

AUTOPILOTS

A properly installed and set up Autopilot will be one of the most enjoyable and useful pieces of electronics that you will have on your boat. An improperly operating autopilot can be a major source of aggravation and also a safety issue. Unfortunately a lot of autopilots are incorrectly specked out and installed. Units on some new boats never get a proper sea trial and operate erratically. These units become a major problem and cause the owner a lot of grief.

Advantages of an autopilot

An autopilot can make life much easier for the captain especially on a long passage or in limited visibility. *Always remember that the captain has to maintain watch while his vessel is underway.* The autopilot has three modes of operation Standby, Auto and Nav.

Standby: In this mode the boat is manually steered and the display will give you information such as the autopilot compass heading and most will have a rudder bar showing the location of the rudder.

Auto: By activating this mode the boat will maintain the current heading at the time of activation. This is a great advantage as the captain does not have to constantly watch the compass and can have hands free from the steering. The heading can be changed by pressing Port or Starboard buttons in increments of 1 degree or 10 degrees. More sophisticated controls have a power steering knob which can be rotated to the desired course change. A properly installed autopilot can hold a course much better than a human in wind, current and following seas.

Nav: When the autopilot is interfaced with a GPS/chartplotter this becomes a very desirable function. When properly interfaced with the chartplotter data can be sent from the chartplotter to the autopilot.

Several functions can be accomplished:

Goto: This is a neat feature. On your chartplotter you can select a position to go to, such as a navigation buoy that is beyond your range of vision. You move

your cursor over the desired buoy and then press the Goto button on the chartplotter. You then press the nav key on your autopilot and the heading to the Goto point will show up on your autopilot display. If you are satisfied with this heading you press the autopilot nav key again and the autopilot will alter course and head to the Goto position.

Nav: Again this selection requires navigation data from a GPS/chartplotter. On your chartplotter you can create a route with as many waypoints as you want up to the maximum capabilities of the chartplotter. By activating the selected route the navigation data will be sent to the autopilot. By pressing the Nav key on the autopilot you will see the waypoint displayed on the autopilot and with a second press the autopilot will alter course to go to the waypoint on display. As the boat approaches the waypoint an alarm will go off to indicate the approach and then will display the next waypoint in the route. If you are happy with the next heading and the heading is safe to turn to then a press of the Nav key on the autopilot will cause the autopilot to change course.

Selecting a Autopilot

The biggest majority of autopilots consist of the following components. A heading sensor, rudder feedback, a drive system for steering and a course computer to process information. A few autopilots have rudderless feedback and also some use GPS heading rather than a heading sensor.

It is critical that the correct system is selected for the boat for proper performance. For example: Installing a wheel system autopilot on a heavy sailboat instead of a linear unit will be overloaded and fail in heavy seas when you most need it. Also on a powerboat with hydraulic steering if too small of a pump is installed it will underperform and too large of a pump will cause over steering.

For small power boats under 25 ft. Autopilot kits are available that include everything you need to do a self installation. A person does need to be very mechanically competent and comfortable cutting into hydraulic steering lines to do the installation. Failure of the steering system when underway is drastic.

Installation

Upon correct selection of system it is very important to install the equipment properly. One item often a problem is the fluxgate compass. It has to be low in the boat and about amidships and away from any magnetic influence.

Equipment such as fridges, a/c units and metal items can have detrimental effects. You should know where the compass is and never place metal items near it. If the compass is affected by items or improperly installed then the autopilot will never work correctly.

Steering components such as linear drives on sailboats have to have a secure mount and on some boats requires fibreglass reinforcement blocks to mount as the forces in a heavy sea can be very stressful. The linear drive should also be connected to a separate rudder arm on the rudder post and not on the quadrant.

Any hydraulic pumps have to be plumbed into the existing hydraulic and there is no room for failure.

Set up and Seatrials

It is imperative that the completed installation go through a seatrial and ensure that all interfacing and operations are functioning properly. There are several steps to this.

Dockside: At the dock we would check complete installation, ensure rudder is turning properly for Port and Starboard turns, check component for leaks, rudder stops and interfacing of electronics for transfer of data.

Seatrials: The boat would be taken out next:

1. The first step would be to do a rudder alignment to ensure that the rudder feedback into is correct
2. We then do a compass calibration. Setting the autopilot in setup mode the boat is run through several circles and the heading sensor (fluxgate Compass) will compensate for deviation. When complete it will show the

amount of deviation. Should it be over 15 degrees it would be necessary to relocate the compass and repeat until an acceptable reading occurs.

3. The next *important* step would be to do a heading offset. We look at a known heading (course over ground from the GPS works well) we then dial the autopilot compass heading to match the COG. (*NOTE: The autopilot steers according to its own heading sensor. The chartplotter uses the GPS for heading COG and sends this information to the autopilot. IF the autopilot heading sensor and Chartplotter COG are not the same on a straight course then the system will fail miserably.*)
4. The next step is to set up the parameters of the autopilot. This used to be very involved but most autopilots now have an auto learn procedure. While underway we activate the auto learn and the boat will do manoeuvres on its own and goes through a learning process to set up its own parameters.
5. The final step is to see how the autopilot performs. We use auto and change course several times and then use the Nav mode utilizing the chartplotter to confirm all operations are satisfactory.

Autopilot Features

The autopilots today have many new features that did not exist years ago

- Better heading sensors and now with internal fast heading sensors which improve the course holding capabilities of the autopilot and also provide heading information for functions such as radar overlay
- Auto self learn features that make setup much easier
- Autoadapt so that the autopilot keeps learning the boats handling even during continued use
- Wireless remote controls
- Fish patterns that can be set so an autopilot will follow orbits, figure 8's and zig zags

Well happy boating and get yourself and nice autopilot