

Residential Refrigerator Install

2005 Dutch Star
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I decided to remove my Norcold 1200 refrigerator and replace it with a new residential refrigerator. The following applies to an installation in a 2005 Newmar Dutch Star floor model 4015 that was originally constructed with the Norcold installed over the rv furnace. Your experience may be considerably different than mine.

Why change?

We ordered our motorhome new in 2005. Our Norcold worked acceptably well but not great from day one. If we were sitting in a warm climate such as Florida or Texas in the summer months the fridge had a hard time maintaining an acceptable internal temperature. I consider a temperature of less than 40 degrees to be acceptable with a temp of 36 degrees being better. We found that if we had the motorhome parked in such a manner that the fridge was on the sunny side, the fridge would many times have a temp rise into the 42-45 degree range. When on the move the temp rise was worse. Often into the 48 to 50 degree range. These high temps occurred mostly after the 2nd year of use and got progressively worse. We did many of the maintenance procedures that were recommended on this and other websites as well as the Norcold recommended remedies with no improvement. We even had Norcold authorized techs check it out with no improvement.

Additionally, like many of you, I have been watching Norcold slowly inching up their recalls to more recently made units. I knew it was only a matter of time before our fridge would be included in a recall. My big disappointment with Norcold is that they were slow to get many of us into the recall thereby leaving us in a potentially dangerous situation should the heating units overheat. My understanding is that the cooling unit has welds that were not up to snuff which is part of the potential fire hazard. The straw that broke the camel's back is the latest recall. This recall installs equipment that detects an overheat situation and shuts down your fridge. If you have a shutdown it is an indication that your cooling unit has to be replaced before the fridge can be used again. Even though this unsafe condition was the result of inferior workmanship on Norcolds part, they will not help you with the fix. It is your pocket that will have to buy the new cooling unit and have it installed. You can pay about \$1500 for the new Norcold cooling unit (I wouldn't) or about \$1050 for one of the better built Amish units- which is the one I would have used if I had kept the Norcold. If we used our rv for weekends and vacations I probably would have replaced the cooling unit with the Amish unit. However, we part-time in our rv from mid May to November and then take shorter trips each month during the winter. Typically we spend a total of about 7 months each year in the motorhome.

Therefore we wanted a safer option than the latest Norcold recall provides as well as better fridge performance.

The Project

The first step was to determine which residential refrigerator could be used in our rv. If possible, I did not want to have to remove a windshield or other window to get the new fridge into the rv. Therefore I had to take some careful measurements and search for an appropriate sized fridge.

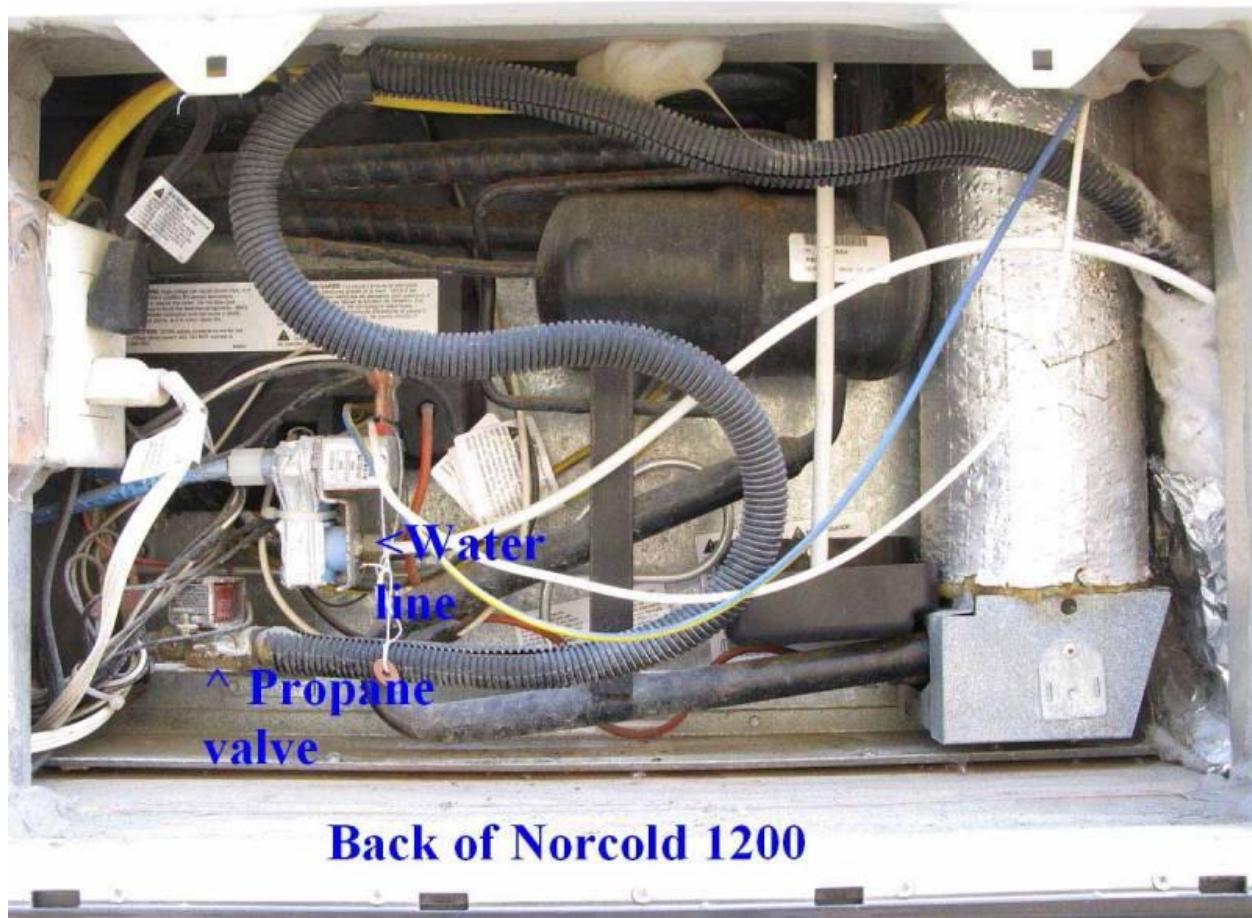
I found that if I was going to use the door to the rv as our entry point, I had a maximum of 24 7/8 inches of width with which to work. The Norcold with the doors removed was about 24 inches or slightly more in depth so it would come out through the rv entry door.

Most residential refrigerators are deeper than 24 inches which would necessitate the previously mentioned window removal. The only other option would be a counter depth residential model with a cabinet depth of about 24 inches with the doors and hinges removed. I found one such model made by Maytag that fit the bill. This model is actually sold under several companies that are owned by Whirlpool. I bought the Maytag since it was on sale at Home Depot. The model I used is MCD2358WEB. It is a 23 cubic foot model. The down side to a counter depth model is the cost- they are considerably more costly than the same size regular model. In my case the total delivered cost was \$1810. This includes an extended warranty for a total of 5 years. I had no labor costs but did have to buy wood, sealant, screws, more wood and casters to make a dolly, etc., so the total cost was about \$2000 complete. That makes this project about \$500 more than replacing the Norcold cooling unit with a new Norcold cooling unit or about \$950 more if I used the Amish unit. This also assumes that I would be providing the labor to replace the cooling units.

This Maytag is about 5 ¾ inches taller than the Norcold it was going to replace as well as about 3 ½ inches wider. In our rv this was going to require cabinet modifications for the install. Additionally, I was going to have to relocate or re-route a water drain line, hot & cold water lines, and the furnace propane line that happens to run under the original fridge support floor and over top of the furnace. They would have to be moved so that the new support floor could be lowered about 5 inches. Here's the old Norcold that was removed.



The first step was to get the Norcold out. This picture shows the back of the Norcold as viewed through the outside access door.



I turned off all power to the rv, and then disconnected the 120v and 12v lines to the fridge. All other connections to the fridge control board were pulled, then the water line for the ice maker. Prior to disconnecting the propane line, I closed the valve at the propane tank. Next 3 screws that were used to secure the Norcold to the support floor were removed to allow the unit to be slid forward. Fortunately Newmar does not glue their fridges down like some manufactures so I did not have to struggle with breaking any glues.

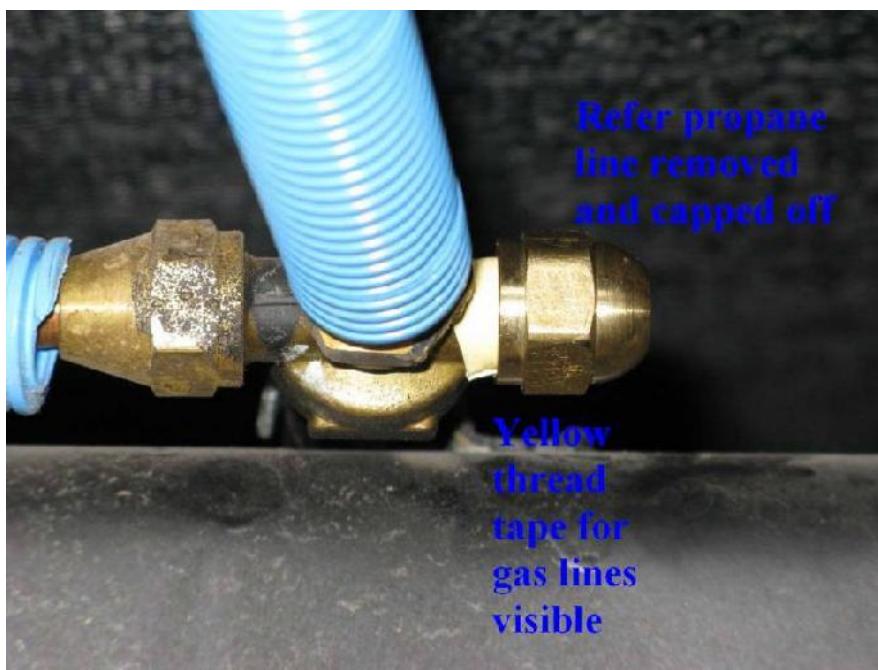
Inside the rv I removed all the doors and hinges from the front of the fridge. I also took out all of the shelves, drawers, etc. Then with the help of my son-in-law, we removed the fridge from its cabinet and took it out the front door. We left the cooling unit on the back of the fridge when we took it out. This made for a very tight fit going out the door. If I did this again, I would remove the cooling unit and anything else that I could from the back of the fridge prior to going out the door. I had removed the screen door from our motorhome to get maximum width for going through the door.

After the fridge was removed, I needed to remove the propane line that supplied the rv fridge. After identifying the correct line in the basement, I

removed it and capped it off at the junction in the basement. Pipe tape for gas lines was used on the threads. Later I checked for leaks with a soapy solution.



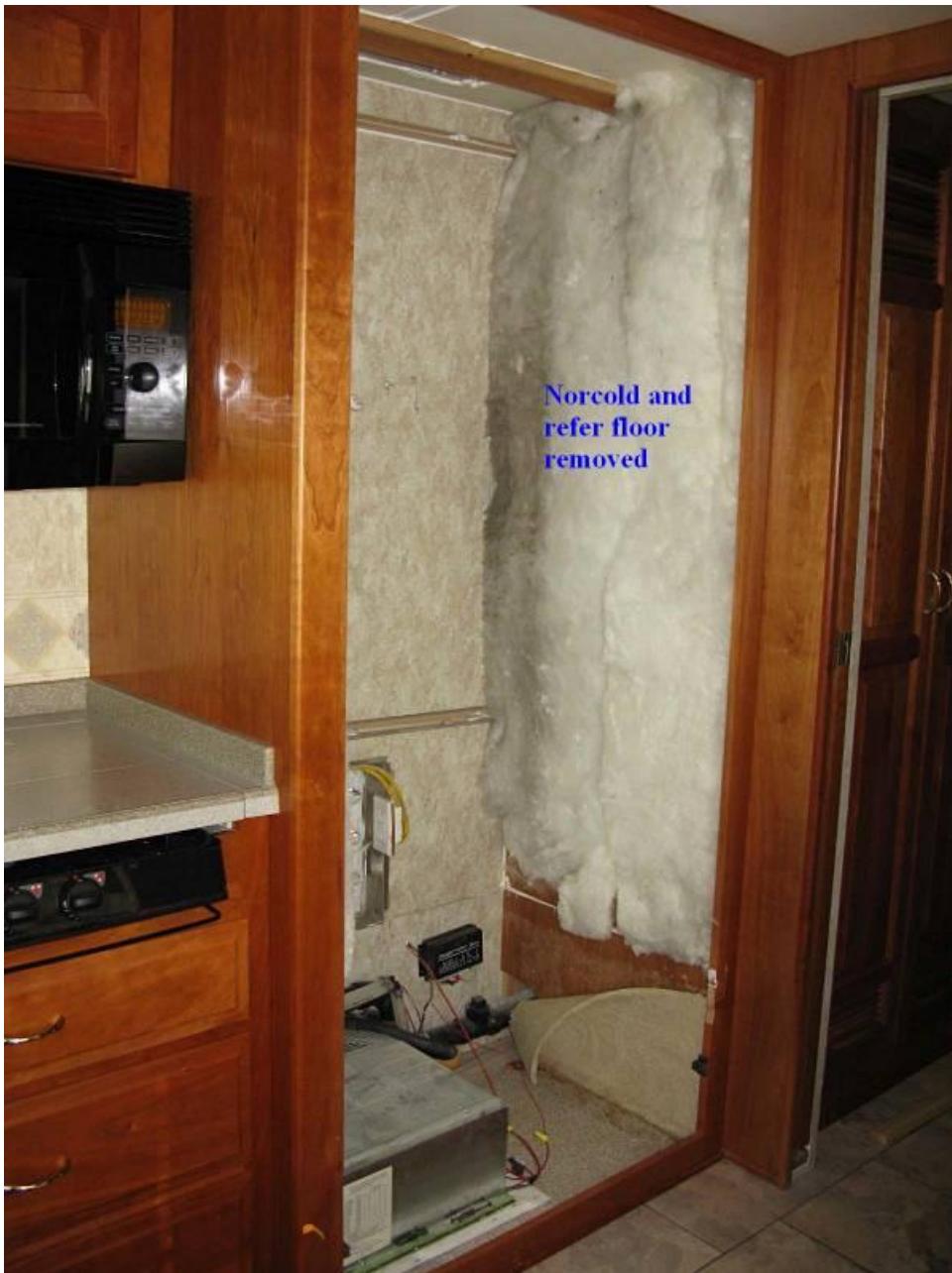
[Propane junction]



[Propane capped]

Next I had to remove the original support floor that the Norcold rested on. This proved to be more difficult than I anticipated. Newmar had the floor stapled, screwed, and glued in place. It was a pain but I got it out and even managed to salvage the bottom trim piece for reinstallation later.

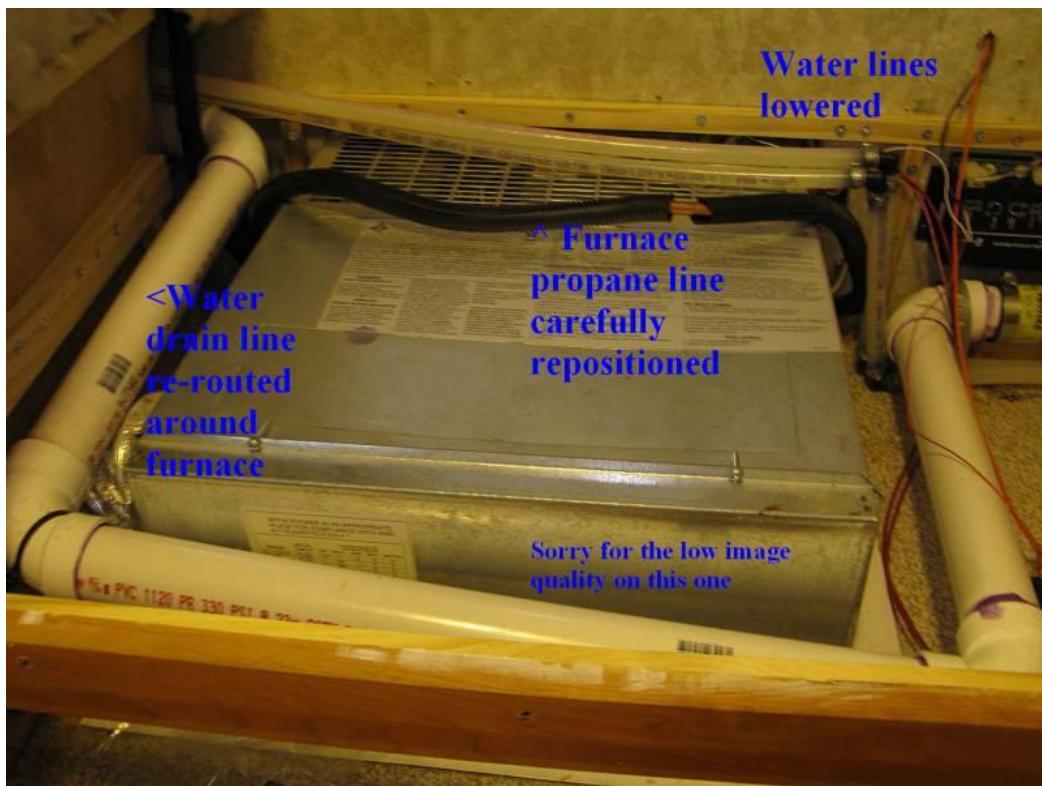
Here's the cabinet with the floor removed.



Before the new floor could be installed I had to move the drain line that comes from the kitchen sink and runs over top of the furnace. I also had to reduce the height of the hot and cold water lines and then carefully reposition the copper propane line the feeds the furnace. All this was necessary to gain the needed clearance for the new lowered fridge support floor. Here's a picture of the plumbing prior to relocation.



Here are the relocated lines. Unfortunately the photographer (me) did a poor job on this photo. To gain the necessary clearance I had no choice but to run the water drain pipe around the furnace.



The next picture shows the new support floor installed. I used additional support around the perimeter and one vertical support under the floor placed near the furnace (near the center of the new floor) to give additional strength to the floor.



Not shown in the picture is the cover I placed over the hole in the back wall and the sealant I used around everything along the back wall.

Next I fitted a piece of wood to close off the outside access door. This is to reduce weather and bug entry. The new cover is removable from the outside. It is equipped with a $\frac{1}{2}$ inch wide by 13 inch long screened vent to allow some venting. I'm going to enlarge this vent to allow more venting based on our 9 day trial run after this install was completed. The original overhead vent was left open.



The last step in the cabinet preparation was to trim the inside edge of the cabinet so that the wider and taller replacement fridge would fit. I measured and marked the cabinet then used a reciprocating saw to cut the wood. Someone smarter than me might choose to use a router.

With the cabinet modifications complete, I was now ready for the new fridge to be installed. However, I had one concern about the installation.

Once we got the fridge into the motorhome we were going to have to lift it vertically 9 ½ inches before we could slide it into the cabinet. Due to limited work space only one person would be lifting on the one side of the fridge. I was worried about straining a back so I decided to build my own dolly for this install.

The dolly was made to top out at exactly the same height as the new fridge support floor. It has casters on the bottom for ease of movement. The idea was to place the fridge on the dolly with 4 people lifting and then move it up to the cabinet. This worked well. It was easy to roll the fridge into place in the cabinet. No one had to strain anything for this install. By the way, since the dolly is essentially a box on wheels, I plan on turning it upside down in our motorhome basement and using it as a box. That way it will be with us all the time. Should I need to service the fridge in the future I can just roll the fridge out on to the dolly and spin it around as necessary. Here is the dolly in place after the fridge was slid back into the cabinet.



Outside, working through the access door behind the fridge, the water line was connected and the power cord inserted into the outlet. I also used a couple of brackets to attach to the back of the fridge to help hold it in place. I'm going to use some additional methods to secure the fridge, but I've not figured out what I'm going to do.

Here's a picture of the access door cover in place. The original outside cover fits in place and hides this cover.



Finally, here is the new refrigerator installed in the motorhome. There is some trim work to be done yet, but it is up and running.



A couple of notes concerning the new fridge. I'm starting out using only shore power or generator power to run the fridge. No additional batteries or inverter connection at this time. However, I will probably install a

refrigerator dedicated inverter in the future and see how the existing 4 batteries handle the load.

The new fridge was delivered to my home 3 days prior to installation in the motorhome. During that time it was plugged in and running. I monitored its power usage using a Kill A Watt P4400 meter. On compressor startup I would see up to 3.98 amps being pulled. That was the highest reading observed. When running otherwise, I saw readings between .92 and about 2.5 amps. The manual says that it can run as high as 7.2 amps but I've not seen that yet. *Editor's note: The icemaker will add a lot of amps when it goes through its heating cycle, but that's only for a minute or two.*

The shelves in a residential refrigerator are not secured as in an rv fridge. Therefore, I used some white electrical ties to secure the rear of the shelves to their brackets. I'm also planning to support the front edge of the shelves with some of those self adhering hooks placed on the sidewall and under the front of the shelf.

I also purchased several of those adjustable refrigerator bars that can be used to secure items on their shelves while the rv is moving. I sure do not want the beer to be spilled! 

Note on cooling:

This unit has the cooling coils on the bottom of the fridge. The same as our home fridge. While I had the fridge running in my home, I noticed that there was air exiting the front left grill area and rear left of the fridge. Also the fridge is not flush against the wall in the back. There is about a 2.5 inch space from the wall to the back of the fridge. This area is the same as the Norcold had behind it. The roof vent was not modified. As you know, I did modify the access door area. I'm going to modify the cover by enlarging the vent to allow more air to pass into the compartment. I'm doing this in response to seeing a 1 degree increase in the refrigerator side which may indicate it is not cooling quite the same as when it was sitting in my home. Plus I left the original insulation in the cabinet on the sides of the fridge. I may remove the insulation if needed. Since I have 12v and 120v available I could also put a switched fan in the cabinet if necessary. I have several wireless thermometers that I can place in various locations to see what is happening. This is also the reason I kept my dolly. It's a one man job to roll the fridge in and out, so adjustments will be relatively easy. As I experiment with this I'll get it right.
