Suburban

An *AIRXCEL* Brand

SF-VH Furnace Ducting Guide

Thank you for choosing Suburban for your heating needs. Your duct system will be supplied with warm air using any of the ten duct ports that exist on the SF-VH model furnace as shown below.

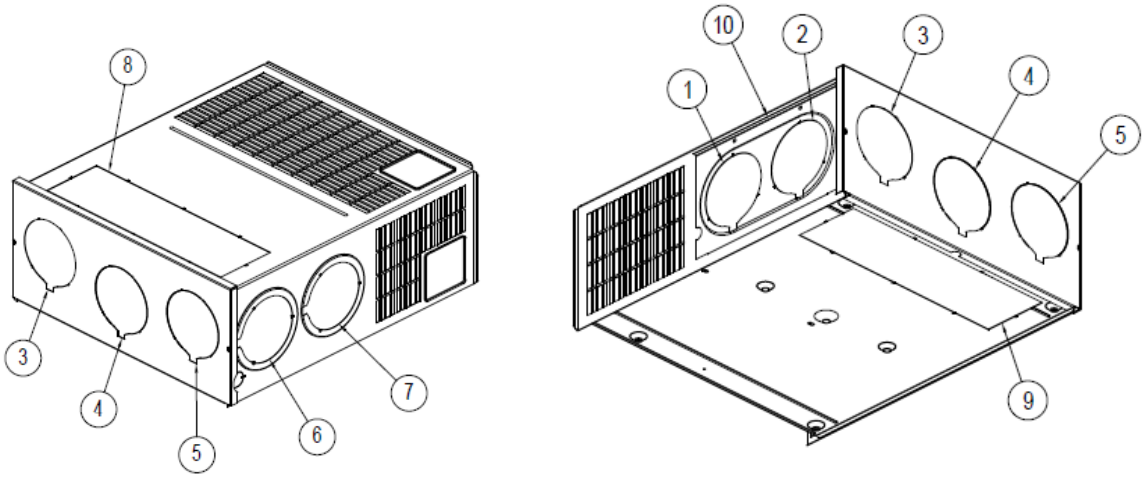


Figure 1

Regardless to which port you choose, the minimum quantity of ducts must be met as specified in your furnace's Installation, Operation and Maintenance manual (IOM). An IOM was provided to you with the product. The airflow within the furnace is subjected to a variety of flow paths depending on the duct ports used. Consequently, some duct ports flow better than others, allowing for optimal performance of the furnace. Some configurations should be avoided, if at all possible. The following table indicates possible configurations based on minimum duct requirements (the numbers in the table refer to duct ports in Figure 1 above):

Best Configurations		**Avoid if Possible**		**Do Not Use**	
SF-35VH(F)Q	**SF-42VH(F)Q**	**SF-35VH(F)Q**	**SF-42VH(F)Q**	**SF-35VH(F)Q**	**SF-42VH(F)Q**
9	9	5,6,7	4,5,6,7	None	None
10	10*	4,6,7	1,4,6,7		
2,3, + Any Other Duct	2,3, + Any 2 Other Ducts	1,4,7	1,2,4,7		
1,2,6	1,2,6,7				

*Requires the use of SF-42 Bottom Duct Kit, 520753

Note: Duct port #5 has little impact on limit temperature. If trying to improve a limiting condition, use duct port #2 and/or #3 instead.

All duct configurations are subject to proper ducting installation as specified in the IOM.

! WARNING

All warm air supply ducting and duct connectors must conform to the requirements of NFPA 1192, *Standard for Recreational Vehicles* and UL 181, *Standard for Safety Factory-Made Air Ducts and Air Connectors*.

TIPS FOR IMPROVED AIRFLOW THROUGH DUCTING SUPPLY SYSTEM

The minimum open duct areas listed below must be maintained throughout entire duct system including through register. Airflow through a duct is greatly affected by crushed hose or sharp bends in flexible ducts.

NOTE: Ducts terminating in dead air space (e.g. holding tank compartments or cargo areas (Toy Boxes) with no means for return air re-circulation) should not be counted in the required duct area. Also, ducts ≤ 2″ diameter may be used to supply auxiliary flow from the furnace, but due to the restrictive nature of these small lines, they may not be counted in the required duct area. These lines are best suited for bathrooms, storage compartments and other small spaces.

A. No outlet register is to be placed within 18″ of the return air opening. Any register installed at 18″ should never be adjusted to blow the outlet air toward the return air opening. If a register is installed on a wall 90 degrees to the return air, it can be less than 18″. This also applies to any auxiliary heat sources, such as an electric wall heater or fireplace.
B. Make the duct connections at the furnace cabinet tight. Loose connections will result in overheating of the component parts on the furnace and a reduction of the heated air flow through the duct system.
C. Avoid making any sharp turns in the duct system. Sharp turns will increase the static pressure in the plenum area and could cause the furnace to cycle.
D. Avoid making multiple turns in the duct system. The straighter the duct system, the better the air flow, and the better the performance of the furnace.
E. Do not install air boosters in the duct system. Such devices will cause the furnace to cycle on limit and to have erratic sail switch operation.
F. Ensure all ducts and duct connectors are leak free. Use of approved UL 181 adhesive tape to seal leaks is suggested, particularly at the duct port. This will prevent warm air from recirculating back to the furnace inlet.
G. The total area (in^2) required from return air grate to the furnace return air louvers must be maintained (See Figure 2). Any blockage (including ducting, RV cabinet members, other RV components and appliances, etc.) in this path reduces return air area and must be considered.

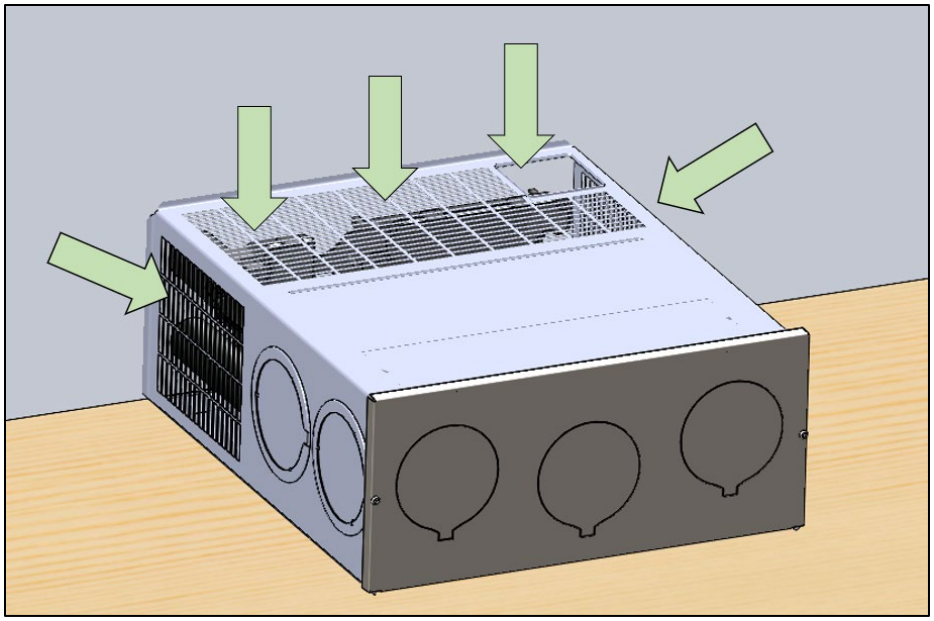


Figure 2

H. The clearances stated on your product are to be considered minimums and if only the minimums are met, there will NOT be sufficient supply of return air, particularly if using side duct ports. See explanation below.

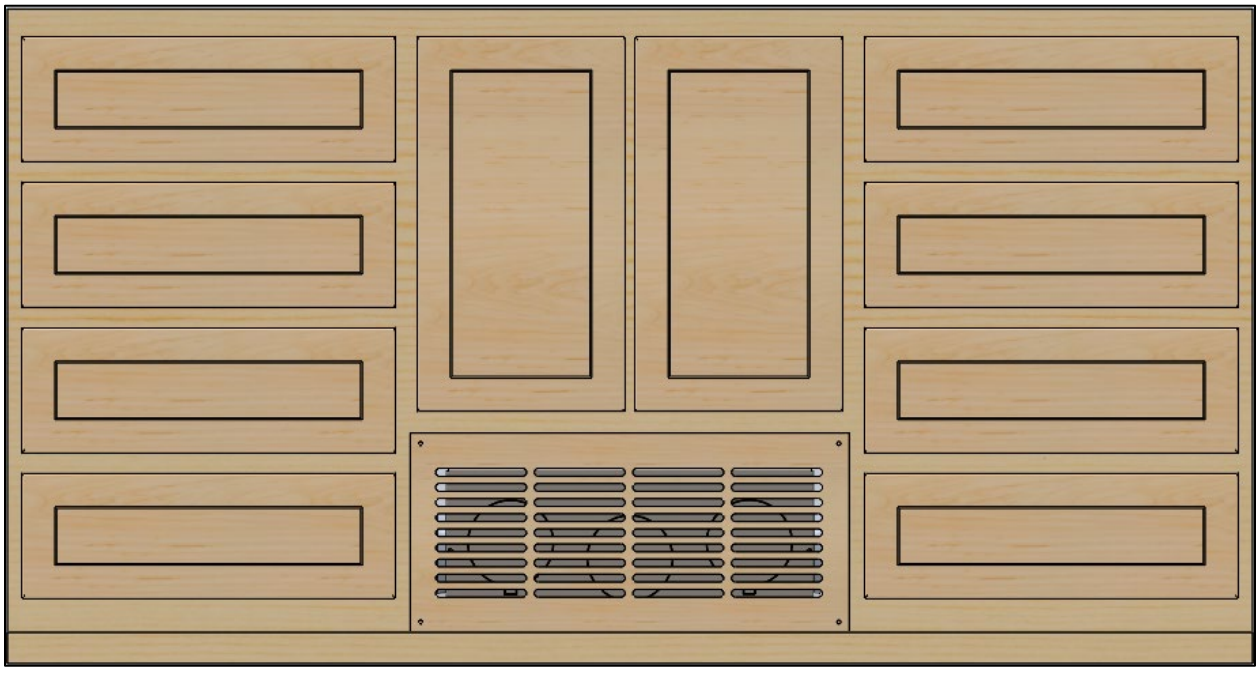


Figure 3

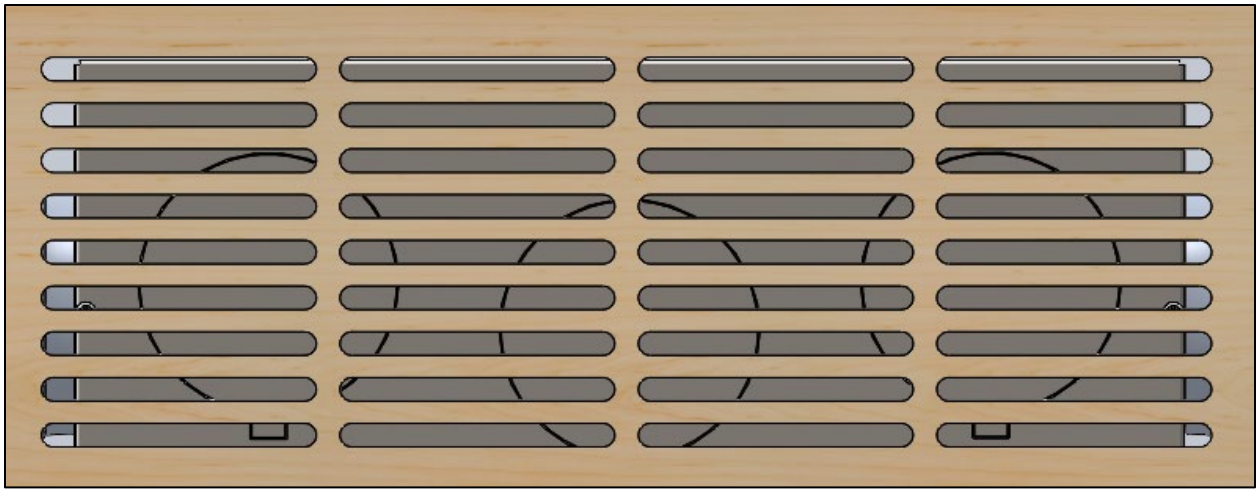


Figure 4

In this example, the return air grate has 9 rows of 4 louver openings.

Each louver opening is 4″ x 1/2″ = 2in^2.

Area per louver = 2in^2 x 9 rows x 4 columns = 72in^2 total open area in return air grate.

In the case of an SF-35VH(F)Q which requires 55in^2 minimum, this grate design is acceptable.

If we remove the grate and inspect the inside dimension of the cabinet, we find the cabinet was designed as tightly as possible to meet the minimum clearance to combustibles only. The SF-35VH(F)Q requires only 1″ clearance above and to the sides of the furnace. While this cabinet design is acceptable from a temperature perspective, we must still investigate whether the return air area is met to ensure the furnace will operate without limiting.

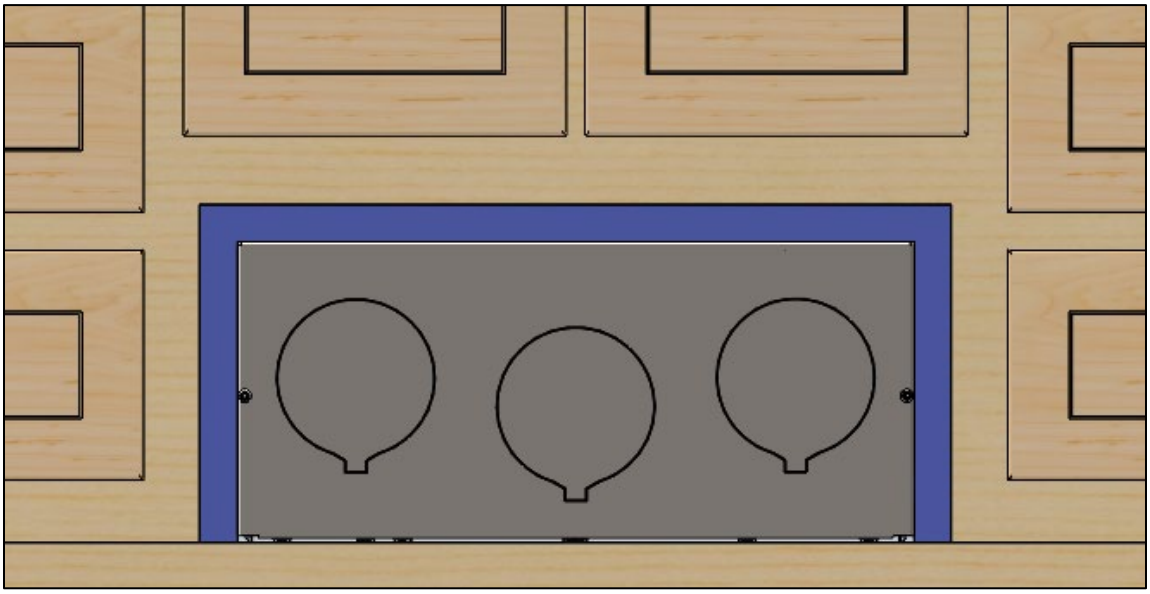


Figure 5

In Figure 5, we show this area bounded in blue which measures 34 in^2, which is below the allowable.

Further, if we add ducting off the sides of the furnace as shown in Figure 6, we obscure more return air area, which now measures only 26 in^2.

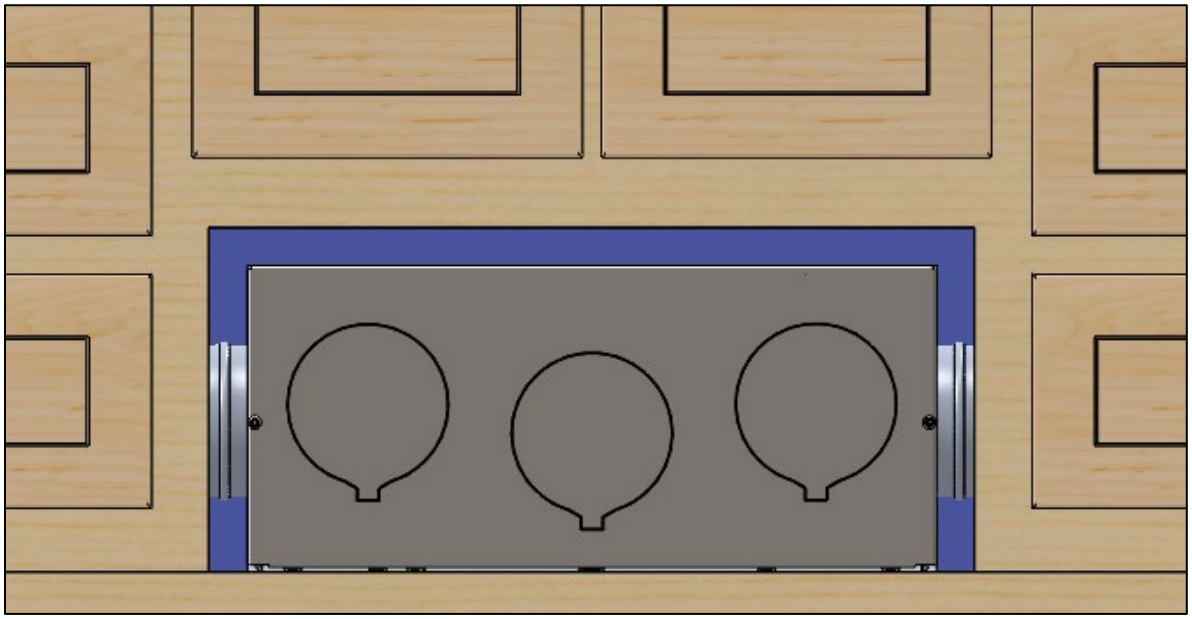
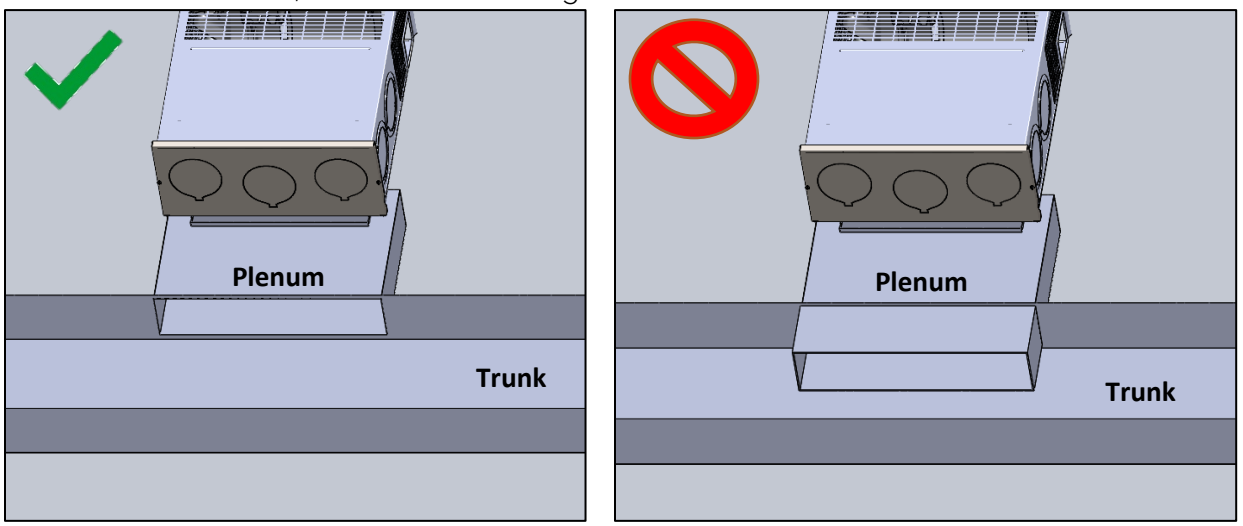


Figure 6

I. In the case of bottom ducting using duct #9 as shown in Figure #1, the cross-section must be maintained throughout plenum, trunk and registers. Common weaknesses in trunk systems could be:
    a. Undersized plenum reducing the flow area.
    b. Plenum, duct branches or register that extend into the trunk reduce the flow area.



    c. Furnace installed at front or rear of RV. Instead, a furnace centrally located along the length of the coach offers the best balance of airflow to the extreme ends of the RV.

J. Ensure flexible ducting is pulled taut enough to fully expand the product, but not so tight that sharp turns or compression of the product are induced.
K. Due to the nature of the compact furnace design, each duct port will provide different flows. Depending on your duct configuration, you must experiment with what duct ports to connect your supply lines to. Position the best flowing supply duct on ports that feed large rooms furthest from the furnace. In contrast, position lower flowing ducts to small rooms like a bathroom.
L. The location of your thermostat should be:
    a. Central to the RV usually near the entry door
    b. As close as possible to the furnace's return grate
    c. On an inside wall
    d. Approximately 4-1/2 feet above the floor. Because heat rises, a thermostat located too high will be satisfied prematurely.