CONFIDENTIAL

MULTI V™ S

Air Conditioner

SERVICE MANUAL (R410A)

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.

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

• There is risk of fire or failure of product.

Use the correctly rated breaker or fuse.

• There is risk of fire or electric shock.

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

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

Do not install the product on a defective installation stand.

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

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

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

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

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

Ventilate before operating air conditioner when gas leaked out.

• It may cause explosion, fire, and burn.

Securely install the cover of control box and the panel.

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

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

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

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

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

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■ Operation

Do not damage or use an unspecified power cable.

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

Use a dedicated power cable 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.

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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.

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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 (44.1 lbs).
- 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 powered on.

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

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Part 1
General Information

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1. Model Names

1.1 Indoor Unit

Category		Chassis Name	Capacity[Btu/h(kW)]														
			5.5 (1.6)	7.2 (2.2)	9.6 (2.8)	12.3 (3.6)	15.4 (4.5)	19.1 (5.6)	24.2 (7.1)	28.0 (8.2)	30.0 (8.8)	36.2 (10.6)	42.0 (12.3)	48.1 (14.1)	54.0 (15.8)	76.4 (22.4)	96.5 (28.0)
Wall Mounted		SB	ARNU053 SB*4	ARNU073 SB*4	ARNU093 SB*4	ARNU123 SB*4	ARNU153 SB*4										
		SC						ARNU183 SC*4	ARNU243 SC*4								
		SV									ARNU303 SVA4	ARNU363 SVA4					
ART COOL		SF			ARNU093 SFA4	ARNU123 SFA4											
Ceiling Cassette	1 Way	TU		ARNU073 TUC4	ARNU093 TUC4	ARNU123 TUC4											
		TT						ARNU183 TTC4	ARNU243 TTC4								
	2 Way	TL						ARNU183 TLC4	ARNU243 TLC4								
	4 Way	TR	ARNU053 TRC4	ARNU073 TRC4	ARNU093 TRC4	ARNU123 TRC4											
		TQ					ARNU153 TQC4	ARNU183 TQC4									
		TP							ARNU243 TPC4	ARNU283 TPC4							
		TN		ARNU073 TNA4	ARNU093 TNA4	ARNU123 TNA4	ARNU153 TNA4	ARNU183 TNA4	ARNU243 TNA4			ARNU363 TNA4					
		TM							ARNU243 TMA4	ARNU283 TMA4		ARNU363 TMA4	ARNU423 TMA4	ARNU483 TMA4			
Ceiling Concealed Duct	High Static	BH		ARNU073 BHA4	ARNU093 BHA4	ARNU123 BHA4	ARNU153 BHA4	ARNU183 BHA4	ARNU243 BHA4								
		BG		ARNU073 BGA4	ARNU093 BGA4	ARNU123 BGA4	ARNU153 BGA4	ARNU183 BGA4	ARNU243 BGA4	ARNU283 BGA4		ARNU363 BGA4	ARNU423 BGA4				
		BR								ARNU283 BRA4		ARNU363 BRA4	ARNU423 BRA4	ARNU483 BR*4	ARNU543 BRA4		
		B8										ARNU363 B8A4	ARNU423 B8A4	ARNU483 B8A4		ARNU763 B8*4	ARNU963 B8*4
	Low Static	L1		ARNU073 L1G4	ARNU093 L1G4												
		L2				ARNU123 L2G4	ARNU153 L2G4	ARNU183 L2G4									
		L3							ARNU243 L3G4								
	Built In	B3		ARNU073 B3G4	ARNU093 B3G4	ARNU123 B3G4	ARNU153 B3G4										
		B4						ARNU183 B4G4	ARNU243 B4G4								
Ceiling & Floor		VE			ARNU093 VEA2	ARNU123 VEA2											
Ceiling Suspended		VJ						ARNU183 VJA2	ARNU243 VJA2								
Floor Standing	With Case	CE		ARNU073 CEA4	ARNU093 CEA4	ARNU123 CEA4	ARNU153 CEA4										
		CF						ARNU183 CFA4	ARNU243 CFA4								
	Without Case	CE		ARNU073 CEU4	ARNU093 CEU4	ARNU123 CEU4	ARNU153 CEU4										
		CF						ARNU183 CFU4	ARNU243 CFU4								
Vertical AHU		NJ				ARNU123 NJA4		ARNU183 NJA4	ARNU243 NJA4		ARNU303 NJA4	ARNU363 NJA4					
		NK											ARNU423 NKA4	ARNU483 NKA4	ARNU543 NKA4		

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

1.2 Outdoor Unit

Power Supply	3TON	4TON
1 Ø, 208/230 V, 60 Hz	ARUM036GSS5	ARUM048GSS5

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1.3 HR Unit

2 Series

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

3 Series

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

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

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2. External Appearance

2.1 Indoor Unit

Ceiling Cassette- 1Way

ARNU073TUD4
ARNU093TUD4
ARNU123TUD4
ARNU183TTD4
ARNU243TTD4

Ceiling Cassette- 4Way

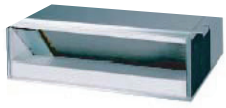
ARNU053TRC4	ARNU243TPC4	ARNU423TMC4
ARNU073TRC4	ARNU283TPC4	ARNU483TMC4
ARNU093TRC4	ARNU073TNA4	
ARNU123TRC4	ARNU093TNA4	
ARNU153TQC4	ARNU123TNA4	
ARNU053TRD4	ARNU153TNA4	
ARNU073TRD4	ARNU183TNA4	
ARNU093TRD4	ARNU243TNA4	
ARNU123TRD4	ARNU363TNC4	
ARNU183TQC4	ARNU243TMA4	
ARNU153TQD4	ARNU283TMA4	
ARNU183TQD4	ARNU363TMA4	

Ceiling Concealed Duct - Low Static

ARNU073L1G4
ARNU093L1G4
ARNU123L2G4
ARNU153L2G4
ARNU183L2G4
ARNU243L3G4

Ceiling Concealed Duct – Built-in

ARNU073B3G4
ARNU093B3G4
ARNU123B3G4
ARNU153B3G4
ARNU183B4G4
ARNU243B4G4



Ceiling Concealed Duct – Middle Static

ARNU073M1A4	ARNU123M2A4	
ARNU093M1A4	ARNU153M2A4	
ARNU123M1A4	ARNU183M2A4	
ARNU153M1A4	ARNU243M2A4	
ARNU183M1A4	ARNU283M2A4	ARNU363M3A4
ARNU243M1A4	ARNU363M2A4	ARNU423M3A4
ARNU073M2A4	ARNU423M2A4	ARNU483M3A4
ARNU093M2A4	ARNU283M3A4	ARNU543M3A4

Ceiling & Floor

ARNU093VEA2
ARNU123VEA2

Ceiling Suspended

URNU183VJA2
URNU243VJA2

Ceiling Cassette -2Way

ARNU183TSA4
ARNU243TSA4

Ceiling Concealed Duct - High Static

ARNU073BHA4	ARNU283BRA4
ARNU093BHA4	ARNU363BRA4
ARNU123BHA4	ARNU423BRA4
ARNU153BHA4	ARNU483BR*4
ARNU183BHA4	ARNU543BRA4
ARNU243BHA4	ARNU363B8A4
ARNU073BGA4	ARNU423B8A4
ARNU093BGA4	ARNU483B8*4
ARNU123BGA4	ARNU763B8*4
ARNU153BGA4	ARNU963B8*4
ARNU183BGA4	
ARNU243BGA4	
ARNU283BGA4	
ARNU363BGA4	
ARNU423BGA4	

* A : Basic, Z : FAU

Wall Mounted

ARNU053SJA4	ARNU153SJA4
ARNU053SJR4	ARNU153SJR4
ARNU073SJA4	ARNU183SKA4
ARNU073SJR4	ARNU183SKR4
ARNU093SJA4	ARNU243SKA4
ARNU093SJR4	ARNU243SKR4
ARNU123SJA4	ARNU303SVA4
ARNU123SJR4	ARNU363SVA4

* A : Basic, R : Mirror

ART COOL

ARNU093SFA4
ARNU123SFA4

Floor Standing

With case

ARNU073CEA4
ARNU093CEA4
ARNU123CEA4
ARNU153CEA4
ARNU183CFA4
ARNU243CFA4

Without case

ARNU073CEU4
ARNU093CEU4
ARNU123CEU4
ARNU153CEU4
ARNU183CFU4
ARNU243CFU4

Vertical AHU

ARNU123NJA4
ARNU183NJA4
ARNU243NJA4
ARNU303NJA4
ARNU363NJA4
ARNU423NKA4
ARNU483NKA4
ARNU543NKA4

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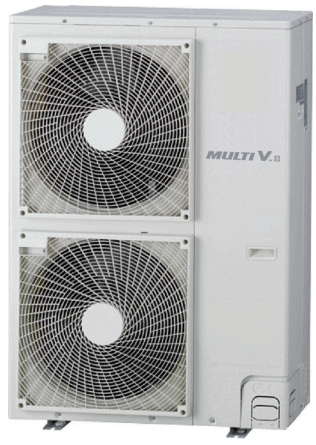
2.2 Outdoor Unit

CHASSIS	Model Name	External Appearance
U3	ARUM048GSS5 ARUM036GSS5	

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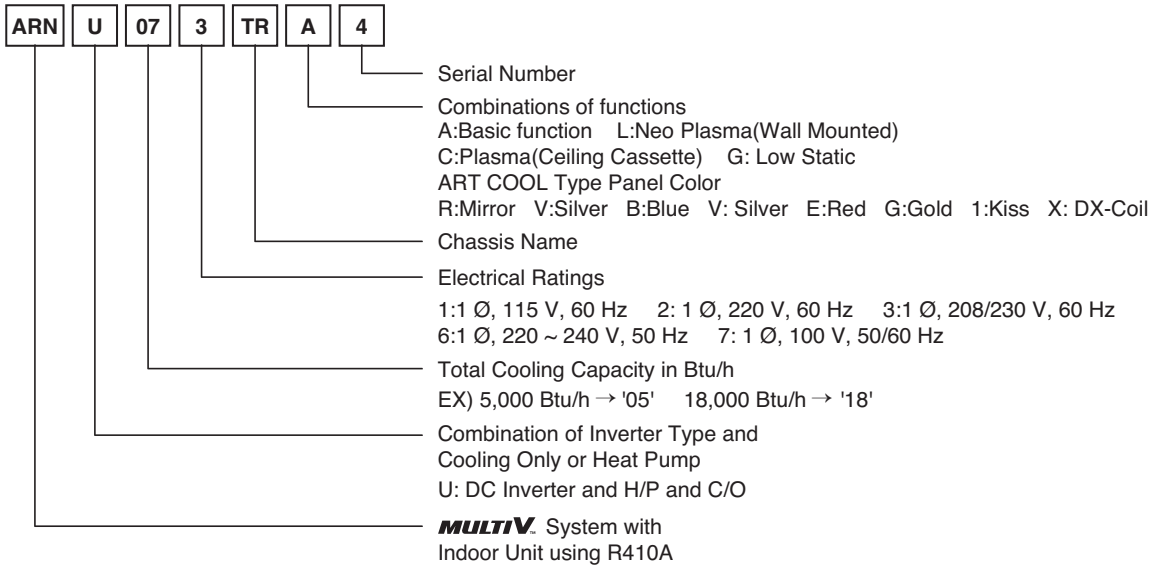
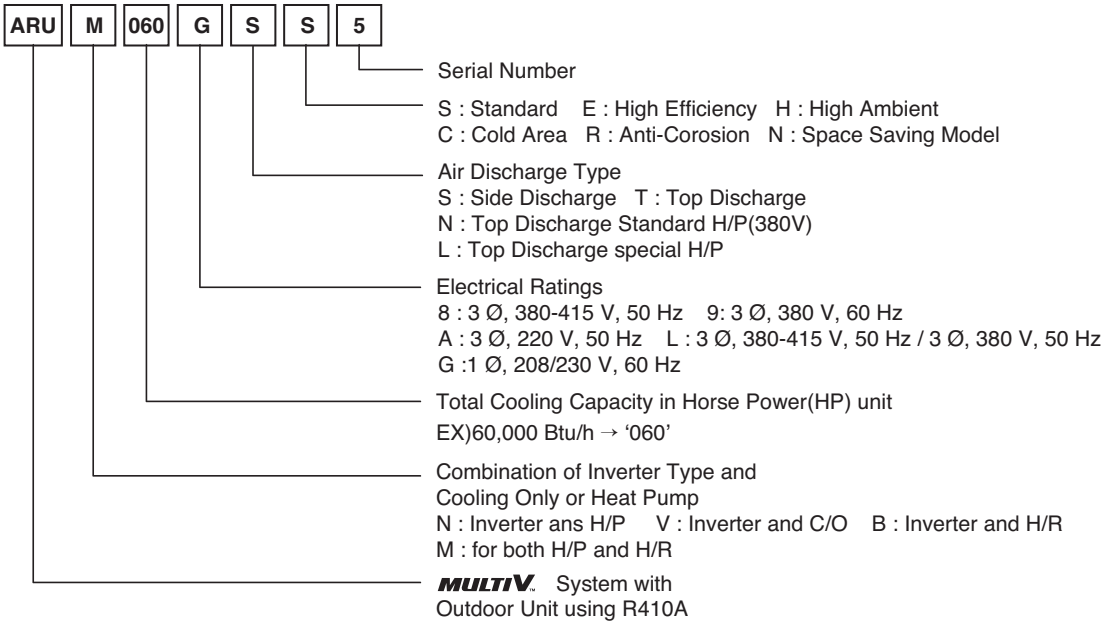
3. Nomenclature

3.1 Indoor Unit



※ Heat recovery ventilator refer to the DX-Coil manual

3.2 Outdoor Unit



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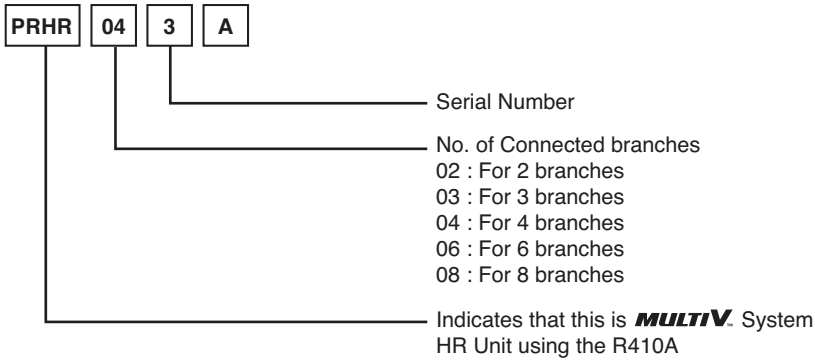
3.3 HR Unit



※ These are model names of the basic function.

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Part 2
Outdoor Units

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ARU* Series

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Function

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1. Basic control

1.1 Normal operation

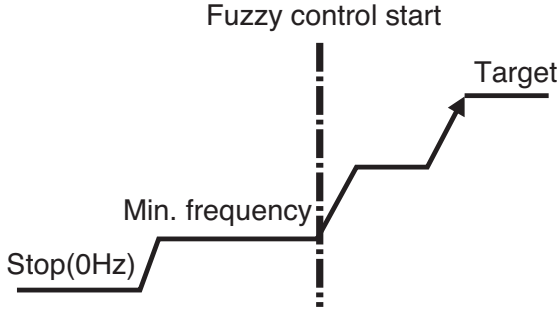
Actuator	Cooling operation	Heating operation	Stop state
Compressor	Fuzzy control	Fuzzy control	Stop
Fan	Fuzzy control	Fuzzy control	Stop
Main EEV	Full open	Fuzzy control	Min. pulse
Subcooling EEV	Fuzzy control	Fuzzy control	Min. pulse
Indoor Unit EEV	Superheat fuzzy control	Subcooling fuzzy control	Min. pulse

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

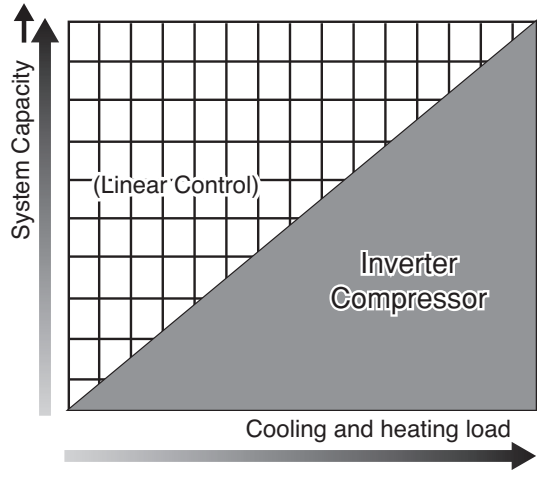
1.2 Compressor control

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

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



Fuzzy Control



Inverter linear control as cooling and heating load increasing

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1.3 EEV control

(1) Main EEV control
Main EEV operates with fuzzy control rules to keep the degree of super Heat(Superheat) (about 3 °C(37.4 °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(59 °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 and discharge temperature is above 85 °C(185 °F) in heating operation, subcooling EEV may control the "subcooling out temperature-evaporating temperature" to be some given difference.

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2. Special control

2.1 Oil return control

2.1.1 Oil return control on cooling mode

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

Outdoor Unit

Component	Starting	Running	Ending
Inverter compressor	30Hz	Setting Value	30Hz
Fan	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Max. pulse
Subcooling EEV	Min. pulse	Min. pulse	Min. pulse
4way valve 1	OFF	OFF	OFF
4way valve 2	Heat Recovery : OFF Heat pump : ON	OFF	OFF

Indoor Unit

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

- Oil return operation time : 3 min for running step
- Starting condition : Every 8 hours operate
- Oil return process ends if compressor protection control starts

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2.1.2 Oil return control on heating mode

Outdoor Unit

Component	Starting	Running	Ending
Inverter compressor	30 Hz	Setting Value	40 Hz
Fan	OFF	Normal control	OFF
Main EEV	300 pulse	Max. pulse	200 pulse
Subcooling EEV	Min. pulse	Min. pulse	Min. pulse
4way valve 1	ON	OFF	ON
4way valve 2	Heat Recovery : OFF Heat pump : OFF	OFF	OFF

Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	Normal control	Normal control
Thermo on unit EEV	Normal control	400~800 pulse	1200 → 600 → Normal Control
Thermo off unit EEV	60~100 pulse	400~800 pulse	1200 → 600 → 60~100 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

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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
Inverter compressor	30 Hz	Setting Value	40 Hz
Fan	OFF	Normal control	OFF
Main EEV	300 pulse	Max. pulse	200 pulse
Subcooling EEV	Min. pulse	Min. pulse	Min. pulse
4way valve 1	OFF	OFF	ON
4way valve 2	OFF	OFF	OFF

Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	Normal control	Normal control
Thermo on unit EEV	Normal control	400~800 pulse	1200 → 600 → Normal Control
Thermo off unit EEV	60~100 pulse	400~800 pulse	1200 → 600 → 60~100 pulse

■ Ending condition

1) All heat exchanger pipe temperature are above setting temperature for 30 seconds.
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.

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2.3 Stopping operation

2.3.1 Stopping operation on cooling mode

Component	Operation	Note
Inverter compressor	0 Hz	-
Fan	Stop	-
Main EEV	Min. pulse	-
Subcooling EEV	Min. pulse	-
4way valve 1	OFF	-
4way valve 2	Heat Recovery : OFF	-
	Heat Pump : ON	-

2.3.2 Stopping operation on heating mode

Component	Operation	Note
Inverter compressor	0 Hz	-
Fan	Stop	-
Main EEV	Min. pulse	-
Subcooling EEV	Min. pulse	-
4way valve 1	ON	OFF over 30 °C[86 °F] air temperature
4way valve 2	OFF	-

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3. Protection control

3.1 Pressure protection control

3.1.1 Pressure control on cooling mode

■ **High pressure control**

Pressure Range	Compressor	Fan
Pd ≥ 4000 kPa(580.2 psi)	Stop	Stop
Pd > 3775 kPa(547.5 psi)	-15 Hz / 10 seconds	+100 RPM / 10 seconds
Pd ≥ 3650 kPa(529.4 psi)	Frequency holding	RPM holding
Pd ≥ 3480 kPa(504.7 psi)	+2 Hz or less / 10 seconds	RPM holding
Pd < 3480 kPa(504.7 psi)	Normal control	

■ **Low pressure control**

Pressure Range	Compressor	Fan
Ps ≤ 110 kPa(15.9 psi)	Stop (1 min. later)	Stop
Ps ≤ 150 kPa (21.8 psi)	-10 Hz / 10 seconds	-100 RPM / 10 seconds
Ps > 150 kPa (21.8 psi)	Frequency holding	RPM holding
Ps > 185 kPa (26.8 psi)	+2 Hz or less / 20 seconds	-100 RPM / 10 seconds
Ps > 220 kPa (31.9 psi)	+2 Hz or less / 10 seconds	-100 RPM / 10 seconds
Ps > 260 kPa (37.7 psi)	Normal control	

❉ 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
Pd ≥ 4000 kPa(580.2 psi)	Stop	Stop
Pd > 3415 kPa(495.3 psi)	-15 Hz / 10 seconds	-50 RPM / 10 seconds

■ **Low pressure control**

Pressure Range	Compressor	Fan
Ps ≤ 50 kPa (7.3 psi)	Stop (1 min. later)	Stop
Ps ≤ 70 kPa (10.2 psi)	-10 Hz / 10 seconds	+100 RPM / 10 seconds
Ps ≤ 70 kPa (10.2 psi)	Frequency holding	RPM holding
Ps > 100 kPa (14.5 psi)	+2 Hz or less / 20 seconds	+100 RPM / 10 seconds
Ps > 185 kPa (26.8 psi)	+2 Hz or less / 10 seconds	+100 RPM / 10 seconds
Ps > 220 kPa (31.9 psi)	Normal control	

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

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3.2 Discharge temperature control

■ **Outdoor unit control**

Temperature Range	Compressor	Sub cooling EEV	IDU EEV
Tdis >113 °C (235.4 °F)	-5 Hz / 10 seconds	SC,SH decrease control	SH decrease control
Tdis >110 °C (230 °F)	-5 Hz / 30 seconds	SC,SH decrease control	SH decrease control
Tdis≥ 105 °C (221 °F)	Frequency holding	SC,SH decrease control	SH decrease control
Tdis≤ 100 °C (212 °F)	+3 Hz or less	SC,SH decrease control	SH decrease control
Tdis >100 °C (212 °F)	Normal control	SC,SH decrease control	SH decrease control

SC : Sub Cooling, SH : Super Heating

3.3 Inverter protection control

- Cooling mode

	Normal Operation	Frequency Down	System Stop
AC input Current	27 A or less	29 A or more	31 A or more
Compressor Current	34 A or less	35 A or more	46 A or more

- Heating mode

	Normal Operation	Frequency Down	System Stop
AC input Current	30 A or less	32 A or more	34 A or more
Compressor Current	34 A or less	35 A or more	46 A or more

3.4 Pressure switch

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

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4. Other control

4.1 Initial setup

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

1) Step 1 : factory setting value display
Factory setting value is displayed in 7 segment on PCB for 24 seconds.
All dip switches must be set properly before step 1.

Power is on		
Master model code is displayed (3 seconds)		(In case of 5 TON : 07)
Blank(6 seconds)		
Total capacity including sub units is displayed (2 seconds)		
Heat Pump : Display 2 is default value Heat Recovery : Display 3 is default value		
Power type		
Model type		

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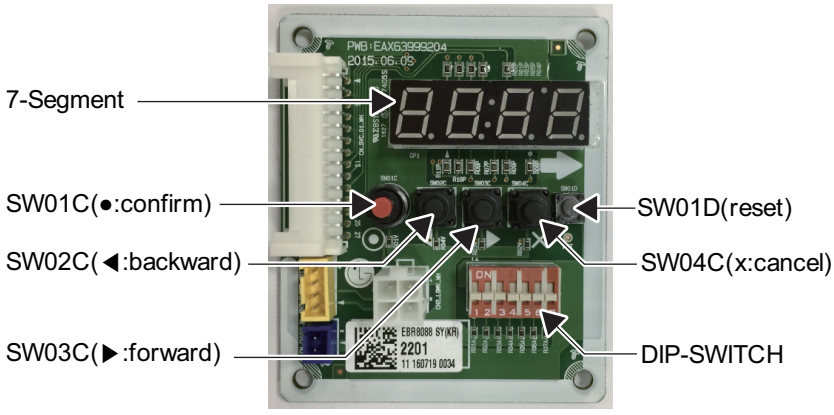
2) Step 2 : Communication check
   - If all model code is displayed in 7 segment communication between outdoor units is normal.
   - If 104* is displayed in 7 segment, check communication wires between outdoor units and Dip switch setting.

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

4) Step 4 : Auto addressing of indoor units
   - Auto addressing begins when address(red) button in Main PCB is pressed for 6 seconds.
   - During auto addressing, 7 segment on main PCB displays "88"
   - After auto addressing, the number of indoor units is displayed in 7 segment for 30 seconds. The address of each indoor unit is displayed on each wired remote controller.

Push address(red) button for 3 seconds

■ **Service PCB**



Auto address starts	
Auto address is in progress (max. 15 min.)	
The number of indoor units is displayed for 30 seconds	 (12 indoor units found)
Auto address process is finished. Every indoor unit displays its address on wired remote controller and the 7 segment of main PCB is off.	

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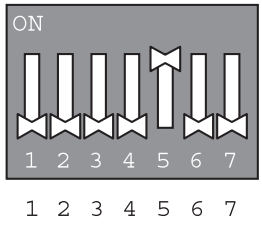
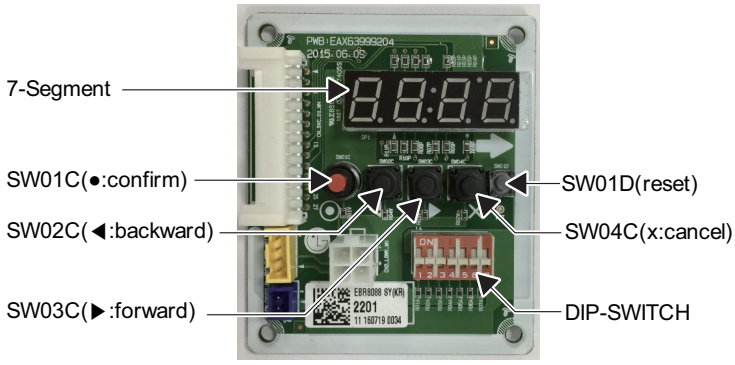
■ Setting the function

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





MODE		FUNCTION		OPTION			VALUE		ACTION		remarks
content	Display1	content	Display2	content		Display3	content	Display4	implement	Display5	
Installation	Func	Cool & Heat Selector (Only Heatpump)	Fn 1	oFF	op1~op2	selected the option	-	-	change the set value	blank	save in EEPROM
		Static pressure compensation	Fn2	oFF	op1~op3	selected the option	-	-	change the set value	blank	save in EEPROM
		Night low noise	Fn3	oFF	op1~op15	selected the option	-	-	change the set value	blank	save in EEPROM
		ODU address	Fn5	-		-	0~254	set the value	change the set value	blank	save in EEPROM
		Snow removal & rapid defrost	Fnb	oFF	op1~op3	selected the option	-	-	change the set value	blank	save in EEPROM
		Target pressure adjusting	FnB	oFF	op1~op7	selected the option	-	-	change the set value	blank	save in EEPROM
SVC	Suc	Pump Down	SE 1	-		-	-	-	start operation	Pd	-
		Vacuum mode	SE3	-		-	-	-	start operation	uAcc	-
		Forced oil return	SE5	-		-	-	-	start operation	o 1	-
		Forced defrost	SEb	-		-	-	-	start operation	dEF	-
		Cycle data view	SEB	-		-	-	-	Show in segment	Show the each numerical value in process	-
		Refrigerant noise reduction mode	SE9	oFF	op1~op2	-	-	-	Change the set value	on oFF	save in EEPROM

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

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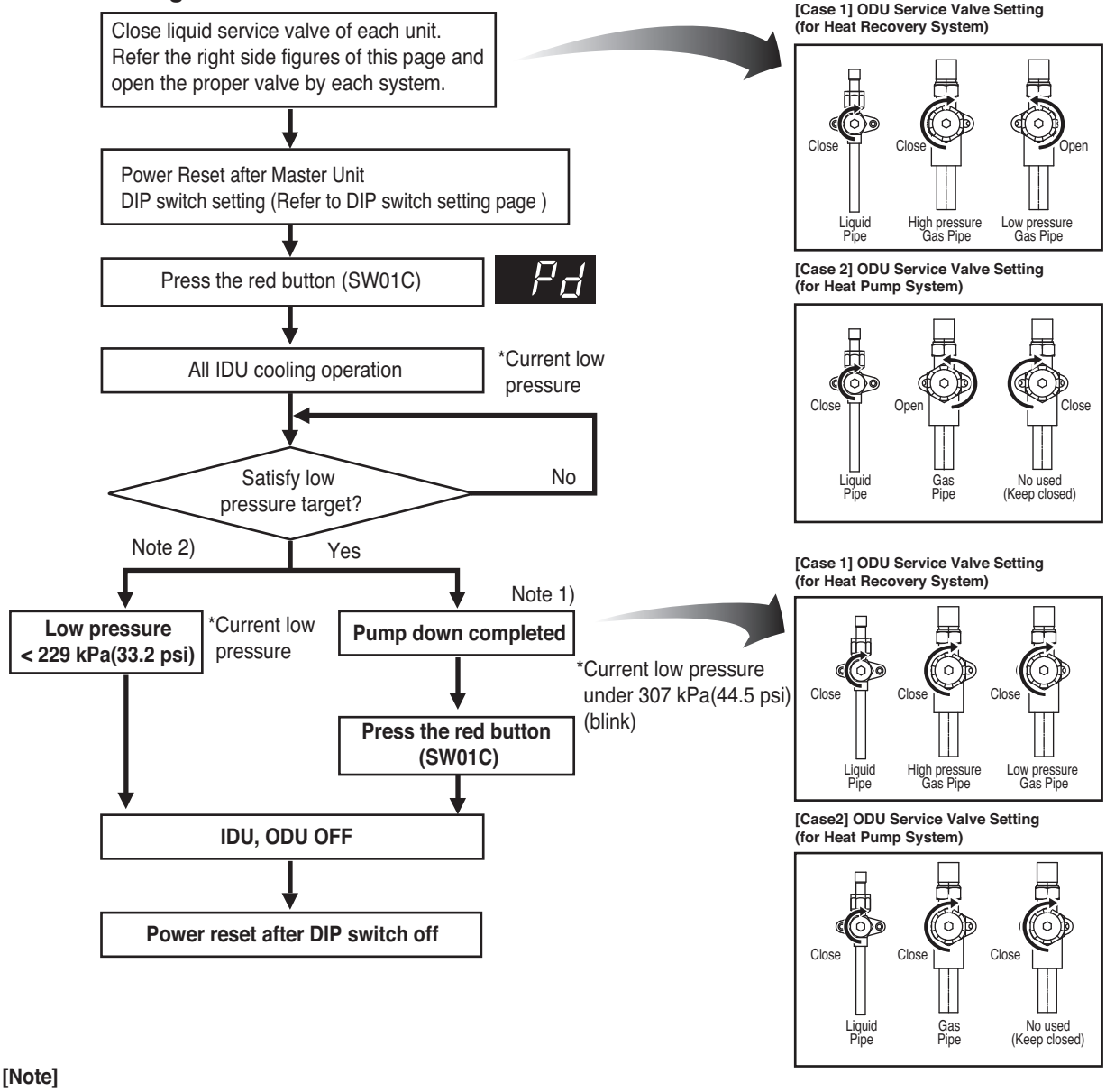
4.2 Pump Down

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.

Setting method



[Note]

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

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

⚠ Caution

1.Use pump down function within guaranteed temperature range
   IDU : 20~32 °C(68~89.6 °F)
   ODU : 5~40 °C(41~104 °F)
2. Make certain that IDU doesn't run with thermo off mode during operation
3. Maximum operation time of pump down function is 30 min.
   (in case low pressure doesn't go down)

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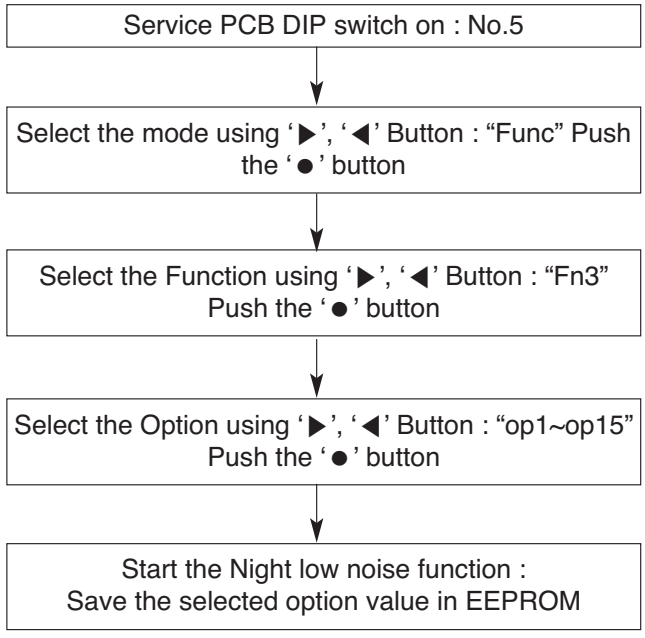
4.3 Night Low Noise Function

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

Night low noise function setting method



RPM / Time Settings

Step	Judgment Time(Hr)	Operation Time(Hr)
op1	8	9
op2	6.5	10.5
op3	5	12
op4	8	9
op5	6.5	10.5
op6	5	12
op7	8	9
op8	6.5	10.5
op9	5	12
op10	Continuous operation	
op11		
op12		
op13	6.5	10.5
op14	6.5	10.5
op15	6.5	10.5

CAUTION

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

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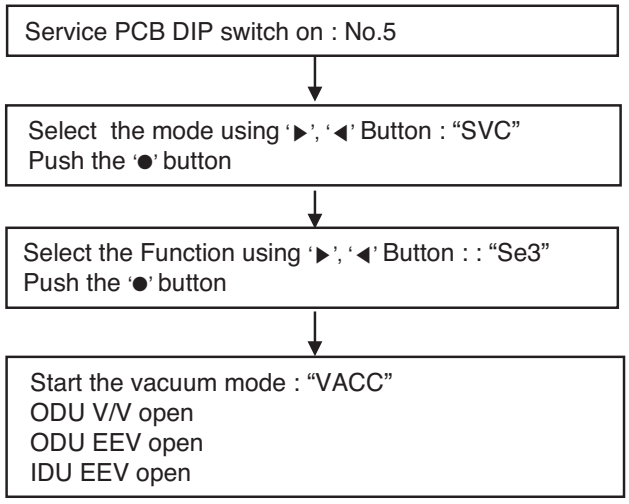
4.4 Vacuum Mode

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

Vacuum mode setting method



Vacuum mode cancellation method

Push the reset button on Master unit PCB

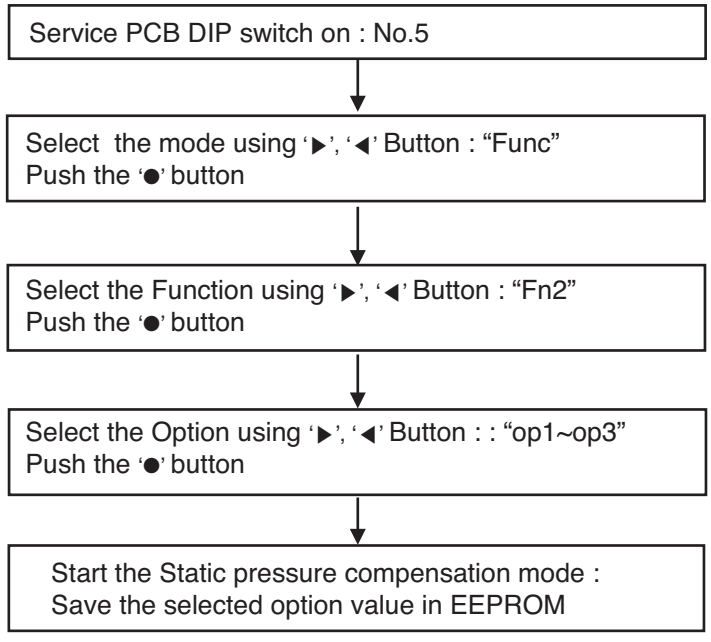
CAUTION

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

4.5 Static pressure compensation mode

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

Static pressure compensation mode setting method



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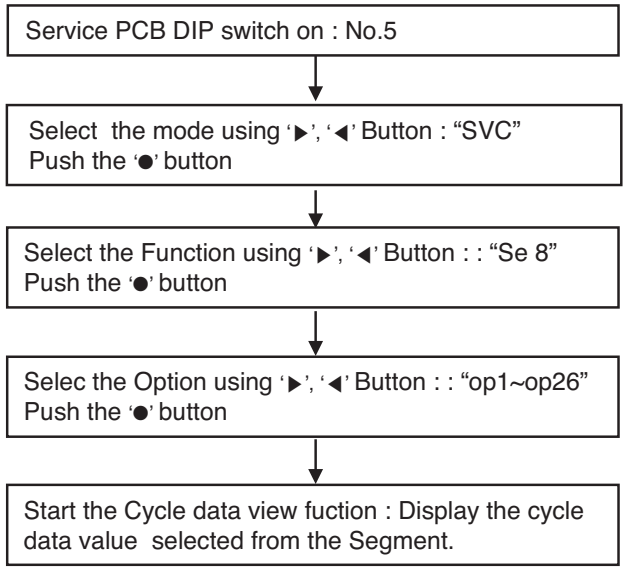
4.6 Cycle Data View

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

The 7 Segment is display 26 different cycle data.

Cycle data view function setting method



No	Title	7-seg	example	Seg_1	Seg_2	Seg_3	Seg_4
1	Current High Pressure	P1	4321 kPa(626.7 psi)	4	3	2	1
2	Current Low Pressure	P2	1234 kPa(179 psi)	1	2	3	4
3	Inv. Comp.	H1	120 Hz		1	2	0
4	Fan1	H3	110 RPM		1	1	0
5	Fan2	H4	110 RPM		1	1	0
6	Superheating degreee	T1	53		5	3	0
7	Subcooling degreee	T2	-4.5	–		4	5
8	ODU temp.	T3	10		1	0	0
9	Suction temp.	T4	43.4		4	3	4
10	Comp. discharge temp.	T5	150	1	5	0	0
12	Liquid pipe temp.	T7	10		1	0	0
14	SC_OUT	T9	10		1	0	0
15	Hex	T10	10		1	0	0
18	Inlet pipe average temp. of IDU	T13	-10	–	1	0	0
19	Main EEV	PLS1	1950 pls	1	9	5	0
21	SC EEV	PLS3	16 pls			1	6
25	IDU running capacity	IDU1	24 KBtu			2	4
26	Total number of IDU	IDU2	10 EA			1	0

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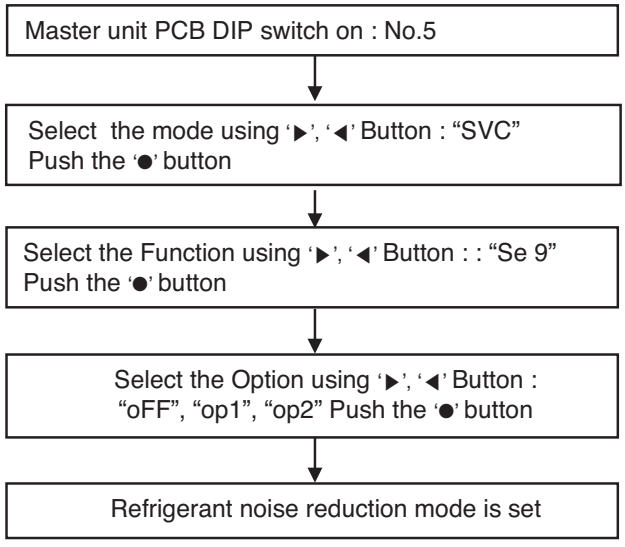
4.7 Refrigerant noise reduction mode

Refrigerant noise reduction mode setting method



mode setting

Option	Setting
Off	Fast cooling &Fast heating
op1	Powerful Refrigerant noise reduction Mode
op2	Mild Refrigerant noise reduction Mode

CAUTION

- Ask an authorized technician to setting a function.
- Change a power consumption or efficiency.

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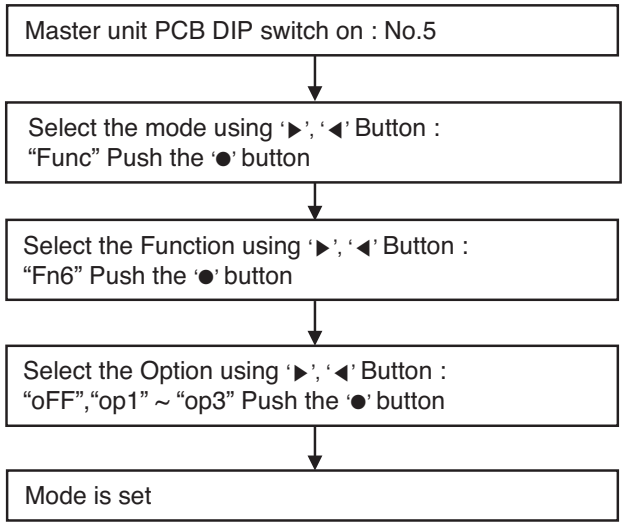
4.8 Snow removal & rapid defrost

Mode setting method



Mode setting

setting	Mode
oFF	Not setting
op1	Snow removal mode
op2	Rapid defrost mode
op3	Snow removal mode. + Rapid defrost mode.

CAUTION

- Ask an authorized technician to setting a function.
- If do not use a function, set an off-mode.
- For cold and humid areas, set the rapid defrost.

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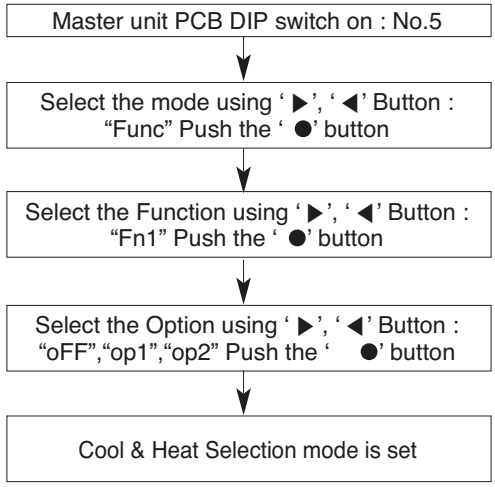
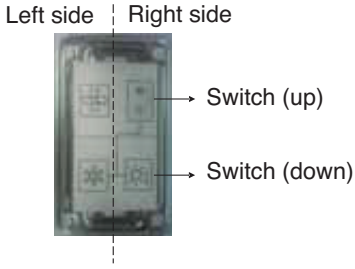
4.9 Cool & Heat Selector (Only Heatpump)

mode setting method



mode setting method

Switch control		Function		
Switch(up)	Switch(down)	oFF	op1(mode)	op2(mode)
Right side(on)	Left side(off)	Not operate	Cooling	Cooling
Right side(on)	Right side(on)	Not operate	Heating	Heating
Left side(off)	-	Not operate	Fan mode	Off



CAUTION

- Ask an authorized technician to setting a function.
- If do not use a function, set an off-mode.
- If use a function, first install a Cool & Heat selector.

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Part 3
HR Units

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HR Units

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Specifications

1. HR Unit

2 Series

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

3 Series

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

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

Notes:

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

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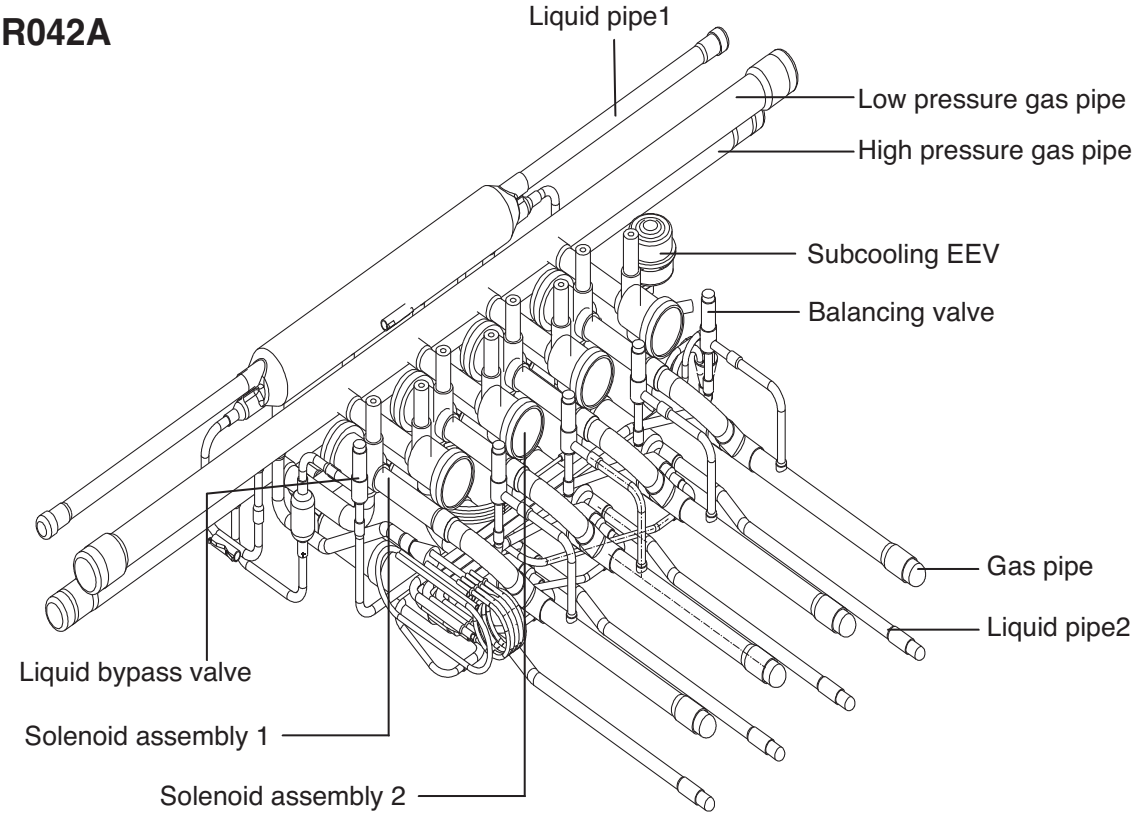
Parts Functions

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

PRHR042A



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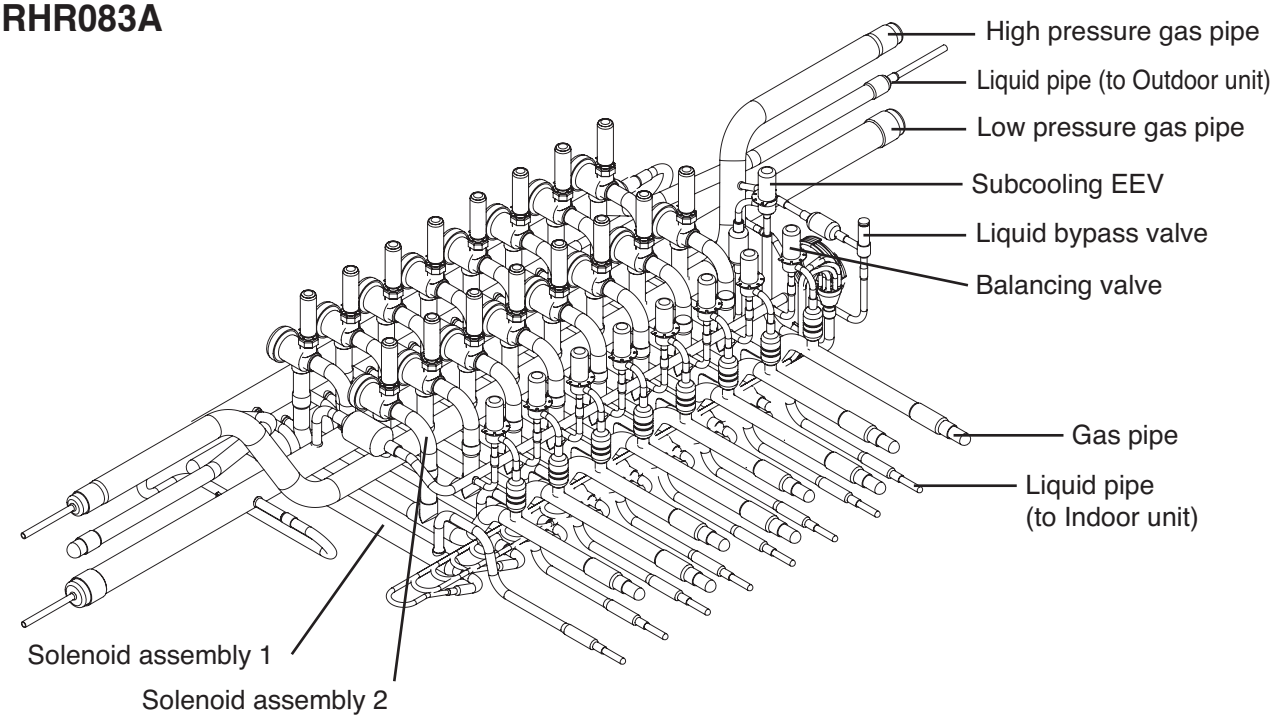
Parts name	Symbol	Major function
Low pressure gas pipe	LPGV	Pipe for low pressure gas
High pressure gas pipe	HPGV	Pipe for high pressure gas
Liquid pipe (to Outdoor unit)	LP(ODU)	Liquid pipe connected with outdoor unit
Liquid bypass valve	LBV	Prevent liquid charging
Solenoid assembly 1, 2	SOL1, 2	Control the path for heating or cooling
Liquid pipe (to Indoor unit)	LP(IDU)	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

PRHR083A



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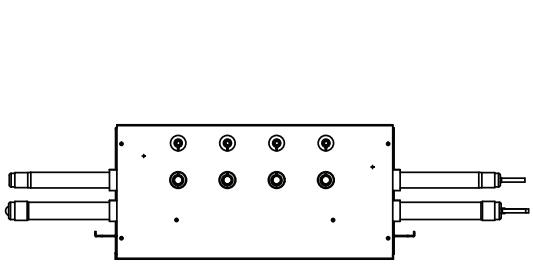
Dimensions

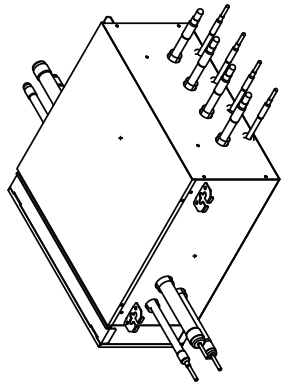
1. HR Units

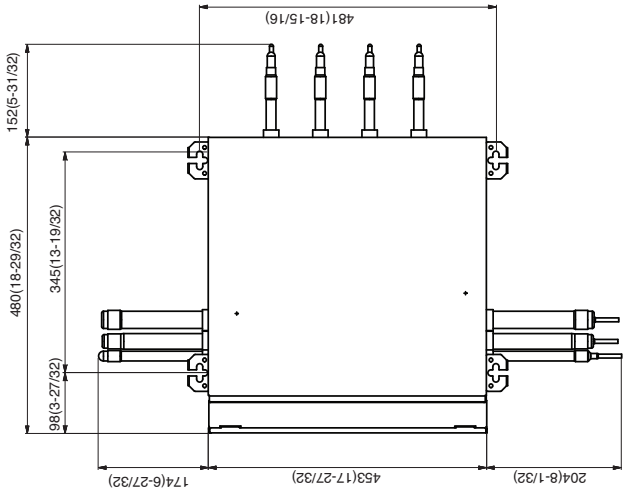
Outdoor Unit

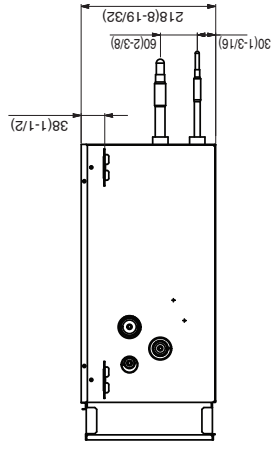
PRHR042/PRHR042A
PRHR032/PRHR032A
PRHR022/PRHR022A

[Unit : mm(inch)]









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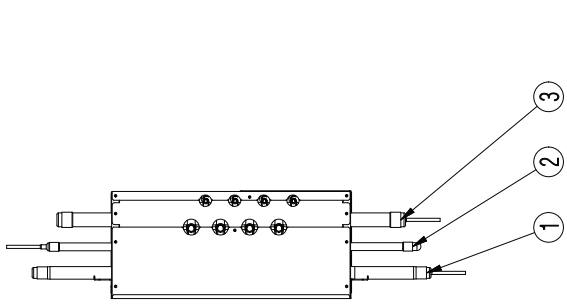
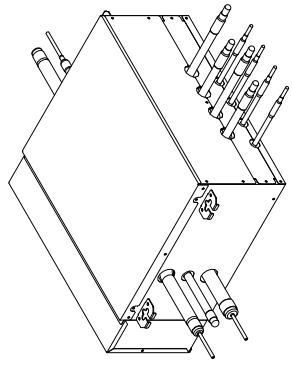
HR Unit

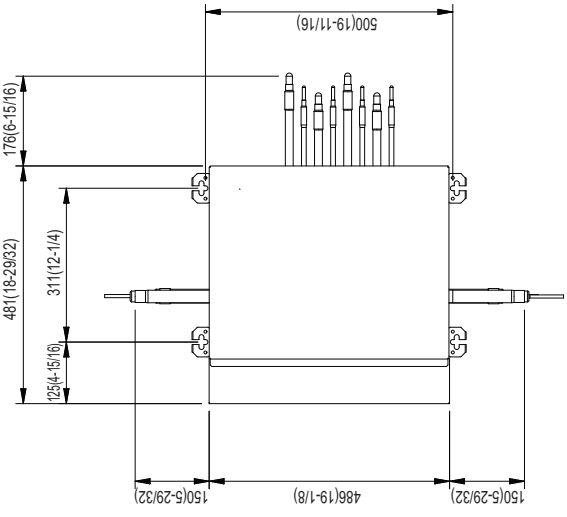
PRHR023 / PRHR023A
PRHR033 / PRHR033A
PRHR043 / PRHR043A

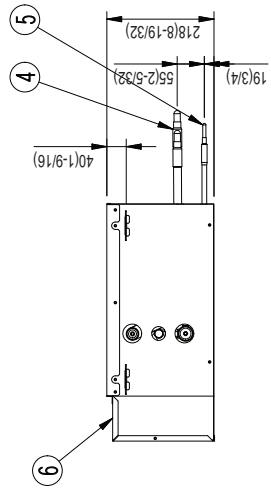
[Unit : mm(inch)]

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









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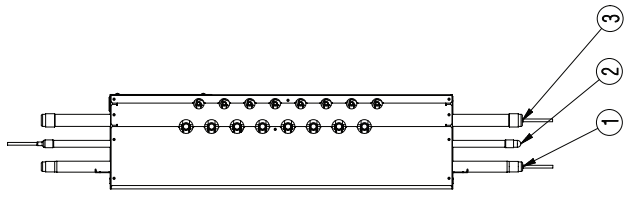
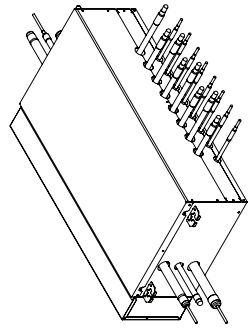
HR Unit

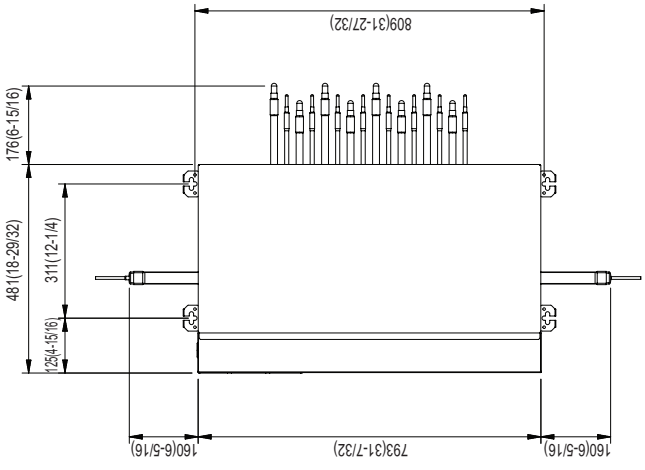
PRHR063 / PRHR063A
PRHR083 / PRHR083A

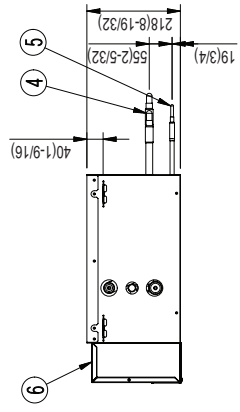
[Unit : mm(inch)]

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









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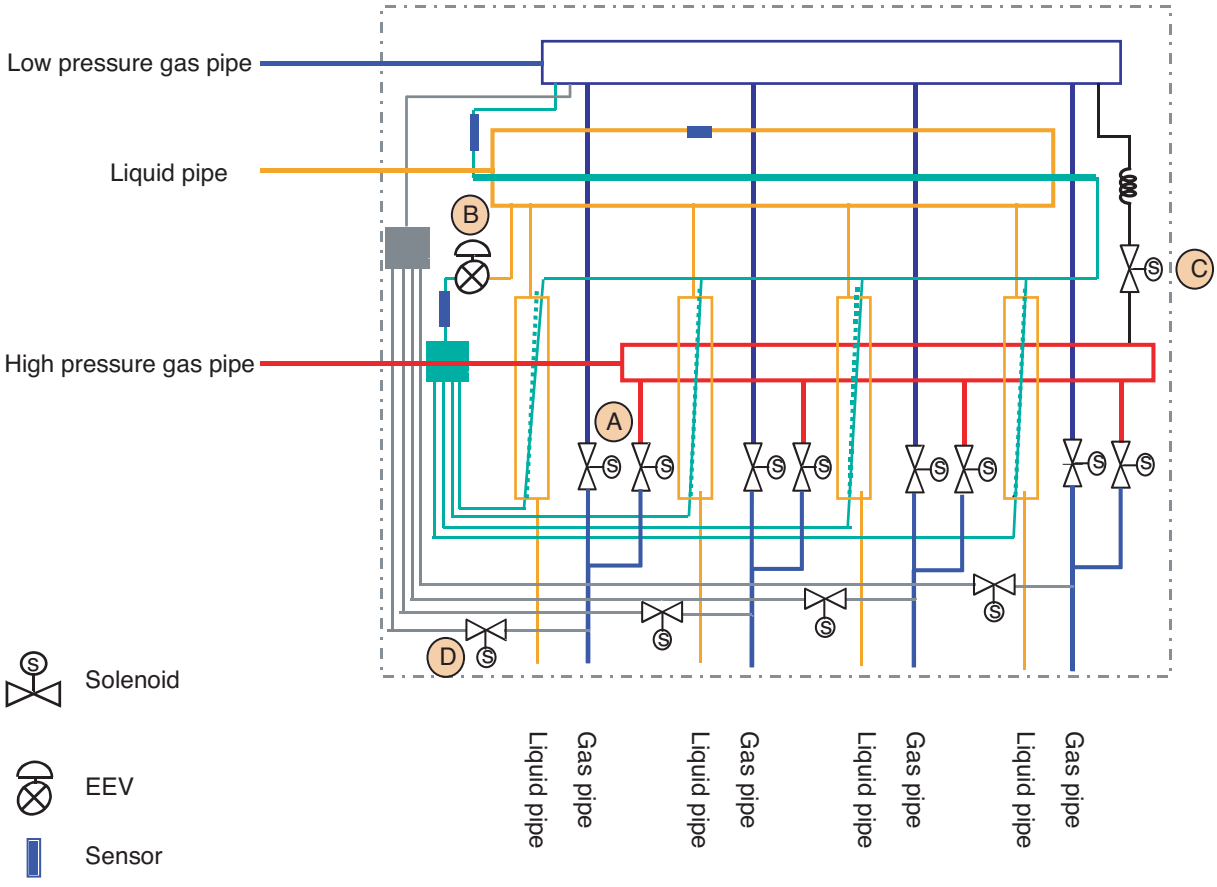
Piping Diagrams

1. HR Unit

PRHR042A



Ⓐ : 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

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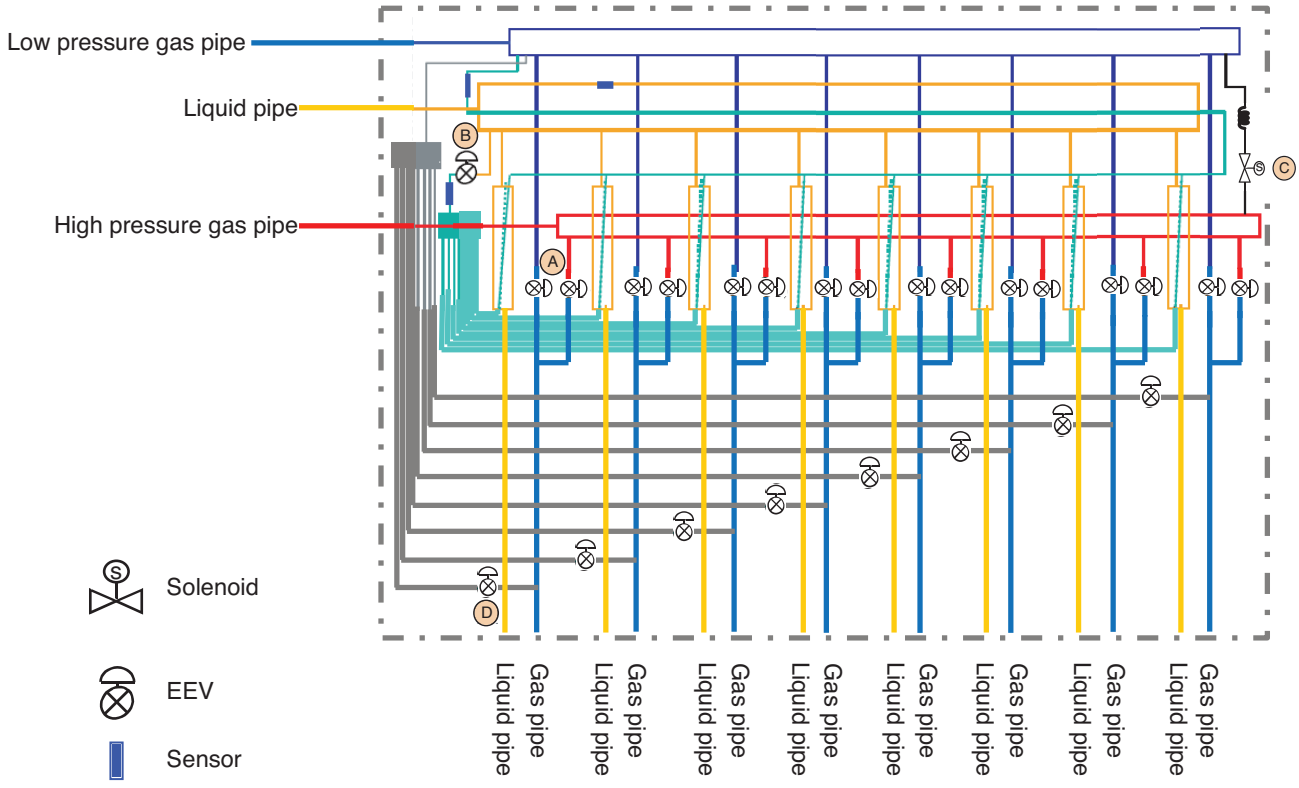
PRHR083A



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

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

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

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

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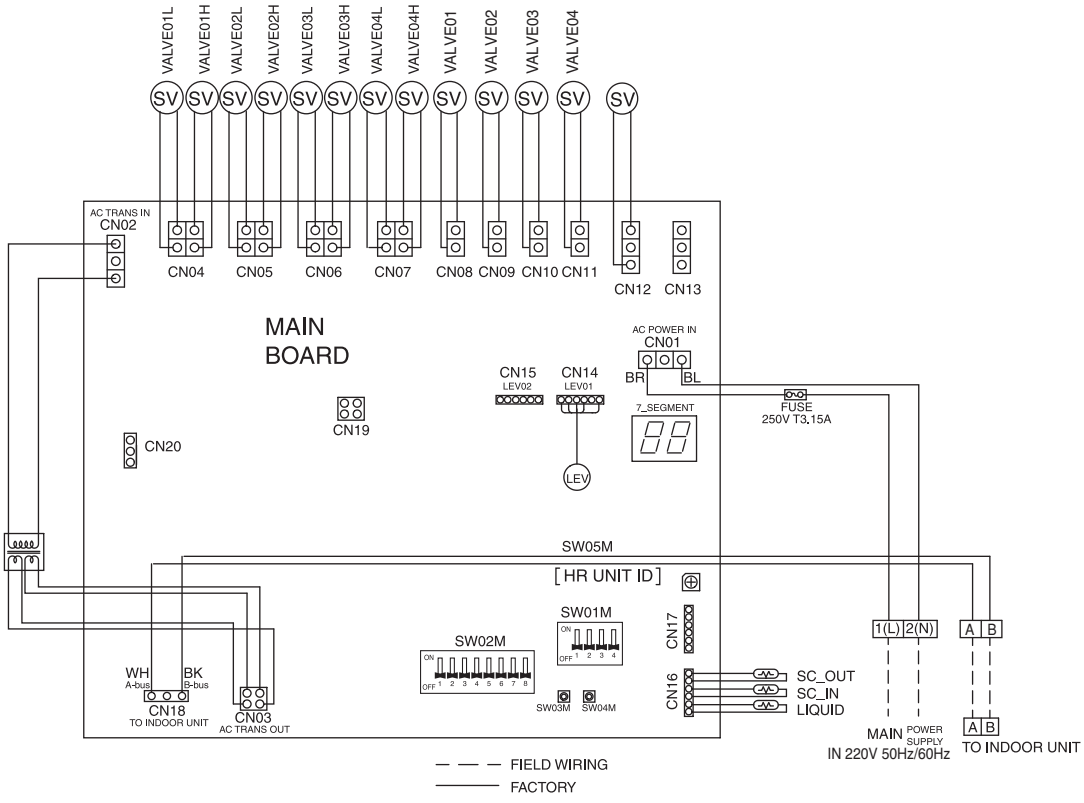
Wiring Diagrams

1. HR Units

1) PRHR042A, PRHR032A, PRHR022A



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

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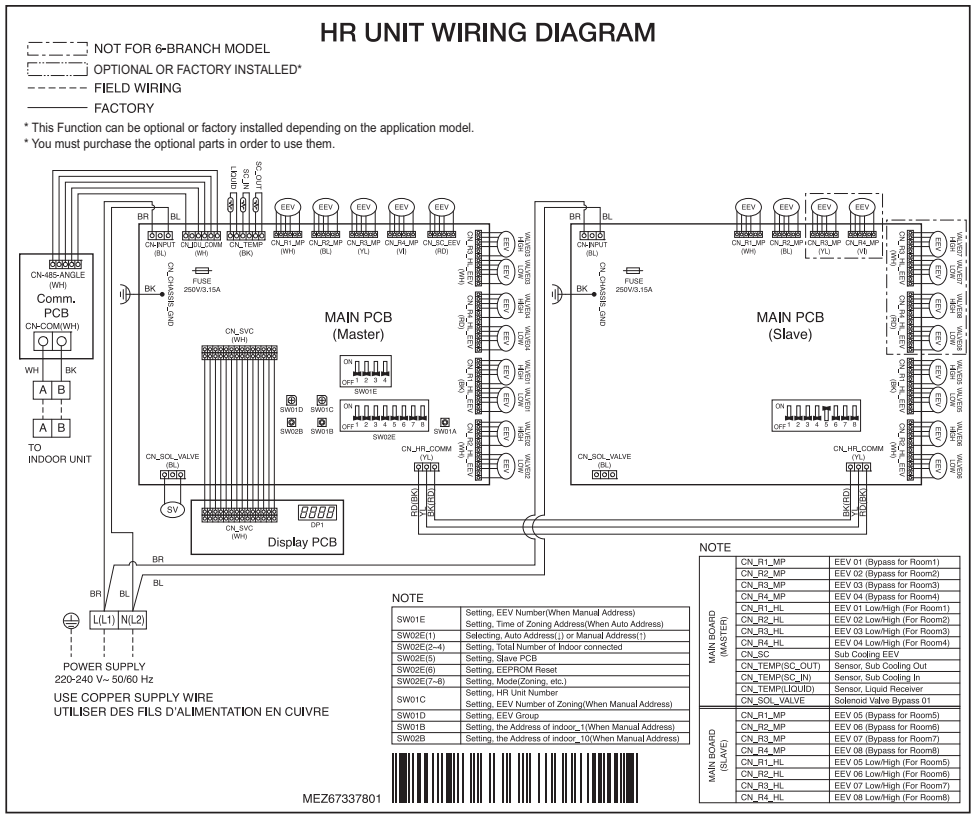
2) PRHR083, PRHR063



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

MAIN BOARD (SLAVE)	CN_R1_MP	EEV 05 (Bypass for Room5)
	CN_R2_MP	EEV 06 (Bypass for Room6)
	CN_R3_MP	EEV 07 (Bypass for Room7)
	CN_R4_MP	EEV 08 (Bypass for Room8)
	CN_R1_HL	EEV 05 Low/High (For Room5)
	CN_R2_HL	EEV 06 Low/High (For Room6)
	CN_R3_HL	EEV 07 Low/High (For Room7)
	CN_R4_HL	EEV 08 Low/High (For Room8)

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

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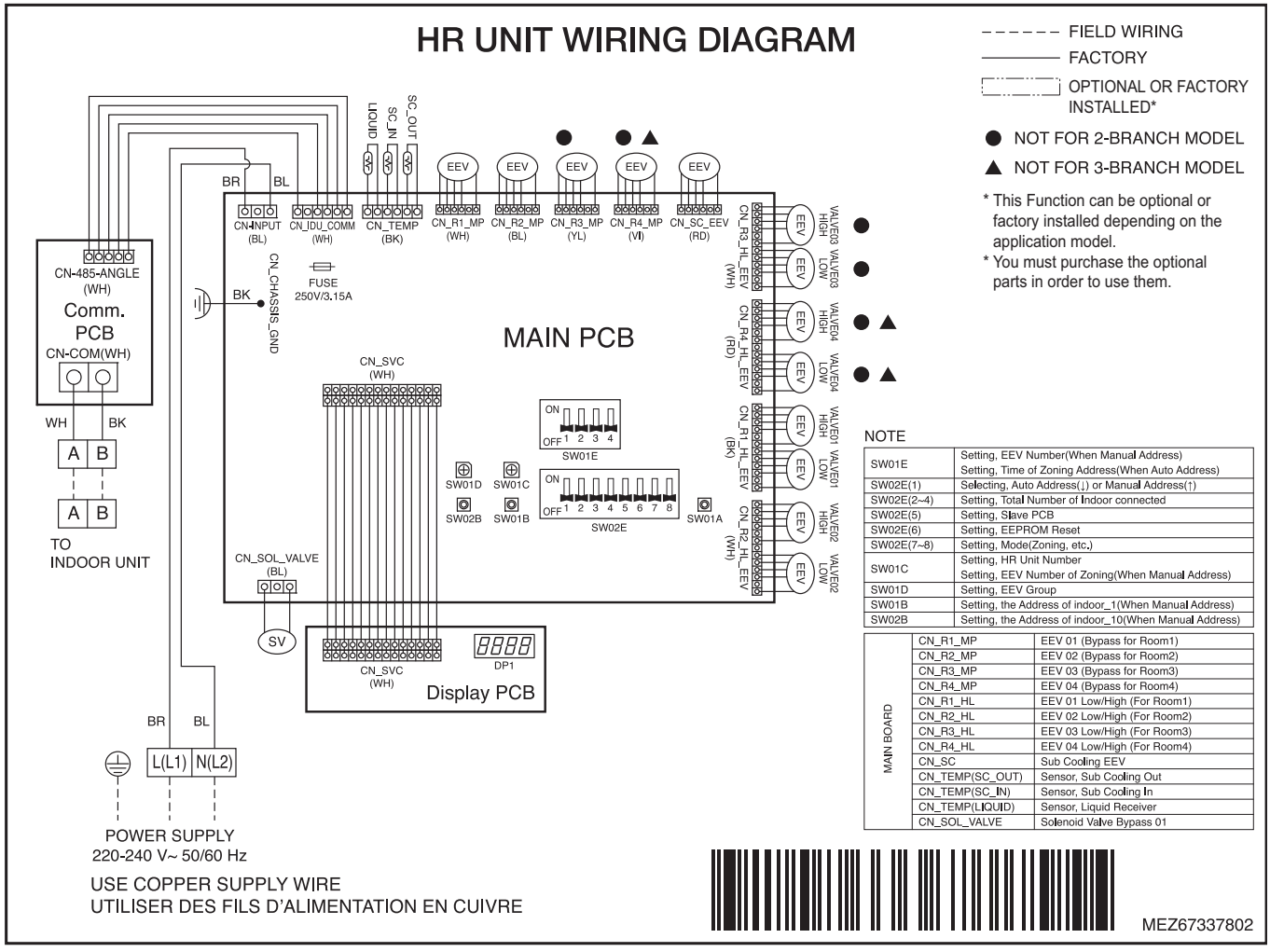
3) PRHR043, PRHR033, PRHR023



NOTE

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

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

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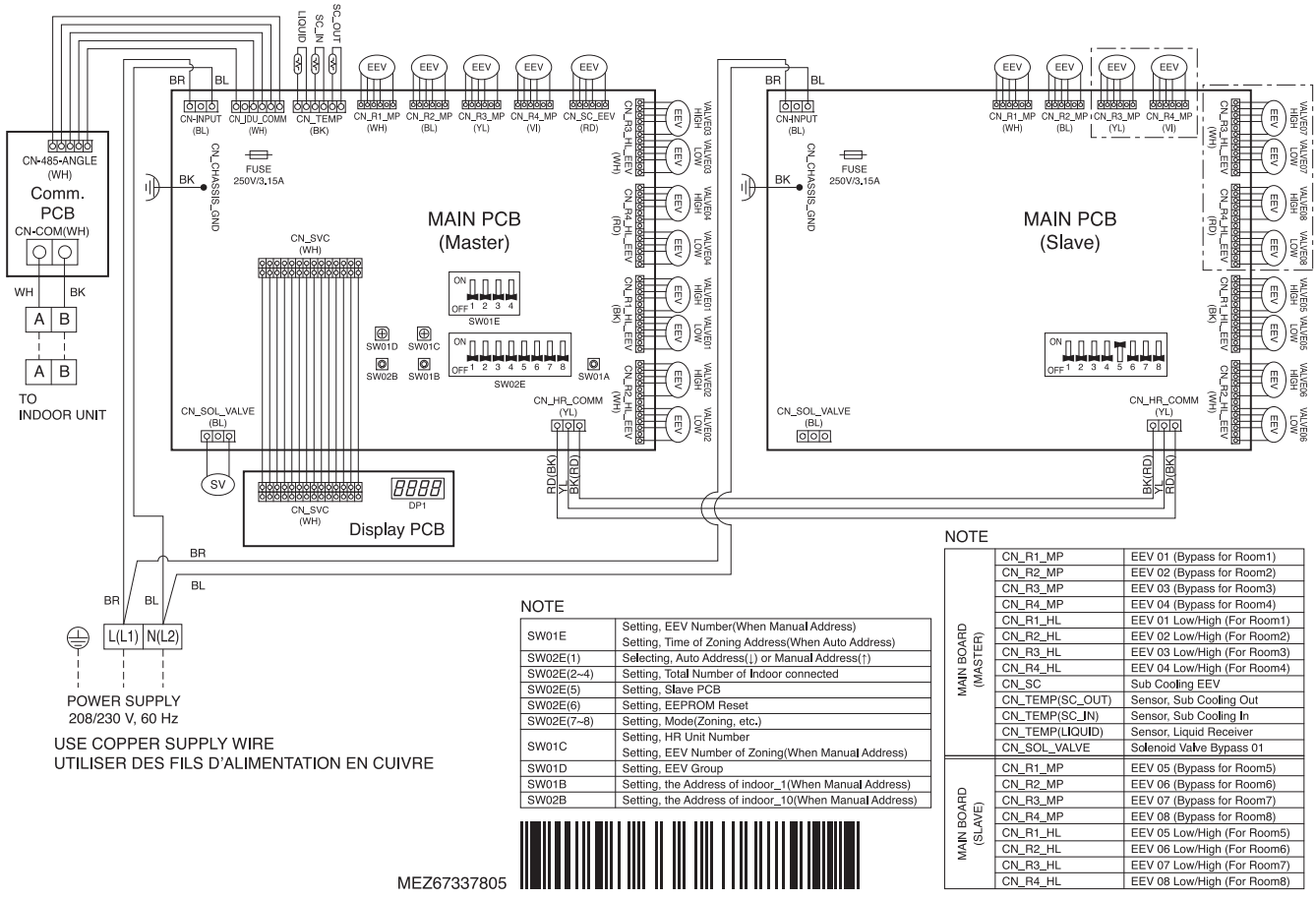
4) PRHR083A, PRHR063A

HR UNIT WIRING DIAGRAM

NOT FOR 6-BRANCH MODEL
OPTIONAL OR FACTORY INSTALLED*
FIELD WIRING
FACTORY

* This Function can be optional or factory installed depending on the application model.
* You must purchase the optional parts in order to use them.



NOTE

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

NOTE

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

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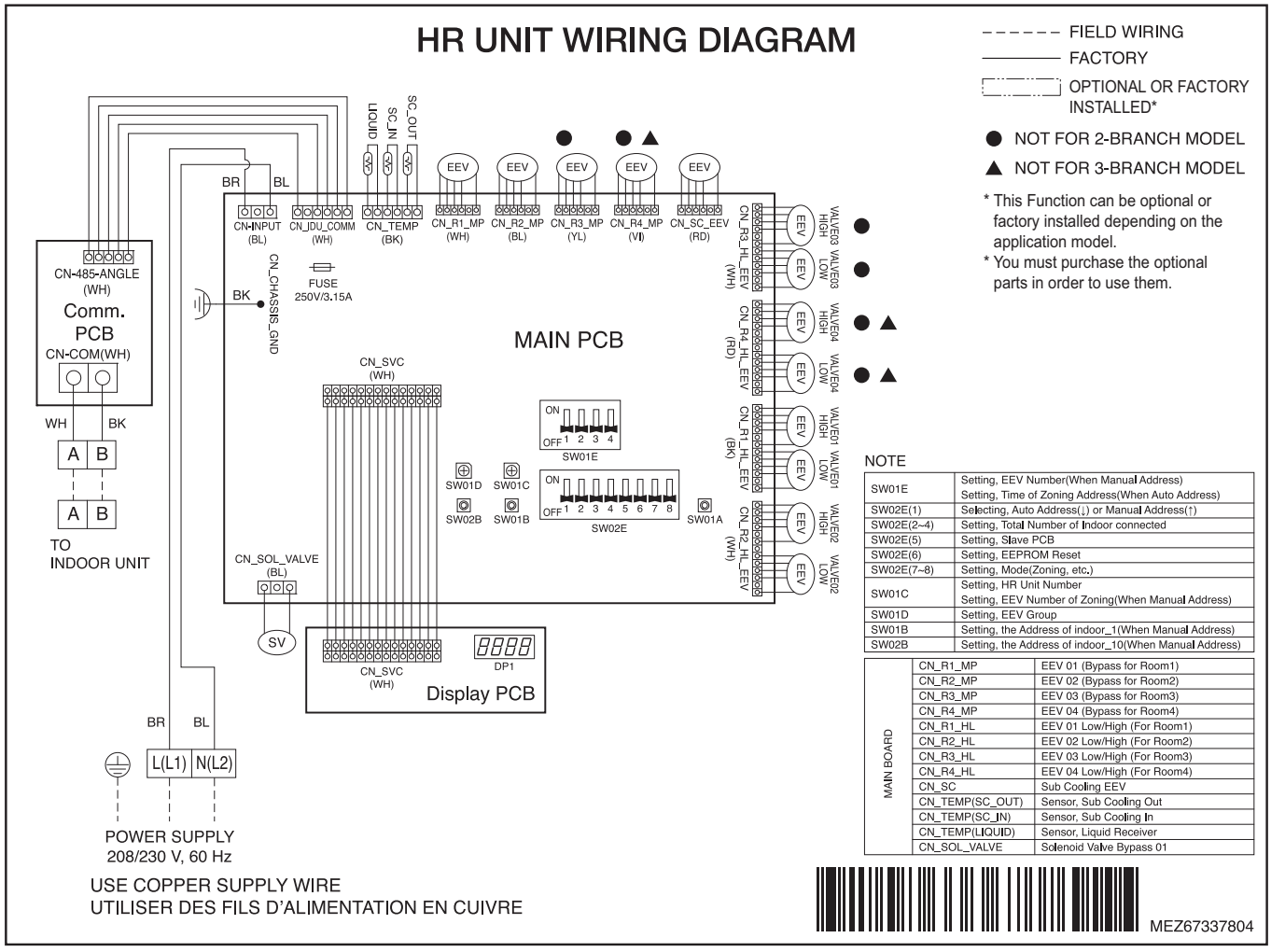
5) PRHR043A, PRHR033A, PRHR023A



NOTE

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

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

USE COPPER SUPPLY WIRE
UTILISER DES FILS D'ALIMENTATION EN CUIVRE

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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 seconds 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 seconds
Cooling mode	Heating	180 seconds
Heating mode	Cooling	120 seconds
Cooling or heating	Stop or ventilation	During heating : 60 seconds During cooling : 0 seconds

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

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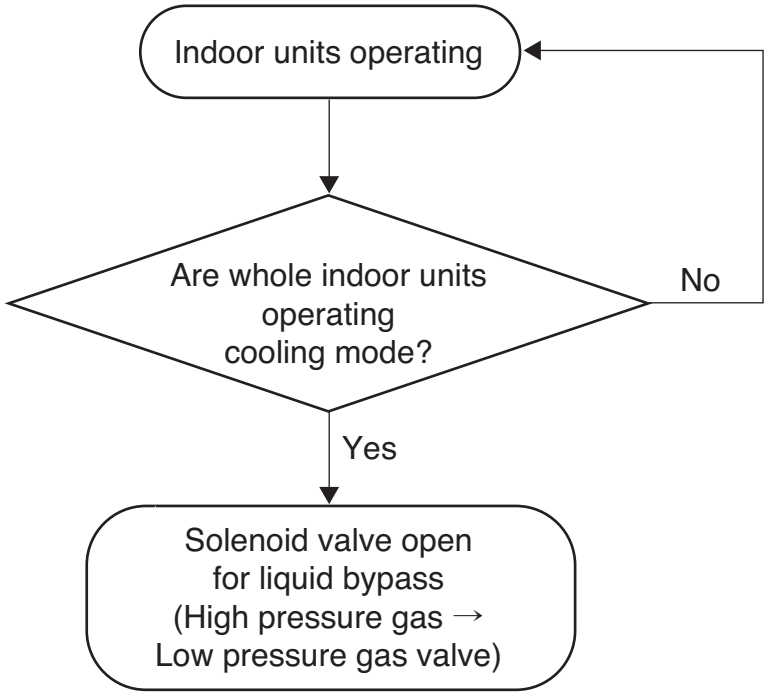
2. Special Control

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

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Part 4
PCB Setting and Test Run

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PCB Setting and Test Run

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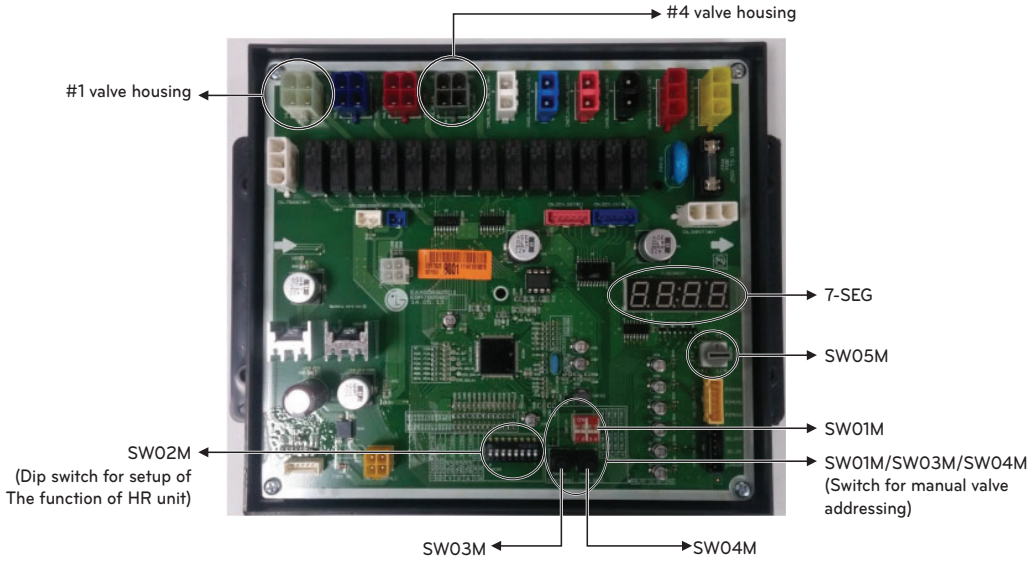
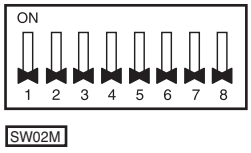
HR Unit PCB (PRHR042A, PRHR032A, PRHR022A)



1. Switch for Setup of HR Unit

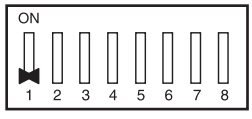
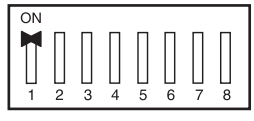
1. Main function of SW02M



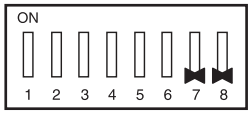
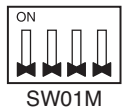
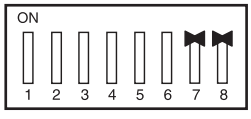
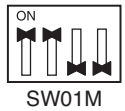
SW02M

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.

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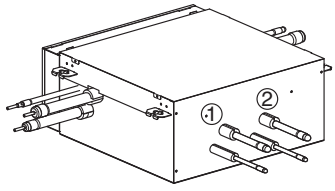
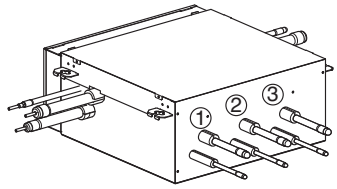
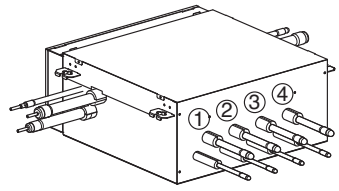
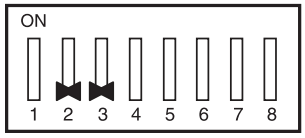
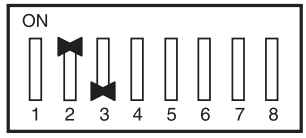
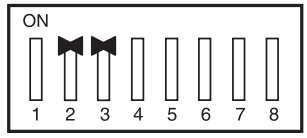
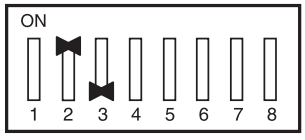
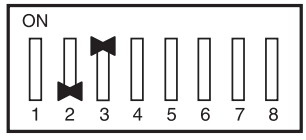
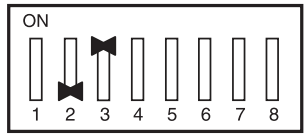
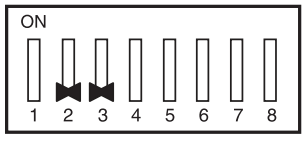
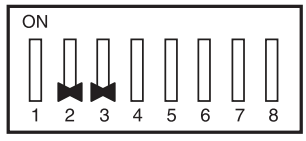
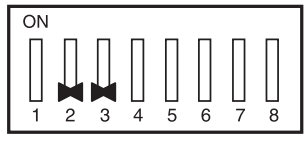
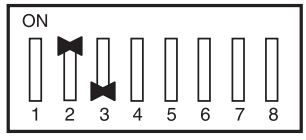
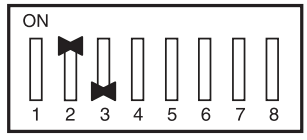
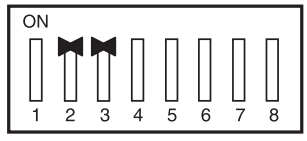
2) Selection of the model of the HR unit

	 (For 2 branches) PRHR022(A)	 (For 3 branches) PRHR032(A)	 (For 4 branches) PRHR042(A)
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 PRHR022(A) 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 PRHR032(A) 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 PRHR042(A) 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.

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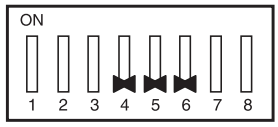
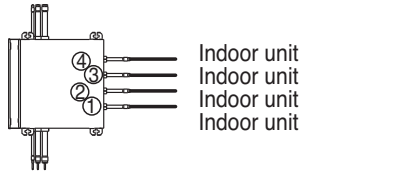
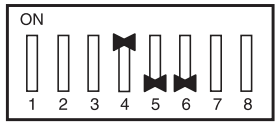
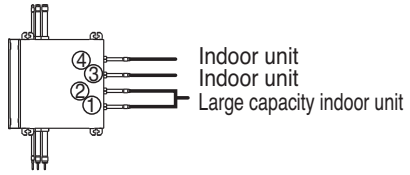
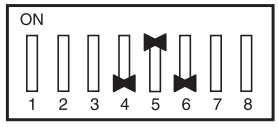
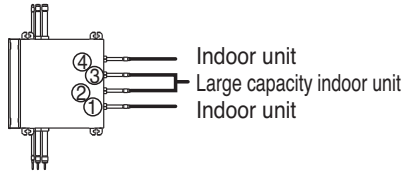
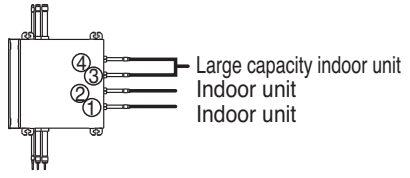
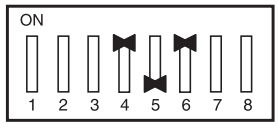
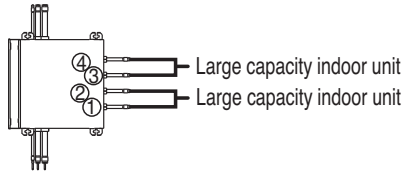
3) Setting the Valve group.

	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		

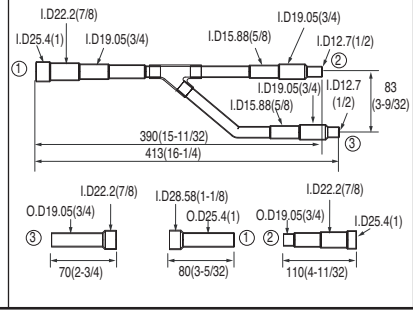
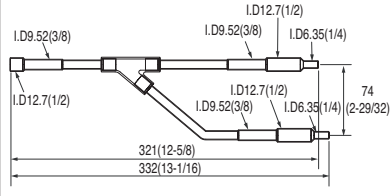
Note:

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

✻ Y branch pipe

[Unit:mm(inch)]

* For more information, refer accessory installation manual.

Models	Low Pressure Gas Pipe	Liquid pipe
ARBLB03321		

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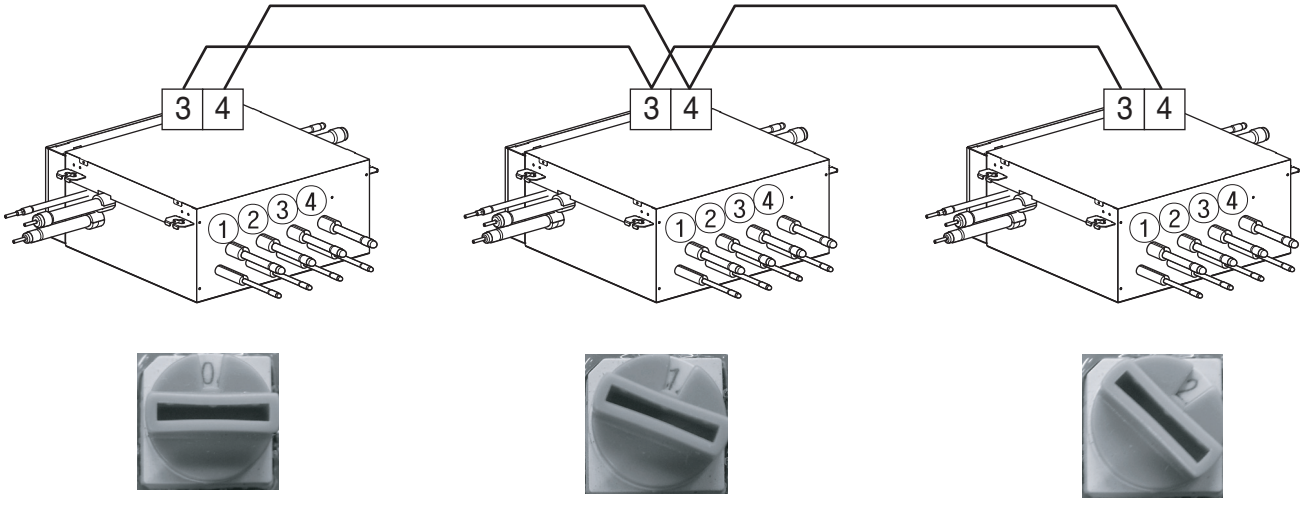
2. SW05M (Rotary switch for addressing HR unit)

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'.

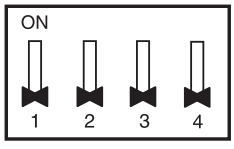
Ex) Installation of 3 HR units



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

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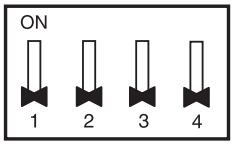
2) Zoning setting

- 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

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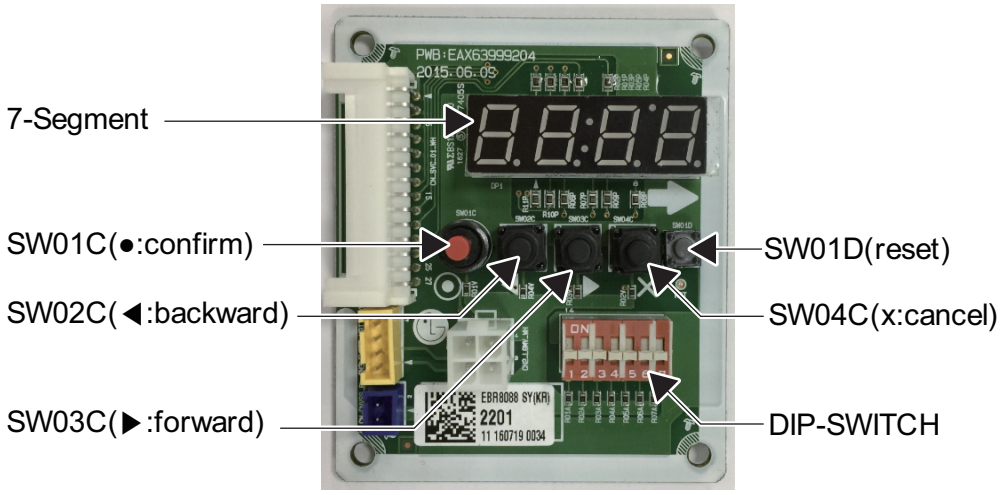
2. Automatic Addressing

The address of indoor units would be set by Automatic Addressing

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

■ Service PCB



CAUTION

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

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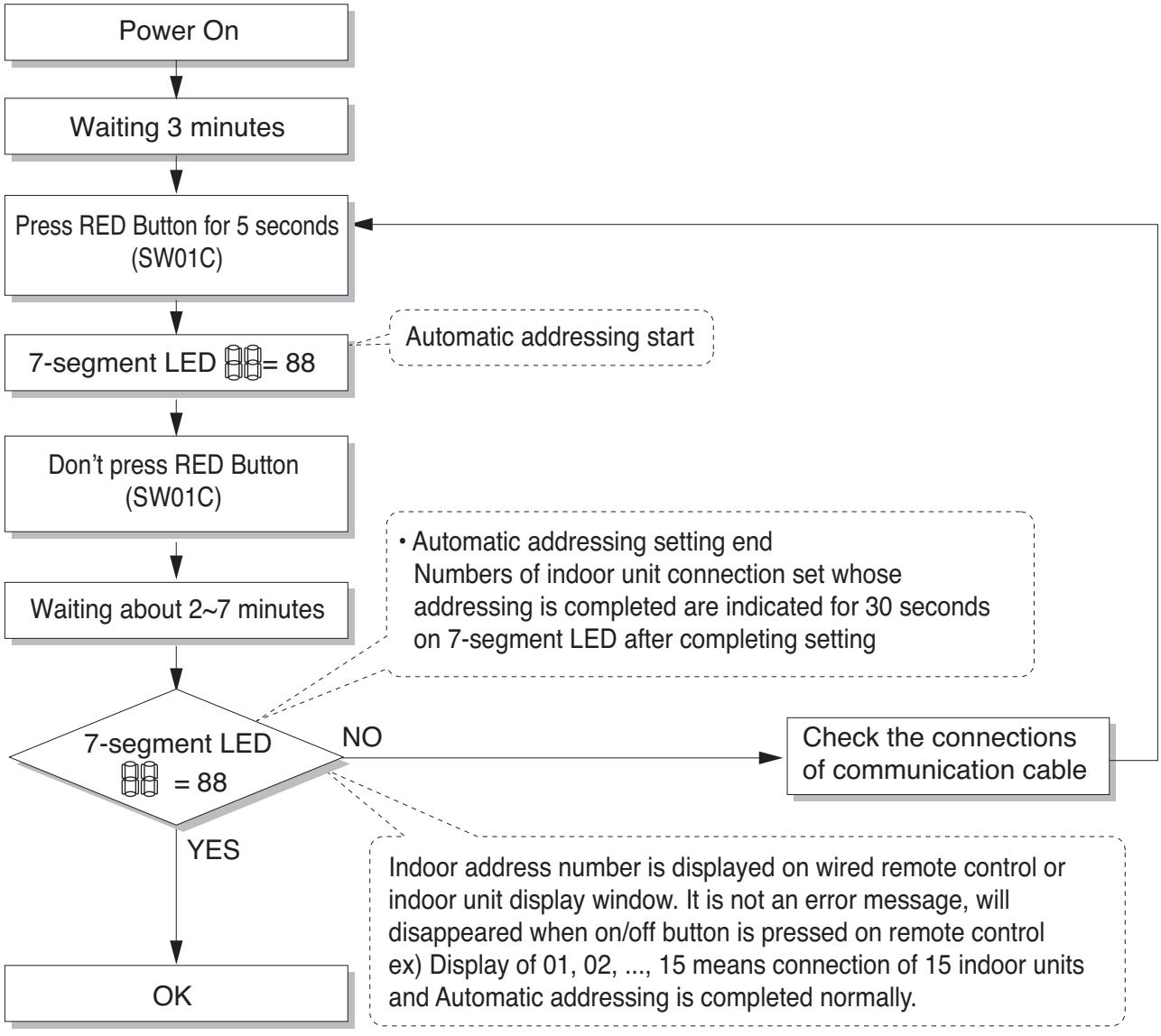
3. Flow chart for Chart for Auto-Addressing of Indoor and HR Unit

1) The Procedure of Automatic Addressing



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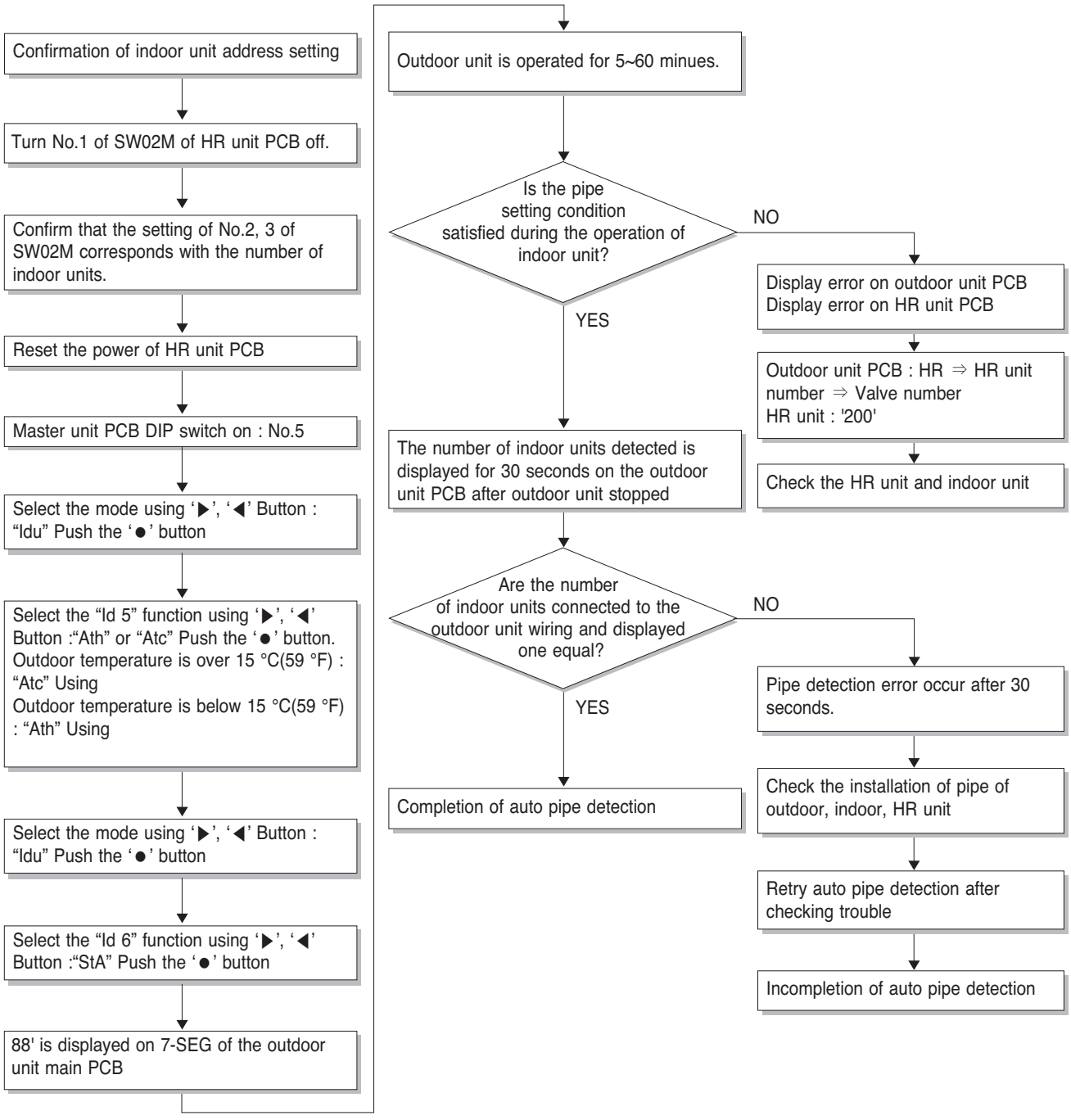
2) Flow chart of auto addressing for pipe detection



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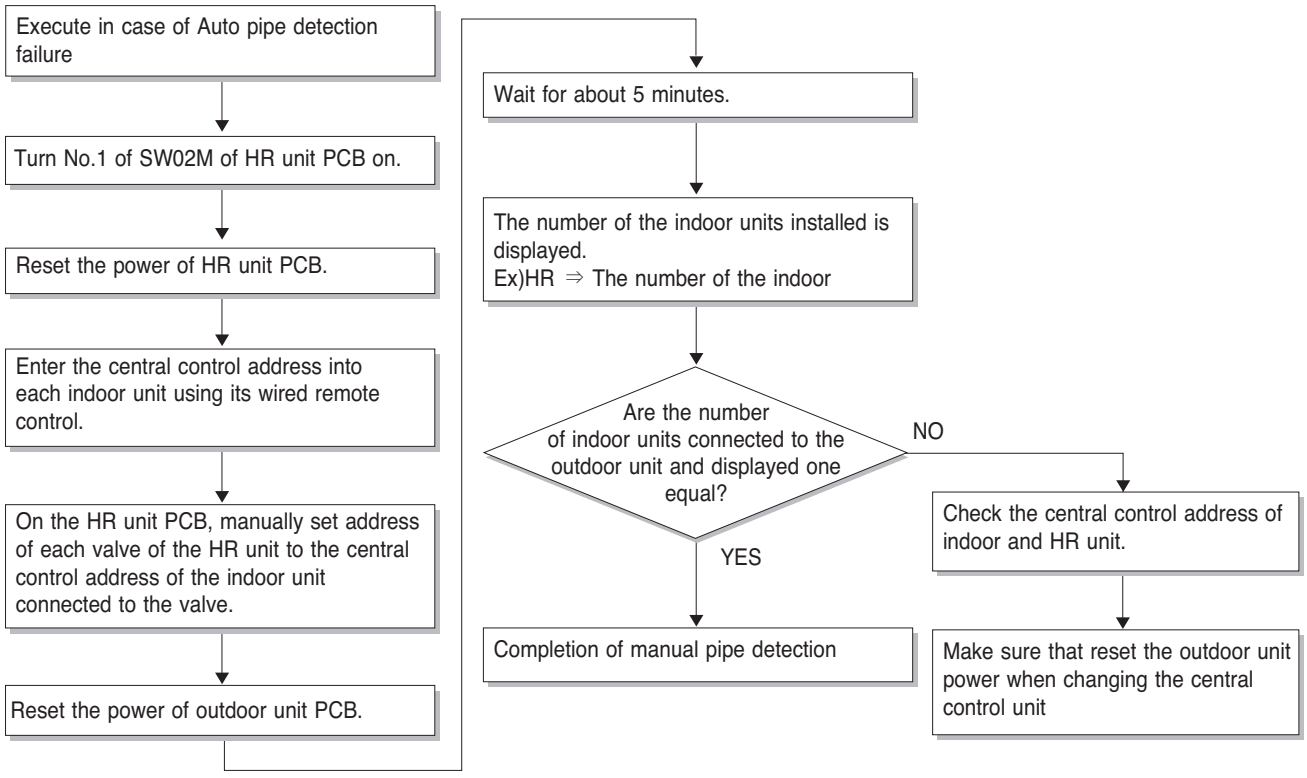
3) Flow chart of manual addressing for pipe detection



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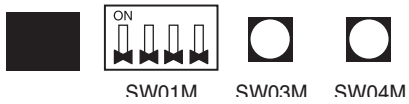
4. Example of Manual Valve Addressing(Non-Zoning setting)

(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.)

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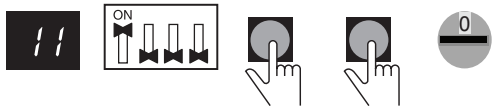
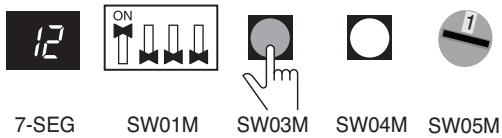
5. Example of manual valve addressing (Zoning setting)

(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.)

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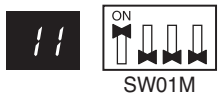
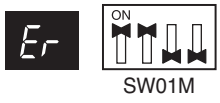
6. Example of Checking Valve Address

(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)

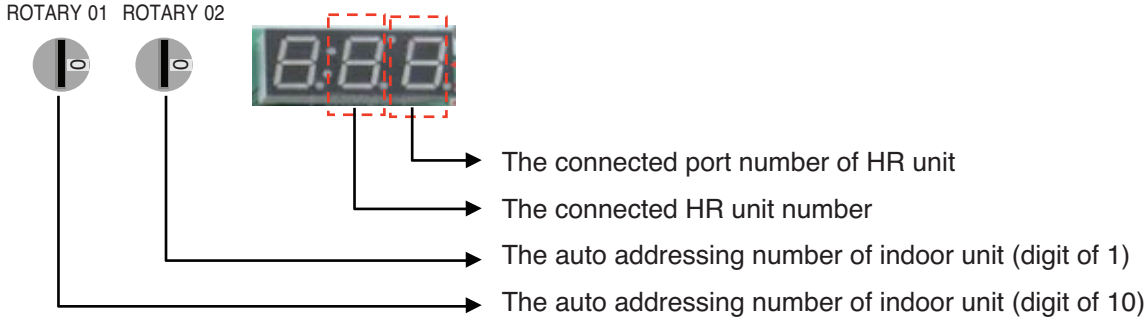
No.	Display and setup	Setup and contents
1		• Operation: more than 2 dip switches turned on. • Display: "Er" is displayed in 7-SEG

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 Outdoor unit

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



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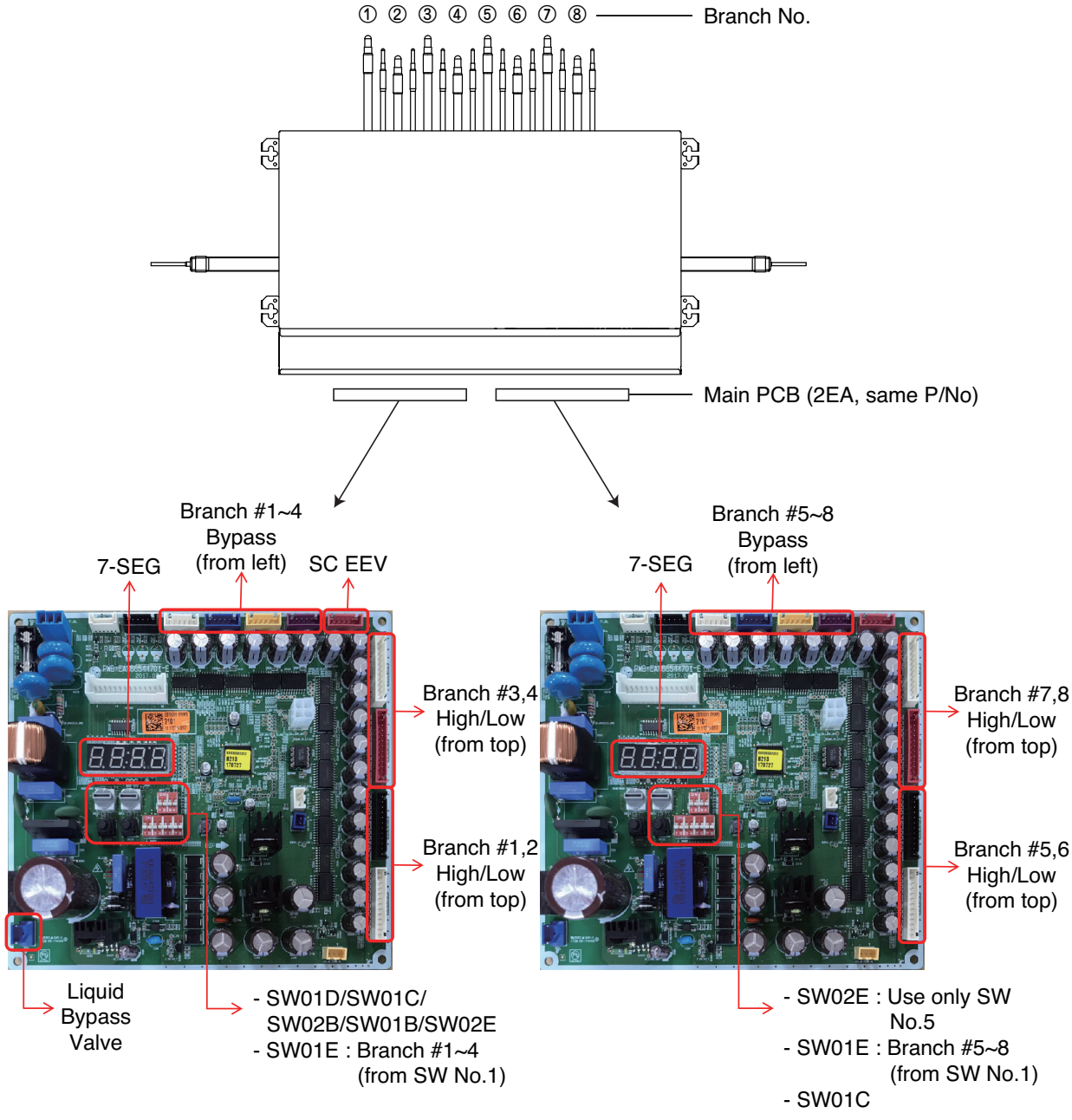
HR Unit PCB (PRHR**3A, ** : 02, 03, 04, 06, 08)



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

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

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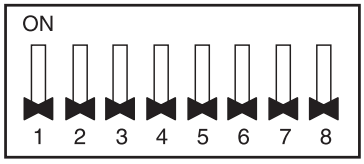
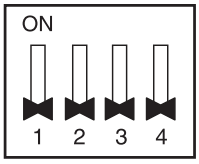
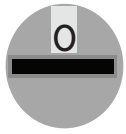
1. Switch for Setup of HR Unit

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

1. Main function of SW02E

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

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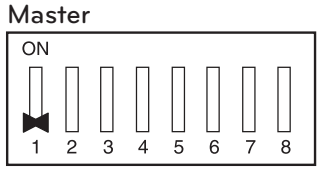
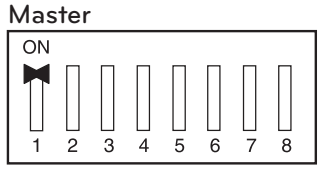
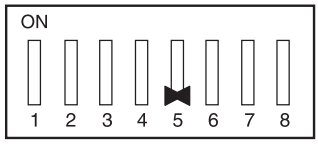
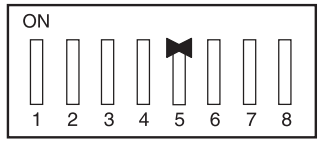
Auto	Manual
Switch No.1 Off 	Switch No.1 On 

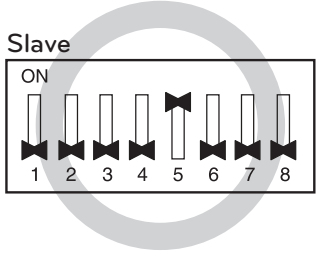
* Master Only

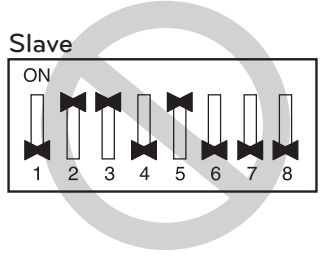
2) Selection of Master/Slave Main PCB

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

NOTE

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





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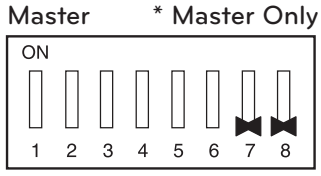
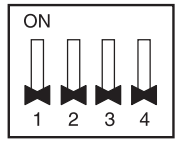
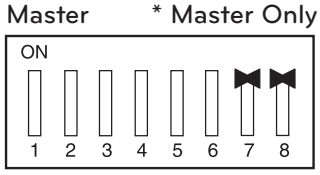
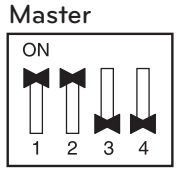
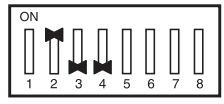
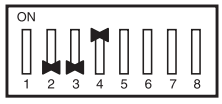
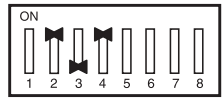
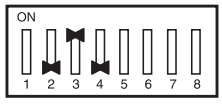
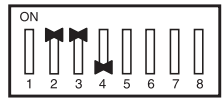
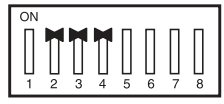
3) Setting the zoning control

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

4) Selection of the No. of connected branches

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

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

WARNING

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

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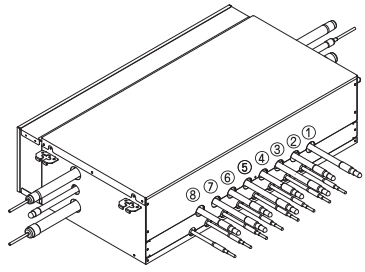
2. Main function of SW01D

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



* Master Only

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

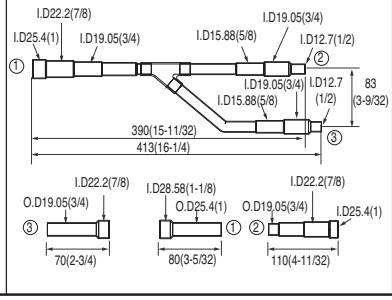
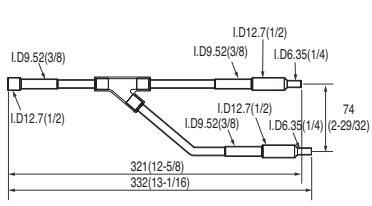
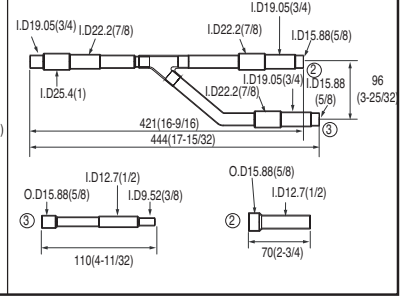
Note:

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

✻ Y branch pipe

[Unit:mm(inch)]

* For more information, refer accessory installation manual.

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

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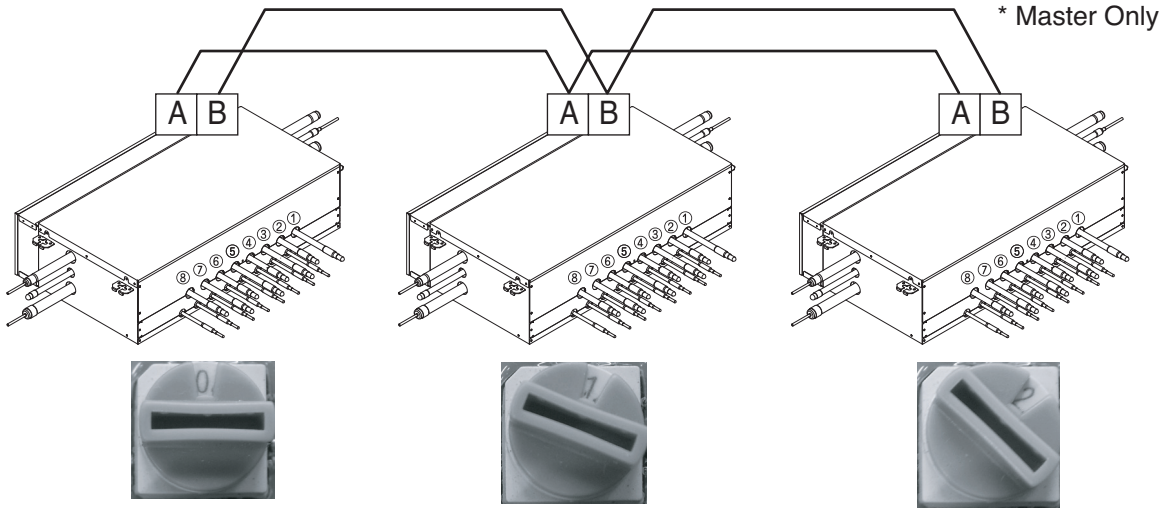
3. SW01C (Rotary S/W for addressing HR unit)

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

Ex) Installation of 3 HR units



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

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

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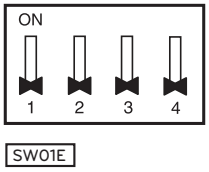
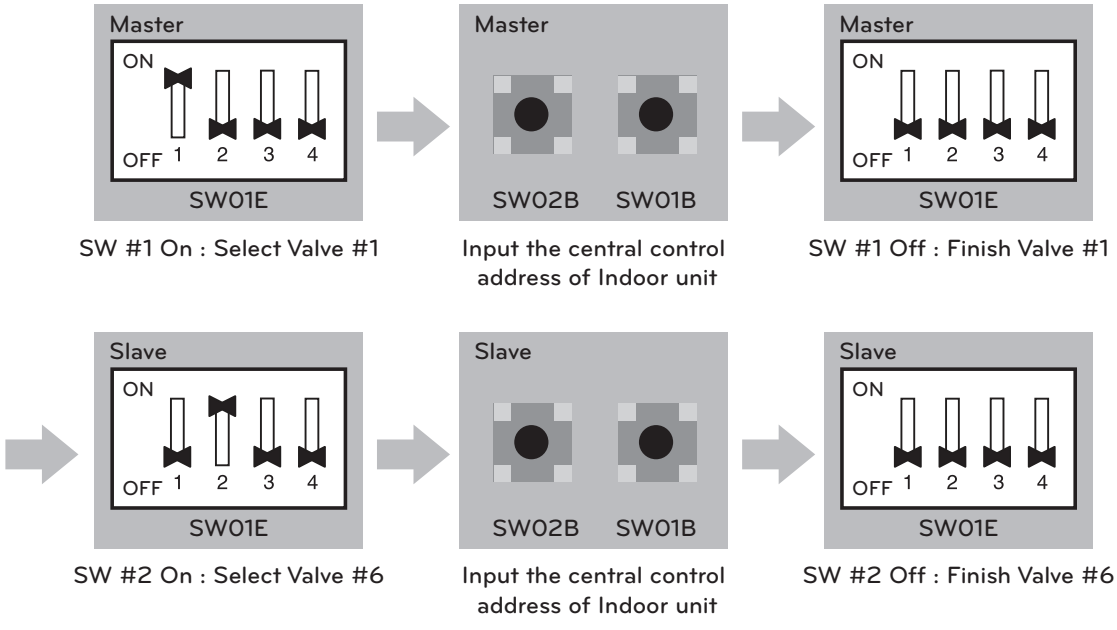
	S/W No.	Setup
	No.1	Manual addressing of valve #1 (Master) / #5 (Slave)
	No.2	Manual addressing of valve #2 (Master) / #6 (Slave)
	No.3	Manual addressing of valve #3 (Master) / #7 (Slave)
	No.4	Manual addressing of valve #4 (Master) / #8 (Slave)
	SW02B	Increase in the digit of 10 of valve address
	SW01B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

1) Normal setting (Non-Zoning setting)

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



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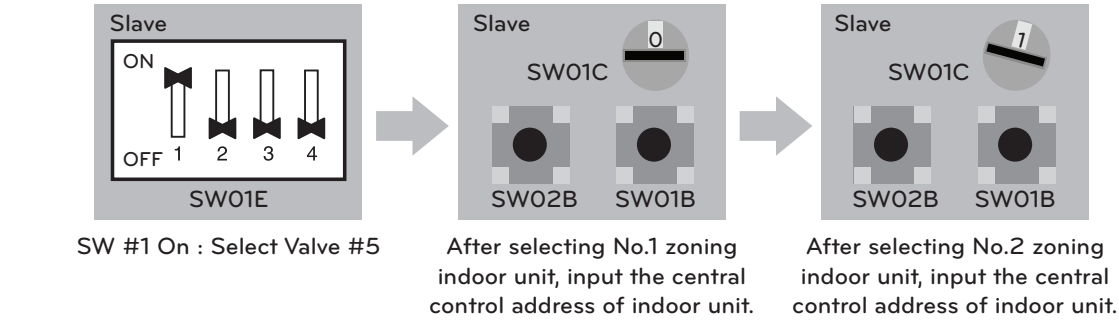
2) Zoning setting

Note:

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

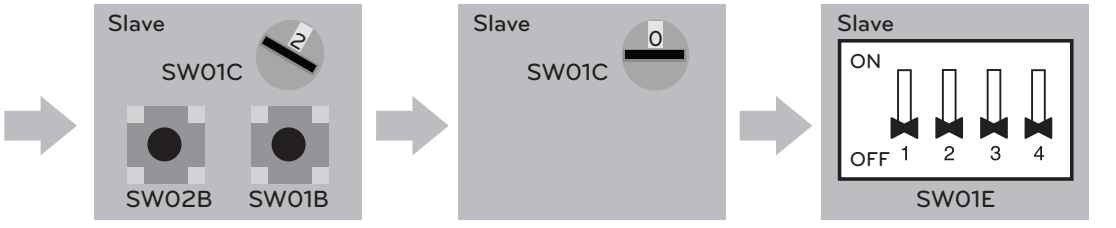
ex) Manual pipe detection of Valve #5 with three zoning indoor units, #6 without zoning unit.



SW #1 On : Select Valve #5

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

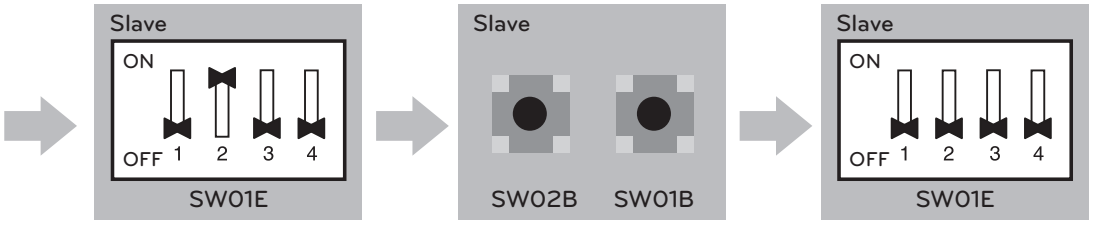
After selecting No.2 zoning indoor unit, input the central control address of indoor unit.



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

Setting SW01C to '0'

SW #1 Off : Finish Valve #5



SW #2 On : Select Valve #6

Input the central control address of Indoor unit

SW #2 Off : Finish Valve #6

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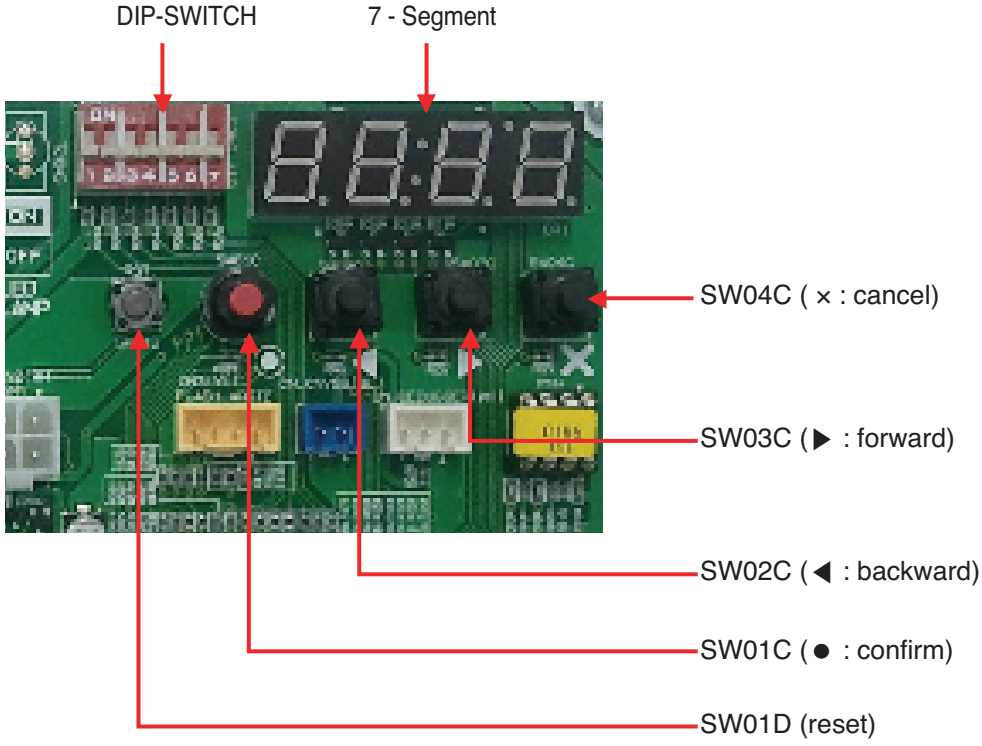
2. Automatic Addressing

The address of indoor units would be set by Automatic Addressing

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

■ MAIN PCB



CAUTION

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

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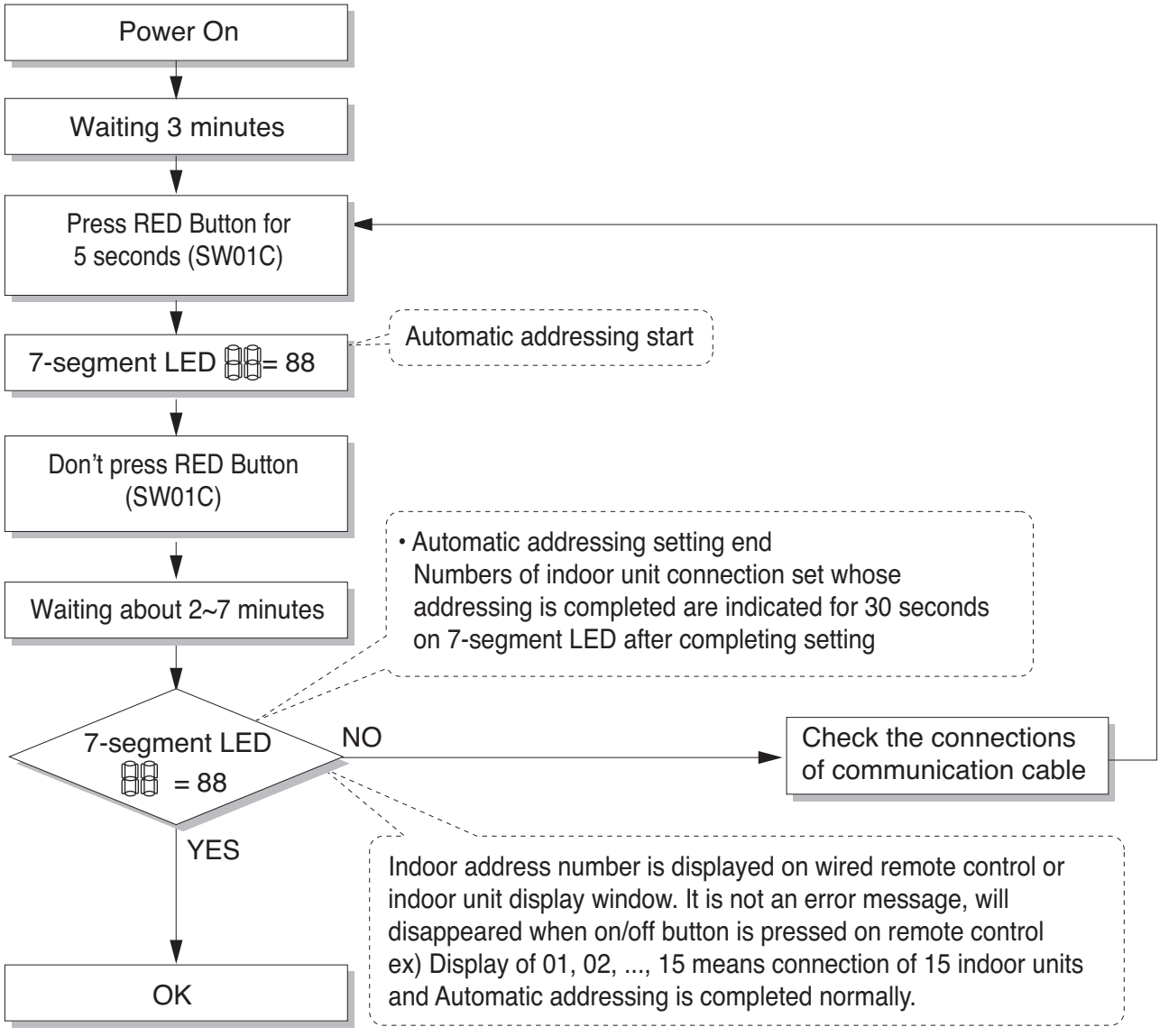
3. Flow chart for Chart for Auto-Addressing of Indoor and HR Unit

1) The Procedure of Automatic Addressing



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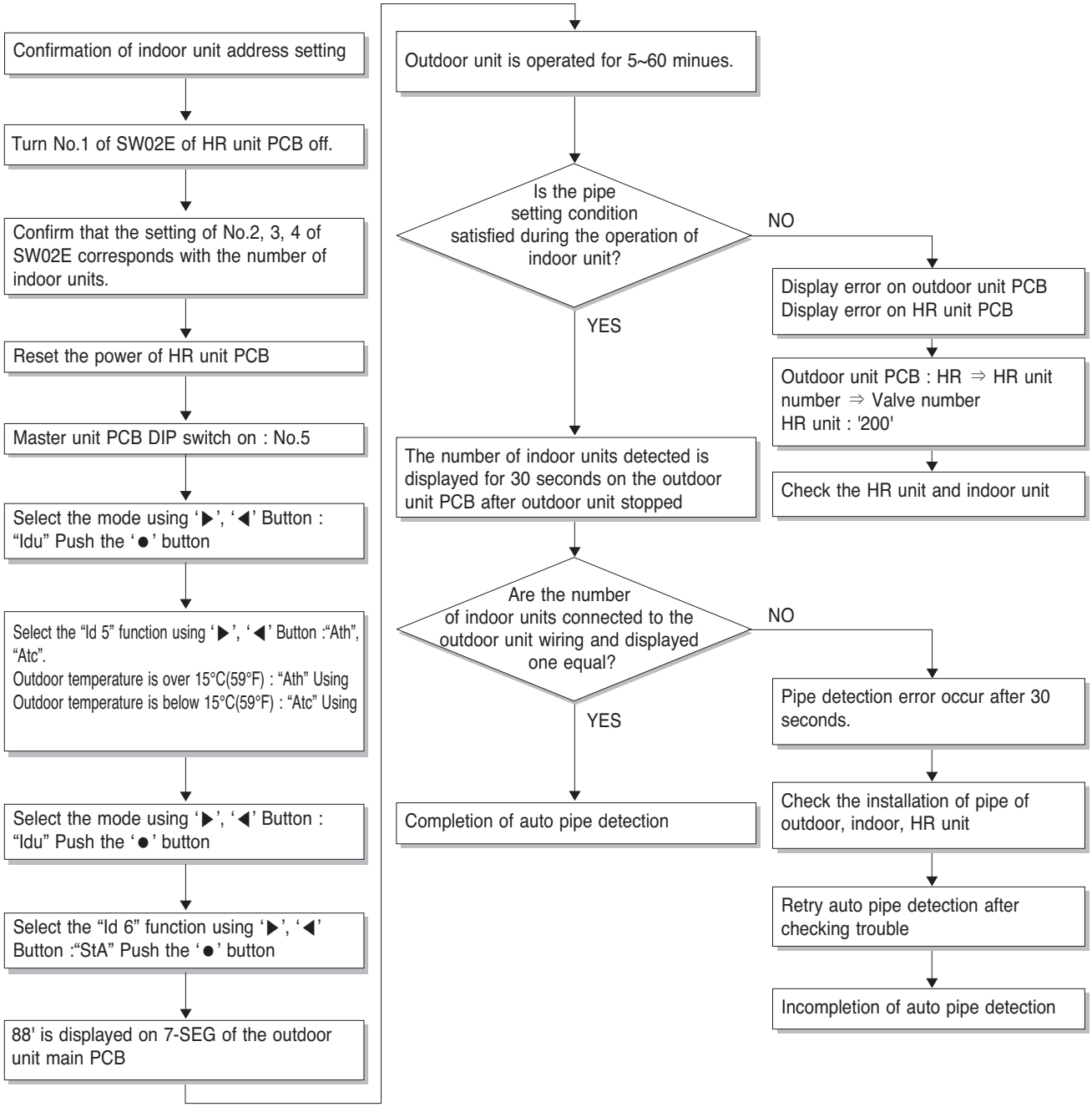
2) Flow chart of auto addressing for pipe detection



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

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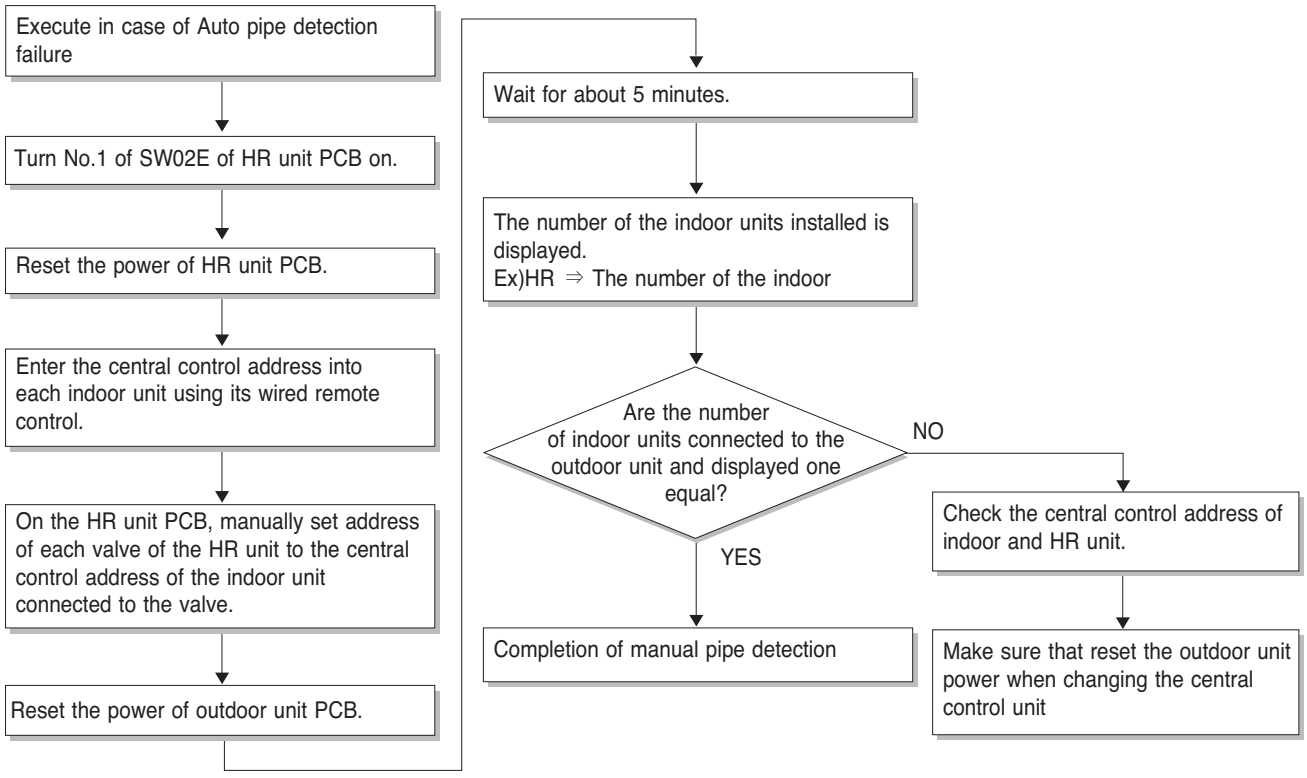
3) Flow chart of manual addressing for pipe detection



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

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

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

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

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

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5. Example of manual valve addressing(Zoning setting)

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

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

No.	Display and setup	Setup and Contents
1	 7-SEG SW01E SW02B SW01B SW01C	• Operation: None • Display: None
2	 7-SEG SW01E SW02B SW01B SW01C	• Operation : Turn dip S/W No.1 on to address valve #1 • Display : Existing value saved in EEPROM is displayed in 7-SEG.
3	 7-SEG SW01E SW02B SW01B SW01C	• 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	 7-SEG SW01E SW02B SW01B SW01C	• Operation : SW05M : 1 • Display : Display former value.
5	 7-SEG SW01E SW02B SW01B SW01C	• Operation : Setting No. using SW03M and SW04M, SW05M : 1 • Display : Display setting value.
6	 7-SEG SW01E SW02B SW01B SW01C	• Operation : Turn dip S/W No.1 off to save the address of valve #1 • Display : "11" displayed in 7-SEG disappears.
7	 7-SEG SW01E SW02B SW01B SW01C	• 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.)

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6. Example of Checking Valve Address

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

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

7. Identification of Manual Valve ID (Address)

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

CAUTION

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

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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 common pipe, liquid pipe and gas pipe 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 4 hours to heat the crank case heater where performing test run after installation of product. It may result in burning out of the compressor if not preheating the crank case with the electrical heater for more than 4 hours.(In case of the outdoor temperature below 10°C)**

⚠ CAUTION

Preheat of compressor

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

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2. How to cope with Test Run abnormality

The phenomena from main component failure

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

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

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

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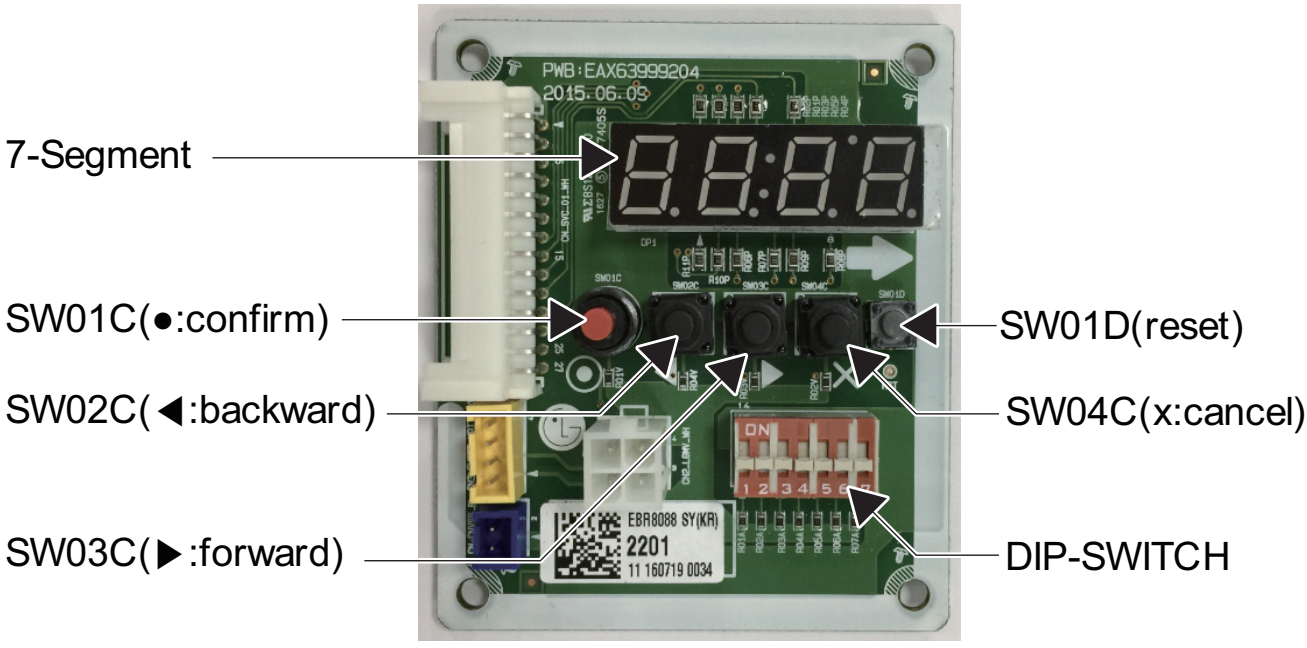
3. DIP Switch Setting

■ Location of setting Switch

Service PCB



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4. Checking the setting of outdoor units

■ Checking according to dip switch setting

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

■ Checking the setting of outdoor units

Checking according to dip switch setting

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

Checking the initial display

The number is sequentially appeared at the 7 segment in 5 seconds after applying the power. This number represents the setting condition. (For example, represents R410A 7HP)

• Initial display order

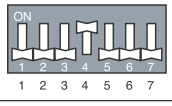
Order	No	Note
①	4~12	Model capacity
②	1	Cooling only
	2	Heat pump
	3	Heat Recovery
③	22	220V
④	1	Standard

• Example) ARUB060GSS4

①	②	③	④
07	3	22	1

❊ Heat Pump installation

① Turn on the DIP s/w No 4.

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

② The factory setting display is appeared “HR”.

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

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

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Part 5
Trouble shooting guide

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Trouble shooting guide

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1. The phenomena from main component failure

The phenomena from main component failure

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

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

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

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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 rowspan="3">Does failure appears again when starting operation?

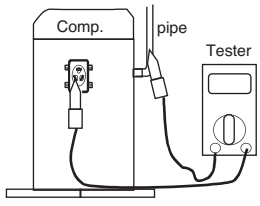
Method to measure insulation resistance
 

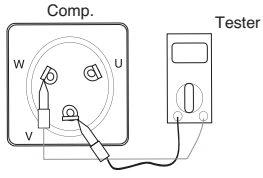
Figure 1.
Method to measure coil resistance
 

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. Note 1)</td><td>* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor.
* Insulation resistor : 50 MΩ or more
* Coil resistor (below table)
JQC048MBC
<table><tr><th>Temp.</th><th>25 °C[77 °F]</th><th>75 °C[167 °F]</th></tr><tr><td>U-V</td><td>0.113±7 %Ω</td><td>0.135±7 %Ω</td></tr><tr><td>V-W</td><td>0.113±7 %Ω</td><td>0.135±7 %Ω</td></tr><tr><td>W-U</td><td>0.113±7 %Ω</td><td>0.135±7 %Ω</td></tr></table></td></tr>
<tr><td>3) If output voltage of the inverter is unstable or it is 0 V.
(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).

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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.

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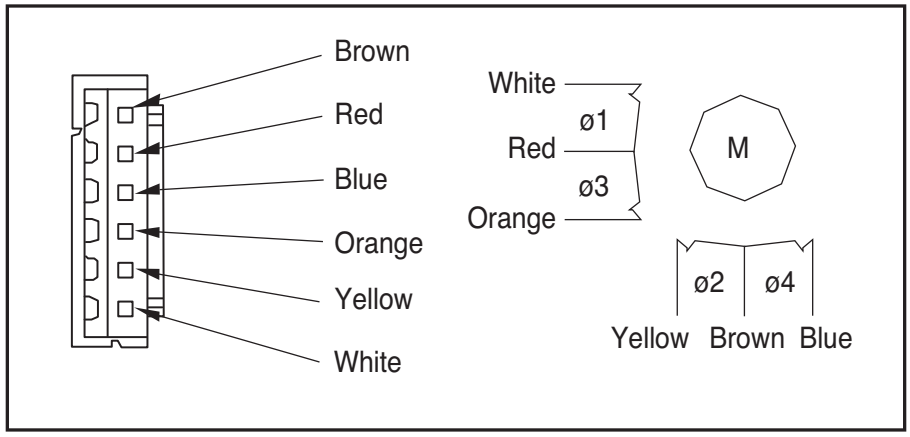
2.3 Electronic Expansion Valve



• Pulse signal output value and valve operation

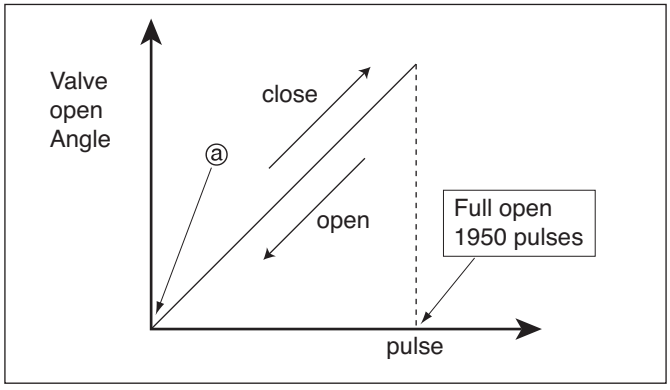
Output(ø) No.	Output state			
	1	2	3	4
ø1	ON	ON	OFF	ON
ø2	ON	ON	ON	OFF
ø3	OFF	OFF	ON	OFF
ø4	OFF	OFF	OFF	ON

• Output pulse sequence

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

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

• EEV valve operation



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

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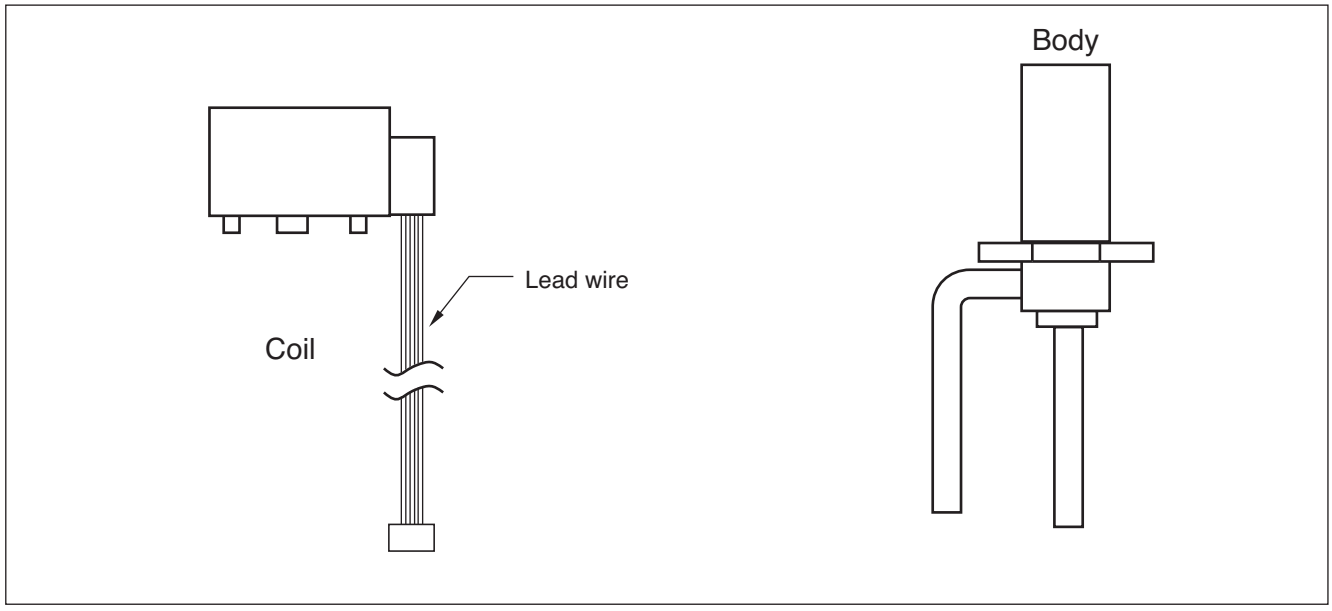
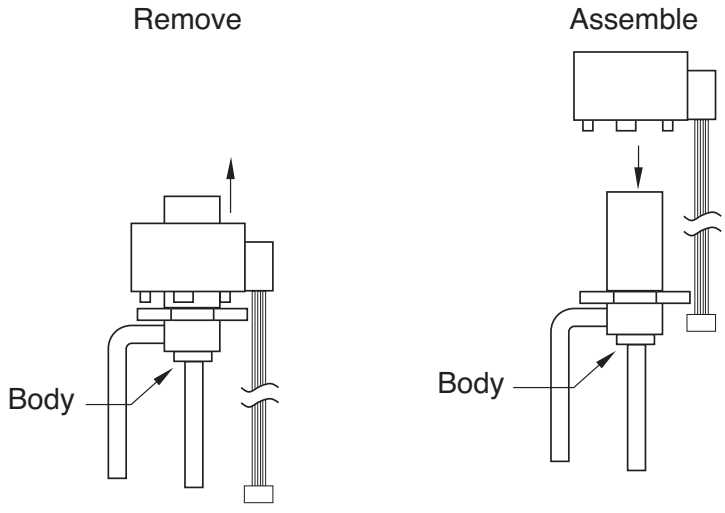
• EEV Coil and body(Outdoor unit)



• Remove and assemble the coil



- Grip the A part tightly, and pull up coil part upward.
  - When the coil part is removed or assembled, be careful not to bend the pipe of the body.

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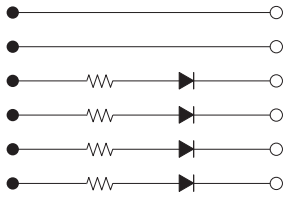
- **EEV failure check method**

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 seconds 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-Orange, Brow-Yellow, Brown-Blue)	Replace EEV	Indoor Unit
	1. Sub cooling EEV : Check the resistance between coil terminal (Red-White, Red-Yellow, Red-Orange, Red-Blue) 2. If the measured resistance value is in 52 Ω ± 3 % (@ 20 °C[68 °F]), then the EEV is normal.	Replace EEV coil	Outdoor Unit
	1. Main / VI EEV : Check the resistance between coil terminal (Red-White, Red-Orange, Brown-Yellow, Brown-Blue) 2. If the measured resistance value is in 150 Ω ± 10 %, then the EEV is normal.	Replace EEV	Outdoor Unit
Full closing (valve leakage)	1. Operate indoor unit with FAN mode and operate another indoor unit with COOLING mode 2. Check indoor unit(FAN mode) liquid pipe temperature (from operation monitor of outdoor unit control board) 3. When fan rotate and EEV is fully closed, if there is any leakage, then the temperature is down If measured temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed	If the amount of leakage is much, Replace EEV	Indoor unit
Incomplete Connector connection or assembly	1. Check the Pin fully engaged into connector and check the color of electric wire 2. After removing the connector on the control board and check with tester.	Check the incorrectly connected part	Outdoor Unit Indoor Unit

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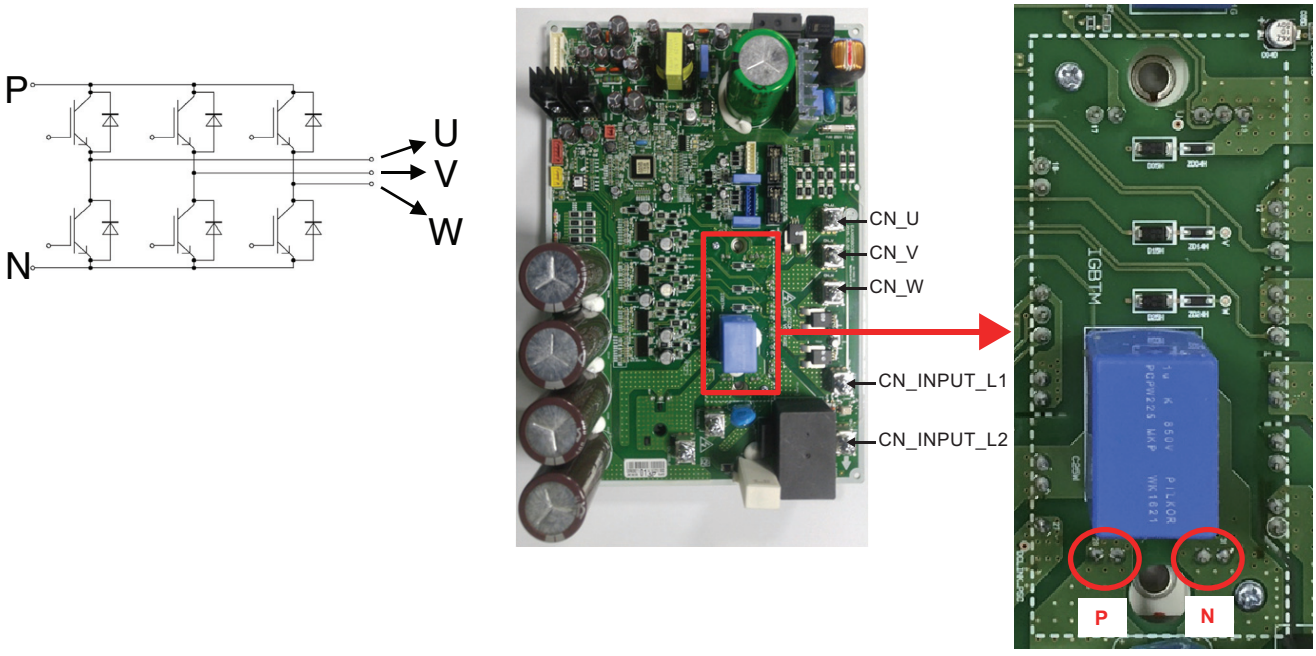
2.4 Inverter IGBTM Checking Method



1. Wait until Comp PCB DC voltage gets discharged, after the main power switch off (10 minutes).
2. Pull out DC_Link connector and U,V,W comp connector connected with Inverter PCB
3. Set multi tester in diode mode.
4. Measured value should be 0.2~0.6 V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure. If the value is small(0 Ω) or high(hundreds MΩ), PCB needs to be replaced.
6. In case that IGBTM is damaged, check if comp is needed to be replaced (PCB damaged).

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

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

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.**

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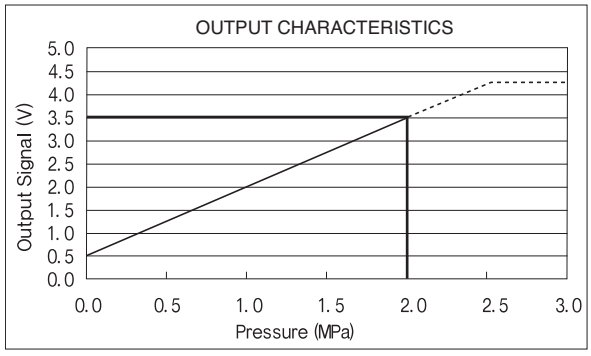
2.5 Pressure Sensor(High/Low Pressure Sensor)

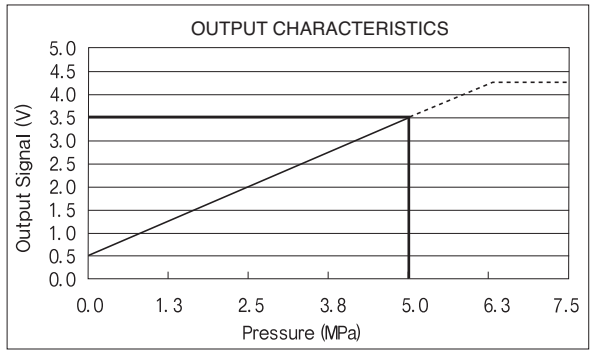
Connect manifold gauge to the service valve of outdoor unit, and compare the output of high pressure sensor to the output of low pressure sensor to detect the defect.

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

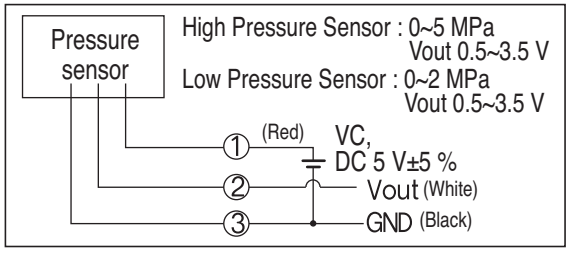
<Low Pressure Sensor>



<High Pressure Sensor>



1) If the pressure of manifold gauge is 0~1 kg/cm^2, it indicates the pressure got lower due to the leakage of refrigerant. Find the place of leakage and fix it.
2) If the difference of the outputs of high and low pressure is in the range of 1 kg/cm^2, the pressure sensor is normal.
3) If the difference of the outputs of high and low pressure is over 1 kg/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 5 V voltage flows on red and black wire, voltage would be made between the white and black wire. The pressure which is equivalent to the pressure output is shown in the table above.

2.6 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.

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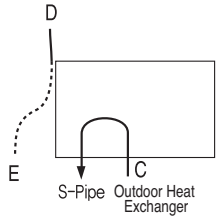
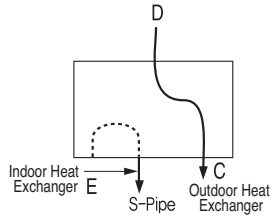
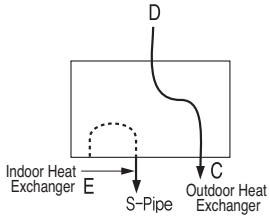
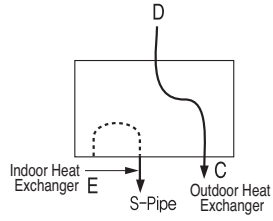
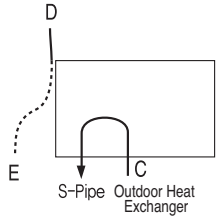
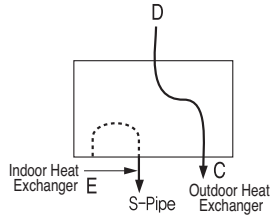
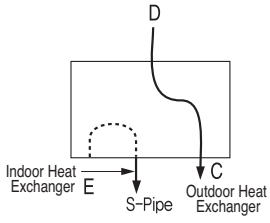
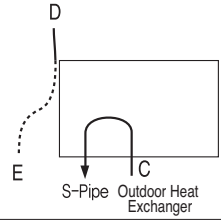
2.7 4 way Valve

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

	Heat Recovery	
	Heating Operation	Cooling Operation
4way Valve 1	On 	Off 
4way Valve 2	Off 	Off 

	Heat Pump	
	Heating Operation	Cooling Operation
4way Valve 1	On 	Off 
4way Valve 2	Off 	On 

D : Discharge
E : Evaporator
C : Condensor
S : Suction

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

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2.8 Temperature Sensor

1) Outdoor temperature sensor : TH1

2) Discharge pipe(D-pipe) 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.

3) Pipe temperature sensor : TH3

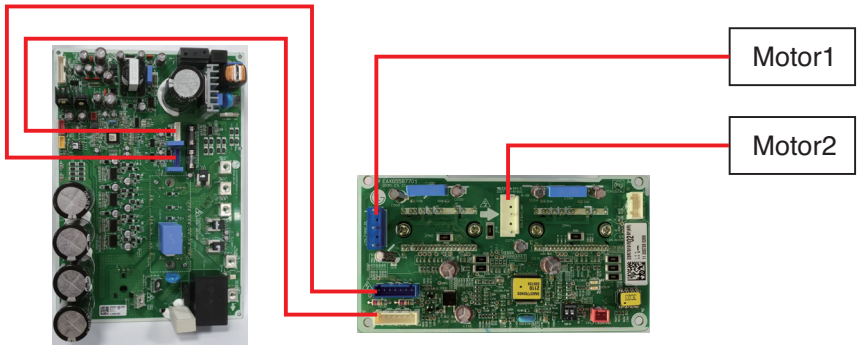
	TH1	TH2	TH3
Resistance	10 kΩ±1 %(25 °C)	200 kΩ±1 %(25 °C)	5 kΩ±1 %(25 °C)
	1.07 kΩ±3.3 %(85 °C)	28 kΩ±7.7 %(85 °C)	535 Ω±3.3 %(85 °C)

2.9 Fan lock and Fan IPM Check

Checking Outdoor Fan Lock

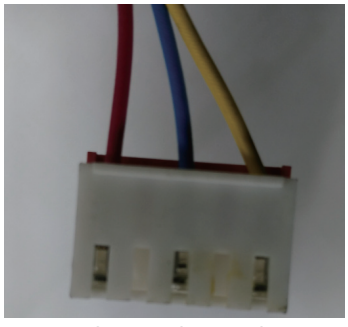
1. Check alien substance in the Fan.
2. Check the imprisonment of fan → Please turn Fan, if fan is turn, ok.
3. Check Motor Wire connection
   (Motor ↔ Motor PCB ↔ Inverter or Main PCB)

Motor Wire Connection



4. Check the Motor. Refer to the below.

■ How to check the outdoor fan motor of BLDC



Tester		Normal resistance (±10%)
①	③	45 Ω
③	⑤	45 Ω
①	⑤	45 Ω

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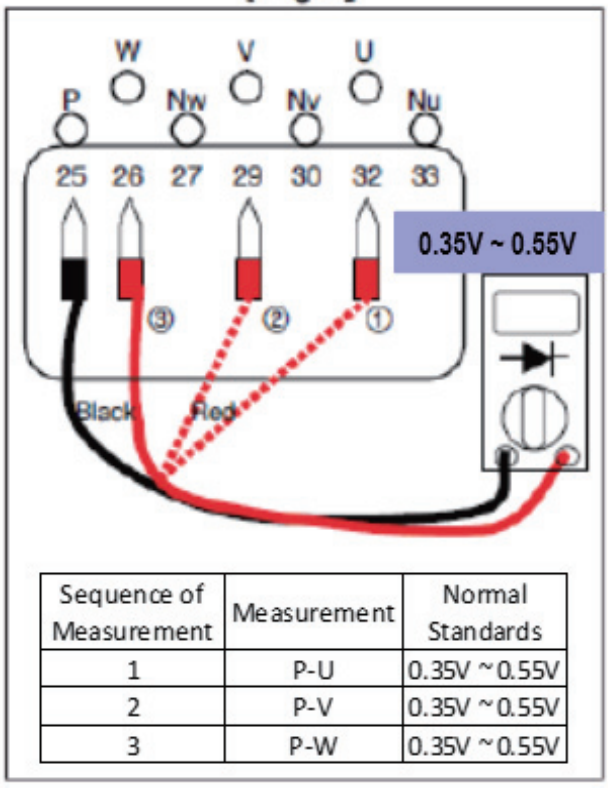
Fan IPM Check

Purpose	Judgment of the Fan IPM part fault of PCB assembly.	Items for checking	1. Judgment of damage of IGBT 2. Checking the soldering state

■ How to check Fan IPM IGBT (Diode Mode)

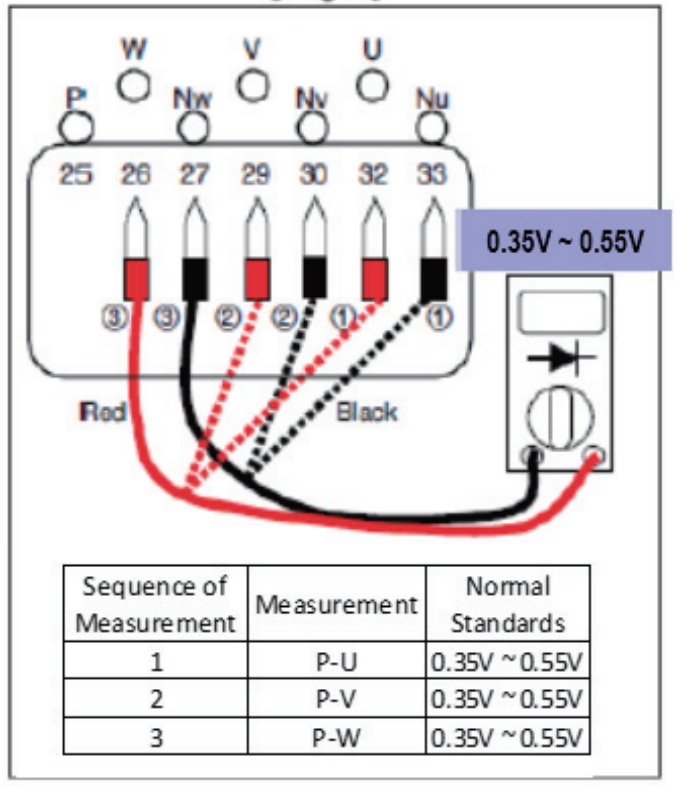
1. Remove the connector from PCB.
2. Set the Multi-Tester as Diode Voltage Measurement Mode. (⟶|)
3. Measure the voltages of P~U / P~V / P~W as shown in Fig. 1.
4. Measure the voltages of U~Nu / V~Nv / W~Nw as shown in Fig. 2.
5. If the measurements are significantly different from the levels shown in the figures, the IPM is deemed to be damaged.

[Fig.1]



Sequence of Measurement	Measurement	Normal Standards
1	P-U	0.35V ~ 0.55V
2	P-V	0.35V ~ 0.55V
3	P-W	0.35V ~ 0.55V

[Fig.2]



Sequence of Measurement	Measurement	Normal Standards
1	P-U	0.35V ~ 0.55V
2	P-V	0.35V ~ 0.55V
3	P-W	0.35V ~ 0.55V

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3. Self-diagnosis function

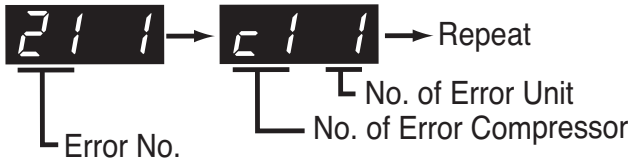
Error Indicator

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

Error Display

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

Ex)



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
Outdoor unit related error	2	1	Outdoor Unit Inverter Compressor IPM Fault	Outdoor Unit Inverter Compressor Drive IPM Fault
	2	2	Inverter Board Input Over Current(RMS) of Outdoor Unit	Outdoor Unit Inverter Board Input Current excess (RMS)
	2	3	Outdoor Unit Inverter Compressor DC link Low Voltage	DC charging is not performed at Outdoor Unit after starting relay turn on.
	2	4	Outdoor Unit High Pressure Switch	System is turned off by Outdoor Unit high pressure switch.
	2	5	Outdoor Unit Input Voltage High/ Low Voltage	Outdoor Unit input voltage is over 487 V or below 270 V
	2	6	Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Outdoor Unit Inverter Compressor Abnormality
	2	9	Outdoor Unit Inverter Compressor Over Current	Outdoor Unit Inverter Compressor Fault OR Drive Fault
	3	2	Outdoor Unit Inverter Compressor1 High Discharge Temperature	Outdoor Unit Inverter Compressor1 High Discharge Temperature
	3	4	High Pressure of Outdoor Unit	High Pressure of Outdoor Unit
	3	5	Low Pressure of Outdoor Unit	Low Pressure of Outdoor Unit

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Display			Title	Cause of Error
Outdoor unit related error	3	6	Outdoor Unit Low Compression Ratio Limited	Outdoor Unit Low Compression Ratio Limited
	4	0	Outdoor Unit Inverter Compressor CT Sensor Fault	Outdoor Unit Inverter Compressor CT Sensor open or short
	4	1	Outdoor Unit Inverter Compressor1 Discharge Temperature Sensor Fault	Outdoor Unit Inverter Compressor Discharge Temperature Sensor open or short
	4	2	Outdoor Unit Low Pressure Sensor Fault	Outdoor Unit Low Pressure Sensor open or short
	4	3	Outdoor Unit High Pressure Sensor Fault	Outdoor Unit High Pressure Sensor open or short
	4	4	Outdoor Unit Air Temperature Sensor Fault	Outdoor Unit Air Temperature Sensor open or short
	4	5	Outdoor Unit Heat Exchanger Temperature Sensor (Front side) Fault	Outdoor Unit Heat Exchanger Temperature Sensor(Front side) open or short
	4	6	Outdoor Unit Suction Temperature Sensor Fault	Outdoor Unit Suction Temperature Sensor open or short
	5	0	Omitting connection of R, S, T power of Outdoor Unit	Omitting connection of outdoor unit
	5	1	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of Outdoor Unit
	5	2	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Outdoor Unit
	5	3	Communication error : indoor unit → Main PCB of Outdoor Unit	Failing to receive indoor unit signal at main PCB of Outdoor Unit .
	5	7	Communication error : Main PCB → inverter PCB	Failing to receive signal main PCB at inverter PCB of Outdoor Unit
	6	0	Inverter PCB EEPROM Error of Outdoor Unit	Access Error of Inverter PCB of Outdoor Unit
	6	2	Outdoor Unit Inverter Heatsink High Temperature	System is turned off by Outdoor Unit Inverter Heatsink High Temperature
	6	5	Outdoor Unit Inverter Heatsink Temperature Sensor Fault	Outdoor Unit Inverter Heatsink Temperature Sensor open or short
	6	7	Outdoor Unit Fan Lock	Restriction of Outdoor Unit
	7	1	Converter CT Sensor Error of Outdoor Unit	Converter CT Sensor Error of Outdoor Unit
	8	6	Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Outdoor Unit Main MICOM and EEPROM or omitting EEPROM

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	Display				Title	Cause of Error
Outdoor unit related error	1	1	3		Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of Outdoor Unit is open or short
	1	1	5		Outdoor Unit Subcooling Outlet Temperature Sensor Error	Outdoor Unit Subcooling Outlet Temperature Sensor Error
	1	5	0		Outdoor Unit Discharge Super Heat Low	Outdoor Unit LowDischarge Super Heat for 5 minutes
	1	5	1		Failure of operation mode conversion at Outdoor Unit	Failure of operation mode conversion at Outdoor Unit
HR unit related error	2	0	0	1	Searching pipe Error	Failure of automatic addressing of valves
	2	0	1	C + #HR	HR unit1 Liqiud sensor error	Liquid pipe sensor of HR unit open or short
	2	0	2	C + #HR	HR unit1 Sub Cooling Pipe In sensor error	Sub Cooling Pipe In sensor of HR unit open or short
	2	0	3	C + #HR	HR unit1 Sub Cooling Pipe Out sensor error	Sub Cooling Pipe Out sensor of HR unit. open or short
	2	0	4	C + #HR	Communication error	Failing to receive HR unit signal at outdoor unit
	2	0	5	C + #HR	Communication error between HR unit and the upgraded 485 modem.	4 series upgraded 485 communication error between HR unit and HR unit modem
	2	0	6	C + #HR	Duplicate address error of HR unit	When the HR unit address is set duplicated at the 4 series upgraded 485 communication
	2	0	7	C + #HR	Communication error between Master and Slave Main PCB of HR Unit	When fail to communication between Master and Slave Main PCB of HR Unit
	2	0	8	C + #HR	Communication error of EEPROM of HR Unit	When fail to communication of EEPROM of HR Unit

C : HR unit

: HR unit Number

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

CAUTION

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

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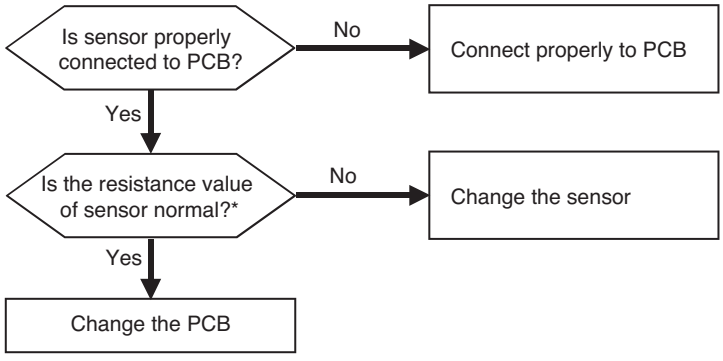
Error No.	Error Type	Error Point	Main Reasons
01	Indoor unit air sensor error	Indoor unit sensor is open/short	1. Indoor unit PCB wrong connection 2. Indoor unit PCB failure 3. Sensor problem (main reason)
02	Indoor unit pipe inlet sensor error		
06	Indoor unit pipe outlet sensor error		

■ Error diagnosis and countermeasure flow chart



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

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

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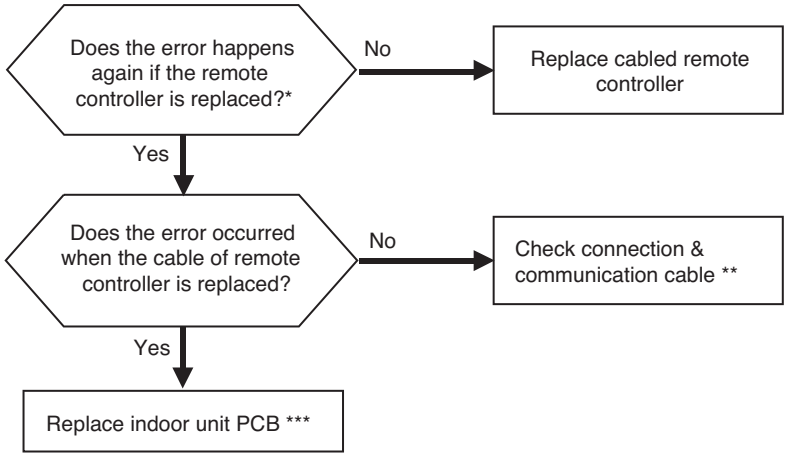
Error No.	Error Type	Error Point	Main Reasons
03	No communication between cabled remote controller & indoor unit	The remote controller did not receive the signal from indoor unit during specific time	1. Remote controller fault 2. Indoor unit PCB fault 3. Connector fault, Wrong connection 4. Communication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

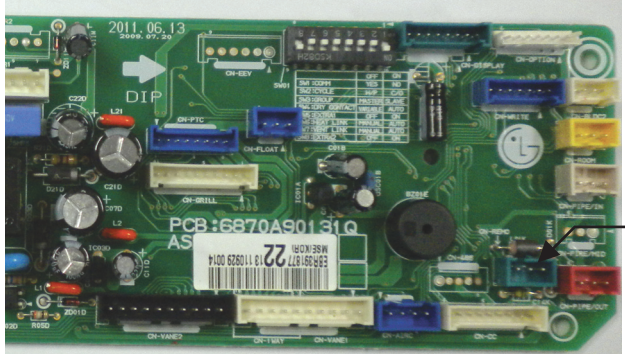
■ Error diagnosis and countermeasure flow chart



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

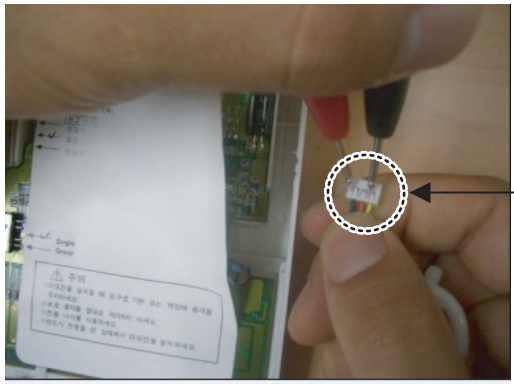
** Check cable : Contact failure of connected portion or extension of cable are main cause
Check any surrounded noise (check the distance with main power cable)
➔ make safe distance from the devices generate electromagnetic wave

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



CN-REMO : Remote controller connection

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



Checking communication cable connection status

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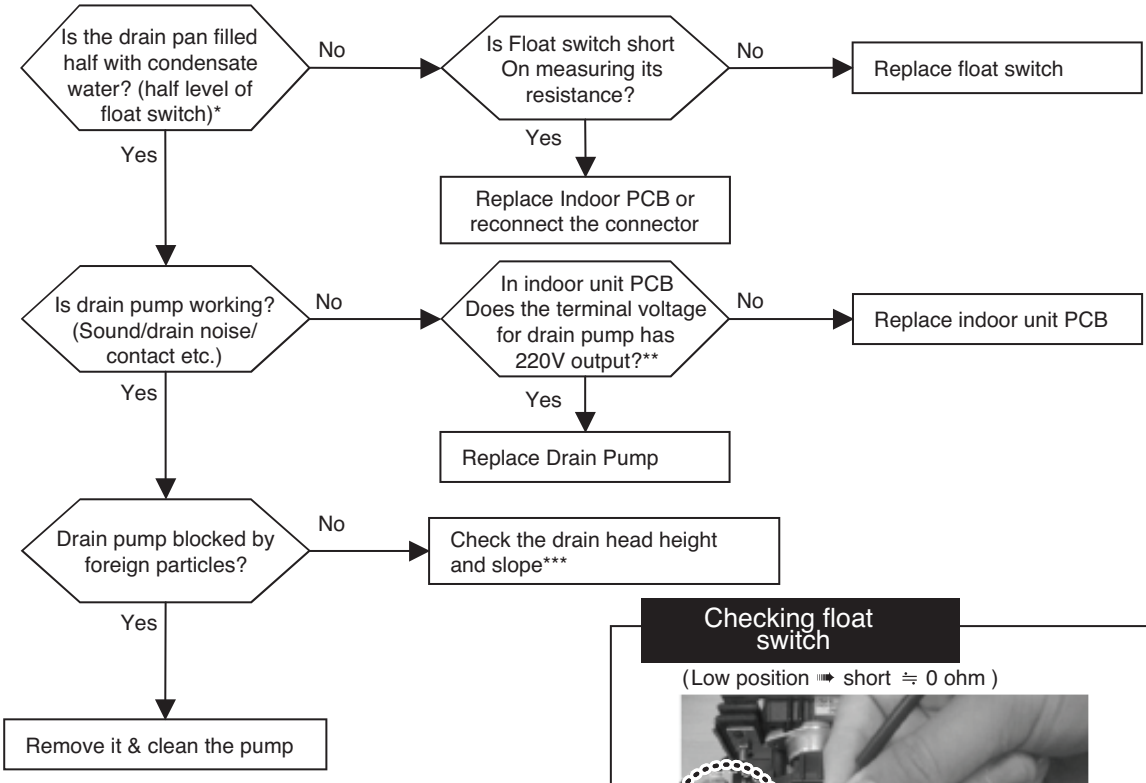
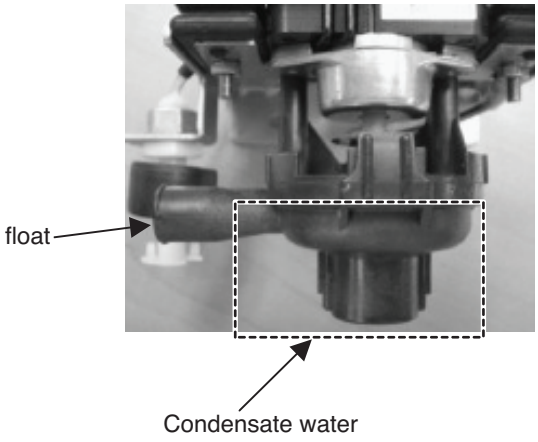
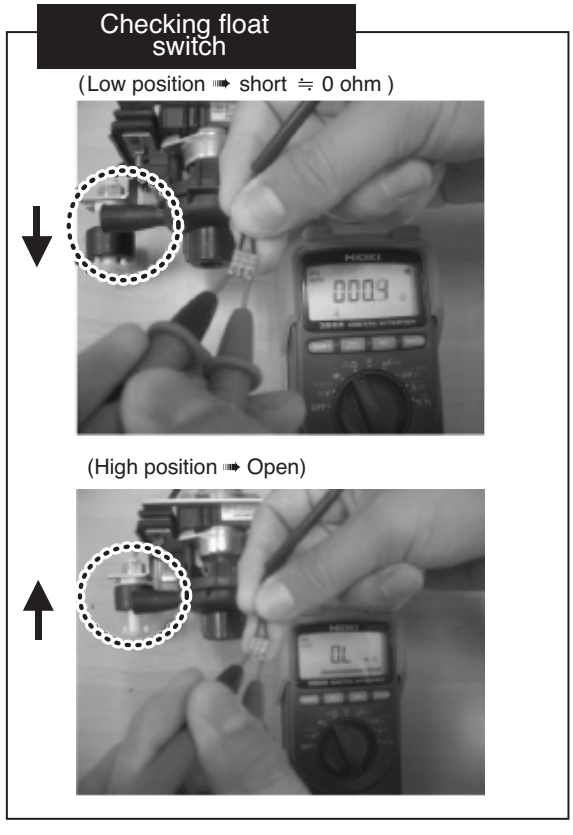
Error No.	Error Type	Error Point	Main Reasons
04	Drain pump error	Float switch is open due to rising of condensate water level because of drain pump fault or drain pipe clogging	1. Drain pump/float switch fault 2. Improper drain pipe location, clogging of drain pipe 3. Indoor unit PCB fault

■ 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.





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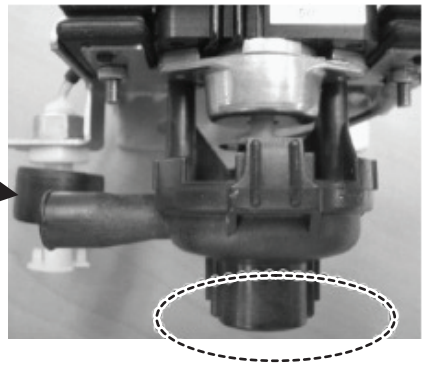
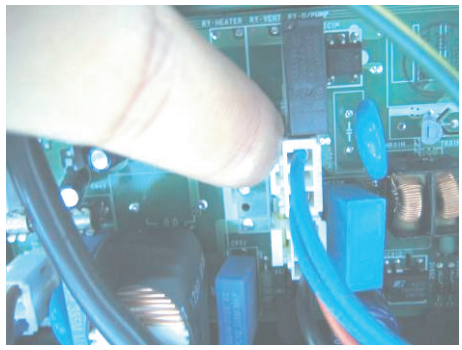


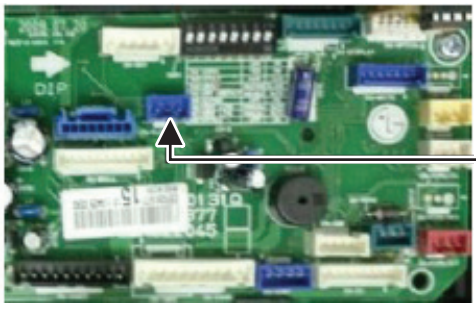
A:Point to check rotating



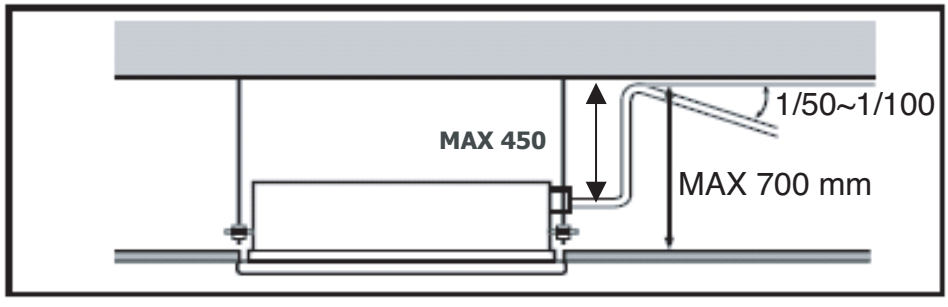
*** Indoor PCB drain pump connector

(Check input of 220 V)

(Marked as **CN-DPUMP)**



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



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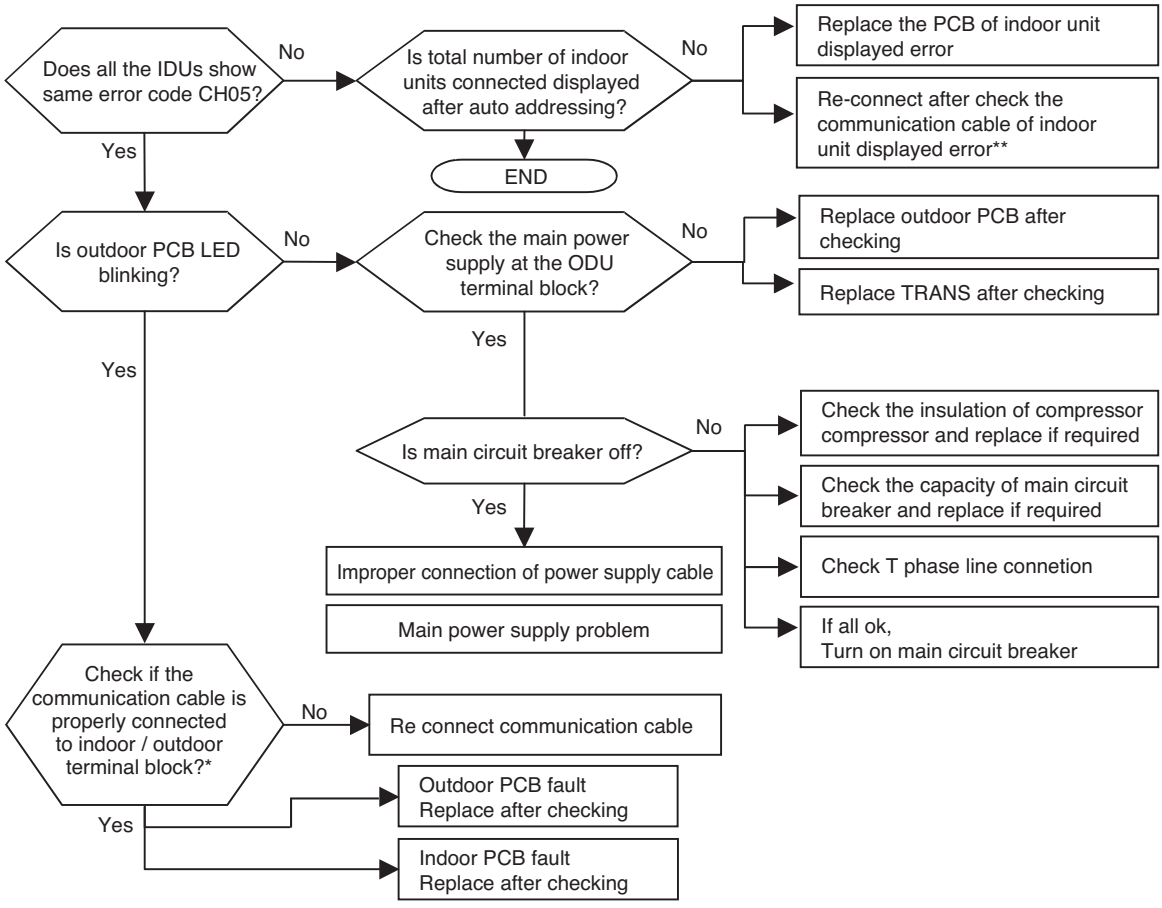
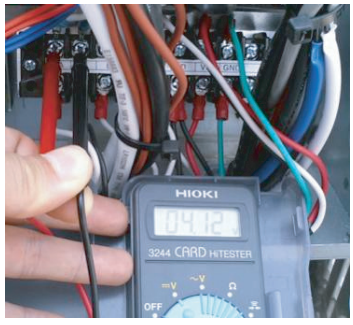
Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Outdoor unit communication error	No signal communication between indoor & outdoor units.	1. Auto addressing is not done 2. Communication cable is not connected 3. Short circuit of communication cable 4. Indoor unit communication circuit fault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

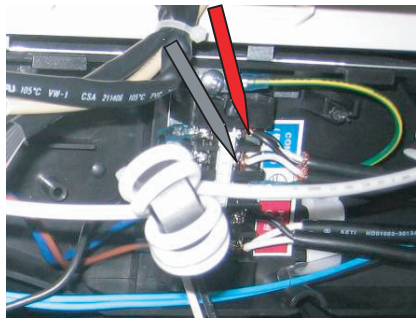
■ Error diagnosis and countermeasure flow chart



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



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



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

■ Error diagnosis and countermeasure flow chart

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

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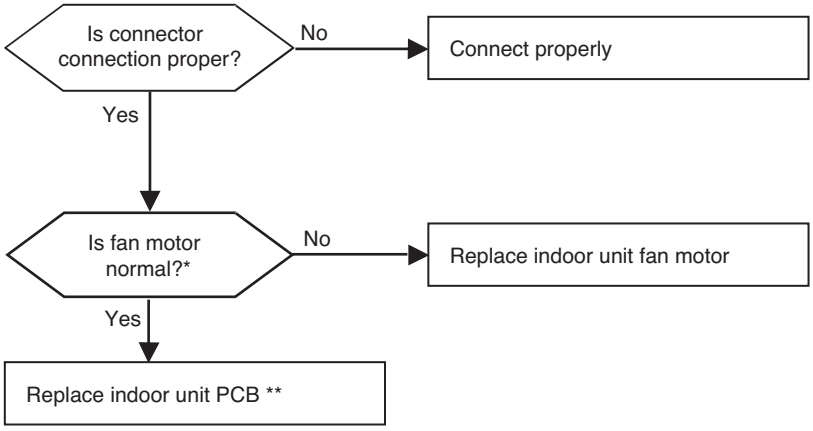
Error No.	Error Type	Error Point	Main Reasons
10	Indoor unit BLDC fan motor failure	Indoor BLDC fan motor feedback signal is absent (for 50 seconds)	1. Motor connector connection fault 2. Indoor PCB fault 3. Motor fault

■ Error diagnosis and countermeasure flow chart

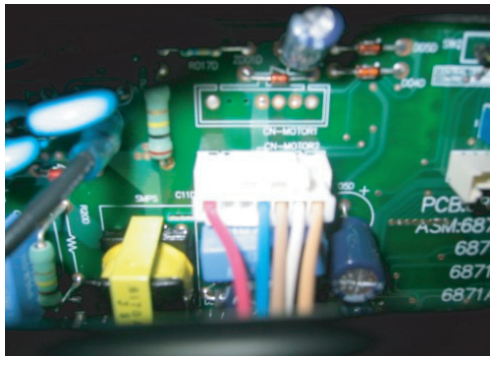


* It is normal when check hall sensor of indoor fan motor as shown below

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)

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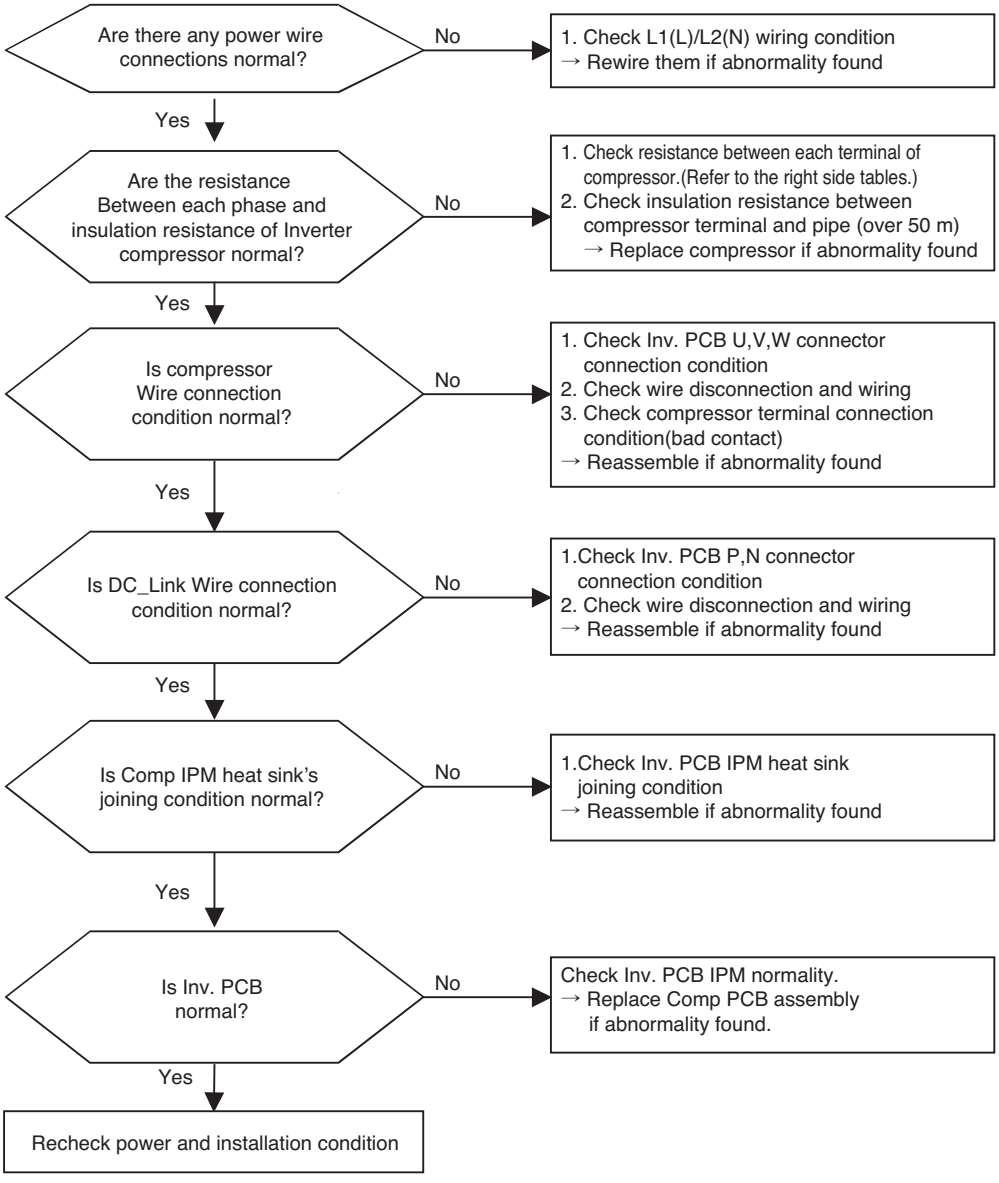
Error No.	Error Type	Error Point	Main Reasons
21	Inv. PCB IPM Fault occur	IPM self protection circuit activation (Overcurrent/IPM overheating/Vcc low voltage)	1.Over current detection at Inverter compressor(U,V,W) 2.Compressor damaged (insulation damaged/Motor damaged) 3.IPM overheating (Heat sink disassembled) 4.Inverter compressor terminal disconnected or loose 5.Inverter PCB assembly damaged 6.ODU input current low

■ Error diagnosis and countermeasure flow chart



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* Measuring resistance between each terminal of compressor

* Compressor wire connector connection point

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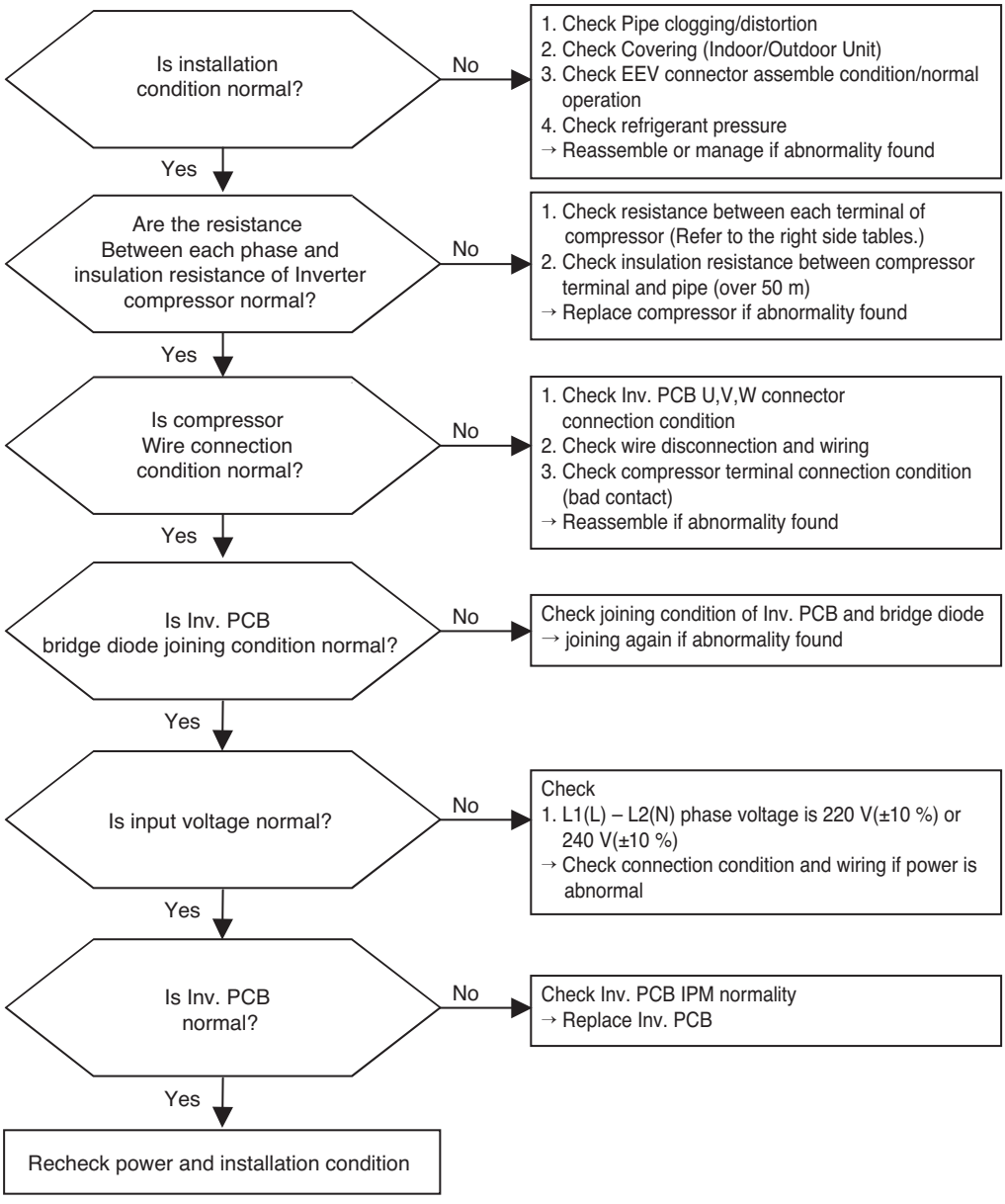
Error No.	Error Type	Error Point	Main Reasons
22	AC Input Current Over Error	Inv. PCB input power current is over limited value(Cooling : 31 A, Heating 34 A)	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Power Line Misconnection 5. Inv. PCB damage (Input current sensing part)

■ Error Diagnosis and Countermeasure Flow Chart



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* Measuring resistance between each terminal of compressor

* Measuring input voltage

* Compressor wire connector connection

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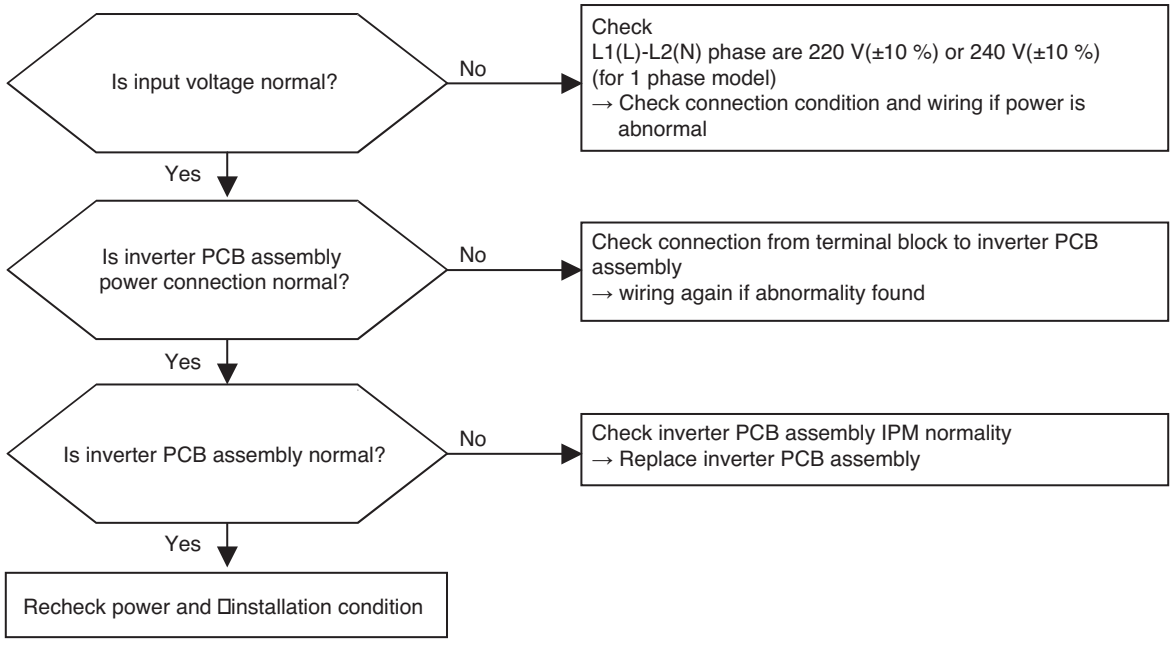
Error No.	Error Type	Error Point	Main Reasons
23	Inverter Compressor DC Link Low Voltage	DC Voltage isn't charged after starting relay on	1. DC Link terminal misconnection/terminal contact fault 2. Starting relay damage 3. Condenser damage 4. Inverter PCB assembly damage (DC Link voltage sensing part)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

■ Error Diagnosis and Countermeasure Flow Chart



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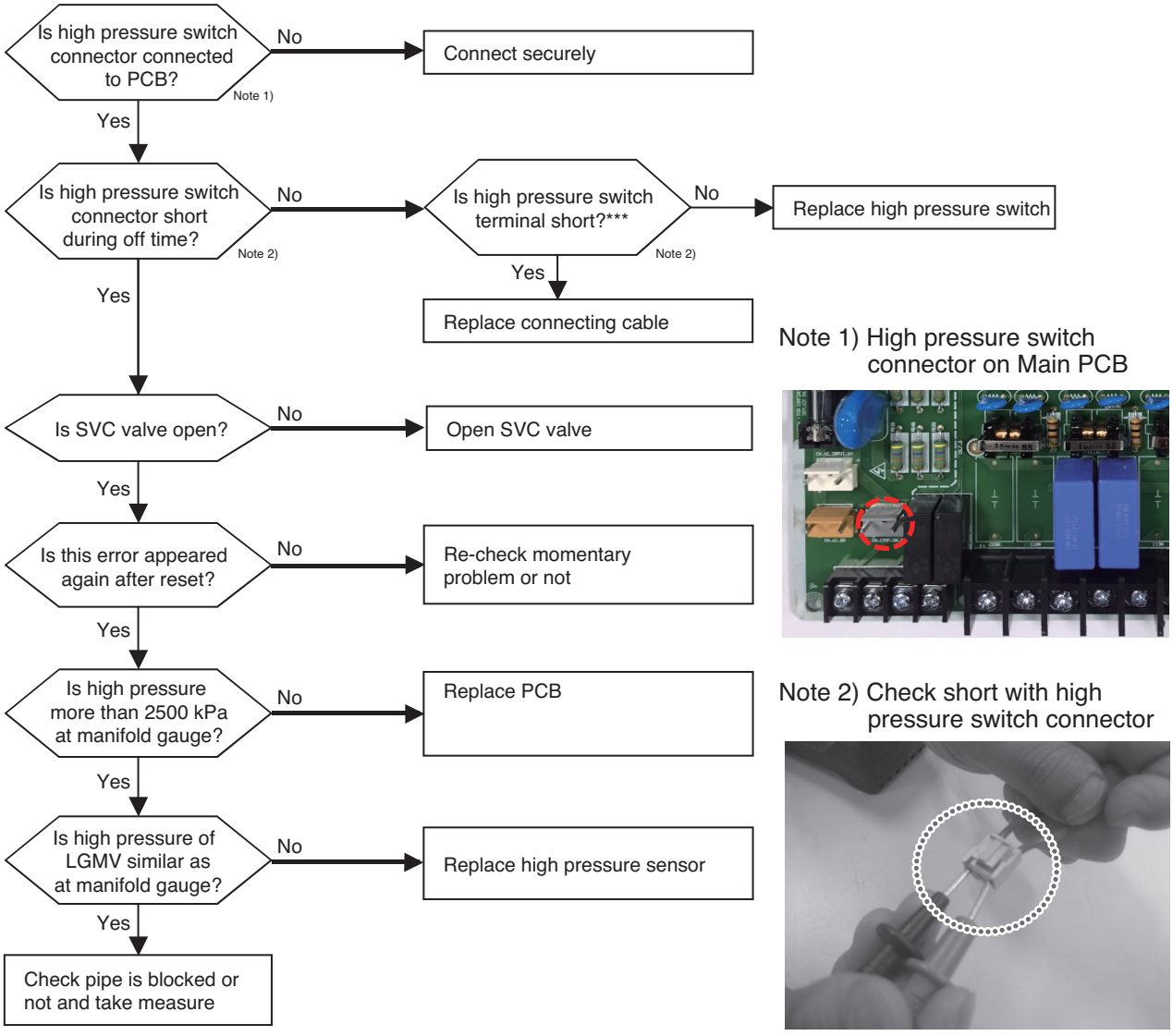
Error No.	Error Type	Error Point	Main Reasons
24	Excessive rise of discharge pressure in outdoor compressor	Compressor off due to the high pressure switch in outdoor unit	1. Defective high pressure switch 2. Defective fan of indoor unit or outdoor unit 3. Check valve of compressor clogged 4. Pipe distortion 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

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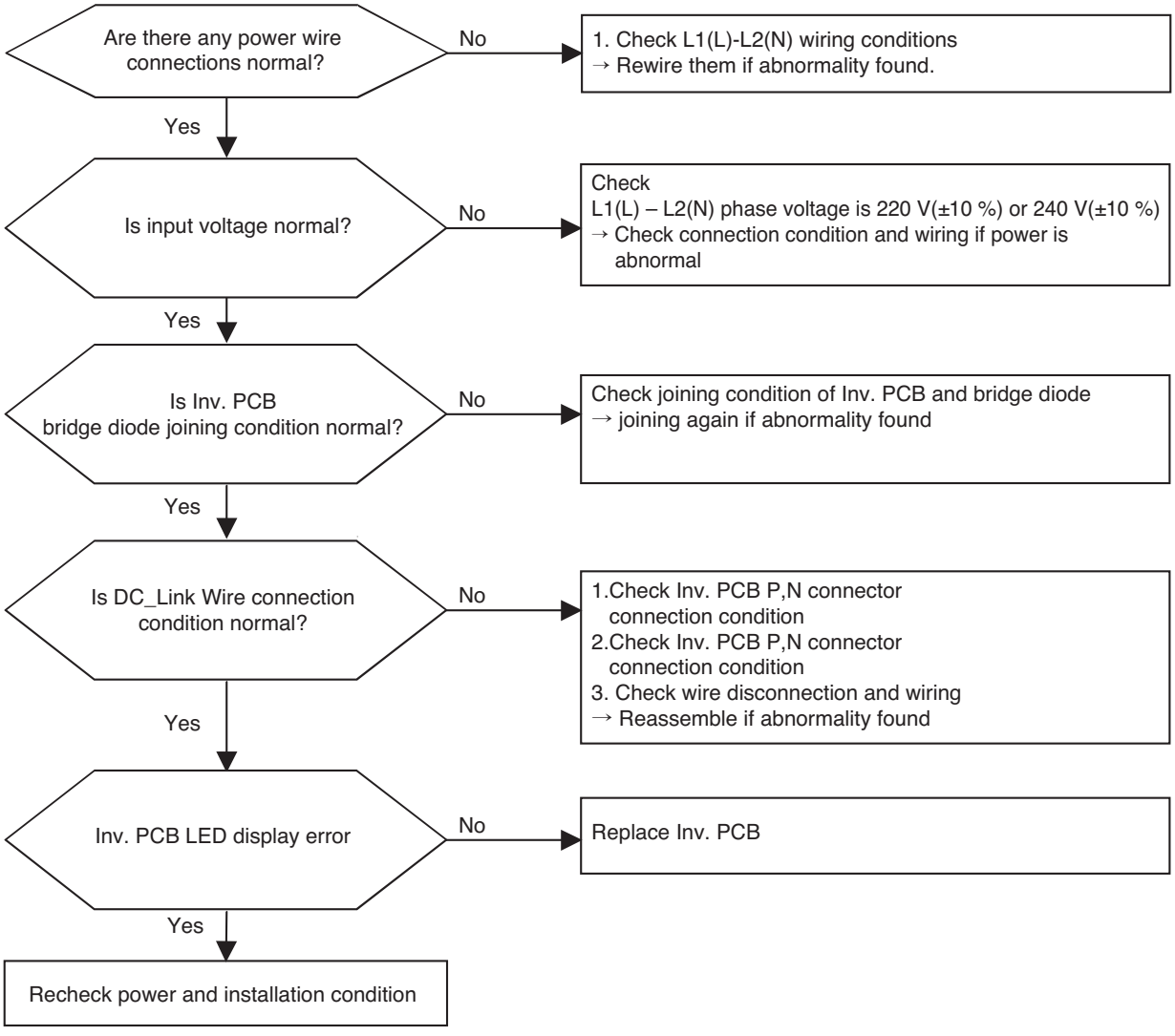
Error No.	Error Type	Error Point	Main Reasons
25	Input Voltage high/low	Input voltage is over limited value of the product (142 V or less, 310 V or more)	1. Input voltage abnormal L1(L)-L2(N) 2. Outdoor unit Inv. PCB damage (input voltage sensing part) 3. L2(N) phase line disconnection

■ Error Diagnosis and Countermeasure Flow Chart



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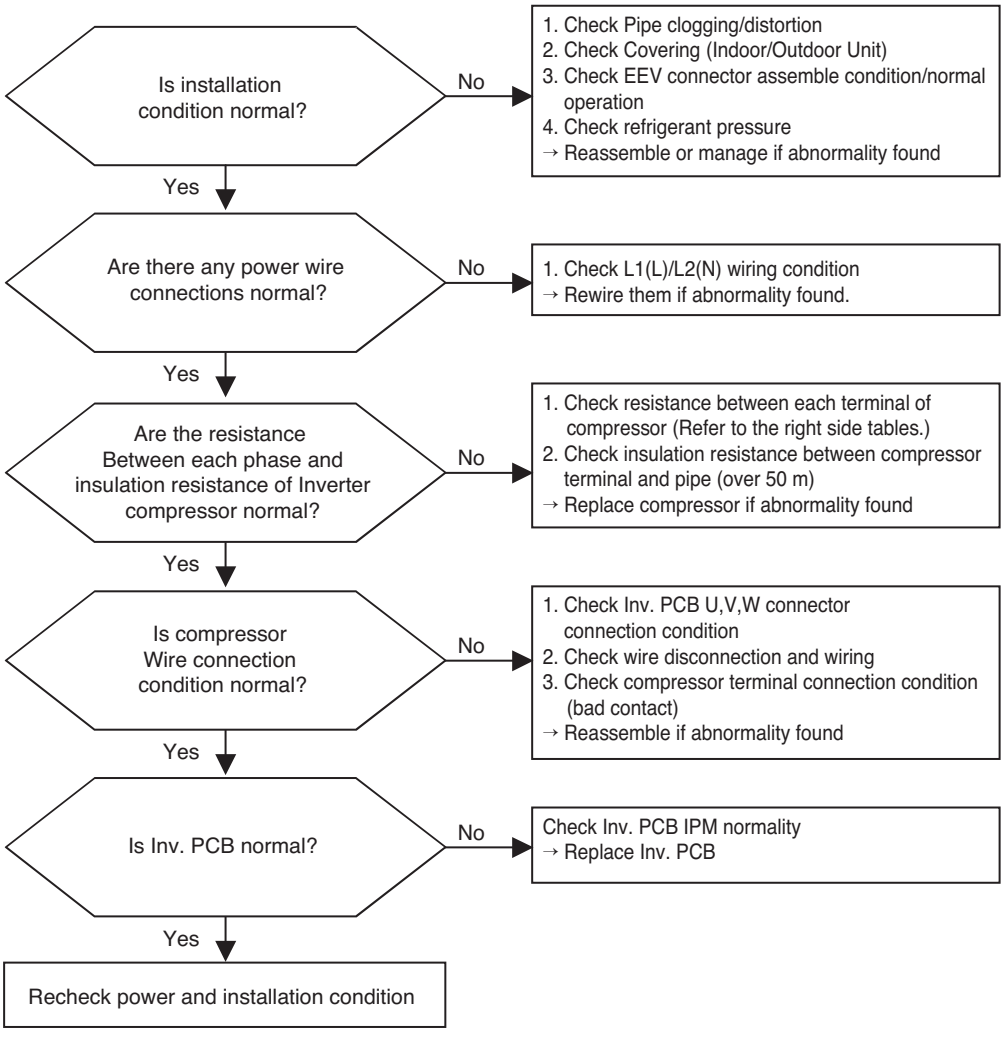
Error No.	Error Type	Error Point	Main Reasons
26	Inverter compressor starting failure Error	Starting failure because of compressor abnormality	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Compressor wiring fault 4.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

■ Error Diagnosis and Countermeasure Flow Chart



JQC048MBC

Temp.	25 °C[77 °F]	75 °C[167 °F]
U-V	0.113±7 %Ω	0.135±7 %Ω
V-W	0.113±7 %Ω	0.135±7 %Ω
W-U	0.113±7 %Ω	0.135±7 %Ω

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* Measuring resistance between each terminal of compressor

* Compressor wire connection

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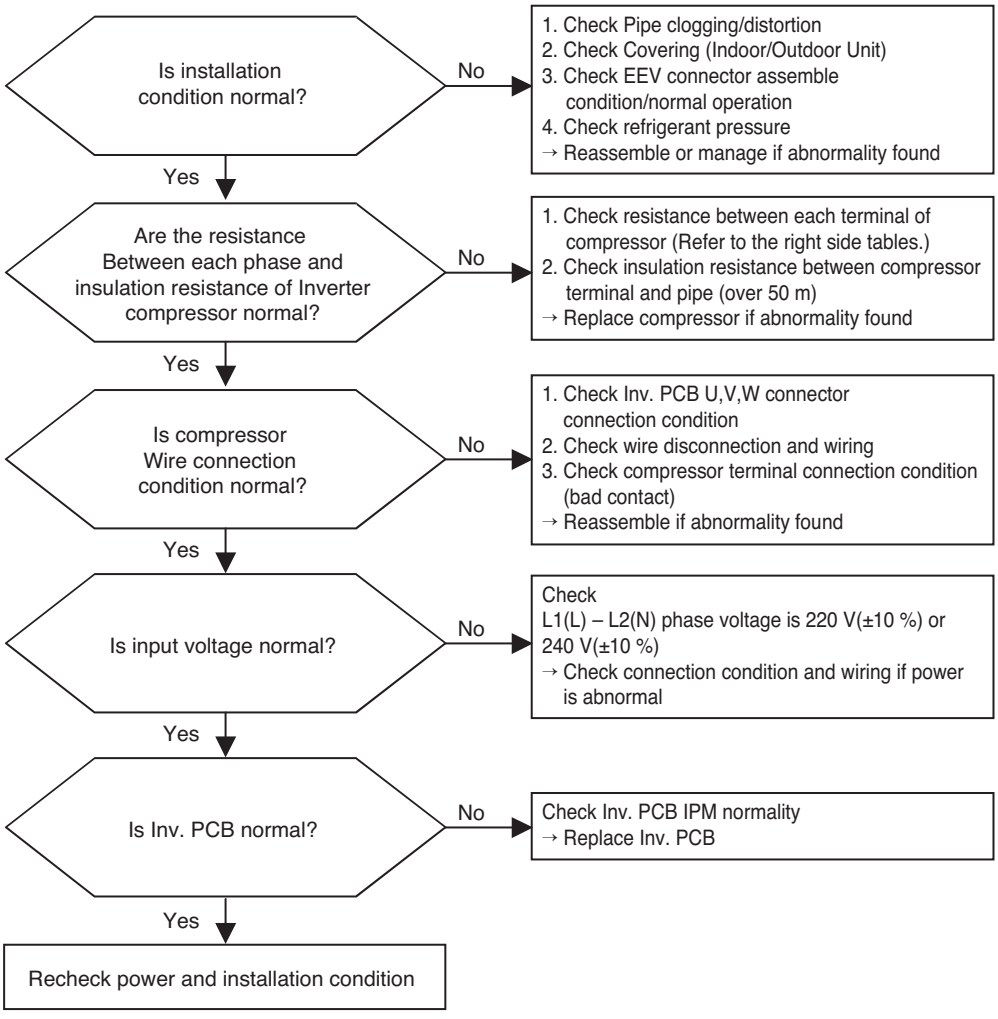
Error No.	Error Type	Error Point	Main Reasons
29	Inverter compressor over current	Inverter compressor input current is over 46 A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Inv. PCB damage

■ Error Diagnosis and Countermeasure Flow Chart



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

*** Measuring input voltage**

*** Compressor wire connection**

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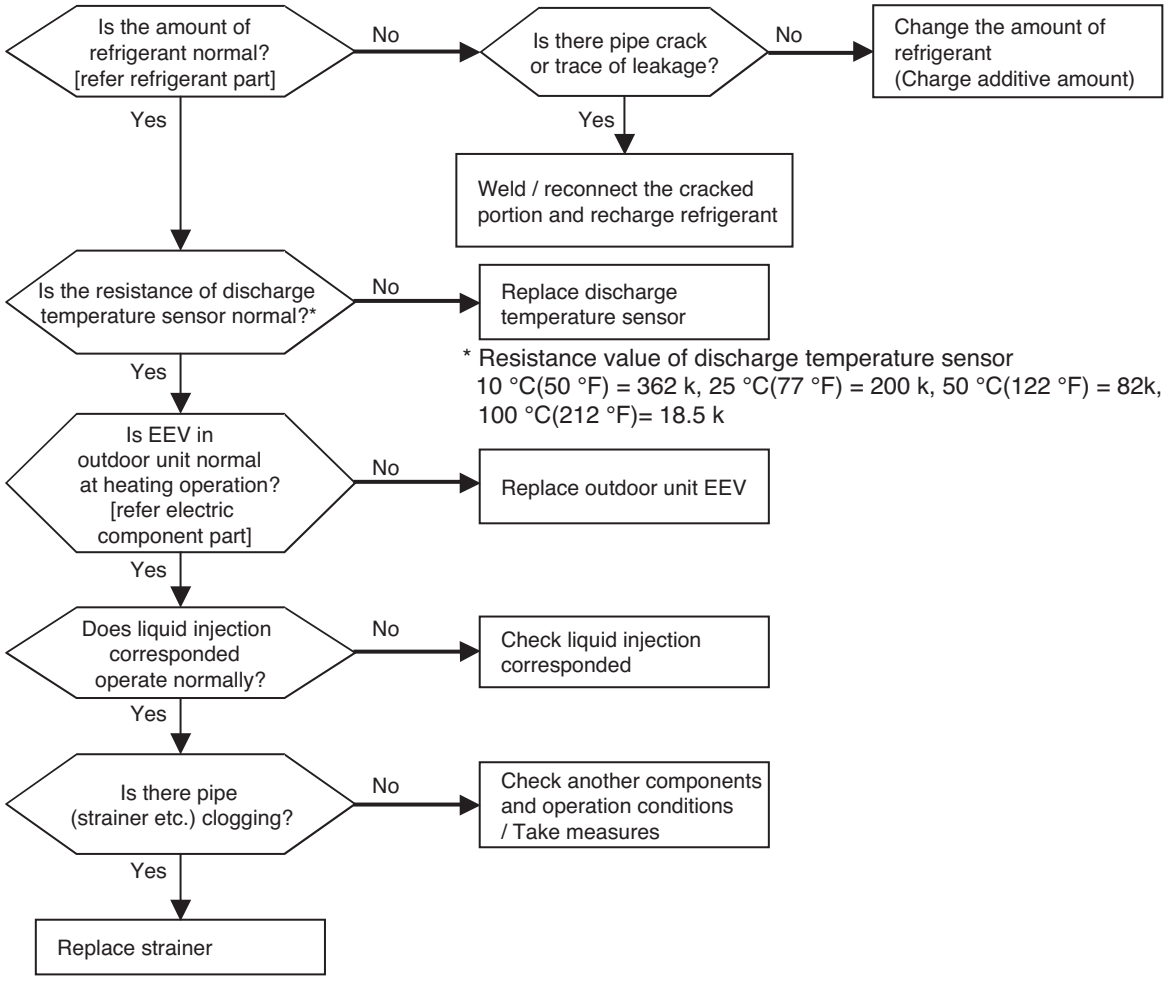
Error No.	Error Type	Error Point	Main Reasons
32	Over-increase discharge temperature of inverter compressor 1 at main outdoor unit	Compressor is off because of over-increase discharge temperature of inverter compressor 1	1. Temperature sensor defect of inverter compressor 1 discharge pipe 2. Refrigerant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

■ Error diagnosis and countermeasure flow chart



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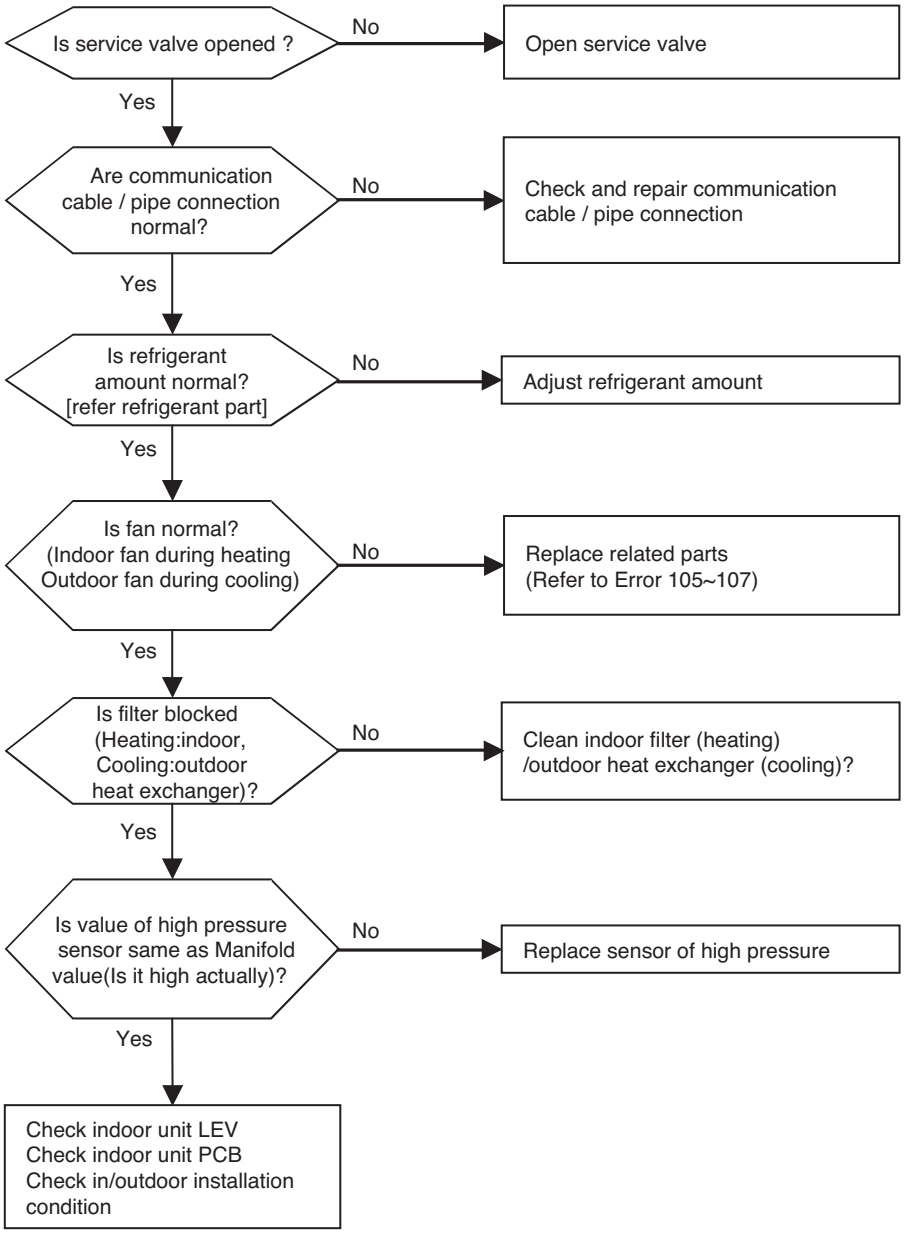
Error No.	Error Type	Error Point	Main Reasons
34	Over-increase of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to over-increase of high pressure by high pressure sensor	1. Defect of high pressure sensor 2. Defect of indoor or outdoor unit fan 3. Deformation 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



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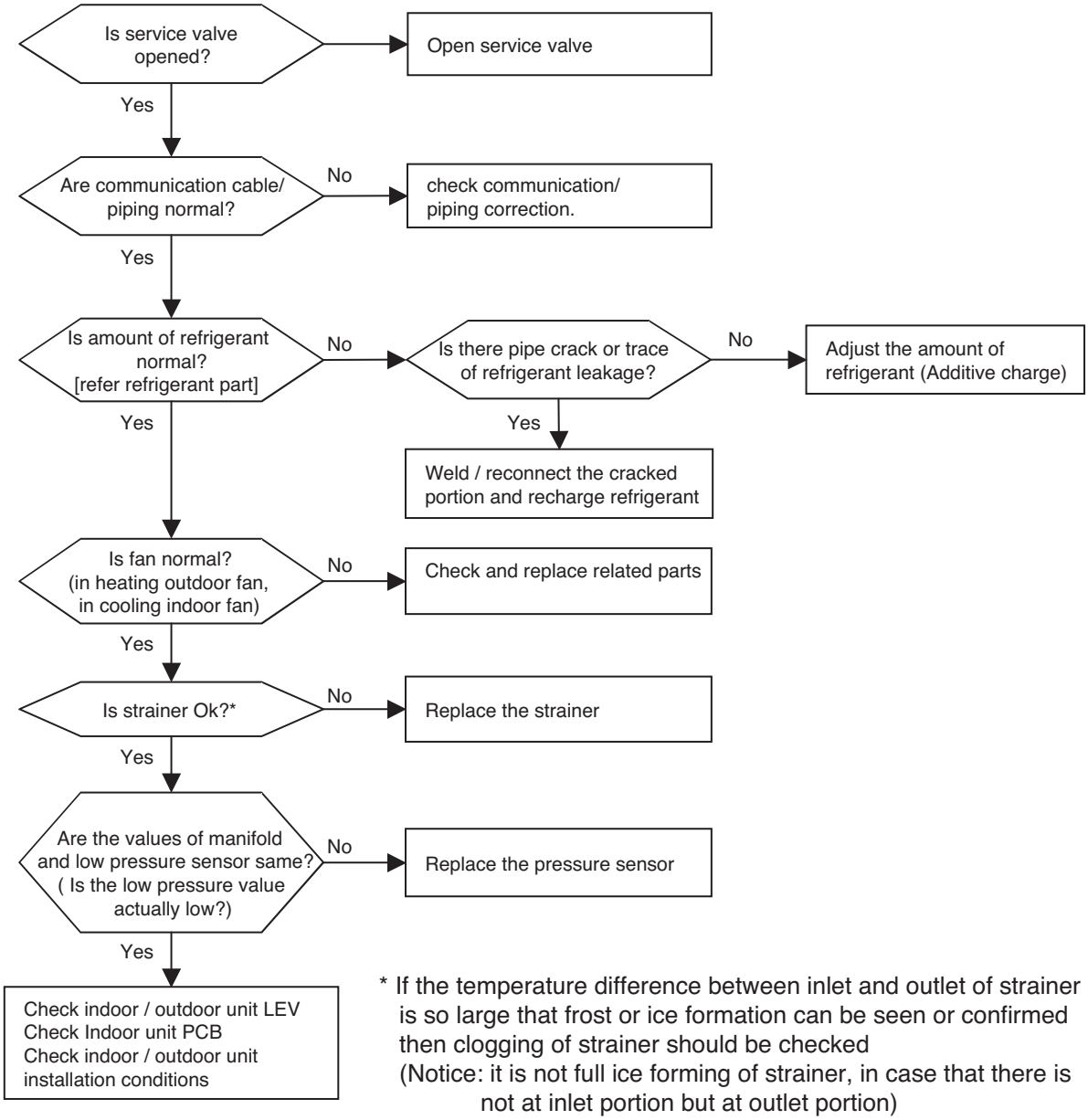
Error No.	Error Type	Error Point	Main Reasons
35	Excessive drop of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to excessive drop of low pressure by the low pressure sensor	1. Defective low pressure sensor 2. Defective outdoor/indoor unit fan 3. Refrigerant 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)

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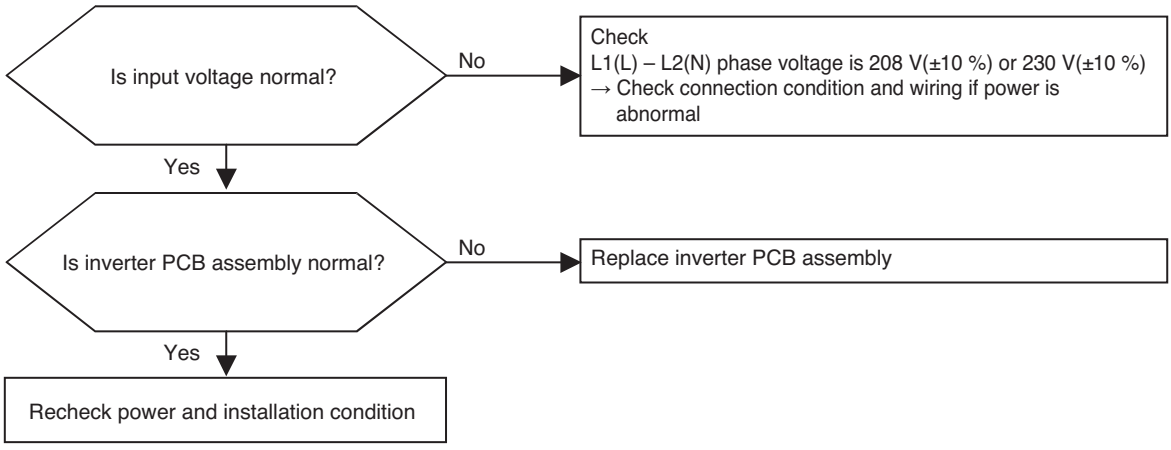
Error No.	Error Type	Error Point	Main Reasons
40	Inverter compressor CT sensor error	Micom input voltage isn't within 2.5 V ±0.3 V at initial state of power supply	1. Input voltage abnormal (L1(L) – L2(N)) 2. ODU Inv. PCB damage (CT sensing part)

■ Error Diagnosis and Countermeasure Flow Chart



* Measuring input voltage

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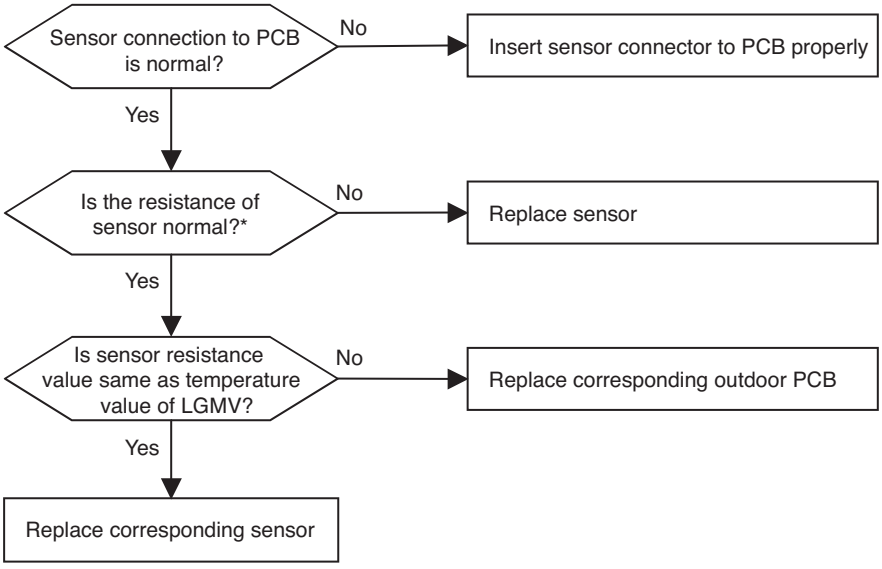
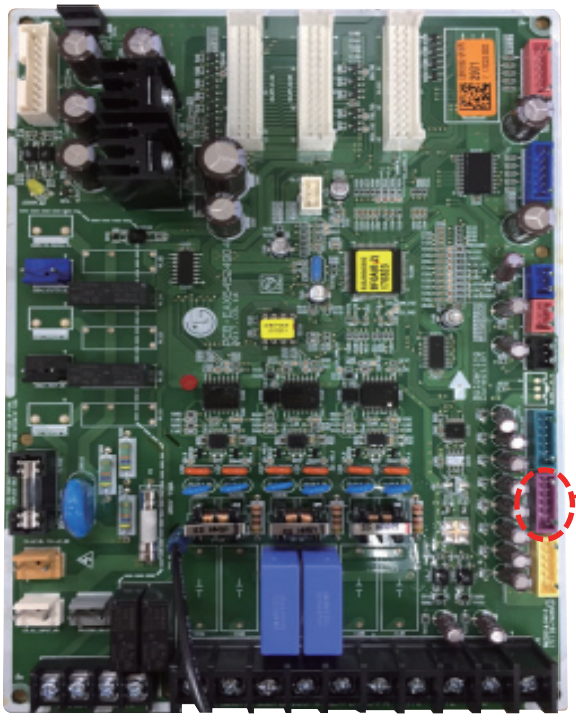
Error No.	Error Type	Error Point	Main Reasons
41	Compressor1 discharge pipe temperature sensor error	Sensor measurement value is abnormal (Open/Short)	1. Defective connection of the compressor1 discharge pipe temperature sensor 2. Defective discharge pipe compressor sensor of the compressor1 (open/short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart



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

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



Check the resistance inverter compressor discharge temperature sensor

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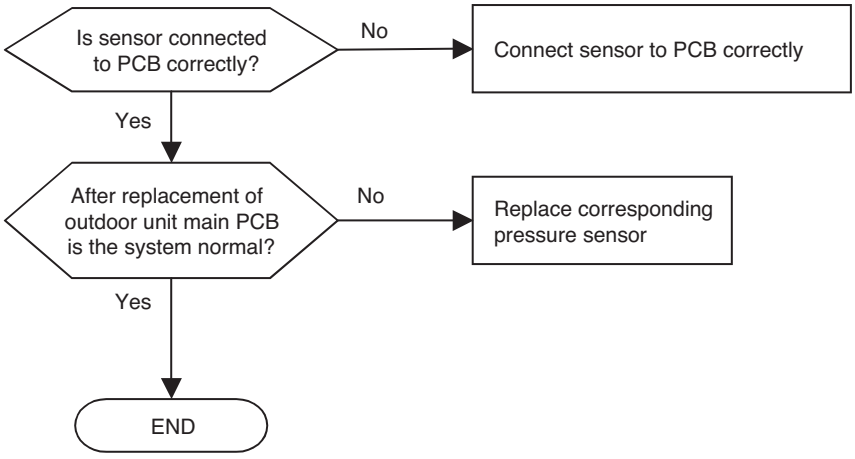
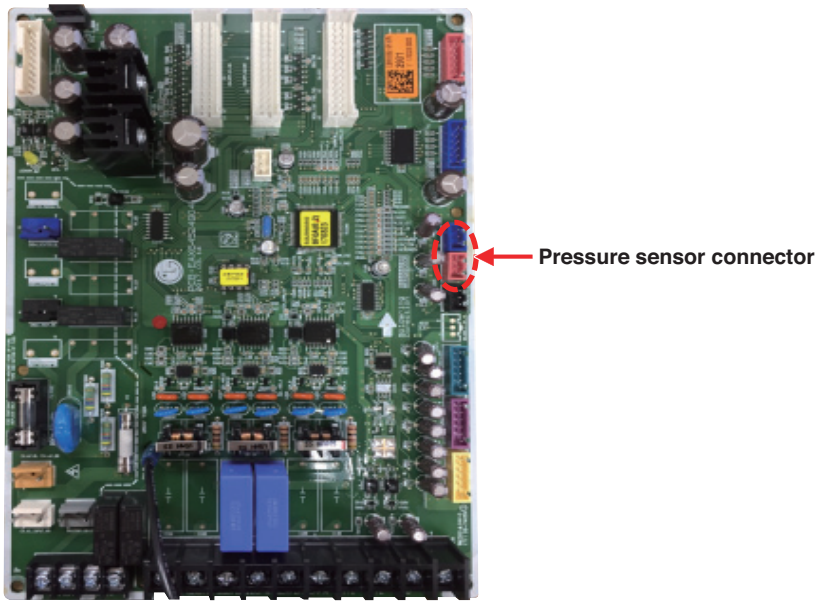
Error No.	Error Type	Error Point	Main Reasons
42	Sensor error of low pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of low pressure connector 2. Defect of low pressure connector (Open/Short) 3. Defect of outdoor PCB
43	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	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





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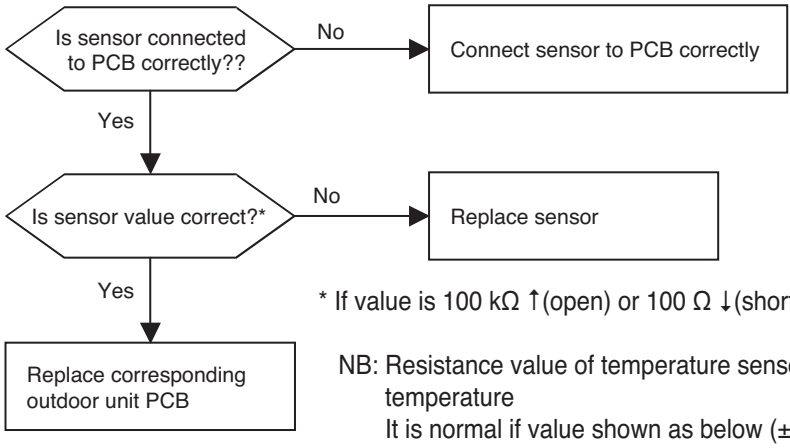
Error No.	Error Type	Error Point	Main Reasons
44	Sensor error of outdoor air temperature	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
45	Piping temperature sensor error of heat exchanger 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	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

■ Error diagnosis and countermeasure flow chart



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

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

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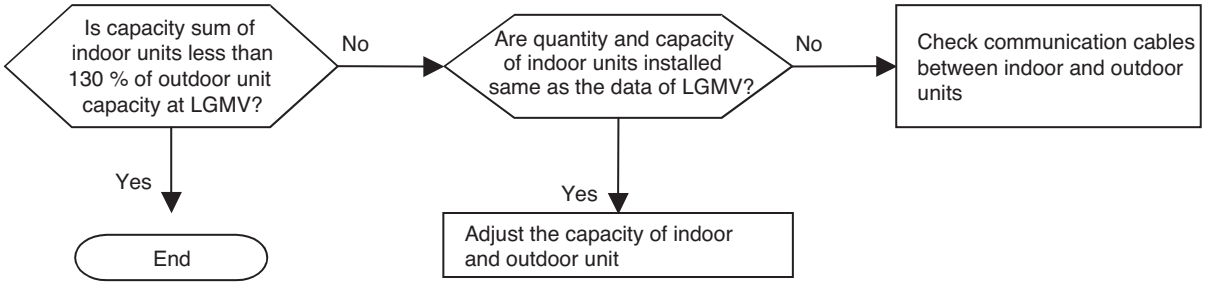
Error No.	Error Type	Error Point	Main Reasons
51	Over-Capacity (Sum of indoor unit capacity is more than outdoor capacity)	Sum of indoor unit capacity exceed outdoor unit capacity specification	1. 130 % more than outdoor unit rated capacity 2. Wrong connection of transmission cable/piping 3. Detect ot outdoor unit PCB

■ Error diagnosis and countermeasure flow chart



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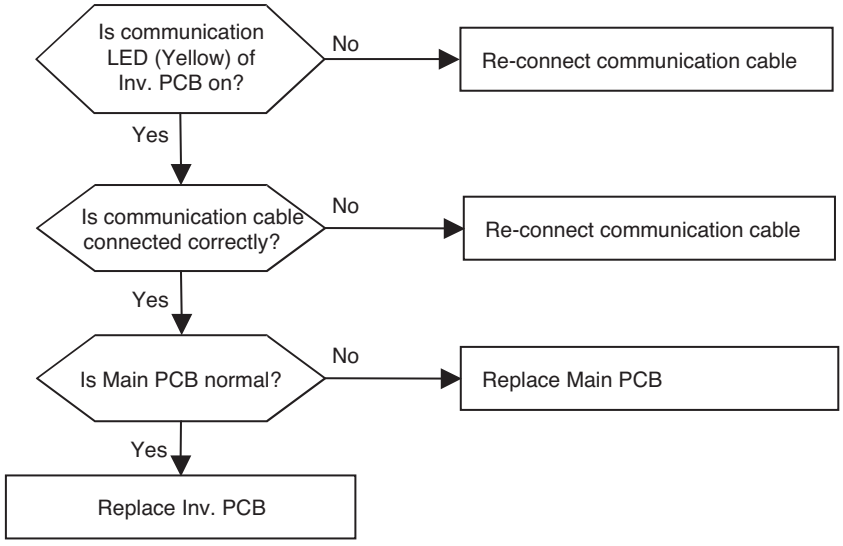
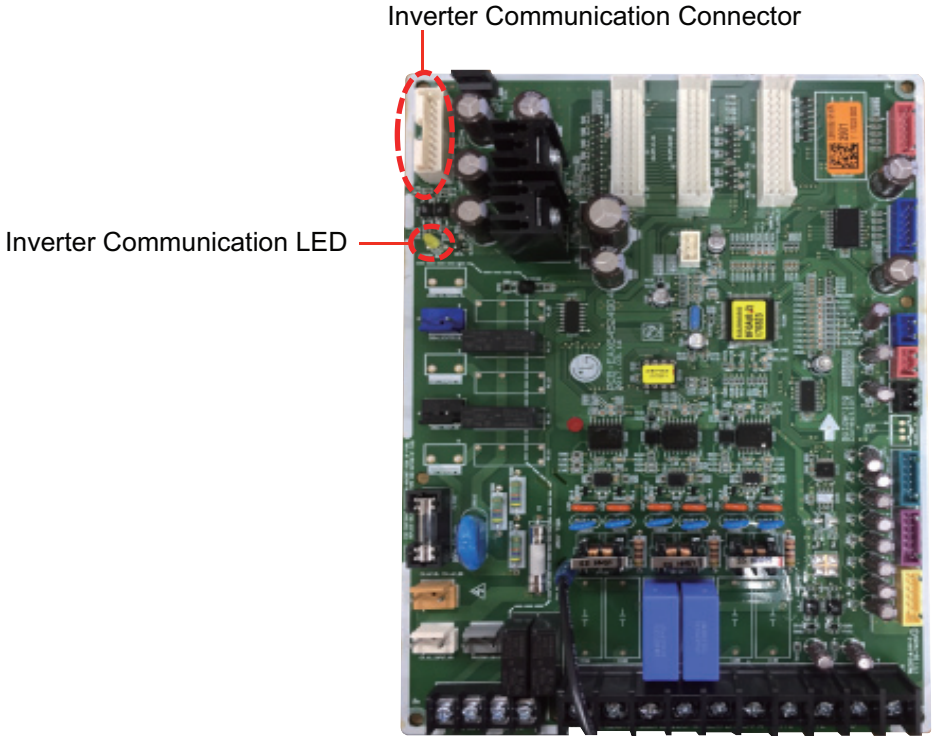
Error No.	Error Type	Error Point	Main Reasons
52	Communication error between (Inv. PCB ➔ Main PCB)	Main PCB of Master unit of Master unit can't receive signal from Inv. PCB	1. Power cable or communication cable is not connected 2. Defect of outdoor Main PCB or Inv. PCB

■ Error diagnosis and countermeasure flow chart



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



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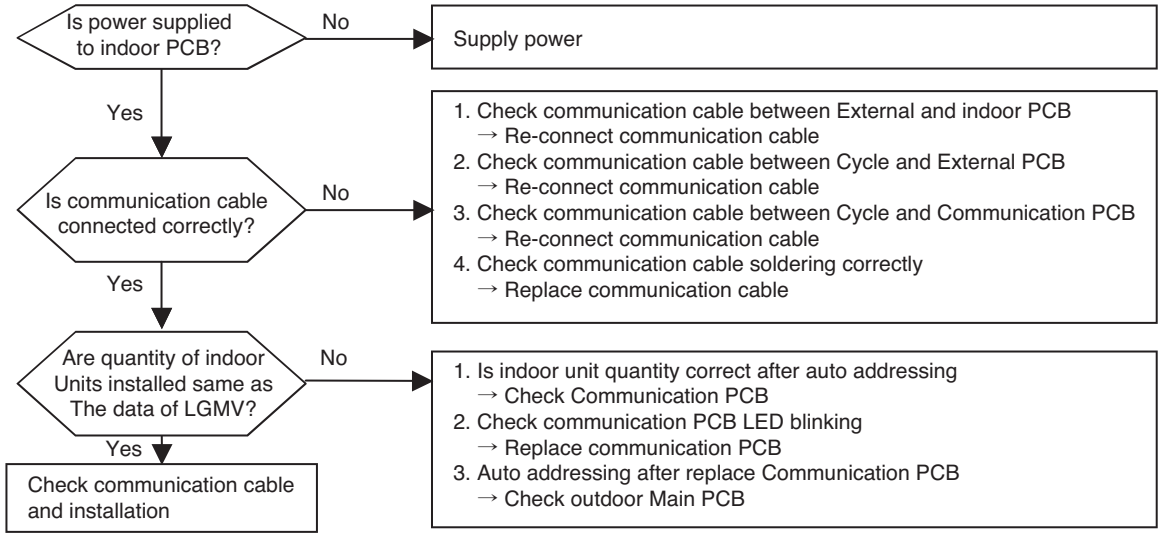
Error No.	Error Type	Error Point	Main Reasons
53	Communication error (Indoor unit ➔ Main PCB)	In case Main PCB can't receive signal from indoor unit	1. Communication cables are not connected between External PCB and indoor PCB 2. Communication cables are not connected between Main PCB and External PCB 3. Communication cables are not connected between Main PCB and Communication PCB 4. Communication cables are short/open 5. Indoor PCB power off 6. Defect of outdoor Cycle/Communication/indoor PCB 7. Communication wire connection fault

■ Error diagnosis and countermeasure flow chart



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

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

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

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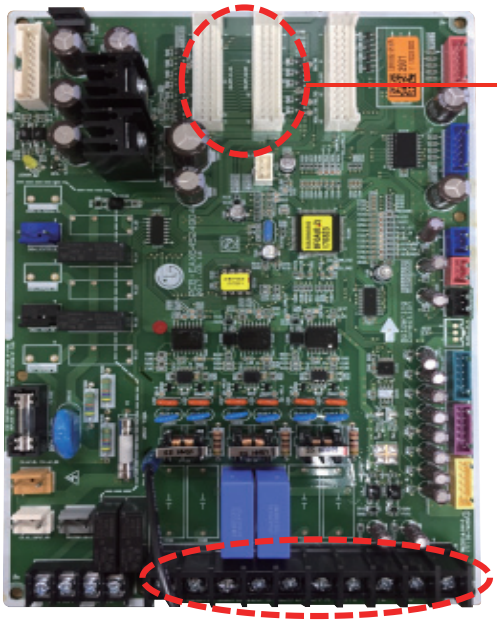
Communication Part in Main PCB



Indoor Unit
Communication PCB

❉ Remark : IDU A/IDU B

Wiring Fault Case

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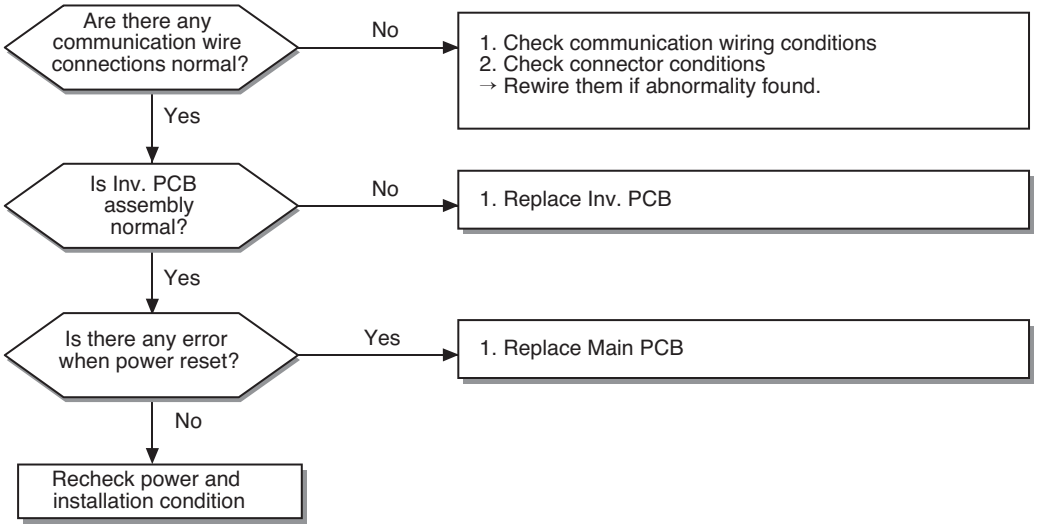
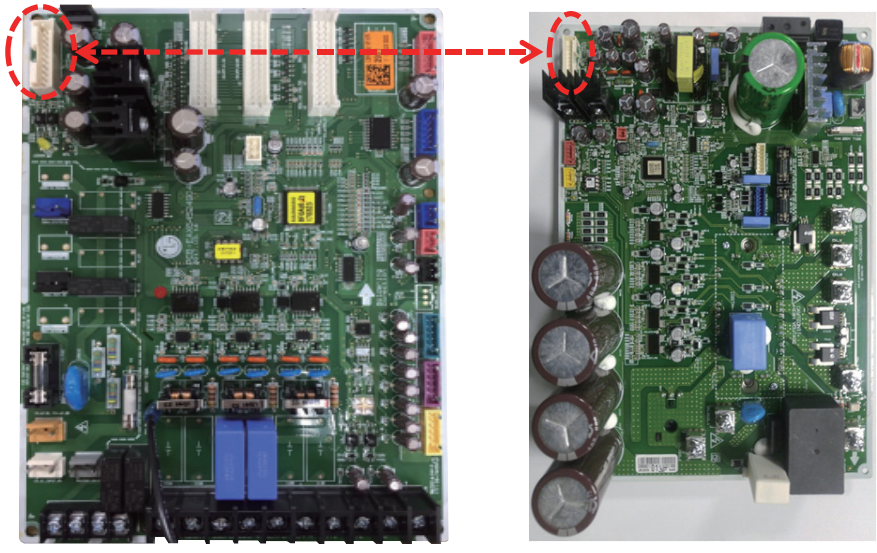
Error No.	Error Type	Error Point	Main Reasons
57	Communication error : Main PCB --> Inv. PCB	Failing to receive inverter signal at main PCB of Outdoor Unit	1. Bad Connection Between Main PCB and Inv. PCB 2. Communication Wire Noise Effect 3. ODU Main PCB Damage

■ Error diagnosis and countermeasure flow chart



Inv. PCB

Main PCB



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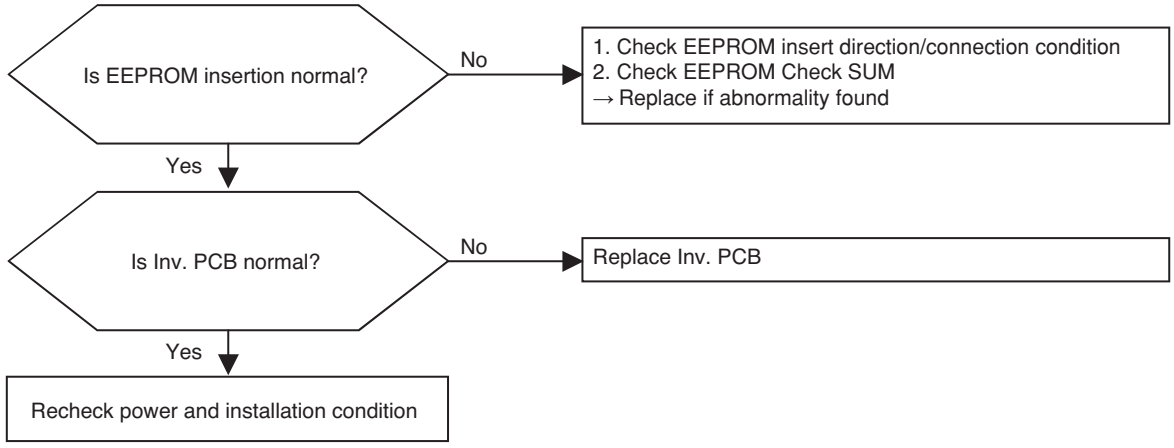
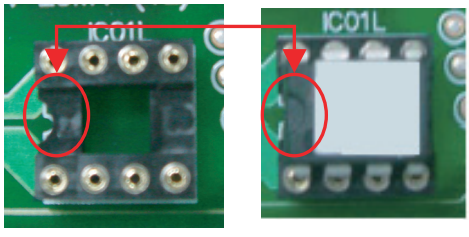
Error No.	Error Type	Error Point	Main Reasons
60	Inv. PCB EEPROM error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inv. PCB assembly damage

■ Error Diagnosis and Countermeasure Flow Chart



* Inv. EEPROM inserting point

* Right inserting direction of Inv. EEPROM



j Note : Replace after power off

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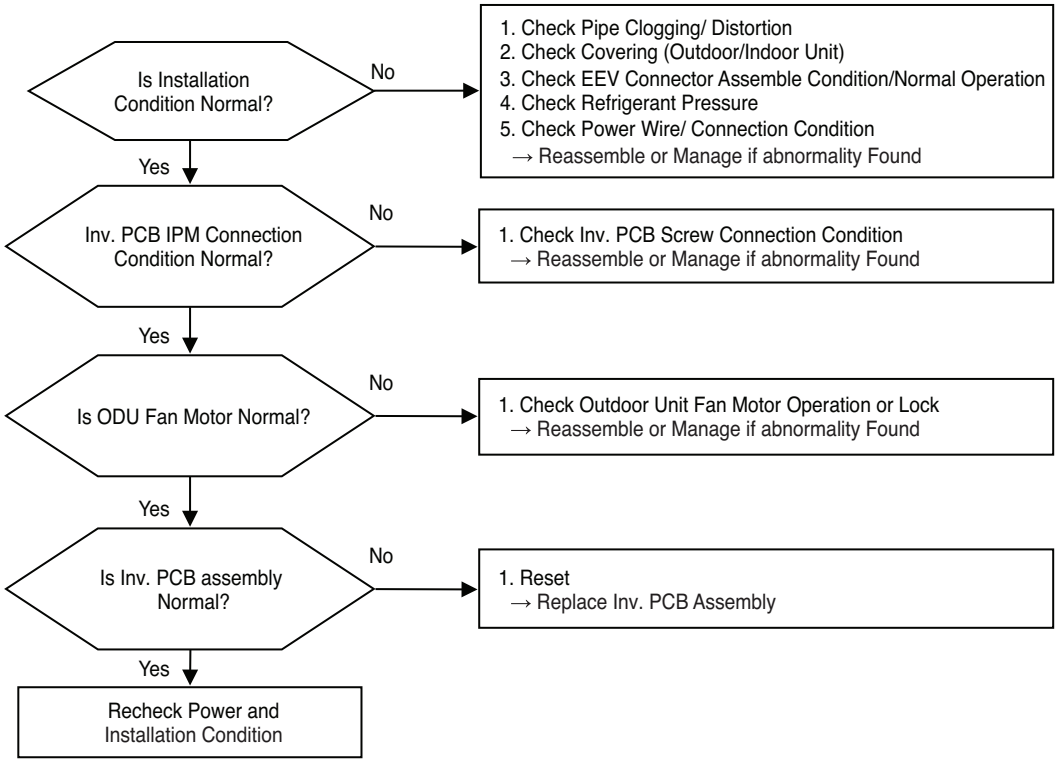
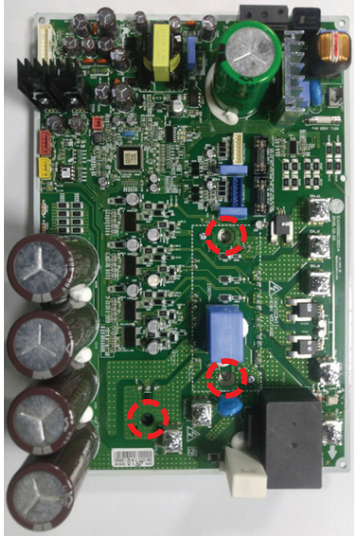
Error No.	Error Type	Error Point	Main Reasons
62	Inv. PCB Heatsink Temperature High	Heatsink Temperature is Over 100 °C	1. Inv. PCB IPM Connection Condition Abnormal 2. Outdoor Unit Fan Motor Operation Abnormal 3. Outdoor Unit Inv. PCB Assembly Defect 4. Overload Operation (Pipe Clogging/ Covering/EEV Defect/Ref. Overcharge)

■ Error diagnosis and countermeasure flow chart



■ Check Inv. PCB Screw Connection Condition



Check Screw Connection Condition

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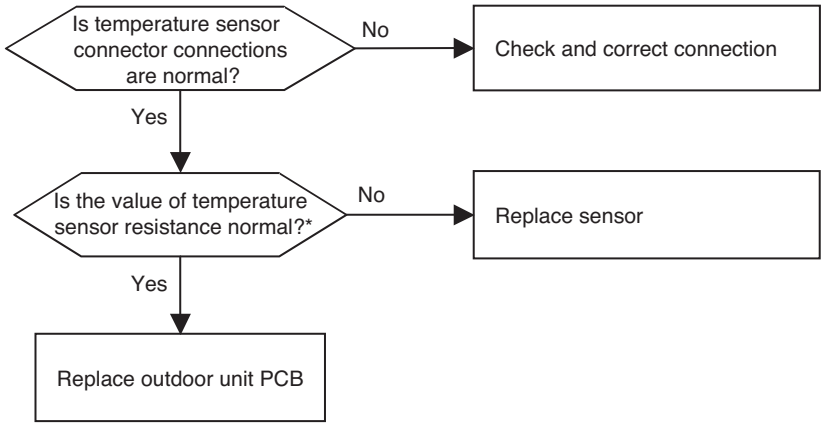
Error No.	Error Type	Error Point	Main Reasons
65	Outdoor unit liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective outdoor unit PCB

■ Error diagnosis and countermeasure flow chart



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

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

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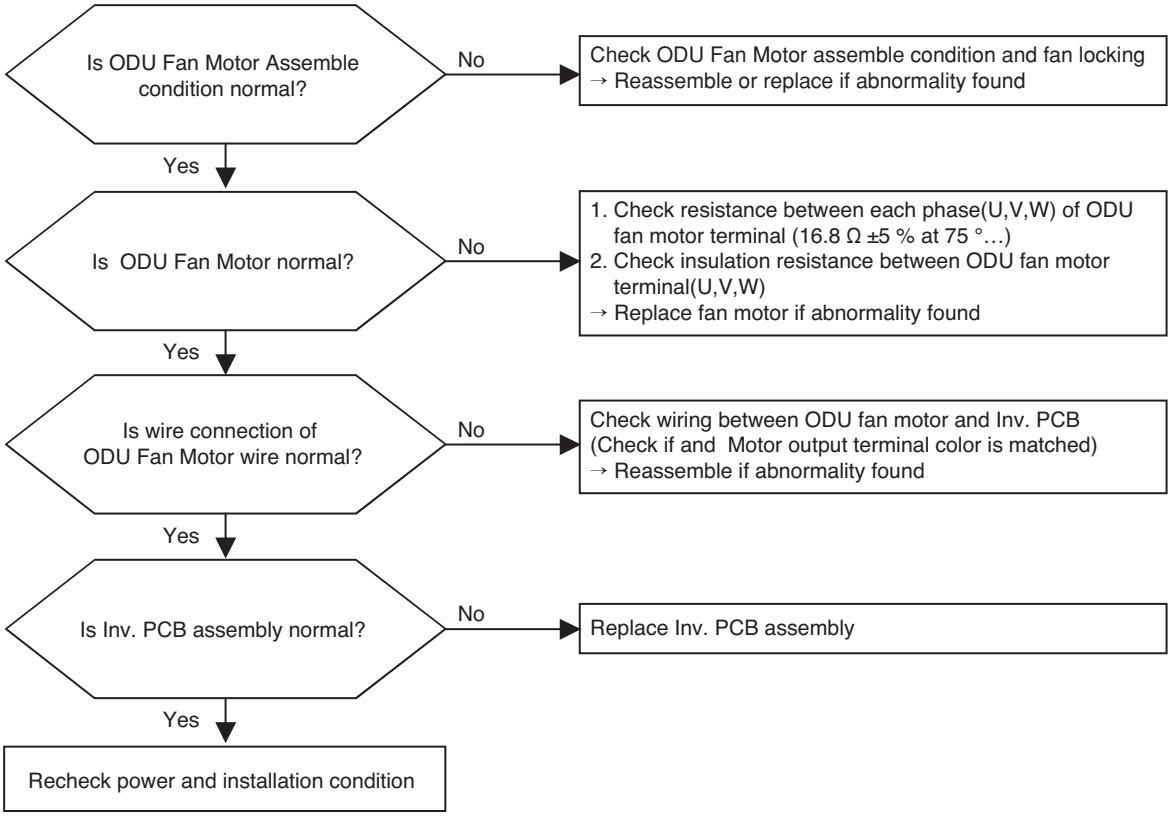
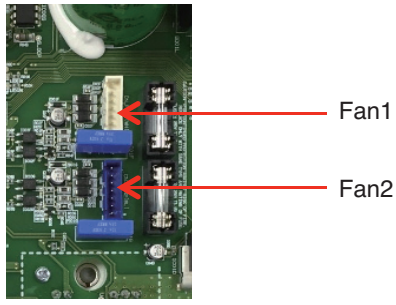
Error No.	Error Type	Error Point	Main Reasons
67	Fan Lock Error	Fan RPM is 10RPM or less for 5 seconds when ODU fan starts or 40 RPM or less after fan starting.	1. Fan motor defect / assembly condition abnormal 2. Wrong connection of fan motor connector 3. Reversing rotation after RPM target apply 4. Inv. PCB assembly defect 5. Fan lock by Heavy Snowfall.

■ Error Diagnosis and Countermeasure Flow Chart



* Inv. PCB



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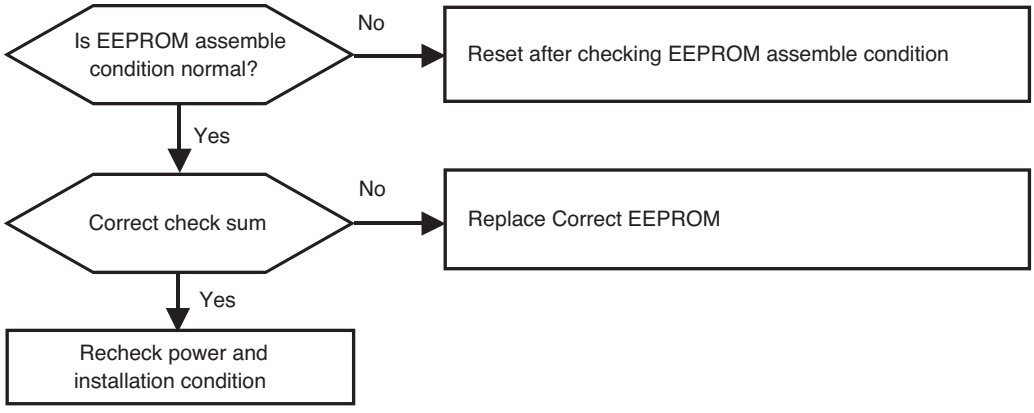
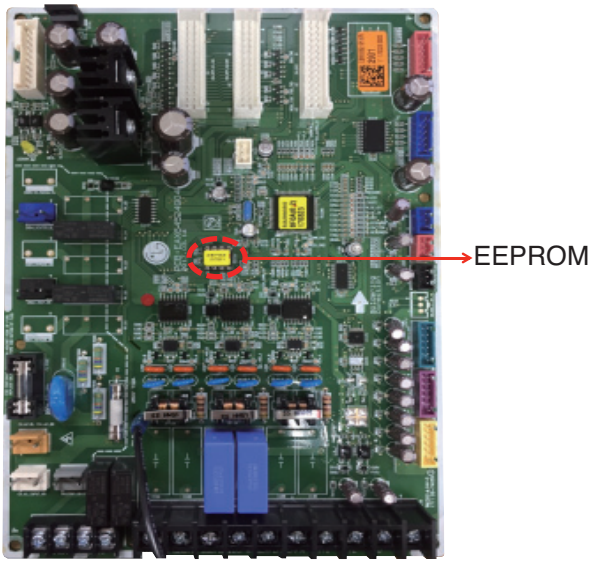
Error No.	Error Type	Error Point	Main Reasons
86	Main PCB EEPROM	EEPROM Access Error	1. No EEPROM 2. EEPROM wrong insertion

■ Error Diagnosis and Countermeasure Flow Chart

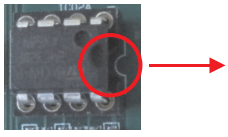


EEPROM Insertion



Main PCB

* Note : Replace after power off



Same direction both socket hole and EEPROM hole

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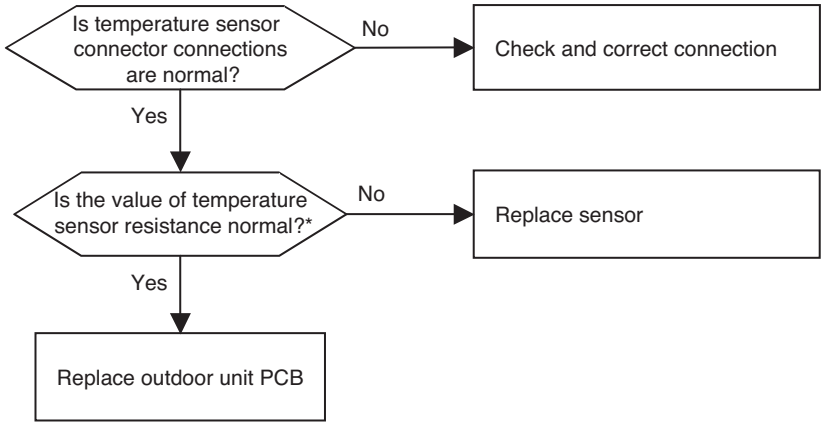
Error No.	Error Type	Error Point	Main Reasons
113	Outdoor unit liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective outdoor unit PCB
115	Outdoor Unit Subcooling Outlet Temperature Sensor Error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open/Short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart



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

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

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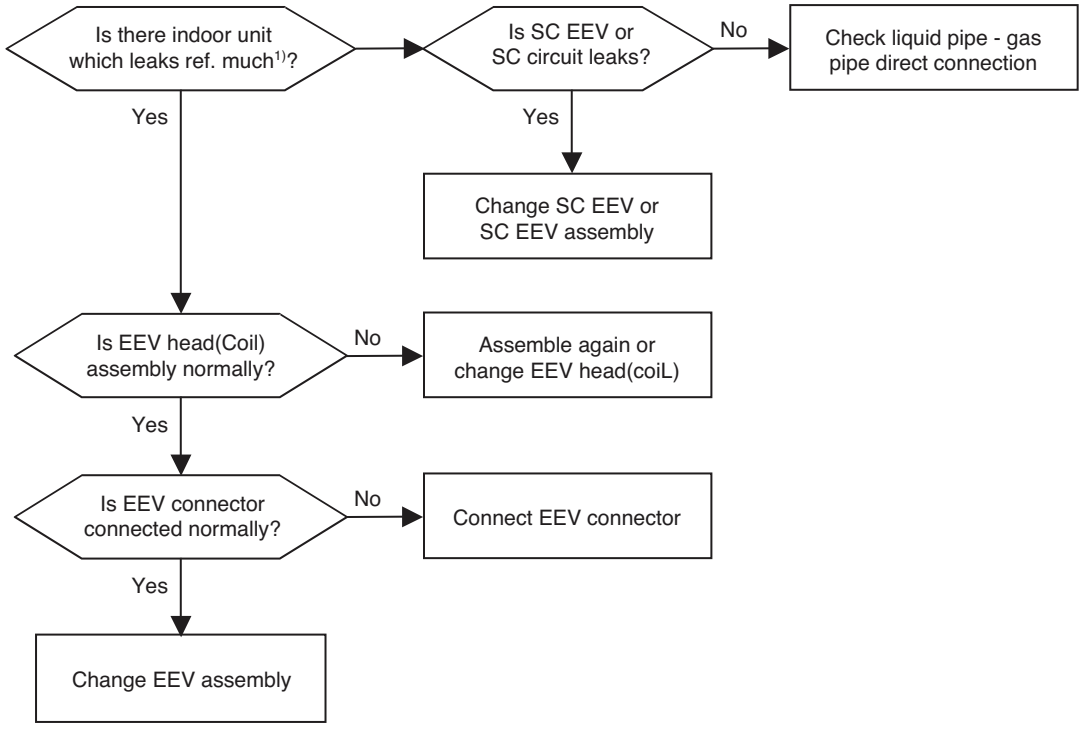
Error No.	Error Type	Error Point	Main Reasons
CH1501	Discharge superheat low	Discharge superrheat is under 3 °C (liquid back)	Check liquid bypass 1. Individual power of indoor unit is open during operation 2. Indoor unit EEV fault(ref. leak much) 3. Indoor unit EEV connector disconnected. 4. SC EEV fault(ref. leak much) 5. Liquid pipe – gas pipe direct connection

■ Error diagnosis and countermeasure flow chart



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

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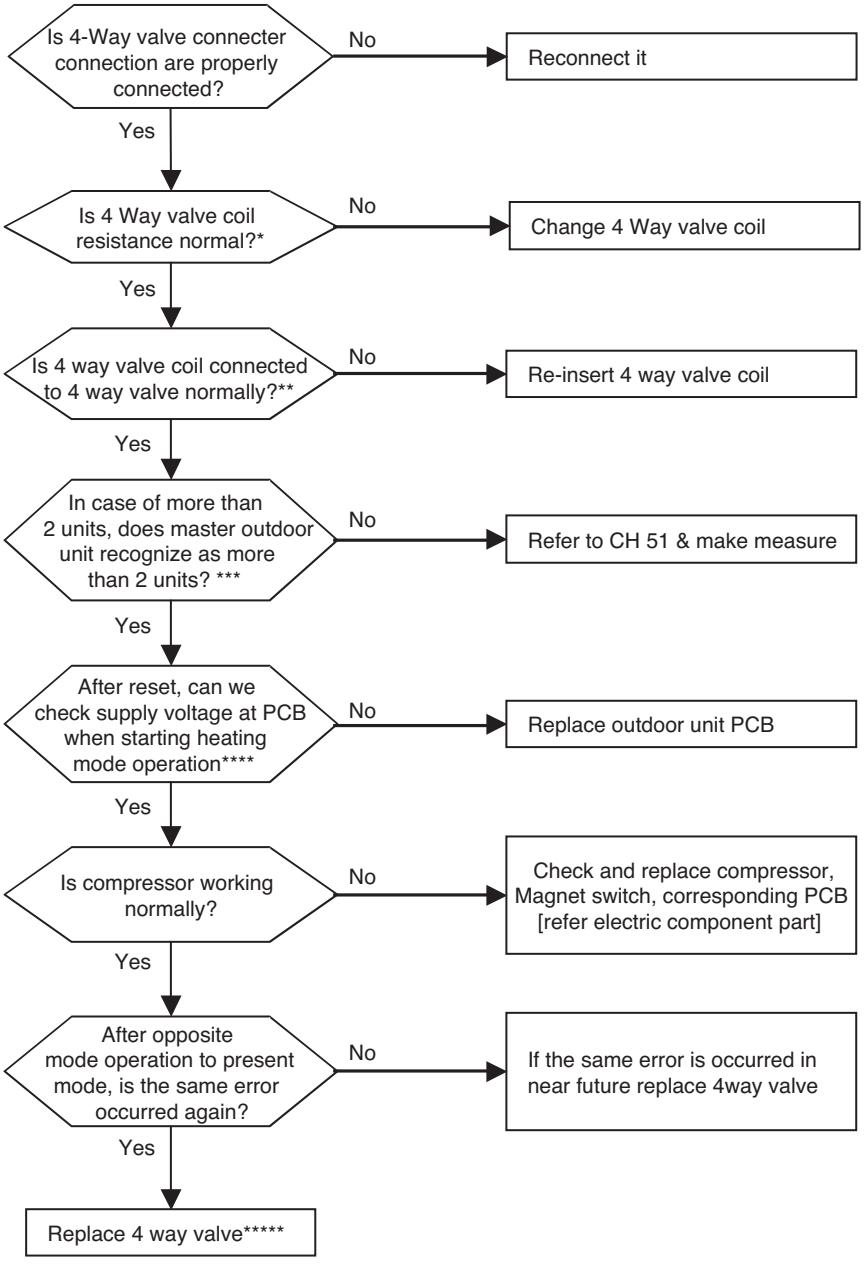
Error No.	Error Type	Error Point	Main Reasons
151	Function error of outdoor 4way (reversing valve)	Function error of 4way (reversing valve) in Main or Slave outdoor units	1. Wrong operation of 4way valve because of sludge etc. inflow 2. No pressure difference because of compressor fault 3. Wrong installation of In/outdoor common pipe 4. Defect of 4way valve

■ Error diagnosis and countermeasure flow chart



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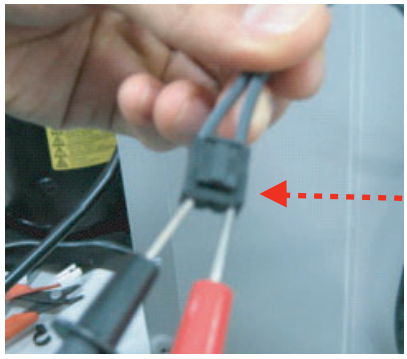
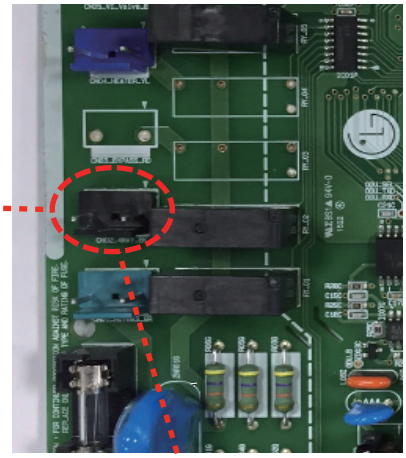
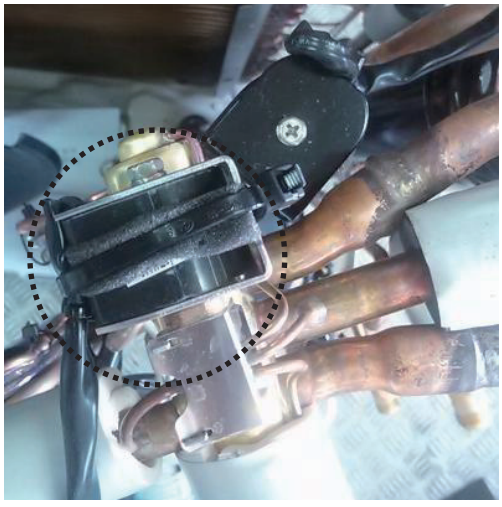
* Measure the resistance of 4way valve



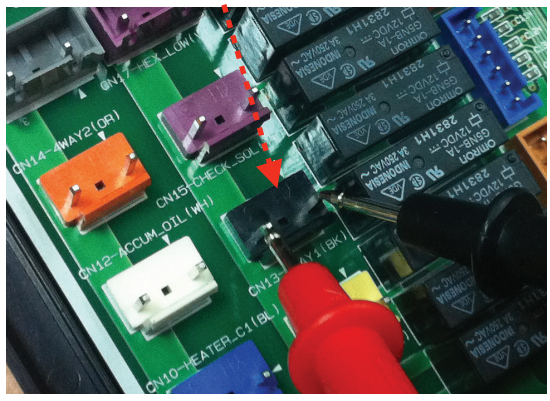
Location of 4way valve connector on Main PCB(marked as 4way,CN09)



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



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



Error No.	Error type	Error point	Main reasons
2001	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

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■ 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.(220 V±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

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■ 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] = 10 kΩ : 25 °C[77 °F] = 5 kΩ : 50 °C[122 °F] = 1.8 kΩ

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

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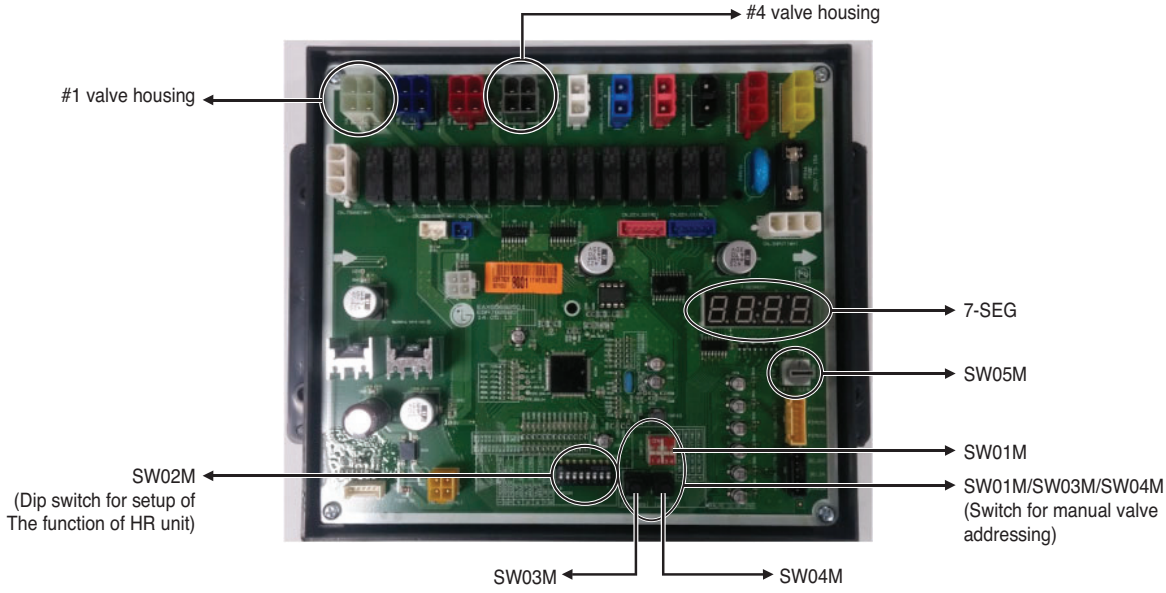
■ Error diagnosis and countermeasure flow chart

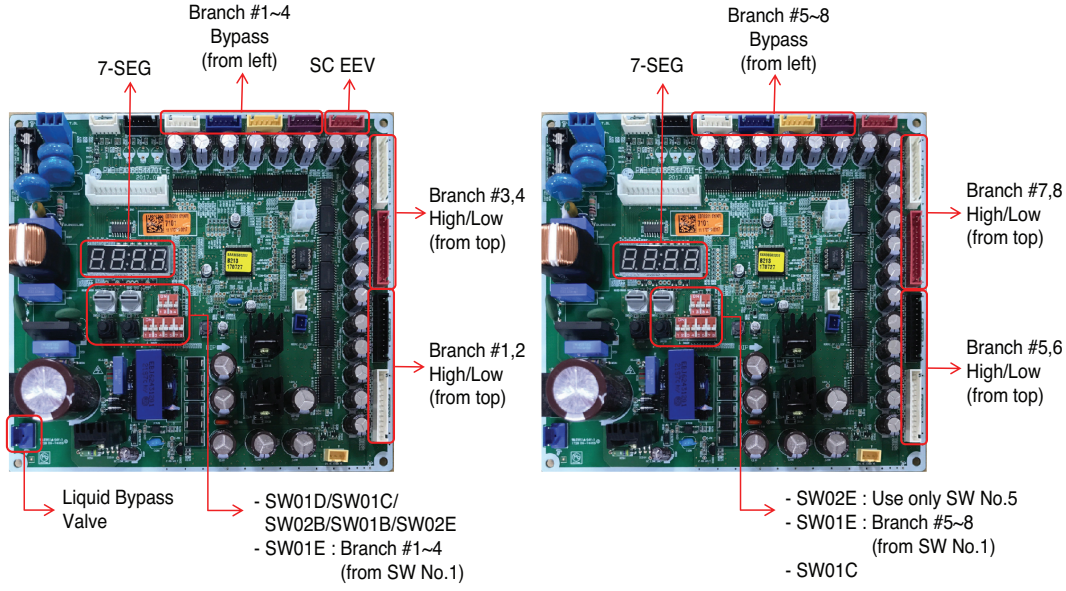
1) Check connection between power cables and communication cables, check communication green LED blink of HR unit PCB
2) If communication green LED blink of HR unit PCB is normal, check setting of rotary switch of HR unit and dip switch(Refer to CH200),
   Reset power of outdoor and HR unit
   (If communication error of HR unit occurs, it can't be released until reset of outdoor power)
3) If communication green LED blink of HR unit PCB is abnormal(not blinking,just on), check communication condition of total indoor units(Refer to CH05)
   If communication green LED blink of HR unit PCB is abnormal(not blinking, just on) even if communication condition is normal, replace HR unit PCB

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

HR Unit PCB (PRHR**2(A))



HR Unit PCB (PRHR**3(A))



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

■ Error diagnosis and countermeasure flow chart

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

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

■ Error diagnosis and countermeasure flow chart

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

• The above error code is only occurred at the upgraded 485 communication (9600bps communication)

• Refer to the installation manual of the outdoor unit for the address setting to HR unit rotary switch for HR units

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

■ Error diagnosis and countermeasure flow chart

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

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

■ Error diagnosis and countermeasure flow chart

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

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