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INSTALLATION MANUAL

AIR CONDITIONER (SPLIT TYPE)

For general public use

ENGLISH | EN

Indoor Unit	Outdoor Unit
RAS-07PKVP-E	RAS-07PAVP-E
RAS-10PKVP-E	RAS-10PAVP-E
RAS-13PKVP-E	RAS-13PAVP-E
RAS-16PKVP-E	RAS-16PAVP-E
RAS-18PKVP-E	RAS-18PAVP-E
RAS-07PKVP-ND	RAS-07PAVP-ND
RAS-10PKVP-ND	RAS-10PAVP-ND
RAS-13PKVP-ND	RAS-13PAVP-ND
RAS-16PKVP-ND	RAS-16PAVP-ND
RAS-18PKVP-ND	RAS-18PAVP-ND

Manual abstract:

*DANGER WARNING CAUTION It indicates that incorrect use of this unit can result in a high possibility of severe injury(*1) or death. It indicates that incorrect use of this unit may cause severe injury or death. It indicates that incorrect use of this unit may cause personal injury(*2), or property damage(*3). *1: A severe injury refers to blindness, injury, burns (hot or cold), electrical shock, bone fracture, or poisoning that leaves aftereffects and requires hospitalization or extended out-patient treatment. *2: Personal injury means a slight accident, burn, or electrical shock which does not require admission or repeated hospital treatment. @@@@@@1.6 times of refrigerant R22. @@Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating machine oil does not enter the refrigeration cycle of a new-refrigerant air conditioner. To avoid mixing refrigerant and refrigerating machine oil, the sizes of charging port connecting sections on the main unit are different from those for the conventional refrigerant, and different size tools are also required. For connecting pipes, use new and clean piping materials with highpressure withstand capabilities, designed for R410A only, and ensure that water or dust does not enter.*

Moreover, do not use any existing piping as its pressure withstand may be insufficient and may contain impurities. DANGER · FOR USE BY QUALIFIED PERSONS ONLY. · MEANS FOR DISCONNECTION FROM THE SUPPLY HAVING A CONTACT SEPARATION OF AT LEAST 3 mm IN ALL POLES MUST BE INCORPORATED IN THE FIXED WIRING. · TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING ANY ELECTRICAL WORK. MAKE SURE ALL POWER SWITCHES ARE OFF.

FAILURE TO DO SO MAY CAUSE ELECTRIC SHOCK. · CONNECT THE CONNECTING CABLE CORRECTLY. IF THE CONNECTING CABLE IS CONNECTED WRONGLY, ELECTRIC PARTS MAY BE DAMAGED. · CHECK THE EARTH WIRE THAT IT IS NOT BROKEN OR DISCONNECTED BEFORE INSTALLATION. · DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OR GAS VAPORS.

FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION. · TO PREVENT OVERHEATING THE INDOOR UNIT AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2 M) FROM HEAT SOURCES SUCH AS RADIATORS, HEATERS, FURNACE, STOVES, ETC. · WHEN MOVING THE AIR CONDITIONER FOR INSTALLING IT IN ANOTHER PLACE AGAIN, BE VERY CAREFUL NOT TO GET THE SPECIFIED REFRIGERANT (R410A) WITH ANY OTHER GASEOUS BODY INTO THE REFRIGERATION CYCLE. IF AIR OR ANY OTHER GAS IS MIXED IN THE REFRIGERANT, THE GAS PRESSURE IN THE REFRIGERATION CYCLE BECOMES ABNORMALLY HIGH AND IT RESULTINGLY CAUSES BURST OF THE PIPE AND INJURIES ON PERSONS. · IN THE EVENT THAT THE REFRIGERANT GAS LEAKS OUT OF THE PIPE DURING THE INSTALLATION WORK, IMMEDIATELY LET FRESH AIR INTO THE ROOM. IF THE REFRIGERANT GAS IS HEATED BY FIRE OR SOMETHING ELSE, IT CAUSES GENERATION OF POISONOUS GAS. 1 EN · WHEN INSTALLING OR RE-INSTALLING THE AIR CONDITIONER, DO NOT INJECT AIR OR OTHER SUBSTANCES BESIDES THE DESIGNATED REFRIGERANT "R410A" INTO THE REFRIGERATING CYCLE. IF AIR OR OTHER SUBSTANCES ARE MIXED, AN ABNORMAL PRESSURE CAN OCCUR IN THE REFRIGERATING CYCLE, AND THIS CAN CAUSE AN INJURY DUE TO A PIPE RUPTURE. WARNING · Installation work must be requested from the supplying retail dealership or professional vendors. Self-installation may cause water leakage, electrical shock, or fire as a result of improper installation.

· Specified tools and pipe parts for model R410A are required, and installation work must be done in accordance with the manual. HFC type refrigerant R410A has 1.6 times more pressure than that of conventional refrigerant (R22). Use the specified pipe parts, and ensure correct installation, otherwise damage and/or injury may be caused. At the same time, water leakage, electrical shock, and fire may occur. · Be sure to install the unit in a place which can sufficiently bear its weight. If the load bearing of the unit is not enough, or installation of the unit is improper, the unit may fall and result in injury. · Electrical work must be performed by a qualified electrical engineer in accordance with the code governing such installation work, internal wiring regulations, and the manual. A dedicated circuit and the rated voltage must be used. Insufficient power supply or improper installation may cause electrical shock or fire.

· Use a cabtyre cable to connect wires in the indoor/outdoor units. Midway connection, stranded wire, and single-wire connections are not allowed. Improper connection or fixing may cause a fire. · Wiring between the indoor unit and outdoor units must be well shaped so that the cover can be firmly placed. Improper cover installation may cause increased heat, fire, or electrical shock at the terminal area.

· Be sure to use only approved accessories or the specified parts. Failure to do so may cause the unit to fall, water leakage, fire or electrical shock. · After the installation work, ensure that there is no leakage of refrigerant gas. If the refrigerant gas leaks out of the pipe into the room and is heated by fire or something else from a fanheater, stove or gas range, it causes generation of poisonous gas. · Make sure the equipment is properly earthed.

Do not connect the earth wire to a gas pipe, water pipe, lightning conductor, or telephone earth wire. Improper earth work may be the cause of electrical shock. · Do not install the unit where flammable gas may leak. If there is any gas leakage or accumulation around the unit, it can cause a fire. · Do not select a location for installation where there may be excessive water or humidity, such as a bathroom. Deterioration of insulation may cause electrical shock or fire. · Installation work must be performed following the instructions in this installation manual. Improper installation may cause water leakage, electrical shock or fire. Check the following items before operating the unit. - Be sure that the pipe connection is well placed and there are no leaks.

- Check that the service valve is open. If the service valve is closed, it may cause overpressure and result in compressor damage. At the same time, if there is a leak in the connection part, it may cause air suction and overpressure, resulting in damage to the unit or injury. · In a pump-down operation, be sure to stop the compressor unit before removing the refrigerant pipe. If removing the refrigerant pipe while the compressor is operating with the service valve opened, it may cause air suction and overpressure, resulting in damage to the unit or injury. · Do not modify the power cable, connect the cable midway, or use a multiple outlet extension cable. Doing so may cause contact failure, insulation failure, or excess current, resulting in fire or electrical shock. · If you detect any damage, do not install the unit. Contact your supplying dealer immediately. · Never modify this unit by removing any of the safety guards or bypassing any of the safety interlock switches.

CAUTION · Please read this installation manual carefully before installing the unit. It contains further important instructions for proper installation. · Exposure of unit to water or other moisture before installation could result in electric shock. Do not store it in a wet basement or expose to rain or water. · After unpacking the unit, examine it carefully for possible damage.

· Do not install in a place that can increase the vibration of the unit. Do not install in a place that can amplify the noise level of the unit or where noise and discharged air might disturb neighbors. · This appliance must be connected to the main power supply by means of a circuit breaker depending on the place where the unit is installed. Failure to do so may cause electrical shock. · Follow the instructions in this installation manual to arrange the drain pipe for proper drainage from the unit.

Ensure that drained water is discharged. Improper drainage can result in water leakage, causing water damage to furniture. · Tighten the flare nut with a torque wrench using the prescribed method. Do not apply excess torque. Otherwise, the nut may crack after a long period of usage and it may cause the leakage of refrigerant. EN 2 · Wear gloves (heavy gloves such as cotton gloves) for installation work. Failure to do so may cause personal injury when handling parts with sharp edges. · Do not touch the air intake section or the aluminum fins of the outdoor unit. It may cause injury. · Do not install the outdoor unit in a place which can be a nest for small animals.

@@@@@@@@@@@@@@@@@@@@When purchasing a charge hose, be sure to confirm the port size. @@The size of opposing flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8. By increasing the clamp bar's receiving hole size, strength of spring in the tool has been improved. Charge hose Electronic balance for refrigerant charging Torque wrench (nominal dia. 1/2, 5/8) Flare tool (clutch type) Gauge for projection adjustment Vacuum pump adapter -- Gas leakage detector Used when flare is made by using conventional flare tool. Connected to conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back into the charge hose. The charge hose connecting part has two ports -- one is for conventional refrigerant (7/ 16 UNF 20 threads per inch) and the other is for R410A. If the vacuum pump oil (mineral) mixes with R410A, a sludge may occur anh a pair of nippers or an equivalent tool.

Slit In case of bottom right or bottom left piping · After making slits on the front panel with a knife or similar tool, cut them out with a pair of nippers or an equivalent tool. Slit Left-hand connection with piping Bend the connecting pipes so that they are positioned within 43 mm above the wall surface. If the connecting pipes are positioned more than 43 mm above the wall surface, the indoor unit may be unstable. When bending the connecting pipe, make sure to use a spring bender to avoid crushing the pipe. Refer to the table below for the bending radius of each connection pipe.

Outer diameter 6.35 mm 9.52 mm 12.7 mm Bending radius 30 mm 40 mm 50 mm To connect the pipe after installation of the unit (figure) (To the front of flare) 270 mm 230 mm Gas side Liquid side R30 or less (Dia. 6.

35), R40 or less (Dia. 9.52), R50 or less (Dia. 12.7) Make sure to use a spring bender to avoid crushing the pipe. 43 mm Outward form of indoor unit Use a screwdriver handle, etc. NOTE If the pipe is incorrectly bent, the indoor unit may be unstable on the wall. After passing the connecting pipe through the pipe hole, connect the connecting pipe to the auxiliary pipes and wrap the facing tape around them. CAUTION · Bind the auxiliary pipes (two) and connecting cable with facing tape tightly. In case of leftward piping and rear-leftward piping, bind the auxiliary pipes (two) only with facing tape.

Indoor unit Auxiliary pipes Connecting cable Installation plate · Carefully arrange the pipes so that none of the pipes stick out of the rear plate of the indoor unit. · Carefully connect the auxiliary pipes and connecting pipes to each other and cut off the insulating tape wound on the connecting pipe to avoid double-taping at the joint, moreover, seal the joint with the vinyl tape, etc. · Since condensation can result in machine performance trouble, be sure to insulate both connecting pipes. (Use polyethylene foam as insulating material.) · When bending a pipe, be careful not to crush it. 11 EN Indoor Unit Installation 1. 2. 3. Pass the pipe through the hole in the wall, and hook the indoor unit on the installation plate at the upper hooks. Swing the indoor unit to right and left to confirm that it is firmly hooked on the installation plate.

While pressing the indoor unit onto the wall, hook it at the lower part on the installation plate. Pull the indoor unit toward you to confirm that it is firmly hooked on the installation plate. Hook here a Installation plate Hook · For detaching the indoor unit from the installation plate pull the indoor unit toward you while pushing the bottom up at the specified places. Push Push Press (unhook) EN 12 Drainage 1. Run the drain hose at a downward sloped angle. NOTE · Hole should be made at a slight downward slant on the outdoor side. Do not route the drain hose upwards. Do not form the drain hose into a waved shape. 50 mm or more Do not put the drain hose end into water. Do not put the drain hose end in a drainage ditch.

2. 3. Put water in the drain pan and make sure that the water is being drained outside. @@Improper drainage can result in water dripping inside the room. @@@@@@@@A place which is not exposed to a strong wind. A place free of combustible gases. A place which does not block a passageway. @@@@@@@@· An allowable height level is up to 10 m. · A place where the drain water does not cause any problems. @@Do not use a bathroom scale or similar instrument.

*· Use liquid refrigerant when refilling the refrigerant. Since the refrigerant is in liquid form, it can fill quickly. @@· · · · · · · · Precautions about Installation in Regions with Snowfall and Cold Temperatures · Do not use the supplied drain nipple for draining water. Drain the water from all the drain holes directly. · To protect the outdoor unit from snow accumulation, install a holding frame, and attach a snow protection hood and plate. * Do not use a double-stacked design. Snow protection plate Front Snow protection hood Install at least 50 cm above the snow accumulation line. At least 50 cm Anchor bolts Snow accumulation line Holding frame CAUTION 1. 2. 3.*

4. Install the outdoor unit in a location where there are no obstructions near its air intake or air outlet.

When the outdoor unit is installed in a place that is always exposed to strong winds like on the coast or on a high story of a building, secure the normal fan operation using a duct or a wind shield. Especially in windy areas, install the unit to prevent the admission of wind. Installation in the following places may result in trouble.

Do not install Strong the unit in such places. wind · A place full of machine oil. · A saline-place such as the coast. · A place full of sulfide gas. · A place where high-frequency waves are likely to be generated, such as from audio equipment, welders, and medical equipment.

*Draining the water · Holes are provided on the base plate of the outdoor unit to ensure that the defrost water produced during heating operations is drained off efficiently. If a centralized drain is required when installing the unit on a balcony or wall, follow the steps below to drain off the water. 1. Proceed with water-proofing by installing the water-proof rubber caps h in the 2 elongated holes on the base plate of the outdoor unit. [How to install the water-proof rubber caps] 1) Place four fingers into each cap, and insert the caps into the water drain holes by pushing them into place from the underside of the base plate. 2) Press down on the outer circumferences of the caps to ensure that they have been inserted tightly. (Water leaks may result if the caps have not been inserted properly, if their outer circumferences lift up or the caps catch on or wedge against something.) * When water still leaks even after performing steps 1) and 2), add caulking material, putty or other sealants. h Water-proof rubber caps (supplied with the outdoor unit) Base plate g Drain nipple EN 14 2. Install the drain nipple g and a commercially available drain hose (with 16 mm inside diameter), and drain off the water.*

(For the position where the drain nipple g is installed, refer to the installation diagram of the indoor and outdoor units.) · Check that the outdoor unit is horizontal, and route the drain hose at a downward sloped angle with very little slack to the hose. Base plate g Drain nipple Commercially available drain hose Do not use ordinary garden hose, which can flatten and prevent drainage. Refrigerant Piping Connection Flaring 1. Cut the pipe with a pipe cutter. Obliquity Roughness Warp 2. Insert a flare nut into the pipe, and flare the pipe. · Projection margin in flaring: A (Unit: mm) Rigid (Clutch type) Outer diameter of copper pipe 6.35 9.52 12.

7 R410A tool used 0 to 0.5 0 to 0.5 0 to 0.5 Imperial (Wing nut type) Outer diameter of copper pipe 6.35 9.

52 12.7 Conventional tool used 1.0 to 1.5 1.0 to 1.

5 1.0 to 1.5 Die Pipe R410A 1.5 to 2.0 1.5 to 2.0 2.0 to 2.5 3. Flaring size : B (Unit : mm) Outer diameter of copper pipe B +0 0.

4 R410A R22 6.35 9.1 9.0 9.52 13.2 13.0 12.7 16.6 16.2 · In case of flaring for R410A with the conventional flare tool, pull it out approx.

0.5 mm more than that of R22 to adjust the specified flare size. The copper pipe gauge is useful for adjusting projection margin size. Tighten the connection Align the centers of the connecting pipes and tighten the flare nut as much as possible with your fingers. Then tighten the nut with a wrench and torque wrench as shown in the figure.

Half union Flare nut Externally threaded side Internally threaded side Use a wrench to secure. Use a torque wrench to tighten. CAUTION · Do not apply excessive force. Otherwise, the nut may break. 15 EN Outer diameter of copper pipe Dia.

6.35 mm Dia. 9.52 mm Dia. 12.7 mm (Unit: N·m) Tightening torque 14 to 18 (1.4 to 1.8 kgf·m) 33 to 42 (3.3 to 4.2 kgf·m) 50 to 62 (5.

0 to 6.2 kgf·m) Flare at indoor unit side · Tightening torque for connection of flare pipe The pressure of R410A is higher than R22. (Approx. 1.6 times.) Therefore securely Flare at outdoor unit side tighten the flare pipes which connect the outdoor unit and the indoor unit with the specified tightening torque using a torque wrench. If any flare pipe is incorrectly connected, it may cause not only a gas leakage but also trouble in the refrigeration cycle. Evacuating After the piping has been connected to the indoor unit, perform vacuuming. AIR PURGE Evacuate the air in the connecting pipes and in the indoor unit using a vacuum pump. Do not use the refrigerant in the outdoor unit.

For details, see the vacuum pump manual. Use a vacuum pump Be sure to use a vacuum pump with counter-flow prevention function so that oil inside the pump does not flow back into the air conditioner pipes when the pump stops. (If oil inside the vacuum pump enters the air conditioner circuit which uses R410A, trouble with the refrigeration system may develop.) 1. Connect the charge hose from the manifold valve to the service port of the gas side packed valve.

2. Connect the charge hose to the port of the vacuum pump. 3. Open fully the low pressure side handle of the gauge manifold valve. 4.

Operate the vacuum pump to begin evacuating. Perform evacuating for about 15 minutes if the piping length is 20 meters (15 minutes for 20 meters) (assuming a pump capacity of 27 liters per minute). Confirm that the compound pressure gauge reading is 101 kPa (76 cmHg). 5. Close the low pressure valve handle of gauge manifold. 6. Open fully the valve stem of the packed valves (both sides of Gas and Liquid). 7. Remove the charging hose from the service port. 8.

Securely tighten the caps on the packed valves. Compound pressure gauge 101 kPa (76 cmHg) Handle Lo Charge hose (For R410A only) Connecting pipe Pressure gauge Manifold valve Handle Hi (Keep full closed) Charge hose (For R410A only) Vacuum pump adapter for counterflow prevention (For R410A only) Vacuum pump Packed valve at liquid side Packed valve at gas side Service port (Valve core (Setting pin)) CAUTION · IMPORTANT POINTS FOR PIPING WORK (1) Prevent dust and moisture from entering the pipes. (2) Tighten connections carefully (between pipes and unit). (3) Evacuate the air in the connecting pipes using a VACUUM PUMP. (4) Check for gas leaks at all connections. EN 16 Packed valve handling precautions · Open the valve stem until it touches the stopper. Once it is in contact with the stopper, refrain from applying any more force than is necessary. · Securely tighten the valve stem cap with torque in the following table: Gas side (Dia. 12.7 mm) Gas side (Dia.

9.52 mm) Liquid side (Dia. 6.35 mm) Service port 33 to 42 N·m (3.3 to 4.

2 kgf·m) 33 to 42 N·m (3.3 to 4.2 kgf·m) 14 to 18 N·m (1.4 to 1.8 kgf·m) 14 to 18 N·m (1.

4 to 1.8 kgf·m) Hexagon wrench is required. 4 mm Wiring Connection 1. 2. 3. 4. 5. 6. Remove the valve cover, the electric parts cover and the cord clamp from the outdoor unit. Connect the connecting cable to the terminal as identified by the matching numbers on the terminal block of indoor and outdoor unit.

Insert the power cord and the connecting cable fully into the terminal block and secure it tightly with screws. Use vinyl tape, etc. to insulate the cords which are not going to be used. Locate them so that they do not touch any electrical or metal parts. Secure the power cord and the connecting cable with the cord clamp. @@@@@@@@· Prepare the power supply for the exclusive use of the air conditioner. 17 EN 6 TEST OPERATION Gas Leak Test · Check the flare nut connections for gas leaks with a gas leak detector and/or soapy water. Check places for the indoor unit Valve cover Check places for outdoor unit Test Operation To test the system, press and hold RESET button for 10 sec. (There will be one short beep.) RESET button Auto Restart Setting This product is designed so that, after a power failure, it can restart automatically in the same operating mode as before the power failure.

INFORMATION The product was shipped with Auto Restart function in the OFF position. Turn it ON as required. How to set the Auto Restart · Press and hold the RESET button for about 3 seconds. After 3 seconds, three short electric beeps will be heard to inform you that the Auto Restart has been selected. @@@@@@1.

@@b Cut the jumper wire inside the battery compartment using nippers. · The jumper wire should not remain in contact after being cut. Also, Jumper wire be careful not to let plastic scraps, jumper wire cuttings or other debris enter the inside of the remote controller. When switching between c Insert the batteries. "B" appears in the remote controller display.

settings "A" and "B", always 2. Setting the unit switch the indoor unit board Press the RESET button to start automatic operation. and the remote controller as a 3. 4. Press the button of the remote controller that was set in step 1 to stop the air conditioner. (This operation will change the setting to "B".) Check that the remote controller operates the indoor unit. pair. (Otherwise, the indoor unit will not accept the remote controller's signals.) RESET button EN 18 7 REMOVING THE MAIN PARTS Normally, the front panel, moving panel, and air flow louvers do not need to be removed.

However, use the procedure below if removal of these parts is necessary. CAUTION Before removing the front panel, moving panel, or air flow louvers, be sure to stop operation of the air conditioner and unplug the power supply. Removing the front panel and moving panel 1. Open the moving panel, and support the moving panel by the panel support on the right side. Panel support Moving panel Front panel 2. Remove the four set screws on the front panel. 3. 4. Insert your thumb into the air outlet bottom section, and lift up the front panel bottom. Close the moving panel to remove the clips on the top side as shown below. Press your finger down on the clip on the front panel top, and lift up the panel back edge so that the clip is released (5 locations). Clipa Clipb Clipc Clipd Clipe 19 EN Removing the moving panel 1. 2. Open the moving panel, and support the moving panel by the panel support on the right side. Remove the lead wire cover on the right side.

(1 screw) Lead wire cover Screw 3. After removing a screw of the left-side panel stopper, slide the panel stopper downwards. Panel stopper Screw 4. Grasp both sides of the moving panel, return the panel support to its original position, and press the left-side arm inwards with your finger. 5.

Pull out the moving panel towards the left side to remove. EN 20 Attaching the moving panel 1. Grasp both sides of the moving panel, and insert the right-side joint first. Left-side joint Right-side joint 2. Insert the left-side joint, raise the panel stopper upwards, and secure with the screw. Panel stopper Screw 3. Insert the top edge of the lead wire cover into the front panel, and secure with a screw. Screw Lead wire cover 21 EN Removing the vertical air flow louver CAUTION The horizontal air flow louvers cannot be released from the vertical air flow louver. 1. 2.

3. Open the moving panel, and support it with the panel support. Open the vertical air flow louver. Insert a flathead screwdriver into the gap of the louver fixture on the right and left ends of the vertical air flow louver, and turn in the counter-clockwise direction to remove. Louver fixture Horizontal air flow louvers Air flow louver Flathead screwdriver Removing the louver fixture (Left side) Removing the louver fixture (Right side) 4. After pressing in the right and left connector joints, remove the vertical air flow louvers. Press in the right-side joint first before pressing in the left-side joint. Attaching the vertical air flow louvers 1. 2. Attach the vertical air flow louvers by inserting the connector joints in the order of left, right, and center.

Secure the horizontal air flow louvers to the connector joints. Louver fixture Connector joints Connectors Horizontal air flow louvers Air flow louver · After pressing in the connector joints, align the positions of the connector joints and connectors. Press the louver fixture downwards to lock it into place. · After attaching, move the louver fixture from side to side to check that the connector joint does not come off. EN 22 EG44550301 .