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You can read the recommendations in the user guide, the technical guide or the installation guide for TOSHIBA RAS-13SK-E. You'll find the answers to all your questions on the TOSHIBA RAS-13SK-E in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual TOSHIBA RAS-13SK-E  
User guide TOSHIBA RAS-13SK-E  
Operating instructions TOSHIBA RAS-13SK-E  
Instructions for use TOSHIBA RAS-13SK-E  
Instruction manual TOSHIBA RAS-13SK-E

**TOSHIBA**

FILE NO. A00-9701

SERVICE MANUAL

**AIR-CONDITIONER**  
SPLIT WALL TYPE  
**RAS-13SK-E/RAS-13SA-E**  
**RAS-13SKX/RAS-13SAX**



PRINTED IN JAPAN, Feb. 1997



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**Manual abstract:**

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... 53 Indoor Unit (2) .....

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DRY) (1) Compressor, outdoor fan and operation display are controlled as shown in Fig. 7-3-1. (Room temp. Set temp.) (2) When the AUTO button is pushed, the louver vertically swings within range of 25deg. +3 +2 +1 ON:5min. OFF:5min.

ON:6min. OFF:4min.



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ON ON OFF Common relay (RY02) ON S.L. L. Fig. 7-3-1 · The microprocessor turns the compressor on and off at regular intervals (4 to 6 minutes on and/or off). During the compressor off, the indoor fan will operate in the super low position. The indoor fan will operate in the AUTO position. · (2) The pattern of operation depending on the relation between room temperature and set temperature is shown below: Room temp.

Set temp.+1 Set temp. Compressor Outdoor fan ON ON ON OFF Indoor fan OFF OFF L. \*S.L.

L. S.L. L. \*Super Low Fig.

7-3-2 13 OPERATION display Compressor Outdoor fan (RY01) Set 0 temp. 7-4. AUTO Operation (MODE of the remote control : AUTO) (1) One of the 2 modes, Cooling or Dry is selected according to room temperature at which operation is to start, as shown in Fig. 7-4-1. The Fan mode will continue until room temperature reaches a level at which another mode is selected. 7-4-1. Temporary Auto When the TEMPORARY button is pushed, the set temperature is fixed at 24°C and controlled in accordance with the chart shown in Fig. 7-4-1. (Room temp. Set temp.

) Cooling mode +4 Cooling mode +1 Dry mode (The same cooling mode as the room temperature control is set at set temp.) The Louver moved downward. (The same cooling mode as the room temperature control is set at set temp. ) (The same dry operation as the room temperature control is set at set temp. )

Fig. 7-4-1 14 7-5. ECONO. Mode When the ECONO. button is pushed, during COOL , and AUTO operation, the OPERATION display is turned off and the ECONO. display is lit and the indoor unit operates quietly and mildly with controlling airflow.

7-6. Low-Temperature Limit Control (Cooling Operation) The microprocessor detects the indoor heat exchanger temperature so as to prevent freezing up the indoor heat exchanger. Control is performed as shown in Fig. 7-6-1. 7-5-1.

Cooling (1) In the ECONO. mode, the set temp. by the remote control is changed automatically as shown in Fig. 7-5-1. (2) Fan speed LOW Heat exchanger temperature Compressor Outdoor fan ON Less than 2°C continues for 5 minutes OFF (°C) 6 2 (°C) Set temp.

is changed +2 Set temp. is changed +1 Fig. 7-6-1 Set temp. 0H 1H 2H TIME ECONO. button is pushed Fig. 7-5-1 15 7-7. Auto Restart Function This unit is equipped with an Automatic restarting facility which allows the unit to restart and resume the set operating conditions in the event of a power supply shutdown without the use of the hand control. The operation will resume without warning three minutes after the power is restored. The Auto Restart function is set not to work on shipment from the factory, and so it is necessary to set it to function as required. 7-7-1.

How to Set the Auto Restart To set the Auto Restart function, proceed as follows: Access the TEMPORARY button located in the lower right hand corner beneath the hinged front panel of the indoor unit (please refer to section on PARTS NAME). The power supply to the unit must be on - the function will not be set if the power is off. To enable the Auto Restart function, press the TEMPORARY button continuously for three seconds. The unit will acknowledge the setting and beep three times. The system will now restart automatically. The above Auto Restart settings can be carried out: · When the system is stand-by (not running) OPERATION Press the TEMPORARY button continuously more than three seconds. MOTION Stand-by The system starts to operate. about three seconds after The unit beeps three times. The system is operating. The green light will be lit.

The orange light will be lit. The orange light is lighting. 0 3S TEMPORARY If the system is not required to run at this time, press the TEMPORARY button once more or use the remote control to stop it. · When the system is operating OPERATION Press the TEMPORARY button continuously more than three seconds. MOTION Operating The system stops to operate.

about three seconds after The unit beeps three times. The system stops. The green light is lit. The green light is turned off. 0 3S TEMPORARY If the system is not required to stop at this time, use the remote control to restart it.

During subsequent operation, the orange light is lit. · The Auto Restart function will not accept an instruction if timer operation with the remote control is selected. (Please refer to the section on setting the timer or setting the louver.) · During louver swing (AUTO) operation, after restart by the Auto Restart function the louver swing stops. 16 7-7-2. How to Cancel the Auto Restart To cancel the Auto Restart function, proceed as follows: Repeat the setting procedure: the unit will acknowledge the instruction and beep three times. · When the system is stand-by (not running) OPERATION Press the TEMPORARY button continuously more than three seconds. The system will now be required to manually restart with the remote control after the main supply is turned off. Cancellation is carried out: MOTION Stand-by The system starts to operate. about three seconds after The unit beeps three times.

The system is operating. The orange light will be lit. The green light will be lit. 0 3S TEMPORARY If the system is not required to run at this time, press the TEMPORARY button once more or use the remote control to stop it. · When the system is operating OPERATION Press the TEMPORARY button continuously more than three seconds. MOTION Operating The system stops to operate. about three seconds after The unit beeps three times. The system stops. The orange light is lit. The orange light is turned off.

0 3S TEMPORARY If the system is not required to stop at this time, use the remote control to restart it. During subsequent operation, the green light is lighting. 7-7-3. In Case of Power Failure during the Timer Operation (1) If ON-TIMER operation is reserved with setting of Auto Restart operation, it is cancelled with power failure. (The OPERATION lamp on the main unit goes on and off to inform of power failure.

) In that case, try to reserve ON-TIMER operation once again. (2) If OFF-TIMER operation is reserved without setting of Auto Restart operation, the reservation is cancelled with power failure. (The OPERATION lamp on the main unit goes on and off to inform of power failure.) In that case, try to reserve OFFTIMER operation. When Auto Restart operation is set, OFF-TIMER reservation is also cancelled with power failure.

17 8. INSTALLATION PROCEDURE 8-1. Safety Cautions For general public use Power supply cord of parts of appliance for Outdoor use shall be more than polychloroprene sheathed flexible cord (design H05 RN-F), or cord designation 245 IEC 57. CAUTION TO DISCONNECT THE APPLIANCE FROM THE MAINS SUPPLY. This appliance must be connected to the mains by means of a circuit breaker or a switch with a contact separation of at least 3 mm.



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If this is not possible, a power supply plug with earth must be used. This plug must be easily accessible after installation. The plug must be disconnected from the power supply socket in order to disconnect the appliance completely from the mains. DANGER `FOR USE BY QUALIFIED PERSONS ONLY. `TURN OFF MAIN POWER SUPPLY AND BREAKER BEFORE ATTEMPTING ANY ELECTRICAL WORK.

MAKE SURE ALL POWER SWITCHES AND BREAKER TURN OFF. FAILURE TO DO SO MAY CAUSE ELECTRICAL SHOCK. `CONNECT THE CONNECTING CABLE CORRECTLY. IF THE CONNECTING CABLE IS CONNECTED BY WRONG WAY, ELECTRIC PARTS MAY BE DAMAGED. `CHECK THE EARTH WIRE IS NOT BROKEN OR DISCONNECTED BEFORE INSTALLATION. `DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OF 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 2M.) FROM HEAT SOURCES SUCH AS RADIATORS, HEAT RESISTORS, FURNACE, STOVES, ETC..

`WHEN MOVING THE AIR-CONDITIONER FOR INSTALLING IT IN ANOTHER PLACE AGAIN, BE VERY CAREFUL NOT TO GET THE SPECIFIED REFRIGERANT (R-22) 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. WARNING `Never modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.

· Do not install in a place which cannot bear the weight of the unit. Personal injury and property damage can result if the unit falls. · Before doing the electrical work, attach an approved plug to the power supply cord. And make sure the equipment to be earthed. · Appliance shall be installed in accordance with national wiring regulations.

If you detect any damage, do not install the unit. Contact your Toshiba dealer immediately. 18 CAUTION `Exposure of unit or water or other moisture before installation will result in an electrical short. Do not store 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 user's neighbors. · To avoid personal injury, be careful when handling parts with sharp edges. · Please read the installation manual carefully before installing the unit. It contains further important instructions for proper installation.

UK Plugs and Sockets etc (Safety) Regulations 1994 SI Number 1768 With regard to Schedule 3, Item 7 of the above UK Regulations, this appliance must be permanently connected to the fixed wiring of the main electrical supply by means other than the use of an approved 13 Amp plug-top as outlined in the Regulations. Electrical work must be carried by suitably qualified persons and in accordance with all relevant safety standards and codes of practice. We recommend that the power supply for this appliance is derived from a suitably protected dedicated circuit. (for U.K. only) 19 8-2. Installation Diagram of Indoor and Outdoor Units For installation of the indoor unit, use the paper pattern on the back. 3 Clip anchor Hook Front cabinet Front panel 66 mm or more For the rear and left piping Wall 120 mm or m Hook ore 1 Installation plate Insert the remote control holder cushion between the indoor unit and wall, and lift indoor unit to make work easier. Do not allow the drain hose to get slack. Hook 120 m or m m ore 8 Mounting screw Air (At tac filte r Cut the piping hole sloped slightly ht 11 Filter frame ot he 5 Shield pipe ba ck sid e.

) 6 Pan head wood screw (At tac ht ot Make sure to run the drain hose sloped downward. The auxiliary piping can be connected the left, rear left, rear, right or bottom. he 9 Deodorizing filter 10 Purifying filter ba ck sid e.) 600 mm or more 4 Remote control holder 2 Wireless remote control Right Before install the wireless remote control 100 mm or m ore ore or m mm 45 Rear Rear left Bottom Left · With the remote control cover open, load the batteries supplied correctly, observing their polarity. 2 Wireless remote control ore or m mm 400 Extension drain hose (Option: RB-821SW) 600 mm or m ore Insulation of refrigerant pipes insulates the pipes separately, not together.

7 Batteries Cover Electric parts cover Loop the connective cable (about 100 mm in diameter and 300~350 mm long). 6 mm thick heat resisting polyethylene foam 20 8-3. Installation 8-3-1. Optional Parts Part code A Parts name Refrigerant piping Liquid side :  $\phi$ 6.35 mm Gas side :  $\phi$ 12.

7 mm Pipe insulating material (polyethylene foam, 6 mm thick) Putty, PVC tapes Each one Q'ty <Anchor bolt arrangement of outdoor unit> 600mm Air inlet B C 1 Each one Air outlet 325mm Fig 8-3-1 Air outlet · Secure the outdoor unit with the anchor bolts if the unit is likely to be exposed to a strong wind. · Use  $\phi$ 8 or  $\phi$ 10 anchor bolts. 8-3-2. Installation Parts Part No. Name of parts Q'ty Part No. Name of parts Q'ty Part No. Name of parts Q'ty 1 5 9 Installation plate x 1 Shield pipe x 1 Deodorizing filter x 1 2 6 Wireless remote control x 1 Pan head wood screw  $\phi$ 3.1 x 16l x 2 10 Purifying filter x 1 3 7 11 Clip anchor x 6 Batteries x 2 Filter frame x 2 4 8 Remote control holder x 1 Mounting screw  $\phi$ 4 x 25l x 6 Others Name Installation manual Owner's manual \* This model is not equipped with an extension drain hose. Option : For the extension drain hose, use an optionally available RB-821SW or commercially available one. 21 8-4.

Indoor Unit t Installation place · A place which provides the spaces around the indoor unit as shown in the diagram in section 8-2. · A place where there is no obstacle near the air inlet and outlet. · A place which allows an easy installation of the piping to the outdoor unit. · A place which allows the front panel to be opened. 8-4-1. Cutting a Hole and Mounting Installation Plate <Cutting a hole> When installing the refrigerant pipes from the rear CAUTION · Direct sunlight to the indoor unit wireless receiver should be avoided. · The microprocessor in the indoor unit should not be too close to r-f noise sources. (For details, see the owner's manual.



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· A place where the operation noise and discharged air do not disturb your neighbors. · A place which is not exposed to a strong wind. · A place free of a leakage of combustible gases. · A place which does not block a passage.

· When the outdoor unit is to be installed in an elevated position, be sure to secure its feet. · An allowable length of the connecting pipe is up to 15 m. · An allowable head level is up to 6 m. · A place where the drain water does not raise any problem. CAUTION Installation in the following places may result in trouble.

Do not install the unit in such places. · A place full of machine oil. · A saline place such as coast. · A place full of sulfide gas. @@@@8-5-1 28 8-5-1. @@@@For details, see the manual of vacuum pump. Fig. @@(2) Connect the charge hose (B) to the port of vacuum pump. (3) Open fully the low pressure side handle of the manifold valve. (4) Operate the vacuum pump. @@@@6) Open the stems of packed valves A and B all the way. @@@@Otherwise, the nut may crack depending on the installation conditions. (Unit : N·m) Outer diam. 6.35 mm 12.

7 mm Tightening torque 15.7 (1.6 kgf·m) 49.0 (5.0 kgf·m) Additional tightening torque 19.6 (2.0 kgf·m) 53.9 (5.5 kgf·m) Pressure gage Low pressure side handle Charge hose (A) Lo Hi Outdoor unit Indoor unit Gas (φ12.7) C A Service port Charge hose (B) Half union or packed valve Flare nut VP B Liquid (φ6.35) Packed valve Externally threaded side Use a wrench to secure. Internally threaded side Use a torque wrench to tighten. D Fig. 8-5-4 Fig. 8-5-5 29 8-5-3.

Wiring Connection CAUTION · KEEP IMPORTANT 4 POINTS FOR INSTALLATION (PIPING WORK) (1) Take away dust and moisture (Inside of the connecting pipes.) (2) Tight connection (between pipes and unit) (3) Evacuate the air in the connecting pipes using VACUUM PUMP. (4) Check gas leak (connected points) (1) Remove the electric parts cover from the outdoor unit. (1 screw) (2) Connect the connecting cable to the terminals as identified with their respective matched numbers on the terminal block of indoor and outdoor units. (Strip the sheath of connecting cable with following stripping length to and insert into the terminal block.

) (3) When connecting the connecting cable to outdoor unit terminal, make a loop as shown in the installation diagram of indoor and outdoor unit, to prevent water coming in the outdoor unit. (4) Insulate the unused cords (conductors) with water coming in the outdoor unit. Process them so that they do not touch any electrical or metal parts. <Packed Valve Handling Precautions> · Open the valve stem all the way out; so not try to open it beyond the stopper. · Securely tighten the valve stem cap with the wrench or like. · Valve stem cap tightening torque is as follows; Gas pipes side (φ12.7) : 40.9 N·m (5.0 kgf·m) Liquid pipe side (φ6.35) : 16.

2 N·m (1.7 kgf·m) <Stripping length of connecting cable> <A5 mm hexagon wrench is required.> 2 Terminal block 60mm Terminal 10mm Earth line screw 1 2 Screw 10mm 50mm Earth line Flare nut 1 Connecting cable Cord clamp 5m m Stopper For a three conductor cable Fig. 8-5-7 Valve body Valve stem Valve stem cap CAUTION Fig. 8-5-6 · Wrong wiring connections may cause some electrical parts to burn out. · Be sure to comply with local code on running the wire from the indoor unit to outdoor unit. (size of wire and wiring method etc.) · Every wire must be connected firmly. NOTE : · Wipe type : More than H05 RN-F 30 8-6. Others 8-6-1.

Gas Leak Test Flare nut connections (indoor unit) C D 8-6-3. 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. Electric parts cover <How to set the Auto Restart> Valve stem cap connection A B Service cap connection Flare nut connections (Outdoor unit) · Press and hold down the TEMPORARY button for about 3 seconds.

After 3 seconds, the electronic beeper makes three short beeps to tell you the Auto Restart has been selected. · To cancel the Auto Restart, follow the page 16,17. Valve stem cap connection Fig. 8-6-1 · Check the flare nut connections, valve stem cap connections and service cap connections for gas leak with a leak detector or soap water. 8-6-2.

Test Operation To switch the TEST RUN (COOL) mode, press TEMPORARY button for 10 sec. (The beeper will make a short beep.) TEMPORARY button TEMPORARY Fig. 8-6-2 31 9. TROUBLESHOOTING CHART TROUBLESHOOTING PROCEDURES : · Following details of "What to be pre-checked first", make sure of the basic items. · When there is no trouble corresponding to above, check in detail the faulty parts following "How to judge faulty parts by symptoms" later. 9-1. What to be Prechecked First 9-1-1. Power Supply Voltage The line voltage must be AC 220/230/240V. If the line voltage is not within this range, this air conditioner may not work normally.

9-1-2. Incorrect Cable Connection between Indoor and Outdoor Units The indoor unit is connected to the outdoor unit with 3 cables. Make certain that the indoor and outdoor units have been connected properly, with terminals assigned the same numbers wired to each other. If the connectors are not connected as specified, the outdoor unit will not operate normally. 32 9-1-3. Misleading but Good Operations (Program Controlled Operation) The microcomputer performs the operations listed in Table 9-1-1 to control the air conditioner. If a claim is made on the operation, check whether it corresponds to the contents in the Table 9-1-1. If it does, it is an indispensable operation for the control and maintenance of the air conditioner: it is not a failure of the unit. Table 9-1-1 No. 1 Operation of air-conditioner When the power plug or the power cord of the indoor unit is inserted, the OPERATION lamp on the setting indication part flashes.

Description The OPERATION lamp flashes, indicating that power is turned on. If this happens, push the START/STOP button once to cause the lamp to stop flashing. A power outage also causes the lamp to flash. 2 Fan speed remains unchanged in the dry Fan speed is automatically controlled in the dry mode. mode.

Room temperature is in the range under The compressor will not stop while the compressor on hold timer which the compressor is turned off, but (3-minutes timer) is actuated. the compressor will not stop. The compressor will not switch on or off In the dry mode, the compressor goes on and off at regular intervals when the thermo control is oper- vals, independent of the thermo control.



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ated in the dry operation. Compressor does not work though room Compressor does not work while the compressor restart delay temperature is in the range of turning the (3-min.

) timer is active. The same is true after power is turned compressor on. on, as the time is still active. During automatic operation, the opera- After selection of the cooling and dry operation, the operation tion mode changes. mode is selected again when the compressor off mode continues for 15 min. according to the room temperature. And after selection of the dry operation, the condition of the room temperature which is Room temp.Set temp.+1 and which is Room temp.<Set temp.

4 continues for 15 min., the operation mode is selected again. When the power is turned on, the opera- When the auto restart controlling is selected, the operation is tion starts automatically. performed automatically in the previous operation mode after the power supply has been turned on. 3 4 5 6 7 33 9-2. Primary Judgement of Trouble Sources 9-2-1. Role of Indoor Unit Controller The indoor unit controller receives the operation commands from the remote control and assumes the following functions. · Measurement of the draft air temperature of the indoor heat exchanger by using the thermo sensor (TA). · Louver motor control · Control of the indoor fan motor operation · Control of the LED display · Control of the outdoor unit compressor, and the outdoor fan motor. 9-2-2.

Display of Abnormalities and Judgement of the Abnormal Spots The indoor unit of this machine observes the operation condition of the air conditioner and displays the contents of the self-diagnosis as block displays on the display panel of the indoor unit. Table 9-2-1 Block display A B C D E F OPERATION display flashing (1 Hz) OPERATION display flashing (5 Hz) OPERATION display flashing (5 Hz) OPERATION display flashing (5 Hz) OPERATION display flashing (5 Hz) OPERATION, TIMER and FAN-ONLY display flashing (5 Hz) Block display Power failure (when power is ON) Thermo sensor (TA) short/break Heat exchanger sensor (TC) short/break Indoor fan lock, abnormality of indoor fan Indoor PC board failure · Gas shortage, other refrigerant cycle trouble · Heat exchanger sensor open/break/short · Overload relay trouble (1) Judgement from defective operation or abnormal operation Table 9-2-2 Symptom No reaction on remote control operation Check Turn off the power once, turn it on again and try to operate the remote control again. Remote control is not possible. Remote control is possible. Primary judgement The indoor part (including the remote control) is defective.

OK. The outdoor part is defective. (outdoor fan motor) The inside part is defective. The outdoor fan does not rotate The compressor operates. The compressor does not operate.

34 (2) Self-diagnosis with remote control With the indoor unit control, self-diagnosis of protective circuit action can be done by turning the remote control operation into service mode, operating the remote control, observing the remote control indicators and checking whether TIMER lamp flashes (5 Hz). Note : · To perform this self-diagnosis, the remote control with the service code of 43069666 is required. 2) Selecting ordinary mode Push the all clear button (ACL) on the rear bottom of the wireless remote control with a tip of pencil for more than 3 seconds. Make sure the operation mode display, wind volume display, clock display and setting temperature display are turned on and " : " of the clock display is flashing. <Cautions when doing service> 1) After completion of servicing, always push the all clear (ACL) button to return the operation mode to the normal mode. 2) After completion of servicing by the check code, turn off the power once and then turn on the power to reset memorized contents of the microcomputer to the initial status. <How to select remote control operation mode> 1) Selecting service mode Push the switch button provided on rear bottom of the wireless remote control with a tip of pencil for more than 3 seconds. Make sure the setting temperature " " is displayed on the display and other display is turned off. All clear button Switch for selecting service mode ACL CLOCK ACL CLOCK Rear bottom cover (Rear bottom of remote control) Fig. 9-2-1 35 <Self-diagnosis by check codes> 1) The self-diagnosis by the check codes is conducted under the block displays of item B-H in Table 9-2-1.

2) Remote control key operation under the service mode is conducted by ON/OFF or TEMP. The remote control display by each key operation is varied as shown below. Two digit number is displayed in a hexadecimal number. 3) The self-diagnosis by the check codes is conducted with procedures shown below. a) Enter the service mode and make sure the off timer display of the remote control shows c) At the same time, also make sure the operation lamp is also flashing. This shows that the protection circuit on the indoor PC board is working. d) Operate the TEMP. key and make sure the remote control display shows " " and flashing of the operation lamp. If the operation lamp is flashing, it shows the protection circuits for connecting cable is working or thermal fuse is blown. e) In the same way, operate the TEMP.

key so that the display is increased one by one to continue checks by the self-diagnosis as shown in the next table. From " "up to " " check operations of protection circuits for each block, and " " to " " check operations of the typical protection circuits. " ". b) Operate the "ON/OFF" key and make sure the timer lamp on the display section is flashing (5 Hz). Table 9-2-3 Operating key Indication after operation " ON/OFF " TEMP.

(Up) 1 is added to data before operation. (Example) " "" © " TEMP. (Down) 1 is subtracted from data before operation. (Example) " "" © " "AUTO" LOUVER 10 is subtracted from data before operation. (Example) " "" © © " "SET" LOUVER Data before operation is directly transferred. (Example) " "" " 36 Table 9-2-4 Block level Check code Check code Diagnosis function Air Conditioner status Judgment and action Condition Block Indoor PC board Symptom Thermo sensor short/break. Continued Indicated when 1. Check thermo sensor. operation detected abnormal 2. If it is OK, check PC board. Heat exchanger sensor short/break. Continued Indicated when 1. Check heat exchanger operation detected abnormal sensor. 2. If it is OK, check PC board.

Indoor fan lock, abnormality of indoor fan. All off Indicated when 1. Disconnect the power plug detected abnormal from AC outlet, and pull out the connector (CN10) for the motor, then connect the plug of AC power cord again and turn the power on.



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2. Check the voltage between pin 1 and 2 of the connector (CN10). 3. If the output voltage is 35V, PC board is OK, check motor. Abnormality of All off other indoor unit PC board. Refrigerant system 1) Gas shortage. (gas leak) 2) Other refrigerant cycle trouble.

3) Heat exchanger sensor off/break/ short. 4) Overload relay All off Indicated when Replace PC board. detected abnormal Indicated when 1. Check gas quantity. (check gas leakage) detected abnormal 2.

If it is OK, check heat exchanger sensor. 3. If heat exchanger sensor is OK. check overload relay and thermostat for compressor. 4.

If overload relay is OK, check refrigerant cycle. 5. If refrigerant cycle is OK, check PC board. Contents detected by the check codes " " to " " are stored in memory of the microcomputer even if the power supply is turned off. Therefore, contents of operations in the past are all displayed. 37 9-3. Troubleshooting Flowcharts 9-3-1. Power can not be Turned on (No Operation at All) <Preliminary checks> (1) Is the supply voltage normal? (2) Is the connection to the AC output OK.? Operation Check Items Main cause Shut off the power supply from AC outlet once and turn it on after 5 seconds. Countermeasure Symptom NO Does the OPERATION lamp flash? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES (No problem) Does the transmission indicator of remote control flash normally and transmit certainly? YES Replace the remote control.

NO NO Remote control is defective. Does the fuse (F01) blow? NO Does the thermal fuse blow? (Under PF. Terminal) NO NO Is the indication voltage (DC12V or 5V) of main PC board correct? YES YES Parts (R21, R109, SG01, C15, C01, DB01, C02, IC01, T01) are defective. YES Wrong wiring of AC cord or connecting cable is defective. Replace the thermal fuse set. Check connection. PC board is defective. Is the voltage NO across C02 measured

DC310V~340V? YES Shut off the power Is the secondary voltage of SW trans- NO supply once, and turn it on again after disformer (T01) measured connecting the motor DC35V, DC12V, connector CN10. and DC7V ? YES Is the secondary voltage of SW NO transformer measured DC35V, DC12V, and DC7V? YES Refer to the paragraph "Pre-check", or defective circuit before power PC board block. Replace the main PC board.

\* SW transformer (T01) or IC (IC01) for power supply is defective. Replace the main PC board. Motor is defective. \* Be sure to disconnect the motor connector CN10 after shut off the power supply, or it will be a cause of damage of the motor. 38 9-3-2.

Power can not be Turned on after Replacing Indoor PC Board <Checking Procedure> Connect the AC Power supply Return the wiring of the power relay is returned to the normal procedure. Does the OPERATION lamp flash? YES NO Is it wired as shown in Figure below? YES NO To the paragraph of "No Power turns on". Black White Blue Brown C02 1 2 NL Power terminal block RY01 PC board RY02 Indoor terminal block T02 9-3-3. Outdoor Unit does not Operate Shut off the power supply from AC outlet once and turn it on after 5 seconds. NO Does the OPERATION lamp flash? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES Is AC220/230/240V supplied between terminal block 1-2? YES Is cable connection between indoor and outdoor units correct? YES Check items as following procedure in 9-3-4, 9-3-5, 9-3-6.

See "Power can not be turned on". NO See "Power can not be turned on". NO Relays (RY01, RY02) or IC31 or IC30 is failure. Replace the PC board. NO Correct cabling between indoor and outdoor units. 39 9-3-4. Only Compressor does not Operate Shut off the power supply from AC outlet once and turn it on after 5 seconds. Does the OPERATION lamp flash? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES NO See "Power can not be turned on". NO See "Power can not be turned on". Is the voltage across the indoor terminal NO ( 1 - 2 ) 220/230/240 VAC? YES Is cable connection between indoor and outdoor units correct? YES Is the voltage across the outdoor terminal ( 1 - 2 ) 220/230/240 VAC? YES Are all the cords for compressor normal? YES Is the compressor motor winding normal? (Check the winding resistor.

) YES Is the capacitor for compressor normal? YES Is the overload relay normal? YES Does the compressor start? YES Compressor starts but it stops after a while? YES Is the gas quantity normal? (Check the pressure) YES Compressor is defective NO NO NO NO NO NO NO NO NO Relay (RY01, RY02) or IC31 or IC30 is failure. Replace the PC board. Correct cabling between indoor and outdoor units. Cables between indoor and outdoor units are defective. Re-wire or replace the defective cords. Compressor is defective. Capacitor is defective. Overload relay is defective. Compressor is defective. Gas shortage (Gas leakage) 40 9-3-5.

Only Outdoor Fan does not Operate Shut off the power supply from AC outlet once and turn it on after 5 seconds. Does the OPERATION lamp flash? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES NO See "Power can not be turned on". NO See "Power can not be turned on". Is the voltage across the indoor terminal NO ( 1 - 2 ) 220/230/240 VAC? YES Is cable connection between indoor and outdoor units correct? YES Is the voltage across the outdoor terminal ( 1 - 2 ) 220/230/240 VAC? YES Are all the cords for outdoor fan motor normal? YES Is the outdoor fan motor winding normal? (Check the winding resistance) YES Is the capacitor for compressor normal? YES Outdoor fan motor is defective. NO NO NO NO NO Relays (RY01, RY02) or IC31 or IC30 is failure.

Replace the PC board. Correct cabling between indoor and outdoor units. Cables between indoor and outdoor units are defective. Correct the wire or replace the defective cords. Outdoor fan motor is defective.

Capacitor for outdoor fan motor is defective. 41 9-3-6. Only the Indoor Fan does not Operate < Check procedure > Shut off the power supply once. Turn the power supply. Does the fan stop in no operating status? YES Start the operation with low fan setting in cool operation. NO Control PC board is defective. Replace the PC board. Does the fan rotate? YES NO Is the voltage measured DC35V between 1 (red lead wire, +) NO and 2 (black lead wire, ) of the motor connector (CN10) ? YES Shut off the power supply. Shut off the power supply, and turn it on after disconnecting the motor connector (CN10) from the PC board. \* Change the setting of cooling to high fan.

Does the cross flow fan rotate normally? YES NO Repair the bearing of the cross flow fan. Turn on the power supply.



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Does the fan speed become higher? YES NO Operation stops Is the rotation signal (DC+5V-0V) output between 4 (blue lead wire) and 2 (black lead wire) of the motor connector (CN10) when rotating the cross flow fan by hand in no operating status ? (2 pulses/one turn) YES Replace the control PC board. Is the voltage of DC35V measured between 1 (red lead wire, +) NO and 2 (black lead wire, -) of the motor connector (CN10) ? YES NO Replace the PC board. Normal Replace the fan motor. \* Be sure to disconnect the motor connector CN10 after shut off the power supply, or it will be a cause of damage of the motor. 42 9-4. How to Check the Remote Control (Including the Indoor PC Board) There is no beep from the indoor unit. The operation lamp of the air conditioner main unit does not light. Push the START/STOP button.

Does the transmission indicator flash? YES NO Is there direct sunlight on the receptor of the air conditioner? YES NO Short-circuit the metal terminal at the side of the battery compartment (all-clear terminal) with a pencil. (wait about 10 seconds) Is there any thyristor fluorescent light near by? YES NO NO Is operation possible when the transmitter is moved nearer to the infrared signal receiver of the air conditioner? YES Battery life Push the START/ STOP button NO Is operation possible when setting the temporary switch of the air conditioner main unit to "TEST RUN" or "TEMPORARY AUTO"? YES NO Does the transmission indicator light? YES NO Is there any beep and operation? YES Can any signal tone be heard in a transistor radio when transmitting within 5cm distance from the radio? YES NO PC Board is failure. Keep the air conditioner away from thyristor fluorescent light. Remote control is failure. Avoid direct sunlight.

Replace PC board. Replace the batteries Normal Replace remote control. Note: After battery replacement, shortcircuit the metal terminal at the side of the battery compartment (all-clear terminal) with a pencil. 43 9-4-1. How to Check the PC Board (1) Operating precautions 1) When removing the front panel or the PC board, be sure to shut off the power supply.

2) When removing the PC board, hold the edge of the PC board and do not apply force to the parts. 3) When connecting or disconnecting the connectors on the PC board, hold the whole housing. Do not pull at the lead wire. (2) Inspection procedures 1) When a PC board is judged to be defective, check for disconnection, burning, or discoloration of the copper foil pattern or this PC board. 2) The PC board consists of the following 2 parts a. Main PC board part: Power relay, indoor fan motor drive circuit and control circuit, C.P and peripheral cir.U. cuits, buzzer drive circuit and buzzer. b.

Infrared rays receive and indication parts: Infrared rays receive unit and LED. 44 (3) Checking procedure Table 9-4-1 No. 1 Procedure Check Point (Symptom) Causes 1. \* Application of shock voltage. \* Overload by short-circuit of the parts. Shut off the power supply and 1. Is the fuse blown? remove the PC board assembly from the electronic parts base. Remove the connecting cable from the terminal block. Remove the connector for the motor, and turn the power on. If the OPERATION lamp flashes (0.

5 sec. :ON, 0.5 sec. :OFF) when the power turning on, the checking points described as 1-5 of right column are not necessary to perform. Voltage check 1. Between TP1 and TP2 (220/230/240V AC) 2. Between TP2 and pin 1 of CN04 (220/230/240V AC) 3. Between TP2 and pin 3 of CN04 (220/230/240V AC) 4. Between + and - of C02 (310 ~ 340V DC) 5. Between 35V and GND 6.

Between 12V and GND 7. Between 5 V and GND Voltage check 1. Voltage of relay coil. (DC 12V) Between pin 10 of IC31 and GND Between pin 11 of IC31 and GND 2. Between No. 1 and 2 of connecting cable terminal block. (220/230/240V AC) 1. All indicators light for 3 sec.. 2.

Indicators do not indicate normally after approximate 3 sec.. 2 1. \* AC power cord is defective. \* Poor contact of the terminal plate. \* Miss wiring of the power relay. 2. Fuse is defective. 3. Operation of the thermal fuse.

4. \* Capacitor (C01, C15) is defective. \* Line filter (L01) is defective. \* Resistor (R01) is defective. \* Diode (DB01) is defective.

5. IC01, IC02, T01 are defective. 6. IC01, IC02, T01, F03 are defective. 7.

IC01, IC02, T01, F02, Q29, IC03 are defective. 1. Breaking wire of the relay coil, defective relay driver. (IC31) 2. Poor contact of relay. 3 Make the operation status by pushing once the START/STOP button, except the status of [FAN ONLY], [ON TIMER]. 4 Start the operation with the system which the time of the restart delay timer is shortened. Defective indicator, or poor housing assembly. (CN13) 5 Make the operation status by pressing 1. Compressor does not operate.

2. OPERATION lamp flashes. once the START/STOP button. 1. The time of the restart delay timer is shortened. 2. Cool operation 3. Air volume [AUTO] 4. Make the setting temperature lower enough than room temperature. 5.

Continuous operation. The status of No. 5 is continued, and make the following condition. 1. Heat operation 2.

Make the setting temperature higher enough than room temperature. 1. Compressor does not operate. 2. OPERATION lamp flashes.

1. The temperature of the indoor heat exchanger is abnormally lower. 2. Poor contact of the heat exchanger sensor. (The connector is disconnected.) (CN01) 3. Heat exchanger sensor, main PC board are defective. (Refer to Table 9-4-2 for the judgment of defective resistance values.) 4. Main PC board is defective.

1. The temperature of the heat exchanger is abnormally high. 2. The heat exchanger sensor connector has short-circuit. (CN01) 3. The heat exchanger sensor is defective. (Refer to Table 9-4-2 for the judgment of defective resistance values.) 4. PC board is defective. 6 7 1.

Indoor fan motor is defective. 1. The voltage of DC 35V is not Turn the power on after connecting (Protecting operation on the PC measured between the red and the motor connector. board.) black of the motor terminals.

Start the operation with the following 2. Poor contact of the motor connec2. Motor does not rotate. condition. tor.

(The key operation is accepted.) 1. Operation [Cooling] 3. The motor rotates, but it vibrates too 3. PC board is defective. 2. Airflow [High fan] much. 3.

Continuous operation 45 9-4-2. PC Board Layout Top View Bottom View 46 Table 9-4-2 Approximate value of the sensor (thermistor) resistance (TA, TC) (= k) Temperature Sensor Themo Sensor 0°C 35.

8 10°C 20.7 20°C 12.6 25°C 10.0 30°C 7.92 9-4-3. How to Reduce the Operation Time of the Anti-Restart Timer · Attach the diode (1S1555 or equivalent) to the rivet inside the unit through holes on the rear of the wireless remote control unit. · Push the START/STOP button to start operation with the diode attached. Wireless remote control Timer short diode Fig. 9-4-1 47 10.



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PART REPLACEMENT 10-1.

Indoor Unit (RAS-13SK-E, RAS-13SKX) No. Part name Front panel Procedure 1) After stopping the operation of the air conditioner, be sure to turn off the circuit breaker or disconnect the power plug from the AC wall socket. 2) Open the screw caps and remove the two screws fixing the front panel. 3) Close the screw caps as they were. 4) Open the horizontal lower right below by your finger.

5) Open the lower side of front panel until it touches the horizontal louver, and remove it from the indoor unit by turning it. 1) 2) 3) 4) <To assemble the front panel> Fix the two screws to secure the front panel. Close the screw caps as they were. Press four places where are the center, right end, left end and lower portions of the air outlet. Check the gap between the front panel and the main unit.

If cooling or drying operation is performed without pressing the center of the air outlet, the surface of the front panel may be covered with frost and have a waterdrop. Remarks Electrical part assembly 1) Perform the process above. 2) Remove the screw securing the shield metal plate. 3) Remove the electrical part cover by pressing the nail located on upper portion of the electrical part cover. 4) Remove the drain guide. 5) Remove the screw securing to the end plate of the heat exchanger. 6) Remove the connector (5p) for the fan motor and the connector (6p) for the louver motor from the microcomputer assembly. @@8) Pull the TC sensor out from the holder of the heat exchanger. @@@@2) Remove the drain-pan by pressing the four hooks downwards. @@2) Remove the screw fixing the lower motor, and remove the lower motor.

3) Remove the shaft of the horizontal grille from the drain-pan. Remarks Heat exchanger 1) Perform the process. 2) Remove the pipe holder from the rear side of main unit by removing the screw. 3) Unhook the hooks fixing the left side of the heat exchanger and remove the screw fixing it, then remove the right side of the end plate from the rib fixing the main unit by sliding the heat exchanger slightly to the right side. Cross flow fan 1) 2) 3) 4) Perform the process.

Loosen the set screw of the cross flow fan. Remove the screw fixing the shaft bearing base. @@2) Remove the shaft bearing from the shaft bearing base. @@Perform the process -2) above. Remove the left and right motor bands.

@@Microcomputer (RAS-13SK-E, RAS-13SKX) No. @@2) Remove the front panel. Remove the two fixing screws. (4 x 14 ) 3) Remove the electrical part base. 1) Perform the process above.

2) Remove terminal cover (Up), (Down). 3) Disconnect the terminal blocks connected with the connecting cable, and the power cord from base Eparts by removing the screws. 4) Remove the thermal fuse (77°C) from base E-parts. Remarks Replace the thermal fuse, terminal block, power cord, microcomputer ass'y and the power supply PC board ass'y. Thermal fuse replacement 50 10-3.

Outdoor Unit (RAS-13SA-E, RAS-13SAX) No. Part name Common procedure Procedure 1) Stop the operation of air-conditioner, and disconnect the power cord from the AC supply. 2) Remove E-parts cover. (2- ST1T  $\phi$ 4 x 10 ) 3) Remove the cord clamp (2- ST2T  $\phi$ 4 x 12 ) and remove the connecting cable. 4)

Remove the front cabinet. (8- ST1T  $\phi$ 4 x 10 with nylon washer) Pull the front lower portion toward you, and remove it pulling out upward. Remarks Capacitor for compressor 1) Perform the process above. 2) Remove the fixing screw securing the capacitor band. (1- ST2T  $\phi$ 4 x 8 ) 3) Remove the cable connected to the terminal. 1) Perform the process above.

2) Remove the fixing screw. (1- ST2T  $\phi$ 4 x 8 ) 3) Remove the cable connected to the terminal. 1) 2) 3) 4) Perform the process above. Remove terminal cover of compressor. Remove thermo holder and thermostal bimetal up. Remove Fastons of leads. Capacitor for fan motor Overload relay 51 11. CAUTIONS ON REPLACEMENT OF PC BOARD ASSEMBLY 1. Set the switch (SW03) provided on the PC board as follows. ON 1 2 3 4 5 6 1 2 3 4 5 6 OFF ON OFF ON OFF OFF 2.

Don't wind the black lead wire around the current trans. (CT. T02) Black White Blue Brown C02 1 2 NL Power terminal block RY01 PC board RY02 Indoor terminal block T02 52 12. EXPLODED VIEWS AND PARTS LIST 12-1. Indoor Unit (1) 402 404 406 401 407 408 403 405 401 Location No.

401 402 403 404 Part No. 43T60002 Description Location No. 405 406 407 408 Part No. 43T69007 Description Base, Terminal 3P AC 300V, 20A , 43T69004 Sensor, Heat Exchanger 10k, 25°C 43T69005 Sensor, Thermostat 10k, 25°C 43T60004 Fuse, Temperature 77°C PC Board, WRS-LED MCC-635 43T69006 PC Board MCC-713 43T61001 Base, E-Parts ABS, Black, UL94-5V 43T62006 Base, Shield SGCC-Z08-LUB 53 Indoor Unit (2) 230 222 229 221 215 211 201 202 214 210 216 217 228 231 233 232 226 206 207 220 224 218 219 235 212 209 208 213 225 227 236 241 239 237 240 205 203 204 234 242 238 Location No. 221 222 224 225 226 227 228 229 230 231 232 233 234 234 235 236 237 238 239 240 241 242 Part No.

43T49005 43T49006 43T79002 43T39002 43T39001 43T21005 43T20007 43T22002 43T39003 43T03001 43T07002 43T82001 43T85004 43T85006 43T11001 43T69009 43T63002 43T62008 43T62002 43T62005 43T62003 43T62004 Location No. 201 202 203 204 205 206 207 208 208 209 210 211 212 213 214 215 216 217 218 219 220 Part No. 43T00002 43T00003 43T80001 43T80002 43T80003 43T07004 43T07003 43T08012 43T08011 43T19004 43T09003 for Service 43T09004 43T70001 43T21003 43T07001 43T44004 43T47006 43T47016 43T49010 43T19003 43T49009 Description Front Panel Assembly Suction Grille Air Filter (L) Air Filter (R) Frame Filter Screw Cap (L) Screw Cap (R) LED Panel (13SK-E) LED Panel (13SKX) Accepted Signal Filter Horizontal Louver Assembly Louver Assembly Drain Hose Assembly Motor Stepping Bushing Refrigeration Cycle Assembly Pipe, Delivery Pipe, Suction Pipe, Shield Holder, Sensor Spring Description Plate of EVA-SEAL Holder for Plate of EVA-SEAL Drain Guide Motor Band (Left) Motor Band (Right) Fan Motor Fan, Cross Flow Bearing Base, Bearing Rear Plate Pipe Holder Installation Plate Owner's Manual (13SK-E) Owner's Manual (13SKX) Pipe Shield Remote Control Holder, Remote Control Cover, E-Parts Terminal Cover (Up) Terminal Cover (Down) Cord Clamp Shield Cover 54 12-2.

Outdoor Unit 25 26 08 01 06 04 10 , , , 05 13 27 09 23 11 21 22 03 14,15 36 Location No. 16 17 18 19 20 21 22 23 24 25 26 27 28 Part No. 12 02 07 16,17 28 24 20 Location No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Part No. 43005144 43005143 43042446 43T19001 43T19005 43T19002 43T62007 43020302 Description Description Cabinet, Front Cabinet, Side Base Guard Fan Handle Stopper, Guard Cover, E-Parts Fan, Propeller MIX-Flow, 410DIA 43021981 Motor, Fan AC 220-240V, 50Hz 43T47001 Flange, Nut 43T63004 Holder, Wire, Lead 43T96001 Bushing 43043599 Condenser 43T46002 Packed Valve, 6.



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