

ROOFTOP PACKAGE AIR CONDITIONER INSTALLATION MANUAL



This manual provides the procedures of installation to ensure a safe and good standard of operation for the air conditioner unit.

Special adjustment may be necessary to suit local requirements.

Before using your air conditioner, please read this instruction manual carefully and keep it for future reference.



FEATURES

Electro Galvanized Steel Panels

Corrosion Resistant Cabinet - The weather proof characteristics of the panels have been significantly reinforced by the adoption of electro galvanized steel panel which have been coated with polyester powder coated paint to resist corrosion.

Protection System

Compressor Protection - The compressor is protected with high pressure switch, an over current relay, an internal overload protector.

Fan motor - The evaporator fan motor and outdoor fan motor are protected with internal overload protector.

Condenser and Evaporator Coil - The coil have seamless Inner groove copper tubing mechanically bonded to high efficiency. Each coil is factory tested at 600 psig. And easily accessible for service.

SAFETY PRECAUTIONS

Before installing the air conditioner unit, please read the following safety precautions carefully.

Warning

- Installation and maintenance should be preformed by qualified persons who are familiar with local code and regulation, and experienced with this type of appliance.
- All field wiring must be installed in accordance with the national wiring regulation.
- Ensure that the rated voltage of the unit corresponds to that of the name plate before commencing wiring work according to the wiring diagram.
- The unit must be GROUNDED to prevent possible hazard due to insulation failure.
- All electrical wiring must not touch the refrigerant piping, compressor or any moving parts of the fan motors.
- Confirm that the unit has been switched OFF before installing or servicing the unit.
- Do not touch the compressor or refrigerant piping without wearing gloves.

Caution

Please take note of the following important points when installing.

- Do not install the unit where leakage of flammable gas may occur.



If gas leaks and accumulates at the surrounding of the unit, it may cause fire ignition.

Ensure that the drainage piping is connected properly.



If the drainage piping is not connected properly, it may cause water leakage.

Do not overcharge the unit.



This unit is factory full charged. Overcharge will cause over-current or damage to the compressor.

Ensure that the unit panel is closed after service or installation.



Unsecured panels will cause the unit to operate noisily.



OUTLINE AND DIMENSIONAL DATA

SRT-30RA









INSTALLATION OF THE UNIT

Location For Installation

Install the unit in such way that air distributed by the unit cannot be drawn in again (as in the case of short circuit of discharge air). Allow sufficient space for maintenance around the unit. Ensure that there are no obstructions of air flow into or out of the unit. Remove obstacles which blocks air intake or discharge.

When two or more outdoor units are installed in a location, they must be positioned such that one unit will not be taking the discharge air from another.

The location must be well ventilated, so that the unit can draw and distribute plenty of air. A place capable of bearing the weight of the outdoor unit and isolating noise and vibration.

A place protected from direct sunlight. Otherwise use an awning for protection, if necessary.

A place where smooth drainage of rain water and water formed by defrosting is acceptable.

A place where the unit will not be buried in snow.

A place where air outlet port is not exposed to strong wind.

A place where the air discharge and operating sound level will not annoy the neighbors.

The location must not be susceptible to dust or oil mist.

Caution

If the condensing unit is operated in an atmosphere containing oils (including machine oils), salt (coastal area), sulfide gas (near hot spring, oil refinery plant), such substances may lead to failure of the unit.



INSTALLATION OF THE UNIT

Unit Support

- 1. The figure shows the use of the roof curb available for mounting these units.
- 2. The curb should be sealed and fixed to the roof by weather stripping. A suggested means of sealing the unit and roof curb as shown in the left.

Duct construction

- These units are equipped with supply and return air openings. Duct connection to the unit should be made with duct flanges and secured directly to the air opening with flexible duct connectors to avoid normal noise transmission.
- To prevent air leakage, all duct seams should be sealed.
- Ducts in the spaces that not air-conditioned, must be insulated.
- Ducts exposed to the outside must be weather proofed.
- Ducts that entering building through the roof, the entering should be sealed with weather stripping to prevent the rain, sand, dust etc. from entering the building.
- Correct size of filter must be installed at the return air duct.

Refrigerant Charge

The units are full charged in Factory, no additional charge is necessary. The table below shows the amount charged pre unit.

Refrigerant R-410A

Model	Charge in circuit (kg)
SRT-30RA	1.35

INSTALLATION OF THE UNIT

Drain piping

- A 1 MPT condensate drain fitting is provided. The drain pipe can be led out at the front side.
- The drain pipe must be provided with a trap on the outside of the unit and also installed at an incline for proper drainage, as shown in the right.
- To prevent condensate formation and leakage, provide the drain pipe with insulation to safeguard against sweating.
- Upon completion of the piping work, check that there is no leakage and that the water drains off properly.





Drain trap for condensate



Control System & Electrical Wiring

Function and Specification

1. Major component -. Main unit

- - Display unitDisplay cable 2 cores, length 4 metres between Main unit and Display unit
 - -. Flush-mounted box





Main Unit

Display Unit



Flush-mounted box



2. User's Features



2.1 Power on/off

Push button ① to on or off unit

2.2 Fan speed

Push button FAN to change fan motor speed. (High, medium, low or auto) In AUTO FAN operation mode, fan motor speed will be change automatic according to the difference temperature gap between $T_{room} \& T_{set.} (\Delta T)$

$\Delta \mathbf{T}$	Speed
> 3°C	high
= 2°C	medium
< 1°C	low

2.3 Operation mode

Auto)

Push button MODE, system will operate as below

? 2 Operating modes (fan, cool) In case of COOL version



? 3 operation modes (fan, heat, cool) In case of Heat/Cool version



Note : In case of remote control utilization, it can be set mode in 5 mode (Fan, Cool, Dry, Heat,

FAN: Air conditioner will operate as fan only. (Compressor will not work) And in this mode, it can't use SLEEP mode and it can't set temperature while there is no temperature display on remote control.

COOL : Air conditioner will operate as cooling by room temperature higher than setting temperature and compressor operation stop working more than 3 minute, compressor will operate again to decrease room temperature.





ZONE A

ZONE B.t

DEAD BAND

Zone A : Room temperature range is higher than setting temperature for 2°C. Zone B : It will be operated in room temperature range equal to setting temperature or temperature gap is lower than 1°C.

Zone C : Room temperature range is lower than setting temperature for 1-2°C Zone D : Room temperature range is higher than setting temperature for 3°C.

E A M PERATURE 2°C VE Ts	Exclude temperature range which are in range of Zone A & Zone B, Zone B & Zone C and Zone C & Zone D, these call DEAD BAND. These Zones have stability
E B M PERATURE BETWEEN ABOVE	which is no changing Zone in these temperature ranges.

-2 ZENE C -3 DEAD BAND ZONE D -4 ł 'B'C С Α В А D В С COMPRESSOR <u>__</u>N DFF ΖDΝ RDD t. 12 Mir TEM IS a ΠN LOW FAN ABD t. DFF COMPRESSOR ZDN RDD ТЕМ DFF IS 1°C LOW FAN 9 Mir в м Ts 30 Sec. 30 Sec. COMPRESSOR ZONE C 6 Mir ΠN DFF DFF ROOM TEMPERATURE IS 1-2 °C BELOW TS LOW FAN ΠN 6 Min DFF 30 Sec. 30 Sec. COMPRESSOR ΠN DFF ZONE D RDDM 12 Min ŧ. TEMPERATURE IS 3°C BELOW Ts ΠN LOW FAN DFF 30 Sec. 30 Sec.

DPERATING ZENE

Tr

+2

+1

Ts

-1

I



Zone calculation will be determined in every 12 minutes which is one operating cycle in DRY MODE and the operation of compressor and fan motor while in each ZONE has show in the picture. By fan motor will operate before compressor starting for 30 seconds and fan motor will stop operation after compressor stop for 30 seconds.

In DRY MODE, we can't use SLEEP function or change speed of fan motor by there is no show fan motor speed on remote control

HEAT : Air Conditioner will operate as heater which call HEAT PUMP

When system operated as HEAT PUMP, controlling system will reverse refrigerant cycle by open REVERSING VALVE to make air conditioner work as heater. When room temperature is lower than setting temperature and compressor has stopped working more than 3 minute, compressor will operate to increase room temperature.

AUTO : Air conditioner operate by controlling system will choose operating system to be COOL or HEAT automatically. It depend on setting temperature and room temperature at that time.

While operating as COOL MODE, setting temperature will simply increase 1°C from setting temperature on remote control. It will use this value as setting temperature to calculate other value.

Tset working in Cool (T_{SC}) = Tset actual + 1°C

While operating as HEAT MODE, setting temperature will simply decrease 1°C from setting temperature on remote control. It will use this value as setting temperature to calculate other value.

Tset working in Heat (T_{SH}) = Tset actual - 1°C

While operating as COOL MODE, it will change to HEAT MODE when room temperature at that time is lower than Tset working in Cool (T_{SC}) from 3°C below. And while operating in HEAT MODE, it will change to COOL MODE when room temperature at that time is higher than set working in Heat (T_{SH}) from 3°C upper.





2.4 Temperature setting

Push button \checkmark or \checkmark to change Setting temperature from 18-30°C

2.5 Dim

Push button \frown or \checkmark by holding for 3 seconds to reduce the intense of LED light. When turn off air conditioner, the intense of light will change to be normal

2.6 Remote Handset

Can use function in remote control as usual such as SLEEP, TIMER

3. SYSEM FEATURES

- 3.1 **Watchdog** : In controlling system, when system error according to computerized system which may come from unstable of electrical voltage or from noise, system will set computer to reset immediately.
- 3.2 **Compressor delay protection** : In case of compressor stop operation, it always delay time before restart again for 3 minute. And in case of electric shut off from system and resupply again, it will delay operating of compressor for 3-4 minute by randomly.
- 3.3 **Compressor minimum on time** : compressor always have to operate at least 24 seconds before stop operation.
- 3.4 Auto restart : In case of electric shut down, when electricity restart as normally, system will operate according to last setting program except SLEEP and TIMER that will be cancelled by value will keep record in MEMORY after changing in value at least 5 seconds. So if the changing in value does not reach 5 seconds before electric shutdown, when system restart, it will operate according to memory value before changing.
- 3.5 Freeze protection : In Cool or Dry mode, if T indoor coil ≤ 0°C and compressor has been operating at least 10 minutes continuously. Freeze will occur. System will stop compressor operation and fan speed will operate in low.

System will return to operate as normally when T _{indoor coil} \geq 7°C or turn off product.

3.6 **Defrost function** : In Heat mode, if T_{outdoor coil} has low value compressor will operate as in effective way. Defrost function will help to protect compressor from damaging.



Defrost approaching

Immediately that T_{outdoor coil} <3°C, Defrost timer will be counted. If T_{outdoor coil} is more than 3°C over 2 minutes, Defrost timer will be reset and Defrost function will be operate when



- a) Compressor continue operate in heat mode over than 5 minutes and
- b) Defrost timer are in below condition.
 - ? T_{outdoor coil} decease from +3 to -8°C (line AB) within 30-60 minutes and still ≤-8°C over than 5 minute
 - ? T_{outdoor coil} decease from +3 to -4°C (line AC) within 60-120 minutes and still ≤-4°C over than 5 minute
 - ? T_{outdoor coil} decease from +3 to -2°C (line AD) after 120 minutes and still ≤-2°C over than 5 minute

While Defrost function

Indoor and outdoor fan motor will stop operation but compressor will operate similar to Cool mode

After Defrost function finish

When T $_{outdoor coil}$ over than 14°C or operating in defrost function more than 10 minutes, system will turn back to operate in Hat mode automatically.

3.7 Pre heat & Post heat functions

Pre heat function help to protect indoor fan motor to blow cool air in Heat mode while compressor operate.

- ? When T indoor coil is lower than 30°C, fan motor will stop operation.
- ? When T indoor coil is in between 30-37°C, fan motor will operate at low speed.
- ? When T indoor coil is more than 37°C, fan motor will operate at setting speed.



Post heat function help to protect indoor fan motor to blow cool air in Heat mode while compressor operate.

- ? When T indoor coil is more than 30°C, fan motor will operate at setting speed.
- ? When T_{indoor coil} is in between 18-30°C, fan motor will operate at low speed.
- ? When T $_{indoor\,coil}\,$ is lower than 18°C, fan motor will stop operation.

In case of model that doesn't have indoor coil sensor, function Post heat will operate as below.

- ? Fan motor operate at low speed when compressor start operation for 30 seconds. After that fan motor will operate at setting speed.
- ? Fan motor will stop operation after compressor stop operation for 30 seconds.



3.8 Compressor overload protection

When compressor operate in heat mode and T $_{indoor coil}$ has high value , compressor will stop operation and alarm. (Section 3.14)



System will restart to operate normally when T indoor coil is lower than 42°C

3.9 Reversing valve change protection

Reversing valve can change stage after compressor stop operation more than 1 minute

3.10 Anti overheat (Outdoor coil) protection

In COOL or DRY mode, if T outdoor coil has high value, compressor will stop operate and alarm. (Section 3.14)



System will restart to operate normally when T_{outdoor coil} is lower than 50°C or change Mode.

3.11 Low ambient protection

When system operate in COOL or DRY mode and compressor operate at least 30 seconds but T _{outdoor coil} is lower than 30°C, outdoor fan motor will stop operation and alarm. (Section 3.14) System will restart to operate normally when T _{outdoor coil} is higher than 38°C or operating mode change to FAN or HEAT MODE or Turn OFF/ON product again.



3.12 Cooling Fail

When system operate in COOL or DRY mode and compressor operate at least 3 minute but T _{indoor coil} is higher than 25°C, it will alarm. (Section 3.14)

System will restart to operate normally when turn off product or change mode.



3.13 Heating Fail

When system operate in HEAT MODE, defrost function doesn't activate and compressor operate at least 3 minute but T indoor coil is lower than 25°C, it will alarm. (Section 3.14) System will restart to operate normally when turn off product or change mode.

3.14 Error display

When Error, Display will be show as below.

Error code	Description
E1	Freeze protection
E2	Defrost protection
E3	Compressor overload protection
E4	Anti overheat protection
E5	Low ambient protection
E6	Cooling fail
E7	Heating fail
E8	Sensor error

3.15 Sensor Error

When abnormal occur to room sensor, controlling system will operate by turn ON/OFF compressor in every 5 minute. And when abnormal occur in indoor coil or outdoor coil sensor, controlling system will operate without concerning of temperature at indoor coil or outdoor coil sensor



Electrical Wiring Diagram

SRT-30RA



MAINTENANCE

Warning

- Disconnect from the main power supply before servicing the air conditioner unit.

- Do Not pull out the power cord when the power is ON. This may cause serious electrical shocks which may result in fire hazards.

Caution

Before turning off the power supply, set the remote controller's ON/OFF switch to the "OFF" position to prevent the nuisance tripping of the unit.

If this is not done, the unit's fans will start turning automatically when power resumes, posing a hazard to service personnel or the user.



If any malfunction of the air conditioner unit is noted, check the following fault conditions and causes for some simple troubleshooting tips.

Symptoms	Probably Causes	Remedy
Unit does not run.	Power Failure.	Press the (ON/OFF) after power restore.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Power supply wiring phase incorrect.	Modify the wiring phase.
Compressor does not	Power line open.	Reset Circuit breaker.
run.	Control circuit breaker trip.	Check control circuit for ground or short ; repair and reset breaker.
	Safety device tripped	Reset control circuit.
	Contactor stuck open	Replace contactor.
	Loose terminal connection	Check connections.
	Improperly wired controls	Check wiring and rewire.
	Low line voltage	Check line voltage—determine location of voltage drop and remedy deficiency.
	Compressor motor defective	Check motor winding for open or short. Replace compressor, if necessary.
	Seized compressor	Replace compressor.
Compressor stop on low pressure control	Low pressure control erratic in action	Raise differential setting. Check capillary for pinches. Replace control.
	Compressor suction shutoff valve partially closed	Open valve.
	Low refrigerant charge	Add refrigerant.
Compressor cycles on high pressure control	High pressure control erratic in action	Check capillary tube for pinches. Set control is required.
	Compressor discharge valve partially closed	Open valve, or replace if defective.
	Air in system	Purge.
	Condenser fan not operating	Reset condenser fan overload. Check motor and wiring, Repair or replace if defective.
Unit operates long or continuously	Low refrigerant charge	Add refrigerant.
	Control contacts fused	Replace control.
	Air in system	Purge.
	Defective insulation	Replace or repair.
Compressor loses oil	Leak in system	Repair leak.



Symptoms	Probably Causes	Remedy
System noise	Piping vibration	Support piping as required. Check for loose pipe connections.
	Compressor noisy	Check valve plates for valve noise. Replace compressor (worn bearing). Check for loose compressor hold- down bolts.
Frosted or swearing suction line	Capillary tube clogged.	Check capillary tube.
Hot liquid line	Shortage of refrigerant due to leak	Repair leak and recharge.
Frosted liquid line	Restricted filter dryer	Remove restriction or replace filter dryer.
Compressor will not	Burned out coil	Replace coil.
unload	Leaky bypass piston	Replace.
	Weak bypass piston spring	Replace.
Airflow is low.	Filter is filled with dust and dirt.	Clean the filter.
	There are some obstacles at the air inlet or outlet of the units.	Remove obstacles.
Compressor operates	Dirty air filter.	Clean the air filter.
continuously.	Temperature setting too low (for cooling). Temperature setting too high (for heating).	Reset the temperature.
No cool air come out during cooling cycle, or no hot air come out	Temperature setting too high (for cooling)	Set the temperature lower.
during neating cycle.	Temperature setting too low (for heating).	Set the temperature higher.

If the fault persists, please call your authorized local dealer/serviceman.