Note:

- Mode 0 is the default value
- Mode 3 will output the correct sentence depending on configuration.
- If Mode 4 is selected and magnetic variation is not available then only the magnetic heading will be output.

WIND SPEED AND ANGLE CALIBRATION

For Hercules Motion systems it is necessary to set the mast height parameter, prior to wind calibration.

 **SETUP ▶ CALIBRATION ▶ OTHER CALIBRATION ▶ PARAMETER ▶ ROLL RATE ▶ MASTLEN ▶ (Set Value) ↵**

Two of the greatest problems for an instrument system to overcome, which have not yet been conquered, are wind shear and wind gradient. These effects are at the root of some apparent instrument inaccuracies. The effects themselves are relatively straightforward and are due to the simple fact that as moving air comes into contact with the ground it slows and changes direction.

The slowing creates the effect called wind gradient. The change in direction creates wind shear. Both shear and the wind gradient depend on the amount of mixing of the wind at ground level and the wind aloft; if the wind is well mixed both effects are minimised. The best example of this is the sea breeze, which starts off almost completely unmixed.

Differences of direction of 40º 50º between the wind at the masthead and the wind at the water are not uncommon in an early sea breeze, but as the day goes on and the sea breeze strengthens this will disappear. This creates a problem for the two things we are about to try to calibrate, measured wind speed and measured wind angle. It is easy to see how shear can affect the measured wind angle; no sooner have you set it up than the shear changes and everything is out again.

This can lead to a circular situation if one is not careful, and the best solution is to do your calibration on a day when the shear is minimal, and thereafter leave it as an indicator of the wind angle at the masthead, always remembering that this is not necessarily the wind angle that you are sailing at.

How do you know the shear is minimal? If you are finding it easier to get speed on one tack than the other for no obvious reasons, then there is likely to be shear. A good look at the general weather conditions is also helpful. Do not calibrate in building sea breezes.

Wind gradient is the biggest culprit for getting true wind speeds accused of gross inaccuracy. The problem is that most people use the wind speed as a measure of the pressure, which it is not. It is a measure of the wind speed at the top of the mast, and that is all. If it is 12 knots at the top of the mast and only 4 at the water, then the breeze will feel a lot softer, and provide less power for the rig than if the breeze is twelve knots all the way down to the water.

There are other signs that can help get a feel for the pressure on the rig. One of the most important of these is the heel angle; it is no bad thing to have an idea of how much heel you normally have in any given wind speed. Target boat speeds can also provide valuable information as to the wind gradient.

The target is read from a polar table which only knows about one average wind condition, it does not know if the wind has a strong gradient or none at all. So next time you are having trouble reaching the target speeds, think about the wind gradient and whether or not it is a soft or heavy breeze, and use the input to help sail the boat. The information from the instruments is generally useful - it just needs rather more interpreting than it sometimes gets.

This is why we recommend that the last thing you touch is the Measured Wind Speed. It is calibrated in the factory where wind tunnel calibrated units are available, and apparent inaccuracies are 99% attributable to effects such as wind gradient, rather than to a basic calibration problem.

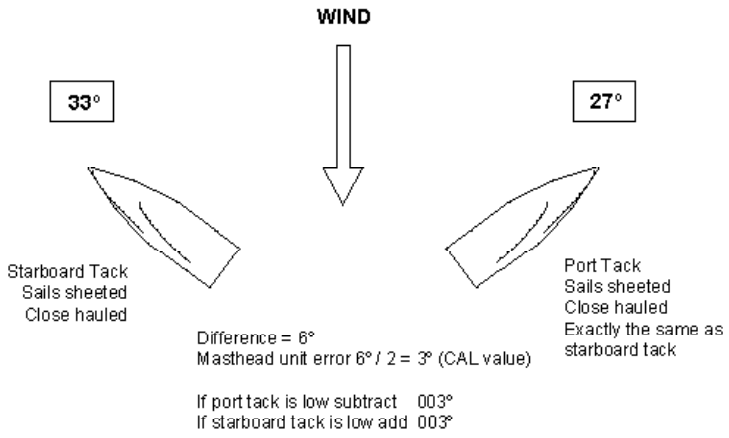
Measured Wind Angle (MWA) Calibration

This provides an offset calibration for any mechanical misalignment of the Mast Head Unit (MHU) at the top of the mast.

To discover the MWA alignment error we can employ one of two techniques. The first is simply to go head to wind and read the value of the Measured Wind Angle. If it reads anything other than 0, you have an error. If the error is greater than 0 (up to 180 degrees), you should subtract the error from 0 and enter this as the calibration value. So if when you go head to wind the measured wind angle reads 4 degrees, then you should enter -4 as the calibration value. If it is less than 0 then the opposite applies.

The before method is not actually very accurate as its quite difficult to hold the boat head to wind steadily whilst you monitor the MWA. The recommended method is therefore described below:

This method involves a sailing trial as depicted below.



Masthead Unit Alignment

MWA AutoCal

The H3000 provides an AutoCal facility for use during this sailing trial and will automatically calculate the MHU alignment correction for you. The process is as follows:

SETUP ▶ CALIBRATION ▶ APPARENT WIND ▶

AUTO MHU ALIGNMENT

Get the boat sailing steadily upwind, close hauled with the sails sheeted fully. The helmsman should focus on steering the boat to the sails as opposed to the instruments at this stage.