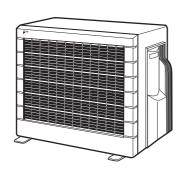




INSTALLATION MANUAL

R410A Split Series



Models
2MXS40BVMB 2MKS40BVMB
2AMXS40BVMB 2AMKS40BVMB

Installation manual R410A Split series

English

Installationsanleitung Split-Baureihe R410A

Deutsch

Manuel d'installation Série split R410A

Français

Montagehandleiding R410A Split-systeem

Nederlands

Manual de instalación Serie Split R410A

Español

Manuale d'installazione Serie Multiambienti R410A

Italiano

Εγχειρίδιο εγκατάστασης διαιρούμενης σειράς R410A

Ελληνικά

Manual de Instalação Série split R410A

Portugues

Руководство по монтажу Серия R410A с раздельной установкой

Russian

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Safety Precautions

- Read these Safety Precautions carefully to ensure correct installation.
- This manual classifies the precautions into WARNINGS and CAUTIONS.

 Be sure to follow all the precautions below: they are all important for ensuring safety.

MARNINGSFailure to follow any of WARNING is likely to result in such grave consequences as death or serious injury.

CAUTIONSFailure to follow any of CAUTION may in some cases result in grave consequences.

The following safety symbols are used throughout this manual:

	_		
4		_	_
	М		I
v	ö	•	٠

Be sure to observe this instruction.



Be sure to establish an earth connection.



Never attempt.

 After completing installation, test the unit to check for installation errors. Give the user adequate instructions concerning the use and cleaning of the unit according to the Operation Manual.

WARNINGS

- Installation should be left to the dealer or another professional.
 Improper installation may cause water leakage, electrical shock, or fire.
- Install the air conditioner according to the instructions given in this manual. Incomplete installation may cause water leakage, electrical shock, or fire.
- Be sure to use the supplied or specified installation parts.
 Use of other parts may cause the unit to come to lose, water leakage, electrical shock, or fire.
- Install the air conditioner on a solid base that can support the unit's weight.
 An inadequate base or incomplete installation may cause injury in the event the unit falls off the base.
- Electrical work should be carried out in accordance with the installation manual and the national electrical wiring rules or code of practice. Insufficient capacity or incomplete electrical work may cause electrical shock or fire.
- Be sure to use a dedicated power circuit. Never use a power supply shared by another appliance.
- For wiring, use a cable long enough to cover the entire distance with no connection.

 Do not use an extension cord. Do not put other loads on the power supply, use a dedicated power circuit.

 (Failure to do so may cause abnormal heat, electric shock or fire.)
- Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the interconnecting wires so their terminals receive no external stresses. Incomplete connections or clamping may cause terminal overheating or fire.
- After connecting interconnecting and supply wiring be sure to shape the cables so that they do not put undue force
 on the electrical covers or panels.

Install covers over the wires. Incomplete cover installation may cause terminal overheating, electrical shock, or fire.

• If any refrigerant has leaked out during the installation work, ventilate the room. (The refrigerant produces a toxic gas if exposed to flames.)



After all installation is complete, check to make sure that no refrigerant is leaking out.
 (The refrigerant produces a toxic gas if exposed to flames.)



- When installing or relocating the system, be sure to keep the refrigerant circuit free from substances other than the specified refrigerant (R410A), such as air.
 (Any presence of air or other foreign substance in the refrigerant circuit causes an abnormal pressure rise or rupture, resulting in injury.)
- Be sure to establish an earth. Do not earth the unit to a utility pipe, arrester, or telephone earth.
 Incomplete earth may cause electrical shock. A high surge current from lightning or other sources may cause damage to the air conditioner.



Be sure to install an earth leakage breaker.
 Failure to install an earth leakage breaker may result in electric shocks.

! CAUTIONS

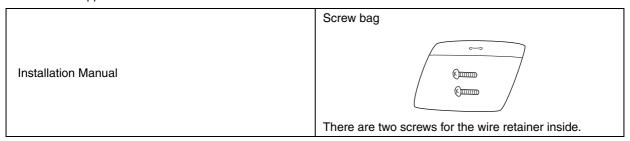
• Do not install the air conditioner in a place where there is danger of exposure to inflammable gas leakage. If the gas leaks and builds up around the unit, it may catch fire.



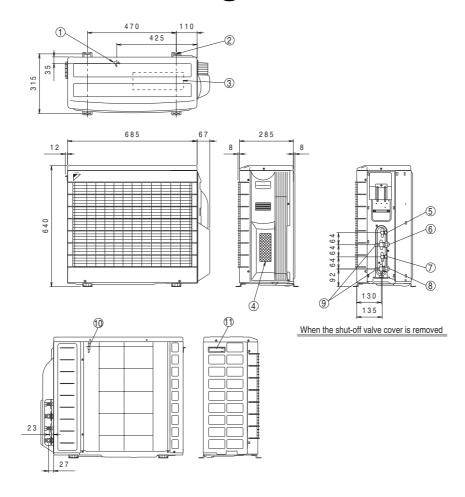
- Establish drain piping according to the instructions of this manual. Inadequate piping may cause flooding.
- Note for installing the outdoor unit. (For heat pump model only.)
 In cold area where the outside air temperature keep below or around freezing-point for a few days, the outdoor unit's drain may freeze.
 If so, it is recommended to install an electric heater in order to protect drain from freezing.
- Tighten the flare nut according to the specified method such as with a torque wrench.
 If the flare nut is tightened too hard, the flare nut may crack after a long time and cause refrigerant leakage.

Accessories

Accessories supplied with the outdoor unit:



Outside Drawings



- 1 Drain outlet
- 2 4-Hole for anchor bolt (for M8 or M10)
- 3 Wiring diagram indication label
- (4) Nameplate

- ROOM-A
- Liquid shut-off valve (\$6.4 flare connection)

ROOM-A

6 Gas shut-off valve (\$\phi 9.5 flare connection)

ROOM-B

7 Liquid shut-off valve (\$\phi6.4 flare connection)

ROOM-B

 Gas shut-off valve (\$\phi 9.5 flare connection)

- 9 Service port
- ① Outside air temperature thermistor
- 11) Handle



Precautions for Selecting the Location

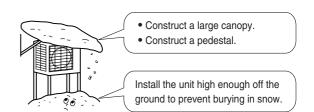
- 1) Choose a place solid enough to bear the weight and vibration of the unit, where the operation noise will not be amplified.
- 2) Choose a location where the hot air discharged from the unit or the operation noise, will not cause a nuisance to the neighbors of the user.
- 3) Avoid places near a bedroom and the like, so that the operation noise will cause no trouble.
- 4) There must be sufficient spaces for carrying the unit into and out of the site.
- 5) There must be sufficient space for air passage and no obstructions around the air inlet and the air outlet.
- 6) The site must be free from the possibility of flammable gas leakage in a nearby place. Locate the unit so that the noise and the discharged hot air will not annoy the neighbors.
- 7) Install units, power cords and inter-unit cables at least 3 meter away from television and radio sets. This is to prevent interference to images and sounds. (Noises may be heard even if they are more than 3 meter away depending on radio wave conditions.)
- 8) In coastal areas or other places with salty atmosphere of sulfate gas, corrosion may shorten the life of the air condi-
- 9) Since drain flows out of the outdoor unit, do not place under the unit anything which must be kept away from moisture.

Phased installation is not possible.



When operating the air conditioner in a low outdoor ambient temperature, be sure to follow the instructions described below.

- 1) To prevent exposure to wind, install the outdoor unit with its suction side facing the wall.
- 2) Never install the outdoor unit at a site where the suction side may be exposed directly to wind.
- 3) To prevent exposure to wind, it is recommended to install a baffle plate on the air discharge side of the outdoor unit.
- 4) In heavy snowfall areas, select an installation site where the snow will not affect the unit.

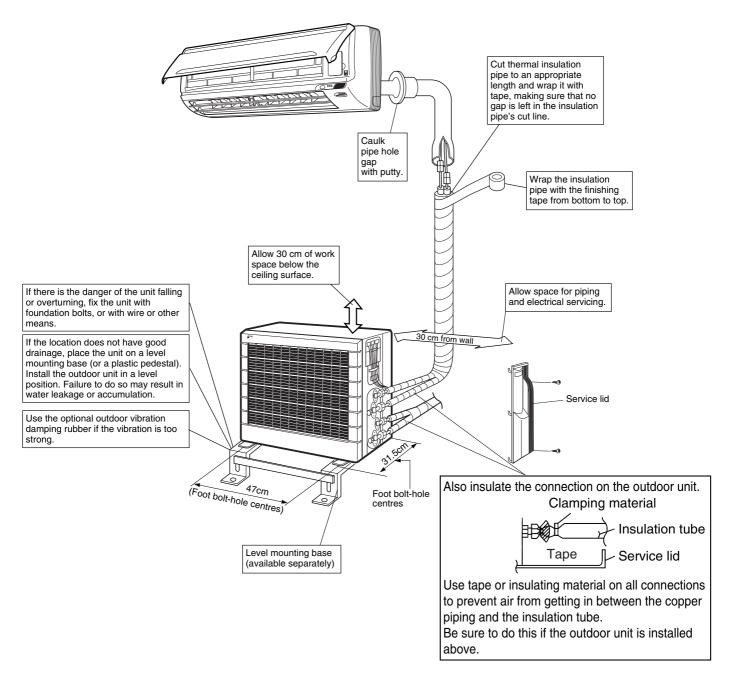


Indoor/outdoor Unit Installation Drawings

For installation of the indoor units, refer to the installation manual which was provided with the units. (The diagram shows a wall-mounted indoor unit.)

∴ Caution

- 1) Do not connect the embedded connect piping and the outdoor unit when only carrying out piping work without connecting the indoor unit in order to add another indoor unit later.
 - Make sure no dirt or moisture gets into either side of the embedded connect piping. See "6. Refrigerant Piping Work" on page 8 for details.
- 2) [2MXS40, 2AMXS40 only] Do not connect to one indoor unit. **Always connect to two indoor units.** [2MKS40, 2AMKS40 only] Can be connected to one indoor unit.

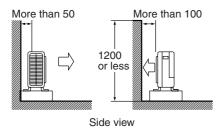


- Install the unit horizontally.
- The unit may be installed directly on a concrete verandah or a solid place if drainage is good.
- If the vibration may possibly be transmitted to the building, use a vibration-proof rubber (field supply).

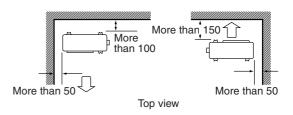
Outdoor Unit Installation Guideline

- Where a wall or other obstacle is in the path of outdoor unit intake or exhaust airflow, follow the installation guidelines below.
- For any of the below installation patterns, the wall height on the exhaust side should be 1200 mm or less.

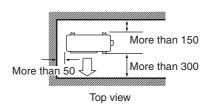
Wall facing one side



Walls facing two sides



Walls facing three sides

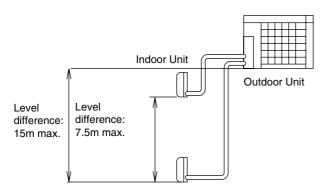


Unit: mm

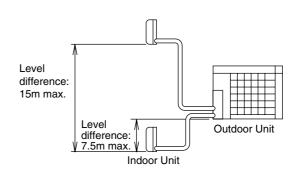
Selecting a location for installation of the indoor units

• The maximum allowable length of refrigerant piping, and the maximum allowable height difference between the outdoor and indoor units, are listed below.

Outdoor unit	2MXS40, 2MKS40 2AMXS40, 2AMKS40
Piping to each indoor unit	1.5m min. 20m max.
Total length of piping between all units	30m max.



If the outdoor unit is positioned higher than the indoor units.



If the outdoor unit is positioned otherwise. (If lower than one or more indoor units)



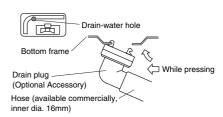
Refrigerant piping work

1. Installing Outdoor Unit

- 1) When installing the outdoor unit, refer to "Precautions for Selecting the Location" and the "Indoor/outdoor Unit Installation Drawings."
- 2) If drain work is necessary, follow the procedures below.

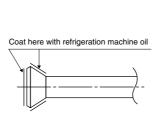
2. Drain Work

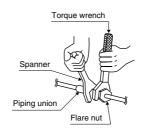
- 1) Use drain plug for drainage.
- If the drain port is covered by a mounting base or floor surface, place additional foot bases of at least 30 mm in height under the outdoor unit(s feet.
- In cold areas, do not use a drain hose with the outdoor unit.
 (Otherwise, drain water may freeze, impairing heating performance.)



3. Refrigerant Piping

- 1) Align the centres of both flares and tighten the flare nuts 3 or 4 turns by hand. Then tighten them fully with the torque wrenches.
 - Use torque wrenches when tightening the flare nuts to prevent damage to the flare nuts and escaping gas.





Flare nut tightening torque	
Flare nut for \phi6.4	14.2-17.2N • m
	(144-175kgf • cm)
Flare nut for $\phi 9.5$	32.7-39.9N • m
	(333-407kgf • cm)

Valve cap tightening
torque
21.6-27.4N • m (220-280kgf • cm)

Service port cap
tightening torque
10.8-14.7N • m (110-150kgf • cm)

2) To prevent gas leakage, apply refrigeration machine oil on both inner and outer surfaces of the flare. (Use refrigeration oil for R410A)



Refrigerant piping work

Purging Air and Checking Gas Leakage

♠ Warning

- 1) Do not mix any substance other than the specified refrigerant (R410A) into the refrigeration cycle.
- 2) Refrigerant gas leaks during air purging, ventilate the room as soon as possible.
- 3) To prevent air pollution, a vacuum pump should be used for air purging wherever possible.
- 4) Be sure to check for gas leaks.
- Be sure to perform an air purge for all the rooms at the same time.
- Be sure to use the special tools for the R410A. (gauge manifold, charge hose, vacuum pump, vacuum pump adapter, etc.)
- Use a hexagonal wrench (4 mm) to operate the shut-off valve rod.
- All refrigerant pipe joints should be tightened with a torque wrench at the specified tightening torque.
 - Connect the charge hose protrusions (the side for pushing the pin) for low pressure and high pressure on the gauge manifold to the gas shut-off valve service port for rooms A and B. (Air purge carried out simultaneously at the pipes for rooms A and B.)



Fully open gauge manifold's low-pressure valve (Lo) and high-pressure valve (Hi).



Apply vacuum pumping for 20 minutes or longer. Check that the compound pressure gauge reads -0.1 MPa (-76cm Hg).



After checking the vacuum, close the low pressure and high pressure valves on the gauge manifold and stop the vacuum pump. (Leave as is for 4-5 minutes and make sure the coupling meter needle does not go back.) If it does go back, this may indicate the presence of moisture or leaking from connecting parts.

After inspecting all the connection and loosening then retightening the nuts, repeat steps 2 - 4.



Remove the valve caps on the liquid and gas shut-off valves at the pipes for rooms A and B.



6) Open the valve rods on the liquid shut-off valves for rooms A and B by turning them 90° counterclockwise using a hex wrench. Close them 5 seconds later and check for gas leaks.

After checking for gas leaks, check the areas around flares on the indoor unit, and the areas around flares and valve rods on the outdoor unit by applying soapy water.

Wipe down thoroughly after the check is complete.

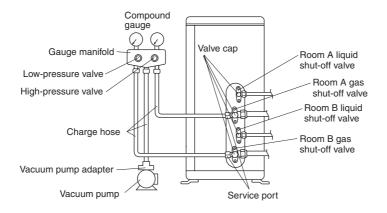


Remove the charge hose from the gas shut-off valve service ports at the pipes for rooms A and B and completely open the liquid and gas shut-off valves at the pipes for rooms A and B.

(Stop the valve rods as far as they go and do not attempt to turn them any further.)



Use a torque wrench to tighten the valve caps and service port caps on the liquid and gas shut-off valves at the pipes for rooms A and B to the designated torque.



5. Charging with Refrigerant

- If the total length of piping for all rooms exceeds 20m, additionally charge with (R410A) 20 g of refrigerant for each additional meter of piping.
 - When extra refrigerant is added, write down the total length of the piping and the amount added on the nameplate for recording how much refrigerant has been added on the back of the service lid on the outdoor unit.

⚠ Caution

- 1) Even though the shut-off valve is fully closed, the refrigerant may slowly leak out; do not leave the flare nut removed for a long period of time.
- 2) Do not overfill with refrigerant. This will break the compressor.

6. Refrigerant Piping Work

Cautions on Pipe Handling

- 1) Protect the open end of the pipe against dust and moisture.
- 2) All pipe bends should be as gentle as possible. Use a pipe bender for bending. (Bending radius should be 30 to 40 mm or larger.)

Selection of Copper and Heat Insulation materials

When using commercial copper pipes and fittings, observe the following:

1) Insulation material: Polyethylene foam

Heat transfer rate: 0.041 to 0.052kW/mK (0.035 to 0.045 kcal/mh°C)

Refrigerant gas pipe's surface temperature reaches 110°C max.

Choose heat insulation materials that will withstand this temperature.

Be sure to insulate both the gas and liquid piping and to provide insulation dimensions as below.

Gas pipe	Gas pipe insulation
O.D.: 9.5mm / Thickness:0.8mm	I.D.: 12 – 15mm / Thickness:13mm min.
Liquid pipe	Liquid pipe insulation
O.D.: 6.4mm / Thickness:0.8mm	I.D.: 8 – 10mm / Thickness:10mm min.

3) Use separate thermal insulation pipes for gas and liquid refrigerant pipes.

Gas pipe Liquid pipe Liquid pipe insulation Liquid pipe insulation Finishing tape Drain hose

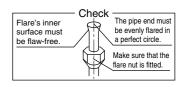
7. Flaring the Pipe End

- 1) Cut the pipe end with a pipe cutter.
- Remove burrs with the cut surface facing downward so that the chips do not enter the pipe.
- 3) Put the flare nut on the pipe.
- 4) Flare the pipe.
- 5) Check that the flaring is properly made.



1.0 ~ 1.5 mm

0 ~ 0.5 mm



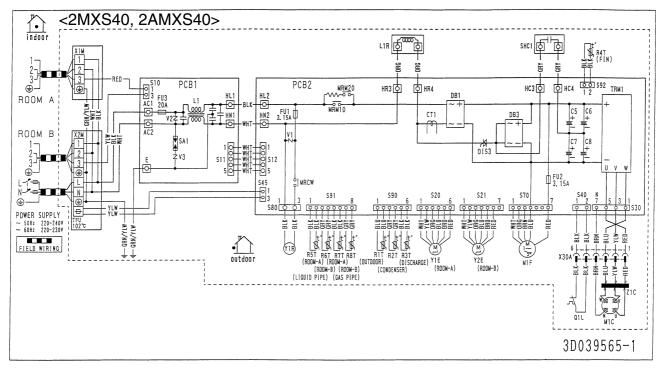
1.5 ~ 2.0 mm

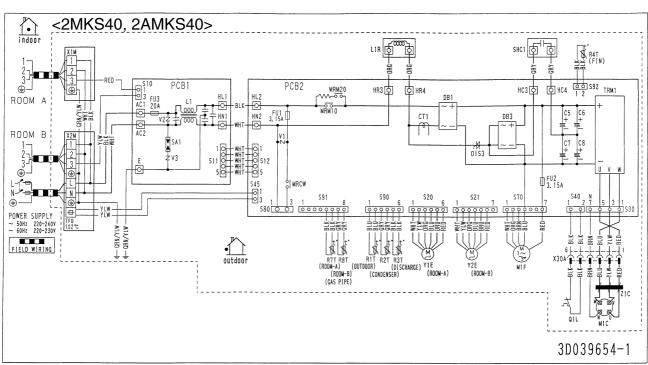
- 1) Do not use mineral oil on flared part.
- 2) Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.
- 3) Never use piping which has been used for previous installations.
- 4) Only use parts which are delivered with the unit.
- 5) Do never install a drier to this R410A unit in order to guarantee its lifetime. The drying material may dissolve and damage the system.
- 6) Incomplete flaring may cause refrigerant gas leakage.

■English 8



Wiring





C5~C8, SHC1 : CAPACITOR : CURRENT TRANSFORMER : OUTDOOR THERMISTER : CONDENSER THERMISTER Y1R: REVERSING SOLENOIDE VALVE COIL Z1C : FERRITE CORE CT1 R2T DB1, DB3 : DIODE BRIDGE : DISCHARGE PIPE THERMISTER R3T ⊕ : PROTECTIVE EARTH \$10~\$12, \$20, \$21, \$30, \$40, \$45, \$70, \$80, \$90~\$92, FU1~FU3 : FUSE LIQUID PIPE : LIVE : THERMISTER ROOM-A R5T L1 : COIL R6T : THERMISTER ROOM-B HL1, HL2, HN1, HN2, HR3, HR4, : REACTOR : COMPRESSOR MOTOR L1R AC1, AC2, HC3, HC4, E, X30A : CONNECTOR GAS PIPE THERMISTER ROOM-A BLK : BLACK : THERMISTER ROOM-B BLU : BLUE M1F : FAN MOTOR R8T SURGE ARRESTER BRN : BROWN MRCW, MRM10, SA1 : MAGNETIC RELAY MRM20 TFU : THERMAL FUSE GRY: GREY : NEUTRAL TRM1 : TRANSISTOR MODULE ORG : ORANGE OIS3 : TRIAC : PRINTED CIRCUIT BOARD V1, V2, V3 X1M, X2M VARISTOR RED : RED TERMINAL STRIP PCB1, PCB2 WHT : WHITE Y1E ELECTRONIC EXPANSION VALVE COIL Q1L : OVERLOAD PROTECTOR YLW: YELLOW Y2E ELECTRONIC EXPANSION VALVE COIL ROOM-B

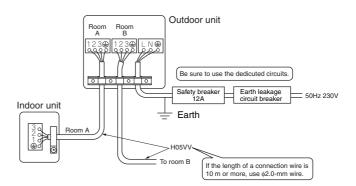
♠ Warning

Do not use tapped wires, stand wires, extensioncords, or starbust connections, as they may cause overheating, electrical shock, or fire.

- Do not turn ON the safety breaker until all work is completed.
 - 1) Strip the insulation from the wire (20 mm).
 - Connect the connection wires between the indoor and outdoor units so that the terminal numbers match. Tighten the terminal screws securely.

We recommend a flathead screwdriver be used to tighten the screws.

The screws are packed with the terminal board.

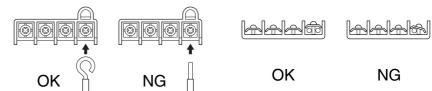




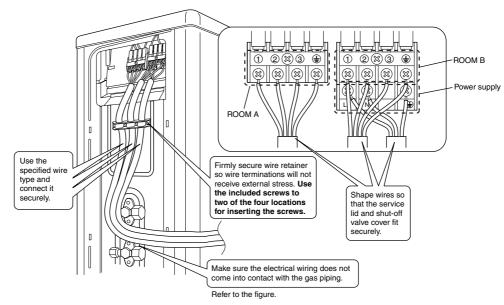
CAUTION

When connecting the connection wires to the terminal board using a single core wire, be sure to perform curling.

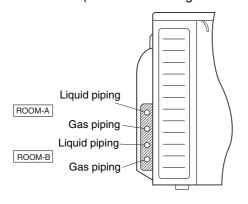
Problems with the work may cause heat and

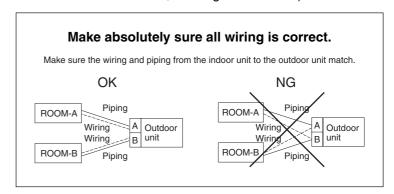


3) Pull the wire and make sure that it does not disconnect. Then fix the wire in place with a wire stop.



Make sure connecting the piping and connecting wiring fit into . (Incorrect handling will make it hard to attach the service lid, causing deformation.)





■English 10



Test Run and Final Check

- Before starting the test run, measure the voltage at the primary side of the safety breaker. Check that it is 230 V.
- Check that all liquid and gas shut-off valves are fully open.
- Check that piping and wiring all match.

1. Test Run and Final Check

- 1) To test cooling, set for the lowest temperature. To test heating, set for the highest temperature. (Depending on the room temperature, only heating or cooling (but not both) may be possible.)
- 2) After the unit is stopped, it will not start again (heating or cooling) for approximately 3 minutes.
- 3) During the test run, first check the operation of each unit individually. Then also check the simultaneous operation of all indoor units.
 - Check both heating and cooling operation.
- 4) After running the unit for approximately 20 minutes, measure the temperatures at the indoor unit inlet and outlet. If the measurements are above the values shown in the table below, then they are normal.

	Cooling	Heating
Temperature difference between inlet and outlet	Approx. 8 °C	Approx. 15 °C

(When running in one room)

- 5) During cooling operation, frost may form on the gas shut-off valve or other parts. This is normal.
- 6) Operate the indoor units in accordance with the included operation manual. Check that they operate normally.

2. Items to check

Check item	Consequences of trouble	Check
Are the indoor units installed securely?	Falling, vibration, noise	
Has an inspection been made to check for gas leakage?	No cooling, no heating	
Has complete thermal insulation been done (gas pipes, liquid pipes, indoor portions of the drain hose extension)?	Water leakage	
Is the drainage secure?	Water leakage	
Are the ground wire connections secure?	Danger in the event of a ground fault	
Are the electric wires connected correctly?	No cooling, no heating	
Is the wiring in accordance with the specifications?	Operation failure, burning	
Are the inlets/outlets of the indoor and outdoor units free of any obstructions? Are the shut-off valves open?	No cooling, no heating	
Do the marks match (room A, room B) on the wiring and piping for each indoor unit?	No cooling, no heating	

ATTENTION

- 1) Have the customer actually operate the unit while looking at the manual included with the indoor unit. Instruct the customer how to operate the unit correctly (particularly cleaning of the air filters, operation procedures, and temperature adjustment).
- 2) Even when the air conditioner is not operating, it consumes some electric power. If the customer is not going to use the unit soon after it is installed, turn OFF the breaker to avoid wasting electricity.
- 3) If additional refrigerant has been charged because of long piping, list the amount added on the nameplate on the reverse side of the shut-off valve cover.



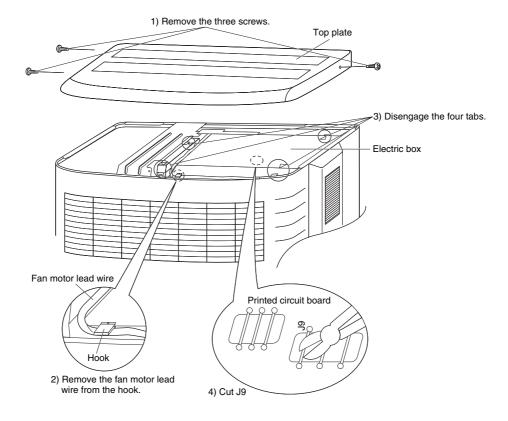
Maximum Power Input Limitation Setting

Always shut off the power supply breaker before starting.

- · The Maximum Power Input Limitation needs to be set when the unit is installed.
- This function limits the power input of the unit to 1700W.
- It is recommended for locations with low-capacity circuit breakers.

This function is only for the 2MKS40 and 2AMKS40.

- · Set as follows.
 - 1) Remove the three screws on the side and remove the top of the outdoor unit.
 - 2) Remove the fan motor lead wire from the hook and loosen it.
 - 3) Disengage the four tabs marked with a triangle and remove the electrical cabinet.
 - 4) Cut the jumper (J9) of the Printed circuit board inside.
 - 5) Go back through step 3) \rightarrow 2) \rightarrow 1). Make sure all components are well secured when doing this.





1. Concerning Handling of High Voltage Parts

Do not touch the charged parts for 10 minutes after the safety breaker is turned off, because of the danger of high voltage.

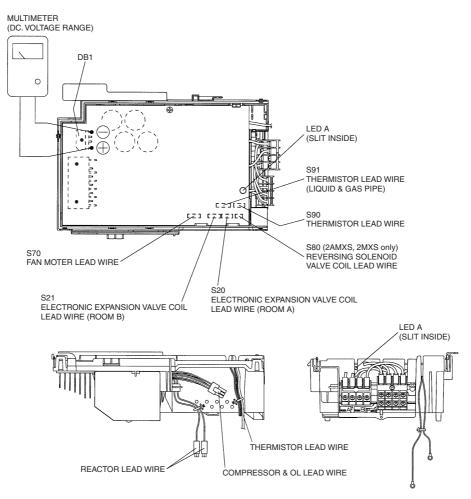
2. To Prevent Electrical Shock

Use a tester to check that the voltage between DB1 "+" and "-" is 50V or less. (Refer to the Figure at below for the locations to check.)

3. Reconnecting After Check

When reconnecting, be sure to reconnect everything the same way it was before.

4. Layout Diagram of Electrical Components



Fault Diagnosis by LED on Outdoor Unit PCB.

		DIAGNOSIS
≯	LED FLASHING	NORMAL → CHECK THE INDOOR UNIT
*	LED ON	NOTE) 1.
•	LED OFF	SUPPLY VOLTAGE OR RELATED ABNORMALITY OR NOTE) 2.

Notes:

- 1) Switch the power off and back on again if the LED display recurs, the outdoor unit PCB is fault.
- Switch the power off and back on again if the LED display recurs, either the outdoor unit PCB is at fault or the thermal fuse in the terminal strip (X2M) is severed.

Error detection should be performed using the malfunction diagnosis function on the remote controller.

Pump Down Operation

In order to protect the environment, be sure to pump down when relocating or disposing of the unit.

- 1) Remove the valve caps on the liquid and shut-off valves at the pipes for rooms A and B.
- 2) Run the unit on forced cooling. (Refer to the below.)
- 3) After 5 to 10 minutes, close the liquid shut-off valves at the pipes for rooms A and B using a hex wrench.
- 4) After 2 to 3 minutes, stop the forced cooling operation as quickly as possible after the gas shut-off valves at the pipes for rooms A and B have been shut off.
- 5) Turn the power breaker off.



Run cooling operation at the pipes for rooms A and B when performing a pump down.

1. Forced Cooling Operation

1-1. Using the indoor unit start/stop button

- 1) Press the start/stop button on the indoor unit in either room A or B for 5 seconds continuously. The units in both rooms will start.
- 2) Forced cooling operation will end after around 15 minutes and the unit will stop automatically. Press the start/stop button on the indoor unit to force the operation to stop.
- 3) Use this method to force cooling operation when the outside temperature is 10°C or lower.

1-2. Using the wireless remote controller

- 1) Select cooling operation and press the start/stop button. (The unit will start.)
- 2) Press the temperature ▲ button, ▼ button, and the "mode" button at the same time.
- 3) Press the "mode" button twice.
 - (7 will be displayed and the unit will go into test-run mode.)
- 4) Test-run mode will end after around 30 minutes and the unit will stop automatically. Press the start/stop button to force the test-run to stop.

1-3. For set-ups where the indoor unit is a low static pressure duct FDBQ series.

1) Perform cooling operation in test-run mode.



If the outside temperature is 10° C or lower, the safety device might start, preventing operation. In this situation, warm the outside temperature thermistor on the outdoor unit to 10° C or warmer. Operation will start.

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