How to set up your autopilot to sail faster, more comfortably and be more efficient

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Pip Hare explains how setting your autopilot to suit conditions will be faster, more comfortable and more efficient

(https://s3-eu-west-1.amazonaws.com/inspire-ipcmedia-com/inspirewp/live/wp-

content/uploads/sites/21/2014/11/Gear-test-autopilots-Oct141.jpg)
Pip Hare explains how to get the best from your autopilot

Cruising sailors tend to under-utilise autopilots, usually simply turning them on and walking away. Learning how to trim and set up your pilot to suit the conditions will not only get you to your destination faster, but should reduce battery consumption and make for a smoother ride.

In this article I aim to highlight a few ways to get the most from your pilot. I will talk you through three popular systems to see how easy it is to change the settings and how much human intervention is required to get the best performance.

Pilots tested:

SmartPilot X-5 by Raymarine

with ST6002 controller

This pilot is five years old and represents a generation of pilots that is perhaps most prevalent on cruising boats today. The model has now been superseded by the Evolution range. I'm very familiar with the X-5 as I have two of these autopilots installed in my 21ft Mini Transat boat and they have supported my single-handed sailing over thousands of miles.

B&G AC12N

course computer controlled by Triton head

We tried this pilot on the Elan 410 Esprit, which is owned by Neil Vardy and used for charter work, racing round the cans and extended passagemaking. This is the newest of all three pilots tested and offers a more intelligent computer that automatically changes settings to suit conditions.

NKE Gyropilot 2

The NKE has long been the autopilot of choice for single-handed sailors. The system is aimed heavily at racing sailors and it is expected that they will adjust settings to optimise performance.

I trialled this system on Concise 8, a third-generation, Mark Mills-designed Class 40, with British skipper Ned Collier Wakefield.

Modes:

Compass is the default mode for most autopilots; once activated, it will steer the compass course shown on the control head at the time of pressing the button.

Choose compass mode for a quick fix while you go forward or below, when motoring, sailing in a confined area, performing sail changes or if fetching or reaching in a challenging sea where the apparent wind angle may change frequently.

Wind or windvane – Engaging this mode allows your course computer to 'see' the wind and steer to it in the same way as a human helmsman. With the exception of conditions mentioned above, I will always choose to steer in wind mode, especially downwind at speed.

For best results switch between true or apparent wind angles as conditions change. Use a true wind angle when sailing downwind; it will allow the boat to surf down waves, accelerating as the apparent wind angle moves forward, but staying on track. Switch to apparent wind mode when sailing upwind to allow the pilot to 'follow the telltales' just as we would.

Changing between true and apparent wind modes is not always straightforward. If you have extended periods when you do not use your pilot, try keeping a check card in the chart table so you do not have to open the manual every time you want to change.

On the X-5 it needs to be done in the user calibration menu, which takes quite a few button pushes. It cannot be done while the pilot is engaged, which can mean steering and pushing buttons at the same time.

The Triton has intelligent sail steering, which offers three options for wind mode, automatic, true or apparent. The automatic mode is the default option and will select true or apparent according to your wind angle and switch between them as the boat heads up or bears away. This feature particularly impressed me as we sailed Esprit under spinnaker and I watched the pilot transition seamlessly from using a true wind angle when running to apparent when reaching, much as a real helmsman would.

The NKE is perhaps the most straightforward to operate, as true wind mode and apparent wind mode are entirely separate options. You can switch between modes while the pilot is running and whichever mode is in operation when standby is pressed will be remembered. However, if you are considering an NKE pilot, be aware that the true wind mode does not come as standard; you have to buy a code to unlock this on your course computer.

Rudder angle/NFU is featured on both the B&G and NKE pilots and simply holds the rudder at one angle much as a wheel lock would. Though this has limited use under normal conditions, we used it on Esprit in light airs and flat water to hold the boat on a steady reaching course with well-trimmed sails. In light airs and large swell this could save your batteries and even your sanity by avoiding continual course adjustments while waiting for the breeze to fill in.

Navigation mode will allow the pilot to link with chart plotters or GPS and drive to waypoints or follow routes. This full integration of navigation and autopilot comes from the world of ships and could potentially take all the hassle out of navigating as routes can be designed on your sofa at home and then uploaded before a passage. On a boat I sailed early this year, installed with a Garmin plotter and pilot, the plotter asked ‘Shall I engage the pilot?’ when a ‘go to’ waypoint had been selected.

Although this level of integration between steering and navigating brings a degree of sophistication on board, I have never used this mode with my autopilot other than when motoring in a familiar area and in benign conditions.

I would express a word of caution if considering using this level of automation as it could take away your engagement with navigation and the world outside. An error made plotting a waypoint the night before could be followed without question.

Settings:

Response

Response could be interpreted as the number of corrections per minute the pilot makes to stay on course.

Sometimes called the 'sensitivity', the response settings are normally the easiest to adjust. In super-light breeze I may knock the response right down to reduce power consumption and keep the boat from making jerky movements. The friskier conditions become, the more I need my pilot to work, especially under spinnaker, so the response will go up in line with how actively I would be steering if on the helm.

It is always a good idea to have a go at steering yourself before turning the response level up as if the boat is struggling to keep on course it is often an indication that sails need to be trimmed or reefed.

The B&G pilot has an automatic response feature, which will select either high response or low response parameters depending on boat speed. This feature should make life easy; however, when we tested the pilot in light winds and flat water, the auto response settings seemed to make the helm unnecessarily active.

It is possible to select response levels manually in the pilot settings menu, though if you press standby the pilot will return to the default automatic response setting.

The gain function on the NKE Gyropilot combines both rudder response and rudder gain as detailed below. Pick a lower number for slower speeds and calmer waters and increase to the highest value for the most challenging conditions.

Wind trim

The wind trim determines the sensitivity of the pilot when operating in wind mode. This is an often-overlooked control, but if you are struggling to keep your course to the wind, it will often be a tweak to the wind trim that is required and not the response.

For both the B&G and Raymarine pilots, the wind trim will be set to a default value somewhere in the middle of the range, but to gain optimum performance from your pilot it is worth changing the wind trim value to suit the conditions.

A high wind trim value will lead to a boat that responds to every shift and gust, which could be beneficial when sailing upwind in flat water or when under spinnaker downwind. But when reaching in a heavy sea a high wind trim value can lead to a rough and erratic ride. It is definitely worth recording wind trim values against conditions when your pilot is set up well.

The NKE uses a wind damping feature; this is particularly useful for boats with large rigs, which would feel significant acceleration at the masthead owing to the action of waves. In heavy seas you can increase the wind damping to update the course computer with information fewer times per minute so smoothing out any accelerations caused by waves. In smooth seas a lower damping value will allow more frequent and sensitive course corrections.

Rudder gain/counter rudder

The rudder gain determines the size of corrective helm movements. The larger the gain, the more severe the helm corrections will be. Counter rudder is the opposite movement of the helm, which stops the boat from over-shooting when a course correction is made.

The balance between rudder gain and counter rudder is critical to keeping a smooth course. If these two are out of sync, the boat will snake around its course.

During set-up your pilot will go through an ‘auto-learn’ routine, which will define the default settings for rudder gain and counter rudder. The auto-learn capabilities of modern pilots make it unnecessary to adjust these settings often. However, in more challenging conditions, such as rolly beam-on seas or very gusty conditions downwind, I found I could make a significant difference to course-keeping with the X-5 by tweaking.

If the helm is moving often with small movements, but struggling to stay on course, you maybe need to increase the rudder gain and decrease the response. If your pilot is struggling, take the helm yourself, note how often you move the helm and by how much then try to replicate this with your settings. Large helm movements equal larger rudder gain. When increasing the rudder gain, do it one level at a time and then wait and watch to see the difference. Make a note of your settings before you change anything so if things do not work, you can go back to where you were.

As a rule of thumb, the gain and counter rudder should be fairly similar values, certainly no more than two levels different. If the counter rudder is too low, the boat will over-steer past its heading and snake back; if too high, the turn down onto course will be arrested and jerky. For my X-5, I keep a chart with optimum rudder gain and counter rudder settings for particular conditions, which I can refer to if my pilot is struggling.

NKE has nine pre-save configurations, allowing you to swap between settings.

The B&G Triton pilot uses a more automated system, which works off two groups of settings. During the 'auto-learn' phase of set-up the computer will define a group of low settings and high settings, which will contain pre-set values for response, rudder gain and counter rudder. At a pre-determined speed (default six knots), the pilot will automatically switch between groups of settings so taking away the need to adjust manually. Unfortunately, our test day was fairly benign so we were unable to see how effective these pre-sets are.

Auto tack

All three pilots tested had an 'auto tack' feature and, if you regularly sail two-up or with friends who are not sailors, it is well worth getting to grips with this option as it frees up the helm to give an extra pair of hands for handling sheets. If you have never tried the auto tack, but are regularly driving with the wheel in one hand and a rope in another, give it a go.

Within the calibration menu you should be able to adjust your tacking angle and rate of tack to suit your boat and conditions. In light breeze and flat water you may be able to tack faster and through a smaller angle, but as the wind builds you can knock down the speed of the tack to give yourself a little more time to handle sails. Beware of going too slowly through tacks in waves as the boat could stop mid-tack.

Some auto tack functions will also allow you to gybe the boat downwind, allowing you an extra pair of hands to control the mainsail through the gybe. If you are going to use auto tack for gybing, make sure that you slow down the rate and angle of turn. Always take the time to set up the pilot before going through the manoeuvre.

The Raymarine pilot has a gybe stop function which, when engaged, will not allow you to gybe using the auto tack function. This can be a useful safety precaution.

Alarms

The autopilot gives you freedom to move around the boat, go below, eat, sleep or just stay dry under the sprayhood, but once it is engaged it is easy to become detached from what is going on around the boat.

As a rule I will always have a windshift alarm on if I leave the autopilot steering in wind mode.

The X-5 pilot has an automatic windshift alarm, which will go off if the wind direction changes by 15° or more. The off-course alarm parameters can be set through an advanced calibration menu and will notify you if the pilot is unable to keep course.

On both the Triton and the Gyropilot, it is possible to set alarms for many different parameters via the alarms menus.

Positioning and remote control

When fitting an autopilot control head, think about how you are going to activate the pilot or change settings while the boat is under way. Not only does the control head and display need to be within reach, but you may also need to be able to read headings on the display while steering at the same time.

As my Mini Transat yacht was only 21ft long, it was not hard to fit the control head at arm's length; however, in certain light conditions I found it hard to read the display headings from a distance while steering.

Esprit suffered from a similar problem; the pilot head was mounted next to the wheel for easy activation, but the Triton display through which calibration menus were accessed was at the companionway and well out of reach. This proved most inconvenient when using the auto tack function, which was activated on the pilot controller next to the wheel, but then prompted an 'Are you sure?' question on the display across the cockpit, which needed to be accepted.

The convenient solution is a remote controller. This will allow you to make subtle changes to course or mode from anywhere on the boat, and is a safety consideration when on deck alone. None of these systems comes with remote control as standard.

Raymarine offers a basic remote that will drive the pilot or a larger version that will also allow you to scroll through and view all instrument data. I found the larger version particularly useful when racing offshore as it allowed me to hike out on the side of the boat while monitoring course and speed, making subtle corrections to the course while the pilot drove the boat.

The NKE remote control features a MOB system, which will cause the boat to round up and tack if the remote control is separated by more than a defined distance from the base station.

Top tips for autopilot set-up

Make the rudder centre mark on your wheel of brightly coloured tape or string so you can see at a glance how much helm is being applied, even in the dark.

When the boat is going particularly well, make a note of the settings and conditions so you can build a trim chart for use on long passages – maybe think about putting an extra column in the log

When changing sails or performing manoeuvres, always change the autopilot from wind mode to compass mode. This will avoid any sudden changes in course because of shifting wind angles

Always make a note of pilot settings before you change anything so you can go back to them if you make the situation worse

If there is no wind and you're making a passage under motor, try playing with the gain, response and counter rudder settings one at a time, while watching the wake of the boat. This will give you a really clear picture of how these controls affect course-keeping.

To set the response, hand steer the boat then try to set response level to match the amount of correction you are making with your hands.

Make sure tiller extensions are properly secured away when the pilot is driving. Dangling extensions (as above) can get wedged in the cockpit as the pilot drives, breaking either the ram or the helm.

As clever as a pilot is, remember it will only ever react to the conditions it senses using data it has previously recorded. It cannot see what is ahead of the boat – that is still the job of the humans on board!

This is an extract from a feature in the October 2014 issue of Yachting World