



MAXWELL

You already know that your VETUS bow thruster and stern thruster makes boating much more enjoyable by giving you sideways control of your boat during docking and close quarters maneuvering, which is especially helpful when there is a cross wind or cross current, but as with all mechanical and electrical equipment, it's easy to take a good thing for granted and overlook the basics of safe operation and routine maintenance.

Safe Operation

Check the water around your boat for swimmers and small boats before using your thruster, the intake stream and water jet from a thruster can injure a swimmer and destabilize or damage a small boat near your bow.

Remember that to bring your thruster to operational status, you must push the green button on the control panel twice, unless you have an old panel which energizes with only one push.

When you change the direction of thrust, very large slamming forces are set up in the gears of the tailpiece. Many VETUS control panels have a one and a half second time delay built into their programming, so that when you change thruster direction, the propeller and gears can come to a smooth stop before having to work in the opposite direction. If your control panel is not equipped with a built-in time delay, adjust your control movements to allow the gears and prop to come to rest before reversing.

If your boat is fitted with electrically powered thrusters, remember that in order to generate the bursts of high power needed in thruster operations, the direct current motors uses a lot of electrical current and makes a lot of heat. Your operating manual and other VETUS documents list the maximum run time per hour for each thruster type, but bear in mind that your electric thruster is designed to be used in short bursts in docking maneuvers, - the maximum run times relate to use in emergency situations, and if utilized or exceeded, will result in a very hot, and probably damaged thruster.

Some VETUS control panels have a built-in electronic two-minute shutdown to warn the helmsman that the thruster has been running for a long time and is hot. This shut down can be over-ridden by a single push of the green button, but that's for boat-threatening emergencies, not for your convenience. If you have over-ridden a panel shutdown, or have reason to believe that you've run the thruster a lot in a short time, dock or anchor your boat, and check the thruster. If it's very hot, do what you can to increase air convection around it by opening inspection hatches and other potential airways. Do not attempt to work on the thruster until it has cooled down, and until you have disconnected the thruster power cables at the battery bank. If your thruster is so hot that it is scorched or smoking, you can be reasonably sure that the electric motor and related components will need to be repaired or replaced.

If your boat has more than one helm station, make sure that you turn off the thruster panel at one station before turning a thruster panel on at another helm station. Simultaneous operation of two or more panels may damage the panels, blow the control circuit fuse, or damage the thruster motor.

Your thruster system has two fuses - a high amperage, slow-blow fuse protecting the power circuit that includes the thruster and the battery, and a 5 amp fuse protecting the control circuits including the panel and the actuating coils of the solenoids. This automotive type control circuit fuse is mounted in a recessed holder on the solenoid pack of the thruster, next to the white plug of the gray control cable, and must be pulled out for inspection with a fuse puller or a pair of needle nose pliers. If you have turned on the battery switch for your thruster, and the green light on the control panel does not light up when pushed, there is a good chance that one or both of these fuses has blown. Turn off the battery switch, disconnect the cables from the battery, and check the fuses, but remember, something causes a fuse to blow, and simply replacing the fuse is unlikely to be a solution to the problem.

Do not store anything in the thruster compartment- loose and moving objects may damage the thruster's power and control wires and devices, and flammable materials may catch fire if they come into with an overheated thruster.

No gasoline powered equipment, gasoline lines or gasoline storage should ever be in the same compartment as an electric thruster unless that thruster is an ignition protected model, with a completely enclosed motor and electrical system. Similarly no liquid such as paint or solvent should ever be in a storage location where that liquid, or its fumes and vapors could come into contact with the thruster, at any temperature.

Routine Maintenance

Because thrusters require little maintenance, they frequently get no maintenance, occasionally with disastrous consequences. Thrusters are electrical and mechanical machines with metal and plastic parts and you need to maintain and protect those parts. Here are the basics.

Always disconnect the cables from the batteries before working on your thruster- these are powerful batteries, devices and conductors that can injure you if proper care is not taken.

Don't allow your thruster motor, solenoids, cables and other conductors to become dirty or corroded. Inspect them regularly, and take preventative action by cleaning and coating with corrosion preventers. Do not use an anti-corrosion spray on the motor or solenoids- the spray may penetrate the devices and coat contactors and brushes, disabling the device. Use brush or cloth applied anti-corrosion coatings in these locations.

Once every two months, check the Voltage of the thruster power circuit when the thruster is operating. If your battery Voltage in a 12 Volt system is much lower than 13 Volts when the thruster is not operating (26 Volts for a 24 Volt system) and there is more than a two Volt drop from thruster on to thruster off, your battery is either undercharged, or more likely, worn out and in need of replacement. A weak battery will provide less power to the thruster, which you will notice, but what you won't notice is that the contactors in the solenoids are being burned out through prolonged arcing, and a replacement solenoid pack will soon be needed.

When replacing a thruster battery, VETUS recommends that you buy an AGM type battery of the size recommended for your thruster, and if you are able to change the thruster power circuit layout, install the new battery as close as possible to the thruster, then make the connections with marine grade power cables of the size recommended by VETUS for your thruster, protected by a correctly sized slow-blow fuse. Cabling and fuse recommendations are in the Installation and Operation Manual supplied with your thruster, and also in the VETUS annual catalog and digital catalog (www.vetus.com).

Because electric thrusters operate at very high power and amperage, not only do their motors generate a lot of heat, but other points of high electrical resistance in the battery to thruster motor circuits will do the same. The most common points of high resistance are corroded, loose and poorly made connections in the power circuits, and such connection can become very, very hot. To avoid this potentially dangerous condition, it is essential that all power circuit connections are checked and maintained on a regular basis. A complete check of all connections must be made by a qualified and experienced marine technician immediately after installation, of the thruster system and then a repeat check should be made after two or three weeks of operation. High levels of vibration, and temperature fluctuations are normal conditions on a boat, and this vibration, combined with expansion and contraction of metal components, leads to threaded connections (nuts, bolts and screws) frequently working loose.

After these initial connection checks and always with the battery disconnected, check the threaded connections on the thruster motor and solenoid no less frequently than once every three months. Loosen, clean, and retighten every nut, being careful to use a static wrench on the back nut, and a turning nut on the front nut of each connection. Failure to do this may result in a terminal post being twisted out of the solenoids or motor, both being difficult or impossible to repair. Once a year, start at the positive terminal of the battery bank and work up to the thruster and then back to the battery, loosening, cleaning and retightening every connection. Careful and sparing use of di-electric greases and thread locking compounds can also be helpful in creating and maintaining good threaded connections.

Make sure that every cabin and compartment in your boat has heat and smoke detectors - it's better to be safe than sorry.

Your electric thruster motor has four brushes or four pairs of brushes in the motor head. The brushes are made principally of carbon, and convey electricity to the moving part of the motor, called the armature. The brushes are spring loaded, and push down on a rotating wheel of brass conductor bars called the commutator. Over time, the brushes wear away until they are no longer making good contact with the commutator, and when that happens, the electric motor stops working, sometimes initially stopping in one direction but not the other. The rate of brush wear is highly variable from one motor to another, and of course, is also greatly affected by how much the boat and the thruster is being used. At least once a year, remove the ventilation cover or access panels from the top of the thruster motor and inspect the brushes. To avoid cutting your fingers on the sharp metal components in the motor head, use a pair of needle nose pliers to grasp the connector wire of each brush and gently pull the brush back a quarter of an inch (6mm) and let it go. It should slide easily in its guide, and be in good contact with the commutator. If that is not the case, undo the connector screw holding the brush wire to the motor, and pull the brush out of its guides. If the brush is shortened so much that the top spring can no longer push it down into good contact with commutator, you will need to replace it and the other three brushes or brush sets. If the brush has plenty of length, but is not sliding freely in its guides, the guides have probably become distorted through overheating. This can sometimes be corrected by a very small reduction of the brush cross sectional dimensions by flat sanding on very fine emery paper. Any substantial distortion of the brush guides will require repair or replacement of the motor. When you are ready to re-install the brushes, make a small hook from coat hanger wire or similar, and use that hook to gently pull the brush spring out of the way to allow the brush to enter it's guides, then using the hook, position the pusher face of the spring on the brush head.

And last, but by no means least, at least once a year, replace the protective zinc anode on the outside of the thruster tailpiece (the bronze gearbox that is located underwater, in the thruster tube). This chunk of zinc is intended to be eaten away by electrolysis, and if it's not there, or is much reduced, your tailpiece, including the inner sections of the thruster prop shaft, will be eaten away by electrolysis instead of the zinc, sometimes very quickly, if there is stray current in the water around your boat, either from your boat, another boat, or the marina electrical system. The rate of erosion of the zinc anode is also accelerated in warm water. The zinc on your VETUS thruster is bolted to the bottom of the bronze tailpiece, or fastened to the endplate of the tailpiece, as a collar behind the prop, or on larger thrusters, forms the boss on the propeller hub and is attached to the shaft of the thruster prop shaft. If you are swimming, snorkeling or diving around the boat, when it's anchored in clear water, take the opportunity to inspect all the zincs (they're also on the propulsion shafts and other underwater metal equipment. Even if it's not time for your annual haul out, if a zinc is more than half gone, it's got to be replaced, replacing the equipment a zinc is protecting is going to cost you a lot more than having a diver install a new zinc, or and also more than even hauling the boat for a day to replace a zinc (do them all while she's on the dry).

Those are the basics- keep your boat well maintained and safe!

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