Internal Use Only

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MULTI V III

Outdoor Unit R410A

SERVICE MANUAL

MODEL : ARUB Series(Heat Recovery)

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.

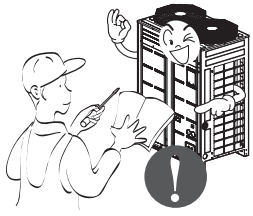
⃠	**Be sure not to do.**
❗	**Be sure to follow the instruction.**

⚠WARNING

■ Installation

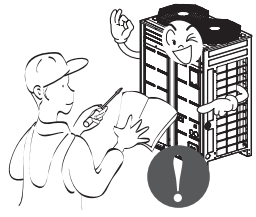
Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.

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



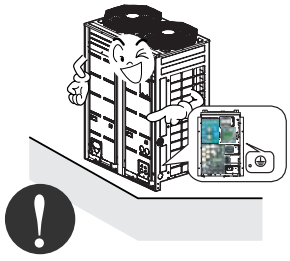
Ask the dealer or an authorized technician to install the air conditioner.

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



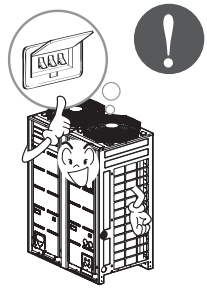
Always ground the product.

- There is risk of fire or electric shock.



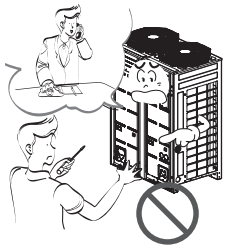
Always intstall a dedicated circuit and breaker.

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



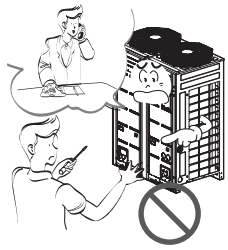
For re-installation of the installed product, always contact a dealer or an Authorized Service Center.

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



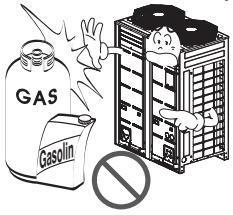
Do not install, remove, or re-install the unit by yourself (customer).

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



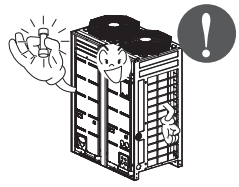
Do not store or use flammable gas or combustibles near the air conditioner.

• There is risk of fire or failure of product.



Use the correctly rated breaker or fuse.

• There is risk of fire or electric shock.

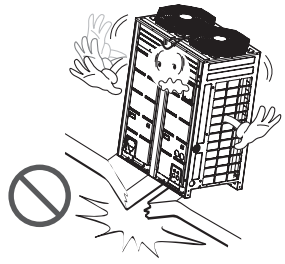


Prepare for strong wind or earthquake and install the unit at the specified place.

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

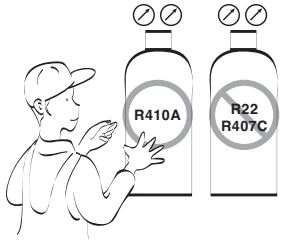
Do not install the product on a defective installation stand.

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



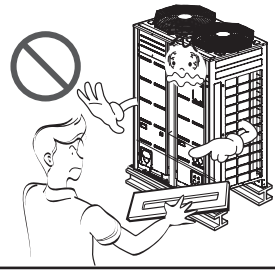
When installing and moving the air conditioner to another site, do not charge it with a different refrigerant from the refrigerant specified on the unit.

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



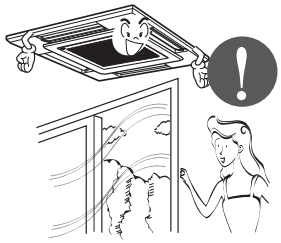
Do not reconstruct to change the settings of the protection devices.

• 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.



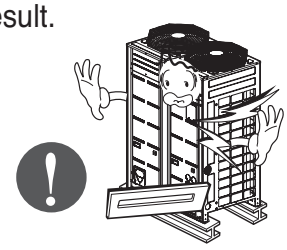
Ventilate before operating air conditioner when gas leaked out.

• It may cause explosion, fire, and burn.



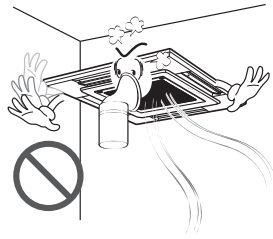
Securely install the cover of control box and the panel.

• 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.

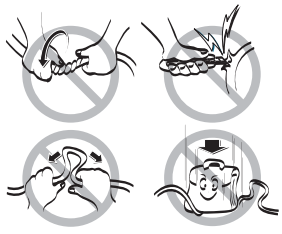
• Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, harzards due to lack of oxygen in the room could result.



■ Operation

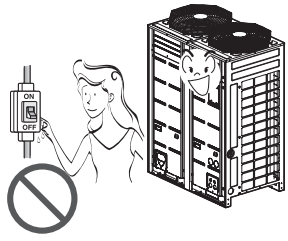
Do not damage or use an unspecified power cord.

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



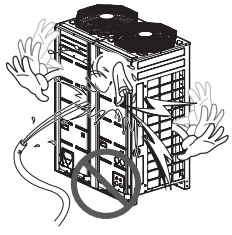
Use a dedicated outlet for this appliance.

• 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.

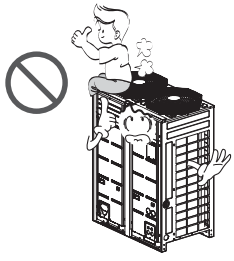
• There is risk of fire or electric shock.

Be cautious not to touch the sharp edges when installing.

• It may cause injury.

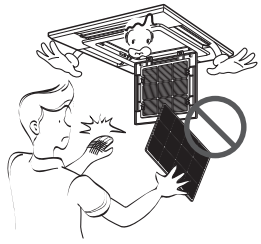
Take care to ensure that nobody could step on or fall onto the outdoor unit.

• This could result in personal injury and product damage.



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

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

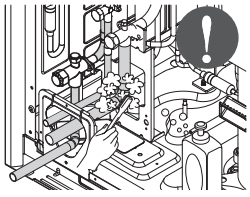


⚠ CAUTION

■ Installation

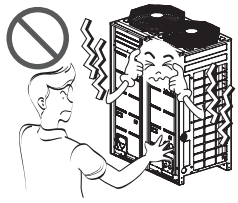
Always check for gas (refrigerant) leakage after installation or repair of product.

• Low refrigerant levels may cause failure of product.



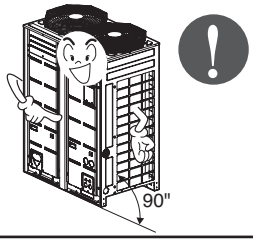
Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

• It may cause a problem for your neighbors.



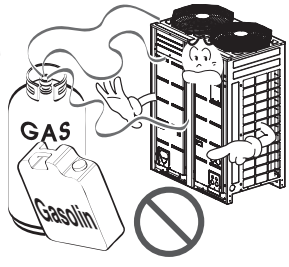
Keep level even when installing the product.

• To avoid vibration or water leakage.



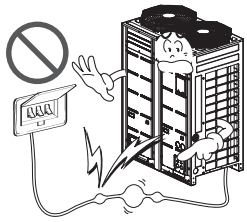
Do not install the unit where combustible gas may leak.

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



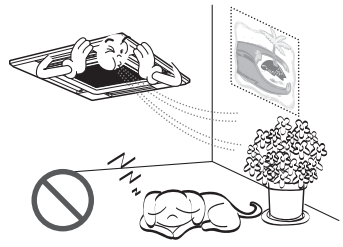
Use power cables of sufficient current carrying capacity and rating.

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



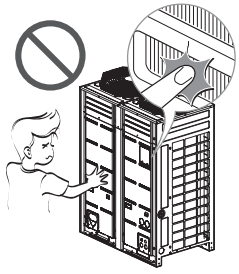
Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.

• There is risk of damage or loss of property.



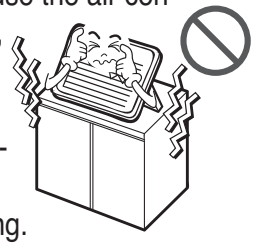
Keep the unit away from children. The heat exchanger is very sharp.

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



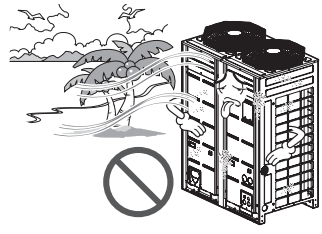
When installting the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.

• 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.

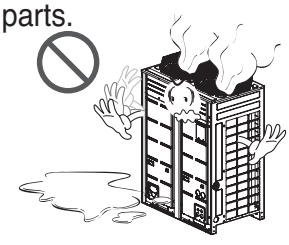
• It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.



■ Operation

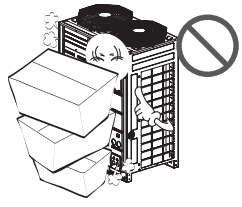
Do not use the air conditioner in special environments.

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



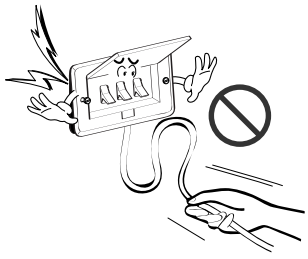
Do not block the inlet or outlet.

• 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.

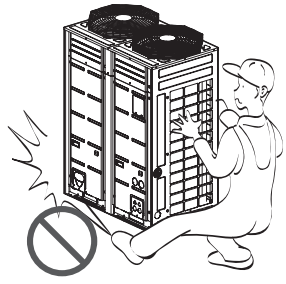
- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, or personal injury.

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.

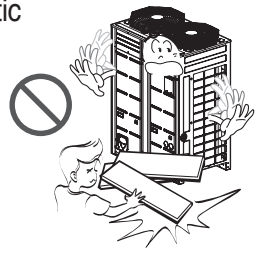
Be very careful about product transportation.

- 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.



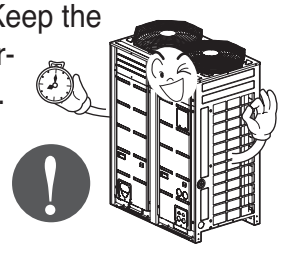
Safely dispose of the packing materials.

- 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.



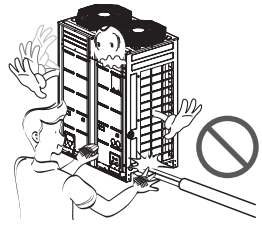
Turn on the power at least 6 hours before starting operation.

- 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.



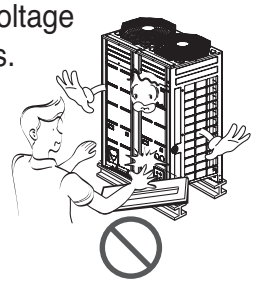
Do not touch any of the refrigerant piping during and after operation.

• It can cause a burn or frostbite.



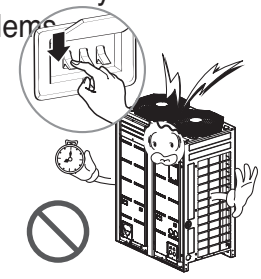
Do not operate the air conditioner with the panels or guards removed.

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

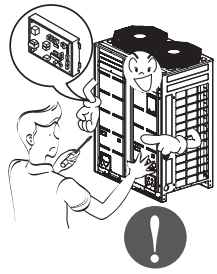


Do not directly turn off the main power switch after stopping operation.

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

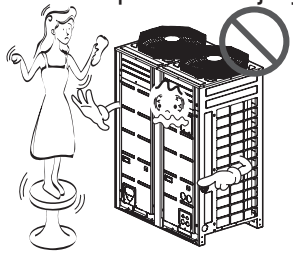


Auto-addressing should be done in condition of connecting the power of all indoor and outdoour units. Auto-addressing should also be done in case of changing the indoor unit PCB.



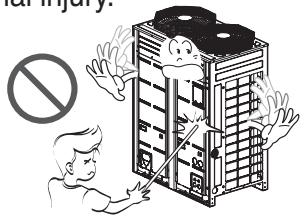
Use a firm stool or ladder when cleaning or maintaining the air conditioner.

• Be careful and avoid personal injury.



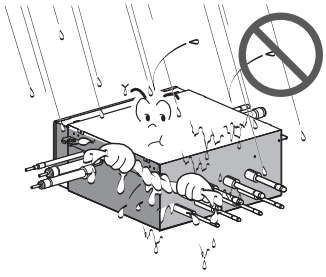
Do not insert hands or other objects through the air inlet or outlet while the air conditioner is plugged in.

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



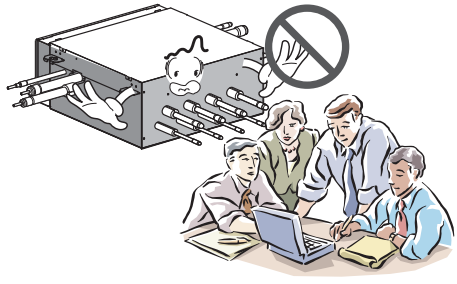
Avoid a place where rain may enter since the HR unit is for indoor

• There is risk of property damage, failure of product or electric shock.



Install the HR unit at a place in which it is not affected by operation mode changing noise.

• Installation within cell such as meeting room etc, may disturb business due to noise.



Part 1
General Information

1. Model Names

1.1 Indoor Unit

Category		Chassis Name	Capacity(Btu/h(kW))														
			5.5 (1.6)	7.5 (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)	95.5 (28.0)
Wall Mounted (General)		SE		ARNU073SE*2	ARNU093SE*2	ARNU123SE*2	ARNU153SE*2										
		S5						ARNU183S5*2	ARNU243S5*2								
ART COOL	Mirror	SE		ARNU073SE*2	ARNU093SE*2	ARNU123SE*2	ARNU153SE*2										
		S8						ARNU183S8*2	ARNU243S8*2								
Ceiling Cassette	1 Way	TJ		ARNU073TJ*2	ARNU093TJ*2	ARNU123TJ*2											
	2 Way	TL						ARNU183TL*2	ARNU243TL*2								
	4 Way	TR	ARNU053TR*2	ARNU073TR*2	ARNU093TR*2	ARNU123TR*2											
		TQ					ARNU153TQ*2	ARNU183TQ*2									
		TP							ARNU243TP*2	ARNU283TP*2							
		TN			ARNU093TN*2	ARNU123TN*2	ARNU153TN*2					ARNU363TN*2					
		TM						ARNU183TM*2	ARNU243TM*2				ARNU423TM*2	ARNU483TM*2			
Ceiling Concealed Duct	High Static	BH		ARNU073BHA2	ARNU093BHA2	ARNU123BHA2	ARNU153BHA2	ARNU183BHA2	ARNU243BHA2								
		BG					ARNU153BGA2	ARNU183BGA2	ARNU243BGA2	ARNU283BGA2		ARNU363BGA2	ARNU423BGA2				
		BR												ARNU483BRA2			
		B8														URNU763B8A2	URNU963B8A2
	Low Static	B1		ARNU073B1G2	ARNU093B1G2	ARNU123B1G2	ARNU153B1G2										
		B2						ARNU183B2G2	ARNU243B2G2								
	Built In	B3		ARNU073B3G2	ARNU093B3G2	ARNU123B3G2	ARNU153B3G2										
		B4						ARNU183B4G2	ARNU243B4G2								
Ceiling & Floor		VE			ARNU093VEA2	ARNU123VEA2											
Ceiling Suspended		VJ						URNU183VJA2	URNU243VJA2								
Floor Standing	With Case	CE		ARNU073CEA2	ARNU093CEA2	ARNU123CEA2	ARNU153CEA2										
		CF						ARNU183CFA2	ARNU243CFA2								
	Without Case	CE		ARNU073CEU2	ARNU093CEU2	ARNU123CEU2	ARNU153CEU2										
		CF						ARNU183CFU2	ARNU243CFU2								
Vertical AHU		NJ						ARNU183NJA2	ARNU243NJA2		ARNU303NJA2	ARNU363NJA2					
		NK											ARNU423NKA2	ARNU483NKA2	ARNU543NKA2		

❉ *ART COOL- SE/S8(* R:Mirror, V:Silver, B : Blue)
*Wall Mounted- A: Basic, L:Plasma
*Ceiling Cassette- A: Basic, C:Plasma

1.2 Outdoor Unit

Power Supply	8HP (6Ton)	10HP (8Ton)	12HP (10Ton)	14HP (12Ton)	18HP (14Ton)	20HP (16Ton)
3Ø, 208/230V, 60Hz	072BT3	096BT3	121BT3	144BT3	168BT3	192BT3

Power Supply	22HP (18Ton)	24HP (20Ton)	26HP (22Ton)	28HP (24Ton)	32HP (26Ton)	34HP (28Ton)
3Ø, 208/230V, 60Hz	216BT3	240BT3	264BT3	288BT3	312BT3	336BT3

Power Supply	36HP (30Ton)	38HP (32Ton)	40HP (34Ton)	42HP (36Ton)
3Ø, 208/230V, 60Hz	360BT3	384BT3	408BT3	432BT3

Heat Recovery	ARUB

1.3 HR Unit

Power Supply	2 branches	3 branches	4 branches
1Ø, 220V, 60Hz	PRHR021A	PRHR031A	PRHR041A

2. External Appearance

2.1 Indoor Unit

Ceiling Cassette- 1Way

ARNU073TJ*2
ARNU093TJ*2
ARNU123TJ*2

* A:Basic, C:Plasma

Ceiling Cassette- 4Way

ARNU053TR*2
ARNU073TR*2
ARNU093TR*2
ARNU123TR*2
ARNU153TQ*2
ARNU183TQ*2
ARNU243TP*2
ARNU283TP*2
ARNU363TN*2
ARNU423TM*2
ARNU483TM*2
ARNU093TN*2
ARNU123TN*2
ARNU153TN*2
ARNU183TM*2
ARNU243TM*2

* A:Basic, C:Plasma

Ceiling Concealed Duct - Low Static

ARNU073B1G2
ARNU093B1G2
ARNU123B1G2
ARNU153B1G2
ARNU183B2G2
ARNU243B2G2

Ceiling Concealed Duct – Built-in

ARNU073B3G2
ARNU093B3G2
ARNU123B3G2
ARNU153B3G2
ARNU183B4G2
ARNU243B4G2

Ceiling & Floor

ARNU093VEA2
ARNU123VEA2

Ceiling Suspended

URNU183VJA2
URNU243VJA2

Ceiling Cassette -2Way

ARNU183TL*2
ARNU243TL*2

* A:Basic, C:Plasma

Ceiling Concealed Duct - High Static

ARNU073BHA2
ARNU093BHA2
ARNU123BHA2
ARNU153BHA2
ARNU183BHA2
ARNU243BHA2
ARNU283BGA2
ARNU363BGA2
ARNU423BGA2
ARNU483BRA2
URNU763B8A2
URNU963B8A2
ARNU153BGA2
ARNU183BGA2
ARNU243BGA2

Wall Mounted

ARNU073SE*2
ARNU093SE*2
ARNU123SE*2
ARNU153SE*2
ARNU183S5*2
ARNU243S5*2

* A:Basic, L:Plasma

ART COOL Mirror

ARNU073SE*2
ARNU093SE*2
ARNU123SE*2
ARNU153SE*2
ARNU183S8*2
ARNU243S8*2

* R:Mirror
V:Silver
B : Blue

Floor Standing

With case

ARNU073CEA2
ARNU093CEA2
ARNU123CEA2
ARNU153CEA2
ARNU183CFA2
ARNU243CFA2

Without case

ARNU073CEU2
ARNU093CEU2
ARNU123CEU2
ARNU153CEU2
ARNU183CFU2
ARNU243CFU2

Vertical AHU

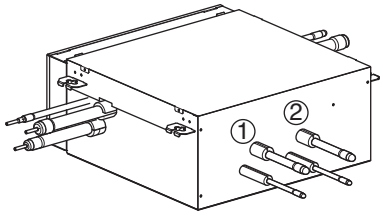
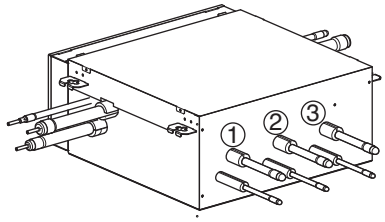
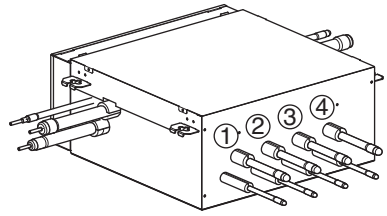
ARNU183NJA2
ARNU243NJA2
ARNU303NJA2
ARNU363NJA2
ARNU423NKA2
ARNU483NKA2
ARNU543NKA2

2.2 Outdoor Unit

2.2.1 Heat Recovery

CHASSIS	Model Name	Model
UX2	ARUB072BT3	
UX3	ARUB096BT3 ARUB121BT3 ARUB144BT3	
UX3 UX2	ARUB168BT3 ARUB192BT3 ARUB216BT3	
UX3 UX3	ARUB240BT3 ARUB264BT3 ARUB288BT3	
UX3 UX3 UX2	ARUB312BT3 ARUB336BT3 ARUB360BT3	
UX3 UX3 UX3	ARUB384BT3 ARUB408BT3 ARUB432BT3	

2.2.2 HR Unit

PRHR021A	PRHR031A	PRHR041A
 (For 2 Branches)	 (For 3 Branches)	 (For 4 Branches)

3. Combination of Outdoor Units

3.1 Heat Recovery

Model Name	Capacity (HP(Ton))	Number of Units	Module(HP)			
			8	10	12	14
ARUB072BT3	8(6)	1	1			
ARUB096BT3	10(8)	1		1		
ARUB121BT3	12(10)	1			1	
ARUB144BT3	14(12)	1				1
ARUB168BT3	18(14)	2	1	1		
ARUB192BT3	20(16)	2	1		1	
ARUB216BT3	22(18)	2	1			1
ARUB240BT3	24(20)	2		1		1
ARUB264BT3	26(22)	2			1	1
ARUB288BT3	28(24)	2				2
ARUB312BT3	32(26)	3	1	1		1
ARUB336BT3	34(28)	3	1		1	1
ARUB360BT3	36(30)	3	1			2
ARUB384BT3	38(32)	3		1		2
ARUB408BT3	40(34)	3			1	2
ARUB432BT3	42(36)	3				3

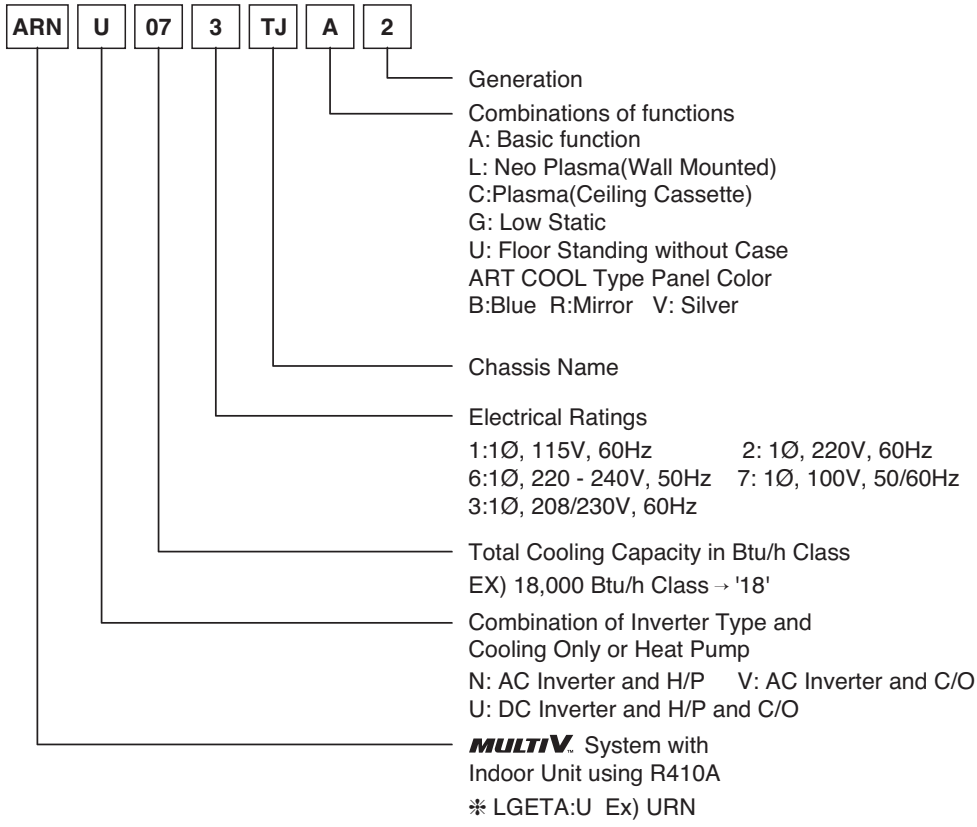
■ A maximum of 42HP can be obtained by combining 8, 10, 12 and 14HP

■ 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.

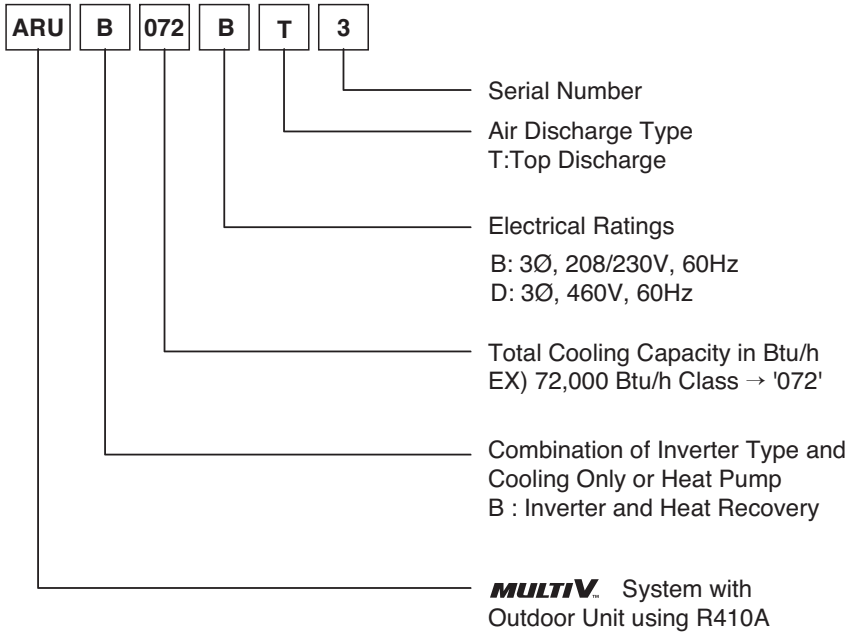
4. Nomenclature

4.1 Indoor Unit

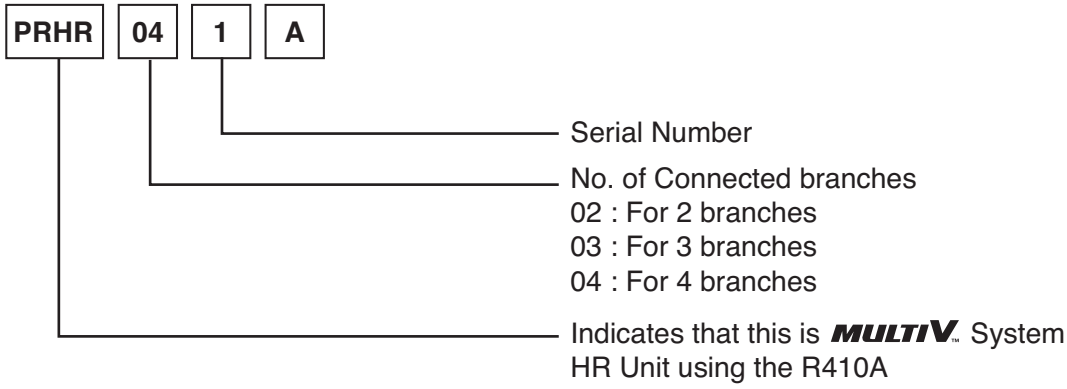


※ Heat recovery ventilator refer to the DX-Coil manual

4.2 Outdoor Unit



4.3 HR Unit



Part 2
Outdoor Units

ARUB Series

Function

1. Basic control

1.1 Normal operation

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

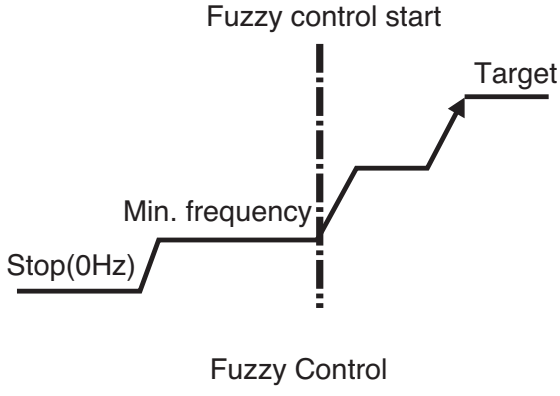
Note : Heating operation is not functional at an outdoor air temperature of 27°C(80°F) or more.
Cooling operation is not functional at an outdoor air temperature of 2°C(36°F) or less with indoor unit combination of 10% or less

1.2 Compressor control

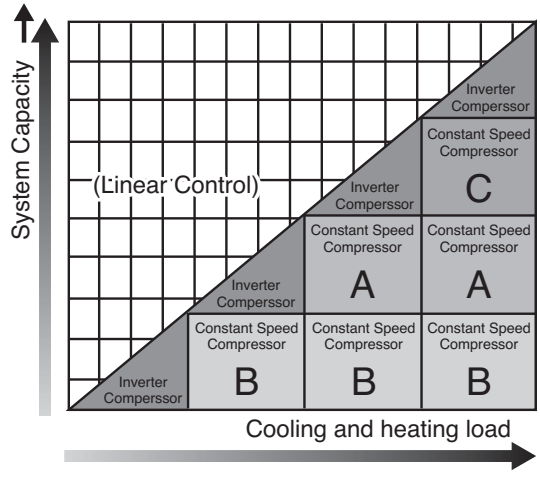
Fuzzy control : Maintain evaporating temperature(Te) to be constant on cooling mode and condensing temperature(Tc) on heating mode by Fuzzy control to ensure the stable system performance.
(Tc:47~51°C(117~124°F), 2~5°C(36~41°F)
(1) Cooling mode
Te can be set by initial dip switch setting. (Normal mode, capacity up mode, and energy save mode)

(2) Heating mode
Tc can be set by initial dip switch setting. (Normal mode, capacity up mode, and energy save 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(37°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(58°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 (R22 : 1000pls, R410A : 800 pls) and discharge temperature is above 85°C(185°F) in heating operation, sub-cooling 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 amount 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	30Hz	Setting Value	30Hz
Constant Speed Compressor	OFF	ON	OFF
FAN	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Max. pulse
Subcooling EEV	Normal control	Main. pluse	100 pulse
4way valve	OFF	OFF	OFF
Hot gas bypass valve	Normal control	Normal control	Normal control

Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	OFF	Normal control
Thermo on unit EEV	Normal control	1200 pulse	Normal control
Thermo off unit EEV	40 pulse	40 pulse	40 pulse
Oil return signal	OFF	ON	OFF

- Oil return operation time : 3 min for running step
- Starting condition:every 8 hours operate
- 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	30Hz	Setting Value	30Hz
Constant Speed Compressor	OFF	ON	OFF
FAN	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Max. pulse
Subcooling EEV	Normal control	Min. pulse	100 pulse
4way valve	ON	OFF	ON
Hot gas bypass valve	Normal control	Normal control	Normal control

Indoor Unit

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

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

2.2 Defrost

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

Outdoor Unit

Component	Starting	Running	Ending
Inv Compressor	30Hz	Setting Value	30Hz
Constant Speed Compressor	OFF	ON	OFF
FAN	Stop	High pressure control	Normal control
Main EEV	Normal control	Max. pulse	Normal control
Subcooling EEV	Normal control	Min. pulse	Normal control
4way valve	On → OFF	OFF	ON
Hot gas bypass valve	Normal control	Normal control	Normal control

Indoor Unit

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

■ Ending condition

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

2.3 Stopping operation

2.3.1 Stopping operation on cooling mode

Component	Operation	Note
Inv Compressor	OFF	-
Constant Speed Compressor	OFF	-
FAN	Stop	-
Main EEV	50 pulse	-
Subcooling EEV	35 pulse	Stop(Min. pulse)
4way valve	OFF	-
Hot gas bypass valve	OFF	OFF after 15 min.

2.3.2 Stopping operation on heating mode

Component	Operation	Note
Inv Compressor	OFF	-
Constant Speed Compressor	OFF	-
FAN	Stop	-
Main EEV	50 pulse	-
Subcooling EEV	35 pulse	Stop(Min. pulse)
4way valve	ON	OFF over 30°C(86°F) air temperature
Hot gas bypass valve	ON	OFF After 15 min.

3. Protection control

3.1 Pressure protection control

3.1.1 Pressure control on cooling mode

■ **High pressure control**

Pressure Range	Compressor	Fan
$P_d \geq$ 4003kPa(581psi)	Stop	Stop
$P_d >$ 3807kPa(552psi)	-5Hz/ 4sec.	+100RPM/4sec.
$P_d \geq$ 3644kPa(529psi)	Frequency holding	Normal control
$P_d <$ 3644kPa(529psi)	Normal control	

■ **Low pressure control**

Pressure Range	Compressor	Fan
Ps ≤ 150kPa(22psi), 1 minute later operation	Stop	Stop
Ps ≤ 346kPa(50psi), 1 minute before operation	-5Hz/4s	-100RPM/ 4sec.
$P_s \leq$ 399kPa(58psi)	Normal control	Frequency holding

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

3.1.2 Pressure control on heating mode

■ **High pressure control**

Pressure Range	Compressor	Fan
$P_d \geq$ 4003kPa(581psi)	Stop	Stop
$P_d >$ 3415Pa(495psi)	-5Hz/4sec.	-50RPM/ 4sec.
$P_d \geq$ 3317Pa(481psi)	Normal control	Frequency holding
$P_d <$ 3317Pa(481psi)	Normal control	$P_d <$ 3284 N/control

■ **Low pressure control**

Pressure Range	Compressor	Fan
Ps ≤ 150kPa(22psi), 1 minute later operation	Stop	Stop
Ps ≤ 150kPa(22psi), 1 minute before operation	-5Hz/4s	+100RPM/4s
$P_s \geq$ 163kPa(24psi)	Normal control	Normal control

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

3.2 Discharge temperature control

■ **Outdoor unit control**

Temperature range	Compressor	Sub cooling EEV	IDU EEV
Tdis >110°C(230°F)	Off	SC,SH decrease control	SH decrease control
Tdis >108°C(226°F)	-5Hz/10sec.	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

	Normal Operation	Frequency Down	System Stop
AC Input Current	20A or less	20A or more	22A or more
Compressor Current	24A or less	24A or more	30A or more

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

3.4 Phase detection

■ **When the product is reversed or missed wiring installation(Power line : R(L1), S(L2), T(L3), it isn't defect or operate for protection of product function and constant speed compressor.**

Reversed Phase	R(L1), S(L2), T(L3)	Single	M		
			541		
		Series	M	S1	S1
			541	542	542
			M+S1(at the same time)	M+S2(at the same time)	M+S3(at the same time)
			542	543	543
			M+S1+S2(at the same time)		
			543		
Missed Phase	R(L1), T(L3)	Single	M		
			501		
		Series	M	S1	S2
			501	502	503
			M+S1(at the same time)	M+S2(at the same time)	M+S3(at the same time)
			502	503	503
			M+S1+S2(at the same time)		
			503		
	S(L2)	Single	M		
			231		
		Series	M	S1	S2
			231	232	233
			M+S1(at the same time)	M+S2(at the same time)	M+S3(at the same time)
			232	233	233
			M+S1+S2(at the same time)		
			233		

3.5 Pressure switch

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

4. Other control

4.1 Initial setup

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

1) Step 1 : factory setting value display
Factory setting value is displayed in 7 segment on PCB for 24sec.
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)	
Heat Recovery : Display 2	
Factory setting(25 is normal)	
Model type	

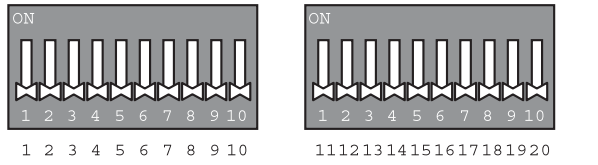
2) Step 2 : Communication check
- If all model code is displayed in 7 segment including all Slave unit, communication between outdoor units is normal.
- If 104* is displayed in 7-segment, check communication wires between outdoor units and Dip switch setting.

3) Step 3 : PCB error check
- After 40 sec, error check begins.

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

4) Step 4 : Auto addressing of indoor units and HR units
- Auto addressing begins when addressing button (Red) in Main PCB in pressed for 6 sec.
- During Auto addressing, 7 segment on Main PCB displays "88"
- After Auto addressing, the number of indoor units and HR units are displayed in 7 segments for 30 sec. The address of each indoor units are displayed on each wired remote controller.

Heat Recovery



Push address(red) button for 5 sec.

5 sec.

Auto address starts

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

The number of indoor units is displayed for 30 sec.

(35 indoor units found)

The number of HR units is displayed for 10 sec.

(4 HR units found)

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

4.2 Emergency operation

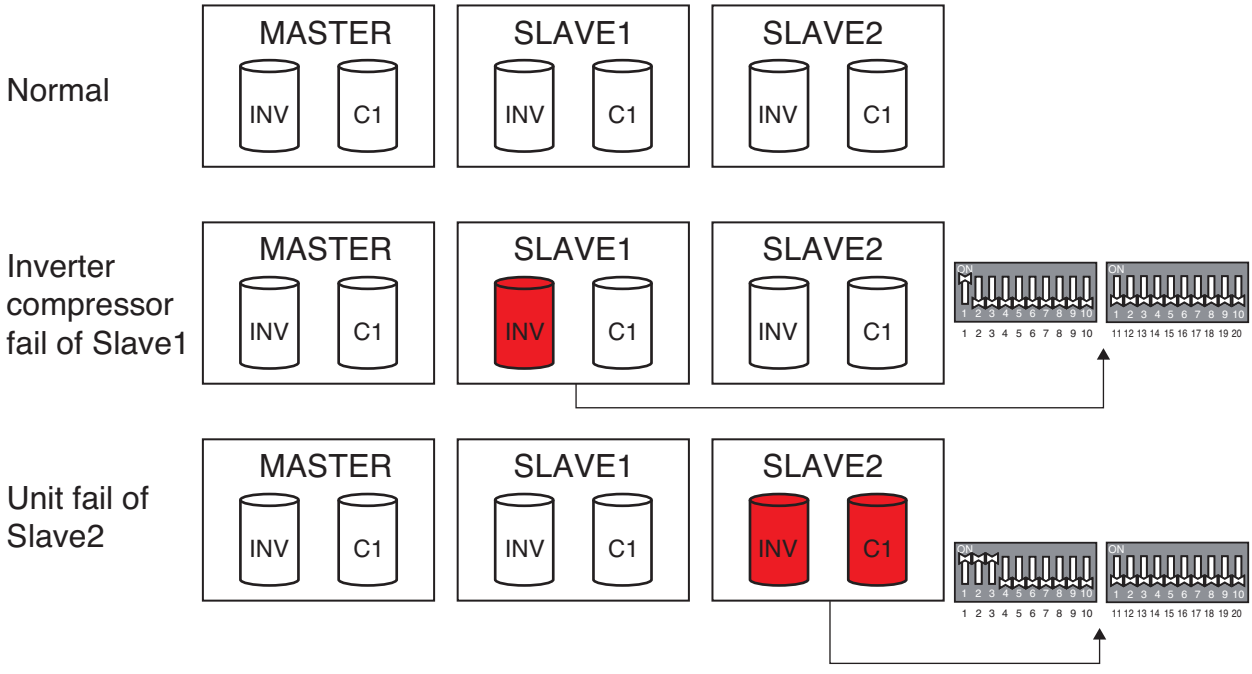
- If a compressor is out of order, the system can be run except the defective compressor by backup function.

■ Automatic emergency operation(automatic back up function)
If outdoor unit detect comp defect during operation,, automatic back up mode is set.

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

■ Manual emergency operation(Manual back up function)

1) Check which compressor is broken.(Refer to Trouble Shooting Guide)
2) Turn off the power.
3) Set the dip S/W of defective outdoor unit.
   - Inverter compressor defect : dip S/W No.3
   - Unit defect : dip S/W No.4
4) Turn on the power.



CAUTION

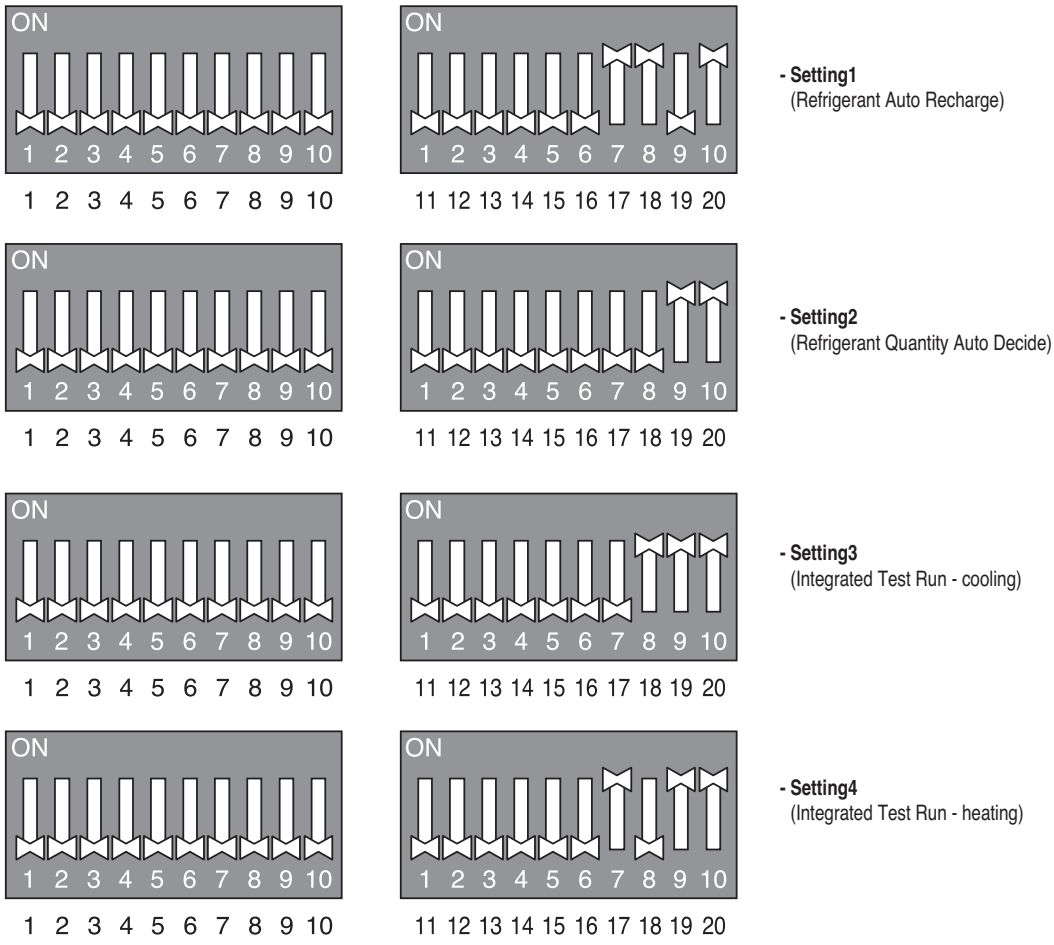
Emergency operation with inverter compressor failure should not last 48 hours. ➔ It causes other compressor failure.

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

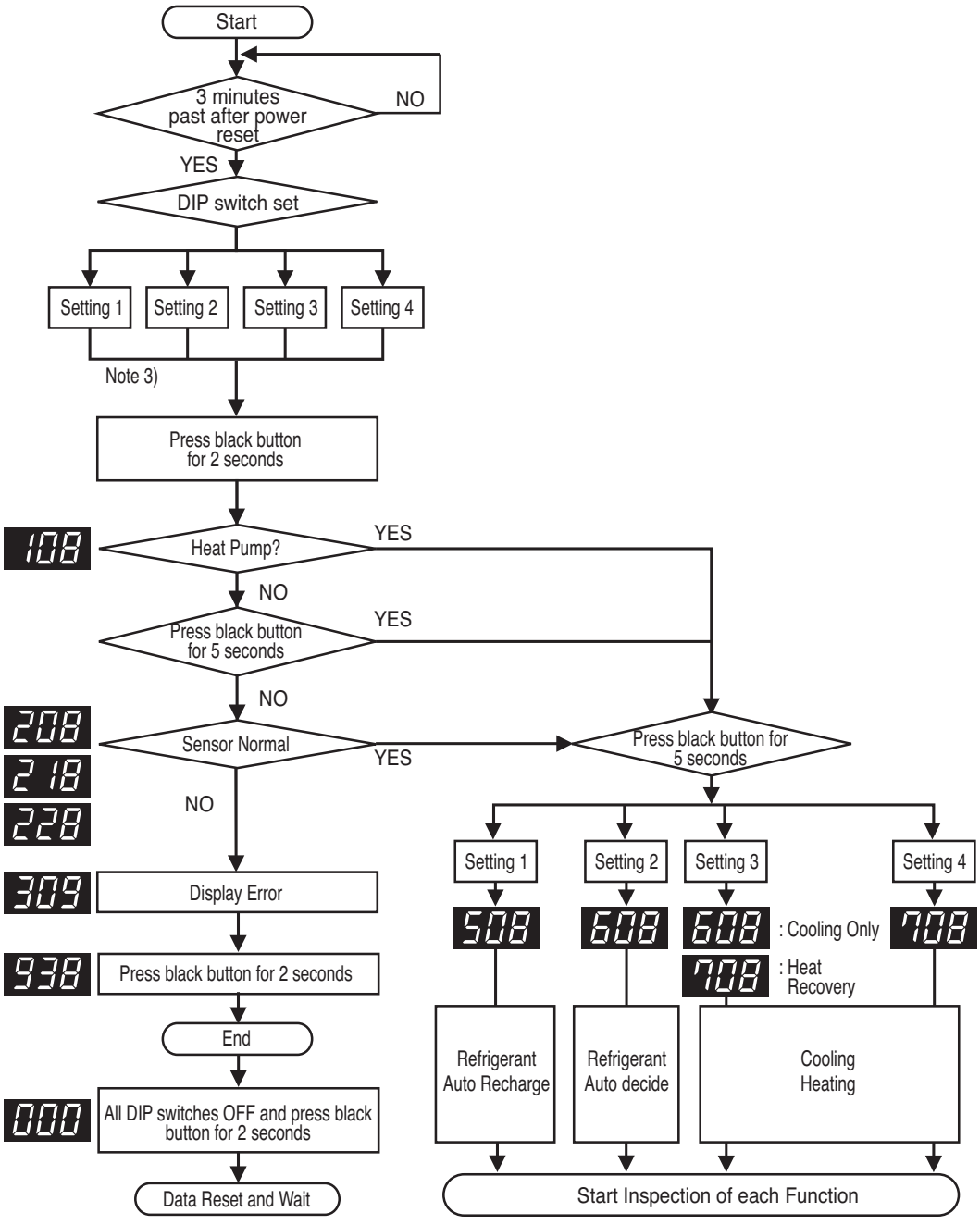
4.3 Sensor checking function Note 1)

Sensor checking function judges whether the current temperature of indoor and outdoor unit sensors is right or not. 3 indoor temperature sensors, 10 outdoor temperature sensor Note 1), 2 outdoor pressure sensors.
This function is used along with Refrigerant Auto recharge and Quantity auto decide function.
It is used for judging sensor abnormality. Note2)

DIP Switch Settings



Warning : Please reset Sub PCB before starting this function



Note 1. Outdoor temperature number is different according to each chassis.

Chassis	UX2(1 Comp)	UX3(2 comp)
No. of sensor	6	7

Note 2. Please check the sensor that is found abnormal.

Note 3. Each step is displayed on the Main PCB LED.

Note 4. Please refer to the sensor error descriptions on the next page.

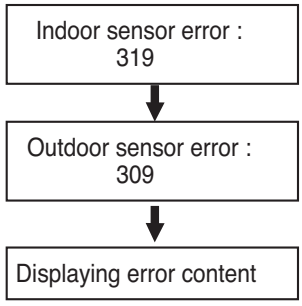
WARNING

1. Please confirm if auto addressing function was executed. (Check the number of installed indoor units)
2. Error may occur when the sensor is normal according to the installed location and the temperature conditions. When error occurs, please check each sensor and decide faultiness.

■ Sensor Check Error Code Display

In case error occurs during sensor checking process.

Following contents are displayed one after the other on the main PCB of master outdoor unit.



* 5 number of errors is displayed continuously and repeatedly.

Displaying error content

■ Indoor unit error display

1.1st and 2nd number represents indoor unit number.

2. Last digit show represents sensor.

1: Pipe inlet temperature sensor
2: Pipe outlet temperature sensor
3: Air temperature sensor

■ Displaying outdoor unit error

1.1st and 2nd number represents error content(code).

2.Last digit show represents outdoor unit number.

1 : Master
2 : Slave 1
3 : Slave 2

ex) Indoor unit No. 2 pipe inlet temperature sensor error

ex) Outdoor master unit liquid pipe temperature sensor error

Table 1. ODU Sensor Error Code

No.	Sensor type
1	Outdoor Air Temperature
2	Heat Exchanger Temperature
5	Liquid Pipe Temperature
6	SC pipe out
7	Suction Temperature
8	Inverter Comp. Discharge Temperature
9	Constant Comp.1 Discharge Temperature
10	Constant Comp.2 Discharge Temperature
11	High Pressure
12	Low Pressure
14	IPM temperature

ex) IDU No.2 pipe inlet temperature sensor error and master ODU suction temperature sensor, slave 3 high pressure sensor error

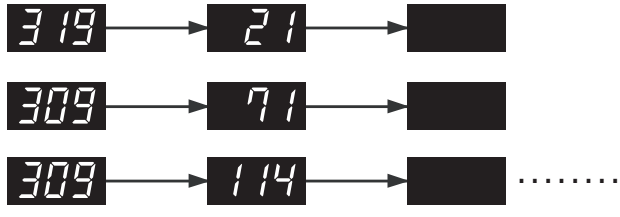


Table 2. IDU Sensor Error Code

No.	Sensor type
1	Pipe In Temperature
2	Pipe Out Temperature
3	Indoore Air Temperature

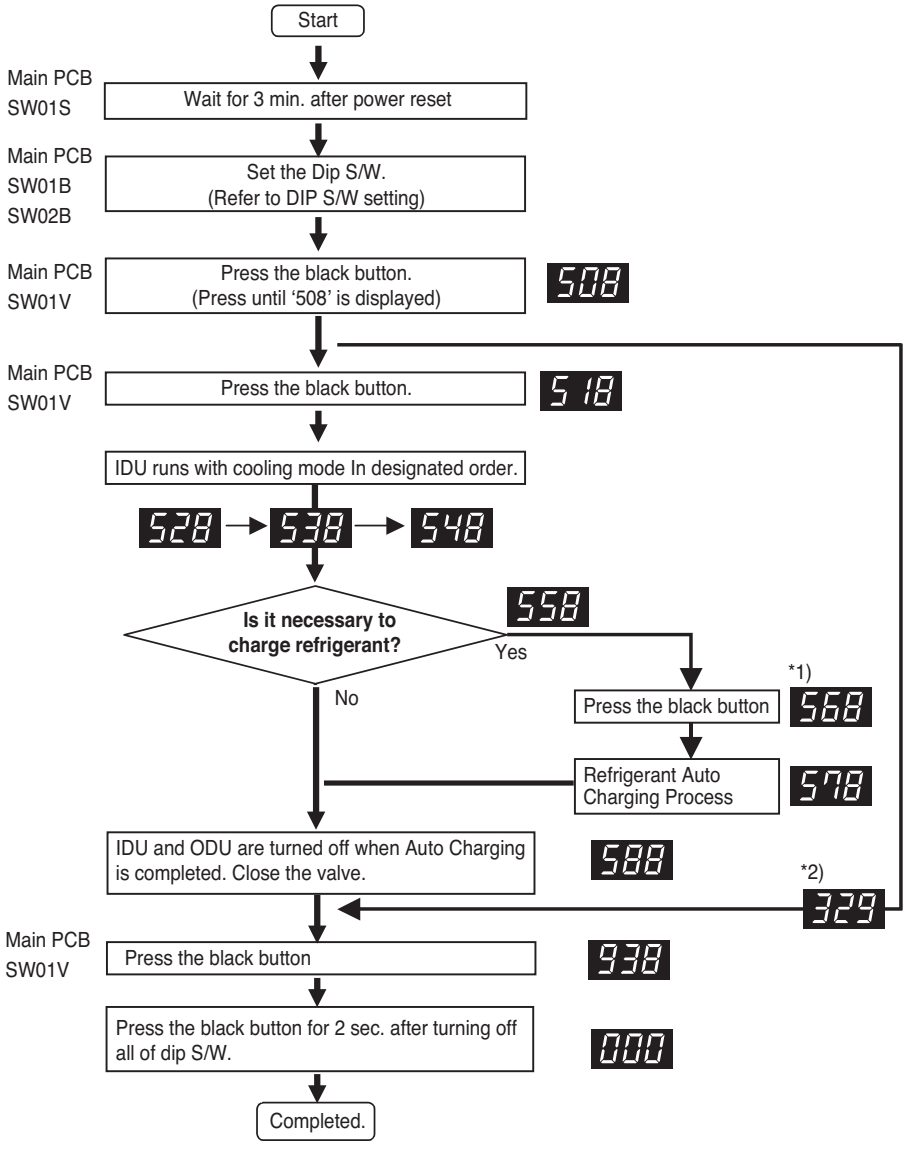
Caution

1. Up to 5 number of errors is displayed continuously and repeatedly.In case 5 number of errors occurs, again perform sensor checking after solving errors.
2. IDU in which error occurred operates air circulation mode.

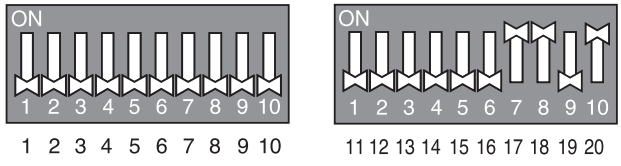
4.4 Refrigerant Auto Charging (Set 1)

This function charges appropriate amount of refrigerant automatically through cycle operation.
It can be used when refrigerant amount Isn't certain because of SVC and leakage.

※ Refrigerant charging time is depending on charging amount. (Charging time : About 3min/Kg)



DIP Switch Settings

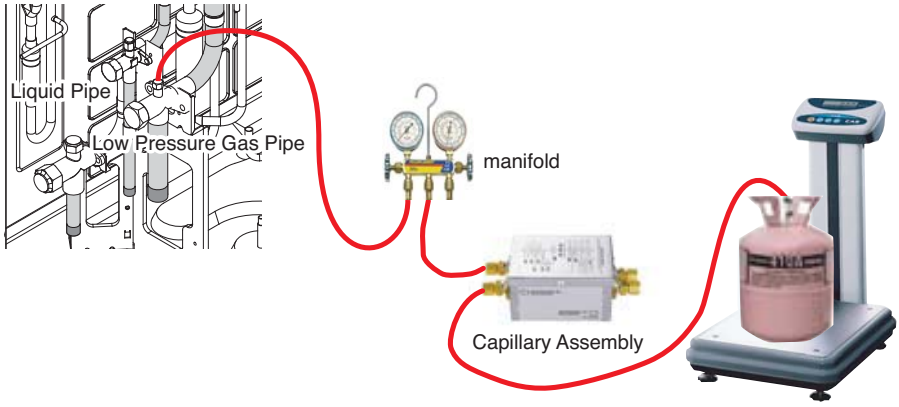


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Warning : Please reset SUB PCB before starting this function

Note

1. After installing the refrigerant charging device, 568 as shown in figure, open the valve
2. In case air temperature is out of guaranteed temperature, it may end without performing Auto charging
3. Refrigerant charging Time may change according to the charging amount. (Abt. 1.5min/lbs)



Procedure

1. Arrange manifold,capillary assembly, refrigerant vessel and scale
2. Connect manifold to the gas pipe service valve of ODU as shown in the figure.
3. Connect manifold and Capillary tube.
Use designated capillary assembly only.
If designated capillary assembly isn't used, the system may get damaged.
4. Connect capillary and refrigerant vessel.
5. Purge hose and manifold.
6. After  **Is displayed, open the valve and charge the refrigerant**

■ Error contents about auto refrigerant charging function

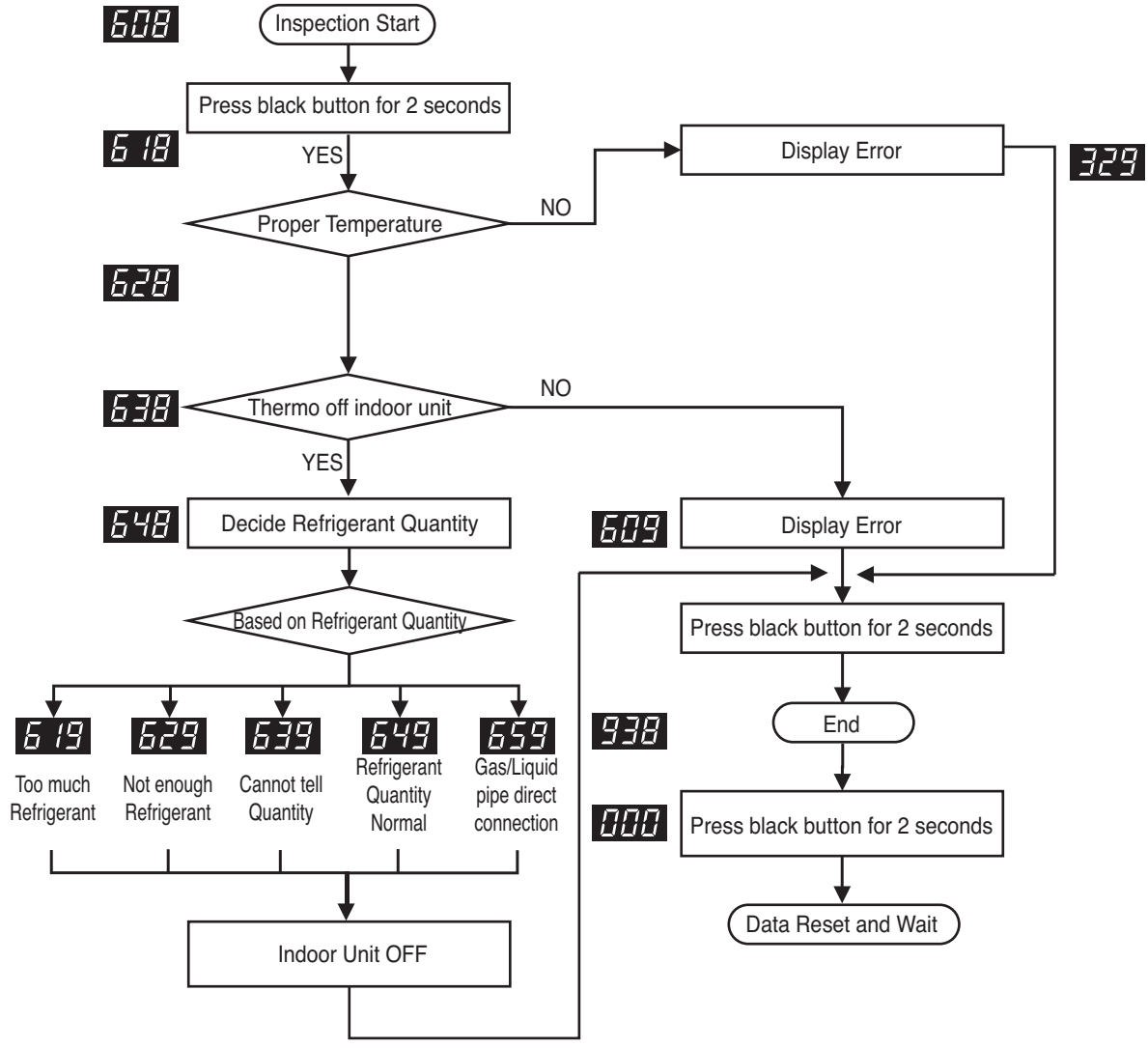
1.  : Temperature Range Error (In case that IDU or ODU is out of range)
2.  : Low Pressure Descent Error (In case the system runs at low pressure limit for over 10 minutes)
3.  : Judging rapid refrigerant inflow (In case the liquid refrigerant flows in because of not using designated Capillary Assembly)
4.  : Instability Error(In case the high/low pressure target doesn't get satisfied for some time after the starting operation)

⚠ CAUTION

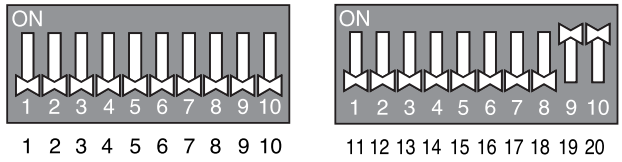
1. Guaranteed temperature range (Error will occur if temperature is out of range)
IDU : 20~32°C(68~90°F)
ODU : 0~43°C(32~109°F)
2. For refrigerant charging, use designated device only. (Capillary Assem Set)
3. Set the IDU wired remote controller temperature sensing mode as IDU
4. Be careful that IDU should not be thermo off.

4.5 Refrigerant Checking Function (Set 2)

This function judges refrigerant leakage and overcharging
It can be used with refrigerant auto charging function.



DIP Switch Settings



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Warning : Please reset SUB PCB before starting this function

Note

1. In case air temperature is out of guaranteed temperature, refrigerant checking function may end without performing refrigerant checking. Use guaranteed temperature range only.
2. During the process of judging refrigerant amount, if the cycle isn't stable, refrigerant checking function may end without performing refrigerant checking.

CAUTION

1. **Guaranteed Temperature range(Error occurs out of guaranteed temperature range)**
   IDU : 20~32°C(68~90°F)
   ODU : 0~43°C(32~109°F)
2. **Set IDU wired remote controller temperature sensor setting as 'IDU'.**
3. **Make certain that IDU doesn't run with thermo off mode during operation.**

[Error contents about auto refrigerant charging function]

1. 329 : Temperature Range Error (In case that IDU or ODU is out of range)
2. 609 : System Unstable Error (In case, After 45 min operating the system, it does not be stable)

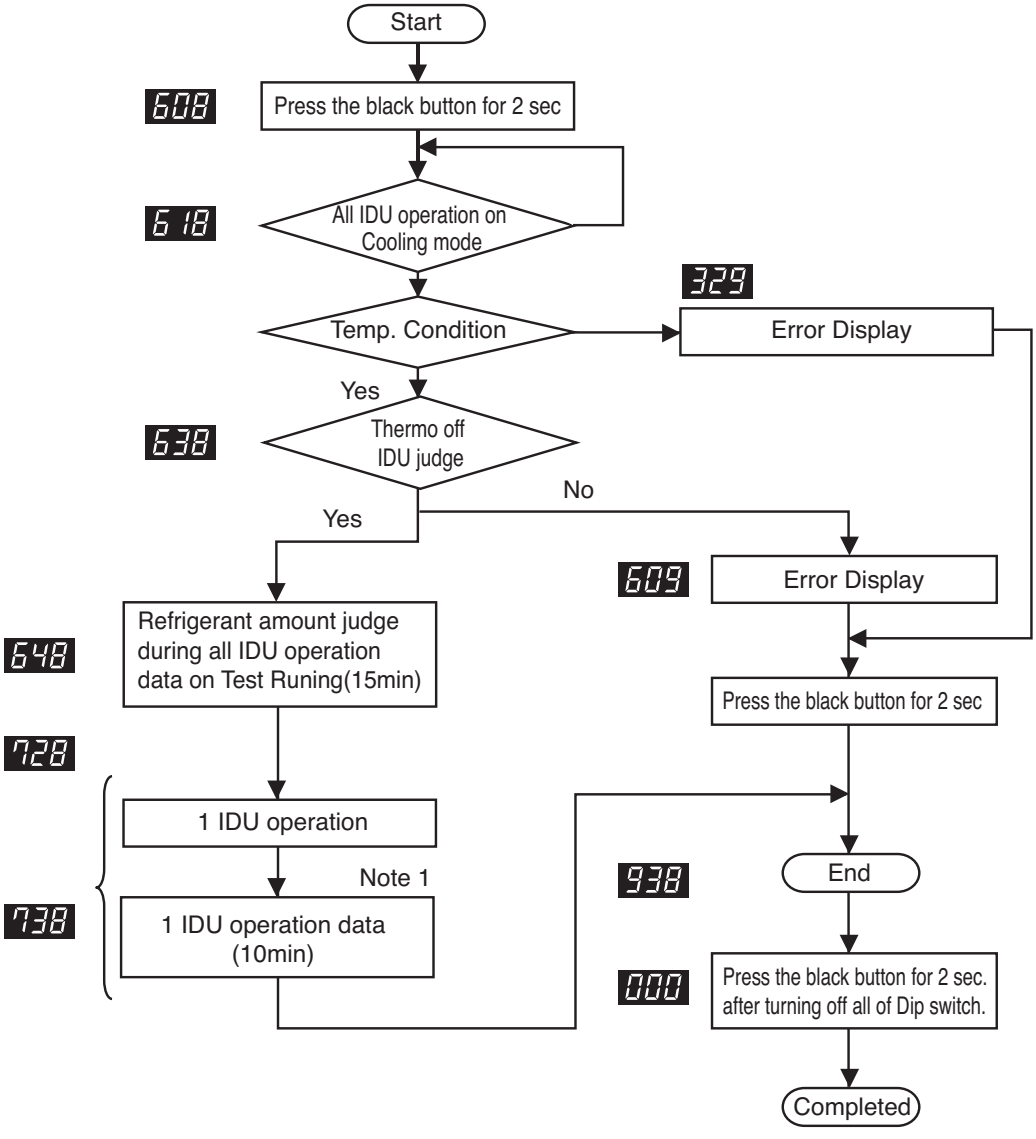
How to Cope with Result of Refrigerant checking

1. If the temperature is not in guaranteed Temperature range, the system will not execute Refrigerant checking and the system will be OFF.
2. **Excess of Refrigerant(619)**
   After remove the 20% of calculated total refrigerant, recharge the refrigerant by using Refrigerant Auto Charging Function.
3. **Scarcity of Refrigerant(629)**
   Charge the refrigerant by using Refrigerant Auto Charging Function.
4. **Impossible to Judge(639)**
   IF the system is not in order, check the other problem except refrigerant.

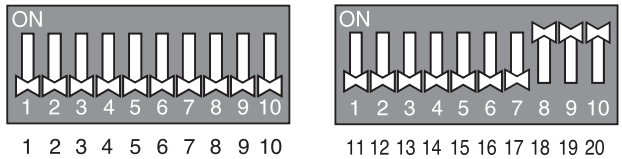
4.6 Integrated Test Running Function_Cooling Mode (Set 3)

This function is checking process for normal operation of parts and system On operating system.

- All processes carry out included refrigerant amount judge logic and check normal condition of parts on cooling mode.
- This function check only normal condition of parts on heating mode.
- Saved data can check using LGMV.



DIP Switch Settings



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Warning : Please reset SUB PCB before starting this function

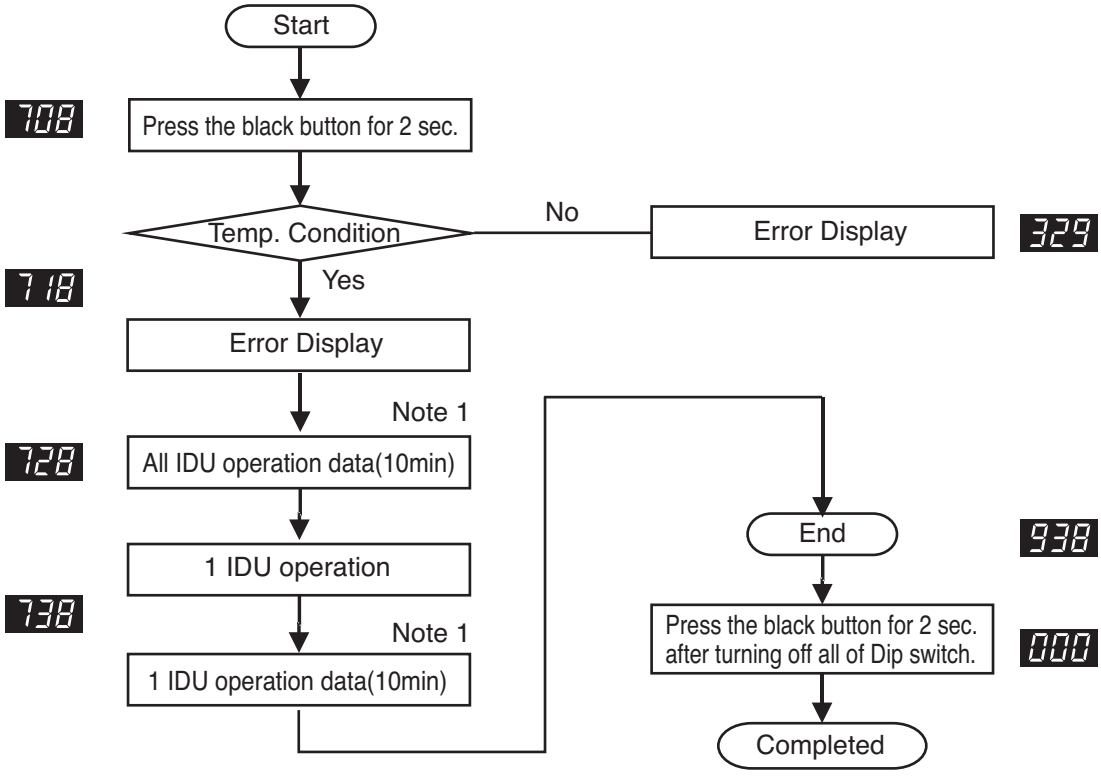
Note

1. Judge the normal condition refer to report of Test Running.

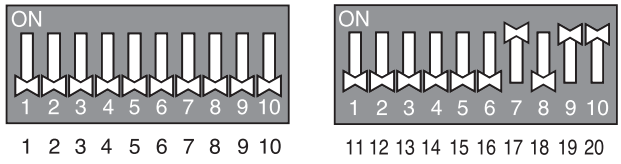
4.7 Integrated Test Running Function_Heating Mode (Set 4)

The function is checking process for normal operation of parts and system On operationg system.

- All processes carry out included drefrigerant amount judge logic and check normal condition of parts on heating mode.
- This function check only normal condition of parts on heating mode.
- Saved data can check using LGMV.



DIP Switch Settings



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Warning : Please reset SUB PCB before starting this function

Note

1. Judge the normal condition refer to report of Test Running.

⚠ CAUTION

1. **Guaranteed Temperature range(Error occurs out of guaranteed temperature range)**
   IDU : 20 ~ 32 °C(68~90°F)
   ODU : 0 ~ 43 °C(32~109°F)
2. **Set IDU wired remote controller temperature sensor setting as 'IDU'.**
3. **Make certain that IDU doesn't run with thermo off mode during operation.**

[Error contents about auto refrigerant charging function]

1.  : Temperature Range Error (In case that IDU or ODU is out of range)
2.  : System Unstable Error (In case, After 45 min operating the system, it does not be stable)

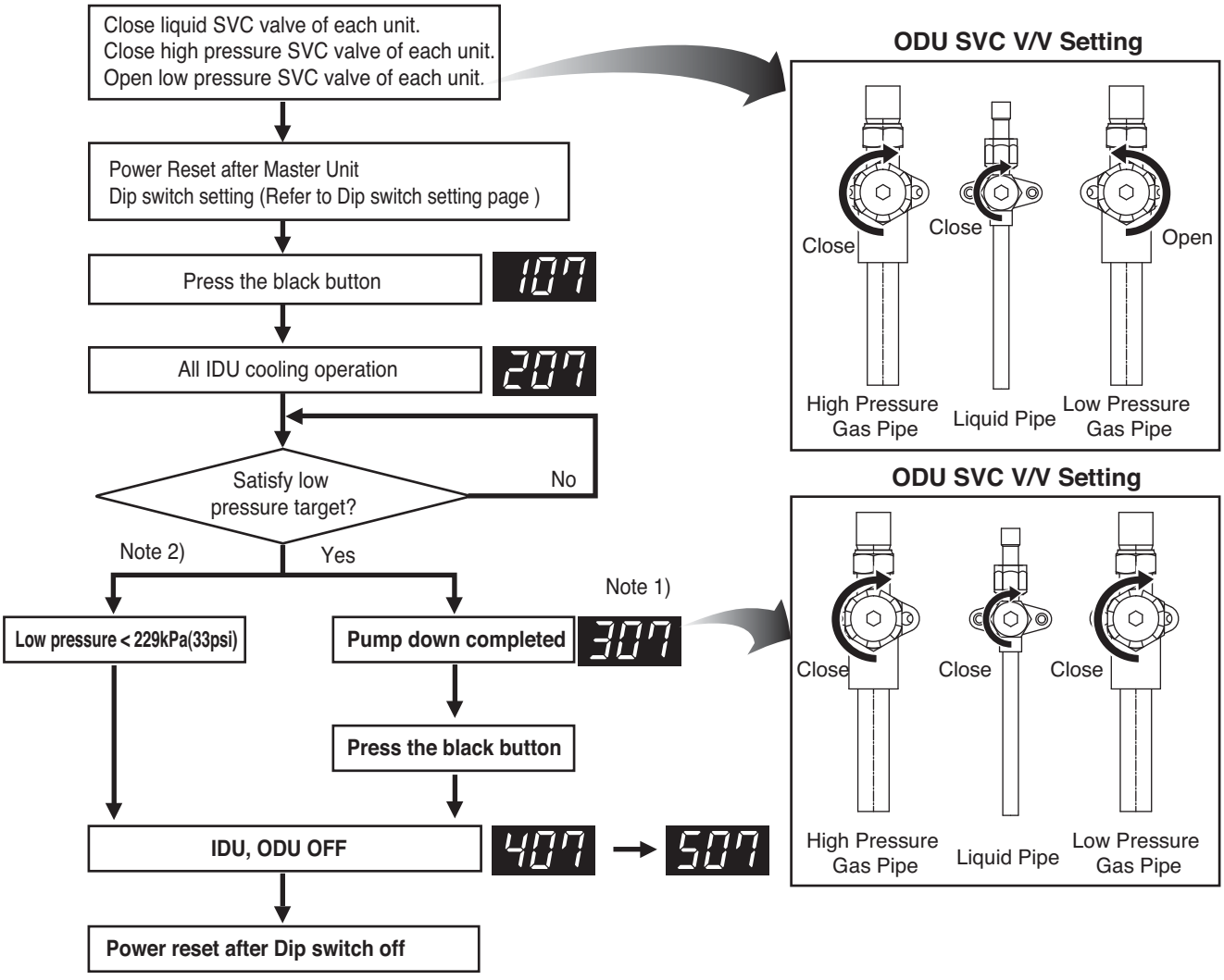
How to Cope with Result of Refrigerant checking

1. If the temperature is not in guaranteed Temperature range, the system will not execute Refrigerant checking and the system will be OFF.
2. **Excess of Refrigerant(619)**
   After remove the 20% of calculated total refrigerant, recharge the refrigerant by using Refrigerant Auto Charging Function.
3. **Scarcity of Refrigerant(629)**
   Charge the refrigerant by using Refrigerant Auto Charging Function.
4. **Impossible to Judge(639)**
   IF the system is not in order, check the other problem except refrigerant.

4.8 Pump Down

This function gathers the refrigerant present in the system to ODU

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



[Note]

If 30 is displayed, close Low Pressure Gas SVC V/V of all ODU immediately.

If low pressure descends below 229kPa(33psi), the system turns off automatically. Close the Low Pressure Gas SVC V/V immediately.

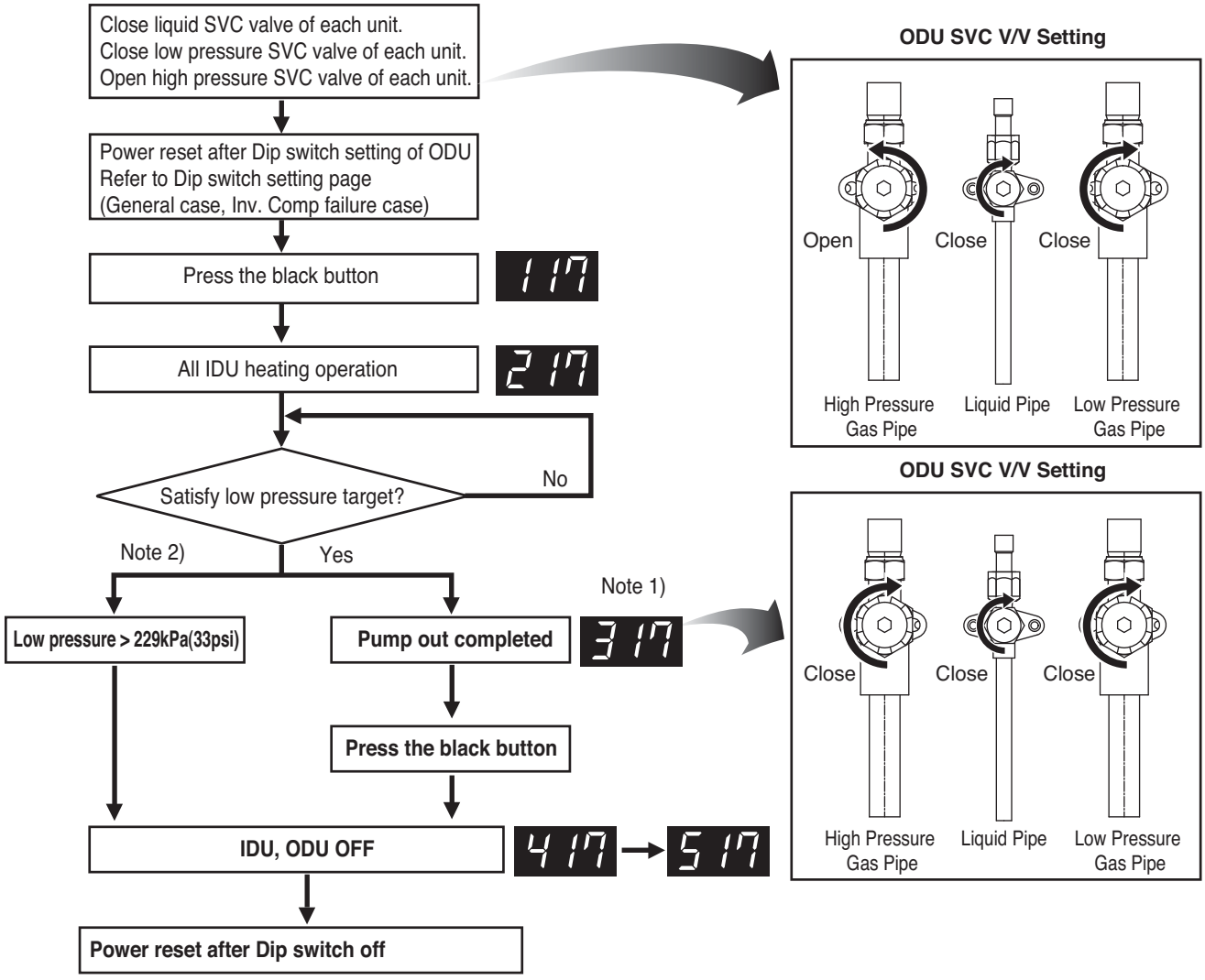
⚠ Caution

1.Use pump down function within guaranteed temperature range
  IDU : 20~32°C(68~90°F)
  ODU : 5~40°C(41~104°F)
2. Make certain that IDU doesn't run with thermo off mode during operation
3. Maximum operation time of pump down function is 30 min.
  (in case low pressure doesn't go down)
4. Press black+red button during operation to end pump down.(IDU,ODU off)
  40 → 50

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.



[Note]

If 3 1 7 is displayed, close Low Pressure Gas SVC V/V of all ODU immediately.

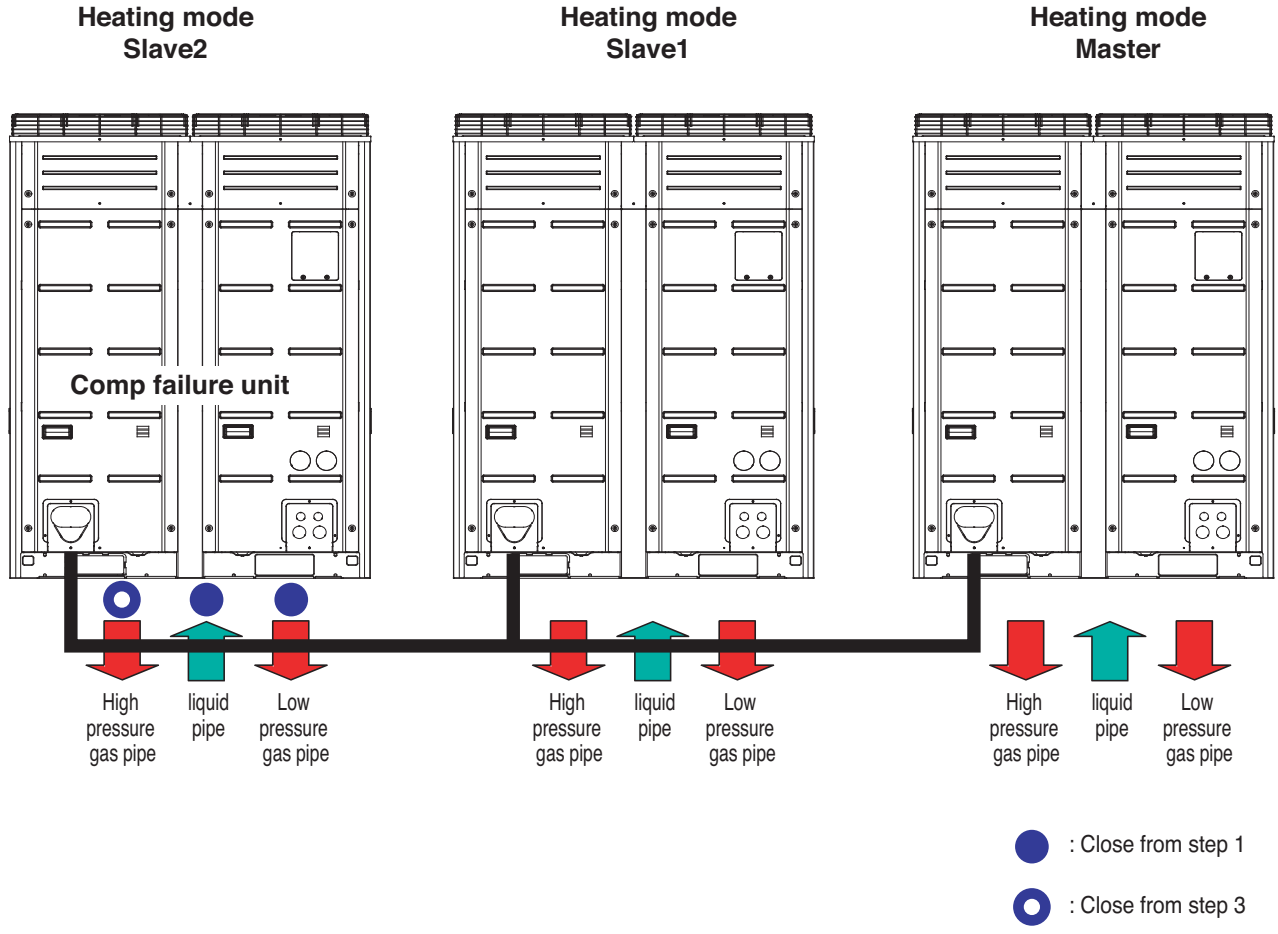
If low pressure descends below 229kPa(33psi), the system turns off automatically. Close Low Pressure Gas SVC V/V immediately.

This function is operating only Heat Pump model.

⚠ Caution

1.Use pump out function within guaranteed temperature range
IDU : 10~30°C(50~86°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 min. after compressor start.
Make certain that IDU doesn't run with thermo off mode during operation
(in case low pressure doesn't go down)
4. Press black+red button during operation to end pump out.(IDU,ODU off)
4 1 7 → 5 1 7

■ Example. Slave2 ODU Inv Comp failure



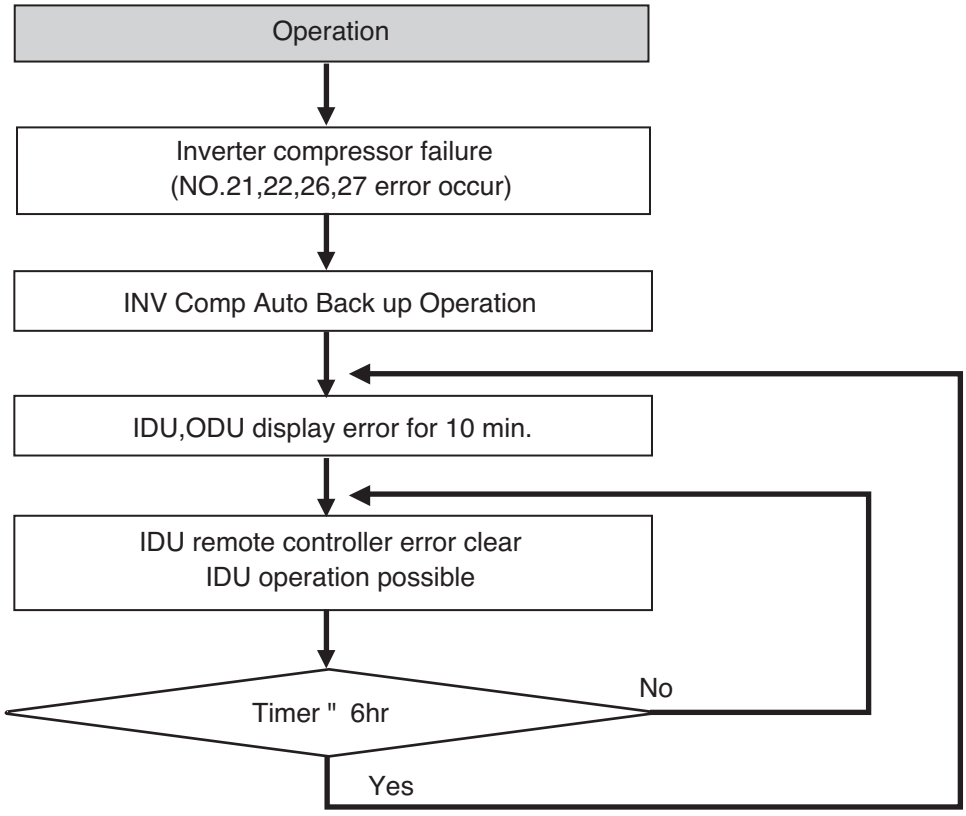
[Step]

1. Close liquid pipe and low pressure gas pipe of the comp failure unit for pump out operation.
2. Operate pump out.
3. Close high pressure gas pipe of comp failure unit after completion.
4. End pump out.
5. Eliminate refrigerant in suction port (For eliminate refrigerant port) after opening the high pressure pipe of corresponding outdoor unit. Replace compressor and perform vacuum.
6. Add the refrigerant with auto charging function.

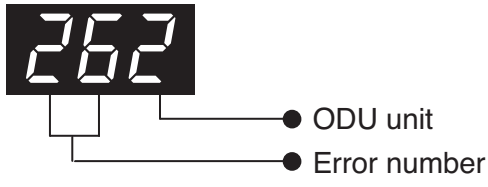
4.10 Auto Back Up Function_Inverter compressor

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

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



Example) Slave1 Unit INV Comp start failure error occur

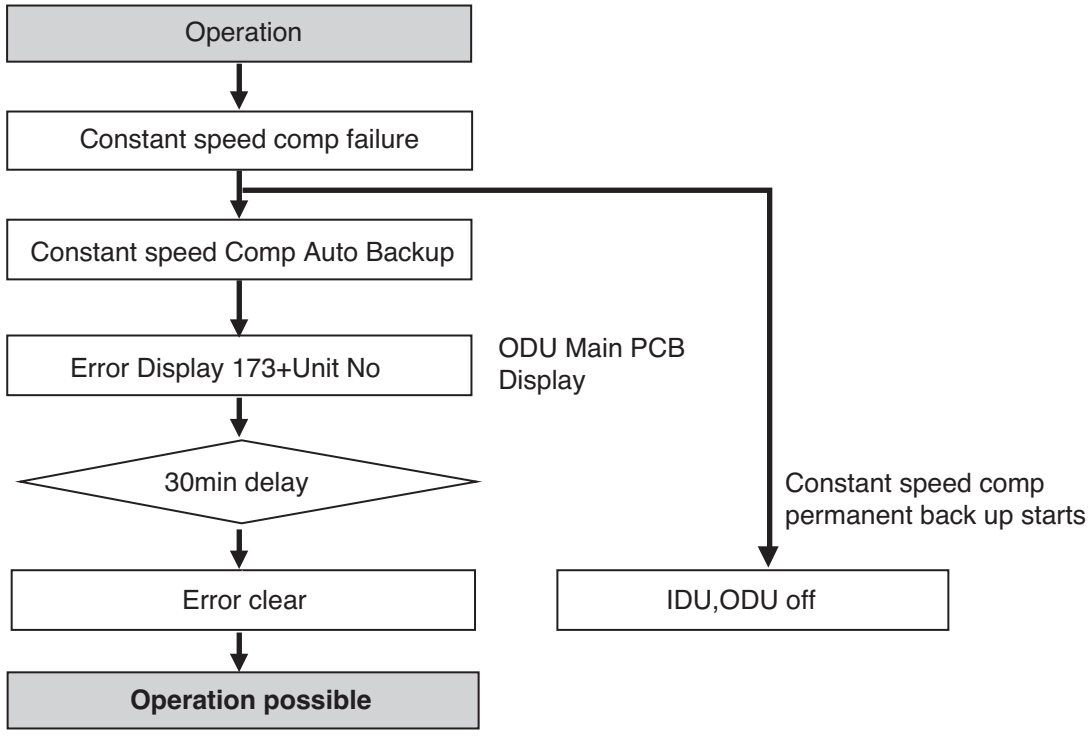


Caution

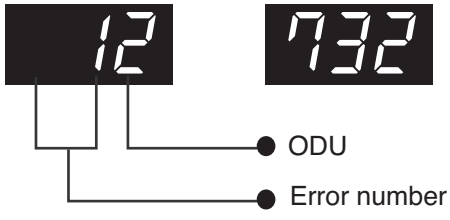
1. Request SVC immediately if error occurs.
2. Auto back up is set up to 1 inverter Comp
3. If Inverter Comp Auto Back up starts, error displays for 10 min. every 6 hours.
4. Error displays continuously at the corresponding ODU.

4.11 Auto Back Up Function_constant speed compressor

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



Example) Slave1 Unit constant speed Comp failure(No.173)



Caution

1. Request SVC immediately if error occurs

4.12 Night Low Noise Function

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

Max. RPM setting method

Set the DIP S/W

↓

Reset the power

↓

Setting the Fan Max. RPM Note 1)

↓

Setting Complete

RPM / Time Settings

		Capacity		Judgment Time (hr)	Operation Time (hr)
Capacity(Hp)		8	10~14		
Step		Fan Maximum RPM			
1	①	790	900	8	9
2				6.5	10.5
3				5	12
4	②	680	800	8	9
5				6.5	10.5
6				5	12
7	③	620	780	8	9
8				6.5	10.5
9				5	12

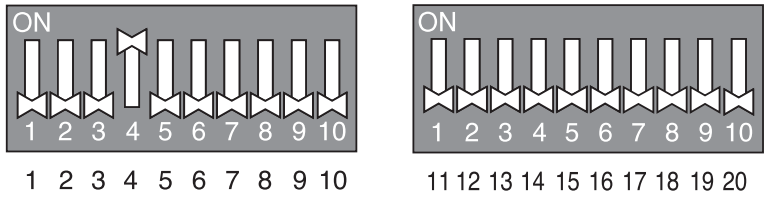
Note 1)
Setting Method for Fan Max. RPM

Step	Black Button	Red Button
1	1 time	1 time
2	2 time	1 time
3	3 time	1 time
4	4 time	1 time
5	5 time	1 time
6	6 time	1 time
7	7 time	1 time
8	8 time	1 time
9	9 time	1 time

Noise

	Capacity	
Capacity(Hp)	8	10~14
Step	Max RPM Noise(dB)	
Standard	58	62
①	55	59
②	52	56
③	49	53

DIP Switch Settings



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

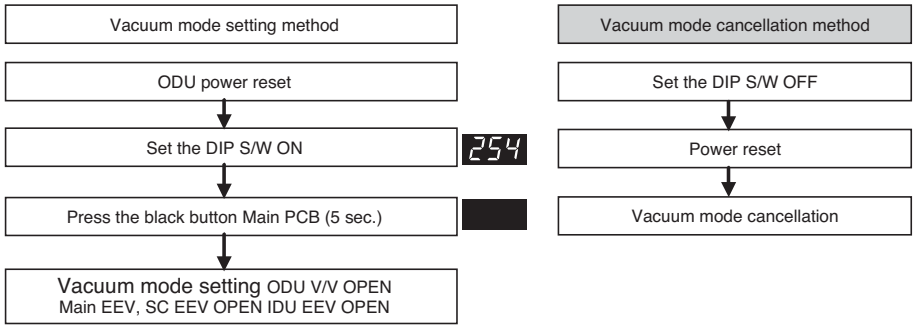
Warning : Please reset Sub PCB before starting this function

CAUTION

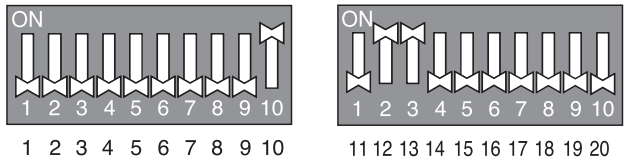
1. Request installer to set the function during installation.
2. In case the function is not used, set the dip S/W OFF and reset the power.
3. If ODU RPM changes, cooling capacity may go down.

4.13 Vacuum Mode

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



DIP Switch Settings



Warning : Please reset SUB PCB before starting this function

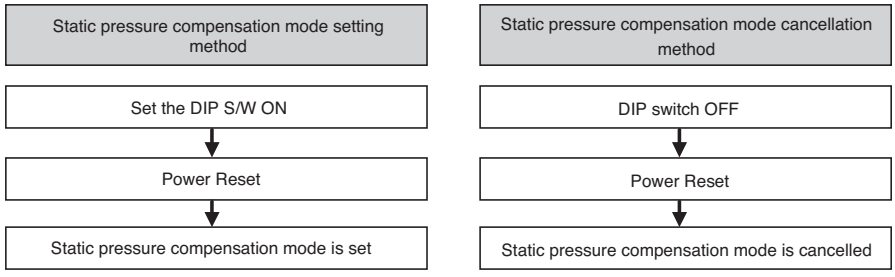
CAUTION

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

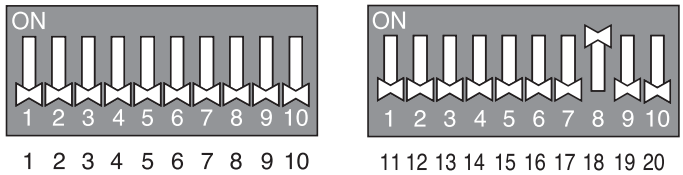
4.14 Static pressure compensation mode

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

High static pressure mode : Set DIP S/W



DIP Switch Settings



Warning : Please reset SUB PCB before starting this function

Note

How to set the unit to high ESP :

1) Standard ESP (External Static Pressure) : 4mmH_2O (39.2Pa)

2) High ESP (External Static Pressure) : 8mmH_2O (78.4Pa) ➔ The setting of dip S/W is needed. (Refer to above operating method)

4.15 Black Box Function

This function saves data immediately before the error occurs in ODU main PCB, and thus making error analysis cause possible.

Data Loading Method

IDU, ODU stop

↓

Press the black button (5 sec.)

↓

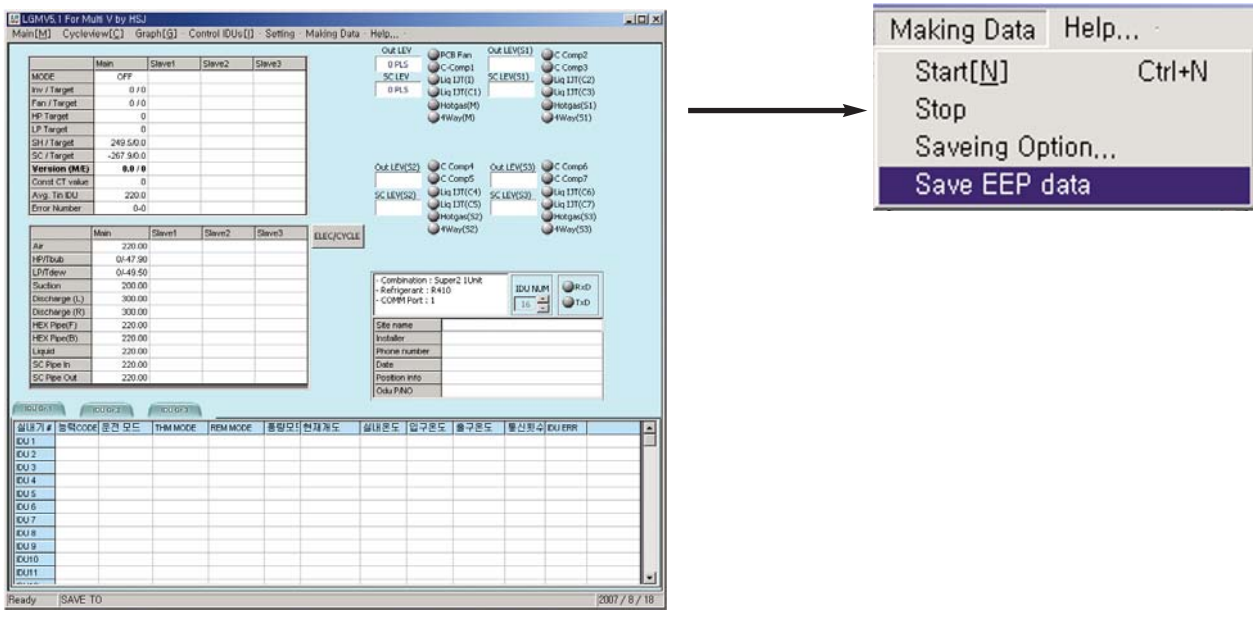
EEPROM ➠ Main Micom data Loading

Yellow LED(LED01C) stops when data is loading
After completion, it is starts blinking (about 20 sec.).

↓

EEPROM data save to PC by using
" Save EEP data" in LGMV

■ Saving process : Making Data ➠ Save EEP data ➠ data saving place select ➠ file save



❉ Use only LGMV 6.2 version.

Part 3
HR Units

HR Units

Specifications

1. HR Unit

Model			PRHR021A	PRHR031A	PRHR041A
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	mm		801x218x617	801x218x617	801x218x617
(WxHxD)	Inch		31.5x8.6x24.3	31.5x8.6x24.3	31.5x8.6x24.3
Casing			Galvanized steel plate		
Connecting Pipes	Indoor	Liquid Pipe [mm/inch]	Ø9.52[3/8]		
		Gas Pipe [mm/inch]	Ø15.88[5/8]		
	Outdoor	Liquid [mm/inch]	Ø9.52[3/8]	Ø12.7[1/2]	Ø15.88[5/8]
		Low Pressure [mm/inch]	Ø22.2[7/8]	Ø28.58[1 1/8]	Ø28.58[1 1/8]
		High Pressure [mm/inch]	Ø19.05[3/4]	Ø22.2[7/8]	Ø22.2[7/8]
Sound Absorbing Insulation Material			Polyethylene Foam		
Current	Minimum circuit Amps(MCA)		0.2		
	Maximum fuse Amps(MFA)		15		
Power Supply			1Ø, 220-240V, 50Hz / 1Ø, 220, 60Hz		

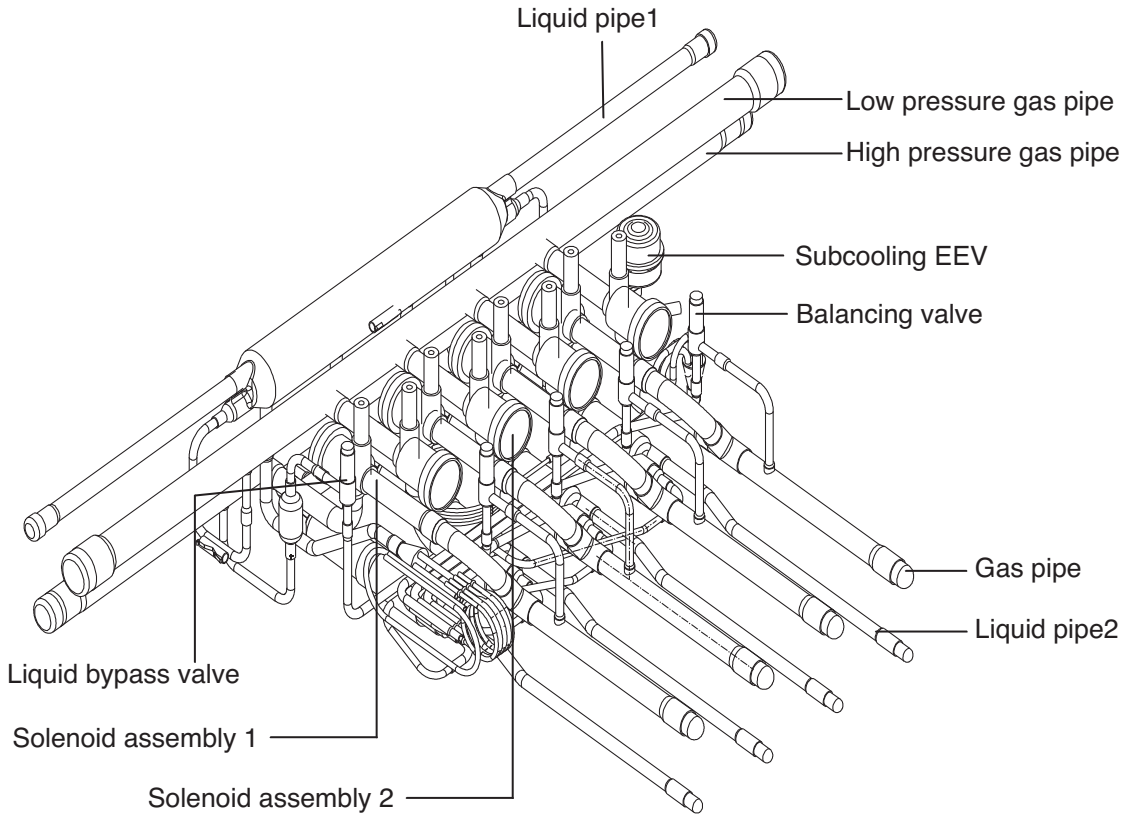
Notes:

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. 15A)
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	HPGV	Pipe for high pressure gas
Liquid pipe 1	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

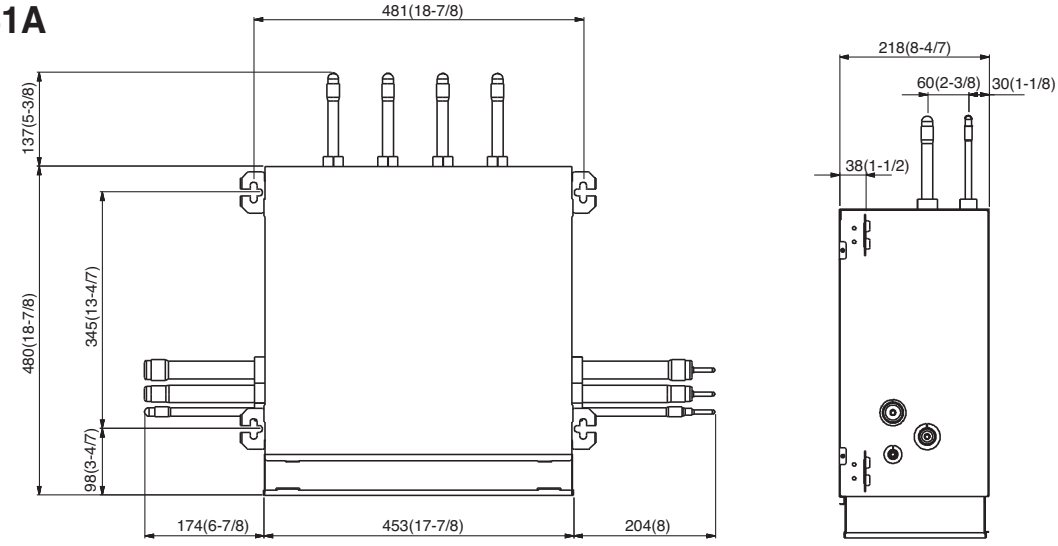


Dimensions

1. HR Units

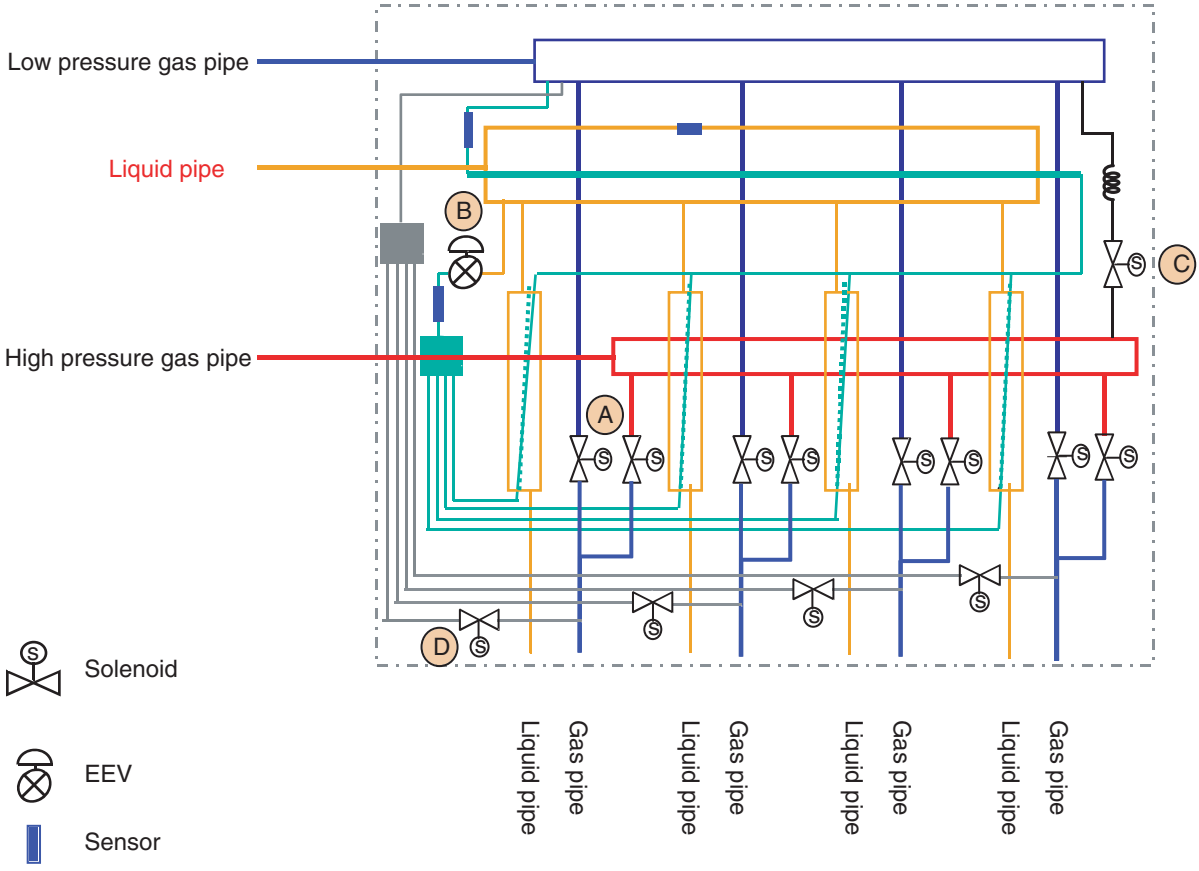
(Unit :mm)

PRHR021A
PRHR031A
PRHR041A



Piping Diagrams

1. HR Unit



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

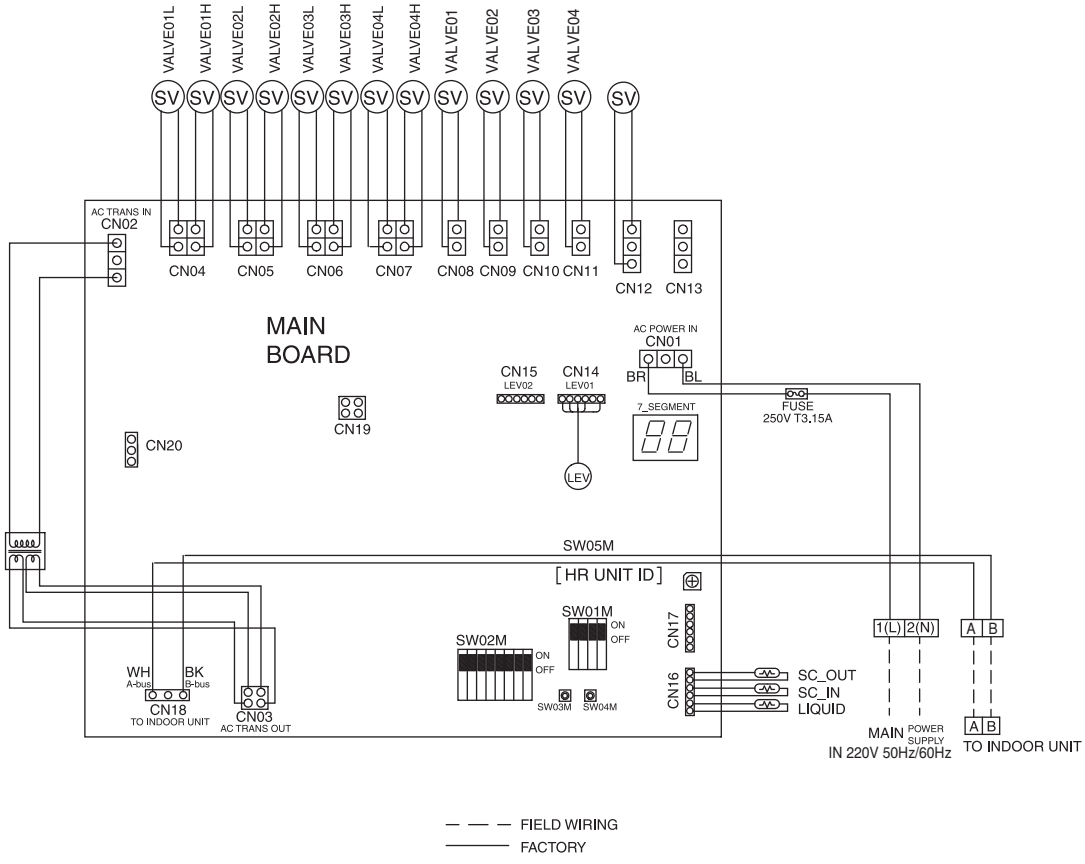
Ⓑ : To be used decreasing noise according to sub-cooling of inlet and outlet of indoor unit (Simultaneous operation)

Ⓒ : 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



CN04	Solenoid valve 01L/H(For room1)
CN05	Solenoid valve 02L/H(For room2)
CN06	Solenoid valve 03L/H(For room3)
CN07	Solenoid valve 04L/H(For room4)
CN08	Solenoid valve 01 (Bypass for room1)
CN09	Solenoid valve 02 (Bypass for room2)
CN10	Solenoid valve 03 (Bypass for room3)
CN11	Solenoid valve 04 (Bypass for room4)
CN12	Solenoid valve bypass
CN14	Sub cooling EEV
CN16(SC Out)	Sensor, sub cooling out
CN16(SC In)	Sensor, sub cooling in
CN18(Liquid)	Sensor, liquid receiver
SW01M	Solonoid valve number Setting(When manual address)
SW02M(1)	Selecting, auto address(↓) or manual address(↑)
SW02M(2~3)	Setting, total number of indoor connected
SW03M	Setting, the address of indoor_10(When manual address)
SW04M	Setting, the address of indoor_1(When manual address)
SW05M	Setting, HR unit number

Functions

1. Basic Control

1.1 Normal Operation

Actuator	Power on	Cooling operation	Heating operation	Stop state
High pressure gas valve	Close	Close	Open	Keep
Low pressure gas valve	After 30 sec. 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
Cooling mode	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

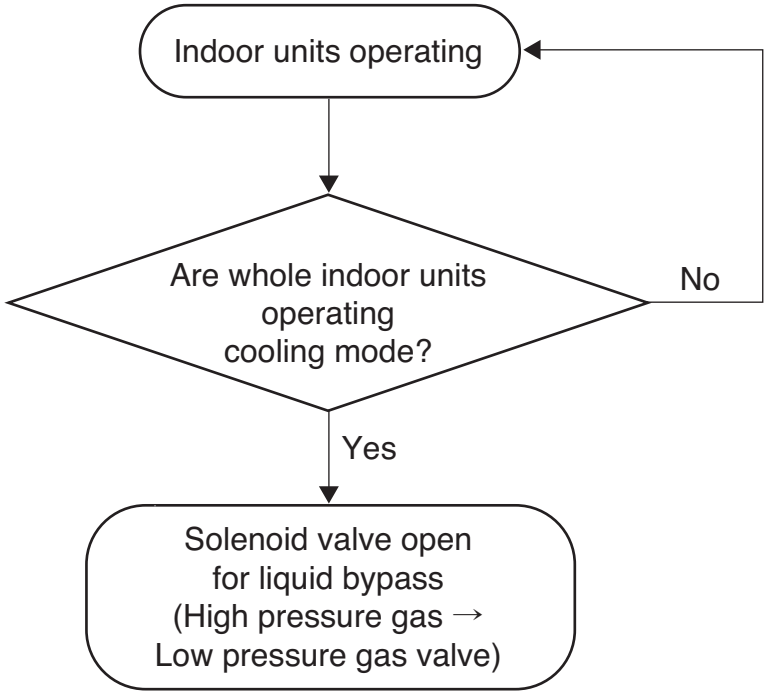
Operating mode	Mode change timer	H/P gas valve	L/P gas valve	Balancing valve
Cooling	120 ≤ timer	Keep	Keep	Close
	0 < timer < 120	Close	Close	Open
	timer = 0	Close	Open	Close
Heating	180 ≤ timer	Keep	Keep	Close
	0 < timer < 180	Close	Close	Close
	timer = 0	Open	Close	Close
Stop or ventilation	0 < timer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



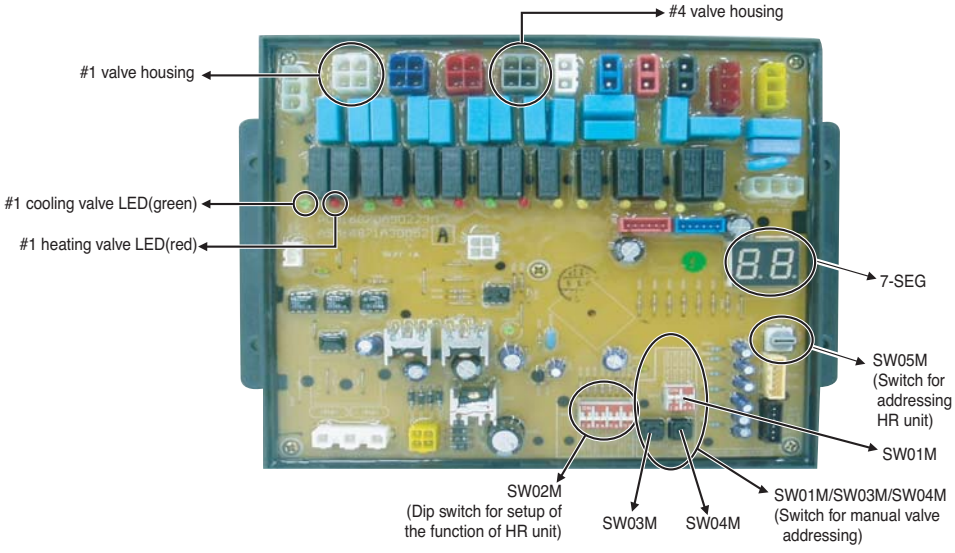
2.3 Subcooling EEV Control

Target : about 25°C(77°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

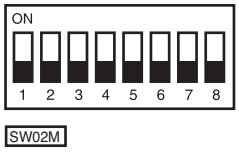
PCB Setting and Test Run

HR Unit PCB



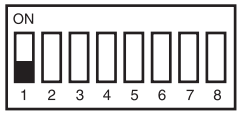
1. Switch for Setup of HR Unit

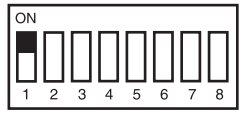
1. Main function of SW02M



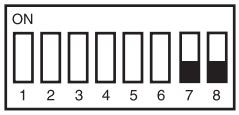
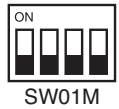
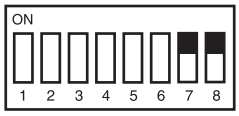
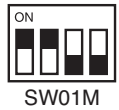
ON switch	Selection	
No.1	Method for addressing valves of an HR unit (Auto/Manual)	
No.2	Model of HR unit	
No.3	Model of HR unit	
No.4	Valve group setting	
No.5	Valve group setting	
No.6	Valve group setting	
No.7	Use only in factory production (preset to “OFF”)	Zoning setting ("ON")
No.8	Use only in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

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

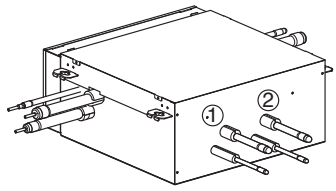
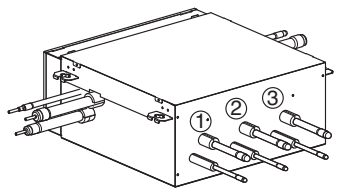
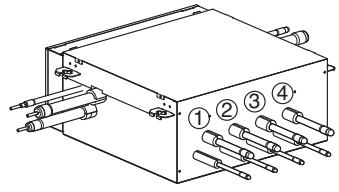
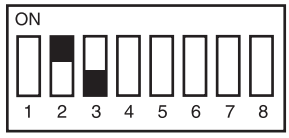
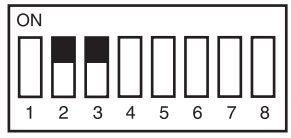
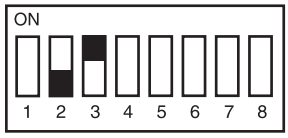
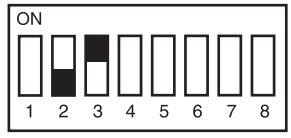
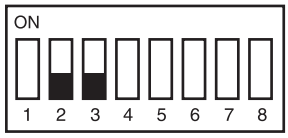
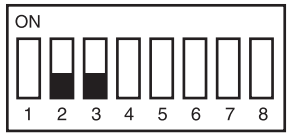
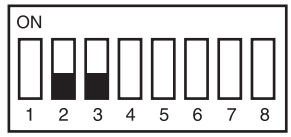
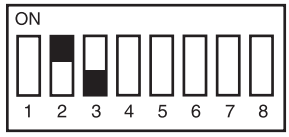
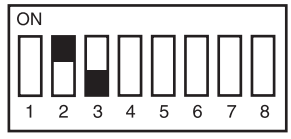
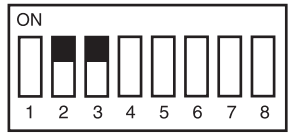




2) Setting the zoning control

	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

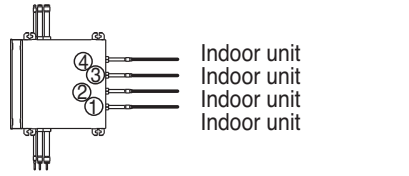
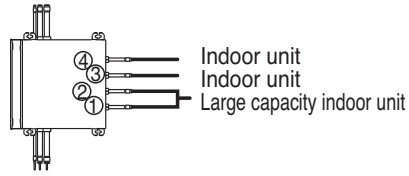
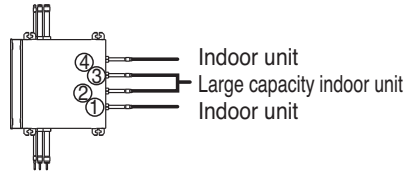
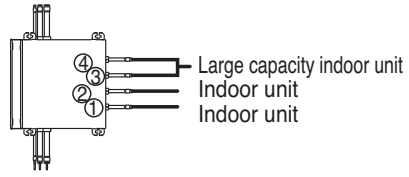
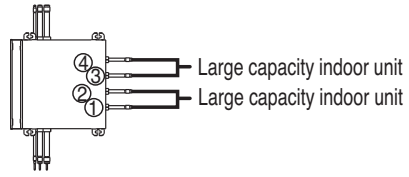
	 (For 2 branches) PRHR021A	 (For 3 branches) PRHR031A	 (For 4 branches) PRHR041
Initial Setting			
1 branches Connected			
2 branches Connected			
3 branches Connected			
4 branches Connected			

❊ 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 PRHR031A 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 PRHR041A 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 PRHR041A 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.

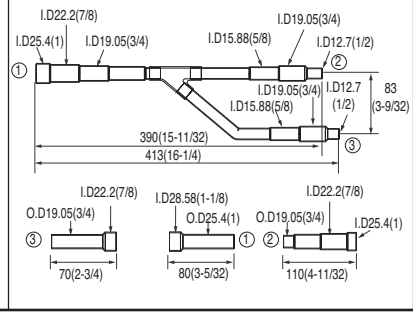
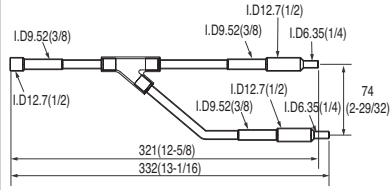
	Dip switch setting	Example
Not control		
No.1, 2 valve control		
No.2, 3 valve control		
No.3, 4 valve control		
No.1, 2 valve / No.3, 4 valve control		

Note:

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

✻ Y branch pipe

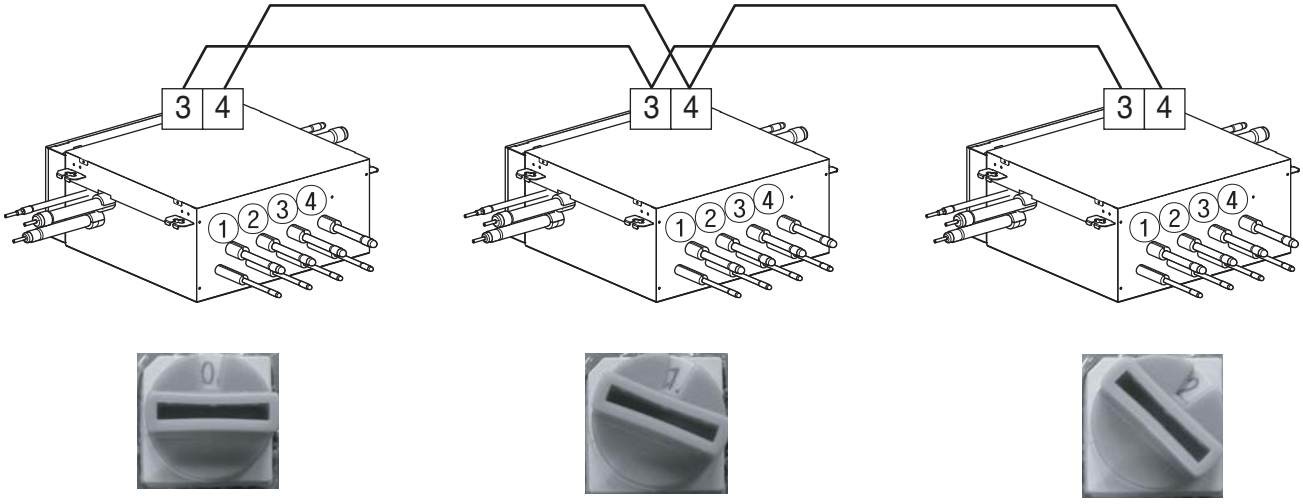
[Unit:mm(inch)]

Models	Low Pressure Gas Pipe	Liquid pipe
ARBLB03321		

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. Method for Addressing of Indoor and HR Unit

1) Auto addressing for indoor unit
2) Auto pipe detection
3) Manual pipe detection(Execute in case of Auto pipe detection failure)

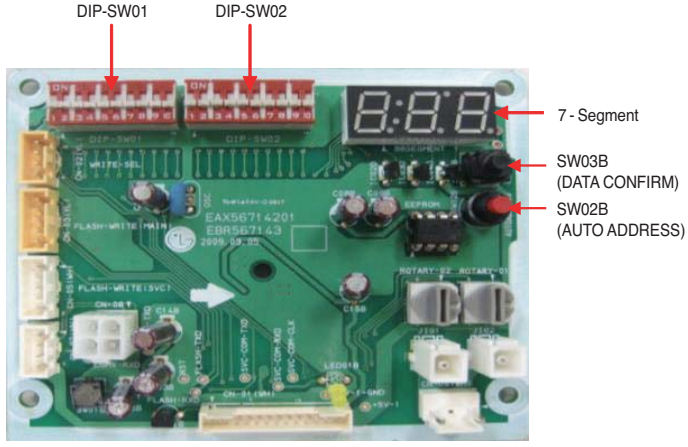
- Turn off all the indoor units before auto addressing.
  If indoor unit is operated, auto addressing would not be completed.

1) Auto addressing for indoor unit

- **The address of indoor units would be set by auto addressing**

1) Wait for 3 minutes after applying power supply (Master and Slave Outdoor unit, Indoor unit).
2) Press the switch of the outdoor unit for 10~15seconds until display 88.(SW02B).
3) A "88" is indicated on 7-segment LED of the outdoor unit PCB.
4) For completing addressing, 2~7 minutes are required depending on numbers of indoor unit connection set.
5) Numbers of inddor unit connection set whose addressing is completed are indicated for 30seconds on 7-segment LED of the oudoor unit PCB.
6) 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 indoor unit connection set).

■ SUB PCB



CAUTION

- **In replacement of the indoor unit PCB, always perform Auto 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.**
- **Auto addressing is only possible on the master Unit.**
- **Auto addressing has to be performed after 3 minutes to improve communication.**

2) Auto pipe detection

1) Turn No.1 of SW02M of HR unit PCB off.
2) Confirm that the setting of No.2, 3 of SW02M corresponds with the number of indoor units.
3) Reset the power of HR unit PCB
4) Turn on the No. 17 DIP S/W of main unit PCB when outdoor temperature is below 15°C(59°F)
   Turn on the No. 14, 17 DIP S/W of main unit PCB when outdoor temperature is over 15°C(59°F)
5) Reset the power of outdoor unit.
6) Wait for 3 minutes.
7) Press SW01V of the outdoor unit main PCB for 5 Seconds.
8) The number of connected HR unit is displayed.
   Ex) In case of installing four HR units : 04
9) Operated after 88 is displayed on 7-SEG of the outdoor unit main PCB.

10) Pipe detection proceed.
11) 5~30 minutes are required depending on the number of the indoor units and outdoor temperature.
12) The number of the indoor units installed is displayed on 7-SEG of the outdoor unit main PCB for about 1 minute
- For a HR unit, the number of the indoor units connected to each HR unit is displayed.
- '200' is displayed in case of auto pipe detection error, and auto detection is completed after '88' is disappeared.

❊ Auto pipe detection function : the function that sets connection relationship automatically between the indoor unit and HR unit.

⚠ WARNING

1. Execute auto addressing and auto pipe detection again whenever the indoor PCB and HR unit PCB is replaced.
• Operation error occurs unless power is applied to the indoor and HR units.
2. Error No.200 occurs if the number of connected indoor units and that of scanned indoor units are different.
3. When auto pipe detection fails, complete it with manual pipe detection (see Manual pipe detection).
4. When auto pipe detection addressing is completed normally, manual pipe detection is not required.
5. If you want to do auto pipe detection again after auto pipe detection fails, do after reset of outdoor unit by all means.
6. During 5 minutes after pipe detection is completed, do not turn off the main unit PCB to save the result of pipe detection automatically.

3) Manual pipe detection

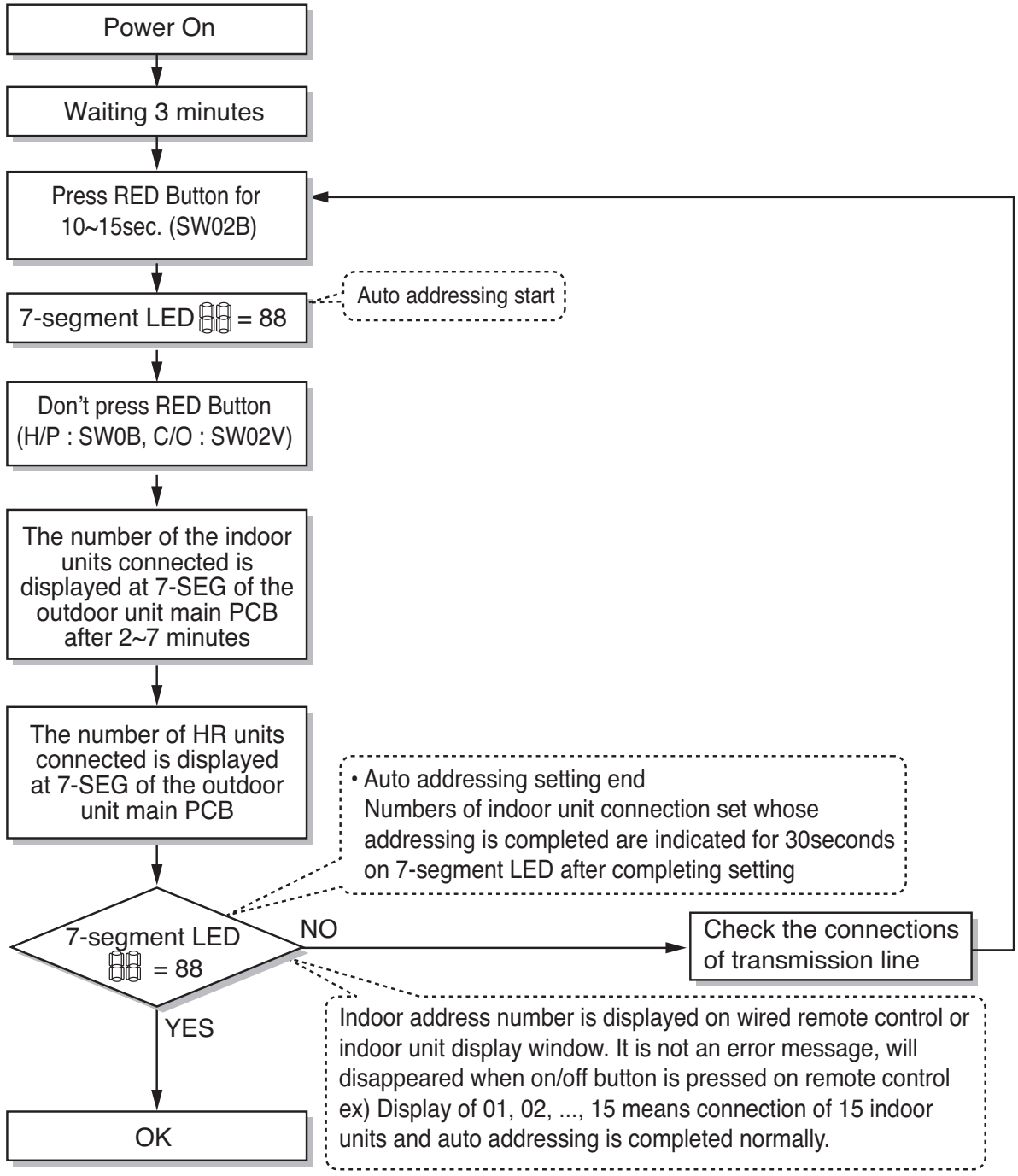
1) Enter the central control address into each indoor unit using its wired remote control.
2) Turn No.1 of SW02M of HR unit PCB on.
3) Reset the power of HR unit PCB.
4) On the HR unit PCB, manually set address of each valve of the HR unit to the central control address of the indoor unit connected to the valve.
5) Turn No.6 of SW03M of outdoor unit PCB on.
6) Reset the power of outdoor unit PCB.
7) The number of the indoor unit installed is displayed after about 5 minutes.
Ex) HR ➠ The number of the indoor
8) Turn No.6 of SW03M of outdoor unit PCB off.
9) Reset the power of outdoor unit PCB, HR unit.
10) Manual pipe detection is completed

⚠ WARNING

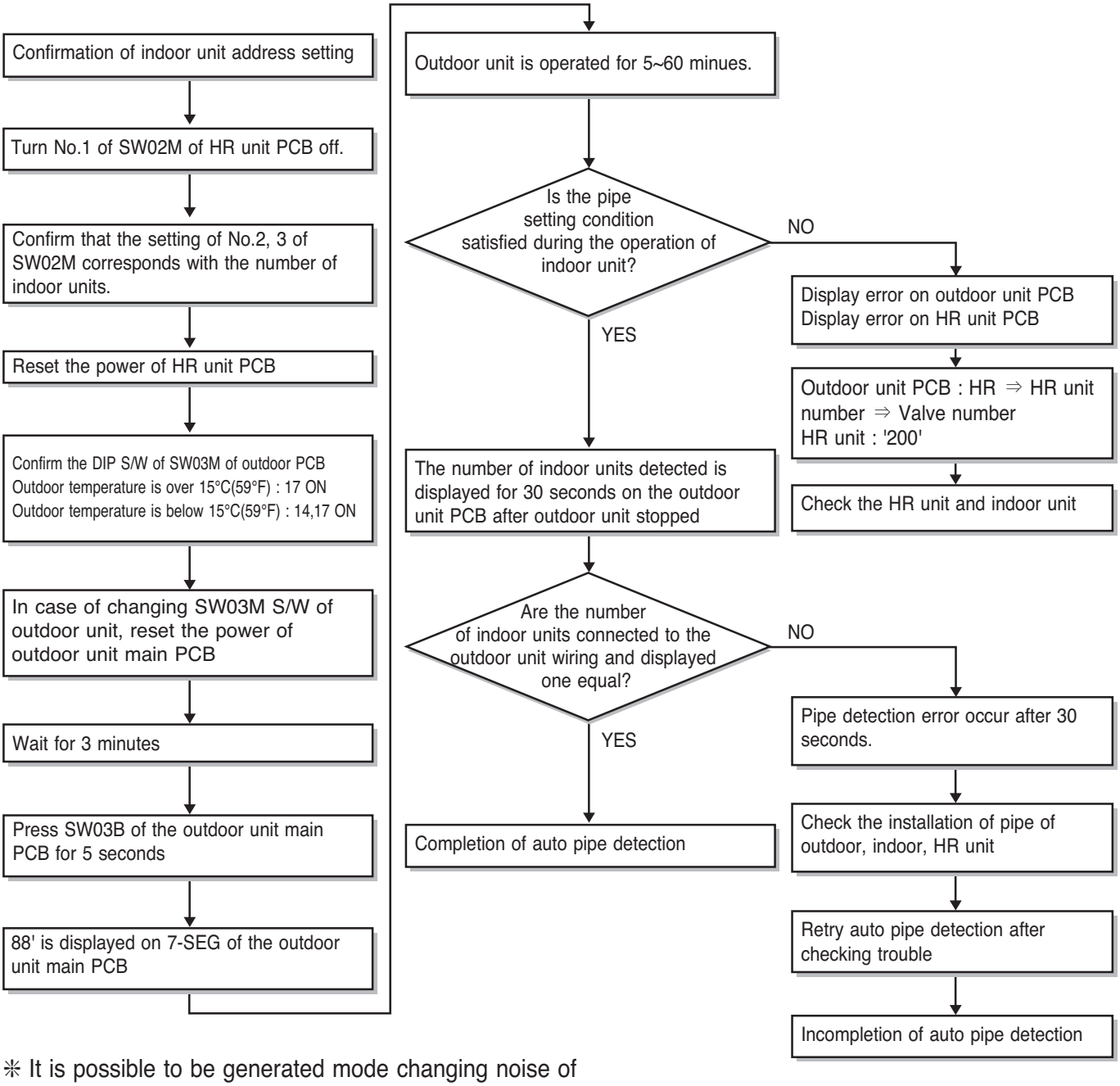
1. In case that central controller is not installed, remain the address data after installer sets central control address as he wants
2. In case that central controller is installed, there would be central control address in wired remote control of indoor unit.
3. In this case, set the HR unit manual pipe address according to central control address of indoor unit.
4. Pipe which is not connected with indoor unit should be set different address with pipe Connected with indoor unit.
(If addresses are piled up, corresponding valve is not working.
5. If you want to change the setting of manual pipe, you should do it on HR unit PCB.
6. If an error occurred, it means that manual pipe setting is not completed.
7. During 5 minutes after pipe detection is completed, do not turn off the main unit PCB to save the result of pipe detection automatically.

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

1) Flow chart for auto addressing

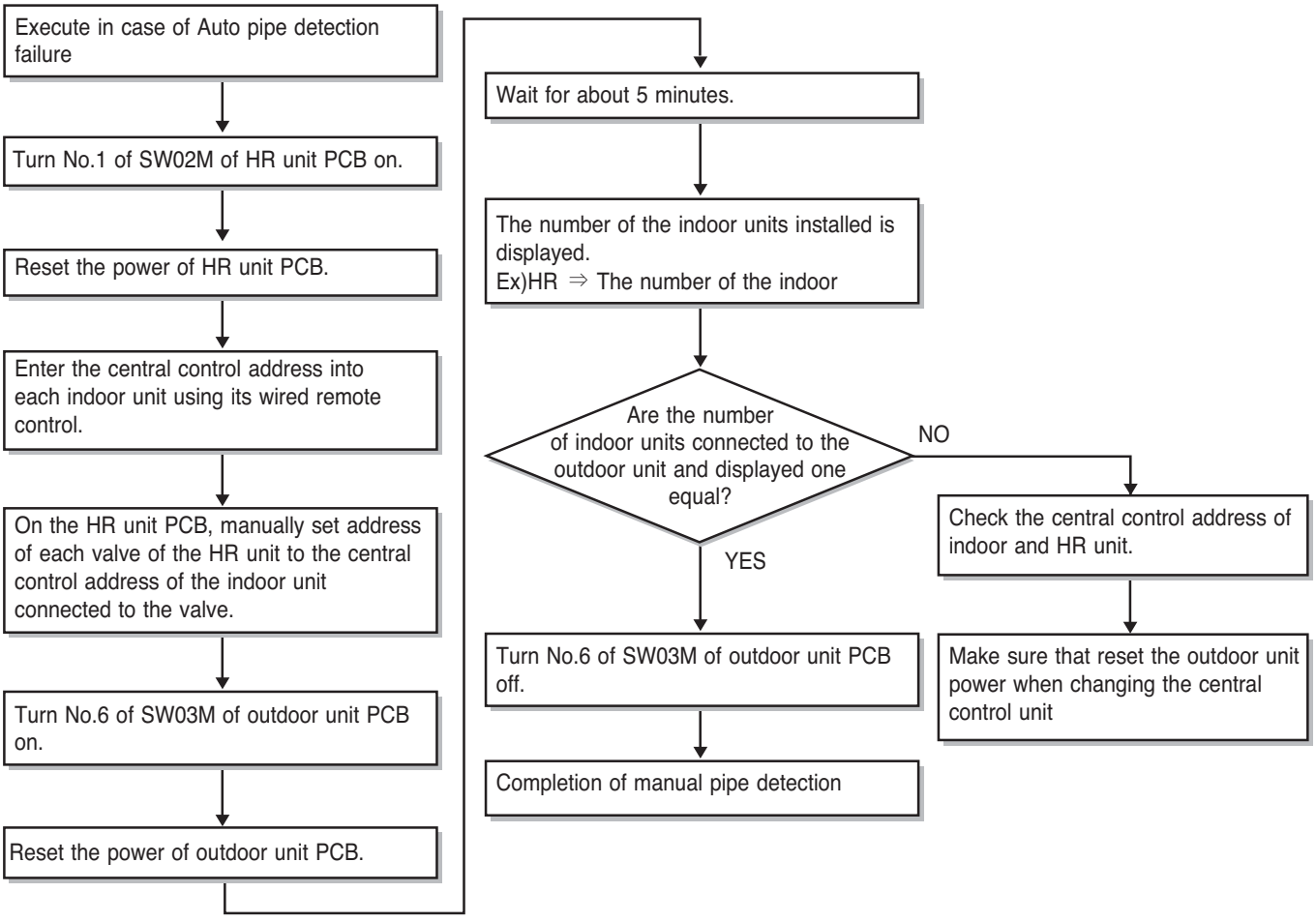


2) Flow chart for auto pipe detection



※ 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.

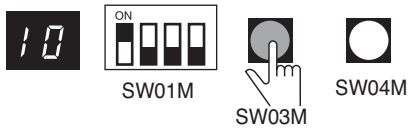
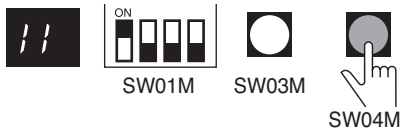
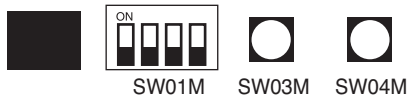
3) Flow chart for manual pipe detection



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

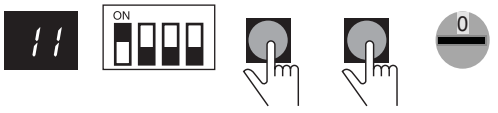
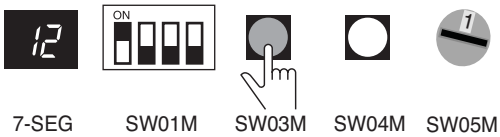
- Above setup must be done for all HR unit valves.
- The valve that is not connected with any indoor unit should be addressed with any other number than used address numbers of the valves connected with indoor units.
  (The valves does not work if the address numbers are same.)

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)

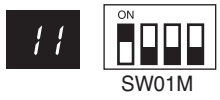
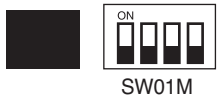
• Prerequisite for manual valve addressing: central control address of each indoor unit must be preset differently at its wired remote control.

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)

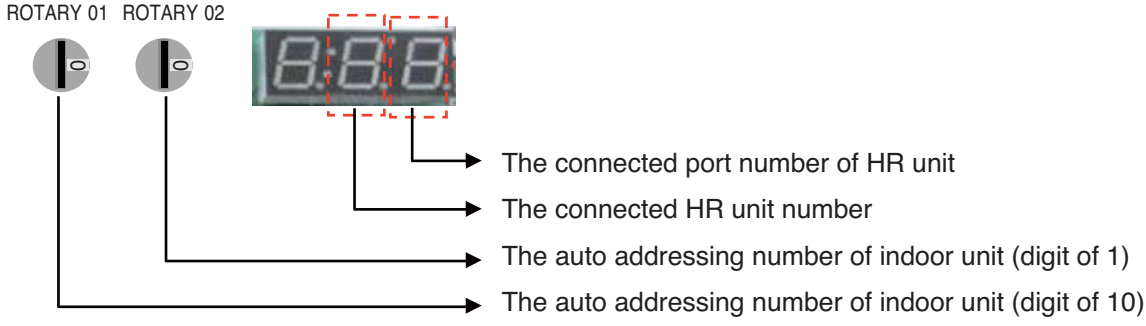
No.	Display and setup	Setup and contents
1		• Operation: more than 2 dip switches turned on. • Display: "Er" is displayed in 7-SEG

8. Method of checking the pipe detection result at outdoor unit

1) Wait for 5 minutes, after Pipe detection is completed.

2) Turn on the No.10,14,16 DIP S/W of Sub PCB at master unit

3) Check the data on 7- segment, switching rotary 01,02.



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	Check if High/low pressure gas and liquid SVC valves are fully opened. 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

- **Always apply main power of the outdoor unit during use of product (cooling season/heating season).**
- **Always apply power before 6 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 6 hours.(In case of the outdoor temperature below 10°C(50°F))**

CAUTION

Preheat of compressor

- **Start preheat operation for 6 hours after supplying main power.**
- **In case that the outdoor temperature is low, be sure to supply power 6 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 amount 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 fan	High pressure error at cooling	Motor failure, bad ventilation around outdoor heat exchanger	Check the outdoor fan operation after being turned the outdoor units off for some time. Remove obstacles around the outdoor units
Outdoor EEV	Heating failure, frequent defrosting	Bad connector contact	Check connector
	No operating sound at applying power	Coil failure	Check resistance between terminals
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	Service necessary

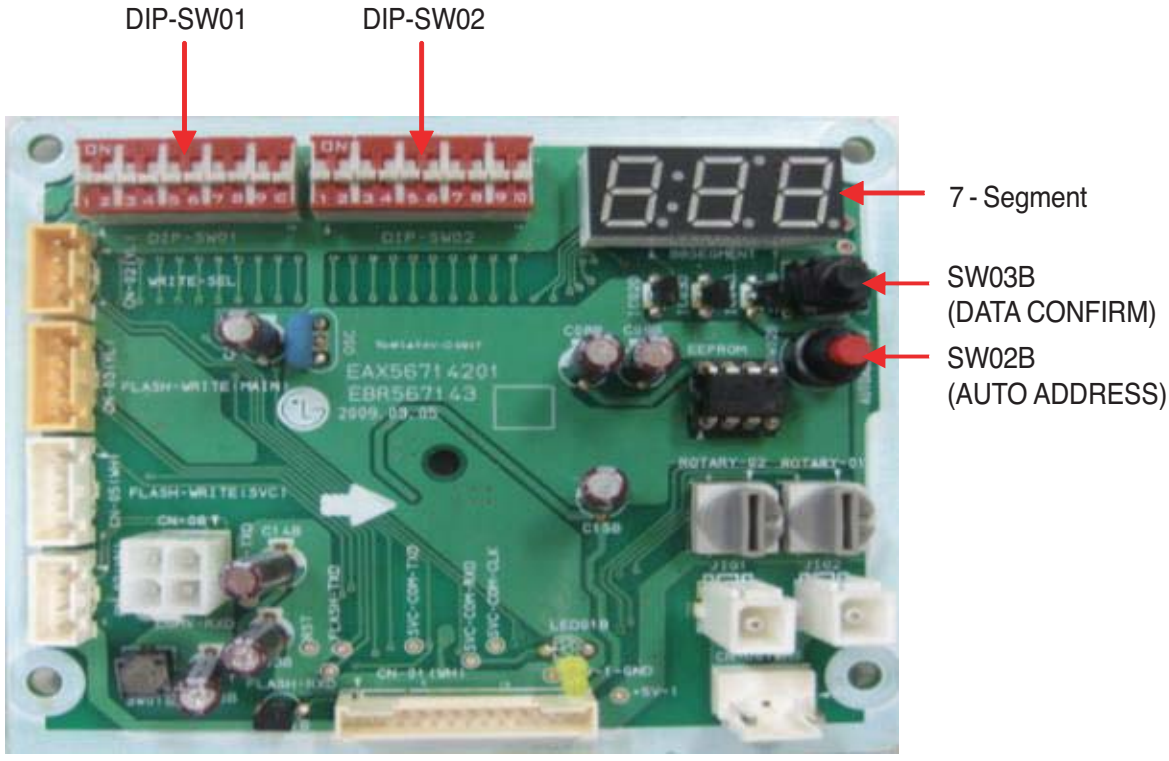
When system fault occurs, the error code is displayed at indoor unit display or remote control display, the trouble shooting guide is in the service manual

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

3. DIP Switch Setting

■ Location of setting Switch

SUB PCB



■ 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 the Master unit

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 28HP)
Master model code ➔ Slave1 model code ➔ Slave2 model code ➔ total capacity ➔ 2 ➔ 25 ➔ 170

1 ~255 : Master model code
1 ~255 : Slave1 model code
1 ~255 : Slave2 model code
} Refer to table code

8 ~42Hp : HP number(sum of master capacity and slave capacity)
No display : cooling only 2 : heat pump / heat recovery
25 : normal
170 : Model Tybe(ARUB***DT3)

Example) 28Hp, R410A
193 → 193 → 28 → 2 → 25 → 170

CAUTION

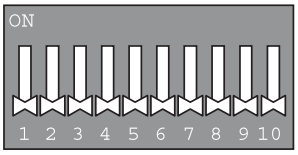
Product may not properly operate if the relevant DIP switch is not properly setup.

Model Code

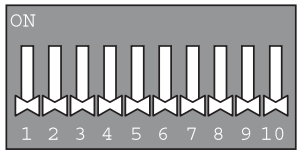
Model Code	Unit (HP)	Unit	Ref.
190	8	Master & Slave	R410A
191	10		
192	12		
193	14		

■ Setting the DIP switch

• If you set the Dip switch when power is on, the changed setting will not be applied immediately.
The changed setting will be enabled only when Power is reset or by pressing Reset button.



1 2 3 4 5 6 7 8 9 10



1112131415161718192O

	Index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Function	Inverter backup	●																			
	Const.1 backup		●																		
	Const.2 backup			●																	
	Unit backup	●	●	●																	
	Night low noise operation (cooling, heating)				●																
	Night low noise operation (cooling only)					●															
	Snow removal function						●				X										
	Forced defrost							●			X										
	Snow removal + Forced defrost						●	●			X										
	Non-operation indoor unit EEV adjustment												●	X							X
	Indoor unit target subcooling / overheating adjustment												X	●							X
	Operation indoor unit EEV adjustment												●	●							X
	Real-time sensor monitring															●					X
	Only overall defrost																●				
	Static pressure mode																		●	X	X
	Pump out										●		●	X							
	Pump down										●		X	●							
	Vacuum mode										●		●	●							
	Forced oil return operation										●				X	●	X				
	4way valve manual operation – upper, low OFF										X		X	X				X	X	X	●
	4way valve manual operation – upper ON, low OFF										X		●	X				X	X	X	●
	4way valve manual operation – upper OFF, low ON										X		X	●				X	X	X	●
	4way valve manual operation – upper, low ON										X		●	●				X	X	X	●
	Auto pipe detection mode 1																	●			X
	Auto pipe detection mode 2														●			●			X
	Indoor unit pipe display										●				●	X	●				
	No. of indoor units connected a branch of HR Unit										●				●	●	●				
	Auto charging																	●	●	X	●
	Refrigerant Checking Function																	X	X	●	●
	Intergrated test operation function (Heating)																	X	●	●	●
	Intergrated test operation function (Cooling)																	●	X	●	●
	Heating Capacity up										●				●						
	IDU Fan RPM Control										●				●	●					
	ODU Address setting										●				X	●	●				
ODU Setting	Master unit								X	X											
	Slave1 unit								●	X											
	Slave2 unit								X	●											
	Slave3 unit								●	●											

⚠ CAUTION

1. 'X' mark within the table means that the dip switch must be pulled down. If not, the function may not work properly.
2. If the applicable dip switch is not set properly, the product may not work properly.
3. When executing the test operation, check the operating condition of the indoor unit and only execute the operation when all indoor units are stopped.
4. Auto test operation function does not work for the product where only one indoor unit is connected for use.

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 amount 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 fan	High pressure error in cooling mode operation	Motor failure, bad ventilation around outdoor heat exchanger	Check the fan operation to confirm proper motor functioning. Switch OFF the outdoor unit and remove obstacles, if any, around the HEX. Check connector
Outdoor EEV	Heating failure, frequent defrosting	Bad connector contact	Check resistance between terminals
	No operation sound after switching ON the power supply	Coil failure	Service necessary
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	

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

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

2. Checking Method for Key Components

2.1 Compressor

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

<table>
<tr><th>No.</th><th>Checking Item</th><th>Symptom</th><th>Countermeasure</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Is how long power on during operation?</td><td>1) Power on for 12 hours or more</td><td>* Go to No.2.</td></tr>
<tr><td>2) Power on for 12 hours or less</td><td>* Go to No.2 after applying power for designated time (12 hours).</td></tr>
<tr><td rowspan="3">2</td><td>Does failure appears again when starting operation?

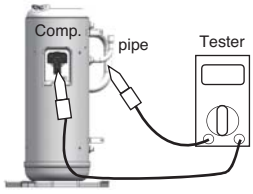
Method to measure insulation resistance
 

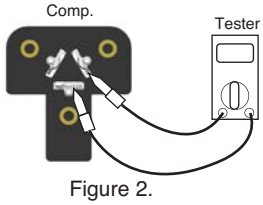
Figure 1.
Method to measure coil resistance
 

Figure 2.</td><td>1) The compressor stops and same error appears again.</td><td>* Check IPM may fail.</td></tr>
<tr><td>2) If output voltage of the inverter is stably output. *1</td><td>* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor.
* Insulation resistor: 2MW or more Coil resistor:
<table><tr><th></th><th>Inverter</th><th>Constant Speed</th></tr><tr><td>U-V</td><td>0.179 Ω (@25°C)</td><td>0.78 Ω ± 7% (@25°C)</td></tr><tr><td>V-W</td><td>0.178 Ω (@25°C)</td><td>0.78 Ω ± 7% (@25°C)</td></tr><tr><td>W-U</td><td>0.178 Ω (@25°C)</td><td>0.79 Ω ± 7% (@25°C)</td></tr></table></td></tr>
<tr><td>3) If output voltage of the inverter is unstable or it is 0V.
(When incapable of using a digital tester)</td><td>* Check the IPM.
If the IPM is normal, replace the inverter board.
* Check coil resistor and insulation resistor.</td></tr>
</table>

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

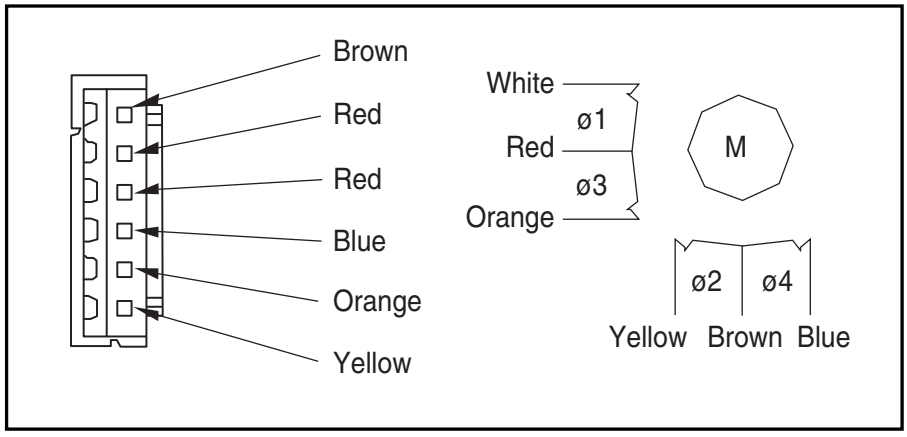
Measuring values may differ depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no since waveform.
Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.
In addition, measuring values 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 Fan Motor

Checking Item	Symptom	Countermeasure
(1) The fan motor does not operate. Does failure appears again when starting operation? (2) Vibration of the fan motor is large.	1) When power supply is abnormal	* Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition.
		* Modify the power supply voltage is beyond specified scope.
	2) For wrong wiring	* For following wiring. 1. Check connection status. 2. Check contact of the connector. 3. Check that parts are firmly secured by tightening screws. 4. Check connection of polarity. 5. Check short circuit and grounding.
	3) For failure of motor	* Measure winding resistance of the motor coils. - 2.85Ω ± 5% (@25°C)
	4) For failure of circuit board	Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.) 1. Replace only fan control boards. If starting is done, it means that the fan control board has defect. 2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect. 3. If problems continue to occur even after countermeasure of No.1 and No.2, it means that both boards has defect.

2.3 Electronic Expansion Valve



• Pulse signal output value and valve operation

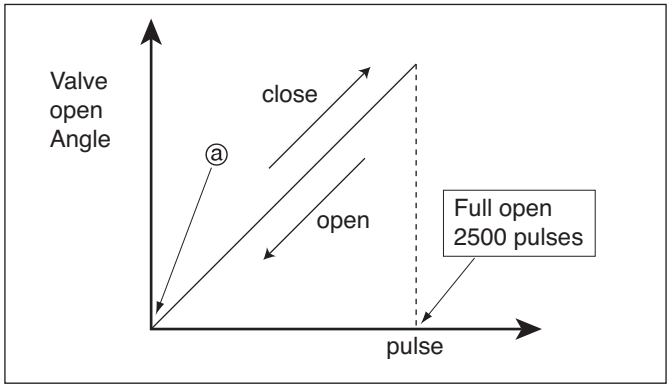
Output(ø) No.	Output state			
	1	2	3	4
ø1	ON	ON	OFF	OFF
ø2	ON	ON	ON	ON
ø3	OFF	OFF	OFF	ON
ø4	OFF	OFF	OFF	OFF

• Output pulse sequence

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

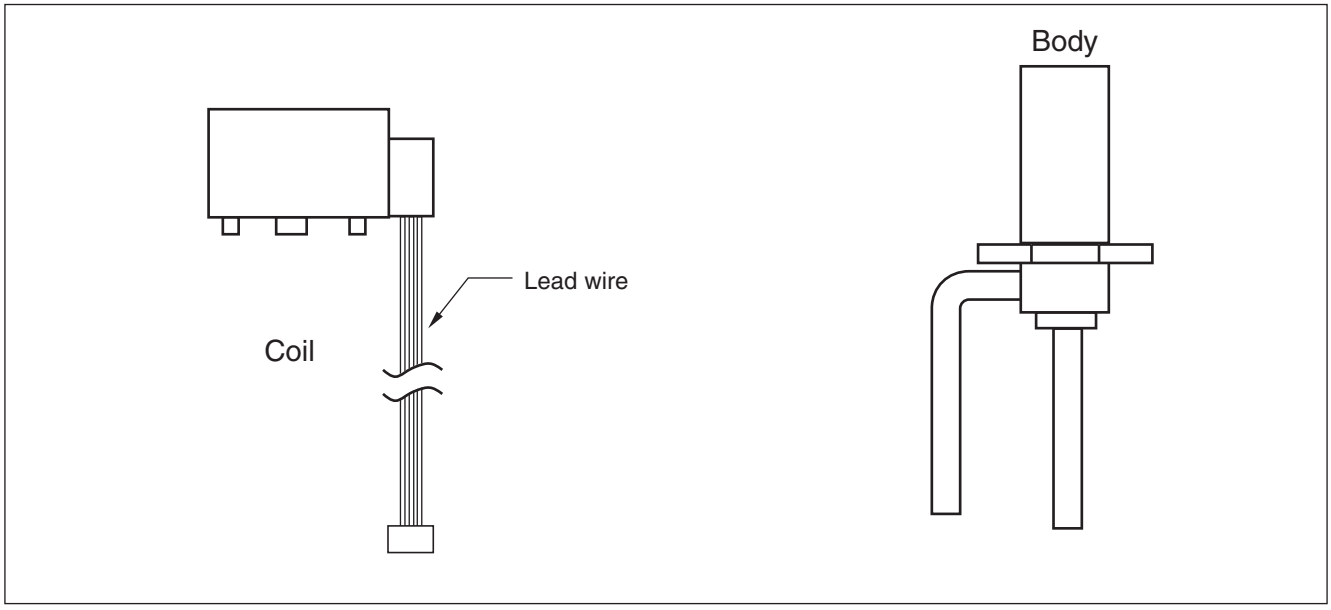
* 1. If EEV open angle does not change, all of output phase will be OFF
2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

• EEV valve operation

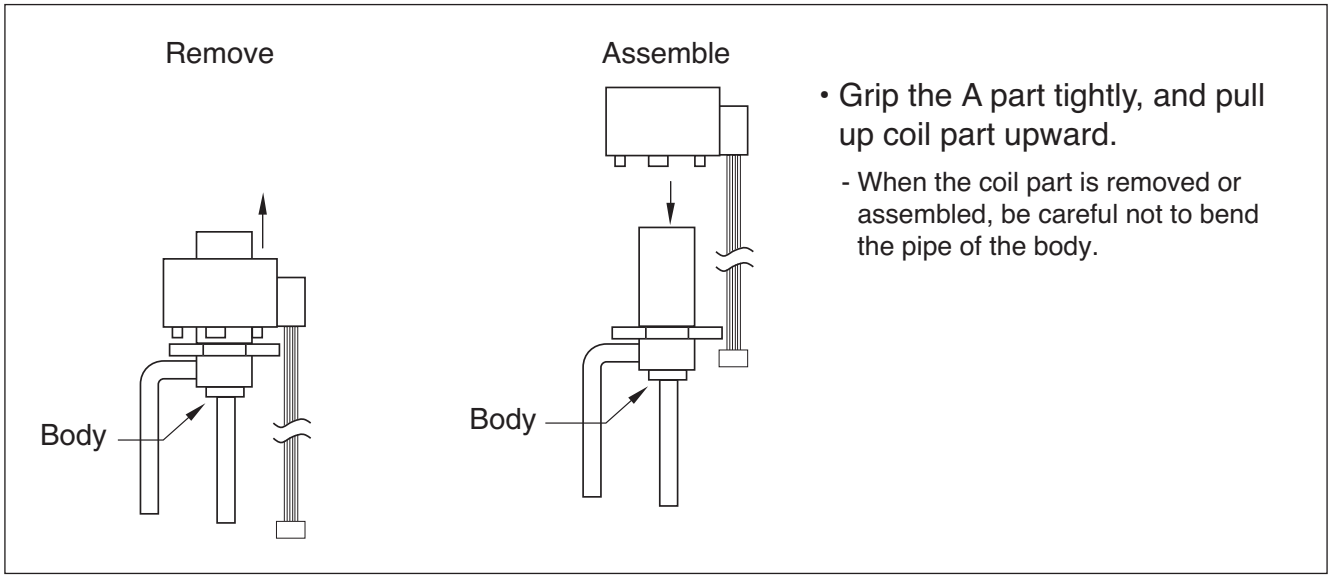


- At power ON, open angle signal of 1400 pulses output and valve position is set to ⓐ
  If valve operates smoothly, no noise and vibration occurs and if valve is closed. noise occurs.
- Noise from EEV can be confirmed by touching the EEV surface with a screw driver and listening the EEV noise.
- If liquid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

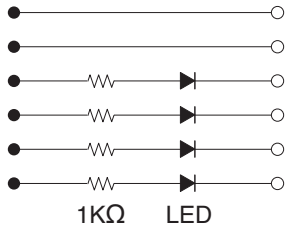
• **EEV Coil and body(Outdoor unit)**



• **Remove and assemble the coil**

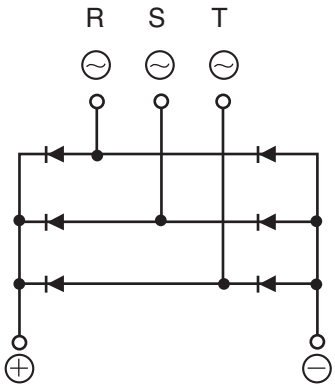


- **EEV failure check method**

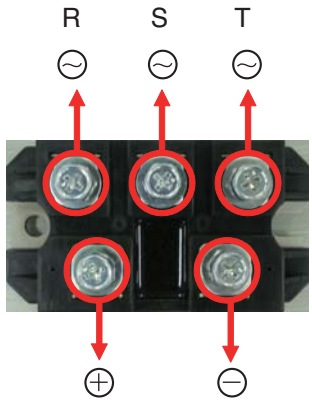
Failure mode	Diagnosis	Repair process	Unit
Microcomputer Driving circuit failure	1.Disconnect the EEV connector form control board and connect testing LED  2. Main power ON, pulse signal is out from EEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal	Check and replace Indoor unit control board	Indoor unit
EEV locking	1.If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV	Indoor / Outdoor unit
EEV Motor coil short or misconnection	1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue) 2. If the estimated resistance value is in 52 ± 3KΩ then the EEV is normal	Replace EEV	Outdoor unit
	1. Check the resistance between coil terminal (brown-white, brown-yellow, brown-orange, brown-blue) 2. If the estimated resistance value is in 150 ± 10KΩ then the EEV is normal	Replace EEV	Indoor 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 estimated 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

2.4 Phase Bridge Diode Checking Method

Internal circuit diagram



Appearance



1. Wait until inverter PCB DC voltage gets discharged, after the main power switch off.
2. Pull out all the connectors connected with 3 phase bridge diode.
3. Set multi tester in diode mode.
4. Measured value should be 0.4~0.7V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure. If the value is small (0 Ω) or high (hundreds M Ω), PCB needs to be replaced.
6. In case that bridge diode is damaged, check if inverter PCB assembly(IPM) is needed to be replaced.

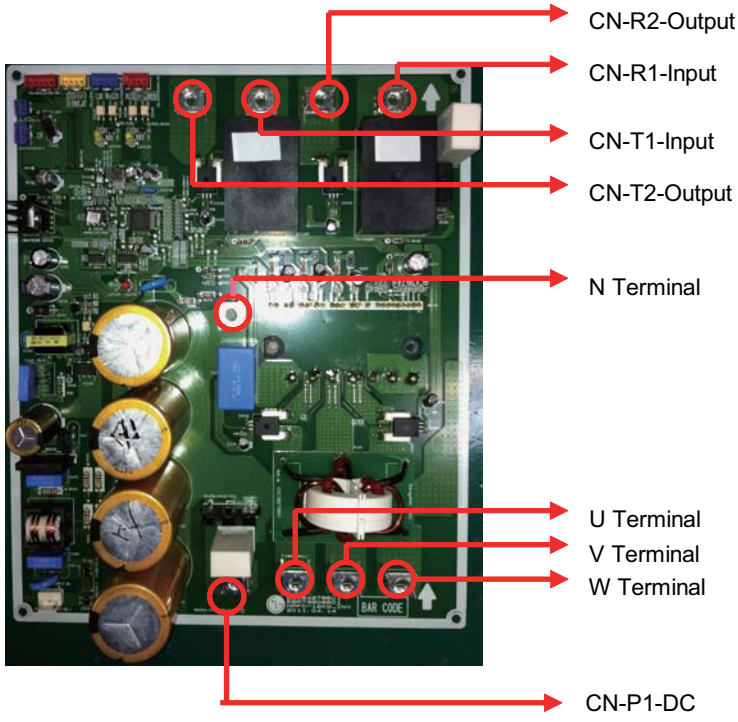
Diode terminal / Tester terminal	+ terminal: black(-)	- terminal: red(+)
R(~) : red(+)	0.4 V ~ 0.7 V	-
S(~) : red(+)	0.4 V ~ 0.7 V	-
T(~) : red(+)	0.4 V ~ 0.7 V	-
R(~) : black(-)	-	0.4 V ~ 0.7 V
S(~) : black(-)	-	0.4 V ~ 0.7 V
T(~) : black(-)	-	0.4 V ~ 0.7 V

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

CAUTION

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

2.5 Inverter IPM Checking Method



1. Wait until inverter PCB DC voltage gets discharged after the main power switch off.
2. Pull out CN-P1, CN-N connectors and U,V,W COMP connector connected with the inverter PCB.
3. Set multi tester in diode mode.
4. Measured value should be 0.4~0.7V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure.
   If the value is small (0Ω) or high (hundreds MΩ), PCB needs to be replaced.
6. In case measured value is different from the table, PCB needs to be replaced (PCB damaged).

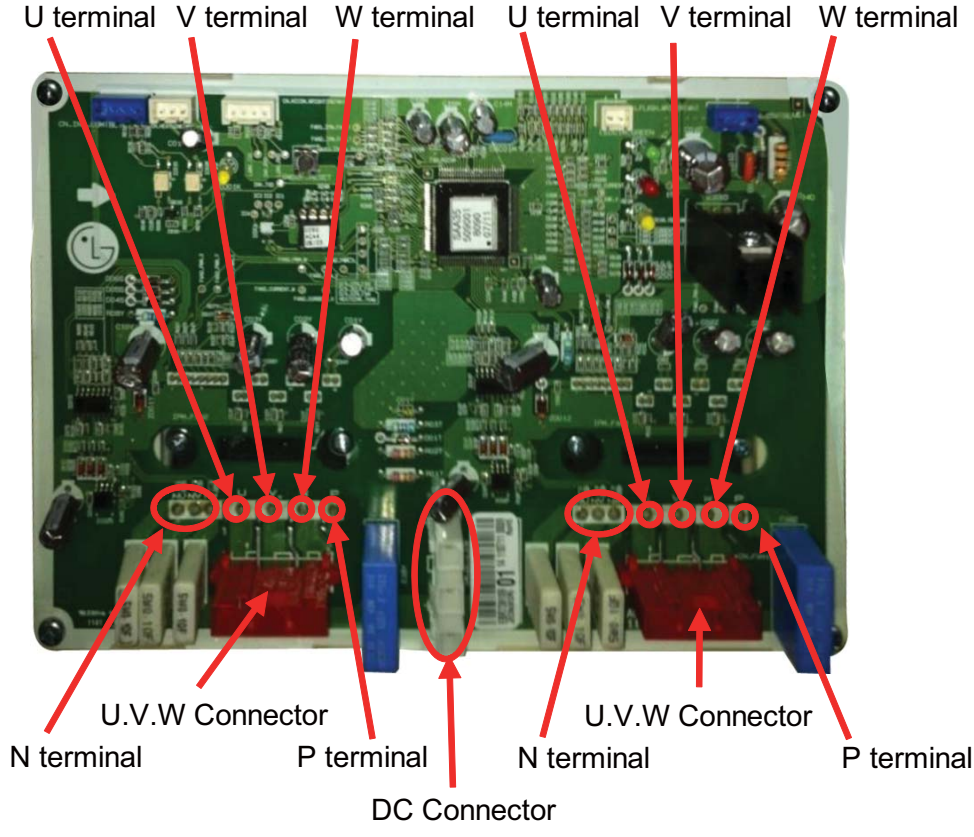
	P1 Terminal : Black (-)	**N Terminal : Black (-)**
U Terminal : Red (+)	0.4V ~ 0.7V	Open
V Terminal : Red (+)	0.4V ~ 0.7V	Open
W Terminal : Red (+)	0.4V ~ 0.7V	Open
	P1 Terminal : Red (+)	**N Terminal : Red (+)**
U Terminal : Black (-)	Open	0.4V ~ 0.7V
V Terminal : Black (-)	Open	0.4V ~ 0.7V
W Terminal : Black (-)	Open	0.4V ~ 0.7V

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

2.6 Fan IPM Checking Method

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

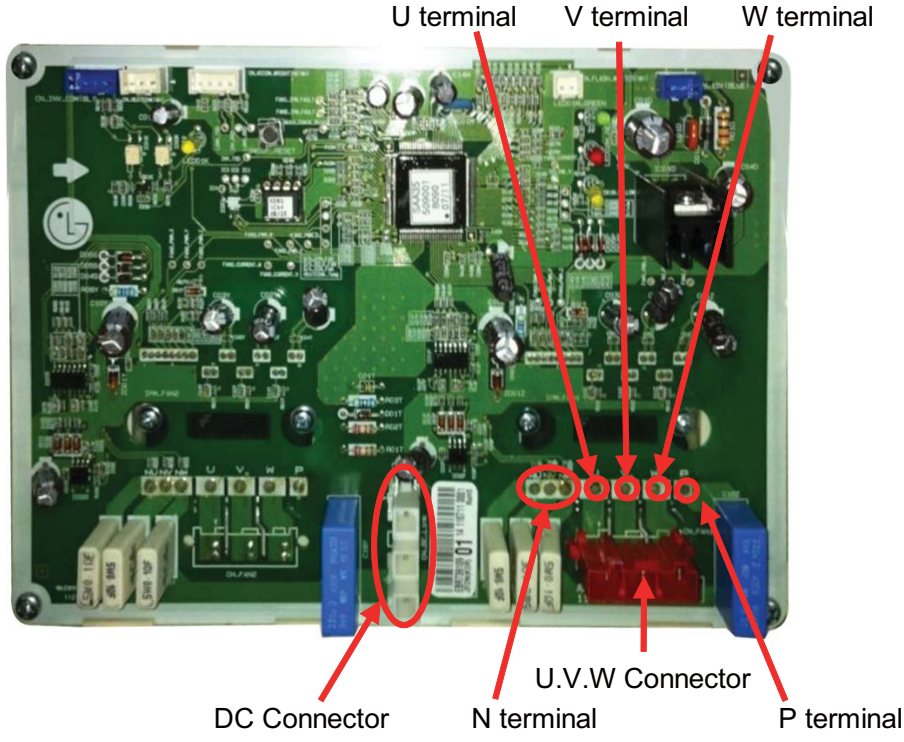
	P Terminal : Black (-)	N Terminal : Black (-)
U Terminal : Red (+)	0.4V ~ 0.7V	Open
V Terminal : Red (+)	0.4V ~ 0.7V	Open
W Terminal : Red (+)	0.4V ~ 0.7V	Open
	P Terminal : Red (+)	**N Terminal : Red (+)**
U Terminal : Black (-)	Open	0.4V ~ 0.7V
V Terminal : Black (-)	Open	0.4V ~ 0.7V
W Terminal : Black (-)	Open	0.4V ~ 0.7V



2.7 Fan IPM Checking Method

1. Wait until inverter PCB DC voltage gets discharged after the main power switch off.
2. Pull out DC Connector and U,V,W fan motor connector connected with fan PCB.
3. Set multi tester in diode mode.
4. Measured value should be 0.4~0.7V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure.
   If the value is small (0Ω) or high (hundreds MΩ), 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 : Black (-)
U Terminal : Red (+)	0.4V ~ 0.7V	Open
V Terminal : Red (+)	0.4V ~ 0.7V	Open
W Terminal : Red (+)	0.4V ~ 0.7V	Open
	P Terminal : Red (+)	**N Terminal : Red (+)**
U Terminal : Black (-)	Open	0.4V ~ 0.7V
V Terminal : Black (-)	Open	0.4V ~ 0.7V
W Terminal : Black (-)	Open	0.4V ~ 0.7V



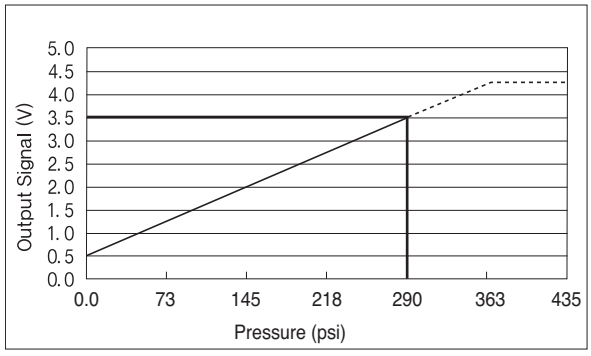
UX2 Fan PCB

2.8 Pressure Sensor(High/Low Pressure Sensor)

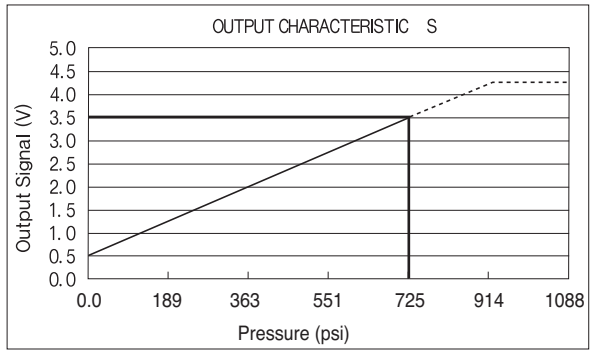
Connect manifold gauge to the service valve of outdoor unit, and compare the output of high pressure sensor to the output of low pressure sensor to detect the defect.

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.

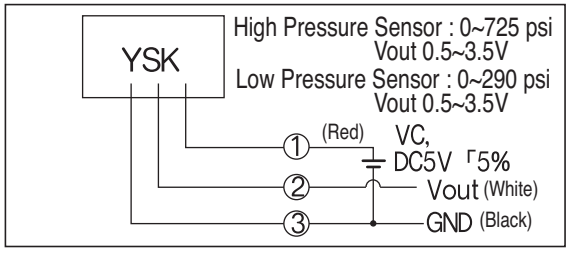
<Low Pressure Sensor>



<High Pressure Sensor>



1) If the pressure of manifold gauge is 0~14 psi, 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/cm^2, the pressure sensor is normal.
3) If the difference of the outputs of high and low pressure is over 1kg/cm^2, 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.

2.9 Outdoor Fan

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

2.10 Solenoid Valve

Check the conformity of the operation of solenoid valve to the output sigh of control board.

1) Hot gas bypass valve

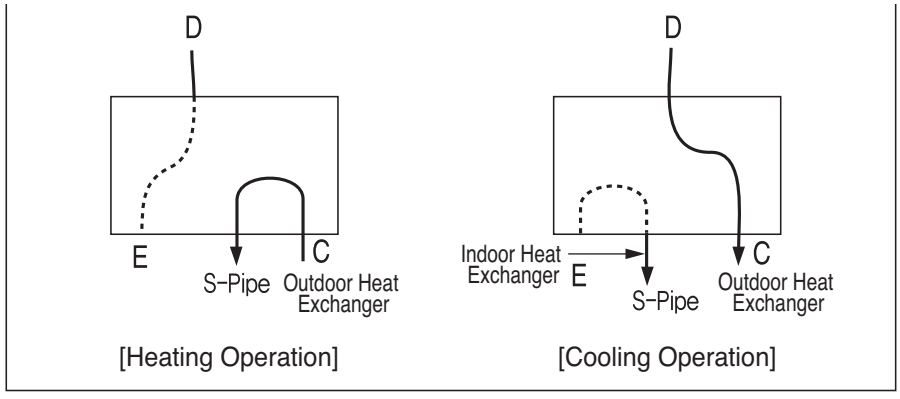
1. When the compressor starts operating, hot gas valve will be on for 1 minute. Check if there is operation noise or piping vibration on the solenoid valve.
2. To get rid of the difference of high and low pressure of system after stop operating the compressor, turn the valve on after 5 seconds.
3. Turn the hot gas valve on if the temperature of compressor suction pipe is lower than ranged temperature.
4. Hot gas valve can be kept on by the condition of cycle operation, this does not indicate the breakdown of the unit.
5. The change of the operation condition by the operation of solenoid valve can be checked by the before and behind temperature of bypass piping and the sound of refrigerant.
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) Oil solenoid valve

1. It is located in the bottom of accumulator, and it starts operating after some period of time of the compressor operation to provide oil stored in the bottom of the accumulator to the compressor.
2. When the compressor starts operating, oil solenoid valve will be on for 2 minutes. Check if there is operation noise or piping vibration on the solenoid valve.
3. It turns on right after the compressor stop operating.
4. Solenoid valve can turn on and off repeatedly by the condition of cycle operation; this does not indicate the breakdown of the unit.
5. Insulation resistance in the state of connecting the valve to coil should be over 100mΩ when measure it with DC mega tester(DC 500V).

2.11 4-Way Valve

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



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

2.12 Temperature Sensor

1) outdoor temperature sensor : TH1
2) Suction pipe(S-pipe) temperature sensor : TH2
3) Discharge pipe(D-pipe) temperature sensor : TH3
4) Outdoor heat exchanger (center of condenser) temperature sensor :TH2
   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))	0.535KΩ±3.3%(@85°C (185°F))	28KΩ±7.7%(@85°C(185°F))

2.13 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

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 LED of 7-segment indicates error number, 3rd LED indicates unit number.

Ex) 211 : No.21 error of master unit 213 : No.21 error of slave2 011 → 051 : 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	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	7	-	Inlet Air temperature sensor of FAU	Air temperature sensor of indoor unit is open or short
Outdoor unit related error	2	1	1	Master Outdoor Unit Inverter Compressor IPM Fault	Master Outdoor Unit Inverter Compressor Drive IPM Fault
			2	Slave1 Outdoor Unit Inverter Compressor IPM Fault	Slave1 Outdoor Unit Inverter Compressor Drive IPM Fault
			3	Slave2 Outdoor Unit Inverter Compressor IPM Fault	Slave2 Outdoor Unit Inverter Compressor Drive IPM Fault
	2	2	1	Inverter Board Input Over Current(RMS) of Master Outdoor Unit	Master Outdoor Unit Inverter Board Input Current excess (RMS)
			2	Inverter Board Input Over Current(RMS) of Slave1 Outdoor Unit	Slave1 Outdoor Unit Inverter Board Input Current excess (RMS)
			3	Inverter Board Input Over Current(RMS) of Slave2 Outdoor Unit	Slave2 Outdoor Unit Inverter Board Input Current excess (RMS)

Display				Title	Cause of Error
Outdoor unit related error	2	3	1	Master Outdoor Unit Inverter Compressor DC link Low Voltage1	DC charging is not performed at Master Outdoor Unit after starting relay turn on.
			2	Slave1 Outdoor Unit Inverter Compressor DC link Low Voltage	DC charging is not performed at Slave1 Outdoor Unit after starting relay turn on.
			3	Slave2 Outdoor Unit Inverter Compressor DC link Low Voltage	DC charging is not performed at Slave2 Outdoor Unit after starting relay turn on.
	2	4	1	Master Outdoor Unit High Pressure Switch	System is turned off by Master Outdoor Unit high pressure switch.
			2	Slave1 Outdoor Unit High Pressure Switch	System is turned off by slave1 Outdoor Unit high pressure switch.
			3	Slave2 Outdoor Unit High Pressure Switch	System is turned off by slave2 Outdoor Unit high pressure switch.
	2	5	1	Master Outdoor Unit Input Voltage High/ Low Voltage	Master Outdoor Unit input voltage is over 300V or below 140V
			2	Slave1 Outdoor Unit Input Voltage High/ Low Voltage	Slave1 Outdoor Unit input voltage is over 300V or below 140V
			3	Slave2 Outdoor Unit Input Voltage High/ Low Voltage	Slave2 Outdoor Unit input voltage is over 300V or below 140V
	2	6	1	Master Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Master Outdoor Unit Inverter Compressor Abnormality
			2	Slave1 Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Slave1 Outdoor Unit Inverter Compressor Abnormality
			3	Slave2 Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Slave2 Outdoor Unit Inverter Compressor Abnormality
	2	8	1	Master Outdoor Unit Inverter DC link High Voltage	System is turned off by Master Outdoor Unit DC Voltage Over Charging
			2	Slave1 Outdoor Unit Inverter DC link High Voltage	System is turned off by Slave1 Outdoor Unit DC Voltage Over Charging
			3	Slave2 Outdoor Unit Inverter DC link High Voltage	System is turned off by Slave2 Outdoor Unit DC Voltage Over Charging
	2	9	1	Master Outdoor Unit Inverter Compressor Over Current	Master Outdoor Unit Inverter Compressor Fault OR Drive Fault
			2	Slave1 Outdoor Unit Inverter Compressor Over Current	Slave1 Outdoor Unit Inverter Compressor Fault OR Drive Fault
			3	Slave2 Outdoor Unit Inverter Compressor Over Current	Slave2 Outdoor Unit Inverter Compressor Fault OR Drive Fault

Display				Title	Cause of Error
Outdoor unit related error	3	0	1	Master Outdoor Unit Constant Speed Compressor2 High Discharge Temperature	System is turned off by Master Outdoor Uunit Constant Speed Compressor2 High Discharge Temperature
			2	Slave1 Outdoor Unit Constant Speed Compressor2 High Discharge Temperature	System is turned off by Slave1 Outdoor Unit Constant Speed Compressor2 High Discharge Temperature
			3	Slave2 Outdoor Unit Constant Speed Compressor2 High Discharge Temperature	System is turned off by Slave2 Outdoor Unit Constant Speed Compressor2 High Discharge Temperature
	3	2	1	Master Outdoor Unit Inverter Compressor High Discharge Temperature	System is turned off by Master Outdoor Unit Inverter Compressor High Discharge Temperature
			2	Slave1 Outdoor Unit Inverter Compressor High Discharge Temperature	System is turned off by Slave1 Outdoor Unit Inverter Compressor High Discharge Temperature
			3	Slave2 Outdoor Unit Inverter Compressor Discharge High Temperature	System is turned off by Slave2 Outdoor Unit Inverter Compressor High Discharge Temperature
	3	3	1	Master Outdoor Unit Constant Speed Compressor1 High Discharge Temperature	System is turned off by Master Outdoor Uunit Constant Speed Compressor1 High Discharge Temperature
			2	Slave1 Outdoor Unit Constant Speed Compressor1 High Discharge Temperature	System is turned off by Slave1 Outdoor Unit Constant Speed Compressor1 High Discharge Temperature
			3	Slave2 Outdoor Unit Constant Speed Compressor1 High Discharge Temperature	System is turned off by Slave2 Outdoor Unit Constant Speed Compressor1 High Discharge Temperature
	3	4	1	High Pressure of Master Outdoor Unit	System is turned off by excessive increase of high pressure of Master Outdoor Unit
			2	High Pressure of Slave1 Outdoor Unit	System is turned off by excessive increase of high pressure of Slave1 Outdoor Unit
			3	High Pressure of Slave2 Outdoor Unit	System is turned off by excessive increase of high pressure of Slave2 Outdoor Unit
	3	5	1	Low Pressure of Master Outdoor Unit	System is turned off by excessive decrease of low pressure of Master Outdoor Unit
			2	Low Pressure of Slave1 Outdoor Unit	System is turned off by excessive decrease of low pressure of Slave1 Outdoor Unit
			3	Low Pressure of Slave2 Outdoor Unit	System is turned off by excessive decrease of low pressure of Slave2 Outdoor Unit
	3	6	1	Master Outdoor Unit Low Condensing Ratio Limited	Master Outdoor Unit stayed under low condensing limit for 3 minutes
			2	Slave1 Outdoor Unit Low Condensing Ratio Limited	Slave1 Outdoor Unit stayed under low condensing limit for 3 minutes
			3	Slave2 Outdoor Unit Low Condensing Ratio Limited	Slave2 Outdoor Unit stayed under low condensing limit for 3 minutes

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

Display				Title	Cause of Error
Outdoor unit related error	4	5	1	Master Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Master Outdoor Unit Heat Exchanger Temperature Sensor(Front side) open or short
			2	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Slave1 Outdoor Unit Heat Exchanger Temperature Sensor (Front side) open or short
			3	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Slave2 Outdoor Unit Heat Exchanger Temperature Sensor(Front side) open or short
	4	6	1	Master Outdoor Unit Suction Temperature Sensor Fault	Master Outdoor Unit Suction Temperature Sensor open or short
			2	Slave1 Outdoor Unit Suction Temperature Sensor Fault	Slave1 Outdoor Unit Suction Temperature Sensor open or short
			3	Slave2 Outdoor Unit Suction Temperature Sensor Fault	Slave2 Outdoor Unit Suction Temperature Sensor open or short
	4	7	1	Master Outdoor Unit Constant Speed Compressor1 Discharge Temperature Sensor Fault	Master Outdoor Unit Constant Speed Compressor1 Discharge Temperature Sensor open or short
			2	Slave1 Outdoor Unit Constant Speed Compressor1 Discharge Temperature Sensor Fault	Slave1 Outdoor Unit Constant Speed Compressor1 Discharge Temperature Sensor open or short
			3	Slave2 Outdoor Unit Constant Speed Compressor1 Discharge Temperature Sensor Fault	Slave2 Outdoor Unit Constant Speed Compressor1 Discharge Temperature Sensor open or short
	4	8	1	Master Outdoor Unit Constant Speed Compressor2 Discharge Temperature Sensor Fault	Master Outdoor Unit Constant Speed Compressor 2 Discharge Temperature Sensor open or short
			2	Slave1 Outdoor Unit Constant Speed Compressor2 Discharge Temperature Sensor Fault	Slave1 Outdoor Unit Constant Speed Compressor 2 Discharge Temperature Sensor open or short
			3	Slave2 Outdoor Unit Constant Speed Compressor2 Discharge Temperature Sensor Fault	Slave2 Outdoor Unit Constant Speed Compressor 2 Discharge Temperature Sensor open or short
	4	9	1	Master Outdoor Unit Faulty IPM Temperature Sensor	Master Outdoor Unit IPM Temperature Sensor short/open
			2	Slave1 Outdoor Unit Faulty IPM Temperature Sensor	Slave1 Outdoor Unit IPM Temperature Sensor short/open
			3	Slave2 Outdoor Unit Faulty IPM Temperature Sensor	Slave2 Outdoor Unit IPM Temperature Sensor short/open

Display				Title	Cause of Error
Outdoor unit related error	5	0	1	Omitting connection of R, S, T power of Master Outdoor Unit	Omitting connection of Master outdoor unit
			2	Omitting connection of R, S, T power of Slave1 Outdoor Unit	Omitting connection of Slave1 Outdoor Unit
			3	Omitting connection of R, S, T power of Slave2 Outdoor Unit	Omitting connection of Slave2 Outdoor Unit
	5	1	1	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of Outdoor Unit
			2	Excessive capacity of indoor units from zoning branches	Excessive connection of indoor units compared to capacity of zoning branches of HR Unit
	5	2	1	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Master Outdoor Unit
			2	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Slave1 Outdoor Unit
			3	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Slave2 Outdoor Unit
	5	3	1	Communication error : indoor unit → main PCB of Outdoor Unit	Failing to receive indoor unit signal at main PCB of Outdoor Unit .
	5	4	1	Reverse connection of R, S, T power of Master Outdoor Unit	Reverse connection or omitting connection of R, S, T power of Master Outdoor Unit
			2	Reverse connection of R, S, T power of Slave1 Outdoor Unit	Reverse connection or omitting connection of R, S, T power of Slave1 Outdoor Unit
			3	Reverse connection of R, S, T power of Slave2 Outdoor Unit	Reverse connection or omitting connection of R, S, T power of Slave2 Outdoor Unit
	5	7	1	Master Outdoor Unit Communication Error with Inverter Controller	Master Outdoor Unit Controller part cannot receive inverter control signals (usually happens after on-boarding)
			2	Slave1 Outdoor Unit Communication Error with Inverter Controller	Slave1 Outdoor Unit Controller part cannot receive inverter control signals (usually happens after on-boarding)
			3	Slave2 Outdoor Unit Communication Error with Inverter Controller	Slave2 Outdoor Unit Controller part cannot receive inverter control signals (usually happens after on-boarding)
	5	9	1	Error of series installation	In the case of installing smaller outdoor unit as master unit

Display				Title	Cause of Error
Outdoor unit related error	6	0	1	Inverter PCB EEPROM Error of Master Outdoor Unit	Access Error of Inverter PCB of Master Outdoor Unit
			2	Inverter PCB EEPROM Error of Slave1 Unit	Access Error of Inverter PCB of Slave1 Outdoor Unit
			3	Inverter PCB EEPROM Error of Slave2 Unit	Access Error of Inverter PCB of Slave2 Outdoor Unit
	6	7	1	Master Outdoor Unit Fan Lock	Restriction of Master Outdoor Unit
			2	Slave1 Outdoor Unit Fan Lock	Restriction of Slave1 Outdoor Unit
			3	Slave2 Outdoor Unit Fan Lock	Restriction of Slave2 Outdoor Unit
	6	9	1	Constant1 CT Sensor Error of Master Outdoor Unit	Constant1 CT Sensor open or short of Master Outdoor Unit
			2	Constant1 CT Sensor Error of Slave1 Outdoor Unit	Constant1 CT Sensor open or short of Slave1 Outdoor Unit
			3	Constant1 CT Sensor Error of Slave2 Outdoor Unit	Constant1 CT Sensor open or short of Slave2 Outdoor Unit
	7	0	1	Constant2 CT Sensor Error of Master Outdoor Unit	Constant2 CT Sensor open or short of Master Outdoor Unit
			2	Constant2 CT Sensor Error of Slave1 Outdoor Unit	Constant2 CT Sensor open or short of Slave1 Outdoor Unit
			3	Constant2 CT Sensor Error of Slave2 Outdoor Unit	Constant2 CT Sensor open or short of Slave2 Outdoor Unit
	7	3	1	Instant Over Current(Peak) of Master Outdoor Unit PFC	Instant Over Current(Peak) of Master Outdoor Unit PFC
			2	Instant Over Current(Peak) of Slave1 Outdoor Unit PFC	Instant Over Current(Peak) of Slave1 Outdoor Unit PFC
			3	Instant Over Current(Peak) of Slave2 Outdoor Unit PFC	Instant Over Current(Peak) of Slave2 Outdoor Unit PFC
	7	5	1	Master Outdoor Unit Fan CT Sensor Error	Master Outdoor Unit Fan CT Sensor open or short
			2	Slave1 Outdoor Unit Fan CT Sensor Error	Slave1 Outdoor Unit Fan CT Sensor open or short
			3	Slave2 Outdoor Unit Fan CT Sensor Error	Slave2 Outdoor Unit Fan CT Sensor open or short

Display				Title	Cause of Error
Outdoor unit related error	7	6	1	Master Outdoor Unit Fan DC Link High Voltage Error	Master Outdoor Unit Fan DC Link High Voltage Error
			2	Slave1 Outdoor Unit Fan DC Link High Voltage Error	Slave1 Outdoor Unit Fan DC Link High Voltage Error
			3	Slave2 Outdoor Unit Fan DC Link High Voltage Error	Slave2 Outdoor Unit Fan DC Link High Voltage Error
	7	7	1	Master Outdoor Unit Fan Over Current Error	Master Outdoor Unit Fan Current is over 10A
			2	Slave1 Outdoor Unit Fan Over Current Error	Slave1 Outdoor Unit Fan is over 10A
			3	Slave2 Outdoor Unit Fan Over Current Error	Slave2 Outdoor Unit Fan is over 10A
	7	9	1	Master Outdoor Unit Fan Start Failure Error	Master Outdoor Unit Fan First Position Sensing Failure
			2	Slave1 Outdoor Unit Fan Start Failure Error	Slave1 Outdoor Unit Fan First Position Sensing Failure
			3	Slave2 Outdoor Unit Fan Start Failure Error	Slave2 Outdoor Unit Fan First Position Sensing Failure
	8	6	1	Master Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Master Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
			2	Slave1 Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Slave1 Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
			3	Slave2 Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Slave2 Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
	8	7	1	Master Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Master Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM
			2	Slave1 Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Slave1 Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM
			3	Slave2 Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Slave2 Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM

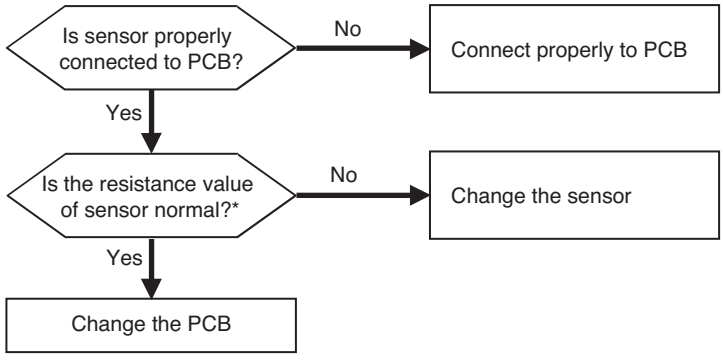
Display					Title	Cause of Error
Outdoor unit related error	1	0	4	1	Communication Error Between Master Outdoor Unit and Other Outdoor Unit	Failing to receive Slave Unit signal at main PCB of Master Outdoor Unit
				2	Communication Error Between Slave1 Outdoor Unit and Other Outdoor Unit	Failing to receive master and other Slave Unit signal at main PCB of Slave1 Outdoor Unit
				3	Communication Error Between Slave2 Outdoor Unit and Other Outdoor Unit	Failing to receive master and other Slave Unit signal at main PCB of Slave2 Outdoor Unit
	1	0	5	1	Master Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of master unit.
				2	Slave1 Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of Slave1 unit.
				3	Slave2 Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of Slave2 unit.
	1	0	6	1	Master Outdoor Unit FAN IPM Fault Error	Instant Over Current at Master Outdoor Unit Fan IPM
				2	Slave1 Outdoor Unit FAN IPM Fault Error	Instant Over Current at Slave1 Outdoor Unit Fan IPM
				3	Slave2 Outdoor Unit FAN IPM Fault Error	Instant Over Current at Slave2 Outdoor Unit Fan IPM
	1	0	7	1	Master Outdoor Unit Fan DC Link Low Voltage Error	Master Outdoor Unit Fan DC Link Input Voltage is under 140V
				2	Slave1 Outdoor Unit Fan DC Link Low Voltage Error	Slave1 Outdoor Unit Fan DC Link Input Voltage is under 140V
				3	Slave2 Outdoor Unit Fan DC Link Low Voltage Error	Slave2 Outdoor Unit Fan DC Link Input Voltage is under 140V
	1	1	3	1	Master Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of Master Outdoor Unit is open or short
				2	Slave1 Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of slave1 Outdoor Unit is open or short
				3	Slave2 Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of slave2 Outdoor Unit is open or short

Display					Title	Cause of Error
Outdoor unit related error	1	1	5	1	Master Outdoor Unit Subcooling Outlet Temperature Sensor Error	Master Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				2	Slave1 Outdoor Unit Subcooling Outlet Temperature Sensor Error	Slave1 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
				3	Slave2 Outdoor Unit Subcooling Outlet Temperature Sensor Error	Slave2 Outdoor Unit Subcooling Outlet Temperature Sensor open or short
	1	5	1	1	Failure of operation mode conversion at Master Outdoor Unit	Pressure unbalance between Outdoor Units
				2	Failure of operation mode conversion at Slave1 Outdoor Unit	Pressure unbalance between Outdoor Units
				3	Failure of operation mode conversion at Slave2 Outdoor Unit	Pressure unbalance between Outdoor Units
	1	7	3	1	Master outdoor unit constant speed Compressor Fault	Master Outdoor Unit rated speed 1 condenser burned/ Locked or fault by over-current
				2	Slave1 outdoor unit constant speed Compressor Fault	Slave1 Outdoor Unit rated speed 1 condenser burned/ Locked or fault by over-current
				3	Slave2 outdoor unit constant speed Compressor Fault	Slave2 Outdoor Unit rated speed 1 condenser burned/ Locked or fault by over-current
	1	7	4	1	Master outdoor unit rated speed 2 condenser over-current	Master Outdoor Unit rated speed 2 condenser burned / locked or fault by over-current
				2	Slave1 outdoor unit rated speed 2 condenser over-current	Slave1 Outdoor Unit rated speed 2 condenser burned / locked or fault by over-current
				3	Slave2 outdoor unit rated speed 2 condenser over-current	Slave2 Outdoor Unit rated speed 2 condenser burned / locked or fault by over-current

	Display				Title	Cause of Error
Outdoor unit related error	**1**	**8**	**2**	**1**	Master outdoor unit Main Board Main-Sub Micom communication error	Master Outdoor Unit Main Board Main-Sub Micom communication failed
				2	Slave1 outdoor unit Main Board Main-Sub Micom communication error	Slave1 Outdoor Unit Main Board Main-Sub Micom communication failed
				3	Slave2 outdoor unit Main Board Main-Sub Micom communication error	Slave2 Outdoor Unit Main Board Main-Sub Micom communication failed
	1	**9**	**3**	**1**	Excessive increase of Master Outdoor Unit Fan PCB Heat Sink Temperature	Master Outdoor Unit Fan Inverter PCB Temperature is Over 95°C
				2	Excessive increase of Slave1 Outdoor Unit Fan PCB Heat Sink Temperature	Slave1 Outdoor Unit Fan Inverter PCB Temperature is Over 95°C
				3	Excessive increase of Slave2 Outdoor Unit Fan PCB Heat Sink Temperature	Slave2 Outdoor Unit Fan Inverter PCB Temperature is Over 95°C
	1	**9**	**4**	**1**	Master Outdoor Unit Fan PCB Heat Sink Temperature Sensor Error	Master Outdoor Unit Fan PCB Heat Sink Temperature Sensor open or short
				2	Slave1 Outdoor Unit Fan PCB Heat Sink Temperature Sensor Error	Slave1 Outdoor Unit Fan PCB Heat Sink Temperature Sensor open or short
				3	Slave2 Outdoor Unit Fan PCB Heat Sink Temperature Sensor Error	Slave2 Outdoor Unit Fan PCB Heat Sink Temperature Sensor open or short

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 100kΩ (open) or less than 100Ω (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) = 20.7kΩ : 25°C(76°F)= 10kΩ : 50°C(122°F)= 3.4kΩ
Pipe temp sensor: 10°C(50°F) = 10kΩ : 25°C(76°F)= 5kΩ : 50°C(122°F)= 1.8kΩ

CN-ROOM : Indoor air temp sensor

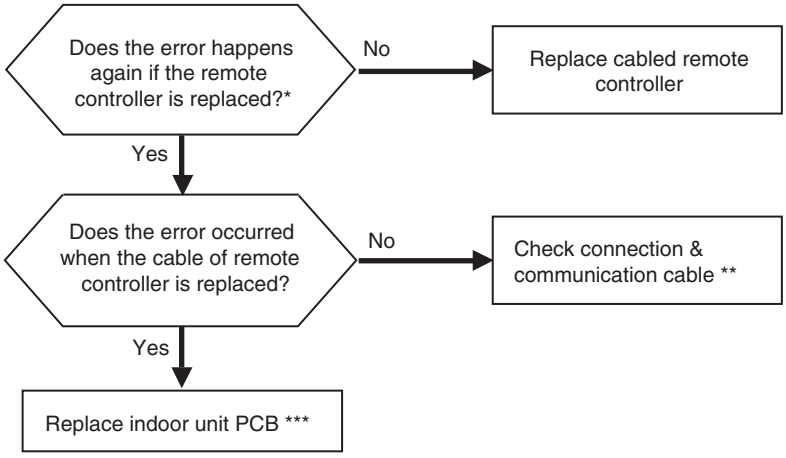
CN-PIPE2 : Pipe outlet temp sensor

CN-PIPE1 : Pipe inlet temp sensor

Measure the resistance of outlet pipe temp sensor.

Error No.	Error Type	Error Point	Main Reasons
03	No communication between wired 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



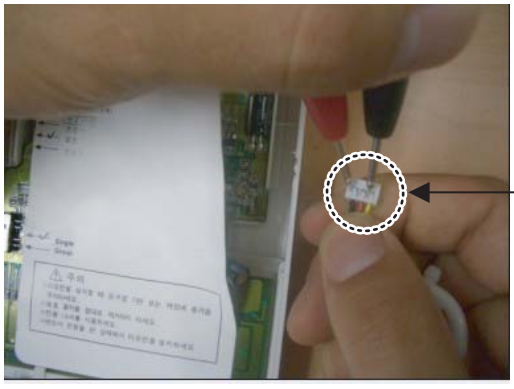
* If there is no remote controller to replace : Use another unit's remote controller doing well

** 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

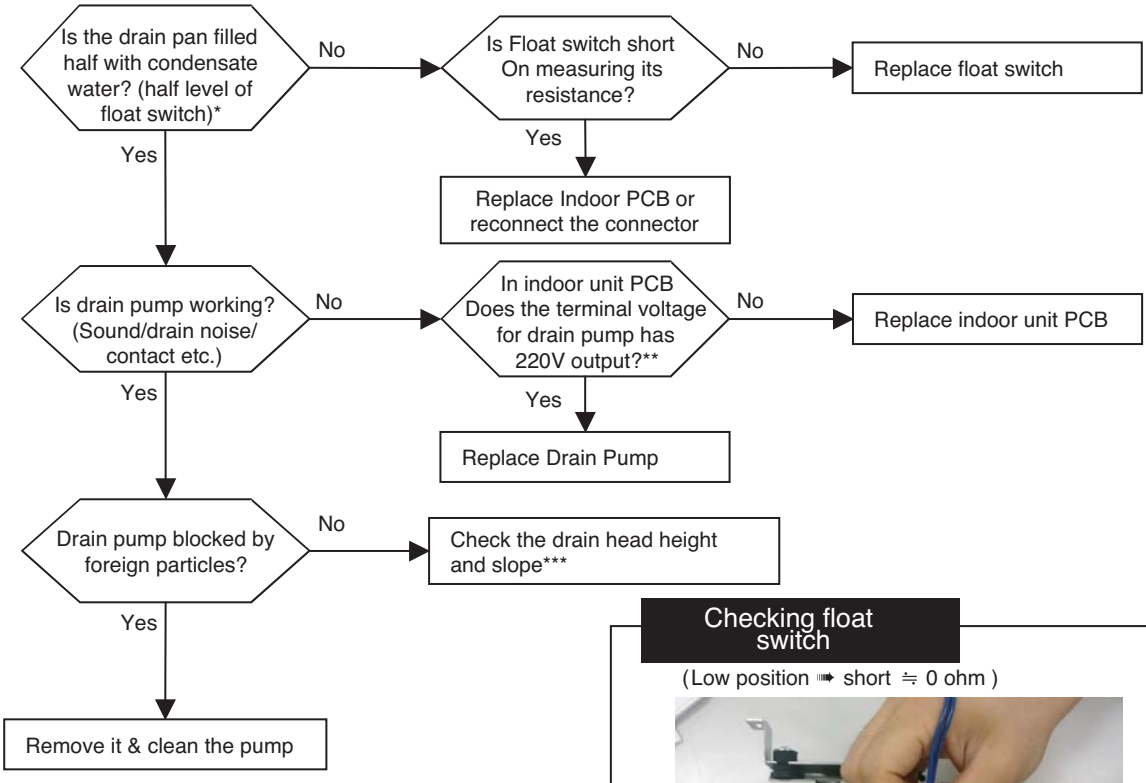
※ The PCB can differ from model to model.
Check from the right source.



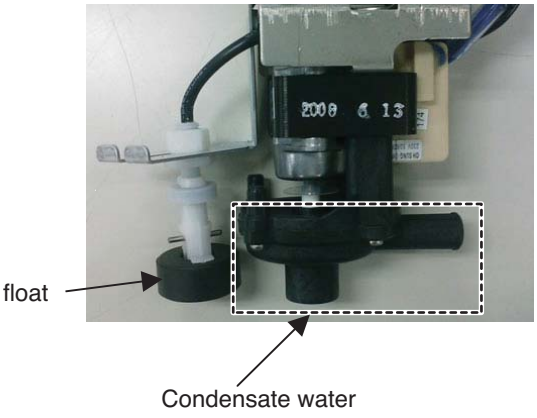
Checking communication cable connection status

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

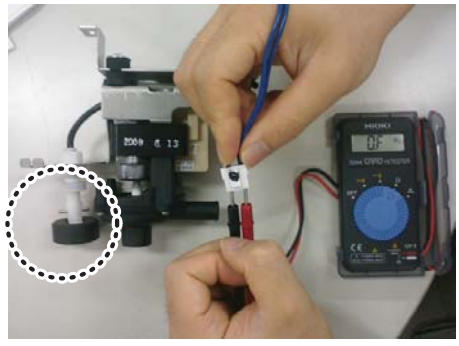


* If the float goes up higher than a half of float switch then the circuit is open & the unit is stopped automatically.

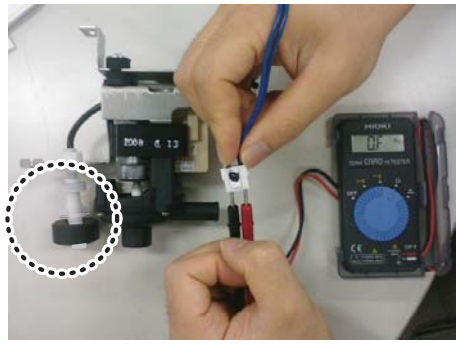


Checking float switch

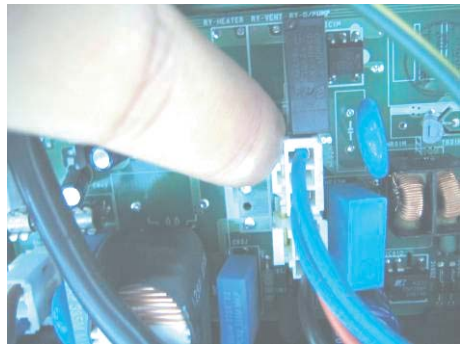
(Low position ➠ short ≒ 0 ohm)



(High position ➠ Open)



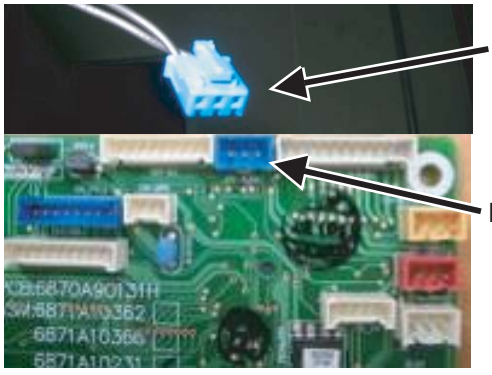
A:Point to check rotating



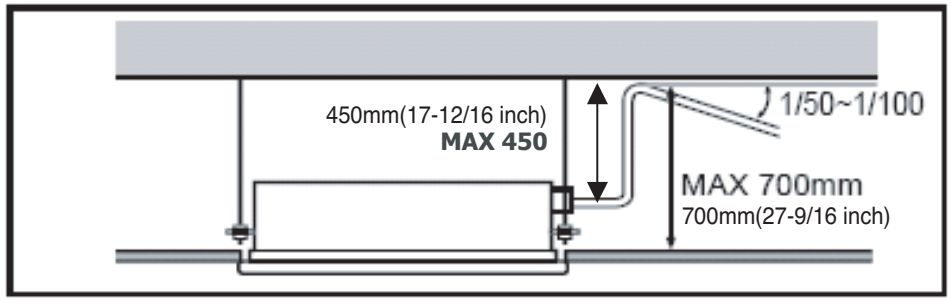
*** Indoor PCB drain pump connector

(Check input of 220V)

(Marked as **CN-DPUMP)**

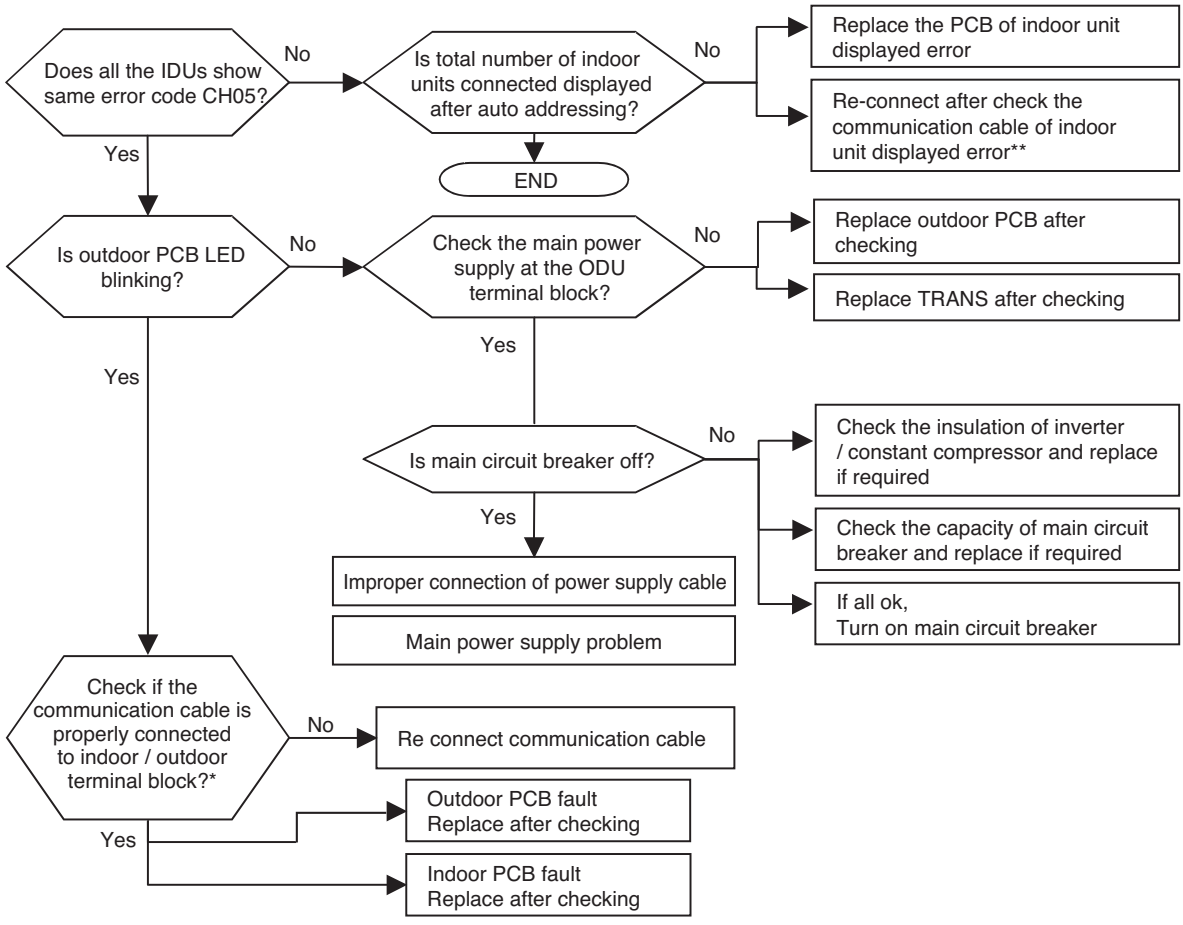


[***] Standard of drain pipe head height / slope



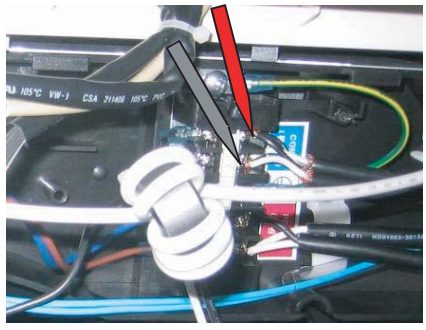
Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Outdoor unit communication error	No signal communication between indoor & outdoor units.	1. Auto addressing is not done 2. Communication cable is not connected 3. Short circuit of communication cable 4. Indoor unit communication circuit fault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

■ 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



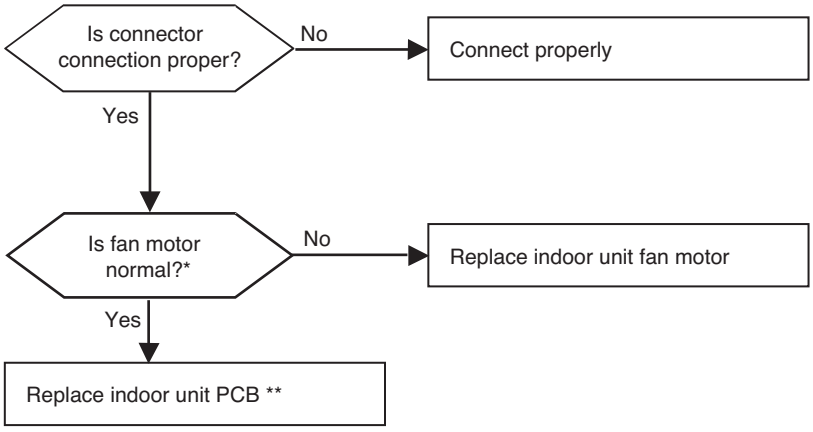
Error No.	Error Type	Error Point	Main Reasons
09	Indoor unit EEPROM error		1. Error developed in communication between the micro- processor and the EEPROM on the surface of the PCB. 2. ERROR due to the EEPROM damage

■ Error diagnosis and countermeasure flow chart

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

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

■ Error diagnosis and countermeasure flow chart

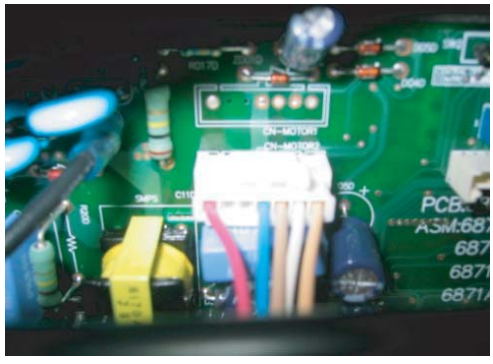


* It is normal when check hall sensor of indoor fan motor as shown below

Each termainl with the tester

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

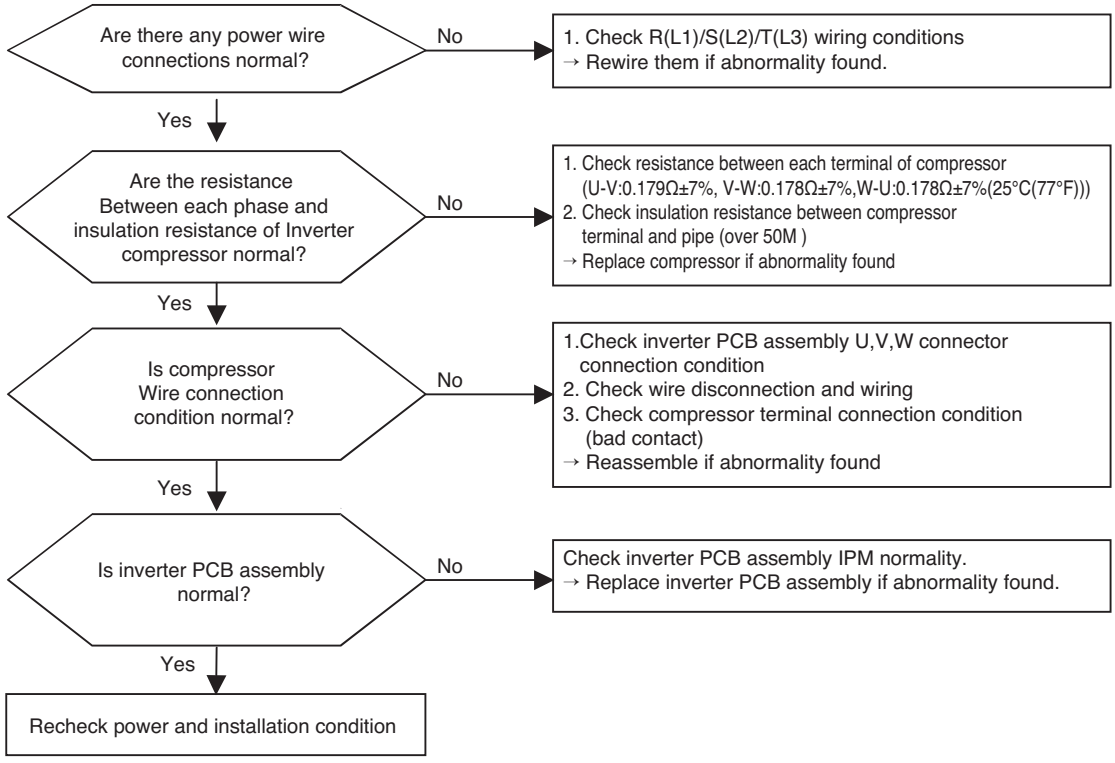
<Checking connection state of fan motor connector>



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

Error No.	Error Type	Error Point	Main Reasons
21* Master 211 Slave1 212 Slave2 213	Inverter PCB Assy IPM 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 fan damaged/Heat sink fan connector disconnected/Heat sink disassembled) 4.Inverter compressor terminal disconnected or loose 5.Inverter PCB assembly damaged 6.ODU input current low

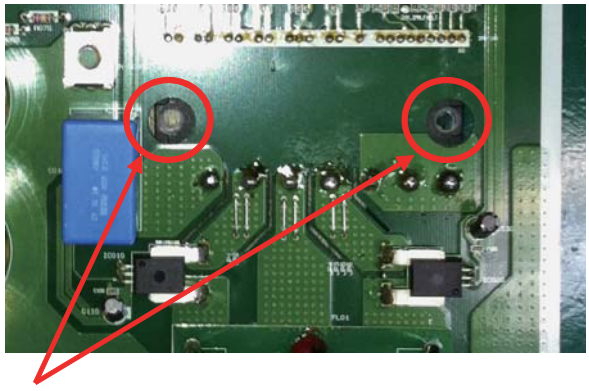
■ Error diagnosis and countermeasure flow chart



* Measuring resistance between each terminal of compressor

* Compressor wire connector connection point

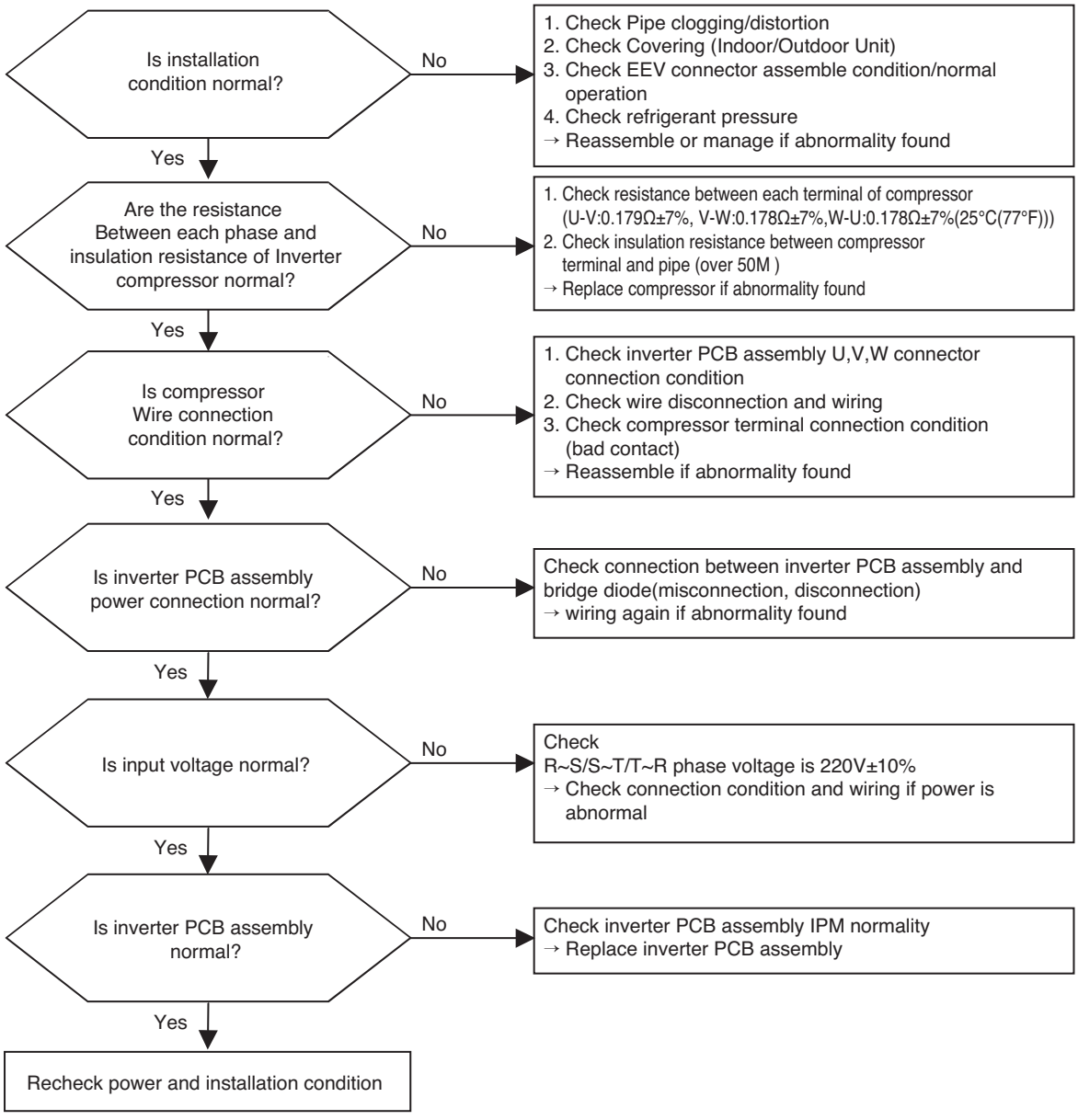
* IPM joining point



Check joining condition

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(40A)	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

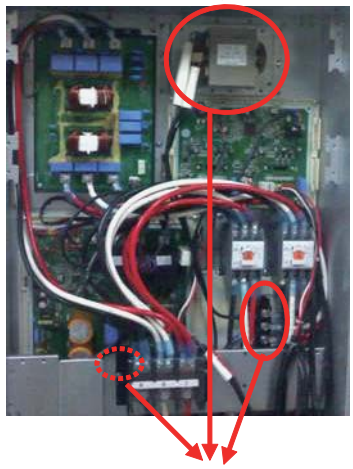


* Measuring resistance between each terminal of compressor

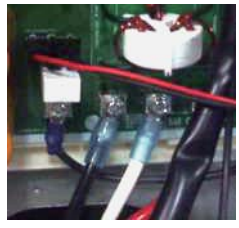
* Compressor wire connector connection

* Measuring input voltage

* Inverter PCB & Bridge Diode wiring

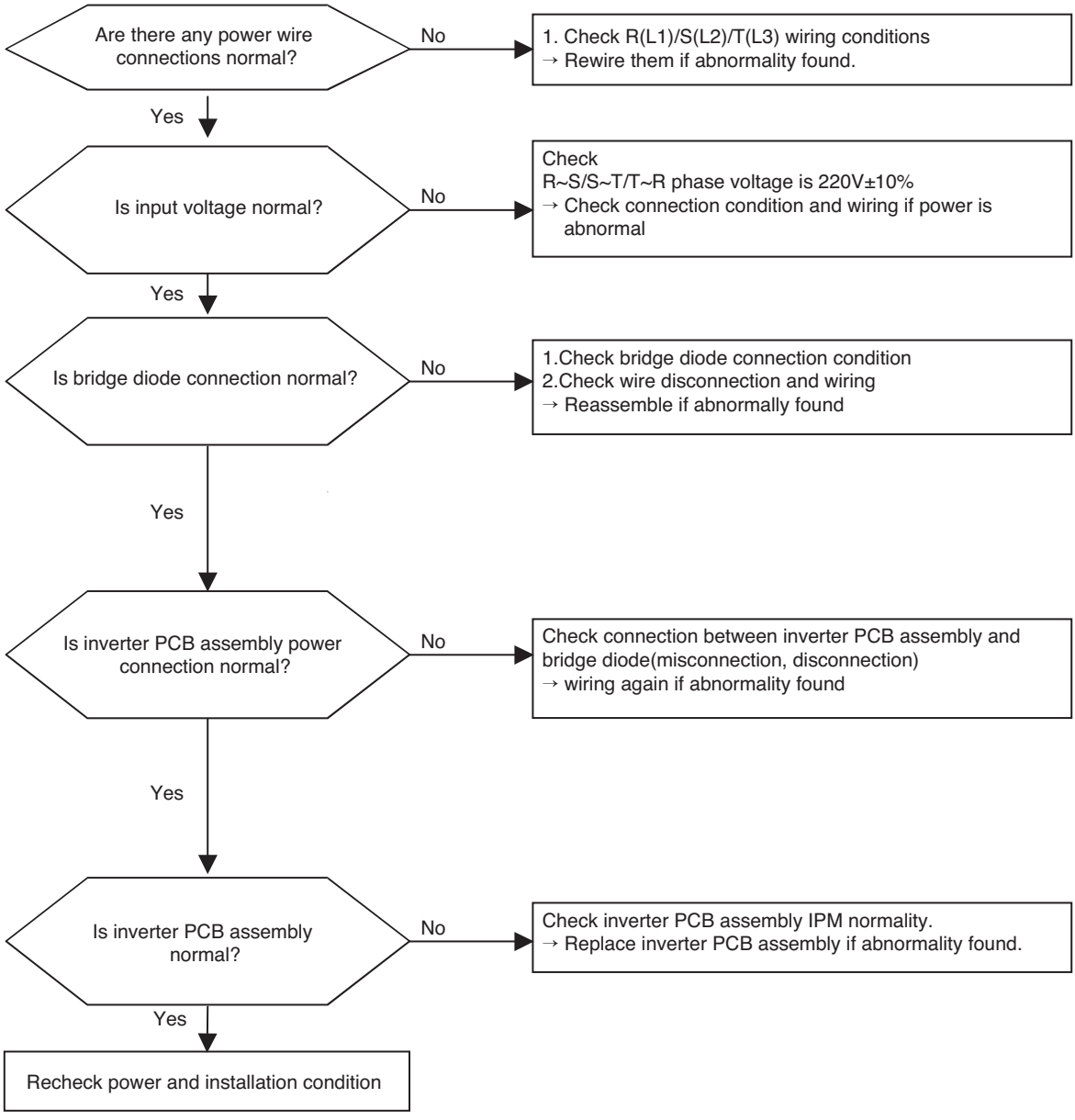


Check joining condition



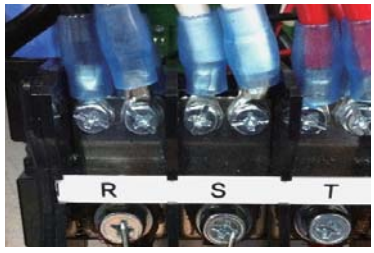
Error No.	Error Type	Error Point	Main Reasons
23* Master 231 Slave1 232 Slave2 233	Inverter Compressor DC Link Low Voltage	DC Voltage isn't charged after starting relay on	1. DC Link terminal misconnection/terminal contact fault 2. Starting relay damage 3. Condenser damage 4. Inverter PCB assembly damage (DC Link voltage sensing part) 5. Input voltage low

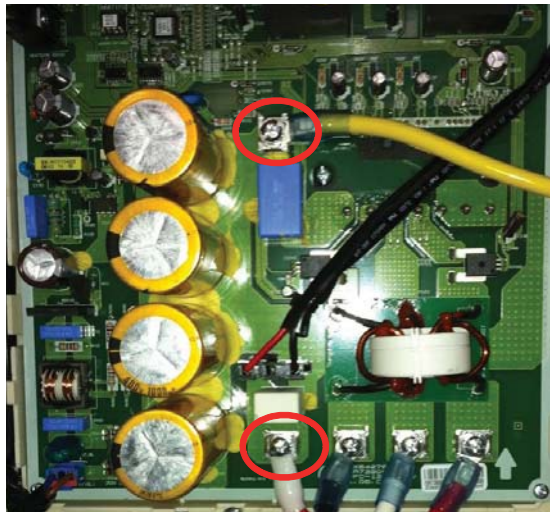
■ Error Diagnosis and Countermeasure Flow Chart



* Inverter PCB & Bridge Diode wiring

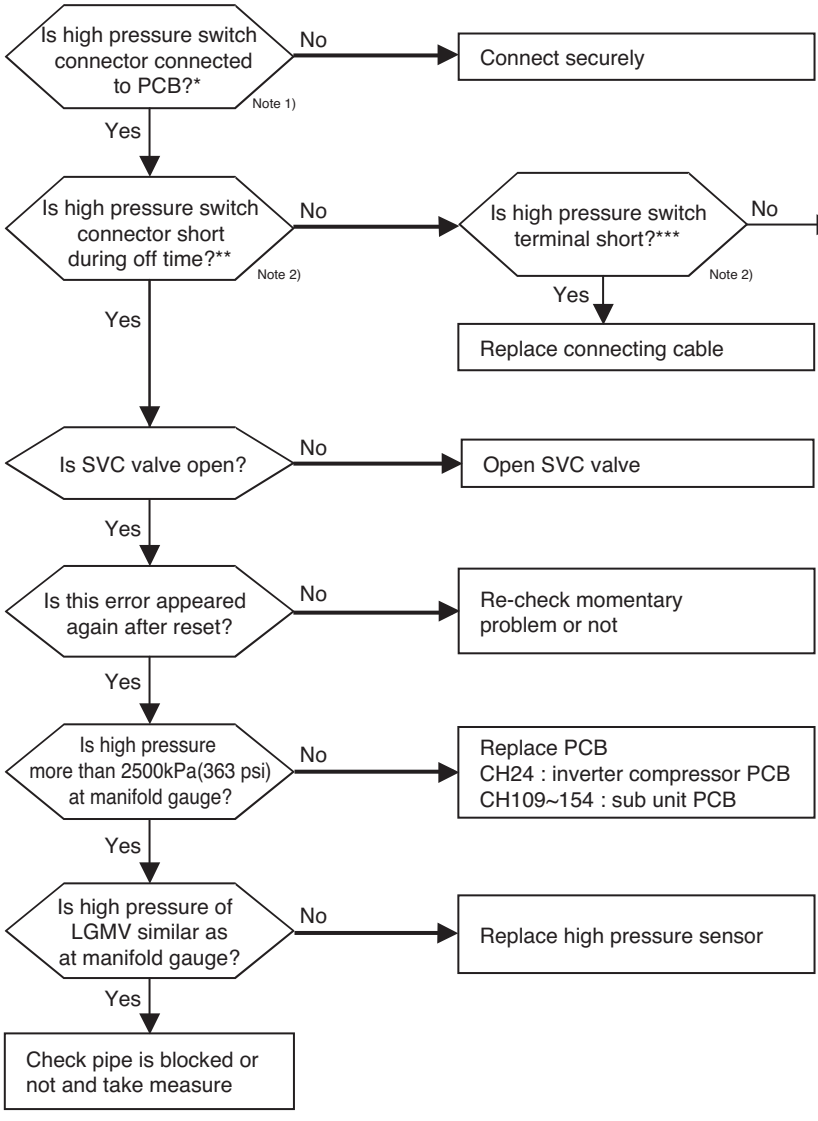
* Measuring input voltage



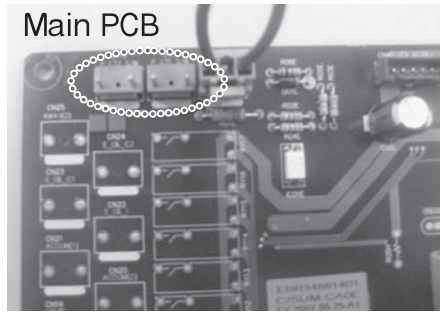


Error No.	Error Type	Error Point	Main Reasons
24* Master 241 Slave1 242 Slave2 243	Excessive rise of discharge pressure in outdoor compressor	Compressor off due to the high pressure switch in outdoor unit	1. Defective high pressure switch 2. Defective fan of indoor unit or outdoor unit 3. Check valve of compressor clogged 4. Pipe distortion due to the pipe damage 5. Refrigerant overcharge 6. Defective LEV at the indoor or outdoor unit . 7. Covering or clogging(Outdoor covering during the cooling mode /Indoor unit filter clogging during the heating mode) 8. SVC valve clogging 9. Defective outdoor PCB

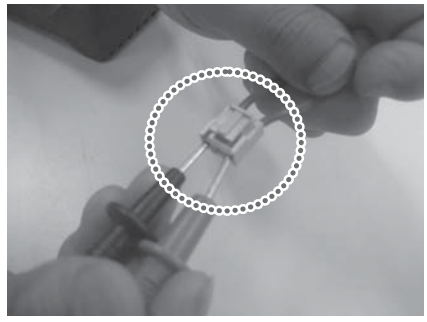
■ Error diagnosis and countermeasure flow chart



Note 1) High pressure switch connector on Main PCB

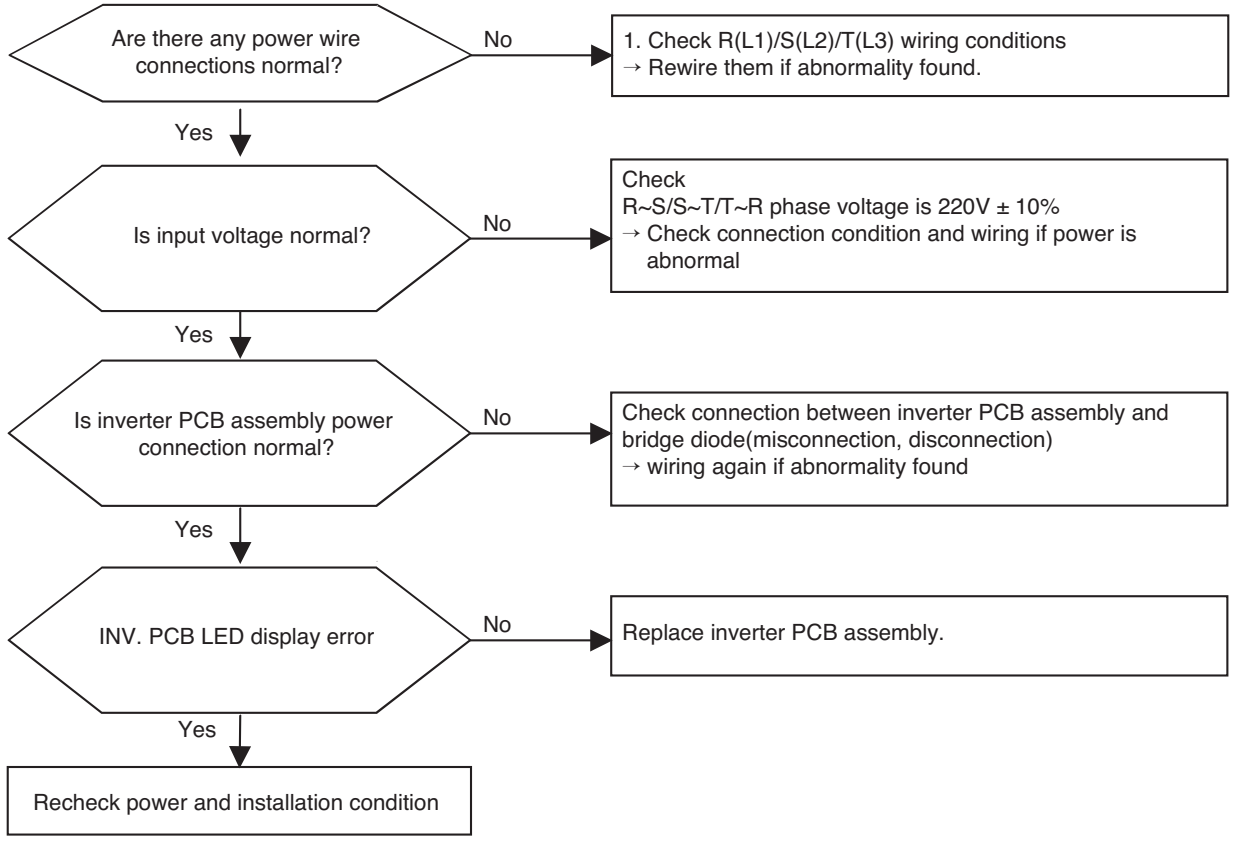


Note 2) Check short with high pressure switch connector



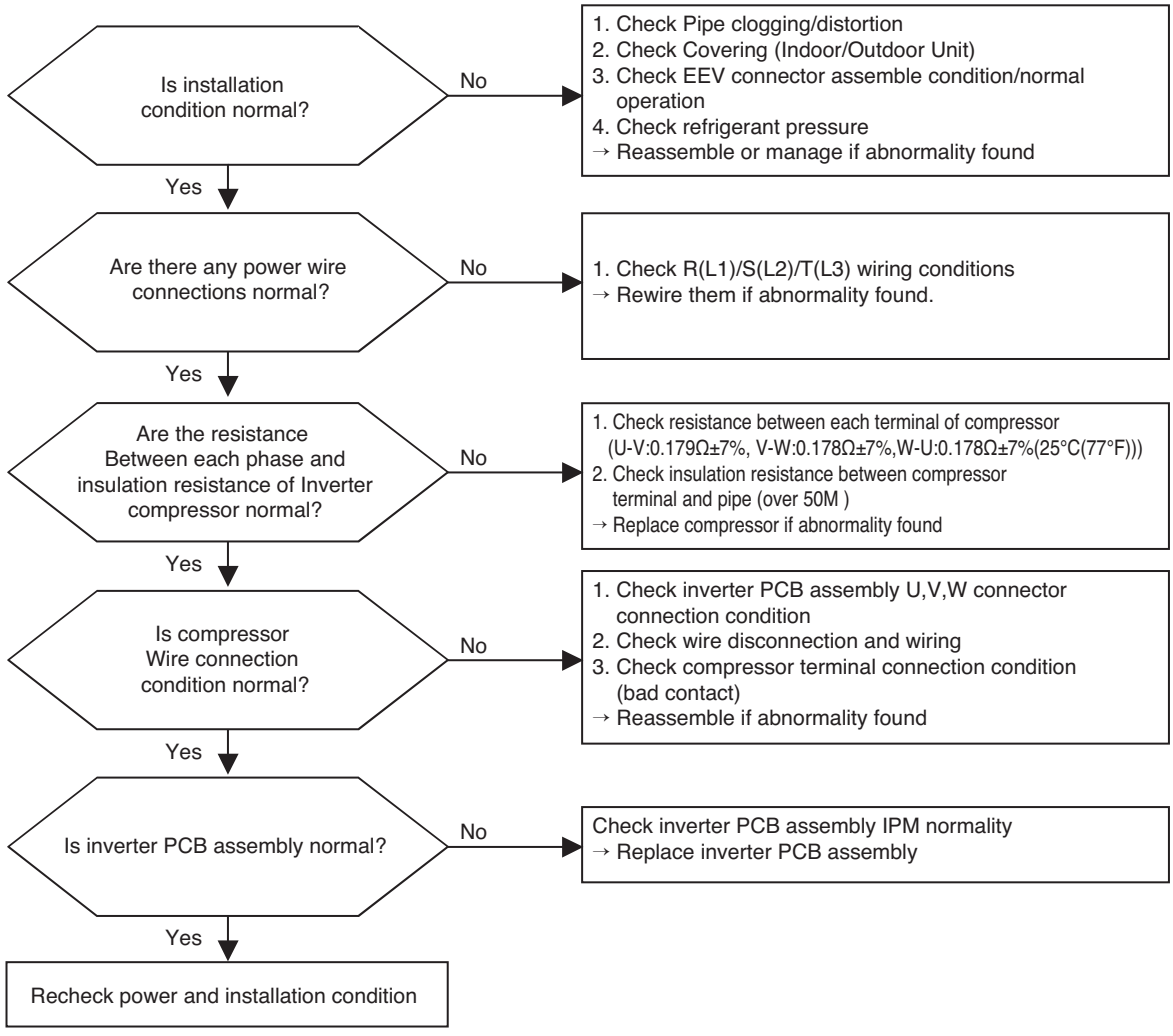
Error No.	Error Type	Error Point	Main Reasons
25* Master 251 Slave1 252 Slave2 253	Input Voltage high/low	Input voltage is over limited value of the product (140V or less, 300V or more)	1. Input voltage abnormal (T-S) 2. Outdoor unit inverter PCB assembly damage (input voltage sensing part)

■ 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 inverter PCB damage (CT)

■ Error Diagnosis and Countermeasure Flow Chart

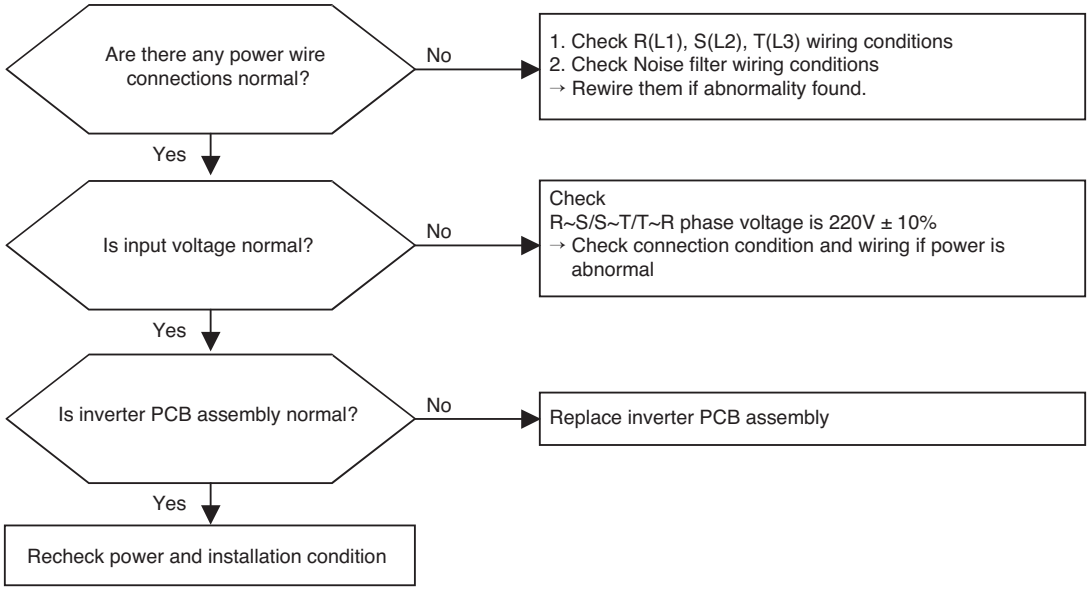


* Measuring resistance between each terminal of compressor

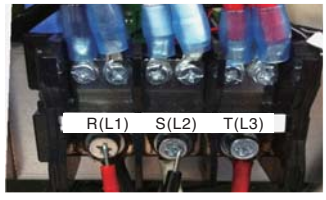
* Compressor wire connection

Error No.	Error Type	Error Point	Main Reasons
28* Master 281 Slave1 282 Slave2 283	Inverter DC link high voltage error	Inv PCB DC link voltage supplied over 420V	1. Input voltage abnormal R(L1), S(L2), T(L3) 2. ODU inverter PCB damage (DC Link voltage sensing part)

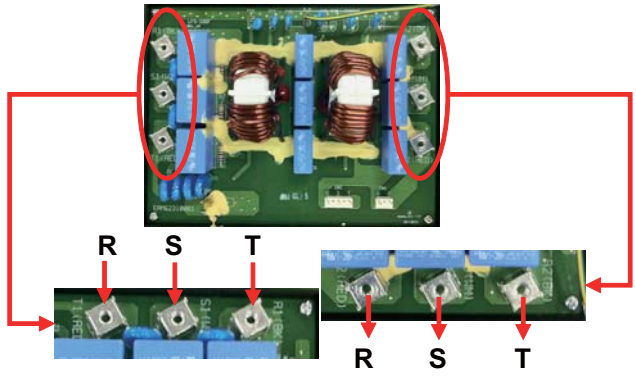
■ Error Diagnosis and Countermeasure Flow Chart



* Measuring input voltage



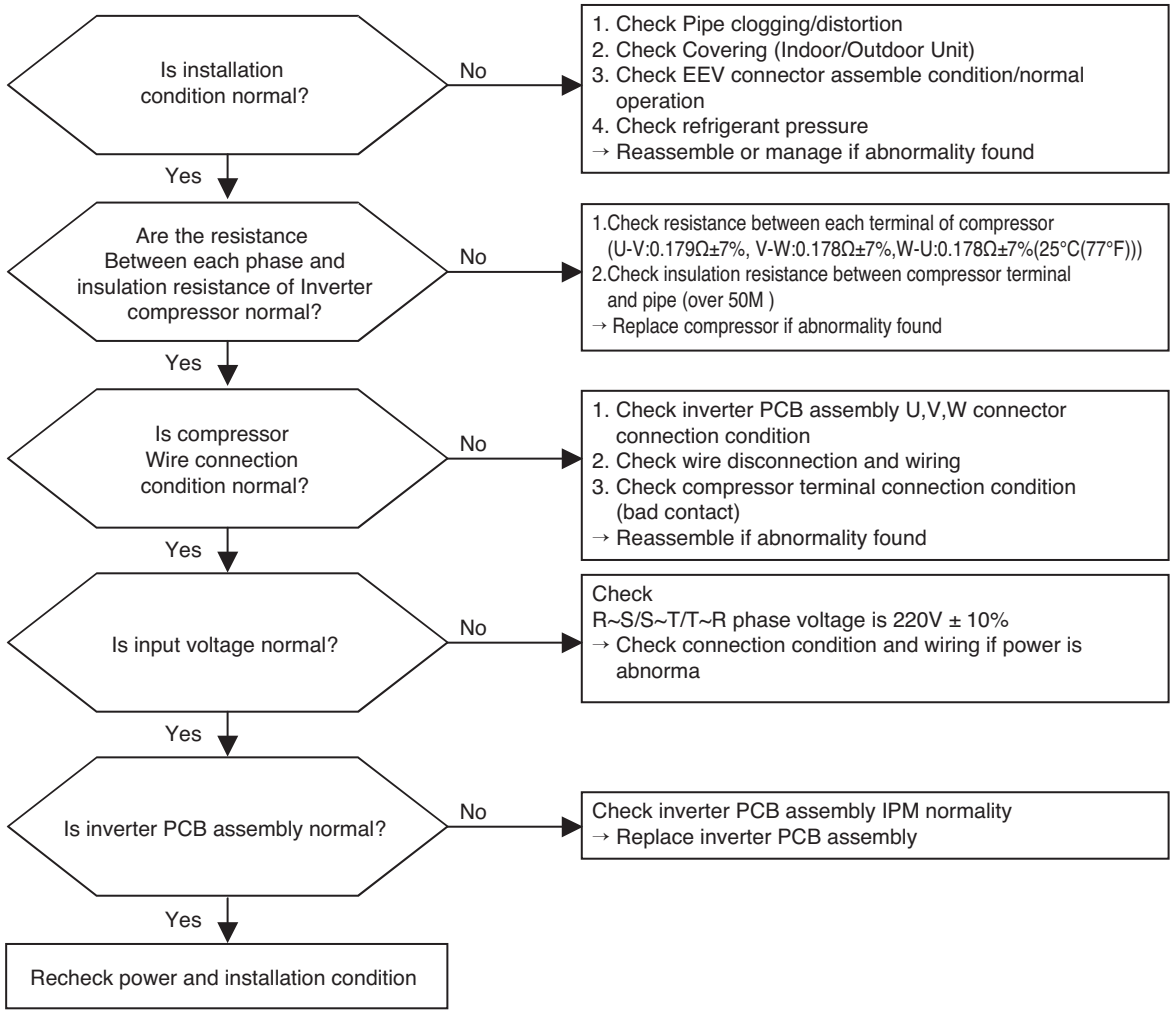
* Noise filter wiring



Noise filter input (upper part) Noise filter output (lower part)

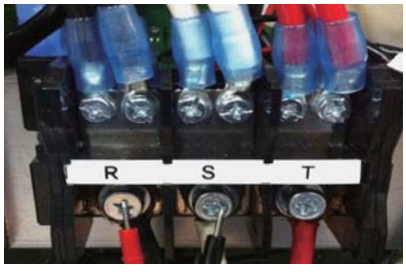
Error No.	Error Type	Error Point	Main Reasons
29* Master 291 Slave1 292 Slave2 293	Inverter compressor over current	Inverter compressor input current is over 40A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU inverter PCB assembly damage

■ Error Diagnosis and Countermeasure Flow Chart

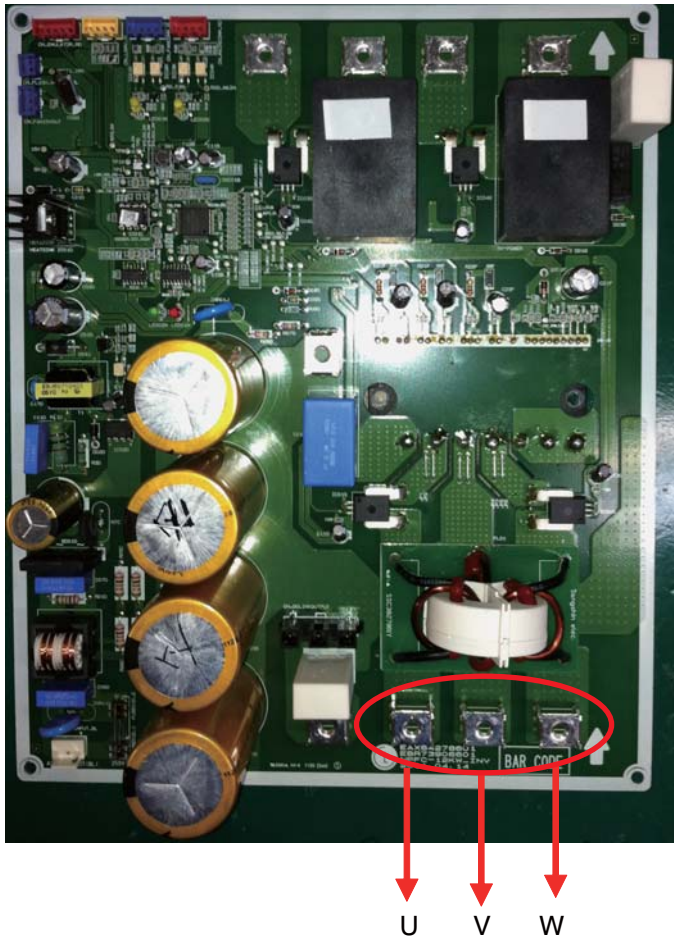


*** Measuring resistance between each terminal of compressor**

*** Measuring input voltage**

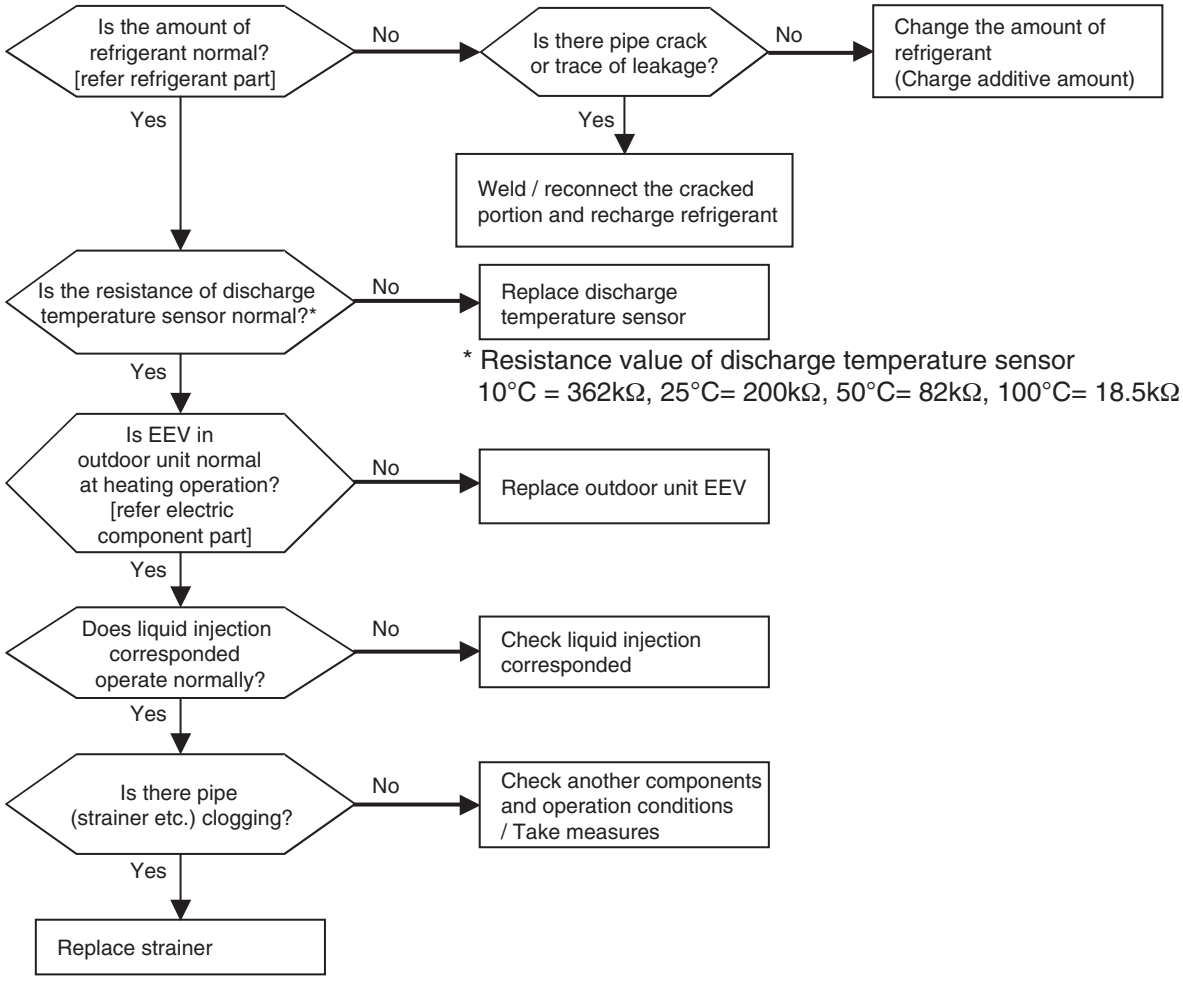


*** Compressor wire connection**



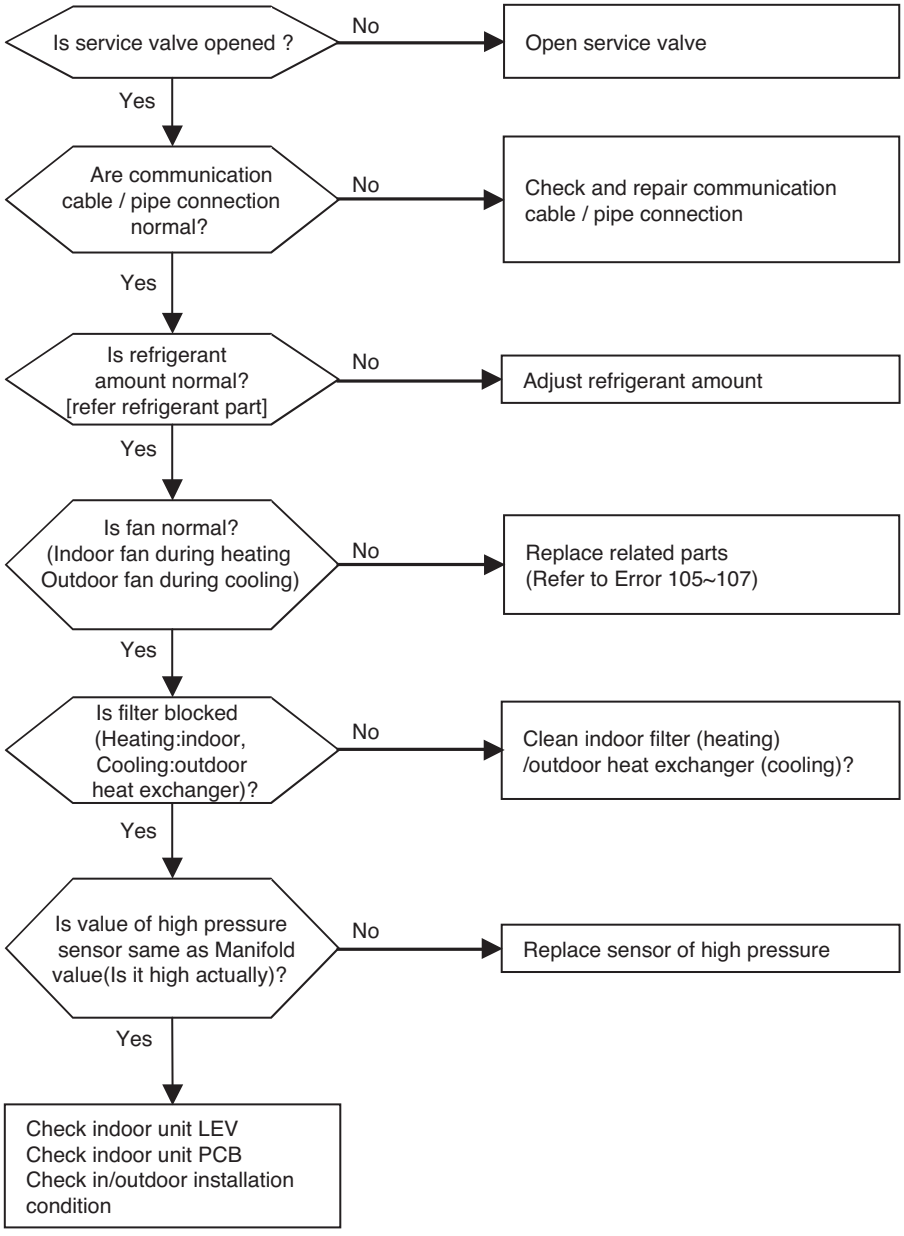
Error No.	Error Type	Error Point	Main Reasons
30* Master 301 Slave1 302 Slave2 303	Master Outdoor Unit Constant Speed Compressor 2 Discharge Temperature Sensor	System is turned off by Master Outdoor Unit Constant Speed Compressor 2 Discharge Temperature Sensor	1.Constant Speed Compressor 2 Discharge Temperature Sensor Fault 2. Refrigerant Short/Leakage 3. EEV Fault
32* Master 321 Slave1 322 Slave2 323	Over-increase discharge temperature of inverter compressor at main outdoor unit	Compressor is off because of over-increase discharge temperature of inverter compressor	1. Temperature sensor defect of inverter compressor discharge pipe 2. Refrigerant shortage / leak 3. EEV defect 4. Liquid injection valve defect
33* Master 331 Slave1 332 Slave2 333	Over-increase discharge temperature of constant compressor 1 at main constant outdoor and sub constant outdoor unit	Compressor is off because of over-increase discharge temperature of constant compressor 1 at main and sub outdoor unit	1. Temperature sensor defect of constant compressor 1 discharge pipe? 2. Refrigerant shortage/leak 3. EEV defect 4. Liquid injection valve defect

■ Error diagnosis and countermeasure flow chart



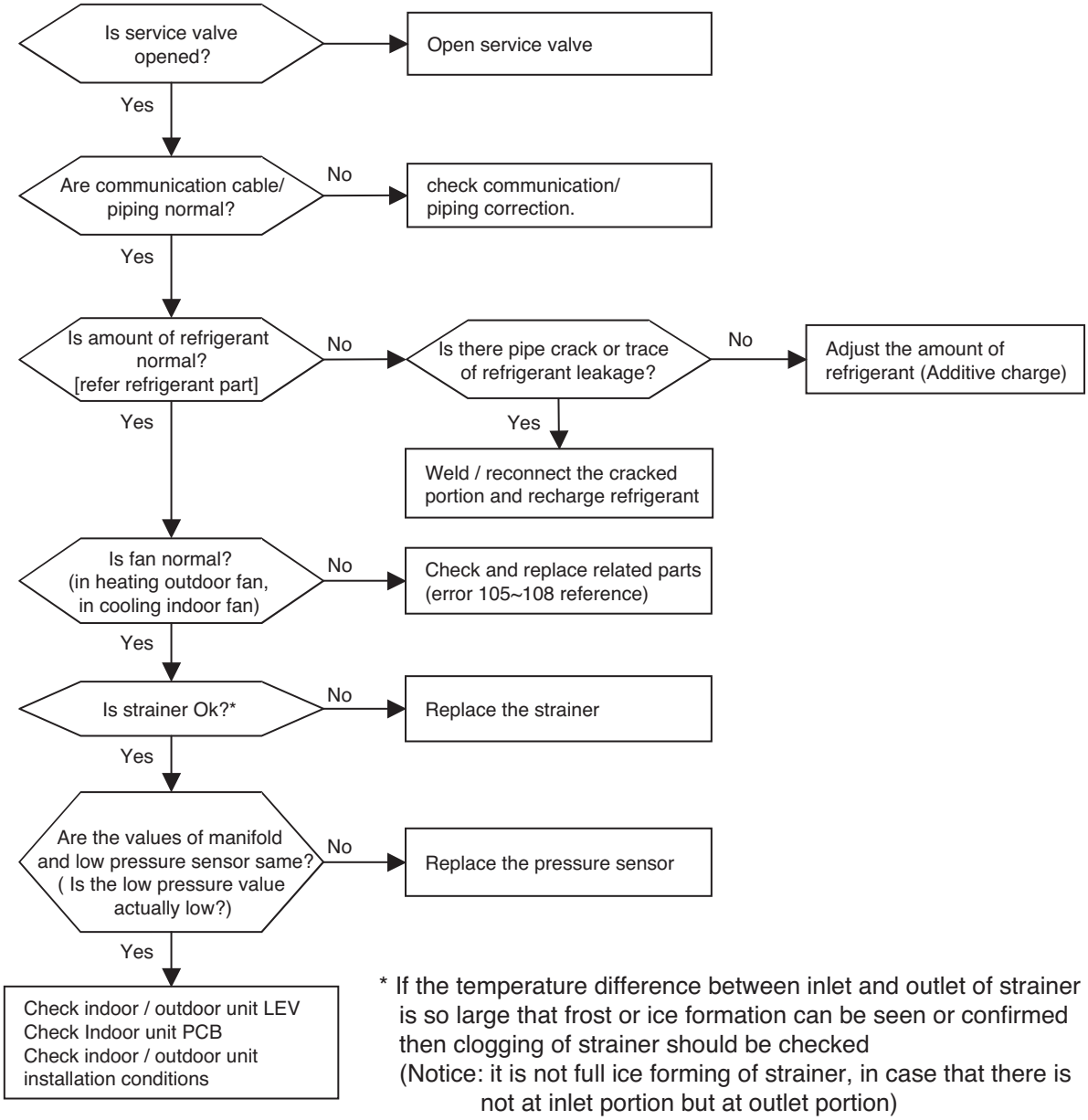
Error No.	Error Type	Error Point	Main Reasons
34* Master 341 Slave1 342 Slave2 343	Over-increase of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to over-increase of high pressure by high pressure sensor	1. Defect of high pressure sensor 2. Defect of 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 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

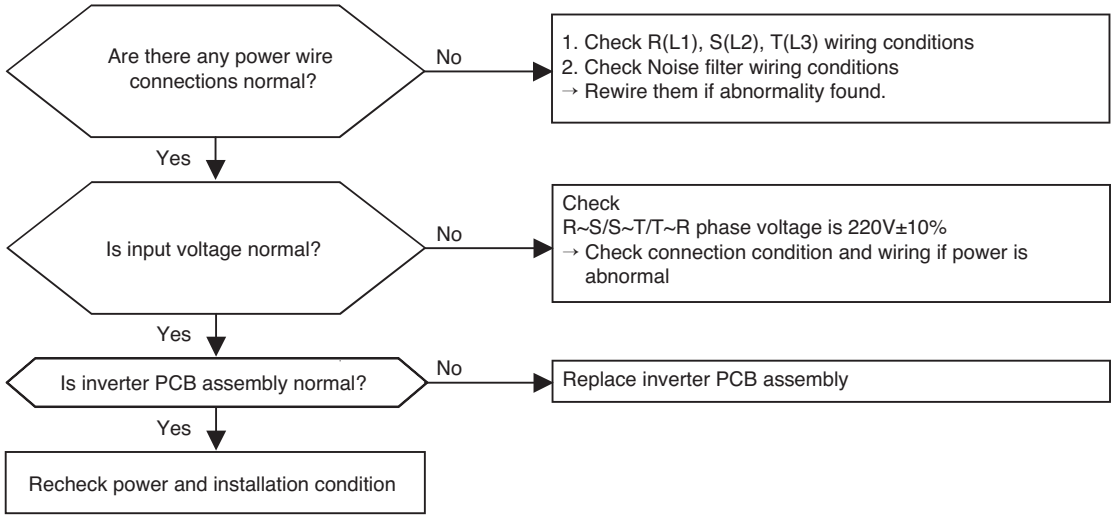
■ Error diagnosis and countermeasure flow chart



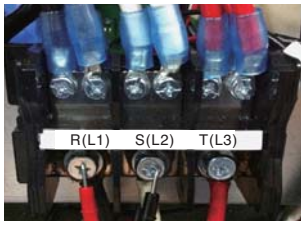
* If the temperature difference between inlet and outlet of strainer is so large that frost or ice formation can be seen or confirmed then clogging of strainer should be checked
(Notice: it is not full ice forming of strainer, in case that there is not at inlet portion but at outlet portion)

Error No.	Error Type	Error Point	Main Reasons
40* Master 401 Slave1 402 Slave2 403 Slave3 404	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 (T-S) 2. ODU inverter PCB damage (CT sensing part)

■ Error Diagnosis and Countermeasure Flow Chart

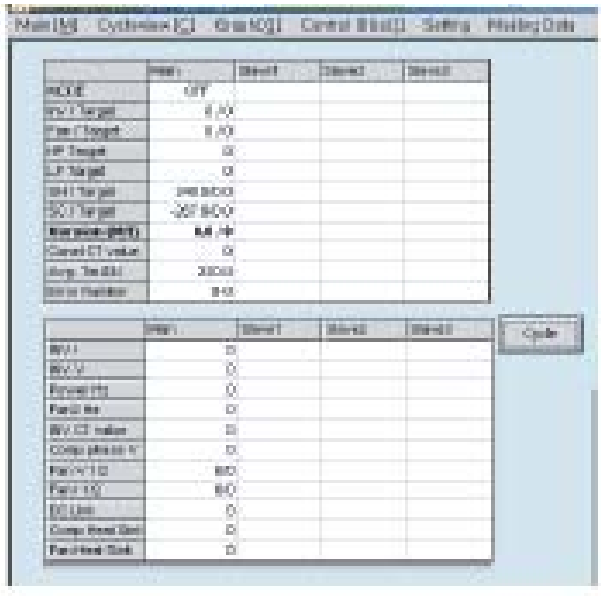


* Measuring input voltage



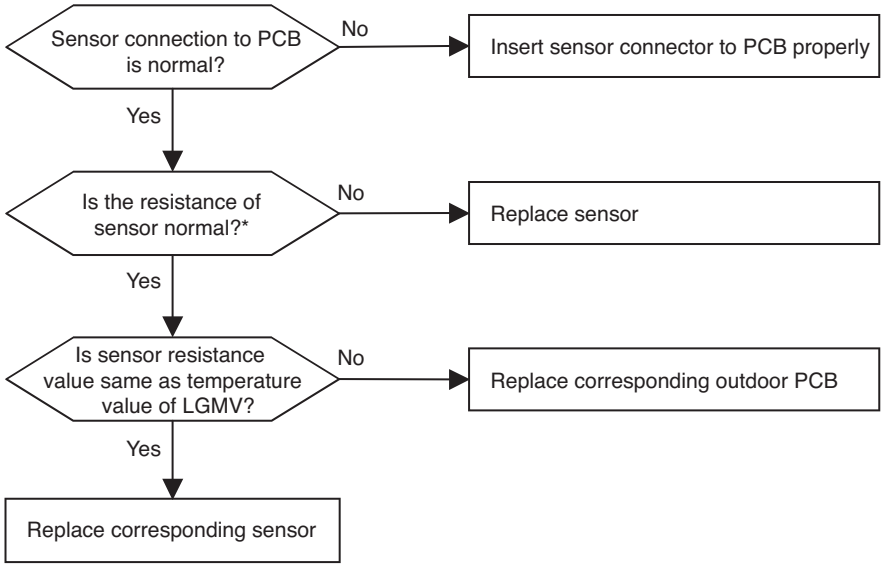
* Inverter PCB assembly

* LGMV Part



Error No.	Error Type	Error Point	Main Reasons
41* (Inverter) Master 411 Slave1 412 Slave2 413 47* (Constant 1) Master 471 Slave1 472 Slave2 473 48* (Constant 2) Master 481 Slave1 482 Slave2 483	vCompressor discharge pipe temperature sensor error	Sensor measurement valve is abnormal (Open/Short)	1. Defective connection of the compressor discharge pipe temperature sensor 2. Defective discharge pipe compressor sensor of the compressor (open/short) 3. Defective outdoor PCB

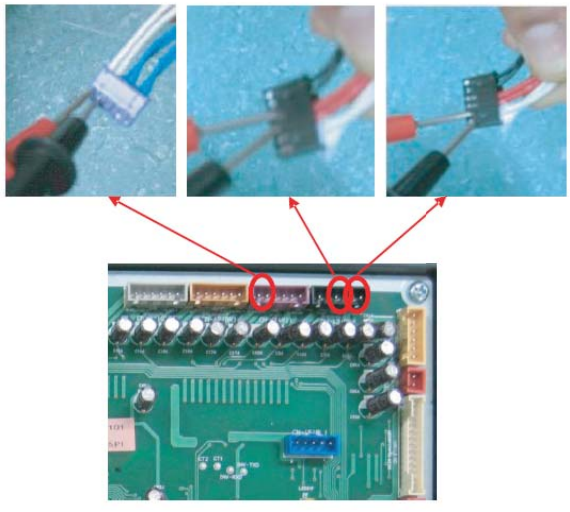
■ Error diagnosis and countermeasure flow chart



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

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

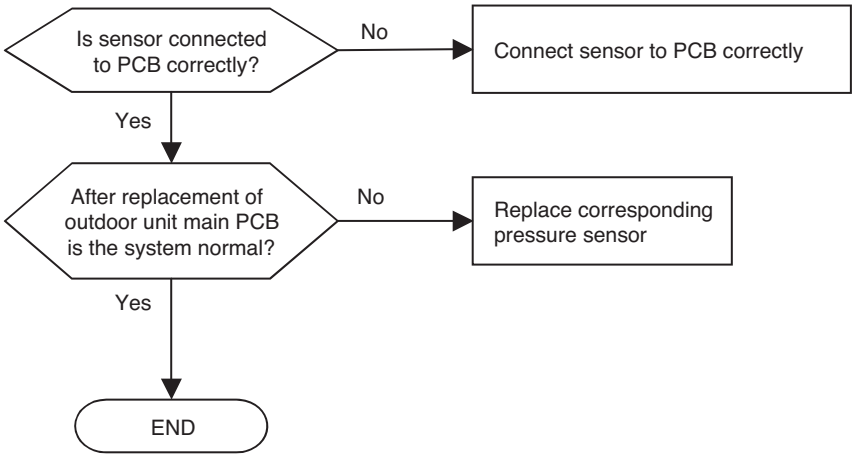
Check the resistance inverter compressor discharge temperature sensor

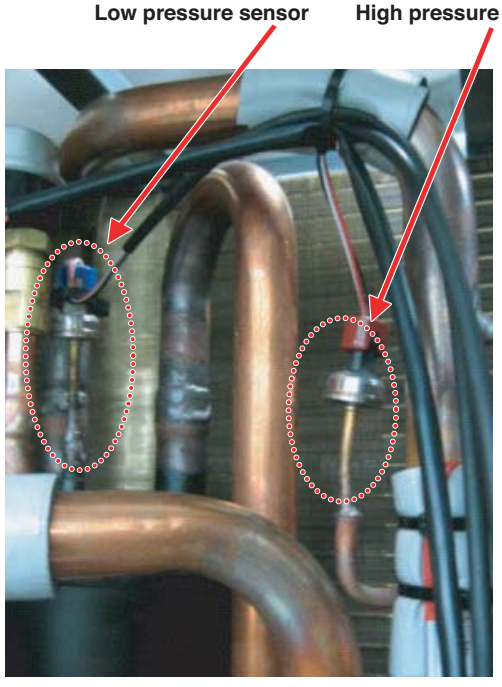


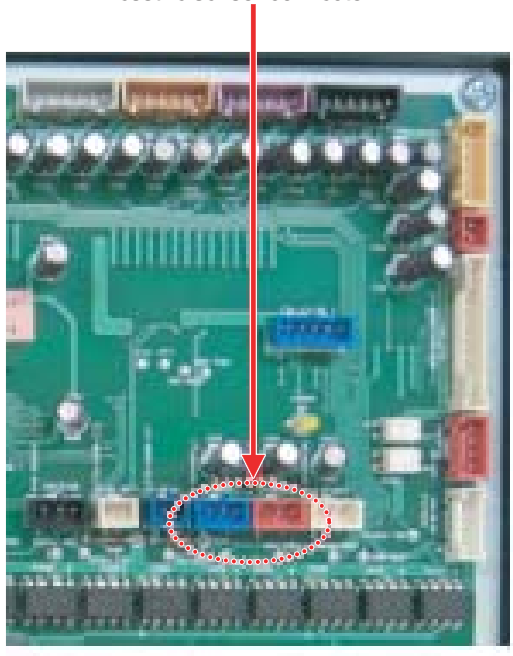
Check the resistance constant speed compressor 2 discharge temperature sensor

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 connector 2. Defect of low pressure 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 connector 2. Defect of high pressure connector (Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart

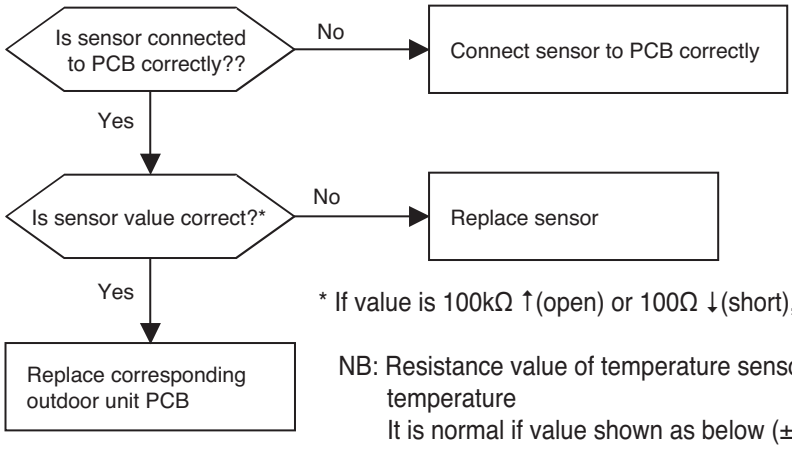






Error No.	Error Type	Error Point	Main Reasons
44* Master 441 Slave1 442 Slave2 443	Sensor error of outdoor air temperature	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
45* Master 451 Slave1 452 Slave2 453	Piping temperature sensor error of heat exchanger in master & slave outdoor unit heat exchanger (A,B)	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 IPM Temperature Sensor Fault	Outdoor Unit IPM 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



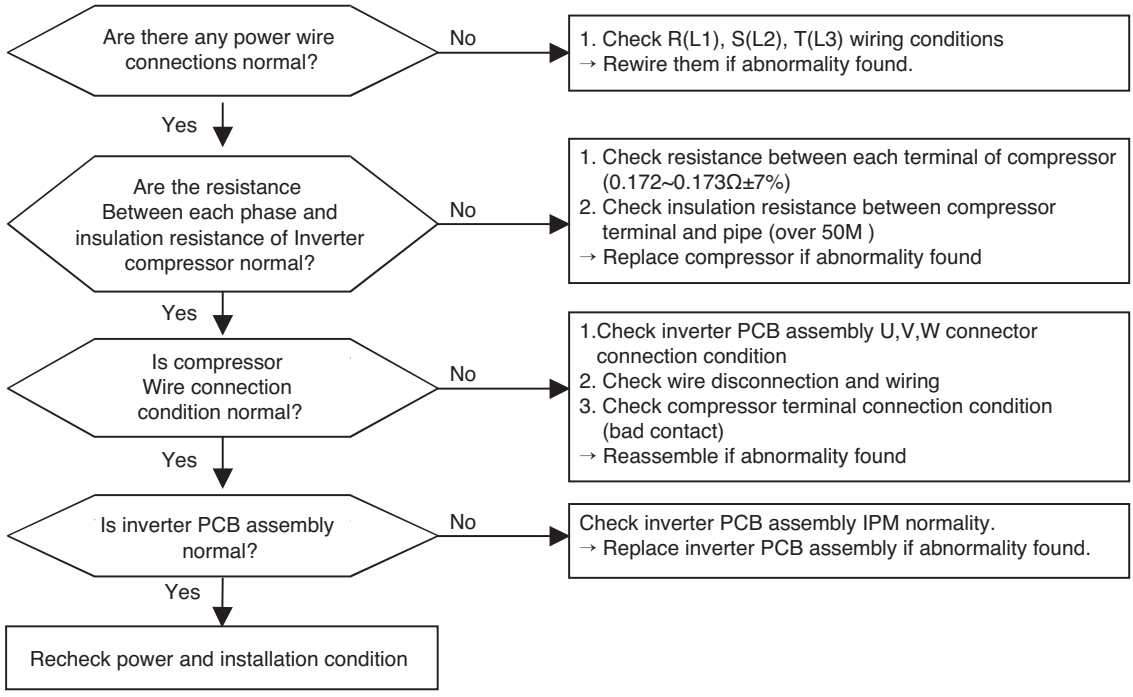
* If value is 100kΩ ↑(open) or 100Ω ↓(short), error occurs

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)= 20.7kΩ : 25°C(77°F)= 10kΩ : 50°C(122°F)= 3.4kΩ
Sensor of piping temperature: 10°C(50°F) = 10kΩ : 25°C(77°F)= 5Ωk : 50°C(122°F)= 1.8kΩ

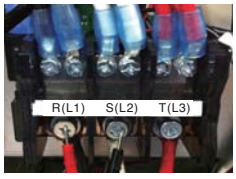
Error No.	Error Type	Error Point	Main Reasons
153* Master 11-> 531 Slave1 12-> 532 Slave2 13-> 533	Outdoor Unit Upper Heat Exchanger Temperature Sensor Fault	Outdoor Unit Upper Heat Exchanger Temperature Sensor open or short	1. Temperature Sensor Connecting Fault 2. Temperature Sensor(Open/Short) 3. Main PCB Fault
154* Master 11-> 541 Slave1 12-> 542 Slave2 13-> 543	Outdoor Unit Low Heat Exchanger Temperature Sensor Fault	Outdoor Unit Low Heat Exchanger Temperature Sensor open or short	1. Temperature Sensor Connecting Fault 2. Temperature Sensor(Open/Short) 3. Main PCB Fault

Error No.	Error Type	Error Point	Main Reasons
50* Master 501 Slave1 502 Slave2 503 Slave3 504	ODU 3phase power omission error	Omitting one or more of R(L1), S(L2), T(L3) input power	1. Input Voltage abnormal R(L1), S(L2), T(L3) 2. Check power Line connection condition 3. Main PCB damage 4. Inverter PCB input current sensor fault

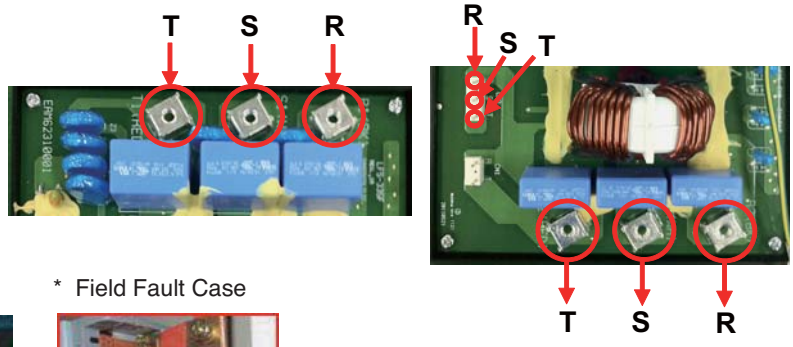
■ Error Diagnosis and Countermeasure Flow Chart



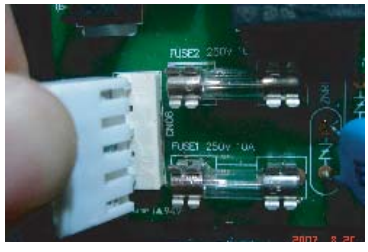
* Measuring input voltage



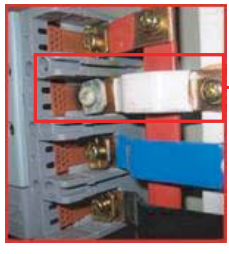
* Noise filter wiring



* Main PCB power connection



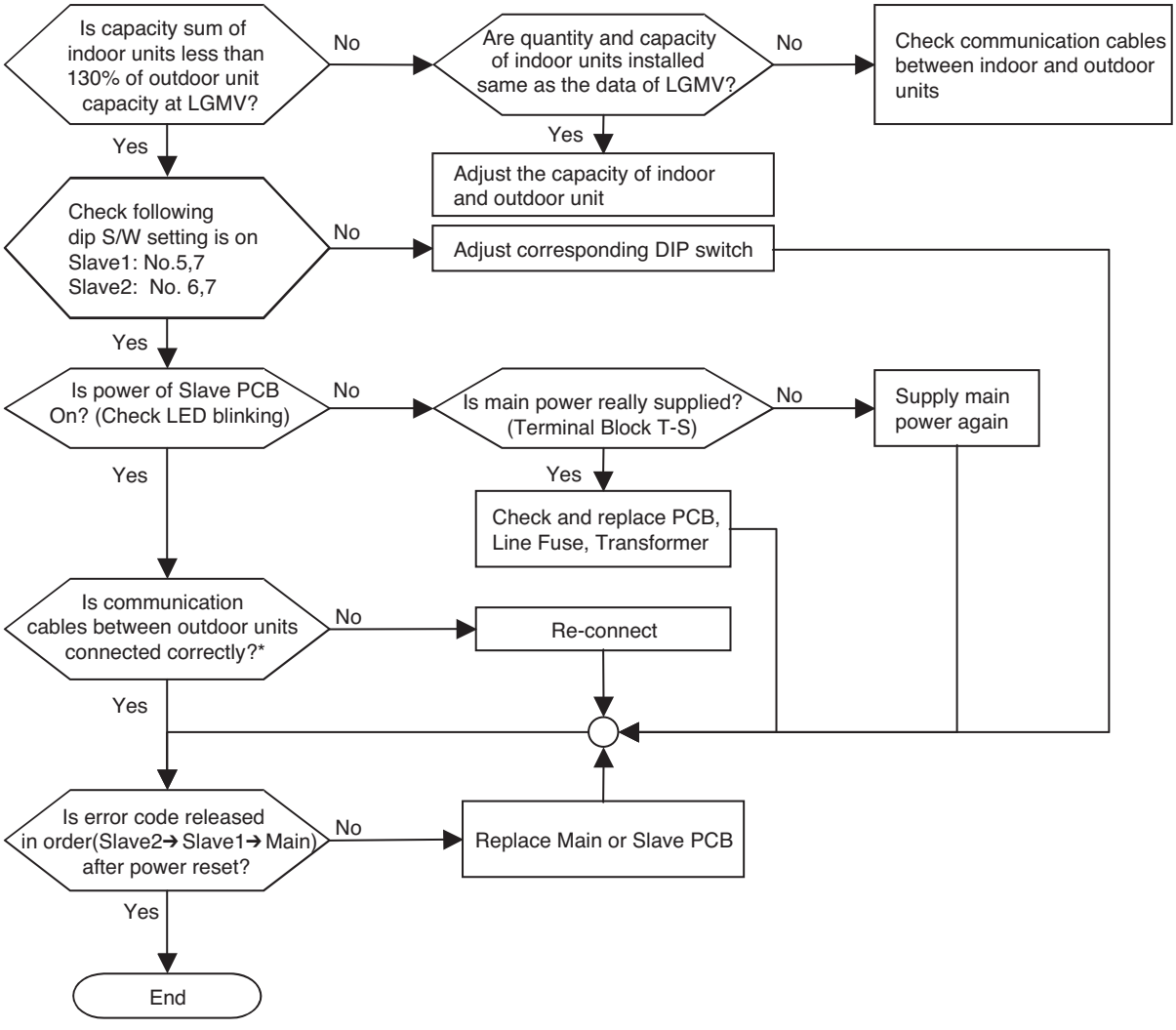
* Field Fault Case



* 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

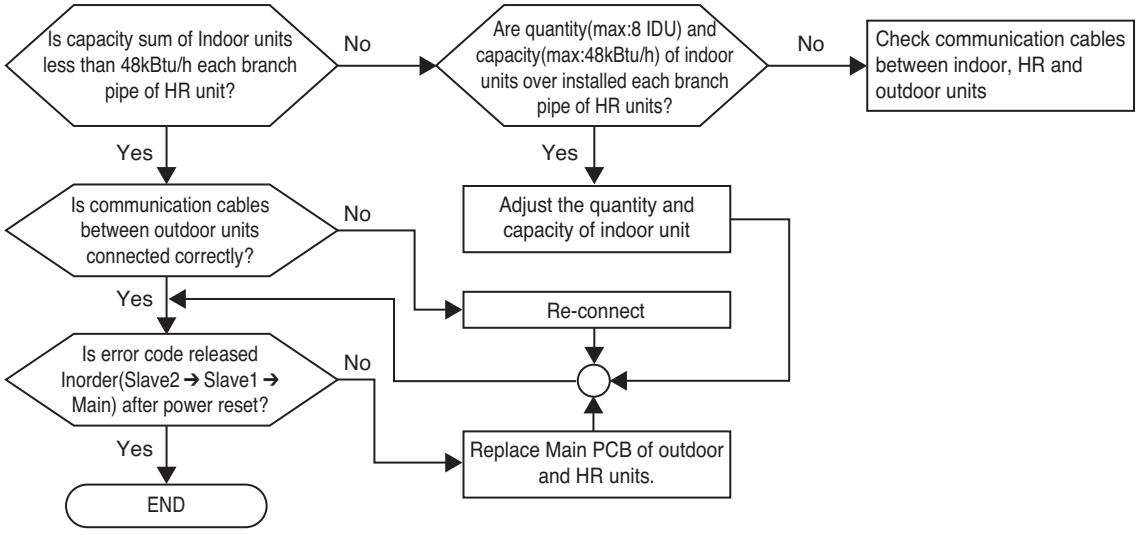
■ Error diagnosis and countermeasure flow chart



* 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
51 Master 512	Over-Capacity from zoning branch pipes(Sum of indoor unit capacity is more than 48kBtu/h per each branch pipe of HR unit)	Sum of indoor unit capacity is more than 48kBtu/h each branch pipe of HR unit	1. Excess 48kBtu/h per each branch pipe of HR unit 2. Connection of excess 8 indoor units per each branch pipe of HR unit 3. Wrong connection of communication cable/piping 4. Defect of outdoor and HR unit main PCB

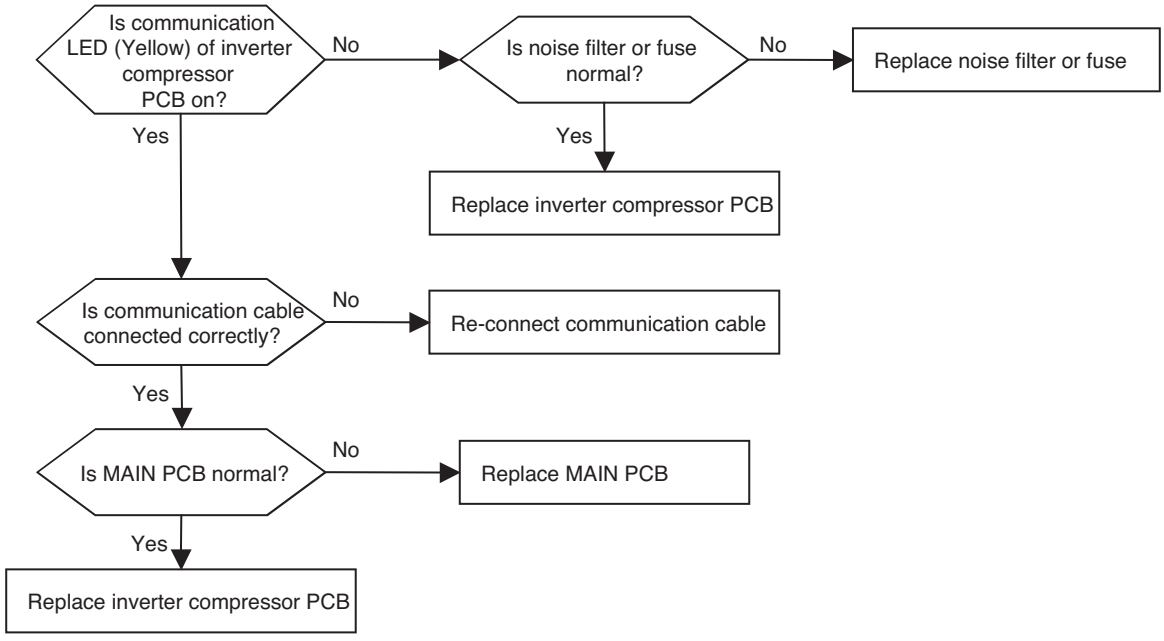
■ Error diagnosis and countermeasure flow chart



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

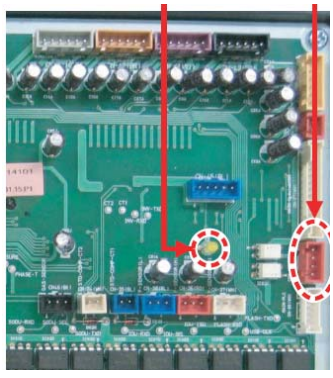
Error No.	Error Type	Error Point	Main Reasons
52* Master 521 Slave1 522 Slave2 523	Communication error between (Inverter PCB ➔ Main PCB)	Main controller of Master unit of Master unit can't receive signal from inverter controller	1. Power cable or communication cable is not connected 2. Defect of outdoor Main fuse/Noise Filter 3. Defect of outdoor Main / inverter PCB

■ Error diagnosis and countermeasure flow chart

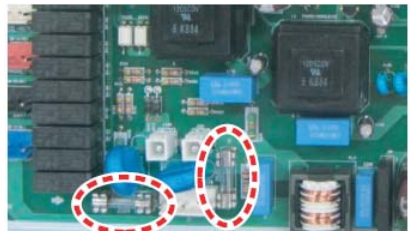


* The method of checking MAIN PCB and inverter compressor PCB (If normal, communication LED blinks)

Communication connector & LED in inverter compressor PCB



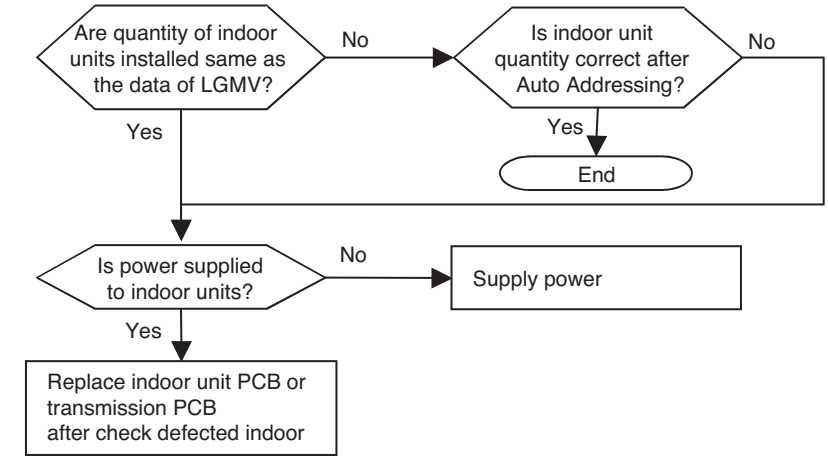
Communication connector & LED in MAIN PCB

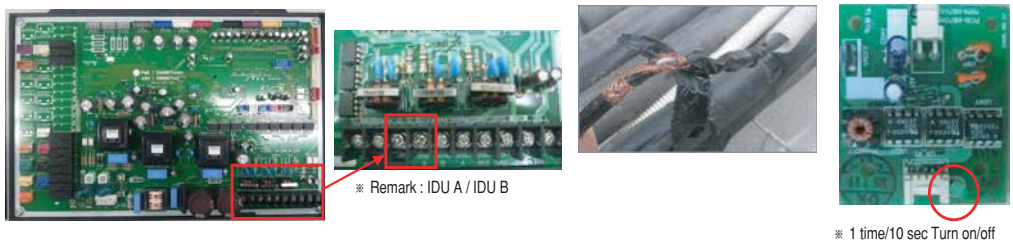


Main PCB Fuse

Error No.	Error Type	Error Point	Main Reasons
53	Communication error (Indoor unit ➔ Main PCB)	In case Main PCB can't receive signal from indoor unit	1. Communication cables are not connected 2. Communication cables are short / open 3. Defect of outdoor Main / indoor PCB 4. ODU/IDU Main PCB Damage. 5. communication Wire Connection Fault.

■ Error diagnosis and countermeasure flow chart





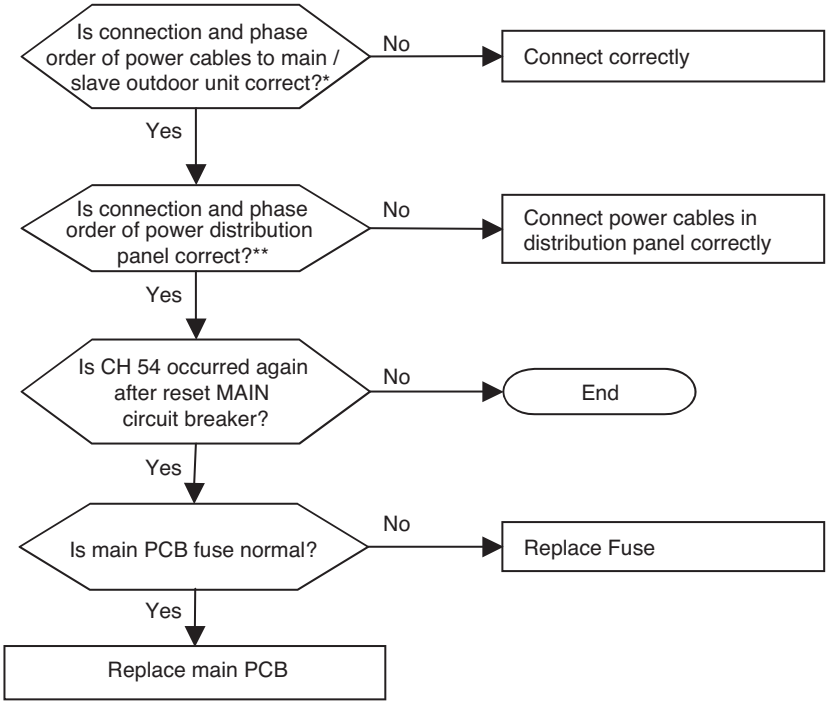
In case of CH53, almost happened with CH05, the indoor units not operated actually are normal so check with same method of CH05. and additionally check as shown as below and above flow chart

- 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

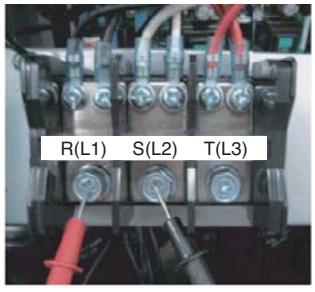
* After replacement of indoor unit PCB, Auto Addressing should be done, if central controller is installed then the central control address also should be input.
  In case that only communication PCB is replaced above process is not needed

Error No.	Error Type	Error Point	Main Reasons
54* Master 541 Slave1 542 Slave2 543 Slave3 544	Wrong connection of 3Ø power supply cable (Reverse direction / missing a phase)	Wrong connection of 3Ø power supply cable (Reverse direction / missing a phase)	1. Main PCB defect 2. No power of R(L1), S(L2), T(L3) supplied 3. Wring connection of R(L1), S(L2), T(L3) cables 4. Main Pcb Fuse failure

■ Error diagnosis and countermeasure flow chart



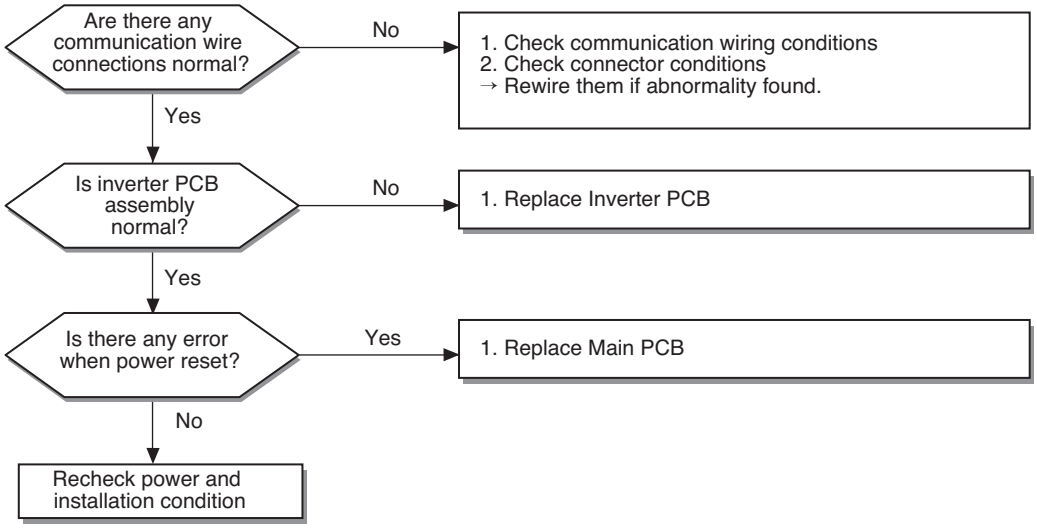
* Check power cable connection state, phase R(L1)-S(L2)-T(L3) order, power supply state in control box of product



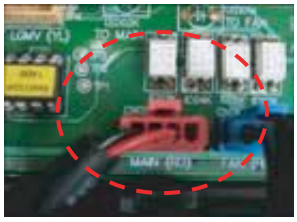
** Check power cable connection state, phase order, power supply state in distribution panel

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 Inv and Main 2. Communication Wire Noise Effect 3. ODU Main PCB Damage 4. ODU Inv PCB Damage

■ Error diagnosis and countermeasure flow chart



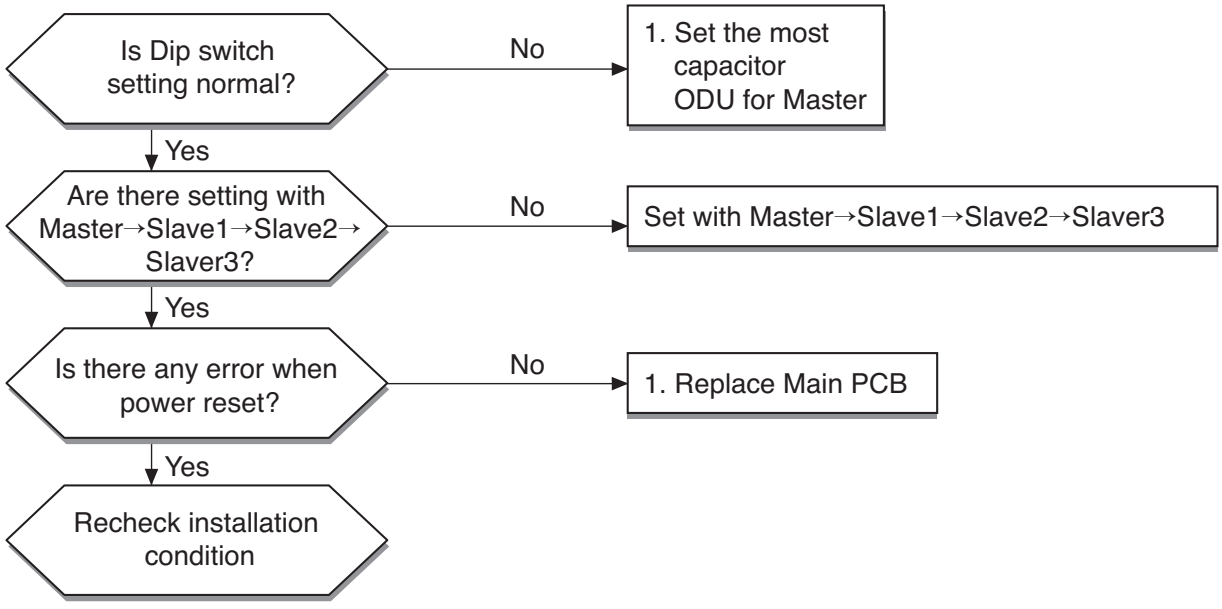
Inverter / Fan PCB



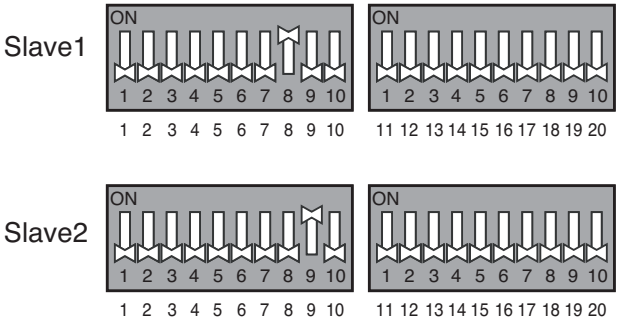
Main PCB

Error No.	Error Type	Error Point	Main Reasons
59* Master 591	Series Installation Error	Series Installation of Slave Outdoor Unit Larger Than Master Capacity	1. Dip Switch Setting Error

■ Error Diagnosis and Countermeasure Flow Chart

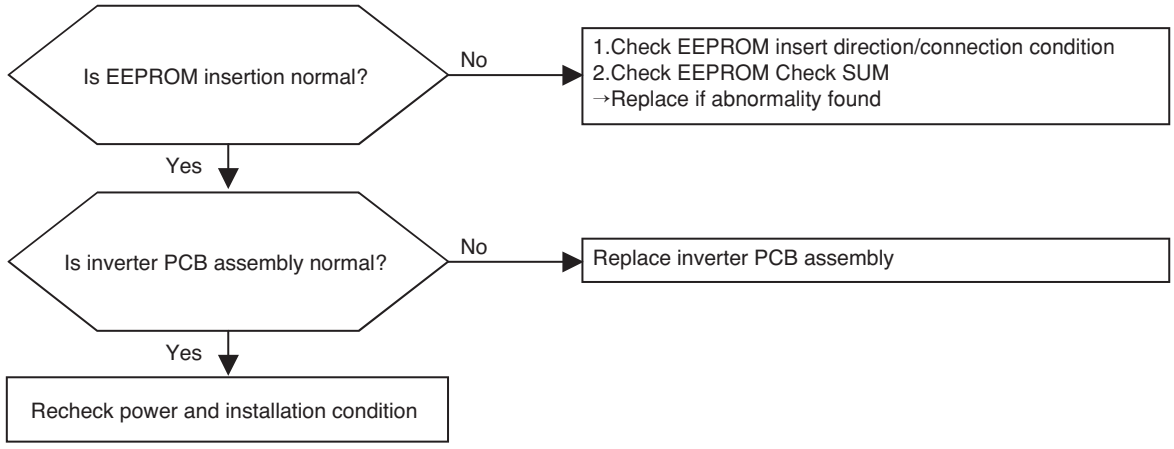


* Dip Switch Setting

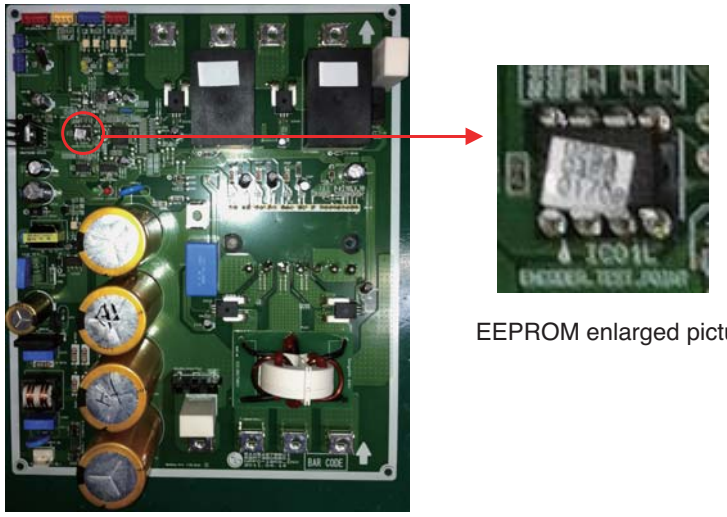


Error No.	Error Type	Error Point	Main Reasons
60* Master 601 Slave1 602 Slave2 603 Slave3 604	Inverter PCB EEP-ROM error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU inverter PCB assembly damage

■ Error Diagnosis and Countermeasure Flow Chart

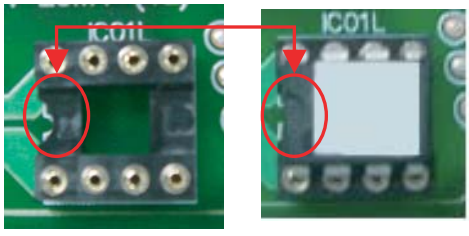


* Inverter EEPROM inserting point



EEPROM enlarged picture

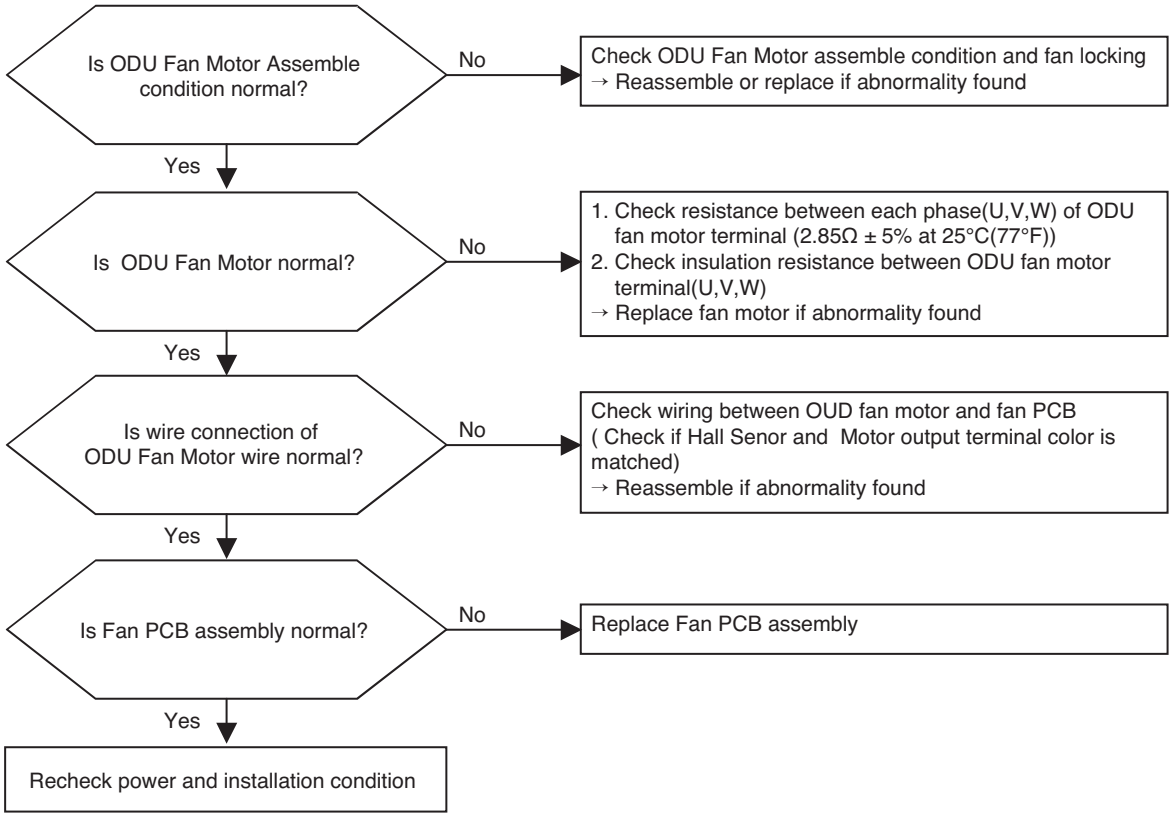
* Right inserting direction of inverter EEPROM



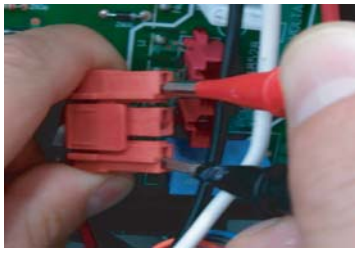
※ Note : Replace after power off

Error No.	Error Type	Error Point	Main Reasons
67* Master 671 Slave1 672 Slave2 673 Slave3 674	Fan Lock Error	Fan RPM is 10RPM or less for 5 sec. when ODU fan starts or 40 RPM or less after fan starting.	1. Fan motor defect / assembly condition abnormal 2. Wrong connection of fan motor connector (Hall sensor, U,V,W output) 3. Reversing rotation after RPM target apply 4. Fan PCB assembly defect 5. Fan lock by Heavy Snowfall.

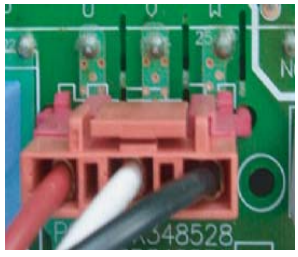
■ Error Diagnosis and Countermeasure Flow Chart



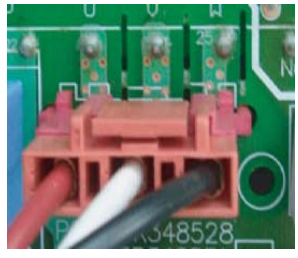
* Fan Motor resistance measuring between each phase



* Hall Sensor connector

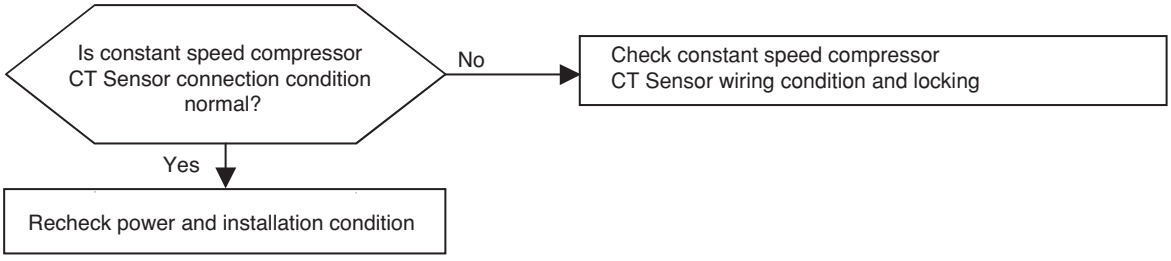


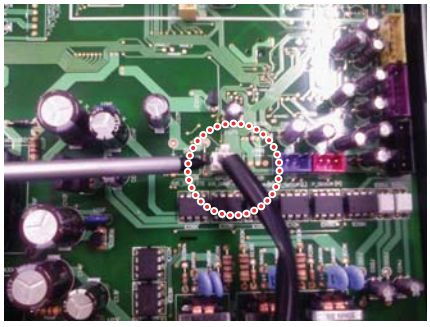
* Fan Motor Wire connection

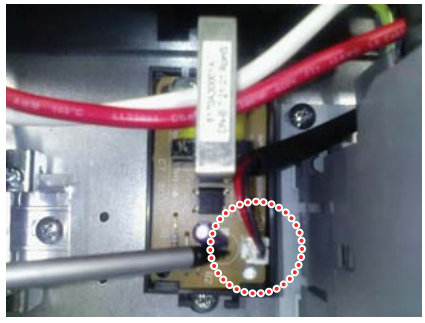


Error No.	Error Type	Error Point	Main Reasons
69* Master 691 Slave1 692 Slave2 693	Constant 1 CT Sensor Error of Outdoor Unit	Constant 1 CT Sensor open or short of Outdoor Unit	Constant 1 CT Sensor Error
70* Master 701 Slave1 702 Slave2 703	Constant Speed Compressor 2 CT Sensor Error	Constant Speed Compressor 2 CT Sensor Open/short	1. Constant Speed Compressor 2 CT Sensor defect

■ Error Diagnosis and Countermeasure Flow Chart

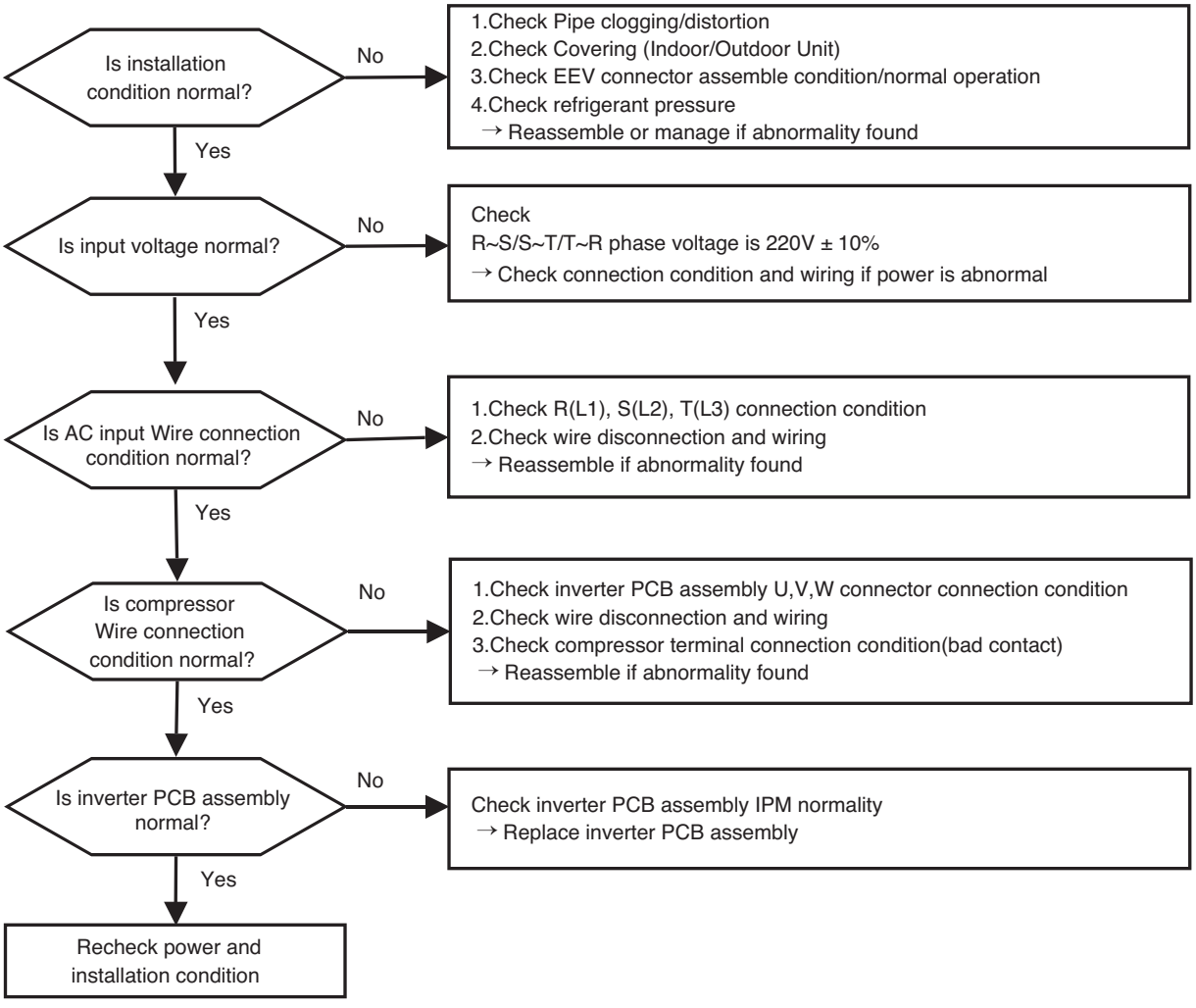




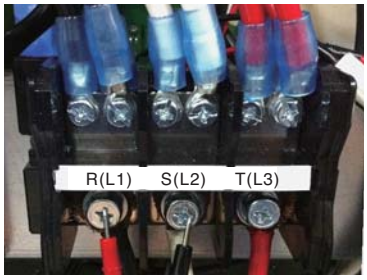


Error No.	Error Type	Error Point	Main Reasons
73* Master 731 Slave1 732 Slave2 733	AC input instant over current error (Matter of software)	Inverter PCB input 3 phase power current is over 50A(peak) for 2ms	1.Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2.Compressor damage(Insulation damage/Motor damage) 3.Input voltage abnormal R(L1), S(L2), T(L3) 4.Power line assemble condition abnormal 5.Inverter PCB assembly damage(input current sensing part)

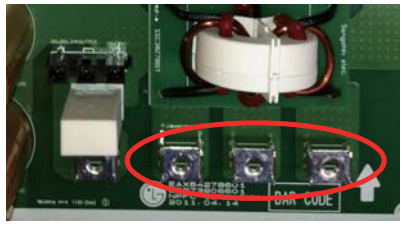
■ Error Diagnosis and Countermeasure Flow Chart



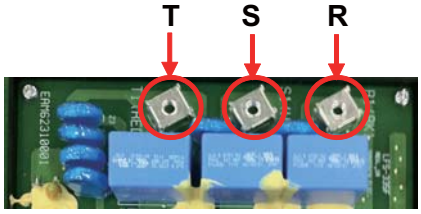
Measuring input voltage



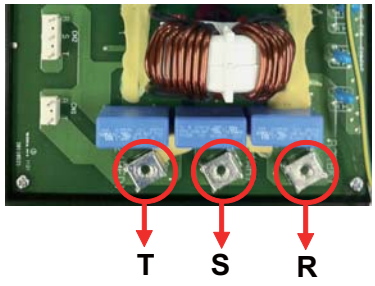
Compressor Wire Connection



Noise filter wiring

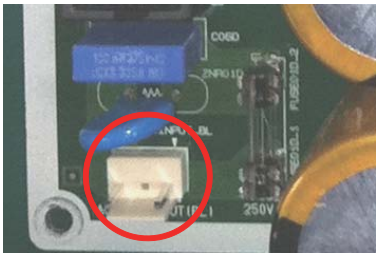


Noise filter input (upper part)

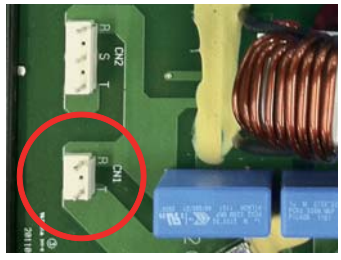


Noise filter output(lower part)

Inverter PCB assembly/Wiring power to inverter PCB on Noise filter



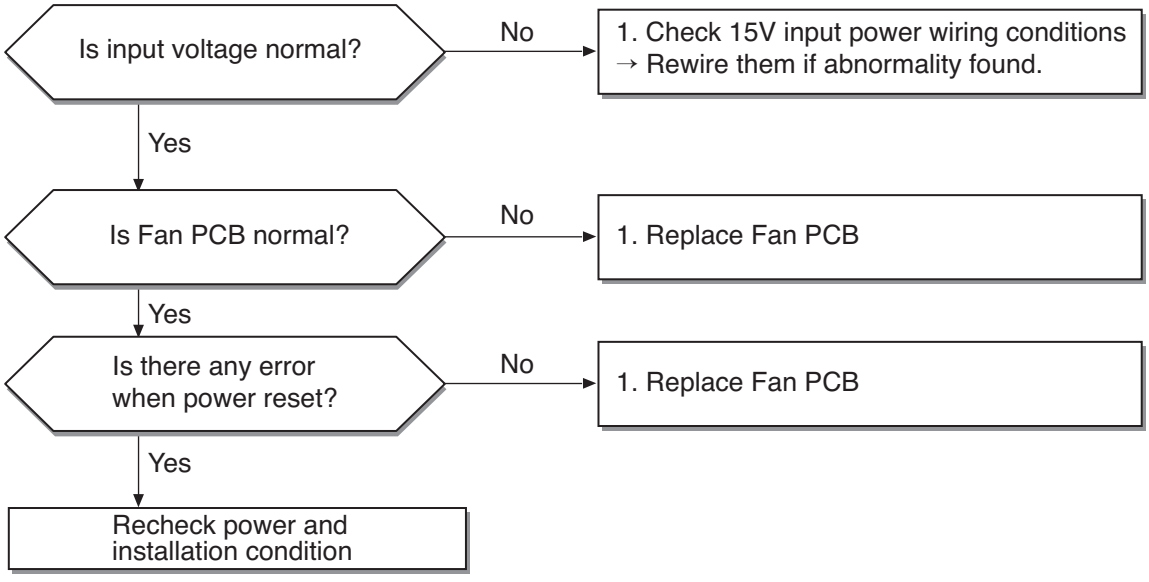
Inverter PCB assembly power connection



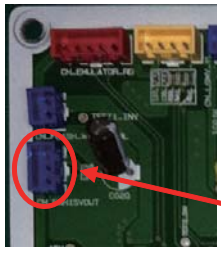
Noise filter power connection

Error No.	Error Type	Error Point	Main Reasons
75* Master 751 Slave1 752 Slave2 753	Fan CT sensor error	Offset of micom which senses the fan motor phase current is not 2.5V	1. Input voltage is abnormal(not 15V) 2. Fan PCB assembly defect 3. Power wire open and connecting fault 4. Inv PCB assembly defect

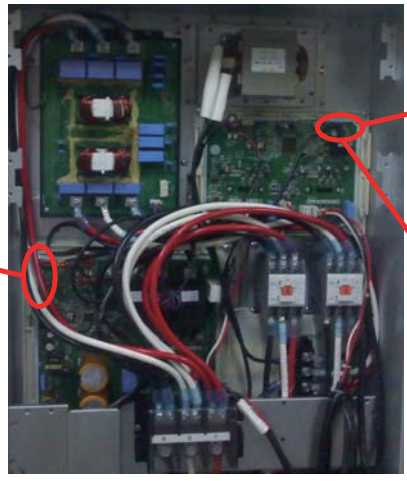
■ Error Diagnosis and Countermeasure Flow Chart

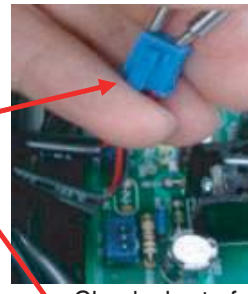


15V input power wiring conditions



15V input power on Inverter PCB

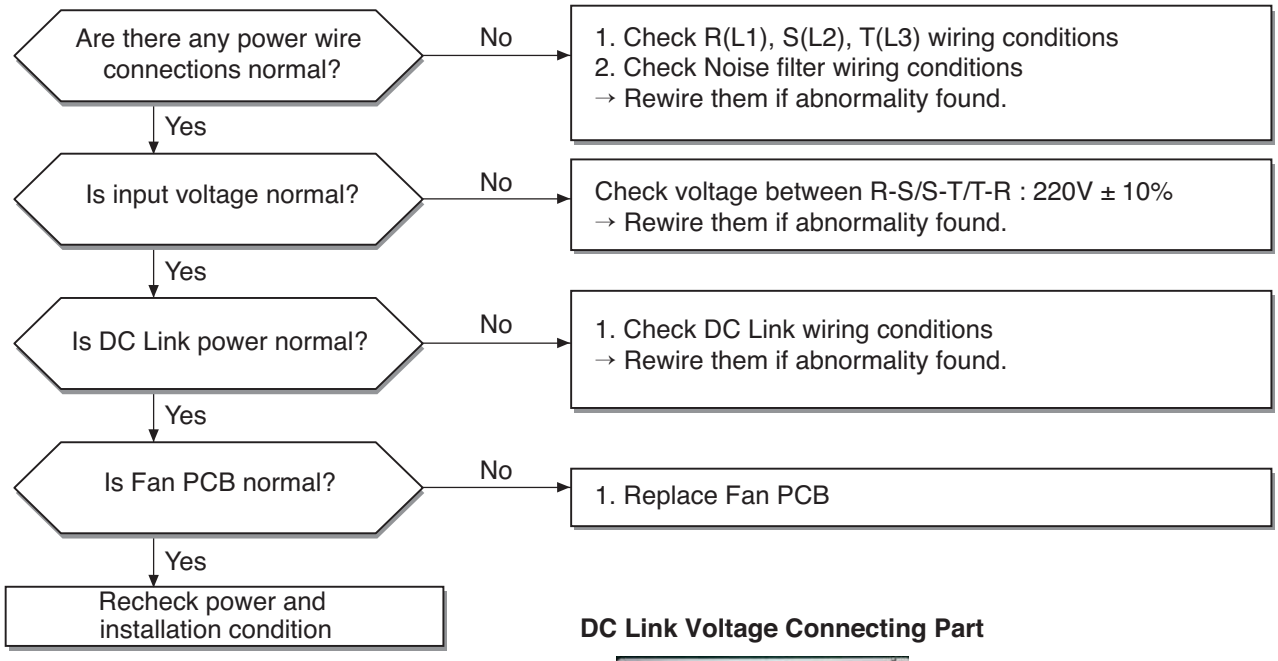




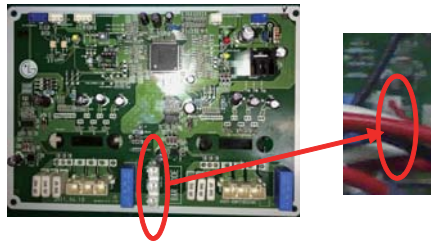
Check short of power wire

Error No.	Error Type	Error Point	Main Reasons
76* Master 761 Slave1 762 Slave2 763	Fan DC Link High Voltage Error	Fan PCB DC link voltage supplied over 420V	1. Input power abnormal 2. Fan PCB assembly defect 3. Power wire connecting fault

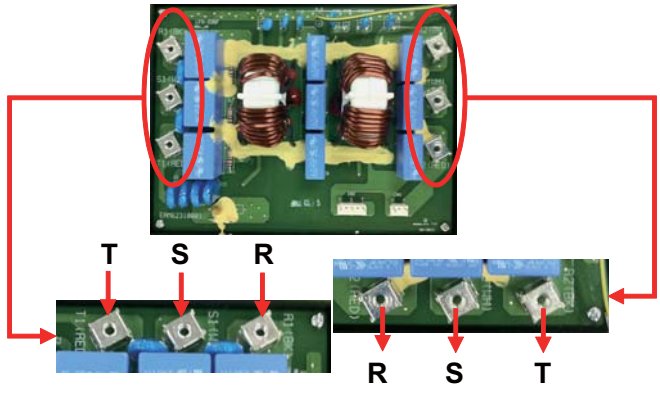
■ Error Diagnosis and Countermeasure Flow Chart



DC Link Voltage Connecting Part



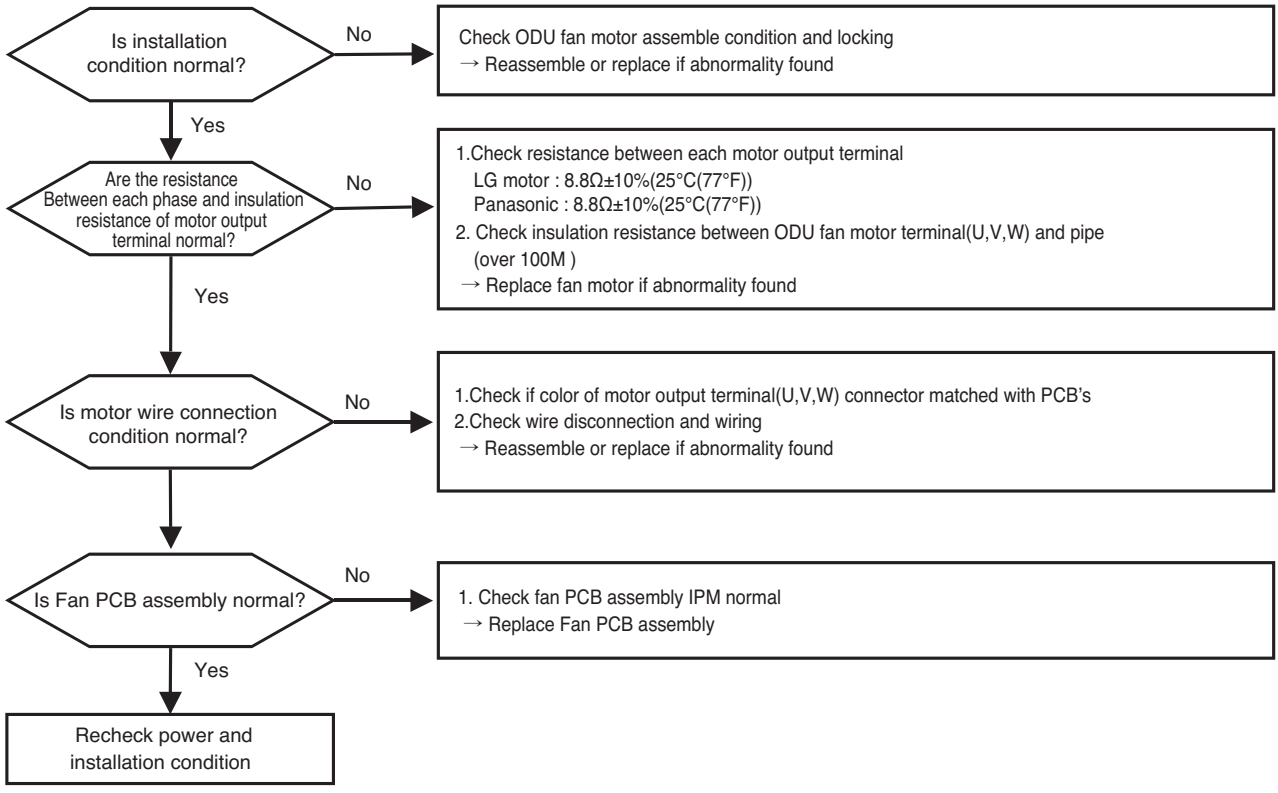
Noise filter wiring



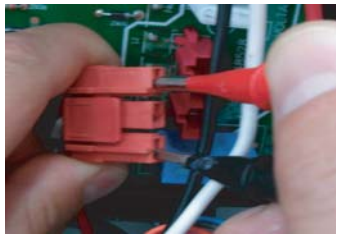
Noise filter input (upper part) Noise filter output (lower part)

Error No.	Error Type	Error Point	Main Reasons
77* Master 771 Slave1 772 Slave2 773	Fan Over Current Error	Output current is over 5A for 40ms	1. Overload operation 2. Fan Motor defect 3. Fan PCB assembly defect 4. Fan Motor connector insert defect 5. Condenser icing or blocking

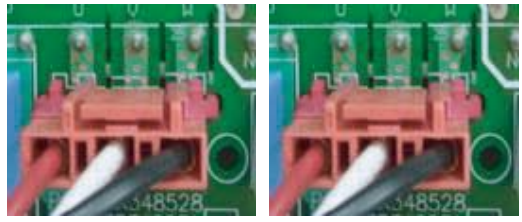
■ Error Diagnosis and Countermeasure Flow Chart



Measuring fan motor phase resistance

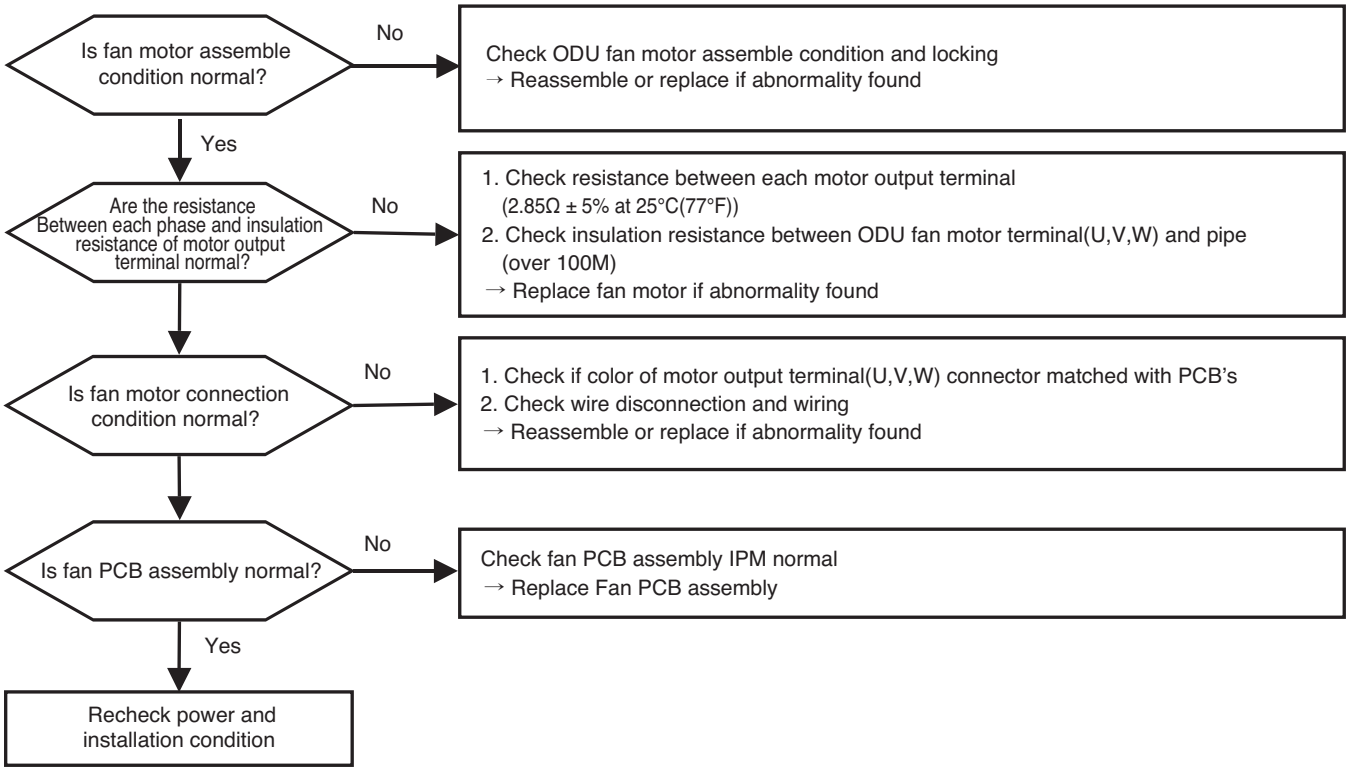


Fan motor wire connection

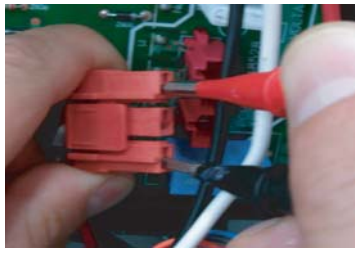


Error No.	Error Type	Error Point	Main Reasons
79* Master 791 Slave1 792 Slave2 793	Fan Starting Failure Error	Fan Motor initial starting failure	1.Fan motor defect/ assemble condition abnormal 2.Fan motor connector misconnection(Hall sensor, U,V,W ouput) 3.Fan PCB defect

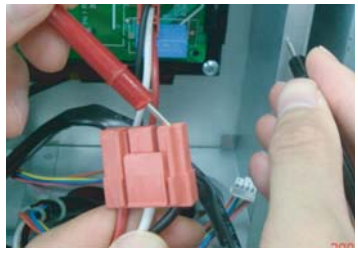
■ Error Diagnosis and Countermeasure Flow Chart

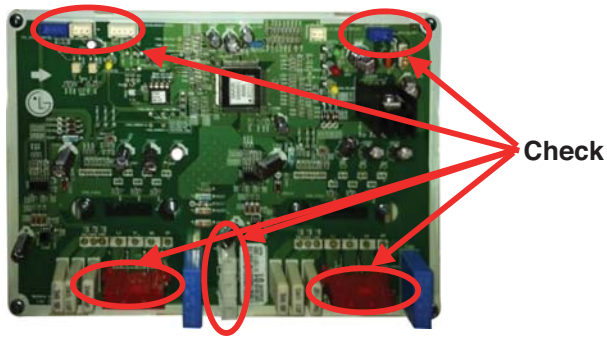


Measuring fan motor phase resistance

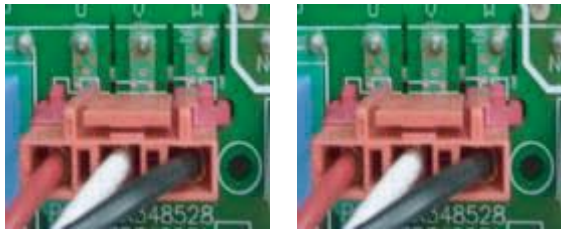


Measuring insulation resistance between fan terminal & chassis



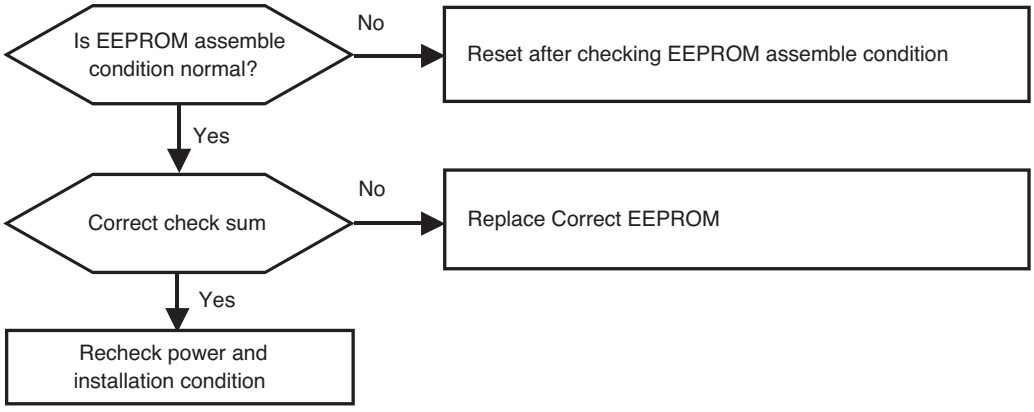


Fan motor wire connection

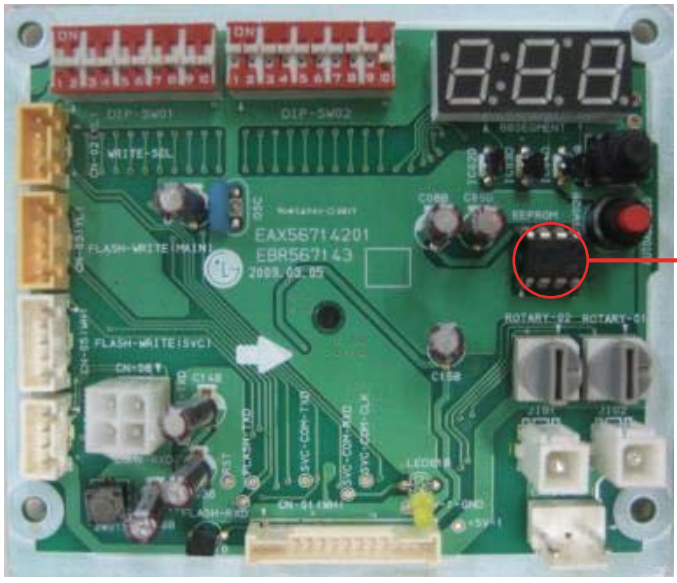


Error No.	Error Type	Error Point	Main Reasons
86* Master 861 Slave1 862 Slave2 863	Main PCB EEPROM Error	EEPROM Access Error	1. No EEPROM 2. EEPROM wrong insertion

■ Error Diagnosis and Countermeasure Flow Chart



EEPROM insertion direction



SUB PCB

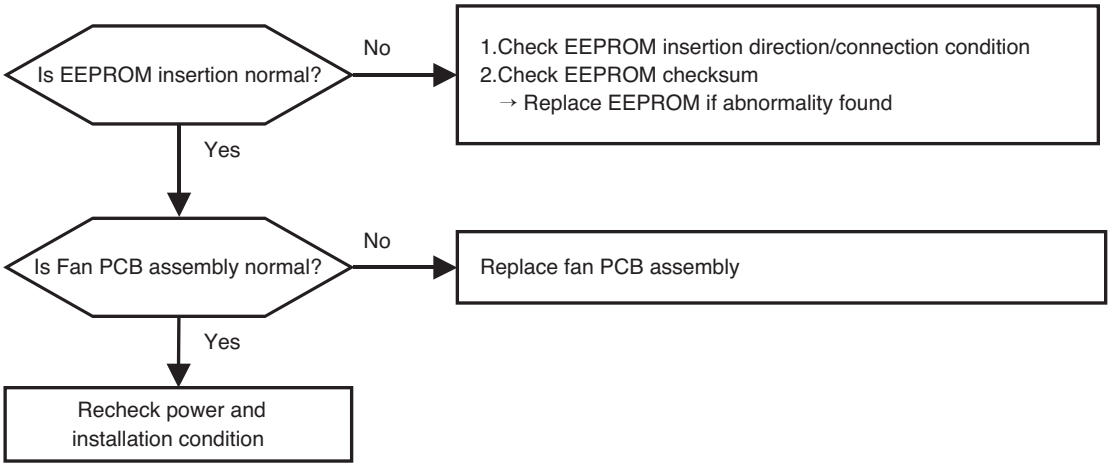
EEPROM

Same direction both socket hole and EEPROM hole

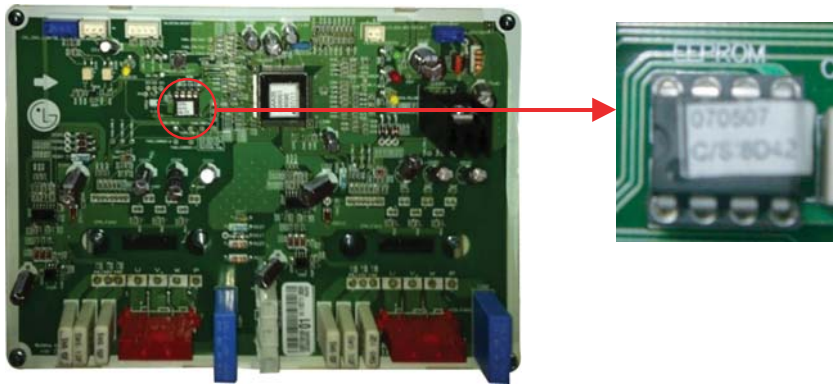
Note : Replace after power off

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

■ Error Diagnosis and Countermeasure Flow Chart



Fan EEPROM insertion

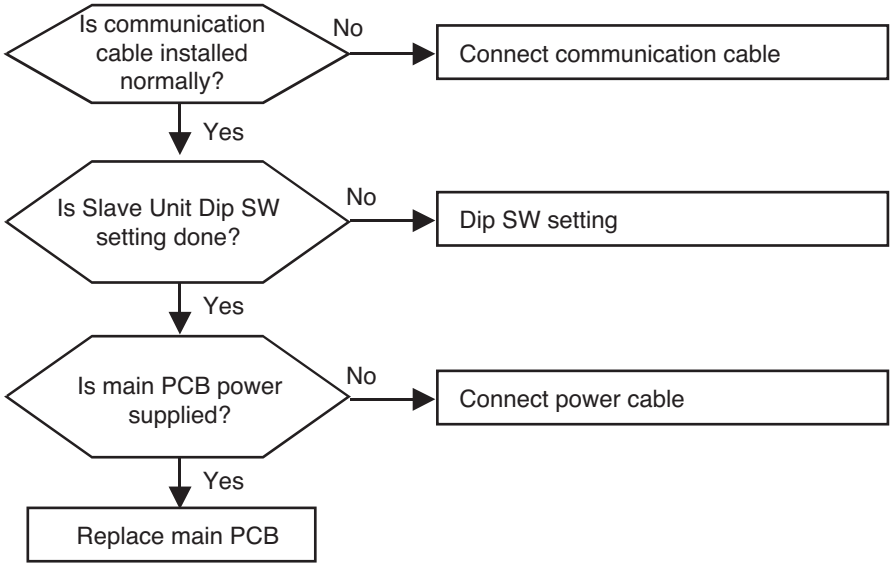


Inverter EEPROM insertion direction

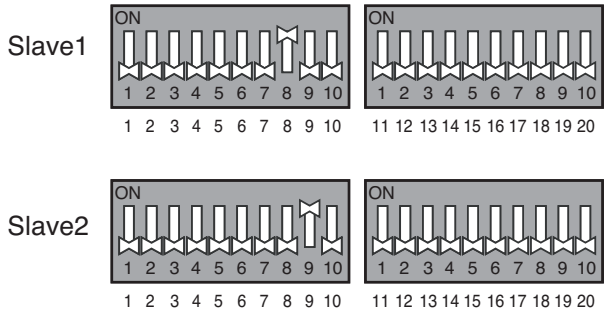
❉ Note : Replace after power off

Error No.	Error Type	Error Point	Main Reasons
104* Master 11 → 041 Slave1 12 → 042 Slave2 13 → 043	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

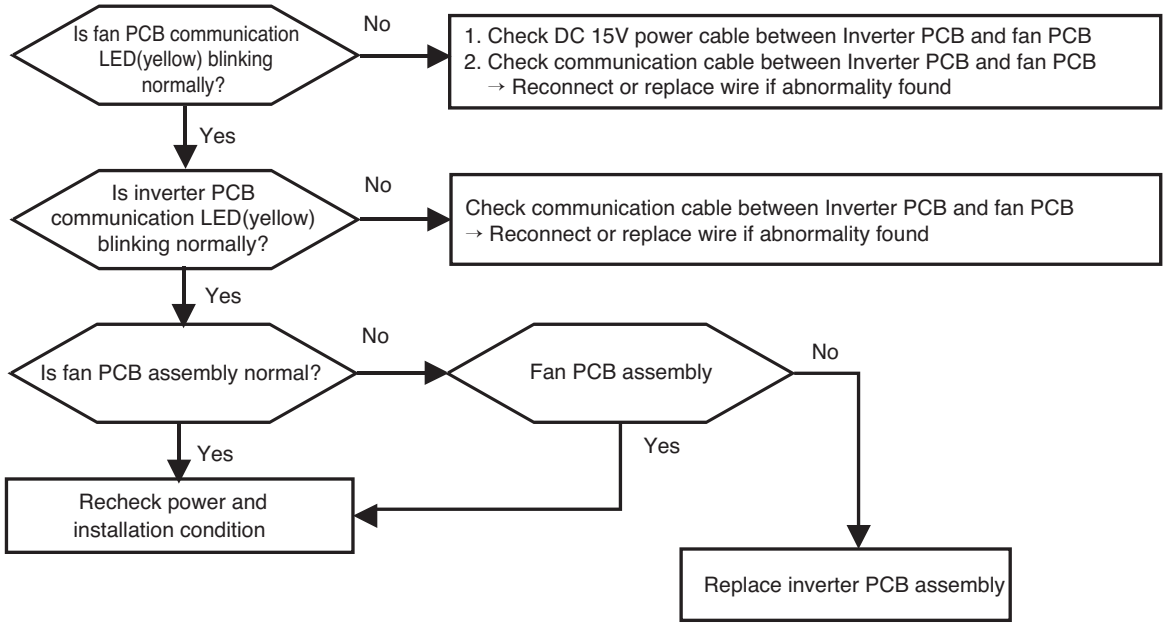


* Slave Unit Dip SW

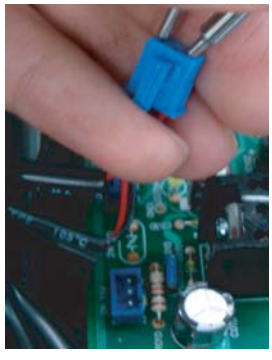


Error No.	Error Type	Error Point	Main Reasons
105* Master 11 → 051 Slave1 12 → 052 Slave2 13 → 053	Communication error (Fan PCB ↔ Inverter PCB)	Fan controller didn't receive signal from inverter controller	1. Wrong connection between Inverter and Fan PCB 2. Fan PCB power not supplied 3. ODU Inv/Fan PCB defect

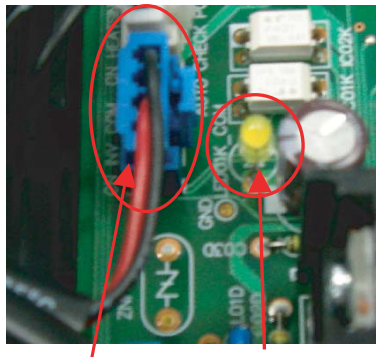
■ Error Diagnosis and Countermeasure Flow Chart



Checking 15V input



Fan communication connection

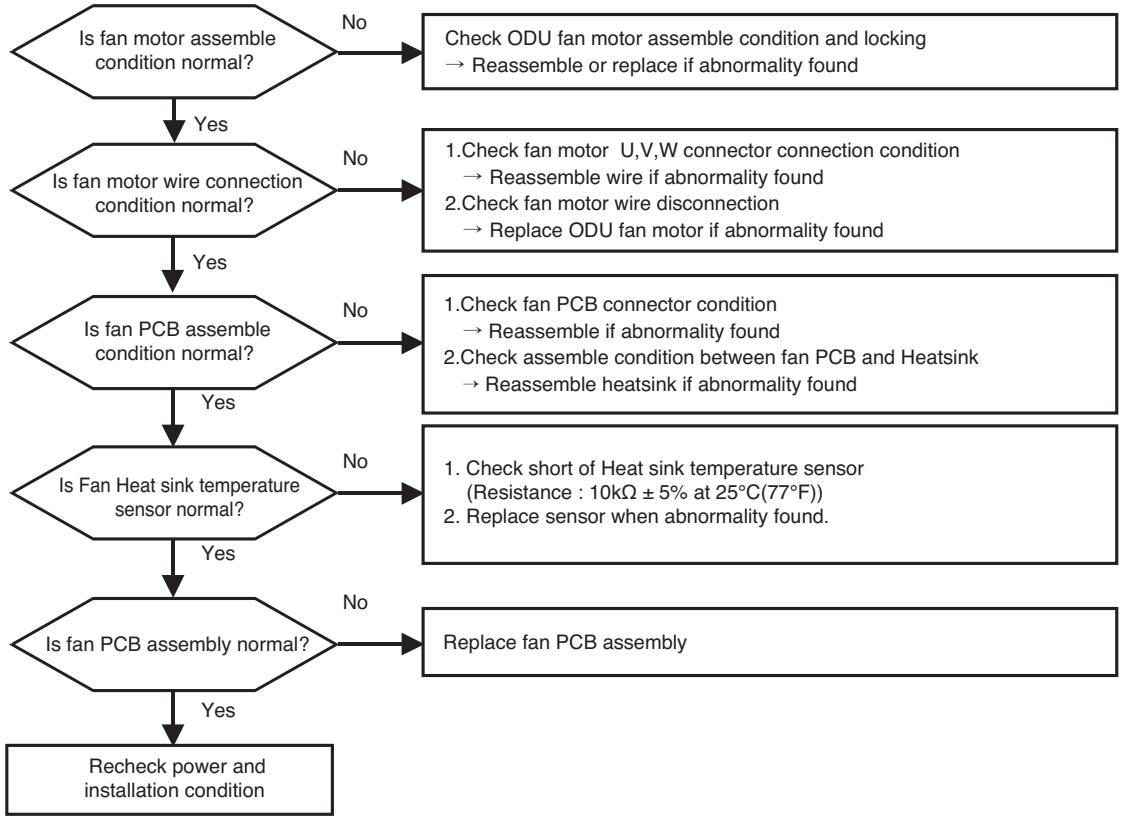


Fan Error LED

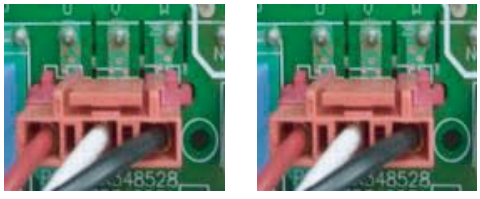
❉ Note : Check fan PCB assembly Error LED blinking (Check 108⁻ Error)

Error No.	Error Type	Error Point	Main Reasons
106* Master 11 → 061 Slave1 12 → 062 Slave2 13 → 063	ODU Fan PCB IPM Fault	IPM protection circuit activation (over current / overheating)	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge 2. ODU fan motor assemble condition abnormal (Coil disconnection/Short/Insulation damage) 3. Fan PCB heatsink assemble condition abnormal 4. Fan PCB assembly defect

■ Error Diagnosis and Countermeasure Flow Chart



Fan Motor Wire connection



Fan IPM assemble position

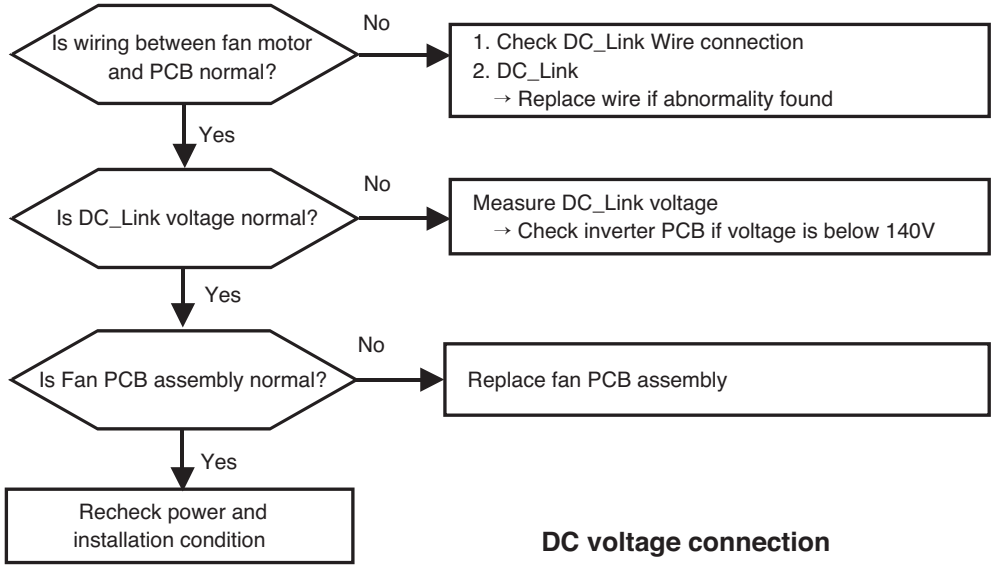
Check assemble condition

Fan Heatsink assemble position

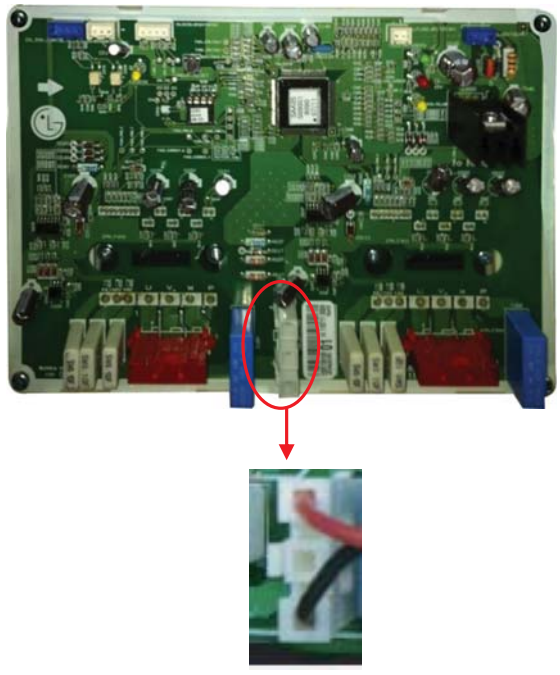
Check assemble condition

Error No.	Error Type	Error Point	Main Reasons
107* Master 11 → 071 Slave1 12 → 072 Slave2 13 → 073	Fan DC Link Low Voltage Error	Fan PCB DC link voltage supplied below 140V	1. Wrong wiring between inverter PCB and Fan PCB 2. Fan PCB assembly defect 3. Reactor terminal contact defect 4. DC link terminal wiring/contact defect 5. Bridge diode defect

■ Error Diagnosis and Countermeasure Flow Chart



DC voltage connection

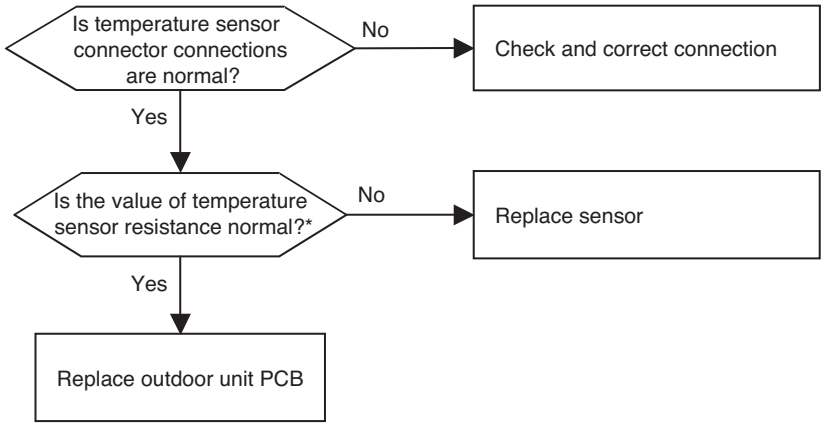


DC Volt connected

Error No.	Error Type	Error Point	Main Reasons
113* Master 11 → 131 Slave1 12 → 132 Slave2 13 → 133	Outdoor unit liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective outdoor unit PCB

Error No.	Error Type	Error Point	Main Reasons
115* Master 11 → 151 Slave1 12 → 152 Slave2 13 → 153	Outdoor Unit Subcooling Outlet Temperature Sensor Error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connecter connection 2. Defective temperature sensor (Open/Short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart

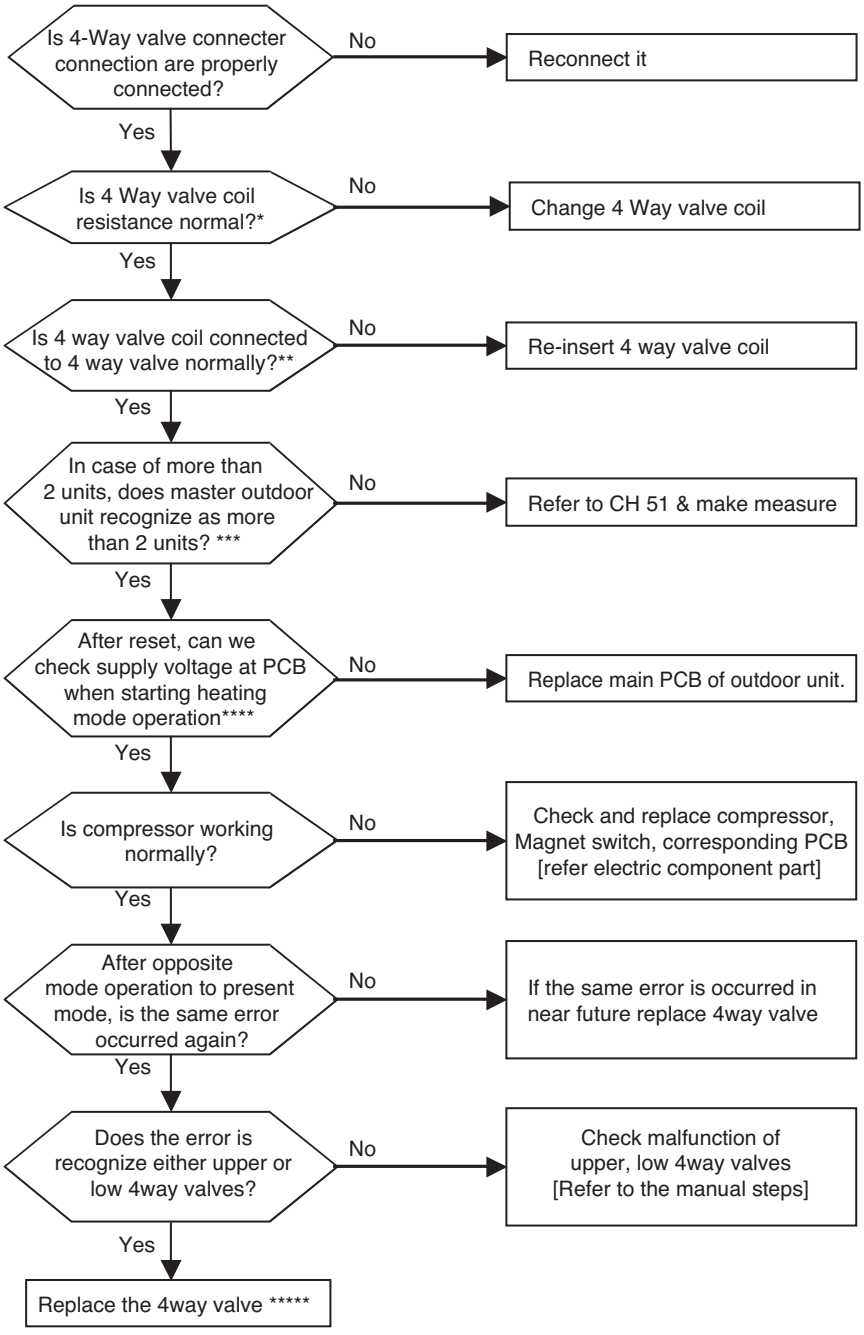


* Sensor resistance 100 kΩover (open) or 100 Ω below (short) will generate error

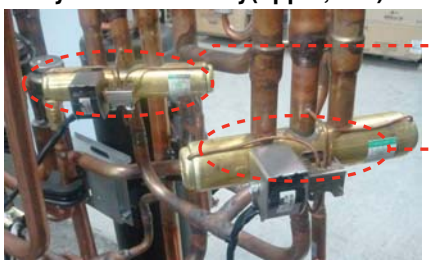
Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table (±5% tolerance)
Air temperature sensor: 10°C(50°F) = 20.7kΩ : 25°C(77°F) = 10kΩ : 50°C(122°F)= 3.4kΩ
Pipe temperature sensor: 10°C(50°F)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

Error No.	Error Type	Error Point	Main Reasons
151* Master 11→511	Function error of outdoor 4way valve	Function error of 4way valve in master or slave outdoor units	1. Wrong operation of 4way valve because of sludge inflow etc. 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

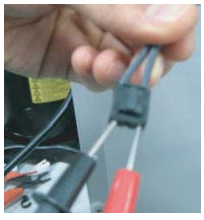


4way valve assembly(upper, low)

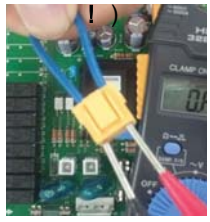


Main PCB of outdoor unit

*** Measure the resistance of 4way valve coil (Normal value : 2~8Ω @ 25°C(77°F))**



Upper 4way valve



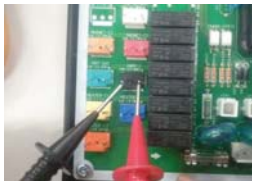
Low 4way valve

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

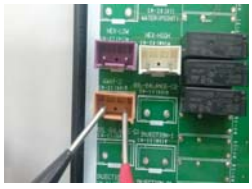
Upper 4way valve

Low 4way valve

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



Upper 4way valve



Low 4way valve

Location of 4way valve connector on Main PCB (marked as 4way,CN12–upper,CN25–low)

Upper 4way valve

Low 4way valve

*** When power is supplied in order as follow
(Slave2 → Slave1 → Mater)
ODU information is displayed one after another on main PCB 7-segment

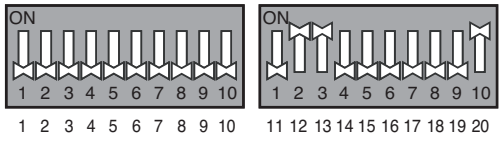
1. Model Code

Model Code	Unit(HP)
190	8
191	10
192	12
193	14

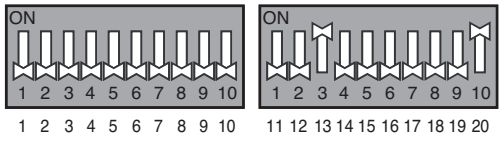
2. Total Capacity
   → Displayed with HP
3. ODU Type
   → Heat Recovery : 4, Heat Pump : 2, Cooling Only : 0
4. Normal mode : 25
5. Refrigerant
   → R410a : 41

***** 1. Checking method for outdoor unit of 3 units system
(Master + Slave1 + Slave2)
① Close all the SVC valves of high pressure gas pipe
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

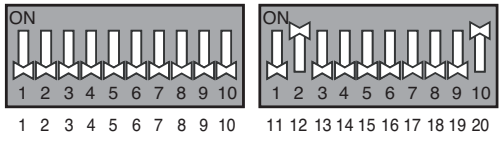
2. Checking method for outdoor unit of single unit system
(Manual steps)
① Turn on dip S/W 12,13,20(upper and low 4way valve ON)
② Turn on dip S/W 13,20(low 4way valve ON)
③ Turn on dip S/W 12,20(upper 4way valve ON)
④ Turn on dip S/W 20(upper and low 4way valve OFF)
⑤ Execute 1~2times until finding defective 4way valves
⑥ Turn off all of dip S/W after finished steps.
❊ Caution : Operate manual steps under 2.0MPa.



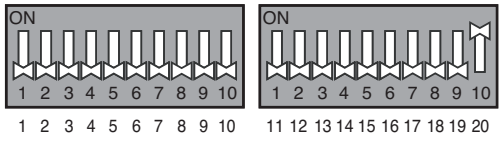
upper 4way valve ON
low 4way valve ON



upper 4way valve OFF
low 4way valve ON



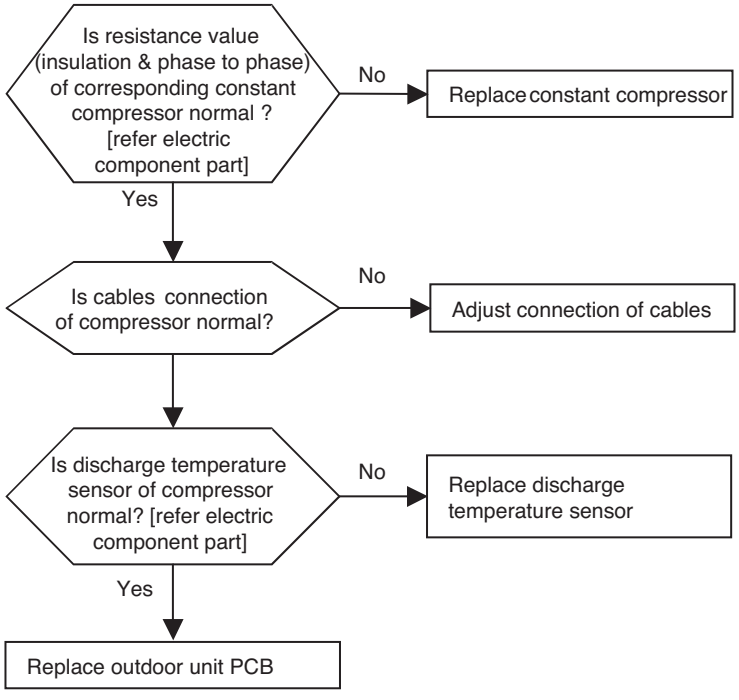
upper 4way valve ON
low 4way valve OFF

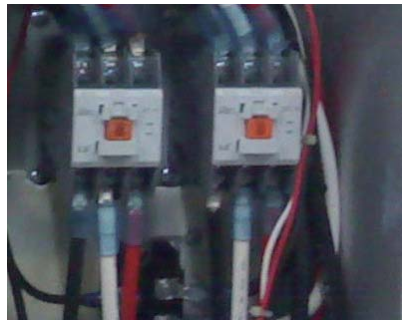


upper 4way valve OFF
low 4way valve ON

Error No.	Error Type	Error Point	Main Reasons
173* Master 11-> 731 Slave1 12-> 732 Slave2 13-> 733	Outdoor Unit Constant Speed Compressor 1 Over Current	Outdoor Unit Constant Speed Compressor 1 Fault or Drive Fault	1. Constant speed compressor 1 damage 2. Constant speed compressor 1 input over current 3. Discharge temperature sensor defect
174* Master 11-> 741 Slave1 12-> 742 Slave2 13-> 743	Outdoor Unit Constant Speed Compressor 2 Over Current	Outdoor Unit Constant Speed Compressor 2 Fault or Drive Fault	1. Constant speed compressor 2 damage 2. Constant speed compressor 2 input over current 3. Discharge temperature sensor defect

■ Error diagnosis and countermeasure flow chart

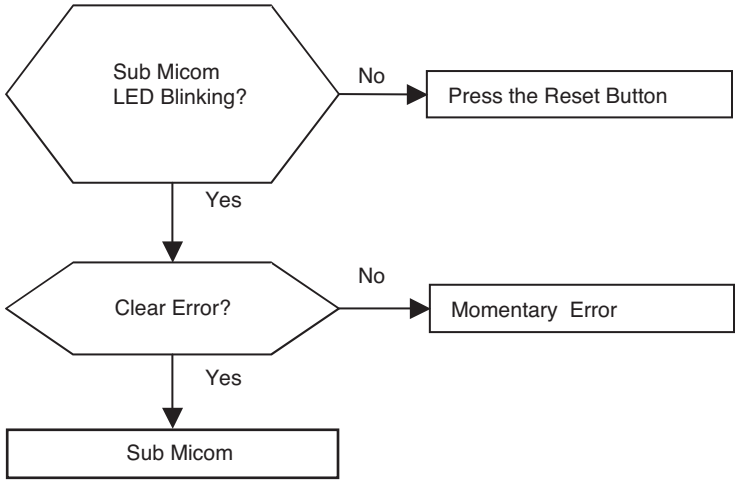


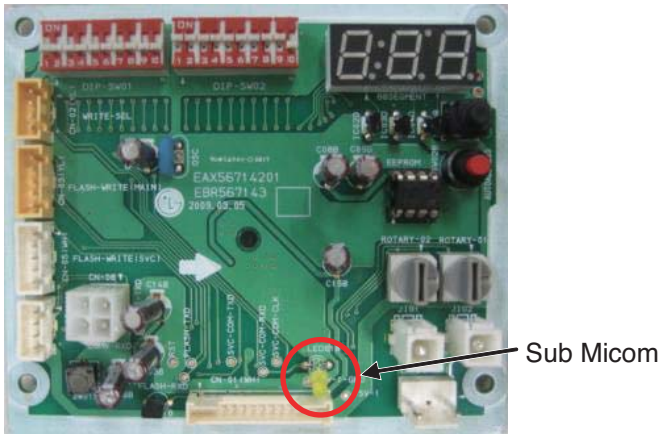


* cables connection between constant compressor and magnetic switch

Error No.	Error Type	Error Point	Main Reasons
182* Master 11-> 821 Slave1 12-> 822 Slave2 13-> 823	Communication Error Between Main-Sub Micom of Master Outdoor unit Main PCB	Failure Receiving Signal Between Main-Sub Micom of Master Outdoor unit Main PCB	1. Failure Receiving Signal Between Main-Sub Micom of Master Outdoor unit Main PCB

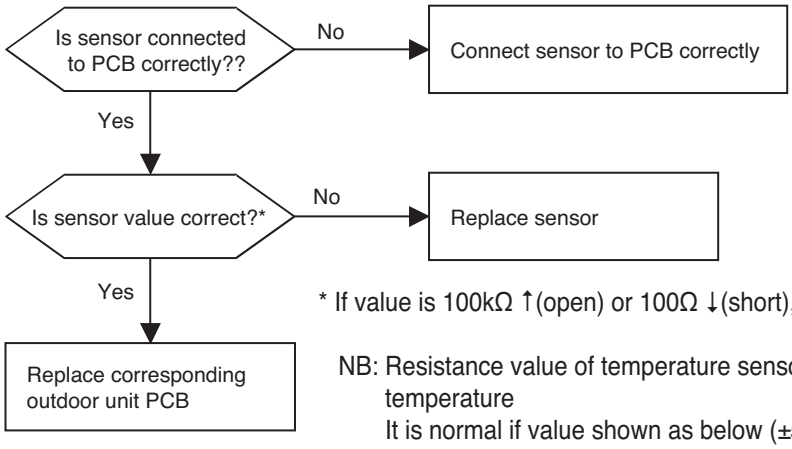
■ Error diagnosis and countermeasure flow chart





Error No.	Error Type	Error Point	Main Reasons
184* Master 11-841 Slave1 12-842 Slave2 13-843	Oil equalizing pipe temperature sensor error	Oil balance pipe temperature sensor Open or short	1. Bad connection of air temperature connector 2. Defect of oil temperature connector (Open/Short) 3. Defect of outdoor PCB
185* Master 11-851 Slave1 12-852 Slave2 13-853	Oil equalizing pipe temperature sensor error	Oil balance pipe temperature sensor Open or short	1. Bad connection of air temperature connector 2. Defect of oil temperature connector (Open/Short) 3. Defect of outdoor PCB
186* Master 11-861 Slave1 12-862 Slave2 13-863	Oil equalizing pipe temperature sensor error	Oil balance pipe temperature sensor Open or short	1. Bad connection of air temperature connector 2. Defect of oil temperature connector (Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart

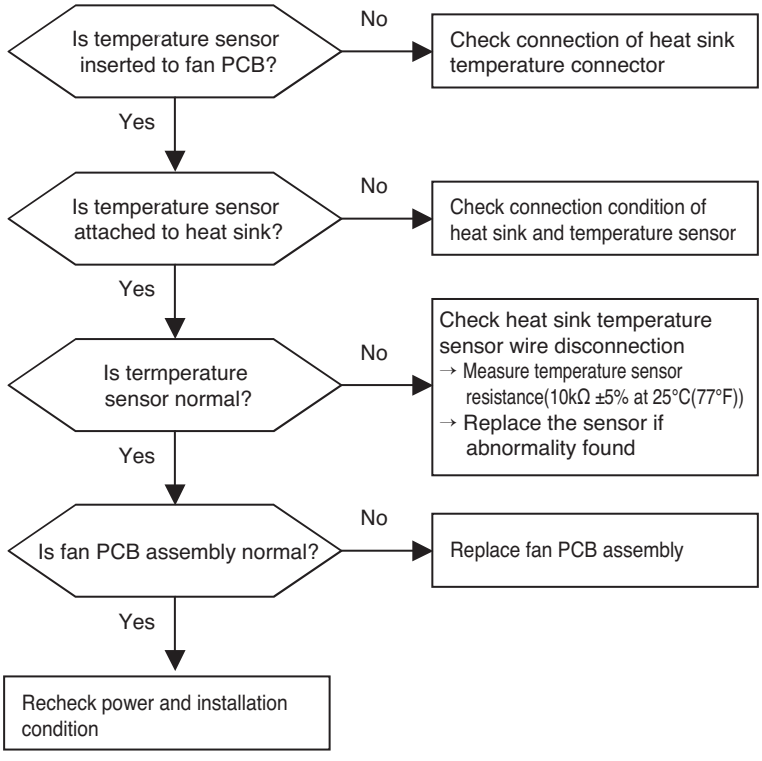


* If value is 100kΩ ↑(open) or 100Ω ↓(short), error occurs

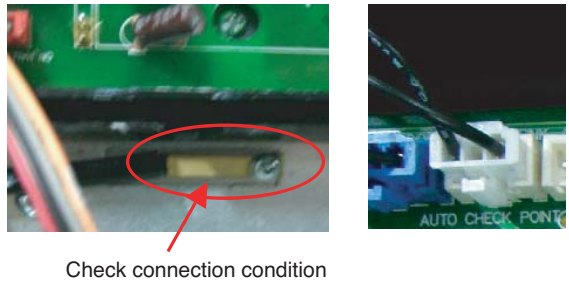
NB: Resistance value of temperature sensor change according to temperature
It is normal if value shown as below (±5% error)
Sensor of air temperature: 10°C(50°F) = 20.7kΩ : 25°C(77°F)= 10kΩ : 50°C(122°F)= 3.4kΩ
Sensor of piping temperature: 10°C(50°F) = 10kΩ : 25°C(77°F)= 5Ωk : 50°C(122°F)= 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
193* Master 11 → 931 Slave1 12 → 932 Slave2 13 → 933	Fan PCB heatsink temperature high	Heat sink temperature is over 95°C(203°F)	1. Heatsink temperature sensor defect 2. Fan PCB assembly defect
194* Master 11 → 941 Slave1 12 → 942 Slave2 13 → 943	Fan PCB heatsink temperature sensor error	Heatsink temperature sensor abnormal	1. Heatsink temperature sensor defect(Open/Short) 2. Wrong connection of temperature sensor connector 3. Fan PCB assembly defect

■ Error diagnosis and countermeasure flow chart

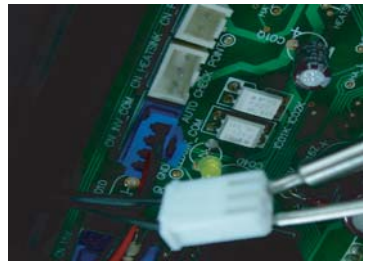


Fan heat sink connection



Check connection condition

Checking temperature sensor disconnection



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

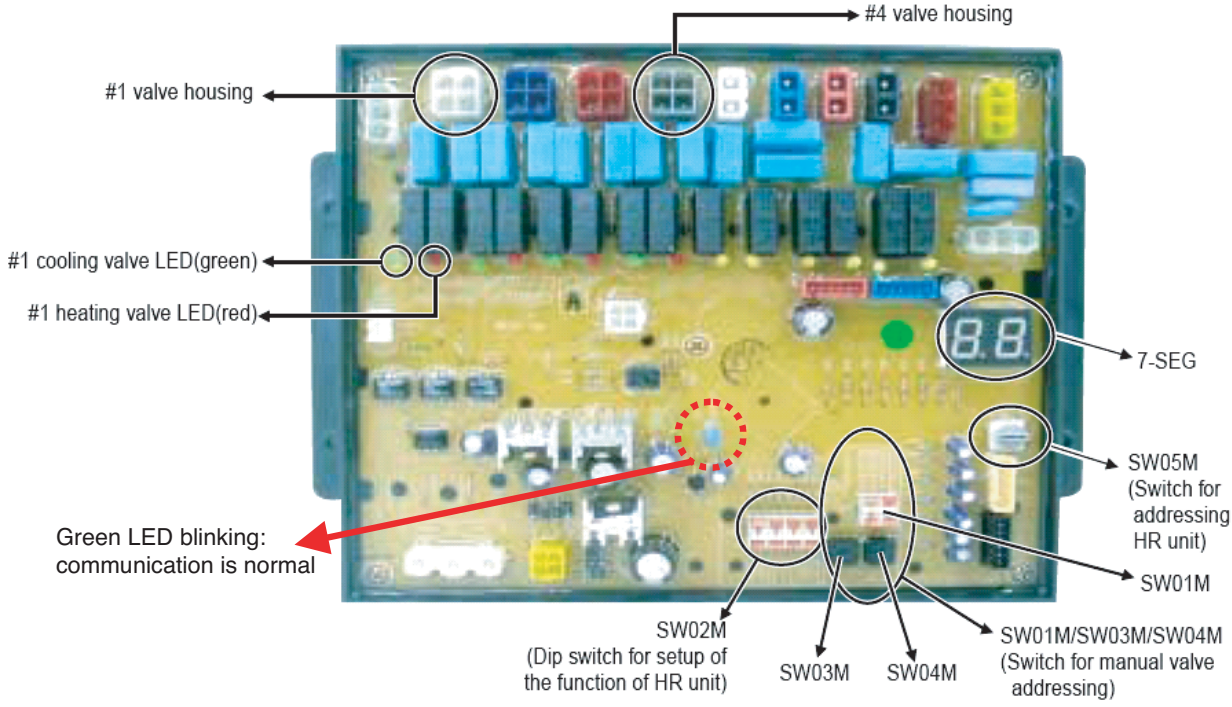
Error No.	Error type	Error point	Main reasons
204C#HR	Transmission error between the HR unit and outdoor unit	Transmission error between the HR unit and outdoor unit	1. Defective connection in HR unit power supply and communication connection 2. Wrong setting of the HR unit rotary switch and dip switch 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

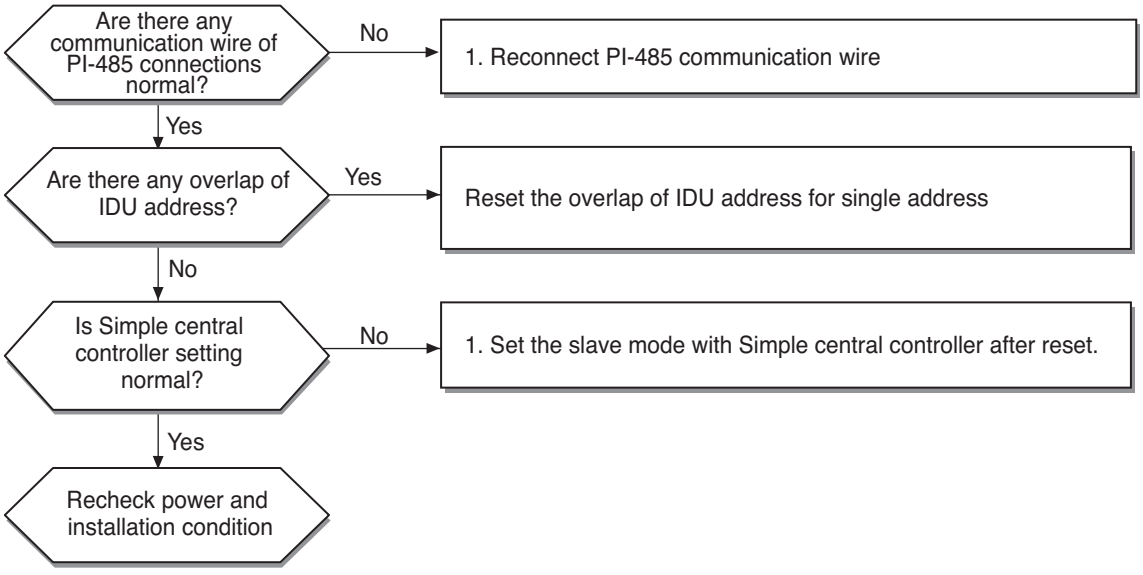
[NB] If Indoor units/communication cables of HR unit and cables of power 220V has been changed each other, communication parts and indoor will be burnt

HR Unit PCB

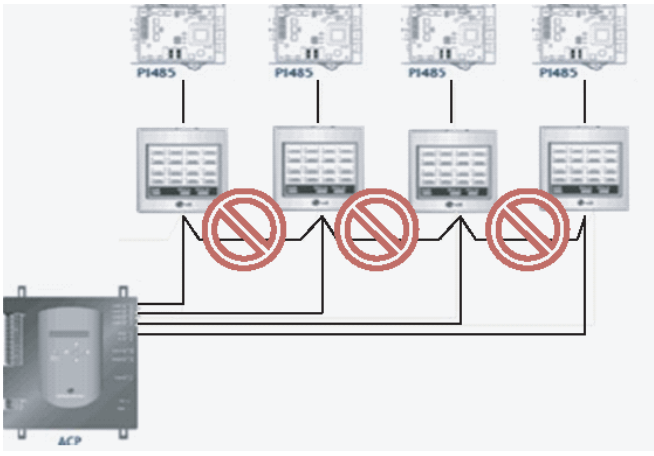


Error No.	Error Type	Error Point	Main Reasons
242	Network Error	Network error of central controller	1. PI-485 communication wiring defect 2. Communication defect between remote controller and indoor unit 3. PI-485 dip switch setting error 4. Indoor unit addressing ssetting error on central controller

■ Error diagnosis and countermeasure flow chart



<PI-485 communication wire miss connection>



P/NO : MFL67400005

AUGUST, 2011