FILE NO. SVM-24047

TOSHIBA

Carrier

SERVICE MANUAL

AIR-CONDITIONER

SPLIT TYPE

INDOOR UNIT

High Wall Type

RAV-HB121KRTP-UL
RAV-HB181KRTP-UL
RAV-HB241KRTP-UL

R454B

November, 2024

Adoption of R454B Refrigerant

This Air Conditioner an environmentally friendly refrigerant.

CONTENTS

Thank you for purchasing this air conditioner.
Please read carefully through these instructions that contain important information and ensure that you understand them.
After completing the installation work, hand over this Installation Manual as well as the Owner's Manual provided with the outdoor unit to the user, and ask the user to keep them in a safe place for future reference.

Generic Denomination: Air Conditioner

Definition of Qualified Installer or Qualified Service Person
The air conditioner must be installed, maintained, repaired and removed by a qualified installer or qualified service person. When any of these jobs is to be done, ask a qualified installer or qualified service person to do them for you. A qualified installer or qualified service person is an agent who has the qualifications and knowledge described in the table below.

Agent	Qualifications and knowledge which the agent must have
Qualified installer	• The qualified installer is a person who installs, maintains, relocates and removes the air conditioners. He or she has been trained to install, maintain, relocate and remove the air conditioners he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations. • The qualified installer who is allowed to do the electrical work involved in installation, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified installer who is allowed to do the refrigerant handling and piping work involved in installation, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified installer who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.
Qualified service person	• The qualified service person is a person who installs, repairs, maintains, relocates and removes the air conditioners. He or she has been trained to install, repair, maintain, relocate and remove the air conditioners he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations. • The qualified service person who is allowed to do the electrical work involved in installation, repair, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified service person who is allowed to do the refrigerant handling and piping work involved in installation, repair, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified service person who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.

Definition of Protective Gear

When the air conditioner is to be transported, installed, maintained, repaired or removed, wear protective gloves and 'safety' work clothing.
In addition to such normal protective gear, wear the protective gear described below when undertaking the special work detailed in the table below.
Failure to wear the proper protective gear is dangerous because you will be more susceptible to injury, burns, electric shocks and other injuries.

Work undertaken	Protective gear worn
All types of work	Protective gloves 'Safety' working clothing
Electrical-related work	Gloves to provide protection for electricians and from heat Insulating shoes Clothing to provide protection from electric shock
Work done at heights (19.7"(50 cm) or more)	Helmets for use in industry
Transportation of heavy objects	Shoes with additional protective toe cap
Repair of outdoor unit	Gloves to provide protection for electricians and from heat

The important contents concerned to the safety are described on the product itself and on this Service Manual.

Please read this Service Manual after understanding the described items thoroughly in the following contents (Indications / Illustrated marks), and keep them.

[Explanation of indications]

Indication	Explanation
⚠ **DANGER**	Indicates contents assumed that an imminent danger causing a death or serious injury of the repair engineers and the third parties when an incorrect work has been executed.
⚠ **WARNING**	Indicates possibilities assumed that a danger causing a death or serious injury of the repair engineers, the third parties, and the users due to troubles of the product after work when an incorrect work has been executed.
⚠ **CAUTION**	Indicates contents assumed that an injury or property damage (*) may be caused on the repair engineers, the third parties, and the users due to troubles of the product after work when an incorrect work has been executed.

* Property damage: Enlarged damage concerned to property, furniture, and domestic animal / pet

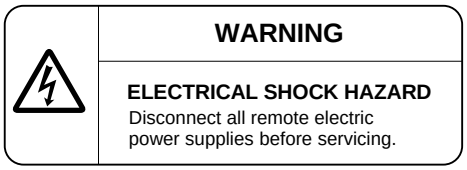
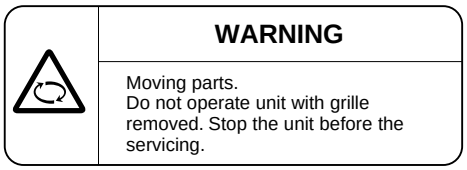
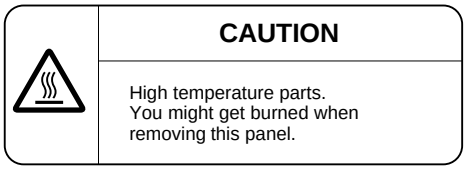
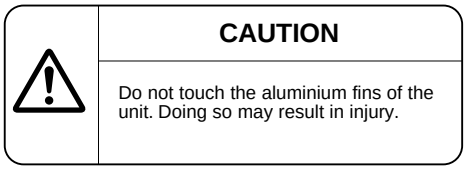
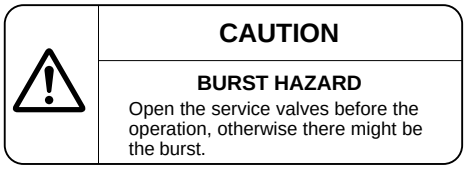
[Explanation of illustrated marks]

Indication	Explanation
	Indicates prohibited items (Forbidden items to do) The sentences near an illustrated mark describe the concrete prohibited contents.
	Indicates mandatory items (Compulsory items to do) The sentences near an illustrated mark describe the concrete mandatory contents.
	Indicates cautions (Including danger / warning) The sentences or illustration near or in an illustrated mark describe the concrete cautious contents.

■ Warning indications on the Air Conditioner Unit

	**WARNING** (Risk of fire)	This mark is for R454B refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R454B, this unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the OWNER'S MANUAL carefully before operation.	
	Service personnel are required to carefully read the OWNER'S MANUAL and INSTALLATION MANUAL before operation.	
	Further information is available in the OWNER'S MANUAL, INSTALLATION MANUAL, and the like.	

Warning Indications on the Air Conditioner Unit
[Confirmation of warning label on the main unit]
Confirm that labels are indicated on the specified positions
If removing the label during parts replace, stick it as the original.

Warning indication	Description
	**WARNING** **ELECTRICAL SHOCK HAZARD** Disconnect all remote electric power supplies before servicing.
	**WARNING** Moving parts. Do not operate unit with grille removed. Stop the unit before the servicing.
	**CAUTION** High temperature parts. You might get burned when removing this panel.
	**CAUTION** Do not touch the aluminium fins of the unit. Doing so may result in injury.
	**CAUTION** **BURST HAZARD** Open the service valves before the operation, to avoid unnecessary pressure built up which could lead to explosion.

Precautions for safety

The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.

⚠ DANGER

 Turn off breaker.	Before carrying out the installation, maintenance, repair or removal work, be sure to set the circuit breaker for both the indoor and outdoor units to the OFF position. Otherwise, electric shocks may result.
	Before opening the front panel of the indoor unit or service panel of the outdoor unit, set the circuit breaker to the OFF position. Failure to set the circuit breaker to the OFF position may result in electric shocks through contact with the interior parts. Only a qualified installer or qualified service person is allowed to remove the front panel of the indoor unit or service panel of the outdoor unit and do the work required.
	Before starting to repair the outdoor unit fan or fan guard, be absolutely sure to set the circuit breaker to the OFF position, and place a “Work in progress” sign on the circuit breaker.
	When cleaning the filter or other parts of the indoor unit, set the circuit breaker to OFF without fail, and place a “Work in progress” sign near the circuit breaker before proceeding with the work.
 Prohibition	Place a “Work in progress” sign near the circuit breaker while the installation, maintenance, repair or removal work is being carried out. There is a danger of electric shocks if the circuit breaker is set to ON by mistake.
 Stay on protection	If, in the course of carrying out repairs, it becomes absolutely necessary to check out the electrical parts with the electrical control box cover of one or more of the indoor units and the service panel of the outdoor unit removed in order to find out exactly where the trouble lies, wear insulated heat-resistant gloves, insulated boots and insulated work overalls, and take care to avoid touching any live parts. You may receive an electric shock if you fail to heed this warning. Only qualified service person is allowed to do this kind of work.
 Execute discharge between terminals.	Even if the circuit breaker has been set to the OFF position before the service panel is removed and the electrical parts are repaired, you will still risk receiving an electric shock. For this reason, short-circuit the high-voltage capacitor terminals to discharge the voltage before proceeding with the repair work. For details on the short-circuiting procedure, refer to the Service Manual. You may receive an electric shock if the voltage stored in the capacitors has not been sufficiently discharged.

⚠ WARNING

General	Before starting to repair the air conditioner, read carefully through the Service Manual, and repair the air conditioner by following its instructions.
	Only qualified service person is allowed to repair the air conditioner. Repair of the air conditioner by unqualified person may give rise to a fire, electric shocks, injury, water leaks and/or other problems.
	Do not use any refrigerant different from the one specified for complement or replacement. Otherwise, abnormally high pressure may be generated in the refrigeration cycle, which may result in a failure or explosion of the product or an injury to your body.
	Only a qualified installer or qualified service person is allowed to carry out the electrical work of the air conditioner. Under no circumstances must this work be done by an unqualified individual since failure to carry out the work properly may result in electric shocks and/or electrical leaks.
	When transporting the air conditioner, wear shoes with protective toe caps, protective gloves and other protective clothing.
	Inside the air conditioner are high-voltage areas and rotating parts. Due to the danger of electric shocks or of your fingers or physical objects becoming trapped in the rotating parts, do not remove the front panel of the indoor unit or service panel of the outdoor unit. When work involving the removal of these parts is required, contact a qualified installer or a qualified service person.
	When connecting the electrical wires, repairing the electrical parts or undertaking other electrical jobs, wear gloves to provide protection for electricians and from heat, insulating shoes and clothing to provide protection from electric shocks. Failure to wear this protective gear may result in electric shocks.
	When checking the electrical parts, removing the cover of the electrical control box of Indoor Unit and/or service panel of Outdoor Unit inevitably to determine the failure, use gloves to provide protection for electricians and from heat, insulating shoes, clothing to provide protection from electric shock and insulating tools. Do not touch the live part. Electric shock may result. Only "Qualified service person is allowed to do this work.
	When checking the electrical parts, removing the cover of the electrical control box of Indoor Unit and/or front panel of Outdoor Unit inevitably to determine the failure, put a sign "Do not enter" around the site before the work. Failure to do this may result in third person getting electric shock.
	Electrical wiring work shall be conducted according to law and regulation in the community and installation manual. Failure to do so may result in electrocution or short circuit.
	Only a qualified installer or qualified service person is allowed to undertake work at heights using a stand of 19.7"(50 cm) or more or to remove the front panel of the indoor unit to undertake work.
	When working at heights, use a ladder which complies with the ISO 14122 standard, and follow the procedure in the ladder's instructions. Also wear a helmet for use in industry as protective gear to undertake the work.
	When working at heights, put a sign in place so that no-one will approach the work location, before proceeding with the work. Parts and other objects may fall from above, possibly injuring a person below. While carrying out the work, wear a helmet for protection from falling objects.
	Wear protective gloves and safety work clothing during installation, servicing and removal.
	Do not touch the aluminum fin of the outdoor unit. You may injure yourself if you do so. If the fin must be touched for some reason, first put on protective gloves and safety work clothing, and then proceed.
	Do not climb onto or place objects on top of the outdoor unit. You may fall or the objects may fall off of the outdoor unit and result in injury.
	When transporting the air conditioner, wear shoes with additional protective toe caps.
	When transporting the air conditioner, do not take hold of the bands around the packing carton. You may injure yourself if the bands should break.
	Use wiring that meets the specifications in the Installation Manual and the stipulations in the local regulations and laws. Use of wiring which does not meet the specifications may give rise to electric shocks, electrical leakage, smoking and/or a fire.
	This air conditioner has passed the pressure test as specified in UL 60335-2-40 Annex EE.

 Check earth wires.	Before troubleshooting or repair work, check the earth wire is connected to the earth terminals of the main unit, otherwise an electric shock is caused when a leak occurs.If the earth wire is not correctly connected, contact an electric engineer for rework.
	After completing the repair or relocation work, check that the ground wires are connected properly.
	Be sure to connect earth wire. (Grounding work) Incomplete grounding causes an electric shock. Do not connect ground wires to gas pipes, water pipes, and lightning rods or ground wires for telephone wires.
 Prohibition of modification.	Do not modify the products.Do not also disassemble or modify the parts. It may cause a fire, electric shock or injury.
 Use specified parts.	When any of the electrical parts are to be replaced, ensure that the replacement parts satisfy the specifications given in the Service Manual (or use the parts contained on the parts list in the Service Manual). Use of any parts which do not satisfy the required specifications may give rise to electric shocks, smoking and/or a fire.
 Do not bring a child close to the equipment.	If, in the course of carrying out repairs, it becomes absolutely necessary to check out the electrical parts with the electrical control box cover of one or more of the indoor units and the service panel of the outdoor unit removed in order to find out exactly where the trouble lies, put a sign in place so that no-one will approach the work location before proceeding with the work. Third-party individuals may enter the work site and receive electric shocks if this warning is not heeded.
 Insulating measures	Connect the cut-off lead wires with crimp contact, etc., put the closed end side upward and then apply a water-cut method, otherwise a leak or production of fire is caused at the users' side.
 No fire	When performing repairs using a gas burner, replace the refrigerant with nitrogen gas because the oil that coats the pipes may otherwise burn. When repairing the refrigerating cycle, take the following measures. 1) Be attentive to fire around the cycle. When using a gas stove, etc., be sure to put out fire before work; otherwise the oil mixed with refrigerant gas may catch fire. 2) Do not use a welder in the closed room. When using it without ventilation, carbon monoxide poisoning may be caused. 3) Do not bring inflammables close to the refrigerant cycle, otherwise fire of the welder may catch the inflammables.
 Refrigerant	The refrigerant used by this air conditioner is the R454B.
	Check the used refrigerant name and use tools and materials of the parts which match with it. For the products which use R454B refrigerant, the refrigerant name is indicated at a position on the outdoor unit where is easy to see.
	For an air conditioner which uses R454B, never use other refrigerant than R454B. For an air conditioner which uses other refrigerant (R22, etc.), never use R454B. If different types of refrigerant are mixed, abnormal high pressure generates in the refrigerating cycle and an injury due to breakage may be caused.
	Do not charge refrigerant additionally. If charging refrigerant additionally when refrigerant gas leaks, the refrigerant composition in the refrigerating cycle changes resulted in change of air conditioner characteristics or refrigerant over the specified standard amount is charged and an abnormal high pressure is applied to the inside of the refrigerating cycle resulted in cause of breakage or injury. Therefore if the refrigerant gas leaks, recover the refrigerant in the air conditioner, execute vacuuming, and then newly recharge the specified amount of liquid refrigerant. In this time, never charge the refrigerant over the specified amount.
	When recharging the refrigerant in the refrigerating cycle, do not mix the refrigerant or air other than R454B into the specified refrigerant. If air or others is mixed with the refrigerant, abnormal high pressure generates in the refrigerating cycle resulted in cause of injury due to breakage.
	After installation work, check the refrigerant gas does not leak. If the refrigerant gas leaks in the room, poisonous gas generates when gas touches to fire such as fan heater, stove or cocking stove though the refrigerant gas itself is innocuous.
	Never recover the refrigerant into the outdoor unit. When the equipment is moved or repaired, be sure to recover the refrigerant with recovering device. The refrigerant cannot be recovered in the outdoor unit; otherwise a serious accident such as breakage or injury is caused.

 Assembly / Wiring	After repair work, surely assemble the disassembled parts, and connect and lead the removed wires as before. Perform the work so that the cabinet or panel does not catch the inner wires. If incorrect assembly or incorrect wire connection was done, a disaster such as a leak or fire is caused at user's side.
 Insulator check	After the work has finished, be sure to use an insulation tester set (500 V Megger) to check the resistance is 1 MΩ or more between the charge section and the non-charge metal section (Earth position). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side.
 Ventilation	If refrigerant gas has leaked during the installation work, ventilate the room immediately. If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
 Compulsion	When the refrigerant gas leaks, find up the leaked position and repair it surely. If the leaked position cannot be found up and the repair work is interrupted, pump-down and tighten the service valve, otherwise the refrigerant gas may leak into the room. The poisonous gas generates when gas touches to fire such as fan heater, stove or cocking stove though the refrigerant gas itself is innocuous. When installing equipment which includes a large amount of charged refrigerant such as a multi air conditioner in a sub-room, it is necessary that the density does not the limit even if the refrigerant leaks. If the refrigerant leaks and exceeds the limit density, an accident of shortage of oxygen is caused.
	Tighten the flare nut with a torque wrench in the specified manner. Excessive tighten of the flare nut may cause a crack in the flare nut after a long period, which may result in refrigerant leakage.
	Nitrogen gas must be used for the airtight test.
	The charge hose must be connected in such a way that it is not slack.
	For the installation / moving / reinstallation work, follow to the Installation Manual. If an incorrect installation is done, a trouble of the refrigerating cycle, water leak, electric shock or fire is caused.
 Check after repair	Before operating the air conditioner after having completed the work, check that the electrical control box cover of the indoor unit and service panel of the outdoor unit are closed, and set the circuit breaker to the ON position. You may receive an electric shock if the power is turned on without first conducting these checks.
	Once the repair work has been completed, check for refrigerant leaks, and check the insulation resistance and water drainage. Then perform a trial run to check that the air conditioner is running properly.
	After repair work has finished, check there is no trouble. If check is not executed, a fire, electric shock or injury may be caused. For a check, turn off the power breaker.
	After repair work (installation of front panel and cabinet) has finished, execute a test run to check there is no generation of smoke or abnormal sound. If check is not executed, a fire or an electric shock is caused. Before test run, install the front panel and cabinet.
	Be sure to fix the screws back which have been removed for installation or other purposes.
 Do not operate the unit with the valve closed.	Check the following matters before a test run after repairing piping. • Connect the pipes surely and there is no leak of refrigerant. • The valve is opened. Running the compressor under condition that the valve closes causes an abnormal high pressure resulted in damage of the parts of the compressor and etc. and moreover if there is leak of refrigerant at connecting section of pipes, the air is sucked and causes further abnormal high pressure resulted in burst or injury.
 Check after reinstallation	Only a qualified installer or qualified service person is allowed to relocate the air conditioner. It is dangerous for the air conditioner to be relocated by an unqualified individual since a fire, electric shocks, injury, water leakage, noise and/or vibration may result.
	Check the following items after reinstallation. 1) The earth wire is correctly connected. 2) The power cord is not caught in the product. 3) There is no inclination or unsteadiness and the installation is stable. If check is not executed, a fire, an electric shock or an injury is caused.
	When carrying out the pump-down work shut down the compressor before disconnecting the refrigerant pipe. Disconnecting the refrigerant pipe with the service valve left open and the compressor still operating will cause air, etc. to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in reputing, injury, etc.

Cooling check	When the service panel of the outdoor unit is to be opened in order for the compressor or the area around this part to be repaired immediately after the air conditioner has been shut down, set the circuit breaker to the OFF position, and then wait at least 10 minutes before opening the service panel. If you fail to heed this warning, you will run the risk of burning yourself because the compressor pipes and other parts will be very hot to the touch. In addition, before proceeding with the repair work, wear the kind of insulated heat-resistant gloves designed to protect electricians.
	When the service panel of the outdoor unit is to be opened in order for the fan motor, reactor, inverter or the areas around these parts to be repaired immediately after the air conditioner has been shut down, set the circuit breaker to the OFF position, and then wait at least 10 minutes before opening the service panel. If you fail to heed this warning, you will run the risk of burning yourself because the fan motor, reactor, inverter heat sink and other parts will be very hot to the touch. In addition, before proceeding with the repair work, wear the kind of insulated heat-resistant gloves designed to protect electricians.
Installation	Only a qualified installer or qualified service person is allowed to install the air conditioner. If the air conditioner is installed by an unqualified individual, a fire, electric shocks, injury, water leakage, noise and/or vibration may result.
	Before starting to install the air conditioner, read carefully through the Installation Manual, and follow its instructions to install the air conditioner.
	Do not install the air conditioner in a location that may be subject to a risk of expire to a combustible gas. If a combustible gas leaks and becomes concentrated around the unit, a fire may occur.
	Install the indoor unit at least 8'2"(2.5m) above the floor level since otherwise the users may injure themselves or receive electric shocks if they poke their fingers or other objects into the indoor unit while the air conditioner is running.
	Install a circuit breaker that meets the specifications in the installation manual and the stipulations in the local regulations and laws.
	Install the circuit breaker where it can be easily accessed by the qualified service person.
	If the unit is installed in a small room, take appropriate measures to prevent the refrigerant from exceeding the limit concentration even if it leaks. Consult the dealer from whom you purchased the air conditioner when you implement the measures. Accumulation of highly concentrated refrigerant may cause an oxygen deficiency accident.
	Do not place any combustion appliance in a place where it is directly exposed to the wind of air conditioner, otherwise it may cause imperfect combustion.

Explanations given to user

If you have discovered that the fan grille is damaged, do not approach the outdoor unit but set the circuit breaker to the OFF position, and contact a qualified service person to have the repairs done.
Do not set the circuit breaker to the ON position until the repairs are completed.

Relocation

- Only a qualified installer or qualified service person is allowed to relocate the air conditioner.
  It is dangerous for the air conditioner to be relocated by an unqualified individual since a fire, electric shocks, injury, water leakage, noise and/or vibration may result.
- When carrying out the pump-down work shut down the compressor before disconnecting the refrigerant pipe.
  Disconnecting the refrigerant pipe with the service valve left open and the compressor still operating will cause air, etc. to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in reputing, injury, etc.

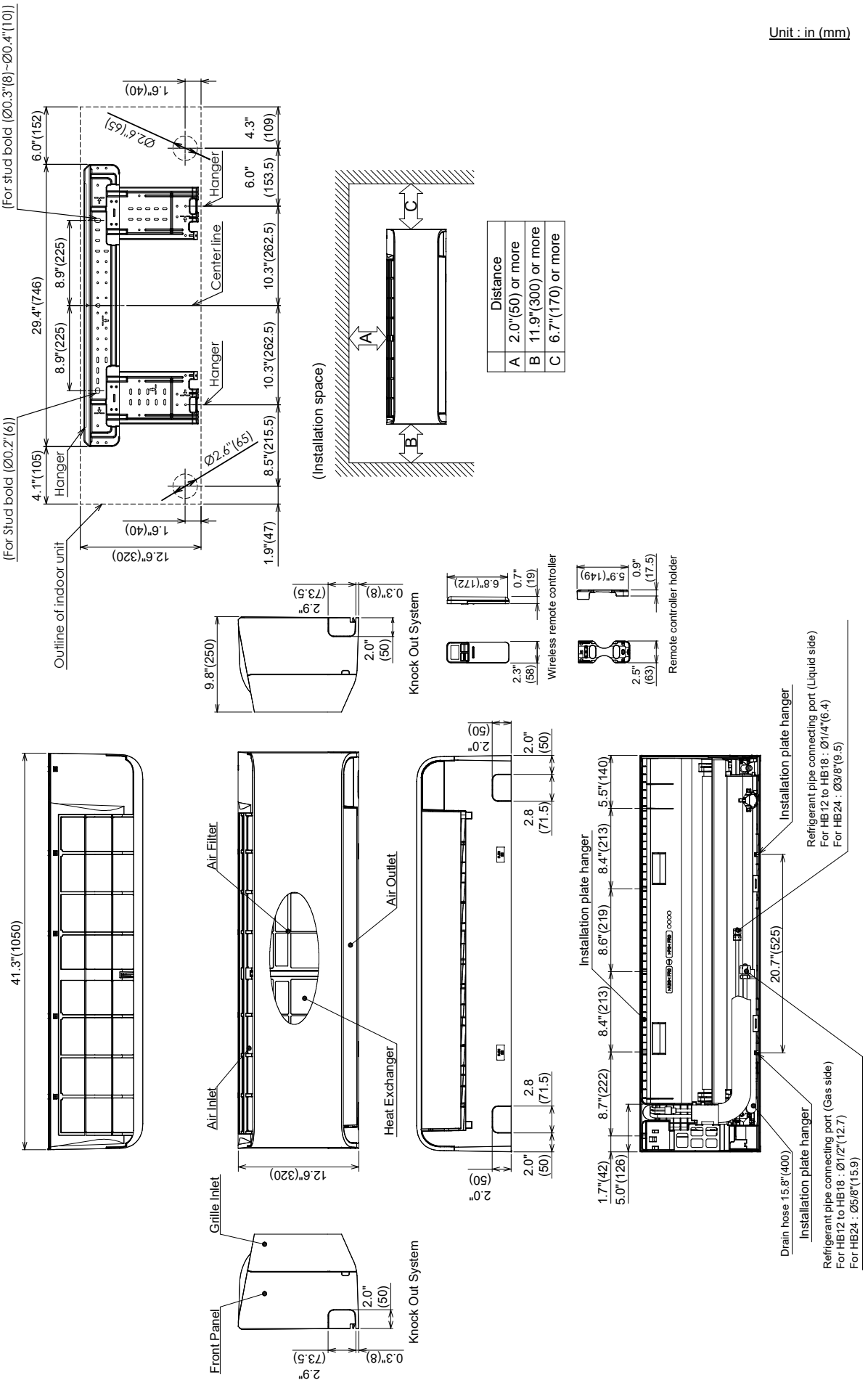
1. SPECIFICATIONS

High-wall type

System	Size			012	018	024
	Indoor Model			RAV-HB121KRTP-UL	RAV-HB181KRTP-UL	RAV-HB241KRTP-UL
	Outdoor Model			RAV-BP121AT2P-UL	RAV-BP181AT2P-UL	RAV-BP241AT2P-UL
Performance	Cooling Rated Capacity (Btu/h)			12000	18000	24000
	SEER2			25.20	23.80	22.70
	EER2			15.70	12.00	11.80
	Heating Rated Capacity (Btu/h)			14000	20000	27000
	HSPF2			11.10	10.4	10.4
	COP2			13.3	11.1	11.3
Operating Range	Cooling	Indoor Min - Max DB (^{o}F)		70 to 89	70 to 89	70 to 89
		Outdoor Min - Max DB (^{o}F)		5 to 115	5 to 115	5 to 115
		Outdoor Min - Max DB (^{o}F) with wind buffels		5 to 115	5 to 115	5 to 115
	Heating	Indoor Min - Max DB (^{o}F)		59 to 86	59 to 86	59 to 86
		Outdoor Min - Max DB (^{o}F)		-13 to 59	-13 to 59	-13 to 59
Piping	Standard Piping Length		(ft)	24'7''	24'7''	24'7''
	Min. Piping Length		(ft)	16'5''	16'5''	16'5''
	Max. Piping Length		(ft)	164'1''	164'1''	164'1''
	Lift (Outdoor below Indoor)		(ft)	98'5''	98'5''	98'5''
	Lift (Outdoor above Indoor)		(ft)	98'5''	98'5''	98'5''
	Gas Pipe (size/connection type)			1/2"	1/2"	5/8"
	Liquid Pipe (size/connection type)			1/4"	1/4"	3/8"
	Additional refrigerant charge under long piping connection			0.22oz/ft (65'7" to 164'1")	0.22oz/ft (65'7" to 164'1")	0.376oz/ft (98'5" to 164'1")
Electrical	Voltage			1Ph, 208-230V ~ 60Hz.		
	Cooling Power Consumption		(W)	765	1500	2034
	Cooling Running Current		(A)	3.50	6.72	9.41
	Heating Power Consumption		(W)	1050	1800	2400
	Heating Running Current		(A)	4.71	8.00	11.50
	Minimum Current Amps		(A)	14	14	17
	Maximum Overcurrent Protection Device Amps		(A)	20	20	25
	Breaker		(A)	15	15	20
Outdoor	Dimensions	Height	(in)	21.7	21.7	35.0
		Width	(in)	30.7	30.7	35.4
		Depth	(in)	11.4	11.4	12.6
	Weight-Net/Gross		(lbs)	82/89	82/89	133/144
	Refrigerant charged		(lbs)	3.31	3.31	4.63
Indoor	Dimensions	Height	(in)	12.6	12.6	12.6
		Width	(in)	41.3	41.3	41.3
		Depth	(in)	9.8	9.8	9.8
	Weight-Net/Gross		(lbs)	33/37	33/37	33/37
	Sound Pressure at Different Speed (H/M/L)		(dBA)	37/33/28	41/37/32	46/41/35
	Air flow DRY (H/M/L)		(CFM)	475/355/250	530/425/325	705/530/355

2. DIMENSIONAL DRAWING

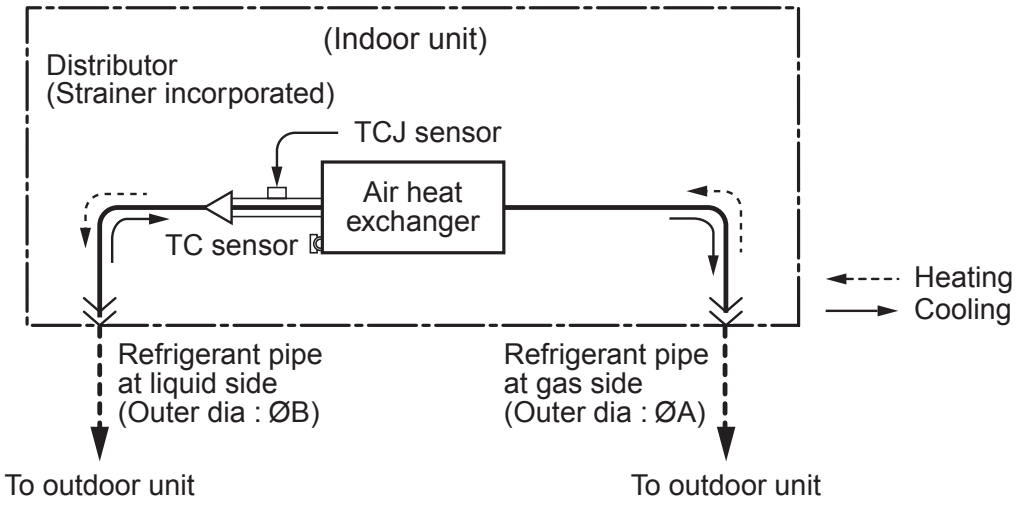
Unit : in (mm)



3. SYSTEMATIC REFRIGERATING CYCLE DIAGRAM

High Wall Type

- **Single type (Combination of 1 indoor unit and 1 outdoor unit)**

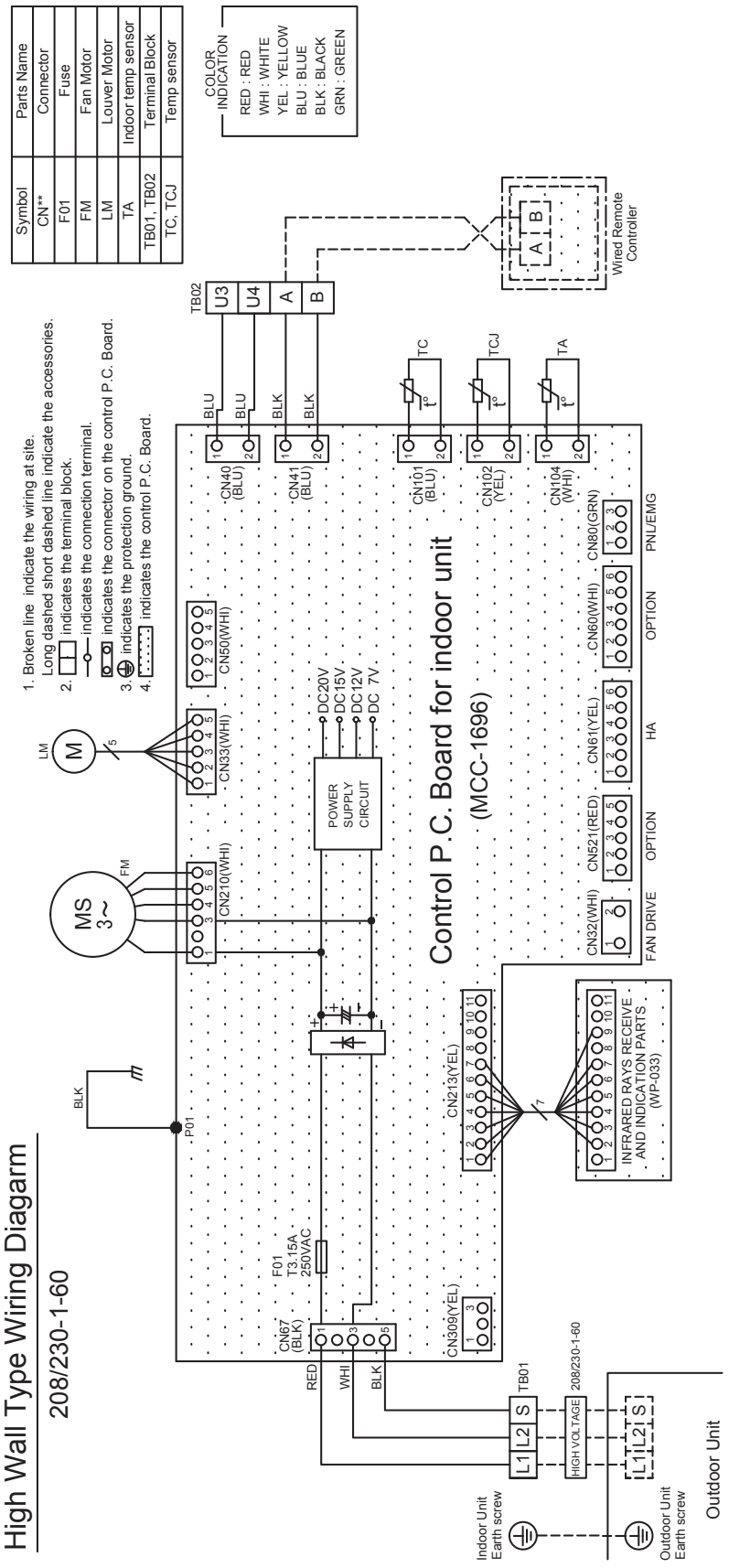


Dimension table

Indoor unit	Outer diameter of refrigerant pipe (In (mm))	
	Gas side ØA	Liquid side ØB
HB12, 18 Type	1/2" (12.7)	1/4" (6.4)
HB24 Type	5/8" (15.9)	3.8" (9.5)

4. WIRING DIAGRAM

High Wall Type

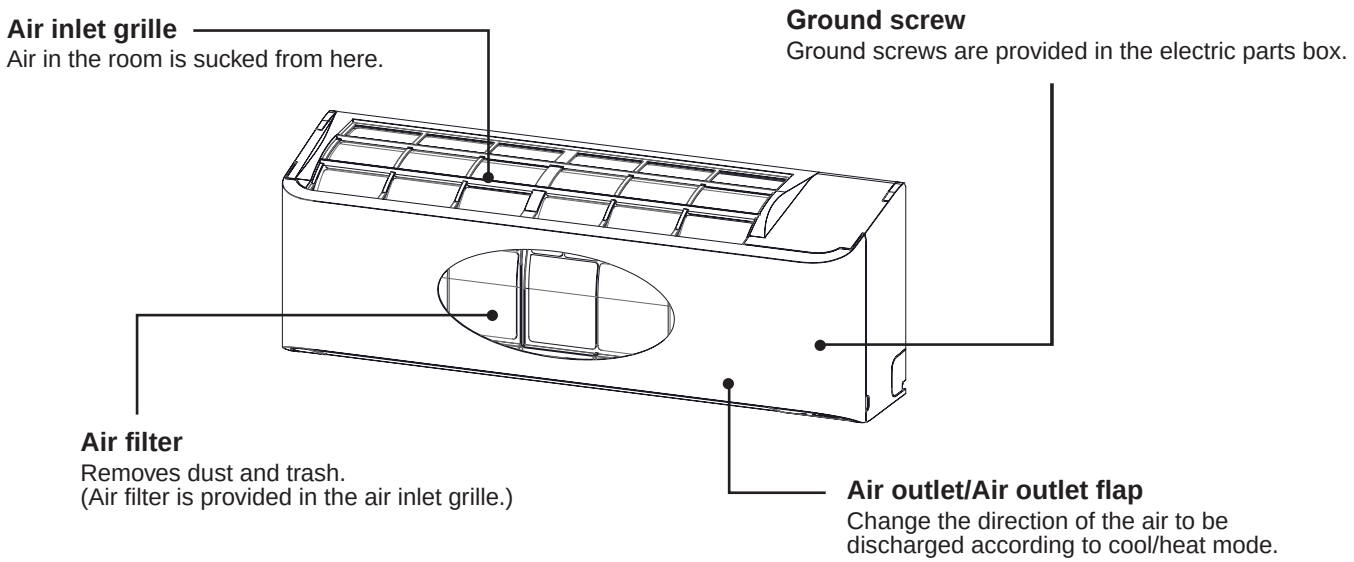


5. SPECIFICATIONS OF ELECTRICAL PARTS

High Wall Type

No.	Parts Name	Type	Specications
1	Fan motor (for indoor)	WDF-340-30CA	Output (Rated) 30W, 340V DC
2	Grille motor	24BYJ48-ST	4 phase, DC 12V
3	Thermo. Sensor (TA sensor)	16.4" (418mm)	10kΩ at 77°F(25°C)
4	Heat exchanger sensor (TC sensor)	Ø0.24"(6), 31.50" (800mm)	10kΩ at 77°F(25°C)
5	Heat exchanger sensor (TCJ sensor)	Ø0.24"(6), 19.69" (500mm)	10kΩ at 77°F(25°C)

■ Name of Each Part



6. REFRIGERANT R454B

This air conditioner adopts the refrigerant R454B which does not damage the ozone layer.

The refrigerating oil is also changed in accordance with change of refrigerant, so be careful that water, dust, and existing refrigerant or refrigerat-ing oil are not entered in the refrigerant cycle of the air conditioner using the new refrigerant during installation work or servicing time.

The next section describes the precautions for air conditioner using the new refrigerant. Conforming to contents of the next section together with the general cautions included in this manual, perform the correct and safe work.

6-1. Safety During Installation/Servicing

By using tools and materi-als exclusive for R454B, it is necessary to carry out installation/servicing safely while taking the following precautions into consideration.

1. Never use refrigerant other than R454B in an air conditioner which is designed to operate with R454B.
   If other refrigerant than R454B is mixed, pressure in the refrigeration cycle becomes abnormally high, and it may cause personal injury, etc. by a rupture.
2. Confirm the used refrigerant name, and use tools and materials exclusive for the refrigerant R454B. The refrigerant name R454B is indicated on the visible place of the outdoor unit of the air conditioner.
3. If a refrigeration gas leakage occurs during installation/servicing, be sure to ventilate fully. If the refrigerant gas comes into contact with fire, a poisonous gas may occur.
4. When installing or removing an air conditioner, do not allow air or moisture to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture or personal injury may be caused.
5. After completion of installation work, check to make sure that there is no refrigeration gas leakage.
   If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur.
6. When an air conditioning system charged with a large volume of refrigerant is installed in a small room, it is necessary to exercise care so that, even when refrigerant leaks, its concentration does not exceed the marginal level.
   If the refrigerant gas leakage occurs and its concentration exceeds the marginal level, an oxygen starvation accident may result.
7. Be sure to carry out installation or removal according to the installation manual.
   Improper installation may cause refrigeration trouble, water leakage, electric shock, fire, etc.
8. Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please call a qualified air conditioner technician or electrician.
   Improper repair's may result in water leakage, electric shock and fire, etc.

6-2. Refrigerant Piping Installation

6-2-1. Piping Materials and Joints Used

For the refrigerant piping installation, copper pipes and joints are mainly used. Copper pipes and joints suitable for the refrigerant must be chosen and installed. Furthermore, it is necessary to use clean copper pipes and joints whose interior surfaces are less affected by contaminants.

1. Copper Pipes

It is necessary to use seamless copper pipes which are made of either copper or copper alloy and it is desirable that the amount of residual oil is less than 0.0001lbs/32'10"(40mg/10). Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface).

Otherwise, the expansion valve or capillary tube may become blocked with contaminants.

Thicknesses of copper pipes used with R454B are as shown in Table 3-2-1. Never use copper pipes thinner than 0.03"(0.8mm) even when it is available on the market.

Table 6-2-1 Thicknesses of annealed copper pipes

Unit : in (mm)

		Thickness
Nominal diameter	**Outer diameter**	**R454B**
1/4" (6.35)	0.25" (6.35)	0.03" (0.80)
3/8" (9.5)	0.37" (9.52)	0.03" (0.80)
1/2" (12.7)	0.50" (12.70)	0.03" (0.80)
5/8" (15.9)	0.63" (15.88)	0.04" (1.00)

2. Joints

For copper pipes, flare joints or socket joints are used. Prior to use, be sure to remove all contaminants.

a) Flare Joints

Flare joints used to connect the copper pipes cannot be used for pipings whose outer diameter exceeds 0.79"(20 mm). In such a case, socket joints can be used.

Sizes of flare pipe ends, flare joint ends and flare nuts are as shown in Tables 6-2-3 to 6-2-6 below.

b) Socket Joints

Socket joints are such that they are brazed for connections, and used mainly for thick pipings whose diameter is larger than 0.79"(20 mm).

Thicknesses of socket joints are as shown in Table 6-2-2.

Table 6-2-2 Minimum thicknesses of socket joints

Unit : in (mm)

Nominal diameter	Reference outer diameter of copper pipe jointed	Minimum joint thickness
1/4" (6.35)	0.25" (6.35)	0.02" (0.50)
3/8" (9.5)	0.37" (9.52)	0.02" (0.60)
1/2" (12.7)	0.50" (12.70)	0.03" (0.80)
5/8" (15.9)	0.63" (15.88)	0.03" (0.80)

6-2-2. Processing of Piping Materials

When performing the refrigerant piping installation, care should be taken to ensure that water or dust does not enter the pipe interior, that no other oil than lubricating oils used in the installed air-water heat pump is used, and that refrigerant does not leak. When using lubricating oils in the piping processing, use such lubricating oils whose water content has been removed. When stored, be sure to seal the container with an airtight cap or any other cover.

1. Flare processing procedures and precautions

a) Cutting the Pipe

By means of a pipe cutter, slowly cut the pipe so that it is not deformed.

b) Removing Burrs and Chips

If the flared section has chips or burrs, refrigerant leakage may occur.
Carefully remove all burrs and clean the cut surface before installation.

c) Insertion of Flare Nut

d) Flare Processing
Make certain that a clamp bar and copper pipe have been cleaned. By means of the clamp bar, perform the flare processing correctly.
Use either a flare tool for R454B or conventional flare tool. Flare processing dimensions differ according to the type of flare tool. When using a con-ventional flare tool, be sure to secure “dimension A” by using a gauge for size adjustment.

e) Joint preparation are recommend to double-flare fitting accordance to ASHRAE15 requirements.

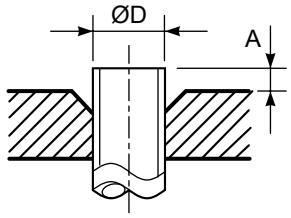


Fig. 6-2-1 Flare processing dimensions

Table 6-2-3 Dimensions related to flare processing for R454B

Unit : in (mm)

Nominal diameter	Outer diameter	Thickness	A		
			Flare tool for R454B clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4” (6.4)	0.25" (6.35)	0.03” (0.8)	0 to 0.02" (0.50)	0.04"(1.0) to 0.06"(1.5)	0.06"(1.5) to 0.08"(2.0)
3/8” (9.5)	0.37" (9.52)	0.03” (0.8)	0 to 0.02" (0.50)	0.04"(1.0) to 0.06"(1.5)	0.06"(1.5) to 0.08"(2.0)
1/2” (12.7)	0.50" (12.70)	0.03” (0.8)	0 to 0.02" (0.50)	0.04"(1.0) to 0.06"(1.5)	0.08"(2.5) to 0.10"(2.5)
5/8” (15.9)	0.63" (15.88)	0.04” (1.0)	0 to 0.02" (0.50)	0.04"(1.0) to 0.06"(1.5)	0.08"(2.5) to 0.10"(2.5)

Table 6-2-4 Flare and flare nut dimensions for R454B

Unit : in (mm)

Nominal diameter	Outer diameter	Thickness	Dimension				Flare nut width
			A	B	C	D	
1/4” (6.4)	0.25" (6.35)	0.03” (0.8)	0.36"(9.1)	0.36"(9.2)	0.26"(6.5)	0.51"(13)	0.67"(17)
3/8” (9.5)	0.37" (9.52)	0.03” (0.8)	0.52"(13.2)	0.53"(13.5)	0.38"(9.7)	0.79"(20)	0.87"(22)
1/2” (12.7)	0.50" (12.70)	0.03” (0.8)	0.65"(16.6)	0.63"(16.0)	0.51"(12.9)	0.91"(23)	1.02"(26)
5/8” (15.9)	0.63" (15.88)	0.04” (1.0)	0.78"(19.7)	0.75"(19.0)	0.63"(16.0)	0.98"(25)	1.14"(29)

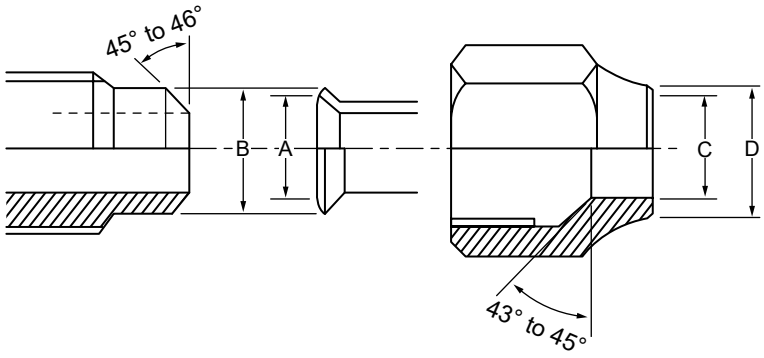


Fig. 6-2-2 Relations between flare nut and flare seal surface

2. Flare Connecting Procedures and Precautions

a) Make sure that the flare and union portions do not have any scar or dust, etc.

b) Correctly align the processed flare surface with the union axis.

c) Tighten the flare with designated torque by means of a torque wrench. Incidentally, when the torque is weak, the gas leakage may occur. When it is strong, the flare nut may crack and may be made non-removable. When choosing the tighten-ing torque, comply with values designated by manufacturers. Table 6-2-5 shows reference values.

NOTE :

When applying oil to the flare surface, be sure to use oil designated by the manufacturer.
If any other oil is used, the lubricating oils may deteriorate and cause the compressor to burn out.

Table 6-2-5 Tightening torque of flare for R454B [Reference values]

Unit : in (mm)

Nominal diameter	Outer diameter	Tightening torque N•m (kgf•cm)	Tightening torque of torque wrenches available on the market N•m (kgf•cm)
1/4” (6.4)	0.25" (6.35)	14 to 18 (140 to 180)	16 (160), 18 (180)
3/8” (9.5)	0.37" (9.52)	33 to 42 (330 to 420)	42 (420)
1/2” (12.7)	0.50" (12.70)	50 to 62 (500 to 620)	55 (550)
5/8” (15.9)	0.63" (15.88)	63 to 77 (630 to 770)	65 (650)

6-3. Tools

6-3-1. Required Tools

The service port diameter of packed valve of the outdoor unit in the air-water heat pump using R454B is changed to prevent mixing of other refrigerant. To reinforce the pressure-resisting strength, flare processing dimensions and opposite side dimension of flare nut (For Ø1/2"(12.7mm) copper pipe) of the refrigerant piping are lengthened.

The used refrigerating oil is changed, and mixing of oil may cause a trouble such as generation of sludge, clogging of capillary, etc. Accordingly, the tools to be used are classified into the following three types.

1. Tools exclusive for R454B.
2. Tools exclusive for R454B, but can be also used for conventional refrigerant.
3. Tools commonly used for R454B and for conventional refrigerant.

The table below shows the tools exclusive for R454B and their interchangeability.

Tools exclusive for R454B (The following tools for R454B are required.)

Tools whose specifications are changed for R454B and their interchangeability

No.	Used tool	Usage	R454B air-water heat pump installation		Conventional air-water heat pump installation
			Existence of new equipment for R454B	Whether conventional equipment can be used	Whether new equipment can be used with conventional refrigerant
1	Flare tool	Pipe flaring	Yes	***(Note 1)**	○
2	Copper pipe gauge for adjusting projection margin	Flaring by conventional flare tool	Yes	***(Note 1)**	***(Note 1)**
3	Torque wrench (For Ø1/2" (12.7mm))	Connection of flare nut	Yes	×	×
4	Gauge manifold	Evacuating, refrigerant charge, run check, etc.	Yes	×	×
5	Charge hose				
6	Vacuum pump adapter	Vacuum evacuating	Yes	×	○
7	Electronic balance for refrigerant charging	Refrigerant charge	Yes	×	○
8	Refrigerant cylinder	Refrigerant charge	Yes	×	×
9	Leakage detector	Gas leakage check	Yes	×	○
10	Charging cylinder	Refrigerant charge	**(Note 2)**	×	×

(Note 1) When flaring is carried out for R454B using the conventional flare tools, adjustment of projection margin is necessary. For this adjustment, a copper pipe gauge, etc. are necessary.

(Note 2) Charging cylinder for R454B is being currently developed.

General tools (Conventional tools can be used.)

In addition to the above exclusive tools, the following equipments are necessary as the general tools.

1. Vacuum pump
   Use vacuum pump by attaching vacuum pump adapter.
2. Torque wrench (For Ø1/4"(6.35mm), Ø3/8"(9.52mm)
3. Pipe cutter
4. Reamer
5. Pipe bender
6. Level vial
7. Screwdriver (+, –)
8. Spanner or Monkey wrench
9. Hole core drill Ø2.56"(65mm)
10. Hexagon wrench (Opposite side 0.16"(4mm)
11. Tape measure
12. Metal saw

Also prepare the following equipments for other installation method and run check.

1. Clamp meter
2. Thermometer
3. Insulation resistance tester
4. Electroscope

6-4. Recharging of Refrigerant

When it is necessary to recharge refrigerant, charge the specified amount of new refrigerant according to the following steps.

Recover the refrigerant, and check no refrigerant remains in the equipment.

↓

Connect the charge hose to packed valve service port at the outdoor unit's gas side.

↓

Connect the charge hose to the vacuum pump adapter.

↓

Open fully both packed valves at liquid and gas sides.

↓

Place the handle of the gauge manifold Low in the fully opened position, and turn on the vacuum pump's power switch. Then, evacuating the refrigerant in the cycle.

↓

When the compound gauge's pointer has indicated –0.1 Mpa (–76 cmHg), place the handle Low in the fully closed position, and turn off the vacuum pump's power switch.

↓

Keep the status as it is for 1 to 2 minutes, and ensure that the compound gauge's pointer does not return.

↓

Set the refrigerant cylinder to the electronic balance, connect the connecting hose to the cylinder and the connecting port of the electronic balance, and charge **liquid refrigerant**.

(For refrigerant charging, see the figure below.)

1. Never charge refrigerant exceeding the specified amount.
2. If the specified amount of refrigerant cannot be charged, charge refrigerant **bit by bit** in COOL mode.
3. Do not carry out additional charging.
   When additional charging is carried out if refrigerant leaks, the refrigerant composition changes in the refrigeration cycle, that is characteristics of the air conditioner changes, refrigerant exceeding the specified amount is charged, and working pressure in the refrigeration cycle becomes abnormally high pressure, and may cause a rupture or personal injury.

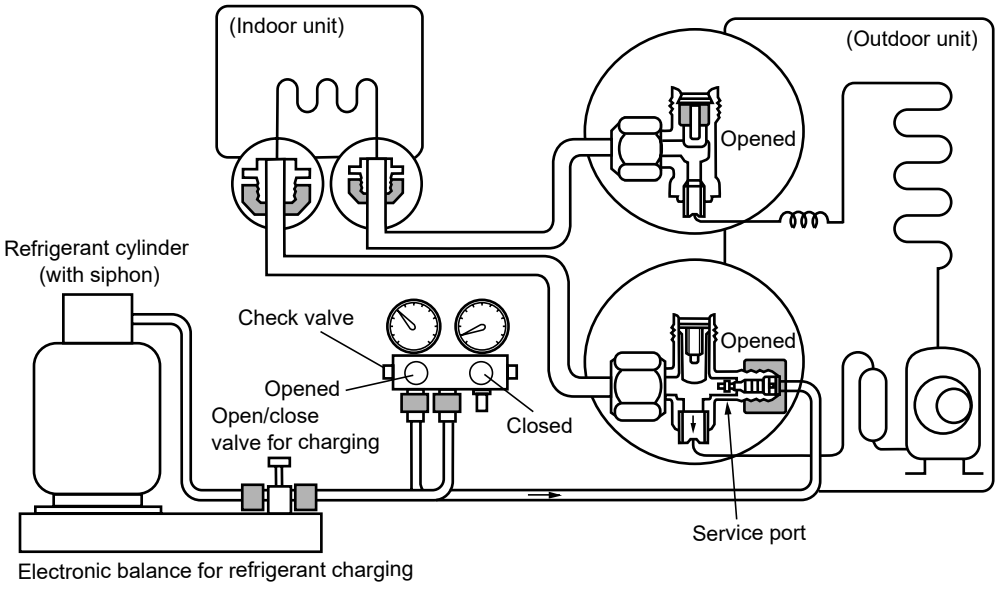
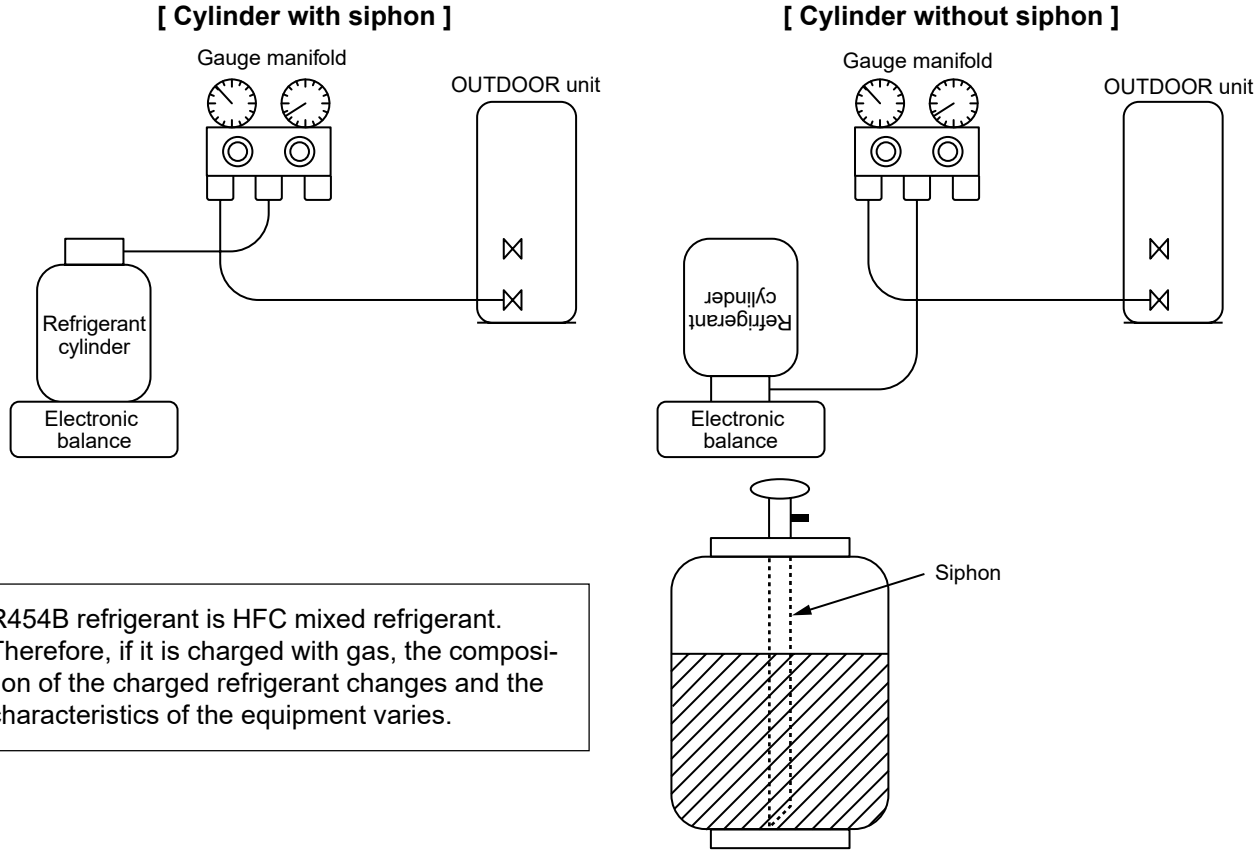


Fig. 6-4-1 Configuration of refrigerant charging

1. Be sure to make setting so that **liquid** can be charged.
2. When using a cylinder equipped with a siphon, liquid can be charged without turning it upside down.

It is necessary for charging refrigerant under condition of liquid because R454B is mixed type of refrigerant. Accordingly, when charging refrigerant from the refrigerant cylinder to the equipment, charge it turning the cylinder upside down if cylinder is not equipped with siphon.



R454B refrigerant is HFC mixed refrigerant. Therefore, if it is charged with gas, the composition of the charged refrigerant changes and the characteristics of the equipment varies.

Fig. 6-4-2

6-5. Brazing of Pipes

6-5-1. Materials for Brazing

1. Silver brazing filler

Silver brazing filler is an alloy mainly composed of silver and copper. It is used to join iron, copper or copper alloy, and is relatively expensive though it excels in solderability.

2. Phosphor bronze brazing filler

Phosphor bronze brazing filler is generally used to join copper or copper alloy.

3. Low temperature brazing filler

Low temperature brazing filler is generally called solder, and is an alloy of tin and lead. Since it is weak in adhesive strength, do not use it for refrigerant pipes.

1. Phosphor bronze brazing filler tends to react with sulfur and produce a fragile compound water solution, which may cause a gas leakage. Therefore, use any other type of brazing filler at a hot spring resort, etc., and coat the surface with a paint.
2. When performing brazing again at time of servicing, use the same type of brazing filler.

6-5-2. Flux

1. Reason why flux is necessary

- By removing the oxide film and any foreign matter on the metal surface, it assists the flow of brazing filler.
- In the brazing process, it prevents the metal surface from being oxidized.
- By reducing the brazing filler's surface tension, the brazing filler adheres better to the treated metal.

2. Characteristics required for flux

- Activated temperature of flux coincides with the brazing temperature.
- Due to a wide effective temperature range, flux is hard to carbonize.
- It is easy to remove slag after brazing.
- The corrosive action to the treated metal and brazing filler is minimum.
- It excels in coating performance and is harmless to the human body.

As the flux works in a complicated manner as described above, it is necessary to select an adequate type of flux according to the type and shape of treated metal, type of brazing filler and brazing method, etc.

3. Types of flux

- **Noncorrosive flux**

  Generally, it is a compound of borax and boric acid.
  It is effective in case where the brazing temperature is higher than 800°C.

- **Activated flux**

  Most of fluxes generally used for silver brazing are this type.
  It features an increased oxide film removing capability due to the addition of compounds such as potassium fluoride, potassium chloride and sodium fluoride to the borax-boric acid compound.

4. Piping materials for brazing and used brazing filler/flux

Piping material	Used brazing filler	Used flux
Copper - Copper	Phosphor copper	Do not use
Copper - Iron	Silver	Paste flux
Iron - Iron	Silver	Vapor flux

1. Do not enter flux into the refrigeration cycle.
2. When chlorine contained in the flux remains within the pipe, the lubricating oil deteriorates. Therefore, use a flux which does not contain chlorine.
3. When adding water to the flux, use water which does not contain chlorine (e.g. distilled water or ion-exchange water).
4. Remove the flux after brazing.

6-5-3. Brazing

As brazing work requires sophisticated techniques, experiences based upon a theoretical knowledge, it must be performed by a person qualified.

In order to prevent the oxide film from occurring in the pipe interior during brazing, it is effective to proceed with brazing while letting dry Nitrogen gas (N2) flow.

Never use gas other than Nitrogen gas.

1. Brazing method to prevent oxidation

1) Attach a reducing valve and a flow-meter to the Nitrogen gas cylinder.
2) Use a copper pipe to direct the piping material, and attach a flow-meter to the cylinder.
3) Apply a seal onto the clearance between the piping material and inserted copper pipe for Nitrogen in order to prevent backflow of the Nitrogen gas.
4) When the Nitrogen gas is flowing, be sure to keep the piping end open.
5) Adjust the flow rate of Nitrogen gas so that it is lower than 0.05 m^3/Hr or 0.02 MPa (0.2kgf/cm^2) by means of the reducing valve.
6) After performing the steps above, keep the Nitrogen gas flowing until the pipe cools down to a certain extent (temperature at which pipes are touchable with hands).
7) Remove the flux completely after brazing.

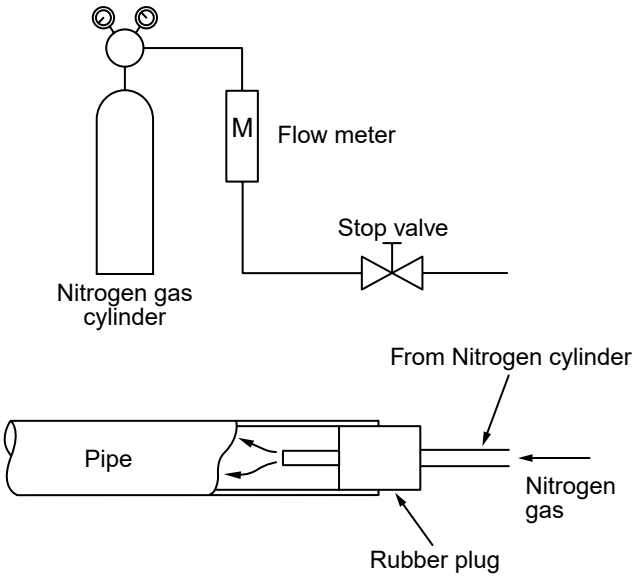
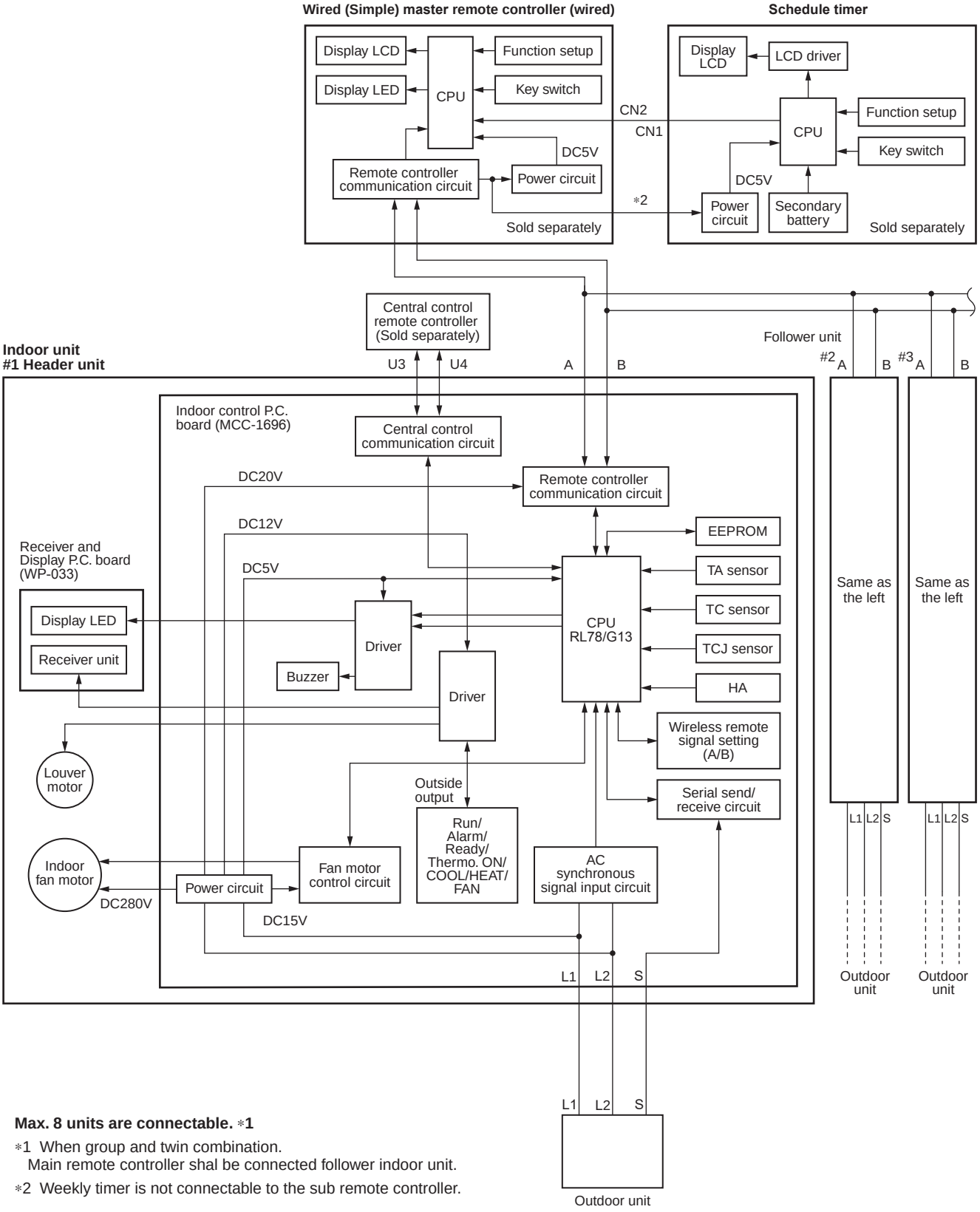


Fig. 6-5-1 Prevention of oxidation during brazing

7. INDOOR UNIT CONTROL

7-1. Indoor Controller block diagram

Connection of wired remote controller

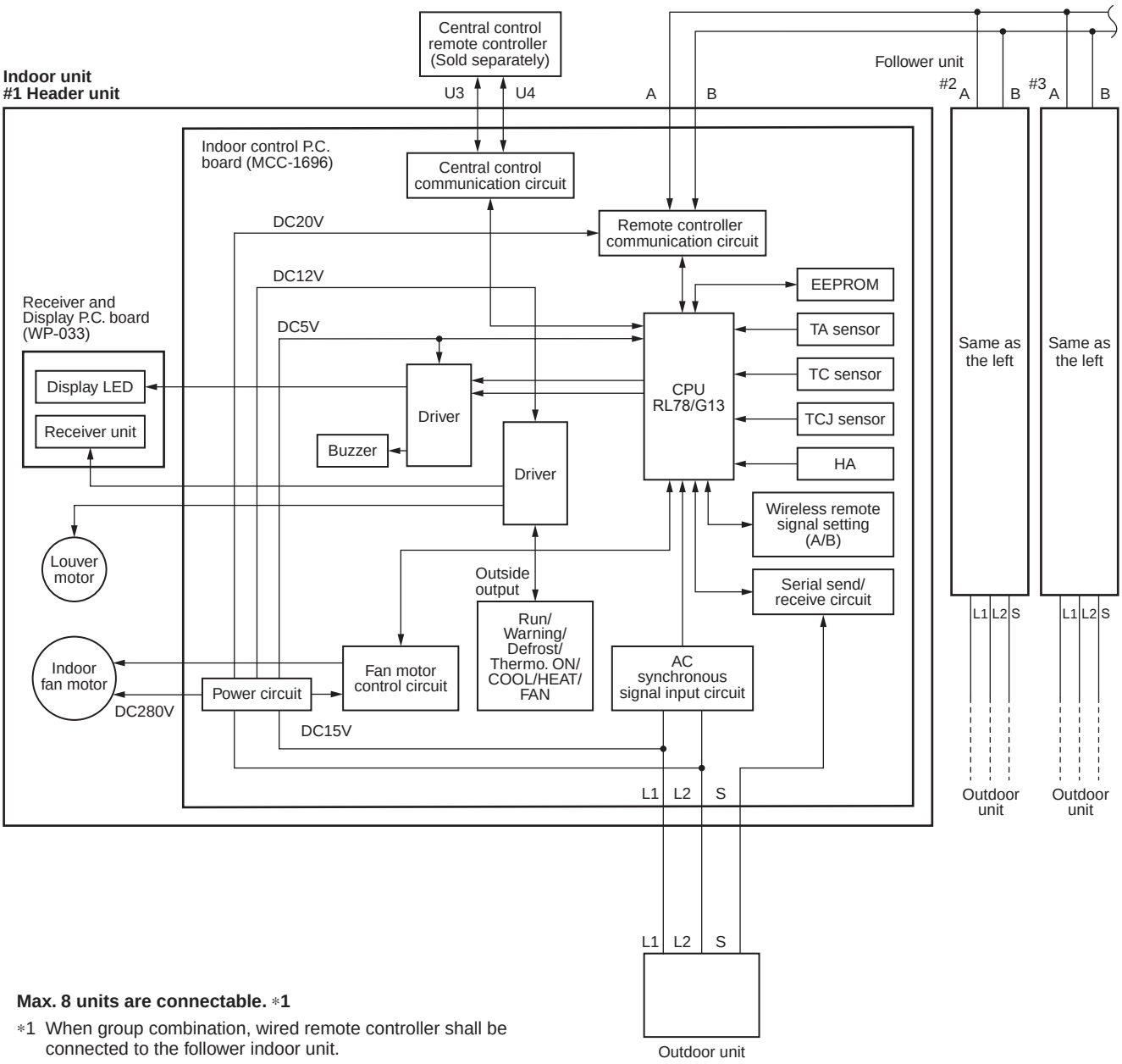


Max. 8 units are connectable. *1

*1 When group and twin combination.
Main remote controller shal be connected follower indoor unit.

*2 Weekly timer is not connectable to the sub remote controller.

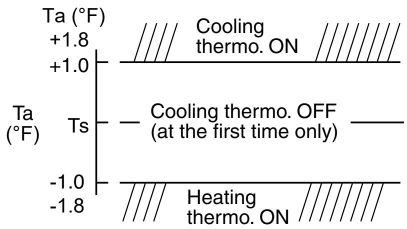
Connection of Wireless Remote Controller



Max. 8 units are connectable. ∗1

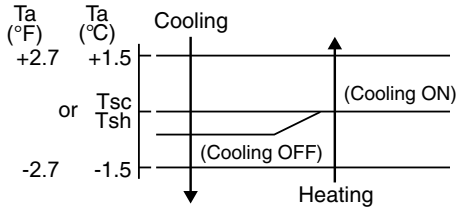
∗1 When group combination, wired remote controller shall be connected to the follower indoor unit.

7-2. Control Specifications (High Wall Type)

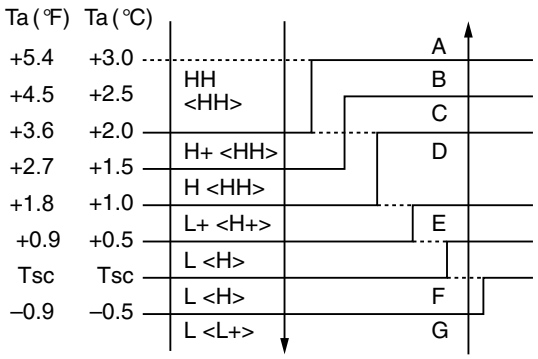
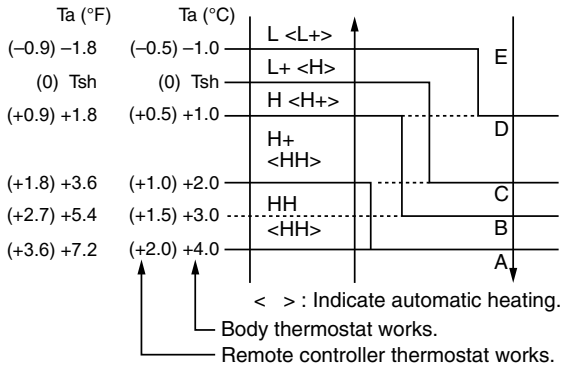
<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>1</td><td>When power supply is reset</td><td>1) Distinction of outdoor unit
When the power supply is reset, the outdoors are distinguished and the control is selected according to the distinguished result.
2) Setting of indoor fan speed and existence of air direction adjustment
Based on EEPROM data, select setting of the indoor fan speed and the existence of air direction adjustment.</td><td>Fan speed (rpm)/
Air direction adjustment</td></tr>
<tr><td>2</td><td>Operation mode selection</td><td>Based on the operation mode selecting command from the remote controller, the operation mode is selected.
<table>
<tr><th>Remote controller command</th><th>Control outline</th></tr>
<tr><td>STOP</td><td>Air conditioner stops.</td></tr>
<tr><td>FAN</td><td>Fan operation</td></tr>
<tr><td>COOL</td><td>Cooling operation</td></tr>
<tr><td>DRY</td><td>Dry operation</td></tr>
<tr><td>HEAT</td><td>Heating operation</td></tr>
<tr><td>AUTO</td><td>• COOL/HEAT operation mode is automatically selected by Ta, Ts and To for operation.
• The operation is performed as shown in the following figure according to Ta value at the first time only. ((In the range of Ts - 1.8°F(-1°C) < Ta < Ts +1.8°F (+1°C) , Cooling thermo. OFF (Fan)/Setup air volume operation continues.</td></tr>
</table>


• α is corrected according to the outside temperature.
<table>
<tr><th>Outside temp.</th><th>Correction value (α)</th></tr>
<tr><td>No To</td><td>0K</td></tr>
<tr><td>To≥ 75.2°F [24°C]</td><td>–1K</td></tr>
<tr><td>75.2°F [24°C] > To ≥ 64.4°F [18°C]</td><td>0K</td></tr>
<tr><td>To < 64.4°F [18°C]</td><td>+1K</td></tr>
<tr><td>To error</td><td>0K</td></tr>
</table></td><td>Ta: Room temp.
Ts: Setup temp.
To: Outside temp.

K = deg</td></tr>
<tr><td>3</td><td>Room temp. control</td><td>1) Adjustment range: Remote controller setup temperature °C
<table>
<tr><th></th><th>COOL/DRY</th><th>HEAT</th><th>AUTO</th></tr>
<tr><td>Wired type ⁎</td><td colspan="3">64°F [18°C] to 84°F [29°C]</td></tr>
<tr><td>Wireless type</td><td colspan="3">63°F [17°C] to 86°F [30°C]</td></tr>
</table>
⁎ When use of remote sensor is set (with DN32), even when sensor value is within the above range in HEAT or AUTO mode, the thermo. sensor turns OFF when Ta sensor value exceeds 89.6°F(35°C).</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>3</td><td>Room temp. control (Continued)</td><td>2) Using the CODE No. 06, the setup temperature in heating operation can be corrected.
<table><tr><td>SET DATA</td><td>0</td><td>2</td><td>4</td><td>6</td></tr><tr><td>Temperature setting adjustment</td><td>+0 ˚F [+0˚C]</td><td>+3.6 ˚F [+2˚C]</td><td>+7.2 ˚F [+4˚C]</td><td>+10.8 ˚F [+6˚C]</td></tr></table>Setting at shipment
<table><tr><td>SET DATA</td><td>3</td></tr></table>• When use of remote controller sensor is set (with DN32), no correction is performed.</td><td>Shift of suction temperature in heating operation</td></tr>
<tr><td>4</td><td>Automatic capacity control (GA control)</td><td colspan="2">1) Based on the difference between Ta and Ts, the operation frequency is instructed to the outdoor unit.
2) Cooling operation
Every 90 seconds, the room temperature difference between temperature detected by Ta and Ts and the varied room temperature value are calculated to obtain the correction value of the frequency command and then the present frequency command is corrected.
Ta (n) – Ts (n) : Room temp. difference
n : Counts of detection
Ta (n-1) – Ts (n) : Varied room temp. value
n – 1 : Counts of detection of 90 seconds before
3) Heating operation
Every 1 minute (60 sec.), the room temperature difference between temperature detected by Ta and Ts and the varied room temperature value are calculated to obtain the correction value of the frequency command and then the present frequency command is corrected.
Ts (n) – Ta (n) : Room temp. difference
n : Counts of detection
Ta (n) – Ta (n – 1) : Varied room temp. value
n – 1 : Counts of detection of 1 minute before
4) Dry operation
The frequency correction control is same as those of the cooling operation.
However the maximum frequency is limited to approximately “S6”.
Note) When LOW is set up, the maximum frequency is limited to approximately “SB”.</td></tr>
<tr><td>5</td><td>Automatic cooling/heating control</td><td>1) The judgment of selecting COOL/HEAT is carried out as shown below. When +2.7°F(+1.5°C) exceeds against Tsh 10 minutes and after thermo.-OFF, heating operation (Thermo. OFF) exchanges to cooling operation.
Description in the parentheses shows an example of cooling ON/OFF.
 

When -2.7°F (-1.5°C) lowers against Tsc 10 minutes and after thermo. OFF, cooling operation (Thermo. OFF) exchanges to heating operation.
2) For the automatic capacity control after judgment of cooling/heating, see Item 4.
3) For temperature correction of room temp. control in automatic heating, see Item 3.</td><td>Tsc: Setup temp. in cooling operation
Tsh: Setup temp. in heating operation + temp. correction of room temp. control</td></tr>
</table>

No.	Item	Outline of specifications	Remarks
6	Fan speed control	1) Operation with (HH), (H), (L) or [AUTO] mode is carried out by the command from the remote controller. 2) When the fan speed mode [AUTO] is selected, the fan speed varies by the difference between Ta and Ts. **<COOL>**  • Controlling operation in case when thermo of remote controller works is same as a case when thermo of the body works. • If the fan speed has been changed once, it is not changed for 3 minutes. However when the air volume is exchanged, the fan speed changes. • When cooling operation has started, select a downward slope for the fan speed, that is, the high position. • If the temperature is just on the difference boundary, the fan speed does not change. • Mode in the parentheses indicates one in automatic cooling operation. **<HEAT>**  Value in the parentheses indicates one when thermostat of the remote controller works. Value without parentheses indicates one when thermostat of the body works. • If the fan speed has been changed once, it is not changed for 1 minute. However when the fan speed I exchanged, the fan speed changes. • When heating operation has started, select an upward slope for the fan speed, that is, the high position. • If the temperature is just on the difference boundary, the fan speed does not change. • Mode in the parentheses indicates one in automatic heating operation. • In Tc ≥ 140°F(60°C), the fan speed increases by 1 step.	HH > H+ > H > L+ > L > UL Wireless type allows HH, H+, H, L+, L and AUTO.  Tc: Indoor heat exchanger sensor temperature

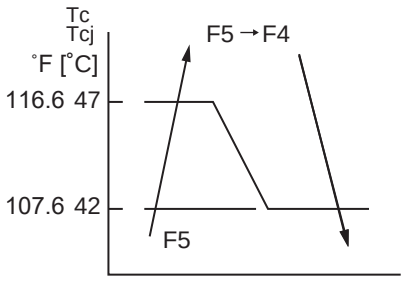
No.	Item	Outline of specifications	Remarks
6	Fan speed control (Continued)	Fan speed [rpm]	

Fan speed table High wall

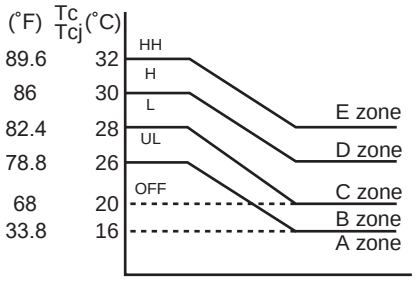
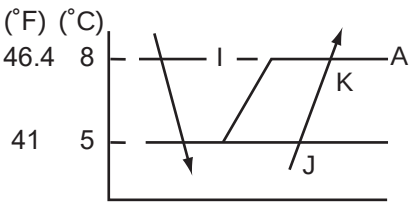
DN	Description	DN[5D]=00		DN[5D]=01		DN[5D]=02		DN[5D]=03		DN[5D]=04		DN[5D]=05		DN[5D]=06	
		Cool	Heat	Cool	Heat	Cool	Heat	Cool	Heat	Cool	Heat	Cool	Heat	Cool	Heat
4F	DC fan tap F1							HH	HH					HH	HH
50	DC fan tap F2			HH	HH										
51	DC fan tap F3				H+	HH	HH	H+, H	H+, H					H+,H,L+, L	H+,H,L+, L
52	DC fan tap F4			H+								HH	HH		
53	DC fan tap F5		HH		H	H+	H+								
54	DC fan tap F6	HH		H			H	L+	L+						
55	DC fan tap F7	H+	H+			H		L	L		HH				
56	DC fan tap F8		H		L+		L+			HH	H+, H		H+, H		
57	DC fan tap F9	H		L+	L	L+	L			H+, H		H+, H			
58	DC fan tap FA		L+	L		L					L+		L+		
59	DC fan tap FB	L+	L							L+	L	L+	L		
5A	DC fan tap FC	L								L		L			
5B	DC fan tap FD	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL

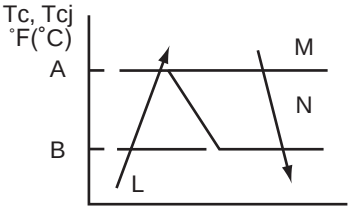
Tap	121	181	241
	Revolution speed (rpm)		
F1	1180	1180	1180
F2	1180	1180	1180
F3	1180	1180	1180
F4	1180	1180	1180
F5	880	960	1140
F6	860	940	1120
F7	800	880	1040
F8	740	840	940
F9	740	840	940
FA	660	800	880
FB	640	760	820
FC	620	740	800
FD	500	500	500

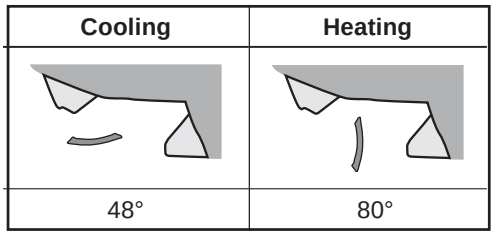
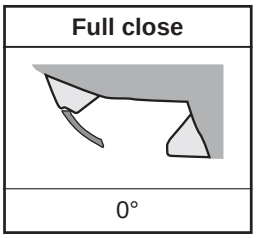
3) When thermo sensor turns OFF during heating, the fan speed mode becomes UL (weak).
4) When Ta is 77°F(25°C) or above at the beginning of HEAT operation or when canceling defrost mode, H or HH mode continues for 1 minute from the time when Tc enters zone E. (Following figure.)
5) The HH fan speed for auto cooling/heating is set to a speed higher than that for normal cooling/heating. However, it varies depending on the temperature difference of Tc during auto heating.



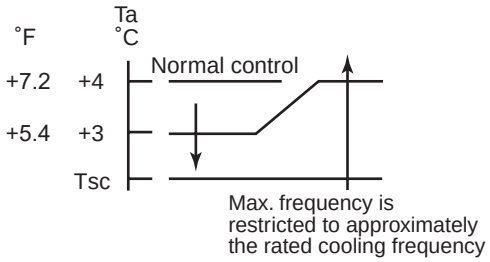
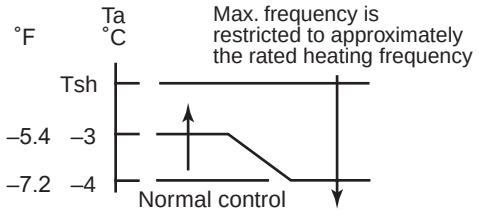
"PRE-HEAT" indication

No.	Item	Outline of specifications	Remarks
7	Cool air discharge preventive control	1) In heating operation, the indoor fan is controlled based on the detected temperature of Tc sensor or Tcj sensor. As shown below, the upper limit of the revolution frequency is restricted. However B zone is assumed as C zone for 6 minutes and after when the compressor activated. In defrost operation, the control value of Tc or Tcj is shifted by 42.8°F(6°C).  	In D and E zones, the priority is given to air volume selection setup of remote controller.
8	Freeze preventive control (Low temperature release)	1) The cooling operation (including Dry operation) is performed as follows based on the detected temperature of Tc sensor or Tcj sensor. When [J] zone is detected for 6 minutes (Following figure), the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [J] zone. In [K] zone, time counting is interrupted and the operation is held. When [I] zone is detected, the timer is cleared and the operation returns to the normal operation. If the commanded frequency becomes S0 because the operation continues in [J] zone, the return temperature A is raised from 46.4°F(8°C) to 53.6°F(12°C) until [I] zone is detected and the indoor fan operates with [L] mode.  In heating operation, the freeze-preventive control works if 4-way valve is not exchanged and the following conditions are satisfied. (However the temperature for J zone dashing control is changed from 41°F(5°C) to 23°F(–5°C). **<Conditions>** • When ① or ② is established 5 minutes after activation. ① Tcn ≤ Tc (n – 1) – 5 ② Tcn < Tc (n – 1) – 1 and Tcn ≤ Ta < 41°F(5°C)	**Tcj:** Indoor heat exchanger sensor temperature **Tcn:** Tc temperature when 5 minutes elapsed after activation **Tc (n – 1):** Tc temperature at start time

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>9</td><td>High-temp. release control</td><td>1) The heating operation is performed as follows based on the detected temperature of Tc sensor or Tcj sensor.
• When [M] zone is detected, the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [M] zone.
• In [N] zone, the commanded frequency is held.
• When [L] zone is detected, the commanded frequency is returned to the original value by approx. 6Hz every 60 seconds.
Setup at shipment
<table><tr><th colspan="2">Control temp. °F(°C)</th></tr><tr><th>A</th><th>B</th></tr><tr><td>132.8(56)
129.2(54)</td><td>125.6(52)
125.6(52)</td></tr></table> 
NOTE:
When the operation has started or when Tc or Tcj < 86°F(30°C) at start of the operation or after operation start, temperature is controlled between values in parentheses of A and B.</td><td></td></tr>
<tr><td>10</td><td>After-heat elimination</td><td>When heating operation stops, in some cases, the indoor fan operates with (L) for approx. 30 seconds.</td><td></td></tr>
</table>

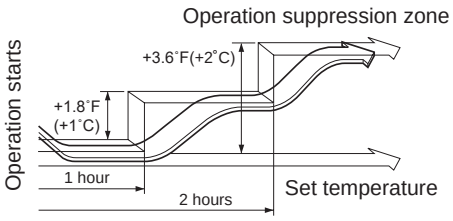
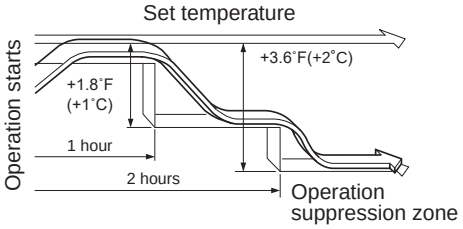
No.	Item	Outline of specifications	Remarks
11	Louver control	1) During the first operation after power on, louver position is controlled automatically according to operation mode (COOL/HEAT).  2) When louver position is controlled by remote controller, the unit's microcomputer memorizes the position for use in the next operation. ∗ The memorized louver position is cleared when power is turned off, and returns to the state of 1) above. 3) Louver position setting • Louver position can be set within the range below. **COOL/DRY** **HEAT/FAN**  4) Swing setting • Louver moves within the range beloW. **All operation modes**  5) When air conditioner opration stops, louver closes automatically. It keeps its position in the event of an alarm. 6) Louver tilts upward automatically during preparation for heating.	Louver angle: 0° (full close)  **Alarm:** A code number (except F08 and L31) appears on the remote controller and the indoor unit stops.
12	HA control	1) This control is connected to TV control or remote start/stop I/F, etc, and start/stop are available by HA signal input from the remote position. 2) This control outputs start/stop status to HA output terminal. 3) I/O specifications conform to JEMA regulations.	In the group operation, use this control by connecting to either master or follower indoor unit.

No.	Item	Outline of specifications	Remarks
13	Frequency fixed operation (Test run)	**<In case of wireless remote controller>** 1) Push [ON/OFF] ⏻ button. 2) Using [SELECT] button, set [COOL] or [HEAT] to the operation mode to drive the air conditioner. 3) Set [HIGH ■■■■■] to the fan speed. 4) To change the temperature setting, repeat it 6 times to COOL and HEAT operations each. COOL: 62°F(17°C) ↔ 64°F(18°C) 62°F(17°C) → 64°F(18°C) → 62°F(17°C) → 64°F(18°C) → 62°F(17°C) → 64°F(18°C) → 62°F(17°C) → (test run) → ON/OFF HEAT: 86°F(30°C) ↔ 84°F(29°C) 86°F(30°C) → 84°F(29°C) → 86°F(30°C) → 84°F(29°C) → 86°F(30°C) → 84°F(29°C) → 86°F(30°C) → (test run) → ON/OFF • Change an operation setting within 3 seconds. • The error detection is performed as usual. • The frequency-fixed operation is performed. 5) To finish a test run, push [ON/OFF] ⏻ button.	
14	Filter sign display (Except wireless type) ∗ It is provided on the separately sold type	1) The operation time of the indoor fan is calculated, the filter reset signal is sent to the remote controller when the specified time (150H) has passed, and it is displayed on LCD. 2) When the filter reset signal has been received from the remote controller, time of the calculation timer is cleared. In this case, the measurement time is reset if the specified time has passed, and display on LCD disappears.	FILTER [▦] goes on.
15	Central control mode selection	1) Setting at the central controller side enables to select the contents which can be operated on the remote controller at indoor unit side. 2) **RBC-AMT32UL** **[Last push priority] :** The operation contents can be selected from both remote controller and central controller of the indoor unit side, and the operation is performed with the contents selected at the last. **[Center] :** Start/Stop operation only can be handled on the remote controller at indoor unit side. **[Operation Prohibited] :** It cannot be operated on the remote controller at indoor unit side. (Stop status is held.)	(No display) [CENTER] goes on. [CENTER] goes on. In a case of wireless type, the display lamp does not change. However, contents which can be operated are same. The status set in [CENTER]/[Operation Prohibited] mode is notified with the receiving sound "Pi, Pi, Pi, Pi, Pi" (5 times).

No.	Item	Outline of specifications	Remarks
16	Power-saving control	1) Power-saving opration is available in the AUTO mode. 2) The set temperature is corrected using various sensor data within the range where comfort is maintained. 3) By using various sensor data including room temp. Ta, outside air temp. To, fan speed, and indoor unit heat exchange sensor temp. Tc, 20 minutes data is averaged to calculate a set temperature correction value. 4) The set temperature is corrected every 20 minutes with the following shift range. Cooling: +1.5 to –1.0K Heating: –1.5 to +1.0K	
17	Max. frequency cut control	1) This control is operated by selecting [AUTO] operation mode. 2) COOL operation mode: It is controlled according to the following figure if To <82.4°F(28°C).  3) HEAT operation mode: It is controlled according to the following figure if To >59°F(15°C).  	
18	DC motor	1) When the fan operation has started, positioning of the stator and the rotor are performed. (Moves slightly with tap sound) 2) The motor operates according to the command from the indoor controller. **Notes)** • When the fan rotates while the air conditioner stops due to entering of outside air, etc, the air conditioner may operate while the fan motor stops. • When a fan lock is found, the air conditioner stops, and an error is displayed.	Check code [P12]

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>19</td><td>Self-clean operation (Dry operation)</td><td>1) When cooling operation mode (AUTO COOL, COOL, DRY) stopped, the following three self-clean operations are performed.
<table>
<tr><th>Compressor ON period</th><th>Self-clean operation period</th><th>FAN</th><th>Louver</th></tr>
<tr><td>0 to 10 min.</td><td>None</td><td rowspan="3">450 rpm</td><td rowspan="3">Position of 15° from all closes</td></tr>
<tr><td>10 to 60 min.</td><td>1 hour</td></tr>
<tr><td>60 min. to</td><td>2 hours</td></tr>
</table>
2) During operation of self-clean, ⟲ lights on the wired remote controller screen. However the operation lamp (Green LED) goes off.
3) To stop the self-clean operation, push twice the [ON/OFF] button on the remote controller continuously. (Stop the operation as compressor ON time in the table above: 10 minutes or below.)
4) When the follower unit executes self-clean operation in the group connection, the segment of ⟲ is displayed on the wired remote controller screen via master unit.
∗ If self-clean operation is not used, set invalidity (does not use) of the self-clean operation by changing [0001 (At shipment) of Item code (DN) [D3] to [0000].
∗ To erase the ⟲ display during operation of self-clean, change Item code [D4] from [0000: Display (At shipment)] to [0001: Non-display].</td><td>On the remote controller before the wired remote controller (RBC-AMT32UL), Self-clean operation display is not output. And it is not also on the wireless remote controller.
It is recognized as [STOP] from the remote monitor side.</td></tr>
<tr><td>20</td><td>Save operation (Wired remote controller specific operation)</td><td>1) Turn on SAVE button on the wired remote controller.
2) During operation of save operation, lights on the wired remote controller.
3) During save operation, the current release control is performed with the restriction ratio set in EEPROM on the outdoor unit.
4) The restriction ratio can be set by keeping SAVE button pushed for 4 seconds or more on the remote controller.
5) When validating the save operation, the next operation starts with save operation valid because contents are held even when operation stops, operation mode changes or power supply is reset.
6) The restriction ratio can be set by changing the setup data of CODE No. (DN) [C2] in the range of 50 to 100% (every 1%, Setting at shipment: 75%).</td><td>Carry out setting operation during stop of the unit; otherwise the unit stops operation.
For the setup operation, refer to “How to set up contents of save operation” of “10. SETUP AT LOCAL SITE AND OTHERS”.</td></tr>
<tr><td>21</td><td>Auto restart</td><td>1) Object
It restarts the operation automatically after resetting the unexpected stop of power supply such as power failure.
2) Contents
After returning from a power failure, the auto restart function reads the operation status from EEPROM and then restarts the operation automatically according to the operation contents.
3) Setup of function exchange by wired remote controller
CODE No. (DN): 28
<table>
<tr><th>SET DATA</th><th>0000</th><th>0001</th></tr>
<tr><td>Auto restart</td><td>None (At shipment)</td><td>Provided</td></tr>
</table></td><td></td></tr>
</table>

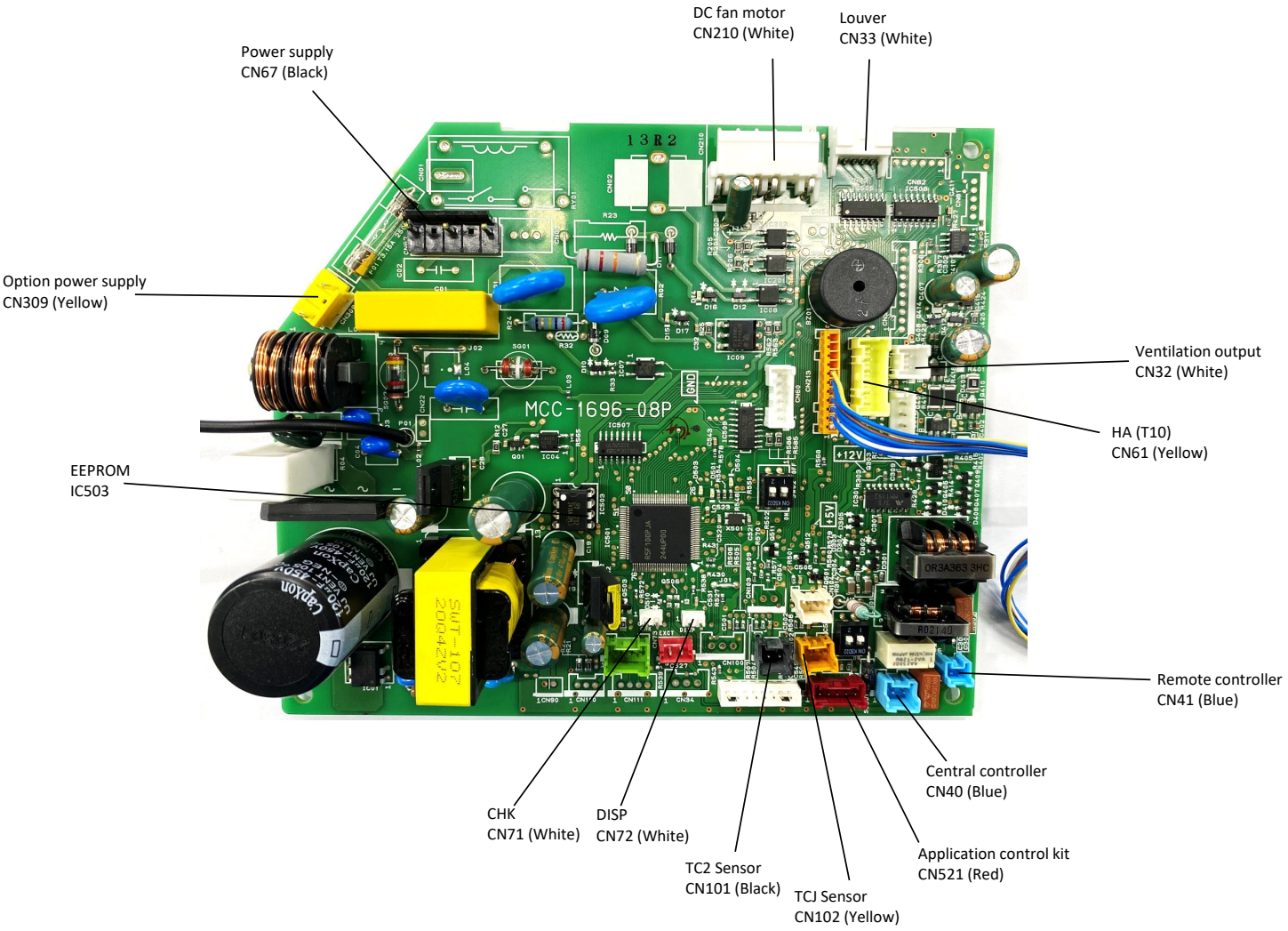
No.	Item	Outline of specifications	Remarks
22	46.4°F(8°C) heating/ Frost protective operation (Wired remote controller specific operations)	1) This functional is intended for the cold latitudes and performs objective heating operation (46.4°F(8°C) heating operation). 2) This function is valid only for combination with the outdoor units (Super Digital Inverter (SDI) 4-series outdoor units). 3) Using the indoor DN code [D1] (1 bit), Valid/Invalid of this function is set up at the customer's side. ∗ The setup by DN code is Invalid [0]/Valid [1] and Invalid [0] has been set at the shipment. 4) This operation is the heating operation which sets 46.4°F(8°C) as the setup temperature of the target. 5) This function starts operation by pushing temperature button (▼) during heating operation; besides by pushing (▼) button for 4 seconds or more after temperature reached the minimum set temperature. 6) To stop/release this operation, select and execute one from the following operations. ① Push (▲) button: Heating operation (64.4°F(18°C) setting) continues. ② Push [START/STOP] button: Air conditioner stops. (Heating 64.4°F(18°C) operation at the next start) ③ Push MODE : Other operation mode is selected and the operation continues. 7) As the setup temperature is 46.4°F(8°C) and the human heating is not targeted, the cold air discharge preventive control (Item 7) is made invalid to suppress the intermittent operation. 8) The settings of the air direction and air volume are changeable during this operation. 9) The indoor fan stops to protect the compressor for 2 minutes after start of heating operation (Thermo-ON) by this function.	In a group connection, if there is even one combination with other unit, "This function is not provided." is displayed. The setup temperature jumps from [18] to [8].
23	Hi POWER operation (Wireless remote controller specific operations)	When you push the Hi POWER button during cooling, heating or AUTO, the air conditioner will start the following operation. • **Cooling operation** Performs the cooling operation at +1.8˚F(+1˚C) lower than the setting temperature. Only when the fan speed before the Hi POWER operation is not high, the fan speed will be increased. • **Heating operation** Performs the heating operation at +3.6˚F(+2˚C) higher than the setting temperature. Only when the fan speed before the Hi POWER operation is not high, the fan speed will be increased.	• [Hi POWER] Display

No.	Item	Outline of specifications	Remarks
24	COMFORT SLEEP operation (Wireless remote controller specific operations)	When you push the COMFORT SLEEP button during cooling, heating or AUTO, the air conditioner will start the following operation. The fan speed display will indicate AUTO and low speed will be used. • **Cooling operation** In the operation suppression zone, where capacity is kept to the minimum, over cooling is prevented by raising the temperature setting by +1.8˚F(+1˚C) after 1 hour and by +3.6˚F(+2˚C) after 2 hours of operation. The room temperature is thus regulated between the operation suppression zone and the set temperature. When the OFF timer is simultaneously set, 1, 3, 5 and 9 hours appear by turns every pushing COMFORT SLEEP button and one of them can be selected for OFF timer. • **Heating operation** In the operation suppression zone, where capacity is kept to the minimum, overheating is prevented by lowering the temperature setting by +1.8˚F(+1˚C) after 1 hour and by +3.6˚F(+2˚C)after 2 hours of operation. The room temperature is thus regulated between the set temperature and the operation suppression zone. When the OFF timer is simultaneously set, 1, 3, 5 and 9 hours appear by turns every pushing COMFORT SLEEP button and one of them can be selected for OFF timer.  	• [ ] display

No.	Item	Outline of specifications	Remarks
25	PRESET operation (Wireless remote controller specific operations)	Start the air conditioner in the operation mode which you want the remote controller to memorize. 1) Push and hold the PRESET button for more than 3 seconds while the display flashes. The mark is indicated and the setting is memorized. • If you do not push the PRESET button within 3 seconds or if you push another button, the memory setting is cancelled. • Operation modes which can be memorized with the PRESET button are MODE, Temperatures, FAN, TIMER and Hi POWER. To operate the air conditioner with the setting memorized by the PRESET button. 1) Push the PRESET button briefly. The setting memorized will be indicated and the air conditioner operates with regards to the setting. • The lamp (green) on the display panel of the indoor unit goes on, and operation starts after approximately 3 minutes. • Initial setting: MODE : AUTO Temperature : 71.6°F(22°C)	• [Ⓟ] display
26	QUIET operation (Wireless remote controller specific operation)	When you push the QUIET button during cooling, heating, fan only or AUTO, the air conditioner will start the following operation. • The fan speed display will indicate AUTO and low speed will be used.	• [ ] display
27	SLEEP operation (Wireless remote controller specific operation)	When the OFF timer is set, 1, 3, 5 and 9 hours appear by turns every pushing SLEEP button and one of them can be selected for OFF timer.	

7-3. Indoor Print Circuit Board (High Wall Type)

<MCC-1696>



High Wall Type P.C. board optional switch/Connector specifications

Function	Connector No.	Pin No.	Specifications	Remarks
Terminator resistor provided/Not provided	SW01	Bit 1	OFF: No terminator resistor, ON: Terminator resistor provided	Setup at shipment OFF: No terminator resistor. Only 1 unit is ON during central control by custom only.
Remote controller A/B		Bit 2	OFF: Remote controller A ON: Remote controller B	Setup at shipment OFF: Remote controller A
Fan output	CN32	1	DC12V	Setup at shipment: Linked operation of ON with operation of indoor unit and OFF with stop * The setup of single operation by FAN button on remote controller is executed from remote controller. (DN = 31)
		2	Output	
HA	CN61	1	Start/Stop input	HA Start/Stop input (J01: Provided/Not provided = Pulse (At shipment from factory)/Static input switch)
		2	0V (COM)	
		3	Handy prohibition input	Operation stop of handy remote controller is permitted / prohibited by input.
		4	Operation output	ON during operation (Answer back of HA)
		5	DC12V (COM)	
		6	Alarm output	ON during output of alarm
Optional output	CN60	1	DC12V (COM)	
		2	Defrost output	ON during defrosting of outdoor unit
		3	Thermo-ON output	ON when Real thermo. ON (Comp. ON)
		4	Cooling output	ON when operation mode is cooling line (Cool, Dry, Cooing/Heating AUTO cooling)
		5	Heating output	ON when operation mode is heating line (Heat, Cooling/Heating AUTO heating)
		6	Fan output	ON when indoor fan is ON
Outside error input	CN80	1	DC12V (COM)	At shipment from factory, the error code “L30” generates and optional error input to stop operation forcedly (DN:2A = 1) is controlled (Display of protection for devices attached to outside) by setup of outside error input (DN:2A = 2) for 1 minute. * Optional error input control is set up on the remote controller.
		2	DC12V (COM)	
		3	Filter/Option/Outside error input	
CHK Operation check	CN71	1	Check mode input	This check is used for operation check of indoor unit. (The specified operation such as indoor fan “H”, drain pump ON, etc. is executed without communication with outdoor unit or remote controller.)
		2	0V	
DISP Display mode	CN72	1	Display mode input	Display mode, communication is enabled by indoor unit and remote controller only. (When power supply is turned on.) Timer short (Usual)
		2	0V	
EXCT Demand	CN73	1	Demand input	Indoor unit forced thermo-OFF operation
		2	0V	

8. TROUBLESHOOTING

8-1. Summary of Troubleshooting

<Wired remote controller type>

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, push pins for reset switch
   - Tester, thermometer, pressure gauge, etc.
2) Confirmation points before check
   a) The following operations are normal.
      1. Compressor does not operate.
         - Is not 3-minutes delay (3 minutes after compressor OFF)?
         - Is not the outdoor unit in standby status though the remote controller reached the setup temperature?
         - Does not timer operate during fan operation?
         - Is not an overflow error detected on the indoor unit?
         - Is not outside high-temperature operation controlled in heating operation?
      2. Indoor fan does not rotate.
         - Does not cool air discharge preventive control work in heating operation?
      3. Outdoor fan does not rotate or air volume changes.
         - Does not high-temperature release operation control work in heating operation?
         - Does not outside low-temperature operation control work in cooling operation?
         - Is not defrost operation performed?
      4. ON/OFF operation cannot be performed from remote controller.
         - Is not the control operation performed from outside/remote side?
         - Is not automatic address being set up?
           (When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)
         - Is not being carried out a test run by operation of the outdoor controller?
   b) Did you return the wiring to the initial positions?
   c) Are connecting wires of indoor unit and remote controller correct?

2. Troubleshooting procedure

When a trouble occurred, check the parts along with the following procedure.

Trouble → **Confirmation of check code display** → **Check defective position and parts.**

NOTE :

For cause of a trouble, power conditions or malfunction/erroneous diagnosis of microcomputer due to outer noise is considered except the items to be checked.

If there is any noise source, change the cables of the remote controller to shield cables.

<Wireless remote controller type>

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, etc.
   - Tester, thermometer, pressure gauge, etc.
2) Confirmation points before check
   a) The following operations are normal.
      1. Compressor does not operate.
         - Is not 3-minutes delay (3 minutes after compressor OFF)?
         - Is not the outdoor unit in standby status though the remote controller reached the setup temperature?
         - Does not timer operate during fan operation?
         - Is not an overflow error detected on the indoor unit?
         - Is not outside high-temperature operation controlled in heating operation?
      2. Indoor fan does not rotate.
         - Does not cool air discharge preventive control work in heating operation?
      3. Outdoor fan does not rotate or air volume changes.
         - Does not high-temperature release operation control work in heating operation?
         - Does not outside low-temperature operation control work in cooling operation?
         - Is not defrost operation performed?
      4. ON/OFF operation cannot be performed from remote controller.
         - Is not forced operation performed?
         - Is not the control operation performed from outside/remote side?
         - Is not automatic address being set up?
         - Is not being carried out a test run by operation of the outdoor controller?
   b) Did you return the wiring to the initial positions?
   c) Are connecting wires between indoor unit and receiving unit correct?

2. Troubleshooting procedure

(When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)

When a trouble occurred, check the parts along with the following procedure.

1) Outline of judgment

   The primary judgment to check where a trouble occurred in indoor unit or outdoor unit is performed with the following method.

Method to judge the erroneous position by flashing indication on the display part of indoor unit (sensors of the receiving unit)

The indoor unit monitors operating status of the air conditioner, and the blocked contents of self-diagnosis are displayed restricted to the following cases if a protective circuit works.

8-2. Troubleshooting (High Wall Type)

8-2-1. Outline of judgment

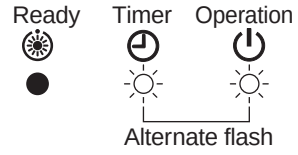
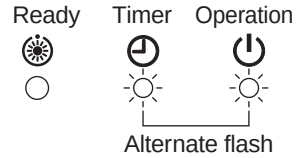
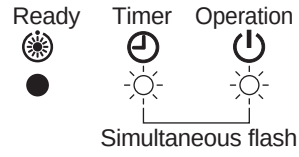
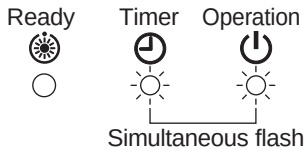
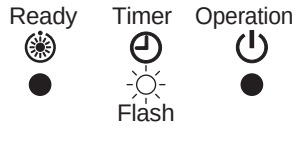
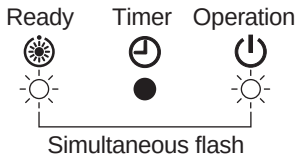
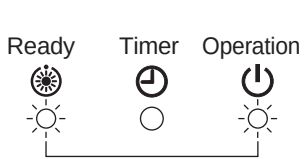
The primary judgment to check whether a trouble occurred in the indoor unit or outdoor unit is carried out with the following method.

Method to judge the erroneous position by flashing indication on the display part of the indoor unit
The indoor unit monitors the operating status of the air conditioner, and the blocked contents of self-diagnosis are displayed restricted to the following cases if a protective circuit works.

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

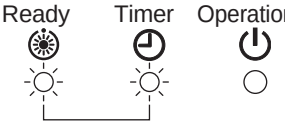
Lamp indication	Check code	Cause of trouble occurrence
Ready ● Timer ● Operation ● No indication at all	—	Power supply OFF or miswiring between receiving unit and indoor unit
Ready ● Timer ● Operation ☼ Flash	E01	Receiving error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit
	E02	Sending error
	E03	Communication stop
	E08	Duplicated indoor unit No. } Setup error
	E09	Duplicated master units of remote controller
	E10	Communication error between CPUs on indoor unit P.C. board
	E18	Wire connection error between indoor units, Indoor power OFF (Communication stop between indoor master and follower or between main and sub indoor twin)
Ready ☼ Timer ● Operation ● Flash	E04	Miswiring between indoor unit and outdoor unit or connection erorr (Communication stop between indoor and outdoor units)
Ready ☼ Timer ☼ Operation ● Alternate flash	P01	Indoor AC fan error } Protective device of indoor unit worked.
	P10	Overflow was detected.
	P12	Indoor DC fan error
Ready ☼ Timer ● Operation ☼ Alternate flash	P03	Outdoor unit discharge temp. error Outdoor high pressure system error } Protective device of outdoor unit worked. ∗1
	P04	Case thermostat worked Power supply error
	P05	Power supply error } Outdoor unit error
	P07	Heat sink overheat error
	P15	Gas leak detection error
	P19	4-way valve system error (Indoor or outdoor unit judged.)
	P20	Outdoor unit high pressure protection
	P22	Outdoor unit: Outdoor unit error } Protective device of outdoor unit worked. ∗1
	P26	Outdoor unit: Inverter Idc operation
	P29	Outdoor unit: Position detection error
	P31	Stopped because of error of other indoor unit in a group (Check codes of E03/L03/L07/L08)

∗1: These are representative examples and the check code differs according to the outdoor unit to be combined.

Lamp indication	Check code	Cause of trouble occurrence
	F01	Heat exchanger sensor (TCJ) error } Indoor unit sensor error
	F02	Heat exchanger sensor (TC) error
	F10	Heat exchanger sensor (TA) error
	F04	Discharge temp. sensor (TD) error } Sensor error of outdoor unit ∗1
	F06	Temp. sensor (TL, TS, TE) error
	F07	Temp. sensor (TD) error
	F08	Temp. sensor (TO) error
	F12	Temp. sensor (TS) error
	F13	Heat sink sensor (TH) error
	F15	Temp. sensor miswiring (TE, TS)
	F29	Indoor EEPROM error
	F31	Outdoor EEPROM error
	H01	Compressor break down } Outdoor compressor system error ∗1
	H02	Compressor lock
	H03	Current detection circuit error } Power supply, outdoor P.C. board error
	H04	Case thermostat worked. } Compressor overheat, outdoor wiring error
	L03	Duplicated master indoor units
	L07	There is indoor unit of group connection in individual indoor unit. → AUTO address ∗ If group construction and address are not normal when power supply turned on, automatically goes to address setup mode.
	L08	Unsetting of group address
	L09	Missed setting (Unset indoor capacity)
	L10	Unset model type (Service board)
	L20	Duplicated indoor central addresses
	L29	Temp. sensor (TH) error EEPROM error Communication between outdoor MCU Heat sink overheat error Gas leak detection error 4-way valve error
	L30	Outside interlock error

∗1: These are representative examples and the check code differs according to the outdoor unit to be combined.

8-2-2. Others (Other than Check Code)

Lamp indication	Check code	Cause of trouble occurrence
Ready Timer Operation  Simultaneous flash	—	During test run
Ready Timer Operation  Alternate flash	—	Disagreement of cool/heat (Automatic cool/heat setting to automatic cool/heat prohibited model, or setting of heating to cooling-only model)

8-2-3. Check Code List (Indoor)

○ : Go on, ◎ : Flash, ● : Go off ALT (Alternate): Alternate flashing when there are two flashing LED SIM (Simultaneous): Simultaneous flashing when there are two flashing LED

(Indoor unit detected)

Check code indication	Sensor lamp indication				Representative defective position	Explanation of error contents	Air conditioner operation	
Wired remote controller	Block indication						Automatic reset	Operation continuation
	Ready	Timer	Operation	Flash				
E03	●	●	◎		Regular communication error between indoor and remote controller	No communication from remote controller and network adapter (Also no communication from central control system)	○	×
E04	◎	●	●		Indoor/Outdoor serial error	There is error on serial communication between indoor and outdoor units	○	×
E08	●	●	◎		Duplicated indoor addresses ✧	Same address as yours was detected.	○	×
E18	●	●	◎		Regular communication error between indoor master and follower units	Regular communication between indoor master and follower units is impossible, Communication between twin master (main) and follower (sub) units is impossible.	○	×
F01	●	◎	◎	ALT	Indoor unit, Heat exchanger (TCJ) error	Open/short was detected on heat exchanger (TCJ).	○	×
F02	●	◎	◎	ALT	Indoor unit, Heat exchanger (TC) error	Open/short was detected on heat exchanger (TC).	○	×
F10	●	◎	◎	ALT	Indoor unit, Room temp. sensor (TA) error	Open/short was detected on room temp. sensor (TA).	○	×
F29	●	◎	◎	SIM	Indoor unit, other indoor P.C. board error	EEPROM error (Other error may be detected. If no error, automatic address is repeated.	×	×
L03	◎	●	◎	SIM	Duplicated setting of indoor group master unit ✧	There are multiple master units in a group.	×	×
L07	◎	●	◎	SIM	There is group cable in individual indoor unit. ✧	When even one group connection indoor unit exists in individual indoor unit.	×	×
L08	◎	●	◎	SIM	Unset indoor group address ✧	Indoor group address is unset.	×	×
L09	◎	●	◎	SIM	Unset indoor capacity	Capacity of indoor unit is unset.	×	×
L20	◎	○	◎	SIM	Duplicated central control system address	Duplicated setting of central control system address	○	×
L30	◎	○	◎	SIM	Outside error input to indoor unit (Interlock)	Abnormal stop by outside error (CN80) input	×	×
P12	◎	◎	●	ALT	Indoor unit, DC fan error	Indoor DC fan error (Over-current/Lock, etc.) was detected.	×	×
P19	◎	●	◎	ALT	4-way valve system error	In heating operation, an error was detected by temp. down of indoor heat exchanger sensor.	○	×
P31	◎	●	◎	ALT	Other indoor unit error	Follower unit in group cannot operate by warning from [E03/L03/L07/L08] of master unit.	○	×

✧ When this warning was detected before group construction/address check finish at power supply was turned on, the mode shifts automatically to AUTO address setup mode.

(Remote controller detected)

Check code indication	Sensor lamp indication				Representative defective position	Explanation of error contents	Air conditioner operation	
Wired remote controller	Block indication						Automatic reset	Operation continuation
	Ready	Timer	Operation	Flash				
E01	●	●	◎		No master remote controller, Remote controller communication (Receive) error	Signal cannot be received from indoor unit. Master remote controller was not set. (including 2 remote controllers)	—	—
E02	●	●	◎		Remote controller communication (Send) error	Signal cannot be sent to indoor unit.	—	—
E09	●	●	◎		Duplicated master remote controller	In 2-remote controller control, both were set as master. (Indoor master unit stops warning and follower unit continues operation.)	×	△

(Central control devices detected)

Check code indication	Sensor lamp indication	Representative defective position	Explanation of error contents	Air conditioner operation	
TCC-LINK central	Block indication			Automatic reset	Operation continuation
	Ready Timer Operation Flash				
C05	Is not displayed. (Common use of remote controller, etc.)	Central control system communication (send) error	Signal sending operation of central control system is impossible. There are multiple same central devices. (AI-NET)	—	—
C06		Central control system communication (receive) error	Signal receiving operation of central control system is impossible.	—	—
C12	—	General-purpose device control interface batched warning	An error on device connected to general-purpose device control interface of exclusive to TCC-LINK/AI-NET	—	—
P30	By warning unit (Above-mentioned)	Group follower unit is defective.	Group follower unit is defective. (For remote controller, above-mentioned [***] details are displayed with unit No.	—	—

NOTE: Even for the same contents of error such as communication error, the display of check code may differ according to detection device.
When remote controller or central controller detects an error, it is not necessarily related to operation of the air conditioner. In this list, the check codes that outdoor unit detects are not described.

Error mode detected by indoor unit

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
E03	No communication from remote controller (including wireless) and communication adapter	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller and communication adapters. • Remote controller LCD display OFF (Disconnection) • Central remote controller [97] check code
E04	The serial signal is not output from outdoor unit to indoor unit. • Miswiring of inter-unit wire • Defective serial sending circuit on outdoor P.C. board • Defective serial receiving circuit on indoor P.C. board	Stop (Automatic reset)	Displayed when error is detected	1. Outdoor unit does not completely operate. • Inter-unit wire check, correction of miswiring • Check outdoor P.C. board. Correct wiring of P.C. board. 2. When outdoor unit normally operates Check P.C. board (Indoor receiving / Outdoor sending).
E08	Duplicated indoor unit address	Stop	Displayed when error is detected	1. Check whether remote controller connection (Group/Individual) was changed or not after power supply turned on (Finish of group construction/Address check). * If group construction and address are not normal when the power has been turned on, the mode automatically shifts to address setup mode. (Resetting of address)
E18	Regular communication error between indoor aster and follower units and between main and sub units	Stop (Automatic reset)	Displayed when error is detected	1. Check remote controller wiring. 2. Check indoor power supply wiring. 3. Check indoor P.C. board.
F01	Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TCJ)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temp. sensor (TCJ). 2. Check indoor P.C. board.
F02	Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TC)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temp. sensor (TC). 2. Check indoor P.C. board.
F10	Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TA)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temp. sensor (TA). 2. Check indoor P.C. board.
F29	Indoor EEPROM error • EEPROM access error	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor EEPROM. (including socket insertion) 2. Check indoor P.C. board.
L03	Duplicated indoor master unit	Stop	Displayed when error is detected	1. Check whether remote controller connection (Group/Individual) was changed or not after power supply turned on (Finish of group construction/Address check). * If group construction and address are not normal when the power has been turned on, the mode automatically shifts to address setup mode. (Resetting of address)
L07	There is group wire in individual indoor unit.			
L08	Unset indoor group address			
L09	Unset indoor capacity	Stop	Displayed when error is detected	1. Set indoor capacity (DN=11)
L30	Abnormal input of outside interlock	Stop	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board.
P12	Indoor DC fan error	Stop	Displayed when error is detected	1. Position detection error 2. Over-current protective circuit of indoor fan driving unit operated. 3. Indoor fan locked. 4. Check indoor P.C. board.
P19	4-way valve system error • After heating operation has started, indoor heat exchangers temp. is down.	Stop (Automatic reset)	Displayed when error is detected	1. Check 4-way valve. 2. Check 2-way valve and check valve. 3. Check indoor heat exchanger (TC/TCJ). 4. Check indoor P.C. board.
P31	Own unit stops while warning is output to other indoor units.	Stop (Follower unit) (Automatic reset)	Displayed when error is detected	1. Judge follower unit while master unit is [E03], [L03], [L07] or [L08]. 2. Check indoor P.C. board.

Error mode detected by remote controller or central controller (TCC-LINK)

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
Not displayed at all (Operation on remote controller is impossible.)	No communication with master indoor unit • Remote controller wiring is not correct. • Power of indoor unit is not turned on. • Automatic address cannot be completed.	Stop	—	Power supply error of remote controller, Indoor EEPROM error 1. Check remote controller inter-unit wiring. 2. Check remote controller. 3. Check indoor power wiring. 4. Check indoor P.C. board. 5. Check indoor EEPROM. (including socket insertion) → Automatic address repeating phenomenon generates.
E01 ∗2	No communication with master indoor unit • Disconnection of inter-unit wire between remote controller and master indoor unit (Detected by remote controller side)	Stop (Automatic reset) ∗ If center exists, operation continues.	Displayed when error is detected	Receiving error from remote controller 1. Check remote controller inter-unit wiring. 2. Check remote controller. 3. Check indoor power wiring. 4. Check indoor P.C. board.
E02	Signal send error to indoor unit (Detected by remote controller side)	Stop (Automatic reset) ∗ If center exists, operation continues.	Displayed when error is detected	Sending error of remote controller 1. Check sending circuit inside of remote controller. → Replace remote controller.
E09	There are multiple main remote controllers. (Detected by remote controller side)	Stop (Sub unit continues operation.)	Displayed when error is detected	1. In 2-remote controllers (including wireless), there are multiple main units. Check that there are 1 main remote controller and other sub remote controllers.
L20 Central controller L20	Duplicated indoor central addresses on communication of central control system (Detected by indoor/central controller side)	Stop (Automatic reset)	Displayed when error is detected	1. Check setting of central control system network address. (Network adapter SW01) 2. Check network adapter P.C. board.
— ∗3 Central controller (Send) C05 (Receive) C06	Communication circuit error of central control system (Detected by central controller side)	Continues (By remote controller)	Displayed when error is detected	1. Check communication wire / miswiring 2. Check communication (U3, U4 terminals) 3. Check network adapter P.C. board. 4. Check central controller (such as central control remote controller, etc.) 5. Check terminal resistance. (TCC-LINK)
— Central controller P30	Indoor Gr sub unit error (Detected by central controller side)	Continuation/Stop (According to each case)	Displayed when error is detected	Check the check code of the corresponding unit from remote controller.

∗2 The check code cannot be displayed by the wired remote controller. (Usual operation of air conditioner becomes unavailable.)
For the wireless models, an error is notified with indication lamp.

∗3 This trouble is related to communication of remote controller (A, B), central system (TCC-LINK U3, U4), and [E01], [E02], [E03], [E09] or [E18] is displayed or no check display on the remote controller according to the contents.

Error mode detected by outdoor unit

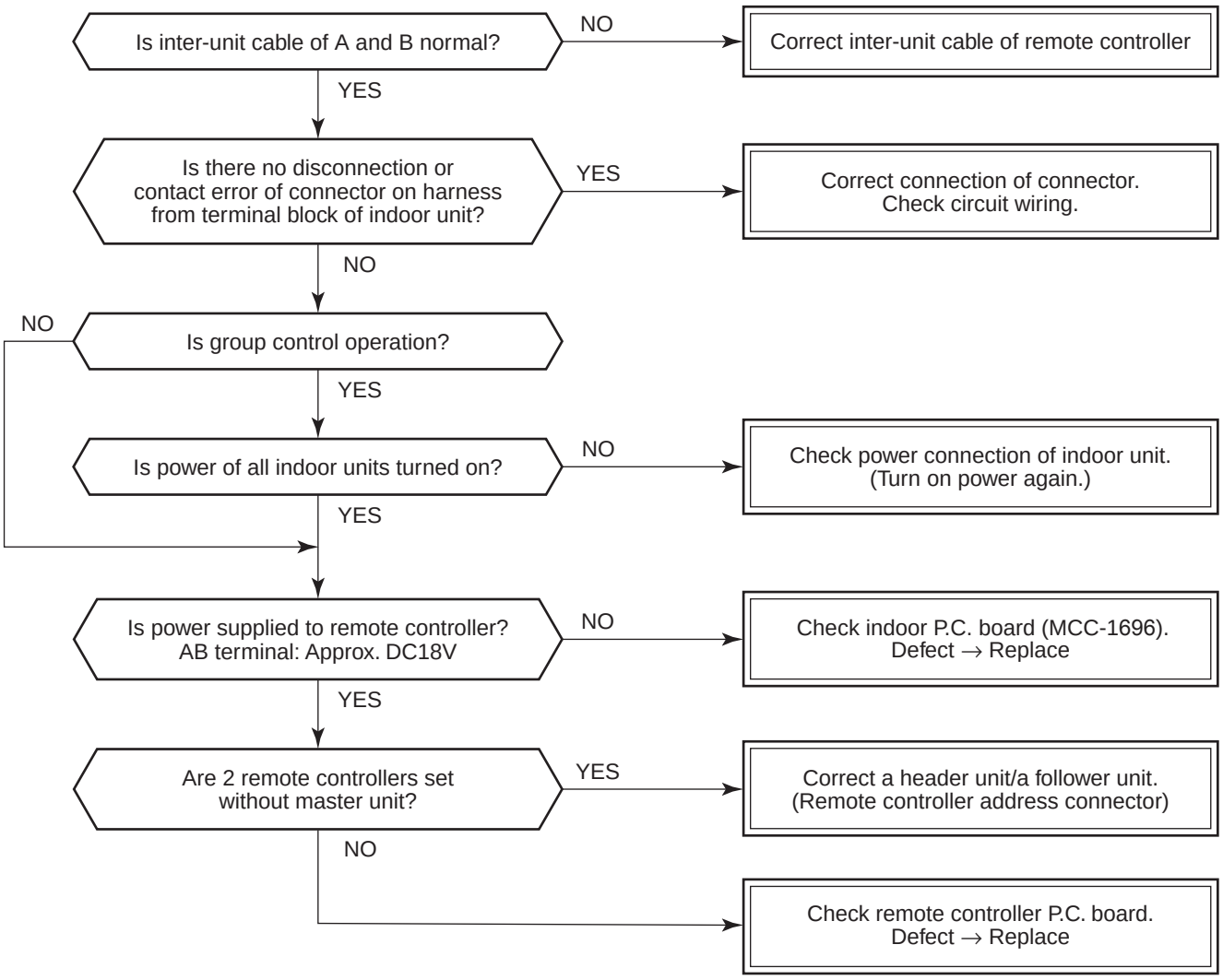
Operation of diagnostic function				Judgment and measures
Check code / Indoor unit / High Wall	Cause of operation	Status of air conditioner	Condition	
F04	Disconnection, short of discharge temp. sensor (TD)	Stop	Displayed when error is detected	1. Check discharge temp. sensor (TD). 2. Check outdoor P.C. board.
F06	Disconnection, short of outdoor temp. sensor (TE)	Stop	Displayed when error is detected	1. Check temp. sensor (TE). 2. Check outdoor P.C. board.
F07	Disconnection, short of outdoor temp. sensor (TL)	Stop	Displayed when error is detected	1. Check temp. sensor (TL). 2. Check outdoor P.C. board.
F08	Disconnection, short of outside temp. sensor (TO)	Continue	Displayed when error is detected	1. Check outside temp. sensor (TO). 2. Check outdoor P.C. board.
F12	Disconnection, short of suction temp. sensor (TS)	Stop	Displayed when error is detected	1. Check suction temp. sensor (TS). 2. Check outdoor P.C. board.
F13	Disconnection, short of heat sink temp. sensor (TH)	Stop	Displayed when error is detected	1. Check outdoor P.C. board.
F15	Miss-mounting of outdoor temp. sensor (TE, TS)	Stop	Displayed when error is detected	1. Check temp. sensor (TE, TS). 2. Check outdoor P.C. board.
F31	Outdoor P.C. EEPROM error	Stop	Displayed when error is detected	1. Check outdoor P.C. board.
H01	Compressor break down * Although operation has started, operation frequency decreases and operation stops.	Stop	Displayed when error is detected	1. Check power supply voltage. (AC208V/230V ±10V) 2. Overload operation of refrigerating cycle
H02	Compressor lock * Over-current detection after compressor start-up	Stop	Displayed when error is detected	1. Trouble of compressor (Lock, etc.): Replace compressor. 2. Wiring error of compressor (Open phase)
H03	Current detection circuit error	Stop	Displayed when error is detected	1. Check outdoor P.C. board. (AC current detection circuit)
H04	Case thermostat operation * Abnormal overheat of compressor	Stop	Displayed when error is detected	1. Check case thermostat and connector. 2. Check gas leak, recharge 3. Check full open of service valve. 4. Check PMV (Pulse Motor Valve). 5. Check broken pipe.
L10	Unset jumper of service P.C. board	Stop	Displayed when error is detected	1. Outdoor service P.C. board Check model type setting jumper wire.
L29	Communication error between outdoor P.C. board MCU	Stop	Displayed when error is detected	1. Check outdoor P.C. board.

Operation of diagnostic function				Judgment and measures
Check code **Indoor unit** **High Wall**	**Cause of operation**	**Status of air conditioner**	**Condition**	
P03	Discharge temp. error * Discharge temp. (TD) over specified value was detected.	Stop	Displayed when error is detected	1. Check refrigerating cycle (Gas leak). 2. Trouble of electronic expansion valve. 3. Check discharge temp. sensor (TD).
P04	High pressure system error	Stop	Displayed when error is detected	1. Freezing cycle overload operation. 2. Check outdoor heat exchange sensor (TE). 3. Check outdoor P.C. board. 4. Check high-pressure switch and circuit.
P05	Power supply voltage error	Stop	Displayed when error is detected	1. Check power supply voltage. (AC208V/230V ±10V)
P07	Heat sink overheat error * Heat sink temp. sensor detected over specified temperature.	Stop	Displayed when error is detected	1. Check screw tightening between PC. Board and heat sink and check radiator grease. 2. Check heat sink blast path.
P15	Detection of gas leak * Discharge temp. sensor (TD), Suction temp. sensor (TS) detected temperature over specified temp.	Stop	Displayed when error is detected	1. Check gas leak, recharge. 2. Check full open of service valve. 3. Check PMV (Pulse Motor Valve). 4. Check broken pipe. 5. Check discharge temp. sensor (TD), suction temp. sensor (TS).
P19	4-way valve inverse error * After heating operation has started, indoor heat exchanger temp. lowers under the specified temp. * After heating operation has started, outdoor heat exchanger / suction temp. rises over the specified temp.	Stop	Displayed when error is detected	1. Check operation of 4-way valve. 2. Check outdoor heat exchanger (TE), suction temp. sensor (TS). 3. Check indoor heat exchanger sensor (TC). 4. Check 4-way valve coil. 5. Check PMV (Pulse Motor Valve).
P20	High pressure protective operation • During cooling operation, outdoor temp. sensor (TL) detected temperature over specified temp. • During heating operation, indoor temp. sensor (TC, TCJ) detected temperature over specified temp.	Stop	Displayed when error is detected	1. Check outdoor heat exchanger sensor (TL). 2. Check indoor heat exchanger sensor (TC, TCJ). 3. Check full open of service valve. 4. Check indoor/outdoor fan. 5. Check PMV (Pulse Motor Valve). 6. Check clogging and short circuit of indoor/outdoor heat exchanger. 7. Overcharge of refrigerant. Recharge
P22	Outdoor fan system error	Stop	Displayed when error is detected	1. Check lock of fan motor. 2. Check power supply voltage. (AC208V/230V ±10V) 3. Check outdoor P.C. board.
P26	Short-circuit error of compressor driving element	Stop	Displayed when error is detected	1. When performing operation while taking-off compressor wire, P26 error occurs. Check control P.C. board. 2. When performing operation while taking-off compressor wire, an error does not occur. (Compressor rare short)
P29	Position detection circuit error	Stop	Displayed when error is detected	1. Check control P.C. board.

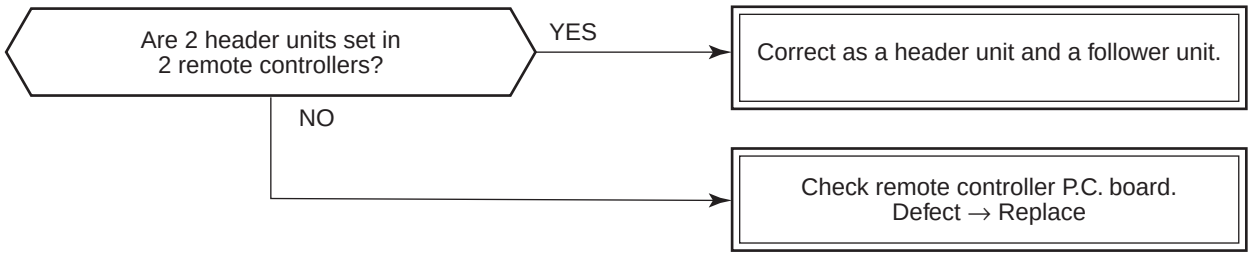
8-2-4. Diagnostic Procedure for Each Check Code (Indoor Unit)

Check code

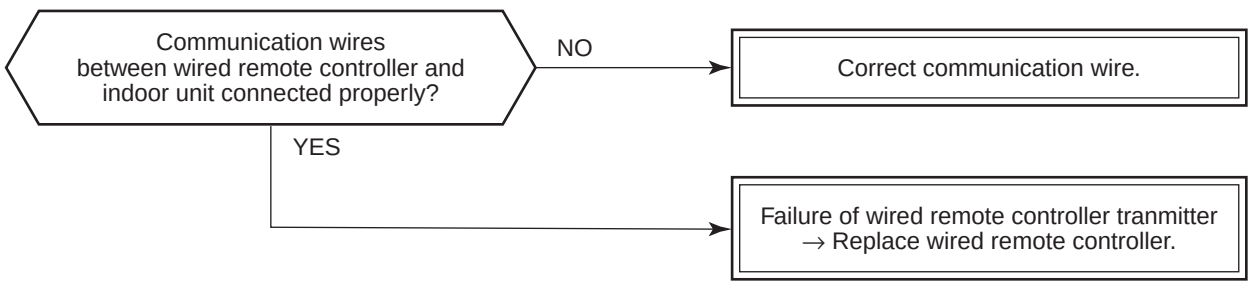
[E01 error]



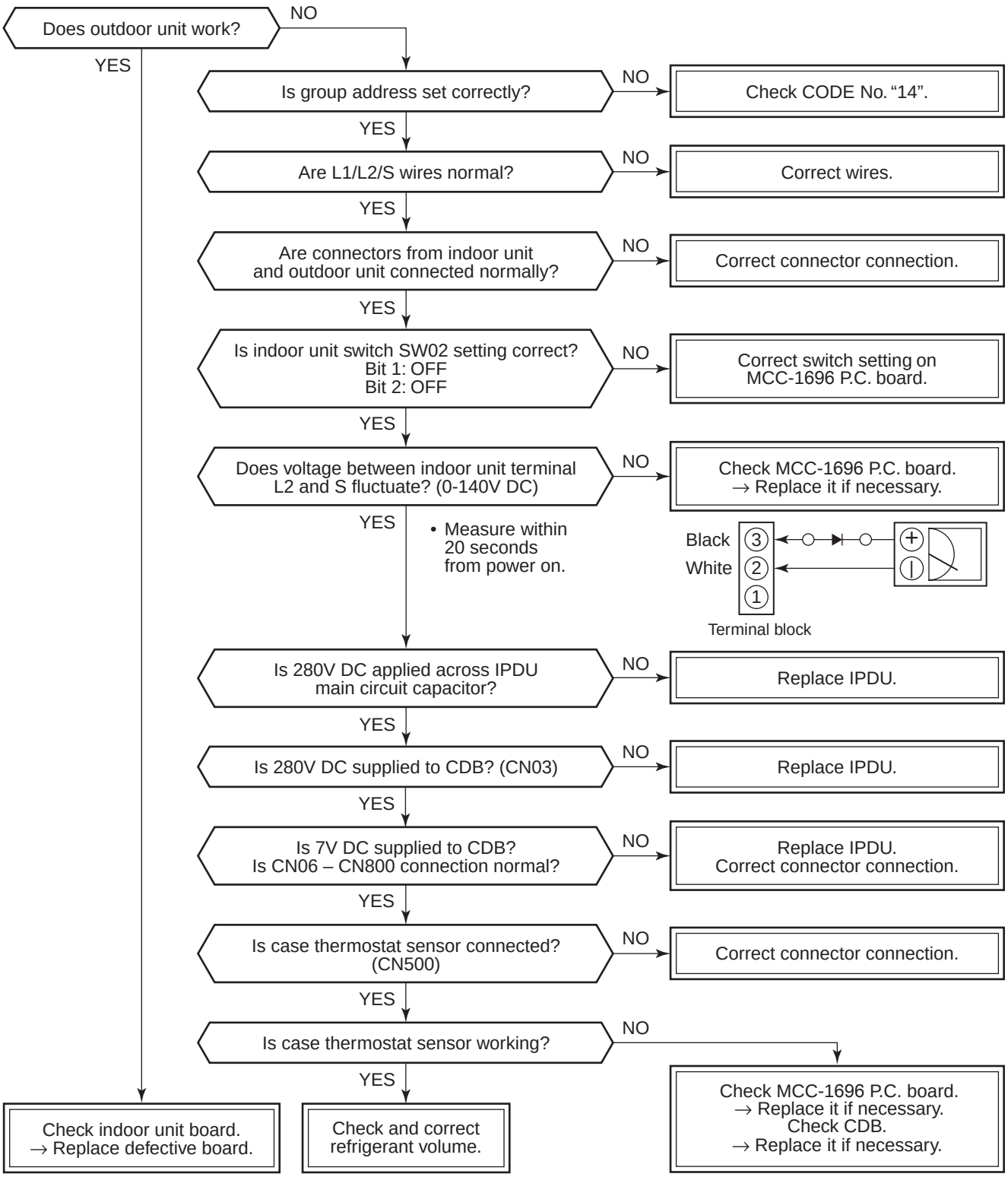
[E09 error]



[E02 error]

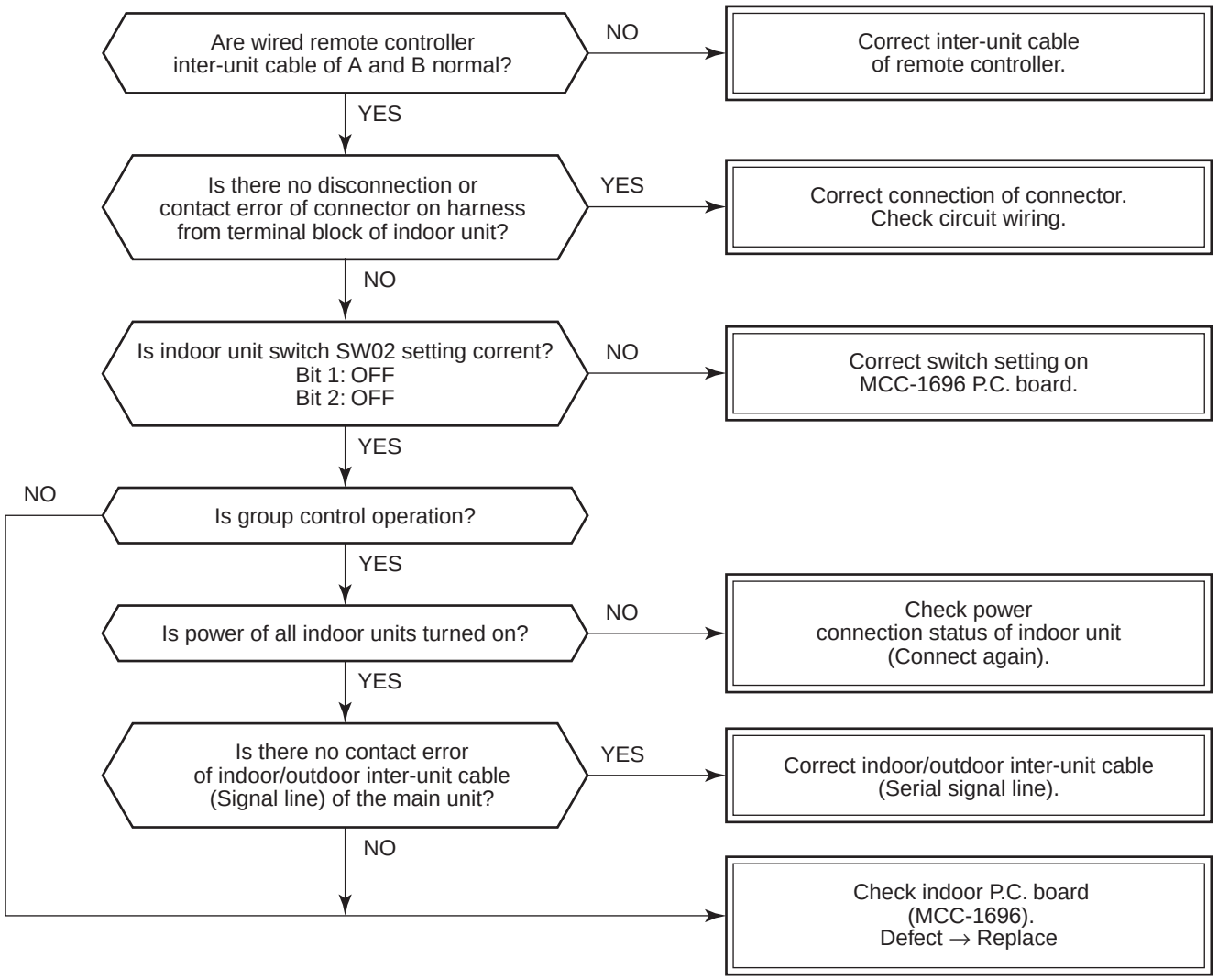


[E04 error]



[E10 error]

[E18 error]



[E08, L03, L07, L08 error]

E08: Duplicated indoor unit No.

L03: There are 2 or more master units in a group control.

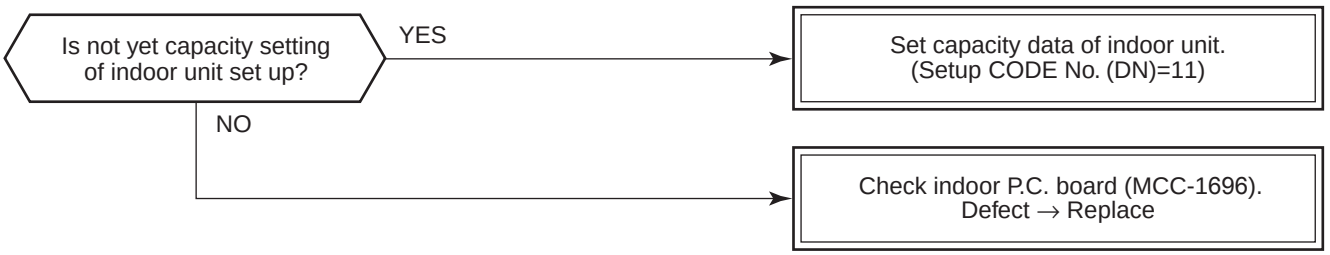
L07: There is 1 or more group address [Individual] in a group control.

L08: The indoor group address is unset. (**11. ADDRESS SETUP**)

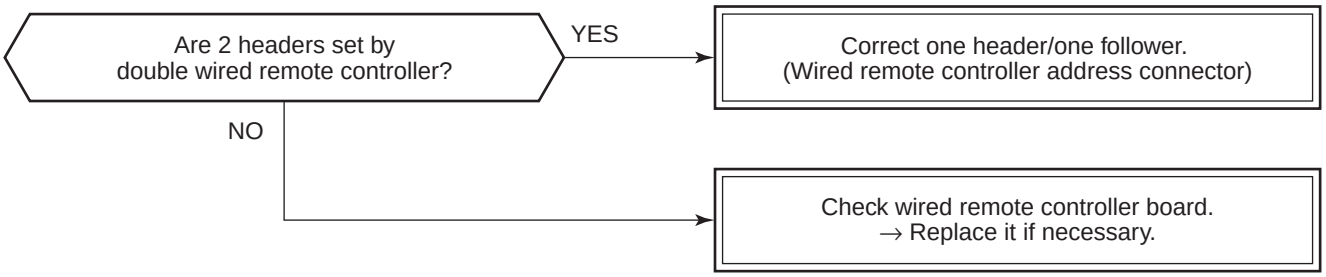
If the above error is detected when power supply turned on, the mode enters automatically in the automatic address set mode. (Check code is not output.)

However, if the above error is detected during the automatic address set mode, a check code may be output.

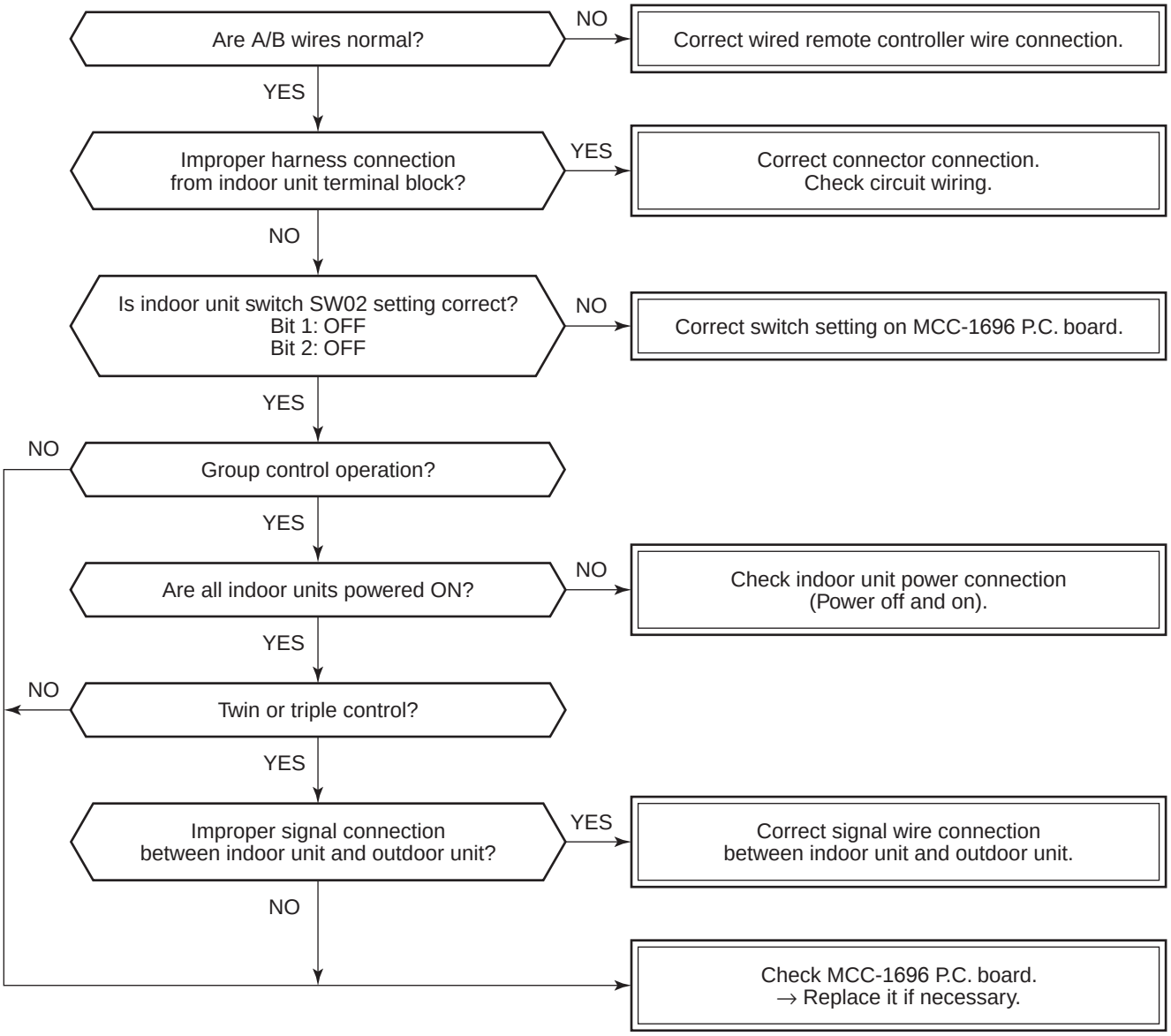
[L09 error]



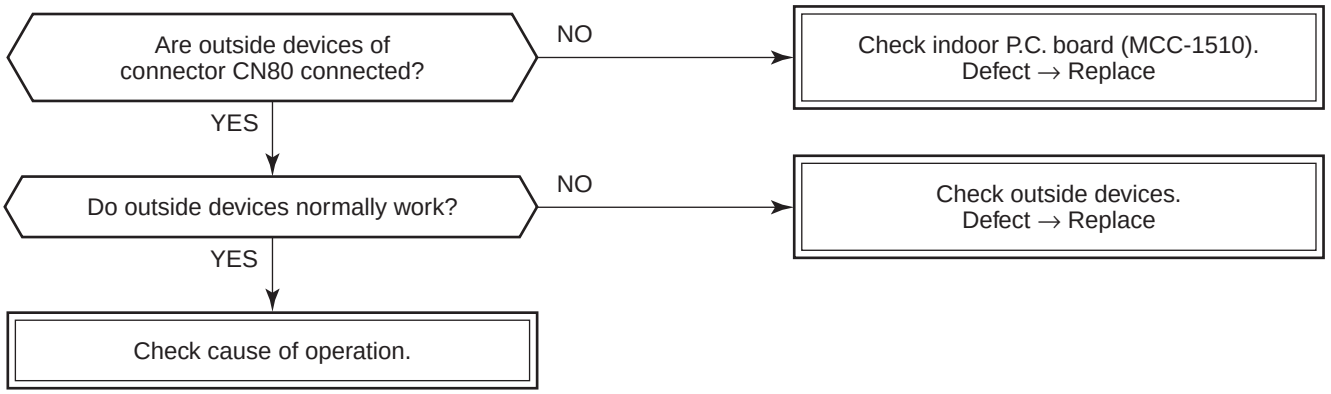
[E09 error]



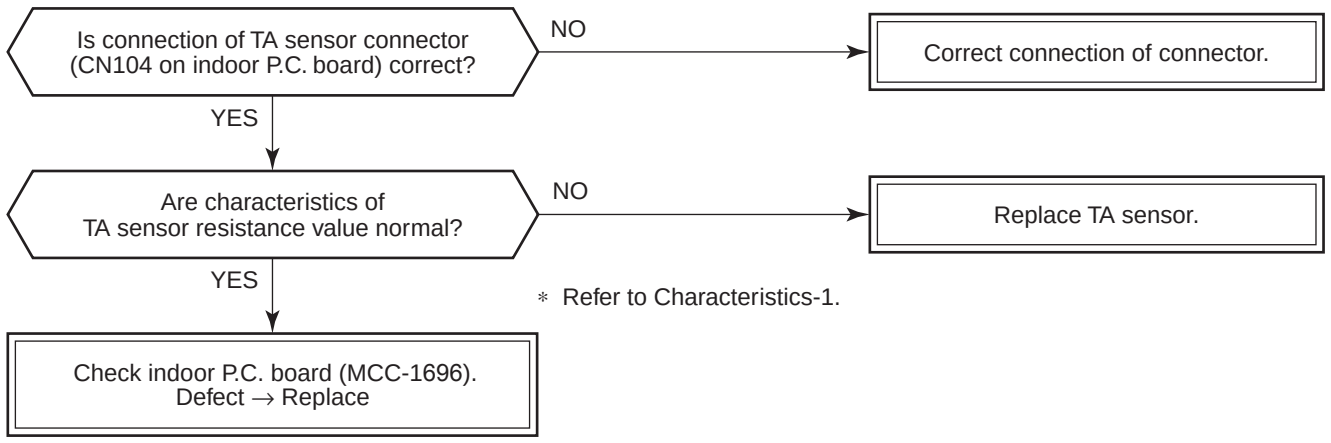
[E18 error]



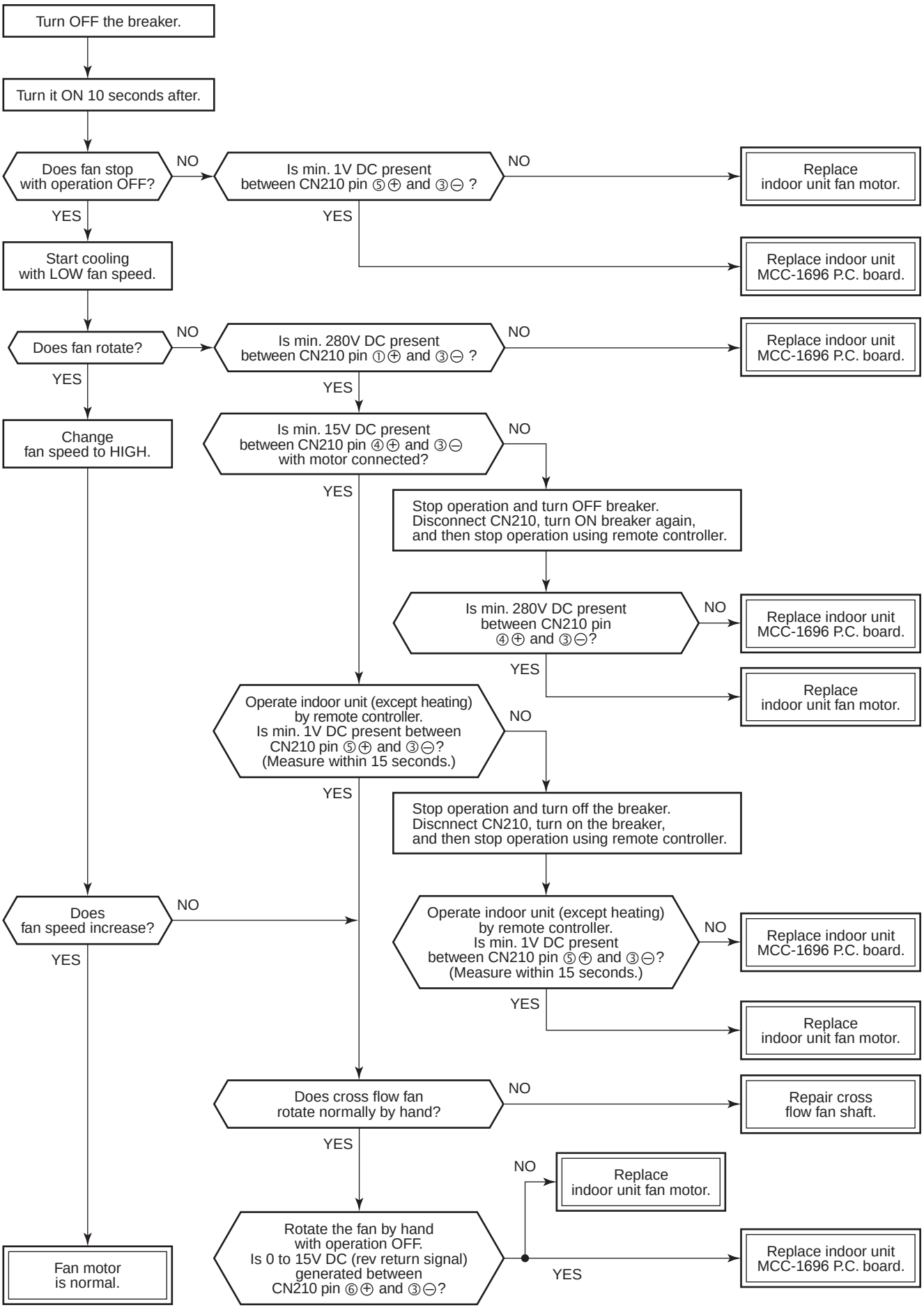
[L30 error]



[F10 error]

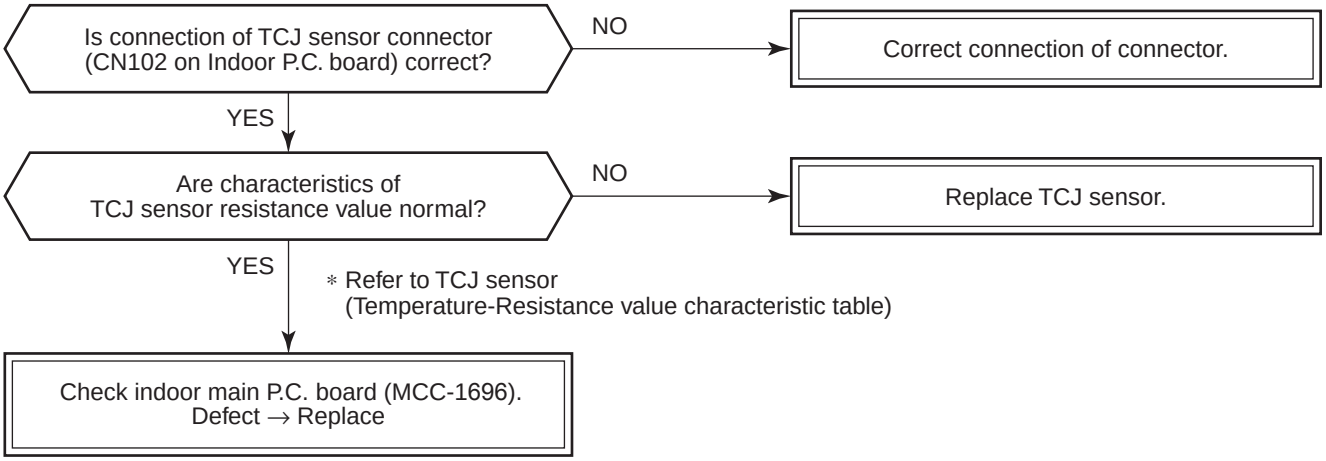


[P12 error]


Turn OFF the breaker.
Turn it ON 10 seconds after.
Does fan stop with operation OFF?
NO
Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖ ?
NO
Replace indoor unit fan motor.
YES
YES
Start cooling with LOW fan speed.
Replace indoor unit MCC-1696 P.C. board.
Does fan rotate?
NO
Is min. 280V DC present between CN210 pin ①⊕ and ③⊖ ?
NO
Replace indoor unit MCC-1696 P.C. board.
YES
YES
Change fan speed to HIGH.
Is min. 15V DC present between CN210 pin ④⊕ and ③⊖ with motor connected?
NO
YES
Stop operation and turn OFF breaker. Disconnect CN210, turn ON breaker again, and then stop operation using remote controller.
Is min. 280V DC present between CN210 pin ④⊕ and ③⊖?
NO
Replace indoor unit MCC-1696 P.C. board.
YES
Replace indoor unit fan motor.
Operate indoor unit (except heating) by remote controller. Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖? (Measure within 15 seconds.)
NO
YES
Stop operation and turn off the breaker. Discnnect CN210, turn on the breaker, and then stop operation using remote controller.
Does fan speed increase?
NO
Operate indoor unit (except heating) by remote controller. Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖? (Measure within 15 seconds.)
NO
Replace indoor unit MCC-1696 P.C. board.
YES
YES
Replace indoor unit fan motor.
Does cross flow fan rotate normally by hand?
NO
Repair cross flow fan shaft.
YES
NO
Replace indoor unit fan motor.
Rotate the fan by hand with operation OFF. Is 0 to 15V DC (rev return signal) generated between CN210 pin ⑥⊕ and ③⊖?
YES
Replace indoor unit MCC-1696 P.C. board.
Fan motor is normal.

[F02 error]

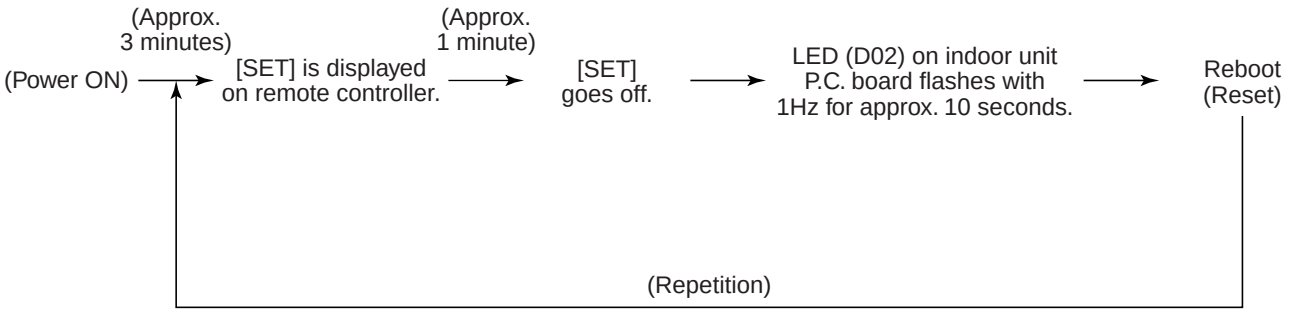
[F01 error]



[F29 error]

This check code indicates a detection error of IC10 non-volatile memory (EEPROM) on the indoor unit P.C. board, which generated during operation of the air conditioner. Replace the service P.C. board.

∗ When EEPROM was not inserted when power supply turned on or when the EEPROM data read/write operation is impossible at all, the automatic address mode is repeated. In this time, [97 error] is displayed on the central controller.



[P31 error] (Follower indoor unit)

When the header unit of a group operation detected [E03], [L03], [L07] or [L08] error, the follower unit of the group operation detects [P31 error] and then the unit stops.

There is no display of the CODE No. or alarm history of the remote controller. (In this model, the mode enters in automatic address set mode when the header unit detected [L03], [L07] or [L08] error.)

Temperature sensor Temperature – Resistance value characteristic table

TA, TC, TCJ, TE, TS, TO sensors

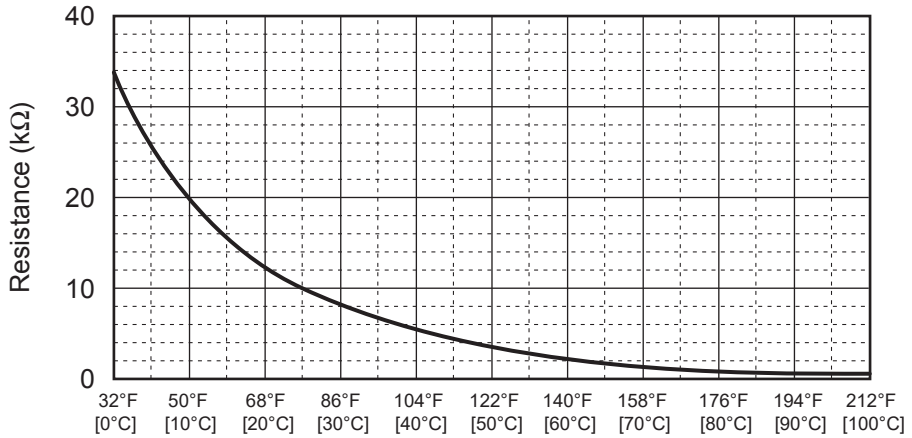
Representative value

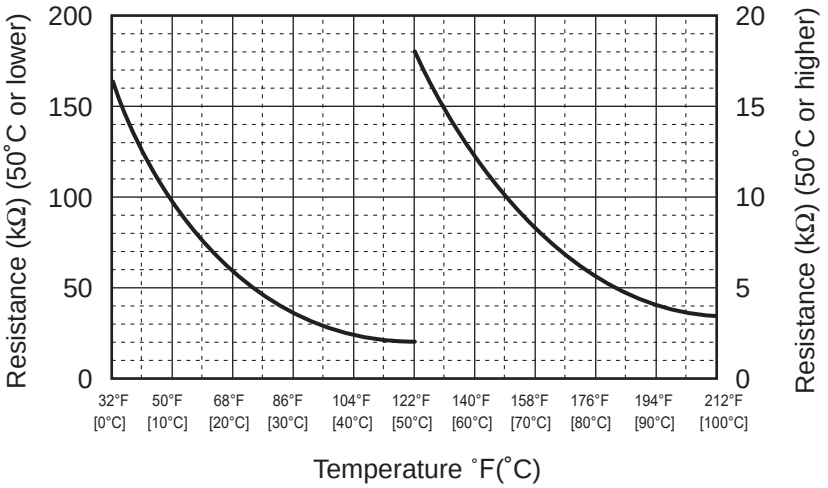
Temperature °F [°C]	Resistance value (kΩ)		
	(Minimum value)	(Standard value)	(Maximum value)
32 [0]	32.33	33.80	35.30
50[10]	19.63	20.35	21.09
68[20]	12.23	12.59	12.95
77[25]	9.75	10.00	10.25
86[30]	7.764	7.990	8.218
104[40]	5.013	5.192	5.375
122[50]	3.312	3.451	3.594
140[60]	2.236	2.343	2.454
158[70]	1.540	1.623	1.709
176[80]	1.082	1.146	1.213
194[90]	0.7740	0.8237	0.8761
212[100]	0.5634	0.6023	0.6434

TD, TL sensors

Representative value

Temperature °F [°C]	Resistance value (kΩ)		
	(Minimum value)	(Standard value)	(Maximum value)
32 [0]	150.5	161.3	172.7
50[10]	92.76	99.05	105.6
68[20]	58.61	62.36	66.26
77[25]	47.01	49.93	52.97
86[30]	37.93	40.22	42.59
104[40]	25.12	26.55	28.03
122[50]	17.00	17.92	18.86
140[60]	11.74	12.34	12.95
158[70]	8.269	8.668	9.074
176[80]	5.925	6.195	6.470
194[90]	4.321	4.507	4.696
212[100]	3.205	3.336	3.468





∗ As TH sensor (Outdoor unit heat sink temp. sensor) is incorporated in the outdoor control P.C. board, the resistance value cannot be measured.

9. REPLACEMENT OF SERVICE P.C. BOARD

<Note: when replacing the P.C. board for indoor unit servicing>

The nonvolatile memory (hereafter called EEPROM, IC503) on the indoor unit P.C. board before replacement includes the model specific type information and capacity codes as the factory-set value and the important setting data which have been automatically or manually set when the indoor unit is installed, such as system/indoor/group addresses, high ceiling select setting, etc.

When replacing the P.C. board for indoor unit servicing, follow the procedures below.

After replacement completes, confirm whether the settings are correct by checking the indoor unit No., Group header unit/follower unit settings and perform the cooling cycle confirmation through the trial operation.

<Replacement procedures>

CASE 1

Before replacement, the indoor unit can be turned on and the setting data can be read out by wired remote control operation.

EEPROM data read out **[1]**

⇩

Replacement of P.C. board for Indoor unit servicing and power on **[2]**

⇩

Writing the read out EEPROM data **[3]**

⇩

Power reset
(for all indoor units connected to the remote control when the group operation control is performed.)

CASE 2

The EEPROM before replacement is defective and the setting data cannot be read out.

EEPROM data read out **[2]**

⇩

Writing the setting data to EEPROM, such as high ceiling installation setting and optional connection setting, etc., based on the customer information. **[3]**

⇩

Power reset
(for all indoor units connected to the remote control when the group operation control is performed.)

[1] Setting data read out from EEPROM

The setting data modified on the site, other than factory-set value, stored in the EEPROM shall be read out.

Step 1 Push [Menu] to open the “Menu”.

Step 2 Push and hold [Menu] and [ ] at the same time to open “Field setting menu”.
• Push and hold 4 secon .

Step 3 Push [ ] and [ ] to select “DN setting”, and then push [Set/Fix].

Step 4 Select “Indoor unit” , and the push [Set/Fix]

Step 5 For group operation, all connected rooms in the system are displayed.
Select the unit whose EEPROM contents you want to read and push [Set/Fix].
→ The fan of the selected indoor unit operates and the flap swings.

1. Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code No. to 1.
   (This is the setting for the filter sign lighting time.)
   At this time, be sure to write down the setting data displayed.
2. Change the CODE No. (DN) by pushing / buttons.
   Similarly, be sure to write down the setting data displayed.
3. Repeat the step 2 to set the other settings in the same way and write down the setting data in the manual that comes with the P.C. board.

CODE No. required at least

DN	Contents
0010	Type
0011	Indoor unit capacity
0012	System address
0013	Indoor unit address
0014	Group address

1. The CODE No. for the Indoor unit type and Indoor unit capacity are required to set the rotation number setting of the fan.
2. If the system/indoor/group addresses are different from those before replacement, the auto-address setting mode starts and the manual resetting may be required again.
   (when the multiple units group operation including twin system.)

[2] P.C. Board for indoor unit servicing replacement procedures

Step 1 Replace the P.C. board to the P.C. board for indoor unit servicing.
At this time, perform the same setting of the jumper wire (J01) setting (cut), switch SW01, SW02, and SW501 as the setting of the P.C. board before replacement.

Step 2 According to the system configuration, turn on the indoor unit following to the either methods shown below.

a) Single operation (Indoor unit is used as standalone.)
Turn on the indoor unit.

1. After completion of the auto-address setting mode (required time: approx. 5 min.), proceed to [3]. (System address = 1, Indoor unit address = 1, Group address = 0 (standalone) are automatically set.)
2. Interrupt the auto-address setting mode, and proceed to [3].

b) Group operation (including twin triple and double twin system)
Turn on the indoor unit(s) with its P.C. board replaced to the P.C. board for indoor unit servicing, according to either methods 1 or 2 shown below.

1. Turn on only the indoor unit with its P.C. board replaced. (Be sure to confirm the remote controller is surely connected. If not, the operation [3] cannot be performed.)
   Perform either methods 1 or 2 described in item a) above.
2. Turn on the multiple indoor units including the indoor unit with its P.C. board replaced.
   - Twin or triple or double twin 1 system only
   - All group connections

After completion of the auto-address setting mode (required time: approx. 5 min.), proceed to **[3]**.

* The header unit of the group may be changed by performing the auto-address setting.
  Also, the system address/Indoor unit address of the indoor unit with its P.C. board replaced may be assigned to the addresses (not used) other than those of the indoor units without its P.C. board replaced.
  It is recommended to keep the information in advance, which refrigerant system the indoor unit belongs to or whether the indoor unit works as the header unit or the follower unit in the group control operation.

[3] Writing the setting data to EEPROM

The settings stored in the EEPROM of the P.C. board for indoor unit servicing are the factory-set values.

Step 1 Push [Menu] to open the “Menu”.

Step 2 Push and hold [Menu] and [ ] at the same time to open “Field setting menu”.
• Push and hold 4 seconds.

Step 3 Push [ ] and [ ] to select “DN setting”, and then push [Set/Fix].

Step 4 Select “Indoor unit” , and the push [Set/Fix]

Step 5 For group operation, all connected rooms in the system are displayed.
Select the unit whose EEPROM contents you want to read and push [Set/Fix].
→The fan of the selected indoor unit operates and the flap swings.

Step 6 Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code.
• Set the indoor unit type and capaci .
The factory-set values shall be written to the EEPROM by changing the type and capacity.

1. Set the CODE No. (DN) to 10 . (without change)
2. Push [ ] to black highlight the data, and then push [ ] and [ ] to set the type.
   (Refer to Type DN code “10” on page 64.)
3. After finishing setting the data of the code (DN), push [Set/Fix]
   → “Continue?” is displayed.
4. To set the data of other codes (DN), push [Set/Fix]
5. Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code No. to 11.
6. Push [ ] to black highlight the data, and then push [ ] and [ ] to set the capacity.
   (Refer to Indoor Unit Capacity DN code “11” on page 64.)
7. After finishing setting the data of the code (DN), push [Set/Fix]
   → “Continue?” is displayed.
8. Push [Return]
   When doing group connections:
   → Push [Return] to open the unit selection screen. In the unit selection screen, push [Return] to briefly display “ ”, and then return to the “Field setting menu” screen.

Step 7 Write the on-site setting data to the EEPROM, such as address setting, etc.
Perform the steps 1 and 4 above again.

Step 8 Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code No. to 1.
(This is the setting for the filter sign lighting time.)

Step 9 Check the setting data displayed at this time with the setting data put down in [1].

1. If the data is different, push [ ] to highlight the data in black and white, push [ ] and [ ] to change the data to what you wrote down, and push [Set/Fix’].
2. If the data is the same, proceed to next step.

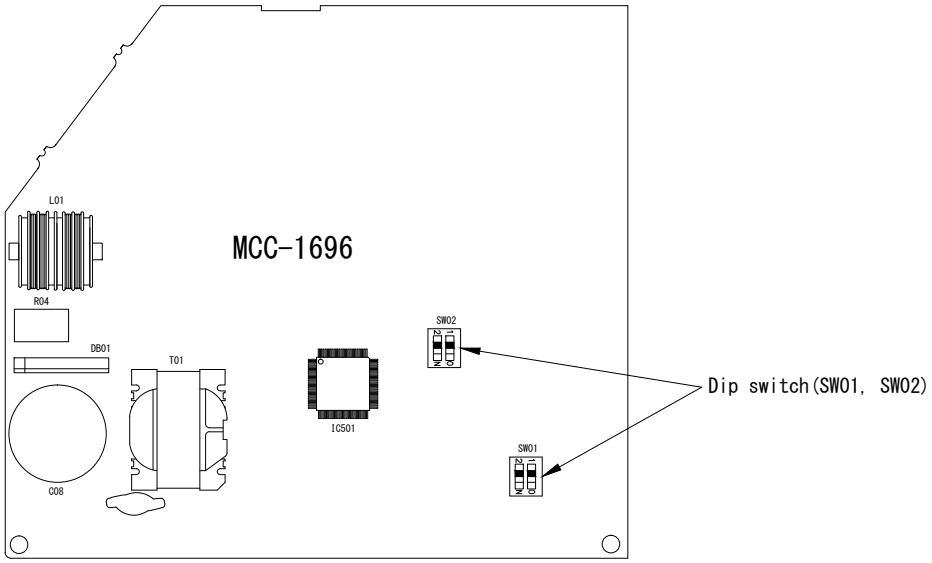
Step 10 Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code.
As described above, check the setting data and modify to the data put down in [1].

Step 11 Repeat the steps 8 and 9.

Step 12 After the setting completes, push [Return]
When doing group connections:
→ Push [Return] to open the unit selection screen. In the unit selection screen, push [Return] to briefly display “ ”, and then return to the “Field setting menu” screen.

Even after modifying the data wrongly and pushing [Set/Fix] it is possible to return to the data before modification by pushing [Return] if the CODE No. (DN) is not changed.

P.C. board parts layout drawing



Method of DIP switch setting

		Selected content	RAV-HB ✻✻✻ KRTP series	At shipment
SW01	Bit 1	Terminator resistor (for central control)	✻ 1	OFF (Without terminator)
	Bit 2	Remote controller A/B selection	✻ 1	OFF (A selection)
SW02	Bit 1	Custom / Multi model selection	ON	OFF (Custom model)
	Bit 2	No use	OFF	OFF

✻1 : Match to set up contents of P.C. board before replacement.

Table 1. CODE No. (DN) table (Please record the objective unit data at field)

DN	Item	Memo	At shipment	
01	Filter sign lighting time		0001: 150 hour	
02	Dirty state of filter		0000: Standard	
03	Central control address		0099: Unfixed	
06	Heating suction temp shift		0002: +3.6°F(+2°C)	
0C	PRE-DEF indication selection		0000: Standard	
0d	Cooling auto mode existence		0000: Auto mode cooling/heating	Automatic selection by connected outdoor unit
0F	Cooling only		0000: Heat pump	
10	Type	Be sure to set as 0008	0008: High wall type	
11	Indoor unit capacity (See below table)		According to capacity type	
12	Refrigerant line address		0099: Unfixed	
13	Indoor unit address		0099: Unfixed	
14	Group address		0099: Unfixed	
1E	Temp difference of automatic cooling/ heating selecting control points		0003: 3deg (Ts ± 1.5)	
28	Auto restart		0001: Provided	
2A	Option input selection (CN80)		0002: External emergency input	
2b	Thermo output selection (T10 ③)		0000: Thermo ON	
2E	Input selection (T10 ①)		0000: Operation input	
32	Sensor selection		0000: Body sensor	
33	Temperature unit select		0001 : (°F)	
77	Dual Set Point		0000: Unavailable	
7A	Change unit 0.9°F[0.5°C] or 1.8°F[1.0°C] on remote		0001 : 0.9°F[0.5°C]	
B3	Soft Cooling		0001: Available	
E0	Region		0001: North America	

Table 2. Type: Code No.10

Setting data	Type	Model
0001*1	4-Way Air Discharge Cassette Type	RAV-HB***UTP-UL
0008	High Wall Type	RAV-HB***KRTP-UL

*1 EEPROM initial value on the P.C. board for indoor unit servicing

Table 3. Indoor unit capacity: Code No.11

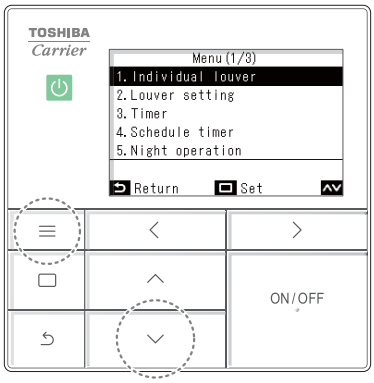
Setting data	Model
0000*	Invalid
0006	12
0009	18
0012	24

10. SETUP AT LOCAL SITE AND OTHERS

10-1. Indoor Unit

10-1-1. Test Run Setup on Remote Controller

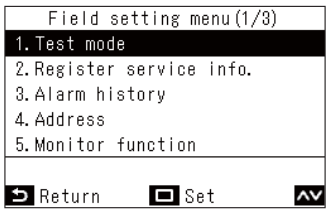
<Wired remote controller>

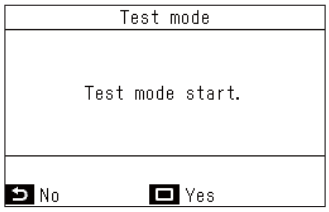


1 **Push [Menu] to open the “Menu”**

2 **Push and hold [Menu] and [ ] at the same time to open “Field setting menu”**

→Push and hold 4 seconds.

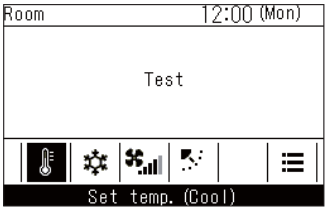




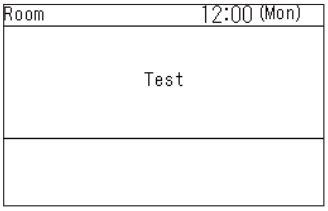
3 **In the “Field setting menu” screen, push [ ] and [ ] to select “Test mode”, and then push [Set/Fix]**

→Test mode is set, and returns to the “Field setting menu” screen. push the [Return] button 2 times, to open screen (2).

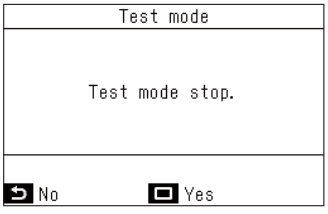
(1)



(2)



(3)



4 **push [ON/OFF ON/OFF]**

→Operation starts, and in test mode screen (1) opens. (While stopped, it is screen (2))

→Test mode is done while the operating mode is set to “Cool” or “Heat”.

→The temperature cannot be set in test mode.

→Check codes are displayed in the normal way.

5 **After completing test mode, in the “Field setting menu” screen, push [ ] and [ ] to select “Test mode”, and then push [Set/Fix]**

→Screen (3) appears.

→Push [Set/Fix] to end test mode and do normal operation.

<Wireless remote controller>

◆ In case of wireless remote controller

1 Turn on the power of the air conditioner.
When power is turned on for the first time after installation, it takes approx. 5 minutes until the remote controller becomes available. In the case of subsequent power-on, it takes approx. 1 minute until the remote controller becomes available.
Execute a test run after the predetermined time has passed.

2 Push “ON/OFF” button on the remote controller, select [Cool] or [Heat] with “MODE” button, and then select [HIGH] with “FAN” button.

3

Cooling test run	Heating test run
Set the temperature to 62°F with the temp. setup buttons.	Set the temperature to 86°F with the temp. setup buttons.

4

Cooling test run	Heating test run
After confirming a signal receiving sound “beep” immediately set the temperature to 64°F with the temp. setup buttons.	After confirming a signal receiving sound “beep” immediately set the temperature to 84°F with the temp. setup buttons.

5

Cooling test run	Heating test run
After confirming a signal receiving sound “beep” Immediately set the temperature to 62°F with the temp. setup buttons.	After confirming a signal receiving sound “beep” immediately set the temperature to 86°F with the temp. setup buttons.

6 Repeat procedures ***4 → 5 → 4 → 5***.
Indicators “Operation” (green), “Timer” (green), and “Ready” (orange) in the wireless receiver section flash in approx. 10 seconds, and the air conditioner starts operation. If any of these indicators does not flash, repeat procedures 2 to 5.

7 Upon completion of the test run, push “ON/OFF” button to stop operation.

<Overview of test run operations using the wireless remote controller>

▼ Cooling test run:
ON/OFF → 62 °F → 64 °F → 62 °F → 64 °F → 62 °F → 64 °F → 62 °F → (test run) → ON/OFF

▼ Heating test run:
ON/OFF → 86 °F → 84 °F → 86 °F → 84 °F → 86 °F → 84 °F → 86 °F → (test run) → ON/OFF

10-1-2. Forced Defrost Setup of Remote Controller (For wired remote controller only)

(Preparation in advance)
Forced Defrost Setup

1 **Push the [MENU] button to display the menu screen.**

2 **Push and hold the [MENU] button and the [ ] button at the same time to display the "Field setting menu".**

→ Push and hold the buttons for more than 4 seconds.

3 **Push the [ ] / [ ] button to select "7. DN setting" on the "Field setting menu" screen, then push the [Set/Fix].**

→ The fan and louver of the indoor unit operate.
When the group control is used, the fan and louver of the selected indoor unit operate.

→ Move the cursor to select "Code(DN)" with the " [ ] button, then set **"008C"** with [ ] / [ ] button.

→ Move the cursor to select "Data" with the [ ] button, then set **"0001"** with the [ ] / [ ] button.

4 **Push the [MENU] button to set the other Code(DN) and Data. After "Continue?" is displayed on the screen, push the [Set/Fix].**

5 **Push the [Set/Fix]. to finish the setting operation. " Setting" appears on the screen for a while, then the screen returns to the "Field setting menu" screen.**

→ Pushing the " **[Set/Fix].** No" displays the unit selection screen when the group control is used. Push the [CANCEL] button on the unit selection screen to finish the setting operation. " Setting" appears on the screen for a while, then the screen returns to the "Field setting menu" screen.

(Practical operation)

- Push [ON/OFF] button.
- Select the HEAT mode.
- After a while, the forced defrost signal is sent to the outdoor unit and then the outdoor unit starts defrost operation. (The forced defrost operation is performed for Max. 12 minutes.)
- After defrost operation finished, the operation returns to the heating operation.

To execute the defrost operation again, start procedure from above item *1* .

(If the forced defrost operation was executed once, setting of the above forced defrost operation is cleared.)

10-1-3. LED Display on P.C. Board

1. D501 (Red)

- It goes on (Goes on by operation of the main microcomputer) at the same time when the power supply is turned on.
- It flashes with 1-second interval (every 0.5 second): When there is no EEPROM or writing-in operation fails.
- It flashes with 10-seconds interval (every 5 second): During DISP mode
- It flashes with 2-seconds interval (every 1 second): While setting of function select (EEPROM)

2. D403 (Red)

- It goes on when power supply of the remote controller is turned on. (Lights on hardware)

3. D14 (Orange)

- It flashes while receiving the serial signal from the outdoor unit. (Hardware)

4. D15 (Green)

- It flashes while sending the serial signal to the outdoor unit. (Hardware)

Function selection CODE No. (DN) list

CODE No. (DN)	Item	Contents	At shipment from factory
01	Filter sign lighting time	0000: None 0001: 150H 0002: 2500H 0003: 5000H 0004: 10000H 0005: Clogging sensor used	0001: 150H
02	Filter stain level	0000: Standard 0001: Heavy stain (Half of standard time)	0000: Standard
03	Central control address	0001: No.1 unit to 0064: No.64 unit 0099: Undecided	0099: Undecided
06	Heating suction temp. shift	0000: No shift 0001: +1.8°F(+1°C) 0002: +3.6°F(+2°C) to 0010: +18°F(+10°C) 0003: +5.4°F(+3°C) (Up to +6 is recommended.)	0003: +5.4°F(+3°C) 0002: +3.6°F(+2°C)
0C	Preparing indication selection	0000: Preparing indicated 0001: No indication	0000: Preparing indicated
0F	Cooling-only	0000: Heat pump 0001: Cooling only (No display for [AUTO] [HEAT])	0000: Heat pump
10	Type	0001: 4-way air discharge cassette 0004: Concealed duct 0007: Under ceiling 0008: High wall	0008: High wall
11	Indoor unit capacity	0000: Undecided 0001 to 0034	According to capacity type
12	Line address	0001: No.1 unit to 0030: No.30 unit	0099: Undecided
13	Indoor unit address	0001: No.1 unit to 0064: No.64 unit	0099: Undecided
14	Group address	0000: Individual 0001: Master unit in group 0002: Follower unit in group	0099: Undecided
1E	In automatic cooling/heating, temp. width of cool → heat, heat → cool mode selection control point	0000: 0 deg to 0010: 10 deg (Cool/heat are reversed with ± (Data value) / 2 against the set temperature)	0003: 3 deg (Ts±1.5)
28	Auto restart	0000: None 0001: Provided	0001: Provided
2A	Selection of option / error input (CN80)	0000: Filter input 0001: Alarm input 0002: External alarm input (Air cleaner, etc.)	0002: External alarm input
2b	Selection of thermostat output (T10 ③)	0000: Indoor thermostat ON 0001: ON receiving output of outdoor compressor	0000: Thermostat ON
2E	Selection of HA (T10 ①) terminal	0000: Normal (JEMA) 0001: Card input 0002: Fire alarm input (Forgotten to be off)	0000: Normal (HA terminal)
31	Fan (Single operation)	0000: Impossible 0001: Possible	0000: Impossible
32	Sensor selection	0000: Body TA sensor 0001: Remote controller sensor	0000: Body sensor
33	Temperature unit select	0000: °C 0001: °F	0001: °F
60	Timer setting (Wired remote controller)	0000: Operable 0001: Operation prohibited	0000: Operable
69	Louver setting for cooling	0000: Normal 0001: Down allowed	0000: Normal
7A	Change unit +0.9°F(0.5°C) or +1.8°F (1.0°C) on remote	0000 : 1.8°F(1.0°C) 0001 : +0.9°F(0.5°C)	0001 : +0.9°F(0.5°C)
86	Correction of feeling of strong heating	0000: Not priovided 0001: Priovided	0000: Not priovided
C2	Power saving (Current demand X% to outdoor unit)	0050 : 50% to 0100 : 100%	0075 : 75%
E0	Region	0000: Domestic 0001: North America	0001: North America

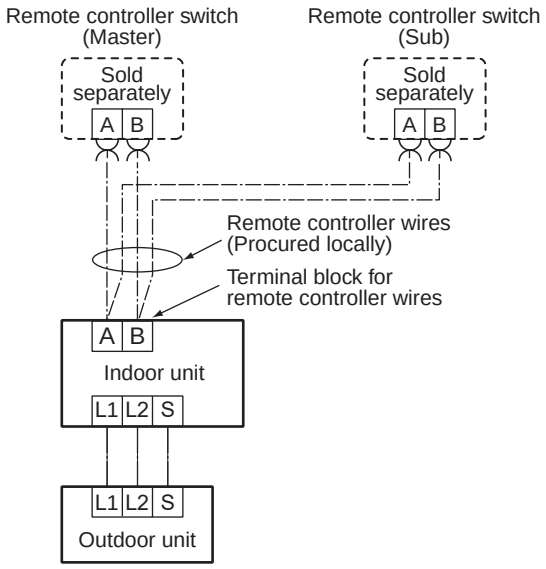
* Restriction ratio setting for save operation (DODE No. (DN) [C2]) can be set/changed from the normal CODE No. (DN) setup (Detail CODE No. (DN) setup).

10-1-5. Wiring and Setting of Remote Controller Control

2-remote controller control (Controlled by 2 remote controllers)

This control is to operate 1 or multiple indoor units are operated by 2 remote controllers.
(Max. 2 remote controllers are connectable.)

- **When connected 2 remote controllers operate an indoor unit**



(Setup method)

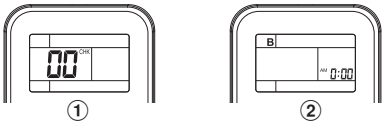
One or multiple indoor units are controlled by 2 remote controllers.
(Max. 2 remote controllers are connect able.)

<Wireless remote controller A-B selection>

Using 2 wireless remote controllers for the respective air conditioners, when the 2 air conditioners are closely installed.

Wireless remote controller B setup

1. Press RESET button on the indoor unit to turn the air conditioner ON.
2. Point the remote control at the indoor unit.
3. Push and hold CHECK button on the Remote Control by the tip of the pencil. “00” will be shown on the display. (Picture ①)
4. Press MODE during pushing CHECK . “B” will show on the display and “00” will disappear and the air conditioner will turn OFF. The Remote Control B is memorized. (Picture ②)



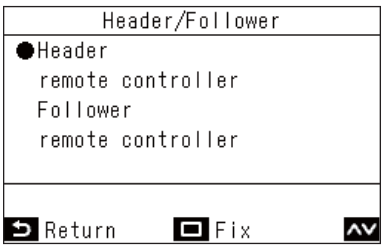
① ②

NOTE

- Repeat above step to reset wireless remote controller to be A.
- The wireless remote controllers do not display “A”.
- The factory default of the wireless remote controllers is “A”.

Set the remote controller as ”Header remote controller (Master)” or “Follower remote controller (Sub)” when the dual remote controller system is used.

Carry out the setting operation while the indoor unit is stopped. (Turn off the air conditioning unit before starting the setting operation.)



1 **In the “Initial setting” screen, press [^] and [v] to select “Header/Follower”, and then press [▭ Set/Fix]**

2 **Press [^] and [v] to select “Header remote controller” or “Follower remote controller”**

3 **Press [▭ Set/Fix]**

→ When “⧖” appears, return to the “Initial setting” screen.

Note for the Header/Follower setting

- Set the RBC-AWSU52-UL remote controller as the Header remote controller when the dual remote controller system is used.
- The RBC-AWSU52-UL remote controller can be used as the Follower remote controller when the dual remote controller system is used that consists of two RBC-AWSU52-UL remote controllers.
- The following functions are not available when the remote controller is set as the Follower remote controller:

  Schedule timer / Off reminder timer / Night operation / Energy saving operation / Return back / Saving operation / Power consumption / Reset power consumption data.

NOTE

- Some functions are not available when the remote controller is set as the Follower remote controller.
- In the dual remote controller system, the latter operation overrides the former.
- The remote controller is set as “Header remote controller” as factory default.
- If the Header (Master) / Follower (Sub) remote controller settings are not set correctly, the “E01,” “E03,” or “E09” check code is displayed.

10-1-6. Monitor Function of Remote Controller Switch

■ Calling of sensor temperature display

The sensor temperature or operational status of indoor unit, outdoor unit, or remote controller can be monitored.

Indoor unit data	
Code	**Data name**
01	Room temperature (remote controller)
02	Indoor unit intake air temperature (TA)
03	Indoor unit heat exchanger (coil) temperature (TCJ)
04	Indoor unit heat exchanger (coil) temperature (TC)
F3	Indoor unit fan cumulative operating hours (x1 h)
E2	Indoor unit refrigerant leak detection sensor output*

Outdoor unit data	
Code	**Data name**
60	Outdoor unit heat exchanger (coil) temperature (TE)
61	Outside air temperature (TO)
62	Compressor discharge temperature (TD)
63	Compressor suction temperature (TS)
65	Heatsink temperature (THS)
6A	Operating current (x1/10)
6D	Outdoor heat exchange (coil) temperature (TL)
F1	Compressor cumulative operating hours (x100 h)

* Display and the contents
- - - - : Sensor function is not available.
0000 : Normal
0001 : Sensor has been used for 5 years.
0002 : Sensor trouble or exceeding the life of the product for sensor
0003 : Sensor is detecting refrigerant leak

1 **Push [☰ Menu] to open the "Menu".**

2 **Push and hold [☰ Menu] and [∨] at the same time to open "Field setting menu".**
• Push and hold 4 secon .

3 **Push [∧] and [∨] to select "Monitor function", and then push [▢ Set/Fix].**
→ In a group connection, after a selection in the unit selection screen, move to the "Monitor function" screen.

4 **Push [<] to black highlight the code (DN), and then push [∧] and [∨] to change to CODE No. of the item to monitor. Refer to the next page for CODE No..**

5 **Push [⮌ Return]**
→ Return to the "Field setting menu" screen.

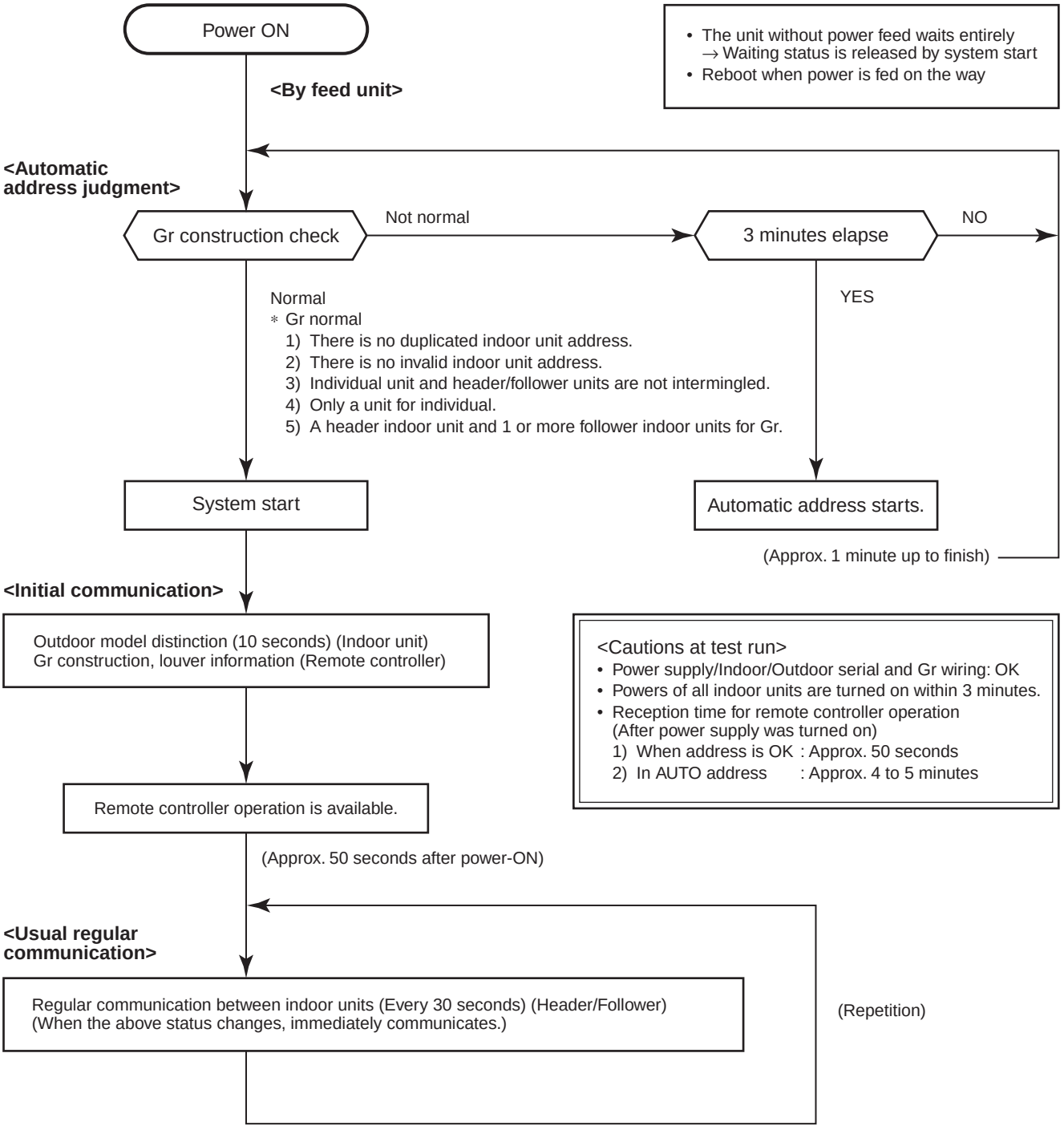
(Group control operation)

In a group control, operation of maximum 16 indoor units can be controlled by a remote controller.
The indoor unit connected with outdoor unit (Individual) controls room temperature according to setting on the remote controller.

<System example>

1. Display range on remote controller
   The setup range (Operation mode/Fan speed select/Setup temp) of the indoor unit which was set to the header unit is reflected on the remote controller.
2. Address setup
   Turn on power of the indoor unit to be controlled in a group within 3 minutes after setting of automatic address. If power of the indoor unit is not turned on within 3 minutes (completion of automatic address setting), the system is rebooted and the automatic address setting will be judged again.
   1) Connect indoor/outdoor connecting wire surely.
   2) Check line address/indoor address/group address of the unit one by one.
   3) The unit No. (line/indoor group address) which have been set once keep the present status as a rule if the unit No. is not duplicated with one of another unit.

■ Indoor unit power-ON sequence



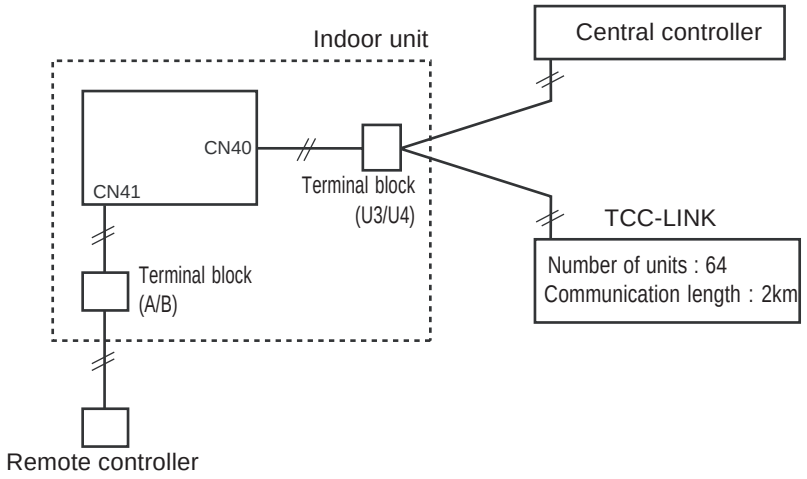
- In a group operation, if the indoor unit which was fed power after judgment of automatic address cannot receive regular communication from the header unit and regular communication on identical pipe within 120 seconds after power was turned on, it reboots (system reset).
  → The operation starts from judgment of automatic address (Gr construction check) again.
  (If the address of the header unit was determined in the previous time, the power fed to the header unit and reboot works, the header unit may change though the indoor unit line address is not changed.)

10-2. TCC-LINK Central Control

10-2-1. Functions

Connect an indoor unit to the TCC-LINK central controller.

10-2-2. Connection Diagram

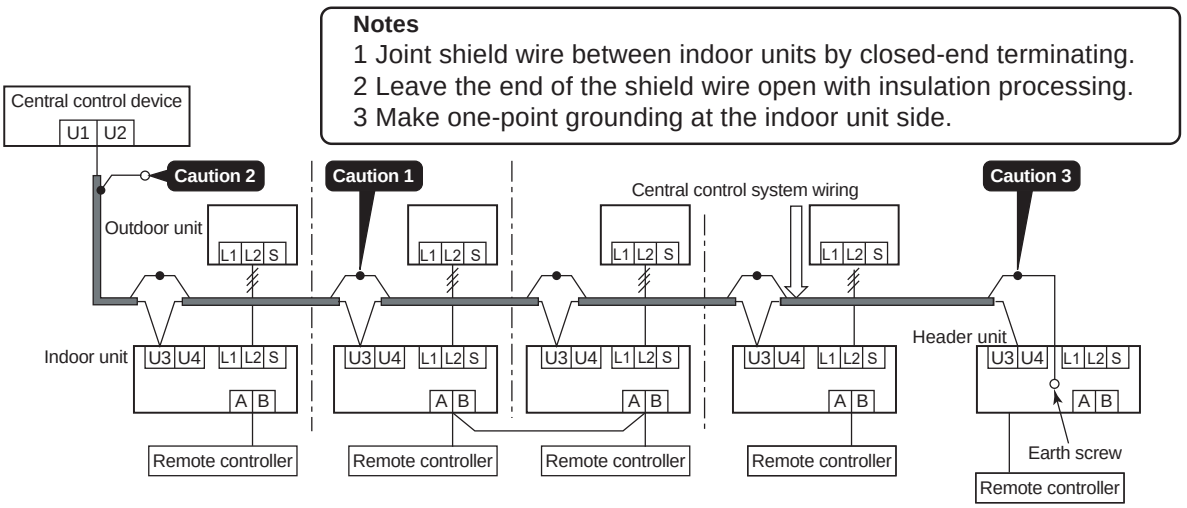


10-2-3. Wiring Specifications

Number of wires	Size	Specification
2	Up to 1000 m: 1.25 mm² stranded wires Up to 2000 m: 2.0 mm² stranded wires	MVVS

- A 2-wire non-polarity cable is used.
- The cable length depends on each central control system.
- When used in a system including multiple air conditioners, the length includes the length of all wires between indoor and outdoor units on the side of multiple air conditioners.
- Use 2-wire shield cable (MVVS) to protect from noise.
- Joint shield wire between indoor units by closed-end terminating, and leave its end open with insulation processing. Make one-point grounding at the indoor unit side. Set the terminating resistors.

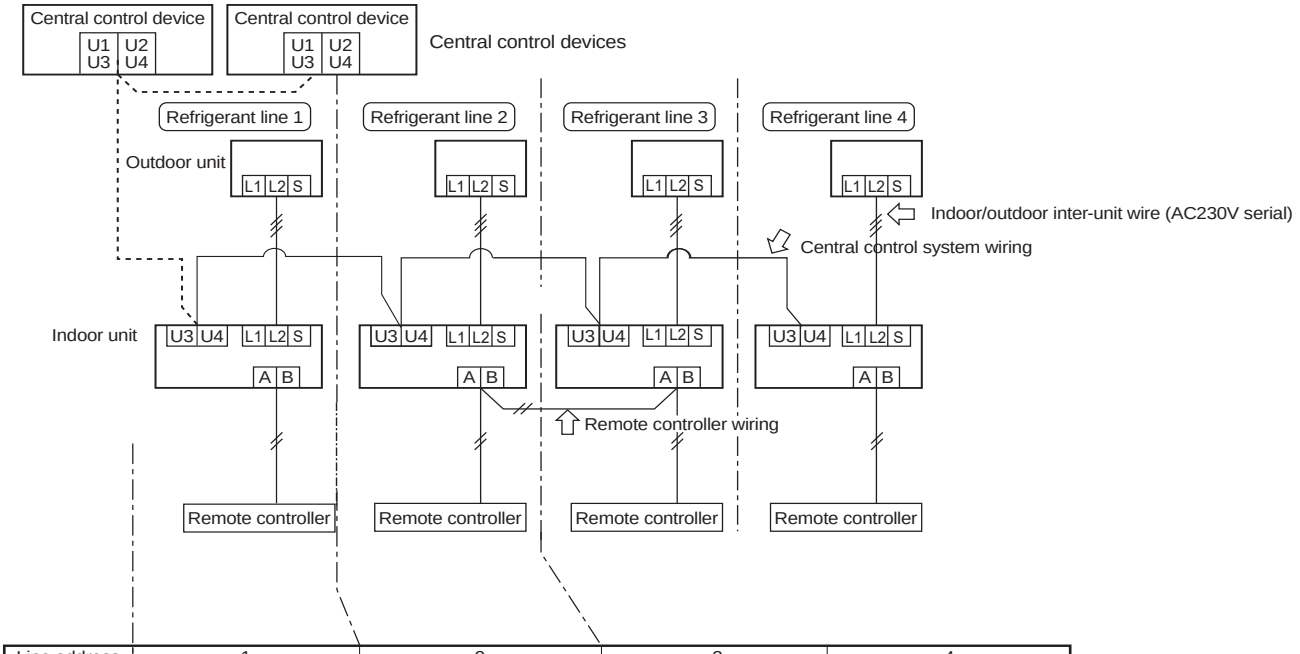
(Central control for custom indoor units only)



10-2-4. Setting On board Switches

Setting of terminating resistors is necessary for central control of custom indoor units only.

- Use SW01 to set terminating resistors.
- **Set terminating resistors for the indoor unit only with the smallest refrigerant line address.**



Line address	1	2	3	4	
SW01 Bit 1	ON	OFF	OFF	OFF	(OFF at shipment from factory)
Remarks	Bit 1 to ON.	Factory setting	Factory setting	As status shipped from factory	

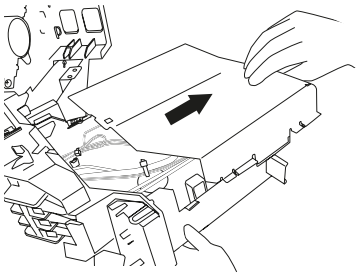
10-2-5. On board Switch Setting Procedure

1. Remove the front panel.

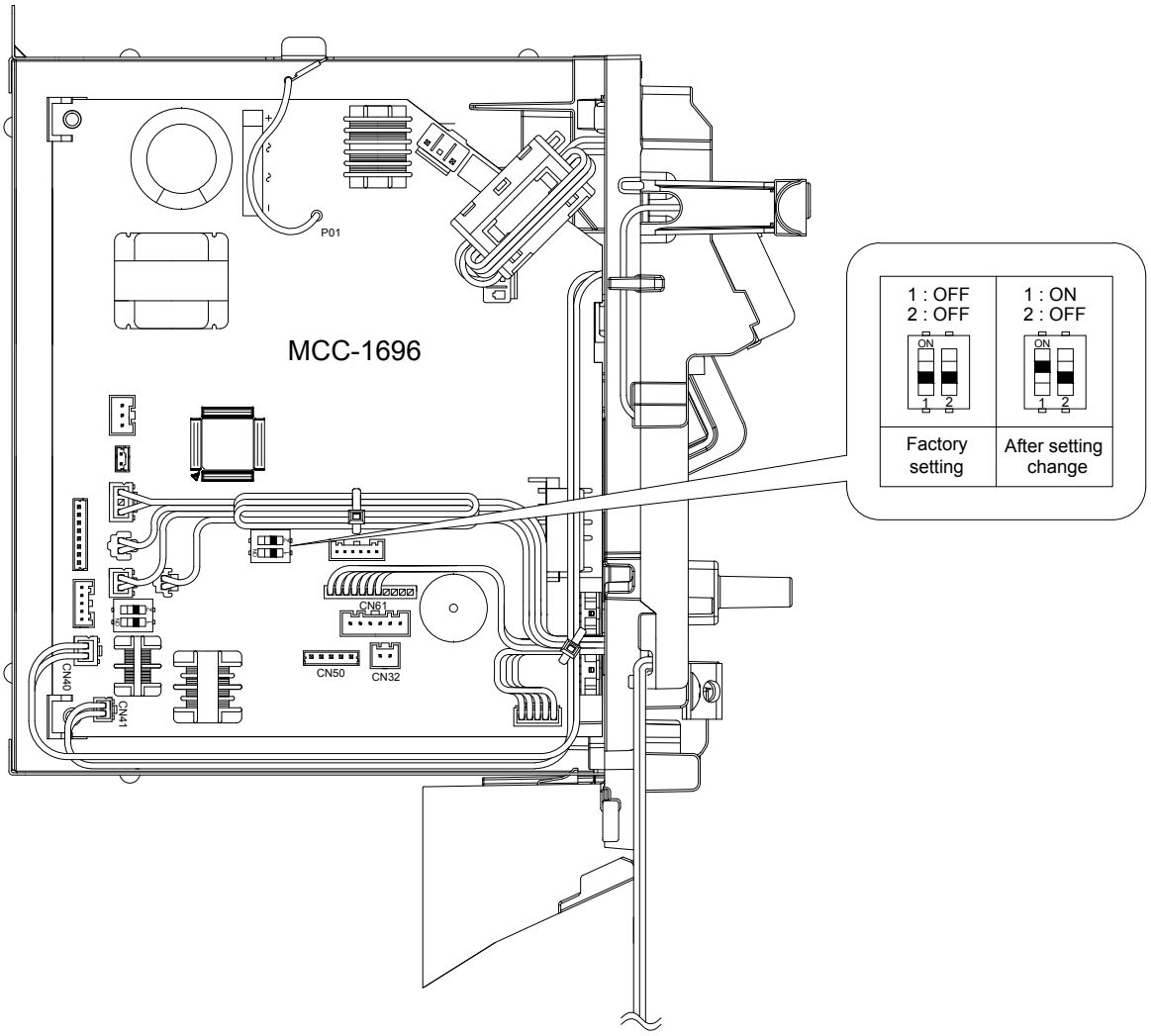
- Before removing the front panel, direct th horizontal louver to the direction shown in the figure below.
- Remove the screws securing the front panel, and detach it from the indoor unit.

2. Remove the earth wire, TC sensor, TCJ sensor motor lead (louver motor, fan motor).

3. Remove the screws and detach the electrical control box.



4. Remove the electrical control box cover and set bit1 of SW01 on the board to ON. (Do not touch SW02 as it is used for other setting.)



5. Assemble the removed parts by reversing steps 1 to 3.

Insert the sensors and motor lead (louver motor, fan motor) into the original positions.

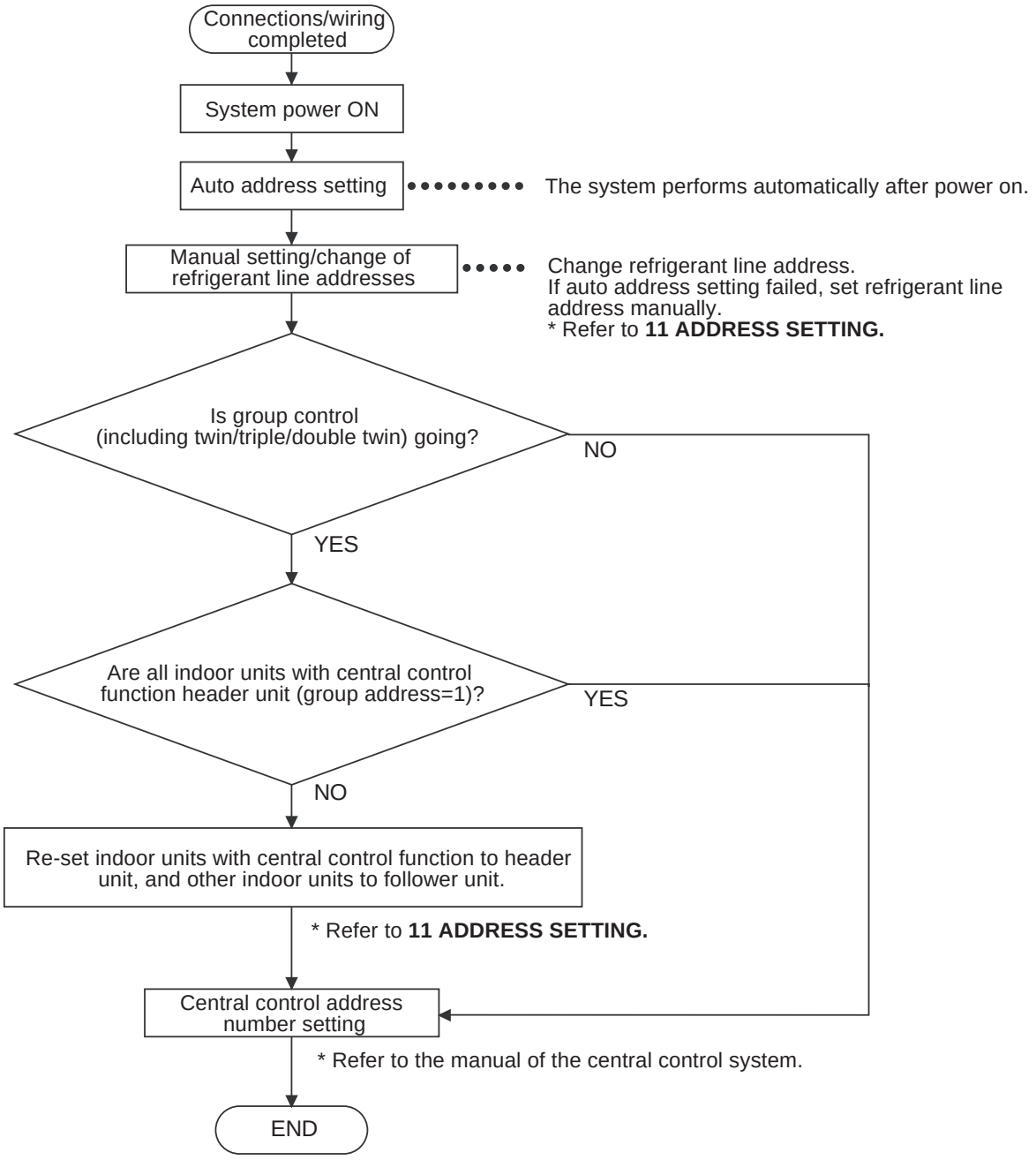
⚠ CAUTION

Connect the sensor and the motor lead certainly back to the previous position. If they are not properly connected, the system will not operate or other errors may occur.

10-2-6. Setting Addresses

Overview

To connect DI-SDI air conditioners to the TCC-LINK central control system for central control/monitoring, addresses of connected indoor units must be set in the following procedure.

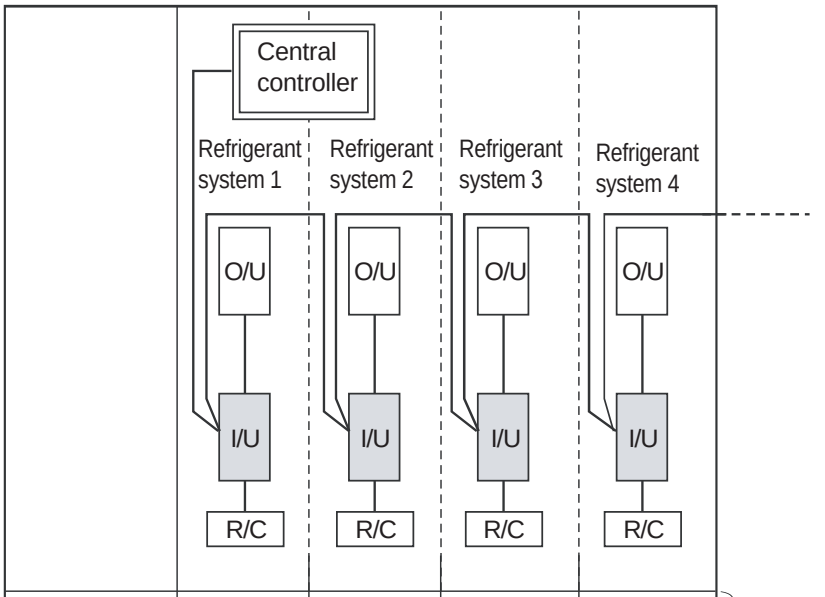


(1) Manual setting/change of indoor unit refrigerant line addresses

[In the case of 29 refrigerant systems or less (when multiple air conditioners are included, their number of refrigerant systems is also included)]

Refrigerant address “1” is assigned to all indoor units except for group control by the auto address setting after system power on.

Therefore, change refrigerant line address of each refrigerant system using the wired remote controller.



Refrigerant line address	1	1	1	1	An example after auto address setting
Indoor unit address	1	1	1	1	
Refrigerant line address	1	2	3	4	After changing refrigerant line address manually
Indoor unit address	1	1	1	1	
Group address	0	0	0	0	

* For changing/setting refrigerant line addresses by wired remote controller, refer to **11. ADDRESS SETTING.**
* Refrigerant line address must be unique for each refrigerant system.
  To perform central control in combination of SMMS and DI•SDI air conditioners, set refrigerant line ad-dresses different from those of SMMS.

10-2-7. Central Control Address Number Setting

To connect an indoor unit to the central control remote controller, an address number for central control must be set.

- An address number for central control is indicated as the refrigerant line number of the remote controller.

1 Setting by Remote Controller on Indoor Unit Side

<Procedure> Perform setup while the unit stops.

1 **Push the [☰ MENU] button to display the menu screen.**

2 **Push and hold the [☰ MENU] button and the [∨] button at the same time to display the "Field setting menu".**

→ Push and hold the buttons for more than 4 seconds.

3 **Push the [∧] / [∨] button to select "7. DN setting" on the "Field setting menu" screen, then push the [▭ Set/Fix].**

→ The fan and louver of the indoor unit operate.
When the group control is used, the fan and louver of the selected indoor unit operate.

→ Move the cursor to select "Code(DN)" with the **[▭ Set/Fix].** button, then set **"0003"** with the [∧] / [∨] button.

→ Move the cursor to select "Data" with the **[▭ Set/Fix].** button, then set **"Data"** with the [∧] / [∨] button. **The setup data is shown in the table below (Table 1).**

4 **Push the [☰ MENU] button to set the other Code(DN) and Data. After "Continue?" is displayed on the screen, push the [▭ Set/Fix].**

"⧖ Setting" appears on the screen for a while, then the screen returns to the "Field setting menu" screen.

(Table 1)

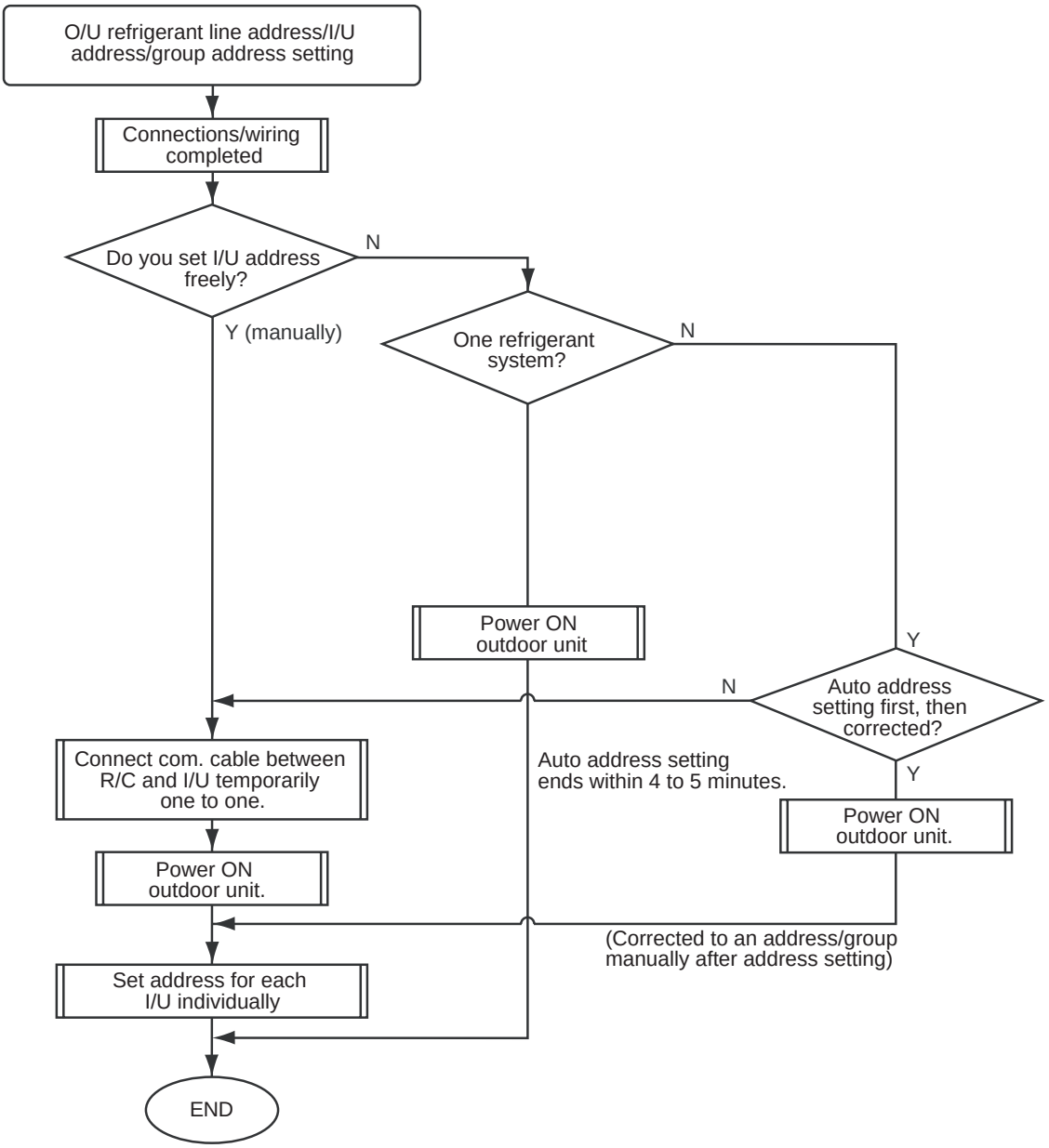
SET DATA	Central control address No.
0001 0002 0003 : 0064	1 2 3 : 64
0099	Unset (Setup at shipment from factory)

11. ADDRESS SETTING

11-1. Address Setting

Address Setting Procedure

When auto address setting is completed during the power on process of outdoor unit.
Remote controller operation is disabled during the auto address setting process (4 to 5 minutes).



- Unless the following addresses are stored in the EEPROM (IC10) on the indoor unit board, trial operation is disabled. (Undefined data is stored at factory shipping.)

	Code	Factory setting data	Setting data range
Refrigerant line address	12	0099	0001 (unit No. 1) to 0030 (unit No. 30)
Indoor unit address	13	0099	0001 (unit No. 1) to 0064 (unit No. 64) Maximum I/U address in the same refrigerant system
Group address	14	0099	0000 : Individual (indoor units without group control) 0001 : Header (one indoor unit in the group) 0002 : Follower (indoor units in the group except header unit)

11-2. Address Setting and Group Control

<Definition of terms>

Indoor unit No. : N-n=O/U refrigerant line address N (30 max.) -I/U address n (64 max.)

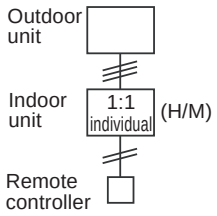
Group address : 0=Individual (without group control)
1=Header unit under group control
2=Follower units under group control

Header indoor unit (=1) : A representative unit of multiple indoor units in group operation, which performs communication between remote controller and follower I/U.
(* It does not mean an indoor unit that communicates with O/U.)
Operation mode and setting temperature range (except louver air flow control) of header unit are reflected on the LCD of remote controller.

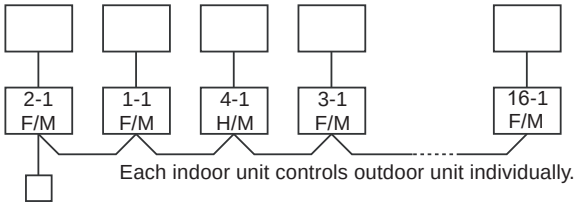
Follower indoor unit (=2) : Indoor units except header unit in group operation.
It does not control communication with remote controller in principle (except response to alarm/service data request).

[1] System Configuration

a) Single



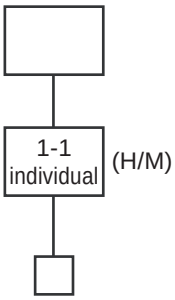
c) Single group operation



[2] Examples of Aut Address Setting fro No Address Setting

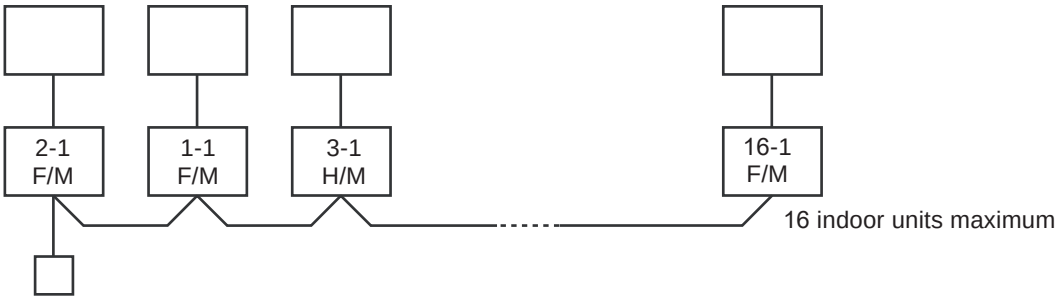
1) Standard (one outdoor unit)

a) Single



***** Turn ON the power. Address setting is completed automatically.*****

2) Group operation (multiple O/U = multiple indoor units with serial communication interface, no twin)



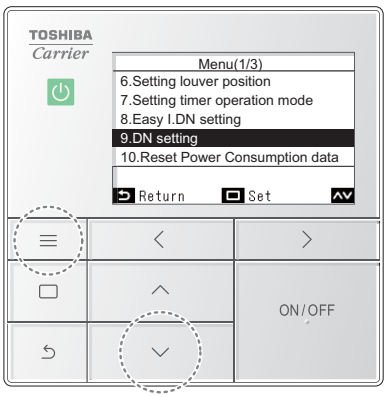
***** Turn ON the power. Address setting is completed automatically.*****

11-3. Address Setting

When determining indoor unit addresses with wiring completed without piping construction

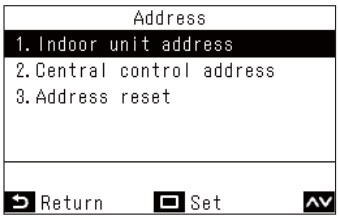
▼ The method to change the address of an individual indoor unit (the indoor unit is paired with a wired remote controller one-to-one), or an indoor unit in a group. (The method is available when the addresses have already been set automatically.)

<RBC-AWSU5*>

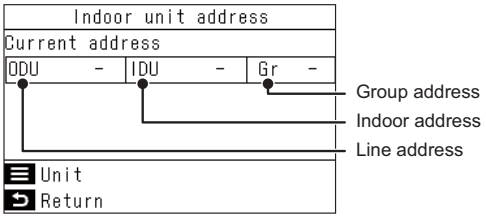


1 **Push [Menu] to open the "Menu"**

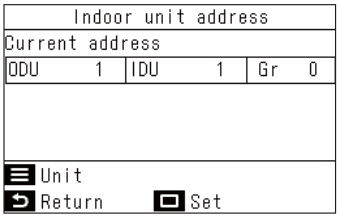
2 **Push and hold [Menu] and [ ] at the same time to open "Field setting menu"**
→Push and hold 4 seconds.



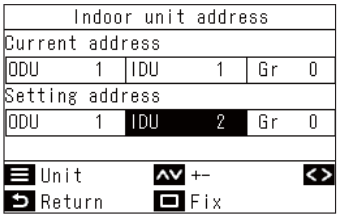
3 **Select "Indoor unit address" from "Address" in the "Field setting menu", and push [Set/Fix]**
→At first, the fans and louvres of all indoor units in the group operate.



The address is indicated as "-".

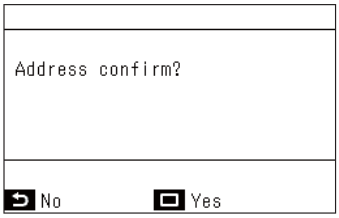


4 **Push [Menu]**
→Each push of [Menu] displays in order: Entire group → Header unit → Follower unit 1 ...
→The fans and louvres of the relevant indoor units operate.



5 **Manually select a unit to change, and push [Set/Fix]**
→The screen for settings appears.

6 **Push [ ] and [ ] to move the black highlight, and then push [ ] and [ ] to set the address**



7 **After manually setting the addresses of all indoor units, push [Set/Fix]**
→The message "Address confirm?" appears on screen.

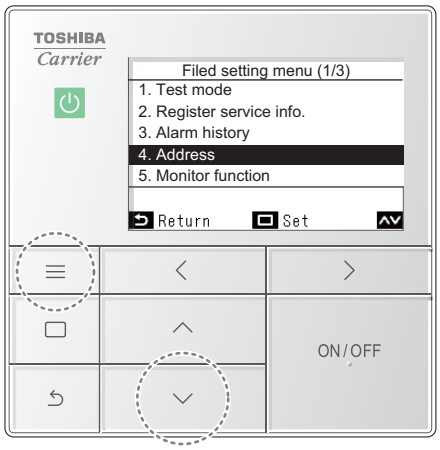
8 **Push [Set/Fix]**
→The changes are fixed.
→"⧖" appears while data is changing.

11-4. Confirming the numbers and positions of indoor units

To know the indoor unit addresses though position of the indoor unit is recognized

▼ When the unit is individual (the indoor unit is paired with a wired remote controller one-to-one), or it is a group-controlled one.

<RBC-AWSU5∗>



1 **Push [Menu] to open the "Menu"**

2 **Push and hold [Menu] and [ ] at the same time to open "Field setting menu"**
→Push and hold 4 seconds.

(1)

Indoor unit address		
Current address		
ODU -	IDU -	Gr -
Unit		
Return		

(2)

Indoor unit address		
Current address		
ODU 1	IDU 1	Gr 1
Unit		
Return	Set	

3 **Select "Indoor unit address" from "Address" in the "Field setting menu", and push [Set/Fix]**
→Screen (1) is displayed, the fans and louvres of all indoor units in the group operate.
→The indoor unit that is operating is connected in a group.

4 **In screen (1), push [Menu]**
→Each push of [Menu] displays in order: Entire group → Header unit → Follower unit 1 ...

5 **Check the position of the indoor unit**
→Screen (2) is displayed, the fans and louvres of the selected indoor units operate, the other units stop.

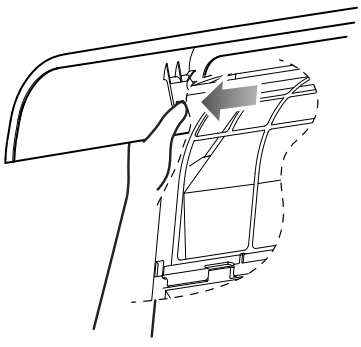
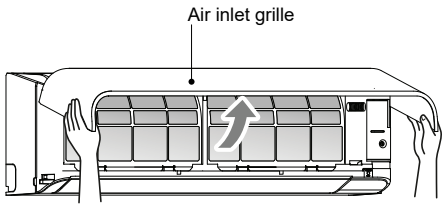
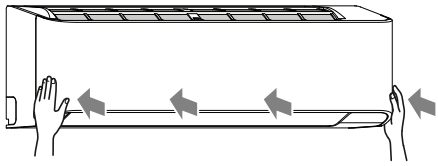
6 **After checking, push [Return]**
→Return to the "Address" screen.

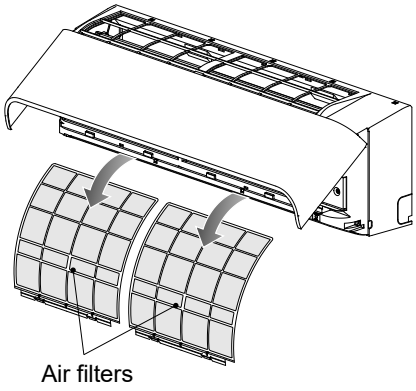
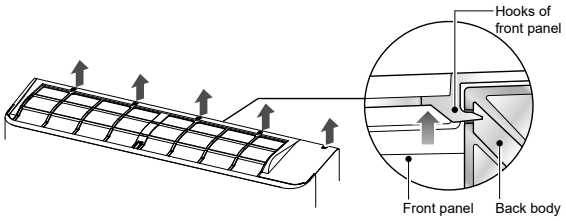
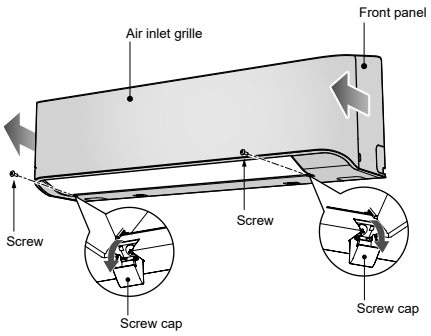
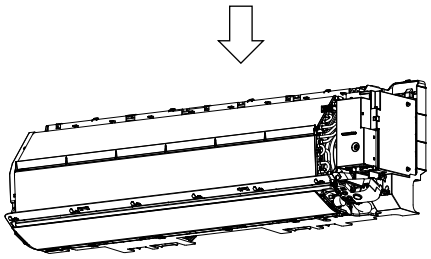
12. HOW TO REPLACE THE MAIN PARTS

WARNING

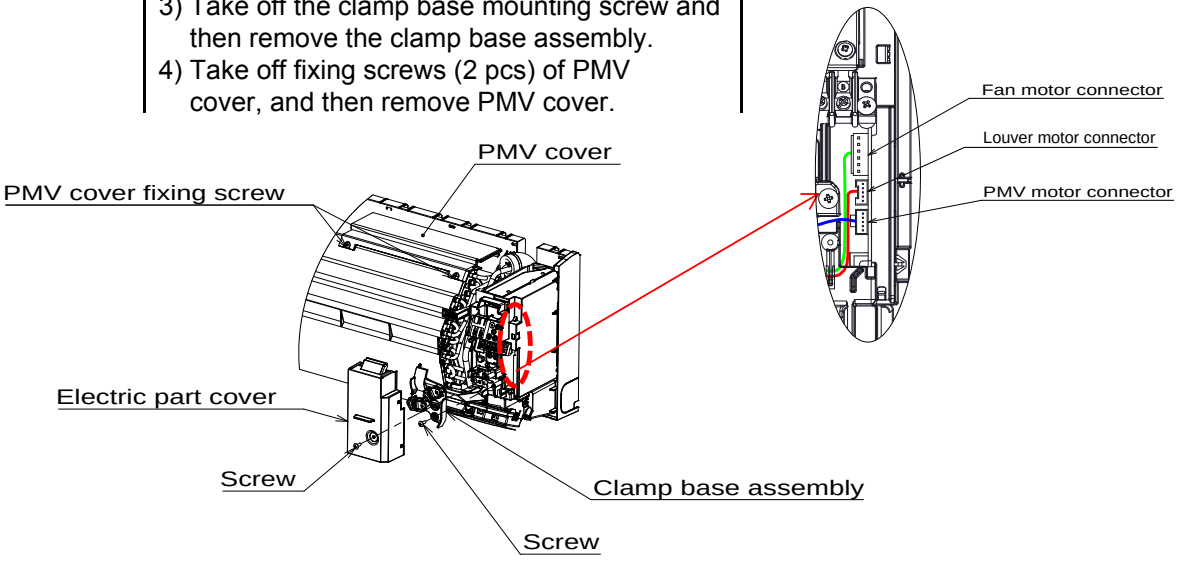
- Since high voltages pass through the electrical parts, turn off the power without fail before proceeding with the repairs.
  Electric shocks may occur if the power plug is not disconnected.
- After the repairs have been completed (after the front panel and cabinet have been installed), perform a test run, and check for smoking, unusual sounds and other abnormalities.
  If this check is omitted, a fire and/or electric shocks may occur.
  Before proceeding with the test run, install the front panel and cabinet.
- Ensure that the following steps are taken when doing repairs on the refrigerating cycle.
  1. Do not allow any naked flames in the surrounding area.
     If a gas stove or other appliance is being used, extinguish the flames before proceeding.
     If the flames are not extinguished, they may ignite any oil mixed with the refrigerant gas.
  2. Do not use welding equipment in an airtight room.
     Carbon monoxide poisoning may result if the room is not properly ventilated.
  3. Do not bring welding equipment near flammable objects.
     Flames from the equipment may cause the flammable objects to catch fire.
- **If keeping the power on is absolutely unavoidable while doing a job such as inspecting the circuitry, wear rubber gloves to avoid contact with the live parts.**
  Electric shocks may be received if the live parts are touched.
  High-voltage circuits are contained inside this unit.
  Proceed very carefully when conducting checks since directly touching the parts on the control circuit board may result in electric shocks.

Indoor Unit

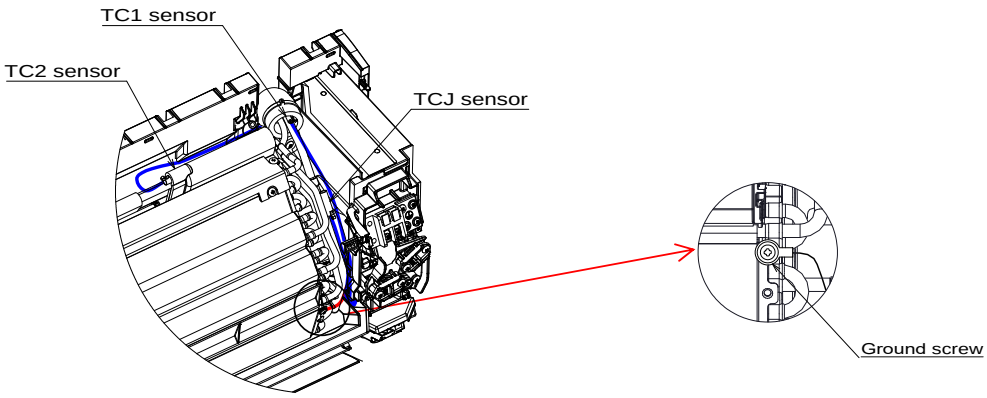
No.	Part name	Procedures	Remarks
①	Air inlet grille	1) Stop operation of the air conditioner and turn off its main power supply. 2) Open the air inlet grille and push it up until the air inlet grille take off. **<Remark>** If you do not have enough space for push the air inlet grille up until it take off, you can push the arms of air inlet grille toward the outside, and remove the air inlet grille.  **<To re-installation>** - Carry out attaching in the reverse order to removal. - Keep front panel horizontally and put both arms into guides. - Make sure both arms are inserted completely.	 

No.	Part name	Procedures	Remarks
②	Air filters	1) Follow to the procedure in the item ①.  2) Remove the left and the right air filters from the front panel.	
③	Front panel	1) Stop operation of the air conditioner and turn off its main power supply. 2) Open two screw caps and securely remove screws (2 pcs.) at the front panel.  3) Take off the hooks of front panel from top side of the back body. 4) Slightly open the lower part of the front panel then pull the upper part of the front panel toward you to remove it as shown on figure.	 

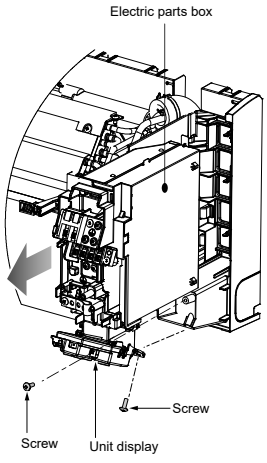
No.	Part name	Procedures	Remarks
④	Electric part box assembly	1) Follow the procedure item③. 2) Remove screw holding the electric part cover. 3) Take off the clamp base mounting screw and then remove the clamp base assembly. 4) Take off fixing screws (2 pcs) of PMV cover, and then remove PMV cover.	

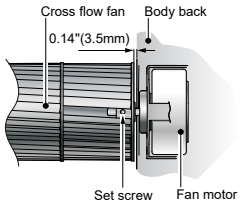
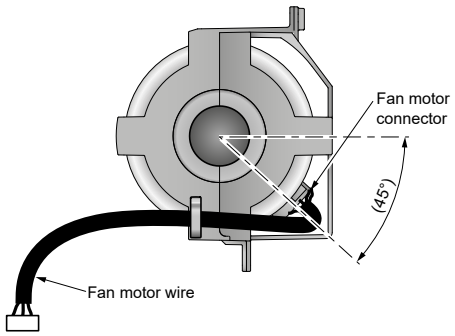
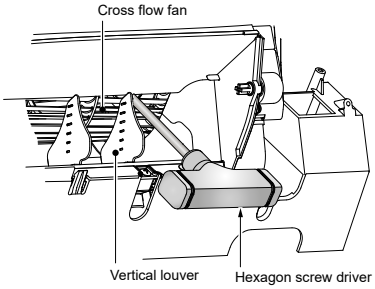
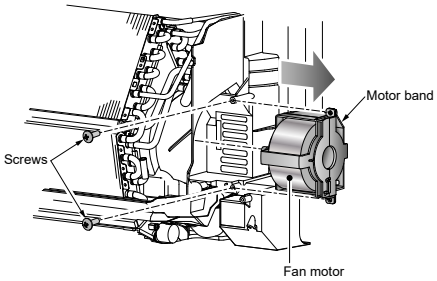
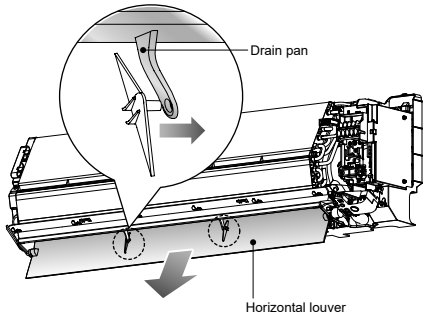
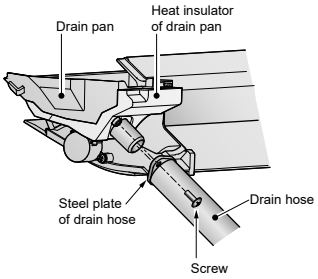
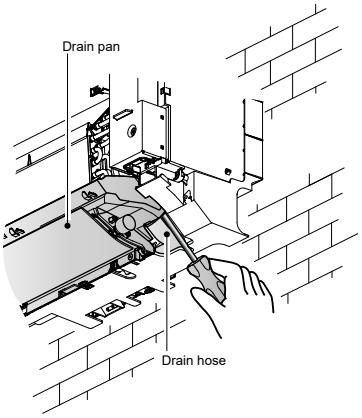


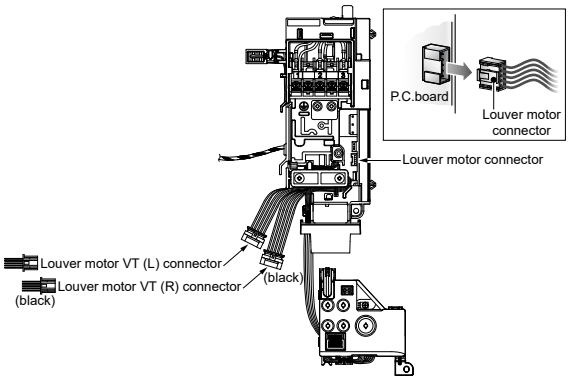
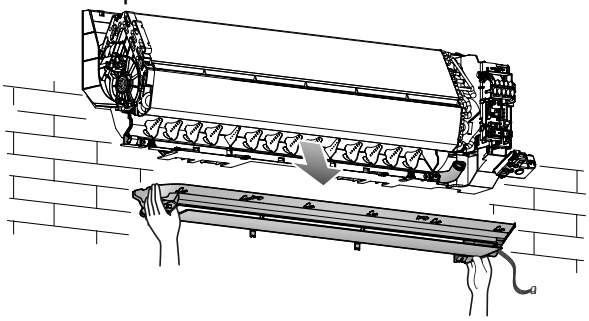
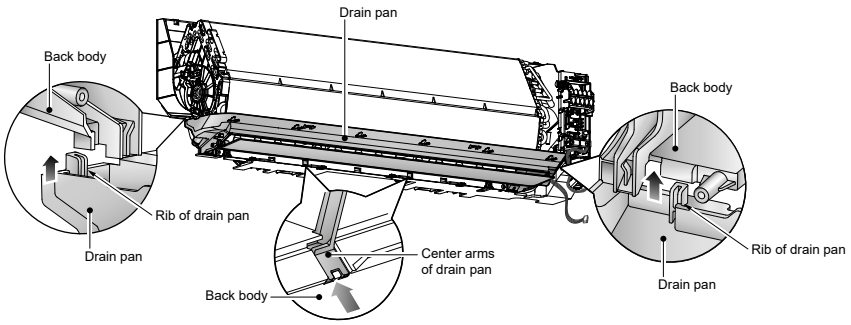
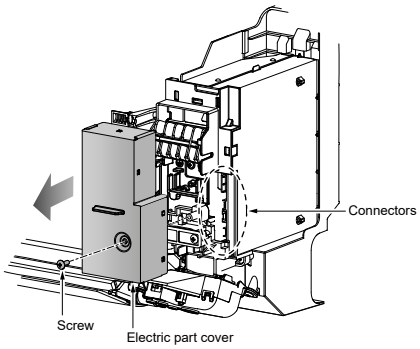
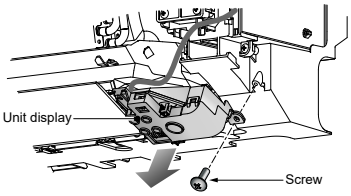
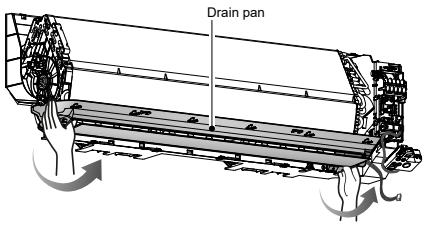
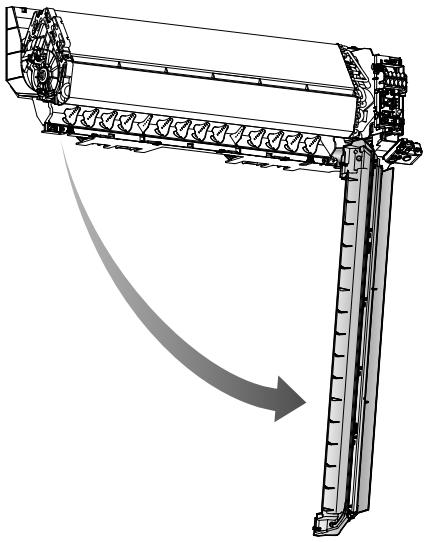
5) Pull out TC1, TC2, TCJ sensors from sensor holder of hear exchanger.
(Pay attention to mounting positions of each sensor when reassembling of electric parts. Be sure to apply marking, etc to TC2 and TCJ sensors before removing because their shapes are reassembled.)

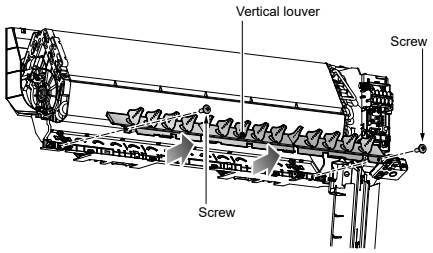
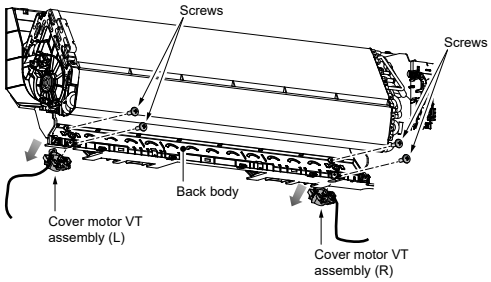
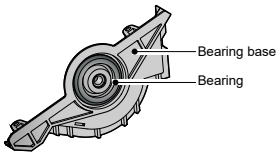
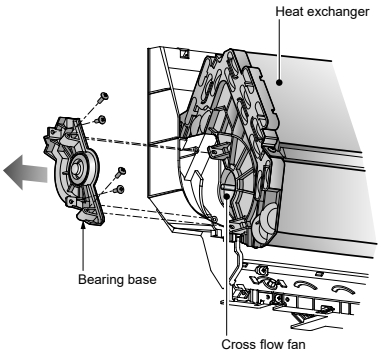
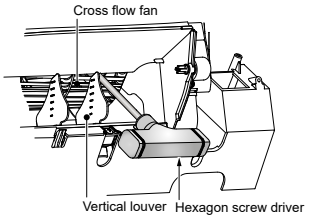
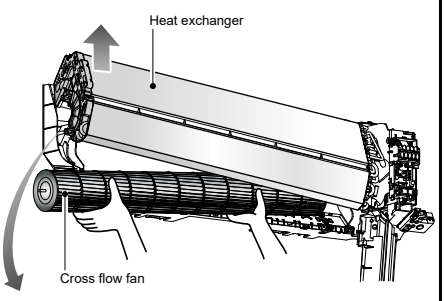


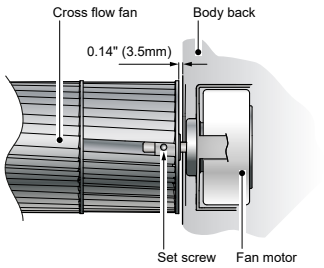
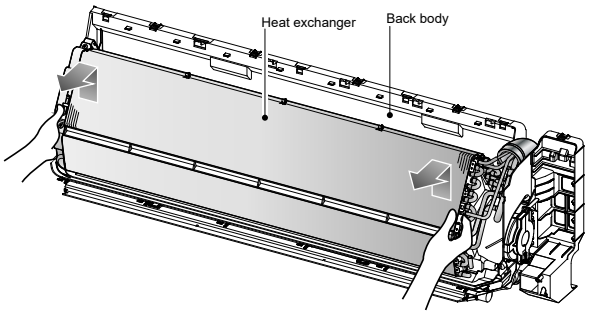
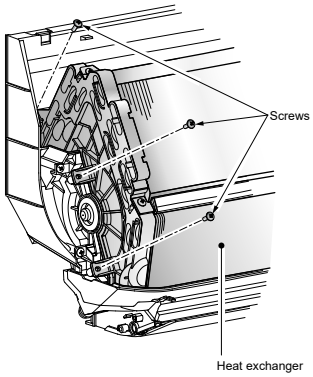
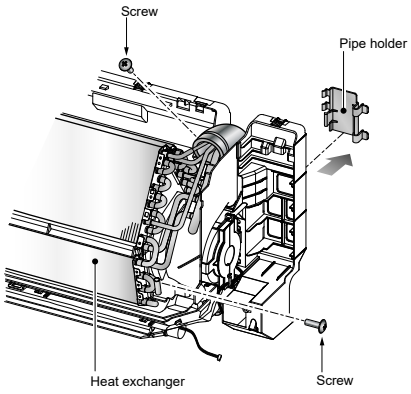
6) Remove the ground screw and ground line from evaporator.
7) Disconnect the connectors for the fan motor, louver motor and PMV motor from P.C. board assembly.
8) Remove the 2 fixing screws that secures the electric parts box assembly, unit display assembly and remove the electric parts box assembly.



No.	Part name	Procedures	Remarks
⑤	Fan motor	1) Follow the procedure item ③and④. 2) Loosen the set screw of the cross flow fan.  3) Remove 2 fixing screws of the motor band. 4) Pull the motor band and the fan motor outward. **<To re-installation>** - Keep connector position and arrange fan motor wire follow figure.  	 
⑥	Horizontal louver	1) Remove shaft of the horizontal louver from the back body. (First remove 2 the center shafts then remove the other shafts.)	
⑦	Drain hose	1) Follow the procedure item ③. 2) The drain hose can be removed by removing the screw securing the drain hose and then pulling out the drain hose. 3) When removing the drain hose, be careful of any sharp edges of steel plate. The edges can injuries.  **<To re-installation>** - To install the drain hose, insert the drain hose firmly until the connection part contacts with heat insulator, and then secure it with original screw.	

No.	Part name	Procedures	Remarks
⑧	Drain pan assembly	1) Follow the procedure item ③. 2) Remove screw holding the electric part cover. 3) Disconnect the louver motor connector (5P) from P.C. board assembly. 4) Disconnect the cord motor of Louver VT (5P) from the Louver VT (L/R) connector.  5) Remove fixing screw of the unit display and remove unit display. 6) Remove drain pan can be selected remove drain hose or not remove drain hose following: ***- Not remove drain hose;*** Pulling out the drain pan from back body, then holding the drain pan with main unit. ***- Remove drain hose;*** Drain hose can be removed follow the procedure item ⑦. After that remove the drain pan from main unit.  **<To re-installation>** - Press the drain pan into the back body. - Please make sure ribs of drain pan in left and right side must be install to lock position. - Press the two center arms of drain pan to back body. 	   

No.	Part name	Procedures	Remarks
⑨	Vertical louver assembly	1) Follow the procedure item③and⑧. 2) Remove 2 fixing screws from the base vertical louver then remove the vertical louver assembly from the body back.	
⑩	Cover motor VT assembly	1) Follow the procedure item③,⑧and⑨. 2) Remove 4 fixing screws from the body back. then remove cover motor VT assembly from rear side of main unit. 	
⑪	Bearing base	1) Follow the procedure item ③. 2) Remove 4 fixing screws from the bearing base, then remove it from the main unit.  **<Caution at assembling>** - If the bearing is out from the housing, push it into the specified position, then incorporate it in the main unit.	
⑫	Cross flow fan	1) Follow the procedure item ⑨ and ⑪. 2) Loosen the set screw of the cross flow fan. 3) Lift up the heat exchanger follow the figure. Pull out the left hand side until the cross flow fan released from the shaft of the fan motor and then pull out the lower side of heat exchanger follow the figure. **<To re-installation>** 1) To incorporate the fan motor and the motor into the position in the following figure. - Install the cross flow fan so that the right end of the 1st joint from the right of the Cross flow fan is keep 0.14" (3.5mm) from closed wall of the main unit.	 

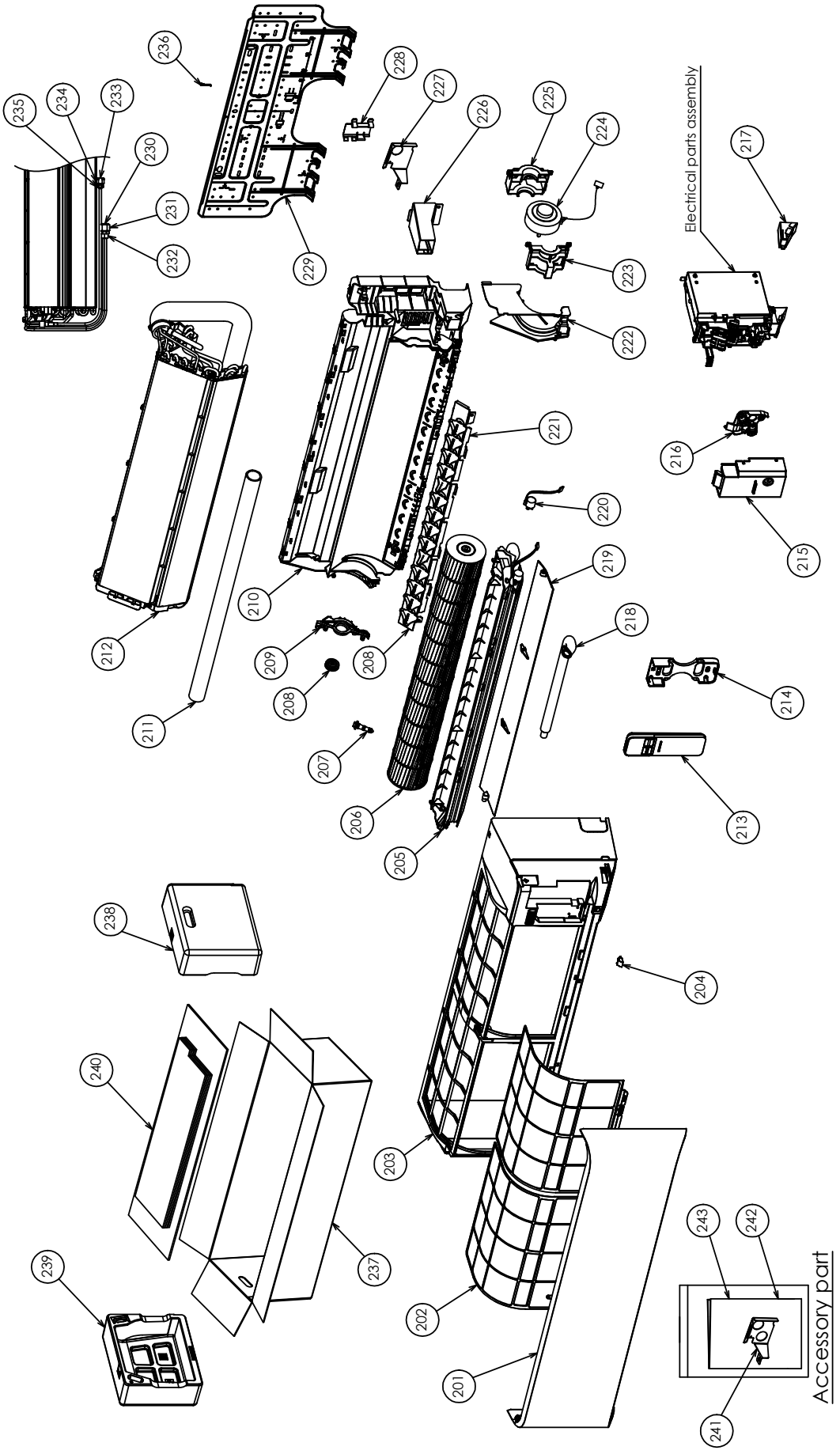
No.	Part name	Procedures	Remarks
		 - Holding the set screw, install the cross flow fan so that flat area on shaft of the fan motor comes to the mounting hole of the set screw.	
⑬	Heat exchanger (Evaporator)	1) Follow the procedure in item③ and④. 2) Remove 3 fixing screws at the upper left side of the heat exchanger. 3) Remove 2 fixing screws at the upper and right side of the heat exchanger. 4) Remove the pipe holder from the rear side of the main unit. 5) Pull out the heat exchanger to upper side.  **<To re-installation>** - Keep the back body horizontally and put the heat exchanger carefully to the back body. - Make sure the heat exchenger can be assembled with the back body and secure it tightly with screws.	 

Microcomputer

No.	Part name	Procedure	Remarks
①	Common procedure	1) Turn the power supply off to stop the operation of air-conditioner. 2) Remove the front panel. • Remove the 2 fixing screws. 3) Remove the electrical part base.	Replace terminal block, microcomputer ass'y and the P.C. board ass'y.

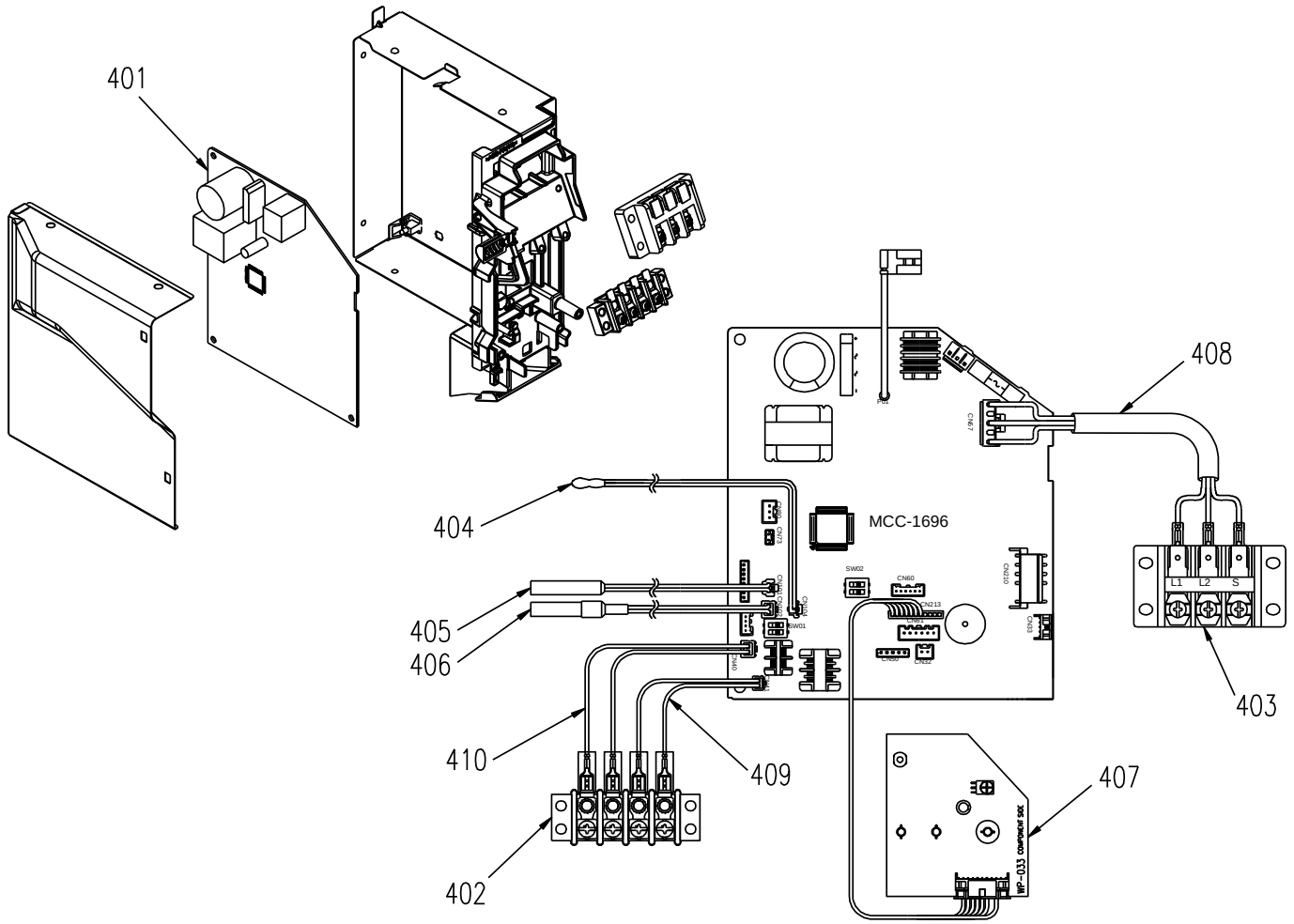
13. EXPLODED VIEWS AND PARTS LIST

High Wall Type



Location No.	Part No.	Description	Model name		
			RAV-HB121KRTP-UL	RAV-HB181KRTP-UL	RAV-HB241KRTP-UL
201	43T09591	GRILLE OF AIR INLET ASSY	1	1	1
202	43T80351	AIR FILTER	2	2	2
203	43T00744	FRONT PANEL ASSY	1	1	1
204	43T00752	CAP SCREW ASSEMBLY	2	2	2
205	43T72344	DRAIN PAN ASSY	1	1	1
206	43T20357	CROSS FLOW FAN ASSY	1	1	1
207	43T79322	DRAIN CAP	1	1	1
208	43T22312	BEARING ASSY, MOLD	1	1	1
209	43T39385	BASE BEARING	1	1	1
210	43T03412	BACK BODY ASSY	1	1	1
211	43T49411	PIPE-SHIELD	1	1	1
212	43T44873	ASM-CYCLE-REF	1	1	-
212	43T44874	ASM-CYCLE-REF	-	-	1
213	43T66415	WIRELESS REMOCO (WH-TE03NE)	1	1	1
214	43T83305	HOLDER, REMOTE CONTROL	1	1	1
215	43T62364	TERMINAL COVER ASSY	1	1	1
216	43T62365	CLAMP BASE ASSY	1	1	1
217	43T62382	CONDUIT PARTITION B ASSENBY	1	1	1
218	43T70321	DRAIN HOSE	1	1	1
219	43T22354	HORIZONTAL LOUVER	1	1	1
220	43T21478	MOTOR; STEPPING	1	1	1
221	43T22357	VERTICAL LOUVER ASSY	1	1	1
222	43T39384	MOTOR COVER	1	1	1
223	43T39382	MOTOR BAND FRONT	1	1	1
224	43T21543	FAN-MOTOR(WDF-340-30CA)	1	1	1
225	43T39381	MOTOR BAND BACK	1	1	1
226	43T62384	CONDUIT PARTITION A ASSENBY	1	1	1
227	43T62387	CONDUIT MOUNT	1	1	1
228	43T49043	HOLDER, PIPE	1	1	1
229	43T82357	PLATE, INSTALLATION	1	1	1
230	43T49407	PLASTIC BONNET 12.7DIA	1	1	-
230	43T49412	PLASTIC BONNET 15.88DIA	-	-	1
231	43T82338	SOCKET	1	1	-
231	43T82339	SOCKET	-	-	1
232	43T97322	NUT, FLARE, 3/8 IN	1	1	-
232	43T97323	NUT, FLARE, 5/8 IN	-	-	1
233	43T49405	PLASTIC BONNET 6.35DIA	1	1	-
233	43T49406	PLASTIC BONNET 6.52DIA	-	-	1
234	43T82336	SOCKET	1	1	-
234	43T82337	SOCKET	-	-	1
235	43T97320	NUT, FLARE, 1/4 IN	1	1	-
235	43T97321	NUT, FLARE, 3/8 IN	-	-	1
236	43T19333	HOLDER, SENSOR	2	2	2
237	43T91443	CARTON-BOX	1	1	1
238	43T91334	PACKING CUSHION RIGHT	1	1	1
239	43T91335	PACKING CUSHION LEFT	1	1	1
240	43T91392	REINFORCEMENT FIBERBOARD ASSY	1	1	1
241	43T62388	CONDUIT MOUNT	1	1	1
242	43T85951	INSTR-INST	1	1	1
243	43T85950	MANUAL	1	1	1

Electric Parts



Location No.	Part No.	Description	Model name		
			RAV-HB121KRTP-UL	RAV-HB181KRTP-UL	RAV-HB241KRTP-UL
401	43TNV592	PC BOARD ASSY (MCC-1696)	1	-	-
401	43TNV593	PC BOARD ASSY (MCC-1696)	-	1	-
401	43TNV594	PC BOARD ASSY (MCC-1696)	-	-	1
402	43T60448	TERMINAL	1	1	1
403	43T60402	TERMINAL:3P	1	1	1
404	43T50392	SENSOR,THERMOSTAT	1	1	1
405	43T50324	SENSOR; HEAT EXCHANGER	1	1	1
406	43T50603	TEMPERATURE SENSOR	1	1	1
407	43T6V932	PC BOARD ASSY	1	1	1
408	43T60583	ASM-HOUSING(PW)	1	1	1
409	43T60545	ASM-HOUSING(REM)	1	1	1
410	43T60546	ASM-HOSING(BUS)	1	1	1

WARNINGS ON REFRIGERANT LEAKAGE

Check of Concentration Limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its concentration will not exceed a set limit.

The refrigerant R454B which is used in the air conditioner is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws to be imposed which protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its concentration should rise excessively. Suffocation from leakage of R454B is almost non-existent. With the recent increase in the number of high concentration buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared with conventional individual air conditioners. If a single unit of the multi conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its concentration does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

In a room where the concentration may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device.

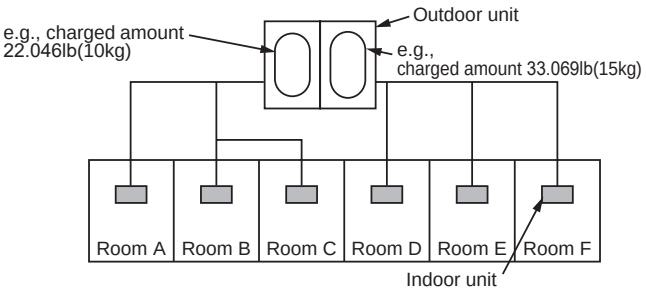
The concentration is as given below.

$$\frac{\text{Total amount of refrigerant (lb(kg))}}{\text{Min. volume of the indoor unit installed room (m}^3\text{)}} \leq \text{Concentration limit (lb)(kg/m}^3\text{)}$$

Refrigerant Concentration limit shall be in accordance with local regulation.

NOTE 1 :

If there are 2 or more refrigerating systems in a single refrigerating device, the amounts of refrigerant should be as charged in each independent device.



For the amount of charge in this example:

The possible amount of leaked refrigerant gas in rooms A, B and C is 22.046lb (10kg).

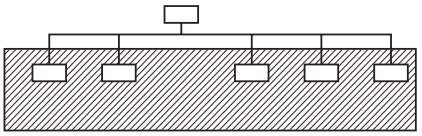
The possible amount of leaked refrigerant gas in rooms D, E and F is 33.069lb (15kg).

Important

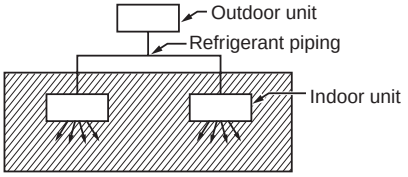
NOTE 2 :

The standards for minimum room volume are as follows.

1) No partition (shaded portion)

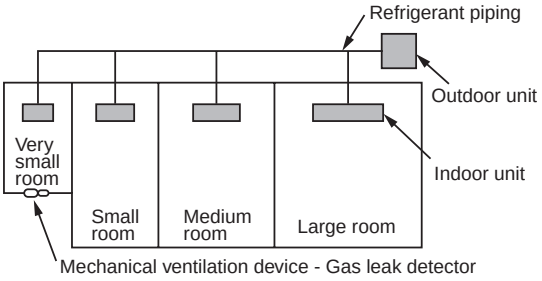


2) When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).



3) If an indoor unit is installed in each partitioned room and the refrigerant piping is interconnected, the smallest room of course becomes the object.

But when a mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.



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