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**Autohelm™ 4000**

# AUTOHELM 4000

Autohelm 4000 is an up-to-the-minute digital autopilot which shares the same microprocessor technology built into our biggest and most sophisticated fully installed pilots. It will provide precise powerful steering for sailing yachts up to 13m (42ft) LOA.

The basic system comprises the main control unit, wheel drive unit and mounting fittings (Fig. 2). This can be extended by adding any of the following accessories.

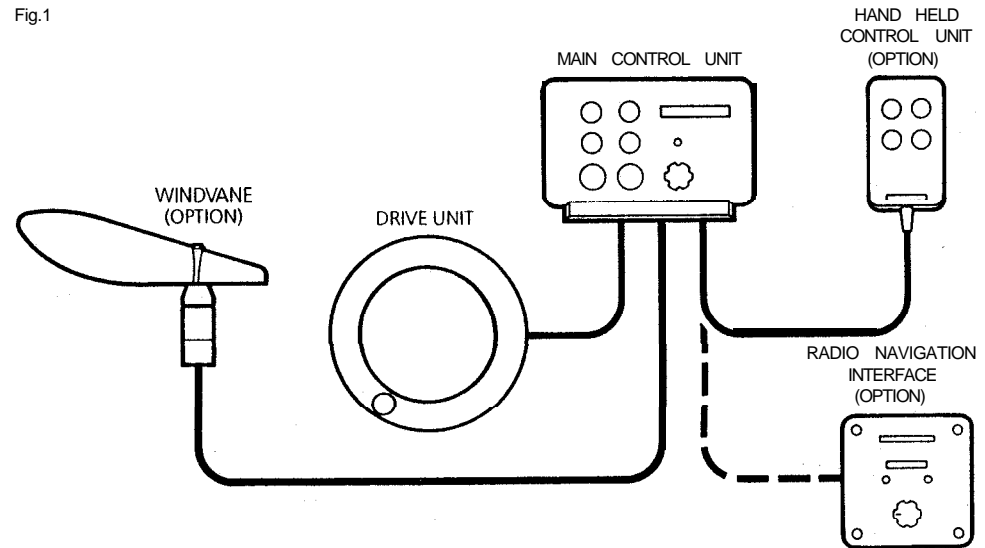
- Windvane
- Radio navigation interface
- Hand held control unit

The full system is shown below (Fig. 1)

The system is designed for owner installation which aided by the following guide should prove to be a simple and interesting job. After fitting the equipment it is only necessary to make a single adjustment to the control unit to match the autopilot's response to the steering characteristics of your vessel.

Good Sailing!

Fig.1



# INSTALLATION

## WHEEL DRIVE UNIT

The wheel drive unit (Fig.2) is attached to the vessel's wheel using the clamps supplied. To complete the installation it is only necessary to screw the torque restraint bracket to the pedestal. It has been designed for permanent mounting in the cockpit and requires no maintenance whatsoever.

A single lever disengages drive for manual steering.

## STEERING SYSTEM

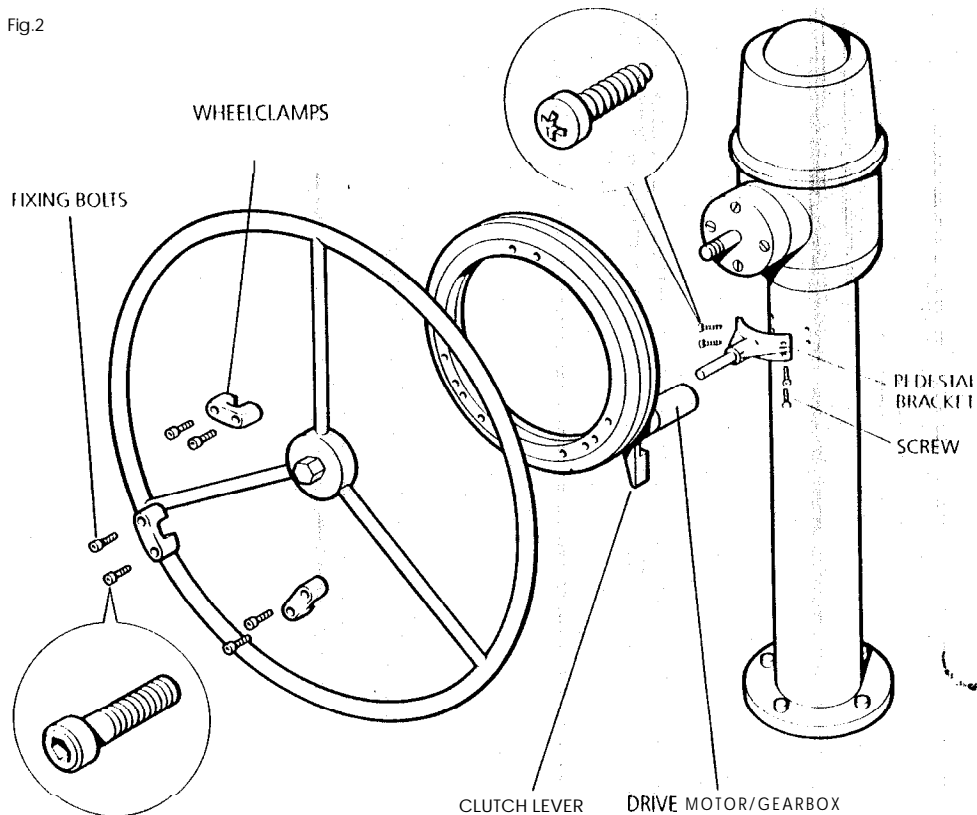
The Autohelm 4000 is designed to operate with steering systems having between 1 and 3.5 turns lock to lock.

Steering systems with more than 3.5 turns may cause impaired steering performance due to reduced rate of rudder application.

Lost motion in the steering system must not exceed 1% of total movement. This is equivalent to 7.5 degrees of free wheel movement for a system with two turns lock to lock. If lost motion exceeds this level it must be corrected otherwise steering performance will be impaired.

It is recommended that the wheel drive is not used on hydraulic steering systems. Hydraulic slip across the helm pump produces significant lost motion which will impair steering performance.

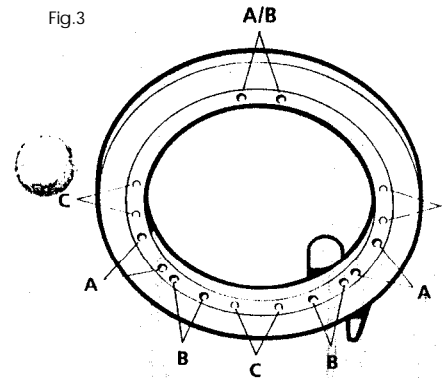
Fig.2



## ATTACHMENT TO THE WHEEL

The drive unit is clamped to the wheel spokes using the bolts and clamps provided, and may be used on wheels with 3, 5 or 6 spokes (Fig. 3).

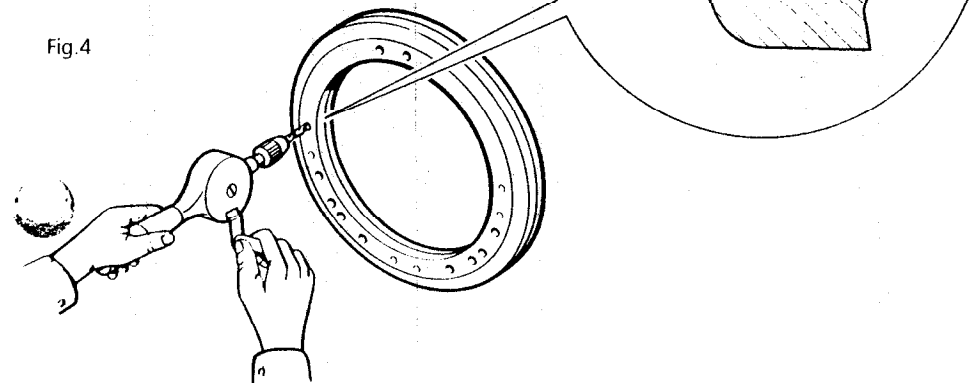
Fig.3



A holes • 3 and 6 spoke wheels  
B holes • 5 spoke wheels

For 4 spoke wheels, use a 4.0mm (5/32in) drill to open out the C pilot holes to gain access to the additional mounting points (Fig. 4). The plastic membrane covering the additional nut inserts is only 1.0mm (0.040in) thick, and care must be taken to ensure that the nut inserts are not damaged when drilling. An additional set of clamps and bolts for the fourth spoke is available from your Autohelm stockist.

Fig.4



The drive unit must be mounted between the wheel and the pedestal (Fig. 2).

The attachment kit has three complete sets of clamps to compensate for differing spoke diameters. Marked alongside each clamp is the spoke diameter to which it relates. The appropriate clamps are simply broken off as required.

The spacers (Fig. 5) must be used when the wheel is dished (Fig. 6) to prevent distortion of the drive unit when the fixing bolts are tightened.

Fig.5

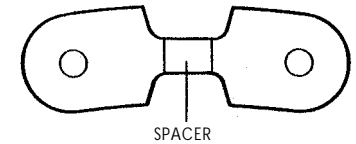
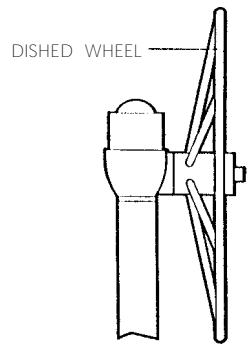


Fig.6

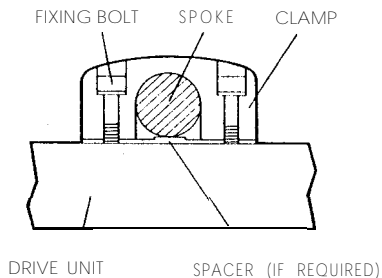


**METAL WHEELS**

To attach the drive unit to the wheel:

- Place the drive unit with the clamping face uppermost i.e. drive motor and gearbox tube downwards.
- Position one spacer at each of the three attachment positions (if the wheel is dished).
- Remove the wheel and place it on top of the drive unit making sure the face which is nearest the pedestal is downwards.
- Place the clamps over the spokes and lightly tighten the bolts supplied (Fig. 7).

Fig.7

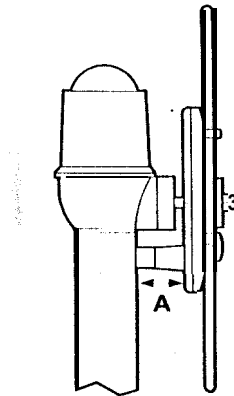


**MOUNTING THE PEDESTAL BRACKET**

The pedestal bracket pin should be cut to length to suit the pedestal as follows:

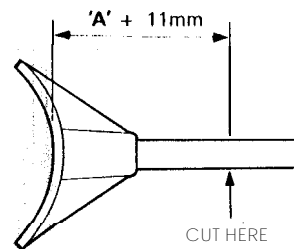
- Replace the wheel and measure the distance between the backplate of the drive unit and the pedestal (dimension A Fig. 8). If the wheel is slightly bent,

Fig.8



the distance will change with the wheel position. The smallest distance should be measured. The mounting pin should be cut 11 mm (0.40in) longer than dimension A (Fig. 9).

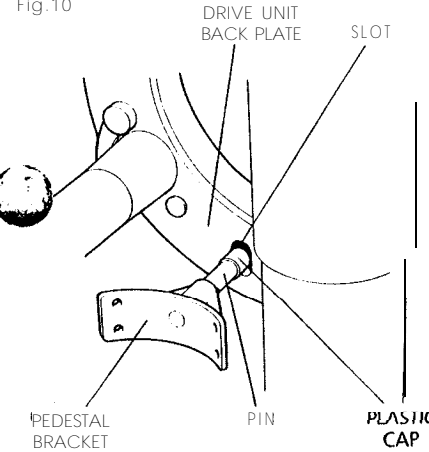
Fig.9



Remove any burrs and place the plastic cap supplied over the cut end.

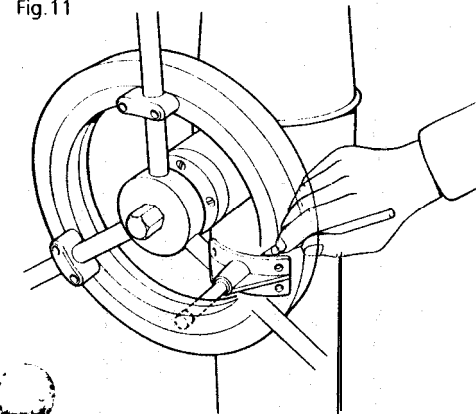
- Slide the wheel forward and place the pin end with the plastic cap in the slot (Fig. 10)

Fig.10



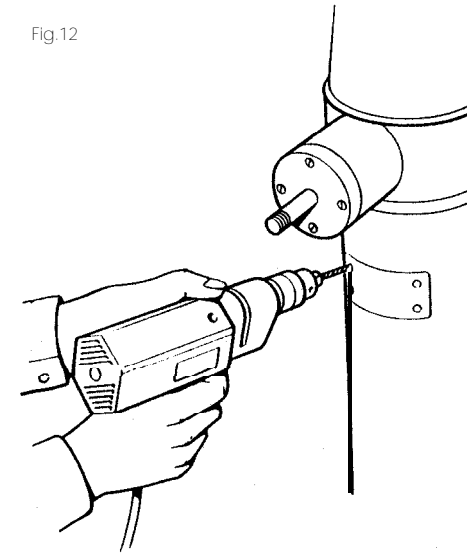
- Return the wheel to its normal position and with the pin mid-way in the slot, carefully mark round the bracket to record its position (Fig. 11).

Fig.11



- Remove the wheel and mark round the inside of the four holes.
- Drill four 4.0mm (5/32in) diameter holes with the drill bit supplied (Fig. 12).

Fig.12



- Attach the bracket and lightly tighten the screws.
- Replace the wheel making sure the pin locates in the bracket. Turn the wheel to confirm the bracket is correctly positioned. If the wheel is slightly bent, or the wheel drive slightly off centre, the pin will move up and down in the slot of the backplate. Provided the pin does not reach the end of the slot this movement is acceptable.
- Fully tighten all four screws.

**WOODEN WHEELS**

A separate attachment kit is available from your Autohelm stockist for use with wooden wheels (Catalogue number D119).

## CONTROL UNIT

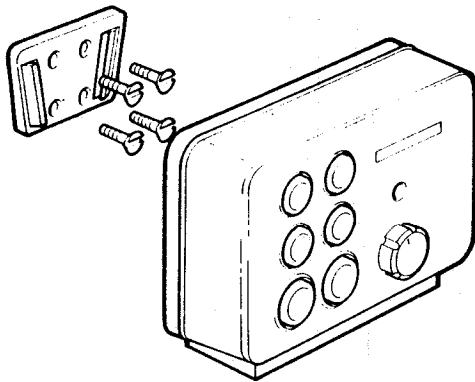
The control unit (Fig. 13) slots into a permanently mounted socket sited in the cockpit. It contains a gimballed fluxgate compass and therefore has some restrictions on mounting position.

The control unit should be sited where it can be operated easily from the steering position. It should also be positioned at least 80cm (2ft6in) away from the main steering compass to avoid deviation of both compasses.

Deviation of the control unit fluxgate compass is less important since headings are always adjusted by reference to the main steering compass. Nevertheless, deviation should be avoided if possible and thus the control unit should be sited as far away from other magnetic or iron devices as practical.

Having selected the best mounting site, the mounting socket may be secured to a vertical surface using the self tapping screws provided.

Fig.13



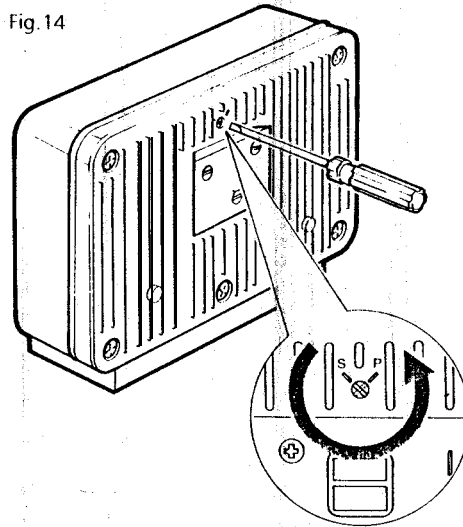
## ALTERNATIVE DRIVE UNIT MOUNTING POSITIONS

The fluxgate compass is calibrated to give correct steering sense when the drive motor is facing forward.

If the steering wheel arrangement makes installation possible only with the motor facing aft, the motor drive sense will have to be corrected as follows.

Use a screwdriver to rotate the changeover switch anti-clockwise until the endstop is reached (Fig. 14). **Never force the changeover switch, light pressure only is required.**

Fig.14



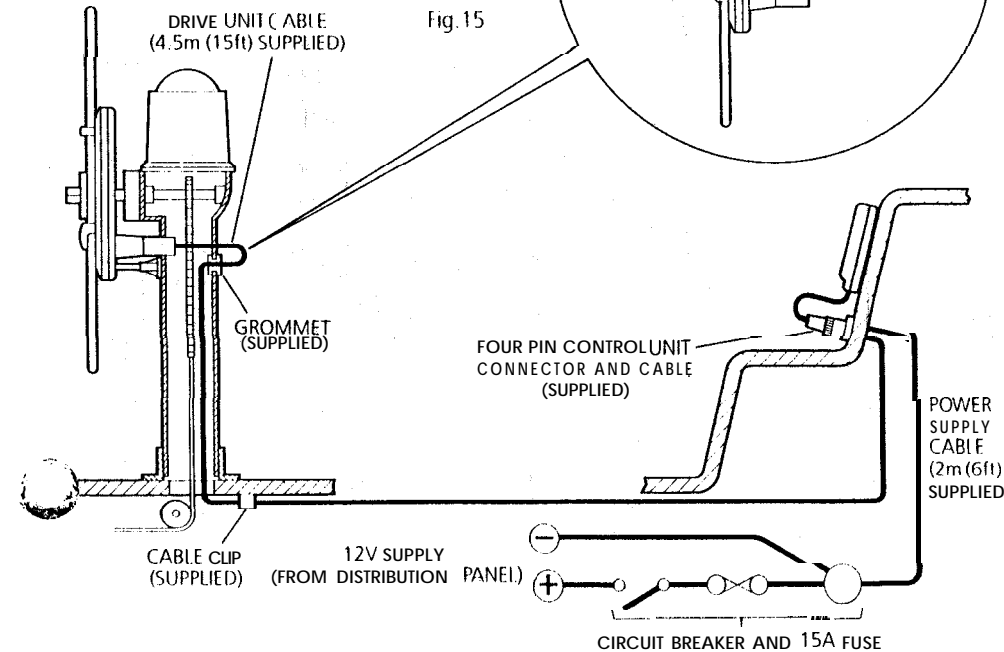
## CABLING AND POWER SUPPLIES (see Fig. 15)

The four pin waterproof connector provides a pluggable connection to the power supply and motor drive.

Two terminals of the socket are pre-wired for connection to the 12v power supply, the drive unit cable is connected to the remaining two terminals on installation. **It is most important that the power supply is not connected to the drive unit terminals. If the 12v supply is accidentally connected to the drive unit connection terminals permanent damage will be caused.**

For this reason the pre-wired power supply cable should not be removed from the socket.

Before wiring the socket, select its position and drill a 22mm diameter hole. Pass the prewired power supply cable through the hole ready for connection to the battery.



## BATTERY CONNECTION

The power supply cable is pre-wired to the socket and must be connected directly to the vessel's electrical distribution panel. It must be independently switched and protected by a 15 amp fuse or current trip, and on no account paralleled into existing wiring for other equipment.

The brown wire of the power supply lead should be connected to positive. If connections are accidentally reversed the Autohelm 4000 will not operate but no damage will result.

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.

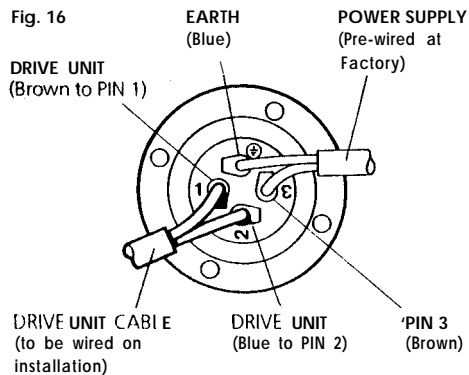
Lead Length	Copper Area	AWG
Up to 2.5m (8ft)	1.5mm <sup>2</sup>	16
Up to 4.0m (13ft)	2.5mm <sup>2</sup>	14

To avoid the risk of confusing the power supply and motor cables the power supply cabling should be completed before wiring the drive unit.

#### DRIVE UNIT CONNECTION

The drive unit is supplied with 4.5m (15ft) of two core cable which is passed through the pedestal or guard rail and connected back to the control unit socket as follows:

- Drill 9mm (0.35in) diameter hole in the front face of the pedestal.
- Select one of the two grommets supplied and use it where the drive unit cable passes through the pedestal wall.
- Run the cable down the pedestal and secure close to the pedestal base using the clip provided.
- Run the cable back to the control unit socket (Fig. 16) and connect as follows:

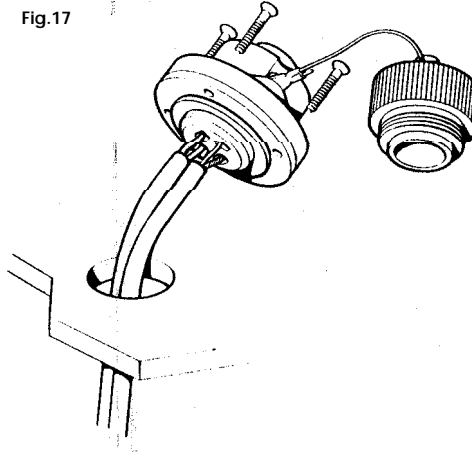


If it is necessary to extend the drive unit cable, the extension should be as short as possible and of no less size than shown in the following table.

Extension Cable Length	Copper Area	AWG
Up to 2.5m (8ft)	1.5mm <sup>2</sup>	16
Up to 4.0m (13ft)	2.5mm <sup>2</sup>	14

Having attached the cable to the control unit socket, the socket may be screwed in place using the four self tapping screws provided (Fig. 17).

Fig.17



#### Accessory Connection

The Autohelm 4000's accessories plug into the control unit to facilitate stowing and servicing. To ensure reliable connection each plug incorporates a locking ring which should be turned clockwise to secure.

The windvane should be connected to the socket marked **Vane** and the hand held remote to the socket marked **Remote**.

#### WINDVANE ATTACHMENT

The windvane attachment is normally mounted centrally on the after rail where it can be sited in clear wind on both tacks. The windvane mounting mast is clamped to the after rail by the two 'U' bolts provided (Fig. 18). The interconnecting cable should be brought through the slot to allow the windvane head to be plugged into the top of the mast (Fig. 19). The interconnecting cable can then be plugged back and plugged into the Autohelm 4000.

**Note** The windvane head is supplied with the vane detached for ease of packing. The vane is easily assembled to the head and secured by means of the circlip provided (Fig. 20). Care should be taken to ensure that the small circlip is correctly located in the groove.

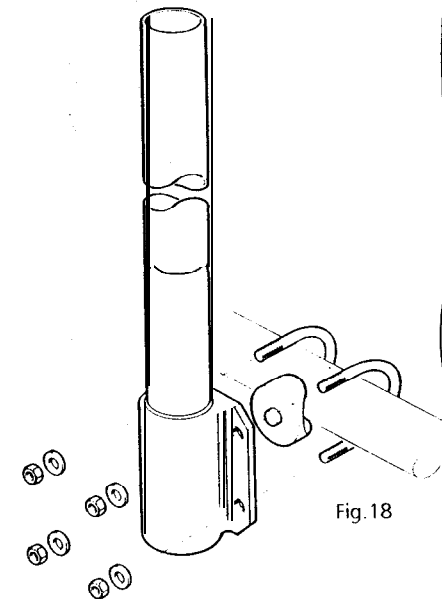


Fig.18

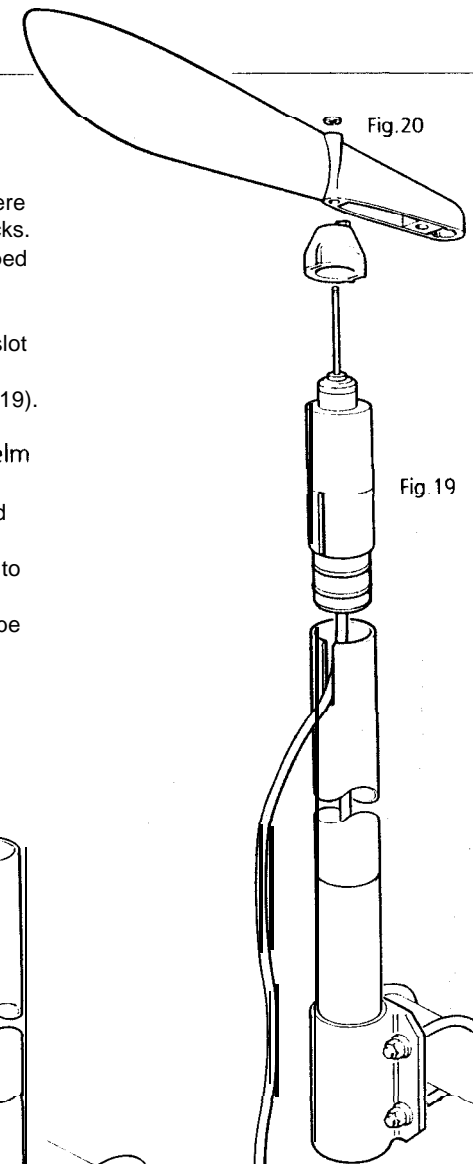


Fig.20

Fig.19

## BASIC PRINCIPLES

The following description of the Autohelm 4000's principle of operation will help you to make full use of its advanced features.

The powerful combination of a fluxgate compass and microprocessor control provides "autolock" course selection together with precise push-button course adjustment.

Deviation from the set course is continuously monitored by the sensitive fluxgate compass and corrective rudder is applied to return the vessel to course. The applied rudder is proportional to course error at any time and thus when the course is restored the rudder will be neutralised.

When changes in vessel trim occur due to variations in wind pressure or engine throttle setting the course can only be maintained by the application of permanent rudder off-set (standing helm) to restore balance. If permanent rudder off-set is not applied to restore balance the vessel will bear on to a new heading. Under these circumstances the Autohelm 4000 detects that the original course is not being restored and continues to apply additional rudder off-set in the appropriate direction until the vessel returns to the original heading. Automatic trimming capability ensures that the originally set course is held irrespective of any changes in balance that may occur during the course of a passage.

The Autohelm 4000's computer also continuously monitors the pattern of applied rudder correction and can distinguish unnecessary repetitive corrections caused by pitch and roll of the vessel from those necessary to maintain the selected heading. The computer will automatically neglect all unnecessary corrections so that autopilot activity and power consumption is continuously optimised at minimum levels.

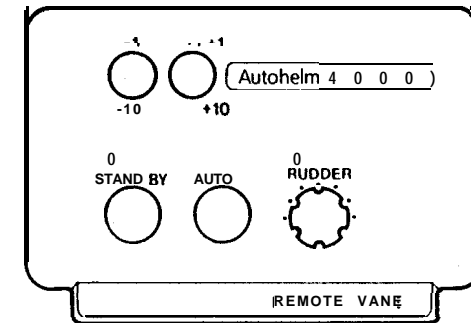
The high degree of control automation made possible by the micro computer simplifies user control to a series of push button operations.

## KEYPAD OPERATION

Full control of the Autohelm 4000 is provided via a simple six button key pad.

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 wheel can be driven by pressing and holding down any of the four course change buttons.



### AUTO



Push **once** to engage the autopilot to maintain the current heading or push **twice** (within 2 seconds) to return to the previous automatic heading.

- 1



+ 1



- 10



+ 10



Push to alter course to port (-) or starboard (+) in increments of 1 and 10 degrees.

### STAND BY



Push **once** to disengage the autopilot and return to **Stand by** mode.  
(The previous automatic heading will be memorised).



## WINDVANE SYSTEM

Performance under **windvane** has been improved by the introduction of Wind Trim.

With Wind Trim the computer uses the **fluxgate** 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 **windvane** with minimum current consumption.

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

	<p>Push both red keys together once to engage the <b>windvane</b> and maintain the current apparent wind angle. or Push both red keys together <b>twice</b> to return the previous apparent wind angle.</p>
<p>- 1                      + 1</p> <p>- 10                     + 10</p>	<p>Push <b>once</b> to alter the vessel's heading relative to the apparent wind in increments of 1 or 10 degrees. <b>Note</b> + keys always turn the vessel to starboard.</p>
<p>STAND BY</p> <p>AUTO</p>	<p>Push <b>once</b> to disengage the <b>windvane</b> for manual steering. (The previous apparent wind angle will be memorised). or Push <b>once</b> to change over to automatic compass heading control and maintain the current heading.</p>

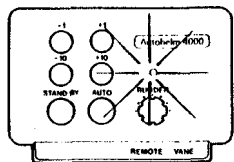
## AUTOTACK FUNCTION

The **Autohelm 4000** has an automatic tacking function which operates in both compass and **windvane** mode as follows:-

<p>- 1</p> <p>- 10</p>	<p>Push <b>- 1</b> and <b>- 10</b> keys together <b>once</b> to initiate a tack to port.</p>
<p>+ 1</p> <p>+ 10</p>	<p>Push <b>+ 1</b> and <b>+ 10</b> keys together <b>once</b> to initiate a tack to starboard.</p>
<p>The Auto Tack function operates by selecting a pre-set course change (1 00°) to bring the vessel into the opposite tack.</p>	<p>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 <b>+ / - 1°</b> keys. 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.</p>
<p>During the tack, the Off Course Alarm may sound. This indicates the autopilot is adjusting trim to acquire the new course.</p>	<p>On completing the tack and</p>

## OPERATING MODE INDICATION

The operating mode of the Autohelm 4000 is indicated by a flashing LED as follows:-



OPERATING MODE	LED FLASHING CODE
<b>STANDBY</b> Provides power steering.	
<b>AUTO</b> Autopilot steers to maintain compass heading.	
<b>WINDVANE</b> Autopilot steers to maintain apparent wind angle. Windvane mode is also confirmed by a single beep tone emitted every 30 seconds.	
<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF    SECONDS' 1 2 3 4 5 6	

## Hand Held Control Unit (Cat. No. 2076)

An optional hand held control unit can be plugged into the control unit to provide full course change capability from anywhere on board. The unit duplicates the main control units four course change keys and may be used in both **Standby** and **Auto** modes. The operation of the main control unit is unchanged when the hand held control unit is connected.

## Radio Navigation Interface (Cat. No. 2075 - NMEA format)

This interface may be used with any radio navigation system that outputs cross track error to either the NMEA 0180, 0182 or 0183 standard. It supervises the Autohelm 4000 to maintain the preselected track set on the radio navigation system. Full operating details are supplied with each interface.

Your main distributor or Nautech's Product Support Department will be able to advise you of Radio Navigation Systems with suitable autopilot output.

## FUNCTIONAL TEST PROCEDURE

After completing the installation you should carry out the following functional test to familiarise yourself with the system before attempting sea trials.

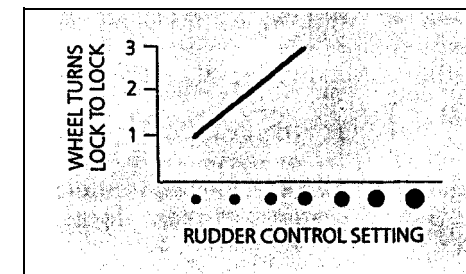
Plug the Autohelm 4000 into the power socket and switch on the electrical supply. The unit will emit a short beep tone to indicate that it is active and the LED will flash to indicate **Stand by** operating mode.

Engage the drive by rotating the clutch lever fully clockwise. Press and hold the + 10 key. The wheel should move to produce a turn to starboard. The unit will emit a short beep tone on each keypress to confirm valid entries. Should the wheel move to produce a turn to port the changeover switch is incorrectly set and must be adjusted as described on page 8.

Press **Auto** to place the autopilot under compass control. The LED will be lit constantly to indicate that the unit is in **Auto** mode. If the yacht is swinging about its mooring, you will see that small variations in heading cause the unit to apply corrective action to the rudder. Press **Stand by** to return the unit to **Stand by** mode.

## Rudder Control Adjustment

Before attempting sea trials the rudder control must first be adjusted to suit the wheel reduction ratio of your particular vessel. The rudder control setting recommended for initial sea trials may be obtained from the following chart.



The setting recommendations above will provide stable control for initial sea trials and may, if necessary, be fine tuned later (see page 19).

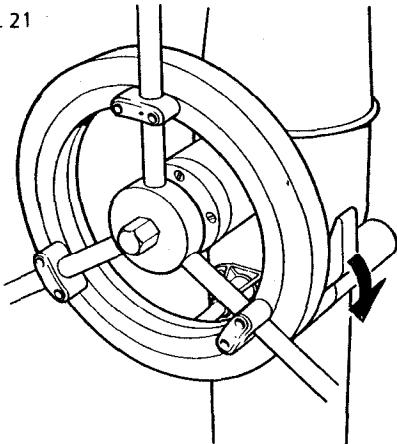
Initial sea trials should be carried out in calm conditions with plenty of sea room. The previously conducted functional test will have verified that the autopilot is operating correctly and that you are familiar with all of its controls.

During first sea trials, the vessel will be constantly changing heading, and it is, therefore, very important to maintain a constant look-out.

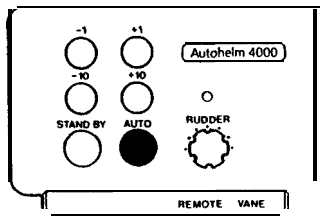
The following initial trial procedure is recommended:-

- \* Steer on to the desired heading and hold the course steady..
- Engage the drive by rotating the clutch lever fully clockwise to its end stops (Fig. 21).

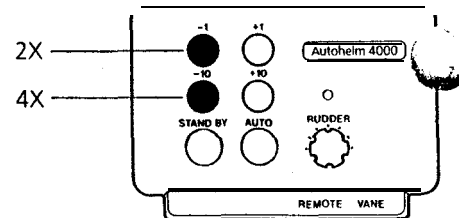
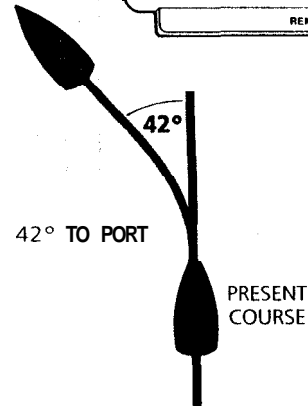
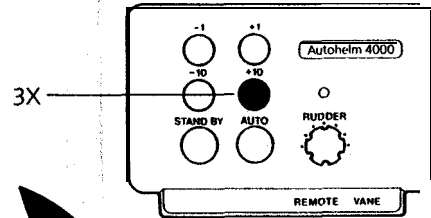
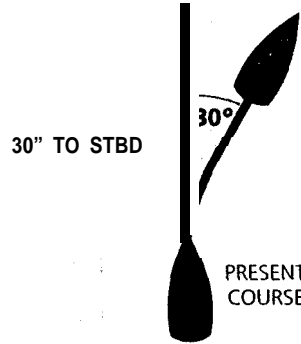
Fig. 21



- 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.



**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 rotate the clutch lever fully anticlockwise for return to hand steering

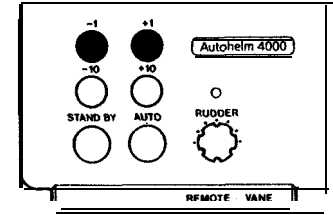
**Automatic Sea State Control**

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 pressing - 1 and + 1 keys together once.



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

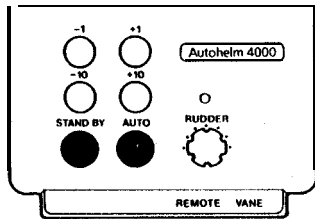
The automatic sea state control is restored by pressing the - 1 and + 1 keys together.

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

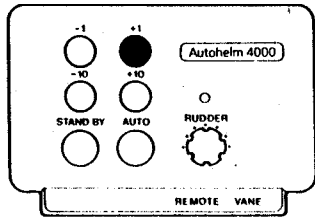
### Auto-Tack Function

The following additional trial is recommended:

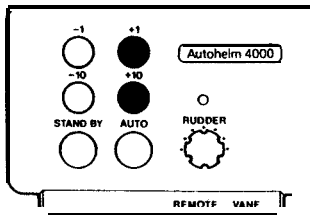
- Steer onto a constant heading approximately  $10^\circ$  free of close hauled
- Press **Auto** to lock onto the current heading or both red keys to lock onto the apparent wind if a vane is fitted.



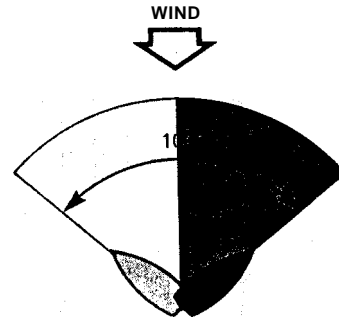
- Decrease the apparent wind angle (using the + 1 key if on the starboard tack) until the yacht is sailing close hauled at optimum penetration.



- 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  $100^\circ$  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/- 1  $^\circ$  keys. 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.

### Disengagement

When manual override is required the drive unit can be rapidly disengaged by operating the clutch lever.

### 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 20 seconds. It is denoted by a continuous series of bleep 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 **Standby**.

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 CUTOUT

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 **standby** key must be pressed to put the unit in **standby** operating mode.

### HEEL BRAKE

At any time when not underway, the wheel drive unit clutch may be engaged to provide a wheel brake.

### Rudder Control Adjustment

The rudder control setting recommended on page 17 will provide stable control for initial sea trials. However, sailing craft can vary widely in their response to the helm and further adjustment of the rudder control setting may improve the Autohelms steering characteristics.

An excessively high rudder control setting results in **oversteer** which can be recognised by the vessel swinging slowly from side to side of the automatic heading accompanied by excessive rudder movement. In addition, distinct overshoot will be observed when the course is changed. This condition can be corrected by reducing the rudder control setting (rotating rudder control anti-clockwise).

Similarly, an insufficient rudder control setting results in **understeer** which gives sluggish steering performance and is particularly apparent when changing course. This is corrected by increasing the rudder control setting (rotating rudder control clockwise). These tendencies are most easily recognised in calm sea conditions where wave action does not mask basic steering performance. The rudder control setting is not over critical and should be set to the lowest setting consistent with accurate course keeping. This will minimise actuator movements and hence reduce power consumption.

The **Autohelm 4000'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. 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.

It may be noticed that the autopilot tends to be a little less stable on northerly headings in the higher latitudes of the northern hemisphere (and conversely southerly headings in the southern hemisphere). This is caused by the increasing angle of dip of the earth's magnetic field at higher latitudes which

has the effect of amplifying rudder response on northerly headings. The tendency towards northerly heading instability is usually more obvious at higher speeds and when it occurs can be corrected by reducing the rudder control setting.

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 appears to be.

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

## WARNING

**Hand steering is not possible with the drive unit clutch engaged. The clutch lever must first be rotated fully anticlockwise to disengage the clutch.**

**It is the skippers responsibility to brief all crew members on this procedure.**

## TOTE BAG (Cat No. D089)

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

### Warning

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

## 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 the autopilot's plugability ensures that only the defective unit need be returned.

Before this is done please double check that the power supply cable is sound and that all connections are tight and free from corrosion.

Since the control unit is the most complex, there is a very high probability that if a fault has occurred it is in this unit which should therefore be returned for repair, which will be carried out speedily and at moderate cost. The drive unit has proven to be extremely reliable and is very unlikely to develop a fault. If however the drive unit is suspected of being faulty it may be checked by connecting 12V across the sockets at the end of the drive unit cable and ensuring the motor runs normally.

If it is noticed that the drive is slipping under normal steering loads, the drive unit should be returned to the nearest Autohelm Distributor or Service Centre for inspection.

In the case of a sailing yacht fitted with a windvane system if a fault occurs only in vane mode then it is likely that a fault has developed in the vane head.

## LIMITED WARRANTY

Nautech or its appointed Distributors or Service Centres will, subject to the conditions below, rectify any failures in this product due to faulty manufacture which become apparent within two years of purchase date.

Equipment used in the country of purchase should be sent directly to the authorised Distributor for that country or its appointed Service Centres. The product will then be serviced free of charge and returned promptly direct to the sender.

Equipment used outside the country of purchase can be either:-

- a. Returned to the Distributor or Dealer in whose country or from whom the equipment was originally purchased - it will then be serviced free of charge and promptly returned direct to the sender, or
- b. The product can be returned freight pre-paid to the authorised Distributor or its appointed Service Centres in the country in which the product is being used. It will then be serviced and returned direct to the sender on the basis that the Distributor or Service Centre will supply any parts used free of charge but the sender will be invoiced for the necessary labour and return shipment at the local rate.

## CONDITIONS

The warranty is invalid if:-

- a. The product has been misused, installed or operated not in accordance with the standards defined in this manual.
- b. Repairs have been attempted by persons other than Nautech approved Service personnel.

## AFTER SALES SERVICE

Should for any reason your Autohelm 4000 require attention ensure that you return it to one of the Authorised Service Centres. You will find a list enclosed.

Each service centre is trained and equipped to provide expert attention to your Autohelm 4000.