
TOSHIBA
INVERTER

# Toshiba RAS-18PKVSG-E Service Manual

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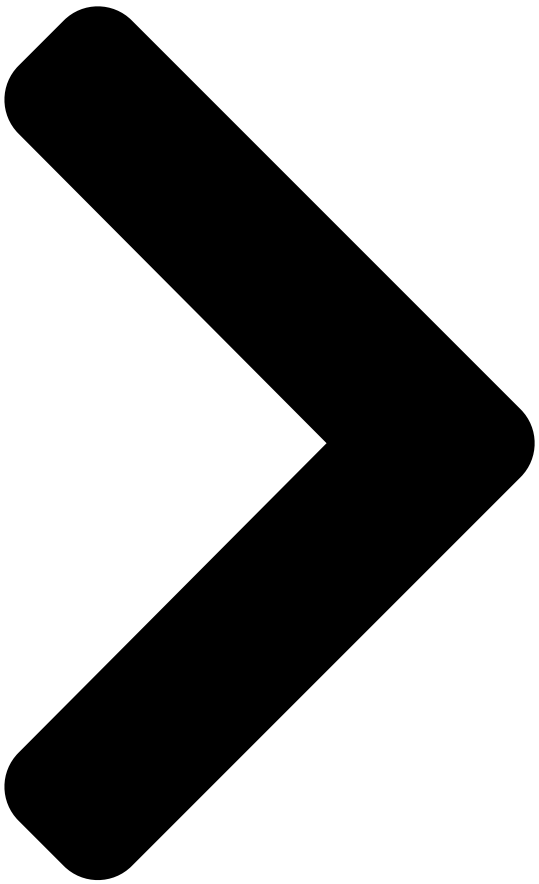

# SERVICE MANUAL

TOSHIBA

Indoor Unit

*RAS-18PKVSG-E*

*RAS-22PKVSG-E*

*RAS-24PKVSG-E*

R32

FILE NO. SVM-17001

AIR-CONDIT

# SPLIT TYPE

Outdoor Unit

*RAS-18PAVSG-E*

*RAS-22PAVSG-E*

*RAS-24PAVSG-E*

*March, 2017*

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# Chapters

## Related Manuals for Toshiba RAS-18PKVSG-E

Air Conditioner Toshiba RAS-18PAVSG-E Owner's Manual

(168 pages)

Air Conditioner Toshiba RAS-B22PKVSG-E Installation Manual

(22 pages)

Air Conditioner Toshiba RAS-24PAVSG-E Installation Manual

(18 pages)

Air Conditioner Toshiba RAS-24PKVSG-E Owner's Manual

(7 pages)

Air Conditioner Toshiba RAS-B22PKVSG-TR Service Manual

(134 pages)

Air Conditioner Toshiba RAS-22 Owner's Manual

(7 pages)

Air Conditioner Toshiba RAS-07PKVP-E Service Manual

Split type (114 pages)

Air Conditioner Toshiba RAS-07PKVP-E Installation Manual

Split type (26 pages)

Air Conditioner Toshiba RAS-07PKVP-E Owner's Manual

Split type for general public use (32 pages)

Air Conditioner Toshiba RAS-18PKSG-T Installation Manual

(28 pages)

Air Conditioner Toshiba RAS-18PKSG-T Owner's Manual

(8 pages)

Air Conditioner Toshiba RAS-18PACVG -T Owner's Manual

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Air Conditioner Toshiba RAS-10 Owner's Manual

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Air Conditioner Toshiba AS-24UKHP-ES3 Service Manual

(82 pages)

Air Conditioner Toshiba RAS-18BKS Series Installation Manual

(20 pages)

Air Conditioner Toshiba RAS-13BKV-E Service Manual

Split type (106 pages)

## Summary of Contents for Toshiba RAS-18PKVSG-E

### Page 1: Service Manual

FILE NO. SVM-17001 SERVICE MANUAL SPLIT TYPE Indoor Unit Outdoor Unit RAS-18PKVSG-E RAS-18PAVSG-E RAS-22PKVSG-E RAS-22PAVSG-E RAS-24PAVSG-E RAS-24PKVSG-E March, 2017...

## Page 2: Table Of Contents

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## Page 3: Safety Precautions

FILE NO. SVM-17001 1. SAFETY PRECAUTIONS Read the precautions in this manual This appliance is fi lled with R32. carefully before operating the unit. (Flammable Material) Information included in the Operation Service personnel should be handing this equipment Manual and/or Installation Manual. with reference to the Installation Manual.

Page 4 FILE NO. SVM-17001 DANGER • ASK AN AUTHORIZED DEALER OR QUALIFIED INSTALLATION PROFESSIONAL TO IN- STALL/MAINTAIN THE AIR CONDITIONER. INAPPROPRIATE SERVICING MAY RESULT IN WATER LEAKAGE, ELECTRIC SHOCK OR FIRE. • TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING ANY ELECTRICAL WORK. MAKE SURE ALL POWER SWITCHES ARE OFF.

Page 5 FILE NO. SVM-17001 • Be aware that refrigerants may not contain an odour. • Do not pierce or burn as the appliance is pressurized. Do not expose the appliance to heat, flame, sparks, or other sources or ignition. Else, it may explode and cause injury or death. •...

## Page 6: Specifications

(Cooling / Heating) -15,46/-15,24 Installation plate Accessory Indoor unit Wireless remote controller Batteries Remote controller holder Toshiba IAQ filter Mounting screw 6(□ □ 4x25L) Remote controller holder 2(□ □ 3.1Lx16L) Flat head wood screw Installation manual Owner's manual * The specification may be subject to change without notice for purpose of improvement.

Page 7 Outdoor (Cooling / Heating) Installation plate Accessory Indoor unit Wireless remote controller Batteries Remote controller holder Toshiba IAQ filter Mounting screw 6(□ □ 4x25L) Remote controller holder 2(□ □ 3.1Lx16L) Flat head wood screw Installation manual Owner's manual * The specification may be subject to change without notice for purpose of improvement.

## Page 8: Operation Characteristic Curve

60.0 70.0 65.0 40.0 60.0 Conditions Capacity ratio : 100 %= Conditions Capacity ratio : 100 %= 6.00kW (RAS-18PKVSG-E) Indoor : DB 20 C/WB 15 Indoor : DB 27 C/WB 19 5.00kW (RAS-18PKVSG-E) 55.0 7.00kW (RAS-22PKVSG-E) Outdoor : DB 7...

## Page 9: Refrigerant R32

FILE NO. SVM-17001 3. REFRIGERANT R32 3. If a refrigeration gas leakage occurs during This air conditioner adopts the new refrigerant HFC (R32) which does not damage the ozone layer. installation/servicing, be sure to ventilate fully. If the refrigerant gas comes into contact with fire, a The next section describes the precautions for air conditioner using the new refrigerant.

Page 10 FILE NO. SVM-17001 Table 3-2-1 Thicknesses of annealed copper pipes Thickness (mm) Nominal diameter Outer diameter (mm) R32(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 FILE NO. SVM-17001 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 R32 or conven- tional flare tool. Flare processing dimensions differ according to the type of flare tool.

Page 12 FILE NO. SVM-17001 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.

Page 13 FILE NO. SVM-17001 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 R32 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

FILE NO. SVM-17001 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: Brazing Of Pipes

FILE NO. SVM-17001 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. 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 FILE NO. SVM-17001 2. Characteristics required for flux 3-5-3. Brazing • Activated temperature of flux coincides with the As brazing work requires sophisticated techniques, brazing temperature. experiences based upon a theoretical knowledge, it must be performed by a person qualified. •...

## Page 17: Construction Views

FILE NO. SVM-17001 4. CONSTRUCTION VIEWS 4-1. Indoor Unit 1050 Air Inlet Air Filter Front Panel Grille Inlet Heat Exchanger Air Outlet Knock Out System Knock Out System Wireless remote controller 50 71.5 71.5 Installation plate hanger 17.5 Remote controller holder Drain hose (0.4m) Installation plate hanger Installation plate hanger...

Page 18 FILE NO. SVM-17001 4-2. Outdoor Unit (RAS-18,22PAVSG-E) (Unit : mm) Ø6 hole R5.5 Ø6 hole Ø11x14 hole A detail Drawing (Back leg) 2- 11 x 14 Hole Ø Ø 25 Drain outlet B Detail Drawing (Front leg) (For Ø8 - Ø 10 anchor bolt) FAN-GUARD Ø...

Page 19 FILE NO. SVM-17001 4-3. Outdoor-Unit (RAS-24PAVSG-E) (Unit : mm) 6 hole R5.5 A detail drawing (Back leg) 6 hole 2- 11x14 Hole 11x14 hole 25 Drain outlet (For 8- 10 anchor bolt) B detail drawing (Front leg) FAN-GUARD COVER-PV ViewZ Electrical part Liquid side (Flare...

## Page 20: Wiring Diagram

FILE NO. SVM-17001 5. WIRING DIAGRAM 5-1. RAS-18PKVSG-E / RAS-18PAVSG-E RAS-22PKVSG-E / RAS-22PAVSG-E - 20 -...

Page 21 FILE NO. SVM-17001 5-2. RAS-24PKVSG-E / RAS-24PAVSG-E - 21 -...

## Page 22: Specifications Of Electrical Parts

FILE NO. SVM-17001 6. SPECIFICATIONS OF ELECTRICAL PARTS 6-1. Indoor Unit Parts name Type Specificat DC-340V, 30W Fan Motor (for indoor) ICF-340-30-6 Room temp. sensor (TA-sensor) 10kΩ at 25°C Heat exchanger temp. sensor (TC-sensor) 10kΩ at 25°C Louver motor (Horizontal) x 1 pcs. 24BYJ48A-080 Output (Rated) 4 phase, DC12V Louver motor (Vertical) x 2 pcs.

## Page 23: Refrigerant Cycle Diagram

FILE NO. SVM-17001 7. REFRIGERANT CYCLE DIAGRAM 7-1. Refrigerant Cycle Diagram RAS-18PKVSG-E / RAS-18PAVSG-E RAS-22PKVSG-E / RAS-22PAVSG-E Temp. measurement INDOOR UNIT Indoor heat exchanger Cross flow fan Max. : 20m Min. : 2m Pressure measurement Chargeless : 15m Deoxidized copper pipe Gauge attaching port Outer dia.

Page 24 FILE NO. SVM-17001 7-2. RAS-24PKVSG-E / RAS-24PAVSG-E Temp. measurement INDOOR UNIT Indoor heat exchanger Cross flow fan Max. : 25m Min. : 2m Pressure measurement Chargeless : 15m Deoxidized copper pipe Gauge attaching port Outer dia. : 6.35mm Vacuum pump connecting port Thickness : 0.8mm Sectional shape Deoxidized copper pipe...

## Page 25: Operation Data

FILE NO. SVM-17001 7-3. Operation Data <Cooling> Tempeature Heat exchanger Model name Standard Indoor Outdoor Compressor condition(°C) pipe temp. RAS- pressure fan mode fan mode revolution Indoor Outdoor P (MPa) T1 (°C) T2 (°C) (rps) High 27/19 35/- 18PKVSG-E 1.0 to 1.1 48 to 50 High 10 to 12...

## Page 26: Control Block Diagram

FILE NO. SVM-17001 8. CONTROL BLOCK DIAGRAM 8-1. Indoor Unit Indoor Unit Control Panel M.C.U Functions Operation Heat Exchanger Sensor • Louver Control Display Timer • 3-minute Delay at Restart for Compressor Temperature Sensor Display • Motor Revolution Control Hi-Power Infrared Rays Signal Receiver Display •...

## Page 27

FILE NO. SVM-17001 8-2. Outdoor Unit (Inverter Assembly) RAS-18PKVSG-E / RAS-18PAVSG-E RAS-22PKVSG-E / RAS-22PAVSG-E - 27 -...

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FILE NO. SVM-17001 8-3. RAS-24PKVSG-E / RAS-24PAVSG-E - 28 -...

## Page 29: Operation Description

FILE NO. SVM-17001 9. OPERATION DESCRIPTION 9-1. Outline of Air Conditioner Control • Detection of inverter input current and current release operation This air conditioner is a capacity-variable type air conditioner. Its system can control the speed of • Over-current detection and prevention operation to compressor motor according to load.

## Page 30

FILE NO. SVM-17001 9-2. Operation Description 1. Basic operation .....31 1. Operation control .....31 2. Cooling/Heating operation .....32 3. AUTO operation ..... 33 4. DRY operation .....33 2. Indoor fan motor control ..... 34 3. Outdoor fan motor control ..... 37 4.

## Page 31: Operation Description

FILE NO. SVM-17001 9-2. Operation Description 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 32: Cooling/Heating Operation

FILE NO. SVM-17001 Operation flow and applicable data, etc. Description Item 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 33: Auto Operation

FILE NO. SVM-17001 Operation flow and applicable data, etc. Description Item 1) Detects the room temperature (Ta) when 1. Basic 3. AUTO operation the operation started. operation Selection of operation mode As shown in the following figure, the operation starts by 2) Selects an operation mode from Ta in selecting automatically the status of room temperature the left figure.

## Page 34: Indoor Fan Motor Control

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 2. Indoor fan <In cooling operation> motor control (This operation controls the fan speed at indoor unit side.) * Symbols The indoor fan (cross flow fan) is operated by the phase- : Ultra High control induction motor.

## Page 35

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description (Table 1) Indoor fan air flow rate Fan speed level Made RAS-18PKVSG-E RAS-22PKVSG-E Cooling Heating Cooling Heating Cool Heat Fan speed Air flow rate Fan speed Air flow rate...

## Page 36

FILE NO. SVM-17001 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 37: Outdoor Fan Motor Control

Compressor speed (rps) RAS-18PAVSG-E Hz<13.8 13.8≤Hz<30.6 30.6≤Hz Model RAS-22PAVSG-E RAS-24PAVSG-E Hz<13.8 13.8≤Hz<32.4 32.4≤Hz To≥38 °C To≥28 °C To≥15 °C To≥5.5 °C To≥0 °C To<0 °C When To is abnormal Outdoor fan speed (rpm) RAS-18PKVSG-E RAS-22PKVSG-E RAS-24PKVSG-E RAS-18PKVSG-E RAS-22PKVSG-E RAS-24PKVSG-E - 37 -...

## Page 38: Capacity Control

FILE NO. SVM-17001 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 39: Release Protective Control By Temperature Of Indoor Heat Exchanger

FILE NO. SVM-17001 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 In cooling/dry operation, the sensor of indoor heat exchanger...

## Page 40: Defrost Control (Only In Heating Operation)

3) Defrost operation continues for Table 2 15 minutes. Heating operation Model <Returning from defrost operation> RAS-18PKVSG-E RAS-22PKVSG-E RAS-24PKVSG-E (time) 1) Stop operation of the compressor for approx. 50 seconds. 2) Invert (OFF) 4-way valve approx. 40 seconds after stop of the compressor.

## Page 41: Louver Control

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 8. Louver control This function controls the air direction of the indoor unit. 1) Louver • The position is automatically controlled according to the operation position mode (COOL/HEAT). • 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 42: Heating Operation

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 8. Louver control Louver position in heating operation Heating operation/ AUTO (HEAT) Initial setting of “Heating storage position” Louver : Directs downward (80.5˚) Wide air direction Wide-angle Right wide Left wide Spot air direction Spot front...

## Page 43: Wind Direction Adjustment

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 8. Louver control 2) Wind direction adjustment Air direction • The Up-Down louver position can be Horizontal Horizontal Inclined Blowing Inclined arbitrarily set up by blowing blowing blowing downward blowing pressing [FIX ] button.

## Page 44: Eco Operation

* 10 (DRY max - COOL min) /6 x 3 + COOL min * 9 (DRY max - COOL min) /6 x 2 + COOL min * 8 (DRY max - COOL min) /6 x 1 + COOL min RAS-18PKVSG-E RAS-22PKVSG-E RAS-24PKVSG-E...

## Page 45: Temporary Operation

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 10. Temporary Pressing [RESET] button starts the temporary opera- 1) When pressing [RESET] button, the operation tion of [AUTO] operation. When keeping [RESET] temporary [AUTO] operation starts. button pressed for 10 seconds or more, the temporary 2) When keeping [RESET] button pressed [COOL] operation is performed.

## Page 46: High Pressure Control

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 12. High pressure control 1. Purpose This function detects error on the refrigerating cycle or error on the com- Cooling Heating pressor, and performs protective control. Control operation (TE) (TC) 2.

## Page 47: Self-Cleaning Function

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 14. Self-Cleaning 1. Purpose function The Self-Cleaning 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 Self-Cleaning operation When the cooling or dry operation shuts...

Page 48 FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 14. Self-Cleaning function 14-1-1. Self-Cleaning diagram Operation display FCU fan rpm is depend on presetting. (500RPM) FCU louver OPEN OPEN (12.7º) CLOSE ON or OFF ON or OFF Timer display depend on presetting of timer function.

## Page 49: Remote-A Or B Selection

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 15. Remote-A or B 1. Purpose Setting the remote controller selection This operation is to operate only one To separate using of remote control for each indoor unit in case of 2 air conditioner are installed nearly. indoor unit using one remote controller.

## Page 50: Short Timer

FILE NO. SVM-17001 Item Operation flow and applicable data, etc. Description 18. Short Timer In the normal condition, after switching one circuit Purpose breaker, 3-minute delay time for compressor and To start the unit immediately for the purpose of 1 hour for plasma air purifier are set for the testing, trial...etc, short timer can be used.

## Page 51: Display Lamp Brightness Adjustment

FILE NO. SVM-17001 Item Operation flow and applicable data,etc Description 20. Display To decrease the display lamp brightness or turn it off. lamp brightness adjustment 1. Press and hold for 3 seconds until brightness level ( ) is shown on remote controller display. to rise or decrease the brightness in 4 levels.

## Page 52: Auto Restart Function

FILE NO. SVM-17001 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.

## Page 53: How To Cancel The Auto Restart Function

FILE NO. SVM-17001 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 54: Remote Controller And Its Fuctions

FILE NO. SVM-17001 9-4. Remote control 9-4-1. Remote Controller and Its Functions 1 Infrared signal emitter 2 Start/Stop button 3 Mode select button (MODE) 4 Temperature button (TEMP) 5 Fan speed button (FAN) 6 Swing louver button (SWING) 7 Set louver Up-Down button (FIX X) 8 On timer button (ON) 9 Off timer button (OFF) SWING...

Page 55 FILE NO. SVM-17001 3 DRY OPERATION (COOLING ONLY) For dehumidification, a moderate cooling performance is controlled automatically. 1. Press : Select Dry MODE 2. Press : Set the desired temperature. 4. Hi-POWER OPERATION To automatically control room temperature and airflow for faster cooling operation (except in DRY and FAN ONLY mode).

Page 56 FILE NO. SVM-17001 8. PRESET OPERATION Set your preferred operation for future use. The setting will be memorized by the unit for future operation (except air flow direction). 1. Select your preferred operation. 2. Press and hold for 3 seconds to memorize the setting. The

mark displays.

## Page 57: Name And Functions Of Indications On Remote Contr Oller

FILE NO. SVM-17001 9-4-3. Names and Functions of Indications on Remote Controller [Display] All indications, except for the clock time indicator, are displayed by pushing the button. Transmission mark (PRESET) indicator This transmission mark indicates when the remote Flashes for 3 seconds when the PRESET button is controller transmits signals to the indoor unit.

## Page 58: Installation Procedure

FILE NO. SVM-17001 10. INSTALLATION PROCEDURE 10-1. Installation Diagram of Indoor and Outdoor Units For the rear left and left piping Wall Hook Installation plate Insert the cushion between the indoor unit and wall, and tilt the indoor unit for Flat head wood screw better operation.

## Page 59: File No. Svm

FILE NO. SVM-17001 10-2. Installation 10-2-1. Optional installation parts Part Parts name Q'ty code Refrigerant piping Liquid side : Ø6.35 mm Gas side : Ø12.70 mm each Pipe insulating material (polyethylene foam, 6 mm thick) Putty, PVC tapes each <Fixing bolt arrangement of outdoor unit> 108 mm 125 mm 28 mm...

Page 60 Wireless remote control × 1 Installation Plate × 1 Battery × 2 Remote control holder × 1 Mounting screw × 6 Toshiba new IAQ filter × 2 Flat head wood screw × 2 Owner's Manual × 1 Screw × 2 Installation Manual × 1 "...

Page 61 FILE NO. SVM-17001 10-2-3. Installation/Servicing Tools Changes in the product and components In the case of an air conditioner using R32, in order to prevent any other refrigerant from being charged accidentally, the service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch) •...

Page 62 FILE NO. SVM-17001 10-3. Indoor Unit 10-3-2. Cutting a hole and mounting installation 10-3-1. Installation place <Cutting a hole> • A place which provides the spaces around the When installing the refrigerant pipes from the rear. indoor unit as shown in the diagram •...

Page 63 FILE NO. SVM-17001 <When the installation plate is directly mounted on 10-3-3. How to Connect Remote Controller for the wall> Wire Operation 1. Securely fit the installation plate onto the wall by screwing it in the upper and lower parts to hook up Indoor unit the indoor unit.

## Page 64: Piping And Drain Hose Installation

FILE NO. SVM-17001 < For remote controller > *Remark : 1. Recommend to use double insulation lead wire for connect remote control and air conditioner. Remove cover of remote controller by sliding down and take it out. For wire operation, 1 remote control can control If batteries are exist, please take them out.

Page 65 FILE NO. SVM-17001 <How to remove the drain hose> <In case of right or left piping> • After scribing slits of the front panel with a knife or a • The drain hose can be removed by removing the making-off pin, cut them with a pair of nippers or an screw securing the drain hose and then pulling out equivalent tool.

Page 66 FILE NO. SVM-17001 NOTE • For detaching the indoor unit from the installation plate, pull the indoor unit toward you while pushing If the pipe is bent incorrectly, the indoor unit may its bottom up at the specified parts. unstably be set 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.

Page 67 FILE NO. SVM-17001 10-3-6. Drainage 1. Run the drain hose sloped downwards. NOTE • Hole should be made at a slight downward slant on the outdoor side. Do not form the drain hose into Do not rise the a wavy shape. drain hose.

Page 68 FILE NO. SVM-17001 10-4. Outdoor Unit CAUTION 10-4-1. Installation place • A place which provides the spaces around the 1. Insall the outdoor unit in a location where there are

outdoor unit as shown in the left diagram. no obstructions near its air intake or air outlet. •...

Page 69 FILE NO. SVM-17001 Flare at indoor unit side Pipe Fig. 10-4-4 Flare at outdoor unit side Imperial (wing nut type) Fig. 10-4-6 Outer dia. of copper pipe CAUTION ∅ 6.35 1.5 to 2.0 CAUTION 10-4-4. Evacuating 2.0 to 2.5 ∅ 12.70 After the piping has been connected to the indoor unit, you can perform the air purge together at once.

Page 70 FILE NO. SVM-17001 Compound pressure gauge Pressure gauge –101 kPa (-76 cmHg) Manifold valve Hexagon wrench is required. Handle Lo Handle Hi (Keep full closed) Charge hose (For R32 only) Charge hose (For R32 only) Connecting pipe Vacuum pump adapter for counter-flow prevention (For R32 only) Service Port Cap...

## Page 71: Wiring Connection

10-5. Electrical works The power supply can be selected to connect to indoor unit or outdoor unit. Choose proper way and connect the power supply and connecting cable by follow the instruction as following. Model RAS-18PKVSG-E RAS-22PKVSG-E RAS-24PKVSG-E Power source 50Hz, 220 –...

Page 72 FILE NO. SVM-17001 10-5-2. Power Supply and Connecting Cable Connection Power Supply Input at Indoor Unit Terminal Block (Recommend) Indoor Unit Outdoor Unit Power supply cable Stripping length of the power Terminal block Power supply cable connect to L N supply cable Terminal block (L N 1 2 3) Earth line...

## Page 73: Power Supply Input Wiring Diagram

FILE NO. SVM-17001 10-5-3..Power supply input wiring diagram RAS-18, 22 PAVSG-E Power supply input at Indoor unit Terminal Block (Recommend) Indoor Terminal Block Power supply input CHASSIS INDOOR UNIT OUTDOOR UNIT Outdoor Terminal Block CHASSIS EARTH Power supply input at Outdoor unit Terminal Block (Optional) Indoor Terminal Block...

Page 74 FILE NO. SVM-17001 RAS-24PAVSG-E Power supply input at Indoor unit Terminal Block (Recommend) Power supply input Indoor Terminal Block CHASSIS INDOOR UNIT OUTDOOR UNIT CHASSIS EARTH Outdoor Terminal Block Power supply input at Outdoor unit Terminal Block (Optional) Indoor Terminal Block CHASSIS INDOOR UNIT...

Page 75 FILE NO. SVM-17001 10-6. Others NOTE : 1. Repeat above step to reset Remote Control to be A. 10-6-1 . Gas leak test 2. Remote Control A has not "A" display. 3. Default setting of Remote Control from Check places for factory is A.

## Page 76: How To Diagnose The Trouble

FILE NO. SVM-17001 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 77 FILE NO. SVM-17001 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 78 FILE NO. SVM-17001 K Precautions when inspecting the control section of the outdoor unit NOTE : A large-capacity electrolytic capacitor is used in the outdoor unit controller (inverter). Therefore, if the power supply is turned off, charge (charging voltage DC280 to 380V) remains and discharging takes a lot of time. After turning off the power source, if touching the charging section before discharging, an electrical shock may be caused.

Page 79 FILE NO. SVM-17001 Sensor leads Fig. 11-4 (RAS-24PAVSG-E) Do NOT lay the circuit board assembly flat. K Precautions when inspecting the control section of the outdoor unit NOTE : A large-capacity electrolytic capacitor is used in the outdoor unit controller (inverter). Therefore, if the power supply is turned off, charge (charging voltage DC280 to 380V) remains and discharging takes a lot of time.

Page 80 FILE NO. SVM-17001 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 81 FILE NO. SVM-17001 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 82 FILE NO. SVM-17001 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 condi- tion and indicates the information of the self-diagnosis on the display of the remote controller with the check codes.

Page 83 FILE NO. SVM-17001 11-4-2 Caution at Servicing 1. After using the service mode of remote controller finished, press the [ ] button to reset the remote controller to normal function. 2. After finished the diagnosis by the remote controller, turn OFF power supply and turn its ON again to reset the air conditioner to normal operation.

Page 84 FILE NO. SVM-17001 Block distinction Operation of diagnosis function Action and Judgment Check Check Display flashing Block Cause of operation conditioner code code error status Serial signal 1) Defective wiring of the Indoor unit Flashes when 1) to 3) The outdoor unit never and connecting connecting cable or operates...

Page 85 FILE NO. SVM-17001 Block distinction Operation of diagnosis function Action and Judgment Check Check Display flashing Block Cause of operation conditioner code code error status Outdoor P.C. Current on inverter circuit All OFF Flashes after 1. Remove connecting lead wire of the board is over limit in short time.

Page 86 FILE NO. SVM-17001 Block distinction Operation of diagnosis function Action and Judgment Check Check Display flashing Block Cause of operation conditioner code code error status Compressor drive output error. All OFF Flashes after 1. Check installation conditions such as (Relation of voltage, current error is detected packed valve opening, refrigerant 8 times*.

Page 87 FILE NO. SVM-17001 Block distinction Operation of diagnosis function Action and Judgment Check Check Display Block Cause of operation conditioner code code flashing error status Compressor does not rotate. All OFF Flashes after 1. Remove connecting lead wire of the Because of missed wiring, error is detected compressor, and operate again.

Page 88 FILE NO. SVM-17001 Block distinction Operation of diagnosis function Action and Judgment Check Check Display Block Cause of operation conditioner code code flashing error status Return signal of the outdoor Indoor unit Flashes when 1. . Check power supply (Rate +10%) operates error is detected unit has been sent when...

## Page 89: Judgment Of Trouble By Every Symptom

FILE NO. SVM-17001 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? 3.

Page 90 FILE NO. SVM-17001 (2) Power is not turned on though Indoor P.C. board is replaced <Confirmation procedure> Turn on power supply. Return the wiring of the power relay is returned to Is it wired as shown in Figure below? Does operation lamp flash? the normal procedure.

Page 91 FILE NO. SVM-17001 (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...

Page 92 FILE NO. SVM-17001 Is it possible to Does check display Replace change airflow level remote on remote show high? to “HIGH”? Change the new PC Replace board. Does fan speed

motor change? Fan motor operates normally. Is it possible to Does check cross-flow Replace bearing rotate cross-flow fan by...

Page 93 FILE NO. SVM-17001 (4) Indoor fan motor automatically starts to rotate by turning on power supply [For DC fan motor] <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.

Page 94 FILE NO. SVM-17001 (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. There is no beep from the indoor unit Push the [ ] button.

Page 95 FILE NO. SVM-17001 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 follow- ing diagram.

Page 96 FILE NO. SVM-17001 11-6. How to Check Simple the Main Parts <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 97: How To Diagnose Trouble In Outdoor Unit

FILE NO. SVM-17001 11-7. How to Diagnose Trouble in Outdoor Unit 11-7-1. Summarized Inner Diagnosis of Inverter Assembly (RAS-18,22PAVSG-E) Table 11-7-1 Diagnosis/Process flowchart Item Contents Summary Preparation Turn “OFF” the power supply breaker, and remove 3P Remove connector connector which connects of compressor.

Page 98 FILE NO. SVM-17001 (RAS-24PAVSG-E) • Connect discharge Check Power Supply resistance (approx. 100Ω (Voltage Rate ±10%) 40W) or soldering iron (plug) between +, – terminals of the electrolytic capacitor (760µF) Turn OFF power of C10 (with printed supply. CAUTION HIGH VOLTAGE) on P.C.

Page 99 FILE NO. SVM-17001 Does outdoor fan operate normally? Turn OFF power supply. Does compresser operate normally? Remove connector CN300 of outdoor fan motor. Check winding resistance by ohmmeter are correct? Compressor Check rotor locking by rotate is normal with hand. Can it rotate? Turn OFF power supply.

Page 100 FILE NO. SVM-17001 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 20MΩ or more • Is not grounded. Replace control board assembly. ...

Page 101 FILE NO. SVM-17001 (3) Check procedures Table 11-8-1 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 or (F02) is blown. indoor fan motor short-circuited.

Page 102 FILE NO. SVM-17001 11-8-2. P .C . Board Layout +12V [1] Sensor characteristic table TD : Discharge temp. sensor TA : Room temp. sensor TC : Heat exchanger temp. sensor TO : Outdoor temp. sensor TS : Suction temp. sensor TA, TC, TO, TS, TE : Outdoor heat exchanger temp sensor...

Page 103 FILE NO. SVM-17001 11-8-3. 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.) Temperature 10°C 20°C 25°C 30°C 40°C Sensor TA, TC (kΩ) 20.7 12.6 10.0...

Page 104 FILE NO. SVM-17001 11-8-5. Checking Method for Each Part Part name Checking procedure Electrolytic capacitor 1. Turn OFF the power supply breaker. (For raising pressure, smoothing) 2. Discharge all three capacitors completely. 3. Check that safety valve at the bottom of capacitor is not broken. 4.

Page 105 FILE NO. SVM-17001 11-9. 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 106: How To Replace The Main Parts

FILE NO. SVM-17001 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. •...

Page 107 FILE NO. SVM-17001 Part name Procedures Remarks Air filters 1) Follow to the procedure in the item 1 . Air filters 2) Remove the left and the right air filters from the front panel. Front panel 1) Stop operation of the air conditioner and turn Front panel off its main power supply.

Page 108 FILE NO. SVM-17001 Part name Procedures Remarks Electric part 1) Follow the procedure item 3 . box assembly 2) Remove screw holding the electric part cover. TA sensor Connectors Fan motor connector Earth line Louver motor connector Screw TC sensor Electric part cover Louver motor VT (L) connector (black)

Page 109 FILE NO. SVM-17001 Part name Procedures Remarks Fan motor 1) Follow the procedure item 3 and 4 . Cross flow fan 2) Loosen the set screw of the cross flow fan. Cross flow fan Body back 3.5 mm Set screw Fan motor Vertical louver Hexagon screw driver...

Page 110 FILE NO. SVM-17001 Remarks Drain pan 1) Follow the procedure item assembly 2) Remove screw holding the electric part cover. 3) Disconnect the louver motor connector (5P) from P.C. board assembly. 4) Disconnect the cord motor of Louver VT (5P) from the Louver VT (L/R) connector.

Page 111 FILE NO. SVM-17001 Part name Procedures Remarks Vertical louver 1) Follow the procedure item 3 and 8 . Vertical louver assembly 2) Remove 2 fixing screws from the base Screw vertical louver then remove the vertical louver assembly from the body back. Screw Cover motor VT 1) Follow the procedure item 3 , 8 and 9 .

Page 112 FILE NO. SVM-17001 Part name Remarks Procedures Cross flow fan Body back 3.5 mm Set screw Fan motor - Holding the set screw, install the cross flow fan so that flat area on shaft of the fan motor comes to the mounting hole of the set screw.

Page 113 FILE NO. SVM-17001 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 114 FILE NO. SVM-17001 12-2. Outdoor unit (RAS-18, 22PAVSG-E) Remarks Part name Procedures 1. Detachment Common procedure NOTE Upper cabinet Wear gloves for this job. Otherwise, you may injure your hands on the parts, etc. 1) Stop operation of the air conditioner, and Waterproof cover turn off the main switch of the breaker for air conditioner.

Page 115 FILE NO. SVM-17001 Part name Procedures Remarks 1. Detachment Front cabinet 1) Perform step 1 in 1. 2) Remove the fixing screws (ST2TØ4 × 10L 2 pcs.) used to secure the front cabinet and inverter cover, the screws (ST2TØ4 × 10L 4 pcs.) used to secure the front cabinet at the bottom, and the fixing screws (ST2TØ4 ×...

Page 116 FILE NO. SVM-17001 Part name Procedures Remarks 1) Perform work of item 1 in 1. Inverter assembly Inverter cover 2) Remove screw (ST2TØ4 × 10L 2 pcs.) of the upper part of the front cabinet. P.C. board (Soldered surface) • If removing the inverter cover in this condition, P.C.

Page 117 FILE NO. SVM-17001 Part name Procedure Remarks 1. Disconnect the leads and connectors connected to Control board assembly the other parts from the control board assembly. 1) Leads • 3 leads (black, white, orange) connected to terminal block. • Lead connected to compressor : Disconnect the connector (3P).

Page 118 FILE NO. SVM-17001 Part name Procedures Remarks 1. Side cabinet (right) Side cabinet 1) Perform step 1 in 2 and all the steps in 3. 2) Remove the fixing screw (ST2TØ4 × 10L

4 pcs.) used for securing the side cabinet to the bottom plate and valve fixing panel.

Page 119 FILE NO. SVM-17001 Part name Procedures Remarks 1) Perform work of item 1 of 1 and 2, 3, 4, 5. Compressor 2) Extract refrigerant gas. 3) Remove the partition board. (ST2TØ4 × 10L 3 pcs.) 4) Remove the sound-insulation material. 5) Remove terminal cover of the compressor, and disconnect lead wire of the compressor from Compressor...

Page 120 FILE NO. SVM-17001 Part name Procedures Remarks 1. Detachment Electronic expansion valve coil 1) Perform step 1 in 2, all the steps in 3 and 1 in 5. 2) Remove the coil by pulling it up from the electronic control valve body. 2.

Page 121 FILE NO. SVM-17001 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.

Page 122 FILE NO. SVM-17001 12-3. Outdoor Unit (RAS-24PAVSG-E) Part name Procedure Remarks  1. Detachment Common 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 123 FILE NO. SVM-17001 Part name Procedure Remarks 1. Detachment  Front cabinet 1) Perform step 1 in  2) Remove the fixing screws (ST2TØ4 × 10L 2 pcs.) used to secure the front cabinet and inverter cover, the screws (ST2TØ4 × 10L 4 pcs.) used to secure the front cabinet at the bottom, and the fixing screws (ST2TØ4 ×...

Page 124 FILE NO. SVM-17001 Part name Procedure Remarks 1) Perform work of item 1 in  Inverter Inverter cover assembly 2) Remove screw (ST2TØ4 × 10L 2 pcs.) of the P.C. board upper part of the front cabinet. (Soldered surface) •...

Page 125 FILE NO. SVM-17001 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 • 3 leads (black, white, orange) connected to terminal block. • Lead connected to compressor : Disconnect the connector (3P).

Page 126 FILE NO. SVM-17001 Part name Procedure Remarks 1. Side cabinet (right)  Side cabinet 1) Perform step 1 in  and all the steps in  2) Remove the fixing screw (ST2TØ4 × 10L 3 pcs.) used for securing the side cabinet to the bottom plate and valve fixing panel.

Page 127 FILE NO. SVM-17001 Part name Procedure Remarks 1) Perform work of item 1 of  Compressor  2) Extract refrigerant gas. 3) Remove the partition board. (ST2TØ4 × 10L 4 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 128 FILE NO. SVM-17001 Part name Procedure Remarks 1. Detachment  Electronic expansion valve 1) Perform step 1 in 2, all the steps in 3 coil and 1 in 5. 2) Remove the coil by pulling it up from the electronic control valve body. 2.

Page 129 FILE NO. SVM-17001 Part name Procedure Remarks TE sensor (outdoor heat exchanging temperature sensor) • Attachment Install the sensor onto the straight pipe part of the condenser output pipe. Arrow D Sensor lead Straight part Detail C Detail B Detail C Detail A TS sensor (Suction pipe temperature sensor) •...

Page 130 FILE NO. SVM-17001 Sensor Temperature replacement method Part name Procedures Remarks Replacement of 1) Cut the sensor 100 mm longer than old temperature sensor one. Cutting here Thermal for servicing only Connector sensor part 2) Cut the protective tube after pulling out it (200 mm).

## Page 131: Exploded Views And Parts List

43T00717 FRONT PANEL ASSY (RAS-24PKVSG-E) 43T39382 MOTOR BAND FRONT 43T00715 CAP SCREW 43T44588 REFRIGERATION CYCLE ASSY 43T09536 GRILLE OF AIR INLET ASSY (RAS-18PKVSG-E) 43T80351 AIR FILTER 43T44589 REFRIGERATION CYCLE ASSY 43T03405 BACK BODY ASSY (RAS-22PKVSG-E) 43T22353 VERTICAL LOUVER ASSY 43T44590...

Page 132 FILE NO. SVM-17001 13-2. Indoor Unit (Part-E) RAS-18, 22, 24PKVSG-E Location Part Location Part Description Description 43T69319 TEMPERATURE SENSOR 43T6V888 PC BOARD (RAS-18PKVSG-E) 43T6V673 43T6V889 PC BOARD (RAS-22PKVSG-E) TERMINAL(5P-TF) 43T6V674 TEMPERATURE SENSOR 43T6V890 PC BOARD (RAS-24PKVSG-E) 43T62340 CORD-CLAMP 43T60480 HOUSING-WiFi...

Page 133 FILE NO. SVM-17001 13-3. Outdoor Unit RAS-18PAVSG-E RAS-22PAVSG-E 10,12 11,13 25 HOLDER SENSOR(TE) 26 HOLDER SENSOR(TD) 27 HOLDER SENSOR(TS) 28 HOLDER SENSOR(TO) Location Part Location Part Description Description 43T00688 FRONT CABINET ASSEMBLY 43T58309 REACTOR 43T00459 LEFT CABINET 43T20319 PROPELLER FAN 43T42327 BASE PLATE ASSEMBLY 43T21460...

Page 134 FILE NO. SVM-17001 13-4. Outdoor Unit RAS-24PAVSG-E 10,12 11,13 25 HOLDER SENSOR(TE) 26 HOLDER SENSOR(TD) 27 HOLDER SENSOR(TS) 28 HOLDER SENSOR(TO) Location Part Location Part Description Description 43T00718 FRONT CABINET 43T20331 PROELLER FAN 43T00560 LEFT CABINET 4302C103 MOTOR-FAN 43T42345 BASE PLATE ASSEMBLY 43T47001 NUT FLANGE 43T00561...

Page 135 FILE NO. SVM-17001 13-5. Outdoor Unit (Part-E) RAS-18, 22PAVSG-E TE Sensor (Ø6) TO Sensor (Ø6) TS Sensor (Ø6) TD Sensor (Ø4) Location Part Location Part Description Description 43T62351 HEATSINK 43T50369 TEMPERATURE SENSOR 43T6V895 PC BOARD (RAS-18PAVSG-E) 43T50336 TEMPERATURE SENSOR PC BOARD (RAS-22PAVSG-E) 43T50370 TEMPERATURE SENSOR 43T6V896...

Page 136 FILE NO. SVM-17001 13-6. Outdoor Unit (Part-E) RAS-24PAVSG-E TE Sensor (Ø6) TO Sensor (Ø6) TS Sensor (Ø6) TD Sensor (Ø4) Location Part Location Part Description Description 43T62353 HEATSINK 43T50336 TEMPERATURE SENSOR 43T6V897 PC BOARD 43T50370 TEMPERATURE SENSOR 43T60384 TERMINAL-6P 43T50371 TEMPERATURE SENSOR 43T60326 FUSE...

Page 137 TOSHIBA CARRIER (THAILAND) CO.,LTD.

## This manual is also suitable for:

Ras-22pkvsg-eRas-24pavsg-eRas-24pkvsg-eRas-18pavsg-eRas-22pavsg-e