CONFIDENTIAL

MULTI V™

Outdoor Unit R410A

SERVICE MANUAL

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.

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 ground the product.

- There is risk of fire or electric shock.

Always intstall a dedicated circuit and breaker.

- Improper wiring or installation may cause 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.

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.

Use the correctly rated breaker or fuse.

• There is risk of fire or electric shock.

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.

Do not install the product on a defective installation stand.

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

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.

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.

Ventilate before operating air conditioner when gas leaked out.

• It may cause explosion, fire, and burn.

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.

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, harzards due to lack of oxygen in the
room could 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.

Use a dedicated outlet for this appliance.

- There is risk of fire or electrical shock.

Be cautious that water could not enter the product.

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

Do not touch the power switch with wet hands.

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

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

- There is risk of fire or electric shock.

Be cautious not to touch the sharp edges when installing.

- It may cause injury.

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

- This could result in personal injury and product damage.

Do not open the inlet grille of the product during operation. (Do not touch the electro-static 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.

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.

Keep level even when installing the product.

- To avoid vibration or water leakage.

Do not install the unit where combustible gas may leak.

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

Use power cables of sufficient current carrying capacity and rating.

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

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.

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.

When installting 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 outdoour 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

1. Model Names

1.1 Indoor Unit

Category		Chassis Name	Capacity[Btu/h(kW)]														
			5.5 (1.6)	7.2 (2.2)	9.6 (2.8)	12.3 (3.6)	15.4 (4.5)	19.1 (5.6)	24.2 (7.1)	28.0 (8.2)	30.0 (8.8)	36.2 (10.6)	42.0 (12.3)	48.1 (14.1)	54.0 (15.8)	76.4 (22.4)	96.5 (28.0)
Wall Mounted		SJ	ARNU053SJ*4	ARNU073SJ*4	ARNU093SJ*4	ARNU123SJ*4	ARNU153SJ*4										
		SK						ARNU183SK*4	ARNU243SK*4								
		SV									ARNU303SVA4	ARNU363SVA4					
ART COOL		SF			ARNU093SFA4	ARNU123SFA4											
Ceiling Cassette	1 Way	TU		ARNU073TUC4	ARNU093TUC4	ARNU123TUC4											
		TT						ARNU183TTC4	ARNU243TTC4								
	2 Way	TL						ARNU183TLC4	ARNU243TLC4								
	4 Way	TR	ARNU053TRC4	ARNU073TRC4	ARNU093TRC4	ARNU123TRC4											
		TQ					ARNU153TQC4	ARNU183TQC4									
		TP							ARNU243TPC4	ARNU283TPC4							
		TN		ARNU073TNA4	ARNU093TNA4	ARNU123TNA4	ARNU153TNA4	ARNU183TNA4	ARNU243TNA4			ARNU363TNA4					
		TM							ARNU243TMA4	ARNU283TMA4		ARNU363TMA4	ARNU423TMA4	ARNU483TMA4			
Ceiling Concealed Duct	High Static	BH		ARNU073BHA4	ARNU093BHA4	ARNU123BHA4	ARNU153BHA4	ARNU183BHA4	ARNU243BHA4								
		BG		ARNU073BGA4	ARNU093BGA4	ARNU123BGA4	ARNU153BGA4	ARNU183BGA4	ARNU243BGA4	ARNU283BGA4		ARNU363BGA4	ARNU423BGA4				
		BR								ARNU283BRA4		ARNU363BRA4	ARNU423BRA4	ARNU483BR*4	ARNU543BRA4		
		B8										ARNU363B8A4	ARNU423B8A4	ARNU483B8A4		ARNU763B8*4	ARNU963B8*4
	Low Static	L1		ARNU073L1G4	ARNU093L1G4												
		L2				ARNU123L2G4	ARNU153L2G4	ARNU183L2G4									
		L3							ARNU243L3G4								
	Middle Static	M2		ARNU073M2A4	ARNU093M2A4	ARNU123M2A4	ARNU153M2A4	ARNU183M2A4	ARNU243M2A4	ARNU283M2A4		ARNU363M2A4	ARNU423M2A4				
		M3								ARNU283M3A4		ARNU363M3A4	ARNU423M3A4	ARNU483M3A4	ARNU543M3A4		
	Built In	B3		ARNU073B3G4	ARNU093B3G4	ARNU123B3G4	ARNU153B3G4										
		B4						ARNU183B4G4	ARNU243B4G4								
Ceiling & Floor		VE			ARNU093VEA2	ARNU123VEA2											
Ceiling Suspended		VJ						ARNU183VJA2	ARNU243VJA2								
Floor Standing	With Case	CE		ARNU073CEA4	ARNU093CEA4	ARNU123CEA4	ARNU153CEA4										
		CF						ARNU183CFA4	ARNU243CFA4								
	Without Case	CE		ARNU073CEU4	ARNU093CEU4	ARNU123CEU4	ARNU153CEU4										
		CF						ARNU183CFU4	ARNU243CFU4								
Vertical AHU		NJ				ARNU123NJA4		ARNU183NJA4	ARNU243NJA4		ARNU303NJA4	ARNU363NJA4					
		NK											ARNU423NKA4	ARNU483NKA4	ARNU543NKA4		

❉ *Wall Mounted - L : Basic, R : Mirror
*Ceiling Cassette - A : Basic, C : Plasma
*Ceiling Concealed Duct - A : Basic, Z : FAU

1.2 Outdoor Unit

Power Supply	8 HP (6 Ton)	10 HP (8 Ton)	12 HP (10 Ton)	14 HP (12 Ton)	20 HP (16 Ton)
3 Ph, 575 V, 60 Hz	072CAS5	096CAS5	121CAS5	144CAS5	192CAS5

Power Supply	24 HP (20 Ton)	28 HP (24 Ton)	34 HP (28 Ton)	43 HP (36 Ton)	46 HP (16 Ton)	54 HP (48 Ton)
3 Ph, 575 V, 60 Hz	240CAS5	288CAS5	336CAS5	432CAS5	480CAS5	576CAS6

Heat Pump	ARWM
Heat Recovery	

1.3 HR Unit

Power Supply	2 branches	3 branches	4 branches
1 Ph, 208/230 V, 60 Hz	PRHR022A	PRHR032A	PRHR042A

Power Supply	2 branches	3 branches	4 branches
1 Ph, 220-240 V, 50 Hz / 1 Ph, 220 V, 60 Hz	PRHR023	PRHR033	PRHR043
1 Ph, 208/230 V, 60 Hz	PRHR023A	PRHR033A	PRHR043A

Power Supply	6 branches	8 branches
1 Ph, 220-240 V, 50 Hz / 1 Ph, 220 V, 60 Hz	PRHR063	PRHR083
1 Ph, 208/230 V, 60 Hz	PRHR063A	PRHR083A

2. External Appearance

2.1 Indoor Unit

Ceiling Cassette- 1Way

ARNU073TUC4
ARNU093TUC4
ARNU123TUC4
ARNU183TTC4
ARNU243TTC4

Ceiling Cassette- 4Way

ARNU053TRC4
ARNU073TRC4
ARNU093TRC4
ARNU123TRC4
ARNU153TQC4
ARNU183TQC4
ARNU073TNA4
ARNU093TNA4
ARNU123TNA4
ARNU153TNA4
ARNU183TNA4
ARNU243TNA4
ARNU363TNC4
ARNU243TPC4
ARNU283TPC4
ARNU243TMA4
ARNU283TMA4
ARNU363TMA4
ARNU423TMC4
ARNU483TMC4

* A:Basic, C:Plasma

Ceiling Concealed Duct - Low Static

ARNU073L1G4
ARNU093L1G4
ARNU123L2G4
ARNU153L2G4
ARNU183L2G4
ARNU243L3G4

Ceiling Concealed Duct – Built-in

ARNU073B3G4
ARNU093B3G4
ARNU123B3G4
ARNU153B3G4
ARNU183B4G4
ARNU243B4G4

Ceiling Concealed Duct – Middle Static

ARNU073M2A4
ARNU093M2A4
ARNU123M2A4
ARNU153M2A4
ARNU183M2A4
ARNU243M2A4
ARNU283M2A4
ARNU363M2A4
ARNU423M2A4
ARNU283M3A4
ARNU363M3A4
ARNU423M3A4
ARNU483M3A4
ARNU543M3A4

Ceiling & Floor

ARNU093VEA2
ARNU123VEA2

Ceiling Suspended

URNU183VJA2
URNU243VJA2

Ceiling Cassette -2Way

ARNU183TLC4
ARNU243TLC4

Ceiling Concealed Duct - High Static

ARNU363B8A4
ARNU423B8A4
ARNU483B8A4
ARNU763B8*4
ARNU963B8*4

* A : Basic, Z : FAU

Wall Mounted

ARNU053SJ*4
ARNU073SJ*4
ARNU093SJ*4
ARNU123SJ*4
ARNU153SJ*4
ARNU183SK*4
ARNU243SK*4
ARNU303SVA4
ARNU363SVA4

* L : Basic, R : Mirror

ART COOL

ARNU093SFA4
ARNU123SFA4

Floor Standing

With case

ARNU073CEA4
ARNU093CEA4
ARNU123CEA4
ARNU153CEA4
ARNU183CFA4
ARNU243CFA4

Without case

ARNU073CEU4
ARNU093CEU4
ARNU123CEU4
ARNU153CEU4
ARNU183CFU4
ARNU243CFU4

Vertical AHU

ARNU123NJA4
ARNU183NJA4
ARNU243NJA4
ARNU303NJA4
ARNU363NJA4
ARNU423NKA4
ARNU483NKA4
ARNU543NKA4

2.2 Outdoor unit

2.2.1 Heat Recovery & Heat Pump

Chassis	Model Name	Model
UWB	ARWM072CAS5 ARWM096CAS5 ARWM121CAS5 ARWM144CAS5 ARWM192CAS5	
UWB UWB	ARWM240CAS5 ARWM288CAS5 ARWM336CAS5	
UWB UWB UWB	ARWM432CAS5 ARWM480CAS5 ARWM576CAS5	

3. Combination of Outdoor Units

3.1 Heat Recovery & Heat Pump

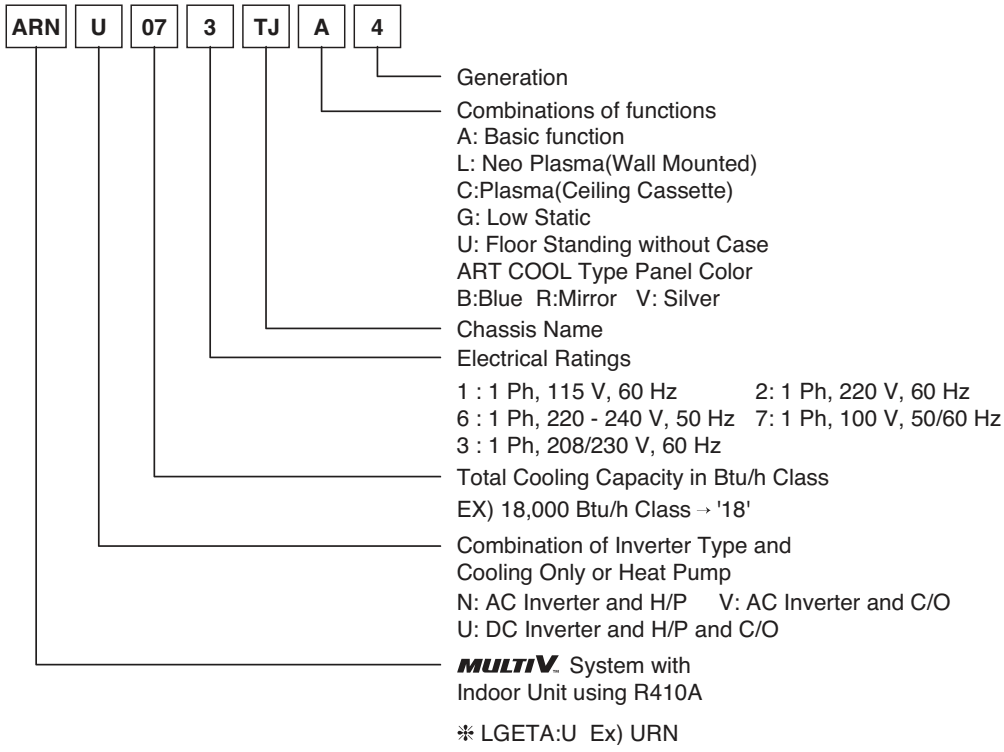
Model Name	HP	Ton	Number of Units	Module (Ton)				
				6	8	10	12	16
ARWM072CAS5	8	6	1	1				
ARWM096CAS5	10	8	1		1			
ARWM121CAS5	12	10	1			1		
ARWM144CAS5	14	12	1				1	
ARWM192CAS5	20	16	1					1
ARWM240CAS5	24	20	2			2		
ARWM288CAS5	28	24	2		1		1	
ARWM336CAS5	34	28	2				1	1
ARWM432CAS5	43	36	3				3	
ARWM480CAS5	46	40	3				2	1
ARWM576CAS5	54	48	3					3

• The biggest module should be master module and others are slaves.

• Setting method of master/slave and position of master in the system is explained in the installation chapter.

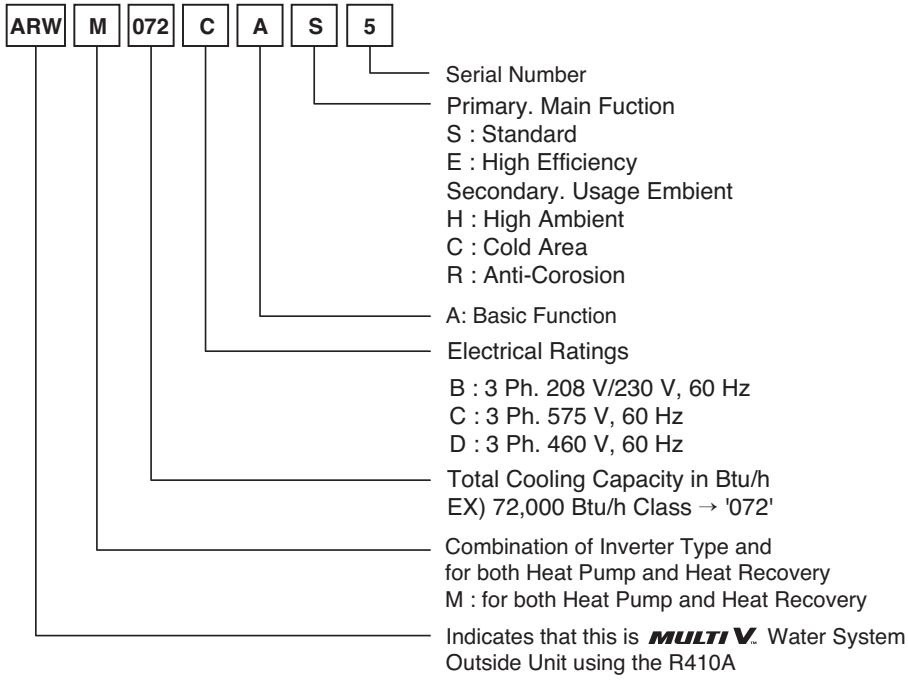
4. Nomenclature

4.1 Indoor Unit

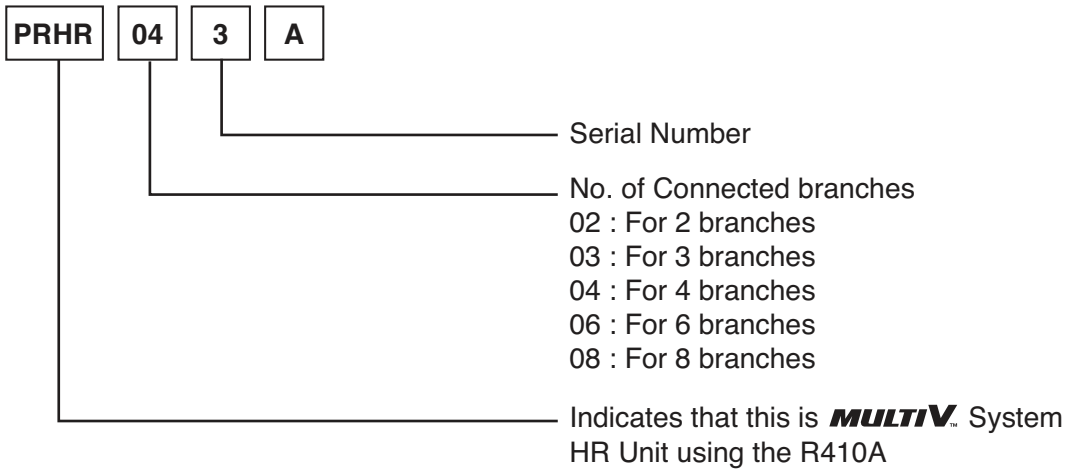


※ Heat recovery ventilator refer to the DX-Coil manual

4.2 Outdoor unit



4.3 HR Unit



※ These are model names of the basic function.

Part 2
Outdoor units

Function

1. Basic control

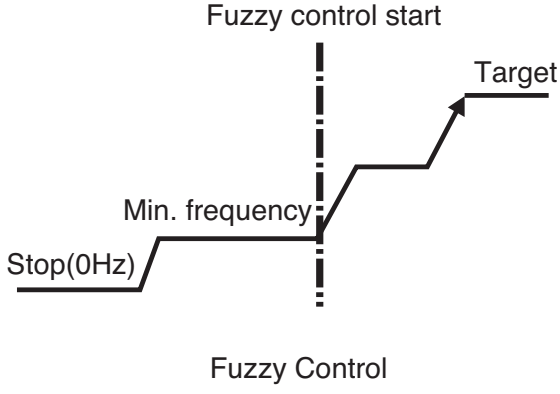
1.1 Normal operation

Actuator	Cooling operation	Heating operation	Stop state
Compressor	Fuzzy control	Fuzzy control	stop
Main EEV	Full open	Fuzzy control	Min. pulse
Subcooling EEV	Fuzzy control	• Avoiding control of high discharge temperature • Fuzzy control	Min. pulse
Indoor Unit EEV	Superheat fuzzy control	Subcooling fuzzy control	Min. pulse

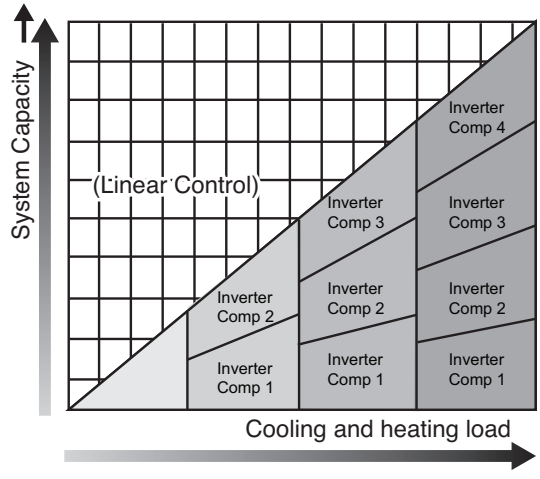
1.2 Compressor control

Fuzzy control : Maintain evaporating temperature(Te) to be constant on cooling mode and condensing temperature(Tc) on heating mode by Fuzzy control to ensure the stable system performance.
[TC:47~51°C(116.6~123.8°F), Te:2~5°C(35.6~41°F)]
(1) Cooling mode
Te can be set various step at installation mode.
(2) Heating mode
Tc can be set various step at installation mode.

Note: By setting dip switch, Te and Tc are decided simultaneously.



Fuzzy Control



Inverter linear control as cooling and heating load increasing

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 or 6°F)at the evaporator outlet stable during heating mode
The degree of Superheat = Tsuction - Tevaporation
Tsuction : temperature at suction pipe sensor(°C,°F)
Tevaporation : evaporation temperature equivalent to low pressure(°C,°F)

(2) Subcooling EEV control(about 15°C or 30°F)
Subcooling EEV works with fuzzy rules to keep the degree of Subcool at the outlet of subcooler during cooling mode
The degree of Subcool = Tcondensation - Tliquid
Tliquid : temperature at outlet of subcooler(°C,°F)
Tcondensation : condensation temperature equivalent to high pressure(°C,°F)

(3) Avoiding excessive high discharge temperature : when main EEV opens some given opening (R410A : 800 pls) and discharge temperature is above 85°C(185°F) 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
Inv Compressor	30 Hz	Setting Value	30 Hz
Main EEV	Max. pulse	Max. pulse	Normal control
Subcooling EEV	Min. pulse	20 pulse	80 pulse
4way valve 1	OFF	OFF	OFF
4way valve 2	Heat Recovery : OFF Heat pump : ON	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	80 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

2.1.2 Oil return control on heating mode

Outdoor unit

Component	Starting	Running	Ending
Inv Compressor	30 Hz	Setting Value	40 Hz
Main EEV	Max. pulse	Max. pulse	Normal control
Subcooling EEV	Min. pulse	20 pulse	80 pulse
4way valve 1	ON	OFF	OFF
4way valve 2	Heat Recovery : OFF Heat pump : OFF	OFF	OFF

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 Stopping operation

2.2.1 Stopping operation on cooling mode

Component	Operation	Note
Inv Compressor	OFF	-
Main EEV	32 pulse	-
Subcooling EEV	16 pulse	Stop(Min. pulse)
4way valve 1	OFF	-
4way valve 2	Heat Recovery : OFF	-
	Heat Pump : ON	-

2.2.2 Stopping operation on heating mode

Component	Operation	Note
Inv Compressor	OFF	-
Main EEV	32 pulse	-
Subcooling EEV	16 pulse	Stop(Min. pulse)
4way valve 1	ON	OFF over 30°C(86°F) air temperature
4way valve 2	OFF	-

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(580.2 psi)	Stop
$P_d > 3775$ kPa(547.5 psi)	-15Hz/10Second
$P_d \geq 3650$ kPa(529.4 psi)	Frequency holding
$P_d \geq 3480$ kPa(504.7 psi)	+2 Hz or less/10Second
$P_d < 3480$ kPa(504.7 psi)	Normal control

• Low pressure control

Pressure Range	Compressor
$P_s \leq 110$ kPa(16 psi) 1 minute later operation	Stop
$P_s \leq 150$ kPa(21.8 psi) 1 minute before operation	-10Hz/10Second

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

3.1.2 Pressure control on heating mode

• High pressure control

Pressure Range	Compressor
$P_d \geq 4000$ kPa(580.2 psi)	Stop
$P_d > 3415$ kPa(495.3 psi)	-15Hz/10Second

• Low pressure control

Pressure Range	Compressor
739 kPa(107.2 psi) $< P_s \leq$ 778 kPa(112.8 psi)	Frequency holding
$P_s \leq 739$ kPa(107.2 psi)	-5Hz/7sec.

❉ 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
Tdis > 113 °C(235.4 °F)	-5 Hz/10 Second	SC,SH decrease control	SH decrease control
Tdis > 110 °C(230 °F)	-5 Hz/30 Second	SC,SH decrease control	SH decrease control
Tdis ≥ 105 °C(221 °F)	Frequency holding	SC,SH decrease control	SH decrease control
Tdis ≥ 100 °C(212 °F)	+3 Hz or less	SC,SH decrease control	SH decrease control
Tdis < 100 °C(212 °F)	Normal control	SC,SH decrease control	SH decrease control

SC : Sub Cooling, SH : Super Heating

3.3 Inverter protection control

	Compressor(kW)	Cooling & Heating		
		Normal Operation	Frequency Down	System Stop
AC Input Current	17	25 A or less	25 A or more	27 A or more
Compressor Current	17	29 A or less	29 A or more	40 A or more

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

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 24Second
   All dip switches must be set properly before step 1.

Power is on	
Master model code is displayed (3sec)	
Slave1 model code is displayed (3sec)	
Slave2 model code is displayed (3sec)	
Total capacity including sub units is displayed (2sec)	
Display 3 is default value	
Power type	
Model type	

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 seconds, error check begins.

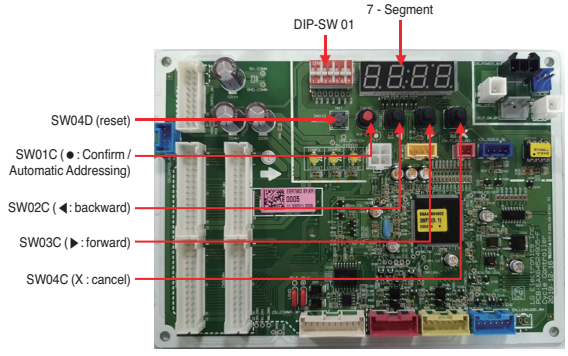
■ Master/ Slave unit
- All errors of units including Slave units are displayed in 7 segment.
- If communication between main PCB and inverter PCB isn't normal, 52* is displayed in 7-segment
  If communication between main PCB and fan PCB isn't normal, 105* is displayed in 7-segment.
  If error is displayed, 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 seconds.
- 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 seconds. The address of each indoor unit is displayed on each wired remote controller.

Push address(red) button for 3 seconds.
↓
Auto address starts
↓
Auto address is in progress (max. 15 minutes.)
↓
The number of indoor units is displayed for 30 seconds.
↓
Auto address process is finished.
Every indoor unit displays its address on wired remote controller and the 7 segment of main PCB is off.

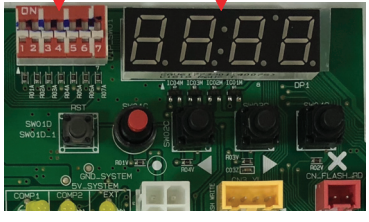
(35 indoor units found)

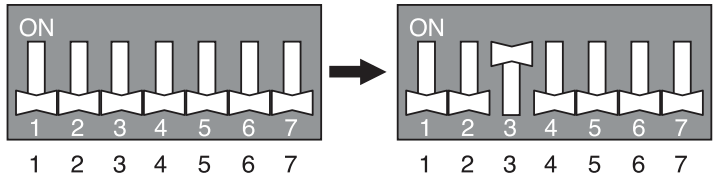
■ **Main PCB**



Communication speed setting
- Set the dip switch 3 to “On” if all the indoor units are “ARN*******4”.
- Set the dip switch 3 to “Off” if not all the indoor units are “ARN*******4”.
- When changing Dip switch, all power should be off and auto addressing must be executed.

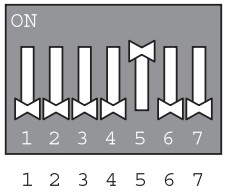
DIP Switch 7 segment

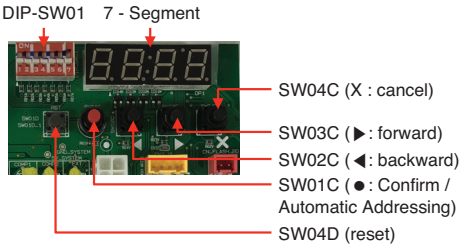




■ Setting the function

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





MODE		FUNCTION		OPTION			VALUE		ACTION		Remark
Content	Display1	Content	Display2	Content		Display3	Content	Display4	Implement	Display5	
Installation	Func	Cool & Heat Selector	Fn 1	oFF	op1~ op2	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Outdoor unit address	Fn5	-	-	-	0~254	Set the value	Change the set value	Blank	Saving in EEPROM
		Airflow Adjusting for IDU (Heating capacity up)	Fn7	on	oFF	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Target pressure Adjusting	Fn8	oFF	op1~ op6	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Compressor Max. Frequency Limit	Fn 12	oFF	op1~ op9	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Central Control Connection at Indoor Unit side	Fn 19	on	oFF	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Compressor Input Current Limit mode	Fn20	oFF	op1~ op10	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Geometrical mode setting	Fn40	on	oFF	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Sol. Valve 200 V output	Fn41	on	oFF	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM
		Variable water flow control	Fn48	on	oFF	Selected the option	-	-	Change the set value	Blank	Saving in EEPROM

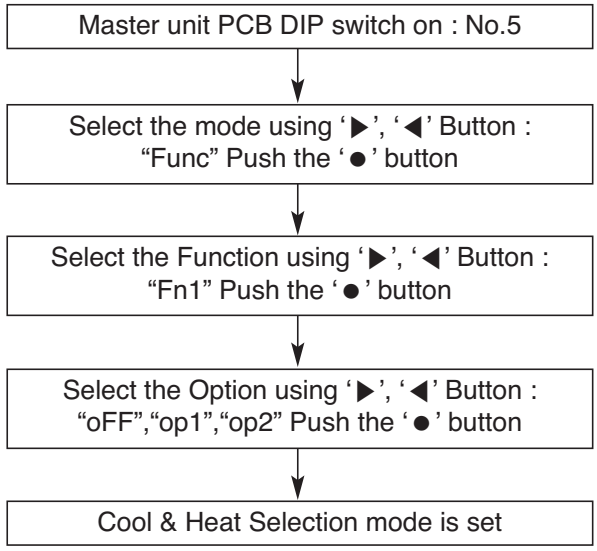
* Functions save in EEPROM will be kept continuously, though the system power was reset.

MODE		FUNCTION		OPTION		VALUE		ACTION		Remark
Content	Display1	Content	Display2	Content	Display3	Content	Display4	Implement	Display5	
SVC	SVC	Pump out	SE2	-	-	-	-	Start operation	Po	-
		Vaccum mode	SE3	-	-	-	-	Start operation	vAcc	-
		Back up	SE4	oFF	ON	-	-	Change the set value	on oFF	save in EEPROM
		Forced oil return	SE5	-	-	-	-	Start operation	o i	-
		Cycle data view	SE8	-	op1~op26	-	-	Show in segment	Show the each numerical value in process	-
		Refrigerant noise Reduction mode	SE9	oFF	op1~op2	-	-	Change the set value	on oFF	save in EEPROM

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

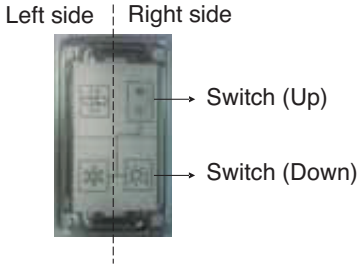
4.2 Cool & Heat selector

Mode setting method



Function setting

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

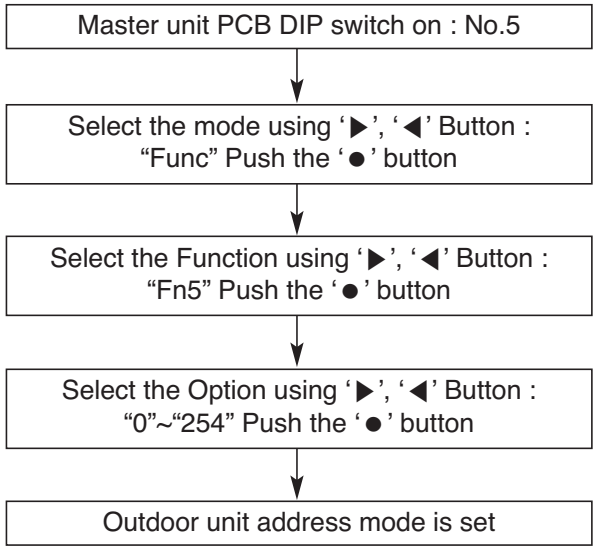


CAUTION

- 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.

4.3 Outdoor unit address

Mode setting method

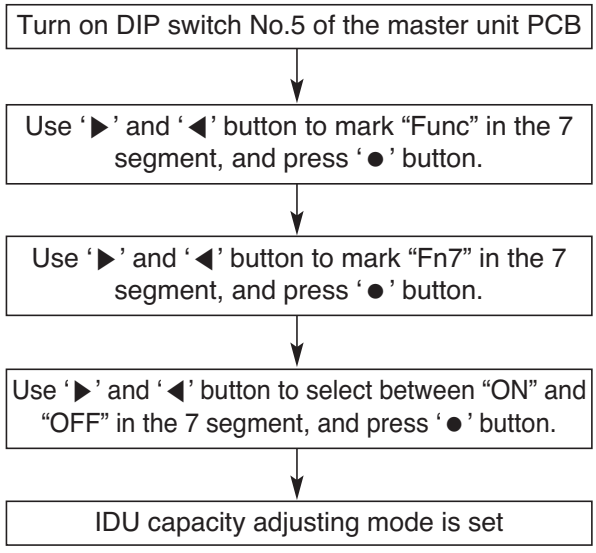


CAUTION

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

4.4 IDU capacity adjusting

Mode setting method



Mode setting

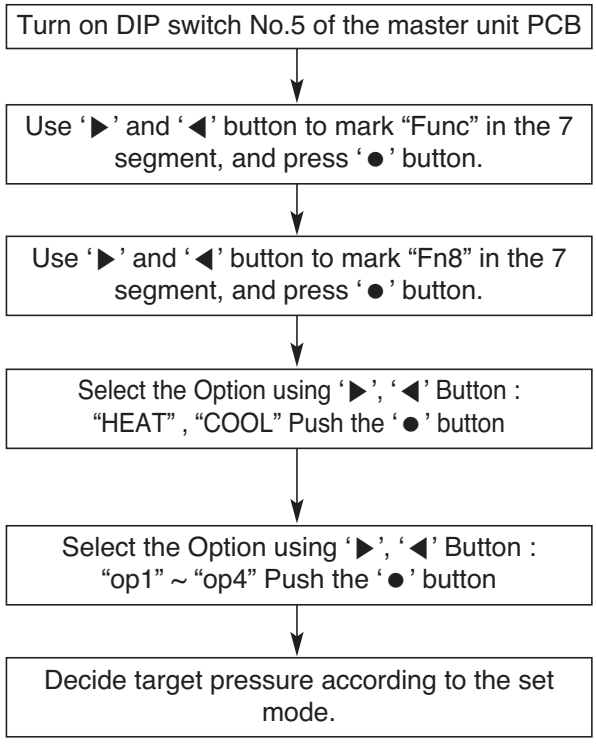
- ON: Set to control the Low capacity mode
- OFF: Set not to control

CAUTION

• Ask an authorized technician to setting a function.

4.5 Target pressure adjusting

How to set the mode



Setting

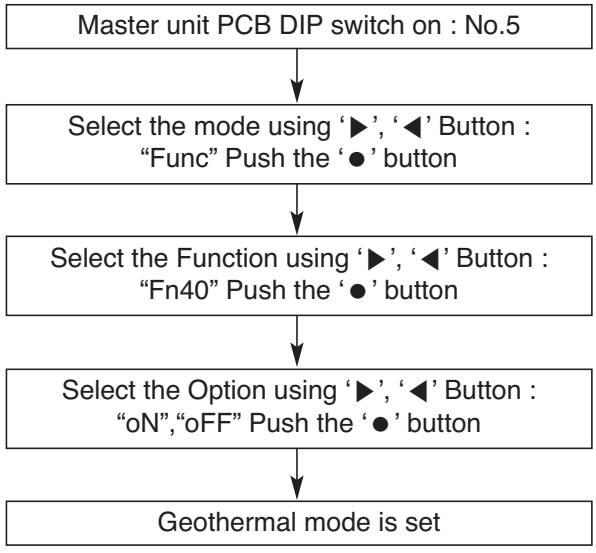
mode	Purpose		Condensing temperature variation	Evaporating temperature variation
	"Heat"	"Cool"		
op1	Increase capacity	Increase capacity	-3°C(26.6°F)	+2°C(35.6°F)
op2	Decrease power consumption	Increase capacity	-1.5°C(29.3°F)	-2°C(28.4°F)
op3	Decrease power consumption	Decrease power consumption	+2.5°C(36.5°F)	-4°C(24.8°F)
op4	Decrease power consumption	Decrease power consumption	+4.5°C(40.1°F)	-6°C(21.2°F)

CAUTION

- Ask an authorized technician to setting a function.
- If do not use a function, set an off-mode.
- Change a power consumption or capacity.

4.6 Geothermal mode

Mode setting method



- ON: Set to operate in geothermal mode
- OFF: Set to operate in general mode

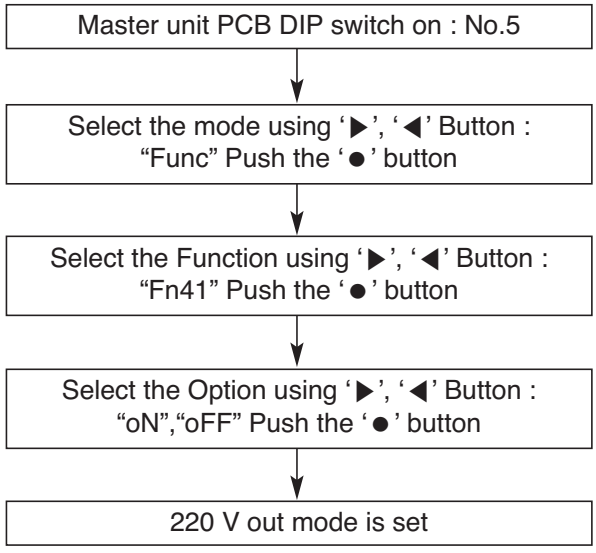
Anti freeze type	Minimum temperature for anti freezing [°C(°F)]					
	0	-5(23)	-10(14)	-15(5)	-20(-4)	-25(-13)
Ethylene glycol (%)	0	12(54)	20(68)	30(86)	-	-
Propylene glycol (%)	0	17(63)	25(77)	33(91)	-	-
Methanol (%)	0	6(43)	12(54)	16(61)	24(75)	30(86)

CAUTION

- Ask an authorized technician to setting a function.
- Anti freeze is essential for geothermal mode.

4.7 220 V out for solenoid valve

Mode setting method



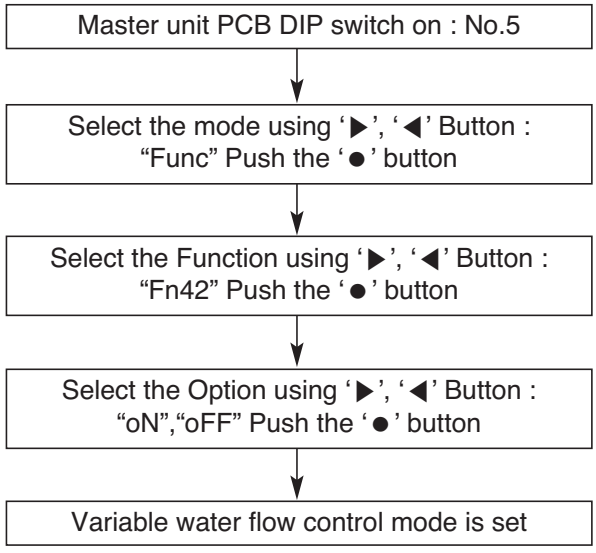
- ON: Set to control the heat source water pipe Solenoid Valve from the product.
- OFF: Set not to control the heat source water pipe Solenoid Valve from the product.

CAUTION

- Ask an authorized technician to setting a function.
- If do not use a function, set an off mode.

4.8 Variable water flow control

Mode setting method



- ON: Set to control the variable water flow control valve from the product
- OFF: Set not to control the variable water flow control valve from the product

CAUTION

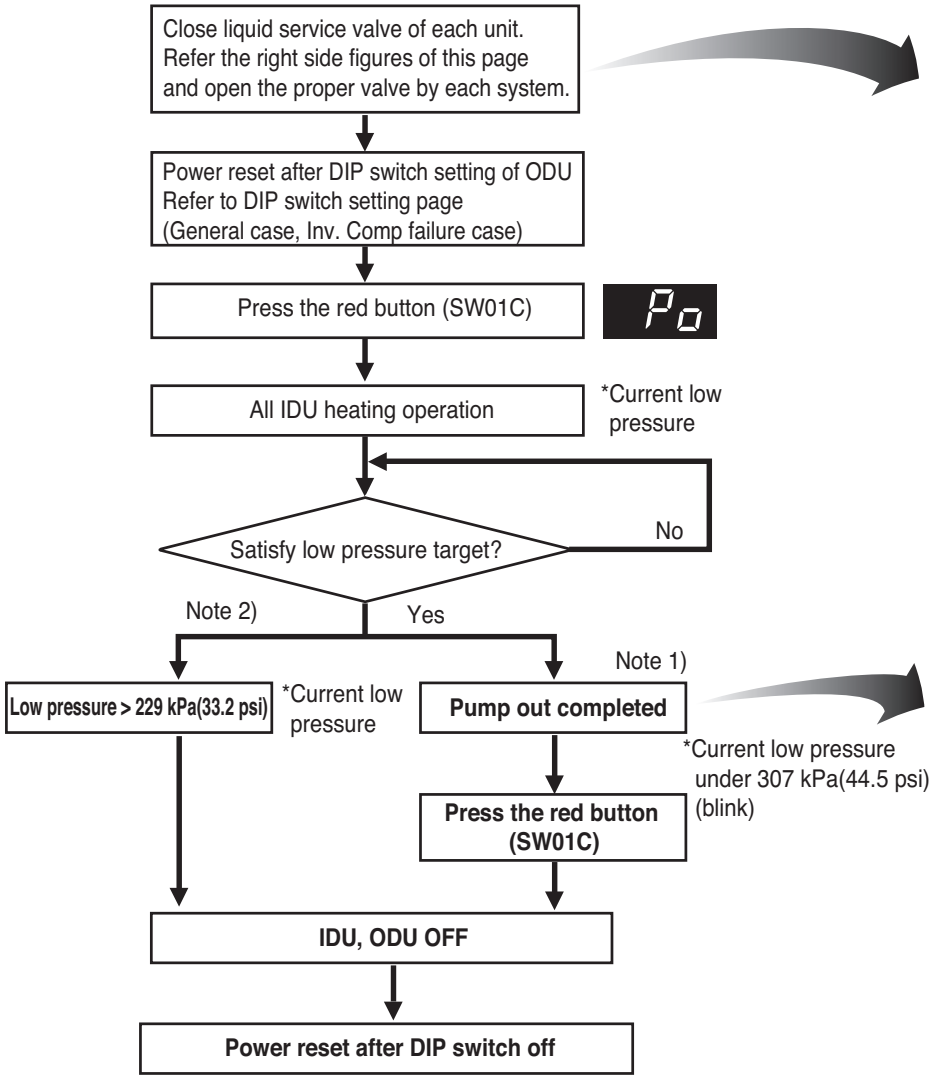
- Ask an authorized technician to setting a function.
- If do not use a function, set an off mode.

4.9 Pump Out

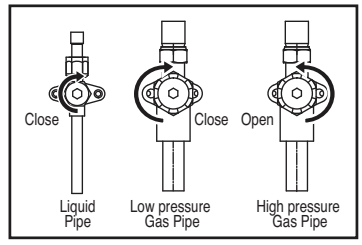
This function gathers the refrigerant to other ODU and IDU.

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

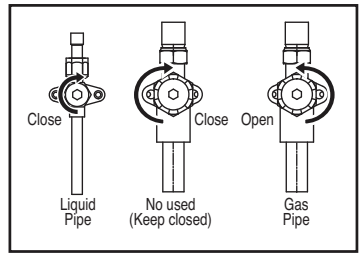
Setting method



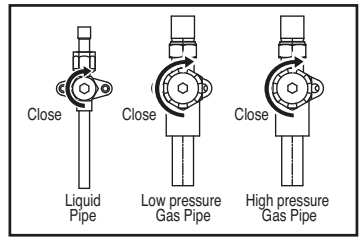
[Case 1] ODU Service Valve Setting (for Heat Recovery System)



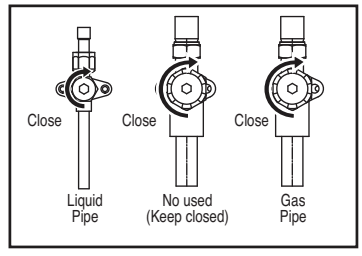
[Case 2] ODU Service Valve Setting (for Heat Pump System)



[Case 1] ODU Service Valve Setting (for Heat Recovery System)



[Case2] ODU Service Valve Setting (for Heat Pump System)



[Note]

If low pressure become under 307 kPa(44.5 psi) (blink), close the gas service valve of all ODU immediately.

If low pressure descends below 229 kPa(33.2 psi), the system turns off automatically. Close gas service valve immediately.

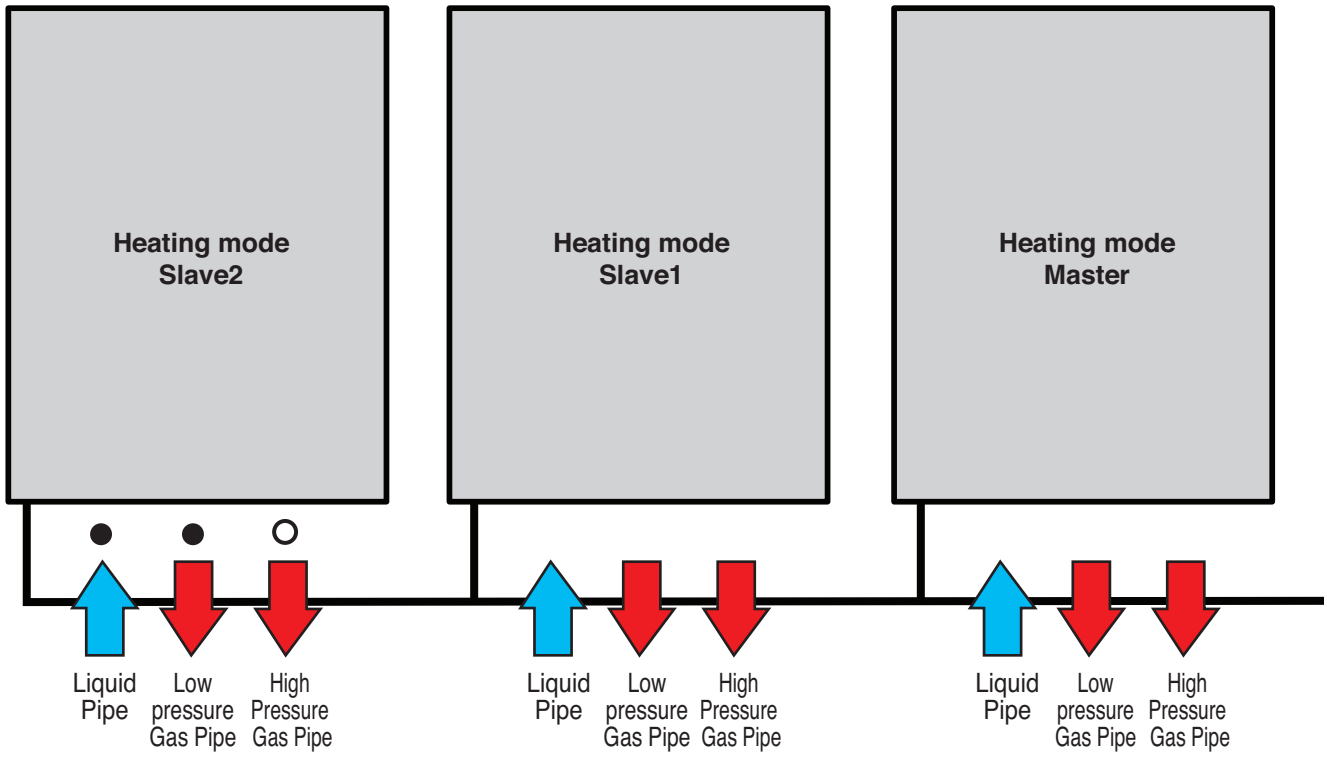
This function is operating only Heat Pump model.

⚠ Caution

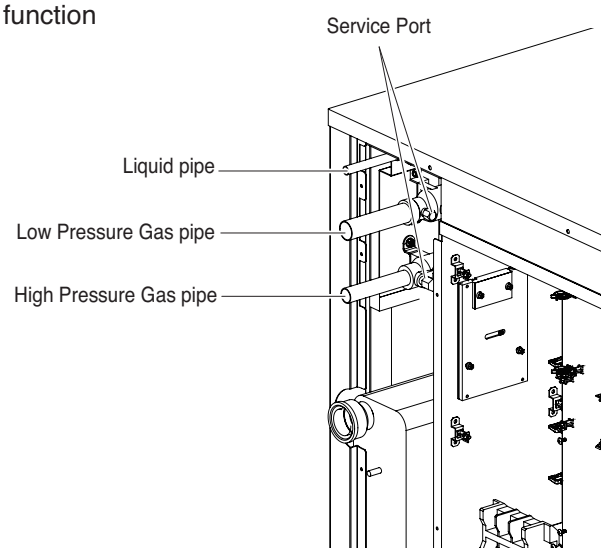
1.Use pump out function within guaranteed temperature range
IDU : 10~32 °C [50~89.6 °F]
ODU : 5~40 °C [41~104 °F]
2. Make certain that IDU doesn't run with thermo off mode during operation
3. Pump out function takes 2~5 minutes after compressor start.
Make certain that IDU doesn't run with thermo off mode during operation
(in case low pressure doesn't go down)

■ Example. Slave2 ODU inverter compressor failure (For Heat Recovery System)

● Close ○ Open

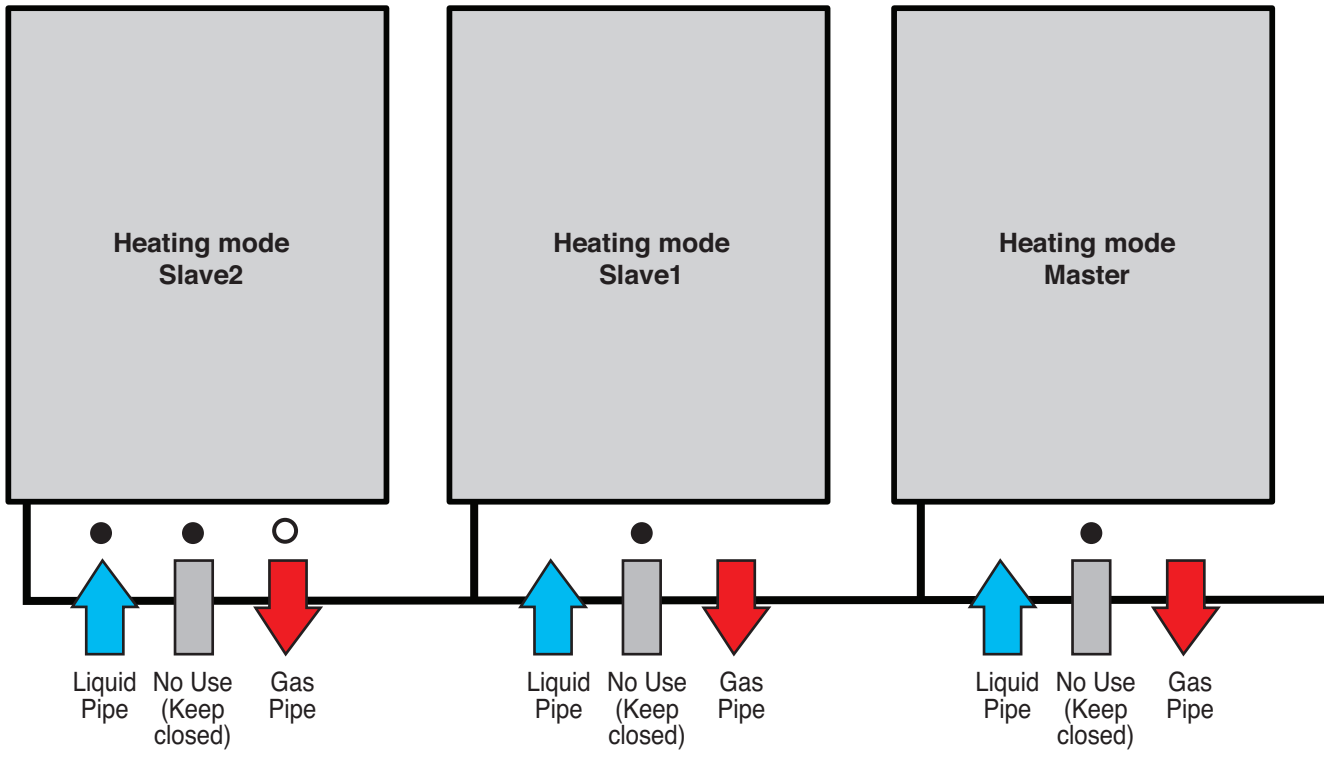


1. Close liquid pipe and low pressure gas pipe of the unit for pump out operation.
2. Operate pump out
3. Close high pressure gas pipe of unit after completion
4. End pump out
5. After replacing the compressor, eliminate remaining refrigerant of corresponding ODU and perform vacuum work. (with vacuum mode)
6. Add the refrigerant with auto charging function

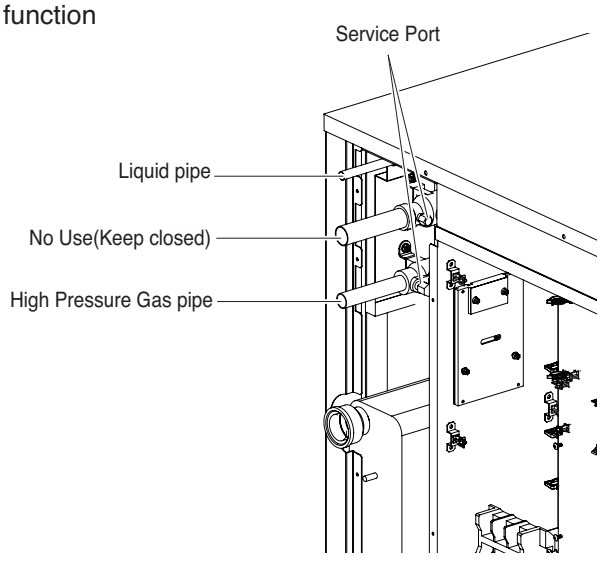


■ Example. Slave2 ODU inverter compressor failure (For Heat Pump System)

● Close ○ Open



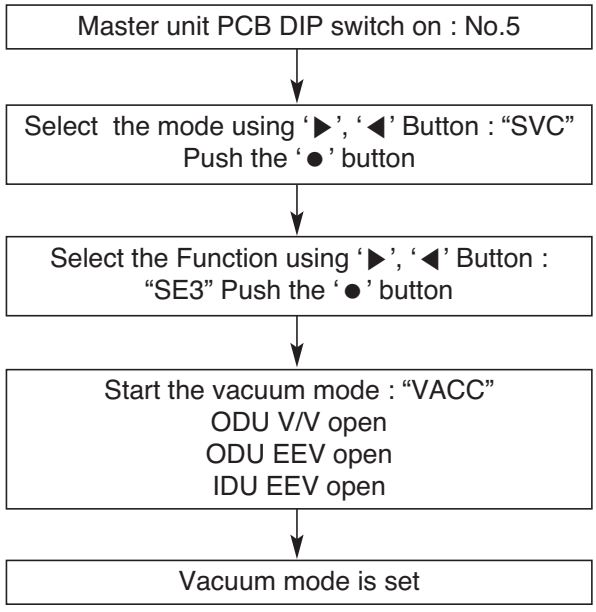
1. Close liquid pipe of the unit for pump out operation.
2. Operate pump out
3. Close gas pipe of unit after completion
4. End pump out
5. After replacing the compressor, eliminate remaining refrigerant of corresponding ODU and perform vacuum work. (with vacuum mode)
6. Add the refrigerant with auto charging function



4.10 Vacuum Mode

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

Mode setting method



Vacuum mode cancellation method

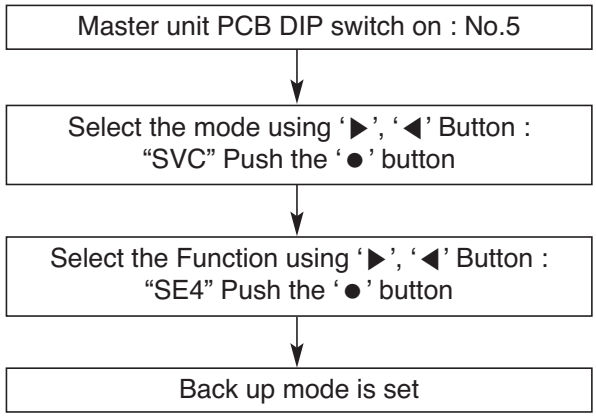
Push the reset button on Master unit PCB

CAUTION

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

4.11 Back up

Mode setting method

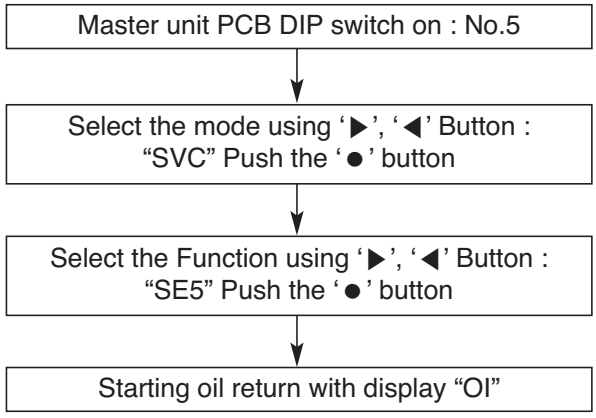


CAUTION

- Ask an authorized technician to setting a function.

4.12 Forced oil return

Mode setting method



· Auto reset after oil return completed.

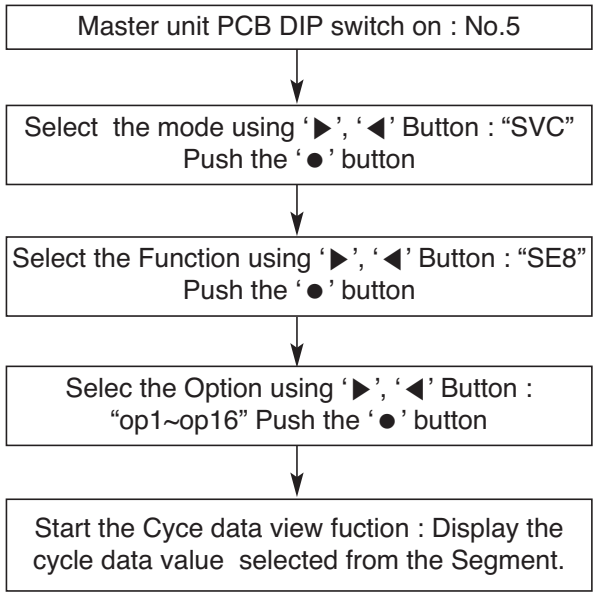
CAUTION

• Ask an authorized technician to setting a function.

4.13 Cycle Data View

This function is intended to identify the Cycle data of Outdoor unit, which is running on.
The 7 Segment is display 16 different cycle data.

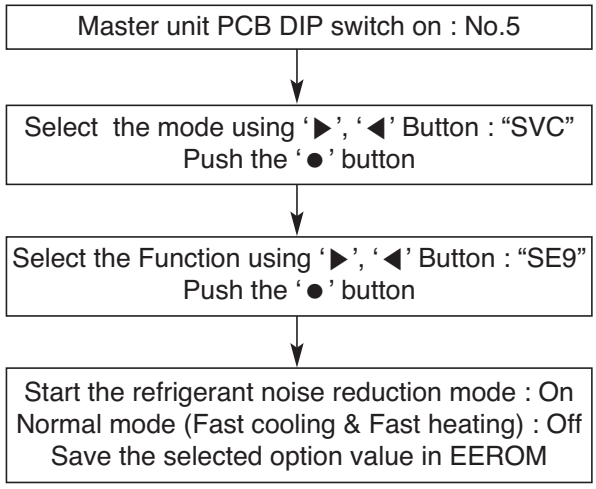
Cycle data view function setting method



step	Title	7-seg	example	seg_1	seg_2	seg_3	seg_4
op1	Current High Pressure	P1	4321 kPa	4	3	2	1
op2	Current low Pressure	P2	1234 kPa	1	2	3	4
op3	Inv 1 Pulse	h1	120 Hz		1	2	0
op6	Superheating degree	T1	5.3 °C			5	3
op7	Subcooling degree	T2	-4.5 °C		-	4	5
op8	ODU temp.	T3	10 °C		1	0	0
op9	Suction temp.	T4	43.4 °C		4	3	4
op10	Comp1 discharge temp.	T5	150 °C		1	5	0
op12	Liquid pipe temp.	T7	10 °C		1	0	0
op14	Sc_out	T9	10 °C		1	0	0
op15	Water out temp.	T10	10 °C		1	0	0
op16	Water in temp.	T11	10 °C		1	0	0
op17	Hc_out	T12	10 °C		1	0	0
op18	Inlet pipe temp of IDU	T13	-10 °C	-	1	0	0
op19	main1 eev	PLS1	1940 pls	1	9	4	0
op21	sc eev	PLS3	16 pls			1	6
op22	hc eev	PLS4	50 pls			5	0
op25	IDU running capacity	IDU1	24 kBtu			2	4
op26	Total number of IDU	IDU2	10 EA			1	0

4.14 Refrigerant noise reduction mode

Refrigerant noise reduction mode setting method



CAUTION

- Ask an authorized technician to setting a function.

Part 3
HR Units

HR Units

Specifications

1. HR Unit

2 Series

Model			PRHR022 PRHR022A	PRHR032 PRHR032A	PRHR042 PRHR042A
Max. Connectable No. of Indoor Units			16	24	32
Max. Connectable No. of Indoor Units of a branch			8	8	8
Nominal Input	Cooling		26	40	40
	Heating		26	40	40
Net. Weight	kg		18	20	22
	lbs		39.7	44.1	48.5
Dimensions (WxHxD)	mm		801 x 218 x 617	801 x 218 x 617	801 x 218 x 617
	Inch		31.5 x 8.6 x 24.3	31.5 x 8.6 x 24.3	31.5 x 8.6 x 24.3
Casing			Galvanized steel plate		
Connecting Pipes	Indoor	Liquid Pipe [mm/inch]	Ø 9.52[3/8]		
		Gas Pipe [mm/inch]	Ø 15.88[5/8]		
	Outdoor	Liquid [mm/inch]	Ø 9.52[3/8]	Ø 12.7[1/2]	Ø 15.88[5/8]
		Low Pressure [mm/inch]	Ø 22.2[7/8]	Ø 28.58[1 1/8]	Ø 28.58[1 1/8]
		High Pressure [mm/inch]	Ø 19.05[3/4]	Ø 22.2[7/8]	Ø 22.2[7/8]
Sound Absorbing Insulation Material			Polyethylene Foam		
Current	Minimum circuit Amps(MCA)		0.2		
	Maximum fuse Amps(MFA)		15		
Power Supply			1 Ø, 220-240 V, 50 Hz / 1 Ø, 220 V, 60 Hz 1 Ø, 208/230 V, 60 Hz		

Notes:

1. Voltage range : Units are suitable for sue on electrical systems where voltage supplied to units terminals is not below or above listed range limits.
2. Maximum allowable voltage unbalance between phases is 2 %
3. MCA/MFA MCA = 1.25 * FLA
   MFA ≤ 4 * FLA
   (Next lower standard fuse rating. Min. 15 A)
4. Select wire size based on the MCA
5. Instead of fuse, use circuit.

3 Series

Model			PRHR023 PRHR023A	PRHR033 PRHR033A	PRHR043 PRHR043A
Max. Connectable No. of Indoor Units			16	24	32
Max. Connectable No. of Indoor Units of a branch			8	8	8
Net. Weight	kg		14.9	16.7	18.2
	lbs		32.8	36.8	40.1
Dimensions (WxHxD)	mm		786 X 218 X 657	786 X 218 X 657	786 X 218 X 657
	Inch		30.9 X 8.6 X 25.9	30.9 X 8.6 X 25.9	30.9 X 8.6 X 25.9
Casing			Galvanized steel plate		
Connecting Pipes	Indoor	Liquid Pipe [mm/inch]	Ø 9.52[3/8] – Ø 6.35[1/4]		
		Gas Pipe [mm/inch]	Ø 15.88[5/8] – Ø 12.7[1/2]		
	Outdoor	Liquid [mm/inch]	Ø 9.52[3/8]	Ø 12.7[1/2]	Ø 15.88[5/8]
		Low Pressure [mm/inch]	Ø 22.2[7/8]	Ø 28.58[1 1/8]	Ø 28.58[1 1/8]
		High Pressure [mm/inch]	Ø 19.05[3/4]	Ø 22.2[7/8]	Ø 22.2[7/8]
Sound Absorbing Insulation Material			Polyethylene Foam		
Power Supply			1 Ø, 220-240 V, 50 Hz / 1 Ø, 220 V, 60 Hz 1 Ø, 208/230 V, 60 Hz		

Model			PRHR063 PRHR063A	PRHR083 PRHR083A
Max. Connectable No. of Indoor Units			48	64
Max. Connectable No. of Indoor Units of a branch			8	8
Net. Weight	kg		27.2	30.7
	lbs		60	67.7
Dimensions (WxHxD)	mm		1 113 X 218 X 657	1 113 X 218 X 657
	Inch		43.8 X 8.6 X 25.9	43.8 X 8.6 X 25.9
Casing			Galvanized steel plate	
Connecting Pipes	Indoor	Liquid Pipe [mm/inch]	Ø 9.52[3/8] – Ø 6.35[1/4]	
		Gas Pipe [mm/inch]	Ø 15.88[5/8] – Ø 12.7[1/2]	
	Outdoor	Liquid [mm/inch]	Ø 15.88[5/8]	
		Low Pressure [mm/inch]	Ø 28.58[1 1/8]	
		High Pressure [mm/inch]	Ø 22.2[7/8]	
Sound Absorbing Insulation Material			Polyethylene Foam	
Power Supply			1 Ø, 220-240 V, 50 Hz / 1 Ø, 220 V, 60 Hz 1 Ø, 208/230 V, 60 Hz	

Notes:

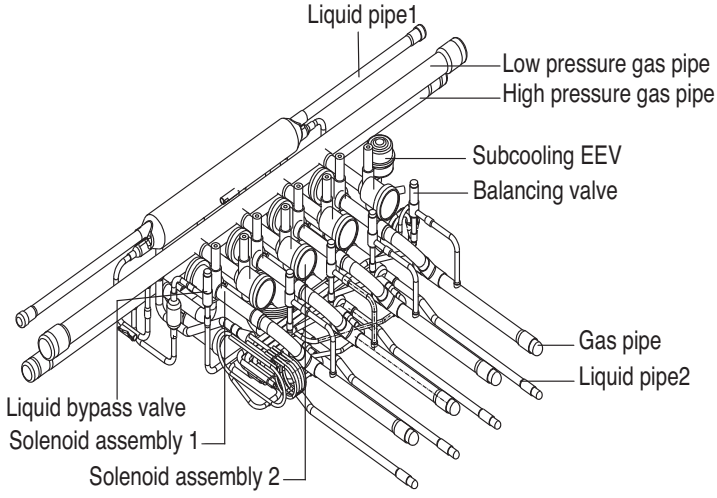
1. Voltage range : Units are suitable for sue on electrical systems where voltage supplied to units terminals is not below or above listed range limits.
2. Maximum allowable voltage unbalance between phases is 2 %
3. MCA/MFA MCA = 1.25 * FLA
   MFA ≤ 4 * FLA
   (Next lower standard fuse rating. Min. 15 A)
4. Select wire size based on the MCA
5. Instead of fuse, use circuit.

Parts Functions

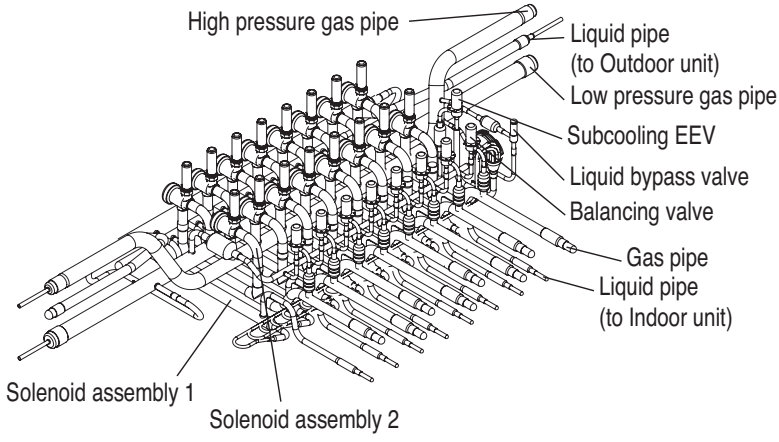
1. Parts Functions

Parts name	Symbol	Major function
Low pressure gas pipe	LPGV	Pipe for low pressure gas
High pressure gas pipe	LP1	Pipe for high pressure gas
High pressure gas pipe	LP1	Liquid pipe connected with Outdoor unit
Liquid bypass valve	LBV	Prevent liquid charging
Solenoid assembly 1, 2	SOL1, 2	Control the path for heating or cooling
Liquid pipe 2	LP2	Liquid pipe connected with indoor unit
Gas pipe	GSP	Gas pipe connected with indoor unit
Balancing valve	BLV	Control the pressure between High and Low pressure pipe during operation switching
Subcooling EEV	SCEEV	Control the subcooling

PRHR042A



PRHR083A

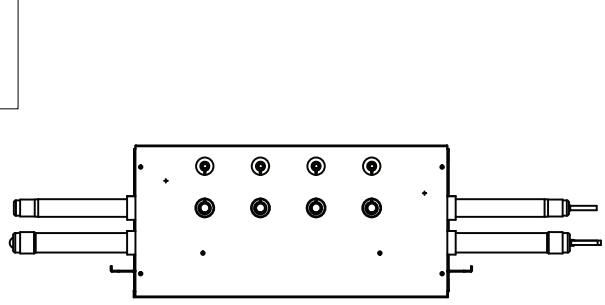


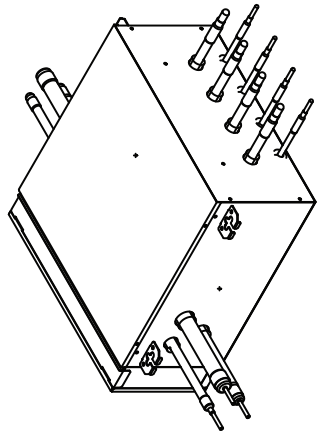
Dimensions

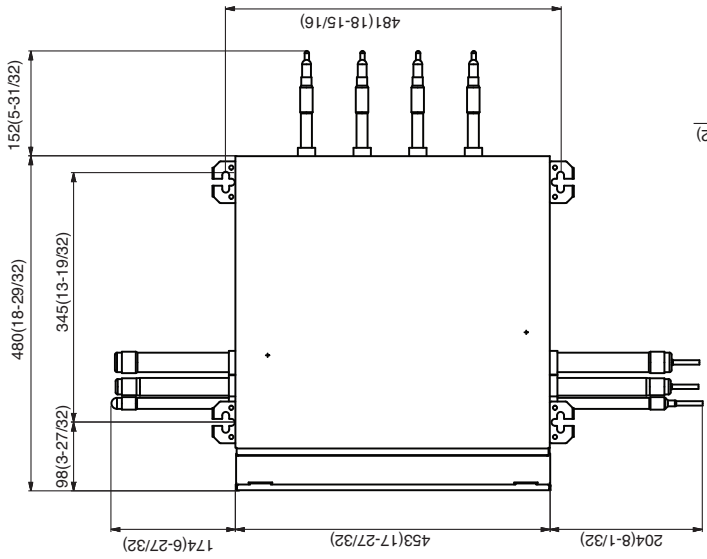
1. HR Units

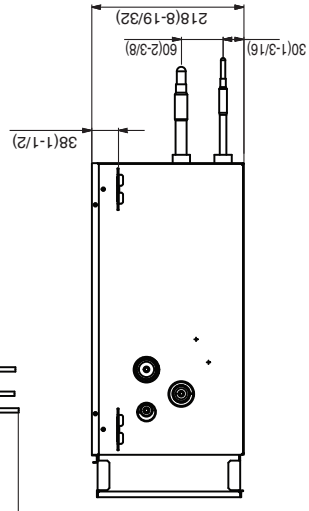
Outdoor Unit
PRHR042/PRHR042A PRHR032/PRHR032A PRHR022/PRHR022A

[Unit : mm(inch)]







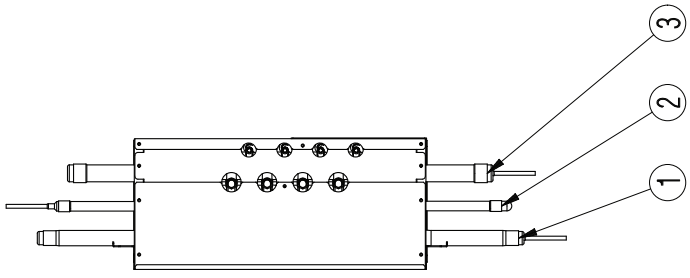


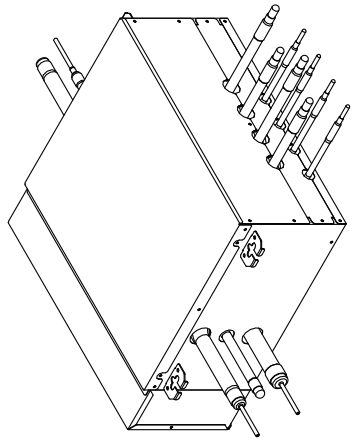
HR Unit

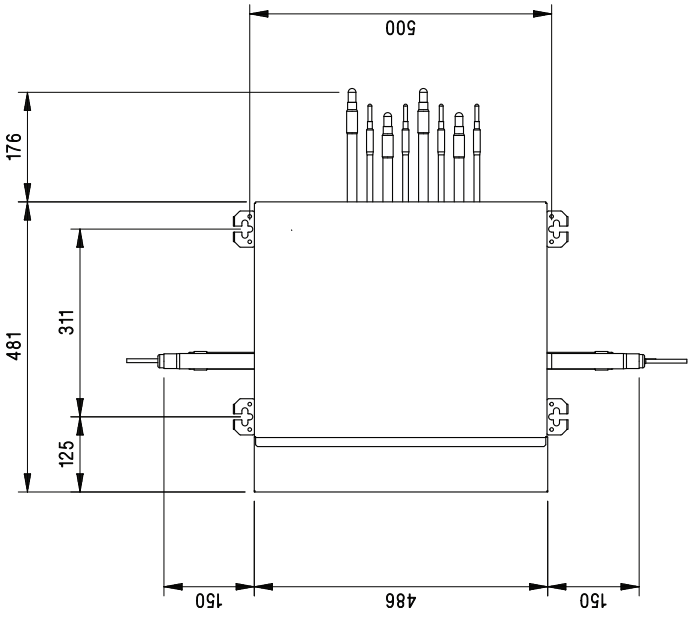
PRHR023 / PRHR023A
PRHR033 / PRHR033A
PRHR043 / PRHR043A

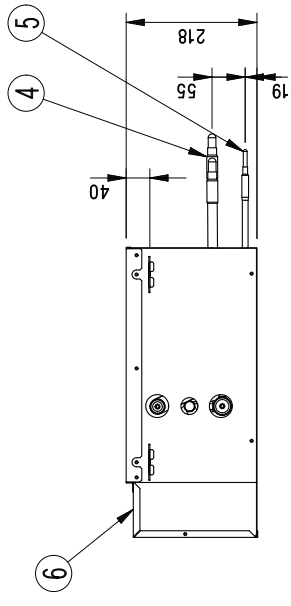
[Unit : mm(inch)]

No.	Part Name	Description
6	Control box	-
5	Liquid pipe to indoor unit	8- ∅ 9.52 - ∅ 6.35
4	Gas pipe to indoor unit	8- ∅ 15.88 - ∅ 12.7
3	Low pressure gas pipe	2- ∅ 28.58
2	Liquid pipe to Outdoor unit	2- ∅ 15.88
1	High pressure gas pipe	2- ∅ 22.2





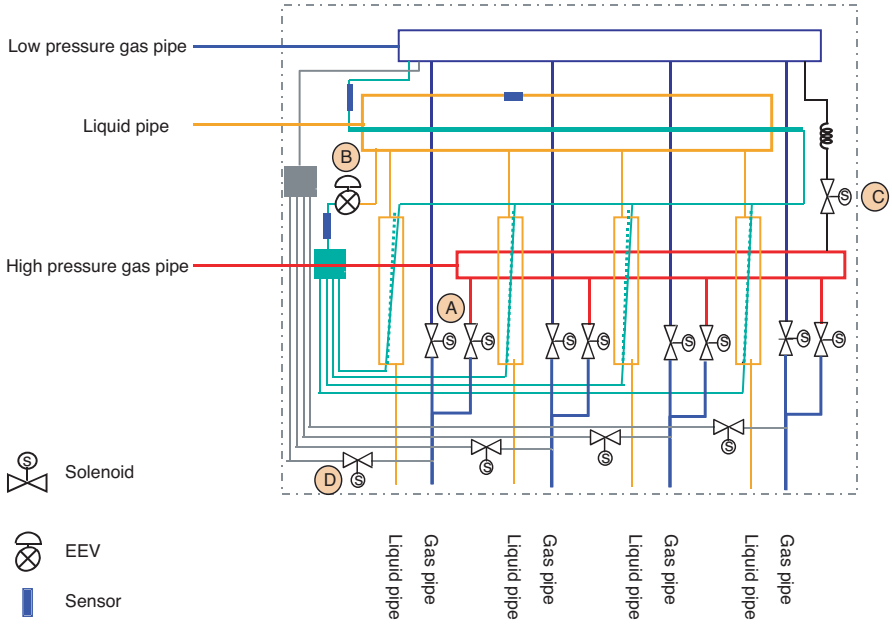




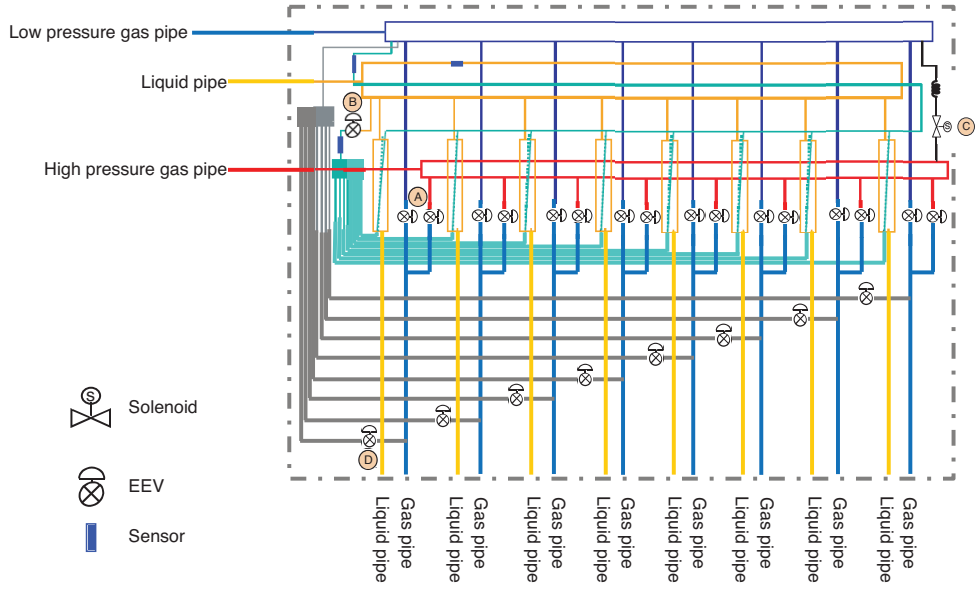
Piping Diagrams

1. HR Unit

PRHR042A



PRHR083A



Ⓐ : To be switched operation between cooling and heating by two valves

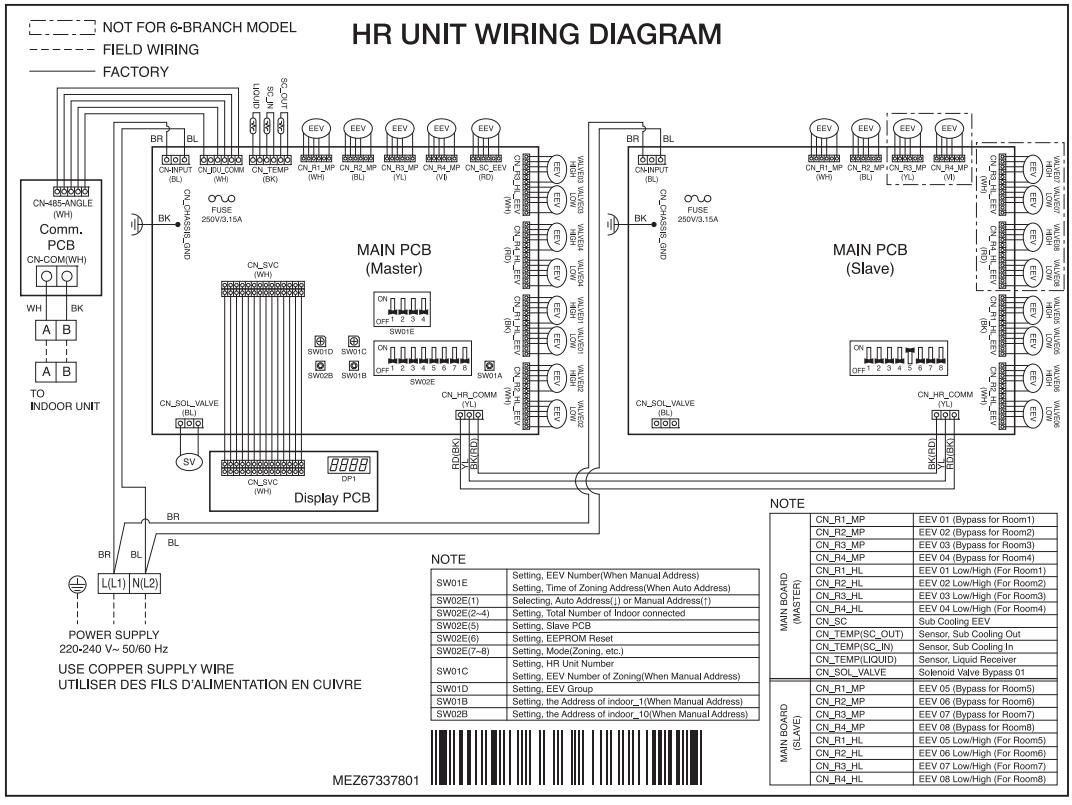
Ⓑ : To be used decreasing noise according to sub-cooling of inlet and outlet of indoor unit (Simultaneous operation)

Ⓒ : To prevent liquid charging between high pressure gas valve and HR unit at cooling mode

Ⓓ : To be controlled the pressure between high and low pressure pipe during operation switching

Wiring Diagrams

1. HR Units

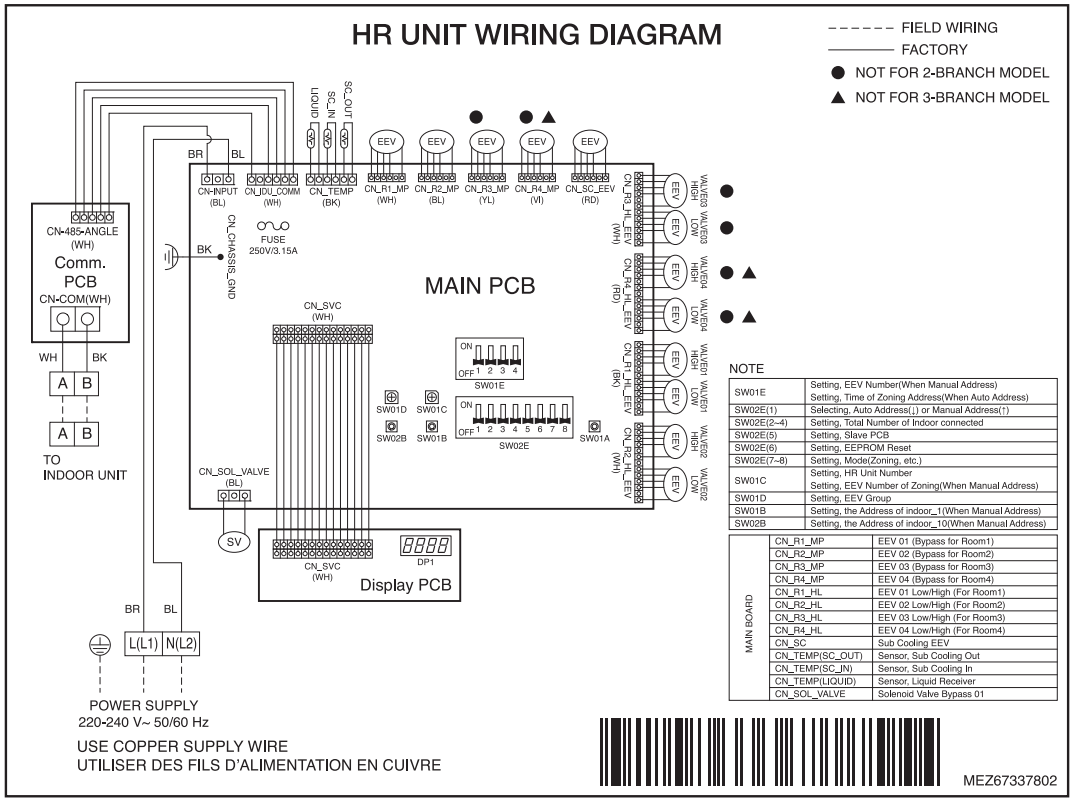


NOTE

SW01E	Setting, EEV Number(When Manual Address) Setting, Time of Zoning Address(When Auto Address)	
SW02E(1)	Selecting, Auto Address(↓) or Manual Address(↑)	
SW02E(2~4)	Setting, Total Number of Indoor connected	
SW02E(5)	Setting, Slave PCB	
SW02E(6)	Setting, EEPROM Reset	
SW02E(7~8)	Setting, Mode(Zoning, etc.)	
SW01C	Setting, HR Unit Number Setting, EEV Number of Zoning(When Manual Address)	
SW01D	Setting, EEV Group	
SW01B	Setting, the Address of indoor_1(When Manual Address)	
SW02B	Setting, the Address of indoor_10(When Manual Address)	

NOTE

MAIN BOARD (MASTER)	CN_R1_MP	EEV 01 (Bypass for Room1)
	CN_R2_MP	EEV 02 (Bypass for Room2)
	CN_R3_MP	EEV 03 (Bypass for Room3)
	CN_R4_MP	EEV 04 (Bypass for Room4)
	CN_R1_HL	EEV 01 Low/High (For Room1)
	CN_R2_HL	EEV 02 Low/High (For Room2)
	CN_R3_HL	EEV 03 Low/High (For Room3)
	CN_R4_HL	EEV 04 Low/High (For Room4)
	CN_SC	Sub Cooling EEV
	CN_TEMP(SC_OUT)	Sensor, Sub Cooling Out
	CN_TEMP(SC_IN)	Sensor, Sub Cooling In
	CN_TEMP(LIQUID)	Sensor, Liquid Receiver
	CN_SOL_VALVE	Solenoid Valve Bypass 01
MAIN BOARD (SLAVE)	CN_R1_MP	EEV 05 (Bypass for Room5)
	CN_R2_MP	EEV 06 (Bypass for Room6)
	CN_R3_MP	EEV 07 (Bypass for Room7)
	CN_R4_MP	EEV 08 (Bypass for Room8)
	CN_R1_HL	EEV 05 Low/High (For Room5)
	CN_R2_HL	EEV 06 Low/High (For Room6)
	CN_R3_HL	EEV 07 Low/High (For Room7)
	CN_R4_HL	EEV 08 Low/High (For Room8)



NOTE

SW01E	Setting, EEV Number(When Manual Address) Setting, Time of Zoning Address(When Auto Address)
SW02E(1)	Selecting, Auto Address(↓) or Manual Address(↑)
SW02E(2~4)	Setting, Total Number of Indoor connected
SW02E(5)	Setting, Slave PCB
SW02E(6)	Setting, EEPROM Reset
SW02E(7~8)	Setting, Mode(Zoning, etc.)
SW01C	Setting, HR Unit Number Setting, EEV Number of Zoning(When Manual Address)
SW01D	Setting, EEV Group
SW01B	Setting, the Address of indoor_1(When Manual Address)
SW02B	Setting, the Address of indoor_10(When Manual Address)

MAIN BOARD	CN_R1_MP	EEV 01 (Bypass for Room1)
	CN_R2_MP	EEV 02 (Bypass for Room2)
	CN_R3_MP	EEV 03 (Bypass for Room3)
	CN_R4_MP	EEV 04 (Bypass for Room4)
	CN_R1_HL	EEV 01 Low/High (For Room1)
	CN_R2_HL	EEV 02 Low/High (For Room2)
	CN_R3_HL	EEV 03 Low/High (For Room3)
	CN_R4_HL	EEV 04 Low/High (For Room4)
	CN_SC	Sub Cooling EEV
	CN_TEMP(SC_OUT)	Sensor, Sub Cooling Out
	CN_TEMP(SC_IN)	Sensor, Sub Cooling In
	CN_TEMP(LIQUID)	Sensor, Liquid Receiver
	CN_SOL_VALVE	Solenoid Valve Bypass 01

Functions

1. Basic Control

1.1 Normal Operation

Actuator	Actuator	Cooling operation	Heating operation	Stop state
High pressure gas valve	Close	Close	Open	Keep
Low pressure gas valve	After 30 Second Open	Open	Close	Keep
Liquid valve	Close	Open	Close	Close

1.2 Starting Control(Heating Mode Only)

If the system is operated in the heating mode, all high pressure gas valves are opened

1.3 Valve Control

Mode change timer is calculated as Table 1, and valves are controlled by Mode change timer according to Table 2.

Table 1. Mode change timer calculation

Previous mode	Changing mode	Mode change timer
Stop or ventilation	Cooling or heating	120 sec
Heating	Heating	180 sec
Heating mode	Cooling	120 sec
Cooling or heating	Stop or ventilation	During heating : 60 sec During cooling : 0 sec

Table 2. Valve control by mode change timer

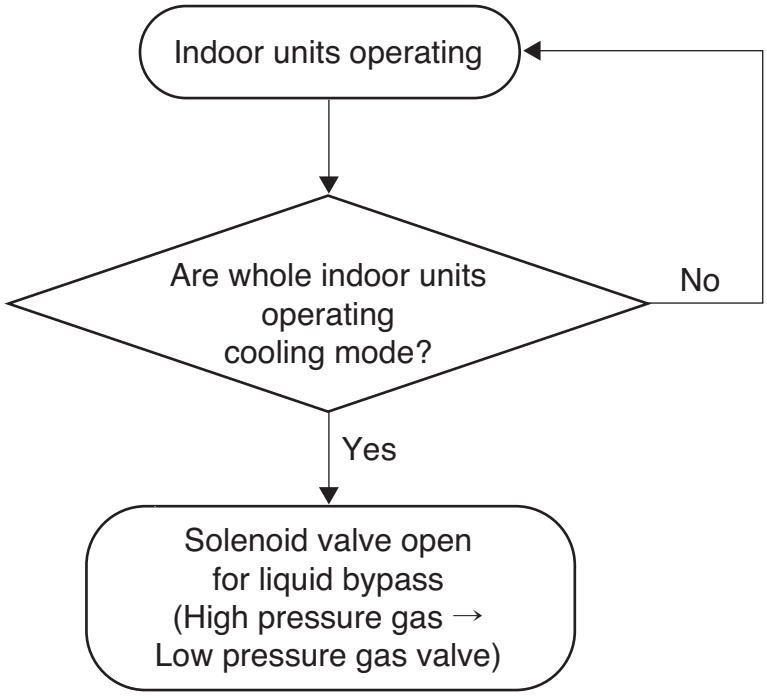
Operating mode	Mode change timer	H/P gas valve	L/P gas valve	Balancing valve
Cooling	120 ≤ timer	Keep	Keep	Close
	0 < timer < 120	Close	Close	Open
	timer = 0	Close	Open	Close
Heating	180 ≤ timer	Keep	Keep	Close
	0 < timer < 180	Close	Close	Close
	timer = 0	Open	Close	Close
Stop or ventilation	0 < timer < 5	Cooling mode : Close	Keep	Close
	Timer = 0	Heating mode : Low pressure gas valve → Close	Keep	Close

2. Special Control

2.1 Oil Return/Defrost Control

Component	Starting	Running	Ending
Inverter compressor	Stop	60 Hz	40 Hz
High pressure gas valve	Keep	Close	Open or Close
Low pressure gas valve	Keep	Open	Open or Close
Balancing valve	Open for 30s	Close	Close

2.2 Liquid Bypass Control



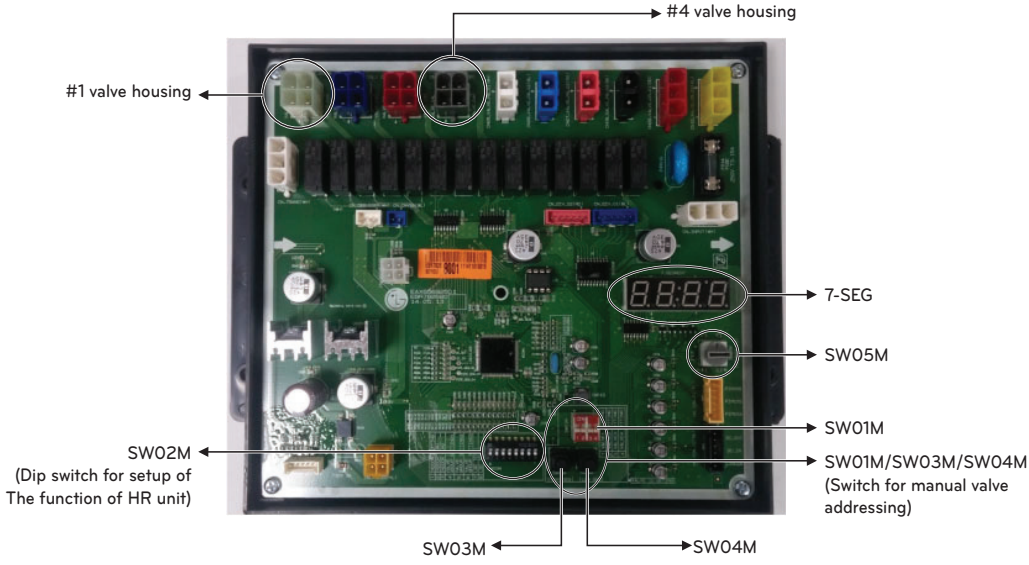
2.3 Subcooling EEV Control

Target : about 25°C(45°F)
Subcooling EEV works with Fuzzy rules to keep the degree of subcooling at the outlet of subcooler during simultaneous operation
The degree of subcooler = T outlet of subcooler – T inlet of subcooler

Part 4
PCB Setting and Test Run

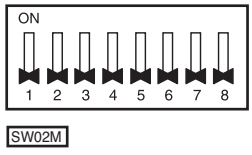
PCB Setting and Test Run

HR Unit PCB (PRHR042A, PRHR032A, PRHR022A)



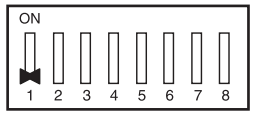
1. Switch for Setup of HR Unit

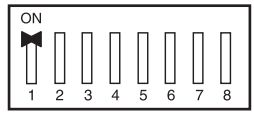
1. Main function of SW02M



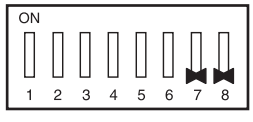
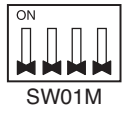
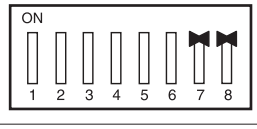
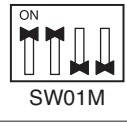
ON switch	Selection	
No.1	Method for addressing valves of an HR unit (Auto/Manual)	
No.2	Model of HR unit	
No.3	Model of HR unit	
No.4	Valve group setting	
No.5	Valve group setting	
No.6	Valve group setting	
No.7	Use only in factory production (preset to “OFF”)	Zoning setting ("ON")
No.8	Use only in factory production (preset to “OFF”)	

1) Selection of the method for addressing valves of an HR unit (Auto/Manual)

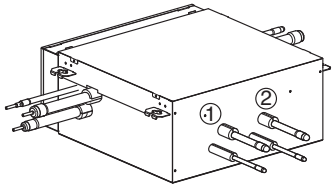
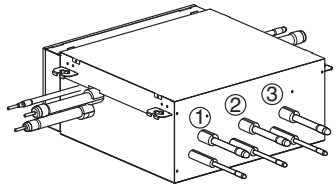
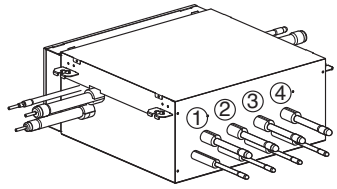
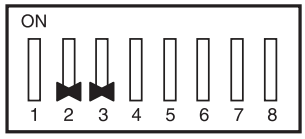
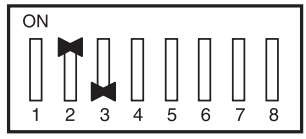
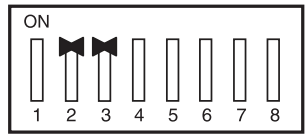
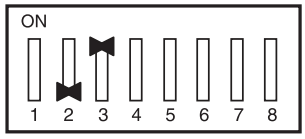
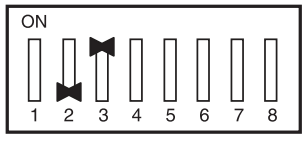
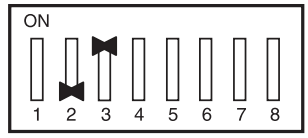
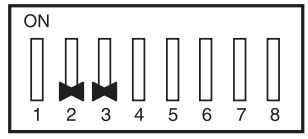
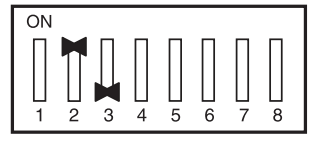
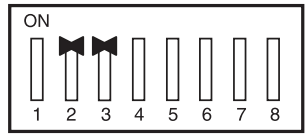




2) Setting the zoning control

	DIP S/W setting	
Normal control		 SW01M
Zoning control		 SW01M Turn the dip switch of the zoning branch on. Ex) Branch 1,2 are zoning control.

2) Selection of the model of the HR unit

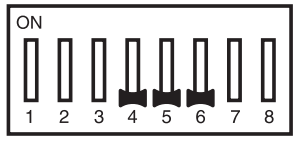
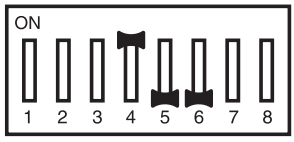
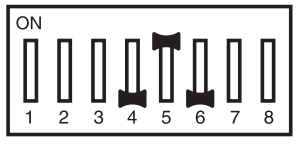
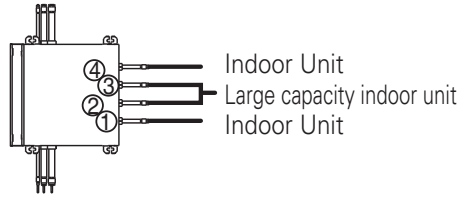
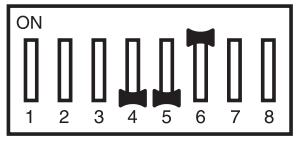
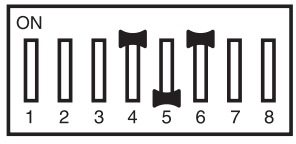
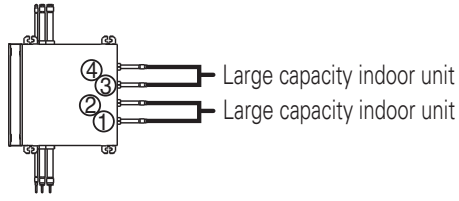
	 (For 2 branches) PRHR022A	 (For 3 branches) PRHR032A	 (For 4 branches) PRHR042A
Initial Setting			
1 branches Connected			
2 branches Connected			
3 branches Connected			
4 branches Connected			

❊ Each model is shipped with the switches No.2 and No.3 pre-adjusted as above in the factory.

WARNING

- If you want to use a PRHR022A for 2 branches HR unit after closing the 3rd pipes, set the dip switch for 2 branches HR unit.
- If you want to use a PRHR032A for 3 branches HR unit after closing the 4th pipes, set the dip switch for 3 branches HR unit.
- If you want to use a PRHR042A for 2 branches HR unit after closing the 3rd and 4th pipes, set the dip switch for 2 branches HR unit.
- The unused port must be closed with a copper cap, not with a plastic cap.

3) Setting the Valve group.

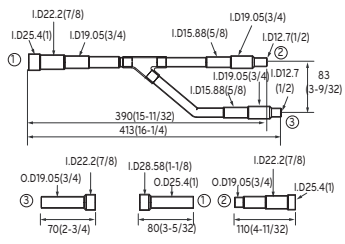
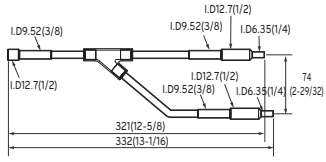
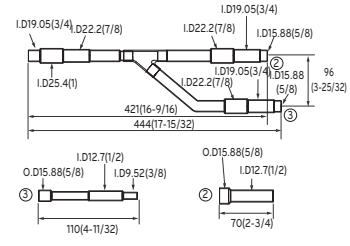
	DIP S/W setting	Example
Not control		
No.1, 2 Valve Control		
No.2, 3 Valve Control		
No.3, 4 Valve Control		
No.1, 2 Valve / No.3, 4 Valve Control		

Note:

If the large capacity indoor units are installed, below Y branch pipe should be used

✻ Y branch pipe

[Unit:mm(inch)]

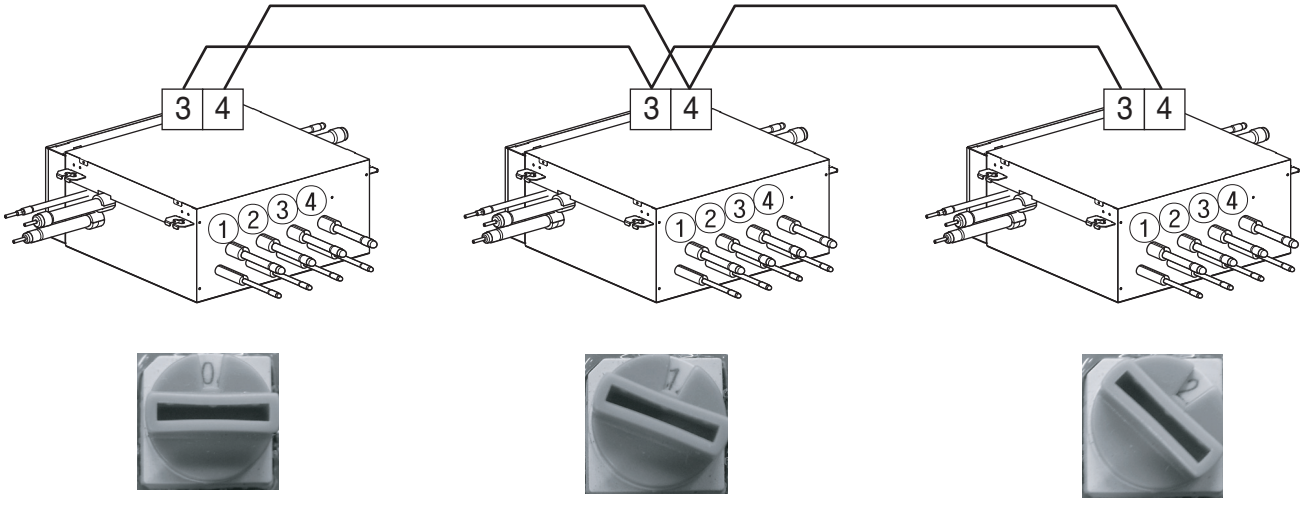
Models	Low Pressure Gas Pipe	Liquid pipe	High Pressure Gas Pipe
ARBLB03321			

For more information, refer accessory installation manual.

2. SW05M (Rotary switch for addressing HR unit)

Must be set to '0' when installing only one HR unit.
When installing multiple HR units, address the HR units with sequentially increasing numbers starting from '0'.

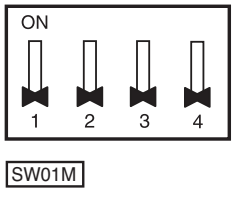
Ex) Installation of 3 HR units



3. SW01M/SW03M/SW04M (Dip switch and tact switch for manual valve addressing)

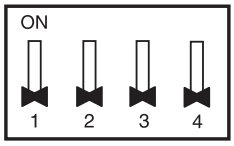
1) Normal setting (Non-Zoning setting)

- Used in manual addressing of the valve in the HR unit
- Set the address of the valve of the HR unit to the central control address of the connected indoor unit.
- SW01M: selection of the valve to address
  SW03M: increase in the digit of 10 of valve address
  SW04M: increase in the last digit of valve address
- Prerequisite for manual valve addressing : central control address of each indoor unit must be preset differently at its wired remote control.

	Switch No.	Setup
 SW01M	No.1	Manual addressing of valve #1
	No.2	Manual addressing of valve #2
	No.3	Manual addressing of valve #3
	No.4	Manual addressing of valve #4
SW03M 	SW03M	Increase in the digit of 10 of valve address
SW04M 	SW04M	Increase in the last digit of valve address

2) Zoning setting

- Set the address of the valve of the HR unit to the central control address of the connected indoor unit.
- SW01M : selection of the valve to address
  SW03M : increase in the digit of 10 of valve address
  SW04M : increase in the last digit of valve address
  SW05M :Rotary S/W
- Prerequisite for manual valve addressing : central control address of each indoor unit must be preset differently at its wired remote control.

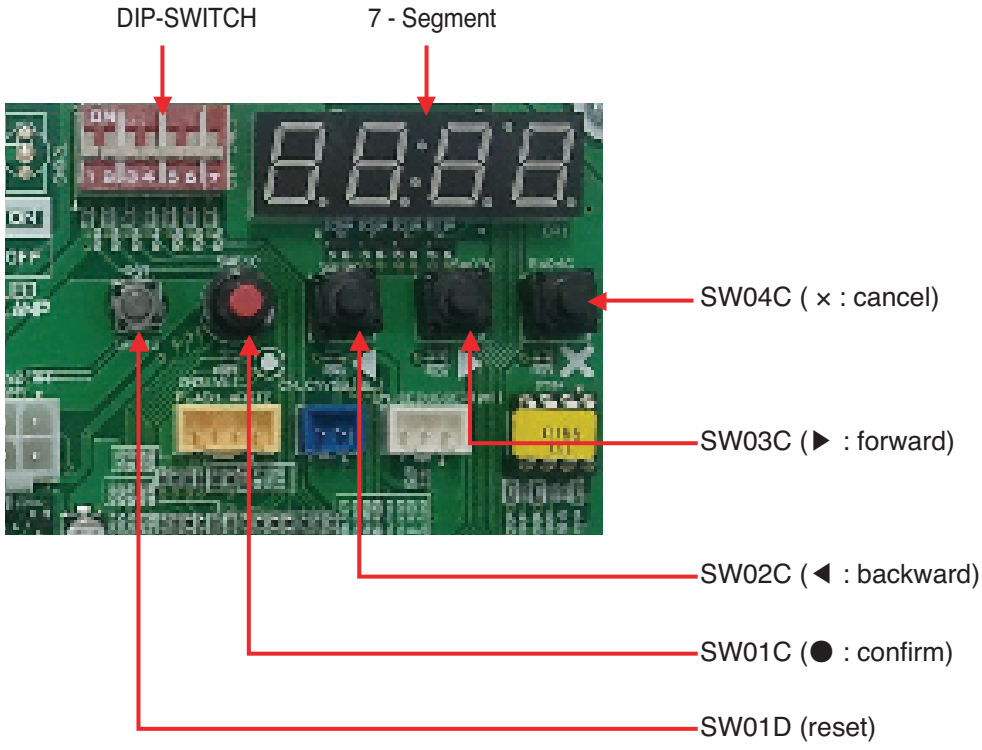
	S/W No.	Setup
 SW01M	No.1	Manual addressing of valve #1
	No.2	Manual addressing of valve #2
	No.3	Manual addressing of valve #3
	No.4	Manual addressing of valve #4
SW03M 	SW03M	Increase in the digit of 10 of valve address
SW04M 	SW04M	Increase in the last digit of valve address
SW05M 	SW05M	Manual addressing of zoning indoor units

2. Automatic Addressing

The address of indoor units would be set by Automatic Addressing

- Wait for 3 minutes after supplying power.
  (Master and Slave Outdoor units, indoor units)
- Press RED button of the Outdoor units for 5 seconds. (SW01C)
- A “88” is indicated on 7-segment LED of the Outdoor unit PCB.
- For completing addressing, 2~7 minutes are required depending on numbers of connected indoor units
- Numbers of connected indoor units whose addressing is completed are indicated for 30 seconds on 7-segment LED of the Outdoor unit PCB
- After completing addressing, address of each indoor unit is indicated on the wired remote control display window. (CH01, CH02, CH03, ……, CH06 : Indicated as numbers of connected indoor units)

■ Heat Recovery (MAIN PCB)

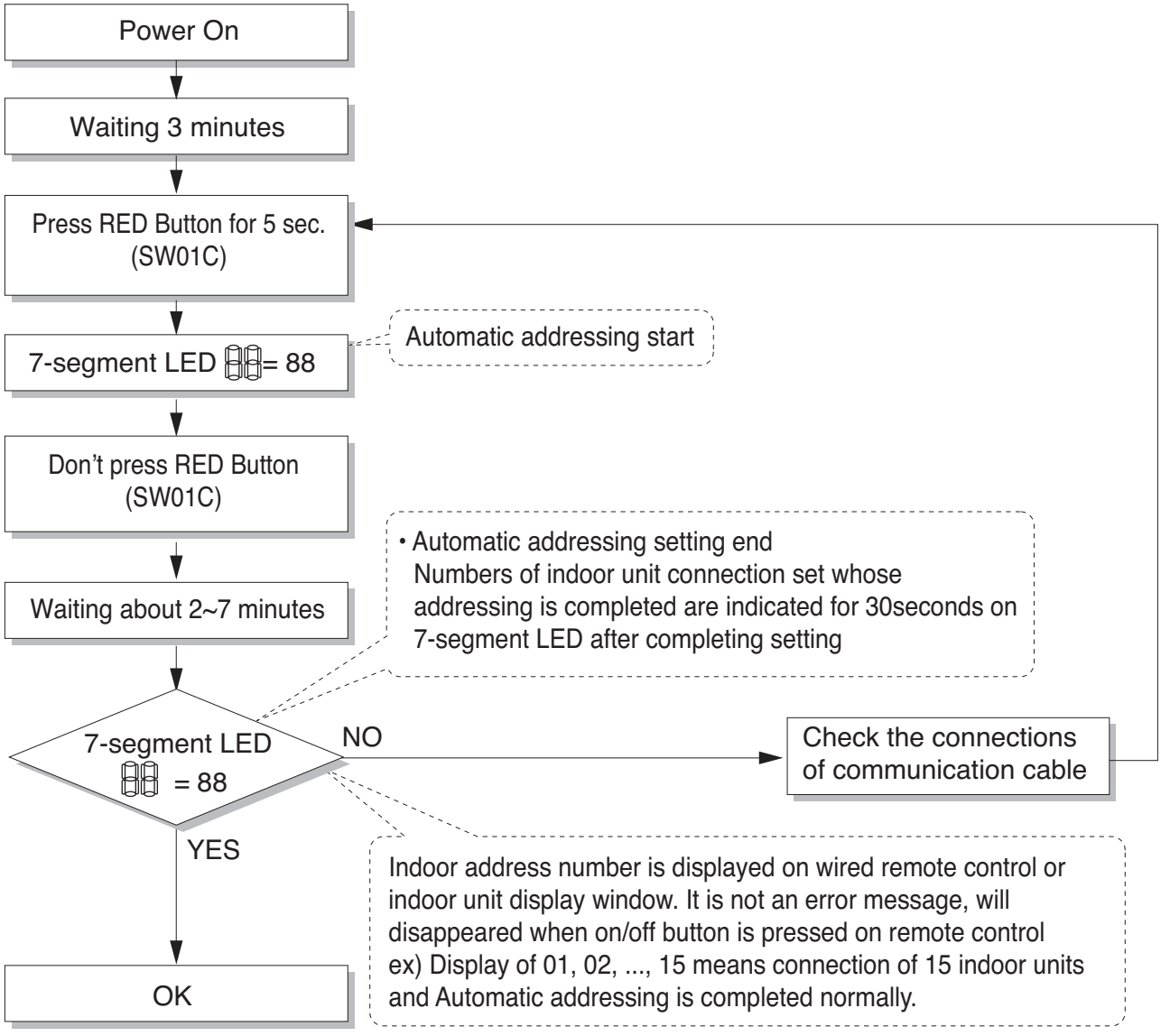


CAUTION

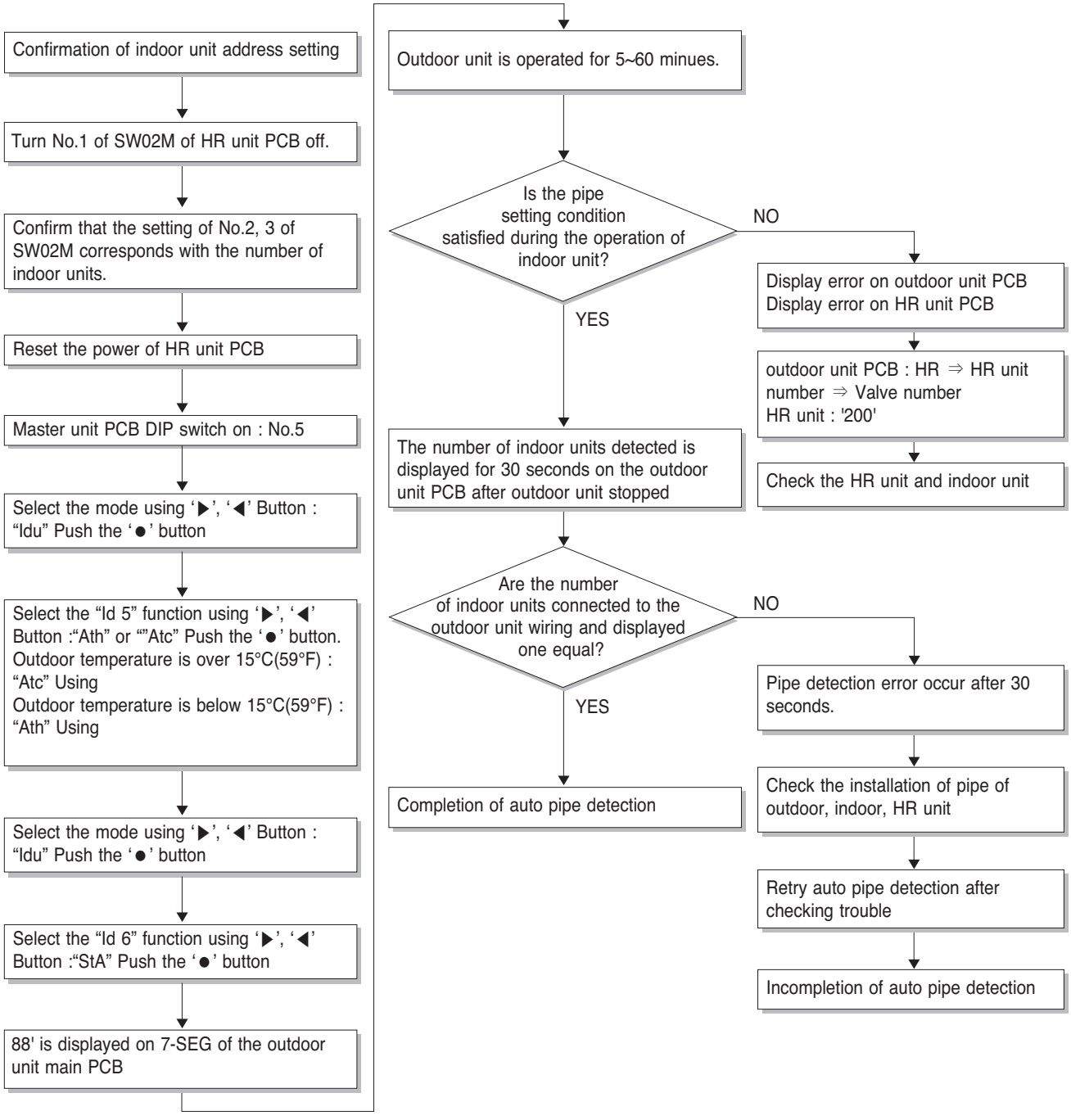
- **In replacement of the indoor unit PCB, always perform Automatic addressing setting again (At that time, please check about using Independent power module to any indoor unit.)**
- **If power supply is not applied to the indoor unit, operation error occur.**
- **Automatic Addressing is only possible on the master Unit.**
- **Automatic Addressing has to be performed after 3 minutes to improve communication.**

3. Flow chart for Chart for Auto-Addressing of Indoor and HR Unit

1) The Procedure of Automatic Addressing

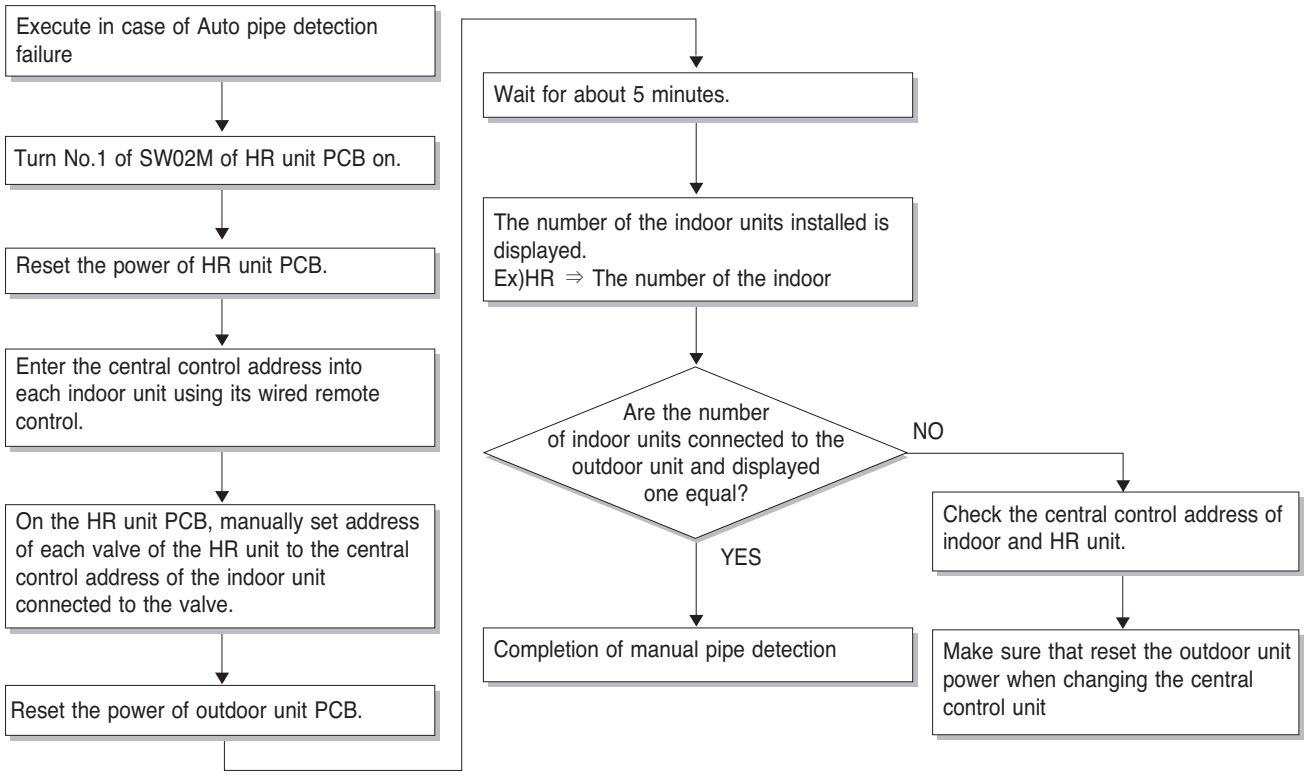


2) Flow chart of auto addressing for pipe detection



※ It is possible to be generated mode changing noise of heating and cooling which is normal. There is no mode changing noise at normal operation.

3) Flow chart of manual addressing for pipe detection



4. Example of Manual Valve Addressing(Non-Zoning setting)

(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)

• Prerequisite for manual valve addressing: central control address of each indoor unit must be preset differently at its wired remote control

No.	Display and setup	Setup and contents
1		• Operation: None • Display: None
2		• Operation: Turn No.1 of SW01M on to address valve #1 • Display: Existing value saved in EEPROM is displayed in 7-SEG.
3		• Operation: Set the digit of 10 to the number in group high data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing SW03M. • Display: Digit increasing with the times of pressing tack switch is displayed in left 7-SEG
4		• Operation: Set the digit of 1 to the number in group low data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing SW04M. • Display: Digit increasing with the times of pressing tack switch is displayed in right 7-SEG
5		• Operation: Turn No.1 of SW01M off to save the address of valve #1 • Display: "11" displayed in 7-SEG disappears

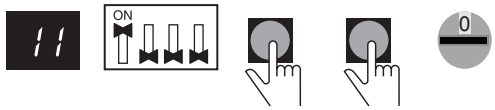
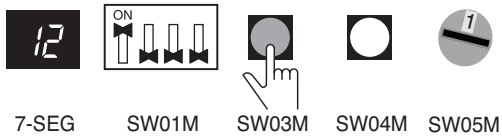
- Above setup must be done for all HR unit valves.
- The valve that is not connected with any indoor unit should be addressed with any other number than used address numbers of the valves connected with indoor units.
  (The valves does not work if the address numbers are same.)

5. Example of manual valve addressing (Zoning setting)

(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)
Zoning control is connecting 2 or more indoor units at one pipe of HR unit. In case of Zoning control, in order to set controls with multiple indoor units connection uses the rotary switch. Namely, only the rotary switch changes from same valve set condition and set indoor units connection.

1) On dip switch of the corresponding valves and sets the rotary switch at 0.
2) Setting the number with tact switch.
3) In case of addition of indoor units to same port, increases 1 with the rotary switch and sets number with tact switch.
4) In case of checking the number which the corresponding valve is stored, turn on dip switch and set the number of rotary switch.
5) Indoor units set available 7 per a port(rotary switch 0~6), in case of setting above of 7 with rotary switch, it will display error.
6) Setting the rotary switch on original condition(HR unit number set conditions) after all finishing a piping setting.
7) The rotary switch set value of above number of indoor units which is connected with FF and prevents a malfunction.
(Example: The case where 3 indoor units is connected in piping 1, sets from rotary switch 0,1,2 and 3,4,5 with FF set)

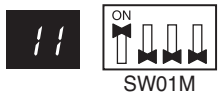
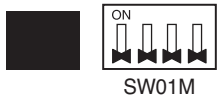
• Prerequisite for manual valve addressing: central control address of each indoor unit must be preset differently at its wired remote control.

No.	Display and setup	Setup and Contents
1		• Operation: None • Display: None
2		• Operation : Turn dip S/W No.1 on to address valve #1 • Display : Existing value saved in EEPROM is displayed in 7-SEG.
3		• Operation : Set the digit of 10(1) to the number in Group High data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing left tack S/W. • Display : Digit increasing with the times of pressing tack S/W is displayed in left 7-SEG.
4		• Operation : SW05M : 1 • Display : Display former value.
5		• Operation : Setting No. using SW03M and SW04M, SW05M : 1 • Display : Display setting value.
6		• Operation : Turn dip S/W No.1 off to save the address of valve #1 • Display : "11" displayed in 7-SEG disappears.
7		• Operation : Return valve of addressing HR unit. • Display : None

- Above setup must be done for all HR unit valves.
- The valve that is not connected with any indoor unit should be addressed with any other number than used address numbers of the valves connected with indoor units.
(The valves does not work if the address numbers are same.)

6. Example of Checking Valve Address

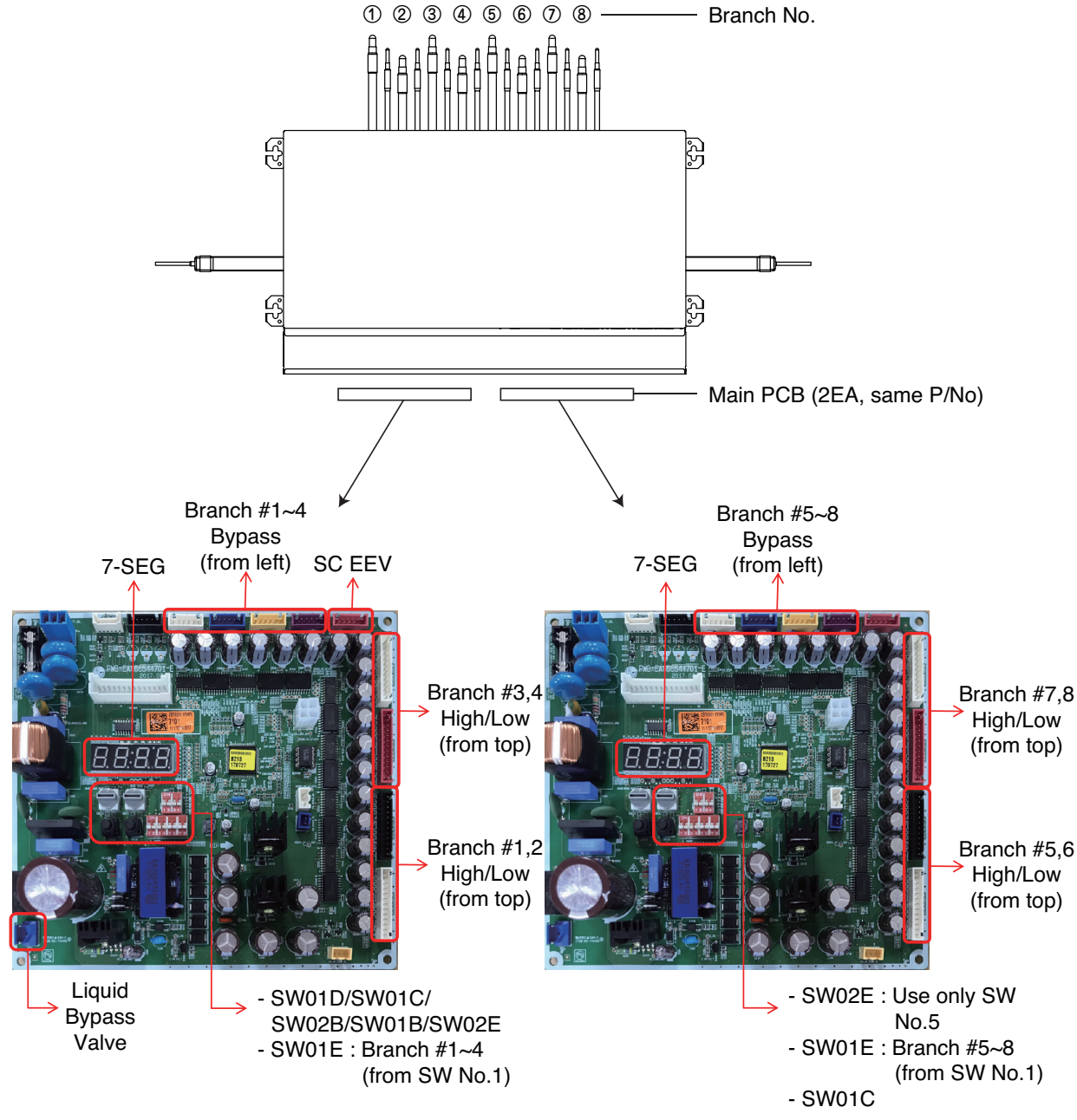
(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)

No.	Display and setup	Setup and contents
1		• Operation: Turn dip switch No.1 on. • Display: "11" is displayed in 7-SEG
2		• Operation: Turn dip switch No.1 on. • 7-SEG disappeared

7. Identification of Manual Valve ID (Address)

No.	Display and setup	Setup and contents
1		• Operation: more than 2 dip switches turned on. • Display: "Er" is displayed in 7-SEG

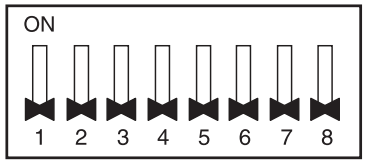
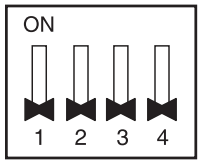
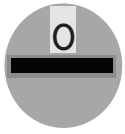
HR Unit PCB (PRHR**3A, ** : 02, 03, 04, 06, 08)



* Number from left in sequence for less-than-8 branch model.

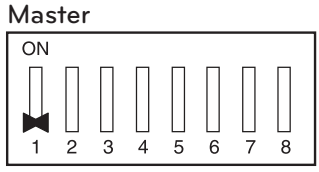
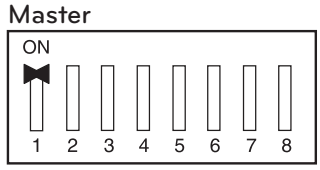
** PRHR043 / PRHR043A / PRHR033 / PRHR033A / PRHR023 / PRHR023A : Master Only

1. Switch for Setup of HR Unit

SW			Function
Dip SW		SW02E (8pin Dip SW)	Selection of the method for pipe detection Selection of Master/Slave Main PCB Setting the Zoning Control Selection of the No. of connected branches
		SW01E (4pin Dip SW)	Selection of the valve to address
Rotary SW		SW01D (Left)	Selection of the Valve Group Control Setting to address HR units
		SW01C (Right)	Manual addressing of zoning indoor units
Push SW		SW02B (Left)	Increase in the digit of 10
		SW01B (Right)	Increase in the digit of 1

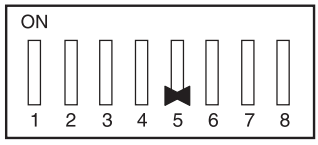
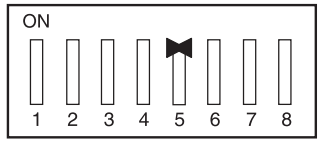
1. Main function of SW02E

ON S/W	Selection	
No.1	Method for pipe detection of an HR Unit (Auto/Manual)	
No.2	No. of connected branches	
No.3		
No.4		
No.5	Master/Slave (Main PCB) Setting	
No.6	EEPROM factory initialization (4,5,6)	
No.7	Use only in factory production (preset to "OFF")	Zoning setting ("ON")
No.8	Use only in factory production (preset to "OFF")	

Auto	Manual
Switch No.1 Off 	Switch No.1 On 

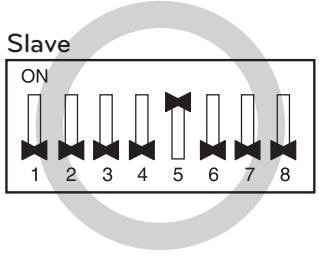
* Master Only

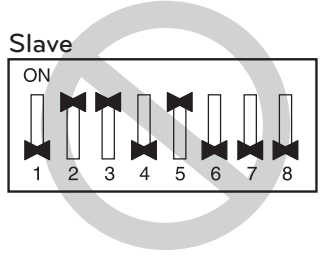
2) Selection of Master/Slave Main PCB

Master	Slave
Switch No.5 Off 	Switch No.5 On 

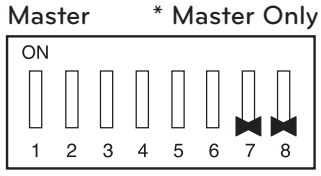
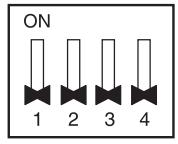
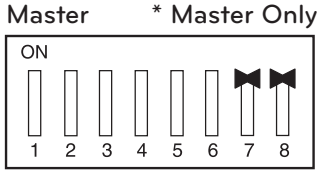
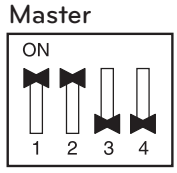
NOTE

Do not turn on any SW02E on Slave Main PCB except No.5.

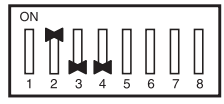
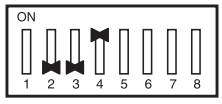
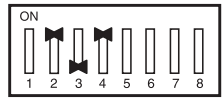
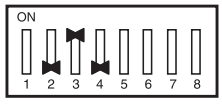
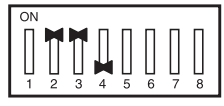
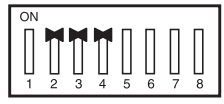




3) Setting the zoning control

	SW02E setting	SW01E setting
Normal control		 SW01E
Zoning control		 SW01E Turn the dip switch of the zoning branch on. EX) Branch 1,2 are zoning control.

4) Selection of the No. of connected branches

1 branch Connected		5 branch Connected	
2 branches Connected		6 branch Connected	
3 branches Connected		7 branch Connected	
4 branches Connected		8 branch Connected	

※ Each model is shipped with the switches No.2, 3, 4 pre-adjusted as above in the factory. * Master Only

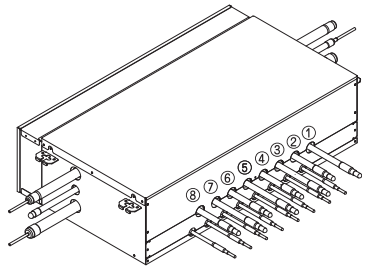
WARNING

If you want to use a “Model” for “No. of using branch(es)” HR Unit after closing the “Closing pipe No.”, set the dip switch for “No. of using branch(es)” HR Unit.
Ex) If you want to use a PRHR083 for 4 branches HR Unit after closing the 5~8th pipes, set the dip switch for 4 branches HR Unit.

2. Main function of SW01D

NOTE

Use the Valve Group Control when 2 branches are connected with only 1 indoor unit which has higher capacity than 61 kBTU.



* Master Only

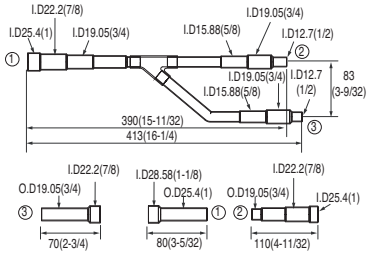
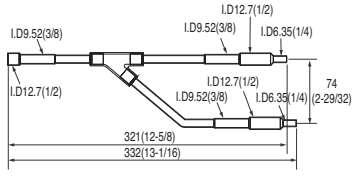
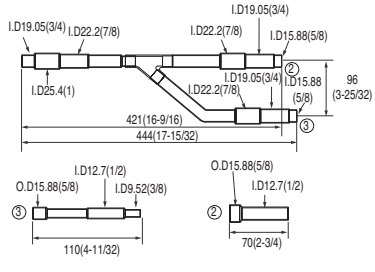
Valve Group	SW01D Setting	Valve Group	SW01D Setting
Not control	0	No. 5,6/7,8 Valve Control	8
No. 1,2 Valve Control	1	No. 1,2/5,6 Valve Control	9
No. 2,3 Valve Control	2	No. 1,2/7,8 Valve Control	A
No. 3,4 Valve Control	3	No. 3,4/5,6 Valve Control	B
No. 5,6 Valve Control	4	No. 3,4/7,8 Valve Control	C
No. 6,7 Valve Control	5	No. 1,2/3,4/5,6 Valve Control	D
No. 7,8 Valve Control	6	No. 1,2/3,4/6,7 Valve Control	E
No. 1,2/3,4 Valve Control	7	No. 1,2/3,4/7,8 Valve Control	F

Note:

If the large capacity indoor units are installed, below Y branch pipe should be used

* Y branch pipe

[Unit:mm(inch)]

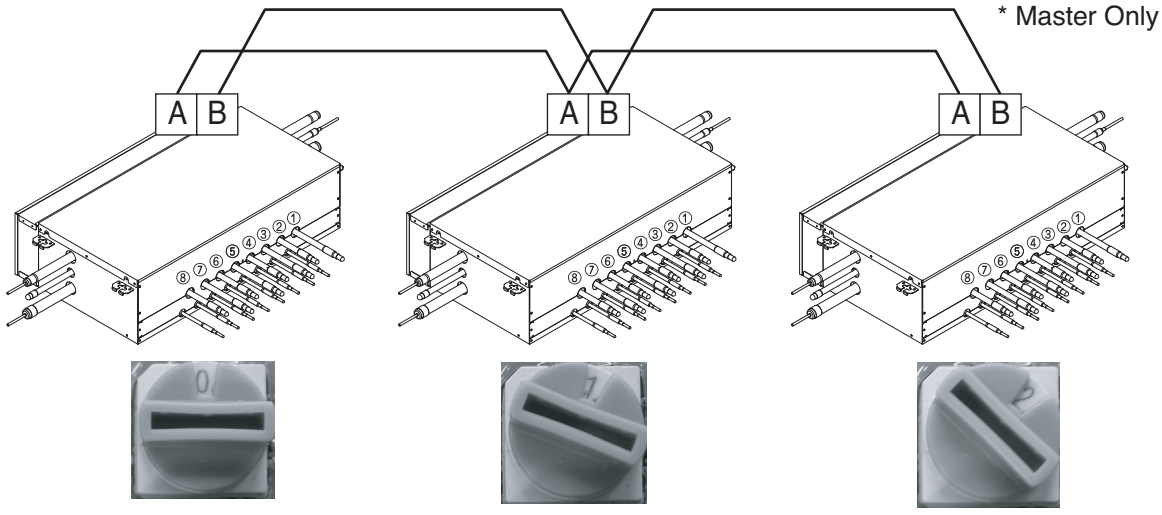
Models	Low Pressure Gas Pipe	Liquid pipe	High Pressure Gas Pipe
ARBLB03321			

For more information, refer accessory installation manual.

3. SW01C (Rotary S/W for addressing HR unit)

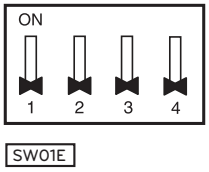
Must be set to '0' when installing only one HR unit.
When installing multiple HR units, address the HR units with sequentially increasing numbers starting from '0'.

Ex) Installation of 3 HR units



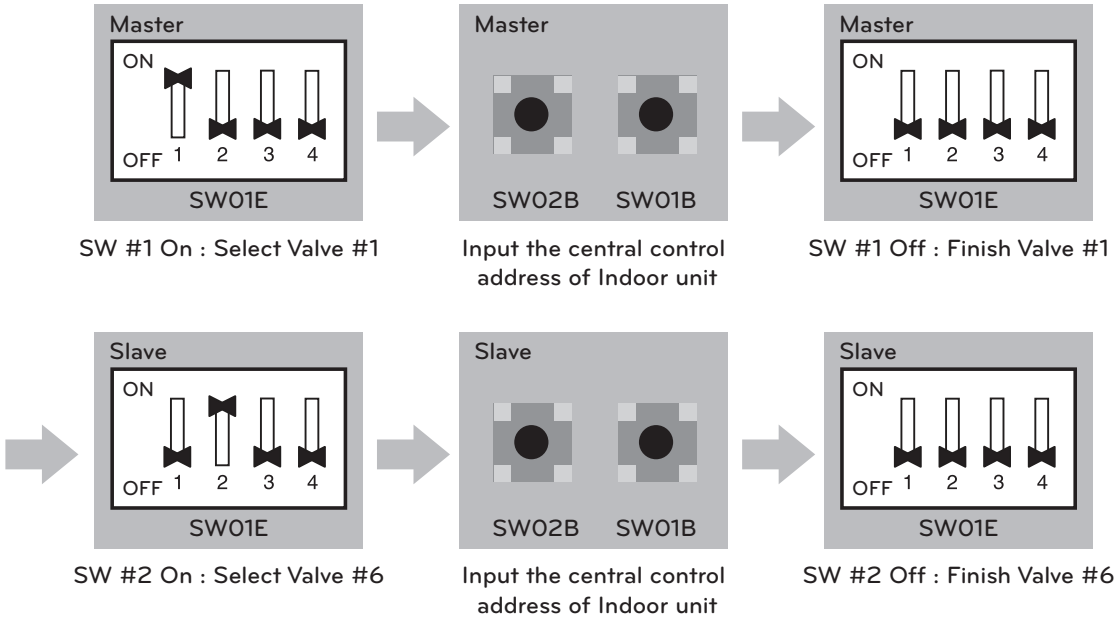
4. SW01B/SW01C/SW01E/SW02B (Dip S/W and push S/W for Manual pipe detection)

- Set the address of the valve of the HR unit to the central control address of the connected indoor unit.
- SW01E: selection of the valve to address
  SW02B: increase in the digit of 10 of valve address
  SW01B: increase in the last digit of valve address
  SW01C: Manual addressing of zoning indoor units (use for Zoning setting)
- Prerequisite for Manual pipe detection : central control address of each indoor unit must be preset differently at its wired remote control.

	S/W No.	Setup
	No.1	Manual addressing of valve #1 (Master) / #5 (Slave)
	No.2	Manual addressing of valve #2 (Master) / #6 (Slave)
	No.3	Manual addressing of valve #3 (Master) / #7 (Slave)
	No.4	Manual addressing of valve #4 (Master) / #8 (Slave)
	SW02B	Increase in the digit of 10 of valve address
	SW01B	Increase in the last digit of valve address
* Use for Zoning setting 	SW01C	Manual addressing of zoning indoor units

1) Normal setting (Non-Zoning setting)

ex) Manual pipe detection of Valve #1, 6.

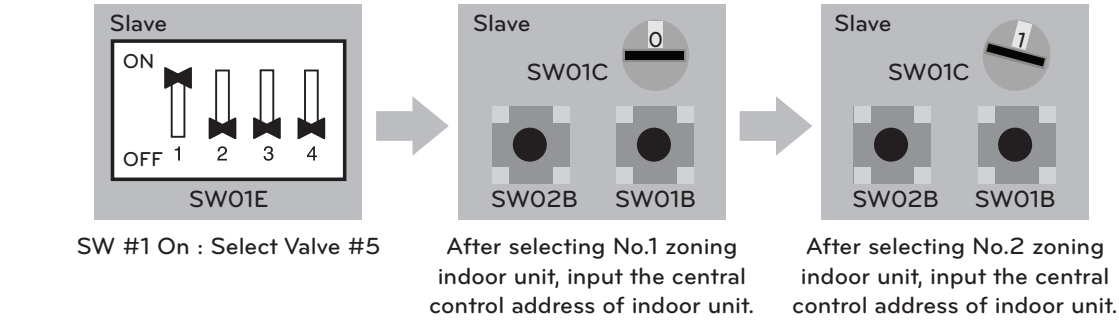


2) Zoning setting

Note:

Use the Zoning Control when install two or more indoor units at 1 branch of HR Unit. The indoor units controlled by Zoning Control can be selected collectively as the cooling/heating mode.

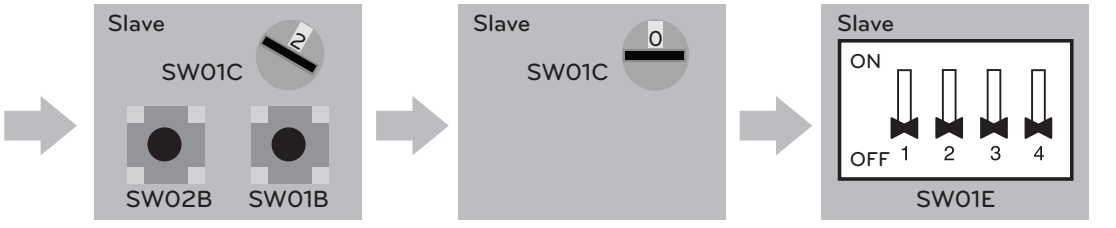
ex) Manual pipe detection of Valve #5 with three zoning indoor units, #6 without zoning unit.



SW #1 On : Select Valve #5

After selecting No.1 zoning indoor unit, input the central control address of indoor unit.

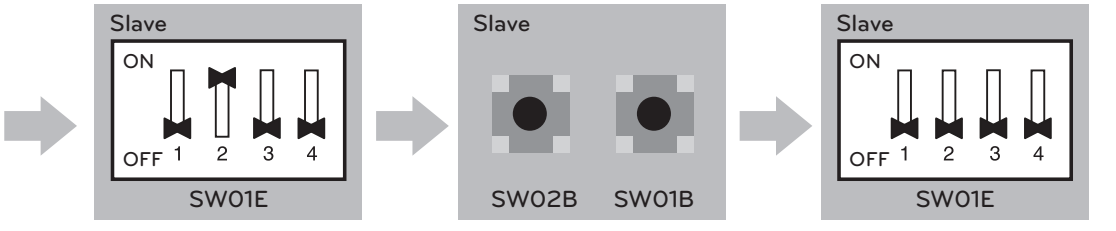
After selecting No.2 zoning indoor unit, input the central control address of indoor unit.



After selecting No.3 zoning indoor unit, input the central control address of indoor unit.

Setting SW01C to '0'

SW #1 Off : Finish Valve #5



SW #2 On : Select Valve #6

Input the central control address of Indoor unit

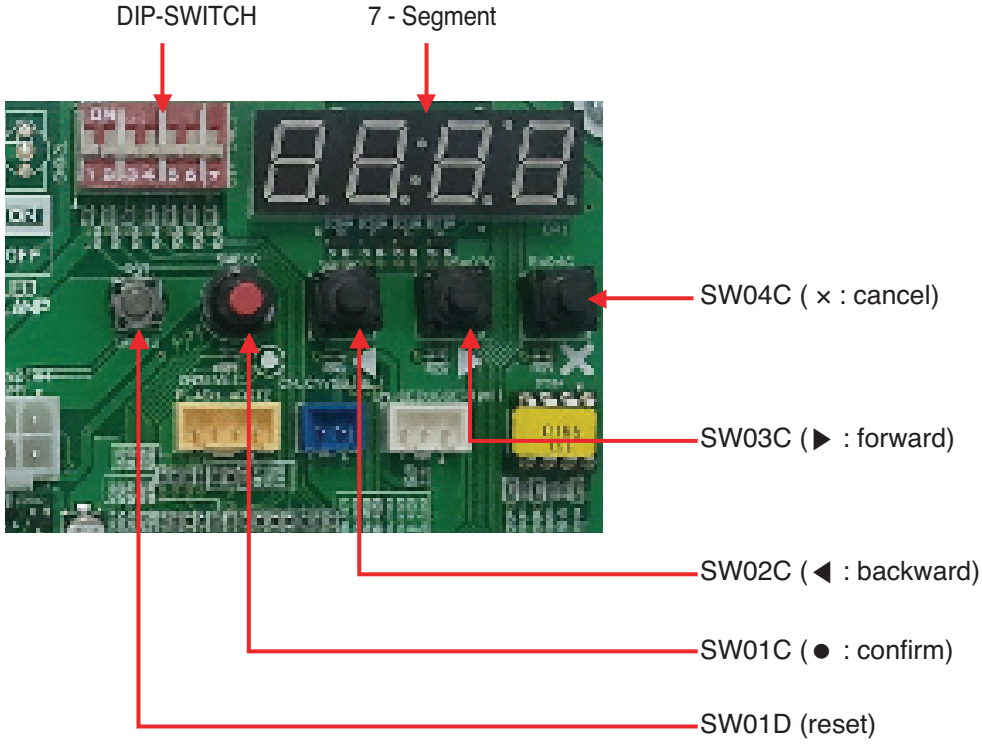
SW #2 Off : Finish Valve #6

2. Automatic Addressing

The address of indoor units would be set by Automatic Addressing

- Wait for 3 minutes after supplying power.
  (Master and Slave outdoor units, indoor units)
- Press RED button of the outdoor units for 5 seconds. (SW01C)
- A “88” is indicated on 7-segment LED of the outdoor unit PCB.
- For completing addressing, 2~7 minutes are required depending on numbers of connected indoor units
- Numbers of connected indoor units whose addressing is completed are indicated for 30 seconds on 7-segment LED of the outdoor unit PCB
- After completing addressing, address of each indoor unit is indicated on the wired remote control display window. (CH01, CH02, CH03, ……, CH06 : Indicated as numbers of connected indoor units)

■ **MAIN PCB**

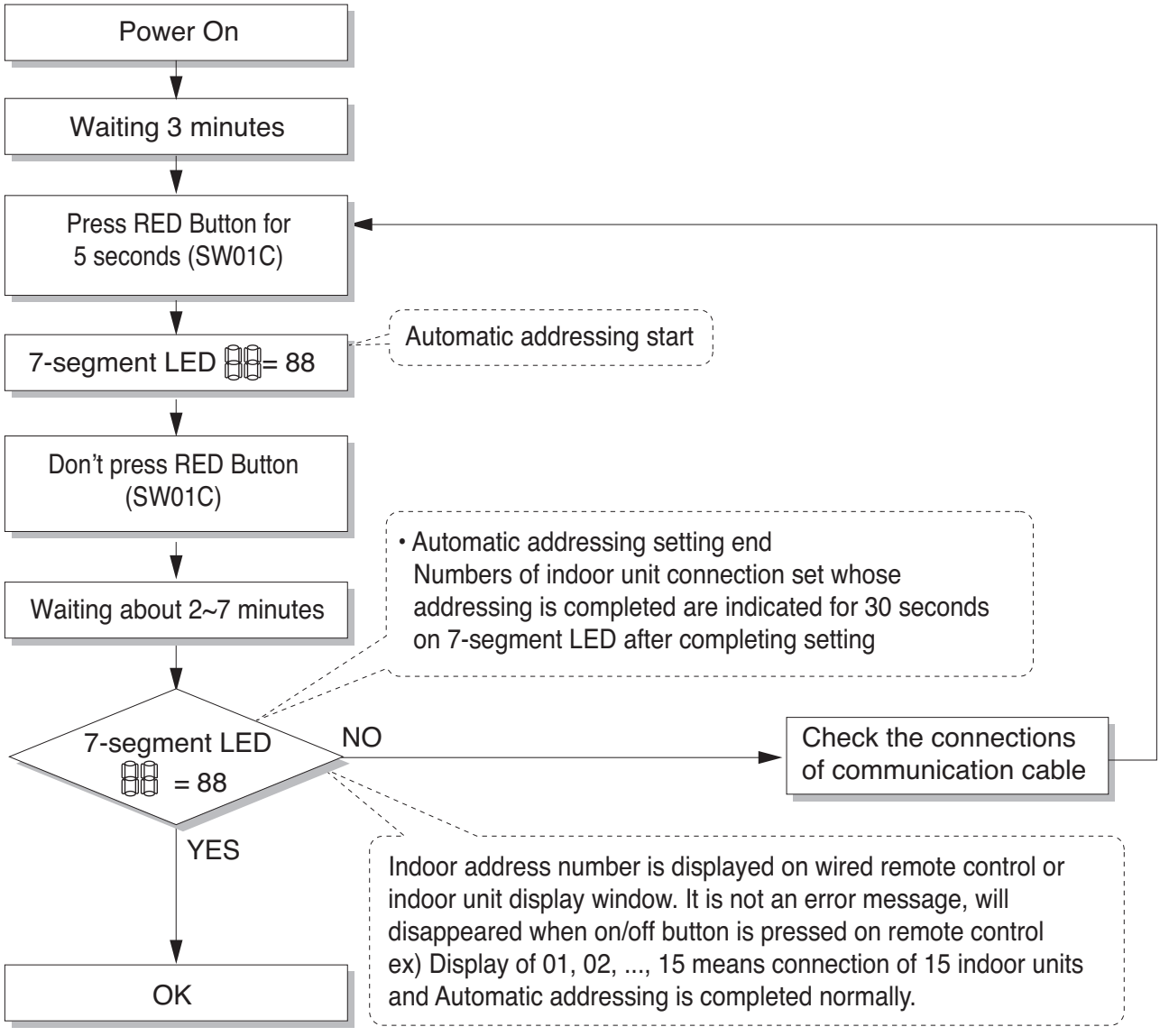


CAUTION

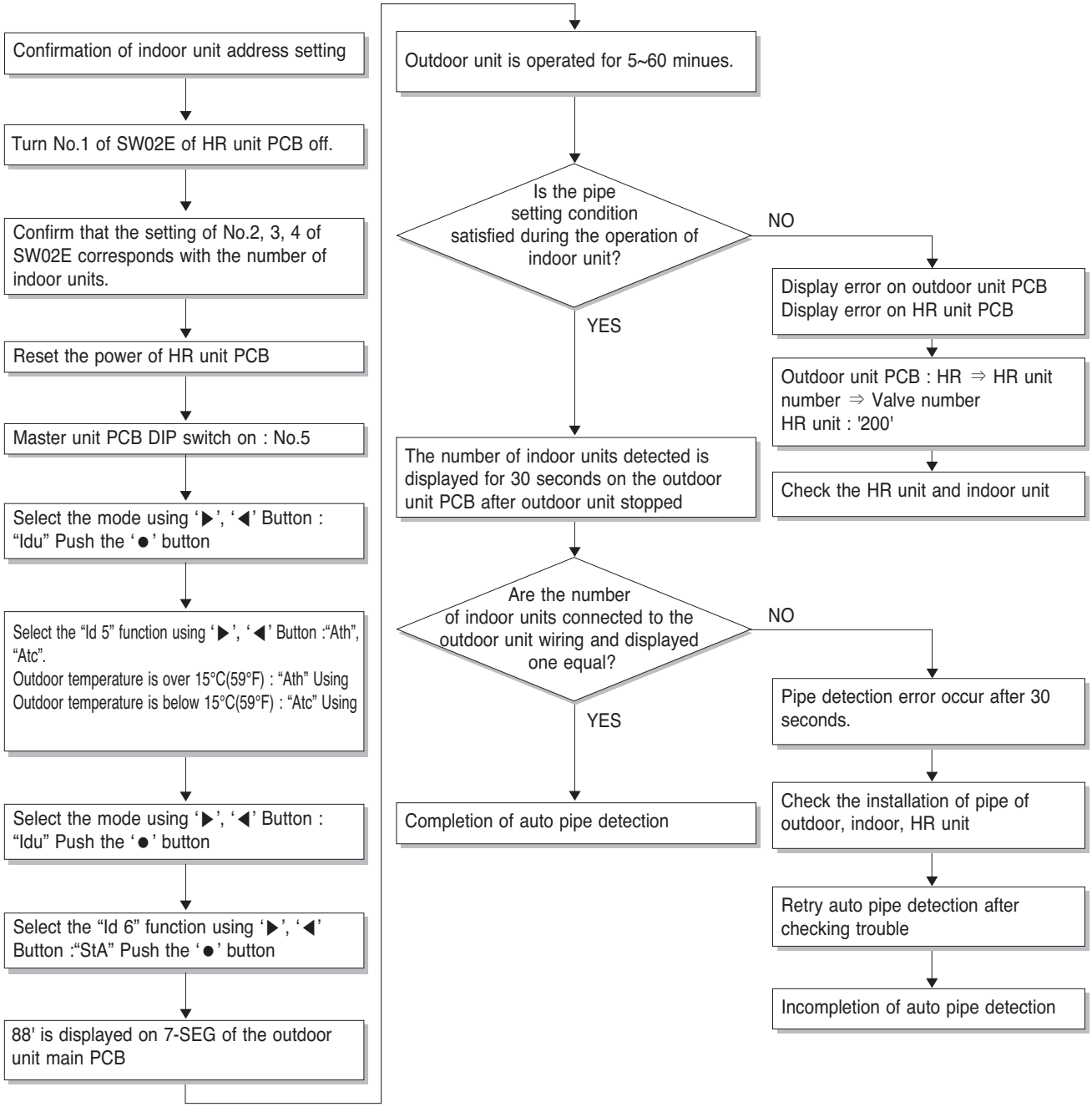
- **In replacement of the indoor unit PCB, always perform Automatic addressing setting again (At that time, please check about using Independent power module to any indoor unit.)**
- **If power supply is not applied to the indoor unit, operation error occur.**
- **Automatic Addressing is only possible on the master Unit.**
- **Automatic Addressing has to be performed after 3 minutes to improve communication.**

3. Flow chart for Chart for Auto-Addressing of Indoor and HR Unit

1) The Procedure of Automatic Addressing

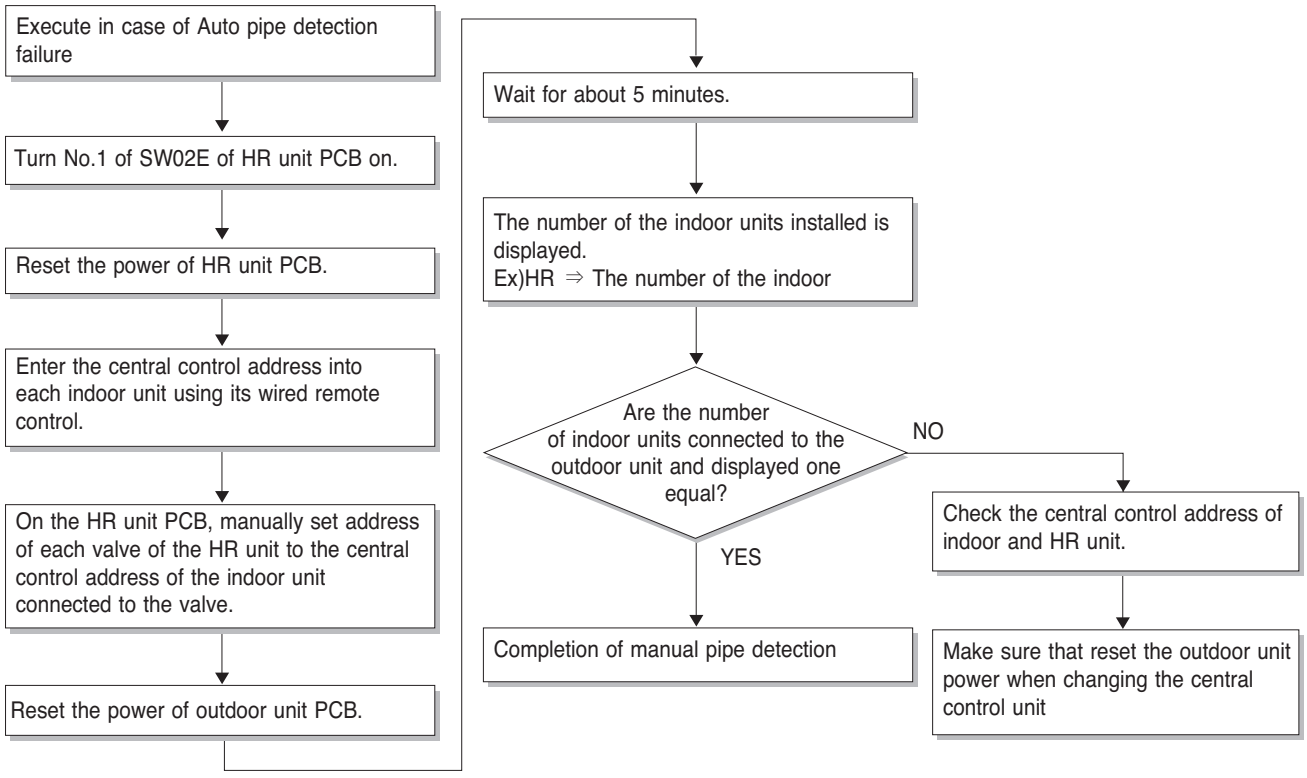


2) Flow chart of auto addressing for pipe detection



※ It is possible to be generated mode changing noise of heating and cooling which is normal. There is no mode changing noise at normal operation.

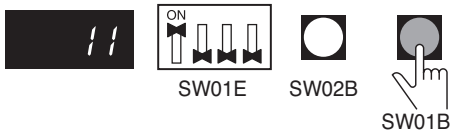
3) Flow chart of manual addressing for pipe detection



4. Example of Manual Valve Addressing(Non-Zoning setting)

(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)

• Prerequisite for manual valve addressing: central control address of each indoor unit must be preset differently at its wired remote control

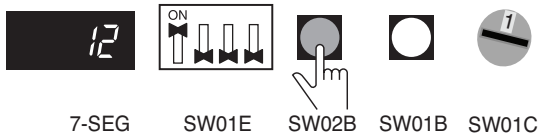
No.	Display and setup	Setup and Contents
1		• Operation: None • Display: None
2		• Operation: Turn dip S/W No.1 on to address valve #1 • Display: Existing value saved in EEPROM is displayed in 7-SEG.
3		• Operation: Set the digit of 10 to the number in Group High data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing left tack S/W. • Display: Digit increasing with the times of pressing tack S/W is displayed in left 7-SEG
4		• Operation: Set the digit of 1 to the number in Group Low data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing right tack S/W. • Display: Digit increasing with the times of pressing tack S/W is displayed in right 7-SEG
5		• Operation: Turn dip S/W No.1 off to save the address of valve #1 • Display: "11" displayed in 7-SEG disappears

- Above setup must be done for all HR unit valves.
- The valve that is not connected with any indoor unit should be addressed with any other number than used address numbers of the valves connected with indoor units.
  (The valves does not work if the address numbers are same.)

5. Example of manual valve addressing(Zoning setting)

(In case that indoor units of central control address “11”, “12” respectively are connected to a valve #1 of an HR Unit.)
Zoning control is connecting 2 or more indoor units at one pipe of HR unit. In case of Zoning control, in order to set controls with multiple indoor units connection uses the rotary switch. Namely, only the rotary switch changes from same valve set condition and set indoor units connection.

1) On dip switch of the corresponding valves and sets the rotary switch at 0.
2) Setting the number with tact switch.
3) In case of addition of indoor units to same port, increases 1 with the rotary switch and sets number with tact switch.
4) In case of checking the number which the corresponding valve is stored, turn on dip switch and set the number of rotary switch.
5) Indoor units set available 8 per a port(rotary switch 0~7), in case of setting above of 8 with rotary switch, it will display error.
6) Setting the rotary switch on original condition(HR unit number set conditions) after all finishing a piping setting.
7) The rotary switch set value of above number of indoor units which is connected with FF and prevents a malfunction.
(Example: The case where 3 indoor units is connected in piping 1, sets from rotary switch 0,1,2 and 3,4,5,6,7 with FF set)
• Prerequisite for manual valve addressing: central control address of each indoor unit must be preset differently at its wired remote control.

No.	Display and setup	Setup and Contents
1		• Operation: None • Display: None
2		• Operation : Turn dip S/W No.1 on to address valve #1 • Display : Existing value saved in EEPROM is displayed in 7-SEG.
3		• Operation : Set the digit of 10(1) to the number in Group High data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing left tack S/W. • Display : Digit increasing with the times of pressing tack S/W is displayed in left 7-SEG.
4		• Operation : SW05M : 1 • Display : Display former value.
5		• Operation : Setting No. using SW03M and SW04M, SW05M : 1 • Display : Display setting value.
6		• Operation : Turn dip S/W No.1 off to save the address of valve #1 • Display : "11" displayed in 7-SEG disappears.
7		• Operation : Return valve of addressing HR unit. • Display : None

- Above setup must be done for all HR unit valves.
- The valve that is not connected with any indoor unit should be addressed with any other number than used address numbers of the valves connected with indoor units.(The valves does not work if the address numbers are same.)

6. Example of Checking Valve Address

(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)

No.	Display and setup	Setup and contents
1		• Operation: Turn dip switch No.1 on. • Display: "11" is displayed in 7-SEG
2		• Operation: Turn dip switch No.1 on. • 7-SEG disappeared

7. Identification of Manual Valve ID (Address)

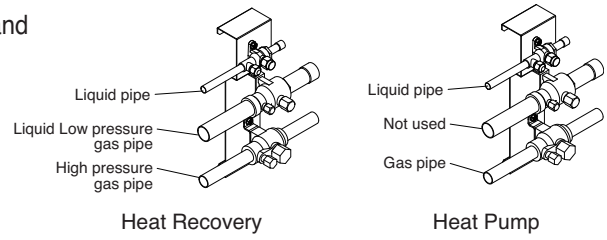
No.	Display and setup	Setup and contents
1		• Operation: more than 2 dip switches turned on. • Display: "Er" is displayed in 7-SEG

CAUTION

- Waiting for 80seconds after power on.
- The zoning information and Master IDU information remove from EEPROM after Auto-addressing.
- If there is installed the central control, it is impossible setting of Master IDU in zoning.

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	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. NOTE: Never carry out megaohm check over terminal control board. Otherwise the control board would be broken. 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 MΩ as a result of refrigerant accumulating in the internal compressor. If the insulation resistance is less than 2 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.
3	**[For Heat Recovery system]** Check if liquid pipe and high/low pressure gas pipe valves are fully opened. **[For Heat Pump system]** Check if the liquid pipe and gas pipe valves are fully opened. NOTE : In case of Heat Pump system, check if liquid pipe and gas pipe valves fully opened. But the middle positioned pipe valve should be closed. (No use) NOTE: Be sure to tighten caps. 
4	Check if there are any problems in automatic addressing or not: Check and confirm that there are no error messages in the display of indoor units or remote controls and LED in outdoor units.

⚠ CAUTION

when cutting main power of the Multi V Water5

- **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(L1)-S(L2)-T(L3) misconnection	Check compressor R(L1)-S(L2)-T(L3) connection
Outdoor EEV	Heating failure	Bad connector contact	Check connector
	No operating sound at applying power	Coil failure	Check resistance between terminals
	Low pressure error or discharge temperature error	EEV clogged	Service necessary

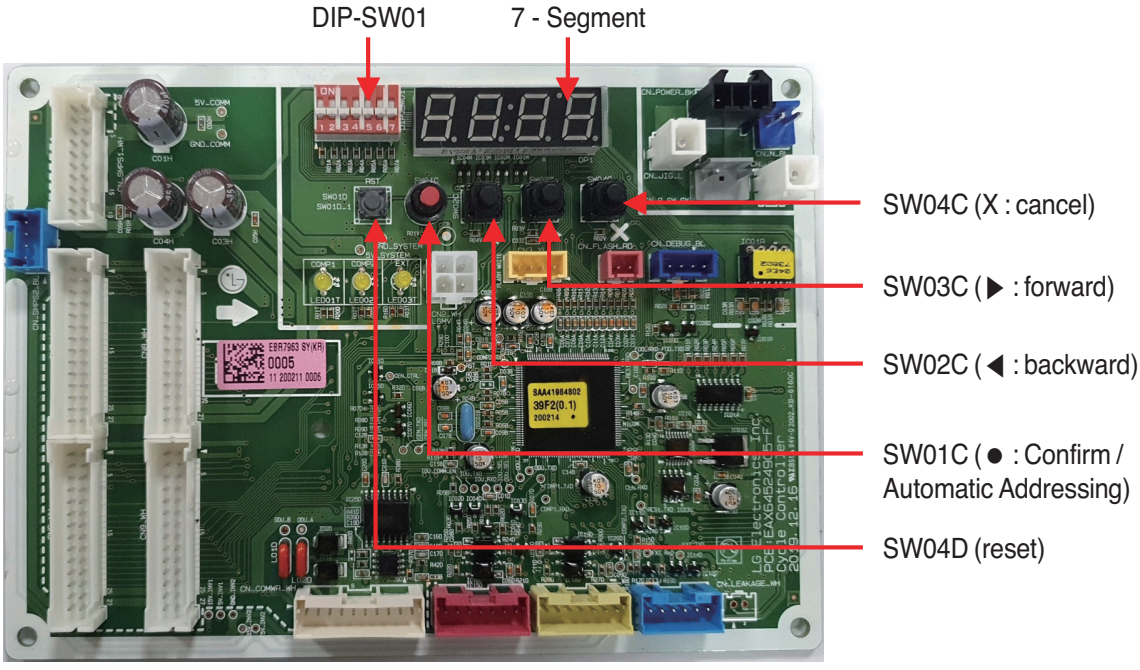
When system fault occurs, the error code is displayed at indoor unit display or remote control display, the trouble shooting guide is in the service manual

• 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 Recovery / 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. (For example, represents R410A 30HP)

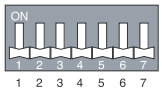
• Initial display order

Order	No	Mean
①	8~20	Master model capacity(HP)
②	10~20	Slave 1 model capacity(HP)
③	10~20	Slave 2 model capacity(HP)
④	8~54	Total capacity(HP)
⑤	2	Heat Pump
	3	Heat Recovery (Factory Setting)
⑥	38	380 V model
	46	460 V model
	57	575 V model
	22	220 V model
⑦	1	Full function

• Example) ARWM480CAS5

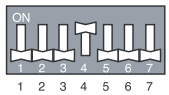
①	②	③	④	⑤	⑥	⑦
20	14	14	48	3	57	1

• Master Unit

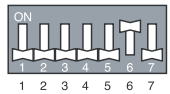
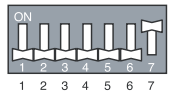
Dip switch setting


❊ Heat Pump installation

① Turn on the DIP s/w No 4.

DIP switch setting	ODU Setting
	Setting Heat pump system or Heat Recovery system (Installer Setting)

• Slave Unit

Dip switch setting	ODU Setting
	Slave 1
	Slave 2

② The factory setting display is appeared “HR”.

③ Change “HR” into “HP” display pushing
▶ button and then push confirm button.

④ Turn off the DIP s/w No 4. and Push reset button to restart the system.
(If you turn on the DIP s/w No 4, you can make sure “HR” or “HP” display later.)

Part 5
Trouble shooting guide

Trouble shooting guide

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 EEV	Heating failure	Bad connector contact	Check resistance between terminals
	No operation sound after switching ON the power supply	Coil failure	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	

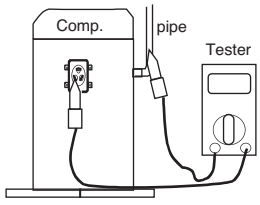
When system fault occurs, the error code is displayed on the indoor unit display or remote control display. The trouble shooting guide is available in the service manual.

• 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:

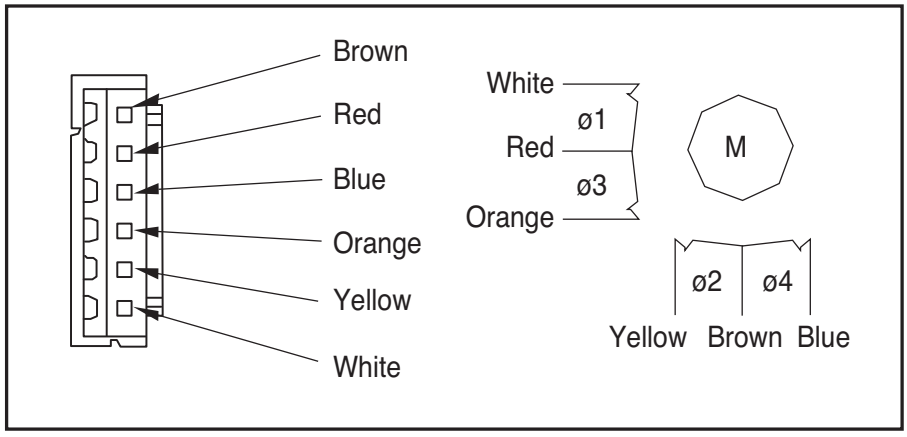
No.	Checking Item	Symptom	Countermeasure
1	Is how long power on during operation?	1) Power on for 12 hours or more	* Go to No.2.
		2) Power on for 12 hours or less	* Go to No.2 after applying power for designated time (12 hours).
2	Does failure appears again when starting operation?  Figure 1.	1) The compressor stops and same error appears again.	* Check IPM may fail.
		2) If output voltage of the inverter is stably output. *1	* Check insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor. * Insulation resistor : 50 MΩ or more
		3) If output voltage of the inverter is unstable or it is 0V. (When incapable of using a digital tester)	* Check the IPM. If the IPM is normal, replace the inverter board. * Check 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 since 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 Electronic Expansion Valve



• Pulse signal output value and valve operation

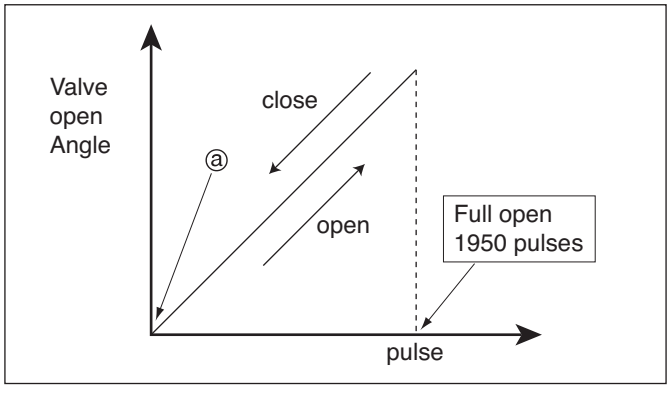
Output(Ø) No.	Wire Color	Output state			
		1	2	3	4
Ø1	White	ON	ON	OFF	ON
Ø2	Yellow	ON	ON	ON	OFF
Ø3	Orange	OFF	OFF	ON	OFF
Ø4	Blue	OFF	OFF	OFF	ON

• 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



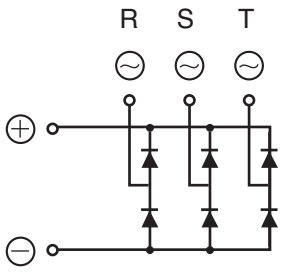
- At power ON, open angle signal of 2000 pulses output and valve position is set to ⓐ
  If valve operates smoothly, no noise and vibration occurs and if valve is closed. noise occurs.
- Noise from EEV can be confirmed by touching the EEV surface with a screw driver and listening the EEV noise.
- If liquid refrigerant is in EEV, the noise is lower.

• EEV failure check method

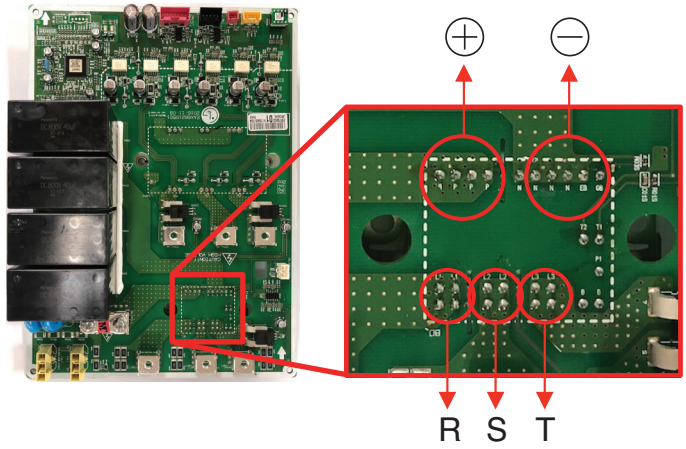
Failure mode	Diagnosis	Repair process	Unit
EEV locking	1.If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV	Indoor / Outdoor unit
EEV Motor coil short or misconnection	1. Check the resistance between coil terminal (Red-White, Red-Orange, Brow-Yellow, Brown-Blue)	Replace EEV	Indoor Unit
	1. Sub cooling EEV : Check the resistance between coil terminal (Red-White, Red-Yellow, Red-Orange, Red-Blue) 2. If the measured resistance value is in 52 Ω ± 3 %(@ 20°C [68°F]), then the EEV is normal.	Replace EEV coil	Outdoor Unit
	1. Main / VI EEV : Check the resistance between coil terminal (Red-White, Red-Orange, Brown-Yellow, Brown-Blue) 2. If the measured resistance value is in 150 Ω ± 10 %, then the EEV is normal.	Replace EEV	Outdoor Unit
Full closing (valve leakage)	1. Operate indoor unit with FAN mode and operate another indoor unit with COOLING mode 2. Check indoor unit(FAN mode) liquid pipe temperature (from operation monitor of outdoor unit control board) 3. When fan rotate and EEV is fully closed, if there is any leakage, then the temperature is down If measured temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed	If the amount of leakage is much, Replace EEV	Indoor unit
Incomplete Connector connection or assembly	1. Check the Pin fully engaged into connector and check the color of electric wire 2. After removing the connector on the control board and check with tester.	Check the incorrectly connected part	Outdoor Unit Indoor Unit

2.3 Inverter Bridge Diode Checking Method

Internal circuit diagram



Appearance



1. Wait until Comp PCB DC voltage gets discharged, after the main power switch off (10 minutes).
2. Pull out all the 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 short (0 Ω) or Open (hundreds MΩ), the Inverter PCB needs to be replaced.
6. In case that bridge diode is damaged, check if the Inverter PCB needs be replaced.

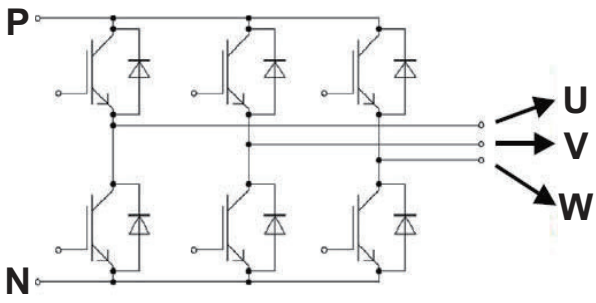
Diode terminal / Tester terminal	+ terminal: black(-)	- terminal: red(+)
R(~) : red(+)	0.4 V ~ 0.7 V	-
S(~) : red(+)	0.4 V ~ 0.7 V	-
T(~) : red(+)	0.4 V ~ 0.7 V	-
R(~) : black(-)	-	0.4 V ~ 0.7 V
S(~) : black(-)	-	0.4 V ~ 0.7 V
T(~) : black(-)	-	0.4 V ~ 0.7 V

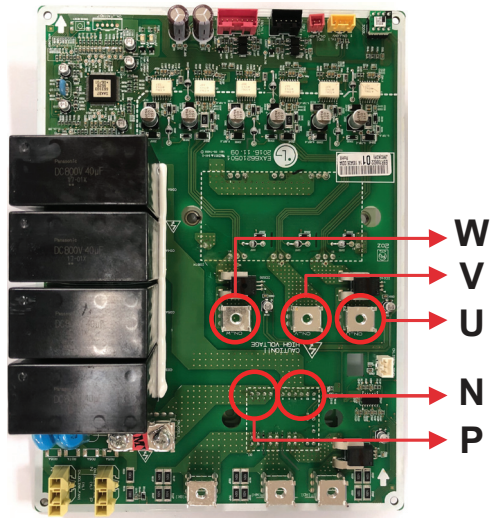
✻ Red(+) and black(-) are the measuring terminals of multi tester.

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.**

2.4 Inverter IPM/IGBT Checking Method





1. Wait until the Inverter PCB DC voltage is discharged after main power off. (10 minutes)
2. Pull out all the connector connected with Inverter PCB.
3. Set multi tester to resistance mode.
4. Measured value should be 0.2 ~ 0.6 V measuring as below table.
5. In case that the measured value is different from the table, set multi tester to resistance mode and measure. If the value is short (0 Ω) or Open (hundreds MΩ), Inverter PCB needs to be replaced.
6. In case measured value is different from the table, PCB needs to be replaced.(PCB damaged).

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

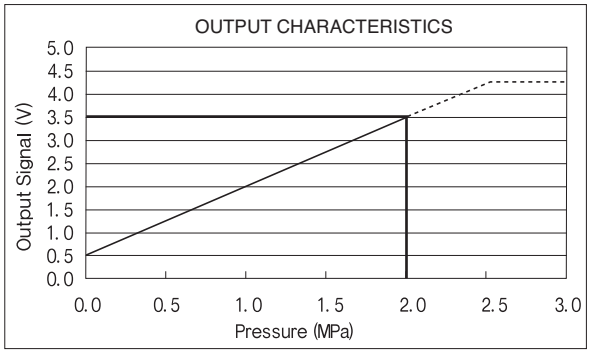
✻ Red(+) and black(-) are the measuring terminals of multi tester.

2.5 Pressure Sensor(High/Low Pressure Sensor)

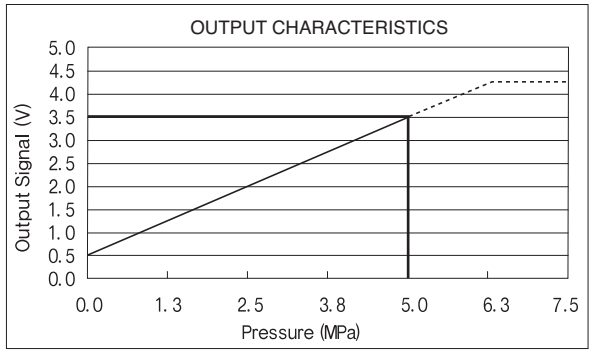
Connect manifold gauge to the service valve of Outdoor unit, and compare the output of high pressure sensor to the output of low pressure sensor to detect the defect.

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.

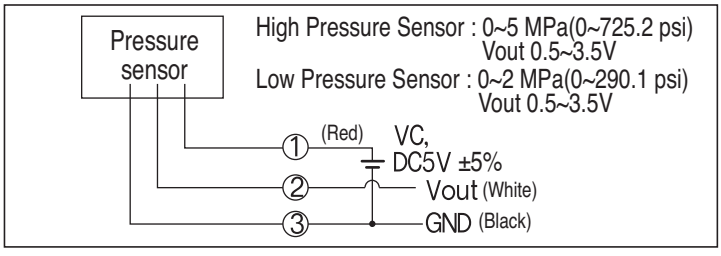
<Low Pressure Sensor>



<High Pressure Sensor>



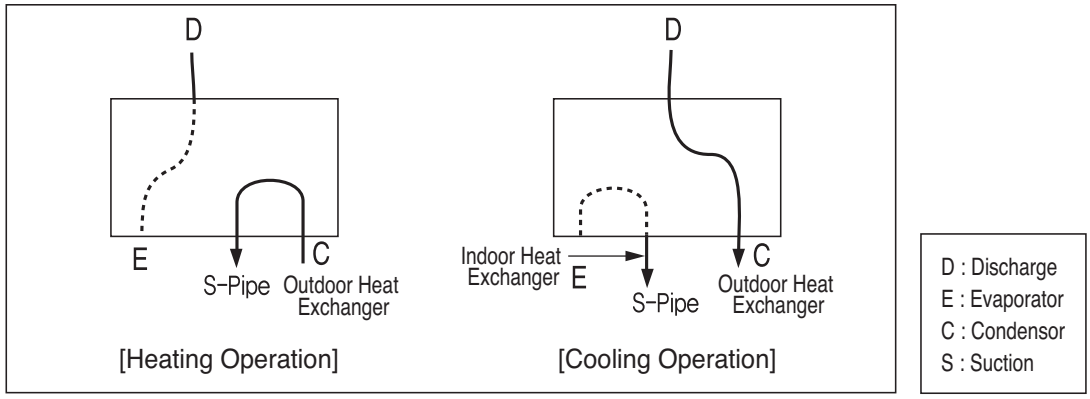
1) If the pressure of manifold gauge is 0~1kg/cm², it indicates the pressure got lower due to the leakage of refrigerant. Find the place of leakage and fix it.
2) If the difference of the outputs of high and low pressure is in the range of 1kg/cm², the pressure sensor is normal.
3) If the difference of the outputs of high and low pressure is over 1kg/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 5V 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.

2.6 Reverse 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 100mΩ when measure it with DC mega tester(DC 500V).

2.7 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	10KΩ±1%[25°C(77°F)]	5KΩ±1%[25°C(77°F)]	200KΩ±1%[25°C(77°F)]
	1.07KΩ±3.3%[85°C(185°F)]	535Ω±3.3%[85°C(185°F)]	28KΩ±7.7%[85°C(185°F)]

2.8 Others

Electrolytic capacitor and resistor for voltage distribution

1) Disconnect an terminal of voltage distribution resistor from each DC link electrolytic capacitor
2) Set the multi meter to resistance mode, connect the probe to +,- terminal of the capacitor. If the estimated resistance value is increase continuously without short(value is 0), then the resistor is normal
3) Set the multi meter to resistance mode, confirm that the resistance value of the resistor is around 270 kOhm

Check and replace inferior components

3. Self-diagnosis function

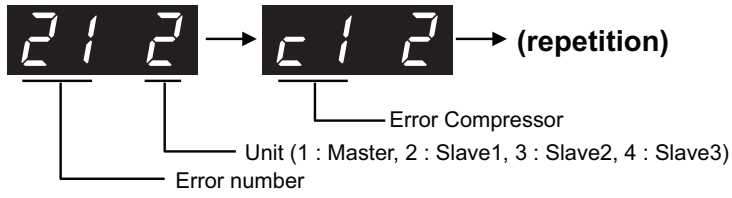
Error Indicator

- 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



❉ Refer to the DX-Venitilation manual for DX-Venitilation error code

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	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	8	-	Hydro Kit Hot water storage tank Temperature sensor	Pipe temperature sensor is open or short
		0	9	-	Indoor EEPROM Error	In case when the serial number marked on EEPROM of Indoor unit is 0 or FFFFFF
		1	0	-	Poor fan motor operation	Disconnecting the fan motor connector / Failure of indoor fan motor lock
		1	1	-	Communication error : Hydro Kit Indoor unit ↔ Inv.PCB	Failing to receive Inv. PCB signal in indoor unit
		1	2	-	Hydro Kit Inv.PCB error	Hydro Kit Inv.PCB error
		1	3	-	Hydro Kit Solar heat piping temperature sensor error	Pipe temperature sensor is open or short
		1	4	-	Hydro Kit Indoor unit Flow switch error	Flow switch flow detection error
		1	5	-	Hydro Kit Liquid pipe Strange overheat Error	Temperature sensor defective or hot water inflow
		1	6	-	Hydro Kit Indoor unit Inlet and Outlet pipe Temperature sensor Error	Pipe temperature sensor is open or short
		1	7	-	Hydro Kit Indoor unit Inlet pipe Temperature sensor Error Outside air Introduction duct Inlet pipe Temperature sensor Error	Pipe temperature sensor is open or short
		1	8	-	Hydro Kit Indoor unit Outlet pipe Temperature sensor Error	Pipe temperature sensor is open or short

	Display				Title	Cause of Error
Indoor unit related error	2	3	0	-	Error in refrigerant leakage detection	Occurs when a refrigerant leakage sensor is detecting refrigerant leakage
	2	3	7	-	Poor communication between the outdoor unit and the indoor unit	The indoor unit could not receive the communication signal from the outdoor unit for at least 3 consecutive minutes
	2	3	8	-	Poor communication between the controlling part of the outdoor unit and the indoor unit.	The controlling part of the outdoor unit could not receive the signal for controlling the indoor unit
Outdoor unit related error		2	1	*	Master Outdoor Unit Inverter Compressor IPM Fault	Master Outdoor Unit Inverter Compressor Drive IPM Fault
		2	2	*	Inverter PCB Input Over Current(RMS) of Master Outdoor Unit	Master Outdoor Unit Inverter PCB Input Current excess (RMS)
		2	3	*	Master Outdoor Unit Inverter Compressor DC Link Low or High Voltage	System is turned off by Master Outdoor Unit DC Link Low/High Voltage.
		2	4	*	Master Outdoor Unit High Pressure Switch	System is turned off by Master Outdoor Unit high pressure switch.
		2	5	*	Master Outdoor Unit Input Voltage High/ Low Voltage	Master Outdoor Unit input voltage is over 537 V or below 247 V (ARWM***LAS5) Master Outdoor Unit input voltage is over 310 V or below 143 V (ARWM***BAS5) Master Outdoor Unit input voltage is over 598 V or below 320 V (ARWM***DAS5) Master Outdoor Unit input voltage is over 776 V or below 373 V (ARWM***CAS5)
		2	6	*	Master Outdoor Unit Inverter Compressor Start Failure	The first start failure by Master Outdoor Unit Inverter Compressor abnormality or Compressor locked
		2	8	*	Master Outdoor unit inverter DC link over-voltage error	Compressor turned Off due to master Outdoor unit inverter DC voltage over-charge
		2	9	*	Master Outdoor Unit Inverter Compressor Over Current	Master Outdoor Unit Inverter Compressor Fault or some bits in pipe.
		3	2	*	Master Outdoor Unit Inverter Compressor1 High Discharge Temperature	Master Outdoor Unit Inverter Compressor1 High Discharge Temperature
		3	4	*	High Pressure of Master Outdoor Unit	High Pressure of Master Outdoor Unit
		3	5	*	Low Pressure of Master Outdoor Unit	Low Pressure of Master Outdoor Unit
		3	6	*	Master Outdoor unit Low Compression Ratio Limited	Master Outdoor unit stayed under low Compression limit for 3 minutes
		4	0	*	Master Outdoor Unit Inverter Compressor CT Sensor Fault	Master Outdoor Unit Inverter Compressor CT Sensor open or short
		4	1	*	Master Outdoor Unit Inverter Compressor1 Discharge Temperature Sensor Fault	Master Outdoor Unit Inverter Compressor Discharge Temperature Sensor open or short
		4	2	*	Master Outdoor Unit Low Pressure Sensor Fault	Master Outdoor Unit Low Pressure Sensor open or short
		4	4	*	Master Outdoor Unit Air Temperature Sensor Fault	Master Outdoor Unit Air Temperature Sensor open or short

Display					Title	Cause of Error
Outdoor unit related error		4	6	*	Master Outdoor Unit Suction Temperature Sensor Fault	Master Outdoor Unit Suction Temperature Sensor open or short
		4	9	*	Master Outdoor Unit Faulty IPM Temperature Sensor	Master Outdoor Unit IPM Temperature Sensor short/open
		5	0	*	Omitting connection of R, S, T power of Master Outdoor Unit	Omitting connection of Master outdoor unit
		5	1	*	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of Outdoor Unit
		5	2	*	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Master Outdoor Unit
		5	3	*	Communication error : indoor unit → Main PCB of Outdoor Unit	Failing to receive indoor unit signal at main PCB of Outdoor Unit.
		5	7	*	Communication error : Main PCB → inverter PCB	Failing to receive signal main PCB at inverter PCB of Master Outdoor Unit
		5	9	*	Wrong setting between master and slave Outdoor unit	When geothermal mode setting is different (Fn 2 setting)
		6	0	*	Inverter PCB EEPROM Error of Master Outdoor Unit	Access Error of Inverter PCB of Master Outdoor Unit
		6	2	*	Master Outdoor Unit Inverter Heatsink High Temperature	System is turned off by Master Outdoor Unit Inverter Heatsink High Temperature
		6	5	*	Master Outdoor Unit Inverter Heatsink Temperature Sensor Fault	Master Outdoor Unit Inverter Heatsink Temperature Sensor open or short
		7	1	*	Inverter CT Sensor Error of Master Outdoor Unit	Inverter CT Sensor open or short of Master Outdoor Unit
		8	6	*	Master Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Master Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
	1	0	4	*	Communication Error Between Master Outdoor Unit and Other Outdoor Unit	Failing to receive Slave Unit signal at main PCB of Master Outdoor Unit
	1	1	3	*	Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of Outdoor Unit is open or short
	1	1	5	*	Outdoor Unit Subcooling Outlet Temperature Sensor Error	Outdoor Unit Subcooling Outlet Temperature Sensor Error
	1	1	6	*	Outdoor Unit Oil Level Sensor Error	Oil Level Sensor of Outdoor Unit is open or short
	1	4	5	*	Outdoor unit Main Board - External Board communication Error	Outdoor unit Main Board - External Board communication Error
	1	5	0	*	Outdoor Unit Discharge Superheat not satisfied	Outdoor Unit Compressor Discharge Superheat not satisfied during 5 Min.
	1	5	1	*	Failure of operation mode conversion at Outdoor Unit	Failure of operation mode conversion at Outdoor Unit
	1	8	0	*	Plate type heat exchanger freeze prevention	Plate type heat exchanger freeze prevention error
	1	8	1	*	Water outlet temperature sensor error	Water outlet temperature sensor open or short
	1	8	2	*	Outdoor unit External Board Main-Sub Micom communication Error	Outdoor Unit Main Board Main-Sub Micom communication failed
	1	8	7	*	Hydro - Kit P,HEX bursting error	Inlet water temperature is below 5 degree or water temperature error during defrosting operation.
	1	8	8	*	Water inlet temperature sensor error	Water inlet temperature sensor open or short
	1	8	9	*	Flow switch error	Heat water not supplied or flow rate is insufficient

Display					Title	Cause of Error
HR Unit related error	2	0	0	1	Searching pipe Error	Failure of automatic addressing of valves
	2	0	1	#HR + h	HR unit1 Liqiud sensor error	Liquid pipe sensor of HR unit open or short
	2	0	2	#HR + h	HR unit1 Sub Cooling Pipe sensor error	Sub Cooling Pipe In sensor of HR unit open or short
	2	0	3	#HR + h	HR unit1 Sub Cooling Pipe Out sensor error	Sub Cooling Pipe Out sensor of HR unit. open or short
	2	0	4	#HR + h	Communication error	Failing to receive HR unit signal at outdoor unit
	2	0	5	#HR + h	Communication error between HR unit and the upgraded 485 modem.	4 series upgraded 485 communication error between HR unit and HR unit modem
	2	0	6	#HR + h	Duplicate address error of HR unit	When the HR unit address is set duplicated at the 4 series upgraded 485 communication
	2	0	7	#HR + h	Communication error between Master and Slave Main PCB of HR Unit	When fail to communication between Master and Slave Main PCB of HR Unit
	2	0	8	#HR + h	Communication error of EEPROM of HR Unit	When fail to communication of EEPROM of HR Unit
Network error	2	4	2	*	Network error of cntral controller	Communication wiring defect

C : HR unit

: HR unit Number

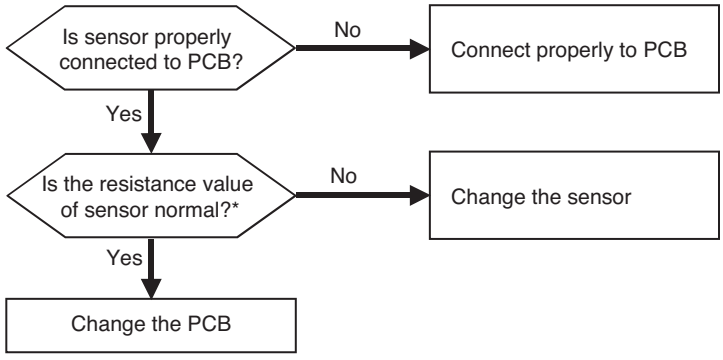
HR is the information in outdoor unit Main PCB segment
(HR unit is excluded from #HR related display on PCB segment)

CAUTION

- To use open line 485 communication (9,600 bps communication), you need to use a product in which all of the indoor unit/HR unit/outdoor unit/accessory model can use (9,600 bps communication).

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)
01(FAU)	FAU Outlet air sensor error		
02	Indoor unit pipe inlet sensor error		
06	Indoor unit pipe outlet sensor error		
17(FAU)	FAU Inlet air sensor error		

■ Error diagnosis and countermeasure flow chart

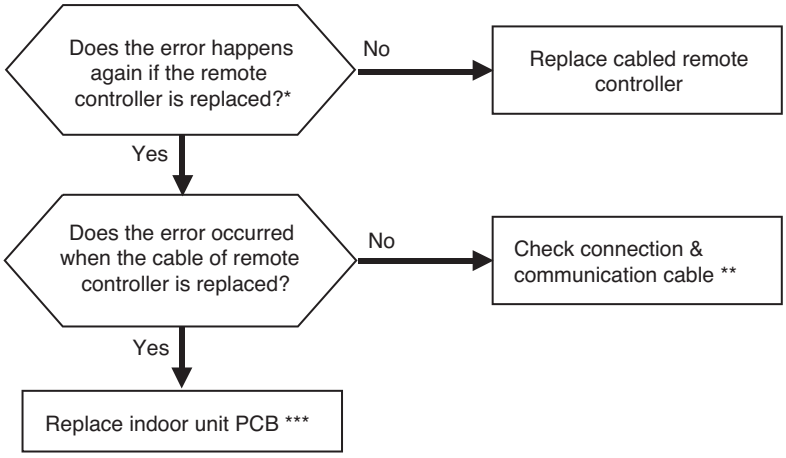


* In case the value is more than 100 kΩ (open) or less than 100 Ω (short), Error occurs

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 [50 °F] = 20.7 kΩ : 25 °C [77 °F]= 10 kΩ : 50 °C [122 °F]= 3.4 kΩ
Pipe temp sensor: 10 °C [50 °F] = 10 kΩ : 25 °C [77 °F]= 5 kΩ : 50 °C [122 °F]= 1.8 kΩ

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

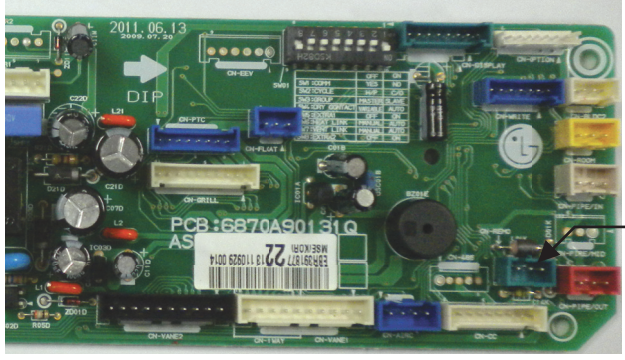
■ Error diagnosis and countermeasure flow chart



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

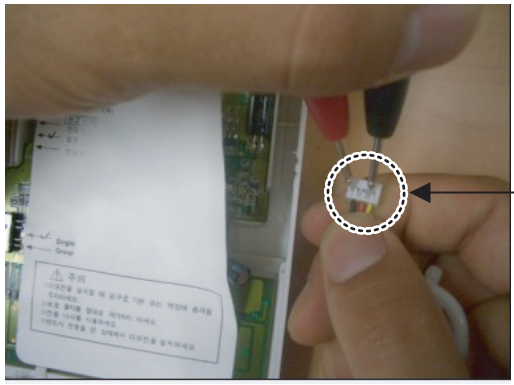
** Check cable : Contact failure of connected portion or extension of cable are main cause
Check any surrounded noise (check the distance with main power cable)
➔ make safe distance from the devices generate electromagnetic wave

*** 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

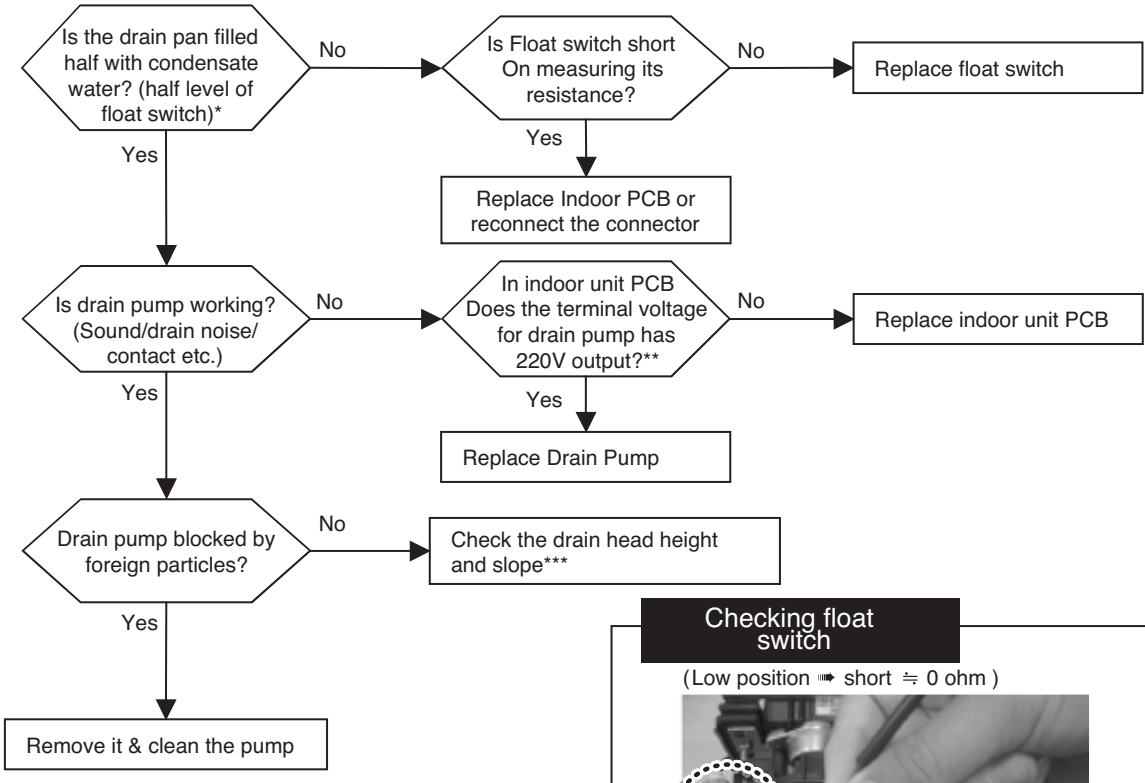
※ The PCB can differ from model to model.
Check from the right source.



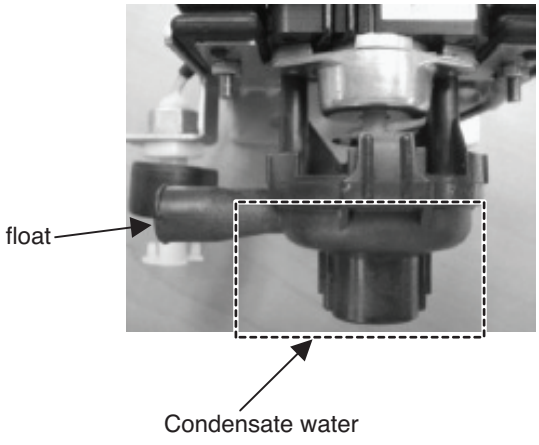
Checking communication cable connection status

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

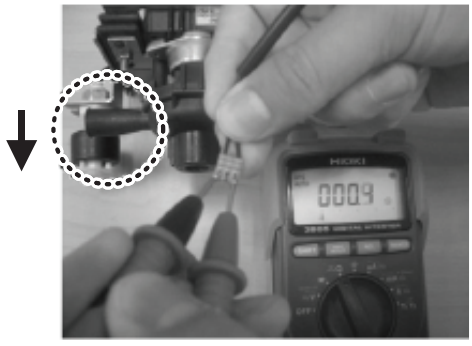


* If the float goes up higher than a half of float switch then the circuit is open & the unit is stopped automatically.

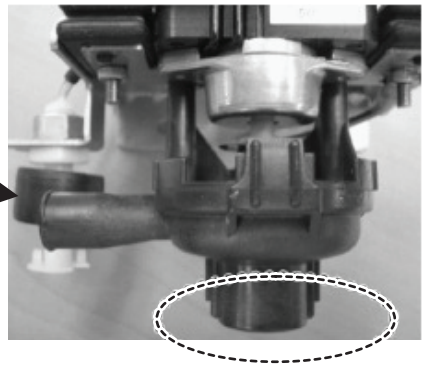


Checking float switch

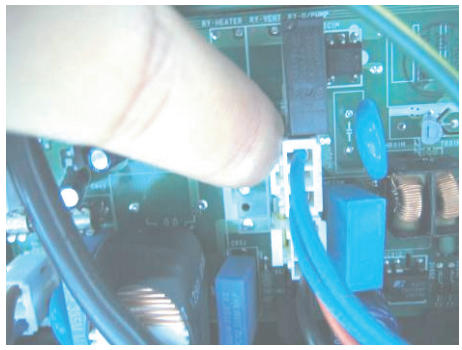
(Low position ➠ short ≒ 0 ohm)



(High position ➠ Open)



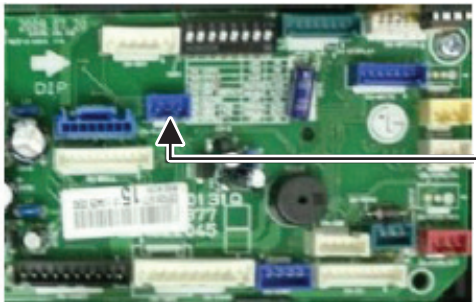
A:Point to check rotating



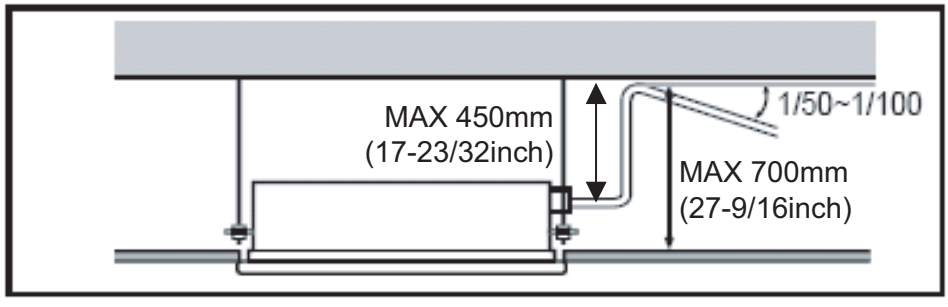
** Indoor PCB drain pump connector

(Check input of 220V)

(Marked as **CN-DPUMP)**

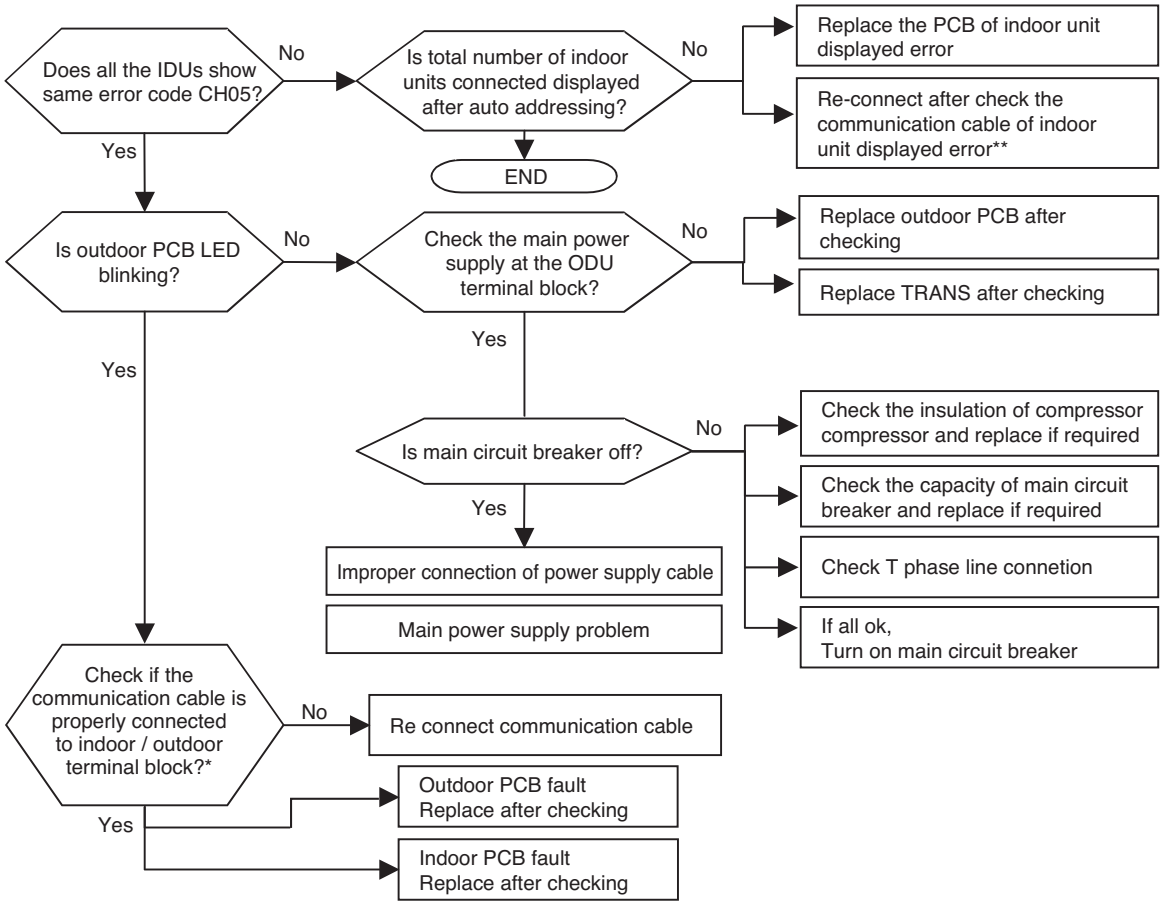


[***] Standard of drain pipe head height / slope

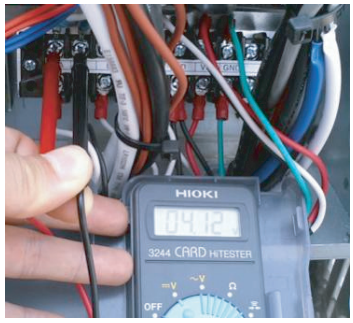


Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Outdoor unit communication error	No signal communication between indoor & outdoor units.	1. Auto addressing is not done 2. Communication cable is not connected 3. Short circuit of communication cable 4. Indoor unit communication circuit fault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

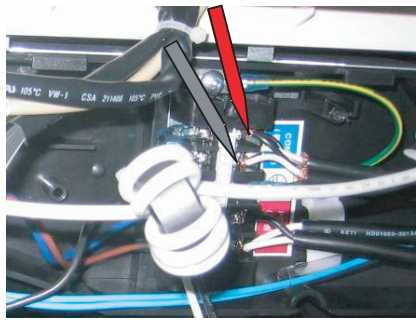
■ Error diagnosis and countermeasure flow chart



* (Note1) communication from IDU is normal if voltage fluctuation(-9V ~ +9V) 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 (-9V~+9V) then communication from outdoor unit is normal



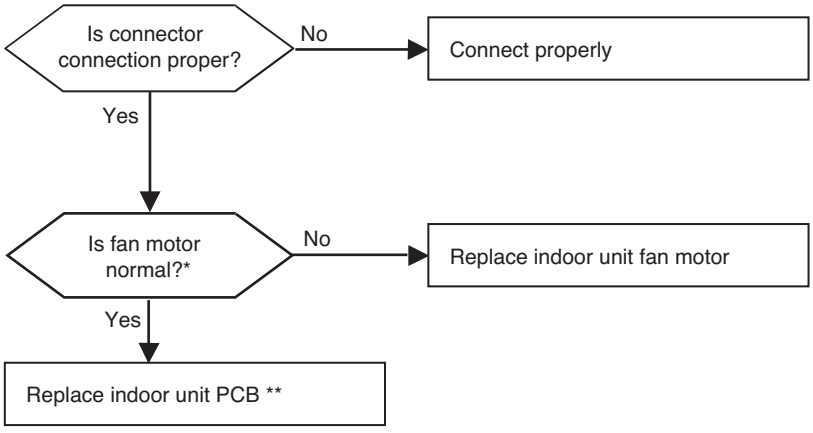
Error No.	Error Type	Error Point	Main Reasons
09	Indoor unit EEPROM error	Error occur in EEPROM of the Indoor PCB	1. Error developed in communication between the micro- processor and the EEPROM on the surface of the PCB. 2. ERROR due to the EEPROM damage

■ 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 s.)	1. Motor connector connection fault 2. Indoor PCB fault 3. Motor fault

■ Error diagnosis and countermeasure flow chart

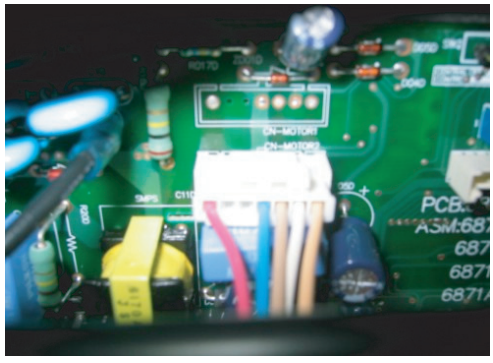


* It is normal when check hall sensor of indoor fan motor as shown below

Each termainl with the tester

Tester		Normal resistance(±10%)	
+	-		
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

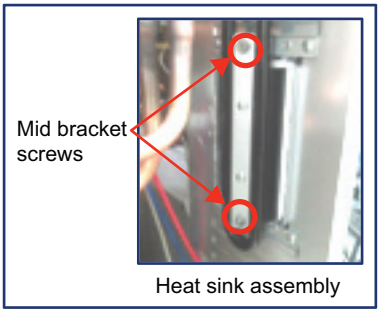
WARNING

- The connection of motor connector to PCB should be done under no power supplying to PCB.

■ Control box / Inverter PCB Servicing / Dismantling Procedure.

WARNING

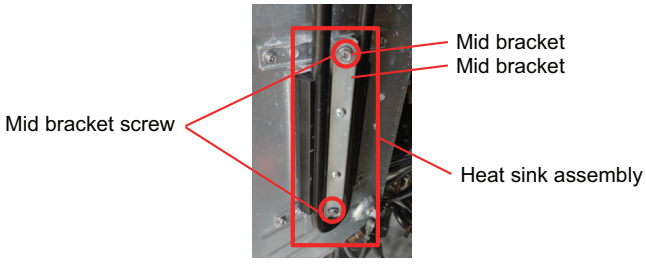
- Do not pull out the heat sink assembly before removing the middle bracket screws.
- Do not apply heavy force on tube parts while detaching the heat sink assembly.
  It may damage and leads to failure of device. Gently detach total heat sink assembly.



■ Control Box assembly Servicing / Dismantling Procedure

1. Remove the control box cover.

2. Remove the middle bracket screws as shown in the figure.

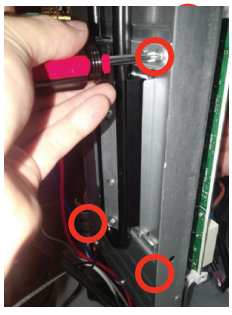


3. Gently detach the Heat sink assembly from the control box
4. Detach Fan lead wire from the control box and compressor lead wires from the compressors.
5. Now the control box assembly can be removed from the outdoor unit after removing the outer screws.
6. Inversely follow above procedure (1~5) to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

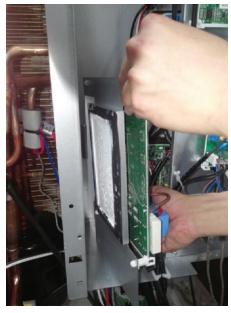
Note.
Apply thermal grease at the heat sink if necessary.

■ Inverter PCB Servicing / Dismantling Procedure

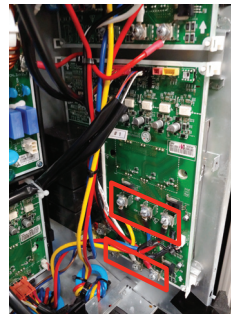
1. Remove the Thermal Pad mounting screws at the left side of the control box (4EA)



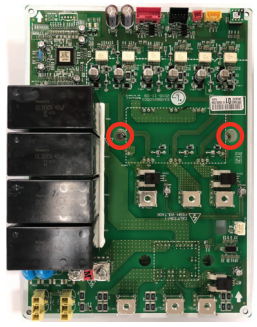
2. Carefully pull out the Inverter PCB from control box assembly.



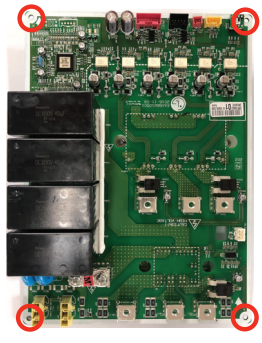
3. Detach the Compressor (U/V/W) and the power input (R/S/T) lead wires.



4. Unscrew the middle IGBT mounting screws (2EA)



5. Finally take out the PCB from the corner supporters.

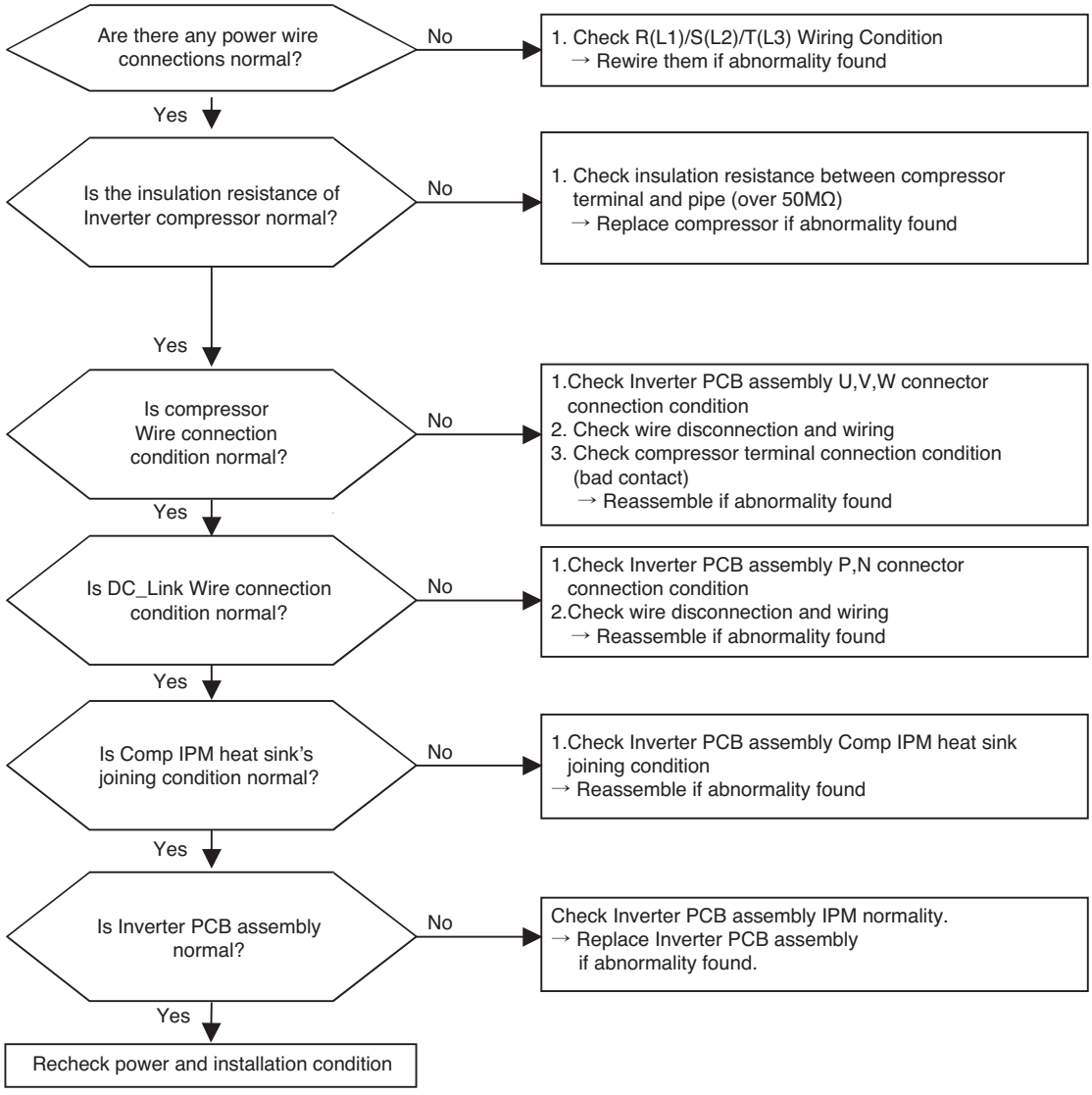


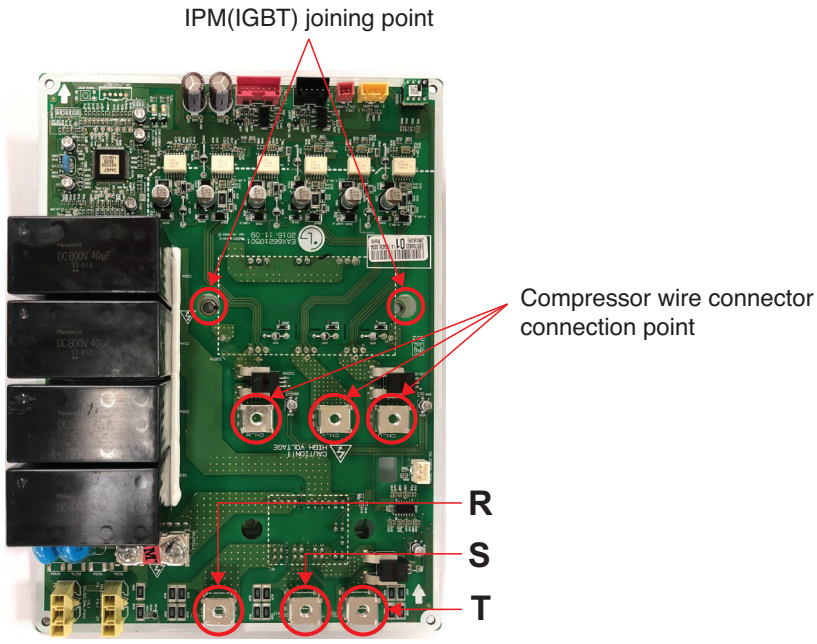
6. Follow the same procedure (1~5) inversely to reassembly the inverter PCB.

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	Inverter PCB Assy. IGBT Fault occur	IPM self protection circuit activation (Overcurrent/IPM overheating/Vcc low voltage)	1.Over current detection at Inverter compressor(U,V,W) 2.Compressor damaged (insulation damaged/Motor damaged) 3.IPM overheating (Heat sink disassembled) 4.Inverter compressor terminal disconnected or loose 5.Inverter PCB assembly damaged 6.ODU input current low 7.15V Regulator damaged in the Inverter PCB 15V Under Voltage(< 10V)

■ Error diagnosis and countermeasure flow chart

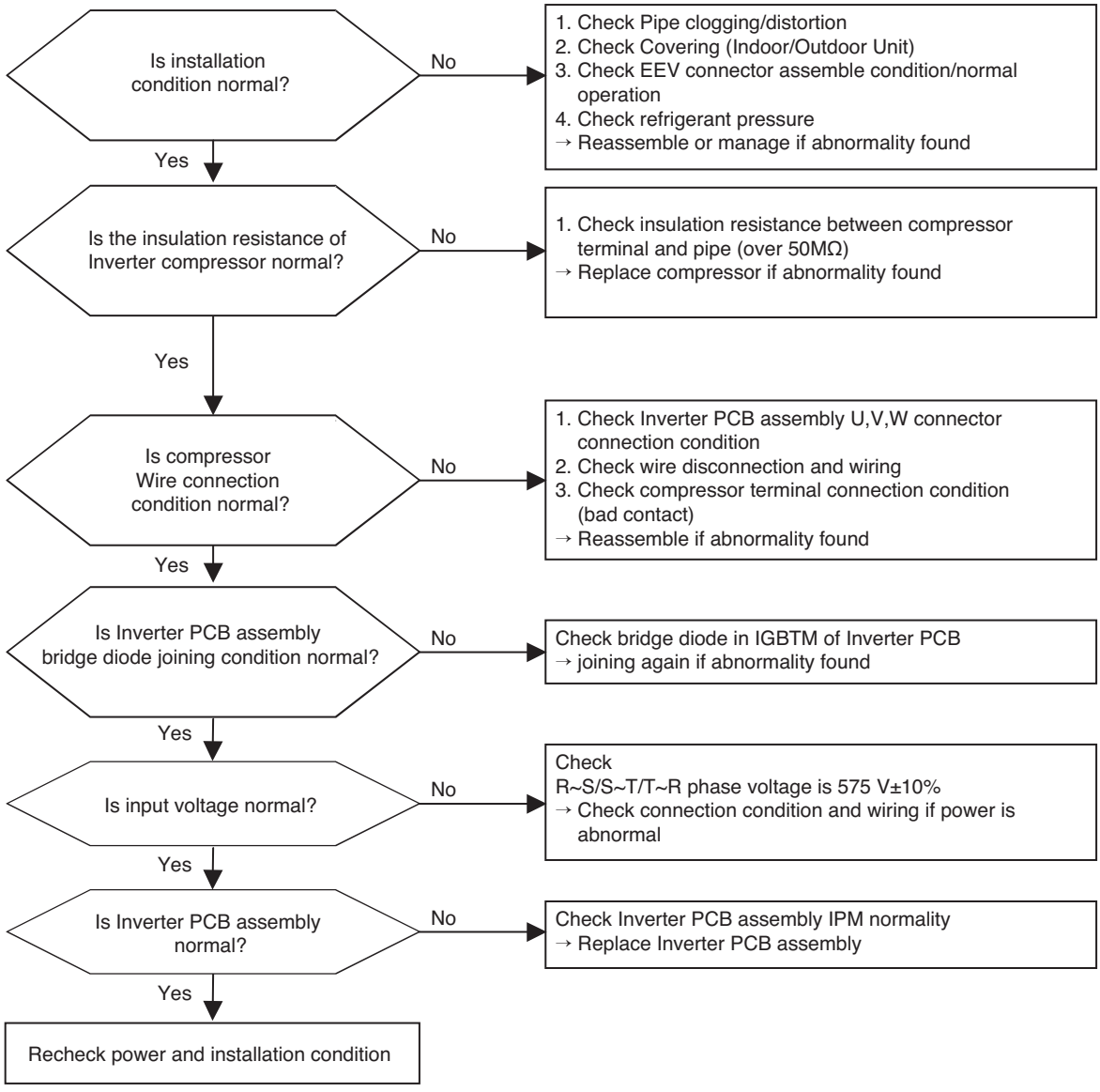




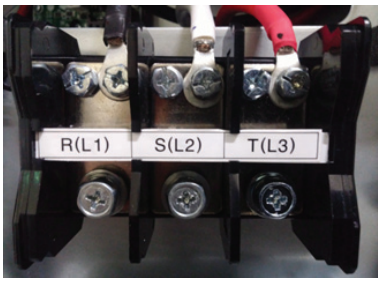
• Check DC Link connector joining condition

Error No.	Error Type	Error Point	Main Reasons
22* Master 221 Slave1 222 Slave2 223	AC Input Current Over Error	Inverter PCB Assembly input 3 phase power current is over limited value	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. Inverter PCB Assembly damage (Input current sensing part)

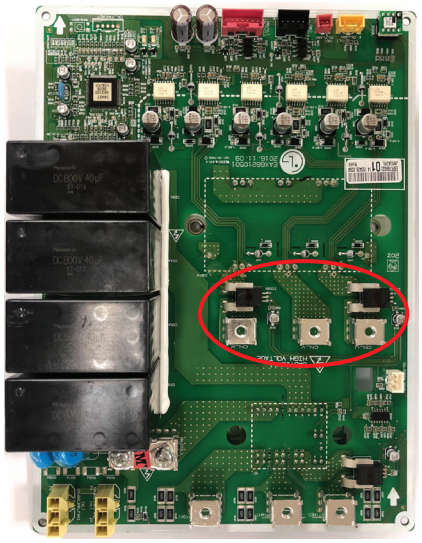
■ Error Diagnosis and Countermeasure Flow Chart

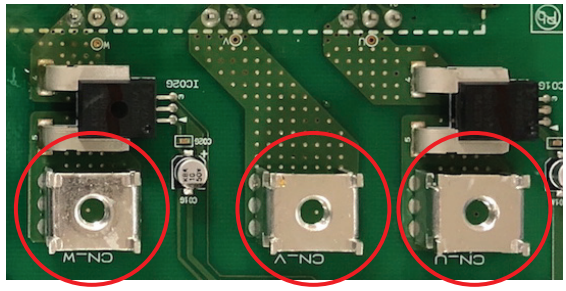


* Measuring input voltage



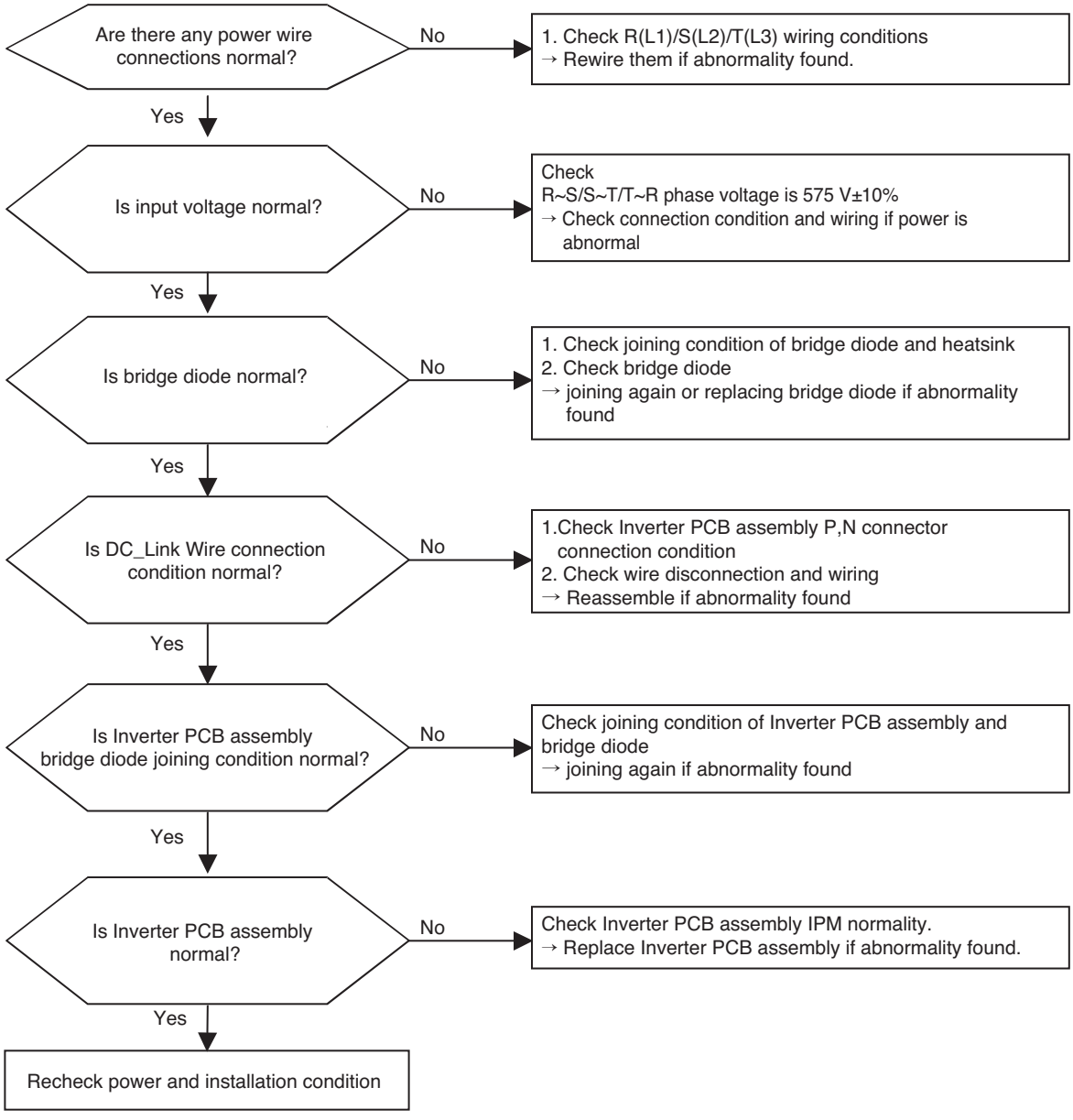
* Compressor wire connector connection



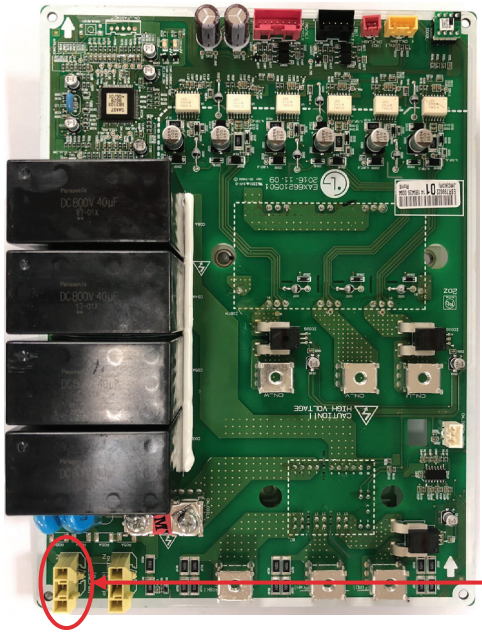


Error No.	Error Type	Error Point	Main Reasons
23* Master 231 Slave1 232 Slave2 233	Inverter Compressor DC Link High / Low Voltage	DC Voltage isn't charged after starting relay on	1. DC Link terminal misconnection/terminal contact fault 2. Condenser damage 3. Inverter PCB assembly damage (DC Link voltage sensing part) 4. Input voltage High / Low

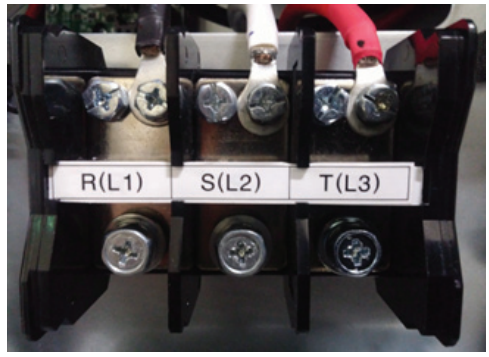
■ Error Diagnosis and Countermeasure Flow Chart



* Check DC_Link Connector joining condition

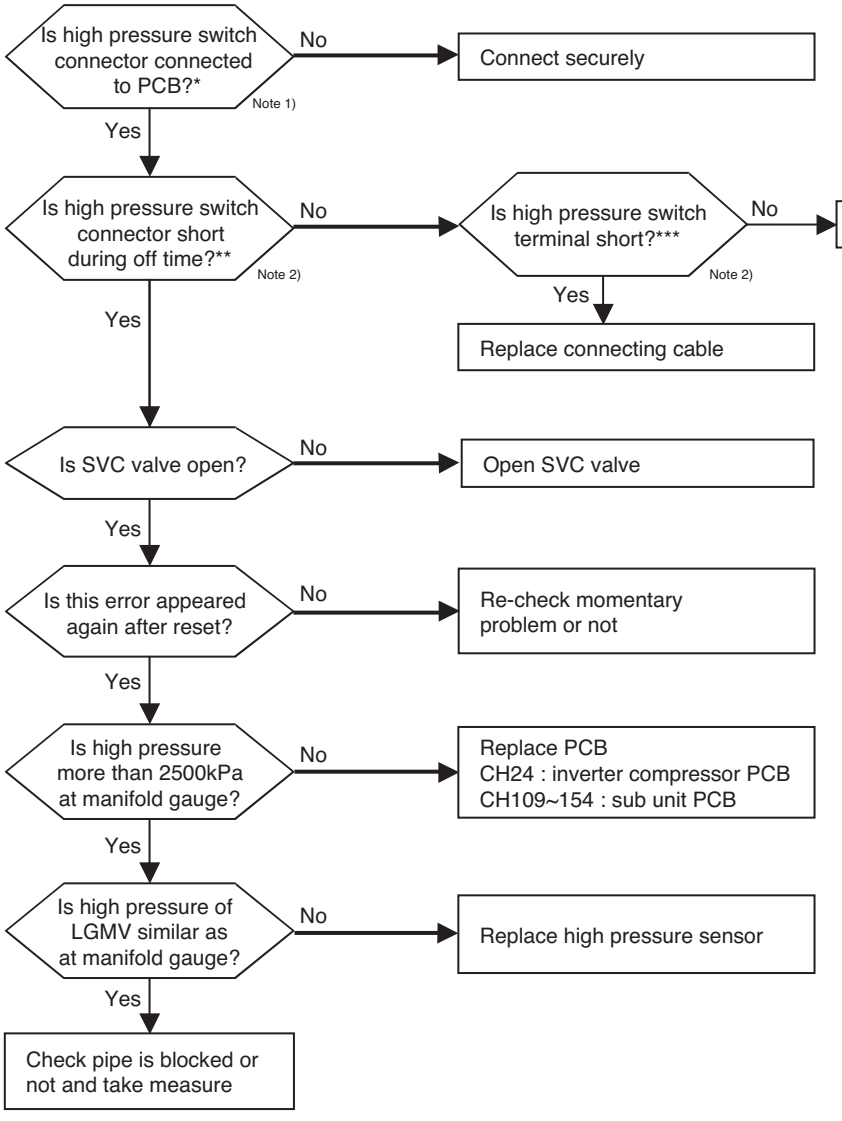


* Measuring input voltage

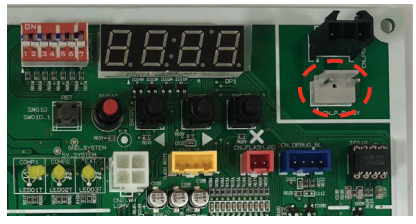


Error No.	Error Type	Error Point	Main Reasons
24* Master 241 Slave1 242 Slave2 243	Excessive rise of discharge pressure in outdoor compressor	Compressor off due to the high pressure switch in outdoor unit	1. Defective high pressure switch 2. Defective fan of indoor unit or outdoor unit 3. Check valve of compressor clogged 4. Pipe distortion due to the pipe damage 5. Refrigerant overcharge 6. Defective EEV 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 10. Defective active path valve

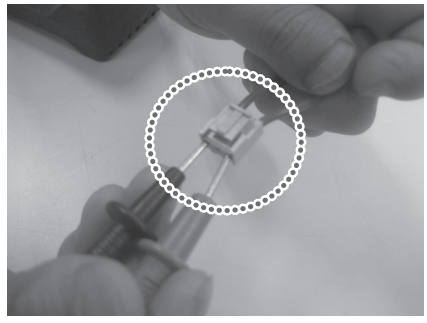
■ Error diagnosis and countermeasure flow chart



Note 1) High pressure switch connector on Main PCB

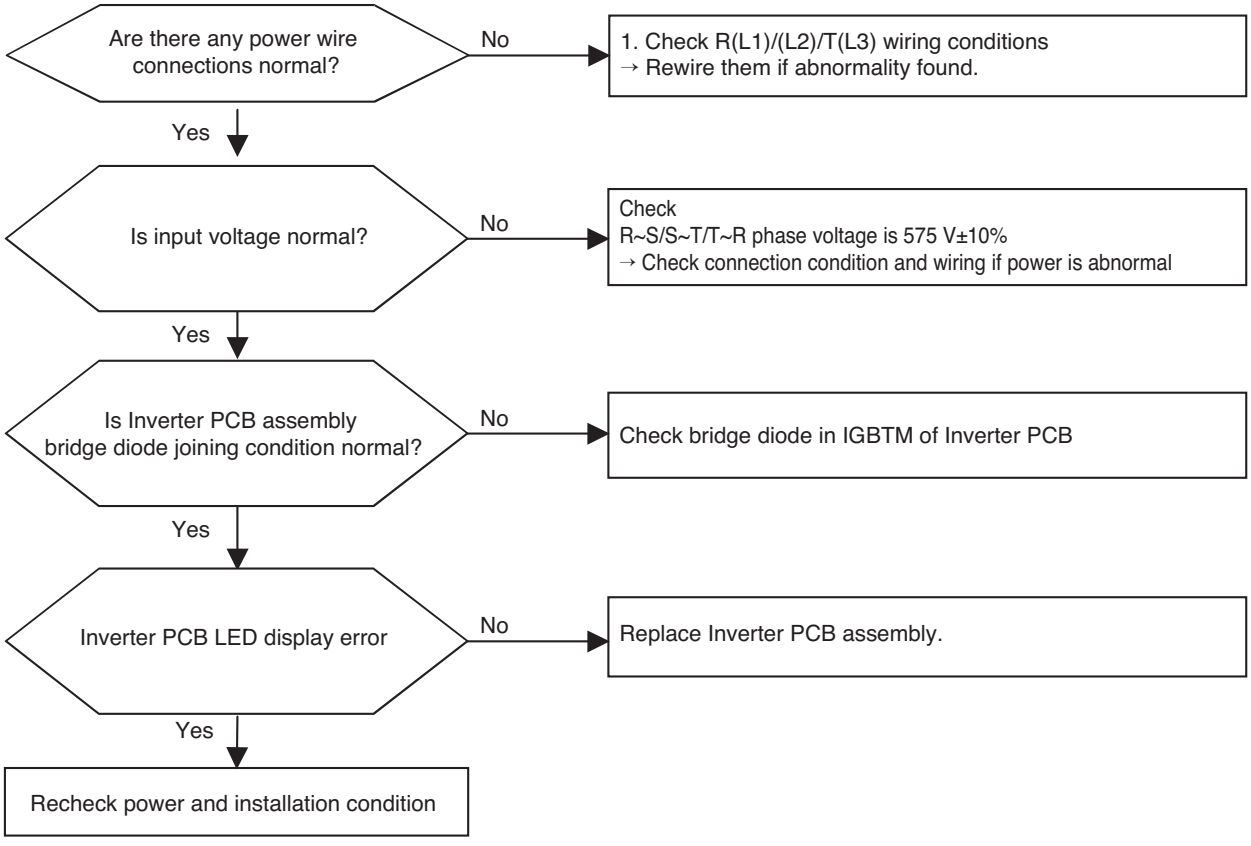


Note 2) Check short with high pressure switch connector



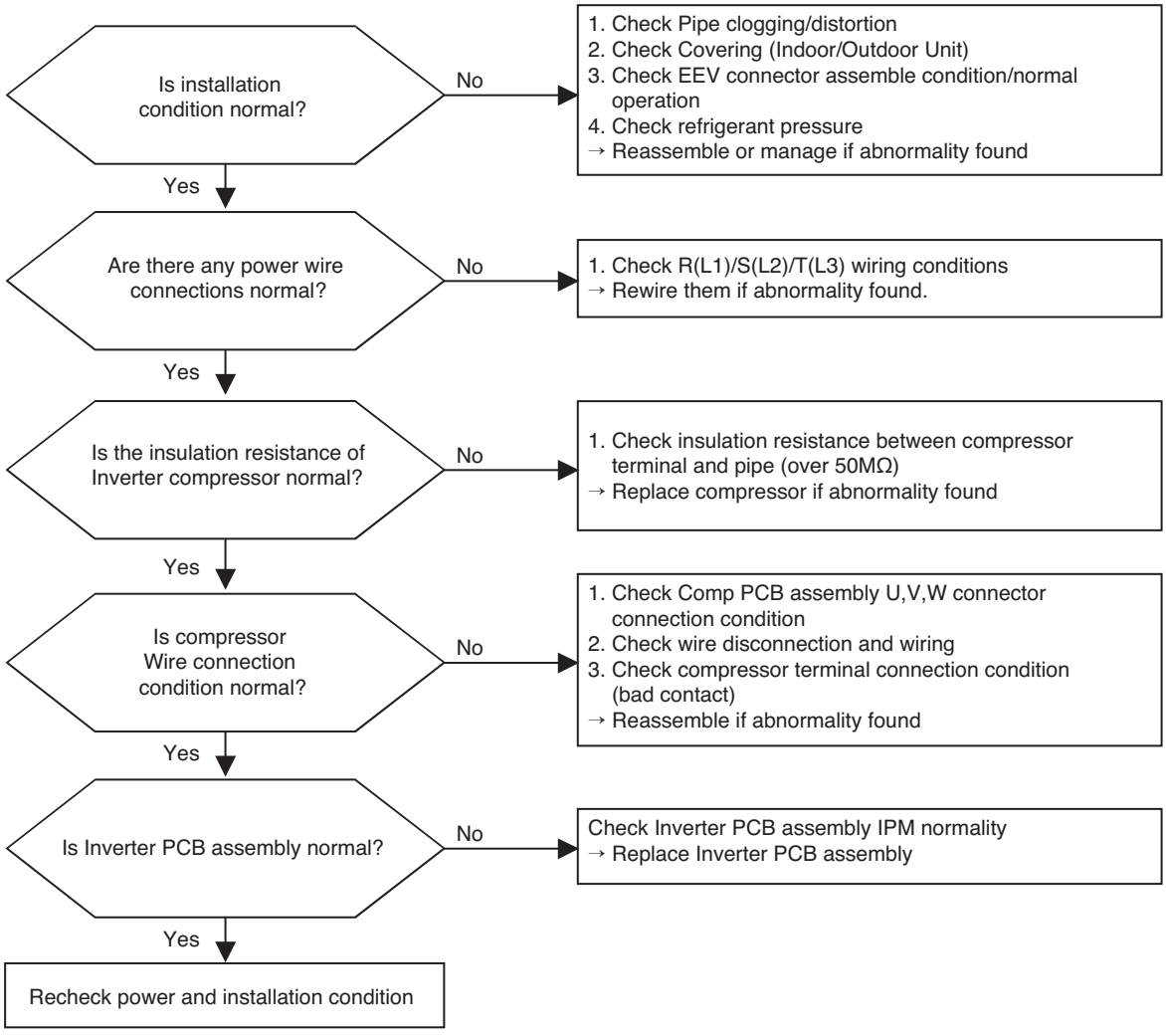
Error No.	Error Type	Error Point	Main Reasons
25* Master 251 Slave1 252 Slave2 253	Input Voltage high/low	Input voltage is over limited value of the product	1. Input voltage abnormal 2. Outdoor unit Inverter PCB assembly damage (input voltage sensing part)

■ Error Diagnosis and Countermeasure Flow Chart

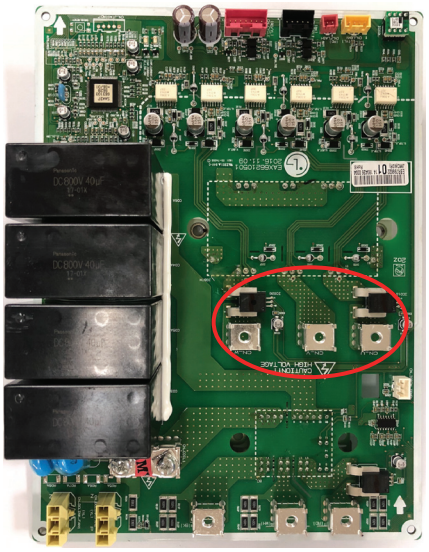


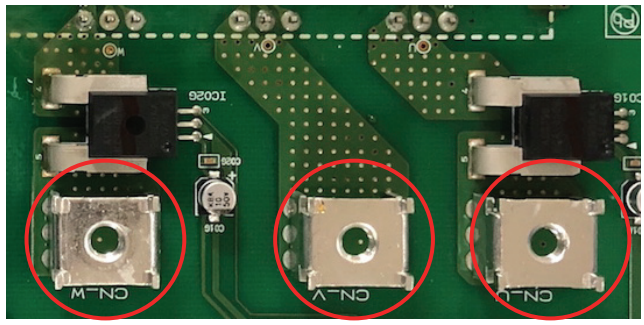
Error No.	Error Type	Error Point	Main Reasons
26* Master 261 Slave1 262 Slave2 263	Inverter compressor starting failure Error	Starting failure because of compressor abnormality	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Compressor wiring fault 4. ODU Comp PCB damage (CT)

■ Error Diagnosis and Countermeasure Flow Chart



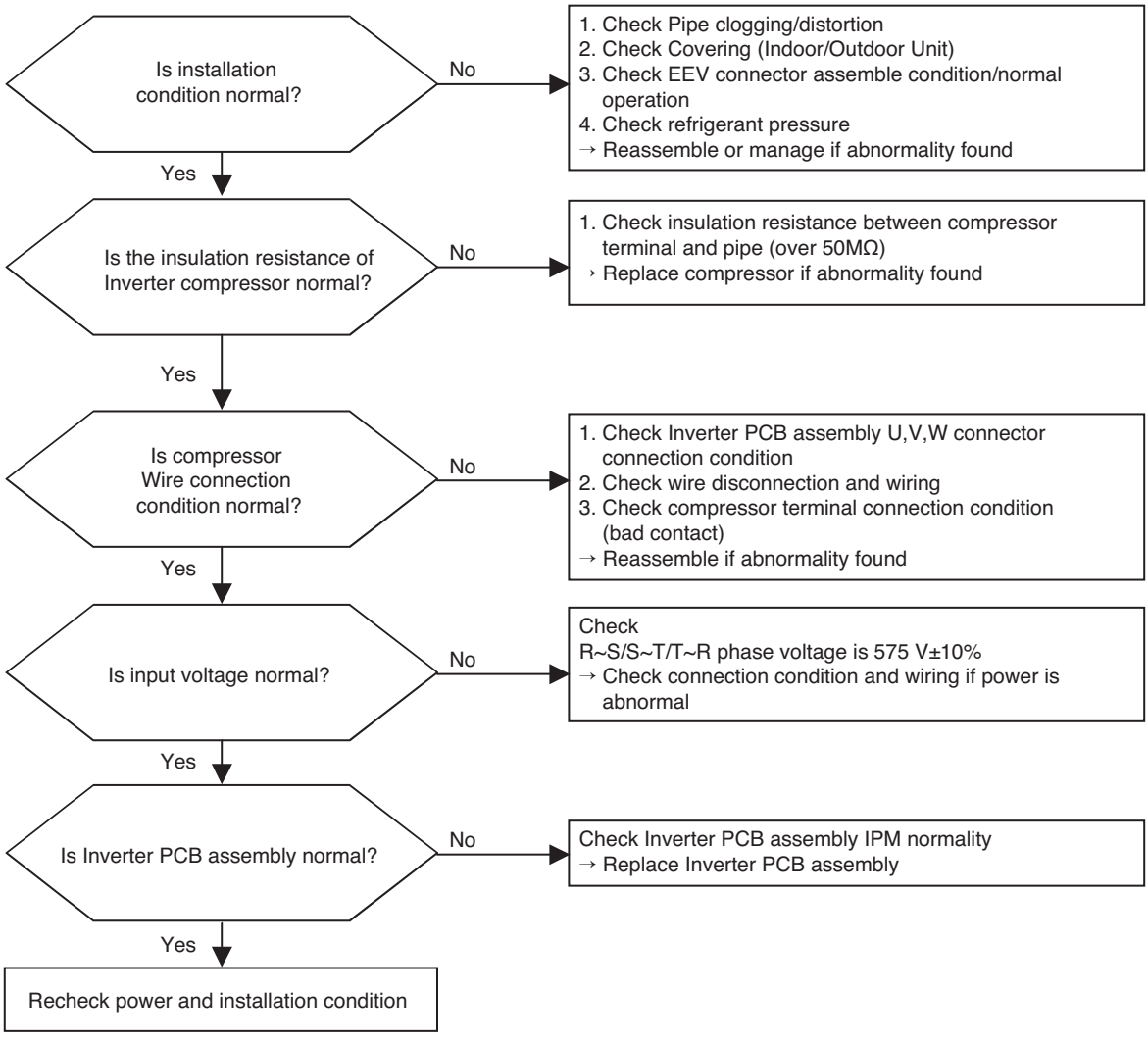
* Compressor wire connection



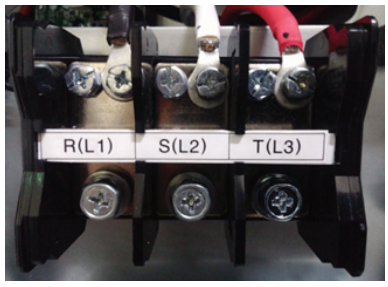


Error No.	Error Type	Error Point	Main Reasons
29* Master 291 Slave1 292 Slave2 293	Inverter compressor over current	Inverter compressor input current is over	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU Inverter PCB assembly damage

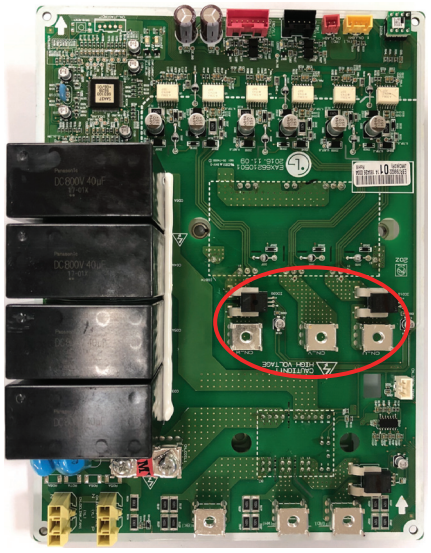
■ Error Diagnosis and Countermeasure Flow Chart

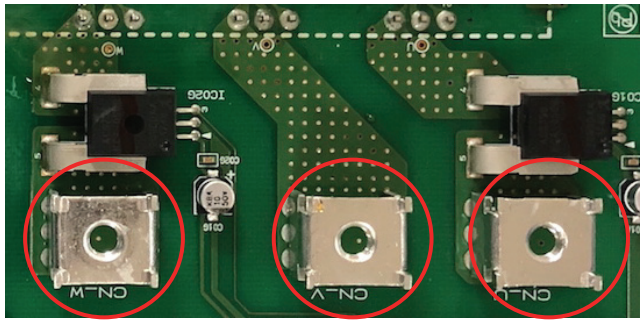


*** Measuring input voltage**



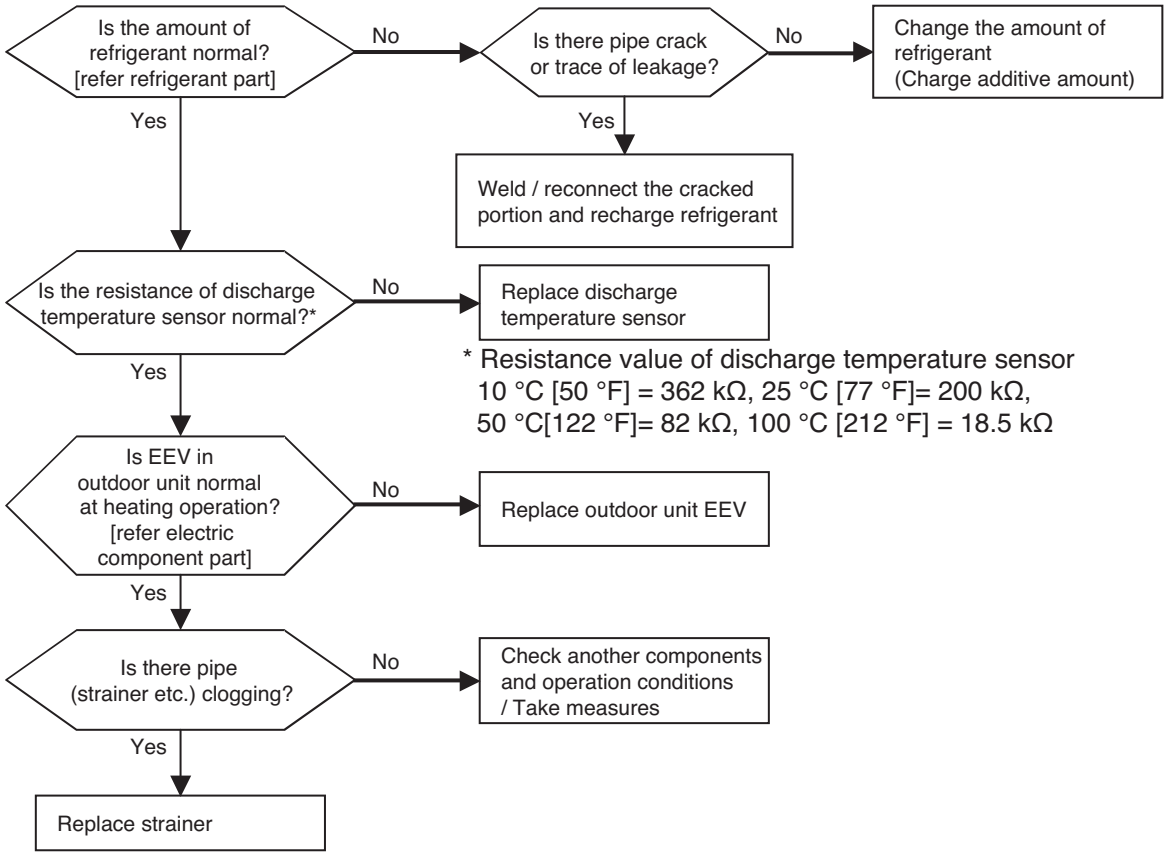
*** Compressor wire connection**





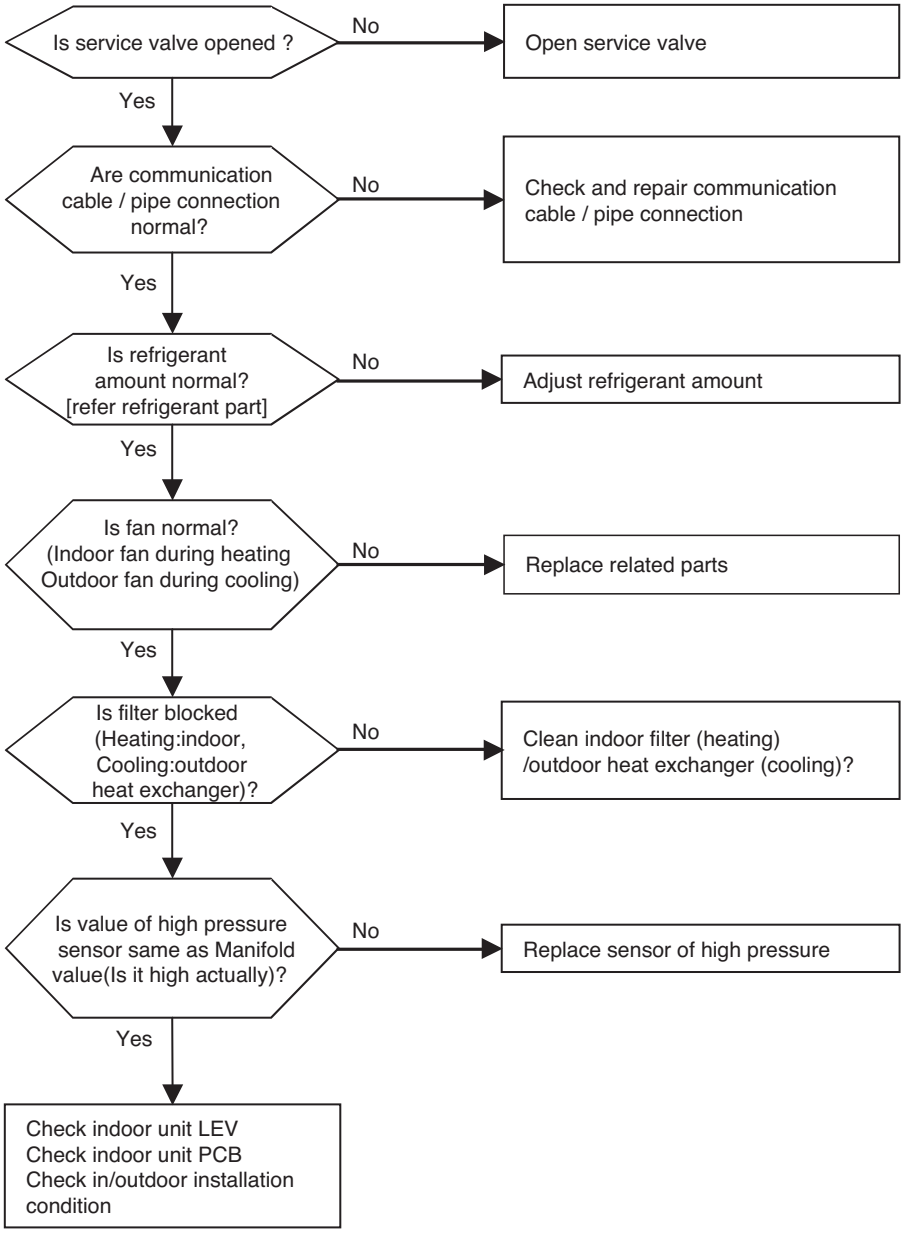
Error No.	Error Type	Error Point	Main Reasons
32* Master 321 Slave1 322 Slave2 323	Over-increase discharge temperature of inverter compressor 1 at main outdoor unit	Compressor is off because of over-increase discharge temperature of inverter compressor 1	1. Temperature sensor defect of inverter compressor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

■ Error diagnosis and countermeasure flow chart



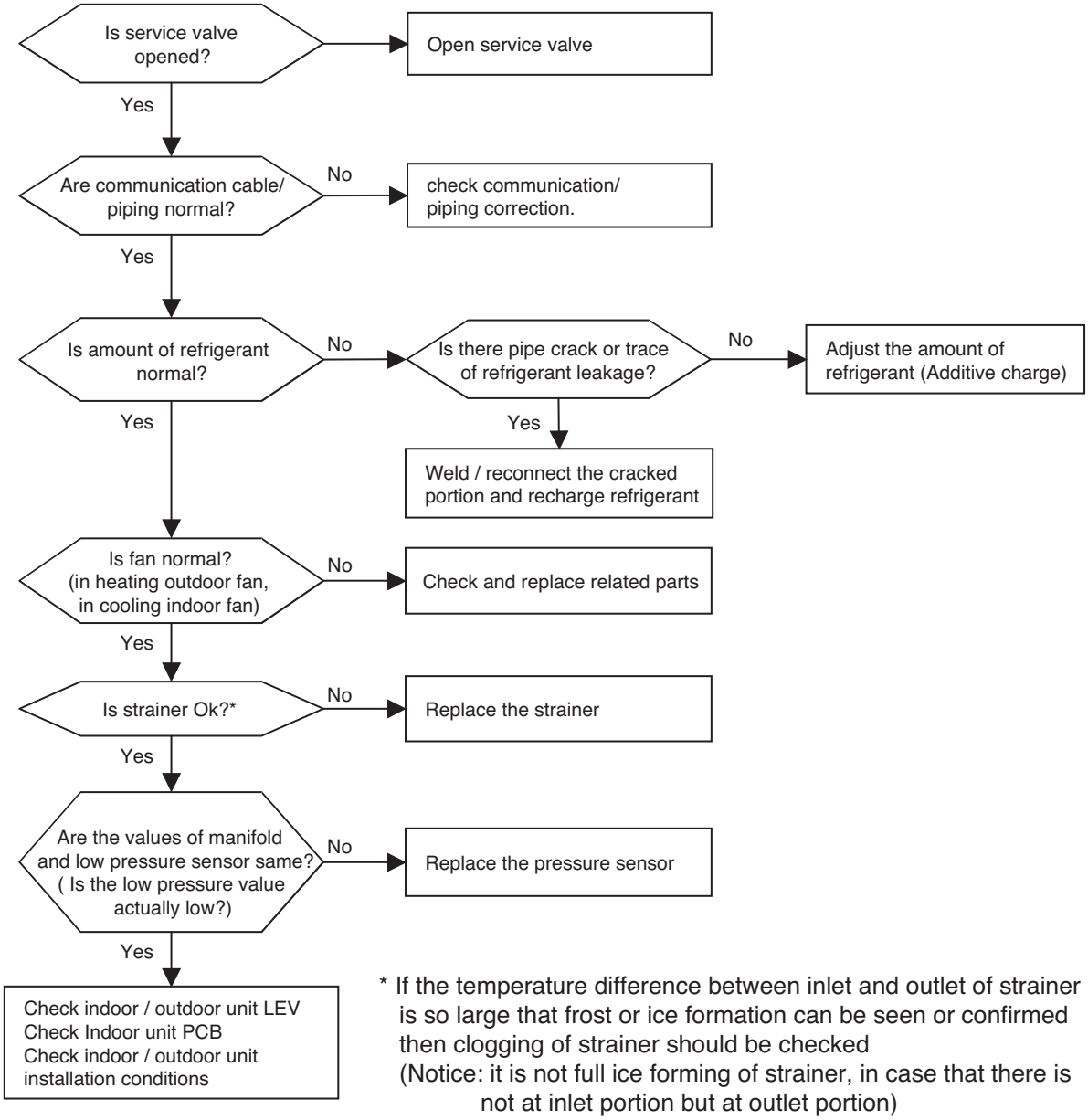
Error No.	Error Type	Error Point	Main Reasons
34* Master 341 Slave1 342 Slave2 343	Over-increase of discharge pressure of compressor	Error happens because of 10 times successive compressor off due to over-increase of high pressure by high pressure sensor	1. Defect of high pressure sensor 2. Defect of 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 - Outdoor unit is blocked during cooling - Indoor unit filter is blocked during heating 7. SVC valve is clogged 8. PCB defect of outdoor unit 9. Indoor unit's pipe temperature defect 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	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	1. Defective low pressure sensor 2. Defective outdoor/indoor unit fan 3. Refrigerant shortage/leakage 4. Deformation because of damage of refrigerant pipe 5. Defective indoor / 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

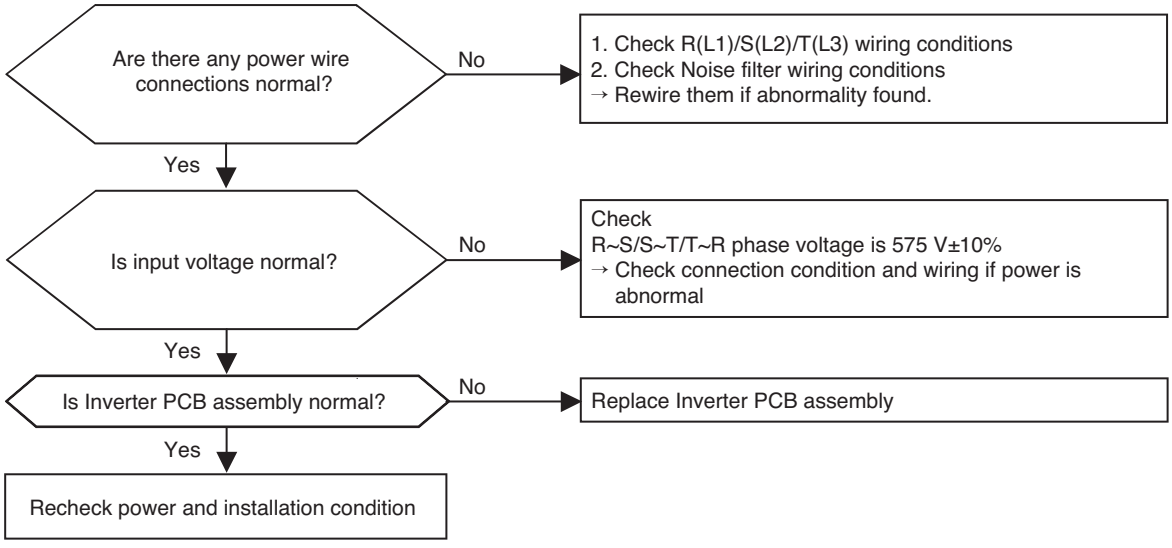
■ Error diagnosis and countermeasure flow chart



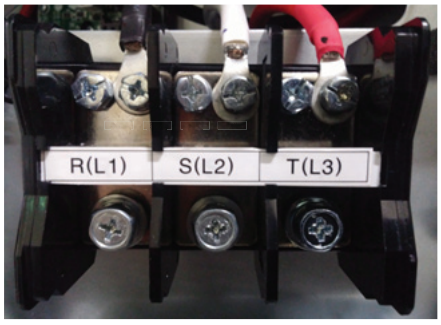
* If the temperature difference between inlet and outlet of strainer is so large that frost or ice formation can be seen or confirmed then clogging of strainer should be checked
(Notice: it is not full ice forming of strainer, in case that there is not at inlet portion but at outlet portion)

Error No.	Error Type	Error Point	Main Reasons
40* Master 401 Slave1 402 Slave2 403	Inverter compressor CT sensor error	Micom input voltage isn't within 2.5V ±0.3V at initial state of power supply	1. Input voltage abnormal 2. DC power part damage (DC 5V) 3. Outdoor unit's inverter PCB damage (CT sensing part)

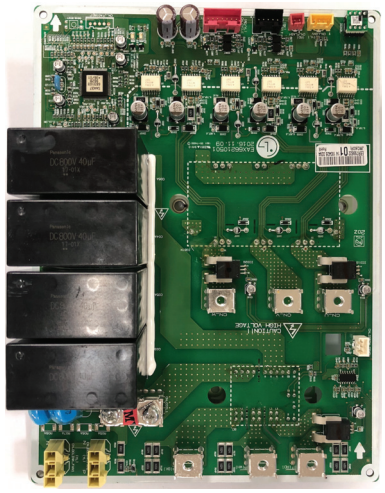
■ Error Diagnosis and Countermeasure Flow Chart



* Measuring input voltage

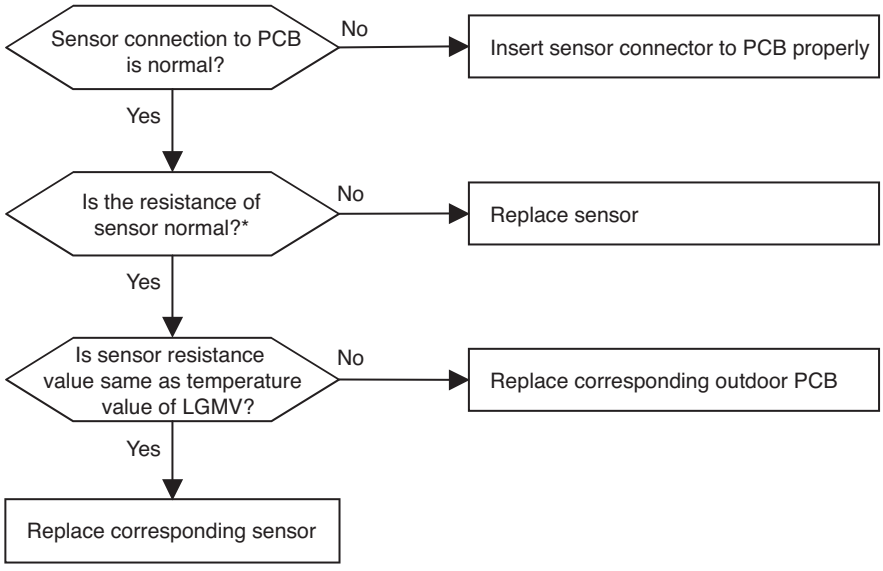


* Inverter PCB assembly



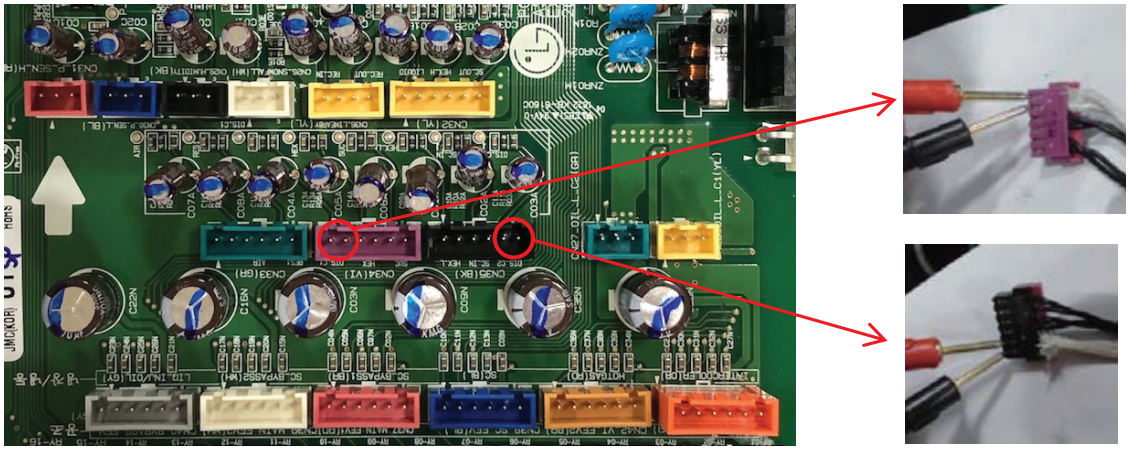
Error No.	Error Type	Error Point	Main Reasons
41* (Inverter1) Master 411 Slave1 412 Slave2 413	Compressor1 discharge pipe temperature sensor error	Sensor measurement value is abnormal (Open/Short)	1. Defective connection of the compressor1 discharge pipe temperature sensor 2. Defective discharge pipe 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 MΩ(open) and less than 2 kΩ (short)

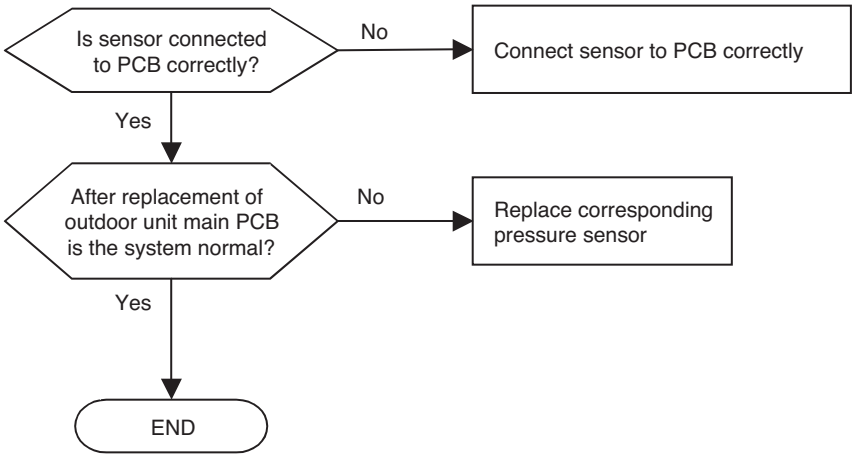
Note: Standard values of resistance of sensors at different temperatures (5% variation)
10 °C [50 °F] = 362 kΩ : 25 °C [77 °F] = 200 kΩ : 50 °C[122 °F] = 82 kΩ : 100 °C [212 °F]= 18.5 kΩ

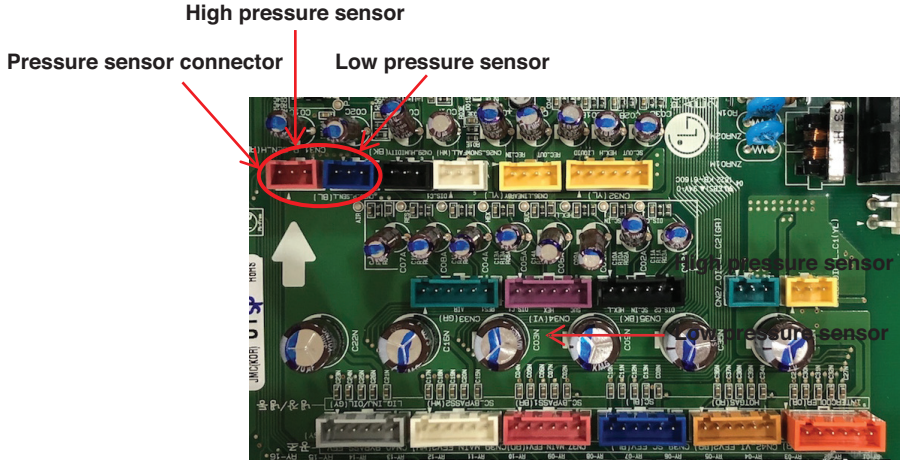


Check the resistance inverter compressor discharge temperature sensor

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

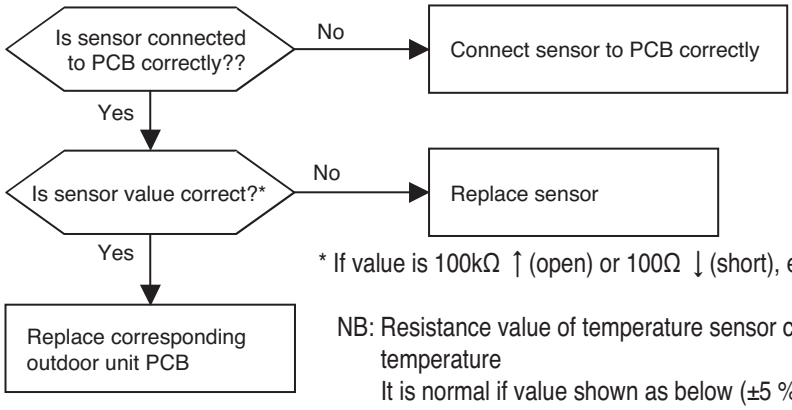
■ Error diagnosis and countermeasure flow chart





Error No.	Error Type	Error Point	Main Reasons
44* Master 441 Slave1 442 Slave2 443	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
46* Master 461 Slave1 462 Slave2 463	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	Outdoor Unit IGBTM Temperature Sensor Fault	Outdoor Unit IGBTM 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

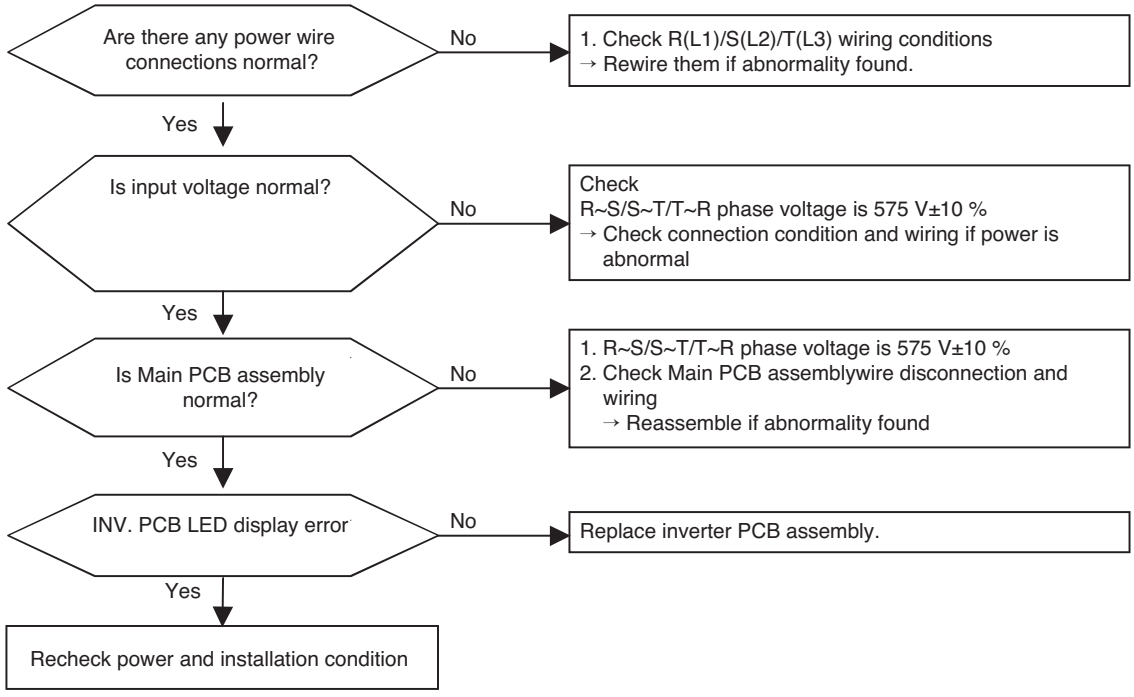


* If value is 100kΩ ↑ (open) or 100Ω ↓ (short), error occurs

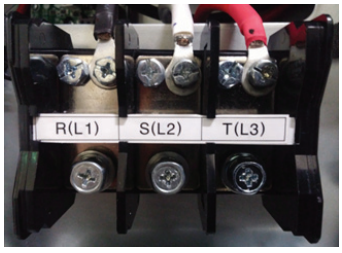
NB: Resistance value of temperature sensor change according to temperature
It is normal if value shown as below (±5 % error)
Sensor of air temperature: 10 °C [50 °F] = 20.7 kΩ : 25 °C [77 °F] = 10 kΩ : 50 °C[122 °F] = 3.4 kΩ
Sensor of piping temperature: 10 °C [50 °F] = 10 kΩ : 25 °C [77 °F] = 5 kΩ : 50 °C[122 °F] = 1.8 kΩ

Error No.	Error Type	Error Point	Main Reasons
50* Master 501 Slave1 502 Slave2 503	ODU 3phase power omission error	Omitting one or more of R,S,T input power	1. Input Voltage abnormal (R,S,T) 2. Check power Line connection condition 3. Main PCB damage 4. Inverter PCB input current sensor fault

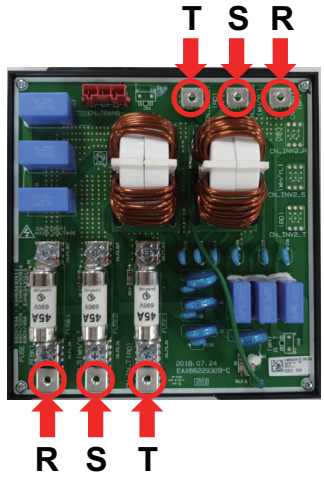
■ Error Diagnosis and Countermeasure Flow Chart



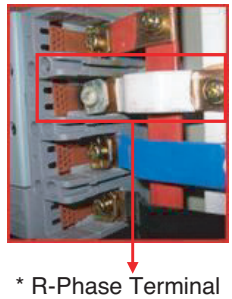
* Measuring input voltage



* Noise filter wiring



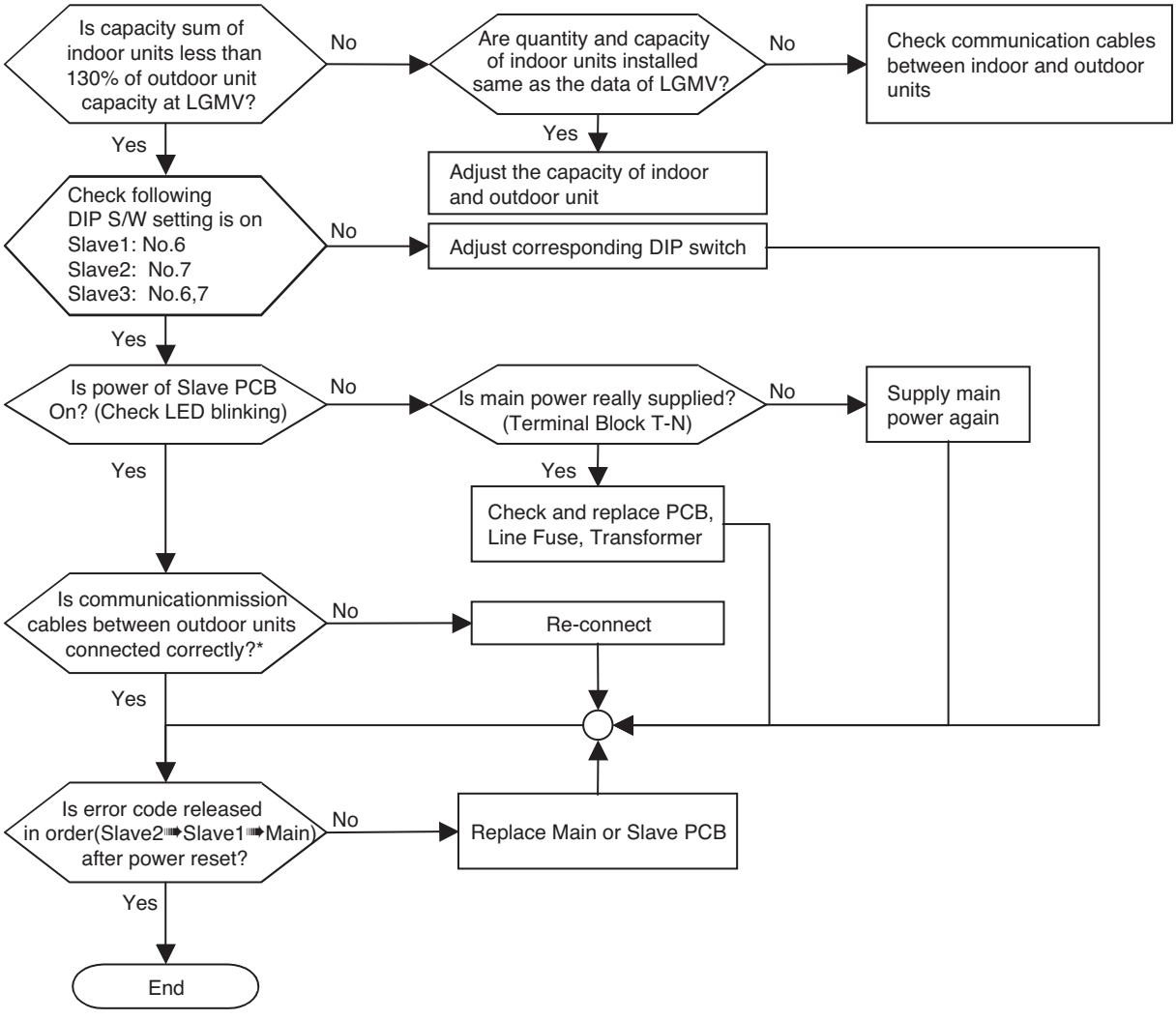
* Field Fault Case



* R-Phase Terminal Changed Color.

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

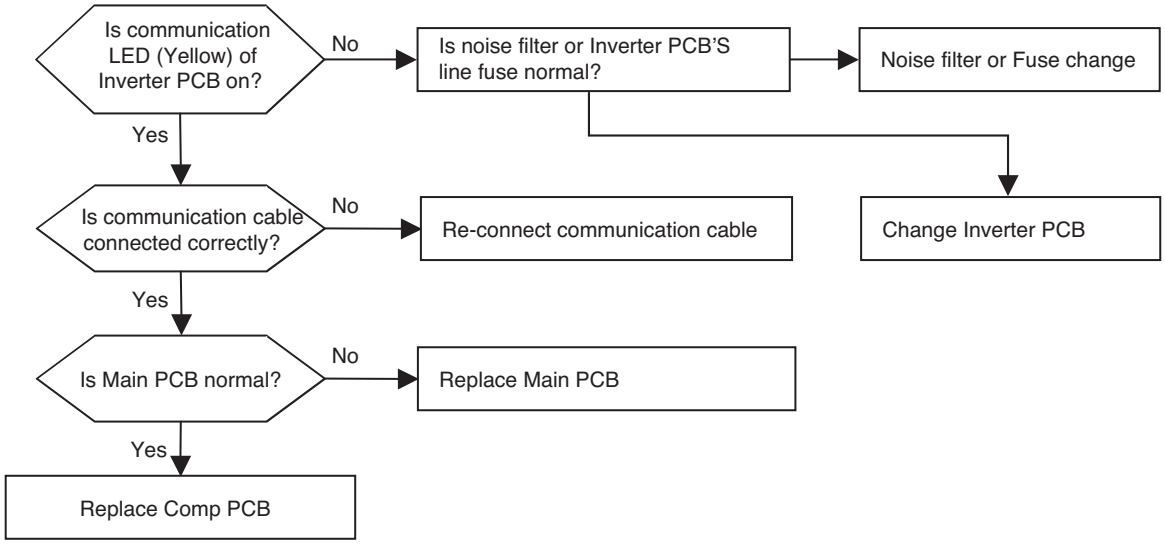
■ Error diagnosis and countermeasure flow chart



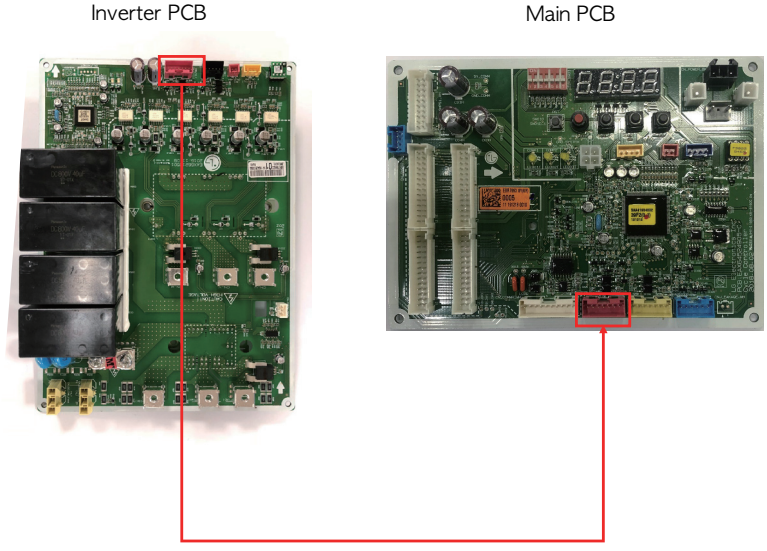
* In order to check communication cables between outdoor units,
check in order as below : PCB connectors ➠ terminal block ➠ communication cables

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

■ Error diagnosis and countermeasure flow chart

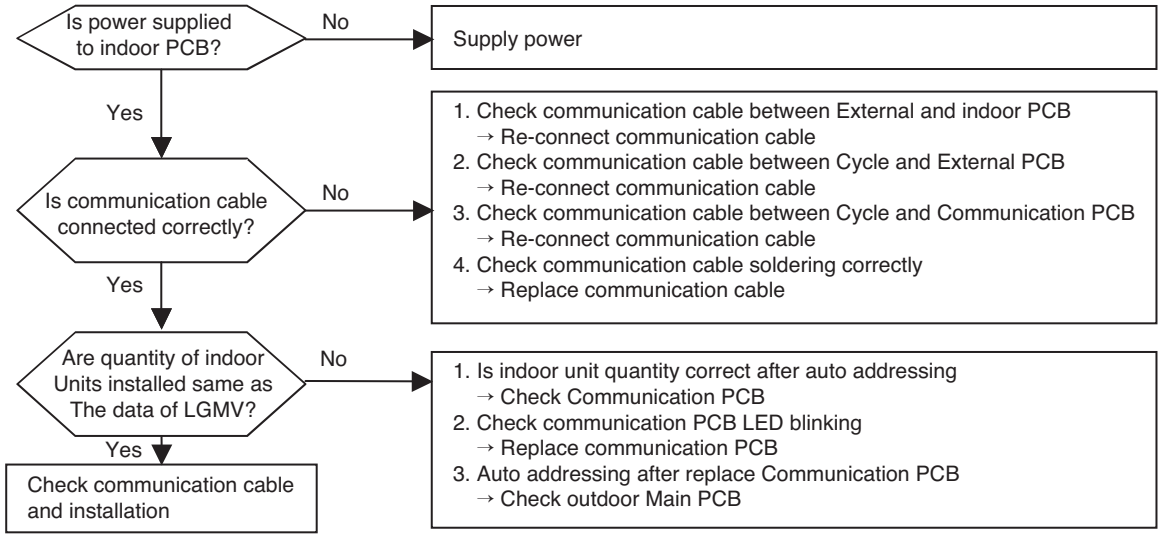


* The method of checking Main PCB and Inverter 2 PCB (If normal, communication LED blinks)



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	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 Main/Communication/indoor PCB 7. Communication wire connection fault

■ Error diagnosis and countermeasure flow chart

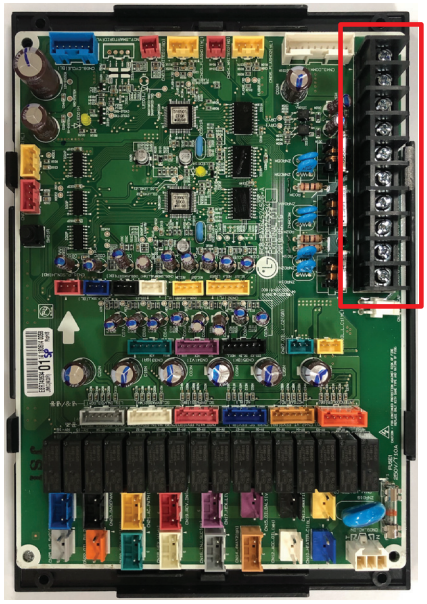


In case of CH53, almost happened with CH05, the indoor units not operated actually are normal so check with same method of CH05. and additionally check as shown as below and above flow chart

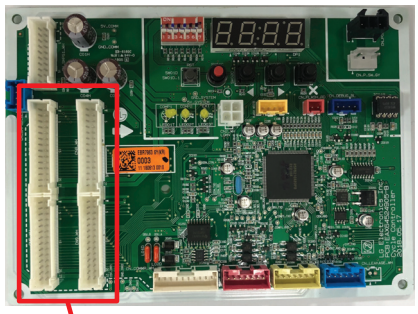
- Although the quantity of indoor units installed is same as LGMV data there may be a few indoor units with which the number of communication is not increased with LGMV
- Although the quantity of indoor units installed is not same as LGMV data, and if communication of the indoor unit displayed at LGMV 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

External PCB



Main PCB

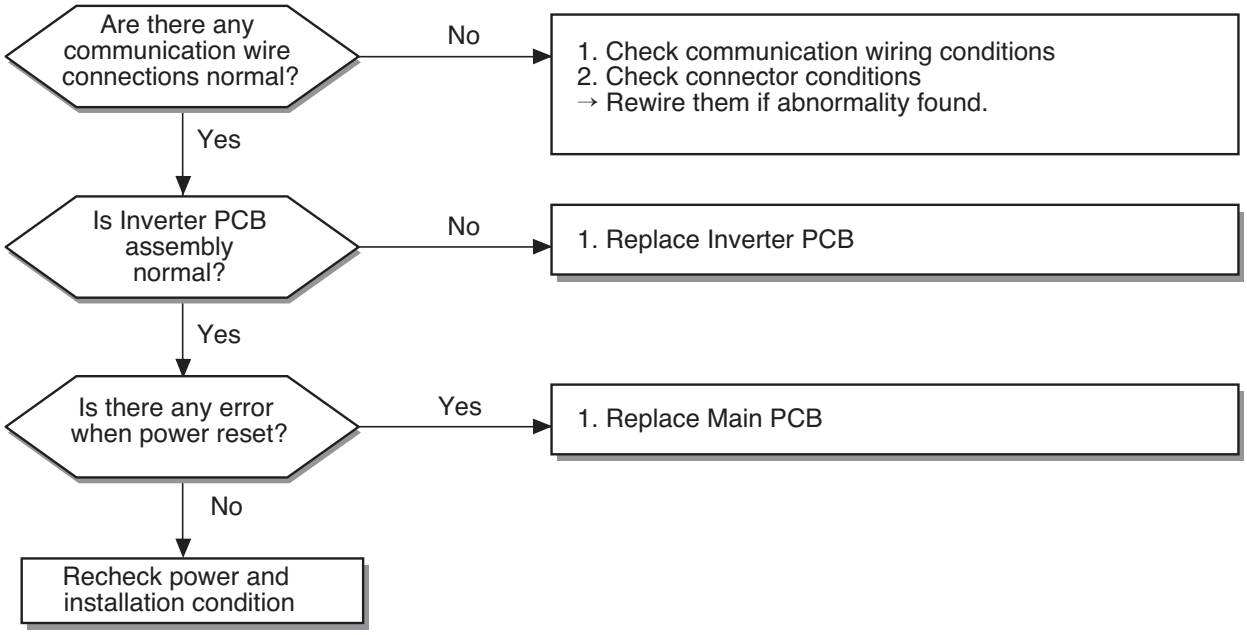


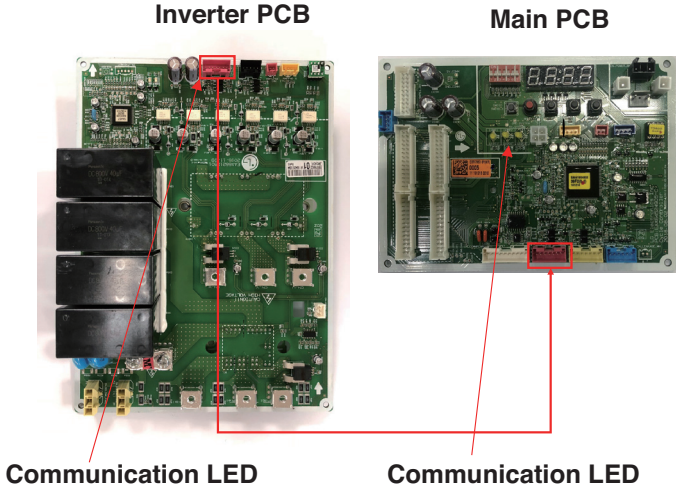
Indoor Unit
Communication PCB

Wiring Fault Case

Error No.	Error Type	Error Point	Main Reasons
57* Master 571 Slave1 572 Slave2 573	Communication error : Main PCB ➔ Inverter PCB	Failing to receive inverter signal at main PCB of Outdoor Unit	1. Bad Connection Between Comp PCB and Comp PCB 2. Communication Wire Noise Effect 3. ODU Main PCB Damage 4. ODU Main PCB Damage

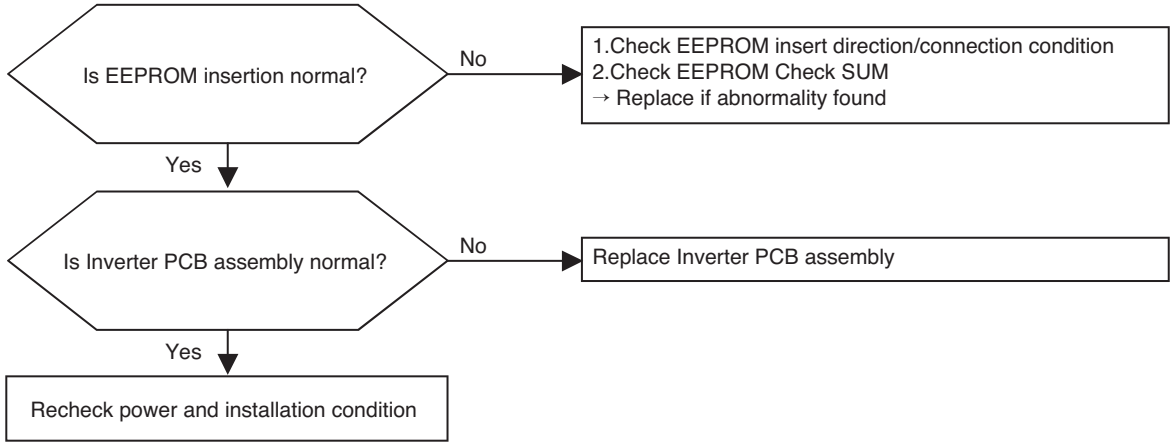
■ Error diagnosis and countermeasure flow chart



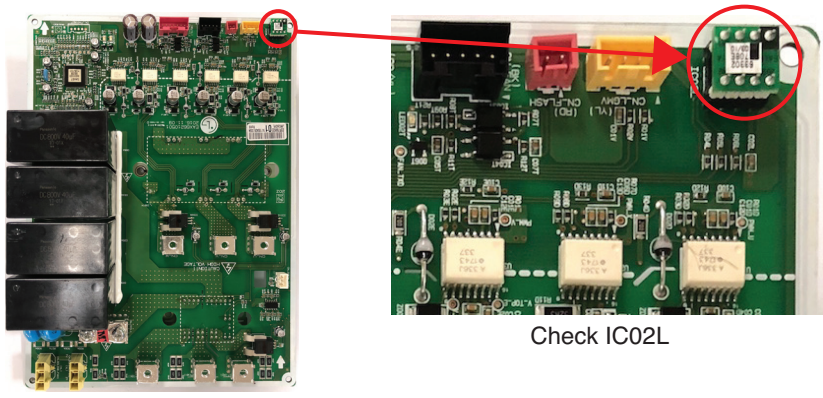


Error No.	Error Type	Error Point	Main Reasons
60* Master 601 Slave1 602 Slave2 603	Inverter PCB EEPROM error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inverter PCB assembly damage

■ Error Diagnosis and Countermeasure Flow Chart

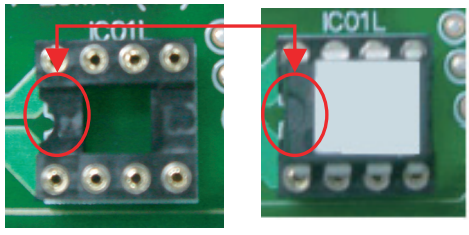


* Inverter EEPROM inserting point



Check IC02L

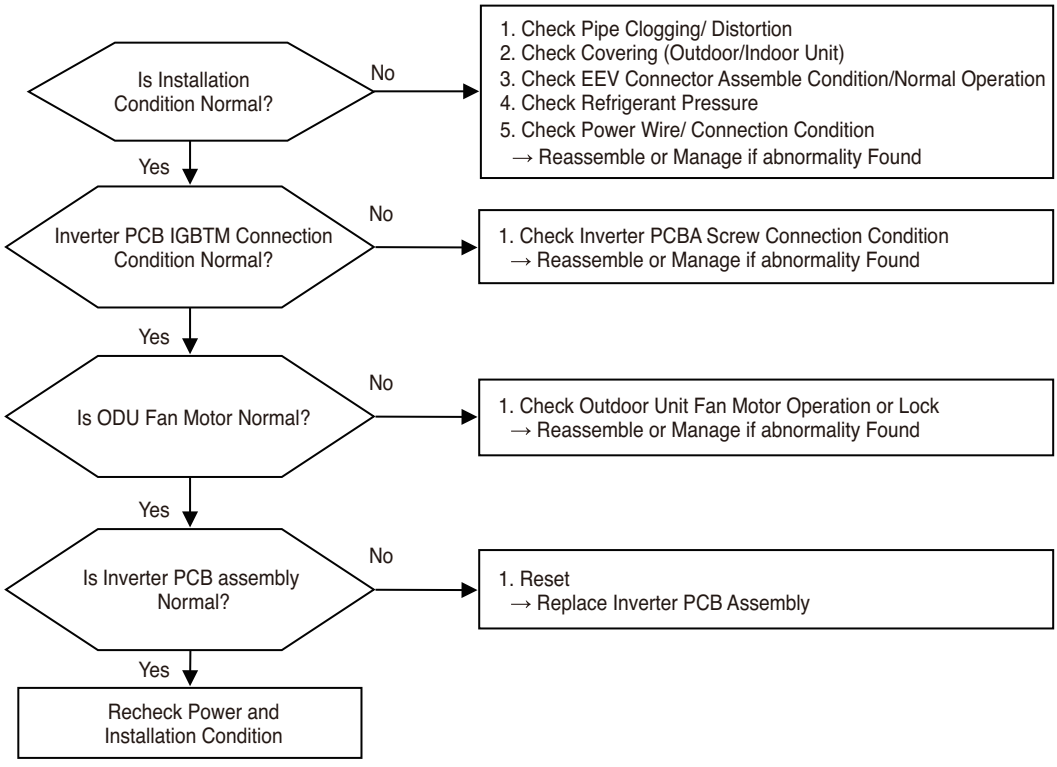
* Right inserting direction of inverter EEPROM



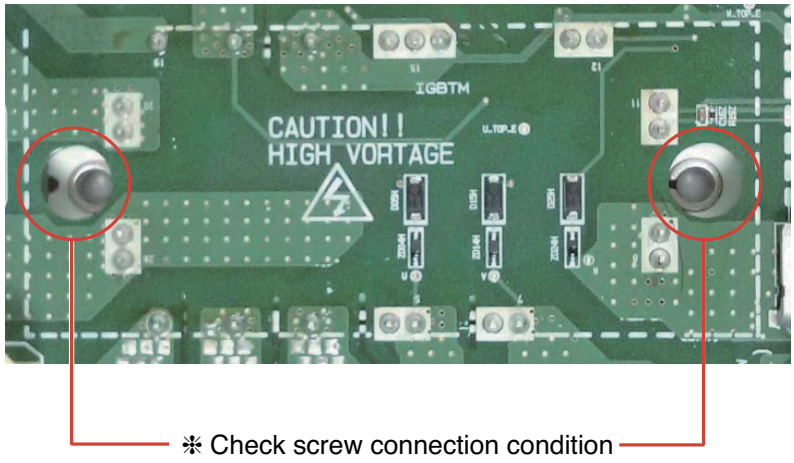
※ Note : Replace after power off

Error No.	Error Type	Error Point	Main Reasons
62* Master 621 Slave1 622 Slave2 623	Inverter PCB Heatsink Temperature High	Heatsink Temperature is Over 125°C[257°F]	1. Inverter PCB 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

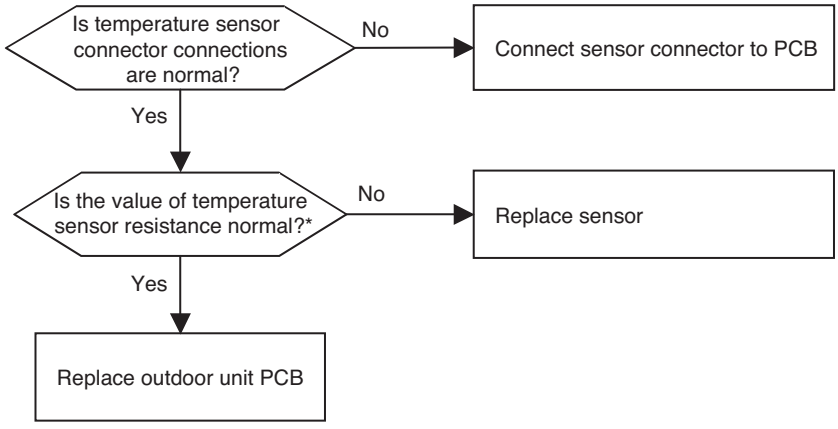


■ Check Inverter PCB Screw Connection Condition



Error No.	Error Type	Error Point	Main Reasons
65* Master 651 Slave1 652 Slave2 653	Inverter PCB Power Module 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

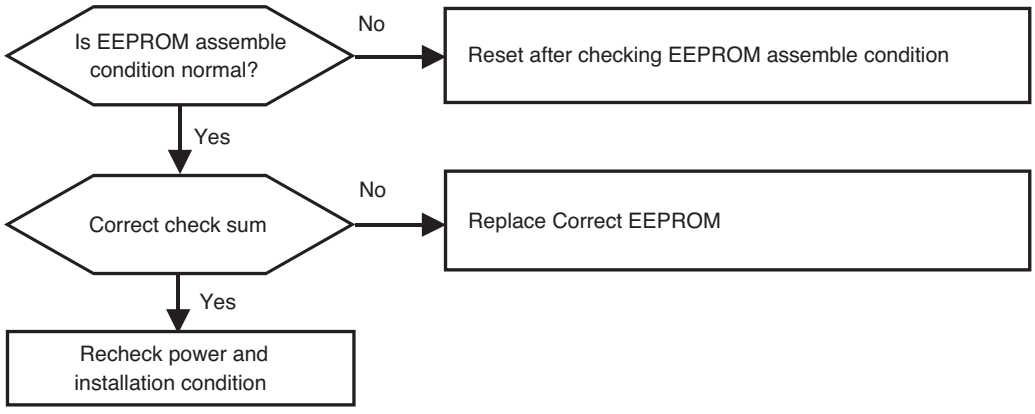


* Sensor resistance 100 kΩover (open) or 100 Ω below (short) will generate error

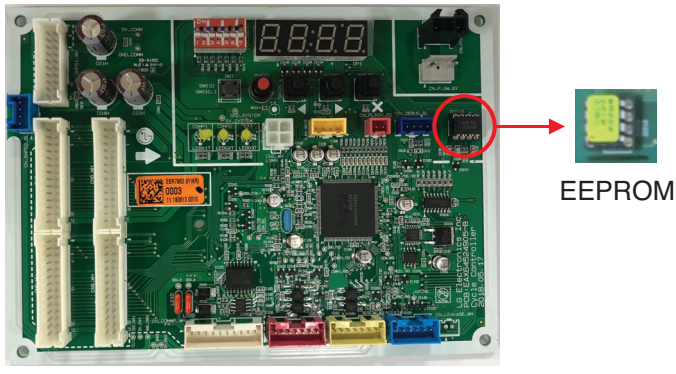
Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table (±5 % tolerance)
Air temperature sensor: 10 °C [50 °F] = 20.7 kΩ : 25 °C [77 °F] = 10 kΩ : 50 °C [122 °F] = 3.4 kΩ
Pipe temperature sensor: 10 °C [50 °F] = 10 kΩ : 25 °C [77 °F] = 5 kΩ : 50 °C [122 °F] = 1.8 kΩ

Error No.	Error Type	Error Point	Main Reasons
86* Master 861 Slave1 862 Slave2 863	Main PCB EEPROM	EEPROM Access Error	1. No EEPROM 2. EEPROM wrong insertion (use only 575 V EEPROM)

■ Error Diagnosis and Countermeasure Flow Chart

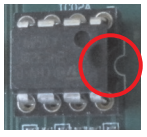


EEPROM Insertion



EEPROM

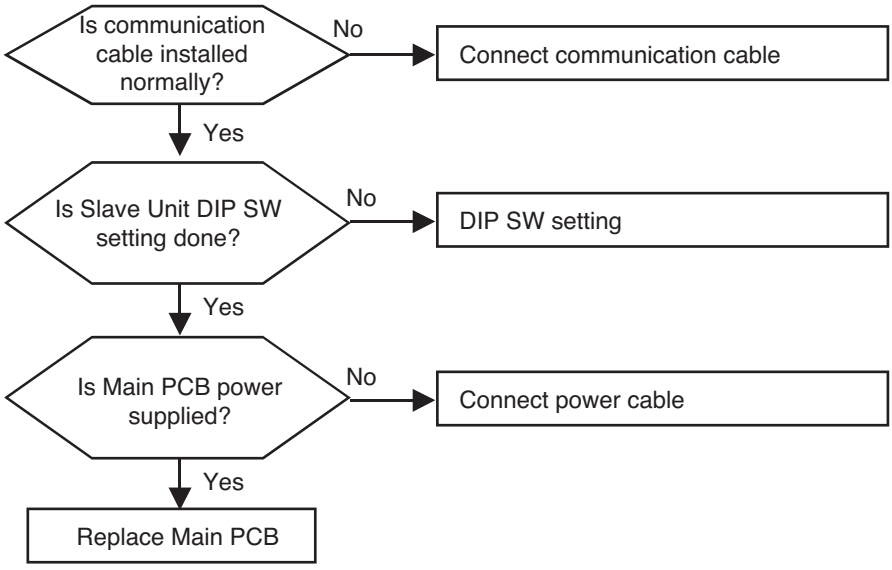
* Note : Replace after power off



Same direction both socket hole and EEPROM hole

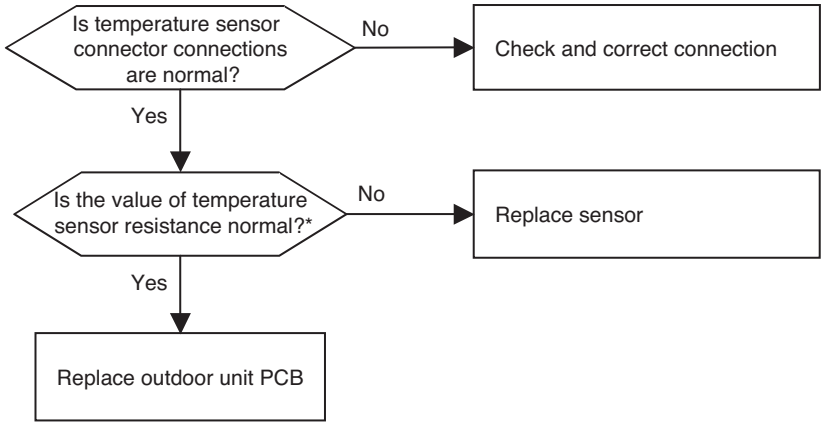
Error No.	Error Type	Error Point	Main Reasons
104* Master 1041 Slave1 1042 Slave2 1043	Communication Error Between Outdoors	Master displays ODU number which is not communicated. Slave displays own error number	1.Loose connection of power cable/ communication cable¸(Open/Short) 2.Defect of each outdoor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

■ Error Diagnosis and Countermeasure Flow Chart



Error No.	Error Type	Error Point	Main Reasons
113* Master 1131 Slave1 1132 Slave2 1133	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
115* Master 1151 Slave1 1152 Slave2 1153	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

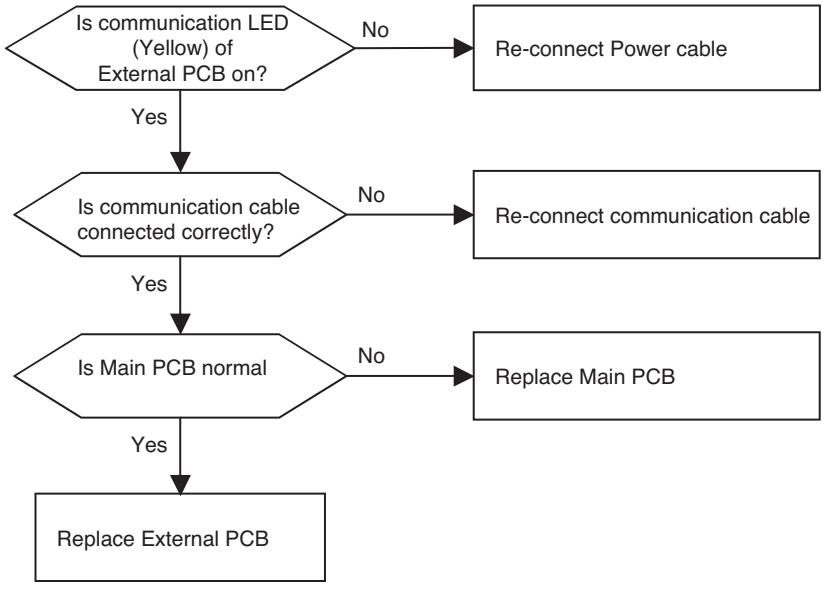


* Sensor resistance 100 kΩover (open) or 100 Ω below (short) will generate error

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[50°F] = 20.7kΩ : 25°C[77°F] = 10kΩ : 50°C[122°F]= 3.4kΩ
Pipe temperature sensor: 10°C[50°F] = 10kΩ : 25°C[77°F] = 5kΩ : 50°C[122°F]= 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
145* Master 1451 Slave1 1452 Slave2 1453	Communication Error between (Main PCB → External PCB)	Cycle controller of Master unit 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

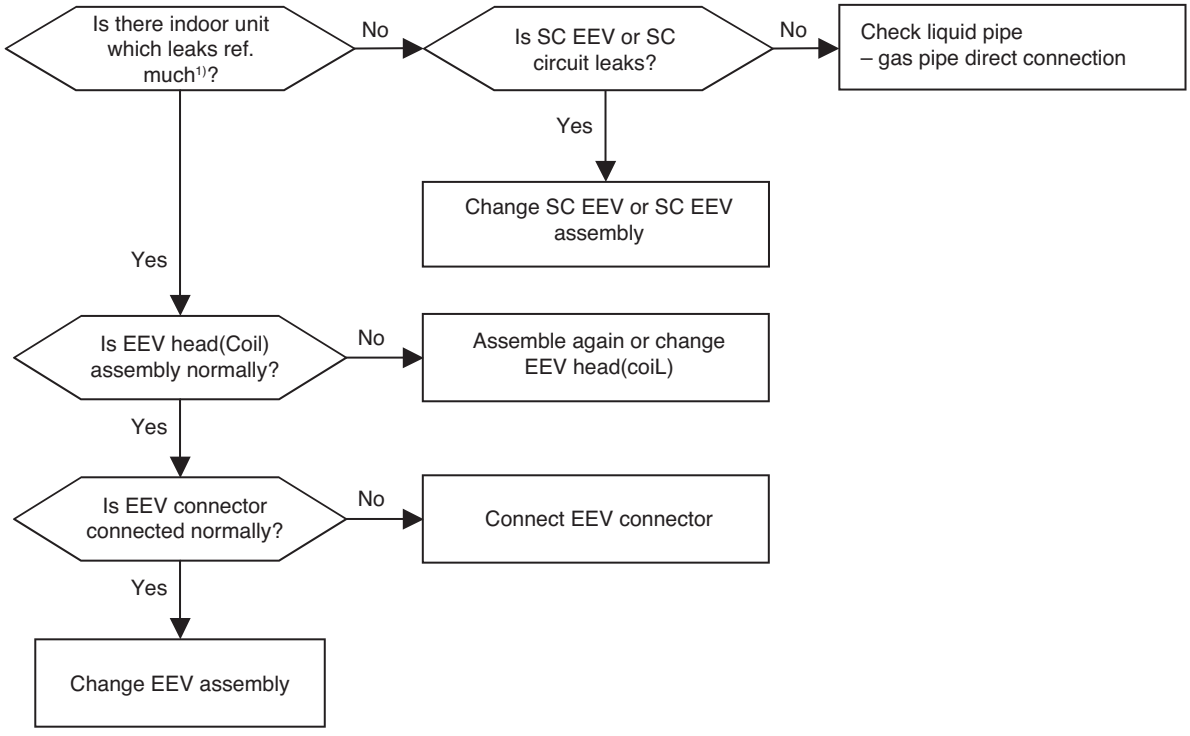
■ Error diagnosis and countermeasure flow chart



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

Error No.	Error Type	Error Point	Main Reasons
CH150	Discharge superheat low	Discharge superrheat is under 3°C[6°F] (liquid back)	Check liquid bypass 1. Individual power of indoor unit is open during operation 2. Indoor unit EEV fault(ref. leak much) 3. Indoor unit EEV connector disconnected. 4. SC EEV fault(ref. leak much) 5. Liquid pipe – gas pipe direct connection

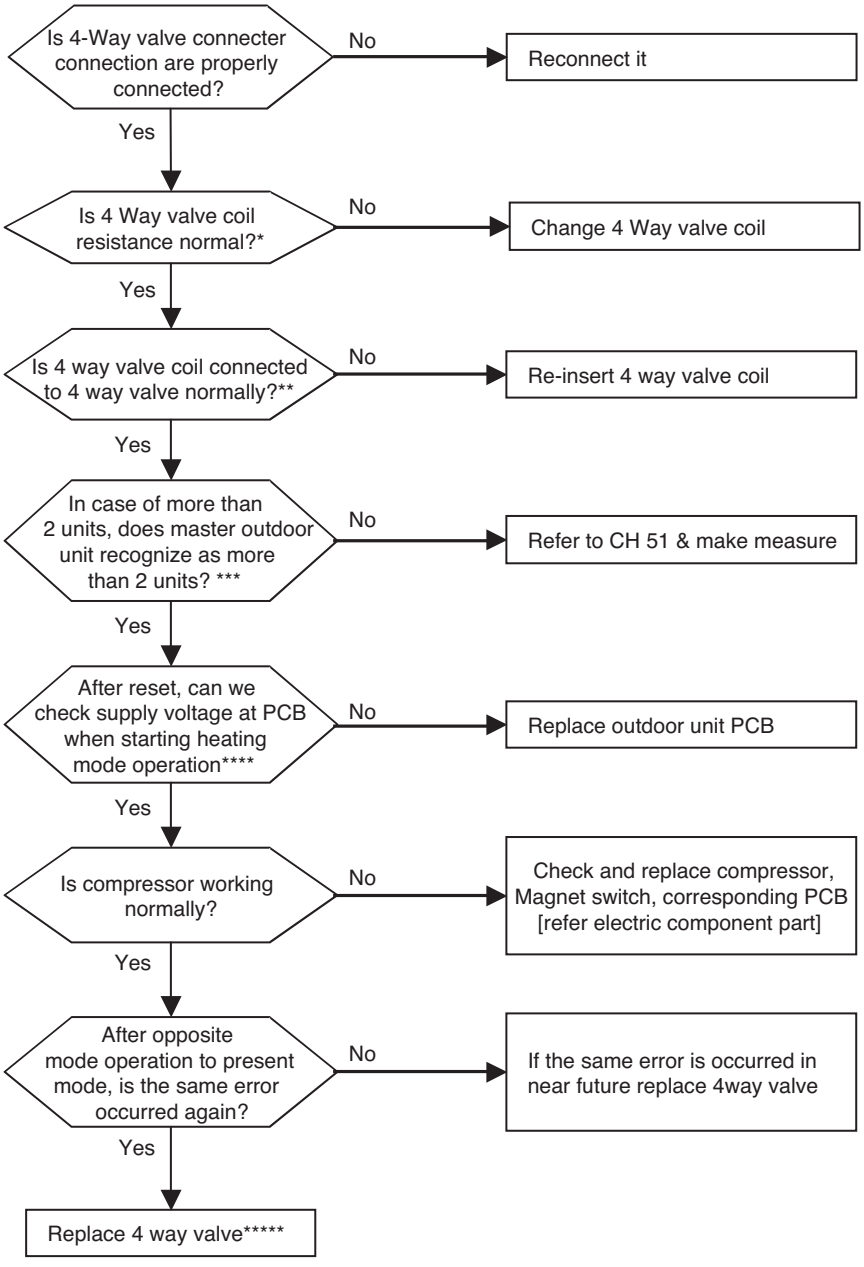
■ Error diagnosis and countermeasure flow chart



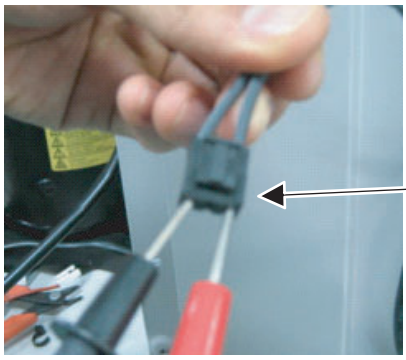
1) Ref. leakage much
: Both Pipe in, pipe out temp. is under 10°C[50°F] during unit is off(EEV 40pls) Also, big refrigerant flow noise occured

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	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

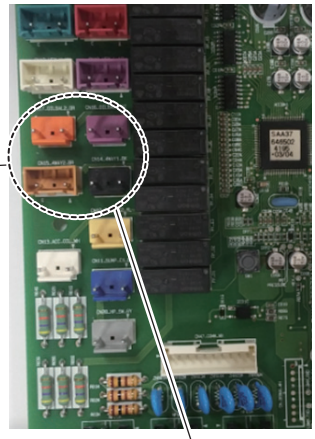
■ Error diagnosis and countermeasure flow chart



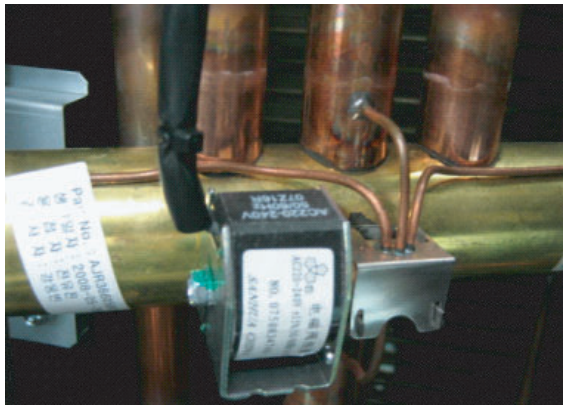
* Measure the resistance of 4way valve



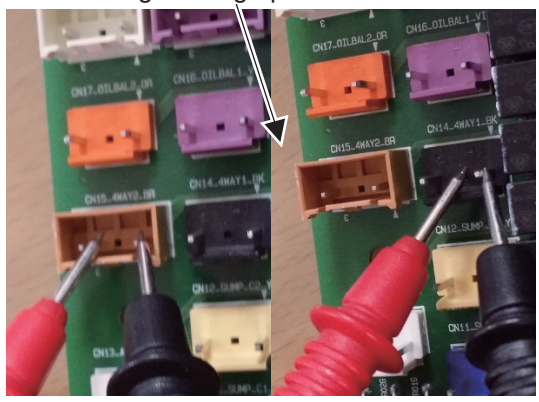
Location of 4way valve connector on Main PCB(marked as 4way,CN09)



** 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

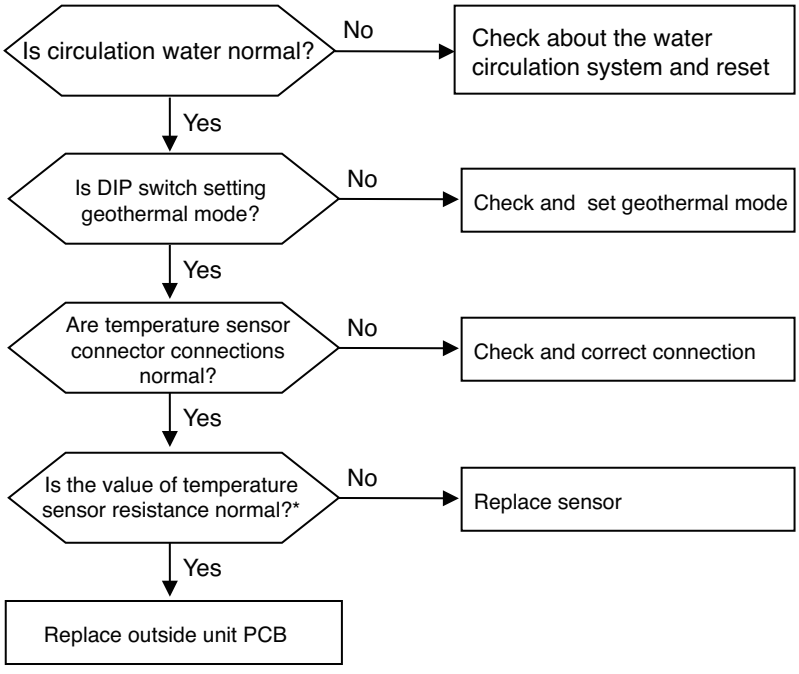
1. Model ID
   → 8 HP : 8, 10 HP : 10, 12 HP : 12, 14 HP : 14, 16 HP : 16, 18 HP : 18, 20 HP : 20
2. Total Capacity
   → Displayed with HP
3. ODU Type
   → Heat Pump : 2
   → Heat Recovery : 3
4. Power type
   → 575 V : 57
5. Model type
   → CAS5 : 30

***** 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

Error No.	Error Type	Error Point	Main Reasons
180 Master 1801 Slave1 1802 Slave2 1803	Plate type heat exchanger freeze prevention	Plate type heat exchanger freeze prevention	1. Lack of circulation water 2. Inlet water temperaure is low 3. Defective water temperature sensor (Open/Short)

■ Error diagnosis and countermeasure flow chart

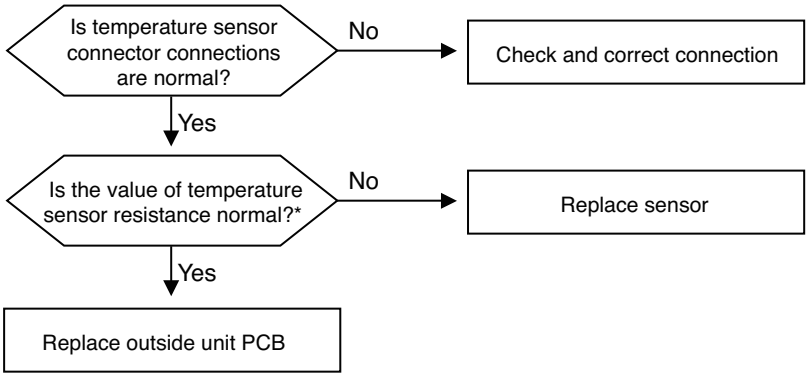


* Sensor resistance 100 kΩ over (open) or 100 Ω below (short) will generate error

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
181 Master 1811 Slave1 1812 Slave2 1813	Water 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
188* Master 1881 Slave1 1882 Slave2 1883	Water 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

■ Error diagnosis and countermeasure flow chart

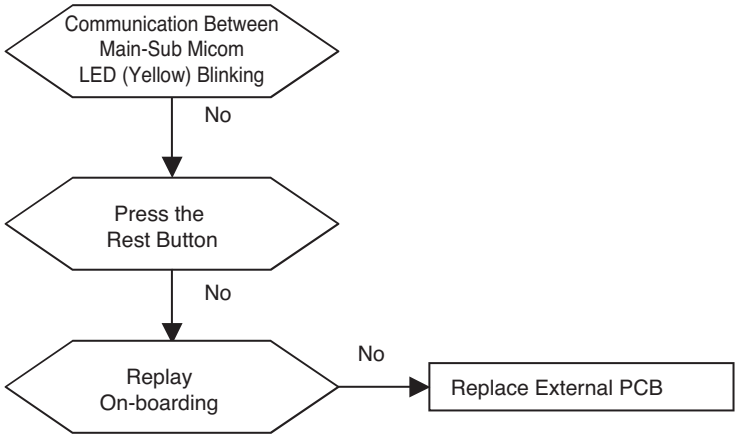


* Sensor resistance 100 k Ωover (open) or 100 Ω below (short) will generate error

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

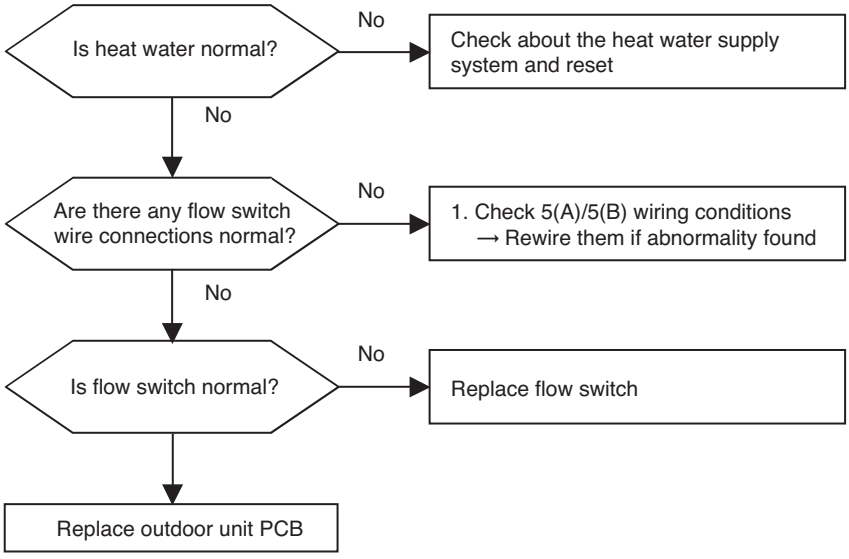
Error No.	Error Type	Error Point	Main Reasons
182* Master 1821 Slave1 1822 Slave2 1823	Communication Error Between Main and Sub Micom of External PCB	Failure Receiving Signal Between Main and Sub Micom	1. Failure Receiving Signal Between Main and Sub Micom

■ Error diagnosis and countermeasure flow chart



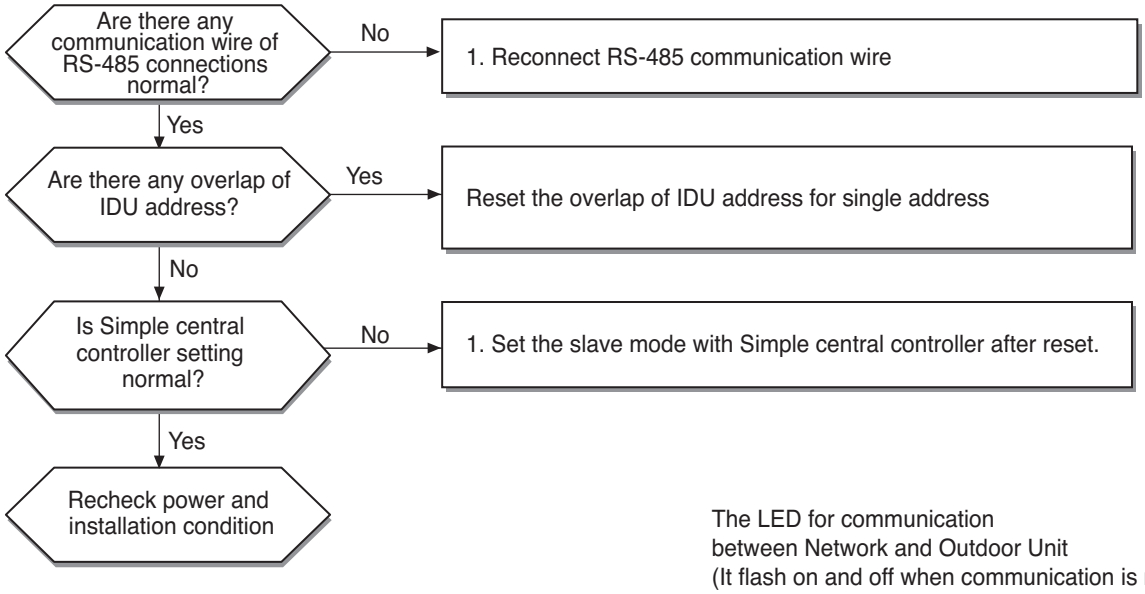
Error No.	Error Type	Error Point	Main Reasons
189* Master 1891 Slave1 1892 Slave2 1893	Flow switch error	Flow switch can't detect flow of the heat water	1. Lack of circulation water 2. Defective flow switch wire connection 3. Defective flow switch 4. Defective outdoor unit PCB

■ Error diagnosis and countermeasure flow chart

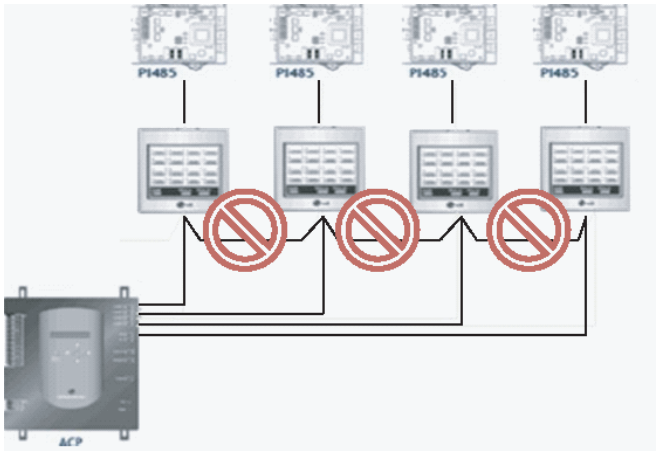


Error No.	Error Type	Error Point	Main Reasons
242* Master 2421	Network Error	Network error of central controller	1. RS-485 communication wiring defect 2. Communication defect between remote controller and indoor unit 3. RS-485 DIP switch setting error 4. Indoor unit addressing ssetting error on central controller

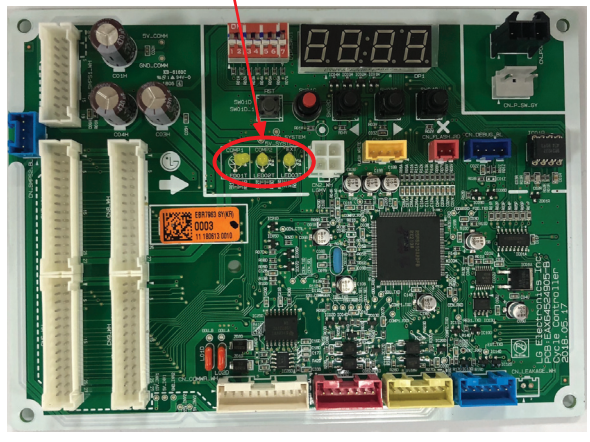
■ Error diagnosis and countermeasure flow chart



<RS-485 communication wire miss connection>



The LED for communication
between Network and Outdoor Unit
(It flash on and off when communication is normally
between Network and Outdoor Unit)



Error No.	Error Type	Error Point	Main Reasons
51C#HR	Excessive connection of indoor unit to HR unit	Indoor unit capacity exceed HR unit capacity specification	1. Wrong connection of communication line or pipe 2. Incorrect operation of HR unit PCB DIP Switch 3. Indoor unit connection each HR unit connection port exceeding the capacity

HR: Heat Recovery

■ Error diagnosis and countermeasure flow chart

1) Check if the communication line and pipe between HR unit and indoor unit are correctly connected
2) Check whether DIP switch is set for each connection conditions between HR unit and indoor unit
3) If the indoor unit connected to HR unit is in group control, check if the corresponding capacity is 100 kBtu or less.
4) If the indoor unit connected to HR unit is not in group control, check if the corresponding capacity is 56 kBtu or less (including zoning control)
5) Even after performing the above process, if the same error code occurs, replace the corresponding HR unit PCB
6) After checking and taking action for No.1~5 processes, carry out auto addressing, and carry out pipe search

Error No.	Error Type	Error Point	Main Reasons
2001 Master 21 ➔ 001	Pipe detection error	After the auto operation, if the number of the indoor units detected is different from the number communicating indoor unit	1. HR unit's power cable or communication cable connection defect 2. After auto-addressing, wrong address setting of the indoor unit (Defective indoor power / transmission error and PCB defect) 3. Wrong setting of the HR unit's rotary switch or DIP switch 4. HR unit PCB defect

HR: Heat Recovery

■ Error diagnosis and countermeasure flow chart

1) Check the periodic blinking of the HR unit's green LED (transmission LED)
2) When green LED (communication LED) of HR unit blinks regularly,
   2.1) Check input power of HR unit.(220V±10%)
   2.2) After reset of power of outdoor, wait for more than 30 minutes, temperature of pipes will be cool down then, do auto-addressing
   2.2) While power of HR unit is on, check total indoors display 'CH05' or not.(Refer to CH05)
3) When green LED (communication LED) of HR unit blinks regularly, Check setting of rotary switch and DIP switch, After reset of power of outdoor and HR unit, wait for more than 30 minutes, temperature of pipes will be cool dow then, do auto-addressing *
4) If indoor unit quantity is different between installed quantity and quantity which check thru piping searching, check pipe installation condition
   Outdoor unit ↔ HR unit ↔ Indoor unit
5) If indoor unit has not been connected to #1 valve of HR unit, set pipes of HR unit manually**
6) If it is not applied as above, set pipes of HR unit as manual

[NB] How to check display method of outdoor main PCB 7-segment ?:
'88' ➔ Indoor qty which check thru 'Auto-Addressing' ➔ '88' ➔ Indoor qty which check thru 'piping checking'

Error No.	Error Type	Error Point	Main Reasons
201C#HR	HR unit liquid pipe temperature sensor error	Abnormal value of sensor measurement (Open / Short)	• Defective temperature sensor connection • Defective temperature sensor (Open/Short) • Defective outdoor unit PCB

Error No.	Error Type	Error Point	Main Reasons
202C#HR	HR unit Sub-cooling inlet pipe temperature sensor error	Abnormal value of sensor measurement(Open / Short)	• Defective temperature sensor connection • Defective temperature sensor (Open/Short) • Defective outdoor unit PCB

Error No.	Error Type	Error Point	Main Reasons
203C#HR	HR unit Sub-cooling discharge pipe temperature sensor error	Abnormal value of sensor measurement(Open / Short)	• Defective temperature sensor connection • Defective temperature sensor (Open/Short) • Defective outdoor unit PCB

■ Error diagnosis and countermeasure flow chart

1) Check connection condition of temperature sensor and lead cable

2) Is value of temperature sensor normal? If not replace sensor
   - Piping temperature sensor : 10°C[50°F] = 10kΩ : 25°C[77°F]= 5kΩ : 50°C[122°F]= 1.8kΩ

3) If connection of sensor and value is correct, replace outdoor unit PCB

■ HR unit error display No.

HR Unit	HR #1	HR #2	HR #3	HR #4	HR #5	HR #6	HR #7	HR #8	HR #9	HR #10	HR #11	HR #12	HR #13	HR #14	HR #15	HR#16
Error display	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	C16

■ Example of HR unit error display.

#16 HR unit Sub-cooling inlet pipe temperature sensor error 200 ➔ C16 (Repeat)

C: HR unit

#: HR unit Nuber

Error No.	Error Type	Error Point	Main Reasons
204C#HR	Transmission error between the HR unit and outdoor unit	Transmission error between the HR unit and outdoor unit	1. Defective connection in HR unit power supply and communication connection 2. Wrong setting of the HR unit rotary switch and DIP switch 3. Defective HR unit PCB

■ Error diagnosis and countermeasure flow chart

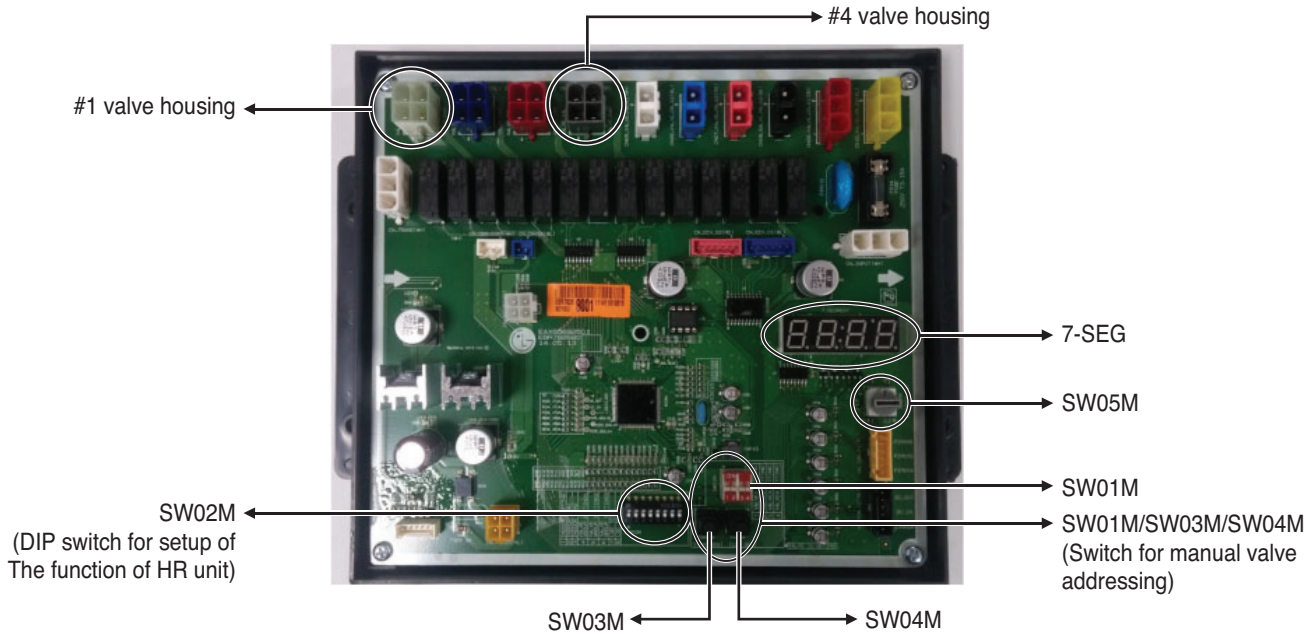
1) Check connection between power cables and communication cables, check communication green LED blink of HR unit PCB

2) If communication green LED blink of HR unit PCB is normal, check setting of rotary switch of HR unit and DIP switch(Refer to CH200),
   Reset power of outdoor and HR unit
   (If communication error of HR unit occurs, it can't be released until reset of outdoor power)

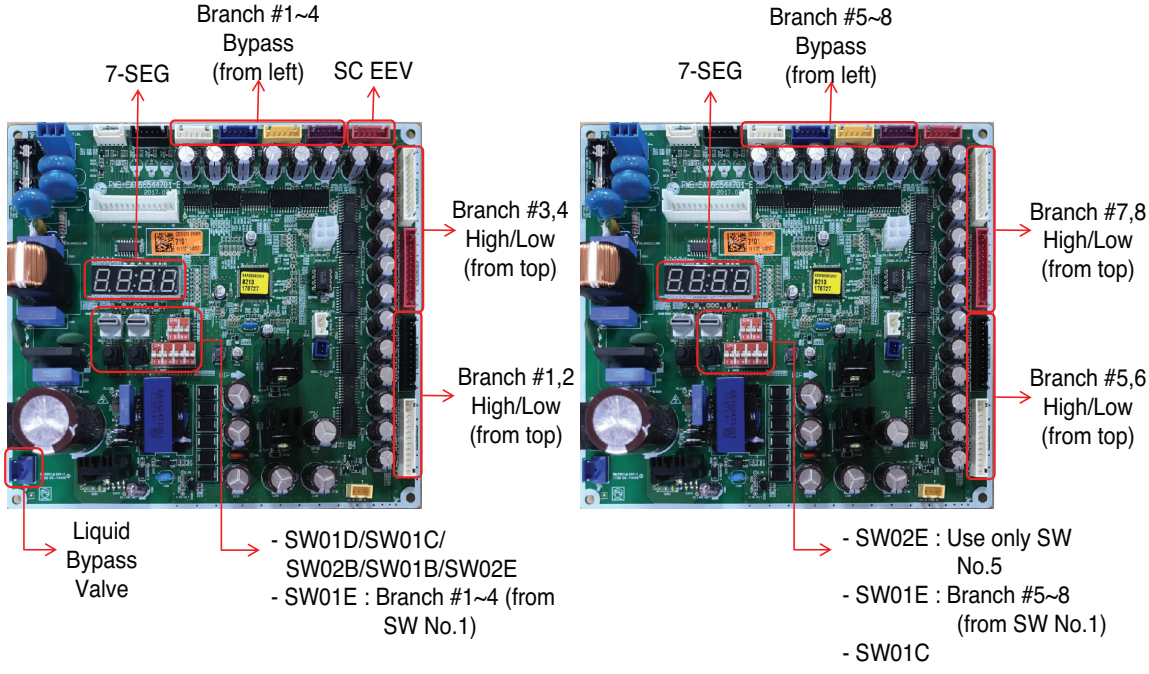
3) If communication green LED blink of HR unit PCB is abnormal(not blinking,just on), check communication condition of total indoor units(Refer to CH05)
   If communication green LED blink of HR unit PCB is abnormal(not blinking, just on) even if communication condition is normal, replace HR unit PCB

[NB] If Indoor units/communication cables of HR unit and cables of power 220 V has been changed each other, communication parts and indoor will be burnt

HR Unit PCB (PRHR**2A)



HR Unit PCB (PRHR**3A)



Error No.	Error Type	Error Point	Main Reasons
205C#HR	Communication error between HR unit and the upgraded 485 modem	4 series upgraded 485 communication error between HR unit and HR unit modem	1. Wiring defect between HR unit and upgraded 485 modem 2. Defect of the upgraded 485 PCB modem 3. Defect of the HR unit PCB

■ Error diagnosis and countermeasure flow chart

1) Check the communication connection between HR unit and the upgraded 485 modem, and check for the red LED on
2) Reset the outdoor unit and the power of HR unit if the red LED of the upgraded 485 modem is on
3) Replace the upgraded 485 modem if the red LED is flashing at the upgraded 485 modem
4) Replace the HR unit PCB if the red LED of the upgraded 485 modem is flashing even after replacing the upgraded 485 modem.

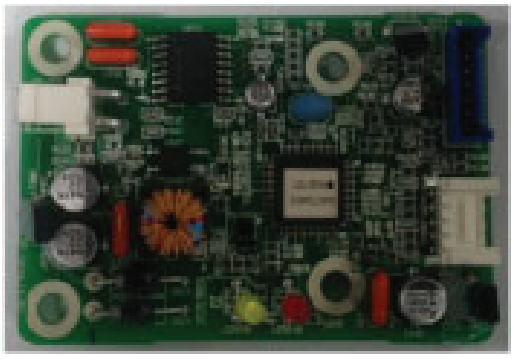
Error No.	Error Type	Error Point	Main Reasons
206C#HR	Duplicate address error of HR unit	When the HR unit address is set duplicated at the 4 series upgraded 485 communication	1. Defect of power cable of HR unit or communication line connection 2. Error of address allocation rotary switch setting of HR unit 3. Defect of the HR unit PCB

■ Error diagnosis and countermeasure flow chart

1) Check whether the rotary switch setting of HR unit PCB is set differently for HR units
2) Reset the outdoor unit and the power of HR unit by setting the rotary switch of HR unit PCB differently for HR units
3) Perform the auto addressing again after performing the number 2 process
4) Replace the corresponding HR unit PCB if the same error code is occurred even after performing the number 3 process

• The above error code is only occurred at the upgraded 485 communication (9600bps communication)
• Refer to the installation manual of the outdoor unit for the address setting to HR unit rotary switch for HR units

Upgraded 485 Modem



Error No.	Error Type	Error Point	Main Reasons
207C#HR	Communication error between Master and Slave Main PCB of HR Unit	When fail to communication between Master and Slave Main PCB of HR Unit	1. Wiring defect between Main and Slave Main PCB of HR Unit. 2. Defect of the Main PCB of HR Unit.

■ Error diagnosis and countermeasure flow chart

1) Check if DIP switch No.5 of SW02E on Slave Main PCB is ON.
2) Check the communication connection between Master and Slave Main PCB of HR Unit even after check No.1 process.
3) Replace Main PCB of HR Unit even after check No.2 process.

Error No.	Error Type	Error Point	Main Reasons
208C#HR	Communication error of EEPROM of HR Unit	When fail to communication of EEPROM of HR Unit	1. Wiring defect between EEPROM and Main PCB of HR Unit. 2. Wiring wrong type of EEPROM. 3. Defect of the Main PCB of HR Unit.

■ Error diagnosis and countermeasure flow chart

1) Check the wiring connection between EEPROM and Main PCB of HR Unit.
2) Replace Main PCB of HR Unit even after check No.1 process.

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