

Quick Airstream Heat

I am of Scottish ancestry and I am frugal. I use the heat pump in my Airstream Classic whenever possible so I can use free campground power rather than burn expensive propane. There are some problems associated with heat pump use:

- The heat pump provides only 13,500 BTU or 15,000 BTU, while the furnace provides several times that amount.
- The heat pump adds only a few degrees to the ambient air so that the output air feels cool for a long time when initially warming a cold trailer.
- The heat pump output does not warm the bedroom well when the bedroom door is closed.
- The heat pump becomes increasingly inefficient when the outside temperature nears freezing; just when heat is needed most. On a cold night, the temperature in the trailer slowly falls off as the outside temperature drops and the heat pump struggles. The automatic switchover to furnace occurs when outdoor temperature drops to the mid-to-high-30s, long after the interior has started to feel uncomfortable.

These problems led me to question why the furnace and heat pump can not be run together to initially heat the trailer and, later, to augment the heat pump as outside temperatures fall or simply to change the switchover point from heat pump to furnace to the user's preference. Unfortunately, the Dometic "Comfort Control" system as installed in Airstreams, makes no provision to run both heat sources simultaneously and no provision to modify the changeover point.

All this can be done easily by any owner for less than \$20 and the addition of only two wires. First, let me describe how the "Comfort Control" system works:

- The Comfort Control (CC) is connected to the air conditioner/heat pump (AC/HP) by a 4-wire telephone cord. The outer wires carry +12v and ground from the AC/HP to power the thermostat. The inner 2 wires carry a serial digital signal very similar to the USB port on your computer.
- The CC sends signal sequences to the heat pump to start and stop operation as the mode and interior temperature requires.
- There are CC signal sequences to switch to AC, furnace, or fan-only mode and to change the fan speed.
- There is no sequence that will run both furnace and heat pump simultaneously.

When the Comfort Control is set to "Furnace" or when set to heat pump and heat is required and the outdoor temperature nears freezing, the AC/HP control makes contact between two wires that run to the furnace and shuts down the heat pump. The connection between the two wires to the furnace starts the furnace fan. Airflow moves a vane to indicate that there is sufficient circulation for safe combustion and this causes the furnace burner to be lighted. When the wires are again disconnected, combustion stops and the furnace fan runs for several minutes to cool down the unit.

The AC/HP and the furnace do not compete for resources. The AC/HP uses 120v AC power and very minimal +12v while the furnace uses +12v power to run the fan and propane for combustion. There is no reason that both heat sources can not operate simultaneously. This will result in faster initial warm up and a more comfortable trailer in cold weather while making maximum use of the heat pump to conserve propane.

The only convenient place to access the wires from the AC/HP to the furnace is by removing the filter on the curb side of the AC/HP shroud. Inside, you will find a number of wire connections. The only two wires that

we will be interested in are the two blue wires coming down from the AC/HP. These wires connect to a blue and a blue/white wire to the furnace. When a connection is made between these wires, the furnace runs.

My first thought was to mount a simple single-pole, on-off-on toggle switch on the shroud which would connect the two blue wires, causing the furnace to run. This would run the furnace with no temperature control. I am quite forgetful, so this is a bad idea. After toying with this approach, I decided on something much better.

Materials and Tools

You will need an electric drill and several bits, a Phillips screwdriver, a small thermostat, several feet of #14, stranded automotive hookup wire, two piggyback connectors, and two AA batteries.

I purchased a small, cheap thermostat from Home Depot and mounted it on the side of the AC/HP shroud. I chose the “ritetemp 6009” thermostat because it is fairly small to fit the shroud side and costs only about \$17. “ritetemp” is a Home Depot house brand. Almost any other small thermostat would do as well. There is a “Heat only” version of the model that I bought that is several dollars cheaper, but few stores stock heat only thermostats in Texas.

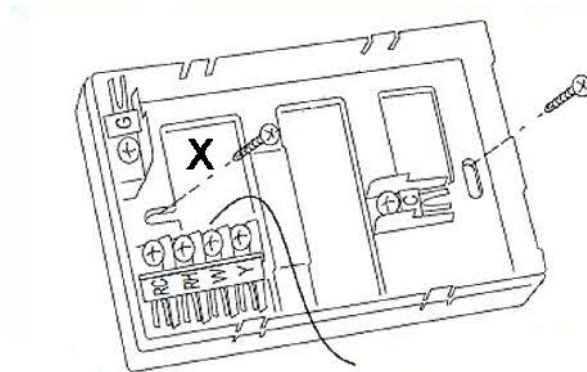


ritetemp 6009

The side of the AC/HP shroud is a good place for the thermostat since it will react to the temperature of the ambient air being drawn into the plenum. Reading the thermostat overhead is a bit awkward, so I used a Sharpie pen to clearly mark the 10-degree points on the dial.

There are two switches on the heat/cool thermostat. The upper switch selects “heat-off-cool”. Switch to heat to have the thermostat control the furnace. You can switch to “off” to save the batteries when the trailer is stored or it is not in the heating season. The lower switch controls the fan in a home system. In our application, it will have no effect and can be ignored.

I recommend wiring the thermostat base before installation on the shroud. It is a lot easier to manipulate the tiny screws at counter level. Pull the body of the thermostat away from the base and lay the body aside. Hold the base up to the shroud, tight against the ceiling, and use a pencil to mark the location of the two mounting screws and a place for the wires to enter the shroud (“X” in the diagram).



Remove the jumper between “RC” and “RH”. Connect 2 12” wires to terminals “RH” and “W”. Drill 1/4” hole in shroud at “X” to pass wires into shroud.

Wiring of the thermostat base

Prepare two 12”, hookup wires by stripping about 1/4” on one end. The diagram shows the location of the wiring terminals in the base. Attach one wire to terminal “RH” and the other wire to terminal “W” by twisting the stripped ends tightly and forming them into a “U” shape to go under the screws and small metal plates in the terminals. Space in the base is limited, and I do not recommend crimp-on terminals for these connections.

Drill two small holes in the shroud for the screws that will attach the base to the shroud. Drill a 1/4” hole for the wires to pass through. Insert the wires from the base through the 1/4” hole and mount the base with the included screws. Insert two AA batteries in the thermostat body, observing polarity, and snap the body firmly into the base.

Remove the filter and pull down the mess of wires as shown. You will now use crimp piggyback connectors to connect your two new blue wires to the blue wires coming out of the AC/HP

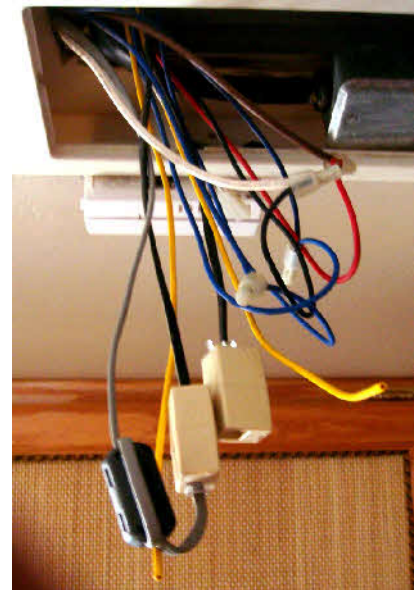
I leave the new thermostat set for 60 degrees. With the thermostat switch set to "Heat", both heat sources will run until my trailer reaches 60 degrees. After that, the heat pump alone will continue to warm the trailer. As an added benefit, the heat is better spread throughout the trailer than by either heat source alone.

If the night time temperatures drop to the point where the heat pump can not maintain my trailer above 60 degrees,, the furnace runs as necessary to keep the trailer at or above that temperature. This is an example: you can choose your own setting.

You can dress up the portion of the base that protrudes below the shroud. I used a fuzzy strip of self-adhesive white Velcro to cover this part of the base.

Test the new thermostat by switching it to "Heat" and turning the thermostat up until you hear the furnace start. Turn the thermostat back down. The furnace blower should continue for several minutes with no heat being produced. Repeat the test for the Comfort Control.

If the AA batteries in the thermostat become low, a LED on the face of the thermostat will start blinking well before the thermostat fails to operate. The batteries should last over a year. If the thermostat is switched off when heating is not needed, the batteries will probably last their shelf life,



Wires pulled down.



The final Installation