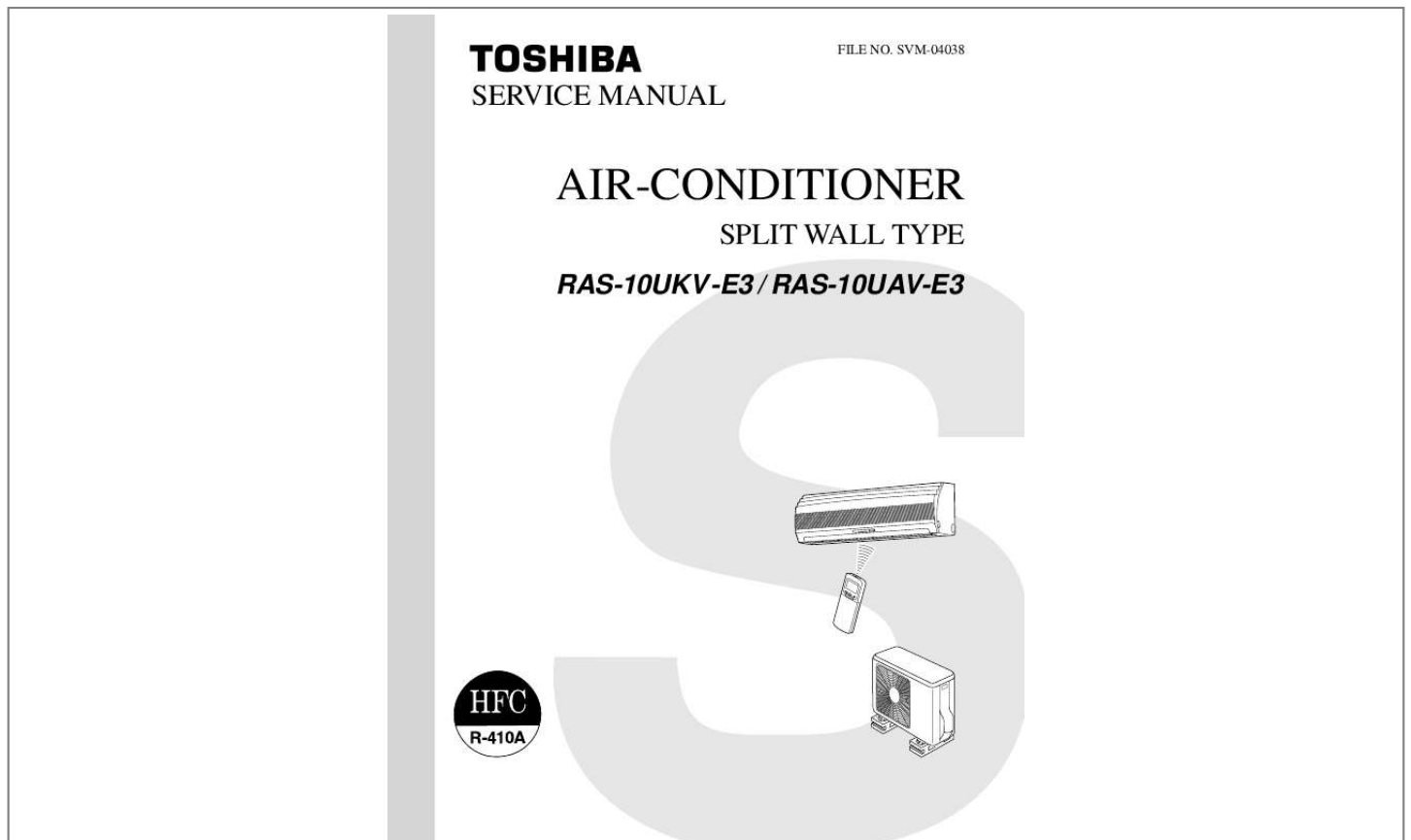




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**Manual abstract:**

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12-2. 12-3. 12-4. Indoor Unit (E-Parts Assy) Indoor Unit Outdoor Unit Outdoor Unit (E-Parts Assy) 2 FILE NO. SVM-04038 1. SPECIFICATIONS 1-1.

Specifications Unit model Current limited Cooling capacity Cooling capacity range Heating capacity Heating capacity range Power supply Electric characteristics Indoor Outdoor (kW) (kW) (kW) (kW) Indoor Operation mode Running current Power consumption Power factor Operation mode Running current Power consumption Power factor Starting current High (Cooling / Heating) Low (Cooling / Heating) (Cooling / Heating) Height Width Depth RAS-10UKV-E3 RAS-10UAV-E3 -- 2.5 0.9 3.0 3.

2 0.7 4.0 220 240V 1Ph 50/60Hz Cooling Heating 0.15 0.15 30 30 87 87 Cooling Heating 3.42 3.69 730 810 92 95 3.84 3.29 38/39 27/29 46/47 RAS-10UKV-E3 275 790 208 10 30 530/590 RAS-10UAV-E3 530 660 240 30 750 Single rotary type with DC-inverter variable speed control DA89XC-23FZ 18 530/620 Flare connection 6.35 9.

52 6.35 9.52 10 10 8 R-410A 0.64 3 Wires: includes earth 4 Wires: includes earth 21 32/0 28 10 43/10 24 1 1 1 2 (3.1 x 16L) 1 1 2 6 (4 x 25L) 1 1 1 (A) (W) (%) (A) (W) (%) (A) (dB-A) (dB-A) (dB-A) (mm) (mm) (mm) (kg) (W) (m3/h) (mm) (mm) (mm) (kg) (W) Outdoor COP (Cooling / Heating) Operation noise Indoor Outdoor Unit model Dimension Indoor unit Net weight Fan motor output Air flow rate (Cooling / Heating) Outdoor unit Unit model Dimension Height Width Depth Net weight Compressor Motor output Type Model Fan motor output Air flow rate (Cooling / Heating) Piping connection Type Indoor unit Liquid side Gas side Outdoor unit Liquid side Gas side Maximum length (Per unit) Maximum chargeless length Maximum height difference Refrigerant Name of refrigerant Weight Wiring connection Power supply Interconnection Usable temperature range Indoor (Cooling / Heating) Outdoor (Cooling / Heating) Accessory Indoor unit Installation plate Wireless remote control Remote controller holder Flat head wood screw Bioenzyme filter Zeolite filter Batteries Mounting screw Installation manual Owner's manual Outdoor unit Drain nipple (W) (m3/h) (m) (m) (kg) (°C) (°C) · The specification may be subject to change without notice for purpose of improvement.

3 FILE NO. SVM-04038 1-2. Operation Characteristic Curve <Cooling> 7 <Heating> 7 6 6 5 5 Current (A) 3 Current (A) Conditions Indoor : DB 27°C/WB 19°C Outdoor : DB 35°C Air flow : High Pipe lengthh : 5m 230V a 4 4 3 2 2 a Conditions Indoor : DB 20°C Outdoor : DB 7°C/WB 6°C Air flow : High Pipe lengthh : 5m 230V 1 1 0 0 20 40 60 80 100 Compressor speed (rps) 0 0 20 40 60 80 100 Compressor speed (rps) 1-3. Capacity Variation Ratio According to Temperature <Cooling> 105 100 95 90 85 80 75 70 65 60 55 50 32 a Conditions Indoor : DB 27°C/WB 19°C Indoor air flow : High Pipe lengthh 5m <Heating> 120 Current Limited Start 110 100 90 80 70 60 50 40 30 20 a Conditions Indoor : DB 20°C Indoor air flow : High Pipe lengthh : 5m Capacity ratio (%) Capacity ratio (%) 33 34 35 36 37 38 39 40 41 42 43 10 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 Outdoor temp. (°C) Outdoor temp.

@@SVM-04038 2. @@@@The next section describes the precautions for air conditioner using the new refrigerant. Conforming to contents of the next section together with the general cautions included in this manual, perform the correct and safe work. (5) After completion of installation work, check to make sure that there is no refrigeration gas leakage. If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur. (6) When an air conditioning system charged with a large volume of refrigerant is installed in a small room, it is necessary to exercise care so that, even when refrigerant leaks, its concentration does not exceed the marginal level. If the refrigerant gas leakage occurs and its concentration exceeds the marginal level, an oxygen starvation accident may result. (7) Be sure to carry out installation or removal according to the installation manual. Improper installation may cause refrigeration trouble, water leakage, electric shock, fire, etc.

2-1. Safety During Installation/Service As R-410A's pressure is about 1.6 times higher than that of R-22, improper installation/service may cause (8) Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please a serious trouble. By using tools and materials excludall a qualified air conditioner technician or sive for R-410A, it is necessary to carry out installation/ electrician. servicing safely while taking the following precautions Improper repair's may result in water leakage, into consideration. electric shock and fire, etc. (1) Never use refrigerant other than R-410A in an air conditioner which is designed to operate with 2-2. Refrigerant Piping Installation R-410A. If other refrigerant than R-410A is mixed, pressure 2-2-1.

Piping materials and joints used in the refrigeration cycle becomes abnormally For the refrigerant piping installation, copper pipes and high, and it may cause personal injury, etc. by a joints are mainly used. Copper pipes and joints suित्रupture. able for the refrigerant must be chosen and installed. (2) Confirm the used refrigerant name, and use tools Furthermore, it is necessary to use clean copper pipes and materials exclusive for the refrigerant R-410A. and joints whose interior surfaces are less affected by The refrigerant name R-410A is indicated on the contaminants. visible place of the outdoor unit of the air condi(1) Copper Pipes tioner using R-410A as refrigerant. To prevent It is necessary to use seamless copper pipes mischarging, the diameter of the service port which are made of either copper or copper alloy differs from that of R-22 and it is desirable that the amount of residual oil is (3) If a refrigeration gas leakage occurs during less than 40 mg/10 m. Do not use copper pipes installation/service, be sure to ventilate fully.



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having a collapsed, deformed or discolored If the refrigerant gas comes into contact with fire, portion (especially on the interior surface). a poisonous gas may occur. Otherwise, the expansion valve or capillary tube may become blocked with contaminants. (4) When installing or removing an air conditioner, As an air conditioner using R-410A incurs presdo not allow air or moisture to remain in the sure higher than when using R-22, it is necessary refrigeration cycle. Otherwise, pressure in the to choose adequate materials. refrigeration cycle may become abnormally high Thicknesses of copper pipes used with R-410A so that a rupture of personal injury may be as shown in Table 2-2-1. Never use copper caused. pipes thinner than 0.8 mm even when it is available on the market. 5 FILE NO. SVM-04038 Table 2-2-1 Thicknesses of annealed copper pipes Thickness (mm) Nominal diameter 1/4 3/8 1/2 5/8 Outer diameter (mm) 6.

35 9.52 12.70 15.88 R-410A 0.80 0.80 0.80 1.00 R-22 0.80 0.80 0.

80 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. In such a case, socket joints can be used.

Sizes of flare pipe ends, flare joint ends and flare nuts are as shown in Tables 2-2-3 to 2-2-6 below. b) Socket Joints Socket joints are such that they are brazed for connections, and used mainly for thick pipings whose diameter is larger than 20 mm. Thicknesses of socket joints are as shown in Table 2-2-2. Table 2-2-2 Minimum thicknesses of socket joints Nominal diameter 1/4 3/8 1/2 5/8 2-2-1. Processing of piping materials When performing the refrigerant piping installation, care should be taken to ensure that water or dust does not enter the pipe interior, that no other oil other than lubricating oils used in the installed air conditioner is used, and that refrigerant does not leak.

When using lubricating oils in the piping processing, use such lubricating oils whose water content has been removed. When stored, be sure to seal the container with an airtight cap or any other cover. (1) Flare Processing Procedures and Precautions a) Cutting the Pipe By means of a pipe cutter, slowly cut the pipe so that it is not deformed. b) Removing Burrs and Chips If the flared section has chips or burrs, refrigerant leakage may occur. Carefully remove all burrs and clean the cut surface before installation. c) Insertion of Flare Nut 6 Reference outer diameter of copper pipe jointed (mm) 6.35 9.52 12.70 15.88 Minimum joint thickness (mm) 0.

50 0.60 0.70 0.80 d) Flare Processing Make certain that a clamp bar and copper pipe have been cleaned. By means of the clamp bar, perform the flare processing correctly. Use either a flare tool for R-410A or conventional flare tool. Flare processing dimensions differ according to the type of flare tool. When using a conventional flare tool, be sure to secure "dimension A" by using a gauge for size adjustment. D A Fig. 2-2-1 Flare processing dimensions FILE NO.

SVM-04038 Table 2-2-3 Dimensions related to flare processing for R-410A Outer diameter (mm) 6.35 9.52 12.70 15.88 A (mm) Thickness (mm) 0.8 0.8 0.8 1.0 Flare tool for R-410A clutch type 0 to 0.5 0 to 0.5 0 to 0.5 0 to 0.

5 0 to 0.5 0 to 0.5 Conventional flare tool Clutch type 1.0 to 1.5 1.0 to 1.5 1.0 to 1.5 1.0 to 1.

5 Wing nut type 1.5 to 2.0 1.5 to 2.0 2.0 to 2.5 2.0 to 2.5 Nominal diameter 1/4 3/8 1/2 5/8 Table 2-2-4 Dimensions related to flare processing for R-22 Outer diameter (mm) 6.35 9.

52 12.70 15.88 A (mm) Thickness (mm) 0.8 0.8 0.

8 1.0 Flare tool for R-410A clutch type 0 to 0.5 0 to 0.5 0 to 0.5 0 to 0.

5 Conventional flare tool Clutch type 0.5 to 1.0 0.5 to 1.0 0.5 to 1.0 0.5 to 1.0 Wing nut type 1.0 to 1.

5 1.0 to 1.5 1.0 to 2.0 1.0 to 2.0 Nominal diameter 1/4 3/8 1/2 5/8 Table 2-2-5 Flare and flare nut dimensions for R-410A Nominal diameter 1/4 3/8 1/2 5/8 Outer diameter (mm) 6.35 9.52 12.70 15.

88 Thickness (mm) 0.8 0.8 0.8 1.0 Dimension (mm) A 9.

1 13.2 16.6 19.7 B 9.2 13.

5 16.0 19.0 C 6.5 9.7 12.9 16.0 D 13 20 23 25 Flare nut width (mm) 17 22 26 29 Table 2-2-6 Flare and flare nut dimensions for R-22 Nominal diameter 1/4 3/8 1/2 5/8 3/4 Outer diameter (mm) 6.35 9.52 12.70 15.

88 19.05 Thickness (mm) 0.8 0l (Opposite side 5 mm) (2) Torque wrench (For 6.35) (7) Screwdriver (+, ) (11) Tape measure (3) Pipe cutter (8) Spanner of Monkey wrench (12) Metal saw Also prepare the following equipments for other installation method and run check. (1) Clamp meter (3) Insulation resistance tester (2) Thermometer (4) Electroscop 9 FILE NO. SVM-04038 2-4. 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.

Connect the charge hose to packer brazing. · The corrosive action to the treated metal and brazing filler is minimum. · It excels in coating performance and is harmless to the human body. As the flux works in a complicated manner as described above, it is necessary to select an adequate type of flux according to the type and shape of treated metal, type of brazing filler and brazing method, etc. (3) Types of flux · Non-corrosive flux Generally, it is a compound of borax and boric acid.

It is effective in case where the brazing temperature is higher than 800°C. · Activated flux Most of fluxes generally used for silver brazing are this type. It features an increased oxide film removing capability due to the addition of compounds such as potassium fluoride, potassium chloride and sodium fluoride to the borax-boric acid compound. (4) Piping materials for brazing and used brazing filler/flux Piping material Used brazing filler Used flux Do not use Paste flux Vapor flux From Nitrogen cylinder Nitrogen gas cylinder 2-5-3. Brazing As brazing work requires sophisticated techniques, experiences based upon a theoretical knowledge, it must be performed by a person qualified.

In order to prevent the oxide film from occurring in the pipe interior during brazing, it is effective to proceed with brazing while letting dry Nitrogen gas (N<sub>2</sub>) flow. Never use gas other than Nitrogen gas. (1) Brazing method to prevent oxidation 1 Attach a reducing valve and a flow-meter to the Nitrogen gas cylinder. 2 Use a copper pipe to direct the piping material, and attach a flow-meter to the cylinder. 3 Apply a seal into the clearance between the piping material and inserted copper pipe for Nitrogen in order to prevent backflow of the Nitrogen gas. 4 When the Nitrogen gas is flowing, be sure to keep the piping end open. 5 Adjust the flow rate of Nitrogen gas so that it is lower than 0.05 m<sup>3</sup>/Hr or 0.02 Mpa (0.2 kgf/cm<sup>2</sup>) by means of the reducing valve.

6 After performing the steps above, keep the Nitrogen gas flowing until the pipe cools down to a certain extent (temperature at which pipes are touchable with hands).



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7 Remove the flux completely after brazing. M Flow meter Stop valve Copper - Copper Phosphor copper Copper - Iron Iron - Iron Silver Silver 1 Do not enter flux into the refrigeration cycle. 2 When chlorine contained in the flux remains within the pipe, the lubricating oil deteriorates. Therefore, use a flux which does not contain chloring. 3 When adding water to the flux, use water which does not contain chlorine (e.g. distilled water or ion-exchange water). 4 Remove the flux after brazing. Pipe Nitrogen gas Rubber plug Fig.

2-5-1 Pre-vention of oxidation during brazing 12 FILE NO. SVM-04038 3. CONSTRUCTION VIEWS 3-1. Indoor Unit Front panel Back body Air inlet Air filter 790 Heat exchanger 208 60 275 6 Air outlet Knock out system 48 Knock out system 64 53 120 590 Hanger 80 Drain hose (0.54m) Hanger 320 Connecting pipe (0.

43m) (Flare 6.35) Connecting pipe (0.33m) 620 235 215 65 or more 235 215 Hanger For stud bolt (8~10) For stud bolt (6) 26 45 Minimum distance to ceiling 45 275 190 Minimum distance to ceiling Minimum distance to ceiling 48 170 or more 170 or more Hanger 90 150 160 160 Hanger 32 40 57 18 90 150 Installation plate outline Center line Wireless remote control 13 160 6 60 FILE NO. SVM-04038 3-2. Outdoor Unit A 97 A Detail Drawing (Back Leg) 660 6 Hole 50 36 B Detail Drawing (Front Leg) R 15 R 5.

5 273.5 273.5 265 6 Hole 11x14 Hole 25 Drain outlet B 2-11x14 hole (for 8-10 anchor bolt) 273.5 265 59.5 36 50 R 15 660 Fan guard Cover PV 420 Z 530 242 500 660 97.5 56 (11) 273.5 (pitch) 297 (12.5) 126 48 Liquid side (Flare 6.35) Gas side (Flare 12.7) 54 Z View Service port Installation dimension 100 or more 600 Air inlet 600 or more 325 100 or more Air outlet 600 or more 4x11x14 Long holes (for 8-10 anchor bolt) 14 FILE NO.

SVM-04038 4. WIRING DIAGRAM 4-1. Indoor Unit or MCC-5014 Table 4-1-1 Simple Check for Failure Diagnosis Check Item Diagnosis Result Check if the OPERATION indicator goes on and off when the main switch or breaker is turned on. (Check the primary and secondary voltage of the transformer.) Check the power supply voltage between 1 and 2. (Refer to the name plate.) (Check the primary and secondary voltage of the transformer.) Check the fluctuating voltage between 2 and 3. (15~60VDC) Check if the fuse blows out. (Check the R04 of the varistor.)

) Check the voltage at the No. 4 pin on CN13 connector of the infrared receiver. (Check the transformer and the power supply circuit of the rated voltage.) Check the voltage at the white lead of the lower motor. (Check the transformer and the power supply circuit of the rated voltage.)

) Check the voltage at the No. 1 pin on CN10 connector. (Check the DB01, R05 and C03.) 1 2 3 4 5 6 OPERATION INDICATOR TERMINAL BLOCK FUSE 3.15A DC5V DC12V DC325V (DC310~340V) Refer to the service data for the detailed failure diagnosis.

15 FILE NO. SVM-04038 4-2. Outdoor Unit TE TO COIL FOR 4 WAY VALVE THERMOSTAT FOR COMPRESSOR REACTOR 12 12 CN600 12 12 CN602 CN08 CT 12 12 1 1 3 3 P06 CN500 SURGE ABSORBER F01 FUSE 15A CN01 BLK CN03 ORN CN07 CN701 REALY POWER SUPPLY 220-240V~ 50/60Hz P09 BRW P10 P11 PUR P12 POWER RELAY VARISTOR ELECTRONIC STARTER N L 3 2 1 TO INDOOR UNIT CN02 WHI RECTIFIER + ~ ~ \_ C12 C13 F04 FUSE T3.15A SWITCHING TRANSFORMER DB01 P15 YEL P16 CN300 RELAY C301 11 RED + BU EU BV EV BW EW BX BY BZ 3 3 BLK 5 5 WHI FM FAN MOTOR IGBT MODULE P.C.BOARD (MCC-866) Q200 P14 BLU P13 CN17 CN18 CN19 RED WHI BLK 11 22 33 CM COMPRESSOR COLOR IDENTIFICATION BLK : BLACK BLU : BLUE RED : RED GRY : GRAY PNK : PINK GRN : GREEN WHI : WHITE BRW : BROWN ORN : ORANGE YEL : YELLOW PUR : PURPLE 16 FILE NO. SVM-04038 5. SPECIFICATION OF ELECTRICAL PARTS 5-1. Indoor Unit No. 1 2 3 4 5 6 7 8 9 10 11 12 13 Parts name Fan motor (for indoor) Thermo.

sensor (TA-sensor) DC-DC transformer (T01) Microcomputer Heat exchanger temp. sensor (TC-sensor) Line filter (L01) Diode (DB01) Capacitor (C03) Fuse (F01) Power supply IC (IC01) Varistor (R21, R109) Resistor (R01) Louver motor Type ICF-340-30-2 ----- SWT-70 ----- SS11V-06270 D3SBA60 KMH450VNSN120M25C FCU250V3.15A STR-L472 15G561K RF-5TK4R7 MP24GA 560V 4.7, 5W 10k at 25°C DC 340V, 30W 10k at 25°C Specifications DC 390V, Secondary DC 15V, 12V, 7V 27mH, AC 0.64A 4A, 600V 120µF, 450V T3.15A, 250V Output (Rated) 1W, 16poles, 1phase, DC 12V 5-2. Outdoor Unit No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Parts name SC coil (Noise filter) DC-DC transformer Reactor Outside fan motor Fan control relay Outside air temp. sensor (TO sensor) Heat exchanger temp. sensor (TE sensor) Terminal block (6P) Fuse L01 Model name ADR2510-020T4B SWT-78 CH-51-Z-T HF-240-20B-1 AJQ1341 (Inverter attached) (Inverter attached) ----- For protection of switching power source For protection of inverter input overcurrent 10A, 2mH Rating Primary side DC280V, Secondary side 7.

5V x 1, 13V x 1, 26.5V x 3, 16V x 1, 15V x 1 L=19mH, 10A 20W Coil DC12V Contact AC250V-2A 10k (25°C) 10k (25°C) 20A, AC250V 3.15A, AC250V 15A, AC250V 500µF, DC400V x 2 pieces 15A, 600V 3-phases 4-poles 750W OFF: 125 ± 4°C, ON: 90 ± 5°C 15A, 600V AC220-240V Electrolytic capacitor IGBT module Compressor Compressor thermo. Rectifier 4-way valve coil LLQ2G501KHUATF, 400LISN500K35F MP6761 DA89X1C-23FZ PW-2AL D15XB60 SQ583 17 FILE NO. SVM-04038 6.

REFRIGERANT CYCLE DIAGRAM 6-1. Refrigerant Cycle Diagram INDOOR UNIT Indoor heat exchanger T1 Temp. measurement Cross flow fan P Pressure measurement Gauge attaching port Vacuum pump connecting port Deoxidized copper pipe Outer dia. : 9.52mm Thickness : 0.

80mm Deoxidized copper pipe Outer dia. : 6.35mm Thickness : 0.80mm Sectional shape of heat insulator Allowable pipe length Allowable height difference : 8m Max. : 10m 4-way valve (VT7101D) Muffler TD Compressor DA89X1C-23FZ TS Outdoor heat exchanger Temp. measurement Split capillary 1.0x600 T2 TE Propeller fan 1.0x600 Refrigerant amount : 0.64kg NOTE: Gas leak check position Refrigerant flow (Cooling) Refrigerant flow (Heating) OUTDOOR UNIT Note : . The maximum length of the pipe for this air conditioner is 10 m. The additional charging of refrigerant is unnecessary because this air conditioner is designed with charge-less specification.

18 FILE NO. SVM-04038 6-2. Operation Data <Cooling> Temperature condition (°C) Indoor 27/19 Outdoor 35/ Standard pressure P (MPa) 1.1 Heat exchanger pipe temp. T1 (°C) 13.5 T2 (°C) 49 Indoor fan mode High Outdoor Compressor fan revolution mode (rps) High 54 Model name 10UKV-E3 <Heating> Temperature condition (°C) Indoor 20/ Outdoor 7/6 Standard pressure P (MPa) 2.



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4 Heat exchanger pipe temp. T1 (°C) 40 T2 (°C) 0 Indoor fan mode High outdoor Compressor fan revolution mode (rps) High 70 Model name 10UKV-E3  
Note : (1) Measure surface temperature of heat exchanger pipe around center of heat exchanger path U bent. (Thermistor thermometer) (2) Connecting piping condition : 5m 19 FILE NO. SVM-04038 7.

CONTROL BLOCK DIAGRAM 7-1. Indoor Unit Indoor Unit Control Panel M.C.U. Heat Exchanger Sensor Functions · Louver Control · 3-minute Delay at Restart for Compressor · Motor Revolution Control · Processing (Temperature Processing) · Timer · Serial Signal Communication Operation Display Timer Display Filter Sign Display PRE DEF.

Sign Display Hi Power Sign Display Indoor Fan Motor Temperature Sensor Infrared Rays Signal Receiver Initializing Circuit Infrared Rays 36.7KHz Clock Frequency Oscillator Circuit Remote Control Power Supply Circuit Louver ON/OFF Signal Noise Filter Louver Driver Louver Motor Serial Signal Transmitter/Receiver From Outdoor Unit Serial Signal Communication Infrared Rays REMOTE CONTROL Remote Control Operation (START/STOP) Operation Mode Selection AUTO, COOL, DRY, HEAT, FAN ONLY Temperature Setting Fan Speed Selection ON TIMER Setting OFF TIMER Setting Louver Auto Swing Louver Direction Setting ECO Hi power Filter Reset 20 For indoor unit P.C.B (MCC-866) Noise filter Converter (AC DC) Over current sensor Inverter (DC AC) 7-2. Outdoor Unit (Inverter Assembly) 1 230V 50Hz Input current sensor Compressor High power factor correction circuit Gate drive circuit 21 signal M.

C. U Rotor position detect circuit Gas side pipe temp. sensor Outdoor air temp. sensor 1. PWM synthesis function 2. Input current release control 3. IGBT over-current detect control 4. Outdoor fan control 5. High power factor correction control 6. Signal communication to indoor unit M.

C. U Relay Relay FILE NO. SVM-04038 4way Valve Fan motor FILE NO. SVM-04038 8. OPERATION DESCRIPTION 8-1. Outlined of Air Conditioner Control This air conditioner is a capacity-variable type air conditioner, which uses DC motor for the indoor fan motor and AC motor for the outdoor fan motor. And the capacity proportional control compressor which can change the motor speed in the range from 18 to 120 rps is mounted. The DC motor drive circuit is mounted to the indoor unit. The inverter to control compressor are mounted to the outdoor unit. The entire air conditioner is mainly controlled by the indoor unit controller.

The indoor unit controller drives the indoor fan motor based upon command sent from the remote controller and transfers the operation command to the outdoor unit controller. (1) Role of indoor unit controller The indoor unit controller judges the operation commands from the remote controller and assumes the following functions. · Judgement of suction air temperature of the indoor heat exchanger by using the indoor temp. sensor (TA sensor). · Temperature setting of the indoor heat exchanger by using heat exchanger sensor (TC sensor).

· Louver motor control · Indoor fan motor operation control · LED display control · Transferring of operation command signal (Serial signal) to the outdoor unit · Reception of information of operation status (Serial signal including outside temp. data) to the outdoor unit and judgement/display of error The outdoor unit controller receives operation command from the indoor unit side, and controls the outdoor fan and the 4 way valves. Besides, detecting revolution position of the compressor motor, the (2) Role of outdoor unit controller outdoor unit controller controls speed of the compressor Receiving the operation command signal (Serial motor by controlling output voltage of the inverter and signal) from the indoor controller, the outdoor unit switching timing of the supply power (current transfer performs its role. timing) so that motors drive according to the operation · Compressor operation command. And then, the outdoor unit controller Operations followed control transfers reversely the operating status information of to judgement of serial · Operation control of the outdoor unit to control the indoor unit controller.

signal from indoor outdoor fan motor side. · 4 way valves · Detection of inverter input current and current release operation As the compressor adopts four-pole · Over-current detection and prevention operation brushless DC motor, the frequency of the to IGBT module (Compressor stop function) supply power from inverter to compressor is · Compressor and outdoor fan stop function when two-times cycles of the actual number of serial signal is off (when the serial signal does revolution. not reach the board assembly of outdoor control by trouble of the signal system) · Transferring of operation information (Serial signal) from outdoor unit to indoor unit · Detection of outdoor temperature and operation revolution control · Defrost control in heating operation (Temperature measurement by outdoor heat exchanger and control for 4 way valves and outdoor fan). 22 FILE NO. SVM-04038 (3) Contents of operation command signal (Serial signal) from indoor unit controller to outdoor unit controller The following three types of signals are sent from the indoor unit controller. · Operation mode set on the remote control · Compressor revolution command signal defined by indoor temperature and set temperature (Correction along with variation of room temperature and correction of indoor heat exchanger temperature are added.) · For these two types of signals ([Operation mode] and [Compressor revolution]), the outdoor unit controller monitors the input current to the inverter, and performs the followed operation within the range that current does not exceed the allowable value. · Temperature of indoor heat exchanger by indoor heat exchanger sensor (Minimum revolution control) (4) Contents of operation command signal (Serial signal) from outdoor unit controller to indoor unit controller The following signals are sent from the outdoor unit controller. . . . The current operation mode The current compressor revolution Outdoor temperature Existence of protective circuit operation For transferring of these signals,

the indoor unit controller monitors the contents of signals, and judges existence of trouble occurrence. Contents of judgement are described below.

· Whether distinction of the current operation status meets to the operation command signal · Whether protective circuit operates When no signal is received from the outdoor unit controller, it is assumed as a trouble. 8-1-1. Capacity control The cooling and heating capacity is varied by changing compressor motor speed. The inverter changes compressor motor speed by changing AC 220-240V power to DC once, and controls capacity by changing supply power status to the compressor with transistor module (includes 6 transistors).



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The outline of the control is as follows: The revolution position and revolution speed of the motor are detected by detecting winding electromotive force of the compressor motor under operation, and the revolution speed is changed so that the motor drives based upon revolution speed of the operation command by changing timing (current transfer timing) to exchange inverter output voltage and supply power winding. Detection of the revolution position for controlling is performed 12 times per 1 revolution of compressor. The range of supply power frequency to the compressor differs according to the operation status (COOL, HEAT, DRY). Table 8-1-1 Compressor revolution range Operation mode COOL HEAT 8-1-2. Current release control The outdoor main circuit control section (Inverter assembly) detects the input current to the outdoor unit. If the current value with compressor motor speed instructed from indoor side exceeds the specified value, the outdoor main circuit control section controls compressor motor speed by reducing motor speed so that value becomes closest to the command within the limited value.

8-1-3. Power factor improvement control Power factor improvement control is performed mainly aiming to reduce the current on much power consumption of cooling/heating operation. Controlling starts from the time when input power has reached at a certain point. To be concrete, IGBT of the power factor improvement circuit is used, and the power factor is improved by keeping IGBT on for an arbitrary period to widen electro-angle of the input current.

Compressor revolution (rps) 21 to 66 21 to 83 23 FILE NO.

SVM-04038 8-1-4. Prevent-freezing control The indoor heat exchanger sensor detects refrigerant vapor temperature in COOL/DRY operation. If the temperature is below the specified value, compressor motor speed is reduced so that operation is performed in temperature below the specified value to prevent freezing of indoor heat exchanger. 8-1-5. Louver control (1) Vertical air flow louvers Positions of vertical air flow louvers are automatically controlled according to the operation status (AUTO (A), COOL ( ), DRY ( ), HEAT ( ) and FAN ONLY ( ).

Besides, positions of vertical air flow louvers can be arbitrarily set by pressing the [FIX] button. (2) Swing If the [SWING] button is pressed during running operation, vertical air flow louvers start swinging. When the [FIX] button is pressed, swinging stops. 8-1-6. Indoor fan control (DC fan motor) (1) The indoor fan is operated by the stepless speed change DC motor. (2) For air flow level, speed of the indoor fan motor is controlled in five steps (LOW, LOW+, MED, MED+ and HIGH) as described in Table 8-1-2. If AUTO mode is selected, the fan motor speed is automatically controlled by the difference between the preset temperature and the room temperature. LOW+ = LOW+MED 2 MED+ = MED+HIGH 2 Table 8-1-2 Normal Fan mode Remote control HIGH MED+ MED LOW+ LOW HIGH MED+ MED LOW+ LOW Powerful Motor speed (rpm) 1,140 1,140 1,100 1,060 960 880 860 810 1,250 1,250 1,170 1,100 1,060 1,050 1,000 880 810 660 Air flow volume (m<sup>3</sup>/h) 535 535 510 490 430 380 370 340 600 600 555 510 490 485 455 380 340 250 Cooling and Fan only H M+ M L+ L L H M+ M L+ L L UL SUL L+ L L UL SUL Heating DRY Motor speed (rpm) 1,140 1,100 1,070 1,000 900 860 810 750 1,250 1,200 1,150 1,060 1,000 970 880 860 750 640 860 810 750 720 660 Air flow volume (m<sup>3</sup>/h) 535 510 495 510 395 370 340 305 600 600 540 490 455 435 380 370 305 240 370 340 305 285 250 24 FILE NO. SVM-04038 8-2. Description of Operation Circuit (1) When turning on the breaker, the operation lamp blinks.

This means that the power is on (or the power supply is cut off.) (2) When pressing [START/STOP] button on the remote control, receiving beep sounds from the indoor unit, and the next operation is performed together with opening the vertical air flow louver. · The outdoor unit controls the outdoor fan relay R01, R02 and R03, and the compressor motor speed according to the operation command signal sent from the indoor unit. · When [FAN] button is set to AUTO, the indoor fan motor operates as shown in Fig. 8-2-2. When [FAN] button is set to LOW, LOW+, MED, MED+, HIGH, the motor operates with a constant air flow. (Room temp.) (Preset temp.) (3) Once the operation mode is set, it is memorized in the microcomputer so that the previous operation can effected thereafter simply by pressing [START/STOP] button. 8-2-1.

Fan only operation ([MODE] button on the remote control is set to the Fan only ( ) operation.) (1) When [FAN] button is set to AUTO, the indoor fan motor operates as shown in Fig. 8-2-1. When [FAN] button is set to LOW, LOW+, MED, MED+ or HIGH, the motor operates with a constant air flow. (Room temp.) (Preset temp.) +3 M+ +2.5 \*1 +2 +1.5 +1 +0.5 0 -0.

5 L \*1 \*1 Preset temp. NOTE : +3 +2.5 M+ \*1 \*1: The values marked with \*1 are calculated and controlled by the difference in motor speed between M+ and L. Fig. 8-2-2 Setting of air flow [FAN:AUTO] (1) Cooling capacity control · The cooling capacity and room temperature are controller by changing the compressor motor speed according to both the difference between the temperature detected by the room temperature sensor and the temperature set by temperature ( ) button and also any change in room temperature. · When compressor has been activated or reactivated, it operates with Max.33 rps for 2 minutes, with Max.57 rps from 2 minutes to 3 minutes, and with Max.64 rps after 3 minutes passed. · When room temperature is lower than set temperature, indoor fan motor is operated at fan speed L as shown in Fig.

8-2-1 while the outdoor unit stops. (2) Prevent-freezing control If temperature of indoor heat exchanger detected by the indoor heat exchanger sensor is 5°C lower, compressor motor speed is gradually lower to prevent freezing of the indoor heat exchanger. If temperature is 7°C or higher, return the operation to the above item (1). +2 \*1 +1.5 \*1 +1 L +0.5 0 Preset temp. NOTE : \*1: The values marked with \*1 are calculated and controlled by the difference in motor speed between M+ and L. Fig. 8-2-1 Setting of air flow [FAN:AUTO] (2) Hi POWER operation cannot be set. 8-2-2.

Cooling operation ([MODE] button on the remote control is set to the Cool ( ) operation.) · Once the setting is made, the operation mode is memorized in the microcomputer so that the same operation can be effected thereafter simply by pushing [START/STOP] button. · A cooling operation signal is transmitted to outdoor unit. 25 FILE NO. SVM-04038 (3) Current release control (5) Limit for maximum compressor motor speed by indoor fan speed The input current of compressor and outdoor fan When the indoor heat exchanger sensor detected motor (Precisely inverter main circuit control section) which occupy most of air conditioner input 17°C or lower, the maximum compressor motor is detected by the outdoor current sensor, and speed is limited by the indoor fan speed.



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compressor motor speed is gradually lowered so For example, the compressor motor speed is that current value does not exceed 7.1A if current limited as described in the table below. value exceeds 7.1A. When the current value lowers to 6.

6A, return the operation to the above Air flow rate To < 32°C To 32°C item (1). after 1H running H Current value (A) 54 48 41 35 28 + 54 49 44 39 28 7.1  
Comp. motor speed down M+ MED. 6.6 Normal control Comp. motor speed keep M, L, L, L, L, UL, SUL Fig. 8-2-3 (4) Outdoor temperature release control The outdoor temperature release is controlled by changing the current release points 7.1 and 6.6 in the above item according to temperature detected by the outdoor temperature sensor.

For example, if the outdoor temperature is 43°C, the value of current release point becomes 5.0A. (6) Louver control The vertical air flow louvers are automatically set to horizontal or cool memory position. When temperature of indoor heat exchanger becomes 5°C or lower by the prevent-freezing control and the compressor is turned off, the vertical air flow louvers close once and then return to the position of previous time. (7) ECO operation control When the ECO button of the remote controller is pushed, quiet and mild operation is performed by restraining air flow and operating motor speed. 1) Indoor air flow is controlled between SUL and L. 2) Setting 32 rps as the maximum operating compressor motor speed, the minimum capacity operation range is widened every 1 hour and 4 hours have passed after ECO operation had started. Indoor fan Comp. motor speed 32rps 6.0 L (Room temp.

) - (Preset temp.) 5.0 4.0 3.5 3.

0 2.5 2.0 1.5 1.0 0.

5 0 -0.5 -1.0 -2.0 1H 2H 3H 4H L- \*1 \*1 \*1 \*1 \*1 22rps UL SUL OFF Fig. 8-2-4 NOTE \*1: The values marked with \*1 are calculated and controlled by the difference in motor speed between 32 rps and 22 rps. 26 FILE NO. SVM-04038 8-2-3. DRY operation ([MODE] button on the remote control is set the Dry ( ) operation.) · Once the setting is made, the operation mode is memorized in the microcomputer so that the same operation can be effected thereafter simply by pushing [START/STOP] button. · Dry operation signal is transmitted to outdoor unit.

· The Cooling operation giving priority to dehumidifying, which restrains the indoor fan speed and compressor motor speed, is performed. · The indoor fan motor operates as shown in Fig. 8-2-5. (Fan speed is AUTO only.) · The outdoor unit controls the outdoor fan relay R01, R02 and R03, and the compressor motor speed according to the operation command signal sent from the indoor unit. 8-2-4. Heat operation ([MODE] button on the remote control is set the Heat ( ) operation.) Transferring of heat operation signal from indoor unit to outdoor unit starts. The indoor fan motor operates by the room temperature when selecting "AUTO" of "FAN" as shown in Fig. 8-2-6, and operates with a set air flow when selecting "LOW" to "HIGH".

However, to prevent cold draft, revolution speed of the fan is restricted by indoor heat exchanger when air flow is AUTO (Fig. 8-2-7) and starting of FAN Manual. [Basic control] 0 Set temperature -0.5 -1 -1.5 -2 -2.

5 (Room temp.) (Set temp.) LOW \*1 \*2 \*3 +2.5 M+ -5.0 -5.

5 HIGH [FAN AUTO] (Room temp.) - (Set temp.) +2.0 +1.5 L- \*1 +1.0 SUL +0.5 0 -0.5 \*1, \*2, \*3 : Approximate revolution speed of M+ and L to linear accordingly to temperature. Fig. 8-2-6 Setting of air flow [Cold draft preventing control] The upper limit of fan revolution speed is shown below.

Set temp. NOTE : \*1 : Middle motor speed between L and SUL SUL : Super ultra Low Fig. 8-2-5 Setting of air flow 46 45 34 33 HIGH Approximate revolution speed of HIGH and SUL linear by Tc. SUL SUL (NOTE : \*1) Stop 33 32 21 20 \*2 \*2 A+4 A+4 A8 A8 FAN Starting AUTO of FAN Manual Fig. 8-2-7 Cold draft preventing control NOTES : \*1 : Stops for 2 minutes after thermostat-OFF. \*2 : 24°C when the set temperature is 24°C or more Set temperature when the set temperature is below 24°C 27 FILE NO. SVM-04038 [In starting and in stability] Outside air temp. (°C) TO 16.0 15.5 11. 0 10.5 7.1A 7.1A 7.1A In starting In stability FAN AUTO · Until 12 minutes · When 12 to 25 passed after minutes passed operation start after operation start and room · When 12 to 25 temperature is minutes passed higher than (set after operation temp.

3°C) start and room temperature is 3°C · When 25 minutes or lower than set or more passed temperature. after operation start · Room temperature · Room tempera< Set temperature ture Set tem4°C perature 3.5°C Fig. 8-2-8 (4) Defrost control 1) Detection of frost In heating operation, time duration while the compressor operates is counted, and defrost operation starts by any condition described below. a.

The counted time is 28 minutes or more, and status that temperature of the outdoor heat exchanger detected by the outdoor heat exchanger is 20°C or lower continued for 2 minutes or more. b. The counted time is 28 minutes or more, and status that temperature of the outdoor heat exchanger detected by the outdoor heat exchanger is 7°C or lower and temperature lowered by 2.5°C than the minimum value of the outdoor heat exchanger during 10 to 15 minutes count time continued for 2 minutes or more. c. The counted time is 34 minutes or more, and status that temperature of the outdoor heat exchanger detected by the outdoor heat exchanger is -5°C or lower and temperature lowered by 3.0°C than the minimum value of the outdoor heat exchanger during 10 to 15 minutes count time continued for 2 minutes or more. d. If the following three conditions are satisfied, defrost operation (Timer defrost) starts after heating operation for 37 minutes. 1 Setting on remote control, HEAT ( ) (mode), HIGH (Fan), 30°C (temperature).

2 Room temperature is 19°C to 24°C, and outside air temperature is 5°C or lower. 3 Defrost operation has been already performed once. FAN Manual The outdoor unit controls the outdoor fan based upon the operation signal sent from the indoor unit, and also controls revolution speed of the compressor motor. The power coupler (IC20) for 4 way valves is turned on, and turned off in defrost operation. (1) Heating capacity control Calculate the difference between temperature detected by room temperature sensor every minute and the set temperature set on "Temperature indicator" and variation amount of room temperature. Then, obtain the correction amount of the command signal, and correct the current frequency command signal. (2) High-temperature release control If temperature of the indoor heat exchanger detected by the indoor heat exchanger sensor is 55°C or higher, compressor motor speed is gradually lowered to prevent over temperature rising of compressed pressure.



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If temperature becomes below 48°C, return to above item (1). (3) Current release control The input current of compressor and outdoor fan motor (Precisely inverter main circuit control section) which occupies most of air conditioner input is detected by the outdoor current sensor. The compressor motor speed is lowered gradually according to the range of TO (outside air temperature) if the input current exceeds the current value determined in each zone as shown in Fig.

8-2-8 so that the input current does not exceed the set value. In case that the current lowered by approx. 0.5A than each set value, return to above item (1). 28 FILE NO.

SVM-04038 2) Defrost operation Operation of the compressor is stopped once, turn off power coupler for 4 way valves after 10 seconds, and then exchange the 4 way valves. After 20 seconds, restart operation of the compressor. Turn off the outdoor fan just when the compressor stopped. If temperature of the indoor heat exchanger lowered than 38°C, stop the indoor fan. 3) Defrost reset Resetting operation from defrost to heating is performed when anyone of the following conditions is satisfied.

a. Temperature of the outdoor heat exchanger rose to +8°C or higher. b. A status that temperature of the outdoor heat exchanger is +5°C or higher continued for 80 seconds. c. Defrost operation continued for 10 minutes. In resetting defrost operation, the compressor stops for 50 seconds if defrost has started under condition a. to c. in item 1), but the compressor is reset to heating operation keeping operated if defrost has started under condition d. in item 1).

(5) Louver control When the compressor is turned off by hightemperature release control, the vertical air flow louvers close once and then return to the position of previous time. 8-2-5. Automatic operation (1) As shown in Fig. 8-2-9, the operation mode (COOL, DRY, HEAT) is selected according to the Preset temperature and room temperature when the operation has started. - If room temperature is higher than 1°C of preset temperature. "Cooling" operation is performed. - If room temperature is within 1°C of preset temperature. "Fan only" operation is performed. (at UL speed). - If room temperature is lower than 1°C of preset temperature.

"Heating operation is performed. Ta Ts+1 Ts Ts-1 Cool Operation Fig. 8-2-9 Preset temp. 30 29 28 27 26 25 24 23 22 21 20 19 18 17 >Ts +6 +5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5 -6 -7 29 FILE NO. SVM-04038 8-3.

Temporary Operation · Temporary Auto operation, existence of Auto Restart, and Temporary Cooling operation can be set by the TEMPORARY button of the indoor controller. TEMPORARY button TEMPORARY button Table 8-3-1 TEMPORARY button OFF ON After pushing button for 3 seconds After pushing button for 10 seconds Control Temporary Auto operation start Auto Restart control select Temporary Cooling operation start 8-3-1. Temporary auto operation · When the TEMPORARY button is pushed, the Auto operation with set temperature fixed at 25°C starts. Controlling is same as that of Auto operation by the remote controller. · When the TEMPORARY button is pushed again, the operation stops.

· During Temporary Auto operation, operation by the remote controller is accepted. · Using the Auto Restart function, the Temporary Auto operation starts when power failure is reset. 8-3-2. Temporary cooling operation · When the TEMPORARY operation button keeps pushed for 10 seconds, Cooling operation of which compressor motor speed and the indoor fan speed are fixed starts. Compressor motor speed : 10 : 28 rps Indoor fan speed : Low · When the TEMPORARY operation button is pushed again, the operation stops. · Auto Restart function is unavailable. 30 FILE NO. SVM-04038 8-4. Auto Restart Function The 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 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. Therefore it is necessary to set it to work. 8-4-1. How to set auto restart function To set the auto restart function, proceed as follows: The power supply to the unit must be on; the function will not set if the power is off. Push the [TEMPORARY] button located in the center of the front panel continuously for three seconds. The unit receives the signal and beeps three times. The unit then restarts operating automatically in the event of power supply being accidentally shut down. When the unit is on standby (Not operating) Operation Push [TEMPORARY] button for more than three seconds. The unit is on standby. Motions The unit starts to operate.

The unit beeps three times and continues to operate. ; The green lamp is on. The lamp changes from green to orange. ; After approx. three seconds, 0 3S TEMPORARY button If the unit is not required to operate at this time, push [TEMPORARY] button once more or use the remote control to turn it off. When the unit is in operation Operation Push [TEMPORARY] button for more than three seconds. The unit is in operation. Motions The green lamp is on. The unit stops operating. The unit beeps three times.

0 ; The green lamp is turned off. ; After approx. three seconds, 3S TEMPORARY button If the unit is required to operate at this time, push [TEMPORARY] button once more or use the remote control to turn it on. · While this function is being set, if the unit is in operation, the orange lamp is on. · This function can not be set if the timer operation has been selected. · When the unit is turned on by this function, the louver will not swing even though it was swinging automatically before shutting down. · While the filter check lamp is on, the TEMPORARY button has the function of filter reset button. 31 FILE NO.

SVM-04038 8-4-2. How to cancel 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 control after the main power supply is turned off. When the unit is on standby (Not operating) Operation Push [TEMPORARY] button for more than three seconds. The unit is on standby. Motions The unit starts to operate. The unit beeps three times and continues to operate. ; The orange lamp is on. The lamp changes from orange to green. ; After approx. three seconds, 0 3S TEMPORARY button If the unit is not required to operate at this time, push [TEMPORARY] button once more or use the remote control to turn it off. When the unit is in operation Operation Push [TEMPORARY] button for more than three seconds.



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The unit is in operation. Motions The orange lamp is on. The unit stops operating. The unit beeps three times. 0 ; The orange lamp is turned off. ; After approx. three seconds, 3S TEMPORARY button If the unit is required to operate at this time, push [TEMPORARY] button once more or use the remote control to turn it on. · While this function is being set, if the unit is in operation, the orange lamp is on. 8-4-3. Power failure during timer operation When the unit is in Timer operation, if it is turned off because of power failure, the timer operation is cancelled.

Therefore, set the timer operation again. 32 FILE NO. SVM-04038 8-5. Hi POWER Mode ([Hi POWER] button on the remote control is pressed.) When [Hi POWER] button is pressed while the indoor unit is in Auto, Cooling or Heating operation, Hi POWER mark is indicated on the display of the remote control and the unit operates as follows. (1) Automatic operation · The indoor unit operates in according to the current operation. (2) Cooling operation · The preset temperature drops 1°C. (The value of the preset temperature on the remote control does not change.) · If the difference between the preset temperature and the room temperature is big, the horizontal louver moves to the Hi POWER position automatically. Then when the difference between them gets smaller, the horizontal louver returns automatically.

(3) Heating operation · The preset temperature increases 2°C. (The value of the preset temperature on the remote control does not change.) · If the difference between the preset temperature and the room temperature is big, the horizontal louver moves to the Hi POWER position automatically. Then when the difference between them gets smaller, the horizontal louver returns automatically. (4) The Hi POWER mode can not be set in Dry or Fan only operation. 8-6. Filter Check Lamp When the elapsed time reaches 1000 hours, the filter check lamp indicates. After cleaning the filters, turn off the filter check lamp. 8-6-1.

How to turn off filter check lamp (1) Press [FILTER] button on the remote control.

(2) Push [TEMPORARY] button on the indoor unit. Note: if [TEMPORARY] button is pushed while the filter check lamp is not indicating, the indoor unit will start the Automatic Operation. 33 FILE NO. SVM-04038 8-7. Remote control 8-7-1.

Remote control and its functions 1 Infrared signal emitter Transmits a signal to the indoor unit. 2 START/STOP button Press the button to start operation. (A receiving beep is heard.) Press the button again to stop operation. (A receiving beep is heard.)

) If no receiving sound is heard from the indoor unit, press the button twice. 3 Mode select button (MODE) Press this button to select a mode. Each time you press the button, a mode is selected in a sequence that goes from A : Auto changeover control, : Cool, : Dry, : Heat, : Fan only, and back to A. (A receiving beep is heard.) ) 4 Temperature button ( ,.....

.The set temperature is increased up to 30°C. 9.....The set temperature is dropped down to 17°C.

(A receiving beep is heard.) 5 Fan speed button (FAN) Press this button to select fan speed. When you select AUTO, the fan speed is automatically adjusted according to the room temperature. You can also manually select the desired fan speed from among five settings. (LOW , LOW+ , MED , MED+ , HIGH ) (A receiving beep is heard.

) 6 Auto louver button (SWING) Press this button to swing the louver. (A receiving beep is heard.) Press the FIX button to stop the louver swinging. (A receiving beep is heard.) 7 Set louver button (FIX) Press this button to adjust the air flow direction.

(A receiving beep is heard.) 8 Off timer button (OFF) Press this button to set the OFF timer. 9 On timer button (ON) Press this button to set the ON timer. !

Reserve button (SET) Press this button to reserve time settings. (A receiving beep is heard.) " Cancel button (CLR) Press this button to cancel ON timer and OFF timer. (A receiving beep is heard.) # High power button (Hi POWER) Press this button to start the high power operation. \$ Memory button (MEMO)

Press this button to stand by memorizing the settings. Press the button again for more than 4 seconds to memorize the setting indicated on the remote control and mark is indicated.

Automatic operation button (AUTO) Press this button to operate the air conditioner automatically. (A receiving beep is heard.) ECO timer button (ECO) Press this button to start the ECO timer (OFF timer) operation. You can select the OFF timer time from among four settings (1,3,5 or 9 hours). FILTER button Press this button to turn off the filter cleaning lamp on the indoor unit. Press this button after cleaning the air filter. PRESET button Press this button to operate the air conditioner according to settings memorized by the MEMO button. TIMER button Use this button to change the clock, ON timer, and OFF timer times. To forward the time, press the "TIMER " button. To set back the time, press the "TIMER " button.

% & ( ) ~ 1 AUTO A B 4 PRESET 13 17 2 5 6 7 9 8 FAN SWING FIX START/STOP MODE ECO TIMER AUTO Hi-POWER MEMO ON OFF FILTER SET CLR RESET CLOCK CHECK 16 3 14 15 12 13 17 11 10 18 34 FILE NO. SVM-04038 8-7-2. Names and functions of indications on remote control Display All indications, except for clock time indication, are indicated by pressing the START/STOP button. 1 Transmission mark This transmission mark (,) indicates when the remote control transmits signals to the indoor unit. 2 Mode display Indicates the current operation mode.

3 1 28 4 (AUTO : Automatic control, A : Auto changeover control, : Cool, : Dry, : Heat, : Fan only) 3 Temperature display Indicates the temperature setting (17°C to 30°C). AUTOA When you set the operating mode to : Fan only, no temperature A B setting is indicated. 4 Louver operation display Indicates the louver positioning and operation. Five selectable positions , , , Automatic Swing 5 FAN speed display Indicates the selected fan speed. AUTO or one of five fan speed levels 9 7 5 6 , MED , MED+ (LOW , LOW+ , HIGH ) can be indicated.

· In the illustration, all indications Indicates AUTO when the operating mode is either AUTO or : Dry. are indicated for explanation. 6 TIMER and clock time display During operation, only the The time set for timer operation or clock time is indicated. relevant indications will be The present time is always indicated except for TIMER operation. indicated on the remote control. 7 Hi POWER display Indicates when the Hi POWER operation starts. Press the Hi POWER button to start and press it again to stop A A the operation. B (MEMORY) display 8 Flashes for 4 seconds when the MEMO button is pressed during operation. mark is indicated when keeping the button depressed for more than 4 seconds while the mark is flashing. Press another button to turn off the mark.

9 ECO TIMER display Indicates when the ECO TIMER is in operation.



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Each time you press the ECO button, the display changes in the sequence of 1,3,5 or 9h. 35 FILE NO. SVM-04038 9. INSTALLATION PROCEDURE 9-1. 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 H07RN-F), or cord designation 245IEC66. (1.5 mm<sup>2</sup> or more) CAUTION New Refrigerant Air Conditioner Installation · THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R-410A) WHICH DOES NOT DESTROY OZONE LAYER. R-410A refrigerant is apt to be affected by impurity such as water, oxidizing membrane, and oils because pressure of R-410A refrigerant is approx. 1,6 times of refrigerant R-22. Accompanied with adoption of the new refrigerant, refrigerating machine oil has been also changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating machine oil does not enter into the refrigerating cycle or new-refrigerant air conditioner. To prevent mixing of refrigerant or refrigerating machine oil, the sizes of connecting sections of charging port of the main unit or installation tools are different from those for the conventional refrigerant. Accordingly, the exclusive tools are required for the new refrigerant (R-410A) as shown below. For connecting pipes, use new and clean piping materials with high pressure-tight force, which were made for R-410A only, so that water or dust does not enter. Moreover, do not use the existing piping because there are problems about pressure-tight force and inner impurity in the existing piping. CAUTION TO DISCONNECT THE APPLIANCE FROM THE MAIN POWER SUPPLY. This appliance must be connected to the main power supply by means of a circuit breaker or a switch with a contact separation of at least 3 mm. The installation fuse (25A D type) must be used for the power supply line of this air conditioner. DANGER · FOR USE BY QUALIFIED PERSONS ONLY. · TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING ANY ELECTRICAL WORK. MAKE SURE ALL POWER SWITCHES ARE OFF. FAILURE TO DO SO MAY CAUSE ELECTRIC SHOCK. · CONNECT THE CONNECTING CABLE CORRECTLY. IF THE CONNECTING CABLE IS CONNECTED 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 OR GAS VAPORS. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION. · TO PREVENT OVERHEATING THE INDOOR UNIT AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2 M) FROM HEAT SOURCES SUCH AS RADIATORS, HEAT REGISTERS, FURNACE, STOVES, ETC. · WHEN MOVING THE AIR-CONDITIONER FOR INSTALLING IT IN ANOTHER PLACE AGAIN, BE VERY CAREFUL NOT TO GET THE SPECIFIED REFRIGERANT 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. CAUTION · Exposure of unit to 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 neighbors. · To avoid personal injury, be careful when handling parts with sharp edges. · Please read this installation manual carefully before installing the unit. It contains further important instructions for proper installation. 36 FILE NO.

SVM-04038 9-1-1. Installation Diagram of Indoor and Outdoor Units 65 mm or more For the rear left and left piping Hook 170 or more 1 Installation plate Wall Hook 170 or more Insert the cushion between the indoor unit and wall, and tilt the indoor unit for better operation. Air filter (At Do not allow the drain hose to get slack. Attach to Shield pipe the front part 5 Zeolite filter net) Cut the piping hole sloped slightly 6 Bioenzyme filter Before installing the wireless remote control · With the remote control cover open, load the batteries supplied correctly, observing their polarity. 2 Wireless remote control Cover 8 Flat head wood screw Make sure to run the drain hose sloped downward. 2 Wireless remote control 4 Remote control holder The auxiliary piping can be connected the left, rear left, rear right, right, bottom right or bottom left. 3 Batteries Right Rear right Rear left Left Bottom left Bottom right 600 mm or more Saddle or mill mm wall 50 from rear 1 m 00 m rear from m or m wall Extension drain hose (Option: RB821SW) m 250 rear mm from m wall Insulate the refrigerant pipes separately with insulation, not together. 200 mm m or more 6 mm thick heat resisting polyethylene foam As shown in the figure, hang power cord and connecting cable downward, and take out it along piping connection port. Fig. 9-1-1 37 FILE NO.

SVM-04038 9-1-2. Optional Installation Parts Part Code Parts name Refrigerant piping Liquid side : 6.35 mm Gas side : 9.52 mm Pipe insulating material (polyethylene foam, 6 mm thick) Putty, PVC tapes Q'ty Each one 1 Each one Fixing bolt arrangement of outdoor unit · Secure the outdoor unit with the fixing bolts and nuts if the unit is likely to be exposed to a strong wind. · Use 8 mm or 10 mm anchor bolts and nuts. · If it is necessary to drain the defrost water, attach drain nipple to the bottom plate of the outdoor unit before installing it. RAS-10UAV-E3 A 275 B 500 C 60 D 97 B Suction side D 50 A B C C Diffuser Drain hole Fig. 9-1-2 9-1-3. Accessory and Installation Parts Part No. Part name (Q'ty) Part No.

Part name (Q'ty) Part No. Part name (Q'ty) 1 Installation plate x 1 4 Remote control holder x 1 7 Mounting screw 4 x 25 s x 6 2 Wireless remote control x 1 5 Zeolite filter x 1 8 Flat head wood screw 3.



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