
TOSHIBA
DAISEIKAI


TOSHIBA
22
PRESET
FAN
ONE-TOUCH
MODE
QUIET
PURE
COMFORT SLEEP
TIMER


TOSHIBA
DAISEIKAI
PURE COMFORT

Toshiba RAS-B10SKVP-E Service Manual

Split type air conditioner

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Table of Contents

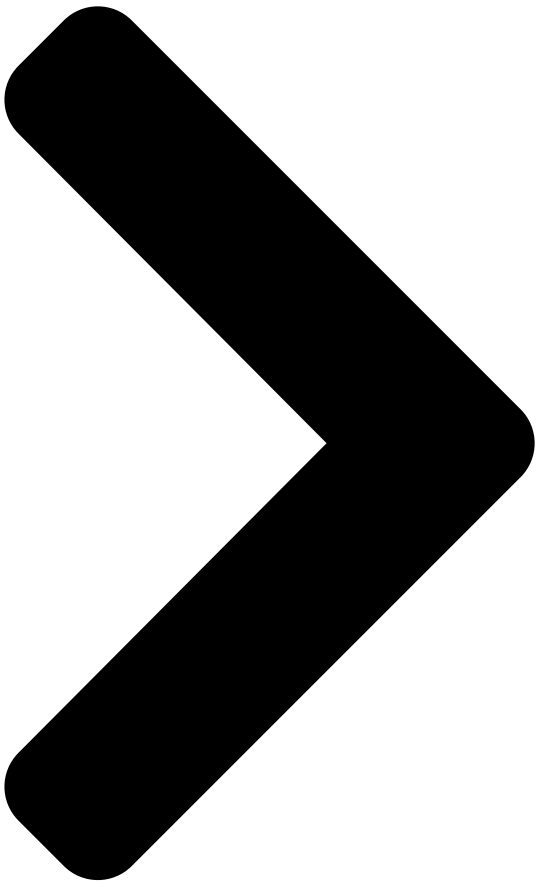
-

Troubleshooting

Bookmarks

Quick Links

See also: Service Manual , Owner's Manual



SERVICE MANUAL

TOSHIBA

AIR-CONDITIONER

Indoor Unit

<High Wall, Heat Pump Type>

(Standard Type)

RAS-B10SKVP-E

RAS-B13SKVP-E

TOSHIBA

RAS-B16SKVP-E

(North Europe Type)

RAS-10SKVP-ND

RAS-13SKVP-ND

RAS-16SKVP-ND

R410A

FILE NO. A06-011

SPLIT TYPE

Outdoor Unit

<Heat Pump Type>

RAS-10SAVP-E

RAS-13SAVP-E

RAS-16SAVP-E

RAS-10SAVP-ND

RAS-13SAVP-ND

RAS-16SAVP-ND

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ToMo

Table of Contents

Next Page

1
2
3
4
5

Chapters

Related Manuals for Toshiba RAS-B10SKVP-E

Air Conditioner Toshiba RAS-B10SKVP-E Installation Manual

(148 pages)

Air Conditioner Toshiba RAS-4M23SAV-E Service Manual

Split type (121 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Service Manual

(120 pages)

Air Conditioner Toshiba RAS-10SAVP-E Service Manual

(119 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Service Manual

Split type (117 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Service Manual

(117 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Owner's Manual

Split type air conditioner (91 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Owner's Manual

Split type; for general public use (31 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Owner's Manual

Split type (31 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Installation Manual

(19 pages)

Air Conditioner Toshiba RAS-B10SKVP-E Installation Manual

Split type air conditioner (19 pages)

Air Conditioner Toshiba RAS-16SKVP-ND Owner's Manual

(230 pages)

Air Conditioner Toshiba RAS-10SKVP-ND Installation Manual

(132 pages)

Air Conditioner Toshiba RAS-10SKVP-ND Owner's Manual

(61 pages)

Air Conditioner Toshiba RAS-B10S4KVDG-E Installation Manual

(24 pages)

Air Conditioner Toshiba RAS-B13S4KVDG-E Service Manual

(149 pages)

Summary of Contents for Toshiba RAS-B10SKVP-E

Page 1: Service Manual

FILE NO. A06-011 SERVICE MANUAL AIR-CONDITIONER SPLIT TYPE Indoor Unit Outdoor Unit <High Wall, Heat Pump Type> <Heat Pump Type> (Standard Type) RAS-B10SKVP-E RAS-10SAVP-E RAS-B13SKVP-E RAS-13SAVP-E RAS-B16SKVP-E RAS-16SAVP-E (North Europe Type) RAS-10SKVP-ND RAS-10SAVP-ND RAS-13SKVP-ND RAS-13SAVP-ND RAS-16SKVP-ND

RAS-16SAVP-ND R410A PRINTED IN JAPAN, Fub, 2007...

Page 2: Table Of Contents

CONTENTS 1. SAFETY PRECAUTIONS .....3 2. SPECIFICATIONS.....5 3. REFRIGERANT R410A .....9 4. CONSTRUCTION VIEWS ..... 17 5. WIRING DIAGRAM ..... 20 6. SPECIFICATIONS OF ELECTRICAL PARTS ..... 22 7. REFRIGERANT CYCLE DIAGRAM .....23 8. CONTROL BLOCK DIAGRAM .....25 9.

Page 3: Safety Precautions

1. SAFETY PRECAUTIONS For general public use Power supply cord of outdoor unit shall be 1.5 mm ² (H07RN-F or 60245IEC66) polychloroprene sheathed flexible cord. • Read this “SAFETY PRECAUTIONS” carefully before servicing. • The precautions described below include the important items regarding safety. Observe them without fail. •...

Page 4 • DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OR GAS VAPORS. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION. • TO PREVENT THE INDOOR UNIT FROM OVERHEATING AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2 M) FROM HEAT SOURCES SUCH AS RADIATORS, HEAT REGISTORS, FURNACE, STOVES, ETC.

Page 5: Specifications

2. SPECIFICATIONS 2-1. Specifications RAS-B10SKVP-E/RAS-B13SKVP-E/RAS-B16SKVP-E, RAS-10SAVP-E/RAS-13SAVP-E/RAS-16SAVP-E Indoor RAS-B10SKVP-E RAS-B13SKVP-E RAS-B16SKVP-E Unit model Outdoor RAS-10SAVP-E RAS-13SAVP-E RAS-16SAVP-E Cooling capacity (kW) Cooling capacity range (kW) 0.5–3.5 0.6–4.5 0.8–5.0 Heating capacity (kW) Heating capacity range (kW) 0.6 – 6.1 0.6 – 6.9 0.8 – 8.0 Power supply 1 Ph/50Hz/220–240 V, 1 Ph/60Hz/220 V...

Page 6 RAS-10SKVP-ND, RAS-13SKVP-ND, RAS-16SKVP-ND/RAS-10SAVP-ND, RAS-13SAVP-ND, RAS-16SAVP-ND Indoor RAS-10SKVP-ND RAS-13SKVP-ND RAS-16SKVP-ND Unit model Outdoor RAS-10SAVP-ND RAS-13SAVP-ND RAS-16SAVP-ND Cooling capacity (kW) Cooling capacity range (kW) 0.5–3.5 0.6–4.5 0.8–5.0 Heating capacity (kW) Heating capacity range (kW) 0.6 – 6.1 0.6 – 6.9 0.8 – 8.0 Power supply 1 Ph/50Hz/220–240 V Operation mode...

Page 7: Operation Characteristic Curve

2-2. Operation Characteristic Curve RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E <Cooling> <Heating> • Conditions • Conditions Indoor : DB 27˚C/WB 19˚C Indoor : DB 20˚C Outdoor : DB 35˚C Outdoor : DB 7˚C/WB 6˚C Air flow : High Air flow : High Pipe length : 5m...

Page 8: Capacity Variation Ratio According To Temperature

2-3. Capacity Variation Ratio According to Temperature RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E <Cooling> <Heating> • Conditions • Conditions Indoor : DB27˚C/WB19˚C Indoor : DB 20˚C Indoor air flow : High Indoor air flow : High Pipe length : 5m Pipe length : 5m –15...

Page 9: Refrigerant R410A

3. REFRIGERANT R410A This air conditioner adopts the new refrigerant HFC 6. When an air conditioning system charged with a (R410A) which does not damage the ozone layer. large volume of refrigerant is installed in a small room, it is necessary to exercise care so that, The working pressure of the new refrigerant R410A even when refrigerant leaks, its concentration is 1.6 times higher than conventional refrigerant...

Page 10 Table 3-2-1 Thicknesses of annealed copper pipes Thickness (mm) Nominal diameter Outer diameter (mm) R410A 6.35 0.80 0.80 9.52 0.80 0.80 12.70 0.80 0.80 15.88 1.00 1.00 2. Joints For copper pipes, flare joints or socket joints are used. Prior to use, be sure to remove all contaminants. a) Flare Joints Flare joints used to connect the copper pipes cannot be used for pipings whose outer diameter exceeds 20 mm.

Page 11 d) Flare Processing Make certain that a clamp bar and copper pipe have been cleaned. ØD By means of the clamp bar, perform the flare processing correctly. Use either a flare tool for R410A or conven- tional flare tool. Flare processing dimensions differ according to the type of flare tool.

Page 12 Table 3-2-6 Flare and flare nut dimensions for R22 Dimension (mm) Nominal Outer diameter Thickness Flare nut width diameter (mm) (mm) (mm) 6.35 9.52 13.0 13.5 12.70 16.2 16.0 12.9 15.88 19.7 19.0 16.0 19.05 23.3 24.0 19.2 Fig. 3-2-2 Relations between flare nut and flare seal surface 2.

Page 13 3-3. Tools 3-3-1. Required Tools The service port diameter of packed valve of the outdoor unit in the air-water heat pump using R410A is changed to prevent mixing of other refrigerant. To reinforce the pressure-resisting strength, flare processing dimensions and opposite side dimension of flare nut (For Ø12.7 copper pipe) of the refrigerant piping are lengthened.

Page 14: Recharging Of Refrigerant

3-4. Recharging of Refrigerant When it is necessary to recharge refrigerant, charge the specified amount of new refrigerant according to the following steps. Recover the refrigerant, and check no refrigerant remains in the equipment. When the compound gauge's pointer has indicated –0.1 Mpa (–76 cmHg), place the handle Low in the fully closed position, and turn off the vacuum pump's power switch.

Page 15 1. Be sure to make setting so that liquid can be charged. 2. When using a cylinder equipped with a siphon, liquid can be charged without turning it upside down. It is necessary for charging refrigerant under condition of liquid because R410A is mixed type of refrigerant. Accordingly, when charging refrigerant from the refrigerant cylinder to the equipment, charge it turning the cylinder upside down if cylinder is not equipped with siphon.

Page 16 2. Characteristics required for flux 3-5-3. Brazing • Activated temperature of flux coincides with As brazing work requires sophisticated techniques, the brazing temperature. experiences based upon a theoretical knowledge, it must be performed by a person qualified. • Due to a wide effective temperature range, flux is hard to carbonize.

Page 17: Construction Views

4. CONSTRUCTION VIEWS 4-1. Indoor Unit RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E Plasma pure filter Front panel Indoor heat exchanger Air filter Knockout system Knockout system Remote controller holder 54.5 54.5 Installation plate hanging section Wireless remote controller Installation plate hanging section Drain hose (Outside length: 0.54m)

Page 18 RAS-10SKVP-ND, RAS-13SKVP-ND, RAS-16SKVP-ND Plasma pure filter Front panel Indoor heat exchanger Air filter Knockout system Knockout system Remote controller holder 54.5 54.5 Installation plate hanging section Wireless remote controller Installation plate hanging section Drain hose (Outside length: 0.54m) Part of Remote controller Connecting pipe (Outside length: 0.4m) WH-H05JE Connecting pipe...

Page 19: Outdoor Unit

4-2. Outdoor Unit RAS-10SAVP-E, RAS-13SAVP-E, RAS-16SAVP-E, RAS-10SAVP-ND, RAS-13SAVP-ND, RAS-16SAVP-ND Dia.11-14U-shape hole A leg part (For dia.8-10 anchor bolt) 8-dia.7 hole (For fixing outdoor unit) dia.11 × 14 long hole (For dia.8-10 anchor bolt) B leg part 69.5 Packed valve cover dia.436 Fan guard Connecting pipe port...

Page 20: Wiring Diagram

P03 P10 Condenser pipe Temp. Sensor Coil for Reactor 4-way Valve 5-2. Indoor Unit Air Purifier Power Supply Electrode 220-240V~, 50Hz RAS-B10SKVP-E, 220-220V~, 60Hz RAS-B13SKVP-E, RAS-B16SKVP-E High-voltage Indoor Terminal Block Power Supply Heat Exchanger Heat GRN & YEL Exchanger CN63...

Page 21 5-3. Outdoor Unit RAS-10SAVP-ND, RAS-13SAVP-ND, RAS-16SAVP-ND Compressor Fan Motor Q200 ~ 205 Q300 ~ 305 IGBT MOS-FET CN300 Pulse Motor Valve R221 R321 R220 R320 CN700 R219 R319 CN603 P. C. Board (TS) MCC-5009 Suction pipe Temp. Sensor – – –...

Page 22: Specifications Of Electrical Parts

6. SPECIFICATIONS OF ELECTRICAL PARTS 6-1. Indoor Unit RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E RAS-10SKVP-ND, RAS-13SKVP-ND, RAS-16SKVP-ND Parts name Type Specifications Fan motor (for indoor) MF-280-30-5R DC280–340V, 30W Room temp. sensor (TA-sensor) (–) 10kΩ at 25°C Heat exchanger temp. sensor (TC-sensor) (–...

Page 23: Refrigerant Cycle Diagram

7. REFRIGERANT CYCLE DIAGRAM 7-1. Refrigerant Cycle Diagram INDOOR UNIT Indoor heat Temp. measurement exchanger Pressure measurement Cross flow fan Max. : 25m Gauge attaching port Min. : 2m Vacuum pump connecting port Chargeless : 15m Deoxidized copper pipe Charge : 20g/m Outer dia.

Page 24: Operation Data

7-2. Operation Data <Cooling> Temperature Heat exchanger Standard Compressor condition (°C) Model name pipe temp. Indoor Outdoor pressure revolution RAS- fan mode fan mode P (MPa) (rps) Indoor Outdoor T1 (°C) T2 (°C) B10SKVP-E 1.0 to 1.2 13 to 15 36 to 39 High High...

Page 25: Control Block Diagram

8. CONTROL BLOCK DIAGRAM 8-1. Indoor Unit RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E / RAS-10SKVP-ND, RAS-13SKVP-ND, RAS-16SKVP-ND Indoor Unit Control Unit M.C.U. Louver Heat Exchanger Sensor (Tcj) Functions Motor • Cold draft preventing Function Heat Exchanger Sensor (Tc) • 3-minute Delay at Restart for...

Page 26

8-2. Outdoor Unit (Inverter Assembly) RAS-10SAVP-E, RAS-13SAVP-E, RAS-16SAVP-E RAS-10SAVP-ND, RAS-13SAVP-ND, RAS-16SAVP-ND – 26 –...

Page 27: Operation Description

9. OPERATION DESCRIPTION • Compressor operation 9-1. Outline of Air Conditioner Control ⎫ control Operations followed to This air conditioner is a capacity-variable type air ⎬ • Operation control of judgment of serial conditioner, which uses DC motor for the indoor fan outdoor fan motor signal from indoor side.

Page 28

9-2. Operation Description 9-2. 1. Basic operation .....29 1. Operation control .....29 2. Cooling/Heating operation .....30 3. AUTO operation ..... 30 4. DRY operation .....30 2. Indoor fan motor control .....31 3. Outdoor fan motor control ..... 33 4.

Page 29: Operation Description 9-2. 1. Basic Operation

Item Operation flow and applicable data, etc. Description 1. Basic 1. Operation control operation Receiving the user's operation condition setup, the operation statuses of indoor/outdoor units are controlled. 1) The operation conditions are selected by the remote controller as shown in the below. 2) A signal is sent by ON button of the remote controller.

Page 30: Cooling/Heating Operation

Item Operation flow and applicable data, etc. Description 1. Basic 2. Cooling/Heating operation operation The operations are performed in the following parts by controls according to cooling/heating conditions. 1) Receiving the operation ON signal of the remote controller, the cooling or heating operation signal starts being transferred form the indoor controller to the outdoor unit.

Page 31: Indoor Fan Motor Control

*4 : Fan speed = (M + –L) x 2/4 + L +1.5 +1.0 *5 : Fan speed = (M + –L) x 1/4 + L +0.5 (Linear approximation L(W6) from M+ and L) (Table 1) Indoor fan air flow rate RAS-B10SKVP-E RAS-B13SKVP-E RAS-B16SKVP-E RAS-10SKVP-ND RAS-13SKVP-ND RAS-16SKVP-ND Fan speed COOL HEAT...

Page 32

Item Operation flow and applicable data, etc. Description 2. Indoor fan <In heating operation> 1) When setting the fan speed to L, motor control L+, M, M+ or H on the remote controller, the operation is per- formed with the constant speed HEAT ON shown in Fig.

Page 33: Outdoor Fan Motor Control

Item Operation flow and applicable data, etc. Description 3. Outdoor fan The blowing air volume at the outdoor unit side is controlled. 1) The operation command sent motor control from the remote controller is Receiving the operation command from the controller of processed by the indoor unit indoor unit, the controller of outdoor unit controls fan speed.

Page 34: Capacity Control

Item Operation flow and applicable data, etc. Description 4. Capacity The cooling or heating capacity depending on the load is 1) The difference between set control adjusted. temperature on remote controller (Ts) and room temperature (Ta) According to difference between the setup value of tempera- is calculated.

Page 35: Release Protective Control By Temperature Of Indoor Heat Exchanger

Item Operation flow and applicable data, etc. Description 6. Release protective <In cooling/dry operation> 1) When temperature of the indoor control by tempera- heat exchanger drops below 5°C, (Prevent-freezing control for indoor heat exchanger) ture of indoor heat the compressor speed is re- In cooling/dry operation, the sensor of indoor heat exchanger duced.

Page 36: Quick Heating Control

Item Operation flow and applicable data, etc. Description 7. Quick heating This function quickens the starting of heating opera- When the following conditions are satis- control tion when indoor/outdoor temperature is low. fied, winding is heated by output varied by (Available only in heating operation) the outdoor heat exchanger temperature.

Page 37: Louver Control

Item Operation flow and applicable data, etc. Description 9. Louver control This function controls the air direction of the indoor unit. 1) Louver • The position is automatically controlled according to the operation mode (COOL/HEAT). position • The set louver position is stored in memory by the microcomputer, and the louver returns to the stored position when the next operation is performed.

Page 38: Sleep Mode Operation

Item Operation flow and applicable data, etc. Description 10. SLEEP When pushing [SLEEP MODE] button on the remote controller, a MODE quiet and mild operation is performed by reducing the fan speed operation and the compressor speed. <Cooling operation> This function operates the air conditioner with the difference between the set and the room temperature as shown in the following figure.

Page 39: Temporary Operation

Item Operation flow and applicable data, etc. Description 11. Temporary Pushing [RESET] button starts the temporary operation 1) When pushing [RESET] button, the operation of [AUTO] operation. When keeping [RESET] button temporary [AUTO] operation starts. pushed for 10 seconds or more, the temporary [COOL] 2) When keeping [RESET] button pushed for operation is performed.

Page 40: Discharge Temperature Control

Item Operation flow and applicable data, etc. Description 1. Purpose 12. Air purifying control [Detection of abnormality] The air purifying control function is to alert the user to trouble in the ionizing or Air purifying operation air purifying operation. 2. Description PURE lamp ON Trouble is determined to have occurred (indicated by the FILTER indicator) in the...

Page 41: Pulse Motor Valve (P .M.v.) Control

Item Operation flow and applicable data, etc. Description 14. Pulse motor This function controls throttle amount of the refriger- 1) When starting the operation, move the valve (PMV) ant in the refrigerating cycle. valve until it fits to the stopper. (Initialize) control According to operating status of the air conditioner, * In this time, “Click”...

Page 42: Clean Operation

Item Operation flow and applicable data, etc. Description 15. Clean operation 1. Purpose The clean operation is to minimize the growth of mold, bacteria etc. by running the fan and drying so as to keep the inside of the air conditioner clean. Unit now performing cooling or dry operation Clean operation When the cooling or dry operation shuts...

Page 43: Clean Operation Release

Item Operation flow and applicable data, etc. Description 16. Clean operation Setting the clean operation cancel NOTE: cancel Once J201 is added, the [RESET] button on the unit is designated

for Add J201 of the indoor P.C. board assembly. CLEAN OPERATION (Set/Cancel), * This cancels the auto restart function.

Page 44: Select Switch On Remote Controller

Item Operation flow and applicable data, etc. Description 17. Select switch on 1. Purpose remote controller This operation is to operate only one indoor unit using one remote controller. 2. Description Push the operation button When operating one indoor unit in a on the remote controller.

Page 45: Set Temp. Correction

Item Operation flow and applicable data, etc. Description 18. Set temp. <Indoor control P.C. board (At shipment)> 1. Purpose correction When the difference between the set temp. of the remote controller and the room temp. is wide due to the installation condition, etc, the set temp.

Page 46: Outdoor Quiet Control

As the maximum number of revolution of the compressor is restricted, the rise-up performance at the start time is weakened. <Maximum number of revolution of compressor at normal time and Quiet control time> RAS-B10SKVP-E RAS-B13SKVP-E RAS-B16SKVP-E Outside temp. Normal time Quiet controlled Normal time Quiet controlledd Normal time Quiet controlled...

Page 47: C Heat Operation (-Nd Model Only)

Item Operation flow and applicable data, etc. Description 20. 8°C HEAT operation Pushing the [8°C] button on the remote <Start> (-ND model only) controller starts HEAT operation with set During stop of air conditioner temp. 8°C. The air conditioner is controlled •...

Page 48

Item Operation flow and applicable data, etc. Description 20. 8°C HEAT operation <Indoor fan control> <Indoor fan control> (-ND model only) When 8°C HEAT operation, the indoor fan control rises up automati- Push [8˚C] button. cally. When the indoor fan is operated manually, it is matched with the fan Fan speed AUTO tap.

Page 49: Cord Heater Control (-Nd Model Only)

Item Operation flow and applicable data, etc. Description 21. Cord heater control <Base plate cord heater control> 1. Purpose (-ND model only) Base plate freeze prevention of the outdoor unit TO temp. Heater output 2. Operation As shown in the left figure, the base plate freeze preventive heater is 9˚C controlled by temperature of the...

Page 50: Auto Restart Function

9-3. Auto Restart Function This indoor unit is equipped with an automatic restarting function which allows the unit to restart operating with the set operating conditions in the event of a power supply being accidentally shut down. The operation will resume without warning three minutes after power is restored. This function is not set to work when shipped from the factory.

Page 51: How To Cancel The Auto Restart Function

9-3-2. How to Cancel the Auto Restart Function To cancel auto restart function, proceed as follows : Repeat the setting procedure : the unit receives the signal and beeps three times. The unit will be required to be turned on with the remote controller after the main power supply is turned off. •...

Page 52: Remote Controller And Its Fuctions

9-5. Remote Controller and Its Fuctions High power button (Hi POWER) 9-5-1. Parts Name of Remote Controller Push this button to start high power operation. Memory button (MEMO) Infrared signal transmitter Push this button to ready for storing the settings. Transmits signals to the indoor unit.

Page 53: Name And Functions Of Indications On Remote Controller

9-5-2. Name and Functions of Indications on Remote Controller [Display] All indications, except for the clock time indicator, are displayed by pushing the button. Transmission mark TIMER and clock time indicator This transmission mark indicates when the remote The time setting for timer operation or the clock time controller transmits signals to the indoor unit.

Page 54: Hi Power Mode

9-6. Hi POWER Mode ([Hi POWER] button on the remote controller is pushed) When [Hi POWER] button is pushed while the indoor unit is in Auto, Cooling or Heating operation, Hi POWER mark is indicated on the display of the remote controller and the unit operates as follows. 1.

Page 55: Installation Procedure

2 Wireless remote controller • Indoor units connectable with a multi-system outdoor unit (Other indoor units are unavailable.) RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E • When using a multi-system outdoor unit, refer to the installation manual provided with the model concerned. – 55 –...

Page 56 • Indoor units connectable with a multi-system outdoor unit Important information (Other indoor units are unavailable.) and warning* RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E • When using a multi-system outdoor unit, refer to the installation B/W strips* manual provided with the model concerned.

Page 57 10-2-3. Installation/Servicing Tools Changes in the product and components In the case of an air conditioner using R410A, in order to prevent any other refrigerant from being charged acciden- tally, the service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch) •...

Page 58 10-3. Indoor Unit 10-3-2. Drilling and Mounting Installation Plate 10-3-1. Installation Location • A place which provides enough spaces around Drilling the indoor unit as shown in the diagram. When install the refrigerant pipes from the rear. • A place where there are no obstacles near the air inlet and outlet.

Page 59 10-3-3. Electrical Work When the installation plate is directly mounted on the wall 1. The supply voltage must be the same as the rated voltage of the air conditioner. 1. Securely fit the installation plate onto the wall by 2. Prepare a power source for the exclusive use of screws with the upper and lower catches.

Page 60 10-3-5. Piping and Drain Hose Installation Terminal cover Piping and drain hose forming Screw • Since condensation results in machine trouble, make sure to insulate both the connecting pipes Screw Terminal block separately. (Use polyethylene foam as insulating material.) Earth wire Rear right Rear left Bottom left...

Page 61 How to attach the drain cap In case of bottom right or bottom left piping 1. Insert hexagonal wrench (4 mm). • 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.

Page 62 10-3-7. Drainage CAUTION 1. Run the drain hose at a downward sloped angle. • Bind the auxiliary pipes (two) and connecting cable with facing tape tightly. NOTE : In case of leftward piping and rear-leftward • Hole should be made at a slight downward slant piping, bind the auxiliary pipes (two) only with on the outdoor side.

Page 63 10-4. Outdoor Unit Precautions for adding refrigerant 10-4-1. Installation Location • Use a scale having at least 10 g per index line precision when adding the refrigerant. • A place which provides enough space around the outdoor unit as shown in the diagram. Do not use a bathroom scale or similar instrument.

Page 64 10-4-2. Draining the Water 10-4-3. Refrigerant Piping Connection • Holes are provided on the base plate of the Flaring outdoor unit to ensure that the defrost water produced during heating operations is drained off 1. Cut the pipe with a pipe cutter. efficiently.

Page 65 Tightening Connection Use a vacuum pump Align the centers of the connecting pipes and tighten Be sure to use a vacuum pump with counter-flow the flare nut as much as possible with your fingers. prevention function so that oil inside the pump does Then tighten the nut with a wrench and torque not flow back into the air conditioner pipes when the wrench as shown in the figure.

Page 66 Packed Valve handling precautions • Open the valve stem until it touches the stopper. 1 2 3 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

(Ø12.7 mm) 50 to 62 N•m (5.0 to 6.2 kgf•m)

Page 67: Test Operation

10-5. Test Operation 10-5-4. If the air conditioner operates incorrectly 10-5-1. Gas Leak Test • If two indoor units are installed in the same room • Check the flare nut connections for gas leaks with or adjoining rooms, when the user tries to operate a gas leak detector and/or soapy water.

Page 68: How To Diagnose The Trouble

11. HOW TO DIAGNOSE THE TROUBLE The pulse motor circuits are mounted to both indoor and outdoor units. Therefore, diagnose troubles according to the trouble diagnosis procedure as described below. (Refer to the check points in servicing written on the wiring diagrams attached to the indoor/outdoor units.) Table 11-1 Troubleshooting Procedure Page...

Page 69 CAUTION A high voltage (equivalent to the supply voltage) is also energized to ground through the sensors, PMV and other low-voltage circuits. The sensor leads and other wires are covered with insulated tubes for protection. Nevertheless, care must be taken to ensure that these wires are not pinched.

Page 70 11-1. First Confirmation 11-1-1. Confirmation of Power Supply Confirm that the power breaker operates (ON) normally. 11-1-2. Confirmation of Power Voltage Confirm that power voltage is AC 220–230–240 ± 10%. If power voltage is not in this range, the unit may not operate normally. 11-1-3.

Page 71 11-2. Primary Judgment To diagnose the troubles, use the following methods. 1) Judgment by flashing LED of indoor unit 2) Self-diagnosis by service check remote controller 3) Judgment of trouble by every symptom Firstly use the method 1) for diagnosis. Then, use the method 2) or 3) to diagnose the details of troubles. 11-3.

Page 72 11-4. Self-Diagnosis by Remote Controller (Check Code) 1. If the lamps are indicated as shown B to E in Table 11-3-1, execute the self-diagnosis by the remote controller. 2. When the remote controller is set to the service mode, the indoor controller diagnoses the operation condition and indicates the information of the self-diagnosis on the display of the remote controller with the check codes.

Page 73 11-4-2. Caution at Servicing 1. After servicing, push the START/STOP button to return to the normal mode. 2. After servicing by the check code, turn off breaker of the power supply, and turn on breaker of the power supply again so that memory in the microcomputer returns the initial status. However, the check codes are not deleted even if the power supply is turned off because they are stored in the fixed memory.

Page 74 Block distinction Operation of diagnosis function Judgment and action Check Check Block Cause of operation conditioner Remarks code code status Outdoor P.C. Inverter over-current All off Displayed when Even if trying operation again, all board protective circuit error is detected. operations stop immediately.

Page 75: Judgment Of Trouble By Every Symptom

11-5. Judgment of Trouble by Every Symptom 11-5-1. Indoor Unit (Including Remote Controller) (1) Power is not turned on (Does not operate entirely) <Primary check> 1. Is the supply voltage normal? 2. Is the normal voltage provided to the outdoor unit? Operation 3.

Page 76 (3) Only the indoor motor fan does not operate <Primary check> □ □ 1. Is it possible to detect the power supply voltage (AC220–240V) between on the terminal block? 2. Does the indoor fan motor operate in cooling operation? (In heating operation, the indoor fan motor does not operate for approximately 10 minutes after it is turned on, to prevent a cold air from blowing in.) Turn off power supply once, and...

Page 77 (4) Indoor fan motor automatically starts to rotate by turning on power supply <Cause> The IC is built in the indoor fan motor. Therefore the P.C. board is also mounted to inside of the motor. If the P .C. board is soldered imperfectly or the IC is defective, the fan motor may automatically rotate by turning on power supply.

Page 78 (5) Troubleshooting for remote controller <Primary check> Check that A or B selected on the main unit is matched with A or B selected on the remote controller. The unit

does not beep at all. Push the START/STOP button. Operation lamp on indoor unit is not indicated.

Page 79 11-5-2. Wiring Failure (Interconnecting and Serial Signal Wire) (1) Outdoor unit does not operate □ □ 1) Is the voltage between of the indoor terminal block varied? Confirm that transmission from indoor unit to outdoor unit is correctly performed based upon the following diagram.

Page 80 11-6. Check Code 1C (Miswiring in indoor/outdoor units) and 1E <Check procedure> Gas leakage, Discharge temp. error, disconnection of TS/TC gas leakage sensors (Check code 02, 1C) (Check code 03, 1E) Valve drive check Is coil of the pulse motor valve Set it correctly.

Page 81: Troubleshooting

11-7. Troubleshooting 11-7-1. How to Check Whether the Air Purifier is Good or Not Turn off the power breaker once, and turn on again after 10 seconds. Does the OPERATION indicator flash? To item “Power supply is not turned on” Turn off the power breaker and remove CN41 (Micro switch connector).

Page 82: How To Diagnose Trouble In Outdoor Unit

11-8. How to Diagnose Trouble in Outdoor Unit 11-8-1. Summarized Inner Diagnosis of Inverter Assembly Table 11-8-1 Diagnosis/Process flowchart Item Contents Summary Preparation Turn “OFF” the power supply breaker, and remove 3P Remove connector connector which connects of compressor. inverter and compressor. If fuse was blown, be sure to Check •...

Page 83: How To Check Simply The Main Parts

Diagnosis/Process flowchart Item Contents Summary Check Check winding resistance between phases of compres- sor, and resistance between outdoor frames by using a tester. → OK if 10MΩ or more • Is not grounded. Replace control board assembly. ⎫ → OK if 0.51Ω → 0.57Ω •...

Page 84 (3) Check procedures Table 11-9-1 Procedure Check points Causes Turn off the power supply breaker Check whether or not the fuse (F01) Impulse voltage was applied or the and remove the P.C. board is blown. indoor fan motor short-circuited. assembly from electronic parts base.

Page 85 11-9-2. P.C. Board Layout +12V [1] Sensor characteristic table : Discharge temp. sensor : Room temp. sensor TC, TCJ : Heat exchanger temp. sensor : Outdoor temp. sensor TA, TC, TCJ, TO, TE, TS : Outdoor heat exchanger temp. sensor : Suction temp.

Page 86 11-9-3. Indoor Unit (Other Parts) Part name Checking procedure Room temp. (TA) sensor Disconnect the connector and measure the resistance value with tester. Heat exchanger (TC) sensor (Normal temp.) Heat exchanger (TCJ) sensor Temperature 10°C 20°C 25°C 30°C 40°C Sensor TA, TC, TCJ (kΩ) 20.7 12.6...

Page 87 11-9-5. Checking Method for Each Part Part name Checking procedure Electrolytic capacitor 1. Turn OFF the power supply breaker. (For boost, smoothing) 2. Discharge all three capacitors completely. 3. Check that safety valve at the bottom of capacitor is not broken. 4.

Page 88 11-10. How to Simply Judge Whether Outdoor Fan Motor is Good or Bad 1. Symptom • Outdoor fan motor does not rotate. • Outdoor fan motor stops within several tens seconds though it started rotating. • Outdoor fan motor rotates or does not rotate according to the position where the fan stopped, etc. Remote controller check code “02 : Outdoor block, 1A : Outdoor fan drive system error”...

Page 89: How To Replace The Main Parts

12. HOW TO REPLACE THE MAIN PARTS WARNING • Since high voltages pass through the electrical parts, turn off the power without fail before proceeding with the repairs. Electric shocks may occur if the power plug is not disconnected. • After the repairs have been completed (after the front panel and cabinet have been installed), perform a test run, and check for smoking, unusual sounds and other abnormalities.

Page 90 Part name Procedures Remarks □ Front panel 4) Push “PUSH” part under the front panel and remove hooks of the front panel from the installation plate. Installation plate Pull here Pull here Front panel Push here Push here P P ush here Push here Push 5) Remove the front

panel fixing screws.

Page 91 Part name Procedures Remarks □ □ High voltage 1) Follow to the procedure in the item generator 2) Disconnect the connectors of the high-voltage generator, and disconnect the four leads from where they are fitted into the other components. Screw Screw 3) Remove the fixing screw which secures the high voltage generator, and remove the...

Page 92 Part name Procedures Remarks □ □ Electric parts 1) Follow the procedure up to 4) in above. TCJ sensor box assembly 2) Remove screw of earth lead attached to the end plate of the evaporator. 3) Remove the lead wire cover, and remove Lead wire cover Lead wire cover connector (5P) for the fan motor and...

Page 93 Part name Procedures Remarks □ Horizontal louver 1) Remove shaft of the horizontal louver from the back body. (First remove the left shaft, and then remove other shafts while sliding the horizontal louver leftward.) Slide the horizontal Slide the horizontal louver leftward louver leftward □...

Page 94 Part name Procedures Remarks □ □ Bearing 1) Follow to the procedure in the items 2) Remove the two fixing screws used to secure the left edge panel of the heat exchanger, and Screw remove the two screws used to secure the Bearing bearing base.

Page 95 Part name Procedures Remarks □ □ Fan motor 1) Follow to the procedure in the item 2) Loosen the set screw of the cross flow fan. 3) Remove two fixing screws of the motor band (Right), and then remove the motor band (Right).

Page 96 Part name Procedures Remarks □ Cross flow fan <Caution at reassembling> 1) At assembling work of the bearing base, check that the drain pipe is surely incorpo- rated in the back body. (Otherwise, water leak is caused.) 2) To incorporate the fan motor, remove the fan motor rubber (at shaft core side), incorporate the motor into the position in the following figure, and then install the fan motor.

Page 97 12-2. Microcomputer Part name Procedure Remarks □ Common procedure 1) Turn the power supply off to stop the Replace terminal block, operation of air-conditioner. microcomputer ass'y and the P .C. board ass'y. 2) Remove the front panel. • Remove the 2 fixing screws. 3) Remove the electrical part base.

Page 98 12-3. Outdoor Unit Part name Procedure Remarks □ Common 1. Detachment procedure NOTE Wear gloves for this job. Otherwise, you may injure your hands on the parts, etc. 1) Stop operation of the air conditioner, and turn off the main switch of the breaker for air conditioner.

Page 99 Part name Procedure Remarks □ Front cabinet 1. Detachment □ 1) Perform step 1 in 2) Remove the fixing screws (ST1TØ4 × 8L 2 pcs.) used to secure the front cabinet and inverter cover, the screws (ST1TØ4 × 8L 3 pcs.) used to secure the front cabinet at the bottom, and the fixing screws (ST1TØ4 ×...

Page 100 Part name Procedure Remarks □ □ Inverter 1) Perform work of item 1 in Inverter cover assembly 2) Remove screw (ST1TØ4 × 8L 2 pcs.) of the P . C. board upper part of the front cabinet. (Soldered surface) • If removing the inverter cover in this condition, P .C.

Page 101 Part name Procedure Remarks □ Control board 1. Disconnect the leads and connectors connected to assembly the other parts from the control board assembly. 1) Leads CN603 • 3 leads (black, white, orange) connected to terminal block. CN601 CN600 CN701 CN703 •...

Page 102 Part name Procedure Remarks □ Side 1. Side cabinet (right) cabinet □ 1) Perform step 1 in and all the steps in □ 2) Remove the fixing screw (ST1TØ4 × 8L 5 pcs.) used for securing the side cabinet to the bottom plate and valve fixing panel.

Page 103 Part name Procedure Remarks □ □ □ □ □ Compressor 1) Perform work of item 1 of 2) Extract refrigerant gas. 3) Remove the partition board. (ST1TØ4 × 8L 3 pcs.) 4) Remove the sound-insulation material. 5) Remove terminal cover of the compressor, and disconnect lead wire of the compressor from the terminal.

Page 104 Part name Procedure Remarks Electronic 1. Detachment expansion   1) Perform step 1 in , all the steps in and 1 valve coil Coil 2) Remove the coil by pulling it up from the anti-turn electronic control valve body. lock 2.

Page 105 Part name Procedure Remarks TE sensor (outdoor heat exchanging temperature sensor) • Attachment With the leads pointing downward and the sensor leads pointing in the direction shown in the figure, install the sensor onto the straight pipe part of the condenser output pipe. Detail A Arrow D Detail C...

Page 106 Part name Procedure Remarks Replacement of 1) Cut the sensor 100 mm longer than old temperature one. Cutting here Thermal sensor for Connector sensor part 2) Cut the protective tube after pulling out it servicing only (200 mm). 3) Move the protective tube toward the Cutting here Common service thermal sensor side and tear the tip of lead...

Page 107 MCC-5009 – 107 –...

Page 108: Exploded Views And Parts List

13. EXPLODED VIEWS AND PARTS LIST 13-1. Indoor Unit RAS-B10SKVP-E, RAS-B13SKVP-E, RAS-B16SKVP-E 216 213 225, 226 218, 219 221, 222, 224 ∗ The parts in the following parts list are conformed to RoHS. Therefore be sure to use the following parts for repairing and replacing.

Page 109 407, 408, 409 ∗ The parts in the following parts list are conformed to RoHS. Therefore be sure to use the following parts for repairing and replacing. Location Part Location Part Description Description 4306A132 Terminal Block, 3P 4306S937 P .C. Board Ass'y (B10SKVP-E) 43062263 Cover, E-Parts...

Page 110 RAS-10SKVP-ND, RAS-13SKVP-ND, RAS-16SKVP-ND 216 213 225, 226 218, 219 221, 222, 224 ∗ The parts in the following parts list are conformed to RoHS. Therefore be sure to use the following parts for repairing and replacing. Location Part Location Part Description Description 43005709...

Page 111 411, 412, 413 ∗ The parts in the following parts list are conformed to RoHS. Therefore be sure to use the following parts for repairing and replacing. Location Part Location Part Description Description 4306A132 Terminal Block, 3P 43067115 Clamp, Cord 43062263 Cover, E-Parts 4306S949...

Page 112 13-2. Outdoor Unit RAS-10SAVP-E, RAS-13SAVP-E, RAS-16SAVP-E 28, 29 30, 31 13, 16, 19, 22 14, 15, 17, 18, 20, 21, 23, 24, 25 – 112 –...

Page 113 Plate, Fix, Valve, Packed 43147196 Bonnet, 1/4 IN 43032441 Nipple, Drain 43047401 Bonnet, 3/8 IN 43089160 Cap, Waterproof (10SAVP-E, 13SAVP-E) 4301P703 Mark, TOSHIBA 43147195 Bonnet, 1/2 IN (16SAVP-E) 4301P702 Mark, DAISEIKAI 43047676 Nut, Flare, 6.35 43042485 Rubber, Cushion 43047677 Nut, Flare, 9.52...

Page 114 RAS-10SAVP-ND, RAS-13SAVP-ND, RAS-16SAVP-ND 28, 29 30, 31 13, 16, 19, 22 14, 15, 17, 18, 20, 21, 23, 24, 25 49 CORD, HEATER, Ass'y – 114 –...

Page 115 Bonnet, 1/4 IN 43032441 Nipple, Drain 43047401 Bonnet, 3/8 IN (10SAVP-ND, 13SAVP-ND) 43089160 Cap, Waterproof 43147195 Bonnet, 1/2 IN (16SAVP-ND) 4301P703 Mark, TOSHIBA 43047676 Nut, Flare, 6.35 4301P702 Mark, DAISEIKAI 43047677 Nut, Flare, 9.52 43042485 Rubber, Cushion (10SAVP-ND, 13SAVP-ND) 43062176...

Page 116 13-3. P.C. Board Layout RAS-10SAVP-E-INV, RAS-13SAVP-E-INV, RAS-16SAVP-E-INV 701 Sensor, TE 702 Sensor, TS 703 Sensor, TO 704 Sensor, TD (Ø4) ∗ The parts in the following parts list are conformed to RoHS. Therefore be sure to use the following parts for repairing and replacing. Location Part Location...

Page 117 RAS-10SAVP-ND-INV, RAS-13SAVP-ND-INV, RAS-16SAVP-ND-INV 701 Sensor, TE 702 Sensor, TS 703 Sensor, TO 704 Sensor, TD (Ø4) ∗ The parts in the following parts list are conformed to RoHS. Therefore be sure to use the following parts for repairing and replacing. Location Part Location...

Page 118: Set Up Of Service P.c. Board

14. SET UP OF SERVICE P.C. BOARD Before replacing the P .C. board, set up the P .C. board according to the following table. When repaired P.C. board should be electric discharge of capacitor. (C12, C13, C14) Caution APPLICATION MODELS : RAS-10SAVP-E, RAS-13SAVP-E, RAS-16SAVP-E RAS-10SAVP-ND, RAS-13SAVP-ND, RAS-16SAVP-ND JUMPER SET UP :...

Page 119 TOSHIBA CARRIER CORPORATION 2 CHOME 12-32, KONAN, MINATOKU, TOKYO, 108-0075, JAPAN

This manual is also suitable for:

Ras-10savp-eRas-13savp-eRas-b16skvp-eRas-16savp-eRas-b13skvp-eRas-10skvp-nd ... Show all