



AIR CONDITIONER & HEAT PUMP

DIGITAL CONTROL FOR DUCTED SYSTEM

INSTALLATION AND OPERATING INSTRUCTIONS

FOR AC135, AC150, AC135HP, AC150HP, ACRG12, ACTH12

RECORD THIS UNIT INFORMATION FOR FUTURE REFERENCE:

Model Number:

Serial Number:

Date Purchased:



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.



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" inch 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 heat pump removes this moisture from the air during normal operation. Keeping doors and windows closed when this air conditioner / heat pump is operating will minimize condensation.

Model	Rated BTU Output	Electrical Rating	Compressor Rated Amperage	Locked Rotor Amperage	Fan Amperage	Locked Fan Rotor Amperage	Air Flow (High Speed) (cfm)	Refrigerant (R410a) (oz)	Min.wire size	AC circuit protection (User supplied)	Unit dimensions (in)	Weight (lbs)
AC135HP	13500	115VAC 60HZ 1PH	12.4 (C) 10.4 (H)	61	2.5	5.8	500	26.5	12AWG copper up to 24'	20 Amp	35.1 x 29.9 x 13.2	92
AC150HP	15000		13.5 (C) 11.5 (H)	66	2.5	5.8	500	29.7		20 Amp	35.1 x 29.9 x 13.2	95

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 heat pump is designed to fit over an existing roof vent opening. When the vent is removed, it normally creates a 14-1/4" x 14-1/4" ±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.

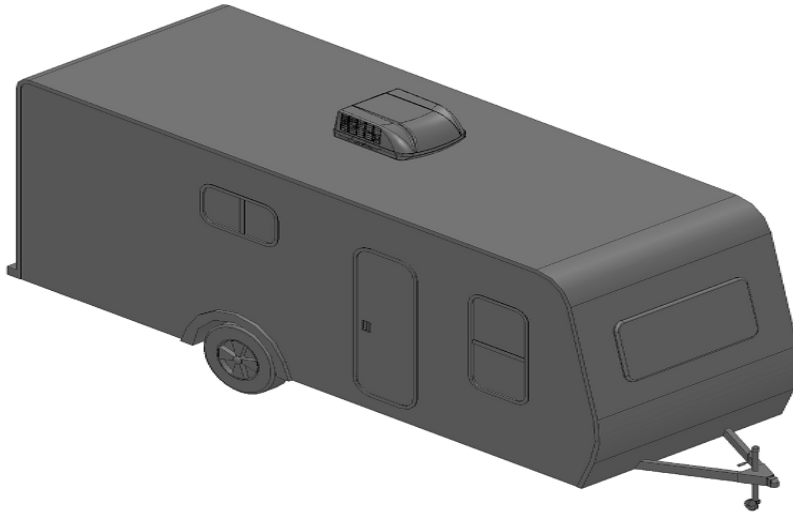


FIGURE 1

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.

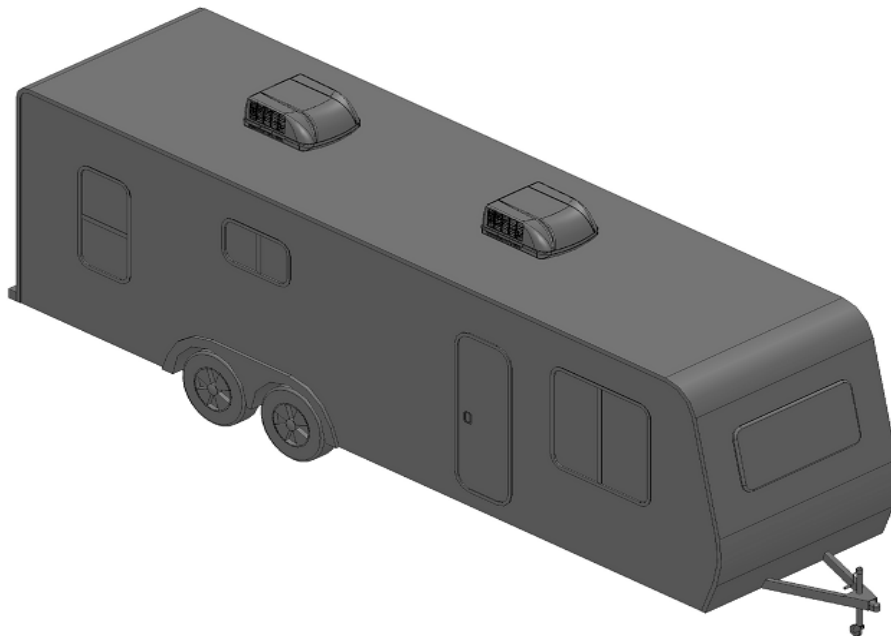


FIGURE 2

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° 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

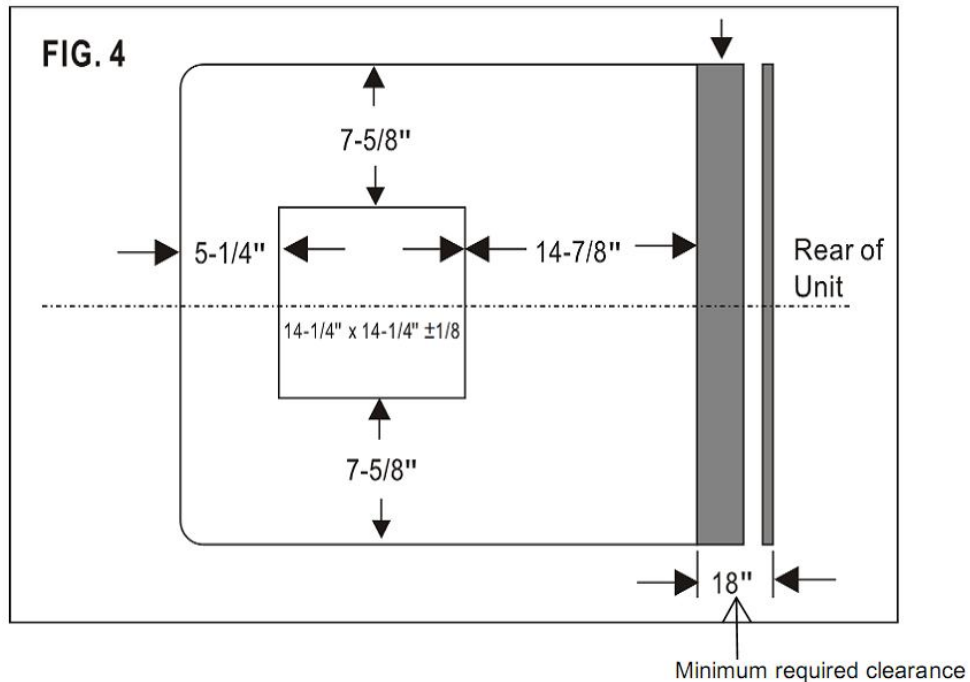
There may be electrical wiring between the roof and the ceiling. Disconnect 120 volt AC power cord and the positive (+) 12 volt DC terminal at the supply battery. Failure to follow this instruction may create a shock hazard causing death or severe personal injury.

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.

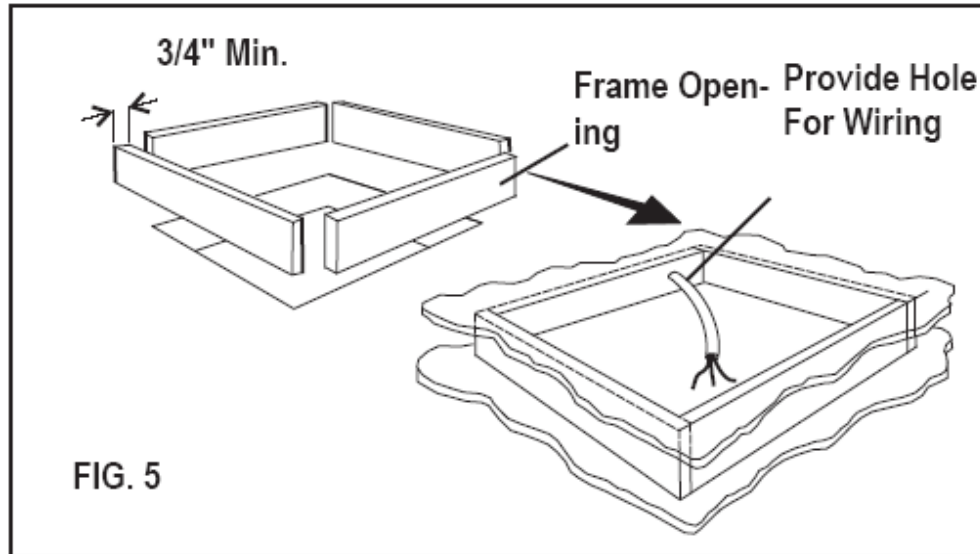
B. NEW OPENING:

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.4.



C. OPENING PREPARATION:

1. If the opening exceeds $14\frac{3}{8}'' \times 14\frac{3}{8}''$, it will be necessary to install spacers.
2. If the opening is less than $14\frac{1}{8}'' \times 14\frac{1}{8}''$, it must be enlarged.
3. Route a 12/3 Romex 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 $\frac{3}{4}''$ 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 110v, 12v, and thermostat wires. See FIG. 5.



5. The 14-1/4" x 14-1/4" ($\pm 1/8$) 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

AIR RETURN GRILL INSTALLATION (ACRG12)

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 ACRG12 must be installed under the roof opening. The ACRG12 bolts to the underside of the roof unit. Compression of the framed ceiling cavity between the roof unit and the ACRG 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 ACRG12 (refer to the wiring diagram 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 analog control box for proper operation.

Wiring diagram for a digital control system. The diagram shows connections for a Roof Top Unit (Motor, Compressor, Fan, 4-way Valve) and a Digital Control unit (ACTH12 Thermostat, PCB, RLY2, Sensors). It includes a 6-pin connector and a 3-pin connector. Wires are color-coded: GRN/YEL, BRN, WHT, BLK, RED, BLU, YEL, GRY. A note indicates '*CAP UNUSED WIRES*'. The date 2/28/12 is at the bottom right.

ROOF TOP UNIT

DIGITAL CONTROL

CAP UNUSED WIRES

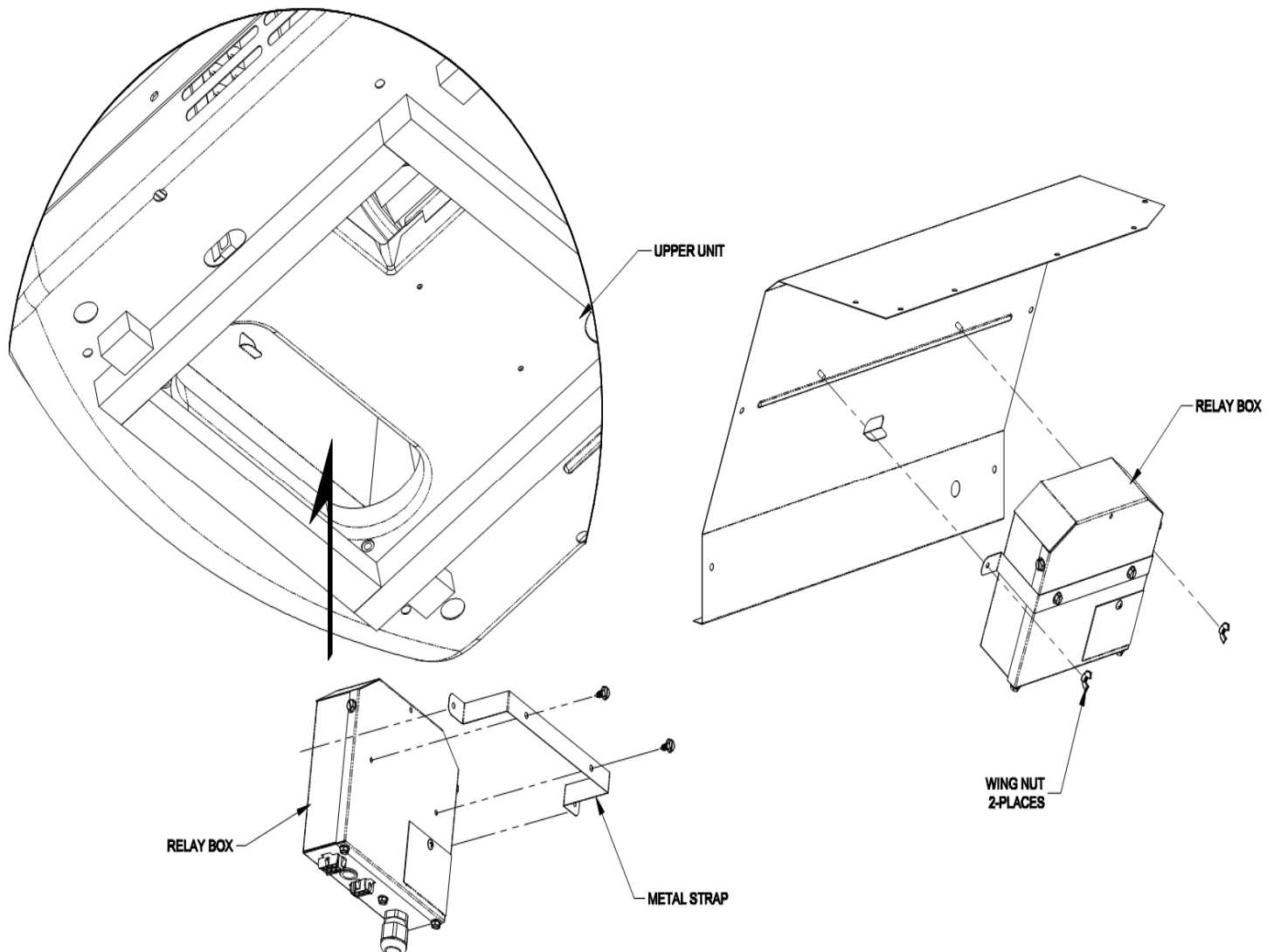
2/28/12

4. The ACRG12 has a 6 pin, 4 pin, 3 pin & 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 ACRG12, 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.

ALTERNATIVE RELAY BOX MOUNTING PROVISION

For installations that require additional space for ducting, the metal relay box can be removed from the ceiling template. Please confirm the roof top unit supports the alternative mounting provision before starting the installation.

1. Remove the two 5/16" Hex Head Screws from the bottom of the relay box.
2. Attach the metal strap to the relay box using the two 5/16" Hex Head screws
3. Connect all wires to relay box before installing in the roof top unit
4. Locate the two wing nuts for attaching the relay box to the roof top unit evaporator cover.
5. Align the relay box & metal strap onto the studs and tighten the wing nuts into place.
6. Ensure the relay box is properly secured
7. See below illustrations for additional clarification



SUPPLY DUCTING AND REGISTERS

A. Ducting

1. The field fabricated supply ducting must attach to both sides of the ACRG12. 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 maximum. Ten square inches of free area per duct is the minimum requirement. Larger ducting will improve airflow and system performance.

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

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 #12 AWG.
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 instructions). 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 6.
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 bolts equally to compress gasket over 50%. 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 6.
8. Seal all seams between output airside and return airside with insulation and foil tape.

ANTI-FREEZING SENSOR INSTALLATION



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



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



2. Remove the sensor from the parts bag.



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



3. Use a flat screw driver to create 1/4" gap between 2 fins (between 2nd tube and 3rd tube) to accept the sensor.



Sensor connector

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.

MAIN RELAY KIT WIRING

Function	Wire Color	Label Text
12VDC output to Thermostat	Red 22 AWG	"T-Stat Power (12VDC)"
Ground output to Thermostat	Grey 22 AWG	"T-Stat Ground"
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)"

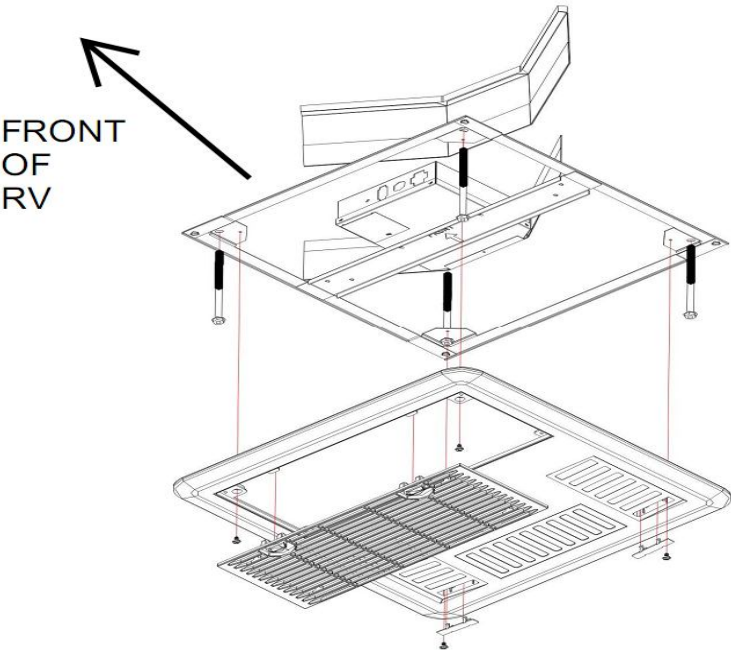
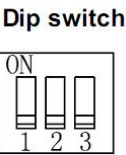
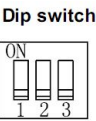


FIG. 6

THERMOSTAT DIP SWITCH SETTINGS:



As shown ALL OFF



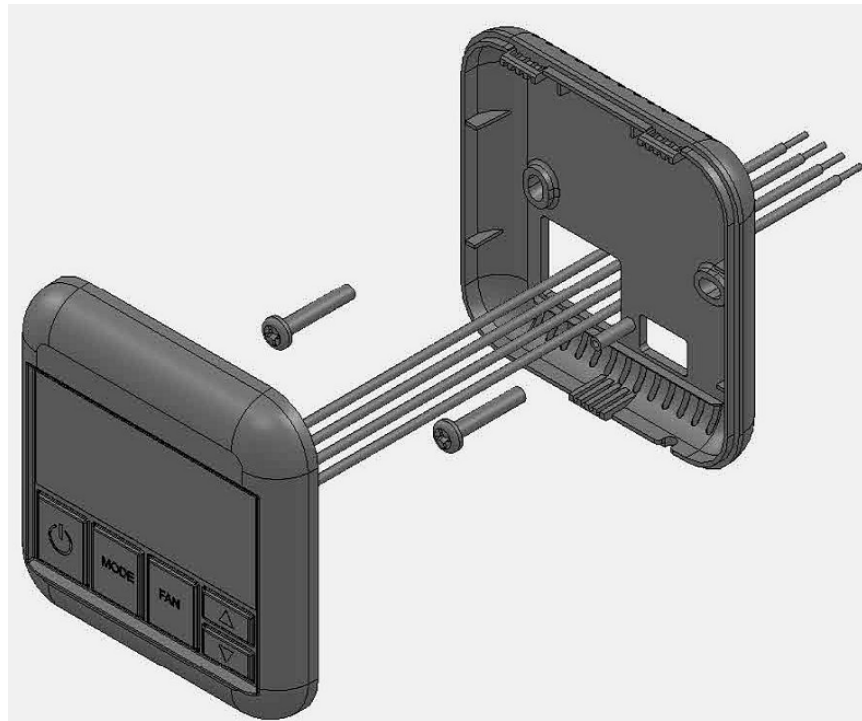
Dip Switch1	Off	Heat Strip function disable
	On	Heat Strip function enable
Dip Switch2	Off	Heat Pump function disable
	On	Heat Pump function enable
Dip Switch3	Off	Furnace function disable
	On	Furnace function enable

Default Setting is 1 OFF, 2 OFF, 3 ON

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

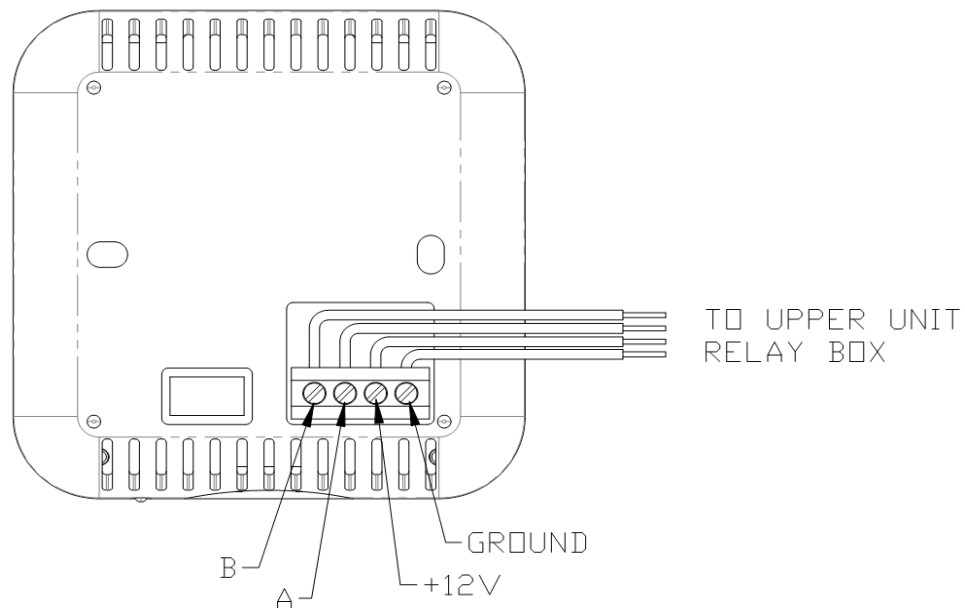
If the switches are not set properly the LCD will display Er

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 $\frac{1}{4}$ " 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.

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 installation.
2. Route the 115 VAC 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 4 provided screws.
2. Install the filter on the air intake grill section.
3. Snap the intake grill section onto the main grille.

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.

THERMOSTAT ERROR CODE TABLE

DISPLAY	CAUSE	SOLUTION
Er	Dip Switch position incorrect	Set Dip switches 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 cannot 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.

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

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IMPORTANT WARRANTY INFORMATION

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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.**



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