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User manual TOSHIBA RAS-M13GKV-E2  
User guide TOSHIBA RAS-M13GKV-E2  
Operating instructions TOSHIBA RAS-M13GKV-E2  
Instructions for use TOSHIBA RAS-M13GKV-E2  
Instruction manual TOSHIBA RAS-M13GKV-E2



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**Manual abstract:**

Specifications 2. Construction Views 3. Wiring Diagram 4. Specifications of Electrical Parts (Indoor unit only) 5. Control Block Diagram (Indoor unit only) 6. Operation Description 7. Installation Procedure 8. How to Diagnose the trouble 9. How to Replace the main parts (Indoor unit only) 10. @@SVM-06036 1.

@@SVM-06036 2. CONSTRUCTION VIEWS Indoor Unit Front panel Air inlet Air filter Heat exchanger 790 218 275 60 Air outlet 48 6 Knock out system 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) (For 10,13 series ; Flare 9.52 For 16 series ; Flare 12.7) 235 215 For stud bolt (8~10) For stud bolt (6) 620 235 215 Minimum distance to ceiling 65 or more Hanger 48 26 45 275 190 Minimum distance to ceiling Minimum distance to ceiling 45 170 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 3 160 6 60 FILE NO. SVM-06036 3. WIRING DIAGRAM 3-1.

Indoor Unit (For 10k & 13k) COLOR INDICATION BRW RED WHI YEL BLU BLK GRY PNK ORN GRN&YEL GRN : : : : : : : : BROWN RED WHITE YELLOW BLUE BLACK GRAY PINK ORANGE GREEN & YELLOW GREEN TERMINAL BLOCK 2 1 BLK W HI RED CN21 INDOOR OUTDOOR UNIT UNIT BLK BLK CN01 (BLU) CN24 CN23 HEAT EXCHANGER SENSOR CN03 (W HI) (TC) BLK BLK 11 22 LINE FILTER Power supply circuit 5 CN07 (W HI) +12 VDC +5 VDC FUSE THERMO SENSOR (TA) 11 22 T3.15A 250VAC F01 R04 3 Fan Motor Drive circuit BLU BLU BLU BLU BLU BLU BLU BLU BLU BLU 10 10 10 10 WHI 11 11 11 11 INFRARED RAYS RECEIVING AND INDICATING PARTS 1 2 3 4 5 6 7 8 9 CN25 (W HI) CN13 (W HI) 11 22 33 44 55 W HI YEL YEL YEL YEL 11 22 33 44 55 1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 LOUVER MOTOR CN11 123 123 CN10 5 5 3 3 BLK 1 1 RED 6 YEL GRY BRW MAIN P.C. BOARD WP-004 150°C 123456 12345 6 AC FAN MOTOR MCC-861 1 4 1234 HA JEM-A CN08 Simple Check for Failure Diagnosis Check Item Diagnosis Result 1 Check to see if the OPERATION indicator goes on OPERATION and off when the main switch or breaker is turned on. INDICATOR (Check the primary and secondary voltage of the transformer.) Check the power supply voltage between 1 and 2. (Refer to the name plate.) TERMINAL (Check the primary and secondary voltage of the BLOCK transformer.) Check the fluctuating voltage between 2 and 3. (15~60VDC) FUSE Check to see if the fuse blows out.

3.15A (Check the R04 of the varistor.) 2 3 4 DC5V 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.) 5 Check the voltage at the white lead of the lower DC12V motor. (Check the transformer and the power supply circuit of the rated voltage.) 6 (AC 220~240V) Check the voltage at the No.1 pin on CN10 connector and CN24. (Check the F01) Refer to the service data for the detailed failure diagnosis.

4 WHI FILE NO. SVM-06036 3-2. Indoor Unit (For 16k) COLOR INDICATION BRW : RED : WHI : YEL : BLU : BLK : GRY : PNK : ORN : GRN&YEL : GRN : BROWN RED WHITE YELLOW BLUE BLACK GRAY PINK ORANGE GREEN & YELLOW GREEN TERMINAL BLOCK 2 BLK 123 WHI RED INDOOR OUTDOOR UNIT UNIT BLK BLK CN01 (BLU) CN24 CN23 CN21 HEAT EXCHANGER SENSOR CN03 (WHI) (TC) BLK BLK 11 22 6 CN10 (WHI) FAN MOTOR RED BLK WHI YEL BLU 11 FUSE THERMO SENSOR (TA) 11 22 T3.15A 250VAC F01 3 LINE FILTER DC5V DC12V 3 4 5 6 3 4 5 6 DC MOTOR CN13 (WHI) BLU BLU BLU BLU BLU BLU BLU BLU BLU BLU 10 10 10 10 WHI 11 11 11 11 INFRARED RAYS RECEIVING AND INDICATING PARTS 1 2 3 4 5 6 7 8 9 CN25 (WHI) 1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 R05 DB01 R04 ~ ~ POWER SUPPLY CIRCUIT 5 CN07 (WHI) + + MAIN P.C.

BOARD MCC-867or MCC-5014 C03 1 2 3 4 5 1 2 3 4 5 WHI YEL YEL YEL YEL 11 22 33 44 55 MCC-861 1 4 1234 HA JEM-A CN08 LOUVER MOTOR Simple Check for Failure Diagnosis Check Item Diagnosis Result 1 Check to see if the OPERATION indicator goes on OPERATION and off when the main switch or breaker is turned on. INDICATOR (Check the primary and secondary voltage of the transformer.) Check the power supply voltage between 1 and 2. (Refer to the name plate.) TERMINAL (Check the primary and secondary voltage of the BLOCK transformer.

) Check the fluctuating voltage between 2 and 3. (15 60VDC) 2 ~ 3 FUSE Check to see if the fuse blows out. 3.15A (Check the R04 of the varistor.) 4 Check the voltage at the No.4 pin on CN13 connector DC5V of the infrared receiver. (Check the transformer and the power supply circuit of the rated voltage.) 5 Check the voltage at the white lead of the lower DC12V motor. (Check the transformer and the power supply circuit of the rated voltage.) ~ Refer to the service data for the detailed failure diagnosis.

5 Check the voltage at the No.1 pin on CN10 DC325V connector. (Check the DB01, R05 and C03.) (DC310 340V) 6 FILE NO. SVM-06036 4.

SPECIFICATIONS OF ELECTRICAL PARTS RAS-M10GKV-E2, RAS-M13GKV-E2 RAS-M10GKCV-E2, RAS-M13GKCV-E2 No. 1 2 3 4 5 6 7 8 9 10 11 12 13 Parts name Fan motor (for indoor) Thermo. sensor (TA-sensor) AC-AC transformer (T01) Microcomputer Heat exchanger sensor (TC-sensor) Line filter (L01) Diode (DB01) Capacitor (C50) Fuse (F01) Regulator IC (IC08) Regulator IC (IC11) Varistor (R21, R109) Lower motor Type SKF-220-20-4A-1 ----- TT-10 Specifications AC Motor with 150°C thermo fuse 10 k at 25°C 187 - 276V, 6VA  $\mu$ PD780024AGK ----- SS11V-06270 KBP06M 10 k at 25°C 27  $\mu$ H, AC 0.64A 1.5A, 420V LXV35VB2200MJ20 BET 3.

15A 250VAC NJM7812 NJM7805 TND15G561K 24BYJ48 2200  $\mu$ F, 35V T3.15A, 250 V 12VDC, 1.5A max 5VDC, 1.5A max 560 V DC 12V RAS-M16GKV-E2, RAS-M16GKCV-E2 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 sensor (TC-sensor) Line filter (L01) Diode (DB01) Capacitor (C03) Fuse (F01) Power supply IC (IC01) Varistor (R21, R109) Resistor (R01) Lower motor Type ICF-340-30-2 ----- SWT-70  $\mu$ PD780024AGK ----- SS11V-06270 D3SBA60 KMH450VSSN120M25C FCU250V, 3.15A STR-L472 TND15G561K RF-5TK4R7 24BYJ48 560 V 4.7, 5 W 12VDC Specifications DC 340 V, 30 W 10 k at 25°C DC 390 V, Secondary DC 15 V, 12 V, 7 V 10 k at 25°C 27mH, AC 0.6A 4A, 600 V 120 $\mu$ F, 450 V T3.15A, 250 V 6 FILE NO.

SVM-06036 5. CONTROL BLOCK DIAGRAM 5-1. Indoor Unit Heat Exchanger Sensor Indoor Unit Control Panel M.C.U. Functions · Lower Control · 3-minute Delay at Restart for Compressor · Motor Revolution Control Infrared Rays Signal Receiver · Processing (Temperature Processing) · Timer Filter Sign Display Operation Display Timer Display Temperature Sensor Infrared Rays Initiallizing Circuit Clock Frequency Oscillator Circuit Fan Only Sign Display Indoor Fan Motor Power Supply Circuit Remote Control Outdoor unit ON/OFF Signal Lower ON/OFF Signal Noise Filter Lower Driver Lower Motor From Outdoor Unit Outdoor Unit REMOTE CONTROLLER RAS-M10GKV-E2, RAS-M13GKV-E2, RAS-M16GKV-E2 RAS-M10GKCV-E2, RAS-M13GKCV-E2, RAS-M16GKCV-E2 (Heat pump model) Infrared Rays (Cooling only model) Infrared Rays Remote Controller Operation ( ) Remote Controller Operation ( ) Operation Mode Selection AUTO, COOL, DRY, HEAT Thermo.



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Setting Fan Speed Selection ON TIMER Setting OFF TIMER Setting Louver AUTO Swing Louver Direction Setting ECONO. Operation Mode Selection AUTO, COOL, DRY, FAN ONLY Thermo. Setting Fan Speed Selection ON TIMER Setting OFF TIMER Setting Louver AUTO Swing Louver Direction Setting ECONO. 7 FILE NO.

SVM-06036 6. OPERATION DESCRIPTION 6-1. Outline of Air Conditioner Control This air conditioner is a capacity-variable type air conditioner. The capacity proportional control compressor which can change the motor speed is mounted. The indoor unit motor drive circuit is mounted to the indoor unit. The compressor and the inverter to control outdoor unit motor 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. The outdoor unit controller receives operation command from the indoor unit side, and controls the outdoor fan and the pulse modulating valve. Besides, detecting revolution position of the compressor motor, the outdoor unit controller controls speed of the compressor motor by controlling output voltage of the inverter and switching timing of the supply power (current transfer timing) so that motors drive according to the operation command.

And then, the outdoor unit controller transfers reversely the operating status information of the outdoor unit to control the indoor unit controller. (2) Role of outdoor unit controller Receiving the operation command signal (Serial signal) from the indoor controller, the outdoor unit performs its role. · Compressor operation Operations followed control to judgment of · Operation control of serial signal from outdoor fan motor indoor side. · P.M.

V. control · Detection of inverter input current and current release operation · Over-current detection and prevention operation to transistor module (Compressor stop function) · Compressor and outdoor fan stop function when serial signal is off (when the serial signal does 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 (Temp. measurement by outdoor heat exchanger and control for 4-way valve and outdoor fan) (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 controller · Compressor revolution command signal defined by indoor temperature and set temperature (Correction along with variation of room temperature and correction of innt 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. -9- FILE NO. SVM-06036 6-1-4. 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. 6-1-6. Louver Control (1) Vertical air flow louvers Positions of vertical air flow louvers are automatically controlled according to the operation status (AUTO, COOL, DRY, HEAT). Besides, positions of vertical air flow louvers can be arbitrarily set by pressing the [FIX] button. The louver position which has been set by the [FIX] button is stored in microcomputer, and the louver is automatically set at the stored position in the next operation. (2) Swing If the [SWING] button is pressed during running operation, vertical air flow louvers start swinging.

When the [SWING] button is pressed again, swinging stops. 6-1-5. P. M. V. (Pulse Modulating Valve) Using P.M.V., refrigerant flow of refrigeration cycle is varied for the optimum temperature. Controlling each unit separately by four P.

M.V. corresponds to difference of pipe length, fan speed, and unit temperature. If an error occurs on cycle temperature when power source of the air conditioner has been turned on, and if start/stop times of the outdoor unit are 30 times, move the valve once until it hits on the stopper for positioning of the valve. In this case, ticktack sound may be heard.

6-1-7. Indoor Fan Control The indoor fan is operated by motor speed non-step variable drive system motor. For flow rate, motor speed is controlled manually in five steps and with the unit of 10 rpm from upper limit to lower limit in AUTO mode as described in Table 6-1-2. It is not selected by relay, so selecting sound does not generate. Table 6-1-2 operation mode Fan mode H M+ Remote HIGH MED+ MED LOW+ LOW Control M10 Motor speed Air flow rate (rpm) (m3/h) 1190 1120 1120 1050 980 930 910 850 930 910 850 720 660 570 530 530 490 440 420 410 370 420 410 370 290 260 610 570 550 490 460 490 420 420 M13 Motor speed (rpm) 1210 1130 1130 1050 980 930 910 850 930 910 850 750 700 1290 1280 1200 1100 1020 1050 940 930 M16 Motor speed (rpm) 1350 1250 1250 1150 1070 1000 980 920 1000 980 920 800 1370 1360 1280 1180 1100 1150 1020 1000 Air flow rate (m3/h) 590 530 530 490 440 420 410 370 420 410 370 310 280 620 620 570 520 470 490 420 420 Air flow rate (m3/h) 650 610 610 550 500 460 440 410 460 440 410 340 660 660 620 560 520 550 470 460 Cooling and Fan only M L+ L LL+ L LUL SUL H M+ M L+ L L- DRY HIGH MED+ MED LOW+ LOW 1250 1200 1160 1060 1000 1050 940 930 Heating NOTE : · UL : Ultra Low, SUL : Super Ultra Low - 10 - FILE NO.

SVM-06036 6-1-7. Outdoor Fan Control (DC Fan Motor) Although the outdoor fan motor drives the outdoor fan by non-step variable system of the revolution speed, the revolution speed is restricted to three steps on the convenience of controlling. If a strong wind is lashing outside of the room, the operation may be continued as the outdoor fan stops in order to protect the outdoor fan motor. If a fan lock occurred due to entering of foreign matter, the air conditioner stops and an alarm is displayed. <COOL, DRY> Table 6-1-3 Compressor revolution (rps) TO 38°C Outdoor temp. sensor 1 to 2 units TO < 38°C TO 3 to 4 units TO 38°C ECONO. operation TO < 38°C TO is abnormal 20.3 390 (rpm) 390 (rpm) 390 (rpm) 390 (rpm) 390 (rpm) 500 (rpm) ~ 50.3 700 (rpm) 640 (rpm) 500 (rpm) 640 (rpm) 500 (rpm) 640 (rpm) ~ 62.



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8 700 (rpm) 640 (rpm) 640 (rpm) 640 (rpm) 500 (rpm) 640 (rpm) 63.

4 ~ 700 (rpm) 700 (rpm) 700 (rpm) 640 (rpm) 500 (rpm) 640 (rpm) <HEAT> Table 6-1-4 Compressor revolution (rps) Outdoor temp. sensor TO 5°C TO TO < 5°C TO 5°C ECONO. operation TO < 5°C TO is abnormal 20.3 390 (rpm) 500 (rpm) 390 (rpm) 390 (rpm) 390 (rpm) ~ 33.3 640 (rpm) 640 (rpm) 500 (rpm) 500 (rpm) 500 (rpm) ~ 33.9 640 (rpm) 640 (rpm) 500 (rpm) 500 (rpm) 640 (rpm) 6-2. Description of Operation Circuit · Turning [ON] the breaker flashes the operation lamp. This is the display of power-ON (or notification of power failure). · When pushing [ ] button of the remote controller, receive sound is issued from the main unit, and the next operations are performed together with opening the vertical air flow louvers. (Room temp.

) (Set temp.) 6-2-1. Fan Only Operation (The Remote controller [MODE] Button is Set to the FAN ONLY Operation) · This mode is only for the cooling only model. · 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 [ ] button. · When the [FAN] button is set to the AUTO position, the indoor fan motor operates as shown in Fig.

62-1. When the [FAN] button is set to LOW, LOW+ MED, MED+, or HIGH, the motor operates with a constant air flow. · ECONO, Hi POWER and COMFORT SLEEP mode cannot be set. °C +3 +2.5 +2 +1.

5 +1 +0.5 0 M+ \*1 \*1 \*1 L Set temp. (Set temp.) 25°C NOTE : \*1: Calculated from difference in motor speed of M+ and L, and controlled. Fig. 6-2-1 Auto setting of air flow - 11 - FILE NO. SVM-06036 6-2-2. Cooling Operation (The Remote controller [MODE] Button is Set to the COOL Position) · 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 [ ] button. · A cooling operation signal is transmitted to outdoor unit. · The indoor fan motor operates as shown in Fig.

62-2 when [FAN] button is set to AUTO. · The motor operates with a constant air flow when the [FAN] button is set to LOW, LOW+, MED, MED+, or HIGH. · 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. (1) Cooling capacity control · The cooling capacity and room temperature are controlled 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 [TEMP] button and also any change in room temperature. · When compressor has been activated or reactivated, it operates with Max. 33 rps for 2 minutes and with Max. 57 rps from 2 to 4 minutes passed. · When room temperature is lower than set temperature and indoor fan motor is operated at fan speed L as shown in Fig. 6-2-2 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 or lower, compressor motor speed is gradually lowered to prevent freezing of the indoor heat exchanger.

If temperature is 7°C or higher, return the operation to the above item (1). (3) Current release control The input current of compressor and outdoor fan motor (Precisely inverter main circuit control section) which occupy most of air conditioner input is detected by the outdoor current sensor, and compressor motor speed is gradually lowered so that current value does not exceed 11.5A if current value exceeds 11.5A. When the current value lowers to 11.

0A, return the operation to the above item (1). (Room temp.) (Set temp.) °C +3 +2.5 +2 +1.

5 +1 +0.5 0 0.5 M+ \*1 \*1 \*1 L In normal operation Set temp. Current value NOTE : \*1: Calculated from difference in motor speed of M+ and L, and controlled. Fig. 6-2-2 Setting of air flow [Air Flow AUTO] 14.2 Comp. motor speed down 13.7 Normal control Comp. motor speed keep Fig. 6-2-3 (4) Outdoor temperature release control The outdoor temperature release is controlled by changing the current release points 14.

2 and 13.7 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 points becomes 9.6A. - 12 - FILE NO. SVM-06036 (5) Limit for maximum compressor motor speed by indoor fan speed When outdoor temperature sensor detected 32°C or lower, and indoor heat exchanger sensor detected 17°C or lower, the maximum compressor motor speed is limited by the indoor fan speed. For example, when 1 unit only operates, the compressor motor speed is limited as described in the table below. Table 6-2-1 Air flow rate HIGH M+ MED L L UL SUL M10 (rps) 32 29 24 20 20 20 20 M13 (rps) 48 42 28 20 20 20 20 M16 (rps) 54 46 38 30 30 20 20 (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) Discharge temperature control The discharge temperature of refrigerant gas from the compressor is detected by the discharge temperature sensor, and controls operating compressor motor speed.

1) Control 1 (A zone) : Normal operation zone When TD detect value is 101°C or lower, the operation is performed with operating motor speed instructed by the serial signal. 2) Control 2 (B zone) : Slow-up zone of motor speed When TD detect value is 101°C or higher, operating motor speed is slowly up. 3) Control 3 (C zone) : Keep zone When TD detect value is 108°C or higher, operating motor speed is not changed if raising operation speed. 4) Control 4 (D zone) : Slow down zone of motor speed When TD detect value is 111°C or higher, operating motor speed is slowly down. 5) Control 5 (E zone) : Normal down zone of motor speed When TD detect value is 115°C or higher, operating motor speed is down.

6) Control 6 (F zone) : Operation stop zone If TD detect value exceeds 120°C during operation, stop the operation immediately. Then, restart the operation when TD detect value becomes 108°C or lower. TD (°C) 120 115 111 Zone F E D Operation stop zone Normal down zone of motor speed Slow down of motor speed Release of motor speed 108 C Keep zone : Motor speed is not changed. 101 B Slow-up zone of motor speed A Normal operation zone Fig. 6-2-4

Compressor motor speed control 13 FILE NO.

SVM-06036 (8) ECONO operation control When the [ECO] button is pushed, ECONO operation is performed by restraining air flow and compressor motor speed. The set temperature is changed also. 1) The set temperature increased 0.



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5°C per hour up to 2°C starting from the set temperature when ECONO has been received. 2) Indoor air flow is controlled between L+ and UL. The compressor motor speed in control as shown in Fig. 6-2-5 Fig. 6-2-5 (9) COMFORT SLEET operation control. When the [COMFORT SLEEP] button is pushed, the ECONO operation activate together with the timer OFF function. Each time of pressing [COMFORT SLEEP] button the off timer setting changes in the sequence of 1, 3, 5 or 9 hours.

(10) Hi POWER operation control. When the [Hi POWER] button is pushed Hi Power operation is performed by change set temperature and air flow (display on the remote control does not change). 1) Changing of set temperature. Fig. 6-2-6 - 14 - FILE NO. SVM-06036 2) Changing of air flow (Fan setting : AUTO) When the Hi POWER is started, the fan of the indoor unit operates at higher air flow level than normal air flow AUTO (normal air flow AUTO is shown in Fig. 6-2-2). Because of the difference between room temperature and set temperature are increased automatically. 3) Changing of air flow (Fan setting : One of 5 levels) When the Hi POWER is started, the fan of the indoor unit operates at higher consecutive air flow level. (Fan speed on the display of remote control does not change) 4) Changing of louver position If the room temperature is higher than setting temperature by 3.

5 °C or more, the louver is automatically set to the maximum air flow position. If it is not, position of louver is not change. When room temperature is reach to setting temperature. The louver moves back to set position. · 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.

+2.5 (Room temp.) (Set temp.) +2.0 +1.

5 L \*1 +1.0 SUL +0.5 0 0.5 Set temp. NOTE : \*1 : Middle motor speed between L and SUL Fig. 6-2-7 Setting of air flow (11) Quiet operation control. When the [QUIET] button is pushed, the fan is restricted the revolution speed at L- level until the [QUIET] button is pushed once again (cancel QUIET operation). Remarks : QUIET operation is appropriate to work with less cooling load condition. Because of the fan speed L- may cause not enough the cooling capacity. 6-2-3.

DRY Operation (The Remote controller [MODE] Button is Set to the DRY Position) · 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 [ ] 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. 6-2-7. (Fan speed is AUTO only.) (1) Dehumidifying-preferential Cooling capacity control · The cooling capacity and room temperature are controlled 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 [TEMP] button and also any change in room temperature. · When the air conditioner operates in Dry mode, the maximum compressor motor speed is restricted. M10 : Max. 20 rps M13 : Max.

20 rps M16 : Max. 22 rps While multiple indoor units operate, compressor motor speed is calculated in the outdoor unit to operate. · When room temperature is lower than set temperature, indoor fan motor is operated at fan speed SUL as shown in Fig. 6-2-7 while the outdoor unit stops. · ECONO Hi POWER, QUIET and COMFORTSLEEP mode cannot be set.

· Other controls than the above-mentioned controls are common to those of cooling operation. - 15 - FILE NO. SVM-06036 6-2-4. Heating Operation Transferring of heating 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.

6-2-8, 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. 6-2-9) and starting of FAN Manual. (3) SUL : Super ultra low [In star ting and in stability] In star ting · Until 12 minutes passed after operation start FAN AUTO · When 12 to 25 minutes passed after operation start and room temp. is 3°C or lower than set temp. In stability · When 12 to 25 minutes passed after operation start and room temp. is higher than (set temp. --3°C) · When 25 minutes or more passed after operation start · Room temp. > Set temp. -3,5°C [Basic control] FAN · Room temp.

Manual Set temp. - 4°C Set temp. (Room temp.) - (Set temp.) 0 -0.5 -1 -1.5 -2 LOW \*1 \*2 M+ 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 four-way valve is turned on, and turned off in defrost operation. (1) Heating capacity control Calculate the difference between temperature detected by room temp. sensor every minute and the set temp.

set on "Temp. indicator" and variation amount of room temp. Then, obtain the correction amount of the command signal, and correct the current frequency command signal. (2) High-temp. 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-temp.

rising of compressed pressure. 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 occupy 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 temp.) if the input current exceeds the current value determined in each zone as shown in Fig.

6-2-10 so that the input current does not exceed the set value. In case that the current lowered by approx. 0.3A to 0.5A than each set value, return to above item (1). -5.0 -5.5 [FAN AUTO] HIGH \*1, \*2 : Approximate revolution speed of M+ and L to linear according to temperature. Fig. 6-2-8 Setting of air flow [Cold draft preventing control] The upper limit of fan revolution speed is shown below.

HIGH 44 43 33 32 Approximate revolution speed of HIGH and SUL linear by Tc. 31 30 20 19 A\*2 A- 8 Starting of FAN Manual SUL\* A+4 A-8 FAN AUTO 3 SUL ( NOTE : \*1) Stop Fig. 6-2-9 Cold draft preventing control NOTES : (1) Stops for 2 minutes after thermostat-OFF. (2) 24°C when the set temp. is 24°C or more Set temp. when the set temp. is below 24°C - 16 - FILE NO. SVM-06036 Outside air temp. (°C) TO 16.0 15.

5 11.0 10.



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8A 3 Defrost operation has been already performed once. 2) Defrost operation Operation of the compressor is stopped once, turn off power coupler for four-way valve after 10 seconds, and then exchange the four-way valve. 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 any one 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 d. in item 1), but the compressor is reset to heating operation keeping operated if defrost has started under condition e.

in item 1). (5) Louver control The vertical air flow louvers are automatically set to heating position or heat memory position. When the compressor is turned off by hightemp. release control, the vertical air flow louvers close once and then return to the position of previous time. (6) ECONO operation control. When the [ECO] button is pushed, ECONO operation is performed by restraining air flow and compressor motor speed. 1) The indoor fan speed is controlled within Las maximum speed. 2) Compressor motor speed is controlled by the difference value of room temperature and set temperature as shown in Fig. 6-2-11 The different value of room temperature and set temperature are separated to A, B and C zone. Then compressor motor speed in each zone are controlled by different speed.

Fig. 6-2-10 (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 3 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 -8°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 3 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 3 minutes or more.

d. The counted time is 4 hours or more, and status that temperature of the outdoor heat exchanger detected by the outdoor heat exchanger is 0°C or lower and temperature lowered by 1.0 °C than the minimum value of the outdoor heat exchanger during 10 to 15 minutes count time continued for 3 minutes or more. e.

If the following three conditions are satisfied, defrost operation (Timer defrost) starts after heating operation for 48 minutes. 1 Setting on remote control, HEAT (mode), HIGH (Fan), 30°C (temp.). 2 Room temp. is 19°C to 24°C, and outside air temp. is 5°C or lower.

- 17 - FILE NO. SVM-06036 After 30 minutes passed, the different value of room temperature and set temperature is separated zone again by more different value than before. Then compressor motor speed after 30 minute passed is lower than before by the same different value of room temperature and set temperature. Fig. 6-2-11 (7) COMFORT SLEEP operation control. When the [COMFORT SLEEP] button is pushed, the ECONO operation activate together with the timer OFF function. Each time of pressing [COMFORT SLEEP] button the off timer setting changes in the sequence of 1, 3, 5 or 9 hours. (8) Hi POWER operation control. When the [Hi POWER] button is pushed Hi Power operation is performed by changing setting temperature and air flow (display on the remote control does not change). 1) Changing of setting temperature.

2) Changing of air flow (Fan setting : AUTO) When the Hi POWER is started, the fan of the indoor unit operates at higher air flow level than normal air flow AUTO (normal air flow AUTO is shown in Fig. 6-2-8). Because of the difference between room temperature and setting temperature are increased automatically. 3) Changing of air flow (Fan setting : One of 5 levels) When the Hi POWER is started, the fan of the indoor unit operates at higher consecutive air flow level. (Fan speed on the display of remote control does not change) (9) QUIET operation control.

When the [QUIET] button is pushed, the fan is restricted the revolution speed at L-level until the [QUIET] button is pushed once again (cancel QUIET operation). Remarks : QUIET operation is appropriate to work with less heating load condition. Because of the fan speed L- may cause not enough the heating capacity. Fig. 6-2-12 - 18 - FILE NO.

SVM-06036 6-2-5. Auto Operation (1) As shown in Fig. 6-2-13, 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 perset temperature. "Cooling" operation is performed. - If room temperture is within 1°C of perset temperature. "Fan only" operation is performed. (at UL speed). - If room temperture is lower than 1°C of perset temperture. "Heating operation is performed.

Ta Cool Operation Ts+1 Ts-1 RESET 6-3. Temporary Operation · Temporary Auto operation, existence of Auto Restart, and Temporary Cooling operation can be set by the [RESET] button of the indoor controller. Fig. 6-3-1 Fan Only Heat Operation [RESET] 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 Fig. 6-2-13 (2)

After selecting the operation mode (COOL or HEAT), select an operation mode again when a status that the compressor was turned off by the room temperature continues for 15 minutes. 6-3-1. Temporary Auto Operation · When the [RESET] button is pushed, the Auto operation with set temperature fixed at 24°C starts. Controlling is same as that of Auto operation by the remote controller. · When the [RESET] 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. 6-3-2. Temporary Cooling Operation · When the [RESET] button keeps pushed for 10 seconds, Cooling operation of which compressor motor speed and the indoor fan speed are fixed starts. Compressor motor speed :



5 rps Indoor fan speed : Low · When the [RESET] button is pushed again, the operation stops.

· Auto Restart function is unavailable. - 19 - FILE NO. SVM-06036 6-4. 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. 6-4-1. 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 [RESET] 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 [RESET] button for more than three seconds. The unit is on standby. · The unit starts to operate.

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

After approx. three seconds, 3S RESET The unit beeps three times If the unit is required to operate at this time, push [RESET] 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 [RESET] button has the function of filter reset button. - 20 - FILE NO. SVM-06036 6-4-2. 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 [RESET] button for more than three seconds. The unit is on standby. Motions · The unit starts to operate. The orange lamp is on. · 0 After approx. three seconds, The lamp changes from orange to green. 3S RESET The unit beeps three times and continues to operate. · If the unit is not required to operate at this time, push [RESET] button once more or use the remote control to turn it off. When the unit is in operation Operation Push [RESET] button for more than three seconds. The unit is in operation.

Motions The orange lamp is on. · The unit stops operating. The orange lamp is turned off. 0 · 3S After approx. three seconds, RESET The unit beeps three times If the unit is required to operate at this time, push [RESET] 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. 6-5. 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. 6-5-1.

How to turn off filter check lamp Push [RESET] button on the indoor unit. Note: If [RESET] button is pushed while the filter check lamp is not indicating, the indoor unit will start the Automatic Operation. 6-4-3. 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.

- 21 - FILE NO. SVM-06036 6-6. Remote control 6-6-1. Remote control and its functions 14 RAS-M10UKCV, RAS-M13UKCV, RAS-M16UKCV 1 2 3 4 5 6 7 8 9 10 11 12 13 Infrared signal emitter Transmits a signal to the indoor unit. START/STOP button [ ] Push the button to start operation.

(A receiving beep is heard.) Push the button again to stop operation. (A receiving beep is heard.) If no receiving sound is heard from the indoor unit, push the button twice. Mode select button [MODE] Push this button to select a mode. Each time you push 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.) Temperature button [TEMP.] ..

.....The set temperature is increased up to 30°C. ....

...The set temperature is dropped down to 17°C. (A receiving beep is heard.)

) Fan speed button [FAN] Push 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. , MED , (LOW , LOW+ MED+ , HIGH ) (A receiving beep is heard.) Auto louver button [SWING] Push this button to swing the louver.

(A receiving beep is heard.) Push the button again to stop the louver swinging. (A receiving beep is heard.) Set louver button [FIX] Push this button to adjust the air flow direction. (A receiving beep is heard.) On timer button [ON] Push this button to set the ON timer. Off timer button [OFF] Push this button to set the OFF timer. Reserve button [SET] Push this button to reserve setting of time, ON timer or OFF timer. (A receiving beep is heard.) Cancel button [CLR] Push this button to cancel ON timer and OFF timer.

(A receiving beep is heard.) Sleep timer button [SLEEP] Push this button to set the OFF timer. (1, 3, 5 or 9 hours) (A receiving beep is heard) High power button [Hi POWER] Push this button to start the high power operation. (A receiving beep is heard.) 15 16 17 18 ECO timer button [ECO] Push this button to start the ECO operation. (A receiving beep is heard) Quiet button [QUIET] Push this button to start the quiet operation. (A receiving beep is heard) Comfort sleep button [COMFORT SLEET] Push this button to start the comfort sleep operation. OFF timer necessary to set together (1, 3, 5 or 9 hours). (A receiving beep is heard) PRESET button Push this button to operate the air conditioner according to settings memorized. (A receiving beep is heard) Or push the button for more than 4 seconds to memorize the setting indicated on the remote control and mark is indicated.

Automatic operation button [AUTO] Push this button to operate the air conditioner automatically. (A receiving beep is heard.) 1 17 18 2 15 6 7 8 12 5 4 3 16 13 14 11 9 10 - 22 - FILE NO.



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SVM-06036 6-6-2. Names and functions of indications on remote control Display All indications, except for clock time indication, are indicated by push the [ ] button.

1 2 3 4 5 6 7 8 9 10 Transmission mark This transmission mark ( ) indicates when the remote control transmits signals to the indoor unit. Mode display Indicates the current operation mode. 10 3 1 4 28 (AUTO : Automatic control, A : Auto changeover control, : Cool, : Dry, : Heat, : Fan only) Temperature display Indicates the temperature setting (17°C to 30°C). When you set the operating mode to : Fan only, no temperature setting is indicated. Louver operation display Indicates the louver operation.

( : Fix, : Swing ). FAN speed display Indicates the selected fan speed. AUTO or one of five fan speed levels (LOW, LOW+, MED+, HIGH, MED) 11 7 9 5 6 can be indicated. Indicates AUTO when the operating mode is either AUTO or : Dry. In the illustration, all indications TIMER and clock time display are indicated for explanation. The time set for timer operation or clock time is indicated. During operation, only the The present time is always indicated except for TIMER operation. relevant indications will be indicated on the remote control. Hi POWER display Indicates when the Hi POWER operation starts. Push the [Hi POWER] button to start and push it again to stop the operation.

PRESET display Flashes for 4 seconds when the [PRESET] button is pushed and hold to memorize. mark is indicated when [PRESET] button is pushed than 4 seconds. Push another button to turn off the mark. ECO display Indicates when the ECO is in operation. COMFORT SLEEP display Indicates when the COMFORT SLEEP is in operation. Each time you push the [COMFORT SLEEP] button, the display changes in the sequence of 1, 3, 5 or 9h. QUIET display Indicates when the QUIET is in operation. 11 - 23 - FILE NO. SVM-06036 7. INSTALLATION PROCEDURE 7-1.

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 mix 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) 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.

@@Do not store in a wet basement or expose to rain or water. @@@@SVM-06036 7-1-1. @@@@When purchasing a charge hose, be sure to confirm the port size. @@The size of opposite sides of flare nuts have been increased. @@@Used when flare is made by using conventional flare tool.

Connected to conventional vacuum pump. @@@@SVM-06036 7-2. @@SVM-06036 7-3-2. 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 l x 6 2 Wireless remote control x 1 5 Sasa-Zeolite Vitamin C filter x 1 8 Pan head wood screw 3.1 x 16 l x 2 3 Battery x 2 6 Bio-enzyme & Ginkgo filter x 1 9 B Label x 1 B Others Name Owner's manual Installation manual This model is not equipped with an extension drain hose. Option : For the extension drain hose, use an optionally available RB-821SW or commercially available one. 27 FILE NO.

SVM-06036 7-2-2. Installation Place · A place which provides the spaces around the indoor unit as shown in the above diagram. · A place where there is no obstacle near the air inlet and outlet. · A place which allows easy installation of the piping to the outdoor unit. · A place which allows the front panel to be opened. · The indoor unit shall be installed as top of the indoor unit comes to at least 2m height.



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Also it must be avoided to put anything on the top of the indoor unit. Mounting the Installation Plate Anchor bolt holes 62 82.5 Hook 170 85 CAUTION · Direct sunlight to the indoor unit wireless receiver should be avoided. · The microprocessor in the indoor unit should not be too close to r-f noise sources. (For details, see the owner's manual.) 1 Hook Hook Thread Pipe hole Indoor unit Weight Pipe hole Installation plate 7 Mounting screw Fig. 7-2-3 Remote controller · 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. (Side view) (Top view) 5 m Indoor unit 5 45° 45° 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. CAUTION When installing the installation plate with a mounting screw, do not use the anchor bolt hole. Otherwise the unit may fall down and result in personal injury and property damage. Indoor unit 7m ° 75 Reception range Remote control Reception range Remote control \* : Axial distance 5 mm dia. hole \*7m Anchor bolt Projection 15 mm or less 7 Mounting screw 4 x 25 s Clip anchor (local parts) Fig. 7-2-1 7-2-3. Cutting a Hole and Mounting Installation Plate Cutting a Hole When install the refrigerant pipes from the rear. Fig.

7-2-4 CAUTION Failure to firmly install the unit may result in personal injury and property damage if the unit falls. · In case of block, brick, concrete or similar type walls, make 5 mm dia. holes in the wall. · Insert clip anchors for appropriate 7 mounting screws. Pipe hole 65 mm NOTE The center of the pipe hole is above the arrow. 100 mm · Install the installation plate using 4 to 6 pieces of mounting screw securing four corners with screws. Fig. 7-2-2 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. 7-2-4.

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. 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.

NOTE · Wire type : More than H07RN-F or 245IEC66 (1.0 mm<sup>2</sup> or more) 28 2 m or more from floor m FILE NO. SVM-06036 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. 7-2-6 Piping and Drain Hose Installation Piping and Drain Hose Forming \* Since dewing results in a machine trouble, make sure to insulate both the connecting pipes. (Use polyethylene foam as insulating material.) Rear right Bottom left Left NOTE · Perform wiring works so as to allow a generous wiring capacity. Bottom right Right 7-2-5. Wiring Connection How to connect the connecting cable Wiring of the connecting cable can be carried out without removing the front panel. 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. Insert the connecting cable (according to the local cords) into the pipe hole on the wall. 4. Take out the connecting cable through the cable slot on the rear panel so that it protrudes about 15 cm from the front. 5. Insert the connecting cable fully into the terminal block and secure it tightly with screws. 6. Tightening torque : 1.

2 N·m (0.12 kgf·m) 7. Secure the connecting cable with the cord clamp. 8. Fix the terminal cover, rear plate bushing and air inlet grille on the indoor unit.

1. Die-cutting Front panel slit Cut out the slit on the left or right side of the front panel for the left or right connection and the slit on the bottom left or right side of the front panel for the bottom left or right connection with a pair of nippers. 2. Changing drain hose For left connection, left-bottom connection and rear-left connection's piping, it is necessary to change the drain hose and drain cap. How to remove the Drain Cap Clip drain cap by needle-nose plier, and pull out.

CAUTION · Be sure to refer to the wiring system diagram labeled inside the front panel. · Check local electrical cords and also any specific wiring instructions or limitations. How to install the Drain Hose Firmly insert drain hose connecting part until hitting on a heat insulator. Heat insulator How to fix the Drains Cap 1) Insert hexagonal wrench (4 mm) in a center head. 4 mm 2) Firmly insert drains cap. No gap Do not apply lubricating oil (refrigerant machine oil) when inserting the drain cap. Application causes deterioration and drain leakage of the plug. Insert a hexagon wrench (4 mm) NOTE · Use stranded wire only. · Wire type : H07RN-F or more. Fig.

7-2-5 CAUTION Firmly insert the drain hose and drain cap; otherwise, water may leak. 29 Die-cutting Front panel slit Fig. 7-2-6 Drain hose Fig. 7-2-7 Fig. 7-2-8 Fig. 7-2-9 Piping preparation Changing drain hose Rear left FILE NO. SVM-06036 In case of right or left piping · After scribing slits of the front panel with a knife or a making-off pin, cut them with a pair of nippers or an equivalent tool. Slit 7-2-6 Indoor Unit Fixing 1. Pass the pipe through the hole in the wall, and hook the indoor unit on the installation plate at the upper hooks. 2.

Swing the indoor unit to right and left to confirm that it is firmly hooked up on the installation plate. 3. While pressing the indoor unit onto the wall, hook it at the lower part on the installation plate. Pull the indoor unit toward you to confirm that it is firmly hooked up on the installation plate. Hook here 1 Fig.

7-2-10 In case of bottom right or bottom left piping · After scribing slits of the front panel with a knife or a making-off pin, cut them with a pair of nippers or an equivalent tool.



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1 Installation plate 2 Slit Hook Press (unhook) Fig. 7-2-11 Fig. 7-2-14 · For detaching the indoor unit from the installation plate pull the indoor unit toward you while pushing its bottom up at the specified parts. Left-hand connection with piping Bend the connecting pipe so that it is laid within 43 mm above the wall surface.

If the connecting pipe is laid exceeding 43 mm above the wall surface, the indoor unit may unstably be set on the wall. When bending the connecting pipe, make sure to use a spring bender so as not to crush the pipe. Bend the connection pipe within a radius of 30 mm (Ø6.35) 40 mm (Ø9.52). To connect the pipe after installation of the unit (figure) (To the forefront of flare) 270 mm 170 mm Push Push Fig. 7-2-15 Liquid side Gas side 7-2-7 Drainage 1. Run the drain hose sloped downwards. NOTE Outward form of indoor unit 43 mm · 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 the waved shape. R30 or less (Ø6.35) R40 or less (Ø9.52) (Use polisin (polyethylene core or the like for bending pipe.) ° 80 Use the handle of screwdriver, etc. 50 mm or more Fig. 7-2-12 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. Do not put the drain hose end into water. Do not put the drain hose end in the drainage ditch.

Fig. 7-2-16 2. Put water in the drain pan and make sure that the water is drained out of doors. 3. When connecting extension drain hose, insulate the connecting part of extension drain hose with shield pipe.

Shield pipe 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 Drain hose Inside the room Extension drain hose Fig. 7-2-17 CAUTION Fig. 7-2-13 Arrange the drain pipe for proper drainage from the unit.

Improper drainage can result in dew-dropping. This air conditioner has the structure designed to drain water collected from dew, which forms on the back of the indoor unit, to the drain pan. Therefore, do not store the power cord and other parts at a height above the drain guide. Space for pipes Wall Drain guide · 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. Fig. 7-2-18 30 FILE NO.

SVM-06036 7-2-8. Setting of Remote Controller Selector Switch When two indoor units are installed in the separated rooms, there is no need to change the select switches. (1) Stop the operation of the air conditioner and turn off its main power supply. (2) Pull the air inlet grille toward you to open it and remove the air inlet grille. (3) First open the horizontal louver and then remove the front panel from the back body by pulling it toward you. Remote Controller Selector Switch · When two indoor units are installed in the same room or adjacent two rooms, if operating a unit, two units may receive the remote controller signal simultaneously and operate. In this case, the operation can be preserved by setting either one indoor unit and remote controller to B setting (Both are set to A setting in factory shipment). · The remote control signal is not received when the settings of indoor unit and remote controller are different. · There is no relation between A setting/B setting and A room/B room when connecting the piping and cables. Position of Remote Control Selector Switch 1.

Setting of remote controller switch at the indoor unit side How to remove the front cabinet Hooks of front panel (4 points ) Fig. 7-2-20 How to mount the front panel Push the front panel back in and make sure all hook are locked. Adhesion of B label (When setting to [B]) Screws Push Screws Be sure to affix the B label on the front panel same as the below figure. Air filter Terminal cover Fig. 7-2-21 Fig.

7-2-19 31 FILE NO. SVM-06036 2. Setting of remote controller selector at the remote controller side [B] of the remote controller is displayed with liquid crystal only when it is set to [B]. There is no display of [A]. · Enter the batter.

· Push the [CHK] button by something with thin edge. ([00] is displayed.) · If [MODE] button is pushed while pushing [CHK] button, the small [B] is displayed at the right of the setting temperature indication section. \* To reset [A] setting, push the [MODE] button again while pushing the [CHK] button.

7-2-9. Check and Test Operation 1. Check the unit is firmly hooked up on the installation plate. 2. Check the connecting pipes tightened securely. Confirm that there is no gas leakage.

3. Confirm that all connecting cables are secured and correct. 4. Check the pipes insulation. 5. Check the drainage. 6. Connection of the grounding wire. 7. To switch the TEST RUN (COOL) mode, turn the switch on.

To switch the TEST RUN (COOL) mode, press TEMPORARY button for 10 sec. (The beeper will make a short beep.) 3. Confirm the indoor unit can operate with the changed setting of the remote controller. RESET Fig.

7-2-23 [MODE] button 8. Operate the unit at cooling operation mode for fifteen minutes or more. Measure the temperature of the intake and discharge air.

Ensure the difference between the intake temperature and the discharge one is more, than 8°C. NOTE: Three-minutes protection feature [CHK] button A protection feature prevents the air conditioner from being activated for about 3 minutes when it is restarted immediately after operation or when the power switch is turned on.

9. Check the remote controller operation. When finished the check and test operation, make sure to return to REMOTE CONTROLLER. (Push the temporary switch with once again.) 10. Explain to the customer on the correct usage of air conditioner simple layman's terms. 32 FILE NO. SVM-06036 8. HOW TO DIAGNOSE THE TROUBLE The pulse modulating circuits are mounted to both indoor and outdoor units. Therefore, diagnose troubles according to the trouble diagnosis procedure as described below.

(Refer to the check points in servicing written on the wiring diagrams attached to the indoor/outdoor units.) 8-1. First Confirmation 8-1-1. Confirmation of Power Supply Confirm that the power breaker operates (ON) normally.



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