



Installation of air conditioners



Since the purchase of Five Senses I have undertaken some improvements: Rigg upgrade, new sails, the underwater paint has been renovated, I have changed the propeller, new electronics have been installed, we have a radar on board, the wooden deck had to be completely renewed, etc., etc.

So far, my crew has either taken note of this with shrugging the shoulders, or, I have had to take criticism, because in their view the money could have been used in

much better ways. The installation of an air condition on board, however, has brought to light a completely new reaction: appreciative gratitude!

I would also like to share another reaction here, which we experienced in Novigrad: Our neighbors at the dock had inquired why water was constantly running out of our boat. I quickly explained that this would be a circulation pump for air conditioning cooling. I invited the highly astonished crew below deck and there it we had, unlike the 38 ° degree outside temperature (at 70% humidity) pleasant 28 ° degree room temperature. "This is true luxury!", it escaped from our neighbor and actually he wouldn't have wanted to leave our salon anymore. Because outside it was just roaring hot. And I think this statement sums up the essence: An air conditioning suddenly increases the comfort on board by tens of times. But of course it is not all gold that shines and you have to accept a few compromises or take in some considerations before you get into installing such devices on your boat.



Storage space and cooling capacity

Depending on the strength of an aggregate, it needs a defined large space for installation. However, it is not only necessary to pay attention to the space required for the compressor, but also to factor in a circulation pump for cooling water, sufficiently sized passes for the cooled air, the collection and removal of condensation water and additionally required cables and electrics. One of the main decisions at the beginning of a such a project is therefore which rooms should be air-conditioned and which aggregate strength to be reckoned with. As a rough guide you need approx. 3,500 BTU cooling capacity for a small (V-)berth. A salon on a approx. 45 ft large yacht needs 9,000-16,000 BTU. The sizing also depends on the color of the hull and, of course, on the climate conditions in you area. For larger ships over 50 feet, split-units are better suited than compact systems.

We opted for a setup of four compact units (2 x 3500 BTU for the V-berth and 2 x 9000 BTU for the salon and the aft cabins). As a result, we were able to keep the compressor size rather small, so the noise pollution is low and the controllability of the system is very individual. The smallest devices in the front cabin absorb even so little power that they could theoretically be run off the batteries. All air conditioners can cool and also heat. As a result, we save ourselves electric radiators in the transitional period and do not have to throw on the diesel heater.



Noise

During the day, the noise is not so decisive, but at night you certainly don't want to have to sleep next to a loudly buzzing aggregate. The fans are very quiet already, but they are far from being totally silent. This is the circumstance you have to bear in mind if you want to install an air conditioning system, because all the components produce noise and you shouldn't be surprised by that. Important, especially when installed near sleeping quarters, is noise and vibration insulation. All bolted joints have therefore received rubber steamers and all installation rooms have been soundproofed.



Power supply

Depending on the phase of cooling (continuous operation vs start-up), the power consumption of our units is 2 x 1.60–5.20 amps for the small devices and 2 x 3.4–21.80 amps for the two larger systems. With 230 volts, 2 x 50–1200 watts and 2 x 780–5000 watts are due. Our system hangs on a shore power-cable that is secured to 32 amps and has been specially re-designed. Until now, the electrics had been designed for a maximum of 16 amps. On hot days and small marinas on islands, it happened to us again and again that the electric system was not sufficiently powered to provide the required electricity in the start-up phase. In that cases we

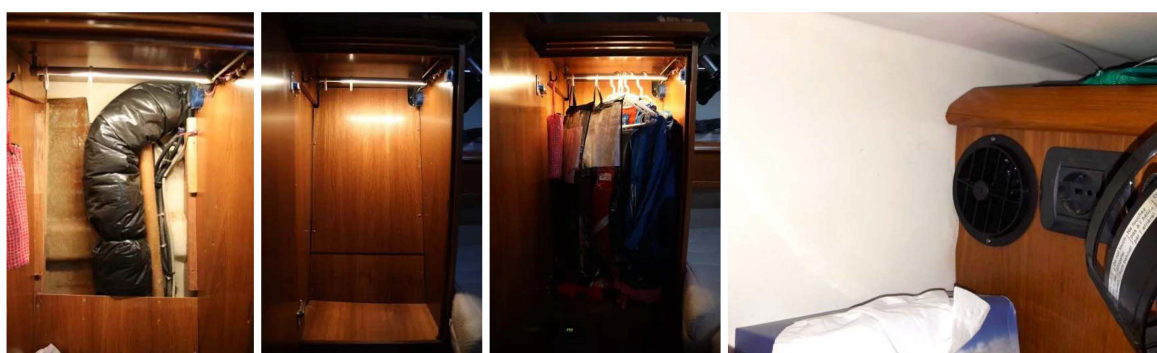
were using the smaller aggregates only. Under this setup, we were able to operate the air conditioning system in almost all marinas.

Operation without a generator and only from the batteries is difficult, but theoretically feasible. The [provision of energy via solar surfaces](#) is possible, but you really need enough space for it. It is also important to note that the inverter [must be able to provide the peak power](#) when switching on. The “Wynns” maintain a Blog/Vlog and describe how they operate their air-con in their RV and later their catamaran with the [help of lithium](#) batteries. For me, lead batteries therefore belong to an expiring generation of energy storage systems. The Wynns also show how they [limited the peak current](#), thus protecting their inverter.



Through-hull installations

Two installations are necessary: Cooling water must be distributed reliably to all aggregates and back into the sea. This requires two additional through-hull wholes, which must be properly protected with valves, provided that they are located below or near the waterline. Condensation water is produced quite a lot and I was strongly discouraged from simply discharging it into the bilge. This makes mould very easy. So a suction and collection system had to be installed to reliably transport the condensation water and dispose back into the sea. Our assembly team has used some well dimensioned wastewater pumps to achieve the necessary flow even when heeling over. It should also be noted that with high seawater temperatures in summer, the temperature difference is small and thus the cooling capacity of the seawater decreases. The cool-water pump and the sizing of the hose diameter must therefore be chosen accordingly to avoid over-heating.



Our project, figures, data, facts

- Three service companies: Boat electricians, boat carpenter and boat painters were involved to carry out all the necessary installation work
- 2 full weeks of working time for 2-3 professionals were necessary
- Planning approx. 2 months – over winter – to be ready for implementation before the start into the next spring season
- Cost: Around 15,000 euros for 4 air-conditioners and all renovation and hull related work
- Satisfaction factor: 100% through implementation by a local and reliable professional team



I definitely see myself as a DIY fan and I don't shy away from bigger projects either, but this time I liked to rely on professionals. Too many components result in too much complexity and special knowledge is necessary. For me, something like this is not a DIY undertaking.

Air system projected and installed by:



Products by:



Thanks for the report to: <https://fivesenses.live/en/2018/12/built-in-air-conditioning/>