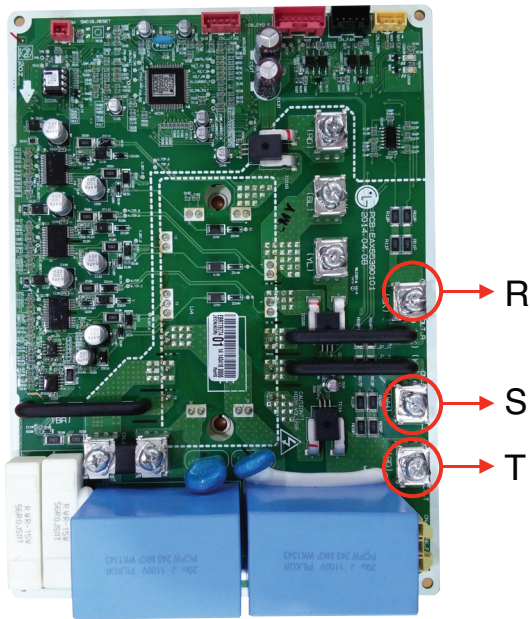


Error No.	Error Type	Error Point	Main Reasons
23* Master 231 Slave1 232 Slave2 233 Slave3 234	Inverter Compressor DC Link Low Voltage	DC Voltage isn't charged after starting power on	<ol style="list-style-type: none"> 1. DC Link terminal misconnection/terminal contact fault 2. Condenser damage 3. Inverter PCB assembly damage (DC Link voltage sensing part) 4. Input voltage low

■ Error Diagnosis and Countermeasure Flow Chart



* Check DC_Link Connector joining condition

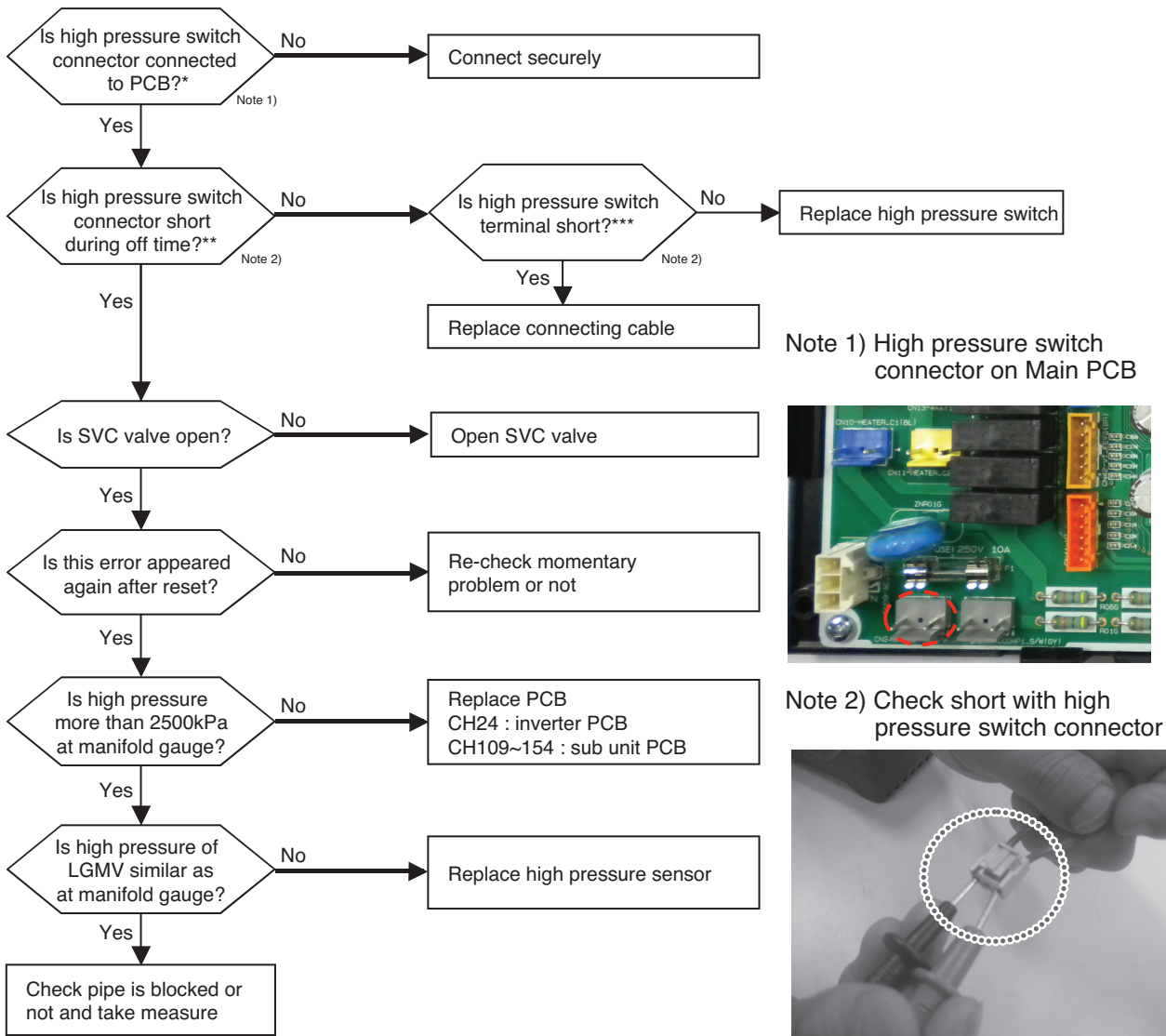


* Measuring input voltage



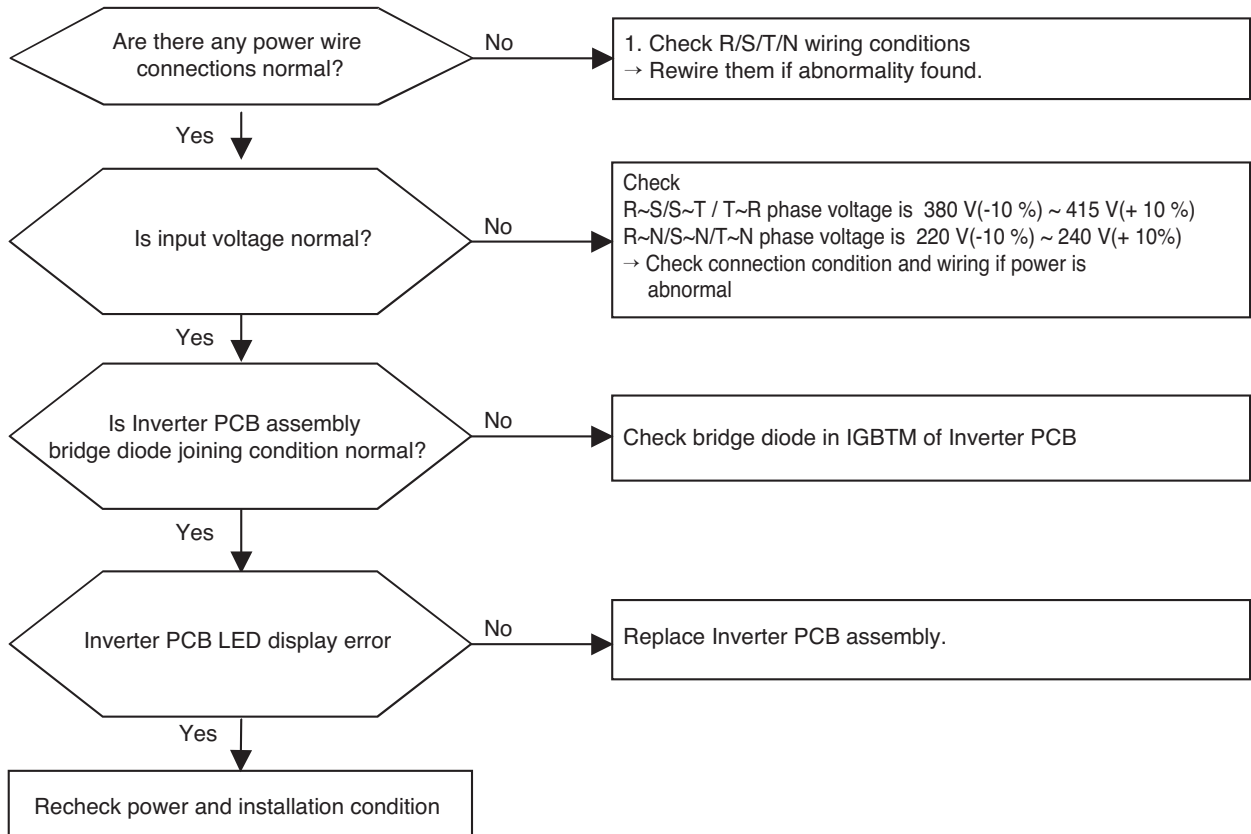
Error No.	Error Type	Error Point	Main Reasons
24* Master 241 Slave1 242 Slave2 243 Slave3 244	Excessive rise of discharge pressure in outdoor compressor	Compressor off due to the high pressure switch in outdoor unit	<ol style="list-style-type: none"> 1. Defective high pressure switch 2. Defective fan of Indoor unit or outdoor unit 3. Check valve of compressor clogged 4. Pipe distortion due to the pipe damage 5. Refrigerant overcharge 6. Defective LEV at the indoor or outdoor unit . 7. Covering or clogging(Outdoor covering during the cooling mode / Indoor unit filter clogging during the heating mode) 8. SVC valve clogging 9. Defective Outdoor PCB

■ Error diagnosis and countermeasure flow chart



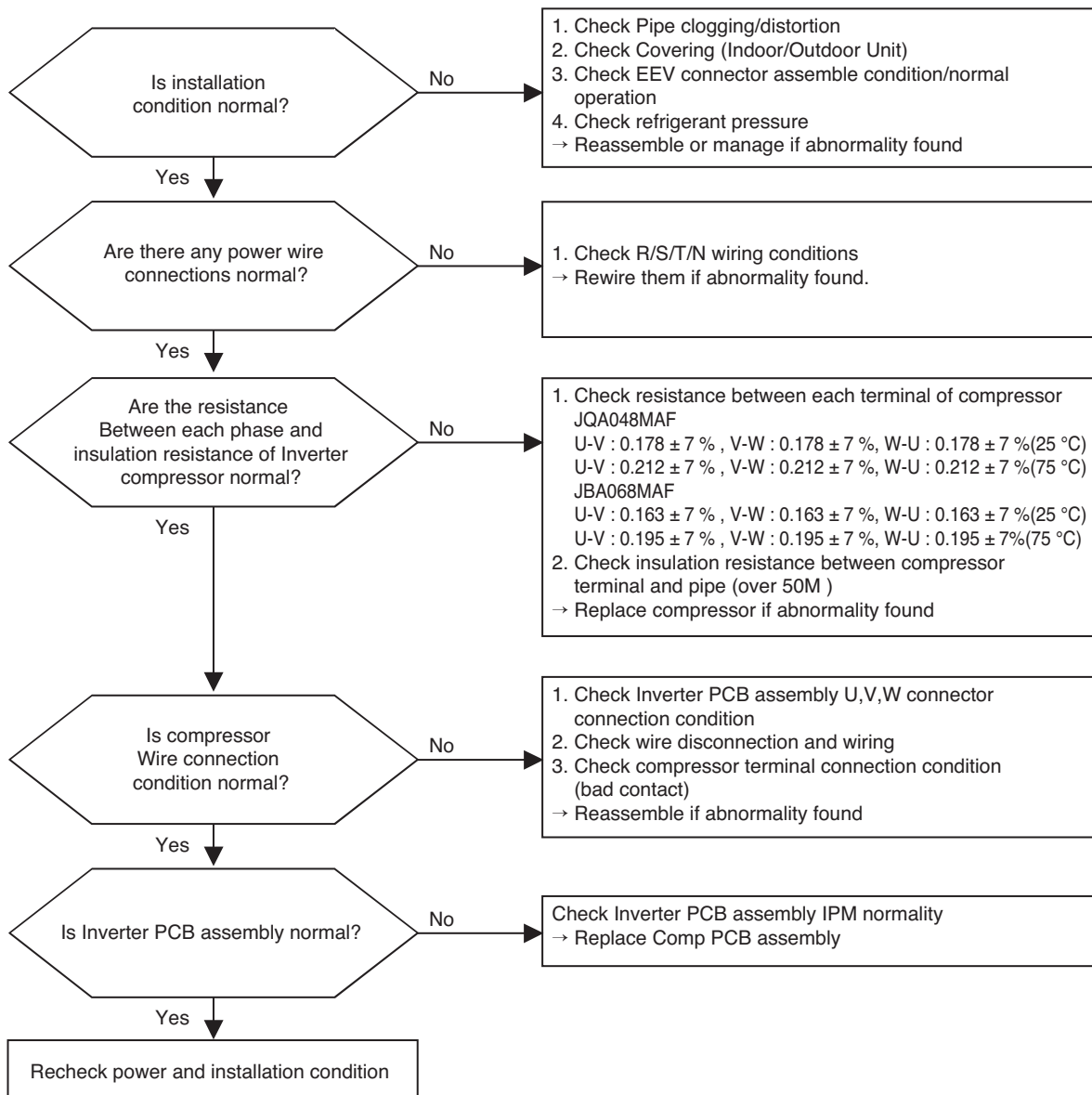
Error No.	Error Type	Error Point	Main Reasons
25* Master 251 Slave1 252 Slave2 253 Slave3 254	Input Voltage high/low	Input voltage is over limited value of the product (304 V or less, 536 V or more)	<ol style="list-style-type: none"> 1. Input voltage abnormal (R-N) 2. Outdoor unit Inverter PCB assembly damage (input voltage sensing part) 3. N phase line disconnection

■ Error Diagnosis and Countermeasure Flow Chart



Error No.	Error Type	Error Point	Main Reasons
26* Master 261 Slave1 262 Slave2 263 Slave3 264	Inverter compressor starting failure Error	Starting failure because of compressor abnormality	<ol style="list-style-type: none"> 1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Compressor wiring fault 4. ODU Inverter PCB damage (CT)

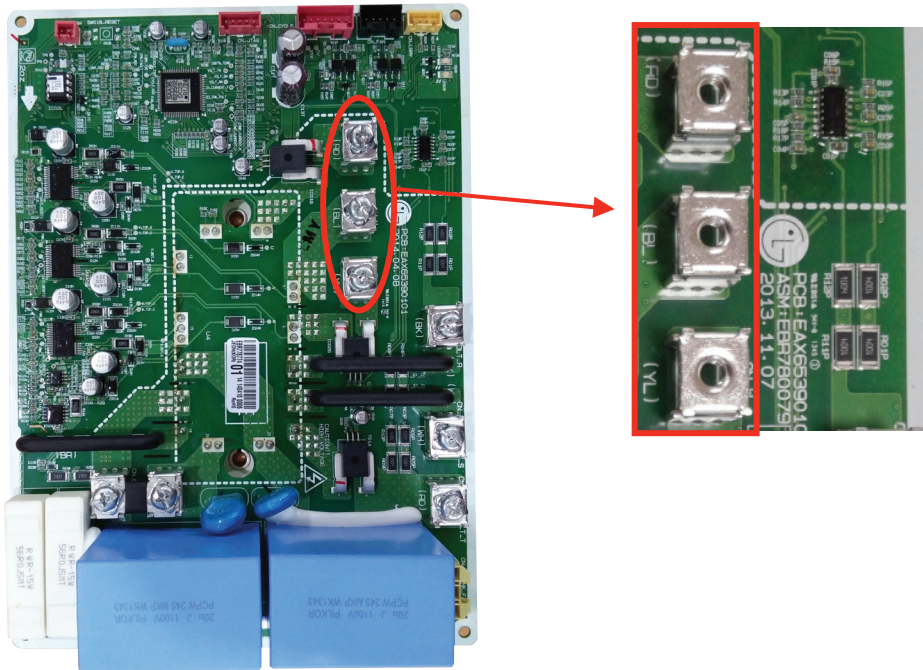
■ Error Diagnosis and Countermeasure Flow Chart



- * Measuring resistance between each terminal of compressor

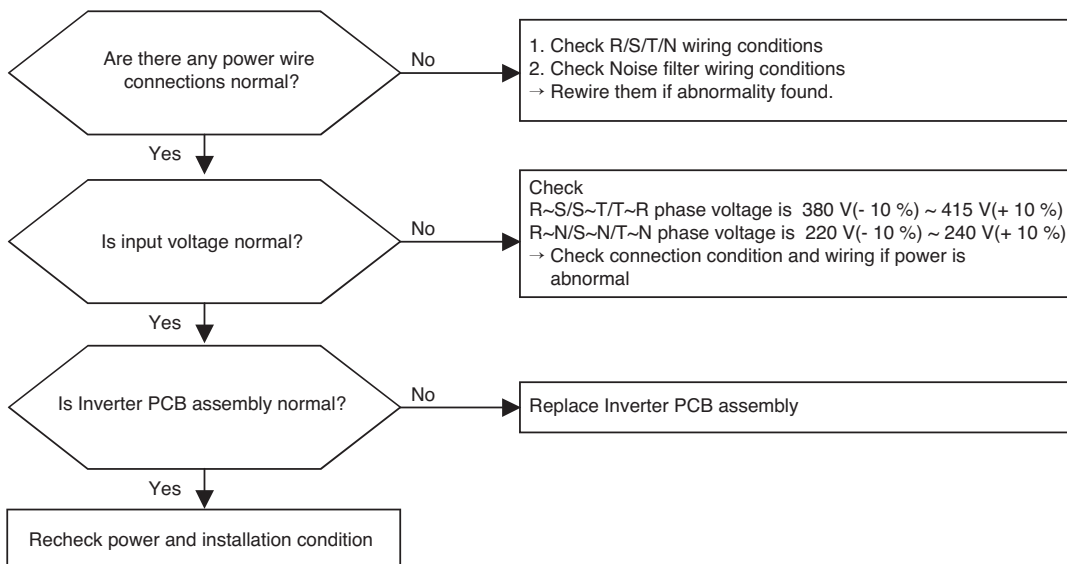


- * Compressor wire connection

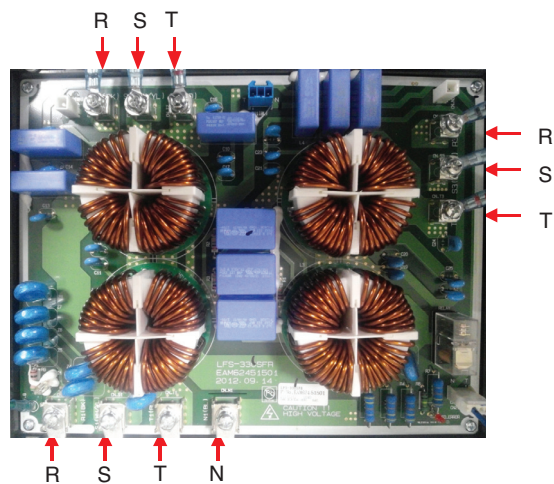
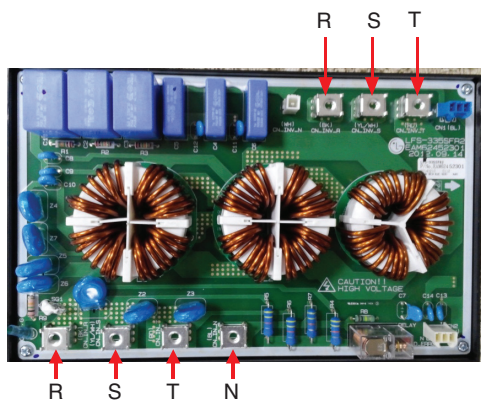


Error No.	Error Type	Error Point	Main Reasons
28* Master 281 Slave1 282 Slave2 283 Slave3 284	Inverter DC link high voltage error	Inverter PCB DC link voltage supplied over 1000 V	1. Input voltage abnormal (R,S,T,N) 2. ODU Inverter PCB damage (DC Link voltage sensing part)

■ Error Diagnosis and Countermeasure Flow Chart

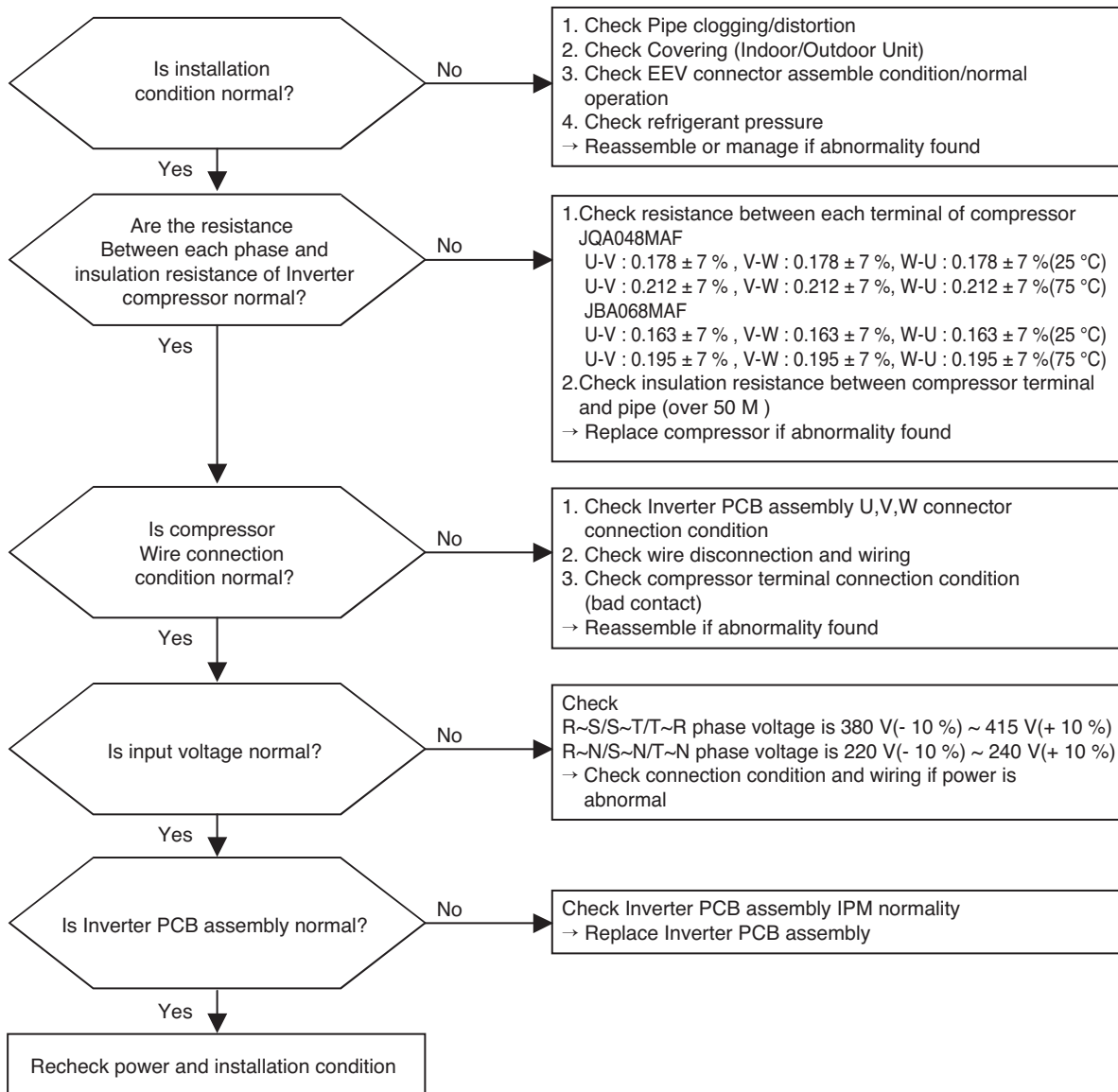


* Measuring input voltage



Error No.	Error Type	Error Point	Main Reasons
29* Master 291 Slave1 292 Slave2 293 Slave3 294	Inverter compressor over current	Inverter compressor input current is over 30 A	<ol style="list-style-type: none"> 1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU Inverter PCB assembly damage

■ Error Diagnosis and Countermeasure Flow Chart



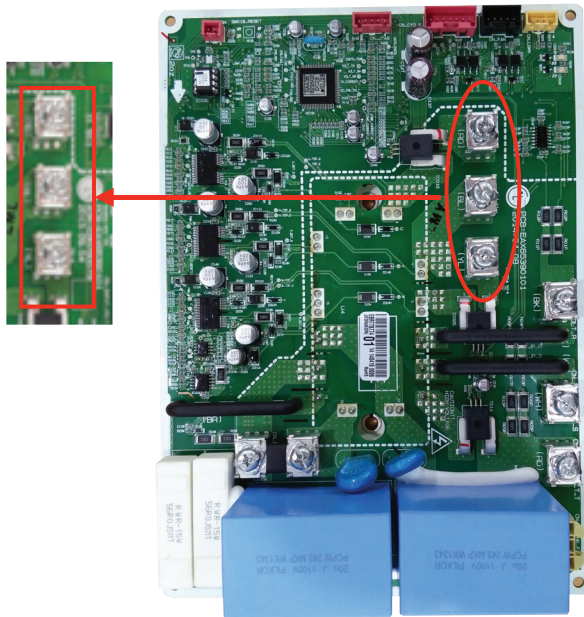
* Measuring resistance between each terminal of compressor



* Measuring input voltage

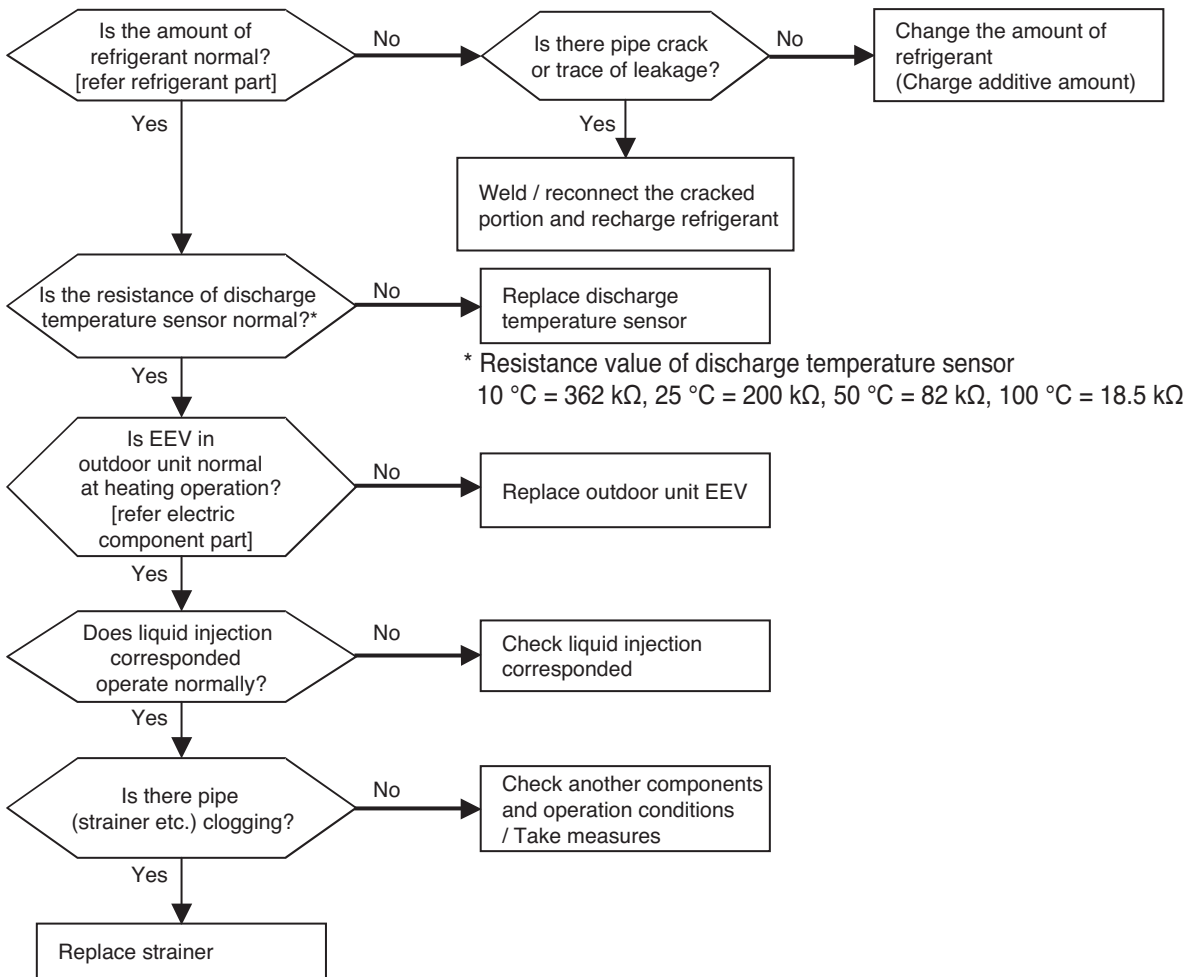


* Compressor wire connection



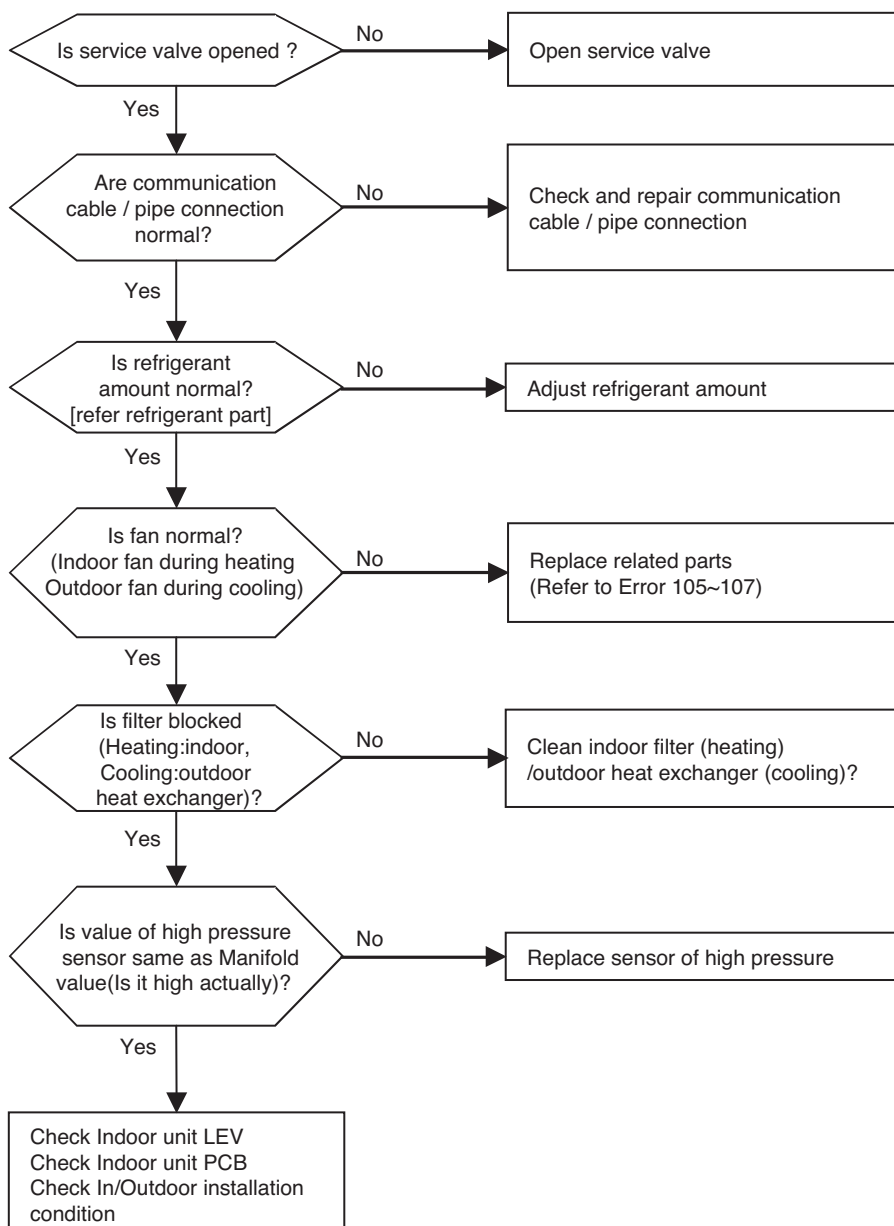
Error No.	Error Type	Error Point	Main Reasons
32* Master 321 Slave1 322 Slave2 323 Slave3 324	Over-increase discharge temperature of inverter compressor 1 at main outdoor unit	Compressor is off because of over-increase discharge temperature of inverter compressor 1	1. Temperature sensor defect of inverter compressor 1 discharge pipe 2. Refrigerant shortage / leak 3. EEV defect 4. Liquid injection valve defect
33* Master 331 Slave1 332 Slave2 333 Slave3 334	Over-increase discharge temperature of inverter compressor 2 at main outdoor unit	Compressor is off because of over-increase discharge temperature of inverter compressor 2	1. Temperature sensor defect of inverter compressor 2 discharge pipe 2. Refrigerant shortage / leak 3. EEV defect 4. Liquid injection valve defect

■ Error diagnosis and countermeasure flow chart



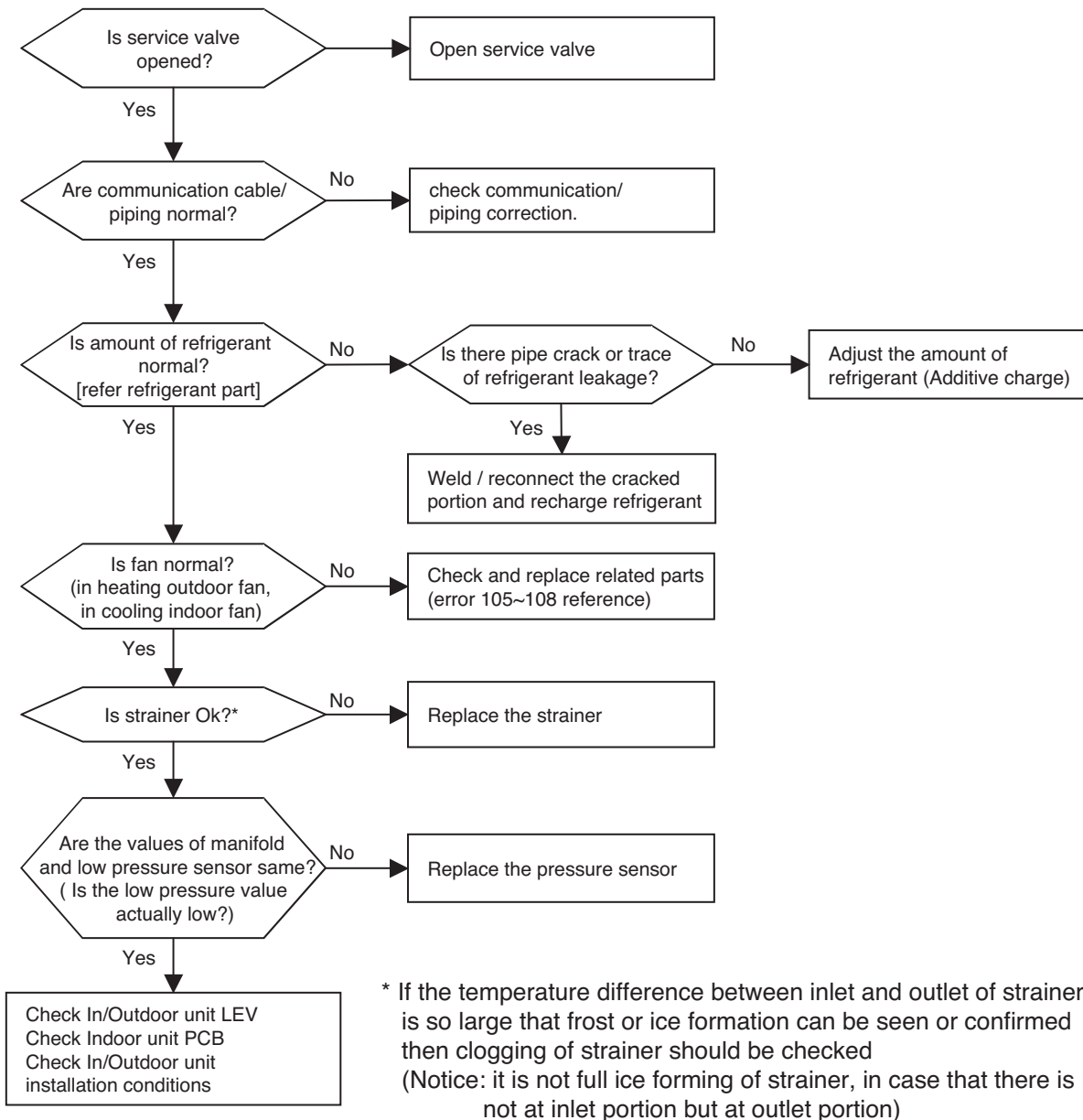
Error No.	Error Type	Error Point	Main Reasons
34*	Over-increase of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to over-increase of high pressure by high pressure sensor	<ol style="list-style-type: none"> 1. Defect of high pressure sensor 2. Defect of Indoor or Outdoor unit fan 3. Deformation because of damage of refrigerant pipe 4. Over-charged refrigerant 5. Defective Indoor / Outdoor unit EEV 6. When blocked <ul style="list-style-type: none"> - Outdoor unit is blocked during cooling - Indoor unit filter is blocked during heating 7. SVC valve is clogged 8. PCB defect of Outdoor unit 10. Indoor unit pipe temperature sensor defect

■ Error diagnosis and countermeasure flow chart



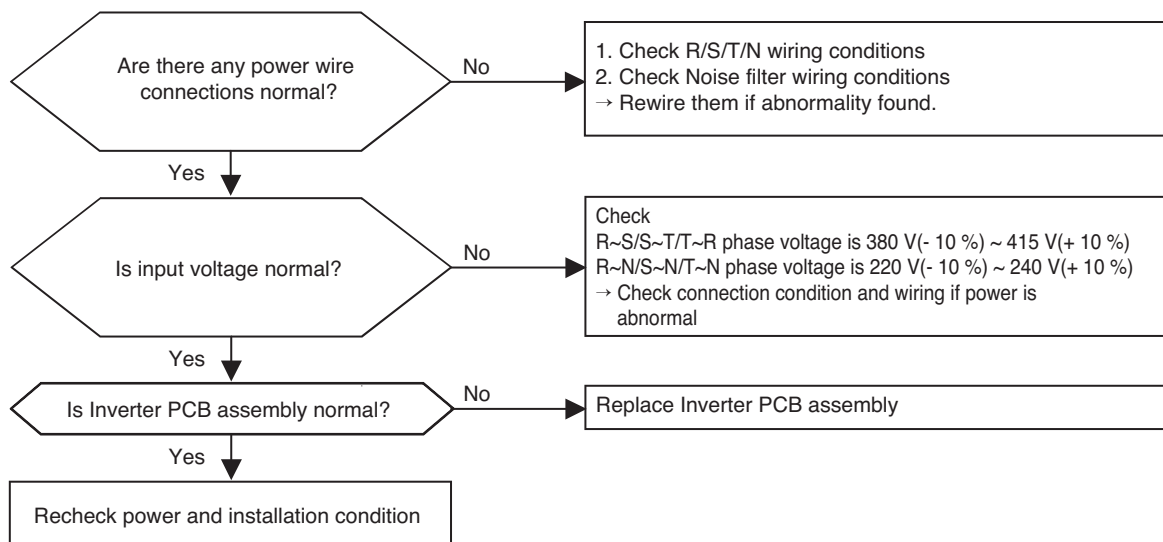
Error No.	Error Type	Error Point	Main Reasons
35* Master 351 Slave1 352 Slave2 353 Slave3 354	Excessive drop of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to excessive drop of low pressure by the low pressure sensor	<ol style="list-style-type: none"> 1. Defective low pressure sensor 2. Defective In/Outdoor unit fan 3. Refrigerant shortage/leakage 4. Deformation because of damage of refrigerant pipe 5. Defective In/Outdoor unit EEV 6. Covering / clogging (Outdoor unit covering during the cooling mode/ Indoor unit filter clogging during heating mode) 7. SVC valve clogging 8. Defective Outdoor unit PCB 9. Defective Indoor unit pipe sensor

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
40* Master 401 Slave1 402 Slave2 403 Slave3 404	Inverter compressor CT sensor error	Micom input voltage isn't within $2.5\text{ V} \pm 0.3\text{ V}$ at initial state of power supply	1. Input voltage abnormal (R-N) 2. ODU Inverter PCB damage (CT sensing part)

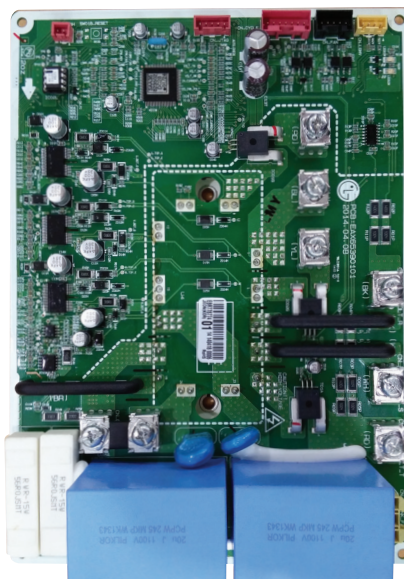
■ Error Diagnosis and Countermeasure Flow Chart



* Measuring input voltage

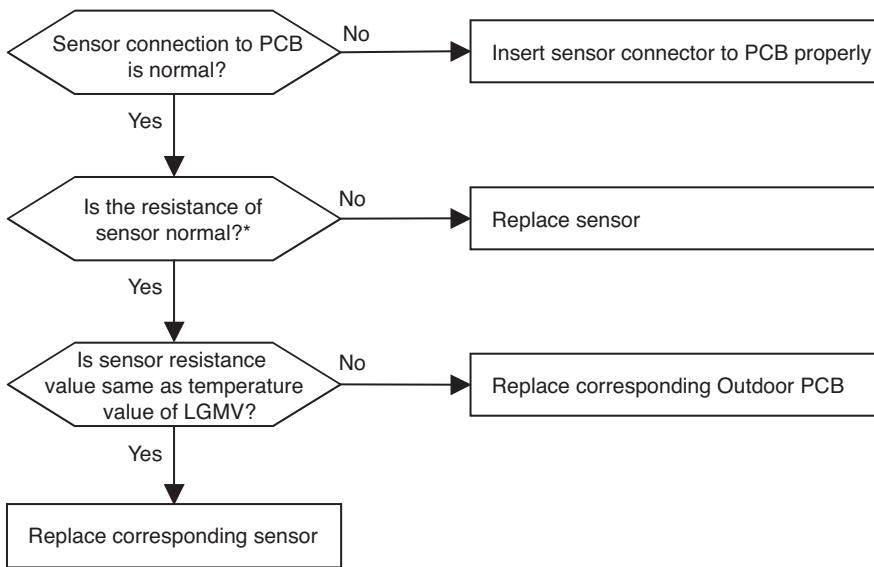


* Inverter PCB assembly



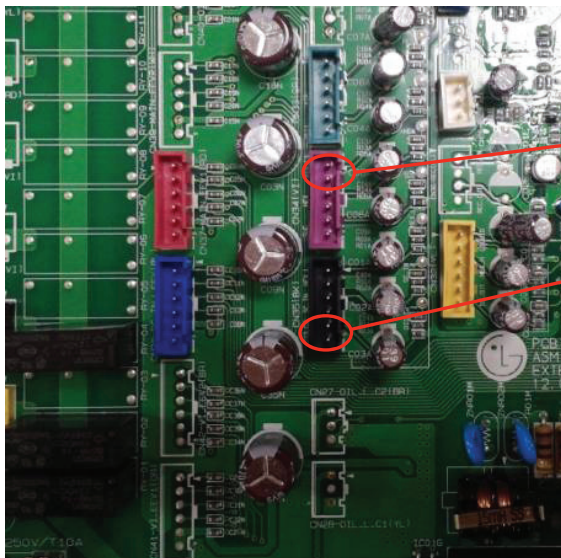
Error No.	Error Type	Error Point	Main Reasons
41* (Inverter1) Master 411 Slave1 412 Slave2 413 Slave3 414	Compressor1 discharge pipe temperature sensor error	Sensor measurement value is abnormal (Open/Short)	<ol style="list-style-type: none"> 1. Defective connection of the compressor1 discharge pipe temperature sensor 2. Defective discharge pipe compressor sensor of the compressor1 (open/short) 3. Defective Outdoor PCB
47* (Inverter2) Master 471 Slave1 472 Slave2 473 Slave3 474	Compressor2 discharge pipe temperature sensor error	Sensor measurement value is abnormal (Open/Short)	<ol style="list-style-type: none"> 1. Defective connection of the compressor1 discharge pipe temperature sensor 2. Defective discharge pipe compressor sensor of the compressor1 (open/short) 3. Defective Outdoor PCB

■ Error diagnosis and countermeasure flow chart



* Error is generated if the resistance is more than 5 M(open) and less than 2 k (short)

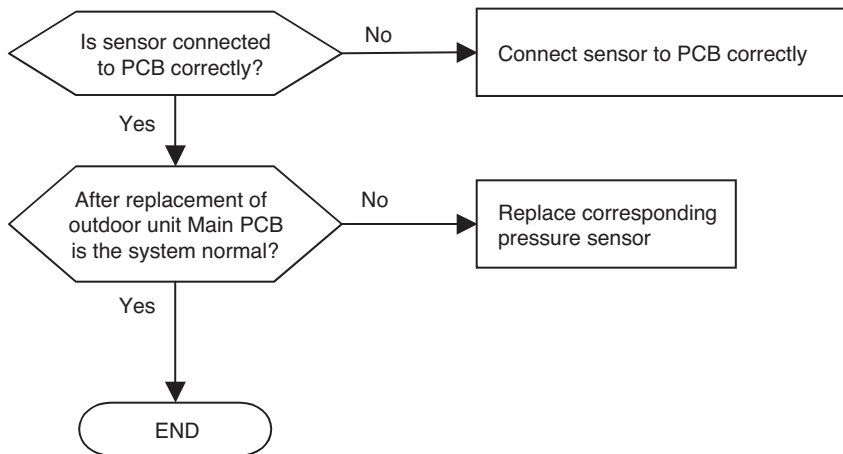
Note: Standard values of resistance of sensors at different temperatures (5 % variation)
 10 °C = 362 kΩ : 25 °C = 200 kΩ : 50 °C = 82 kΩ : 100 °C = 18.5 kΩ



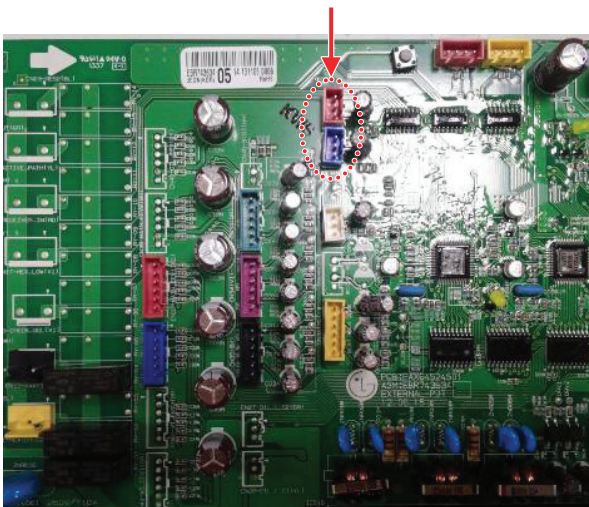
Check the resistance inverter compressor discharge temperature sensor

Error No.	Error Type	Error Point	Main Reasons
42* Master 421 Slave1 422 Slave2 423 Slave3 424	Sensor error of low pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of low pressure connector 2. Defect of low pressure connector (Open/Short) 3. Defect of Outdoor PCB
43* Master 431 Slave1 432 Slave2 433 Slave3 434	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of high pressure connector 2. Defect of high pressure connector (Open/Short) 3. Defect of Outdoor PCB

■ Error diagnosis and countermeasure flow chart

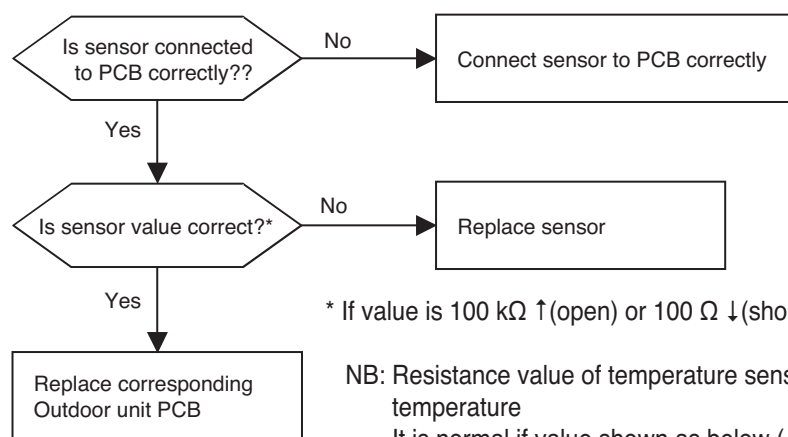


Pressure sensor connector



Error No.	Error Type	Error Point	Main Reasons
44* Master 441 Slave1 442 Slave2 443 Slave3 444	Sensor error of outdoor air temperature	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of Outdoor PCB
45* Master 451 Slave1 452 Slave2 453 Slave3 454	Piping temperature sensor error of heat exchanger in master & slave outdoor unit heat exchanger	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of Outdoor PCB
46* Master 461 Slave1 462 Slave2 463 Slave3 464	Compressor suction temperature sensor error	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of Outdoor PCB
49* Master 491 Slave1 492 Slave2 493 Slave3 494	Outdoor Unit IGBM Temperature Sensor Fault	Outdoor Unit IGBM Temperature Sensor Open or Short	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of Outdoor PCB

■ Error diagnosis and countermeasure flow chart



* If value is 100 kΩ ↑(open) or 100 Ω ↓(short), error occurs

NB: Resistance value of temperature sensor change according to temperature

It is normal if value shown as below (± 5 % error)

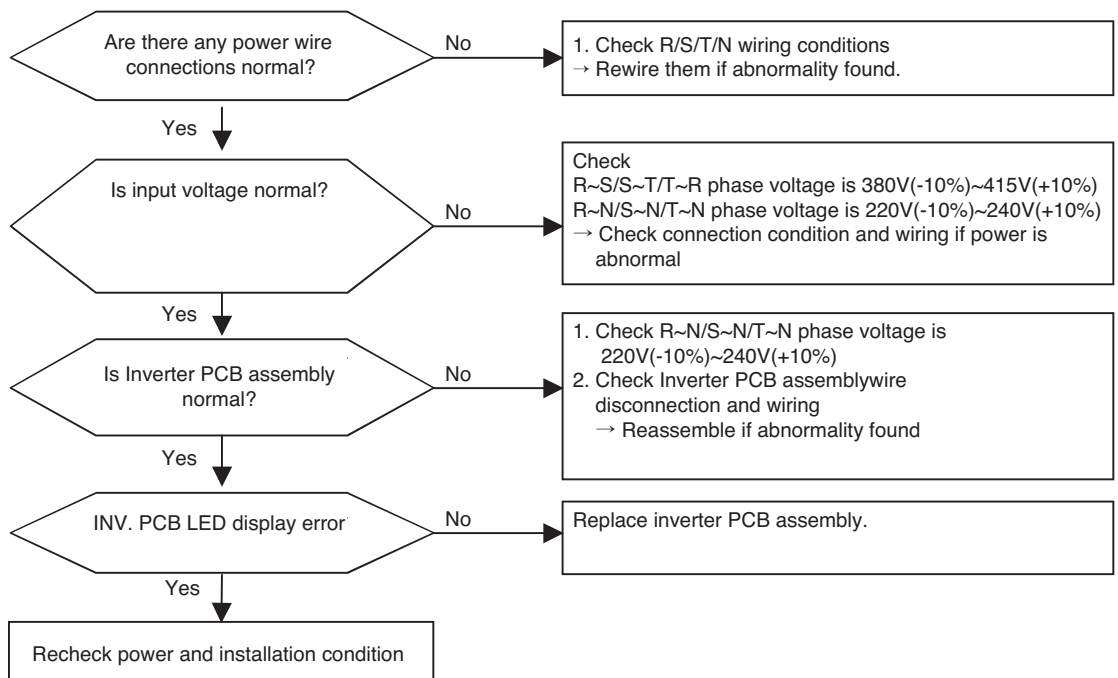
Sensor of air temperature: 10 °C = 20.7 kΩ : 25 °C = 10 kΩ : 50 °C = 3.4 kΩ

Sensor of piping temperature: 10 °C = 10 kΩ : 25 °C = 5 kΩ : 50 °C = 1.8 kΩ

Error No.	Error Type	Error Point	Main Reasons
153* Master 1531 Slave1 1532 Slave2 1533 Slave3 1534	Outdoor Unit Upper Heat Exchanger Temperature Sensor Fault	Outdoor Unit Upper Heat Exchanger Temperature Sensor open or short	1. Temperature Sensor Connecting Fault 2. Temperature Sensor(Open/Short) 3. Main PCB Fault
154* Master 1541 Slave1 1542 Slave2 1543 Slave3 1544	Outdoor Unit Low Heat Exchanger Temperature Sensor Fault	Outdoor Unit Low Heat Exchanger Temperature Sensor open or short	1. Temperature Sensor Connecting Fault 2. Temperature Sensor(Open/Short) 3. Main PCB Fault

Error No.	Error Type	Error Point	Main Reasons
50* Master 501 Slave1 502 Slave2 503 Slave3 504	ODU 3phase power omission error	Omitting one or more of R,S,T input power	<ol style="list-style-type: none"> 1. Input Voltage abnormal (R,S,T,N) 2. Check power Line connection condition 3. Inverter PCB damage 4. Inverter PCB input current sensor fault

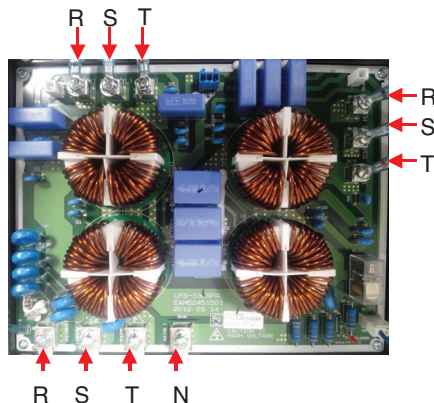
■ Error Diagnosis and Countermeasure Flow Chart



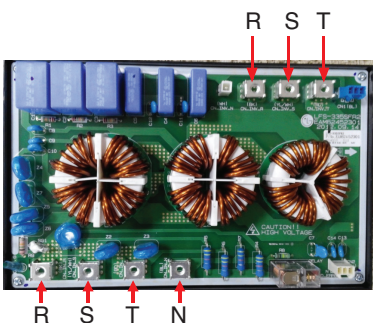
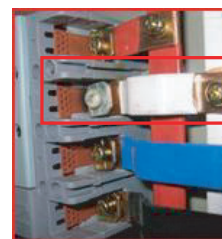
* Measuring input voltage



* Noise filter wiring

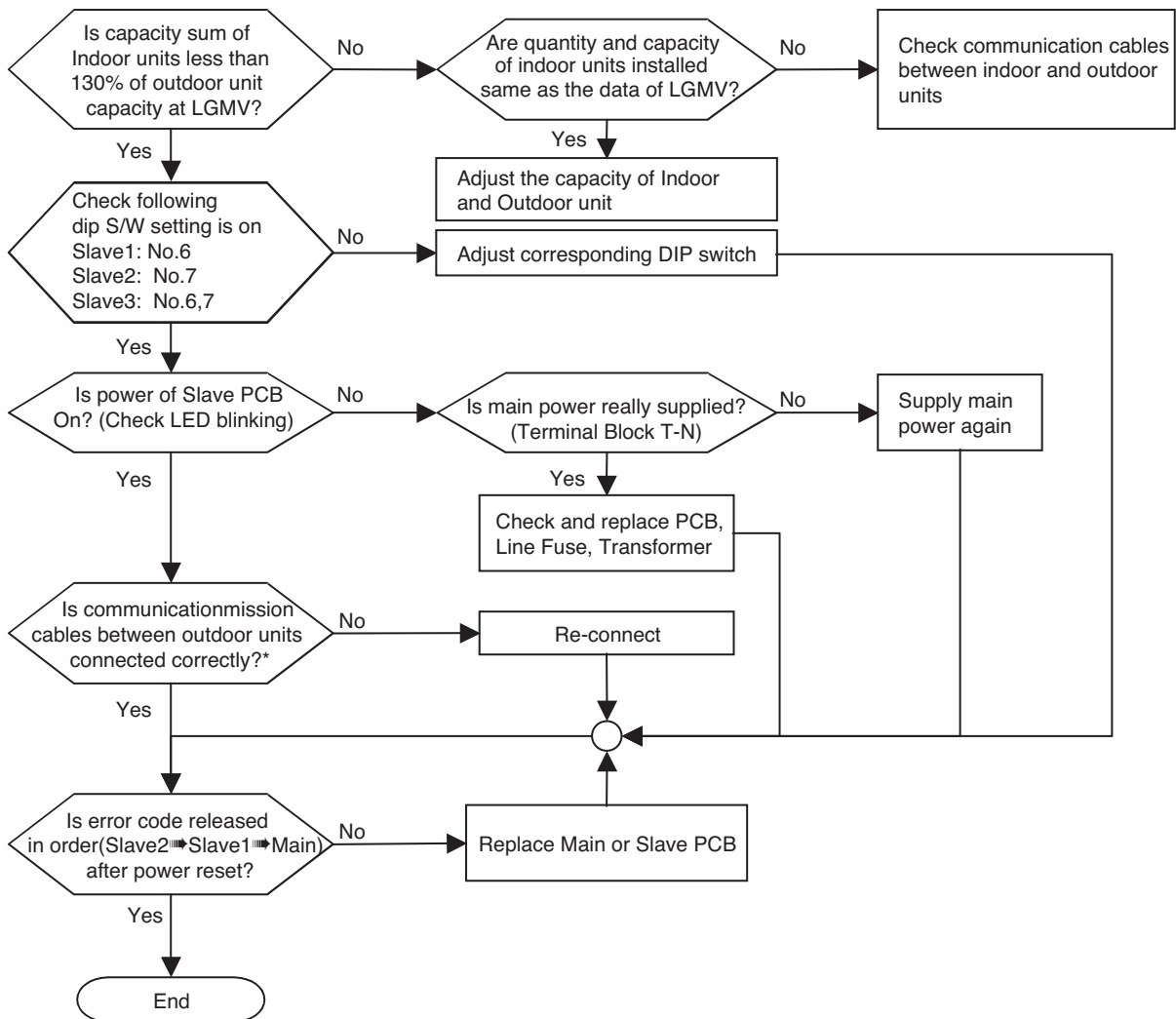


* Field Fault Case



Error No.	Error Type	Error Point	Main Reasons
51* Master 511	Over-Capacity (Sum of indoor unit capacity is more than outdoor capacity)	Sum of Indoor unit capacity exceed Outdoor unit capacity specification	1. 130% more than outdoor unit rated capacity 2. Wrong connection of communication cable/piping 3. Control error of slave outdoor unit Dip switch 4. Power supply defect of Slave unit PCB 5. Defect of Outdoor unit PCB

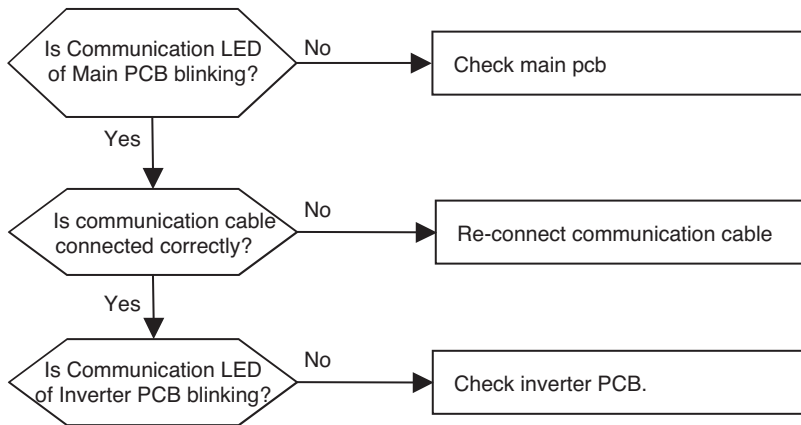
■ Error diagnosis and countermeasure flow chart



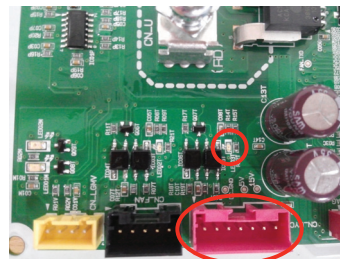
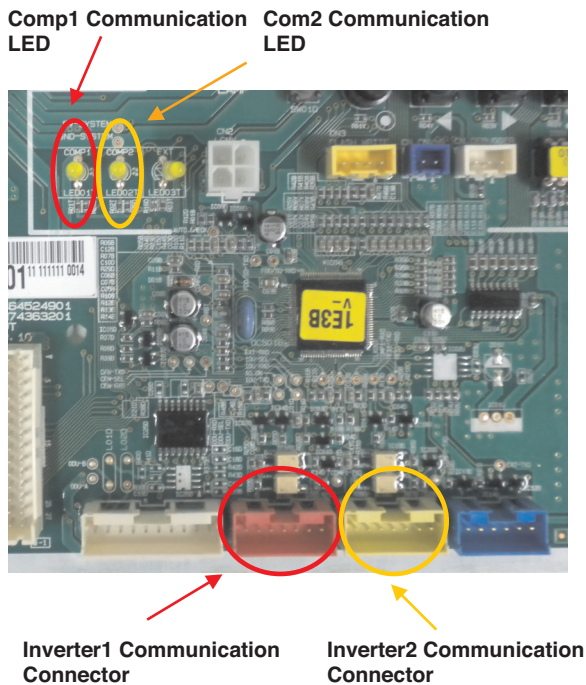
* In order to check communication cables between Outdoor units, check in order as below : PCB connectors → terminal block → communication cables

Error No.	Error Type	Error Point	Main Reasons
52* Master 521 Slave1 522 Slave2 523 Slave3 524	Communication error between (Inverter1/Inverter2 PCB → Main PCB)	Main PCB of Master unit can't receive signal from Comp1/Comp2 controller	1. Power cable or communication cable is not connected 2. Defect of outdoor Main PCB or Inverter1/Inverter2 PCB

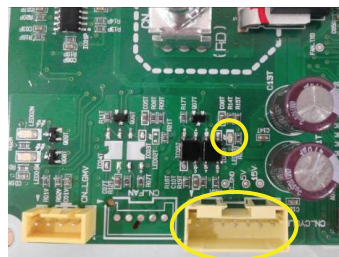
■ Error diagnosis and countermeasure flow chart



* The method of checking Main PCB and Inverter1/Inverter2 PCB (If normal, communication LED blinks)



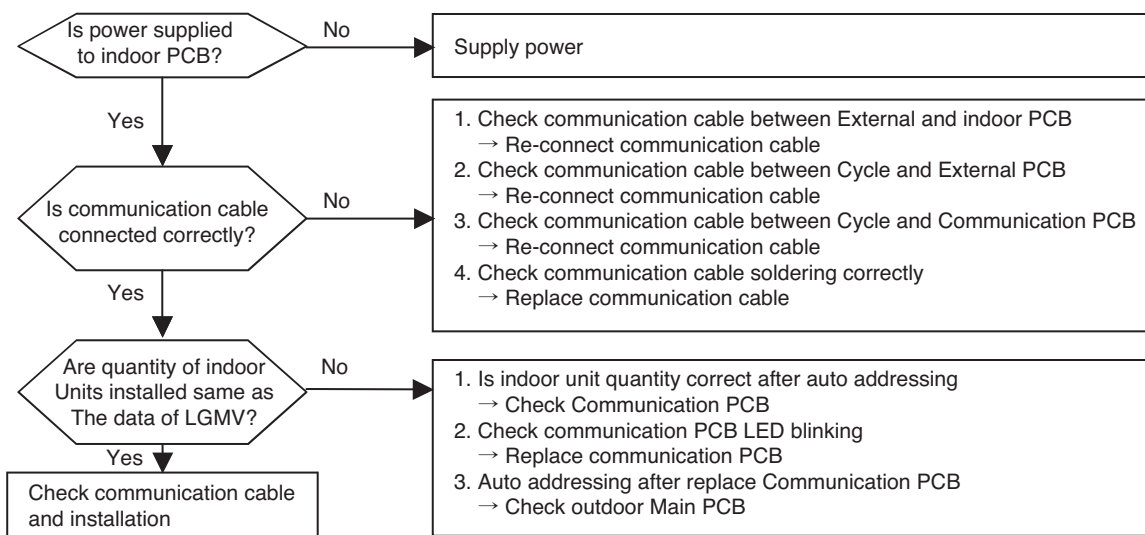
Communication Connector & LED in Inverter1 PCB



Communication Connector & LED in Inverter2 PCB

Error No.	Error Type	Error Point	Main Reasons
53* Master 531	Communication error (Indoor unit → Main PCB)	In case Main PCB can't receive signal from indoor unit	<ol style="list-style-type: none"> 1. Communication cables are not connected between External PCB and indoor PCB 2. Communication cables are not connected between Main PCB and External PCB 3. Communication cables are not connected between Main PCB and Communication PCB 4. Communication cables are short/open 5. Indoor PCB power off 6. Defect of outdoor Cycle/Communication/indoor PCB 7. Communication wire connection fault

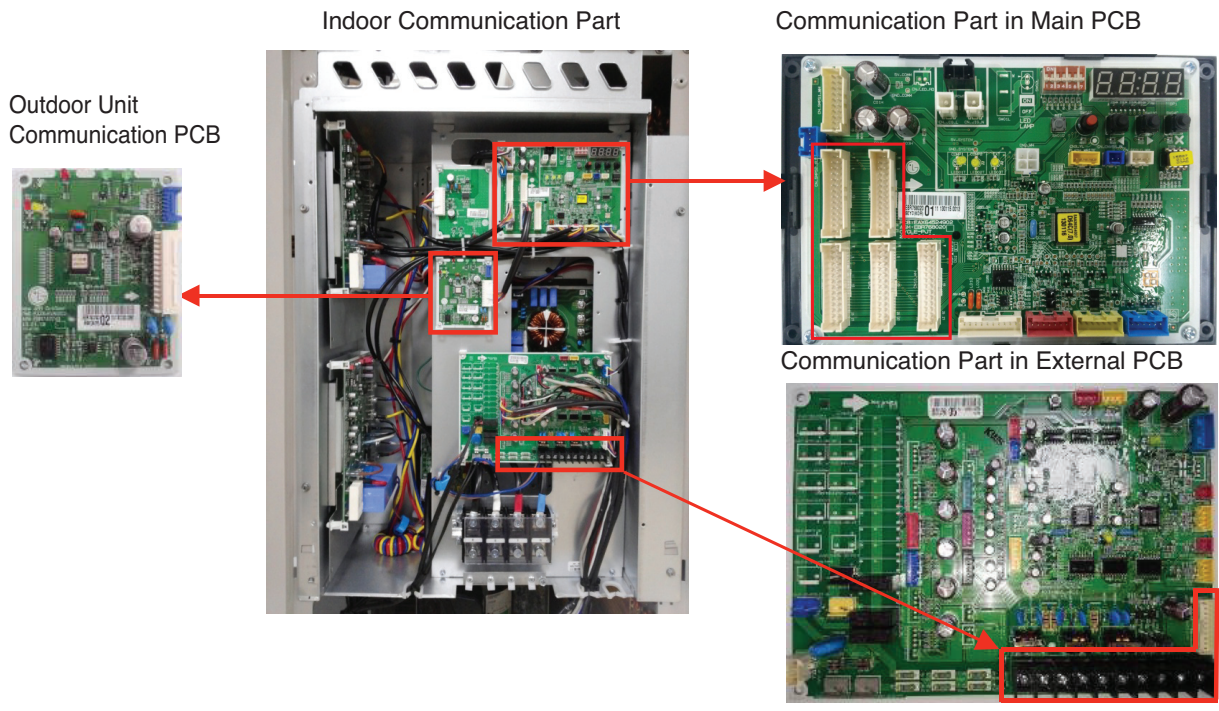
■ Error diagnosis and countermeasure flow chart



In case of CH53, almost happened with CH05, the indoor units not operated actually are normal so check with same method of CH05. and additionally check as shown as below and above flow chart

- Although the quantity of indoor units installed is same as LGMV data there may be a few indoor units with which the number of communication is not increased with LGMV
- Although the quantity of indoor units installed is not same as LGMV data, and if communication of the indoor unit displayed at LGMV is done well then the indoor unit suspected to have some problem (and is not appear at LGMV) may have following problems
 - ① wrong connection of communication cable or power cable
 - ② fault of power / PCB / communication cable
 - ③ duplication of indoor unit number
- If communication is not doing well wholly then the Auto Addressing is not done
- The case that CH53 appear at indoor unit also Auto Addressing is not done so indoor unit address may be duplicated

* After replacement of indoor unit PCB, Auto Addressing should be done, if central controller is installed then the central control address also should be input.
In case that only communication PCB is replaced above process is not needed



※ Remark : IDU A/IDU B

Wiring Fault Case



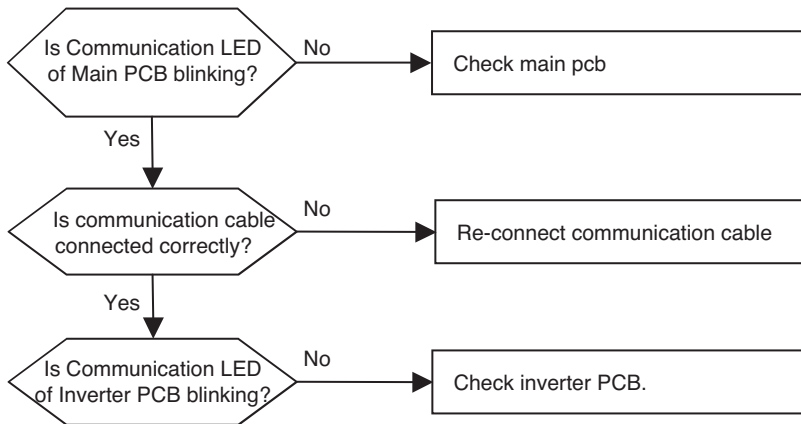
Indoor Unit
Communication PCB



※ 1 time/10 sec Turn on/off

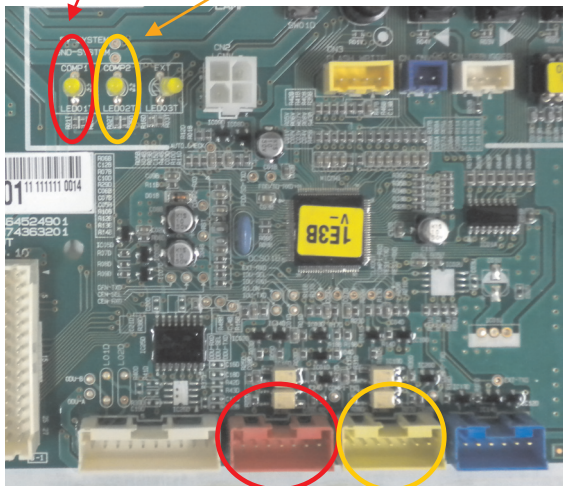
Error No.	Error Type	Error Point	Main Reasons
57* Master 571 Slave1 572 Slave2 573 Slave3 574	Communication error : Main PCB --> Inverter PCB	Failing to receive inverter signal at main PCB of Outdoor Unit	<ol style="list-style-type: none"> 1. Bad Connection Between Main PCB and Inverter PCB 2. Communication Wire Noise Effect 3. ODU Main PCB Damage 4. ODU Main PCB Damage

■ Error diagnosis and countermeasure flow chart



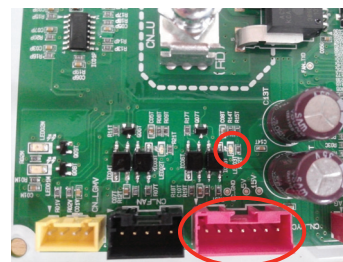
* The method of checking Main PCB and Inverter1/Inverter2 PCB (If normal, communication LED blinks)

Comp1 Communication LED Com2 Communication LED

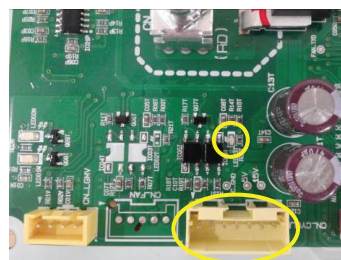


Inverter1 Communication Connector

Inverter2 Communication Connector



Communication Connector & LED in Inverter1 PCB



Communication Connector & LED in Inverter2 PCB

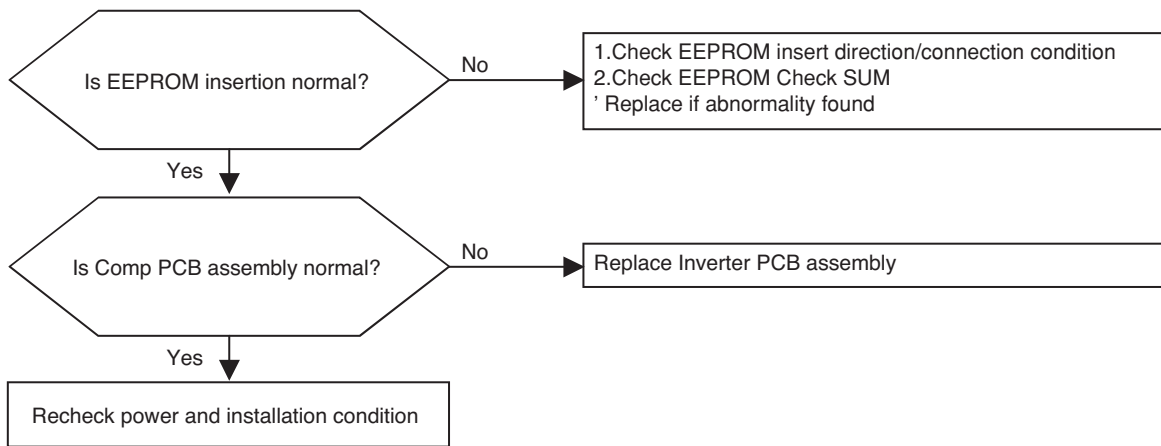
Troubleshooting Guide

Error No.	Error Type	Error Point	Main Reasons
59	Series Installation Error	Wrong combination of outdoor units	Wrong combination of outdoor units

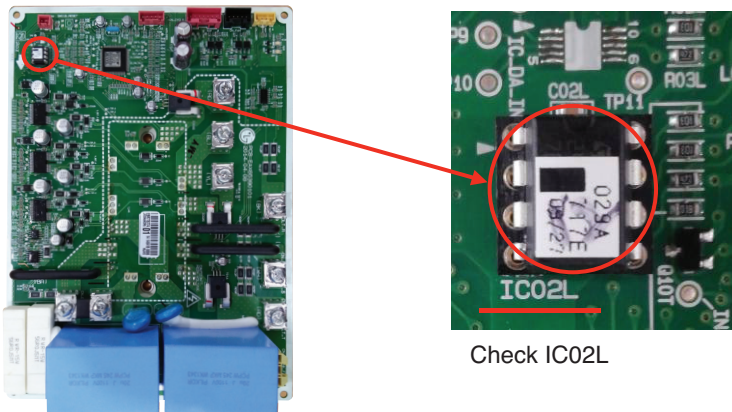
Note: Do not combine old series such as MV III , MV II with MV IV models.

Error No.	Error Type	Error Point	Main Reasons
60* Master 601 Slave1 602 Slave2 603 Slave3 604	Inverter PCB EEPROM error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inverter PCB assembly damage

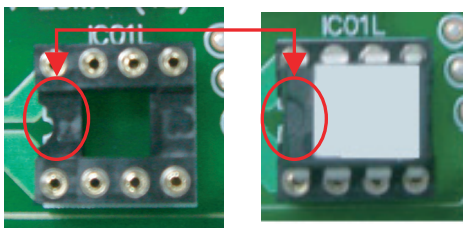
■ Error Diagnosis and Countermeasure Flow Chart



* Inverter EEPROM inserting point



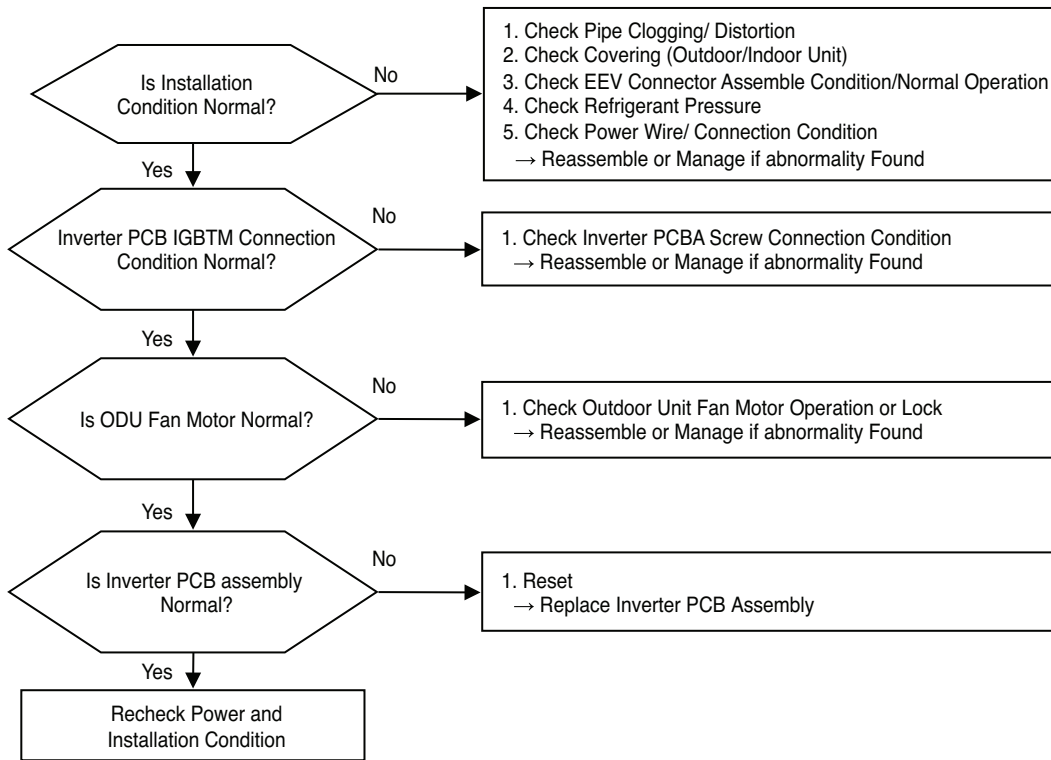
* Right inserting direction of inverter EEPROM



* Note : Replace after power off

Error No.	Error Type	Error Point	Main Reasons
62* Master 621 Slave1 622 Slave2 623 Slave3 624	Inverter PCB Heatsink Temperature High	Heatsink Temperature is Over 125 °C	1. Inverter PCBA IGBTM Connection Condition Abnormal 2. Outdoor Unit Fan Motor Operation Abnormal 3. Outdoor Unit Inverter PCB Assembly Defect 4. Overload Operation (Pipe Clogging/ Covering/EEV Defect/Ref. Overcharge)

■ Error diagnosis and countermeasure flow chart



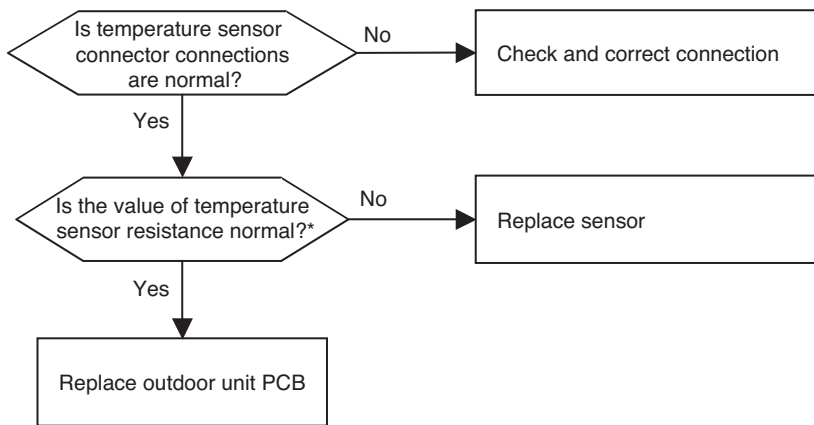
■ Check Inverter PCB Screw Connection Condition



Check Screw Connection Condition

Error No.	Error Type	Error Point	Main Reasons
65* Master 651 Slave1 652 Slave2 653 Slave3 654	Outdoor unit liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective outdoor unit PCB

■ Error diagnosis and countermeasure flow chart



* Sensor resistance 100 kΩ over (open) or 100 Ω below (short) will generate error

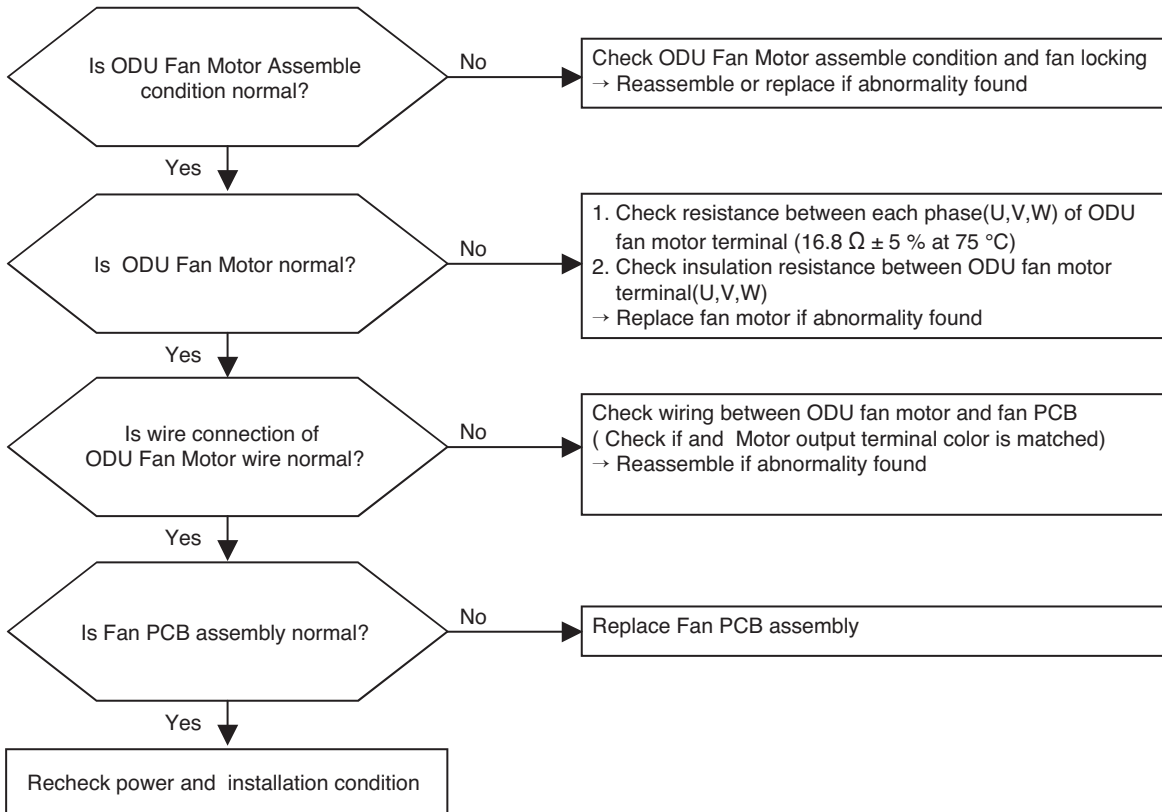
Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table (±5% tolerance)

Air temperature sensor: 10 °C = 20.7 kΩ : 25 °C = 10 kΩ : 50 °C = 3.4 kΩ

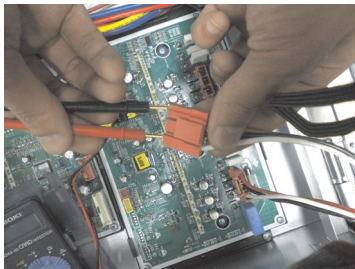
Pipe temperature sensor: 10 °C = 10 kΩ : 25 °C = 5 kΩ : 50 °C = 1.8 kΩ

Error No.	Error Type	Error Point	Main Reasons
67* Master 671 Slave1 672 Slave2 673 Slave3 674	Fan Lock Error	Fan RPM is 10RPM or less for 7sec. when ODU fan starts or 20 RPM or less after fan starting.	<ol style="list-style-type: none"> 1. Fan motor defect / assembly condition abnormal 2. Wrong connection of fan motor connector (U,V,W output) 3. Reversing rotation after RPM target apply 4. Fan PCB assembly defect 5. Fan lock by Heavy Snowfall.

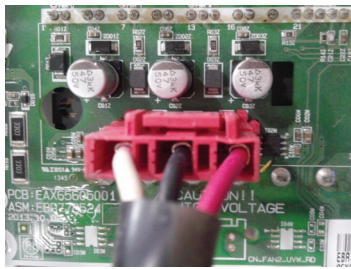
■ Error Diagnosis and Countermeasure Flow Chart



* Fan Motor resistance measuring between each phase

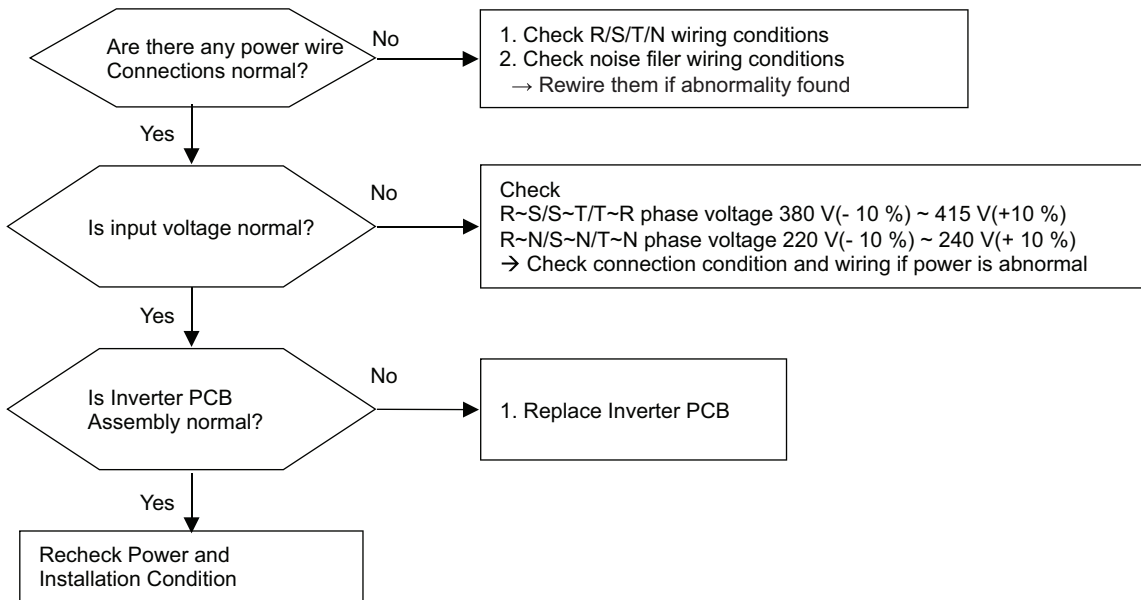


* Fan PCB



Error No.	Error Type	Error Point	Main Reasons
71* Master 711 Slave1 712 Slave2 713 Slave3 714	Input CT Sensor Error	Micom input voltage isn't within $2.5V \pm 0.3V$ at initial state of power supply	1. Input Voltage is abnormal (R-N) 2. ODU Converter PCB damage (CT sensing part)

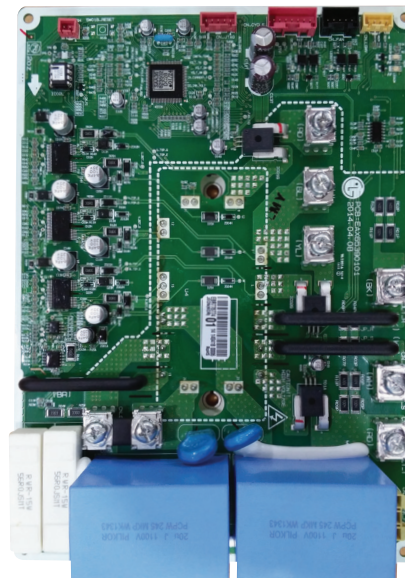
■ Error diagnosis and countermeasure flow chart



* Measuring input voltage

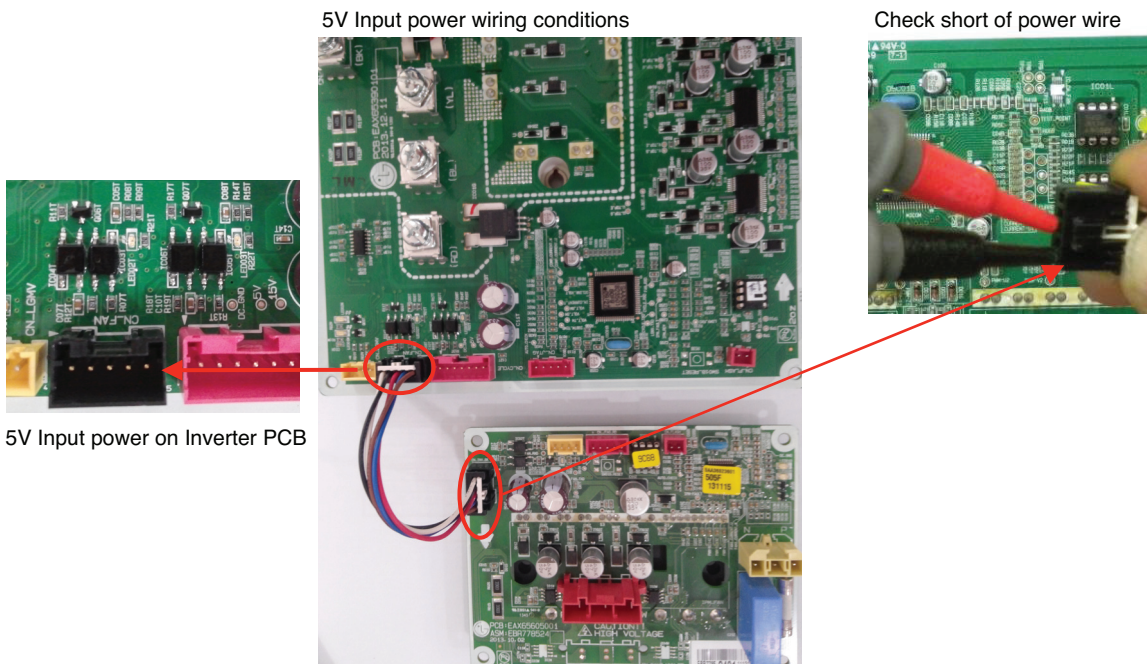
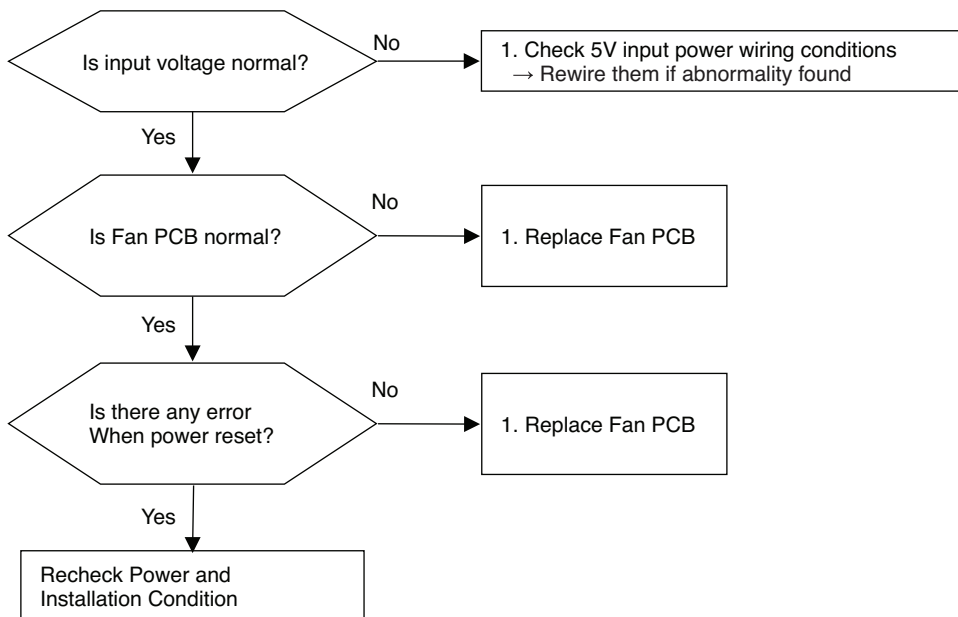


* Inverter PCB assembly



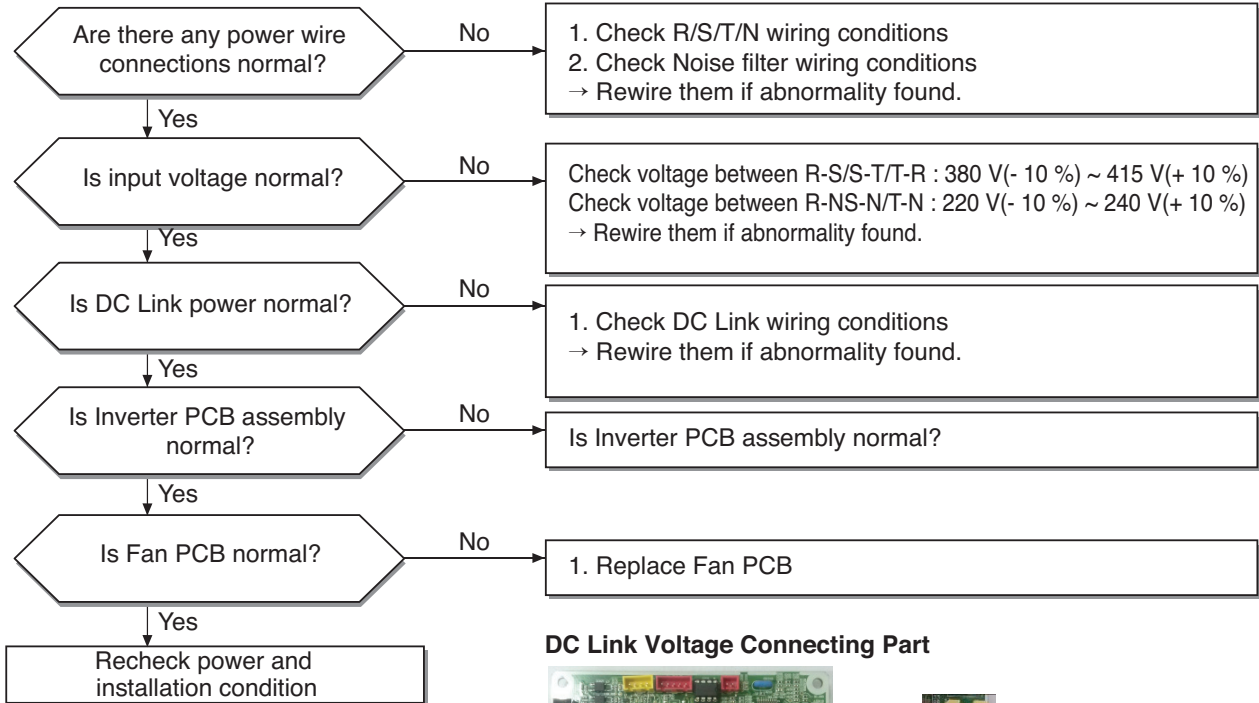
Error No.	Error Type	Error Point	Main Reasons
75* Master Slave1 Slave2 Slave3	Fan CT Sensor Error	Offset of Micom which sense the fan motor phase current is not 2.5V	1. Input Voltage is abnormal (not 5V) 2. Fan PCB assembly defect 3. Power wire open and connecting fault 4. Inverter PCB assembly defect

■ Error diagnosis and countermeasure flow chart

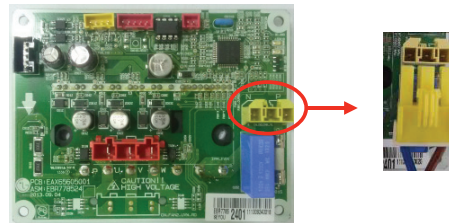


Error No.	Error Type	Error Point	Main Reasons
76* Master 761 Slave1 762 Slave2 763 Slave3 764	Fan DC Link High Voltage Error	Fan PCB DC link voltage supplied over 1100 V	1. Input voltage abnormal(R,S,T,N) 2. Fan PCB assembly defect 3. Power wire connecting fault

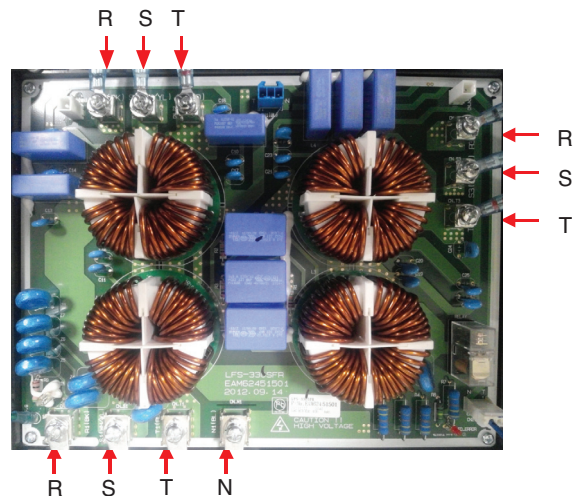
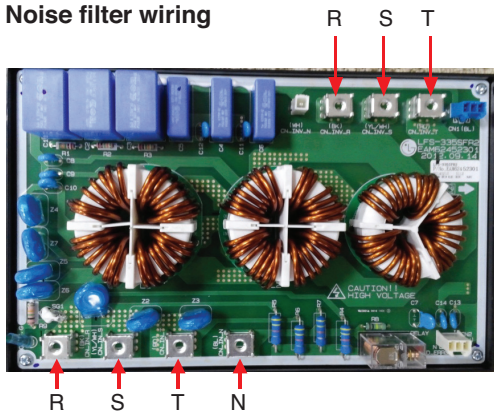
■ Error Diagnosis and Countermeasure Flow Chart



DC Link Voltage Connecting Part

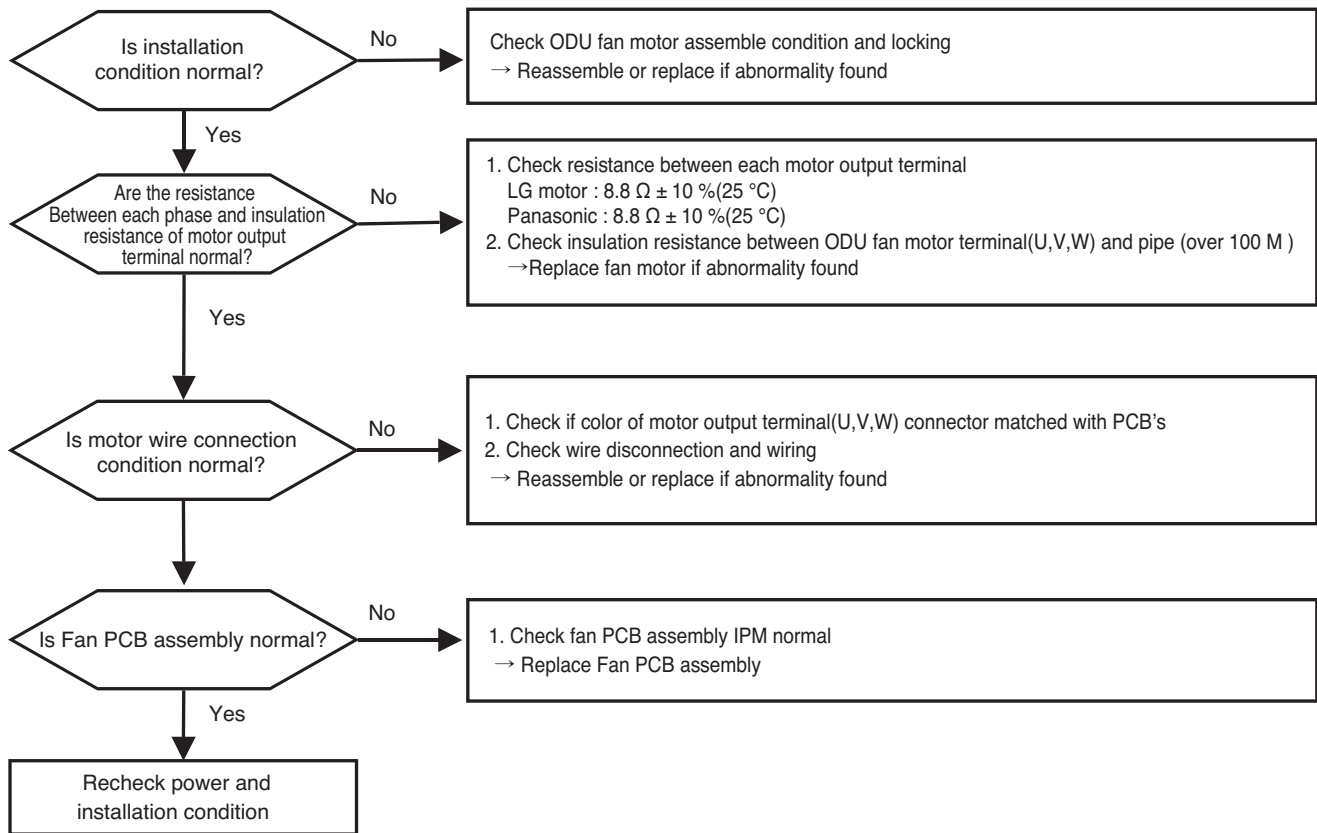


Noise filter wiring

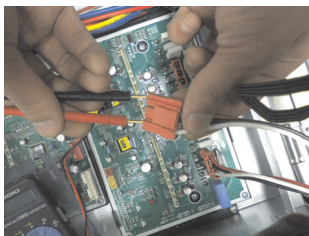


Error No.	Error Type	Error Point	Main Reasons
77* Master 771 Slave1 772 Slave2 773 Slave3 774	Fan Over Current Error	Output current is over 11 A for 40 ms	<ol style="list-style-type: none"> 1. Overload operation 2. Fan Motor defect 3. Fan PCB assembly defect 4. Fan Motor connector insert defect 5. Condenser icing or blocking

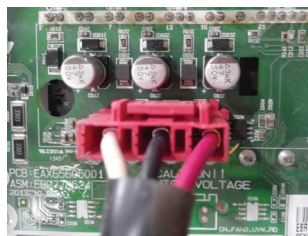
■ Error Diagnosis and Countermeasure Flow Chart



Measuring fan motor phase resistance

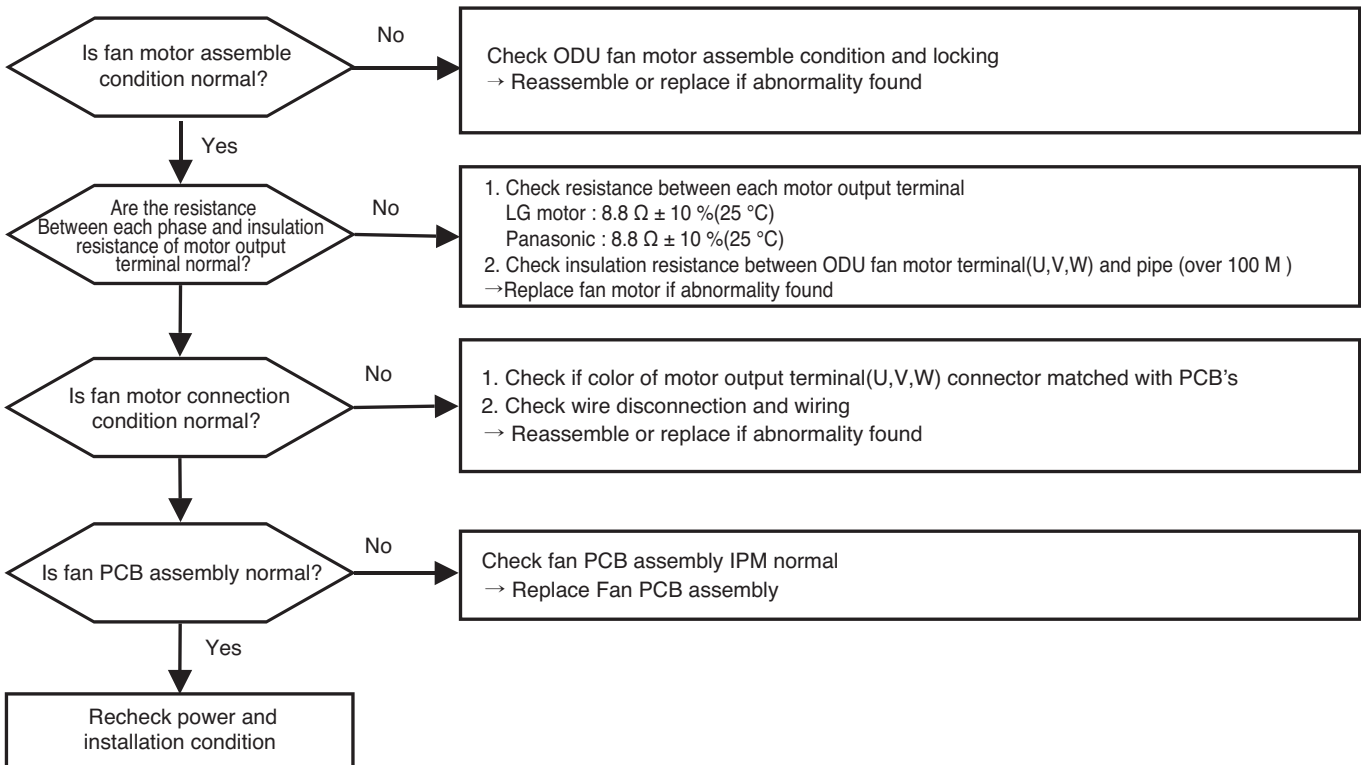


* Fan PCB

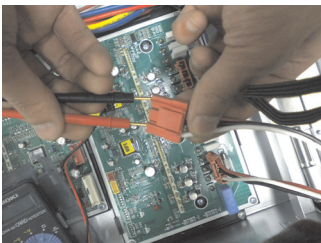


Error No.	Error Type	Error Point	Main Reasons
79* Master 791 Slave1 792 Slave2 793 Slave3 794	Fan Starting Failure Error	Fan Motor initial starting failure	1. Fan motor defect/ assemble condition abnormal 2. Fan motor connector misconnection(U,V,W output) 3. Fan PCB defect

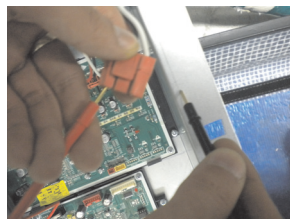
■ Error Diagnosis and Countermeasure Flow Chart



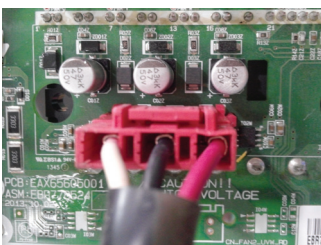
Measuring fan motor phase resistance



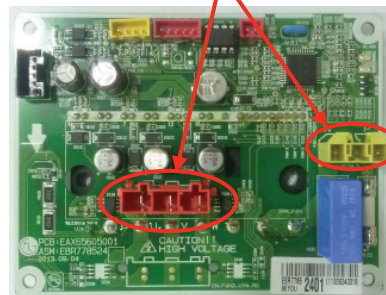
Measuring insulation resistance between fan terminal & chassis



*** Fan PCB**

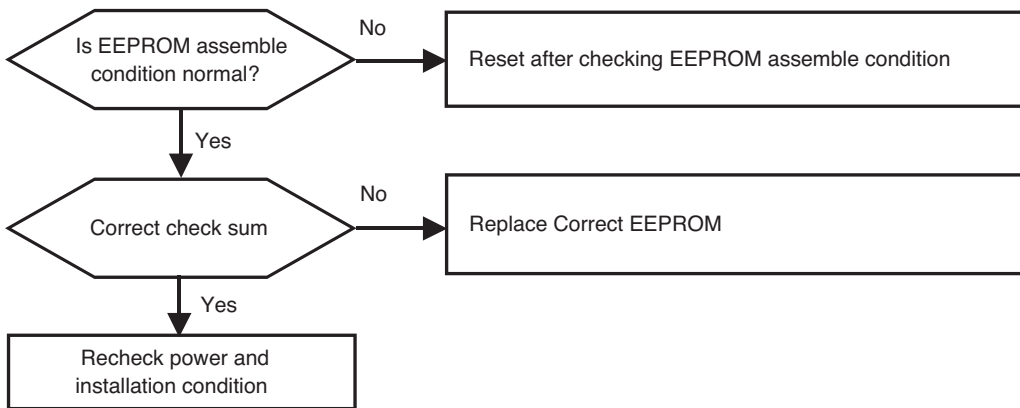


Check Point

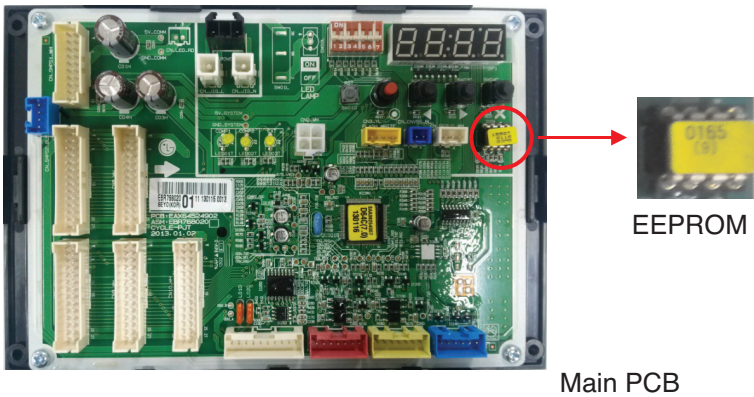


Error No.	Error Type	Error Point	Main Reasons
86* Master 861 Slave1 862 Slave2 863 Slave3 864	Main PCB EEPROM	EEPROM Access Error	1. No EEPROM 2. EEPROM wrong insertion

■ Error Diagnosis and Countermeasure Flow Chart



EEPROM Insertion

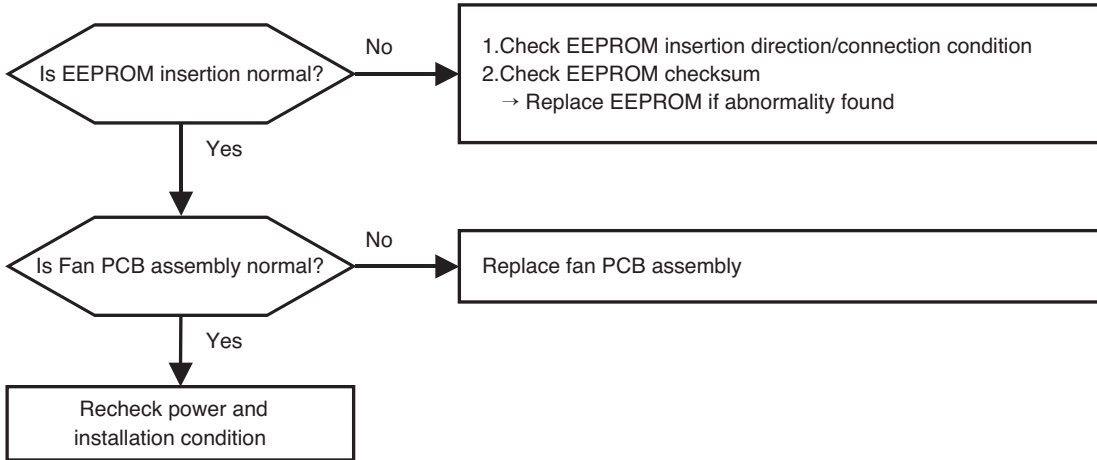


* Note : Replace after power off

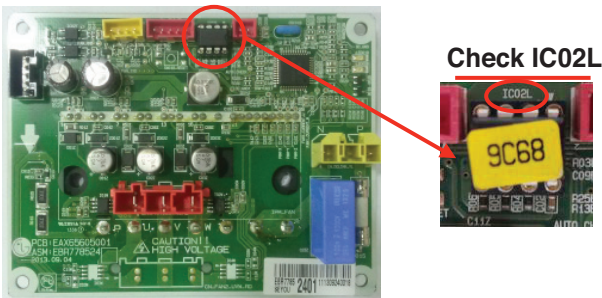


Error No.	Error Type	Error Point	Main Reasons
87* Master 871 Slave1 872 Slave2 873 Slave3 874	Fan PCB EEPROM Error	Error occurs when checking the EEPROM checksum as initializing after power is supplied	1.EEPROM bad contact/wrong insertion 2.EEPROM Version is different 3.ODU fan PCB assembly damage

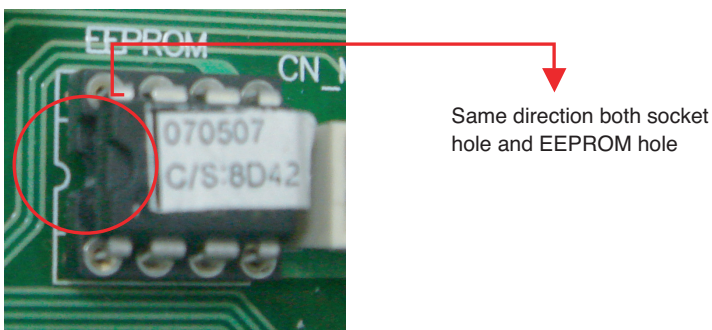
■ Error Diagnosis and Countermeasure Flow Chart



Fan PCB



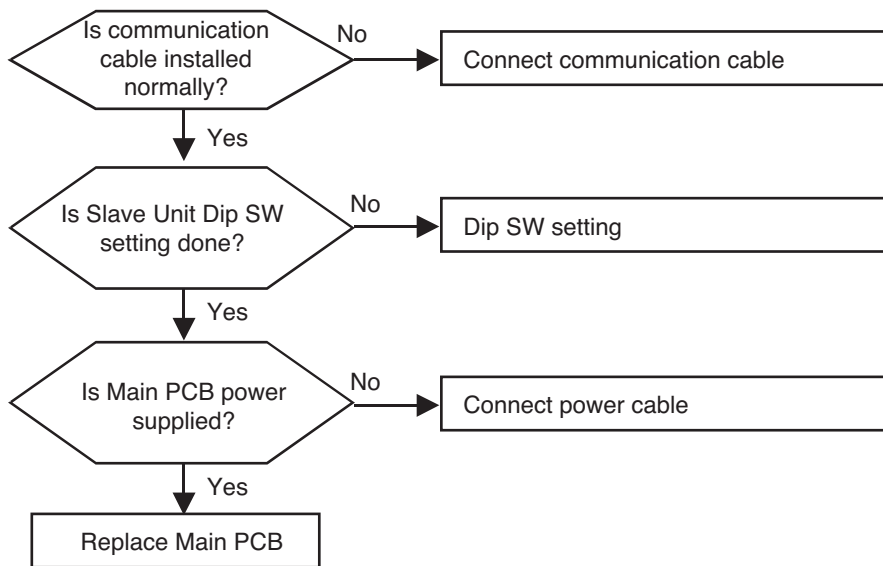
Inverter EEPROM insertion direction



* Note : Replace after power off

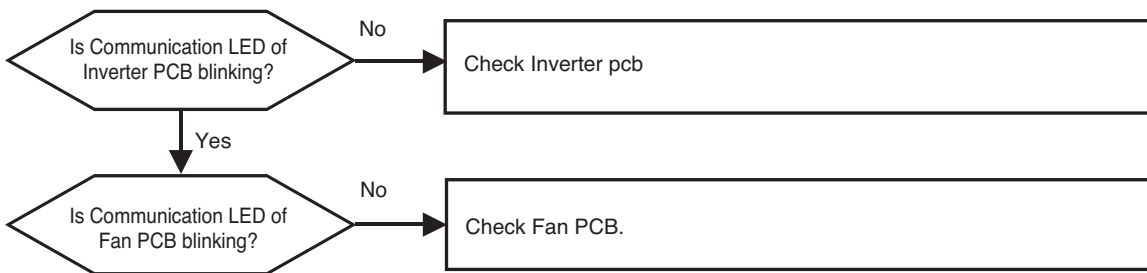
Error No.	Error Type	Error Point	Main Reasons
104* Master 1041 Slave1 1042 Slave2 1043 Slave3 1044	Communication Error Between Outdoors	Master displays ODU number which is not communicated. Slave displays own error number	1. Loose connection of power cable/ communication cable, (Open/Short) 2. Defect of each outdoor unit PCB

■ Error Diagnosis and Countermeasure Flow Chart

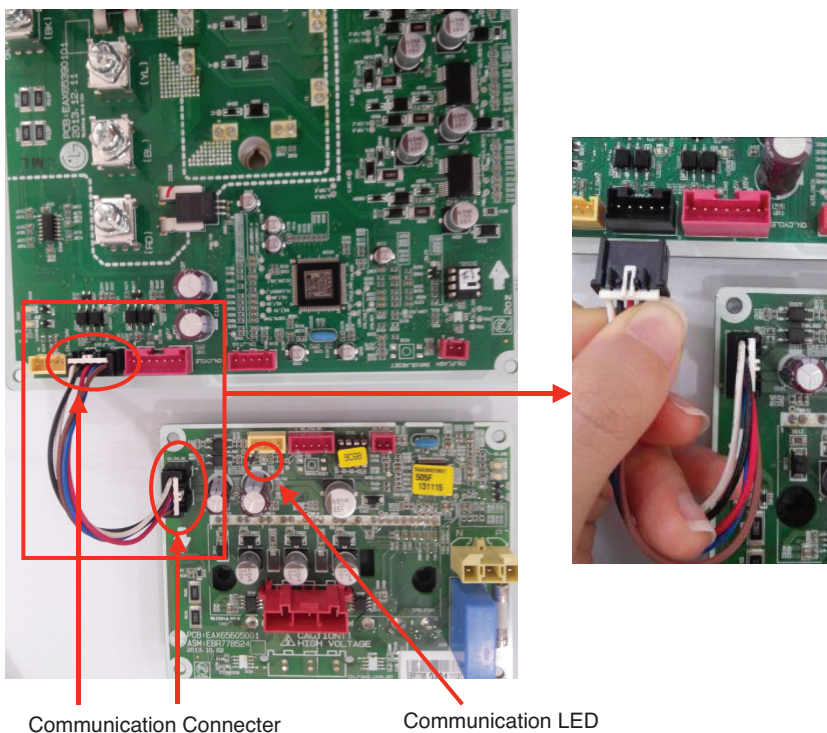


Error No.	Error Type	Error Point	Main Reasons
105* Master 1051 Slave1 1052 Slave2 1053 Slave3 1054	Communication error (Fan PCB ↔ Inverter PCB)	Fan controller didn't receive signal from Inverter PCB	1. Wrong connection between Inverter and Fan PCB 2. Fan PCB power not supplied 3. ODU Inverter/Fan PCB defect

■ Error Diagnosis and Countermeasure Flow Chart

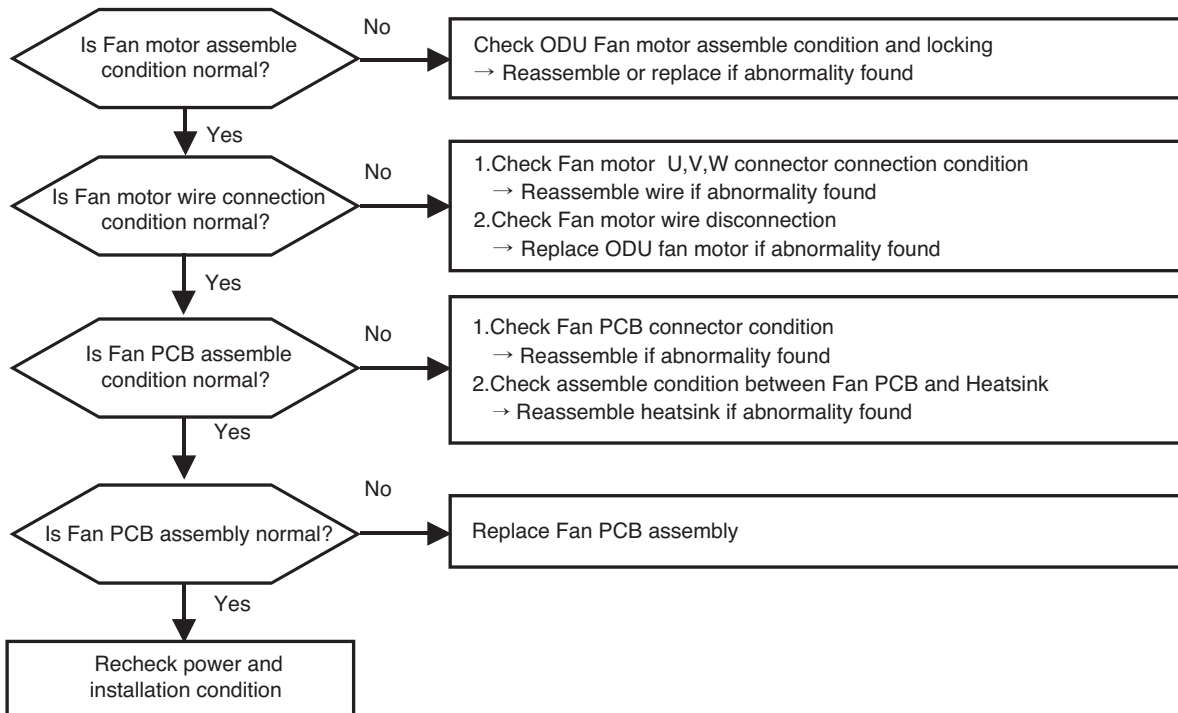


Comp ↔ Fan Communication Connection



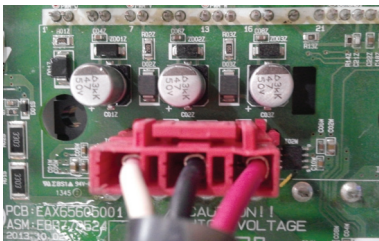
Error No.	Error Type	Error Point	Main Reasons
106 * Master 1061 Slave2 1062 Slave3 1064	ODU Fan PCB IPM Fault	IPM protection circuit activation (over current)	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. ODU fan motor assemble condition abnormal (Coil disconnection/Short/Insulation damage) 3. Fan PCB assembly defect

■ Error Diagnosis and Countermeasure Flow Chart



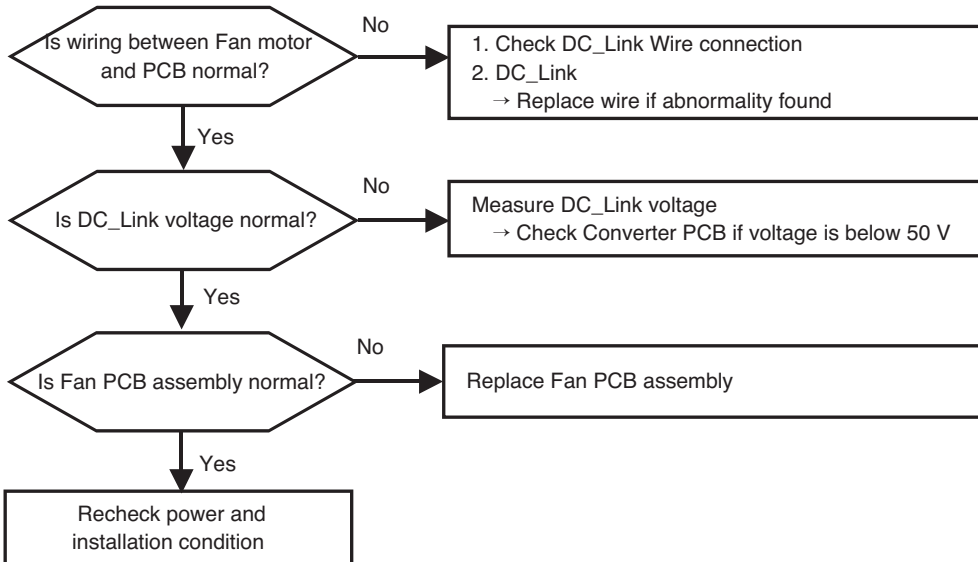
Fan Motor Wire connection

* Fan PCB

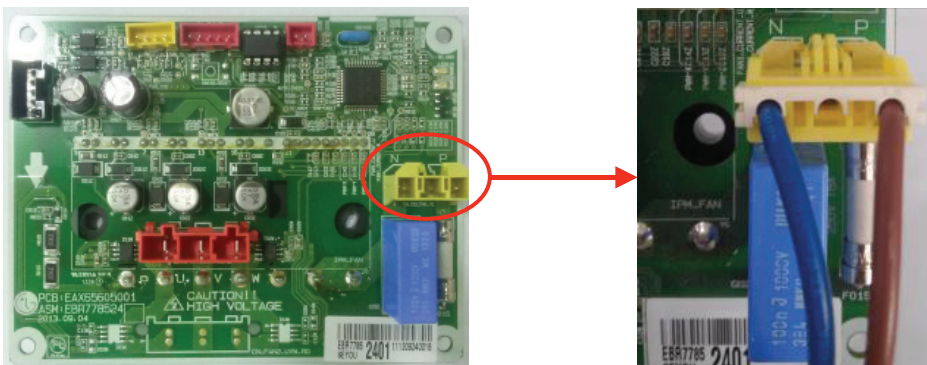


Error No.	Error Type	Error Point	Main Reasons
107 * Master 1071 Slave2 1072 Slave3 1074	Fan DC Link Low Voltage Error	Fan PCB DC link voltage supplied below 50 V	<ol style="list-style-type: none"> 1. Wrong wiring between Inverter PCB and Fan PCB 2. Fan PCB assembly defect 3. DC link terminal wiring/contact defect 4. Bridge diode defect

■ Error Diagnosis and Countermeasure Flow Chart



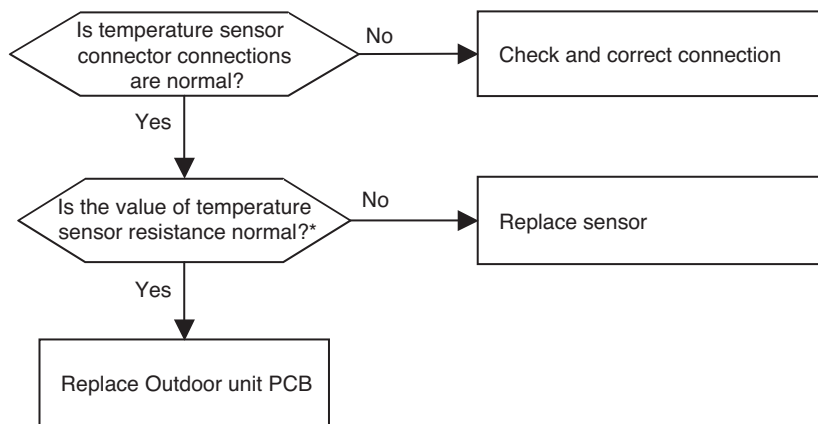
DC voltage connection



DC Volt connected

Error No.	Error Type	Error Point	Main Reasons
113* Master 1131 Slave1 1132 Slave2 1133 Slave3 1134	Outdoor unit liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective Outdoor unit PCB
114* Master 1141 Slave1 1142 Slave2 1143 Slave3 1144	Outdoor Unit Subcooling Inlet Temperature Sensor Error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open/Short) 3. Defective Outdoor PCB
115* Master 1151 Slave1 1152 Slave2 1153 Slave3 1154	Outdoor Unit Subcooling Outlet Temperature Sensor Error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open/Short) 3. Defective Outdoor PCB

■ Error diagnosis and countermeasure flow chart



* Sensor resistance 100 kΩ over (open) or 100 Ω below (short) will generate error

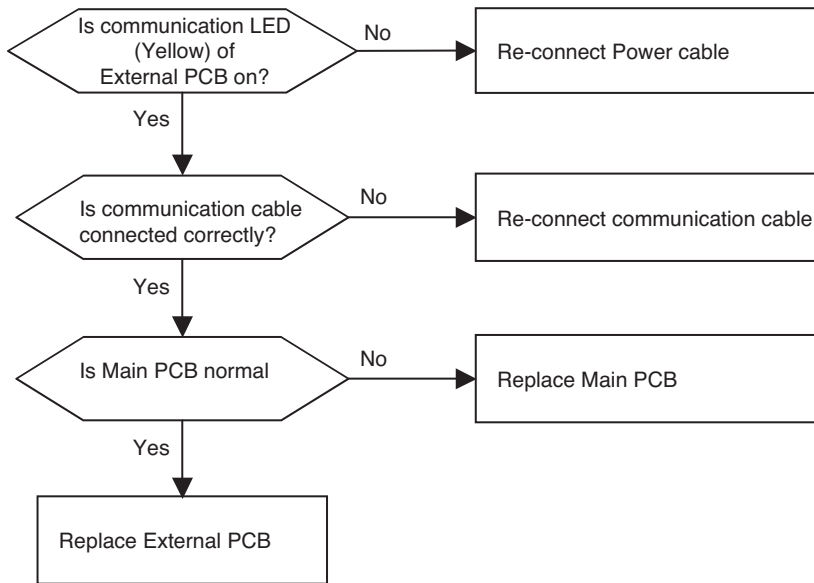
Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table (±5% tolerance)

Air temperature sensor: 10 °C = 20.7 kΩ : 25 °C = 10 kΩ : 50 °C= 3.4 kΩ

Pipe temperature sensor: 10 °C = 10 kΩ : 25 °C = 5 kΩ : 50 °C = 1.8 kΩ

Error No.	Error Type	Error Point	Main Reasons
145* Master 1451 Slave1 1452 Slave2 1453 Slave3 1454	Communication Error between (Main PCB → External PCB)	Cycle controller of Master unit can't receive signal from External controller	1. Power cable or communication cable is not connected 2. Defect of outdoor Cycle/External PCB

■ Error diagnosis and countermeasure flow chart

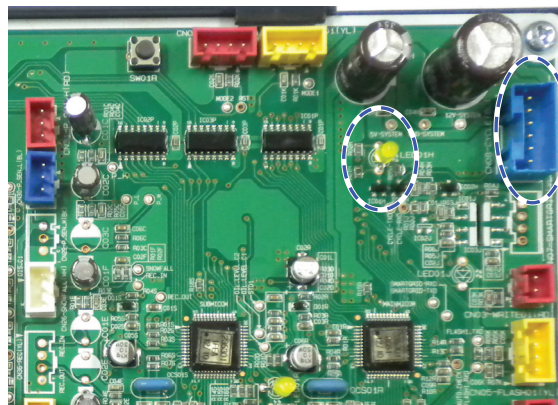


* The Method of checking Main PCB and External PCB (If normal, communication LED blinks)



External Communication Connector

Communication Connector & LED in Main PCB

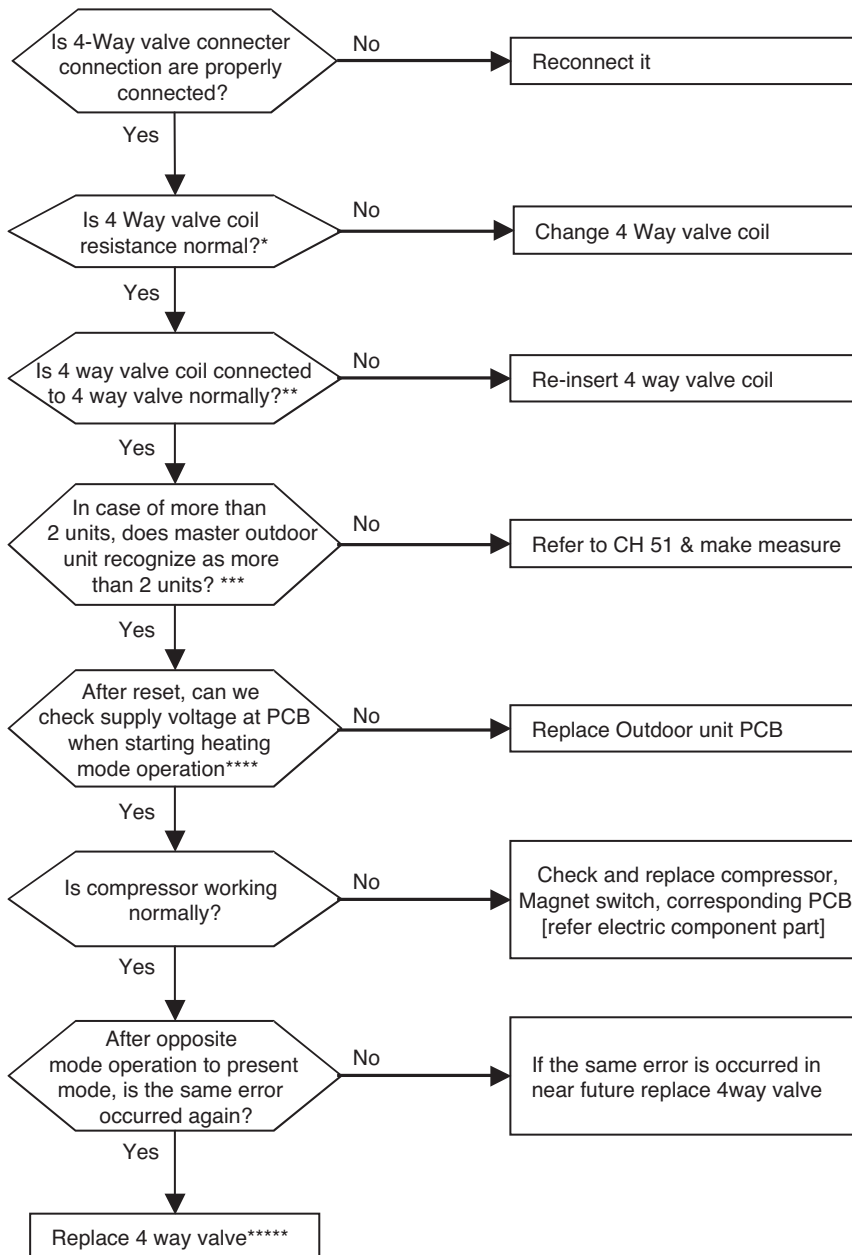


Communication Connector & LED in External PCB

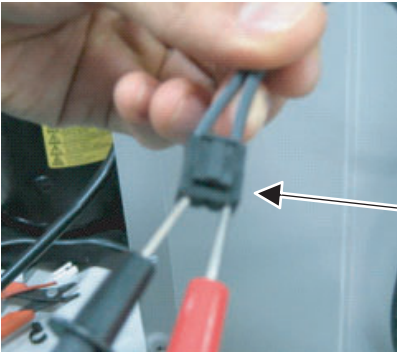
Troubleshooting Guide

Error No.	Error Type	Error Point	Main Reasons
151* Master 1511	Function error of outdoor 4way (reversing valve)	Function error of 4way (reversing valve) in Main or Slave Outdoor units	<ol style="list-style-type: none"> 1. Wrong operation of 4way valve because of sludge etc. inflow 2. No pressure difference because of compressor fault 3. Wrong installation of In/Outdoor common pipe 4. Defect of 4way valve

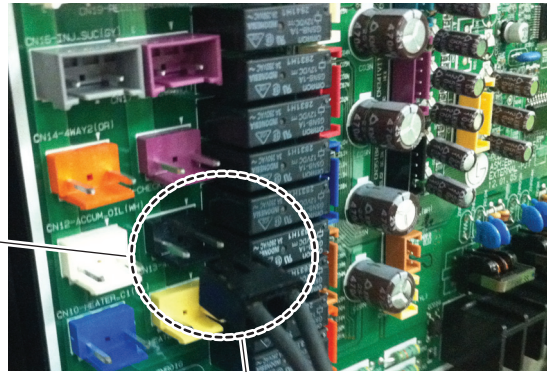
■ Error diagnosis and countermeasure flow chart



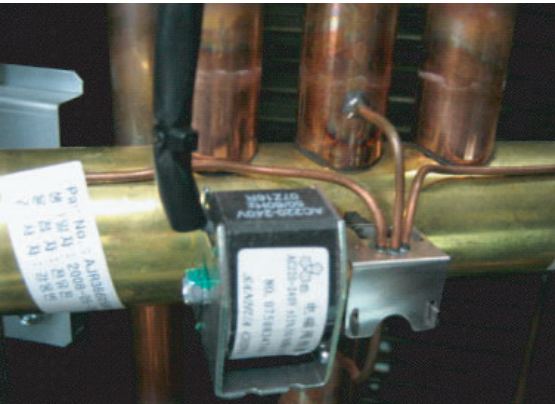
* Measure the resistance of 4way valve



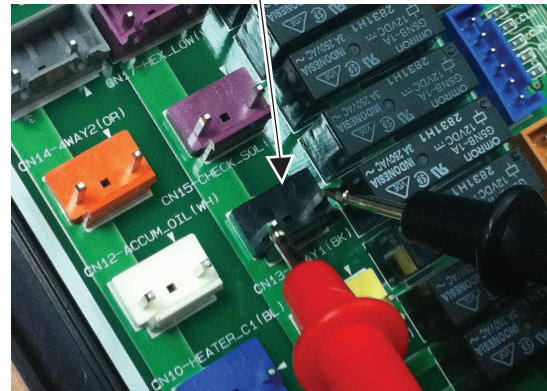
Location of 4way valve connector on Main PCB (marked as 4way, CN13)



** Confirm the 4way valve coil is inserted to the end



**** Check the output voltage of terminal socket during heating operation



*** When power is supplied in order as follow

(Slave2 → Slave1 → Mater)

ODU information is displayed one after the other at main PCB 7-segment

1. Model ID

→ 8 HP : 8, 10 HP : 10, 12 HP : 12, 14 HP : 14, 16 HP : 16, 18 HP : 18, 20 HP : 20

2. Total Capacity

→ Displayed with HP

3. ODU Type

→ Cooling only :1

→ Heat pump :2

4. Power type

→ 380V : 38

5. Model type

→ LTE4 : 1

→ LTS4 : 2

→ LLS4/LLN4 : 9

***** Checking method for Outdoor unit of 3unit system

(Master + Slave1 + Slave2)

① Close all the SVC valves of high / low pressure

② Operate system

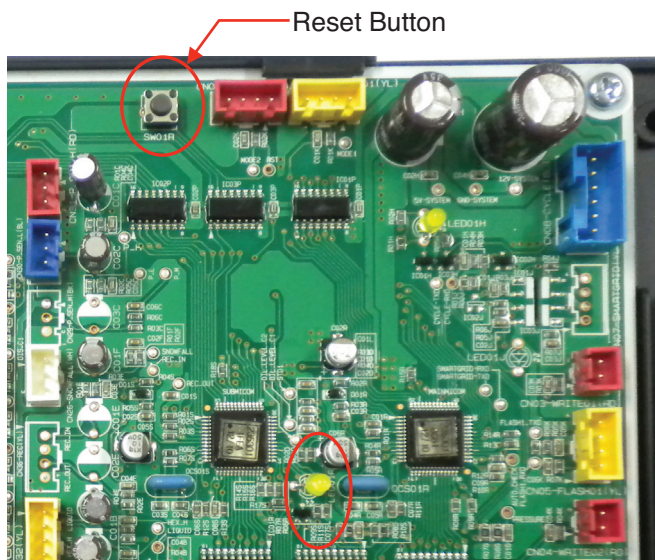
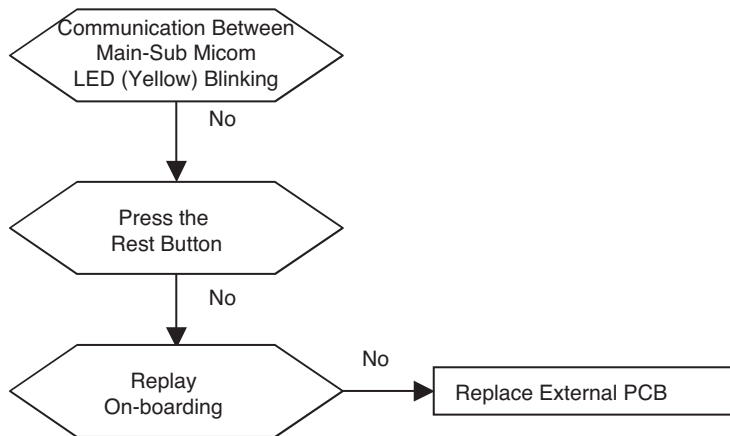
③ Check the difference of high and low pressure with LGMV for each unit (Master, Slave1, Slave2)

④ If there is a unit in which the difference is not increased then the 4way valve of that unit is defective

Troubleshooting Guide

Error No.	Error Type	Error Point	Main Reasons
182* Master 1821 Slave1 1822 Slave2 1823 Slave3 1824	Communication Error Between Main and Sub Micom of External PCB	Failure Receiving Signal Between Main and Sub Micom	1. Failure Receiving Signal Between Main and Sub Micom

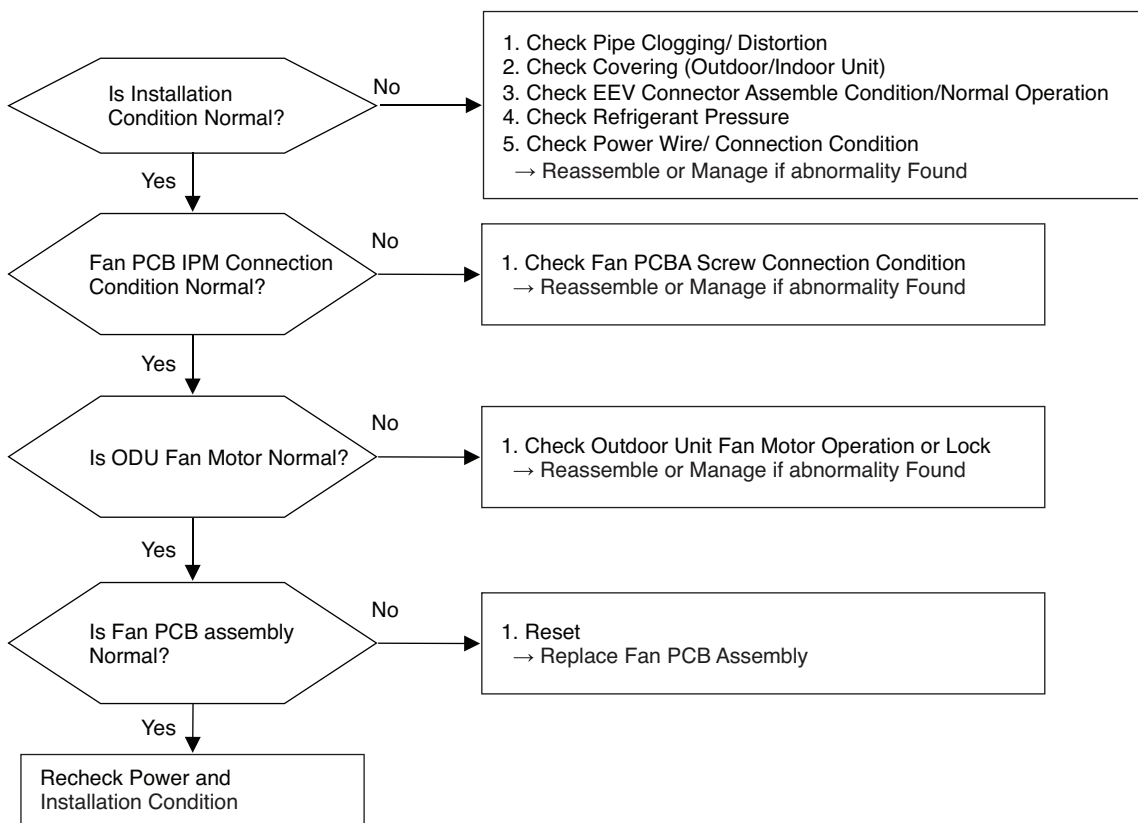
■ Error diagnosis and countermeasure flow chart



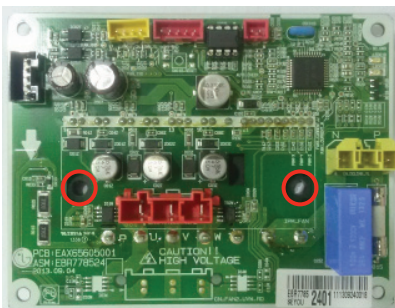
Reset Button
Communication LED
Between Main and Sub Micom

Error No.	Error Type	Error Point	Main Reasons
193* Master 1931 Slave1 1932 Slave2 1933 Slave3 1934	Fan PCB Heatsink Temperature High	Heatsink Temperature is Over 95 °C	<ol style="list-style-type: none"> 1. Fan PCBA IPM Connection Condition Abnormal 2. Outdoor Unit Fan Motor Operation Abnormal 3. Outdoor Unit Fan PCB Assembly Defect 4. Overload Operation (Pipe Clogging/ Covering/EEV Defect/Ref. Overcharge)

■ Error diagnosis and countermeasure flow chart



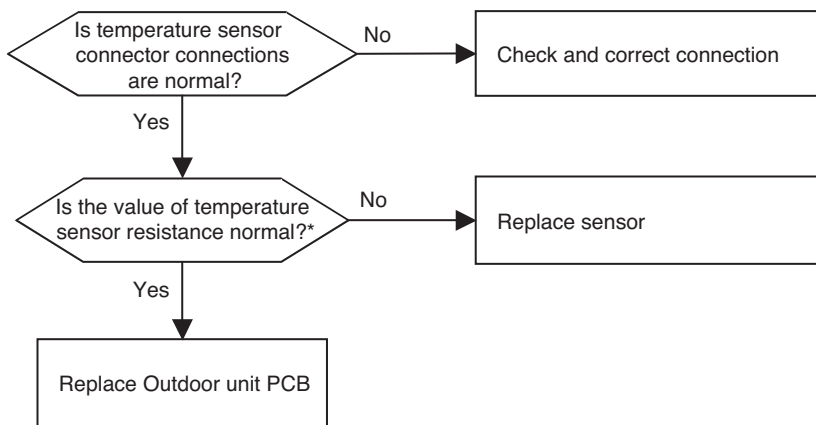
■ Check Fan PCB Screw Connection Condition



Check Screw Connection Condition

Error No.	Error Type	Error Point	Main Reasons
194* Master 1941 Slave1 1942 Slave2 1943 Slave3 1944	Outdoor unit Fan PCB heatsink temperature sensor error	Outdoor unit Fan PCB heatsink temperature sensor error	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective Outdoor unit PCB

■ Error diagnosis and countermeasure flow chart



* Sensor resistance 100 kΩ over (open) or 100 Ω below (short) will generate error

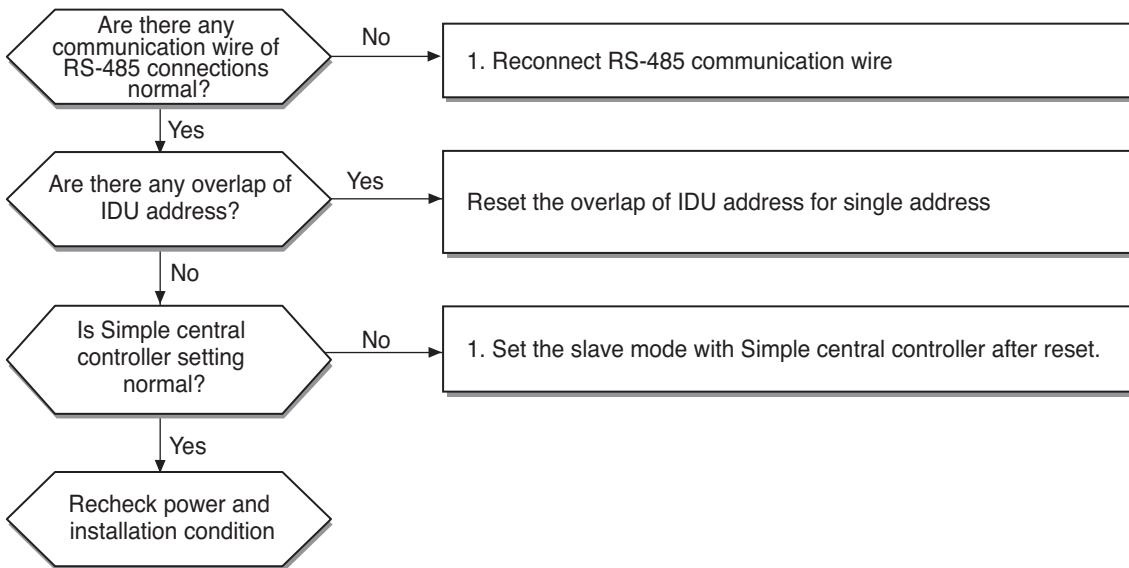
Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table (± 5 % tolerance)

Air temperature sensor: 10 °C = 20.7 kΩ : 25 °C = 10 kΩ : 50 °C = 3.4 kΩ

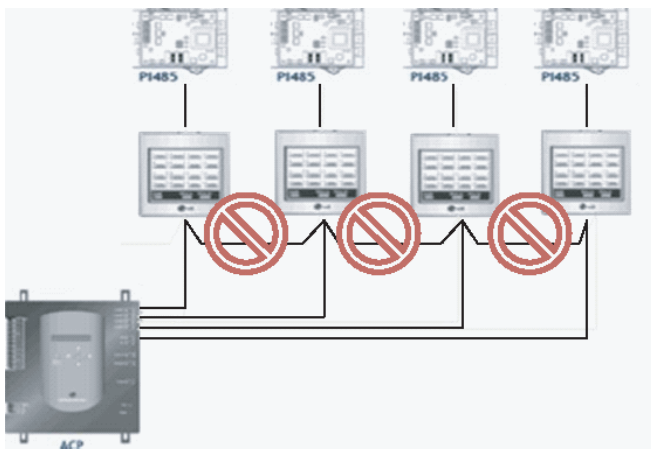
Pipe temperature sensor: 10 °C = 10 kΩ : 25 °C = 5 kΩ : 50 °C = 1.8 kΩ

Error No.	Error Type	Error Point	Main Reasons
242* Master 2421	Network Error	Network error of central controller	<ol style="list-style-type: none"> 1. RS-485 communication wiring defect 2. Communication defect between remote controller and indoor unit 3. RS-485 dip switch setting error 4. Indoor unit addressing ssetting error on central controller

■ Error diagnosis and countermeasure flow chart



<RS-485 communication wire miss connection>





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