

Air Conditioner Installation and Ventilation

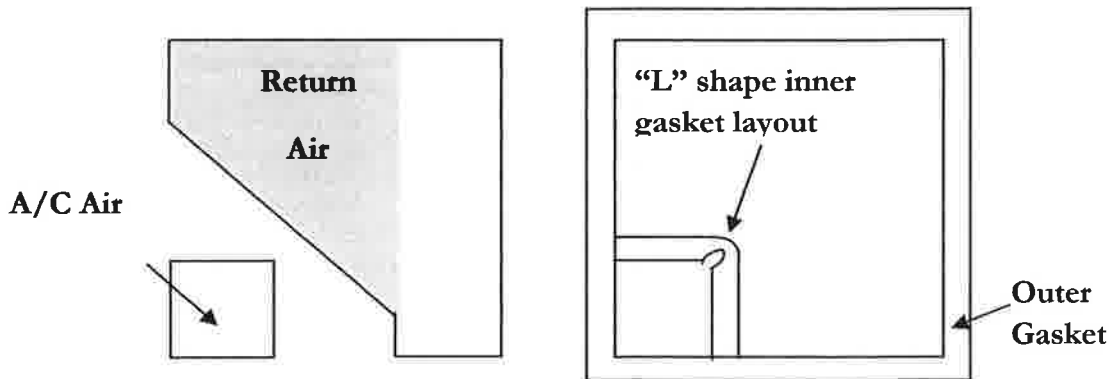
Installation for Newmar Corporation Air Conditioners

When replacing an air conditioner, or repairing ventilation inside a Newmar unit, you should first consider which model air conditioner (AC) is on the roof. If the AC has previously been replaced or repaired, determine the model number of the appliance *before* completing the repair.

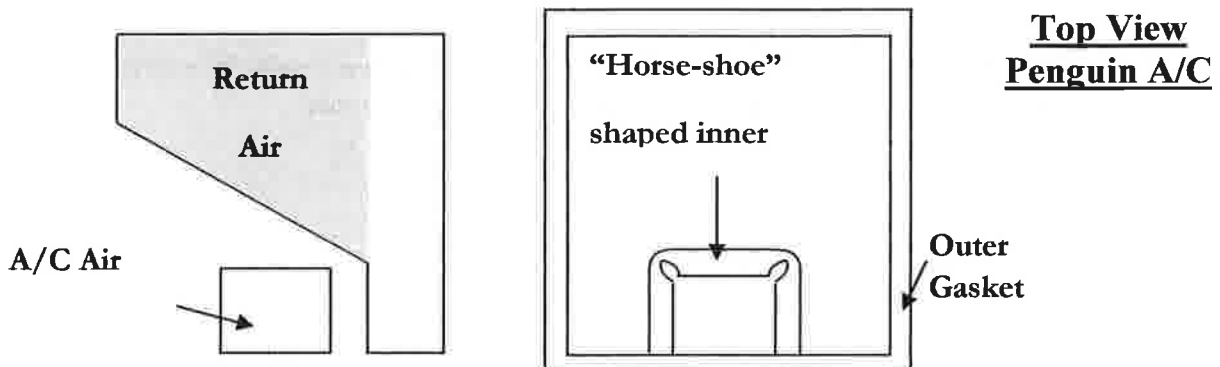
To determine the specific model, you will need to remove the outside shroud of the AC and locate the model and serial. It will be listed on the manufacturer specification tag. Without the model and serial number, the repairs may not be credited when the parts are returned. You should call Newmar for prior authorization when a claim is going to be submitted. 1-866-290-5371 for East Coast Dealers.

The diagram below shows some of the different types of gasket layouts. First are the Brisk Air, (A) and Penguin Air Conditioners (B). You can see from the diagrams the gasket configuration changes when using a different model number. Currently all of the models use the same aluminum return air frame configuration, even though the discharge of the AC is not in the same place. This current Newmar plenum is “universal” and will fit all A/C configurations.

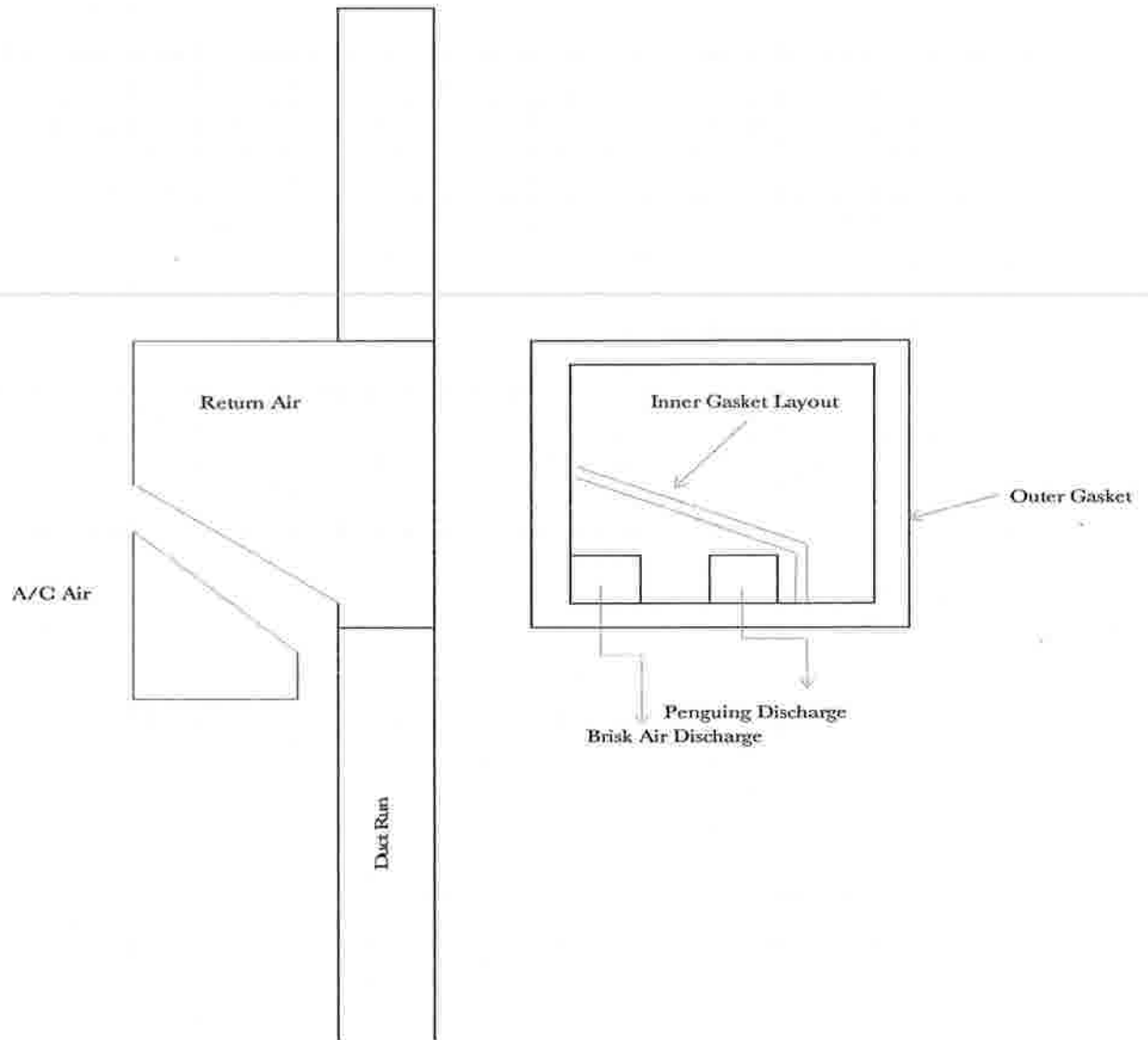
A. Brisk AC Gasket Configuration without universal plenum.



B. Penguin AC Gasket Configuration without universal.



C. Current Universal Plenum Configuration fits all Dometic A/C's



Note: This universal plenum can be added on to any Newmar coach. It increases air flow because of the larger openings in the intake and discharge vents.

When removing the AC from the roof for repairs, or replacing the AC with a new one, you *must install new gaskets*. These gaskets are *not* provided with a new air conditioner. You will need to order these gaskets separately.

The only gasket that comes with a new AC is the large 14" x 14" square mounting gasket. You can secure the AC to the roof again using the same lag bolts and washers, or order new ones with the gaskets if needed. The Newmar part numbers for each of the additional gaskets and hardware are as follows.....

Gasket Requirements for Penguin and Brisk AC's

Penguin A/C

1 each	1" x 16" x 1 1/2"	gasket part #52715	
4 each	2" x 2 1/2"	gasket part #28165	> These 3 parts are now a kit
1 each	14" x 14"	gasket part #00830	part #017841
3 each	2 1/4" x 3/8"	lag bolt part #28774	
1 each	3 1/4" x 3/8"	lag bolt part #29785	

Brisk A/C

1 each	1" x 16" x 1 1/2"	part #52715	
1 each	14" X 14"	part # 04768	> These 3 parts are now a kit
3 each	2" x 2" x 1/2"	part # 28165	part #017841
1 each	2" x 2" x 1 1/4"	part # 57381	
3 each	2 1/4" x 3/8"	part # 28774	
1 each	3 1/4" x 3/8"	part # 29785	

Please contact the Newmar Corporation Parts Department to place your order.
1-800-561-5790

After you have installed all of the gaskets onto the base of the AC, you should tighten the AC down to the roof with lag bolts. These lag bolts may be used again when installing the AC. Tighten the lag bolts so you do not exceed 60 inch pounds of torque.

If you do not have a way to measure the pounds of torque, you can watch the 14" x 14" gasket being compressed as you tighten the lag. You should tighten the lag until the gasket is 50% compressed, or half the original depth in size.

Failure to install new gaskets to the base of the AC may cause the following....

- A.) Excessive noise and vibration
- B.) Lack of air flow
- C.) Poor cooling
- D.) Freezing up of the evaporator coil
- E.) Short cycling
- F.) Water condensation inside the AC
- G.) Water leaks into the AC ventilation ducts
- H.) Water damage to the inside of the roof and coach

Construction of the A/C Duct

The transfer of air throughout a Newmar coach is made with ventilation ducts. These ducts include an intake duct, which starts air flowing through a filter first, then the air finishes when passing through the exit duct and ceiling vent.

After the air moves through a *new* filter, 50% of the air flow is lost due to the density of the filtration device. As air moves across and through the filter to the A/C evaporator coil, it then passes to the exit duct. This duct provides the cool air.

Both the intake and exit ducts are uniform in size and shape. They provide an equal amount of air flow from one duct to the other. A dirty intake filter or a duct that is collapsing, or is obstructed, will cause the following symptoms....

Symptoms of Poor Air Flow

- A.) Inadequate cooling
- B.) A/C short cycle
- C.) A/C freeze up
- D.) Condensation in ducts
- E.) Water overflowing the A/C drain pan and subsequently into the ducts
- F.) Discolored air filter

If your customer complains about any of the above symptoms, you will have to determine where the lack of air flow is. If the intake filters are clean and all of the gaskets are properly installed on the bottom of the AC, the duct itself will need to be examined.

Duct and Ventilation Inspection

Duct inspection can be started by removing the ceiling vents inside the coach. Using a mirror and flashlight, look at the shape of the duct. A Newmar duct is built in a rectangular shape. If the duct is collapsing, you will likely notice this at the top. Your duct should measure approximately 2" of vertical clearance inside.

The top will be bowed downward toward the center. If you notice any concave shape in the ducts, completely inspect both the intake and exit ducts front and rear.

Any duct that is separated or not adjoined should be repaired. Also, you should look at the seal between the ceiling vent and duct. Check to be sure a bead silicon was used to join them together. Re-seal each vent with silicon after replacing it or having removed it for duct inspection.

Keep in mind the tape that the duct sections are joined with may not appear to seal from the inside of the duct. If the tape is loose on the outside of the duct, or the foil tape used under the AC is loose or separating, it must be repaired with new foil tape.

Duct and Ventilation Repair

After you have determined that a duct is in need of repair, please contact our warranty department with your customers needs. Your information will be used to complete a warranty authorization prior to your repairs being started.

Our warranty advisors will direct you with additional and timely advice to complete your repairs. Their advice may help save your shop time as they may have seen a particular item and direct you with a problem solving idea you may not have considered.

In most cases where a duct is partially collapsed, simply removing a light, ceiling vents, or by removing the AC, access can be made for the repair.

When you access a duct run where the duct needs to be expanded, a spacer can be inserted inside. It can be taped and sealed into place to maintain an open duct. If the duct is being pushed down by the installation in the roof, some of the insulation can be removed before expanding the duct. This will alleviate the pressure from the top and make it easier for the spacer to hold the original size of the duct.

If the ducts are collapsing from the entire front to rear of the coach, the roof may need to be removed so the thickness of the fiberglass insulation can be trimmed. When the entire roof is removed, new duct runs must be installed.

The following steps should be made when all of the ducts are being replaced:

1. Removal of all roof accessories, trim, and decking.
2. Removal of all interior AC vents intake and exit.
3. Removal of collapsed ducts.
4. Installation of new ducts.
5. Installation of insulation at the proper thickness so there is not too much pressure put on top of the duct run.
6. Installation of new return-air and exit-air duct runs using foil tape. We do not recommend gray tapes or clear cellophane tape for the duct construction.
7. Assemble the roof and install all ceiling vents.

Air Conditioner Duct Construction & Repair

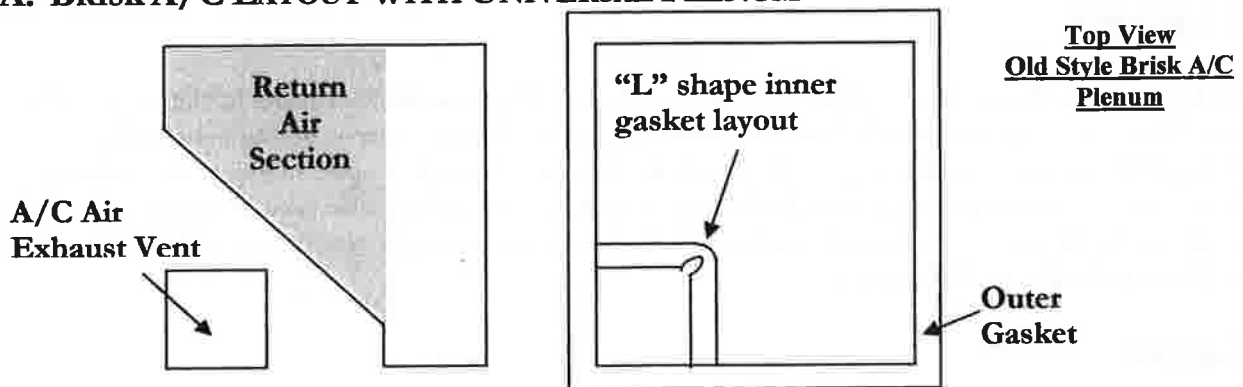
PROPER ROOF AIR CONDITIONER MOUNTING

At Newmar, there are two different models of air conditioners available on all towable and motorized units. The different models are the Dometic Brisk and Penguin models, which are installed on each RV as ordered. Over time, there has been some questions as to how each model is mounted and whether they are interchangeable with the same mounting.

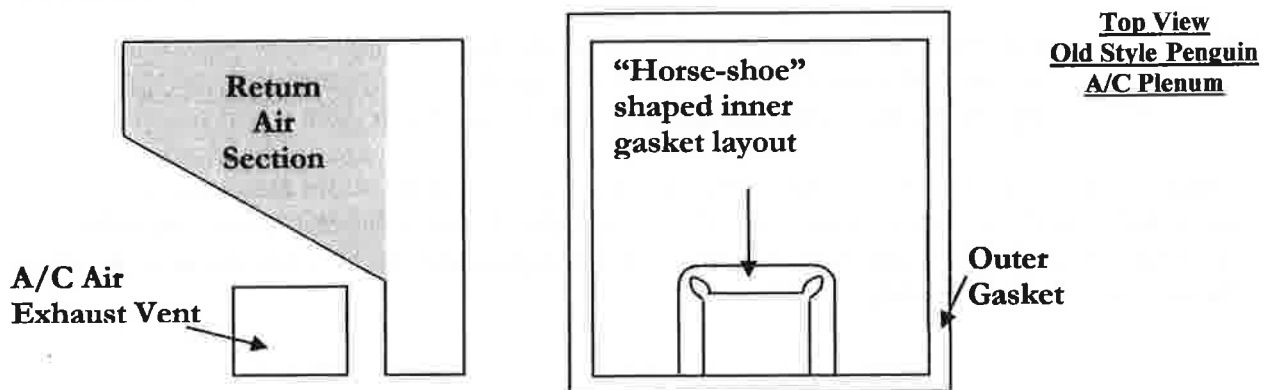
It is very important to know that these two mountings are not the same and only after proper modifications can the models be switched from one to the other. Although both models use the same gasket set, they use different plastic roof inserts and the layout of the gaskets are different. See the following diagrams that are labeled A for the Brisk models and B for the Penguin models.

The small inner gasket must be cut to fit on the Brisk A/C, but not on the Penguin A/C. Bend the gasket in an "L" shape for the Brisk, and a "Horse-shoe" shape for the Penguin. Place both the inner and outer gaskets on the bottom of the A/C before installing the air conditioner.

A. BRISK A/C LAYOUT WITH UNIVERSAL PLENUM



B. PENGUIN A/C LAYOUT WITH UNIVERSAL PLENUM



Each air conditioner is secured with four lag bolts that run into a bracket installed in the roof. There should be foam pads between the roof and the air conditioner that the mounting bolts go through to seal off the roof. The top of each bolt should be covered with silicone. The mounting bolts should be tightened to 60 inch pounds of torque.

Air Conditioner Duct Construction & Repair

Construction

Air conditioner ducts are made of foiled 1/4" foam core. They are taped at the edge and inserted in the rafter spaces and usually run the entire length of the unit (See picture 2.) There are two separate ducts side by side. One is for exhaust air and the other one is for return air. Each duct should have inside measurements of 1 3/4" X 8." As the roof section is assembled on the line the ducts are covered with yellow fiberglass insulation and then roof decking (usually 3/8 Luan) then covered with the rubber roof material. (See pictures 4 & 5.) In the case of a fiberglass roof, the yellow fiberglass insulation is covered with foam core before the single fiberglass roof section is laid on top.

Problem

Air conditioner ducts may collapse or flatten in certain areas. This does not allow enough airflow for the air conditioners to work properly. They will not cool very well, may freeze up frequently, or they may cool well in one area of the coach, but not another.

Diagnosis

To determine if the ducts are collapsed, open several or all air conditioner vents in the ceiling of the unit. Next, measure for the 1 3/4" and 2" inside clearance. Using a mirror in one vent and a flashlight in another, visually inspect the inside of the duct. Look for open seams at the corners. Also look for a rafter pushing through the top or bottom. Look for loose tape at the air conditioner. Be certain to check to make sure that there is an air tight seal between the ceiling vents and duct with Silicon 999 Sealant.

Causes

There are several reasons or causes of collapsed ducts. They are as follows:

- A. Too much insulation on the topside of the ducts.
- B. Not seamed correctly when folded and taped.
- C. Tape at the duct seam becomes brittle because of heat from a heat pump.

A unit with a collapsed duct system may be caused by any one of the above reasons or a combination of all situations mentioned. There could also be other reasons, which cause the structure of the ducts to weaken and breakdown causing poor airflow. The reasons mentioned are the most prevalent in our shop.

Air Conditioner Duct Construction & Repair

Solutions

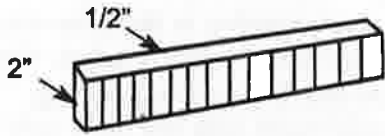
If a duct system is restricted or collapsed in only a small area, braces or supports can be made to insert into the duct. This will hold the duct open and is generally a good, quick fix if the customer is in a hurry and the duct system is not too bad. To make these supports, use a length of 1/2" plywood (usually long enough to reach from one air conditioner vent to another in the same run, 4 to 6 feet.) The plywood should be ripped to 2" to keep the 2" inside opened when installed. One side of the plywood will need cuts approximately every 1/2 to allow it to bend while installing through the ceiling vent. (See Diagram 1.) These side cuts are usually made with saw kerfs only 1/8" - 3/16" deep. This support should then be covered with a foil tape to help control the warmer temperature associated with a heat pump. Install the support into one vent until it can be reached through the second vent. With the help of another person, stand the support on edge to push the duct up and open. The ends of the support can be siliconed to help hold it in place.

If the duct system is broke open or collapsed in several areas the duct system will need to be replaced. This is the most complete and long term solution to this problem. Follow these steps:

1. Remove all roof accessories and trim.
2. Remove roof material and decking to expose yellow fiberglass insulation.
3. Inside the unit, remove all air conditioner ceiling vents that would tie into the duct system.
4. On the roof, fold back the yellow fiberglass insulation to expose the ducts. Note the thickness of this insulation.
5. Cut the centers out of the top of three rafters near the middle. On fifth wheels, cutting near the roof bend works best. Cutting these rafters makes removal of the old ducts and inserting new ones much easier.
6. Remove old collapsed ducts, noting where each run terminated at each end.
7. Prep the new ducts by making sure they are overlapped correctly and taped properly to strengthen the duct. (See diagram 2.) The duct seam should be overlapped so that the side of the duct supports downward pressure or weight. (See diagram 2.) Taping the seam should be done to help hold the seam together as noted above and layered for strength. A good quality foil tape works best and is recommended over gray tapes and clear cellophane tapes.
8. Install one side of the new duct one section at a time, by sliding into the opening of the three cut rafters. The ends of the ducts should be folded and taped for strength. Duct sections should be butted tight together and taped.
9. Install the second run by sliding it against the side of the first run. Watch carefully so the duct doesn't get damaged when pushing it through the rafters. Again tape each joint and fold and tape the ends.
10. Make sure at least every other rafter has a small piece of wood between the rafter and the duct. A 2 - 3" wide strip of panel or plywood will work to protect the duct from the rafter.
11. Cut pieces of 1 X 1 aluminum angle to replace the sections that were cut out. Overlap each side of the rafter by 2" and rivet or screw these to the rafters.
12. Replace the yellow fiberglass insulation. Thin the insulation that directly covers the ducts. Too much insulation is one of the reasons these ducts collapse. If 3" insulation was used it can be split so that 1 1/2" is above the duct and should not be too tight.
13. Re-assemble the rest of the roof.
14. Re-install all ceiling vents by drilling new 4 1/2", or 5.25 depending on ceiling vent size, holes into the new duct and install vents as normal.

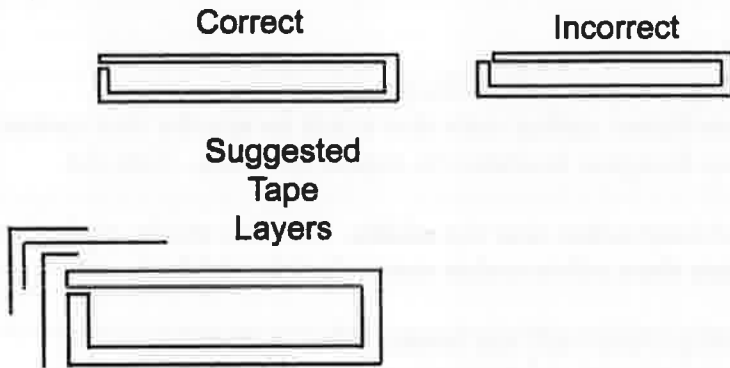
Air Conditioner Duct Construction & Repair

Diagram # 1



1/8" saw kerfs
4 - 6 ft. length on one side

Diagram # 2



Air Conditioner Duct Construction & Repair



PICT. #2

Air Conditioner Duct Construction & Repair



PICT. #4

Air Conditioner Duct Construction & Repair



PICT. #5

Air Conditioner Duct Construction & Repair



Pict. 8



Pict. 11

Air Conditioner Duct Construction & Repair



Pict. 12

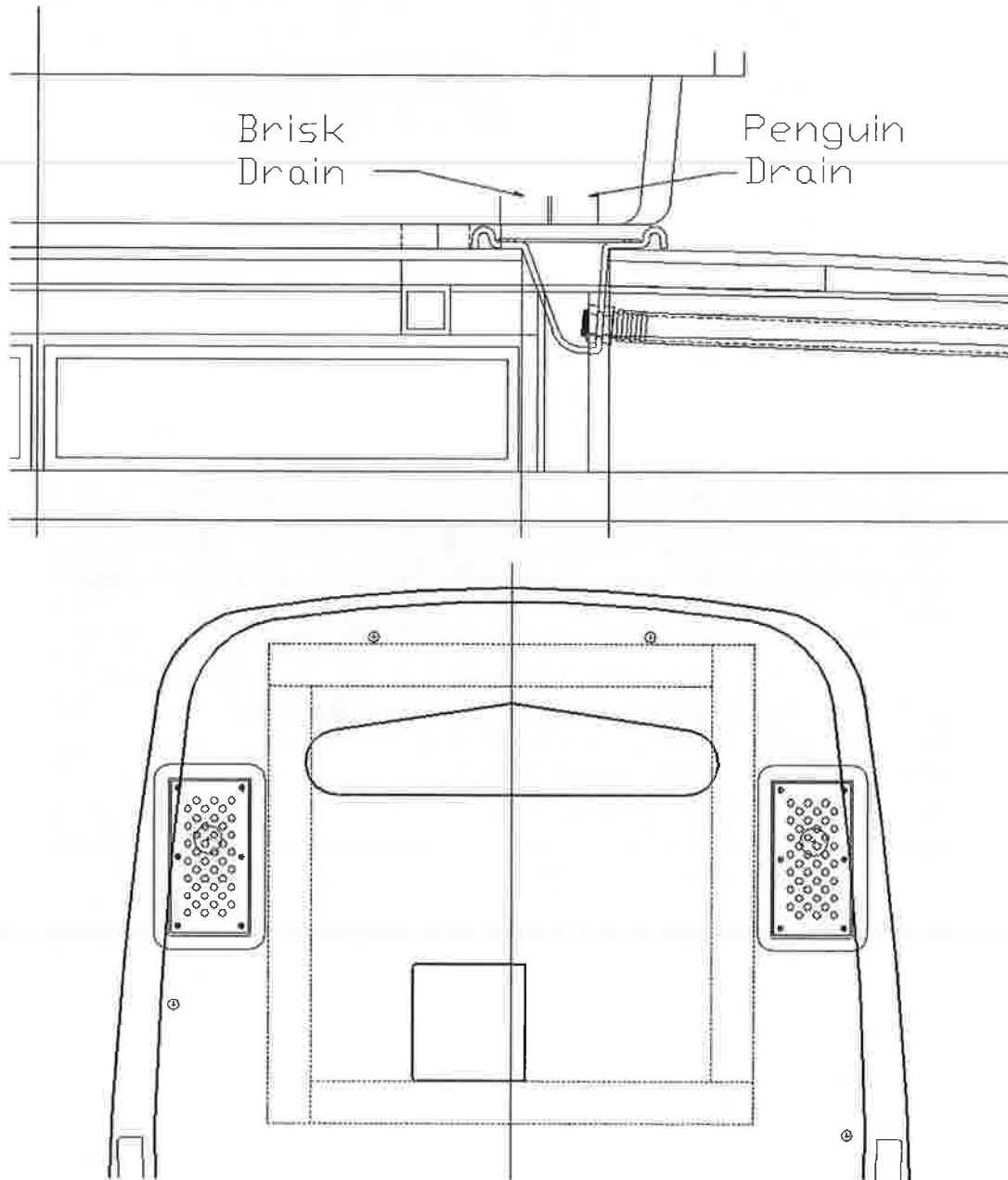


Pict. 13

Air Conditioner Duct Construction & Repair

2004 Essex Application

- Roof Mount, Duotherm air conditioner with water drains.
- Interior water condensation is caught in the air conditioner drain pan. The water then exits the air conditioner drain pan and gravitationally feeds through a screened cup. The water then flows through a 3/4" water line to the rear of the unit, down the inside of the rear cap. The water exits at the bottom of the cap.



Note: This drain system has been replaced with a gutter style rail on this model.