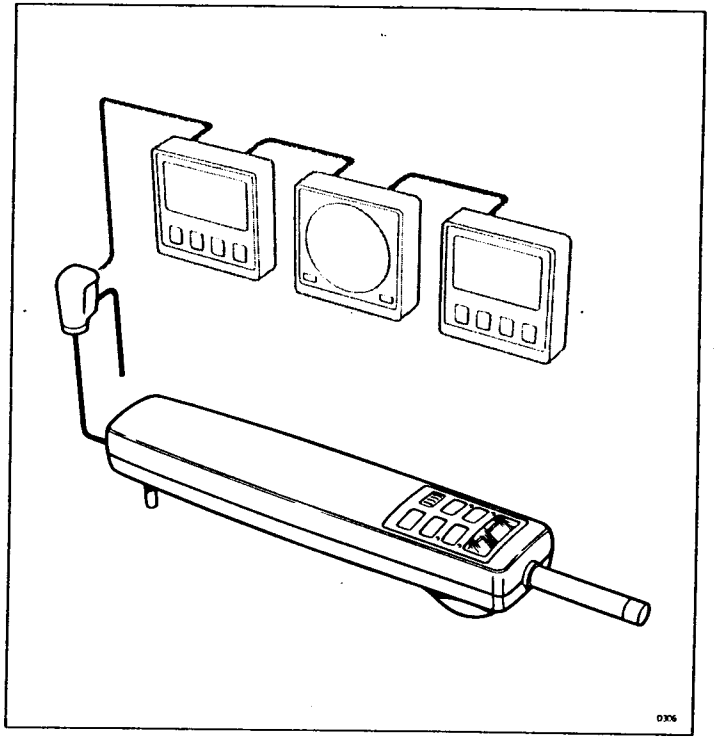
Distributed by

Any reference to Raytheon or
RTN in this manual should be
interpreted as Raymarine.
The names Raytheon and RTN
are owned by the
Raytheon Company.

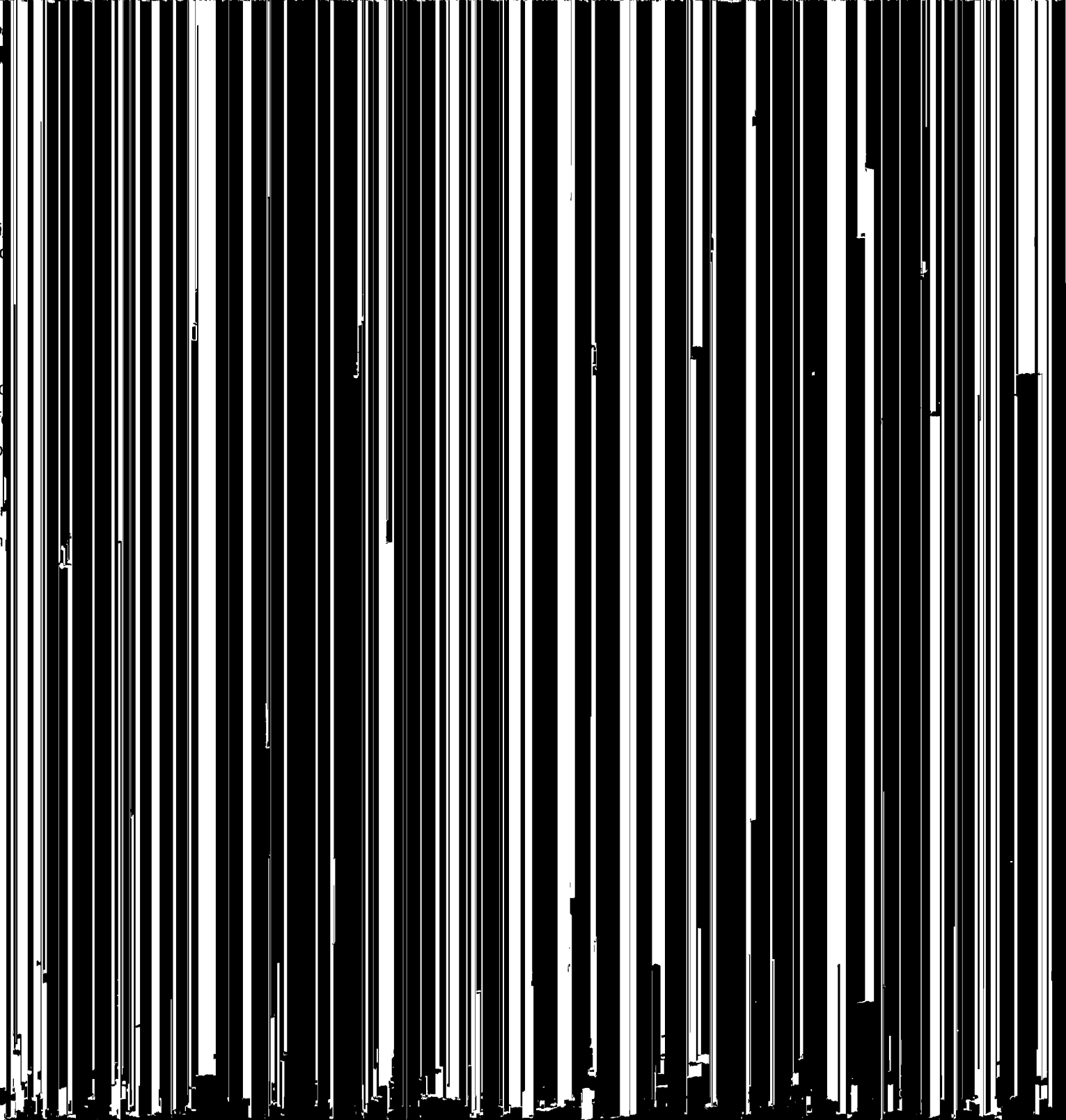


ST1000 Autopilot

Contents

Specifications

- Power Supply
  - 10 to 15V d.c.
- Current consumption
  - Standby: 65mA (120mA with li
  - Auto: between 0.5A and 1.5A
    and sailing conditions
- Operating temperature
  - 0°C to +70°C
- 6 button digital keypad
- LCD display of heading, locked c
- User calibration for optimum perf
- Wind trim control in wind vane mo
- SeaTalk compatible
- Automatic compass deviation co
- Northerly/Southerly heading com
- Automatic heading deadband
- Automatic tack
- Built-in radio navigation interface
- Waypoint advance feature



Safety

Passage making under autopilot can greatly voyage and ensure the crew can relax. How dangerous lack of attention to basic seamar should always be observed:

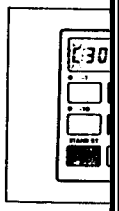
- Maintain a permanent watch and check re vessels and obstacles to navigations. No appear a dangerous situation can develop
- Maintain an accurate record of the vessel' radio navigation receiver or visual bearing
- Maintain a continuous plot of position on a locked autopilot heading steers you clear allowance for Tidal Set – the autopilot cann
- Even when your autopilot is locked to the c navigation receiver maintain a log and a re navigation signals can produce significant stances and the autopilot cannot detect thi
- **Ensure that all members of crew are fa dures required to disengage the autop**

Your Autohelm ST1000 will add a new dimen ment. However, it is the responsibility of the s the vessel at all times by careful observance

Contents

1.2 Operator controls

Standby



■ Push to dis

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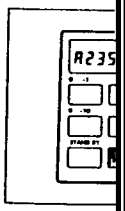
Auto key (s

In 'Standby'

Auto



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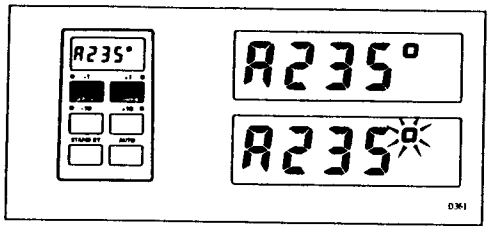
Automatic Deadband Control (Auto seastate)



- Press the **+1** and **–1** degree course change keys together to toggle between auto deadband and fixed minimum deadband. The degree sign will flash when the fixed minimum dead band is selected

  This can only be done with the Autopilot in 'Auto' mode.

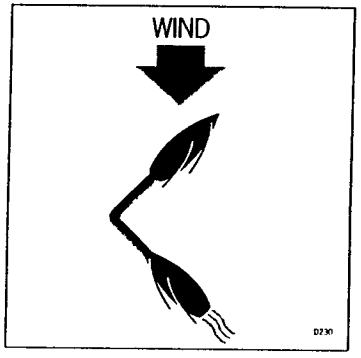
  'Automatic deadband' (Auto seastate) will cause the pilot to gradually neglect repetitive movements of the vessel and only respond to true variations in course. This provides the best compromise between power consumption and course keeping accuracy by neglecting unnecessary rudder movements.

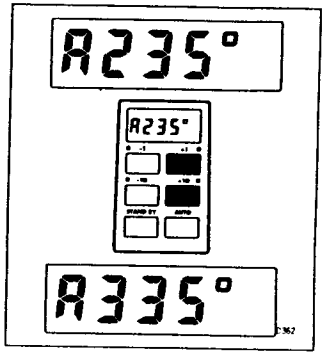
  'Minimum deadband' will always provide the tightest course keeping possible but at the expense of increased power consumption and drive unit activity.

Automatic Tack (Autotack)

The ST1000 has a built in automatic tack facility which will turn the vessel through 100° in the required direction. This feature is available in both compass and vane modes.

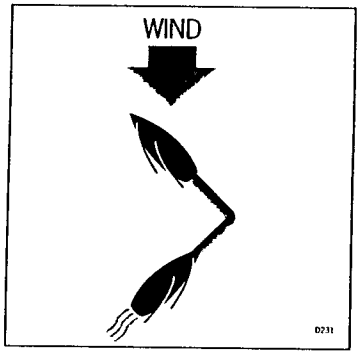
- Press the **+1** and **+10** degree keys together to Tack through 100° to starboard

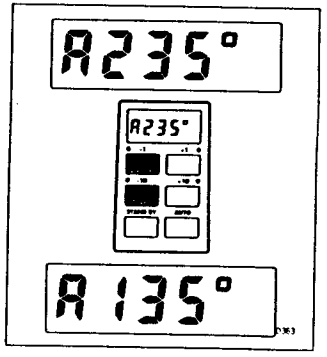




Or:

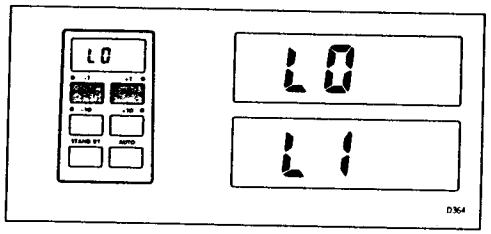
- Press the **–1** and **–10** degree keys together to Tack through 100° to port





Illumination

Illumination for the control head display can be switched on for night time viewing. This can only be done with the autopilot in 'Standby' mode

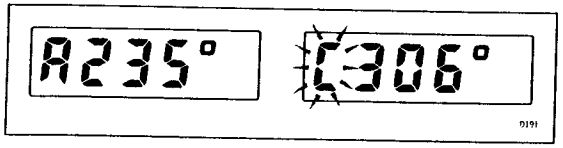


- Press the **+1** and **–1** keys together to toggle illumination on and off

Also if other SeaTalk instruments or autopilot control units are connected to the SeaTalk bus the illumination on the ST1000 can be switched on or off from these units.

Off Course Alarm

The off course alarm will sound if the locked autopilot heading and the vessels current heading differ, for greater than 20 seconds, by more than the value set in calibration level 6.



To cancel the off course alarm push **Standby** to return to hand steering.

If the off course alarm sounds it is usually an indication that the vessel is carrying too much sail, or that the sails are badly balanced. In this case a significant improvement in course keeping can usually be obtained by improving sail balance.

1.3 Operating hi

Contents

Advanced operation

The ST1000 h
for most types
steering syste
ST1000 can b

- The pilot do
- The boat ap
  headings in
- You wish to
- You operate
- You wish to

The ST1000 is
such as a GPS
tidal streams a
can also be ma

'Advanced Ope
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supervisory m
include other S

Chapter 2: Using 'Track Con

2.1 Operation in 'Track Control'

'Track Control' allows th
points entered on a GPS

Operating hints

The Autopilot can receiv
the following sources:

- ST50 Navdata
- ST50 Navcenter
- ST6000 Autopilot Con
- ST7000 Autopilot Con
- SeaTalk Interface Box

Note: All of the above mus
ting data to the NMEA 01
course changes which will
automatically compensati

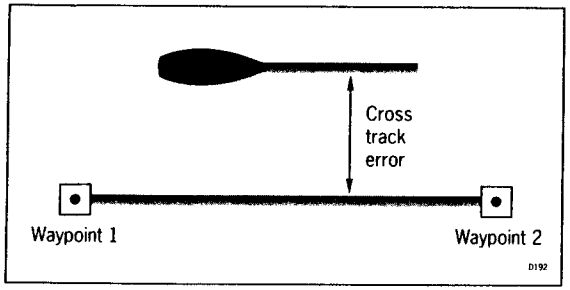
When initiating 'Track Con
ways:

- Automatic acquisition
  Waypoint data required
- Manual acquisition (NM
  required only)

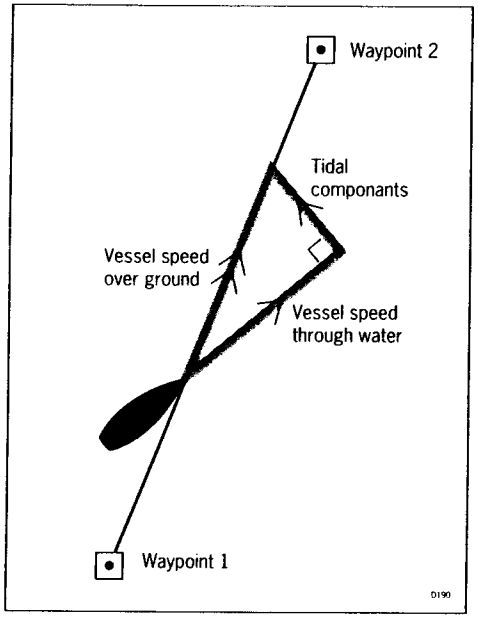
Manual acquisition is achie
track and then bringing the
waypoint. The pilot is then
entering 'Auto' and then pr
to initiate 'Track Control'. T
error and the locked pilot h

Automatic acquisition can
track error and bearing to
initiated as follows:

- Bring the vessel to within 0
- Press **Auto**
- Press **+10** and **–10** degree



Tidal Stream Compensation



Under most conditions 'Track Control' will hold the selected track to within ±0.05nm (300ft) or better.

The autopilot takes account of vessel speed when computing course changes to ensure optimum performance over a wide range of vessel speeds. If an Autohelm ST50 Speed or Tridata instrument is connected to the SeaTalk bus the control head will use measured vessel speed, otherwise the cruise speed entered during calibration level 5 will be used.

Waypoint Advance

If your navigation receiver transmits valid 'Waypoint Number' and 'Bearing to Waypoint' NMEA headers it is possible to advance from one waypoint to

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'Track Control'. Do
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steer back towards

Safety

Passage making in
for wind and tidal d
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computed position
reckoned position f
distance logged. In
more frequent in co

Local variations in r
produce deviations
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using an easily ident
and enable compens

**The use of track c
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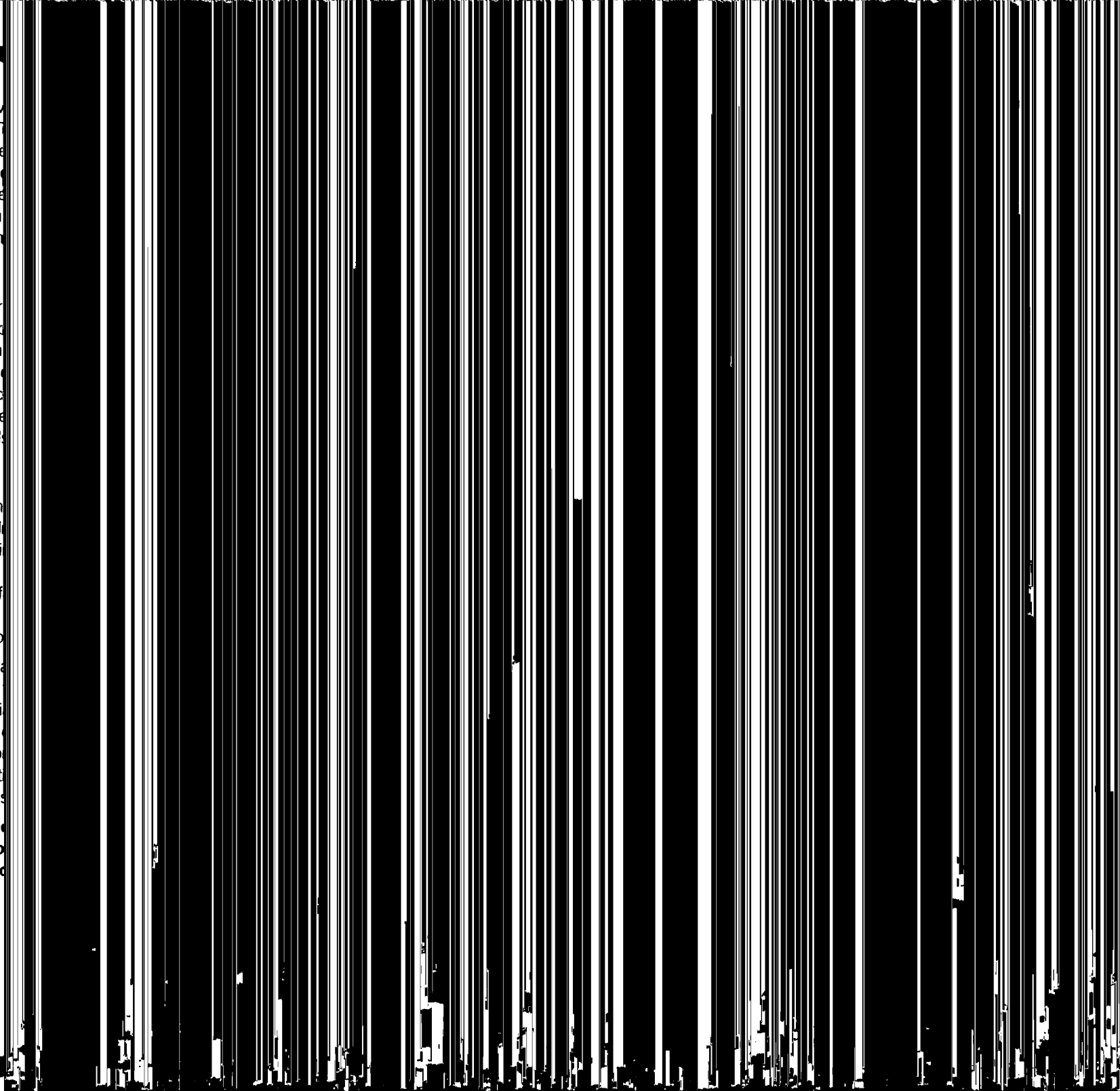
careful navigation**



2.2 Operation in 'Wi

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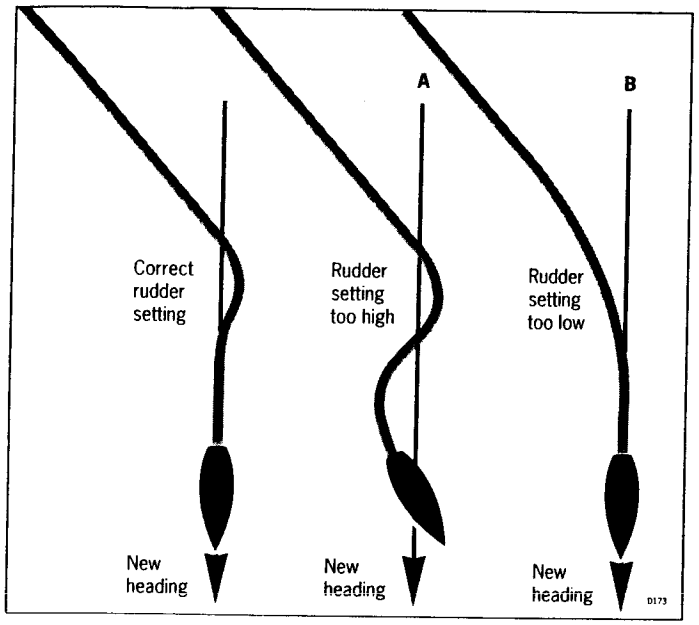


These actions are most easily recognised in calm sea conditions where wave action does not mask basic steering performance.

Refer to chapter 4: 'Autopilot re-calibration', for instructions on how to adjust the rudder gain setting.

Repeat the test until a crisp course change with no more than 2° to 5° of overshoot is achieved.

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 and wear and tear generally.

Similarly, an insufficient rudder control setting will result in understeer which gives sluggish steering performance (**B**). If the vessel takes a long time to make the turn and there is no overshoot then the rudder setting is too low.

Chapter 4: Autopilot re-calibration

The ST1000 can be adjusted to mee
and steering system.

The calibration routine allows the follo
from their factory de-fault settings.

- Rudder gain (Value on power up)
- Off course alarm limit
- Northerly/Southerly turning error c

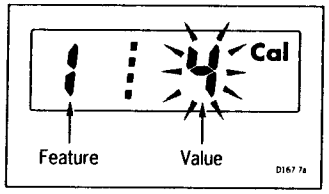
The autopilot also requires certain oth

- Average cruise speed
- Local variation

This section will look at each feature ir
to suit your particular boat.

4.1 Entering calibration mode

■ Press the **Standby** button for 5 secor

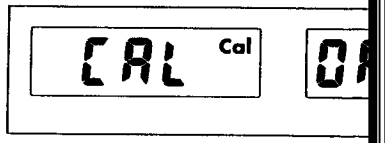


The number on the left identifies the fe
on the right the selected value for that

Each feature can be cycled through us

The existing values can be viewed at a
momentary push of the **Standby** key w
operating mode without affecting the p

Note: If on entering calibration the disp



Please refer to 'Disabled calibration ac
how to adjust.

4.2 Exiting calibration mode

You can exit calibration at any time in one of tw

- Press **Standby** for 1 second

  This will enter any adjusted values into memor

- Momentarily press **Standby**

  This will exit calibration without entering any ad

4.3 Suggested initial calibration settings

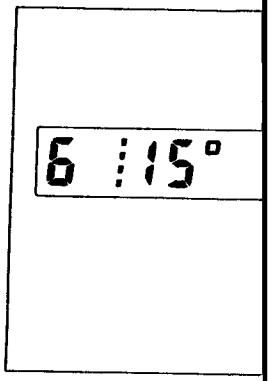
Listed below are suggested initial calibration se
safe performance for the initial seatrial.

If you change any of the settings you can recor
Values' column for future reference.

Feature Number	Feature	Se
1	Rudder gain	5
5	Average cruise speed	8
6	Off course alarm angle	20
9	Local magnetic variation	Off
10	North/South turning error correction	Off
11	Current vessel latitude	xx

Note:

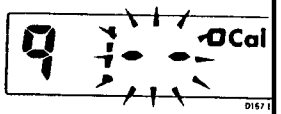
1. Levels 2,3,4,7,8,12 and 13 are not available
2. If level 10 is set to 0 then level 11 will be ommi



Calibration level 9 (Magnetic var

Calibration level 9 tells the p
the boats current position.

- Press the **Auto** key



You should enter your local v
value will then be transmitted
SeaTalk instruments such as

Note: – ve variation: East

+ve variation: West

Calibration level 10 (Northerly / S

Calibration level 10 allows No
to be switched in.

It may be noticed that the auto
northerly headings in the highe
conversely southerly heading
by the increasing angle of dip
latitudes which has the effect
(southerly) headings. This erro
worse the further away from t

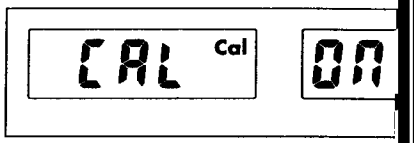
The ST1000 is able to compe
keeping on all headings by aut
depending on heading.

4.5 Disabled calibration access

It is possible to disable the calibration set-
access.

This is achieved as follows:

- Press and hold the **–1** and **Standby** keys
shows:



- Toggle the calibration access on and off u
- Store the setting by pressing the **–1** and **S**
until the control head returns to normal op

If preferred this page can be removed fro
has been switched off.

Contents

Chapter 5: Installation

Introduction

The autopilot i
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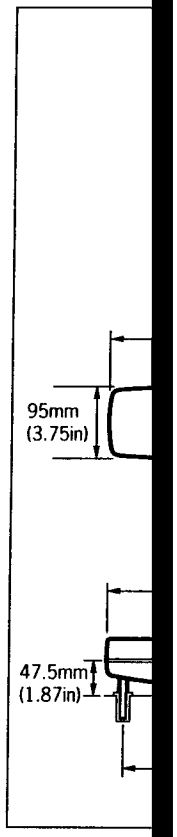

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Note: The
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5.1 Basic installation

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Proceed as

Tiller pin (cat no DC

- Drill 6mn
- Using a t
- Position

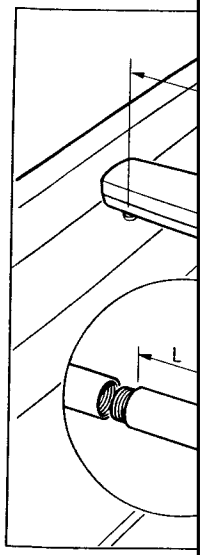
5.2 Installation Accessories

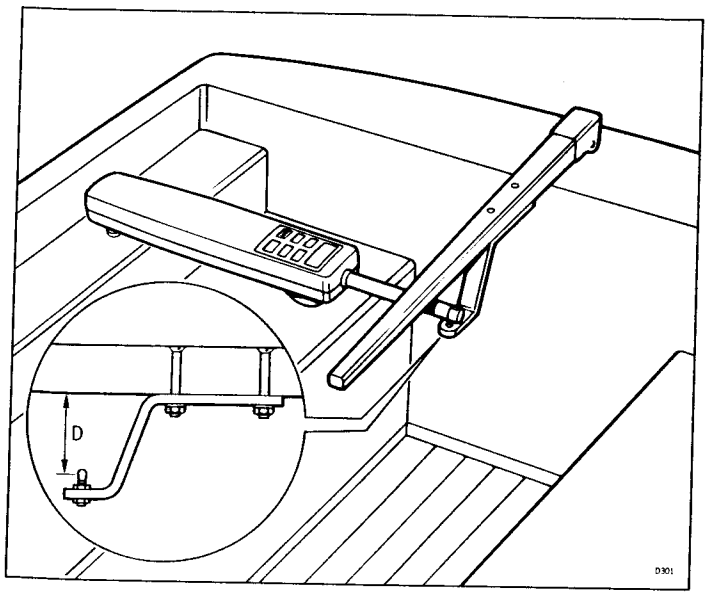
If it is not possible
seat/tiller as desc
will ensure a perfe

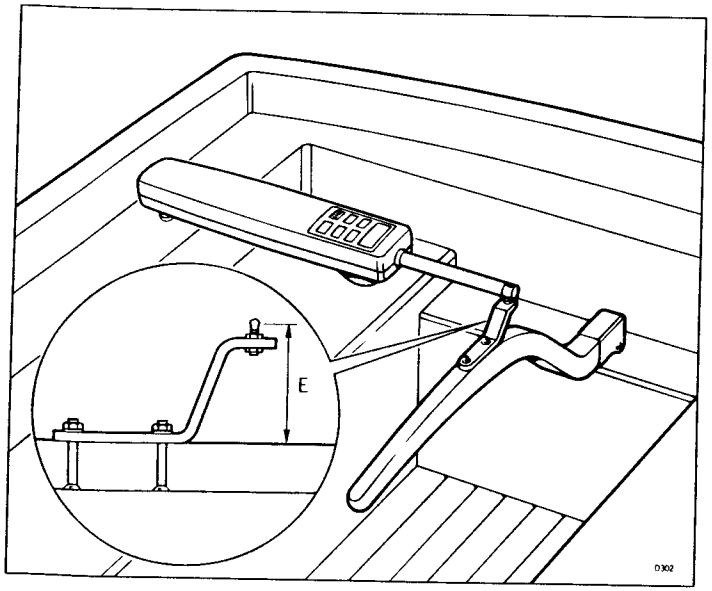
Pushrod extensions

The pushrod lengt
pushrod extension

Dimension C
589mm (23.2in)
615mm (24.2in)
640mm (25.2in)
665mm (26.2in)
691mm (27.2in)
716mm (28.2in)
742mm (29.2in)







Cantilever mour

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- Meas
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Pedestal socket n

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Selection

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- Establis
  (460mn
- Measur

Dimension G	Pedestal socket length L
64mm (2.5in)	Std dimension
102mm (4.0in)	38mm (1.5in)
114mm (4.5in)	50mm (2.0in)
128mm (5.0in)	64mm (2.5in)
140mm (5.5in)	76mm (3.0in)
153mm (6.0in)	89mm (3.5in)

Tiller pins

For certain non-standard installations a range of tiller pins

Description	Size
Small threaded tiller pin	25mm (1in)
Extra length tiller pin	72mm (2.8in)
Extra length threaded tiller pin	72mm (2.8in)

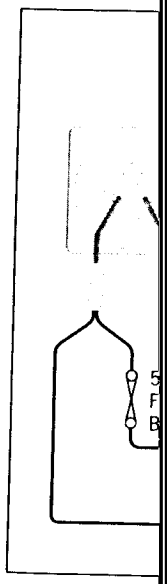
5.3 Cabling and Socket installation

The ST1000 is SeaTalk compatible receiving and transmit
to other instruments and autopilot control units via the Sea
cannot source power from the SeaTalk bus and therefore
dedicated power supply.

Both power and data are supplied to the ST1000 via a cus
plug and socket. The plug comes ready assembled and th
mounted in the cockpit area adjacent to the autopilot.

SeaTalk data cabling

The ST1000 is
D131). It can b
instrument or a
the back of the



The fuse used wi
SeaTalk bus. Any
via a separate 5A

Mounting

The socket is ass

- Fix the self adh
  location
- Carefully drill th
  pilot holes. Ren
- Fit the plug cap
- Locate the 'O' ri
  socket body

Chapter 6: Functi

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6.1 Functional test

Switch on

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Operating sens

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- Place th
- Press +

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If the ST1000
the two instru

- Press the **Sta**

The ST1000 s
shown.

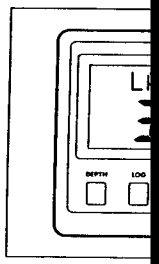
If the display c
flashing 'C' the

The most likely
circuit or wires

SeaTalk bus

If the ST1000 h
bus the link can

- Push **Standby**
- Select display i
autopilot contro



The ST1000 sh
illumination.

If the illuminatio
SeaTalk cabling
control unit.

Keeping boat sp
control the rudd
at least 3 minute
changes to shov
Deviation and cu

Use the **+1°** and
displayed heading
known transit bea

Exit compass adju
follows:

- Push and hold **Sta**

  or, to exit compas

- Push **Standby** mo

  Note: For installati
  connected to the S
  transducer connec
  correction on the S
  Compass handboo

Autopilot operation

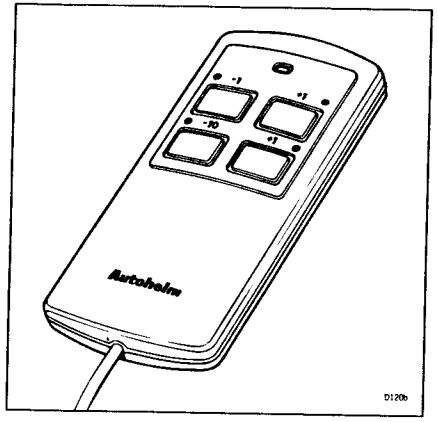
Having calibrated t
to familiarise yours

- Steer onto a compa
- Place the autopilot
- Push **Auto** to lock c
  constant heading w
- Alter course to port

Chapter 7: Accessories

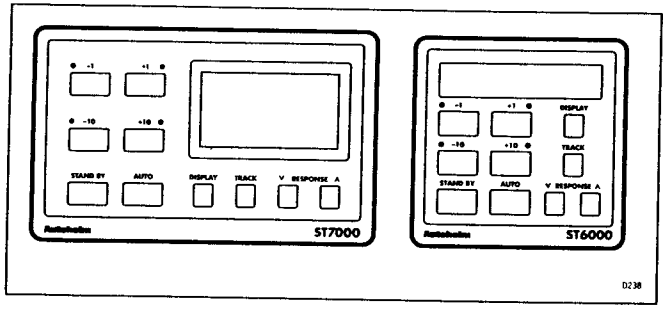
Various accessories are available for your ST1000 autopilot. These include:

- Handheld remote control (Z101)



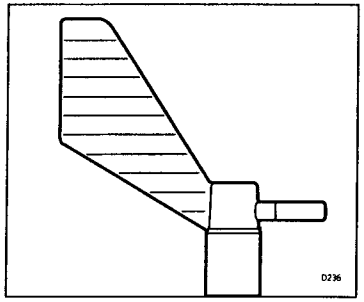
The handheld remote is supplied with 6m (20ft) of cable and a waterproof plug and socket. It allows you remote access to the four autopilot course change buttons

- Fixed control units – ST7000 (Z082), ST6000 (Z124)



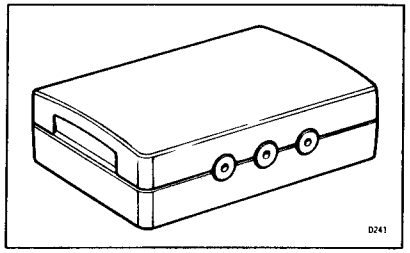
These control units are available for permanent mounting at additional positions where autopilot control is desired.

- Digital Windvane (Z087)



The digital windvane also requires the SeaTalk interface. When combined with the ST1000 these two pieces of equipment allow you to steer your boat on any course relative to an apparent wind angle.

- SeaTalk Interface (Z137)



The SeaTalk Interface will convert all SeaTalk data to NMEA 0183. This allows you to feed NMEA 0183 Navigation data to a plotter or Speed and Compass NMEA information back to a position transducer for dead reckoning (Assuming the correct instruments are present on the SeaTalk bus to generate the information initially).

Chapter 8: Maintenance

- In certain conditions, condensation may app
not harm the unit, and can be cleared by sw
- Never use any chemical or abrasive materia
becomes dirty wipe clean with a damp cloth

Cabling

- Avoid running cables through bilges where p
coiled lengths at regular intervals
- Avoid running cables close to flurescent light
transmitting equipment etc
- Check cabling for chafing or damage to oute
necessary and re-secure

Advice

Should any difficulties arise, please consult Nau
department in the U.K. or your own National Dis
provide expert assistance.

The working parts of the drive system are seale
during manufacture and therefore do not requir

Before the unit is returned please double check
cable is sound and that all connections are tight
Then refer to the fault finding section of this mar
traced then please contact your nearest Autohe
center for advice.

**Always quote the serial number, which is pr
the underside of the autopilot.**

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