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User manual TOSHIBA RAS-10UKHP-AS2

User guide TOSHIBA RAS-10UKHP-AS2

Operating instructions TOSHIBA RAS-10UKHP-AS2

Instructions for use TOSHIBA RAS-10UKHP-AS2

Instruction manual TOSHIBA RAS-10UKHP-AS2

TOSHIBA SERVICE MANUAL

FILE NO. SVM-03001

AIR CONDITIONER

SPLIT WALL TYPE

RAS-13UKHP-ES2 / RAS-13UAH-ES2
RAS-13UKHP-AS2 / RAS-13UAH-AS2
RAS-10UKHP-ES2 / RAS-10UAH-ES2
RAS-10UKHP-AS2 / RAS-10UAH-AS2
RAS-13UKP-ES2 / RAS-13UA-ES2
RAS-13UKP-AS2 / RAS-13UA-AS2
RAS-10UKP-ES2 / RAS-10UA-ES2
RAS-10UKP-AS2 / RAS-10UA-AS2



Feb., 2003



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Manual abstract:

@@SVM-03001 CONTENTS 1. 2. @@SVM-03001 7. @@@@PARTS REPLACEMENT 10-1 Indoor Unit 10-2 Outdoor Unit 11. EXPLODED VIEWS AND PARTS LIST 11-1 11-2 11-3 11-4 11-5 11-6 Indoor Unit (E-Parts Assy) Indoor Unit Outdoor Unit (RAS-13UAH-ES2, RAS-13UAH-AS2) Outdoor Unit (RAS-10UAH-ES2, RAS-10UAH-AS2) Outdoor Unit (RAS-13UA-ES2, RAS-13UA-AS2) Outdoor Unit (RAS-10UA-ES2, RAS-10UA-AS2) · This air conditioner is charged with HFC (R410A) that doesn't deplete the Ozone layer. · This air conditioner requires special installation for the refrigerant R410A. 2 FILE NO. SVM-03001 1. SPECIFICATIONS MODEL ITEM Capacity 220V kW Phase Power source Power consumption Power factor Running current Indoor Outdoor V Hz kW % A A A lit/h dB dB kg mm mm 49 51 1.00 Capillary tube 12.

7 Flare connection 6.35 Flare connection m m RAS-13UKHP-ES2, AS2 Height Dimensions Net weight Evaporator type Indoor fan type High fan Air volume Medium fan Low fan Fan motor output Air filter OUTDOOR UNIT Height Dimensions Net weight Condenser type Outdoor fan type Airflow volume Fan motor output Compressor Safety device Louver type Usable outdoor temperature range °C 15 ~ 43 Model Output W m/h W 3 RAS-13UKHP-ES2, AS2 RAS-13UAH-ES2, AS2 Cooling 240V 3.60 220V 4.20 1 220 240 50 1.10 98 4.

95 1.12 97 4.65 27 2.0 41/35/31 49 R410A 51 1.14 97 0.

15 5.20 4.95 1.18 96 3.60 Heating 240V 4.26 RAS-13UKP-ES2, AS2 RAS-13UA-ES2, AS2 Cooling 220V 3.75 240V 3.75 1.13 98 5.10 28 1.

17 97 4.90 Starting current Moisture removal Noise Refrigerant Indoor (H/M/L) Outdoor (220-240V) Name of refrigerant Rated amount Gas side size Connection type Liquid side size Interconnection Connection type pipe Maximum length (One way) Maximum height difference INDOOR UNIT 49 0.97 50 Refrigerant control 15*1 6 RAS-13UKP-ES2, AS2 275 790 208 10 Finned tube Cross flow fan mm mm mm kg Width Depth m³/h m/h m³/h W 3 630 520 430 650 550 490 20 Honeycomb woven filter with PP frame RAS-13UAH-ES2, AS2 630 520 430 RAS-13UA-ES2, AS2 550 780 270 mm mm mm kg 40 Width Depth 37 Finned tube Propeller fan 2120 2200 2120 42 2200 2120 2200 PA150X2T-4FM1 1100 Fuse, Overload relay Automatic louver 10 ~ 24 15 ~ 43 3 FILE NO. SVM-03001 MODEL ITEM Capacity 220V kW Phase Power source Power consumption Power factor Running current Indoor Outdoor V Hz kW % A A A lit/h dB dB kg mm mm 47 3.65 0.82 98 2.70 RAS-10UKHP-ES2, AS2 RAS-10UAH-ES2, AS2 Cooling 240V 2.70 220V 2.90 1 220 240 50 0.84 97 3. 45 0.78 97 0.15 3.50 18 1.2 39/33/26 49 0.

72 Capillary tube 9.52 Flare connection 6.35 Flare connection 47 R410A 49 3.40 0.82 96 Heating 240V 2.

96 RAS-10UKP-ES2, AS2 RAS-10UA-ES2, AS2 Cooling 220V 2.70 240V 2.70 0.82 98 3.80 0.84 97 3.60 Starting current Moisture removal Noise Refrigerant Indoor (H/M/L) Outdoor (220-240V) Name of refrigerant Rated amount Gas side size Connection type Liquid side size Interconnection Connection type pipe Maximum length (One way) Maximum height difference INDOOR UNIT Height Dimensions Net weight Evaporator type Indoor fan type High fan Air volume Medium fan Low fan Fan motor output Air filter OUTDOOR UNIT Height Dimensions Net weight Condenser type Outdoor fan type Airflow volume Fan motor output Compressor Safety device Louver type Usable outdoor temperature range Model Output Width Depth 46 0.65 47 Refrigerant control m m RAS-10UKHP-ES2, AS2 mm mm mm kg 10*1 5 RAS-10UKP-ES2, AS2 275 790 208 10 Finned tube Cross flow fan m³/h m/h m³/h W 3 570 460 340 610 520 400 20 Honeycomb woven filter with PP frame RAS-10UAH-ES2, AS2 630 490 370 RAS-10UA-ES2, AS2 550 780 270 mm mm mm kg 35 30 Finned tube Propeller fan m/h W W 3 2030 2150 30 2030 2150 1740 20 1850 PA108XIT-4FZ1 750 Fuse, Overload relay Automatic louver °C 15 ~ 43 10 ~ 24 15 ~ 43 4 FILE NO. @@@@SVM-03001 2. CONSTRUCTION VIEWS 2-1.

@@SVM-03001 2-2. Outdoor Unit A A Detail Drawing (Back Leg) 600 6 Hole 310 302 52 36 32.5 115 125 B Detail Drawing (Front Leg) 310 302 102 310 302 R15 6 Hole R5.5 11x14 Hole 36 52 R15 30 Drain outlet B 2-11x14 Hole (For 8-10 anchor bolt) 436 FAN GUARD COVER PV 530 Z 270 265 600 780 90 62 310 330 Electrical part cover Liquid side (Flare 6.35) Gas side (Flare 9.52) 10 Series Gas side (Flare 12.7) 13 Series 54 120 ZView Installation dimension B or more 325 600 Air inlet 600 or more A Air outlet A or more B 75 Service port 13 Series 600 mm 100 mm 10 Series 400 mm 45 mm 100 or more 4x11 Long holes (For 8-10 anchor bolt) 7 FILE NO. SVM-03001 3. WIRING DIAGRAM 3-1. RAS-13UKHP-ES2 / RAS-13UAH-ES2 RAS-13UKHP-AS2 / RAS-13UAH-AS2 Louver motor INFRARED RAYS RECEIVE AND INDICATION PARTS 1 2 3 4 5 6 7 8 9 10 11 PNK PNK YEL YEL YEL YEL WHI CN25 1 2 3 4 5 6 7 8 9 10 11 12 12 CN04 BLK GRN&YEL P04 SG01 DSA R22 VARISTOR F01 T6.

3A 250V 3 RY01 BLK T02 C.T RY04 4 C15 L01 R21 VARISTOR 54321 54321 CN07 POWER TERMINAL BLOCK L N GRN&YEL MAIN P.C. BOARD MCC-862 C01 R01 DB01 C02 POWER SUPPLY CIRCUIT BRW BLU CR03 POWER SUPPLY SINGLE PHASE 220-240V, 50 Hz WHI R47 R46 D38 R48 RY03 C58 123 123 YEL GRY BRW CN27 CR01 CN11 5 5 BLK 3 3 1 1 CN10 BLK BLK 3 CR02 123456 123456 RED WHI 1 INDOOR TERMINAL BLOCK OUTDOOR TERMINAL BLOCK BLK GRN&YEL HEAT THERMO SENSOR EXCHANGER SENSOR (TA) (TC) AC FAN MOTOR INDOOR OUTDOOR RED 1 2 3 BLU WHI BLK 4 1(L) 2(N) BLU 3 BLU 4 CHASSIS SOLENOID COIL RED RED COMPRESSOR RED FAN MOTOR CAPACITOR CAPACITOR WHI BLK COLOR IDENTIFICATION BRW : BROWN RED : RED WHI : WHITE YEL : YELLOW BLU : BLUE BLK : BLACK GRY : GRAY PNK : PINK ORN : ORANGE GRN&YEL : GREEN & YELLOW GRN : GREEN PNK WHI 8 135 BLK BLK BLU BLU BLU BLU BLU BLU BLU BLU BLU BLU WHI 1 2 3 4 5 6 7 8 9 10 11 CN13 DC 12V DC 5V IC03 12 12 CN03 1 2 CN01 12 FILE NO. SVM-03001 3-2.

RAS-10UKHP-ES2 / RAS-10UAH-ES2 RAS-10UKHP-AS2 / RAS-10UAH-AS2 Louver motor INFRARED RAYS RECEIVE AND INDICATION PARTS 1 2 3 4 5 6 7 8 9 10 11 PNK PNK YEL YEL YEL YEL WHI CN25 1 2 3 4 5 6 7 8 9 10 11 12 12 CN04 BLK GRN&YEL P04 SG01 DSA R22 VARISTOR F01 T6.3A 250V 3 RY01 BLK T02 C.T RY04 4 C15 L01 R21 VARISTOR 54321 54321 CN07 POWER TERMINAL BLOCK L N GRN&YEL MAIN P.C. BOARD MCC-862 C01 R01 DB01 C02 POWER SUPPLY CIRCUIT BRW BLU CR03 POWER SUPPLY SINGLE PHASE 220-240V, 50 Hz WHI R47 R46 D38 R48 RY03 C58 123 123 YEL GRY BRW CN27 CR01 CN11 5 5 BLK 3 3 1 1 CN10 BLK BLK 3 CR02 123456 123456 RED WHI 1 INDOOR TERMINAL BLOCK OUTDOOR TERMINAL BLOCK BLK GRN&YEL HEAT THERMO SENSOR EXCHANGER SENSOR (TA) (TC) AC FAN MOTOR INDOOR OUTDOOR RED 1 2 3 BLU WHI BLK 4 1(L) 2(N) BLK 3 BLK 4 CHASSIS SOLENOID COIL RED RED COMPRESSOR RED FAN MOTOR CAPACITOR CAPACITOR WHI BLK COLOR IDENTIFICATION BRW : BROWN RED : RED WHI : WHITE YEL : YELLOW BLU : BLUE BLK : BLACK GRY : GRAY PNK : PINK ORN : ORANGE GRN&YEL : GREEN & YELLOW GRN : GREEN PNK WHI 9 135 BLK BLK BLU BLU BLU BLU BLU BLU BLU BLU BLU BLU WHI 1 2 3 4 5 6 7 8 9 10 11 CN13 DC 12V DC 5V IC03 12 12 CN03 1 2 CN01 12 FILE NO.



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SVM-03001 3-3. RAS-13UKP-ES2 / RAS-13UA-ES2 RAS-13UKP-AS2 / RAS-13UA-AS2 Louver motor INFRARED RAYS RECEIVE AND INDICATION PARTS 1 2 3 4 5 6 7 8 9 10 11 PNK PNK YEL YEL YEL WHI CN25 1 2 3 4 5 6 7 8 9 10 11 12 12 CN04 BLK GRN&YEL P04 SG01 DSA R22 VARISTOR F01 T6.3A 250V 3 RY01 4 C15 L01 R21 VARISTOR 54321 54321 CN07 MAIN P.C. BOARD MCC-862 C01 R01 DB01 C02 POWER SUPPLY CIRCUIT POWER TERMINAL BLOCK L N GRN&YEL BRW BLU CR03 D38 POWER SUPPLY SINGLE PHASE 220-240V, 50 Hz WHI R47 R46 R48 C58 123 123 YEL GRY BRW CN11 5 5 BLK 3 3 1 CN10 1 BLK BLK 123456 123456 RED WHI INDOOR TERMINAL BLOCK GRN&YEL HEAT THERMO SENSOR EXCHANGER SENSOR (TA) (TC) AC FAN MOTOR INDOOR OUTDOOR 1 WHI BLK 2 OUTDOOR TERMINAL BLOCK 1(L) 2(N) CHASSIS RED BLK BLK RED FAN MOTOR RED WHI COMPRESSOR PNK WHI CAPACITOR CAPACITOR 135 COLOR IDENTIFICATION BRW : BROWN RED : RED WHI : WHITE YEL : YELLOW BLU : BLUE BLK : BLACK GRY : GRAY PNK : PINK ORN : ORANGE GRN&YEL : GREEN & YELLOW GRN : GREEN 10 BLK BLK BLU BLU BLU BLU BLU BLU BLU BLU BLU WHI 1 2 3 4 5 6 7 8 9 10 11 CN13 DC 12V DC 5V IC03 12 12 CN03 1 2 CN01 12 FILE NO. SVM-03001 3-4. RAS-10UKP-ES2 / RAS-10UA-ES2 RAS-10UKP-AS2 / RAS-10UA-AS2 Louver motor INFRARED RAYS RECEIVE AND INDICATION PARTS 1 2 3 4 5 6 7 8 9 10 11 PNK PNK YEL YEL YEL WHI CN25 1 2 3 4 5 6 7 8 9 10 11 12 12 CN04 BLK GRN&YEL P04 SG01 DSA R22 VARISTOR F01 T6.3A 250V Type PA108XIT-4FZI Specifications Output (Rated) 750W, 2poles, 1 phase, 220 240V, 50Hz Winding resistance () (at 20°C) 2 Fan motor (for outdoor) Running capacitor (for fan motor) Running capacitor (for compressor) HF-240-20B Winding resistance () (at 20°C) 3 4 DS451155BPQC DS371256CPNB AC 450V, 1.5µF AC 370V, 25µF C-R 3.89 Red-Black 387.

3 C-S 4.51 White-Black 466.2 Output (Rated) 20W, 6poles, 1 phase, 220 240V, 50Hz 14 FILE NO. SVM-03001 5. REFRIGERATION CYCLE DIAGRAM 5-1. RAS-13UKHP-ES2 / RAS-13UAH-ES2 RAS-13UKHP-AS2 / RAS-13UAH-AS2 T1 Cooling 0.39m (Connecting pipe) 12.7 Indoor unit Evaporator Heating Cross flow fan 0.49m (Connecting pipe) 6.35 O. D.:12.7mm P Packed valve (12.7) Heating Packed valve (6.35) O. D.:6.35mm Cooling 4-way valve Heating Cooling Compressor PA150X2T-4FM1 Accumulator Condenser Capillary tube 1.5x1200s Capillary tube 1.2x1600s Cooling Heating Propeller fan Outdoor unit Refrigerant R410A : 1.00 kg. Mark () means check points of Gas Leak. 50Hz Standard pressure P (MPaG) Surface temp. of heat exchanger interchanging pipe T1 (°C) Fan speed (indoor) Ambient temp. conditions DB/WB (°C) Indoor Outdoor Standard Heating Overload*1 Low temperature Standard Cooling Overload Low temperature 2.75 3.20 ~ 3.70 2.20 0.90 1.

10 0.70 44.0 52.0 ~ 59.0 35.0 10.0 14.0 2.0 High Low High High High Low 20/15 27/ 20/ 27/19 32/23 21/15 7/6 24/18 10/10 35/24 43/26 21/15 Note : · Measure the heat exchanger temperature at the center of U-bend. (By means of TC sensor) *1 · During heating overload operation, a value for the high temperature limit control operation is included. 15 FILE NO. SVM-03001 5-2. RAS-10UKHP-ES2 / RAS-10UAH-ES2 RAS-10UKHP-AS2 / RAS-10UAH-AS2 Cooling 0.39m (Connecting pipe) 9.52 Indoor unit Evaporator T1 Heating Cross flow fan 0.49m (Connecting pipe) 6.35 O.D.:9.52mm P Packed valve (9.52) Heating Packed valve (6.35) O.D.:6.35mm Cooling 4-way valve Heating Cooling Compressor PA108XIT-4FZI Accumulator Condenser Capillary tube 1.2x800s Capillary tube 1.0x800s Cooling Heating Propeller fan Outdoor unit Refrigerant R410A : 0.72 kg. Mark () means check points ign Display Indoor Fan Motor Thermo. Sensor · Louver Control Infrared Rays Signal Receiver · 3-minutes Delay at Restart for Compressor Initializing Circuit Clock Frequency Oscillator Circuit · Motor Revolution Control · Processing (Temperature Processing) · Timer Power Supply Circuit Compressor ON/OFF Signal Louver ON/OFF Signal Louver Motor Noise Filter Relay Driver, Louver Driver Relay RY01 220-240 V~, 50Hz Compressor, Outdoor Fan Motor REMOTE CONTROL Infrared Rays Remote Control Operation (START/STOP) Operation Mode Selection AUTO, COOL, DRY, 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 FILE NO.

SVM-03001 7. OPERATION DESCRIPTION 7-1. Outline of Air Conditioner Control This is a fixed capacity type air conditioner, which uses a AC motor for an indoor fan. The AC motor drive circuit is mounted in the indoor unit. And electrical parts which operate the compressor and the outdoor fan motor, are mounted in the outdoor unit. The air conditioner is mainly controlled by the indoor unit controller. The controller operates the indoor fan motor based upon commands transmitted by the remote control and transfers the operation commands to the outdoor unit controller. The outdoor unit controller receives operation commands from the indoor unit, and operates the outdoor fan motor and the compressor. 7-1-1. Louver control (1) Vertical air flow lower Position of vertical air flow lower is automatically controlled according to the operation mode.

Besides, position of vertical air flow lower can be arbitrarily set by pressing [FIX] button. The lower position which is set by [FIX] button is stored in the microcontroller, and the lower is automatically set at the stored position for the next operation. (2) Swing If [SWING] button is pressed when the indoor unit is in operation, the vertical air flow lower starts swinging. When [FIX] button is pressed, it stops swinging. (1) Role of indoor unit controller The indoor unit controller receives the operation 7-1-2.

Indoor fan control (AC Fan motor) commands from the remote control and executes them. (1) The indoor fan is operated by the stepless speed · Temperature measurement at the air inlet of the change AC motor. indoor heat exchanger by the indoor (2) For air flow level, speed of the indoor fan motor is temperature sensor controlled in five steps (LOW, LOW+, MED, MED+ · Temperature setting of the indoor heat and HIGH). If AUTO mode is selected, the fan exchanger by the heat exchanger sensor motor speed is automatically controlled by the · Louver motor control difference between the preset temperature and · Indoor fan motor operation control the room temperature. · LED display control · Transferring of operation commands to the LOW+ = LOW+MED outdoor unit 2 ·

Receiving of information of the operation status MED+ = MED+HIGH and judging of the information or indication of 2 error Table 7-1-1 Model RAS-13UKHP-ES2 RAS-13UKHP-AS2 Motor speed Air flow level (rpm) (m3/h) 1,300 630 1,200 570 1,100 520 1,020 470 950 430 1,350 650 1,250 610 1,150 550 1,100 520 1,050 490 RAS-13UKP-ES2 RAS-13UKP-AS2 1,300 630 1,200 570 1,100 520 1,020 470 950 430 RAS-10UKHP-ES2 RAS-10UKHP-AS2 Motor speed Air flow level (rpm) (m3/h) 1,200 570 1,100 520 1,000 460 900 400 800 340 1,250 610 1,170 560 1,100 520 1,000 460 900 400 RAS-10UKP-ES2 RAS-10UKP-AS2 1,300 630 1,180 560 1,050 490 950 430 850 370 Cooling and Fan only Heating HIGH MED+ MED LOW+ LOW HIGH MED+ MED LOW+ LOW Model HIGH MED+ MED LOW+ LOW Cooling and Fan only 21 FILE NO.



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SVM-03001 7-2. 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 lower. (3) Once the operation mode is set, it is memorized in the microcontroller so that the previous operation can be effected thereafter simply by pressing [START / STOP] button. 7-2-1. 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. 7-2-1. When [FAN] button is set to LOW, LOW+, MED, MED+ or HIGH, the motor operates with a constant air flow.

(Room temp.) (Preset temp.) 7-2-2. Cooling operation ([MODE] button on the remote control is set to the cooling operation.) (1) The compressor, 4-way valve, outdoor fan and operation display on the remote control are controlled as shown in Fig. 7-2-2. (Room temp.) -- (Preset temp.) ON 0.5 ON OFF OFF OFF ON Fig.

7-2-2 +3 +2.5 M+ *1 +2 *1 +1.5 (2) When [FAN] button is set to AUTO, the indoor fan motor operates as shown in Fig. 7-2-3. When [FAN] button is set to LOW, LOW+, MED, MED+ or HIGH, the motor operates with a constant air flow.

(Room temp.) (Preset temp.) *1 +1 +0.5 0 +3 M+ +2.5 *1 +2 +1.

5 +1 +0.5 0 -0.5 *1 *1 Preset temp. NOTE : *1: The values marked with *1 are calculated and controlled by the difference in motor speed between M+ and L. Fig. 7-2-1 Setting of air flow [FAN:AUTO] (2) The Hi POWER operation cannot be set. Preset temp. NOTE : *1: The values marked with *1 are calculated and controlled by the difference in motor speed between M+ and L. Fig. 7-2-3 Setting of air flow [FAN:AUTO] 22 OPERATION display Compressor 4-way valve Outdoor fan Preset temp.

0 FILE NO. SVM-03001 7-2-3. Dry operation ([MODE] button on the remote control is set to the dry operation.) (1) The compressor, 4-way valve, outdoor fan and operation display on the remote control are controlled as shown in Fig. 7-2-4. (Room temp.) -- (Preset temp.) ON:6min. OFF:4min. ON:6min. OFF:4min. 7-2-4. Heating operation *Heat pump model only ([MODE] button on the remote control is set to the heating operation.) (1) The compressor,

4-way valve, outdoor fan and operation display on the remote control are controlled as shown in Fig. 7-2-6.

+3 +2 +1 Preset temp. 0 OFF ON (Room temp.) (Preset temp.) ON:5min. OFF:5min.

ON:5min. OFF:5min. OFF ON OFF ON OFF 0 OFF -0.5 ON Compressor 4-way valve ON OPERATION display OPERATION display Compressor 4-way valve Outdoor fan Fig. 7-2-4 (2) The microcontroller turns the compressor on and off at the regular intervals (4 to 6 minutes). While the compressor is turning off, the indoor fan motor operates in the SUPER LOW position. The pattern of operation depending on the relation between room temperature and preset temperatures is shown in Fig. 7-2-5. Room temp. Fig.

7-2-6 (2) When [FAN] button is set to AUTO, the indoor fan motor operates as shown in Fig. 7-2-7. When [FAN] button is set to LOW, LOW+, MED, MED+ or HIGH, the motor operates with a constant air flow. Preset (Room temp.) -- (Preset temp.) temp. 0 -0.5 -1 -1.5 -2 L *1 *2 Preset temp. +1 Preset temp.

M+ -5.0 -5.5 [FAN AUTO] Compressor Outdoor fan ON ON ON ON H OFF Indoor fan OFF OFF L. *S.L.

L. S.L. L. S.

L. L. *1, *2 : The values marked with *1 and *2 are calculated and controlled by the difference in motor speed between M+ and L. Fig. 7-2-7 Setting of air flow [FAN:AUTO] *Super Low Fig. 7-2-5 (3) [FAN] button on the remote control is set to AUTO only. (4) The Hi POWER operations cannot be set. 23 Outdoor fan Preset temp. FILE NO. SVM-03001 (3) The indoor heat exchanger restricts revolving speed of the fan motor to prevent a cold draft.

The upper limit of the revolving speed is shown in Fig. 7-2-8 and Table 7-2-1. RAS-13UKHP-ES2, RAS-13UKHP-AS2 Indoor heat exchanger temperature *5 and *6: Table 7-2-1 Fan speed AUTO *5 Starting period · Up until 12 minutes passed after starting the unit · From 12 to 25 minutes passed after starting the unit and room temperature is 3°C lower than preset temperature *6 Stabilized period · From 12 to 25 minutes passed after starting the unit and room temperature is between preset temperature and 3°C lower than preset temperature · 25 minutes or more passed after starting the unit · Room temperature · Room temperature Preset temperature < Preset temperature 3.5°C 4°C Manual AUTO (One of 5 steps) 42 41 34 33 29 28 21 20 *4 L-H (Up to setting speed)

*2 A+4 A+4 A-8 A-8 *6 *5 SUL*3 SUL*1 Stop Manual (L H) RAS-10UKHP-ES2, RAS-10UKHP-AS2 Manual AUTO (One of 5 steps) 46 45 34 33 Indoor heat exchanger temperature 7-2-5. Automatic operation ([MODE] button on the remote control is set to the automatic operation.) (1) One of 3 operations (Cooling, Fan only or Heating) is selected according to difference between the preset temperature and the room temperature at which the automatic operation has started, as shown in Fig. 7-2-9. The Fan only operation continues until the room temperature reaches a level at which another mode is selected.

(2) Temporary Auto When the TEMPORARY button on the indoor unit is pushed, the preset temperature is fixed at 24°C and the indoor unit is controlled as shown in Fig. 7-2-9.

32 31 21 20 *4 L-H (Up to setting speed) SUL*3 *2 A+4 A+4 A-8 A-8 *6 *5 SUL*1 Stop Fig. 7-2-8 Cold draft preventing control NOTES : *1: The fan stops for 2 minutes after thermostat-OFF. *2: A is 24°C when the preset temperature is 24°C or more and A is the preset temperature when it is under 24°C. C

(Room temp.) (Preset temp.)

) *3: SUL means Super Ultra Low. *4: Calculated from difference in motor speed between SUL and HIGH. +4 Cooling operation The louver moves to the position same as Hi POWER operation. Cooling operation 0 Fan only operation Heating operation RAS-13UKHP-ES2 RAS-13UKHP-AS2 RAS-10UKHP-ES2 RAS-10UKHP-AS2 RAS-13UKP-ES2 RAS-13UKP-AS2 RAS-10UKP-ES2 RAS-10UKP-AS2 Fig. 7-2-9 24 FILE NO.

SVM-03001 7-3. 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 3°C. (The value of the preset temperature on the remote control does not change.)



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) · 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. · FAN speed : [AUTO] If the difference between the preset temperature and room temperature is big, the air conditioner operates at maximum airflow level. If the difference between the preset temperature and the room temperature is small, the air conditioner operates at normal airflow level.

· FAN speed : One of 5 levels The air conditioner operates at normal airflow level. (3) Heating operation *Heat pump model only · The preset temperature increases 2°C, (The value of the preset temperature on the remote control does not change.) · The indoor unit operates in normal heating mode except the preset temperature is higher (+2°C). (4) The Hi POWER mode can not be set in Dry or Fan only operation. RAS-10UKHP-ES2 RAS-10UKHP-AS2 RAS-10UKP-ES2 RAS-10UKP-AS2 Heat exchanger temperature 7-4. High-Temperature Limit Control *Heat pump model only The microcontroller detects the indoor heat exchanger temperature to prevent pressure of a refrigerating cycle from increasing excessively. The compressor and outdoor fan motor are controlled as shown in Fig. 7-4-1. Compressor Outdoor fan OFF ON ON OFF OFF ON Heat exchanger temp. 60 53 52 Fig.

7-4-1 7-5. Low-Temperature Limit Control The microcontroller detects the indoor heat exchanger temperature to prevent the indoor heat exchanger from freezing. The compressor and outdoor fan motor are controlled as shown in Fig. 7-5-1 and 7-5-2. RAS-13UKHP-ES2 RAS-13UKHP-AS2 RAS-13UKP-ES2 RAS-13UKP-AS2 Heat exchanger temperature Compressor Outdoor fan ON 6 2 Less than continues for 5 minutes OFF Fig.

7-5-1 Compressor Outdoor fan ON 7 5 Less than continues for 5 minutes OFF Fig. 7-5-2 25 FILE NO. SVM-03001 7-6. Defrost Operation *Heat pump model only <In case of C> (1) The heating operation is performed for at least 90 During the heating operation, the outdoor heat minutes. exchanger temperature goes down and sometimes it is frozen.

(2) The defrost operating time is 10 minutes. In this case, the air conditioner stops the heating operation and starts the defrost operation to melt ice. 7-6-3. Ending condition at defrost operation 7-6-1. Condition to start the defrost operation The defrost operation starts whichever below conditions are satisfied. (1) When the compressor current becomes 7.5A or more during defrost operation, the defrost operation stops and the heating operation restarts. (The current sensor detects the compressor current.) Indoor heat exchanger temp - Room temp (1) When the cumulative compressor operating time is (2) The defrost operation continues for at most longer than 40 or 90 minutes and difference 6 minutes or 10 minutes. between the indoor heat exchanger temperature and the room temperature is less than the specified value.

(This value is decided by the DEFROST LAMP : microprocessor.) (Control example is shown in · During defrost operation, the PRE-DEF. lamp is Fig. 7-6-1. In case of B or C, the defrost operation on and the indoor and outdoor fans are off. starts.) · The compressor start protection timer is inter(2) When the current limit control or the high looked with the PRE-DEF. lamp. So the PRE-DEF. temperature limit control is performed for total of Lamp is off (the fans stop) for about 3 minutes 90 minutes.

after the START/STOP button is turned on. When the compressor is turned on, the PRE-DEF. lamp comes on. After the heat exchanger is preheated to about 24°C or higher, the PRE-DEF. Lamp goes off, and the indoor fan starts.

D A B C Cumulative compressor operating time Fig. 7-6-1 (Indoor fan speed : M) 7-6-2. Defrost operation time control <In case of B> (1) The heating operation is performed for at least 40 minutes. (2) The maximum defrost operating time is 6 minutes. The defrost operating time for the 4th cycle is 10 minutes.

(When the outdoor temperature is very low, however, the defrost operating time is 10 minutes.) minutes 40 minutes 40 minutes 40 minutes 40 Heating Heating Heating Heating Defrost Defrost Defrost Max 6 minutes 10 minutes 1 cycle Fig. 7-6-2 26 Defrost FILE NO. SVM-03001 7-7. Current Limit Control *Heat pump model only The microcontroller detects the input current so as to prevent it exceeds a specified value by means of controlling the outdoor fan control as described in (1) and (2). (1) Current limit control (Cooling operation) Control is performed as shown below by detecting the compressor operating current with a current sensor (C.T). RAS-13UKHP-ES2, RAS-13UKHP-AS2 / RAS-10UKHP-ES2, RAS-10UKHP-AS2 Input current Compressor Outdoor fan More than I4 continues for 3 seconds OFF More than I3 continues for 5 seconds OFF ON 13.5A/ 19.2A I4 12.

5A/ 17.8A I3 Fig. 7-7-1 (2) Current limit control (Heating operation) Control is performed as shown in Fig. 7-7-2 RAS-13UKHP-ES2, RAS-13UKHP-AS2 / RAS-10UKHP-ES2, RAS-10UKHP-AS2 Input current 13.5A/ 19.2A I4 12.5A/ 17.8A I3 10A/ 15.6A I2 9A/ 15.0A I1 Compressor Outdoor fan More than I4 continues for 3 seconds OFF More than I3 continues for 5 seconds OFF ON OFF ON Fig.

7-7-2 Remark : This function is available only for heat pump model (Cooling models have no a current sensor (C.T.)). 27 FILE NO. SVM-03001 7-8.

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. 7-8-1.

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. 0 3S The unit beeps three times and continues to operate. 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. ; The green lamp is on.

; After approx. three seconds, The lamp changes from green to orange. 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.



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The unit stops operating. 0 The unit beeps three times 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 the filter check lamp is on, the TEMPORARY button has the function of filter reset button. ; The green lamp is turned off. ; After approx.

three seconds, · · · 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 lower will not swing even though it was swinging automatically before shutting down. 28 FILE NO. SVM-03001 7-8-2.

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.

0 3S The unit beeps three times and continues to operate. 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. ; The orange lamp is on. ; After approx. three seconds, The lamp changes from orange to green. When the unit is in operation Operation Push [TEMPORARY] button for more than three seconds. The unit is in operation. Motions The orange lamp is on. The unit stops operating. 0 The unit beeps three times 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.

; The orange lamp is turned off. ; After approx. three seconds, · While this function is being set, if the unit is in operation, the orange lamp is on. 7-9. 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. 7-9-1. How to turn off filter check lamp Press [FILTER] button on the remote control. OR 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.

7-8-3. 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. 29 FILE NO. SVM-03001 8.

INSTALLATION PROCEDURE 8-1. Safety Cautions For general public use Power supply cord of parts of appliance for Outdoor use shall be at least polychloroprene sheathed flexible cord (design H07 RN-F), or cord designation 245 IEC66. CAUTION New Refrigerant Air conditioner Installation · THIS AIR CONDITIONER USES THE NEW HFC REFRIGERANT (R410A), WHICH DOES NOT DESTROY THE OZONE LAYER. R410A refrigerant is apt to be affected by impurity such as water, oxidizing membranes, and oils because the pressure of R410A refrigerant is approx. 1.

6 times of refrigerant R22. As well as the adoption of this new refrigerant, refrigerating machine oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating machine oil does not enter into the refrigerating cycle of a new-refrigerant air conditioner.

To avoid mixing refrigerant and refrigerating machine oil, the sizes of charging port connecting sections on the main unit are different from those for the conventional refrigerant, and different size tools are also required. Accordingly, special tools are required for the new refrigerant (R410A) as shown below. For connecting pipes, use new and clean piping materials with high-pressure withstand capabilities, designed for R410A only, and ensure that water or dust does not enter. Moreover, do not use any existing piping as its pressure withstand may be insufficient, and may contain impurities. 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. If this is not possible, a power supply plug with earth must be used. This plug must be easily accessible after installation.

The plug must be disconnected from the power supply socket in order to disconnect the appliance completely from the mains. 30 FILE NO. SVM-03001 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 WRONGLY, ELECTRIC PARTS MAY BE DAMAGED. · CHECK THE EARTH WIRE THAT IT IS NOT BROKEN OR DISCONNECTED BEFORE INSTALLATION. · DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OR GAS VAPORS.

FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION. · TO PREVENT OVERHEATING THE INDOOR UNIT AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2 M) FROM HEAT SOURCES SUCH AS RADIATORS, HEATERS, FURNACE, STOVES, ETC. · WHEN MOVING THE AIR-CONDITIONER FOR INSTALLING IT IN ANOTHER PLACE AGAIN, BE VERY CAREFUL NOT TO GET THE SPECIFIED REFRIGERANT (R410A) WITH ANY OTHER GASEOUS BODY INTO THE REFRIGERATION CYCLE. IF AIR OR ANY OTHER GAS IS MIXED IN THE REFRIGERANT, THE GAS PRESSURE IN THE REFRIGERATION CYCLE BECOMES ABNORMALLY HIGH AND IT RESULTINGLY CAUSES BURST OF THE PIPE AND INJURIES ON PERSONS. · IN THE EVENT THAT THE REFRIGERANT GAS LEAKS OUT OF THE PIPE DURING THE INSTALLATION WORK, IMMEDIATELY LET FRESH AIR INTO THE ROOM.

IF THE REFRIGERANT GAS IS HEATED BY FIRE OR SOMETHING ELSE, IT CAUSES GENERATION OF POISONOUS GAS. WARNING · Never modify this unit by removing any of the safety guards or bypassing 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. Also, make sure the equipment is properly 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 could result in electric shock. Do not store it in a wet basement or expose to rain or water. · After unpacking the unit, examine it carefully for possible damage. · Do not install in a place that can increase the vibration of the unit.



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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. **REQUIREMENT OF REPORT TO THE LOCAL POWER SUPPLIER** Please make absolutely sure that the installation of this appliance is reported to the local power supplier before installation. If you experience any problems, or if the installation is not accepted by the supplier, the service agency will take adequate countermeasures. Remark per EMC Directive 89/336/EEC To prevent flicker impressions during the start of the compressor (technical process) following installation conditions do apply. 1. The power connection for the air conditioner has to be done at the main power distribution. This distribution has to be of an impedance. Normally the required impedance is reached at a 32A fusing point. Air conditioner fuse has to be 16A max.

! 2. No other equipment should be connected to this power line. 3. For detailed installation acceptance, please contact your power supplier whether its restriction does apply for products like washing machines, air conditioners or electrical ovens. 4.

For power details of the air conditioner, refer to the rating plate of the product. 31 FILE NO. SVM-03001 8-2. Installation Diagram of Indoor and Outdoor Units 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 170 or more mm or 65 mm or more Hook For the rear left and left piping plate Wall 1 Installation Hook 170 or more mm or 3 Batteries (Attach to Air filter Insert the cushion between the indoor unit and wall, and tilt the indoor unit for better operation.

Do not allow the drain hose to get slack. the front panel) Shield pipe 5 Zeolite filter 6 Purifying filter 8 Pan head wood screw Cut the piping hole sloped slightly 2 Wireless remote control Make sure to run the drain hose sloped downward. 4 Remote control holder The auxiliary piping can be connected the left, rear left, rear right, right, bottom right or bottom left. 13 series A B 600 mm 100 mm 10 series 400 mm 45 mm Right Vinyl tape Apply after carrying out a drainage test. Saddle 600 mm or more Rear right Rear left Left Bottom left Bottom right 100 mm or more Extension drain hose (Option: RB821SW) 600 mm or more Insulate the refrigerant pipes separately with insulation, not together. 6 mm thick heat resisting polyethylene foam 32 FILE NO. SVM-03001 8-3. Installation 8-3-1. Optional installation parts Part Code Parts name Refrigerant piping Liquid side : 6.35 mm Gas side : 9.

52 mm (10 series) Gas side : 12.70 mm (13 series) Pipe insulating material (polyethylene foam, 6 mm thick) Putty, PVC tapes Q'ty A One each B C 1 One each <Fixing bolt arrangement of outdoor unit> 115 mm 32.5 mm 125 mm Air inlet 30 310 mm 7 mm Air outlet 90 mm 600 mm Drain outlet Fig. 8-3-1 · Secure the outdoor unit with 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 9 drain nipple and ! cap water proof to the bottom plate of the outdoor unit before installing it. 102 mm 73 mm 33 FILE NO. SVM-03001 8-3-2. 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 Pan head wood screw 3.1 x 16 s x 2 3 Battery x 2 6 Purifying filter x 1 9 Drain nipple* x 1 (For Heat pump model only) Others Name Owner's manual Installation manual ! Cap water proof* x 2 (For Heat pump model only) This model is not equipped with an extension drain hose. The part marked with asterisk (*) is packaged with the outdoor unit. Option : For the extension drain hose, use an optionally available RB-821SW or commercially available one.

34 FILE NO. SVM-03001 8-3-3. Installation/Service tools <Changes in the product and components> In the case of an air conditioner using R410A, in order to prevent any other refrigerant from being charged accidentally, the service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch) · In order to increase the pressure withstand strength of the refrigerant piping, flare processing diameter and size of opposite side of flare nuts have been changed. (for copper pipes with nominal dimensions 1/2 and 5/8) New tools for R410A Gauge manifold Applicable to R22 model Changes As pressure is high, it is impossible to measure by means of conventional gauge.

In order to prevent any other refrigerant from being charged, each port diameter has been changed. In order to increase pressure withstand strength, hose materials and port size have been changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to confirm the port size. As pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of a charging cylinder, as air bubbles occur. The size of opposing flare nuts has been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8. By increasing the clamp bar's receiving hole, strength of spring in the tool has been improved. -- Charge hose Electronic balance for refrigerant charging Torque wrench (nominal dia. 1/2, 5/8) Flare tool (clutch type) Gauge for projection adjustment Vacuum pump adapter Used when flare is made with a conventional flare tool. Connected to conventional vacuum pump.

It is necessary to use an adapter to prevent vacuum pump oil from flowing back to the charge hose. The charge hose connecting part has two ports: one for conventional refrigerant (7/16 UNF 20 threads per inch) and one for R410A. If the vacuum pump mineral oil mixes with R410A, a sludge may occur and damage the equipment. Exclusive for HFC refrigerant. Gas leakage detector · Incidentally, the "refrigerant cylinder" comes with the refrigerant designation (R410A) and protector coating in the U. S ARI specified rose color (ARI color code: PMS 507). · Also, the "charge port and packing for refrigerant cylinder" require 1/2 UNF 20 threads per inch corresponding to the port size of the charge hose. 35 FILE NO. SVM-03001 8-4. Indoor Unit 8-4-1.

Installation place · A place which provides the spaces around the indoor unit as shown in the above diagram.



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· A place where there is no obstacle near the air inlet and outlet. · A place that allows easy installation of the piping to the outdoor unit. · A place which allows the front panel to be opened. 8-4-2.

Cutting a hole and mounting installation plate <Cutting a hole> When installing the refrigerant pipes from the rear. CAUTION · Direct sunlight to the indoor unit's wireless receiver should be avoided. · The microprocessor in the indoor unit should not be too close to RF noise sources. (For details, see the owner's manual.) <Remote control> · A place where there are no obstacles such as a curtain that may block the signal from the indoor unit.

· Do not install the remote control in a place exposed to direct sunlight or close to a heating source, such as a stove. · Keep the remote control at least 1 m apart from the nearest TV set or stereo equipment. (This is necessary to prevent image disturbances or noise interference.) · The location of the remote control should be determined as shown below. Indoor unit (Side view) 7m Pipe hole 65 mm The center of the pipe hole is above the arrow. 100 mm Fig. 8-4-2 1. After determining the pipe hole position on the mounting plate (A), drill the pipe hole (65 mm) at a slight downward slant to the outdoor side. NOTE · When drilling a wall that contains a metal lath, wire lath or metal plate, be sure to use a pipe hole brim ring sold separately. <Mounting the installation plate> For installation of the indoor unit, use the paper pattern on the back.

Hook 62 82.5 (Top view) m Indoor unit 5 45° 45 ° *7m 5 m 170 85 ° 75 Remote Reception control range Reception range * : Axial distance Remote control Pipe hole Hook Thread Weight Hook Pipe hole 1 Installation plate Fig. 8-4-1 Indoor unit 7 Mounting screw Fig. 8-4-3 36 FILE NO. SVM-03001 <When the installation plate is directly mounted on the wall> 1. Securely fit the installation plate onto the wall by screwing it in the upper and lower parts to hook up the indoor unit. 2. To mount the installation plate on a concrete wall with anchor bolts, utilize the anchor bolt holes as illustrated in the above figure. 3. Install the installation plate horizontally in the wall.

8-4-3. Electrical work 1. The supply voltage must be the same as the rated voltage of the air conditioner. 2. Prepare the power source for exclusive use with the air conditioner.

CAUTION · This appliance can be connected to the mains in either of the following two ways. (1) Connection to fixed wiring: A switch or circuit breaker which disconnects all poles and has a contact separation of at least 3 mm must be incorporate in the fixed wiring. An approved circuit breaker or switches must used. (2) Connection with power supply plug: Attach power supply plug with power cord and plug it into wall outlet. An approved power supply cord and plug must be used.

@@@holes in the wall. · Insert clip anchors for appropriate 7 mounting screws. @@SVM-03001 8-4-4. @@(1) Open the air inlet grille upward. (2) Remove the four screws securing the front panel. @@@@ (6) Put the power supply cord through the notch. @@8-4-7 NOTE · Use stranded wire only. · Wire type : H07 RN-F or more <Taking out the power cord> Notch Front panel Fig. 8-4-8 2 1 3 · Put the power supply cord through the notch. Fig.

8-4-5 Earth line Terminal block Cord clamp Screw Screw Screw Power supply cord Power cord connect cover Fig. 8-4-6 38 FILE NO. @@1. Remove the air inlet grille. Open the air inlet grille upward and pull it toward you. 2. Remove the terminal cover and cord clamp. 3. @@4. @@5.

@@6. Tightening torque : 1.2 N·m (0.12 kgf·m) 7. Secure the connecting cable with the cord clamp.

8. @@@@ @8-4-12 NOTE · Use stranded wire only. @@8-4-9 Earth line 80 mm 10 mm 70 mm Fig. @@8-4-10 39 FILE NO. SVM-03001 8-4-5.

@@@Application causes deterioration and drain leakage of the plug. Insert a hexagon wrench (4 mm) 1. @@(A knife will produce splinters, so use nippers.) 2. @@@@ @8-4-15 Slit Fig. 8-4-19 40 FILE NO. SVM-03001 <Left-hand connection with piping> 8-4-6. @@@@If the connecting pipe is laid the indoor unit on the installation plate at the upper exceeding 43 mm above the wall surface, the indoor hooks. unit may unstably be set on the wall. When bending the 2.

Swing the indoor unit to right and left to confirm that connecting pipe, make sure to use a spring bender so it is firmly hooked up on the installation plate. as not to crush the pipe. 3. While pressing the indoor unit onto the wall, hook it at the lower part on the installation plate. Pull the Bend the connection pipe within a radius of 30 mm. indoor unit toward you to confirm that it is firmly To connect the pipe after installation of the unit (figure) hooked up on the installation plate. (To the forefront of flare) 1 270 mm 170 mm Hook here 1 Installation plate Liquid side Gas side 2 Hook Outward form of indoor unit 43 mm Press (unhook) R 30 mm (Use polisin (polyethylene) core or the like for bending pipe.) Fig. 8-4-21 · For detaching the indoor unit from the installation plate, pull the indoor unit toward you while pushing its bottom up at the specified parts. 80 Use the handle of screwdriver, etc.

Fig. 8-4-20 NOTE If the pipe is bent incorrectly, the indoor unit may 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. Push Push CAUTION · Bind the auxiliary pipes (two) and connecting cable with facing tape tightly. In case of leftward piping and rear-leftward piping, bind the auxiliary pipes (two) only with facing tape.

Indoor unit Auxiliary pipes Connecting cable Installation plate Fig. 8-4-22 · Carefully arrange pipes so that any pipe does not stick out of the rear plate of the indoor unit. · Carefully connect the auxiliary pipes and connecting pipes to each other and cut off the insulating tape wound on the connecting pipe to avoid double-taping at the joint, moreover, seal the joint with the vinyl tape, etc. · Since dewing results in a machine trouble, make sure to insulate both the connecting pipes. (Use polyethylene foam as insulating material.

) · When bending a pipe, carefully do it, not to crush it. 41 FILE NO. SVM-03001 8-4-7. Drainage 1. Run the drain hose sloped downwards. NOTE · Hole should be made at a slight downward slant on the outdoor side. Do not rise the drain hose. Do not form the drain hose into a wavy shape. 8-5. Outdoor Unit 8-5-1.

Installation place · A place which provides the spaces around the outdoor unit as shown in the left diagram. · A place which can bear the weight of the outdoor unit and does not allow an increase in noise level and vibration.



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· A place where the operation noise and discharged air do not disturb your neighbors. · A place which is not exposed to a strong wind. · A place free of a leakage of combustible gases. · A place which does not block a passage. · When the outdoor unit is to be installed in an elevated position, be sure to secure its feet. · An allowable length of the connecting pipe is up to 10 m (RAS-10UA) or 15 m (RAS-13UA). · An allowable height level is up to 5 m (RAS-10UA) or 6 m (RAS-13UA). @ @8-4-23 2.

@ @3. @ @ @ @2. @ @3. @ @4. Installation in the following places may result in trouble.

Do not install the unit in such places. · A place full of machine oil. · A saline-place such as the coast. · A place full of sulfide gas. @ @ @ @ Improper drainage can result in dew-dropping.

@ @ @ @8-5-1 Fig. 8-4-25 42 FILE NO. SVM-03001 8-5-2. Refrigerant piping connection 1. @ @ of copper pipe 6.35 9.52 12.70 Tightening torque 16 to 18 (1.6 to 1.8 kgf-m) 30 to 42 (3).

0 to 4.2 kgf-m) 50 to 62 (5.0 to 6.2 kgf-m) 90° Fig. 8-5-2 2. Insert a flare nut into the pipe, and flare the pipe. · Projection margin in flaring : A (Unit : mm) A · Tightening torque of flare pipe connections The operating pressure of R410A is higher than that of R22. (Approx. 1.6 times).

It is therefore necessary to firmly tighten the flare pipe connecting sections (which connect the indoor and outdoor units) up to the specified tightening torque. Incorrect connections may cause not only a gas leakage, but also damage to the refrigerant cycle. Flare at indoor unit side Die Pipe Fig. 8-5-3 Rigid (Clutch type) Outer dia. of copper pipe 6.

35 9.52 12.70 R410A tool used 0 to 0.5 0 to 0.5 0 to 0.

5 Conventional tool used 1.0 to 1.5 1.0 to 1.5 1.0 to 1.5 Flare at outdoor unit side Fig. 8-5-4 Imperial (wing nut type, conventional tool) Outer dia. of copper pipe 6.35 9.

52 12.70 <Tightening connection> Align the centers of the connecting pipes and tighten the flare nut as far as possible with your fingers. Then tighten the nut with a spanner and torque wrench as shown in the figure. Half union R410A Mark line 1.5 to 2.0 1.5 to 2.0 2.0 to 2.5 Fig.

8-5-5 Flare nut Externally threaded side Internally threaded side CAUTION · Do not apply excess torque. · Otherwise, the nut may crack depending on the conditions. Use a wrench to secure. Use a torque wrench to tighten. Fig.

8-5-6 CAUTION · KEEP IMPORTANT 4 POINTS FOR PIPING WORK (1) Take away dust and moisture (Inside of the connecting pipes.) (2) Tight connection (between pipes and unit) (3) Evacuate the air in the connecting pipes using VACUUM PUMP. (4) Check gas leak (connected points) 43 FILE NO. SVM-03001 8-5-3. Evacuating After the piping has been connected to the indoor unit, you can perform the air purge together at once.

AIR PURGE Evacuate the air in the connecting pipes and in the indoor unit using a vacuum pump. Do not use the refrigerant in the outdoor unit. For details, see the manual of the vacuum pump. <Using a vacuum pump> Be sure to use a vacuum pump with counter-flow prevention function so that inside oil of the pump does not flow backward into pipes of the air conditioner when the pump stops. (If oil inside of the vacuum pump enters into the air conditioner, which use R410A, refrigeration cycle trouble may result.) 1. Connect the charge hose from the manifold valve to the service port of the gas side packed valve. 2. Connect the charge hose to the port of the vacuum pump. 3.

Open fully the low pressure side handle of the gauge manifold valve. 4. Operate the vacuum pump to start evacuating. Perform evacuating for about 15 minutes if the piping length is 20 meters. (15 minutes for 20 meters) (assuming a pump capacity of 27 liters per minute.) Then confirm that the compound pressure gauge reading is 101 kPa (76 cmHg). 5. Close the low pressure side valve handle of gauge manifold. 6. Open fully the valve stem of the packed valves (both sides of Gas and Liquid).

7. Remove the charging hose from the service port. 8. Securely tighten the caps on the packed valves. Compound pressure gauge -10kPa (-76cmHg) Manifold valve Handle Lo Charge hose (For R410A only) Connecting pipe Vacuum pump adapter for counter-flow prevention (For R410A only) Handle Hi (Keep full closed) Charge hose (For R410A only) Pressure gauge <Packed valve handling precautions> · Open the valve stem all the way out; but do not try to open it beyond the stopper.

· Securely tighten the valve stem cap with torque in the following table: Gas side (12.70 mm) Gas side (9.52 mm) Liquid side (6.35 mm) Service port 50 to 62 N-m (5.0 to 6.

2 kgf-m) 30 to 42 N-m (3.0 to 4.2 kgf-m) 16 to 18 N-m (1.6 to 1.8 kgf-m) 9 to 10 N-m (0.9 to 1.0 kgf-m) Hexagonal wrench is required. 4m m Fig. 8-5-8 Vacuum pump Packed valve at gas side Service port (Valve core (Setting pin)) Packed valve at liquid side Fig. 8-5-7 44 FILE NO.

SVM-03001 8-5-4. Wiring connection 1. Remove the valve cover from the outdoor unit. 2. Connect the connecting cable to the terminal as identified with their respective matched numbers on the terminal block of indoor and outdoor unit. 3. When connecting the connecting cable to the outdoor unit terminal, make a loop as shown in the installation diagram of indoor and outdoor unit, to prevent water coming in the outdoor unit. 4. Insulate the unused cords (conductors) from any water coming in the outdoor unit. Proceed them so that they do not touch any electrical or metal parts.

<Stripping length of connecting cable> For RAS-13/10UAH Terminal block 70 mm 10 mm 8-6. How to Set Remote Control Selector Switch When two indoor units are installed in separated rooms, there is no need to change the selector switch. <Remote control selector switch> · When two indoor units are installed in the same room or the adjacent two rooms, they may be controlled simultaneously with a single remote control. To prevent this, set either unit and its remote control to B setting. (Both units are set to A setting before shipment.

) · The remote control signal is not received when the indoor unit setting is different from the remote control one. 1. Set the remote control selector switch with the indoor unit. 1) Turn the circuit breaker of the main power switch off before setting the selector switch. Earth line Terminal screw Screw Earth line 10 mm 60 mm 2) Remove the Air inlet grille and Front panel.

(Refer to page 63, 10-1) 3) Select the terminal of selector switch from [A position] to [B position]. Connecting cable Cord clamp Fig. 8-5-9 For RAS-13/10UA Terminal block 60 mm 10 mm Earth line Terminal screw Screw Earth line 10 mm 50 mm Connecting cable Selector Switch Cord clamp Fig. 8-5-10 CAUTION · Wrong wiring connection may cause some electrical parts burn out. · Be sure to comply with local codes on running the wire from indoor unit to outdoor unit (size of wire and wiring method etc.



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) · Every wire must be connected firmly. NOTE · Wire type: H07 RN-F or 245 IEC66 (2.0 mm² or more) LED Assembly Fig. 8-6-1 45 FILE NO. SVM-03001 2.

Set the remote control selector switch with the remote control [B] is indicated on the liquid crystal display when setting remote control selector switch to B. [A] is not indicated on the display even if the selector switch is set to A. 1) Load the remote control with the batteries. 2) Press the [CHECK] button using something with sharp point. (The preset temperature on the remote control changes to [00].) 3) Press the [MODE] button while pressing the [CHECK] button, [B] is indicated at the right of the present temperature display. · To reset the switch to the [A] setting, press the [MODE] button again while pressing the [CHECK] button. Valve stem cap connection Service cap connection 8-7. Others 8-7-1. Gas leak test Valve cover Fig.

8-7-1 · Check the flare nut connections, valve stem cap connections and service port cap connections for gas leak with a leak detector or soap water. 8-7-2.

Test operation To switch the TEST RUN (COOL) mode, press TEMPORARY button for 10 sec. (The beeper will make a short beep.) A B A B PRESET START/STOP FAN SWING FIX ON OFF FILTER MODE ECO TIMER AUTO HI-POWER MEMO SET CLR [MODE] button TEMPORARY button RESET CLOCK CHECK Fig.

8-7-2 [CHECK] button 8-7-3. Auto restart setting This product is designed so that, after a power failure, it can restart automatically in the same operating mode as before the power failure. Fig. 8-6-2 3. Confirm that the indoor unit can operate with the new setting.

Information The product was shipped with Auto Restart function in the off position. Turn it on as required. <How to set the auto restart> · Press and hold the TEMPORARY button for about 3 seconds. After 3 seconds, the electronic beeper makes three short beeps to tell you the Auto Restart has been selected. · To cancel the Auto Restart, follow the steps described in the section Auto Restart Function of the Owner's Manual. 46 FILE NO. SVM-03001 9.

TROUBLESHOOTING CHART 9-1. Troubleshooting Procedure Follow the details of 9-2. Basic Check Items.

If there is no trouble corresponding to 9-2, check whether or not there are faulty parts following 9-4. Self-Diagnosis by Remote Control. 9-2-2. Incorrect cable connection between Indoor and outdoor units The indoor unit is connected to the outdoor unit with 5 cables (Heat pump model) or 3 cables (Cooling Only model). Check that the indoor and outdoor units have been properly connected with terminals assigned the same numbers. If the connectors are not properly connected, the outdoor unit will not operate normally, or OPERATION lamp and TIMER lamp will blink (5Hz). 9-2-3. Program control The microcontroller operates as shown in Table 9-2-1 to control the air conditioner. If there are any operational problems, check whether or not the problems correspond to Table 9-2-1. If they correspond to the Table, they are not problems with the air conditioner, but they are indispensable operations to control and maintain the air conditioner properly.

9-2. Basic Check Items 9-2.1 Power supply voltage The line voltage must be AC 220 240V. If it is not within this range, the air conditioner may not operate normally. Table 9-2-1 No.

1 Operation of air conditioner When the main power supply is turned on, the OPERATION lamp on the indoor unit blinks. The indoor fan motor speed does not change in the Dry operation. Descriptions The OPERATION lamp blinks to indicate that power is turned on. If the [START/STOP] button is pressed, the lamp stops blinking. The indoor fan motor speed is automatically controlled in the Dry operation.

2 3 The compressor is not turned off even though The compressor has a function that it is not turned off for the room temperature is in the range that the 3 minutes after it is turned on even though the room temperature compressor is turned off. is in the range that the compressor is turned off. The compressor is not turned on and off even In the Dry operation, the compressor is turned on and off though the thermo control is operated in the automatically at the regular intervals, independent of the thermo Dry operation. control. The PRE-DEF. lamp is indicated when the Heating operation starts. The PRE-DEF. lamp is indicated during the Defrosting operation or if the indoor heat exchanger temperature is low when the Heating operation starts. At this time, the indoor fan motor stops to prevent cold air from blowing in the room. When the indoor heat exchanger temperature is high, the outdoor fan motor is stopped by the high-temperature limit control operation.

4 5 6 The outdoor fan motor stops in the Heating operation. 7 The compressor is not turned on even though The compressor is not turned on in the restart delay timer the room temperature is in the range that the (3-minutes timer) operation. It is also not turned on after the power compressor is turned on. supply is turned on because of this timer operation. The operation mode changes in the Automatic operation. In Automatic operation, the room temperature is detected all time for control fan speed and the operation mode is changed every 15 minutes according to difference between the room temperature and the preset temperature. When the room temperature is in the range (Preset temperature $\pm 1^{\circ}\text{C}$), the Fan only operation is selected. This operation does not work when the unit is in the Dry operation or Fan only operation. 8 9 10 The Fan only operation continues in the Automatic operation. The Hi-POWER operation does not work.

47 FILE NO. SVM-03001 9-3. Primary Judgement 9-3-1. Role of indoor unit controller The indoor unit controller receives the operation commands from the remote control and executes them. · Temperature measurement at the air outlet of the indoor heat exchanger by the indoor temperature sensor · Temperature setting of the indoor heat exchanger by the heat exchanger sensor · Louver motor control · Indoor fan motor operation control · LED display control · Transferring of operation commands to the outdoor unit 9-3-2.

Failure diagnosis The indoor unit diagnoses the operation condition and indicates the information of the self-diagnosis with the lamps on the display panel of the indoor unit. Table 9-3-1 Lamps A B C D E F G OPERATION lamp is blinking. (1Hz) OPERATION lamp is blinking. (5Hz) OPERATION lamp is blinking. (5Hz) OPERATION lamp is blinking.

(5Hz) OPERATION lamp is blinking. (5Hz) OPERATION and TIMER lamps are blinking. (5Hz) OPERATION, TIMER and PRE-DEF. (or FAN ONLY for cooling only model) lamps are blinking. Self-diagnosis Power failure (when the power supply is turning on) Thermo sensor (TA) short or break Heat exchanger sensor (TC) short or break Indoor fan motor lock or failure Indoor P.C. board failure Wrong wiring of connecting cable Cycle failure · Gas shortage or other refrigerant cycle trouble · Heat exchanger sensor open, break or short · Overload relay or thermostat trouble of compressor Table 9-3-2 Diagnosis by detective operation Symptom The remote control does not work.



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