

## Ice Box Conversion

Karen and I have started enjoying long cruises. With the availability and poor efficiency of ice, refrigeration became a critical path fix. We chose the Norcold SCQT-4400 6 cubic foot Ice box conversion kit mostly because it was available through West Marine without shipping costs. This article is intended to discuss the installation, costs, efficiencies, and (Great!) results for those in the “same boat” as us without a fridge.

The installation was challenging but very do-able. The instruction says that if you are a fairly good handy man you should have no problem with the install. So, if you think you are good, and your spouse thinks your fair, have no fear, you can do it. The unit has two parts; the compressor (which has to find a ventilated home somewhere) and the evaporator (which goes directly in the ice box).



The first step per the instructions is to find a large deep cabinet with unused space in the back. I have a 32' C&C racer / cruiser. The cruiser part of the boat has a great layout with teak walls and teak & holly floor. The racer part of the boat means cabinets are a waste of space and don't exist let alone be large and deep. I opted to locate the 14" x 8" x 6" compressor in the large step in lasserette near the bulkhead adjacent to the ice box. The

lasserette gets a workout storing all the lines, sheets, fenders, etc. The compressor had to be located in a ventilated enclosure to protect it from the abuse. I chose PVC lattice, and will get into that part later on. I located the compressor on a platform that was abandoned when I ripped out the hot water heater after it caused chronic engine overheating.



The 16" x 8" x 10" evaporator plate only has a few placement options. I chose to keep the large part of the plate near the galley and away from the hull side which is the warmest part of the box. The plate easily screws into the box with stand-off pegs. A thermostat switch is also installed very close to the front of the box with wires being attached neatly with clips. The thermostat is cleverly rounded to fit in the curved corner of the ice box.

The most fearful part of the whole process was the handling of the 12' of refrigerant charged fragile tubing. This coil had to be unwound very carefully. One kink and you have \$700 of crap-o-la on your hands. It reminded me of assigning a 250lb to foredeck during a race. After George of the jungle got through with a jibe, the crew shouted “Ballerinas not Baboons”. The point is

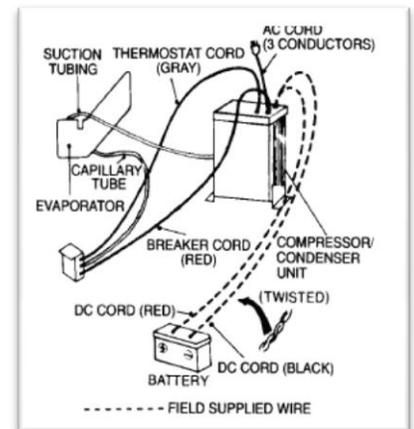
finesse is required. The tubing must have certain bends to double back to your opening and then a bend out the exit. The instructions said use your tube bender (like that was not going to happen) or use something with about a 2 1/2" radius like a can. I found that a large can of WD-40 worked perfectly to make the bends in the tubing. Remember... "Ballerinas" when you're making the bends. Once all the bends are made to track back to the compressor, roll any extra tubing back into a large 13" coil to keep it neat. I purchased some split foam tube insulation and installed it on all the exposed tubing. While I'm on insulation, after the wires and tubing was passed through the ice box exit hole, I pumped as much aerosol foam with the long tip as I could in the void. I also made holes under and behind out of sight to pump as much extra insulation around the box as I could.



Next step was to carefully engage the two quick connect fittings on the tubing from the evaporator to the condenser. Just make sure they are not cross-threaded and quickly tighten them. A small hiss can be heard. The unit is now ready for the electrical.

I was lucky in that a 110vac home run and plug was already in place to run the water heater which was removed. I just had to replace the label on the 110 panel and swap it out. The unit is very efficient under

shore power at .083 amp @ 120v. Once shore power is detected, any 12 volt feed is bypassed. My existing battery configuration was one engine battery and one house battery on a 1-2-all-off Battery Switch. I added one more battery to the house in parallel which I found made life on the hook more confident. The instructions direct you to hook the + and - 12 volt feed directly to the house battery vs. an open circuit on the panel. They indicated you could switch the feed which I did. I used a 12 volt lighted toggle and placed it next to my volt meter in clear view. You can always turn it on or off via the thermostat switch



which has a green indicator light, however, it is not visible since it is in the box. During battery management times I want to be able to know it is off. The 12 volt side of the compressor is rated at 3.1 amps. To put that into perspective, with a 100 amp hour marine battery, using the 60% rule, you can expect 19 hours of run time with this one device. While on the hook, our standard practice is to run the engine 1 hour in the morning and one at night to keep the house charged up and I never was uncomfortable with power availability.



Getting back to the fact that the compressor was in a highly used lasserette, a ventilated cage of some sort needed to be fabricated to protect it. I chose PVC lattice since it had great weatherproof characteristics and PVC channels made the construction easy. The panels slide in and out of the channels for easy maintenance.

The install took me a weekend (20 man hours) which included a few runs to the store, the new battery platform install, the wiring and the compressor cage. With all said and done, it cost about 1 Boat Unit (\$1K). Using boat units always makes it sound better.

**RESULTS:** We are very pleased with the outcome. Our last month long cruise was more carefree not having to worry about ice acquisition.

I measured the temperature in the box and it runs 27° to 35° near the evaporator and 45° to 54° near the hull depending on night (65°) and day (85°) temperatures. After some experimenting with refrigerator management we were able to determine placement of items depending on how cold they needed to be. To accomplish this we used gallon size storage bags to store like items. The bags made it easy to see what you were pulling out and also gave Karen's short arms something to grab hold of in the deep box instead of chasing that jar of mayonnaise all the way to the bottom of the box.

The only regret is that I didn't do it sooner. It would have been a lot less painful climbing in and out of the lasserette a million times at age 50 vs. 60.

In summary; if you're thinking about doing it, **DO IT**, you're not getting any younger and the beer is getting warm!