

Which Condensing Unit: Air Cooled? Water Cooled? Or Keel Cooled?

Frigoboat designates their condensing units as either “35” or “50”, and this corresponds to the model of Danfoss compressor used; i.e. either the Danfoss BD 35 or BD 50 compressor. These high-efficiency, variable speed compressors look identical, and share the same electronic controller, but the BD 50 has more capacity. However, the extra capacity of the BD 50 is achieved at the expense of some degree of efficiency, so please refer to the Pricing Matrix or other Frigoboat literature to determine which size compressor you should consider using, based on box size and application.

Air Cooled – Paris 35, Capri 35, and Capri 50



Air cooling is the least efficient cooling medium compared to water, but the systems are cheapest to buy and the easiest to install. To achieve maximum efficiency, air cooled condensing units need to draw in cool air, which is then forced by the fan across the condenser, picking up heat as it passes through. Consequently, the heated air should be expelled away, ideally into a different area. The Capri and Paris condensing units that Frigoboat offers both feature a duct ring on the condenser discharge to facilitate adding a flexible duct so that the heated air can be discharged to a remote area where it has little or no chance to return to the intake of the condenser. The fan can also be reversed so that it will then draw cool air in through the duct ring. This is to enable an air cooled condensing unit to be installed in an engine room or other hot or poorly vented area, where cool air can be drawn in from another location. A Keel Cooler can always be added later to an air cooled Frigoboat system using basic tools and with no refrigeration experience necessary. This is a useful feature if cruising plans change, or if some form of refrigeration is required immediately, but it is impractical or inconvenient to haul the boat until a later date.

Water Cooled with Pump – W35, and W50



If the vessel is to be based in, or travel to warmer or tropical climates, water cooling should be a serious consideration. If the system is to be a freezer, then water cooling is highly recommended regardless of where the vessel is located. Water is a far denser medium than air, and much better for heat transfer, having 24 times more heat transfer capacity. Sea water typically stays at a fairly constant and lower temperature than the air inside the boat or locker in tropical areas, but utilizing it normally involves installing a pump, so the gains in efficiency must outweigh the added power requirement. The water pump that Frigoboat specifies for the W35 and W50 adds approx. 1amp (at 12v) to the total system current draw, but one pump can be used to support up to three water cooled systems thereby minimizing the extra current draw for the pump. As with any system using pumped sea water as a cooling medium, there is also the high probability of clogged strainers and/or pump failures.

Keel Cooled – K35 and K50



The Keel Cooler is the logical step up from a pump-fed water cooled system, as now the condenser is outside the vessel, and instead of pumping water into the boat and back out over the side, we take the refrigerant outside the boat to be cooled, and then back in again. The only moving part of this system is the compressor, and this results in the Keel Cooler system being the quietest, most reliable, & most efficient system of all. There are some boat owners that are concerned with “putting another hole in the boat”, but it should be remembered that in a Keel Cooler installation the Keel Cooler itself is simply a tough and sturdy plug, and there is absolutely no water coming on board. The water stays where it belongs; i.e. outside the boat!

Keel Cooled plus Air Cooled



Occasionally, concern is raised by long-range cruisers regarding not being able to operate a Keel Cooled system when hauled out for repairs. If the haul-out is for one or two days, then something can be rigged to drip water from a hose onto the Keel Cooler, but that arrangement may not be workable for longer stays on the hard. If this is a major concern, a simple solution is to install a Keel Cooler system, but with an air cooled condensing unit instead of a K35 or K50. The fan on the air cooled unit would then be wired via a switch, and the fan only operated when the vessel is hauled out. This is a simple solution that is gaining popularity in cruising circles, where a little extra initial outlay buys considerable peace of mind.