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ADVENT® AIR

AIR CONDITIONER & HEAT PUMP

DIGITAL CONTROL FOR DUCTED SYSTEM

INSTALLATION AND OPERATING INSTRUCTIONS

FOR ACR135, ACR150, ACR135LP, ACR150LP, ACRDTH25, ACTH12

RECORD THIS UNIT INFORMATION FOR FUTURE REFERENCE:
Model Number:
Serial Number:
Date Purchased:

⚠WARNING

This manual must be read and understood before installation, adjustment, service, or maintenance is performed. This unit must be installed by a qualified service technician. Modification of this product can be extremely hazardous and could result in personal injury or property damage.

SAFETY PRECAUTIONS FOR R32 REFRIGERANT

1. Overview

1.1. Safety Instructions

This manual, provided by the manufacturer, is part of the air conditioner, which must be read by users carefully. The information provided in the instructions, if correctly observed, can ensure the correct use of the machine and help users eliminate or reduce the risk of accidents and injuries.

Safety Symbol

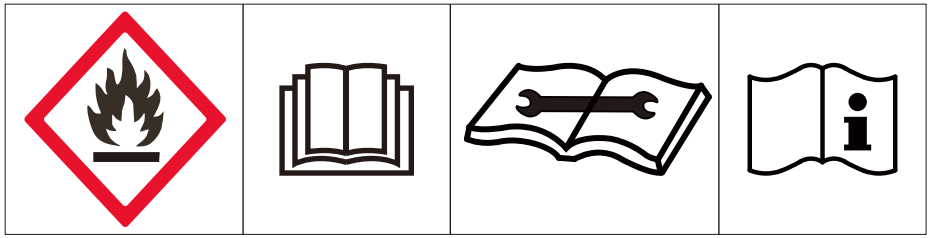
This is a safety warning sign. When you see this sign in this manual, the corresponding contents may cause personal injury, so you must follow the recommended preventive measures and safe operation instructions.

Sign: Warning or caution signs are used simultaneously, which indicate the potential risk level.

Warning indicate a potentially dangerous situation that may lead to death or serious injury.

Note indicate a potentially dangerous situation, which may lead to minor or moderate injury.

Caution indicate a potentially dangerous situation, which may cause property damage.



The appliance is not accessible to general public.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

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

THERMOSTAT ERROR CODE TABLE

DISPLAY	CAUSE	SOLUTION
Er	Dip Switch position incorrect	Set Dip swithces to correct position on back of Thermostat
E1	Room Temp Sensor Defect	Replace Thermostat
E2	Indoor Coil Temp Sensor Defect	Check wire connections and ensure sensor is properly installed. Replace Sensor
E3	Outdoor Coil Temp Sensor Defect	Check wire connections and ensure sensor is properly installed. Replace Sensor
E4	Outdoor Ambient Temp Sensor Defect	Check wire connections and ensure sensor is properly installed. Replace Sensor
E5	Communication Defect with T-Stat and Relay Kit	Check wire connections at T-Stat and relay kit
Lo	DC voltage is below 10 Volts(+/-0.5V)	Check wire connections and ensure DC voltage is above 10 volts
dF	Indoor or Outdoor coil is frozen	System is deicing and can not be used for 35 minutes and will restart automatically

ADVENT®
24 MONTH LIMITED WARRANTY

ASA Electronics (ASA) warrants to the original retail purchaser of this Advent product that should this product or any part thereof, under normal use and conditions, be proven defective in material or workmanship within 24 months from the date of original purchase, such defect(s) will be repaired or replaced (at ASA'S option) without charge for parts and repair labor.

The intended use of this Advent product is on recreational vehicles, also known as motorhomes and travel trailers. Any installation outside of this intended use is not to be considered normal use and warranty coverage will not be extended under the expressed warranty condition of improper installation.

To obtain repair or replacement within the terms of this warranty, contact ASA at (888) 283-7374. The product is to be delivered with proof of warranty coverage (dated bill of sale), specification of defect(s) with purchaser's name and return address, transportation prepaid to ASA at the address shown provided at the time of return authorization.

This warranty does not extend to the effects of this device on other devices, to costs incurred for removal or reinstallation of the product, or to damage of any product, accessories, or electrical system(s). This warranty does not apply to any product or part thereof which, in the opinion of the company, has been damaged through alteration, improper installation, mishandling, misuse, neglect, or accident.

THE EXTENT OF ASAS LIABILITY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT PROVIDED ABOVE, AND, IN NO EVENT, SHALL ASAS LIABILITY EXCEED THE PURCHASE PRICE PAID BY THE PURCHASER FOR THE PRODUCT.

This warranty is in lieu of all other express warranties or liabilities. ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, SHALL BE LIMITED TO THE DURATION OF THIS WARRANTY. ANY ACTION FOR BREECH OF ANY WARRANTY HEREUNDER INCLUDING WARRANTY OF MERCHANTABILITY MUST BE BROUGHT WITHIN A PERIOD OF 30 DAYS FROM THE DATE OF ORIGINAL PURCHASE. IN NO CASE SHALL ASA BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREECH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WHATSOEVER. No person or representative is authorized to assume for the company any liability other than expressed herein in connection with the sale of this product.

ASA Electronics
(888) 283-7374

37000008
Rev B

IMPORTANT WARRANTY INFORMATION

DO NOT RETURN DEFECTIVE PRODUCT TO YOUR PLACE OF PURCHASE

CONTACT ADVENT® @ 1-888-283-7374

Please place this Warranty Agreement and a copy of your sales receipt in a safe and secure location, along with your other valuable documents.

CONNECTING 115VAC WIRING

1. WARNING - SHOCK HAZARD: To prevent the possibility of severe personal injury or equipment damage due to electrical shock, always be sure the electrical power is disconnected or off before beginning installatiom.
2. Route the 115VAC supply wiring previously routed into the frame of the roof opening, through the strain relief of the electrical box and into the high voltage wiring area.

DANGER

TO PREVENT THE POSSIBILITY OF SHOCK INJURY FROM APPLIANCE OPERATION: THE WHITE WIRE MUST BE CONNECTED TO NEUTRAL IN THE SERVICE BOX ENTRANCE AND THE GREEN GROUND WIRE MUST BE CONNECTED TO A GROUNDING SCREW.

ATTACH CEILING GRILL

1. Position the grill next to the interior frame and attach it with the provided screws.
2. Install the filter on the air intake grill section.
3. Snap the intake grill section onto the main grille.
4. Install the screw covers.

MAINTENANCE

1. **AIR FILTER:**
   Remove the return air filter (after every 30 days of use) located above the removable air intake grill. Wash the filter with soap and warm water, let dry and then reinstall.
   Note: Never run the air conditioner / heat pump without putting the air filter back in place. This may plug the indoor coil with dirt and may substantially affect the performance of the unit.
2. **Air Return Grill:**
   Clean panel and control panel with a soft cloth dampened with a mild detergent. Never use furniture polish or harsh chemicals.
3. **FAN MOTOR:**
   Factory lubricated and requires no service.
4. **FROST FORMATION ON COOLING COIL:**
   Under certain conditions, frost may form on the indoor coil. If this should occur, inspect the filter and clean if dirty. Make sure air louvers are not obstructed. Air conditioners / heat pumps have a greater tendency to frost when the outside temperature is relatively low. This may be prevented by adjusting the thermostat control to a warmer setting.

SERVICE

If the unit does not operate:

1. If RV is connected to a generator, check to be sure generator is running and producing the proper power.
2. If RV is connected to shore power, check to be sure supply breaker is sized properly to run air conditioner / heat pump load and it is plugged into power supply.
3. Check your fuse or circuit breaker to see if it is off.
4. After the above checks, call your local service center for further help. This unit must be serviced by qualified service personnel only.

WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)
Do not pierce or burn.
Be aware that refrigerants may not contain an odour.

The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation;

- a warning that the appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).

The appliance shall be stored so as to prevent mechanical damage from occurring.

The compliance with national gas regulations shall be observed; Min applicable area of this machine is 15m .Please ensure that there are no obstacles in front of the machine, keep ventilation openings clear of obstruction. Servicing shall be performed only as recommended by the manufacturer.

Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.

Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

Before servicing the appliance

Checks to the area:

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is linimized. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

Work procedure:

Work shall be undertaken under a controlled procedure so as tominimise the risk of a flammable gas or vapour being present while the work is being performed.

General work area:
All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

Checking for presence of refrigerant:
The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.
Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

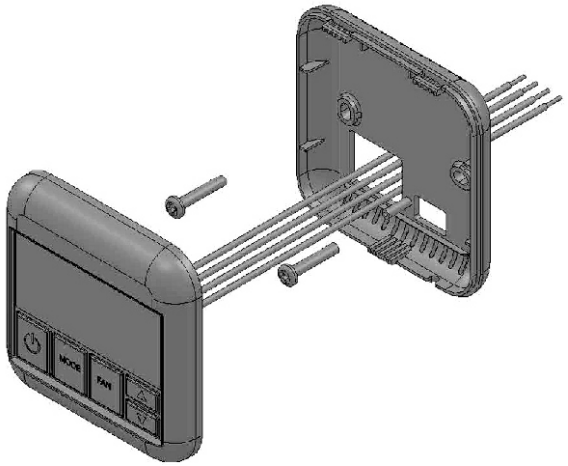
Presence of fire extinguisher:
If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

No ignition sources:
No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that
contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

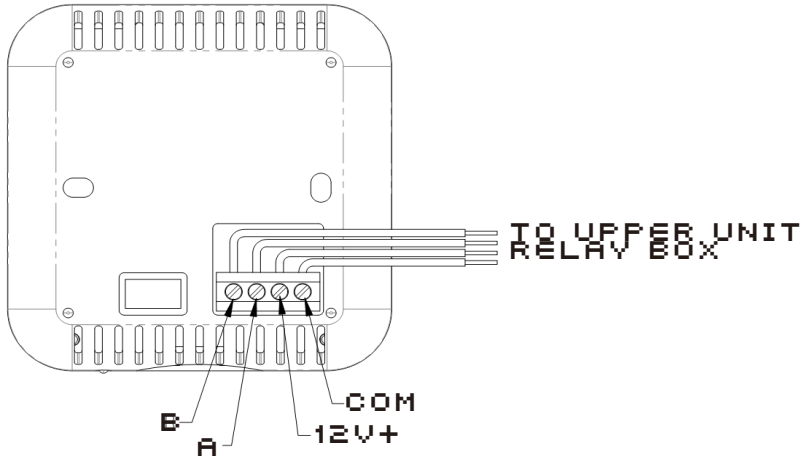
Checks to the refrigeration equipment:
Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:
-- the charge size is in accordance with the room size within which the refrigerant containing parts are installed;
-- the ventilation machinery and outlets are operating adequately and are not obstructed;

ACTH12 THERMOSTAT INSTALLATION:



ACTH12 THERMOSTAT WIRING

Function	Wire Size	Label Text
12VDC	22 AWG	12V+
Ground	22 AWG	COM
A Data Communication	22 AWG	A
B Data Communication	22 AWG	B



IMPORTANT: When connecting the wires:
1. Make any adjustments required to relieve pinched or stressed wiring.
2. Remove 1/4"insulation from the 4 wires. Use a small Flat-head screw driver to loosen the wire terminal screws. Push each corresponding wire into the proper terminal hole and tighten each screw.

MAIN RELAY KIT WIRING

Function	Wire Color	Label Text
12VDC output to Thermostat	Red with White Stripe 22 AWG	"T-Stat Power (12VDC)
Ground output to Thermostat	Green 22 AWG	COM
A Data Communication	Blue 22 AWG	"A"
B Data Communication	Purple 22 AWG	"B"
Main 12VDC Input 14AWG	Red 18 AWG	"Power (12VDC)"
Main DC Ground Input 14AWG	Black 18 AWG	"Ground (12VDC)"
12VDC output for furnace relay	Brown with White Stripe 20AWG	To Furnace (12VDC)

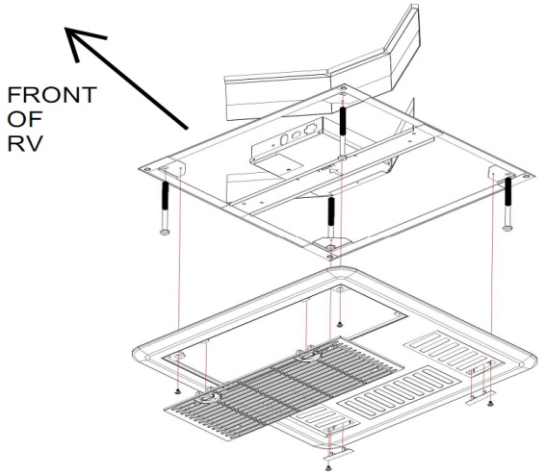


FIG.7A

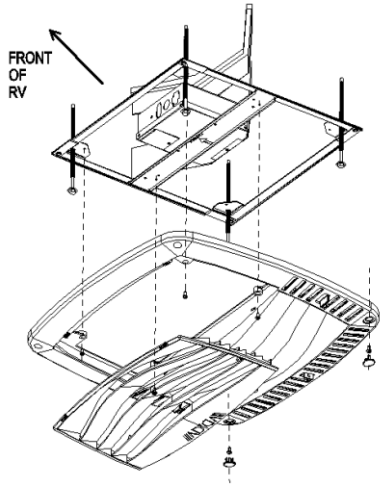
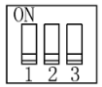


FIG.7B

THERMOSTAT DIP SWITCH SETTINGS:

Dip switch



As shown ALL OFF

Dip Switch1	Off	Heat Strip function disable
	On	Heat Strip function enable
Dip Switch2	Off	Heat Pump function disable
	On	Heat Pump function enable
Dip Switch3	Off	Furnace function disable
	On	Furnace function enable

Default Setting is 1 OFF, 2 OFF, 3 ON

Dip switch

SW1	SW2	SW3	Mode Cycle
OFF	OFF	OFF	FAN - COOL
ON	OFF	OFF	FAN - COOL - HEAT STRIP
OFF	ON	OFF	FAN - COOL - HEAT PUMP
OFF	OFF	ON	FAN - COOL - FURNACE
ON	ON	OFF	Configuration not possible
OFF	ON	ON	FAN - COOL - HEAT PUMP - FURNACE
ON	OFF	ON	FAN - COOL - HEAT STRIP - FURNACE
ON	ON	ON	Configuration not possible

If the switches are not set properly the LCD will display Er

-- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
-- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
-- refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Checks to electrical devices:

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used.
This shall be reported to the owner of the equipment so all parties are advised. Initial safety checks shall include:
that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking; that no live electrical components and wiring are exposed while charging, recovering or purging the system;
that there is continuity of earth bonding.

Repairs to sealed components:

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
Ensure that apparatus is mounted securely.
Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres.
Replacement parts shall be in NOTE
The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them

Repair to intrinsically safe components:
Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not. exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

Cabling:
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

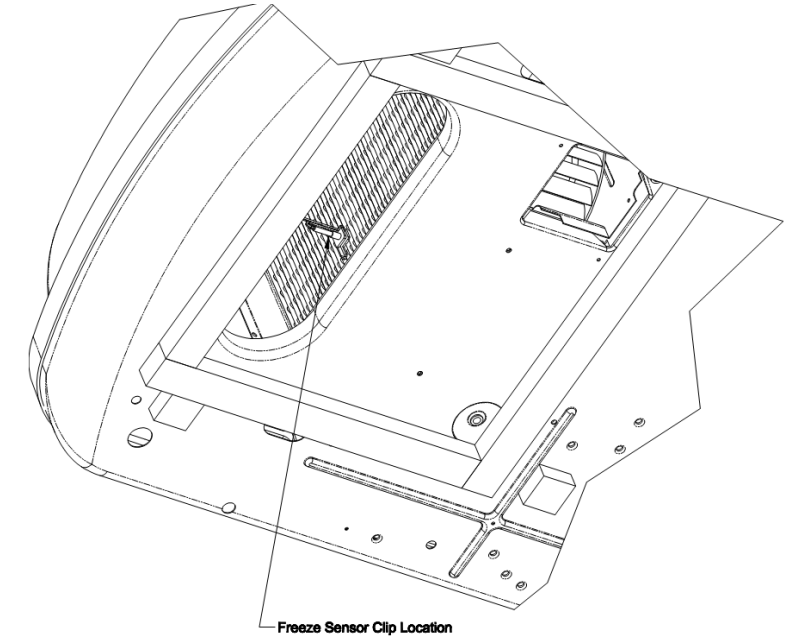
Detection of flammable refrigerants:
Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

Leak detection methods:
The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.
Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed.
Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
If a leak is suspected, all naked flames shall be removed/extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

Removal and evacuation:
When breaking into the refrigerant circuit to make repairs- or for any other purpose-conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration.
The following procedure shall be adhered to:

ALTERNATIVE FREEZE SENSOR INSTALLATION

Check Upper Unit to see if freeze sensor clip is preinstalled in evaporator fins. If so, insert the copper sensor from the Ducted Ceiling kit into the clip as show below.



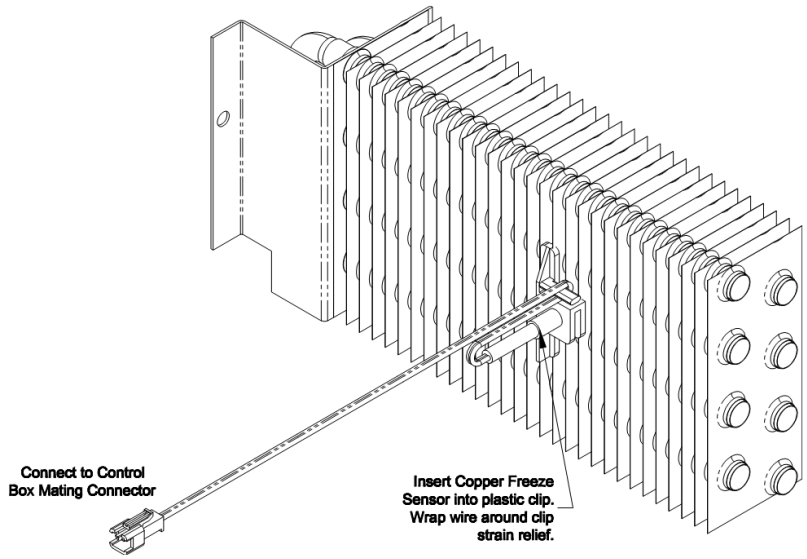
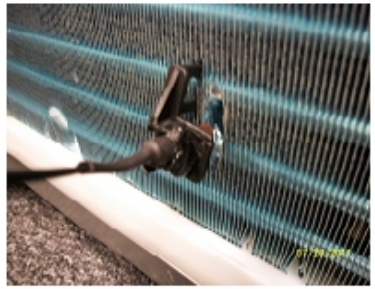


FIG.6 **ANTI-FREEZING SENSOR INSTALLATION**

1. Before template installation, with upper unit placed over opening; the freeze sensor should be installed in evaporator coil.

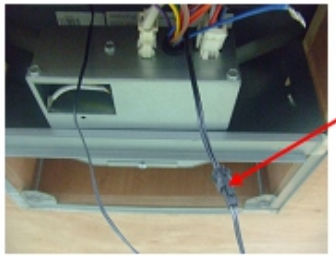
2. Remove the sensor from the parts bag.

3. Use a flat screw driver to create ¼" gap between 2 fins (between 2nd tube and 3rd tube) to accept the sensor.



4. Slowly press fork and sensor into gap created in step 3, until clip locks onto 3rd coil.

5. Install the template and electrical box on the ceiling.



6. Connect the sensor.

CAUTION:

1. Make sure the sensor dip is secured to copper tube.
2. Don't pull the wire to avoid damage to sensor.

- remove refrigerant;
- purge the circuit with inert gas;
- evacuate;
- purge again with inert gas;
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.
Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipework are to take place.
Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

Charging procedures:

In addition to conventional charging procedures, the following requirements shall be followed.

-- Ensure that contamination of different refrigerants does not occur when using charging equipment.
Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
-- Cylinders shall be kept upright.
-- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
-- Label the system when charging is complete (if not already).
-- Extreme care shall be taken not to overfill the refrigeration system.

Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completionof charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning:

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.
b) Isolate system electrically.
c) Before attempting the procedure ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.
e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f) Make sure that cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate in with manufacturer's instructions.
h) Do not overfill cylinders. (No more than 80 % volume liquid charge).
i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Recovery:

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.

Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants.

In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does

B. Registers

Air registers should have a minimum discharge area of 48 square inches per system, or 24 square inches per duct run.

Warnings about wiring:

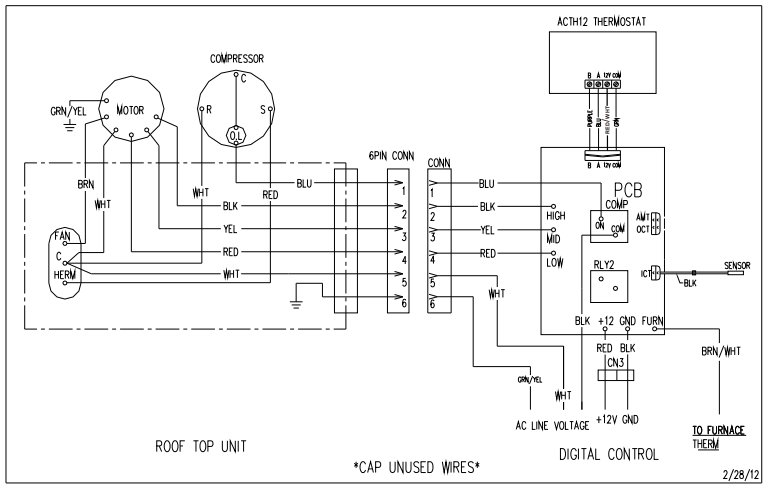
1. U.L. approval requires the power supply to be copper conductors with minimum #12AWG.
2. To prevent voltage drops greater than 10% during starting loads, adhere to the following guideline: **For lengths greater than 50 feet, use #10 AWG.**

TEMPLATE MOUNTING

Frame Mounting

1. Place the air conditioner / heat pump over the roof opening.
2. Install freeze sensor(see below Fig.6). Some air conditioners / heat pumps may contain a preinstalled, plastic, retaining clip for the freeze sensor. If the clip is present in the evaporator coil, please use this clip and discard the clip that came with the freeze sensor.Insert the freeze sensor into the plastic clip and ensure the freeze sensor is secured properly in the clip. Connect the freeze sensor harness to the relay box mating harness.
3. Position the mount frame into the ceiling opening. See Figure 7.
4. Using the four bolts provided, hold up the mount template to the ceiling. The four mounting bolts are to be inserted up through the bottom of the mount template and into the bottom of the air conditioner / heat pump. Tighten all 4 boles equally to compress gasket 33-35 inch pounds. When moving the air conditioner / heat pump be sure not to damage the gasket by sliding it across the roof. If the gasket is damaged and needs replaced, please contact ASA Electronics and purchase an authorized Advent gasket for replacement. Using other gasket material is not recommended and could result in warranty denial.
5. Install divider with foam seal against base pan of upper unit. On thinner roofs, the divider may be too high, so break away additional portion. Remove paper cover on fixed divider, insert loose divider against base pan and stick to fixed divider.
6. Cut the insulation to the height of the divider, center insulation on divider before removing paper backing and apply to divider. Excess insulation will help ensure the seal at the end of the divider/frame.
7. Connect 115VAC and 12VDC wires, Freeze Sensor Thermistor, Heat Pump specific (Outdoor Coil Thermistor, Outdoor Ambient Thermistor), and thermostat cable according to the wiring diagram. Install the cover over the electrical box using the small screw provided as shown in Figure 7.
8. Seal all seams between output airside and return airside with insulation and foil tape.

FIGURE 5B WIRING DIAGRAM FOR AIR CONDITIONER ONLY



4.The ACRDTH25 has a 6pin, two 3 pin & two 2 pin connectors extending from the front of the relay kit. These connectors mate with the air conditioner / heat pump. When making this connection, verify that the plugs are properly aligned and have snapped together securely.

5.Provided with the ACRDTH25,is a divider plate which is used to separate the warm return air from the cold supply air. If the roof thickness is greater than 2.5", you MUST use the additional divider provided.

SUPPLY DUCTING AND REGISTERS

A. Ducting

1. The field fabricated supply ducting must attach to both sides of the ACRDTH25. A minimum of two ducts are required, with one duct attached to each side of the plenum.
2. Each duct must have a minimum height of 1-1/2". Maximum height cannot exceed 4". Total free area inside each duct must be no less than 10 square inches.

NOTE: To decrease restriction and increase airflow, the ducting should make as few bends and turns as possible. When corners or turns are required, we recommend that you add radii to the corners to keep airflow at a airflow and system performance.

3. All field fabricated air supply ducting must be insulated to avoid condensation and prevent cooling / heating loss.

not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

INSTALLATION & OPERATING INSTRUCTIONS

These instructions must stay with the unit

Safety Instructions
This manual has safety information and instructions to help users eliminate or reduce the risk of accidents and injuries.

Read and follow all safety information, installation guides, recommended precautions, and safe operating instructions.

GENERAL INFORMATION

A. This air conditioner / heat pump is designed for:

1. Installation on a recreational vehicle.
2. Mounting on the roof of a recreational vehicle.
3. Roof construction with rafters/joists on 16 inch centers.
4. 2.5" to 5.5" thick roofs.

B. The efficiency of the air conditioner / heat pump will be affected by the conditions inside and outside of the RV. Reducing the heat gain of the RV will allow the air conditioner / heat pump to function with greater efficiency. Here are some suggestions to reduce heat gain in your RV.

1. Select a shaded area to park your RV
2. Close windows and utilize the blinds and / or curtains.
3. Keep doors shut.
4. Avoid using appliances that produce heat.

Beginning the cooling / heating process early in the day will greatly improve the heat pump's ability to maintain the desired temperature.

In high temperature and high humidity environments, the air conditioner / heat pump should be set in Cool mode with the Fan Speed in the high position, This will allow for optimal cooling efficiency.

C. Condensation

The manufacturer of this air conditioner / heat pump will not be responsible for damage caused by condensed moisture on ceilings or other surfaces, Air contains moisture and this moisture tends to condense on cold surfaces, When air enters the RV, condensed moisture may appear on the ceiling, windows, metal parts, etc. The air conditioner / heat pump removes this moisture from the air during cooling operation, Keeping doors and windows closed when this air conditioner /heat pump is operating will minimize condensation.

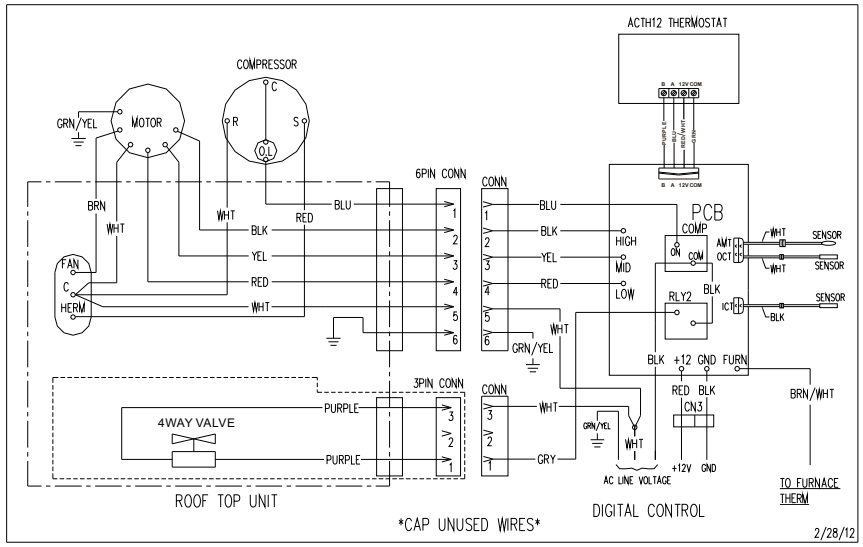
AIR RETURN GRILL INSTALLATION (ACRDTH25)

The Air Return Grill is designed for application in systems that utilize field fabricated (OEM supplied)air ducting. The ducting must be routed through the ceiling cavity (between the interior ceiling and roof). Ducting specifications are given in the section labeled Supply Ducting and Registers.

INSTALLATION REQUIREMENTS (ROOF THICKNESS MUST BE AT LEAST 2.5")

1. The ACRDTH25 must be installed under the roof opening. The ACRDTH25 bolts to the underside of the roof unit. Compression of the framed ceiling cavity between the roof unit and the ACRDTH25 is what holds both components in place.
2. Ceiling cavity depth (the measurement from the ceiling to the roof): 5.5" - Maximum, 2.5" - Minimum
3. The 115 VAC service for the air conditioner / heat pump must be routed into the ACRDTH25 (refer to Fig.5 A & B below). 12VDC should be routed to the digital control box. If a LP furnace is being used, a control wire must be connected from the furnace to the digital control box for proper operation.

FIGURE 5A WIRING DIAGRAM FOR HEAT PUMP



C. OPENING PREPARATION:

1. If the opening exceeds 14-3/8" x 14-3/8", it will be necessary to install spacers.
2. If the opening is less than 14-1/8" x 14-1/8", it must be enlarged.
3. Route a 12/3 Rmoex type supply line from the circuit breaker box to the Front of the roof opening.
   a. The power supply must be on a separate 20 amp Time Delay Fuse or HACR Circuit Breaker.
   b. Wiring must comply with all National, State and Local wiring codes.
   c. Make sure at least 15" of wire extend into the roof opening to ensure easy connections.
4. The opening must be framed to provide adequate support and prevent air from being drawn from the roof cavity. Lumber 3/4" thick or more and long enough to bridge the opening must be used. Remember to provide an entrance hole in the front of the opening for 115v, 12v, and thermostat wires. See FIG.4.

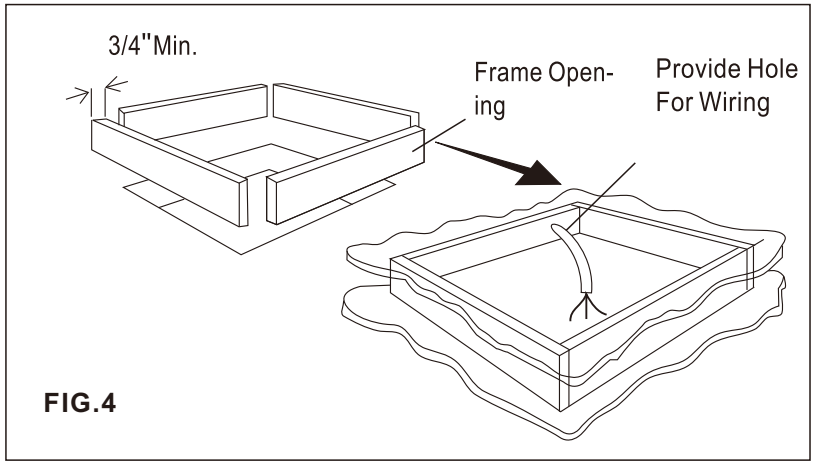


FIG.4

5. The 14-1/4" x14-1/4"(±1/8) roof opening is part of the return air duct and must be finished in accordance with NFPA standard 501C, Standard for Recreational Vehicles, Section 2-7.

CAUTION

It is the responsibility of the installer of this system to ensure structural integrity of the RV roof. Never create a low spot on the roof where water will collect. Water standing around the air conditioner/heat pump may leak into the interior causing damage to the product and RV

Model	Rated BTU Output	Power supply	Compressor Rated Amperage	Locked Rotor Amperage	Fan Amperage	Locked Fan Rotor Amperage	Air Flow (High Speed) (cfm)	Refrigerant (R32) (oz)	Min. wire size	AC circuit protection (User supplied)	Unit dimensions (in)	Weight (lbs)
ACR135	13500	115VAC 60Hz 1PH	7.5	59.1	2.6	5.8	450	13	12AWG copper up to 24'	20 Amp	31x24.9x12.9	68
ACR150	15000		10.3	73.5	2.6	5.8	435	12		20 Amp	31x24.9x12.9	68
ACR135LP	13500		10.2	44.9	2.6	5.8	345	11.3		20 Amp	31x24.9x10.1	66
ACR150LP	15000		10.2	44.9	2.6	5.8	370	13.76		20 Amp	31x24.9x10.1	68

Notes:

1. Consult the National Electric Code for proper sizing for wire lengths over 24 ft.
2. When sizing the generator, the total power usage of your recreational vehicle must be considered. Keep in mind generators lose power at high altitudes and from lack of maintenance.
3. CIRCUIT PROTECTION: Time Delay Fuse or HACR Circuit Breakers Required.

INSTALLATION INSTRUCTIONS

1. PRECAUTIONS

A. Read installation and operating instructions carefully before attempting to start your air conditioner / heat pump installation.
B. The manufacturer will not be liable for any damages or injury incurred due to failure to follow these instructions.
C. Installation **must** comply with the National Electrical Code and any State or Local Codes or regulations.
D. **DO NOT** add any devices or accessories to this air conditioner / heat pump except those specifically authorized by manufacturer.
E. This equipment must be serviced by qualified personnel and some states require licensed personnel.

2. CHOOSING A LOCATION FOR THE AIR CONDITIONER / HEAT PUMP

This product is designed for use as a RV roof top air conditioner / heat pump. The use of this product in other applications will void the manufactures warranty.

A. NORMAL LOCATIONS:

The unit is designed to fit over an existing roof vent opening. When the vent is removed, it normally creates a 14-1/4" x14-1/4"±1/8" opening.

B. OTHER LOCATIONS:

When a roof vent is not available or another location is desired, the following is recommended:

1. For one unit installation: The air conditioner / heat pump should be mounted slightly forward of center (front to back) and centered from side to side. See FIG.1.

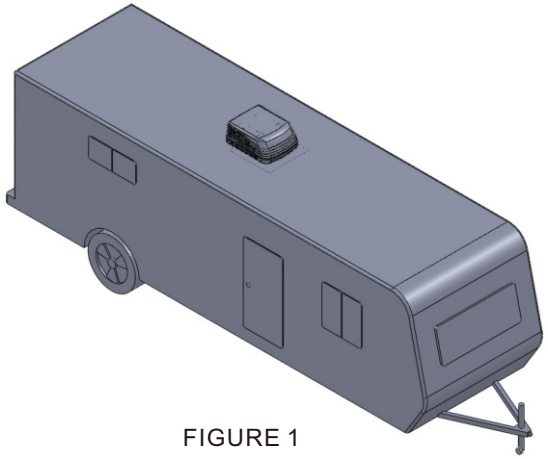


FIGURE 1

2. For two unit installation: Install one air conditioner / heat pump 1/3 distance and the other air conditioner / heat pump 2/3's from front of RV and centered from side to side. See FIG.2.

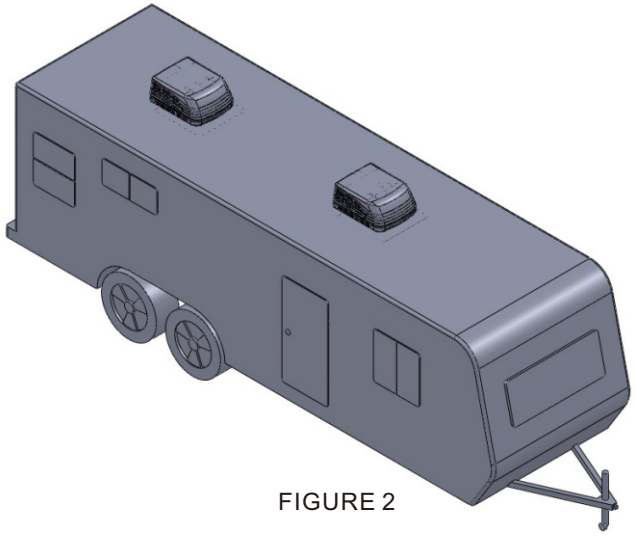


FIGURE 2

It is preferred that this air conditioner / heat pump be installed in a relatively flat and level roof section measured with the RV parked on a level surface; however, up to 15 degree slant to either side, or front-to-back is acceptable.

C. POST LOCATION SELECTION:

1. Check for obstructions in the area where air conditioner / heat pump will be installed. A minimum clearance of 18" is required for the rear section of the air conditioner / heat pump to any other roof mounted object.
2. The roof must be capable of supporting 100 lbs while the RV is in motion. Normally, a 200 lb. static load design will meet this requirement.

3. ROOF PREPARATION

⚠WARNING

There may be electrical wiring between the roof and the ceiling. Disconnect 115 volt AC power cord and the positive (+) 12 volt DC terminal at the supply battery. Failure to follow this instruction may create a shock hazard causing death or severe personal injury.

A. EXISTING ROOF VENT REMOVAL:

1.Unscrew and remove the roof vent.
2. Remove all caulking compound around opening.
3. Seal all screw holes and seams where the roof gasket will be located. Use a good grade of all weather sealant.

B. NEW OPENING:

1.A 14-1/4" x 14-1/4"±1/8" opening must be cut through the roof and ceiling of the RV. It is recommended this opening be located between roof framework.
2. Mark a 14-1/4" x 14-1/4" square on the roof and carefully cut the opening.
3. Using the roof opening as a guide, cut the matching hole in the ceiling. See FIG.3.

FIG.3