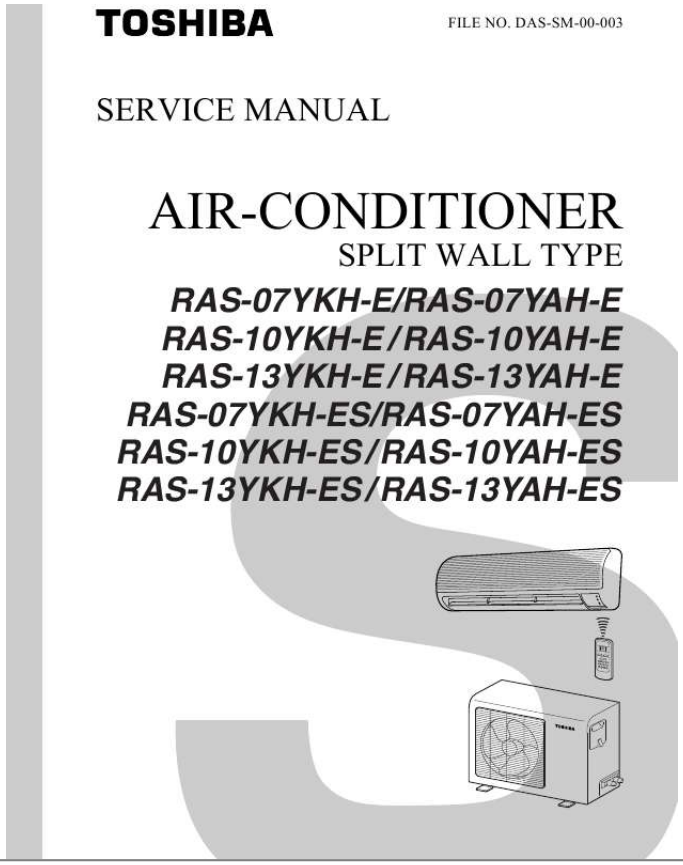

TOSHIBA

FILE NO. DAS-SM-00-003

SERVICE MANUAL

AIR-CONDITIONER

SPLIT WALL TYPE

RAS-07YKH-E/RAS-07YAH-E
RAS-10YKH-E/RAS-10YAH-E
RAS-13YKH-E/RAS-13YAH-E
RAS-07YKH-ES/RAS-07YAH-ES
RAS-10YKH-ES/RAS-10YAH-ES
RAS-13YKH-ES/RAS-13YAH-ES

Manual abstract:

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12 5. REFRIGERANT CYCLE DIAGRAM ....

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*@@65 2 1. SPECIFICATIONS RAS-10YKH-E / RAS-10YAH-E, RAS-13YKH-E / RAS-13YAH-E MODEL ITEM Capacity kW 1 RAS-10YKH-E/10YAH-E Cooling Heating 220V240V 220V240V 2,652,70 3,003,10 RAS-13YKH-E/13YAH-E Cooling Heating 220V240V 220V240V 3,453,50 4,004,10 * Power source Power consumption Power factor Running current Starting current Moisture removal Noise (SPL at 1 meter) Refrigerant Refrigerant control Gas side size Connection type Liquid side size Connection type Maximum length (of one way) Maximum height difference Indoor unit Outdoor unit Outer diameter Height Width Depth Indoor (H/M/L) Outdoor (220240V) Name of refrigerant Rated volume Indoor/Outdoor Interconnection pipe Phase Single V 220240 Hz 50 kW 0,981,02 0,890,91 1,261,30 1,191,27 % 9590 9588 9892 9593 V 220V240V 220V240V 220V240V 220V240V A 0,11/4,58 - 0,11/4,61 0,11/4,17 - 0,11/4,22 0,15/5,70 - 0,15/5,75 0,15/5,54 - 0,15/5,44 A 19 14 25 25 lit/h 1,2 2,0 dB (A) 41 / 36 / 29 41 / 36 / 29 44 / 39 / 34 44 / 39 / 34 dB (A) 4749 4749 49 / 51 49 / 51 R-22 kg 0,74 0,88 Capillary tube mm 9,52 12,7 Flare connection mm 6,35 Flare connection m2 10 15 * m mm 5 16 RAS-10YKH-E 6 Condensate drain pipe INDOOR UNIT Dimensions Net weight Evaporator type Indoor fan type Air flow rate Fan motor output Air filter OUTDOOR UNIT Dimensions Net weight Condenser type Outdoor fan type Air flow rate (220240V) Fan motor output Compressor RAS-13YKH-E 265 790 189 8 Finned tube Cross flow fan mm mm mm kg High fan Medium fan Low fan m³/h m³/h m³/h W 600 500 400 650 560 510 20 Polypropylene net filter (Washable) RAS-10YAH-E 530 770 200 31 Finned tube Propeller RAS-13YAH-E 538 780 300 42 Height Width Depth mm mm mm kg m³/h W Model Output W 15001700 18 PH120T1-4C 750 16901730 28 PH170T2-4L2 1100 Safety device Auto louver Usable outdoor temperature range °C 2143 Fuse, Overload relay Yes -521 2143 -521 Specifications are subject to change without notice. 3 RAS-10YKH-ES / RAS-10YAH-ES, RAS-13YKH-ES / RAS-13YAH-ES MODEL ITEM Capacity kW 1 RAS-10YKH-ES/10YAH-ES RAS-13YKH-ES/13YAH-ES Cooling Heating Cooling Heating 220V240V 2,652,70 3,003,10 3,453,50 4,004,10 Single 220240 50 0,981,02 0,89-0,91 1,261,30 1,191,27 9590 9588 9894 9793 220V240V * Power source Power consumption Power factor Running current Starting current Moisture removal Noise (SPL at 1 meter) Refrigerant Refrigerant control Gas side size Connection type Liquid side size Connection type Maximum length (of one way) Maximum height difference Indoor unit Outdoor unit Outer diameter Height Width Depth Indoor (H/M/L) Outdoor (220240V) Name of refrigerant Rated volume Indoor/Outdoor Interconnection pipe Phase V Hz kW % V 0,11/4,44 - 0,11/4,46 0,11/4,15 - 0,11/4,10 0,15/5,70 - 0,15/5,61 0,15/5,43 - 0,15/5,54 A A 19 14 25 25 lit/h 1,2 2,0 dB (A) 41 / 36 / 29 41 / 36 / 29 44 / 39 / 34 44 / 39 / 34 dB (A) 4749 4749 49 / 51 49 / 51 R-410A kg 0,69 0,80 Capillary tube mm 9,52 Flare connection mm 6,35 Flare connection m2 10 15 * m mm 5 16 RAS-10YKH-ES 6 Condensate drain pipe INDOOR UNIT Dimensions Net weight Evaporator type Indoor fan type Air flow rate Fan motor output Air filter OUTDOOR UNIT Dimensions Net weight Condenser type Outdoor fan type Air flow rate (220240V) Fan motor output Compressor RAS-13YKH-ES 265 790 189 8 Finned tube Cross flow fan mm mm mm kg High fan Medium fan Low fan m³/h m³/h m³/h W 600 500 400 650 560 510 20 Polypropylene net filter (Washable) RAS-13YAH-E 530 770 200 31 Finned tube Propeller RAS-13YAH-ES 538 780 300 42 Height Width Depth mm mm mm kg m³/h W Model Output W 15001700 18 PA118X1T-4FZ 750 16901730 28 PA160X2T-4FM 1100 Safety device Auto louver Usable outdoor temperature range °C 2143 Fuse, Overload relay Yes -521 2143 -521 Specifications are subject to change without notice. 4 Note : 1 · Capacity is based on the following temperature conditions. CONDITION TEMPERATURE (DB) Indoor unit inlet air temperature (WB) (DB) Outdoor unit inlet air temperature (WB) 24 °C 6 °C 19 °C 35 °C 12 °C 7 °C 27 °C 20 °C COOLING HEATING * Notes : 2 * CHARGELESS RAS-07YKH-E, RAS-07YKH-*

ES, RAS-10YKH-E, RAS-10YKH-ES · No additional refrigerant required. · This air conditioner accepts a connection piping length of up to 10m and a head of up to 5m. · There is no need to add the refrigerant as long as the total length of the connection piping is up to 10m. RAS-13YKH-E, RAS-13YKH-ES · No additional refrigerant required. · This air conditioner accepts a connection piping length of up to 15m and a head of up to 6m. · There is no need to add the refrigerant as long as the total length of the connection piping is up to 15m. 6-2. CONSTRUCTION VIEWS 2-1. Indoor Unit Air inlet Air filter 790 Heat exchanger 189 265 47 Air outlet Knock out system 790 232 326 Hanger 232 Front panel Back body 321 Connecting pipe (0,49m) (Flare Ø6,35) 10 Drain hose (0,54m) Hanger 50 47 Knock out system Connecting pipe (0,39m) (Flare Ø9,52) (Flare Ø12,7 for 13YKH-E only) 65,5 659 450 326 66 or more Minimum distance to ceiling 65,5 Hanger For stud bolt (Ø8~Ø10) For stud bolt (Ø6) 20 Hanger 2,5 46 20 Minimum distance to wall 120 or more 265 178,5 17 Minimum distance to wall 120 or more 40,5 3,5 37 20 Hanger Center line 76 319 790 Hanger Installation plate outline 269 126 60,5 7 40,5 10 50 2-2. Outdoor Unit RAS-07YKH-E, RAS-07YKH-ES, RAS-10YKH-E, RAS-10YKH-ES 600 111 Ø25 Drain hole 85 Gas side (flare Ø9,52) A Detail Drawing 600 36 50 R10 A 230 216 36 230 216 25 30 Liquid side (flare Ø6,35) Ø6 Hole 50 8-Ø6 Holes (For fixing the outdoor unit) Fan guard 4-Ø11x14 Long holes (For anchor bolt Ø8-Ø10) 200 12 11 Ø11x14 Hole Handle 11 111 Ø420 TOSHIBA Electric parts cover Z 525 530 54 268 62 89 Service port 250 5 770 59 89 59 770 Z 45 or more View 600 Inlet port 600 or more Visible outline (Minimum distance of the product of the wall) 230 Inlet port 100 or more 400 or more Outlet port Center port 4-Ø11x14 Long holes (For anchor bolt Ø8-Ø10) Mounting dimension of anchor bolt 8 268 RAS-13YAH-E, RAS-13YAH-ES A A Detail Drawing 600 50 36 120 Gas side (Flare Ø12,7 for 13YAH-E, Flare Ø9,52 for 13YAH-ES) 23 325 52,5 R10 325 301 Liquid side (Flare Ø6,35) Ø6 hole Ø11x14 hole Ø25 Drain outlet Handle Fan guard 8-Ø6 hole(for fixing outdoor unit) 6-Ø11x14 hole (for Ø8-Ø10 anchor bolt) Electric parts cover Ø420 Z 27 54 61 538 100 130 Service port 325 (pitch) 342 (8,5) 300 600 780 90 59 (8,5) Z View Installation dimension 100 or more 600 Air inlet 600 or more 325 100 or more Air outlet 600 or more 4xØ11x14 Long holes (for Ø8-Ø10 anchor bolt) 9 07 07 07 07 RAS-13YKH-E / RAS-13YAH-E RAS-13YKH-ES / RAS-13YAH-ES LOUVER MOTOR INFRARED RAYS RECEIVE AND INDICATION PARTS 123456789 CN25 123456789 THERMAL FUSE 77°C x 2 ORN ORN 12 CN04 1 2 BLK P04 GRN&YEL SG01 DSA R22 VARISTOR F01 POWER L TERMINAL N BLOCK Ø 220V-240V 50Hz BRW BLU RY02 BLK 4 T02 C.

T WHI RY03 4 3 6,3A 250V 3 R21 C15 RY01 L01 CN07 6 5 4 3 2 1 BLU PNK YEL ORN RED BRW 654321 1 2 3 4 5 6 7 8 9 CN13 C01 R01 DB01 C02 POWER SUPPLY CIRCUIT DC 12V DC 5V CR03 IC 03 RY04 1 2 3 CN11 123 5 5 3 3 C58 1 CN10 1 1 2 CN03 12 YEL BLK BRW BLK BLK 3 CR02 123456 123456 PNK WHI 1 RED Detail A RAS-13YAH-ES Same as figure.

*RAS-13YAH-E BLK INDOOR TERMINAL BLOCK BLK GRN&YEL THERMO SENSOR (TA) HEAT EXCHANGER SENSOR (TC) BLU WHI AC FAN MOTOR INDOOR OUTDOOR 1 2 3 4 Detail B RAS-13YAH-ES RAS-13YAH-E OVER LOAD RELAY BLK THERMOSTAT FOR COMPRESSOR BLK COMPRESSOR OUTDOOR TERMINAL BLOCK BLK 1 2 3 4 BLUBLU A GRN & YEL CHASSIS BLK RED COMPRESSOR Same as figure. SOLENOID COIL CAPACITOR RED WHI RED CAPACITOR PNK WHI FAN MOTOR B COLOR IDENTIFICATION BRW : BROWN RED : RED WHI : WHITE YEL : YELLOW BLU : BLUE BLK : BLACK GRY : GRAY PNK : PINK ORN : ORANGE GRN&YEL : GREEN & YELLOW 11 BLK BLK CR01 BLK BLU BLU BLU BLU BLU BLU PNK BLK WHI MCC-798 1 2 CN01 12 4-2. Outdoor Unit RAS-10YAH-E, RAS-10YAH-ES RAS-13YAH-E, RAS-13YAH-ES No. PARTS NAME MODELS TYPE SPECIFICATIONS Output (Rated) 750W, 2poles, 1phase, 220240V, 50Hz RAS-10YAH-E PH120T1-4C Winding resistance (W) (at 20°C) C-R 4,53 C-S 8,73 Output (Rated) 1100W, 2poles, 1phase, 220240V, 50Hz RAS-13YAH-E 1 Compressor Output (Rated) 750W, 2poles, 1phase, 220-240V, 50Hz RAS-10YAH-ES PA118X1T-4FZ Winding resistance (W) (at 20°C) C-R 3,17 C-S 5,18 PH170T2-4L2 Winding resistance (W) (at 20°C) C-R 2,22 C-S 3,04 Output (Rated) 1100W, 2poles, 1phase, 220240V, 50Hz RAS-13YAH-ES PA160X2T-4FM Winding resistance (W) (at 20°C) C-R 2,26 C-S 3,53 Output (Rated) 18W, 6poles, 1phase, 220240V, 50Hz RAS-10YAH-E RAS-10YAH-ES 2 Fan motor (for outdoor) RAS-13YAH-E RAS-13YAH-ES RAS-10YAH-E RAS-10YAH-ES RAS-13YAH-E RAS-13YAH-ES RAS-10YAH-E RAS-10YAH-ES RAS-13YAH-E RAS-13YAH-ES RAS-10YAH-E RAS-13YAH-E 6 Thermostat (for compressor) Solenoid coil (for 4-way valve) RAS-10YAH-E RAS-10YAH-E RAS-13YAH-E RAS-10YAH-ES RAS-13YAH-ES AF-230-28P UE6-21SJ5P Winding resistance (W) (at 20°C) Red-Black 370 White-Black 370 Output (Rated) 28W, 6poles, 1phase, 220240V, 50Hz Winding resistance (W) (at 20°C) AC 500V, 1,5mF AC 500V, 1,5mF AC 400V, 25mF AC 400V, 35mF U/T : 6,8A (90°C), OPEN 135 ± 5°C, CLOSE : 69 ± 11°C U/T : 8,0A (80°C), OPEN 145 ± 5°C, CLOSE : 75 ± 11°C OFF : 130°C, ON : 70°C AC 200 / 240V AC 200 / 240V Red-Black 198 White-Black 160 3 Running capacitor (for fan motor) SK-50FMP1,5U1 SK-50FMP1,5U2 SK-40CMP25U1 SK-40CMP35U1 JMRA99269-9200 JMRA99257-9200 CS-7 LB60012 VHV-01A1501A1 4 Running capacitor (for compressor) 5 Overload relay 7 13 5. REFRIGERANT CYCLE DIAGRAM RAS-10YKH-E / RAS-10YAH-E Cooling 0,39m (Connecting pipe) ø9,52 Indoor unit Evaporator T Heating Cross flow fan 0,49m (Connecting pipe) ø6,35 O.D.:9,52mm P Packed valve (ø9,52) Heating Packed valve (ø6,35) O.D.:6,35mm Cooling 4-way valve Heating Cooling Compressor PH120T1-4C Accumulator Condenser Dryer Capillary tube ø1,5x500 Cooling Heating Propeller fan Outdoor unit Refrigerant R-22 0,74kg Mark( )means check points of Gas Leak 50Hz Standard Heating High temperature *1 Low temperature Standard Cooling High temperature Low temperature Standard pressure P (kg/cm²G) 15,0 1923 12,5 6,0 6,5 4,0 Surface temp. of heat exchaeat exchanger temperature at the center of U-bend.*

*(By means of TC sensor.) 1 : During heating overload, the high temperature limit control operation is included. * 18 RAS-13YKH-ES / RAS-13YAH-ES Cooling 0,49m (Connecting pipe) ø9,52 Indoor unit Heat exchanger T (Note) Maximum pipe length is 15m Maximum pipe head is 6m Cross flow fan 0,39m (Connecting pipe) ø6,35 O.D.:9,52mm P Packed valve (ø9,52) Gas container connection (Reinstall etc.*

) Heating Packed valve (&osays RY01 and RY02 are turned on to energize the outdoor unit, and a cool operation is carried out. 1) When the FAN is set to AUTO, the indoor fan motor operates as shown in Fig. 7-2-2. 2) When the FAN is set to LOW, MED, or HIGH, the indoor fan motor operates with a constant in volume as listed in Table 7-1-1. Fig.

7-1-1 Auto setting of air volume Table 7-1-1 Manual setting of FAN SPEED HIGH Air volume (m3/hr) RAS-10YKH-E RAS13-YKH-E RAS-10YKH-ES RAS13-YKH-ES Indication of FAN SPEED LOW MED HIGH (Room temp. Set temp.) 400 (430) 500 (490)* 600 (550)* 510 560 650 +4 MED +3 +2 +1 0 RY01 OFF According LOW(+) to the set position LOW LOW (continuous) *For model : RAS-07YKH-E, RAS-07YKH-ES (2) 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 the START/STOP button. Set temp. Fig. 7-2-2 (3) 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 the START/STOP button. 22 Compressor (RY01) Common relay (RY02) 4-way valve (RY04) Outdoor fan (RY03) OPERATION display Set 0 temp. FAN AUTO HIGH Manual 7-2-1. Louver Control (1) By pushing the SET button of the remote control during the operation, the louver can be set to the desired position. And the louver position is stored in the microcomputer, the louvers will be set to the position automatically at the next operation.*

(2) When the AUTO button is pushed, the louver vertically swings within range of 25deg. 7-4. HEAT Operation (MODE of the remote control : HEAT) (1) Relays compressor 4-way valve, outdoor fan and operation display are controlled as shown in Fig. 7-4-1. (Room temp. Set temp.) 7-3. DRY Operation (MODE of the remote control : DRY) (1) Compressor 4-way valve, outdoor fan and operation display are controlled as shown in Fig. 7-3-1. ON:6min. OFF:4min. ON:6min. OFF:4min. 0 OFF ON ON 1 ON OFF ON ON (Room temp. Set temp.

) +3 +2 +1 ON:5min. OFF:5min. ON:5min. OFF:5min. ON OFF ON OFF OFF Fig.

7-4-1 (2) Relays RY01 and RY02 are turned on to energize the outdoor unit, and a heat operation is carried out. The indoor fan motor operates as shown in Fig. 7-4-2, when the FAN is set to AUTO. The motor operates with a constant air volume as listed in Table 7-1-1, when the FAN is set to LOW, MED, or HIGH. Fig. 7-3-1 · The microprocessor turns the compressor on and off at regular intervals (4 to 6 minutes on and/or off). During the compressor off, the indoor fan will operate in the super low position. · The indoor fan will operate in the AUTO position. (2) The pattern of operation depending on the relation between room temperature and set temperature is shown below: Room temp.

Compressor (RY01) Common relay (RY02) 4-way valve (RY04) Outdoor fan (RY03) OPERATION display Set 0 temp.

*RY01 OFF Set temp. (Room temp. Set temp.) 0 -1 LOW -2 -3 -4 MED According LOW(+) to the set position MED(-) Set temp.+1 Set temp. Compressor Outdoor fan ON ON ON ON Fig. 7-4-2 OFF OFF OFF Indoor fan L. *S.L. L. S.L. L. S.L.*

*L. *Super Low (3) 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 the START/STOP button. Fig. 7-3-2 23 Compressor (RY01) Common relay (RY02) 4-way valve (RY04) Outdoor fan (RY03) OPERATION display FAN AUTO Manual 7-6. ECONO.*

Mode When the ECONO. button is pushed, during COOL and AUTO operation, the OPERATION display is turned off and the ECONO. display is lit and the indoor unit operates quietly and mildly with controlling airflow. 7-7. Current Limit Control The microprocessor 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) Control is performed as shown below by detecting the compressor operation current with a current sensor (C.T). RAS-07YKH-E, RAS-10YKH-E, RAS-13YKH-E RAS-07YKH-ES, RAS-10YKH-ES, RAS-13YKH-ES Input current 13,5A/ 10A I4 12,5,A/ 9A I3 Compressor Outdoor fan 7-6-1. Cooling (1) In the ECONO. mode, the set temp.

by the remote control is changed automatically as shown in Fig. 7-6-1. (2) Fan speed LOW (°C) Set temp. is changed More than I4 continues for 3 seconds OFF More than I3 continues for 5 minutes OFF ON +2 Set temp. is changed +1 Set temp. 0H 1H 2H TIME Fig. 7-7-1 ECONO. button is pushed Fig. 7-6-1 (2) Current limit control (Heating) Control is performed as shown in Fig. 7-7-2.

RAS-07YKH-E, RAS-10YKH-E, RAS-13YKH-E RAS-07YKH-ES, RAS-10YKH-ES, RAS-13YKH-ES Input current 13,5A/ 10A I4 12,5A/ 9A I3 2H TIME 7-6-2. Heating (1) In the ECONO. mode, the set temp. by the remote control is changed automatically as shown in Fig. 7-6-2.

(2) Fan speed LOW Compressor Outdoor fan More than I4 continues for 3 seconds OFF More than I3 continues for 5 minutes OFF ECONO. button is pushed 0H 1H Set temp. 10A/ 8A I2 9A/ 7.5A I1 ON OFF ON -1 Set temp. is changed Fig.

7-7-2 -2 Set temp. is changed (°C) Fig. 7-6-2 25 7-8. High-Temperature Limit Control (Heating Operation) The microprocessor detects the indoor heat exchanger temperature so as to prevent exceeding the condensate pressure. Control is performed as shown in Fig. 7-8-1. Heat exchanger temperature 7-10. Cool Airflow Prevention Control (Heating Operation) (1) During the heating operation, the indoor fan speed is controlled automatically in accordance with the indoor heat exchanger temperature to prevent blowing the cool air. Control is performed as shown in Fig. 7-10-1 and 7-10-2.

*RAS-07YKH-E, RAS-07YKH-ES, RAS-10YKH-E, RAS-10YKH-ES Heat exchanger temperature (°C) 60 53 52 Compressor, Outdoor fan *1 OFF (°C) 30 25 20 Indoor fan speed According to the set position U.L. (Ultra Low) Room temp. Room temp. Set temp. Set temp. OFF S.L (Super Low) < > ON *1 ····· Only outdoor fan is turned off. Fig. 7-8-1 7-9.*

Low-Temperature Limit Control (Cooling Operation) The microprocessor detects the indoor heat exchanger temperature so as to prevent freezing up the indoor heat exchanger. Control is performed as shown in Fig. 7-9-1 and 7-92. Fig. 7-10-1 RAS-13YKH-E, RAS-13YKH-ES Heat exchanger temperature (°C) 35 32 30 Indoor fan speed According to the set position U.

L. (Ultra Low) Room temp. Room temp. < > RAS-07YKH-E, RAS-07YKH-ES, RAS-10YKH-E, RAS-10YKH-ES Heat exchanger temperature Compressor Outdoor fan ON Less than 5°C continues for 5 minutes OFF 20 (°C) 7 5 Set temp. Set temp.

OFF S.L (Super Low) Fig. 7-10-2 (2) As soon as the defrost operation starts, the indoor fan stops. Fig. 7-9-1 RAS-13YKH-E, RAS-13YKH-ES Heat exchanger temperature Compressor Outdoor fan ON Less than 2°C continues for 5 minutes OFF (°C) 6 2 Fig. 7-9-2 26 7-11. Defrost Operation During the heating operation, the outdoor heat exchanger temperature goes down and sometimes it is frozen. In this case, the air conditioner stops the heating operation and starts the defrost operation to melt ice. 7-11-2. Defrost Operation Time Control <In case of B> (1) The heating operation is performed for at least 40 minutes.

(2) The maximum defrost operation time is 6 minutes. The defrost operation time for the 4th cycle is 10 minutes. (When the outdoor temperature is very low, however, the defrost operation time is 10 minutes.) minutes 40 minutes 40 minutes 40 minutes 40 7-11-1. Condition to Start the Defrost Operation The defrost operation starts whichever below conditions are specified. (1) When the cumulative compressor operation time is longer than 40 or 90 minutes and difference between the indoor heat exchanger temperature and the room temperature is less than the specified value. (This value is decided by the microprocessor.) (Control example is shown in Fig. 7-11-1. In case of B or C, the defrost operation starts.

) (2) When the current limit control or the high temperature limit control is performed for total of 90 minutes. Heating Heating Heating Heating Defrost Defrost Max 6 minutes 10 minutes 1 cycle Fig. 7-11-2 <In case of C> (1) The heating operation is performed for at least 90 minutes. (2) The defrost operation time is 10 minutes. Indoor heat exchanger temp.

Room temp. (°C) D 19 10 A B C 40 90 (min.) Cumulative compressor operation time 7-11-3. Ending Condition at Defrost Operation (1) When the compressor current becomes 7,5A or more during defrost operation, the defrost operation stops and the heat operation restarts. (The current sensor detects the compressor current.

) (2) The defrost operation continues for at most 6 minutes or 10 minutes. Fig. 7-11-1 (Indoor fan speed : M) DEFROST LAMP : · During defrost operation, the PRE-DEF. lamp is on and the indoor and outdoor fans are off. · The compressor start protection timer is interlocked with the PRE-DEF. lamp. So the PRE-DEF. lamp is off (the fans stop) for about 3 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 30°C or higher, the PRE-DEF. lamp goes off, and the indoor fan starts. 27 Defrost 7-12. Auto Restart Function This unit is equipped with an Automatic restarting facility which allows the unit to restart and resume the set operating conditions in the event of a power supply shutdown without the use of the hand control. The operation will resume without warning three minutes after the power is restored.

The Auto Restart function is set not to work on shipment from the factory, and so it is necessary to set it to function as required. 7-12-1. How to Set the Auto Restart To set the Auto Restart function, proceed as follows: Access the TEMPORARY button located in the lower right hand corner beneath the hinged front panel of the indoor unit (please refer to section on PARTS NAME). The power supply to the unit must be on the function will not be set if the power is off. To enable the Auto Restart function, press the TEMPORARY button continuously for three seconds.

The unit will acknowledge the setting and beep three times. The system will now restart automatically. The above Auto Restart settings can be carried out: · When the system is stand-by (not running) OPERATION Push the TEMPORARY button continuously more than three seconds. MOTION Stand-by The system starts to operate. The green light will be lit.

about three seconds after The unit beeps three times. The orange light will be lit. The system is operating. The orange light is lighting. If the system is not required to run at this time, push the TEMPORARY button once more or use the remote control and the unit will stop.

0 3S TEMPORARY · When the system is operating OPERATION Push the TEMPORARY button continuously more than three seconds. MOTION Operating The green light is lit. The system stops to operate. The green light is turned off. about three seconds after The unit beeps three times. The system stops. If the system is not required to stop at this time, use the remote control and to restart. 0 3S TEMPORARY During subsequent operation, the orange light goes on. · The Auto Restart function will not accept an instruction if timer operation with the remote control is selected. (Please refer to the section on setting the timer or setting the louver.

) · During louver swing (AUTO) operation, after restarting by the Auto Restart function, the louver swing stops. 28 7-12-2. How to Cancel the Auto Restart To cancel the Auto Restart function, proceed as follows: Repeat the setting procedure: the unit will acknowledge the instruction and bleep three times. The system will now be required to manually restart with the remote control after the main supply is turned off. Cancellation is carried out: · When the system is stand-by (not running) OPERATION Push the TEMPORARY button continuously more than three seconds. MOTION Stand-by The system starts to operate. The orange light will be lit. about three seconds after The unit beeps three times. The green light will be lit. The system is operating.

If the system is not required to run at this time, push the TEMPORARY button once more or use the remote control and stop the unit. 0 3S TEMPORARY · When the system is operating OPERATION Push the TEMPORARY button continuously more than three seconds. MOTION Operating The orange light is lit. The system stops to operate. The orange light is turned off.

about three seconds after The unit beeps three times. The system stops. If the system is not required to stop at this time, use the remote control and to restart. During subsequent operation, the green light is lighting. 0 3S TEMPORARY 7-12-3.

In Case of Power Failure during the Timer Operation (1) If ON-TIMER operation is reserved with setting of Auto Restart operation, it is cancelled with power failure. (The OPERATION lamp on the main unit goes on and off to inform of power failure.) In that case, try to reserve ON-TIMER operation once again. (2) If OFF-TIMER operation is reserved without setting of Auto Restart operation, the reservation is cancelled with power failure. (The OPERATION lamp on the main unit goes on and off to inform of power failure.) In that case, try to reserve OFF-TIMER operation. When Auto Restart operation is set, OFF-TIMER reservation is also cancelled with power failure. 29 8. INSTALLATION PROCEDURE 8-1. 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 H05 RN-F), or cord designation 245 IEC 57.

CAUTION TO DISCONNECT THE APPLIANCE FROM THE MAINS SUPPLY. This appliance must be connected to the mains 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. DANGER ENGAGE DEALER OR SPECIALIST FOR INSTALLATION. `FOR ELECTRICAL WORKS THE WIRING AND CABLES MUST BE PERFORMED IN COMPLIANCE WITH NATIONAL WIRING STANDARD OR REGULATION. IF INCORRECT AND INCOMPLETE WIRING IS CARRIED OUT, IT WILL CAUSE AN ELECTRICAL FIRE OR ELECTRICAL SHOCK. `USE THE SPECIFIED CABLE (1,5 to 2,0mm²) AND CONNECT TIGHTLY FOR INDOOR/OUTDOOR CONNECTION. CONNECT TIGHTLY AND CLAMP THE CABLE SO THAT EXTERNAL FORCE WILL BE ACTED ON THE TERMINAL.

`WIRE ROUTING MUST BE PROPERLY ARRANGED SO THAT CONTROL BOARD COVER IS FIXED PROPERLY. `DO NOT DAMAGE OR SCRATCH THE CONDUCTIVE CORE AND INNER INSULATOR OF THE CABLES. `DO NOT DEFORM OR SMASH ON THE SURFACE OF THE CABLES. DO NOT PRESS OR FIX THE CORD AND CABLES FIRMLY WITH STAPLES, etc. `DO NOT USE THE EXTENSION CABLE FOR POWER SUPPLY CORD OR INTER-CONNECTING CABLE.

NEVER EXECUTE THE CONNECTION OF WIRING WITH OTHER METHOD THAN THE APPROVED ONE. OTHERWISE, OVERHEAT, SMOKE OR FIRE MAY BE GENERATED BY CONTACT ERROR. `TURN OFF MAIN POWER SUPPLY AND BREAKER BEFORE ATTEMPTING ANY ELECTRICAL WORK. MAKE SURE ALL POWER SWITCHES AND BREAKER TURN 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. `GROUNDING WIRE WORKS MUST BE CONSTRUCTED IN COMPLIANCE WITH INSTALLATION MANUAL. `DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE 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 2M.) FROM HEAT SOURCE SUCH AS RADIATORS, HEAT REGISTORS. FURNACE, STOVES, etc. `IF A REFRIGERATION GAS LEAKS DURING INSTALLATION, BE SURE TO PERFORM VENTLATION.

IF THE REFRIGERANT GAS COMES INTO CONTACT WITH FIRE, A POISONOUS GAS MAY OCCUR. WHEN INSTALLING AN AIR CONDITIONER, DO NOT ALLOW AIR OR MOISTURE TO REMAIN IN THE REFRIGERATION CYCLE. OTHERWISE, PRESSURE IN THE REFRIGERATION CYCLE MAY BECOME ABNORMALLY HIGH SO THAT A RUPTURE OR PERSONAL INJURY MAY BE CAUSED. `BE SURE TO USE THE CORD-CLAMPS AND THE ELECTRIC PARTS COVER TO THE SPECIFIED POSITION WITH ATTACHED TO THE PRODUCT. MOUNT THE ELECTRIC PARTS COVER FOR CABLES OF CONNECTING SECTION FIRMLY WITH THE SCREWS. 30 WARNING · Never modify this unit by removing any of the safety guards or 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 requlations. If you detect any damage, do not install the unit. Contact your Toshiba dealer immediately. CAUTION · Exposure of unit to water or other moisture before installation will result in an electrical short. Do not store in a wet basement or expose to rain or water.

· After unpacking the unit, examine it carefully for possible damage. · Do not install in a place that can increase the vibration of the unit. Do not install in a place that can amplify the noise level of the unit or where noise and discharged air might disturb user's neighbors. · To avoid personal injury, be careful when handling parts with sharp edges. · Please read the installation manual carefully before installing the unit.

It contains further important instructions for proper installation. UK Plugs and Sockets etc (Safety) Regulations 1994 SI Number 1768 With regard to Schedule 3, Item 7 of the above UK Regulations, this appliance must be permanently connected to the fixed wiring of the main electrical supply by means other than the use of an approved 13 Amp. plug-top as outlined in the Regulations. Electrical work must be carried by suitably qualified persons and in accordance with all relevant safety standards and codes of practice. We recommend that the power supply for this appliance is derived from a suitably protected dedicated circuit. (for U.K. only) 31 8-2. Installation Diagram of Indoor and Outdoor Units For installation of the indoor unit, use the paper pattern on the back. Clip anchor Hook 66 mm or more For the rear left and left piping Wall 120 mm or m Front cabinet ore Front panel Hook 1 Installation plate Insert the cushion between the indoor unit and wall, and lift indoor unit to make work easier.

*Do not allow the drain hose to get slack. Hook 120 m or m m ore 4 Mounting screw Air (At tac h to filte r Cut the piping hole sloped slightly Shield pipe the fron t ca bin et) (At tac h to Pan head wood screw 9 the fron t ca bin et) Make sure to run the drain hose sloped downward. The auxiliary piping can be connected the left, rear left, rear, right or bottom. 5 Deodorizing filter 600 mm or more 6 Purifying filter 2 Wireless remote control 8 Remote control holder Right Before install the wireless remote control 100 mm or m ore ore or m mm B Rear Rear left Bottom Left · With the remote control cover open, load the batteries supplied correctly, observing their polarity. 2 Wireless remote control re r mo mo Am Extension drain hose (Option: RB-821SW) 600 mm or m ore Insulation of refrigerant pipes insulates the pipes separately, not together. 3 Batteries Cover Be sure to use the Electric parts cover Loop the connective cable (about 100 mm in diameter and 300~350 mm long). *Included RAS-07YKH-E, RAS-07YKH-ES 6 mm thick heat resisting polyethylene foam RAS-10YA-ES RAS-10YAH-ES A B 400 * 45* RAS-13YA-ES RAS-13YAH-ES 600 100 32 8-3. Installation 8-3-1. Optional Parts Part code A Parts name Refrigerant piping Liquid side : ø6,35 mm Gas side : ø12,7 mm (ø9,52 mm) Q'ty * Each one · Secure the outdoor unit with the anchor bolts if the unit is likely to be exposed to a strong wind. · Use ø8 or ø10 anchor bolts.*

*· If it is necessary to drain the defrost water from the outdoor unit, attach W drain nipple to the bottom plate of the outdoor unit before installing it. The drain nipple is located as shown above. <Drainage> ø25 Bottom plate 7 Drain nipple B C Pipe insulating material (polyethylene foam, 6 mm thickness) Putty, PVC tapes 1 Each one * For model RAS-13YAH-ES <Anchor bolt arrangement of outdoor unit> RAS-07YAH-E, RAS-07YAH-ES, RAS-10YAH-E, RAS-10YAH-ES Drain hose sold separately or one on the market. 600mm Air inlet 120mm Fig. 8-3-2 · Install the provided drain nipple in the hole of the bottom plate of the outdoor unit.*

(See the above figure.) · Perform proper drainage processing using a drain hose sold separately or one on the market. (Inner diameter : 16 mm) · Do not use an ordinary hose on the market, because it tends to get flat and as a result, it prevents water from draining. 52,5mm 301mm 7 Drain nipple Air outlet Fig 8-3-1-1 Air outlet RAS-13YAH-E, RAS-13YAH-ES 600mm Air inlet 111mm 230mm 30mm 7 Drain nipple Air outlet Fig. 8-3-1-2 Air outlet 33 8-3-2. Installation Parts Parts with an asterisk (*) are packaged with the outdoor unit. Part No. Name of parts Q'ty Part No. Name of parts Q'ty Part No. Name of parts Q'ty 1 4 7 Installation plate x 1 Mounting screw ø4x 25 x 6 Drain nipple x 1 2 5 8 Wireless remote control x 1 Deodorizing filter x 1 Remote control holder x 1 3 6 9 Batteries x 2 Purifying filter x 1 Pan head wood screw ø3,1 x 16 x 2 Others Name Installation manual Owner's 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. 34 8-4. Indoor Unit K Installation place · A place which provides the spaces around the indoor unit as shown in the diagram in section 8-2. · A place where there is no obstacle near the air inlet and outlet. · A place which allows an easy installation of the piping to the outdoor unit.*

· A place which allows the front panel to be opened. 8-4-1. 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 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.) <Remote control> · A place where there are no obstacles such as a curtain that may block the signal from the remote control. · 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. The center of the piping slot is above the arrow. The center of the pipe hole is above the arrow. Pipe hole 40,5 mm 66mm or more 65,5mm 1 Installation plate Fig.

8-4-2 (1) After determining the pipe hole position with the mounting plate (80 mm), drill the pipe hole (ø65 mm) at a slight downward slant to the outdoor side.

*NOTE : · When drilling the 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. Anchor bolt hole (Side view) Indoor unit (Top view) 7m Indoor unit 5m 5m 4 *7m 45° 5° 120mm or more 75 65,5mm Reception range *:Axial distance Remote control ° Reception Remote control range Pipe hole Pipe hole Thread Indoor unit Weight 4 Mounting screw Fig. 8-4-1 Fig. 8-4-3 35 65 80mm m m <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) Install the installation plate horizontally in the wall. (3) To mount the installation plate on a concrete wall with anchor bolts, utilize the anchor bolt holes as shown in the above figure. 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 holes in the wall. · Insert clip anchors for appropriate T mounting screws. NOTE : · Install the installation plate using 4 to 6 pieces of mounting screw securing four corners with screws. CAUTION When installing the installation plate with mounting screw, do not use the anchor bolt hole. Otherwise the unit may fall down and result in personal injury and property damage. 8-4-2. 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. Installation plate (Keep horizontal direction) Anchor bolt Projection 15mm or less 5mm dia, hole CAUTION · Use power specified above table. · 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 be 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. NOTE : · Perform wiring works so as to allow a generous wiring capacity. Clip anchor 4 Mounting screw Ø4 x 25 Fig. 8-4-4 MODEL Power source Maximum running current Plug socket & fuse rating Wiring RAS-07YKH-E, RAS-10YKH-E RAS-13YKH-E RAS-07YKH-ES, RAS-10YKH-ES RAS-13YKH-ES 50Hz *220240V ~ Single-phase 7,5A (4,0A For RAS-07YKH-E, ES only) 12A 16A 16A 1mm2 or more 1,3mm2 or more * No adjustment is necessary.*

36 8-4-3. Wiring Connection Taking out the power cord WARNING To plug the cable in the plug receptacle, take the following precaution. THIS APPLIANCE MUST BE EARTHED. Slitted portion IMPORTANT THE WIRES IN THIS MAINS LEAD ARE COLORED IN ACCORDANCE WITH THE FOLLOWING CODE: L : Brown N : Blue : Green and Yellow -LIVE -NEUTRAL -EARTH L N · Cut off the slitted portion in the side face of the rear panel to take out the power cord. After this, remove burrs, sharp edges, etc.

, to smooth the cut face. <How to connect the power cord> For the air conditioner that has no power cord, connect a power cord to it as mentioned below. · After removing the front cabinet, remove the terminal cover and the cord clamp. · Connect and secure the power supply cord and secure the cord clamp and the terminal cover. · Cut the rear panel following the cutting mark and put the power supply cord through the notch.

· Be sure to smooth out the notch with a file, etc. Fig. 8-4-5 As the colors of the flexible cord of this appliance may not correspond with the colored markings, to identify terminals in your plug, as follows: Connect BROWN colored core to plug terminal marked letter "L". Connect BLUE colored core to plug terminal marked letter "N". Connect GREEN AND YELLOW colored core to plug terminal marked Earth Symbol " ". <How to remove the front cabinet> Terminal block Power supply cord L N Cord clamp Terminal cover Screw 4 4 12 12 3 Vertical air flow louver. Screw Earth line Screw Fig. 8-4-6 Fig. 8-4-7 <Stripping length of power cord> 30mm 10mm How to open the screw cap · Place your finger on the lower part and push up to open the screw cap. (1) Open the screw caps and remove the two screws securing the front cabinet.

(2) Close the screw caps as behind. (3) Open the vertical airflow louver horizontally by hand. (4) Slightly open the lower part of the front cabinet then pull the upper part of the front cabinet toward you to remove it from the rear plate. L N 10mm 40mm Earth line NOTE : · Use standard wire only. · Wire type: More than H05-RN-F Fig. 8-4-8 37 <How to connect the connecting cable> Wiring of the connecting cable can be carried out without removing of the front panel. (1) Remove the front panel. Fully open the front panel. Disengage the support arm located in the upper center while pushing its handle leftwards, and then remove the front panel toward you. (2) Remove the terminal cover and cord clamp.

(3) Insert the connecting cable (according to local codes) into pipe hole on the wall. (4) Take out the connecting cable through the cable slot on the rear panel so that it is exploded by about 15 cm long in the front side. (5) Insert the connecting cable fully into the terminal block and secure it by screw tightly. (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 and front panel on the indoor unit. <How to install the front cabinet on the indoor unit> Install the front cabinet through the opposite order of "How to remove the front cabinet". When the panel is removed and mounted again, take the following actions: After fastening the two screws, one each at the left and right of the air outlet, be sure to push the upper center Q right end R , left end S and the lower center T of the air outlet, and confirm that no gap is left between the front cabinet and the rear plate. · If cooling (dry) operation is made without pushing the air outlet, dew can be deposited on the front cabinet surface. @@@@8-4-11 8-4-4. @@8-4-9 Fig. @@· Wire type:More than H05 RN-F Fig. 8-4-10 Slit (front panel) Slit (rear panel) Fig. @@@@@@Bend the connection pipe within a radius of 30 mm. @@@@@@@@Pull the indoor unit toward you by the lower part to confirm that it is firmly hooked up on the installation plate.

Side of liquid flow Side of gas flow Outward form of indoor unit (1) Hook here 43mm 1 Installation plate (2) R 30mm (Use polisin or the like for bending pipe.) Hook 80 ° Push Use the handle of screwdriver,etc. Fig. 8-4-14 NOTE : If the pipe is bent incorrectly, the indoor unit may unstably be set on the wall. @@@@@@@@@@@@@Drainage (1) Run the drain hose sloping downwards. @@Do not form the drain hose into the wared shape.

8-5. @@@@@@· 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. @@@@@@@@@@@@@@Improper drainage can result in damage to property. @@@@8-5-1 Space for pipes Fig. 8-4-19 40 8-5-2. @@Do not install the unit in such places. · A place full of machine oil. · A saline place such as coast.
· A place full of sulfide gas. @@8-5-2 (2) Insert a flare nut into the pipe, and flare the pipe. 8-5-1. Required Tools for Installation Work 1) Philips screw driver 2) Hole core drill (65mm) 3) Gaugramanifold 4) Spanner 5) Pipe cutter 6) Knife 7) Reamer 8) Gas leak detector 9) Tape measure 10) Thermometer 11) Mega-tester 12) Electro circuit tester 13) Vacuum pump 14) Hexagonal wrench (5mm) 15) Torque wrench Outer dia. 6,35mm 9,52mm 12,7mm A (mm) R22 Imperial 1,0 ~ 1,5 1,0 ~ 1,5 1,5 ~ 2,0 Rigid 0,5 ~ 1,0 0,5 ~ 1,0 0,5 ~ 1,1 A (mm) R410A Imperial 1,5 ~ 2,0 1,5 ~ 2,0 Rigid 1,0 ~ 1,5 1,0 ~ 1,5 A Die Pipe Fig. 8-5-3 <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. CAUTION · Do not apply excess torque. Otherwise, the nut may crack depending on the installation conditions. Tightening touque N·m (kgf·m) 16 ~ 18 (1,6 ~ 1,8) 30 ~ 42 (3,0 ~ 4,2) 50 ~ 62 (5,0 ~ 6,2) Flare nut Outer dia.
6,35mm 9,52mm 12,7mm Half union or packed valve Externally threaded side Use a wrench to secure. Internally threaded side Use a torque wrench to tighten. Fig. 8-5-4 41 8-5-3. Vacuum Pumping Pressure gage INFORMATION In order to prevent any other refrigerant from being charged accidentally, each port of the manifold has been changed in shape. Differences in Port Size between Conventional R22 and R410A Manifold valve High pressure side handle Low pressure side handle Charge hose (A) Outdoor unit Indoor unit Gas (Ø9,52) C A Service port Charge hose (B) Lo Hi Manifold for R22 Port size 7/16 UNF 20 threads per inch Manifold for R410A 1/2 UNF 20 threads per inch D B Liquid (Ø6,35) Packed valve VP Fig. 8-5-5 AIR PURGE Evacuate the air in the connecting pipes and in the indoor unit using vacuum pump. Do not use the refrigerant in the outdoor unit. For details, see the manual of vacuum pump. <Use of vacuum pump> (1) Connect the charge hose (A) from the manifold valve to the charge inlet of the gas side packed valve.

(2) Connect the charge hose (B) to the port of vacuum pump. (3) Open fully the low pressure side handle of the manifold valve. (4) Operate the vacuum pump. (5) Close the low pressure side handle of manifold valve after vacuumizing and stop the vacuum pump. Continue vacuumizing more than 15 minutes and check the pressure gage indicates 0,1MPa (76 cmHg). (6) Open the stems of packed valves A and B all the way. (7) Securely tighten the stem cap to each of the packed valve stems. CAUTION · KEEP IMPORTANT 4 POINTS FOR INSTALLATION (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) <Packed Valve Handling Precautions> · Open the valve stem all the way out; so not try to open it beyond the stopper.
· Securely tighten the valve stem cap with the wrench or like. · Valve stem cap tightening torque is as follows; Gas pipes side (Ø12,7) : 49 ~ 62 N·m (5,0 ~ 6,2 kgf·m) Gas pipes side (Ø9,52) : 30 ~ 42 N·m (3,0 ~ 4,2 kgf·m) Liquid pipe side (Ø6,35) : 16 ~ 18 N·m (1,6 ~ 1,8 kgf·m) Service port cap : 9 ~ 10 N·m (0,9 ~ 1,0 kgf·m) <A5 mm hexagon wrench is required.> Flare nut Valve body Stopper Wrench m Service port Valve stem Service port cap Valve stem cap Note : Service port at Gas pipes valve only. Fig. 8-5-6 42 5m 8-5-4.
Wiring Connection (1) Remove the electric parts cover from the outdoor unit. (2) Connect the connecting cable to the terminals as identified with their respective matched numbers on the terminal block of indoor and outdoor units. (Strip the sheath of connecting cable with following stripping length to and insert into the terminal block.) (3) When connect the connecting cable to 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) with water coming in the outdoor unit. Process them so that they do not touch any electrical or metal parts. <Stripping length of connecting cable> 8-6. Others 8-6-1.
*@@@@@@@@@@@@@@@@@@@8-6-2 8-6-3. @@Turn it on as required. * See detail in section 7-7. Auto Restart Function. 43 9. @@@@What to be Prechecked First 9-1-1. Power Supply Voltage The line voltage must be AC 220240V.*

If the line voltage is not within this range, this air conditioner may not work normally. 9-1-2. Incorrect Cable Connection between Indoor and Outdoor Units The indoor unit is connected to the outdoor unit with 5 cables. Make certain that the indoor and outdoor units have been connected properly, with terminals assigned the same numbers wired to each other. If the connectors are not connected as specified, the outdoor unit will not operate normally, or OPERATION lamp and TIMER lamp will blink (5Hz). 9-1-3. Misleading but Good Operations (Program Controlled Operation) The microcomputer performs the operations listed in Table 9-1-1 to control the air conditioner. If a claim is made on the operation, check whether it corresponds to the contents in the Table 9-1-1. If it does, it is an indispensable operation for the control and maintenance of the air conditioner: it is not a failure of the unit. Table 9-1-1 No.
1 Operation of air conditioner When the power plug or the power cord of the indoor unit is inserted, the OPERATION lamp on the setting indication part blinks. Fan speed remains unchanged in the dry mode. The compressor will not switch on or off even when the thermo. control is operated in the dry operation. The PRE-DEF.
lamp comes on when the heating operation is started. The outdoor fan stops once in the while during the heating operation. Compressor does not work though room temperature is in the range of turning the compressor on.

During automatic operation, the operation mode changes. Dur ing automatic operation mode, the fan only operation continues.
When the power is turned on, the operation starts automatically. Description The OPERATION lamp blinks, indicating that power is turned on. If this happens, push the START/STOP button once to cause the lamp to stop blinking. A power outage also causes the lamp to blink. Fan speed is automatically controlled in the dry mode. In the dry mode, the compressor goes on and off at regular intervals, independent of the thermo. control. The PRE-DEF. lamp comes on during defrost operation and when the indoor heat exchanger temperature is low when the heating operation is started. At this time, the indoor fan is stopped to prevent cold air from drifting into the room.

· When the indoor heat exchanger temperature is high, the outdoor fan may be stopped by the high-temperature limit control operation. · When the compressor current is large, the outdoor fan may be stopped by the current limit control operation. Compressor does not work while the compressor restart delay (3-min.) timer is active. The same is true after power is turned on, as the time is still active. After selection of the cooling and heating operation, the operation mode is selected again when the compressor off mode continues for 15min. according to the room temperature. When the room temperature is within setting temperature ± 1°C the fan only mode is selected. When the auto restart controlling is selected, the operation is performed automatically in the previous operation mode after the power supply has been turned on. 2 3 4 5 6 7 8 9 44 9-2.
Primary Judgement of Trouble Sources 9-2-1. Role of Indoor Unit Controller The indoor unit controller receives the operation commands from the remote control and assumes the following functions. · Measurement of the draft air temperature of the indoor heat exchanger by using the thermo sensor (TA). · Louver motor control · Control of the indoor fan motor operation · Control of the LED display · Control of the outdoor unit compressor, 4-WAY VALVE and the outdoor fan motor. 9-2-2.
Display of Abnormalities and Judgement of the Abnormal Spots The indoor unit of this machine observes the operation condition of the air conditioner and displays the contents of the self-diagnosis as block displays on the display panel of the indoor unit. Table 9-2-1 Block display A B C D E F OPERATION display blinking (1 Hz) OPERATION display blinking (5 Hz) OPERATION display blinking (5 Hz) OPERATION display blinking (5 Hz) OPERATION display blinking (5 Hz) OPERATION, and TIMER Display blinking (5 Hz) Description Power failure (when power is ON) Thermo. sensor (TA) short/break Heat exchanger sensor (TC) short/break Indoor fan lock, abnormality of indoor fan Indoor P.C. board failure Wrong wiring of connecting cable Thermal fuse is blown · Gas shortage, other refrigerant cycle trouble · Heat exchanger sensor open/break/short · Overload relay or thermostat for compressor trouble Compressor trouble G OPERATION, TIMER and PRE-DEF.
display blinking (5 Hz) H OPERATION, TIMER and PRE-DEF. display blinking (5 Hz) (1) Judgement from defective operation or abnormal operation Table 9-2-2 Symptom Check Remote control is not possible. Remote control is possible. Primary judgement The indoor part (including the remote control) is defective. OK. The outdoor part is defective. (outdoor fan motor) The inside part is defective. No reaction on remote control operation Turn off the power once, turn it on again and try to operate the remote control again. The outdoor fan does not rotate The compressor operates. The compressor does not operate.

45 (2) Self-diagnosis with remote control With the indoor unit control, self-diagnosis of protective circuit action can be done by turning the remote control operation into service mode, operating the remote control, observing the remote control indicators and checking whether TIMER lamp blinks (5 Hz). [METHOD] 1 Push the [CHK] button with a thin tip of pencil or others. The remote control display shows " MODE TEMP . AUTO COOL DRY HEAT FAN ONLY ". FAN AUTO LOW 2 Push " Hr.ON OFF TIMER C MED. HIGH " key of TEMP. one by one. The receiving beep "Pi!" is heard, and the timer lamp of the air conditioner blinks. (5 times for 1 sec.
) to " " key, the 35 check codes from " " are sent. " " TEMP. 3 Operating " 4 START/STOP 2 3 FAN 4 To reduce the check code number, push the " 6 AUTO SET MODE ACL CHK TIMER ECONO. key of TEMP. --> <--> --> <--> <--> <---> <-<-- 1 CNL 5 If the check code agrees with the error code, the ON OFF RSV WH-E1BE receiving beep continues ringing "Pi, Pi, Pi .
.." (for approx.10 sec.), and all the LED of air conditioner blink.
(5 times for 1 sec.) [To release the servicing check] 6 Push the [START/STOP] button. Display screen returns to one before check. The servicing check operation can be also released by [ACL] button. <Caution of servicing check> 1. After finished servicing check, push [START/ STOP] button and confirm to change main body and remote control on normal operation mode. 2. After finished servicing check, disconnect plug (or turned off circuit breaker) of main body due to reset operation memory of microcomputer but in case of found the check code, it's stoked in microcomputer memory. Therefore, the memory of check code can not delete after disconnected plug (or turnrd off circuit breaker). 3.

After finished repair the main unit, clear the memory of microcomputer. To clear the memory, need to use another service check remote control. (service part No. 43T69058). <How to clear the memory> 1. Push the button (rear bottom) of the remote control with a tip of pencil for more than 3 seconds. Make sure the setting temperatur " " is displayed on. 2. Adjust the check code to " ". (Use [AUTO] button and TEMP .
, button 3. Push [SET] button. (Data before operation is directly transferred.) 4. Push [ON/OFF] button.
(Transfer the signal to main unit.) 46 Table 9-2-3 Block level Check code Block Indoor P board .C. Check code Diagnosis function Symptom Thermo. sensor short/break.
Air Conditioner status Judgment and action Condition Indicated when detected abnormal 1.Check thermo. sensor. 2.If it is OK, check P board. .C. 1.Check heat exchanger sensor. 2.

If it is OK, check P board. .C. Continued operation Heat exchanger sensor short/break. Continued operation Indicated when detected abnormal Indoor fan lock, abnormality of indoor fan or thermal fuse break. All off Indicated when detected abnormal 1.Check heat thermal fuse is blow or not? (Terminal block part.) 2. f the thermal fuse is not I blow, check indoor fan motor.

(Refer to trouble shooting flow charts.
) Abnormality of other indoor unit P board. .C. All off Indicated when detected abnormal Replace P board. .
C. Cable connectio n/Therm al fuse Refrigera nt system 1) Wrong wiring or disconnection of connective cable. 2) Thermal fuse cut off. 1) Overload relay or thermostat for compressor break. All off Indicated when detected abnormal 1.
Check connective cable correct if wiring is wrong. 2. Check thermal fuse and Terminal blocks. 3. f it is OK, check P board. I .C. All off Indicated when detected abnormal 1. If overload relay and themostat for compressor are OK, check refrigerant cycle. 2.

If refrigerant cycle is OK, check P board. .C. 3.If heat exchenger sensor is OK, check overload relay and thermostat for compressor. Compressor break down. All off Indicated when detected abnormal 1. Check compressor. 2. If it is OK, check P .
C. board. Contents detected by the check codes " " to " " are stored in memory of the microcomputer even if the power supply is turned off. Therefore, contents of operations in the past are all displayed. 47 9-3.
Troubleshooting Flowcharts 9-3-1. Power can not be Turned on (No Operation at All) <Preliminary checks> (1) Is the supply voltage normal? (2) Is the connection to the AC output OK.? Shut off the power supply from AC outlet once and turn it on after 5 seconds. Operation Check Items Main cause Countermeasure Symptom NO Does the OPERATION lamp blink? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES (No problem) Does the transmission indicator of remote control flash normally and transmit certainly? YES Replace the remote control. NO NO Remote control is defective.
Does the fuse (F01) blow? NO Does the thermal fuse blow? (Under PF. Terminal) NO NO Is the indication voltage (DC12V or 5V) of main PC board correct? YES YES Parts (R21, R22, SG01, C15, C01, DB01, C02, Q01, T01) are defective. YES Wrong wiring of AC cord or connecting cable is defective. Replace the thermal fuse set. Check connection. Does the CN13 connector the wrong connecting? YES NO P.C. board is defective. Replace the main P.C.

*board. Is the voltage NO Refer to the paragraph "Pre-check", or defective circuit across C02 measured before power PC board block. DC310V~340V? YES Shut off the power Is the secondary voltage of SW trans- NO supply once, and turn it on again after disformer (T01) measured connecting the motor DC35V, DC12V, connector CN10 . and DC7V ? YES Is the secondary voltage of SW NO transformer measured DC35V, DC12V, and DC7V? YES Re-wiring the cable. * SW transformer (T01) or Tr (Q01) for power supply is defective. Replace the main P.C. board. Motor is defective. disconnect * Be sure to motor.*
the motor connector CN10 after shut off the power supply, or it will be a cause of damage of the 48 9-3-2. Power can not be Turned on after Replacing Indoor P.C. Board <Checking Procedure> Connect the AC Power supply Return the wiring of the power relay is returned to the normal procedure. Does the OPERATION lamp blink? YES NO Is it wired as shown in Figure below? YES NO To the paragraph of "No Power turns on".
RAS-07YKH-E, RAS-07YKH-ES, RAS-10YAH-E, RAS-10YAH-ES Black White Blue Brown Bind Band 1 2 3 4 NL Power terminal block RY01 P.C. board RY02 Indoor terminal block Double winding T02 RAS-13YKH-E, RAS-13YKH-ES Black White Blue Brown 1 2 3 4 NL Power terminal block RY01 P.C. board RY02 Indoor terminal block T02 49 9-3-3.
Outdoor Unit does not Operate Shut off the power supply from AC outlet once and turn it on after 5 seconds. NO Does the OPERATION lamp blink? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES Is AC 220240V supplied between terminal block 1-2? YES Is cable connection between indoor and outdoor units correct? YES Check items as following procedure in 9-3-4, 9-3-5, 9-3-6. See "Power can not be turned on". NO See "Power can not be turned on". NO Relays (RY01, RY02) or IC31 or IC30 is failure. Replace the P.C. board. NO Correct cabling between indoor and outdoor units. 50 9-3-4.

Only Compressor does not Operate Shut off the power supply from AC outlet once and turn it on after 5 seconds. Does the OPERATION lamp blink? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES Is the voltage across the indoor terminal (1 - 2) AC 220240V? YES Is cable connection between indoor and outdoor units correct? YES Is the voltage across the outdoor terminal (1 - 2) AC 220240V? YES Are all the cords for compressor normal? YES Is the compressor motor winding normal? (Check the winding resistor.) YES Is the capacitor for compressor normal? YES Is the overload relay normal? YES Does the compressor start? YES Compressor starts but it stops after a while? YES Is the gas quantity normal? (Check the pressure) YES Compressor is defective NO See "Power can not be turned on". NO See "Power can not be turned on". NO Relays (RY01, RY02) or IC31 or IC30 is failure. Replace the P.C. board. NO Correct cabling between indoor and outdoor units. NO Cables between indoor and outdoor units are defective. NO Re-wire or replace the defective cords. NO Compressor is defective. NO Capacitor is defective. NO Overload relay is defective. NO Compressor is defective.
NO Gas shortage (Gas leakage) 51 9-3-5. Only Outdoor Fan does not Operate Shut off the power supply from AC outlet once and turn it on after 5 seconds. Does the OPERATION lamp blink? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES Is the voltage across the indoor terminal (2 - 4) AC 220240V? YES Is cable connection between indoor and outdoor units correct? YES Is the voltage across the terminal (2 - 4) AC 220240V? YES Are all the cords for outdoor fan motor normal? YES Is the outdoor fan motor winding normal? (Check the winding resistance) YES Is the capacitor for compressor normal? YES Outdoor fan motor is defective. NO See "Power can not be turned on". NO See "Power can not be turned on". NO Relays (RY02, RY03) or IC31 or IC30 is failure. Replace the P.C. board. NO Correct cabling between indoor and outdoor units. NO Cables between indoor and outdoor units are defective. NO Correct the wire or replace the defective cords. NO Outdoor fan motor is defective. NO Capacitor for outdoor fan motor is defective. 52 9-3-6.

Only 4-Way Valve does not Operate (During Heating Operation) Shut off the power supply from AC outlet once and turn it on after 5 seconds. Does the OPERATION lamp blink? YES Does the power turn on by pushing the [START/STOP] button of the remote control? YES Is the voltage across the terminal (2 - 3) 220-240 V? YES Is cable connection between indoor and outdoor units correct? YES Is the voltage across the terminal (2 - 3) 220-240 V? YES Is the wiring of solenoid coil for 4-way valve normal? YES 4-way valve is defective.