HYDROVANE Self Steering…..
Survive Your Dream

TIPS

INDEX

1. GENERAL
2. WARNINGS!
3. MORE GENERAL INFO
4. FINAL INSPECTION – TESTS
5. IDEAS!
6. GETTING STARTED
7. POOR PERFORMANCE
8. TIPS FOR CRUISING WITH WINDVANE SYSTEMS
9. RACERS, RALLY PARTICIPANTS, MOTOR SAILORS, OVERWEIGHT VESSELS
10. OLD UNITS

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1. GENERAL

INSTALLING THE VANE COVER - Use silicone spray - This nearly is a MUST! - it makes the job so much easier. Spray the tube and inside the vane cover - spray the seam that must slide over the tube.

Start the lace in the holes nearest the casting. The finish will need only half a knot or two hitches - then it is easy to bury the ends.

Cinch it tight enough to remove the wrinkles. The cloth is very stretchy. Initially you will think it is too small - keep cinching - **it will fit……and it will not rip. We often see vane covers with big gaps at the bottom – those gaps should not be there – cinch it up!**

REMOTE COURSE SETTING LINE - MAKING AN ENDLESS LOOP - The line provided is intended to be threaded through two eyes and around the wheel that drives the worm gear. The length should be tailored to your needs - to be set-up somewhere handy to the cockpit - include the small block provided in your loop - when welded, you can attach that block to a bungy chord that positions the line where you want it.

Cut the line to length then make a heat weld to the butt ends. Three hands are better than two for the heat weld:

HEAT WELD - For the Remote Course Setting Line

- Someone holding a lighter or gas flame
- Heat the ends until they are gooey
- Then stick the two ends together
- Best to have already licked your fingers then pat down the joint to make it consistent.
- You can always get more line. We prefer sail maker's 'leach line' - has a straight core - so it will fray less when cut.

IMPROVE LIGHT AIR PERFORMANCE – LEAD WEIGHTS COULD BE TUNED BY drilling out some weight on the right hand side **(Discretionary – Not At All Necessary)** - The two counter weights for the windvane are designed to render the vane virtually weightless - vertical but feather light to the touch. Our production methods have erred on the conservative side leaving those weights a slight bit on the heavy side – and older units have two equal weights – newer versions have the left one 7 oz. heavier than the right one.

It does not take much wind to correct any weight imbalance.

For those interested in achieving better light air performance you might remove some of the lead. Ideally the vane should be truly feather light – e.g. – put the vane vertical and it stays there – it should have no propensity to move when in calm air - but with the slightest poke, in either direction - would cause it to drift away. This test can only be done when there is absolutely no wind – sometimes at sunset or dawn or in a room.

We do know that the two weights should not be equal - about 7 oz. difference. With the weights closest to you the one on the left should be the heaviest. The easiest way to remove lead is by unbolting the weights and drilling out some lead from the inside - portion not normally visible - use a big drill bit.

New 'Stubby' - One aspect of the new 'stubbies' that we have not yet dealt with is in reducing the size/weight of the counter weights. They will be a bit heavy – generally not noticeable but it will make a difference in light air performance. All of the above pertains even more so to the 'stubbies'.

MAINTENANCE – CLEANING

The unit needs only a regular washing with fresh water and periodic cleaning with soap and water.

At sea - a dousing with a bucket of sea water will remove the salt build-up.

When dry, spray with a light aerosol oil such as WD40.

No grease!

No replacements required for first circumnavigation - and even then not much is recommended!

RETURN TO INDEX

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2. WARNINGS!

WARNING - SHAFT ASSEMBLY OFTEN KNOCKED LOOSE IN SHIPPING – Shippers are famous for dropping the shaft on its end. The typical result is that the top bearing separates a bit – usually ¼ in. (5 to 10 mm) or so. At the top of the tube, the top bearing – black delrin plastic - should be a flush joint with the stainless tube. Simply turn the shaft upside down and tap the end on concrete – it all should fall into place - well, then the BOTTOM COLLAR will also need to be re-set – see below.

WARNING – TETHERS FOR RUDDER & LOCKING PINS – Keep a tether on the rudder whenever it is attached. It does not float. All locking pins should also be tethered.

WARNING – (All units pre the fall of 2006) VANE and AXIS LOCKING KNOBS – can easily be spun off – then typically fall overboard. They only need a partial turn to loosen. It might be wise to drill a small hole in the knobs and attach a string/tether. NOTE - We now have new knobs that include a nyloc locking nut that solves this problem. Contact us to order the knobs and nuts.

WARNING – GRIT IN THE RUDDER'S SHAFT HOLE – Any bits of sand in the shaft hole of the rudder can act as a grinder and eventually cause that hole to get larger and larger. In fact, once it enlarges the process accelerates and the rattle of the rudder gets worse. For those over sized holes the best solution is a new rudder. An alternative is for a good machine shop to re-bore the hole and insert a stainless steel sleeve. The boring requires a precision low speed drill with coolant and the rudder locked in position – not a job for amateurs or inadequate equipment.

WARNING - ROTATE THE LOCKING PINS - The rudder locking pin can suffer from metal fatigue, over time. It is wise to rotate it with the other two locking pins from time to time……and eventually replace with a new one.

WARNING - OVER TIGHTENING THE BOTTOM COLLAR – One is so easily tempted to over tighten the set screw on the bottom collar (black plastic above the rudder) causing the collar to split. That screw only needs to slightly dig into the steel tube. The collar is not holding anything up so it does not have to be very secure. Make it snug and nothing more.

WARNING - BOTTOM COLLAR BINDING ON BEARING - When installing the rudder it is easy to bang it against the bottom collar - and knock the collar up against the bottom bearing. Periodically check that there is a hair of space between the 'collar' and 'bearing'. If not, you will feel it when wiggling the tiller. See test #5 above.

WARNING - GALLING OF STAINLESS STEEL BOLTS - Stainless nuts and bolts, when under load, can seize up and become impossible to loosen. (That is why rigging screws are typically made with bronze barrels.) This problem is exacerbated by bits

of stray stainless steel or other grit and especially if the nut and bolt threads are cut to a tight tolerance. You might wire brush the threads of the bolts to clean them and use a lubricant before tightening. It is wise to use plain steel nuts when positioning as 'dummies' and only use the stainless nuts for the final assembly. Never use an electric air drill – the speed and pressure causes heat which makes matters worse.

WARNING - HARMONIC VIBRATON CAUSED BY ENGINE - Some boats find that when the engine is running at certain RPMs that the Hydrovane rudder develops considerable vibration. Try securing the rudder with a heavy duty shock chord - to deaden the vibration. Cinch it up with force – the Hydrovane can take it. This vibration will certainly exacerbate a growing shaft hole.

RETURN TO INDEX

---

3. MORE GENERAL INFO

EVERY JOINT SHOULD RATTLE – If any of the axles, shafts or bearings are removed for cleaning or adjustment, the unit should be reassembled so that there is slight but noticeable end play between the moving parts – "every joint should rattle". The HYDROVANE is designed to 'rattle' – so, do not re-set those joints to remove the 'rattle' or 'looseness'. The purpose of the loose joints is twofold:

1. There must be room for a delay in the transition from a course change in one direction to a course change in the opposite direction. Otherwise the system would be 'on' all the time – another type of 'over steering'.
2. The joints need space to accommodate salt and dirt build-up. Otherwise a tight system soon becomes too tight causing unnecessary friction and poor performance. Meaning well, many owners and even skilled tradesman mistakenly tighten up those loose joints. There are 4 pairs of set screws that control the 'looseness':

    - A pair of axles holding the 'bobbin' - part 3
    - A pair of axles holding the vane axis disc – part 8
    - A pair of axles holding the ratio arm – part 70
    - A pair of ball sockets (part 20) holding the ball screw set – part 57

The degree of looseness should be just enough to feel a 'tic' – less than a millimeter - when moving the part back and forth. Cumulatively all those little spaces result in a fairly loose feeling when the tiller is jiggled.

When finished re-setting check that the relevant parts are still 'centered':

- The ratio rod (part 35) sits in the middle of the drive shaft when the ratio control is set in the 'neutral' (right hand) position
- The 'bobbin' is centered.
- The 'vane axis disc' is centered

PROPERLY LINED UP – With all 3 locking pins in place - the vane lock pin, the shaft lock pin and the rudder lock pin - now check the following:

- Rudder Centered Fore and Aft - The rudder and the tiller should be aligned in a perfect fore and aft direction – 180 degrees.
- Ratio Rod Moves Freely Between Fork Arms - The 'ratio rod' (part 35) should fit between the two 'drive rods' (part 36 – the fork of the fork assembly) without touching. You should be able to move the ratio control freely from neutral to the 3:1 position – that is from right to left - without the ratio rod binding on either of the two 'drive rods' of the fork assembly. If necessary, adjustments can be made to the top (easiest) or bottom of the con rod. New units should not need adjustment.
- Shaft Lock Pin Easily Inserted - The shaft lock pin is easy to use – insert and remove. If not, the two shaft bolts (#55) should be loosened and the unit jiggled until the holes line up. You might re-visit the installation instructions about opening that joint.

CHECK FOR FRICTION - Periodically, it is wise to get familiar with the amount of friction in the system so that you can be aware if it starts to lose its responsiveness. With the rudder detached and the ratio control in neutral – right hand setting – then move the tiller from side to side then push it slightly and let go – it should not do an immediate stop – but keep moving with momentum. It should be evident by its movements that there is almost no friction. Next engage the unit by moving the ratio control to any setting on the left. Give a gentle push to the lead weights – the vane must be attached. Once pushed the moving parts of the assembly should keep on moving from the momentum. If it stops quickly then there is some friction that needs correcting.

Common problem - Bottom collar binding on the bottom bearing – When installing the rudder it is easy to bang it up against the bottom collar causing the collar to slide up and jam next to the bottom bearing. This causes some 'binding' on the bottom bearing. Simply loosen the set screw on the collar and move it just a hair or mm. clear of the bearing. Actually any separation is fine as long as it does not touch the bearing and there is room for the rudder. See comment below about 'Over tightening the bottom collar'

RETURN TO INDEX

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4. FINAL INSPECTION – TESTS

The following are tests that can be performed to verify that the HYDROVANE is properly installed. Note that only items 1, 2 and 5 need to be checked for new units:

1. MAIN FRAME POSITIONED ON SHAFT
Shaft Lock Pin #61 should be easy to insert. If not then loosen the main frame and try again.

2. TILLER AND RUDDER TRULY FORE AND AFT – 180 DEGREES

- Install rudder
- Insert Shaft Lock Pin #61 then eyeball the alignment

3. CON ROD ALIGNMENT- DRIVE SLEEVE (#19) SPINS FREELY

- Insert Vane Lock Pin #60
- Insert Shaft Lock Pin #61
- Set ratio control in 'neutral' or far right position
- Check that the 'drive sleeve' spins freely and does not bind on either of the 'drive rods' #36. If not then the con rod needs adjustment – loosen the top bolt, re-position then tighten. If that does not solve the problem then adjust the 'ball screw set' - #57. NOTE – It is highly unlikely that this problem would be found in new units. Be very weary of attempting to re-set the 'ball screw set'.

4. CON ROD ALIGNMENT – SHAFT LOCK PIN FITS

- Insert Vane Lock Pin #60
- Set ratio control at far left (3:1) position
- Insert Shaft Lock Pin #61 – If this cannot be done then the con rod needs adjustment – loosen the top bolt, re-position then tighten. If that does not solve the problem then adjust the 'ball screw set' - #57. NOTE – It is highly unlikely that this problem would be found in new units. Be very weary of attempting to re-set the 'ball screw set'.

5. FRICTION TEST FOR SHAFT – BOTTOM COLLAR TOUCHING BOTTOM BEARING – * COMMON PROBLEM *

- Set ratio control in 'neutral' or far right position
- Flip the tiller back and forth. It must freely move from side to side with only the slightest push. If it stops before going fully over then check the bottom collar #26. There must be a hair of space between it and the bottom bearing #25. Do NOT over-tighten the set screw on the collar. It only needs to be slightly tight. It is too easy to split the collar.

6. RATTLE TEST – OVERALL

- Set ratio control in gear – any position except far right
- Jiggle the tiller vigorously. There should be considerable rattle as there must be a bit of 'play' at every joint. NOTE – It is highly unlikely that this problem would be found in new units.

7. RATTLE TEST – TOP BEARING

- After test 6 then jiggle the tiller fore and aft – on the 180 line. You must feel a little looseness – slight knocking of the top bearing. NOTE – It is highly unlikely that this problem would be found in new units.

8. RATTLE TEST – BOTTOM BEARING

- After test 6, with the rudder removed, jiggle the bottom of the shaft. You must feel a little looseness – slight knocking of the bottom bearing. NOTE – It is highly unlikely that this problem would be found in new units.

RETURN TO INDEX

---

5. IDEAS!

IDEA! – RETROFIT A SOLAR PANEL IN PLACE OF VANE WHEN NOT IN USE – A customer at Southampton has provided a brilliant idea. He uses the vane locking screw and bracket and has fitted a solar panel to it. The panel sits at the full deflection point which is 50 degrees off the horizontal – a perfect compromise angle.

IDEA! – RETROFIT A BASE FOR A FLAG STANDARD IN PLACE OF VANE WHEN NOT IN USE

IDEA! - STOWING THE VANE – Two options:

- Make a pocket in the lifelines using sail cover material – eg – Sunbrella or equivalent
- Using the back of a door install a bolt with dimensions that utilizes the same locking arrangement as is on the vane - use a wing-nut.

IDEA! - CASSETTE TAPE TELL-TALE - We have often heard that cassette tapes make ideal tell-tales. It is equally handy to have a tell-tale on the windvane - top trailing edge.

IDEA! - STERN LIGHT ON HOUSING COVER - The plastic cover is very strong - easy to drill holes to fit a stern light - some ingenuity needed for the wiring and angling of the light - the height is ideal.....so much for the Hydrovane logo.

RETURN TO INDEX

---

6. GETTING STARTED

THE FIRST TEST DRIVE – VANE SET AT 20 DEGREES AND RATIO KNOB AT MIDDLE SETTING - The vane can be inclined from the vertical position by up to 30 degrees. To change the vane's position loosen the vane's axis locking knob and push the lead weights up. To start set it at 20 degrees off the vertical – 2/3 way through its range.

Try the ratio knob at the middle setting.

Ideally one would have fairly calm seas and a nice wind on your first test of the HYDROVANE. You might refresh yourself with all the set-up procedures from the detailed instructions. Essentially: the sails trimmed and balanced, the vane set with

the leading edge dead into the wind, **then lock the main rudder, not centered but in that 'sweet spot' that holds the boat 'on course' and compensates for any tendencies of the boat** – weather or lee helm. Finally engage the HYDROVANE by moving the ratio control from the neutral, right hand position (with the rod pointing vertical/down) to the middle setting (with the rod off to the side - pointing at 4:00 o'clock). Stand back and watch. Typically you should now be marveling that it really does work. Let it perform for a while. Observe the wake. The goal is to achieve a straight wake – and reduce the yaw.

STRAIGHTENING THE WAKE AND REDUCING YAW – There are two tools for adjusting the sensitivity and steerage of the HYDROVANE:

1. **Adjustable Vane Axis (Sensitivity)** - The inclination of the vane - 0 to 30 degrees for sensitivity:

- Light Airs - 0 degrees or vertical - most power - most sensitive
- Middle or Normal Setting - 15 to 20 degrees
- Heavy Weather - 30 degrees or fully inclined - least sensitive

2. **Ratio Control (Steerage)** - 3 settings for different amounts of rudder and power:

- Far left - 15 degrees (1:3 power) – least steerage, most power, for light airs
- Middle -25 degrees (1:2 power) - normal setting
- Right – 40 degrees (1:1 power) - most steerage, for heavy weather
- Neutral – far right

Middle & Middle - Many find that the basic settings previously suggested – vane partially inclined (about 15 -20 degrees) and ratio knob in the middle setting - are all that they need. But you might want to fine tune to see just how well the HYDROVANE can perform.

Vane Angle Settings - If the Hydrovane is responding too slowly, under steering, then finally catching up by over steering, try raising the vane – make it more responsive/sensitive/powerful by putting it in the vertical position. Conversely, if the vessel is over steering with each correction being too dramatic, then de-sensitize/de-power the vane by further inclining it.

Ratio Control Settings - If it appears you need altogether less steerage, usually for smaller or lighter boats or lighter sea conditions, try the first ratio control setting (far left). Alternatively, if more steerage is needed use the 3rd setting (right). Then at those settings you can try varying sensitivity/power with the vane angle.
Examples - In light airs, when the vane may be vertical for maximum power, the resulting rudder movement can be reduced, if necessary to avoid over steering, by moving the Ratio Control to the left. In heavy weather, when the vane axis will be declined for stability; the ratio knob can be moved to the right to give more rudder control from a smaller vane movement.

Easy Waving Motion of Vane - The end result should be a an easy waving motion of the vane as it swings from side to side, rarely banging at the stop and not

spending long periods without moving. If it bangs from side to side it needs to be de-sensitized - lower it. If it is not moving much then add sensitivity by raising it. You should soon learn what positioning works for you. Over time you will develop your own technique for altering the settings. Surprisingly, many users are happy to leave the settings alone - seeing no need.

ONLY HYDROVANE CAN CHANGE ITS AXIS/SENSITIVITY - The HYDROVANE is not finicky. As just mentioned, many owners leave their vane and ratio knob at the same setting for most conditions. The degree of tuning is a personal taste. All the other major brands have either no such tuning capability or at best can make only minor adjustments. Some can change the angle of their vanes but none can change the axis angle. All other brands have fixed axis – generally 20 degrees. Only Hydrovane can change that axis angle – hence change the vane's sensitivity/power.

RETURN TO INDEX

---

7. POOR PERFORMANCE

A HYDROVANE should perform beautifully on any boat that sails well, easily holding its course. Its control diminishes for heavier boats and for boats with balance (weather helm) problems. If it is easy to helm, it will also be easy for the self steering system.

Performance problems can be divided into:

1. INSTALLATION CONFIGURATION – Mechanical set-up problems – see 'Final Inspection Tests' above
2. FAMILIARIZATION – Sailing issues – discussion follows
3. CHRONIC BALANCE PROBLEMS - weather helm etc. – see following discussion

If the boat is off course and the Hydrovane vane is over – then the Hydrovane is doing all it can. If the boat is reluctant to get back on course there must be other forces at play – the boat must want to get back on course – if it wants to go elsewhere it is hard for the Hydrovane to tell it otherwise – ditto for any steering system. **The answer should be in the sails and their trim.....and locking position of the main rudder.**

MAIN RUDDER IS NOT LOCKED IN THE RIGHT POSITION - needs re-setting - experiment - find that 'on course' 'sweet spot' before locking it - typically never locked on the centre line. The positioning of the main rudder's locked spot is critical to Hydrovane's performance.

UNTRIMMED SAILS – sheeted too hard, unbalanced configuration or over-canvassed - difficult for helmsman as well - first hand steer to see if the boat is tracking well - if not, adjust sheeting or change/reef sails. The Hydrovane is the teacher - it is happiest when you have done a good job of sail trim and balance. The sails must be trimmed so that the boat wants to go in the same direction as the desired course. If the boat wants to go elsewhere that makes it hard for autopilot, human helmsman and Hydrovane.

A big lesson can be learned from the long distance single-handed racers. They focus all their efforts on the 'trim' of the sails to the extent that their wheels are so light to the touch and their self steering has relatively little loads to deal with. Surprisingly, they are much more concerned about being over-canvassed than you think. A good test is to see if you can alter the course of the boat by only adjusting the sails. Once you have achieved that you know you have figured out how to trim your sails.

BAGGY SAILS - old sails are harder to trim

UNBALANCED BOAT – difficult to steer by human or autopilot - chronic weather-helm - consider major changes: to rake of mast, or reduce length of boom and mainsail or re-position mast! Take a good sail maker for a sea trail.

WEATHER HELM OR LEE HELM? - In conditions that overwhelm the Hydrovane, disengage it and take the wheel yourself – feel what the Hydrovane must deal with.

The auxiliary rudder concept makes the Hydrovane's job easier because the main rudder should be set to 'balance out the boat'. With a truly balanced boat the Hydrovane's power, leverage and nimbleness should be enough to get the boat back on course. This concept is corrupted if the Hydrovane must steer a boat that wants to go in a direction other than the desired course.

SEVERE WEATHER HELM - RE-SETTING THE MAIN RUDDER - A TEMPORARY FIX - If the Hydrovane rudder is hard over and the boat is not responding that means the boat is trying very badly to go in another direction. If you have some speed through the water the nearly 3 sq. ft. of Hydrovane's rudder is providing lots of power to turn your boat. You must have even more power heading in opposition. You need to solve where that opposition is coming from. Does re-setting of the main rudder help? As the wind gains strength do you have to keep re-setting the main rudder? Can you tell how far off centre the main rudder is positioned? It will be compensating for any weather helm. For boats with severe weather helm as the wind gains in strength so does the weather helm. Re-positioning of the rudder is a temporary fix. The permanent fix is probably in the positioning of the main mast or hopefully in cheaper solutions like the rake of the mast, size of sails etc.

GUSTY CONDITIONS - In changing conditions the dynamics that the Hydrovane is relying on could need constant adjusting. This is especially so for boats with bad weather helms or sails that fold over in a rolly sea. As the wind gains strength a number of things happen:

- Typically boats gain more weather helm resulting from increased pressure on a portion of one of the sails – roach of the main could be a culprit
- Boat speed changes which in turn changes apparent wind direction
- Heel of the boat might change – lesser affect but contributes to the changing dynamics

The result is that the 'balance' of the boat has altered and the Hydrovane is fighting a boat that wants to go 'off course'. **The solution is to re-set the locked position of the main rudder.** The dilemma is that no sooner than the correction has been made than the wind calms – reversing the affect meaning another re-setting of the main rudder position…and on and on….

STOP HEADSAIL FROM COLLAPSING OR FOLDING - POLE AND VANG - A pole is a must – keeps the jib from folding. The 'wing-on-wing' for downwind sailing is nearly bullet proof – stability is created by both the slot between the two sails and the rigid position of each sail – jib sheeted hard to windward on the pole and main secured to leeward with a preventer or vang. The use of a pole will solve beam reaching problems as well – again the folding jib is the issue. If the jib folds the whole balance of the boat changes as the main takes over, driving the boat upwind and the jib is not there to push the bow down. You will be amazed how peaceful the boat becomes without the jib collapsing and re-filling with that horrible bang.

GENOA – Is your headsail a genoa? – a big jib with a long low cut foot with a clue near deck level. Those genoas are designed for racing – an upwind sail – not at all versatile for the needs of a cruiser. I always take those genoas to my sailmaker and have them create a new clew that effectively makes the sail nearly an isosceles triangle (leach and foot are nearly of equal length). Coincidentally a '140' genoa becomes about a '110' yankee type jib – an ideal sail for cruisers. as its sheet is slacked off the sail evenly changes its shape. Slacking sheets on a genoa creates a loose bag at the top while the foot is still fairly flat – very inefficient – as it should be as it is not designed for reaching. Another big bonus of this re-cut of the sail is that then you can see under it – so much safer. Sheeting of this new sail is easy too – with the sail set, sight a line from the clue to the mid point on the forestay (half way up the sail) then extend that notional line straight aft to your track – voila, that is where the block should be.

HEAVY WEATHER – The Hydrovane will outperform any human or autopilot in heavy weather. With the vane fully inclined to de-sensitize it and the ratio control setting at the right-hand position for maximum rudder the boat's yaw is minimized. With less yaw the vessel will be more comfortable (HOW CAN BAD WEATHER BE CALLED COMFORTABLE?) and travel a shorter route for a faster passage. The main rudder can provide the greatest yaw resistance only if it is fixed - meaning the Hydrovane system has a 'natural stability' in heavy weather. The Hydrovane's rudder, in its more levered position further aft, responds almost instantaneously to course changes. It is not as big as the main rudder but it is faster and smarter.

LIGHT AIRS – Hydrovane's superiority in light airs is because it can be set in a 'light air mode' and there is so little inherent friction. No other system can match these capabilities. The 'light air mode' - the vane set in the vertical position for maximum power and responsiveness and the rudder perhaps in the most powerful setting (far left) the Hydrovane should perform in apparent winds of 3 to 6 knots – depending on the sea state (a rolly sea can throw the vane off course). For the purists or those without enough fuel the next step would be to have a small tiller style autopilot fitted onto the Hydrovane tiller for the lightest of airs.

Hydrovane owners marvel that their Hydrovane's performance is superior to any helmsman or their autopilot – in the worst and lightest of conditions. There is no reason why the HYDROVANE should not be used 100% of the time when sailing. OFF THE WIND - Sailing off the wind in lumpy seas is precarious sailing – the toughest for any steering system. Sail trim is so important. Simply engaging the Hydrovane does not assure the boat will hold its course. The secret to trim in downwind sailing is in securing or stabilizing the sails. If the sails are able to flop about there is no hope of balancing the boat…..and any self steering system, especially the Hydrovane, need a balanced boat to work with.

The following is a copy of the text of an email sent to a solo circumnavigator who was at sea and reporting poor performance from his Hydrovane. Like many, his first time using the Hydrovane was not a sea trial but when he finally got on his way. In fact, **he had not looked at any of the instructions.....of course!** What he had not yet understood is that the Hydrovane needs a balanced boat to work with (ESPECIALLY AS HIS BOAT WAS QUITE HEAVY - 20 TONS (40,000 LBS. OR 18,000 KGS.). The boat can only be balanced by trimming the sails and positioning the main rudder when it is locked so that the boat wants to go in the same direction as the desired course. If the boat is poorly trimmed or the main rudder not set in the right direction there could be, especially as the wind increases, too much force for the Hydrovane to overcome.

Shortly after sending this email we received a response - A Eureka! kind of realization: "Ah ha, now I understand" - ***he has since sailed from the UK around Cape Horn and now in Nome, Alaska - all sailed by his Hydrovane.***

Your problem (Hydrovane's poor performance) is very solvable. You are going to learn a lot more about your boat and sail trim.

The Hydrovane delivers it certain amount of steering - and that is all. If it is not working for you the solution lies in sail trim. "The boat must want to go in the same direction as the Hydrovane is trying to steer it". I have put quotation marks around that comment for emphasis - same for the next comment.

"The Hydrovane is the instructor". If it is not functioning well you need to look at your sails and sheeting and the position of the main rudder. The boat must want to go in the same direction. If the boat has a tendency to go elsewhere that makes it hard for the autopilot or human helmsman as well as the Hydrovane. The solution for any wandering should be found in either the trim of the sails or the positioning of the main rudder.

If the Hydrovane is having a tough time then disengage it and take the wheel to feel what the Hydrovane feels. Is there weather helm? Ease the sheet on the main....then do the same on the jib. Does any of that help?

With autopilots many sailors have sloppy sailing methods oblivious to the strain that the autopilot must deal with. In fact many cruisers simply hoist the sails, cleat the sheets and leave it at that. A baggy main - the luff of the

sail could be luffing while the roach is sheeted too hard and driving the boat hard to windward. Genoas have awful shapes for cruisers - only efficient when on the wind. As its sheet is slackened it opens at the top - soon luffing at the top and yet too hard at the bottom.

The single handed racers spend enormous time trimming their boats. You would be amazed at how light their wheels/tillers are as they work hard at balancing their boat by trimming their sails.

The Hydrovane concept is simple. Trim the sails to balance the boat so that the boat naturally wants to hold its course. Then set the main rudder at a position that holds the course or compensates for any weather or lee helm. The Hydrovane should do the rest - its rudder correcting to keep on course.

The quantity of sail is important for balance. Experiment with different amounts of reefing.

We so often hear from Hydrovane owners that they learned so much about sailing their boats from their Hydrovane. The Hydrovane is giving its certain amount of steering power to make corrections. If the boat it is working with is not balanced then as the wind gains strength it will have a tougher and tougher time. You must deliver to the Hydrovane a 'balanced' boat.

The owner of an Oyster 55 that weighs 25 tons told me that it took him some time to get 'in tune' with the Hydrovane. Eventually he found himself using it all the time. I can tell you of other very over weight boats that delight with their Hydrovanes. You have to learn about your sails and trim. The Hydrovane is the instructor. The suspects for your problem are your sails, their trimming and the position that you lock your main rudder.

RETURN TO INDEX

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8. TIPS FOR CRUISING WITH WINDVANE SYSTEMS

'WORKING' SAILS – My technique for family cruising involves just our 'working sails' – jib, staysail and main – and a spinnaker pole. Furlers are a big help. The jib was a cut down genoa with a high clue that provided visibility. The jib should not be too big – a 110 to 120 max. – about the same surface area as the main. Ideally the

pole is that length that can hold the jib taught. A spinnaker is not much use for us – a fun sail to use on an afternoon when many hands are available. It is too frightening to have a spinnaker up in the middle of the night with building winds. That is when s___ happens.

WING-ON-WING – For downwind sailing we had the jib poled out to the windward side with a course 15 to 20 degrees off a dead run. We had great control with that configuration. The two sails set can be kept at about equal size – hence the balance. Even with too much sail for the conditions the boat was stable. Reefing was achieved on the run. The jib was furled and the main was muscled down. It was hard work furling if you wait too long in building weather but it was far better than the alternatives.

THE POLE – The spinnaker pole was critical to all running and much of the reaching. In a heavy sea on a beam reach the jib would collapse in the wallow of the waves then fill with a brutal bang on the wave peaks. By putting the jib on the pole, and sheeting it taut that collapsing and filling with a bang was stopped completely – so much easier on the crew and the boat. For less strong or agile crew the extra cost of a carbon fiber pole is not a bad idea.

SELF STEERING SYSTEMS ARE EXCELLENT TEACHERS – All of the tried and proven windvane systems work well. If they did not perform they would be out of business a long time ago. So, if a system is not working on your boat you should treat the system as the teacher and try to discover the problem. (There are some exceptions though – some boats with friction or steering problems might not be suitable for servo pendulum systems that try to drive the main rudder.) The HYDROVANE system is completely oblivious to whatever the main steering system is. If the HYDROVANE does not perform well the cause is probably in the rig or sails. By adjusting the sails or rig and observing changes in performance you will learn a lot about sailing your boat. In due course you will not only discover what works and what does not work but also find that the boat has a more comfortable motion – probably heeled less and definitely less yaw.

RETURN TO INDEX

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9. RACERS, RALLY PARTICIPANTS, MOTOR SAILORS, OVERWEIGHT VESSELS

RACERS

The Hydrovane offers the single or short handed racer some advantages not available with any other gear:

ALTERNATIVE STEERING SYSTEM - Qualifies as an ‘alternate steering system’ as required for most races.

STEERS STRAIGHTER COURSE - 1) Sophisticated ability to adjust for sensitivity and power produces a straighter course for less distance traveled. 2) The direction of the wind is constantly varying by at least 10 degrees. Mechanical systems naturally exploit those wind shifts. Electronic systems steering a magnetic course are more

often out of trim than in trim. And as the wind shifts direction mechanical self steering devices alertly detect each change - whereas our human watch-keepers are not always so interested or willing or available to make adjustments.
HYDROVANE AND AUTOPILOT IN TANDEM - An autopilot on the main rudder can be engaged simultaneously with the Hydrovane. With a Hydrovane, once surfing conditions are encountered the autopilot can be engaged in tandem. Then the autopilot will compensate to keep the boat on course when the boat goes through dramatic speed changes while surfing down a wave. This system actually works! It is also helpful for sail changes etc.

ENORMOUS REDUNDANCY - With a Hydrovane you are no longer vulnerable to any of the thousands of things that could go wrong to cause: no power, no autopilot, no steerage, no rudder.

LESS ELECTRICITY - Considerably less time, effort and stress over maintaining and operating the power generation system.

QUIET - A quieter boat with so much less time running generators or engines - closer to nature - and better sleep!

A SINGLE-HANDERS BEST….AND ONLY CREW!

RALLY PARTICIPANTS

As well as all of the above comments for racers a Hydrovane also offers:

INSURANCE - Owners are not always able to stay with the boat for the return trip and the delivery crew is typically more prone to have mechanical difficulties. A Hydrovane is perfect insurance against much of the unforeseen.

IDEAL FOR CRUISING POST RACE/RALLY - All the above features are compelling for the short handed cruisers.

MOTOR SAILORS – Many sailors are content to set their sails and turn on the engine, only stopping the engine in ideal sailing conditions. Because they have a strong bias towards running the iron staysail any notion of the rather sophisticated and finicky mechanical self steering devices seems very unnecessary. The HYDROVANE is different than the other systems. Although more sophisticated in design it is much more easy to use and more versatile. The reasons such a motor sailor might consider a Hydrovane are:

EMERGENCY STEERING - A complete back-up steering system all in place ready to go. Consider it insurance.

EASE OF USE – Simply click it into gear – no lines into cockpit that need constant tensioning and adjusting - just too easy to use.

OVER SIZED VESSELS

The Hydrovane is a wonderful tool for any boat. But it does have its limits. The question is often asked: "What would a Hydrovane do for a boat well over your suggested 40,000 lb. (18,000 kg.) limit". The answer is that it will produce its certain amount of steerage power no matter how big the boat. In heavier and lighter winds it might not be adequate. Given a balanced boat it could well perform most of the time. If need be in difficult conditions, light or heavy, the autopilot could be clicked on to assist – two rudders being better than one – and the autopilot would not have to work nearly so hard. The trump card is always its ability as a back emergency steering system. In an emergency a Hydrovane can adequately steer any boat.

PERFORMS - Only need to sail more conservatively

AUTOPILOT IN TANDEM - Can always click on the autopilot in challenging conditions - see section above "HYDROVANE AND AUTOPILOT IN TANDEM"

EMERGENCY STEERING - No matter how big the boat it is an ideal backup system.

RETURN TO INDEX

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10. OLD UNITS

TUNE UP OR RE-BUILD - We have always offered a 'rebuild' service for older units. Currently we are under the gun to produce units and Geoff is simply unavailable. So, now our UK customers must do what all other Hydrovane owners in other parts of the world must do – that is to do the tune-up themselves – or perhaps turn it over to a local tradesman. Any good rigger or marine tradesman should be comfortable with it. This TIPS section combined with the PARTS and INSTRUCTIONS sections should make you or your helper comfortable in handling whatever needs doing.

Typically it is the bottom bearing and drive sleeve need replacing – see INSTRUCTIONS #12 and #14.
Please feel welcome to contact Will (will@hydrovane.com) or John (john@hydrovane.com) for any advice or simply send any parts orders straight to Sherry (sherry@hydrovane.com).

OXIDATION - The Hydrovane is not designed to be absolutely immune to corrosion. In fact we allow for a bit of oxidation to occur in certain joints of the bracket assembly - it strengthens it - like a weld. Although the aluminum used is the most corrosion resistant because of a high magnesium content there is small amounts of oxidation in the screw holes which are not anodized. Although these old units can have some oxidation, none of it is damaging to the extent of compromising its strength or integrity. The exceptions are in situations where electrical current was allowed to pass through the bracket or the brackets were permanently submerged in salt water.

The tricks to loosen those frozen parts:

- **Bathe in Penetrating Oil** - Frequent spraying or, better yet, immersion over a period of time.

- **Boil it** - Yes, like vegetables. The heating and contraction of the differing metals can cause a separation. Using more aggressive heating methods are very risky as aluminum is most vulnerable to high heat temperatures.
- **Impact Tools** - Machinists use special 'impact tools' that twist a screw or bolt just a fraction on impact.
- **Skilled Machinists** - We have yet to see a unit that we could not take apart. Before damaging it you might consider taking the unit to a qualified machine shop where they have the proper tools and savoir faire.
- **Corrosion Inhibitor** - When replacing or re-installing any of the set screws (grub screws) use a corrosion inhibitor to protect against electrolytic action such as:
    - 'Locktite' green
    - 'Duralac' from www.llewellyn-ryland.co.uk
    - 'Studlock' by Rite-lock www.railpart.co.uk/WebSiteWorkshop/ad/ad1.htm

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SHAFT HOLE IN RUDDER IS GROWING - Any bits of sand in the shaft hole of the rudder can act as a grinder and eventually cause that hole to get larger and larger. In fact, once it enlarges the process accelerates and the rattle of the rudder gets worse. For those over sized holes the best solution is a new rudder. An alternative is for a good machine shop to re-bore the hole and insert a stainless steel sleeve. The boring requires a precision low speed drill with coolant and the rudder locked in position – not a job for amateurs or inadequate equipment.

RETURN TO INDEX