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Installation & Operating Handbook

Autohelm 200

AUTOHELM 2000

Autohelm 2000 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. It will provide precise powerful steering for sailing yachts up to 13m (43') LOA.

The basic system comprises the main control unit, tiller drive unit and basic mounting fittings. This can be extended by adding any of the following accessories:

- Windvane
- Radio Navigation interlace
- Hand Held Control Unit

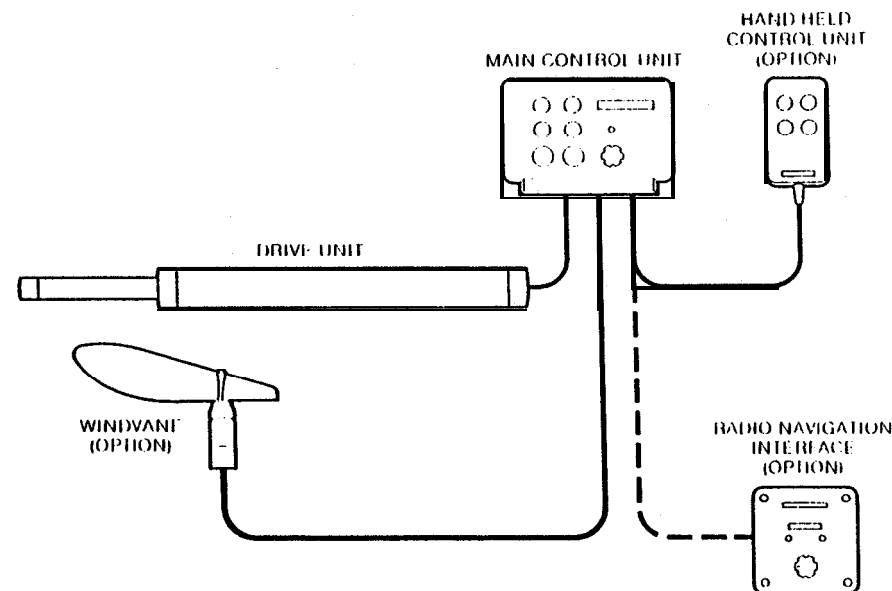
The full system is shown below.

Cockpit and tiller configurations vary widely and to ensure your Autohelm 2000 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 our Technical Sales Department for assistance.

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!



INSTALLATION

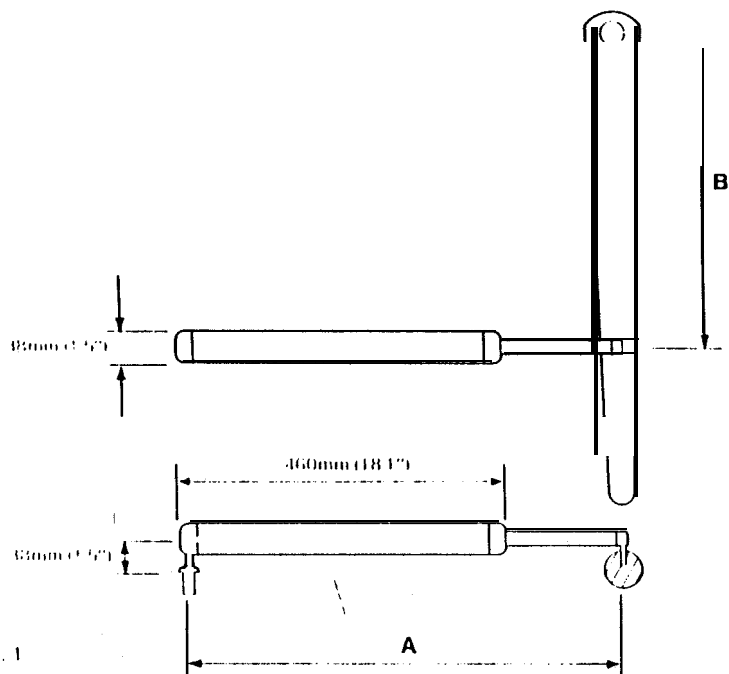


Fig. 1

DRIVE UNIT

The drive unit 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.

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

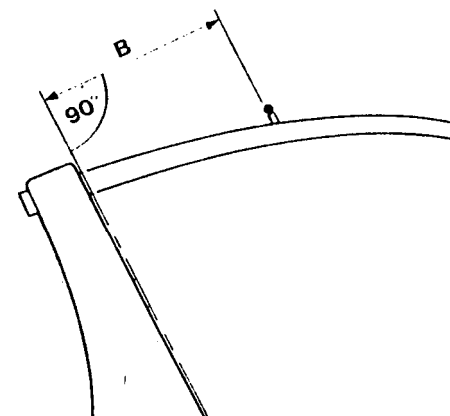
Dimension A = 620mm (24.5")
mounting socket to tiller pin

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 drive unit must be mounted horizontally.

SLOPING RUDDERSTOCK



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. Use a screwdriver to rotate the switch anti-clockwise until the endstop is reached (Fig. 2).

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

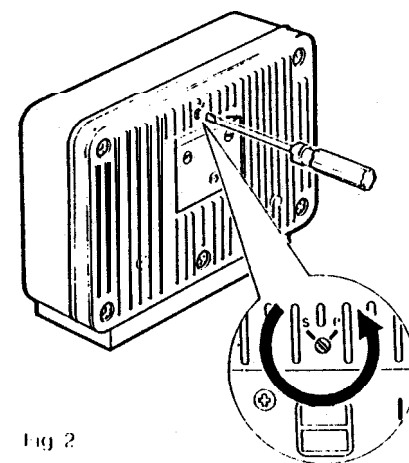


Fig. 2

BASIC INSTALLATION

After establishing the control dimensions the Aulohelm 2000 can usually be mounted directly onto the Starboard cockpit seal (Fig 3). Proceed as follows.

TILLER PIN (Cat No. 0001)

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

MOUNTING SOCKET

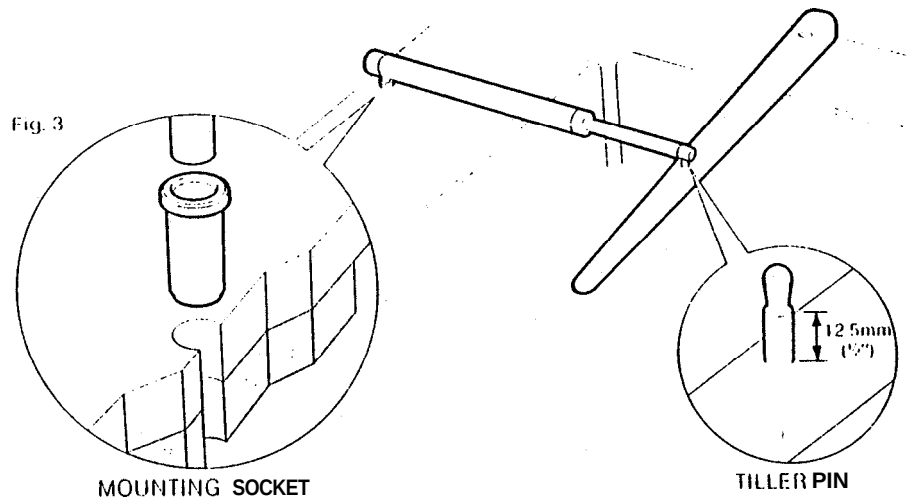
(Cat No. D002)

- Drill 12.5mm (1/2") hole x 25mm (1") deep into the starboard cockpit seal.

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

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.



INSTALLATION ACCESSORIES

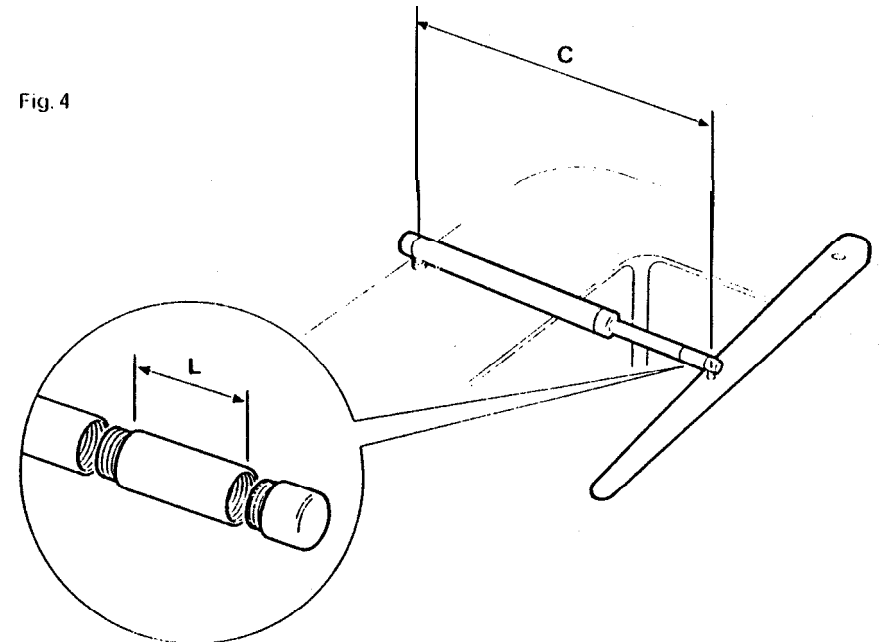
If it is not possible to install the drive unit directly onto the cockpit seal or tiller as described, one of the following accessories (or combination) will ensure a perfect installation.

PUSHROD EXTENSIONS (Fig.4)

The pushrod length may be simply extended using one of the standard pushrod extensions. Dimension C is modified as follows:-

Dimension C	Pushrod Extension Length L	Cat No.
622mm (24.5")	Std Dimension	---
646mm (25.5")	25mm (1")	D003
673mm (26.5")	51 mm (2")	D004
699mm (27.5")	76mm (3")	D005
724mm (28.5")	102mm (4")	D006
749mm (29.5")	127mm (5")	D007
775mm (30.5")	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 the control dimensions A and B.

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

SLOPING TILLER

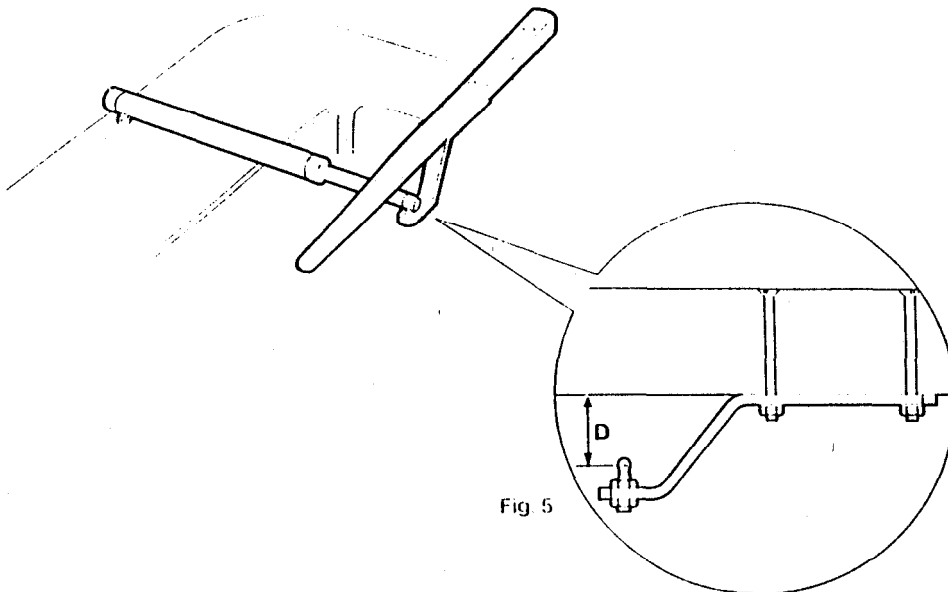
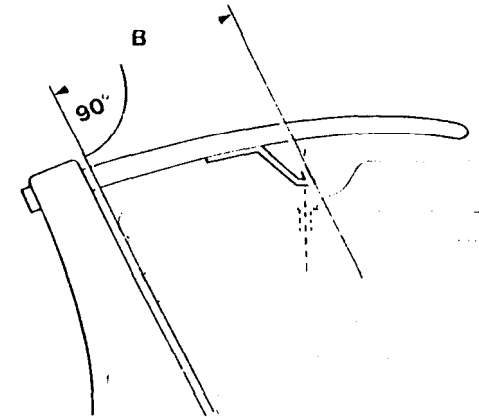


Fig 5

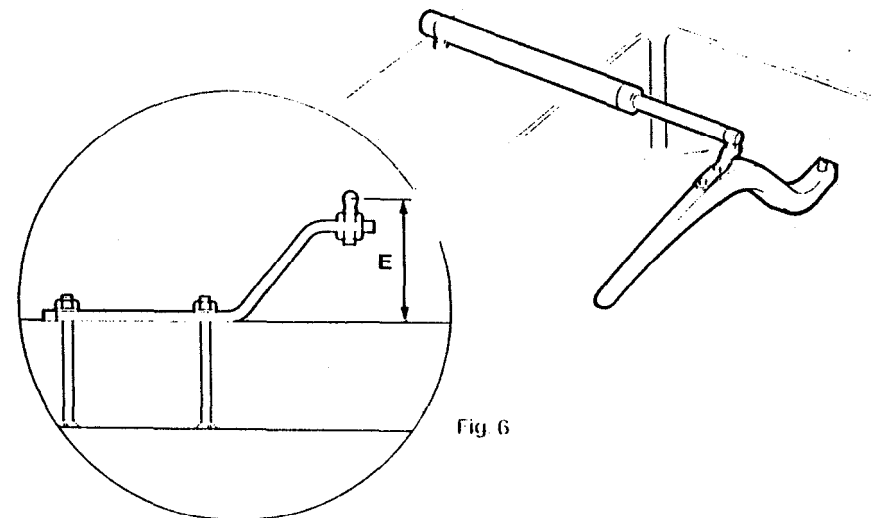


Fig 6

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 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.

Dimension F	Cut Length L
686mm (27")	51 mm (2")
711mm (28")	75mm (3")
737mm (29")	102mm (4")
762mm (30")	127mm (5")
787mm (31")	152mm (6")
813mm (32")	178mm (7")
838mm (33")	203mm (8")

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

- Remove burrs with file.
- Temporarily assemble the cantilever by screwing the rod into the mounting flange.
- Ensure the drive unit is horizontal and mark off the location of the mounting flange.
- Mark and drill 3 x 6mm (1/4") clearance holes (ignore the two inner holes).
- Mount the flange using 3 x 6mm (1/4") diameter bolts with nuts and washers. Be sure to install the backing plate correctly. Bed the flange on a thin coat of silicone sealant.
- Screw the rod firmly into place using a 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 drive unit mounting pin is facing up.
- Allow the epoxy adhesive 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 unobstructed.

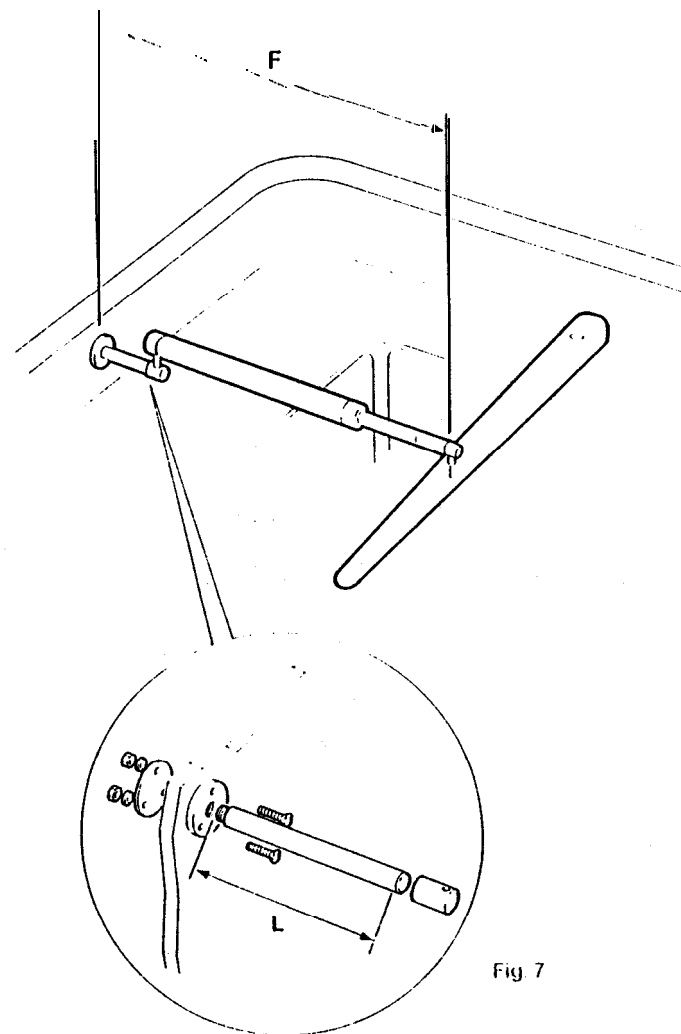


Fig. 7

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 and B.
- Measure dimension G (Fig.8) ensuring the Autohelm actuator is horizontal.
- Select the appropriate pedestal socket assembly from the table shown.

Installation

- Mark off the position of the mounting flange on the cockpit seat or counter.

Dimension G	Pedestal Socket Length L	Cat No.
38mm (1.5")	Std. Dimension	
76mm (3.0")	38mm (1.5")	DO26
89mm (3.5")	50mm (2.0")	DO27
102mm (4.0")	64mm (2.5")	DO28
114mm (4.5")	76mm (3.0")	DO29
127mm (5.0")	89mm (3.5")	DO30

TILLER PINS

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

Description	Size	Cat No.
Small threaded tiller pin	25mm (1")	DO14
Extra length tiller pin	72mm (2.8")	DO20
Extra length threaded tiller pin	72mm (2.8")	DO21

- Ensure that control dimensions A and B are correct
- Mark and drill 3 x 6mm (1/4") diameter clearance 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 silicone rubber 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 unobstructed.

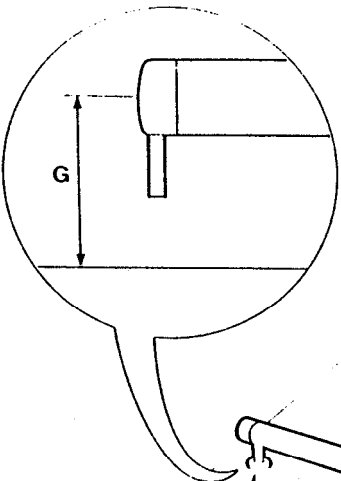


Fig. 8

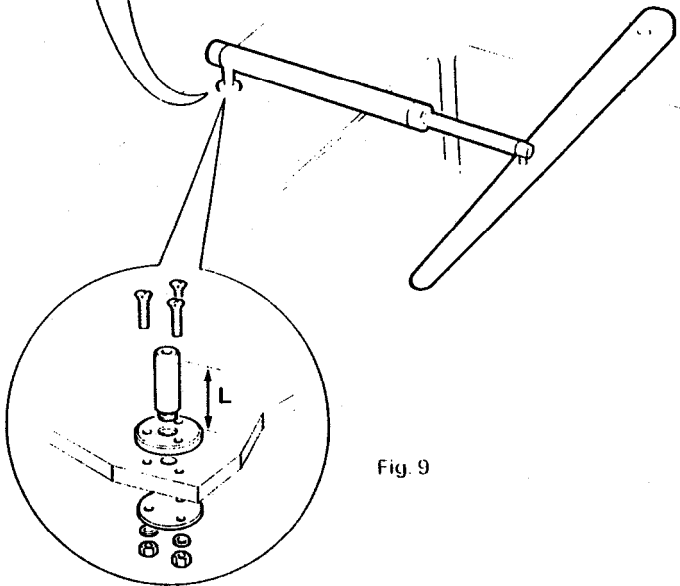


Fig. 9

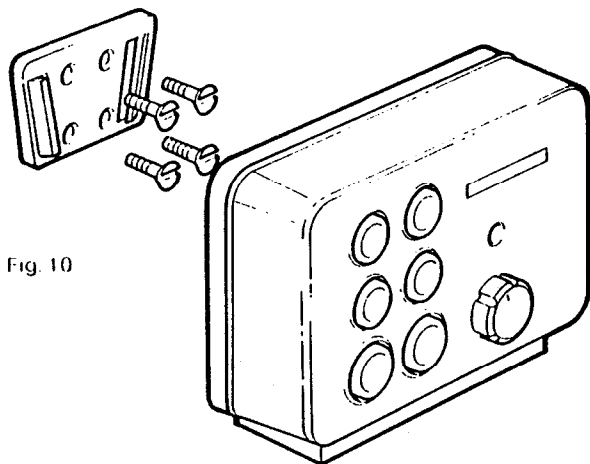


Fig. 10

CONTROL UNIT

The control unit **slots** into a permanently mounted socket sited in the cockpit. It contains a gimbaled **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 (2'6")** 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 convenient wooden or glass fibre surface using the self-lapping screws provided. The mounting surface may slope away from **vertical** by a maximum of 45°

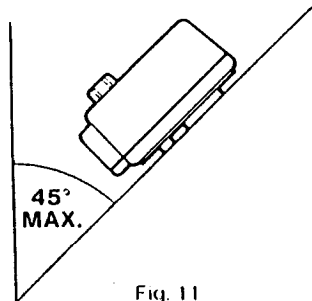


Fig. 11

Battery Connection

The waterproof 'Dri-Plug' supplied should be **sited** as close as possible to the Autohelm 2000 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 Autohelm 2000 lead should be connected to **positive**. If connections are accidentally reversed the Autohelm 2000 will **not** operate but no damage will result.

Lead Length	Copper Area
Up to 2.5m (8')	10mm ²
Up to 4.0m (13')	15mm ²
Up to 6.5m (22')	25mm ²

Accessory Connection

In common with all the Autohelm 2000's accessories, the drive unit plugs into the control unit to facilitate slowing and servicing. To ensure reliable connection each plug incorporates a locking ring which should be turned clockwise to secure.

Although each accessory has a unique socket and cannot be **misconnected**, the drive unit should be connected to the socket marked **Helm**, the windvane to the socket marked **Vane** and the hand held remote control 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.12). The interconnecting cable should be brought through the slot to allow the windvane head to be plugged into the top of the mast (Fig.13). The interconnecting cable can then be run back and plugged into the Autohelm 2000.

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.14). Care should be taken to ensure that the small circlip is correctly located into the groove.

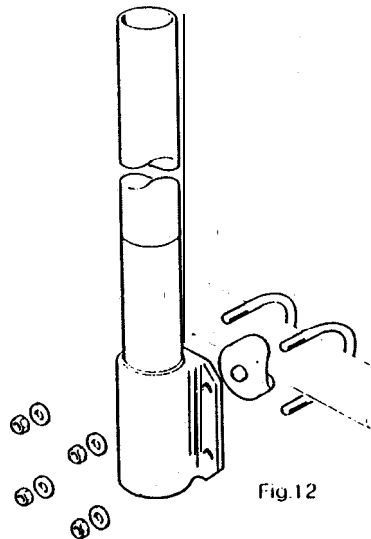


Fig.12

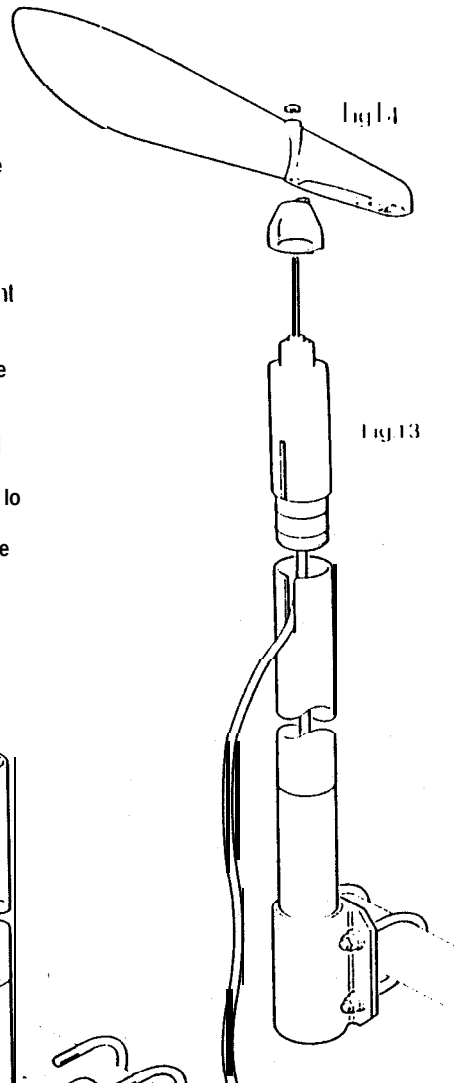


Fig.13

Fig.14

OPERATION

BASIC PRINCIPLES

The following description of the Autohelm 2000'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 course is continuously monitored by a 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 2000 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 2000'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.

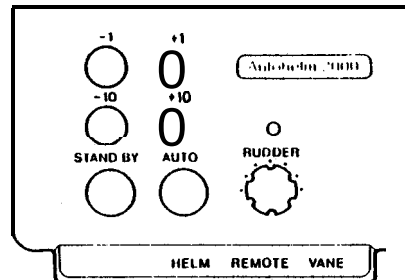
The high degree of control automation made possible by the micro computer simplifies user control to a series of push button operations.

KEYPAD OPERATION

Full control of the Autohelm 2000 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 pushrod can be extended or retracted to engage with the tiller pin using the four black buttons.



-1 +1 -10 +10	Push and hold down to extend/retract the pushrod.
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:-

	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.
-1  +1  -10  +10 	Push once to alter the vessel's heading relative to the apparent wind in increments of 1 or 10 degrees. Note + keys always turn the vessel to starboard.
STAND BY  AUTO 	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.

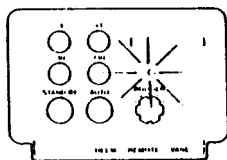
AUTOTACK FUNCTION

The Autohelm 2000 has an automatic tacking function which operates in both compass and windvane mode as follows:-

-1  -10 	Push -1 and -10 keys together once to initiate a tack to port.
+1  +10 	Push +1 and +10 keys together once to initiate a tack to starboard.
The Auto Tack function operates by selecting a preset 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 line adjustments to the course using the +/-1° 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.	

OPERATING MODE INDICATION

The operating mode of the Autohelm 2000 is indicated by a flashing LED as follows:-



OPERATING MODE	LED FLASHING CODE
STANDBY Enables the pushrod to be positioned over the tiller pin and provides power steering.	1 1 1
AUTO Autopilot steers to maintain compass heading.	[REDACTED]
WINDVANE Autopilot steers to maintain apparent wind angle. Windvane mode is also confirmed by a single beep tone emitted every 30 seconds.	[REDACTED] [REDACTED] [REDACTED]

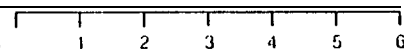


ON



OFF

SECONDS



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 Stand by 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 2000 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 2000 into the power socket and switch on the electrical supply. The unit will emit a short beep lone to indicate that it is active and the LED will flash to indicate Stand by operating mode.

Ensure the mounting pin is engaged in the socket. Using the four course control keys to extend or retract the pushrod position the end over the tiller pin. The unit will emit a short beep lone on each press of a key to confirm valid entries. Place the pushrod end on the tiller pin, and press the +10 key. The tiller should move to port. If the tiller moves to starboard, the changeover switch is incorrectly set and must be adjusted as described on page 3.

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 the setting shown below.



This setting will provide stable control for initial sea trials and may, if necessary, be fine tuned later (see page 25).

SEA TRIALS

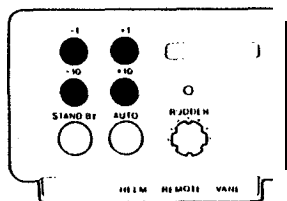
Initial sea trials should be carried out in calm conditions with plenty of sea room. The previously conducted functional test will have verified that the autopilot is operating correctly and that you are familiar with all of its controls.

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

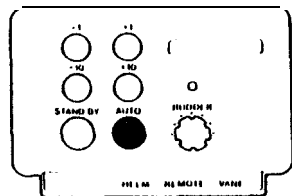
The following initial trial procedure is recommended:-

@ Steer on to the desired heading and hold the course steady.

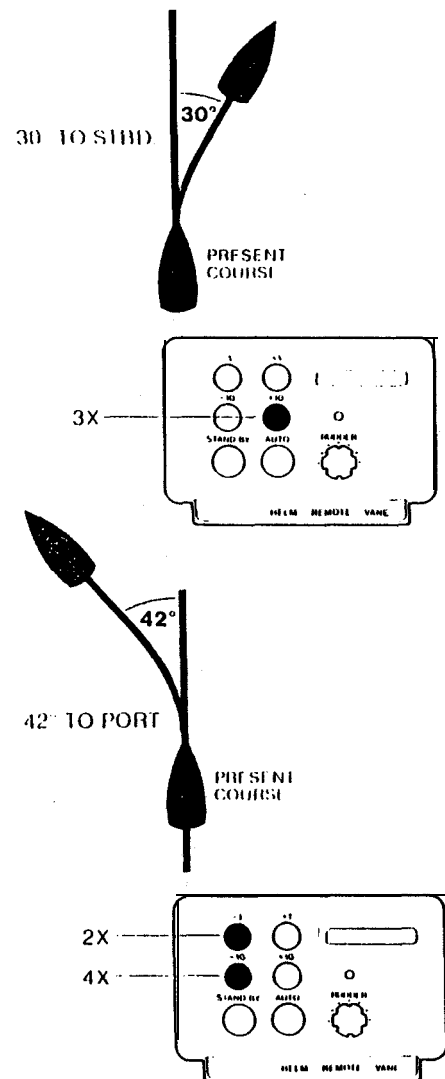
- Using the four course control keys, position and then place the pushrod end over the tiller pin.



- 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.



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 tiller pin for return to hand steering.

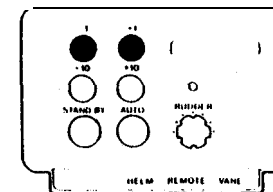
Automatic Sea State Control

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.

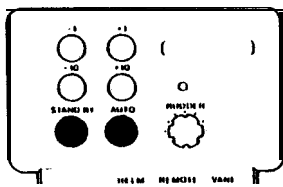
The automatic **seastate** control is restored by pressing the **-1** and **+1** keys together.

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

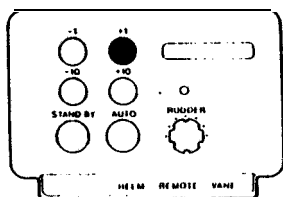
Auto-Tack Function

The following additional trial is recommended:

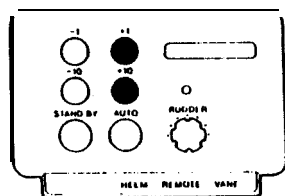
- Steer onto a constant heading approximately 10° free of close hauled
- Press Auto to lock onto the current heading or both red keys to lock onto the apparent wind if a vane is fitted.



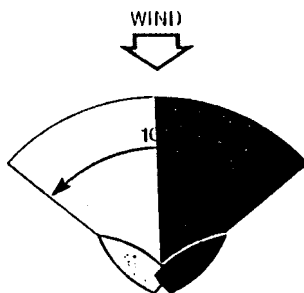
- Decrease the apparent wind angle (using the +1 key if on the starboard tack) until the yacht is sailing close hauled at optimum penetration.



- 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° 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 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

The pushrod is held into engagement with the tiller pin 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 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 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 standby key must be pressed to put the unit in standby operating mode.

Rudder Control Adjustment

The rudder control setting recommended on page 21 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.

OPERATING HINTS

The Autohelm 2000'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 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 the bilge water.
- Do not leave your Autohelm 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.

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 its 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 2000 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 2000.

SERVICE CENTRES — UK, Eire and Channel Islands

Factory Service

Nautech Ltd
Anchorage Park
Portsmouth
Hampshire
0705 693611

Portsmouth/Chichester Harbour

Greenham Marine Ltd
Emsworth Yacht Harbour
Thorney Road
Emsworth
Hampshire
0243 378314

Pennant Marine
Chichester Marina
Chichester
West Sussex
0743 511070

Hamble River/ Southampton Water

B K Electro Marine
Stone Pier Yard
Shore Road
Warsash
Hampshire
048 95 2170

Hudson Marine Electronics
Mercury Yacht Harbour
Satchell Lane
Hamble
Hampshire
0703 455129

Isle of Wight

Lecmar Marine Electronics
Ancasta Marine
Cowes
Isle of Wight
0983 293996

Lymington/Poole

Greenham Marine Ltd
King Salterns Lane
Lymington
Hampshire
0590 75771

Danlea Electronics
Cobles Quay
Poole
Dorset
0202 673880

Greenham Marine Ltd
Quay West Marina
23 West Quay Road
Poole
Dorset
0202676363

Devon

Burwin Marine Electronics
Island Street
Sakombe
054 884 3321

Greenham Marine Ltd

Watersports Centre
Queen Anne Battery
Coxide
Plymouth
0752 228114

Marine Electronics Systems

Putridge
Buckland Brewer
Bideford
North Devon
0805 22870

Ocean Marine Services

43 Bretonside
Plymouth
0752 23922

Quay Electrics (Teignmouth) Ltd

The Sail Loft
Pump Street
Brixham
080 45 3030

Cornwall

Mylor Marine Electronics
Mylor Yacht Harbour
Falmouth
Cornwall
0326 74001

Severn & Bristol Channel

A N D Electronics
Unit 302
Dene Road
Sevenside Trading Estate
Avonmouth
Bristol
0272 821441

South Wales

Caxios Instrumentation Ltd
Lion Way
Enterprise Park
Llansanct
Swansea
0792 797898

Dale Sailing Co Ltd

Dale
Haverford West
Dyfed
064 65 349

North & West Wales

Rowlands Marine
Electronics Ltd
The Outer Harbour
Pwllheli
0758613193

Sailtronic Marine
Church Street
Glan Conwyn
Colwyn Bay
Clwyd
0492 68 536

Merseyside

Robbins Marine Services
North East Coburg Dock
Liverpool
051709 5431

Lancashire

John N Jones Ltd
Marine Electronics Services
190 Dock Street
Fleetwood
03917 5241

Northern Ireland

Belfast Lough Marine Electronics
55 Belfast Road
Carrickfergus
co Antrim
09603 65565

Eire

A E Brunker
20 Oakwood Park
Dublin 11
0001 342590

Rider Services

Glenbrook
Passage West
Co Cork
010 353 2184 11/6

Isle of Man

Bevan Ltd
Steamyacket Building
East Quay
Ransey
Isle of Man
0624 812583

S/W Scotland

Boat Electrics & Electronics
145 Temple Hill
Troon
Ayrshire
0292 315355

Western Scotland

Jell Rutherford
Yacht Electrical and
Electronic Services
Largs Yacht Haven
Inver Road
Largs
Ayrshire
0475686091

Northern Scotland

B P Instrumentation Ltd
Greenbank Road
East Tullos
Aberdeen
0224 874003

Shetland Isles

H Williamson & Sons
(Salloway) Ltd
Main Street
Salloway
Shetland
059588645

S/E Scotland

Forth Area Marine Electronics
Electronics Centre
Port Edgar
South Queensferry
Edinburgh
0313314343

OVERSEAS REPRESENTATIVES

Humberts
Electronics Marine Ltd
9/11A Wright Dock
Hull
0482 25163

Norfolk/Suffolk
Greenham Marine Ltd
Windboats Yard
Grangewalk
Wroxham
Norfolk
06053 2238

R & J Marine Electronics
2 Birch Avenue
Dovercourt Bay
Harwich
0255 502849

R & J Marine Electronics
c/o Suffolk Yacht Harbour
Levington
Ipswich
047 388 737

Essex
Mantsbrite Marine Electronics
19d Spital Road
Maldon
Essex
0621 53003

Kent
Heron Marine Services
129 Broadway
Heme Bay
Kent
0227 361255

East Sussex
D M S Seatrionics
Brighton Marina
Brighton
0273 605166

Channel Islands
Boatworks +
Castle Emplacement
St Peter Port
Guernsey
0481 26071

Jersey Marine Electronics
Unit 2
La Folie
St Helier
Jersey
0534 21603

Mainbrayce Ltd
Inner Harbour
Braye
Alderney
048 182 2772

Argentina
Trimer SA
1 way 15 M de Oro 20 30/40
1475 Buenos Aires
Argentina
Tel (010 54 1) 774 3728/4470
Telex (07 3) 21653 TRIMER AR

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Solo Marine Pty Ltd
11 Green Street
Revesby NSW 2212
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Tel (010 61 2) 774 5255
Telex 007 71 127045 SOLMAR AA
Fax (01061 2) 7745291

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Werner Ober-Yachtelektronik
A 6890 Lustenau
Reichsstrasse 38
Austria
Tel (010 43) 5577 2419
Fax (010 43) 5577 24195

Barbados
C.O. Williams Electrical Co. Ltd
Warrens
St Michael
Barbados
Tel (010 1 809) 425 2250
Telex 007 392 2366 COW WB
Fax (010 1 809) 474 0374

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B 8450 Nieuwpoort
1 oursweg 2
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Tel (010 32 58) 23 40 61
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72 Pitts Bay Road
Pembroke HM 06
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Tel (010 1 809) 295-0558
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Fast Yachts
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P.O. Box 12700
Sao Paulo - SP
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Tel (010 55) 11 5211844
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Fax (010 55) 11 5482070

British Virgin Islands
Cay Electronics
P.O. Box 345
Road Town
Tortola
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Tel (010 1 809 49) 42400
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Fax (010 1 809 49) 44707

Canada
Iom Taylor Co Ltd.
72 Fraser Avenue
Korontok MGK 311
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Cyprus
Mercury Divers Co. Limited
83 Spyrou Arzouzu Street
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Limassol
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Tel (010 357 51) 65492
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Tel (010 350) 73701
Telex 007 405 2373 GIBRLP GK
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Malta
H. Sheppard & Co.
Waterport
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Tel (010 350) 77183
Telex 007 405 2324 MARINA GK

Greece
Piraeus Electronic
46 Akti Moutsopoulou
Marina Zeas
185 36 Piraeus
Greece
Tel (010 301) 453 10 27/418 17 97
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P.O. Box 50128
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Baskerville House
22 Lee I House Street
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Telex 007 802 65925 KREMA HX

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Lagnula 7
125 Reykjavik
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Tel (010 3541) 84077
Telex (07 501) 2 334 BOLLIX IS
Fax (010 3541) 29323

Israel
Briza Yacht & Marine Supply
Tel Aviv P.O. Box 39232
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Tel (010 9721320 259913284432
Telex 265871
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Vale Cerdosa 155
20151 Milano
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Telex 007 43 353147 DECK I
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1 Iayama - Ishiki
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Ripard Larvan & Ripard
156 la'Xbex Seafront
Yacht Marina
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P.O. Box 146
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BP 848 Noumea
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New Zealand
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89 Waitai Road
Takapuna
Auckland 10
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Fax (010 64 9) 444 3798

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80680 Besiktas
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