SIMRAD CE30

GPS Chart Sounder

183.0100.502 Rev.C English

Note! Insert or remove C-MAP cartridges ONLY thru CHART menu or when unit is off.

All electronic navigation equipment is subject to external factors beyond the control of the manufacturer. Therefore such equipment must be regarded as an aid to navigation. The prudent navigator will, for that reason, never rely on a single source for position fixing and navigation.

1830100502

MOB 'MAN OVERBOARD' function

2 sec's | MOB | In case someone falls overboard, press the [MOB] key and hold for two seconds (or activate an external MOB switch), and the system will provide you with all relevant data for an efficient rescue operation.

MAN OVERBOARD	
C241°	B113°
DIST	1.89nm
TIME	8min
MOB	56°52.743N
POS	9°46.572E
Stop MOB: MENU 4+3	

An alarm will sound if the function is activated from an external MOB switch. Press [CLR] to confirm and reset the alarm.

The **MOB** display will provide present course, bearing and distance to the MOB position. Elapsed time - first in seconds and then in minutes (*=over 9999 minutes).

| GOTO | *Go to graphical MOB display*

The **CHART** display will provide a graphical impression of the MOB position - a man waving his arms in relation to the ship.

| WIN | *Press [WIN] repeatedly to return to the MOB display*

| MENU | | 4+3 | *Press [MENU], [4], and [3], to turn the MOB function off*

| MENU | | 2+6 | *Press [MENU], [2], and [6] to re-call the last MOB position plus the exact time and date of the incident.*

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Table of contents

Congratulations on your purchase of **SIMRAD GPS Chart Sounder CE30** - a totally new generation from Simrad Shipmate AS. Great care has been taken to create the ultimate navigation aid .... both in design and performance. The CE30 is a unique combination of accurate GPS positioning, detailed cartography and high performance echo sounder in a compact design with a 6" large LCD display in TFT colour or monochrome.

The CE30 chart system includes a built-in world chart for rough planning and overview. The choice of chart system best suitable for the SIMRAD CE30 was carefully singled out to be the **C-MAP mini cards CF95**. The optional C-MAP charts are available world-wide at your local Simrad dealer.

The echo sounder system will provide an impression of Bottom expansion, VRM expansion, A-scope and white line.

The Global Positioning System is rapidly becoming the most common system used for navigation and positioning all over the world. Not only for maritime use, but also for land-based applications and aviation. The satellite-based system has been developed and is operated by the US Department of Defence in order to provide an accurate and reliable service, which include a 24-hour global coverage. The GPS system consists of approx. 24 satellites which orbit around the Earth at an altitude of approx. 20,200 km. The satellites transmit perfectly syncronized data. However, depending on the position, the signals will reach the receiver at a slightly different time. By adding the measured time difference to the known position of the satellites it is possible to calculate the ship's position to within a few meters.

How to use this manual?
It is a good idea if you make yourself familiar with the key functions and menu structure described in chapter 2 before you start out, and then proceed with 2.2 Getting started.
If your CE30 is the monochrome version, it will not be possible to apply the colour features described in the manual.

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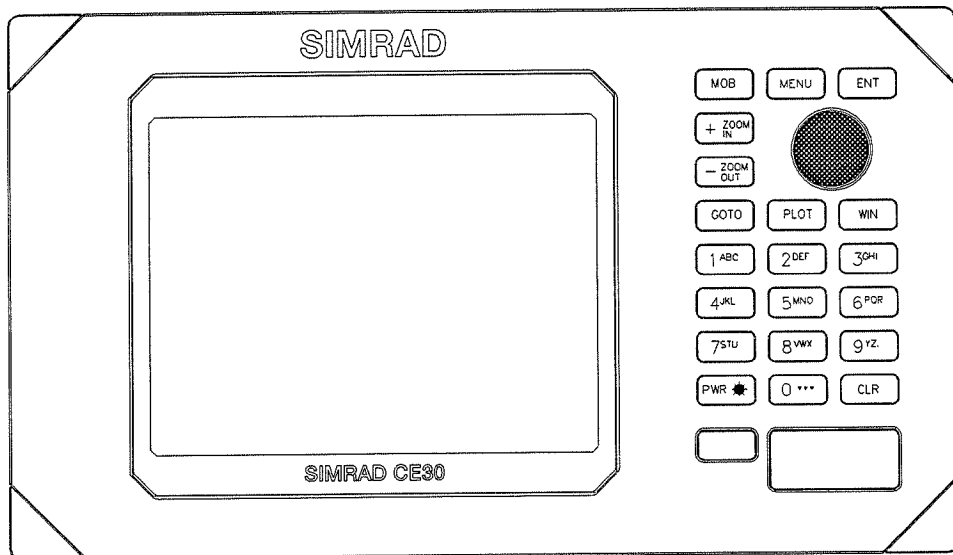
2.1 Keypad

The keypad consists of 21 operation keys which gives a very straightforward access to the many features.

The [ENT] key has the special function of opening and closing for insertion/editing of data. Use the multi-direction cursor key to move around in the chart display, and to place the cursor on the function you wish to change, then select the data by using the alphanumeric keys or +/- keys.

How to interpret special marked key symbols etc. in the manual:

| +/- | Either the + (plus) or - (minus) key may be applied. |

| 0-9 | Alpha-numeric keys for insertion of figures. |

| A-Z | Alpha-numeric keys for insertion of letters. |

☞ Emphasizes important points.

7
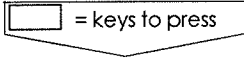
[☐☐] = keys to press   When the key symbol and **"keys to press"** appear next to the start of a new section, it is to point out that when you press the various keys next to the text in italic, you will then obtain what the italic text describes.

• Example:
In the manual's section 3.1.3 Chart setup 1, you have:

| MENU | | 1+5 | *Load Chart setup 1*

- meaning that, by pressing the [MENU] key and then pressing [1] and [5], you will call up the 'Chart setup 1' display.

Key applications:
Some of the key functions are general and can be applied at any time, other key functions are related to a certain menu(s) and can only be applied when in the appropriate menu.

| ENT | Turns cursor on/off in data displays. Opens for/confirms insertion and editing of data. Calls up information on marks, waypoints, etc. on chart.

| MENU | Turns the menu bar on/off. Exits any data display without taking any action.

2 sec's | MOB | Press for 2 seconds to activate the MOB - 'Man overboard' function.

| + ZOOM IN | Zooms in for greater chart details (smaller scale).

+ and - toggles between available values.

| - ZOOM OUT | Zooms out for better overview (larger scale).

Use the multi-direction cursor key to move around in menus, displays and charts + activate cursor on chart.

| GOTO | Activates pop-up window 'Select NAV mode' Shortcut to chart display. |

| PLOT | Activates pop-up window 'Select PLOT mode' |

| WIN | Toggles between four pre-selected windows. Hold two seconds for automatic rotation of preselected displays. Press WIN again to return to manual operation. |

| CLR | Turns off the menu bar. Turns off the cursor. Deletes data, leaps to first vacant WP in WP list. |

| PWR ✱ | Turns the CE30 on. Calls up an info window where you can adjust light/contrast in screen and background light in keypad. Adjust contrast in black & white version. |

Press 2 times — Turns the CE30 off.

Ejects drawer for insertion of C-card.

⬜ = keys to press

2.2 Getting started

| PWR ✱ | *To turn the CE30 on, press and hold the* [PWR] *key until there is a picture on the screen*

The unit will now perform a fully automatic start-up and find the correct position without further data entries. The start-up phase is completed when the letter **S** (Start-up) in the status indicator disappears in the position display - see section 3.2.1.

To customize the CE30 to suit individual likings can be done as you go along i.e. choose a different colour for the display background, text, menu, etc. But to start out

it will be wise to select the display language you prefer
to be using, and to insert the correct antenna altitude
into the system.

Display language

| MENU | | 6+1 | *Call up display* |

| ENT | | ⬤ | *Open for change, and go to 'Display text in'* |

| +/- | | ENT | *Select language, and confirm* |

Insert correct antenna altitude (above sea level)

| MENU | | 2+7 | *Call up display for 'Position setup'* |

| ENT | | ⬤ | *Open for change, and go to 'Manual antenna altitude'* |

| +/- | | 0-9 | *Insert new altitude e.g. 10 metres (010),* -altitude can
be set to positive or negative value |

| ENT | *Confirm entry* |

Rotation of WINdows

| WIN | *Press* [WIN] *repeatedly to leaf through the 4 windows
currently selected for rotation*

The sequence of the 4 displays will be as they are se-
lected. If you only need 3 or 2 displays in the rotation,
then you call up the same display in more than one
WINdow to make the total of 4:
Press [WIN] to select the first display, press [WIN] to se-
lecte the second display, press [WIN] to select the third
display, press [WIN] to select the fourth and last display.

2 sec's | WIN | *Start automatic rotation of preselected windows at a
preselected time interval (adjustable, see sec.5.1.3)*

| WIN | *Press the* [WIN] *key again to return to normal operation*

10

| = keys to press |

2.3 Menu bar

| MENU | *Toggles the menu bar on/off*

The menu bar is placed at the top of the screen, and the individual menus are selected by keying the number next to the menu or by using the cursor key to highlight the menu, and pressing [ENT].

To fit in the complete menu bar across the screen, some of the menus have been abbreviated. However, the last selected menu will be highlighted, and if it's an abbreviation of the menu, then the complete menu title is written above the menu bar e.g.:

NAVIGATION

1:	2:	3:	4:	5:	6:
CHART	POS	MARK	NAV	ECHO	SETUP

← Main menus

Sub-menus →

| 1:......... |
| 2:......... |
| 3:......... |
| 4:......etc. |
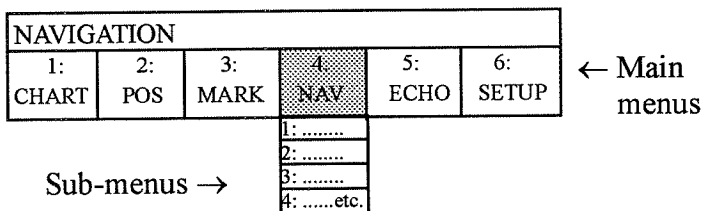
Having selected e.g. 4:NAVIGATION from the menu bar, its associated menus (sub-menus) will drop down.
Key in the number next to the function you wish to call forward, or use the cursor key to highlight the function and press [ENT].

If you want to switch to a different menu, use the cursor key to move to the adjacent menu.

The menu bar will disappear from the screen at the selection of a function, or by pressing the [CLR] key. Besides - if not used, it automatically turns off after 30 seconds.

2.4 Menu layout

1: CHART	2: POS	3: MARK
1:Chart & echo display	1:Position display	1:Mark, WP list
2:Chart display	2:Course and speed	2:WP used in routes
3:C-MAP cartridge	3:Dual speed	3:Delete group of WPs
4:Turn cursor ON/OFF	4:Decca lanes	4:Route
5:Chart setup 1	5:Loran C	5:Trackplot
6:Chart setup 2	6:MOB position	6:Line
	7:Position setup	7:Target

4: NAV	5: ECHO	6: SETUP
1:Navigation display	1:Echo display	1:Speed alarm, units & language
2:Navigation setup	2:Bottom expansion	2:Interface setup NMEA
(3:Cursor)	3:VRM expansion	3:Interface setup remote
3:Waypoint	4:Turn A-scope ON	4:Interace setup alarm/log
4:Route	5:Turn VRM ON	5:Wind display
(5:Track)	6:Presentation setup	6:Display colour
	7:Echo sounder setup	

The **NAV** menu is dynamic and will adapt to the function which is currently active, see below variations:

1:Navigation display
2:Navigation setup
3:ETA
(4:Waypoint advance)
5:Turn NAV OFF

1:Anchor guard display
2:Navigation setup
3:Turn anchor guard OFF

1:MOB display
2:Navigation setup
3:Turn MOB OFF

3.1 CHART menu

CHART
1:Chart & echo display
2:Chart display
3:C-MAP cartridge
4:Turn cursor ON/OFF
5:Chart setup 1
6:Chart setup 2

☞ For safety reasons, navigation with electronic charts should always be combined with authorized paper charts.

For the combination display of chart and echo, please refer to section 3.1.1 Chart and section 5.2 Echo sounder.

☐ = keys to press
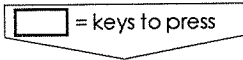
3.1.1 Chart

GOTO *The* [GOTO] *key gives you direct access to the chart display (or load chart display from menu, press* [MENU], [1], [2]*), and open for the built-in world chart and the optional, detailed C-MAP electronic charts.*

GPS C *° *.*kh 56°52.786N 9°50.318E
⊢—31nm—⊣
CANADA
UNITED STATES
⊘
NORTH
ATLANTIC
OCEAN
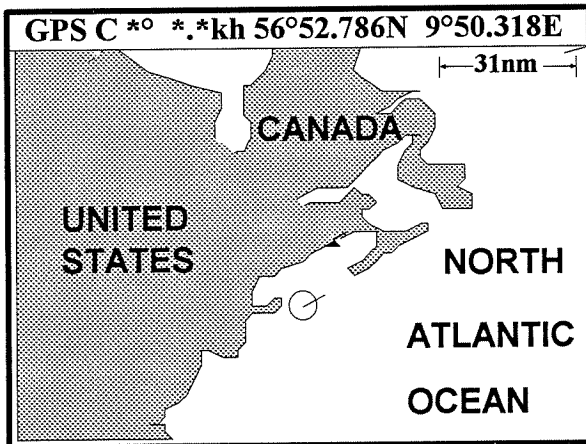
Chart scale indicator can be set ON/OFF in [MENU],[1],[6].

The top line of the chart display (with cursor off) will give you course, speed and ship's position. With cursor active, the top line will show the cursor position in lat/long, bearing and distance from actual position to cursor position.

⊘ The ship symbol indicates the present position on the chart and the pointer informs of the actual true course (course over ground). There is a built-in autohome

function, which automatically will move the chart to
keep the ship symbol in the display (with cursor off).

Cursor function

CLR

With chart display active, *press the cursor key to acti-*
vate the cursor and *press* [CLR] *to turn the cursor off*

Use the cursor key to move cursor in any direction on
the screen - the chart will automatically adjust.

In the standard data displays the cursor will be shown
in form of a line under the active field or as a ruling
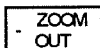box around.

MENU   1+4   *This key sequence will also turn the cursor on/off*

Zoom function - with *cursor on*, the zoom function
will zoom around the cursor. With *cursor off*, the zoom
function will zoom around the ship's position.

+ ZOOM IN   *Zoom in for details (smaller scale)*

- ZOOM OUT   *Zoom out for overview (greater scale)*

The built-in world chart can be zoomed up/down in
five steps from a scale of approx. 1:33,000,000 to
1:3,800,000.

An **over-zoom function** enables you to zoom beyond
the chart, which automatically is switched off and re-
placed by a lat/lon coordinate grid. In this mode the
scale can go down to 1:60.

GOTO function - has three main functions:
1.Direct access to chart display, **2**.Select, change or stop navigaion, **3**.Home function for cursor or ship.

| GOTO | **1.** The [GOTO] is a shortcut to call up the chart display from any other display.

| GOTO | **2.** With chart in display, press [GOTO] to call up info window with available navigation modes.

In case one of the NAV modes is active, a warning will pop up on the screen = 'Navigation is ON', where it is possible to choose between: 'Restart to approaching point', 'Change navigation mode', 'Turn NAV OFF' or 'Exit' without making any changes.

If you have not placed the cursor in the vicinity of a WP, route or track, a small info window will pop up with the following to choose from:

Select NAV mode
1:Cursor
2:Waypoint
3:Route
4:Track
Home: GOTO
Exit: MENU

To select 'Cursor' navigation will require that the cursor is active. 'Waypoint', 'Route' and 'Track' navigation will require there is at least one of the objects stored in the memory.

For further details on the different NAV modes, refer to section: 4.1.1 Cursor navigation
                4.1.5 Waypoint navigation
                4.1.7 Route navigation
                4.1.9 Track navigation

| GOTO | **3.** Press [GOTO] to select 'Home' to center the ship symbol or cursor position on the screen.

| MENU | Press [MENU] to turn off the info window.

PLOT function

PLOT | Press the [PLOT] key with chart in display, to call up an info window with the following to choose from:

```
        Select PLOT mode
1:Plot mark
2:Plot mark with name etc.
3:Plot mark with depth
4:Make route
5:Draw line
6:Plot target
7:Bearing and dist from A to B
8:Set vertical mark
Exit: MENU
```

☞ Cursor must be active, otherwise it will be the ship's position which is plotted.

1:Plot mark

Plot and save the cursor position as a waypoint.

2:Plot mark with name etc.

Plot and save the cursor position as a waypoint, plus you can insert a location name, change the symbol or change the colour on the symbol.

3:Plot mark with depth

Plot and save the cursor position as a waypoint together with depth information.

4:Make route

You can quickly make a route by plotting the cursor's position, one after another i.e. place the cursor on the first position of the route you wish to make and press [PLOT]. Move the cursor to the next position and press [PLOT]. Continue in this manner till the route is complete. In case you make a wrong plot, press [CLR] to erase the last plotted position. Save the route with [ENT] or exit the function with [MENU] to abandon the route.

5:Draw line

To draw lines or to make a route is the same procedure, please refer to above point 4.

6:Plot target

Plot and save the cursor position as a special target position. You will receive a display 'Set up target' where it is possible to alter the position, insert a location name and select a colour for the target number and symbol.

7:Bearing and dist from A to B

You can quickly obtain your bearing and distance from your current position to an arbitrary point. Place cursor on first position (A) and press [PLOT], then place cursor on second position (B). Bearing and distance will now be calculated from position A to B, and the data will be shown in a small info window. Press [MENU] to exit the function.

8:Set vertical mark

This function will set a vertical marker (line) at the current ping in the Echo display.

☞ = keys to press
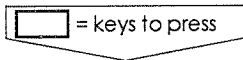
3.1.2 C-MAP cartridges (C-cards)

On the front of the CE30 below the keypad is a small watertight drawer wherein you place the C-MAP cartridge you wish to load.

☞ Do not attempt to insert or remove cartridges unless the CE30 is turned off or chart reading is in stand-by:

| MENU | | 1+3 | *Load display for insertion/removal of C-MAP cartridge* - see next page.

```
┌─────────────────────────────────────┐
│                                     │
│  C-MAP cartridge:                   │
│                                     │
│  Name: MAP CARTRIDGE   N. B0114.00  │
│                                     │
│                                     │
│                                     │
│                                     │
│  Chart reading is now in stand-by.  │
│                                     │
│  Insert/remove cartridge, and press ENT. │
│  Accept:   ENT.          Exit:   MENU │
│                                     │
└─────────────────────────────────────┘
```

Chart reading is now in stand-by, and you may insert/remove cartridges. To open the drawer below the keypad, press the eject key next to the drawer.

Place the cartridge in tray with face up and terminals pointing towards the unit, and push the drawer to close it - make sure it clicks in all the way (to stay watertight).

| ENT | *Confirm that you wish to load the C-MAP cartridge chart data*

The CE30 will now test the data on the cartridge to see if its valid and free from faults, or it will test if there is any data present at all.
☞ If a cartridge is defect, it must be removed before you can exit the display.

When the 'Cartridge status' display informs that the cartridge is O.K., then:

| GOTO | *Activate chart display*

In addition to the larger boundaries of the world chart there will be separate boundary lines for the individual charts stored on the same cartridge.
Other chart areas can quickly be reached by:

| - ZOOM OUT | *Zoom out until desired area becomes visible*

| + ZOOM IN | *Move cursor to approximate area, and zoom in*

The chart will automatically start to move when the cursor reaches the edge of the screen.
When the cursor is switched off [CLR], the chart will return to the ship's position.

| ⬤ | ENT | *Place cursor on any C-MAP object (light, buoy, etc.) or own recordings (mark, waypoint, etc.). Repeat pressing* [ENT] *to scroll through all available information, including chart scale.* |

☐ = keys to press

3.1.3 Chart setup 1

| MENU | 1+5 | *Load 'Chart setup 1' -* In this display you can customize the presentation of C-MAP charts. |

```
C h a r t   s e t u p   1 :
Chart boundary lines:                    ON
Location names:                          ON
Navigation marks:                        ON
Lights:                                  ON
Depth lines:                             ON
  Depth 1:                 0  -   5  m
  Depth 2:                 6  -  50  m
  Depth 3:                51  - MAX  m
Chart detail level:               AUTO HIGH
Restricted areas:                        ON
Land settings:                           ON
Marine settings:                         ON
Naval aid settings:                      ON
Paper chart settings:                    ON
```

To obtain a 'cleaner' view of the chart details, you can turn some of the settings OFF if they do not contribute to the clarity of the chart area you wish to explore.
The 'Chart detail level' can also help to control the amount of details shown on the chart. The advanced zoom feature will automatically expand or compress charts for the scale you have selected and attempt to compensate for missing charts. Whenever a chart is compressed, however, it tends to get cluttered with details. Choose between five settings:

1. AUTO HIGH (default) - compressed charts will display depth lines and buoys.

2. AUTO LOW - compression of charts will occur in two

steps (by pressing [ZOOM] i.e. showing depth lines and buoys, or only depth lines.

3. HIGH - all available data is displayed in all scales.

4. MEDIUM - depth lines and buoys are displayed.

5. LOW - only depth lines are shown.

The depth areas 1, 2 and 3 are identified by different colours i.e. deep blue, medium blue and light blue - where light blue is for deep water. In the black & white display, the areas are identified by the density of grey dots i.e. the fewest dots are for the deepest water.

| ENT | *Open for change*

⬤ *Move cursor to the desired setting*

| +/- | *Toggle to OFF*

Continue in this manner until you have turned those of the settings off which you do not require to have shown on the chart at the moment.

| ENT | *Confirm entry*

☐ = keys to press

3.1.4 Chart setup 2

In this display you can adjust what type of information you want shown on the screen.

This gives you the opportunity to have an uncluttered screen to look at with no more information than what is needed for the time being.

Position in chart display can be shown in LAT/LON, Loran C or in decca lanes.

| MENU | | 1+6 | *Load display for 'Chart setup 2'* - see next page.

```
┌──────────────────────────────────────────────┐
│  C h a r t   s e t u p   2 :                   │
│                                                │
│  Waypoints:                              ON    │
│  Information shown on chart:                   │
│    Waypoint numbers:                     OFF   │
│    Waypoint names:                       OFF   │
│    Route numbers:                        OFF   │
│    Track numbers:                        OFF   │
│    Line numbers:                         OFF   │
│    Target numbers:                       ON    │
│  Chart scale factor:                      1    │
│  Show scale:                             OFF   │
│  LAT/LON grid:                           OFF   │
│  Auto chart select:                      ON    │
│  Position in chart display:           LAT/LON  │
└──────────────────────────────────────────────┘
```

'Chart scale factor' can be set to 1/2, 1 or 2 e.g. 1/2:500.000 - see also chapter 9.1 Glossary of terms.
Setting 'Show scale' to ON will add a small line to the chart display indicating that the length of the line equals a certain number nautical miles / km.
When sailing with 'Auto chart select' ON, you will always have a chart presented. But when set to OFF, the scale will have highest priority i.e. changing to overzoom and grid when no chart is available in the same scale or close to.

| ENT | *Open for change*

⬤ | +/- | *Move cursor to the setting you want to change, and toggle between available settings*

| ENT | *Confirm entry*

3.2 POSITION menu

```
┌──────────────────────────────────────┐
│              2.                        │
│             POS                        │
├──────────────────────────────────────┤
│  1: Position display                   │
├──────────────────────────────────────┤
│  2: Course and speed                   │
├──────────────────────────────────────┤
│  3: Dual speed                         │
├──────────────────────────────────────┤
│  4: Decca lanes                        │
├──────────────────────────────────────┤
│  5: Loran C                            │
├──────────────────────────────────────┤
│  6: MOB position                       │
├──────────────────────────────────────┤
│  7: Position setup                     │
└──────────────────────────────────────┘
```

All the functions in the POSITION menu are described in sections 3.2.1 to 3.2.6, except for the MOB position:

Selecting '6:MOB position' will call up a display which will provide information of the last activated MOB position.

☐ = keys to press

3.2.1 Position display

| MENU | | 2+1 | *Load position display*

Indicates the datum currently selected.

Datum WGS84	Log 1 0.2nm	Log 2 0.4nm
LAT 56°52.500 N LON 9°50.700 E		
Speed **0.4kn**	Course **17°**	Altitude 2D **5m**
Status DGPS 8 Sat a	UTC Time 18:09:38	UTC Date 10- 9-1996

Trip log 1 and 2

Position with three decimals in minutes.

Speed over ground.
Course, magnetic or true.
Altitude or depth.

UTC or local time & date.

Time and date in UTC - Universal Time Coordinates - is equal to standard time in London (GMT). UTC is not affected by the local summertime adjustments.

Status indicator with number of received satellites: S= Satellite search, a(A)= good, b(B)= acceptable, c(C)= fair, or *= no update (see also 'Status indicator and accuracy' on next page).

With D-GPS receiver connected:
dGPS= differential data received,
DGPS= corrected differential data received.
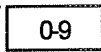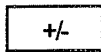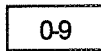
To reset log, or set time - local/UTC

| ENT | *Open for change*

⬤ *Shift between Log 1 and 2*

| CLR | / | 0-9 | *Reset log / insert alternative start figure* |

| +/- | *Toggle between local/UTC time* |

| 0-9 | *Go to, and insert local time and date* |

| ENT | *Confirm entry* |

Status indicator and accuracy

Small letters (a,b,c,) indicate that SA is active, and the position accuracy is expected to be better than 100 metres in 95% of the time. Capital letters indicate that SA is OFF, and the position accuracy is then expected to be 15 metres or better in 95% of the time.

dGPS indicates that differential data is received from eg. RS5660/RS5665, and DGPS indicates that the position is corrected by the differential data. The accuracy will typically be 3-5 metres.

In order to utilize the high accuracy of the GPS system, it is necessary to align the lat/long calculations to the paper charts you are using. Refer to setup for NAV-datum, section 6.1.1.

☞ When using C-MAP electronic charts, the datum will be aligned automatically.
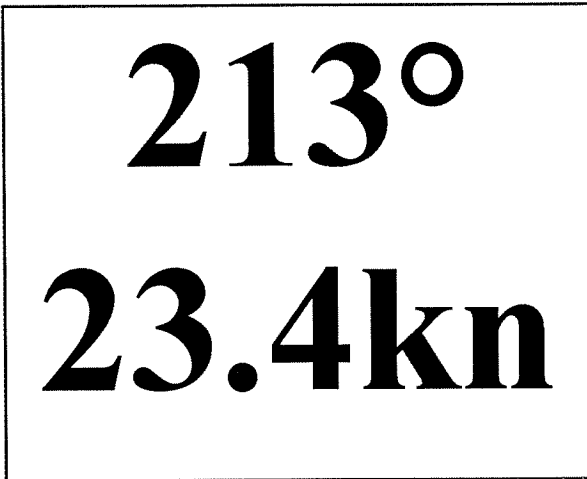
☐ = keys to press

3.2.2 Course and speed

| MENU | | 2+2 | *Load display for 'Course and speed'*

$$213°$$
$$23.4kn$$

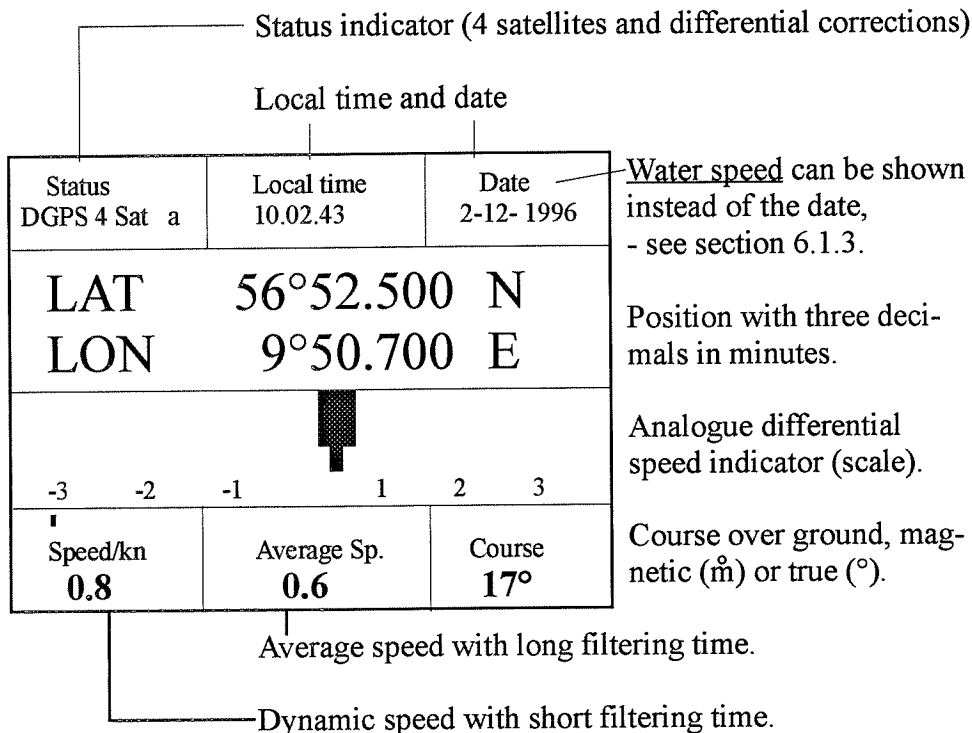☐ = keys to press

3.2.3 Dual speed / Position display

| MENU | | 2+3 | *Load Dual speed / Position display*
(see illustration next page)

The analogue differential speed indicator will show how much the present speed variates from the average speed. If the difference exceeds +/- 3 knots (or km/h or miles/h), an arrow will appear which will be pointing out of the scale.

Status indicator (4 satellites and differential corrections)

Local time and date

Status	Local time	Date
DGPS 4 Sat a	10.02.43	2-12- 1996

LAT	56°52.500 N
LON	9°50.700 E

| -3 | -2 | -1 | | 1 | 2 | 3 |

Speed/kn	Average Sp.	Course
0.8	**0.6**	**17°**

~~Water speed~~ can be shown instead of the date, - see section 6.1.3.

Position with three decimals in minutes.

Analogue differential speed indicator (scale).

Course over ground, magnetic (m̊) or true (°).

Average speed with long filtering time.

Dynamic speed with short filtering time.

The average speed indicator with long filtering time gives a very stable reading.

The dynamic speed indicator with short filtering time is more unsteady but with quick reaction to changes.

How to reset dual speed:

ENT	*Open for change*
ENT	*Press [ENT] to reset dual speed, or...*
MENU	*Press [MENU] to exit function without making any changes*

☐ = keys to press

3.2.4 Decca lanes

| MENU | | 2+4 | *Load decca chain display*

| ENT | | 0-9 | *Open for entry, and key in chain number, or leaf through chains by the +/- keys,*
- to clear chain number, insert number 99.

| ENT | *Confirm entry*

List of decca chains:

00	S Baltic	0A
01	Vestlandet	0E
02	SW British	1B
03	North Humber	2A
04	Holland	2E
05	British	3B
06	Lofoten, Norway	3E
07	German	3F
08	N Baltic	4B
09	NW Spanish	4C
10	Trondelag (N)	4E
11	English	5B
12	N Bothnian	5F
13	S Spanish	6A
14	N Scottish	6C
15	Finland	6E
16	Danish	7B
17	Irish	7D
18	Finnmarken	7E
19	French	8B
20	S Bothnian	8C
21	Hebridean	8E
22	Frisian	9B
23	Helgeland	9E

24	Skagerak	10B
25	N Persian	5C
26	S Persian	1C
27	Bombay	7B
28	Calcutta	8B
29	Bangladesh	6C
30	Hokkaido	9C
31	Tohoku	6C
32	Kyusyu	7C
33	Namaqua	4A
34	Cape chain	6A
35	E Province	8A
36	Dampier	8E
37	Port Hedld	4A
38	Hokuriku	2C
39	Newfoundld.	2C
40	Cabot strt	6B
41	Nova Scotia	7C
42	Salaya	2F
43	Kanto	8C
44	SW Africa	9C
45	Natal	10C
46	Shikoku	4C

| ▢ = keys to press |

3.2.5 Loran C

| MENU | | 2+5 | *Load Loran C chain display*

```
┌────────────────────────────────────────┐
│ 55°54.219N            12.4kn            │
│ 15°06.424E             121°            │
│                                         │
│ Loran C chain:        9940             │
│ Name:    West Coast US                 │
│          W  11210.59                   │
│          X  28943.89                   │
│          Y  28943.89                   │
└────────────────────────────────────────┘
```

| ENT | | +/- | *Open for entry, and leaf through chain numbers*
- to clear chain number, select **** located between 4990 and 8000.

| ENT | *Confirm entry*

List of Loran C chains:

Central Pacific	4990	Commando Lion	5970
Gulf of Alaska	7960	North West Pacific	9970
Southeast U.S.	7980	Norwegian Sea	7970
Great Lakes	8970	Mediterranean Sea	7990
Northeast U.S.	9960	Icelandic	9980
Canadian West Coast	5990	Saudi Arabia South	7170
Canadian East Coast	5930	Saudi Arabia North	8990
Labrador Sea	7930	Eastern U.S.S.R.	7950
West Coast U.S.	9940	Western U.S.S.R.	8000
North Pacific	9990		****

| = keys to press |

3.2.6 Position setup

| MENU | | 2+7 | *Load display for 'Satellite overview' and 'Position setup'*

Satellite overview:
>++-++++-+---+-+++++++++++++++++-+-<
```
  2P    5P    7P    8P   11P   12P   18P   22P
10dB  13dB  12dB  9dB  11dB  8dB  13dB  11dB
     HDOP  1.4                DOP limit  8
```

Position setup:
```
  Manual antenna altitude:              5m
  Altitude mode:                    MANUAL
  Display depth in POS display:         NO
  DGPS input format:             RTCM 1.04
  DGPS: data     0,    max     2,    test11860
  Speed filter level:                    3
```

The display will show the status of all the satellites in the GPS system, starting from left to right with the numbers 1 to 32, or the legend: No almanac.

Satellite overview:
+ indicates the satellite is healthy
- excluded or non-existing satellite
0 satellite data is faulty
* satellite is manually excluded

You may want to exclude a satellite manually in case a particular satellite is disturbing the navigation.

| ENT | *Open for change*

 Move cursor left/right to locate satellite to be excluded

| - | | + | *The minus key will exclude the satellite / and the plus key will reinstate it*

| ENT | *Confirm entry*

HDOP, PDOP and DOP limits:

| MENU | | 2+7 | *Load status display*

The value of HDOP (horizontal dilution of precision) expresses "the quality" of the satellite geometry in relation to 2D positioning and a fixed antenna altitude.

HDOP: Low
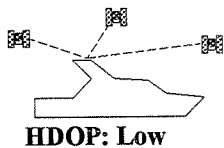
PDOP (position dilution of precision) is equivalent to 3D positioning. The values will typically stay between 1.3 and 8. The lower the value the higher the "quality". A poor geometry might produce a value of more than 20.

HDOP: High

If the preset DOP limit is exceeded (indicated by * in the position display) it will cause the position updating to stop until it once again is within the limit.

The DOP limit can be changed manually, but should not be set to higher than 8 (factory set-up), as this may result in poor accuracy - false position.

| ENT | *Open for change*

| 0-9 | *Go to DOP limit (6-99), and insert new limit*

| ENT | *Confirm entry*

Reception status:

Satellite number

26 P ——— Status: S: Search of satellites

14 dB   C: Code lock

                           F: Frequency lock

                           P: Phase lock

Signal to noise in dB. Typically 18 - 31 dB
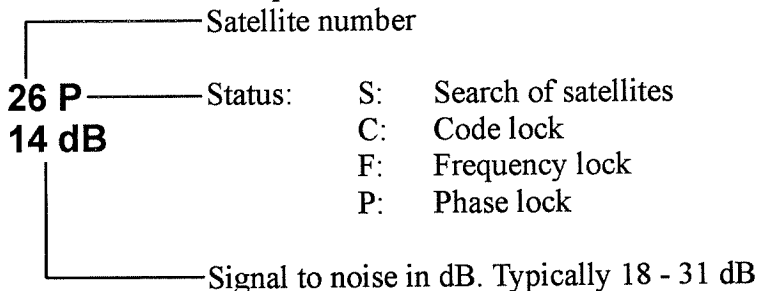
Position setup:

| MENU | | 2+7 | *Load 'Position setup' display*

Manual antenna altitude is preset to 5m. Insert actual antenna height to achieve uptimum position accuracy.

Altitude mode can be set to automatic for cars, trucks and aircraft, but should stay on manual for ships.

Display depth: YES Depth will be shown when NMEA depth data is received from connected transducer. -See also section 7.1.1.

DGPS input format can be set to RTCM 1.04 (standard receivers, incl. RS5660/RS5665), or RS5460 - RTCM.

DGPS Data counts up slowly when correct DGPS data is received. A break in the data flow will reset the counter. Maximum number of received DGPS data (will be reset by power off/on).

Test counts up slowly when any data is received. (Will not be displayed after activating **ENT** *Open for change)*

Speed filter level There is a speed filter of 10 steps available (0= fast response, 9= stable speed).

| ENT | *Open for change*

⬤ *Go to the function you wish to alter*

| +/- | / | 0-9 | *Toggle the function / insert figures*

| ENT | *Confirm entry*

4.1 NAVIGATION MENU

| 4. |
| NAVIGATION |
| 1:Navigation display |
| 2:Navigation setup |
| 3:Waypoint |
| 4:Route |
| (5:Cursor) |
| (6:Track) |
| 3:ETA |
| (4:Waypoint advance) |
| 5:Turn NAV OFF |

The navigation program is featuring several methods of navigation. The easiest and most straightforward mode is to start with Chart/cursor navigation described just below. After getting more aquinted with the unit and having explored the setup functions, you can enjoy the more enhanced features, such as Route navigation or Track navigation.
Point 2:Navigation setup is preset from the factory to e.g. 'RHUMBLINE' navigation mode, 'MAGNETIC' course and bearing indication, all alarms are set to 'OFF' - all values are changeable by the user to suit individual needs - see section 6.1.1 Navigation setup.

☐ = keys to press
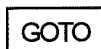
4.1.1 Chart/cursor navigation

To start the chart/cursor navigation will require that the cursor is already activated in the chart display. If you currently have a chart display on the screen, all you do to activate the cursor is pressing the cursor key. And if your current display is something different than the chart display:

| GOTO |

Press [GOTO] *to load the chart display, and press the cursor key to activate the cursor, then move the cursor to your destination*
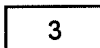
| GOTO | | ENT |

Select navigation mode: 1:Cursor

You will now have a course line from actual position (ship's position) to destination (cursor's position).

| GOTO | | 3 |

To stop navigating

☐ = keys to press

| MENU | | 4+1 |

4.1.2 Navigation display

Call up graphical steering display in active window (navigation must be active)

| C142m̂ | DT | S15.7 |
| B145m̂ | WP 1 | V15.7 |

X 0.32 | D 4.7

Status

8a

WP | TTG

(1) (2) (3) (4) (5)

S: Speed over ground
V: Speed towards waypoint - "velocity"
C: Course over ground
B: Bearing to approaching waypoint
X: XTE - Cross-track-error
D: Distance to waypoint
8a: Status indicator
Bottom line in display indicates WP no., route no., Time To Go for Waypoint navigation or Total Distance To Go for Route navigation and Bearing to Next WP.

1. Ship's position in relation to intended track. (Does not indicate heading).

2. Waypoint circle alarm -you will receive an alarm when touching the circle

3. Ideal course line between two waypoints starting from ship's position when NAV is activated.

4. Waypoint and waypoint line - you will receive an alarm when reaching the point/line.

5. XTE alarm lines - you will receive an alarm if you drift so far off the courseline and touch one of the boundary lines.

Adjust alarm limits in SETUP.

☐ = keys to press

4.1.3 Estimated time of arrival (ETA)

| MENU | | 4+3 | *Call the ETA display in active window*
(navigation must be active)

```
ETA: Estimated Time
      of Arrival
Arrival Time:
Date:

WP:  0
ETA Speed:        AUTO
ETA Speed:        * . *kh
```

ETA refers to the inserted local time, and can be calculated to any waypoint in the route, or waypoint used for navigation.
The present speed (automatic), or a manually inserted speed can be used for the calculation.

| ENT | *Open for change* - the final destination route point is automatically suggested.

| 0-9 | *If required - insert alternative (earlier) route point* (only in Route navigation)

⬤ *Go to ETA speed mode*

| +/- | *Select AUTO or MANUAL*

⬤ | 0-9 | *Go to and insert manual speed*

| ENT | *Confirm entry*

⬜ = keys to press
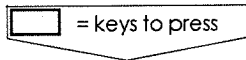
4.1.4 Create route by cursor

Waypoints entered by cursor plottings are stored in the WP list starting from the highest vacant WP number.

● | PLOT | *Locate the position of the first waypoint by means of the cursor key, and press* [PLOT)

| 4 | *Select '4.Make route' from 'Select PLOT mode' window*

● | PLOT | *Move cursor to next position, and press* [PLOT], *etc.*

CRS 56°50.425N 10°32.374E B124° 10.5nm
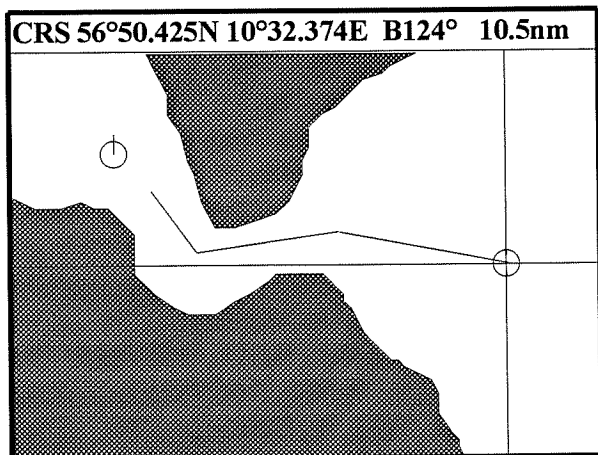
The example shows that route point no. 4 is about to be made.

The top line will show cursor's position in lat/long (or decca lanes/Loran TDs) plus bearing and distance from position (or last plot) to cursor.

If you plot a wrong position by mistake:

| CLR | *Delete the last plotted position*

| ENT | *Press* [ENT] *when ready to save the Route*

Save route as
route number: 0̲2.00

Name:

Route 2.00: Vacant

The first vacant route number is suggested.

You can give the route a name (section 4.2.1).

| 0-9 | / | +/- | *Alternative route number can be selected* |

| ENT | *Save the route in the memory* |
(See 4.1.7 Route navigation)

☐ = keys to press

4.1.5 Waypoint navigation

| GOTO | *Press [GOTO] to load Chart display + press [GOTO] to call up 'Select NAV mode'* |

| ⬤ | ENT | *Highlight 'Waypoint' (with cursor) and press [ENT]* |

| 0-9 | / | +/- | *Key in destination WP number (3 digits)/scroll through list to select WP number, or...* |

| ⬤ | A-Z | *...move cursor to name field to key in the name of the WP instead of the number* |

| ENT | *Start navigating* |

Refer to section 4.1.2 Navigation display and
4.1.3 Estimated time of arrival.

| GOTO | 3 | *To stop navigating from chart display, or...* |
-press [MENU], [4], [4] to turn NAV off via the menu.

4.1.6 Make a route by using the WPlist

The system can hold up to 30 routes numbered from 1
to 30, and one route can hold up to 99 waypoints. Each
route can be given a name of max 27 characters for
easy identification. Each leg in a route can have an indi-
vidual XTE alarm distance corridor.

| = keys to press | General rules for waypoints applied in routes:

- Waypoints inserted in a route will, besides its WP number, also be given a route point number.

- Waypoints used in routes can be edited when they are not included for navigation. Existing waypoints can be deleted from the route, and new ones can be inserted.

- A waypoint can not be deleted from the waypoint list as long as it is part of a route or used for navigation.

| MENU | | 3+4 | *Load Route display*

Route 01.01:
Course line: ▨▨▨ OFF   XTE: ▨▨▨ OFF

○ ***N ***○** ***E

○ ***N ***○** ***E

→   **○** ***N ***○** ***E

○ ***N ***○** ***E

○ ***N ***○** ***E

Route 01.01: Indicates Route no. 01, and Route Point no. 01, which is the first point in the route. The course line and the XTE corridor can be set ON/OFF, and the colour can be changed.

| 0-9 | / | +/- | *Enter vacant route number in 2 digits / leaf through the routes in the memory*

| ENT | *Open for data entry*

Set up route: 2.01

Name:
Course line: ▓▓▓ OFF   XTE: ▓▓▓ OFF

	°.***N ***°**.***E
→	**°**.***N ***°**.***E
	°.***N ***°**.***E
	°.***N ***°**.***E

New WP.   XTE: 0.50nm   Nav.:   RHUMBLINE
▣92   x 57°03.000N   9°50.000E

Insert:	PLOT	Replace:	GOTO
Delete:	CLR.	Delete route:	WIN
Accept:	ENT.	Exit:	MENU

-the active WP (last entered) in the WP list is automatically suggested, if acceptable press [PLOT] or..

0-9	/	+/-	*key in the first waypoint (3 digits) / scroll through the WP list to select the point*

⬤ | 0-9 | *If required - go to, and set XTE limit for each leg*
The preset XTE alarm limit can be changed in [MENU], [4]+[2].

⬤ | +/- | *If required - go to, and set navigation mode*
- toggle between Rhumbline and Great circle, each leg can be set individually for composite route navigation. (See 6.1.1 Navigation setup).

| PLOT | *Insert waypoint in route* |

| 0-9 | / | +/- | *Key in/locate next waypoint number from the list* |

| PLOT | *Insert next waypoint, etc.* |
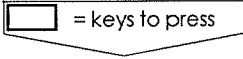
⬤ | +/- | *If desired , use cursor to go to, and select new colour for course line or XTE, and toggle the functions ON/OFF*

⬤ | A-Z | *Go to name field, and insert name of max.27 characters*
- refer to section 4.2.1. The name field will automatic-

ally contain the names (if any) of the first and last way-point in the route.

| ENT | *Confirm and save route* (See 4.1.7 Route navigation)

| | = keys to press

4.1.7 Route navigation

| GOTO | | 3 | *Select Route navigation from chart display, or...*
Press [MENU], [4], and select Route from menu

Route no.   *Point no.*

```
┌─────────────────────────────────────────────────┐
│ Route number:              [0]1.01               │
│ Name:                                            │
│─────────────────────────────────────────────────│
│ Direction in the route:              FORWARD     │
│ Navigation from your position:           YES     │
│ Show XTE limit:                           ON     │
│                                                  │
│                     56°52.786N   9°50.318E       │
│ POS                 **°**.***N ***°**.***E       │
│ 945            x    56°43.100N   6°36.985E       │
│ 944  ROUTE   1.03x  56°23.602N   6°16.984E       │
│ 943  ROUTE   1.04x  56°06.404N   5°39.207E       │
│─────────────────────────────────────────────────│
│ Start navigation: ENT              Exit: MENU    │
└─────────────────────────────────────────────────┘
```

| 0-9 | / | +/- | *Key in the Route number (2 digits)/or select from list*

| 0-9 | / | +/- | *Choose first WP (route point) to go to*
-cursor must be located under Point no.

⬤ | +/- | *Go to, and choose route direction, and maybe change start point, etc.*

| ENT | *Start navigating*

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You will now have the graphical steering display to navigate by, see section 4.1.2 for interpretation.
For ETA-Estimated Time of Arrival, see section 4.1.3.

| GOTO | | 3/4 | *To stop navigating from chart display, or...*

-press [MENU], [4], [4/5], to stop navigating from menu
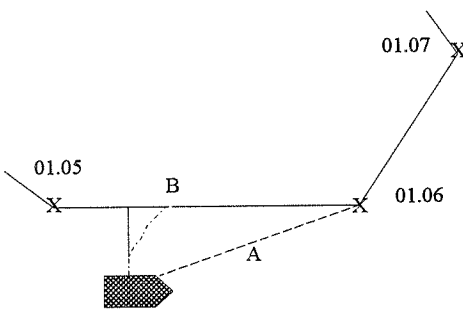
This example shows the vessel in relation to the route points 01.05, 01.06, 01.07. If you can go in a straight course line (A) to point 01.06, you select route no. 01 and route point no. 06, direction is 'forward', and you say 'YES' to navigate from POS (current position).

If you need to go back to the original course line (B), you will also select route no. 01 and route point no. 06, direction is 'forward', but you say 'NO' to navigate from POS (toggle with +/-), and confirm by pressing the [ENT] key.

| ☐ | = keys to press

4.1.8 Editing of route

After having set up and saved a route it is still possible to add / insert new waypoints, and to modify / delete existing ones. It is also possible to delete a total route. There are two ways of performing the editing, either by means of the cursor or through the route menu.

1. Edit route by means of the cursor

| GOTO | *Activate chart display + cursor*

| ENT |

Place cursor on the route leg or waypoint you wish to edit, and open for editing

WP966 found.
Move: cursor
+ GOTO
Edit: GOTO
Delete from
route: CLR
Exit: MENU

With cursor placed on a waypoint, the INFO window (called forward by [ENT] + [GOTO]) will inform of which options are available for editing of the waypoint. Changing the position of a waypoint will also update the WPlist with the new position. Deleting a waypoint from a route will not delete the waypoint from the WP-list.

Route   5.04
Insert WP:
cursor + PLOT
Delete route:
CLR
Exit: MENU

With cursor placed on a leg of a route, the INFO window (called forward by [ENT] + [GOTO]) will inform of which options are available for editing of the route. You can insert a new waypoint between two existing waypoints by moving the cursor to the desired location (rubberbanding), and then press [PLOT] + [ENT] to insert it in the route.

You can delete a total route with its waypoints, if they are not used in other routes, or you can delete just the route lines and keep all the waypoints in the WPlist, and their symbols will stay on the screen.

Cursor is not
placed on WP
or route.
Move cursor
and try
again.

In case this INFO window appears on the screen, it's because the cursor is not placed on the exact right spot. Move the cursor slightly, and try pressing [ENT] again. If you want to place it on a waypoint symbol which is part of a route, make sure the cursor does not touch any of the route lines, as it otherwise will be the INFO window for the route and not the waypoint which is called forward.

2. Edit route thru route menu

Edit route:	2.01

Name:

Course line: ▓▓▓ OFF   XTE: ▓▓▓ OFF

	°.***N ***°**.***E
→997	57°46.201N 9°26.643E
998	57°28.732N 9°02.995E
999	57°15.259N 8°10.460E

New WP.   XTE: 0.50nm   Nav.:   RHUMBLINE

⊠92	x 57°03.000N 9°50.000E

Insert:	PLOT	Replace:	GOTO
Delete:	CLR.	Delete route:	WIN
Accept:	ENT.	Exit:	MENU

This is an example of what the Edit route display could look like, and what type of editing is available. Refer to details below and in the next couple of sections.

How to extend a route by adding a waypoint:

MENU   3+4   *Load the Route display*

0-9 / +/-   *Key in the Route number/or select from list*

9+9   *With cursor under Point no., press 2 x 9 to go to the current final WP of route - if the total of route points are more than 9, if not, then you will only have to press 9 once.*

ENT   *Open for editing, - the last used WP from the WP list is suggested (New WP), if acceptable press* [ENT]*, or..*

0-9 / +/-   *key in the WP no. (3 digits) / or scroll through list*

PLOT   *Add the waypoint to the route*

ENT   *Confirm entry*

How to change XTE limit or replace a waypoint in existing route:

| MENU | | 3+4 | *Load the Route display* |

| 0-9 | / | +/- | *Key in the Route number/or select from list* |

| 0-9 | / | +/- | *With cursor under Point no., key in the Point no. to be replaced/or scroll through list*
The selected WP no. will now appear next to the pointer. |

| ENT | *Open for editing* |

| 0-9 | / | +/- | *Key in the New WP no. (3 digits)/or scroll through list* |

| ● | | 0-9 | *Go to, and key in new XTE value* |

| GOTO | *Replace "old" WP with New WP (or new XTE value)* |

| ENT | *Confirm editing* |

How to insert a waypoint in existing route:

| MENU | | 3+4 | *Load the Route display* |

| 0-9 | / | +/- | *Key in the Route number/or select from list* |

| 0-9 | / | +/- | *With cursor under Point no., key in the Point no. where you want a new WP to follow / or select the Point no. by scrolling through list* |

| ENT | *Open for editing* |

| 0-9 | / | +/- | *Key in the New WP number (3 digits) / or scroll through list* |

| PLOT | | ENT | *Insert the New WP, and confirm editing* |

How to delete a waypoint in existing route:

| MENU | | 3+4 | *Load Route display* |

| 0-9 | / | +/- | *Key in the Route number / or select from list* |

| 0-9 | / | +/- | *With cursor under Point no., key in the Point no. you want to delete from the route / or select the Point no. by scrolling through list* |

| ENT | | CLR | *Open for editing, and delete the WP from the route* |

| ENT | / | MENU | *Confirm editing / or exit Editing mode without taking any action* |

How to delete a total route:

| MENU | | 3+4 | *Load Route display* |

| 0-9 | / | +/- | *Select route number to be deleted* |

| | | ENT | *Open for change* |

| | | WN | *Call up new display with choice of what to delete* |

DELETE TOTAL ROUTE!
Delete route + WPs not used in other routes?

ROUTE ONLY: ENT
ROUTE+WPs: CLR
EXIT: MENU

To delete the route lines only, press [ENT].

To delete the route lines + the waypoints in the route which are not used in other routes, press [CLR].

If you changed your mind, press [MENU] to exit the Editing mode without deleting anything.

☐ = keys to press

4.1.9 Track navigation

To start the track navigation will require that the chart display is active, and the tracking function for the track in question is set to OFF. With cursor OFF, the system will search for nearest trackpoint to the ship.

| GOTO | *Activate chart display*

With track information shown on chart (see section 3.1.4) check the number on the track so you can set Tracking to OFF (see section 4.2.5) for that particular track before you can start navigating.

●*Place the cursor in the vicinity of the trackpoint you wish to go to*

| GOTO | | 4 | *Select Track navigation from chart display, or...*

-press [MENU], [4], [6], and select Track from menu

```
Track:                    4 . 126

  Name:
  Position:        56°52.819N   9°50.255E

  Bearing to trackpoint:              143m
  Distance to trackpoint:           0.23 nm

  Direction in track:             FORWARD
  Auto trackpoint shift:               ON

  Start navigation: ENT          Exit: MENU
```

Number **4.126** indicates that the track's number is **4** and the nearest track-point to the cursor/ship is number **126**.

Auto trackpoint shift set to ON will, when reaching the approaching track-point, automatically pro-vide navigational data to the next point in the track.

Auto trackpoint shift can be set to OFF if you wish to receive an alarm when reaching the approaching track-point and then manually accept the next trackpoint be-fore receiving the new steering data.

⬤ | +/- | *If required, go to, and select a different trackpoint as the approaching point*

⬤ | +/- | *Go to, and choose sailing direction in track*

| ENT | *Start navigating*

Refer to section 4.1.2 Navigation display and 4.1.3 Estimated time of arrival.

| GOTO | | 3 | *To stop navigating from chart display, or...*
-press [MENU], [4], [5], to stop navigating from menu

4.2 MARK MENU

3:
MARK
1:Mark, WP list
2:WP used in routes
3:Delete group of WPs
4:Route
5:Trackplot
6:Line
7:Target

The waypoint/mark program is featuring 999 points, 17 different symbols, and location names. The waypoints can be organized into 30 routes or sailplans of max. 99 waypoints in one route. Waypoints can be entered as cursor plots directly on the chart, or as coordinates via the keypad. Waypoints can also be transferred from a digi-tizer (Yeoman).

| | = keys to press

4.2.1 Plot mark or waypoint by cursor

A position located by the cursor can be plotted and stored in the WP list. If Chart display is not in current display, press [GOTO]

| + ZOOM IN | ⬤ *Zoom in, and move cursor to position on chart*

| PLOT | | 1-6 | *Activate 'Select PLOT mode', + one of the options,*
-see next page, where point 2 is selected as an example.

Plot POS from Chart

WP⟨9⟩99   56°52.929N

Empty   010°03.184E

Symbol : x WAYPOINT

Name   : PLOT 1

Colour :   ▓▓▓▓▓

Accept: ENT   Exit: MENU

The first vacant waypoint starting from WP 999 is suggested. Waypoints and other points appearing on the screen can be marked by one of 17 symbols. The plotted waypoints are given a preset name starting from PLOT 1 with a consecutive numbering for easy recognition in the WPlist.

| ENT | *Accept suggested waypoint or..* |

| 0-9 | / | +/- | *Enter/locate alternative WP no.* |

| ⬤ | +/- | *Go to, and change symbol* -see below |

| ⬤ | A-Z | *Go to, and insert name of max. 12 characters, if preset name is not acceptable*, -see 'Alphanumeric naming of points' on next page. |

| ⬤ | +/- | *Go to, and change colour* |

| ENT | *Confirm entry* |

Choice of 17 symbols:

✕ Waypoint	⊥ Beacon	⊙ Marker	▲ Starboard
1 Red buoy	◀H Fish	⬆ North	■ Port
Γ Green buoy	▣ Platform	⬇ South	
⤙ Wreck	✳ Rock awash	⬍ East	
+ Danger	⚓ Harbour	I West	

Alphanumeric naming of points:

First select the key with the desired letter, then you can either repeat the keystrokes, which will toggle between eg. A,B,C, 1, or once you have selected one letter you can go back and forth in the alphabet by means of the +/- keys. Use the cursor key to go to next space or to go back one space if you make a mistake.

Depending on the selected language the **0** (zero) key will hold special characters eg.: Æ Ø Å Ä Ö Ü Ñ, and the 9 key will hold: (empty space) **. - :**

Press the [CLR] key to delete a character/word.

A waypoint can be located in the WP list by its number or name:

| MENU | | 3+1 | *Load Waypoint list* |

Place cursor in the number field
-the WP list will appear in numerical order.

| 0-9 | *Insert number of waypoint you wish to call* |

Place cursor in the name field
-the WP list will appear in alphabetical order.

| A-Z | *Insert name of waypoint you wish to call* |

☐ = keys to press

4.2.2 Plot mark or waypoint as ship's position

There are two ways of entering the present position (ship's position) as a waypoint:
1. Plot position in WPplot list - the quick way.
2. Plot position as specific WP number.

Plot position to WPplot list

With the chart display present on the screen [GOTO]

and with the cursor off [CLR], you can quickly make a mark of the ship's position:

| PLOT | | 2 | *Plot actual position on chart, inclusive name*

Plot POS:

WP⑨99   57°52.929N

Empty   010°03.184E

As default from the factory: The first WPplot is stored in WP 999 with the name PLOT 1, the next in 998 with PLOT 2, the next again in 997 with PLOT 3, and so on.

| ENT | *Confirm entry*

Plot position as specific WP number:

| PLOT | | 2 | *Plot actual position on chart*

| 0-9 | / | +/- | *Insert/locate desired number,*
-WP number must be empty

| ENT | *Complete WPplot*
-or, before you press [ENT] you may want to change the name, symbol or colour as described in section 4.2.1.

☞ A WPplot can be changed/adjusted or used in routes the same way as an "ordinary" waypoint.

☐ = keys to press

4.2.3 Insert mark or waypoint via keypad

| MENU | | 3+1 | *Load Waypoint list*

Waypoint number: <u>996</u> Name:		Example:
988	**○** ***N ***○** ***E	The display will show
988	**○** ***N ***○** ***E	part of the WP list in
988	**○** ***N ***○** ***E	numerical order, and the
988	**○** ***N ***○** ***E	actual waypoint will be
988	**○** ***N ***○** ***E	placed in the center next
→996	56°41.864N 9°32.678E	to the pointer.
997	57°46.201N 9°26.643E	The WP list can also be
998	57°28.732N 9°02.995E	shown in alphabetical or-
999	57°15.259N 8°10.460E	der, refer to section 4.2.1.
		The bottom line will indi-
Vacant WPs: 993		cate the number of vacant
		waypoints left in the list.

To insert a new waypoint in the WP list:

| 0-9 | *Key in the waypoint no. eg. 035 or..*

| +/- | *scroll thru the list to place the desired WP no. next to the pointer or..*

| CLR | *go to the first vacant WP no. in the list*

| ENT | *Open for entry*

Set up waypoint:

WP 003:   5̲7°03.001N

009°50.000E

When selecting a vacant WP number, the system will suggest to use the present position as waypoint. This position can be acknowledged by [ENT] or you can enter a new position, and also change symbol, add name + change colour.

	0-9	*Insert latitude (overrides existing figures)*
● /	+/-	*Pass, or toggle N/S*
	0-9	*Insert longitude*
● /	+/-	*Pass, or toggle E/W*
	+/-	*Choose between 17 symbols* -refer to section 4.2.1.
●	A-Z	*Go to, and insert WP name of max. 12 characters* -refer to section 4.2.1.
●	+/-	*Go to, and select colour*
	ENT	*Complete WP entry*

☐ = keys to press

4.2.4 Delete mark or waypoint

Waypoints used in one or more routes, or used for navigation, can not be deleted from the WP list before deleted from the route - see section 4.1.8.

Delete marks or waypoints by means of cursor:

GOTO	*Activate chart display*
●	*Activate cursor, and locate waypoint*

ENT	GOTO	*Open for editing*
CLR	CLR	*Delete waypoint*

Delete waypoints thru the waypoint list:

| MENU | | 3+1 | *Load Waypoint list* |

| 0-9 | / | +/- | *Insert WP no. (3 digits) or place the WP no. next to the pointer by means of the +/- keys* |

| ENT | | CLR | *Open for editing, and delete waypoint* -latitude and longitude will be replaced by * |

| ENT | / | MENU | *Confirm edit / or exit function without deleting the waypoint* |

Delete a group of waypoints:

| MENU | | 3+3 | *Load 'Delete group of WPs' display* |

| ENT | | 0-9 | *Open for editing, and key in the number of the first and last WP in the group* |

| ENT | / | MENU | *Confirm edit / or exit function without deleting the waypoints* |

Overview of which routes a specific waypoint is part of:

| MENU | | 3+2 | *Load 'WP used in routes'* |

| 0-9 | / | +/- | *Select the waypoint you wish to check* |

Waypoint number: 992 Name:	The numbers in the "star
x 57°03.000N 9°50.000E	field" indicate in which
WP 992 is used in the following routes:	routes the selected way-
	point is used. To delete a
* 2 * * * *	waypoint from the WP list
	it will first have to be de-
* * 9 * * *	leted from the routes, see
	section 4.1.8.

☐ = keys to press

4.2.5 Trackplotting

The CE30 can hold up to 9 tracks (numbered 1 to 9) with up to 256 points in each.

Start and stop track function

| MENU | | 3+5 | *Load Track setup*

```
Track  setup:                01

Name:

Tracking:                   OFF

Display track:              OFF

Interval:               0.10 nm

Trackpoints:                  0

Colour:                 ▓▓▓▓▓▓

Wake line:                  OFF
```

Plot intervals can be set from 0.01 to 9.99nm.

Select colour to specify the tracks. The tracks will remain in the memory, also when Display track is OFF.

| 1-9 | *Key in Track number from 1 to 9*

| ENT | *Open for change*

| A-Z | *Insert track name of max. 27 characters*
-refer to section 4.2.1 Alphanumeric naming of points

| +/- | *Go to, and set Tracking to ON / OFF'*

| +/- | *Go to, and change Interval and Colour, etc.*

| ENT | *Start / stop Track function*

With **Wake line OFF** - means that once the total of 256 plots have been used up, an alarm will sound and the tracking will stop.

With **Wake line ON** - means that the track will continue to trail the ship, and once the total of 256 plots have been used up, then the first trackpoints at the tip of the tail will start to 'fall off' in the extend the capacity is needed to keep trailing the ship.

Editing of track

After a track is made you can give it a name, change its name, select a different colour for the track, or you can cancel the track by resetting it.

| MENU | | 3+5 | *Load Track setup* |

| 0-9 | | ENT | *Key in the desired track number, and open for change* |

| | A-Z | *Name or rename the track (max. 27 characters)* -refer to section 4.2.1. |

| ⬤ | +/- | *Go to Reset track, and toggle to YES to cancel track* |

| ⬤ | +/- | *Go to Colour, and select new colour* |

| | ENT | *Confirm editing* |

53

☐ = keys to press

4.2.6 Lines (drawing)

To define a certain area on the chart, this be a fishing ground, a shipwreck, large rocks, restricted areas, etc., or to define a channel to sail in through narrow passages, make your own coast line or for whatever reason you could use a drawing on the chart.

| GOTO | *Load chart display* |

● *Activate cursor + locate the place on the chart where you wish to start the drawing*

| PLOT | | 5 | *Plot the first point of the drawing* |

● *Move cursor to next point to draw a line section from point 1 to point 2*

| PLOT | *Plot the second point of the drawing, etc.* |

Continue to draw line sections in this manner until the line drawing is complete. If you plot a wrong point by mistake:

| CLR | *Delete the last plotted point* |

| ENT | *Press* [ENT] *when ready to save the line drawing* |

| A-Z | *The drawing can be given a name of 27 characters* |

● | +/- | *Go to, and select line colour* |

| ENT | *Confirm the entry* |
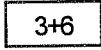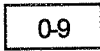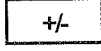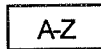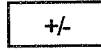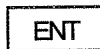
Editing of lines (drawing)
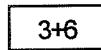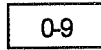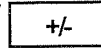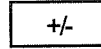
After having made a drawing and saved it in the memory, you can still make a few corrections, or delete the whole drawing.

Change name or colour:

| MENU | | 3+6 | *Load Edit line display*

| 0-9 | / | +/- | *Key in Line number / or select from list*

| ENT | *Open for change*

| A-Z | *A new name of can be given to the drawing*

⬤ | +/- | *Go to, and change the colour if required*

| ENT | / | MENU | *Confirm editing / or EXIT the editing menu without making any changes.*

Make lines invisible:

When you are not using a line, it can be temporarily removed from the chart without having to erase it completely. Use same key sequence for having it shown on the chart again.

| MENU | | 3+6 | *Load Edit line display*

| 0-9 | / | +/- | *Key in Line number / or select from list*

| ENT | *Open for change*

⬤ | +/- | *Go to, and toggle line color ON/OFF* (OFF is invisible)

| ENT | *Confirm entry*

Delete a whole line:

| MENU | 3+6 | *Load Edit line display* |

| 0-9 | / | +/- | *Key in Line number / or select from list* |

| ENT | *Open for change* |

| CLR | *Delete line (drawing)* |

| ☐ | = keys to press |

4.2.7 Targets

The CE30 can display the bearing and distance of up to three targets in relation to the vessel e.g. harbours or important navigational points. A target is a fixed point on the chart which can be plotted by the cursor or from the ship's position, or keyed in via the keypad.

Set up targets

The plotted target position is automatically preset to actual position of ship, or to cursor position when the chart display is active and the cursor is on:

| PLOT | *Call up 'Select PLOT mode'* |

| ENT | *Select 'Plot target' or key in the point number* |

| +/- | *Select target 1, 2 or 3* |

| 0-9 | *The suggested ship or cursor position can be altered by keying in a new lat/long position* |

| A-Z | *Go to, and insert name of 12 characters if required* |

| +/- | *Go to, and change colour if required* |

| ENT | *Confirm target entry* |

Target display

The target display can show bearing and distance to three plotted positions, including position and name.

| MENU | | 3+7 | *Load 'Target' display from menu*

| GOTO | *Shortcut to chart display*

The targets are indicated by a coloured circle and the target number e.g. T1. Refer to section 3.1.4 Chart setup 2.

Edit targets

| MENU | | 3+7 | *Load 'Target' display*

| ENT | *Open for edit*

| A-Z | *Insert or change name if required*

● | +/- | *Go to, and change colour if required*

| ENT | *Confirm entry*

Switch targets ON/OFF

| MENU | | 3+7 | *Load 'Target' display*

● | +/- | *Go to, and set target ON/OFF*

| ENT | *Confirm entry*

☞ You can exit a menu without making any changes by pressing [MENU] instead of [ENT].

5.1 Echo sounder operation

The echo sounder function of the CE30 determines the distance between its transducer and underwater objects such as fish, lake bottom or seabed. It does this by utilizing the fact that an ultrasonic wave transmitted through water travels at a nearly constant speed of 4800 feet (1500 meters) per second. When a sound wave strikes an underwater object such as fish or sea bottom, part of the sound wave is reflected back toward the source. Thus by calculating the time difference between the transmission of a sound wave and the reception of the reflected sound wave, the depth to the object can be determined.

The entire process begins in the display unit. Transmitter power is sent to the transducer as a short pulse of electrical energy. The electrical signal produced by the transmitter is converted into an ultrasonic signal by the transducer and transmitted into the water. Any reflected signals from intervening objects (such as a fish school) are received by the transducer and converted back into an electrical signal. It is then amplified in the amplifier section, and finally, displayed on the screen.

The picture displayed is made up of a series of vertical scan lines (pings), one for each transmission. Each line represents a 'snapshot' of what has occured beneath the boat. The series of snapshots are accumulated side by side across the screen, and the resulting contours of the bottom and fish between the bottom and surface are displayed.

Selecting echo sounder displays

The CE30 provides four types of echo sounder displays: standard, bottom zoom, marker zoom and A-scope. Each display has its advantages and disadvantages. Select the appropriate setup for the echo sounder display in the 'Presentation setup' and 'Echo sounder setup' displays, considering current sea area and target fish.

☞ To view the echo display while plotting ship's route, select the Chartplotter/Echo sounder combination display with the key combination: [MENU], [1] and [1].

5.2 Echo sounder menu

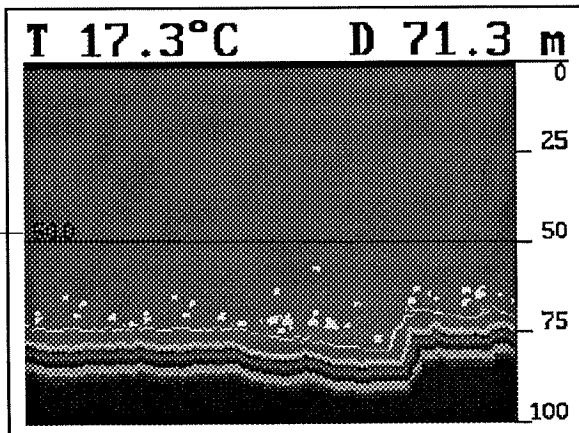| 5. ECHO |
|---|
| 1:Echo sounder display |
| 2:Bottom expansion |
| 3:VRM expansion |
| 4:Turn A-scope ON/OFF |
| 5:Turn VRM ON/OFF |
| 6:Presentation setup |
| 7:Echo sounder setup |

| = keys to press

5.2.1 Echo display

| MENU | | 5+1 | *Load 'Echo display'*

This is the basic presentation mode (standard display) for observing fish schools and seabed.
T= Temperature, D= Depth.

VRM

Depth range can be adjusted by the [+/-] keys. Press the cursor key (left/right) to adjust gain.

Press [ENT] to open 'Presentation setup' if any changes are required. Press [ENT] again to confirm changes and to return to the standard echo sounder display.

5.2.2 Bottom expansion

| MENU | 5+2 | *Select 'Bottom expansion'*

T 17.3°C   D 70.7 m
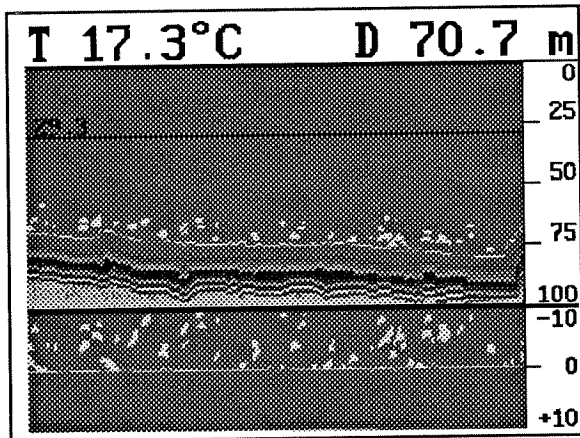
The bottom lock expansion feature ensures a reliable depth readout and provides a compressed standard display in the upper 2/3 of the screen.

Depth range at the right of the screen can be adjusted by means of the [+/-] keys. The cursor key (left/right) will adjust gain - the new value will briefly appear in the top line.

The **bottom expansion** function will allow you to take a closer look at a particular section of the water near the bottom underneath your boat, and could be thought of as a "zoom" function.

The expanded area will start approximately 0.5m under the detected bottom structure, and in steps from 3 to 50 metres, feet or fathoms.

| ENT | *Open 'Presentation setup' if any changes are required in the setup e.g. the 'Expansion window' - number of*

| ENT | *metres above the bottom, and confirm entry*

| MENU | 5+1 | *Return to standard display*

☐ = keys to press

5.2.3 VRM expansion

| MENU | | 5+3 | *Select VRM expansion*

```
T 17.3°C    D 71.0 m
```
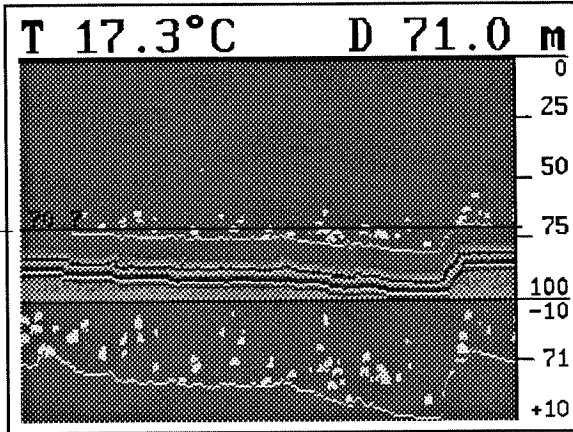

The **VRM expansion**
(VRM zoom) function
will provide an expanded
view of the area near the
Variable Range Marker
which will give a better
separation of echoes.
The zoom level can be se-
lected in seven steps rang-
ing from 3 to 50 metres,
feet or fathoms.

**The VRM can be moved up/down by means
of the cursor.**

| ENT | | ENT | *Open 'Presentation setup' if any changes are required,
and confirm entry*

| +/- | *Use the + or - keys as a shortcut to adjust range*

● *Use the cursor key (left/right) as a shortcut to adjust
gain*

| MENU | | 5+1 | *Return to standard display*

| | = keys to press |

5.2.4 A-scope

| MENU | 5+4 | *Turn A-scope ON*


```
T 17.3°C    D 71.3 m
                              0

                              25


                              50

                              75


                              100
```
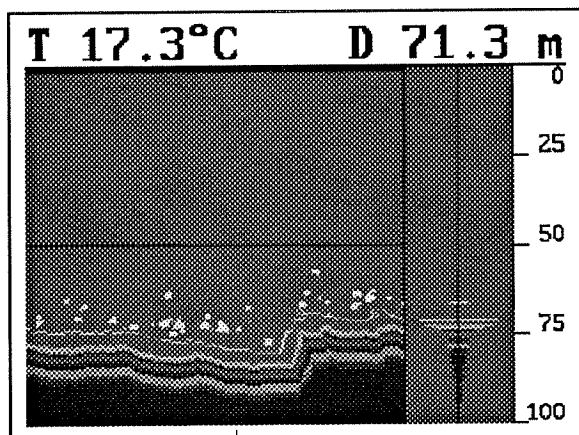
The echoes are displayed in a "bar-graph" format, with stronger echoes displayed not only in the color representing their target strength, but also in the width.
The readout indicates the precise amplitude or strength of each received echo, which often can be used for determining individual species of fish or hardness of the bottom.

Vertical EVENT marker - press [PLOT] and select 'Set vertical mark'.

| ENT | ENT | *Open 'Presentation setup' if any changes are required, and confirm entry*

| MENU | 5+4 | *Turn A-scope OFF again*

| | = keys to press |

5.2.5 Variable range marker

This function is not available if VRM expansion is ON.

| MENU | 5+5 | *Turn VRM ON*
The Variable Range Marker can be moved up/down by the cursor key, and the range can be adjusted by means of the [+/-] keys.

| MENU | 5+5 | *Turn VRM OFF again*

| MENU | | 5+6 | *Select 'Presentation setup, and...'* |

| ENT | *Open for change, or...* |

| ENT | *Just press [ENT] from any of the echo displays* |

Presentation setup:

Range start:	00 m
Range:	AUTO
Gain:	15.0dB
Scroll synchroniztion:	TIME
Scroll speed:	HIGH
White line:	OFF
Expansion window:	20 m
TVG:	Bottom (20 log R)
Water profile:	SALT
Ping to ping filter:	OFF
Signal threshold:	OFF
Colour threshold:	OFF
Depth grid:	OFF
Echo sounder frequency:	50kHz

Use the cursor to move around in the display and select new values by means of the [-/+] keys. Range start can be anywhere from 00 to 99 m. Range can be set to 5,10, 25,50,75,100,150,250,500, 750,1000 units, or AUTO for automatic selection of scale to actual depth. Gain can be set up to 99.9dB.

"Echo sounder frequency" indicates what type of transducer is connected to the CE30 - 50kHz or 200kHz.

Scroll synchronization can be set to TIME or DISTANCE.
Scroll speed: LOW, MEDIUM, HIGH, MAX., FREEZE.
Expansion window can be set to 3, 6,10,20,30,40,50 m.
TVG (Time Varying Gain) can be set to Bottom or Fish.
Water profile can either be SALT or FRESH.
White line, Ping to ping filter, Signal threshold and Depth grid can all be turned OFF or ON.
Colour threshold, set to ON to select a colour from which you want the below colours not to be shown in the echo display - see scale in echo display.

☞ Refer to chapter 9 for more details on special functions.

| ENT | / | MENU | *Confirm new setup with [ENT], or exit with [MENU]*

| = keys to press |

5.2.7 Echo sounder setup

| MENU | | 5+7 | *Select 'Echo sounder setup'*

| ENT | *Open for change*

Echo sounder setup:

Transducer depth below surface:			0.0 m
Keel depth below surface:			0.0 m
Display:		DEPTH BELOW KEEL	

Alarm for fish:	Strength:		30dB	OFF
Depth for fish:	min:	10 m	max: 100 m	
Depth alarm maximum:			100 m	OFF
Depth alarm minimum:			10 m	OFF

Transmitter:	ACTIVE
Transmit pulse length:	LONG
Demo mode:	OFF
External temperature sensor:	ON

Use the cursor to move around in the display and select new values by means of the [-/+] keys. Offset figures up to 99.9m can be inserted to make up transducer depth and keel depth below surface. The display can show: DEPTH BELOW SURFACE, DEPTH BELOW TRANS-DUCER, DEPTH BELOW KEEL.

The system will take a couple of minutes to recal-culate when switching the de-mo mode ON or OFF.

Alarm for fish: Set strength to anywhere from 00dB (weak echo) to 30dB (strong echo), and yout can set it ON or OFF.

Depth for fish can be set to min/max 0/9999 units.

Depth alarm can be set to min/max 0/9999 units.

The transmitter can be set PASSIVE to determine noise.

The transmit pulse length can be set SHORT, MEDIUM (only 200kHz), LONG or AUTO.

External temperature sensor can be set ON or OFF.

☞ See chapter 9 for more details on special functions.

| ENT | / | MENU | *Confirm entry with* [ENT], *or exit with* [MENU] *without making any changes*

5.3 How the echo sounder works

When the CE30 is turned on the processor begins to send electrical pulses to the transducer. The ceramic resonator in the transducer has a special property which enables it to change dimensions slightly when a varying voltage is applied. The voltage is thus converted to mechanical vibrations (sound waves) which are then transmitted down through the water. See Figure 1
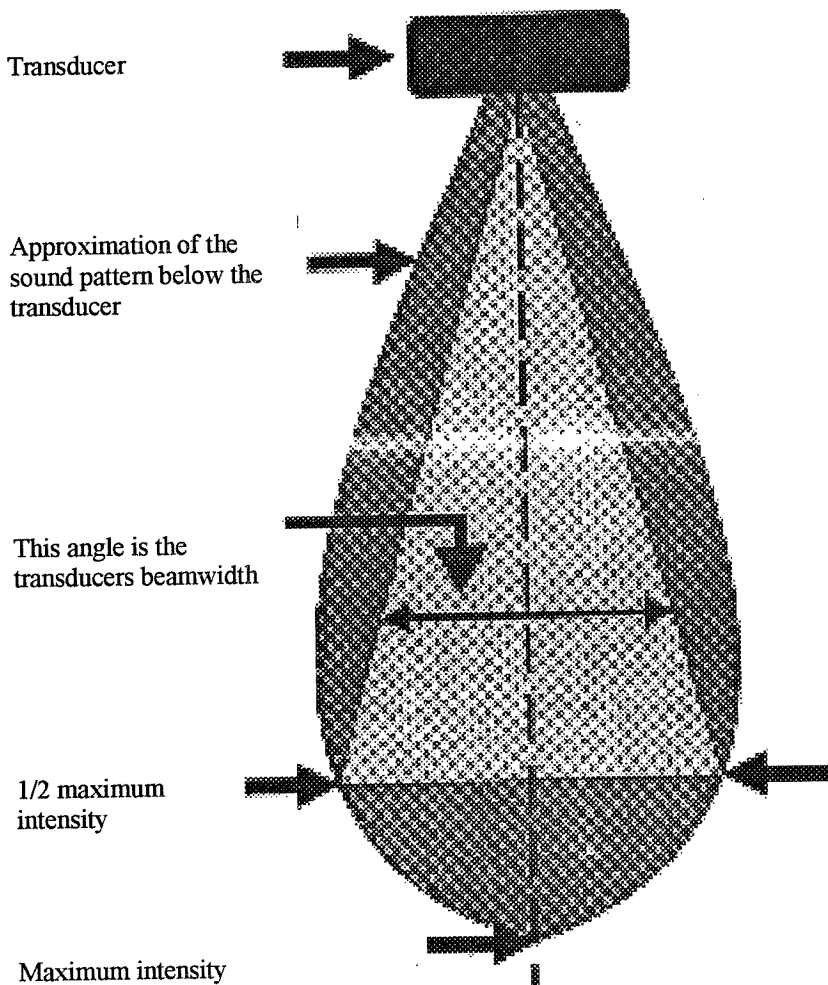
Figure 1 - Transmitted 'ping' from the receiver/transmitter.

The sound waves move through the water until they encounter a change in density, such as a fish or the bottom. This causes the sound waves to "echo" back up through the water. When the reflected sound waves (echoes) hit the transducer the ceramic disk vibrates at the same frequency. This generates a varying voltage between the disk surfaces. This voltage goes back up through the cable to the receiver. The CE30 processes the signals and presents them on the display screen. See Figure 2

Figure 2 - Echoes returning to the receiver.

5.3.1 Transducer beamwidth

The transducer mounted to the hull of your vessel serves as both a "speaker" when transmitting, and as a "microphone" when the echo sound is receiving. Similar to the way a flashlight focuses light, most of the sound from your transducer is focused downwards with a smaller amount going out to the sides. The amount of focusing of the sound beam is expressed as a "beamwidth".

Transducer

Approximation of the
sound pattern below the
transducer

This angle is the
transducers beamwidth

1/2 maximum
intensity

Maximum intensity

Figur 3 - A representation of a transducer beamwidth.

The center of the sound beam is the most intense, then as you move out towards the sides of the sound beam there is a point where the intensity of the sound is 1/2 what it was in the center. The distance moved is the "beamwidth". See Figure 3

The beamwidth is related to the actual frequency and transducer. The CE30 200kHz will have a 15° beamwidth and the 50kHz version will have a 45° beamwidth.

5.3.2 Effects of the vessel's speed

The display of fish on the CE30 depends directly on the vessel's speed, as well as on the depth of the fish. When the vessel is at rest, the echo traces will appear stretched and flattened. As the vessel's speed becomes greater, the echo traces will become shorter and more arched. The reason for this change in appearance is that as the vessel speed increases fewer number of sound "pings" strike each fish. A low vessel speed will provide the most accurate information of where fish are located.
See Figure 4

Faster boat speed   Slower boat speed
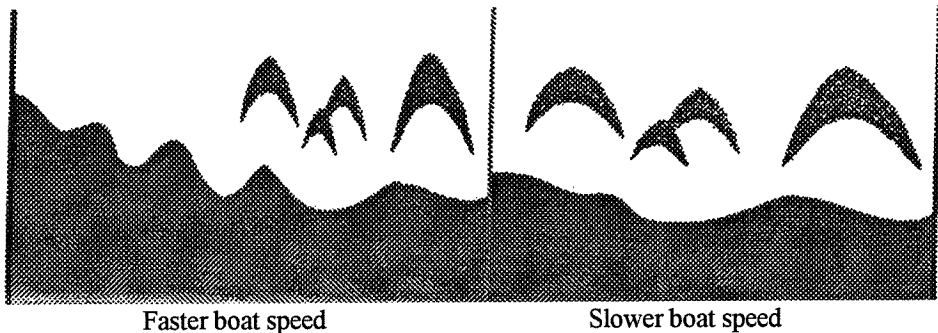
Figur 4 - A representation of the effects of vessel speed on the displayed echoes.

6.1 SETUP MENU

4: NAV
1:Navigation display
2:Navigation setup
3:Waypoint
4:Route
etc.

6: SETUP
1:Speed alarm, units and language
2:Interface setup NMEA
3:Interface setup remote
4:Interface setup alarm/log
5:Wind display
6:Display colour

| ☐ | = keys to press |
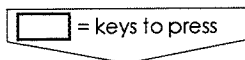
6.1.1 Navigation setup

| MENU | | 4+2 | *Load display for Navigation setup*

| Navigation setup:

Datum   0:
Datum name: World Geodetic System 1984
Delta position: 0°10.000N 0°00.000E
Course & bearing as: MAGNETIC
Navigation mode: RHUMBLINE
Auto waypoint shift: WP-line
WP circle alarm: OFF   0.50 nm
XTE alarm distance: OFF   0.50 nm
Anchor alarm: OFF   0.50 nm |

Refer to the next two pages for a description of the individual functions in the Navigation setup display.

| ENT | *Open for change*

● *Go to the function you wish to change*

| 0-9 | *Go to alarm distance, and insert value* |

| ENT | *Confirm data entry* |

Datum - is preset to WGS84 (World Geodetic System 1984), but can be changed to any of the 118 datums listed in Appendix A e.g. to match old paper charts or trackplotter data from RS2500/RS4000 (datum #002 European 1950).
The position in the position display and NMEA output will refer to the selected datum. To select a new datum: Press [ENT] from the "Navigation setup" display, leaf through the datum list with +/-, or key in the number, and confirm by [ENT].
☞ The datum in the chart display is fixed i.e. WGS84.

Delta position - some paper charts do not indicate a datum, but instead they have a notation to an offset or delta position to WGS84.

Course and bearing - readings of course and bearing can be made in either magnetic or true.

Navigation mode - rhumbline navigation is used for shorter distances, and great circle for long trips, especially when crossing high latitudes.

Auto waypoint shift - in Auto waypoint shift mode the navigator will automatically change to the next waypoint after passing a waypoint line border, or after passing a waypoint circle border i.e. if Auto waypoint shift mode is set to shift at the circle alarm border, then the alarm function at the waypoint's line and circle will be OFF.
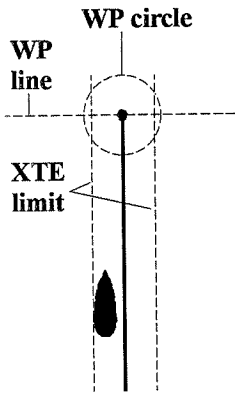
The **WP circle alarm** forms a circle around each way-point, and the alarm distance can be set to anywhere be-tween 0.01 to 9.99nm. The waypoint alarm will be acti-vated when you reach the circle or the perpendicular line - **WP line alarm** - crossing through the waypoint. The alarm will not be activated if 'Auto waypoint shift' is selected.

WP circle

WP line

XTE limit

The **XTE distance alarm** forms a corridor along the ideal track. When touching one of the boundaries the XTE alarm will be activated. The alarm distance can be set to anywhere between 0.01 to 9.99nm.
This value may be overwritten if the legs in a route have been specified with different values.

Anchor alarm When setting the anchor it is possible to set up an alarm at the same time, so you will be warned in case you drift too far from the anchored posi-tion. The alarm distance can be set to anywhere from 0.01 to 9.99nm:

| MENU | 4+2 | *Load display for Navigation setup* |

| ENT | *Open for data* |

| +/- | *Go to, and set the Anchor alarm to ON* |

| 0-9 | *Go to and insert alarm distance* |

| ENT | *Confirm entry* |

| MENU | 4+1 | *Call up the anchor guard display* |
-this display will provide an impression of the vessel's position in relation to the alarm circle.

An alarm will sound if the vessel should drift outside
the alarm circle. There are two ways of disactivating
the alarm:

| ENT | *Confirm alarm and deactivate function*

-the Anchor guard will automatically turn OFF
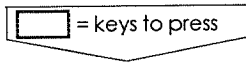
| CLR | *Confirm and reset alarm*

| MENU | | 4+3 | *Turn anchor guard OFF*

| [__] | = keys to press

6.1.2 Setup for display colours -only colour version

| MENU | | 6+6 | *Load Palette setup*

Palette setup: **1**

NAME: DAY PALETTE

Text:
Background:
Cursor:
Menu text:
Menu background:
Menu text highlight:
Menu highlight:
Menu frame:
Menu example: | ECHO   SETUP |
Echogram background:

In this display you can
customize the display
colours. You can define 9
different display settings
of colours for text, back-
ground, highlighted menu,
etc. **Display 1** is preset to
daylight, and **Display 2** is
preset to **nightlight**.

If you wish to make your own special setup in e.g. Dis-
play 3, then:

| 3 | | ENT | *Select Display 3, and open for change*
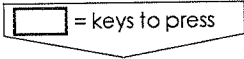
| A-Z | *Rename display - max. 31 characters,*
-see section 4.2.1 'Alphanumeric naming of points'
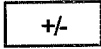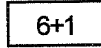
⬤ | +/- | *Go to, and change colour settings*

| ENT | *Confirm new setup*

| [____] | = keys to press |

6.1.3 Setup for speed alarm, units and language

| MENU | | 6+1 | *Load display*

Setup for speed:

LOG speed sensor:	OFF
LOG speed calibration:	19000 PULSES/nm
Speed alarm maximum (SOG):	0.0kn OFF
Speed alarm minimum (SOG):	0.0kn OFF

Setup for units:

Depth/altitude in:	METRES
Distance in:	NAUTICAL MILES
Speed in:	KNOTS
Temperature in:	DEGREE CELCIUS
Software version:	1.00
WIN change interval:	5 sec. MANUAL
Display text in:	ENGLISH GB

When 'Log speed sensor' is ON, the date in the dual speed display will be re-placed by: <u>Speed through water</u>.

Calibrate log speed read-out by increasing/decreas-ing the number of pulses per nautical mile.

Refer to the next page for a description of the re-maining functions in this display.

| ENT | *Open for change*

⬤   *Go to the function you wish to change*
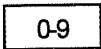
| 0-9 | / | +/- | *Select new values*

| ENT | *Confirm entry*

The **speed alarm** can be set to maximum and/or a mini-mum cruising speed. This may be handy for trawl fish-ing, entering into harbours with speed limits, etc.

Speed stability and time of response can be adjusted in
[MENU], [2]:Position, [7]:Position setup, [ENT], and use
cursor key to go to 'Speed filter level' to adjust the set-
ting, confirm with [ENT].

How to reset an alarm
The same procedure applies to all activated alarms in
the system:

| CLR | *Reset alarm*

Setup for units - The depth/altitude can be set to me-
tres, feet or fathoms.
Distances can be calculated in nautical miles (nm), kilo-
metres (km) or statute miles (mi).
The speed can be shown in knots (kn), kilometres/hour
(kh) or miles/hour (mh).
The temperature can be shown in Celcius or Fahrenheit.

☞ The last line in 'Setup for units' will tell you which
software version is installed in the unit.

WIN change interval - can be set to anywhere be-
tween 01 to 99 seconds. Refer to 'Rotation of WIN-
dows' in section 2.2 for more details on how the
function works.

Display text in - as standard the CE30 is supplied with
a national display language + English, but the system is
available in a variety of display languages:
English (GB), Danish (DK), Swedish (S), German (D),
French (F), Spanish (E), Nederlands (NL), Italian (I),
English (US), and Portuguese (P).

7.1 Interface settings

6:
SETUP
1:Speed alarm, units and language
2:Interface setup NMEA
3:Interface setup remote
4:Interface setup alarm/log
5:Wind display
6:Display colour

The CE30 has 2 in/out ports, which can be set individually to NMEA 0183, 0182, 0180, and IS11 Dataline, etc.

☐ = keys to press
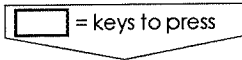
7.1.1 Interface setup

MENU		6+2

Select 'Interface setup NMEA'
or

MENU		6+3

Select 'Interface setup remote'

Example:

Interface setup NMEA:				NMEA0183
Input pin (3,4):				NMEA0183
Water temperature:			MTW	OFF
True wind:			VWT	ON
Relative wind:			VWR	ON
External position, course and speed:				OFF
Datum 000: World Geodetic System 1984				
Position:			GLL	ON
Course:			VTG	ON
Speed:			VTG	ON
Output pin (1,2):				NMEA0183
APB OFF	BWR OFF	GGA OFF	GL2 OFF	GLL ON
RMC/RMB ON		VTG ON	XTE OFF	ZTG OFF
ZDA OFF	WPL OFF	RTE OFF	RNN OFF	DBK ON
DBS OFF	DBT OFF	DPT ON	MTW ON	VHW ON

Use the cursor to move around in the display and select new values by means of the [+/-] keys.

Refer to next page for further details.

<u>To change preset interface settings:</u>

| ENT | | ENT | *Open for change, and confirm warning*

⬤ *Go to the senteces you want to use*

| +/- | *Toggle between OFF/ON*

| ENT | *Confirm entry*

<u>NMEA0183/0182/0180/DATADUMP/DATALINE etc.:</u>

| ENT | | ENT | *Open for change, and confirm warning*

| +/- | *Toggle between the output formats:*
- NMEA0183 (see listing below)
- NMEA0182, position and autopilot data.
- NMEA0180, autopilot data only.
- DUMP ***%, data transfer to (other) CE30/CP30.
- **DUMP OK** will appear (after approx. 6 min.) when the transfer is completed -after confirming with [ENT]
- DATALINE (IS11)
- DGPS, the unit is ready for RTCM 1.04 standard.
- REMOTE - for remote interface only.

| ENT | *Confirm entry*

<u>NMEA 0183 version 2.00 output:</u>
GLL   Geographic position, latitude/longitude
GL2   Geographic position, with 2 decimals
GGA   Global Positioning System fix data
APB   Autopilot sentence "B"
BWR   Bearing and distance to waypoint, Rhumbline
BWC   Bearing and distance to waypoint, Great circle
RMB   Recommended minimum navigation information
RMC   Recommended minimum specific GPS data
VTG   Track made good (course) and ground speed
XTE   Cross-Track-Error, measured
ZTG   UTC & time to destination waypoint
ZDA   Time and date

WPL   Waypoint location
RTE   Routes, ONC or ONW
          ONC - ON Complete route
          ONW - ON Working route
RNN   Routes
☞ GLL and GL2 (V.1.5) can not be on at the same time.
Output must be set to NMEA0183 to receive input.
GGA is invalid when operating on external position.

NMEA0183 instrument input:
WPL   Waypoint data
MTW   Water temperature
VHW   Water speed and heading
VWT   True wind speed and angle
VWR   Relative wind speed and angle
DBS   Depth below surface
DBK   Depth below keel
DBT   Depth below transducer
DPT   Depth, including offset

NMEA0183 external position, heading and speed input:
GLL   Geographic position, latitude/longitude
RMA   Recommended minimum specific Loran C data
RMC   Recommended minimum specific GPS data
GGA   Global Positioning System fix data
VTG   Track made good (course) and ground speed
☞ Input is only valid when output is set to NMEA0183.

Interface setup alarm/LOG:

| MENU | | 6+4 | *Select 'Interface setup alarm/LOG'* |

| ENT | | +/- | *Open for change and toggle between outputs: alarm and log (200 pulses/nm)* |

⬤ | +/- | *Use cursor to move around in display, and change settings with +/-*
Alarm stand-by level: LOW=0 volt, HIGH=5 volt

| ENT | *Confirm entry*

☐ = keys to press

7.2 Wind instrument display

6.
SETUP
1:Speed alarm, units and language
2:Interface setup NMEA
3:Interface setup remote
4:Interface setup alarm/log
5:Wind display
6:Display colour

The CE30 is ready to present depth, temperature, and wind data from installed transducer and connected instrument.

Wind data

The "wind instrument" can provide both wind direction and wind speed, and the readings can be shown in relative or true.

| MENU | | 6+5 | *Call the "wind instrument" display*
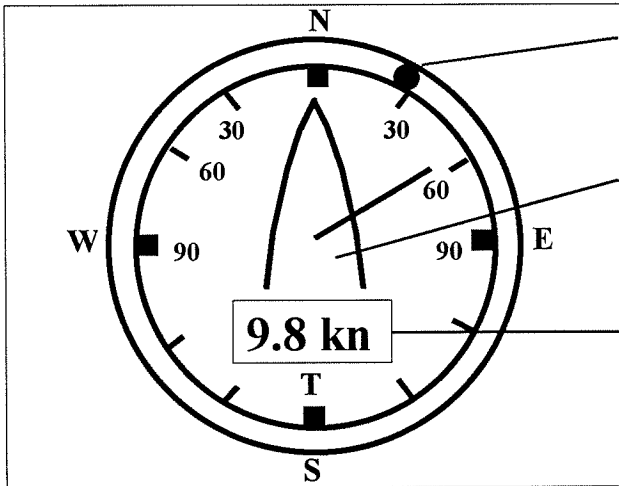
True wind direction.

Wind relative to vessel.

Wind speed, relative or true.

ENT   *Call 'Setup for Wind' display*

Setup for Wind:

Damping level: LOW

Relative wind-scale: NORMAL

Wind angle offset: 000°

Show wind speed as: TRUE

Wind speed unit: METERS/SECOND

The damping level can be set to LOW, MEDIUM, or HIGH. The higher level the more steady and slow re-acting reading.

The wind-scale can be set to 0-180° (NORMAL), or 0-60° (MAGNIFIED).

The wind angle offset can be from 0 to 360°

The wind speed can be set to TRUE or RELATIVE, and the wind speed unit can be either METERS/SECOND, KNOTS, KILOMETRES/HOUR or MILES/HOUR.

●   *Go to the function you wish to change*

+/- / 0-9   *Toggle between settings, or key in new figure*

ENT   *Confirm entry*

☐ = keys to press

7.3 Master reset

If the unit is totally locked i.e. no immediate response from the keypad, the unit can be reset by disconnecting the power supply and then start up again.

If the unit is still 'alive' but cease to respond to normal operation, you can make a limited master reset.
A full reset will erase all data, waypoints, and settings, and restore the basic settings from the factory.

| MENU | | 6+0 | *Call master reset display*

MASTER RESET

Return to factory presets.

FULL RESET

All data incl. WPs, routes etc. will be erased: ↑,↓, CLR

LIMITED RESET

User data, WPs, routes etc. will be preserved: ↑,↓, ENT

Exit: MENU

To activate a **master reset**, follow the instructions in the display, or exit the function without making any changes by pressing [**MENU**].

After a master reset the CE30 will perform a fully automatic start-up.

8.1 Installation of CE30

The CE30 can be flat or bracket mounted - overhead, bulkhead or con-
sole.
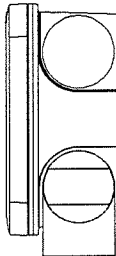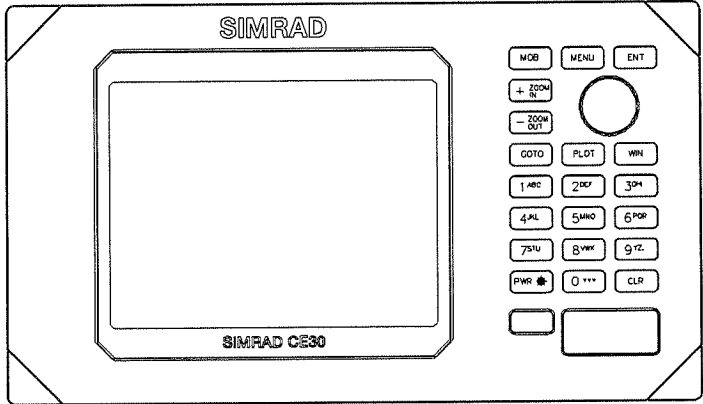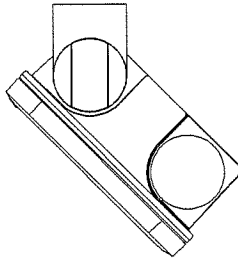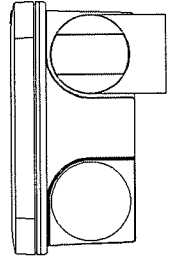
Console   **Overhead**   **Bulkhead**
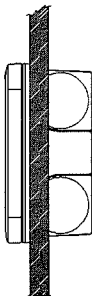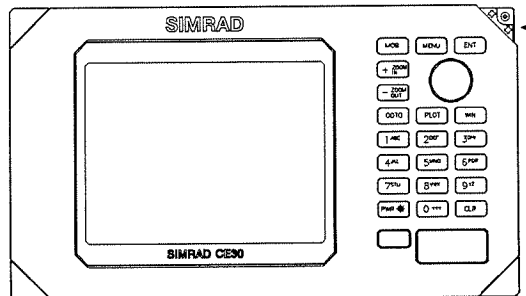
Flat mounted   -   **See templet for instructions**   -   **Removable corners, ex.**
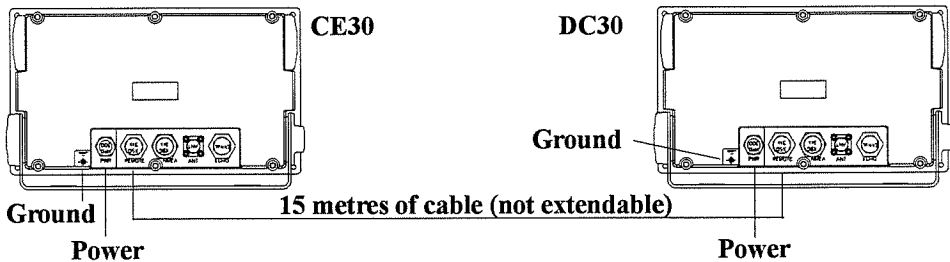
8.2 Installation of DC30 Dual Station

The DC30 is a remote control unit for the CE30 GPS Chart Sounder.
Both units are identical in size and appearance, so the DC30 can also be
flat or bracket mounted - overhead, bulkhead or console - as described
on the previous page.
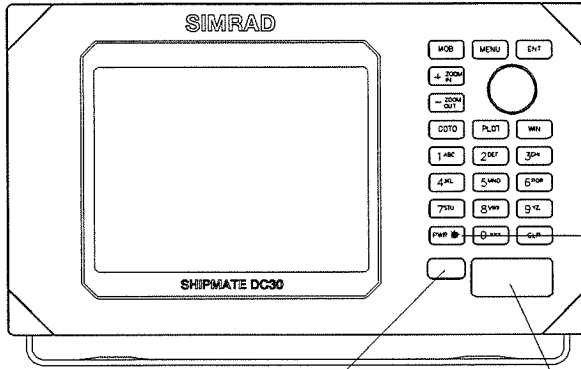
Adjust light/con-
trast in screen and
background light
in keypad via the
[PWR] key.

**The eject key and cartridge drawer are
blinded, and can not be opened on DC30.**

A connection cable of 15 meters with two female plugs is supplied with
the DC30. Push the female plug into the receptacle marked 'REMOTE'
on the back of the CE30 GPS Chart Sounder and DC30 Dual Station.

CE30   **DC30**

Ground

Ground   **15 metres of cable (not extendable)**

Power   **Power**

8.2.1 Operation of DC30

All key commands are relayed to the main unit - CE30 - and the display
picture is instantly transferred back via a high speed link.

8.3 Installation of antenna
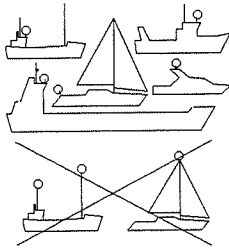
The antenna must be placed in a position where tall constructions, steel wires, masts, etc. do not obstruct the view to the satellites. Do not, however, mount the antenna in the top of a mast or tower, as this may degrade the COG and SOG readings, especially if DGPS is used. Do not place the antenna close to sources of electrical interference, such as radar, satcom, etc. If installing the GPS antenna close to other antennas it must be placed either above or below the radiation beams. There is full coverage down to 20° below the horizon.

Satcom   VHF   Radar
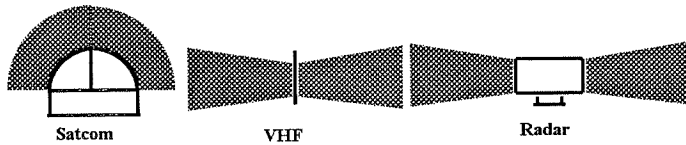
Beam area Avoid installing the GPS antenna inside the beam area.
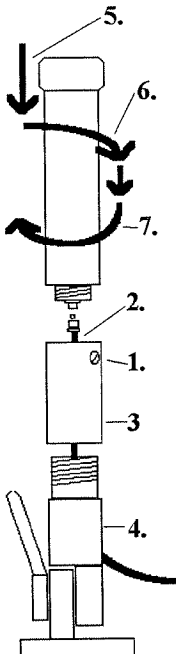
Mounting of GPS antenna RS5640

Loosen the screw (1) of the antenna adaptor. Guide the antenna cable (2) through the adaptor and connect it to the antenna. Screw the US 1" 14 mount adaptor (3) firmly onto the optional antenna mount (4). Press (5) the antenna into the adaptor and turn it (6) approx. 1/2 to 1 turn counter clockwise to "catch" the thread. Turn (7) clockwise 1 to 2 turns and firmly secure the antenna with the lock screw (1).
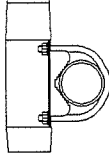
NB! Do not close the small ventilation hole at the bottom of the antenna, and do not attempt to open the antenna.

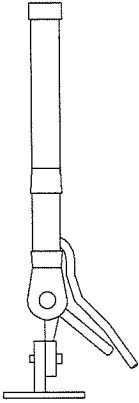## Optional universal antenna mounting kit

Mounting examples:
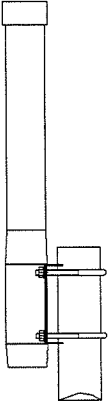
The universal antenna mount is for vertical and horizontal pipes of 20-40 mm.
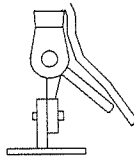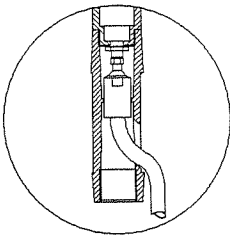
Part no. 401.0040:
The kit consist of an adaptor and a stainless steel bracket.

The antenna adaptor from the mounting kit will also fit directly onto a standard US 1" 14 thread pipe.
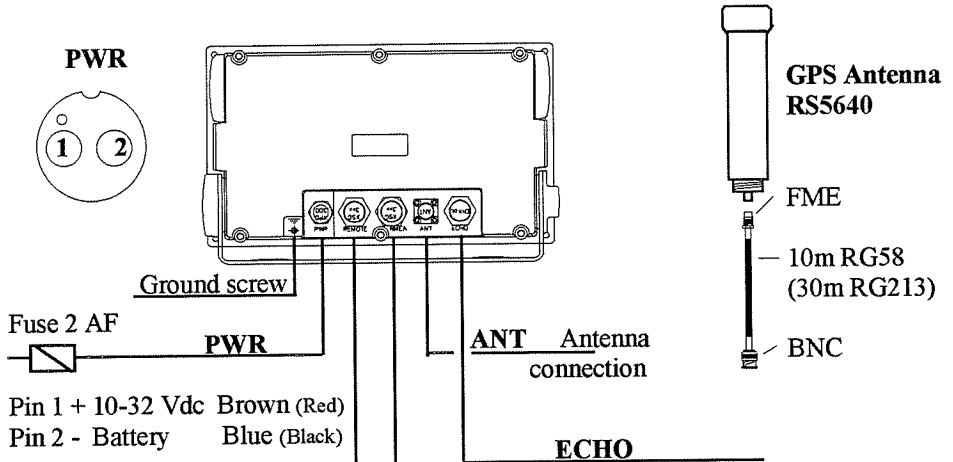
Ask your dealer for further information regarding these special mountings.

When utilizing the adaptor from the mounting kit, be careful to *gently* turn the cable along with the antenna when screwing it onto the adaptor.

8.4 Electrical connections

PWR

**GPS Antenna
RS5640**

FME

— 10m RG58
(30m RG213)

Ground screw

ANT   Antenna
connection

BNC

Fuse 2 AF   **PWR**

Pin 1 + 10-32 Vdc Brown (Red)
Pin 2 - Battery   Blue (Black)

ECHO
Pin 1 SPEED LOG
Pin 2 VCC SPEED LOG
Pin 3 DEPTH +
Pin 4 NC
Pin 5 DEPTH -
Pin 6 GND SHIELD
Pin 7 THERM.

REMOTE
Pin 1 TX A (DATA OUT)
Pin 2 TX B (RETURN)
Pin 3 RX A (DATA IN)
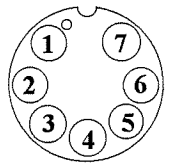Pin 4 RX B (RETURN)
Pin 5 REMOTE DATA
Pin 6 CLK REMOTE

Connectors,
seen from solder side

NMEA

Pin		
Pin 1	TX A (DATA OUT)	White
Pin 2	TX B (RETURN)	Brown
Pin 3	RX A (DATA IN)	Yellow
Pin 4	RX B (RETURN)	Green
Pin 5	ALARM/LOG	Grey
Pin 6	MOB	Pink

NMEA & REMOTE
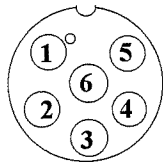
ECHO

External MOB switches
NMEA
Pin
6
2
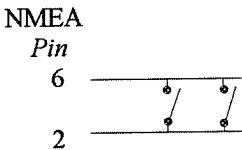
External/log/alarm relay
NMEA Relay 5V/50mA
Pin
5
2
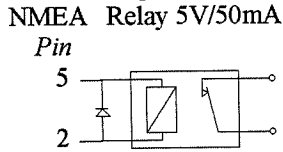
8.4.1 Power supply connections

The internal voltage regulator will allow the CE30 to operate normally over the power supply voltage range from 10 to 32 Vdc. Connection between the CE30 and the external power supply ia accomplished by means of the supplied power cable, which is approximately 1.5 meters long.

After connecting the cable to the power source, push the plug as far as it will go into the receptacle marked 'PWR' on the rear of the cabinet and turn the plug's coupling ring clockwise until it makes a click.

8.4.2 Transducer connections

The installation should be carefully planned in advance, keeping in mind the standard cable length of 10 meters (32feet) which will be connected to the transducer. In the event where the standard cable is not long enough, up to an additional 10 meters (32 feet) may be connected without affecting the performance of the transducer. The cable must be of the same type as the standard cable.

☞ *The CE30 must be turned off while connecting/disconnecting the transducer cable.*

The use of longer cable runs, while possible, always increases the likelihood of increased interference and decreased performance. Care must be taken when increasing the cable lengths to ensure that proper, adequate and consistent shielding is maintained, that cable of adequate cross section is used, and that all connections are properly made and protected from the effects of the marine environment.

8.4.3 Fuse

Warning! Using a fuse which is not specified for your equipment can cause it to blow the instant the CE30 has been switched on or it will not protect the equipment in the event of trouble.
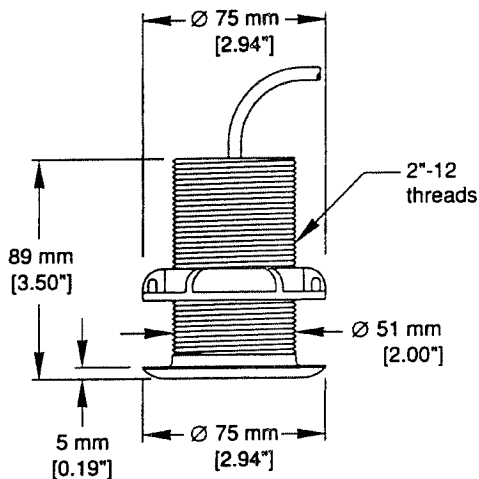
8.4.4 NMEA 0183 interface connections

NMEA 0183 interface connections are made to the receptacle marked 'NMEA' on the rear of the cabinet.

☞ *The CE30 must be turned off while connecting/disconnecting the interface cable.*

8.5 Transducer connections

P319

Thru-hull mount

(not for use in wood hulls)
Frequency: 50/200 kHz
Beamwidth: 45°/15°
Cable length: 10m (32')
Depth information.

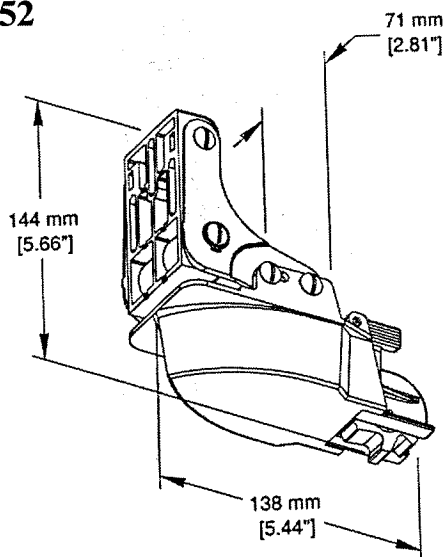Reference No. 179.0401.002
Housing: Reinforced plastic

Reference No. 179.0401.003
Housing: Bronze

Reference No. 179.0401.004
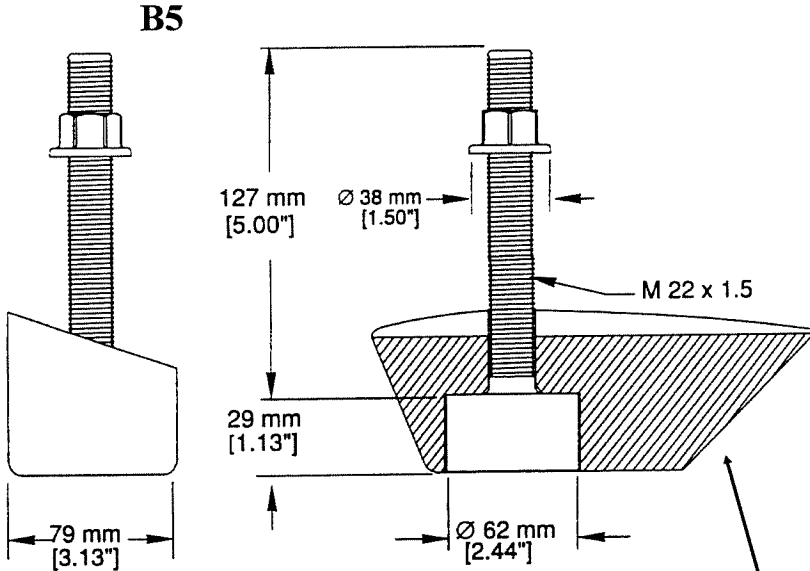Housing: Stainless steel

P52

Transom mount

(for fiberglass, aluminium, wood, or inflatable hulls)
Frequency: 50/200 kHz
Beamwidth: 45°/15°
Cable length: 10m (32')
Speed, temperature + depth information.

Reference No. 179.0401.001
Housing: chemical resistant, high impact plastic alloy.

B5

127 mm
[5.00"]

Ø 38 mm
[1.50"]

M 22 x 1.5

29 mm
[1.13"]

79 mm
[3.13"]

Ø 62 mm
[2.44"]

Ref. No. 179.0401.011
Optional fairing

Thru-hull stem mount
Accomodates hull thickness:
Min. no fairing   6mm (1/4")
Max. with fairing 83mm (3 1/4")

Frequency: 50/200 kHz
Beamwidth: 45°/15°
Cable length: 10m (32')
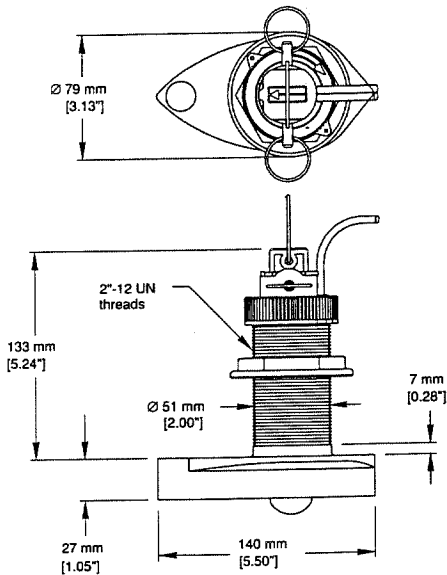Depth information.

Ref. No. 179.0401.007
Housing: Bronze
(fiberglass or wood hulls only)

Ref. No. 179.0401.008
Housing: Stainless steel
(compatible with any hull
material)

B44V top and side view

Ø 79 mm
[3.13"]

2"-12 UN
threads

133 mm
[5.24"]

Ø 51 mm
[2.00"]

7 mm
[0.28"]

27 mm
[1.05"]

140 mm
[5.50"]

Thru-hull triducer
Frequency: 50/200 kHz
Beamwidth: 45°/15°
Cable length: 10m (32')
Speed, temperature + depth
information.

Ref. No. 179.0401.009
Housing: Bronze

Ref. No. 179.0401.010
Housing: Stainless steel

8.5.1 Determining the position for the transducer

The performance of the echo sounder under actual operating conditions
will be largely dependent upon the location of the transducer and how it
has been installed. Careful consideration, therefore, must be given to se-
lecting the mounting location and on deciding the method of installation
that best suits the vessel.

Air bubbles and turbulence caused by the vessel's movement through the
water will seriously degrade the transducer's performance. Therefore the
transducer should be located well clear of any water intake or discharge
line and also clear of any projection along the hull line which might dis-
turb the smooth flow of water. It is of profound importance for good per-
formance that the water flowing over the transducer be free of bubbles
and aeration. If the transducer face is clean but the performance degrades
with increasing vessel speed, then aeration of the water flowing under
the transducer may be the cause of the poor performance. Due to the
varying design of ship's hulls and different operating speeds, there can
be great variation in the amount of air bubbles which are carried beneath
the hull. The bubbles tend to be carried close to the hull as they pass aft.

For this reason, the transducer should to be mounted on a fairing block which holds the transducer away from the hull and which directs the flow of aerated water around the sides rather than over the face of the transducer. On deep keeled vessels, care must be taken to ensure that the transducer beam wil not be blocked by any part of the keel. Although the appropriate mounting location depends on the type of vessel and its normal operating speeds, a practical choice is usually somewhere between one third and one half of the vessel's water line length from the bow. Levelling blocks may be designed accordingly to meet this requirement.
☞ The more the transducer protrudes from the hull, the better the results will be. Particularly the lower frequency operation, interference from propeller noise can be a significant problem. This can be seen as an increase in the 'noise' on the echo sounder display when the propeller speed is increased. To help reduce this, the transducer's mounting face may be angled slightly forward on the order of 5° for the 50 kHz transducers and 3° for the 200 kHz transducers. The goal is to incline the transducer so that a line of sight along the transducer's radiating surface passes below the propeller.

8.6 Optional connections

RS2500/RS2800 Colour Trackplotter

CE30 NMEA		RS2500	RS2800
Pin		*Terminal strip*	*Port 1 to 4*
1 White	TX A	RD+1	*Pin 5*
2 Brown	TX B	RR+1	*Pin 9*

RS5660/RS5665 Differential Beacon Receiver

CE30 NMEA		RS5660/RS5665	
Pin 3 Yellow	RX A	*Pin*	2
Pin 4 Green	RX B	*Pin*	5

External position, heading and speed

CE30 NMEA		
Pin 3 Yellow	RX A	NMEA0183
Pin 4 Green	RX B	

Dataline Repeater Waypoint+

CE30 NMEA			Waypoint+	
Pin 1	White	TX A	White	
Pin 2	Brown	TX B	Green	
Pin 3	Yellow	RX A	Brown	
			Red	+12V
Pin 4	Green	RX B	Black	- Battery

Dataline Data box

CE30 NMEA			Data Box	
Pin 1	White	TX A	+ Radio nav input	
Pin 2	Brown	TX B	-	
Pin 3	Yellow	RX A	WHT	NMEA bus to
Pin 4	Green	RX B	GRN	repeaters

Overview of optional connections:
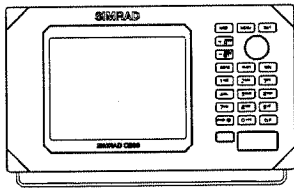
- Dual Station DC30
- Repeater Waypoint +
- IS11 - Dataline instrument serie
- Colour Trackplotter RS2500/RS2800
- Diff. Beacon Receiver RS5660/RS5665
- Differential Receiver RS5460
- Autopilot
- Radar
- Yeoman digitizer
- Other equipment via NMEA 0180, 0182, 0183
- NMEA Buffer RS5345

8.7 Maintenance

The CE30 does not require any maintenance other than an occational external cleaning. We recommend the use of a cloth with mild soap water. Periodically clean the face of the transducer with a plastic utensil using a scrubbing action.

8.8 Troubleshooting procedure

For all fault finding, first check that the supply voltage is between 10-32 Vdc.

Sympton	Check	Remedy
No picture on display screen	Check that the unit is turned on	Press [PWR] key on keypad
	Check fuse in power cable	Replace fuse. Use only type 2 AmpF
Picture appears on the display screen, but image is too dark or too bright		Adjust the image as desired by pressing the [PWR] key, adjust light/contrast, and press the [MENU] key
No normal picture or key operation	Check antenna and antenna cable	Turn unit off, and on again
		Disconnect antenna, disconnect power and connect power again
		Perform master reset, refer to section 7.3
No GPS position update	Check external position to be OFF, refer to interface display in [MENU],[6],[2].	Replace antenna or cable
	Check antenna and cable	Replace antenna or cable
Picture appears normal, but no targets are shown or only random 'noise' is seen	Check that the transducer connectors have been wired properly	If not properly wired, rewire the connectors
	Check that the transducer connectors are securely mated with the console	Correctly mate the connectors to the console
	Check that the receiver gain is set high enough	Increase the receiver gain, refer to section 5.2.6
	Check that the range is correct for the water depth	Adjust the range, refer to section 5.2.6
	Check that the Demo mode is not active	Go to 'Echo sounder setup' and set Demo mode OFF, refer to section 5.2.7

8.9 Specifications of the CE30
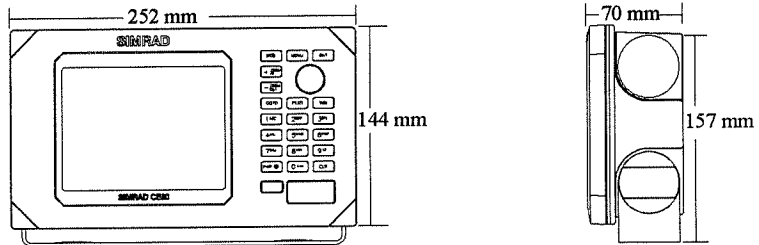
GPS Chart Sounder CE30

Power supply 10-32 V dc
Power drain   10/7 W
Dimensions   144x252x70mm/1.5kg
Environm.   0°C to +50°C, waterproof
Display, b&w 6-inch, 320x240 pixels
              STN transflective
 - colour   5.5-inch, 320x240 pixels
              TFT, power backlight
Interfacing   2 ports in/out NMEA 0180,
              0182, 0183,dual station, IS11
Alarm/log   Output for relay

GPS section

Receiver   8 channel parallel, C/A
              code, all-in-view
Filter   8 state Kalman filter
Accuracy   Position: 8m RMS*
              15m - 95% of fixes
              Speed: 0.1 kn*
              Heading: 1°*
Speed filter 10 settings
Update   1-2 sec's interval, typical
Dynamics   Velocity: 600 km/h
              Acceleration: 10m/s^2
WP/marks   999 w/info (12 characters)
Tracks   9 tracks, 256 points/each +
              selectable interval
Lines   Approx.500 lines/line sections
Routes   30 w/max.99 WPs/each

GPS Antenna RS5640

Type   Quadrifilar Helix
Dimensions   L: 230mm, D: 38mm/150 gr
Environm.   -35°C to +75°C, 95% rel.
Mounting   1" 14 thread (standard US).
Cable   Max. 10m RG58 (standard)
              Max. 30m RG213 (option)

Echo sounder section

Frequency   50 or 200 kHz
Output power 500 watts RMS (4,000 w PP)
Depth range
display   5-1000 units and auto
Depth range   Up to 350m at 200kHz, and
              800m at 50kHz
Max. ping rate 6 pings per second
Alarms   Fish, max. and min. depth
Zoom   Bottom and VRM expan-
              sion: 3 to 50 units
Event marker At current ping
Image speed   True distance/time,
              1 step/ping and freeze
Temperature   Transducer or NMEA
Speed (water) Transducer or NMEA

Options

Dual Station DC30
D-GPS Receiver RS5660/RS5665
C-MAP electronic charts CF95
6-channel NMEA Buffer RS5345
NMEA interface cable

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*The accuracy is measured on a satellite constellation with HDOP <8 and without SA. US Department of Defence has intentionally degraded the accuracy for civil users to <100m in 95% of the position fixes.

9.1 Glossary of terms

Almanac	A satellite's almanac data, is data which determines an approximate lane for satellites in orbit. The almanac data is used by the GPS receiver to find and lock onto the satellite signal. The CP30 has a built-in basic almanac.
Auto trackpoint shift	Will automatically shift to the next trackpoint in the track and provide new steering details (Track nav.)
Auto waypoint shift	Will automatically shift to the next waypoint in the route and provide new steering details.
Bearing	The direction of where to go eg. towards a specific waypoint.
Chart scale factor	An additional zoom function, which can be set to 1 for normal, 1/2 for better overview of chart area, and 2 for close-up - without changing to a different chart level.
Course	*Course Over Ground*, magnetic or true. The direction of which the vessel is moving.
Default	"Typical" value settings preselected from the factory.
dGPS	Differential data is received from e.g. RS5660/RS5665.
DGPS	The position is being corrected by differential data.
Heading	The direction of which the vessel is pointing.
	Measurement units:
nm	*nautical mile*, 1 nm is 1,852 metres
kn	*knots*, nautical mile per hour
km	*kilometer*, 1 km is 1,000 metres
kh	kilometer per hour
mi	*statute mile*, 1 mile is 1,609 metres
mh	mile per hour

Restart to approaching point	Will automatically re-calculate the navigation data from current position to approaching point.
Rhumbline / Great circle	The straight line to a waypoint on a chart / The shortest distance on the globe.
Route number	Each route is assigned a route number.
Route point no.	When waypoints are inserted as part of a route, they will also be given a route point number eg. WP8 could be the third point in a route ie. route point number 3.
Speed	*Speed Over Ground*, measured in knots, km, mi.
Starboard/Port	Right (green) / Left (red)
TFT / LCD	Thin-Film Transistor (Active matrix) / Liquid Crystal Display
UTC	Universal Time Coordinates, which is equal to standard time in London (GMT). UTC is not affected by the local summertime adjustments.
Velocity	Speed towards approaching waypoint.
Wake line	Continuous track trailing the ship.
WP number	Each waypoint is assigned a number and is registered in the waypoint list.
WPplot	Instant storage of actual position as a waypoint.
XTE	Cross-Track-Error (Dist.), measured magnitude of the position error perpendicular to the intended track line.

Echo sounder section:

Colour threshold   Allows the "weaker" targets and noise which may be shown on the display screen to be eliminated from the display. These targets are usually shown in the weaker target colours such as blues and greens. The Colour threshold allows you to choose not to display the blues, or the blues and greens, etc. Doing this will leave only the stronger targets on the display screen.

Echogram back-ground color   Is the screen colour shown in the echo displays in the event no target is present. There are two colors to choose from, white or black, where black is especially useful during nighttime operation when the white background could appear too bright.

Gain   Is another way of saying "sensitivity", or possibly "volume". Increasing the gain setting of the CE30 Echo sounder function will allow you to see smaller and deeper targets. If the gain is set too high, however, you will begin to see "noise" and unwanted targets. Generally speaking, you want to set the gain control just below the point that you begin to see speckles of "noise" on the screen.

Log speed cali-bration   The unit is preset to receive 19000 pulses per nautical mile from the log transducer (paddle wheel). However, the figure might have to be changed to compensate for various transducers and actual waterflow passing the transducer. The correct pulse rate is calculated by:

$$\frac{19000 \times \text{indicated speed (eg. 4 kn)}}{\text{actual speed (GPS) (eg. 5 kn)}} = 15.200 \text{ pulses/nm}$$

NMEA   National Marine Electronics Association. The NMEA is an organization of manufacturers of marine electronics equipment. They have adopted the NMEA 0183 as a standard for communications between various types of marine electronic equipment.

Ping to ping filter	Can be set either on or off. With the filter 'off', then each received echo will be reflected on the screen. Whereas with the filter 'on', the system will compare every two echoes received and only reflect on the screen what is received from both echoes, which will give a more uncluttered and precise recording.

Pulse length   The transmitted pulse length can be set to:

	50kHz	200kHz
SHORT =	less than 5 m deep water	less than 5 m deep water
MEDIUM =	not available	between 5 and 50m deep water
LONG =	more than 5 m deep water	more than 50 m deep water
AUTO =	will continuously adjust the pulse length to be at an uptimum level	

☞ A long pulse will reach deeper but give less resolution.

Range	"Range" refers to the distance shown from the top to the bottom of the display screen.
Signal threshold	Can be set to ON to eliminate the appearance of unwanted noise. The threshold level is automatic and the feature should be used with caution, as it may eliminate small fish and small unidenfied objects on the screen.
Start range	Allows the user to set the displayed depth range to begin at some point below the surface. For example, a 100 meter displayed range can be 'phased' downwards, so that the screen shows a 100 meter section beginning at, say, 200 meters and going to 300 meters depth.
White line	Places a white/black line to indicate the sea floor, and blanks out four pixels just below the line. The purpose

of this is to help the user detect targets, such as fish, which are very close the the sea floor and whose echoes tend to merge with those of the sea floor itself.

TVG

Time Varying Gain - is a control that allows the CE30 to make corrections for most of the losses and absorption that occurs as sound energy passes through sea water. Generally speaking, if you are searching for small targets or are looking for the best picture of the bottom at great depths, use 'Fish (40 log R)'. And if you are observing large schools of fish or have excessive noise on the display screen, try the 'Bottom (20 log R)' setting.

Select the appropriate datum by inserting the number prefix: Press [MENU], [4], [2], [ENT], and key in the desired number by means of the numerical keys or the +/- keys, confirm entry by [ENT].

000	World Geodetic System 1984
001	World Geodetic System 1984
002	European 1950
003	European 1979
004	North American 1927
005	North American 1983
006	Geodetic Datum 1983
007	Ordnance Survey of GB 1936
008	South American 1969
009	Adindan
010	Afgooye
011	Ain el Abd 1970
012	Anna 1 Astro 1965
013	Arc 1950
014	Arc 1960
015	Ascension Island 1958
016	Astro Beacon E
017	Astro B4 Sorol Atoll
018	Astro Dos 71/4
019	Astronomic Station 1952
020	Australian Geodetic 1966
021	Australian Geodetic 1984
022	Bellevue (IGN)
023	Bermuda 1957
024	Bogota Observatory
025	Campo Inchauspe
026	Canton Astro 1966
027	Cape
028	Cape Canaveral
029	Carthage
030	Chatham 1971
031	Chua Astro
032	Corrego Allegre
033	Djakarta
034	DOS 1968
035	Easter Island 1967
036	Gandajika Base
037	Guam 1963
038	GUX 1 Astro
039	Hjorsey 1955
040	Hong Kong 1963
041	Indian
042	Ireland 1965
043	ISTS 073 Astro 1969
044	Johnston Island 1961
045	Kandawala
046	Kerguelen Island
047	Kertau 1948
048	L. C. 5 Astro
049	Liberia 1964
050	Luzon
051	Mahe 1971
052	Marco Astro
053	Massawa
054	Merchic
055	Mercury 1960
056	Midway Astro 1961
057	Minna
058	Modified Mercury 1968
059	Nahrwan
060	Nanking 1960
061	Naparima, BWI
062	Observatorio 1966
063	Old Egyptian
064	Old Hawaiian
065	Oman
066	Pico de las Nieves
067	Pitcairn Astro 1967
068	Prov. South Chilean 1963
069	Prov. South American 1956
070	Puerto Rico
071	Qatar National

072	Qornoq	112	Indian (old)
073	Reunion	113	Qornoq Datum 1927
074	Rome 1940	114	Scoresbysund Datum 1952
075	Santo (DOS)	115	Angmassalik Datum 1958
076	Sao Bras	116	Tanarieve Observatory 1925
077	Sapper Hill 1943	117	Timbalai
078	Schwarzeck	118	Special Indian (MGRS rel.)
079	South Asia		
080	Southeast Base		
081	Southwest Base		
082	Timbalai 1948		
083	Tokyo		
084	Tristan Astro 1968		
085	Viti Levu 1916		
086	Wake-Eniwetok 1960		
087	Wake Island Astro 1952		
088	Zanderij		
089	Finnish Datum		
090	Swedish Datum		
091	World Geodetic System 1984		
092	World Geodetic System 1984		
093	World Geodetic System 1984		
094	World Geodetic System 1984		
095	World Geodetic System 1972		
096	World Geodetic System 1984		
097	World Geodetic System 1984		
098	World Geodetic System 1984		
099	Lisboa Datum		
100	Pulkovo 1942		
101	North Am. 1927.Alaska,Can.		
102	South American - Yacare		
103	Old Hawaiian Maui		
104	Old Hawaiian Oahu		
105	Old Hawaiian Kauai		
106	Bukit Rimpah		
107	Camp Area Astro		
108	Guam 1963		
109	G. Segara		
110	Herat North		
111	HU-TZU-SHAN		

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