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Installing a Windlass

By Paul Esterle

We all get nostalgic about the "good old days" when boating was simpler. That is, until we remember things like dragging that anchor rode back aboard – especially if it had a significant amount of chain attached.

Recollections like that are one reason the anchor windlass is among the most popular options on new boats, and one of the more frequently added accessories on older craft.

Choosing a windlass involves a couple of key decisions, such as the type of unit (drum or gypsy), the orientation (horizontal or vertical) and the size. You must also think through how the unit will be powered, how it will be controlled and any special considerations associated with installation on your boat.

The increasing number of models at different price points – most of them extremely reliable with little maintenance – makes these decisions fairly simple. Before you lay your money down, study your options, talk to others who own the same boat and see if they will demonstrate their windlass. Shop around for the best deals on components, and make sure you follow the manufacturer's suggestions.

Installing a windlass can be worthwhile – the back you save may be your own – but the execution can be difficult if not thought through.

WINDLASS CHOICES

Windlass units can first be distinguished by the part of the unit that actually handles the chain or anchor line. There are two types, gypsies and drums.

Gypsies are used to handle rope/chain rodes and are shaped like a small metal wheel. The rim of the wheel, where the tread is on a tire, has pockets that fit the chain and a deep V-groove that grips the rope portion of the rode. The pockets are sized for specific chain, so that part of your rode must match the gypsy.

Shackles will jam a windlass with a gypsy, so the anchor line will need to be spliced to the chain. Tests and experience have shown that properly executed splices are almost as strong as either component. Most windlass manufacturers either sell rodes or can recommend a supplier. An experienced rigging shop can also do the splice for you if you want a rode configuration that is not readily available.



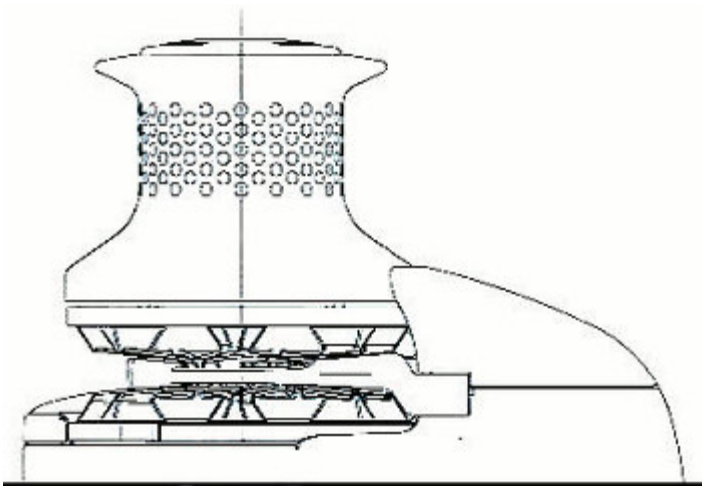
Drums look like sailboat winches, and are much wider than a gypsy. Drums work only with line – never chain – and some drums have a rough surface to improve grip. Several turns are wrapped around the drum to provide enough friction to pull the line. You will have to "tail" the windlass like a winch, keeping tension on the free end of the line to make use of the unit's power without having the line slip.

Some modern units feature both a gypsy and a drum, allowing some flexibility when you set and take up the hook.

WINDLASS ORIENTATION

The next design feature that distinguishes windlass units is the orientation. Some are horizontal, and some are vertical.

Horizontal windlasses have the main shaft parallel to the horizon, much like the manual windlasses found on old sailing ships. In this case, the motive power is provided by an electric motor mounted behind the main shaft, which drives it through a series of gears. Many horizontal windlasses come equipped with both a gypsy and a drum.



The advantage of a horizontal windlass is that it only requires that a few small mounting holes, as well as the hawsehole for the chain, be drilled through the deck. The downside is that the guts of the windlass – the gears and electric motor – are on deck and

subject to the elements.

A vertical windlass has its main shaft running straight up and down. Most have only a gypsy, though some are available with a drum mounted on top of the gypsy. The advantage of the vertical windlass is that most of the important and expensive parts are below decks and out of the weather. The vertical windlass, unless equipped with a drum, also has a much lower profile, meaning you are less likely to trip over it. The disadvantage is that a much larger hole must be cut in the deck to accommodate the bulk of the motor and gearbox.

Windlasses can also be purchased with one of two operational modes: Power Up/Power Down and Free Fall. With the Power Up/Power Down windlass, you control both the paying out of the anchor rode as well as the retrieving electrically. In the Free-Fall mode, you need to be at the windlass to control the manual clutch release mechanism.

POWERING AND CONTROL

Unless they are powered manually or by hydraulics (which we will not discuss here), windlass units are electric. Most are powered via the 12-volt DC panel, though many larger boats are now using 24-volt systems.

Because most windlasses are power-hungry, many captains opt for a dedicated windlass battery. This is often mounted in the bow, close to the unit. The configuration eliminates the need for large cables, which are required to guard against excessive voltage drop if the windlass is powered by the house batteries farther aft. Instead, much smaller wires can be run back to the source charging the battery.

Whatever your configuration, you should consider a windlass with a provision for manual operation, in case of an electrical failure.

When the power is working, you'll need a means to control it. A toggle switch is the simplest control device. A switch with center off and momentary up and down positions will give you the ability to raise and lower rode. Foot switches – one for up and one for down – are other options.

Both these options have reliability problems if they are used to control the full windlass current. Remember, a windlass can pull more than 300 amps. A better solution is to use the controls to switch a heavy-duty windlass solenoid on and off. The solenoid is basically a relay sized to handle the large current loads. Low amperage current through the switch turns the solenoid on or off. A system using solenoids will also allow you to install additional controls at a remote location, such as the helm or flybridge.

Like almost any electrical device these days, you can also use a remote to control your windlass, either hard-wired or wireless. A wired remote can have multiple access locations throughout the boat. But, as you would with any operations device, always provide a backup control system in case of a failure (such as dropping the remote over the side).

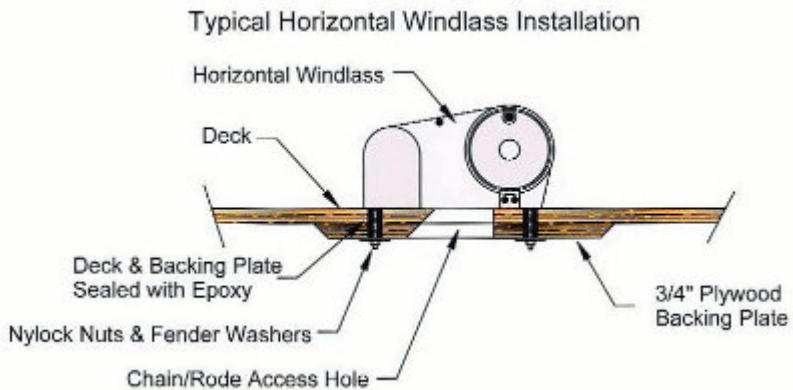
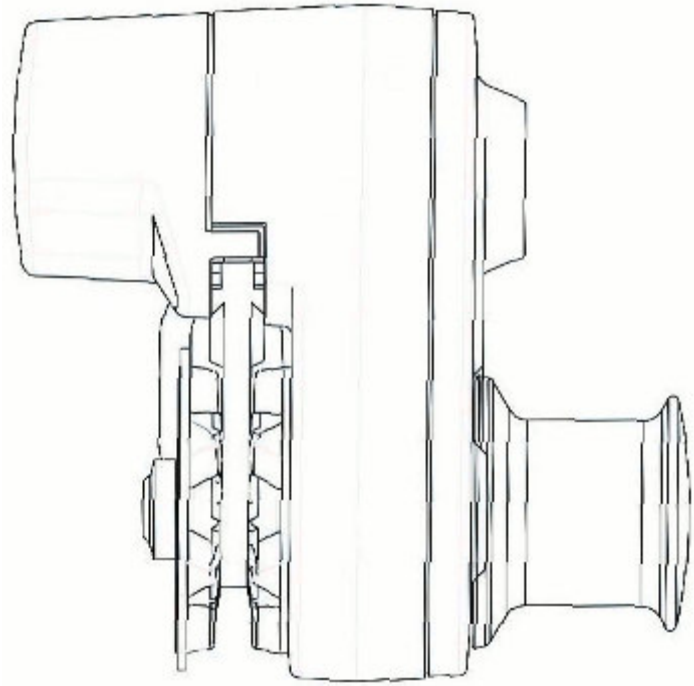
SIZING THE WINDLASS

One other major decision is choosing the right size windlass for your particular vessel. Many manufacturers provide a sizing chart that are usually accurate. However, if you are near the dividing line between one size and the next, it is often smart to opt for the larger size.

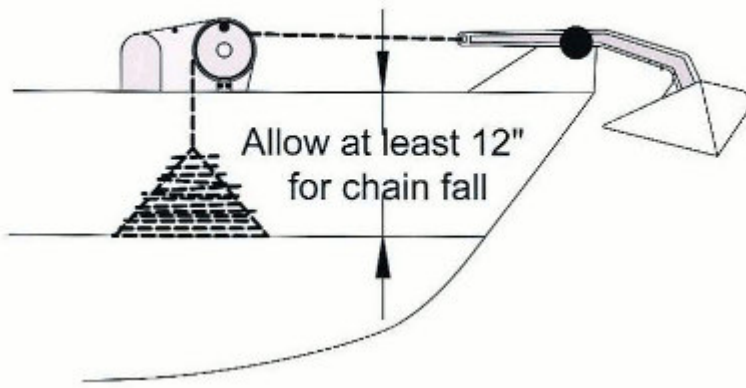
One manufacturer recommends sizing a windlass by calculating the weight of the entire ground-tackle system. This includes the anchor, the anchor chain and the anchor line. Multiply that value by a factor of three to account for tidal currents and windage. The resulting value should not exceed more than one-third the rated pulling power of the windlass.

Lewmar, another major manufacturer, recommends that the windlass's maximum capacity be four times the weight of the ground tackle. For example, if you have a total ground tackle weight of 62 pounds, you should choose a windlass with at least a 248-pound maximum pulling capacity.

Remember that a windlass isn't designed to pull the anchor by itself. It should be capable of breaking out a lightly buried anchor and pulling it aboard. However, a better practice is to snug up the anchor rode vertically, lock the chain and use the engine to break out a deeply buried anchor.



Chain Locker for a Horizontal Windlass



INSTALLATION CONSIDERATIONS

There are many considerations that can impact windlass performance when it comes to installation, the foremost of which is location. The anchor rode should be able to travel a straight line from the bow anchor roller to the windlass gypsy. A chain trying to engage the gypsy pockets is likely to foul or jump off the gypsy if it meets it at an angle. The windlass will need to be situated such that the chain and rode can fall into the chain locker as freely as possible.

If you choose a vertical windlass, the chain locker will need to be deep enough to contain the chain and the unit. Be careful, though, especially if you have all-chain rode. Chain does not play nice in a chain locker. Instead of spreading out as it enters, it "pyramids," forming a tower directly under the hawsehole where it enters the locker. A horizontal windlass requires a drop of at least 12 inches below deck level, and a vertical windlass may require much more room.

The windlass must also be mounted in a location that is strong enough to withstand the load placed on the bow structure by the pull on the unit. It will require a substantial backing plate underneath and, in the case of a vertical windlass, sufficient room to house the motor and gearbox.

There are several factors to consider when bolting a windlass to the deck. First, check to see if the deck is cored. A cored deck has a top surface of fiberglass, a middle layer or core and then a bottom layer of fiberglass. The lightweight core provides a lighter and stiffer panel than an uncored fiberglass deck. That core is often plywood, balsa or foam. If the windlass is not sealed properly, water can leak into the core and weaken the structure.

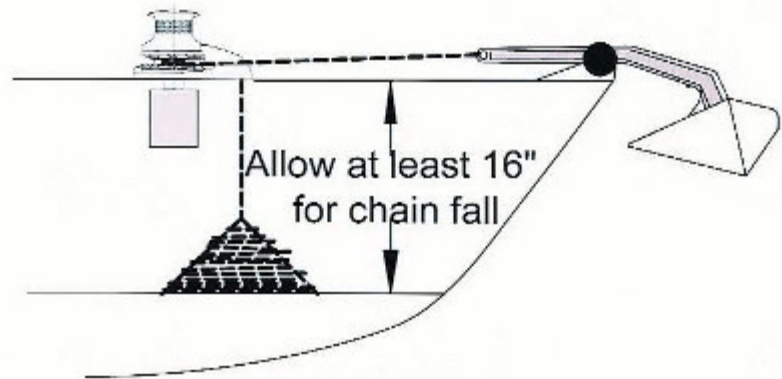
The proper technique to seal mounting holes for bolts is to drill an oversized hole and then fill it with epoxy filler. Once the epoxy has cured, the mounting hole is redrilled through the solid epoxy plug. The plug effectively seals the core from any water intrusion.

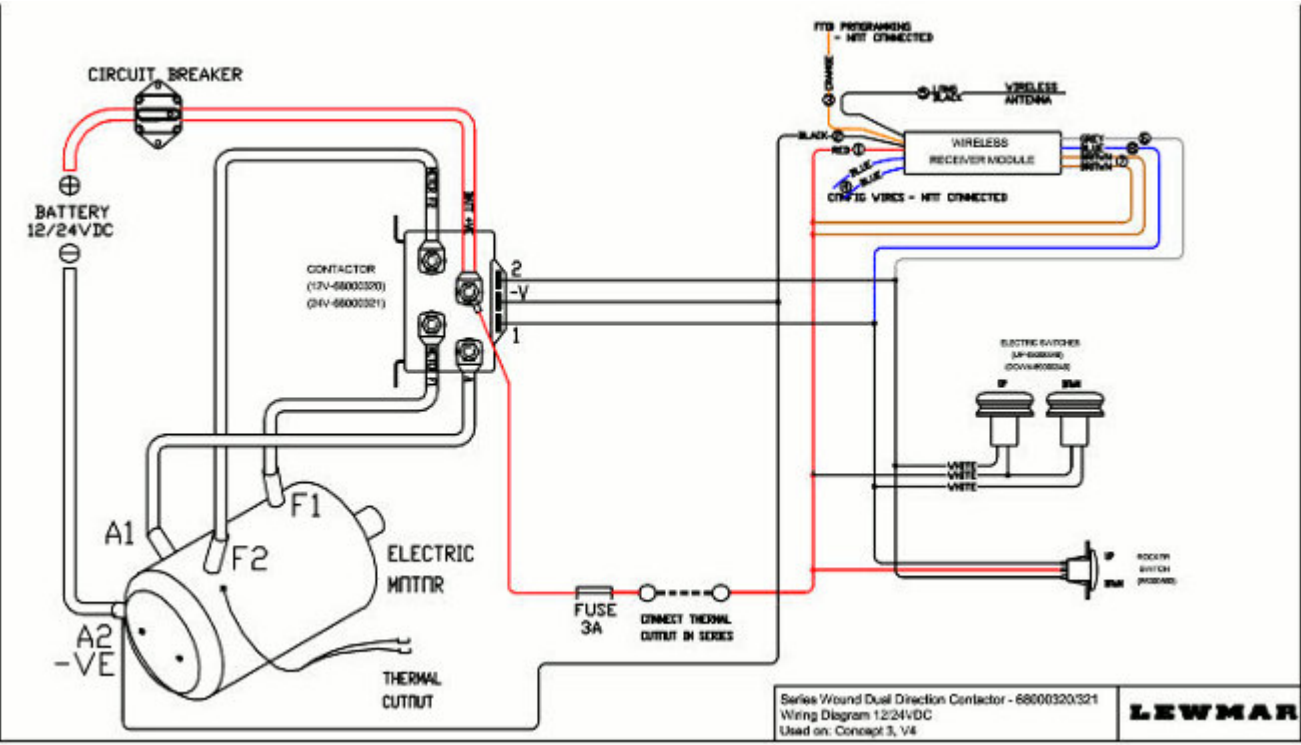
Larger deck holes, such as the clearance hole for a vertical windlass, also need to be sealed. Here the technique is to cut back the core around the edge of the opening and then fill that void with epoxy filler. A windlass imposes great strain on the deck it is mounted on, and the backing plate is used to distribute those forces over a larger area. That plate can be plywood or metal. If you use plywood, $\frac{3}{4}$ -inch marine plywood works, but remember to give all surfaces several coats of epoxy to seal against any leaks. In some cases, the foredeck around the windlass installation is curved, and a flat plywood backing plate won't bend to follow the curve of the deck. In cases like this, you can laminate a backing plate in place, made of three layers of $\frac{1}{4}$ -inch plywood. The three thinner layers will conform to the deck curvature and, when the epoxy cures, be as strong as a single layer of $\frac{3}{4}$ -inch plywood. Aluminum backing plates are also sometimes used. Just be sure to use sealant between the steel mounting bolts and the aluminum plates, or corrosion will take place.

Obviously, a liberal amount of sealant should be applied to seal the deck against leaks. I like to use a polysulfide sealant, such as 3M101. You can use 3M5200, but expect problems if you have to remove the windlass for servicing. Avoid over-tightening the mounting bolts and squeezing out all the sealant. In fact, I usually place rubber washers under all my deck-mounted hardware when bedding them. The rubber washer ensures an effective layer of sealant is in place when the fasteners are tightened. You can go back after the sealant has cured and retighten the mounting nuts for a more effective seal.

While you are working on the windlass, you may as well inspect your ground tackle and all other elements of the system. Give careful consideration to the anchor platform on the bow. It needs to be substantial enough to hold the weight of the anchor(s) in a blow, keeping them firmly away from the hull to prevent damage. There also should be some provision for locking the anchor shank in place; don't depend on the pull of the windlass. You will also need to provide a "chain stopper" to lock the chain in place after the anchor is deployed. This is required to take the load off of the windlass, which is not designed to hold the chain in place while anchored.

Chain Locker for a Vertical Windlass





Paul Esterle is Technical Editor for Small Craft Advisor Magazine, and his freelance work has appeared in Sail, BoatWorks, Voyaging and Good Old Boat magazines. He has produced a series of boating videos and lectures widely. He also works at West Marine and has written product reviews for the company.

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