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Autohelm 800

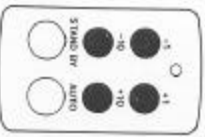
Installation & Operating Handbook

SEA TRIALS

Initial sea trials should be carried out in calm conditions with plenty of sea room. The previously conducted functional test will have verified that the autopilot is operating correctly and that you are familiar with all of its controls.

During first sea trials, the vessel will be constantly changing heading, and it is, therefore, very important to maintain a constant look-out. The following initial trial procedure is recommended:

- Steer on to a compass heading and hold the course steady.
- Using the four course control keys, position and then place the pushrod end over the filler pin.

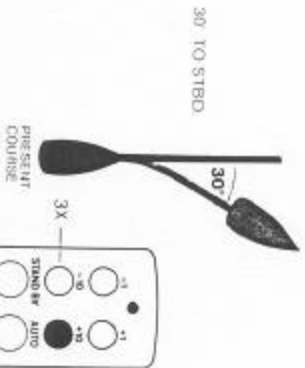


- Press **Auto** to lock on to the current heading. In calm sea conditions a perfectly constant heading will be maintained.

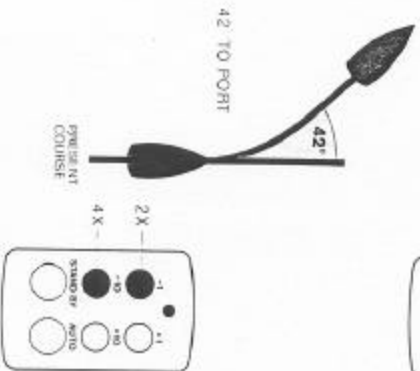


- Alter course to port or starboard in multiple increments of 1 and 10 degrees.

30° TO STBD



42° TO PORT



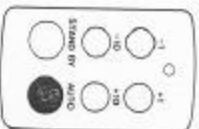
- **Power Steering**
- Press **Stand by** and practice power steering using the four course control keys.
- Press **Auto** twice (within 2 seconds) to return to the original automatic heading.

- **Hand Steering**
- Press **Stand by** and lift the autopilot from the filler pin for return to hand steering.

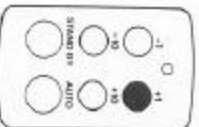
Auto Tack Function

The following additional trial is recommended:

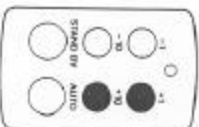
- Steer onto a constant heading approximately 10° free of close hauls.
- Press **Auto** to lock onto the current heading or both red keys to lock onto the apparent wind if a vane is fitted.



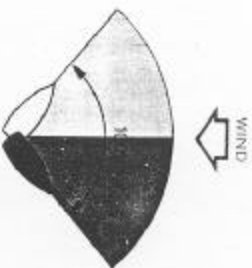
- Decrease the apparent wind angle using the +1 key (if on the starboard tack) until the yacht is sailing close hauled at optimum penetration.



- Prepare to tack and then press the +1 and +10 keys together (if on the starboard tack) to initiate a tack to starboard.



- The yacht will complete a 100° course change to bring it onto the opposite tack.



On completing the tack and having sheeted and retrimmed the sails, the vessel may be brought onto the desired apparent wind angle by fine adjustments to the course using the +/-1° buttons. No adjustments should be made within 1 minute of completing the tack to allow the Autopilot to compensate for the helm trim on the new tack.

AUTOHELM 800

Your Autohelm is an up-to-the-minute digital tiller autopilot which shares the same microprocessor technology built into our biggest and most sophisticated fully installed pilots.

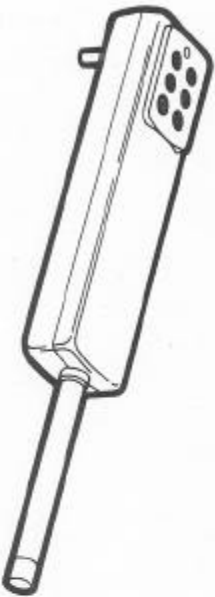
The Autohelm 800 will provide precise powerful steering for sailing yachts up to 9m(30') LOA.

The use of your Autohelm may be extended by adding any of the following accessories:

- Windvane
- Radio Navigation Interface
- Hand Held Control Unit

Only one accessory may be used at any time.

You will find installing the unit simple and enjoyable using this handbook and a minimum of hand tools.

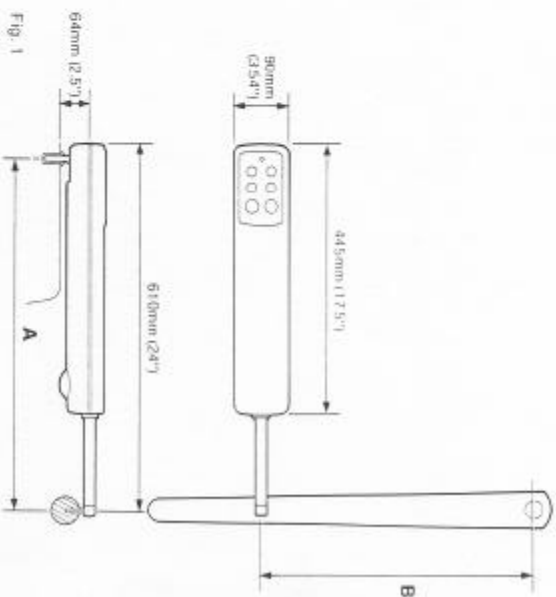


Cockpit and tiller configurations vary widely and to ensure your Autohelm installation is as neat and secure as possible a full range of fitting accessories is available from authorised Autohelm stockists. Full details are included. In case of any difficulty please contact your main distributor or Nautitech's Technical Sales Department for assistance.

Properly installed and operated in accordance with our recommendations the Autohelm will give outstanding performance even under the toughest conditions and become an indispensable member of your crew.

Good sailing

INSTALLATION



Your Autohelm is a totally self contained magnetic sensing automatic pilot. The autopilot is mounted between the tiller and a single attachment point on the yacht's structure. After connection to the yacht's 12 volt electrical system the unit becomes operational.

Since the autopilot incorporates a magnetic sensing device, it is advisable to ensure that the yacht's steering compass is situated at least 750mm (2'6") away to avoid deviation.

For correct installation two basic dimensions are critical (Fig. 1):

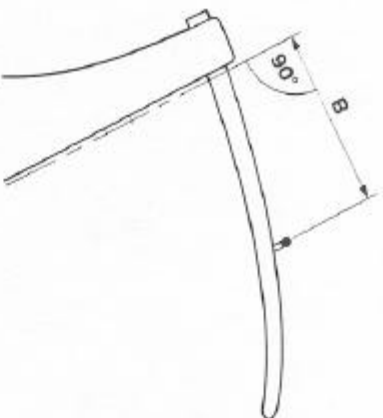
Dimension A = 589mm (23.2")
mounting socket to tiller pin.

Dimension B = 460mm (18")
rudder stock centre line to tiller pin.

Clamp the tiller on the yacht's centre line and mark off dimensions **A** and **B** (**A** is measured on the STARBOARD side of the cockpit) using masking tape to locate the fixing points. Ensure the measurements are at right angles as shown.

The autopilot must be mounted **horizontally**.

SLOPING RUDDERSTOCK



BASIC INSTALLATION

After establishing the three control dimensions the autopilot can be mounted directly onto the **Starboard** cockpit seat (Fig. 3). Proceed as follows:

TILLER PIN (Cat No. D001)

- Drill 6mm (1/4") hole x 25mm (1") deep at point marked.
- Using a two part epoxy such as Araldite, epoxy the tiller pin into place.
- Position the shoulder of the pin 12.5mm (1/2") above the tiller surface.

MOUNTING SOCKET

- (Cat No. D002)
- Drill 12.5mm (1/2") hole x 25mm (1") deep into the **starboard** cockpit seat.

- If the thickness of the mounting position is less than 25mm (1") carefully reinforce the under surface with a plywood plate epoxied into position.
- Install the mounting socket using two part epoxy:

Note The autopilot is capable of generating high pushrod loads. Ensure that:

- The epoxy is allowed to harden thoroughly before applying any loads;
- All holes are drilled to correct size and where necessary reinforcing is provided.

PORTHAND MOUNTING

In certain circumstances it may be more convenient to mount the unit on the porthand side. When this is the case, the changeover switch will require adjustment as follows. Remove the blanking screw and use the adjuster provided to rotate the switch anti-clockwise until the endstop is reached (Fig. 2).

Never force the changeover switch, light pressure only is required.

Finally replace and fully tighten the blanking screw to ensure watertightness.

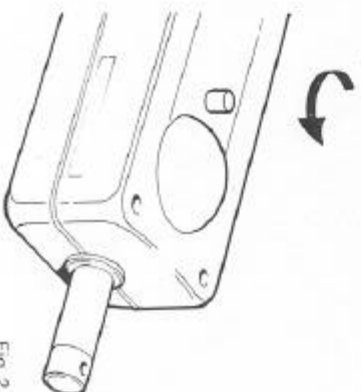


Fig. 2

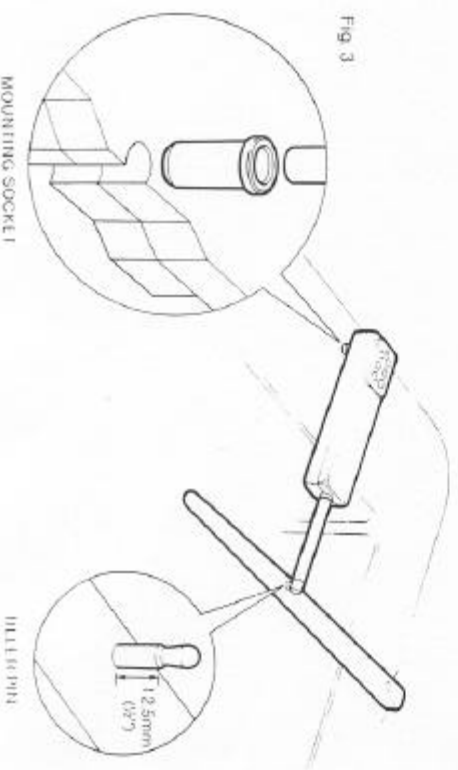


Fig. 3

MOUNTING SOCKET

TILLER PIN

INSTALLATION ACCESSORIES

If it is not possible to install your Authelm directly onto the cockpit seat/tiler as described one of the following accessories (or combination) will ensure a perfect installation.

PUSHROD EXTENSIONS (Fig. 4)
The pushrod length may be simply extended using one of the standard pushrod extensions. Dimension **A** is modified as follows:-

Dimension C	Pushrod Extension Length L	Cat. No.
	Std Dimension	-
589mm (23.2")	25mm (1")	D003
615mm (24.2")	51mm (2")	D004
640mm (25.2")	76mm (3")	D005
665mm (26.2")	102mm (4")	D006
691mm (27.2")	127mm (5")	D007
716mm (28.2")	152mm (6")	D008

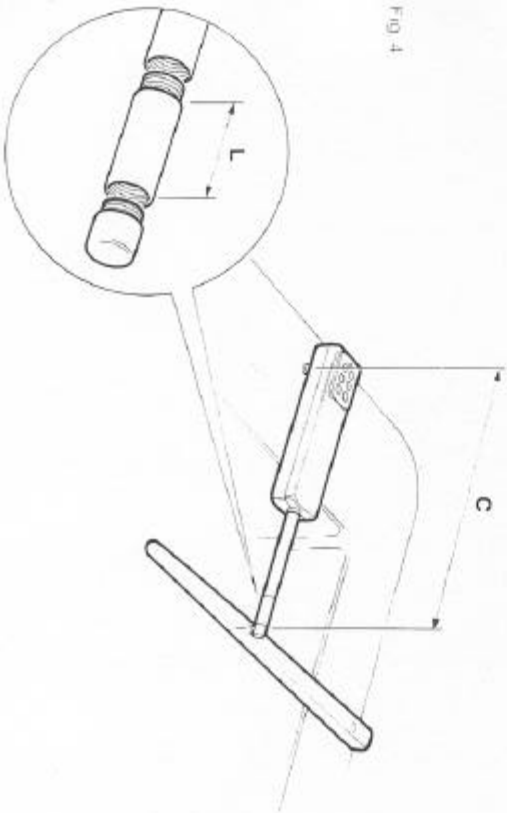


Fig. 4

TILLER BRACKETS (Figs. 5 and 6)
Where the height of the tiller above or below the cockpit seat or mounting plane is such that standard mounting is not practical a range of tiller brackets allows the tiller pin offset to be varied.

Installation
● Position the tiller bracket on the centre line (upper/lower) of the tiller and establish control dimensions **A** and **B**.

- Mark off the position of the centres of the two fixing bolt holes.
- Drill two holes 6mm (1/4") diameter through the centre line of the tiller.
- Install the tiller bracket using 2 x 6mm (1/4") diameter bolts, nuts and washers.
- Epoxy the fixing bolts in place and fully tighten the nuts.

Dimension D (below tiller)	Dimension E (above tiller)	Cat. No.
25mm (1")	51mm (2")	D009
51mm (2")	76mm (3")	D010
76mm (3")	102mm (4")	D011
102mm (4")	127mm (5")	D012
127mm (5")	152mm (6")	D013

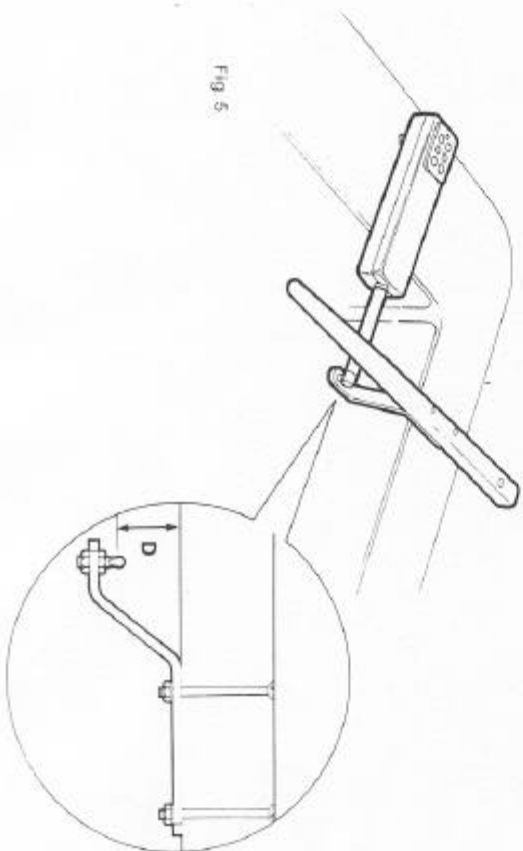
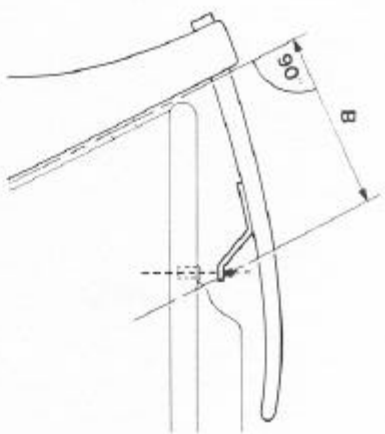


Fig. 5



SLOPING TILLER

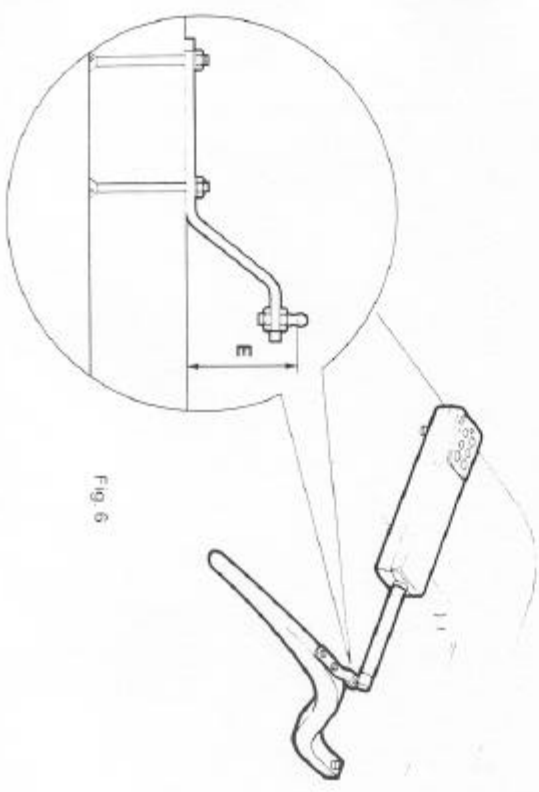


Fig 6

CANTILEVER MOUNTING (Fig. 7)

Where it is necessary to attach the autopilot to a vertical face such as the cockpit sidewall a cantilever socket assembly is used.

The maximum extension offset is 254mm (10") and the cantilever length can be cut to the exact length necessary during mounting.

Installation

- Clamp the tiller on the yacht's centre line.
- Measure dimension **F** (actual).
- Refer to table to establish cutting length for cantilever rod. (Double check measurements **before** cutting).

Dimension F	Cut Length L
654mm (25.75")	51mm (2")
705mm (27.75")	102mm (4")
743mm (29.75")	152mm (6")
806mm (31.75")	203mm (8")
832mm (32.75")	229mm (9")

- Cut cantilever rod to length **L** using a hacksaw. **Measure from threaded end.**

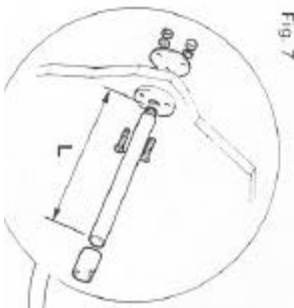


Fig 7

- Remove burrs with file.
- Temporarily assemble the cantilever by screwing the rod into the mounting flange.
- Ensure the Autohelm body is **horizontal** and mark off the location of the mounting flange.
- Mark and drill 3 x 6mm (¼") holes (ignore the two inner holes).
- Mount the flange using 3 x 6mm (¼") diameter bolts with nuts and washers. Be sure to install the backing plate correctly. Bed the flange on a thin coat of silicon sealant.
- Screw the rod firmly into place using :
 tommy bar.
- Roughen the end of the rod and the inside of the cap to provide a key.
- Apply the two part epoxy adhesive provided to the rod end and cap and place the cap over the rod end.
- Ensure the hole for the Autohelm mounting pin is facing **up**.
- Allow the epoxy 30 minutes to fully harden before applying any load.

When the Autohelm is not in use the complete rod assembly may be unscrewed, leaving the cockpit uncluttered.

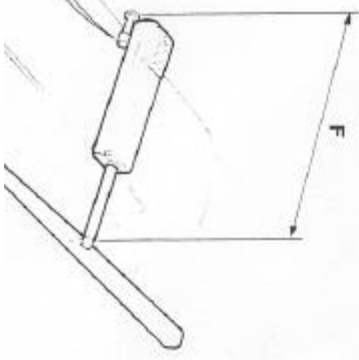


Fig 7

PEDESTAL SOCKET MOUNTING

It may be necessary to raise the height of the Autohelm mounting socket above the mounting surface. For this a pedestal socket assembly is used.

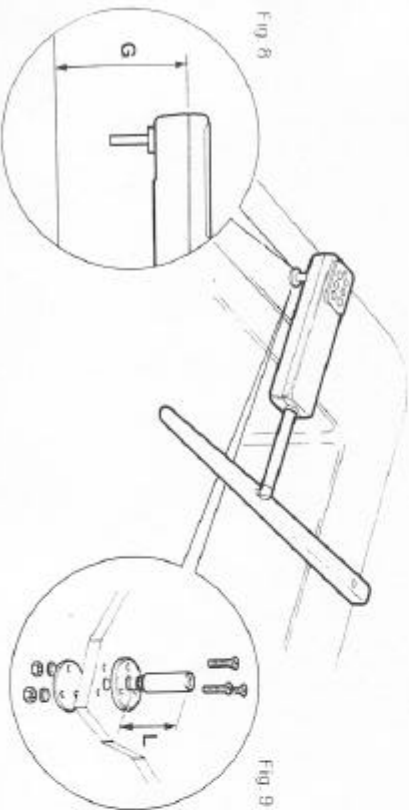
Selection

- Lock the tiller on the yacht's centre line.
- Establish the standard control dimensions **A** (57.7mm/2.27") and **B** (46.0mm/1.8").
- Measure dimension **G** (Fig. 8) ensuring the Autohelm actuator is **horizontal**.
- Select the appropriate pedestal socket assembly from the table shown.

- Mark off the position of the mounting flange on the cockpit seat or counter.
- Ensure that control dimensions **A** and **B** are correct.
- Mark and drill 3 x 6mm (1/4") diameter holes (ignore the two inner holes).
- Mount the flange using 3 x 6mm (1/4") diameter bolts, nuts and washers, being sure the back plate is installed correctly. Bed the flange on a thin coat of silicon sealant (Fig. 9).
- Screw the mounting socket firmly into place.

When the Autohelm is not in use the mounting socket may be unscrewed to leave the cockpit uncluttered.

Dimension G	Pedestal Socket Length L	Cat No.
64mm (2.5")	Std dimension	-
102mm (4.0")	38mm (1.5")	D026
114mm (4.5")	50mm (2.0")	D027
128mm (5.0")	64mm (2.5")	D028
140mm (5.5")	76mm (3.0")	D029
153mm (6.0")	89mm (3.5")	D030



TILLER PINS

For certain non-standard installations a range of tiller pins are available.

Description	Size	Cat No.
Small threaded tiller pin	25mm (1")	D014
Extra length tiller pin	72mm (2.8")	D020
Extra length threaded tiller pin	72mm (2.8")	D021

Battery Connection

The waterproof 'Dri-Plug' supplied should be situated as close as possible to minimise lead length. The Dri-Plug socket must be connected **directly** to the vessel's electrical distribution panel and on no account paralleled into existing wiring for other equipment.

The Autohelm supply must be independently switched and protected by a 5 amp fuse or current trip.

Since the autopilot is microprocessor based it is very important that voltage losses in supply cables are minimised. Supply cables should therefore be as

short as possible and of no less size than shown in the following table.

The **brown** wire of the power supply lead should be connected to **positive**. If connections are accidentally reversed the autopilot will not operate but no damage will result.

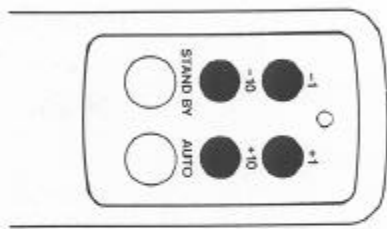
Lead Length	Copper Area
Up to 2.5m (8')	1.0mm ²
Up to 4.0m (13')	1.5mm ²
Up to 6.5m (22')	2.5mm ²

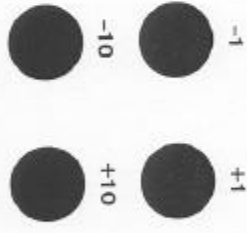

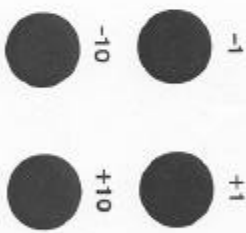

KEYPAD FUNCTIONS

Full control of the Autohelm is provided via a simple six button keypad.

The basic control functions are as follows:-

When the autopilot is switched on it will always start up in **Stand by** mode. In **Stand by** mode the pushrod can be extended or retracted to engage with the tiller pin using the four black buttons.



 <p>Push and hold down to extend/ retract (+/-) the pushrod.</p>
<p>AUTO</p>  <p>Push once to engage the autopilot to maintain the current heading or push twice (within 2 seconds) to return to the previous automatic heading.</p>
 <p>Push to alter course to port (-) or starboard (+) in increments of 1 and 10 degrees.</p>
<p>STAND BY</p>  <p>Push once to disengage the autopilot and return to Stand by mode. (The previous automatic heading will be remembered).</p>

WINDVANE SYSTEM

Performance under wind vane has been improved by the introduction of Wind Trim.

In Wind Trim the computer uses the flutgate compass as the primary heading reference. However, as changes occur in the apparent wind angle the computer automatically adjusts the compass heading to maintain the original

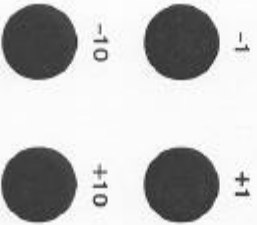
apparent wind angle.

This system eliminates the effects of turbulence or short term wind variations and provides smooth precise performance under wind vane with minimum current consumption.

When a windvane system is fitted, a new layer of control functions is automatically opened as follows:-



Push both red keys together **once** to engage the windvane and maintain the current apparent wind angle.
or
Push both red keys together **twice** to return to the previous apparent wind angle.



Push **once** to alter the vessel's heading relative to the apparent wind in increments of 1 or 10 degrees.
N.B. + keys always turn the vessel to starboard.

STAND BY



Push **once** to disengage the windvane for manual steering. (The previous apparent wind angle will be memorised).
or
Push **once** to change over to automatic compass heading control and maintain the current heading.

AUTOTACK FUNCTION

The Autohelm has an automatic tacking function which operates in both compass and windvane mode as follows:-



Push -1 and -10 keys together **once** to initiate a tack to port.



Push +1 and +10 keys together **once** to initiate a tack to starboard.

The Auto Tack function operates by selecting a pre-set course change (100°) to bring the vessel onto the opposite tack.

During the tack, the Off Course Alarm may sound. This indicates the autopilot is adjusting trim to acquire the new course.

On completing the tack and having sheeted and retrimmed the

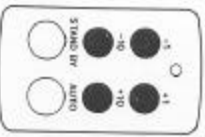
sails, the vessel may be brought onto the desired apparent wind angle by fine adjustments to the course using +/- 1° buttons. No adjustments should be made within 1 minute of completing the tack to allow the Autopilot to compensate for the helm trim on the new tack.

SEA TRIALS

Initial sea trials should be carried out in calm conditions with plenty of sea room. The previously conducted functional test will have verified that the autopilot is operating correctly and that you are familiar with all of its controls.

During first sea trials, the vessel will be constantly changing heading, and it is, therefore, very important to maintain a constant look-out. The following initial trial procedure is recommended:

- Steer on to a compass heading and hold the course steady.
- Using the four course control keys, position and then place the pushrod end over the filler pin.

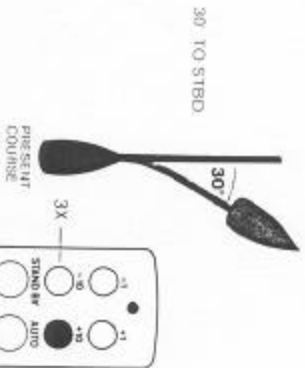


- Press **Auto** to lock on to the current heading. In calm sea conditions a perfectly constant heading will be maintained.

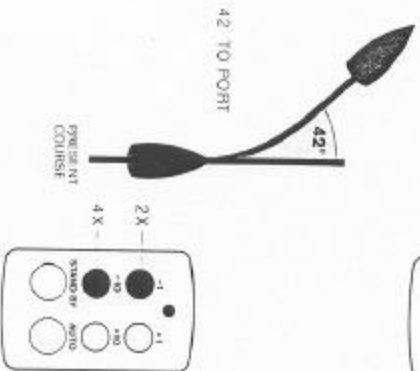


- Alter course to port or starboard in multiple increments of 1 and 10 degrees.

30° TO STBD



42° TO PORT



- Press **Stand by** and practice power steering using the four course control keys.
- Press **Auto** twice (within 2 seconds) to return to the original automatic heading.

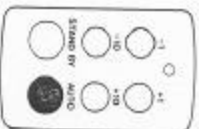
Hand Steering

- Press **Stand by** and lift the autopilot from the filler pin for return to hand steering.

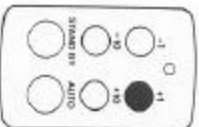
Auto Tack Function

The following additional trial is recommended:

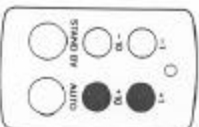
- Steer onto a constant heading approximately 10° free of close haul.
- Press **Auto** to lock onto the current heading or both red keys to lock onto the apparent wind if a vane is fitted.



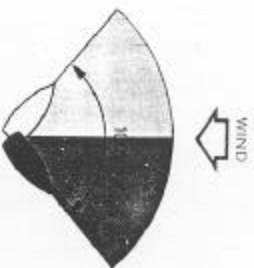
- Decrease the apparent wind angle using the +1 key (if on the starboard tack) until the yacht is sailing close hauled at optimum penetration.



- Prepare to tack and then press the +1 and +10 keys together (if on the starboard tack) to initiate a tack to starboard.



- The yacht will complete a 100° course change to bring it onto the opposite tack.



On completing the tack and having sheeted and retrimmed the sails, the vessel may be brought onto the desired apparent wind angle by fine adjustments to the course using the +/-1° buttons. No adjustments should be made within 1 minute of completing the tack to allow the Autopilot to compensate for the helm trim on the new tack.

OPERATING HINTS

Disengagement

The pushrod is held into engagement with the tiller pin merely by the weight of the actuator unit. This method of engagement is secure and has been adopted for safety reasons to allow the pushrod to be easily disengaged when manual override becomes necessary.

OFF-COURSE ALARM

When the autopilot is set to either **Auto** or **Vane** mode a built in off-course alarm is automatically set up. The off-course alarm will sound when the vessel deviates for any reason from the original course by more than 15° degrees for over 10 seconds. It is denoted by a continuous series of beep tones.

The alarm will be silenced if the vessel returns to within 15 degrees of the original course.

In **Auto**, if the vessel does not return within these limits the alarm can only be silenced by selecting **Stand by**.

In **Vane**, the alarm will sound when the wind direction changes by more than 15 degrees and may be accepted by pressing both red keys together. This will silence the alarm and advance the off course alarm datum to the current compass heading.

CURRENT LIMITING AND CUTOFF

If the autopilot is driven into its end stops, the drive will be **pulsed** to prevent overloading the motor. If the pilot is left in this condition for 30 seconds the microprocessor will automatically cut out power to the motor and sound the alarm continuously.

To restore the autopilot for normal operation the **Stand by** key must be pressed to put the unit in **Stand by** operating mode.

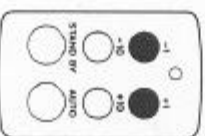
AUTOMATIC SEA STATE CONTROL

During the sea trial, the operation of the automatic sea state control can be observed. When the autopilot is initially engaged in **Auto** mode the autopilot will respond to all pitch and roll movements. During the first minute of operation, it will be noticed that repetitive movements of the vessel are gradually neglected until finally the autopilot will respond only to true variations in course.

To ensure accurate course adjustment the sea state control is automatically reset whenever a 10 degree course change is executed.

Sea State Inhibit

Where maximum course keeping accuracy is required the automatic sea state control may be inhibited by -1 and +1 keys together once.



Autopilot activity and therefore power consumption will be increased but course keeping accuracy will be maximised.

The automatic sea state control is restored by pressing the -1 and +1 keys together.

Note: Engaging the autopilot (pushing **Auto**) or engaging the windvane (both red keys together) will always restore the automatic sea state control.

The Autohelm's computer continuously optimises automatic steering performance eliminating the need for operator supervision.

It is, however, very important to understand the effect of sudden trim changes on steering performance. When a sudden change in trim occurs the automatic trim compensation system requires approximately 60 seconds to apply the necessary rudder off-set to restore the automatic heading. In gusting conditions, therefore, the course may tend to wander slightly, particularly in the case of a sailing yacht with badly balanced sails. In the latter case, a significant improvement in course keeping can always be obtained by improving sail balance. Bear in mind the following important points:-

- Do not allow the yacht to heel excessively.
- Ease the mainsheet traveller to leeward to reduce heeling and weather helm.
- If necessary reef the mainsail a little early.

It is also advisable whenever possible to avoid sailing with the wind dead astern in very strong winds and large seas.

MAINTENANCE

All moving parts of the system have been lubricated for life at the factory. Therefore no maintenance whatsoever will be required. Should a fault develop,

Ideally, the wind should be brought at least 30° away from a dead run and in severe conditions it may be advisable to remove the mainsail altogether and sail under headsail only. Providing these simple precautions are taken the autopilot will be able to maintain competent control in gale force conditions.

Passage making under automatic pilot is a very pleasant experience which can lead to the temptation of relaxing permanent watch. This must always be avoided no matter how clear the sea may appear to be.

Remember, a large ship can travel two miles in five minutes – just the time it takes to make a cup of coffee!

TOTE BAG (Cat No. D089)

A special zip top padded bag made from tough PVC is available to protect and stow your Autohelm and is available from Autohelm stockists.

Warning

- Do not stow your Autohelm in a locker liable to flooding by bilge water.
- Do not leave your Autohelm in a locker over the winter lay up period.

The entire unit should be returned, in the original packing case for repair and servicing, which will be carried out speedily and at a moderate cost.

OVERSEAS REPRESENTATIVES

Humbeside
Electronics Marine Ltd
99M Wignin Dock
Hull
0482 2510 3

Merfolk/Starfolk
Gerrard Marine Ltd
Warrington, Cheshire
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