

Remember that you are working on a heating system and not just a furnace. A majority of furnace problems lie outside of the product itself. Therefore, when trouble-shooting a furnace problem, always check the following items before testing or replacing components.

#1 - GAS PRESSURE

The gas pressure should be set at a minimum of 11" W.C. with a minimum of 50% and ideally 100% of the gas fired appliances operating. You should test this pressure with a U-tube Manometer only. If you choose to use a dial-type manometer, calibrate it often with a U-tube manometer.

#2 - VOLTAGE

Voltage to the furnace should be between 10.5 and 13.5 VDC during operation with the interior lights ON and OFF. This check should be made with the battery, converter or generator when applicable. Use a digital or analog multi-meter when taking voltage readings. Do not use a test light. It does not provide enough useful information for proper diagnosis.

#3 - DUCTING

Always make sure that the furnace has at least the minimum number of ducts (not including closeable outlets) called out in the installation instructions. Check for proper duct connections at the furnace and heat registers, collapsed ducts and holes in the ducting. The duct runs must be as straight and tight as possible. The heat ducts must also be clean and clear of obstructions.

#4 - RETURN AIR

The return air passage should meet the minimum square inches as specified for the particular model of furnace in the installation instructions. This air passage should also be clean and clear of obstructions. Do not put air filters in this passage way. Also make sure that combustibles are not stored in the furnace compartment.

#1 - Gas Pressure

A furnace is a consumer's friend when the outside temperature gets colder. Unfortunately though, cold is an enemy of LP gas. The BTU capacity of LP per volume decreases as the outside temperature gets colder. Therefore, based on how full the LP tanks are, the ambient temperature outside and how many BTU's the furnace is, there may not be enough gas to sustain ignition on the furnace.

Using the charts below, let's say that a 40,000 BTU furnace won't fire up, and we also know that the 65 lb. LP bottle on the RV is 40% full and it is 0 degrees F. outside. One's first thought might be that the burner or valve is bad. However, if

we use the chart, the vaporization capacity of the tank in these conditions is only 38,500 BTU's. The furnace is not going to perform very well because there is insufficient BTU capacity in the tank.

If you were to put an insulated fire resistant blanket over the tanks and a 75 watt light bulb under that, you would probably raise the temperature of the bottles 10-20 degrees and almost double the BTU capacity of the tank. This in turn would allow the furnace to operate properly. So keep in mind that a furnace problem is not always a component problem.

| 20 lb. Bottle (*30 lb. bottle multiply X 1.40) | | | | | | |
|---|-------------|-----------|------------|-------------|-------------|--|
| % Full | +20° | 0° | -5° | -10° | -15° | |
| 60% | 36,000 | 18,000 | 12,750 | 8,500 | 4,250 | |
| 50% | 32,400 | 16,200 | 12,150 | 8,100 | 4,050 | |
| 40% | 28,800 | 14,400 | 11,400 | 7,600 | 3,800 | |
| 30% | 25,200 | 12,600 | 10,450 | 7,300 | 3,150 | |
| 20% | 21,600 | 10,800 | 8,100 | 5,400 | 2,700 | |
| 10% | 16,200 | 8,100 | 6,075 | 4,050 | 2,025 | |

| 65 lb. Under Mtd. LP Gas Tank BTU available at | | | | | | |
|---|-------------|-----------|------------|-------------|-------------|--|
| % Full | +20° | 0° | -5° | -10° | -15° | |
| 60% | 95,600 | 47,800 | 36,000 | 23,900 | 12,100 | |
| 50% | 86,000 | 43,000 | 32,250 | 21,500 | 11,750 | |
| 40% | 77,000 | 38,500 | 29,250 | 19,250 | 9,625 | |
| 30% | 68,000 | 34,000 | 25,500 | 17,000 | 8,500 | |
| 20% | 58,000 | 29,000 | 21,750 | 14,500 | 7,250 | |
| 10% | 43,200 | 21,600 | 16,200 | 10,800 | 5,400 | |

#2 - Voltage

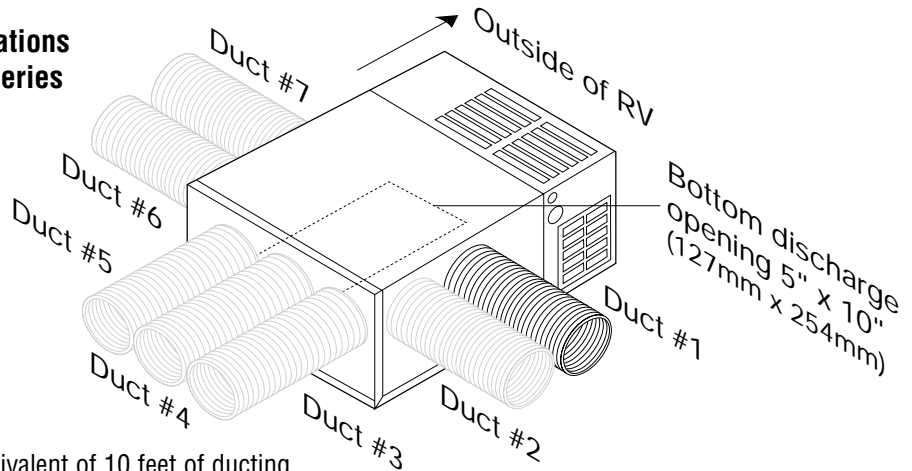
Explained sufficiently under the 4 Always.

#3 - Minimum Ducting Requirements

The various BTU sizes of 85 and 89 series furnaces require a minimum number of square inches of heat ducting. The most common size of soft ducting is 4" diameter. Therefore, since a 4" duct is equal to 12 square inches, we can call out the minimum number of ducts needed for the models of furnaces noted below.

| Furnace Model | Minimum Ducting | Minimum Ducts |
|------------------|-----------------|---------------|
| 8516, 8520, 8525 | 24 sq. in. | 2 |
| 8531, 8535 | 36 sq. in. | 3 |
| 8935, 8940 | 48 sq. in. | 4 |

Ducting Locations 85 and 89 Series



CAUTION - Ducting Installation

4" Flexible Hose

- each 90° bend adds the equivalent of 10 feet of ducting
- ducting should be securely attached to furnace
- each run should be as straight and short as possible

2" Flexible Hose

- 2 - 2" duct runs do not equal one 4" duct. A 2" duct is only 3 sq/inches
- 2" duct adapters are available
- 2" ducts are ideally suited for bathroom and holding tank compartments

Closeable Outlets

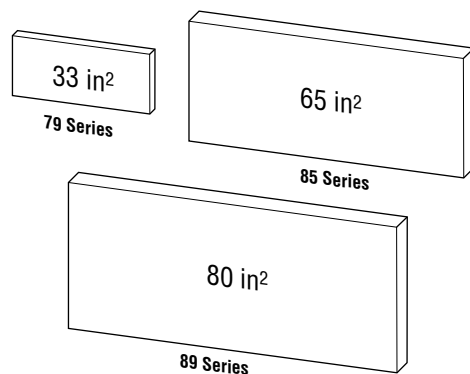
- a closeable outlet does not contribute to the minimum of total outlets recommended for a furnace.

Bottom Discharge

- furnace must be completely sealed to floor and plenum with a bottom discharge gasket, with no air gaps.
- if furnace is installed in middle of run, the main duct run must be a minimum of 24 sq/inches.
- if furnace is installed at the end of the run, the main duct must be 48 sq/inches.

#4 - Return Air

This return air requirement can be met in a couple of ways.



- The return air grille mounted on an inside wall of the trailer, exposed to the cabinet area of the furnace is the most common mounting used on the 85 and 89 Series furnaces.
- Another option is to provide openings at various locations in the furnace cabinet area capable of drawing air from inside the trailer (ie. rowtered holes at bases of sofas or walls, etc.).

The total square inches of openings must meet minimum requirements.

Do not place any types of air filters in front of or behind the return air door. Blocking this area will substantially decrease the return air causing - less air delivery to the heat registers - short cycle of the furnace - limiting of the furnace.

We recommend electrical air filters that can be placed anywhere in the open living area of the recreation vehicle. They can be purchased in most hardware stores.