DI / SDI DX AHU Control Panel
Installation manual

Outdoor Unit

For Commercial Use

Model name: RAV Digital Inverter and Digital Super Inverter

GM301ATP-E
GM401ATP-E
GM561ATP-E
GM801ATP-E
GM1101ATP-E
GM1101AT8P-E
GM1401ATP-E
GM1401AT8P-E
SM304ATP-E
SM404ATP-E
SM564ATP-E
SM804ATP-E
SM1104ATP-E
SM1104AT8P-E
SM1404ATP-E
SM1404AT8P-E
SM1603AT-E
SM2246AT8-E
SM2806AT8-E
GP561ATP-E
GP801AT-E
GP1101AT-E
GP1401AT-E
SP404ATP-E
SP564ATP-E
SP804ATP-E
SP1104AT-E1
SP1404AT-E1
SP1604AT-E1
SP1104AT8-E1
SP1404AT8-E1
SP1604AT8-E 1

Installation Manual

RBC-AHU1

Please read this Installation Manual carefully before installing the Control Panel.

- This Manual describes the installation method of the Control Panel.
- You must also refer to the Installation and Owner's Manual attached to the Toshiba outdoor unit.
- Please follow the manual(s) for your Air Handling Unit (local supply).
- Toshiba Carrier UK (Ltd) does not take any responsibility on the local design.

ADOPTION OF NEW REFRIGERANT

This Air Conditioner has adopted a refrigerant HFC (R32 of R410A) which does not destroy the ozone layer. Be sure to check the refrigerant type of outdoor unit before installation and connection to AHU.

This appliance is for commercial use only and should not be accessible to the general public.

This appliance is not intended for use by person (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

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This symbol mark is for EU countries only.
This symbol mark is according to the directive 2002/96/EC Article 10 Information for users and Annex IV.
This product is designed and manufactured with high quality materials and components which can be recycled and reused.
This symbol means that electrical and electronic equipment, at the end-of-life, should be disposed of separately from your household waste.
Please dispose of this equipment at your local community waste collection / recycling centre.
In the European Union there are separate collection systems for used electrical and electronic product.

Thank you for purchasing this Toshiba air conditioner.
Please read carefully through these instructions that contain important information which complies with the “Machinery” Directive (Directive 2006/42/EC), and ensure that you understand them.
After reading these instructions, be sure to keep them in a safe place together with the Owner’s Manual and Installation Manual supplied with your product.

Generic Denomination: Air Conditioner

Definition of Qualified Installer or Qualified Service Person

The air conditioner must be installed, maintained, repaired and removed by a qualified installer or qualified service person. When any of these jobs is to be done, ask a qualified installer or qualified service person to do them for you.
A qualified installer or qualified service person is an agent who has the qualifications and knowledge described in the table below.

Agent	Qualifications and knowledge which the agent must have
Qualified installer	• The qualified installer is a person who installs, maintains, relocates and removes the air conditioners made by Toshiba Carrier Corporation. He or she has been trained to install, maintain, relocate and remove the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations. • The qualified installer who is allowed to do the electrical work involved in installation, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified installer who is allowed to do the refrigerant handling and piping work involved in installation, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified installer who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.
Qualified service person	• The qualified service person is a person who installs, repairs, maintains, relocates and removes the air conditioners made by Toshiba Carrier Corporation. He or she has been trained to install, repair, maintain, relocate and remove the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations. • The qualified service person who is allowed to do the electrical work involved in installation, repair, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified service person who is allowed to do the refrigerant handling and piping work involved in installation, repair, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified service person who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.

Definition of Protective Gear

When the air conditioner is to be transported, installed, maintained, repaired or removed, wear protective gloves and “safety” work clothing.
In addition to such normal protective gear, wear the protective gear described below when undertaking the special work detailed in the table below.
Failure to wear the proper protective gear is dangerous because you will be more susceptible to injury, burns, electric shocks and other injuries.

Work undertaken	Protective gear worn
All types of work	Protective gloves “Safety” working clothing
Electrical-related work	Gloves to provide protection for electricians and from heat Insulating shoes Clothing to provide protection from electric shock
Work done at heights (50 cm or more)	Helmets for use in industry
Transportation of heavy objects	Shoes with additional protective toe cap
Repair of outdoor unit	Gloves to provide protection for electricians and from heat

These safety cautions describe important matters concerning safety to prevent injury to users or other people and damages to property. Please read through this manual after understanding the contents below (meanings of indications), and be sure to follow the description.

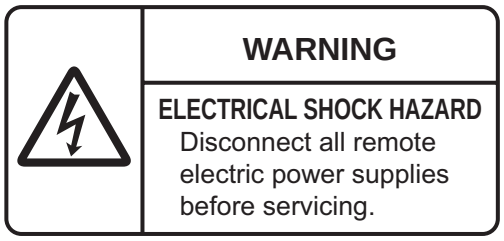
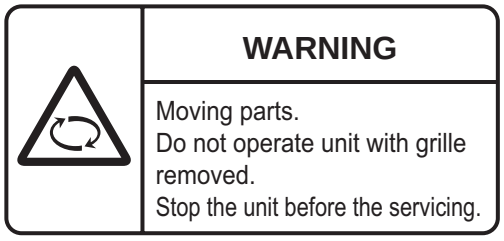
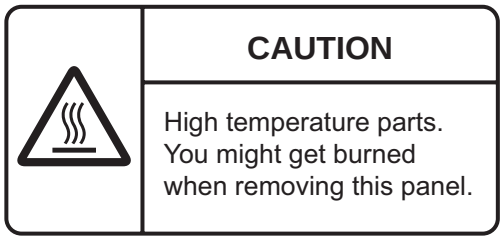
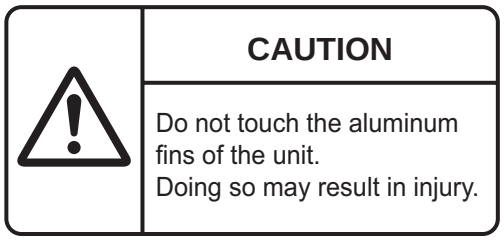
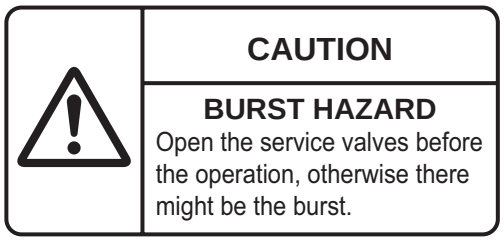
Indication	Meaning of Indication
⚠ WARNING	Text set off in this manner indicates that failure to adhere to the directions in the warning could result in serious bodily harm (*1) or loss of life if the product is handled improperly.
⚠ CAUTION	Text set off in this manner indicates that failure to adhere to the directions in the caution could result in slight injury (*2) or damage (*3) to property if the product is handled improperly.

*1: Serious bodily harm indicates loss of eyesight, injury, burns, electric shock, bone fracture, poisoning, and other injuries which leave aftereffect and require hospitalization or long-term treatment as an outpatient.
*2: Slight injury indicates injury, burns, electric shock, and other injuries which do not require hospitalization or longterm treatment as an outpatient.
*3: Damage to property indicates damage extending to buildings, household effects, domestic livestock, and pets.

MEANINGS OF SYMBOLS DISPLAYED ON THE UNIT

	**WARNING** (Risk of fire)	This mark is for R32 refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R32, this unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the OWNER’S MANUAL carefully before operation.	
	Service personnel are required to carefully read the OWNER’S MANUAL and INSTALLATION MANUAL before operation.	
	Further information is available in the OWNER’S MANUAL, INSTALLATION MANUAL, and the like.	

■ Warning Indications on the Air Conditioner Unit

Warning indication	Description
	**WARNING** **ELECTRICAL SHOCK HAZARD** Disconnect all remote electric power supplies before servicing.
	**WARNING** **Moving parts.** Do not operate unit with grille removed. Stop the unit before the servicing.
	**CAUTION** High temperature parts. You might get burned when removing this panel.
	**CAUTION** Do not touch the aluminum fins of the unit. Doing so may result in injury.
	**CAUTION** **BURST HAZARD** Open the service valves before the operation, otherwise there might be the burst.

1 ELECTRICAL WORK

⚠ WARNING

1. **Using the specified wires, ensure to connect the wires, and fix wires securely so that the external tension to the wires do not affect the connecting part of the terminals.**
   Incomplete connection or fixation may cause a fire, etc.
2. **Be sure to connect earth wire. (grounding work)**
   Incomplete grounding cause an electric shock. Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone wires.
3. **Appliance shall be installed in accordance with national wiring regulations.**
   Capacity shortage of power circuit or incomplete installation may cause an electric shock or a fire.

⚠ CAUTION

- If incorrect/incomplete wiring is carried out, it will cause an electrical fire or smoke.
- Be sure to install an earth leakage breaker that is not tripped by shock waves.
  If an earth leakage breaker is not installed, an electric shock may be caused.
- Be sure to use the cord clamps attached to the product.
- Do not damage or scratch the conductive core and inner insulator of power and inter-connecting wires when peeling them.
- Use the power cord and Inter-connecting wire of specified thickness, type, and protective devices required.
- Never connect 220-240V power to the terminal blocks (A , B etc.) for control wiring. (Otherwise, the system will fail.)

REQUIREMENT

- For power supply wiring, strictly conform to the Local Regulation in each country.
- For wiring of power supply of the outdoor units, follow the Installation Manual of each outdoor unit.
- Perform the electric wiring so that it does not come to contact with the high-temperature part of the pipe. The coating may melt resulting in an accident.
- After connecting wires to the terminal blocks, provide a trap and fix wires with the cord clamp.
- Run the refrigerant piping line and control wiring line in the same line.
- Do not turn on the power of the indoor unit until vacuuming of the refrigerant pipes completes.

■ Power supply wire and communication wires specifications

Power supply wire and communication wires are procured locally.
For the power supply specifications, follow to the table below. If capacity is little, it is dangerous because overheat or seizure may be caused. For specifications of the power capacity of the outdoor unit and the power supply wires, refer to the Installation Manual attached to the outdoor unit.

Indoor unit power supply

- For the power supply of the indoor unit, prepare the exclusive power supply separated from that of the outdoor unit.
- Arrange the power supply, earth leakage breaker, and main switch of the indoor unit connected to the same outdoor unit so that they are commonly used.
- Power supply wire specification : Cable 3-core 2.5mm^2, **in conformity with Design 60245 IEC 57.**

▼ Power supply

Power supply	220-240V —, 50Hz	
Power supply switch/Earth leakage breaker or power supply wiring/fuse rating for indoor units should be selected by the accummulated total current values of the indoor units.		
Power supply wiring	Below 50m	2.5 mm^2

Control wiring, Central controller wiring

- 2-core with polarity wires are used for the Control wiring between indoor unit and outdoor unit and Central controller wiring.
- To prevent noise trouble, use 2-core shield wire,
- The length of the communication line means the total length of the inter-unit wire length between indoor and outdoor units added with the central control system wire length

2 PRECAUTIONS FOR SAFETY

The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.

⚠ WARNING

General

- Before starting to install the air conditioner, read carefully through the Installation Manual, and follow its instructions to install the air conditioner.
- Only a qualified installer(*1) or qualified service person(*1) is allowed to install the air conditioner. If the air conditioner is installed by an unqualified individual, a fire, electric shocks, injury, water leakage, noise and/or vibration may result.
- Do not use any refrigerant different from the one specified for complement or replacement. Otherwise, abnormally high pressure may be generated in the refrigeration cycle, which may result in a failure or explosion of the product or an injury to your body.
- When transporting the air conditioner, use a forklift and when moving the air conditioner by hand, move the unit with 4 people.
- Before opening the intake grille of the indoor unit or service panel of the outdoor unit, set the circuit breaker to the OFF position. Failure to set the circuit breaker to the OFF position may result in electric shocks through contact with the interior parts. Only a qualified installer(*1) or qualified service person(*1) is allowed to remove the intake grille of the indoor unit or service panel of the outdoor unit and do the work required.
- Before carrying out the installation, maintenance, repair or removal work, be sure to set the circuit breaker to the OFF position. Otherwise, electric shocks may result.
- Place a “Work in progress” sign near the circuit breaker while the installation, maintenance, repair or removal work is being carried out. There is a danger of electric shocks if the circuit breaker is set to ON by mistake.
- Only a qualified installer(*1) or qualified service person(*1) is allowed to undertake work at heights using a stand of 50 cm or more.
- Wear protective gloves and safety work clothing during installation, servicing and removal.
- Do not touch the aluminum fin of the outdoor unit. You may injure yourself if you do so. If the fin must be touched for some reason, first put on protective gloves and safety work clothing, and then proceed.
- Do not climb onto or place objects on top of the outdoor unit. You may fall or the objects may fall off of the outdoor unit and result in injury.
- When working at heights, use a ladder which complies with the ISO 14122 standard, and follow the procedure in the ladder’s instructions. Also wear a helmet for use in industry as protective gear to undertake the work.
- When cleaning the filter or other parts of the outdoor unit, set the circuit breaker to OFF without fail, and place a “Work in progress” sign near the circuit breaker before proceeding with the work.
- When working at heights, put a sign in place so that no-one will approach the work location, before proceeding with the work. Parts and other objects may fall from above, possibly injuring a person below.
- The refrigerant used by this air conditioner is the R410A.
- You shall ensure that the air conditioner is transported in stable condition.
- Do not modify the products. Do not also disassemble or modify the parts. It may cause a fire, electric shock or injury.

Selection of installation location

- If you install the unit in a small room, take appropriate measures to prevent the refrigerant from exceeding the limit concentration even if it leaks. Consult the dealer from whom you purchased the air conditioner when you implement the measures. Accumulation of highly concentrated refrigerant may cause an oxygen deficiency accident.
- Do not install the air conditioner in a location that may be subject to a risk of expire to a combustible gas. If a combustible gas leaks and becomes concentrated around the unit, a fire may occur.
- When transporting the air conditioner, wear shoes with additional protective toe caps.
- When transporting the air conditioner, do not take hold of the bands around the packing carton. You may injure yourself if the bands should break.
- Do not place any combustion appliance in a place where it is directly exposed to the wind of air conditioner, otherwise it may cause imperfect combustion.

2 PRECAUTIONS FOR SAFETY

- Ensure that all Local, National and International regulations are satisfied.
- Read this “PRECAUTIONS FOR SAFETY” carefully before installation.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem.
- Follow the installation manual to explain how to use and maintain the unit to the customer.
- Turn off the main power supply switch (or breaker) before the unit maintenance.
- Ask the customer to keep the installation manual.

CAUTION

- **This Air Conditioner has adopted a refrigerant HFC (R32 or R410A) which does not destroy the ozone layer.**
  - As the R32 or R410A refrigerant is easily affected by impurities such as moisture, oxidized film, oil, etc., due to the high pressure, be careful not to allow the moisture, dirt, existing refrigerant, refrigerating machine oil, etc., to get mixed up in the refrigeration cycle during the installation work.
  - A special tool for the R32 or R410A refrigerant is required for installation.
  - Use a new and clean piping materials for the connecting pipe so that moisture and dirt are not mixed together during the installation work.
  - When using existing pipes, follow the installation manual enclosed with the outdoor unit.
  - Do not use the refrigerant other than R32 or R410A. For the refrigerant type, check the outdoor unit to be combined.

CAUTION **To Disconnect the Appliance from Main Power Supply**

This appliance must be connected to the main power supply by means of a switch with a constant separation of at least 3mm.

1 SUPPLIED PARTS

The RBC-AHU Control Panel is designed to allow the connection of a third party air handling unit (with R410A DX Coil) to a Toshiba DI/SDI outdoor unit (RAV-SM Digital Inverter and RAV-SP Super Digital Inverter).

The components consists of a Control Panel, two coil sensors, one return air sensor, one fixed sensor (resistor) and coil sensor fixing kit.

Item	Description	QTY
	TCJ (TC1) Sensor (Coil Sensor)	
	TC (TC2) Sensor (Coil Sensor)	
	TA Sensor (Return Air or Sensing)	
	Sensor Fixing Kit	

3 OVERVIEW

The minimum 'air on' temperature that Toshiba recommend for our AHU applications is 15°C Cooling, 12ÁC Heating

Cooling Mode

Air temperatures flowing across the coil below this level, can in some circumstances, cause icing and freezing issues with the coil and eventually forcing the system to shut down and also be detrimental to the outdoor unit itself.

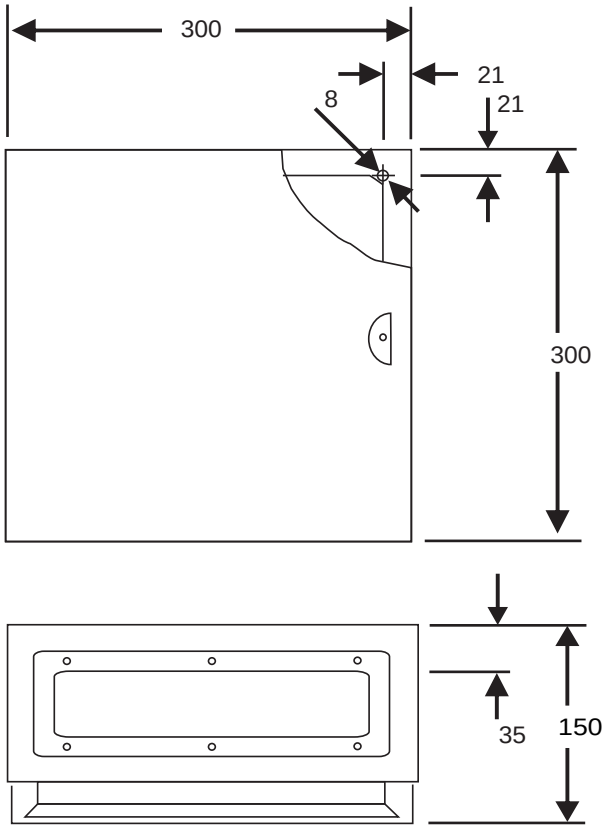
Heating Mode

In the reverse cycle mode when the outdoor unit is producing hot gas, the coil in the AHU is effectively the condenser. Air temperatures flowing across the coil below this level, can cause over condensing of the refrigerant. This can result in liquid being returned to the compressor which will cause a mechanical failure of the outdoor unit. Low air temperatures will also cause the unit to use it's defrost mode more often.

We cannot guarantee operation of the systems for applications with 'air on' temperatures below stated figures or with coil details outside of those published in the installation manual. Operation outside of these parameters may invalidate your warranty.

The control panel is designed to allow the connection of a third party air handling unit to a Toshiba Digital Inverter / Super Digital Inverter outdoor unit.

Kit contents: Control Panel, 2 x Coil Sensors (TC & TCJ), 1 x Return Air Sensor (TA), 1 x Fixed TA Sensor (resistor) & 1 x Coil Sensor Fixing Kit



CHARACTERISTICS
* Enclosure and door manufactured from 1.5 mm sheet steel
* Flat mounting plate manufactured from 2.5 mm
* Rating IP55

PAINT FINISH
* Eta standard cycle thermosetting epoxypolyester powder coating
* Enclosure and door RAL 7035 textured finish

All dimensions in mm.

4 INSTALLING CONTROL PANEL

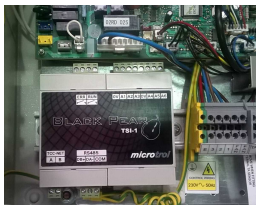
The controller is designed for two mounting options.

Option 1

The controller is contained in a weather proof enclosure, which facilitates mounted on or close to the AHU. The cables should be glanded through the removable plate on the base of the controller to maintain waterproof integrity.

Option 2

Should there be a requirement to install the controller in a third party panel, it is possible to remove the base plate from the enclosure.



Electrical Connections

The controller is connected to the outdoor unit via a three core and earth interconnecting cable. The control option is selected depending upon the wider AHU control strategy. A wiring diagram showing the connection and control options is shown on page 6

5 INSTALLING THE SENSORS

Coil Sensor Locations

There are two coil sensors, which require attaching to the AHU coil. It is essential that the sensors are correctly located to ensure efficient system performance.

TCJ (TC1) Sensor

This sensor is fitted to the coil inlet pipe (liquid). Please see the picture below.

TC (TC2) Sensor

This sensor should be installed approximately two thirds of the way through the coil.

Fitting the Coils sensors I

It is essential that the sensors are securely attached and insulated to give best system performance.

1. Fix to pipe or U bend with two cable ties

2.Fit the insulation over the sensor

6 AIR TEMPERATURE SENSING OPTIONS

Return Air or Temperature Sensing Options

Several temperature sensing options are available.

Fixed TA Sensor (resistor)

A fixed resistance can be used, which will allow maximum system operation on receipt of an enable signal.

Actual TA Sensor

A Standard TA sensor could be used as the temperature control point for the AHU Control Panel in this case the TA sensor should be placed in the return air duct.

Secure this sensor using the supplied plastic clamp. It must be located in the Return Air Flow (Prior to mixing with any fresh air). Ensure that the Resin Sensor bulb is not covered by the protective vinyl-tube.

Remote Controller Sensor

It is also possible to configure the system to use the temperature sensor located in the RBC-AMT32E / AMS41E remote controllers.

7 WIRED CONTROLLER

1. **IMPORTANT**
   It is necessary to connect a Toshiba wired controller (option supplied separately), TCC-Net control or third party controller to terminals RC A+B on RBC-AHU1 to operate the system. RBC-AHU1 will not operate if this connection is not made. It is also necessary to connect a Toshiba wired controller to configure the DN address code settings for Toshiba Digital and Super Digital condensing units.
2. Standard Toshiba RBC-AMT32E / AMS41E controllers are compatible.
3. Remote enable signal from a third party source. Operation and fault signals can also be obtained as standard from the control panel.
4. Advanced control options are available on contact with Toshiba Technical Support

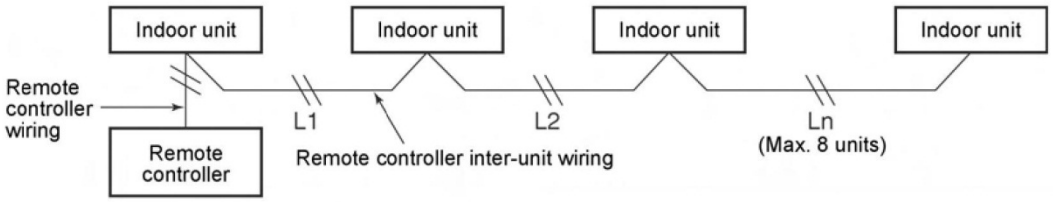
Remote controller wiring

- 2-core with non-polarity wire is used for wiring of the remote controller wiring and group remote controllers wiring.

Remote controller wiring, remote controller inter-unit wiring	Wire size: 0.5mm² to 2.0mm²	
Total wire length of remote controller wiring and remote controller inter-unit wiring = L + L1 + L2 + … Ln	In case of wired type only	Up to 500m
	In case of wireless type included	Up to 400m
Total wire length of remote controller inter-unit wiring = L1 + L2 + … Ln		Up to 200m

⚠ CAUTION

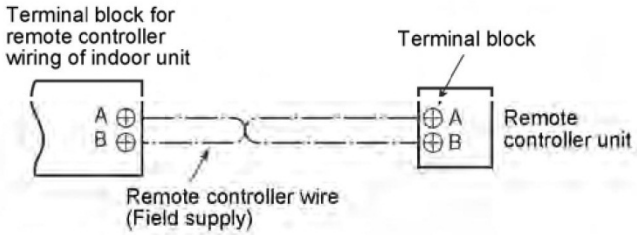
The remote controller wire (Communication line) and AC220–240V wires cannot be parallel to contact each other and cannot be stored in the same conduits. If doing so, a trouble may be caused on the control system due to noise, etc.



■ Remote controller wiring

- As the remote controller wire has non-polarity, there is no problem if connections to indoor unit terminal blocks A and B are reversed.

▼ Wiring diagram



8 CONTROL OPTIONS

TOSHIBA OUTDOOR

REFRIGERANT PIPE WORK CONNECTING OUTDOOR UNIT TO AHU PIPE WORK (SEE DATA TABLES FOR LIMITS)

ROOM AIR TEMPERATURE SENSOR (OPTION)

AIR HANDLING UNIT WITH REFRIGERANT DX COIL (*R32 or R410A)

TOSHIBA HARD WIRED CONTROLLER (OPTION)

TOSHIBA AIR HANDLING UNIT CONTROL KIT

RBC-AHU1

OPTIONS

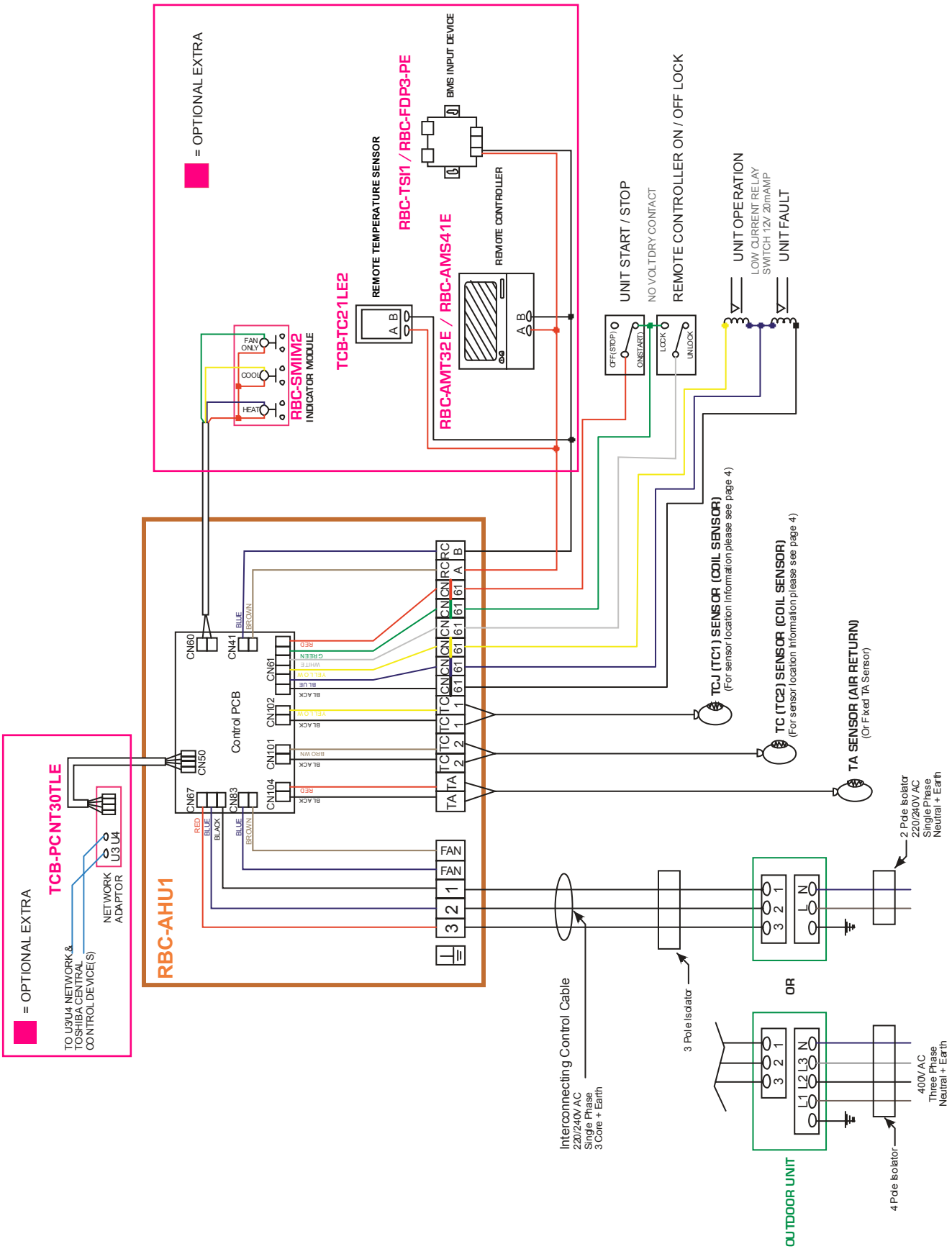
WEEKLY SCHEDULE TIMER (available RBC-AMS41-E)
TCB-PCNT30TLE TOSHIBA TCC LINK NETWORK INTERFACE

STANDARD FEATURE

REMOTE ON / OFF (VOLT FREE)
REMOTE FAULT / RUN OUTPUT (12V DC 20mAMP)

	**WARNING** (Risk of fire)	*This mark is for R32 refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R32, this unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire. The DX coil fitted must be rated for use with R32 and the AHU must be fitted with components that are suitable for use with A2L classification.

9 WIRING DIAGRAM



10 PERFORMANCE SPECIFICATIONS

R32 Digital Inverter

RAV Digital	RAV-	GM301ATP-E	GM401ATP-E	GM561ATP-E	GM801ATP-E
Cooling Capacity	kW	0.9 - 3.0	0.9 - 4.0	1.5 - 5.6	1.5 - 8.0
Heating Capacity	kW	0.8 - 4.5	0.8 - 5.0	0.8 - 4.5	0.8 - 5.0
HEX Air Volume	m3/hr	480 - 660	522 - 690	480 -1100	700 -1500
HEX Coil Diameter	mm / in	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
HEX Paths	No.	4	4-6	4 - 6	6 - 8
Piping Limits Min. - Max.	m	2 - 20	2 - 20	5 - 30	5 - 30
Maximum Height Difference	m	±10	±10	±10	±10
Pipe Diameter Gas/ Liquid	inch	3/8 -1/4	1/2 -1/4	1/2 -1/4	5/8 -3/8
Refrigerant	Gas	R32	R32	R32	R32
Refrigerant Base Charge	kg	0.63/15	0.9/15	0.9/20	1.3/20
Charge-less Length	m	15	15	20	20
Additional Charge	g/m	20	20	20	35
Replacement Technology		YES	YES	YES	YES
Air Flow	m3/h	1,800	2,200	2,400	2,700
Sound Pressure Cool - Heat	dBA	46 - 47	49 - 50	46 - 48	48 - 52
Sound Power Cool - Heat	dBA	61 - 62	64 - 65	63 - 65	65 - 69
Dimensions Height x Width x Depth	mm	550x780x290	550x780x290	550x780x290	550x780x290
Weight	kg	29	34	40	42
Drain Port Connection	mm	16	16	16	16
Operating Ambient Range	°C	-15~46/-15~15	-15~46/-15~15	-15~46/-15~15	-15~46/-15~15
Run Current	Amps	4.17	5.60	7.78	12.23
Power Supply	V/ph/Hz-A	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50
Suggested Fused Supply	Amps	10	10	16	16

RAV Digital	RAV-	GM1101ATP-E	GM1101AT8P-E	GM1401ATP-E	GM1401AT8P-E
Cooling Capacity	kW	3.0 - 11.2	3.0 - 11.2	3.0 - 13.2	3.0 - 13.2
Heating Capacity	kW	3.0 - 13.0	3.0 - 13.0	3.0 - 16.0	3.0 - 16.0
HEX Air Volume	m3/hr	1260 - 2500	1260 - 2500	1260 - 2750	1260 - 2750
HEX Coil Diameter	mm / in	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
HEX Paths	No.	6-10	6-10	8-12	8-12
Piping Limits Min. - Max.	m	5 - 50	5 - 50	5 - 50	5 - 50
Maximum Height Difference	m	±30	±30	±30	±30
Pipe Diameter Gas/ Liquid	inch	5/8 -3/8	5/8 -3/8	5/8 -3/8	5/8 -3/8
Refrigerant	Gas	R32	R32	R32	R32
Refrigerant Base Charge	kg	2.1/30	2.1/30	2.1/30	2.1/30
Charge-less Length	m	30	30	30	30
Additional Charge	g/m	35	35	35	35
Replacement Technology		YES	YES	YES	YES
Air Flow	m3/h	4080	4080	4200	4200
Sound Pressure Cool - Heat	dBA	54 - 57	54 - 57	55 - 57	55 - 57
Sound Power Cool - Heat	dBA	70 - 74	70 - 74	70 - 74	70 - 74
Dimensions Height x Width x Depth	mm	890x900x320	890x900x320	890x900x320	890x900x320
Weight	kg	68	69	68	69
Drain Port Connection	mm	16	16	16	16
Operating Ambient Range	°C	-15~46/-15~15	-15~46/-15~15	-15~46/-15~15	-15~46/-15~15
Run Current	Amps	14.20	4.75	20.75	6.90
Power Supply	V/ph/Hz-A	220-240/1/50	380-415/3/50	220-240/1/50	380-415/3/50
Suggested Fused Supply	Amps	20	10	32	16

10 PERFORMANCE SPECIFICATIONS

R32 Super Digital Inverter

RAV Super Digital	RAV-	GP561ATP-E	GP801AT-E	GP1101AT-E	GP1401AT-E
Cooling Capacity	kW	1.2 - 5.6	1.9 - 8.0	3.1 - 12.0	3.1 - 14.0
Heating Capacity	kW	0.9 - 8.1	1.3 - 11.3	2.6 - 13.0	2.6 - 16.5
HEX Air Volume	m3/hr	480 -1100	700 -1500	1260 - 2500	1260 - 2750
HEX Coil Diameter	mm / in	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
HEX Paths	No.	4 - 6	6 - 8	6-10	8-12
Piping Limits Min. - Max.	m	3 - 50	3 - 50	3 - 75	3 - 75
Maximum Height Difference	m	±30	±30	±30	±30
Pipe Diameter Gas/ Liquid	inch	1/2 -1/4	5/8 -3/8	5/8 -3/8	5/8 -3/8
Refrigerant	Gas	R32	R32	R32	R32
Refrigerant Base Charge	kg	1.35/20	1.9/30	3.1/30	3.1/30
Charge-less Length	m	20	30	30	30
Additional Charge	g/m	20	35	35	35
Replacement Technology		YES	YES	YES	YES
Air Flow	m3/h	2,250	3,180	6,960	6,960
Sound Pressure Cool - Heat	dBA	46 - 48	46 - 48	49 - 50	50 - 51
Sound Power Cool - Heat	dBA	63 - 65	63 - 65	66 - 67	67 - 68
Dimensions Height x Width x Depth	mm	630x799x299	1050x1010x370	1550x1010x370	1550x1010x370
Weight	kg	45	74	104	104
Drain Port Connection	mm	16	16	16	16
Operating Ambient Range	°C	-15~52/-27~15	-15~52/-27~15	-15~52/-27~15	-15~52/-27~15
Run Current	Amps	6.33	8.56	11.20	15.36
Power Supply	V/ph/Hz-A	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50
Suggested Fused Supply	Amps	16	16	20	25

10 PERFORMANCE SPECIFICATIONS

R410A Digital Inverter

RAV Digital	RAV-	SM304ATP-E	SM404ATP-E	SM564ATP-E	SM804ATP-E	SM1104ATP-E	SM1104AT8P-E
Cooling Capacity	kW	0.9 - 3.0	0.9 - 4.0	1.5 - 5.6	1.5 - 8.0	3.0 - 11.2	3.0 - 11.2
Heating Capacity	kW	0.8 - 4.5	0.8 - 5.0	1.5 - 6.3	1.5 - 9.0	3.0 - 13.0	3.0 - 13.0
HEX Air Volume	m3/hr	480 - 660	522 - 690	480 -1100	700 -1500	1260 - 2500	1260 - 2500
HEX Coil Diameter	mm / in	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
HEX Paths	No.	4	4-6	4 - 6	6 - 8	6-10	6-10
Piping Limits Min. - Max.	m	2 - 20	2 - 20	5 - 30	5 - 30	5 - 50	5 - 50
Maximum Height Difference	m	±10	±10	±10	±10	±30	±30
Pipe Diameter Gas/ Liquid	inch	3/8 -1/4	1/2 -1/4	1/2 -1/4	5/8 - 3/8	5/8 - 3/8	5/8 - 3/8
Refrigerant	Gas	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant Base Charge	kg	0.8	1.4	1.1	1.7	2.8	3.1
Charge-less Length	m	15	15	20	20	30	30
Additional Charge	g/m	20	20	20	40	40	40
Replacement Technology		YES	YES	YES	YES	YES	YES
Air Flow	m3/h	1800	2220	2400	2700	4080	4080
Sound Pressure Cool - Heat	dBA	46 - 47	49 - 50	46 - 48	48 - 52	53 - 54	53 - 54
Sound Power Cool - Heat	dBA	61 - 62	64 - 65	63 - 65	65 - 69	70 - 71	70 - 71
Dimensions Height x Width x Depth	mm	550x780x290	550x780x290	550x780x290	550x780x290	890x900x320	890x900x320
Weight	kg	33	39	40	44	68	68
Drain Port Connection	mm	16	16	16	16	16	16
Operating Ambient Range	°C	-15~46/-15~24	-15~46/-15~24	46~-15/15~-15	46~-15/15~-15	46~-15/15~-15	46~-15/15~-15
Run Current	Amps	3.86	5.14	8.95	11.43	15.18	3.67
Power Supply	V/ph/Hz-A	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50	380-415/3/50
Suggested Fused Supply	Amps	10	10	16	16	20	10

RAV Digital	RAV-	SM1404ATP-E	SM1404AT8P-E	SM1603AT-E	SM2246AT8-E	SM2806A8T-E
Cooling Capacity	kW	3.0 - 13.2	3.0 - 13.2	3.0 - 16.0	4.6 - 22.4	4.6 - 27.0
Heating Capacity	kW	3.0 -16.0	3.0 -16.0	3.0 -16.0	4.6 - 25.0	4.6 - 31.5
HEX Air Volume	m3/hr	1260 - 2750	1260 - 2750	1260 - 3000	2880 - 4320	3360 - 5040
HEX Coil Diameter	mm / in	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
HEX Paths	No.	8-12	8-12	8-12	10 - 12	10 - 12
Piping Limits Min. - Max.	m	5 - 50	5 - 50	5 - 50	5 - 75	5 - 75
Maximum Height Difference	m	±30	±30	±30	±30	±30
Pipe Diameter Gas/ Liquid	inch	5/8 - 3/8	5/8 - 3/8	5/8 - 3/8	1 1/8 - 1/2	1 1/8 - 1/2
Refrigerant	Gas	R410A	R410A	R410A	R410A	R410A
Refrigerant Base Charge	kg	2.8	3.1	3.1	5.9	5.9
Charge-less Length	m	30	30	30	30	30
Additional Charge	g/m	40	40	40	80	80
Replacement Technology		YES	YES	YES	YES	YES
Air Flow	m3/h	4200	4200	6180	9180	10920
Sound Pressure Cool - Heat	dBA	54 - 55	54 - 55	51 - 53	58 - 60	61 - 63
Sound Power Cool - Heat	dBA	70 - 71	70 - 71	68 - 70	72 - 74	74 - 75
Dimensions Height x Width x Depth	mm	890x900x320	890x900x320	1340x900x320	1550x1010x370	1550x1010x370
Weight	kg	68	68	99	142	142
Drain Port Connection	mm	16	16	16	16	16
Operating Ambient Range	°C	46~-15/15~-15	46~-15/15~-15	43~-15/15~-15	46~-15/15~-20	46~-15/15~-20
Run Current	Amps	21.37	5.37	21.7	8.99	12.79
Power Supply	V/ph/Hz-A	220-240/1/50	380-415/3/50	220-240/1/50	380-415/3/50	380-415/3/50
Suggested Fused Supply	Amps	32	10	32	16	20

10 PERFORMANCE SPECIFICATIONS

R410A Super Digital Inverter

RAV Super Digital	RAV-	SP404AT-E	SP564ATP-E	SP804ATP-E	SP1104AT-E1
Cooling Capacity	kW	1.5 - 4.0	1.2 - 5.6	1.9 - 8.0	2.6 - 12.0
Heating Capacity	kW	1.5 - 5.0	0.9 - 8.1	1.3 - 11.3	2.4 - 13.0
HEX Air Volume	m3/hr	480 - 880	480 - 1100	700 - 1500	1260 - 2500
HEX Coil Diameter	mm / in	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
HEX Paths	No.	4	4 - 6	6 - 8	6 - 10
Piping Limits Min. - Max.	m	5 - 50	5 - 50	5 - 50	3 - 75
Maximum Height Difference	m	±30	±30	±30	±30
Pipe Diameter Gas/ Liquid	inch	1/2 - 1/4	1/2 - 1/4	5/8 - 3/8	5/8 - 3/8
Refrigerant	Gas	R410A	R410A	R410A	R410A
Refrigerant Base Charge	kg	1.0	1.4	2.1	3.1
Charge-less Length	m	20	20	30	30
Additional Charge	g/m	20	20	40	40
Replacement Technology		YES	YES	YES	YES
Air Flow	m3/h	2400	2400	3000	6060
Sound Pressure Cool - Heat	dBA	45 - 47	47 - 48	48 - 49	49 - 50
Sound Power Cool - Heat	dBA	62 - 64	63 - 64	64 - 65	66 - 67
Dimensions Height x Width x Depth	mm	550x780x290	550x780x290	890x900x320	1340x900x320
Weight	kg	40	44	66	93
Drain Port Connection	mm	16	16	16	16
Operating Ambient Range	°C	43~-15/15~-15	43~-15/15~-15	43~-15/15~-15	43~-15/15~-15
Run Current	Amps	4.98	6.55	9.02	10.43
Power Supply	V/ph/Hz-A	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50
Suggested Fused Supply	Amps	10	16	16	16

RAV Super Digital	RAV-	SP1104AT8-E1	SP1404AT-E1	SP1404AT8-E1	SP1604AT8-E1
Cooling Capacity	kW	2.6 - 12.0	2.6 - 14.0	2.6 - 14.0	2.6 - 16.0
Heating Capacity	kW	2.4 - 13.0	2.4 - 16.5	2.4 - 16.5	2.4 - 19.0
HEX Air Volume	m3/hr	1260 - 2500	1260 - 2750	1260 - 2750	1260 - 3000
HEX Coil Diameter	mm / in	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
HEX Paths	No.	6 - 10	8 - 12	8 - 12	8 - 12
Piping Limits Min. - Max.	m	3 - 75	3 - 75	3 - 75	3 - 75
Maximum Height Difference	m	±30	±30	±30	±30
Pipe Diameter Gas/ Liquid	inch	5/8 - 3/8	5/8 - 3/8	5/8 - 3/8	5/8 - 3/8
Refrigerant	Gas	R410A	R410A	R410A	R410A
Refrigerant Base Charge	kg	3.1	3.1	3.1	3.1
Charge-less Length	m	30	30	30	30
Additional Charge	g/m	40	40	40	40
Replacement Technology		YES	YES	YES	YES
Air Flow	m3/h	6060	6180	6180	6180
Sound Pressure Cool - Heat	dBA	49 - 50	51 - 52	51 - 52	51 - 53
Sound Power Cool - Heat	dBA	66 - 67	68 - 69	68 - 69	68 - 70
Dimensions Height x Width x Depth	mm	1340x900x320	1340x900x320	1340x900x320	1340x900x320
Weight	kg	93	95	95	95
Drain Port Connection	mm	16	16	16	16
Operating Ambient Range	°C	46~-15/15~-20	43~-15/15~-20	46~-15/15~-20	46~-15/15~-20
Run Current	Amps	3.72	15.76	5.42	6.66
Power Supply	V/ph/Hz-A	3-ph 400v 50Hz	1-ph 230v 50Hz	3-ph 400v 50Hz	3-ph 400v 50Hz
Suggested Fused Supply	Amps	10	25	16	16

10 PERFORMANCE SPECIFICATIONS

RBC-AHU1 Panel			
Dimensions Height x Width x Depth		(mm)	300 x 300 x 150
Weight		(kg)	10
Power Supply			6 Amps /1 phase 230v 50Hz
Control Relay	Unit	0 volt	On / Off
Control Relay	Remote	0 volt	Lock / Unlock

Accessories	
***** RBC-AMT32E	Wired Remote Controller
***** RBC-AMS41E	Wired Remote Controller inc. 24/7 Timer
TCB-PCNT30TLE	Network Adaptor
RBC-SMIM2	Remote Indicator Module - Cool / Heat / Fan Only
RBC-TSI1 or RBC-FDP3-PE	BMS Interface Module
TCB-TC21LE2	Remote Temperature Sensor

*** NOTE** It is necessary to connect a Toshiba wired controller (accessory supplied separately), TCC-Net control or third party controller to terminals RC A+B on RBC-AHU1 to operate the system. RBC-AHU1 will not operate if this connection is not made. It is also necessary to connect a Toshiba wired controller to configure the DN address code settings for Toshiba Digital and Super Digital condensing units.

- The DX Coil must be suitable for **R410A**.
- The counter flow principle must be observed.
- Cooling: Saturated Suction Temperature (evaporating) 7°C
- Heating: Saturated Discharge Temperature (condensing) 44°C
- Target Suction Super Heat 5K
- System Maximum Operating Pressure 4.15MPa
- DX Coil must satisfy Burst Pressure (more than 12.45MPa)

11 REPLACEMENT TECHNOLOGY

REPLACEMENT TECHNOLOGY PIPING SPECIFICATION RAV

Existing piping connection with different diameter gas and liquid line is possible using the criteria detailed below

Liquid Pipe Size in"		1/4 (STD)				3/8 (1-size larger)			
Gas Pipe Size in"		3/8 (STD)		1/2 (1-size larger)		3/8 (STD)		1/2 (1-size larger)	
Maximum Pipe Distance		Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
RAV-DI Series 4 R410A Series 1 R32	**SM/GM30***	20	15	20	15	13	7.5	13	7.5

Liquid Pipe Size in"		1/4 (STD)						3/8 (1-size larger)			
Gas Pipe Size in"		3/8 (1-size smaller)		1/2 (STD)		5/8 (1-size larger)		1/2 (STD)		5/8 (1-size larger)	
Maximum Pipe Distance		Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
RAV-DI Series 4 R410A Series 1 R32	**SM/GM40***	20	15	20	15	20	15	13	7.5	13	7.5
	SM/GM56*			30	20	30	20	20	10	20	10
RAV-SDI Series 4 R410A Series 1 R32	**SP/GP40***	30	20	30	20	30	20	20	10	20	10
	SP/GP56*			50	20	50	20	20	10	20	10

Liquid Pipe Size in"		1/4 (1-size smaller)				3/8 (STD)						1/2 (1-size larger)			
Gas Pipe Size in"		1/2 (1-size smaller)		5/8 (STD)		1/2 (1-size smaller)		5/8 (STD)		3/4 (1-size larger)		5/8 (STD)		3/4 (1-size larger)	
Maximum Pipe Distance		Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
RAV-DI Series 4 R410A Series 1 R32	**SM/GM80***	20	20	20	20	30	20	30	20	30	20				
	SM/GM110*							50	30	50	30	25	15	25	15
	SM/GM140*							50	30	50	30	25	15	25	15
RAV-DI Series 3 R410A	**SM/160***							50	30	50	30	25	15	25	15
RAV-SDI Series 4 R410A Series 1 R32	**SP/GP80***	30	20	30	20	50	30	50	30	50	30				
	SP/GP110*							75	30	75	30	25	15	25	15
	SP/GP140*							75	30	75	30	25	15	25	15
	SP160*							75	30	75	30	25	15	25	15

Liquid Pipe Size in"		1/2 (STD)				5/8 (1-size larger)			
Gas Pipe Size in"		7/8 (1-size smaller)		1 1/8 (STD)		7/8 (1-size smaller)		1 1/8 (STD)	
Maximum Pipe Distance		Length	Pre-charged	Length	Pre-charged	Length	Pre-charged	Length	Pre-charged
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
RAV-DI Series 4 R410A	**SM224***	70	30	70	30	50	20	50	20
	SM280*	70	30	70	30	50	20	50	20

Common Refrigerants For Existing Plant
R12
R134A
R22
R404A
R407C
R417A

REPLACEMENT TECHNOLOGY PIPING SPECIFICATION RAS

Existing piping connection with same diameter gas and liquid line is possible using the criteria detailed below

Liquid Pipe Size in"		1/4 (STD)		3/8 (STD)	
Gas Pipe Size in"		3/8 (STD)		1/2 (STD)	
Maximum Pipe Distance		Length	Pre-charged	Length	Pre-charged
		(m)	(m)	(m)	(m)
MIRAI	***10***	15	15		
	13	15	15		
	16			20	15
	18			20	15
	24			20	15
SHORAI	***10***	20	15		
	13	20	15		
	18			20	15
	22			20	15
	24			25	15

Smaller Pipe Sizes (Performance capacity is reduced due to the effect of gas pipe size being smaller than standard connection)

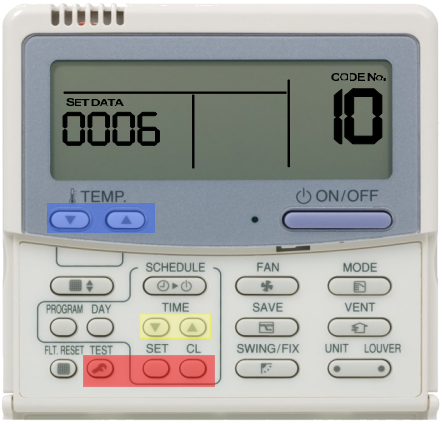
Normal Pipe Sizes

Larger Pipe Sizes

Not Compatible

12 COMMISSIONING CONTROL PANEL

1. Ensure all connections are correctly made and the sensors have been suitably located.
2. Confirm the integrity of the power supply at the outdoor unit and between terminals 1 & 2 at the controller input terminals. 1 is Live and 2 is Neutral.



3. It is necessary to set the system capacity and type via the RBC-AMT32E / AMS41E. The configuration menu is accessed by pressing SET + TEST + CL buttons (indicated Red) for 4 seconds. Item CODE No.10 (two figure is displayed right). SET DATA (four figure displayed left) requires changing from 0001 to 0006 by pressing TIME Up Down buttons (indicated Yellow). Press SET to save configuration. SET DATA value 0006 is the same for all systems.
4. Press TEMP Up and Down buttons (indicated Blue) to select item Code No.11 (two figure displayed right). SET DATA (four figure displayed left) to values detailed in tables below "Digital Inverter" or "Super Digital Inverter" according to condensing unit model type by pressing TIME Up Down buttons (indicated Yellow). Press SET to save configuration.
5. After setting the SET DATA codes press TEST button (indicated Red) SETTING is displayed on the controller for approximately 5 minutes and then normal display resumes.

Digital Inverter

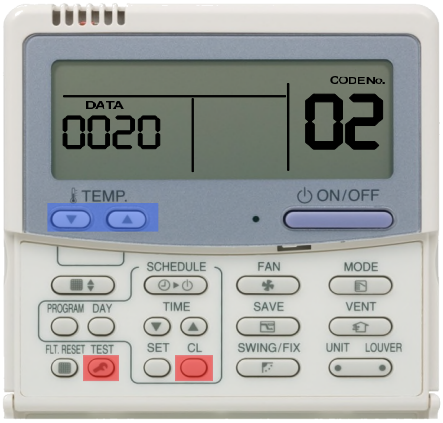
Unit	GM/SM30*	GM/SM40*	GM/SM56*	GM/SM80*	GM/SM110*	GM/SM140*	SM160*	SM2246*	SM2806*
Value	0003	0006	0009	0012	0015	0017	0018	0021	0023

Super Digital Inverter

Unit	SP40*	GP/SP56*	GP/SP80*	GP/SP110*	GP/SP140*	SP160*
Value	0006	0009	0012	0015	0017	0018

Sensor Connection Confirmation

It is possible to read data from the sensors by accessing the data retrieval menu. Press TEST and CL (indicated Red) for 4 Seconds and use TEMP up and down buttons (indicated Blue) to retrieve the data as shown in the table below.



Code	Outdoor Sensor Data
60	TE Sub-cooled Liquid Temp. (°C)
61	TO Ambient Temp. (°C)
62	TD Discharge Temp. (°C)
63	TS Suction Temp. (°C)
65	THS Inverter Heat Sink Temp. (°C)

Code	Outdoor Data	Code	AHU Sensor Data
6A*	Operation Current (A)	02	TA Return Air Temp. (°C)
70*	Compressor Frequency (Hz)	03	TCJ Coil Liquid Temp. (°C)
F1*	Compressor Run Time (x 100h)	04	TC Coil Vapour Temp. (°C)
*Data for 4 series outdoor units only			

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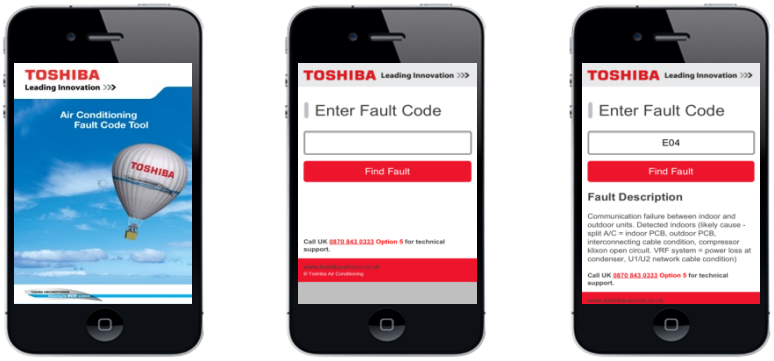

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Technical Department

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