

FURUNO

OPERATOR'S MANUAL

Electronic Chart Display and Information System (ECDIS)

FEA-2107

FEA-2107-BB

MODEL FEA-2807

(Applicable to program version no. 05.52)



(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, 662-8580, JAPAN

Telephone : +81-(0)798-65-2111

Fax : +81-(0)798-65-4200

• FURUNO Authorized Distributor/Dealer

All rights reserved.

Printed in Japan

A : OCT . 2009

Pub. No. OME-41223-A

(DAMI) FEA-2107



* 0 0 0 1 7 2 6 9 8 1 0 *

Important Notices

General

- The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.
- Do not copy any part of this manual without written permission from FURUNO.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications can change without notice.
- The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.
- Save this manual for future reference.
- Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.
- All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

How to discard this product

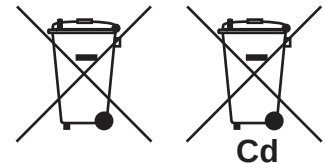
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (<http://www.eiae.org/>) for the correct method of disposal.

How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery(ies), see the chapter on Maintenance. Follow the instructions below if a battery(ies) is used.

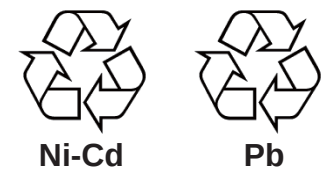
In the European Union

The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive 2006/66/EU.



In the USA

The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the used batteries to a battery collection site according to local laws.



In the other countries

There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycling symbols in the future.

SAFETY INSTRUCTIONS

The operator must read the safety instructions before attempting to operate the equipment.



WARNING

Indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.



Warning, Caution



Prohibitive Action



Mandatory Action



WARNING



ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.



Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.



Turn off the power immediately if water leaks into the equipment or the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock.



Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.



Do not operate the equipment with wet hands.

Electrical shock can result.



Do not allow rain or water splash to leak into the equipment.

Fire or electrical shock can result if water leaks into the equipment.

NOTICE



THE BACKPLANE board (PCI-5S-RS-R40, in the processor unit) has a lithium battery. The battery should only be replaced by a qualified technician.

The battery may burst if it is the wrong type or is incorrectly installed.

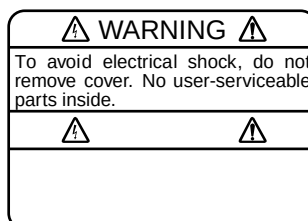


No one navigation device should ever be solely relied upon for the navigation of the vessel.

Always confirm position against all available aids to navigation, for safety of vessel and crew.

WARNING LABEL

A warning label is attached to the processor unit. Do not remove the label. If the label is missing or damaged, contact a FURUNO agent or dealer about replacement.



Name: Warning Label (1)
Type: 86-003-1011-0
Code No.: 100-236-230

Table of Contents

Foreword	xv
1. Introduction.....	1-1
1.1 Manual Contents.....	1-1
1.2 System Configuration	1-2
1.2.1 Single workstation.....	1-2
1.2.2 Multiple workstation configuration.....	1-3
1.3 The Processor Unit	1-4
1.4 Turning the Power On/Off.....	1-4
1.5 How to Find Version Number of ECDIS Software	1-4
1.6 Diagnostics	1-4
2. Navigation Tasks.....	2-1
2.1 Overview	2-1
2.2 Voyage Planning	2-1
2.2.1 Route planning	2-2
2.2.2 Route calculation.....	2-2
2.2.3 Chart planning.....	2-2
2.2.4 User chart planning	2-2
2.3 Positioning.....	2-3
2.3.1 Direct positioning sensors	2-3
2.3.2 Dead reckoning equipment.....	2-3
2.3.3 Manual correction	2-3
2.4 Monitoring.....	2-4
2.4.1 Display of electronic sea chart	2-4
2.4.2 Alarms	2-4
2.4.3 Man overboard	2-4
2.4.4 Data logging.....	2-4
2.4.5 Data distribution.....	2-4
3. ECDIS Display.....	3-1
3.1 Overview	3-1
3.2 Electronic Chart Area	3-2
3.2.1 Electronic charts in ECDIS	3-2
3.3 User Interface	3-4
3.3.1 Color palettes for the operator interface.....	3-4
3.3.2 Sidebar on operator interface	3-6
3.3.3 Activating dialog boxes on the display	3-10
3.4 Controlling Planning and Monitoring Modes on the ECDIS Display	3-12
4. Control Units	4-1
4.1 How the ECDIS is Controlled	4-1
4.2 Control Unit RCU-018	4-1
4.2.1 Keys in control unit RCU-018	4-2
4.3 Control Unit RCU-015	4-3
4.3.1 Configuring hot keys F1-F4.....	4-4
4.4 Mouse Operations.....	4-5
4.4.1 Parts of the mouse	4-5
4.4.2 How to enter alphanumeric data	4-6
4.4.3 Using the scrollwheel	4-8
4.4.4 Calling menus and functions by the mouse buttons.....	4-10
5. Standby Mode.....	5-1
5.1 Switching Standby Mode ON and OFF.....	5-1
6. Setup Before Departure.....	6-1
6.1 Update Chart Material	6-1
6.2 Display and Approve Dates for S57 Charts and Manual Updates	6-1
6.3 Creating or Updating User Chart.....	6-1
6.4 Creating or Updating Pilot Data.....	6-1

6.5	Setting Chart Alarm Calculation	6-2
6.6	Creating or Updating a Route	6-2
6.6.1	Checking your route against chart alarms.....	6-2
6.6.2	Recalculating timetable and ETA values.....	6-3
6.7	Checking and Preparing Route to Monitor	6-4
6.7.1	Choosing TO waypoint.....	6-5
6.7.2	Choosing final waypoint.....	6-5
6.7.3	Confirming checked conditions of the route plan.....	6-5
6.7.4	Using planned user chart.....	6-6
6.7.5	Using planned pilot data	6-7
6.8	Verifying Configuration of Navigation Sensors.....	6-8
6.8.1	Verifying source of navigation sensors	6-8
6.9	Resetting Distance and Trip Counters.....	6-10
6.10	Verifying Datum.....	6-10
7.	Conditions Required to Replace Paper Charts	7-1
7.1	Introduction	7-1
7.2	Detecting ENC Coverage in S57 Chart Display	7-4
8.	Vector Chart Material	8-1
8.1	Introduction	8-1
8.2	S57 Charts	8-1
8.2.1	Introduction.....	8-1
8.2.2	Chart legend of S57 chart	8-3
8.2.3	Permanent warnings of S57 charts.....	8-4
8.3	Loading S57 Charts.....	8-5
8.3.1	Flow chart for loading S57 charts into ECDIS	8-5
8.3.2	Loading S57 charts from a CD ROM, floppy disk or LAN	8-7
8.3.3	Loading S57 charts that are not fully compliant with the IMO standards.....	8-16
8.4	S57 SENC Conversion Details.....	8-17
8.4.1	Speeding up SENC conversion.....	8-17
8.4.2	Choosing automatic SENC conversion and display until date	8-18
8.4.3	Viewing progress of SENC conversion.....	8-19
8.4.4	Using the failed SENC conversion window	8-20
8.4.5	Using SENC conversion history log.....	8-21
8.4.6	Using SENC convert window to initiate SENC conversion.....	8-23
8.5	Features of the Chart Menu.....	8-24
8.5.1	Overview of the chart menu.....	8-24
8.5.2	Catalogue of S57 cells	8-26
8.5.3	Grouping S57 chart cells.....	8-28
8.5.4	Viewing status and setting viewing dates of S57 chart cells and their updates.....	8-37
8.5.5	Removing an S57 chart cell from the system	8-38
8.6	S57 Chart Service from an RENC	8-39
8.6.1	Introduction.....	8-39
8.6.2	Permits	8-39
8.6.3	Product list	8-39
8.6.4	Authentication.....	8-39
8.6.5	Available service types	8-40
8.6.6	Subscription types.....	8-40
8.7	Services Provided by an RENC	8-41
8.7.1	Viewing the coverage of an RENC service	8-41
8.7.2	Knowing up-to-date status of a chart from an RENC.....	8-42
8.7.3	Knowing up-to-date status of an RENC product list	8-43
8.7.4	Managing permits from an RENC	8-44
8.7.5	Managing public key from an RENC	8-45
8.8	CD ROM Service From an RENC	8-47
8.8.1	Getting started with S57 charts using an RENC.....	8-47
8.8.2	Keeping S57 charts up to date using an RENC	8-48
8.8.3	Enlarging chart coverage using an RENC	8-49
8.8.4	Base CD ROM from an RENC.....	8-49
8.8.5	Update CD ROM from an RENC	8-53
8.8.6	Viewing coverage of a base or update CD ROM from an RENC	8-57
8.8.7	Loading an RENC-generated permit CD ROM or floppy disk	8-58

8.9	RENC Security System	8-60
8.9.1	Standard messages in S57 chart load	8-60
8.9.2	Additional messages in S57 chart load	8-60
8.9.3	Standard messages in S57 SENC conversion	8-62
8.9.4	Additional messages in S57 SENC conversion	8-63
8.10	Vector Chart Display	8-64
8.10.1	Choosing vector chart material to use	8-64
8.10.2	Choosing charts for viewing	8-64
8.10.3	Choosing a chart by its name on the display	8-65
8.10.4	Controlling visible chart features	8-66
8.10.5	Display base	8-68
8.10.6	Controlling visible navigation features	8-69
8.10.7	Storing and recalling chart display settings for visible chart and navigational features	8-73
8.10.8	Control of predefined IMO chart display settings	8-74
8.11	Sailing Directions, Tidal Tables, etc., Features of Vector Charts (S57)	8-75
8.12	Chart Viewing Dates and Seasonal Features of the Vector Chart	8-76
8.12.1	Introduction	8-76
8.12.2	Approving and highlighting vector chart updates	8-76
8.12.3	Setting "display until" date	8-77
8.12.4	Setting "approve until" date	8-77
8.12.5	About chart viewing date dependency of S57 standard	8-78
8.12.6	Other functions of chart viewing dates window	8-83
8.13	Symbology Used in Vector Charts	8-84
8.13.1	How to change presentation library used for vector chart features	8-85
8.14	Requesting Information About Vector Chart Objects	8-85
8.14.1	Setting visible vector chart features	8-85
8.14.2	Choosing desired object from the list of found objects	8-85
8.14.3	Viewing properties of a vector chart object	8-87
8.14.4	About vector chart coding	8-88
8.15	Other Features of Vector Charts	8-94
8.15.1	Cell status	8-94
8.15.2	S57 cell details	8-95
8.15.3	Using cell status window to initiate SENC conversion	8-96
9.	Raster Chart Material	9-1
9.1	ARCS Charts	9-1
9.1.1	Chart legend of ARCS chart	9-1
9.1.2	T&P notices, details and warnings of ARCS	9-2
9.2	Datum and ARCS Charts	9-5
9.2.1	Difference between ARCS chart local datum and positions in WGS-84 datum	9-5
9.2.2	Permanent messages of ARCS	9-10
9.3	Chart Menu	9-11
9.4	ARCS Subscriptions	9-12
9.4.1	ARCS Navigator	9-12
9.4.2	ARCS Skipper	9-12
9.4.3	ARCS license information	9-12
9.4.4	Getting started with ARCS charts	9-13
9.4.5	Loading chart permits for ARCS Navigator license	9-14
9.4.6	Loading chart permits for ARCS Skipper license	9-15
9.4.7	Removing chart permits	9-16
9.4.8	Loading a new ARCS chart into the system	9-17
9.4.9	Updating ARCS charts	9-20
9.4.10	Viewing chart load and update history of ARCS	9-23
9.4.11	Viewing update status of your ARCS charts	9-24
9.4.12	ARCS catalogue	9-25
9.4.13	Grouping ARCS charts	9-27
9.4.14	Removing ARCS charts from the system	9-30
9.5	ARCS Chart Display	9-32
9.5.1	Displaying ARCS chart material	9-32
9.5.2	Choosing ARCS chart datum	9-32
9.5.3	Viewing different ARCS charts	9-33
9.5.4	Choosing an ARCS chart by its number on display	9-35
9.5.5	Controlling visible ARCS chart features	9-37
9.5.6	Display base	9-39

9.5.7	Controlling visible navigation features.....	9-42
9.5.8	Storing and recalling chart display settings for visible chart and navigational features	9-46
10.	Manual Updates	10-1
10.1	Introduction	10-1
10.2	Symbols to Use with Manual Updates.....	10-2
10.3	Displaying Manual Updates	10-2
10.3.1	Controlling visibility of orange symbols from manual updates.....	10-2
10.3.2	Controlling visibility of true symbols from manual updates.....	10-3
10.4	Controlling Chart Viewing Dates of Manual Updates	10-3
10.4.1	Setting current date for viewing	10-3
10.5	Using Manual Update Editor w/Orange Symbols.....	10-4
10.5.1	Manual update planning	10-4
10.5.2	Inserting new orange symbols	10-5
10.5.3	Deleting orange symbols	10-8
10.5.4	Editing position of orange symbols.....	10-9
10.6	Using Manual Update Editor with True Symbols.....	10-12
10.6.1	Manual update planning	10-12
10.6.2	Deleting chart objects.....	10-13
10.6.3	Modifying chart objects.....	10-14
10.6.4	Inserting new chart objects.....	10-15
10.6.5	Editing properties of manually updated chart objects	10-21
10.7	Checking Creation and Usage History of Manual Updates	10-24
11.	Chart Alarms.....	11-1
11.1	General	11-1
11.2	Chart Alarms	11-2
11.2.1	Choosing safety contour	11-2
11.2.2	Choosing objects used in chart alarms	11-3
11.2.3	Highlighting chart alarms	11-5
11.3	Inserting User Chart Symbols, Lines and Areas in Chart Alarm	11-6
11.4	Activating Own Ship Check.....	11-8
11.5	Route Planning.....	11-10
11.5.1	Finding chart alarms leg by leg	11-11
11.5.2	Finding chart alarms by category	11-12
11.6	Route Monitoring	11-13
11.7	Chart Alarm Using ARCS Charts.....	11-14
12.	Navigation Tools.....	12-1
12.1	Display Mode and Chart Orientation	12-1
12.1.1	Choosing desired display mode and chart orientation.....	12-1
12.2	Navigation Marks.....	12-2
12.2.1	Shifting the EBL	12-3
12.2.2	Shifting the VRM	12-3
12.2.3	Adjusting the parallel index lines	12-3
12.2.4	Shifting the reference point	12-4
13.	Route Planning	13-1
13.1	Introduction	13-1
13.2	Main Menu for Route Planning.....	13-2
13.3	Choosing Datum.....	13-3
13.4	Creating a New Route	13-4
13.4.1	Processing waypoints	13-5
13.4.2	Alarms page	13-6
13.4.3	Using the check page.....	13-7
13.4.4	Using the parameters page.....	13-8
13.4.5	Using the prepare page	13-9
13.5	Modifying an Existing Route	13-10
13.5.1	Parameters	13-10
13.5.2	Changing waypoint position.....	13-10
13.5.3	Changing other waypoint data.....	13-12
13.5.4	Adding a new waypoint at the end of a route.....	13-13
13.5.5	Inserting a waypoint	13-13
13.5.6	Deleting a waypoint.....	13-14
13.5.7	Importing waypoint from other routes	13-14

13.5.8	Importing waypoint from external device (GP-80 or GP-90)	13-15
13.5.9	Reversing sailing order of a route	13-16
13.5.10	Geometry check of route	13-16
13.6	Route Optimization	13-16
13.6.1	Available route optimization strategies	13-16
13.6.2	Optimizing a route	13-17
13.6.3	Planning a speed profile	13-17
13.7	WP Table Report	13-18
13.8	Full WP Report	13-19
13.9	Passage Plan Report	13-20
14.	Route Monitoring	14-1
14.1	Introduction	14-1
14.2	Choosing Route to Monitor	14-1
14.3	Choosing TO Waypoint	14-2
14.4	Choosing Final Waypoint	14-3
14.5	Viewing Waypoint Information	14-3
14.6	Displaying a Route on the Electronic Chart Screen	14-4
14.7	Route Assistant	14-5
14.8	Monitoring a Route	14-7
14.8.1	Information about steering mode on permanent route monitor windows	14-8
14.9	ETA (Estimated Time Of Arrival)	14-9
14.10	Route Monitoring Alarms	14-12
15.	User Chart Control	15-1
15.1	Introduction	15-1
15.1.1	Objects of user charts	15-1
15.1.2	Modes of user charts	15-2
15.2	What is a User Chart Point and How is it Used?	15-4
15.3	Choosing Datum	15-6
15.4	Choosing User Chart to use in Monitoring Mode	15-6
15.5	Choosing User Chart to use in Planning Mode	15-7
15.6	Creating a User Chart	15-8
15.6.1	Point page	15-9
15.6.2	Symbol page	15-10
15.6.3	Line page	15-11
15.6.4	Tidal page	15-12
15.6.5	Area page	15-13
15.6.6	Adding a new point, symbol, line or tidal to a user chart	15-16
15.6.7	Changing other data of point, symbol, line or tidal	15-17
15.6.8	Deleting a point, symbol, line or tidal	15-17
15.6.9	Importing points, symbols, lines or tidsals from other user chart	15-18
15.7	Joining Two or More User Charts	15-18
15.8	Displaying User Charts on ECDIS display	15-19
15.9	Backing up User Charts to a Floppy Disk	15-21
15.10	Restoring User Charts from a Floppy Disk	15-21
15.11	Reports	15-21
16.	Pilot Data	16-1
16.1	Introduction	16-1
16.1.1	Pilot data modes	16-2
16.2	Using Pilot Data	16-3
16.3	Choosing Pilot Data to use in Monitoring Mode	16-4
16.3.1	Monitor pilot data dialog box description	16-5
16.4	Choosing Pilot Data to use in Planning Mode	16-6
16.4.1	Plan pilot data dialog box description	16-7
16.5	Creating New Pilot Data	16-8
16.5.1	Adding new pilot data record	16-8
16.5.2	Choosing pilot data record to modify	16-9
16.5.3	Changing pilot data record position	16-9
16.5.4	Changing other data of pilot data record	16-10
16.5.5	Deleting a pilot data record	16-10
16.5.6	Importing pilot data from other routes	16-10

17. Backup Operations.....	17-1
17.1 Introduction	17-1
17.2 Choosing Appropriate File Category	17-2
17.3 Copying a File	17-2
17.4 Renaming a File	17-2
17.5 Backing up a File to a Floppy Disk.....	17-3
17.6 Restoring a File from a Floppy Disk.....	17-3
17.7 Deleting a File	17-3
17.8 Moving a File to Planning or Navigation Station	17-4
17.9 Reading a File from Planning or Navigation Station	17-5
17.10 Loading User Chart and Route Files of Former Vector System Format.....	17-5
17.11 Saving User Chart and Route Files in Former Vector System Format	17-5
17.12 Saving a Route as an ASCII Text File.....	17-6
17.13 Restoring a Route from an ASCII Text File.....	17-6
17.14 Backing up Chart Material	17-7
17.15 Restoring Chart Material	17-8
18. Common Reference System (Multi-workstation mode).....	18-1
18.1 Introduction	18-1
18.2 Controlling Common Reference System	18-2
18.2.1 Shared alarm management	18-3
18.2.2 Harmonized databases on workstations.....	18-3
18.2.3 Shared operator selections.....	18-5
18.3 Usage Rights	18-5
18.3.1 Setting usage rights as "master"	18-5
18.3.2 Setting usage rights as "multi" or "slave".....	18-6
18.3.3 Setting usage rights as "plan"	18-7
18.4 Sensor Source for the System	18-8
18.5 Mode of Workstations	18-9
18.5.1 Changing mode to single or multi workstation	18-9
18.6 Troubleshooting.....	18-10
18.6.1 What to do if pending access server window remains on screen	18-10
18.6.2 Access server log	18-11
18.6.3 Human interface log	18-12
19. Navigation Sensors.....	19-1
19.1 Choosing Navigation Sensors	19-1
19.1.1 Sensors dialog box description.....	19-1
19.2 Source of Position	19-6
19.3 Primary and Secondary Positions of Own Ship	19-7
19.4 Position Discrepancy Alarm.....	19-7
19.5 Source of SOG, COG, Speed, Heading, ROT, Drift and Docking Speed Components	19-8
19.6 Dual Gyro Interface for DNV NAUT-AW	19-12
19.6.1 Indication of gyro source.....	19-13
19.6.2 Gyro-associated alarms.....	19-14
19.7 Filter Operation	19-15
19.7.1 Filter and automatic route steering.....	19-16
19.8 Position Alignment.....	19-17
19.8.1 Position alignment by means of the ECDIS	19-17
19.8.2 Resetting position alignment	19-19
19.8.3 Position alignment by ARPA radar	19-19
19.9 Gyro Error Correction	19-20
19.9.1 Enabling gyro error correction	19-21
19.10 Wind Sensor	19-22
19.10.1 Installation parameter for wind sensor	19-23
19.11 Depth Sensor	19-25
19.12 Sensor-related Alarms	19-26
20. ARPA Target Functions	20-1
20.1 ARPA Radar Targets.....	20-1
20.1.1 Dangerous ARPA radar targets	20-1
20.1.2 Lost ARPA radar targets	20-1
20.1.3 Displaying true or relative speed vectors	20-2
20.2 Displaying ARPA Target Data	20-3
20.2.1 Viewing ARPA data of normal targets.....	20-3

20.3	Source of ARPA Radar Targets.....	20-4
20.3.1	ARPA-related alarms	20-4
20.4	Displaying ARPA Target Past Positions	20-5
20.5	ARPA Target Recording Functions.....	20-6
20.6	Using ARPA Targets for Chart Align.....	20-6
21.	AIS Target Functions.....	21-1
21.1	Introduction	21-1
21.2	Displaying AIS Targets.....	21-2
21.2.1	Dangerous AIS targets	21-3
21.2.2	Lost AIS targets	21-3
21.2.3	Displaying true or relative speed vectors.....	21-3
21.2.4	Maximum number and range for displaying AIS targets on ECDIS.....	21-4
21.2.5	Source of AIS target related alarms	21-4
21.3	Displaying AIS Target Data.....	21-5
21.4	Displaying AIS Target Past Positions.....	21-7
21.4.1	Displaying name or call sign of AIS target	21-8
21.5	Displaying AIS Interface Status	21-9
21.6	AIS Safety Message	21-10
21.6.1	Introduction.....	21-10
21.6.2	Creating a new safety message	21-11
21.6.3	Reading a received safety message.....	21-12
21.6.4	Replying to a safety message.....	21-13
22.	Radar Overlay	22-1
22.1	Introduction	22-1
22.2	Activating Radar Overlay on the ECDIS	22-2
22.3	Choosing Source of Radar Overlay	22-3
22.3.1	Radar overlay through LAN from FAR-2x07 radars	22-3
22.3.2	Radar overlay through radar overlay card inside ECDIS	22-4
22.3.3	Radar overlay display modes	22-5
22.4	Adjusting Radar Overlay (Radar Overlay dialog box).....	22-6
22.4.1	Radar overlay source	22-6
22.4.2	Gain.....	22-6
22.4.3	Sea clutter.....	22-6
22.4.4	Rain clutter.....	22-7
22.4.5	Controlling video processing	22-7
22.4.6	Echo overload condition	22-8
22.4.7	Transparency.....	22-9
22.5	Adjusting Radar Overlay to Match Positions of Chart Features.....	22-10
22.5.1	Error sources of radar echo image and chart display mismatch	22-10
22.5.2	Error sources for radar echo image and ARPA target mismatch	22-10
22.5.3	Compensating for bearing error.....	22-11
22.5.4	Compensating for position error	22-11
22.6	Radar Overlay Related Alarms.....	22-12
23.	Recording Functions	23-1
23.1	Introduction	23-1
23.2	Events and Man Overboard Functions	23-1
23.3	Voyage Records	23-2
23.3.1	Details log.....	23-2
23.3.2	Voyage log.....	23-3
23.3.3	Danger target log.....	23-6
23.3.4	Chart usage log	23-8
23.3.5	Printing details, voyage or danger targets log	23-8
23.3.6	Making backup copy from details, voyage or danger targets log.....	23-10
23.3.7	Resetting (emptying) voyage and danger targets logs.....	23-11
23.3.8	Making a user chart from a log (past track).....	23-11
23.3.9	Alarms log.....	23-12
23.4	Distance and Trip Counters	23-14
23.4.1	Resetting distance and trip counters	23-14

24. Datum	24-1
24.1 General	24-1
24.2 Paper Charts	24-1
24.3 Electronic Sea Charts	24-1
24.4 Positioning Devices and Datum	24-1
24.5 ECDIS and Datum.....	24-2
24.6 ECDIS and User Selectable Local Datum	24-2
25. Parameters Setup	25-1
25.1 Parameters	25-1
25.1.1 Parameter-related menus	25-2
25.1.2 Accessing installation parameters	25-3
25.1.3 Choosing datum	25-3
25.1.4 Navigation parameters setting	25-4
25.1.5 Optimization parameters setting.....	25-7
26. Color Calibration	26-1
26.1 Color Calibration Settings.....	26-1
26.1.1 Color test for ARCS charts	26-1
26.1.2 Color differentiation test for S57 charts	26-2
26.1.3 Gray scale test.....	26-3
27. Conning Display	27-1
27.1 System Configuration.....	27-1
27.2 Display Interpretation.....	27-2
27.2.1 ROT window	27-3
27.2.2 Heading window	27-3
27.2.3 Speed window.....	27-3
27.2.4 Rudder window.....	27-4
27.2.5 Position window	27-4
27.2.6 Drift and radius window	27-4
27.2.7 Autopilot FAP-2000 window	27-5
27.2.8 Route window.....	27-6
27.2.9 Weather and wind window	27-7
27.2.10 Depth window.....	27-7
27.2.11 Combined wind, depth and destination window (for DNV specification).....	27-7
27.2.12 Fuel consumption window	27-8
27.2.13 Thruster window	27-8
27.2.14 Propellers window	27-8
27.2.15 Azimuth propulsion window	27-10
27.2.16 Speedpilot window	27-11
27.2.17 Message window	27-11
27.2.18 Main engine start air pressure window.....	27-12
27.2.19 Alarm messages window	27-12
27.2.20 Propulsion and thruster window (for DNV specification)	27-12
27.3 Modes for Conning Display	27-13
27.3.1 Choosing mode for conning display	27-13
27.3.2 Choosing background color of conning display	27-13
27.3.3 Changing color palette of conning display	27-13
28. Steering with FURUNO Autopilot FAP-2000.....	28-1
28.1 Introduction	28-1
28.2 Steering Modes.....	28-1
28.2.1 Hand steering.....	28-2
28.2.2 Autopilot FAP-2000 steering	28-2
28.2.3 Waypoint mode.....	28-2
28.2.4 Track mode	28-2
28.3 Autopilot FAP-2000 Control Panel.....	28-3
28.4 Manual Steering	28-5
28.4.1 Heading control	28-5
28.4.2 Radius control.....	28-5
28.4.3 Program heading change	28-5
28.4.4 Program track	28-6
28.4.5 Summary of manual steering modes	28-7

28.5	Automatic Route Steering	28-8
28.5.1	"Goto waypoint" mode	28-9
28.5.2	"Goto track" mode	28-10
28.5.3	Summary of automatic route steering modes	28-10
28.5.4	Preconditions for automatic route steering.....	28-11
28.5.5	How to activate automatic route steering	28-12
28.5.6	Arriving to a waypoint.....	28-14
28.5.7	Automatic route steering alarms	28-16
28.5.8	Collision avoidance maneuver during automatic route steering	28-18
28.5.9	Stopping or modifying pre-enabled route turn	28-18
28.5.10	Accuracy of automatic route steering	28-19
28.6	Additional Information About Steering Modes.....	28-20
28.7	Important Information About Steering Mode Changes.....	28-22
28.8	Expected Steering Performance Under Various Conditions.....	28-24
28.8.1	Expected steering performance for going ahead	28-24
28.8.2	Expected steering performance for turns.....	28-27
28.9	Expected Steering Performance Under Critical Failure	28-29
28.9.1	Lost heading from Autopilot FAP-2000 (ECDIS may also have lost heading)	28-29
28.9.2	Lost heading from ECDIS (Autopilot FAP-2000 still has heading)	28-29
28.9.3	Lost speed	28-30
28.9.4	Low speed.....	28-31
28.9.5	Lost SOG/COG reference.....	28-32
28.9.6	Total lost position	28-33
28.9.7	Lost differential position.....	28-34
28.9.8	Lost differential position and position discrepancy	28-35
28.9.9	Lost communication between ECDIS and Autopilot FAP-2000.....	28-35
28.9.10	Lost communication between Autopilot FAP-2000 and ECDIS.....	28-36
28.10	Other Operations with Autopilot FAP-2000.....	28-36
28.10.1	Speed used by Autopilot FAP-2000	28-36
28.10.2	Control strategy used by Autopilot FAP-2000	28-36
28.10.3	Load conditions used by Autopilot FAP-2000	28-36
28.11	Description of Alarms Generated by Autopilot FAP-2000	28-37
28.11.1	Alarms.....	28-37
28.11.2	Errors.....	28-39
28.12	Using the Curved EBL	28-40
28.12.1	Structure of the curved EBL	28-42
28.12.2	Use of curved EBL to design a new turn while ship is turning.....	28-42
28.13	Using the Predictor.....	28-43
29.	Steering with YOKOGAWA Autopilot PT-500A	29-1
29.1	Introduction	29-1
29.2	Steering Control Unit.....	29-1
29.3	Steering Modes of the System.....	29-2
29.3.1	Hand steering (Mode selector: HAND).....	29-2
29.3.2	Autopilot steering (Mode selector: AUTO).....	29-2
29.3.3	Track mode automatic route steering (Mode selector: NAVI).....	29-2
29.4	Automatic Route Steering	29-3
29.4.1	Characteristics of automatic route steering.....	29-4
29.4.2	Summary of route steering.....	29-4
29.4.3	Preconditions for route steering.....	29-4
29.4.4	Activating route steering.....	29-5
29.4.5	Arrival to a waypoint	29-6
29.4.6	Route steering alarms.....	29-7
29.4.7	Collision avoidance maneuver during automatic route steering	29-8
29.4.8	How to stop or modify already enabled route turn.....	29-9
29.4.9	Notes	29-9
29.5	Other Operations with Autopilot PT-500A.....	29-10
29.5.1	Speed used by autopilot	29-10
29.5.2	Control strategy used by autopilot	29-10
29.5.3	Load conditions used by autopilot	29-10
29.6	Description of Alarms with Autopilot PT-500A.....	29-11
29.6.1	Alarms.....	29-11
29.6.2	Errors.....	29-11

29.7	Expected Steering Performance Under Various Conditions	29-12
29.7.1	Expected steering performance for going ahead	29-12
29.7.2	Expected steering performance for turns.....	29-13
29.8	Expected Steering Performance Under Critical Failure.....	29-14
29.8.1	Lost heading from autopilot (ECDIS may also have lost heading).....	29-14
29.8.2	Lost heading from ECDIS (Autopilot still has heading).....	29-15
29.8.3	Lost speed	29-16
29.8.4	Low speed.....	29-17
29.8.5	Total lost position	29-18
29.8.6	Lost differential position and position discrepancy	29-20
29.8.7	ECDIS lost messages from Autopilot.....	29-21
29.8.8	Autopilot lost messages form ECDIS.....	29-22
29.9	How to Use the Curved EBL with YOKOGAWA PT-500A Autopilot	29-23
29.10	Using the Predictor.....	29-24
30.	Steering with TOKYO KEIKI Autopilot PR-6000	30-1
30.1	Introduction	30-1
30.2	Steering Control Unit	30-1
30.3	Steering Modes of the System.....	30-2
30.3.1	Hand steering (Mode selector: HAND).....	30-2
30.3.2	Autopilot steering (Mode selector: AUTO)	30-3
30.3.3	Non-Follow Up steering (Mode selector: NFU)	30-3
30.3.4	Track mode automatic route steering, RC/NAV (Mode selector: RC)	30-4
30.3.5	Remote hand steering (Mode selector: RC), (option)	30-4
30.3.6	Override steering method (option)	30-5
30.4	Automatic Route Steering, RC/Nav (Mode: RC)	30-7
30.4.1	"Goto OS" mode.....	30-7
30.4.2	"Goto AW" mode	30-7
30.4.3	Summary of automatic route steering modes	30-7
30.4.4	Activation of route steering.....	30-8
30.4.5	Missing preconditions for route steering.....	30-10
30.4.6	Arrival to a waypoint.....	30-13
30.4.7	Route steering alarms	30-14
30.4.8	Collision avoidance maneuver during automatic route steering	30-16
30.4.9	How to stop or modify already enabled route turn.....	30-17
30.4.10	How to change mode of route steering.....	30-18
30.4.11	Notes on steering	30-19
30.5	Other Operations with TOKYO KEIKI PR-6000.....	30-20
30.5.1	Adjusting method for Auto steering (Auto mode)	30-20
30.5.2	Rate of Turn (RATE).....	30-20
30.5.3	Rudder angle ratio (RUDDER)	30-20
30.5.4	Weather adjustment (WEATHER).....	30-20
30.5.5	Course keeping mode selection (CNF-OPN).....	30-20
30.5.6	Pilot watch (PILOT WATCH)	30-20
30.5.7	Rudder angle limit (RUDDER LIMIT).....	30-20
30.6	Description of Alarms with TOKYO KEIKI PR-6000	30-21
30.6.1	Alarms	30-21
30.6.2	Errors	30-22
30.7	Autopilot Dialog Box for Tokyo Keiki PR-6000.....	30-22
30.8	Expected Steering Performance Under Various Conditions	30-24
30.8.1	Expected steering performance for going ahead	30-24
30.8.2	Expected steering performance for turns.....	30-26
30.9	Expected Steering Performance Under Critical Failure.....	30-28
30.9.1	Lost heading from Autopilot (ECDIS may also have lost heading)	30-28
30.9.2	Lost heading from ECDIS (Autopilot still has heading).....	30-28
30.9.3	Lost speed	30-29
30.9.4	Low speed.....	30-30
30.9.5	Lost SOG/COG reference.....	30-30
30.9.6	Total lost position	30-31
30.9.7	Lost differential position	30-32
30.9.8	Lost differential position and position discrepancy	30-33
30.9.9	Lost communication between ECDIS and Autopilot	30-34
30.9.10	Lost communication between Autopilot and ECDIS	30-34

30.10	How to use the Curved EBL with TOKYO KEIKI Autopilot.....	30-35
30.11	Using the Predictor.....	30-36
31.	Alarms.....	31-1
31.1	Overview	31-1
31.2	Alarms Generated by Navigation Calculation.....	31-2
31.3	Alarms Generated by Chart Calculation	31-2
31.4	Alarms Generated by Steering Calculation	31-2
31.5	Alarms Generated by Radar Overlay	31-2
31.6	Description of the Alarm Priority System	31-3
31.7	Description of Backup Navigator Alarm.....	31-4
31.8	List of Alarms	31-5
31.8.1	List of navigation alarms	31-5
31.8.2	List of chart alarms	31-25
31.8.3	List of steering alarms with Autopilot FAP-2000	31-27
31.8.4	List of steering alarms only with YOKOGAWA Autopilot.....	31-35
31.8.5	List of radar overlay related alarms	31-37
32.	Maintenance and Troubleshooting.....	32-1
32.1	Maintenance.....	32-1
32.2	Replacing the Fuse	32-2
32.3	Replacing the Battery	32-2
32.4	Troubleshooting.....	32-3
32.5	Keyboard Test.....	32-5
32.6	Consumable Parts	32-6
Appendix 1: Glossary of Terms		AP-1
Appendix 2: IHO ECDIS Chart 1.....		AP-5
A.2.1	IHO ECDIS Chart 1.....	AP-5
Appendix 3: Interpreting S57 Charts		AP-11
A3.1	Interpreting S57 Charts.....	AP-11
Appendix 4: C-MAP CM-93/3 Charts.....		AP-23
A4.1	C-MAP Cartographic Service.....	AP-23
A4.1.1	Registration of the system at C-MAP Norway	AP-23
A4.1.2	Ordering charts.....	AP-23
A4.1.3	Applying licenses.....	AP-23
A4.1.4	Troubleshooting	AP-23
A4.2	Chart Subscription Service	AP-24
A4.2.1	C-MAP service.....	AP-24
A4.2.2	RENC service.....	AP-25
A4.3	CM93/3 Chart Display	AP-26
A4.3.1	Introduction.....	AP-26
A4.3.2	Choosing CM93/3 chart material to use	AP-27
A4.3.3	Choosing charts for viewing	AP-27
A4.3.4	Chart catalogue of C-MAP charts.....	AP-29
A4.4	S57 Managing C-MAP charts.....	AP-30
A4.4.1	Licensing system used by the C-MAP.....	AP-30
A4.4.2	Introduction.....	AP-30
A4.4.3	System ID for C-MAP	AP-30
A4.5	CM93/3 Database	AP-31
A4.5.1	Load of CM93/3 database to ECDIS	AP-31
A4.5.2	Use of multiple databases	AP-32
A4.6	License of CM93/3.....	AP-33
A4.6.1	Add license from file	AP-33
A4.6.2	Add license manually.....	AP-35
A4.6.3	Renewal of license	AP-36
A4.7	How to Keep Charts up to Date.....	AP-37
A4.7.1	Creating update order file	AP-37
A4.7.2	Loading chart updates from the file	AP-39
A4.7.3	Review of chart updates.....	AP-41
A4.8	Removing CM93/3 Charts.....	AP-43

Appendix 5: C-MAP CM-93/2 Charts	AP-45
A5.1 C-MAP Charts	AP-45
A5.1.1 Introduction	AP-45
A5.1.2 S57 chart legend with C-MAP charts	AP-45
A5.2 Managing C-MAP charts	AP-46
A5.2.1 Licensing system used by the C-MAP	AP-46
A5.2.2 Getting started with C-MAP charts	AP-46
A5.2.3 Keeping C-MAP charts up to date	AP-46
A5.2.4 Defining subscription of C-MAP charts	AP-47
A5.2.5 Loading C-MAP charts from a CD ROM into the system	AP-52
A5.2.6 Catalogue of S57 cells with C-MAP charts	AP-56
A5.2.7 Grouping S57 chart cells	AP-57
A5.2.8 Automatic display until setting	AP-64
A5.2.9 Removing C-MAP charts from the system	AP-64
A5.2.10 Viewing status and date dependency of S57 chart cells and their updates	AP-65
Appendix 6: Route Backup	AP-67
A6.1 Route Backup & Restore in ASCII Format	AP-67
A6.1.1 Exporting ECDIS route data into an Excel file	AP-68
A6.1.2 Importing route data from Excel file into ECDIS	AP-69
A6.2 Route Backup & Restore in Orion Pro Weather Routing Format	AP-71
A6.2.1 Exporting Route from ECDIS to Orion Pro	AP-71
A6.2.2 Importing Route from Orion Pro	AP-72
Appendix 7: Menu Overview	AP-73
A7.1 Hierarchic Menu Tree	AP-73
A7.1.1 Menu	AP-73
Appendix 8: Digital Interface	AP-85
A8.1 Data Sentences	AP-85
A8.1.1 Input sentences	AP-85
A8.1.2 Output sentences	AP-85
A8.1.3 Data reception	AP-85
A8.1.4 Sentence structure	AP-86
A8.1.5 Serial interface: input ports	AP-94
A8.1.6 Serial interface: input/output ports	AP-95
Appendix 9: Parts List and Parts Location	AP-97
A9.1 Parts List	AP-97
A9.2 Parts Location	AP-98
A9.2.1 Processor unit EC-1000C	AP-98
A9.2.2 Control unit RCU-018	AP-99
A9.2.3 Control unit RCU-015	AP-99
Specifications	SP-1
Index	IN-1

Foreword

Congratulations on your choice of the FURUNO ECDIS FEA-2107/FEA-2107-BB/FEA-2807. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

For more than 60 years FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

This equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless installed, operated and maintained properly. Please carefully read and follow the recommended procedures for operation and maintenance.

Features

The FEA-2x07 series ECDIS is the product of FURUNO's extensive experience in computer technology and marine electronics. It complies with IMO Resolution A.817(19), IEC 61174 and other related standards. The ECDIS displays electronic charts, nav lines, ARPA data, AIS targets and other navigation data on a high-resolution 20.1-inch (FEA-2107) or 23.1-inch display (FEA-2807). The FEA-2107-BB is supplied without a monitor, permitting use of the commercial monitor of your choice.

The main features of the ECDIS are

- Continuous monitoring of ship's position through multi-sensor Kalman filter processing using GPS, DPGS, SDME
- Route planning and route monitoring facilities
- Wide variety of warning facilities contribute to safer and more efficient navigation
- Radar image may be superimposed on electronic charts (option)
- Grounding warnings, safe depth contours
- Chart database loaded and updated using CD ROMs
- Target data from ARPA/radar and AIS transponder to aid collision avoidance. (AIS transponder and ARPA)

Program Number

05.52_05.52

Foreword

This page intentionally left blank.

1. Introduction

1.1 Manual Contents

This manual provides the following information:

- System configuration
- Screen interpretation and use of the control unit
- Set up before departure
- Rules to replace paper charts with electronic ones
- Chart material management
- Manual updates, which are used to manually enter Notices to Mariners and Navtex warnings
- Chart alarm calculation
- Route planning and monitoring
- Various operator tools such as user charts, pilot data and navigation tools
- Backup operations
- Common reference system
- Use of navigation sensors
- Use of ARPA targets
- Use of AIS targets
- Radar overlay
- Various recording functions
- Essential information of the datum used by the charts and the ECDIS
- Steering related operations
- List of alarms

1.2 System Configuration

The ECDIS EC1000C Workstation, comprised of the components shown in the illustration below, displays electronic sea charts and operates as the operator interface for the system.

The ECDIS processor is connected to various sensors, and performs navigation calculations and route monitoring. Connections to interfaces are typically made with a LAN (Local Area Network) Adapter.

The ECDIS processor can be used for both route planning and route monitoring. If required, there can be additional identical ECDIS EC1000C Workstation(s) connected to the same LAN to share the tasks of the ECDIS. If the system incorporates more than one ECDIS EC1000C Workstation, one or more workstation(s) can be used as an operator interface (with "full" usage rights) and one or more workstation(s) may be used as planning stations (usage rights as "planning").

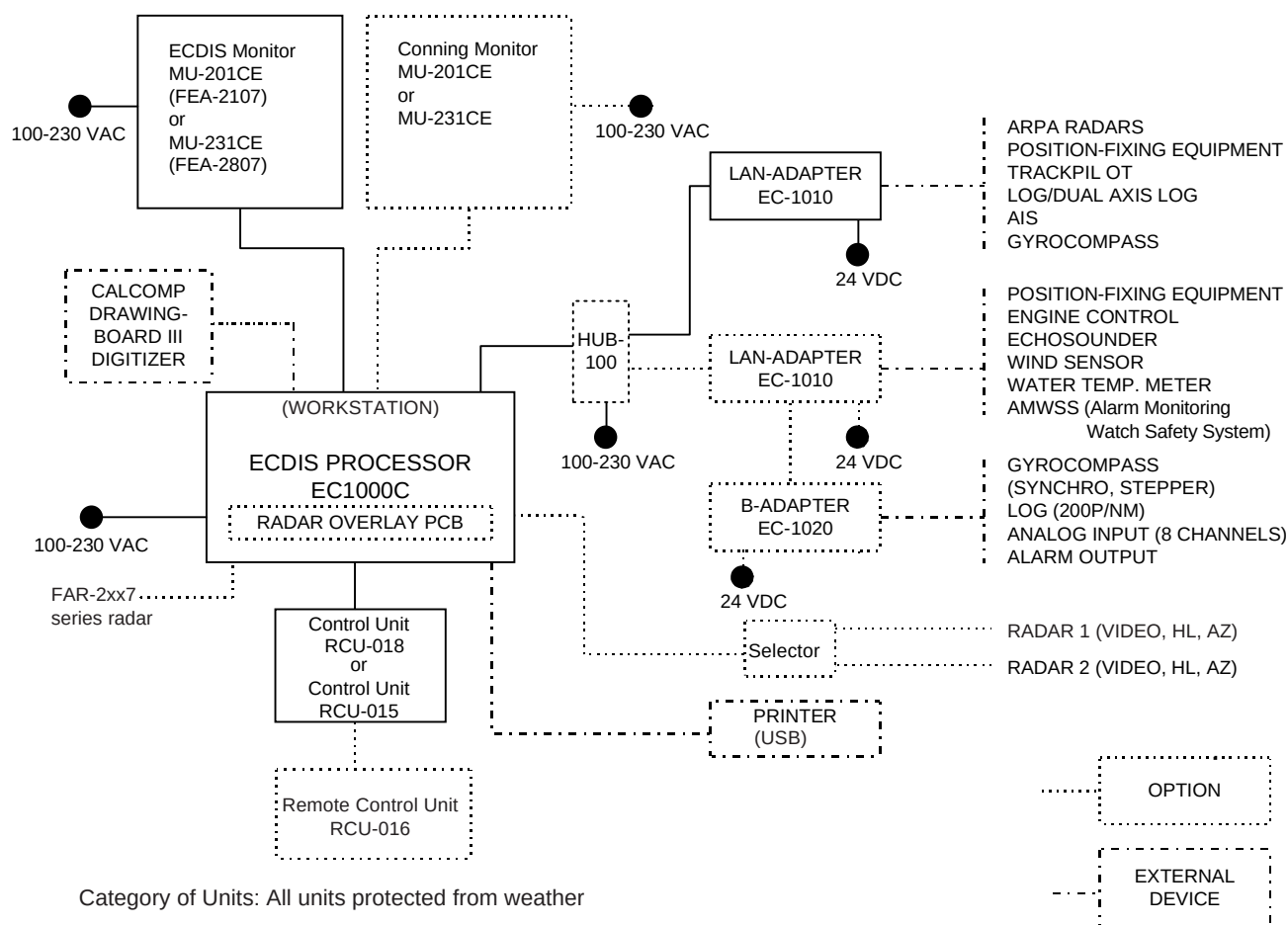
If the system has two workstations connected together as multiple workstations, the system keeps data on the workstations harmonised and also tracks selections and settings made on any workstation.

Typically there can be the following kinds of configurations of workstations:

- Mode as **Single**, only one workstation is used in the system.
- Mode as **Multiple**, two workstations are used in the system where usage rights and sensor source of workstations can be changed by the operator.

For more information, see Chapter 18 Common Reference System.

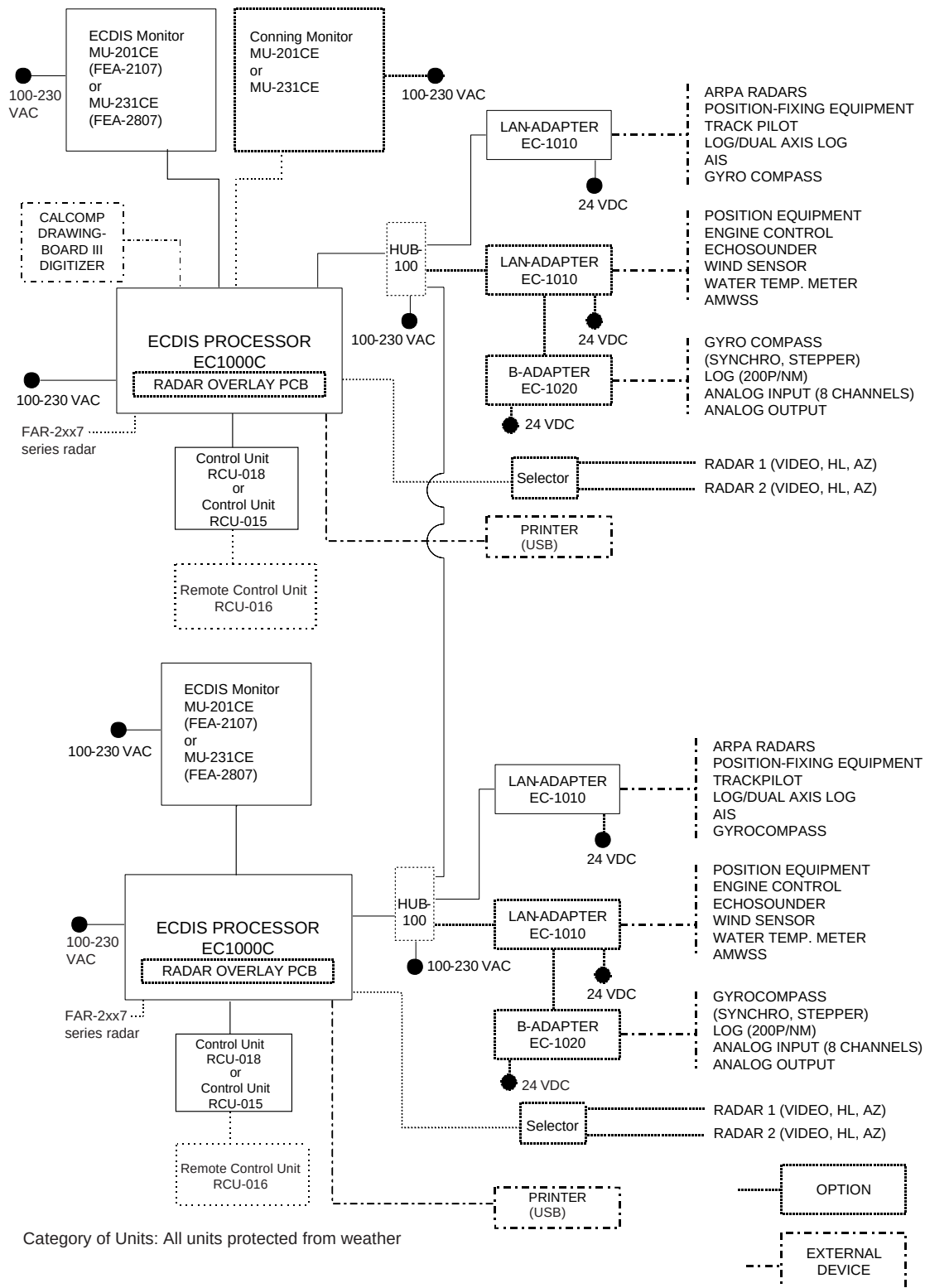
1.2.1 Single workstation



Single workstation with connection to navigation sensors

1.2.2 Multiple workstation configuration

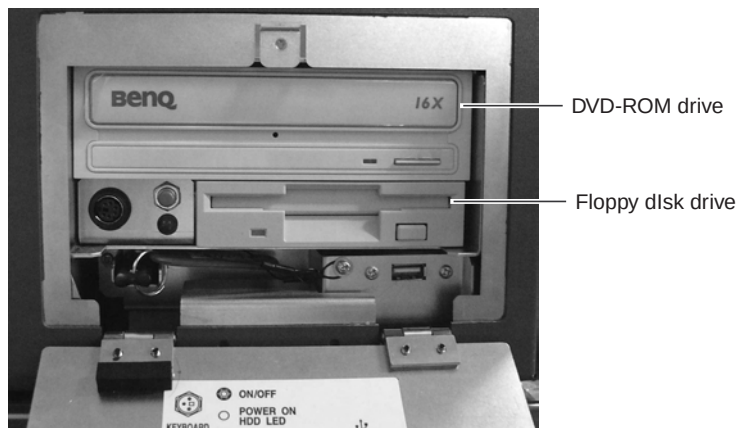
In the multiple workstation configuration, there can be two workstations connected together by a Local Area Network (LAN). In this configuration, one workstation is used as the "sensor source" for navigation sensors and the other workstation is used as the sensor source workstation to communicate with sensors, receiving and transmitting data from/to workstation via the LAN. In the multiple workstation configuration where navigation sensors are connected to two workstations, the sensor source may be changed and still receive and transmit information from/to the system and to/from navigation sensors.



Multiple workstation with connection to navigation sensors

1.3 The Processor Unit

The processor unit is the heart of the system, responsible for the loading, storing, updating and processing of electronic sea charts, with the DVD-ROM drive or floppy disk drive. The DVD-ROM and floppy disk drives are behind the lid on the front panel.



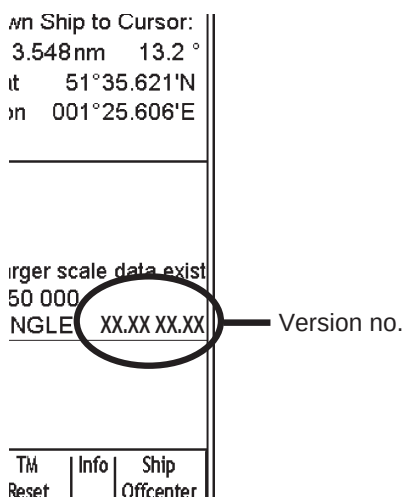
1.4 Turning the Power On/Off

The system may be turned on by turning on the power switch at the rear of the processor unit then pressing the **POWER** switch on the Control Unit, until you feel a "click." At this time the equipment releases a beep. To turn off the system, reverse this sequence.

Note: The amount of resources used increases over time, sometimes slowing down operation. If operation seems to be slow, re-set the power, when use of the equipment is not required; for example, when in port.

1.5 How to Find Version Number of ECDIS Software

The ECDIS software version number is displayed in the information area, next to the scale factor.



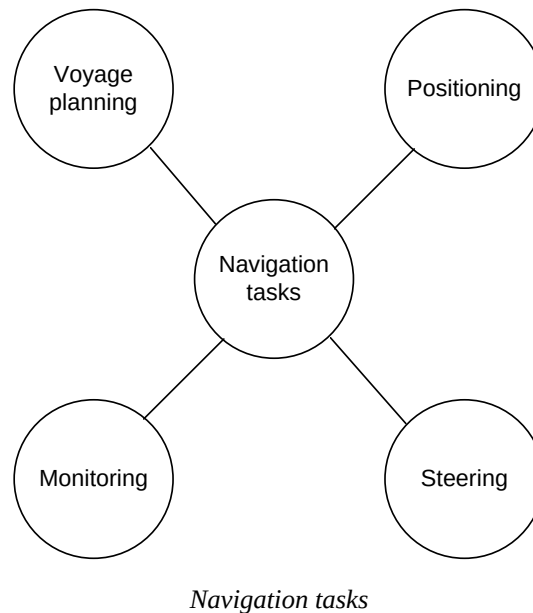
1.6 Diagnostics

The ECDIS has two types of diagnostic tests. One type (several tests) checks the functionality of the equipment and the other type calibrates the monitor. This manual provides only the instructions for testing the keyboard. For further details about diagnostic tests, see the service manual.

2. Navigation Tasks

2.1 Overview

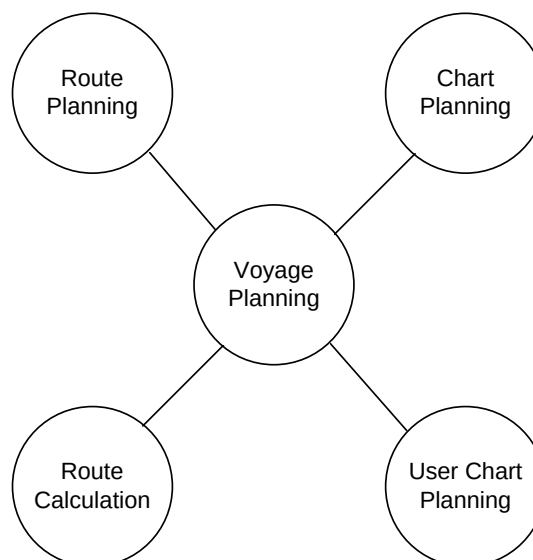
Navigation tasks can be divided into four basic tasks:



2.2 Voyage Planning

Voyage planning is the preparation phase for a coming voyage. Preparation includes route definition, route calculation and route optimisation.

Required sea charts are also prepared in voyage planning, either by updating existing charts or creating new ones.



2. Navigation Tasks

2.2.1 Route planning

A route can be created two ways: Modify an existing route to create a new route or create a new route from scratch.

A route consists of the following:

- Position of each waypoint
- Turning instructions for each waypoint
- Safety limits between waypoints (channel limits)
- Safe water calculation based on safety limits
- Required steering accuracy for individual legs
- Speed restrictions for legs

Information notebook:

- Information pages to alert the operator to a given waypoint or a chosen area.
- Automatic and/or manual notebook function to tell operator position-based information.

Voyage optimisation parameters: See "voyage optimization" below.

2.2.2 Route calculation

Route calculation for voyage planning includes the following:

Route profile calculation:

- Distance between consecutive waypoints
- Course between waypoints
- Calculation of wheel over point
- Total distance
- Estimated time for voyage

Route check:

- Grounding alarm based on available depth information in digital chart database.

Voyage optimisation:

- Timetable optimisation
- Optimisation based on economical factors
- The ECDIS processor calculates optimum speed and course between each waypoint, ETA and fuel consumption, based on the defined data. There are four calculation strategies: Max. Speed, Timetable, Lowest Cost and Best Profit. In case of Great Circle sailing between two waypoints, the ECDIS calculates minimum and maximum latitudes, and if needed adds an extra waypoint(s) so as not to exceed minimum and maximum latitudes.

2.2.3 Chart planning

Chart planning consists of the following steps:

1. Load new S57 and ARCS charts.
2. Update existing S57 and ARCS charts.
3. Manage chart permits.
4. Manually update charts.

2.2.4 User chart planning

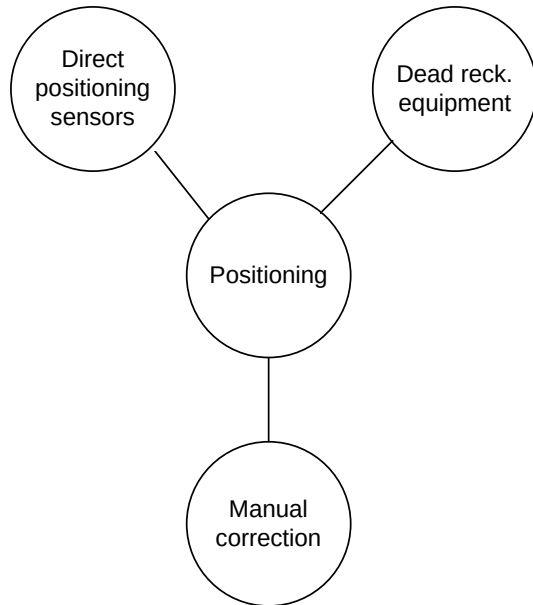
User chart planning consists of the following steps:

1. Create operator navigation charts.
2. Process chart alarms based on symbols, lines and areas of user chart.

2.3 Positioning

Positioning means using all available methods available to calculate and keep ship's position up-to-date during a voyage.

The calculation of ship's position is based on available navigation sensors. The system integrates valid information from different sensors and uses the Kalman filter technology for final position calculation.



2.3.1 Direct positioning sensors

Radio navigation equipment:

- Decca navigator
- Loran-C navigator
- SYLEDIS navigator
- Local position-fixing systems

Satellitenavigation systems:

- GPS navigator
- GPS navigator with a differential correction, DGPS

2.3.2 Dead reckoning equipment

Ship's heading measurement devices:

- Gyrocompass
- Magnetic compass
- GPS gyrocompass

Speed measuring devices:

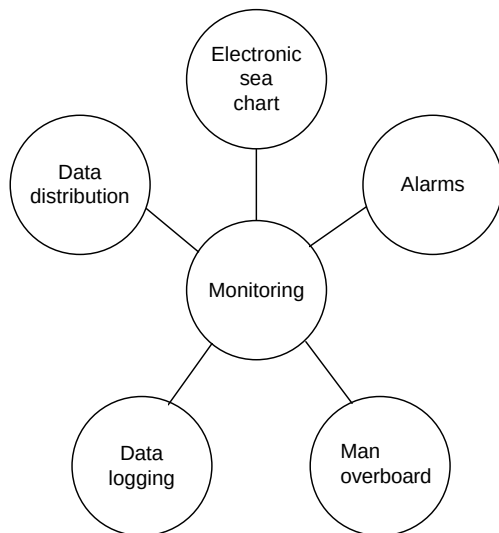
- Single-axis speed logs
- Dual-axis speed logs
- Radionavigation equipment
- Satellitenavigation equipment

2.3.3 Manual correction

User-executed position correction where radar echoes and information from synthetic charts are combined and verified by the operator, and adjusted if necessary.

2.4 Monitoring

Monitoring is a continuous check of navigation data, operator actions and performance of the system. Part of the monitoring is also the display of electronic sea charts and conning information.



2.4.1 Display of electronic sea chart

The following information is available on the electronic sea chart:

- Own ship position
- Planned track
- Planned safety lines
- Ship's predictor (See the section Using the Predictor (section 28.13, 29.10, 30.11, according to Autopilot used)
- Chart alarms
- ARPA targets
- Chart information
- AIS targets

2.4.2 Alarms

The following alarms are incorporated:

- Route monitoring alarms
- Position calculation alarms
- Position monitoring alarms
- Waypoint approach alarms
- Alarms for sensor failure
- Alarms for system failure
- Alarms for incorrect operator action
- Alarm based on chart database

2.4.3 Man overboard

Built-in man over board function records position at the time of man overboard.

2.4.4 Data logging

The following information may be logged:

- Past track history
- Events
- Dangerous targets
- Voyage recording

2.4.5 Data distribution

Data is distributed via the ECDIS's computer system.

3. ECDIS Display

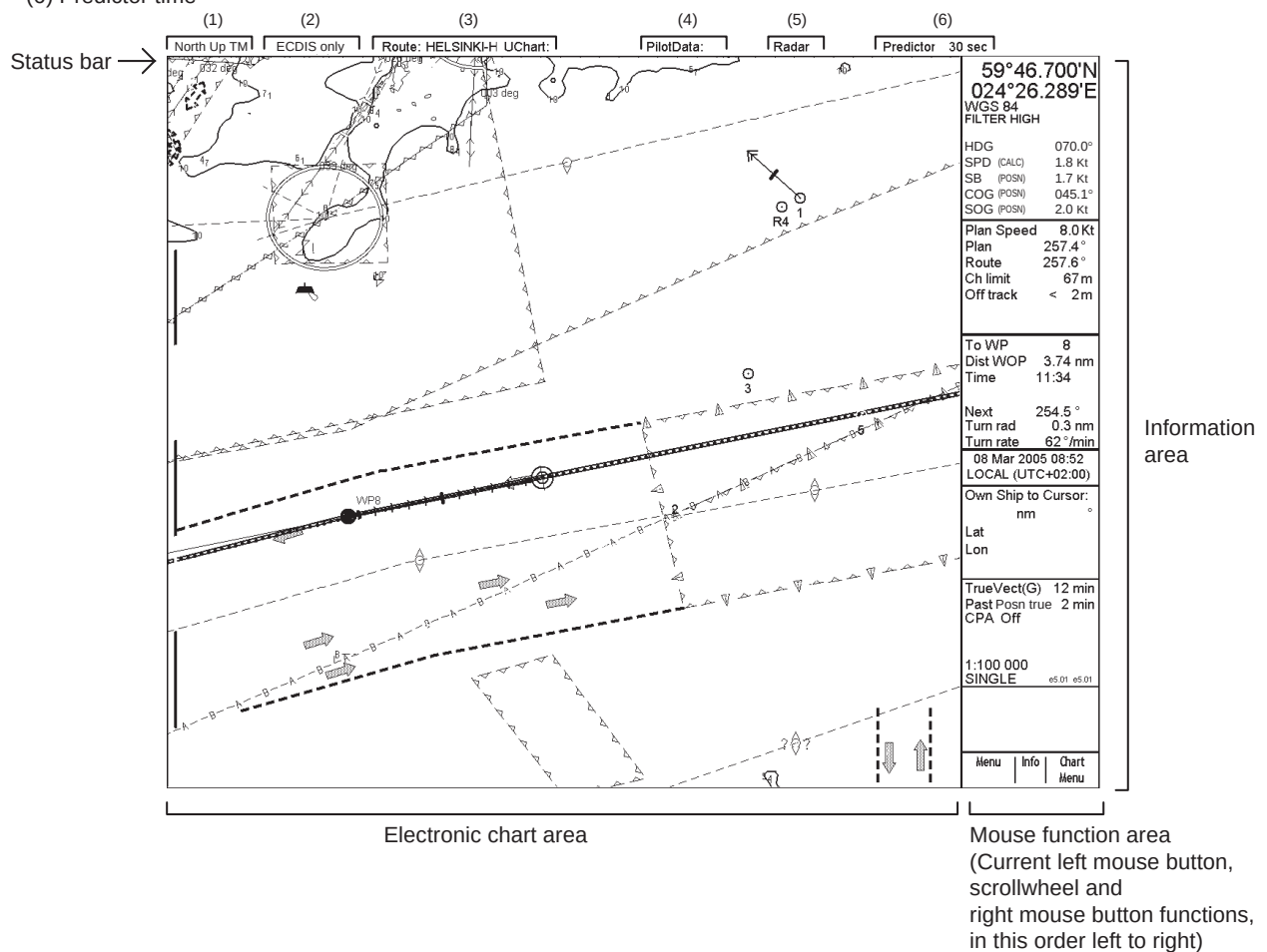
3.1 Overview

The ECDIS (Electronic Chart Display and Information Systems) screen is divided into several areas. The **Status bar**, which is always shown at the top of the screen, mainly displays equipment status.

The boxes at the right side of the screen comprise the **Information areas**. They are permanently displayed and show information such as your ship's position, alarms generated by the system, workstation mode and cursor position. The operator may display the data of his or her choice in one of the information areas called a **Sidebar**. (See section 3.3.2 Activating dialog boxes on the display.) The bottom block in the information area is the **Mouse functions area**, and it shows the current left mouse button, scrollwheel and right mouse button functions, in that order from left to right.

7/8 of the ECDIS display is taken up by the **Electronic chart area**.

- (1) Presentation mode
- (2) Operating mode
- (3) Route name, User Chart name
- (4) Pilot Data name
- (5) Source of Radar video and source of target's information
- (6) Predictor time



Parts of the ECDIS display

3.2 Electronic Chart Area

The ECDIS can use the following types of charts:

- S57ed3 ENC charts (vector)
- CM-93 charts (vector)
- ARCS charts (raster)

The following information can also be displayed:

- Cursor (moved by trackball)
- Planned route
- EBL (Electronic Bearing Line) and VRM
- Own ship symbol with speed vector
- ARPA-acquired target
- AIS targets

3.2.1 Electronic charts in ECDIS

The electronic navigational charts are displayed in the electronic chart area. There are two kinds of electronic navigational charts available for use in the ECDIS:

- S57ed3 ENC or CM-93 vector format
- ARCS raster format

Official paper charts may be replaced with S57ed3 ENC and ARCS charts. The operator should check the current situation in his or her flag country administration and if in doubt use the paper charts as the primary source of navigational information.

The ECDIS combines chart and navigational information. It should be noted that modern navigation systems (e.g., differential GPS) may offer more accurate positioning than what was used to position some of the surveys from which the electronic navigational chart was derived.

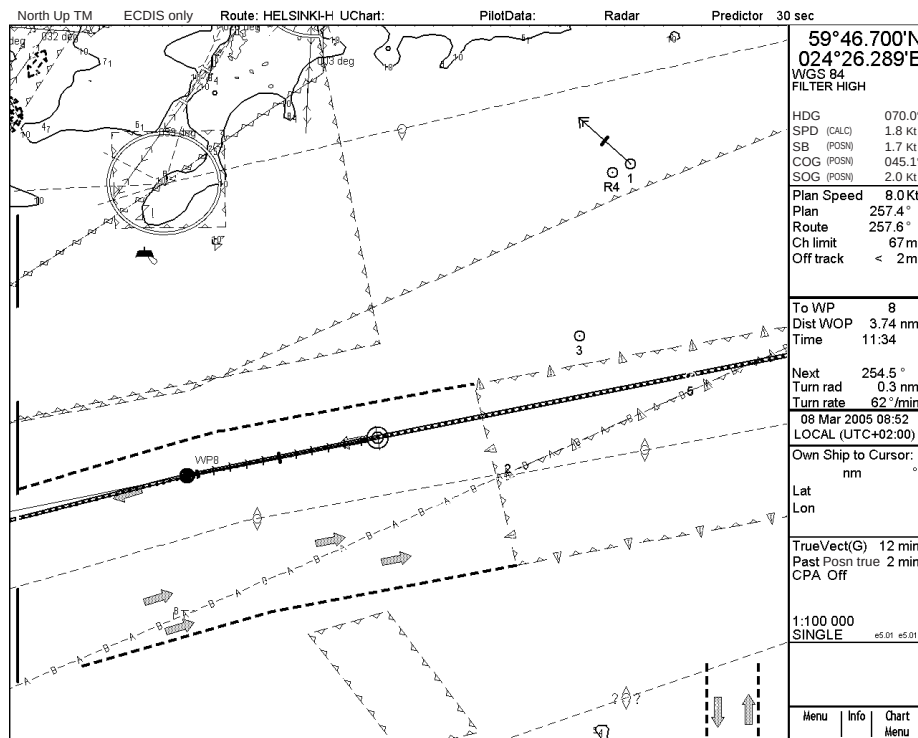
S57 vector format

ECDIS is compatible with S57 release 3 ENC format charts. From this format, the ECDIS generates the "system ENC", = SENC, which is used for actual operations of the ECDIS.

When you open a chart, it is displayed with the default scale, called the compilation scale. The details for the chart are displayed in the electronic chart area and these can be modified. You can change the chart scale with the ZOOM IN and ZOOM OUT functions, and the scale range is 1:1,000 - 1:50,000,000.

CM-93

Compatibility with CM-93 format depends on commercial agreements. Some versions of this ECDIS are compatible and others are not. The compatibility is controlled by the security device called a dongle. From CM-93 format the ECDIS generates SENC, which is used for actual operations of the ECDIS. The difference between S57ed3 ENC charts and CM-93 charts is that the CM-93 charts are from a private source and they cannot be used as a substitute for paper charts under any condition. To emphasize this point these charts are called "Non-HO" charts in this manual.

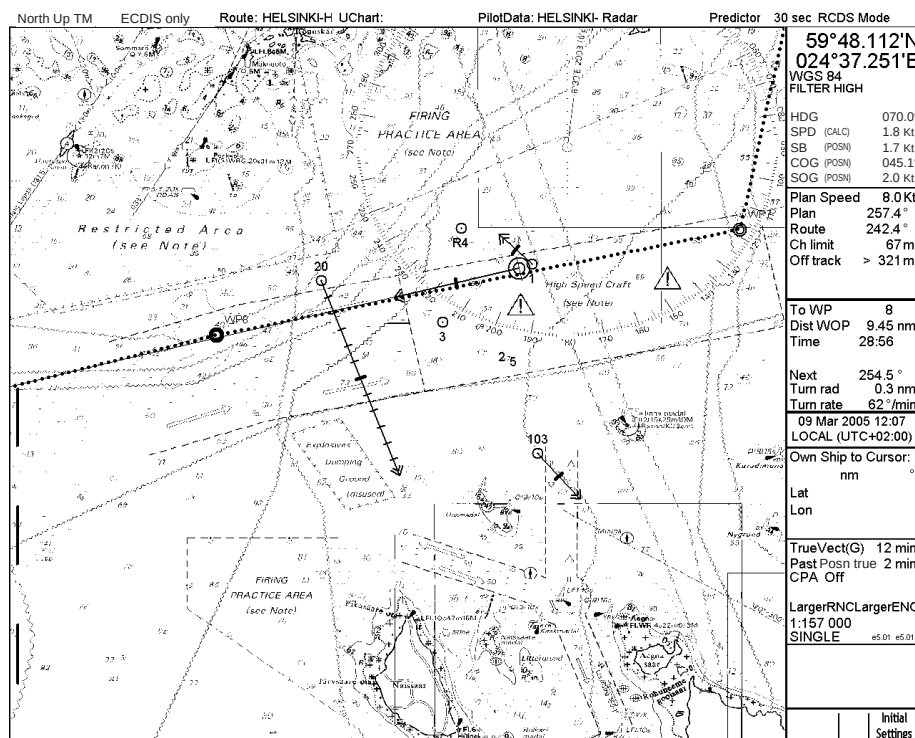


S57 vector chart

ARCS raster format

ARCS charts are digital reproductions of British Admiralty (BA) paper charts. They retain the same standards of accuracy, reliability and clarity as paper charts.

Zooming into the ARCS chart can be useful for magnifying a complex detail, however this decreases the density of the data displayed, and can give a false impression of the distance from danger. Therefore, it is possible to zoom 2x the original paper chart's scale or ½ the original paper chart's scale.



ARCS raster format chart

3.3 User Interface

The operator interface is defined as the areas which are not displaying the electronic chart, either raster chart or vector chart.

The operator interface contains information about settings, parameters and selections used by the ECDIS. The nature of the information displayed can be either static (such as name of a certain window, fields in chart legend, units, etc.) or dynamic (such as position of your ship, time, operator selections, etc.).

3.3.1 Color palettes for the operator interface

There are several color palettes available for choosing colors for the chart background and information areas.

Setting	Background color of chart	Background color of information area
Day Bright	Light-blue	White
Day Blue	Light-blue	Dark-blue
Dusk	Blue	Black
Dusk Blue	Blue	Dark-blue
Night	Black	Black

With any palette selection except Day Bright, static text from dynamic text is shown in different colors to help you distinguish between them. For example, dynamic data like your ship's position, time or direct control of parameters (scale, predictor time, etc.) is shown in yellow color.

To choose a color palette, do the following:

1. Set the cursor in the electronic chart area.
2. Spin the scrollwheel until Chart Display/Info/Standard Display is shown in the mouse functions area.
3. Push the left mouse button to open the Chart Display dialog box.
4. If the "Chart page" is not selected, click an arrow tab in the dialog box to display it.
5. Place the cursor on Palette.
6. Spin the scrollwheel to choose desired palette, referring to the table above, then push the scrollwheel.
7. Click the X at the top right corner of the dialog box to close the box.

Note: The display colors may change to the Windows standard color palette whenever a USB memory device is inserted or removed. (When Windows initiates USB recognition procedures, the Windows standard color palette is restored.) To restore the ECDIS color palette, open the Chart Display menu and do the procedure on this page.

Information area

The information area displays details about your ship's position, course and speed and the cursor's location on the chart

Information from the positioning sensors:

- Latitude and longitude position of your ship
- Datum in use (WGS 72, WGS 84, European 1950, etc.), which is shown above positioning source.
- Positioning source: Dead Reckoning, GPS, DGPS, LORAN, FILTER, etc.
- HDG reading and its source if it is not true gyro.
- SPD water speed
- SB, Transversal speed, positive value to Starboard
- COG (Course over ground) and its source
- SOG (Speed over ground)
- Range and bearing from your ship's position to cursor
- Latitude and longitude position of cursor displayed in chosen datum.

Note: The order of items in the position and cursor windows can change with the sidebar used. See the next page.

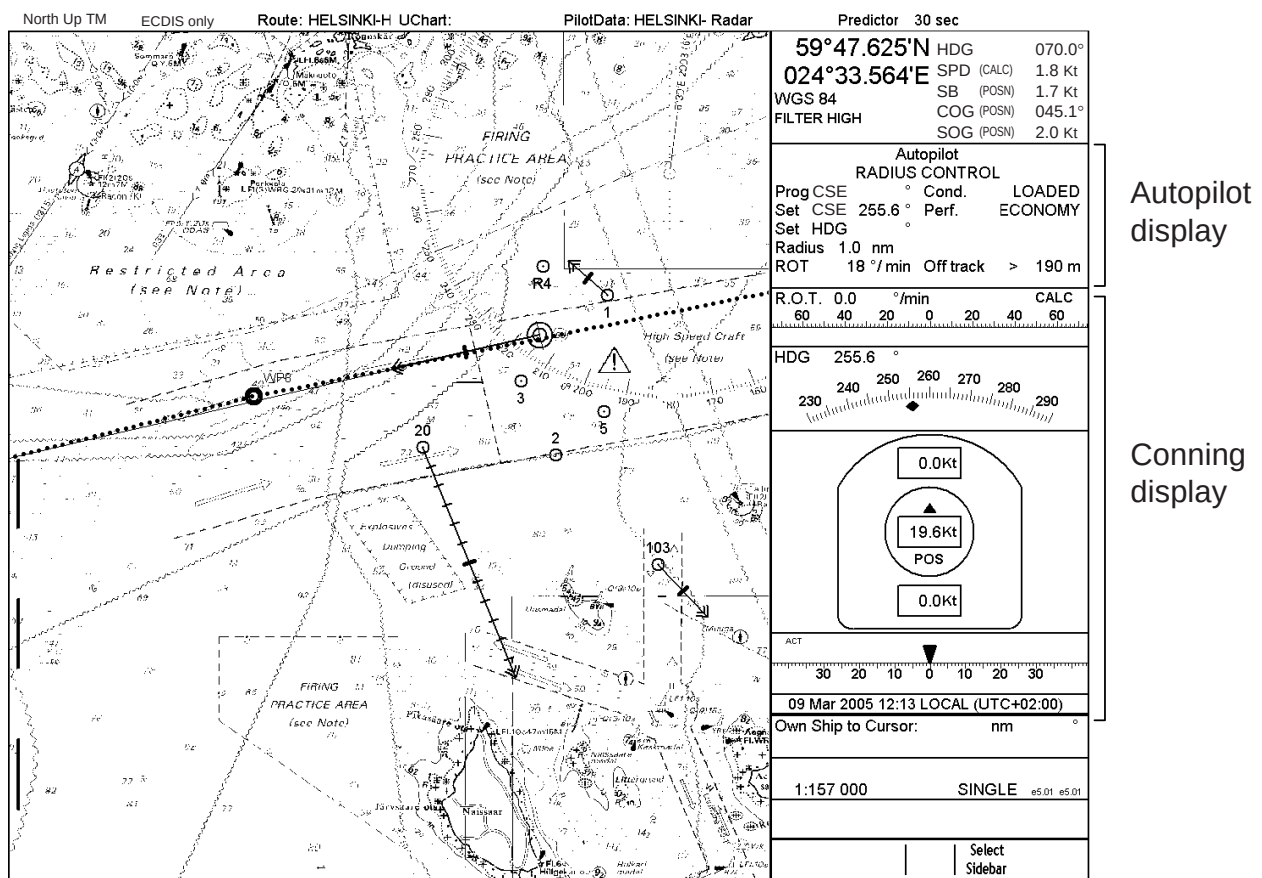
59°50.502'N	
024°52.836'E	
WGS 84	
FILTER HIGH	
HDG	197.9 °
SPD (WAT)	17.2 Kt
SB (POSN)	0.0 Kt
COG (POSN)	200.0 °
SOG (POSN)	17.2 Kt

Own Ship to Cursor:	
5.403nm	154.7 °
Lat	50°14.469'N
Lon	000°04.880'E

3.3.2 Sidebar on operator interface

You may choose what kind of information to display in the sidebar (right side) of the ECDIS. The options shown below are available and the content of the sidebar windows change with the devices and sensors connected to the system. The route display or autopilot display is always displayed. You can display one of them together with the conning display, docking display or chart legend. When two sidebars are active, the width of the information area is doubled, as shown below.

- Route display
- Autopilot display
- Conning display
- Docking display
- Chart legend



Sidebar, with autopilot and conning display windows

Opening the sidebar on the display

Sidebar(s) may be opened as shown below. Two sidebars may be displayed.

- 1. Place the cursor on the area shown.
- 2. "Select Sidebar" appears in the mouse functions area. See figure at right.
- 3. Click the right mouse button to show the sidebar menu on the display.
- 4. Spin the scrollwheel to choose desired sidebar from the menu then push the scrollwheel.

To remove an item from the sidebar, deselect it following this procedure.

1 sec

59°48.112'N
024°37.251'E
WGS 84
FILTER HIGH

HDG 070.0°
SPD (CALC) 1.8 Kt
SB (POSN) 1.7 Kt
COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Plan Speed 18.5 Kt
Plan 73.2°
Route 79.1°
Ch limit
Off track

To WP 8
Dist WOP 13.04 nm
Time 01:11:54
Next WP 9

ad 58.8°
ate 1.0 nm
ate 10°/min

0.2004 08:20
L (UTC+01:00)

Ship to Cursor:
nm °

Lon

True Vect(G) 12 min
Past Posn rel 2 min
CPA 10 nm 10 min

1:166 386
SINGLE b5.01 b5.01

Menu | Select
Sidebar

1.

3.

2.

✓Route
Autopilot

Conning
Docking
Chart Legend

Close

3. ECDIS Display

Information in route sidebar

The following information is shown in the route sidebar:

Information from route monitoring:

- **Plan Speed:** Planned speed to approach "To WP".
- **Plan:** Planned course between previous WP and "To WP".
- **Route:** Calculated set course to follow the monitored route, including off track, drift and gyro error compensation.
- **Ch limit:** Planned width of channel to approach "To WP".
- **Off track:** Perpendicular distance the ship is from the intended track.
- **To WP:** The waypoint which the ship is approaching.
- **Dist WOP (Wheel Over Point):** Distance to the point where rudder order for course change at "To WP" will be given.
- **Time:** Time to go to WOP (dd:hh:mm:ss).
- **Next WP:** The WP following the "To WP".
- **Next:** Planned course between "To WP" and "Next WP".
- **Turn rad:** Planned turning radius at "To WP".
- **Turn rate:** Calculated rate of turn which is based on current speed and planned turning radius.

The following information is calculated from data of positioning sensors and from route monitoring data:

- **Route**
- **Off track**
- **Dist WOP**
- **Time**
- **Next**

Plan Speed	18.5 Kt
Plan	73.2 °
Route	79.1 °
Ch limit	185 m
Off track	< 18 m
To WP	8
Dist WOP	13.04 nm
Time	01:11:54
Next WP	9
Next	58.8 °
Turn rad	1.0 nm
Turn rate	10 °/min

Additional textual information is available if any of the following steering modes are in use.

For FURUNO Autopilot FAP-2000, see Chapter 28.

- "Goto WP", "Goto WP Great circle", "Ass. Appr enabled" and "Ass. Turn enabled" and "Assisted turn" in Goto Waypoint mode
- "Goto Track", "Track Great circle" and "Track Appr. Enabled", "Track Turn Enabled" and "Track Turn" in Go Track mode

For the Autopilot PR-6000 the following steering modes are available. For more information, see Chapter 30.

- "Goto OS", "Goto OS Great circle", "Ass. Appr. Enabled", "Ass. Turn enabled" and "Assisted turn" in Goto OS mode
- "Goto AW", "GoAW Great circle", "GoAWAppr. Enabled", "GoAW Turn Enabled" and "Goto AW Turn" in Go Track mode

Permanent alarms are available in the following cases, regardless of the steering mode used:

- "Outside channel" is indicated by displaying the indication "Off track" in red and its value in orange.
- "Out of gate" is colored orange. It indicates that if the ship continues using the current course the ship will be outside of the channel at wheel over point.
- "Autopilot Conflict", available only with Autopilot PT-500A.

Information in autopilot sidebar

The following information is shown in the autopilot sidebar, which shows settings and readings from an autopilot.

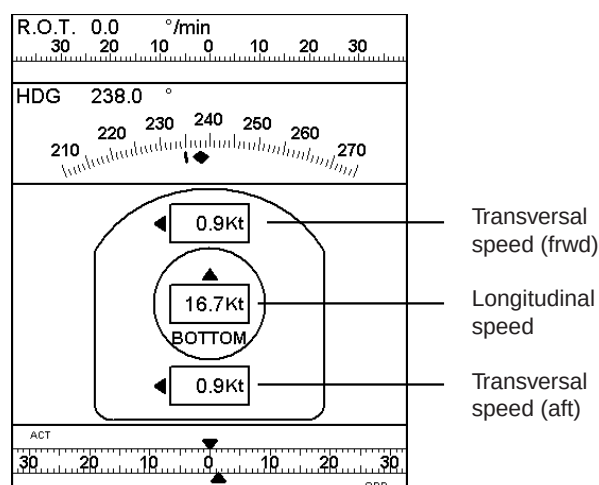
- **Steering mode (below "Autopilot")**
- **Prog CSE:** If you use program track or program heading change steering modes, planned course is shown.
- **Set CSE:** Actual set course
- **Set HDG:** Actual set heading
- **Radius:** Actual set radius
- **ROT:** Value for ROT
- **Cond:** Setting for loading condition
- **Perf:** Setting for steering accuracy
- **Off track:** Distance from center line of planned route



Information in conning display sidebar

The following information is shown in the conning display sidebar:

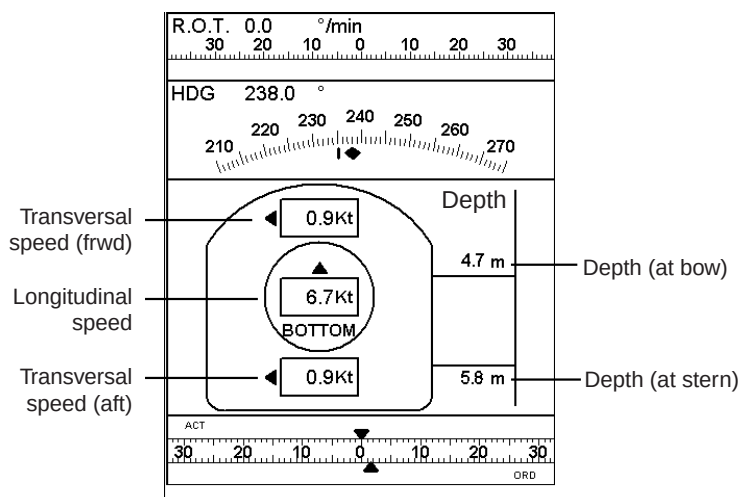
- **ROT indicator**
- **Heading indicator**
- **Speed indicators**
 - Longitudinal speed and source of speed
 - Transversal speed
- **Rudder angle indicator**



Information in docking sidebar

The following information is shown in the docking sidebar:

- **ROT indicator**
- **Heading indicator**
- **Speed indicators**
 - Longitudinal speed and source of speed
 - Transversal speed
- **Rudder angle indicator**
- **Depth below transducer**
 - On bow
 - On stern



3. ECDIS Display

Information in chart legend sidebar

For detailed information see the chapters on vector charts (S57) and raster charts (ARCS).

3.3.3 Activating dialog boxes on the display

There are several dialog boxes which can be activated by mouse-clicking over certain areas on the ECDIS display. Place the cursor over the appropriate area then click the right or left mouse button to display the corresponding dialog box on the ECDIS display. See the figure below to find the places and mouse button to click to get desired dialog boxes on the display. To close a dialog box, click the X at the top right corner of the dialog box. Note that only one dialog box may be shown at a time.

The screenshot shows the ECDIS display with a route plan and several dialog boxes. The main display area shows a route plan with waypoints and a table of waypoints. The 'PLAN ROUTE' dialog box is open, showing a table of waypoints. The 'SET TIME' dialog box is open, showing the time zone and date. The 'NAV. MARKS' dialog box is open, showing the navigation marks. The 'ALARM QUEUE' dialog box is open, showing the alarm queue. The 'SENSORS' dialog box is open, showing the sensor data. The 'MON. ROUTE' dialog box is open, showing the monitored route.

PLAN ROUTE

WP	NAME	Lat	Lon	Leg	Leg/Nm	Str mode	Rad/Nm	Ch limit/m	Spd min	Spd max
2	WP 1	32°49.250'N	130°24.200'E	203.8	5.9	Rhumb Line	0.3	185	0	20
3	WP 2	32°44.000'N	130°27.200'E	154.2	5.8	Rhumb Line	0.3	185	0	20
4	HAYASAKI	32°34.300'N	130°15.100'E	226.5	14.1	Rhumb Line	0.3	185	0	20
5	HAYASA 2	32°34.300'N	130°10.000'E	270.0	4.3	Rhumb Line	0.5	185	0	20

SET TIME

Set time zone, date and time of your workstation.

Time: (00) Greenwich Mean T1

Automatically adjust clock for daylight saving changes

Local time: 04 Oct 2004 10:07

NAV. MARKS

Set 1 Set 2

Centered Ref. Pt

Display:

☒ Ref. Pt

☒ VRM

☒ EBL

☐ Parallel index

☐ Rings: 2 nm

☐ Info

EBL 328.2 °T

VRM 0.525 nm

Lat 50°27.122'N

Lon 000°41.390'E

Ref. Pt : ConnPos

Lat 50°26.675'N

Lon 000°41.823'E

ALARM QUEUE

SENSORS

Spd/Coe Posn

☐ Manual speed

☒ Dual log (water)

> 0.0 Kt

< 12.5 Kt

☒ Dual log (bottom)

> 0.0 Kt

< 12.5 Kt

☐ ARPA

Kt

☒ Manual heading

000.0 °

☐ Gyro 1

☐ Gyro 2

☐ Rate gyro (calc)

0.0 °/min

MON. ROUTE

Monitor Alarms

To WP 8

ETA WP 10

Time 04 Oct 04 12:52

Distance 31.4 nm

Final WP 20

Time 05 Oct 04 04:34

Distance 210.4 nm

Plan final 05 Oct 04

Off plan -94 min

Suggested spd 22.1 Kt

Trial spd 11.4 Kt

Spd profile Trial

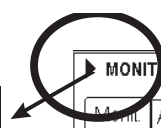
This route is unchecked

Additional menu functions in dialog boxes

Dialog boxes which have a triangle at their upper left-hand corner contain a menu which provides additional functions. See the figure at right. Place the cursor on the triangle to show a menu from which to choose additional functions.

Note: A menu will also appear if you try to activate a dialog box without choosing an option from the menu. (For route, user chart or pilot data, see section 3.4 Controlling Planning and Monitoring Modes on the ECDIS Display.)

[Route Monitor]
Select
Unselect
Report
Close

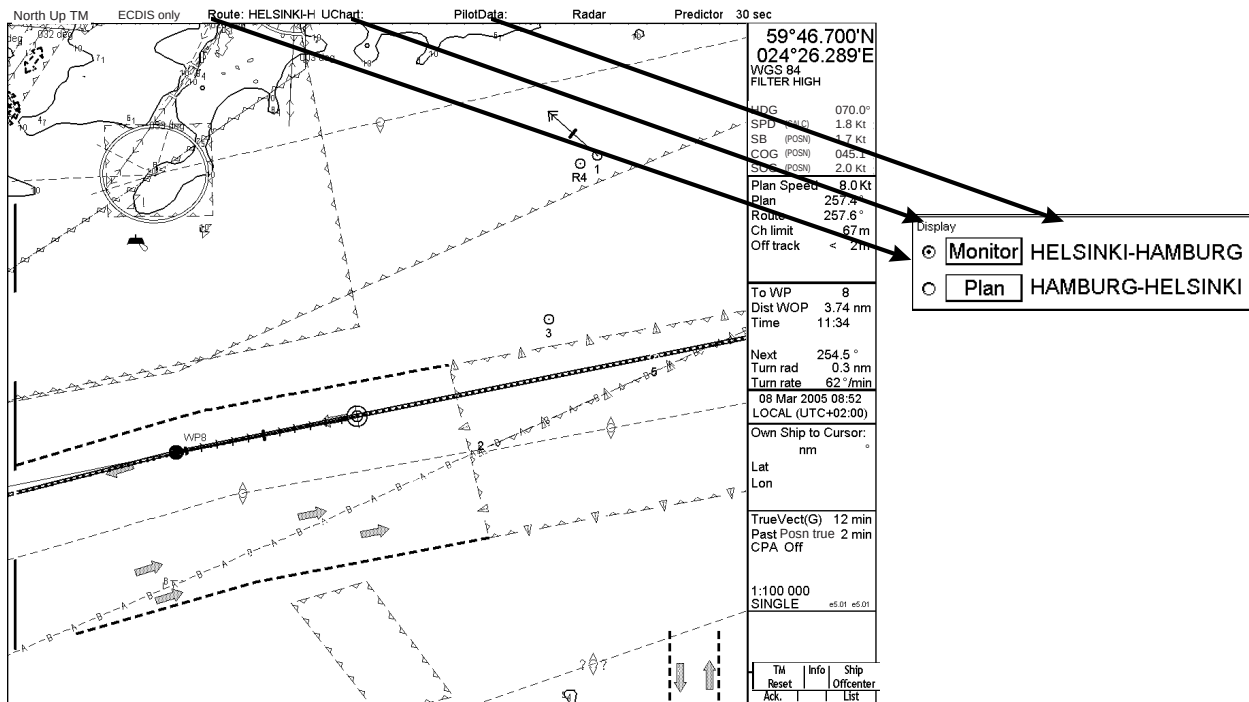


MONITOR ROUT ...		✕
Menu	Alarms	◀ ▶
To WP	8	
Timetable		
ETA WP		
Time		
Distance		nm
Final WP	20	
Time	05 Oct 04 06:14	
Distance	212.1	nm
Plan final	05 Oct 04	
Off plan	-74 min	
Suggested spd	12.2	Kt
Trial	11.4	Kt
Spd profile	Trial	▶
Checked conditions differ		

3.4 Controlling Planning and Monitoring Modes on the ECDIS Display

A route, a user chart or pilot data can be displayed at the top of the electronic chart in the status bar, in either the planning mode or the monitoring mode.

To choose desired mode, put the cursor on the text Route, User Chart or PilotData on the status bar. A drop-down dialog box appears, where you can choose either Monitor or Plan by clicking the appropriate button with the left mouse button. With user chart or pilot data, only the planning mode or the monitoring mode can be displayed in the status bar. (Displayed selected may be activated with a radio button. See the figure below.)



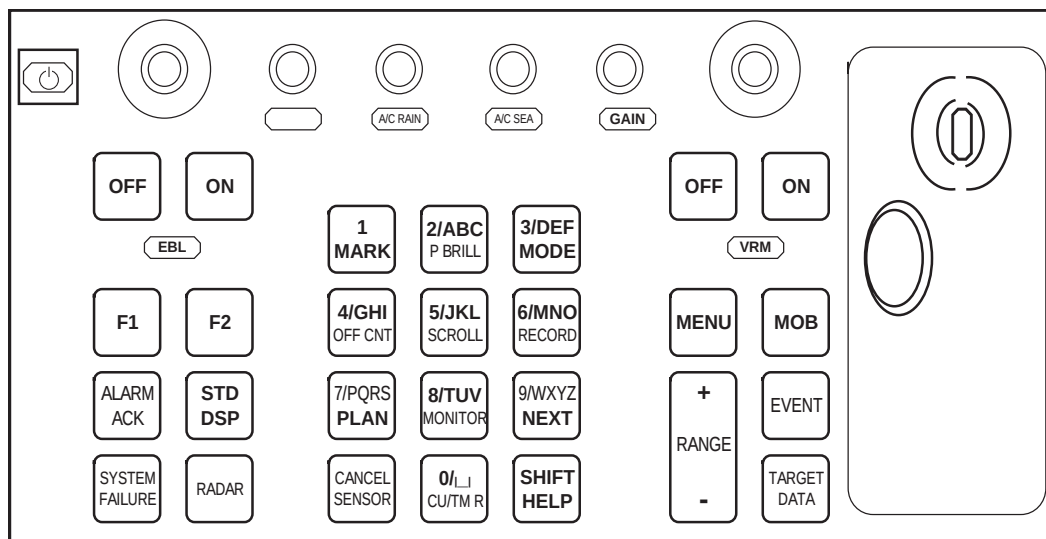
4. Control Units

4.1 How the ECDIS is Controlled

The operator controls the ECDIS with the Control Unit RCU-018 or the Control Unit RCU-015. Either unit is equipped with a trackball, right and left mouse buttons and a scrollwheel. The RCU-018 is additionally equipped with a keyboard. All functions of the ECDIS can be accessed using the trackball, mouse buttons and scrollwheel alone. To operate from a menu with the mouse, roll the trackball to choose desired item, operate the mouse buttons or scrollwheel (depending on item) to choose option then push the scrollwheel to confirm your selection.

4.2 Control Unit RCU-018

The Control Unit RCU-018 consists of a keyboard, the trackball, scrollwheel and mouse buttons. The trackball functions like a mouse; the operator rolls the trackball and operates the left and right mouse buttons to access functions.



Layout of the control unit RCU-018

4.2.1 Keys in control unit RCU-018

Key	Description
Power	Turns the system on/off. (This control does not switch the display on/off.)
VRM rotary encoder	Adjusts active VRM.
VRM ON	Activates and displays EBL1 if none is displayed or EBL 2 is active. Activates and displays EBL 2 if EBL1 is active.
VRM OFF	Inactivates and erases EBL1 if both EBLs are displayed. Inactivates and erases EBL 2 if EBL1 is active.
EBL rotary encoder	Adjusts active EBL.
EBL ON	Activates and displays EBL1 if none is displayed or EBL 2 is active. Activates and displays EBL 2 if EBL1 is active.
EBL OFF	Inactivates and erases EBL1 if both EBLs are displayed. Inactivates and erases EBL 2 if EBL1 is active.
F1	Activates operator-defined function or menu.
F2	Activates operator-defined function or menu.
ALARM ACK	Alarm acknowledgement for alarms generated by chart, navigation or steering calculation.
SYSTEM FAILURE	The red lamp behind the key lights and the buzzer sounds when system failure is found. Hit the ALARM ACK key to silence the buzzer. The key remains lit until the reason for the problem is removed. System failure: control unit cannot communicate with EC-1000C. (EC-1000C is inoperative.)
RADAR	Displays Radar Overlay dialog box, which provides functions for adjustment of the radar picture.
STD DSP	Activates standard display presentation on the ECDIS. Restore monitor brilliance to calibrated state.
1/MARK	Displays the Nav. Marks dialog box, which mainly provides for activation/deactivation of various markers.
2/ABC/P BRILL	Adjusts control unit dimmer.
3/DEF/MODE	Chooses presentation mode: North-up TM, Route-up RM, Course-up RM, North-up RM, Course-up TM.
4/GHI/OFF CNT	Offcenters your ship's position to cursor location on the ECDIS display. Press again to return your ship's position to screen center.
5/JKL/SCROLL	Enables scrolling, when the trackball is active.
6/MNO/RECORD	Opens Voyage Record sub menu.
7/PRQS/PLAN	Opens Plan Route dialog box.
8/TUV/MONITOR	Opens Monitor Route dialog box.
9/WXYZ/NEXT	Opens "Next" page in multi-page dialog box.
CANCEL/SENSOR	Opens Sensors dialog box; closes open dialog box or window.
0/space CU/TM R	Returns your ship marker to screen center in TM and CU modes; inserts a space.

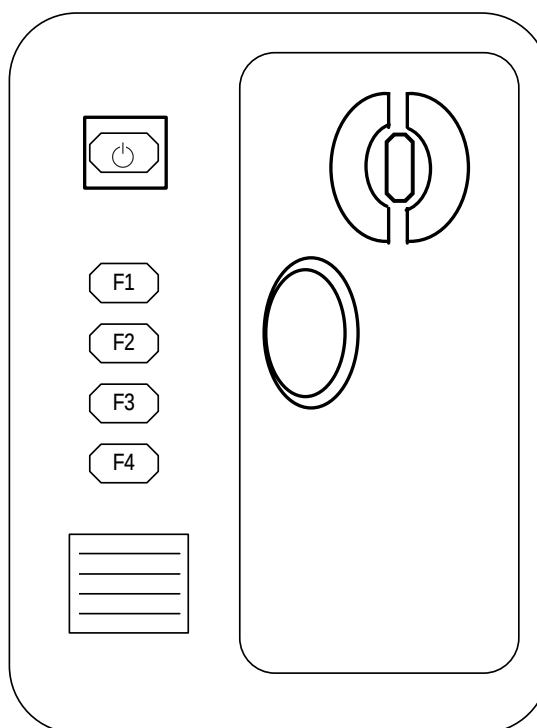
(Continued on the next page)

(Continued from previous page)

Key	Description
SHIFT/HELP	SHIFT: Shifts between lower case and upper case alphabets. HELP: Activates info/help. (Mouse must not be over input field.)
MENU	Displays the Main menu.
+ RANGE –	Adjusts charts scale.
MOB	Inscribes MOB mark on the screen.
EVENT	Records textual information fixed to your ship's position.
TARGET DATA	Shows target data for selected ARPA target; provides data for selected chart area.
GAIN	Adjusts radar gain on the radar overlay.
A/C RAIN	Reduces rain clutter on the radar overlay.
A/C SEA	Reduces sea clutter on the radar overlay.
	Adjust backlight brilliance of ECDIS display(s). Color calibrated backlight brilliance can be set using "Standard Display" button or selecting desired "Palette" in the Chart page of the Display window.

4.3 Control Unit RCU-015

The control unit RCU-015 provides minimum configuration with controls that function as shown in the table below.



Key	Description
Power	Turns the system on/off. (This control does not switch the display on/off.)
F1	Executes function assigned. Press more than two seconds to restore monitor brilliance to calibrated state.
F2	Same function as F1.
F3	Same function as F1.
F4	Same function as F1.

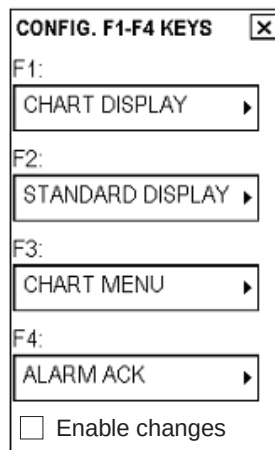
4.3.1 Configuring hot keys F1-F4

Hot keys (F1-F4 on the Control Unit RCU-015 and F1 and F2 on the Control Unit RCU-018) are provided to call a desired function/menu when pressed.

How to configure keys F1-F4

You may choose desired function/menu from a predefined list. To choose desired function/menu for each key, do the following:

1. Spin the scrollwheel until Menu/Info/Chart Menu appears in the mouse functions area.
2. Click the left mouse button.
3. Spin the scrollwheel to choose Initial Settings then push the scrollwheel.
4. Place the cursor on the triangle in the dialog box to show the Initial Settings menu.
5. Spin the scrollwheel to choose Function keys, then push the scrollwheel. The dialog box shown right appears.
6. Check Enable changes.
7. Place the cursor on the box for F1, F2, F3 or F4 as appropriate then spin the scrollwheel to choose desired function or menu. The choices are



ALARM ACK: Acknowledge ECDIS-generated alarm.
CHART DISPLAY: Opens Chart Display dialog box.
CHART MENU: Opens chart menu.
INITIAL SETTINGS: Display Initial Settings dialog box.
MENU: Opens Main menu
RADAR: Displays Radar Overlay dialog box.
RANGE+: Raises chart scale.
RANGE-: Lowers chart scale.
SCROLL: Scrolls display.
SENSORS: Opens Sensors dialog box
SET CHART CENTER: Sets chart center as selected with the cursor.
SET SHIP CENTERED: Centers your ship's position.
SET SHIPOFFCENTER: Offcenters ship position to cursor location.
STANDARD DISPLAY: Calls up standard display; restores monitor brilliance to calibrated state..
TM RESET: Resets your ship's position in true motion.

In the example at right the function of each key is as below:

F1: Opens **Chart Display** dialog box.

F2: Sets **Standard Display** settings on display.

F3: Opens **Chart** menu.

F4: **Acknowledges** alarms generated by ECDIS.

8. Click the X mark at the top right corner to close the dialog box.

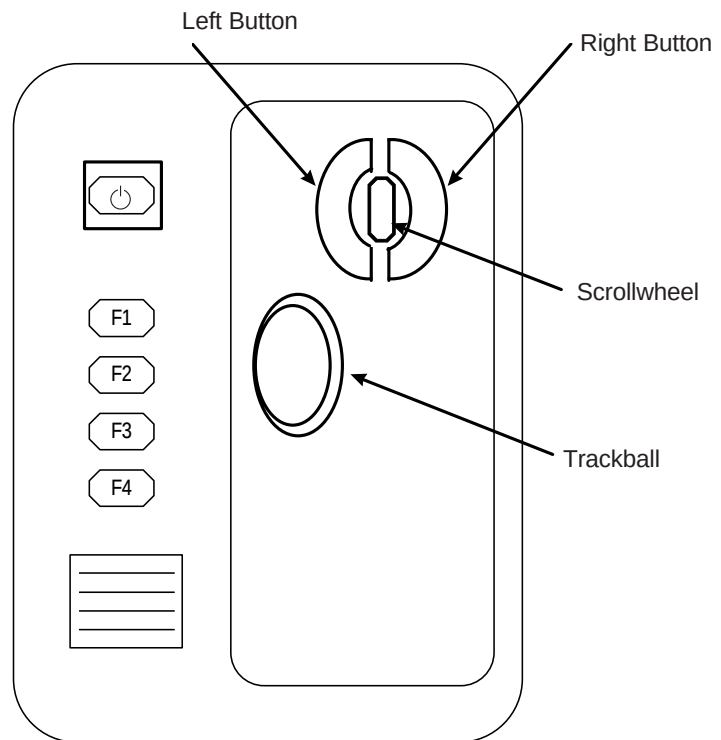
How to activate a menu or function with a hot key

Press the hot key corresponding to the menu or function you wish to activate.

4.4 Mouse Operations

4.4.1 Parts of the mouse

The mouse consists of the trackball, scrollwheel, left mouse button and right mouse button.



4.4.2 How to enter alphanumeric data

Entering alphanumeric data

With trackball

Alphanumeric input fields are activated for input by pointing with the mouse cursor and clicking the left mouse button. This action also displays minimum and maximum values beside the input field. The input value is chosen by spinning the scrollwheel, and the value is accepted by pushing the scrollwheel. (Alphanumeric data may also be entered directly from the keyboard-equipped control unit.)

To change a specific digit or alphabet, roll the trackball to put the cursor to the left of the digit or character that you want to change then spin the scrollwheel to choose appropriate alphanumeric character.

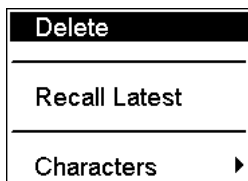
Changing co-ordinate polarity

By clicking co-ordinate polarity

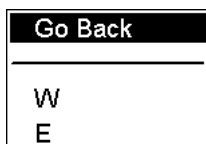
1. Place the cursor before the co-ordinate (N, S, E, W) then push the left mouse button.
2. Spin the scrollwheel to choose desired polarity then push the scrollwheel.

By choosing polarity from drop-down menu

1. Place the cursor inside the input window.
2. Click the right mouse button to show the following window.



3. Choose Characters and push the left mouse button. Your window should now look something like the one below. (N and S shown for latitude.)

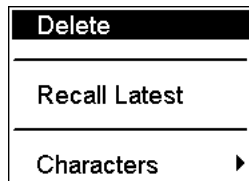


4. Spin the scrollwheel to choose appropriate polarity then push the scrollwheel. The coordinate is changed and the window is closed.

Deleting a character

A character can be deleted from text/numeric input field as follows:

1. Place the cursor to the right of the digit you want to delete then push the right mouse button.



2. Delete is chosen – push the scrollwheel to delete the alphanumeric chosen. The character is deleted and the window is closed.

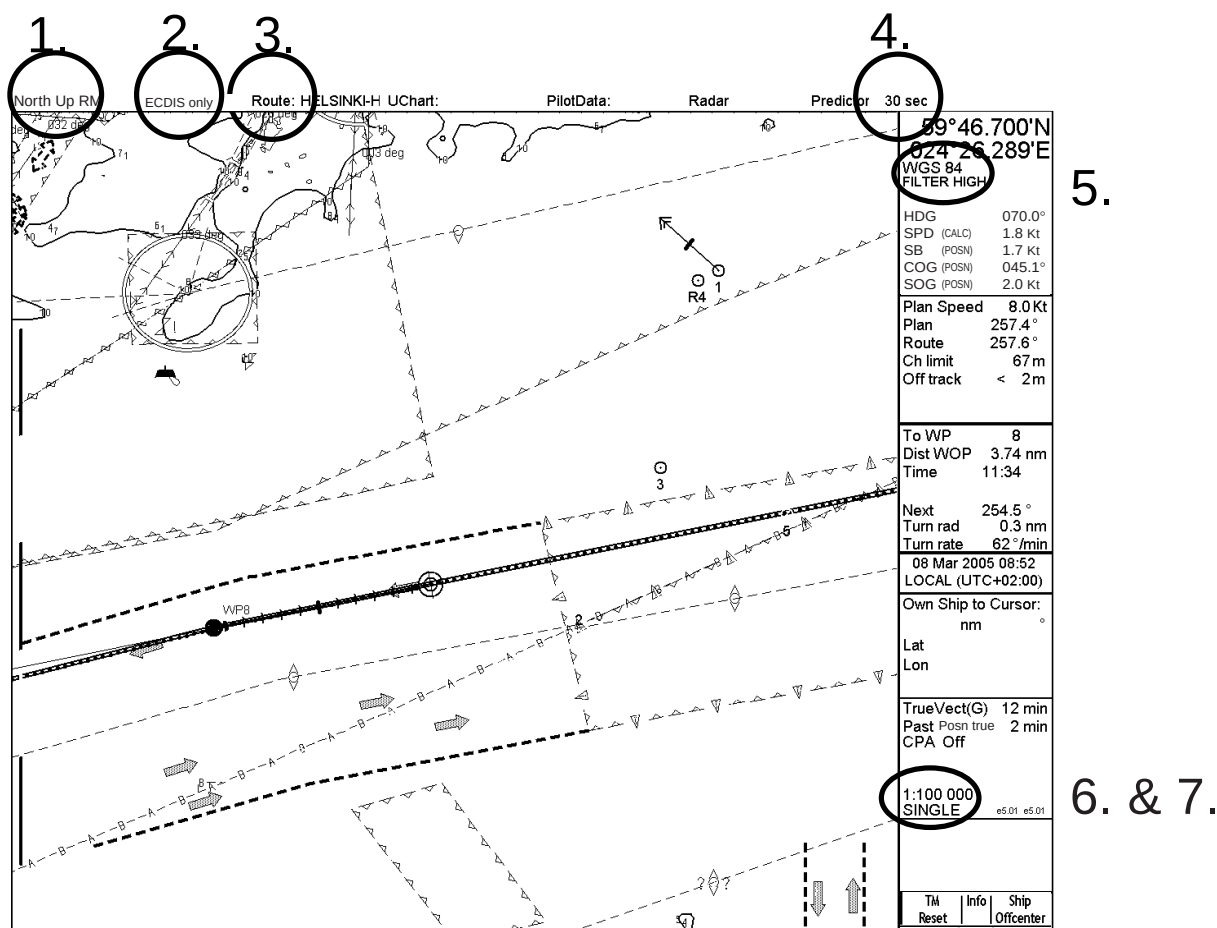
4.4.3 Using the scrollwheel

Items directly controlled by the scrollwheel

Selections can be made on the screen by pointing on the screen with the cursor then scrolling various options with the scrollwheel. When you put the cursor over text or numeric, it turns green, purple or blue (depending on Palette in use) to indicate that the scrollwheel can be used to scroll options available or change value of number. Selection is confirmed by pushing the scrollwheel.

The following selections can be adjusted directly on the screen. See also the figure below.

1. Display mode and orientation of chart.
2. Operating mode
3. Length of speed vectors
4. Predictor - set predictor ON/OFF and time for predictor
5. Datum for output co-ordinates
6. Scale of displayed chart
7. Workstation mode (in case of multiple workstations)



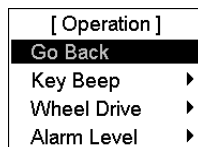
The procedure below shows you how to change the presentation mode from North Up TM to Course Up RM.

1. Place the cursor on the text at the location shown by "1." in the figure above, and the color of the text changes from current color to green.
2. Use the scrollwheel to scroll options until Course Up RM appears. As you scroll, the color of the text changes to magenta, blue or green depending on the Palette in use.
3. Push the scrollwheel to confirm your selection, and the color of the text becomes green.
4. When you move the cursor away from the text, the color of the text returns to its original color.

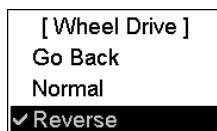
Choosing scrollwheel incrementing direction

The scrollwheel incrementing direction can be chosen to forward or backward as desired.

1. Open the Initial settings menu, and select Operation from the menu.



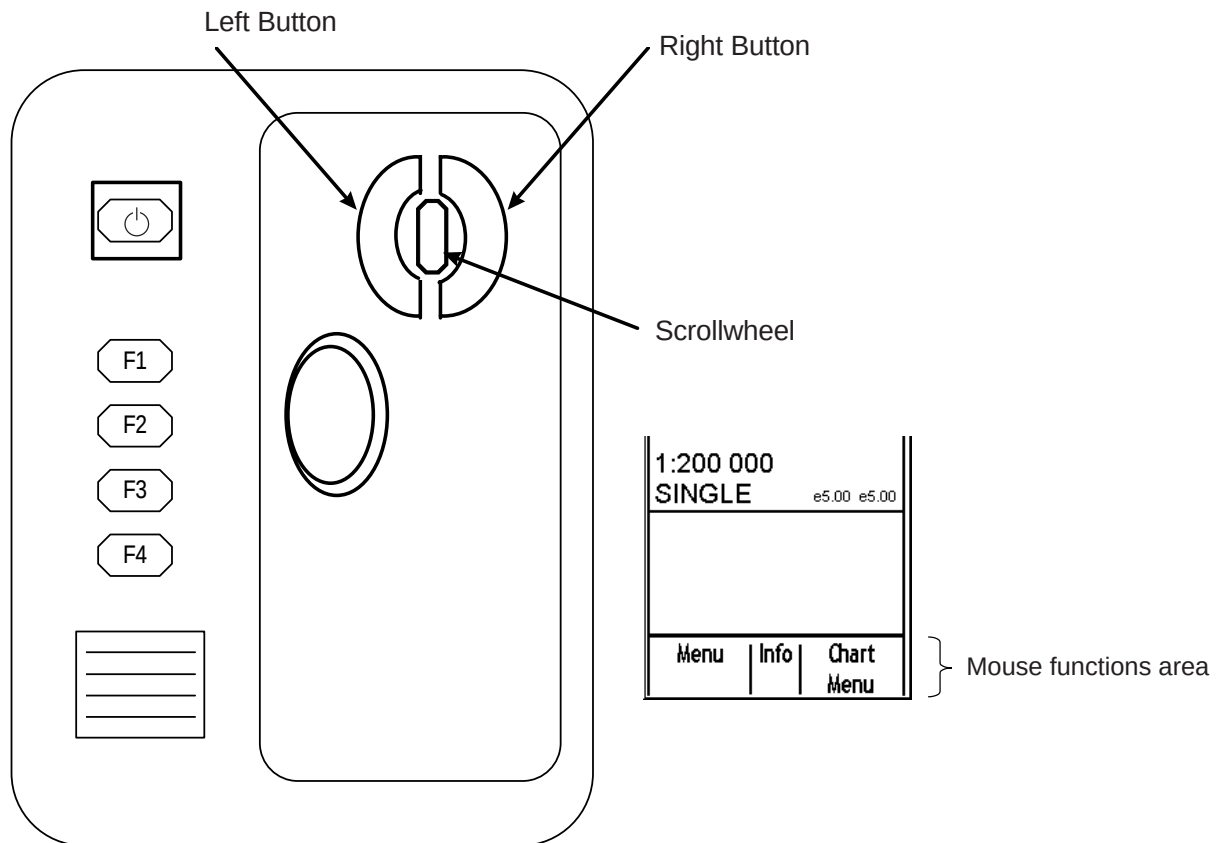
2. Spin the scrollwheel to choose Wheel Drive then push the scrollwheel.



3. Spin the scrollwheel to choose Normal or Reverse as appropriate then push the scrollwheel.

4.4.4 Calling menus and functions by the mouse buttons

The mouse buttons can be used to call menus or functions on the display. At the lower right corner of the display the mouse functions area displays available function or menu name, as shown in the figure below. Spin the scrollwheel to choose menu or function desired, then push the left mouse button, scrollwheel or right mouse button as appropriate to access the menu or function desired. Available menus and functions depend on cursor location. (For more information, see section 3.3 User Interface.)



LEFT MOUSE BUTTON

Menu
Range-
TM Reset
Event
Set Chart Center
Show Value
Chart Display

SCROLLWHEEL

Info
Info
Info
Info
Info
Info
Info

RIGHT MOUSE BUTTON

Chart Menu
Range+
ShipOffcenter
MOB
Activate Scroll
Nav Marks
Standard Display

Using the functions shown in the figure above as an example, the available functions with the mouse are as follows:

- "Menu" by pushing left mouse button
- "Info" by pushing scrollwheel
- "Chart Menu" by pushing right mouse button

5. Standby Mode

5.1 Switching Standby Mode ON and OFF

The standby mode deactivates the audible alarms from the ECDIS. Use it while in harbour or other similar situation where use of the ECDIS is not required. To switch the Standby mode ON, do as shown in the procedure below.

When you switch Standby mode ON, Human Interface, ARCS and S57 drawing processes are automatically restarted.

[Initial Settings]	
Set time	
Function keys Operation	▶
Parameter Backup Digitizer Backup and Restore	
Installation parameters C-Map Ed3 installation Navigation parameters	▶
Chart Alarm parameters	
Optimization parameters	▶
Print Navigation parameters	▶
Print Optimization parameters	▶
Selftest Standby	
Presentation library	
Access Server and Diagnostic	▶
Close	

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Spin the scrollwheel to choose Initial Settings then push the scrollwheel.
3. Place the cursor on the triangle inside the Initial Settings dialog box, and the menu shown left appears.
4. Choose Standby then push the scrollwheel.
5. The following window appears at the top of the ECDIS display to indicate that audible alarms are switched off.

SYSTEM IN STANDBY
(audible alarms switched off)

BACK TO NORMAL MODE

To switch Standby mode OFF, that is, return to normal operation, choose "BACK TO NORMAL MODE" with the cursor then push the left mouse button.

5. Standby Mode

This page intentionally left blank.

6. Setup Before Departure

6.1 Update Chart Material

Update your ARCS and S57 chart material before embarking on a new voyage. To get more information about updating ARCS charts, see Chapter 9 Raster Chart Material. For information about updating S57 charts, see section 8.2 S57 Charts.

6.2 Display and Approve Dates for S57 Charts and Manual Updates

Note: It is very important that you set the Display and Approve dates for S57 charts as the current date.

There may be features which require chart viewing dates or seasonal dates in S57 charts. Accordingly, if you have not set Display and Approve dates as the current date there is a possibility that you may get a wrong presentation or some feature may be absent. For how to set Display and Approve dates, see section 8.12 Chart Viewing Dates and Seasonal Features of the Vector Chart.

6.3 Creating or Updating User Chart

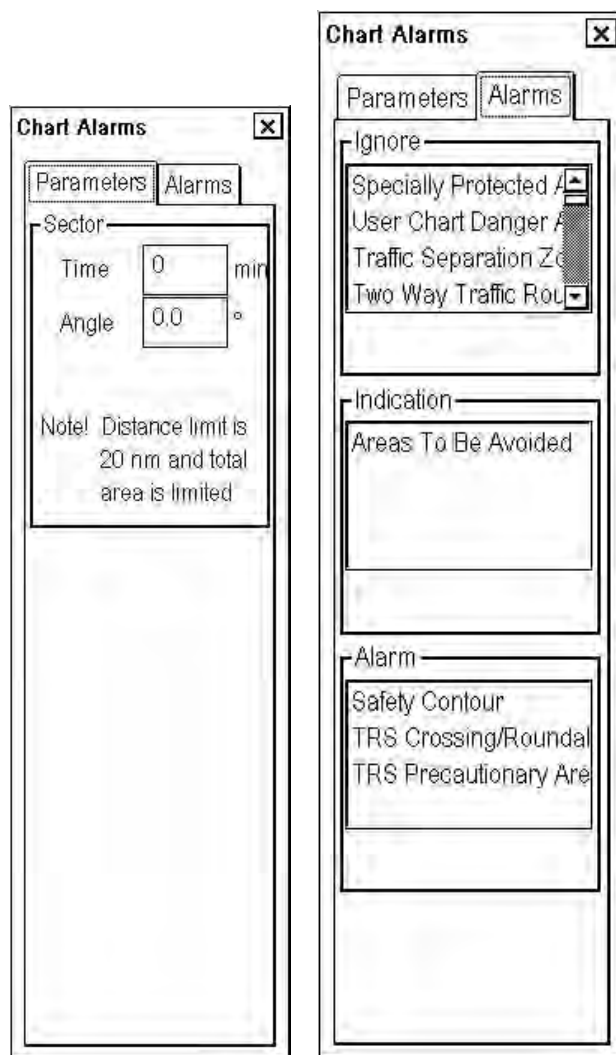
If necessary, create a new user chart or modify an existing one. For more information about user charts, see Chapter 15 User Chart Control.

6.4 Creating or Updating Pilot Data

If necessary, create a new pilot data or modify an existing one. For more information about pilot data, see Chapter 16 Pilot Data.

6.5 Setting Chart Alarm Calculation

Set chart alarm areas suitable for your coming voyage. For more information, see Chapter 11 Chart Alarms.



6.6 Creating or Updating a Route

Create a new route or modify an existing one. For further information about creating or updating a route, see Chapter 13 Route Planning.

6.6.1 Checking your route against chart alarms

Before you sail your route, you should always check your route against chart alarms. This is important because your S57 charts and manual updates may contain chart viewing dates information. You can check chart alarms from the Check page on the Plan Route dialog box. You can access this dialog box by placing the cursor on Route in the status bar, clicking the **Plan** button to show the Plan Route dialog box then clicking the Check tab.

The following information is stored with the route during route plan:

- Conditions for chart alarms during route monitoring, which includes safety contour and other chart alarms.
- Name of the user chart to be used during route monitoring together with this planned route.
- Name of the pilot data to be used during route monitoring together with this planned route.

PLAN ROUTE - HELSINKI-HAMBURG / 09.09.2003 13:11

WP Alarms Check Parameters Prepare

Legs: Alarms:

Alarms by leg

Alarms:

Leg:

Locate leg

Legs by alarm

Alarm:

Leg:

Locate leg

Planned User Chart

Planned Pilot Data

☒ Enable changes Partly Displayed

Start

This route is unchecked.

PLAN ROUTE - HELSINKI-HAMBURG / 09 Sep 2003 13:12

WP Alarms Check Parameters Prepare

Legs: 2 Alarms: 2

Alarms by leg

Alarms: Safety Contour

Leg: 1

Locate leg

Legs by Alarm

Alarm: Safety Contour

Leg: 1

Locate leg

Planned User Chart

HELSINKI-HAMBURG

Planned Pilot Data

HELSINKI-HAMBURG

☒ Enable changes

Start

To store selections on the Alarms page, click the **Start** button. Also, the name of the user chart and the name of pilot data, which were chosen as planning mode, are stored in this route

6.6.2 Recalculating timetable and ETA values

Timetable and ETA values can be recalculated from the Parameters page in the Plan Route dialog box. Minimally set ETD to equal departure time, and perform desired optimization.

PLAN ROUTE - HELSINKI-HAMBURG / 09.09.2003 13:41

WP Alarms Check Parameters Prepare

Description

☒ Enable changes

ETD/UTC+3

1 09 Sep 2009 14:30

ETA/UTC+3

13 11 Sep 2009 14:55

11 Sep 2009 14:55

Total Length: 389.1 nm

Speed limit

20.0 Kt

Optimize

Max speed

Income

0 \$

After checking the chart alarms and setting the ETD, cancel selection of the planned route in order to enable the selection of it as the route to be monitored, using "Unselect" in the Plan Route menu, or use "Exchange with Monitored" on the same sub menu to choose it directly as monitored route.

6.7 Checking and Preparing Route to Monitor

Choose a route for the next voyage: Choose Route on the status bar then click the **Monitor** button. For more information about route selection, see section 14.2 Choosing Route to Monitor.

[Route Monitor]

Select

Unselect

Report

Close

▶ MONITOR ROUT ...

Monit.

Alarms

◀

▶

To

WP

8

Timetable

ETA

WP

Time

Distance

nm

Final

WP

20

Time

05 Oct 04 06:14

Distance

212.1

nm

Plan final

05 Oct 04

Off plan

-74

min

Suggested spd

12.2

Kt

Trial

11.4

Kt

Spd profile

Trial

▶

Checked conditions differ

If the text "Checked conditions differ" appears in the dialog box, this means that conditions chosen during route planning were different than those chosen for use during route monitoring. For further details on how to use checked conditions, see section 6.7.3 Confirming checking conditions of the route plan and section 6.7.4 Using planned user chart.

6.7.1 Choosing TO waypoint

The system chooses a TO waypoint automatically. Check that it is the correct one. Note that waypoint number 1 is not accepted. Use the Monitor Route dialog box to choose a waypoint.

6.7.2 Choosing final waypoint

This selection is used ONLY when the last waypoint should be different than the one defined last in your route. If needed use the Monitor Route dialog box to choose it.

6.7.3 Confirming checked conditions of the route plan

You can check on the Alarms page if checked conditions in the Alarms page are used with the route in route monitoring.

If the text "Current selection is different" is displayed, use Initial Settings>Chart Alarm parameters to make "Chart alarms" selections. Safety contours may be changed with the "Safety contour" field in the Display Settings. Select used condition during monitoring the same as planned. Differences between used and planned conditions are displayed with asterisks (*).

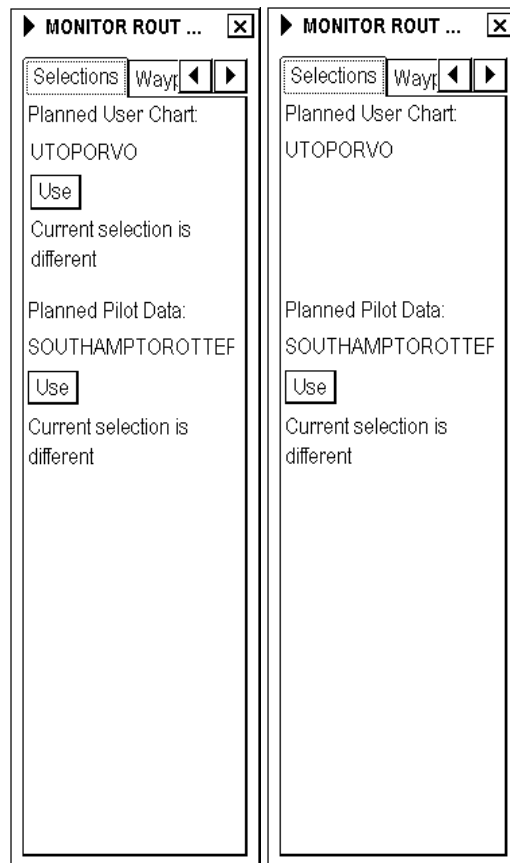
The screenshot shows the 'MONITOR ROUT ...' dialog box with the 'Alarms' tab selected. The 'Planned as:' section includes 'Ignore during' with a list of conditions: 'Areas To Be Avoided', 'Specially Protected A', and 'TRS Crossing/Round'. Below this is a list of 'Indication during' with 'User Chart Danger'. The 'Alarm during monitoring' section shows 'Safety Contour' and 'Traffic Separation Zone'. At the bottom, it displays 'Safety 10 m' and a note: '* = Current selection differ'.

6.7.4 Using planned user chart

To check if planned user chart is chosen, open the Selections page in the Monitor Route dialog box to check that you have the correct user chart in the monitoring mode.

If the text "Current selection is different" is displayed, click the **Use** button to choose user chart as monitoring mode.

If the text "This has been changed after Route Planning Check" is displayed, re-check your route against chart alarms.

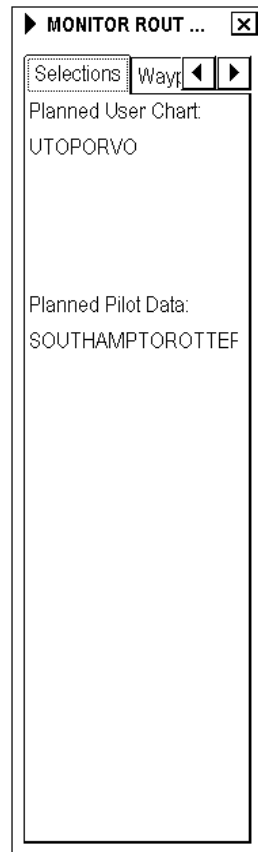


6.7.5 Using planned pilot data

To check if planned pilot data is chosen, open the Selections page in the Monitor Route dialog box to check that you have correct pilot data in the monitoring mode.

If the text "Current selection is different" is displayed, click the **Use** button to choose pilot data as monitoring mode.

The text "This has been changed after Route Planning Check" reminds you that pilot data has been modified after route planning check.



6.8 Verifying Configuration of Navigation Sensors

The operator can choose navigation sensors for use in navigation and view their current values. There are "pages" for speed and course and position. The figure below shows the Speed/Course page.

Checkbox status shows whether the sensor is used for integrated navigation or not. If there is no value shown for a sensor, it indicates that the sensor is not valid. Note that the content of these pages depends on the sensors that are in use on the ship.

To display the Sensors dialog box, put the cursor on the position indication in the information area then push the right mouse button.

SENSORS

Spd/Cse Posn

☐ Manual speed
0.0 Kt

☒ Dual log (water)
> 0.0 Kt
^ 12.5 Kt

☒ Dual log (bottom)
> 0.0 Kt
^ 12.5 Kt

☐ ARPA
0.0 Kt

☒ Manual heading
000.0 °

☐ Gyro 1
0.0 °

☒ Gyro 2
0.0 °

☐ Rate gyro (calc.)
0.0 °/min

6.8.1 Verifying source of navigation sensors

In a multiple workstation environment, verify that the sensor sources indicated are the intended ones. This can be done on the Sensors dialog box.

Verifying SPEED settings (Speed/Course page)

Choose both Log and Dual log, if they are available, or choose one of them, on the Speed/Course page.

Note that manual speed should only be used in an emergency, when no other speed reference is available. Remember that position sensors are also available as speed sources. If neither Log nor Dual log is available, you can use a radar as the source for speed and course.

Verifying GYRO settings (Speed/Course page)

Choose Gyro1 or Gyro2 on the Speed/Course page. Note that in the typical installation Gyro1 is connected to a traditional gyrocompass, while Gyro2 receives gyro value from either a Autopilot FAP-2000 or a DGPS sensor.

Manual heading should only be used in an emergency, when no other heading source is available.

A rate gyro is always automatically chosen.

Verifying position sensors (Posn page)

On the Posn page of the Sensors dialog box, the data field of a position sensor contains a label(s) (in the figure at right it is DGPS, GPS+ZDA) which indicates the type of the sensor. Primary-Secondary-OFF indicates sensor status and priority. Position in local datum, speed and course are also shown. A DGPS position sensor also shows the text "Diff" if the differential signal is in use.

Position sensors have priority, which is indicated by Primary and Secondary. Only one sensor can be primary while the others can be secondary or off position. After a sensor is turned off, its status is changed to Secondary state. When a position sensor state is changed to primary and another sensor was primary, the sensor formerly primary becomes secondary.

SENSORS	
Spd/Cse	Posn
☐ Chart Align	☐ Enable
0.0 °	0.0 nm
Deadrec	50°28.224'N
☐	000°50.123'E
Kalman filter	On
078.7 °	50°28.225'N
12.5 kt	000°50.130'E
DGPS	Primary
078.7 °	50°28.225'N
12.5 kt	000°50.104'E
GPS+ZDA	Sec
078.7 °	50°28.225'N
12.5 kt	000°50.095'E

Choose the "Primary" navigation sensor as the sensor that is considered to be most accurate and reliable. Set all other navigation sensors as "Secondary".

Verifying Kalman filter (Posn page)

The Kalman filter is an automatic process that will calculate the most probable position based on all position sensors. The filter uses in its process all sensors that are not chosen to OFF. For more information about the Kalman Filter, see section 19.7 Filter Operation.

Verifying alignment (Posn page)

The alignment is a correction given by the chart align function, and it is used to move the ship to the "correct" position. Normally turn this feature off in the start-up procedure. For more information about position alignment, see the section 19.8 Position Alignment.

6.9 Resetting Distance and Trip Counters

[Record]
Go Back
Details Log
Voyage Log
Danger Target Log
Alarms Log
Current Alarms
Chart Usage Log
Backup and Restore
Settings
Reset ▶

Record menu

[Reset]
Go Back
Voyage Log
Danger Target Log
Distance Counter
Trip Counter
Logs + Counters

Reset menu

To reset the distance and trip counters to zero, do the following:

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Record then push the scrollwheel.
3. Choose Reset then push the scrollwheel.
4. Choose Distance Counter or Trip Counter as appropriate then push the scrollwheel.
Distance counter: Reset both Distance and Trip counters.
Trip counter: Reset Trip counter.
5. An appropriate prompts asks you if you are sure to reset chosen counter. Click the **OK** button to reset. The prompt window disappears.

6.10 Verifying Datum

Datum is used to choose between different models of the earth. It is essential that you use datum in a consistent way.

If you use paper charts together with electronic chart material, it is recommended that you use the same datum as your current paper chart to avoid misalignment between your electronic chart system and points taken or plotted on your current paper chart.

Once you have chosen a datum, all numerical latitude-longitude position values are presented in your chosen datum.

To change the datum:

1. Choose the datum indication in the top box in the information area.
2. Spin the scrollwheel to choose appropriate datum, the one that matches your paper charts, then push the scrollwheel.

60°04.836'N
024°53.424'E
WGS 84
DEADREC

Note: ARCS raster charts contain some rasterized position information, like scale bars on PA paper charts, which is true only if you have chosen native datum of that ARCS chart.

7. Conditions Required to Replace Paper Charts

7.1 Introduction

Carriage requirements for adequate and up-to-date charts for a voyage can be found in SOLAS Chapter V/20 of 1974. In resolution A.817(19), IMO has specified how those requirements can be fulfilled with a device called ECDIS. In resolution A.817(19), Appendix 7 (RCDS 1998), IMO has specified how requirements of the V/20 of 1974 can be fulfilled when an ECDIS uses the RCDS (Raster Chart Display System) mode. The traditional alternative way to fulfil requirements of the SOLAS chapter V/20 has been the use of paper charts.

If you use the type-approved version of this ECDIS (BSH type approval certificate number 6579 / 080 138 / 99) you may replace paper charts with electronic ones. If the following conditions are met, then your system fulfils IMO A.817(19).

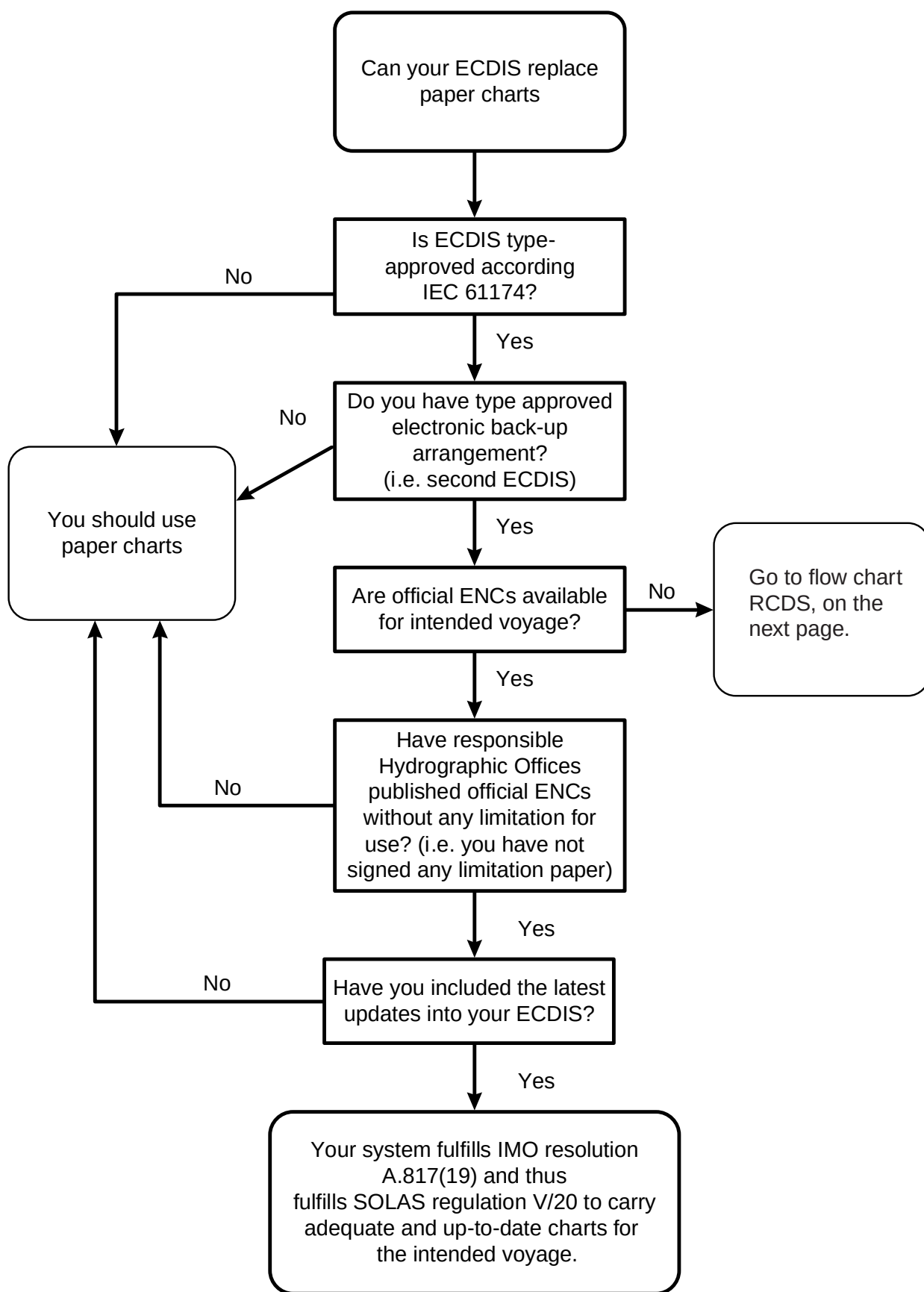
- Own ship area is covered with updated ENC charts.
- Your chosen display area is covered with updated ENC charts.
- You have a backup system that fulfils IMO A.817 requirements. One example is a second ECDIS.

Note that ENC producers provide their conditions of use in the Publisher Notes, which you should always read when loading new material into the ECDIS. For further details, see section 8.3.2 Loading S57 charts from a CD ROM, floppy disk or LAN.

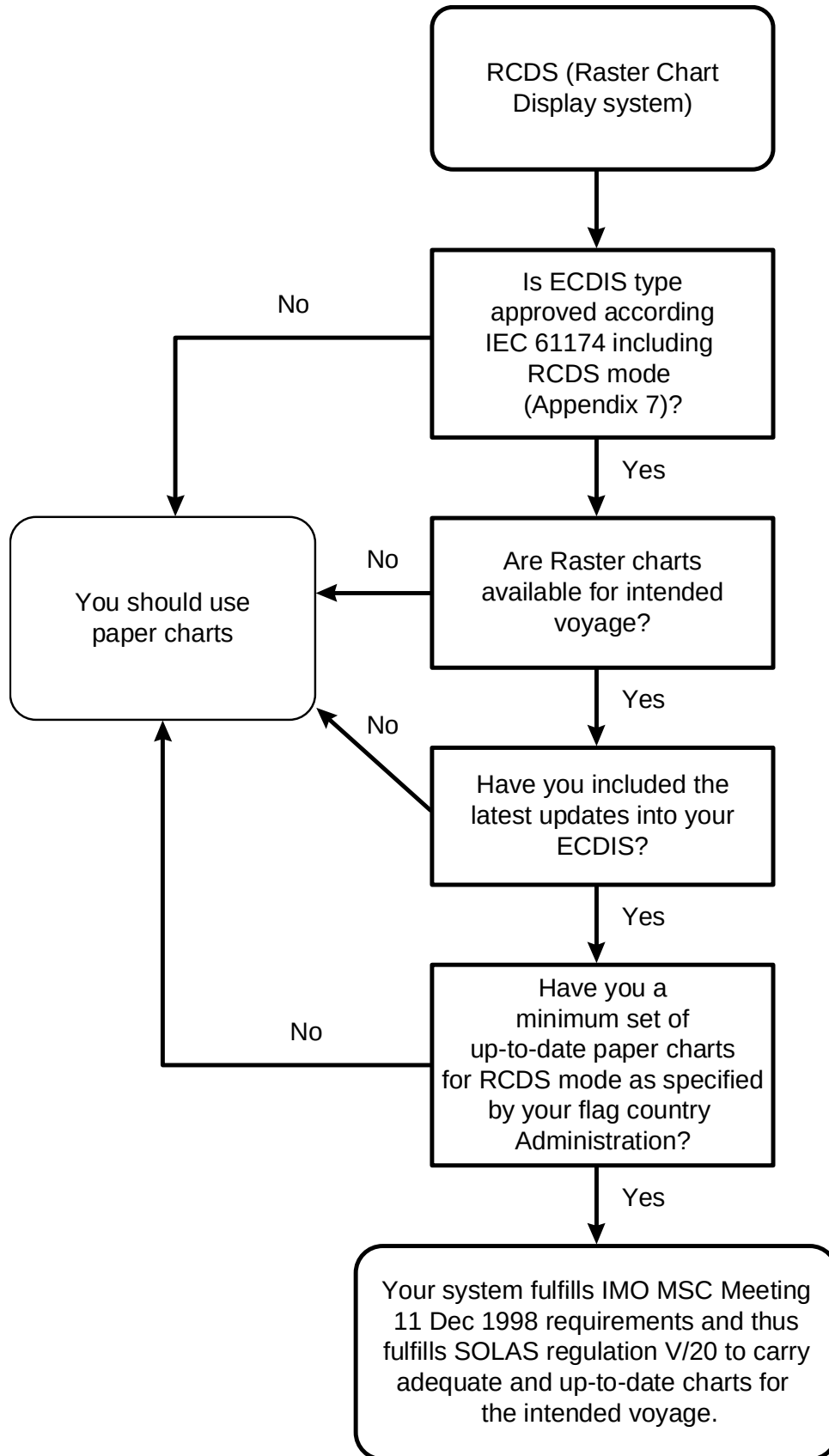
In areas where ENCs are not available, raster chart material called ARCS (from UK HO) can be used in the ARCS mode of this ECDIS, provided the following additional conditions are met:

- Own ship area is covered with updated ARCS charts.
- Your chosen display area is covered with up-to-date ARCS charts.
- Appropriate folio of up-to-date paper chart is carried onboard and available, if required by your flag country administration.

7. Conditions Required to Replace Paper Charts



Data flow chart for replacing paper chart with ENC chart material



Data flow chart for replacing paper chart with Raster chart material

7.2 Detecting ENC Coverage in S57 Chart Display

The electronic chart system can display more than one S57 chart cell at a time. This feature is called multi-cell display. If one S57 chart cell does not cover the whole display, the system will open more S57 chart cells for display, if appropriate cells for the displayed area are available. The status bar shows information about S57 chart cells displayed on the electronic chart display area. When automatic TM reset is active, the information is displayed with reference to your ship's position. If TM reset is OFF, the information is displayed with reference to current cursor position.

The possible indications are as follows:

30 s RCDS Mode
50°20.833'N 004°08.111'W WGS 84

"**RCDS mode**" is shown in red text at the upper right-hand corner. This means that raster chart material is displayed on the electronic chart display area.

30 s Non ENC Data
50°20.833'N 004°08.111'W WGS 84

"**Non ENC data**" is shown in red text at the upper right-hand corner. This means that the S57 chart shown is not official ENC material.

30 s
50°20.833'N 004°08.111'W WGS 84

"**No indication**" is shown at the upper right-hand corner: This means the S57 chart shown is official ENC material.

8. Vector Chart Material

8.1 Introduction

Theoretically a chart can be coded for use on a computer as raster or vector chart. Vector-coded charts are coded using a variety of techniques. One technique is called S57ed3 and it has been chosen by IMO as the only alternative for SOLAS compliant electronic charts. If an S57ed3-coded chart is published by a government-authorised Hydrographic Office, then it is called "ENC". If an S57ed3-coded chart is published by a private firm, then it is called "NON ENC". Another vector coding technique is known as CM-93/2, and it is employed by the private firm C-MAP. All CM-93/2 charts are NON ENC. For further details about C-MAP charts, see Appendix 4. You can read more about ENC and related legal issues in Chapter 7. Hereafter, all references to vector chart material are referred to as "S57 charts" regardless of their source.

Sometimes you may wish to manually add Notices to Mariners or Navtex warnings into your S57 charts. This is called "manual updates". Manual updates are valid for both S57 and ARCS charts so you need to define them only once. Also, manual updates are valid for all scales so that you don't need to repeat them for charts published in different scales from the same area. For further details, see Chapter 10 Manual Updates.

8.2 S57 Charts

8.2.1 Introduction

The electronic chart system is compatible with official IHO S57 release 3 chart material produced by Hydrographic Offices (HO). This material, when issued by a government-authorised Hydrographic Office, is called ENC (electronic navigational chart). Use, presentation and display of S57 charts are based on International Maritime Organisation (IMO), International Hydrographic Organisation (IHO) and International Electrotechnical Commission (IEC) regulations and rules (S52ed3.1). When this ECS (Electronic Charts system) uses an ENC (S57 release 3 chart produced by a government-authorised Hydrographic Office), it is an ECDIS as defined by IMO, IHO and IEC.

An ENC could be encrypted to prevent unauthorised use so the operator needs a permit to view the ENC. This permit could be entered manually from the control unit, loaded from a floppy disk or loaded through telecommunications from an RENC.

Before any ENC can be used in the ECDIS, it is loaded into your hard disk and converted into the system's own internal format (SENC). Some parts of the charts may be date dependent, i.e., they are visible after a set date or they are visible only for a limited period, etc. In the electronic chart system, you control all date-dependent objects with Display Until and Approve Until dates. In the paper chart world, the Preliminary and Temporary Notices to Mariners represent the date dependency described above for S57 charts.

An important part of ENCs are the updates. Hydrographic Offices can issue two kinds of updates:

- Incremental updates, which are small additions to original Base cells.
- Reissues and new editions, which are complete replacements of previous Base cells and their updates.

All updates are date stamped and they may also contain date-dependent parts. You control usage of updates in the electronic chart system from Display Until and Approve Until dates. Using Display Until and Approve Until dates, you can view your charts correctly drawn on any date in the past or in the future.

Chart material is stored in media such as CD ROMs and floppies, electronically through telecommunications from RENCs or electronically from LAN (Local Area Network) in which it could have arrived from RENCs, CD ROMs or floppies. Such material can contain only basic cells, cells and updates or only updates. The electronic chart system contains as standard the software required to access CD ROMs, floppies and LAN. A telecommunications package to establish a connection to an RENC in Stavanger, Norway, which operates using the marketing name PRIMAR, is optionally available.

8. Vector Chart Material

Each S57 chart may contain additional links to textual descriptions or pictures, besides the chart itself. Typically additional textual descriptions and pictures contain important sailing directions, tidal tables and other traditional paper chart features that do not have any other method to be included into the S57 chart. This ECDIS copies these textual descriptions and pictures into its hard disk so the operator may cursor-pick them for viewing purposes.

For how to interpret the S57 ENC chart display, see Appendix 2.

Definitions of terms

<i>Cell</i>	A cell is a geographical area containing ENC data. Each cell has a separate unique name. Hydrographic Offices divide their responsibility area by the cells that they publish.
<i>S57 chart</i>	A database, standardized as to content, structure and format, is issued for use with ECDIS without any authority of government-authorized Hydrographic Office. The difference of S57 chart and ENC is that non-ENC charts require complete up-to-date paper charts to be used as the primary aid to navigation.
<i>ENC</i>	A database, standardized as to content, structure and format, is issued for use with ECDIS on the authority of government-authorized Hydrographic Offices. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (e.g., sailing directions) that may be considered necessary for safe navigation. The name of the coding standard for ENC is S57ed3.
<i>SENC</i>	A database resulting from the transformation of the ENC by ECDIS for appropriate use, updates to the ENC by appropriate means, and other data added by the mariner. It is this database that is actually accessed by the ECDIS for display and other navigational functions, and is the equivalent to an up-to-date paper chart. The SENC may also contain information from other sources.
<i>RENC</i>	A service provider offering ENC delivery and update service as defined in IHO standard S52e3. Often an RENC provides both CD ROM and telecommunications-based service to ECDIS operators. One example of an RENC is an RENC in Stavanger, Norway, operating under the marketing name PRIMAR.

8.2.2 Chart legend of S57 chart

The chart legend, which provides various data about the chart currently displayed, can be toggled on and off by placing the cursor in the sidebar, clicking the right mouse button, choosing Chart Legend from the menu then pushing the scrollwheel.

This system is capable of showing more than one S57 chart at a time. This feature is called the multi-chart display. If one S57 chart does not cover the whole display, the system will open more S57 chart cells for display, if appropriate cells for the displayed area are available. The chart legend shows information about S57 charts displayed on the electronic chart display area. The information is displayed with reference to your ship's position if automatic TM reset is active, or with reference to the current position of the cursor if automatic TM Reset is OFF.

S57 chart legend	
Cell name	F14EIIQR
Navigational purpose	Approach
Issue date	20010201
Edition number	1
Last displayed update	019
Update issue date	20010724
Last update appl. date	20010201
Projection	Mercator
Horizontal datum	WGS 84
Vertical datum	
	Approximate mean sea level
Sounding datum	
	Mean lower low water springs
Quality of data	Zone of confidence A1
Magnetic var.	
Depth	metres
Height	metres

Cell name:

Name of chart.

Navigational purpose:

S57 charts are compiled for a variety of navigational purposes. The navigational purpose, for which an individual S57 chart has been compiled by a Hydrographic Office, is indicated in this field. Alternatives are: Overview, General, Coastal, Approach, Harbour and Berthing.

Issue date:

Issue date of the Base cell of the chart.

Edition number:

Edition number of the chart.

Last displayed update:

Number of last update, which is visible on the chart screen.

Update issue date:

Issue date of last update, which is visible on the chart screen

Last update appl. date:

Date to which the last update, which is visible on the chart screen, is effective.

Projection:

Projection of the chart. The projection is always Mercator.

Horizontal datum:

Horizontal datum of the chart data as published by the chart producer. By definition this must be WGS 84.

Vertical datum:

Vertical datum of the chart.

Sounding datum:

Datum used for soundings.

Quality of data:

Quantitative estimate of the accuracy of chart features, given by the chart producer.

8. Vector Chart Material

Magnetic var.:

Amount of magnetic variation. A positive value indicates a change in an easterly direction and a negative value indicates a change in a westerly direction.

Depth:

Unit of measurement for depth.

Height:

Unit of measurement for height above sea level (for example, clearance height).

8.2.3 Permanent warnings of S57 charts

Permanent warnings help you keep the S57 charts up-to-date and these are shown at the top left corner on the screen. Only up-to-date S57 charts can be legal replacement for paper charts. Permanent warnings appear if the system detects a condition that may cause the use of charts that are not up-to-date.

Note: The system can assist in keeping RENC-received charts up-to-date. For charts that have been loaded from sources other than an RENC, the system is unable to know the exact up-to-date situation.

For further details see section 8.12 Chart Viewing Dates and Seasonal Features of the Vector Chart.

Permanent Warning

At least one of used charts has more than 1 week "Approved Until" and/or "Displayed Until" and current date. Use Chart Menu - Set Chart viewing dates

You have loaded updates into your hard disk, but these updates are not included in the SENC. The name of the chart appears in orange in the chart catalogue.

Permanent Warning

At least one of used charts is not up-to-date. At least one update is loaded in harddisk, but not in SENC. Use Chart Menu - Set Chart viewing dates to check charts

Perform SENC conversion for these charts. For SENC conversion, see section 8.4.6 Using SENC convert window to initiate SENC conversion.

For further details, see section 8.7.3 Knowing up-to-date status of an RENC product list.

Permanent Warning

At least one of used charts is not up-to-date. Get or load latest updates from your RENC service. Use Chart Menu - Set Chart viewing dates to check charts

You have loaded an update that contained cancel information for a chart, and you have chosen not to remove the cancelled chart. This permanent indication reminds you about your intended use of a cancelled chart.

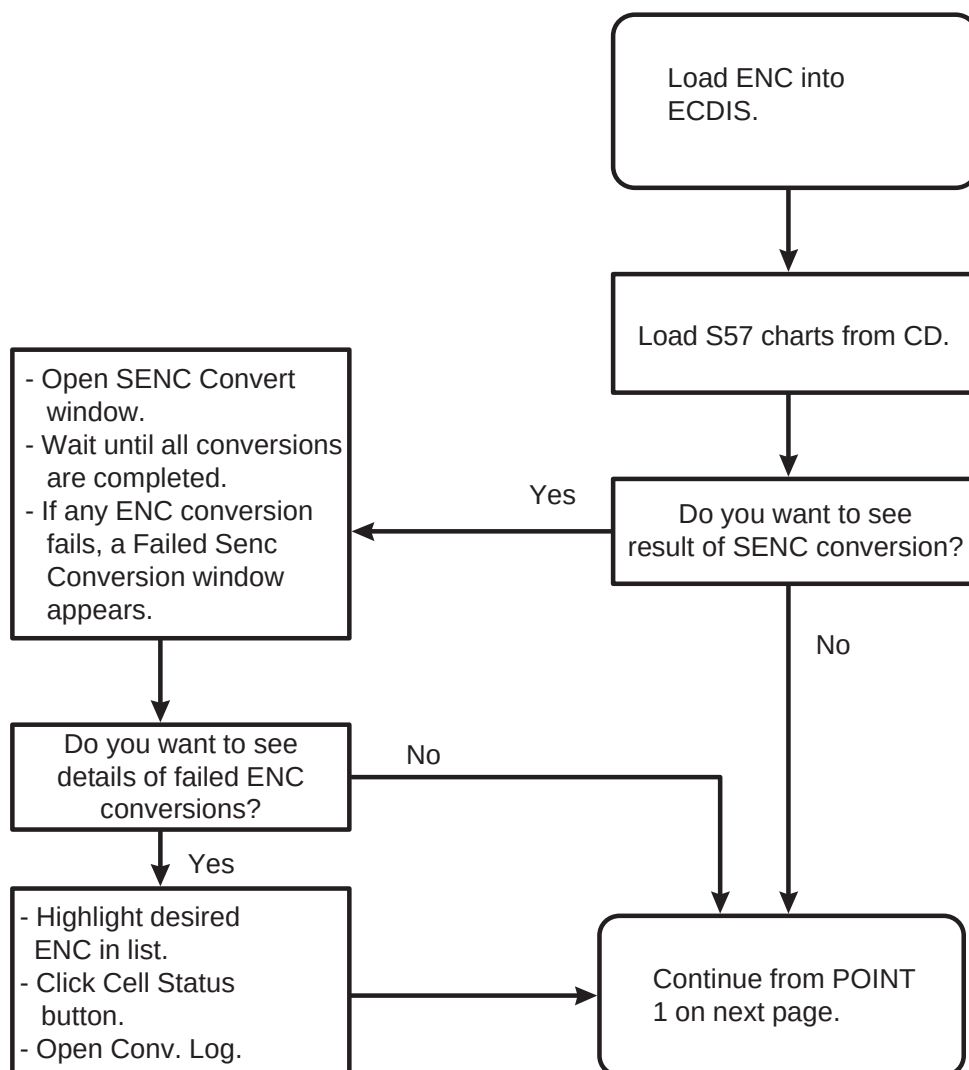
Permanent Warning

At least one of used charts is canceled
Use Chart Menu - Catalogue to check charts.
Use Chart Menu - Remove to remove canceled charts.

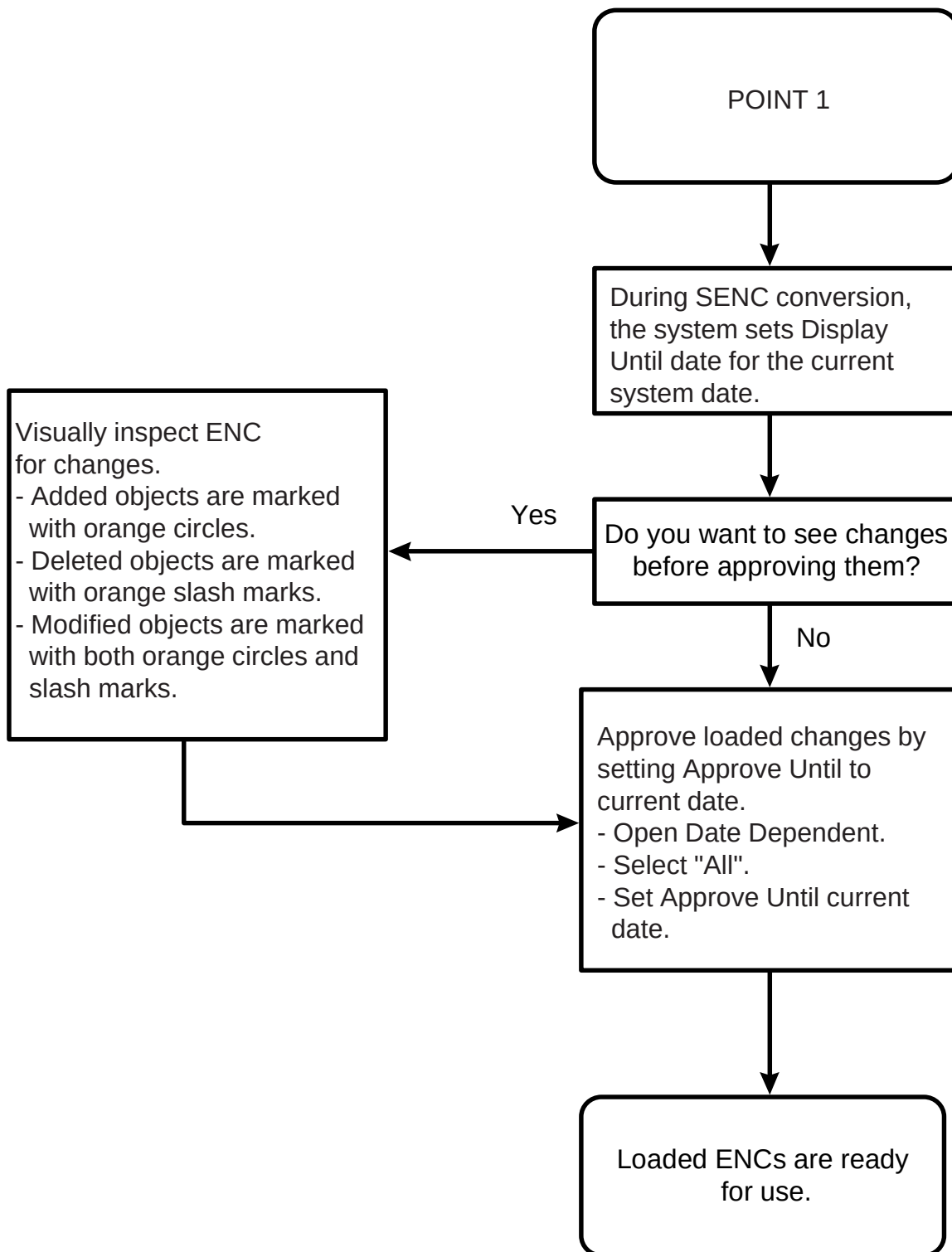
Consider removing the chart. For information on how to remove S57 charts, see section 8.5.5 Removing an S57 chart cell from the system.

8.3 Loading S57 Charts

8.3.1 Flow chart for loading S57 charts into ECDIS



Data flow chart, How to load S57 charts into ECDIS



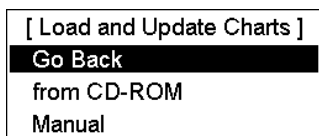
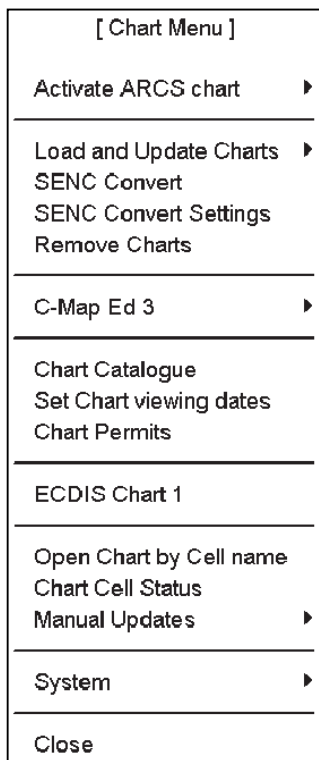
How to load S57 charts into ECDIS (continued)

8.3.2 Loading S57 charts from a CD ROM, floppy disk or LAN

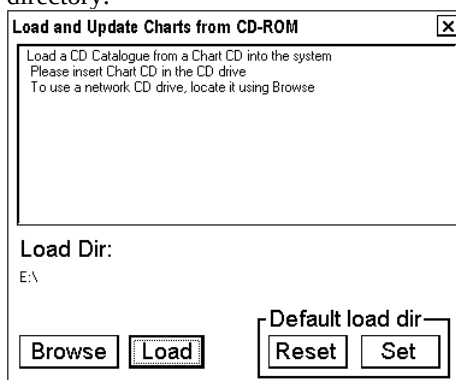
When you load S57 charts by CD ROM catalogue, the system first loads a CD ROM catalogue, which stores certain information into your hard disk such as cell IDs, their position, and edition number, from your LAN (Local Area Network) connection, floppy disk or CD ROM. Then, the system asks which charts you want to load from the chosen media. After building the CD ROM catalogue, you can view the contents of it using the Chart Catalogue command in the Chart menu.

Note: All CD ROMs, floppies or LAN (Local Area Network) connections from one single National Hydrographic Office have the same names although their contents could be totally different. You can use your own unique names to identify them separately and correctly later.

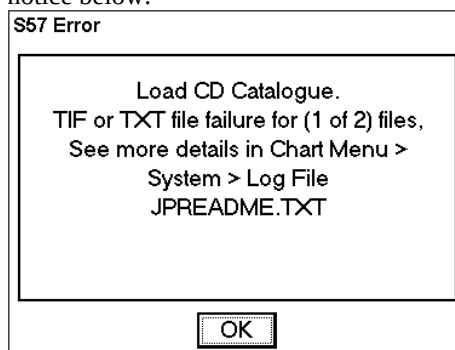
To load by CD ROM catalogue, do the following:



1. Insert CD ROM or floppy disk to drive. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose "Load and Update Charts" from the menu and "from CD ROM" from the sub menu (see bottom figure at left). The default load source is from CD ROM. Click the **Load** button to load from a CD ROM.
3. If you want to load from another media, open the menu with no CD-ROM in the drive. Click the **Browse** button to choose a new directory.



- The ECDIS loads content summary and Product List from the CD ROM then opens the Load or Update Charts from CD ROM dialog box.
- The system automatically copies all text and pictures files associated with charts from the CD ROM catalogue. The system keeps only the latest version of these. If your system already has newer text or pictures in use, you will get the notice below.

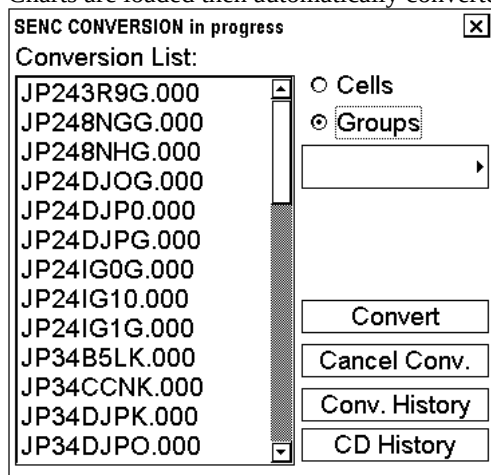


5. In the Load or Update Charts from loaded CD ROM dialog box (see page 8-10), choose the charts to load into the ECDIS. Click the **Load** button to load charts into the ECDIS. See also "Interpretation of Load or Update Charts from loaded CD ROM dialog box" on page 8-10.

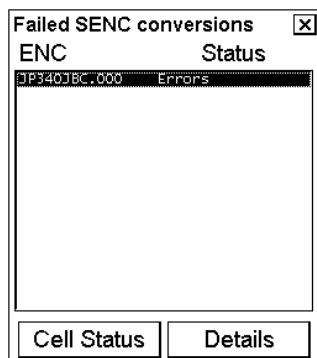
6. Before loading starts (then automatically converts them into SENC format) you are asked confirmation for this operation.

8-8

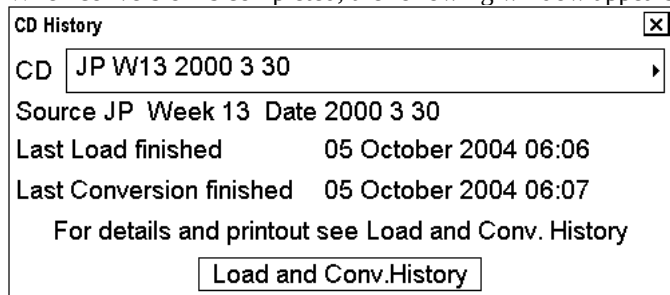
7. Charts are loaded then automatically converted to SENC format, showing the SENC Conversion window.



If an error is detected during conversion from ENC to SENC, the following window appears. To find the reason, click the **Details** button. Note that a chart and/or its update(s) in the conversion list are taken for use after conversion of all charts and updates are completed.

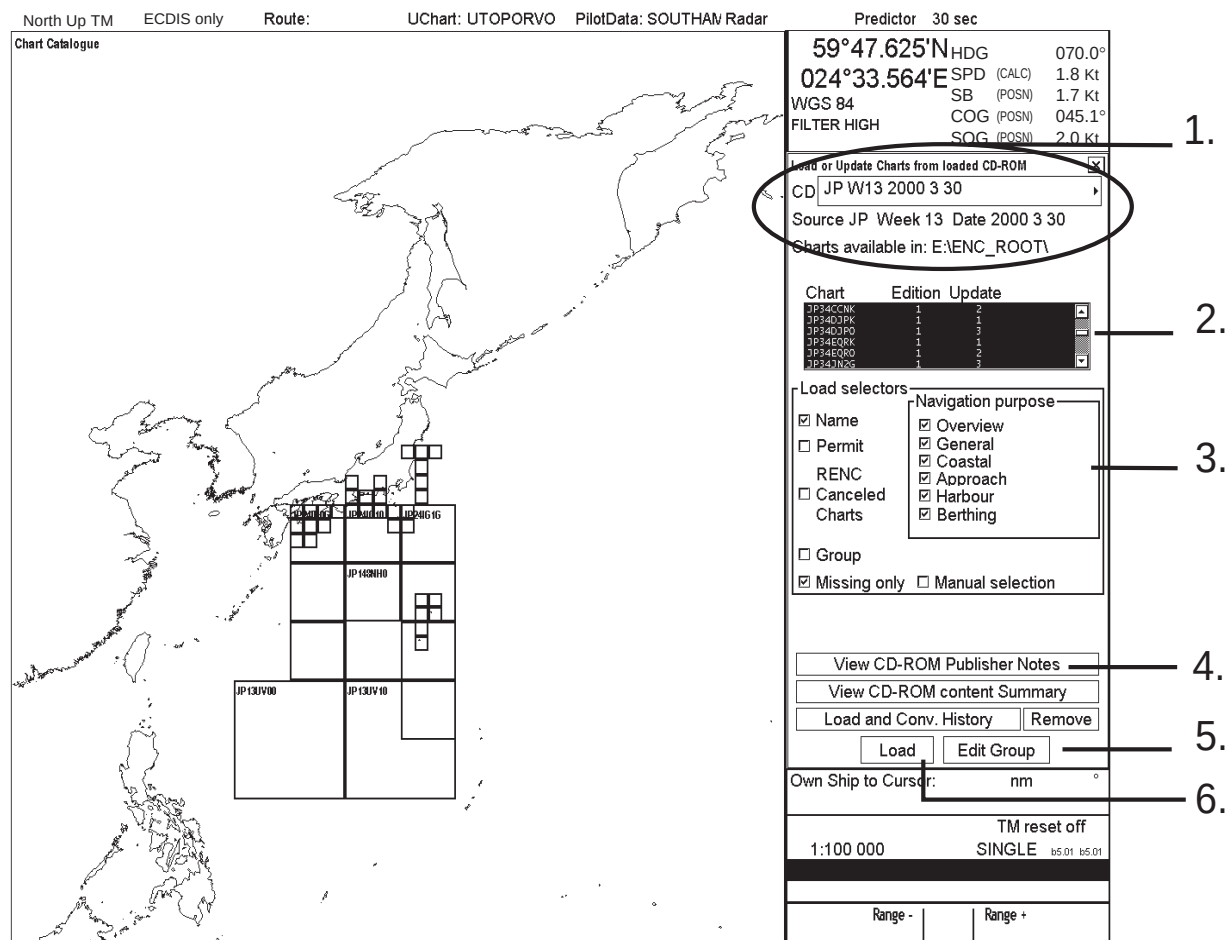


8. When conversion is completed, the following window appears.



Interpretation of Load or Update Charts from loaded CD ROM dialog box

This window provides information about the loaded CD-ROM. To display this window, open the Chart Menu and choose Load and Update Charts from the menu and "from loaded CD-ROM" from the sub menu.



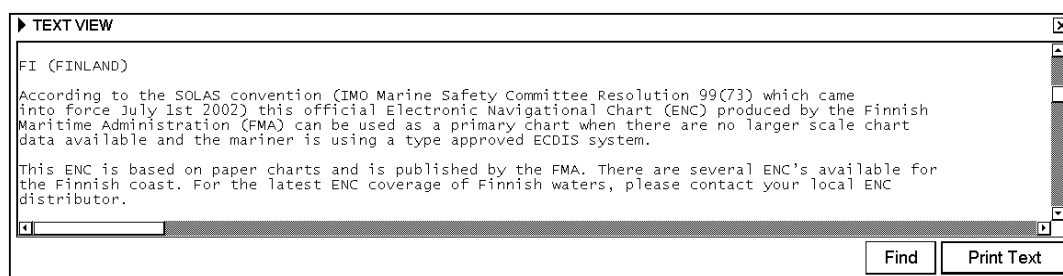
1. The source and edition date of the CD are displayed here.
2. A list of charts stored in the CD-ROM, edition number of the chart and the number of updates included in the chart.
3. In the **Load Selector** field, you can choose how to pick desired charts from the list:
 - **Name:** Chart names are displayed on graphical presentation if selected.
 - **Permit:** Available charts will be highlighted in the CD-ROM and for which you have permits.
 - **RENC Canceled Charts:** The system will display charts on display which are canceled on RENC and normally on CD-ROM.
 - **Group:** If you have predefined a group of charts the system will highlight those charts in the group which are available in the CD-ROM.
 - **Manual Selection:** You can highlight desired charts from the list.
 - **Missing only:** Loads and display on graphical presentation only charts and their updates which are not already loaded.
4. The **View CD-ROM Publisher Notes** button is used to view important notices published by chart producer. The **CD ROM Content Summary** button is used to list charts available on CD-ROM and **Load and Conv. History** button check what is loaded and converted from the CD ROM. The **Remove** button is used to remove the CD ROM catalogue permanently from the ECDIS.
5. The **Edit Group** button is used to create and modify group.
6. The **Load** button is used to start loading.

Note 1: If you want to make chart selection by group, click the **Group** button and choose desired group. If the same chart exists in both the group and the list, they are highlighted in the list box.

Note 2: The system can make conversion into the SENC and set the "Display Until" date automatically. This is the recommended way. For how to do this, see section 8.4.2 Choosing automatic SENC conversion and displaying until date.

Note 3: You should read the text file associated with each catalogue. The text file typically contains **very important notices for the usage of the charts from the producing Hydrographic Office**.

1. Click the **View CD-ROM Publisher Notes** button in the Load or Update Charts from loaded CD ROM dialog box (see previous page)



2. To close this window, click the X at the upper right corner of the window.

Note4: You can view the summary of the contents of the CD ROM. It contains information about charts you are going to load.

1. Click the **View CD-ROM content Summary** button on the S57 load window.
2. Date for the selected CD-ROM is displayed.

Cell ID: Name of the chart

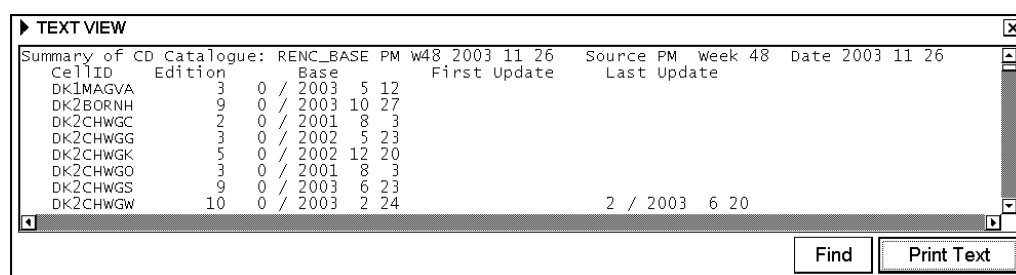
Edition: Edition number of the chart

Base: Including update number and issue date of Base cell of the chart

First Update: Update number and issue date of the first update included

Last Update: Update number and issue date of the last update included

3. If you want to make a hard copy of the Content Summary, hit the **Print Text** button.



4. To close this window, click the X in the upper right corner of the window.

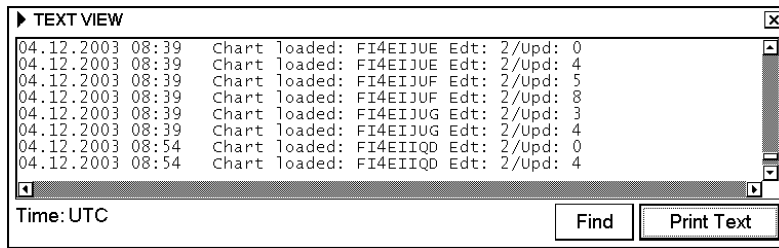
8. Vector Chart Material

Viewing load history of CD ROM

You can view what is loaded from a CD ROM using Load History, which is in the Load or update Charts from CD ROM dialog box.

1. Show the Load or Update Charts from loaded CD ROM dialog box. (See page 8-10.)
2. Choose desired CD ROM from the list of CD ROMs.
3. Click the **Load and Conv. History** button.

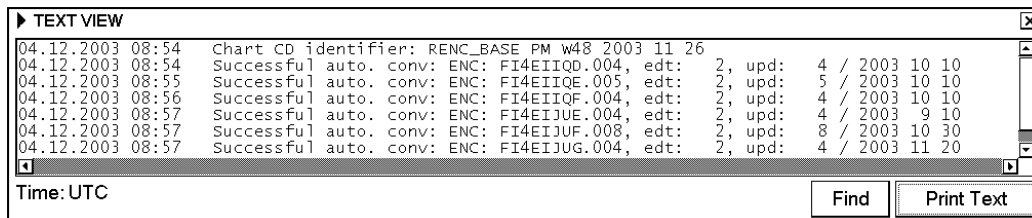
A window that looks something like the one below appears. You can verify which charts are already loaded from the CD ROM.



Viewing conversion history of CD ROM

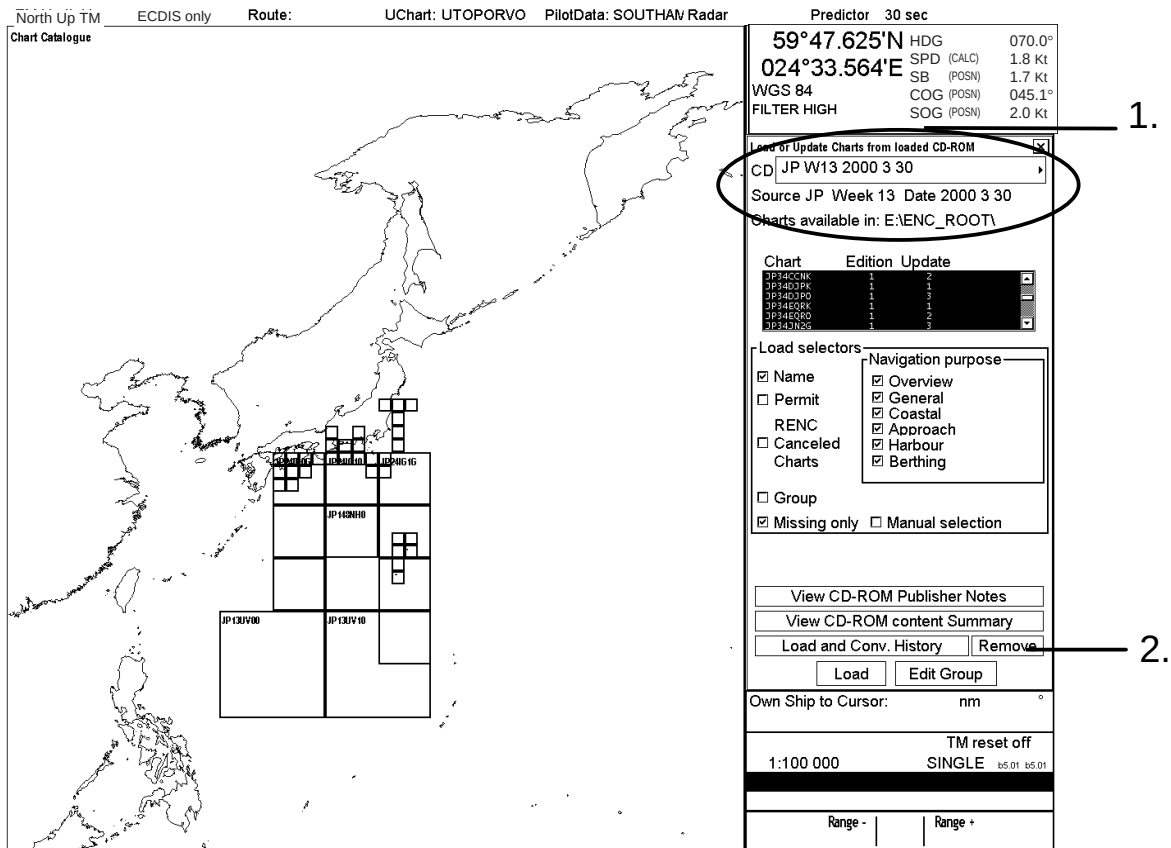
1. Show the Load or Update Charts from loaded CD ROM dialog box. (See page 8-10.)
2. Choose desired CD ROM from the list of CD ROMs.
3. Click the **Load and Conv. History** button.

A window that looks something like the one below appears. You can verify which charts are already converted from the CD ROM.



Removing an unnecessary CD ROM catalogue

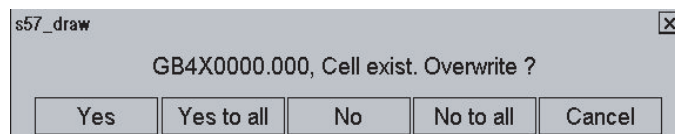
If you have unnecessary CD ROM catalogues on your CD ROM list, you can remove them as follows:



1. Show the Load or Update Charts from loaded CD ROM dialog box. (See page 8-10.) Choose desired CD ROM.
2. Use the **Remove** button to permanently remove chosen CD ROM catalogue from ECDIS.

Messages which control reload

If you try to load charts with the same edition already loaded into your hard disk or if you try to load the same update already loaded into your hard disk, you get the following messages after clicking the **Load** button.



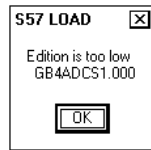
If you want to avoid the very time consuming task of reloading charts which you already have, then you should choose the "No for all" option in the above window

However if you want to reload charts, then choose the "Yes for all" option in above window).

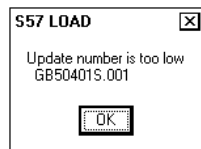
Messages which contain only notice

If you tried to load chart data that is older than you already have in your hard disk, you will get one of the following messages:

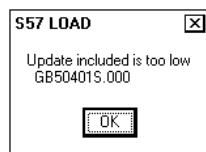
This indicates that you are using a newer edition of the chart mentioned in the box.



This indicates that you are using a newer reissue of the chart mentioned in the box, which includes this update.



This indicates that you are using a newer reissue of the chart mentioned in the box.



This indicates that you are using the updates mentioned in the box.



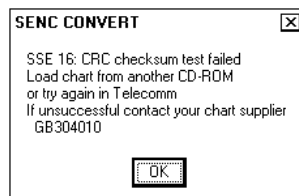
Note: You cannot replace chart data that is already in use unless you only replace the latest Base cell or update. If you want to reload older data again, you must first remove the chart from your hard disk. For further details, see section 8.5.5 Removing an S57 chart cell from the system.

Messages that require careful attention

All messages in this chapter change the legal status of the charts in your system. Study these messages very carefully because you may need to use paper charts to fulfil SOLAS requirements.

Test before ENC to SENC conversion fails

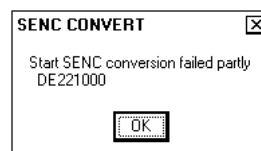
CRC checksum is tested before the SENC conversion and if it fails you get this message.



Conversion from ENC to SENC fails partly

Conversion failed partly due to internal booking error of the chart.

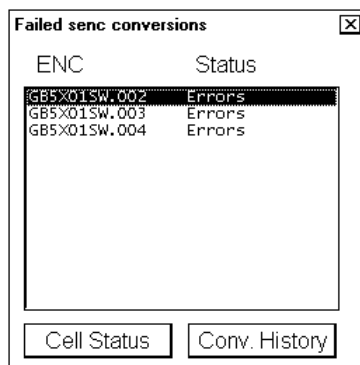
Load the chart and updates again into the system.



ENC to SENC conversion fails or detects errors

If the SENC conversions detect anything abnormal, you get the following message window:

For further details, see section 8.4 S57 SENC Conversion Details.

**A new edition of the chart has been published and you missed it**

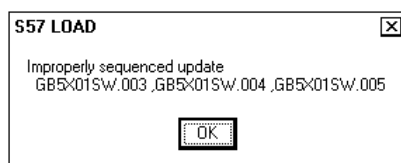
If you tried to load updates for a chart for which you do not have new enough Base cell or reissue in your hard disk, you will get following message:



The message above clearly indicates that this chart is not up-to-date and thus it does not fulfil SOLAS requirements. Get the latest edition of the chart from the publisher immediately.

You do not have all the published updates

If you tried to load updates and you missed one or more updates between updates already loaded into your hard disk and the updates that you are loading, then you get following message:

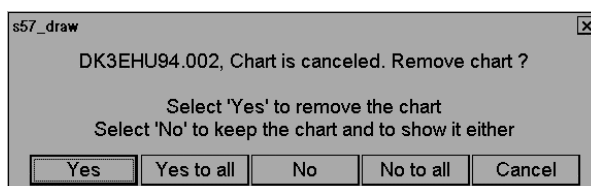


The message above indicates that you tried to load update numbers 3, 4 and 5 when at least update 2 and possibly update 1 were not available in your hard disk. Check the content of your CD ROMs to find the missing update/updates or contact your chart supplier.

The message above clearly indicates that this chart is not up-to-date and thus it does not fulfil SOLAS requirements. Get the latest edition of the chart from the publisher immediately.

Unsafe chart has been cancelled by the publisher

If you load an update that contains instructions from the publisher to cancel the chart, you get following message:



Normally, you should accept the cancellation by clicking the **Yes** button. Then the system automatically removes the chart from the hard disk and from your chart screen.

You may elect to keep the chart although the publisher of it has told you that the content of the chart is so unsafe that they have cancelled it. The reason might be that you do not have anything better available. In this case, click the **No** button. Then the system automatically removes the ENC status from the chart, because the publisher has told so in his special cancellation update.

Note that the cancellation message above clearly indicates that the publisher says that this chart is unsafe for navigation and thus it does not fulfil SOLAS requirements. Get the latest edition of the chart from the publisher immediately to replace the unsafe cancelled chart.

8.3.3 Loading S57 charts that are not fully compliant with the IMO standards

The ECDIS could in some cases load S57 charts that do not have full compliance with S57 standard coding for transfer media. Minimum requirements for loading manually is legally coded:

- XXXXXXXX.000 file, which includes a Base cell.
- XXXXXXXX.NNN file, in which NNN is a number from 001 to 999, and which includes an update.

To load charts without building a named "CD ROM catalogue" do the following:

[Chart Menu]
Activate ARCS chart ▶
Load and Update Charts ▶
SENC Convert
SENC Convert Settings
Remove Charts
C-Map Ed 3 ▶
Chart Catalogue
Set Chart viewing dates
Chart Permits
ECDIS Chart 1
Open Chart by Cell name
Chart Cell Status
Manual Updates ▶
System ▶
Close

[Load and Update Charts]
Go Back
from CD-ROM
Manual

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the right mouse button. Choose Load and Update Charts from the menu and Manual from the sub menu. Then, choose desired drive and charts.

Chart Operation	
Drive:	E:\
Current Directory: E:\MENC_ROOT	
Sub Dirs	Contents
Go Up	JP13UV00.000
	JP13UV10.000
	JP148NG0.000
	JP148NH0.000
	JP14IG00.000
Load Chart	

2. When you are ready to load charts, click the **Load Chart** button.

The system may also make conversion into the SENC and setting of Display Until date automatically if you have set up for them. This can take a few minutes.

8.4 S57 SENC Conversion Details

S57 charts from Hydrographic Offices are called ENC's. An ENC has to be converted into SENC format before it can be used in the ECDIS. The ECDIS can convert ENC into SENC format automatically. If the conversion is successful, the Failed SENC conversion window does not appear.

If the system fails to convert ENC into SENC or if the system detects a coding error in an ENC, the Failed SENC conversion window appears with a list of failed ENC's. In this window you can choose any of the charts to see the reason for failure in conversion.

Normally the conversion is initiated automatically when a chart is loaded. Paragraph 8.3 "Loading S57 Charts" describes the loading process. Paragraph 8.4.2 describes how to choose automatic conversion. You can also initiate conversion from The SENC Convert window or from a cell status window.

Note: SENC conversion must be done in the single-workstation mode. Switch to single-workstation mode before converting, following the procedure below. This procedure should also be followed when converting C-MAP Ed.2 charts to SENC format.

1. Multi-workstation mode to single-workstation mode conversion
 - (1) Operating procedure at workstation designated as sensor source
 - Right-click "MULTI" at the bottom of the information area to show the Initial Settings dialog box.
 - Check "Usage rights" and change Multi(slave) to Master.
 - Check "Mode" and change Multi workstation to Single workstation.
 - (2) Operating procedure at other workstation(s)
 - Right-click "MULTI" at the bottom of the information area to show the Initial Settings dialog box.
 - Check "Usage rights" and change Multi(slave) to Master.
 - Check "Mode" and change Multi workstation to Single workstation.
2. Turning off radar overlay (do for all workstations)
 - Left-click "Radar" on the status bar to show the Radar Overlay dialog box.
 - In the Mode box, change "ECDIS and Radar" to "ECDIS only".

8.4.1 Speeding up SENC conversion

The SENC conversion speed depends about how many other tasks the system is occupied with. The system can conduct SENC conversion in the background during any other system operations, but you can greatly lessen the time for SENC conversion by doing the following:

1. Disable radar overlay by choosing radar overlay mode as "ECDIS only".
 - a) Click Radar on the status bar with the left mouse button to show the Radar Overlay window.
 - b) Choose "ECDIS only" then push the scrollwheel.
2. Choose control of visible navigation features as "Off" for radar overlay.
 - a) Roll the scrollwheel to display Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button.
 - b) Click the right arrow tab to display the Standard page.
 - c) Uncheck Radar.
 - d) Click the X at the top right corner of the window to close the window.
3. Choose display mode (upper left corner on the status bar) as True Motion.
4. Spin the scrollwheel to display Set Chart Center/Info/Active Scroll in the mouse functions area then push the left mouse button. Set chart center so ship is off the screen or TM reset is OFF.
5. Set the scale to 1:1,000 by displaying Range+ / Range- in the mouse functions area and pushing the appropriate mouse button to display 1:1,000.

8.4.2 Choosing automatic SENC conversion and display until date

When you are loading new S57 charts Base cells and/or their updates into your hard disk, they can be automatically converted to SENC format. Further, display dates can be set as issue dates automatically. Do the following to set these options:

[Chart Menu]
Activate ARCS chart ▶
Load and Update Charts ▶
SENC Convert
SENC Convert Settings
Remove Charts
C-Map Ed 3 ▶
Chart Catalogue
Set Chart viewing dates
Chart Permits
ECDIS Chart 1
Open Chart by Cell name
Chart Cell Status
Manual Updates ▶
System ▶
Close

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse function area then push the right mouse button.
2. Choose SENC Convert Settings from the menu then push the scrollwheel. The SENC Convert Settings dialog box appears:
3. Check Automatic SENC conversion and Automatic Display Until.
4. Click the X at the top of the dialog box to close the box.

8.4.3 Viewing progress of SENC conversion

If you want to view the progress of SENC conversion, display the SENC Convert window as follows:

[Chart Menu]

Activate ARCS chart ▶

Load and Update Charts ▶

SENC Convert

SENC Convert Settings

Remove Charts

C-Map Ed 3 ▶

Chart Catalogue

Set Chart viewing dates

Chart Permits

ECDIS Chart 1

Open Chart by Cell name

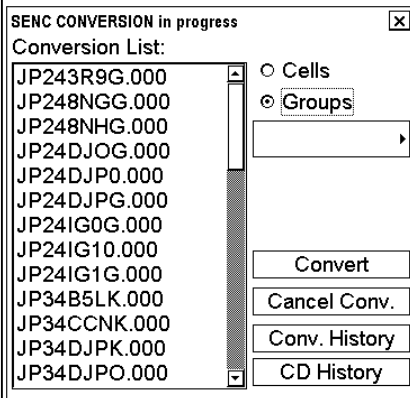
Chart Cell Status

Manual Updates ▶

System ▶

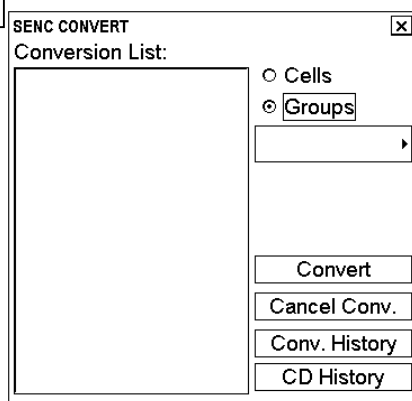
Close

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose SENC Convert from the menu then push the scrollwheel to show the SENC Convert window.

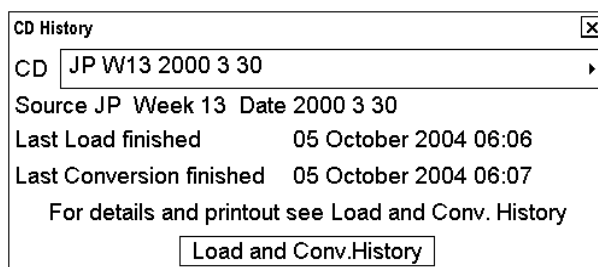


The example above shows a queue of unfinished SENC conversions.

Note: You can remove charts from the conversion list at any time. Use the cursor to highlight desired amount of chart names in the Conversion List. Then, click the **Cancel Conv.** button to remove those charts from the SENC conversion queue.



The example above shows that all SENC conversions have been finished. Then, you can see CD ROM history by clicking the **CD History** button.



You can view the results of loaded charts from a CD-ROM by clicking the **Conv. History** button, or you can view the results of the finished SENC conversions by clicking **Load and Conv. History** button.

8.4.4 Using the failed SENC conversion window

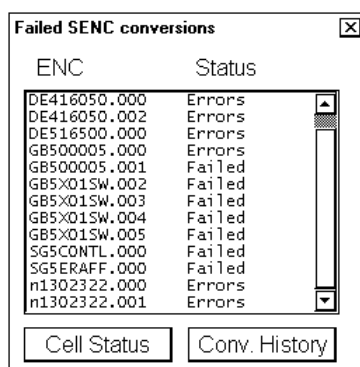
If the system is unable to convert ENC into SENC without any error or failure, the Failed SENC conversion window appears with a list of failed ENCs. Status of Failure means that the system completely failed to convert the ENC into the SENC and thus the ENC cannot be used.

Status of Errors means that the system detected minor or major errors in the conversion of the ENC into the SENC. Check the content of Conv. History and cell status to see if the error was minor or major. Major errors are indicated as NON ENC in Conv. History. Note that the status of errors together with NON ENC in Conv History clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements. Get the latest edition of this chart from the publisher immediately.

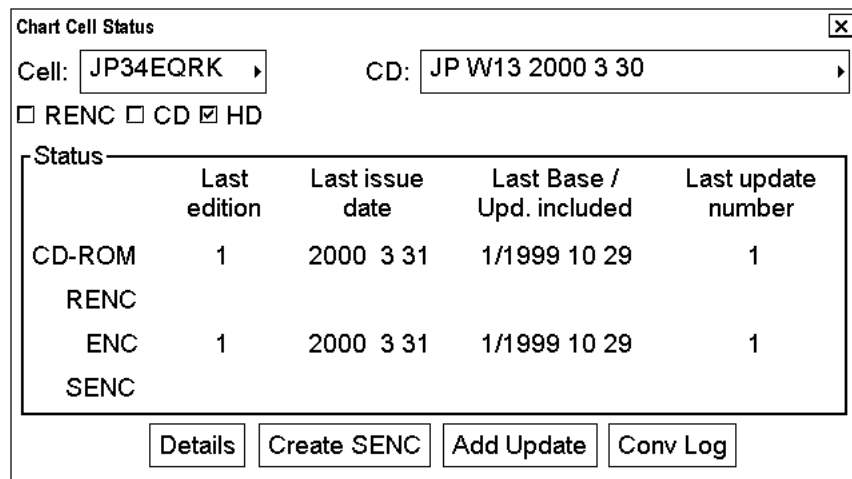
"Failed" means that the system completely failed to convert the ENC into the SENC and thus the ENC cannot be used. Failure clearly indicates that this chart is not up-to-date and thus it does not fulfil SOLAS requirements. Get the latest edition of this chart from the publisher immediately.

The Failed SENC conversion window contains two buttons. **Conv. History** opens the conversion history log and **Cell Status** opens the window of chosen item in the list of Failed SENC conversions window.

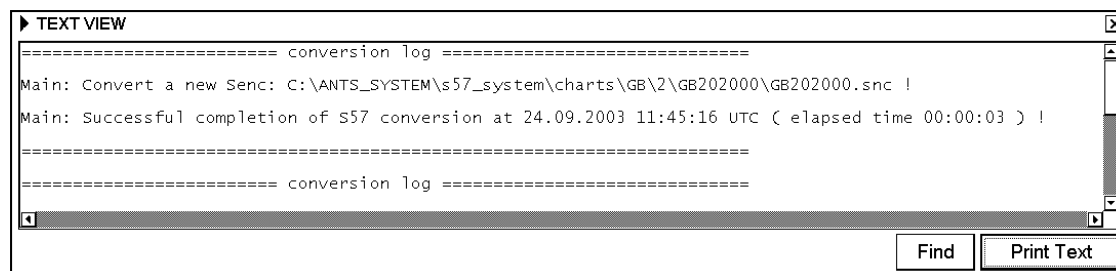
The **Conv. History** button is used to display the conversion log. The conversion log shows the status of converted ENCs. For further details about the results of conversions, see section 8.4.5 Using SENC conversion history log.



Click the **Cell Status** button, and a Cell Status window appears.



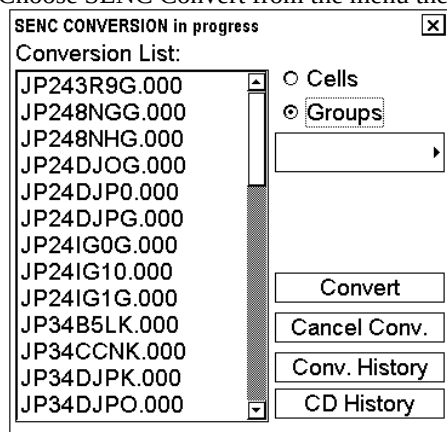
Then you can click the **Conv Log** button to view a detailed description of errors and failures detected during SENC conversion (see example below).



8.4.5 Using SENC conversion history log

The system automatically records the results of all conversions into the conversion history log. You can view the content of this log at any time by doing the following:

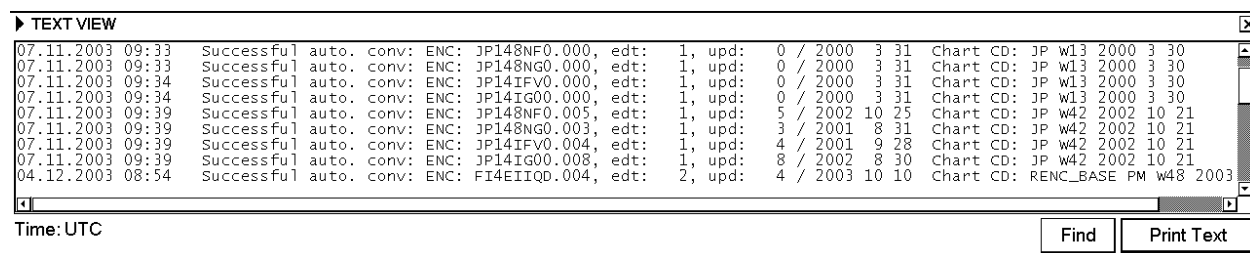
1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose SENC Convert from the menu then push the scrollwheel to show the SENC Convert window.



3. After conversion (Conversion list is empty), click the **Conv. History** button.

Note: You can also activate the **Conv. History** from the "Failed SENC conversions" window.

A list of converted charts appears. You can view the status of converted charts on the list, and also source if it is available.



4. Click the X at top right corner to close the window.

Below are examples of all possible results of conversion:

Perfect chart

Successful auto. conv: ENC: GB203000.000, edt: 1, upd: 0 / 1999 4 3

Perfect chart that is produced by a private chart producer (i.e., chart doesn't have ENC status)

A private chart cannot fulfil SOLAS requirements and you must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Successful auto. conv: ENC: AS31MATT.000, edt: 1, upd: 0 / 1999 4 8 NON ENC

Conversion errors, but the chart is partly usable

Use cell status to check details of errors. Note that the chart is still ENC.

Successful auto. conv with errors: ENCD ROME416050.000, edt: 3, upd: 0 / 1998 6 12

Conversion errors, but the chart is partly usable as NON ENC

Use cell status to check details of errors. Note that the chart is no longer ENC if it was produced by a Hydrographic Office. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Successful auto. conv with errors: ENC: n1302322.000, edt: 1, upd: 0 / 1999 1 4 NON ENC

Failed conversion

Chart is not usable and you cannot view the chart. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENCD R0MK3EI0XE.000, edt: 1, upd: 0 / 1999 2 17

Failed conversion of an update

Chart is partly usable, but it is not up-to-date and you need the latest edition of the chart from its publisher. Note that the chart is still ENC, but it no longer fulfils the SOLAS requirement. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed auto. conv: ENC: GB500005.001, edt: 2, upd: 1 / 1997 9 26 Updating impossible before new edition of Base cell

Failed conversion. Checksum is not correct

Chart is not usable and you cannot view it. Try to reload the Base cell or update from the original media. And if that doesn't work order a new CD ROM from your chart supplier. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: SG5CONTL.000, edt: 1, upd: 0 / 1996 2 25 CHECKSUM ERROR

Failed conversion. Checksum of an update is not correct

Chart is partly usable, but it is not up-to-date. Try to reload the update from the original media. And if that doesn't work order a new CD ROM from your chart supplier. Note that the chart is still ENC, but it no longer fulfils the SOLAS requirement. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: GB5X01SW.002, edt: 1, upd: 2 / 2005 1 1 CHECKSUM ERROR

Failed conversion. At least one of the previous updates has failed in its SENC conversion

The system cannot accept additional updates unless all previous updates have been successfully converted into the SENC. Chart is partly usable, but it is not up-to-date. Try to reload the failed previous update from the original media (in this example the failed previous update is GB5X01SW.002). And if that doesn't work, order a new CD ROM from your chart supplier. Note that the chart is still ENC, but it no longer fulfils the SOLAS requirement. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: GB5X01SW.003, edt: 1, upd: 3 / 2005 9 8 PREVIOUS Update MISSING

Failed conversion. The Base cell has failed in its SENC conversion

The system cannot accept updates unless the Base cell has been successfully converted into the SENC. Chart is not usable and you cannot view it. Try to reload the Base cell from the original media (in this example the failed Base cell is GB5X01SW.000). And if that doesn't work, order a new CD ROM from your chart supplier. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: GB5X01SW.001, edt: 1, upd: 1 / 1998 9 8 PREVIOUS Base CELL OR Update MISSING

NOTE: Always study both the "Failed SENC conversion" dialog and "Conversion history log" very carefully, because they contain important information about the legal status of the charts. Specially note that a chart may lose its legal status to fulfil SOLAS requirements and you may need to refer to a paper chart as legal primary aid of navigation.

8.4.6 Using SENC convert window to initiate SENC conversion

Normally automatic SENC conversion is chosen and there is no need to initiate SENC conversions from the SENC convert window. If you do not use the automatic SENC conversion, you need to manually initiate SENC conversion. Another case where you need to manually initiate SENC conversion is if you upgraded or reloaded the ECDIS software from the ECDIS software CD ROM.

To initiate SENC conversions manually, do the following:

[Chart Menu]
Activate ARCS chart ▶
Load and Update Charts ▶
SENC Convert
SENC Convert Settings
Remove Charts
C-Map Ed 3 ▶
Chart Catalogue
Set Chart viewing dates
Chart Permits
ECDIS Chart 1
Open Chart by Cell name
Chart Cell Status
Manual Updates ▶
System ▶
Close

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.

2. Choose SENC Convert from the menu and push the scrollwheel. The SENC Convert window appears:

3. Use the **Cells** button to choose an individual chart or use the **Groups** button to choose a group of charts.

4. Click the **Convert** button to initiate the SENC conversion of the charts. Note that Convert only converts those charts that are not currently converted into the SENC format. If your chosen chart or all members of your chosen group are already in the SENC format, the Conversion list remains empty. If all or some charts are not yet in the SENC format, they are added to the Conversion list (see the example below). If, for some reason, you need to force SENC conversion of an already converted chart, refer to section 8.15 Other Features of Vector Charts.

Note 1: You may remove charts from the conversion list at any time. Use the cursor to highlight the charts to remove then click the **Select** button. Finally, click the **Cancel Conv.** button to remove chosen charts from the SENC conversion queue.

Note 2: You can view the results of the finished SENC conversions at any time. Click the **Conv. History** button to view the conversion log.

8.5 Features of the Chart Menu

8.5.1 Overview of the chart menu

The Chart menu provides various features for processing charts. To display the menu, spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then click the right mouse button.

[Chart Menu]	
Activate ARCS chart	▶
Load and Update Charts	▶
SENC Convert	
SENC Convert Settings	
Remove Charts	
C-Map Ed 3	▶
Chart Catalogue	
Set Chart viewing dates	
Chart Permits	
ECDIS Chart 1	
Open Chart by Cell name	
Chart Cell Status	
Manual Updates	▶
System	▶
Close	

Activate ARCS chart:

This function activates ARCS chart onto the screen. You have two options for how to open the chart on the display. "Ignore scale" opens an ARCS chart with the chart scale used the last time you opened an ARCS chart. "Sync scale" opens an ARCS chart with a scale that is as close as possible to the scale that was used with S57 charts.

Load and Update Charts:

You can load ENC's into your hard disk, using CD ROMs, floppies or LAN (Local Area Network). For further details see the section 8.3 Loading S57 Charts.

SENC Convert:

You can convert ENC's (Base cells and/or updates) into the SENC format by individual cell or by groups of cells. For further details, see section 8.4.6 Using SENC convert window to initiate SENC conversion.

SENC Convert Settings:

You can choose automatic conversion from ENC format into the SENC format when you load charts into your hard disk. You can also choose automatic setting of Display Until date to current date after the SENC conversion. For further details see section 8.4.2 Choosing automatic SENC conversion and display until date.

Remove Charts:

You can remove cells from your hard disk. See section 8.5.5 Removing an S57 chart from the system.

C-MAP Ed3:

Load, register, update, etc. C-Map charts.

Chart Catalogue:

You can manage S57 charts. See section 8.5.2 Catalogue of S57 cells.

Set Chart viewing dates:

You can view date dependency of the cells (RENC status query date number of updates available, update display dates, update approve dates of the cells) in the SENC format. For more information, see section 8.12 Chart Viewing Dates and Seasonal Features of the Vector Chart.

Chart Permits:

You can load permits for encrypted charts to enable their use in your ECDIS. Currently PRIMAR and C-MAP use encryption.

ECDIS Chart 1:

This is used to open the chart set "IHO ECDIS Chart 1". This function helps you familiarize yourself with the various chart symbologies used with the ECDIS. For detailed information, see section 8.13 Symbology Used in Vector Charts.

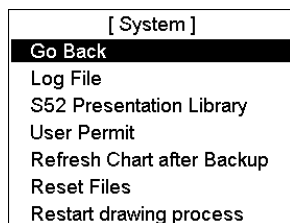
Open Chart by Cell name:

You can open a S57 chart by its number. See section 8.10.2 Choosing charts for viewing.

Chart Cell Status: You can view status of the cells (edition number and date number of updates of the cell) stored in your hard disk, CD ROMs or RENC. You can compare that you have the latest cell with latest update in use. For further details, see section 8.15 Other Features of Vector Charts.

Manual Updates: You can update your charts manually. For the procedure, see Chapter 10 Manual Updates.

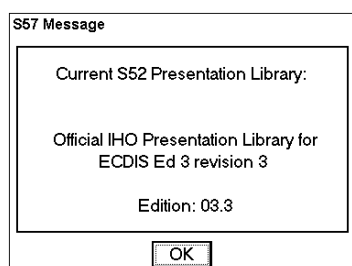
System



System contains a set of additional selections, and they are described below:

Log file: The log file contains various system events that might be useful when your system supplier tries to find the reason for unexpected behavior of the system reported by you.

S52 presentation library



You can confirm the S52 presentation library revision number for S57 charts. The current official Presentation library is shown in this example.

User permit

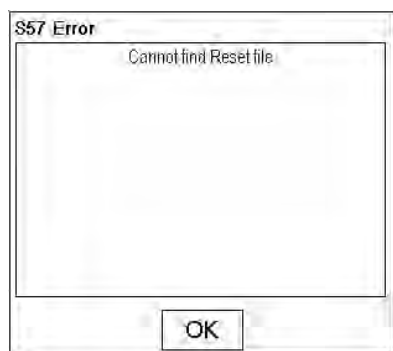


You can check your operator permit that is used as your identifier in security systems such as PRIMAR and CMAP. See the example at left.

Refresh charts after backup: This is used to refresh available charts and updates after someone backs up all charts and updates from another ECDIS to this ECDIS.

Reset files

For factory-use only. This feature demonstrates chart uploading and downloading.



If you accidentally choose this option, you get the question shown left. Click the **OK** button to escape.

Restart drawing process: This is used to restart chart drawing. Use restart drawing process, if you are not able to move chart or zoom in/out.

8.5.2 Catalogue of S57 cells

An S57 catalogue is used to view graphical coverage of the charts stored in your hard disk, available in a named "CD ROM" or available from an RENC. Available charts are displayed using their limits of charts. Note that sometimes the real coverage of the charts may be considerably less than the declared limits of it. You can cursor-pick any chart by going over its limit then you can view the information for it.

To display the catalogue, do the following:

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.

[Chart Menu]	
Activate ARCS chart	▶
Load and Update Charts	▶
SENC Convert	
SENC Convert Settings	
Remove Charts	
C-Map Ed 3	▶
Chart Catalogue	
Set Chart viewing dates	
Chart Permits	
ECDIS Chart 1	
Open Chart by Cell name	
Chart Cell Status	
Manual Updates	▶
System	▶
Close	

2. Spin the scrollwheel to choose Chart Catalogue then push the scrollwheel.

The screenshot displays the ECDIS Chart Catalogue interface. The main map area shows a coastal region with various chart cells overlaid. The right-hand panel contains the following elements:

- Top Status Bar:** North Up TM, ECDIS only, Route: UChart: UTOPORVO, PilotData: SOUTHAW Radar, Predictor 30 sec.
- Chart Catalogue Panel:**
 - Source of Chart Catalogue:** Radio buttons for CD, RENC, SENC, and C-Map. The RENC option is selected.
 - View filters:** Checkboxes for Name, Permit, RENC, Canceled Charts, and Group.
 - Navigation purpose:** Checkboxes for Overview, General, Coastal, Approach, Harbour, and Berthing.
 - Selected Chart:** A dropdown menu showing 'Cell:'. Buttons for 'Cell Status' and 'Open' are next to it.
 - Edit Group:** A button below the 'Cell:' dropdown.
- Bottom Panel:**
 - Date/Time:** 05.10.2004 07:21 LOCAL (UTC+01:00).
 - Own Ship to Cursor:** nm.
 - Ship off screen:** 1:100 000, SINGLE.
 - Buttons:** Set Chart Center, Activate Scroll.

Numbered callouts (1-5) point to specific features in the right-hand panel:

1. Source of Chart Catalogue (RENC selected)
2. Navigation purpose (Overview, General, Coastal, Approach, Harbour, Berthing)
3. Selected Chart (Cell:)
4. Edit Group
5. Ship off screen (1:100 000, SINGLE)

1. Source of Chart Catalogue

- **CD ROM:** Display charts available in a named "CD ROM".
- **RENC:** Display charts available from an RENC.
- **SENC:** Display charts stored in your hard disk in SENC format.

2. View Filters

- **Name:** Display also cell names in graphical coverage display.
- **Permit:** Display only charts for which you have permit.
- **RENC Cancelled Charts:** Display charts that are cancelled in an RENC.
- **Navigation purpose:** Display charts for chosen navigation purpose (overview, general, coastal, approach, harbour, berthing).

3. Selected Chart

- **Cell:** Name of the chart
- **Permit:** Existence of the permit
- **SENC:** Existence of SENC in your hard disk

4. Edit Group: For further details, see section 8.5.3 Grouping S57 chart cells.

5. The chart limit boxes are color-coded as follows:

Green	The chart is available for use in SENC format. If the source of the chart is an RENC then the chart is also up-to-date. If the source of the chart is something other than an RENC, then all loaded updates are included into the SENC.
Orange	The chart is available for use in SENC format but the chart is either <u>not</u> up-to-date or has been cancelled. Either the SENC is from a former edition, the SENC is missing the latest updates or the chart has been cancelled.
Red	If the chart is permit free, you do not have it available for use in SENC format and thus you cannot use the chart currently. The chart requires a permit but you do not have the permit for the chart therefore you cannot use the chart currently.
Blue	The chart is available either in ENC format, in SENC format for another software version or in SENC format for another ECDIS. For example, the chart is blue during SENC conversion and when you loaded a chart into the ECDIS and the system could not convert the chart into SENC format.
Magenta	You have a permit to use the chart, but the chart is not available in SENC format and thus you cannot use the chart currently.

8.5.3 Grouping S57 chart cells

You can define groups of S57 charts. This means you can collect related charts, for example, all cells that cover a route from Liverpool to New York or all cells available from a National Hydrographic Office. This makes it easier to perform many SENC maintenance functions such as loading Base cells and updates, setting Display Until and Approve Until dates, etc. Below is the procedure for how to make a group and add charts into it.

When you load or update S57 charts from CD-ROM, you are able to define a group in "Load or Update Charts from loaded CD-ROM" window. To do this, proceed as follows:

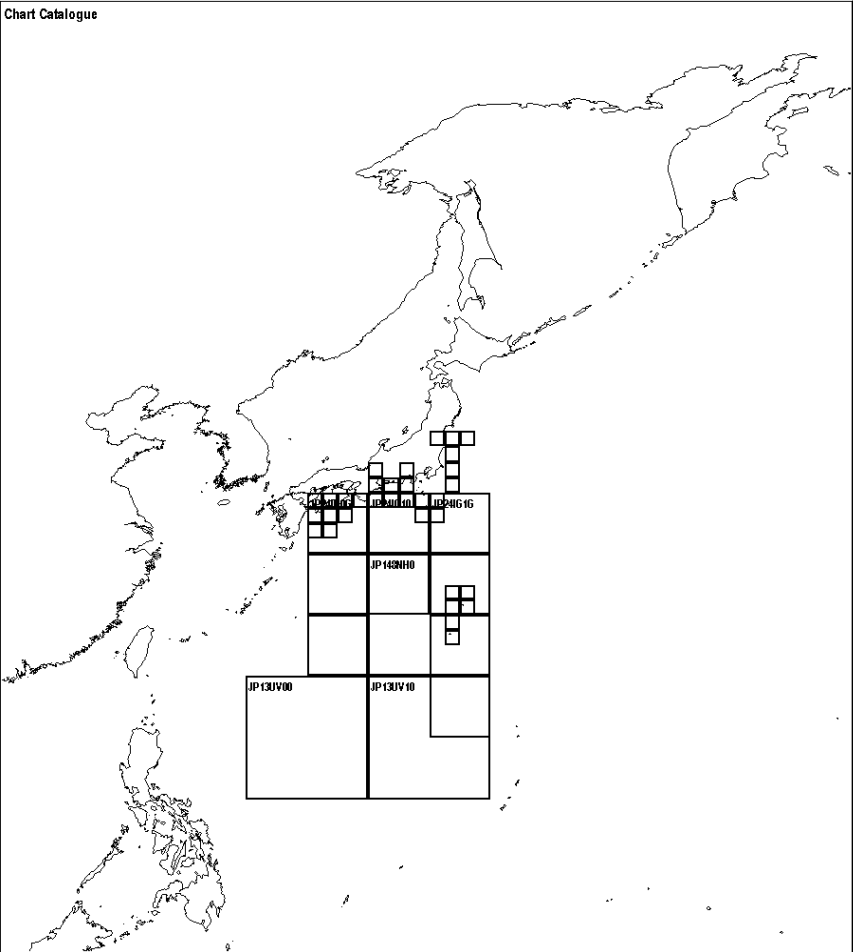
Using Load or Update Charts from loaded CD-ROM window

When you load or update S57 charts from CD-ROM, you are able to define a group in "Load or Update Charts from loaded CD-ROM" window. To do this, proceed as follows:

1. Select Load or Update charts>From CD-ROM in Chart menu. A "Load or Update Charts from loaded CD-ROM" window appears.

North Up TM ECDIS only Route: UChart: UTOPORVO PilotData: SOUTHAN Radar Predictor 30 sec

Chart Catalogue



59°47.625'N HDG 070.0°
024°33.564'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
FILTER HIGH COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM

CD JP W13 2000 3 30

Source JP Week 13 Date 2000 3 30

Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
JP134CCNK	1	2
JP134D3PK	1	1
JP134D3PO	1	1
JP134E0RK	1	1
JP134E0RO	1	1
JP134J2G	1	3

Load selectors

☒ Name ☒ Permit ☐ RENC ☐ Canceled Charts ☐ Group ☒ Missing only ☐ Manual selection

Navigation purpose

☒ Overview ☒ General ☒ Coastal ☒ Approach ☒ Harbour ☒ Berthing

View CD-ROM Publisher Notes

View CD-ROM content Summary

Load and Conv. History Remove

Load Edit Group

Own Ship to Cursor: nm

TM reset off

1:100 000 SINGLE b5.01 b5.01

Range - Range +

2. Press the **Edit Group** button.
3. Press the **New** button.
4. Enter group name and click the **OK** button.

5. Click the **Add Frame** button.

North Up TM ECDIS only Route: UChart: PilotData: HELSINKI- Radar Predictor 30 sec Non ENC Data

Chart Catalogue

59°47.625'N HDG 070.0°
024°33.564'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
FILTER HIGH COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM [X]
CD JP W13 2000 3 30
Source JP Week 13 Date 2000 3 30
Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
JP13UV00	1	1
JP13UV10	1	1
JP148NG0	1	2
JP148NG1	1	2
JP14IG00	1	4
JP14IG10	1	5

Load selectors

☒ Name ☒ Overview
☒ Permit ☒ General
☒ RENC ☒ Coastal
☒ Canceled ☒ Approach
☒ Charts ☒ Harbour
☒ Berthing

☐ Group ALL
☒ Missing only ☐ Manual selection

Edit group

Inside	Outside
TC1M0001	JP13UV00
TC1M0002	JP13UV10
TC1M0003	JP148NG0
TC1M0004	JP148NG1
TC1M0005	JP14IG00
TC1M0006	JP14IG10

Add Frame Close edit
New Group Remove Group

Own Ship to Cursor: nm
TM reset off
1:500 000 SINGLE b5.01 b5.01

Show Value Nav Marks

6. Use the trackball to define a frame then the push the left mouse button.

North Up TM ECDIS only Route: UChart: PilotData: HELSINKI- Radar Predictor 30 sec Non ENC Data

Chart Catalogue

59°47.625'N HDG 070.0°
024°33.564'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
FILTER HIGH COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM [X]
CD JP W13 2000 3 30
Source JP Week 13 Date 2000 3 30
Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
JP13UV00	1	1
JP13UV10	1	1
JP148NG0	1	2
JP148NG1	1	2
JP14IG00	1	4
JP14IG10	1	5

Load selectors

☒ Name ☒ Overview
☒ Permit ☒ General
☒ RENC ☒ Coastal
☐ Canceled ☒ Approach
☐ Charts ☒ Harbour
☐ Berthing

☐ Group JAPAN
☒ Missing only ☐ Manual selection

Edit group

Inside	Outside
TC1M0001	JP13UV00
TC1M0002	JP13UV10
TC1M0003	JP148NG0
TC1M0004	JP148NG1
TC1M0005	JP14IG00
TC1M0006	JP14IG10

Done Cancel

Own Ship to Cursor: nm
TM reset off
1:500 000 SINGLE b5.01 b5.01

Select Chart Menu

7. When the frame is completed, click the **Done** button.

8. When you have completed entering frames, click the **Close Edit** button.

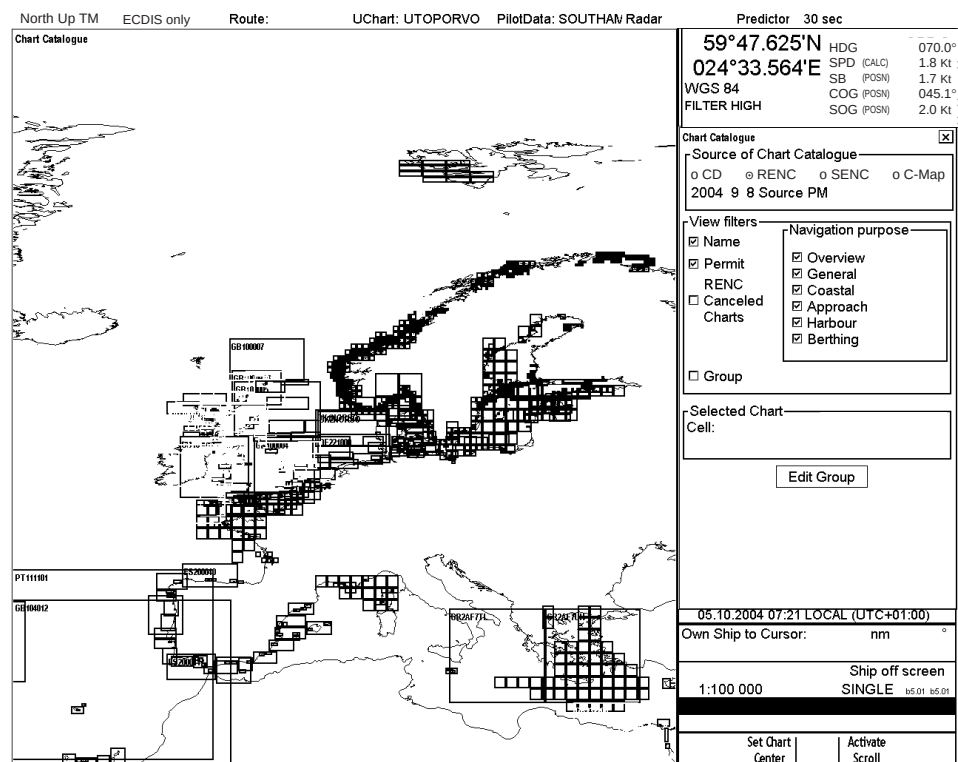
9. Select Group as a qualifier for loading.

10. Now you can load charts member of group Japan by clicking the **Load** button followed by the **Yes** button.

Using Chart catalogue window

Chart Catalogue can be used to define a group as follows:

1. Select "Chart Catalogue" from the Chart menu window.

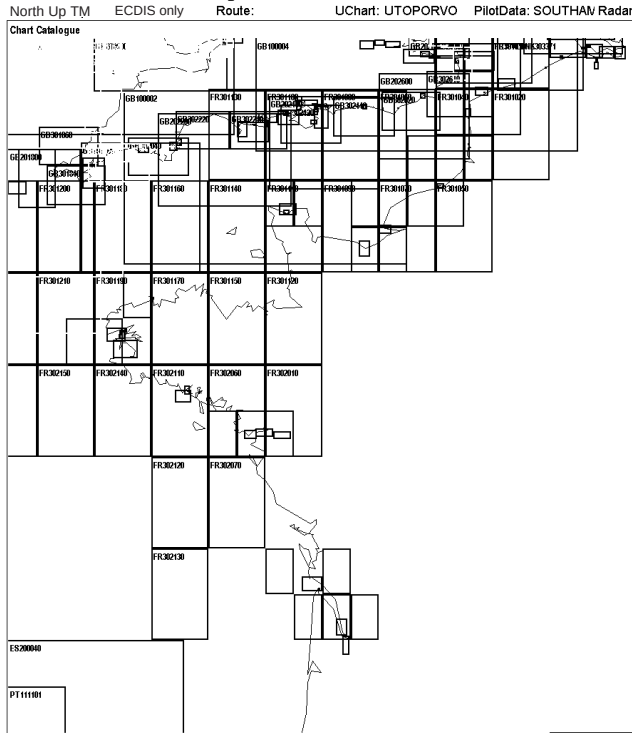


2. Press the **Edit Group** button then click the **New** button.

8. Vector Chart Material

3. Enter name for Group and click the **OK** button.

North Up TM ECDIS only Route: UChart: UTOPORVO PilotData: SOUTHAM Radar Predictor 30 sec



59°47.625'N HDG 070.0°
024°33.564'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
FILTER HIGH COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Chart Catalogue

Source of Chart Catalogue
☐ CD ☒ RENC ☐ SENC ☐ C-Map
2004 9 8 Source PM

View filters
☒ Name
☒ Permit
☐ RENC
☐ Canceled
Charts

Navigation purpose
☒ Overview
☒ General
☒ Coastal
☒ Approach
☒ Harbour
☒ Berthing

☐ Group FRANCE

Selected Chart
Cell:

Inside Outside
>> <<

Add Frame Close Edit Group
New Save As Text Remove

05.10.2004 07:47 LOCAL (UTC+01:00)
Own Ship to Cursor: nm
Ship off screen
1:100 000 SINGLE 05.01 05.01

Drag Window Chart Menu

Write name of the new Group Name

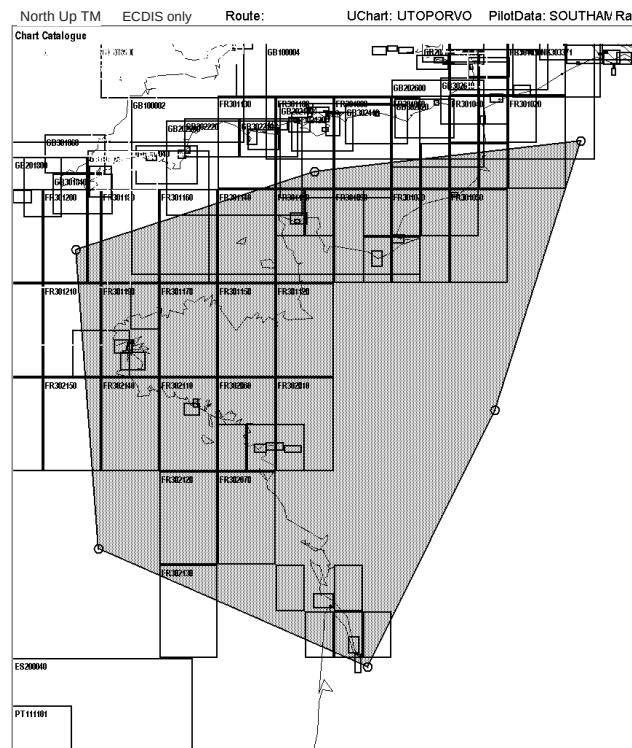
FRANCE

OK

4. Press the **Add Frame** button.

5. Define frame using left mouse button and click the **Done** button.

North Up TM ECDIS only Route: UChart: UTOPORVO PilotData: SOUTHAM Radar Predictor 30 sec



59°47.625'N HDG 070.0°
024°33.564'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
FILTER HIGH COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Chart Catalogue

Source of Chart Catalogue
☐ CD ☒ RENC ☐ SENC ☐ C-Map
2004 9 8 Source PM

View filters
☒ Name
☒ Permit
☐ RENC
☐ Canceled
Charts

Navigation purpose
☒ Overview
☒ General
☒ Coastal
☒ Approach
☒ Harbour
☒ Berthing

☐ Group FRANCE

Selected Chart
Cell:

Inside Outside
>> <<

Done Cancel

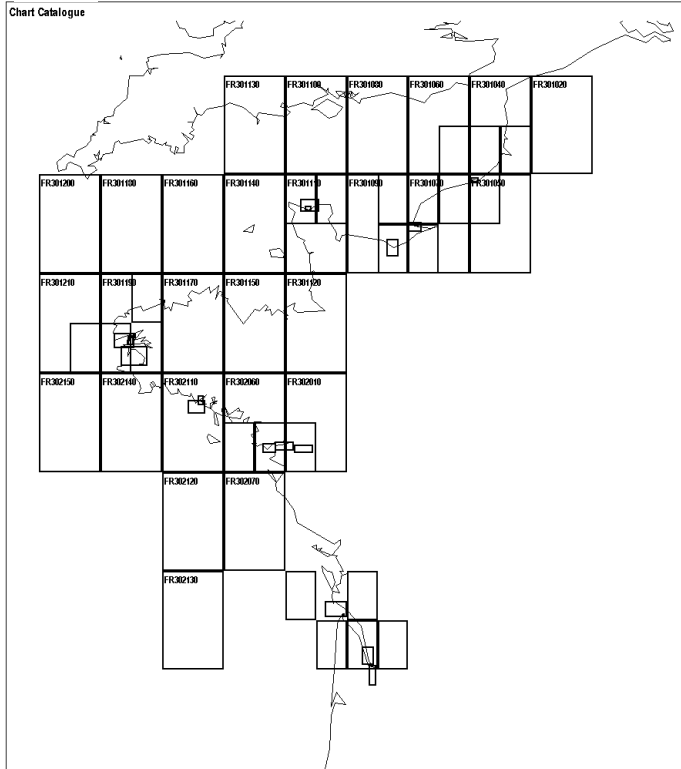
05.10.2004 07:48 LOCAL (UTC+01:00)
Own Ship to Cursor: nm
Ship off screen
1:100 000 SINGLE 05.01 05.01

Select Chart Menu

6. Select Group to view content of group in Chart Catalogue window.

North Up TM ECDIS only Route: Uchart: UTOPORVO PilotData: SOUTHAV Radar Predictor 30 sec

Chart Catalogue



59°47.625'N	HDG	070.0°
024°33.564'E	SPD (CALC)	1.8 Kt
WGS 84	SB (POSN)	1.7 Kt
FILTER HIGH	COG (POSN)	045.1°
	SOG (POSN)	2.0 Kt

Chart Catalogue ☐

Source of Chart Catalogue

☐ CD ☒ RENC ☐ SENC ☐ C-Map

2004 9 8 Source PM

View filters

☒ Name

☒ Permit

☐ RENC

☐ Canceled Charts

☒ Group

Navigation purpose

☒ Overview

☒ General

☒ Coastal

☒ Approach

☒ Harbour

☒ Berthing

FRANCE

Selected Chart

Cell:

Edit Group

05.10.2004 07:49 LOCAL (UTC+01:00)

Own Ship to Cursor: nm

Ship off screen

1:100 000 SINGLE b5.01 b5.01

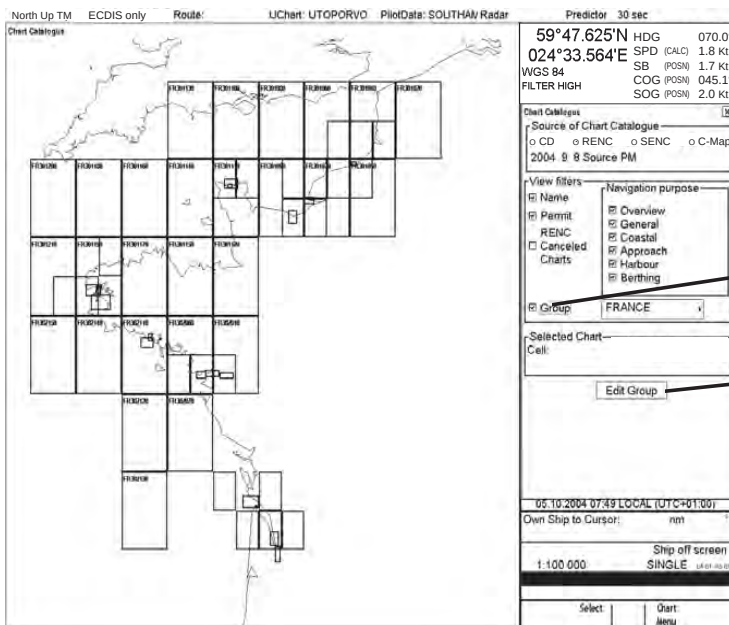
Select Chart Menu

8. Vector Chart Material

Removing S57 chart cells from a group

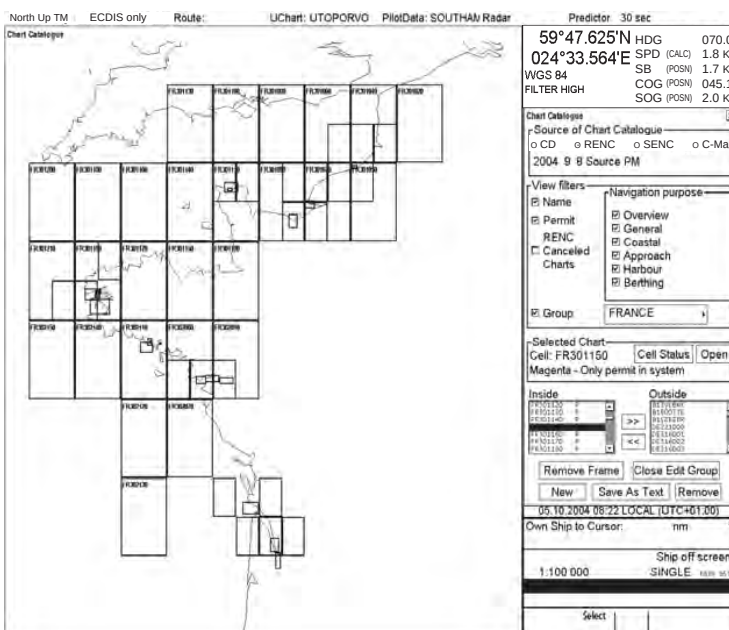
You can remove chart cells from a defined group as follows:

1. Select desired group.
2. Press the **Edit Group** button.
3. Use the **Remove frame** button to define area for charts or pick charts individually from the list.



1. Check group and choose group name to remove.

2. Click Edit Group.

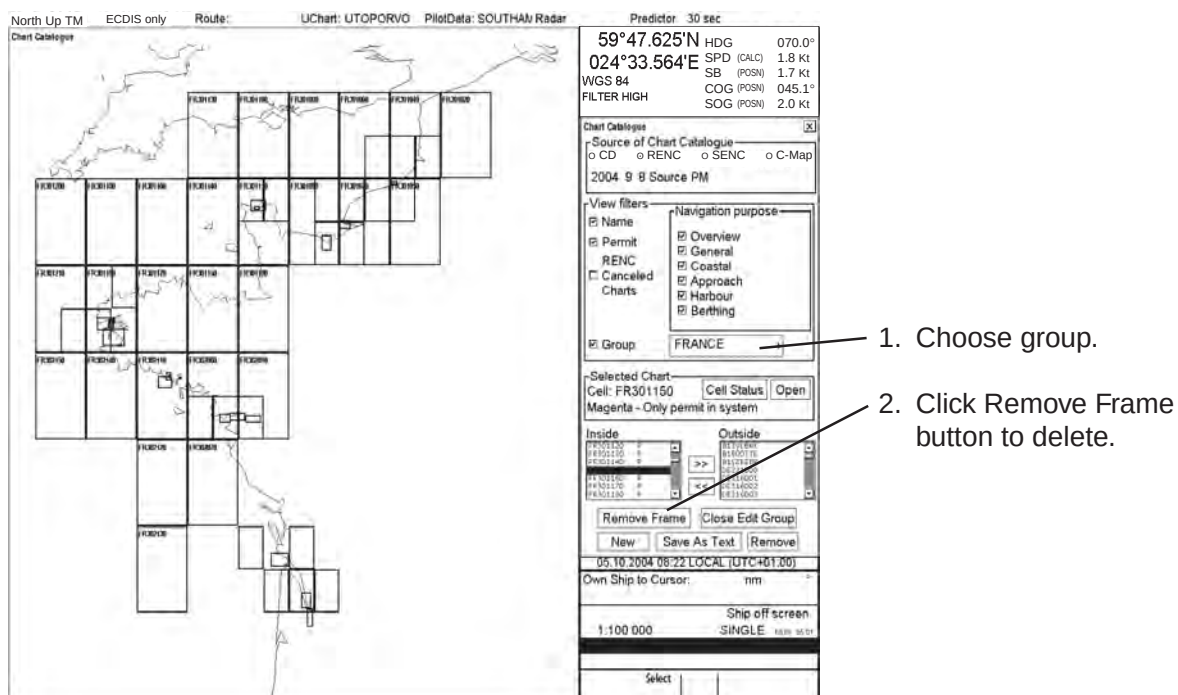


3. Use Remove Frame button to use graphical catalog, or choose individual cell by using left mouse button and clicking >>.

4. Click Done.

Deleting a group

You can delete a defined group as follows:



Choosing active group for viewing with catalogue

To choose active group do the following:

1. Choose Chart Catalogue from the Chart menu.
2. Check **Groups**.
3. Choose desired group from Edit Group list box.

The name of active group appears in the Active Group field.

8. Vector Chart Material

Viewing active group with catalogue

To view active group, check "Group" selection and select desired group from list box

North Up TM ECDIS only Route: UChart: UTOPORVO PilotData: SOUTHAM Radar Predictor 30 sec

Chart Catalogue

59°47.625'N HDG 070.0°
024°33.564'E SPD (CALC) 1.8 Kt
WGS 84 SB (PGN) 1.7 Kt
FILTER HIGH COG (PGN) 045.1°
SOG (PGN) 2.0 Kt

Chart Catalogue [X]

Source of Chart Catalogue
☐ CD ☐ RENC ☐ SENC ☐ C-Map
2004 9 8 Source PM

View filters

☒ Name ☒ Permit ☒ RENC ☐ Canceled Charts

Navigation purpose
☒ Overview ☒ General ☒ Coastal ☒ Approach ☒ Harbour ☒ Berthing

☒ Group: FRANCE

Selected Chart
Cell: Cell Status Open

Edit Group

05.10.2004 07:49 LOCAL (UTC+01:00)

Own Ship to Cursor: nm

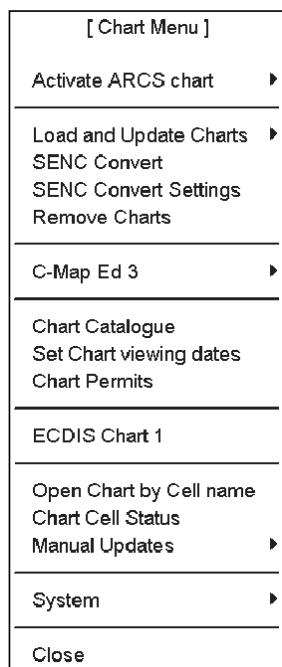
Ship off screen
1:100 000 SINGLE 105.01 105.01

Select Chart Menu

Select "Group" to activate a Group selection. Select desired group.

8.5.4 Viewing status and setting viewing dates of S57 chart cells and their updates

When you load S57 chart cell(s) and/or their updates, the system sets Display Until of S57 chart cell(s) as current date of the system. To set Approve Until as current date of the system, you must open the Set Chart viewing dates dialog box and perform Approve Until. You can view status and set viewing dates of S57 chart cells and their updates. To view status and date dependency, do the following:



1. Choose Set Chart viewing dates from the Chart menu.
2. The Chart Viewing date dialog box appears.

Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displ. until	Updates Approv. until
FI3EIR1	1/ 3	1/ 3	2005 3 10	-
FI49IHMJ	2/ 10	2/ 10	2005 3 10	-
FI49IHMK	2/ 3	2/ 3	2005 3 10	-
FI49IHM L	2/ 9	2/ 9	2005 3 10	-
FI49IHMS	2/ 1	2/ 1	2005 3 10	-
FI4EIGII	1/ 3	1/ 3	2005 3 10	-
FI4EIGIJ	2/ 4	2/ 4	2005 3 10	-
FI4EIGIK	2/ 2	2/ 2	2005 3 10	-
FI4EIGIL	2/ 4	2/ 4	2005 3 10	-
FI4EIHMI	1/ 7	1/ 7	2005 3 10	-
FI4EIHMM	2/ 4	2/ 4	2005 3 10	-
FI4EIHMN	1/ 6	1/ 6	2005 3 10	-
FI4EIHMO	1/ 11	1/ 11	2005 3 10	-
FI4EIHMP	1/ 12	1/ 12	2005 3 10	-
FI4EIHMQ	1/ 6	1/ 6	2005 3 10	-
FI4EIHMR	2/ 4	2/ 4	2005 3 10	-
FI4EIIQN	1/ 3	1/ 3	2005 3 10	-
FI4EIIQO	1/ 3	1/ 3	2005 3 10	-
FI4EIIOP	1/ 4	1/ 4	2005 3 10	-
FI4EIIQI	1/ 10	1/ 10	2005 3 10	-
FI4EIIQR	3/ 13	3/ 13	2005 3 10	-
FI4EIIQS	2/ 16	2/ 16	2005 3 10	-
FI4EIIQT	2/ 11	2/ 11	2005 3 10	-
FI4EIIQU	2/ 11	2/ 11	2005 3 10	-
FI4EIIQV	1/ 4	1/ 4	2005 3 10	-
FI4EIIQW	1/ 5	1/ 5	2005 3 10	-

Latest RENC Product List 2005 2 23 Source PM
 Oldest date 2005 3 10 2005 3 10
 Newest date 2005 3 10 2005 3 10
 Manual Updates 2005 3 10 2005 3 10
 Display Until 10 Mar 2005 Approve Until 10 Mar 2005
☒ Sync Manual Update Dates
☒ All SENCs
 Manual Update Dates

Recommended settings in Chart viewing date are:

- Sync Manual Update Dates: ON position
- All SENCs: ON position

RENC edt / upd: The column "RENC" contains edition/update status from Product List.

SENC edt / upd: The column "SENC" contain edition/update status from "SENC", i.e., loaded and converted in the ECDIS.

Updates displ. until: "date until updates" is displayed. You can enter desired date by using the Display Until field. The number after the date shows the number of updates for the displayed cell (number of displayed updates / number of updates in SENC format).

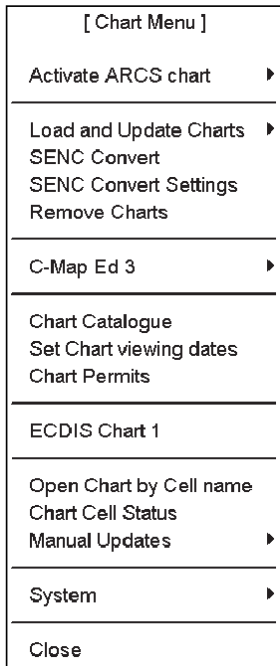
Updates approv. until: View the Date Until updates is approved. You can enter desired date by using the Approve Until field (number of approved updates / number of updates in SENC format).

The issue date of the Product List used is displayed as "Latest RENC Product List". An RENC Product List contains information about the charts stored in RENC and the date when the Product List was issued. If the ECDIS does not contain any Product List, then the date of the Product List is displayed as "—NVLD—".

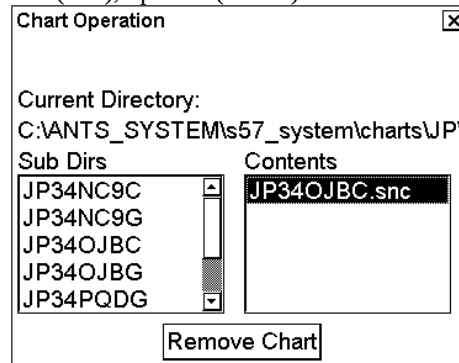
The ">>>" mark is used to indicate that a chart is not up-to-date. The "<<<" mark is used to indicate that SENC contains newer information than the information in an RENC Product List. (You may need to load newer RENC Product List.) Cancelled charts are indicated as "cancelled" instead of "edtn/updn". If an SENC contains a cancelled chart, then the indication ">>>" is replaced with "XXX".

8.5.5 Removing an S57 chart cell from the system

To remove an S57 format vector chart cell from the system, do the following:



1. Choose Remove Charts from the Chart menu.
2. Choose chart cells to remove from the system. You can remove Base cell (000), updates (001...) and SENC format (snc).



Click the **Remove Chart** button.

3. Click the **OK** button to remove the chart chosen.



The system will remove file(s) from the hard disk.

8.6 S57 Chart Service from an RENC

8.6.1 Introduction

Before you can use an RENC service, you have to be authorized as a customer of an RENC. To be authorized you have to contact an official distributor (chart agent) of RENC. Then, the following services are available:

8.6.2 Permits

Permits are used to control the permission to use a chart. A permit in RENC security is connected to an edition.

Permits also include the expiry date. The expiry date of a permit controls the ENC to SENC conversion. If the issue date of a chart or update is older or equal to the permit expiry date, then the system can convert an ENC into the SENC. There are no viewing time limits as used in some other security systems such as ARCS. The operator has a right to view a chart forever and more over he has a right to convert a chart from its ENC format into the SENC forever.

An RENC can issue permits in two formats:

- **"*.pmt" format.** This format does not include the applicable chart edition nor does it include applicable permit type.
- **PERMIT.TXT format.** This format includes the applicable chart edition as well as applicable permit type.

Both permit formats are fully operational, but the older "*.pmt" format creates confusion because it cannot support the operator when chart edition changes.

The system display warnings associated with expiry date. Examples are "will expire" warning 30 days before the expiry date and "have expired" after the expiry date. These warnings are relevant only for Subscription permits. Only the new PERMIT.TXT format supports the system to suppress irrelevant warnings associated with expiry date.

8.6.3 Product list

A Product List is maintained by an RENC. You can retrieve the Product List from an RENC via telecommunications or you can load it from the CD ROM of an RENC. This list contains an up-to-date list of available charts and their edition/update status in an RENC. When you load a CD ROM or use telecommunications to receive a Product List from an RENC, the ECDIS checks the issue date of the Product List. If the issue date indicates a newer Product List, then it is copied into the ECDIS. If the issue date indicates an older Product List, then ECDIS shows a notice to the operator that newer Product List is already loaded.

8.6.4 Authentication

Normally the authentication process is invisible to the operator. Only if the authentication fails, then the operator gets an appropriate notice. From a operator point of view, the authentication is similar to the CRC checksum test. If the CRC checksum test or authentication fails, then the chart is unusable.

Authentication uses a private key and a public key. A digital signature associated with each chart contains a private key. A public key is stored in the ECDIS and it is truly public. RENC may publish a new public key. This public key will be available as text by fax, by post, by front page of a newspaper, etc. and as a text file, for example, PRIMAR.PUB.

8.6.5 Available service types

CD ROM service

If you are using a CD ROM service, you receive the following from an RENC:

- Base CD ROM contains all Base cells that are available in an RENC CD ROM database when the CD ROM was released.
- Update CD ROM contains all updates to the Base CD ROM, but it will also contain any new Base cells and new edition and re-issues received from the contributing Hydrographic Offices. Update CD ROM will be issued once a week.

If you want to enlarge your chart coverage, you have to contact your distributor to order more permits for new charts.

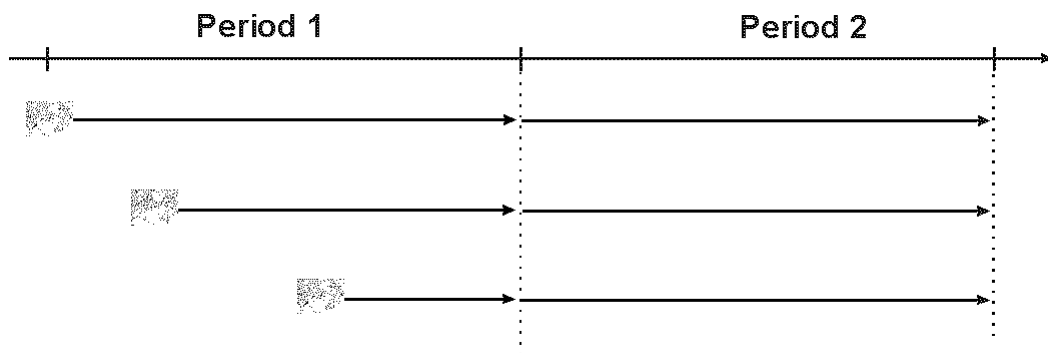
8.6.6 Subscription types

Charts and their updates stored in RENC are decrypted and you have to get a key (permit) to load charts into the ECDIS.

Subscription

Subscription period is 12 months and it starts when you order first permit(s) from an RENC.

- User subscribes to an updating service
- Updating service has a renewable expiration date
- ENC is still available after expiration, but cannot apply any new information
- User will receive the following during the service period:
 - All updates issued to the ENC
 - Any re-issues for the ENC
 - Any new edition of the ENC



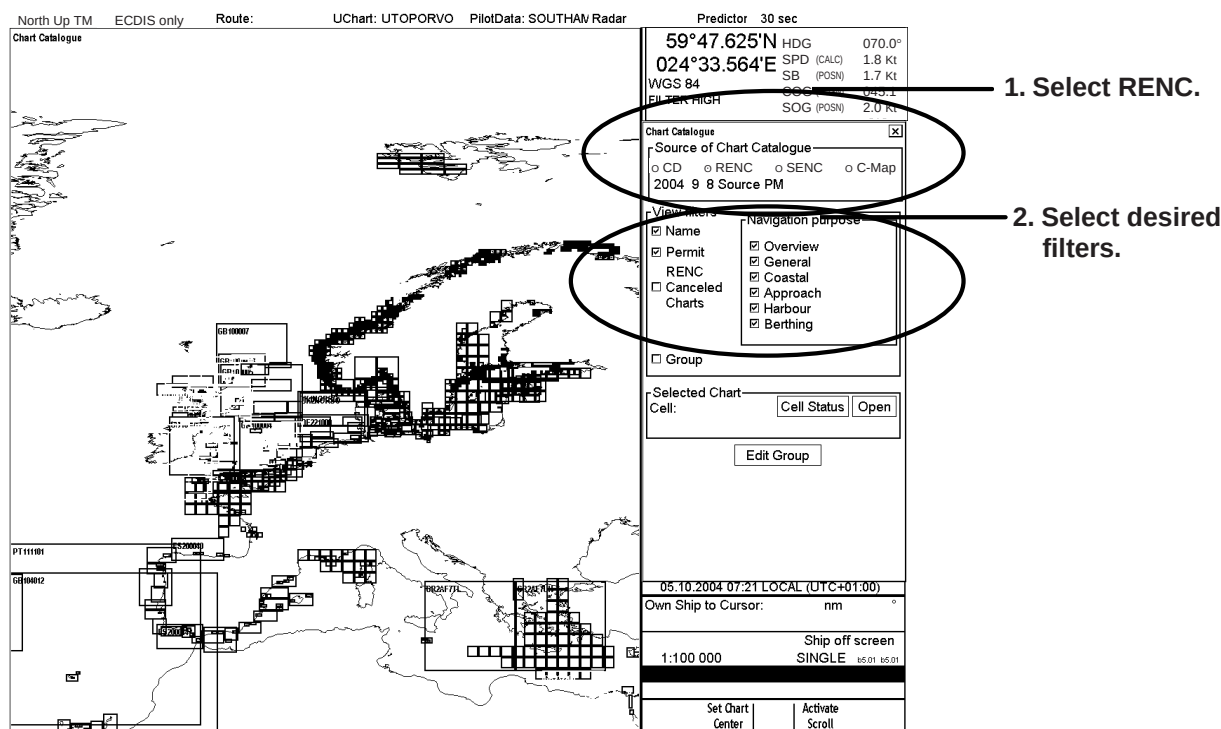
If you enlarge your chart coverage during your subscription period as shown above, the date of subscription expiration for all charts will be the same date.

8.7 Services Provided by an RENC

8.7.1 Viewing the coverage of an RENC service

To view the Product List in graphical presentation, use the catalogue, which you may display by opening the Chart menu and choosing Chart Catalogue. The catalogue of S57 charts shows the situation when you last ordered the Product List from an RENC or loaded the latest Base or Update CD ROM into the ECDIS.

Note: The ECDIS automatically keeps the latest available Product List. Thus the ECDIS does not load the Product List if it is older than the one already loaded into the ECDIS.



The chart limit boxes are color-coded as follows:

- Green** The chart is available for use in SENC format. If the source of the chart is an RENC, then the chart is also up-to-date. If the source of the chart is something other than an RENC then all loaded updates are included into the SENC.
- Orange** The chart is available for use in SENC format but the chart is either not up-to-date or has been cancelled. Either the SENC is from a previous edition, the latest SENC update was missed or the chart has been cancelled.
- Red** If the chart is permit free, you do not have it available for use in SENC format and thus you cannot use the chart currently.
If the chart requires a permit and you do not have the permit for the chart, you cannot use the chart currently.
- Blue** The chart is available either in ENC format, in SENC format for another software version or in SENC format for another ECDIS. For example the chart is blue during SENC conversion and if you loaded a chart into the ECDIS and the system could not convert the chart into SENC format.
- Magenta** You have a permit to use the chart, but the chart is not available in SENC format and thus you cannot use the chart currently.

8.7.2 Knowing up-to-date status of a chart from an RENC

To keep charts up-to-date, you should check for updates with an RENC weekly. The ECDIS compares charts used to Product List of an RENC. If a Permanent Warning appears on the chart display of ECDIS (at the upper left corner), this means that the charts used were checked against the Product List and at least one of the charts used is not up-to-date. See the Permanent Warning below.

Permanent Warning

At least one of used charts is not up-to-date. Get or load latest updates from your RENC service. Use Chart Menu - Set Chart viewing dates to check charts

The information of available charts and their up-to-date status is available both in the catalogue and in the Chart viewing dates window.

The easiest method to check if charts are up-to-date is to view the catalogue and check that the names of all required charts appear in green. The names of charts that are not up-to-date appear in orange. For further details see section 8.7.1 Viewing the coverage of an RENC service.

You can also use the Chart viewing dates window in the Chart menu when you have doubt that some charts are not up-to-date or the Permanent Warning shown above is displayed.

Chart viewing dates

Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displ. until	Updates Approv. until
GB40344A	19/ 1 >>>	17/ 4	2005 1 3	2005 1 3
GB40344B	24/ 1 >>>	18/ 0	2005 1 3	2005 1 3
GB40344E	10/ 2 >>>	9/ 0	2005 1 3	2005 1 3
GB40346A	13/ 2 >>>	12/ 3	2005 1 3	2005 1 3
GB40364A	6/ 3 >>>	5/ 1	2005 1 3	2005 1 3
GB404015	-/ -	3/ 0	2005 1 3	2005 1 3
GB40484A	2/ 0 >>>	2/ 0	2005 1 3	2005 1 3
GB40484B	2/ 0 >>>	2/ 0	2005 1 3	2005 1 3
GB40484C	2/ 2 >>>	2/ 0	2005 1 3	2005 1 3
GB40484H	2/ 0 <<<	3/ 0	2005 1 3	2005 1 3
GB40486A	1/ 9 >>>	1/ 0	2005 1 3	2005 1 3
GB40502A	1/ 0	1/ 0	2005 1 3	2005 1 3
GB40502E	Canceled XXX	16/ 4	2005 1 3	2005 1 3
GB40504A	1/ 2 >>>	1/ 1	2005 1 3	2005 1 3
GB40522A	Canceled XXX	1/ 0	2005 1 3	2005 1 3
GB40582A	3/ 0 >>>	2/ 1	2005 1 3	2005 1 3
GB40582C	3/ 0 >>>	2/ 0	2005 1 3	2005 1 3
GB40584A	2/ 0 >>>	1/ 1	2005 1 3	2005 1 3
GB40584B	2/ 0 >>>	1/ 0	2005 1 3	2005 1 3
GB40612A	Canceled XXX	1/ 0	2005 1 3	2005 1 3
GB40622A	1/ 2	1/ 2	2005 1 3	2005 1 3
GB40642A	3/ 0 >>>	1/ 0	2005 1 3	2005 1 3
GB40642B	8/ 1 >>>	4/ 0	2005 1 3	2005 1 3
GB40682A	2/ 0 >>>	1/ 0	2005 1 3	2005 1 3
GB40682B	7/ 4 >>>	6/ 0	2005 1 3	2005 1 3
GB40722D	2/ 1	2/ 1	2005 1 3	2005 1 3

Latest RENC Product List 2004 11 24 Source PM
 Oldest date 2005 1 3 2005 1 3
 Newest date 2005 1 3 2005 1 3
 Manual Updates 2005 1 3 2005 1 3

Display Until 05 Jan 2005 Approve Until 05 Jan 2005

☒ Sync Manual Update Dates
☒ All SENCs

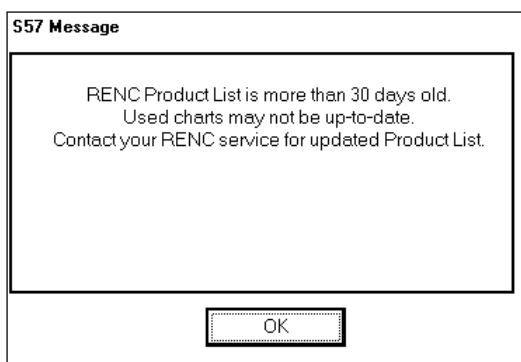
Manual Update Dates

Interpreting the chart viewing date window

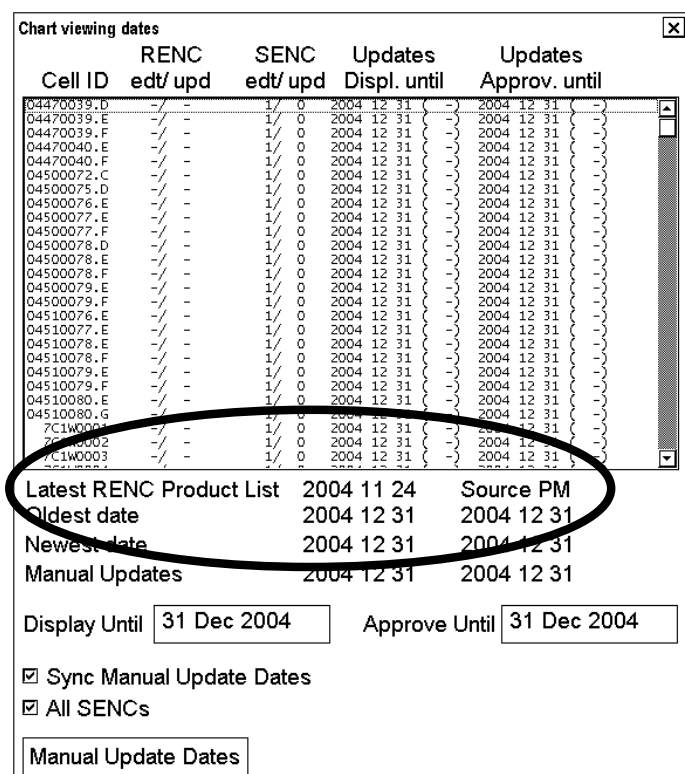
- RENC edt / upd: The chart's edition and its update in an RENC appear here. The information is based on the last-ordered Product List.
- SENC edt / upd: The chart's edition and its update in the ECDIS appear here.
- If a chart is not available in an RENC but it is in the ECDIS the RENC edt/upd shows "- / -".
- If a chart in the ECDIS is newer than the associated chart in an RENC, for example, the Chart viewing date window the RENC edt/upd field shows "2/ 8" and the SENC edt/ upd field shows "2/ 9".
- Chart Displayed and Approved Until are set based on Updates number (Updates Displayed and Approved until as NVLD (Not Valid) indication).
- If a chart in the ECDIS is older than the associated chart an RENC, for example, the RENC edt/upd field shows "1/ 21" and the SENC edt/ upd field shows "1/ 0".

8.7.3 Knowing up-to-date status of an RENC product list

The ECDIS periodically checks for the last time you ordered the Product List from an RENC. If the Product List is more than 30 days old, the ECDIS displays the S57 Message shown below:



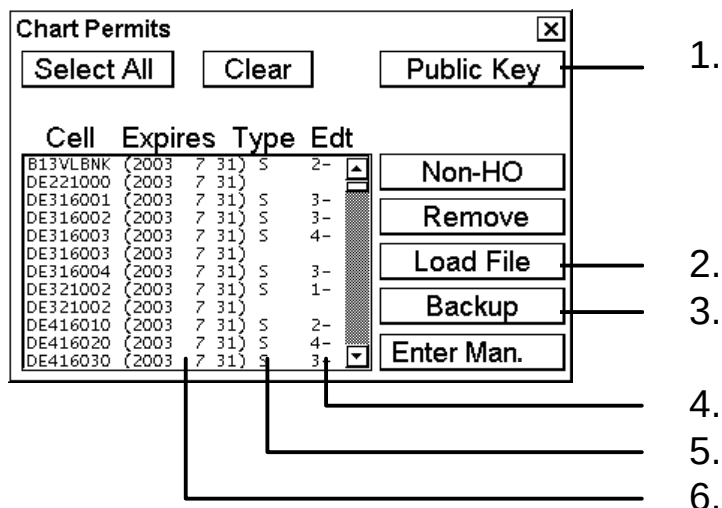
To check the date when you last ordered the Product List of an RENC CD ROM, choose Set Chart viewing dates from the Chart menu. The date the Product List was last ordered is shown at the lower left corner of the Chart viewing dates window.



8.7.4 Managing permits from an RENC

- Permits are used to control the right to use a chart in the ECDIS. A permit in an RENC ENC service is connected to an edition of a chart.

The expiry date of a permit controls the loading of Base charts and their updates to the ECDIS. The ECDIS will warn you when you are loading charts or updates that are issued less than 30 days before the expiration date of a permit. If a permit has expired, it is impossible to load a chart or its update that was issued after the expiration date of the permit. The operator has a right to view a chart forever, but it will not complete the requirements for having up-to-date charts. To view the Chart Permits window, open the Chart menu and choose Chart Permits.



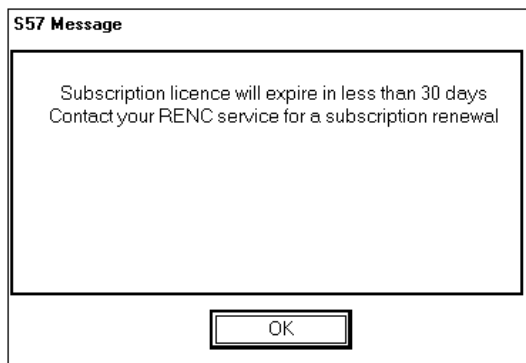
Description of the chart permits window

- Public Key** lets you view a public key or load a new one.
- Load File** enables downloading from an RENC when you receive permits from that RENC.
- Backup** makes a back-up copy of permits.
- The **Edt (Edition)** field displays edition number of a chart to which the permit is valid. Note that when a new edition of a chart is issued a new permit is required. It is possible to have permits for different editions of the same chart.
- The **Type** field shows type of permit held for a chart: S, Subscription
- The **Expires** field shows the expiration date of permits. All subscription-type permits will expire on the same date.

Subscription warnings

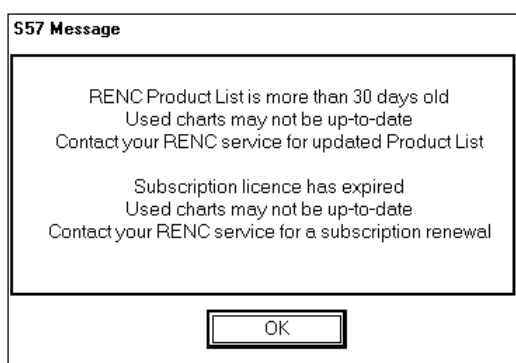
If you have at least one subscription-type permit, the system will automatically warn you about the expiration date of your subscription license.

Warning about soon-to-be-expired subscription is activated every 12 hours when it is less than 30 days from the expiration date.



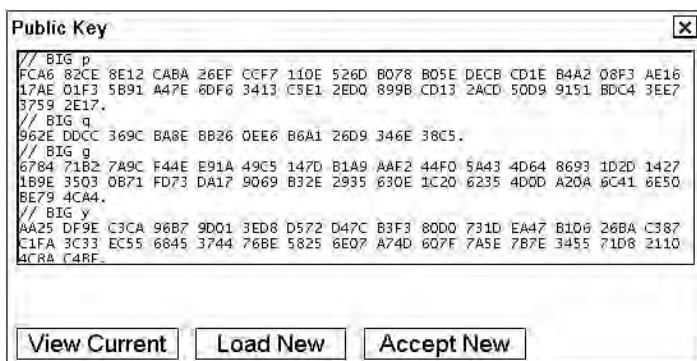
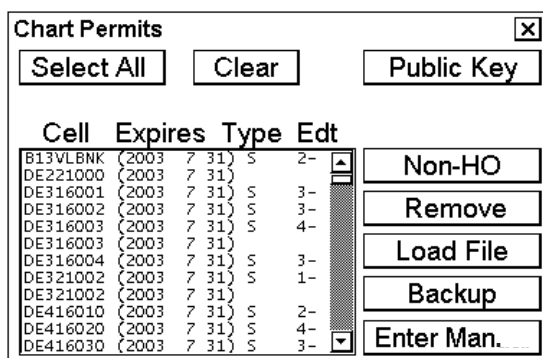
Warning about expired subscription is activated every 12 hours after the subscription has expired.

Note: The top half of this message display provides a warning that the Product List is not up-to-date.



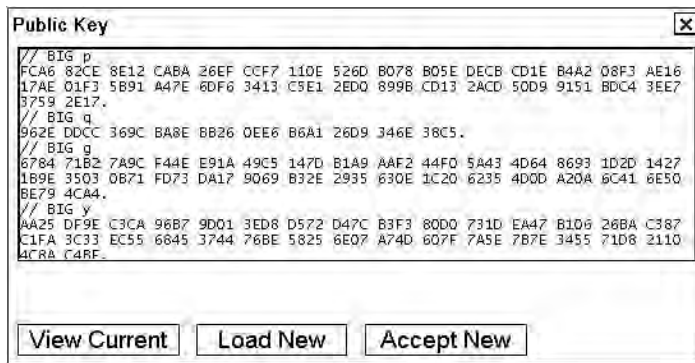
8.7.5 Managing public key from an RENC

To view a public key or to load a public key into the ECDIS, choose Chart Permits from the Chart menu then click the **Public Key** button.



8. Vector Chart Material

The **View Current** button displays current public key. The **Load New** button loads a new public key from *.PUB file (for example, PRIMAR.PUB) and displays that file's contents.

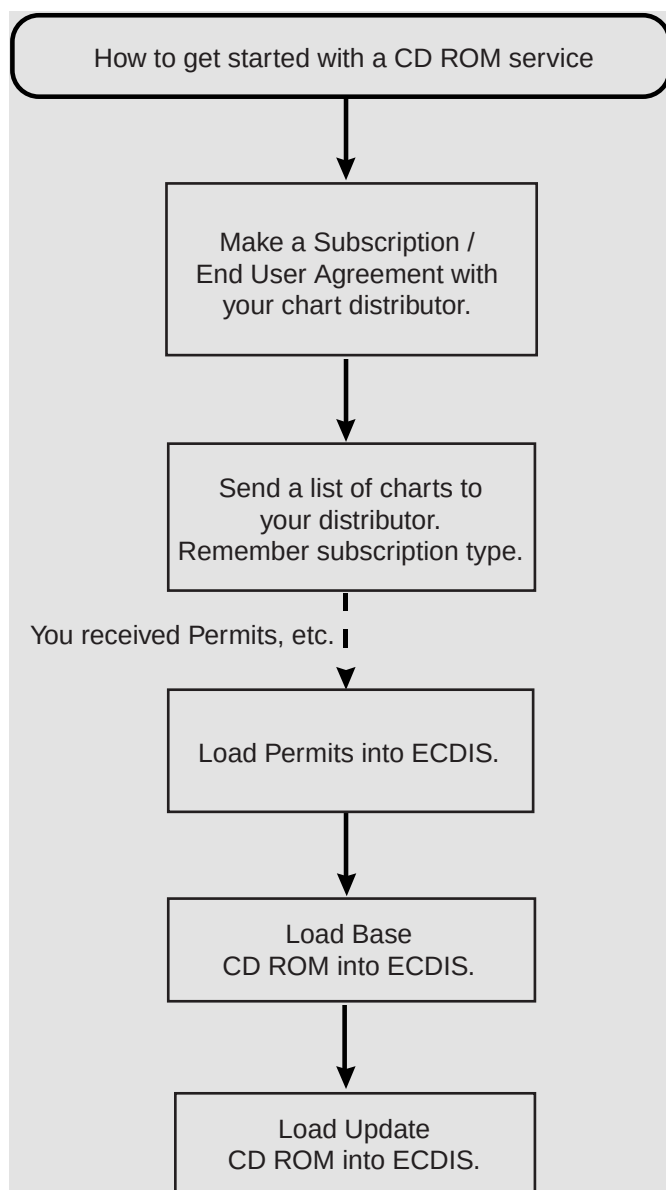


Compare the content of the newly loaded public key with the known content of the public key of an RENC you use.

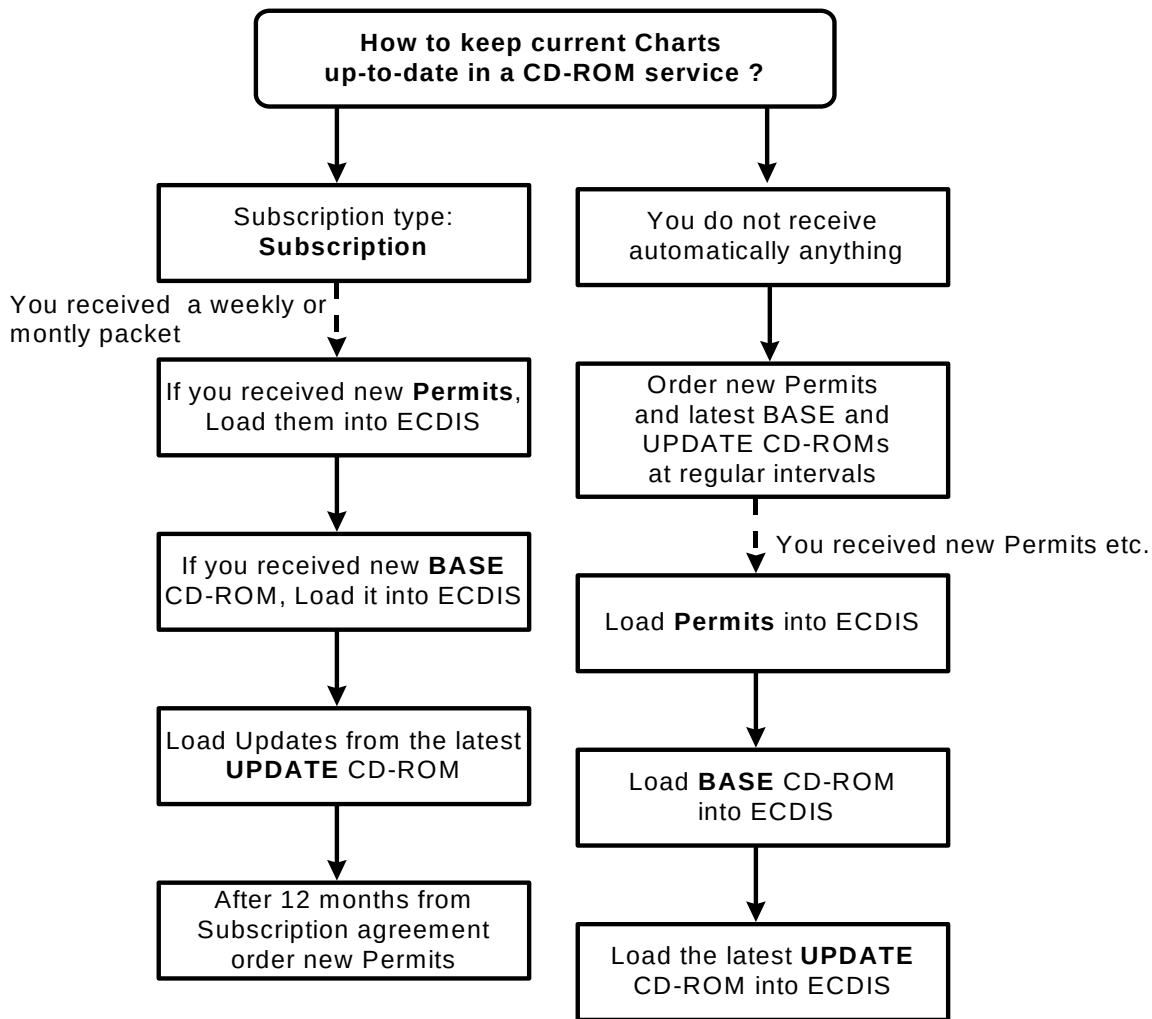
If the contents are the same, you can accept the newly loaded public key by clicking the **Accept New** button.

8.8 CD ROM Service From an RENC

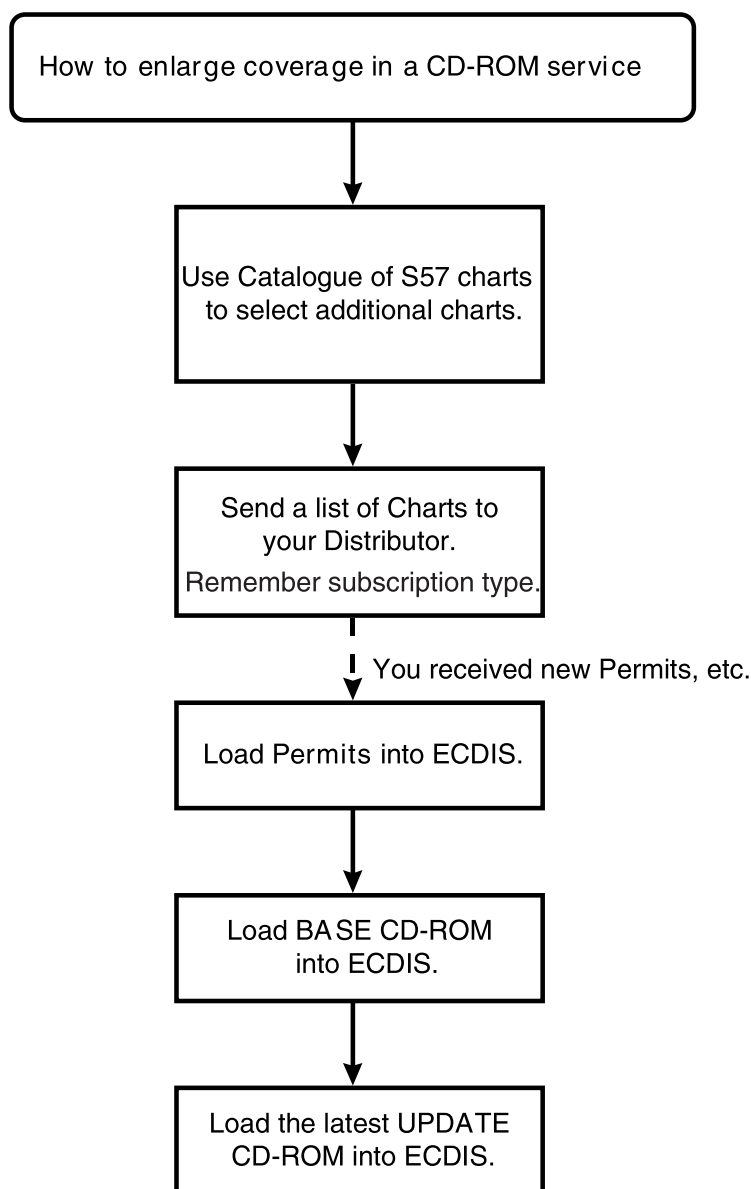
8.8.1 Getting started with S57 charts using an RENC



8.8.2 Keeping S57 charts up to date using an RENC



8.8.3 Enlarging chart coverage using an RENC



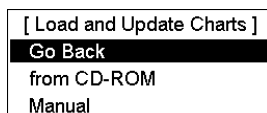
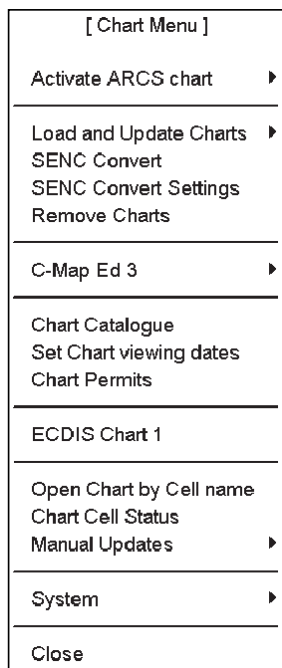
8.8.4 Base CD ROM from an RENC

A Base CD ROM from an RENC contains all the charts stored in an RENC when the CD ROM was issued. When you load charts (using the CD ROM catalogue) the following information is also loaded into the ECDIS hard disk:

- The Content Summary of the Base CD ROM
- Publisher Notes
- Product List

When you receive a new Base CD ROM from an RENC, load charts into the ECDIS as follows:

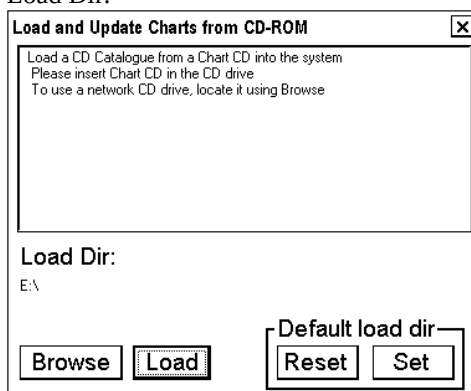
8. Vector Chart Material



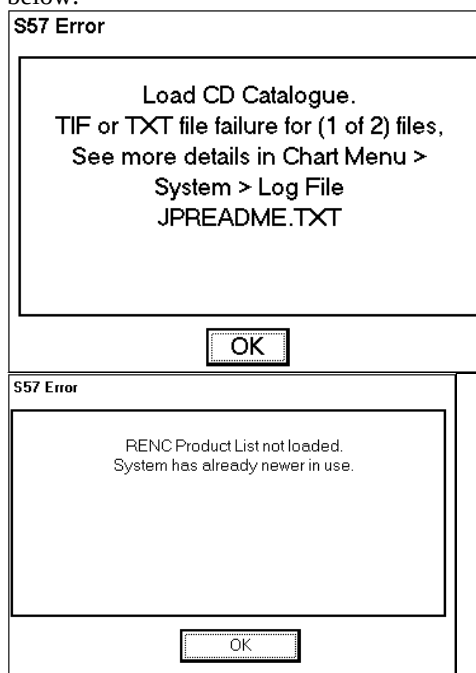
If you have a newer Product List already in use, you get following notice.

Note: It is very typical that the Product List of a base CD ROM is older than the Product List in use.

1. Check that you have already loaded correct Public key. This is very important if you receive CD ROMs for multiple RENC. For details, see section 8.7.5 Managing public key from an RENC.
2. Input CD ROM to drive.
3. Choose Load and Update Charts from the Chart menu and "from CD ROM" from the sub menu. If the following window appears, you have to define location of CD ROM, then click the **Load** button. If you want to load from another ECDIS via LAN, you have to change Load Dir. Click the **Browse** button to select a new Load Dir.



4. When you click the **Load** button, the ECDIS loads Content Summary, Publisher Notes and Product List from the CD ROM and opens the Load and Update Charts from CD ROM dialog box.
5. The system automatically copies all text and pictures files associated with charts on the CD ROM catalogue. The system keeps only the latest version of these. If your system is already using the latest text and picture files you will get the notice below.



6. In the Load or Update Charts from CD ROM dialog box, choose the charts to load into ECDIS, then click the **Load** button to load the charts into the ECDIS. For further details, see "Interpretation of Load or Update Charts from CD ROM" on page 8-47.

North Up TM	ECDIS only	Route:	UChart:	PilotData:	Radar	Predictor 30 sec Non ENC Data																					
						59°14.110'N HDG 070.0° 022°56.441'E SPD (CALC) 1.8 Kt WGS 84 SB (POSN) 1.7 Kt DGPS COG (POSN) 045.1° SOG (POSN) 2.0 Kt																					
Chart Catalogue						Load or Update Charts from loaded CD-ROM CD JP W13 2000 3 30 Source JP Week 13 Date 2000 3 30 Charts available in: E:\ENC_ROOT\ <table border="1"> <thead> <tr> <th>Chart</th><th>Edition</th><th>Update</th></tr> </thead> <tbody> <tr><td>JP34NG9G</td><td>1</td><td>4</td></tr> <tr><td>JP34NG9K</td><td>1</td><td>2</td></tr> <tr><td>JP34OJBD</td><td>1</td><td>3</td></tr> <tr><td>JP34OJBH</td><td>1</td><td>4</td></tr> <tr><td>JP34OJBC</td><td>1</td><td>12</td></tr> <tr><td>JP34OJBG</td><td>1</td><td>7</td></tr> </tbody> </table> Load selectors ☒ Name ☐ Permit RENC ☐ Canceled Charts ☐ Group ☒ Missing only ☐ Manual selection Navigation purpose ☒ Overview ☒ General ☒ Coastal ☒ Approach ☒ Harbour ☒ Berthing View CD-ROM Publisher Notes View CD-ROM content Summary Load and Conv. History Remove Load Edit Group	Chart	Edition	Update	JP34NG9G	1	4	JP34NG9K	1	2	JP34OJBD	1	3	JP34OJBH	1	4	JP34OJBC	1	12	JP34OJBG	1	7
Chart	Edition	Update																									
JP34NG9G	1	4																									
JP34NG9K	1	2																									
JP34OJBD	1	3																									
JP34OJBH	1	4																									
JP34OJBC	1	12																									
JP34OJBG	1	7																									
						Own Ship to Cursor: nm °																					
						TM reset off																					
						1:500 000 SINGLE d5.01 d5.01																					
						Set Chart Center Activate Scroll																					

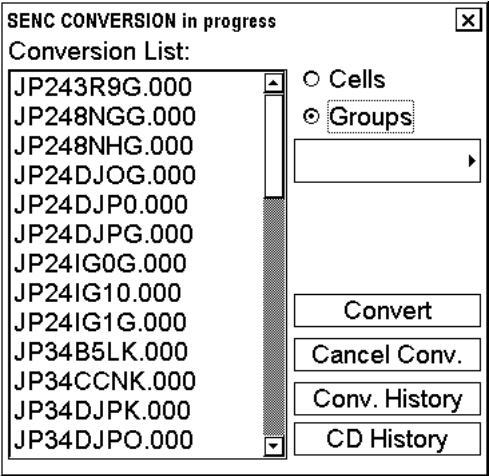
7. Before ECDIS starts loading charts (then automatically converts them into SENC format) you are asked confirmation for this operation.

Load from CD

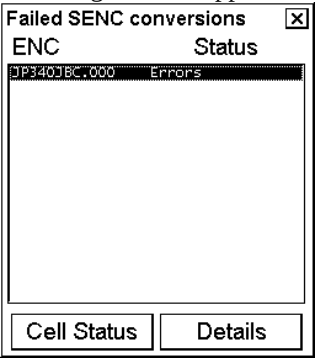
Loading may take time and prevent monitoring. Do you like to continue?

Yes No

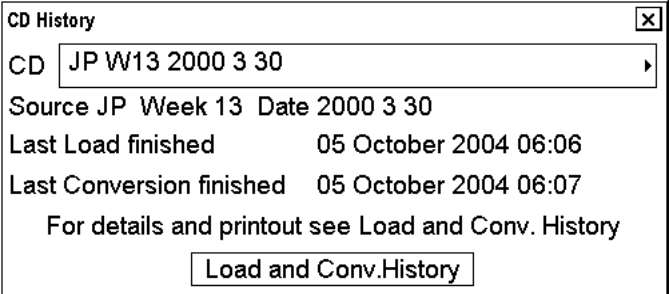
- 8.The SENC conversion window appears.



9. If error is detected during conversion from ENC to SENC, the following window appears.



10. When conversion is completed, the following window appears.



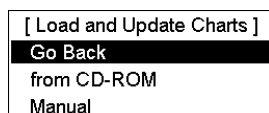
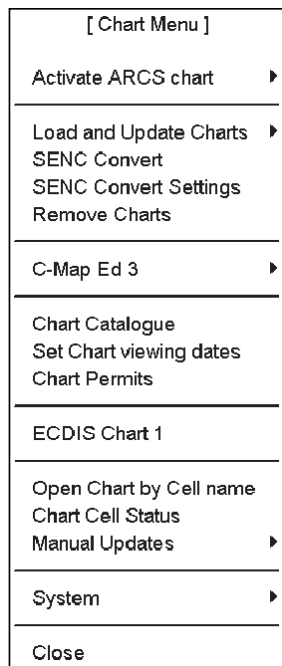
For further details, see "Viewing load history of CD ROM" on page 8-12.

8.8.5 Update CD ROM from an RENC

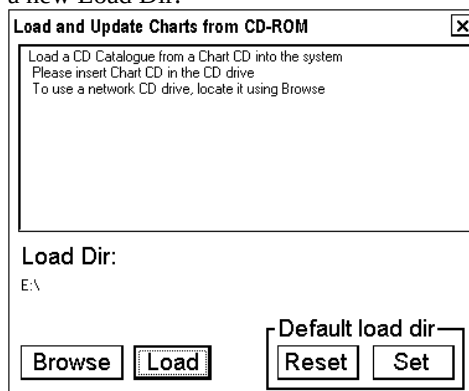
An Update CD ROM from an RENC contains all the updates included for charts stored in an RENC when the latest Base CD ROM was issued. When you load charts by a CD ROM catalogue the following information is also loaded into the ECDIS hard disk:

- The Content Summary of the Update CD ROM
- Publisher Notes
- The Product List

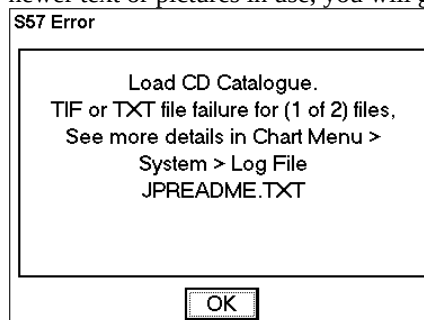
When you receive a new Update CD-ROM from an RENC, load charts into the system as follows:



1. Check that you have already loaded correct Public key. This is very important if you receive CD-ROMs for multiple RENC. For details, see section 8.7.5 Managing public key from an RENC.
2. Insert CD-ROM or floppy disk to drive. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
3. Choose Load and Update Charts from the menu and "from CD-ROM" from the sub menu (see bottom figure at left). The default load source is from CD-ROM. If ECDIS finds a CD-ROM containing chart data then CD-Catalogue will be automatically loaded otherwise window shown below appears, you have to define correct directory, then click the **Load** button to load from a CD-ROM. If you want to load from another ECDIS using LAN, you have to change Load Dir. Click the **Browse** button to choose a new Load Dir.



4. The system loads content summary, publisher notes and Product List from the CD-ROM then opens the Load or Update Charts from CD-ROM dialog box.
5. The system automatically copies all text and pictures files associated with charts from the CD-ROM catalogue. The system keeps only the latest version of these. If your system already has newer text or pictures in use, you will get the notice below.

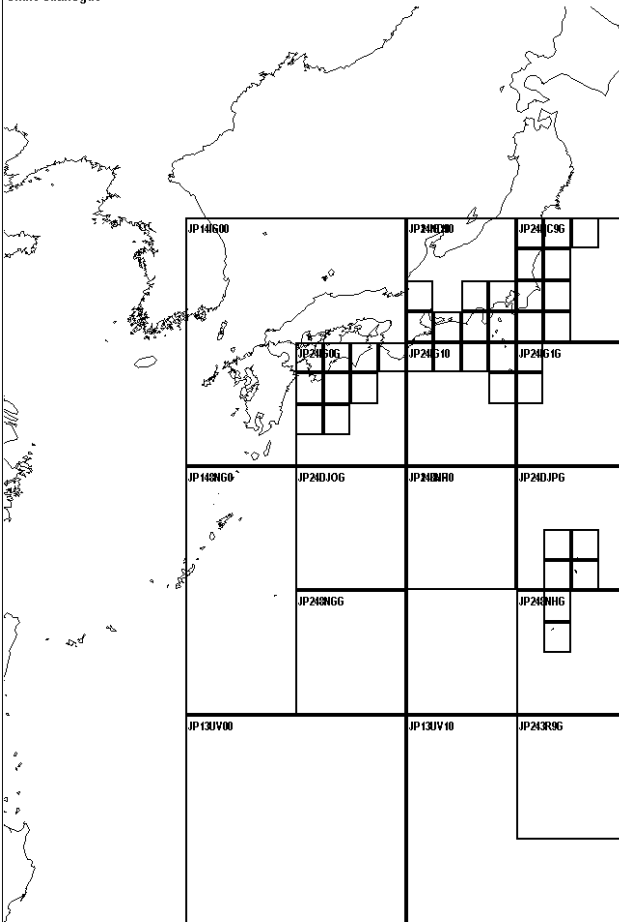


8. Vector Chart Material

6. In the Load or Update Charts from loaded CD-ROM window, choose the charts to load.

North Up TM ECDIS only Route: UChart: PilotData: Radar Predictor 30 sec Non ENC Data

Chart Catalogue



59°14.110'N HDG 070.0°
 022°56.441'E SPD (CALC) 1.8 Kt
 WGS 84 SB (POSN) 1.7 Kt
 DGPS COG (POSN) 045.1°
 SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM

CD JP W13 2000 3 30

Source JP Week 13 Date 2000 3 30

Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
JP240100	1	4
JP240101	1	4
JP240102	1	4
JP240103	1	4
JP240104	1	4
JP240105	1	4
JP240106	1	4
JP240107	1	4
JP240108	1	4
JP240109	1	4
JP240110	1	4
JP240111	1	4
JP240112	1	4
JP240113	1	4
JP240114	1	4
JP240115	1	4
JP240116	1	4
JP240117	1	4
JP240118	1	4
JP240119	1	4
JP240120	1	4
JP240121	1	4
JP240122	1	4
JP240123	1	4
JP240124	1	4
JP240125	1	4
JP240126	1	4
JP240127	1	4
JP240128	1	4
JP240129	1	4
JP240130	1	4
JP240131	1	4
JP240132	1	4
JP240133	1	4
JP240134	1	4
JP240135	1	4
JP240136	1	4
JP240137	1	4
JP240138	1	4
JP240139	1	4
JP240140	1	4
JP240141	1	4
JP240142	1	4
JP240143	1	4
JP240144	1	4
JP240145	1	4
JP240146	1	4
JP240147	1	4
JP240148	1	4
JP240149	1	4
JP240150	1	4
JP240151	1	4
JP240152	1	4
JP240153	1	4
JP240154	1	4
JP240155	1	4
JP240156	1	4
JP240157	1	4
JP240158	1	4
JP240159	1	4
JP240160	1	4
JP240161	1	4
JP240162	1	4
JP240163	1	4
JP240164	1	4
JP240165	1	4
JP240166	1	4
JP240167	1	4
JP240168	1	4
JP240169	1	4
JP240170	1	4
JP240171	1	4
JP240172	1	4
JP240173	1	4
JP240174	1	4
JP240175	1	4
JP240176	1	4
JP240177	1	4
JP240178	1	4
JP240179	1	4
JP240180	1	4
JP240181	1	4
JP240182	1	4
JP240183	1	4
JP240184	1	4
JP240185	1	4
JP240186	1	4
JP240187	1	4
JP240188	1	4
JP240189	1	4
JP240190	1	4
JP240191	1	4
JP240192	1	4
JP240193	1	4
JP240194	1	4
JP240195	1	4
JP240196	1	4
JP240197	1	4
JP240198	1	4
JP240199	1	4
JP240200	1	4

Load selectors

☒ Name ☒ Permit ☐ RENC ☐ Canceled Charts ☐ Group ☒ Missing only ☐ Manual selection

Navigation purpose

☒ Overview ☒ General ☒ Coastal ☒ Approach ☒ Harbour ☒ Berthing

View CD-ROM Publisher Notes

View CD-ROM content Summary

Load and Conv. History Remove

Load Edit Group

Own Ship to Cursor: nm

TM reset off

1:500 000 SINGLE d5.01 d5.01

Set Chart Center Activate Scroll

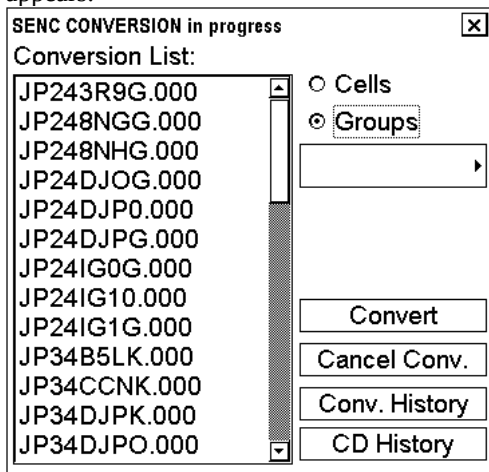
7. Then, click the **Load** button to load charts. See also "Interpretation of Load or Update Charts from loaded CD-ROM dialog box" on page 8-11.
8. Before ECDIS starts loading charts (then automatically converts them into SENC format) you are asked confirmation for this operation.

Load from CD

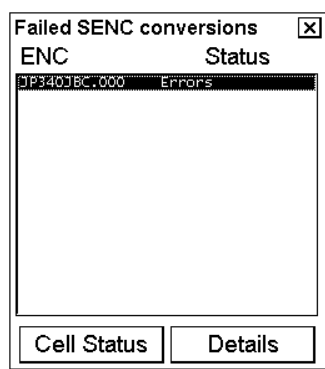
Loading may take time and prevent monitoring. Do you like to continue?

Yes No

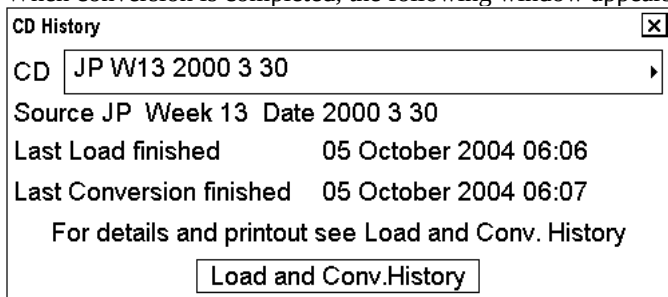
9. Charts are loaded into ECDIS then automatically converted to SENC format. The SENC Convert window appears.



10. If an error is detected during conversion from ENC to SENC, the following window appears. To find the reason click the **Details** button.



11. When conversion is completed, the following window appears.



Interpretation of Load or Update Charts from loaded CD-ROM window

North Up TM ECDIS only Route: UChart: PilotData: Radar Predictor 30 sec Non ENC Data

Chart Catalogue

59°14.110'N HDG 070.0°
022°56.441'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
DGPS COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM [X]

CD JP W13 2000 3 30

Source JP Week 13 Date 2000 3 30

Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
JP34NC96	1	4
JP34NC9K	1	2
JP340280	1	3
JP340388	1	4
JP34038C	1	12
JP340385	1	7

Load selectors

☒ Name ☒ Overview

☐ Permit ☒ General

☐ RENC ☒ Coastal

☐ Canceled ☒ Approach

☐ Charts ☒ Harbour

☐ Group ☒ Berthing

☒ Missing only ☐ Manual selection

View CD-ROM Publisher Notes

View CD-ROM content Summary

Load and Conv. History Remove

Load Edit Group

Own Ship to Cursor: nm

TM reset off

1:500 000 SINGLE 05 01 05 01

Set Chart Center Activate Scroll

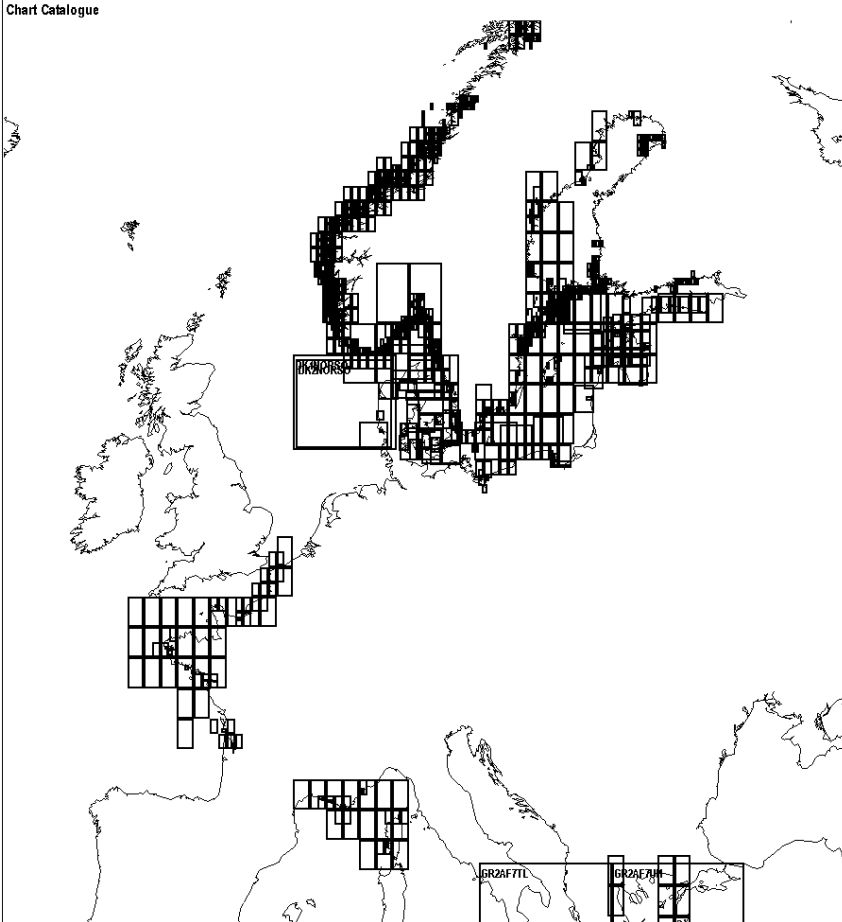
1. The source and edition date of the CD is displayed here.
2. A list of charts stored in the CD-ROM, edition number of the chart and the number of updates included in the chart.
3. In the **Load Selector** field, you can choose how to pick desired charts from the list:
 - **Name:** ECDIS will display chart names on graphical presentation if selected.
 - **Permit:** ECDIS will highlight the charts that are available in the CD-ROM and for which you have permits.
 - **RENC Canceled Charts:** ECDIS will display charts on display that are canceled on RENC and normally on CD-ROM.
 - **Group:** If you have predefined a group of charts, ECDIS will highlight those charts in the group that are available in the CD-ROM.
 - **Manual Selection:** You can highlight desired charts from the list.
 - **Missing only,** loads and display on graphical presentation only charts and their updates that are not already loaded into the system.
4. The **View CD-ROM Publisher Notes** button is used to view important notices published by chart producer, The **View CD-ROM content Summary** button is used to list charts available on CD-ROM and the **Load and Conv. History** button check what is loaded and converted from the CD-ROM. The **Remove** button is used to remove the CD-ROM catalogue permanently from the system.
5. The **Edit Group** button is used to create and modify group.
6. The **Load** button is used to start loading.

8.8.6 Viewing coverage of a base or update CD ROM from an RENC

Insert desired CD-ROM into CD-ROM drive. Select from Chart menu **Load or Update Charts** and next menu select **from CD-ROM**.

North Up TM ECDIS only Route: UChart: PilotData: Radar Predictor 30 sec Non ENC Data

Chart Catalogue



59°14.040'N HDG 070.0°
022°55.385'E SPD (CALC) 1.8 Kt
SB (POSN) 1.7 Kt
WGS 84 COG (POSN) 045.1°
DGPS SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM [X]

CD RENC_BASE PM W48 2004 11 24

Source PM Week 48 Date 2004 11 24

Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
PL333030	9	0

Load selectors

☒ Name ☒ Overview

☒ Permit ☒ General

RENC ☒ Coastal

☐ Canceled ☒ Approach

Charts ☒ Harbour

☐ Group ☒ Berthing

☒ Missing only ☒ Manual selection

View CD-ROM Publisher Notes

View CD-ROM content Summary

Load and Conv. History Remove

Load Edit Group

Own Ship to Cursor: nm

TM reset off

1:500 000 SINGLE d5.01 d5.01

Select Chart Menu

Sample coverage area when a CD-ROM catalogue is from a Base CD-ROM from an RENC

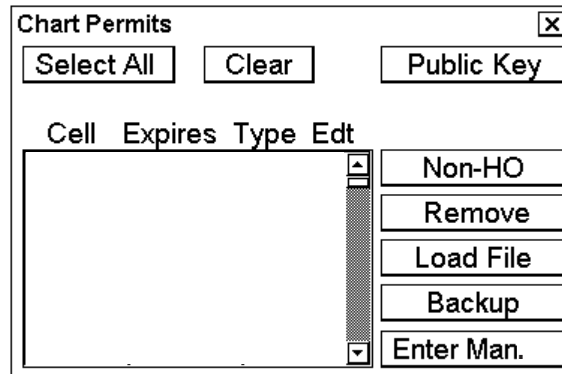
Note: remove selection "Missing only" to see total content of CD-ROM.

8.8.7 Loading an RENC-generated permit CD ROM or floppy disk

An RENC can deliver permits in a CD ROM or a floppy disk. When you receive new permits from an RENC, you have to load them into the ECDIS. A permit is a key that is used to decrypt the chart you want to use in the ECDIS. To load permits, do the following:

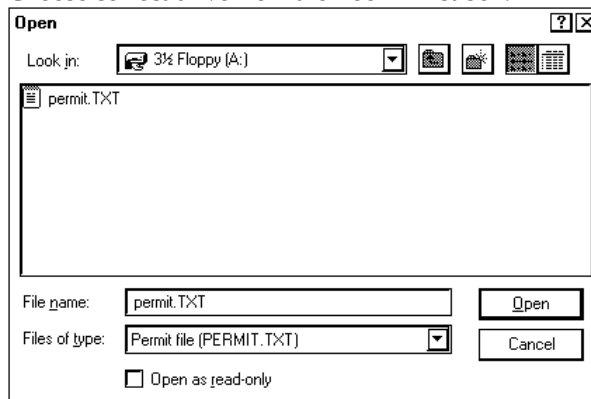
[Chart Menu]	
Activate ARCS chart	▶
Load and Update Charts	▶
SENC Convert	
SENC Convert Settings	
Remove Charts	
C-Map Ed 3	▶
Chart Catalogue	
Set Chart viewing dates	
Chart Permits	
ECDIS Chart 1	
Open Chart by Cell name	
Chart Cell Status	
Manual Updates	▶
System	▶
Close	

1. Choose Chart Permits from the Chart menu.



The 'Chart Permits' dialog box contains buttons for 'Select All', 'Clear', and 'Public Key'. It features a table with columns 'Cell', 'Expires', 'Type', and 'Edt'. To the right of the table are buttons for 'Non-HO', 'Remove', 'Load File', 'Backup', and 'Enter Man.'.

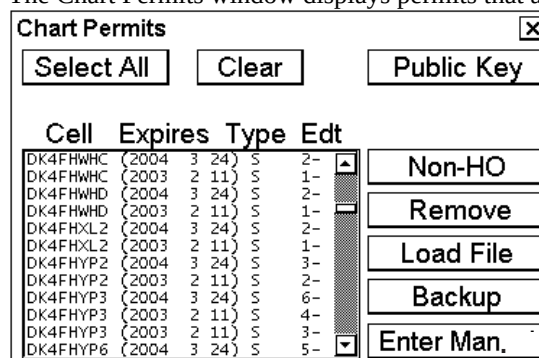
2. Click the **Load File** button.
3. Choose correct drive from the Look in list box.



The 'Open' dialog box shows 'Look in:' set to '3 1/2 Floppy (A:.)'. The file list contains 'permit.TXT'. The 'File name:' field is 'permit.TXT' and 'Files of type:' is 'Permit file (PERMIT.TXT)'. Buttons for 'Open' and 'Cancel' are present, along with an 'Open as read-only' checkbox.

Permits are available in two formats.

- **PERMIT.TXT** contain permits and their editions and subscription types. This is the preferred format.
- *.PMT, received from an RENC, contain permits, but no edition or subscription information. Note that the *.PMT format is used by the system for backup of permits. As a backup it contain also subscription type and edition.
- Choose suitable permit file and click the **Open** button to load permits.
- The Chart Permits window displays permits that are loaded into the ECDIS.

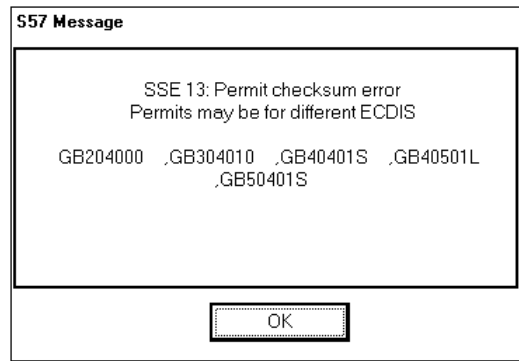


The 'Chart Permits' dialog box now displays a list of loaded permits in the table:

Cell	Expires	Type	Edt
DK4FHWHC	(2004 3 24)	S	2-
DK4FHWHC	(2003 2 11)	S	1-
DK4FHWHD	(2004 3 24)	S	2-
DK4FHWHD	(2003 2 11)	S	1-
DK4FHXL2	(2004 3 24)	S	2-
DK4FHXL2	(2003 2 11)	S	1-
DK4FHYP2	(2004 3 24)	S	3-
DK4FHYP2	(2003 2 11)	S	2-
DK4FHYP3	(2004 3 24)	S	6-
DK4FHYP3	(2003 2 11)	S	4-
DK4FHYP3	(2003 2 11)	S	3-
DK4FHYP6	(2004 3 24)	S	5-

Messages that may appear when loading a permit

If you load permits from a different ECDIS, you get the following message:



8.9 RENC Security System

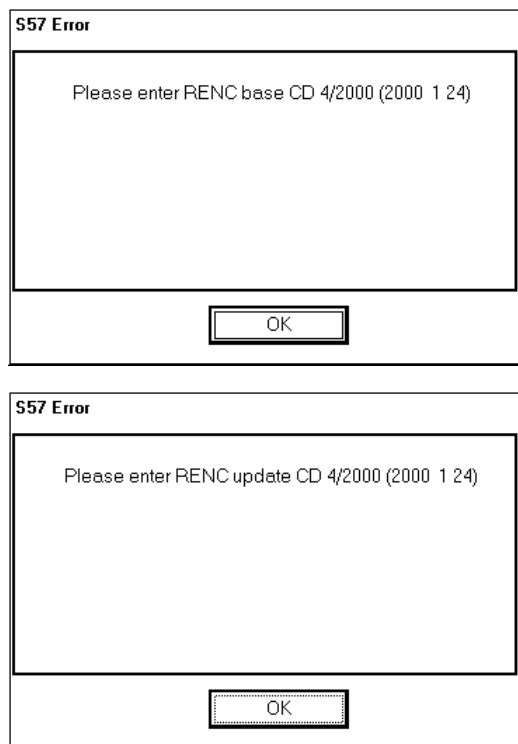
8.9.1 Standard messages in S57 chart load

When loading S57 charts into the ECDIS, messages appear to alert you to permits and authentication. These are described below and on the next several pages.

8.9.2 Additional messages in S57 chart load

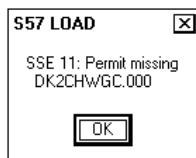
Issue control of Base and Update CD ROM from RENC

CD ROMs from an RENC contain issue control. If you later use a CD ROM catalogue created during loading of S57 charts, you get the following messages for a wrong CD ROM.



Messages that contain only notice

If you tried to load charts for which you do not have a permit, you will get the following message:

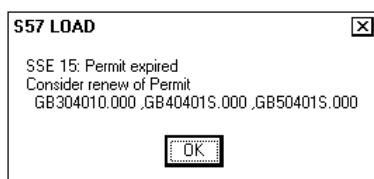


Messages that require careful attention

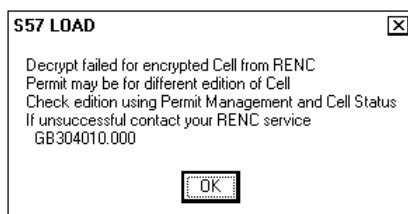
All messages in this chapter change the legal status of the charts in your system. Study these messages carefully because you may need to use paper charts to fulfil SOLAS requirements.

You do not have a valid permit

A chart was not converted into SENC because the permit for it has expired.



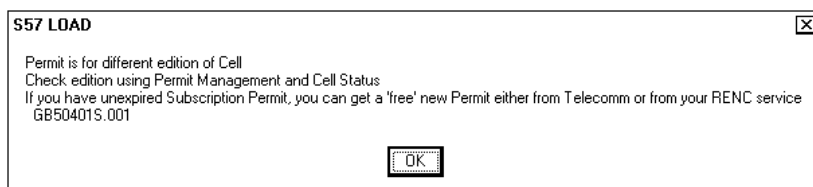
A chart was not converted into SENC because a permit is for a different edition.



You can check edition of the permit using the Chart Permits window in the Chart menu and the edition of the chart by using the Cell Status window.

Typical reason is that the chart has been updated too many times as new edition instead of an update. Ask for new permits from your chart agent.

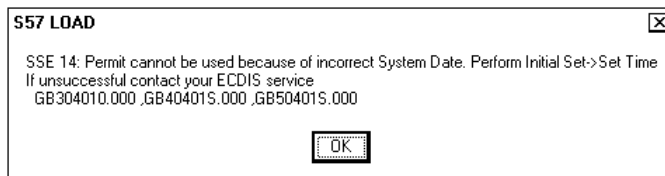
A chart was not converted into SENC because your permit was for different edition.



You can check edition of a permit using the Chart Permits and the edition of a chart using the Chart Cell Status window, both in the Chart menu.

The common reason for this message is that the chart has been updated too many times as new edition instead of update. Ask for new permits from your chart agent.

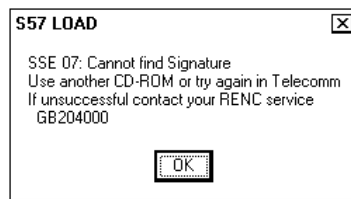
A chart was not converted into SENC because the software, data and system time in the ECDIS indicates tampering.



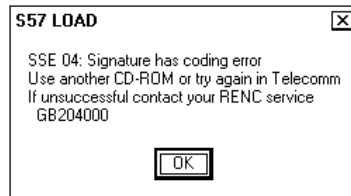
The common reason for this message is that RENC released a chart before the issue date of the chart.

Authentication of chart failed

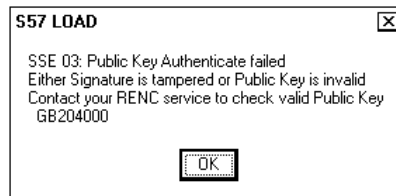
The chart was not loaded because of missing signature.



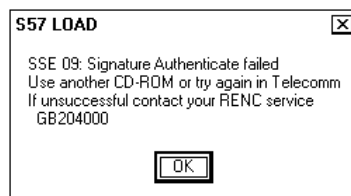
The chart was not loaded because of coding error in Signature.



The chart was not loaded because of tampered Signature or invalid Public Key.



The chart was not loaded because of invalid or tampered Signature.



8.9.3 Standard messages in S57 SENC conversion

When converting S57 charts for use in the ECDIS, messages appears to alert you during the conversion. For details see section 8.4.5 Using SENC conversion history log.

8.9.4 Additional messages in S57 SENC conversion

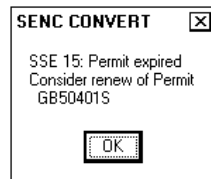
Messages that contain only notice

You do not have a permit.



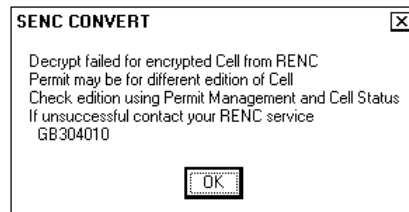
Messages that require careful attention

Permit for a chart has expired.



You have a permit, but it is valid for another edition of the cell.

You can check edition of the permit using the Chart Permits window and the edition of a chart using the Cell Status window, both in the Chart menu.



A typical reason is that the chart has been updated too many times as a new edition instead of an update. Ask for new permits from your chart agent.

8.10 Vector Chart Display

8.10.1 Choosing vector chart material to use

To activate S57 chart material onto the display, do the following:

1. Place the cursor just above the chart scale indication in the information area.
2. Activate S57 Chart appears in the mouse functions area; push the left mouse button.

8.10.2 Choosing charts for viewing

Choosing a chart from a catalogue

To choose a chart for viewing from a catalogue, do the following:

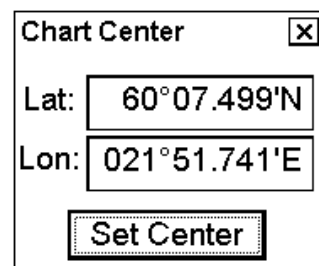
1. Choose Chart Catalogue from the Chart menu.
2. From the Chart Catalogue dialog box, use the cursor to choose desired chart. For further details, see section 8.5.2 Catalogue of S57 cells.
3. Click the **Open** button.

Browsing your charts

You may view S57 charts using different positions and different scales. The basic tools for browsing charts are **Range -**, **Range+**, **Set Chart Center**, **ShipOffcenter**, **Active Scroll** and **TM Reset**.

Activate Scroll allows you to look ahead from a place other than own ship's current position. Spin the scrollwheel to display Set Chart Center/Info/Activate Scroll in the mouse functions area. Move cursor to desired place on chart and then push the right mouse button. Keep button pressed down while moving cursor over desired place. Release right button to get chart redrawn. You can repeat this until you have desired area on screen. When true motion reset is off, the indication "TM Reset off" or "Ship out of dsp" appears in the information area.

Set Chart Center allows you to look ahead from a place other than your ship's current position. Choose Set Chart Center from the Main menu to display the dialog box shown below. Use the scrollwheel to set the latitude and longitude position for chart center then click the **Set Center** button.



Note: The chart can also be centered (with less precise positioning) by placing the cursor at desired location, displaying Set Chart Center/Info/Activate Scroll in the dialog box and pushing the left mouse button.

To turn off automatic true motion reset, display and click TM Reset (in the guidance area). When true motion reset is off, the indication "Ship off screen" appears in the information area.

To restore your ship's position to the screen center, display TM Reset/Info/ShipOffcenter in the guidance area then push the right mouse button.

Range - and **Range+** change the chart scale. If true motion reset is active, ZOOM IN and ZOOM OUT keep the relative position of your ship with respect to the display. If true motion reset is on, ZOOM IN and ZOOM OUT keep the relative position pointed by the cursor with respect to the display.

The system automatically chooses next larger or smaller scale. If a chart with larger compilation scale is available at your current viewing position, the message "Larger Scale Data Exists" appears.

Looking for charts around your ship

You can use either true motion or relative motion. In the true motion mode, your ship moves until it reaches the true motion reset borderline, where it jumps back to an opposite position on the screen based on ship's course. In the relative motion mode, your ship stays in a fixed position, while the chart moves on screen.

If, in the true motion mode, you reset own position with TM Reset, your ship will immediately jump to the true motion reset position.

If, in the true motion mode, you use ShipOffcenter, your ship will go to that position on screen and continue true motion movement from that position. When it reaches the true motion reset borderline, it will automatically jump to the true motion reset position.

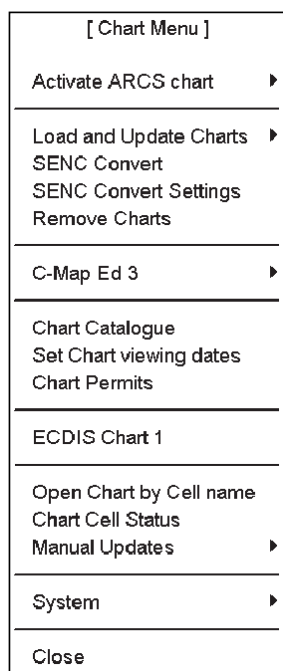
If, in the relative motion mode, you reset own position with TM Reset, your ship will immediately jump to the true motion reset position and use that position as fixed position to stay on screen.

If you use relative motion, you can choose a new fixed position for your ship by using ShipOffcenter.

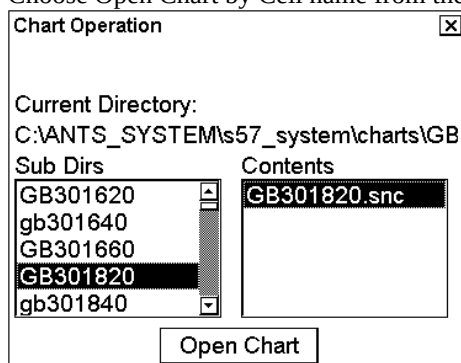
Use **Range** - and **Range+** to choose desired chart scale.

8.10.3 Choosing a chart by its name on the display

To activate a specific S57 chart cell onto the display, use Open Chart by Cell name menu in the Chart menu as follows:



1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Open Chart by Cell name from the menu then push the scrollwheel.



3. Choose desired chart from chart list dialog then click the **Open Chart** button.

The chosen chart is automatically displayed in the electronic chart area.

8.10.4 Controlling visible chart features

The Chart Display dialog box contains several pages of chart features that you may adjust as appropriate. To display this dialog box, spin the scrollwheel to show Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button.

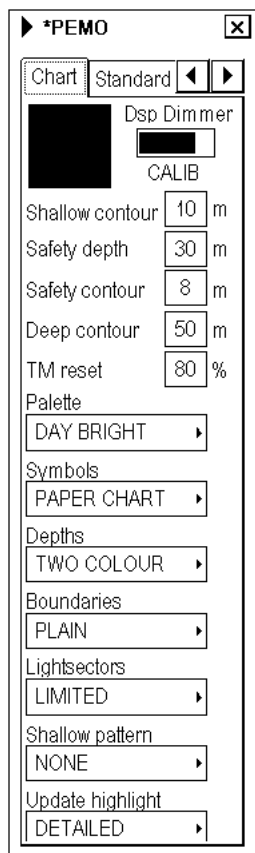


Chart page

Black and grey color symbol:



This symbol is used to verify that you can distinguish black (frame of symbol) and grey (inner part of symbol) colors with current contrast and brilliance settings.

Dsp Dimmer:

Use this control to adjust dimming of the display. The text "CALIB" indicates that dimming of display is set within calibration values. Monitor brilliance is restored to calibrated state by doing the following:

- 1) Place the cursor on the calibration bar and spin the scrollwheel to show "CALIB".
- 2) Choosing "Set Std Display" from the menu.
- 3) Pressing and holding down any one of the F1-F4 keys more than two seconds on the Control Unit RCU-015.

Shallow contour:

Set value of shallow water contour.

Safety depth:

Set value of safety depth. Spot soundings below the safety depth are highlighted.

Safety contour:

Set value of safety contour. Visible safety contour is equal to set value or if the contour of set value is not available then the visible safety contour is next deeper contour than safety contour.

Note: The system uses safety contour also for chart alarms.

Deep contour:

Set deep-water contour.

TM reset:

In the true motion mode, your ship moves until it reaches the true motion reset borderline (set here), then it jumps back to an opposite position on screen based on its course. Set the limit for TM reset (in percentage).

Palette:

Choose appropriate palette for the display depending on the brightness of the bridge.

Symbols:

Choose how to display chart symbols. The options are:

SIMPLIFIED: The shape of symbols is of modern design and the sea mark symbols are filled in a color.

PAPER CHART: The shape of symbols imitates traditional symbols used in paper charts.

Depths:

Set how to display different depth zones on the chart display.

For **MULTICOLOUR**, the chart display uses four different colors for contours:

- Deeper than operator-chosen deep contour
- Between deep contour and operator-chosen safety contour
- Between safety contour and operator-chosen shallow water contour
- Between shallow water contour and coastline.

For **TWO COLOUR**, the chart display uses only two colors:

- Deeper than safety contour
- Shallower than safety contour

Boundaries:

Set how to display boundaries of some chart features. The options are:

- **PLAIN:** The line styles are limited to plain solid and dashed lines.
- **SYMBOLIZED:** Some of the line styles use symbols to highlight the purpose of a line.

Light sectors:

Set how to display light sectors. The options are:

- **LIMITED:** The length of a light sector is fixed at 25 mm independently of the displayed scale.
- **FULL:** The length of a light sector represents its nominal range as defined by the chart producer.

Shallow pattern:

Set how to display shallow water area. The options are:

- **NONE**
- **DIAMOND:** Provided to distinguish shallow water at night.

Update highlight:

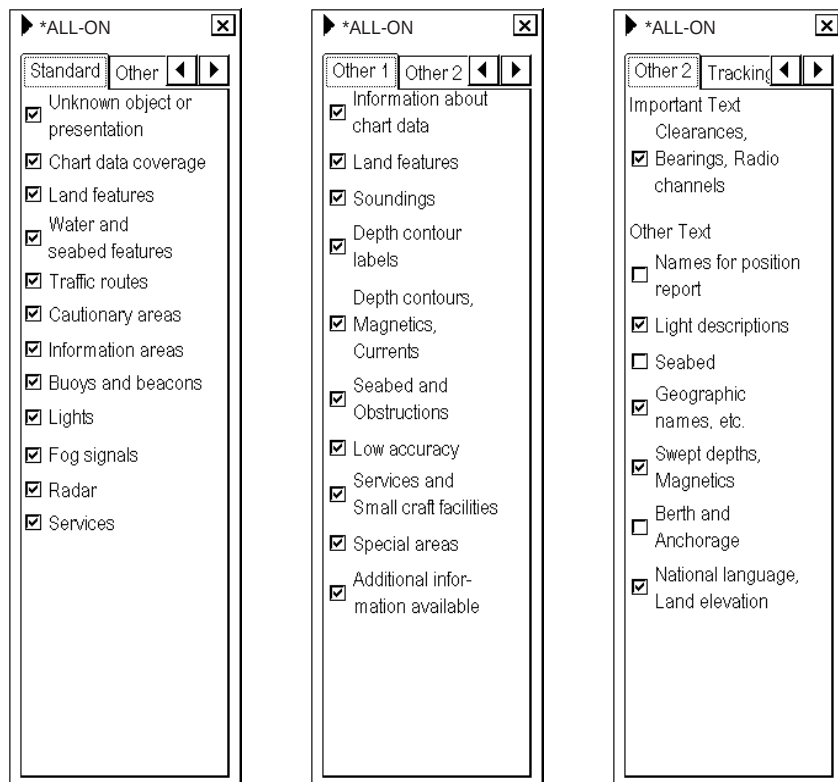
Set how the updates are highlighted on the screen before you approve them. The options are

- **DETAILED:** The system tries to highlight updates so that only those objects that have visible changes are highlighted. Use this option to see the practical change of an update.
- **ALL EFFECTS:** The system highlights updates so that all the objects pertaining to updates are highlighted although some of them have not been changed.

"Standard, Other 1 and Other 2" pages

The Standard page contains chart features defined by IMO that comprise a standard display. You can recall the standard display at any time using a single action, by displaying Chart Display/Info/Standard Display in the mouse function area and pushing the right mouse button.

The Other 1 and Other 2 pages contain chart features for which you can control visibility and that are not part of IMO-defined standard display.



Note 1: To use the Info request feature, which provides information for cursor-chosen chart feature, the associated chart feature must be turned on from the Standard page.

Note 2: To navigate between the pages in the Chart Display dialog box, click the appropriate arrow tab with the left mouse button.

8.10.5 Display base

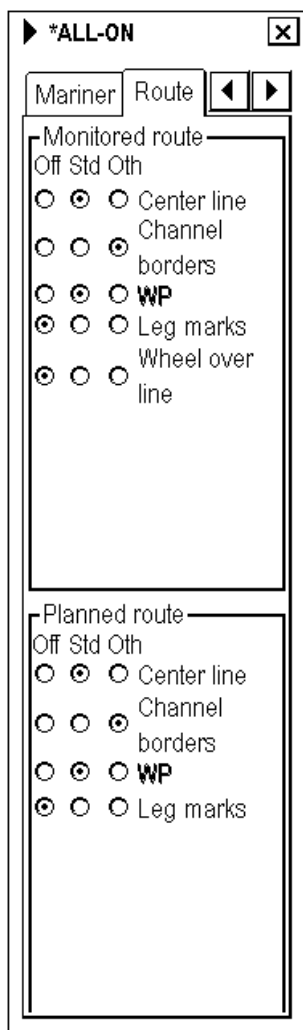
A subset of chart features is called the Display Base. As required by IMO, these features cannot be made invisible. The Display Base consist of the following chart features:

- Coastline (high water)
- Own ship's safety contour, which is chosen by the operator
- Indication of isolated underwater dangers of depths less than the safety contour that lie within the safe waters defined by the safety contour
- Indication of isolated dangers that lie within the safe water defined by the safety contour such as bridges, overhead wires, etc., and including buoys and beacons whether or not these are being used as aids to navigation.
- Traffic routine systems
- Scale, range, orientation and display mode
- Units of depth and height

8.10.6 Controlling visible navigation features

Visibility control of the navigation features is divided into four pages in the Chart Display menu. The "Route" page controls planned and monitored routes. The "Tracking" page controls past tracks and some other features. The "Target" page controls ARP and AIS targets. The "Mariner" page controls pilot data, user charts and chart alarms. The "Target" page.

The operator can define settings for chart details that are displayed over the chart area. This means that the operator can choose different layers to be **Off**, **Std** or **Other**. **Off** turns off the feature chosen. **Std** turns on the navigation feature chosen when the standard display is made active by accessing the mouse function Standard Display). **Other** turns off the navigation features when the standard display is made active as mentioned above.



Route page

This page contains selection of route related navigation features

monitored route: Choose which part of monitored route to display.

Planned route: Choose which part of planned route to display.

Note: WP mark on both monitor and planned routes is set permanently to Std position.

▶ *ALL-OFF ✕

Tracking Target ◀ ▶

Past tracks
Off Std Oth

☐ ☒ ☐ Ship Sys
☒ ☐ ☐ Ship Pri
☒ ☐ ☐ Ship Sec

Length min

Labels min

☐ ☐ ☒ Targets
 Use points

Interval

Events

☒ ☐ ☐ User Event
☒ ☐ ☐ Auto Event
☐ ☐ ☒ Positions

Show

Tracking page

Past tracks

- **Ship System:** Choose Std or Other to plot your ship's tracks using system-fed position.
- **Ship Primary:** Choose Std or Other to plot your ship's past track with position fed from the primary sensor.
- **Ship Secondary:** Choose Std or Other to plot your ship's past track with position fed from a secondary sensor.
- **Length:** Choose length (in minutes) of past tracks shown on the screen.
- **Labels:** Choose period of track labeling.
- **Targets:** Choose Std or Other to plot ARPA target past tracks. **Use** chooses number of track points to display; **Interval** chooses the plotting interval for the track points.

Events: These marks are based on voyage log records. For more information, see section 23.3.2 Voyage log.

- **User Event:** Choose Std or Other to display event symbols on ECDIS, where the system has recorded an event based on conditions you have set (Type: User and Auto).
- **Automatic Event:** Choose Std or Other to display automatically entered event symbols, where the system has recorded an event based on conditions you have set (Type: Ship and Alarm).
- **Positions:** Choose Std or Other to show applicable position marker at event position.

Note 1: MOB event is always visible.

Note 2: You can choose period of time to display event marks in the list box "Show".

Targets		Mariner	◀	▶
ARPA Targets				
Off Std Oth				
☐	☒	☐	Symbol	
AIS Targets				
☐	☒	☐	Symbol	
Max.	200		▶	
Max.	48		▶ nm	
Filter	RANGE			

Targets page

ARPA Targets:

- Choose Std or Other to show ARPA target labels.

AIS Targets:

- **Symbol:** Choose Std or Other to display AIS target symbols.
- **Max (count):** Set the maximum number of AIS targets to display.
- **Max. (range):** Set maximum range of AIS targets from your ship to display.
- **Filter:** Sort AIS targets by Range, CPA or TCPA. See section 21.2.4 Maximum number and range for displaying AIS targets on ECDIS.

Mariner page

Pilot data:

- **Position:** Choose Std or Other to show positions of pilot data records with symbols on the chart.
- **Range:** Choose Std or Other to circumscribe pilot data records with circles on the display. The size of a circle depends on the value set in pilot data.
- **Text:** Choose Std or Other to show text of pilot data records on the chart.

User chart:

- **Points:** Choose Std or Other to show operator points on user charts.
- **Lines:** Choose Std or Other to show lines on user charts.
- **Symbols, Tidal:** Choose Std or Other to show symbols and tides on user charts.
- **Areas:** Choose Std or Other to show areas on the display. Color fill for the areas can be chosen as transparent from 25 to 75% and as No color fill. If No color fill is chosen, only the boundaries of the areas are visible.
- **Only radar of Symbols, Lines, Areas:** If chosen as **Std** or **Other**, only those Lines, Symbols and Areas are displayed that have operator selection "on radar" activated for them in the user chart. This is used to view only that part of the user chart that will be sent to the ARPA radar connected to the system.

Chart Alarm: Choose Std or Other to show chart alarm warning areas (in red highlight).

Manual Updates: Choose Std or Other to show manual updates with orange symbols.

Note: Visibility of manual updates made as true symbols are controlled through Standard and Other pages of the Chart Display menu.

Ship: Own ship symbol is displayed in true scale if the displayed chart scale is larger than the chosen limit scale and if the size of the true scale symbol is longer than 6 mm on the chart display.

Radar overlay: Choose Std or Other to display the radar video overlay on the display.

8.10.7 Storing and recalling chart display settings for visible chart and navigational features

You can define chart display settings for chart details that are displayed over S57 charts cells. You can save these chart display settings to your hard disk and recall them whenever you need them.

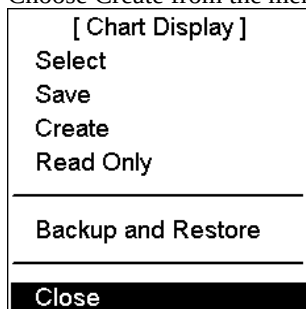
Creating new chart display settings

To create new settings for chart displays, do the following:

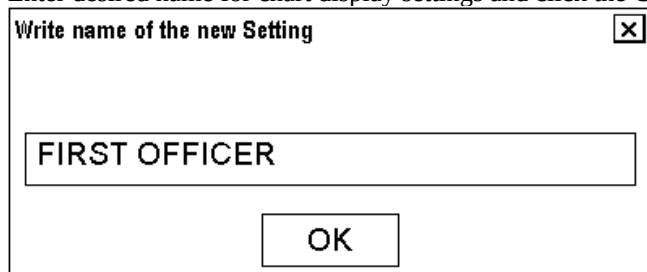
1. Display Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button.



2. Move the cursor over the small triangle on the Chart Display dialog box to show the Chart Display menu. Choose Create from the menu then push the scrollwheel.



3. Enter desired name for chart display settings and click the **OK** button in the window.



Choosing chart display settings

1. Open the Chart Display dialog box and put the cursor on the triangle.
2. Choose Select from the menu and push the scrollwheel.
3. Choose desired chart display settings from the list box.

Saving changes to chart display settings

1. Open the Chart Display dialog box and put the cursor on the triangle.
2. Choose Save from the menu to save current chart display settings.

8.10.8 Control of predefined IMO chart display settings

There are three sets of predefined Chart Display Settings that can be used to display Charts with certain chart features. In IMO Chart Display Settings you are not able to change visibility of chart feature using Chart Display Settings. The predefined Chart Display Settings are called as:

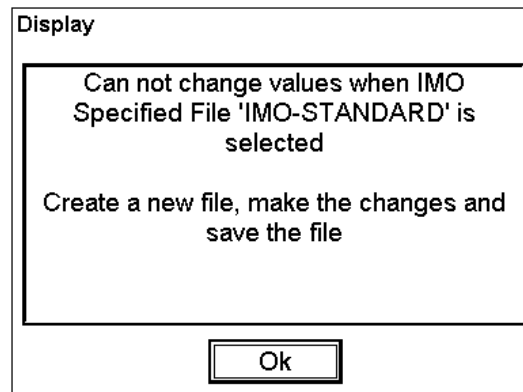
- IMO-BASE
- IMO-STANDARD
- IMO-ALL ON

To select desired IMO Chart Display Settings, proceed as follows:



1. Open the Chart Display dialog box and click the triangle with the left mouse button.
2. Choose **Select** from the menu.
3. Select desired Chart Display Settings from list box.

If you try to modify selection in Chart Display dialog box when any of IMO Chart Display Settings is used, following message appears:



8.11 Sailing Directions, Tidal Tables, etc., Features of Vector Charts (S57)

Vector charts (S57) contain sailing directions, tidal tables and other textual and picture information that is not immediately visible on the chart. This information forms an integral part of the legal ENC chart that can fulfil SOLAS requirements and thus replace a paper chart. As a navigator you should check them as well as you check the visible chart when you do your planning and when you perform navigation.

Because these features are not permanently visible on the chart as they used to be in case of a paper chart, the ECDIS has special symbols to highlight the locations from which you can use the Info request to know additional information about the above-mentioned features. Below are examples of these symbols. For further details, see section 8.14 Requesting Information About Vector Chart Objects.



A grey box is used to show that Tidal information is available for Info request by cursor pick.

Note: The visibility of the grey box symbol is controlled by the item "Depth contours, magnetics, currents" in the Other 1 page of the Chart Display dialog box.



A magenta-colored symbol is used to show that additional textual or picture information such as sailing directions are available from Info request by cursor pick.

Note: The visibility of the magenta symbol is controlled by the item "Additional information available" in the Other 1 page of the Chart Display dialog box.

8.12 Chart Viewing Dates and Seasonal Features of the Vector Chart

8.12.1 Introduction

Vector charts (S57) contain date-dependent features. Updating in general, including reissues, new editions and updates, creates date dependency. In addition to the obvious date dependency, some features of the S57 charts create additional date dependency. These features include "Date Start", "Date End", "Seasonal date start" and "Seasonal date end". Hydrographic Offices use these features to publish Temporary and Preliminary Notices to Mariners, as their paper chart equivalent updates are called. The ARCS equivalent is called T&P Notices. "Seasonal date start" and "Seasonal date end" are used for seasonal chart features such as summer-only sea marks, seasonal yacht race areas, etc. For further details see section 8.12.5 About chart viewing date dependency of S57 standard.

You can efficiently use chart viewing date dependency to use the valid data for any given date applicable for your navigation or planning purposes. For example, you can check for existence of changes and restrictions weeks before they became valid. Date dependency is a part of the new electronic method to keep your chart up-to-date and valid for your intended use. Normally you should set Display Until and Approve Until once per week to keep your chart up-to-date.

Note: When you load charts and their updates into your system, the Display Until date is set as current date of the system. You must set the Approve Until date yourself. Make sure that you have set Display Until and Approve Until dates to the current date or to your planning date, whichever is applicable to your current usage of charts. For details on how to set Display/Approve date, see the section 8.12.2 Approving and highlighting vector chart updates. If the charts you are currently using have Display Until and/or Approved Until set more than 1 week from current system date, you will get the Permanent Warning on your chart display.

Permanent Warning

At least one of used charts has more than 1 week
"Approved Until" and/or "Displayed Until" and current
date. Use Chart Menu - Set Chart viewing dates

8.12.2 Approving and highlighting vector chart updates

Before you approve updates, you can display (highlight) updates that are included into S57 charts. Normally you have chosen "Automatic Display Until" after the SENC conversion. In this case, after all the SENC conversions have been finished, all updates are automatically highlighted and you can view and approve them after viewing. For further details, see section 8.12.4 Setting "approve until" date.

If you want to review updates after the initial approval of the updates do the following:

1. Use Approve Until to set the begin date for the update highlight. See section 8.12.4 Setting "approve until" date.
2. Use Display Until to set the end date for the update highlight. See section 8.12.3 Setting "display until" date.
3. Review the changes. Added features are highlighted with orange circles. Removed features are highlighted with orange slashes. Changed features are highlighted with both orange circles and slashes. See the picture at right.
4. After reviewing, set Approve Until and Display Until back to the current system date.

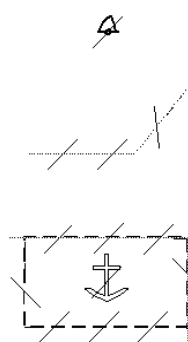
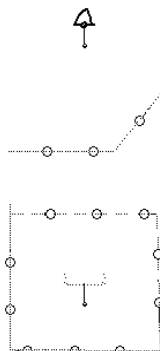
Point

Insertion

Deletion

Line

Area



8.12.3 Setting "display until" date

- 1. Open the Chart menu.
- 2. Choose Set Chart viewing dates from the menu.
- 3. Set the cursor in the Display Until field, use the scrollwheel to set desired date, and confirm by pushing the scrollwheel.

Chart viewing dates

Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displ. until	Updates Approv. until
04470039.D	-/-	1/ 0	2004 12 31	2002 10 29
04470039.E	-/-	1/ 0	2004 12 31	2002 10 29
04470039.F	-/-	1/ 0	2004 12 31	2002 10 29
04470040.E	-/-	1/ 0	2004 12 31	2002 10 29
04470040.F	-/-	1/ 0	2004 12 31	2002 10 29
04500072.C	-/-	1/ 0	2004 12 31	2002 5 22
04500075.D	-/-	1/ 0	2004 12 31	2002 5 22
04500076.E	-/-	1/ 0	2004 12 31	2002 5 22
04500077.E	-/-	1/ 0	2004 12 31	2002 5 22
04500077.F	-/-	1/ 0	2004 12 31	2002 5 22
04500078.D	-/-	1/ 0	2004 12 31	2002 5 22
04500078.E	-/-	1/ 0	2004 12 31	2002 5 22
04500078.F	-/-	1/ 0	2004 12 31	2002 5 22
04500079.E	-/-	1/ 0	2004 12 31	2002 5 22
04500079.F	-/-	1/ 0	2004 12 31	2002 5 22
04510076.E	-/-	1/ 0	2004 12 31	2002 5 22
04510077.E	-/-	1/ 0	2004 12 31	2002 5 22
04510078.E	-/-	1/ 0	2004 12 31	2002 5 22
04510078.F	-/-	1/ 0	2004 12 31	2002 5 22
04510079.E	-/-	1/ 0	2004 12 31	2002 5 22
04510079.F	-/-	1/ 0	2004 12 31	2002 5 22
04510080.E	-/-	1/ 0	2004 12 31	2002 5 22
04510080.G	-/-	1/ 0	2004 12 31	2002 5 22
7C1W0001	-/-	1/ 0	2004 12 31	1999 4 20
7C1W0002	-/-	1/ 0	2004 12 31	1999 4 21
7C1W0003	-/-	1/ 0	2004 12 31	1999 4 21

Latest RENC Product List

2004 11 24

Source PM

Oldest date

2004 12 31

1999 1 5

Newest date

2004 12 31

2004 8 18

Manual Updates

2004 12 31

2004 12 31

Display Until

31 Dec 2004

Approve Until

31 Dec 2004

☒ Sync Manual Update Dates

☒ All SENCs

Manual Update Dates

8.12.4 Setting "approve until" date

- 1. Open the Chart menu.
- 2. Choose Set Chart viewing dates from the menu.
- 3. Set the cursor in the Approve Until field, use the scrollwheel to set desired date, and confirm by pushing the scrollwheel.

Chart viewing dates

Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displ. until	Updates Approv. until
04470039.D	-/-	1/ 0	2004 12 31	2004 12 31
04470039.E	-/-	1/ 0	2004 12 31	2004 12 31
04470039.F	-/-	1/ 0	2004 12 31	2004 12 31
04470040.E	-/-	1/ 0	2004 12 31	2004 12 31
04470040.F	-/-	1/ 0	2004 12 31	2004 12 31
04500072.C	-/-	1/ 0	2004 12 31	2004 12 31
04500075.D	-/-	1/ 0	2004 12 31	2004 12 31
04500076.E	-/-	1/ 0	2004 12 31	2004 12 31
04500077.E	-/-	1/ 0	2004 12 31	2004 12 31
04500077.F	-/-	1/ 0	2004 12 31	2004 12 31
04500078.D	-/-	1/ 0	2004 12 31	2004 12 31
04500078.E	-/-	1/ 0	2004 12 31	2004 12 31
04500078.F	-/-	1/ 0	2004 12 31	2004 12 31
04500079.E	-/-	1/ 0	2004 12 31	2004 12 31
04500079.F	-/-	1/ 0	2004 12 31	2004 12 31
04510076.E	-/-	1/ 0	2004 12 31	2004 12 31
04510077.E	-/-	1/ 0	2004 12 31	2004 12 31
04510078.E	-/-	1/ 0	2004 12 31	2004 12 31
04510078.F	-/-	1/ 0	2004 12 31	2004 12 31
04510079.E	-/-	1/ 0	2004 12 31	2004 12 31
04510079.F	-/-	1/ 0	2004 12 31	2004 12 31
04510080.E	-/-	1/ 0	2004 12 31	2004 12 31
04510080.G	-/-	1/ 0	2004 12 31	2004 12 31
7C1W0001	-/-	1/ 0	2004 12 31	2004 12 31
7C1W0002	-/-	1/ 0	2004 12 31	2004 12 31
7C1W0003	-/-	1/ 0	2004 12 31	2004 12 31

Latest RENC Product List

2004 11 24

Source PM

Oldest date

2004 12 31

2004 12 31

Newest date

2004 12 31

2004 12 31

Manual Updates

2004 12 31

2004 12 31

Display Until

31 Dec 2004

Approve Until

31 Dec 2004

☒ Sync Manual Update Dates

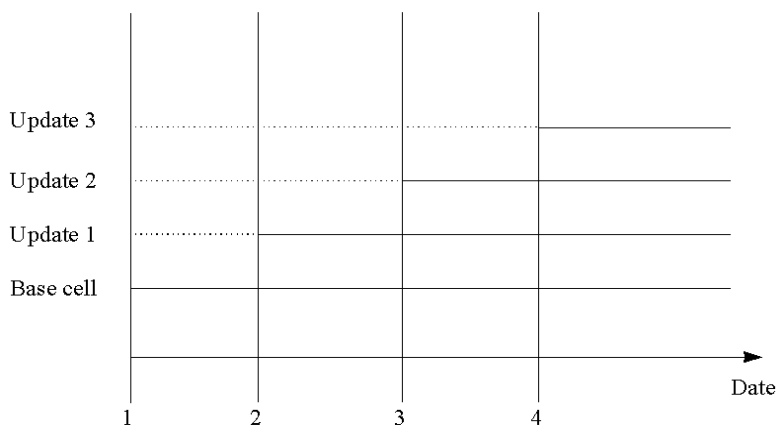
☒ All SENCs

Manual Update Dates

8.12.5 About chart viewing date dependency of S57 standard

How the issue date of updates changes the visibility of the changes

Study the example below to understand the behavior of updates relative to date.



The figure above shows how updates are dependent Chart viewing dates set in Display/Approve date settings by operator. Actions 1 to 4 areas as follows:

1. Base cell including three updates is converted into SENC. Display date is set as current date of the system. Approve date has to be set to current date.
2. The date when update 1 was issued. Display and Approve dates have to be set to correct date in order to see the chart with update 1.
3. The date when update 2 was issued. Display and Approve dates have to be set to correct date in order to see the chart with update 1 and update 2.
4. The date when update 3 was issued. Display and Approve dates have to be set to correct date in order to see the chart with update 1, update 2 and update 3.

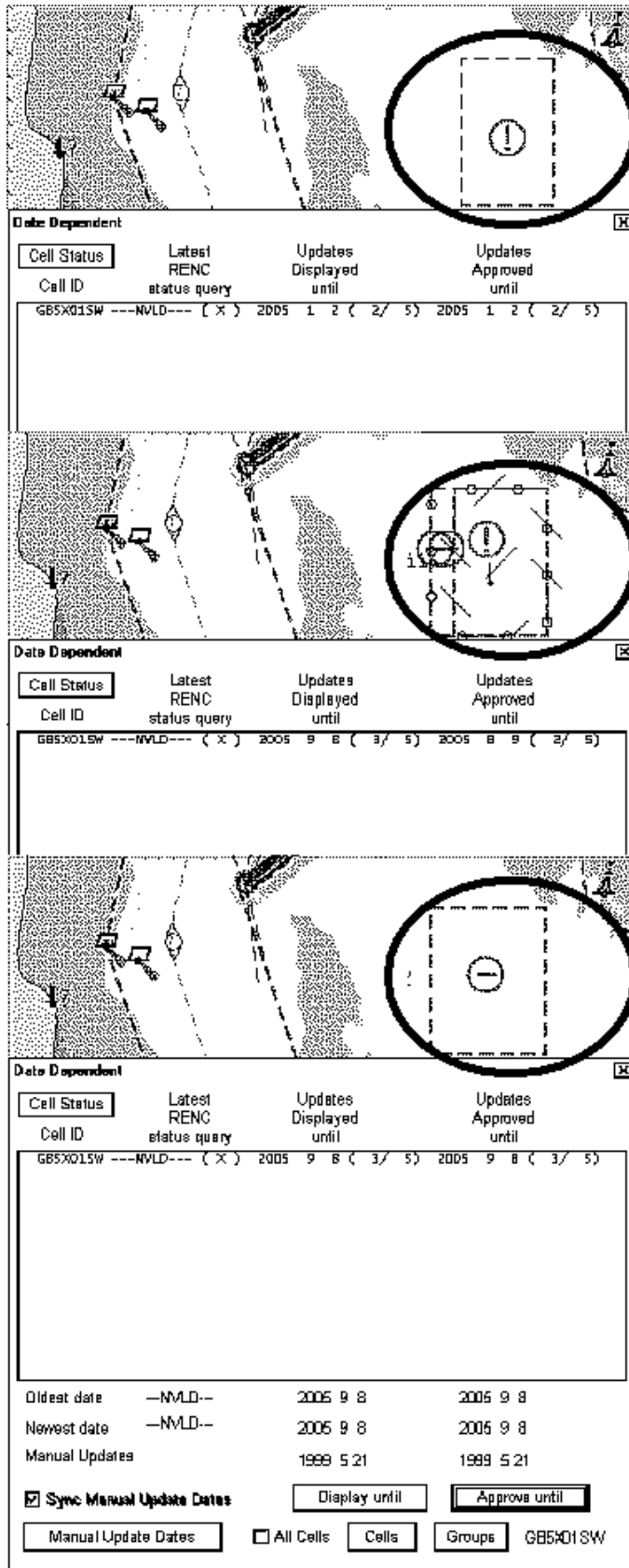
Note 1: In order to display charts with correct updated situation, always use current date during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage.

Note 2: In order to display charts with correct updated situation during route planning, always use planned date of each waypoint to check your plan.

How temporary and preliminary notices to mariners behave with vector charts (S57)

In some cases the producer of a chart (Hydrographic Office) is aware of changes that will happen in the future. A Hydrographic Office is able to include this kind of update into the chart for later use. In the paper chart world, these changes are published in Preliminary and Temporary Notices to Mariners. In ARCS these are known as T&P Notices.

An example of changes known to happen in the future



Display/Approve date is set to 2005-01-02.

You can see a box-shaped Cautions area on the screen.

Display date is now set to 2005-09-08 and Approve date is 2005-9-09.

You can see a new area (Restricted Area) inserted into existing area (Cautions Area).

Display/Approve data is set to 2005-09-08.

You see only a Restricted Area without any Cautions Area.

8. Vector Chart Material

How seasonal features are coded in vector charts (S57)

Some chart producers may define a chart feature to use seasonal date start and end as shown below.

- YYMMDD (Full date for date start and date end)
- --MMDD (The same date every year)
- --MM (The same month every year)

The example below shows how a user can find, using Info query (seasonal), the full date for starting date (YYYYMMDD).

Object

Object: Restricted area

Drawing Type: Area

Used in From 2 / 2005 1 1
updates to 2 / 2005 9 8

Properties

Date start	20050220
A Restriction	entry prohibited

Position

Point 4 / 4 Lat: 32°33.100S
Lon: 060°56.700E

Position remarks

Master: >>>
Slaves: >>>

View Presentation Details

The example below shows how a user can find, using Info query (seasonal), the full date for ending date (YYYYMMDD).

Object

Object: Caution area

Drawing Type: Area

Used in From 2 / 2005 1 1
updates to 2 / 2005 9 8

Properties

Date end	20050220
A Information	Prohibited Entry Area to be

Position

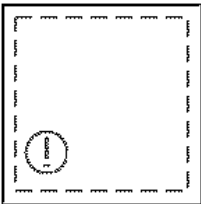
Point 2 / 4 Lat: 32°33.100S
Lon: 060°56.700E

Position remarks

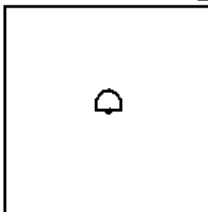
Master: >>>
Slaves: >>>

View Presentation Details

This example shows how a user can find, using the Info query (seasonal), the starting and ending month and day in every year (-MMDD).

Feature Object									
Object:	Caution area								
Geometric Type:	Area								
Used in updates	From 0 / 1998 5 25 to								
									
Feature Attributes									
<table border="1"> <thead> <tr> <th>A Information</th> <th>YACHT RACE AREA</th> </tr> </thead> <tbody> <tr> <td>Periodic date end</td> <td>--1115</td> </tr> <tr> <td>Periodic date start</td> <td>--0401</td> </tr> <tr> <td>Scale minimum</td> <td>139996</td> </tr> </tbody> </table>	A Information	YACHT RACE AREA	Periodic date end	--1115	Periodic date start	--0401	Scale minimum	139996	
A Information	YACHT RACE AREA								
Periodic date end	--1115								
Periodic date start	--0401								
Scale minimum	139996								
Position									
Point	14 / 15 Lat: 55°59.595N Lon: 012°34.279E								
Position Attributes									
<table border="1"> <tr> <td></td> <td></td> </tr> </table>									
Master:	>>								
Slaves:	>>								
View Presentation Details									

This example shows how a user can find, using the Info query (seasonal), the starting and ending month and day in every year (-MM).

Feature Object									
Object:	Buoy, special purpose/general								
Geometric Type:	Point								
Used in updates	From 0 / 1998 2 25 to								
									
Feature Attributes									
<table border="1"> <thead> <tr> <th>M Category of special purpose</th> <th>yachting mark</th> </tr> </thead> <tbody> <tr> <td>M Colour</td> <td>yellow</td> </tr> <tr> <td>Periodic date end</td> <td>--10</td> </tr> <tr> <td>Periodic date start</td> <td>--03</td> </tr> </tbody> </table>	M Category of special purpose	yachting mark	M Colour	yellow	Periodic date end	--10	Periodic date start	--03	
M Category of special purpose	yachting mark								
M Colour	yellow								
Periodic date end	--10								
Periodic date start	--03								
Position									
Point	1 Isol / 1 Lat: 50°46.200N Lon: 001°17.595W								
Position Attributes									
<table border="1"> <tr> <td></td> <td></td> </tr> </table>									
Master:	>>								
Slaves:	Top mark >>								
View Presentation Details									

8. Vector Chart Material

An example of a seasonal chart feature

The next two figures show a caution area that is valid from April 1 to November 15.

Date Dependant

Cell Status	Latest RENC status query	Updates Displayed until	Updates Approved until
n1300131	---NVLD---	(X) 1999 3 31 (6/ 6)	1999 3 31 (6/ 6)

Oldest date: ---NVLD--- 1999 3 31 1999 3 31
Newest date: ---NVLD--- 1999 3 31 1999 3 31
Manual Updates: 1999 5 21 1999 5 21

☒ Sync Manual Update Dates

☐ All Cells n1300131

Date Dependant

Cell Status	Latest RENC status query	Updates Displayed until	Updates Approved until
n1300131	---NVLD---	(X) 1999 4 1 (6/ 6)	1999 3 31 (6/ 6)

Oldest date: ---NVLD--- 1999 4 1 1999 3 31
Newest date: ---NVLD--- 1999 4 1 1999 3 31
Manual Updates: 1999 5 21 1999 5 21

☒ Sync Manual Update Dates

☐ All Cells n1300131

Display/Approve date has been set to to 1999-3-31.
Caution Area is NOT displayed because the date is NOT valid for displaying it.

Display date has been set to to 1999-4-1.
Caution Area is displayed because the date is valid for displaying it.

The figure below shows the attributes of the caution area in the example above, in the Info request window.

Object

Object: Caution area

Drawing Type: Area

Used in From 0 / updates to

Properties

Information	YACHT RACE AREA
Periodic date end	--1115
Periodic date start	--0401
Scale minimum	139996

Position

Point 4 / 15 Lat: 56°00.145N
Lon: 012°35.230E

Position remarks

Master: >>>
Slaves: >>>

8.12.6 Other functions of chart viewing dates window

Manual update dates

You can check when a manual update has been added into the ECDIS. Click the **Manual Update Dates** button to open the Manual Update Chart viewing dates window. Enter date and edition, and a Manual Update symbol for that time appears on the display. For further details, see section 10.7 Checking Creation and Usage History of Manual Updates.

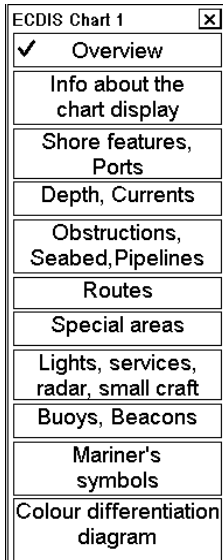
Cell status

To find cell status from the Chart viewing dates window, choose a cell in the window and click the **Cell Status** button to show the Chart Cell Status window. For further details, see section 8.15.1 Cell status.

8.13 Symbology Used in Vector Charts

You can familiarize yourself with the symbology used by browsing IHO ECDIS Chart 1, which is included in this ECDIS. Note that it behaves as any S57 chart and it follows your selections. See section 8.10.4 Controlling visible chart features.

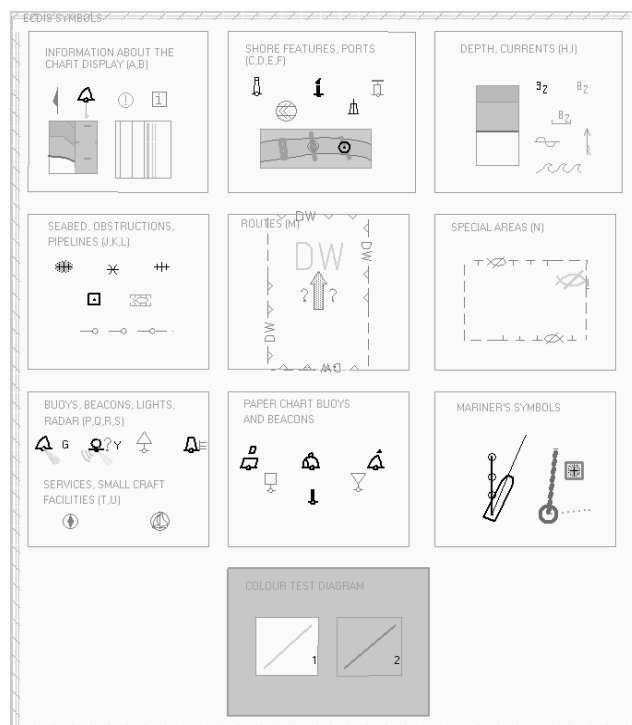
1. Open the Chart menu.
2. Choose ECDIS Chart 1 from the menu then push the scrollwheel.



3. Choose desired chart symbols from the submenu to show on the ECDIS.

Appendix 2 contains examples of plots with symbols.

The Return dialog window appears when you choose something from the submenu of ECDIS Chart 1. When you close the Return dialog window, by clicking the X at the upper right corner, ECDIS Chart 1 will be closed and normal chart presentation is displayed.



An example of Overview chart

8.13.1 How to change presentation library used for vector chart features

The ECDIS uses the official IHO presentation library to draw vector charts (S57). The presentation library is replaceable, but this feature is only intended to be used by qualified service personnel and type approval authorities.

When this manual was published the official presentation library was "pslb03_2.dai", known as "Official IHO presentation library for ECDIS Ed 3 revision 1, Edition: 3.2".

8.14 Requesting Information About Vector Chart Objects

The ability to cursor-pick an object to find additional information about the object is an important function of the ECDIS. However, an unprocessed cursor pick, which does not discriminate or interpret and merely dumps on the interface panel all the information available at that point on the display, will normally result in pages of unsorted and barely intelligible attribute information.

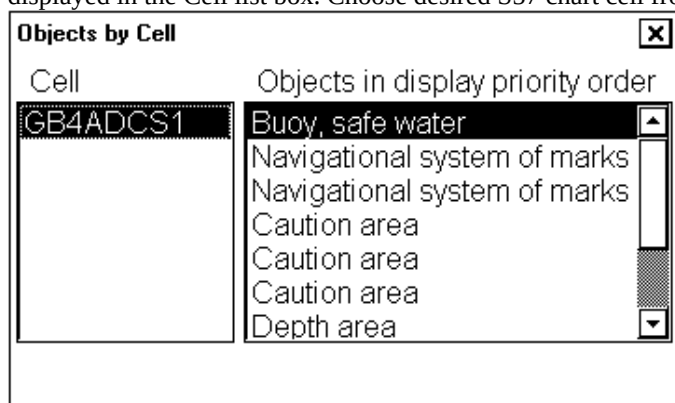
8.14.1 Setting visible vector chart features

The request information about S57 chart objects is given only to objects that are chosen for display by the operator. For how choose chart details to display, see section 8.10.4 Controlling visible chart features.

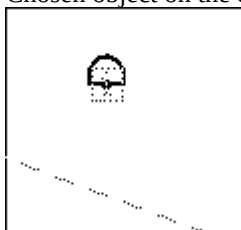
8.14.2 Choosing desired object from the list of found objects

To specify desired SENC and object for information request, do the following:

1. Place the cursor on object desired.
2. Push the scrollwheel. Two windows appear: Objects by Cell and Object.
3. Use the Objects by Cell window to choose desired chart cell and desired object from which you need information. If there are different navigation purpose S57 charts over the area where you are making an information request, you can choose desired S57 chart cell from the Cell window. A list of S57 chart cells is displayed in the Cell list box. Choose desired S57 chart cell from the list.



4. Choose desired object from the Objects in display priority order list box.
5. Chosen object on the chart is shown with mark showing information in the Object window.



8. Vector Chart Material

6. Detailed information for the chosen object appears in the Object window.

Object

Object: Buoy, safe water
Drawing Type: Point
Used in From 0 / 1998 11 10
updates to



Properties

M Buoy shape	spherical buoy
M Colour	red, white
Colour pattern	vertical stripes
Object name	Orford Haven

Position

Point 1 Isol / 1 Lat: 52°01.469N
Lon: 001°27.492E

Position remarks

Master:

Slaves:

>>

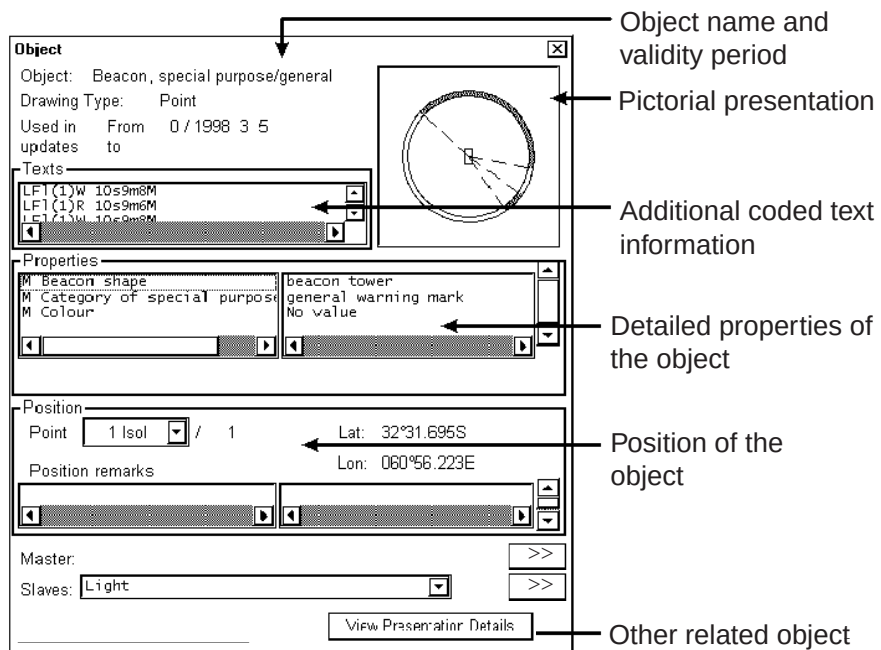
>>

View Presentation Details

7. To close the windows, click the **CANCEL** key on the Control Unit RCU-018, or click the X on the window you wish to close.

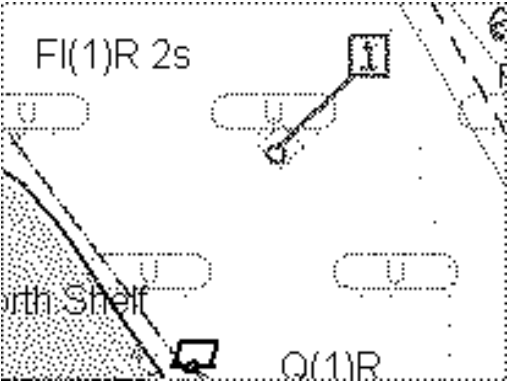
8.14.3 Viewing properties of a vector chart object

After you have chosen a vector chart object, you can view detailed information about it in the Object window:



8.14.4 About vector chart coding

Tidal information is available as a table



Object

Object: Tidal stream panel data

Drawing Type: Point

Used in updates From 0 / 1998 11 10 to

Properties

Object name

Textual description

M Tidal stream - panel value:

H

GB0TG969.TXT

O131 ,HARWICH,HW,297,0.2,339

Position

Point 1 Isol / 1

Lat: 51°57.904N

Long: 16.802E

Untitled - TextView

File Setting Text

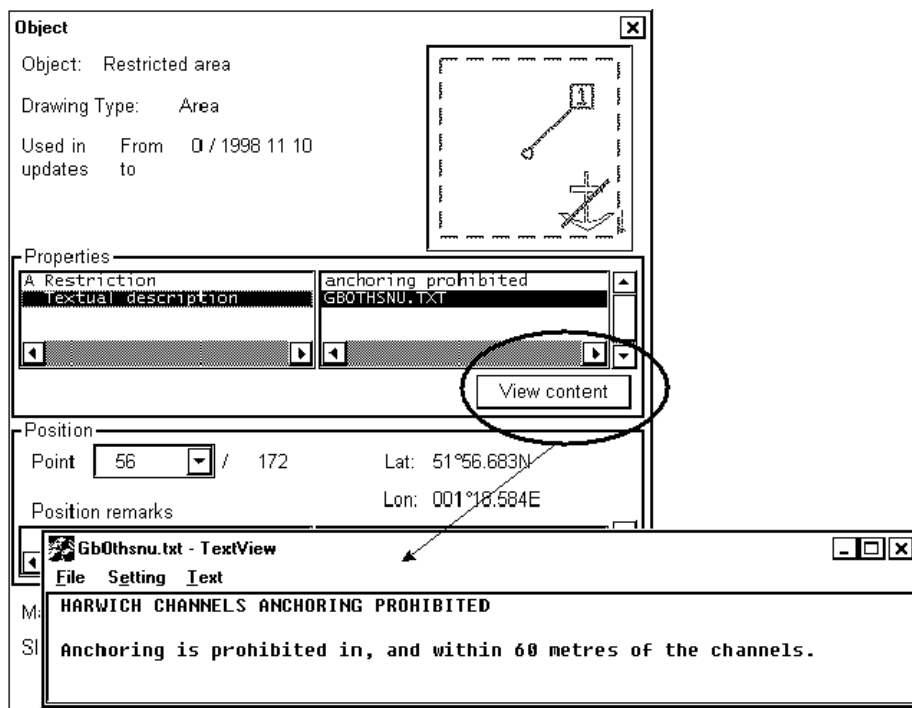
Tidal stream panel values:

O131 HARWICH HW

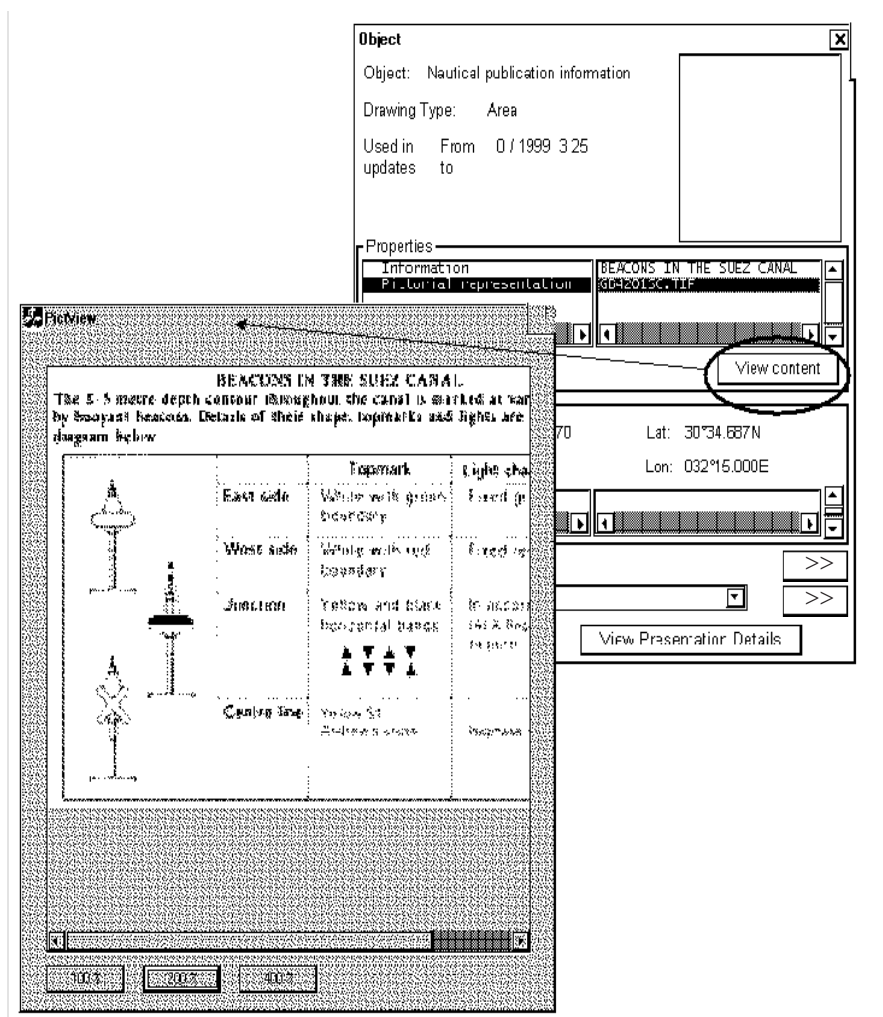
Hour	Dir[°]	Rate[kt]
-6	297	0.2
-5	339	1.0
-4	335	1.0
-3	341	0.9
-2	339	1.2
-1	338	0.8
0	327	0.3
1	156	0.7
2	154	1.5
3	159	1.4
4	156	1.1
5	161	0.7
6	235	0.1

View content

More information is available in text



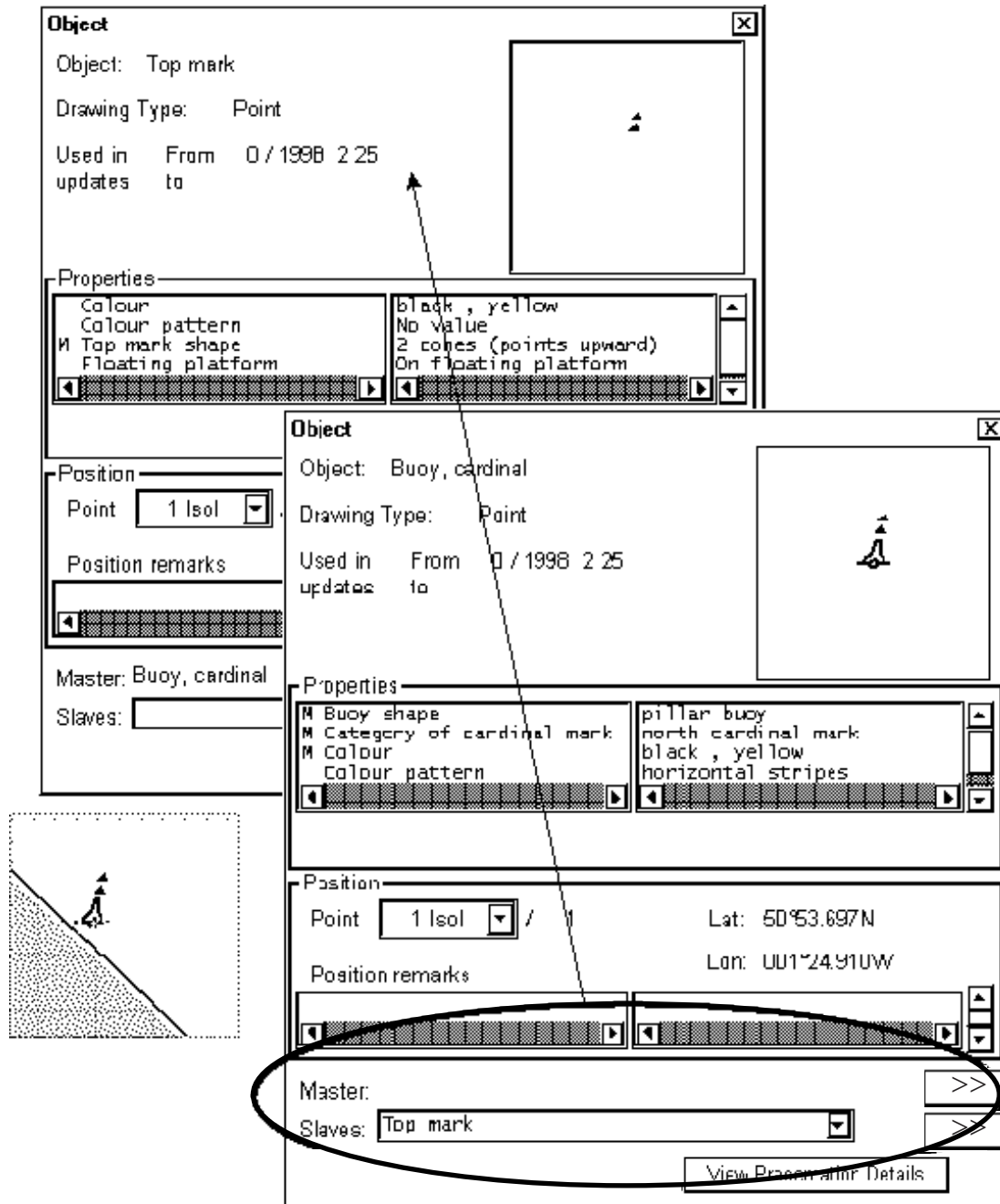
More information is available as a picture

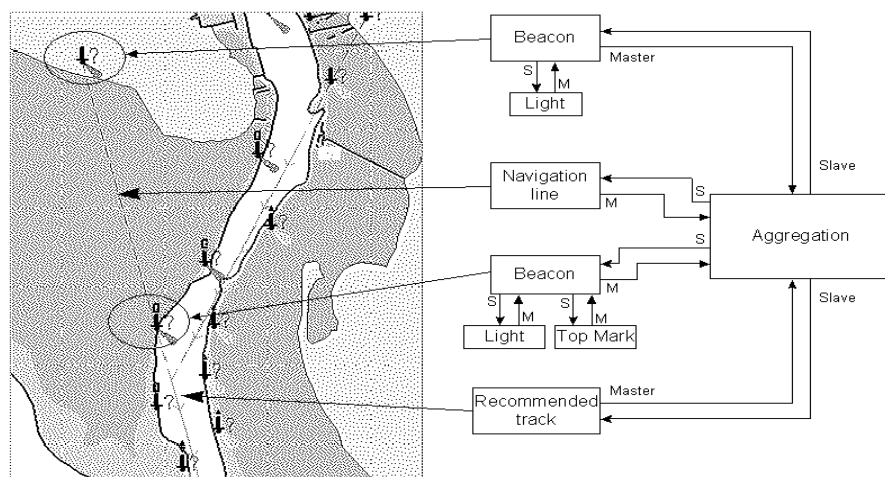


Linked objects

Often a group of chart objects are linked together. The most common example of this practice is a beacon or buoy, in which the body and the top mark are defined separately. Another example is lights and recommended track. Still another example is measurement mile. There are also other similar cases.

Body and top hat of a beacon or buoy



Recommended track defined by two beacons

Object
Object: Recommended track
Drawing Type: Line
Used in From 0/1998 2 25
updates to

Properties
Category of recommended track based on a system of fixed marks
Orientation 345.50 °
Traffic flow inbound

Position
Point 1 Con / 3 Lat: 50°50.541N
Lon: 001°18.792W

Position remarks

Master: Aggregation
Slaves: >>> View Presentation Details

Object
Object: Beacon, lateral
Drawing Type: Point
Used in From 0/1998 2 25
updates to

Properties
Beacon shape No value
Category of lateral mark port-hand lateral mark
Colour red
Conspicuous, visually not visually conspicuous

Position
Point 1 Isol / 1 Lat: 50°50.624N
Lon: 001°18.626W

Position remarks

Master: Aggregation
Slaves: Light, Top mark >>> View Presentation Details

Object
Object: Aggregation
Drawing Type: Point
Used in From 0/1998 2 25
updates to

Properties

Position
Point 1 Isol / 0 Lat: 50°50.541N
Lon: 001°18.792W

Position remarks

Master: Aggregation
Slaves: Navigation line, Recommended track, Beacon, lateral, Beacon, special purpose/general >>> View Presentation Details

Object
Object: Light
Drawing Type: Point
Used in From 0/1998 2 25
updates to

Properties
Category of light Leading light, front light
Colour red
Light characteristic occulting
Signal group (2)

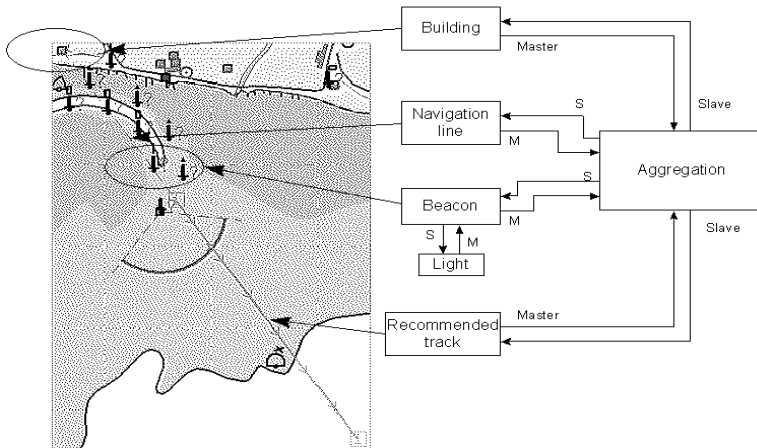
Position
Point 1 Isol / 1 Lat: 50°50.624N
Lon: 001°18.626W

Position remarks

Master: Beacon, lateral
Slaves: >>> View Presentation Details

8. Vector Chart Material

Recommended track defined by a building and a beacon



Object

Object: Recommended track

Drawing Type: Line

Used in From 0/1998 2 25
updates to

Properties

M Category of recommended track based on a system of fixed n
M Orientation 324.00 *
M Traffic flow Inbound

Position

Point 2 Con / 2 Lat: 50°46.467'N
Lon: 001°21.246'W

Position remarks

Master: Aggregation
Slaves:

View Presentation Details

Object

Object: Aggregation

Drawing Type:

Used in From 0/1998 2 25
updates to

Properties

Position

Point / 0 Lat: 50°46.992'N
Lon: 001°21.722'W

Position remarks

Master:
Slaves: Building, single
Building, single
Navigation line
Recommended track

View Presentation Details

Object

Object: Beacon, special purpose/general

Drawing Type: Point

Used in From 0/1998 2 25
updates to

Properties

M Colour orange, red
Colour pattern No value
Information Conspicuous, visually
not visually conspicuous
Also Port hand lateral mark

Position

Point 1 Isol / 1 Lat: 50°46.934'N
Lon: 001°21.782'W

Position remarks

Master: Aggregation
Slaves: Top mark

View Presentation Details

Object

Object: Top mark

Drawing Type: Point

Used in From 0/1998 2 25
updates to

Properties

Information
M Top mark shape Pentagonal
other shape (see INFO&M)

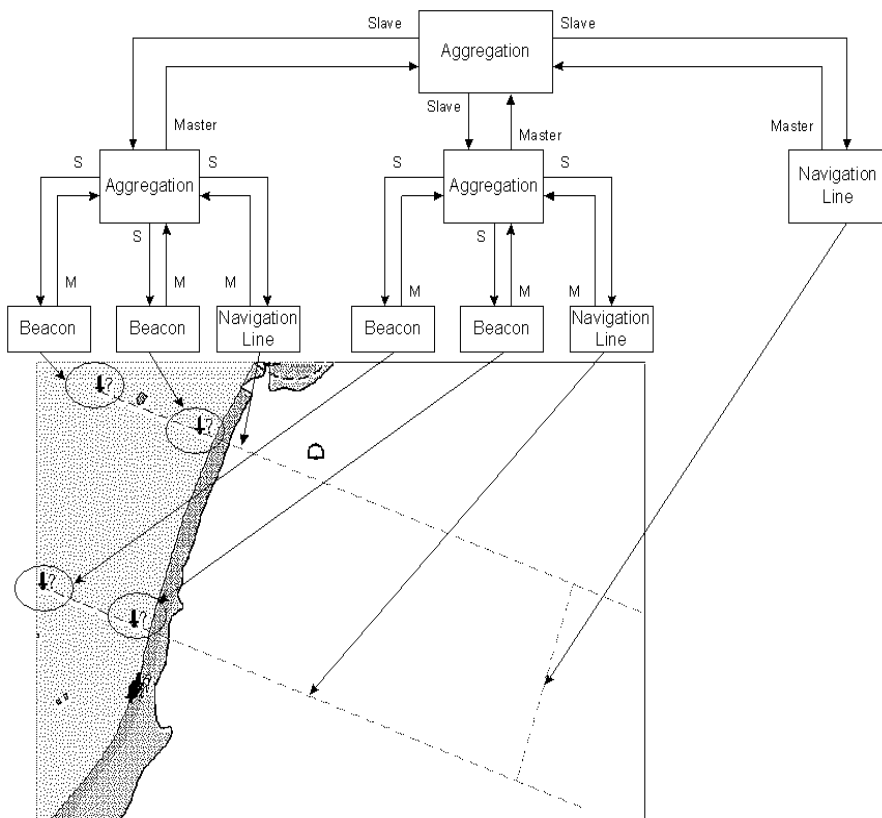
Position

Point 1 Isol / 1 Lat: 50°46.934'N
Lon: 001°21.782'W

Position remarks

Master: Beacon, special purpose/general
Slaves:

View Presentation Details

Measurement mile

The following table summarizes the configuration details for each object shown in the screenshots:

Object	Drawing Type	Used in updates	Properties	Position	Master/Slaves
Navigation line	Line	From 0/1998 11 10 to	Category of navigation line: No value Orientation: No value	Point: 2 Con / 3 Lat: 52°00.955N Lon: 001°29.507E	Master: Aggregation Slaves: (empty)
Aggregation	(empty)	From 0/1998 11 10 to	(empty)	Point: (empty) / 0 Lat: 52°00.152N Lon: 001°29.070E	Master: Aggregation Slaves: Beacon, special purpose/general Beacon, special purpose/general Navigation line
Aggregation	(empty)	From 0/1998 11 10 to	(empty)	Point: (empty) / 0 Lat: 52°00.152N Lon: 001°29.070E	Master: (empty) Slaves: Navigation line Navigation line Aggregation
Beacon, special purpose/general	Point	From 0/1998 11 10 to	Beacon shape: No value Category of special purpose: mark with unknown purpose Colour: No value	Point: 1 Isol / 1 Lat: 52°01.576N Lon: 001°26.586E	Master: Aggregation Slaves: (empty)

8.15 Other Features of Vector Charts

There are some functions or features that are not used on a daily or weekly basis, but sometimes there is a need to use them.

8.15.1 Cell status

Use the Chart Cell Status function in the Chart Menu to find out the status of individual cells in your system, in a CD ROM or in an RENC.

Status of CD ROM: This information is based on information in the CD ROM catalogue you have loaded and chosen here from the CD ROM list box.

Status of RENC: This information is based on information in an RENC. One example of an RENC is PRIMAR. You get the status of cells in an RENC via telecommunications, if you have optional telecommunication installed in your system and you are a licensed operator of an RENC.

Status of ENC: This information is based on information on the hard disk of the system. The ENC used here is S57ed3 delivery formatted chart. Before it can be displayed as a chart it has to be converted into the system's internal display format SENC.

Status of SENC: This information is based on information on the hard disk of the system. A SENC is the system's internal display format.

Chart Cell Status

Cell: JP34EQRK

CD: JP W13 2000 3 30

☐ RENC
 ☐ CD
 ☒ HD

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM	1	2000 3 31	1/1999 10 29	1
RENC				
ENC	1	2000 3 31	1/1999 10 29	1
SENC	1	2000 3 31	1/1999 10 29	1

Details

Create SENC

Add Update

Conv Log

Use the **Conv Log** button to view a detailed conversion log of S57 chart cell.

8.15.2 S57 cell details

You may need to check when an update has been added into your ECDIS. Also you may need to check what was shown in your chart display three weeks ago. There are also many other cases where you need to find what was known by your ECDIS.

To view updates by their numbers, open the Chart menu, choose Chart Cell Status to display the Chart Cell Status window then click the **Details** button. You will get a Chart Cell Details window, where you can view updates by their numbers.

To check any situation in the past, you can use the Displayed Update and Approved Update fields to specify update number.

Chart Cell Details

Item:

Cell:

RENC
CD
HD

Edition number	Update number	Issue date	Upd. appl. date
1	0	1998 11 2	1998 11 2
1	1	1998 11 3	
1	2	1998 11 11	
1	3	1998 11 11	
1	4	1998 11 12	

Displayed Update

Approved Update

Latest Update

8.15.3 Using cell status window to initiate SENC conversion

The Cell Status window in the Chart menu can be used to force a new SENC conversion for any chart cell that is already in the SENC format. Normally you do not need this feature, but it could be useful if, for example, you need to analyze why an update cannot be converted, etc.

Open the Chart menu, choose Cell Status then click the **Create SENC** button to initiate SENC conversion of the Base cell.

Chart Cell Status

Cell: JP34EQRK CD: JP W13 2000 3 30

☐ RENC ☐ CD ☒ HD

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM	1	2000 3 31	1/1999 10 29	3
RENC				
ENC	1	2000 3 31	1/1999 10 29	3
SENC	1	2000 3 31	1/1999 10 29	3

Details Create SENC Add Update Conv Log

If the Base cell has already been converted to the SENC format, then the system asks you if it is OK to write over existing SENC.

Click the **OK** button to overwrite the existing SENC.

If the S57 Error window shown right appears, the permit for the chart is for another edition.

Create S57 Senc

Overwrite existing Senc: GBSX01SW

OK Cancel

S57 Error

Cell N04D1621. Test before SENC convert failed

Decrypt failed for encrypted Cell from RENC

Permit may be for different edition of Cell

Check edition using Permit Management and Cell Status

If unsuccessful contact your RENC service

OK

Then, the contents of the Cell Status window change as in this example at right.

Note that the SENC row is now empty.

Chart Cell Status

Cell: JP34EQRK CD: JP W13 2000 3 30

☐ RENC ☐ CD ☒ HD

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM	1	2000 3 31	1/1999 10 29	3
RENC				
ENC	1	2000 3 31	1/1999 10 29	3
SENC				

Details Create SENC Add Update Conv Log

After the SENC conversion is completed, the contents of the Cell Status window change as in this example at right.

Note that the last update number for the SENC row is now 0 to indicate that only the Base cell is included into the SENC.

Now click the **Add Update** button to add an update in the SENC.

Chart Cell Status

Cell: JP34EQRK CD: JP W13 2000 3 30

☐ RENC ☐ CD ☒ HD

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM	1	2000 3 31	1/1999 10 29	3
RENC				
ENC	1	2000 3 31	1/1999 10 29	3
SENC	1	2000 3 31	1/1999 10 29	0

Details Create SENC Add Update Conv Log

After the SENC conversion for the added update is completed, the contents of the Cell Status window change as in the example at right.

Note that the last update number for the SENC row is now 1 to indicate that the first update has been added into the SENC.

Now click the **Add Update** button again to add the rest of the updates in the SENC. In this example you need to repeat it four times to get updates 2, 3, 4 and 5.

Chart Cell Status

Cell: JP34EQRK CD: JP W13 2000 3 30

☐ RENC ☐ CD ☒ HD

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM	1	2000 3 31	1/1999 10 29	3
RENC				
ENC	1	2000 3 31	1/1999 10 29	3
SENC	1	2000 3 31	1/1999 10 29	1

Details Create SENC Add Update Conv Log

9. Raster Chart Material

9.1 ARCS Charts

Approximately 2,700 ARCS charts are available on 11 chart CD ROMs, covering the world's major trading routes and ports. Regionally based chart CD ROMs RC1 to RC10 contain standard BA navigation charts, while RC11 contains ocean charts at scales of 1:3,500,000 and smaller. ARCS charts are facsimile copies of BA paper charts, and as such share a common numbering system. New editions and new charts for ARCS and BA paper charts are issued simultaneously. They are supplied on each Weekly Update CD ROM until incorporated into the chart CD ROMs at the next issue.

Occasionally, it is necessary to issue new charts in advance of their intended date of validity, for example a change in regulations commencing on a future date. In such cases the current chart will co-exist with the new chart until the date of implementation, the earlier chart being indicated with the suffix "X" after the chart number. The system will allow access to both charts for the period of overlap by issue of new chart permits.

Sometimes you may wish to manually add Notices to Mariners or Navtex warnings into your ARCS charts. In this system this is called Manual Updates. Manual updates are valid for both ARCS and S57 charts so that you need to define them only once. Further, manual updates are valid for all scales so that you don't need to repeat them for charts published in different scales from the same area. For further details see Chapter 10 Manual Updates.

9.1.1 Chart legend of ARCS chart

The chart legend provides information about edition date and updates of the displayed chart. To toggle the legend ON/OFF, put the cursor in the sidebar area, confirm that "Select Sidebar" appears in the mouse functions area then push the right mouse button. Then, choose Chart Legend from the menu and push the scrollwheel to open or close the ARCS chart legend.

Chart Number:

Number of current chart is shown in this field.

Country Of Origin:

The country that produced the original chart.

Latest NM:

Date of the latest Notice to Mariners included in the chart.

Edition Date:

Date when the chart was issued.

Publication Date:

Issue date of Update CD ROM used to update the system.

WGS shift status:

Datum shift between local datum and WGS-84 datum is known (=Defined), unknown, operator defined (=Undefined) or shift is known only some parts of chart (=Partially defined).

Depth:

Unit of depth measurement.

Height:

Unit used for indication of height above sea level (for example, clearance height).

ARCS chart

Chart Number :	2224
Country Of Origin:	United Kingdom
Latest NM:	1743/2001
Edition Date:	1998 12 10
Publication Date:	2001 5 3
WGS shift status:	Defined
Depth:	Metres
Height:	Metres

T&P Notices Details

Warnings

9.1.2 T&P notices, details and warnings of ARCS

Access to view T&P Notices, which are details or warnings of ARCS, is contained in the ARCS chart legend mentioned on the previous page. At the lower part of the legend there are three buttons to activate a corresponding window. These are as follows:

T&P notices

T&P Notices are also known as Temporary and Preliminary Notices to Mariners. Click the **T&P Notices** button to open a text window. This window provides chart information that does not warrant permanent chart correction.

T&P Notices to Mariners

Nro: 4882-08

1668(T)/95 NORTH ATLANTIC - PACIFIC - INDIAN OCEAN - MEDITERRANEAN SEA - Round the World Yacht Cruising Rally - UK to Gibraltar to Gibraltar - Oct 97 - Jun 97

1. A Round the World yacht cruising rally will take place from July 1995 to June 1997. It is anticipated that over 40 yachts will participate. The route and timetable for the event is as follows:

Depart	Date	Arrive	Date	Remarks
Hamble (UK)	9 Jul 95	Gibraltar	31 Oct 95	
Gibraltar	23 Oct 95	Tenerife	31 Oct 95	
Tenerife	15 Nov 95	Antigua	6 Dec 95	
Antigua	2 Jan 96	Critobal	26/31 Jan 96	Transit Panama Canal
Balboa	8 Feb 96	Galapagos	18 Feb 96	
Galapagos	1 Mar 96	Marquesas	20/27 Mar 96	Nuku Hiva
			30/3 - 12/4/96	Cruise in Marquesas
Marquesas	12 Apr 96	Tahiti	20 Apr 96	
Tahiti	27/28 Apr 96	Bora Bora	9 May 96	
Bora Bora	12 May 96	Tonga	28 May 96	via Cook Is
Tonga	11 Jun 96	Fiji	15 Jun 96	via Suva
Fiji	27/28 Jun 96	Cairns	31 Jul 96	poss via Vanuata/ New

Details

Click the **Details** button on the ARCS Chart Legend sidebar to open the ARCS Details dialog box, which shows detailed information about current chart.

Projection:

Projection of current chart. Click the **Projection** button to find information about latitude of true scale and rotation angle.

Orig. Scale:

The scale of the original paper chart is shown here.

Hor Datum:

Horizontal datum used with current chart.

Depth Unit:

Unit of depth used with current chart.

Depth Datum:

Vertical datum of depth used with current chart.

Height Unit:

Unit of measurement used to measure height of objects above sea level.

Height Datum:

Vertical datum for objects located above sea.

ARCS Details

English Channel

Projection... Mercator

Orig. Scale: 500 000

Hor Datum: European 1989 (ETRS89)

Depth Unit: Metres

Depth Datum: Approx Lowest

Height Unit: Metres

Height Datum: Mean High Water Springs

Panels: * English Channel

Locate ☒ Preference

Notes... IALA Region

WGS84 Shift...

Cursor Position

Local Datum

49°21.147'N 002°05.569'W

WGS84 Chart

49°21.147'N 002°05.569'W

Panels:

Chooses desired inset (Panel) from the combo box. This function also works in conjunction with Locate, Preference and Notes.

Locate:

This function displays the inset chosen in the Panels combo box.

Warnings

There could be warnings not included in Notices to Mariners. British Admiralty may release textual warnings for any chart and they are available here.

Setting preference for inset (panel)

If there are the different insets with the same position, the operator can choose preferred inset, which displays your ship's position.

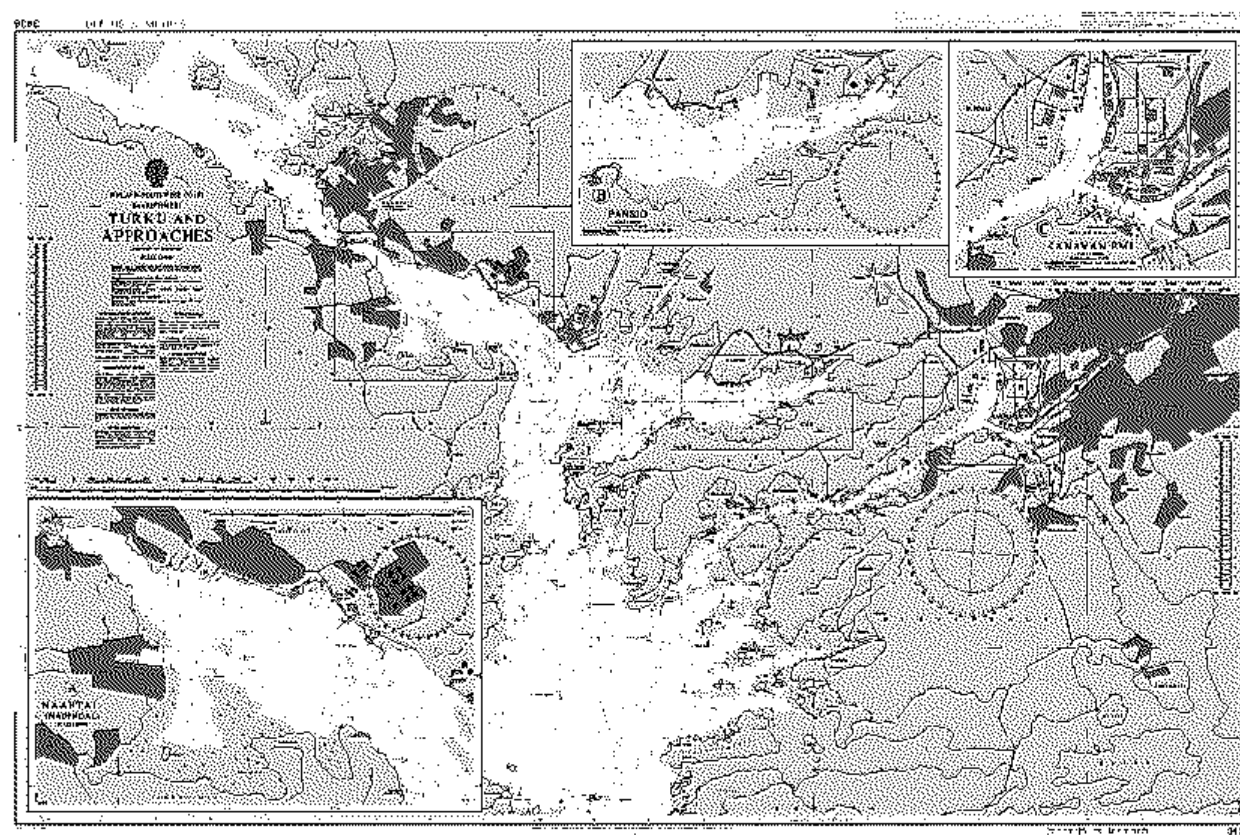
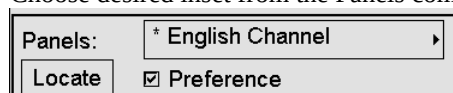


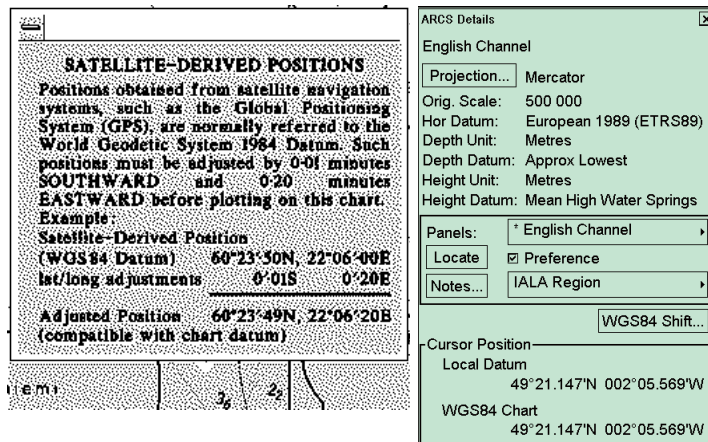
Chart with three insets

1. Place the cursor in the sidebar area, confirm that "Select Sidebar" appears in the mouse functions area then push the right mouse button.
2. Choose Chart Legend from the menu then push the scrollwheel.
3. Click the **Details** button on the Chart Legend sidebar to open the ARCS Details dialog box.
4. Choose desired inset from the Panels combo box. Check Preference as shown below.



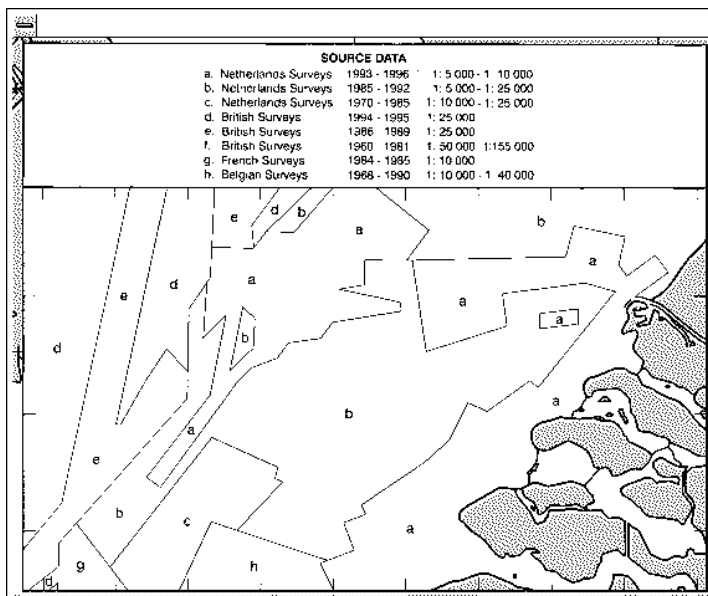
Viewing notes of ARCS chart

The operator can choose a desired item from the combo box in the ARCS Details dialog box in order to view notes for that item. After choosing the item from the Notes combo box, click the **Notes...** button, and a text window appears. To close the window, click the X at the right corner of the display.



Using Source Data Diagram (SDD)

A Source Data Diagram (SDD) consists of two parts: a graphic showing the areas covered by each type of source material from which the chart was compiled, and a tabulation, keyed to a graphic, giving details of source dates and scales. The layout of the graphic corresponds to the layout of the chart, and the borders of the diagram equate to the limits of the chart panels. If this option is chosen, on the ARCS Details dialog box, it is possible to click by the cursor ARCS chart to plot origin on SDD. If plot positions on SDD are not active, there is no SDD on the chart.



9.2 Datum and ARCS Charts

9.2.1 Difference between ARCS chart local datum and positions in WGS-84 datum

The difference between ARCS chart local datum and WGS-84 datum is known as WGS-84 Shift. For most of the ARCS charts this is known and the system can do the conversion automatically. For some ARCS chart, however, this is unknown and the operator must define the shift. For some ARCS charts this is partially known and the operator is responsible for defining the shift for the unknown areas of partially known ARCS charts. For further details, see "Specifying operator WGS-84 shift" on page 9-9.

Further, see "Use with GPS" in the ARCS Navigator User Guide.

How the state of WGS shift is indicated permanently

No warning appears in the cursor window. The cursor position is shown in the operator-chosen working datum. (See section 13.3 Choosing Datum.)

Own Ship to Cursor:	
158.3 nm	78.8°
Lat	60°02.767'N
Lon	028°31.983'E

The warning WGS undefi. appears (in red) in the Cursor window.

Own Ship to Cursor:	
158.3 nm	78.8°
Lat	60°02.767'N
Lon	028°31.983'E
WGS undefi.	

The system still operates in the operator-chosen working datum. However, the system is unable to correctly do the transformation between local paper chart datum and the operator-chosen working datum.

The warning WGS operator appears (in red) in the Cursor window.

Own Ship to Cursor:	
158.3 nm	78.8°
Lat	60°02.767'N
Lon	028°31.983'E
WGS user	

The system still operates in the operator-chosen working datum. However, the system uses the operator-defined WGS shift to perform the transformation between local paper chart datum and the operator chosen working datum.

Checking WGS shift status of current chart

The ARCS chart legend contains a WGS shift status field. (To display the ARCS chart legend, put the cursor in the Sidebar, confirm that the mouse functions area shows Select Sidebar, push the right mouse button, choose Chart Legend then push the scrollwheel.)

9. Raster Chart Material

WGS shift is defined for this chart. All latitude and longitude positions of the cursor, routes, user charts, pilot data, etc. are correctly displayed on this ARCS chart.

ARCS chart

Chart Number :	2224
Country Of Origin:	United Kingdom
Latest NM:	1743/2001
Edition Date:	1998 12 10
Publication Date:	2001 5 3
WGS shift status:	Defined
Depth:	Metres
Height:	Metres
T&P Notices.. Details...	
Warnings...	

WGS shift is not defined for this chart. Latitude and longitude positions of the cursor, routes, user charts, pilot data, etc. may not be correctly displayed on the current ARCS chart. You can use WGS shift to define correct transformation from WGS-84 co-ordinates to local datum of the current ARCS chart.

ARCS chart

Chart Number :	2264
Country Of Origin:	United Kingdom
Latest NM:	2276/2000
Edition Date:	1999 8 5
Publication Date:	2000 8 31
WGS shift status:	Not Defined
Depth:	Metres
Height:	Metres
T&P Notices.. Details...	
Warnings...	

WGS shift is partially defined for this chart. Some parts or panels of this chart do not have defined WGS shift. Latitude and longitude positions of the cursor, routes, user charts, pilot data, etc. may not be correctly displayed on current ARCS chart. You can use WGS shift to define correct transformation from WGS-84 co-ordinates to local datum of the ARCS chart for the parts or panels of this chart that do not have defined WGS shift.

ARCS chart

Chart Number :	1358
Country Of Origin:	United Kingdom
Latest NM:	4003/2000
Edition Date:	1998 10 22
Publication Date:	2001 1 11
WGS shift status:	Partially Defined
Depth:	Metres
Height:	Metres
T&P Notices.. Details...	
Warnings...	

Viewing cursor position in local datum of an ARCS chart

On demand you can view the cursor position in local datum of an ARCS chart. This is useful when you need to refer to the corresponding paper chart. You can access ARCS details with the **Details** button in the chart legend of ARCS.

In this example WGS-84 shift is defined for the current ARCS chart.

The Cursor Position window shows cursor position in local ARCS chart datum (indicated as Local Datum) and in WGS-84 datum as defined in the used ARCS chart (indicated as WGS84 Chart).

ARCSDetails

English Channel

Projection...Mercator

Orig. Scale: 500 000

Hor Datum: European 1989 (ETRS89)

Depth Unit: Metres

Depth Datum: Approx Lowest

Height Unit: Metres

Height Datum: Mean High Water Springs

Panels: * English Channel

Locate

Preference

Notes...IALA Region

WGS84 Shift...

Cursor Position

Local Datum

49°21.147'N 002°05.569'W

WGS84 Chart

49°21.147'N 002°05.569'W

Cursor

From Own Ship: 358.2 nm 112.3°

60°04.159N 029°15.243E

Note: The Cursor window, below the ARCS Details dialog box, always shows cursor position in operator-chosen working datum.

In this example WGS-84 shift is not defined for the current ARCS chart.

The Cursor Position window shows cursor position only in local ARCS chart datum (indicated as Local Datum).

ARCSDetails

English Channel

Projection...Mercator

Orig. Scale: 500 000

Hor Datum: European 1989 (ETRS89)

Depth Unit: Metres

Depth Datum: Approx Lowest

Height Unit: Metres

Height Datum: Mean High Water Springs

Panels: * English Channel

Locate

Preference

Notes...IALA Region

WGS84 Shift...

Cursor Position

Local Datum

49°21.147'N 002°05.569'W

WGS84 Chart

49°21.147'N 002°05.569'W

Cursor

From Own Ship: 362.8 nm 112.2°

60°03.261N 029°22.862E WGS undefi.

Note: The Cursor window, below the ARCS Details dialog box, shows the warning "WGS undefi" to indicate that the system is unable to do a correct transformation from local ARCS chart datum to the operator-chosen working datum.

9. Raster Chart Material

In this example WGS-84 shift is not defined for the current ARCS chart.

The Cursor Position panel shows cursor position in local ARCS chart datum (indicated as Local Datum) and in WGS-84 datum as defined by the operator WGS shift (indicated as WGS-84 User).

ARCS Details

English Channel

Projection... Mercator

Orig. Scale: 500 000

Hor Datum: European 1989 (ETRS89)

Depth Unit: Metres

Depth Datum: Approx Lowest

Height Unit: Metres

Height Datum: Mean High Water Springs

Panels: * English Channel

Locate ☒ Preference

Notes... IALA Region

WGS84 Shift...

Cursor Position

Local Datum

49°21.147'N 002°05.569'W

WGS84 Chart

49°21.147'N 002°05.569'W

Note: The Cursor window, below the ARCS Details dialog box, shows the warning "WGS undefi" to indicate that the system uses operator-defined transformation from local ARCS chart datum to the operator chosen working datum.

Cursor

From Own Ship: 361.7 nm 112.3°

60°03.219N 029°20.841E WGS user

Viewing value of WGS-84 shift

You can view the value of WGS-84 shift of the current ARCS chart. To do this, click the **Details** button on the ARCS Chart Legend sidebar to open the ARCS Details dialog box, then click the **WGS84 Shift...** button.

In this example the WGS-84 shift is defined for current ARCS chart.

Chart Shift:

The latitude and longitude shifts between WGS-84 datum and the local datum.

Accuracy:

This field contains accuracy as defined by the chart producer.

ARCS WGS84 Shift

Chart Shift: 00.010'N 00.190'E

Accuracy: Undefined Undefined

User WGS Shift

☐ Active

☐ Enable

☐ Changes

In this example WGS-84 shift is not defined in the current ARCS chart.

Chart Shift:

Undefined indicates that this ARCS chart does not have defined WGS-84 shift.

Accuracy:

This field contains accuracy as defined by the chart producer.

ARCS WGS84 Shift

Chart Shift: Undefined Undefined

Accuracy: Undefined Undefined

User WGS Shift

☐ Active 00.000'N 00.000'E

☐ Enable

☐ Changes

In this example WGS-84 shift is not defined in the current ARCS chart

Chart Shift:

Undefined indicates that current ARCS chart does not have defined WGS-84 shift.

Accuracy:

This field contains accuracy as defined by the chart producer.

User WGS shift

The shifts between WGS-84 datum and the local datum as defined by the operator.

Active

Indicates that the operator-defined WGS-84 shift is in use.

ARCS WGS84 Shift ✕

Chart Shift: Undefined Undefined
Accuracy: Undefined Undefined

User WGS Shift

☒ Active Reset 00.176'N 01.290'E

☐ Enable
Changes

Specifying operator WGS-84 shift

You can define WGS-84 shift for those ARCS charts that do not have defined WGS-84 shift. You cannot redefine WGS-84 shift for any ARCS chart for which it is defined by the chart producer.

To define operator WGS-84 shift do the following:

1. Click the **Details** button on the ARCS Chart Legend sidebar to open the ARCS Details dialog box.
2. Click the **WGS84 Shift...** button. Check Enable changes. Locate the cursor where desired. Check Active and Enable changes.

Use the **Reset** button to reset the values of the operator defined WGS-84 shift to zero.

Use Active to control use of operator defined WGS-84 shift. Check to activate operator-defined WGS-84 shift; uncheck to deactivate.

ARCS WGS84 Shift ✕

Chart Shift: 00.010'N 00.190'E
Accuracy: Undefined Undefined

User WGS Shift

☒ Active Reset 00.000'N 00.000'E

☐ Enable
Changes

ARCS WGS84 Shift ✕

Chart Shift: 00.010'N 00.190'E
Accuracy: Undefined Undefined

User WGS Shift

☒ Active Reset 00.000'N 00.000'E

☒ Enable
Changes

ARCS WGS84 Shift ✕

Chart Shift: 00.010'N 00.190'E
Accuracy: Undefined Undefined

User WGS Shift

☒ Active Reset 00.176'N 00.290'E

☐ Enable
Changes

9.2.2 Permanent messages of ARCS

The system can help you to keep your ARCS charts up-to-date for the charts that you have received from ARCS. Producers of ARCS charts store up-to-date status on an ARCS Weekly Update CD ROM (system Files). This information is loaded into the ECDIS when you update, either by permits or by active group. Based on this information, ARCS permanent messages are displayed to help you keep your ARCS charts up-to-date.

Chart is loaded from RCxx CD ROM, but not updated using ARCS Weekly Update CD ROM.

Perform update for the chart.

ARCS Permanent Message

This Chart is not up to date. UNSAFE FOR NAVIGATION
Reason: Missing update

Chart is not updated using an ARCS Weekly Update CD ROM from which ARCS system files are loaded.

Use the correct ARCS Weekly Update CD ROM to load updates for chart.

ARCS Permanent Message

This Chart is not up to date. UNSAFE FOR NAVIGATION
Reason: Chart not updated using current System files

Updates for the chart are not for the same edition as chart. Load chart from the latest RCxx CD ROM and update chart using latest Update CD ROM.

ARCS Permanent Message

This Chart is not up to date. UNSAFE FOR NAVIGATION
Reason: Edition mismatch in last update (ARCS 03 or 04)

Chart is cancelled and no longer kept up-to-date by its producer.

ARCS Permanent Message

This Chart is not up to date. UNSAFE FOR NAVIGATION
Reason: Chart is canceled (Not in the System files)

ARCS license has expired.

Contact chart agent to renew your license.

ARCS Permanent Message

Chart 259 cannot be seen
Reason: License expired (ARCS 10)

9.3 Chart Menu

The Chart menu is used for managing chart database.

[Chart Menu]	
Activate S57 chart	▶
Load Charts	▶
Update Charts	▶
Load and Update History	
Remove Charts	▶
Chart Catalogue	
Chart Permits	
Licence	
Select Next Chart	
Open Chart	▶
Manual Updates	▶
System	▶
Close	

Menu description

Activate S57 chart: The function activates an S57 chart onto the display. You have two options to choose how to open a chart on the display. "Ignore scale" opens S57 chart cell with the scale that was used the last time you used an S57 chart. "Sync scale" opens a S57 chart with the scale that was used with ARCS charts.

Load Charts: User can load ARCS chart from a CD ROM to the hard disk.

Update Charts: User can update ARCS charts stored in the hard disk. Updates are delivered weekly by British Admiralty, in a CD ROM.

Load and Update History: You can view history of load and update actions for ARCS charts.

Remove Charts: User can remove charts from the hard disk.

Chart Catalogue: For managing ARCS charts. See section 9.4.12 ARCS Catalogue.

Chart Permits: Load permit from floppy disk.

License: View license information of the current ARCS chart.

Select Next Chart: Select next chart in currently selected group.

Open Chart: User can open appropriate ARCS chart on the display.

Manual Updates: User can see manual updates made.

System:

- **ARCS Update Status:** Display information about ARCS Update CD ROM that is loaded in the system.
- **S52 Presentation Library:** View information of presentation library used with manual updates.
- **Verify system files:** Compare loaded system files with files on Update CD ROM.
- **Refresh Charts after backup:** Refresh charts after backup from another ECDIS.
- **Log File:** User can view log file including ARCS depending functions
- **Colors:** Display color sample.
- **Restart drawing process:** Redraw chart.

Close: Close menu.

9.4 ARCS Subscriptions

ARCS customers can subscribe to one of two service levels, ARCS Navigator or ARCS Skipper.

9.4.1 ARCS Navigator

ARCS Navigator operators receive a comprehensive weekly updating service on CD ROM that mirrors the Admiralty Notices to Mariners (NMs) used to correct Admiralty paper charts. The update information is cumulative, ensuring that only the most recent Update CD ROM is necessary. ARCS Navigator license is valid for 12 months. During this period, weekly updates will be delivered on Weekly Update CD ROMs. ARCS Navigator is intended for SOLAS class operators who require that their charts are up-to-date.

Content of ARCS Navigator pack:

- One (1) or more Chart CD ROMs (RC1-RC11) containing ARCS charts
- One (1) Update CD ROM containing the latest ARCS chart corrections
- One (1) floppy disk storing ARCS chart permits

9.4.2 ARCS Skipper

For the ARCS Skipper operator, the charts you have a license for were fully up-to-date at the day of sale. They can be updated for NMs whenever you like by buying a new ARCS Skipper license, which is again fully up-to-date for the day of sale.

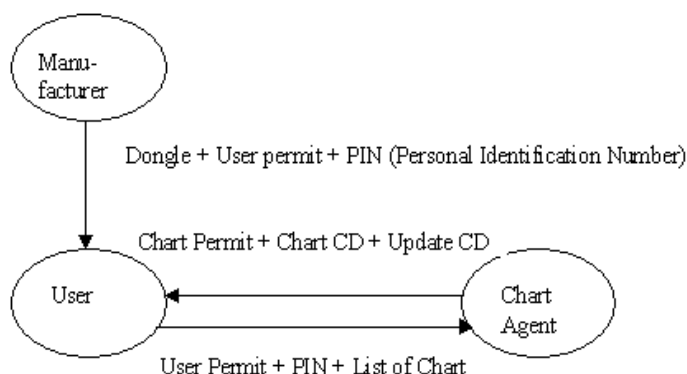
Content of ARCS Skipper pack:

- One (1) or more Chart CD ROMs (RC1-RC11) containing ARCS charts
- One (1) Update CD ROM containing the latest ARCS chart corrections
- One (1) floppy disk storing ARCS chart permits

Note: If you are holding more than one ARCS Skipper packs onboard, only one pack can be loaded into the ECDIS at a time.

9.4.3 ARCS license information

License information, which is transferred between participants, is as shown below.



If ARCS format is active, you can choose ARCS License from the Chart menu, with "Licence". License information is shown in the window. This window contains information about owner of license, operator permit and type of license.

Licence Information ✕

Licencee: Mr. Ship Owner

Vessel: MT Motortanker

Company: Shipping Company Ltd
Homestreet 12
FIN-01234 HELSINKI
FINLAND

Host

User AAAABBBBCCCCDDDD

PIN: XXXX

Licence Type/Number: Navigator YYYYYYZ

This licence is only valid if the chart permits on this system are licenced to the person or company named above. If you are not the named person or do not represent the named company, you may be in breach of the licence conditions relating to the use of these charts. If in doubt please contact your nearest ARCS supplier.

License information window

9.4.4 Getting started with ARCS charts

In order to get charts in the system and display them you have to do the following:

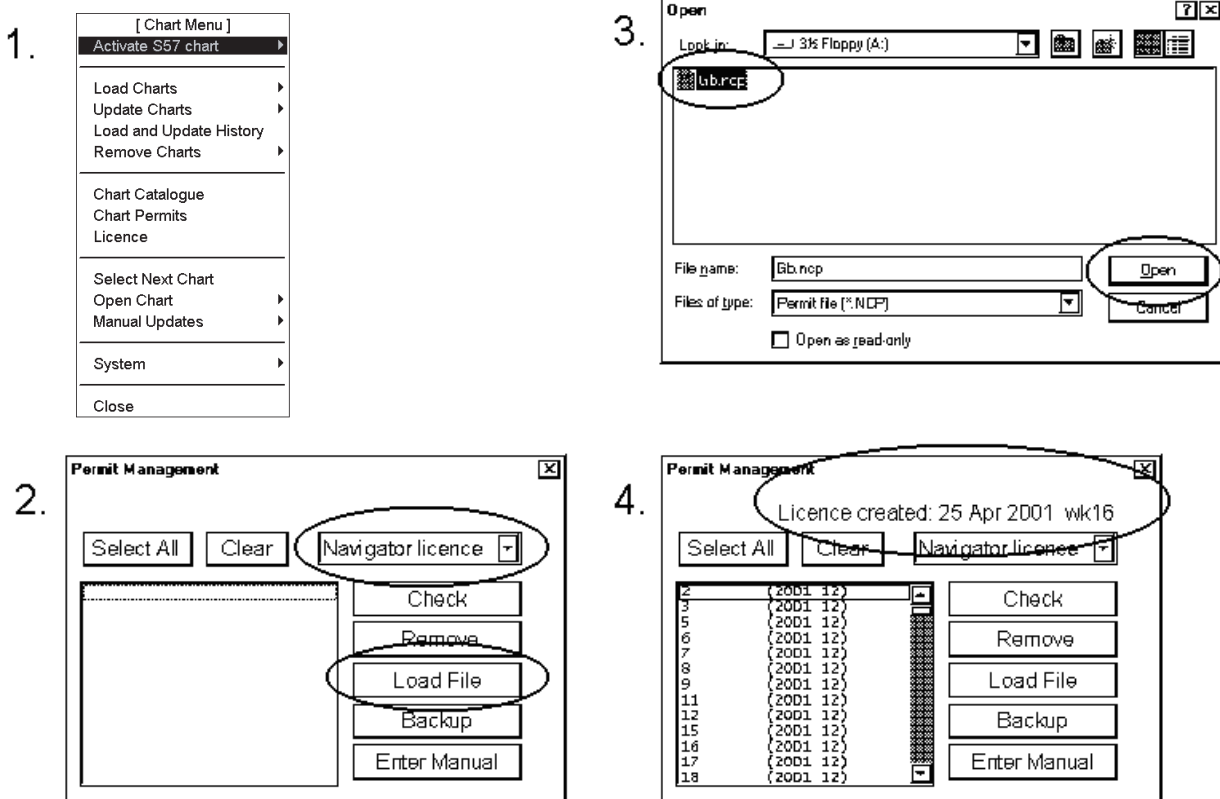
1. Load permit from the floppy disk by using Chart Permits in the Chart menu. For further details, see 9.4.5 Loading chart permits for ARCS Navigator license".
2. Load chart from ARCS CD ROMs. For how to load chart, see section 9.4.8 Loading a new ARCS chart into the system.
3. Load update from a Weekly CD ROM. For how to update chart, see section 9.4.9 Updating ARCS chart.
4. Open desired chart from the Chart menu by using the Open Chart or Chart Catalogue command.

If new Update CD ROM arrives, continue from step 3.

If you order more charts, continue from step 1.

9.4.5 Loading chart permits for ARCS Navigator license

Permits are usually delivered in a floppy disk. You may load permits as follows:



1. Open the Chart menu then choose Chart Permits from the menu.
2. Choose Navigator license as the type of license. Insert a permit floppy disk in the floppy disk drive. Click the **Load File** button.
3. Choose Gb.ncp then click the **Open** button.
4. Check in the Permit Management window that permits are displayed here with correct information. Close the window by pressing the **CANCEL** key on the Control Unit RCU-018 or clicking the X at the upper right side of the window.

Enter Manual button:

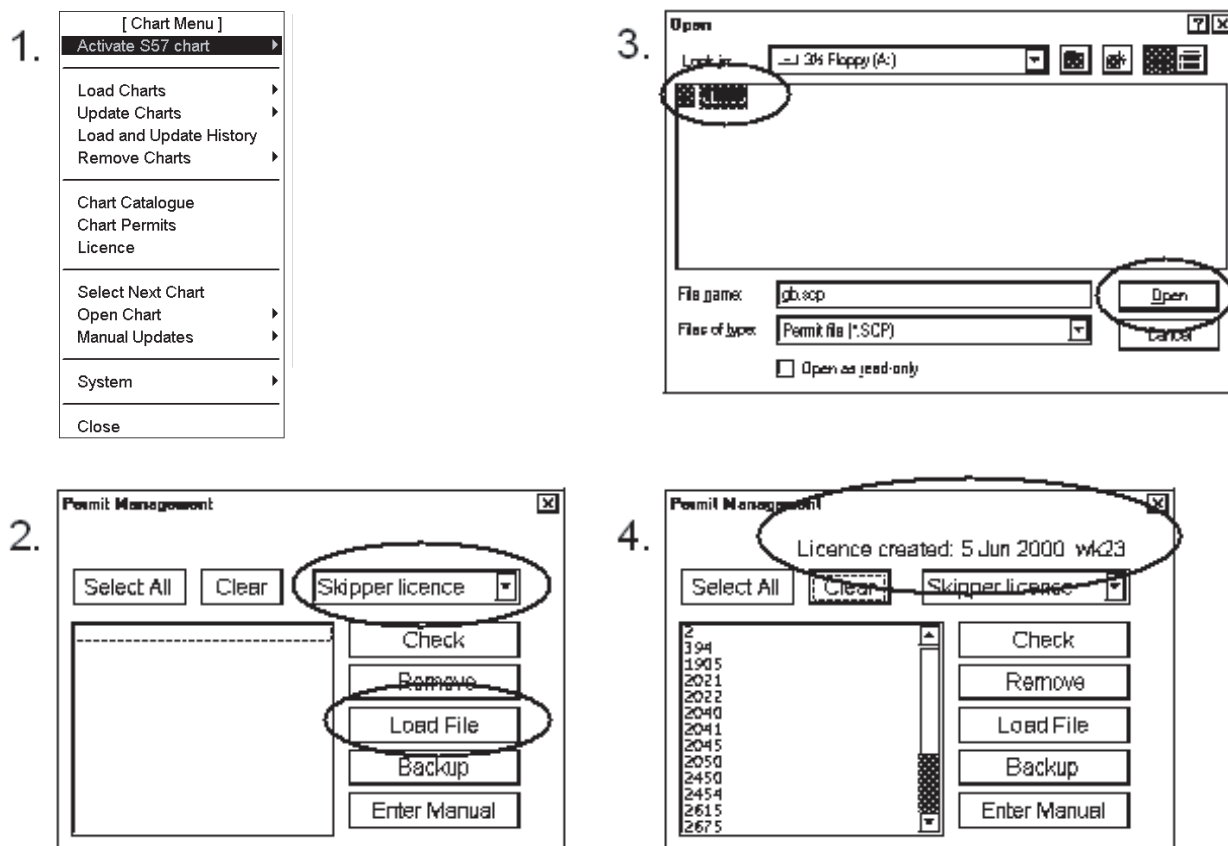
This function enables manual entry of a permit string that is delivered, for example, by telex. After typing the string, the operator can accept it by clicking the **Add** button or reject it by clicking the X at the upper right side of the window.

Backup button:

This button opens the "Save As" window, where the operator may make a backup copy from a chart permit file.

9.4.6 Loading chart permits for ARCS Skipper license

Permits are usually delivered in a floppy disk. To load chart permit into the system, do the following:



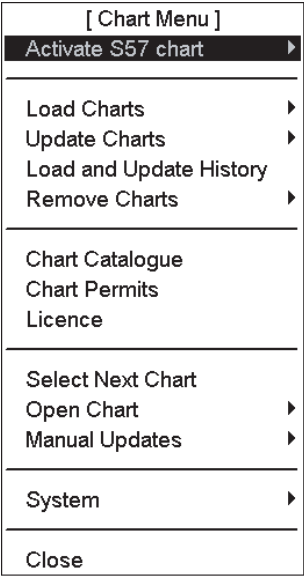
1. Open the Chart menu, then choose Chart Permits from the menu.
2. Choose Skipper license as the type of license. Insert a permit floppy disk in the floppy disk drive. Click the **Load File** button.
3. Choose Gb.scp then click the **Open** button.
4. Check in the Permit Management window that permits are displayed there with correct information. Close the window by pressing the **CANCEL** key on the Control Unit RCU-018 or clicking the X on the window.

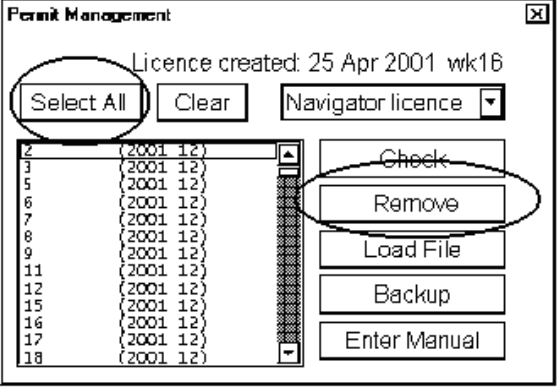
Note: If you are holding more than one ARCS Skipper packs onboard, only one pack can be loaded into the ECDIS at a time. If you load a new ARCS Skipper permit floppy disk into the ECDIS, you must load charts and weekly updates from CD ROMs delivered with and listed in your License Agreement (also known as "Schedule A").

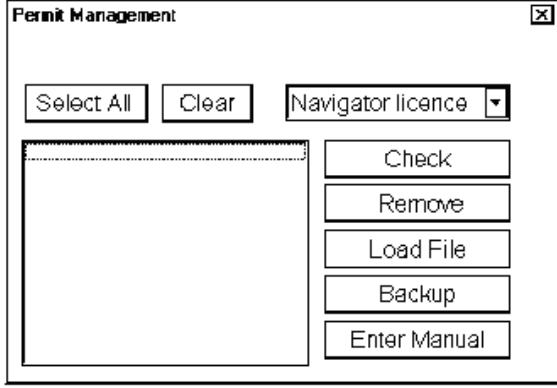
9.4.7 Removing chart permits

Normally you do not need to remove permits during normal operation. However, it may be necessary to remove chart permits from the system. Permits may be removed individually or collectively.

To remove chart permits, do the following:

1. 

The screenshot shows a menu titled "[Chart Menu]". The first item is "Activate S57 chart" with a right-pointing arrow. Below it are "Load Charts", "Update Charts", "Load and Update History", and "Remove Charts", each with a right-pointing arrow. A horizontal separator line follows. Below the line are "Chart Catalogue", "Chart Permits", and "Licence". Another horizontal separator line follows. Below the line are "Select Next Chart", "Open Chart" (with a right-pointing arrow), and "Manual Updates" (with a right-pointing arrow). A third horizontal separator line follows. Below the line are "System" (with a right-pointing arrow) and "Close".
2. 

The screenshot shows the "Permit Management" window. At the top, it says "Licence created: 25 Apr 2001 wk16". Below this are two buttons: "Select All" and "Clear". To the right of these buttons is a dropdown menu labeled "Navigator licence". Below the buttons is a list box containing 18 items, each consisting of a number in the first column and "(2001 12)" in the second column. To the right of the list box are five buttons: "Check", "Remove", "Load File", "Backup", and "Enter Manual". The "Select All" button and the "Remove" button are circled in the image.
3. 

The screenshot shows the "Permit Management" window. It has the same layout as the previous screenshot, but the list box is empty. The "Remove" button is circled in the image.

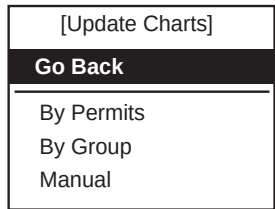
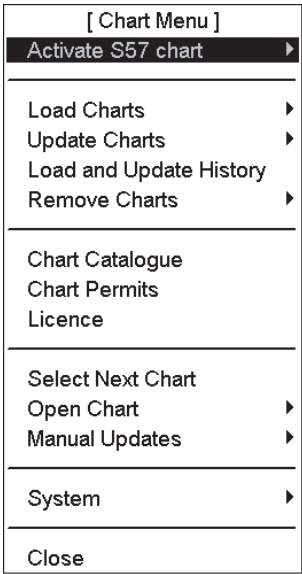
1. Open the Chart menu then choose Chart Permits from the menu.
2. **To remove all permits**, click the **Select All** button then click the **Remove** button.
To remove an individual permit, use the cursor to choose the permit then click the **Remove** button.
3. Check that chosen permits have been removed. Close the window by clicking the X on the window.

9.4.8 Loading a new ARCS chart into the system

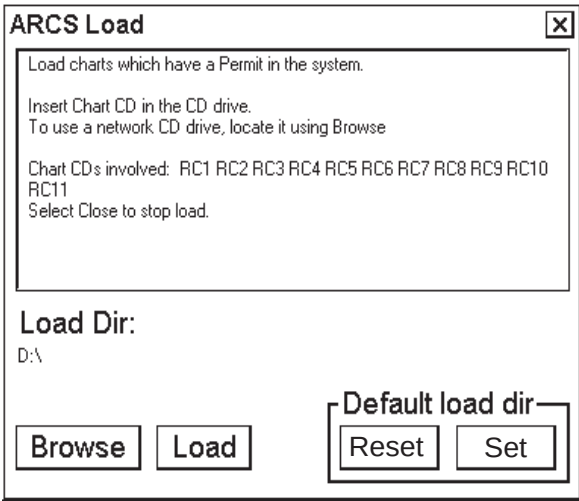
You may load a new ARCS chart into the system for which you have a permit, by the following methods.

- **Load by permit.** You can load all the charts that are covered in your license. The system will load them automatically.
- **Load by active group.** You can define a group of charts to be loaded into the system. It will be useful to define groups to make it easier to maintain your chart database.
- **Load manually.** You can manually load charts into the system.

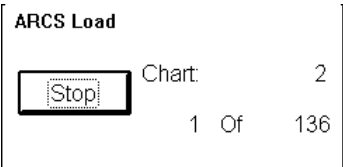
Loading ARCS charts by permits



1. Choose Load Charts from the Chart menu and By Permits from the sub menu.



2. Insert desired CD ROM into the CD ROM drive then click the **Load** button. The progress indicator shows the number of charts loaded and the number of charts to be loaded.

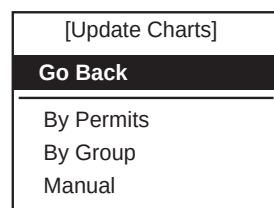
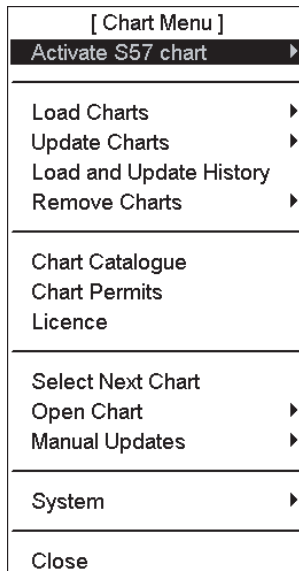


3. Repeat step 2 until you have loaded all the CD ROMs covered in your license. After you have loaded all CD ROMs, click the X on the ARCS Load window to close the window.

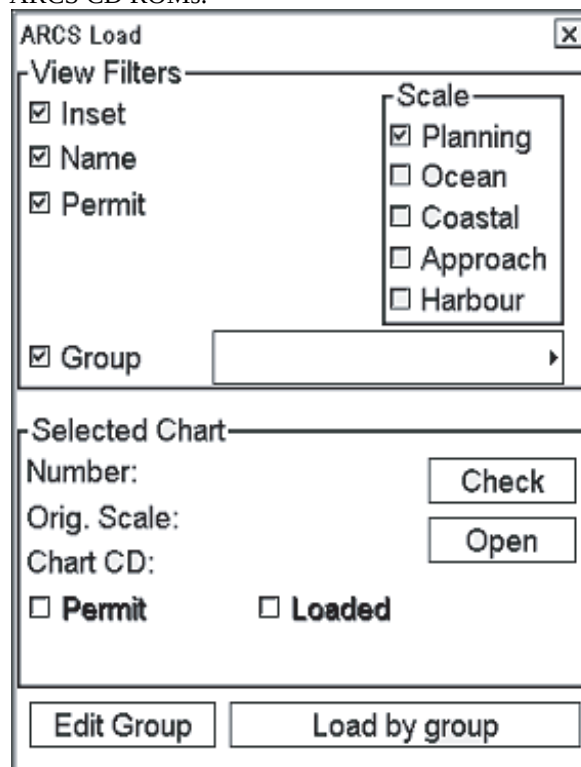
Loading ARCS charts by active group

"Loading by active group" is used when you want to load only ARCS charts that are in a group that you have defined. This is very useful if your license includes many charts from around the world and you are going to use only a part of those charts for which you have a permit. Simply define a group of charts you need for voyage then load them into the system. To load by active group, do the following:

1. Define a group, if one does not exist. For further details, see section 9.4.13 Grouping ARCS charts.
2. Set group as an active group. To set a group as an active group, see the section "Choosing active group" on page 9-29.



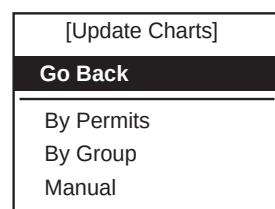
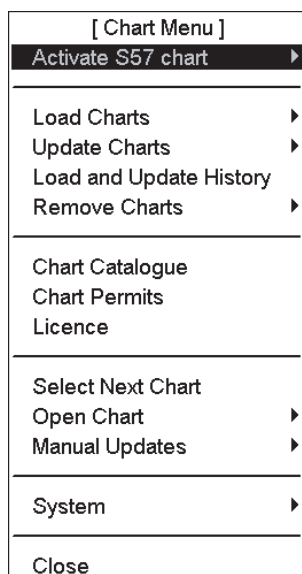
3. Choose Load Charts from the Chart menu and By Group from the sub menu.
4. An ARCS Load window appears that shows active group and desired ARCS CD ROMs.



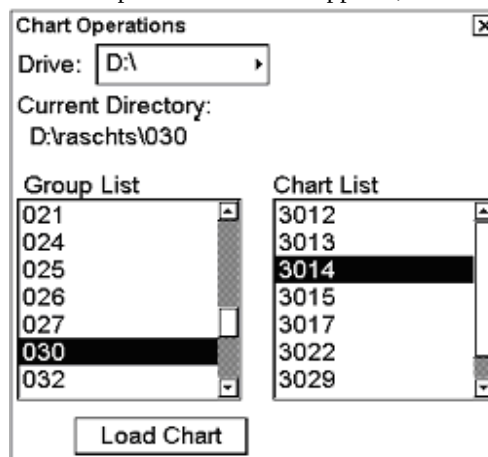
5. Insert desired CD ROM in the CD ROM drive then click the **Load** button.
6. Repeat step 5 until you have loaded all the CD ROMs pertaining to the active group. After you have loaded all CD ROMs, click the X on the ARCS Load window to close the window.

Loading ARCS charts manually

You can also load ARCS charts manually into the system as follows.

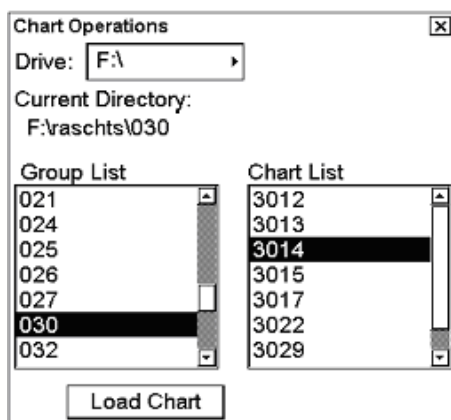


1. Insert desired ARCS CD ROM into the CD ROM drive.
2. Choose Load Charts from the Chart menu and Manual from the sub menu.
3. A Chart Operations window appears; choose desired chart from the list box.



To load a chart into the system, click the **Load Chart** button.

Note: To use another CD ROM drive connected in your network, choose desired drive from the Drive field.



D: Local CD ROM drive

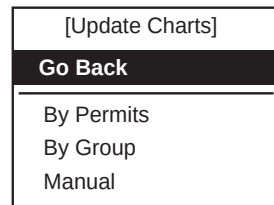
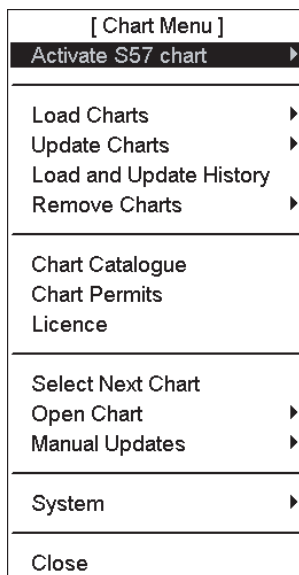
F: Other CD ROM drive (from other ECDIS, connected via LAN)

9.4.9 Updating ARCS charts

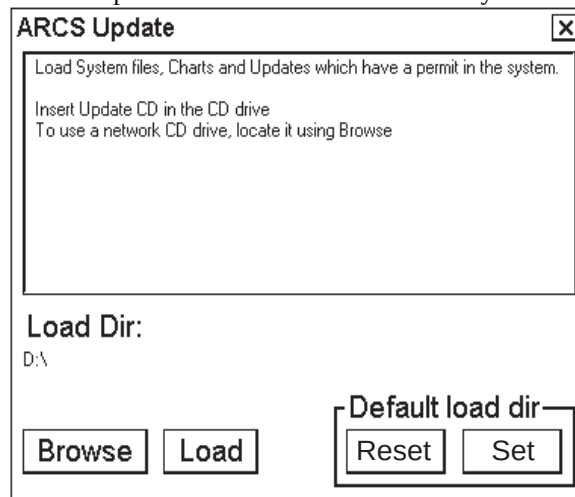
The updates are delivered separately in an Update CD ROM. To update ARCS format raster chart into the system, you can use one of following procedures:

- **Update by permit.** You can update all the charts that are applicable to your license. The system will update them automatically.
- **Update by active group.** You can define a group of charts to be updated. It is useful to define groups to make it easier to maintain your database.
- **Loading updates manual.** You can manually choose the charts that will be updated into the system.

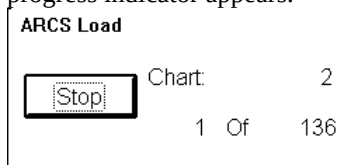
Loading updates by permits



1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Update Charts from the menu and By Permits from the sub menu.



3. Insert Update CD ROM to drive then click the **Load** button. A loading progress indicator appears.

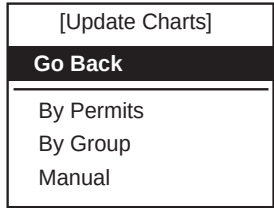
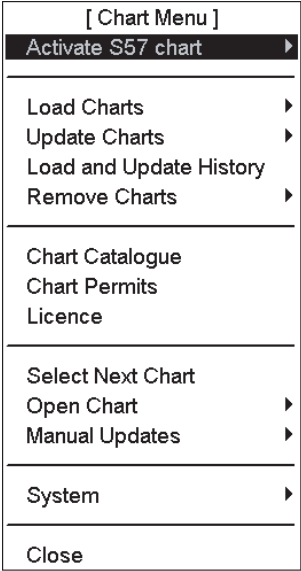


The system will automatically update charts for which you have a permit.

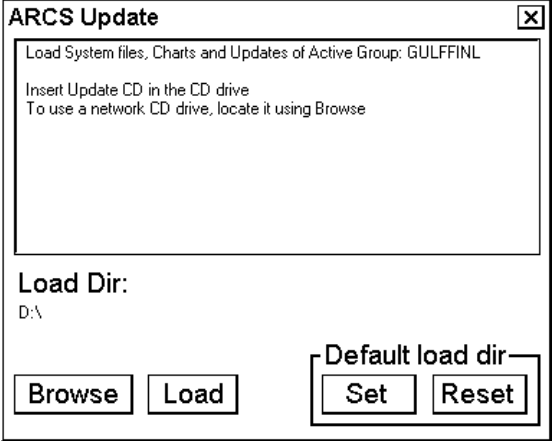
Loading updates by active group

Loading updates by active group is used when you want to update only ARCS charts that you have designed to include in a defined group. This is very useful if your license includes a lot of charts from around the world and you are going to use only a part of charts for which you have a permit. Define a group from charts you need for voyage and update them into the system. To update by active group, proceed as follows:

- 1. Define a group, if one does not exist. For more information, see section 9.4.13 "Grouping ARCS charts".
- 2. Set group as an Active group. To set group as Active group, see "Choosing active group" on page 9-30.



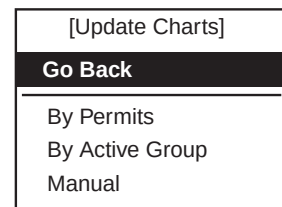
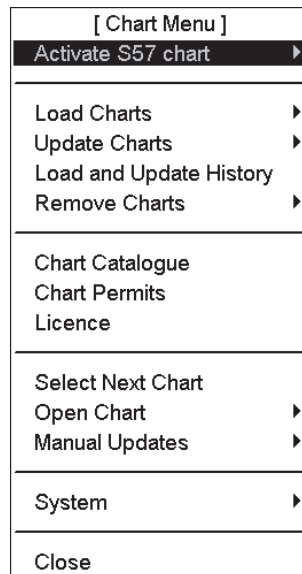
- 3. Open the Chart menu, choose Update Charts from the menu and By Group from the sub menu.
- 4. An ARCS Update window appears and it shows active group.



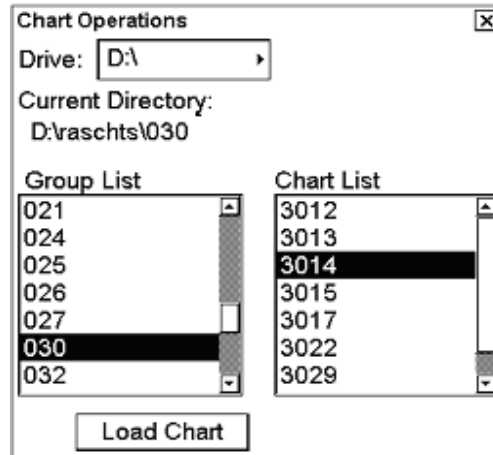
- 5. Insert Update CD ROM in the CD ROM drive then click the **Load** button.

Loading updates manually

You can also load updates for ARCS charts manually as follows:

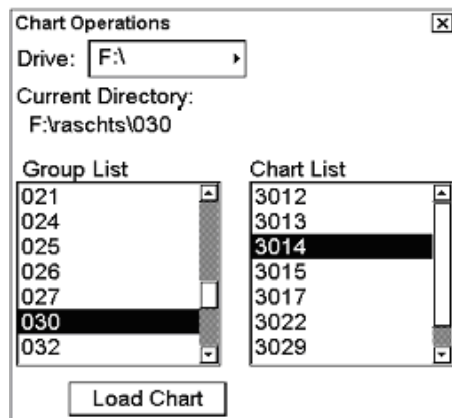


1. Insert Update ARCS CD ROM into CD ROM drive.
2. Open the Chart menu, choose Update Charts from the menu and Manual from the sub menu.
3. The Chart Operations window appears; choose desired chart from list box.



To load updates into the system, click the **Load Chart** button. To close this window, click the **OK** button.

Note: To use a different CD ROM drive connected in your network, use the Drive field to choose appropriate CD ROM drive.

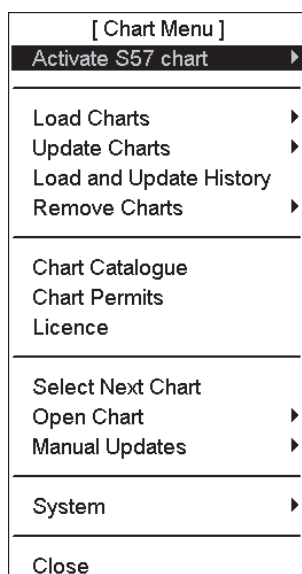


D: Local CD ROM drive

F: External CD ROM drive

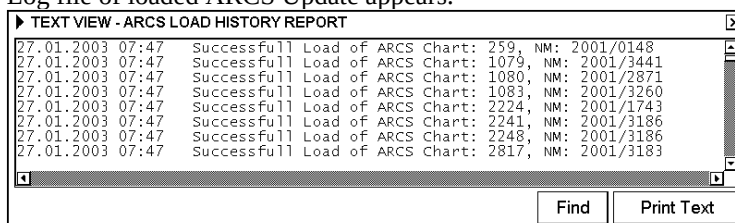
9.4.10 Viewing chart load and update history of ARCS

You may view a history of all chart load and updates (Notices to Mariners) of ARCS. This information is stored in the ECDIS.



1. Open the Chart menu and choose Load and Update History.

2. Log file of loaded ARCS Update appears.

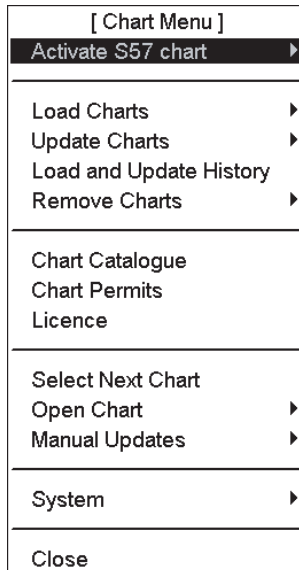


You can view all Notices to Mariners loaded to the ECDIS.

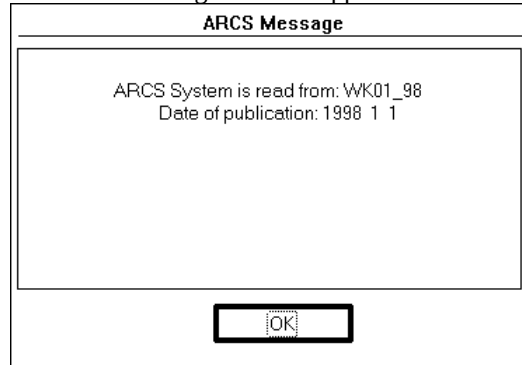
9.4.11 Viewing update status of your ARCS charts

You can easily check which is the latest Update CD ROM introduced to your system.

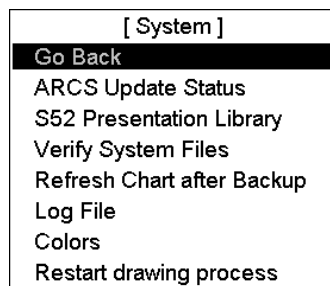
To view update status of ARCS charts, do the following:



1. Open the Chart menu, choose System from the menu, then choose ARCS Update Status from the submenu.
2. An ARCS Message window appears.

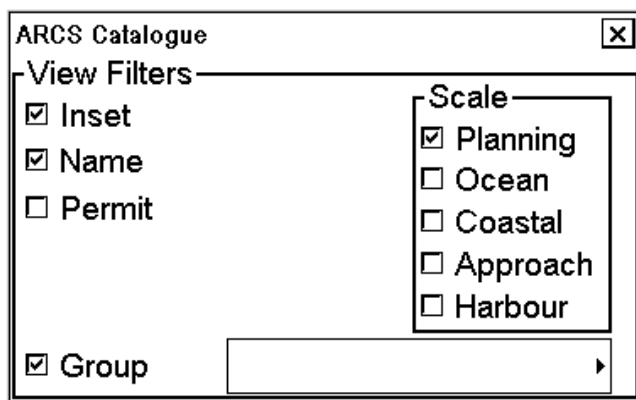


This dialog shows information about the Latest Update CD ROM loaded into the system.



9.4.12 ARCS catalogue

The Chart Catalogue command in the Chart menu helps you manage ARCS charts. When you choose this command, the ARCS Catalogue window opens in the electronic chart area and the ARCS Catalogue dialog box appears in the information area.



View filters window:

You may filter ARCS chart limits with "Scale" in the ARCS Catalogue dialog box. There are different categories for the ARCS charts depending on their scale. The categories are:

- Planning
- Ocean
- Coastal
- Approach
- Harbour

"Inset" displays insets contained in charts. "Name" displays ID number of charts. "Permit" displays limits only for charts that the system has a permit to use.

"Group" displays limits for operator defined group charts.

The ARCS catalogue displays chart limits in different colors. Each ARCS Weekly Update CD ROM contains information for each chart available in UKHO with up-to-date information at the date of issue. When loading updates using by permits or by active group, this information is loaded into the ECDIS. This information is used to display limits of charts on the ARCS catalogue. The chart limit boxes are color coded as follows:

Color of chart limit	Meaning
Green	The chart is available for use and it is also up-to-date.
Orange	The chart has a valid permit and it is loaded on the hard disk, but it is not up-to-date. Update chart using the same weekly updates as displayed in the ARCS Catalogue information.
Red	Neither permit nor chart has been loaded onto the hard disk. Load permit, chart and updates.
Blue	The chart is not seen on the ECDIS. Possible reasons are: • Chart permit is for different edition of the chart. This may occur when a new edition of a chart has been issued, but either only new permit or only new chart has been loaded onto the hard disk. • Chart permit has expired. Contact your chart agent to renew permit for the chart. • Content of the chart is corrupted. Load the chart and updates.
Magenta	A permit for the chart has been loaded, but the chart is not loaded on the hard disk. Chart cannot be seen on the ECDIS unless the chart is loaded into the ECDIS.

You can choose a chart by clicking the limit of the chart in the ARCS Catalogue dialog box. The information about the chosen chart is displayed in the Selected Char field.

9. Raster Chart Material

After you have clicked the limit of chart you get information of the chart in Selected Chart window as follows:

- **Number:** Chart number as stated on the corresponding paper chart.
- **Orig. Scale:** Scale of original paper chart.
- **Chart CD ROM:** The number of the CD ROM in which chosen chart is stored.
- **Permit:** If chosen there is permit in the ECDIS.
- **Loaded:** If chosen chart is loaded into the ECDIS.
- Chart usability and Update Status

Selected Chart	
Number: 2248	Check
Orig. Scale: 200 000	Open
Chart CD: RC3	
☒ Permit	☒ Loaded
Orange - Update missing	

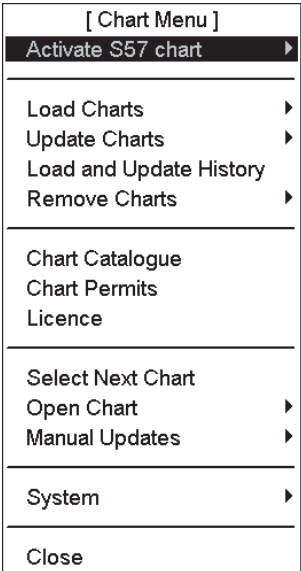
The Selected Chart window also contains several buttons for handling charts. The **Check** button checks if the edition and updates of the chosen chart are valid. The **Open** button opens chosen chart, if it has been loaded and the system has a permit for chosen chart.

The **Edit Group** button is used to define a group of charts. For further details, see section 9.4.13 Grouping ARCS charts..

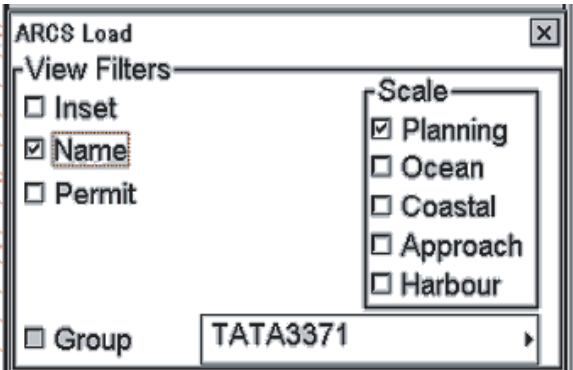
9.4.13 Grouping ARCS charts

Creating an ARCS chart group

To create a ARCS chart group, do the following:



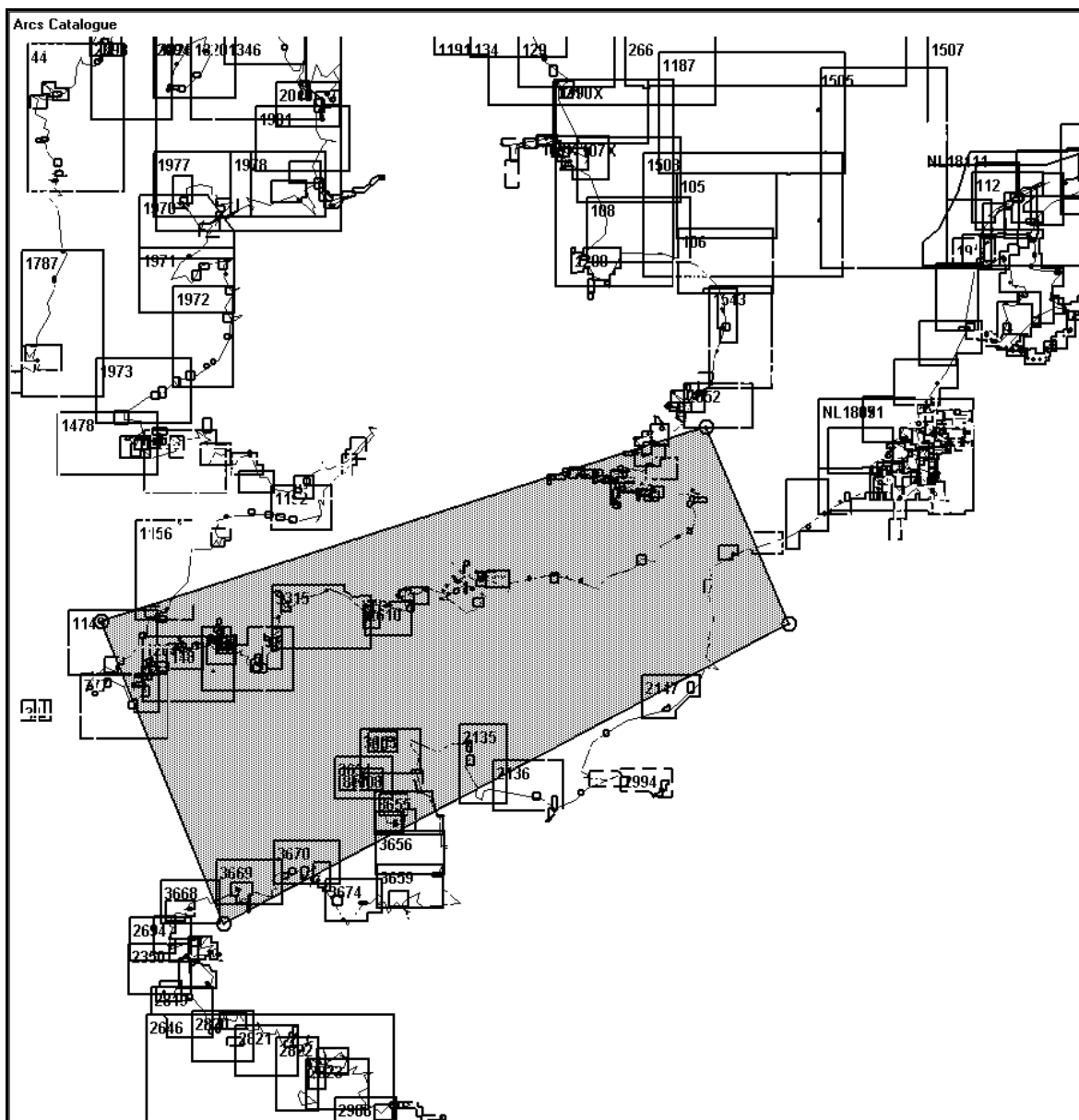
1. Open the Chart menu.
2. Choose Chart Catalogue from the menu to show the ARCS Catalogue dialog box.
3. Click the **Groups** button to show the Group dialog box. See the figure below.
4. Click the **New** button, use the scrollwheel to create a name for the new group, then click the **OK** button.



Entered group name (in the example above it is ENG-CHA) appears in the Edit Group field. Now you can define chart cells to include in this group, following the procedure on the next page.

Adding ARCS charts to a group

After you have entered a name for the group, click the **Add Frame** button in the Group field. Choose the area to group by moving the cursor to the desired location and clicking the left mouse button. Below is a sample group.



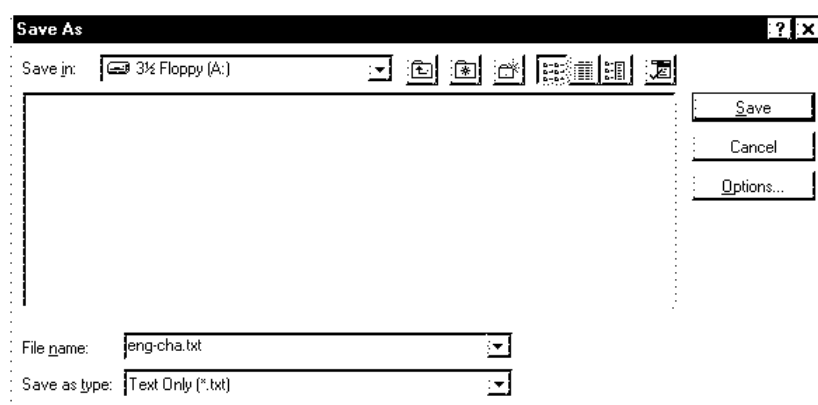
Charts that are inside the frame or intersect a frame limit are added to the group. When your frame is ready, click the **Done** button in the Group field. Chart cells that are chosen into defined group are displayed in the Inside list box in the Group window.

You can also add charts to your group by using the << (add) button. To add a chart, choose the chart ID from the Outside list box then click the << button.

Note: Check the Permit box to have the system display only the chart cells for which you have permits.

After you have selected some charts to group, click the **Save** button to save the chosen charts as a group.

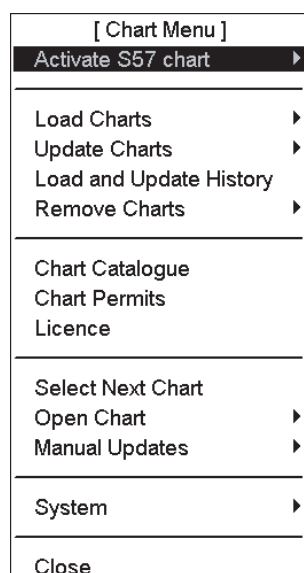
You can also save your chart cells as a text file, if you want to have a list of chart cells in text format. To do this, click the **Save As Text...** button. The Save As window appears as below.



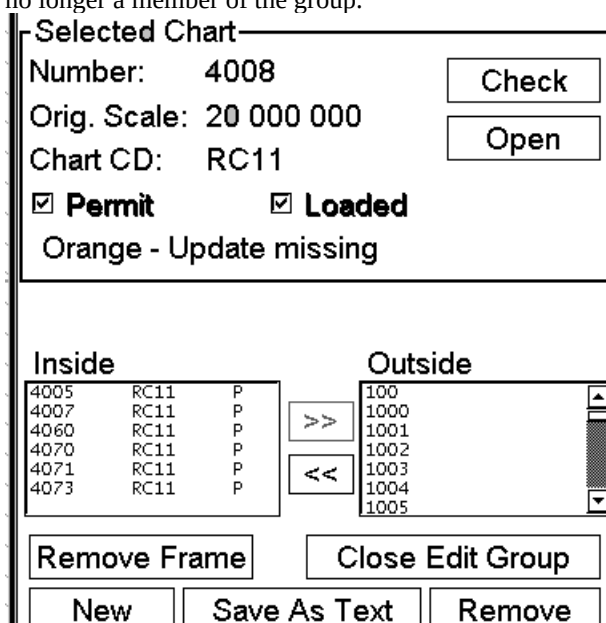
Choose directory and drive where you want save your text file. You can use the Windows NotePad application to view and print a list of charts in a group.

Removing ARCS charts from a group

You can remove charts from a group as follows:



1. Open the Chart menu. Choose Chart Catalogue from the menu.
2. Click the **Groups** button in the Group window to show the Group window.
3. Choose desired group from the Edit Group list box.
4. Choose desired chart(s) from the Inside list box, by pointing the cursor and clicking the left mouse button.
5. Click the >> button. Chosen chart is removed to the Outside list box and it is no longer a member of the group.



Choosing active group

You can make a group an active group as follows:

- 1. Open the Chart menu. Choose Chart Catalogue from the menu.
- 2. Click Groups in the View Filters window.
- 3. Choose desired group from the Edit Group list box.

Removing a group

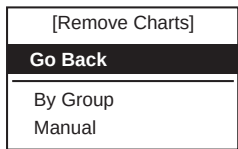
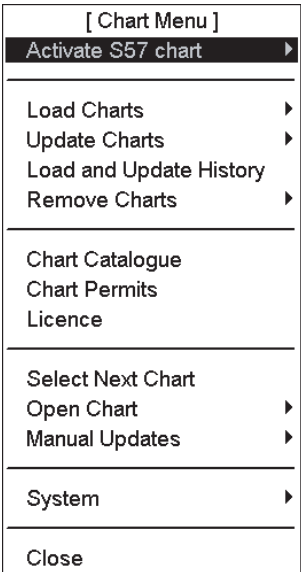
You can remove a group from the hard disk as follows:

- 1. Open the Chart menu. Choose Chart Catalogue from the menu.
- 2. Choose desired group from the Edit Group list box.
- 3. Click the **Edit Group** button followed by clicking the **Remove** button. Click the **OK** button to confirm.

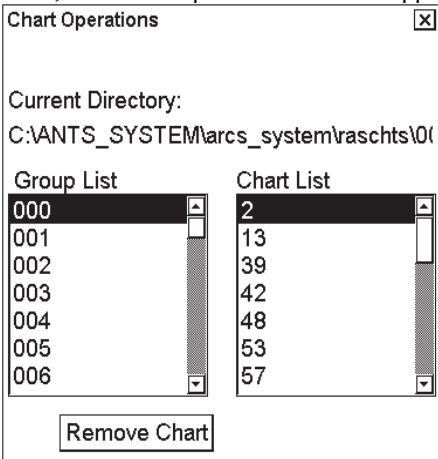
9.4.14 Removing ARCS charts from the system

You can remove ARCS charts from the system, manually or by active group.

Manually removing an ARCS chart

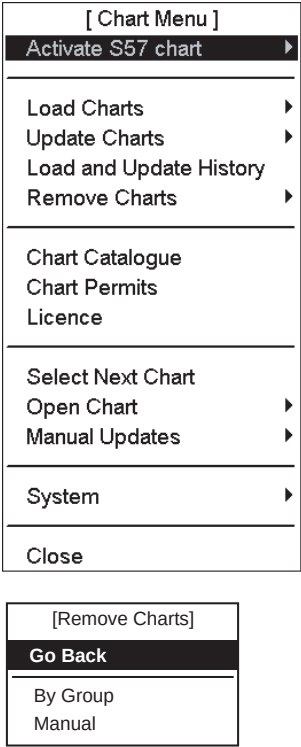


- 1. Open the Chart menu.
- 2. Choose Remove Charts from the menu and Manual from the sub menu. Then, the Chart Operations window appears.

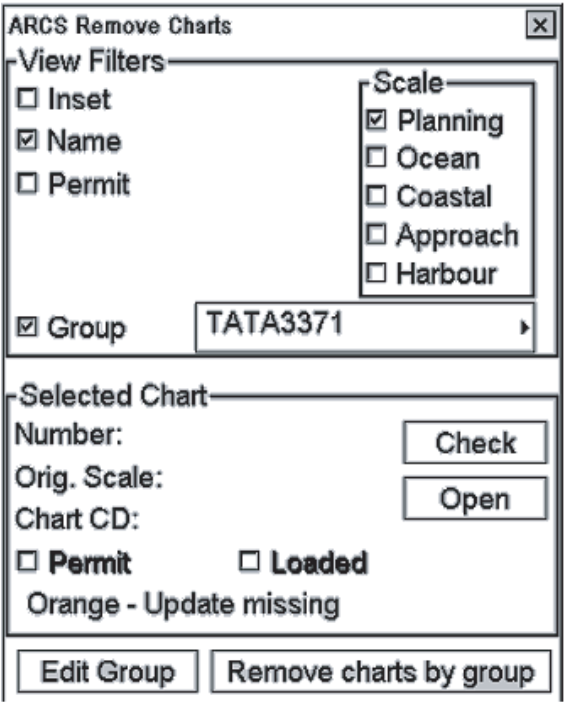


- 3. Choose desired charts to remove them from the system.
- 4. Click the **Remove Chart** button to remove chosen charts from the hard disk.

Removing ARCS chart group by "group"



- 1. Open the Chart menu.
- 2. Choose Remove Charts from the menu and By Group from the sub menu to show the ARCS Remove window.



- 3. Choose group from Group List then choose the chart you want to remove.
- 4. Click the **Remove charts by group** button. The system removes the ARCS charts from the hard disk that pertain to the active group.
- 5. Click the **OK** button.

9.5 ARCS Chart Display

9.5.1 Displaying ARCS chart material

To display ARCS format raster chart material on the display, do the following:

1. Place the cursor just above the area where the ECDIS shows chart scale.
2. Spin the scrollwheel to show "Activate ARCS Chart" in the mouse functions area, then push the left mouse button to show ARCS charts on the display.

9.5.2 Choosing ARCS chart datum

Datum is used to choose between different models of the earth. It is essential that you use datum in a consistent way.

If you use paper charts together with electronic charts, it is recommended that you use the same datum as your current paper chart to avoid misalignment between your electronic system and points taken or plotted on your current paper chart.

Once you have chosen a datum, all numerical latitude and longitude position values are presented in your chosen datum.

Note: If you use ARCS raster chart material, the rasterized charts contain some rasterized position information. These positions, like scales in the edges of ARCS charts, are true only if you have chosen native datum of that ARCS chart. Normally this is the natural situation, because you use ARCS together with corresponding official paper chart and because you have chosen the datum that is equal to the official paper chart.

To find out native datum of ARCS chart, do the following:

1. Click the sidebar area in the information area, spin the scrollwheel to show Menu/ /Select Sidebar in the mouse functions area, push the right mouse button, choose Chart Legend from the menu then push the scrollwheel.
2. Click the **Details...** button in the Chart Legend window to show ARCS Details.

ARCS chart	
Chart Number :	2224
Country Of Origin:	United Kingdom
Latest NM:	1743/2001
Edition Date:	1998 12 10
Publication Date:	2001 5 3
WGS shift status:	Defined
Depth:	Metres
Height:	Metres
T&P Notices.. Details...	
Warnings...	

ARCS Details	
The Sound	
Projection...	Mercator
Orig. Scale:	150 000
Hor Datum:	World Geodetic System 1984
Depth Unit:	Metres
Depth Datum:	Approx Mean Sea Level
Height Unit:	Metres
Height Datum:	Mean Sea Level
Panels:	The Sound
Locate	☒ Preference
Notes...	Vertical Datums
☐ Plot positions on SDD WGS84 Shift...	
Cursor Position	
Local Datum	55°36'292N 012°41'785E
WGS84 Chart	55°36'292N 012°41'785E

In the Hor Datum field the native datum of the displayed ARCS chart is shown.

3. Move the cursor over Datum on the upper right corner of the ECDIS and choose desired datum by spinning the scrollwheel and pushing it to confirm selection. Chosen datum is shown on the status bar (at the top of the screen).

```

30 s  RCDS Mode
60°08.199'N
024°54.267'E
WGS 84
DEADREC
  
```


9.5.3 Viewing different ARCS charts

Choosing a chart from ARCS catalogue

You may use the ARCS Catalogue to display an ARCS format chart.

1. Open the Chart menu.
2. Choose Chart Catalogue from the menu.
3. From the ARCS Catalogue dialog box, activate desired chart. For more information, see section 9.4.12 ARCS Catalogue.
4. Click the **Open** button.

Indication of availability of alternative charts such as S57 (ENC) or other suitable ARCS chart

The system has several indications to alert you to availability of charts. The indication is based on information available from position of your ship if automatic TM reset is active, or from current position of cursor if automatic TM reset is off.

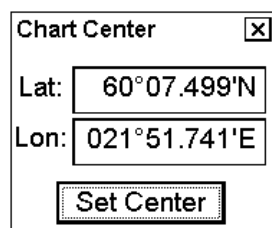
- **Larger RNC:** Larger ARCS scale is available.
- **Equal RNC:** Same scale ARCS scale is available.
- **Larger ENC:** Larger ENC compilation scale is available.
- **Eq ENC:** Same ENC compilation scale is available.
- **Smaller ENC:** Smaller ENC compilation scale is available.

Note: When using ARCS, the system also recognises if ENCs are available over the specified area and indicates it with the texts shown above. This is important because under the current IMO rules only ENC charts can fully replace the traditional paper charts.

Browsing your ARCS charts

You may view S57 charts using different positions and different scales. The basic tools for browsing charts are **Range -**, **Range +**, **Set Chart Center**, **ShipOffcenter** and **TM Reset**.

Set Chart Center allows you to look ahead from a place other than your ship's current position. Choose Set Chart Center from the Main menu to display the dialog box shown below. Use the scrollwheel to set the latitude and longitude position for chart center then click the **Set Center** button.



Note: The chart can also be centered (with less precise positioning) by placing the cursor at desired location, displaying Set Chart Center/Info/Activate Scroll in the dialog box and pushing the left mouse button.

To turn off automatic true motion reset, display and click TM Reset (in the guidance area). When true motion reset is off, the indication "Ship off screen" appears in the information area.

To restore your ship's position to the screen center, display TM Reset/Info/ShipOffcenter in the guidance area then push the right mouse button.

9. Raster Chart Material

Range - and **Range+** change the chart scale. If true motion reset is active, ZOOM IN and ZOOM OUT keep the relative position of your ship with respect to the display. If true motion reset is on, ZOOM IN and ZOOM OUT keep the relative position pointed by the cursor with respect to the display.

The system automatically chooses next larger or smaller scale. If a chart with larger compilation scale is available at your current viewing position, the message "Larger Scale Data Exists" appears.

If the indication "Equal RNC" appears, this means that you have a chart with the same scale and overlapping with the displayed ARCS chart. When you reach an edge of a chart and the indication "Equal RNC" appears, this means you can switch to another chart with the same scale to the display by displaying Edit Insert/Info/Select Next in the mouse functions area and pushing the right mouse button. An overlapping chart with the same scale will be opened.

Searching for an ARCS chart around your ship

You can use either true motion or relative motion. In the true motion mode, your ship moves until it reaches the true motion reset borderline, where it jumps back to an opposite position on the screen based on ship's course. In the relative motion mode, your ship stays in a fixed position, while the chart moves on screen.

If, in the true motion mode, you reset own position with TM Reset, your ship will immediately jump to the true motion reset position.

If, in the true motion mode, you use ShipOffcenter, your ship will go to that position on screen and continue true motion movement from that position. When it reaches the true motion reset borderline, it will automatically jump to the true motion reset position.

If, in the relative motion mode, you reset own position with TM Reset, your ship will immediately jump to the true motion reset position and use that position as fixed position to stay on screen.

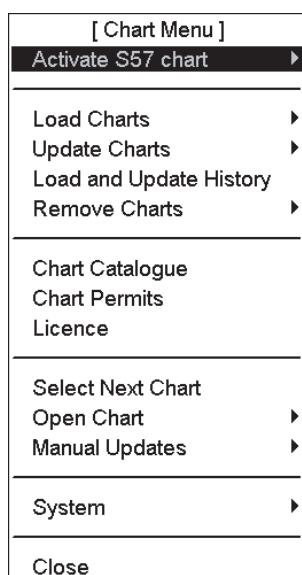
If you use relative motion, you can choose a new fixed position for your ship by using ShipOffcenter.

Use **Range -** and **Range+** to choose desired chart scale.

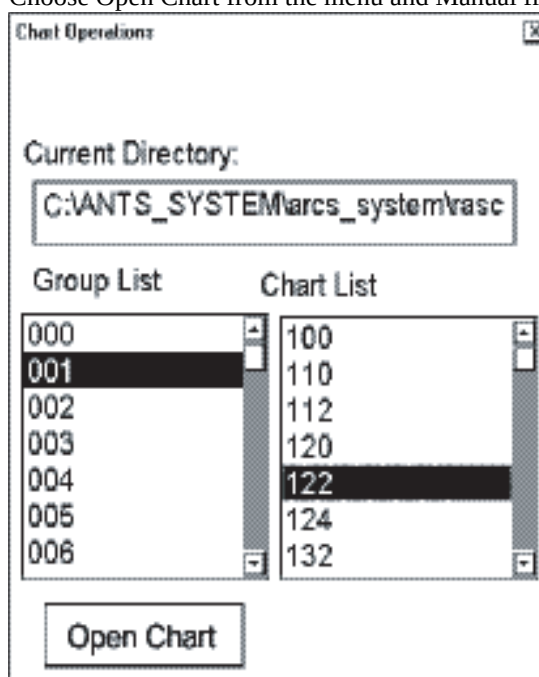
9.5.4 Choosing an ARCS chart by its number on display

Opening an ARCS chart manually

To choose a specific ARCS format raster chart onto the display use **Open** menu command. Do the following:



1. Open the Chart menu.
2. Check if the text Activate S57 chart appears on the first line of the menu. If it is displayed, then go to step 4.
3. If the text Activate ARCS Chart is shown, push the scrollwheel.
4. Choose Open Chart from the menu and Manual from sub menu.

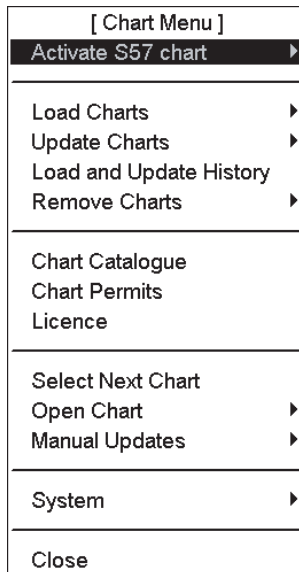


5. Choose desired chart from the chart list dialog then click the **Open Chart** button.

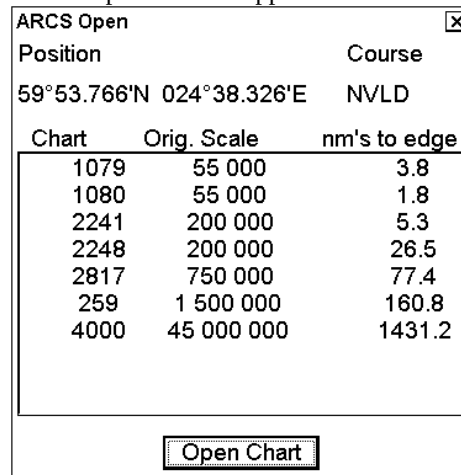
The chosen chart is automatically displayed in the electronic chart area.

Opening an ARCS chart by position

To open an ARCS chart by position of your ship or by chart center, if your display is in TM RESET OFF status, use the item "Open by position". Then you get a list of charts that cover current position. To open chart by position, do the following:



1. Open the Chart menu.
2. Check if the text Activate S57 chart appears on the first line of the menu. If it is displayed, then go to step 4.
3. If the text Activate ARCS chart is shown, push the scrollwheel.
4. Choose Open Chart from the menu and By Position from sub menu. The ARCS Open window appears.



5. Choose desired chart from the list box then click the **Open Chart** button.

9.5.5 Controlling visible ARCS chart features

The Display dialog box contains several pages to control visible chart features.

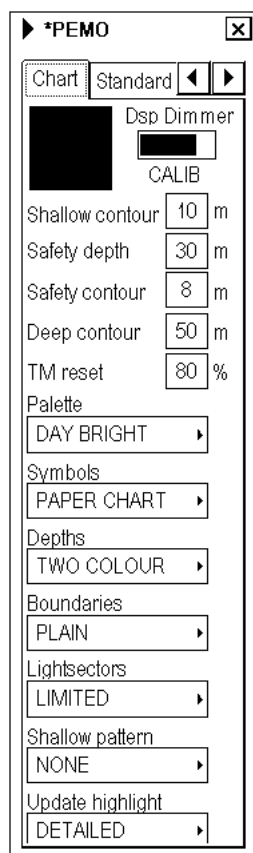


Chart page

Black and grey color symbol:



This symbol is used to verify that you can distinguish black (frame of symbol) and grey (inner part of symbol) colors with current contrast and brilliance settings.

Dsp Dimmer:

Use this control to adjust dimming of the display. The text "CALIB" indicates that dimming of display is set within calibration values. Monitor brilliance is restored to calibrated state by doing the following:

- 1) Place the cursor on the calibration bar and spin the scrollwheel to show "CALIB".
- 2) Select "Set Std Display" from the menu.
- 3) Press and hold down any one of the F1-F4 keys more than two seconds on the Control Unit RCU-015.

Shallow contour:

Set value of shallow water contour.

Safety depth:

Set value of safety depth. Spot soundings below the safety depth are highlighted.

Safety contour:

Set value of safety contour. Visible safety contour is equal to set value or if the contour of set value is not available then the visible safety contour is next deeper contour than safety contour.

Note: The system uses safety contour also for chart alarms.

Deep contour:

Set deep-water contour.

TM reset:

In the true motion mode, your ship moves until it reaches the true motion reset borderline, then it jumps back to an opposite position on screen based on its course. Set the limit for TM reset (in percentage).

Note: ARCS charts are "photocopies" of original paper charts. One cannot change images of these photocopies. Selections of shallow contour, safety depth, safety contour, deep contour, symbols, depths, boundaries, light sectors, shallow pattern and Update highlight in Chart page control only visibility of add-on layer(s) on top of the ARCS chart image (manual updates are such an add-on layer). For more information about manual updates, see Chapter 10 Manual Updates.

Palette:

Choose appropriate palette for the display depending on the brightness of the bridge.

9. Raster Chart Material

Symbols:

Choose how to display chart symbols. The options are:

SIMPLIFIED: The shape of symbols is of modern design and the sea mark symbols are filled in a color

PAPER CHART: The shape of symbols imitates traditional symbols used in paper charts.

Depth:

Set how to display different depth zones on the chart display.

For **MULTICOLOUR**, the chart display uses four different colors for contours:

- Deeper than operator-chosen deep contour
- Between deep contour and operator-chosen safety contour
- Between safety contour and operator-chosen shallow water contour
- Between shallow water contour and coastline.

For **TWO COLOUR**, the chart display uses only two colors:

- Deeper than safety contour
- Shallower than safety contour

Boundaries:

Set how to display boundaries of some chart features. The options are:

- **PLAIN:** The line styles are limited to plain solid and dashed lines.
- **SYMBOLIZED:** Some of the line styles use symbols to highlight the purpose of a line.

Light sector:

Set how to display light sectors. The options are:

- **LIMITED:** The length of a light sector is fixed at 25 mm independently of the displayed scale.
- **FULL:** The length of a light sector represent its nominal range as defined by the chart producer.

Shallow pattern:

Set how to display shallow water area. The options are:

- **NONE**
- **DIAMOND:** Provided to distinguish shallow water at night.

Update Highlight:

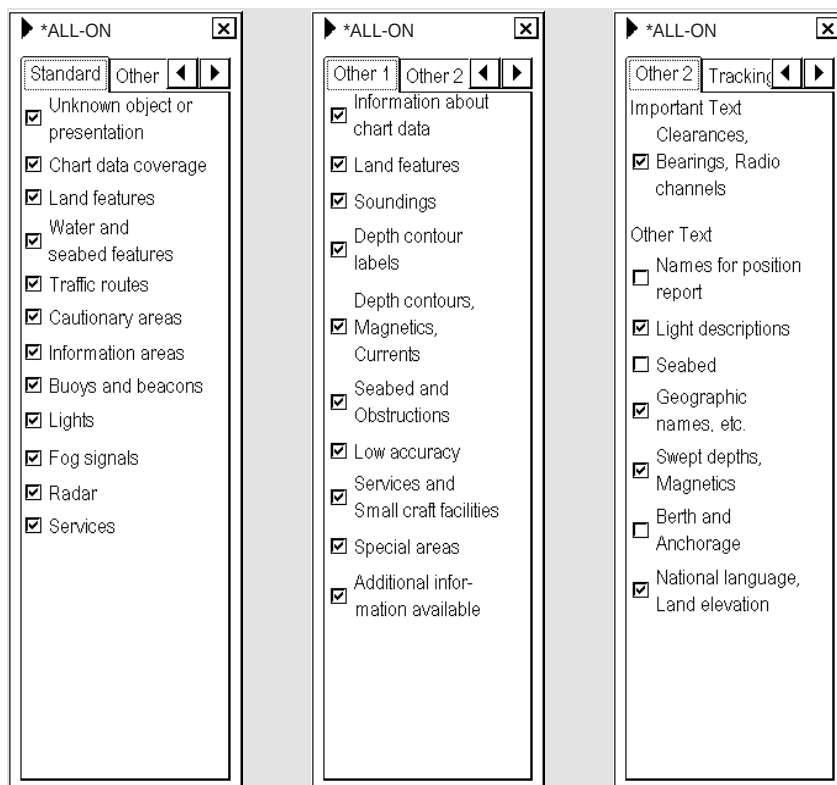
Set how the updates are highlighted on the screen before you approve them. The options are

- **DETAILED:** The system tries to highlight updates so that only those objects that have visible changes are highlighted. Use this option to see the practical change of an update.
- **ALL EFFECTS:** The system highlights updates so that all the objects pertaining to updates are highlighted although some of them have not been changed.

"Standard, Other 1 and Other 2" pages

The Standard page contains chart features defined by IMO that comprise a standard display. You can recall the standard display at any time using a single action, by pressing the **STD DSP** key on the Control Unit RCU-018 or displaying Chart Display/Info/Standard Display in the mouse function area and pushing the right mouse button.

The Other 1 and Other 2 pages contain chart features for which you can control visibility and that are not part of IMO-defined standard display.



Note 1: To use the Info request feature, which provides information for cursor-chosen chart feature, the associated chart feature must be turned on from the Standard page.

Note 2: To navigate between the menus in the Chart Display dialog box, click the appropriate arrow tab with the left mouse button.

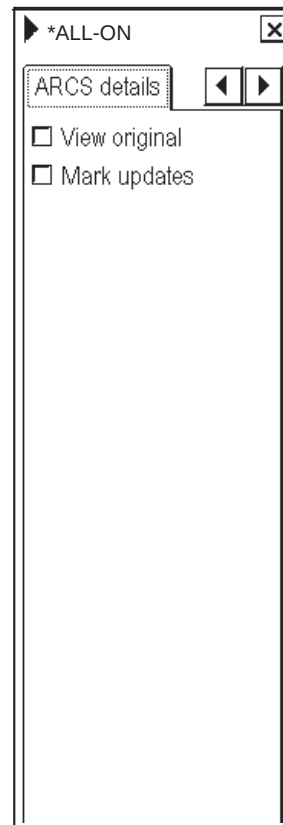
9.5.6 Display base

A subset of chart features is called the Display Base. As required by IMO, these features cannot be made invisible. The Display Base consists of the following chart features:

- Coastline (high water)
- Own ship's safety contour, which is chosen by the operator
- Indication of isolated underwater dangers of depths less than the safety contour that lie within the safe waters defined by the safety contour
- Indication of isolated dangers that lie within the safe water defined by the safety contour such as bridges, overhead wires, etc., and including buoys and beacons whether or not these are being used as aids to navigation
- Traffic routine systems
- Scale, range, orientation and display mode
- Units of depth and height

ARCS details page

The ARCS details page provides details about current ARCS chart. To open this box, spin the scrollwheel to show Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button. You can change pages by clicking the right mouse button (Choose Next), clicking the arrow tabs in the dialog box.

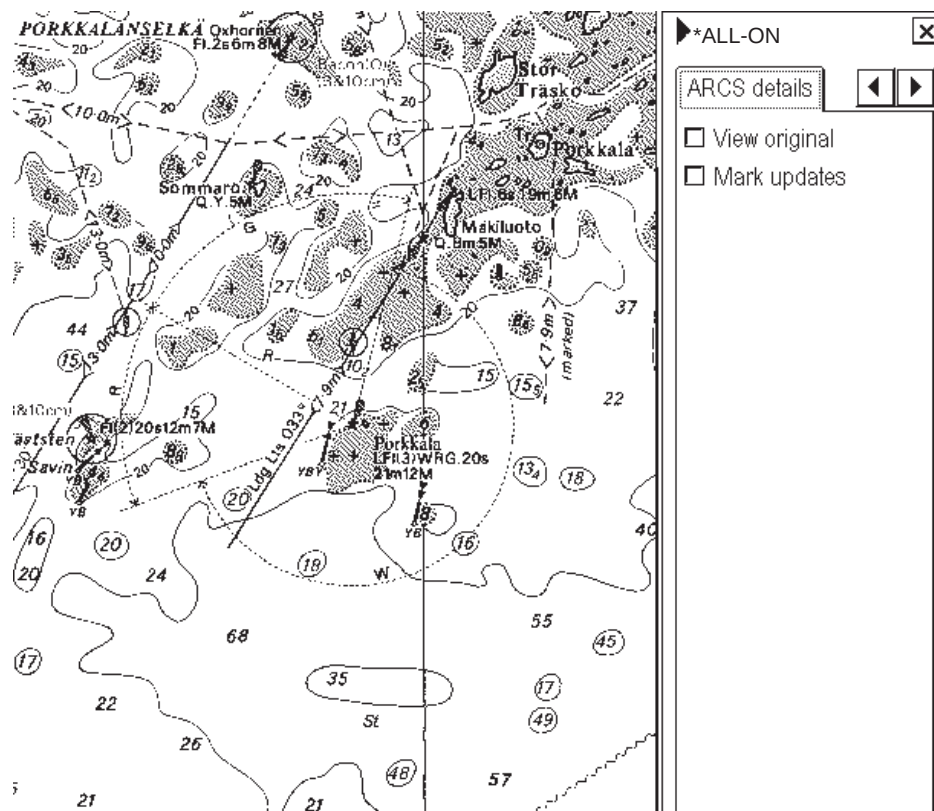


View original: Check to show current chart without displaying updated parts.

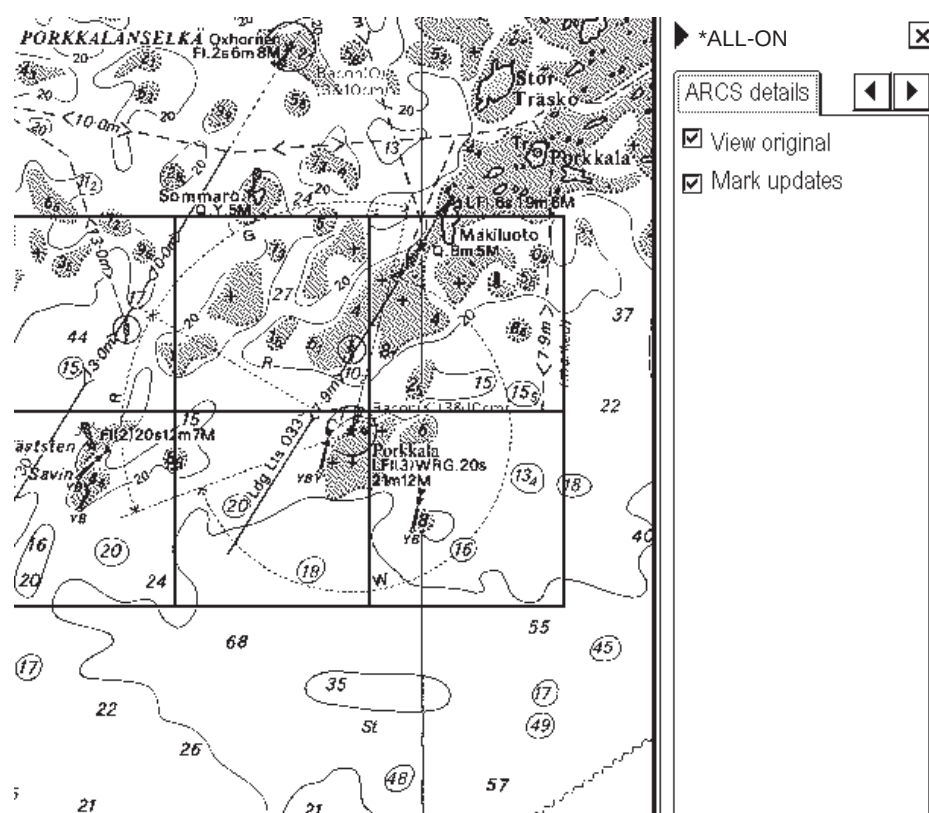
Mark updates: Check to show updated parts of chart with red rectangles.

The figures below show how to find places on the chart that have been updated.

The ARCS chart that is displayed for "normal" use.



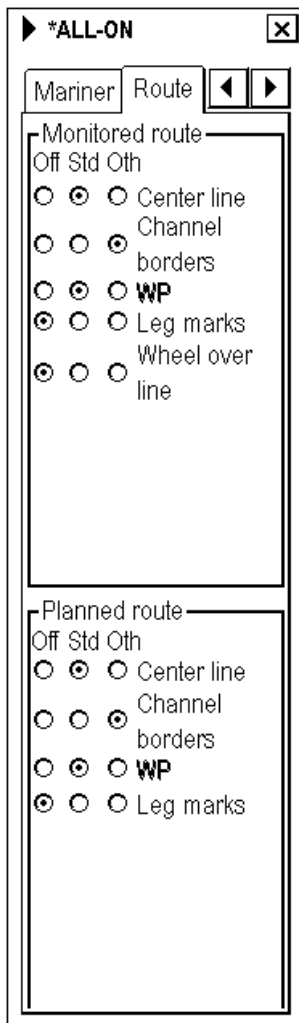
The ARCS chart that is displayed as original edition and places that show updates are marked with a red rectangle.



9.5.7 Controlling visible navigation features

Visibility control of the navigation features is divided into four pages in the Chart Display dialog box. The "Route" page controls planned and monitored route. The "Tracking" page controls past tracks and some other features. The "Mariner" page controls pilot data, user charts and chart alarms. The "Targets" page controls ARPA and AIS targets.

The operator can define settings for chart details that are displayed over the chart area. This means that the operator can choose different layers to be **Off**, **Std** or **Other**. **Off** turns off the feature chosen. **Std** turns on the navigation feature chosen when the standard display is made active by accessing the mouse function Standard Display. **Other** turns off the navigation features when the standard display is made active as mentioned above.



Route page

This page contains selection of route related navigation features

monitored route: Choose which part of monitored route to display.

Planned route: Choose which part of planned route to display.

Note: WP mark on both monitor and planned routes is permanently set to Std position.

▶ *ALL-ON [X]

Tracking Target ◀ ▶

Past tracks
Off Std Oth

☒ ☐ ☐ Ship Sys
☒ ☐ ☐ Ship Pri
☒ ☐ ☐ Ship Sec

Length min

Labels min

☒ ☐ ☐ Targets
 Use points

Interval min ▶

Events

☒ ☐ ☐ User Event
☒ ☐ ☐ Auto Event
☒ ☐ ☐ Positions

Show
Newer than 3 months ▶

Tracking page

Past tracks

- **Ship system:** Choose Std or Other to plot your ship's tracks using system-fed position.
- **Ship Primary:** Choose Std or Other to plot your ship's past track with position fed from the primary sensor.
- **Ship Secondary:** Choose Std or Other to plot your ship's past track with position fed from a secondary sensor.
- **Targets:** Choose Std or Other to plot ARPA target past tracks.

Events: These marks are based on voyage log records. For more information, see section 23.3.2 Voyage log.

- **User Event:** Choose Std or Other to display event symbols on ECDIS, where the system has recorded an event based on conditions you have set (Type: User and Auto).
- **Automatic Event:** Choose Std or Other to display automatically entered event symbols, where the system has recorded an event based on conditions you have set. (Type: Ship and Alarm)
- **Positions:** Choose Std or Other to display the latitude and longitude of an event.
Note 1: MOB event is always visible.
Note 2: You can choose period of time to display event marks in the Show list box.

Targets
Mariner
◀ ▶

ARPA Targets

Off Std Oth
☐ ☒ ☐ Symbol

AIS Targets

☐ ☒ ☐ Symbol

Max. ▶

Max. ▶ nm

Filter

Targets page

ARPA Targets:

- **Symbol:** Choose Std or Other to show ARPA target labels.

AIS Targets

- **Symbol:** Choose Std or Other to display AIS target symbols.
- **Max (count):** Set the maximum number of AIS targets to display.
- **Max. (range):** Set maximum range of AIS targets from your ship to display.
- **Filter:** Sort AIS targets by Range, CPA or TCPA. See section 21.2.4 Maximum number and range for displaying AIS targets on ECDIS.

*ALL-ON

Mariner Route

Pilot data
Off Std Oth

Position
Range
Text

User chart
Points
Lines
Symbols, Tids
Areas

50% Transparent

Only radar of Symbols, Lines, Areas

Chart Alarm
Highlight

Manual Updates
Std orange

Ship
True symbol scale limit
1:50000

Radar Overlay
In use

Mariner page

Pilot data:

- **Position:** Choose Std or Other to show positions of pilot data records with symbols on the chart.
- **Range:** Choose Std or Other to circumscribe pilot data records with circles on the display. The size of a circle depends on the value set in pilot data.
- **Text:** Choose Std or Other to show text of pilot data records on the chart.

User chart:

- **Points:** Choose Std or Other to show operator points on user charts.
- **Lines:** Choose Std or Other to show lines on user charts.
- **Symbols, Tids:** Choose Std or Other to show symbols and tids on user charts.
- **Areas:** Choose Std or Other to show areas on the display. Color fill for the areas can be chosen as transparent from 25 to 75% and as No color fill. If No color fill is chosen, only the boundaries of the areas are visible.
- **Only radar of Lines, Symbols, Areas:** If chosen as **Std** or **Other**, only those Lines, Symbols and Areas are displayed that have operator selection "on radar" activated for them in the user chart. This is used to view only that part of the user chart that will be sent to the ARPA radar connected to the system.

Chart Alarm: Choose Std or Other to show chart alarm warning areas in red highlight.

Manual Updates: Choose Std or Other to show manual updates with orange symbols.

Note: Visibility of manual updates made as true symbols are controlled through Standard and Other pages of the Chart Display menu.

Ship: Own ship symbol is displayed in true scale if the displayed chart scale is larger than the chosen limit scale and if the size of the true scale symbol is longer than 6 mm on the chart display.

Radar overlay: Choose Std or Other to display the radar video overlay on the display.

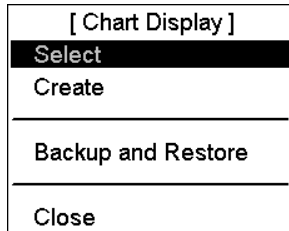
9.5.8 Storing and recalling chart display settings for visible chart and navigational features

You can define chart display settings for chart details that are displayed over S57 charts cells. You can save these chart display settings into your hard disk and later recall them on demand.

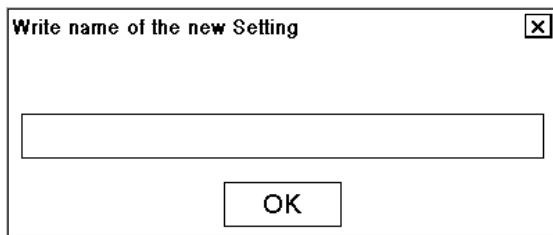
Creating new chart display settings

To create new settings for chart displays, do the following:

1. Display Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button.
2. Place the cursor on the triangle in the Chart Display dialog box to show the Chart Display menu.



3. Choose Create from the menu then push the scrollwheel.



4. Enter desired name for chart display settings and click the **OK** button in the window.

Choosing chart display settings

1. Open the Chart Display dialog box and put the cursor on the triangle.
2. Choose Select from the menu and push the scrollwheel.
3. Choose desired chart display settings from the list box.

Saving changes to chart display settings

1. Open the Chart Display dialog box and put the cursor on the triangle.
2. Choose Save from the menu to save current chart display settings.

10. Manual Updates

10.1 Introduction

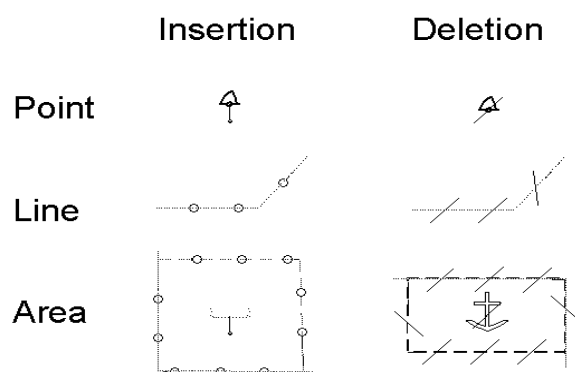
SOLAS requires that mariners keep their charts up-to-date for an intended voyage. Mariners receive chart corrections and other essential information for the area of their intended voyage as

- Notices to Mariners (by post, by email, by fax, etc.)
- Navtex warnings

Mariners should also keep the electronic charts in their ECDIS up-to-date. Regardless of the chart material used, mariner must know which of these chart corrections are applied into their ECDIS charts and which of them needs to be added as manual updates.

Manual update may include deleting an already existing object, modifying a position or other characteristics of an already existing object or inserting of a new object. In this ECDIS, manual updates are stored in a common database, which is used for both S57 and ARCS charts.

Mariners cannot permanently remove any of the official objects from the chart display. If a mariner needs to make obsolete any of the official objects he deletes them. Then, in practice, the deleted features are still visible, but they are displayed a certain way to indicate a deleted object.



However, a mariner can remove objects that he has inserted himself.

Note that the manual updates have no automatic connection to any automatic update received later for S57 or ARCS charts. If a manual update itself became obsolete, because the official chart has been updated to include the update defined as a manual update, the mariner must himself delete the obsolete manual update in question.

This ECDIS records complete usage of manual updates. All deletions, modifications and insertions are recorded and time stamped. If the mariner wishes to see what kind of manual updates he had in the past, for example, two weeks ago, he uses Update History to specify the relevant date range. For information on how to set Display and Approve dates, see section 8.12 Chart Viewing Dates and Seasonal Features of Vector Chart.

10.2 Symbols to Use with Manual Updates

Manual updates can be used for the following purposes:

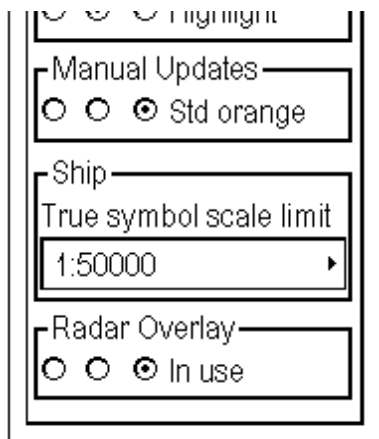
- Keep charts up-to-date using similar symbols as the real chart uses. We refer to these symbols as "True symbols".
- Keep charts up-to-date using conspicuous orange symbols reserved for this purpose. We refer to these symbols as "Orange symbols".
- Add additional mariner information using conspicuous orange symbols reserved for this purpose.

Orange symbols are recommended because then you, your mates and pilots can easily find these symbols. Another benefit of the orange symbols is that they are very easy to insert. However, orange symbols do not cover all possibilities. Experienced operators can use true symbols to create their own cartography.

10.3 Displaying Manual Updates

10.3.1 Controlling visibility of orange symbols from manual updates

Visibility of the orange symbols from manual updates is controlled on the Mariner pages of the Chart Display dialog box.



On the Mariner page the item Manual Updates is selected to "Std Orange".

For chart alarms calculation, the following orange symbols can be detected and highlighted during route planning and route monitoring. The associated alarm is "5100 Safety contour".

Category type:

- Symbol: **Mariner Danger Highlight**
- Symbol: **Mariner Foul Ground**
- Symbol: **Mariner Isolated Danger**
- Symbol: **Mariner Obstruction**
- Symbol: **Mariner Underwater Rock**
- Symbol: **Mariner Wreck**
- Line: **Mariner Danger Highlight Line**
- Area: **Mariner Danger Highlight Area**

10.3.2 Controlling visibility of true symbols from manual updates

Chart features added by manual updates behave exactly as any other chart feature. Their visibility follows common rules. For more information, see the section "8.10.4 Controlling visible chart features.

10.4 Controlling Chart Viewing Dates of Manual Updates

10.4.1 Setting current date for viewing

Manual updates operate like any other S57 chart that contains updates and other set chart viewing dates features.

When you accept manual updates as permanent, the system sets Display Until of manual updates as current date of the system. To set Approve Until as current date of the system, you must open the Set chart viewing dates window (in the Chart menu) and perform Approve Until. For how to set current date, see section 8.12 Chart Viewing Dates and Seasonal Features of Vector charts (S57). Recommended settings in the Chart viewing dates window are:

- Sync Manual Update Dates as ON position
- All SENCs ON position

See the example below where Displ. until and Approv. until are set as the system current date.

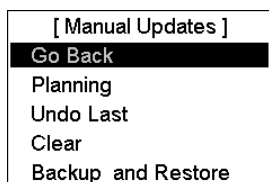
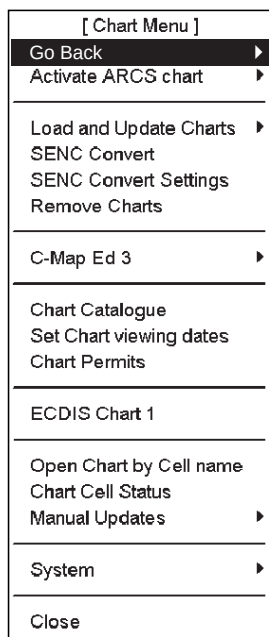
Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displ. until	Updates Approv. until
04470039.D	-/-	1/ 0	2004 12 31	2004 12 31
04470039.E	-/-	1/ 0	2004 12 31	2004 12 31
04470039.F	-/-	1/ 0	2004 12 31	2004 12 31
04470040.E	-/-	1/ 0	2004 12 31	2004 12 31
04470040.F	-/-	1/ 0	2004 12 31	2004 12 31
04500072.C	-/-	1/ 0	2004 12 31	2004 12 31
04500075.D	-/-	1/ 0	2004 12 31	2004 12 31
04500076.E	-/-	1/ 0	2004 12 31	2004 12 31
04500077.E	-/-	1/ 0	2004 12 31	2004 12 31
04500077.F	-/-	1/ 0	2004 12 31	2004 12 31
04500078.D	-/-	1/ 0	2004 12 31	2004 12 31
04500078.E	-/-	1/ 0	2004 12 31	2004 12 31
04500078.F	-/-	1/ 0	2004 12 31	2004 12 31
04500079.E	-/-	1/ 0	2004 12 31	2004 12 31
04500079.F	-/-	1/ 0	2004 12 31	2004 12 31
04510076.E	-/-	1/ 0	2004 12 31	2004 12 31
04510077.E	-/-	1/ 0	2004 12 31	2004 12 31
04510078.E	-/-	1/ 0	2004 12 31	2004 12 31
04510078.F	-/-	1/ 0	2004 12 31	2004 12 31
04510079.E	-/-	1/ 0	2004 12 31	2004 12 31
04510079.F	-/-	1/ 0	2004 12 31	2004 12 31
04510080.E	-/-	1/ 0	2004 12 31	2004 12 31
04510080.G	-/-	1/ 0	2004 12 31	2004 12 31
7C1W0001	-/-	1/ 0	2004 12 31	2004 12 31
7C1W0002	-/-	1/ 0	2004 12 31	2004 12 31
7C1W0003	-/-	1/ 0	2004 12 31	2004 12 31

Latest RENC Product List	2004 11 24	Source PM
Oldest date	2004 12 31	2004 12 31
Newest date	2004 12 31	2004 12 31
Manual Updates	2004 12 31	2004 12 31

Display Until	31 Dec 2004	Approve Until	31 Dec 2004
---------------	-------------	---------------	-------------

☒ Sync Manual Update Dates
☒ All SENCs

10.5 Using Manual Update Editor w/Orange Symbols



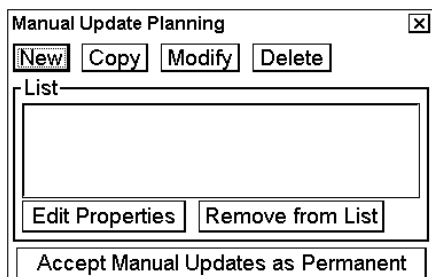
The manual update editor has the choices shown below and you can choose one by choosing Manual Updates from the Chart menu.

- **Planning:** Operate with new manual updates.
- **Undo Last:** Remove last accepted manual update planning session. By repeating Undo Last you can remove any amount of old manual update planning session.
- **Clear:** Remove all manual updates in a single operation.
- **Backup and Restore:** Make a backup or recall already recorded backup.
- With an ARCS chart, you also have "Set chart viewing dates" to set viewing date of manual updates. Note that with S57 charts "Set chart viewing dates" is in the Chart menu.

10.5.1 Manual update planning

The manual update editor operates in sessions. You create a session when you activate the Manual Update Planning dialog box, displayed by choosing Manual Update from the Chart menu followed by Planning from the sub menu. You can freely delete, modify, copy or create chart objects until you feel finished with your session. Then, you terminate your session by clicking the **Accept Manual Updates as Permanent** button then the ECDIS stores your manual updates permanently. If you need to leave your manual update session and discard all modifications made during the current session, click X in upper right corner.

Note: The manual update editor is only available in the North Up or Course Up orientation mode.



New, Copy, Modify, Delete: These buttons are used to collect chart objects into a list shown in the Manual Update Planning dialog box for further editing during current session of manual update planning. **New** creates an object from scratch. **Copy** creates an object using an existing object as an example. **Modify** changes an existing object. **Delete** removes an existing object.

Remove from List: If you made a manual update by mistake, you can remove it if you haven't accepted it yet as permanent. You can remove it by choosing (highlighting) that chart object in the List then clicking the **Remove from List** button.

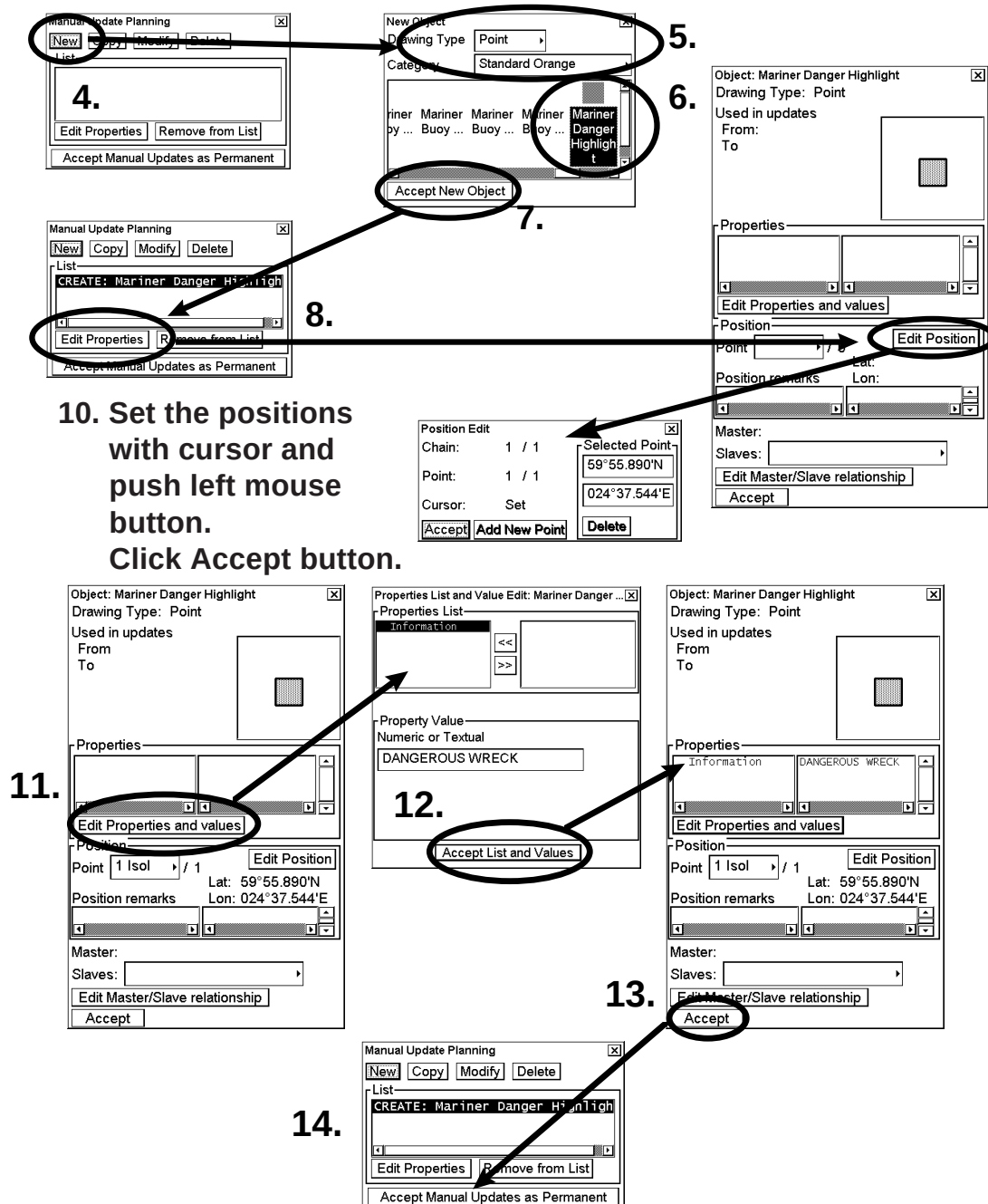
Edit Properties: You can edit properties of a chosen (highlighted) chart object by using the **Edit Properties** button.

10.5.2 Inserting new orange symbols

The mariner can insert a new object either using New or Copy in the Manual Update Planning dialog box. With New he creates a new feature from scratch. With Copy he uses an already existing object as an example for the newly inserted feature.

Inserting new orange symbols using "new"

When you want to create a new object from scratch, you start creating by clicking the **New** button in the Manual Update Planning dialog box. A New Object window appears. Use the default Category Standard Orange to insert a new orange symbol. The detailed procedure is as follows:

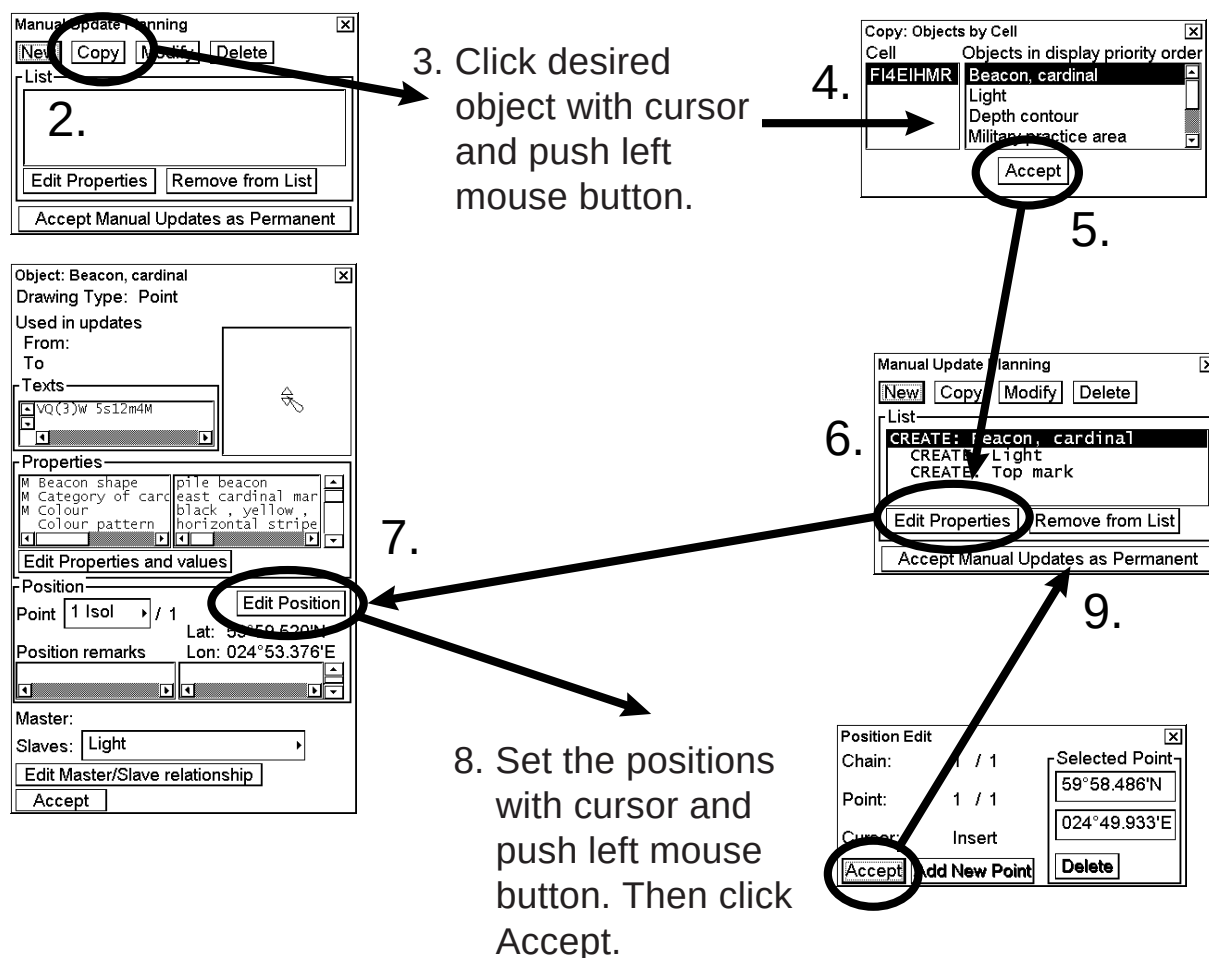


10. Manual Updates

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area.
2. Push the right mouse button.
3. Choose Manual Updates, push the scrollwheel, choose Planning then push the scrollwheel.
4. Click the **New** button in a Manual Update Planning dialog box.
5. Choose desired Drawing Type (Point, Line or Area), and choose Category as Standard Orange.
6. Choose desired Symbol from the Symbol list box.
7. Click the **Accept New Object** button.
8. Click the **Edit Properties** button.
9. Click the **Edit Position** button. Now you have two alternatives: If you want to add a text, then continue from step 10. Otherwise go to step 14.
10. Use the cursor and the left mouse button to define position of symbol then click the **Accept** button.
11. If you would like to include textual information related to an orange symbol, click the **Edit Properties and values** button.
12. Highlight Information in the right side box then click the << button to move it to the left hand box then highlight it. Then, you can add textual information in the Property Value field. To enter text or numeric value, click inside the box, spin the scrollwheel to choose character desired then push the scrollwheel. After entering all characters desired, click the **Accept List and Values** button.
13. Click the **Accept** button.
14. Click the **Accept Manual Updates as Permanent** button.

Inserting new orange symbols using "copy"

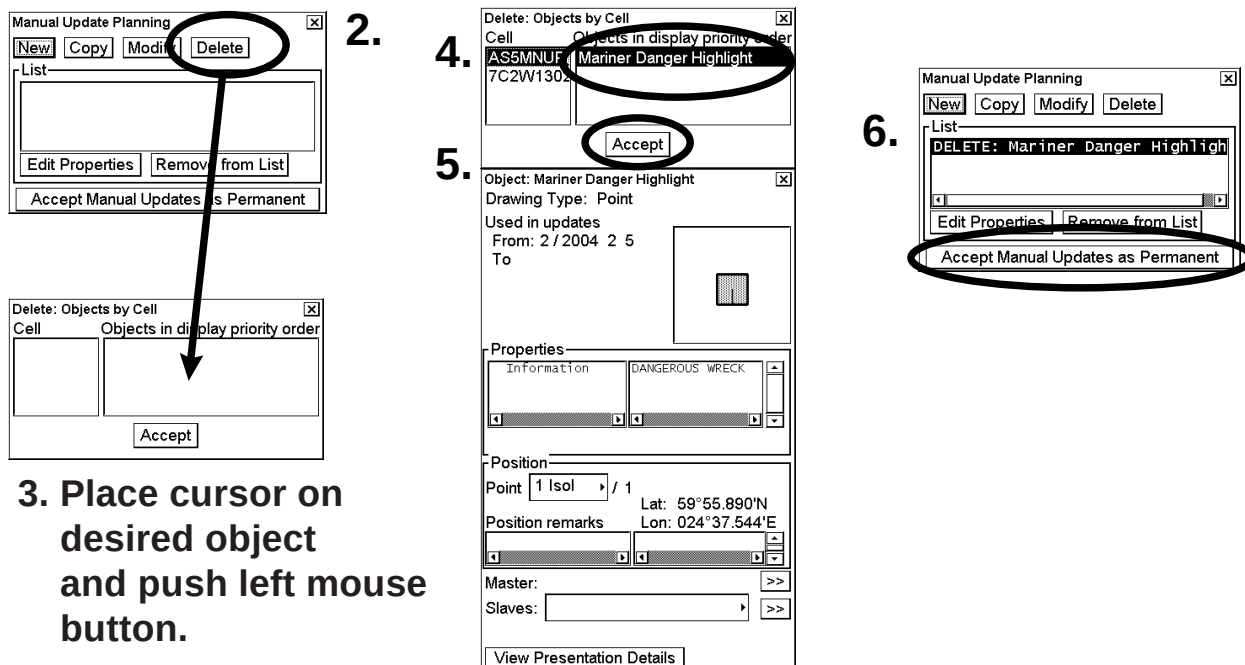
You can make new orange symbols by copying existing orange symbols. Then you pick up an orange symbol and make a copy of it. After copying you can modify position suitable for your purposes.



1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **Copy** button in the Manual Update Planning dialog box.
3. Place cursor on the desired object then press left mouse button.
4. Choose object from the Objects by Cell window. There can be more than one object in the area.
5. Click the **Accept** button.
6. New orange symbols are displayed in the list in the Manual Update Planning dialog box. Then click the **Edit Properties** button.
7. Click the **Edit Position** button.
8. Place cursor on the desired location on the ECDIS display. Push the left mouse button then click the **Accept** button.
9. Click the **Accept Manual Updates as Permanent** button.

10.5.3 Deleting orange symbols

The mariner cannot permanently remove any of the official chart objects from the chart display. If the mariner needs to remove any of the official chart objects, he is allowed to mark them as deleted. In practice the deleted chart object is still visible, but it has a special presentation for a deleted object on top of it. To delete a chart object, do the following:



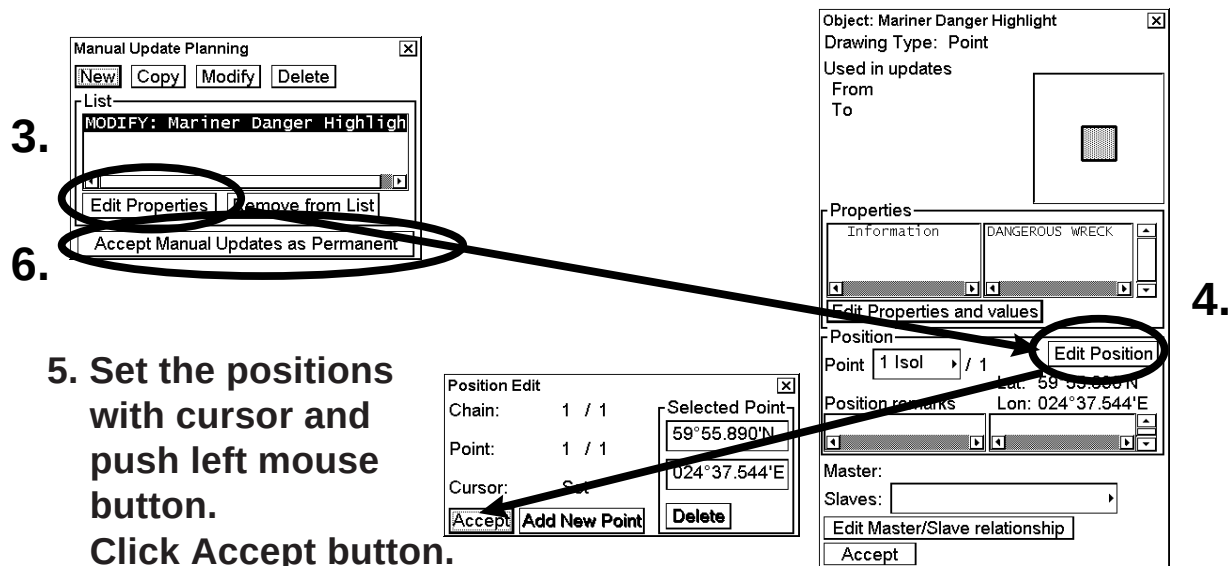
1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **Delete** button in the Manual Update Planning dialog box.
3. Place the cursor on the desired chart object and push the left mouse button.
4. Choose the object from the Objects by Cell window that you wish to delete. You can also view data of each object before making your selection.
5. Click the **Accept** button.
6. Click the **Accept Manual Updates as Permanent** button to complete the deletion.

Note: If you deleted an official ENC chart object, a deletion mark is added over the original chart object that is still visible. If you delete a manual update chart object, it is removed from the chart display based on date of deletion.

10.5.4 Editing position of orange symbols

An object can be type of point, line or area.

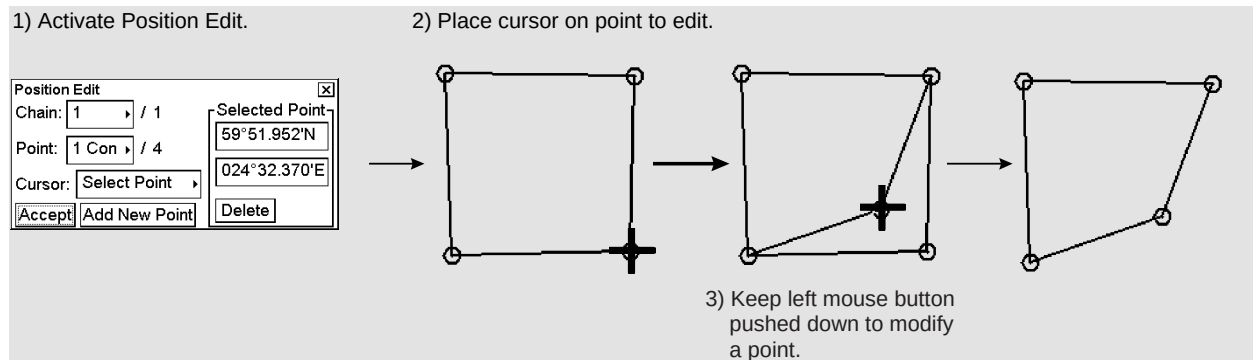
- Point has only one point in its presentation.
- Line can consist of one or more chains. A chain consists of two or more points.
- Area consists of a line that is closed.



1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **Modify** button, click the object on the chart that you want to edit, then click the **Accept** button.
3. Click the **Edit Properties** button. The Object window appears.
4. Click the **Edit Position** button.
5. Edit the position of the chosen chart feature then click the **Accept** button. See the next two pages for how to modify a chart object.
6. Click the **Accept Manual Updates as Permanent** button.

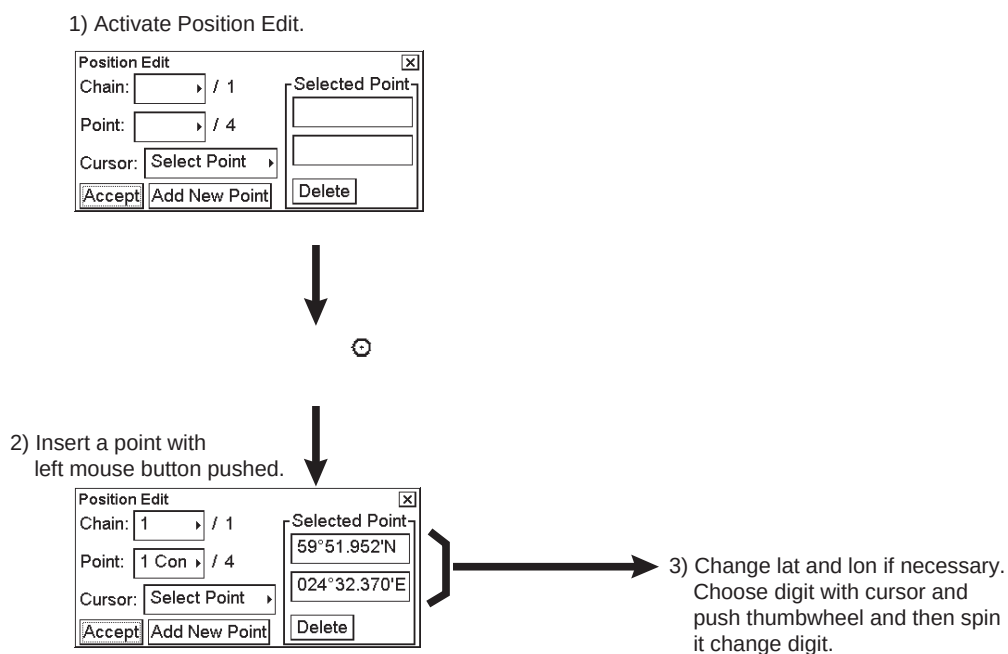
10. Manual Updates

The example below shows how to modify a line.



The example below shows how to set position for a point.

This method is also applicable to insert or append new points for existing chart features.



The example below how to define an area for an existing chart feature.

1) Activate Position Edit.

Position Edit

Chain: 1 / 1

Point: 1 Con / 4

Cursor: Select Point

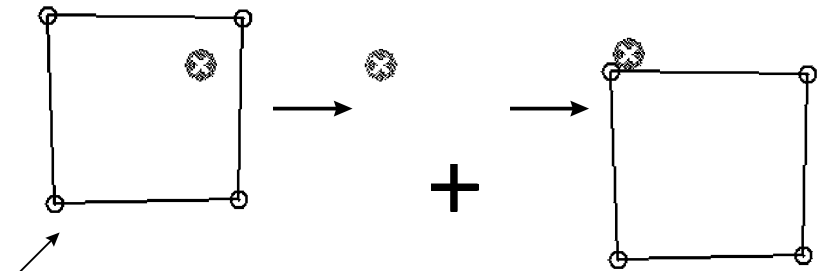
AcceptAdd New PointDelete

Selected Point

59°51.952'N

024°32.370'E

Delete



2) Choose "Set Center".

Position Edit

Chain: 1 / 1

Point: 1 Con / 4

Cursor: Set Center

AcceptAdd New PointDelete

Selected Point

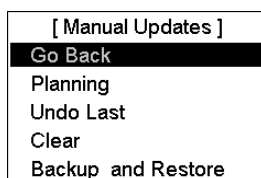
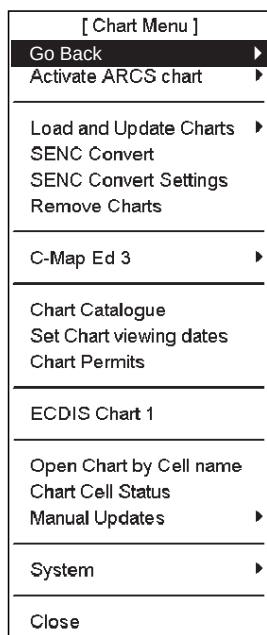
59°51.952'N

024°32.370'E

Delete

3) Place cursor on required point and push left mouse button.

10.6 Using Manual Update Editor with True Symbols



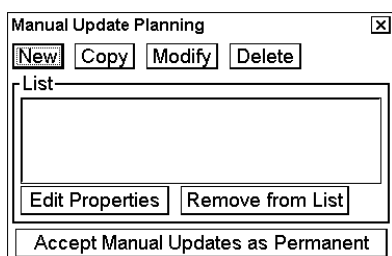
The manual update editor has the following features:

- **Planning:** Operate with new manual updates.
- **Undo Last:** Remove last accepted manual update planning session. By repeating Undo Last you can remove any amount of old manual update planning session.
- **Clear:** Remove all manual update in a single operation.
- **Backup and Restore:** Make a backup or to recall already recorded backup.
- With an ARCS chart, you also have "Set chart viewing dates" to set viewing date of manual updates. This is done with "Set Chart viewing dates" in the Chart menu.

10.6.1 Manual update planning

The manual update editor operates in sessions. You create a session when you activate the Manual Update Planning dialog box. You can freely delete, modify, copy or create chart objects until you feel finished with your session. Then, you terminate your session by clicking the **Accept Manual Updates as Permanent** button and the ECDIS stores your manual updates permanently. If you need to leave your manual update session and discard all modifications made during the current session, click X in upper right corner.

Note: The manual update editor is only available in the North Up or Course Up orientation mode.



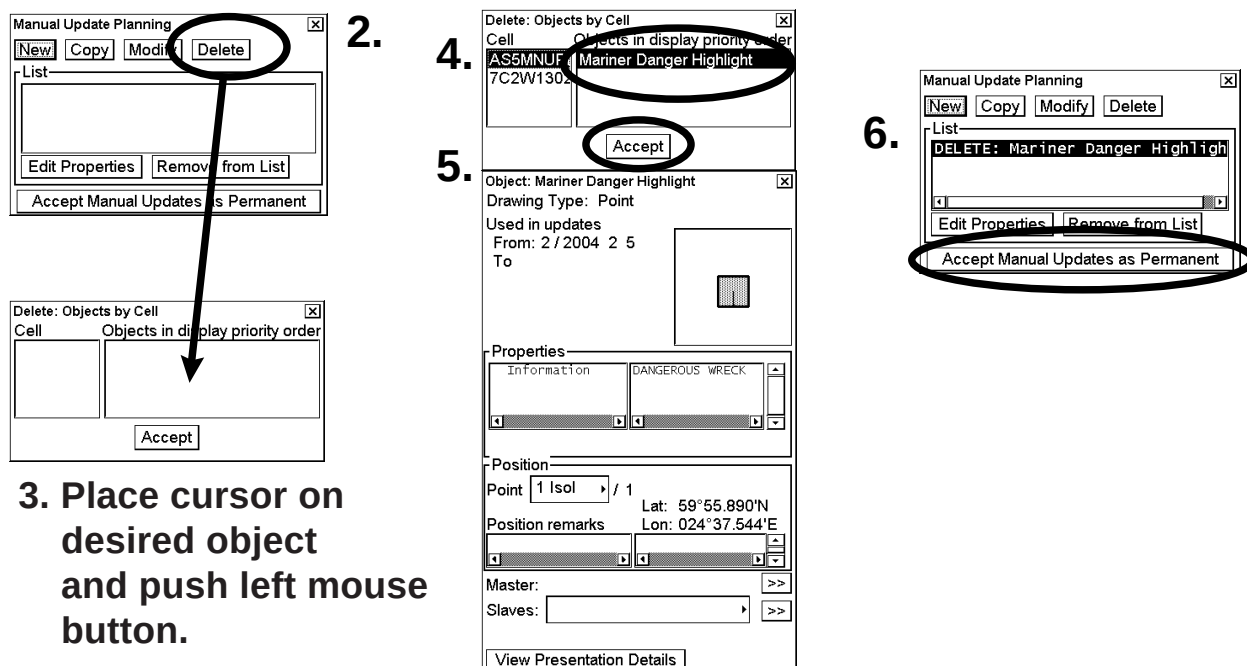
New, Copy, Modify, Delete: These buttons are used to collect chart objects into a list shown in a Manual Update Planning dialog box for further editing during current session of manual update planning. **New** creates an object from scratch. **Copy** creates an object using an existing object as an example. **Modify** changes an existing object. **Delete** removes an existing object.

Remove from List: If you made a manual update by mistake, you can remove it if you haven't accepted it yet as permanent. You can remove it by choosing (highlighting) chart object in the List then clicking the **Remove from List** button.

Edit Properties: You can edit properties of chosen (highlighted) chart object by using the **Edit Properties** button.

10.6.2 Deleting chart objects

The mariner cannot permanently remove any of the official chart objects from the chart display. If mariner needs to remove any of the official chart objects he is allowed to mark them as deleted. In practice the deleted chart object is still visible, but it has a special presentation for a deleted object on top of it. To delete a chart object, do the following:



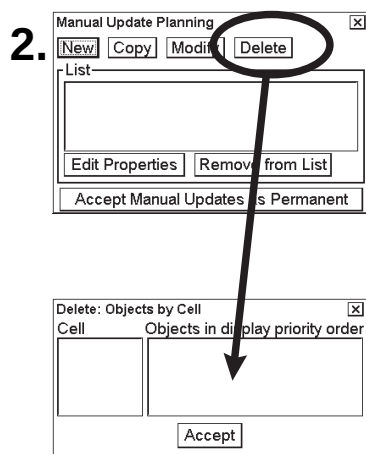
1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **Delete** button in the Manual Update Planning dialog box.
3. Place cursor on desired chart object and push the left mouse button.
4. Choose the object from the Objects by Cell window. Confirm data for selected object.
5. Click the **Accept** button.
6. Click the **Accept Manual Updates as Permanent** button to complete the deletion.

Note: If you deleted an official ENC chart object, a deletion mark is added over the original chart object that is still visible. If you delete a manual update chart object, then it is removed from the chart display based on date of deletion.

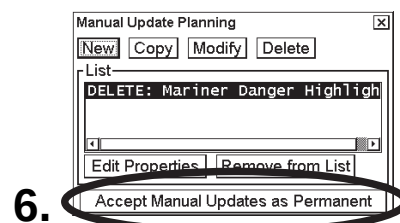
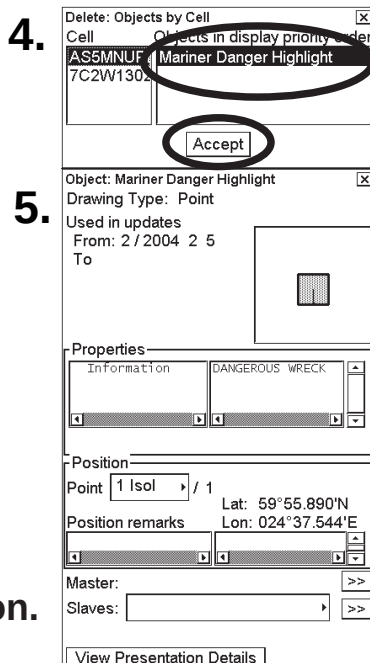
10.6.3 Modifying chart objects

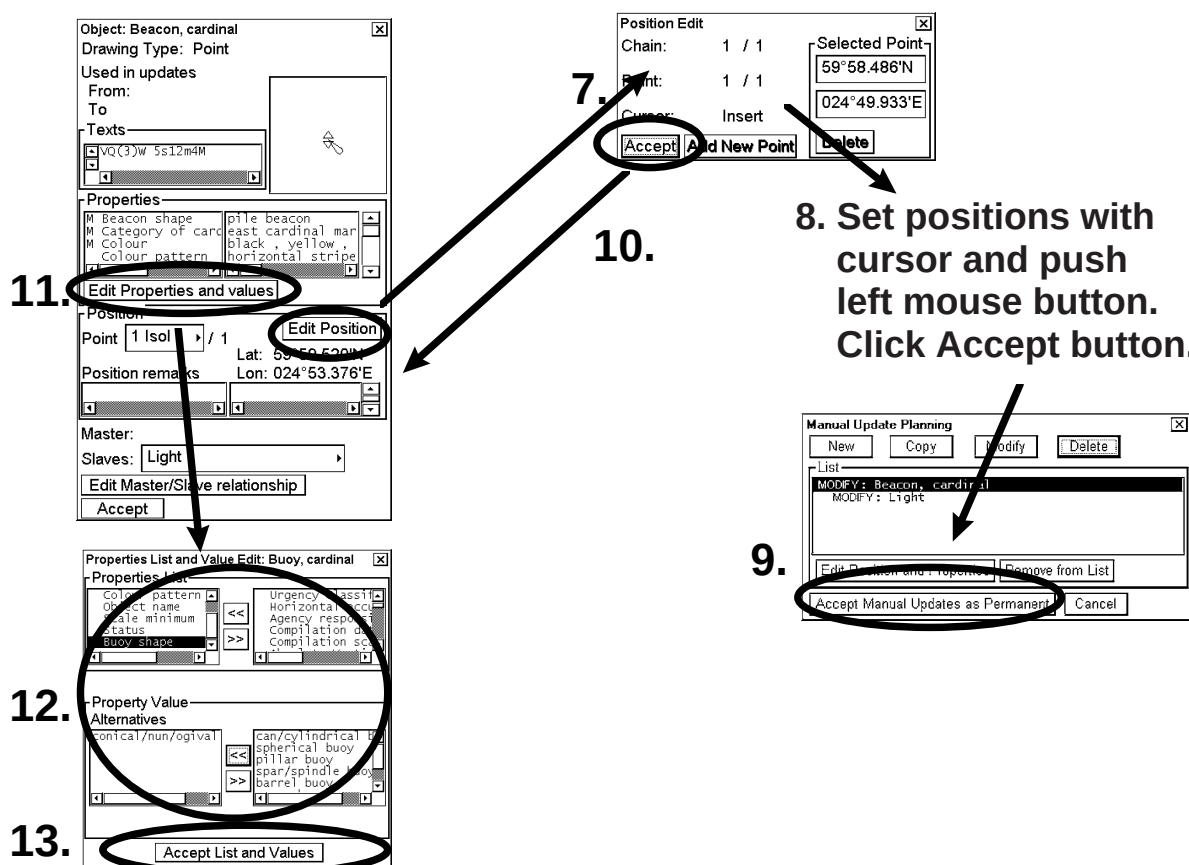
The mariner cannot permanently remove from the chart display any of the official chart objects, but he can modify position and/or properties of chart objects. When the mariner modifies a chart object, the ECDIS will mark original chart object as deleted and a copy of original chart object as inserted.

1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **Modify** button.
3. Place the cursor on the desired object then push the left mouse button.
4. Choose the object from the Objects by Cell window. Confirm data for selected object.
5. Click the **Accept** button.
6. Click the **Edit Properties** button.
7. If you want to modify the position of the object, click the **Edit Position** button. Otherwise continue from step 13.
8. Place the cursor on the desired location on the ECDIS display. Click the **Accept** button.
9. Click **Accept Manual Updates as Permanent**. If you want to modify also properties continue from step 10.
10. If you want to modify properties, also click the **Accept** button.
11. If you want to modify the properties of the object click **Edit Properties and values** button. Otherwise continue from step 9.
12. Pick from the list properties you want to modify and give them new values. You can also add new properties or remove old.
13. Click **Accept List and values** to continue from step 5 or 11 again. Otherwise continue from step 9.



3. Place cursor on desired object and press left mouse button.





10.6.4 Inserting new chart objects

The mariner can insert a new object either using New or Copy. With New he creates a new feature from scratch. With Copy he uses an already existing object as an example for the new inserted feature.

Inserting new chart objects using "new"

When you want to create a new object from a scratch, you start creating by clicking the **New** button in the Manual Update Planning dialog box. A S57 Object window appears. In this window you can choose geometric type of object (Point, Line or Area) and type of object:

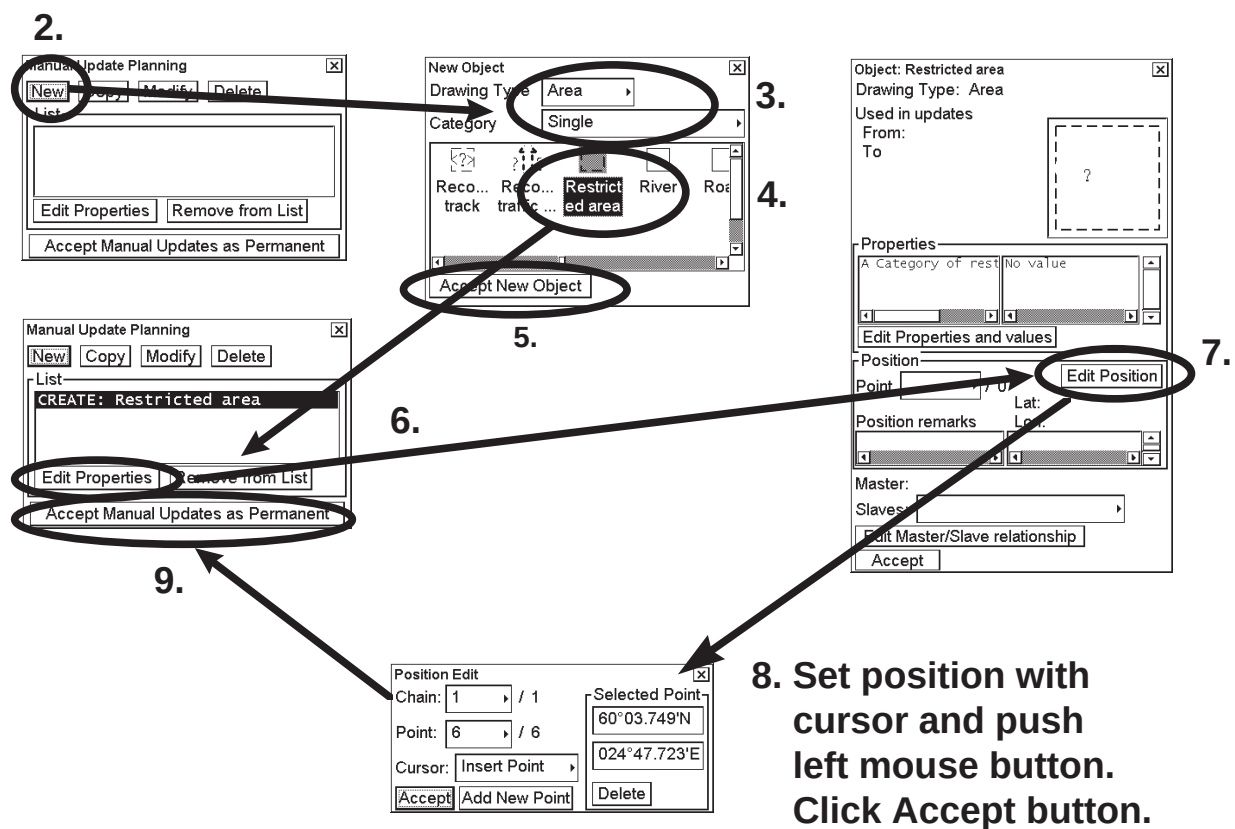
Object type (category)

- **Standard orange.** This category is reserved for simple orange symbols.
- **Single.** All self-understandable chart objects that can be created based on a single chosen chart object. Examples are different kind of restricted and warning areas, light ships, anchorage symbols, etc.
- **Nav Aid.** Nav Aid is a guided method to create navigational aids such as lights and buoys, because they consist of several objects put together with master and slave relationships.
- **Easy Lateral Sea Mark.** Guided method to create nav aid easily for any lateral sea marks.
- **Easy Cardinal Sea Mark.** Guided method to create nav aid easily for any cardinal sea marks.
- **Easy Other Sea Mark.** Guided method to create nav aid easily for any other sea marks.
- **Easy Obstruction.** Guided method to create obstructions.
- **Easy Light.** Guided method to create nav aid easily for any simple lights.

10. Manual Updates

Example of how to insert a "restricted area"

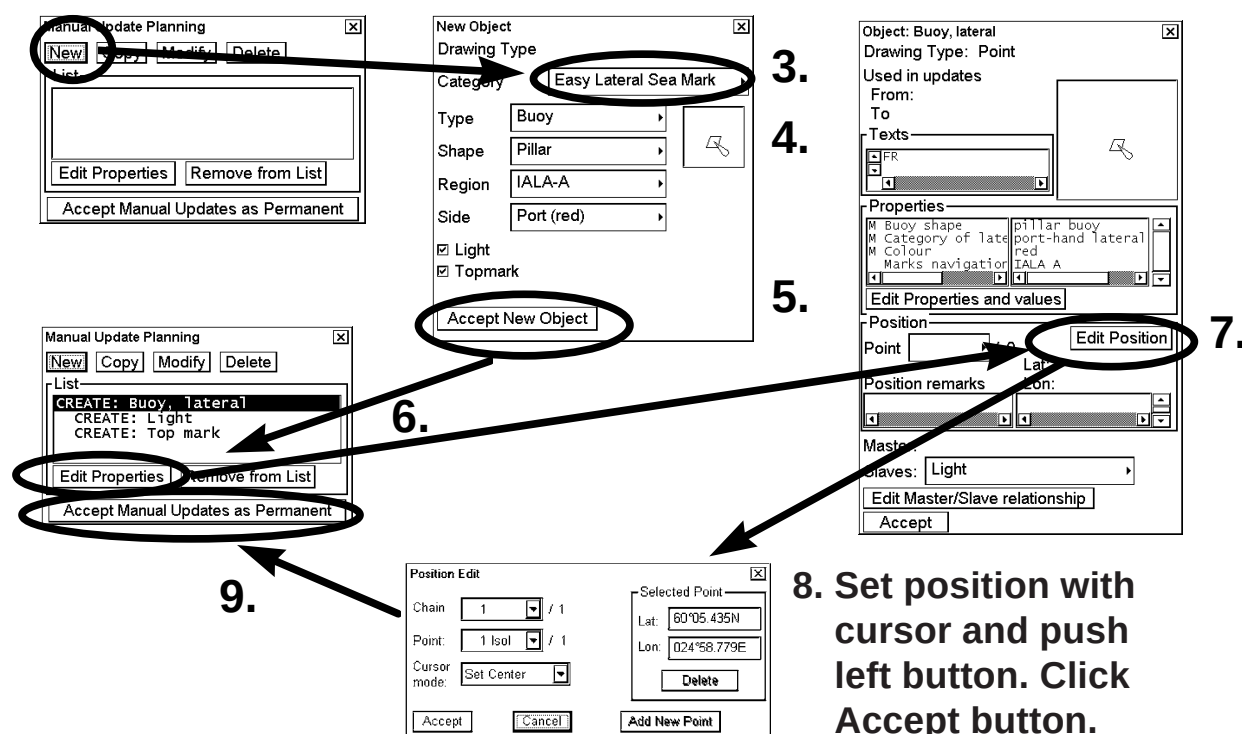
1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **New** button in the Manual Update Planning dialog box.
3. Choose Area from the Drawing Type list box then choose Single from the Category list box.
4. Choose desired icon from the list of available chart objects.
5. Click the **Accept New Object** button. New object is displayed in the List.
6. Then, click the **Edit Properties** button.
7. Click the **Edit Position** button.
8. Set cursor on the desired location on the ECDIS display then push the left mouse button. Repeat this until you have defined all points.
9. Click the **Accept Manual Updates as Permanent** button to finish.



Example of how to insert easy lateral sea mark

The method is similar also for easy cardinal sea marks, easy other sea marks, Easy lights and easy obstructions.

1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **New** button.
3. Choose Easy Lateral Sea Mark from the Category list box.
4. Select appropriate items from Type, Shape, Region and Side.
5. Click the **Accept New Object** button. New object is displayed in the List.
6. Then click the **Edit Properties** button.
7. Click the **Edit Position** button.
8. On the desired location on the ECDIS display push left mouse button. Click the **Accept** button.
9. Click the **Accept Manual Updates as Permanent** button.



10. Manual Updates

Example of how to insert a nav aid

A light is only a light - it also requires a support that could be a pile or buoy, etc. Body and top mark of a buoy are separated to enable a vast number of possible combinations.

1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **New** button.
3. Choose Point as Drawing Type; choose Nav Aid as Category. Then use the cursor to choose desired icon from the master object.
4. Click the **Set as Master** button.
5. When you have set a master object, you can define nav aid slaves for it. Use the cursor to choose desired icon (for example, Light) of a slave object.
6. Click the **Set as Nav Aid Slave** button. If you need more than one slave object continue from step 5.
7. When you are ready with master and its slave objects, click the **Accept New Object** button. The new object w/slave (two lights) is shown in the list box.
8. Then, set the position of your master and slave objects. Click the **Edit Properties** button.
9. Click the **Edit Position** button.
10. Place the cursor on desired location on the ECDIS display and the push the left mouse button.
11. Click the **Accept Manual Updates as Permanent** button (11b in the example), or click the **Accept** button (11a in the illustration on the next page).
12. Click the **Accept** button.
13. Click the **Accept Manual Updates as Permanent** button, and the object appears on the display at the position selected.

1. **Manual Update Planning** dialog box. The **New** button is circled.

2. **New Object** dialog box. The **Category** dropdown is set to **Nav Aid** (circled).

3. **New Object** dialog box. The **Set as Master** button is circled.

4. **New Object** dialog box. The **Set as Nav Aid Slave** button is circled.

5. **New Object** dialog box. The **Accept New Object** button is circled.

6. **Manual Update Planning** dialog box. The **Edit Properties** button is circled.

7. **Manual Update Planning** dialog box. The **Accept Manual Updates as Permanent** button is circled.

8. **Manual Update Planning** dialog box. The **Edit Properties** button is circled.

9. **Object: Beacon, isolated danger** dialog box. The **Edit Position** button is circled.

10. **Position Edit** dialog box. The **Accept** button is circled.

11a. **Position Edit** dialog box. The **Accept** button is circled.

11b. **Position Edit** dialog box. The **Accept** button is circled.

12. **Object: Beacon, isolated danger** dialog box. The **Accept** button is circled.

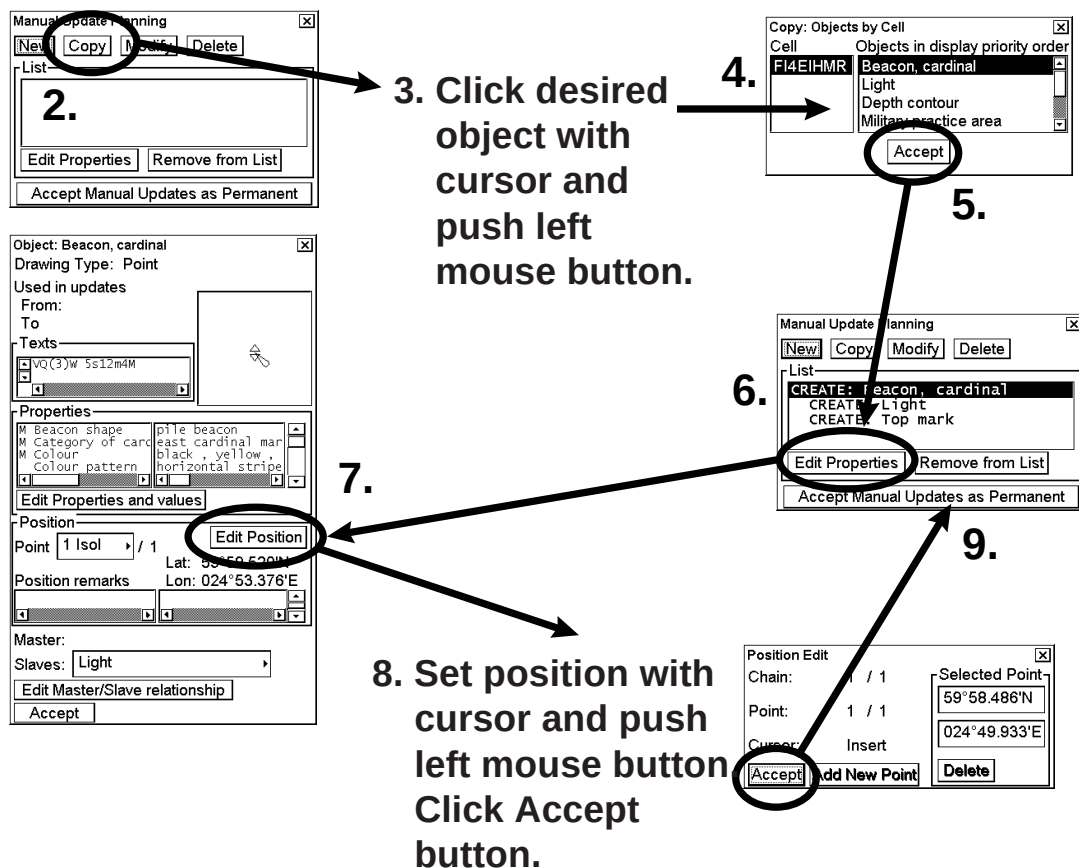
13. **Manual Update Planning** dialog box. The **Accept Manual Updates as Permanent** button is circled.

10. Set position with cursor and push left mouse button. Press Accept button.

11b. Set position and then click the Accept Manual Updates as Permanent button.

Inserting new chart objects using "copy"

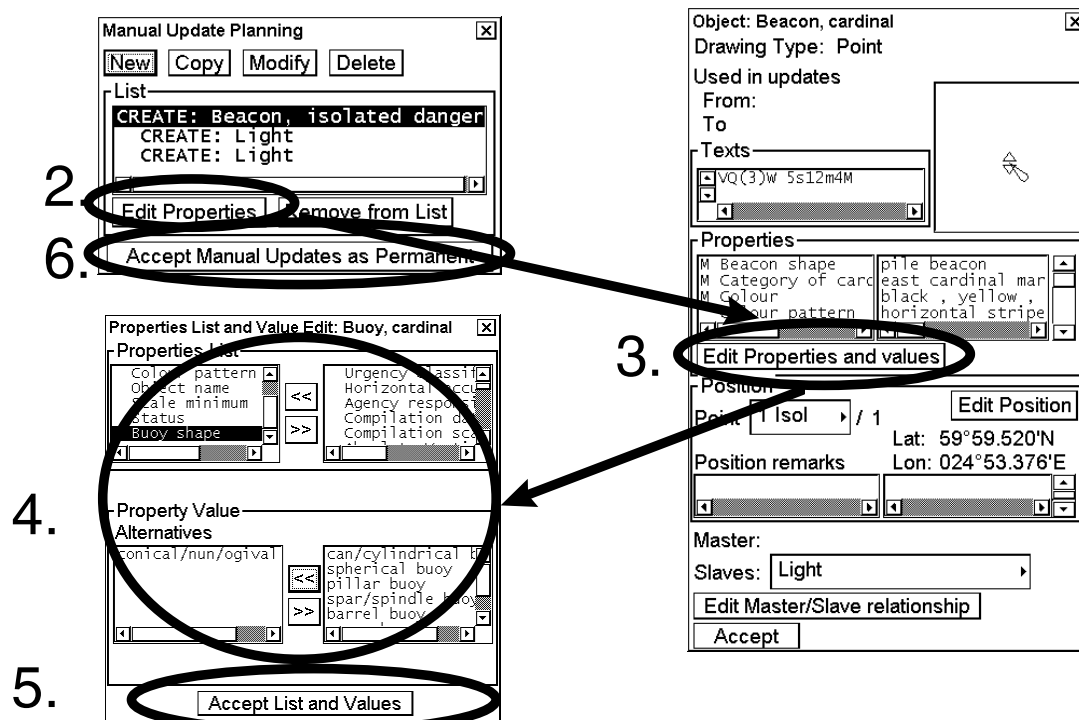
You can make a new object by copying an existing one. Then you pick up an object and make a copy of it with all related properties. After copying, you can modify position and properties of copied object suitable for your purposes.



1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Click the **Copy** button in the Manual Update Planning dialog box.
3. Place the cursor on a desired object and click the left mouse button.
4. Choose object from the Object by Cell window.
5. Click the **Accept** button.
6. New object is displayed in "List of". Then, click the **Edit Properties** button.
7. Click the **Edit Position** button.
8. Place the cursor on desired location on the ECDIS display. Click the left mouse button.
9. Click the **Accept Manual Updates as Permanent** button. (If button is hidden by window, move the window.)

10.6.5 Editing properties of manually updated chart objects

Editing properties of chart objects



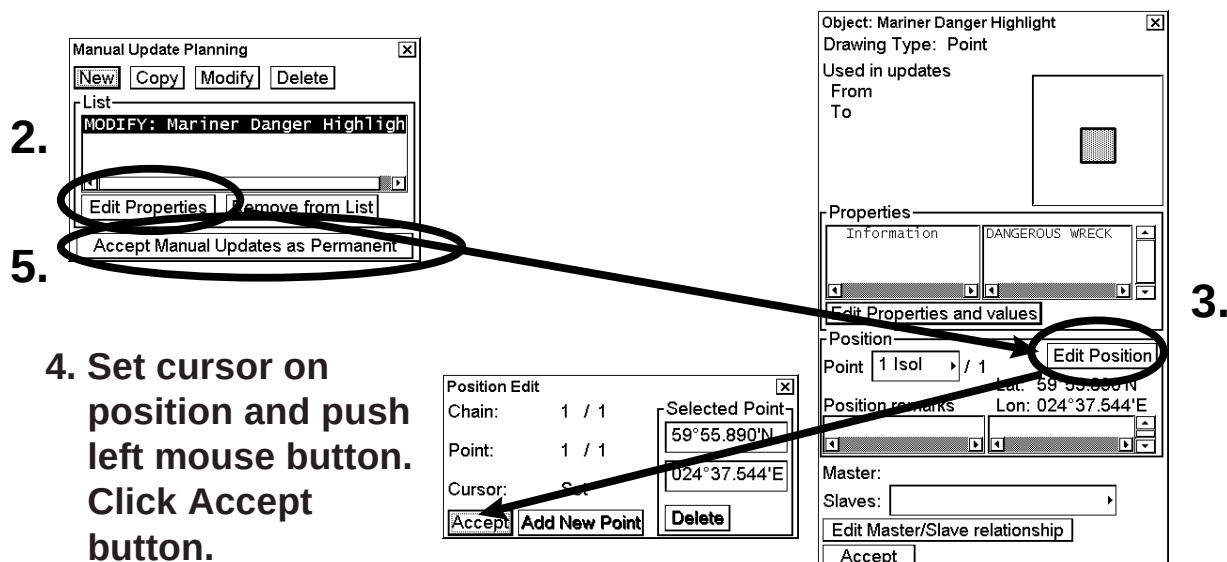
1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. In Manual Update Planning dialog box, click the **Edit Properties** button. An Object window appears.
3. Click the **Edit Properties and values** button. A Properties List and Values Edit window appears.
4. Add or remove features from/to the Properties List using >> and << buttons. To edit property value, highlight desired value in the Properties List, then you can edit in the Property Value field using Alternatives field or enter Numeric or Textual value. If the Object has a linked object, you can also edit those values. Click **Edit Master/Slaves relationship** button to edit them. Make desired modifications in the Master/Slave relationship edit window. After you have edited all the values of the linked objects, click the **Accept** button.
5. After you have edited all the values of the object you click the **Accept List and Values** button, if you want continue from step 2 with the object. Otherwise continue from step 4.
6. Click the **Accept Manual Updates as Permanent** button.

10. Manual Updates

Editing position of chart objects

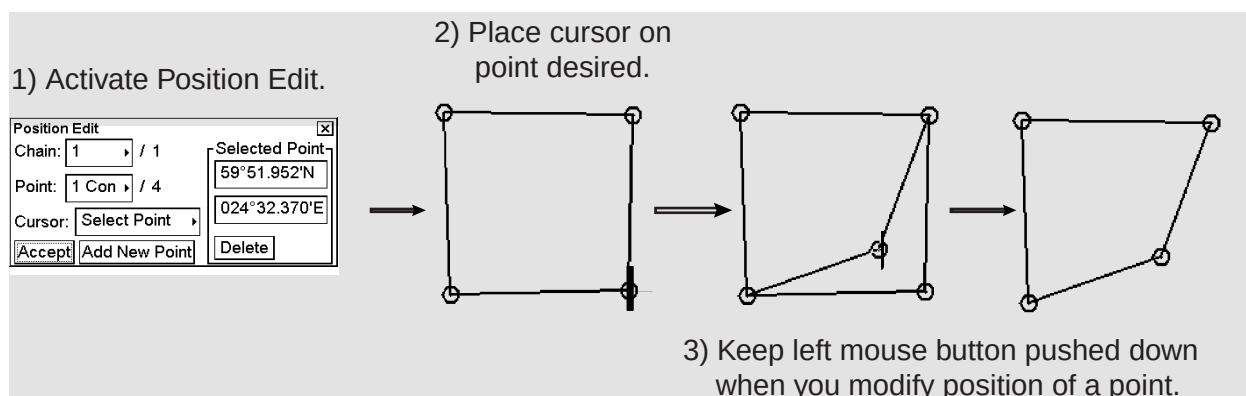
An object can be type of point, line or area.

- A Point has only one point in its presentation.
- A Line can consist of one or more chains. A chain consists of two or more points.
- An Area consists of a line that is closed.



1. Follow steps 1-3 on page 10-6 to display the Manual Update Planning dialog box.
2. Press the **Modify** button, select object on chart then click the **Edit Properties** button. Object window appears. An Object window appears.
3. Click the **Edit Position** button.
4. With the Position Edit window open, you can edit the position of the chosen chart feature. For further details, see the next several pages.
5. Click the **Accept Manual Updates as Permanent** button.

Example of how to modify a line



Example of how to set new position for a point

The method is also applicable to insert or append new points for existing chart features.

1) Activate Position Edit.

Position Edit		
Chain: 1 / 1	Selected Point 	
Point: 1 / 4		
Cursor: Select Point		
Accept	Add New Point	Delete



2) Insert point with left mouse button.

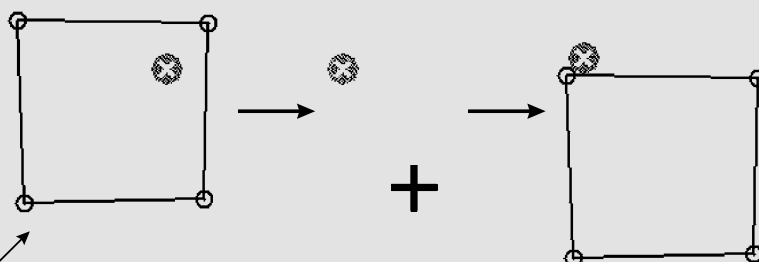
Position Edit		
Chain: 1 / 1	Selected Point 59°51.952'N 024°32.370'E	
Point: 1 Con / 4		
Cursor: Select Point		
Accept	Add New Point	Delete

3) If necessary change lat and lon position. Place cursor on digit, push thumbwheel and then roll thumbwheel.

Example of how to define a new center point for an existing chart feature

1) Activate Position Edit.

Position Edit		
Chain: 1 / 1	Selected Point 59°51.952'N 024°32.370'E	
Point: 1 Con / 4		
Cursor: Select Point		
Accept	Add New Point	Delete



2) Select "Set Center".

Position Edit		
Chain: 1 / 1	Selected Point 59°51.952'N 024°32.370'E	
Point: 1 Con / 4		
Cursor: Set Center		
Accept	Add New Point	Delete

3) Place cursor on new required center point and push left mouse button.

10.7 Checking Creation and Usage History of Manual Updates

You may need to check when a manual update has been added into your ECDIS. Also you may need to check what was shown in your chart display three weeks ago. There are also many other cases when you need to know what was known by your ECDIS.

To check any situation in the past, you can use either Display Until and Approve Until to specify exact date of interest. Alternatively, you can specify directly the number of the manual update planning session. See below.

To open the Manual Update Chart viewing dates window, open the Chart menu, choose Set Chart viewing dates. In the Chart Viewing Dates window, click the **Manual Update Dates** button.

Manual Update Chart viewing dates		
Update	Display Until	Update
0 2003	05 Feb 2004	4
1 2004		
2 2004	Approve Until	Update
3 2004	05 Feb 2004	4
4 2004		

11. Chart Alarms

11.1 General

The ECDIS can detect areas where the depth is less than the safety contour or detect an area where a specified condition exists. If you plan a route or if prediction of your ship movement goes across a safety contour or an area where a specified condition exists, the system will display a visual alarm or sound an audible alarm to alert you to impending danger. For this function, the ECDIS utilises the chart database (S57 charts) stored on the hard disk in SENC format. **Note that the ECDIS calculates dangerous areas using the largest scale chart available, which may not be the visualised chart.**

You can choose objects that are included for calculation of danger area (for example, restricted areas). A window lists the various areas that activate danger warnings.

You can also define your own safe area by creating a user chart area. The system can utilise these areas when calculating chart alarms. This is very useful with raster chart material such as ARCS.

The ECDIS can check the following for you:

- Predicted movement area of your ship
- Planned route with an easy to use locator function to find dangerous areas

The ECDIS will highlight the following for you:

- Dangerous areas inside predicted movement area of your ship
- Dangerous areas inside your monitored route
- Dangerous areas inside your planned route

11.2 Chart Alarms

Official S57 chart material contains depth contours that can be used for calculation of chart alarms. A chart database also includes different types of objects that the operator can use for chart alarms. The procedure for setting chart alarms is outlined below.

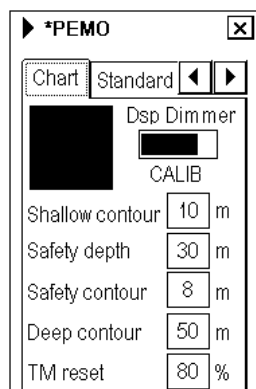
1. Choose suitable safety contour for your ship. See section 11.2.1 Choosing safety contour.
2. Check that "Chart Alarms" is set for display. See section 11.2.3 Highlighting chart alarms. If you want chart alarms to be included in some other objects or areas, choose them for indication or alarm. See section 11.2.2 Choosing objects used in chart alarms.
3. In the route planning mode, define a new route or choose an existing one. Make a chart alarm calculation of the route if there are indications of danger areas in the route. For more information, see section 11.5 Route Planning. Modify your route if necessary and do the chart alarm calculation again.
4. Choose route as monitored route.
5. Set watch sector for your ship.

The system is now ready for chart alarm calculation of monitored route and estimated your ship's position.

11.2.1 Choosing safety contour

User has to choose safety depth suitable for your ship. To choose suitable depth, do the following:

1. Spin the scrollwheel to display Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button.
2. If the Chart page is not displayed, click the Chart tab to display it.



3. Enter desired depth in the Safety contour field.

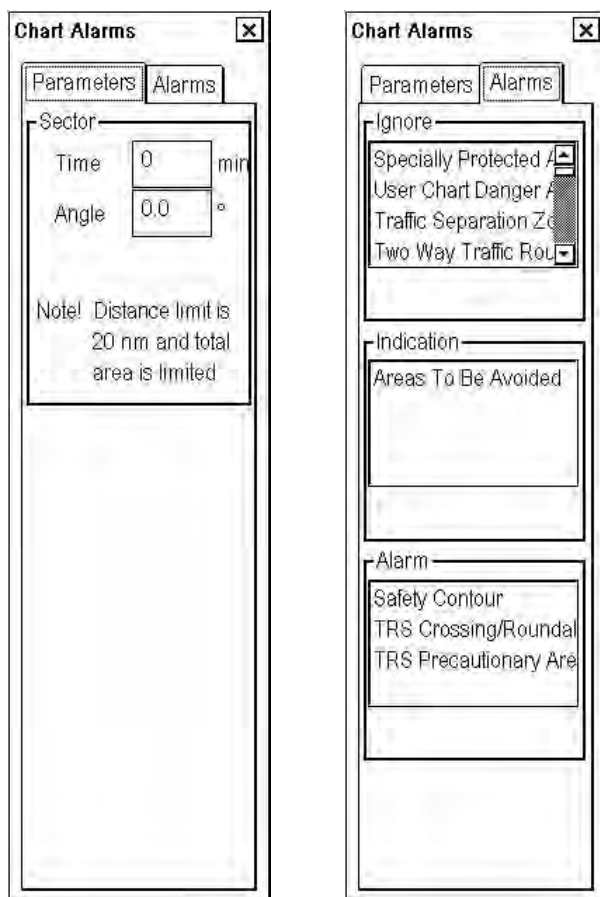
Note: If the chart does not contain chosen depth contour, the system will automatically choose next deeper contour.

In the example above the safe water depth is set for 10 m.

11.2.2 Choosing objects used in chart alarms

You can also include calculation areas that have to be noted when sailing (for example, restricted areas). To include these areas in chart alarms, do the following:

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Initial Settings from the menu then push the scrollwheel.
3. Place the cursor on the triangle inside the Initial Settings dialog box to open the Initial Settings menu.
4. Choose Chart Alarm parameters then push the scrollwheel.
5. Click the Chart Alarms tab to show the Chart Alarms dialog box. In the Ignore box at the top of the window, use the left mouse button to click the alarm item you wish to process.
6. Choose what alarm type you desire. Click the **Indication** button to display visual alarm, or **Alarm** button to get the audible alarm. The item chosen is moved from the Ignore box to the Indication or Alarm box as appropriate.
7. To remove an alarm, click it in the Indication or Alarm box with the left mouse button then click the **Ignore** button. To change an alarm alert method, click it in the Indication or Alarm box with the left mouse button then click the **Indication** or **Alarm** button as appropriate.
8. Click the Parameters tab with the left mouse button.
9. Time and sector angle are explained in section 11.4 Activating Own Ship Check. Set them appropriately.



11. Chart Alarms

List of areas

There are the areas that the ECDIS detects and provides the audible alarm or visual indication if estimated your ship's position or planned or monitored route cross the area defined on the Chart Alarms page. You can choose from the following areas:

Fairway	Cargo Transhipment Area
Restricted Area	User Chart Danger
Caution Area	Traffic Separation Zone
Offshore Production Area	TRS Crossing/Roundabout
Military Practise Area	TRS Precautionary Area
Seaplane Landing Area	Two Way Traffic Route
Submarine Transit Lane	Deep Water Route
Fishing Ground	Recommended Traffic Line
Pipeline Area	Inshore Traffic Zone
Cable Area	Ice Area
Anchorage Area	Channel
Anchorage Prohibited	Fishing Prohibited
Dumping Ground	Spoil Ground
Incineration Area	Dredged Area

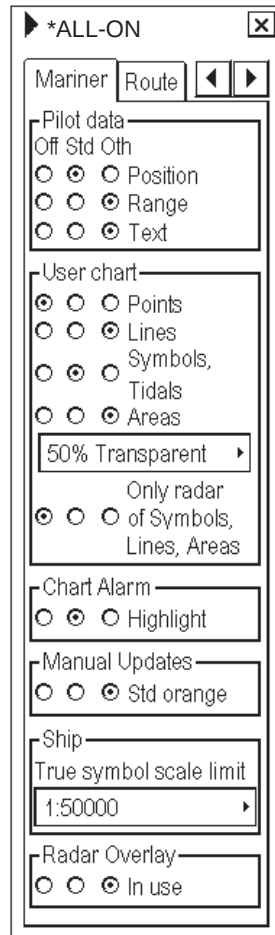
Note: Areas To Be Avoided and Specially Protected Areas are collections of certain types of areas. If you choose either of them, a group of areas will trigger an indication or audible alarm. The table below shows which areas are chosen if Areas To Be Avoided or Special Protected Areas is chosen.

Areas To Be Avoided	Specially Protected Areas
Fairway	Fishing Ground
Restricted Area	Pipeline Area
Caution Area	Cable Area
Offshore Production Area	Anchorage Area
Military Practise Area	Anchorage Prohibited
Seaplane Landing Area	Dumping Ground
Submarine Transit Lane	Incineration Area
	Cargo Transhipment Area

11.2.3 Highlighting chart alarms

The operator can choose the level of transparency of the chart alarm highlight. Follow the procedure below to choose the level of transparency.

1. Spin the scrollwheel to show Chart Display/Info/Standard Display then push the left mouse button.
2. Click the right or left arrow tab to choose the Mariner page, as shown right.
3. In the User chart box, put the cursor in the combo box, spin the scrollwheel to choose level of transparency desired then push the scrollwheel.
4. In the Chart Alarm box, choose Std or Other position to enable highlighting of alarm area.



11.3 Inserting User Chart Symbols, Lines and Areas in Chart Alarm

Symbols

For user chart symbols, use the option Danger Symbol in the Symbol page of the Plan User Chart dialog box. To display this box, do the following:

1. Place the cursor on UserChart on the status bar.
2. Click the **Plan** button to show the Plan User Chart dialog box.
3. Click the Symbol tab.

To include symbols in the chart alarm, first check the Enables changes box then check the Danger Symbol box of the Plan User Chart dialog box. Danger Symbol must checked, otherwise danger symbols of a user chart cannot not be used in the chart alarm. The dangerous symbol is drawn in red instead of dark yellow (color may be different depending on Palette in use).

In the Symbol page, you can include symbols in the chart alarm by checking Danger Symbol.

Lines

To include lines in the chart alarm, check the Danger Line box in the Line page of the Plan User Chart dialog box. Danger Line must checked, otherwise danger lines of a user chart cannot not be used in the chart alarm. The dangerous line is drawn in red instead of dark yellow (color may be different depending on Palette in use).

In the Line page, you can include lines in the chart alarm by checking Danger Line.

Areas

To include areas in the chart alarm, check the Danger Area box in the Area page of the Plan User Chart dialog box. Danger Area must be checked, otherwise danger areas of a user chart cannot be used in the chart alarm. The dangerous area is drawn in red instead of dark yellow (color may be different depending on Palette in use).

In the Area page, you can include areas in the chart alarm by checking Danger Area.

Name: MUSTAMAT

☒ On Radar

☒ Danger Area

Add Import Delete

Corner Points of Area

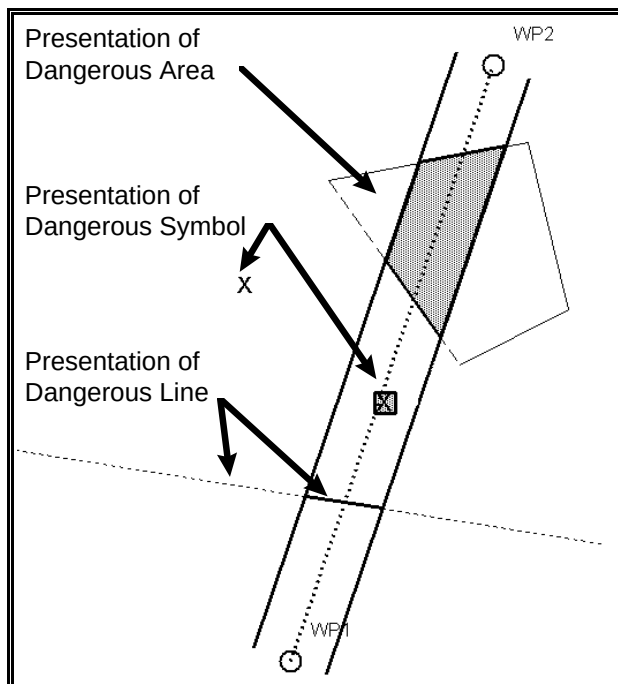
1 / 6

60°22'138"N

028°29.231'E

Add Delete

The figure below shows the behaviour of a dangerous symbol, line and area in the chart alarm check.



11.4 Activating Own Ship Check

Calculation of your ship predicted movement area is done using watch sector from your ship's position. Sector size is defined by time and angle. To set them, do the following:

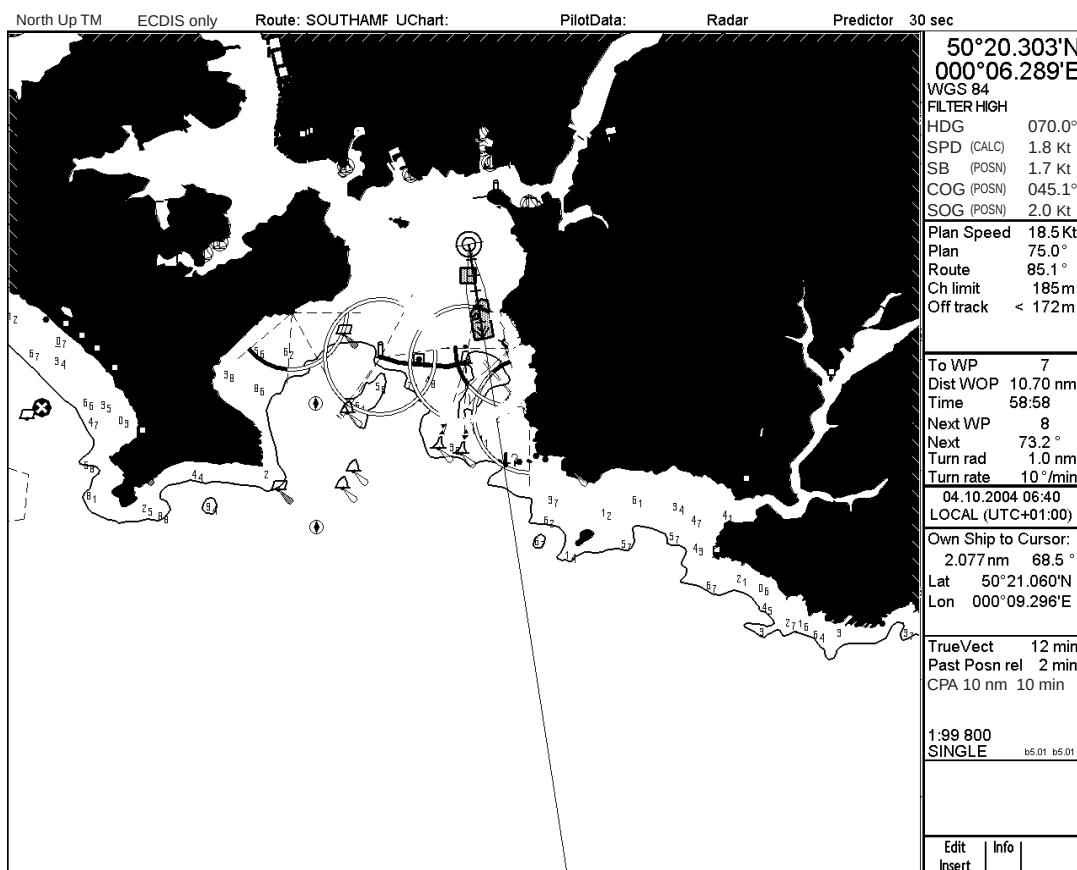
[Initial Settings]	
Set time	
Function keys	
Operation	▶
Parameter Backup	
Digitizer	
Backup and Restore	
Installation parameters	
C-Map Ed3 installation	
Navigation parameters	▶
Chart Alarm parameters	
Optimization parameters	▶
Print Navigation parameters	▶
Print Optimization parameters	▶
Selftest	
Standby	
Presentation library	
Access Server and Diagnostic	▶
Close	

1. Spin the scrollwheel to show Menu/Info/Chart menu in the mouse functions area then push the left mouse button.
2. Roll the wheel to choose Initial Settings then push the scrollwheel.
3. Place the cursor in the Initial Settings dialog box to show the menu displayed at left.
4. Roll the scrollwheel to choose Chart Alarm parameters from the menu then push the scrollwheel.
5. Click the Parameters tab.

Chart Alarms	
Parameters	Alarms
Sector	
Time	6 Min
Angle	12.0 °
Note! Distance limit is 20nm	

6. Set the sector time and sector angle as appropriate.
7. Click the X at the top right corner to close the dialog box.

The figure below and on the next page shows how a watch sector is displayed on the ECDIS display.



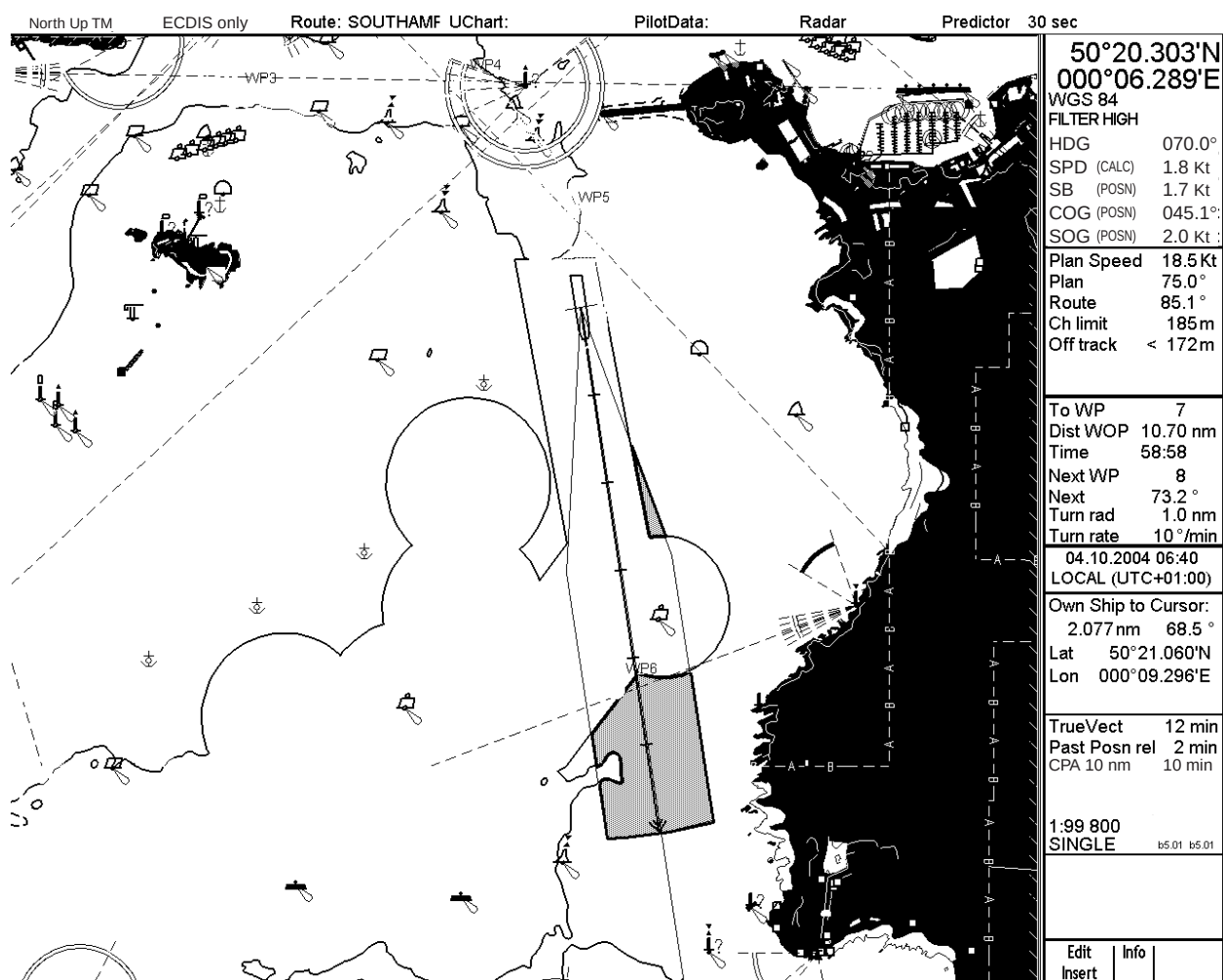


Chart alarm always uses the largest scale chart available no matter which chart is chosen for display.

11.5 Route Planning

The system will calculate chart alarms using operator-defined channel limit for routes. Danger areas are shown highlighted if safety contour or operator-chosen chart alarm areas are crossed by the planned route. For more information on route planning, see Chapter 13 Route Planning.

Note: If your voyage is going to take a long time or you are planning it much earlier than it is to take place, use display and approve dates corresponding to the dates you are going to sail.

You can generate a list of chart alarms that cross by the planned route. This can be done as follows:

1. Enter safety contour you want to use. See section 11.2.1 Choosing safety contour.
2. Plan a route; define waypoints and other necessary information. See Chapter 13 Route Planning.
3. Choose dangerous objects to be monitored during route monitoring, on the Alarms page in the Plan Route dialog box, shown below.
 - a) Open the Plan Route dialog box by selecting UserChart-Plan from the status bar.
 - b) Click the Alarms tab.
 - c) Check the Enable changes box, then click the alarm to process from the Ignore during monitoring list then click the **Indication** or **Alarm** button as appropriate to choose what type of alarm you want.

4. Click the Check tab then click the **Start** button to generate a list of chart alarms.

The system will check a route leg by leg and when finished you will see the number of Legs and Alarms below the tab buttons.

The figure above shows the alarms to be monitored. If there are alarms included in the planned route, check alarms leg by leg, or check alarms by using category of alarm.

11.5.1 Finding chart alarms leg by leg

After you have done chart alarm calculation, the system is able to show you legs on the route where danger areas are located. All the alarms for each leg where alarms occur are shown in the Alarms list. The list of alarms is based on selections made in the Chart alarm parameters sub menu. To find chart alarms by route leg, do the following:

1. In the Check page of the Plan Route dialog box, the Alarms by leg field has a selection box where you may choose desired leg number.

PLAN ROUTE - HELSINKI-HAMBURG / 24.09.2003 13:25

WP Alarms **Check** Parameters Prepare

Legs: 13 Alarms: 11

Alarms by leg

Alarms: Safety Contour
Specially Protected Areas
Restricted Area

Leg: 9 Locate leg

☒ Enable changes

Legs by alarm

Alarm: Safety Contour

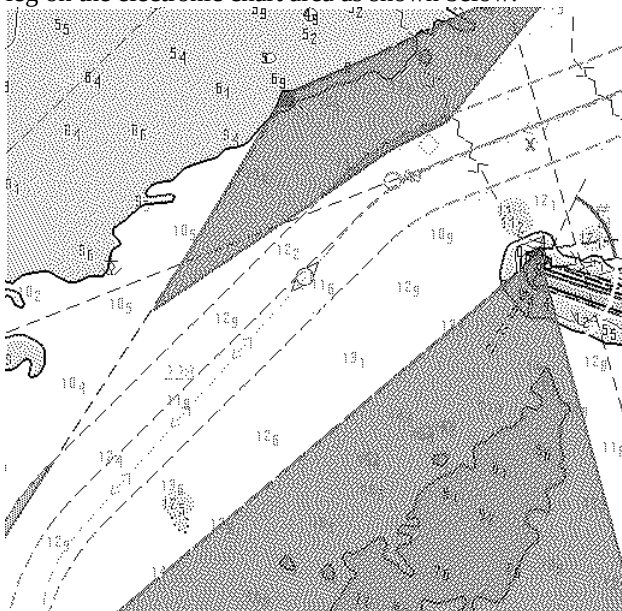
Leg: 1 Locate leg

Start

Planned User Chart
HELSINKI-HAMBURG

Planned Pilot Data
HELSINKI-HAMBURG

2. Choose the Alarm from the Alarms by leg field then click **Locate leg** button. The system will display chosen leg on the electronic chart area as shown below.



11.5.2 Finding chart alarms by category

After you have done chart alarm calculation, the system is able to show you legs on the route where the chart alarms are located. The system can show alarms by their category. To find chart alarms for a route by alarm category, do the following:

1. In the Check page of the Plan Route dialog box, the Legs by alarm field has a selection box where you may choose desired leg number.

PLAN ROUTE - HELSINKI-HAMBURG / 24.09.2003 13:25

WP Alarms **Check** Parameters Prepare

Legs: 13 Alarms: 11

Alarms by leg

Alarms: Safety Contour
Specially Protected Areas
Restricted Area

Leg: 11 **Locate leg**

☒ Enable changes

Legs by alarm

Alarm: Caution Area

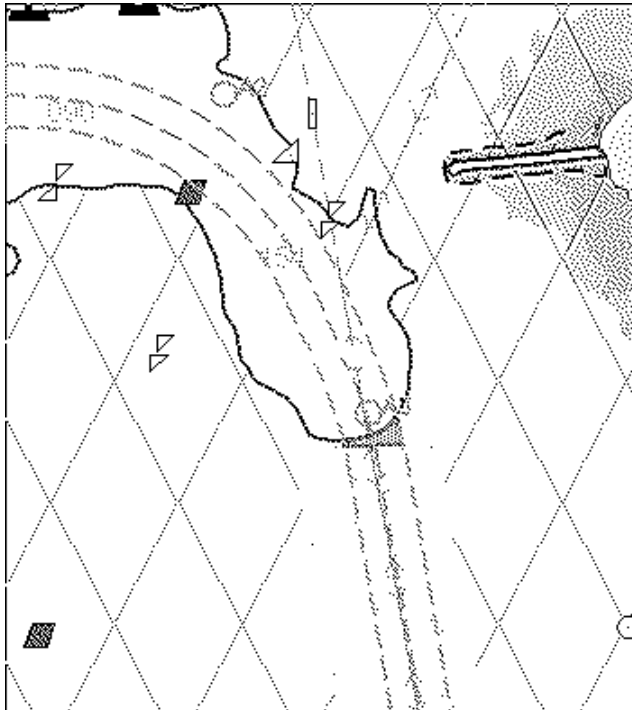
Leg: 1 **Locate leg**

Start

Planned User Chart
HELSINKI-HAMBURG

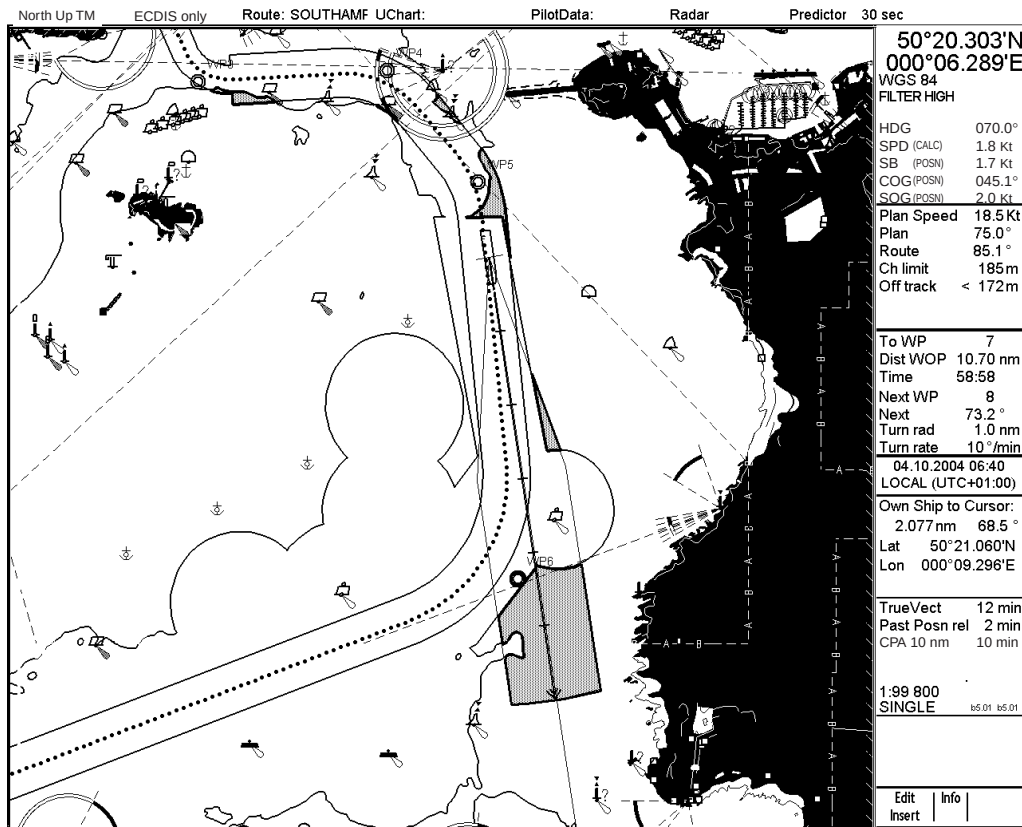
Planned Pilot Data
HELSINKI-HAMBURG

2. Choose the leg number from the Leg field then click **Locate leg** button. The system will display chosen leg on electronic chart area as shown below.



11.6 Route Monitoring

Route monitoring can be divided into two categories: your ship estimated position and monitored route.



The figure above shows how the system highlights chart alarms inside channel limits of a monitored route and inside predicted movement area of your ship.

Note: The system has a route monitor that facilitates safe use of routes. You can check your route plan for safe water and you can attach a user chart and pilot data that you intend to use together with a route plan. To show the route monitor, choose Route-Monitor from the status bar then push the left mouse button to show the Monitor Route dialog box.

If the text "Checked conditions differ" appears at the bottom of the Monitor Route dialog box, use the Alarms page in this dialog box to verify difference between actual and planned situation.

► MONITOR ROUT ...

Monit. Alarms

To WP 8

Timetable

ETA WP

Time

Distance nm

Final WP 20

Time 05 Oct 04 06:14

Distance 212.1 nm

Plan final 05 Oct 04

Off plan -74 min

Suggested 12.2 Kt

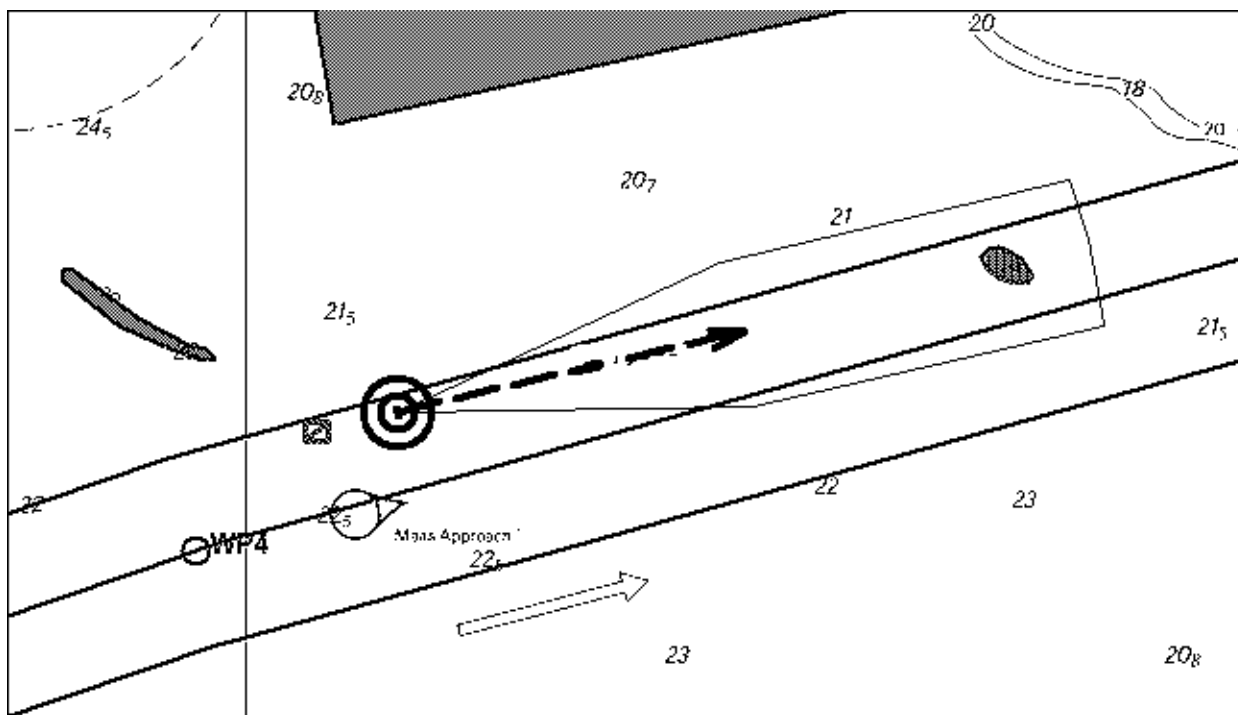
Trial 11.4 Kt

Spd Trial

Checked conditions differ

11.7 Chart Alarm Using ARCS Charts

In case of ARCS charts, the operator can define danger areas by using a user chart. The system can use user chart symbols, lines and areas and calculate chart alarm from this material. For further details, see Chapter 15 User Chart Control.



This figure shows chart alarm used with an ARCS chart. The chart alarm calculation is done with route and predicted movement area of your ship.

To get chart alarm with a user chart, when you start planning of next voyage, do the following:

1. Create a new user chart or choose an existing one in which has been defined symbols have been defined, lines and/or areas for chart alarms. See section 15.6 Creating a User Chart for how to create a user chart.
2. Check that "Chart Alarm Warning Area" is set for display. See section 11.2.3 Highlighting chart alarms for the procedure.
3. Choose user chart danger area indication or alarm position. See section 11.2.2 "Choosing objects used in chart alarms" for the procedure.
4. In the route planning mode, define a new route or choose an existing one. Make chart alarm for the route if there are indications of danger areas along the route. Modify your route if necessary. See section 11.5 Route Planning.
5. Choose route as monitored route, by using Exchange with Monitored in the Route menu.
6. Set watch sector for your ship. See section 11.4 Activating Own Ship Check for the procedure.

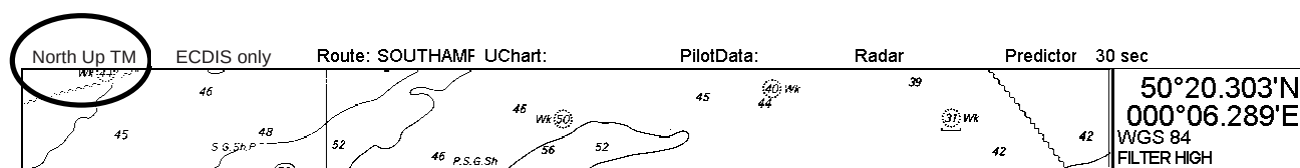
The system is ready for chart alarms based on user chart for monitored route, planned route and your ship.

12. Navigation Tools

12.1 Display Mode and Chart Orientation

There are two display modes to present your ship's movement on the electronic chart. They are true motion, TM, and relative motion, RM. In the true motion mode, the ECDIS shows your ship's position and other movable data such as radar targets moving on the earth-fixed chart background. In the relative motion mode, the ECDIS shows the chart information and radar targets moving relative to your ship's position fixed on the screen.

The display mode currently in use is shown at the top left corner on the screen.



The list below shows the display mode and chart orientation combinations available.

True Motion:

- True Motion North Up
- True Motion Course Up

In the true motion display mode, the orientation of the chart is automatically reset when it reaches the TM reset boundary, or when you use the TM Reset function, accessed from the mouse functions area or the **CU/TM R** key on the keyboard-equipped unit.

Relative Motion:

- Relative Motion North Up
- Relative Motion Course Up
- Relative Motion Route Up

In the relative motion display your ship's position does not change, but the chart display area changes with ship's movement. The orientation of the chart is reset when you use the TM Reset function, accessed from the mouse functions area or the **CU/TM R** key on the keyboard-equipped unit.

Note: When using Route-up RM, the chart is redrawn whenever the chart source is changed.

12.1.1 Choosing desired display mode and chart orientation

Place the cursor on the orientation indication at the top left corner on the screen, spin the scrollwheel to choose orientation desired then push the scrollwheel.

12.2 Navigation Marks

Navigation marks consist of Reference Point, EBL, VRM, Parallel Index and Range Rings. Two sets of these marks are provided on the Nav. Marks dialog box, so that you can arrange each set according to a particular navigation operation. To display the Nav. Marks dialog box, spin the scrollwheel to display Show Value/Info/Nav Marks in the mouse functions area then push the right mouse button.

Note: If you are using the Control Unit RCU-018, the EBLs and VRMs can also be turned on or off from the keyboard.

NAV. MARKS

Set 1 Set 2

☒ Centered Ref. Pt

Display :

☒ Ref. Pt

☒ VRM

☒ EBL

☐ Parallel index

☐ Rings: 4 nm

☐ Info

EBL 035.6 °T

VRM 8.220 nm

Lat 50°24.585'N

Lon 000°00.051'E

Ref. Pt : ConnPos

Lat 50°17.902'N

Lon 000°07.430'W

Set 1 page

Centered Ref. Pt:

Use this to set center for your ship.

Ref. Pt:

Turn on/off the reference point on the electronic chart.

VRM:

Turn on/off the VRM (Variable Range Marker), which is displayed around the reference point.

EBL:

Turn on/off EBL (Electronic Bearing Line), which extends from the reference point.

Parallel index:

Turn on/off the parallel index lines. The distance between the parallel index lines is controlled by adjusting the VRM.

Rings:

Turn on/off the range rings, which circumscribes the reference point. The ring interval depends on scale of displayed chart.

Info:

Turn on/off numerical information about VRM, EBL and reference point.

Set 2 page

Provides a second set of the items contained in Set 1.

12.2.1 Shifting the EBL

With control unit RCU-018

There are two EBLs, No. 1 and No. 2. Each EBL is a straight dashed line extending out from your ship's position up to the edge of the screen. The long dashed line is the No. 1 EBL and the short dashed one is the No. 2 EBL. Press the **EBL ON** key to display either of the EBLs. Successive presses of the **EBL ON** key toggle the active EBL between No. 1 and No. 2. To adjust an EBL, use the EBL rotary encoder, above the **EBL OFF** and **EBL ON** keys. The EBLs can be turned on or off from the Nav Marks dialog box by checking or unchecking EBL on the Set 1 or Set 2 page.

Each EBL carries a range marker, or a short line crossing the EBL at right angles and its distance from the EBL origin is indicated at the VRM readout whether or not the corresponding VRM is displayed. The range marker changes its position along the EBL with the rotation of the VRM rotary encoder. The corresponding VRM must be turned off to use a range marker.

With control unit RCU-015

You have two methods available to adjust the EBL. You can directly enter a numeric value for the EBL on the Nav. Marks dialog box, or you can put the cursor on an EBL, then press and hold down the left mouse button while rotating the trackball. If you locate the cursor over the intersection of a VRM and an EBL, you can adjust them together, using the left mouse button and trackball. (Note that this can also be done from the keyboard-equipped control unit.) The EBLs can be turned on or off from the Nav Marks dialog box by checking or unchecking "EBL" on the Set 1 or Set 2 page.

12.2.2 Shifting the VRM

With control unit RCU-018

There are two VRMs, No. 1 and No. 2, which appear as dashed rings so that you can discriminate them from the fixed range rings. The two VRMs can be distinguished from each other by different lengths of their dashes. Press the **VRM ON** key to display either of the VRMs. Successive presses of the **VRM ON** key toggle the active VRM between No. 1 and No. 2. To adjust a VRM, use the VRM rotary encoder, above the **VRM OFF** and **VRM ON** keys.

With control unit RCU-015

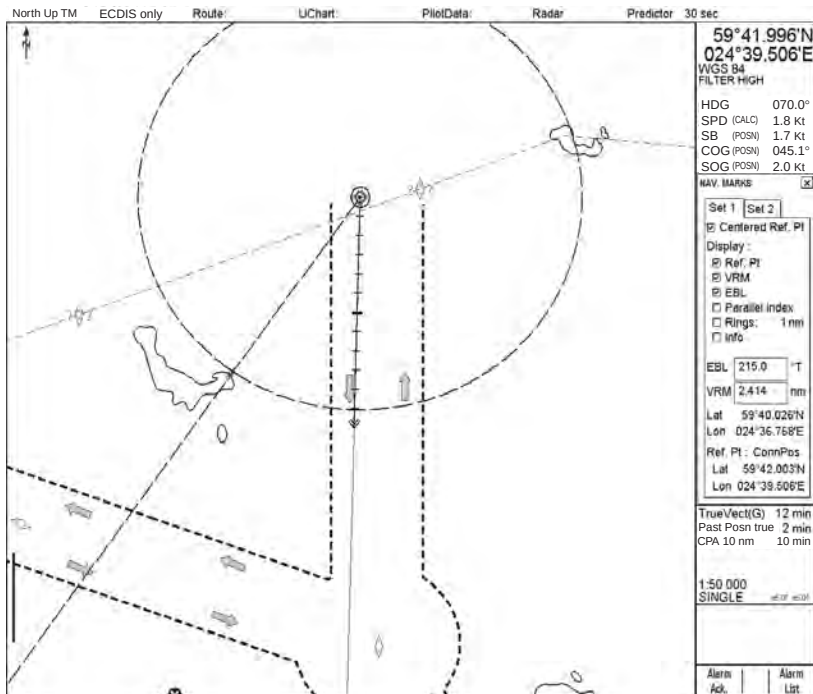
You have two methods available to adjust the VRM. You can directly enter a numeric value for the VRM on the Nav. Marks dialog box, or you can locate cursor over the VRM, then press and hold down the left mouse button while rotating the trackball. If you locate the cursor over the intersection of a VRM and an EBL, you can adjust them together, using the left mouse button and trackball. (Note that this can also be done from the keyboard-equipped control unit.) The VRMs can be turned on or off from the Nav Marks dialog box by checking or unchecking "VRM" on the Set 1 or Set 2 page.

12.2.3 Adjusting the parallel index lines

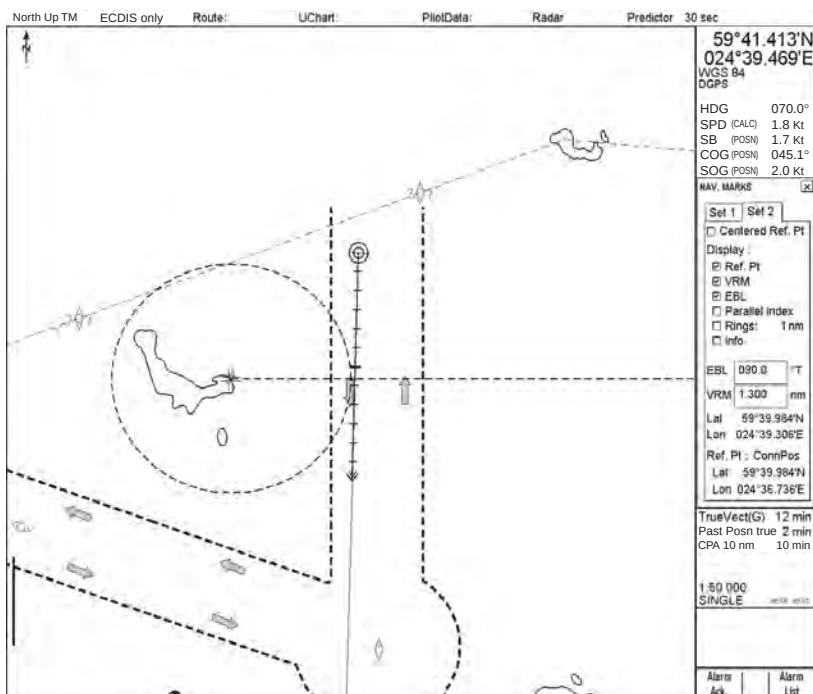
Parallel index lines are useful for keeping a constant distance between your ship and a coastline or a partner ship when navigating. You may control their orientation with the No. 1 EBL and line interval with the No. 1 VRM.

12.2.4 Shifting the reference point

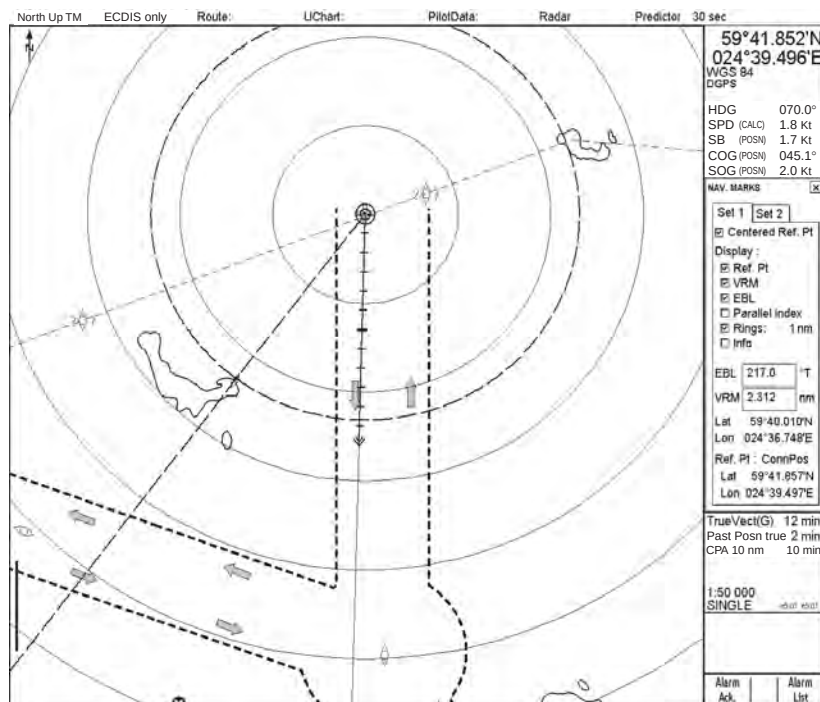
The reference point, shown on the display with a cross mark (if turned on in the Nav Marks dialog box), is a specified location to which measurements of range and bearing are referred. To choose the location for the reference point, open the Nav. Marks dialog box, check Ref. Pt, put the cursor at the location desired then push the right mouse button.



Centered reference point with Variable Range Marker (VRM) and Electronic Bearing Line (EBL)



Reference point off centered with Variable Range Marker (VRM) and Electronic Bearing Line (EBL)



Centered reference point with range ring

12. Navigation Tools

This page intentionally left blank.

13. Route Planning

13.1 Introduction

A route plan defines the navigation plan from starting point to the final destination. The plan includes:

- Route name
- Name, latitude and longitude of each waypoint
- Radius of turn circle at each waypoint
- Safe channel limits
- Chart alarm calculation based on channel limits against chart database and user chart danger
- Deadband width
- Minimum and maximum speed for each leg
- The navigation method (rhumb line, great circle)
- Fuel saving
- ETD for the first waypoint
- ETA for the last waypoint
- Ship and environmental condition affecting the ship speed calculation
- Name of the user chart to use during route monitoring together with this planned route
- Name of the pilot data to use during route monitoring together with this planned route

Using the above-mentioned data, the system calculates speed, course and length for each leg, ETAs for each waypoint, fuel consumption and WOP for the Autopilot FAP-2000. It also calculates safe water areas based on operator-defined channel limits. The calculated data is displayed in tabular form that can be printed as a documented route plan and also stored in a file for later use. The route files thus formed contain the trackpilot commands for each waypoint.

Main functions of route planning are:

- Define waypoints
- Define turnings for each waypoint
- Define channel limits for each leg (a leg is the line connected between two waypoints). The channel limits are used to detect chart alarms when you are planning or monitoring your route.
- Define the speed for each leg
- Calculation for ETD and ETA
- Calculation for most economical sailing

13.2 Main Menu for Route Planning

The main parameters for the route planning are:

- Latitude and longitude of the waypoint
- Channel limits to the waypoint
- Turning radius of the waypoint
- Maximum and minimum speed limits for a leg

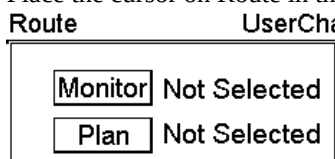
There are two phases for a route: Route Plan and Route Monitor. Route plan is used for planning the route and route monitor is used to control a route for monitoring.

To complete route planning, do the following

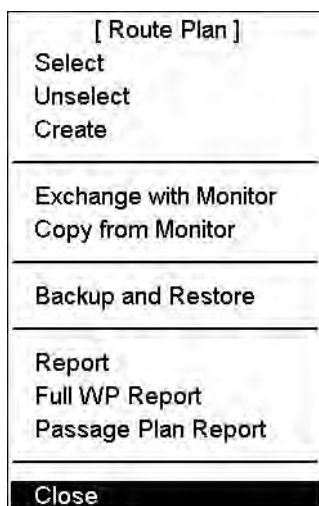
1. Create a new route or choose an existing one. See section 13.4 Creating a New Route.
2. Modify your route if necessary. See section 13.5 Modifying an Existing Route.
3. Make chart alarm (safe water) calculation. See section 13.4.3 Using the check page.
4. Optimize your route. See section 13.6 Route Optimization.

Description of Plan Route menu

1. Place the cursor on Route in the status bar, and the following dialog box appears:



2. Click the **Plan** button to open the Plan Route dialog box. The Plan Route dialog box appears together with the Plan Route menu, shown below.
3. The Plan Route menu is where you select, unselect or create a route. If it is not shown, that is, a route has been selected, you can show it by placing the cursor on the triangle in the Plan Route dialog box.



Select:

Choose an existing route and edit it for use. Choose Select from the menu and push the scrollwheel, and a list box appears. Spin the scrollwheel to choose appropriate route from the list box, push the scrollwheel to confirm then click the **OK** button.

Unselect:

Deselect a route here. The operation is similar to how you select a route.

Create:

Create a new route. An input box appears; enter name for new route, using the scrollwheel. The route name may have up to 30 alphanumeric characters. See also section 13.4 Creating a New Route.

Exchange with Monitored:

This function exchanges planned and monitored routes. Planned route is used both as alternative route and as an editable route.

Copy from Monitored:

Copy monitored route to plan route.

Backup and Restore:

You can make a backup of a route to a floppy disk or restore a route from a floppy disk. See Chapter 17 Backup Operations.

Report:

Generate report of planned route.

Full WP Report:

Generate detailed report of planned route.

Passage Plan Report:

Generate a combined report from active planned route and active pilot data.

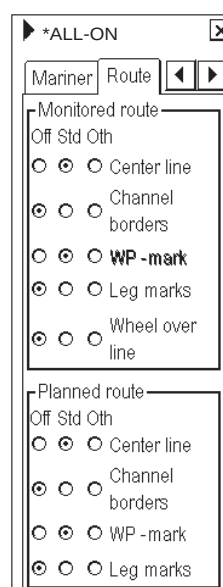
Note: To display a planned route, make sure that desired options of the planned route (Center line, Channel borders, WP marks, Leg marks, etc.) are chosen to either Std or Other on the Route page in the Chart Display dialog box. For the procedure, see below.

PLAN ROUTE - SOUTHAMPTON ROTTERDAM / 03.02.2004 07:27

WP	NAME	Lat	Lon	Leg°	Leg/Nm	Str mode	Rad/Nm	Ch limit/m	Spd min	Spd max
1		50°48.627'N	001°22.306'W		0.0	Rhumb Line	1.0	185	0	20
2		50°45.372'N	001°09.031'W	111.1	9.0	Rhumb Line	1.0	185	0	20
3		50°41.304'N	000°53.101'W	111.9	10.9	Rhumb Line	1.0	185	0	20
4		50°33.981'N	000°42.481'W	137.3	9.9	Rhumb Line	1.0	185	0	20
5		50°33.981'N	000°23.895'W	90.0	11.8	Rhumb Line	1.0	185	0	20

☐ Enable changes WP count 20 Total length 279.2Nm

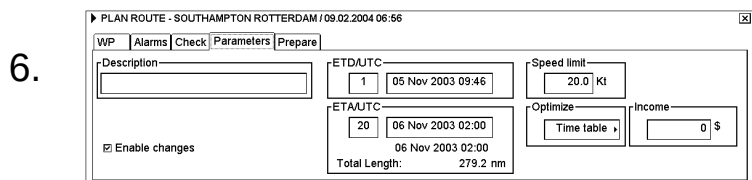
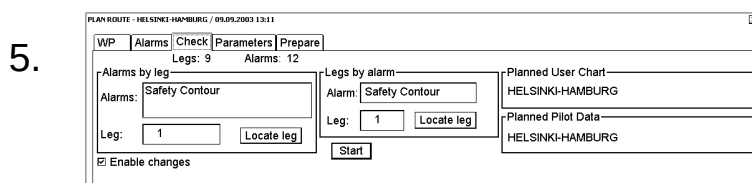
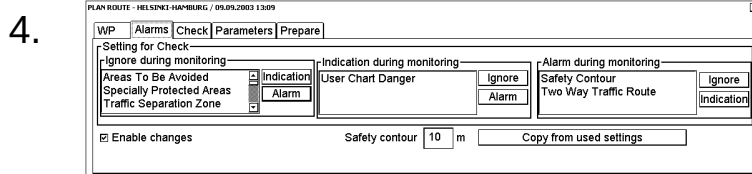
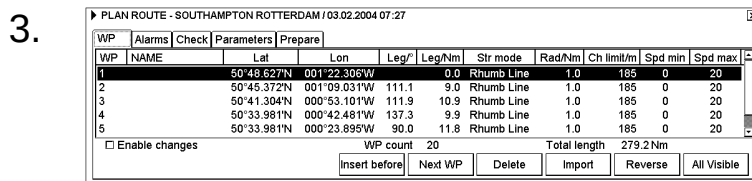
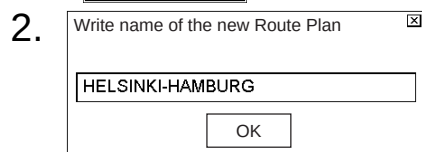
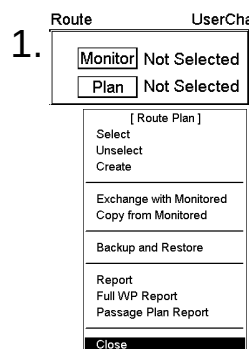
Spin the scrollwheel to display Chart Display/Info/Standard Display in the mouse functions area then click the left mouse button to open the Chart Display dialog box. Click the arrow tabs or right mouse button (or **NEXT** key on the keyboard-equipped control unit) to choose the Route page.



13.3 Choosing Datum

Selection of datum is very important, especially if you manually enter latitude-longitude positions or if you use a digitizer. If you use the cursor to add and to modify waypoint locations, then you could use any datum, although it is recommended to use native datum of the chart. For more information to choose datum, see section 15.3 Choosing Datum.

13.4 Creating a New Route



To make a complete route for a voyage, do the following:

1. Place the cursor on Route in the status bar, then click the **Plan** button to open the Plan Route dialog box with Route Plan menu. (If the menu does not appear, put the cursor on the triangle in the dialog box.) Choose Create from the menu and push the scrollwheel.
2. Enter a name (max. 30 alphanumeric characters) for the route by spinning the scrollwheel to choose character desired and confirming desired character by pushing the scrollwheel. When name is ready, click the **OK** button.
3. Check Enable changes in the Plan Route dialog box. Choose position of a waypoint by placing the cursor on the location desired on the electronic chart display then pushing the left mouse button. After entering a waypoint, edit Name, Steering mode, Radius, Channel limit and Speed (Min, Max) as appropriate in the Plan Route dialog box. (Place the cursor on an item, spin the scrollwheel to change value then push the scrollwheel.) Do this for all waypoints of your route.
4. Use the Alarms page to define safety contour and other specified conditions for checking the route. Choose item from a list then click **Indication** (to get a visual indication), **Alarm** (to get the audible alarm) or **Ignore** (to remove check item) button as appropriate.
5. Use the Check page to detect areas where depth is less than the safety contour or where specified conditions exist. The ECDIS can examine chart database against planned route to make a list of alarms where a route crosses a safety contour or specified areas used in chart alarms. To create a list of alarms, click the **Start** button.
6. Use the Params page to enter Estimated Time of Departure (ETD) and Estimated Time of Arrival (ETA), if you are using Time table optimizing. Choose desired optimizing mode from the Optimize window.

To print a waypoint report, open the Plan Route dialog box, put the cursor on the triangle to show the Plan Route menu, choose Report or Full Report from the menu then push the scrollwheel. Click the **Print Text** button. (If you want to change the font size, put the cursor on the triangle, choose font size then push the scrollwheel, before clicking the **Print Text** button.)

13.4.1 Processing waypoints

PLAN ROUTE - SOUTHAMPTON ROTTERDAM / 03.02.2004 07:27

WP Alarms Check Parameters Prepare

WP	NAME	Lat	Lon	Leg/°	Leg/Nm	Str mode	Rad/Nm	Ch limit/m	Spd min	Spd max
1		50°48.627'N	001°22.306'W		0.0	Rhumb Line	1.0	185	0	20
2		50°45.372'N	001°09.031'W	111.1	9.0	Rhumb Line	1.0	185	0	20
3		50°41.304'N	000°53.101'W	111.9	10.9	Rhumb Line	1.0	185	0	20
4		50°33.981'N	000°42.481'W	137.3	9.9	Rhumb Line	1.0	185	0	20
5		50°33.981'N	000°23.895'W	90.0	11.8	Rhumb Line	1.0	185	0	20

☐ Enable changes

WP count 20 Total length 279.2 Nm

Insert before Next WP Delete Import Reverse All Visible

Following fields and buttons can be found in the WP page.

Enable changes: Check to edit waypoints.

Note: Routes can only be modified in the North-up or Course-up mode.

WP: Each waypoint has a number.

NAME: You can name each waypoint.

Lat: WP's latitude co-ordinate is displayed in chosen datum.

Lon: WP's longitude co-ordinate is displayed in chosen datum.

Leg/° Bearing of leg

Leg/Nm: Leg's length (nm)

Str mode: Define steering mode, rhumb line or great circle, for each leg.

Radius/Nm: Define turning radius for each waypoint.

Chl limit/m : Define channel limit for each leg.

Spd min: Define minimum speed of ship used with a leg.

Spd max: Define maximum speed of ship used with a leg.

Insert before: Insert a new waypoint before the current waypoint.

Next WP: Add a new waypoint after current waypoint. You can define direction and distance for next waypoint.

Delete: Delete current waypoint.

Import: Import new waypoints from already existing routes into your current route.

Reverse: Reverse sailing order of the entire route.

All Visible: Center line, channel borders, WP marks and leg marks are made visible on top of the electronic chart.

13.4.2 Alarms page

The Alarms page lets you define conditions along a route for which you want to be alerted, by visual or audible indication. (You cannot get both visual and audible indications for a condition.) You can choose safety contour and chart alarms used to check the safety of the route. This allows you to check safety with conditions different from those chosen for system use. This is useful when making a route for different loading or sailing conditions.

Enable changes

Check here in order to enable editing.

Note: A route may only be modified when using the north-up or course-up mode.

Ignore during monitoring

Chart objects in this list box are not used for chart alarm calculation.

Indication during monitoring

Chart objects in this list box are used for chart alarm calculation. Only the visual alarm is released.

Alarm during monitoring

Chart objects in this list box are used for chart alarm calculation. Both visual and audible alarms of chosen chart objects are generated by the system.

Safety contour

Deep contour chosen for chart alarm calculation

Copy from used settings

Copy system settings to here.

13.4.3 Using the check page

The Check page allows you to make safe water calculation for your route. You also store the names of the user chart and pilot data to use during route monitoring together with planned route on this page. This storage happens when you activate the safe water calculation by pushing the **Start** button. The stored names are the names of the planned user chart and planned Notes.

The time used for the Chart Alarm check is subject to chart data base and route distance. When the **Start** button is clicked, one of the dialog boxes shown below appears as a reminder. To continue, click the **Yes** button.

If selected scale for displayed chart(s) is smaller than 1:5000 00, Chart Alarm calculation is not performed. In this case use scale range 1:1 000 – 1: 500 00 .

Note 1: In order to display charts with correct updated situation, always use current date during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage.

Note 2: In order to display charts with correct updated situation during route planning, always use planned date of each waypoint to check your plan.

13.4.4 Using the parameters page

The Parameters page allows you to set departure time and arrival time for your route. Also optimisation type is chosen in this page.

Enable changes: Check in order to enable editing.

Note: A route may only be modified when using the north-up or course-up mode.

Description: Enter note concerning the route.

ETD/UTC: Planned estimated time of departure from a specified waypoint. (1 is automatically the first waypoint)

ETA/UTC: First part is planned estimated time of arrival to last waypoint. (0 is automatically the last waypoint). ETA can be calculated between two specified waypoints.
Second part is calculated ETA that may differ from planned ETA if it is impossible for them to agree with chosen optimization method. Also total length of the route is displayed.

Speed limit: Set speed limit for a route.

Income: Budget for this voyage. (Income * 1000\$)

Optimize: Optimize types are max. speed, timetable, max profit and min. cost. (Description is provided in section 13.6.1 Available route optimization strategies.)

Optimizing your route

After all waypoints are inserted and you have made safe water calculation, you can optimize your route. If not chosen, then optimisation will be done automatically with max. speed. If you want do optimization with specific strategy, see section 13.6.1 Available route optimization strategies.

13.4.5 Using the prepare page

The Prepare page allows you to prepare for exchange of planned route with monitored route. Use this page if you are going to use the exchange function to choose planned route as monitored route. If you do not use this page to define To WP and Final WP for steering in the planning mode, ECDIS will choose the most suitable To WP based on your ship's position and Final WP based on waypoint selected on the Parameters page.

PLAN ROUTE - HELSINKI-HAMBURG / 09.09.2003 13:41

WP

Alarms

Check

Parameters

Prepare

Prepare for exchange with Monitored

To WP

2

Max speed

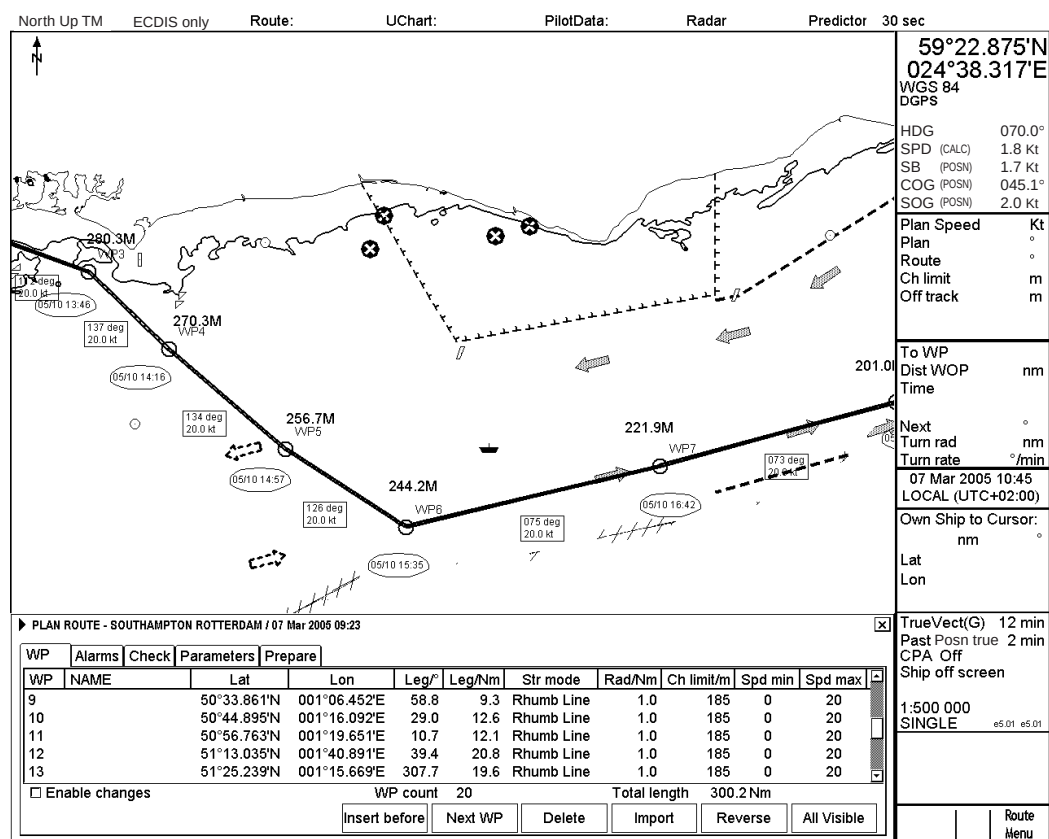
ETA

Final WP

13

11 Sep 03 14:55

13.5 Modifying an Existing Route



Modifying an existing route

13.5.1 Parameters

Main parameters for the route planning are:

- Latitude and longitude of the waypoint
- Channel limits to the waypoint
- Turning radius of the waypoint
- Maximum and minimum speed limits for a leg

13.5.2 Changing waypoint position

To change position of a waypoint you have following alternatives:

- Enter latitude and longitude on the WP page in the Plan Route dialog box.
- Enter distance and direction for next waypoint.
- Drag and drop waypoint using the left mouse button.

Entering latitude and longitude in position field

1. Place the cursor on Route in the status bar, click the **Plan** button to open the Plan Route dialog box then click the WP tab.
2. Check Enable changes, then choose desired WP. Place the cursor in the Lat or Lon field as appropriate, spin the scrollwheel to set co-ordinates then push the scrollwheel to confirm.

Entering distance and direction for next waypoint

Position of WP can be defined using distance and direction between two waypoints.

1. Place the cursor on Route in the status bar, click Plan to open the Plan Route dialog box then click the WP tab.
2. Check Enable changes, then highlight number of WP by cursor then push the left mouse button.
3. Click the **Next WP** button, and the following dialog box appears.

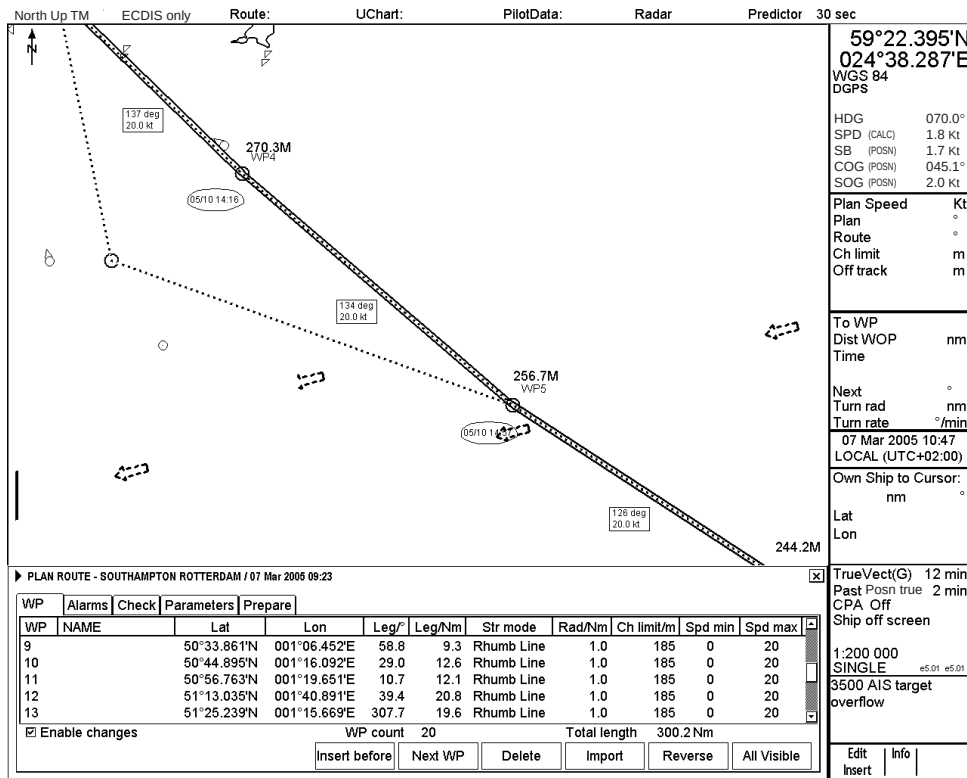
INSERT/MODIFY NEXT WP	
Current Wp: 5 Name PILOT Lat 50°45.372'N Lon 001°09.031'W Next Wp Direction of Wp 111.9 Distance to Wp 10.90 nm Ok	

4. Enter Direction and Distance in respective box in the Next WP field then click the **OK** button.

13. Route Planning

Dragging and dropping waypoint to new position

1. Place the cursor on Route in the status bar, click Plan to open the Plan Route dialog box then click the WP tab.
2. Check Enable changes, then put the cursor on the waypoint you want to process.
3. Press and hold down the left mouse button while rolling the trackball to move the cursor to a desired position. Keep the button pressed down while you move the cursor and release it when the cursor is at desired position.



Drag and drop waypoint to new position (in this case waypoint number 9 is taken to a new position)

13.5.3 Changing other waypoint data

To change other data of a waypoint, such as name, steering mode, turning radius, min/max speed, do the following:

1. Place the cursor on a desired field and spin the scrollwheel to change data.
2. Push the scrollwheel to confirm changes.

13.5.4 Adding a new waypoint at the end of a route

There are two ways that you can add a new waypoint at the end of a route:

- Use the cursor and left mouse button to define position of a waypoint.
- Use the **Next WP** button in the WP page.

To add a new waypoint by using the left mouse button, do the following:

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Click the WP tab to open the WP page. Check Enable changes.
2. Place the cursor in the electronic chart area on the location desired for a waypoint then push the left mouse button. The waypoint is added at the end of route.
3. Modify data of added waypoint.

To add a new waypoint by the Next WP button, do the following:

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Click the WP tab to open the WP page. Check Enable changes.
2. Choose last waypoint.
3. Click the **Next WP** button in the Waypoints page. Enter direction and distance for waypoint then click the **OK** button.

INSERT/MODIFY NEXT WP	
Current Wp: 5	
Name	PILOT
Lat	50°45.372'N
Lon	001°09.031'W
Next Wp	
Direction of Wp	111.9 °
Distance to Wp	10.90 nm
Ok	

13.5.5 Inserting a waypoint

If you want to insert a waypoint between two waypoints, use the **Insert before** button, on the WP page. This inserts a waypoint next to current waypoint. For example, you want insert a new waypoint between waypoints 6 and 7. Choose WP 7 then click the **Insert before** button. The new waypoint will be inserted between WP 6 and WP 7. WP is highlighted on WP list.

13.5.6 Deleting a waypoint

To delete a waypoint, do the following:

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Click the WP tab to open the WP page. Check Enable changes.
2. Highlight WP number on WP list that you wish to delete.
3. Click the **Delete** button.

13.5.7 Importing waypoint from other routes

You are able to choose waypoints from other routes to import them to current route. To import waypoints do the following:

1. Place the cursor on Route in the status bar then click Plan to open the Plan Route dialog box. Click the WP tab to open the WP page. Check Enable changes.
2. Click the **Import** button. The following dialog box appears.

WP IMPORT	
Copy from	
Route	SOUTHAMPTON ROTTERDAM
Wp total	30
First wp to copy	8
Number of wp's	23
Copy Copy from ext. device	
Copy to	
Route	PLYMOUTH-RDAM
Wp total	25
Copy after wp	14
Copy before wp	15
Copying order	Direct

3. In the Copy from window, put the cursor in the Route box, spin the scrollwheel to choose the route from which to copy waypoints then push the scrollwheel.
4. Enter first waypoint to copy in "First wp to copy". Spin the scrollwheel to choose WP number then push the scrollwheel.
5. Enter number of waypoints to copy in "Number of wp's". Spin the scrollwheel to choose desired number then push the scrollwheel.
6. Enter where to import waypoints. To enter them after a WP in a route, enter waypoint number in the "Copy after wp" box. If you want to enter them before a WP in the route where WPs will be imported, enter waypoint number in the "Copy before wp" box. Spin the scrollwheel to choose desired number then push the scrollwheel.
7. Choose copying order, Direct or Reverse. "Direct" copies the waypoints in their original order; "Reverse" copies them in reverse order. Spin the scrollwheel to choose desired option then push the scrollwheel.
8. Click the **Copy** button.
9. When finished, click X at top right corner of the dialog box to close the dialog box.

13.5.8 Importing waypoint from external device (GP-80 or GP-90)

You are able to import waypoints from other External Device, like FURUNO GP-80 or GP-90 GPS Navigator to current route. To import waypoints do the following:

1. Place the cursor on Route in the status bar then click Plan to open the Plan Route dialog box. Click the WP tab to open the WP page. Check Enable changes.
2. Click the **Import** button. The following dialog box appears.

Enter where to import waypoints. To enter them after a WP in a route, enter waypoint number in the "Copy after wp" box (if applicable). If you want to enter them before a WP in the route where WPs will be imported enter waypoint number in the "Copy before wp" box.

Spin the scrollwheel to choose desired number then push the scrollwheel.

3. Press the **Copy from ext. device** button.

When text "Import from ext. device: Waiting messages" appears, you can start importing WPs from a GPS Navigator.

When WPs are imported, you can monitor progress of it as it is shown picture above.

When it is ready you will have "Transfer ready" message as shown picture above.

4. Click the **Done** button.
5. When finished, click X at top right corner of the dialog box to close the dialog box.

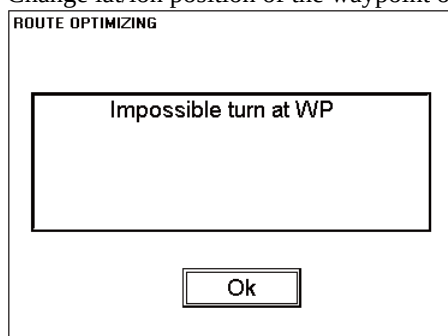
13.5.9 Reversing sailing order of a route

You may reverse the order of waypoints in a plan route. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Click the WP tab to open the WP page. Check Enable changes. Click the **Reverse** button.

13.5.10 Geometry check of route

When you added a new waypoint, modify a waypoint or change other waypoint data, the message "Impossible turn at WPXX" (XX=waypoint number) may appear (in red). It means that the geometry of route makes it impossible for the ship to sail along a certain leg. Typically it is enough if you do the following, on the WP page in the Plan Route dialog box.

1. Decrease the radius of turn of the waypoint or one of its neighbors.
2. Change lat/lon position of the waypoint or its neighbors.



13.6 Route Optimization

13.6.1 Available route optimization strategies

After all waypoints are inserted, the route is optimized from the Parameters page in the Plan Route dialog box. Optimization calculates all parameters for route steering (course and distance between two waypoints, maneuvering start point, WOP, etc.). There are four methods for optimization:

Max Speed:

This calculation uses the maximum speed defined in the ship parameters and multiplies by all reduction factors (weather, ice, fouling, etc.) together with speed limits given for each waypoint to generate ETA. ETA may be entered, however it is calculated with operator-entered ETD and Speed limit. ETA and ETD are shown on the Monitor display (see the figure on page 14-3).

Time Table:

Calculates the speed required in order to arrive at destination at required ETA. Maximum speed is never exceeded. The operator enters ETD and ETA to calculate speed to use. * If, the operator-entered ETA is earlier than that found with the Max. Speed calculation, the Max. speed-calculated ETA will be indicated below the Time Table ETA calculation figure.. The calculated speed is shown on the Monitor display as "Suggested **.Kt".

Max. Profit:

Based on ETD, this calculation takes in account the fuel cost and the fixed cost of the ship and calculates the most profitable speed (highest profit per time unit). You need to set Optimization parameters beforehand to use this feature. For further details, see section 25.1.5 Optimization parameters setting.

Min. Cost:

Based on ETD, this calculation takes in account the fuel cost and the fixed cost of the ship and calculates the speed that gives the minimum total cost. You need to set Optimization parameters beforehand to use this feature. For further details, see section 25.1.5 Optimization parameters setting.

13.6.2 Optimizing a route

You can define Estimated Time of Departure (ETD), desired number of waypoints and Estimated Time of Arrival (ETA) on the Parameters page in the Plan Route dialog box to optimize your route.

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Click the Parameters tab to open the Parameters page. Check Enable changes.
2. Choose desired optimization strategy from the Optimize field. Spin the scrollwheel to choose desired strategy then push the scrollwheel.
3. Enter speed limit, ETC/UTC, ETA/UTC (Max. speed not required) in respective boxes.

In case of optimization by "max. speed"

With entered EDT as reference, ETA is calculated with entered speed limit. ETA may be entered in ETA/UTC box, however ETA is shown below it.

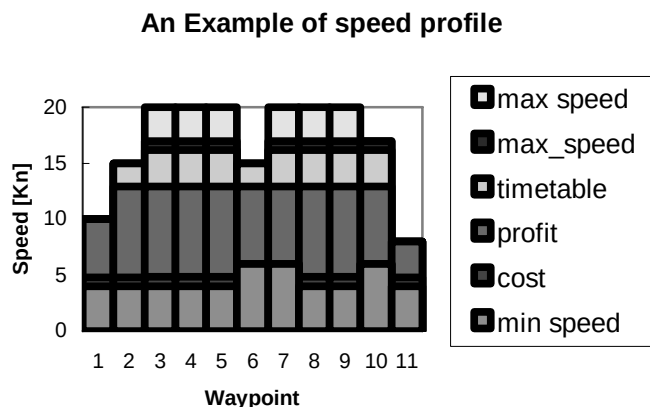
The monitor display shows ETD, speed limit and calculated ETA.

13.6.3 Planning a speed profile

A speed profile is defined by general max. speed and optimization types. These values are given while planning a route. You can define speed limit and optimize type in the Parameters page of the Plan Route dialog box and in the WP page of the Plan Route dialog box you can give min. and max. speed for each leg. The table and illustration below demonstrate how different optimize types and speed limits influence speed.

max speed (general)						17
wp	min speed	cost	profit	timetable	Max speed	max speed
1	4	4.8	10.0	10.0	10	10
2	4	4.8	12.9	15.0	15	15
3	4	4.8	12.9	16.2	17	20
4	4	4.8	12.9	16.2	17	20
4	4	4.8	12.9	16.2	17	20
5	6	6.0	12.9	15.0	15	15
6	6	6.0	12.9	16.2	17	20
7	4	4.8	12.9	16.2	17	20
8	4	4.8	12.9	16.2	17	20
9	6	6.0	12.9	16.2	17	17
10	4	4.8	8.0	8.0	8	8

13. Route Planning



13.7 WP Table Report

This report is generated when you choose Report from the Plan Route menu. To display the report viewer, choose Route-Plan from the status bar, put the cursor on the triangle in the Plan Route dialog box, choose Report then push the scrollwheel. To close the report viewer, click X in the right corner of the report viewer. The report may be printed by clicking the **Print Text** button.

WP report consists information of:

- Position of waypoints
- Planned speeds
- Planned courses
- Distances between waypoints. Distance is not directly calculated from LAT and LON values of WP's location, but the distance is shorter distance compensated for planned radius for each waypoint.
- Estimated times of arrival (ETA)
- Planned fuel consumption
- Total distance of route. Distance is not directly calculated from LAT and LON values of WP's location, but the distance is shorter distance compensated for planned radius for each waypoint.

TEXT VIEW - ROUTE PLANNING REPORT

PLAN SUMMARY SOUTHAMPTON ROTTERDAM 09.02.2004 07:18 Datum: WGS 84

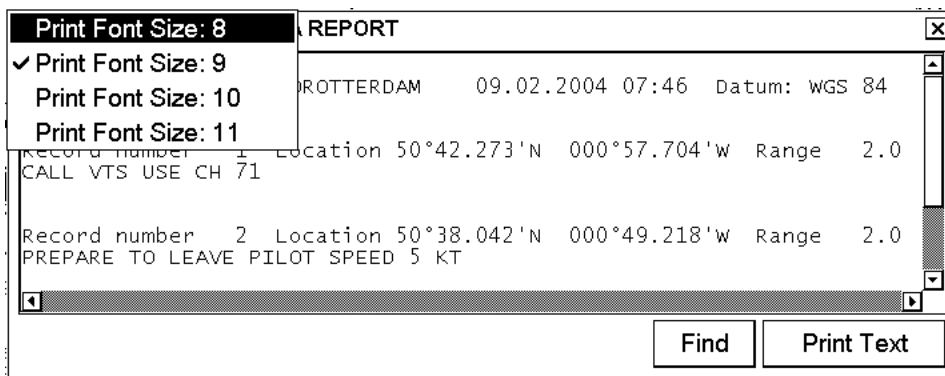
WP	LAT	LON	SPD	CRS	M	LEG	REMAIN	ETA (UTC)	HFO	DO
1	50°48.627'N	001°22.306'W	17.2	111.1	R	9.0	279.2	05.Nov.2003 09:46	0	0
2	50°45.372'N	001°09.031'W	17.2	111.9	R	10.9	270.1	05.Nov.2003 10:17	0	0
3	50°41.304'N	000°53.101'W	17.2	137.3	R	9.9	259.2	05.Nov.2003 10:55	0	0
4	50°33.981'N	000°42.481'W	17.2	90.0	R	11.8	249.3	05.Nov.2003 11:30	0	0
5	50°33.981'N	000°23.895'W	17.2	79.1	R	12.9	237.5	05.Nov.2003 12:11	0	0
6	50°36.422'N	000°03.983'W						05.Nov.2003 12:56	0	0

Find Print Text

Changing font used in report

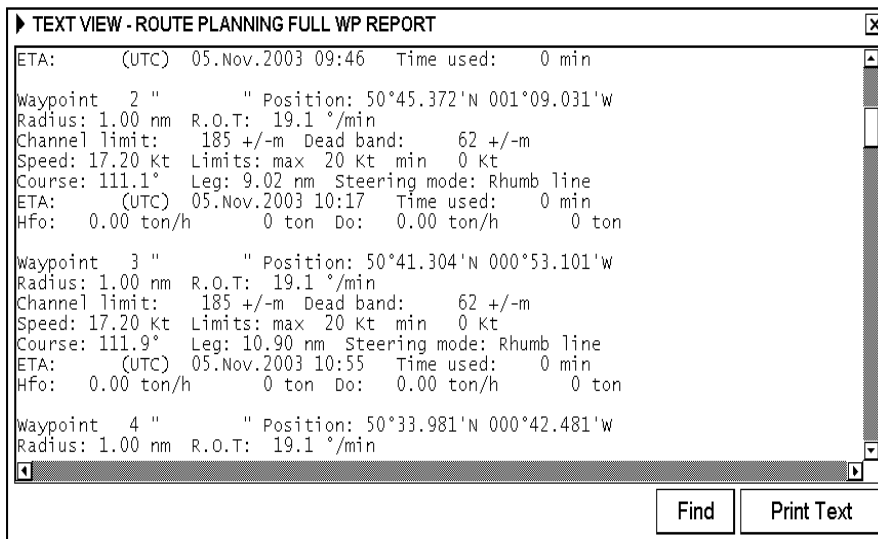
If you want to change the size of the font for the report:

1. Place the cursor on the triangle in the report window.
2. Choose desired option from the list then push the scrollwheel.



13.8 Full WP Report

The Full WP Report provides detailed information on each waypoint in a plan route. To display the report viewer, Place the cursor on the triangle in the Plan Route dialog box, choose Full WP Report from the menu then push the scrollwheel. The report may be printed by clicking the **Print Text** button.



13.9 Passage Plan Report

Passage Plan report generates WP report together with pilot data report. The system automatically attaches pilot data from the planning mode on the route plan when you choose the Passage Plan report. To display the report viewer, choose Route-Plan from the status bar, put the cursor on the triangle in the Plan Route dialog box, choose Passage Plan Report from the menu then push the scrollwheel. To close the report, click X in the right corner of the report viewer. The report may be printed by clicking the **Print Text** button.

The example below shows that a passage plan has been generated using the route plan "SOUTHAMPTON ROTTERDAM" and pilot data generated for "SOUTHAMPTOROTTERDAM".

► TEXT VIEW - ROUTE PLANNING REPORT

PLAN SUMMARY SOUTHAMPTON ROTTERDAM 09.02.2004 07:18 Datum: WGS 84

WP	LAT	LOn	SPD	CRS	M	LEG	REMAIN	ETA (UTC)	HFO	DO
1	50°48.627'N	001°22.306'W	17.2	111.1	R	9.0	279.2	05.Nov.2003 09:46	0	0
2	50°45.372'N	001°09.031'W	17.2	111.9	R	10.9	270.1	05.Nov.2003 10:17	0	0
3	50°41.304'N	000°53.101'W	17.2	137.3	R	9.9	259.2	05.Nov.2003 10:55	0	0
4	50°33.981'N	000°42.481'W	17.2	90.0	R	11.8	249.3	05.Nov.2003 11:30	0	0
5	50°33.981'N	000°23.895'W	17.2	79.1	R	12.9	237.5	05.Nov.2003 12:11	0	0
6	50°36.422'N	000°03.983'W						05.Nov.2003 12:56	0	0

Find Print Text

An example of WP report

► TEXT VIEW - PILOT DATA REPORT

PILOT DATA SOUTHAMPTOROTTERDAM 09.02.2004 07:46 Datum: WGS 84

Record number 1 Location 50°42.273'N 000°57.704'W Range 2.0
CALL VTS USE CH 71

Record number 2 Location 50°38.042'N 000°49.218'W Range 2.0
PREPARE TO LEAVE PILOT SPEED 5 KT

Find Print Text

An example of pilot data report

► TEXT VIEW

Passage plan: Route: SOUTHAMPTON ROTTERDAM Pilot Data: SOUTHAMPTOROTTERDAM

09.02.2004 07:27 Datum: WGS 84

WP	Lat	Lon	Leg Length	Cumul Length
1:	50°48.627'N	001°22.306'W	0.0	0.0
2:	50°45.372'N	001°09.031'W	9.0	9.0
PilotData (1):	50°43.194'N	001°00.499'W	5.8	14.9
Text:	CALL VTS USE CH 71			
PilotData (1):	50°41.708'N	000°54.683'W	15.6	24.7
Text:	CALL VTS USE CH 71			
3:	50°41.304'N	000°53.101'W	10.9	19.9
PilotData (2):	50°39.752'N	000°50.848'W	1.9	21.8
Text:	PREPARE TO LEAVE PILOT SPEED 5 KT			

Find Print Text

An example of a passage plan report. Pilot data text notes are placed between waypoints based on their position (in which leg defined Pilot data will be activated)

14. Route Monitoring

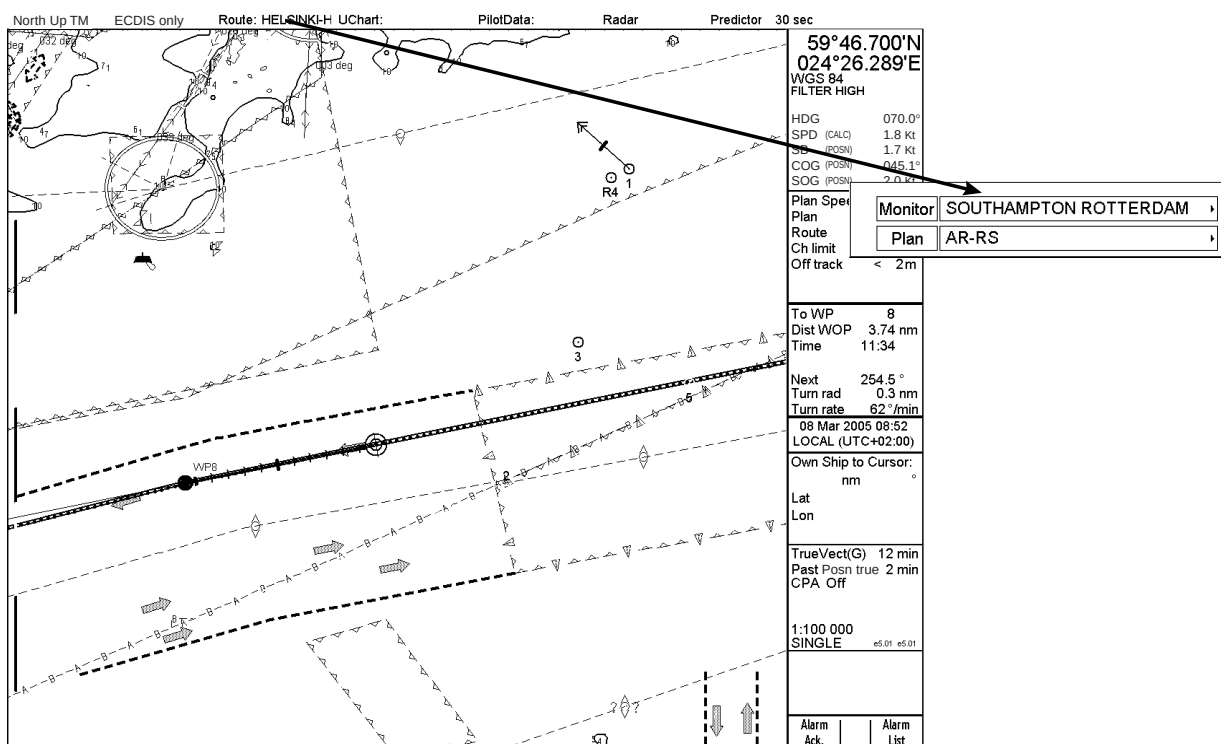
14.1 Introduction

Route monitor is a means for permanent monitoring of the ship's behavior relative to the monitored route. The information area displays the data on the ship's position relative to the monitored route. The monitored route consists of the following information, displayed in the electronic chart area:

- The route is displayed with red dots.
- The limits of channels of each leg are displayed with solid red lines. These limits are used to detect chart alarms when you are monitoring the route. For further details, see section 11.2 Chart Alarms.
- Each leg has information about planned speed, shown inside a rectangle.
- Each leg has information about planned course to steer.

Note: In order to display charts with correctly updated situation, always use current date as Approve Until and Display Until during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage. For more information, see section 8.12 Chart Viewing Dates and Seasonal Features of the Vector Chart.

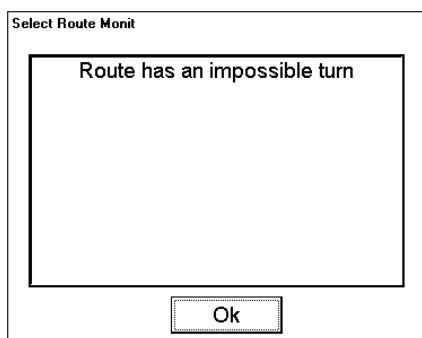
14.2 Choosing Route to Monitor



To choose the route to monitor, put the cursor on Route in the status bar, put the cursor in the Monitor combo box, spin the scrollwheel to choose route then push the scrollwheel.

14. Route Monitoring

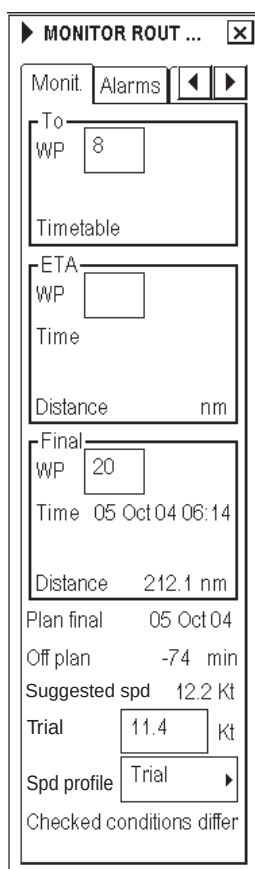
Note: When you choose a route for monitoring, the message shown below may appear when the geometry of the route makes it impossible to sail the ship. Choose the Plan Route dialog box and make necessary modifications.



14.3 Choosing TO Waypoint

When the connected ARPA radar is FURUNO or ARPA radar that communicates using IEC 61162-1 standard the monitor dialog box looks like the figure at right. Note that there is no control for visibility of monitored route in this dialog box.

To display this dialog box, choose Route from the status bar then click the **Monitor** button.



When you have chosen a route to monitor, the system chooses a next waypoint automatically. Check that the To waypoint is the desired one. The ECDIS will automatically advance to a next waypoint when you pass the To waypoint.

The ECDIS automatically sets the last waypoint of your monitored route as the final waypoint.

To choose To waypoint, do the following:

1. Open the Monitor Route dialog box, choose Route from the status bar then click the **Monitor** button.
2. Place the cursor in the To WP box then spin the scrollwheel to choose desired WP.
3. Push the scrollwheel to confirm your selection.

14.4 Choosing Final Waypoint

Normally you use the last waypoint in a monitored route as the final waypoint, and the ECDIS automatically does this when you choose the route to monitor. However, sometimes you may prefer to use some other waypoint as the final waypoint of a monitored route.

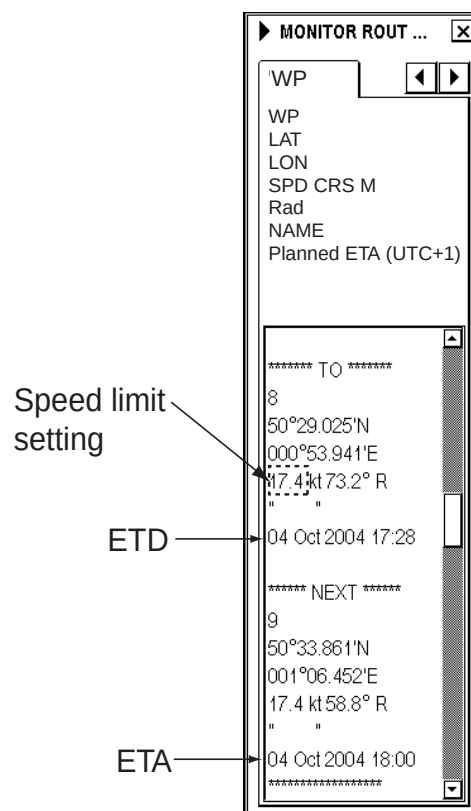
To choose a waypoint as final waypoint, do the following:

1. Open the Monitor Route dialog box; choose Route from the status bar, then click the **Monitor** button.
2. Place the cursor in the Final WP box; spin the scrollwheel to choose a waypoint.
3. Push the scrollwheel to confirm your selection.

14.5 Viewing Waypoint Information

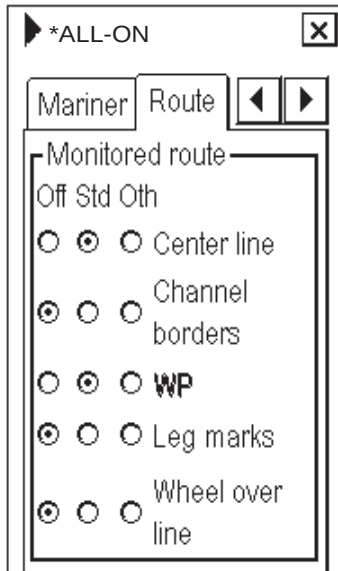
You can view waypoint information for the monitored route by clicking the Waypoints tab in the Monitor Route dialog box. This information is printed from route planning information made for this voyage.

"TO WP" and "NEXT WP" are indicated on this list.



14.6 Displaying a Route on the Electronic Chart Screen

To display a monitored route, make sure that desired options of the monitored route (center line, channel borders, WP marks, leg marks and wheel over line) are chosen on the Route page of the Chart Display dialog box.



To show this display, spin the scrollwheel to show Chart Display/Info/Standard Display in the mouse functions area, push the left mouse button then click an arrow tab to display the Route menu.

Setting "WP" to Std or Oth enables display of a waypoint's number in a route.

"Leg marks" enables display of planned speed and planned course to steer in a route.

"Wheel over line" enables display of a line that denotes turn start line for a waypoint. This line appears when "WP approach" is coming and disappears when turning has started.

Do not set the following combinations of Center line and Channel borders:

<u>Center lines</u>	<u>Channel borders</u>
Off	Off
Oth	Oth
Off	Oth
Oth	Off

14.7 Route Assistant

The system has a built-in route assistant that facilitates safe use of routes. During route planning, you can check your route plan for safe water and you can attach a user chart and pilot data that you intend to use together with a route plan.

The assistant reminds you if

- You are using a route that you have not checked following recent change to your route plan.
- You use a combination of a route plan, user chart and pilot data that you did not plan to be used together.

If the conditions defined during route plan do not meet the conditions during route monitoring, Mon. Route appears in red on the status bar.

The following indications may appear on the Monitoring page:

"This route is unchecked".

Reminds you that you did not check the route plan after the route was modified. **Remedy:** check route plan for the route.

"Checked conditions differ" means that current conditions differ from set conditions of route plan. **Remedy:** Use Alarms and Selections pages to set them as they were when route was planned.

MONITOR ROUT ...	
Monit.	Alarms
To Wp	7
Timetable	
ETA Wp	12
Time	06 Oct 04 18:58
Distance	81.5 nm
Final Wp	20
Time	07 Oct 04 07:48
Distance	227.6 nm
Plan final	06 Oct 04
Off plan	-1608 min
Suggested spd	22.1 Kt
Trial	11.4 Kt
Spd profile	Trial
This route is unchecked	

MONITOR ROUT ...	
Monit.	Alarms
To Wp	8
Timetable	
ETA Wp	
Time	
Distance	nm
Final Wp	20
Time	05 Oct 04 06:14
Distance	212.1 nm
Plan final	05 Oct 04
Off plan	-74 min
Suggested spd	12.2 Kt
Trial	11.4 Kt
Spd profile	Trial
Checked conditions differ	

14. Route Monitoring

The Alarms page may show the following message:

"* = **Current selection differ**" indicates which conditions are currently set differently as planned.

Remedy:

Open Chart Alarm parameters to set them as they were at the time the route was planned.

The screenshot shows the 'MONITOR ROUT ...' dialog box with the 'Alarms' tab selected. The 'Selection' sub-tab is active. It displays settings for 'Planned as:', 'Ignore during', 'Indication during', and 'Alarm during monitoring'. The 'Ignore during' section has a list box with 'Specially Protected Area', 'TRS Crossing/Roundabout', and 'TRS Precautionary Area'. The 'Indication during' section has a list box with '* Areas To Be Avoided' and 'User Chart Danger'. The 'Alarm during monitoring' section has a list box with 'Safety Contour' and 'Traffic Separation Zone'. Below these is a 'Safety' field set to '10 m'. At the bottom, a note states '* = Current selection differ'.

The Selection page may show the following messages:

"**Current selection is different**" This means the name of user chart and/or pilot data in the monitoring mode is not the same as route planning check.

Remedy: Click the **Use** button to choose user chart and/or pilot data in the monitoring mode.

"**This has been changed after Route Planning Check**" This means that user chart and/or pilot data was modified after the latest route planning check.

Remedy: Check route planning for the route with attached user chart and/or pilot data.

The screenshot shows the 'MONITOR ROUT ...' dialog box with the 'Selection' sub-tab active. It displays 'Planned User Chart' as 'UTOPORVO' and 'Planned Pilot Data' as 'SOUTHAMPTOROTTEF'. Both sections have a 'Use' button and a message 'Current selection is different'.

This screenshot is identical to the previous one, but it includes an additional message: 'This has been changed after Route Planning check' located between the 'Planned User Chart' and 'Planned Pilot Data' sections.

14.8 Monitoring a Route

You can monitor the route from the two Plan Speed windows in the information area.

Plan Speed	20.0 Kt
Plan	216.9°
Route	216.8°
Ch limit	185m
Off track	<32m

Below is an example with additional text information

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185m
Off track	<247m
Goto WP	
Out of Gate	

To WP	3
Dist WOP	2.55nm
Time	06:36
Next WP	4
Next	228.4°
Turn rad	1.0 nm
Turn rate	22°/min

Upper window:

- **Plan Speed:** Planned speed to approach "To WP".
- **Plan:** Planned course between previous WP and "To WP". Note that if the gyro value is compensated and Gyro error correction and Gyro error compensation have been enabled in Ship and Route parameters in the Initial Settings menu, then the text "(corr)" appears (in red) in the Plan field.
- **Route:** Calculated set course to follow the monitored route, including off track, drift and gyro error compensation.
- **Ch limit:** Planned width of channel to approach "To WP".
- **Off track:** Perpendicular distance of the ship from the track.

Additional textual information is available if any of following steering modes are in use:

- **Waypoint mode:** "Goto WP", "Goto WP Great circle", "Ass. Turn enabled" and "Assisted turn"
- **Go Track mode:** "Goto Track", "Track Great circle" and "Track Turn"

Permanent alarms are available regardless of the steering mode used and these are as follows:

- "Outside channel" is indicated by showing "Off track" in orange and its value in red.
- "Out of gate" is shown in orange. Out of gate indicates that, if the ship continues using the current course, then the ship will be outside of the channel at wheel over point.

Lower window:

- **To WP:** The waypoint that the ship is approaching.
- **Dist WOP:** Distance to the point where rudder order for course change at "To WP" will be given.
- **Time:** Time remaining until WOP (dd:hh:mm:ss).
- **Next WP:** The WP following the "To WP".
- **Next:** Planned course to steer after "To WP". Note that if the gyro value is compensated and Gyro error correction and Gyro error compensation have been enabled in the Ship and Route parameters in the Initial Settings menu, then the text "(corr)" appears (in red) in the Plan field.
- **Turn rad:** Planned turning radius at "To WP".
- **Turn rate:** Calculated rate of turn, which is based on current speed and planned turning radius.

14.8.1 Information about steering mode on permanent route monitor windows

Information about steering mode is available on Route monitor windows. The information displayed depends on connected autopilot and route steering mode in use.

FURUNO Autopilot FAP-2000

Following information can be seen with different steering modes:

- **Waypoint mode:** "Goto WPT", "Goto WPT Great circle", "Ass. Appr. Enabled", "Ass. Turn enabled" and "Assisted turn"
- **Go Track mode:** "Goto Track", "Track Great circle" and "Track Appr. Enabled", "Track Turn enabled", "Track Turn"

Plan Speed	20.0 Kt	Plan Speed	20.0 Kt
Plan	248.0°	Plan	248.0°
Route	256.7°	Route	247.8°
Ch limit	185m	Ch limit	185m
Off track	<147m	Off track	<9m
Goto WP		Goto Track	

For further information about steering with the FAP-2000, see Chapter 28 Steering with FURUNO Autopilot FAP-2000.

YOKOGAWA Autopilot PT-500A

Following information can be seen with steering mode:

- **NAVI:** "Autopilot Conflict", "Track", "Ass. Appr. enabled", "Ass. Turn enabled" and "Assisted turn"

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185m
Off track	<147m
Track	

For further information about steering with the PT-500A, see Chapter 29 Steering with YOKOGAWA Autopilot PT-500A.

TOKYO KEIKI Autopilot PR-6000

Following information can be seen with different steering modes:

- **Open Sea mode:** "Goto OS", "Goto OS Great circle", "GoOS Appr. enabled", "GoOS Turn enabled" and "Goto OS turn"
- **All Waters mode:** "Goto AW", "Goto AW Great circle", "GoAW Appr. enabled", "GoAW Turn enabled" and "Goto AW turn"

Plan Speed	20.0 Kt	Plan Speed	20.0 Kt
Plan	248.0°	Plan	248.0°
Route	256.7°	Route	247.8°
Ch limit	185m	Ch limit	185m
Off track	<147m	Off track	<9m
Goto OS		Goto AW	

For further information about steering with the PR-6000, see Chapter 30 Steering with TOKYO KEIKI Autopilot PR-6000.

14.9 ETA (Estimated Time Of Arrival)

Estimated time of arrival to a waypoint is calculated by the ECDIS. The operator can choose waypoint number and speed profile for calculation in the Monitoring page of the Monitor Route dialog box.

To WP:

Indicates approaching "TO WP".

ETA WP:

Indicates waypoint number of special ETA waypoint and estimated time and distance to it.

Final WP:

Indicates waypoint number of final waypoint and estimated time and distance to it.

Monitored route is optimized using "Max Speed".

The screenshot shows the 'MONITOR ROUT ...' dialog box. It has tabs for 'Monit.' and 'Alarms'. The 'Monit.' tab is active. It contains three main sections: 'To WP' with a value of 8, 'ETA WP' with a value of 12, and 'Final WP' with a value of 20. Below these are fields for 'Time' and 'Distance'. The 'ETA WP' section shows a time of '04 Oct 04 18:58' and a distance of 'nm'. The 'Final WP' section shows a time of '05 Oct 04 06:14' and a distance of '212.1 nm'. At the bottom, there are fields for 'Suggested spd' (min), 'Trial' (11.4 Kt), and 'Spd profile' (Trial).

Speed profile:

There are three calculation strategies:

- **Plan:** The system calculates with optimization made in route planning.
- **Trial:** You can enter speed to test ETAs with different speeds.
- **Current:** The system calculates ETAs using average speed of last five minutes. Note that if Speed profile is chosen as Current, your ship average speed (i.e., speed for calculation) the Trial speed box replaces the Average Speed box.

14. Route Monitoring

Trial speed:

Choose Trial from the Speed profile box to enter desired speed for calculation of ETA to waypoint.

Speed profile is changed to Trial speed. You can enter Trial speed and system will calculate ETAs.

► MONITOR ROUT ...

Monit

Alarms

◀

▶

To

WP

7

Max speed

ETA

WP

12

Time 06 Oct 04 18:58

Distance 79.6 nm

Final

WP

20

Time 07 Oct 04 07:47

Distance 225.8 nm

Suggested spd

min

Kt

Trial

11.4

Kt

Spd profile

Trial

►

Time table optimization
displayed in route monitoring.

The screenshot shows the 'MONITOR ROUT ...' dialog box with the 'Monit.' tab selected. It displays route information for a 'To WP' (Waypoint 7) and a 'Final WP' (Waypoint 20). The 'To WP' section shows a 'Time' of '06 Oct 04 18:58' and a 'Distance' of '81.5 nm'. The 'Final WP' section shows a 'Time' of '07 Oct 04 07:48' and a 'Distance' of '227.6 nm'. Below these, it shows 'Plan final' as '06 Oct 04', 'Off plan' as '-1608 min', 'Suggested spd' as '22.1 Kt', and 'Trial' as '11.4 Kt'. The 'Spd profile' is set to 'Trial'. At the bottom, it states 'This route is unchecked'.

Plan:

This displays ETA at final WP. This value also appears in the Parameters page of the Plan Route dialog box.

Off Plan:

Indicates time difference between planned ETA and calculated ETA to final WP.

Suggested speed:

The system calculates suggested speed so that ETA to the final WP would be same as planned ETA if type of optimization was "Time table".

The table below shows how the system calculates ETAs.

Type of chosen speed profile / optimization on Route Monitor dialog box	Used speed from current point to the To wp	Used speed from the To WP to the final wp
Speed profile: Plan MAX SPEED	current average speed	planned leg speed
Speed profile: Plan TIMETABLE	current average speed	planned leg speed
Speed profile: Plan ECO: COST	current average speed	planned leg speed
Speed profile: Plan ECO: PROFIT	current average speed	planned leg speed
Speed profile: Trial	current trial speed	current trial speed
Speed profile: Current	current average speed	current average speed

14.10 Route Monitoring Alarms

The following alarms are related to route monitoring.

2052 Route: Illegal ETA WP: Appears when the system cannot use the chosen ETA waypoint. The reason might be corrupted or missing route file.

2053 Route: Illegal To WP: Appears when the system cannot use the chosen "To WP". The reason might be corrupted or missing route file.

2054 Route: Illegal final WP: Appears when the system cannot use the chosen final waypoint. The reason might be corrupted or missing route file.

2060 Route: WP change disabled: Appears when you try to change next or final waypoint while the system is in automatic route steering. Leave automatic route steering and change the waypoint.

2063 Route: Choose disabled: Appears when the you try to choose a new route for route monitoring while the system is in automatic route steering. Leave automatic route steering and choose a new route.

2064 Route: Cancel disabled: Appears when you try to cancel current monitored route while the system is in automatic route steering. Leave automatic route steering and cancel the current route.

2454 Route: End reached: Appears when your ship passes the last waypoint. The system cancels current route monitoring. Normally this alarm only appears when alarm 2458 is left unacknowledged.

2457 Route: Outside chl limits alarm: Appears when your ship is outside the monitored channel.

The following alarms are related to route monitoring when automatic route steering is not used:

2451 Route: WP approach alarm: Appears when your ship is "x" minutes of the wheel over point of the next waypoint, "x" being the time specified.

2458 Route: Last WP approach alarm: Appears when your ship arrives "x" minutes from the last waypoint, "x" being the time specified. Acknowledgement of this alarm cancels current route monitoring.

15. User Chart Control

15.1 Introduction

User charts are simple overlay charts that the operator makes for his own purposes. They can be displayed on both the radar display and the electronic chart. These charts are intended for highlighting safety-related items like position of important navigation marks, safe area for the ship, etc. User charts areas can be used to activate alarms and indications based on operator-defined danger symbols, lines and areas. When route or your ship estimated position is going to cross a user chart symbol, line or area that is defined as a dangerous one, an alarm or indication is generated by the system. For further details about chart alarms, see Chapter 11 Chart Alarms.

A user chart consists of points, lines and letter/number, symbols, etc. Size of user chart is limited to have the max. number of items below:

- 200 Points
- 2000 Lines
- 1000 Symbols (alphanumerics)
- 50 Areas; an area can have 20 corner points.

The user chart is displayed on the radar display and its position and shape is based on the ship's actual position. When your ship is moving in the area covered by the user chart, the elements of the user chart are superimposed on the radar overlay, with max. 80 nearest elements displayed. The user charts can also be shown on the ECDIS display. In this way the radar display can be kept as "clean" as possible for radar target detection.

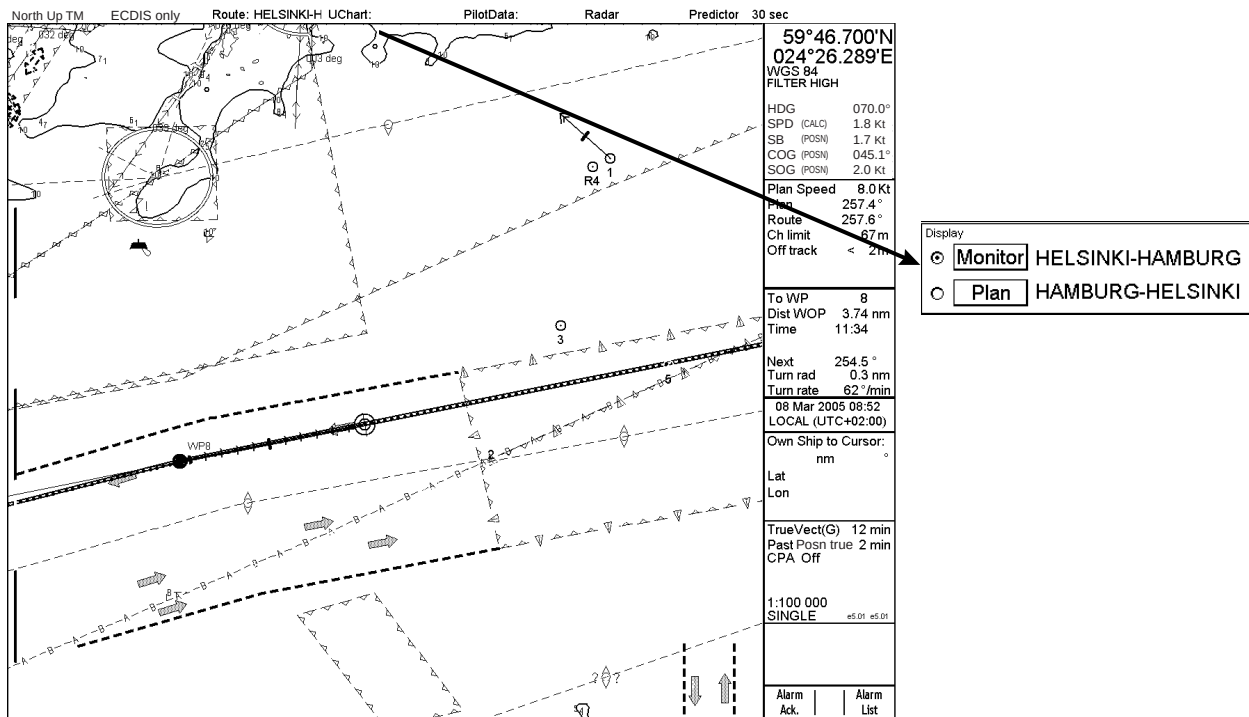
15.1.1 Objects of user charts

Below is a description of the objects used in a user chart.

- **Line:** You can define four different types of lines. Lines can be used in chart alarm calculation and/or display on the radar:
 - **Navigation lines:** Displayed on both displays (radar overlay + ECDIS). Navigation lines are reference lines for coastline.
 - **Coastline:** Displayed on the ECDIS display only. Coastal line is usually a well-defined (by chart digitizer) multi-segment line showing the coastline. The operator is able to create this type of line in case there is no suitable chart available over desired area in ARCS or S57 format.
 - **Depth contour:** Displayed on the ECDIS display only. Depth line shows the chosen depth levels. The operator is able to create this type of line in case there is no suitable chart available over desired area in ARCS or S57 format.
 - **Route line:** Displayed on both radar overlay and ECDIS. Route lines are zones for anchoring, traffic separation lines, etc.
- **Area:** User can define closed areas that the system can use to detect safe water areas. If route or estimated ship position is going to cross the area, the system generates a warning to the operator. These areas can be used to specify safe areas as defined by the master or by the policy of the ship's owner. They are always available regardless of the type of chart material used.
- **Symbols:** User selectable symbols can be displayed on both displays or on the ECDIS display only. Symbols are used to indicate buoys, lighthouses, fixed targets, wrecks, etc. Symbols can be used in chart alarm calculation.
- **Tidals:** Displayed on the ECDIS display only. Tidals can be used to make own notes about tides at operator-defined points.
- **Points:** It doesn't itself have any symbol on the radar screen, but it is a very important element of a user chart. For further details, see section 15.2 What is a User Chart Point and How is it Used?.

15.1.2 Modes of user charts

A user chart can be chosen for the monitoring mode, which means that it is displayed on connected ARPA radar display and it can be used in chart alarm calculation. Another user chart mode modifies the user chart planning mode. In the planning mode, a user chart is only displayed on the chart radar display; it is not displayed on the connected ARPA radar nor is it used in chart alarm calculation. It is possible to have both the monitored and planned user chart at the same time if separate plan and monitor units are used. Eventually the monitored and planned user charts copy the operation of monitored and planned routes. Below is an example how to know which user chart is used for monitoring mode and which one is used in planning mode.

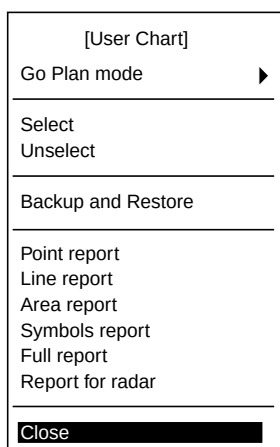
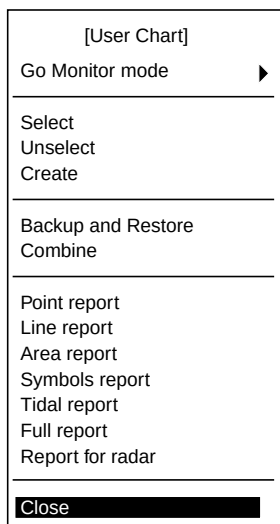


The UserChart field in the status bar always shows the name of the user chart chosen for the monitoring mode. If the user chart displayed on the ECDIS is the monitored user chart, then the text "UserChart" is black (or white depending on color scheme). If the user chart displayed on the ECDIS is the planned user chart, then the text "UserChart" is in red. The name of the planned user chart is only available in the planning mode dialog box.

Opening the user chart dialog box and menu

1. Place the cursor on UserChart on the status bar. Click either **Plan** or **Monitor** button to open corresponding dialog box. If no User Chart has been chosen, one of the menus shown below appears, along with appropriate dialog box.
2. Use the menu to choose user chart.

If you want to make further selection from a menu and only the dialog box is shown, you can show the menu on the display by clicking the **Plan** or **Monitor** button again, or put the cursor on the triangle in the dialog box.



Go Monitor(or Plan) mode:

The operator can switch user chart mode between plan and monitoring modes with Go Monitor(Plan) mode on the menu. Push the scrollwheel to show the sub menu shown below.

Go Monitor mode>Go Monitor mode: User chart used in planning mode can be switched directly to monitoring mode.

Go Monitor mode>Move Plan to Mon.: Switch to monitor mode and open current file in monitoring mode.

Go Plan mode>Go Plan mode: User chart used in monitoring mode can be switched directly to planning mode.

Go Plan mode>Move Mon to Plan.: Switch to plan mode and open current file in planning mode.

Select:

User can specify user chart to use.

Unselect:

Remove current user chart from active use.

Create:

User can create a new user chart.

Backup and Restore:

User can make backup copy of user chart or restore user chart from backup device.

Combine:

User can combine two or more user charts together.

Point report:

Generates report about points in a user chart.

Line report:

Generates report about lines in a user chart.

Area report:

Generates report about area objects in a user chart.

Symbols report:

Generates report about symbols in a user chart.

Tidal report:

Generates report about tides in a user chart.

Full report:

Generates report about all the objects in a user chart.

Report for radar:

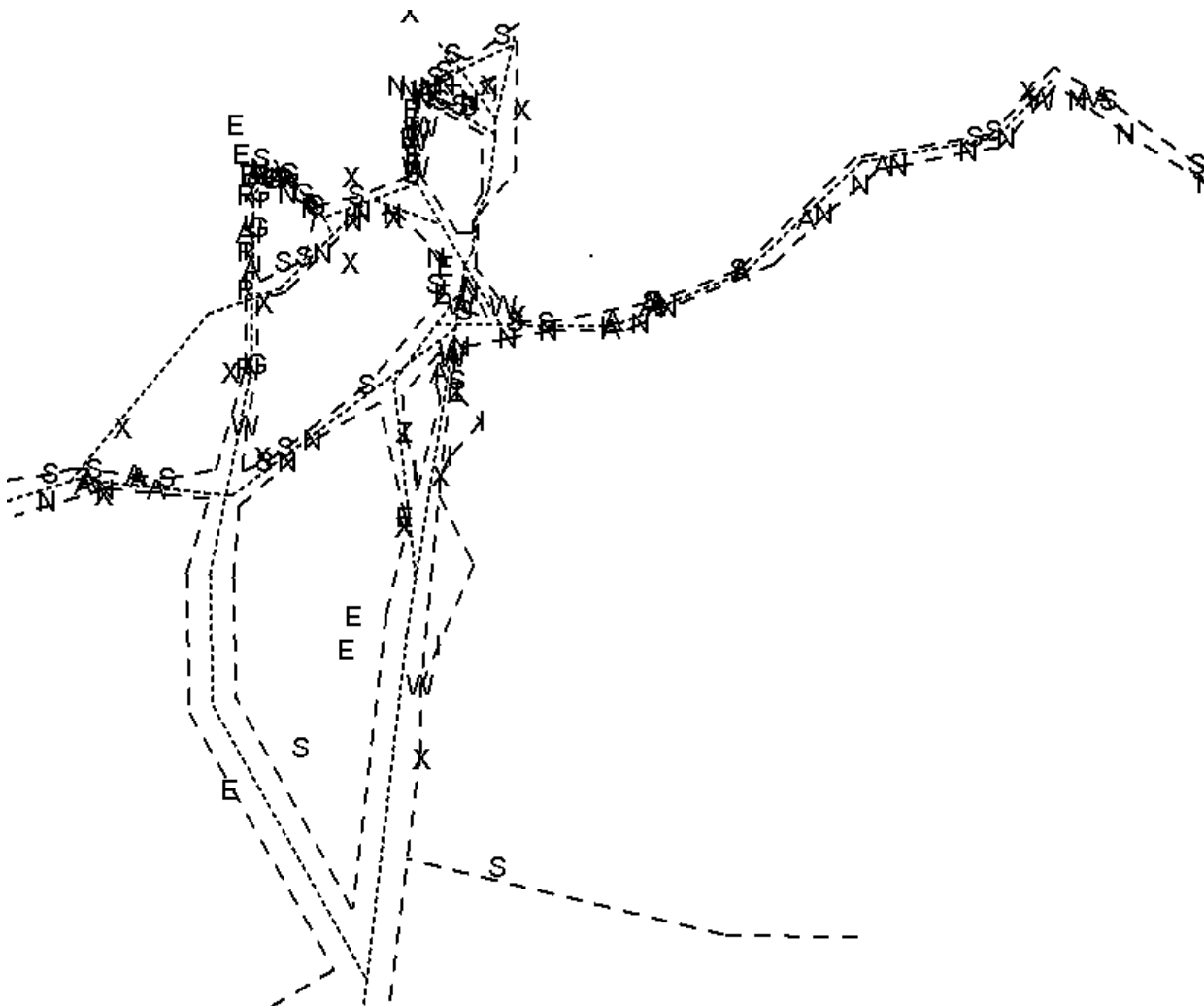
Generates report about all the objects in a user chart that are displayed on the radar screen.

15.2 What is a User Chart Point and How is it Used?

A point is a center point for a sub chart inside a user chart. Sub charts are small enough (max 80 elements) to be sent for display on the radar. Sub charts are made with post processing, which is performed automatically, when you leave editing (i.e., you uncheck Enable changes), you close the user chart window with the **CANCEL** button on the keyboard-equipped control unit or you choose a user chart from the menu.

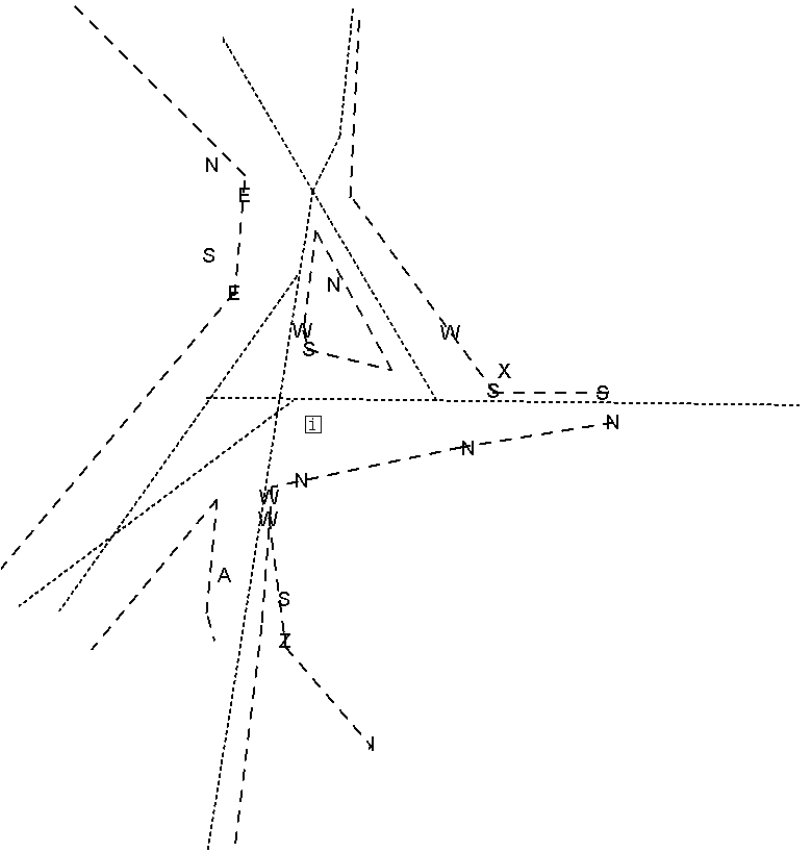
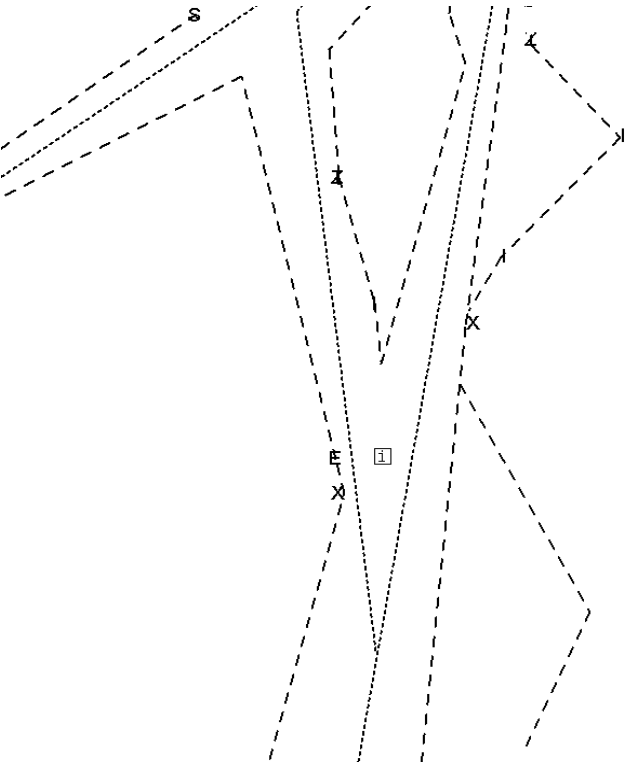
The symbol used for points is box with "I" inside: 

.....



This is an example of a complex user chart with several hundreds of lines and symbols. The ARPA radar can display max. 60 lines and 20 symbols from the complete user chart. Points are used to create sub-charts for ARPA radar use. Each point can collect 60 nearest lines and 20 nearest symbols in a sub chart.

Below are some examples of sub-charts. Note the position used for points to collect the sub charts.



15.3 Choosing Datum

Selection of datum is very important, especially if you manually enter latitude-longitude positions from the control panel or keyboard or if you use digitizer. If you only use the cursor to add and to modify waypoint locations, then you could use any datum, although it is recommended to use native datum of the chart.

15.4 Choosing User Chart to use in Monitoring Mode

The user chart that is chosen for the monitoring mode is indicated in the UserChart field in the status bar. If "UserChart" is red this means that the workstation is currently displaying the user chart for the planning mode. To activate the monitoring mode and choose a user chart for the monitoring mode, do the following:

North Up TM ECDIS only Route: HELSINKI-H UChart: PilotData: Radar Predictor 30 sec

59°46.700'N
024°26.289'E
WGS 84
FILTER HIGH

HDG 070.0°
SPD (CALC) 1.8 Kt
SB (POSN) 1.7 Kt
COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Plan Speed 8.0 Kt
Plan 257.4°
Route 257.6°
Ch limit 67m
Off track < 2m

To WPT 8
Dist WOP 3.74 nm
Time 11:34

Next 254.5°
Turn rad 0.3 nm
Turn rate 62°/min

08 Mar 2005 08:52
LOCAL (UTC+02:00)

Own Ship to Cursor:
nm

Lat
Lon

TrueVect(G) 12 min
Past Posn true 2 min
CPA Off

1:100 000
SINGLE

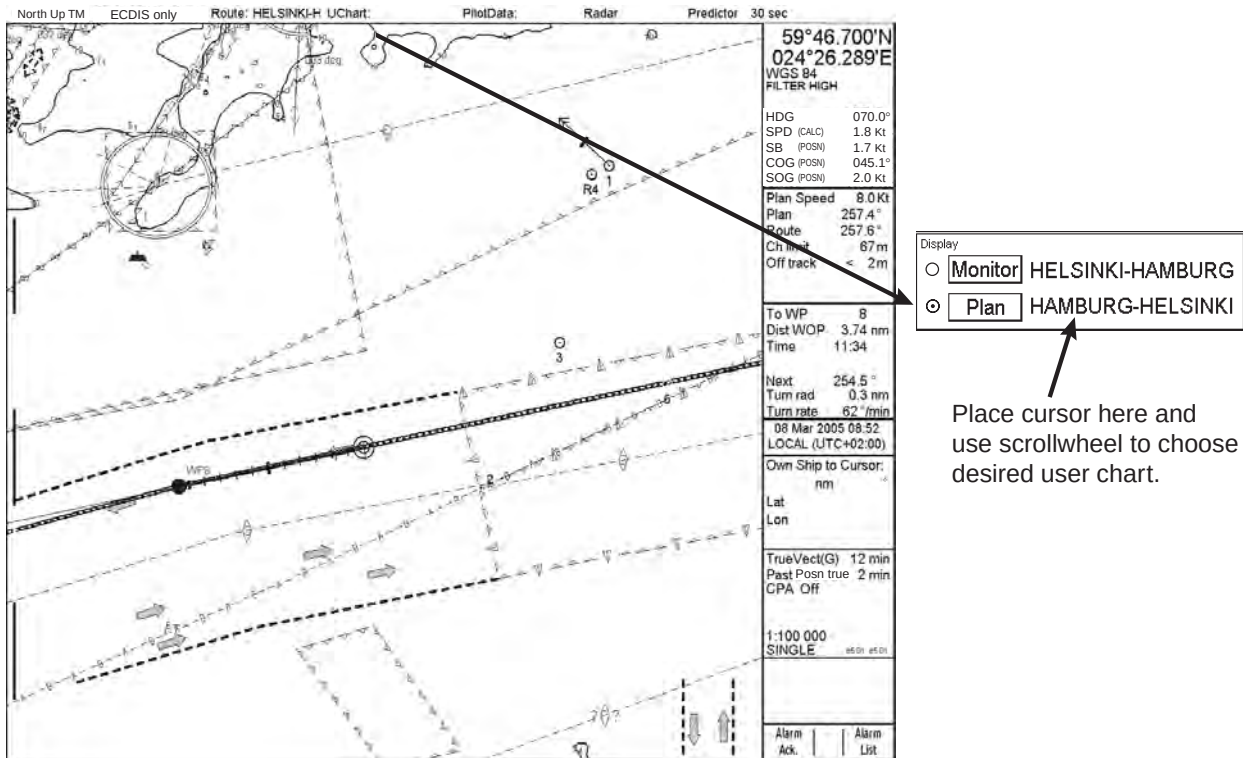
Alarm
Ack. Alarm
List

Display
☒ Monitor HELSINKI-HAMBURG
☐ Plan HAMBURG-HELSINKI

Place cursor here and use scrollwheel to choose desired user chart.

15.5 Choosing User Chart to use in Planning Mode

If "User Chart" on the status bar is white (or black depending on color scheme in use) it means that the workstation is in the monitoring mode user chart. To activate the planning mode and choose a user chart for the planning mode, do the following:



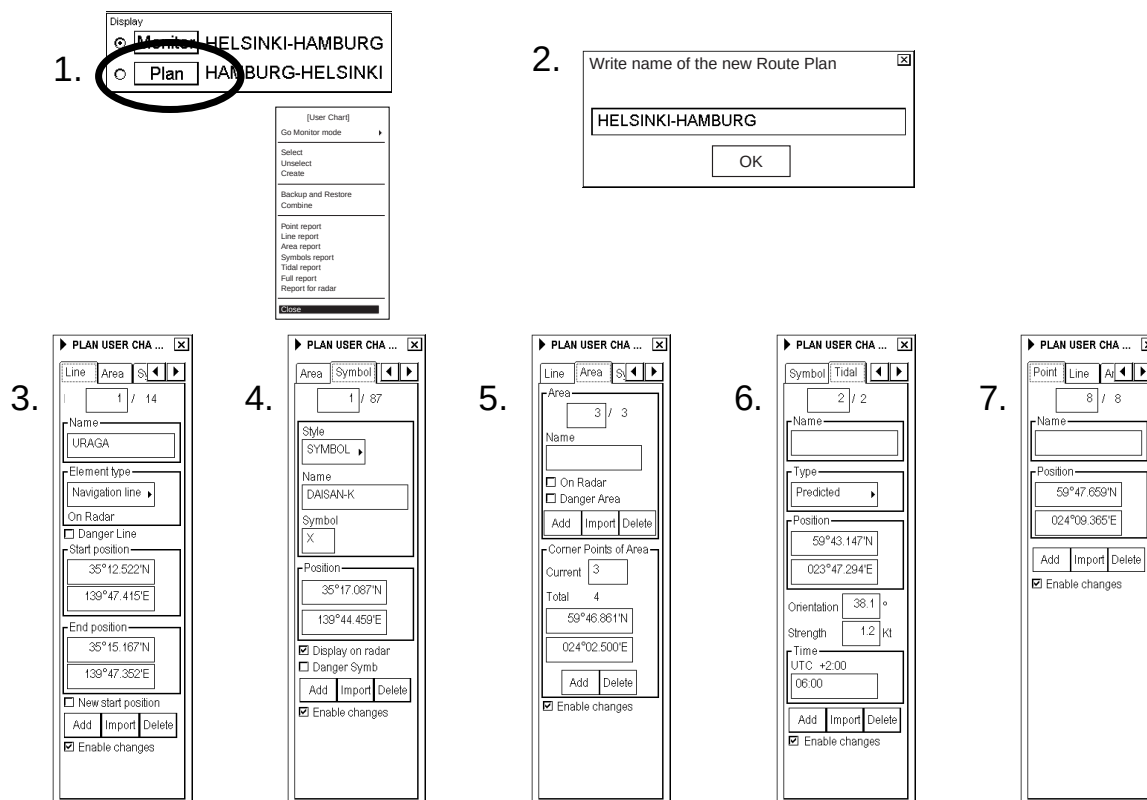
The screenshot shows the ECDIS interface with a route from Helsinki to Hamburg. The status bar at the top indicates "North Up TM", "ECDIS only", "Route: HELSINKI-H UChart", "PilotData:", "Radar", and "Predictor 30 sec". The right-hand panel displays various data fields:

59°46.700'N	
024°26.289'E	
WGS 84	
FILTER HIGH	
HDG	070.0°
SPD (CALC)	1.8 Kt
SB (POSN)	1.7 Kt
COG (POSN)	045.1°
SOG (POSN)	2.0 Kt
Plan Speed	8.0 Kt
Plan	257.4°
Route	257.6°
Ch limit	67 m
Off track	< 2 m
To WP	8
Dist WOP	3.74 nm
Time	11:34
Next	254.5°
Turn rad	0.3 nm
Turn rate	62°/min
08 Mar 2005 08:52	
LOCAL (UTC+02:00)	
Own Ship to Cursor:	
nm	
Lat	
Lon	
TrueVect(G)	12 min
Past Posn true	2 min
CPA	Off
1:100 000	
SINGLE	
Alarm	
Alarm	List

The 'Display' menu is shown with two options: 'Monitor' (selected) and 'Plan'. An arrow points to the 'Plan' option, with a note: "Place cursor here and use scrollwheel to choose desired user chart."

15.6 Creating a User Chart

You can create and modify a user chart when you have chosen the planning mode of user chart.



Note: If you want to display a user chart on the electronic chart, make sure, that Points, Symbols & Tidsals, Lines and Areas of User chart are selected to Std or Oth from the Mariner page of the Chart Display menu.

To make a complete user chart, do the following:

1. Place the cursor on UChart in the status bar then click the **Plan** button. The Plan User Chart dialog box appears in the information area.
2. Place the cursor on the triangle in the dialog box, choose Create from the menu then push the scrollwheel. Enter a name for the user chart; spin the scrollwheel to choose character and push it to confirm character. Click the **OK** button to finish.
3. Click the Line tab then check Enable changes. Use the scrollwheel to enter a name for the line in the Name field. Spin the scrollwheel in the Element type box to choose line type then push the scrollwheel. To start a new line from a new position, check "New start position". Check "Danger Line" if you want to use the line in chart alarm calculation. Use the cursor to specify position for line point then push the left mouse button.
4. Click the Symbol tab then check Enable changes. Click the **Add** button then Define Style (Symbol or Label), Name and Symbol character in case of symbol. "Display on radar" is automatically chosen; uncheck it if you do not want the symbol or label to appear on the radar. Check "Danger Symb" to use the symbol in chart alarm calculation. Use the cursor to choose position for symbol or label then push the left mouse button.
5. Click the Area tab then check Enable changes. To make a new area, click the **Add** button in the Area field. Define Name for area, define also if it is displayed on Radar display (On Radar) and used in Chart Alarms calculation (Danger Area). Use the cursor to choose position for points then push the left mouse button.
6. Click the Tidal tab then check Enable changes. To mark a tidal on the screen, use the mouse to locate the cursor then push the left mouse button. Define Name, Type, Orientation, Strength and Time for Tidal. The Tidal symbol is displayed only on the ECDIS display.
7. Click the Point tab then check Enable changes. Use cursor and left mouse button to define location of points.

15.6.1 Point page

The Point page lets you define points on a user chart. To choose this page, push the right mouse button (Next Card) then click the tab with the left mouse button.

The screenshot shows a dialog box titled 'PLAN USER CHART' with a close button (X). It has three tabs: 'Point', 'Line', and 'At'. The 'Point' tab is selected. Inside the dialog, there is a box showing '8 / 8'. Below that is a 'Name' field. Then a 'Position' section with two input fields: the first contains '59°47.659'N' and the second contains '024°09.365'E'. Below the position fields are three buttons: 'Add', 'Import', and 'Delete'. At the bottom, there is a checkbox labeled 'Enable changes' which is checked.

Enable changes:

Check in order to modify user chart.

Note: The user chart may only be modified in the Course-up or North-up mode.

Point box:

Shows the current and total number of points.

Name:

Permits naming of current point.

Position:

Manually enter latitude and longitude of point in this box.

Add:

Add new record next to current record with the same information.

Import:

Choose a user chart from which to import points.

Delete:

This function deletes current point.

15.6.2 Symbol page

The Symbol page lets you draw symbols on a user chart. To choose this page, push the right mouse button (Next Card), click the tab with the left mouse button or hit the **NEXT** key on the keyboard-equipped control unit.

PLAN USER CHA... [X]

Line Area Sy [Left Arrow] [Right Arrow]

Area

3 / 3

Name

[Empty Text Box]

☐ On Radar

☐ Danger Area

Add Import Delete

Corner Points of Area

3 / 4

54°46.861'N

024°02.500'E

Add Delete

☒ Enable changes

Enable changes:

Check in order to modify user chart.

Note: The user chart may only be modified in the Course-up or North-up mode.

Symbol box:

Shows the current and total number of symbols

Style:

You can choose either Label (displayed only on ECDIS) or Symbol (displayed also on ARPA display).

Name:

If available, operator can give name to symbol.

Symbol:

If available, operator can give name for displayed text on ECDIS

Position:

Manually enter latitude and longitude of symbol in this box.

Display on radar:

Check to also display the symbol on the radar screen.

Danger Symbol:

Check to use symbol in chart calculation.

Add:

Add new record to end of symbol list.

Import:

Choose a user chart from which to import symbols.

Delete:

This function deletes current symbol.

15.6.3 Line page

The Line page lets you inscribe lines on a user chart. To choose this page, push the right mouse button (Next Card), click the tab with the left mouse button or hit the **NEXT** key on the keyboard-equipped control unit

PLAN USER CHA... [X]

Point: 9 / 9

Name: URAGA

Element type: Navigation line

On Radar: ☐

☐ Danger Line

Start position: 35°12.522'N, 139°47.415'E

End position: 35°15.167'N, 139°47.352'E

☐ New start position

Add Import Delete

☒ Enable changes

Enable changes:

Check in order to modify user chart.

Line box:

Note: The user chart may only be modified in the Course-up or North-up mode. Shows the current and total number of line points.

Name:

Permits naming of current line.

Element type:

User can choose appropriate line type from combo box. Available types are:

- Navigation line
- Route line
- Depth contour
- Coast line

Navigation and route lines may also be displayed on the ARPA radar screen. Depth contours and coastlines are visible only on the ECDIS display.

Danger Line:

Check to use line in chart alarm calculation.

Start position:

Manually enter starting latitude and longitude in this box.

End position:

Manually enter ending latitude and longitude of line in this box.

New start position:

Check to draw a new line. If unchecked, any newly entered line will be connected to previous line.

Add:

This function adds new record next to current record. User can either edit position by entering new co-ordinates or by showing new location with the trackball and left mouse button.

Import:

Choose a user chart from which to import lines.

Delete:

This function deletes current record of line.

15.6.4 Tidal page

The Tidal page lets you inscribe tidal data on a user chart. To choose this page, push the right mouse button (Next Card) then click the tab with the left mouse button.

PLAN USER CHA... [X]

Symbol Tidal [Left Arrow] [Right Arrow]

2 / 2

Name [Text Field]

Type [Predicted] [Dropdown Arrow]

Position [61°00.609'N] [025°05.810'E]

Orientation [38.1] [Degree Symbol]

Strength [1.2] [Kt]

Time [UTC +9:00] [09:00]

[Add] [Import] [Delete]

☒ Enable changes

Enable changes:

Check in order to modify user chart.

Tidal box:

Note: The user chart may only be modified in the Course-up or North-up mode.
Shows the current and total number of tidal points.

Name:

Permits naming of current tide.

Type:

User can choose type of tide here.

Position:

Manually enter latitude and longitude of tide in this box.

Orientation, Strength and Time:

You may enter speed, course and time for tide. Note that time of the tide is always in local time.

Add:

This function adds new record next to current record.

Import:

User is able to choose from the list of user charts to import to current tidal file.

Delete:

This function deletes current record of tide.

15.6.5 Area page

The Area page lets you inscribe areas on a user chart. To choose this page, push the right mouse button (Next Card) then click the tab with the left mouse button.

Enable changes:

Check in order to modify user chart.

Note: The user chart may only be modified in the Course-up or North-up mode.

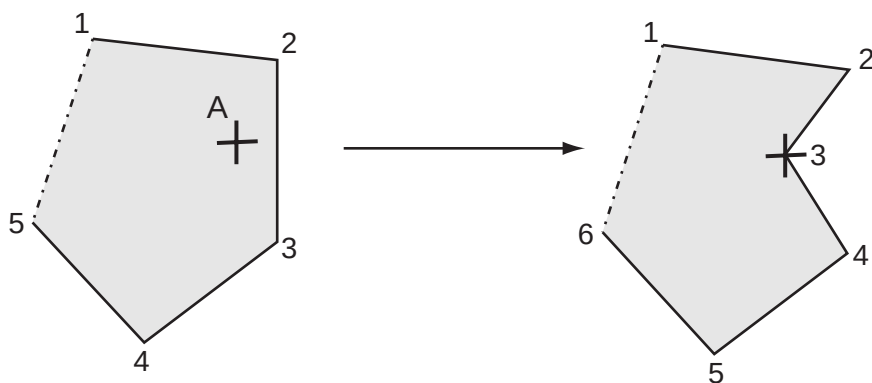
Area window

When a operator defines an area for a user chart he adds an area object then gives a name and chooses if it is displayed on radar and/or if it is used for safe water calculation (Danger Area).

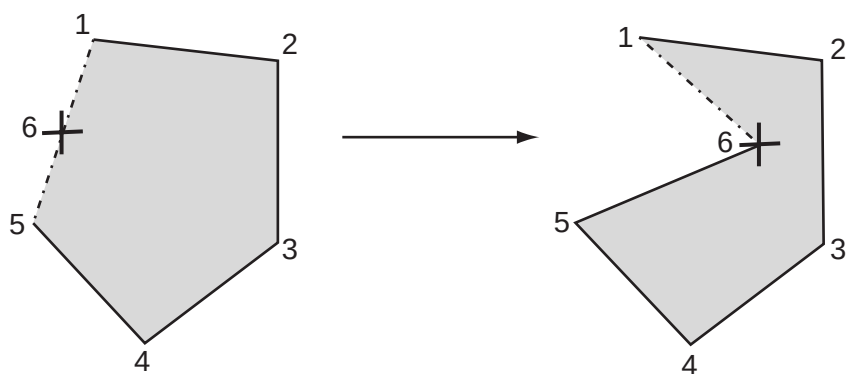
Area box:	Number of current area appears in this field. User can choose area by editing desired number in the Current box or create new one.
Name:	You may assign a name to the current area.
On Radar:	Check to also display the area on the ARPA radar display.
Danger Area:	Check to include the current area in chart alarm calculation.
Add:	Sets different area. Click button then set area.
Import:	Import area.
Delete:	Delete area.
Corner Points of Area:	See description on next page.

Corner points of area window

After you have defined an area, you can define corner points for it, by inserting a new point or appending a point, as shown in the figure below. For example, put the cursor on position A, click the left mouse button, and the area changes as in the right-side figure below. Pulling the closest line to the point changes the area as shown.



Place the cursor at point 6 to insert a point between points 1 and 5. Click the point with the left mouse button, holding down the button, then drag cursor to desired location.



Adding a new area to a user chart

An area of a user chart can be used, for example, to define a safe water area for display on the ARPA radar. To add a new user chart area, do the following:

1. Open the Area page as described on the previous page. Check Enable changes.
2. Click the **Add** button in the Area field.
3. Give a name for the area and check Danger Area to use it in chart alarm calculation and check "On Radar" to show the area on the radar as well.
4. Define corner points on the electronic chart area using the cursor and the left mouse button.
5. To define more areas, continue from step 2.

Choosing an area of a user chart to modify

In the Area field, Current indicates which area of a user chart is chosen for modification. To modify another area, two methods are available:

- Enter desired area number of user chart object in the Rec box. To modify number, put the cursor in the Current box and use scrollwheel to change desired number.
- Use the Info feature to find area. Place the cursor on the desired corner point of the area on the electronic chart then push the scrollwheel.

Changing position of corner point

The easiest way to move a corner point is to drag and drop it to a desired position. This can be done as follows:

1. Open user chart then check Enable changes on the Plan User Chart dialog box.
2. Choose appropriate chart scale so you can see desired area of user chart on display.
3. Place the cursor on the corner point you want to move to a new position.
4. While pressing and holding down the left mouse button, roll the trackball to put the cursor on desired position. Keep the button held down while you move the cursor and release it when the cursor is at the position desired.

Deleting an area from a user chart

To completely delete an area from a user chart, check Enable changes on the Plan User Chart dialog box. Choose desired area object to display from the Area field then click the **Delete** button.

Importing an area to a user chart

You can copy Areas of User Chart from another User Chart file to active User Chart file.

1. Click the **Import** button in the Area field, and the User Chart Import dialog box appears.
2. Choose chart from which to copy areas in the Chart box; spin the scrollwheel to choose a chart then push the scrollwheel.
3. "Total record count" shows number of areas stored in chosen user chart. Enter into the "First record to copy" field the area number from which you want to start copying.
4. Enter in the "Number of records" field how many areas you want copy into the active user chart file.
5. Click the **Copy** button to copy chosen areas. If you do not want copy, click the X at the top right corner to quit.

15.6.6 Adding a new point, symbol, line or tidal to a user chart

In this manual the term "user chart object" refers to any of point, symbol, line or tidal. The procedure for modifying a user chart object is common to all user chart objects. To choose a user chart object to modify, open the appropriate user chart object page in the Plan User Chart dialog box. The Current field shows the user chart object currently chosen for modification.

To modify user chart areas, see "Area page" on page 15-13.

To add a new user chart object you have following methods available:

- Use the left mouse button (Edit Insert feature).
- Click the **Add** button in corresponding user chart object page.

To add a new user chart object by using the left mouse button, do the following:

1. Open desired user chart object page.
2. Place the cursor in the electronic chart on the desired position then push the left mouse button. New user chart object appears.
3. Modify data of added user chart object. For how to modify Point, Symbol, Line and Tidal data, see section 15.6.7 Changing other data of point, symbol, line or tidal.

To add a new user chart object by using the Add button, do the following:

1. Open desired user chart object page.
2. Click the **Add** button in the chosen user chart object page. This adds a new user chart object to the end of file, which is a copy of current user chart object.
3. Modify position of operator object. Modify position following "Changing position of a point, symbol, line or tidal," on the next page.
4. Modify other data of user chart object. For how to modify position, see section 15.6.7 Changing other data of point, symbol, line or tidal.

Choosing a point, symbol, line or tidal to modify

In this manual the term "user chart object" refers to any of point, symbol, line or tidal. The procedure for modifying a user chart object is common to all user chart objects. To choose the user chart object to modify, open the appropriate user chart object page. In the Current field, the number indicates user chart object that is currently chosen for modification. If you want to select a different number, do one of the following:

- Enter desired number of user chart object in the Current box. To change the number put the cursor in the Current box, spin the scrollwheel to choose number then push the scrollwheel. Click the **OK** button.
- Use the Info feature to find area. Place the cursor on the desired corner point of the area on the electronic chart then push the scrollwheel.

Changing position of a point, symbol, line or tidal

You can change the position of a user chart object two ways:

- Enter latitude and longitude in the Position field.
- Drag and drop a user chart object with the left mouse button.

Entering latitude and longitude in position field

1. Open desired user chart object page.
2. Choose desired user chart object.
3. Enter co-ordinates in the Position field. To change a co-ordinate, put the cursor to the right of the digit to change, in the appropriate box, click the left mouse button, spin the scrollwheel to choose desired value then push the scrollwheel. Note that lines have starting and ending point position fields.

Dragging and dropping a user chart object to new position

1. Open desired user chart object page.
2. Place the cursor on the user chart object in the electronic chart area then press and hold down the left mouse button while rolling the trackball to position the user chart object.
3. Keep the button pressed down while you move the cursor and release it when the cursor is at the position desired.

15.6.7 Changing other data of point, symbol, line or tidal

To change other data of a user chart object, such as name, symbol, element type, do the following:

1. Choose desired user chart object. For more information, see "Choosing a point, symbol, line or tidal to modify" on page 15-16.
2. Place the cursor in desired edit box then use the scrollwheel to enter data. Push the scrollwheel to confirm.

15.6.8 Deleting a point, symbol, line or tidal

To delete a user chart object, do the following:

1. Open desired user chart object page.
2. Choose user chart object to delete.
3. Click the **Delete** button in the chosen user chart object page.

15.6.9 Importing points, symbols, lines or tidsals from other user chart

User is able to choose User chart objects from other user chart to import them to current User chart. To import User chart object do the following:

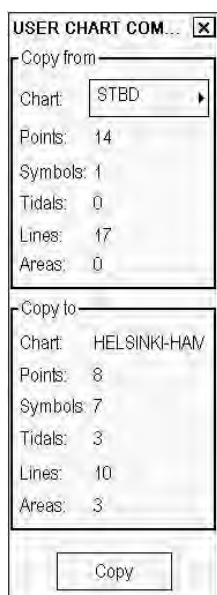
1. Open desired user chart object page.
2. Click the **Import** button. The dialog box shown right appears.
3. In the Chart box, choose the chart from which to copy user chart objects.
4. The Element category field shows the category elements that will be copied.
5. In the First record to copy box, enter the number of the object from which to begin copying.
6. In the Number of records box, enter number of records to copy.
7. Click the **Copy** button to copy.



15.7 Joining Two or More User Charts

The ECDIS allows you to combine two or more user charts into one user chart. To join two or more user charts, do the following:

1. Click Plan in UserChart in the status bar to show the Plan User Chart dialog box. Place the cursor on the triangle in the Plan User Chart dialog box to display the menu. Choose a chart with "Select" or choose "Create" and create a new chart.
2. Choose Combine then push the scrollwheel.
3. From the Chart box, choose a chart then push the scrollwheel.

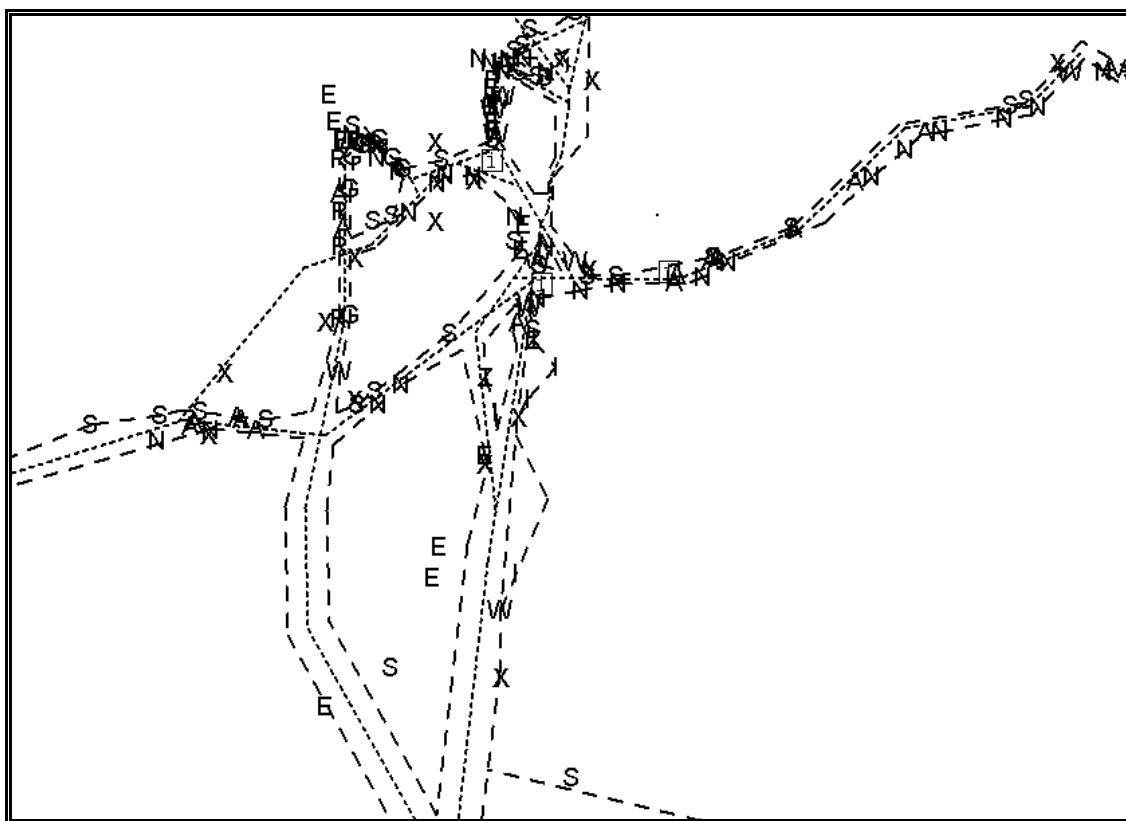
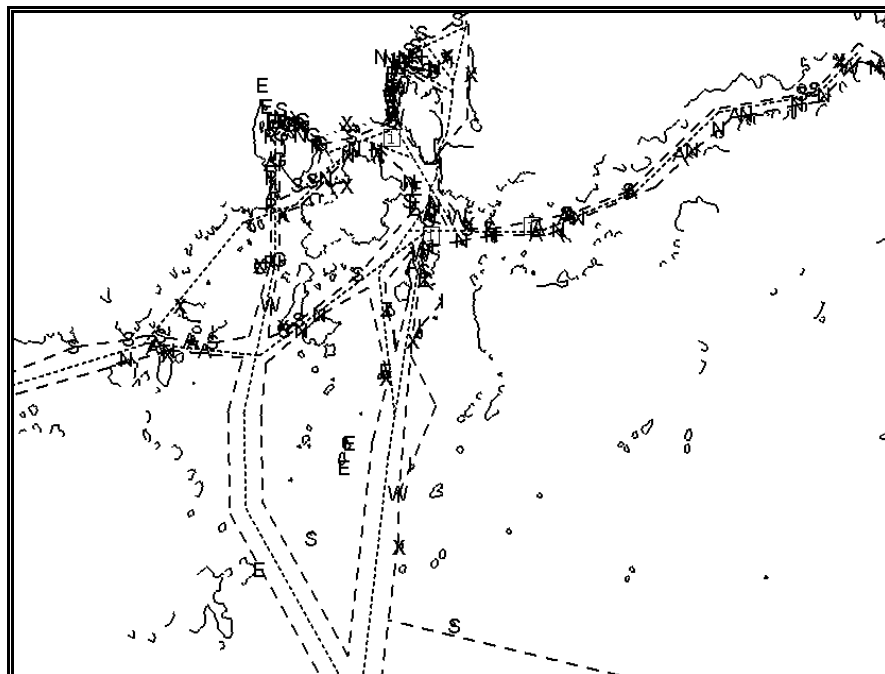
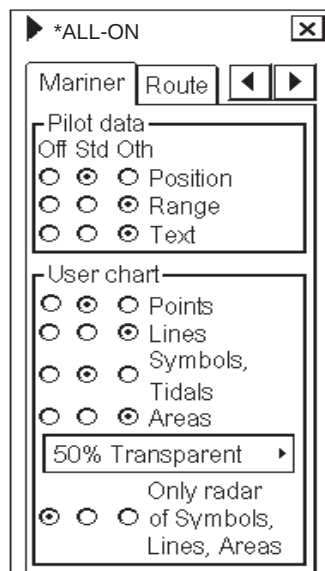


4. Click the **Copy** button.

15.8 Displaying User Charts on ECDIS display

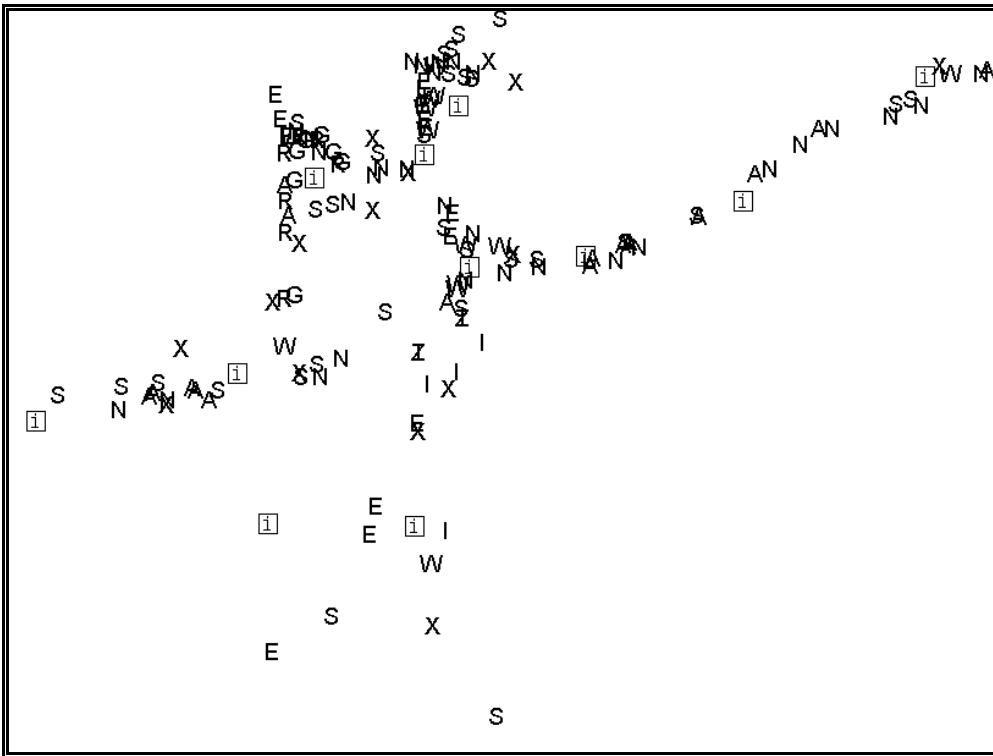
User charts can be displayed on the ECDIS display, and you can choose which chart objects to display from the Mariner page in the Chart Display dialog box. Below are some examples from the same user chart with different selections.

This user chart has all user chart objects displayed.

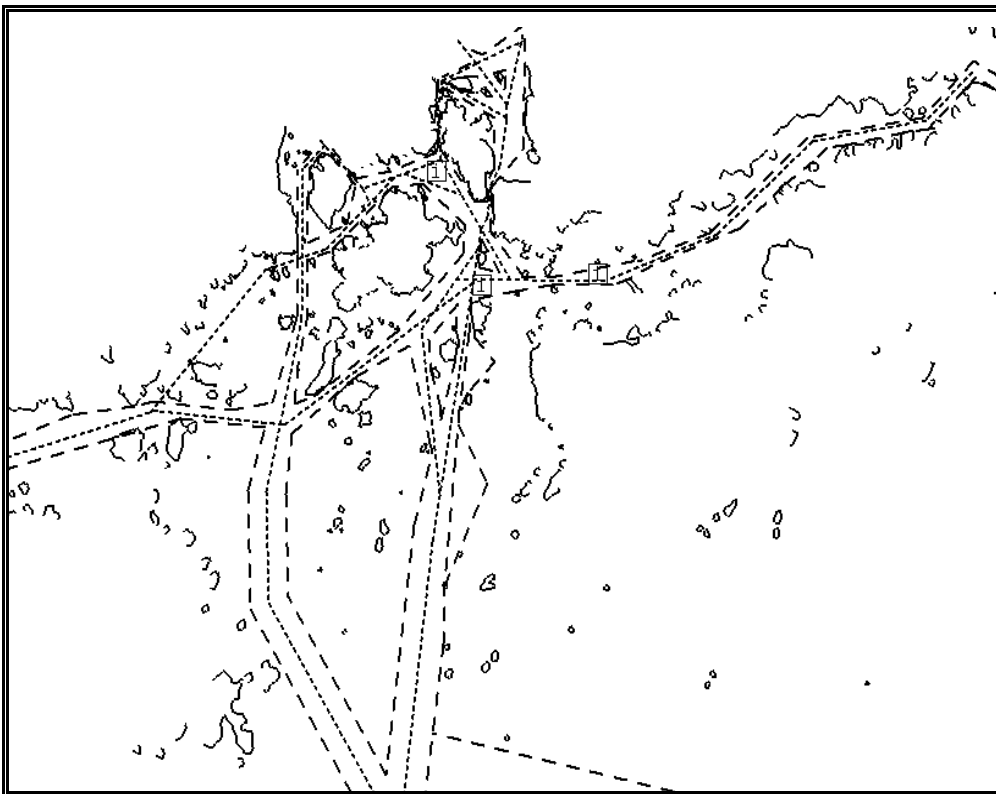


An example with only radar part of lines, symbols and areas displayed

15. User Chart Control



An example with only symbols and points displayed. Note that this is also a very good example how many and where the points should be defined.



No symbols displayed

15.9 Backing up User Charts to a Floppy Disk

You may make backups of user charts. This feature is also useful for carrying user charts to other planning or navigation station. For further details, see section 17.5 Backing up a File to a Floppy Disk.

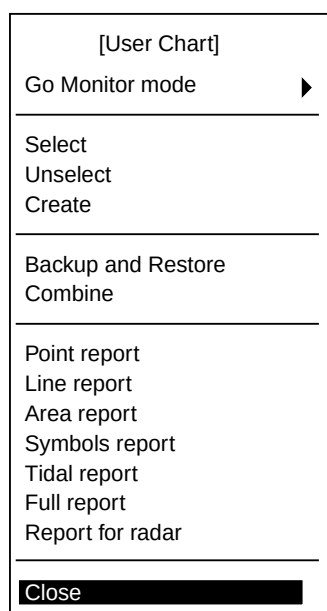
15.10 Restoring User Charts from a Floppy Disk

This procedure can be used to read backup copies of any User Chart file if some data is lost during Pilot data modifying. The other usage is to read User Chart files originating from other planning or navigation station. For further details, see section 17.6 Restoring a File from a Floppy Disk.

15.11 Reports

You may generate a report for each chart object (point, line, area, symbol and tidal) as follows:

1. Choose UserChart from the status bar then click the **Plan** button to show the Plan User Chart dialog box.
2. Place the cursor on the triangle in the dialog box to show the User Plan menu.



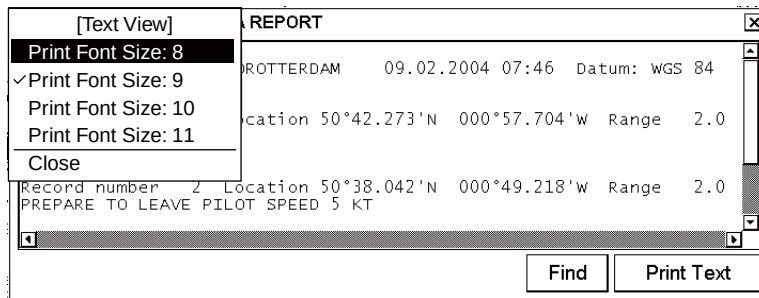
3. Choose desired report from the report group then push the scrollwheel.
4. To print the report, click the **Print Text** button.

See the next page for sample reports.

Changing font size in report

If you want to change the size of the font in a report hard copy, do the following:

1. Move the cursor onto the triangle in the report window.



2. Spin the scrollwheel to choose desired font size from the list then push the scrollwheel.

Sample reports

► TEXT VIEW - USER CHART REPORT

USER CHART UTOPORVO 09.02.2004 12:20 Datum: WGS 84 UTC +0:00

POINTS

1	59°55.482'N	024°15.544'E
2	59°49.584'N	023°33.924'E
3	59°50.325'N	023°19.729'E

Find Print Text

Points report

► TEXT VIEW - USER CHART REPORT

USER CHART UTOPORVO 09.02.2004 12:20 Datum: WGS 84 UTC +0:00

LINES

1	"	"	Route line	On radar
	59°53.202'N	022°18.774'E		
	59°53.202'N	022°18.774'E		
2	"	"	Route line	On radar
	59°54.422'N	022°39.572'E		
	59°53.625'N	022°44.541'E		

Find Print Text

Lines report

► TEXT VIEW - USER CHART REPORT

USER CHART UTOPORVO 09.02.2004 12:22 Datum: WGS 84 UTC +0:00

AREAS

Area: 1 "MUSTAMAT" Danger On Radar

60°22.138'N	028°29.231'E
60°20.241'N	028°32.886'E
60°18.279'N	028°34.392'E
60°17.873'N	028°31.682'E
60°19.623'N	028°24.199'E
60°21.669'N	028°23.382'E

Area: 2 "KOIRAKOS" On Radar

60°09.938'N	028°25.403'E
-------------	--------------

Find Print Text

Areas report

► TEXT VIEW - USER CHART REPORT

USER CHART UTOPORVO 09.02.2004 12:23 Datum: WGS 84 UTC +0:00

SYMBOLS

1	59°28.308'N	020°48.724'E	×	LEIJONA	On radar
2	59°45.043'N	022°18.709'E	×	OLYCKSBO	On radar
3	59°55.048'N	022°36.432'E	×	GALTARNA	On radar
4	59°54.820'N	022°39.572'E	×	LERHARU	On radar

Find Print Text

Symbols report

► TEXT VIEW - USER CHART REPORT

USER CHART UTOPORVO 09.02.2004 12:20 Datum: WGS 84 UTC +0:00

POINTS

1	59°55.482'N	024°15.544'E
2	59°49.584'N	023°33.924'E
3	59°50.325'N	023°19.729'E

Find Print Text

Full report

► TEXT VIEW - USER CHART REPORT

2 59°49.584'N 023°33.924'E

Displayed Lines:

839	838	837	840	841	842	822	823	836	843
821	820	817	818	835	816	824	819	844	815
834	825	826	833	827	828	832	871	870	845
814	846	809	810	811	916	917	812	854	806
807	808	855	856	910	911	915	912	869	872
813	909	805	847	857	914	913	908	848	804

Displayed symbols:

38	19	39	18	40	84	83	17	37	145
16	41	143	139	140	142	141	113	112	82

3 59°50.325'N 023°19.729'E

Displayed Lines:

Find Print Text

Report for radar

15. User Chart Control

This page intentionally left blank.

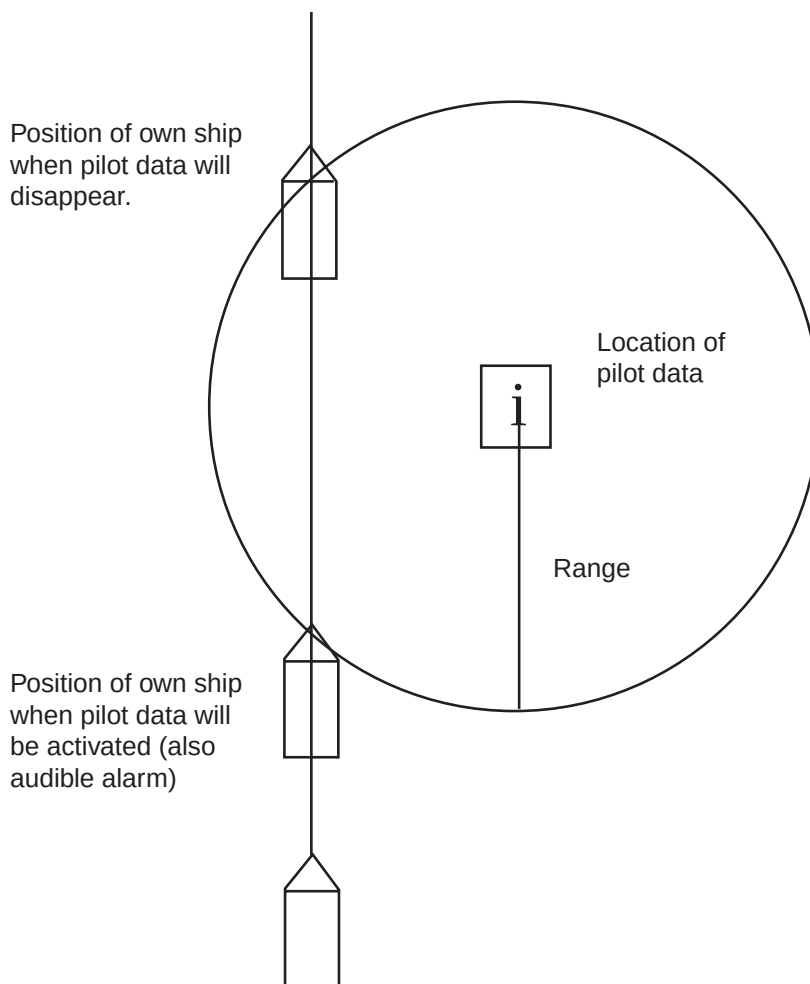
16. Pilot Data

16.1 Introduction

A navigation-related notebook is called "pilot data". Pilot data is a "notebook data" file that provides messages for the operator relative to a specific ship position in the monitoring mode. The operator specifies range for each pilot data record. The ECDIS compares pilot data range and your ship's position and displays pilot data when your ship goes within the range set for the pilot data. (See figure below.)

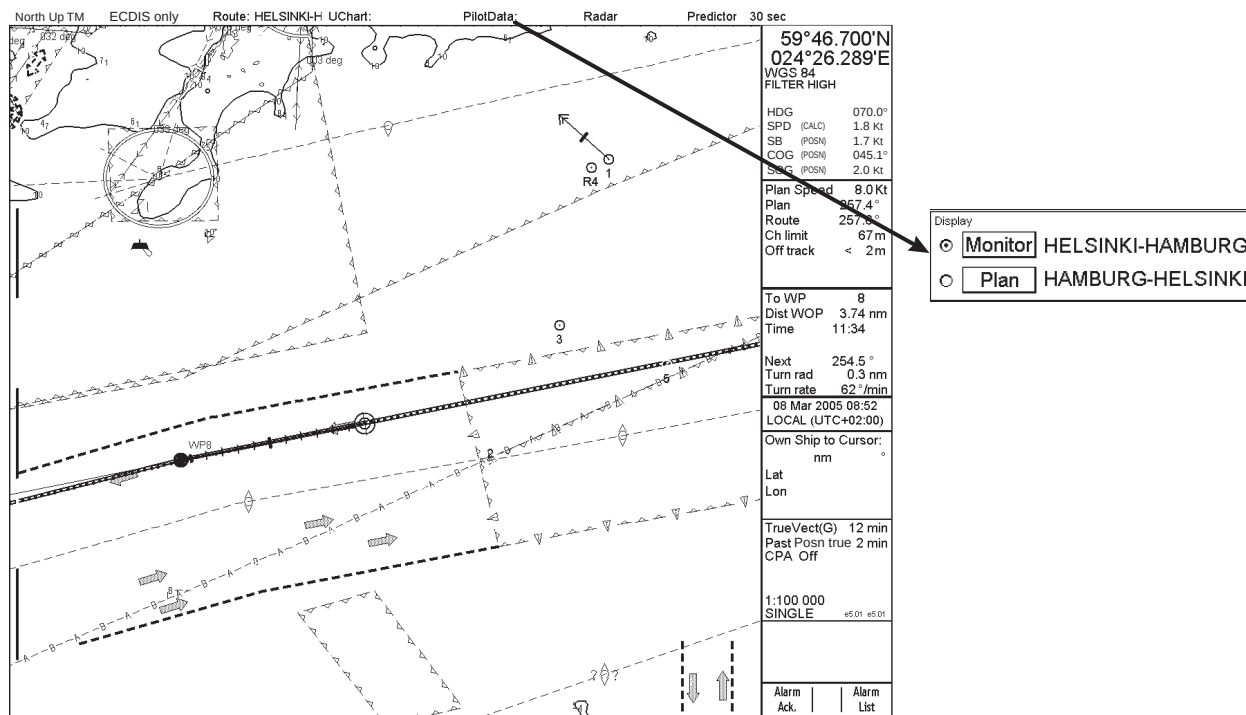
The operator may assign a brief message that will appear on the radar display together with the notice of the proximity of the relevant point.

While the ship sails, notebook pages (= records) in the chosen pilot data file are compared with your ship's position once per minute to choose pilot data. Further, when the ship has passed a waypoint, the system will make a comparison against your ship's position. If the system finds that you have arrived within a new pilot data notebook page, it generates the alarm "5001 Pilot Data: New Record".



16.1.1 Pilot data modes

Pilot data can be chosen for the monitoring mode, which means that pilot data gives predefined messages for the operator relative to a specific ship position. Another mode is for modifying pilot data in the planning mode. In the planning mode, pilot data is used to define predefined messages relative to your ship's position. Eventually the monitored and planned pilot data copy the operation of the monitored and planned routes. Below is an example of how to know which pilot data is used in the monitoring mode and which is used in the planning mode.

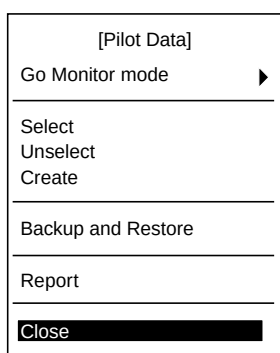
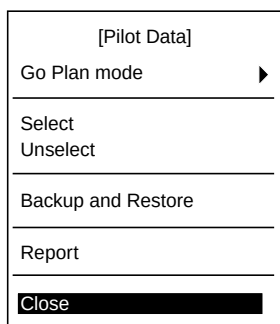


The PilotData field in the status bar always shows the name of the pilot data chosen for the monitoring mode. If the displayed pilot data on the ECDIS display is the monitored pilot data, then the text "PilotData" is in black (or white depending on color scheme). If the displayed pilot data on the ECDIS display is the planned pilot data, then the text "PilotData" is in red. The name of the planned pilot data is only available in the dialog box for the planning mode of pilot data.

16.2 Using Pilot Data

To prepare pilot data, do the following:

1. Place the cursor on PilotData in the status bar, then click the **Plan** or **Monitor** button as appropriate. If no pilot data is chosen, the Pilot Data menu (shown below) appears in addition to the Monitor Pilot Data dialog box or Plan Pilot Data dialog box.
2. If no menu appears, click the same button once more to open the menu.



Activate Monitor/Plan mode:

User can switch pilot data mode between plan and monitor. Using **Go Monitor mode>Go Monitor mode:** User chart used in planning mode can be switched directly to monitoring mode.

Go Monitor mode>Move Plan to Mon.: Switch to monitor mode and open current file in monitoring mode.

Go Plan mode>Go Plan mode: User chart used in monitoring mode can be switched directly to planning mode.

Go Plan mode>Move Mon to Plan.: Switch to plan mode and open current file in planning mode.

Select:

Chooses pilot data to use; monitor or planning mode.

Unselect:

Unselect removes pilot data from active use.

Create:

Creates new pilot data. Pilot data can be named, using up to 30 alphanumeric characters.

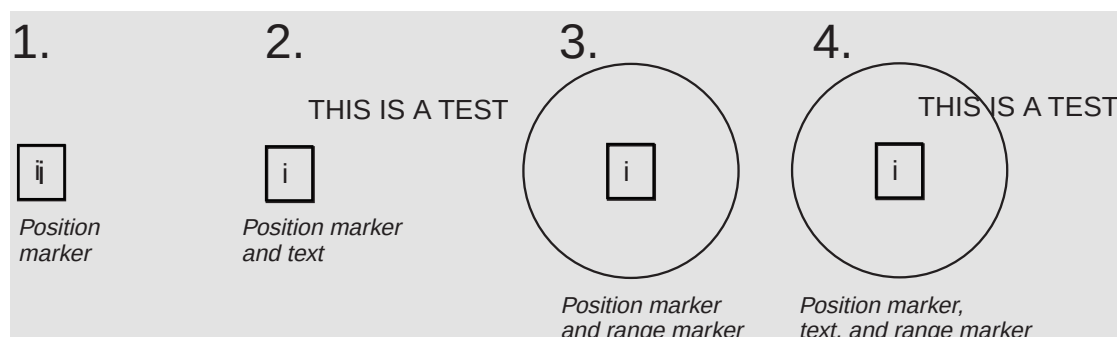
Backup and Restore:

User can make backup copy from pilot data or restore from backup media.

Report:

Generates tabulated report from chosen pilot data.

Note: If you want pilot data to be displayed on the electronic chart, make sure that pilot data options are turned on in the Mariner page of the Chart Display dialog box.



Four different variations as examples of how pilot data is presented on the chart area:

1. Position marker
2. Position marker and text
3. Position marker and range marker
4. Position marker, text and range marker

16.3 Choosing Pilot Data to use in Monitoring Mode

Pilot data that is for system use is displayed in the pilot data field on the status bar. If the text "PilotData" is red this means that the workstation is in the planning mode for pilot data. To activate the monitoring mode and choose pilot data for the monitoring mode, do the following:

North Up TM ECDIS only Route: HELSINKI-H UChart: PilotData: Radar Predictor 30 sec

59°46.700'N
024°26.289'E
WGS 84
FILTER HIGH

HDG 070.0°
SPD (CALC) 1.8 Kt
SB (POSN) 1.7 Kt
COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Plan Speed 8.0 Kt
Plan 257.4°
Route 257.4°
Ch limit 67 m
Off track < 2 m

To WP 8
Dist WOP 3.74 nm
Time 11:34

Next 254.5°
Turn rad 0.3 nm
Turn rate 62°/min

08 Mar 2005 08:52
LOCAL (UTC+02:00)

Own Ship to Cursor:
nm

Lat
Lon

TrueVect(G) 12 min
Past Posn true 2 min
CPA Off

1:100 000
SINGLE e5.01 e5.01

Alarm Ack. Alarm List

Place cursor here, spin scrollwheel to choose pilot data and push scrollwheel.

Display
☒ Monitor HELSINKI-HAMBURG
☐ Plan HAMBURG-HELSINKI

16.3.1 Monitor pilot data dialog box description

Current page

If "View all records" is not chosen (checked):

- Opens "Current Record" page.
- When the ship is within the range set for a pilot data, the information of current record appears, something like the dialog box shown right.

The screenshot shows a dialog box titled 'MONITOR PILOT' with a close button. It has a tab labeled 'Current Record'. Below the tab is a counter '1 / 2'. The 'Position' section contains two text boxes: '59°38.352'N' and '023°26.254'E'. The 'Range' section has a text box with '3.0' and a label 'nm'. The 'Description' section is a larger text box containing 'CALL PILOT USE CH 71'. At the bottom, there are two checkboxes: 'Enable changes' (unchecked) and 'View all records' (unchecked).

View page

If "View all records" is chosen:

- Opens "View Record" page.
- Choose "View all records".
- You can view any pilot data record by clicking the arrow keys.

The screenshot shows the same dialog box but with the 'View Record' tab selected. The counter is still '1 / 2'. The 'Position' section now shows '60°08.352'N' and '024°54.254'E'. The 'Range' section shows '0.0' and 'nm'. The 'Description' section is the same. The 'View all records' checkbox at the bottom is now checked, while 'Enable changes' remains unchecked.

View record box:

This indicates current number of active records.

Position:

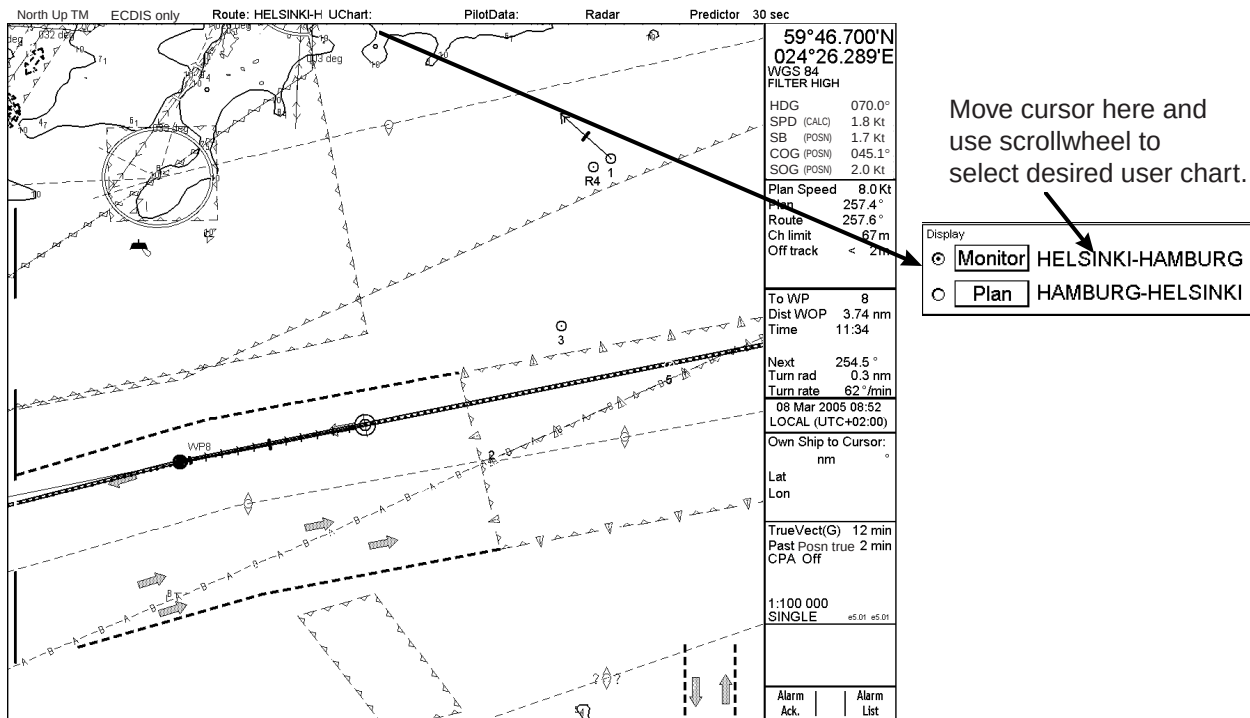
This indicates position of current record (LAT, LON).

Range:

Control range for the system to activate current record of pilot data.

16.4 Choosing Pilot Data to use in Planning Mode

If the PilotData in the status bar is black (or white depending on color scheme) this means that the workstation is in the monitoring mode for pilot data. To activate the planning mode and choose pilot data for the planning mode, do the following:



16.4.1 Plan pilot data dialog box description

Edit record page

Edit Record box:

This indicates current number of active records.

Enable changes:

Check to enable changes.

Note: Pilot data may only be modified in the North-up or Course-up mode.

Position:

Indicates the latitude and longitude position of current record.

Range:

Range from your ship at which current pilot data is activated on the screen.

Description:

The operator may edit a pilot data message record, which appears on the screen, after the ship has passed the calculated point. To edit the text, put the cursor in the text window, spin the scrollwheel to choose character then push the scrollwheel.

Add:

This function adds a new record next to current record. User can edit position by entering new co-ordinates or by choosing new location with the trackball then pushing the left mouse button.

Import:

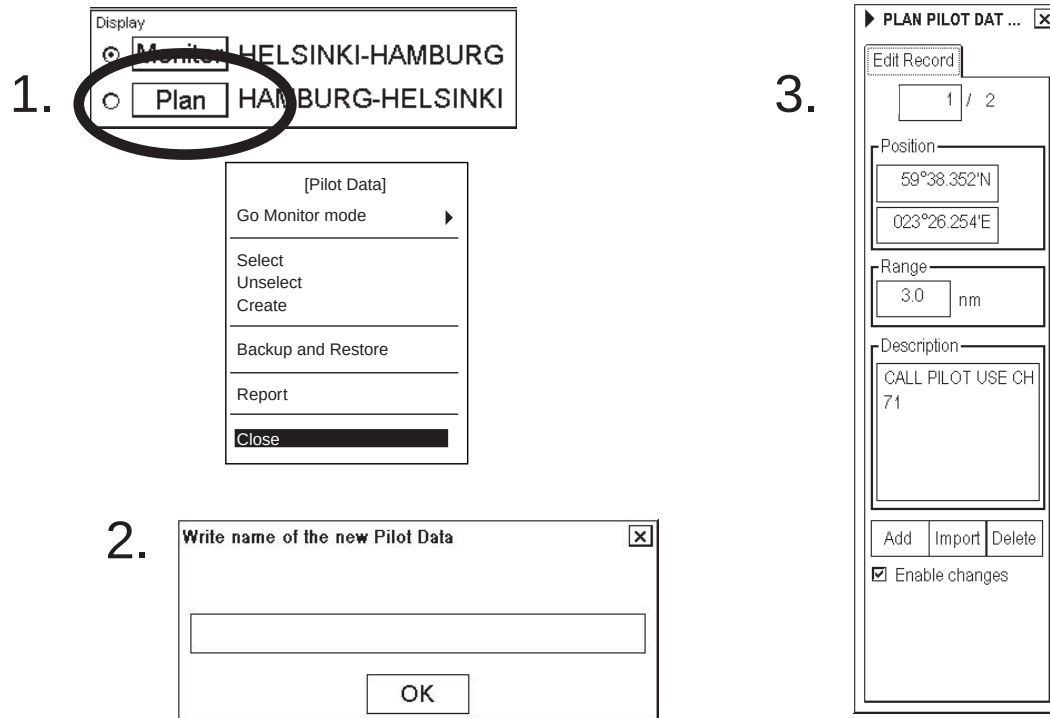
You may import an existing file (whole file or part of file), to current pilot data file.

Delete:

Deletes current record of pilot data.

16.5 Creating New Pilot Data

You can create and modify pilot data, and this can be done in the planning mode. It is recommended to use the true motion display mode while editing.



To create a new pilot data, do the following:

1. Place the cursor on PilotData in the status bar then click the **Plan** button to show the Plan Pilot Data dialog box. If you have not already chosen pilot data, the Plan Pilot Data menu also appears. If the menu is not displayed, click the triangle mark again. Choose Create from the menu then push the scrollwheel.
2. In the pilot name entry box, spin the scrollwheel to choose character, then push the scrollwheel. Repeat to enter name desired then click the **OK** button.
3. In the Edit Record page of the Plan Pilot Data dialog box, check "Enable changes". Roll the trackball to put the cursor on the location desired for pilot data then push the left mouse button. In the Range box, enter the range from your ship at which to activate the pilot data. To show text message on the screen, enter desired message in the text window; spin the scrollwheel to choose character and push the scrollwheel to confirm.

16.5.1 Adding new pilot data record

To add a new pilot data record the following choices are available:

- Using the left mouse button.
- Using the **Add** button in the Edit page.

To add a new pilot data record by using the left mouse button:

1. Open the Edit page of the Plan Pilot Data dialog box and check Enable changes.
2. Place the cursor on the location in the chart area where you want to add a new pilot data, then push the left mouse button. New pilot data record appears at the end of file.
3. Modify Range, Position, text message, etc. as appropriate.

To add a new pilot data record by Add button:

1. Open the Edit page of the Plan Pilot Data dialog box then check Enable changes.
2. Click the **Add** button. This adds a new pilot data record to the end of record, and it is a copy of current pilot data record.
3. Modify position of pilot data record. For how to modify position, see section 16.5.3 Changing pilot data record position.
4. Modify other data of pilot data record as appropriate. For how to modify other data in a pilot data record, see section 16.5.4 Changing other data of pilot data record.

16.5.2 Choosing pilot data record to modify

The Current box in the Plan Pilot Data dialog box shows the pilot data currently selected for modification. To choose a different pilot data the following methods are available:

- Enter desired record number in the Current box, using the scrollwheel; spin the scrollwheel to choose record number then push the scrollwheel.
- Place the cursor on desired pilot data in the electronic chart area, then push the scrollwheel.

16.5.3 Changing pilot data record position

To change the position of a pilot data, two choices are available:

- Enter latitude and longitude in the Position field on the Edit page.
- Drag and drop pilot data mark using the trackball and left mouse button.

Entering latitude and longitude in position field

1. Open the Edit page of the Plan Pilot Data dialog box then check Enable changes.
2. Choose desired pilot data, following section 16.5.2 Choosing pilot data record to modify.
3. Enter co-ordinate in Lat (Lon) field as appropriate. Spin the scrollwheel to change digit then push the scrollwheel to confirm.

Dragging and dropping pilot data to new position

1. Open the Edit page of the Plan Pilot Data dialog box then check Enable changes.
2. Use the trackball to put the cursor on the pilot data you wish to move.
3. Press and hold down the left mouse button while rolling the trackball to position the pilot data mark where desired. Keep the button pressed and held down while you move the cursor and release it when the cursor is at position desired.

16.5.4 Changing other data of pilot data record

To change function range or character data of pilot data, such as range and text, do the following:

1. Choose desired pilot data record, following section 16.5.2 Choosing pilot data record to modify.
2. Place the cursor in the desired edit box, spin the scrollwheel to choose desired value, then push the scrollwheel to confirm.

16.5.5 Deleting a pilot data record

To delete a pilot data record, do the following:

1. Open the Edit page of the Plan Pilot Data dialog box then check Enable changes.
2. Choose desired pilot data record to delete, following section 16.5.2 Choosing pilot data record to modify.
3. Click the **Delete** button.

16.5.6 Importing pilot data from other routes

You may import pilot data records from other pilot data records as follows:

1. Open the Edit page of the Plan Pilot Data dialog box then check Enable changes. Click the **Import** button to show the following dialog box.

PILOT DATA IMPORT

Copy from

Pilot data
HELSINKI-HAMBURG

Total page count 1

First page to copy 1

Number of pages to copy 1

Copy to

Pilot data
SOUTHAMP

First page copied as page 3

Copy

2. In the Pilot data field, choose the source pilot data.
3. Enter first pilot data record to copy in the First page to copy field.
4. Enter number of pilot data records to copy in the Number of pages to copy field.
5. "Copy to pilot data" shows where the pilot data record is to be copied to and "First page copied as page" shows the number that the first record from the pilot data source will be copied into the current pilot data.
6. After confirming settings, click the **Copy** button to import pilot data records.

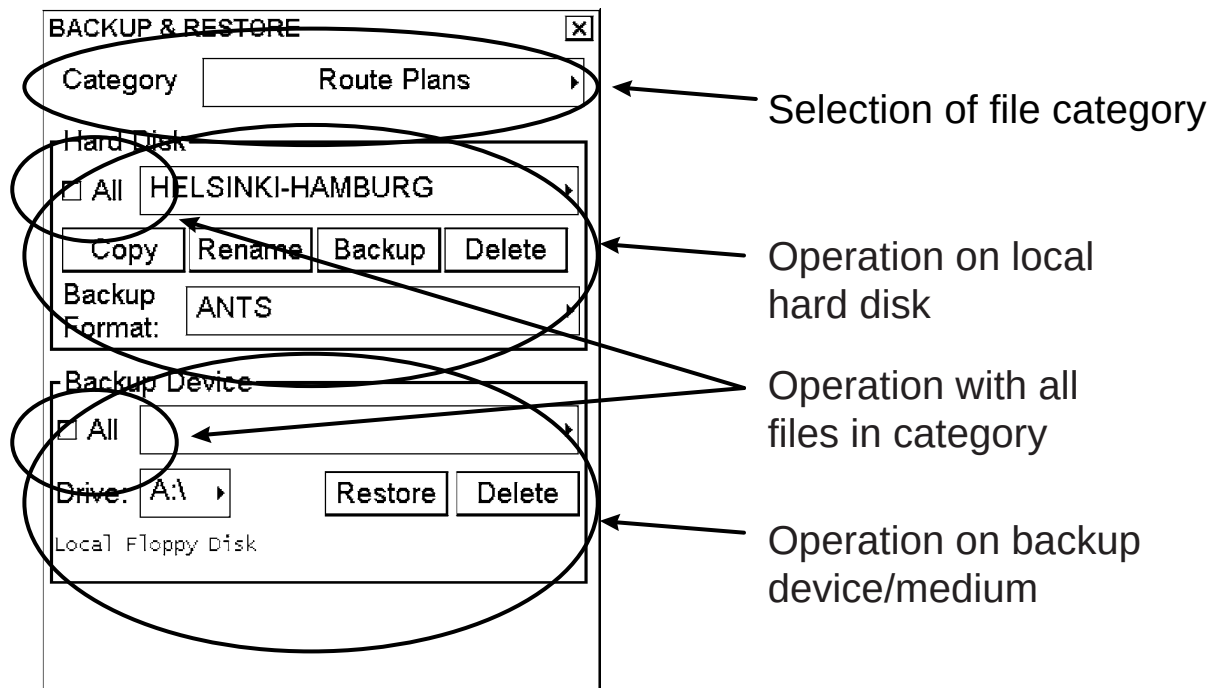
17. Backup Operations

17.1 Introduction

There are several menus from which the operator may initiate backup and restore functions. From those menus the operator may execute hard disk operations such as backup, copy, rename and delete. The operator may make backup copies to backup devices or restore from backup device to hard disk. These pushbuttons and menu commands, which are used to access the system's database, are listed below.

Note: Use only IBM PC formatted floppy disks.

The Backup & Restore dialog box is where backup and restore operations are initiated.



17.2 Choosing Appropriate File Category

The system automatically chooses corresponding file depending on your selection. The categories consist of the following files:

- Route plans
- User charts
- Pilot data
- Installation parameters
- Chart display settings
- Paper chart set up
- Presentation libraries
- Logs
- Manual updates
- All charts and updates

You can choose desired category from the File category box in the Backup & Restore dialog box. For the chosen category, the system shows all the possible functions executable with the chosen category.

17.3 Copying a File

You can make a copy of an original file using the Copy function in the Backup & Restore dialog box. To copy a file, do the following:

1. Choose desired file category.
2. Choose desired file from the Hard Disk field.
3. Click the **Copy** button.
4. Enter new name for chosen file then click the **OK** button.

17.4 Renaming a File

You can rename a file using the Rename function in the Backup & Restore dialog box. To rename a file, do the following:

1. Choose desired file category from the Category field.
2. Choose desired file from the Hard Disk field.
3. Click the **Rename** button.
4. Enter new name for chosen file then click the **OK** button.

17.5 Backing up a File to a Floppy Disk

You can make a backup from an original file to a floppy disk. To make a backup of a file to a floppy disk, insert a floppy disk in the disk drive, then do the following:

1. Choose desired file category.
2. Choose desired file from the Hard Disk field.
3. Choose desired Drive from the Drive field.
4. Click the **Backup** button.

17.6 Restoring a File from a Floppy Disk

You can restore a file with one stored on a floppy disk. To restore a file stored on a floppy disk, do the following:

1. Choose desired file category.
2. Choose desired Drive from the Drive field.
3. Choose desired file from the Backup Device field.
4. Click the **Restore** button.

17.7 Deleting a File

You can delete a file as follows:

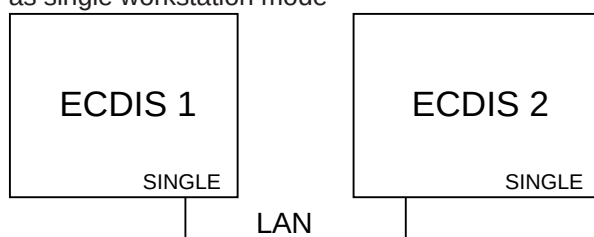
1. Choose desired file category.
2. Choose desired file from the Hard Disk field.
3. Click the **Delete** button.

17.8 Moving a File to Planning or Navigation Station

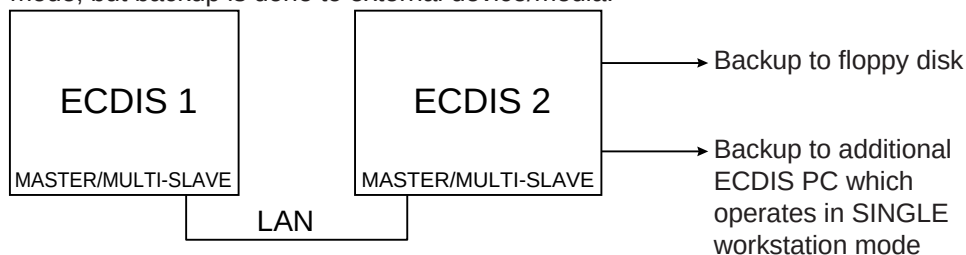
If there are two ECDIS workstations connected via a LAN, files can be moved from one workstation to another and vice versa.

Note: The intention of the Backup function is to make a backup copy of a route, user chart, etc. to a backup medium. If you want to copy charts, routes, user charts, etc. between ECDIS workstations, it is recommended that you use the Restore function instead of Backup. For use of Backup, see the illustration below for when it is possible to use the Backup function.

Between ECDIS workstations when both workstations are set as single workstation mode



Between both workstations are set as Master/Slave or Multi-workstation mode, but backup is done to external device/media.

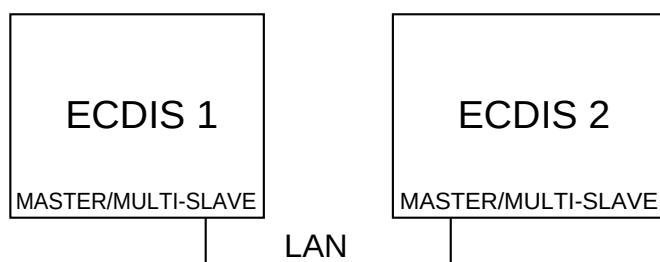


To use the Backup function:

1. Open desired menu.
2. From the menu, choose the Backup and Restore command.
3. Choose desired file from the Hard disk field.
4. Select backup drive from the Backup device field.
5. Press the **Backup** button.

The figure below shows when you should not use the backup function to copy files between ECDIS workstations. To copy files between ECDIS workstations use the Restore function. For more information, see "Reading a File from Planning or Navigation Station" on the next page

DO NOT use the backup function between two ECDIS workstations when both workstations operate as master/slave or multi-mode (or one workstation mode indication is red (single))



17.9 Reading a File from Planning or Navigation Station

If there are two ECDIS workstations connected via a LAN, it is possible to read files from planning station to navigation station and vice versa.

1. Select desired menu.
2. Choose Backup and Restore command from menu.
3. Choose backup drive from the Backup device field.
4. From the Backup Device field, choose desired file.
5. Click the **Restore** button in the Backup Device field.

17.10 Loading User Chart and Route Files of Former Vector System Format

Route and user chart files can be read in vector system format (Inc) files. When loading Inc format files, the ECDIS converts the files to the format used with the ECDIS. To do this, do the following:

1. Choose desired menu.
2. Choose Backup and Restore from the menu.
3. Choose backup drive from the Backup device field.
4. From the Backup Device field, choose desired file.
5. Click the **Restore** button in the Backup Device field.

17.11 Saving User Chart and Route Files in Former Vector System Format

The Route and User chart files can be read in vector system format (Inc). When moving files from the ECDIS to a backup device the ECDIS converts the file to Inc format.

To do this:

1. Choose desired menu.
2. Choose Backup and Restore from the menu.
3. From the Hard Disk field, choose desired file then choose Backup file format as Inc.
4. Choose backup drive from the Backup device field.
5. Click the **Backup** button in the Hard Disk field.

17.12 Saving a Route as an ASCII Text File

Sometimes it is useful to save route information as an ASCII text file for use with some other application, or to restore some ASCII text produced by some other application to the ECDIS. For further details see Appendix 5.

The following formats are available for route backup and restore:

- ASCII PROPRIETARY
- ASCII POSITION (list of Latitude/Longitude values)
- ASCII WPNAME POSITION (list of WP names and Latitude/Longitude)
- ASCII POSITION WPNAME (list of Latitude/Longitude and WP names)
- ASCII FULL (all route related information)

To make a backup of a route in ASCII format, do the following:

1. Choose the Backup and Restore command from the menu.
2. From the Hard disk field, choose desired file.
3. Choose desired backup format with Backup format.
4. Choose backup drive in the Backup drive field.
5. Click the **Backup** button in the Hard Disk field.

17.13 Restoring a Route from an ASCII Text File

Sometimes it is useful to restore to the ECDIS route information stored in an ASCII text file that was produced by some other application. For further details see Appendix 5.

The following formats are available for route backup and restore:

- ASCII PROPRIETARY
- ASCII POSITION, list of Latitude/Longitude values
- ASCII WPNAME POSITION, list of WP names and Latitude/Longitude
- ASCII POSITION WPNAME list of Latitude/Longitude and WP names
- ASCII FULL, all route related information

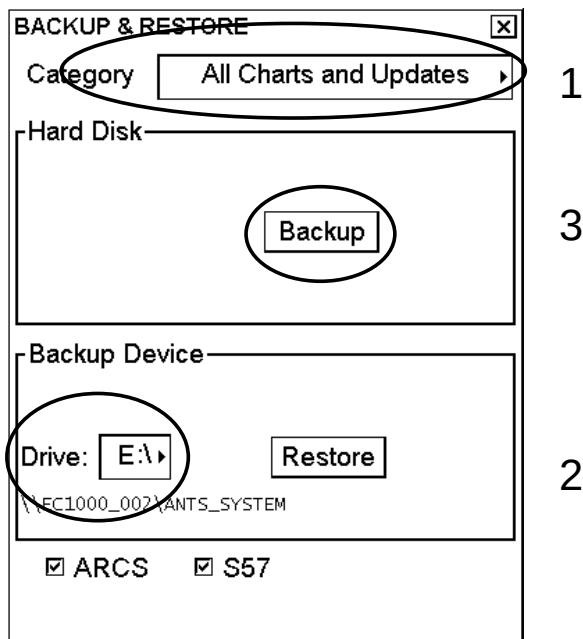
To restore a route using ASCII data, do the following:

1. Choose the Backup and Restore command from the menu.
2. Choose desired Backup Format.
3. Choose backup drive from the Backup device field.
4. Choose desired file.
5. Click the **Restore** button in the Backup Device field.

17.14 Backing up Chart Material

The ECDIS lets you keep a chart database identical both in the hard disk of the ECDIS and the hard disk of the backup ECDIS. If you want to make a backup of chart material to backup ECDIS, open the Backup & Restore dialog box and do the following:

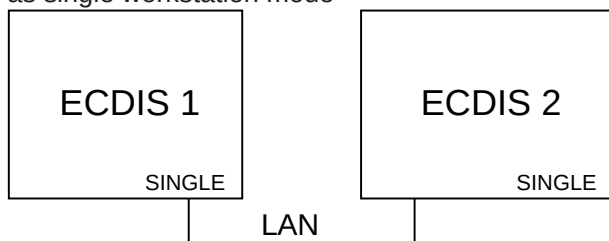
1. Choose file category
2. Choose Drive for backup of ECDIS at Drive in the Backup Device window.
3. Click the **Backup** button.



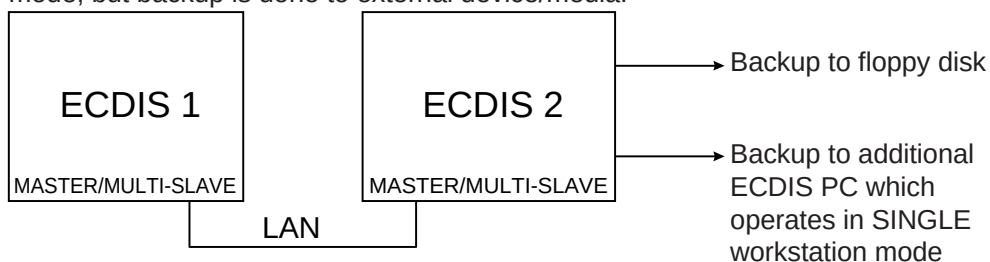
Note: To copy charts between ECDIS workstations, it is recommended that you use the Restore function instead of Backup. For use of Backup, see the illustration below for when it is possible to use the Backup function.

After the backup has been completed, the hard disk content of the backup ECDIS is identical with backup ECDIS. However, the backup ECDIS doesn't automatically start to use possible new material. To do this, open the Chart menu and select System>Refresh Charts after backup from the menu.

Between ECDIS workstations when both workstations are set as single workstation mode



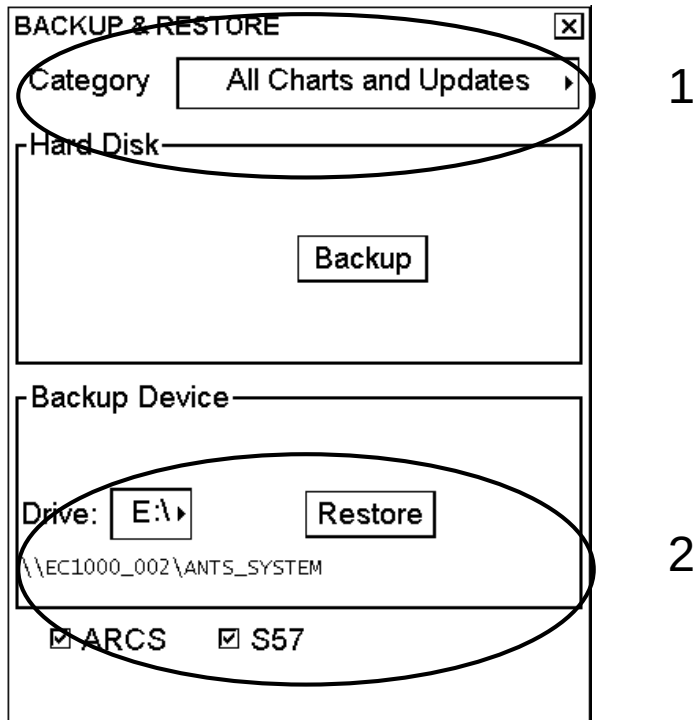
Between both workstations are set as Master/Slave or Multi-workstation mode, but backup is done to external device/media.



17.15 Restoring Chart Material

The ECDIS lets you keep a chart database identical both in the hard disk of the ECDIS and the hard disk of backup the ECDIS. If you want restore a backup of some chart material from the backup ECDIS, open the Backup and Restore dialog box and do the following:

1. Choose file category.
2. At Drive in the Backup Device window, choose the drive where backup ECDIS is stored. Then, click the **Restore** button.



Note: After the restore has been completed, the hard disk content of the backup ECDIS is identical with backup ECDIS. However, the backup ECDIS doesn't automatically start to use possible new material. To do this, open the Chart menu and select System>Refresh Charts after backup from the menu.

18. Common Reference System (Multi-workstation mode)

18.1 Introduction

A system is comprised of one or more Workstation(s) and it is configured as follows:

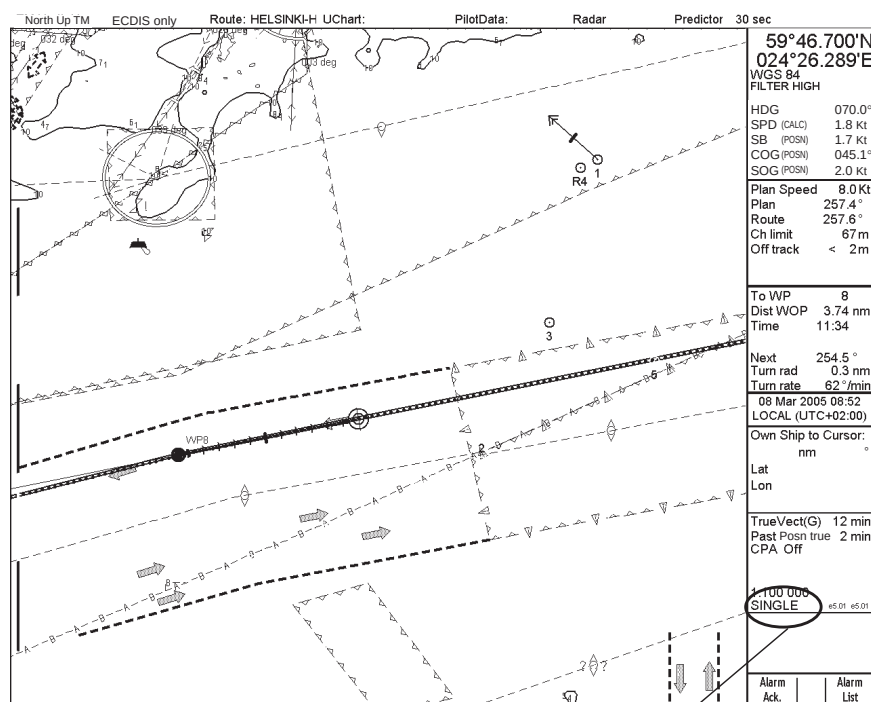
- Single workstation
- Multiple workstation (for example, navigation workstation and planning station)
- Multiple workstation (for example, navigation workstations)

An access server takes care of information shared inside the system to keep workstations consistent within the common reference system concept. The access server also monitors if a workstation has a right to make certain actions (for example if a workstation has usage rights to change monitored route for the system).

The common reference system concept includes the following features:

- Shared navigation sensors
- Shared alarm management
- Shared chart databases for S57 (ENC) and ARCS
- Shared databases for routes, user charts, manual updates and pilot data
- Some operator selections are shared (for example safety contour), while some other operator selections are defined separately for each workstation.
- User selections used for route planning are separate for each workstation

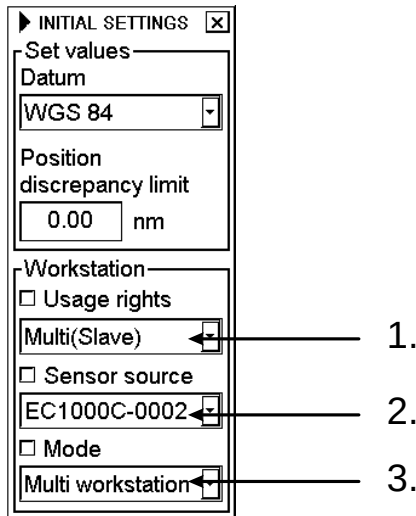
The Installation parameters of the system define if the system consists of more than one workstation and in which the access server is running. For further details see the service manual.



Workstation mode indication

18.2 Controlling Common Reference System

If the system has a dual workstation, the following dialog box appears when choosing the Initial Settings menu. Open the box by moving the cursor onto the workstation mode indication and pushing the right mouse button.



1. **Usage rights:** The following options are available to request usage rights:

- **Master:** Only this workstation can be used to make selections for the monitoring mode (for example, route monitor, user chart monitoring mode, etc.) and system use (for example, navigation sensors, ARPA target source, etc.).
- **Plan:** Only this workstation can access the planning mode (i.e., the other workstation is used for selections for the monitoring mode and system use).
- **Multi:** This workstation shares usage rights in order to make selections for the monitoring mode and system use with the other Workstation set as Multi. Note that this is only a request for shared operation. If any other Workstation has been chosen as Master, then you do not get Multi usage rights, but Slave usage rights. The difference between Slave and Plan usage rights is that Plan retains that status but Slave will be changed to Multi, if the current workstation holding Master usage rights is changed from Master to any other alternative.

2. **Sensor source:** This box shows the Workstation into which all the navigation sensors are connected. If you have a fully redundant system where all the sensors are connected to all workstations, you can choose which workstation to use as a sensor source.

3. **Mode:** Normally, in a multi-workstation environment, this selection should always be "Multi workstation". The alternative selection is "Single workstation" and it is used for two purposes:

- If you do not have more than one workstation powered, then this workstation is chosen for "single workstation" mode.
- If you want to use this workstation of your system temporarily as a totally independent separate workstation, then choose "Single workstation" mode. Note that during the "Single workstation" mode the system does not use the common reference system concept, since everything you do is not shared by other workstations.

Switching between single mode and multi mode

The operator may change the operating mode to "single" or "multi". Switch to single mode when conducting SENC conversion of S57 or C-MAP CM-93/2 charts. (All stations must be in the single mode in SENC conversion.)

1. Right-click MULTI in the information area.
2. Check Usage Rights and change from Multi(slave) to Master.
3. Check Mode and change from Multi Workstation to Single Workstation.

18.2.1 Shared alarm management

The common reference system concept provides that all alarms are indicated in all workstations and a single acknowledge of alarm from any workstation is enough to acknowledge the alarm from all workstations.

18.2.2 Harmonized databases on workstations

When the multi-workstation mode is used, information between workstations is shared via the access server. The access server is responsible for harmonizing data on all workstations when any data listed below has been changed in one of the workstations.

- Chart data
- ARCS
- S57
- Manual updates
- Permits

Notes on harmonization

- If you have the multi-workstation mode in use, it is recommended that loading or updating of ARCS and S57 charts be made when the ship is NOT sailing on restricted waters, because harmonising of databases may cause delay in system operations. To load or update charts while sailing, switch to single-workstation mode. For how to change the mode, see section 18.5 Mode of Workstations.
- In the multi-workstation mode, ECDIS charts are harmonized whenever a chart is loaded, removed, manually updated, viewing dates set, etc. If harmonization is executed between ECDIS units operating in the single-workstation mode, however, the ECDIS workstation having the latest "global_catalog.cat" is used for harmonization. This can cause loss of charts if, for example, the ECDIS workstation to be harmonized has more charts than the other ECDIS workstation but its global_catalog.cat is older than the ECDIS workstation with fewer charts.
- The date of modification of global_catalog.cat for both the S57 system and ARCS system is changed whenever respective charts are loaded, deleted, etc. Both chart systems are harmonized with the latest charts, with no order or priority. The date of global_catalog.cat is modified in the following instances: Permit loading, Permit removal, Chart loading, Chart update, Chart removal, Manual chart viewing dates, Manual update, etc.
- When ECDIS is installed or updated, global_catalog.cat of both the ARCS system and S57 system is deleted. After ECDIS is restarted, rebuild is executed to create a new global_catalog.cat, and the newly created file is time-stamped "Monday, January 01, 1601 9:00:00 AM". (This happens only when it and the S57_setup_file are deleted together. If only global_catalog.cat is deleted, the current time stamp is applied.)

This usually presents no problem with harmonization of S57 charts. However, if "Permanent Warning" appears during the rebuild, "Set chart viewing date" will be executed. When this occurs, the time stamp for global_catalog.cat is written over and its time stamp becomes older than the ECDIS time stamp. This causes the ECDIS to revert to the harmonized state directly after installation. To prevent this, "use" the time stamp obtained from "Set chart viewing date" and execute "Set chart viewing date" on the ECDIS on which to harmonize S57 charts. This will always give the most recent time stamp to the ECDIS to be harmonized.

- Do not turn off the power of an ECDIS unit when charts are being harmonized between two ECDIS units in the multi-workstation mode. The unit that was turned off may malfunction after activating the single-workstation mode.
- Turn off the radar overlay feature before conducting harmonization after loading or updating charts, to prevent the overload condition, which causes slow operation.
- For multi-workstation system, if charts are loaded and updated at Workstation A in the single mode then the mode is switched to multimode, charts are then automatically loaded to Workstation B for harmonization of charts. After harmonization is completed, charts must be refreshed at Workstation B, in the following operating sequence: Chart menu→System→Refresh charts after backup. This same operating procedure applies if charts are loaded and updated while the multi-workstation mode is active.

18. Common Reference System

You can set access server display options ON if you want to monitor access server windows to know harmonization status, whenever harmonization is completed by the system.

[Initial Settings]	
Set time	
Function keys Operation	▶
Parameter Backup Digitizer Backup and Restore	
Installation parameters C-Map Ed3 installation Navigation parameters	▶
Chart Alarm parameters Optimization parameters	▶
Print Navigation parameters	▶
Print Optimization parameters	▶
Selftest Standby	
Presentation library	
Access Server and Diagnostic	▶
Close	

To set access server display ON/OFF, do the following:

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Initial Settings then push the scrollwheel.
3. Place the cursor on the triangle in the Initial Settings dialog box to show the menu shown left.
4. Choose Access Server and Diagnostic from the menu then Access Server Display from the submenu.

[Access Server and Diagnostic]	
Go Back	
Access Server Display	
Access Server	
Access Server Log	
Human Interface Log	
ECDIS Shutdown Dialog	
Diagnostics console	

5. When access server windows are displayed, the following messages may appear.

If the system recognises that any data mentioned above has been changed in one workstation, the access server indicates the need for pending harmonisation, using the window shown right.

Harmonization in Access Server is currently pending.

When the access server recognises that the editing, loading, updating, etc. session has been completed in one workstation, the access server starts harmonising databases in order to get databases identical on all workstations. The message "Access Server is currently harmonizing" appears to alert you to this action. If you click the **Show Details...** button, the "Progress of harmonization" window appears to give detailed information about harmonization progress. This window can be closed by clicking the "Access server is currently harmonizing" window.

Note: The **Stop** button in the Progress of harmonization window is intended to stop the harmonization in case of system malfunction.

When route, user chart or pilot data is chosen for the planning mode, the access server locks it and rejects further selection of it in other workstations until "Enable changes" selection is removed or the Plan Route dialog box is closed.

Harmonising starts when "Enable changes" selection is removed or corresponding window(s) are closed. After harmonisation has been done, the route, user chart or pilot data can be chosen in another workstation for the planning mode.

Access Server is currently harmonizing.

Details...

Access Server is currently harmonizing.

Details off

Access Server: Progress of harmonization

Arcs NMS

02_01089.TXT

54 of 1589

Stop

18.2.3 Shared operator selections

The common reference system concept allows that some selections and settings made by a operator in one workstation are transferred to the other workstation. These are as follows:

- Route, user chart and pilot data in monitoring mode
- Chosen sensors in speed/course and position pages (including position alignment of your ship and gyro correction) in the Sensors dialog box
- Settings for chart alarms and watch sector
- Settings of conditions for voyage and dangerous targets recordings
- Ship parameters (table of forwarding distance, optimization parameters and navigation parameters)
- Setting for position discrepancy limit

18.3 Usage Rights

A workstation can have different usage rights. Master and Multi (Slave) rights allow control of both planning and monitoring modes and navigation sensors. Slave (Multi) and Plan usage rights allow only control of the planning mode. Workstations can be set so that

- One has Master usage rights. The rest has Slave (Multi) or Plan usage rights.
- One or two have Multi (Slave) usage rights. The rest has Plan usage rights.

18.3.1 Setting usage rights as "master"

One single workstation can be chosen to control the monitoring mode and navigation sensors. This means that this particular workstation is used to choose route, user chart and pilot data for the monitoring mode.

To choose configuration of system in which one workstation has usage rights set as Master, do the following:

1. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
2. Check the Usage rights box and choose Master from the List box.
3. The indication MASTER appears at the lower right hand corner on the chosen workstation.
4. The indication SLAVE appears at the lower right hand corner on the other workstation.

INITIAL SETTINGS

Set values

Datum

WGS 84

Position discrepancy limit

0.00 nm

Workstation

☒ Usage rights

Master

☐ Sensor source

EC1000C-0002

☐ Mode

Multi workstation

1:20000

X1.3

MASTER

ab.00 a5.00

1:20000

X1.3

SLAVE

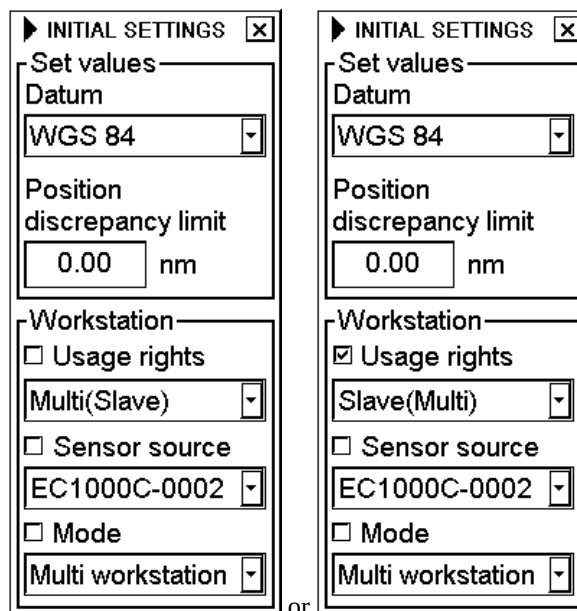
ab.00 a5.00

18.3.2 Setting usage rights as "multi" or "slave"

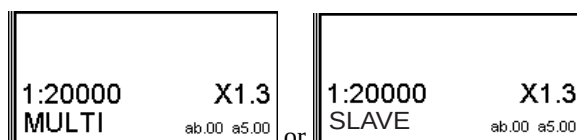
Multiple workstations can be chosen to control monitoring modes and navigation sensors. This means that these particular workstations are used to choose route, user chart and pilot data for monitoring modes. However, the multiple control requires that none of the other workstations is set for Master usage rights. If the other workstation is set for Master usage rights, then this workstation can be set only as Slave or Plan. The transition from Slave to Multi usage right is automatic. If later the usage right selections in the other workstation are changed, then the usage rights in this workstation is automatically set as Multi or Slave based on non-existence or existence of a Master usage rights workstation.

To choose configuration of system in which multiple workstations have usage rights set as Multi, do the following:

1. Operate at the workstation for which you like to give Multi or Slave usage rights.
2. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
3. Check the Usage rights box and choose either Multi (Slave) or Slave (Multi) from the List box. First alternative indicates the selection and second alternative in parenthesis indicates the provisional selection. Provisional selection may be used by the system if new usage rights selections are made in the other workstation.



4. If, based on your request, you got shared Multi usage rights, then the indication MULTI appears at the lower right hand corner of display. If one of the workstations was already chosen as Master, then the system cannot give you Multi usage rights. In this case the indication SLAVE appears at the lower right hand corner of display.



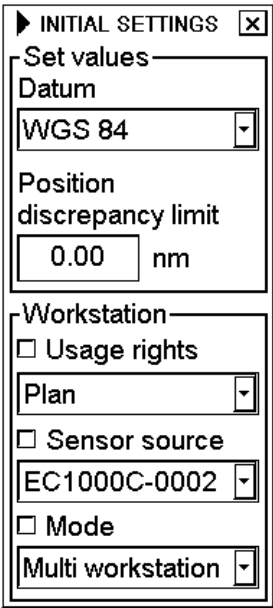
18.3.3 Setting usage rights as "plan"

Workstation can be chosen to control only the planning mode. This means that particular workstation is used to edit route, user chart and pilot data in the planning mode. Selection of Plan usage rights is done in the Installation Parameters of the ECDIS by service personnel. The operator is not able to set these usage rights.

Note that a workstation chosen for Plan usage rights still has full viewing access to navigation sensors and to monitored routes, user charts, etc. This is important because it allows that parallel operator(s) can monitor navigation situation.

To verify configuration of the system in which a chosen workstation has usage rights set as Plan, do the following:

- 1. Operate at the workstation for which you like to give Plan usage rights.
- 2. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
- 3. Check Usage rights and choose Plan from the list box.



The indication PLAN appears at the lower right hand corner of the display.



18.4 Sensor Source for the System

Normally the sensor source of a system is a single workstation to which all the sensors are connected. All workstations share the navigation sensors. The workstation chosen as a sensor source is connected to all sensors. The workstations that can be used as sensor source are shown in the Sensor source list box in the Sensors dialog box.

Typically, the following kinds of installations for connecting sensors to the system are used:

- One workstation to which all the sensors are connected and the others have only one DGPS connected (minimum system configuration which fulfil IMO back-up arrangement for the ECDIS).
- Multiple workstations to which all the sensors are connected (fully redundant workstations)

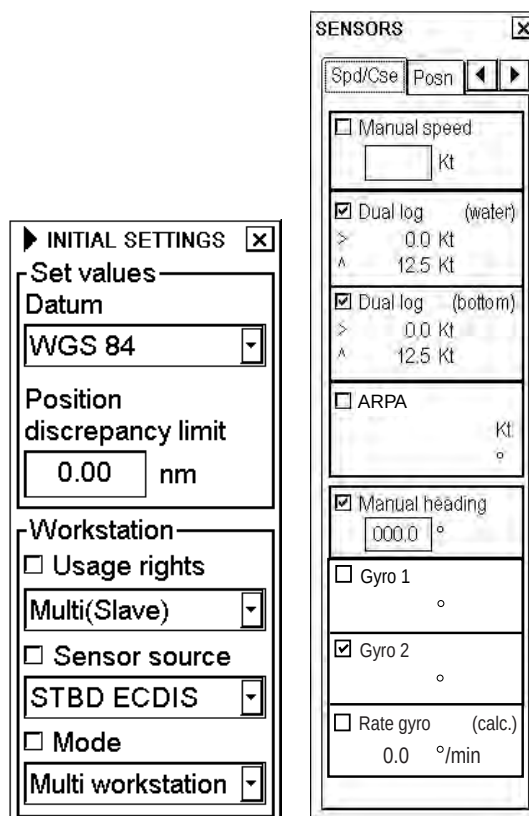
Consult with the installer to know the installation method.

Note: If you have a fully redundant system where all the sensors are connected to all workstations, it is possible to have the same information available no matter which workstation is chosen as the sensor source. If there is any difference in installation parameters due to different combination of sensors connected, the information available may vary when changing the sensor source. It is highly recommended that you change sensor source only when it is required (for example when you have some failure in communications, when hardware fails, etc.) and also to change the sensor source only when it is safe for navigation to do so. (Change of sensor source will take some time during which the system is not fully operational.)

To change sensor source, do the following:

1. Operate at the workstation for which you want to set sensor source.
2. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
3. Check Sensor source then choose sensor source from the list box.

Communication program is started at the workstation specified as the sensor source responsible for receiving and transmitting data from/to sensors. The workstation selected as sensor source is also indicated at the top of the Sensors dialog box.



18.5 Mode of Workstations

The system is designed so that information and operations can be shared among workstations. Sharing requires that the access server be running in the specified workstation. (This is an installation parameter. See the Installation Manual.) The access server requires that the workstation be designated as multi workstation.

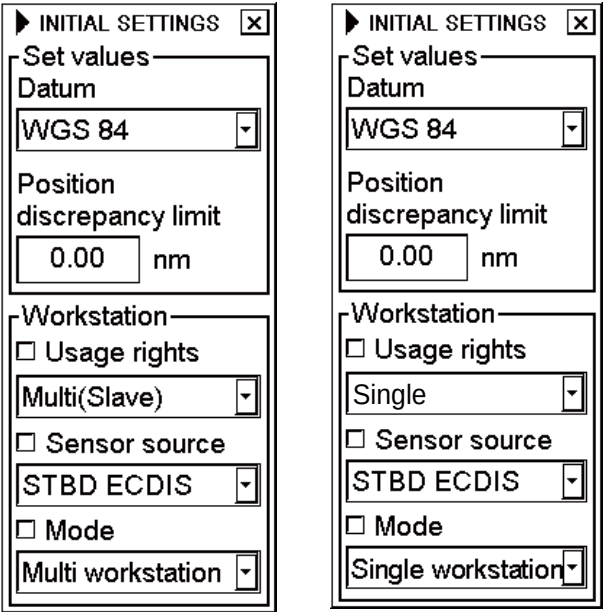
If something fails in a workstation or in the LAN connecting the workstations that prevents multi workstation operations, it is possible to switch the mode to single workstation. If the mode of a workstation that is defined in the installation parameters for the access server is set as a single workstation, the access server is stopped and the workstation continues as if they are separate individual ECDIS systems.

Note: When the mode is single workstation, no data are harmonised nor are information of operator selection shared between workstations.

18.5.1 Changing mode to single or multi workstation

To change sensor source, do the following:

1. Operate at the workstation for which you want to set sensor source.
2. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
3. Check Mode and choose appropriate workstation from the List box.



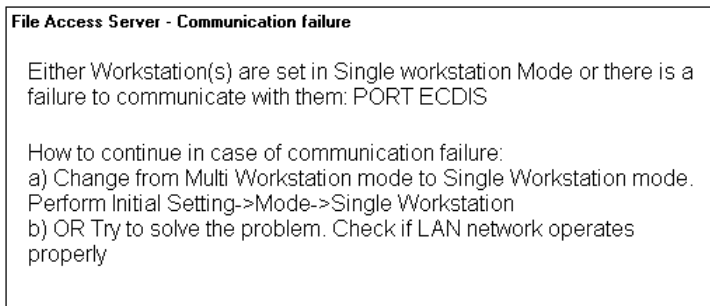
In this example, mode was changed from multi to single.

The selection Single workstation disables selections of usage rights and sensor source and stops the access server operations on the workstation. In the single workstation mode, the indication SINGLE appears at the lower right hand corner in red.



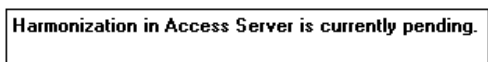
18.6 Troubleshooting

If something fails while the access server is harmonizing workstations, the following window appears to indicate that harmonising has failed.



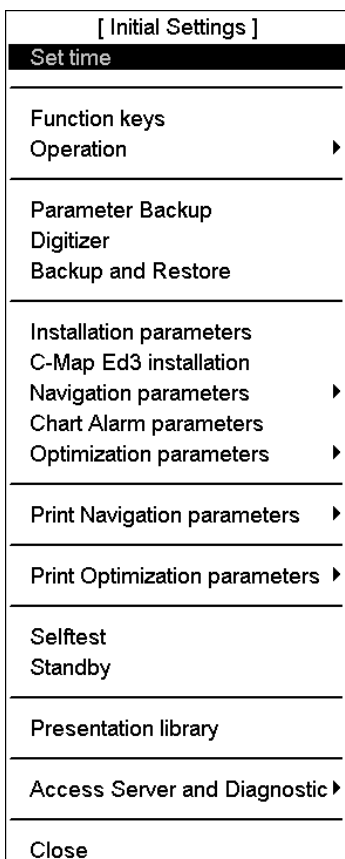
18.6.1 What to do if pending access server window remains on screen

The window below indicates that operation of the access server is pending.

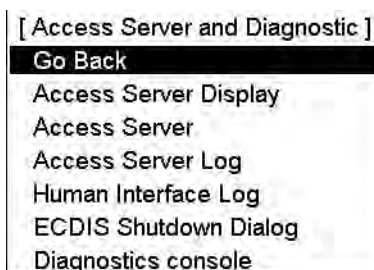


There are two alternatives for pending state:

1. You have not closed all related windows. To solve this, click the **Cancel** button several times to erase all windows from the ECDIS display.
2. The Access Server remains in pending state for some other reason. To solve this, try manual activation of harmonization of workstations as follows:

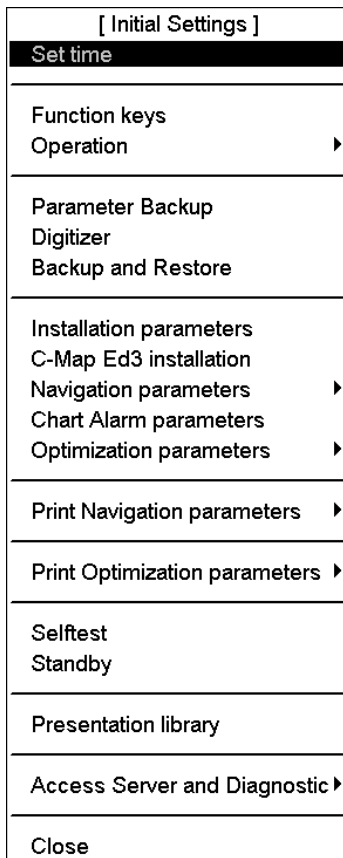


1. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
2. Place the cursor on the triangle in the dialog box to display the menu shown left.
3. Choose Access Server and Diagnostic from the menu and choose Access Server from the sub menu to start harmonization.

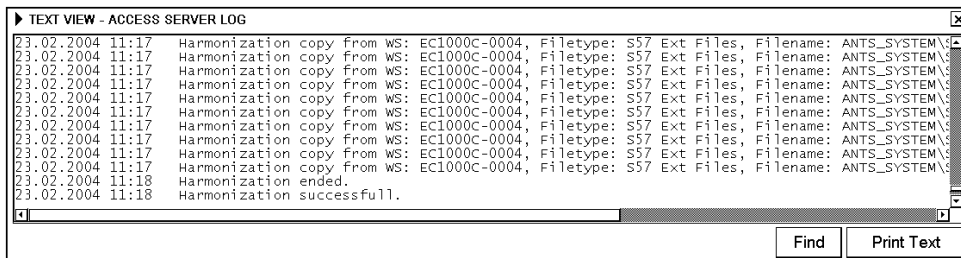
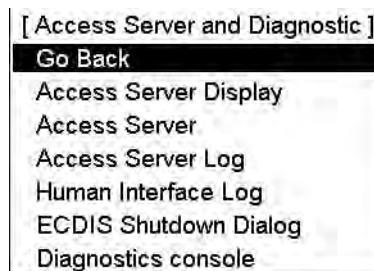


18.6.2 Access server log

The access server log is used to analyze and diagnose access server operation. Service personnel can use this log to check the access server for proper operation. To access the access server log, do the following:



1. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
2. Place the cursor on the triangle in the dialog box to display the menu shown left.
3. Choose Access Server and Diagnostic from the menu and choose Access Server Log from the sub menu.



18.6.3 Human interface log

The human interface log is used to analyse and diagnose system operation. Service personnel can use this log to check the system for proper operation. To activate the human interface log, do the following:

[Initial Settings]	
Set time	
Function keys	
Operation	▶
Parameter Backup	
Digitizer	
Backup and Restore	
Installation parameters	
C-Map Ed3 installation	
Navigation parameters	▶
Chart Alarm parameters	
Optimization parameters	▶
Print Navigation parameters	▶
Print Optimization parameters	▶
Selftest	
Standby	
Presentation library	
Access Server and Diagnostic	▶
Close	

1. Place the cursor below the chart scale indication, confirm that Initial Settings is shown in the mouse functions area then push the right mouse button.
2. Place the cursor on the triangle in the dialog box to display the menu shown left.
3. Choose Access Server and Diagnostic from the menu and choose Human Interface log from the sub menu.

[Access Server and Diagnostic]
Go Back
Access Server Display
Access Server
Access Server Log
Human Interface Log
ECDIS Shutdown Dialog
Diagnostics console

▶ TEXT VIEW - HUMAN INTERFACE LOG	
24.02.2004 06:58	Started mouse_thr (receives panel events)
24.02.2004 06:58	Calling: aesmouset_get_event
24.02.2004 06:58	The checking of the mutex starts after 300 seconds
24.02.2004 07:03	The checking of the mutex continues in 1000 millisecond periods
24.02.2004 12:17:20	Log file checked but not truncated
24.02.2004 12:17:20	Logging started ECAHI Ver f5.00
24.02.2004 12:17	Started mouse_thr (receives panel events)
Find Print Text	

19. Navigation Sensors

19.1 Choosing Navigation Sensors

The operator can choose navigation sensors to use for navigation and view their current values on the Sensors dialog box. To access this dialog box, put the cursor on the Position field in the information area then push the right mouse button.

Checkbox status shows whether the sensor is used for integrated navigation or not. If there is no value shown for a sensor this means that the sensor is not valid. Note that the content of these pages depends on sensors that are in use on the ship.

19.1.1 Sensors dialog box description

Speed/Course page

Source:

In a multiple workstation environment verify that the sensor source indicated at the top of dialog box is the intended one.

Manual speed:

If checked, operator can enter value (Kt) for speed.

Note: This is used only if there are no other speed or SOG sensors chosen.

Log:

If checked, a log is used as water speed source. "(no pulse)" is used to indicate that a log device with closed contact relay interface using 200 pulses/nm does not give any pulses and thus the speed might be wrong. If Log is chosen and "no pulse" condition is detected, then the system generates the alarm "2005 Log data unreliable".

Note: If you have a dual-axis Doppler log which can measure both water and bottom track, then installation parameters can be set to receive water tracking as log device.

SENSORS

Spd/Cse Posn

☐ Manual speed
[] Kt

☒ Dual log (water)
> 0.0 Kt
^ 12.5 Kt

☒ Dual log (bottom)
> 0.0 Kt
^ 12.5 Kt

☐ ARPA
[] Kt
°

☒ Manual heading
000.0 °

☐ Gyro 1
°

☒ Gyro 2
°

☐ Rate gyro (calc.)
0.0 °/min

Dual log (water):

If checked, a dual log is used as speed and course source. "(water)" is used to indicate that this information is from water track of dual log.

Dual log (bottom):

If chosen, a dual log is used as speed and course source. "(bottom)" is used to indicate that this information is from bottom track of dual log.

19. Navigation Sensors

ARPA:

If checked, ARPA is used as speed and course source. The following indications appear to denote source:

(bottom): Log operating in bottom tracking mode.

(water): Log operating in water tracking mode.

(posit.): Position receiver such as GPS.

(manual): Manual speed.

Manual heading:

If chosen, the operator enters heading manually. Note that this is used only if there are no other sensors chosen.

Gyro1:

Heading source is a gyrocompass. "(mag)" means the source is magnetic heading. True heading source has no indication. If the source of Gyro1 is a gyro with synchro or stepper interface, the indication "(require set)" appears when you need to set a new initial value for the gyro.

Gyro2:

Heading source is a gyrocompass. "(mag)" means the source is magnetic heading. True heading source has no indication.

If you have both gyro1 and gyro2 chosen and if their value differs more than 5°, the system generates the alarm "2004 Gyro data unreliable".

Rate gyro:

Heading source is a Rate of Turn gyro. "(calc.)" means the rate of turn is calculated from gyro movement.

Setting initial value of gyro1:

Initial setting of gyro1 is not necessary if it outputs serial data. However, if it is of synchro or stepper type, you will need to set initial gyro value. If gyro1 requires initial value, then the indication "(require set)" is displayed. Use the scrollwheel to enter initial value. After you enter a value "require set" disappears.

☒ Gyro 1 (require set)		°
--	----------------------	---

Position page

The field of a position sensor contains a label (here FURUNO and MX 200) which indicates the name of the sensor; a status (primary/secondary/off) which indicates if the sensor is used or not; position at conning position and local datum; speed and course which has (mag) if the course is referenced to magnetic north. A DGPS position sensor has additional text Diff, if differential signal is in use. Latitude and longitude values will appear in red and with additional text in the following conditions:

- Kalman filter has excluded the sensor from its estimated position. Additional text is "Excluded".
- Received position from position sensor is in another datum as set to be received in the ECDIS. Additional text is "Datum".
- If position sensors have position discrepancy active. Additional text is "Discrepancy".

The screenshot shows a 'SENSORS' window with a close button (X). It contains two sensor entries. The first entry is for 'FURUNO' with a status of 'Primary'. It shows a speed of '12.5 Kt', a course of '078.7 °', and a position of '50°36.989'N' and '001°34.004'E'. The second entry is for 'MX 200' with a status of 'Sec'. It shows a speed of '12.5 Kt', a course of '078.7 °', and a position of '50°36.989'N' and '001°33.958'E'. Above the sensors, there are checkboxes for 'Chart Align' and 'Enable', both set to '0.0'. A 'Kalman filter' status is set to 'On'. The 'Deadrec' field shows '50°36.989'N' and '001°34.004'E'.

Position sensors have priority, which is indicated as "primary" or "secondary". Only one sensor can be primary while the others can be secondary or off. If a position sensor is changed from secondary to primary state and another position sensor was chosen as primary, then that sensor previously selected to primary state is then automatically selected to secondary state. When the position source is changed based on priorities and signal validity to another position source, then you get the alarm "2009 Position source change". Note that alarm 2009 is active only when the Kalman filter is off because the filter has its own process to calculate estimated position and in that process priority given by primary and secondary is not used.

If a DGPS is chosen as primary or secondary, and its status changes from "no Diff" to "Diff" or from "Diff" to "no Diff" the system generates the alarm "4027 DGPS pos. Source change" (alarm numbers are from 4027 to 4032 depending on position receiver).

"Pri no alarm" and "Sec no alarm" can be chosen from the DPGS box if you want to disable the alarm "4027 DGPS pos. source change". These selections are intended for the area where the differential coverage is fading. One example is if you sail along coastline but you are so far away that the differential signal changes its status very often.

The system generates the alarm "4038 Datum mismatch" (alarm numbers are from 4038 to 4043 depending on the position receiver) if output datum of a chosen position sensor (status other than Off) is changed from WGS-84 to another datum or if chosen position sensor does not send datum message. Additional text "datum" appears, in red. Further, lat/lon values for the position sensor turn red. If the position sensor is also used for system position, Kalman filter and your ship's position (Lat/Lon values and datum used) are indicated in red. If output datum of a chosen position sensor is changed from no datum message or another datum to WGS-84 and the operator has used the selection Primary or Secondary, then the system generates the alarm "4044 Datum change" (alarm numbers are from 4044 to 4049 depending on position receiver).

Note: The ability to check datum of position is a relatively new feature for position receivers. It was introduced in standard IEC 61162-1 Ed2, published in July 2000. Only EPFS (for example GPS or DGPS) which has "IEC 61162-1 Ed 2 (2000-7)" indicated in their type approval certificate can support the ECDIS to detect datum mismatch.

The system generates the alarm "2007 Position discrepancy" if there is discrepancy in position. Together with this alarm, the system shows the text "Discrepancy" in red in the Position page for a position sensor which has position discrepancy active.

19. Navigation Sensors

Enable:

Check to align chart, using the "drag and drop" feature.

Chart alignment:

Alignment is automatically chosen if the operator has defined position offset by using the chart align feature. The offset values are given in nautical miles and degrees. If position alignment is used, the operator is reminded of it every 30 minutes by the alarm "2011 ChartAlign: over 30 min".

Dead rec:

The system automatically chooses dead reckoning if there are no valid and chosen position sources and if there are valid and chosen speed and course sources. If the system has chosen dead reckoning, then the operator can enter a new position for the ship in the Lat and Lon fields.

Kalman filter:

The Kalman filter calculates estimated position using all valid and chosen position, speed and course sensors. Choose On to activate this feature.

Other page

Set and Drift: See description below.

Wind:

Wind (True or North) speed (Kt or m/s) and direction are displayed. Note that true wind is wind relative to your ship heading. For further details, see section 19.10 Wind Sensor.

Depth below trans:

Depth from hull at bow and aft to bottom. A depth alarm value may be entered to alert you to

Temperature:

Water surface temperature.

Water current:

Tide at current position.

AIS targets:

Status of AIS data. Check Danger & Lost Alms to get alarm for dangerous or lost target. Check Safety Msg alarm to get alarm when safety messages are received.

The screenshot shows a 'SENSORS' window with the following sections:

- Set and Drift:** Includes a 'Manual' checkbox, 'Angle' (0.0°), 'Set' (000.0°), and 'Drift' (0.0 Kt).
- Gyro corr:** A field for gyro correction.
- Wind:** Includes 'Kt' and 'True Wind' buttons.
- Depth below trans:** Includes 'Bow' (m), 'Aft' (m), and 'Echo alarm' (0 m).
- Temperature:** Includes 'Water' (°).
- Water Current:** Includes 'Course' (°) and 'Speed' (Kt).
- AIS Targets:** Includes checkboxes for 'Danger & Lost Alms' (checked) and 'Safety Msg Alarm' (unchecked), and status indicators for 'Received data' (Err) and 'Display Ok Storage Ok'.

Set and drift:

Check the Manual box to manually set speed and course of drift.

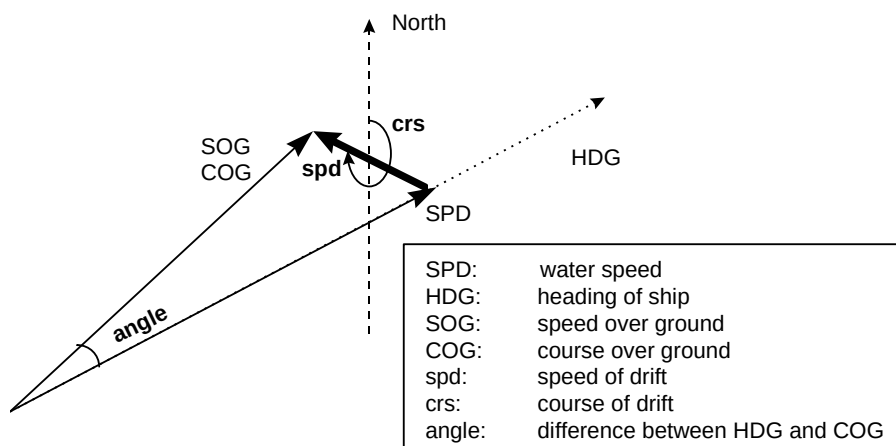
Note that you can choose manual drift only if there are no automatic sources for SOG and COG. In other words, you have neither a dual-axis log nor any position receiver available.

Angle = Difference between heading and COG

Spd = Speed component of the drift vector

Crs= Course component of the drift vector

Vector defined by (SOG and COG) is equal to vector sum of vectors defined by (SPD and HDG) and (set and drift).

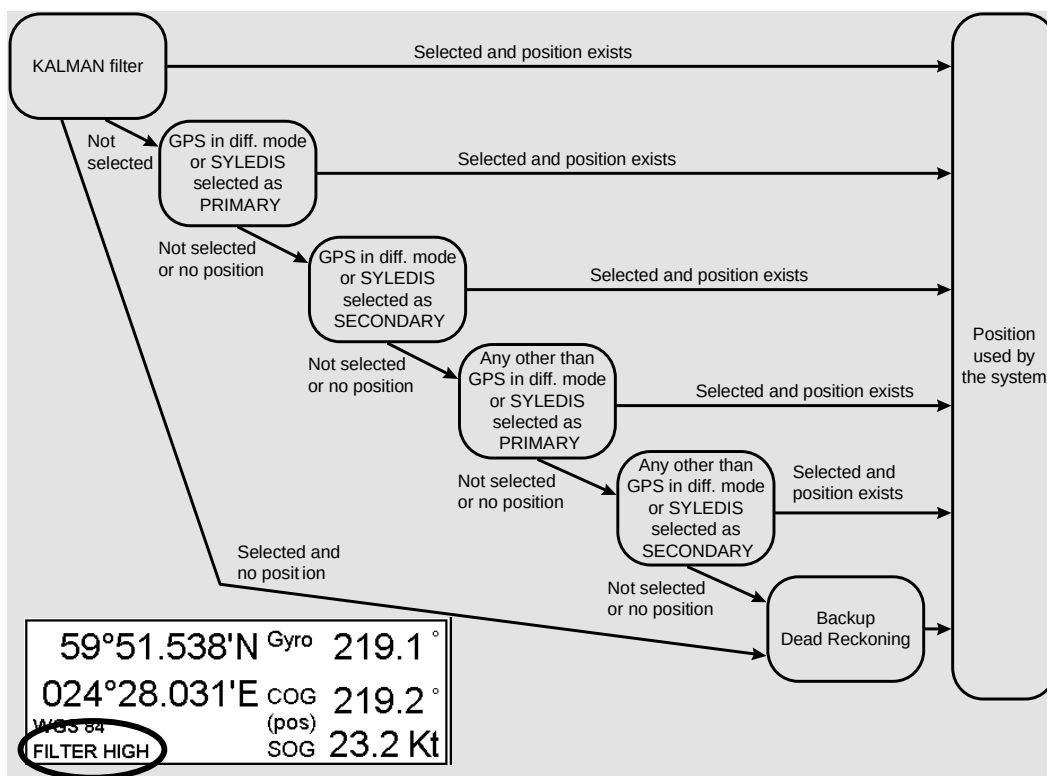


19.2 Source of Position

The figure below shows how source for position is chosen. The Kalman filter uses all position sensors which have either primary or secondary as input for its calculation. DGPS and SYLEDIS position sensors are considered more accurate than other position sensors.

The latitude and longitude position is shown at the upper right corner on the ECDIS display, and in the example below the position source is DGPS. Other indications which may be displayed in the position area are as follows:

- **NO POSIT:** Appears (in red) when no dead reckoning sensors are chosen and valid.
- **DEAD REC:** Shown (in red) when position source is dead reckoning.
- **DGPS, GPS: LORAN, DECCA or SYLEDIS:** Name of position source.
- **LOST DGPS:** Shown (in red) when the operator-selected DGPS device has lost the DGPS signal.
- **FIL LOST DGPS:** Shown (in red) when the Kalman filter is in use and the operator-selected DGPS device has lost the DGPS signal.
- **FILTER HIGH:** Shown when the position source is the Kalman filter with high-precision position sensor.
- **FILTER:** Shown when position source is the Kalman filter without high-precision position sensor.
- **BAD FILTER:** Shown (in red) when position source is the Kalman filter and the filter has excluded at least one of the chosen sensors because of poor accuracy.



If the system changes the source of position because of lost sensor data or the differential mode is changed on a DGPS device, the system immediately generates the alarm "2009 Position source change". If the Kalman filter is used, the system generates the alarm "2010 Filter: Pos source change" after a time out period of 90 sec.

If a chosen DGPS sensor changes its operation mode and its status is primary or secondary, then the system generates the alarm "4027 DGPS pos. source change" (4027 for first sensor, 4028 for second, etc.). These alarms are not generated if the operator has chosen Pri no alarm or Sec no alarm.

If source of position includes a position sensor which is in datum mismatch condition, the latitude, longitude and chosen datum are displayed in red.

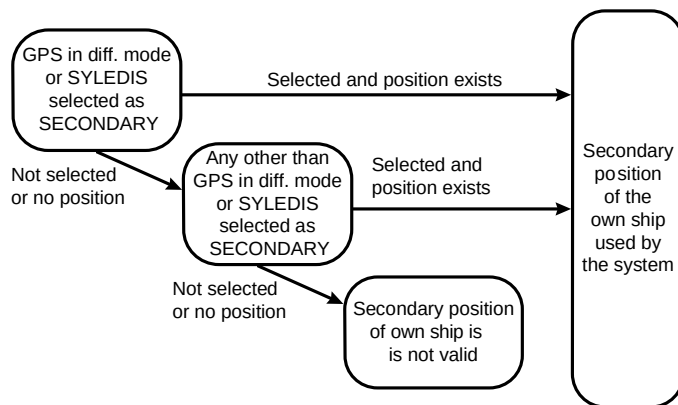
19.3 Primary and Secondary Positions of Own Ship

The system has three different positions for your ship: System position, primary position and secondary position:

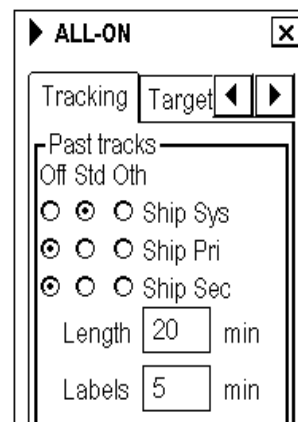
- System position: Used for navigation and steering. See "Source of Position" on page 19-6.
- Primary position: Position generated by position source chosen as primary position source.
- Secondary position: Position generated by position source chosen as secondary position source.

The position source for primary position of your ship is chosen either as Primary or as Pri no alarm on the Position page of the Sensors dialog box.

The position source for secondary position of your ship is chosen either as Secondary or as Sec no alarm on the Position page of the Sensors dialog box. Secondary position of your ship is not available as latitude/longitude value for the operator.

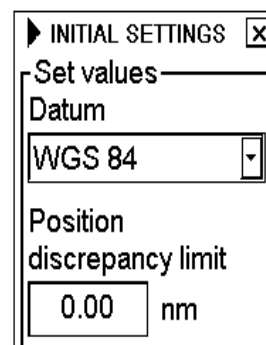


System, primary and secondary positions of your ship may be plotted on the ECDIS display with the Past tracks feature. You can control their visibility from the Tracking page of the Chart Display dialog box, shown right. In this example, past tracks are plotted using Ship system position.



19.4 Position Discrepancy Alarm

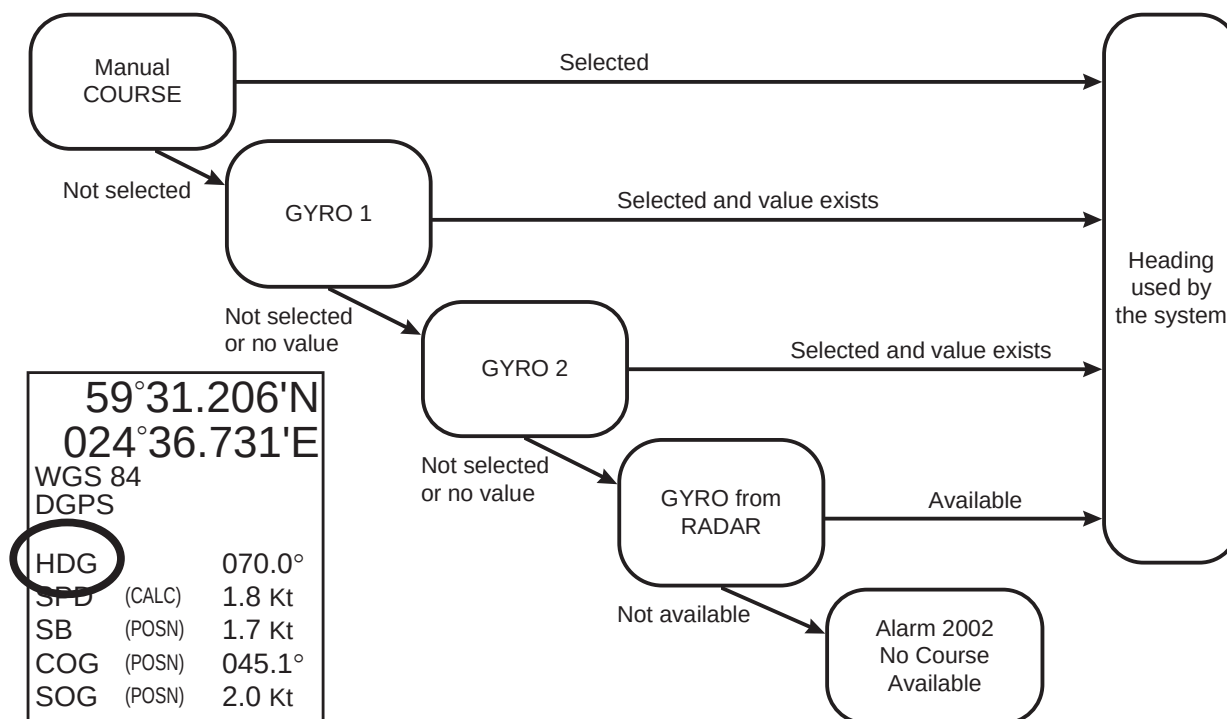
You can activate the alarm "2007 Position discrepancy" from the Initial Settings dialog box. The alarm is active between primary position and any secondary positions. Note that the alarm is also effective between your ship's position and any positions, since ECDIS compass position discrepancy between position used by system (your ship's position) and any individual position sensor selected as primary or secondary source of position. To deactivate the alarm set limit as 0.00.



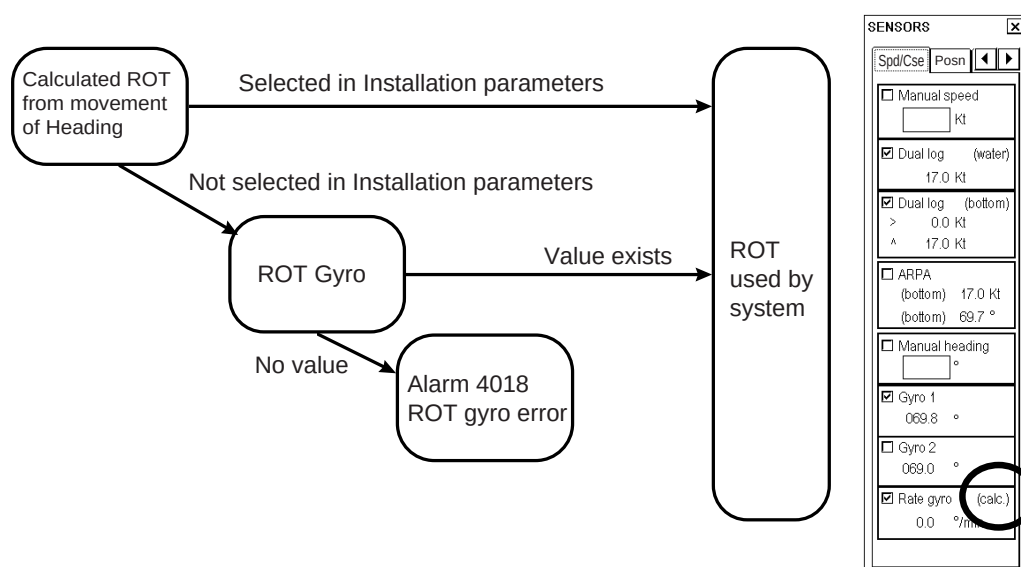
19.5 Source of SOG, COG, Speed, Heading, ROT, Drift and Docking Speed Components

The figure below shows how various sources of navigation data are chosen. "SOG, COG" is speed over ground and course over ground, respectively. "Speed" is speed over water, "Drift" is the difference between speed over water and speed over ground. Docking speed components are bow speed (transversal), stern speed (transversal) and center speed (longitudinal).

Heading used by the system is shown at the upper right corner of the ECDIS display. In the example shown below, heading is received from a gyrocompass and it is shown without additional text, meaning the value is referenced to true North. Additional gyro-related text which may appear are "(mag)" if the value is referenced to magnetic North, "(man)" if the value has been manually entered; or "(corr)", which is displayed in red, if the value includes gyro correction.



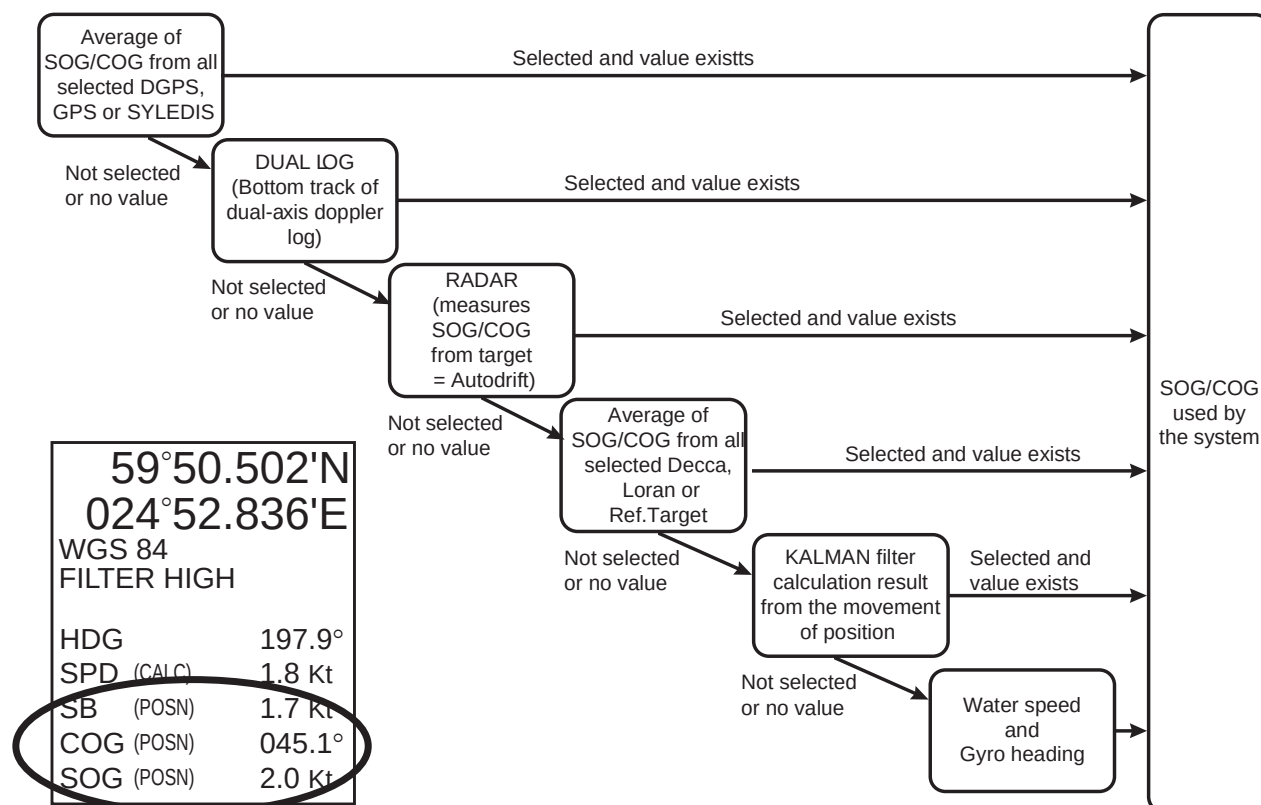
ROT used by the system is shown in the Speed/Course page of the Sensors dialog box. The Rate Gyro field shows the text "(calc.)" when the system calculates ROT from movement of heading. No text is shown when the value is received from an ROT gyro.



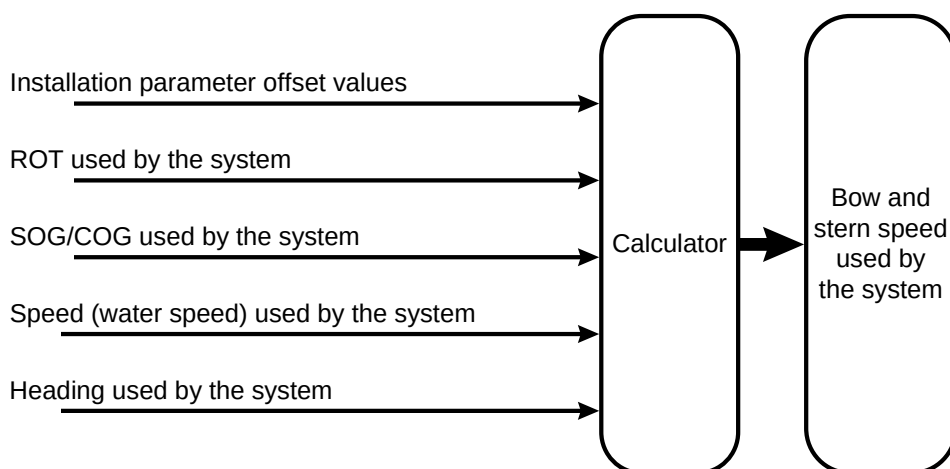
SOG/COG used by the system is shown at the upper right corner of the ECDIS display. In the example below, COG and SOG are from chosen position sensors and this is indicated with the text "(pos)". Other text which denote SOG/COG source are

(BOT): Bottom tracking dual-axis log
 (CALC): Speed calculated from SOG
 (WAT): Water tracking log
 (ARPA): Mixed sources of COG and SOG in the connected ARPA radar
 (POSN): Average of chosen position sensors
 (FILTER): Kalman filter
 (MAN): Manual entry

Note that (pos), (bot), (wat) and (man) could come from direct interfaces of the system or from the connected ARPA radar.

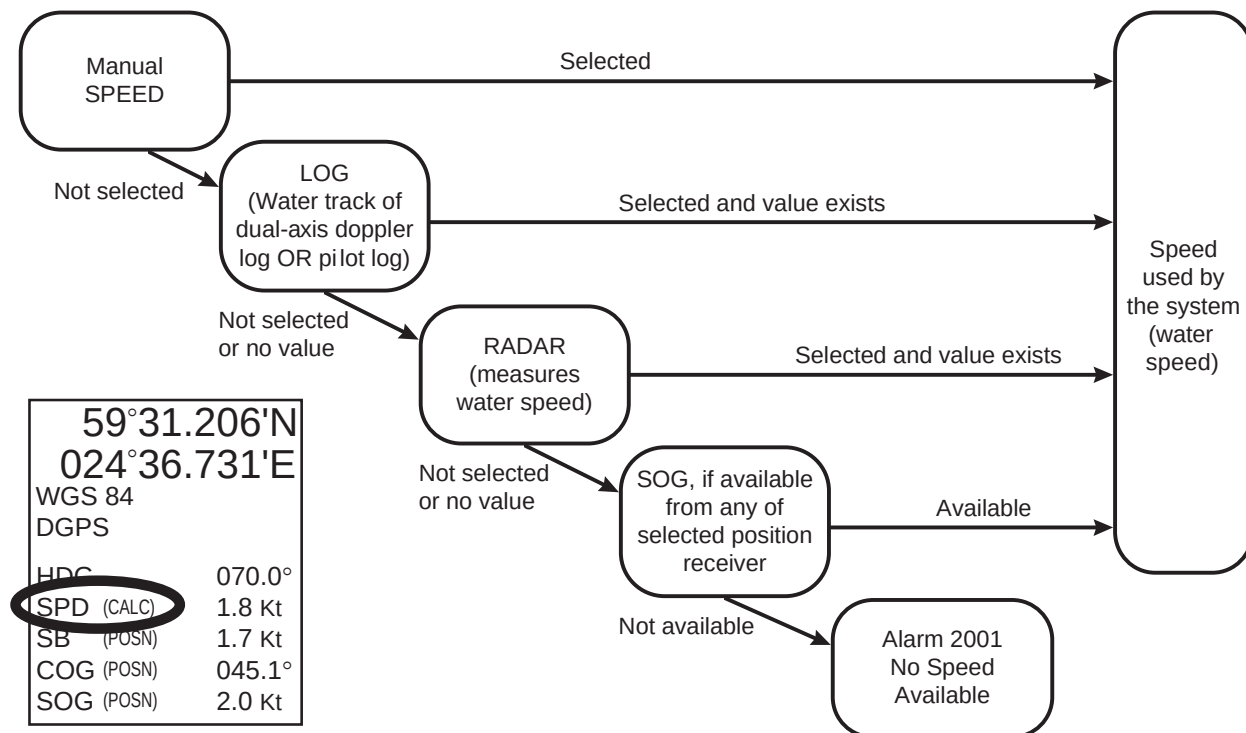


The figure below show the source of docking speed components used for the predictor.



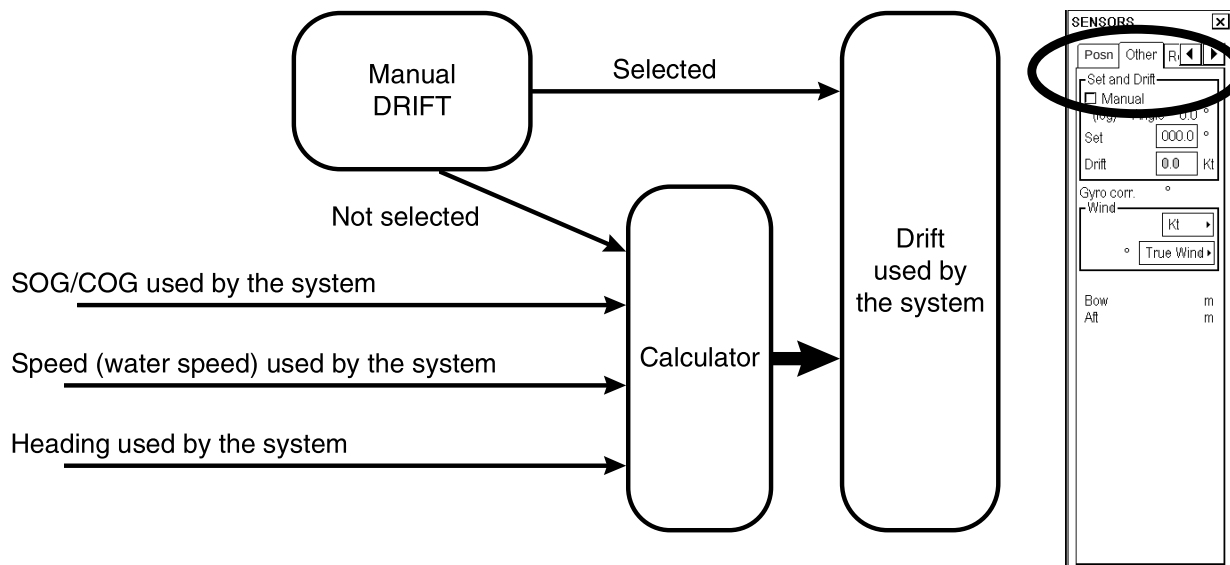
19. Navigation Sensors

The figure below shows the source of water speed is used for drift calculation.



Drift used by the system is shown in the Other page of the Sensors dialog box. In the example below, set and drift have been entered manually since the Manual box is checked. Other text which may appear to show source of set and drift are

(LOG): Log or dual-axis log
 (POSN) Position sensor
 (FILTER): Kalman filter
 (MAN): Manual entry.



Alarm related to SOG, COG, speed, heading, ROT, drift and docking speed components

It is possible that the operator has not chosen any speed or heading sensors, or that the chosen sensors do not have any valid values. This kind of a situation is critical for the system, because it cannot even perform dead reckoning. When no speed source is available, the system generates the alarm "2001 No speed available". When no heading source is available the system generates the alarm " 2002 No heading available".

The system may find that SOG and/or COG from the sensors are unreliable, at which time it generates the alarm "2013 SOG&COG unreliable". Note that the source of SOG and COG is not only speed and course sensors, but the source can also be position-fixing equipment. For more information about source priority for SOG/COG, see section 19.5 Source of SOG, COG, Speed, Heading, ROT, Drift and Docking Speed Components.

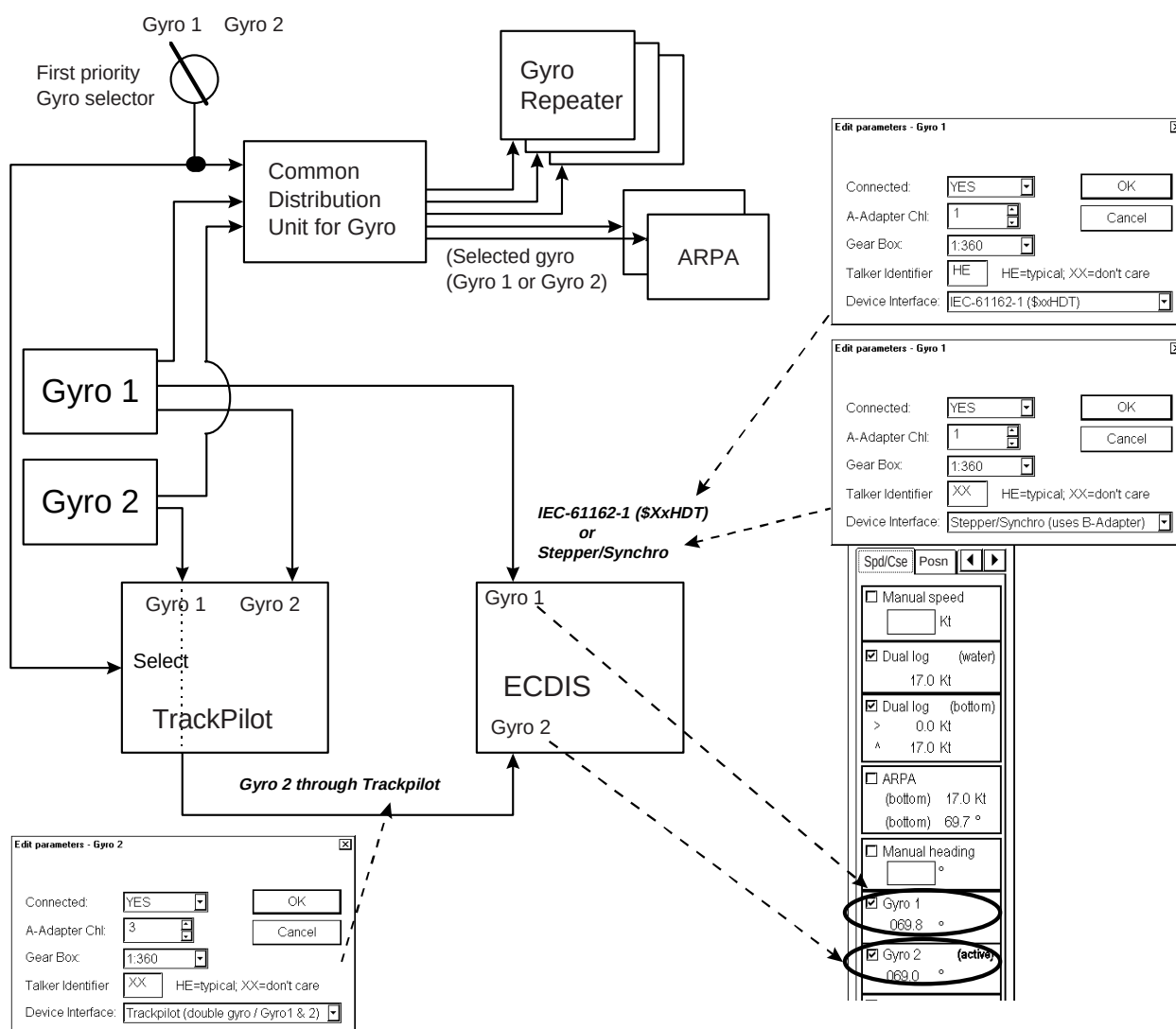
Verify and choose valid sensors in the Speed/Course and Pos pages of the Sensors dialog box for SOG and COG used by the system.

19.6 Dual Gyro Interface for DNV NAUT-AW

DNV NAUT-AW requires dual gyro interface for a track control system, which consists of the ECDIS and a Autopilot FAP-2000. The benefit of this arrangement is that loss of a single gyro does not interrupt track control. The track control system can continue smoothly with a backup gyro.

Dual gyro interface is accomplished by connecting two gyros (Gyro 1 and Gyro 2) directly to the Autopilot FAP-2000. A selection switch (first priority Gyro selector) is used to choose heading source for Autopilot FAP-2000, ECDIS and common gyro distribution unit. The ECDIS indicates the state of "First priority Gyro Choose selector" switch on the Speed/Course page of the Sensors dialog box, with the text indication "active" or "backup" in the Gyro 1 or Gyro 2 field.

Smoothing is added for smooth transition (i.e., without unexpected large rudder movements) from one gyro source to another gyro source. This smoothing is used both for operator requested changes (i.e., operator change position of "First priority Gyro Choose selector") and for automatic changes (i.e., automatic continuation with backup source).



Gyro data distribution for track control system

19.6.1 Indication of gyro source

Information area

Possible gyro source indications, which appear at the upper right corner, are as follows:

- (1): Heading used by the ECDIS is from Gyro 1.
- (2): Heading used by the ECDIS is from Gyro 2.
- (cor1): Heading used by the ECDIS is from Gyro 1 and that gyro correction has been used
- (cor2): Heading used by the ECDIS is from Gyro 2 and that gyro correction has been used
- (mg1): Heading used by the ECDIS is from Gyro 1 which is a magnetic compass
- (mg2): Heading used by the ECDIS is from Gyro 2 which is a magnetic compass

59°31.206'N	
024°36.731'E	
WGS 84	
DGPS	
HDG (2)	071.0°
SPD (CALC)	1.8 Kt
SB (POSN)	1.7 Kt
COG (POSN)	045.1°
SOG (POSN)	2.0 Kt

Above is an example where "First priority Gyro selection" switch is in state Gyro 2.

Sensors dialog box

The Speed/Course page of the Sensors dialog box shows gyro indication as follows:

- (active): The system uses value from this gyro which is chosen by "First priority Gyro Choose selector".
- (backup): The system uses value from this gyro which is NOT chosen by "First priority Gyro Choose selector"

In the example screen at left in the figure below, heading information from Gyro 2 is used by a Autopilot FAP-2000 and the ECDIS. The indication "(active)" in the Gyro 2 field indicates that the system uses operator-chosen gyro as source of heading (State of "First priority gyro selector" switch). In this case the text "(2)" appears at the upper right corner.

In the example screen at right in the figure below, heading value from Gyro 1 is lost. In this case, the system automatically chooses Gyro 2 to be used as the source of heading. The indication "(backup)" in the Gyro 2 field means that a backup gyro is used.

(bottom) 17.0 Kt	(bottom) 17.0 Kt
(bottom) 69.7 °	(bottom) 69.7 °
☐ Manual heading [] °	☐ Manual heading [] °
☒ Gyro 1 069.8 °	☒ Gyro 1 °
☒ Gyro 2 (active) 069.0 °	☒ Gyro 2 (backup) 069.0 °
☒ Rate gyro (calc.) 0.0 °/min	☒ Rate gyro (calc.) 0.0 °/min

19.6.2 Gyro-associated alarms

When no gyro value is received from gyro chosen by "First priority gyro selection", alarm AL 10 (Missing working gyro) is generated at the Autopilot FAP-2000.

When no gyro value is received from a gyro not chosen by "First priority gyro selection", alarm AL 11 (Reference gyro missing or Compass comparison alarm) is generated at the Autopilot FAP-2000. Note that alarm AL 11 is activated also if the deviation between Gyro 1 and Gyro 2 is too large (default is 12°).

ECDIS generates alarm 4005 for missing Gyro 1 and alarm 4006 for missing Gyro 2. If the deviation between gyro 1 and gyro 2 is over 5°, then ECDIS generates the alarm 2004 Gyro data unreliable.

19.7 Filter Operation

The ECDIS has an automatic multi-sensor Kalman filter for position. The filter can calculate estimated position using all operative position sensors.

To view position sensor status, put the cursor on the Position indication, confirm that Sensors appears in the mouse functions area then push the right mouse button.

Operator can manually include or exclude sensors. Remaining sensors (= sensors with any selection other than OFF) are included in the filter processing. The purpose of this filter is to continuously monitor the position given by each individual sensor to determine if the sensor is reliable or not. Also chosen gyro and log sensors are included into this analysis. The filter knows the behavior of different types of sensors (Loran, Decca, GPS, DGPS, etc.). The result of the processing is a smoothed position which is used as final position of the ship. The filter eliminates all "position jumps" in the final position even if there is a position jump in a sensor. (A position jump is caused by line change in Decca, loss of differential signal with DGPS, etc.)

The filter can be selected or deselected by switching it ON or OFF. When switching filter state from ON to OFF, new start position of the filter is set as an average value of the enabled sensors (sensors with any selection other than OFF). Change the filter state from OFF to ON, and the filter continues processing from current position.

When the filter is chosen, alarms are generated if the system does not have a valid position available. No alarms are generated for position jumps of the position sensors chosen to be used with the filter as long as the filter is able to estimate a reliable position based on chosen position sensors. If there is a change in the availability of the sensor chosen with the Kalman filter and if the filter cannot continue the same level of position accuracy, then the system generates the alarm "2010 Filter: Pos source change". This change of available sensor may or may not affect the operation of the filter.

The filter requires at least one position sensor and one course sensor (i.e., gyro) chosen and valid in order to operate. The filter has one main alarm "2000 Filter: Pos unreliable". This alarm means that the filter is not able to calculate the position from the connected sensors. This can happen if there is only one position sensor connected and the position generated by it becomes unreliable or if there are more position sensors but they are deviating too much. Alarm can appear also if the speed/course sensor (Log or Gyro) is found to be unreliable. Note that the filter indicates unreliable position sensor by showing position in red.

If the filter is used without automatic route steering then, in case of alarm 2000, only the filter itself is set in the OFF state. After generating the alarm 2000, the system will use its normal method to choose position source from available sensor. Normally, this causes a jump in the position. After the alarm 2000 is generated, the operator should evaluate which sensor caused the problem. Disable the bad sensor then turn the filter ON again.

The Kalman filter is designed to support automatic route steering and thus it requires that you have some speed. If the speed is less than the value set in the installation parameters (for example 4 kt), the system generates the alarm "2008 Filter: Speed below 4 kn". If you don't use automatic route steering, the system also chooses the filter as OFF after generating the alarm 2008. With automatic route steering the system keeps the filter chosen, but repeats alarm 2008.

The system can check that each chosen position sensor is within position discrepancy limit set by the operator. (For further details, see section 19.4 Position Discrepancy Alarm.) If a position sensor has position discrepancy active, it is automatically excluded from the Kalman filter. This feature enables the operator to control how much discrepancy there can be between the Kalman filter position and any position sensor.

19.7.1 Filter and automatic route steering

The filter can operate based on only one position sensor and one gyro. However, this minimum selection is not suitable for automatic route steering or program track, which both require an independent speed source. With automatic route steering the minimum selection is for GOTO Waypoint:

- One position sensors, gyro and log or
- Two position sensors and gyro
- And for GOTO Track:
 - One high-precision position sensor, gyro and log or
 - One high-precision position sensor, secondary position sensors and gyro

Source of position indicates what kind of sensors the filter is using for position calculation. The permanent indication is shown at the top right hand corner:

- FILTER: There is no high-precision position sensor chosen and available for the filter.
- FILTER HIGH: There is a high-precision position sensor chosen and available for the filter. It is possible to use track steering modes which require accurate position (Goto Track, Program Track).

Filter state, automatic route steering and alarm

Filter state, automatic route steering and alarm

Alarm	Meaning
2000 Filter: Pos unreliable	The filter is not able to calculate the position from the connected sensors.
2006 Route: CRS jump possible	Generated after alarm 2000 is displayed. It reminds you that if you want to continue automatic route steering you need to choose one of the position sensors. Then, most probably your ship will perform a turn as a consequence of new position.
2470 Disabled: Needs filter on	You tried to enable automatic route steering without Kalman filter positioning.
2475 Route: Needs filter ON	Filter is lost during automatic route steering.
2476 Route: Needs log sensor	Log device is lost during automatic route steering and your remaining log selection doesn't meet minimum requirements.
2490 Disabled: Needs log sensor	You tried to enable automatic route steering without an independent speed source.
2491 Disabled: Needs diff pos.	You tried to enable automatic route steering for GOTO Track mode without a high-precision sensor.
2492 Route: Needs diff pos.	You lost high-precision sensor in automatic steering, GOTO Track mode, and remaining sensor doesn't meet the minimum requirements for high-precision sensor.
2493 ProgTrack: Needs Filter ON	You lost the Kalman filter position during program track.
2494 ProgTrack: Needs diff pos.	You lost high-precision position sensor during program track and remaining sensor doesn't meet the minimum requirements for high-precision sensor remaining selection doesn't meet the minimum.
2495 ProgTrack: Needs log sensor	You lost a log device during program track and your remaining log devices selections don't meet the minimum requirements.

About alarm "2000 Filter: Pos unreliable"

If the filter is used with automatic route steering then, in case of alarm "2000 Filter: Pos unreliable", all position sensors and the filter itself are switched OFF and the system continues with backup dead reckoning, based on chosen speed/course sensors. In this case it is recommended that you leave automatic route steering and continue using a more traditional steering mode until you find the reason why alarm 2000 was generated. If you don't leave automatic route steering, the system will repeat alarm "2475 Route: Needs filter ON" every 15 seconds.

After the alarm 2000 is generated, the operator should leave automatic route steering and evaluate which sensor caused the problem. If the ship position from a position sensor is acceptable, switch it on. Don't choose any sensor which causes jumping. Then, you can turn the filter ON again and continue automatic route steering.

19.8 Position Alignment

The position alignment feature functions to fine-tune ship's position by using radar overlay, radar echo target and ECDIS chart material.

If position alignment is in use, the ECDIS will generate the following alarm every 30 minutes to remind the operator to align position: "2352 ChartAlign: over 30 min".

19.8.1 Position alignment by means of the ECDIS

If the radar echo targets' symbols are not positioned correctly, there is either position error or gyro error or some combination of these errors.

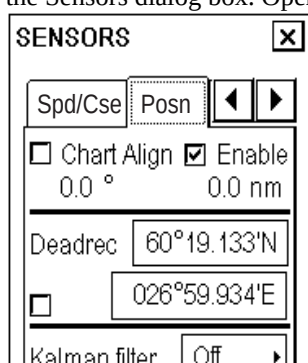
Position may be aligned on the ECDIS display by moving your ship's position or by moving ARPA radar target position. Moving is done by dragging and dropping your ship symbol or ARPA radar target to desired location. Drag and drop means that you place the object on desired location by rolling the trackball while pressing and holding down the left mouse button then "anchoring" the object by releasing the left mouse button.

Note: If the radar overlay is on the ECDIS display when position alignment is done, then

- Mode of radar overlay is temporarily changed to "Radar over Chart".
- ECDIS temporarily uses radar overlay color also for your ship and ARPA targets symbols.

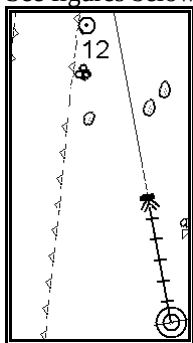
To align position, do the following:

1. Choose desired chart material (ARCS or S57).
2. Choose suitable radar target manually for tracking.
3. Place the cursor on the position indication in the information area then push the right mouse button to display the Sensors dialog box. Open the Position page, then check Enable chart align.

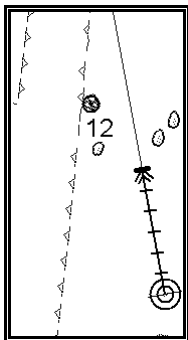


19. Navigation Sensors

4. Use the trackball and the left mouse button to drag and drop a symbol or suitable chart detail on a radar target. See figures below.



Before position alignment



After position alignment

5. If the position source is dead reckoning, the position set with chart alignment is the new start position for dead reckoning. In this case, there is no offset and the text indication OFFSET does not appear. If the position source is something other than dead reckoning, then the indication OFFSET is displayed at the upper part of the information area. Also the range and bearing of the offset are shown in the Position page of the Sensors dialog box. See the figure at the top of the next page.

You can see range and bearing of the offset in the Position page of the Sensors dialog box.

SENSORS	
Spd/Cse	Posn
☒ Chart Align	☒ Enable
6.9 °	0.6 nm
Deadrec	60°19.133'N
☐	026°59.934'E

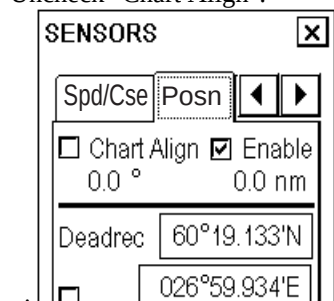
The indication OFFSET appears on the ECDIS display.

59°31.960'N	
024°39.577'E	
WGS 84	
DGPS	
OFFSET	
HDG	070.0°
SPD (CALC)	1.8 Kt
SB (POSN)	1.7 Kt
COG (POSN)	045.1°
SOG (POSN)	2.0 Kt

19.8.2 Resetting position alignment

To reset position alignment, proceed as follows:

1. Open the Sensors dialog box then open the Position page.
2. Uncheck "Chart Align".



3. Check that the indication OFFSET is not shown in the upper part of the information area, to the right of the position source indication.

59°31.206'N	
024°36.731'E	
WGS 84	
DGPS	
HDG	071.0°
SPD (CALC)	1.8 Kt
SB (POSN)	1.7 Kt
COG (POSN)	045.1°
SOG (POSN)	2.0 Kt

19.8.3 Position alignment by ARPA radar

A user chart, showing coast line, buoys, etc., can be used as a position reference once the ARPA radar is able to see these objects. If the ARPA radar targets and the user chart are not exactly overlapping there is either position error or gyro error or some combination of these errors. This feature can only be performed on ARPA radars which are able to display a user chart.

Position alignment with ARPA radar which has a CHART ALIGN button

1. Display user chart on the ARPA radar.
2. Press the **CHART ALIGN** button on the ARPA radar display once. Then, use the trackball on the ARPA radar to move the user chart so that it overlaps radar echoes correctly. Press the **CHART ALIGN** button again once. Then the amount of alignment is transferred to the ECDIS.

If the position source is dead reckoning, the position set with chart alignment is the new start position for dead reckoning. In this case there is no offset and no OFFSET indication in the information area. If the position source is something other than dead reckoning, then the indication OFFSET is displayed at the upper part of the information area, to the right of the position source.

59°31.960'N	
024°39.577'E	
WGS 84	
DGPS	
OFFSET	
HDG	070.0°
SPD (CALC)	1.8 Kt
SB (POSN)	1.7 Kt
COG (POSN)	045.1°
SOG (POSN)	2.0 Kt

19.9 Gyro Error Correction

Typical gyro error sources are installation error, speed/latitude error and dynamic settling error. Typically you detect gyro error on a user chart superimposed on the ARPA picture, on ARPA targets drawn on the ECDIS display or on radar overlay drawn on the ECDIS display.

Gyro error correction is used to remove the difference between the chart north and the gyro north.

Gyro error can be corrected totally or partially in the gyro compass system itself. Many gyro compass systems have automatic speed/latitude corrector, which may use automatic or manual input for speed and latitude. Some gyrocompass systems also include correction for dynamic settling error.

Automatic gyro error correction based on tabled speed/latitude correction can be used, if the gyrocompass itself does not make any corresponding correction.

Gyro error compensation can be used to:

- Correct user chart on ARPA radar screen
- Correct ARPA target positions on ECDIS display
- Correct radar overlay drawn on ECDIS display
- Compensate courses used in route monitoring and automatic route steering.

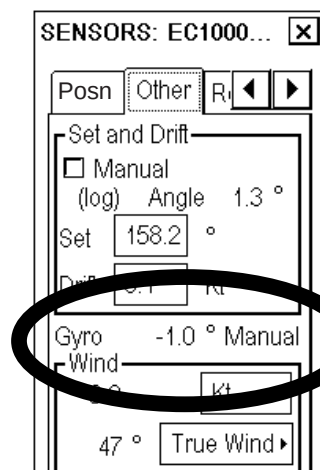
If you have enabled Gyro error correction (see the next page) and if this correction has modified the value of your ship heading, then this condition is always visible in the information area. Red "(corr)" means the gyro value has been corrected.

59°31.206'N	
024°36.731'E	
WGS 84	
DGPS	
HDG	071.0°
SPD (CALC)	1.8 Kt
SB (POSN)	1.7 Kt
COG (POSN)	045.1°
SOG (POSN)	2.0 Kt

If you have enabled both Gyro error correction from ship parameters and Gyro error compensation from route parameters, then Plan and Next in the information area display show compensated values, as shown in the example at right. Also, course to steer (used by automatic route steering) is compensated in this case.

Plan Speed	20.0 Kt	To WP	3
Plan (corr)	216.9°	Dist WOP	2.55 nm
Route	216.8°	Time	06:36
Ch limit	185m	Next WP	4
Off track	<32m	Next (corr)	228.4°
		Turn rad	1.0 nm
		Turn rate	22°/min

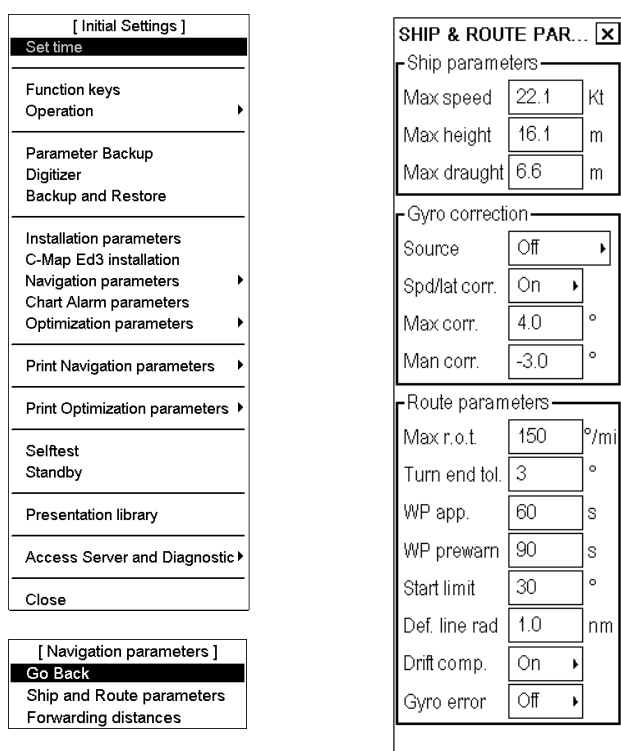
The current value of gyro correction and its method are displayed in the Other page of the Sensors dialog box as shown in the example at right. "Table" means speed/latitude table is the source for gyro correction; "Manual" indicates manual entry of gyro correction.



19.9.1 Enabling gyro error correction

To enable gyro error correction, which is effective for radar, ECDIS and route steering, do the following:

1. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area, push the left mouse button, choose Initial Settings from the menu then push the scrollwheel.
2. Place the cursor on the triangle in the Initial Settings dialog box, choose Navigation Parameters from the menu then push the scrollwheel.
3. Choose Ship and Route parameters from the sub menu then push the scrollwheel.
4. Place the cursor in the Gyro error correction box, spin the scrollwheel to choose Auto then push the scrollwheel. This enables automatic gyro correction.



Gyro correction related settings in Ship parameters field in Ship and Route parameters dialog box

Ship parameters field

Gyro error correction:

- **Off:** Disables any gyro error correction.
- **Auto:** Enables automatic gyro correction based on tabled speed/latitude.
- **Manual:** Enables manual gyro error correction, in the Manual gyro correction field.

Gyro spd/lat error: Chooses the automatic gyro error compensation based on tabled speed/latitude correction. Gyro error correction must be set for Auto for Gyro spd/lat error to be effective.

Max gyro error correction: Sets limit for maximum correction allowed. Typical value is 3 degrees.

Manual gyro correction: Adjusts gyro error manually. Note that to enable this function you have to switch Gyro error correction to the Manual position.

Route parameters field

Gyro error compensation: Choose ON if set courses in route steering are corrected for gyro error.

19.10 Wind Sensor

ECDIS can display and output wind data in the following three formats:

Apparent: Wind meter-measured wind speed and direction.

Wind angle reference: Heading

North: True wind angle, true wind speed

Wind angle reference: True North

Theoretical: True wind angle, true wind speed

Wind angle reference: Heading

The illustration below shows wind speed and direction with given ship data.

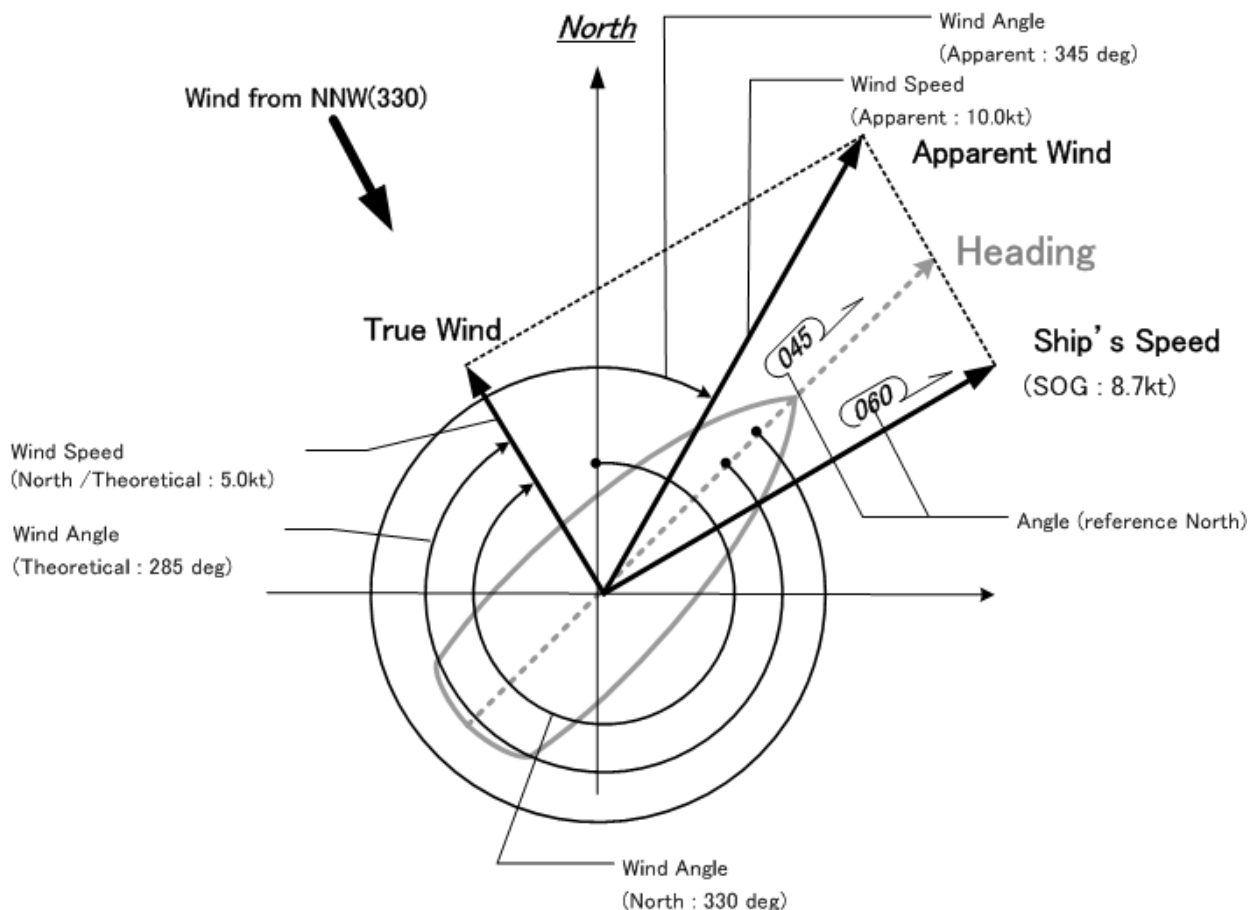
The wind values are as shown below.

Ship information:

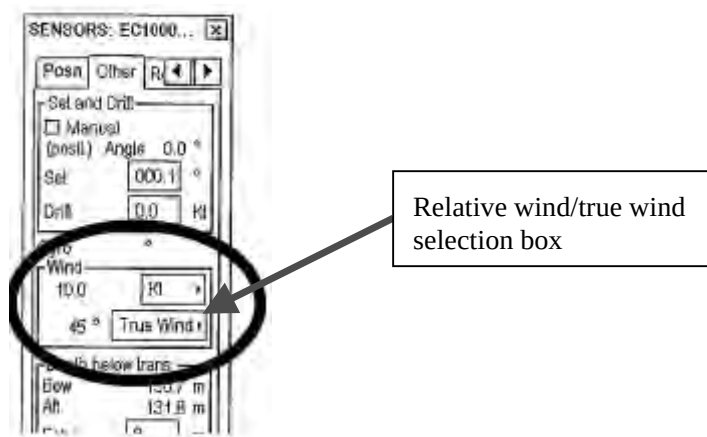
COG: 60 deg SOG: 8.7 kt

Heading: 45 deg

	Wind angle	Wind speed
Apparent:	345 deg	10 kt
North:	330 deg	5 kt
Theoretical:	285 deg	5 kt



True wind or Relative wind may be selected from the Other dialog box in the Sensors menu.



19.10.1 Installation parameter for wind sensor

There are installation parameters for a wind sensor:

- Source of True wind (Setting for inputted serial data)
- Display format (Relative wind, true wind)
- Output format to ARPA (output format to ARPA)

The tables which follow describe the above-mentioned parameters. Greyed options are default settings.

Source of true wind

Option	Description
Receive (R)elative/Apparent Wind and Calculate True Wind	R(Relative) is extracted from the MWV sentence, read as Apparent data and North and Theoretical are calculated.
Receive (T)heoretical Wind(HDG) and Calculate True Wind	T(True) is extracted from the MWV sentence, read as Theoretical data and North and Apparent are calculated.
Receiver (T)rue Wind(North) and use it directly	T(True) is extracted from the MWV sentence, read as North data and Apparent and Theoretical are calculated.

Display format

Option	Option in Sensor dialog box	
	Rel wind	True wind
Display Rel(=Theoretical) or True(=North)	Theoretical	North
Display Rel(=Apparent) or True(=North)	Apparent	North
Display Rel(=Apparent) or True(=Theoretical)	Apparent	Theoretical

Output to ARPA

Option	Description	
Output T(=True/North) only	The reference field of the MWV sentence is T(True) and North data is output.	
Output T(=True/Theoretical) only	The reference field of the MWV sentence is T(True) and Theoretical data is output.	
Output R(=Rel/Apparent) only	The reference field of the MWV sentence is R(Relative) and Apparent data is output.	
Output R(=Rel/Theoretical) only	The reference field of the MWV sentence is R(Relative) and Theoretical data is output.	
The output sentence of the items below changes according to setting of Rel Wind and True Wind.	Option on Sensor dialog box	
	Rel Wind	True wind
Output T(=True/North) or R(=Apparent)	The reference field of the MWV sentence is R(Relative) and Apparent data is output	The reference field of the MWV sentence is T(True) and North data is output.
Output T(=True/North) or R(=Theoretical)	The reference field of the MWV sentence is R(Relative) and Theoretical data is output.	The reference field of the MWV sentence is T(True) and North data is output.
Output T(=True/Theoretical) or R(=Apparent)	The reference field of the MWV sentence is R(Relative) and Apparent data is output.	The reference field of the MWV sentence is T(True) and Theoretical data is output.

MWV sentence

\$--MWV,x.x,a,x.x,a,A*hh<CR><LF>

```

| | | | |
| | | | +----- 6
| | | | +----- 5
| | | +----- 4
| | +----- 3
| +----- 2
+----- 1

```

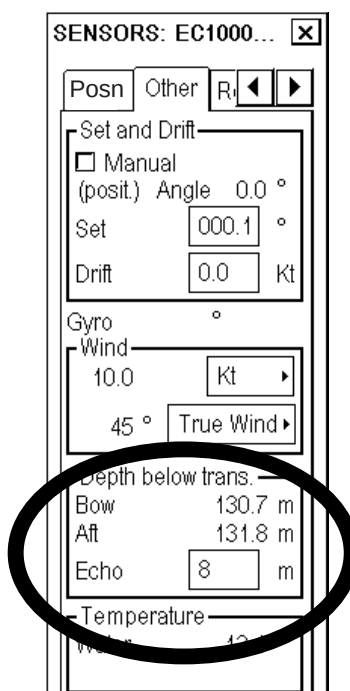
1. Wind angle, 0 to 359 (degrees)
2. Reference, R=relative, T=true
3. Wind speed
4. Wind speed units, K/M/N
5. Status, A=data valid, V=data invalid
6. Checksum

19.11 Depth Sensor

The depth output from a depth sensor (for example, echo sounder) is shown on the Other page in the Sensors dialog box.

The content of the Other page in the Sensor menu depends on sensors connected.

In this example there are two transducers (bow and aft) installed.



The system displays depth value as depth below the transducer. If required, you can activate an alarm, in the Echo alarm box, based on the depth below the transducer. If the measured depth is less than the set at Echo alarm, the system generates the alarm "1200 Depth below limit".

19.12 Sensor-related Alarms

The following alarms, which are not described elsewhere, are related to sensors.

"2055 ARPA Radar Comm. Error": Lost connection to ARPA radar 1. As a consequence the system loses tracked ARPA targets and speed/course available from ARPA.

"2056 ARPA Radar Comm. Error": Lost connection to ARPA radar 2. As a consequence the system loses tracked ARPA targets and speed/course available from ARPA.

"2057 ARPA Radar Comm. Error": Lost connection to ARPA radar 3. As a consequence the system loses tracked ARPA targets and speed/course available from ARPA.

"2058 ARPA Radar Comm. Error": Lost connection to ARPA radar 4. As a consequence the system loses tracked ARPA targets and speed/course available from ARPA.

"2071 Source ARPA Radar changed": Lost connection to the ARPA radar which is the source of tracked ARPA targets and speed/course information. Then, if other ARPA radars exist, the system chooses one of them as the new source of tracked ARPA targets and speed/course information and the system generates alarm 2071.

"4001 B-Adapter Error": Lost connection to B-Adapter, which is an interface to various navigation sensors.

"4002 Engine Control Comm Error": Lost connection to engine control, which could be an interface to various navigation sensors.

"4005 Gyro Error": Lost connection to gyro1 sensor.

"4006 Gyro Error": Lost connection to gyro2 sensor.

"4008 Log Error": Lost connection to log sensor.

"4009 Dual Axis Log Error": Lost connection to dual-axis log sensor.

"4010 Echo Sounder Error": Lost connection to echo sounder sensor.

"4011 Wind Sensor Error": Lost connection to wind sensor.

"4012 Position Eq Error": Lost connection to position sensor number 1.

"4013 Position Eq Error": Lost connection to position sensor number 2.

"4014 Position Eq Error": Lost connection to position sensor number 3.

"4015 Position Eq Error": Lost connection to position sensor number 4.

"4016 Position Eq Error": Lost connection to position sensor number 5.

"4018 ROT gyro error": Lost connection to ROT gyro sensor.

"4021 ARPA Radar system Error": Displayed if ARPA radar number 1 reports internal failure.

"4022 ARPA Radar system Error": Displayed if ARPA radar number 2 reports internal failure.

"4023 ARPA Radar system Error": Displayed if ARPA radar number 3 reports internal failure.

"4024 ARPA Radar system Error": Displayed if ARPA radar number 4 reports internal failure.

"4201 Ext. navigation eq. error": Displayed if external navigation equipment number 1 reports internal failure.

"4202 Ext. navigation eq. error": Displayed if external navigation equipment number 2 reports internal failure.

"4203 Ext. navigation eq. error": Displayed if external navigation equipment number 3 reports internal failure.

"4204 Ext. navigation eq. error": Displayed if external navigation equipment number 4 reports internal failure.

"4205 Ext. navigation eq. error": Displayed if external navigation equipment number 5 reports internal failure.

"4206 Ext. navigation eq. error": Displayed if external navigation equipment number 6 reports internal failure.

"4207 Ext. navigation eq. error": Displayed if external navigation equipment number 7 reports internal failure.

"4208 Ext. navigation eq. error": Displayed if external navigation equipment number 8 reports internal failure.

20. ARPA Target Functions

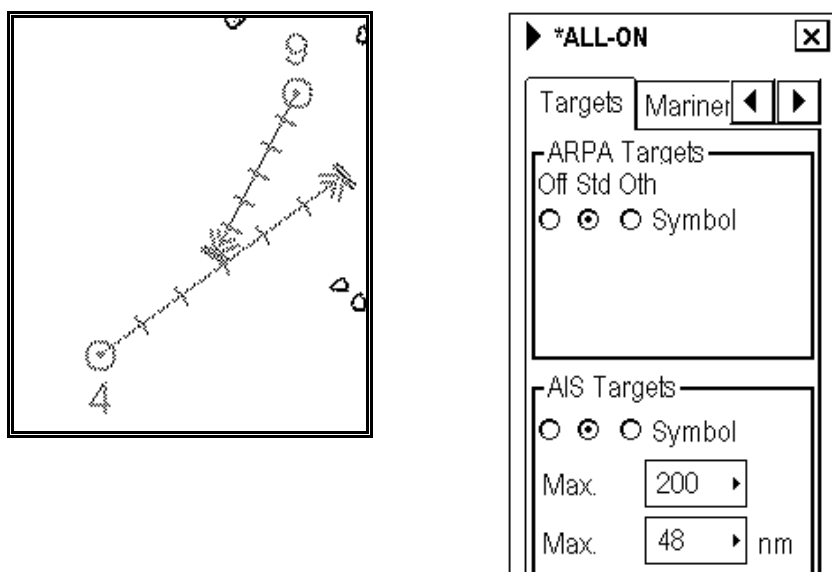
20.1 ARPA Radar Targets

ARPA-tracked targets may also be displayed on the ECDIS display. To do this, do the following:

1. Spin the scrollwheel to display Chart Display/Info/Standard Display in the mouse functions area.
2. Push the left mouse button.
3. Place the cursor on an arrow tab and click it until the Targets page appears.
4. Click the **Std** or **Oth** radio button of ARPA Targets.

Note: AIS and ARPA targets viewing limitations are as below.

- AIS and ARPA targets are displayed on top of chart 1:1,000,001 for S57 charts.
- AIS and ARPA targets are displayed on top of chart 1:1,900,001 for ARCS charts. This allows display of AIS and ARPA targets on top of the largest scale ocean charts (original scale 1:3,500,000) when they are zoomed to overscale.



20.1.1 Dangerous ARPA radar targets

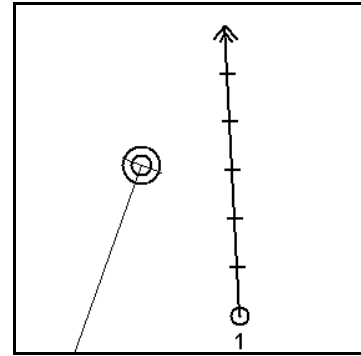
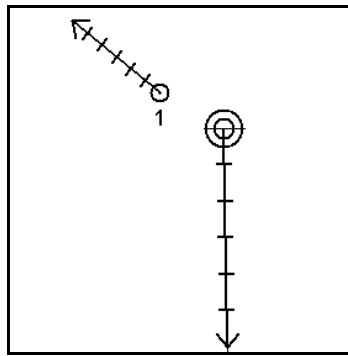
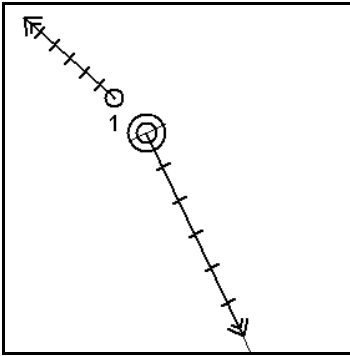
A dangerous ARPA target is displayed on the ECDIS as a blinking target symbol in green and red color alternately. The ECDIS has its own definition for dangerous target limits, thus an ARPA radar may show a target as dangerous while ECDIS shows it as safe and vice versa. You can set CPA and TCPA limits used by the ECDIS in the Danger Targets page of Voyage Recording dialog box. For more information, see "Setting conditions of viewing and logging danger targets" on page 23-7.

20.1.2 Lost ARPA radar targets

A lost ARPA radar target is displayed on the ECDIS as a blinking target symbol in green and dark yellow alternately.

20.1.3 Displaying true or relative speed vectors

Targets vector can be displayed relative to your ship's heading (relative vector) or with reference to the North (true vector). Both presentation modes can be used with relative motion or true motion.

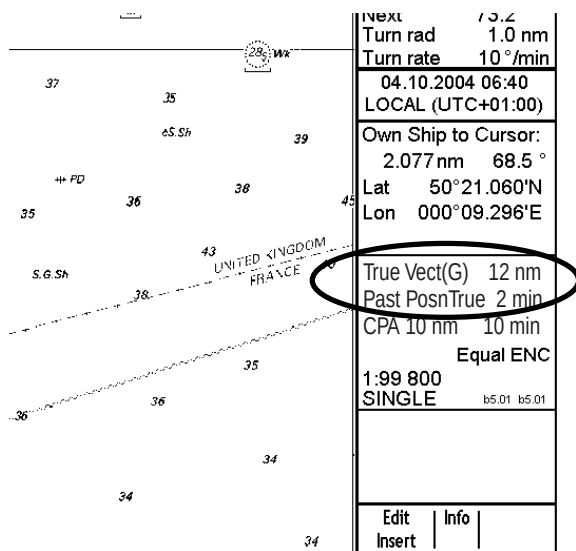


Ground stabilised True Vect (G)

Sea stabilised True Vect (S)

Relative vector presentation

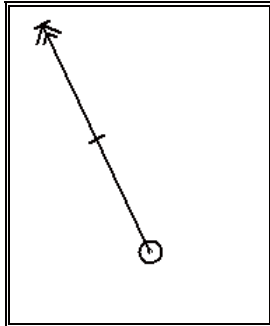
Vector time (or the length of vectors) and presentation mode can be set from the information area. Place the cursor on the item you wish to change, spin the scrollwheel to choose setting then push the scrollwheel. See the figure below for location of vector-related items.



20.2 Displaying ARPA Target Data

20.2.1 Viewing ARPA data of normal targets

On the ECDIS display, put the cursor on a desired ARPA radar target then push the scrollwheel.



TARGET DIALOG 1 ☐			
ARPA	ARPA		
40	20		
BRG	197.2	305.1	'T
RNG	4.55	10.99	nm
CSE	40.0	160.0	'T
SPD	10.0	35.0	Kt
CPA	0.0	8.9	nm
TCPA	-17.2	9.6	min
BCR	0.0	-10.5	nm
BCT	-17.3	18.0	min
Tracking			

TARGET DETAILS ☐			
ARPA	18		
BRG	128.7	'T	
RNG	1.87	nm	
CSE	271.4	'T	
SPD	25.6	Kt	
CPA	0.0	nm	
TCPA	7.3	min	
BCR	-0.1	nm	
BCT	7.0	min	
Tracking Dangerous			
59°53.499'N			
024°47.099'E			

ARPA Radar target on ECDIS screen ARPA target display window

ARPA target display with details

The basic target display dialog for an ARPA radar target consists of the following information:

- Target's number
- Bearing (BRG) and distance (RNG) of the target from your ship
- Speed and Course: SOG and COG when the vector mode is True Vect(G), or STW and CSE when the vector mode is True Vect(S).
- CPA and TCPA. Note that if TCPA has a negative value, this means that you have already passed the closest point and the ARPA target is going away from your ship.
- Bow Cross Range (BCR) and Bow Cross Time (BCT)
- Status of target. Status can be Query, Tracking or Lost. "Query" indicates a new target for which there is not yet enough tracking history to have target speed, course, CPA and TCPA available.

The detailed target display dialog for an ARPA radar target displays the contents of the basic ARPA target display plus the following information. To display detailed information, push the left mouse button

- Position of target (Lat, Lon)

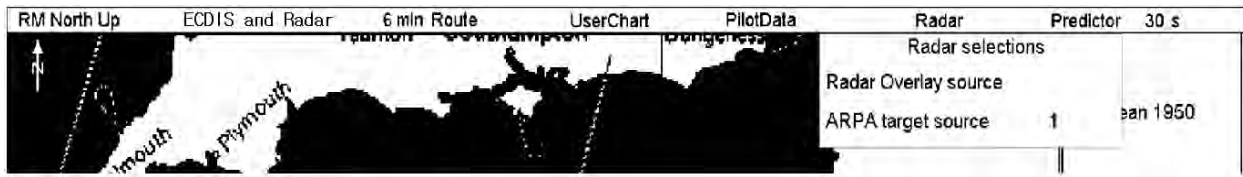
User can set Closest Point of Approach (CPA), and Time for CPA (TCPA) to define dangerous ARPA targets. CPA and TCPA limits are common for ECDIS display and danger target log function of ARPA and AIS targets. On the ECDIS display, a dangerous ARPA target blinks in green and red color alternately.

Note that the CPA and TCPA limits are only for ECDIS. ARPA radar has its own setting for dangerous targets and thus a target which is dangerous on the ARPA display can be safe on ECDIS and vice versa. If an ARPA target is within the CPA and TCPA settings, it is shown as a dangerous ARPA target on the ECDIS display. Log interval defines time period for logging.

	Next	13.2
	Turn rad	1.0 nm
	Turn rate	10 °/min
	04.10.2004 06:40	
	LOCAL (UTC+01:00)	
	Own Ship to Cursor:	
	2.077 nm 68.5 °	
	Lat 50°21.060'N	
	Lon 000°09.296'E	
	True Vect(G) 12 nm	
	Past Posn True 2 min	
	CPA 10 nm 10 min	
	Equal ENC	
	1:99 800	
	SINGLE b5.01 b5.01	
	Edit Info	
	Insert	

20.3 Source of ARPA Radar Targets

To find the source of ARPA radar targets, put the cursor on Radar in the status bar.



To change the source of ARPA radar targets, put the cursor on Radar in the status bar, spin the scrollwheel to choose desired item then push the scrollwheel.

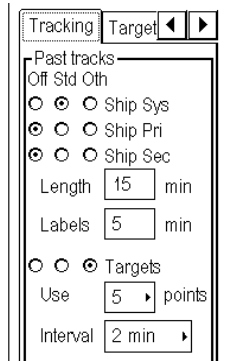
20.3.1 ARPA-related alarms

The alarm **"2055 ARPA Radar comm error"** indicates failure to receive data from connected ARPA radars. The alarm **"2071 Source ARPA Radar changed"** informs that the system has automatically changed the source of ARPA radar targets from current source to a new source. The reason for automatic change is that the communication with current source is in failure state.

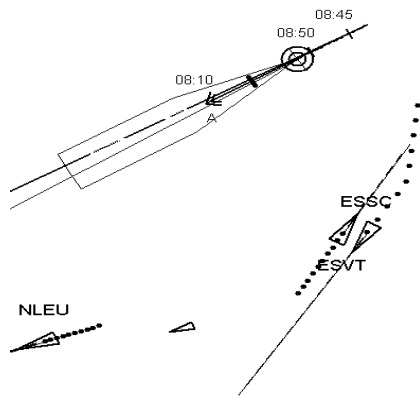
20.4 Displaying ARPA Target Past Positions

To display ARPA target past tracks, do the following:

1. Spin the scrollwheel to display Chart Display/Info/Standard Display in the mouse functions area, then push the left mouse button.
2. Click an arrow tab in the dialog box until the Targets page appears if it is not already open. Click the **Oth** or **Std** radio button of the item Targets to display ARPA target past positions on the ECDIS.



3. Set the length of track (in minutes) and define number of points to display past track of targets.



Display of ARPA target past track using 1 minute labels

20.5 ARPA Target Recording Functions

Target recording is used to record ARPA targets information to danger targets log. For more information about recording a dangerous target, see section 23.3.3 Danger target log.

20.6 Using ARPA Targets for Chart Align

Targets can be used for chart alignment. For more information, see section 19.8.3 Position alignment by ARPA radar.

21. AIS Target Functions

21.1 Introduction

An AIS transponder can be connected to the ECDIS to display AIS targets received from the AIS transponder. The ECDIS can store up to 1,500 AIS targets in its storage buffer. When this buffer becomes full of AIS targets, the Alarm 3501 is generated to alert you to full storage buffer. The storage buffer contains automatic dead reckoning for all AIS targets, which is based on reported Speed Over Ground (SOG), Course Over Ground (COG), Rate Of Turn (ROT) and heading. The storage buffer also contains calculation of range, bearing, CPA, TCPA, etc. The CPA and TCPA limits set for dangerous targets are common for ARPA and AIS targets.

ECDIS can display AIS targets which are within the operator-defined range. The maximum number of targets which can be displayed is 200 and the operator may choose the number of targets to display. Alarm 3500 is generated when there are more than the operator-specified amount of AIS targets within the operator-chosen range.

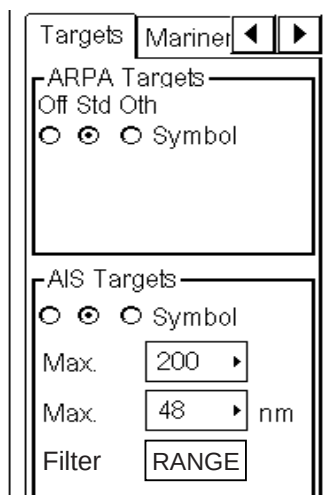
The frequency for update of AIS transponder-sent data depends on speed and course of tracked AIS target. The current reporting rate of each AIS target is available by using the Help/Info feature. The table below shows the IMO standardized reporting rates for the AIS transponder. Based on the table below, the ECDIS defines which AIS targets are in tracking, lost or deleted.

Type of Ship	IMO nominal reporting interval	Lost target indication (reporting interval >)	Automatic dead reckoning of target (reporting interval >)
Ship at anchor or moored and not moving faster than 3 knots	3 min	18 min	30 min
Ship at anchor or moored and moving faster than 3 knots	10 s	60 s	1 min 40 s
Ship with a speed of between 0 - 14 knots	10 s	60 s	1 min 40 s
Ship with a speed of between 0 - 14 knots and changing course	3 1/3 s	60 s	33 s
Ship with a speed of between 14 - 23 knots	6 s	36 s	1 min
Ship with a speed of between 14 - 23 knots and changing course	2 s	36 s	20 s
Ship with a speed of greater than 23 knots	2 s	12 s	20 s
Ship with a speed of greater than 23 and changing course	2 s	12 s	20 s

An AIS transponder "sees" all ships fitted with an AIS transponder. There can be several hundreds or several thousands of AIS targets, and of those only a few will be significant for your ship. To remove unnecessary AIS targets from the ECDIS display, the feature "active and sleeping AIS targets" is available. Initially any new AIS target received by an AIS transponder is not-active (= "sleeping"). Such non-active targets are shown with a small triangle. User can pick any AIS target and change it from non-active to active. Active AIS targets are shown with a large triangle with speed vector, headline, rot indicator, etc. Further, the operator can pick active AIS targets and change their status to non-active.

ECDIS generates AIS-related alarms and these are "Alarm 3502: Dangerous AIS target" and "Alarm 3503: Lost AIS target". Only active AIS targets generate alarms. The operator can enable or disable AIS target alarms as desired. The feature "active and sleeping AIS targets" is very effective for focusing on only those AIS targets which need supervision. The ECDIS further eases the task of the operator by automatically changing non-active targets to active targets, if they meet the dangerous target limits set by CPA and TCPA.

21.2 Displaying AIS Targets



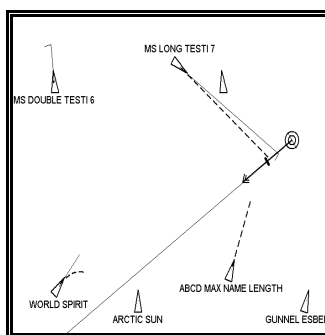
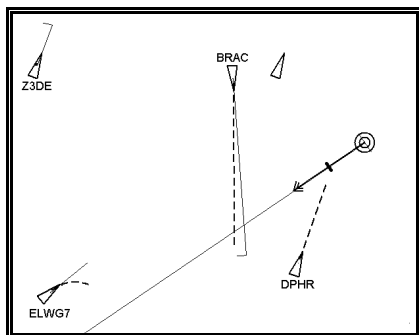
Targets which are being tracked by an AIS transponder can also be displayed on the ECDIS display. To do this;

1. Display Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button.
2. Click an arrow tab in the Chart Display dialog box until the Targets page appears, if it is not already displayed.
3. Click the radio button **Std** or **Oth** of the item Symbol in the AIS Targets window to display AIS targets.

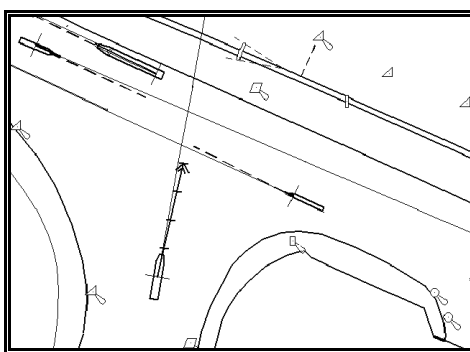
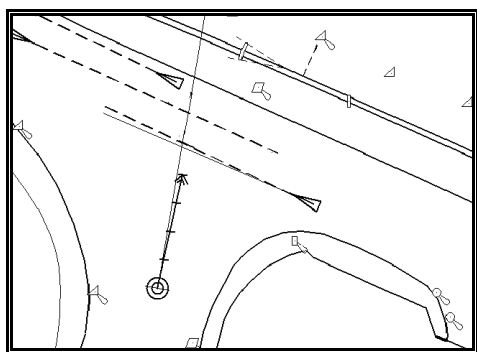
Note: AIS and ARPA targets viewing limitations are as follows:

- AIS and ARPA targets are displayed on top of chart 1:1,000,001 for S57 charts.
- AIS and ARPA targets are displayed on top of chart 1:1,900,001 for ARCS charts. This allows display of AIS and ARPA targets on top of the largest scale ocean charts (original scale 1:3,500,000) when they are zoomed to "overscale".

See the AIS target examples below where the example at left shows targets' call sign and the right example shows targets' name.



See the examples below where the example at left is a presentation of AIS targets with "true scale symbol" and the one at right is a presentation with "point symbols". Note that your ship and AIS targets are displayed as true scale symbol if the displayed chart scale is larger than set with "Ship true symbol scale" limit on the Tracking page in the Chart Display dialog box and if the size of the true scale symbol is larger than 6 mm on the chart display.



21.2.1 Dangerous AIS targets

A dangerous AIS target is displayed as a blinking target symbol, in green and red alternately. You can set CPA and TCPA limits used by the ECDIS in the Danger Targets page of the Voyage Recording dialog box. For further details, see "Setting conditions of viewing and logging danger targets" on page 21-6.

21.2.2 Lost AIS targets

A lost AIS target is displayed as a blinking target symbol, in green and dark yellow alternately. Timeout for displaying AIS target as 1st AIS target:

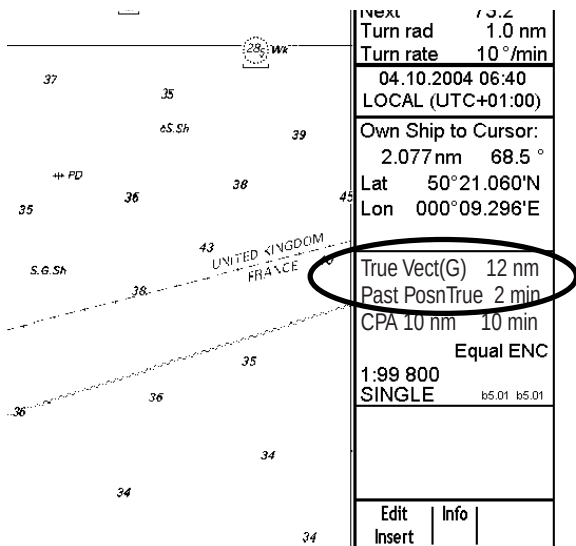
Vessel speed (kt)	Period of time out
At anchor	18 min
0-14	60 sec
14-23	36 sec
>23	12 sec

Lost AIS target symbol will be automatically removed from display if the state "Lost AIS target" for the AIS target has been in effect 430 seconds. Exception is if your ship is at anchor, then the time is 36 minutes.

21.2.3 Displaying true or relative speed vectors

AIS targets vector can be displayed relative to your ship's heading (RelVect) or with reference to the North (TrueVect).

Vector time (or the length of vectors) and presentation mode can be set on the status bar, at the locations circled in the illustration below.



21.2.4 Maximum number and range for displaying AIS targets on ECDIS

The screenshot shows the 'Targets' dialog box with the 'Mariner' tab active. It contains two main sections: 'ARPA Targets' and 'AIS Targets'. In the 'ARPA Targets' section, the 'Off' radio button is selected. In the 'AIS Targets' section, the 'Symbol' radio button is selected. Below these, there are three input fields: 'Max.' with a value of 200, 'Max.' with a value of 48 and the unit 'nm' to its right, and 'Filter' with the value 'RANGE'.

You can choose the maximum number of AIS targets to display on the ECDIS. Further, you can also define the range within which to show AIS targets and how to sort them. These items are available on the Targets page in the Chart Display dialog box.

In this example the max number of AIS targets to display is 200, the targets must be within 48 nm of your ship, and those targets are sorted by Range.

The Filter function sorts AIS targets according to its setting, Range, CPA or TCPA. The targets are sorted according the settings for maximum number of targets and maximum range, and those targets are displayed with an AIS symbol.

21.2.5 Source of AIS target related alarms

The alarm "3500 AIS Target Overflow" warns that the maximum number of AIS targets set to display on the ECDIS has exceeded the operator-specified maximum range. It is possible that some of the AIS targets are not displayed on the ECDIS. To display all AIS targets, increase maximum number of AIS targets or decrease value of maximum range. This can be done on the Targets page in the Chart Display dialog box.

The alarm "3501 AIS Target storage full" warns that the maximum number of AIS targets which can be stored for displaying on ECDIS has been exceeded.

The alarm "4037 AIS receive error" warns that data from an AIS transponder is not correctly received.

AIS target overflow

A Hysteresis is forced on the threshold ship count value that will trigger the alarm, as shown below. An AIS target count that is approximately the same as the set threshold does not consecutively trigger the alarm, even if it frequently exceeds the entered ECDIS threshold.

No. of ships (set on menu)	No. of ships at time of alarm	No. of ships at time alarm is cleared
200 (Maximum)	201	189
100	101	94
40	41	37
20	21	18

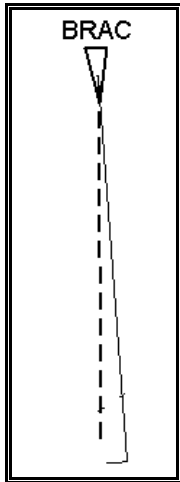
AIS target storage full

Like the AIS target overflow arrangement, the set threshold does not consecutively trigger the alarm.

AIS target capacity	No. of ships at time of alarm	No. of ships at time alarm is cleared
1500 (Maximum)	1501	1424

21.3 Displaying AIS Target Data

Place the cursor on a desired AIS target then push the scrollwheel. The AIS Target Dialog window appears, similar to the one shown below.



AIS target on ECDIS display

TARGET DIALOG 1 ✕		
AIS	☒	
EUROP		
BRG	125.2	"T
RNG	5.4	nm
CSE	251.3	"T
SPD	12.5	Kt
CPA	5.2	nm
TCPA	16.2	min
BCR		nm
BCT	>65	min

AIS target dialog window

The Target Dialog window displays the following information for an AIS target:

AIS Target Name or Call Sign

SPD: SOG for True Vect(G); STW for TrueVect(S) or Rel Vect

BRG: True bearing from your ship

CPA and TCPA

RNG: Distance from your ship

BCR, BCT: Bow Cross Range, Bow Cross Time

CSE: COG for True Vect(G); CSE for TrueVect(S) or Rel Vect

If more detailed information is needed, put the cursor in the Target Dialog window then push the left mouse button to get the Target Details window.

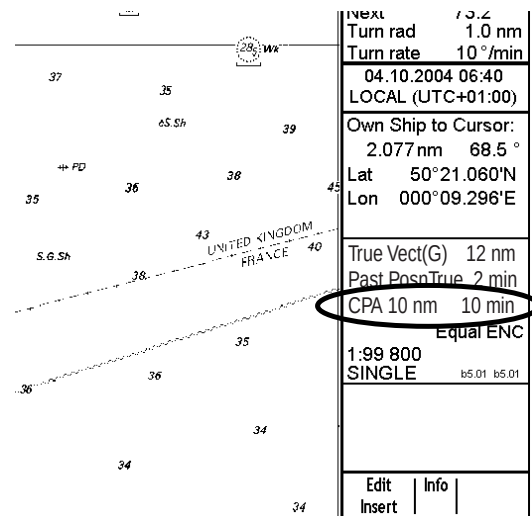
Note: Availability of data in the Target Details window is subject to the content the AIS transponder reports.

TARGET DETAILS			☒
AIS ☒		Active	
EUROPE			
BRG	124.6	°T	
RNG	5.4	nm	
CSE	251.3	°T	
SPD	12.5	Kt	
CPA	5.2	nm	
TCPA	15.6	min	
BCR		nm	
BCT	>65	min	
Tracking		GPS	
59°53.499'N			
024°47.099'E			
Call Sign		NLEU	
HDG	253.0°T	ROT	0°
Age	2.2s	Draught	5.6 m
Dest.		ROTTERDAM	
ETA (UTC+2)		12 Nov 14:30	
Under Way Using Engine			
Length	89 m	Width	13 m
Ref Bow	80 m	Port	6 m
IMO#		0	
MMSI		7598434	
Cargo ship Carrying DG, HS or MP category B			

21. AIS Target Functions

The operator can set Closest Point of Approach (CPA), and Time to CPA (TCPA) to define dangerous AIS targets. CPA and TCPA limits are common for ECDIS display and danger target log function of ARPA and AIS targets. The ECDIS display shows a dangerous AIS target with its symbol blinking, in green and red alternately.

Note that the CPA and TCPA limits are only for ECDIS. ARPA radar has its own setting for dangerous targets and thus a target which is dangerous on the ARPA display can be safe on ECDIS and vice versa. If an ARPA target is within the CPA and TCPA settings, it is shown as a dangerous ARPA target on the ECDIS display. Log interval defines time period for logging.



If an AIS target locates within the CPA and TCPA values, it is shown as a dangerous AIS target on the ECDIS display. Note that the same situation occurs with ARPA targets.

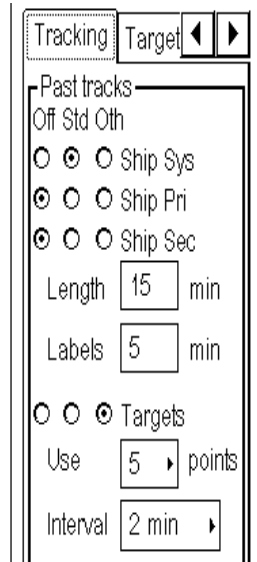
Note1: If your ship's position is based on Dead Reckoning, then CPA/TCPA and BCR/BCT values are not calculated and not displayed.

Note2: If TCPA has a negative value it means that you have already passed the closest point and the AIS target is going away from your ship.

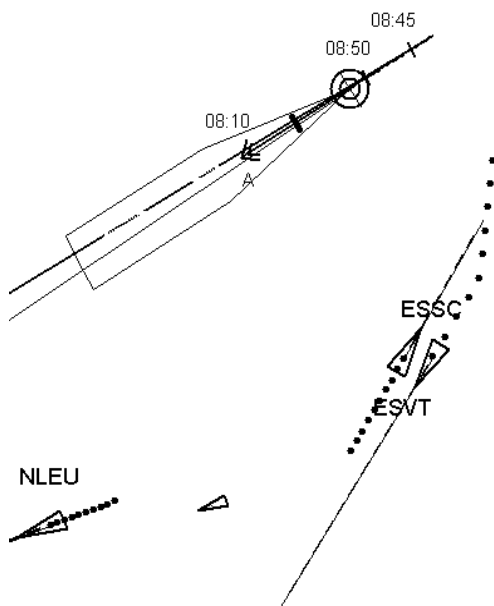
21.4 Displaying AIS Target Past Positions

To display AIS target past tracks, do the following:

1. Spin the scrollwheel to display Chart Display/Info/Standard Display in the mouse functions area, then push the left mouse button.
2. Click an arrow tab in the dialog box until the Tracking page appears if it is not already open. Click the **Oth** or **Std** radio button of the item Targets to display AIS target past positions on the ECDIS.



3. Set the length of track (in minutes) and define number of points to display past track of targets.



Presentation of AIS target past track. ARPA targets have same kind of presentation for past track.

21.4.1 Displaying name or call sign of AIS target

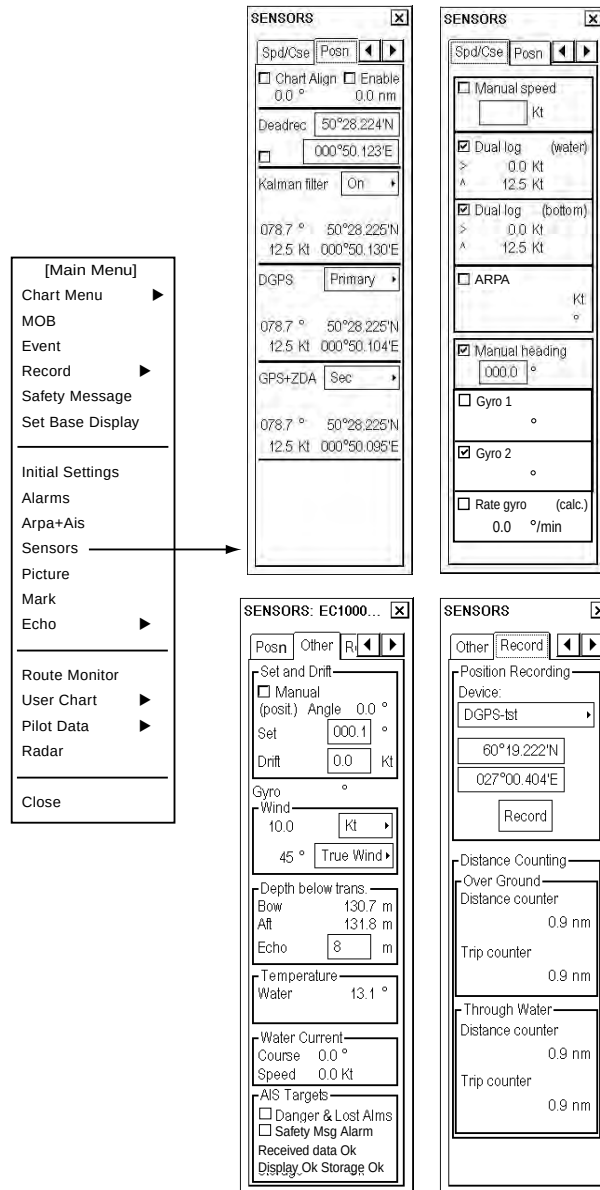
You can display either the name or call sign of AIS targets on the ECDIS display. Place the cursor in the Target Dialog window then push the right mouse button to display name and call sing alternately. See the figure below for display appearance when changing from call signs to names and vice versa.

TARGET DIALOG 1		TARGET DIALOG 1	
AIS ☒		AIS ☒	
EUROP		NLEU	
BRG 123.7	°T	BRG 123.0	°T
RNG 5.4	nm	RNG 5.4	nm
CSE 251.3	°T	CSE 251.3	°T
SPD 12.5	Kt	SPD 12.5	Kt
CPA 5.2	nm	CPA 5.2	nm
TCPA 14.7	min	TCPA 14.0	min
BCR	nm	BCR	nm
BCT >65	min	BCT >65	min
On track		On track	
05.11.2003 15:51 LOCAL (UTC+02:00)		05.11.2003 15:52 LOCAL (UTC+02:00)	
Own Ship to Cursor: nm °		Own Ship to Cursor: nm °	
Lat		Lat	
Lon		Lon	
1:100 000 SINGLE a5.00 a5.00		1:50 000 SINGLE a5.00 a5.00	
Show Details / AIS Call Signs		Show Details / AIS Names	

21.5 Displaying AIS Interface Status

You can verify the status of the AIS interface on the Other page in the Sensors dialog box. The lower part of this page is reserved for AIS interface monitoring.

- **Received Data:** Whether data from AIS transponder is correctly received or not (Status: OK or Error).
- **Display:** Whether maximum number of AIS targets set for display on the ECDIS has been exceeded within the defined maximum range or not (Status: OK or Overflow).
- **Storage:** Whether maximum number of AIS targets for storage has been exceeded or not (Status: OK or Overflow).



Further, you can enable or disable the alarms "Alarm 3502: Dangerous AIS target" and "Alarm 3503: Lost AIS target" on this page. Check Danger & Lost Alms on the Other page in the Sensors dialog box if you want alarms for dangerous and lost AIS targets.

21.6 AIS Safety Message

21.6.1 Introduction

You may send and receive messages via the VHF link, to a specified destination (MMSI) or all AIS-equipped ships in the area. Messages can be sent to warn of safety of navigation, for example, an iceberg sighted. Routine messages are also permitted. Short safety related messages are only an additional means to broadcast safety information. They do not remove the requirements of the GMDSS.

To open the Safety message dialog box, which is where all phases of AIS safety messages are initiated, do the following:

1. Display Menu/Info/Chart Menu in the mouse functions area then push the left mouse button to open the Main menu.
2. Choose Safety Message from the menu then push the scrollwheel.

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

▶ SAFETY MESSAGE X	
MESSAGE	
Filter	
All	▶
Name	
S17052004-103836	▶
Status: Unsent	
Vessel	
Call Sign:	
MMSI:	12345
Addressed to MMSI	▶
Safety Message	▶
Don't care of Channel	▶
☒ Enable changes	

The Safety Message dialog box contains the following items:

- Filter:** Select category of messages to show in the Safety Message menu.
- Name:** Each message has an individual name based on time of creation or time of receiving of message.
- Status:** Display status of selected safety message.
- Send:** Display date and time when message is sent.
- Org:** Original message name is displayed here if selected safety message is reply for received message.
- Vessel:** AIS target related information is displayed in this field.
- Address:** Select how to send a safety message.
- Msg Type:** Select message format.
- Channel:** Specify channel for transmitting.

21.6.2 Creating a new safety message

You can create a safety message on the ECDIS for transmission by the AIS transponder. This can be done as follows:

1. Display Menu/Info/Chart Menu in the mouse functions area then push the left mouse button to open the Main menu.
2. Choose Safety Message from the menu then push the scrollwheel.
3. The Safety message dialog box appears. Place the cursor on the triangle in the dialog box to show the submenu.

4. Choose Create Message from the menu and push the scrollwheel.
5. Check Enable changes.
6. Place the cursor in the Address box. Spin the scrollwheel to choose Addressed to or Broadcast to All as appropriate then push the scrollwheel. Choose Broadcast to All to send to all nearby AIS transponder-equipped ships. To send to a specific vessel, enter MMSI of ship, in the MMSI input box.
7. Use the Msg Type box to choose message type; Safety Message for safety message, Binary Message for routine message.
8. At the Channel box, choose channel over which to broadcast your message. Four choices are available.
9. Enter the text of your message in the box below Channel. The number of characters that may be entered depends on message type.

Safety message broadcast:	161 characters
Binary message broadcast:	156 characters
Safety message addressed to MMSI:	156 characters
Binary message addressed to MMSI:	151 characters

10. To send the message, put the cursor on the triangle to show the sub menu, choose Send Message then push the scrollwheel.
11. If message is sent successfully, status is changed from Unsent to Sent.

How to get vessel information for an addressed safety message

You can find vessel information for an addressed safety message. This is useful when you want to send a Safety message to a specific vessel. To get vessel information, proceed as follows:

1. Display Menu/Info/Chart Menu in the mouse functions area then push the left mouse button to open the Main menu.
2. Choose Safety Message from the menu then push the scrollwheel.
3. Place the cursor on a desired AIS target on the ECDIS chart then push the scrollwheel to get MMSI number, call sign and ship name of the target. Call sign and MMSI of the vessel selected are shown in the Vessel field in the Safety Message dialog box.
4. To send a message to the vessel, select Addressed from the Address box then set other items as appropriate, referring to the procedure on the preceding page.

21.6.3 Reading a received safety message

When a message is received by AIS, it is indicated on the ECDIS with the alarm "3504 AIS message received". To read the message, do the following:

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

1. Display Menu/Info/Chart Menu in the mouse functions area then push the left mouse button to open the Main menu.
2. Choose Safety Message from the menu then push the scrollwheel.
3. Check Enable changes.
4. The Safety Message dialog box shows the message received by the AIS transponder.

▶ SAFETY MESSAGE [X]	
MESSAGE	
Filter	
Unread	▶
Name	
S17052004-104716 ▶	
Status: Unread	
Vessel	
ARCTIC SUN	
Call Sign: ELQB8	
MMSI:	636009927
Addressed to MMSI ▶	
Safety Message ▶	
▶	
ENGINE IS NOT RUNNING	
☐ Enable changes	

21.6.4 Replying to a safety message

To reply to a safety message, proceed as follows:

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

1. Display the Safety Message dialog box.
2. Check Enable changes.

SAFETY MESSAGE
✕

MESSAGE

Filter

Unread ▶

Name

S17052004-104716 ▶

Status: read

Vessel

ARCTIC SUN

Call Sign: ELQB8

MMSI: 636009927

Addressed to MMSI ▶

Safety Message ▶

Don't care of Channel ▶

ENGINE IS NOT
RUNNING

☒ Enable changes

3. In the Filter field, choose Received from the upper box and the message to reply to from the lower box.
4. Choose Message Type and Channel as appropriate referring to section 21.6.2 Creating a new safety message.
5. Enter your reply in the text window.
6. Place the cursor on the triangle to open the sub menu.
7. Choose Send Message then push the scrollwheel.

21. AIS Target Functions

This page intentionally left blank.

22. Radar Overlay

22.1 Introduction

The radar overlay is optionally available. This means that the radar echo image can be output from the radar unit and shown on the ECDIS chart display.

Radar overlay video can be received by two methods by ECDIS:

1. Through Radar overlay card fitted in the ECDIS
2. Through LAN from FAR-2x07 Radars, which are capable to send radar video to LAN

This ECDIS has many features to support exact match in scale and orientation of the chart and radar echo image. Exact match of the radar echo image and chart is an essential security feature. If the radar echo image and the chart display match, then the mariner can rely on what he sees and the mariner also gets a very good confirmation that his navigation sensors (such as gyro and position receivers) operate properly and accurately. However, if the mariner is unable to achieve exact match, it is a very strong indication that something is wrong and he should not rely on what he sees.

This ECDIS can use radar echo image in several operator selectable modes. The "ECDIS only" mode operates without the radar echo image. The "ECDIS and radar" mode operates using rules for the type-approved ECDIS to visualize the radar echo image. The "radar over chart" mode draws radar echo image on top of the chart. This mode should only be used temporarily because legally the equipment is not an ECDIS that can legally replace paper chart when operating with "Radar over chart". The "radar video only" mode should only be used temporarily to check radar echo presentation, because the equipment is not an ECDIS that can legally replace paper chart when operating with the "radar video only" mode.

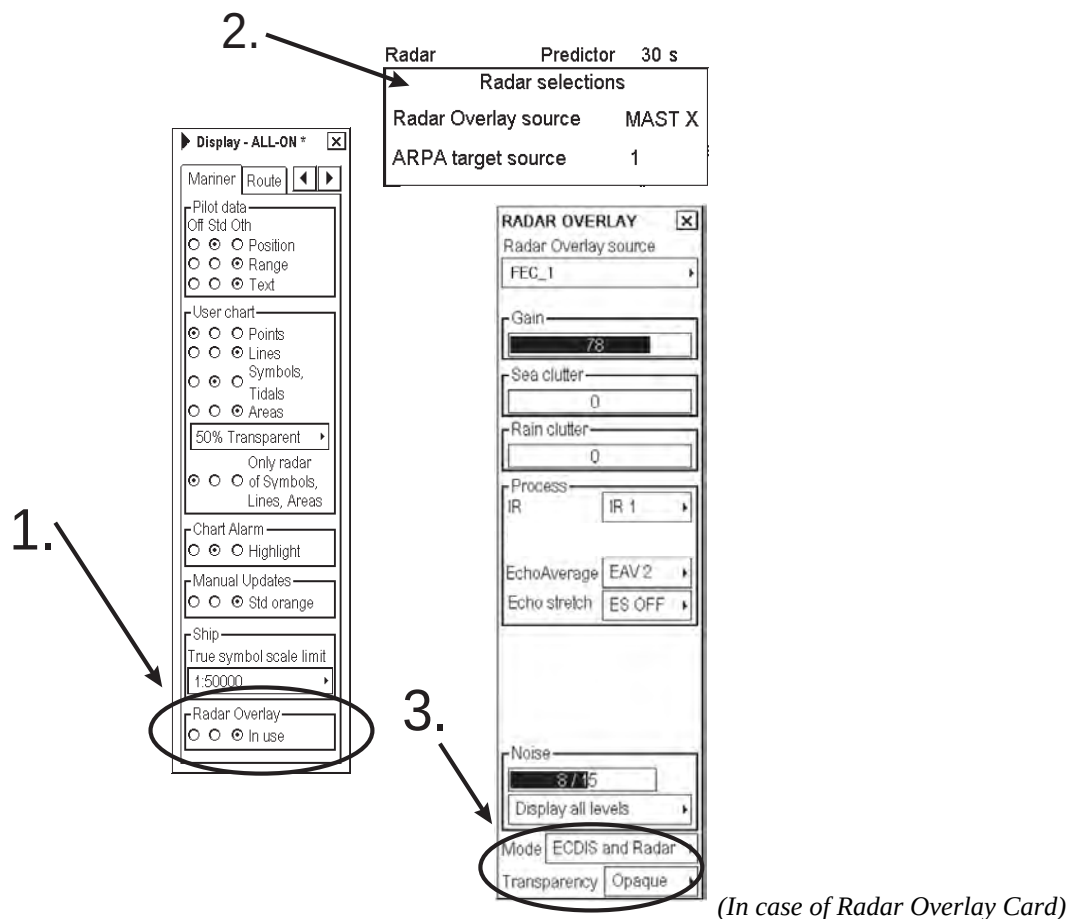
Chosen scale of displayed chart also defines scale of radar overlay. When you change the chart scale, the scale of the radar overlay is automatically changed. The maximum range of the radar overlay is 24 nautical miles. Radar overlay can be displayed even if your ship is not located in the displayed chart area if the range is less than 24 nm.

The thumb rule for range of displayed area:

- Chart scale 1:10,000 is almost equal to traditional radar range of 0.75 nm
- Chart scale 1:20,000 is almost equal to traditional radar range of 1.50 nm

22.2 Activating Radar Overlay on the ECDIS

Radar overlay can be output to the ECDIS and shown on its display. Like details on Vector charts (S57), the radar overlay can be displayed or removed from the chart display. The Mariner page in the Chart Display dialog box enables or disables the radar overlay. You can choose how to display the radar overlay with the Radar selector on the status bar. To activate the radar overlay, do the following:



1. Spin the scrollwheel to show Chart Display/Info/Standard Display in the mouse functions area then push the left mouse button. Click an arrow tab in the dialog box until the Mariner page is displayed. Click the radio button **Std** or **Oth** in the Radar Overlay window.
2. Place the cursor on Radar in the status bar then push the left mouse button.
3. In the Mode window, choose "ECDIS only" to show ECDIS only, or choose "ECDIS and Radar" to overlay radar image on ECDIS.
4. Adjust radar echo image as appropriate.

22.3 Choosing Source of Radar Overlay

22.3.1 Radar overlay through LAN from FAR-2x07 radars

Place the cursor on Radar in the status bar, and the Radar Selection window appears. Radar overlay source indicates source radar overlay. In the example display below the source is MAST X. If there are more than one radar video source available, you can change the radar overlay source by clicking Radar Overlay source then spin the scrollwheel to choose a source.

Radar MAST X	Predictor	30 s
Radar selections		
Radar Overlay source	MAST X	
ARPA target source	1	

RADAR OVERLAY

Radar Overlay source

MAST X

Gain

78

Process

IR

IR 1

Clean

OFF

EchoAverage

EAV 2

Echo stretch

ES OFF

Noise

8 / 15

Display all levels

Mode

ECDIS and Radar

Transparency

Opaque

(In case of LAN Radar Overlay)

22.3.2 Radar overlay through radar overlay card inside ECDIS

If there is more than one Radar video source available and connected to ECDIS, you can use external switch to select desired source of Radar video overlay. Selected source is displayed on Radar Overlay dialog box and on upper status bar:

Radar MAST X	Predictor	30 s
Radar selections		
Radar Overlay source	MAST X	
ARPA target source	1	

RADAR OVERLAY

Radar Overlay source
MAST X

Gain
78

Sea clutter
0

Rain clutter
0

Process
IR IR 1

EchoAverage EAV 2

Echo stretch ES OFF

Noise
8 / 15
Display all levels

Mode ECDIS and Radar

Transparency Opaque

(in case of Radar Overlay Card)

22.3.3 Radar overlay display modes

You can choose from the following presentation modes with the radar overlay:

ECDIS only:

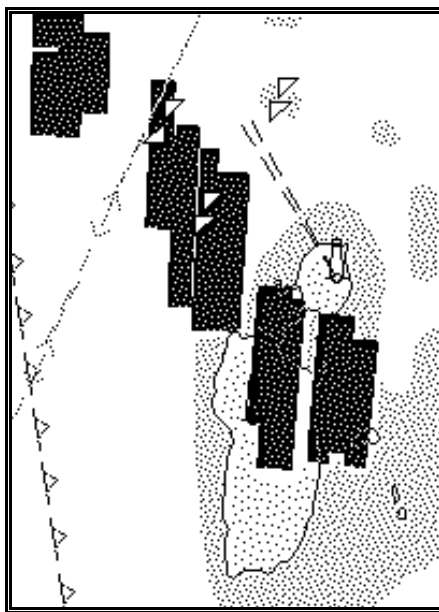
Only chart is displayed on the ECDIS.

ECDIS and radar:

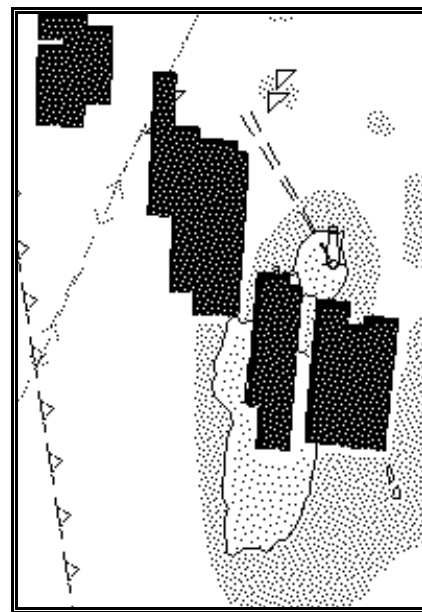
With S57 chart material, the radar echo image is mixed into the chart so that some chart features lie above or beneath the radar image. This presentation follows the drawing rules of the Standard S52ed3.1 of IHO. If you use the ARCS chart material, the radar image is drawn on top of the chart.

Radar over chart:

Radar echo image is drawn on top of the chart.



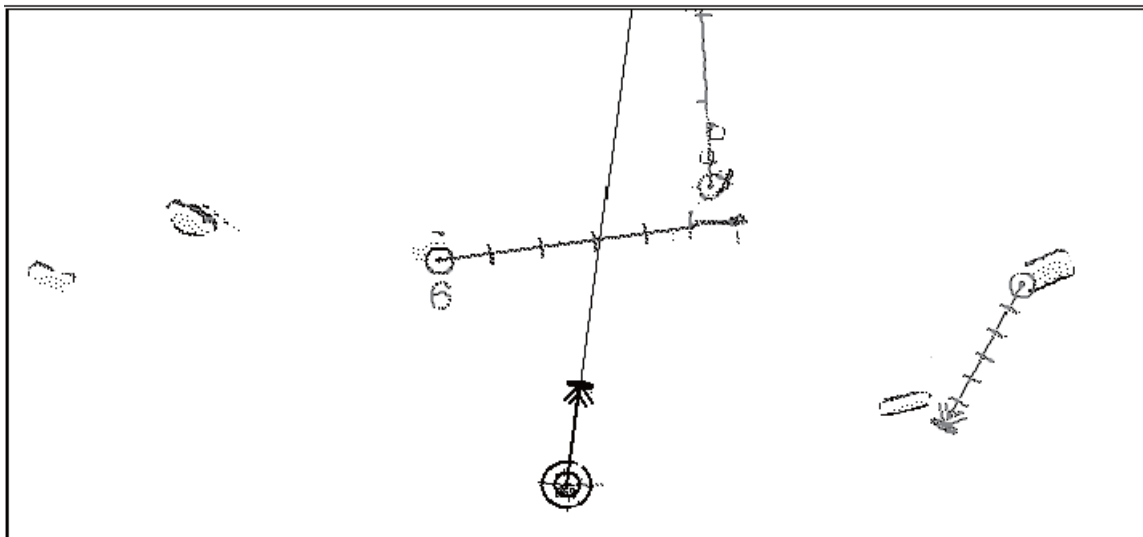
ECDIS and radar presentation



Radar over chart presentation

Radar video only:

Only radar echo image is drawn on the ECDIS display.



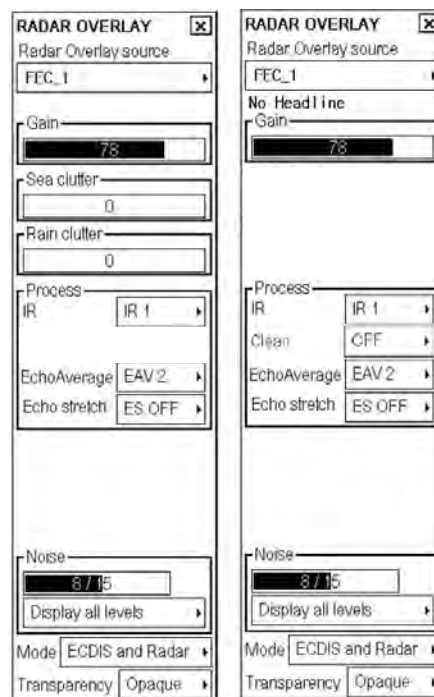
22.4 Adjusting Radar Overlay (Radar Overlay dialog box)

The Radar Overlay dialog box has controls for adjustment of the radar image - gain, sea clutter, rain clutter, interference rejector, echo stretch, and echo average.

Note 1: Sea clutter and rain clutter controls are not available in Radar Overlay dialog box if radar video is received through LAN from FAR-2x07 radars. Sea clutter and rain clutter are controlled on the ARPA display that controls the transmitter.

Note 2: Gain, sea clutter and rain clutter are independent from the same controls of any radar display. Therefore, their optimum position may be different from those on the radar display.

Note 3: If the ECDIS fails to receive heading, trigger or azimuth signal from the radar transceiver, it is indicated in the Radar Overlay dialog box. In the right-hand figure the indication "No Headline" is displayed, indicating no heading signal.



(for Radar Overlay Card)

(for LAN Radar Overlay)

22.4.1 Radar overlay source

Indicates source of current radar overlay.

22.4.2 Gain

Gain control is used to set the sensitivity of the radar echo image. When you adjust the gain, "Noise" is automatically switched ON in order to display low-level radar images.

Note: After adjusting the gain, check and readjust the sea clutter because these two controls affect one another.

22.4.3 Sea clutter

The sea clutter control removes sea clutter from the radar echo image.

Note: After adjusting the sea clutter, check and readjust the gain because these two controls affect one another.

When you adjust the sea clutter, "Noise" is automatically switched ON in order to display low-level radar images.

If you have radar overlay video through LAN from FAR-2x07 radar, use control of sea clutter on radar.

22.4.4 Rain clutter

The rain clutter control removes rain clutter from the radar echo image.

When you adjust the rain clutter, "Noise" is automatically switched ON in order to display low-level radar images.

If you have radar overlay video through LAN from FAR-2x07 radar, use control of rain clutter on radar.

22.4.5 Controlling video processing

Interference rejector:

The interference rejector suppresses mutual radar interference that may occur in the vicinity of another shipborne radar operating in the same frequency band. Three options are available: OFF, IR1 and IR2. Choose suitable level to reduce interference from other radars. Choose OFF when no noise exists, so as not to miss weak targets.

Echo average:

You can turn echo averaging on or off. Scan-to-scan correlation averages echoes over successive picture frames to distinguish real target echoes from sea clutter. The choices are EAV1, EAV2, EAV3 and OFF.

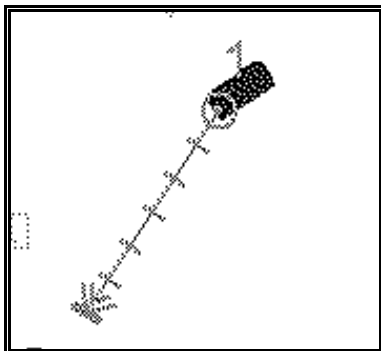
EAV1: Helps distinguish targets from sea clutter and suppress brilliance of unstable echoes.

EAV2: Distinguishes small stationary targets such as navigation buoys.

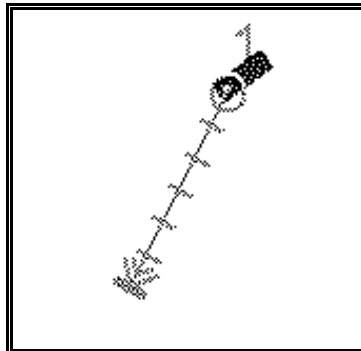
EAV3: Stably displays distant target.

Echo stretch:

Echo stretch emphasizes radar echo to increase detectability of targets. "ES1" emphasise both noise and target level echoes while "ES2" emphasizes only target level echoes.



Echo stretch ES2



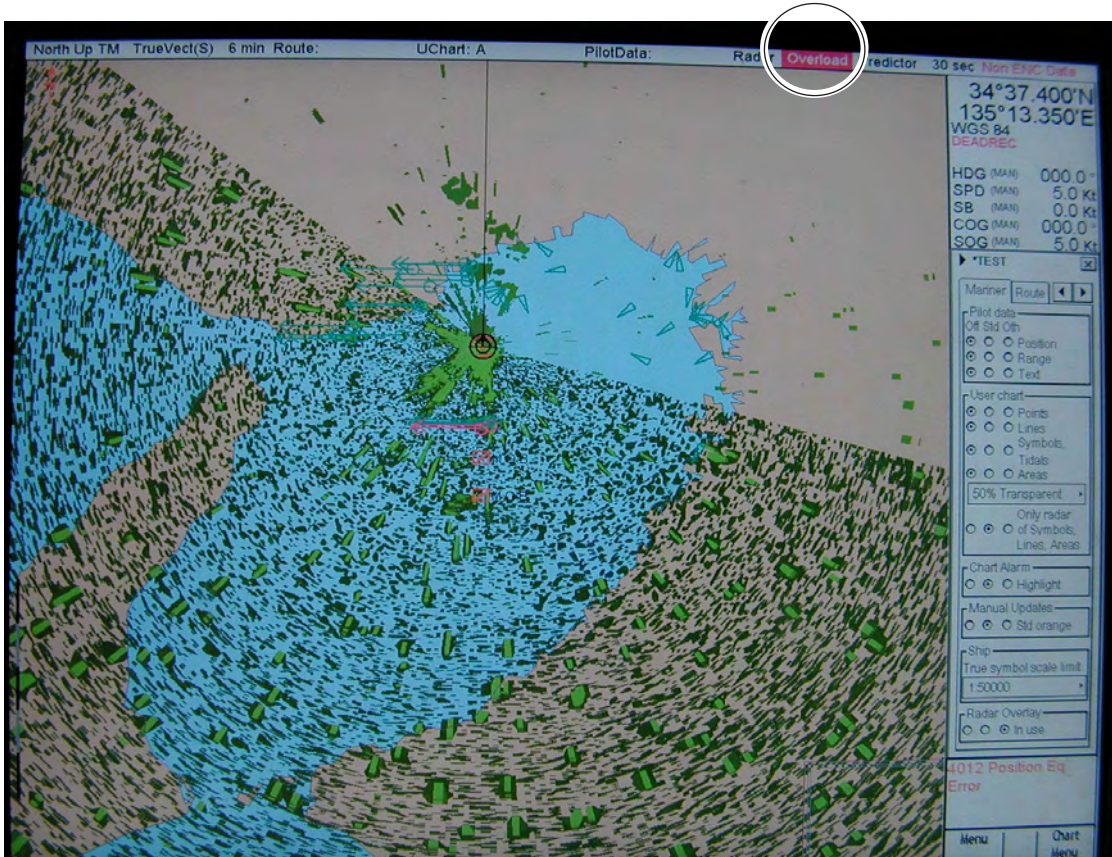
Echo stretch OFF

Clean:

Removes noise from the screen. Choose LOW or HIGH according to amount of noise. Choose OFF when no noise exists.

22.4.6 Echo overload condition

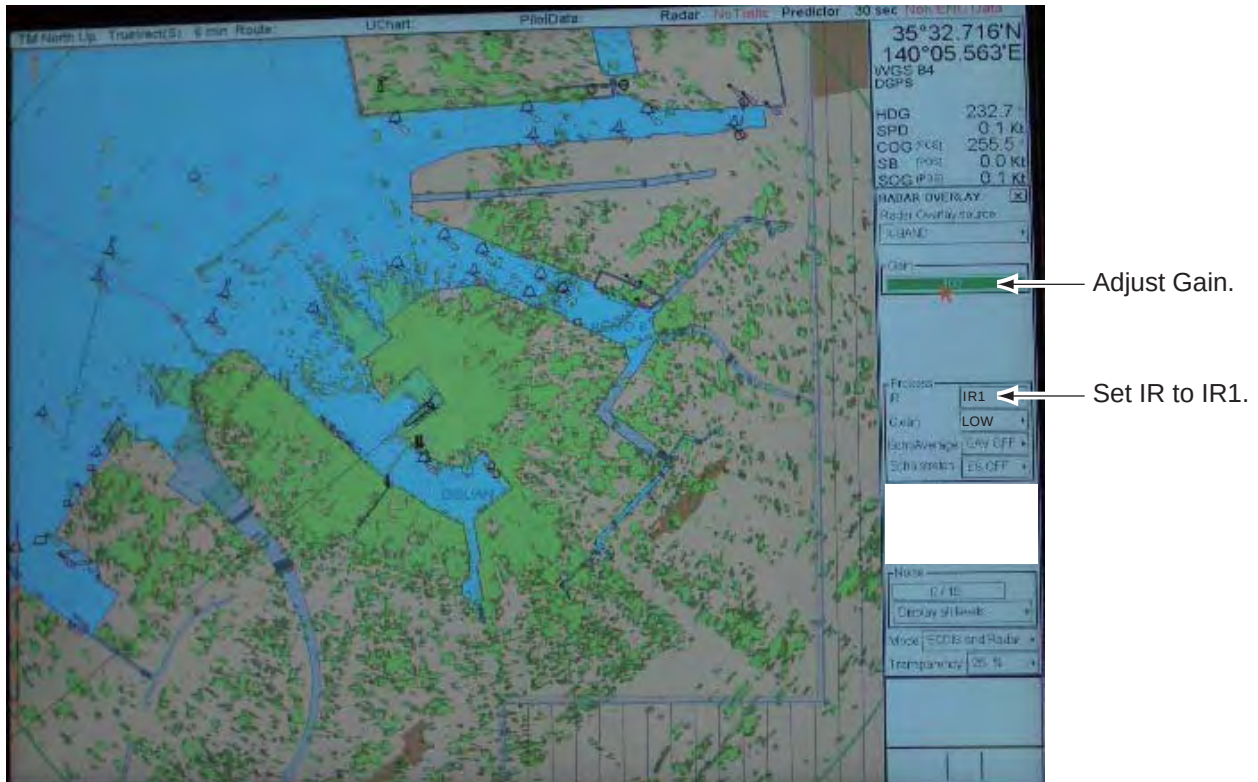
When the number of targets on the screen exceeds the capacity of the CPU, the warning "Overload" appears in red on the status bar. The gain is temporarily lowered automatically then gradually raised. If the overload condition continues, the above-mentioned process is repeated. If this occurs, lower the gain (from the keyboard or the GAIN dialog box) to erase the Overload indication.



When the overload condition occurs, do the following:

1. Adjust controls (gain, sea clutter, rain clutter, interference rejector, etc) on the radar to obtain proper radar image.
2. On the radar overlay dialog box, do the following:
 - a) Set IR to IR1.
 - b) Adjust the Gain control to properly set the gain.

Note: The condition of the radar echo changes with adjustment of range, etc. on the radar. When the overload condition occurs, adjust the gain on the radar to obtain proper picture.



22.4.7 Transparency

Transparency controls "see through" behavior of the radar overlay. The option "Opaque" superimposes radar echoes on the chart display without modifying their color. "25%" displays radar echoes somewhat faintly, and "75%" displays radar echoes very faintly. It is recommended to use 25% or 50% when navigating narrow channels, so as not to conceal landmasses.

22.5 Adjusting Radar Overlay to Match Positions of Chart Features

22.5.1 Error sources of radar echo image and chart display mismatch

There are several reasons why the radar echo image and chart display do not match exactly. The mismatch is a combination of several reasons and removing one reason doesn't solve the mismatch perfectly. There is a fundamental difference between the radar echo image and corresponding chart feature. The radar echo is a reflection from the real life target and the actual position of the real life target is the front edge of the radar echo. Therefore, the radar echo should start from the chart feature and existed as far as the radar pulse length goes.

Bearing error sources:

1. Gyro
2. Inaccurate chart
3. Improper installation parameters (radar overlay bearing offset)

Position error sources

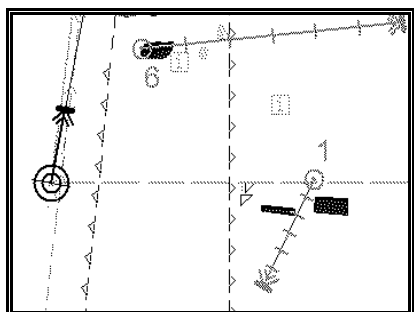
1. Inaccurate position
2. Position offset
3. Inaccurate chart
4. Wrong datum
5. Datum offset with ARCS material
6. Improper installation parameters (conning position offset, position receiver antenna offset, radar overlay range offset, datum chosen for position receiver)

22.5.2 Error sources for radar echo image and ARPA target mismatch

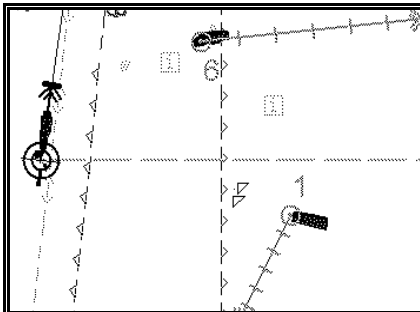
There are several reasons why the radar echo image and ARPA target symbols do not match exactly.

1. Different gyro value at ARPA radar display and at ECDIS.
2. Improper installation parameters (radar overlay bearing offset, radar overlay range offset, conning position offset).

The example below shows how different gyro value set at ARPA radar display and at ECDIS affect the display of the ECDIS.



Different gyro value at ARPA and ECDIS



Equal gyro value at ARPA and ECDIS

22.5.3 Compensating for bearing error

There are two ways to compensate for gyro-induced bearing error:

1) Manual

- Adjust value of manual gyro correction.

2) Table-based gyro speed/latitude correction (Note that the ECDIS's built-in correction facility doesn't correct dynamic error, settling time after course change, etc.)

- Turn On Gyro speed/latitude correction in the Ship and Route Parameters dialog box.

The image shows two side-by-side screenshots of the 'SHIP & ROUTE PAR...' dialog box. The left-hand figure shows the 'Gyro correction' section with 'Source' set to 'Off'. The right-hand figure shows the 'Gyro correction' section with 'Source' set to 'Manual' and 'Spd/lat corr.' set to 'On'. Both figures show the same 'Ship parameters' and 'Route parameters' sections.

SHIP & ROUTE PAR...	
Ship parameters	
Max speed	20.0 Kt
Max height	15.0 m
Max draught	6.0 m
Gyro correction	
Source	Off
Spd/lat corr.	On
Max corr.	4.0 °
Man corr.	-3.0 °
Route parameters	
Max r.o.t.	200 °/mi
Turn end tol.	2 °
WP app.	60 s
WP prewarn	120 s
Start limit	20 °
Def. line rad.	1.0 nm
Drift comp.	On
Gyro error	Off

No manual gyro correction (left-hand figure)

- ARPA targets and radar overlay match perfectly.
- Chart features and radar overlay have some mismatch.

Manual gyro correction in use (right-hand figure)

- ARPA targets and radar overlay match perfectly.
- Chart features and radar overlay match perfectly.

22.5.4 Compensating for position error

Verifying position and alignment

See section 19.8.1 Position alignment by means of ECDIS.

Verifying correct datum used in positioning

It is very important that output co-ordinates of a position device is the same as the ECDIS expects to receive, otherwise you may get incorrect position in the ECDIS. Verify in position device configurations that output of co-ordinates is WGS-84 and also check in the installation parameters of the ECIDS that it is set to receive position in WGS-84 datum.

22.6 Radar Overlay Related Alarms

Alarms generated by Radar Overlay are related to ECDIS workstation where Radar overlay card is located. This means that Radar overlay related alarms on first ECDIS workstation starts with alarm number 6100 and Radar overlay related alarms on second ECDIS starts with alarm number 6200.

Alarm number 6100: RADOV NO HEADLINE 6/13

NO HEADLINE AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6101: RADOV NO AZIMUTH 6/13

NO AZIMUTH AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6102: RADOV NO TRIGGER 6/13

NO TRIGGER AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6103: RADOV NO VIDEO /14

NO VIDEO AVAILABLE FOR RADAR
OVERLAY. CHECK ADJUSTMENT OF GAIN ON
ON RADAR OVERLAY. CHECK CONNECTORS
AND CABLING FOR RADAR OVERLAY

Alarm number 6104: RADOV NO GYRO 6/13

NO HEADING REFERENCE AVAILABLE FOR
ARPA PROCESSOR WHICH IS SOURCE FOR
RADAR OVERLAY. CHECK ARPA PROCESSOR

Alarm number 6105: RADOV HW FAILURE 6/13

 RADAR OVERLAY HARDWARE FAILURE.
 SWITCH POWER ON/OFF. REINSTALL
 ECDIS SW.

Alarm number 6106: LAN RADAR CONNECT STATE 5/12

 INDICATION WHILE LAN CONNECTION FOR
 ARPA FEATURES IS ESTABLISHED BETWEEN
 ECDIS PROCESSOR AND ARPA PROCESSOR

Alarm number 6107: LAN RADAR CONNECT FAILURE 5/12

 FAILURE TO ESTABLISH LAN CONNECTION
 FOR ARPA FEATURES BETWEEN ECDIS
 PROCESSOR AND ARPA PROCESSOR.
 CHECK LAN CONNECTORS AND CABLES
 POWER ON/OFF AND REINSTALL ECDIS SW.

Alarm number 6108: LAN RADAR DLL FAILURE 5/12

 FAILURE INSIDE ECDIS PROCESSOR
 BETWEEN DLL INTERFACE SW AND ECDIS
 SOFTWARE. SWITCH POWER ON/OFF AND
 REINSTALL ECDIS SW.

Alarm number 6110: RADOV CONNECT STATE 6/13

 INDICATION WHILE LAN CONNECTION FOR
 RADAR ECHO DATA IS ESTABLISHED
 BETWEEN ECDIS PROCESSOR AND ARPA
 PROCESSOR

Alarm number 6111: RADOV NO ECHODATA 7/14

 FAILURE TO RECEIVE RADAR ECHO DATA

22. Radar Overlay

This page intentionally left blank.

23. Recording Functions

23.1 Introduction

The ECDIS records various voyage-related items like movement and position of your ship and dangerous radar targets (from ARPA radar). These items are recorded in the following logs:

Voyage log: Records entire voyage, i.e., a sailing of a route from first point to the last.

Details log: Records position, speed and course once every minute.

Danger Targets log: Records ARPA target data.

Chart Usage log: Records information of used charts in display.

Alarms log: Records alarms generated by the system.

The operator may print the contents of any log.

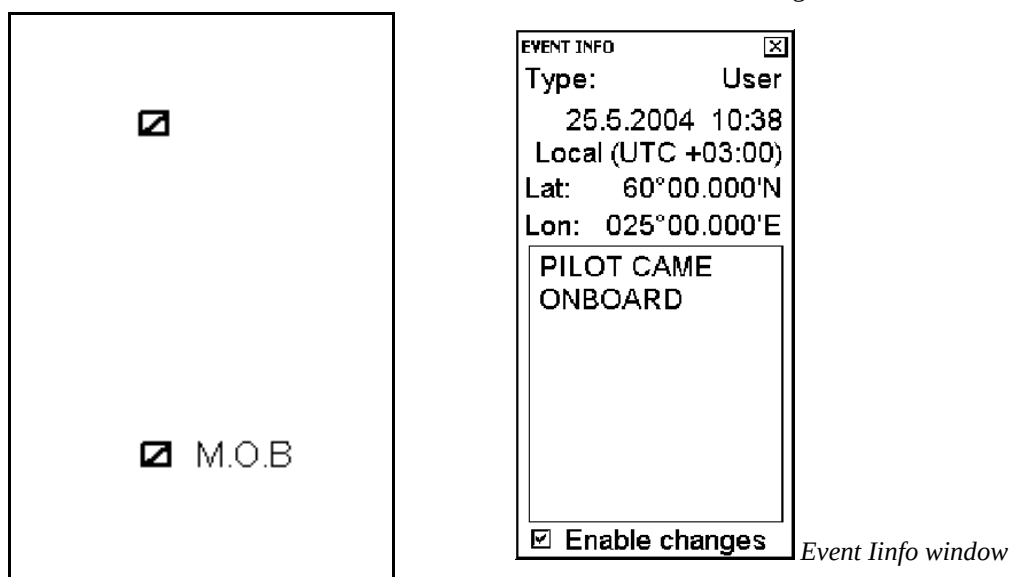
23.2 Events and Man Overboard Functions

The Events and Man Overboard (MOB) functions are accessed with the mouse. Spin the scrollwheel to display Event/Info/MOB in the mouse functions area then push the left or right mouse button as appropriate.

Left mouse button (Event): Records an event to the logbook. You can also write a comment (up to 48 alphanumeric characters) for this event. It is displayed only in the electronic chart area if Events is chosen for display in the Tracking page of the Chart Display dialog box.

Right mouse button (MOB): Records MOB position to the logbook.

Scrollwheel (MOB): Enters a comment. Put cursor on event mark and push the scrollwheel to show the Event Info window, shown below. Enter comment as desired and check Enable changes to save the comment.



*The ECDIS can display Events and MOB.
These events are also recorded into the Voyage log.*

23.3 Voyage Records

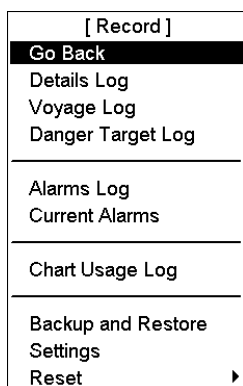
23.3.1 Details log

The details log contains voyage information of the last 12 hours. Various information is recorded in the details log once per minute.

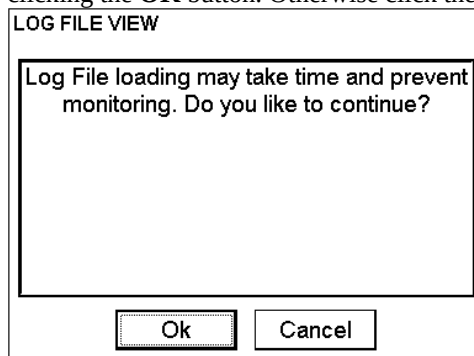
- Date and time
- Position of your ship as output by chosen navigator.
- Alignment (range, bearing) values, if used.
- Speed over ground and course over ground.
- Heading.
- Gyro correction value, if used.

Viewing the details log

To open the details log, do as follows:



1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Record from the menu then push the scrollwheel.
3. Choose Details Log from the menu then push the scrollwheel.
4. The following window appears. Confirm that you want to open the log by clicking the **OK** button. Otherwise click the **Cancel** button.



The system will start viewing program of log.

You may print the entire log or a desired part. To change print font size, put the cursor on the triangle and choose desired font size. To print the log, click the **Print Log** button. To print whole log, select **Print All** from the menu.

LOG FILES - DETAILS LOG											
Date	Time	Type	Lat	Lon	Align/nm	Align/°	Sog/kt	Cog/°	Hdg/°	Corr./°	
11.02.2004	14:49:10	Auto	60°25.629'N	027°23.698'E	0.0	0.0	10.5	259.3	259.3	NVLD	
11.02.2004	14:48:10	Auto	60°25.661'N	027°24.037'E	0.0	0.0	10.5	259.3	259.3	NVLD	
11.02.2004	14:47:10	Auto	60°25.694'N	027°24.375'E	0.0	0.0	10.5	259.3	259.3	NVLD	
11.02.2004	14:46:10	Auto	60°25.727'N	027°24.714'E	0.0	0.0	10.5	259.3	259.3	NVLD	
11.02.2004	14:45:10	Auto	60°25.760'N	027°25.049'E	0.0	0.0	10.5	259.3	259.3	NVLD	
11.02.2004	14:44:10	Auto	60°25.792'N	027°25.389'E	0.0	0.0	10.5	259.3	259.3	NVLD	
File name: details.log			Time: LOCAL (UTC +2:00)				Datum: WGS 84				

Note: For how to make a user chart from this log, see section 23.3.8 Making a user chart from the log (past track).

23.3.2 Voyage log

The voyage log holds data for the entire voyage, recording the following data:

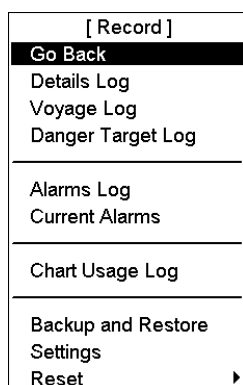
- Changes of course and speed. User can define limits for course change and speed change of your ship to be recorded. This data is filed in the log as type "Ship".
- User is able to define time period, how often there is a recording regardless of course or speed changes. (For example, once per 4 hours). This data is filed in the log as type "Auto".
- Man Over Board event. This data is filed in the log as type "MOB".
- Standard event. This data is filed in the log as type "User".
- Alarms generated by the system. User is able to choose alarms, which are recorded into the Voyage log. This data is filed in the log as type "Alarm".
- Positions. This data is filed in the log as type "Posdev".

When an event is generated it is saved to the log. The event types are as follows:

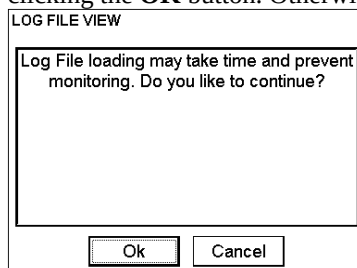
- Date and time
- Position of your ship as output by chosen navigator
- Speed over ground and course over ground
- Wind speed and direction
- Distance counter value
- Depth information.

Viewing the voyage log

To open the voyage log, do the following:



1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button
2. Choose Record from the menu then push the scrollwheel. Choose Voyage Log from the menu then push the scrollwheel.
3. The following window appears. Confirm that you want to open the log by clicking the **OK** button. Otherwise click the **Cancel** button.



The system will start viewing program of log.

You may print the entire log or a desired part. To change print font size, put the cursor on the triangle and choose desired font size. To print the log, click the **Print Log** button. To print whole log, select **Print All** from the menu.

LOG FILES - VOYAGE LOG													
Date	Time	Type	Lat	Lon	Sog/kt	Cog°	Hdg°	Cor°	Wind/	Wind°	Dist/nm	Depth/m	Description
16.02.2004	13:48:40	Ship	59°32.057'N	020°49.577'E	10.5	186.3	186.3	NVLD	3.8	29.0	230.0	38.1	
16.02.2004	13:47:40	Ship	59°32.221'N	020°49.660'E	10.5	209.0	208.8	NVLD	3.8	6.5	229.8	38.1	
16.02.2004	13:46:40	Ship	59°32.345'N	020°49.886'E	10.5	238.6	238.4	NVLD	3.8	336.5	229.6	38.1	
16.02.2004	13:45:40	Ship	59°32.397'N	020°50.198'E	10.5	268.0	267.8	NVLD	3.8	306.5	229.5	38.1	
16.02.2004	13:44:40	Ship	59°32.364'N	020°50.523'E	10.5	297.6	297.4	NVLD	3.8	277.7	229.3	38.1	
16.02.2004	13:43:40	Ship	59°32.254'N	020°50.771'E	10.5	327.2	327.0	NVLD	3.8	247.7	229.1	38.1	
File name: voyage.log Time: LOCAL (UTC +2:00) Datum: WGS 84													
☐ Enable changes													

Note 1: You can add a description to a log entry. Check Enable changes then enter description desired in the text box, using the scrollwheel.

Note 2: For how to make a user chart from this log, see section 23.3.8 Making a user chart from the log (past track).

Setting conditions of logging

The operator can define limits for course change and speed change of your ship to be recorded and also time period for automatic logging. To set them, do the following:

[Record]	
Go Back	
Details Log	
Voyage Log	
Danger Target Log	
Alarms Log	
Current Alarms	
Chart Usage Log	
Backup and Restore	
Settings	
Reset	

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button
2. Choose Record from the menu then push the scrollwheel.
3. Choose Settings from the menu then push the scrollwheel.
4. If the Voyage page is not already open, click the Voyage tab to open it.

Set desired limits for speed and course and also logging interval, using the scrollwheel. When the speed or course changes by the amount set here, a log entry is made.

5. Choose alarms (alarm numbers) to record, in the Alarms window. For alarm numbers and their meanings, see Chapter 11 Chart Alarms.

Resetting voyage log for next voyage

For how to empty the voyage log, see section 23.3.7 Resetting (emptying) voyage and danger target logs. A backup copy of the voyage log can be made. See section 23.3.6 Making backup copy from details, voyage or danger target log for details.

Recording positions

The operator may manually save positions to the voyage log in various ways. These are:

- Direct sensor position (GPS, Loran, etc.)
- Positions calculated by the system (in example below such are Kalman filter and Dead reckoning)
- User observations. (Visual, astronomical and MFDF. MFDF is Medium Frequency Direction Finder.)

The screenshot shows the 'SENSORS' dialog box with the 'Record' tab selected. Under the 'Position Recording' section, the 'Device' dropdown is set to 'DGPS-1st'. Below this, the latitude is displayed as '60°19.222'N' and the longitude as '027°00.404'E'. A 'Record' button is located at the bottom of the section.

An example of saving direct position or position calculated by the system

The screenshot shows the 'SENSORS' dialog box with the 'Record' tab selected. Under the 'Position Recording' section, the 'Device' dropdown is set to 'FURUNO'. Below this, the latitude is displayed as '60°19.222'N' and the longitude as '027°00.404'E'. A 'Record' button is located at the bottom of the section.

An example of saving position based on operator observation

First you should locate the position of your observation on the ECDIS chart. Use, for example, the two separate EBL and VRM available in the Nav Marks dialog box. Open the Sensors dialog box then click the Record tab. Choose appropriate method from the Device list box. In case a User Observation is selected, put the cursor on the desired location on the ECDIS display then press the left mouse button. The latitude/longitude position of the cursor is then copied to the Lat and Lon fields. If you are satisfied, then click the **Record** button to save the position observation into the voyage log. If you wish you can also enter Lat and Lon values manually.

23.3.3 Danger target log

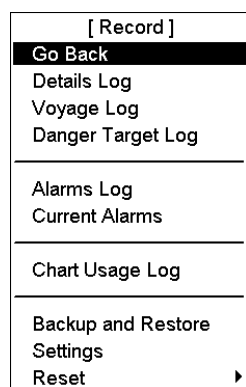
The danger target log stores information about targets which are received from an ARPA radar (ARPA targets) and/or targets which are received from an AIS transponder (AIS targets).

If an ARPA target or AIS target is within the set CPA and TCPA, information of all tracked targets (including non-dangerous targets) are recorded into the danger targets log. This data is as follows:

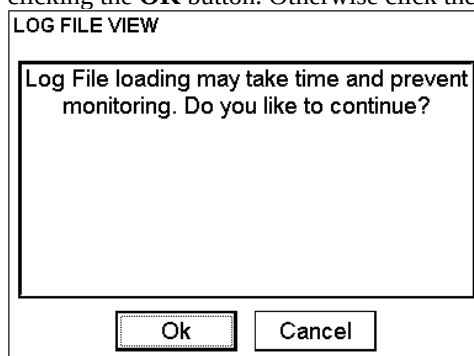
- Date and time, index of target (number of tracked target on ARPA radar or IMO MMSI number from AIS transponder).
- CPA and TCPA of both AIS and ARPA targets
- Position (Lat, Lon), speed (Spd) and course (Cse) of both AIS and ARPA targets.
- Heading (Hdg) information of AIS target.

Viewing danger target log

To open the Danger Target log, do the following:



1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Record from the menu then push the scrollwheel.
3. Choose Danger Target Log from the menu then push the scrollwheel.
4. The following window appears. Confirm that you want to open the log by clicking the **OK** button. Otherwise click the **Cancel** button.



The system will start viewing program of log.

You may print the entire log or a desired part. To change print font size, put the cursor on the triangle and choose desired font size. To print the log, click the **Print Log** button. To print whole log, select **Print All** from the menu.

LOG FILES - DANGER TARGETS LOG											
Date	Time	Type	Lat	Lon	Spd/kt	Cse/°	Hdg/°	Cpa/nm	Tcpa/nm	Index	
16.02.2004	15:03:10	ARPA	64°47.360'N	063°07.802'E	15.8	57.9	NVLD	3.0	-21.9	10	
16.02.2004	15:03:10	ARPA	64°47.808'N	062°59.943'E	16.5	59.7	NVLD	0.7	-3.4	9	
16.02.2004	15:03:10	ARPA	64°48.645'N	062°55.301'E	14.9	110.6	NVLD	0.7	3.7	8	
16.02.2004	15:03:10	ARPA	64°47.512'N	062°58.965'E	16.2	58.1	NVLD	0.2	-2.8	7	
16.02.2004	15:03:10	ARPA	64°47.329'N	062°58.966'E	16.4	59.2	NVLD	0.1	-3.9	6	
16.02.2004	15:03:10	ARPA	64°47.480'N	063°02.603'E	16.2	58.4	NVLD	1.3	-10.9	5	
File name: target.log Time: LOCAL (UTC +2:00) Datum: WGS 84											

Note: For how to make a user chart from this log, see section 23.8 Making a user chart from the log (past track).

Setting conditions for viewing and logging of danger targets

The operator may set Closest Point of Approach (CPA), Time to CPA (TCPA) and Log interval for viewing dangerous ARPA and AIS targets on the ECDIS display. A dangerous ARPA or AIS target is blinking and its color is green and red alternately. User can also alternatively log only information of a single chosen ARPA or AIS target.

[Record]	
Go Back	
Details Log	
Voyage Log	
Danger Target Log	
Alarms Log	
Current Alarms	
Chart Usage Log	
Backup and Restore	
Settings	
Reset	

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Record from the menu and Settings from the submenu.
3. If the Danger Targets page is not already open, click the Danger Targets tab to open it.

The screenshot shows a window titled "VOYAGE RECORD" with a close button (X). Inside, there is a "Danger Targets" tab with left and right arrow buttons. Below the tab, there is a "Log interval" section with a text box containing "5" and the unit "min". Underneath is a "Log Single Target" section. It contains two rows: "ARPA" with a dropdown menu showing "NONE" and a right arrow, and "AIS" with a dropdown menu showing "NONE" and a right arrow. The bottom half of the window is a large empty rectangular area.

Set desired limits for CPA, TCPA and log interval. Note that these limits are only for ECDIS; an ARPA radar has its own setting for dangerous targets and thus a target which is dangerous at an ARPA display can be safe on the ECDIS and vice versa. If an ARPA target is inside the CPA and TCPA, it is shown as a dangerous ARPA target on the ECDIS display. Log interval defines time period for logging.

Note: The operator may choose logging of the track of a single AIS and/or ARPA target, if he chooses in the Log Single Target window the desired number from the ARPA and/or AIS box. If this option is chosen, only information of the target(s) selected is recorded.

Saving past track of a chosen ARPA or AIS target

To save past track of chosen ARPA or AIS target, do the following:

1. Find number of ARPA target or name of AIS target, by placing the cursor on the target and pushing the scrollwheel.
2. Choose Settings from the Record menu then open the Danger Targets page.
3. In the Log Single Target window, choose ARPA target number and/or AIS target name from the ARPA and AIS boxes.
4. You can make a user chart from the danger target log. For further details see section 23.3.8 Making a user chart from the log (past track).

Note: By choosing a single target only the chosen target's information is recorded. If you want to record information of all danger targets, remove selection from the boxes in the Log Single Target window.

23.3.4 Chart usage log

The chart usage log stores which charts were displayed on the ECDIS chart display area or which were used for chart alarms. The following information is recorded in the chart usage log:

- Chart ID
- Chart edition
- The latest update included to chart
- Displayed Updates Until
- Approved Updates Until
- Center position of display (Lat, Lon).
- Scale of chart display
- Details of chart chosen for display

TEXT VIEW

13.02.2004	11:31	Scale:	20000	Center position:	59°49.003'N 020°57.319'W	Details:	5A90A90803001FFF
-----	-----	CellID/	-----	Base	Displayed Upd/Until	Approved Upd/Until	-----
-----	-----	FI4EIHMC/	2	0/2003 2 3	0/2003 2 3/2004 2 5	0/2003 2 3/2004 2 5	-----
-----	-----	7c1w0001/	1	0/1999 4 20	0/1999 4 20/2004 2 5	0/1999 4 20/2004 2 5	-----
-----	-----	7c2w1302/	1	0/1999 4 20	0/1999 4 20/2004 2 5	0/1999 4 20/2004 2 5	-----
13.02.2004	11:32	Scale:	20000	Center position:	59°49.132'N 020°57.116'W	Details:	5A90A90803001FFF
-----	-----	CellID/	-----	Base	Displayed Upd/Until	Approved Upd/Until	-----
-----	-----	FI4EIHMC/	2	0/2003 2 3	0/2003 2 3/2004 2 13	0/2003 2 3/2004 2 13	-----
-----	-----	7c1w0001/	1	0/1999 4 20	0/1999 4 20/2004 2 13	0/1999 4 20/2004 2 13	-----
-----	-----	7c2w1302/	1	0/1999 4 20	0/1999 4 20/2004 2 13	0/1999 4 20/2004 2 13	-----

Time: Find Print Text

23.3.5 Printing details, voyage or danger targets log

This procedure is the same if you make User Chart from Details, Voyage or Danger Targets log.

Printing entire log

1. Open the Main menu, choose Record then choose appropriate Log item. The example below shows the Details Log.

LOG FILES - DETAILS LOG

Date	Time	Type	Lat	Lon	Align/nm	Align/°	Sog/kt	Cog/°	Hdg/°	Corr./°
11.02.2004	14:49:10	Auto	60°25.629'N	027°23.698'E	0.0	0.0	10.5	259.3	259.3	NVLD
11.02.2004	14:48:10	Auto	60°25.661'N	027°24.037'E	0.0	0.0	10.5	259.3	259.3	NVLD
11.02.2004	14:47:10	Auto	60°25.694'N	027°24.375'E	0.0	0.0	10.5	259.3	259.3	NVLD
11.02.2004	14:46:10	Auto	60°25.727'N	027°24.714'E	0.0	0.0	10.5	259.3	259.3	NVLD
11.02.2004	14:45:10	Auto	60°25.760'N	027°25.049'E	0.0	0.0	10.5	259.3	259.3	NVLD
11.02.2004	14:44:10	Auto	60°25.792'N	027°25.389'E	0.0	0.0	10.5	259.3	259.3	NVLD

File name: details.log Time: LOCAL (UTC +2:00) Datum: WGS 84

2. Place the cursor on the triangle to show Log File menu and select Print Log.
3. To print a log, click the **Print Log** button. To print whole log, select **Print All** from the menu.
4. A Print dialog box appears, click the **OK** button. The entire log will be printed.

Print

Printer Name: \SERVER1\HP4PS Properties

Status: Ready

Type: HP LaserJet 4/4M PS

Where: CAD.koppi

Comment: ☐ Print to file

Print range: ☒ All ☐ Pages from: to: ☐ Selection

Copies: Number of copies: 1 ☐ Collate

OK Cancel

Printing specific portion of a log

1. Open desired log.
2. Click left mouse button to choose portion of log to print.

LOG FILES - DETAILS LOG

Date	Time	Type	Lat	Lon	Align/nm	Align/°	Sog/kt	Cog/°	Hdg/°	Corr./°	
16.02.2004	15:03:40	Auto	59°19.276'N	020°46.632'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:02:40	Auto	59°19.446'N	020°46.672'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:01:40	Auto	59°19.617'N	020°46.711'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:00:40	Auto	59°19.792'N	020°46.751'E	0.0	0.0	0.0	186.3	186.3	NVLD	
16.02.2004	14:59:40	Auto	59°19.957'N	020°46.789'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	14:58:40	Auto	59°20.129'N	020°46.828'E	0.0	0.0	10.5	186.3	186.3	NVLD	

File name: details.log Time: LOCAL (UTC +2:00) Datum: WGS 84

3. Place the cursor on the triangle and left-click Print Log.
4. Click the **OK** button to print.

Print

Printer:

Status: Ready
Type: HP LaserJet 4/4M PS
Where: CAD koppi
Comment: ☐ Print to file

Print range:
☐ All
☐ Pages from: to:
☒ Selection

Copies:
 Number of copies:
☐ Collate

Changing font size for paper copy of logs

In each log (Details, Voyage or Danger Targets log) you can choose font size for printed version. To change font size, do the following:

1. Open desired log.
2. Place the cursor on the triangle on the upper left corner and select Print Font.

[Print Font]

Go Back

Print Font Size: 8

Print Font Size: 9

Print Font Size: 10

Print Font Size: 11

Date	Time	Type	Lat	Lon	Align/nm	Align/°	Sog/kt	Cog/°	Hdg/°	Corr./°	
16.02.2004	15:04:40	Auto	59°18.424'N	020°46.436'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:04:40	Auto	59°18.594'N	020°46.475'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:04:40	Auto	59°18.764'N	020°46.514'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:04:40	Auto	59°18.935'N	020°46.554'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:04:40	Auto	59°19.104'N	020°46.593'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:03:40	Auto	59°19.276'N	020°46.632'E	0.0	0.0	10.5	186.3	186.3	NVLD	

File name: details.log Time: LOCAL (UTC +2:00) Datum: WGS 84

23.3.6 Making backup copy from details, voyage or danger targets log

If necessary you can make a backup copy of ECDIS logs onto a floppy disk as follows:

[Record]
Go Back
Details Log
Voyage Log
Danger Target Log
Alarms Log
Current Alarms
Chart Usage Log
Backup and Restore
Settings
Reset

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Record from the menu then push the scrollwheel.
3. Choose Backup and Restore from the menu then push the scrollwheel.
4. The Backup and Restore dialog box appears.

BACKUP & RESTORE

Category

Logs

Hard Disk

☐ All

DETAILS.LOG

Backup

Backup Device

Drive:

A:\

View...

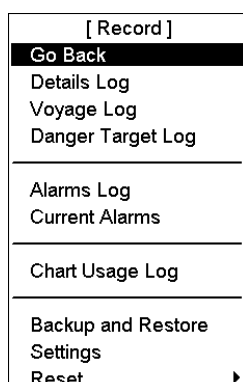
Delete

Local Floppy Disk

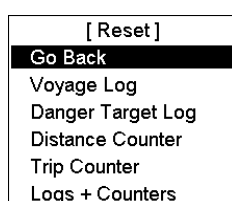
5. Choose desired log and drive for backup copy. Then, click the **Backup** button.

23.3.7 Resetting (emptying) voyage and danger targets logs

It may be useful to reset (empty) the voyage and danger targets logs when you are starting a new voyage. If necessary, make a backup copy before resetting. To reset a log, do the following:



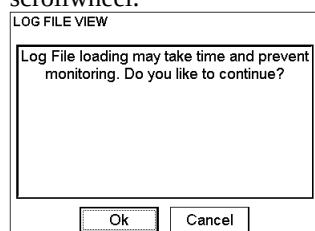
1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Record from the menu then push the scrollwheel.
3. Choose Reset from the menu then push the scrollwheel.
4. Choose the log to reset from the menu then push the scrollwheel.
5. The system will ask you if you are sure to reset chosen log. Click the **OK** button to reset the chosen log.



23.3.8 Making a user chart from a log (past track)

You may create a user chart from any log among details, voyage and danger target. The past track of the Danger Log target is useful for making a use chart from a single target.

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button. Choose Record from the menu then push the scrollwheel.
2. Choose the log (Details, Voyage, Danger Target) from which you want to make a user chart then push the scrollwheel.



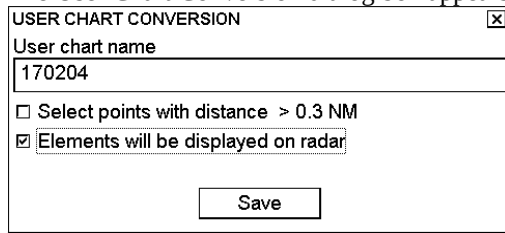
3. Click the **OK** button to continue.
4. Choose the log entries which you want to use to create a user chart.

LOG FILES - DETAILS LOG											
Date	Time	Type	Lat	Lon	Align/nm	Align/°	Sog/kt	Cog/°	Hdg/°	Corr./°	
16.02.2004	15:03:40	Auto	59°19.276'N	020°46.632'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:02:40	Auto	59°19.446'N	020°46.672'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:01:40	Auto	59°19.617'N	020°46.711'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	15:00:40	Auto	59°19.792'N	020°46.751'E	0.0	0.0	0.0	186.3	186.3	NVLD	
16.02.2004	14:59:40	Auto	59°19.957'N	020°46.789'E	0.0	0.0	10.5	186.3	186.3	NVLD	
16.02.2004	14:58:40	Auto	59°20.129'N	020°46.828'E	0.0	0.0	10.5	186.3	186.3	NVLD	
File name: details.log Time: LOCAL (UTC +2:00) Datum: WGS 84											

5. Click the triangle and select "Save as User Chart" to show log.

23. Recording Functions

6. The User Chart Conversion dialog box appears.



The dialog box is titled "USER CHART CONVERSION" and has a close button (X) in the top right corner. It contains a text field labeled "User chart name" with the value "170204" entered. Below this are two checkboxes: "Select points with distance > 0.3 NM" (unchecked) and "Elements will be displayed on radar" (checked). At the bottom is a "Save" button.

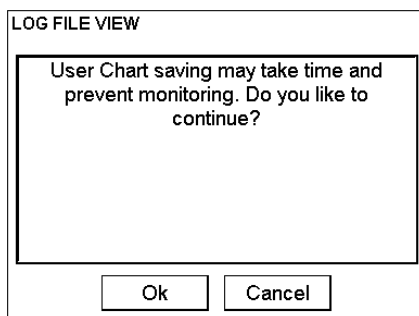
This dialog box contains the following fields:

User chart name: Enter name for the user chart.

Select points with distance > 0.3 NM: Check to have the system filter the chosen log so that the minimum distance between points in the user chart is 0.3 nm.

Elements will be displayed on radar: Check to display the chart on the radar screen.

7. Click the **Save** button.



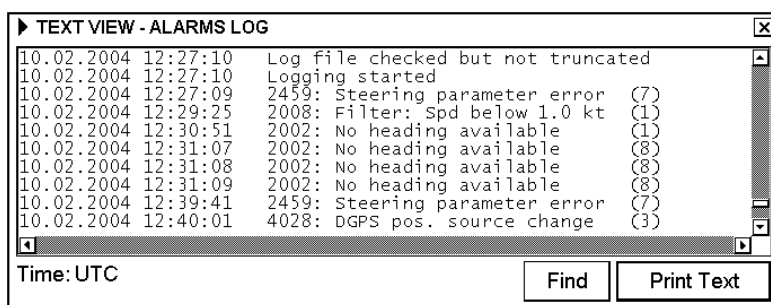
The dialog box is titled "LOG FILE VIEW" and contains a text area with the message: "User Chart saving may take time and prevent monitoring. Do you like to continue?". At the bottom are "Ok" and "Cancel" buttons.

8. Confirm creating of user chart by clicking the **OK** button.

Note: If your chosen range for conversion from log to user chart contains periods of invalid your ship's positions, then the user chart has a gap in the line for these periods.

23.3.9 Alarms log

The alarm log collects and records alarms generated by the system. You may view a list of generated alarms using the Alarms Log.

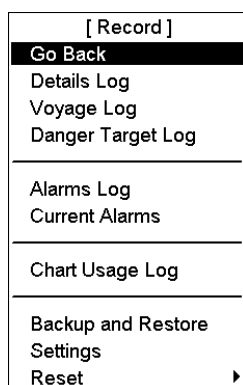


The window is titled "TEXT VIEW - ALARMS LOG" and contains a list of log entries. The entries are as follows:

Time	Event	Count
10.02.2004 12:27:10	Log file checked but not truncated	
10.02.2004 12:27:10	Logging started	
10.02.2004 12:27:09	2459: Steering parameter error	(7)
10.02.2004 12:29:25	2008: Filter: Spd below 1.0 kt	(1)
10.02.2004 12:30:51	2002: No heading available	(1)
10.02.2004 12:31:07	2002: No heading available	(8)
10.02.2004 12:31:08	2002: No heading available	(8)
10.02.2004 12:31:09	2002: No heading available	(8)
10.02.2004 12:39:41	2459: Steering parameter error	(7)
10.02.2004 12:40:01	4028: DGPS pos. source change	(3)

At the bottom of the window, there is a "Time: UTC" label and two buttons: "Find" and "Print Text".

To open the log, proceed as follows:

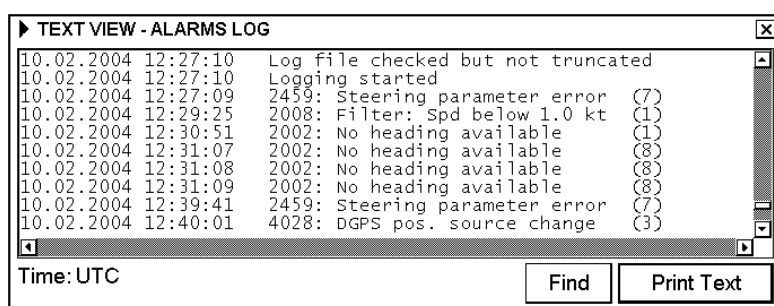


1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button. Choose Record from the menu then push the scrollwheel.
2. Choose Alarms Log from the menu then push the scrollwheel.

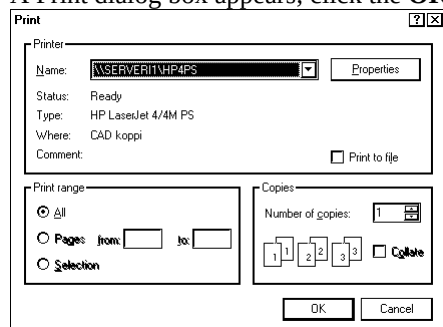
The Alarms Log appears on the display. See below for an example.

Printing latest alarm

1. Open the Record menu following step 1 in the above procedure.
2. Choose Alarms Log from the menu then push the scrollwheel.



1. Click the **Print Text** button.
2. A Print dialog box appears; click the **OK** button to print (complete log).



23.4 Distance and Trip Counters

Distance and trip counters have separate fields for both through water and over ground distances. This information is available on the Record page of the Sensors dialog box, shown right. To reset the distance and/or trip counter, see the section which follows.

SENSORS [X]

Other | **Record** [Left Arrow] [Right Arrow]

Position Recording

Device: DGPS-1st

60°19.222'N

027°00.404'E

Record

Distance Counting

Over Ground

Distance counter 0.9 nm

Trip counter 0.9 nm

Through Water

Distance counter 0.9 nm

Trip counter 0.9 nm

23.4.1 Resetting distance and trip counters

It is useful to reset the distance counter when you are starting a new voyage.

[Record]

Go Back

Details Log

Voyage Log

Danger Target Log

Alarms Log

Current Alarms

Chart Usage Log

Backup and Restore

Settings

Reset ▶

[Reset]

Go Back

Voyage Log

Danger Target Log

Distance Counter

Trip Counter

Logs + Counters

To reset the distance and trip counters, do the following:

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button. Choose Record from the menu then push the scrollwheel.
2. Choose Reset from the menu then push the scrollwheel.
3. Choose Distance Counter from the submenu then push the scrollwheel.
4. You are asked if you are sure to reset the distance and trip counters; click the **OK** button to reset those counter.

To reset only the trip counter, do the following:

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button. Choose Record from the menu then push the scrollwheel.
2. Choose Reset from the menu then push the scrollwheel.
3. Choose Trip Counter from the submenu then push the scrollwheel.
4. You are asked if you are sure to reset the trip counter; click the **OK** button to reset the trip counter.

24. Datum

24.1 General

Datum is a mathematical model of the earth based on which a sea chart is produced. If the datum of a position sensor and that of a sea chart are different, a transformation has to be made somewhere in the system. Not doing so can result in errors of several sea miles. The difference between two datums is never constant, but depends on position. This means that the difference between WGS 84 and local datum, generally used in paper charts, is not generally valid with electronic sea charts.

24.2 Paper Charts

Datums used in paper charts have been traditionally national datums for historical reasons. Many paper charts do not have a marked datum, therefore compatibility with electronic charts may be complicated. In some paper charts, the correction terms are printed in lieu of datum, for correction of the WGS 84 system satellite locations. The correction terms are usable but only with the paper chart in question.

24.3 Electronic Sea Charts

Until now, electronic sea charts have generally been based on rasterizing or vectorizing of paper charts, resulting in the respective transfer of the local datum.

Exceptions:

- The ARCS (raster) material includes polynomials for each chart, making it possible for the ECS system to solve the difference between the WGS 84 datum and the local datum with an accuracy sufficient for authority responsibility. In some charts, the mentioned difference is not known with sufficient accuracy, resulting in displaying a permanent warning window when displayed in ARCS compatible systems.

Own Ship to Cursor:	
158.3 nm	78.8°
Lat	60°02.767'N
Lon	028°31.983'E
WGS undefi.	

- ENC vector material which according to S57 standard has to be produced by a National Hydrographic Office in the WGS-84 datum.

24.4 Positioning Devices and Datum

In early days of electronic positioning devices, datums received little attention because the commonly used systems utilised special charts (like Decca charts). Later on, data output was added to these systems, but still no attention was paid to datums and the position errors were considered as an inaccuracy of the system. With the spread of the GPS, however, datum has become better known. An accurate position is of no value if co-ordinates are in a wrong datum. GPS satellites utilize the WGS-84 datum. However, the WGS-84 datum is not a general solution for all positioning systems, due to differences between electronic sea chart system and the chart material displayed.

24.5 ECDIS and Datum

The real ECDIS uses ENC material, produced to standards using WGS-84 datum. Positioning devices connected to the ECDIS must work in the WGS-84 datum. IMO requires that the ECDIS must give an alarm if the datum of a positioning device is not the WGS-84. In practice this is impossible, because the standard used by positioning devices (IEC 61162, previously NMEA 0183) does not include a datum message. Consequently, the classification societies only approve a positioning device interfaced with the ECDIS in which datum cannot be changed (i.e., is always WGS-84).

Note: The ability to check datum of position is a relatively new feature for position receivers. It was introduced in standard IEC 61162-1 Ed2, published in July 2000. Only an EPFS (for example GPS or DGPS) which has "IEC 61162-1 Ed 2 (2000-7)" indicated in its type approval certificate can support the ECDIS to detect datum mismatch.

24.6 ECDIS and User Selectable Local Datum

The ECDIS allows the operator to change viewed datum. This selection of the datum does not change anything inside the ECDIS for navigation calculation processes or for electronic sea chart display processes. But it changes the numerical values of positions displayed on the ECDIS display into the operator-chosen datum. This is very useful, especially if you like to plot positions from the ECDIS on a traditional paper chart.

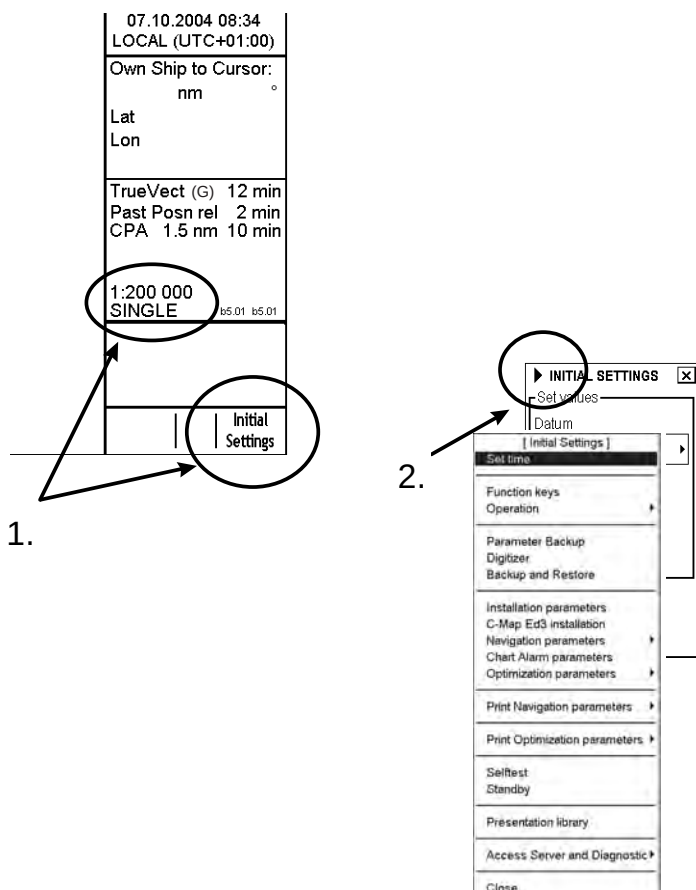
25. Parameters Setup

25.1 Parameters

The Initial Settings menu in the Initial Settings dialog box contains the installation parameters, navigation parameters and optimization parameters which define the configuration of the ECDIS and operative parameters which are either used to control steering and navigation calculation or used during route planning.

To open the Initial Settings menu, do the following:

1. Place the cursor on the text SINGLE, PLAN, SLAVE, MULTI or MASTER (whichever is shown) on the lower right corner of the information area, confirm that Initial Settings appears in the mouse functions area, then push the right mouse button to open the Initial Settings dialog box.
2. Place the cursor on the triangle in the Initial Settings dialog box to show the Initial Settings menu.

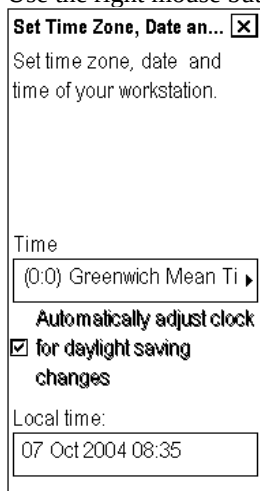


25.1.1 Parameter-related menus

Set time

Place the cursor on the date and time presentation on right-hand side of ECDIS display.

- Use the left mouse button to display UTC time and local time alternately.
- Use the right mouse button to change time zone and/or time.



In order to set the time, the following conditions must be met:

- Set time on workstation chosen as the sensor source.
- Kalman filter should be OFF.
- Turn off any track steering mode (Goto WP or Goto Track).

Parameter backup

User can make backup copy of parameters. See Chapter 17 Backup Operations for details.

Installation parameters

The ECDIS system parameters are set by the installation parameters. **Note:** Access to the installation parameters requires a key disk, which is delivered by the manufacturer. For details see the installation manual.

Navigation parameters

Parameters for your ship and routes. For more information about setting navigation parameters, see "Ship and route parameters" on page 25-2.

Optimization parameters

This function is used to define parameters for speed and fuel consumption. For further details, see "Optimization parameters setting" on page 25-7.

Print navigation parameters

Prints navigation parameters to default printer.

Print optimization parameters

Prints optimization parameters to default printer.

25.1.2 Accessing installation parameters

The installation parameters command is used to set installation parameters for the system. These parameters are concerned with hardware configurations and set up. They need only be set during installation and if sensor configuration changes. Installation parameters are described in detail in the Installation Manual.

25.1.3 Choosing datum

Datum is used to choose between different models of the earth. It is essential that you use Datum in a consistent way. See also "ECDIS and Datum" on page 24-2.

If you use paper charts together with electronic chart material, it is recommended that you use the same datum as your current paper chart to avoid misalignment between your electronic system and points taken or plotted on your current paper chart.

Once you have chosen a datum, all numerical latitude-longitude position values are presented in your chosen datum.

Note: If you use ARCS raster chart material, rasterized charts contain some rasterized position information. These positions, like scales in the edges of ARCS charts, are true only if you have chosen native datum of that ARCS chart. Normally this is the natural situation, because you use ARCS together with matching official paper chart and because you have chosen as datum the datum of your matching official paper chart.

To choose datum do the following:

1. Place the cursor on the datum indication at the upper right corner of the display.
2. Spin the scrollwheel to choose appropriate datum then push the scrollwheel.

59°50.005'N	
024°51.475'E	
WGS 84	
DGPS	
HDG	070.0°
SPD (CALC)	1.8 Kt
SB (POSN)	1.7 Kt
COG (POSN)	045.1°
SOG (POSN)	2.0 Kt

25.1.4 Navigation parameters setting

The purpose of navigation parameters is set the basic parameters for the ship. These parameters are relative to ship steering and they are very important to get correct function of the integrated navigation system. They must be maintained carefully. Modification requires a good knowledge of the parameters' importance.

In order to edit Ship and Route parameters, do the following:

1. Place the cursor on the text SINGLE, PLAN, SLAVE, MULTI or MASTER (whichever is shown) on the lower right corner, then push the right mouse button to open the Initial Settings dialog box.
2. Choose Navigation parameters then push the scrollwheel.
3. Choose Ship and Route parameters from the menu then push the scrollwheel.

Ship parameters

Max. speed: Maximum speed the ship can do.

Max. height: Max. height of ship above sea level.

Max draught: Max. draught of ship.

Gyro correction:

Source: Choose method of gyro error correction, auto, manual or off.

Spd/lat corr.: Choose On or Off

Max corr.: enter max. value for correction

Man corr.: enter value for manual gyro correction.

Route parameters

Max r.o.t.: Indicates the maximum rate of turn of the ship.

Turn end tol: This defines the window for the detection of the end of turn. Typical values are between 2 to 4 degrees.

WP approach: Set the alarm time before approaching the wheel over point.

WP prewarn: Set the alarm time before approaching the wheel over point. It should be well in advance of the WP approach alarm time.

Start limit: Set the maximum approach angle against planned course in order to accept start of automatic route steering.

Def. line rad: Used to define the default value of radius between waypoints during automatic route steering.

Def. ch limit: Used to define the default value of channel limit between waypoints during automatic route steering.

Drift compensation: Enables/disables the drift compensation during automatic route steering.

Gyro error comp: Enables/disables the gyro error compensation of set course during automatic route steering.

When using FURUNO
FAP-2000 or YOKO-
GAWA PT-500A

When using TOKYO
KEIKI PR-6000

Forwarding distances

The forwarding distance is the distance the ship travels straight after the steering command is given to the autopilot. This distance may vary with a different required radius of turn. The logic to verify the correct distance is to perform a maneuver of 90 degrees (Port and Starboard), with a SMALL RADIUS (0.3 nm), and verify from the radar, using the curved EBL, if the turn goes "long" or is too "sharp". The parameter should also be verified with a different radius. (Most important radius values are between 0.3 to 1.0 nm). You can define set of Forwarding Distances both for "Go To Track" and "Go To WP" steering modes.

How to set Forwarding distances for FURUNO FAP 2000

You can define set of Forwarding Distances both for "Go To Track" and "Go To WP" steering modes.

In order to edit forwarding distances parameters, do the following:

1. Place the cursor on the text SINGLE, PLAN, SLAVE, MULTI or MASTER (whichever is shown) on the lower right corner, then push the right mouse button to open the Initial Settings dialog box.
2. Place the cursor on the triangle in the Initial settings dialog box, choose Navigation parameters then push the scrollwheel.
3. Choose Forwarding distance then push the scrollwheel.
4. Insert "Authorizing key disk" in floppy disk drive.
5. Check Enable changes to modify desired set of Forwarding Distances.

FORWARDING DISTANCES			
GO TO TRACK			
Port			
Radius /nm	- 7.5 kt	7.5 - 15.0 kt	15.0 kt -
- 0.5	0.052	0.054	0.053
0.6 - 1.1	0.053	0.055	0.056
1.2 -	0.034	0.056	0.064

Starboard			
Radius /nm	- 7.5 kt	7.5 - 15.0 kt	15.0 kt -
- 0.5	0.052	0.053	0.053
0.6 - 1.1	0.052	0.053	0.056
1.2 -	0.038	0.054	0.067

☐ Enable changes

Normally these parameters are entered during sea trial but can also be modified later on. See the next page.

How to set forwarding distances for YOKOGAWA Autopilot PT-500AA

In order to edit forwarding distances parameters, do the following:

1. Place the cursor on the text SINGLE, PLAN, SLAVE, MULTI or MASTER (whichever is shown) on the lower right corner, then push the right mouse button to open the Initial Settings dialog box.
2. Place the cursor on the triangle in the Initial settings dialog box, choose Navigation parameters then push the scrollwheel.
3. Choose Forwarding distance then push the scrollwheel.
4. Insert "Authorizing key disk" in floppy disk drive.
5. Check "Enable changes" to modify desired set of Forwarding Distances.

FORWARDING DISTANCES			
TRACK			
Port			
Radius /nm	- 8.3 kt	8.3 - 16.6 kt	16.6 kt -
- 0.5	0.052	0.040	0.055
0.6 - 1.1	0.053	0.102	0.106
1.2 -	0.034	0.056	0.064

Starboard			
Radius /nm	- 8.3 kt	8.3 - 16.6 kt	16.6 kt -
- 0.5	0.052	0.043	0.053
0.6 - 1.1	0.052	0.104	0.107
1.2 -	0.038	0.054	0.067

☐ Enable changes

How to set forwarding distances for TOKYO KEIKI PR-6000

In order to edit forwarding distances parameters, do the following:

1. Place the cursor on the text SINGLE, PLAN, SLAVE, MULTI or MASTER (whichever is shown) on the lower right corner, then push the right mouse button to open the Initial Settings dialog box.
2. Place the cursor on the triangle in the Initial settings dialog box, select Navigation parameters then push the scrollwheel.
3. Select Forwarding distance then push the scrollwheel.
4. Check "Enable changes" to modify desired set of Forwarding Distances.
5. To operate without XTE gain, check "Service state". When service state is checked, the dialog box shown right appears.
4. After doing forwarding distances, be sure to uncheck "Service state".

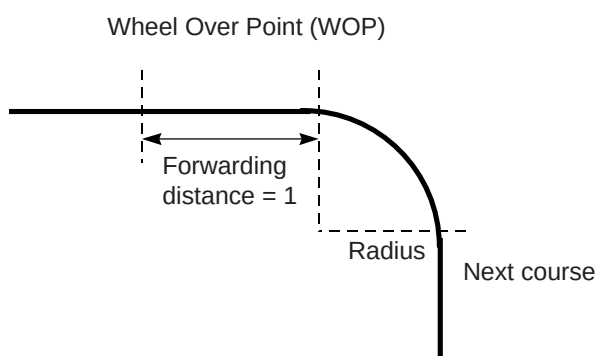
FORWARDING DISTANCES			
GO TO AW / GO TO OS			
Port			
Radius /nm	Speed		
	- 9.4 kt	9.4 - 18.8 kt	18.8 kt -
- 0.5	0.140	0.155	0.170
0.6 - 1.1	0.100	0.090	0.120
1.2 -	0.120	0.100	0.110

Starboard			
Radius /nm	Speed		
	- 9.4 kt	9.4 - 18.8 kt	18.8 kt -
- 0.5	0.140	0.155	0.170
0.6 - 1.1	0.100	0.090	0.120
1.2 -	0.120	0.100	0.110

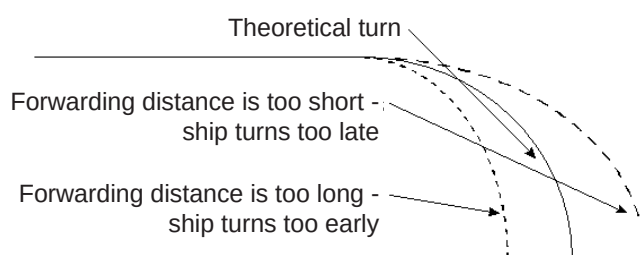
☐ Enable changes ☐ Service state

Warning	
Service state	
XTE gain is set as zero for tuning of Forwarding distances	

Normally these parameters are entered during sea trial but can also be modified later on. See figures below:



How forwarding distance is defined



Influence of forwarding distance to ship's turn

25.1.5 Optimization parameters setting

The optimization parameters are used in optimization calculation. Therefore these parameters must be defined before calculation.

In order to modify optimization parameters, do the following:

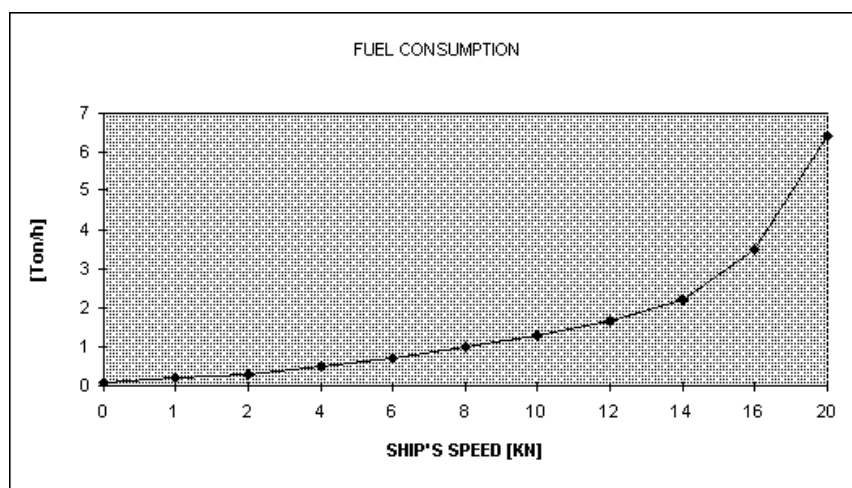
1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Initial Settings and push the scrollwheel.
3. Place the cursor on the triangle in the Initial Settings dialog box to show the Initial Settings menu.
4. Choose Optimization parameters from the menu then push the scrollwheel.
5. Choose Planning parameters from the menu then push the scrollwheel.
6. Modify optimization parameters by placing the cursor in the desired edit box and using the scrollwheel to set value. Push the scrollwheel to confirm.

Note 1: HFO: Heavy fuel oil, DO: Diesel oil

Note 2: It is not necessary to enter leading zero ("0").

PLANNING OPTIMIZATION PARAMETERS		
Cost		
Hour \$/h	HFO \$/ton	DO \$/ton
1200	75	90
Speed Kt	HFO ton/h	DO ton/h
0.0	0.000	0.000
2.0	0.600	0.100
4.0	0.850	0.100
6.0	1.100	0.100
8.0	1.400	0.100
10.0	1.750	0.100
12.0	2.000	0.100
14.0	2.400	0.100
16.0	2.800	0.100
18.0	3.300	0.100
20.0	4.000	0.100

This is a very important data table that contains ship's fuel consumption with the different speeds. There are 11 different speeds available to define fuel consumption on those specific speeds. Prior to entering data in the form, prepare the following graphic in order to find those 11 points.



Set 11 points on the graphic as explained above. Transfer those 11 points to the table in the ECDIS. Use more points where the curve bends more.

Example: 3.5 KN = 0.72 Ton / Hour HFO

Use the second graphic for diesel oil, if diesel oil consumption is relative to the speed.

25. Parameters Setup

This page intentionally left blank.

26. Color Calibration

26.1 Color Calibration Settings

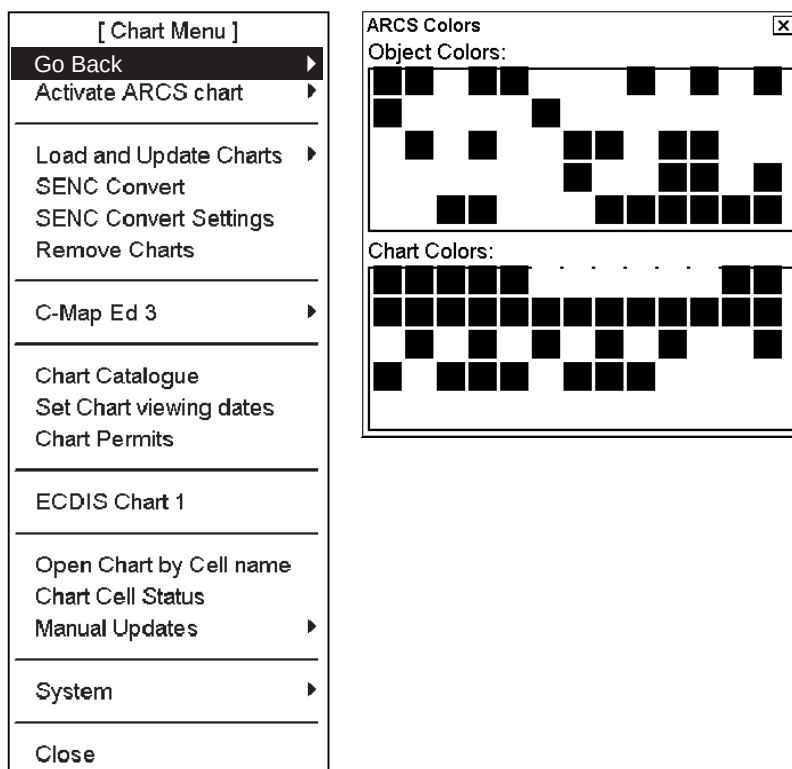
Note: Use of the brilliance control (with FURUNO-supplied monitor) may adversely affect the visibility of information on the night display.

26.1.1 Color test for ARCS charts

You may want to adjust brilliance. You have a tool to check that you can clearly see all details of the charts. For ARCS chart this tool is Colors.

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area, then push the right mouse button.
2. Choose System from the menu then push the scrollwheel.
3. Choose Colors from the submenu then push the scrollwheel.

In the ARCS Colors window, you can see if individual colors can be distinguished when viewing. This lets you see how light levels may affect the visibility of the chart.

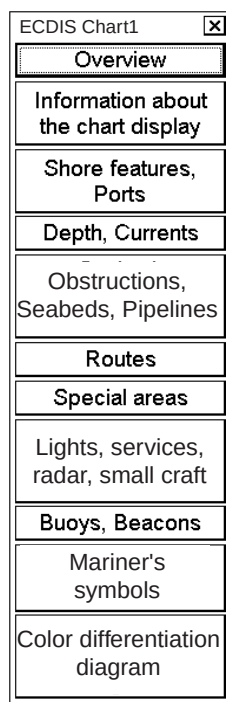


26.1.2 Color differentiation test for S57 charts

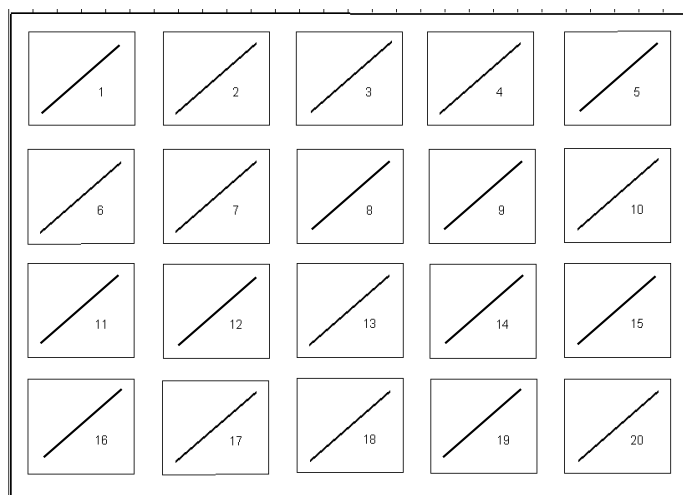
You may want to adjust brilliance. You have a tool to check that you can clearly see all details of the charts. For ARCS chart this tool is Colors. For S57 charts this tool is the color differentiation test diagram.

The color differentiation test diagram is a part of ECDIS chart 1 and you can use it as follows:

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose ECDIS Chart 1 from the menu then push the scrollwheel.



3. Choose "Color differentiation" from the submenu then push the scrollwheel.
4. A diagonal line should be present in each of the twenty (1-20) boxes if color differentiation is proper.



Color differentiation diagram

5. Press each button in the Return dialog at the left side of the screen to display corresponding symbol.
6. Click the X mark to quit.

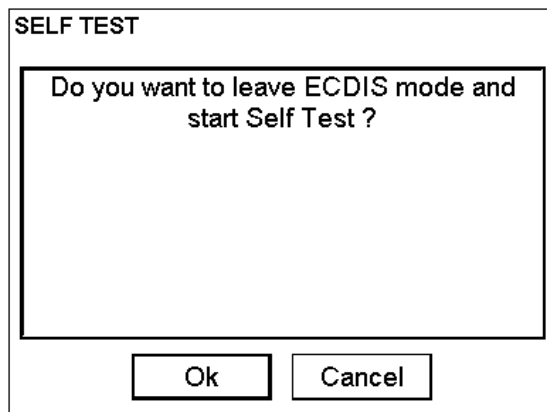
26.1.3 Gray scale test

Set brilliance and contrast to calibrated positions. Use the gray scale test to visually inspect neutral shades of grey.

Note: During any self-test, the ECDIS becomes inoperative and this is indicated by sounding the buzzer and flashing the lamp in the **SYSTEM FAILURE** key on the keyboard-equipped control unit.

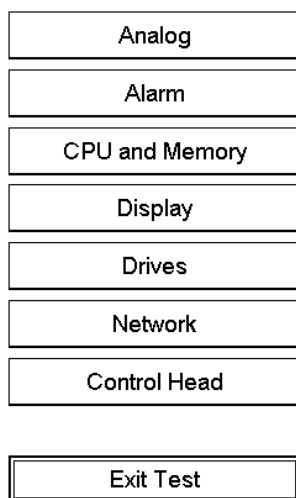
To activate the grey scale test, do the following:

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the left mouse button.
2. Choose Initial Settings from the menu then push the scrollwheel.
3. Place the cursor on the triangle in the dialog box, choose Selftest from the menu then push the scrollwheel.



4. Click the **OK** button. The system will end normal operation and start the self-test mode.

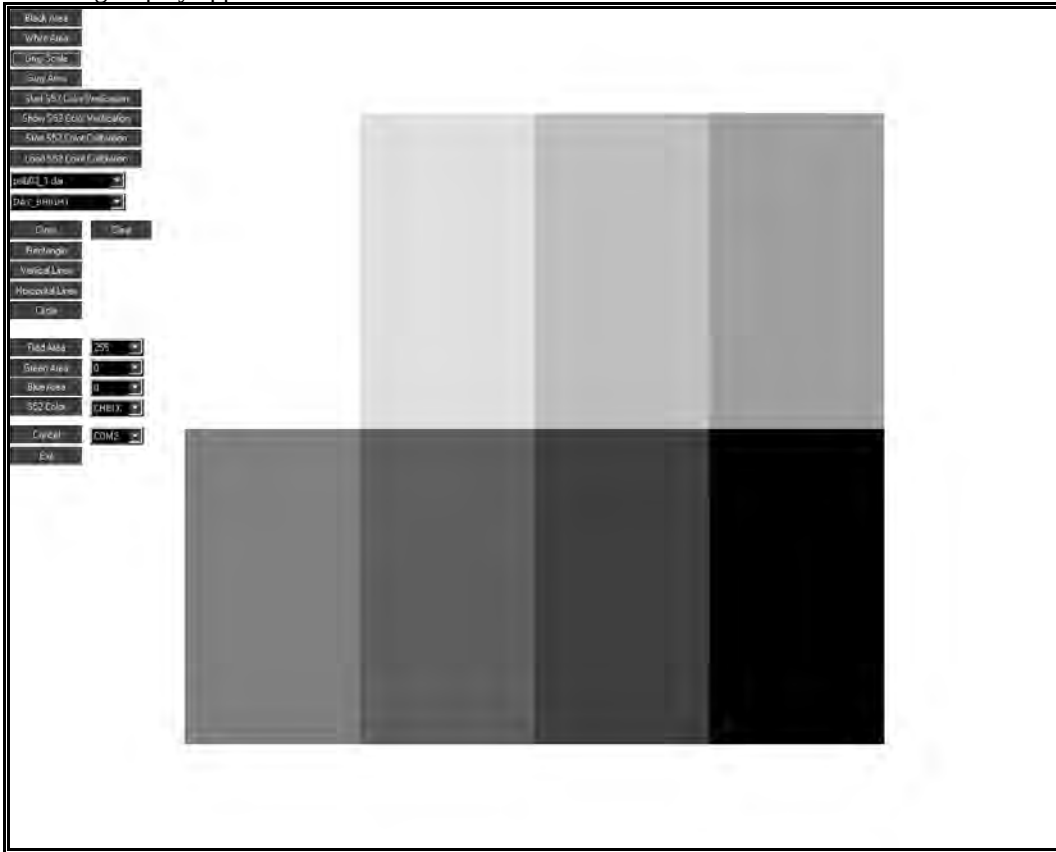
Self Test



5. Choose **Display** then push the left mouse button.

26. Color Calibration

- Click the **Gray Scale** button at the upper left-hand corner of display with the left mouse button, and the following display appears:



Grey scale test pattern

- Check for proper display of gray shades. If the menu at the left side has disappeared, roll the trackball rightward to display it.
- Click the **Exit** button with the left mouse button to close the display.
- Click the **Exit Test** button to exit the test mode. The system will then start normal operation.

27. Conning Display

27.1 System Configuration

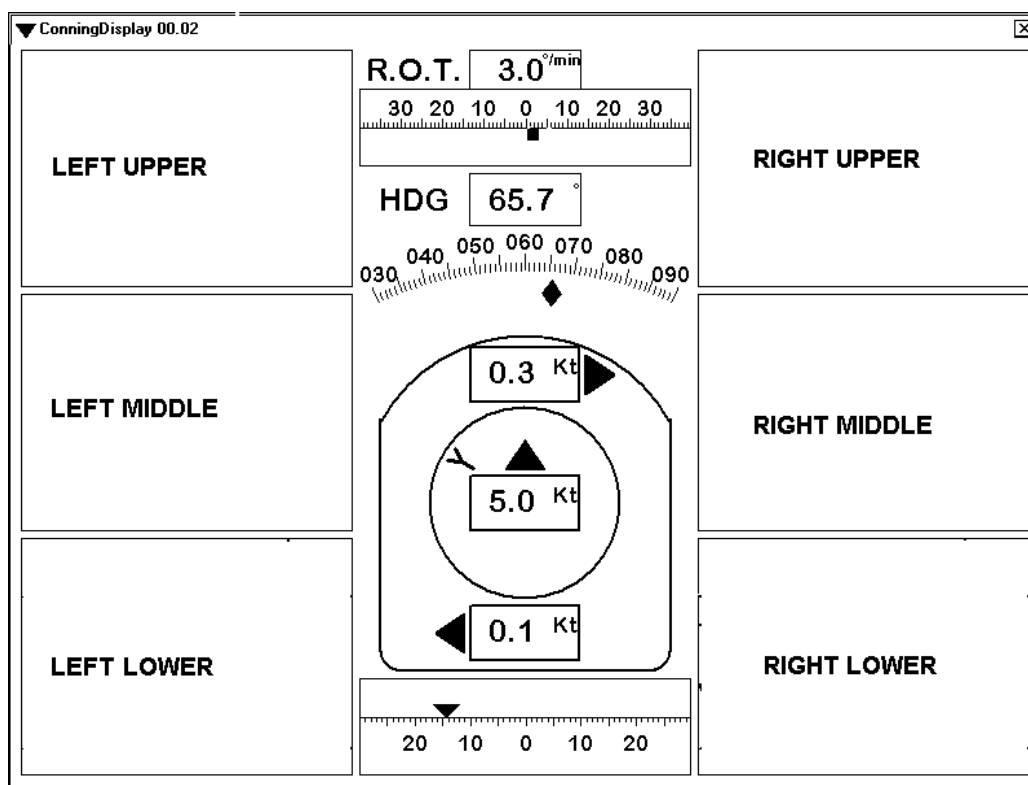
The ECDIS can receive data from various sensors. It can adopt information output by the sensors in either analog or digital format, make navigation calculations from the data display and show the results on the conning display (option).

The ECDIS can be connected to up to 16 sensors (two LAN adapters, eight sensors/adapters), which output analog data and up to eight sensors that output serial data.

Data displayed on the conning display depends on the settings in the ECDIS and the conning display configuration set in the installation parameters, where you can arrange the layout of the conning display.

There are six predefined places on the conning display where you can specify data to display. The center of the conning display is fixed to show information defined by the manufacturer. For more information about how to process these windows, see the description of the installation parameters in the installation manual.

The figure below shows the locations of operator-defined windows. The content of the windows are defined in the installation parameters.



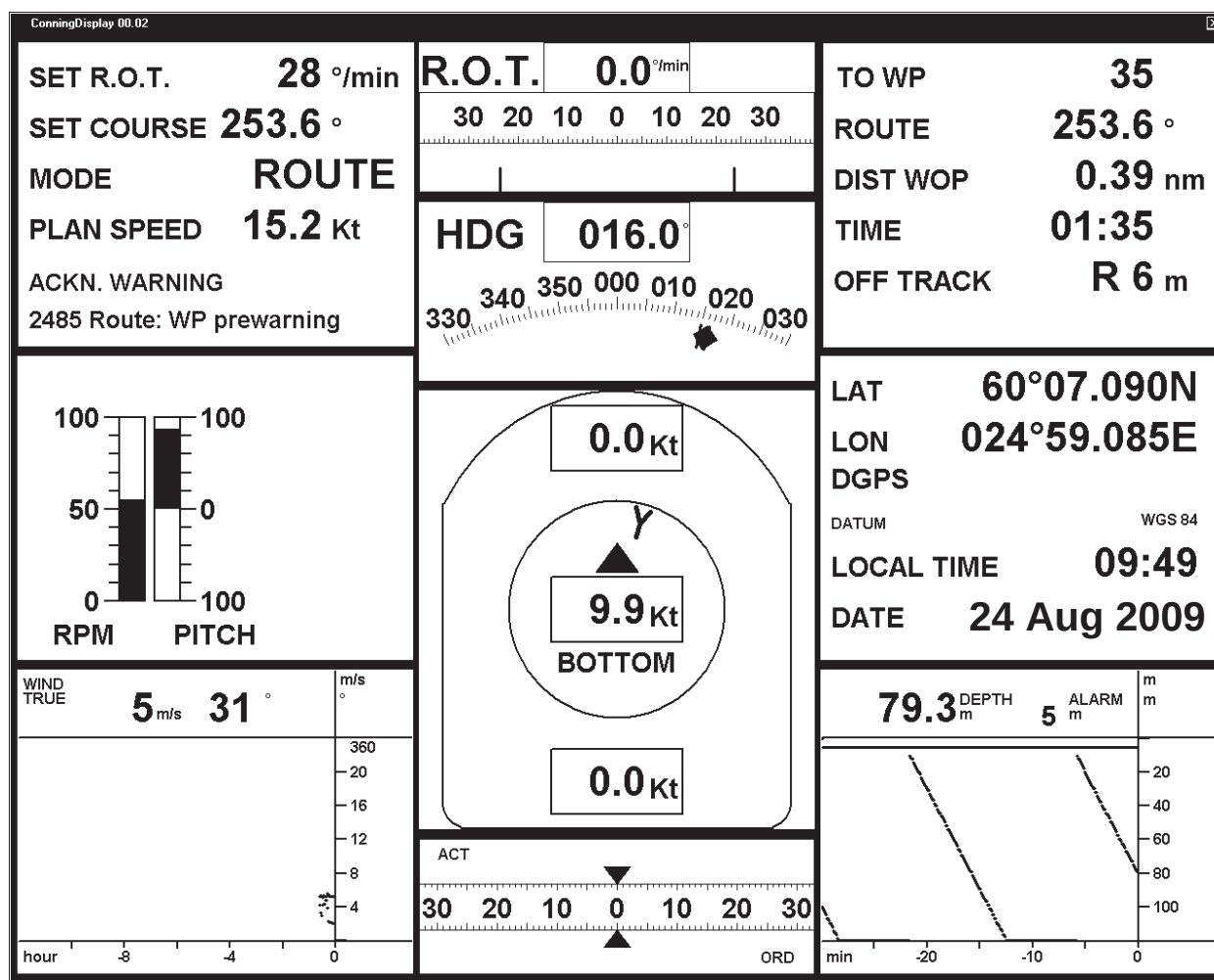
Conning display

27.2 Display Interpretation

The conning display shows collected data from different sensors, and the data below is available for display. However, this depends on which sensors are installed and connected on board the ship.

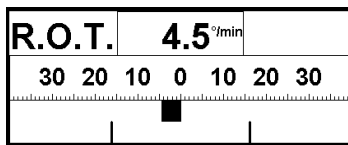
Typically information which is displayed on the conning display are received from following sensors:

- Position sensors
- Wind sensor
- Gyro
- Rate of turn gyro
- Log
- Dual-axis log
- Rudder
- Propellers
- Thrusters



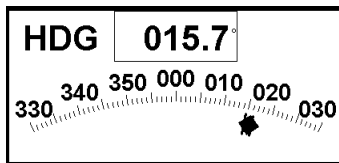
Typical layout of conning display in navigate mode

27.2.1 ROT window



The ROT window monitors actual ROT, which is displayed in digital format in the upper center box and analog format in the center of the window. The text "CALC" appears when ROT is calculated by the system. The scale is available from 35 to 90 degrees, and is set at installation, with installation parameters. For further details, see Chapter 19 Navigation Sensors.

27.2.2 Heading window

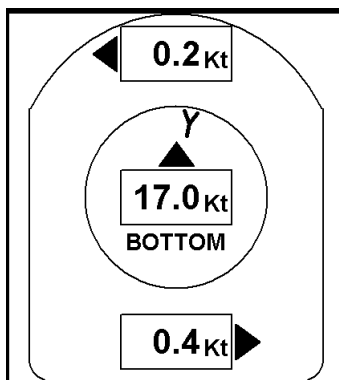


The heading window shows the following information:

- Gyro course, both in digital and analog formats.
- Diamond figure shows heading in graphical format.

For further details, see Chapter 19 Navigation Sensors.

27.2.3 Speed window

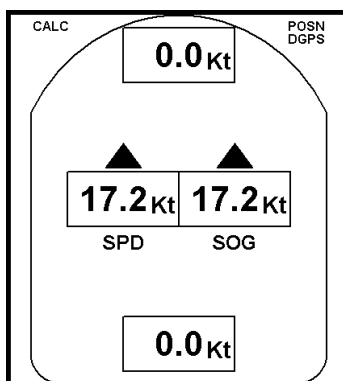


The speed window shows the following information:

- Bow speed
- Longitudinal speed
- Stern speed
- Direction of true wind relative to your ship. (True wind must be chosen on the menu to get true wind.)
- Source of speed indicator (BOTTOM in example)

This window shows center speed, single speed readout.

For further details, see Chapter 19 Navigation Sensors.



Speed window shows speed through water (SPD) and Speed Over Ground SOG

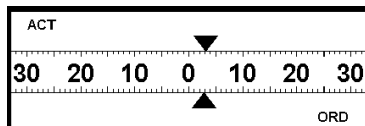
Source of SPD is shown upper left corner and source of SOG is shown upper right corner.

This window shows center speed, dual speed readout.

Note: There are two different sizes in the vertical direction for the Speed window. The size of the Speed window depends on of Rudder window selected.

For how to set the speed window, see the installation manual.

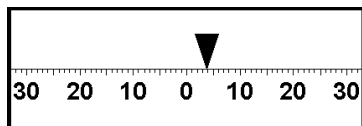
27.2.4 Rudder window



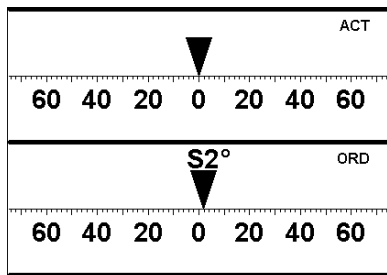
The rudder window shows the following information:

First rudder and source of the first rudder. In this example the source is actual rudder (ACT).

Second rudder and source of the second rudder. In this example the source is ordered rudder (ORD).

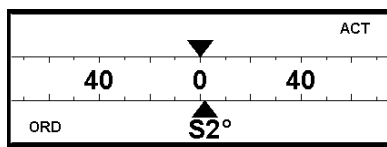


In this example only one rudder is connected.



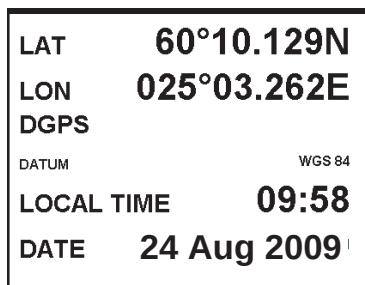
Double rudder window for actual and order rudder.

To get this window, the size of the speed window should be set to "small size or small with double window". For information, see the installation manual.



Double rudder window for actual and order rudder. Numerical value for ordered rudder position available.

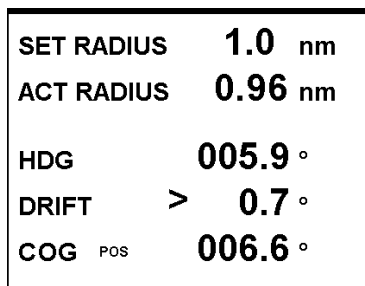
27.2.5 Position window



The position window shows the following information:

- LAT and LON of your ship's position
- Source of your ship's position. See Chapter 19 Navigation Sensors.
- Datum of your ship's position. See Chapter 24 Datum.
- Local date and time. Current date and time used in the ECDIS.

27.2.6 Drift and radius window



The drift and radius window shows the following information:

- **SET RADIUS:** Current set radius on Autopilot FAP-2000.
- **ACT RADIUS:** Current radius of turn.
- **HDG:** Current heading
- **DRIFT:** Direction and angle of drift.
- **COG:** Course Over Ground and source of it.

27.2.7 Autopilot FAP-2000 window

SET R.O.T.	28 °/min
SET COURSE	253.6 °
MODE	ROUTE
PLAN SPEED	15.2 Kt
ACKN. WARNING	
2485 Route: WP prewarning	

The trackpilot window displays the following information:

- **SET R.O.T.:** Current set rate of turn based on current speed and set turning radius.
- **SET COURSE:** Current set course.
- **MODE:** Indicates chosen steering mode.
- **PLAN SPEED:** Planned speed in current leg of the monitored route.
- **ACKN WARNING:** Steering-related alarms displayed in lower status bar of ECDIS are also displayed on the conning display.

SET RADIUS	0.5 nm
PROG CRS	015.0 °
SET COURSE	006.9 °
SET HDG	006.9 °
MODE	Prg Track Turn
ACKN. WARNING	

This is called the trackpilot existed window, where the following additional information is available:

- **SET RADIUS:** Indicates chosen radius for turn.
- **PROG CRS:** Course after turn designed by program course change or program track steering mode.
- **SET HDG:** Calculated heading for ship based on SET COURSE and DRIFT. This information is available when the program track steering is in use.

Autopilot FAP-2000 order window for DNV specification

SET COURSE	xxx.x deg
SET RADIUS	x.x nm
SET R.O.T.	xxx.x deg/min
SET SPEED	xx.x kt
MODE	(steering mode)
ACKN. WARNING	(steering related warning)

27.2.8 Route window

TO WP	35
ROUTE	253.6 °
DIST WOP	0.39 nm
TIME	01:35
OFF TRACK	R 6 m

Route window

TO WP	2
ROUTE	006.2 °
DIST WOP	0.07 nm
TIME	00:23
OFF TRACK	R 2 m
NEXT	010.6 °
RADIUS	1.0 nm

Route with next leg

When you have chosen a route to monitor, the route window shows the following information:

To WP: The waypoint your ship is approaching.

Route: Calculated set course to follow the monitored route including off track, drift and gyro error compensation.

DIST WOP: Distance to Wheel Over Point (WOP)

TIME: Time left to reach WOP

OFF TRACK: Distance to center line of route

An example of a route with a next leg window, where the following additional information is available:

- **NEXT:** Planned course to steer after "To WP".

Note: The text "(corr)" in red color is displayed beside NEXT to indicate that the value of the planned course to steer after "To WP" is compensated for gyro error correction. This condition exists if "Gyro error correction" has been enabled in the Navigation parameters, gyro value is compensated for gyro error correction and gyro error compensation have been enabled in Navigation parameters.

- **RADIUS:** Planned turning radius of "To WP".

Route windows for DNV specification (Norwegian ship classification body)

PRESENT LEG WP.NO	1
DIST TO WOP	0.66 nm
TIME TO WOP	02:17
BRG TO WOP	021.8 °
OFF TRACK	L 56 m
TRACK LIMIT	101 m

(1)

OR

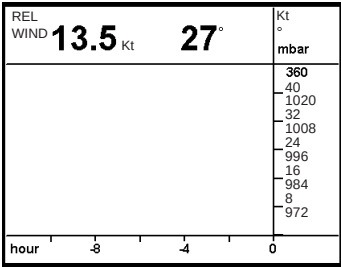
NEXT LEG WP.NO	2
NEXT RADIUS	0.3 nm
NEXT COURSE	009.8 °
NEXT LEG DIST	3.2 nm
NEXT LEG TIME	0:11:19
REMAINING DIST	42.9 nm
REMAINING TIME	5:27:11

(2)

(1) Route present leg

(2) Route next leg

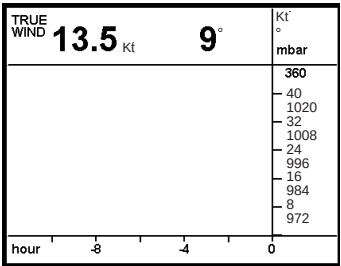
27.2.9 Weather and wind window



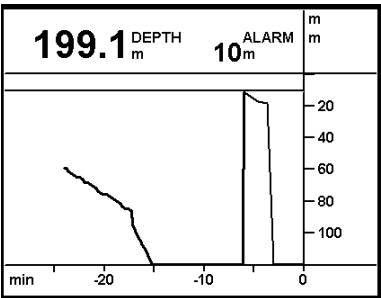
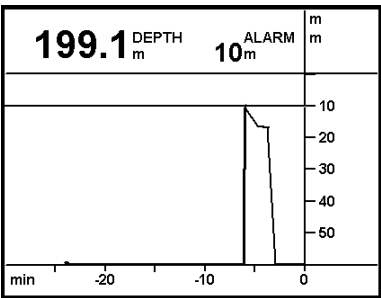
The weather and wind window shows

- Wind direction, true or relative
- Wind speed
- Air pressure (optional)

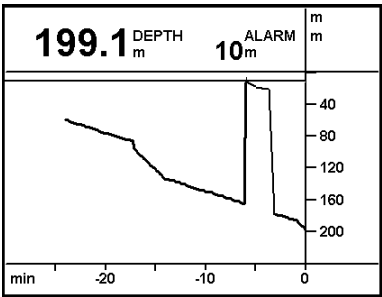
Weather conditions of last 12 hours are shown.



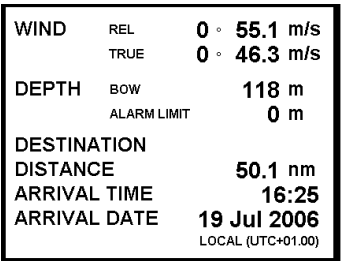
27.2.10 Depth window



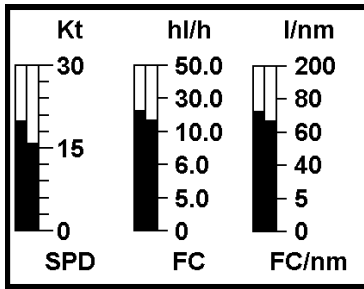
The depth window shows, in digital and analog formats, the latest 30 minutes of depth data fed from an echo sounder. Three depth scales are available: 50 m, 100 m and 200 m. Depth alarm limit is also shown.



27.2.11 Combined wind, depth and destination window (for DNV specification)



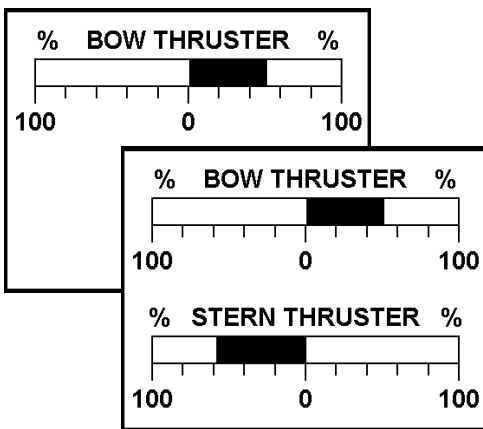
27.2.12 Fuel consumption window



The fuel consumption window displays three sets of indications that show ship's speed, fuel consumption per hour and fuel consumption per nautical mile. Each indication has two vertical bars. The bar on the left shows planned speed or fuel consumption and the bar at right shows actual situation.

27.2.13 Thruster window

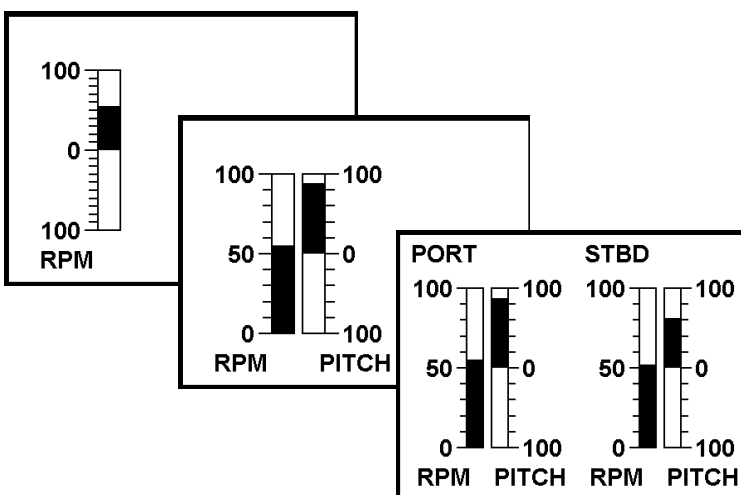
Two types of thruster windows are available and one is chosen during the installation. The content of this window is defined with Thrusters 1-4 in the Installation parameters.



27.2.14 Propellers window

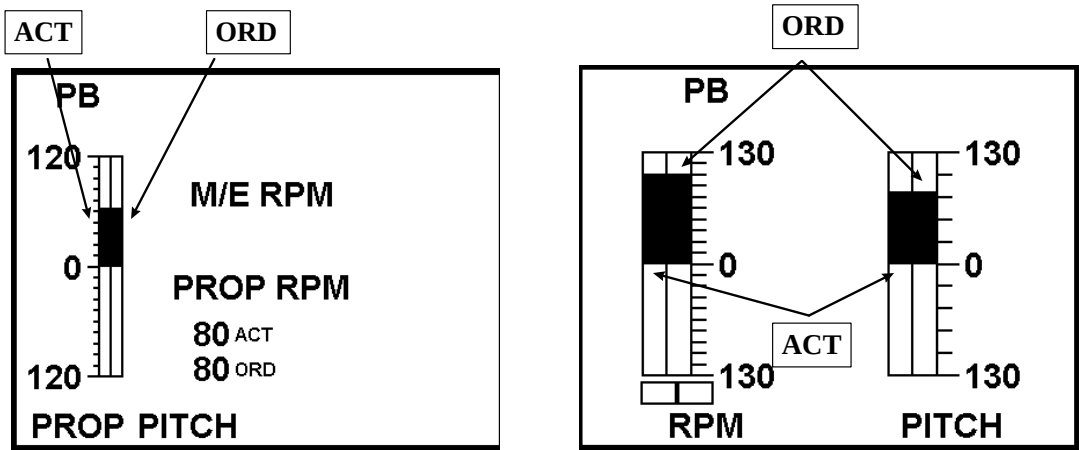
Propulsion RPM and pitch

Three different types of propellers windows are available and one is chosen during the installation. The content of this window is defined with Propellers 1-4 in the Installation parameters.



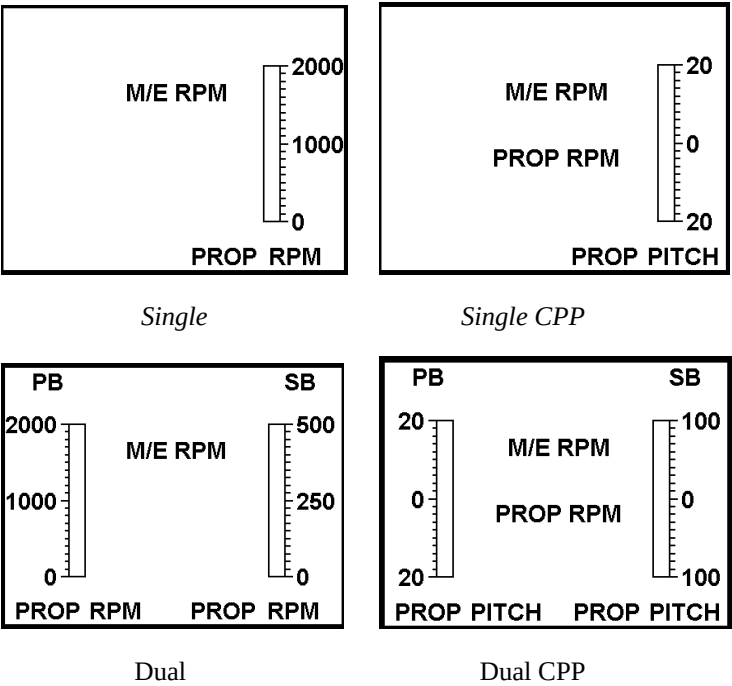
Propulsion with actual and ordered information

You can select during installation actual and ordered information of propeller using Engine Control Device Type "IEC 61162-1 (MAN B+W, \$xxXDR, \$xxRPM)".



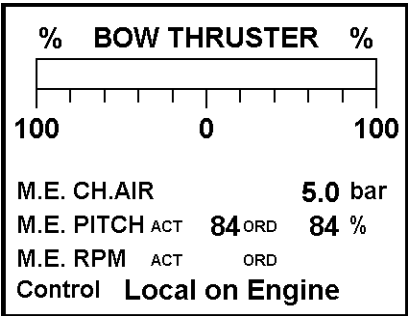
Propulsion with main engine (for DNV specification)

Four different types of propellers windows are available and one is selected during the installation. The content of this window is defined with Propellers 1-4 in the Installation parameters.



Thruster and propulsion information with control position & source of ordered r.p.m. and pitch

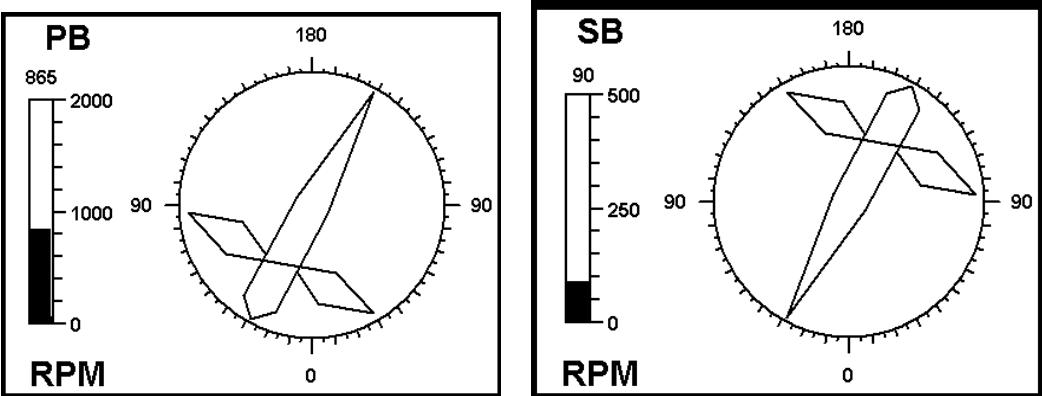
You can select during installation ordered RPM and Pitch and Control Position using Engine Control Device type "IEC 61162-1 (MAN B+W, \$xxXDR, \$xxRPM)"



Select "Bow thruster and Engine" on Conning Display.

27.2.15 Azimuth propulsion window

Two different types of azimuth propulsion windows are available and one is selected during the installation. The content of this window is defined with Azimuth in the Installation parameters.



27.2.16 Speedpilot window

ROUTE		Timetable
PLAN LEG		10.0 Kt
SUGGESTED		10.5 Kt
SPEEDPILOT		PLAN
ACTUAL	POS	10.5 Kt
SET		Kt
PLAN	8.2	10.5 Kt

The speedpilot window displays the following data:

- **ROUTE:** Optimization type for monitored route.
- **PLAN LEG:** Planned speed for current leg (based on plan).
- **SUGGESTED:** If optimization type is "timetable", then this indicates suggested speed to keep the timetable. For other optimization types this is blank.
- **SPEEDPILOT:** Chosen mode in Speed Pilot, OFF, SET or PLAN.
- **ACTUAL:** Speed and source of the speed used by the speedpilot.
- **SET:** Set position of handle and set speed of speedpilot during operation mode SET of the speedpilot. Blank during other operation modes.
- **PLAN:** Set position of handle and set speed of speedpilot during operation mode PLAN of the speedpilot. Blank during other operation modes.

ROUTE		Timetable
PLAN LEG		10.0 Kt
SUGGESTED		10.5 Kt
SPEEDPILOT		SET
ACTUAL	POS	10.5 Kt
SET	8.2	10.5 Kt
PLAN		Kt

The last row is reserved for alarm indication. The speedpilot display shows alarms as ALnn, where nn is the number of the alarm. The conning display shows the speedpilot alarm as self-explanatory text.

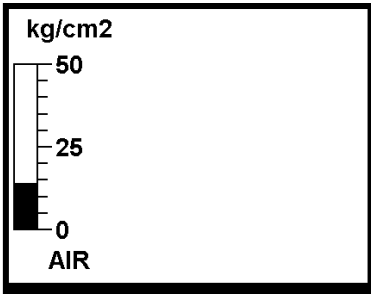
ROUTE		Timetable
PLAN LEG		10.0 Kt
SUGGESTED		10.5 Kt
SPEEDPILOT		OFF
ACTUAL	POS	10.5 Kt
SET		Kt
PLAN		Kt

27.2.17 Message window

14 RADAR SUPPLY FAILURE
16 WATER TIGHT DOORS
16 WATER TIGHT DOORS
18 STEERING GEAR ALARM
20 GMDSS ALARM
22 SPEED INFO MISSING

The message window is available with connection of a central alarm unit (option), and it shows various alarms generated by the central alarm unit.

27.2.18 Main engine start air pressure window



This window shows engine starting air pressure.

27.2.19 Alarm messages window

5104 Traffic Separation Zone
6203 RadOv No Video

This window shows all active or pending alarms in priority order. For more information, see section 31.8 List of Alarms.

27.2.20 Propulsion and thruster window (for DNV specification)

PORT PROPULSION	XXX RPM
PITCH	XXX%
PORT PROPULSION	XXX RPM
PITCH	XXX%
BOW THRUSTER	XXX%
STERN THRUSTER	XXX%

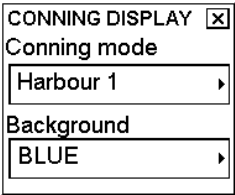
27.3 Modes for Conning Display

The conning display shows data collected from different sensors and also data from ECDIS and trackpilot processors. There are four different conning display modes; Harbour 1 mode, Harbour 2 mode, Navigate 1 mode and Navigate 2 mode, and one of these modes may be selected from a dialog box. The parameters for each display mode are chosen during the installation, on the Installation parameters.

27.3.1 Choosing mode for conning display

You may choose the conning display mode from the Conning Display dialog box. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area, push the left mouse button, choose Conning Display from the menu, choose conning display mode from the Conning mode list box then push the scrollwheel.

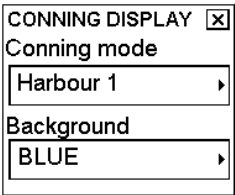
The conning display window appears in where you can choose desired conning mode.



27.3.2 Choosing background color of conning display

You may choose the background color for the conning display. Spin the scrollwheel to display Menu/Info/Chart Menu in the mouse functions area, push the left mouse button, choose Conning Display from the menu, choose conning display mode from the Background list box then push the scrollwheel.

Choose the background color from the Background list box.



27.3.3 Changing color palette of conning display

The conning display is using the same color palette as the ECDIS. When you change color palette of the ECDIS you also change the palette of the conning display.

1. Spin the scrollwheel to show Chart Display/Info/Standard Display in the mouse functions area.
2. Push the left mouse button to show the Chart Display dialog box.
3. If the Chart page is not active, click an arrow tab in the dialog box several times to display it.
4. Choose palette scheme from the Palette list box; spin the scrollwheel to choose a palette and push the scrollwheel to confirm.

27. Conning Display

This page intentionally left blank.

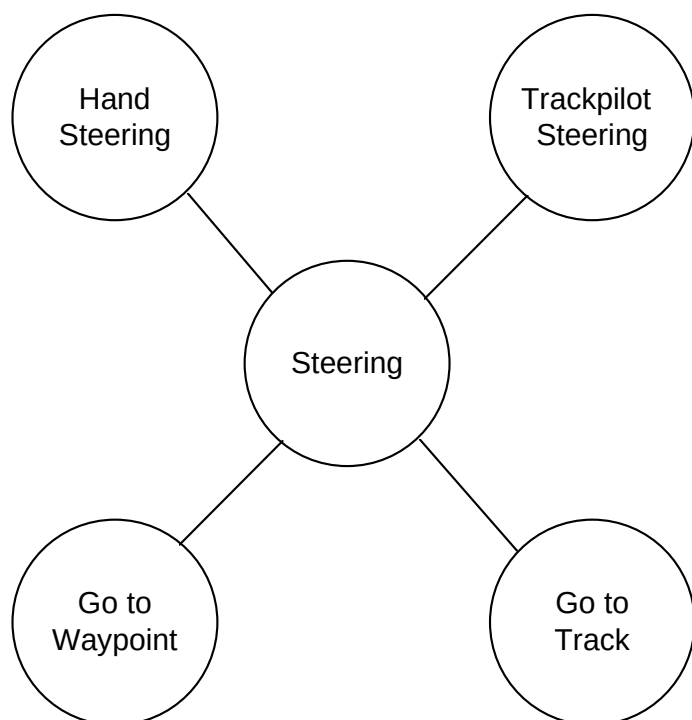
28. Steering with FURUNO Autopilot FAP-2000

28.1 Introduction

This chapter describes the steering functions (trackpilot) available with connection of the optional FURUNO Autopilot FAP-2000. This Autopilot FAP-2000 receives position, heading and speed data, compares this with the track section to be steered, and applies the ship model to calculate and command the necessary rudder angle.

28.2 Steering Modes

Note that all steering-related functions are available only if the ECDIS system is also connected to the optional Autopilot FAP-2000.



Steering modes of the ECDIS together with the trackpilot

28.2.1 Hand steering

The manual steering modes are:

- Steering wheel
- Wing steering control
- Override tiller

While in a manual steering mode, the ECDIS provides indication of the rudder angle and the hand steering mode.

28.2.2 Autopilot FAP-2000 steering

- The operator sets the required heading of the ship.
- The turning radius is also set by the operator (or in Heading Control mode the rudder angle limit).
- A turn is initiated by the operator.

The ECDIS displays required heading, radius, rate of turn and predicted turn. (Curved EBL can also be displayed, but not in the Heading Control mode.)

28.2.3 Waypoint mode

The ECDIS system will follow the planned track to a next waypoint with moderate accuracy to get more economical sailing (sailing in ocean areas).

When approaching a next waypoint, the ECDIS alerts the operator both well before the turn and just before the turn.

The ECDIS system performs turns using planned radius.

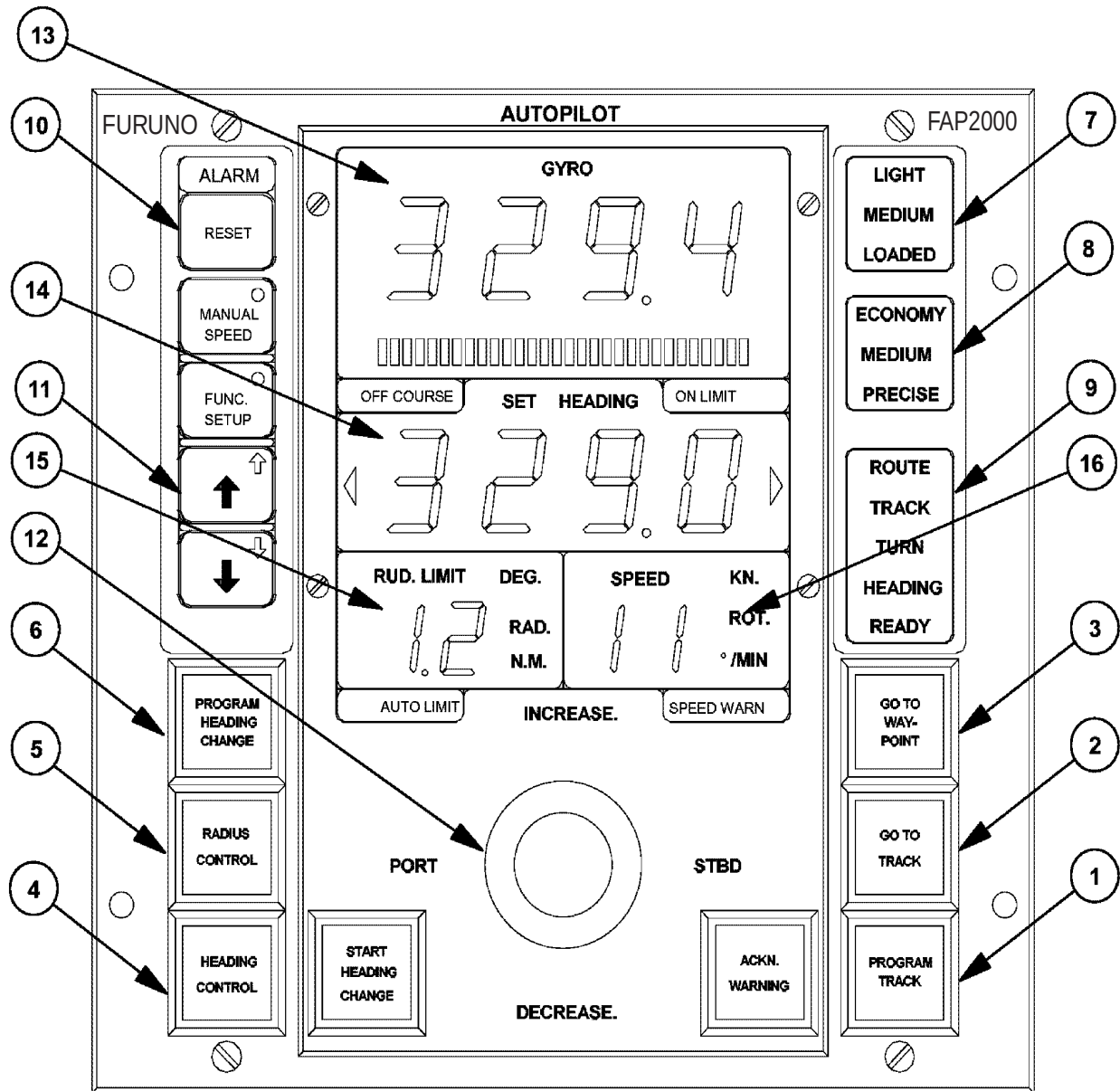
28.2.4 Track mode

In the track mode, the planned track is followed at the maximum accuracy between waypoints and also in turns (position-controlled turn).

Like at the approach to a waypoint, the ECDIS alerts the operator both well before the turn and just before the turn when approaching a waypoint.

28.3 Autopilot FAP-2000 Control Panel

This section describes the Autopilot FAP-2000 control panel.



1-6: Steering mode selection

- **PROGRAM TRACK:** Programmed track-controlled heading change using set radius. Also for steering with chosen ARPA models.
- **GOTO TRACK:** Track-controlled automatic route steering
- **GOTO WAYPOINT:** Course-controlled automatic route steering
- **HEADING CONTROL:** Immediate heading-controlled course change using set rudder angle limit
- **RADIUS CONTROL:** Immediate radius-controlled course change using set radius
- **PROGRAM HEADING CHANGE:** Programmed heading-controlled course change using set radius

7: **Loading condition indicator:** Loading conditions, Light, Medium or Loaded

8: **Performance indicator:** Performance status, Economy, Medium or Precise

28. Steering with FURUNO Autopilot FAP-2000

9: **Autopilot FAP-2000 status indicator:** Shows chosen mode and state of readiness.

- Autopilot FAP-2000 in operation: READY
- Autopilot FAP-2000 control mode: HEADING/TRACK
- Autopilot FAP-2000 automatic route steering: ROUTE
- Autopilot FAP-2000 track controlled turn: TURN

10: **Autopilot FAP-2000 alarm indicator and buzzer cancel**

- **ALARM** lamp for other Autopilot FAP-2000-related alarms and errors
- **RESET** button for acknowledging other Autopilot FAP-2000-related alarms and errors.

11: **Special function keypad**

- Select manual speed
- Adjust panel dimmer
- Set manual speed value, auto speed, rudder limit function, performance and conditions.

12: **Tiller**

- Set course and radius.
- PORT and STBD lamps show when the tiller can be used to set course.
- INCREASE. and DECREASE. lamps show when the tiller can be used to set a radius or a rudder angle limit.

13: **Gyro reading and a bar graph showing rate of turn**

14: **Set Heading display includes:**

- Off course alarm
- Turn side
- Rudder-on limit indication

15: **Displays:**

- Radius set-point in Radius Control mode
- Rudder limit in Heading Control mode
- AUTO LIMIT lamp lights to indicate selection of automatic rudder limit function.

16: **Displays:**

- ROT in Radius Control mode
- Speed in Heading Control mode
- Speed warning indicator (LOG FAILURE or LOW)

28.4 Manual Steering

28.4.1 Heading control

The heading control steering mode can be used always; it doesn't require position data.

- Mode selection: HEADING CONTROL
- The HEADING CONTROL and HEADING lamps are lit.
- Immediate course change when the tiller is used to set the heading.
- Course change is defined as heading controlled with the set rudder angle limit.

28.4.2 Radius control

The radius control steering mode can be used always; it doesn't require position data.

- Mode selection: RADIUS CONTROL
- RADIUS CONTROL and HEADING lamps are lit
- Immediate course change when the tiller is used to set the heading.
- Course change is radius controlled with set radius
- If wind, current, etc. affect the ship, the ship will drift (inside or outside) from the planned designed turn. This is displayed on the radar screen.

28.4.3 Program heading change

Program heading change steering mode can be used always, it doesn't require any position source.

- Mode selection: PROGRAM HEADING CHANGE
- PROGRAM HEADING CHANGE and HEADING lamps are lit.
- The tiller is first used to set a new heading and radius, which are also displayed on the radar screen.
- "START HEADING CHANGE" flashes if the newly set heading is different from the currently used heading.
- Course change is activated by pushing START HEADING CHANGE.
- After activation, control is returned to RADIUS CONTROL.
- If wind, current, etc. affect the ship, the ship will drift away (inside or outside) from planned designed turn. This is displayed on the radar screen.

28.4.4 Program track

The Program track steering mode can be used with the Kalman filter and a high-precision sensor such as DGPS:

- Mode selection: PROGRAM TRACK
- PROGRAM TRACK, TRACK and TURN lamps are lit.
- The tiller is first used to set a new heading and radius, which are also displayed on the radar screen.
- "START HEADING CHANGE" flashes if newly set heading is different from currently used set heading.
- Course change is activated by pushing START HEADING CHANGE.
- After activation, the mode becomes PROGRAM TRACK.
- Course change is track controlled with set radius.
- If wind, current, etc. affect the ship, the system tries to prevent the ship from drifting away (inside or outside) from planned designed turn. This is displayed on the radar screen.

The following alarms may be released in the Program track steering mode:

- Alarm **"2488 Steering:Stop-system fail"**: Internal failure - Program track steering mode is cancelled.
- Alarm **"2493 ProgTrack: Needs Filter ON"**: The Kalman filter is not used with the program track. This alarm will be repeated every four minutes for the next 10 minutes and if the condition continues, the alarm **"2496 ProgTrack: Stop - Sensor Fail"** is generated and the steering mode is automatically changed to "radius control".
- Alarm **"2494 ProgTrack: Needs Log sens."**: The Kalman filter is used with the program track but without including an independent speed source (separate log sensor or two position sensors). This alarm will be repeated every four minutes for the next 10 minutes and if the condition continues, the alarm **"2496 ProgTrack: Stop - Sensor Fail"** is generated and the steering mode is automatically changed to "radius control".
- Alarm **"2495 ProgTrack: Needs diff Pos."**: The Kalman filter is used with the program track but without a high-precision sensor (for example, DGPS). This alarm will be repeated every four minutes for the next 10 minutes and if the condition continues, the alarm **"2496 ProgTrack: Stop - Sensor Fail"** is generated and the steering mode is automatically changed to "radius control".
- Alarm **"2496 ProgTrack: Stop - Sensor Fail"**: No gyro data or if conditions of alarm 2493, 2494, 2495 or 2503 have been valid for the last 10 minutes.
- Alarm **"2498 Use manual rudder control"**: Generated every 2 minutes to alert the operator to control the rudder manually, when the trackpilot has lost the gyro and thus cannot control the rudder.
- Alarm **"2503 ProgTrack:Need higher Spd"**: The Kalman filter is used with the program track but the speed is below the limit set for the track steering in the installation parameters. This will be repeated every four minutes for the next 10 minutes and if the condition continues, the alarm **"2496 ProgTrack: Stop - Sensor Fail"** is generated and the steering mode is automatically changed to "radius control".
- Alarm **"2504 ProgTrack: Use Radius ctrl."**: Informs the operator to change the steering mode to "radius control". This alarm is generated if there are not sufficient conditions to continue the program track (i.e. alarm 2493, 2494, 2495 or 2503 has been valid 2 minutes). This alarm is repeated every four minutes.
- Alarm **"2509 ProgTrack:Need sog/cog ref"**: Appears when there is no Speed Over Ground (SOG) and Course Over Ground (COG) available from the position sensor(s) or bottom track from a dual-axis log. This alarm will be repeated every four minutes for next 10 minutes and if the condition continues, the alarm **"2496 ProgTrack: Stop - Sensor Fail"** is generated and the steering mode is automatically changed to "radius control".

28.4.5 Summary of manual steering modes

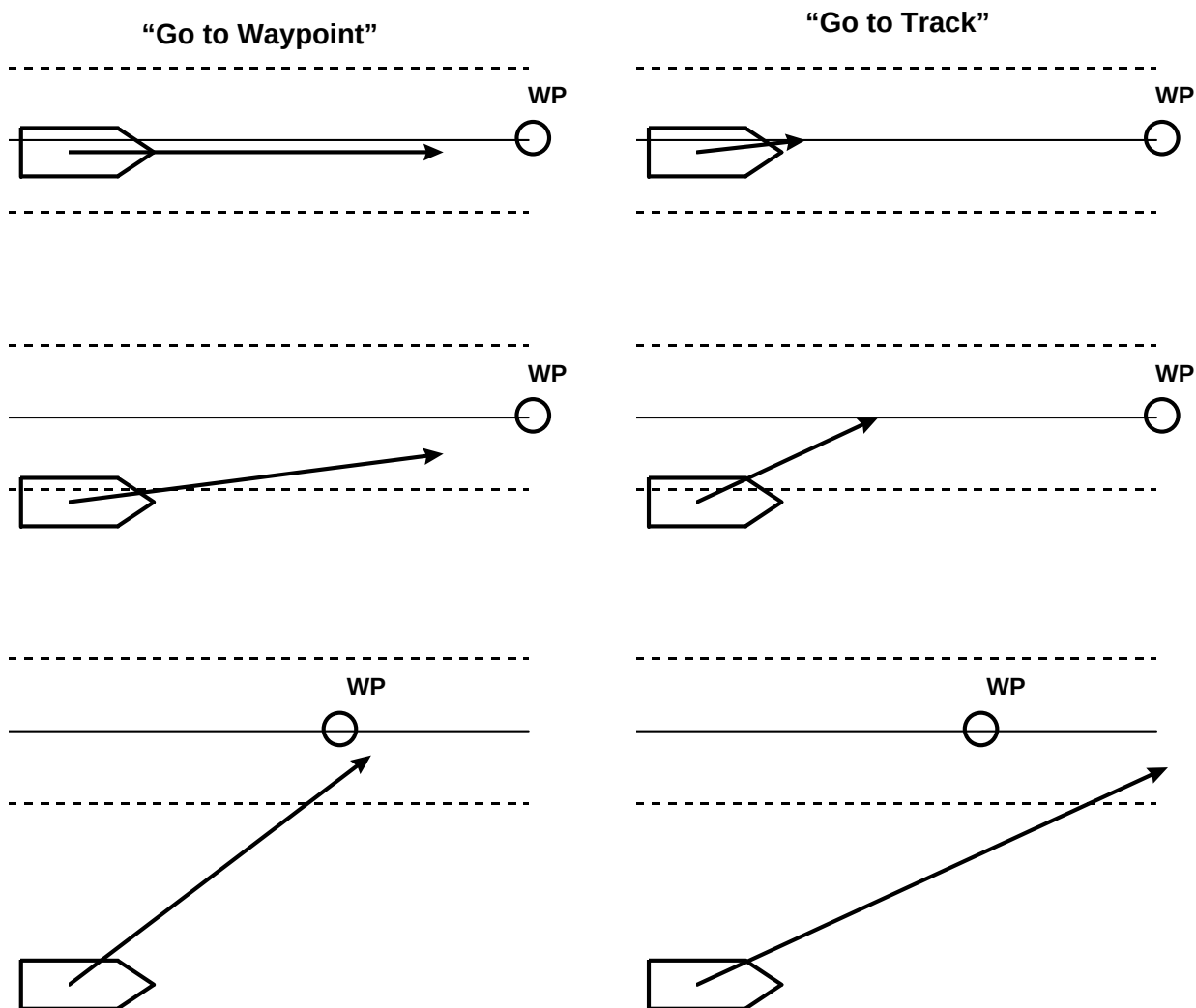
	HEADING CONTROL	RADIUS CONTROL	PROGRAM HEADING CHANGE	PROGRAM TRACK
Set heading	Yes	Yes	Yes	Yes
Set radius	No	Yes	Yes	Yes
Radius control	No	Yes	Yes	Yes
Design before execution	No	No	Yes	Yes
Full curved EBL on radar screen	No	Yes	Yes	Yes
Wind, current, etc. compensation	No	No	No	Yes
Needs gyro	Yes	Yes	Yes	Yes
Needs log	No	Yes	Yes	Yes
Needs high-precision position	No	No	No	Yes
Needs direct SOG/COG sensor	No	No	No	Yes

28.5 Automatic Route Steering

In automatic route steering, you can use either the Go to Waypoint mode or the Go to Track mode. Automatic route steering can be used with a predefined monitored route.

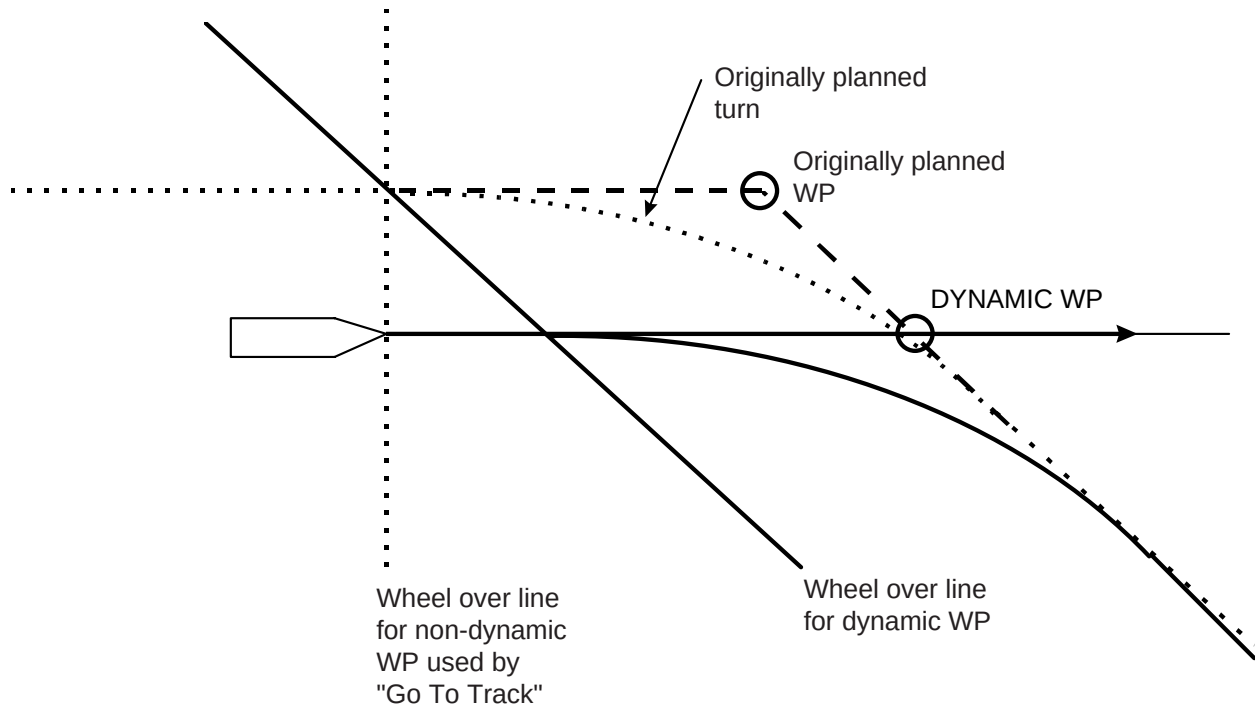
Go to WP and Go to Track modes can be activated when your ship is located inside a channel of a monitored route.

See the figure below for differences between "Go to WP" and "Go to Track". As shown, the ship will always make way toward the waypoint in Go to WP, and return to set course in Go to Track.



Note: If the off track error is more than 100 meters in the "Go to Track" mode, the system cannot increase the approach angle towards the center line of the route.

See the figure below to find how location of dynamic WP is defined when the "Go to Waypoint" mode is used.



28.5.1 "Goto waypoint" mode

- Mode selection: GO TO WAYPOINT
- GO TO WAYPOINT and ROUTE lamps are lit.
- The tiller can be used to set radius, but not course, which is set automatically.
- Steering is course controlled with set radius.
- If wind, current, etc. affect the ship between waypoints, the system tries to prevent the ship from drifting from the planned route. The system has three means to prevent drifting from the planned route, and they are most effective when used together. If cross-track error is used alone, your ship stabilizes typically in a constant off-track position. The means are:
 - Measured cross-track error from the center line, which is always active
 - Drift compensation available from route parameters
 - Gyro error compensation available from route parameters
- If wind, current, etc. affect the ship during turns, the ship will drift (inside or outside) from the planned turn, which is displayed on the radar screen. This kind of turn is called an "assisted turn".
- Can be used when the ship has accurate position source available.
- Normally, the Goto Waypoint mode uses the dynamic location of a waypoint. However, if alarm 2013 is active, a non-dynamic waypoint is used.

28.5.2 "Goto track" mode

- Mode selection GO TO TRACK
- **GO TO TRACK** button and ROUTE and TRACK lamps are lit.
- The tiller can be used to set radius, but not heading, which is set automatically.
- Steering is track-controlled with set radius.
- If wind, current, etc. affect the ship between waypoints, the system tries to prevent the ship from drifting from the planned route. The system has three means to prevent drifting from the planned route, and they are most effective when used together. If cross-track error is used alone, your ship stabilizes typically in a constant off-track position. The means are:
 - Measured cross-track error from the centerline, which is always active.
 - Drift compensation is available from the route parameters.
 - Gyro error compensation is available from the route parameters.
- Can be used when the ship has high-precision position source available.
- Goto Track mode uses non-dynamic waypoint.

28.5.3 Summary of automatic route steering modes

	GO TO WAYPOINT	GO TO TRACK
Set course	Automatic	Automatic
Set radius	Automatic / Manual	Automatic / Manual
Radius control	Yes	Yes
Dynamic waypoint location	Yes	No
Design before execution	Yes	Yes
Full curved EBL on radar screen	Yes	Yes
Wind, current, etc. compensation in linear parts between wpt.	Low gain	High gain
Wind, current, etc. compensation in turns	No	Yes
Needs gyro	Yes	Yes
Needs log	Yes	Yes
Precision of position equipment	Good ¹	High ⁱ
Needs direct sog/cog sensor	No	Yes

¹ Precision of position is good with LORAN and GPS.

ⁱ Precision of position is high with DGPS and SYLEDIS.

28.5.4 Preconditions for automatic route steering

General preconditions

The Goto WP and Goto Track modes can be activated when your ship is located inside a channel of a monitored route.

The difference between actual heading and planned course to approach "To WP" must be less than the limit set in the route steering parameters in order to initiate automatic route steering. For further details, see section 25.1.4 Navigation parameters setting.

Route steering requires activation of the Kalman filter. If you try to activate any of the route steering modes without the filter, you get the alarm "2470 Disabled: Needs filter on".

If you try to activate any of the route steering modes without an independent speed source, you get the alarm "2490 Disabled: Needs log sensor". Route steering requires that you have at least either one log and position receiver or two position receivers available and in use.

Alarm "**2499 Disabled: Needs good Pos**" appears when the filter did not have high-precision position sensor for route steering, and position discrepancy limit between primary and secondary sensors is exceeded.

Alarm "**2502 Disabled: Need higher Spd**" appears when the speed used by the Kalman filter calculation is below the limit set for track steering in the installation parameters.

It is recommended to activate the position discrepancy detector (i.e., set position discrepancy limit > 0). This lets the Kalman filter exclude from position calculation a sensor that has large position discrepancy. This also influences the Goto WP, Goto Track and Program track steering modes.

- If the position discrepancy limit is set very small (0.01 nm), the system will quickly alert you to the discrepancy, but you may also experience frequent release of the alarm.

Goto track mode preconditions

Route steering with the Goto Track mode requires that you have at least one high-precision position receiver and direct SOG/COG reference available and in use.

At least one high-precision position is available and in use when the permanent indication **FILTER HIGH** appears at the upper right corner of the ECDIS display. DGPS, etc. are considered high-precision position receivers. Note that a standard GPS or a DGPS without differential position available are not acceptable as high-precision position receivers.

It is also required that the Speed Over Ground (SOG) reference is available either from position sensor(s) or bottom track from a dual-axis log.

If any of the conditions described above is lost during the Goto Track mode, the system automatically activates the Goto WP mode within 10 minutes and you get the alarm "2489 Route: Changed to Go to WP".

28.5.5 How to activate automatic route steering

Route steering can be activated by pushing the **GOTO WAYPOINT** or **GOTO TRACK** button on the Autopilot FAP-2000 panel. The lamp of the pushed button will start to flash and if the ECDIS accepts the requested route steering mode, the lamp will then light to indicate the used route steering mode.

Go to WP

If a Go to WP is activated, the indication "Goto WP" appears in the route monitor window.

Plan Speed	20.0 Kt	To WP	4
Plan	248.0°	Dist WOP	1.38 nm
Route	256.7°	Time	04:21
Ch limit	185 m	Next WP	7
Off track	<147 m	Next	271.6°
Goto WP		Turn rad	1.0 nm
		Turn rate	18°/min

If the planned course to approach a "To WP" is defined using Great Circle, the indication "Goto WP Great circle" appears in the route monitor window.

Plan Speed	20.0 Kt	To WP	4
Plan	248.0°	Dist WOP	1.38 nm
Route	256.7°	Time	04:21
Ch limit	185 m	Next WP	7
Off track	<147 m	Next	271.6°
Goto WP Great circle		Turn rad	1.0 nm
		Turn rate	18°/min

Go to Track

If Go to Track is activated, the indication "Goto Track" appears in the route monitor window.

Plan Speed	20.0 Kt	To WP	4
Plan	248.0°	Dist WOP	0.76 nm
Route	247.8°	Time	02:24
Ch limit	185 m	Next WP	7
Off track	<9 m	Next	271.6°
Goto Track		Turn rad	1.0 nm
		Turn rate	18°/min

If the planned course to approach a "To WP" is defined using Great Circle, the indication "Track Great circle" appears in the route monitor window.

Plan Speed	20.0 Kt	To WP	4
Plan	248.0°	Dist WOP	0.76 nm
Route	247.8°	Time	02:24
Ch limit	185 m	Next WP	7
Off track	<9 m	Next	271.6°
Track Great circle		Turn rad	1.0 nm
		Turn rate	18°/min

When route steering is not used or if the ECDIS did not accept the requested route steering mode, there is no indication of route steering in the route monitor window, as shown right.

Plan Speed	20.0 Kt	To WP	3
Plan	216.9°	Dist WOP	2.55 nm
Route	216.8°	Time	06:36
Ch limit	185 m	Next WP	4
Off track	<32 m	Next	228.4°
		Turn rad	1.0 nm
		Turn rate	22°/min

Alarms when automatic route steering cannot be accepted

There are several reasons why the requested route steering mode could not be accepted:

Alarm "**2467 Disabled: Steering off**" informs you that the ECDIS didn't have steering controlling permission at the time of the request. Check that you have properly enabled the Autopilot FAP-2000 for steering.

Alarm "**2470 Disabled: Needs filter on**" informs you that you didn't have the Kalman filter ON at the time of the request. Route steering requires that you use the Kalman filter, because the filter eliminates sudden jumps of the position and thus prevents unpredictable maneuvers of your ship. Check your selection of sensors.

Alarm "**2490 Disabled: Needs log sensor**" informs you that the Kalman filter did not have an independent speed source. You need either a log, a dual-axis log or two position receivers. Check your selection of sensors.

Alarm "**2491 Disabled: Needs diff Pos**" informs you that the Kalman filter did not have high-precision position sensor for "Goto track" steering mode. Chosen sensors must include at least one high-precision sensor.

Alarm "**2477 Disabled: Out of channel**" informs you that the current location of your ship is not inside channel of a monitored route.

Alarm "**2468 Disabled: Out of course**" informs you that the difference between current heading of your ship and the required set course to start the route steering is greater than set by the operator in the route start limit angle of route parameters.

Alarm "**2464 Route: No chosen route**" informs you that there is no route chosen for route monitoring.

Alarm "**2465 Route: Illegal WP**" informs you that there is a route chosen for route monitoring, but the selection of the next or final waypoint is missing or illegal.

Alarm "**2499 Disabled: Needs good Pos**" appears when the Kalman filter did not have a high-precision position sensor for route steering, and position discrepancy limit between primary and secondary sensors is exceeded.

Alarm "**2502 Disabled: Need higher Spd**" appears when the speed used by the Kalman filter calculation is below the limit set for track steering in the installation parameters.

Alarm "**2508 Disabled: Need sog/cog ref**" appears when neither Speed Over Ground (SOG) nor Course Over Ground COG) is available from position sensor(s) or bottom track of a dual-axis log.

Alarm "**2510 Disabled: Out of turn**" appears when **Goto WP** or **Goto Track** button was pressed when the route monitoring of the system detects that your ship is turning, but your ship's location is out of the turn. Check and reset correct "To WP" for route monitoring.

28.5.6 Arriving to a waypoint

Automatic route steering navigation tries to keep the ship always inside the channel limits and go to a next waypoint. At the "pre-warning point", the visual indication "2485 Route: WP prewarning" appears on the ECDIS display and the **ACKN. WARNING** button on the Autopilot FAP-2000 lights.

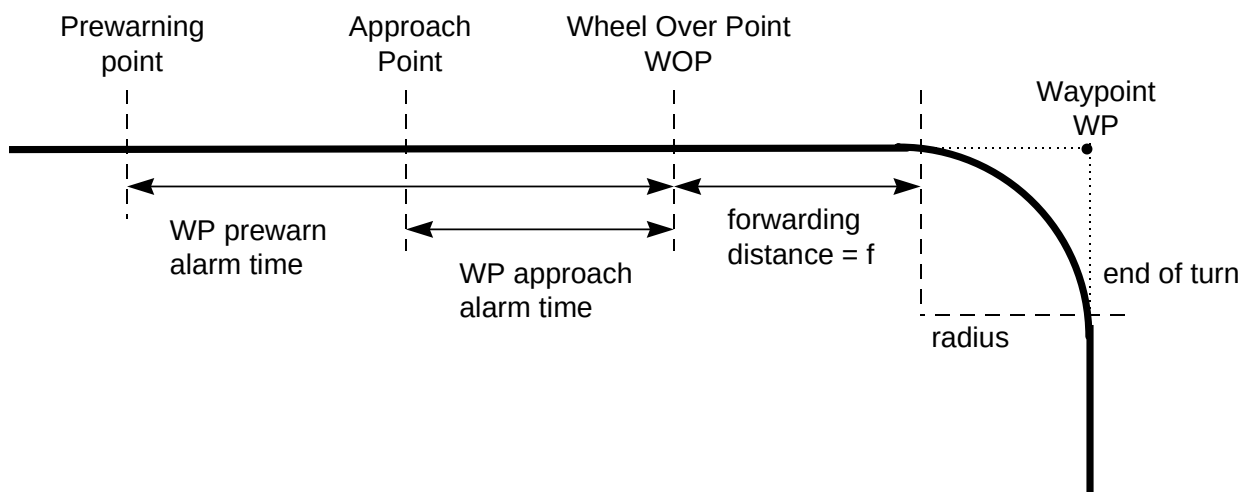
At the "approach point", the operation that will occur depends on if you acknowledged the preceding acknowledgeable visual indication "2485 Route: WP prewarning".

If you acknowledged the alarm 2485 then, at the approach point, the acknowledgeable visual indication "2451 Route: WP approach alarm" appears on the ECDIS display and the **ACKN. WARNING** button on the Autopilot FAP-2000's control panel lights. If you do not acknowledge alarm 2451 before wheel over point, the alarm 2451 will be changed from an acknowledgeable visual indication to an audible alarm.

If you did not acknowledge the alarm 2485 at the approach point, the alarm "2451 Route: WP approach alarm" appears on the ECDIS display and the **ACKN. WARNING** button on the Autopilot FAP-2000's control lights and the buzzer sounds.

TURN IS ALWAYS ENABLED. THE ONLY WAY TO DISABLE THE AUTOMATIC TURN IS TO CHOOSE ANOTHER STEERING MODE.

Note that these alarms are programmable (the time before you reach a turn) and it is relative to the starting point of the maneuver). See the figure below for description.



As soon as the ship arrives to the wheel over point, the ECDIS sends a new course command to the Autopilot FAP-2000 and the corresponding maneuver is initiated. During a maneuver, both the radar display and the ECDIS display show the Curved EBL, indicating the planned radius for maneuver.

Go to WP

When the "pre-warning point" is passed in the "Go to WP" mode and the acknowledgeable visual indication "2485 Route: WP prewarning" is acknowledged at the control panel of the Autopilot FAP-2000, the text "Ass. Appr. Enabled" appears in the route monitor window of the ECDIS display.

Plan Speed	20.0 Kt	To WP	5
Plan	232.6°	Dist WOP	0.32 nm
Route	230.7°	Time	00:57
Ch limit	185 m	Next WP	6
Off track	>59 m	Next	206.5°
Ass. Appr. Enabled		Turn rad	1.0 nm
		Turn rate	19°/min

Go to Track

When the "pre-warning point" is passed in the "Go to Track" mode and the acknowledgeable visual indication "2485 Route: WP prewarning" is acknowledged at the control panel of the Autopilot FAP-2000, the text "Track Appr. Enabled" appears in the route monitor window of the ECDIS display.

Plan Speed	20.0 Kt	To WP	5
Plan	232.6°	Dist WOP	0.32 nm
Route	230.7°	Time	00:57
Ch limit	185 m	Next WP	6
Off track	>59 m	Next	206.5°
Track Appr. Enabled		Turn rad	1.0 nm
		Turn rate	19°/min

If acknowledgeable visual indication 2485 is not acknowledged, the text in the route monitor window will remain the same as it was before the prewarning point (Goto Track or Goto WP).

Go to WP

When the "approach point" is passed and acknowledgeable visual indication or alarm "2451 Route: WP approach alarm" is acknowledged, the text "Ass. Turn enabled" appears in the route monitor window of the ECDIS display.

Plan Speed	20.0 Kt	To WP	5
Plan	248.0°	Dist WOP	0.76 nm
Route	247.8°	Time	02:24
Ch limit	185 m	Next WP	6
Off track	<9 m	Next	271.6°
Goto Track		Turn rad	1.0 nm
		Turn rate	18°/min

Plan Speed	20.0 Kt	To WP	5
Plan	232.6°	Dist WOP	0.32 nm
Route	230.7°	Time	00:57
Ch limit	185 m	05 Dec 02 14:22	
Off track	>59 m	Next	206.5°
Ass. Turn enabled		Turn rad	1.0 nm
		Turn rate	19°/min

Go to Track

When the "approach point" is passed and acknowledgeable visual indication or alarm "2451 Route: WP approach alarm" is acknowledged, the text "Track Turn enabled" appears in the route monitor window of the ECDIS display.

Plan Speed	20.0 Kt	To WP	5
Plan	232.6°	Dist WOP	0.24 nm
Route	230.7°	Time	00:42
Ch limit	185 m	Next WP	6
Off track	>60 m	Next	206.5°
Track Turn enabled		Turn rad	1.0 nm
		Turn rate	19°/min

Go to WP

During the turn the text "Assisted Turn" appears in the route monitor window of the ECDIS display.

Plan Speed	20.0 Kt	To WP	2
Plan	283.3°	Dist WOP	nm
Route	283.3°	Time	
Ch limit	185 m	Next WP	3
Off track	<7 m	Next	283.3°
Assisted Turn		Turn rad	1.0 nm
		Turn rate	19°/min

Go to Track

During the turn the text "Track Turn" appears in the route monitor window of the ECDIS display.

Plan Speed	20.0 Kt	To WP	3
Plan	214.3°	Dist WOP	nm
Route	214.2°	Time	
Ch limit	185 m	Next WP	4
Off track	>7 m	Next	214.3°
Track Turn		Turn rad	1.0 nm
		Turn rate	19°/min

Note: When you approach the last waypoint the acknowledgeable visual indication or alarm "2458 Route: Last WP approach" appears. After you acknowledge the alarm 2458, the route steering is automatically terminated and the Autopilot FAP-2000 goes into the Radius Control mode.

28.5.7 Automatic route steering alarms

There are two types of alarms relevant to route steering, permanent and intermittent.

Permanent alarms are available regardless of the steering mode used:

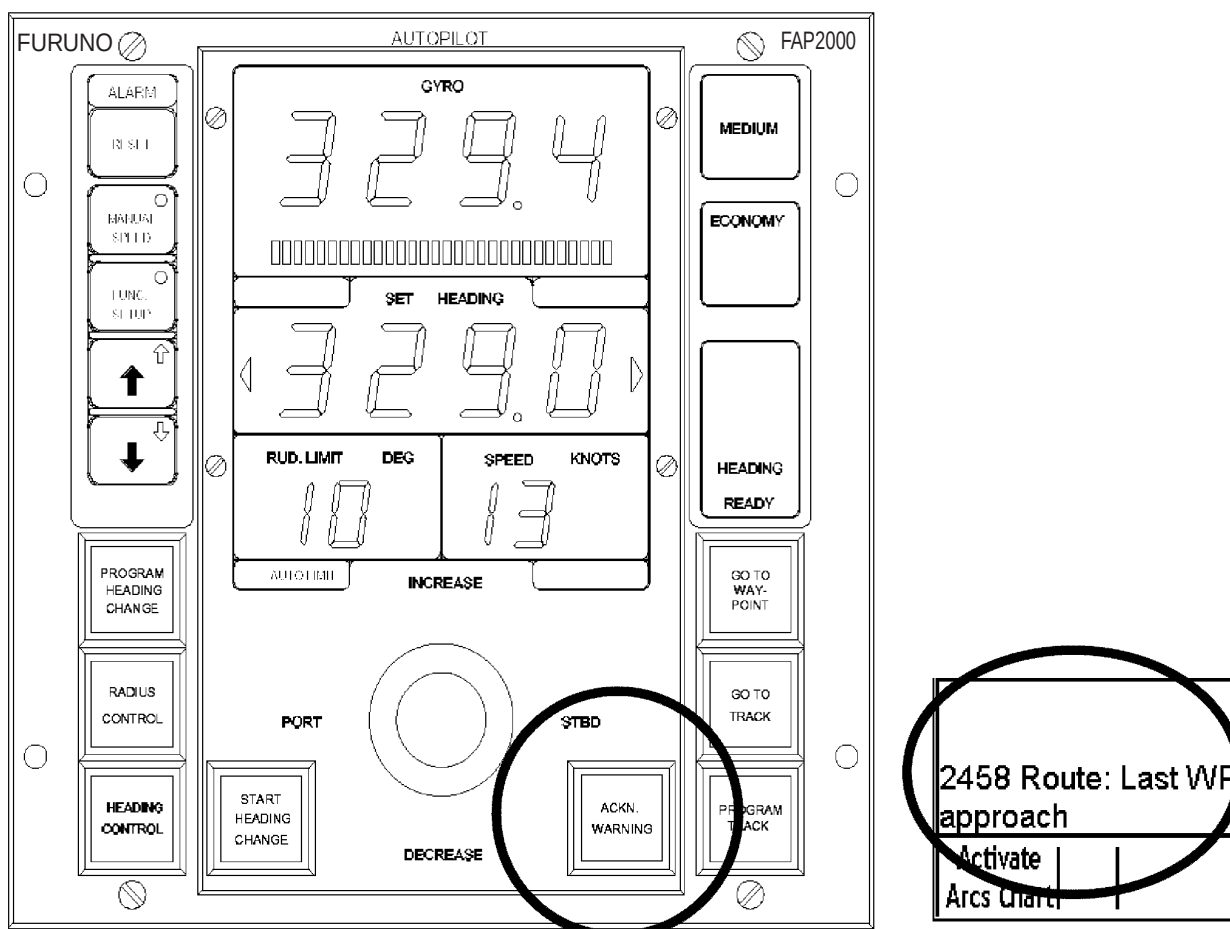
- Outside channel is indicated by displaying the text "Off track" in orange and its value in red.
- The text "Out of Gate" is orange. Out of gate indicates that, if the ship continues using the current course, the ship will be outside of the channel at the wheel over point.

Plan Speed	20.0 Kt	To WP	4
Plan	248.0°	Dist WOP	1.38 nm
Route	256.7°	Time	04:21
Ch limit	185 m	Next WP	5
Off track	<147 m	Next	271.6°
Goto WP		Turn rad	1.0 nm
Out of Gate		Turn rate	18°/min

Intermittent audio/visual alarms appear as follows:

- Alarm number and text are visible at lower right corner of the ECDIS display (see example below).
- The **ACKN. WARNING** button of the Autopilot FAP-2000 control panel lights to provide visual alarm (see example below).
- Buzzer sounds from the Autopilot FAP-2000's panel.

You acknowledge an intermittent alarm by clicking the **ACKN. WARNING** button on the Autopilot FAP-2000's panel.



Typical intermittent alarms not described in other sections are:

Alarm **"2010 Filter: Pos source change"** appears when differential GPS used in filter positioning has changed its operation mode either from differential mode to normal mode or normal mode to differential mode. If the steering mode is "Goto Track" alarm **"2492 Route: Needs diff Pos"** also appears, if DGPS has changed its mode to normal mode.

Alarm **"2013 SOG&COG unreliable"** appears when the system finds out that SOG and COG from sensors are inaccurate. Speed/Course sensors and position sensors can be source of SOG and COG.

Alarm **"2457 Route: Outside chl limits"** appears when your ship goes outside the planned channel.

Alarm **"2455 Route: off course"**, appears when the system needs more than a set limit (the limit is available in Installation parameters) to keep the track. This alarm is repeated every five minutes, if the condition continues.

Alarm **"2456 Route: WP approach error"** appears when your ship speed is decreased more than waypoint approach alarm time + 100 seconds away from the wheel over point after the operator has already acknowledged alarm **"2451 Route: WP approach alarm"** to enable the next automatic turn. After the alarm 2456, the next turn is not enabled and the system will generate a new alarm **"2451 Route: Wp approach alarm"** when appropriate.

Alarm **"2460 Pilot: ROT will be exceed"** appears when the set radius value in the Autopilot FAP-2000 panel together with the current speed of the ship request rate of turn which is over the limit set for **Max. rate of turn** in the route parameters.

Alarm **"2461 Route: ROT will be exceed"** appears when the planned radius for next waypoint together with the current speed of the ship request rate of turn which is over the limit set for **Max. rate of turn** in the Route parameters. This alarm is activated if your ship is within value **WP approach alarm time** set in Route Parameters from the wheel over point.

Alarm **"2469 Autopilot FAP-2000: off course"** appears when the trackpilot needs more than a set limit (the limit is available in Installation parameters for Go To Waypoint mode. Go To Track mode uses fixed value of 30 degrees) to keep the track. This alarm is repeated every five minutes, if the condition continues.

Alarm **"2488 Steering: Stop-System fail"** appears when the system has internal failure, which prevents continuation of Goto Waypoint or Goto Track.

Alarm **"2497 Route: Stop - Sensor Fail"** appears when no gyro data is received or if conditions of alarm 2475, 2476, 2478, 2492 or 2501 has been valid for last 10 minutes.

Typical guidance alarms not described in other sections are:

Alarm **"2475 Route: Needs filter on"**, which appears when the position from the Kalman filter is not available. Alarm 2475 will be repeated every four minutes for next 10 minutes and if condition still exists, alarm **"2497 Route: Stop - Sensor Fail"** is generated and steering mode is automatically changed to Radius Control.

Alarm **"2476 Route: Needs log sensor"** appears when the position from the Kalman filter cannot be compared against an independently operating log. Alarm 2476 will be repeated every four minutes for next 10 minutes and if condition still exists, alarm **"2497 Route: Stop - Sensor Fail"** is generated and steering mode is automatically changed to Radius Control.

Alarm **"2478 Route: Needs good Pos"** appears when the Kalman filter did not have high precision position sensor for route steering and position discrepancy limit between primary and secondary position or between your ship and any position is exceeded. Alarm is repeated every 2 minutes for 10 minutes after which alarm **"2497 Route: Stop - Sensor Fail"** appears.

Alarm **"2492 Route: Needs diff Pos"** appears for any use of Goto Track with Kalman filter but without a high precision sensor (an example is DGPS). Alarm 2492 will be repeated every four minutes for next 10 minutes and if condition still exists, alarm **"2489 Route: Changed to Goto WP"** is generated and steering mode is automatically changed to Goto WP.

Alarm **"2498 Use manual rudder control"** appears every two minutes to advise the operator to use manual control of rudder, when the trackpilot has lost gyro and thus cannot control rudder.

28. Steering with FURUNO Autopilot FAP-2000

Alarm "**2501 Route: Needs higher Speed**" appears for any use of Goto Track with the Kalman filter but speed below limit set for track steering in the Installation Parameters. This alarm is repeated every four minutes for the next 10 minutes and if condition still exists, alarm "**2497 Route: Stop - Sensor Fail**" is generated and the steering mode is automatically changed to Radius Control.

Alarm "**2505 Route: Use Goto WP**" is instruction for the operator to change the steering mode to Goto WP. This alarm is generated if there are not sufficient conditions to continue Goto Track (i.e. alarm 2492 or 2507 has been valid two minutes). This alarm is repeated every four minutes.

Alarm "**2506 Route: Use Radius control**" is instruction for the operator to change the steering mode to Radius Control. This alarm is generated if there are not sufficient conditions to continue Goto Track (i.e. alarm 2475, 2476 or 2501 has been valid 2 minutes). This alarm is repeated every four minutes.

Alarm "**2507 Route: Need sog/cog ref.**" appears when any use of Goto Track with the Kalman filter but without direct Speed Over Ground (SOG) and Course Over Ground (COG) available from position sensor(s) or from bottom track of a dual-axis log. If the condition still exists after 10 minutes, alarm "**2489 Route: Changed to Goto WP**" is generated and the steering mode is automatically changed to Goto WP.

28.5.8 Collision avoidance maneuver during automatic route steering

Often route steering is interrupted by a collision avoidance maneuver, but there are also several other reasons to interrupt route steering. You have several options with which to set the collision avoidance or any other maneuver:

- Use override tiller, direct rudder pump operation button or non-follow-up rudder control.
- Use follow-up rudder control.
- Use Autopilot FAP-2000 HEADING CONTROL.
- Use Autopilot FAP-2000 RADIUS CONTROL.
- Use Autopilot FAP-2000 Program Track.

To use any of the above Autopilot FAP-2000 modes, push the desired mode button and follow normal instructions. See section 28.4.5 Summary of manual steering modes.

Now the route steering is disabled until the **GO TO WAYPOINT** or **GO TO TRACK** button is pushed again. Note that in order to return to route steering the ship heading must point to the next waypoint, otherwise the alarm "2468 Disabled: Out of course" is generated.

28.5.9 Stopping or modifying pre-enabled route turn

There are two cases where the automatic route turn must be stopped or modified:

- The turn cannot be performed up to the final value.
- The turn that your ship will perform is outside of the planned turn. (Too fast or too slow.)

You can also during turns use all methods described in the above-mentioned in section 28.5.8. However, you may interrupt an automatic route steering turn and continue it in the manual steering mode.

Interrupted turn

- If the turn has already started, the set course display on the Autopilot FAP-2000 shows the new course value.
- Push the **RADIUS CONTROL** button on the Autopilot FAP-2000 control panel.
- Now the manual steering is enabled and your turn continues with previously set values of course and radius.
- Using the tiller, set the new intended course.

Example:

Actual course = 45°, new course = 120°, route turn was enabled. At the moment the ship's heading is 60°, the helmsman wishes to change the course to 90°. The set course already shows 120°. Push the **RADIUS CONTROL** button on the Autopilot FAP-2000 control panel then use the tiller to set the new course to 90°. The turn will be finished to that value.

Too fast or too slow turn

This is used in case the ship is not performing the planned radius and the radius must be modified.

1. If the actual turning is too fast, use the tiller on the Autopilot FAP-2000 control panel to increase the radius.
2. With some chosen radar models you can also use the **RADIUS INCR** button. Push the button once.

The new situation is shown on the radar screen. The same logic applies for too slow turning.

28.5.10 Accuracy of automatic route steering

Accurate route steering is defined as a small cross-track error when automatically following a route. Two of the route parameters - Drift compensation and Gyro error compensation - have a significant effect on the accuracy of route steering. If you need the most accurate route steering, then both of these parameters should be enabled. Before activating the Gyro error compensation, see section 19.9 Gyro Error Correction to find the available methods for gyro error compensation.

28.6 Additional Information About Steering Modes

Use of multiple Autopilot FAP-2000 control panels

The Autopilot FAP-2000 system may incorporate several control panels. In this case:

- The active panel is indicated by a light in one of the steering mode buttons (RADIUS CONTROL, COURSE CONTROL, GOTO WAYPOINT, GOTO TRACK and PROGRAM TRACK).
- Both active and non-active panels indicate the steering mode in use by lamps and displays. See the table below.
- You can transfer control from the active panel to the non-active panel by pushing one of the steering mode buttons (RADIUS CONTROL, COURSE CONTROL, GOTO WAYPOINT, GOTO TRACK and PROGRAM TRACK). This action lets you change the steering mode or continue with the previous one. To continue with the previous steering mode, push the steering mode button corresponding to the previous steering mode. Note that you can observe the lamp indications to know the current steering mode.

Steering mode	Lamp indication	Radius/Rudder limit display
Heading Control	Course	Rudder limit
Radius Control	Course	Radius
Program Track	Track	Radius
Goto WP	Route	Radius
Goto Track	Route and Track	Radius

Details of programmed turns

The Autopilot FAP-2000 allows the operator to design a turn beforehand and to begin execution of the turn when the **START COURSE CHANGE** button is pushed. The table below summaries properties of each applicable steering mode.

Steering mode	Rule applicable	Turn control	Change of Set course	Change of Radius	Change of rudder limit	Curved EBL "Start course change" does not flash	Curved EBL "Start course change" flashes
Heading control	Turn or linear	Rudder angle limit	Immediate action	Not applicable	Immediate	Not applicable	Not applicable
PHC + Heading control	Turn or linear	Rudder angle limit	No action until click of Start (*)	Not applicable	Immediate	Not applicable	Not applicable
Radius control	Turn or linear	Radius control	Immediate action	Immediate	Not applicable	If displayed indicates ongoing turn	Not applicable
PHC + Radius control	Linear (**) (***)	Radius control	No action until click of Start (*)	Immediate	Not applicable	If displayed indicates ongoing turn	Display planned turn
PHC + Radius control (executing a turn)	Turn (**) (***)	Radius control	No action until click of Start (*)	Not available	Not applicable	Displays ongoing turn	Display planned turn
PTT	Linear (**) (***)	Not applicable	No action until click of Start (*)	Immediate	Not applicable	If displayed indicates ongoing turn	Display planned turn
PTT (executing a turn)	Turn (**) (***)	Position controlled radius	No action until click of Start (*)	Not available	Not applicable	Displays ongoing turn	Display planned turn

(*) "Start course change" flashes to indicate immediate execution of the changed set course.

(**) "Increase" and "Decrease" lamps indicate "Linear" and "Turn". If those lamps are on, then it is Linear. If the lamps are off, then it is Turn.

(***) If the difference between the heading and set course is less than 10 degrees, then the situation is interpreted as Linear.

PHC = Program Heading Change

PTT = Program Track

28.7 Important Information About Steering Mode Changes

When the Autopilot FAP-2000 is not used for steering

In addition to the Autopilot FAP-2000, a ship may have a steering selection unit of some kind that minimally incorporates "HAND" and "TRACKPILOT" functions. "HAND" can function to override the tiller, direct rudder pump operation buttons, non-follow-up rudder control or follow-up rudder control. While in the "HAND" mode, the Autopilot FAP-2000 always sets a course equal to the gyro course.

User can change to the "HAND" mode from any of the Autopilot FAP-2000 steering modes.

Steady as she goes

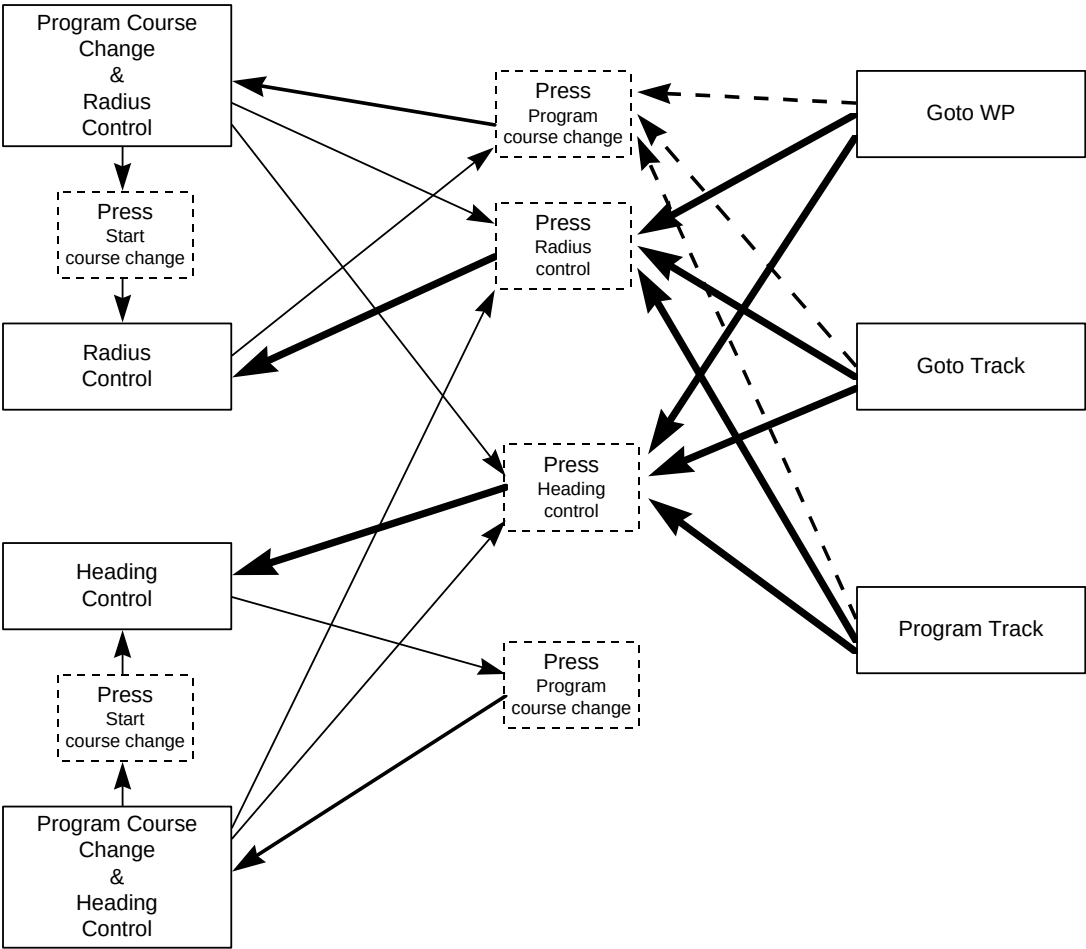
If you want the ship to go "steady as she goes" while in the middle of any Autopilot FAP-2000 operation, switch from any Autopilot FAP-2000 steering mode to the "HAND" mode (and back again to switch back to Autopilot FAP-2000 control).

About mode changes when using Autopilot FAP-2000 for steering

The operator can change from any steering mode to any other steering mode. For example, it is possible to leave automatic route steering and return to automatic route steering during both linear parts and turns.

The new steering mode continues from the previously displayed course, shown on the set course display. The only exceptions are pending program modes (PROGRAM HEADING CHANGE and PROGRAM TRACK), when the new mode continues from currently used set course. These pending modes are indicated by flashing the lamp in the **START HEADING CHANGE** button.

The diagram below shows all other possible steering mode changes, but not activation of Goto WP, Goto Track or Program Track.



28.8 Expected Steering Performance Under Various Conditions

The system has many available steering modes. Below is a summary of effect of various environmental conditions.

28.8.1 Expected steering performance for going ahead

Environment conditions	Heading control Radius control Program heading change	Program track	Goto Waypoint	Goto Track
Calm sea, no wind, no current	COG is about the same as Set Course in Autopilot FAP-2000.	Drift compensation ON or OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship accurately follows imaginary line over ground.	Drift compensation ON or OFF: - Ship follows monitored route.	Drift compensation ON or OFF: - Ship follows monitored route.
Moderate wind and/or current	Ship has at tendency to drift.	Drift compensation ON or OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship accurately follows imaginary line over ground.	Drift compensation ON: - Ship follows monitored route. Drift compensation set as OFF: - Ship follows monitored route in an off-track position inside the channel limit.	Drift compensation ON or OFF: - Ship follows monitored route.
High wind and/or current	Ship is drifting.	Drift compensation ON: - COG is equal to course set on Autopilot FAP-2000. - Ship follows nicely imaginary line over ground. Drift compensation OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship has trouble in following imaginary line over ground.	Drift compensation ON: - Ship follows monitored route. - Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit.	Drift compensation ON: - Ship follows monitored route Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit

Environment conditions	Heading control Radius control Program heading change	Program track	Goto Waypoint	Goto Track
Slow change of wind and/or current	There is no compensation for change	Drift compensation ON: - COG is equal to course set on Autopilot FAP-2000. - Ship follows imaginary line over ground. Drift compensation OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship has trouble in following imaginary line over ground.	Drift compensation ON: - Ship follows monitored route, but may need full channel limit area. Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit.	Drift compensation ON: - Ship follows monitored route. Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit
Sudden change of wind and/or current (For example sudden change from no current to 5 kt current perpendicular to track)	There is no compensation for change	Drift compensation ON: - COG is equal to course set on Autopilot FAP-2000. - Ship follows imaginary line over ground, but may drift away from imaginary line then return to it. Drift compensation OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship has trouble in following imaginary line over ground.	Drift compensation ON: - Ship follows monitored route, but may need full channel limit area. - Ship may go outside channel limit and return back inside channel limit. Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit.	Drift compensation ON: - Ship may go outside channel limit and return back inside channel limit. Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit.

Environment conditions	Heading control Radius control Program heading change	Program track	Goto Waypoint	Goto Track
Slow change of speed	There is no compensation for change	Drift compensation ON or OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship follows imaginary line over ground.	Drift compensation ON: - Ship follows monitored route. Drift compensation set as OFF: - ship may have troubles to follow monitored route inside the channel limit	Drift compensation ON or OFF: - Ship follows monitored route.
Fast change of speed (For example speed decrease from 20 to 7 kt)	There is no compensation for change	Drift compensation ON or OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship follows imaginary line over ground, but may drift away from imaginary line then return to it. Drift compensation OFF: - COG is equal to course set on Autopilot FAP-2000. - Ship may have trouble in following imaginary line over ground.	Drift compensation ON: - Ship follows monitored route, but may need full channel limit area. - Ship may go outside channel limit and return back inside channel limit. Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit.	Drift compensation ON: - Ship follows monitored route, but may need full channel limit area. Drift compensation OFF: - Ship may have trouble in following monitored route inside the channel limit.

28.8.2 Expected steering performance for turns

Environment conditions	Heading control Radius control Program heading change	Program track	Goto Waypoint (assisted turn)	Goto Track
Calm sea, no wind, no current	Ship follows curved EBL.	Drift compensation ON or OFF: - Ship follows curved EBL.	Drift compensation ON or OFF: - Ship follows monitored route.	Drift compensation ON or OFF: - Ship follows monitored route.
Moderate wind and/or current	Ship goes inside or outside of turn.	Drift compensation ON or OFF: - Ship follows curved EBL	Drift compensation ON: - Ship follows monitored route, but may need full channel limit area. Drift compensation set as OFF: - Ship goes inside or outside of turn.	Drift compensation ON or OFF: - Ship follows monitored route.
High wind and/or current	Ship goes fast inside or outside of turn.	Drift compensation ON: - Ship follows curved EBL. Drift compensation OFF: - Ship goes inside or outside of turn.	Drift compensation ON: - Ship follows monitored route, but may go outside channel limit area. Drift compensation OFF: - Ship goes fast inside or outside of turn.	Drift compensation ON: - Ship follows monitored route. Drift compensation OFF: - Ship goes inside or outside of turn.
Slow change of wind and/or current	Ship goes inside or outside of turn.	Drift compensation ON or OFF: - Ship follows curved EBL.	Drift compensation ON or OFF: - Ship goes inside or outside of turn.	Drift compensation ON: - Ship follows monitored route Drift compensation OFF: - Ship may have troubles in following monitored route inside the channel limit.

Environment conditions	Heading control Radius control Program heading change	Program track	Goto Waypoint (assisted turn)	Goto Track
Sudden change of wind and/or current (For example sudden change from no current to 5 kt current perpendicular to track)	Ship goes fast inside or outside of turn.	Drift compensation ON: - Ship follows curved EBL, but may drift from curved EBL then return back to curved EBL. Drift compensation OFF: - Ship goes inside or outside of turn.	Drift compensation ON or OFF: - Ship goes fast inside or outside of turn.	Drift compensation ON: - Ship may go outside channel limit and return back inside channel limit. Drift compensation OFF: - Ship goes inside or outside of turn.
Slow change of speed	Ship follows curved EBL.	Drift compensation ON or OFF: - Ship follows curved EBL.	Drift compensation ON or OFF: - Ship follows monitored route, but may need full channel limit area.	Drift compensation ON or OFF: - Ship follows monitored route.
Fast change of speed (For example speed decrease from 20 to 7 kt)	Ship goes inside or outside of turn.	Drift compensation ON: - Ship follows curved EBL, but may drift from curved EBL then return back to curved EBL. Drift compensation OFF: - Ship drifting away from curved EBL and may not return back to curved EBL.	Drift compensation ON or OFF: - Ship goes inside or outside of turn.	Drift compensation ON or OFF: - Ship follows monitored route, but may need full channel limit area.

Note: Drift compensation is turned on or off in the Ship and Route parameters in the Navigation Parameters dialog box. For further details, see section 25.1.4 Navigation parameters setting.

28.9 Expected Steering Performance Under Critical Failure

Below is a summary of system behavior in various failures when Program Track, Goto Waypoint or Goto track steering mode is in use.

Note: Backup navigator alarm is activated if alarm is not acknowledged within 30 seconds. For more information about this alarm, see section 31.7 "Description of Backup Navigator Alarm".

28.9.1 Lost heading from Autopilot FAP-2000 (ECDIS may also have lost heading)

	Associated alarms	Expected system performance	What end operator should do
Immediately	- Sensor alarm "4055: Gyro error (Autopilot FAP-2000)" is generated at ECDIS. - Alarm 10 is generated at Autopilot FAP-2000 control panel.	- If ship is in linear part, Rudder order is frozen for last value in order to approximately continue ahead. - If ship is turning, rudder order is frozen for last value in order to approximately continue rate of turn.	- Change immediately to manual control of rudder. - Acknowledge alarms. - Study situation.
Within few seconds	Alarm "2496 ProgTrack Stop-Sensor fail" or "2497 Route Stop-Sensor fail".		- Change immediately to manual control of rudder. - Acknowledge alarms. - Study situation.
Repeat every 2 minutes	Alarm "2498 Use manual rudder control" is generated at ECDIS.	Reminder	Change immediately to manual control of rudder.

28.9.2 Lost heading from ECDIS (Autopilot FAP-2000 still has heading)

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Sensor alarm, for example Alarm "4005: Gyro error" or "4006: Gyro error."		- Acknowledge alarms. - Study situation.
Within few seconds	- Alarm "2002 No heading available." - Alarm "2496 ProgTrack Stop-Sensor fail" or "2497 Route Stop-Sensor fail".	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.3 Lost speed

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Sensor alarm, for example Alarm "4008: Log error", "4012...4016: Position equipment error", etc.		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2476 Route Needs log sensor" or "2494 Progtrack: Needs log sens."		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use Radius control" or "2504 Progtrack: Use Radius Ctrl."	Guidance for navigator	- Change immediately to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 4 minutes	Alarm "2476 Route Needs log sensor" or "2494 Progtrack: Needs log sens."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2496 ProgTrack Stop-Sensor fail" or "2497 Route Stop-Sensor fail."	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.4 Low speed

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "2008 Filter: Speed below xx."		- Acknowledge alarms. - Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source change."		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2503 ProgTrack: Needs higher Speed" or "2501 Route: Needs higher Speed."		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use Radius control" or "2504 Progtrack: Use Radius Ctrl."	Guidance for navigator	- Change immediately to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 2 minutes	Alarm "2503 ProgTrack: Needs higher Speed" or "2501 Route: Needs higher Speed."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2496 ProgTrack Stop-Sensor fail" or Alarm "2497 Route Stop-Sensor fail."	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.5 Lost SOG/COG reference

Goto track steering mode

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "2507 Route: Need sog/cog ref."		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2505 Route: Use Goto WP."	Instruction for navigator	- Change to Goto WP steering mode. - Acknowledge alarms.
After 4 minutes then every 4 minutes	Alarm "2507 Route: Need sog/cog ref."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2489 Route: Changed to Goto WP."	Automatic change of steering mode to Goto WP mode.	- Acknowledge alarms. - Study situation.

Program track steering mode

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "2509 Progtrack: Needs sog/cog ref."	Program Track mode requires differential position.	- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2504 Progtrack: Use Radius Ctrl."	Guidance for navigator	- Change immediately to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 2 minutes	Alarm "2509 Progtrack: Needs sog/cog ref."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2496 ProgTrack: Stop-Sensor fail."	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.6 Total lost position

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	- Alarm "4012...4016: Position equipment error" OR - Kalman filter detects jump, etc.		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarms "2000 Filter: Position unreliable" and "2006 Route: Course jump possible."	- Kalman Filter is switched Off and system uses dead reckoning for positioning. - If you have log or dual-axis log, then dead reckoning is based on them and gyro. - If you have log or dual-axis log, then dead reckoning is based on last plausible speed from position sensors. This is indicated by showing your ship's position, SOG and COG in red. The source indication for SOG and COG is "(LAST)".	- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use Radius control" or "2504 Progtrack: Use Radius Ctrl."	Guidance for navigator	- Change immediately to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 4 minutes	Alarm "2475 Route Needs filter ON", or "2493 Progtrack: Needs filter ON."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2496 ProgTrack: Stop-Sensor fail" or Alarm "2497 Route Stop-Sensor fail."	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.7 Lost differential position

Goto track steering mode

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "4027...4031: Lost DGPS" or "4012...4016: Position equipment error."		- Acknowledge alarms. - Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source changed."		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2492 Route: Needs diff pos."	Goto Track requires differential position.	- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2505 Route: Use Goto WP."	Guidance for navigator	- Change to Goto WP steering mode. - Acknowledge alarm.
After 4 minutes then every 4 minutes	Alarm "2492 Route: Needs diff pos."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2489 Route: Changed to Goto WP."	Automatic change of steering mode to Goto WP mode.	- Acknowledge alarms. - Study situation.

Program track steering mode

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "4027...4031: Lost DGPS" or "4012...4016: Position equipment error."		- Acknowledge alarms. - Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source changed."		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2495 Progtrack: Needs diff pos."	Program Track mode requires differential position.	- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2504 Progtrack: Use Radius Ctrl."	Guidance for navigator	- Change immediately to local autopilot control. - Acknowledge alarm.
After 4 minutes then every 2 minutes	Alarm "2503 ProgTrack: Needs diff pos."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2496 ProgTrack: Stop-Sensor fail."	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is in turn, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.8 Lost differential position and position discrepancy

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
Precondition	If sensors in Filter calculation are NOT inside operator chosen position discrepancy limit. Alarm "2007 Position discrepancy"		- Acknowledge alarms. - Study situation.
	Alarm "4027...4031: Lost DGPS" or "4012...4016: Position equipment error"		- Acknowledge alarms. - Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source changed"		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2478 Route: Needs good Pos"		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use Radius control"	Guidance for navigator	- Change to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 2 minutes	Alarm "2478 Route: Needs good Pos"	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail"	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is in turn, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.9 Lost communication between ECDIS and Autopilot FAP-2000

	Associated alarms	Expected system performance	What end operator should do
Within 15 seconds	- Alarm "2488 Steering: Stop-system fail" generated at ECDIS. - Alarm 12 is generated at the Autopilot FAP-2000.	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is in turn, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.9.10 Lost communication between Autopilot FAP-2000 and ECDIS

	Associated alarms	Expected system performance	What end operator should do
Within 15 seconds	- Alarm "2488 Steering: Stop-system fail" and "2480 Autopilot FAP-2000 Receive error" is generated at the ECDIS. - Alarm 05 is generated at the Autopilot FAP-2000.	- Automatic change of steering mode to Radius Control mode. - If ship is in linear part, actual heading is used as set heading. If ship is in turn, last-set heading and radius remain.	- Acknowledge alarms. - Study situation.

28.10 Other Operations with Autopilot FAP-2000

28.10.1 Speed used by Autopilot FAP-2000

- The Autopilot FAP-2000 uses the speed from its own log input interface or from the serial line coming from an integrated computer, and one is chosen during the installation. This speed is called the "internal speed reference".
- The operator may choose internal speed reference or manual speed with the **MANUAL SPEED** button.

28.10.2 Control strategy used by Autopilot FAP-2000

- The operator may choose among ECONOMY, MEDIUM and PRECISE by using the **FUNC. SETUP** button and the **ARROW** buttons.
- Control strategy (economy, medium, precise) chooses course-keeping accuracy.

28.10.3 Load conditions used by Autopilot FAP-2000

- The operator may choose among LIGHT, MEDIUM and LOADED by using the **FUNC. SETUP** button and the **ARROW** buttons.
- Load condition (light, medium, loaded) chooses rudder gain.

28.11 Description of Alarms Generated by Autopilot FAP-2000

28.11.1 Alarms

Autopilot FAP-2000 operation related alarms

- ALARM lamp on the Autopilot FAP-2000 control panel goes on.
- Alarm is displayed on the Autopilot FAP-2000 control panel as OFF COURSE/SPEED WARNING or as an alarm number "AL: NN", where NN is the number of an alarm.
- Alarm is acknowledged by pushing the **RESET** button on the Autopilot FAP-2000 control panel.
- List of typical alarms:

OFF COURSE	The ship is not following set course.
SPEED WARNING	The speed is below 20% or above 120% of MCR speed (max. cruising speed). For further details, see the Autopilot's operator's manual. Another reason is that the trackpilot has lost speed data from the ECDIS. In this case, the trackpilot uses its backup speed source or last plausible speed.
ON LIMIT	Autopilot FAP-2000 uses rudder up to its set limit value. Normally this is only an indication, but if it continues for a long period and the heading of the ship doesn't turn, it is an indication of failure of the steering system. For further details, see the Autopilot's operator's manual.
AL 04	Rudder servo: Leak detected or no movement when valve is on.
AL 05	Navigation computer has cancelled a remote mode.
AL 06	24VDC alarm system supply failure.
AL 07	Navigation computer didn't accept a request to go for a remote mode.
AL 10	Missing working gyro.
AL 11	Compass comparison alarm or reference gyro missing.
AL 12	Messages from the navigation computer were missing while Autopilot FAP-2000 was in remote mode.

The central alarm system outputs these and other alarms: low voltage alarm, stop alarm (track control), position differential alarm, heading differential alarm, course error alarm, cross-track error alarm, sensor alarm, low speed alarm, destination arrival alarm, track control loss alarm, etc. For more information about the alarms the central alarm system displays see its Operator's Manual.

Integrated operation related alarms

- ACKN. WARNING lamp of the Autopilot FAP-2000 control panel flashes.
- Type of alarm is displayed on the ECDIS display as number and text.
- Alarm is acknowledged by pushing the **ACKN. WARNING** button on the Autopilot FAP-2000 control panel.
- List of typical alarms:

2451	Route: WP approach alarm
2452	Route: Turning disabled
2455	Route: Off course
2456	Route: WP approach error
2458	Route: Last WP approach
2460	Pilot: ROT will be exceed
2461	Route: ROT will be exceed
2467	Disabled - steering off
2468	Disabled - out of course
2469	Autopilot FAP-2000: Off course
2470	Disabled - Need filter ON
2475	Route: Need filter ON
2476	Route: Need log sensor
2478	Route: Need good Posit.
2485	Route: WP prewarning
2488	Steering: Stop-system fail
2489	Route: Changed to Goto WP
2490	Disabled: Need log sensor
2491	Disabled: Need diff pos
2492	Route: Need diff pos
2493	ProgTrack: Need Filter ON
2494	ProgTrack: Need diff pos.
2495	ProgTrack: Need log sens
2496	ProgTrack: Stop - Sensor Fail
2497	Route: Stop - Sensor Fail
2498	Use manual rudder control
2499	Disabled: Need good Pos.
2501	Route: Need higher Speed
2502	Disabled: Need higher Speed
2503	ProgTrack: Need higher Speed
2504	ProgTrack: Use Radius ctrl.
2505	Route: Use Goto WP
2506	Route: Use Radius control
2507	Route: Need sog/cog ref.
2508	Disabled: Need sog/cog ref.
2509	ProgTrack: Need sog/cog ref.
2510	Disabled: Out of Turn

28.11.2 Errors

Errors should not happen during normal operation. They are related to internal problems.

Autopilot FAP-2000 operation related errors

- ALARM lamp on the Autopilot FAP-2000 control panel lights.
- Error is displayed on the Autopilot FAP-2000 control panel as error number type ERR NN, where NN is the number of an error.
- Error is acknowledged by pushing the **RESET** button on the Autopilot FAP-2000 control panel.
- List of typical errors:

ERR 12 Autopilot FAP-2000 processor failure

Integrated operation related errors

- The ALARM ACK lamp on the ECDIS lights.
- The type of alarm is displayed on the display ECDIS display as number and text.
- Alarm is acknowledged by pushing the ECDIS control panel's **ALARM** button.
- List of typical alarms:

2480 Autopilot FAP-2000 receive error

28.12 Using the Curved EBL

The curved EBL is a design and control tool which functions to start a turn at the correct position and to monitor behavior of your ship during the turn. The curved EBL is available on the ECDIS display and on some ARPA radar displays.

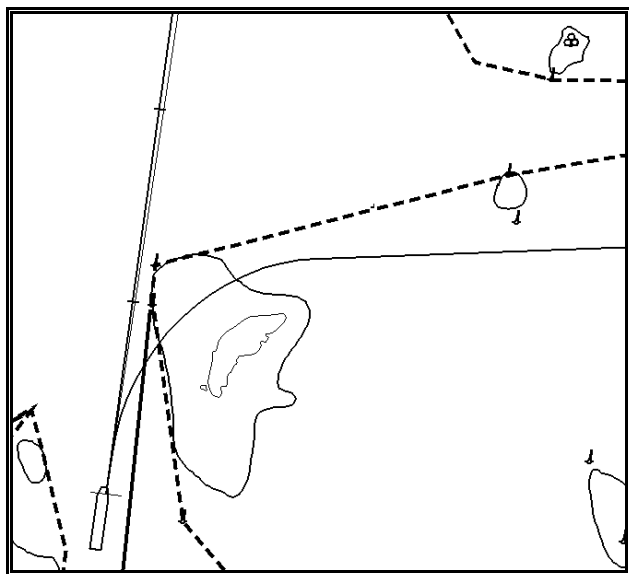
Before you make a turn, you can use the curved EBL to choose best position to initiate the intended turn. In this so-called design phase, your ship pushes curved EBL in front of the ship. This design phase is available in the following conditions:

- Program track of the Autopilot FAP-2000
- Program course change of the Autopilot FAP-2000
- Radar steering (available on some ARPA radars)

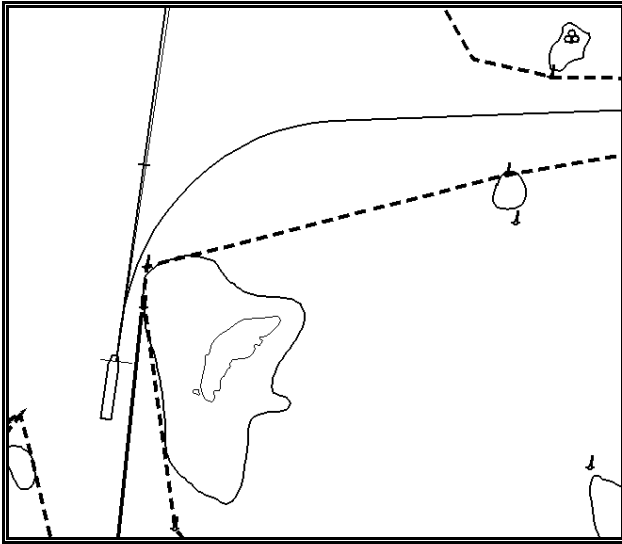
The curved EBL is locked to its position when your ship initiates a turn by

- Automatic route steering: Goto WP or Goto Track
- Program track of the Autopilot FAP-2000
- Program course change of the Autopilot FAP-2000
- Radar steering: New set course from ARPA radar (available on some ARPA radars)

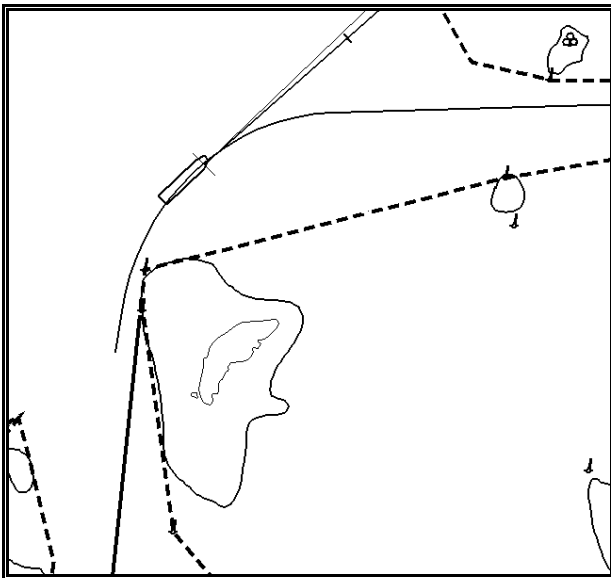
During the turn you can monitor how your ship performs the intended maneuver against the plan by comparing the Curved EBL position and your current your ship's position.



Curved EBL designed before the wheel over point



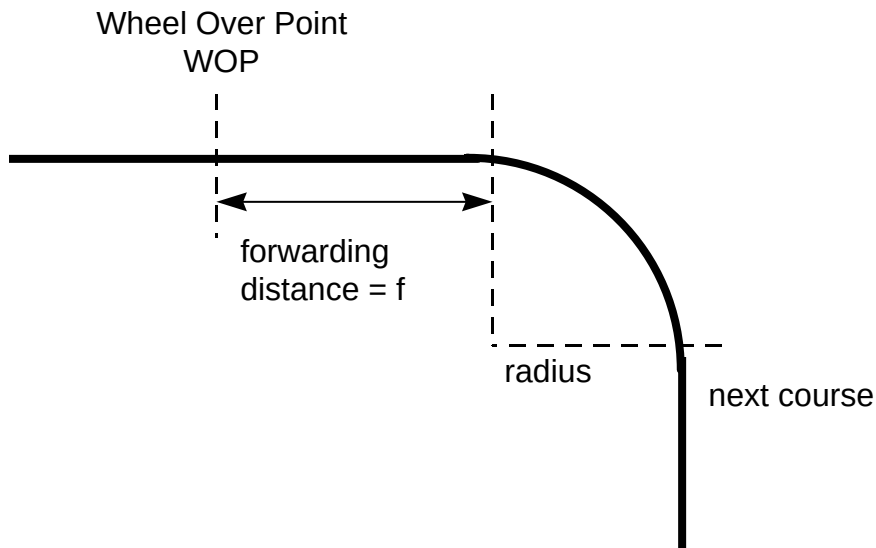
Curved EBL at the wheel over point



Curved EBL locked during turn

28.12.1 Structure of the curved EBL

The curved EBL consists of a straight part at its beginning called "forwarding distance". Then an arc with chosen radius and finally an EBL in the direction of the newly requested set course. See the figure below.



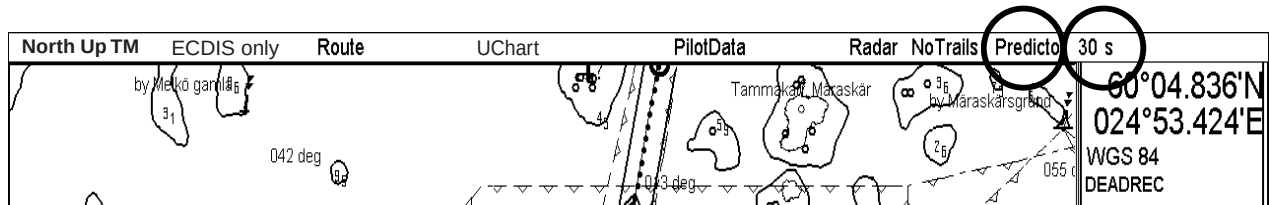
You may adjust forwarding distances to suit your ship's characteristics. For further details see Chapter 25 Parameters Setup.

28.12.2 Use of curved EBL to design a new turn while ship is turning

Program Course Change and Program track steering modes allow you to design turns before you execute them. The system displays only one curved EBL. A newly designed turn takes priority over the currently displayed turn. If turn design is available from the Program Heading Change or Program track steering mode, the curved EBL shows it. If no turn design is available, the curved EBL shows current turn.

28.13 Using the Predictor

The Predictor is a tool for estimating your ship's future positions and behavior, and it is available on the status bar. Place the cursor on the text "Predictor" then use left mouse button to toggle the predictor ON/OFF. The current setting is shown in the mouse functions area. To set the time for the predictor, put the cursor on the time indication next to Predictor, spin the scrollwheel to choose a time then push the scrollwheel. The time from current position to the last of the predicted position may be chosen by the between 30 and 180 seconds, in 30 second intervals. The on-screen Predictor graphic consists of five pieces of your ships drawn in true scale to successive future positions.

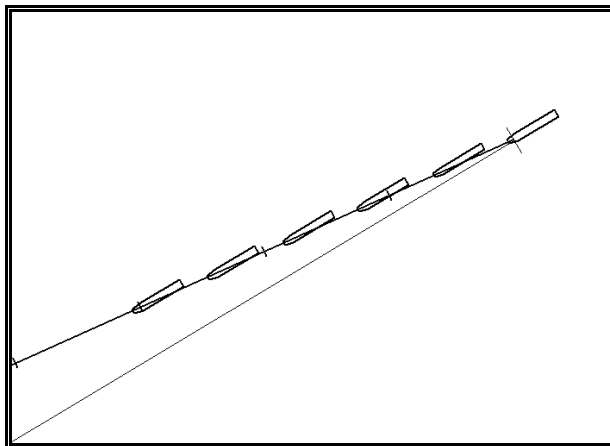


The predictor is calculated using current:

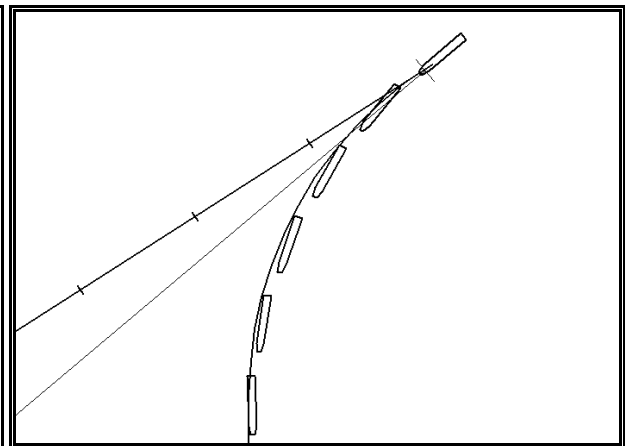
- Docking speed components:
 - Transversal bow speed
 - Transversal stern speed
 - Longitudinal center speed
- Rate of turn

These components are assumed to be stable during the prediction period.

The predictor can be used in every steering-state, even when steering without the Autopilot FAP-2000.



Predictor shows drift



Predictor in a turn

28. Steering with FURUNO Autopilot FAP-2000

This page intentionally left blank.

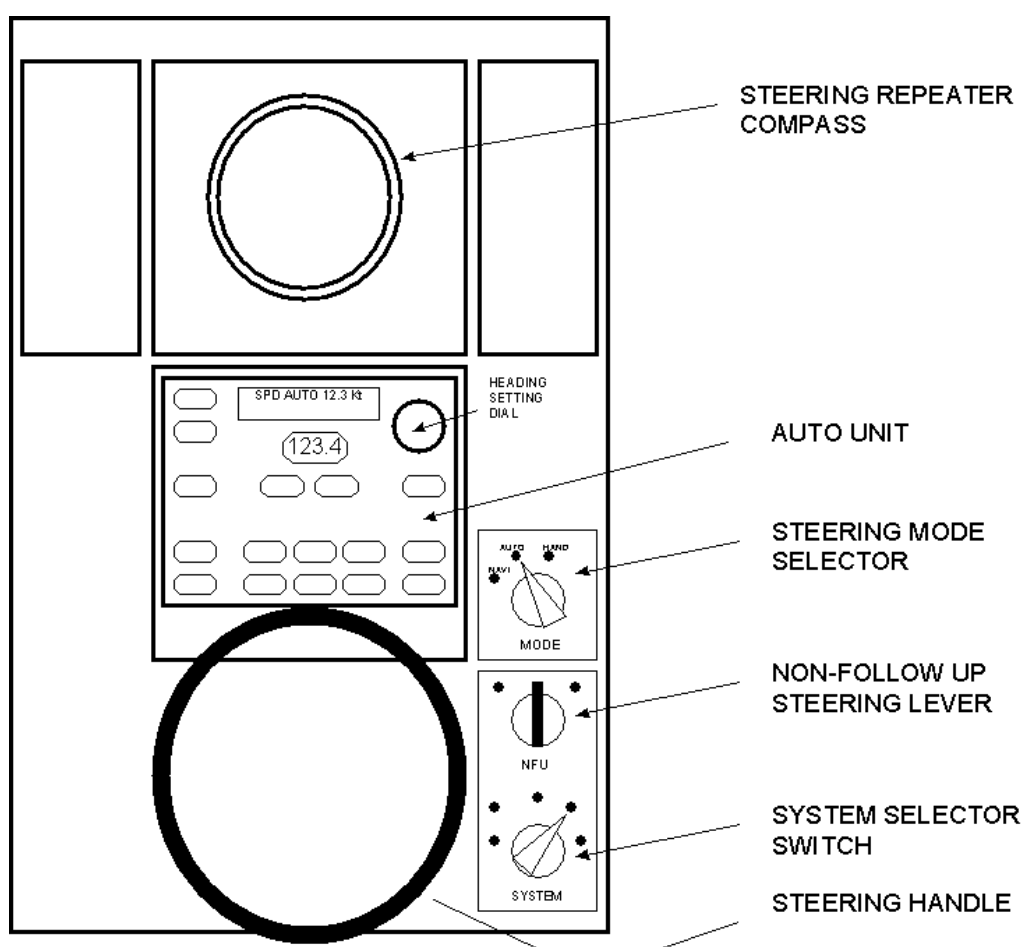
29. Steering with YOKOGAWA Autopilot PT-500A

29.1 Introduction

This chapter describes steering functions available with the YOKOGAWA Autopilot PT-500A.

29.2 Steering Control Unit

Below is layout of Autopilot PT-500AA autopilot steering control unit.



29.3 Steering Modes of the System

Note that all steering related functions are available only if the ECDIS system is also connected to an optional Autopilot PT-500AA autopilot processor.

With Autopilot PT-500AA autopilot following steering modes are available:

- Hand steering (Mode selector: HAND)
- Autopilot steering (Mode selector: AUTO)
- Track mode automatic Route steering (Mode selector: NAVI)

Note: to use any of above steering modes **SYSTEM STEERING SWITCH** must be switched as **FU** (Follow Up).

29.3.1 Hand steering (Mode selector: HAND)

Switch Steering mode selector to "HAND".

While in hand steering mode the ECDIS system displays the rudder angle and indication of steering mode.

29.3.2 Autopilot steering (Mode selector: AUTO)

Autopilot steering mode:

- Operator sets the required heading of the vessel using "Heading Setting Dial".
- Turns are controlled by the rudder limit
- Turn is initiated by operator

While in Autopilot steering mode the ECDIS system displays the rudder angle and indication of steering mode. The Curved EBL is not available because the use of it requires radius controlled turns.

29.3.3 Track mode automatic route steering (Mode selector: NAVI)

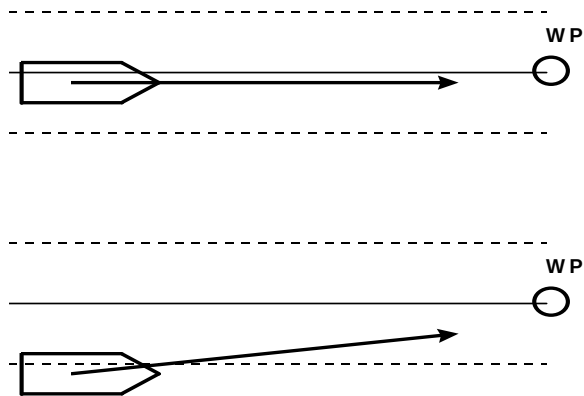
The ECDIS system will follow the planned track to next waypoint but with a moderate accuracy in order to have more economic sailing (sailing in ocean areas).

When approaching the next waypoint the system is pre alerting operator well before the turn and just before the turn a second acknowledge is required.

The ECDIS system performs turns using planned radius.

29.4 Automatic Route Steering

Automatic route steering can be used with predefined monitored route. It can be activated when vessel is located inside a channel of monitored route.



The figure above demonstrates performance of the automatic route steering.

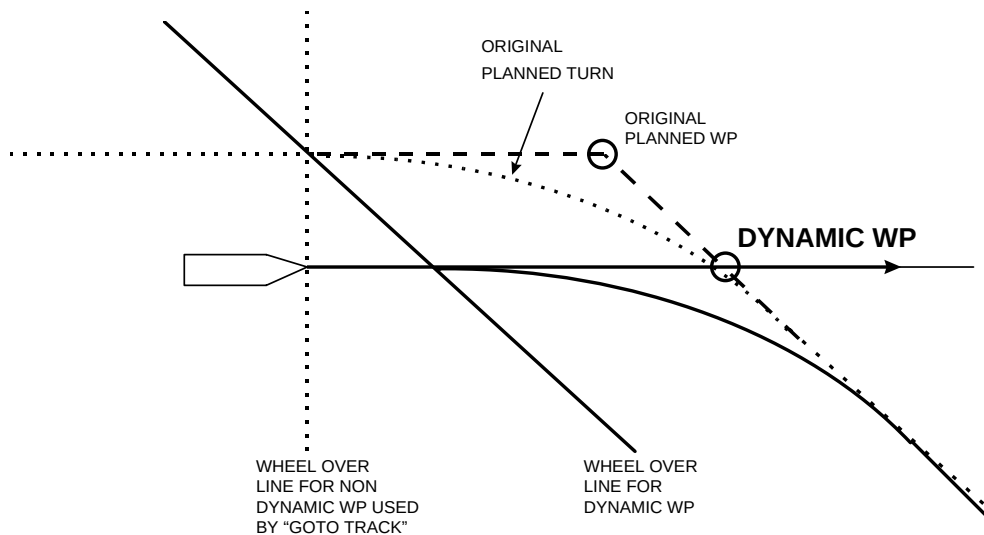


Figure above to understand how location of Dynamic WP is defined when "NAVI" steering mode is used.

29.4.1 Characteristics of automatic route steering

Steering is course controlled with set radius between waypoints, if wind, current etc. effects the ship, the system tries to prevent the ship from drifting away from planned route. The system has three means to prevent drifting away from the planned route. They are most effective when used together. If cross track error is used alone, then your ship stabilises typically in a constant off track position. The means are:

- Measured cross track error from the center line, which is always active
- Drift compensation available from Route Parameters
- Gyro error compensation available from Route Parameters

During turns, if wind, current etc. effects the ship, the ship will drift away (inside or outside) from planned designed turn which is displayed on radar screen.

29.4.2 Summary of route steering

	GO TO WAYPOINT
Set heading	automatic
Set radius	automatic
Radius control	yes
Dynamic waypoint position	yes
Design before execution	yes
Full curved EBL on radar screen	yes
Wind, current etc. compensation in linear parts between wp.	low gain
Wind, current etc. compensation in turns	no
Needs gyro	yes
Needs log	yes
Precision of position equipment	good ²

29.4.3 Preconditions for route steering

Route steering requires that the position filter is used. See section 19.7 Filter Operation.

If you try to activate any of the route steering modes without the filter, you get alarm **"2470 Disabled: Needs filter on"** and **"2471 AP mode Conflict - Use AUTO"**. First change mode selector back to "AUTO" or "HAND" in YOKOGAWA autopilot panel then switch Kalman filter "ON". After that try again select "NAVI" mode.

Ship heading must point to the next waypoint and vessel must be located inside the channel limits of route, otherwise an alarm **"2468 Disabled - out of course"** or **"2477 Disabled: Out of channel"** is given.

If you loose the filter position while you perform automatic route steering, you get first alarm **"2475 Route: Needs filter on"** then alarm **"2506 Use Heading Control"**

² Precision of position is good with LORAN and GPS.

29.4.4 Activating route steering

Activate route steering by selecting mode "NAVI" in the YOKOGAWA autopilot panel.

Track

If "NAVI" is selected, indication "**Track**" appears in Route Monitor window of ECDIS display.

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185m
Off track	<147m
Track	

If the ECDIS did not accept the requested route steering mode, then there is an "**Autopilot Conflict**" indication in Route Monitor window of the ECDIS Display.

Also alarms "**2470 Disabled: Needs filter on**" and "**2471 AP mode Conflict - Use AUTO**" appear.

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185m
Off track	<147m
Autopilot Conflict	

In YOKOGAWA steering control unit text "Caution-01 CHANGE TO AUTO" appears with buzzer sound.

When route steering is not used, there is an empty indication in Route Monitor window of the ECDIS Display

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185m
Off track	<147m

There are several reasons why the requested route steering mode cannot be accepted:

Alarm "**2470 Disabled: Needs filter on**" informs you that you didn't have the Kalman filter operative and selected in ON position at the time of request. Route steering requires that you use Kalman filter, because the filter eliminates sudden jumps of the position and thus prevents unpredictable maneuvers of your ship. Check your selection of the sensors. See more information at Filter Operation

Alarm "**2490 Disabled: Needs log sensor**" informs you that the Kalman filter did not have an independent speed source. You need either a log, a dual-axis log or two position receivers. Check your selection of the sensors. See more information at Filter Operation

Alarm "**2468 Disabled: Out of course**" informs you that the current heading of your ship and the required set heading to start the route steering has more difference than set by the operator in the **Route start limit angle** of Route Parameters.

Alarm "**2471 AP mode Conflict - Use AUTO**" informs you that ECDIS and YOKOGAWA autopilot cannot perform route steering mode. First change mode from "NAVI" to "AUTO" then check that preconditions for route steering are fulfilled.

Alarm "**2477 Disabled: Out of channel**" informs you that the current location of ship is not inside channel of monitored route.

Alarm "**2464 Route: No selected route**" informs you that there is no route selected for route monitoring.

Alarm "**2465 Route: Illegal WP**" informs you that there is a route selected for route monitoring, but the selection of the next or final waypoint is missing or illegal.

29.4.5 Arrival to a waypoint

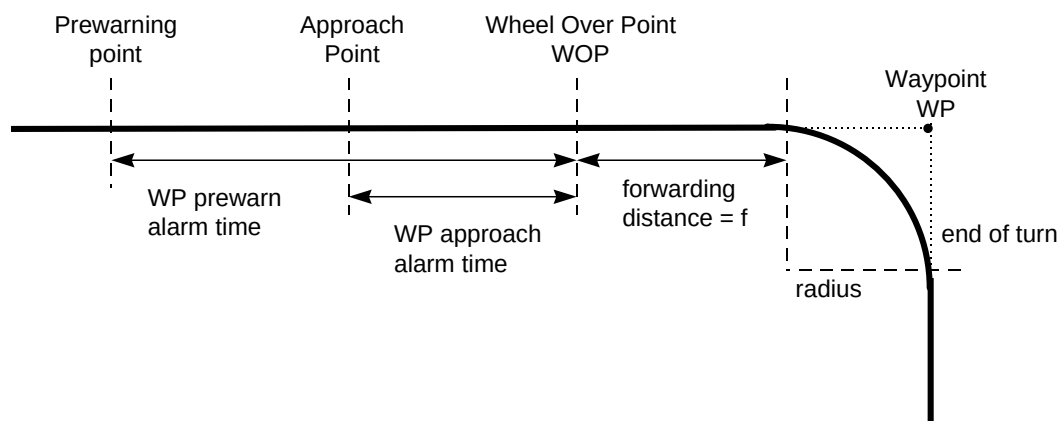
Automatic route steering navigation tries to keep the ship always inside the channel limits and going to next waypoint. Well before the next waypoint, there will be an alarm **2485 ROUTE WP PREWARNING**. As soon as the alarm appears verify that the maneuver is safe and there are no dangerous targets. If the maneuver can be performed press the **ALARM ACK** button on the ECDIS control unit. If the maneuver is impossible you can leave the automatic route steering changing "NAVI" to "AUTO" or to "HAND" mode in YOKOGAWA autopilot control unit.

TURN IS ALWAYS ENABLED. THE ONLY WAY TO DISABLE THE AUTOMATIC TURN IS TO SELECT ANOTHER STEERING MODE EXCEPT "NAVI" FROM YOKOGAWA Autopilot

Note that alarm 2485 is programmable (the time before turn) and it is relative to the starting point of the maneuver. See Figure.

At the moment the next waypoint is about to be reached, there will be a second alarm "**2451 Route: WP approach alarm**". **In case that you have acknowledged alarm 2485, then alarm 2451 (silent) appears.**

Note that also alarm 2451 is programmable (the time before turn) and it is relative to the starting point of the maneuver. See the figure below.:



As soon as the ship arrives to the wheel over point the ECDIS sends a new course command to the autopilot and the maneuver is started. During a maneuver the radar display and ECDIS display shows the CURVED EBL indicating the planned radius for maneuver.

After acknowledge of the waypoint approach alarm the text "**Ass. Turn enabled**" appears in Route Monitor window of ECDIS display.

Plan Speed	20.0 Kt
Plan	232.6°
Route	230.7°
Ch limit	185 m
Off track	>59 m
Ass. Turn enabled	

During the turn the text "**Assisted Turn**" appears in Route Monitor window of ECDIS display.

Plan Speed	20.0 Kt
Plan	283.3°
Route	283.3°
Ch limit	185 m
Off track	<7 m
Assisted Turn	

Note: Approaching the last waypoint will give an alarm "**2458 Route: Last WP approach**". With YOKOGAWA autopilot one should leave "NAVI" mode of the YOKOGAWA autopilot before performing acknowledge of the alarm **2458**. This will terminate the route correctly. If one acknowledge alarm **2458**, when YOKOGAWA autopilot is still in "NAVI" mode, then the route steering is automatically terminated and system generates alarm "**2471 AP mode Conflict - Use AUTO**".

29.4.6 Route steering alarms

The alarms relevant to the Steering are of two types (permanent and intermittent).

Permanent alarms below are available regardless of the steering mode used:

Outside Channel

red color of the "Off track" value

orange color text "**Outside Channel**"

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185 m
Off track	<247 m
Track	
Outside Channel	

Out of Gate is indicated by orange text. Out of gate indicates that, if your ship continues using the current course, then your ship will be outside of the channel at wheel over point.

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185 m
Off track	<247 m
Track	
Out of Gate	

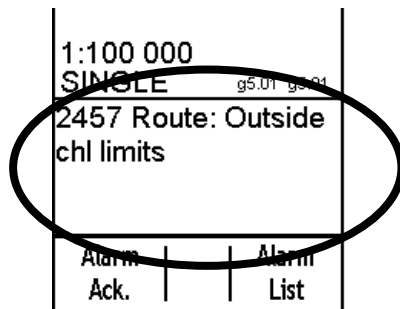
Permanent alarm below is available only during route steering mode:

Rate of Turn Limit is indicated by orange text

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185 m
Off track	<247 m
Track	
Rate of Turn limit	

Intermittent audio/visual alarms appear as follows:

- visual alarm and buzzer is located in ECDIS control unit.
- alarm number and text is visible on the lower right corner of the ECDIS display (see example below)



Typical intermittent alarms not described in other sections are:

Alarm "**2455 Route: off course**" appears when the system needs more than a set limit (the limit is available in Installation parameters) to keep the track. This alarm is repeated every 5 minutes, if the condition continues.

Alarm "**2456 Route: WP approach error**" appears when, when decreasing speed, for example, your ship is at the point "waypoint approach alarm time + 100 seconds" away from the wheel over point after the operator has acknowledged alarm "2451 Route: WP approach alarm" to enable the next automatic turn. After the alarm 2456 the next turn is not enabled and the system will generate a new alarm "2451 Route: Wp approach alarm" when appropriate.

Alarm "**2457 Route: Outside chl limit**" appears when your ship is outside the planned channel.

Alarm "**2460 Pilot: ROT will be exceed**" appears when the set radius value together with the current speed of the ship request rate of turn which is over the limit set in the Route Parameter **Max. rate of turn**.

Alarm "**2461 Route: ROT will be exceed**" appears when the planned radius for next waypoint together with the current speed of the ship request rate of turn which is over the limit set in Route Parameter **Max. rate of turn**. This alarm is activated if your ship is within value **WP approach alarm time** set in the Route Parameters from the wheel over point.

29. Steering With YOKOGAWA Autopilot PT-500A

Alarm **"2469 Autopilot: off course"** appears when the autopilot needs more than a set limit (the limit is available in Installation parameters for Track mode). This alarm is repeated every 5 minutes, if the condition continues.

Alarm **"2471 AP mode Conflict - Use AUTO"** informs you that neither ECDIS nor the YOKOGAWA autopilot can do activate the track steering mode. First change the mode from "NAVI" to "AUTO" then check that preconditions for route steering are fulfilled.

Alarm **"2475 Route: Needs filter on"** appears when the position from the Kalman filter is not available. This alarm is repeated every 15 seconds, if the condition continues.

Alarm **"2476 Route: Needs log sensor"** appears when the position from the Kalman filter cannot be compared against an independently operating log. This alarm is repeated every 15 seconds, if the condition continues.

Alarm **"2488 Integrated Steering lost"** appears when the connection to the autopilot is lost during automatic route steering and the used integrated steering mode cannot be continued. **NOTE:** Normally you get first alarm **"2480 Autopilot Receive error"**

Alarm **"2497 Route: Stop - Sensor Fail"** appears when no gyro data is received or if the conditions of alarm 2475 or 2476 have been valid for last minute.

Alarm **"2506 Route:Use AUTO control"** is instruction for the operator to change the steering mode to AUTO. This alarm is generated if there are not sufficient conditions to continue the Track mode (i.e. alarm 2475 or 2476 has been valid 10-15 seconds).

Alarm **"2511 Route:Auto resume disable"** appears when alarm 2471 has been generated and later the condition for alarm 2471 disappears without changing the steering mode from "NAVI" to "AUTO" or "HAND". First change the steering mode to "AUTO" or "HAND" then check that the preconditions for route steering are fulfilled.

Alarm **"2512 Use NFU rudder control"** appears when the rudder servo unit cannot be controlled by the YOKOGAWA steering control unit. This alarm is generated to request a change to the Non Follow Up control of the rudder(s). First change using **System Selector Switch** from "FU" to "NFU" then use the **Non-Follow Up steering lever** to control rudder(s).

Alarm **"2514 Route:Complete turn"** is generated if there are not sufficient conditions to continue the Track mode during a turn (i.e. alarm 2475 or 2476 has been valid 10-15 seconds). Your ship will complete the turn with the planned conditions.

Alarm **"2515 Conflict - NAVI Compl. turn"** informs you that neither the ECDIS nor the YOKOGAWA autopilot can perform the track steering mode after a turn. The autopilot uses the planned radius to complete the turn. After the turn is completed, first change the mode from "NAVI" to "AUTO" then check that preconditions for route steering are fulfilled, to start the track steering mode again.

Alarm **"2516 Autopilot: Drift limit"** appears when the autopilot needs more than the set limit to compensate drift. (The limit is available in the Installation parameters for the Track mode (max drift compensation)). This alarm is repeated every 5 minutes, if the condition continues.

29.4.7 Collision avoidance maneuver during automatic route steering

Often the route steering is interrupted by a collision avoidance maneuver, but there are also several other reasons to interrupt the route steering.

There are several possibilities to set the collision avoidance or any other maneuver:

- Use the Non Follow Up steering lever to control directly rudder pumps
- Use the Follow Up rudder control (Change mode from "NAVI" to "HAND").
- Use the local Autopilot Heading control (Change mode from "NAVI" to "AUTO").

Now the route steering is disabled until the "NAVI" mode is again selected at the YOKOGAWA Autopilot. Note that for going back to route steering, the ship heading must point to the next waypoint and vessel must be located inside the channel limits, otherwise an alarm is given.

29.4.8 How to stop or modify already enabled route turn

There are two cases that the automatic route turn must be stopped or modified.

- The turn cannot be performed up to the final value.
- The turn goes outside of the planned turn. (Too fast or too slow).

Stop a turn

To stop a turn, change the steering mode from "NAVI" to "AUTO" on the YOKOGAWA steering control unit.

Modify turn

What do you want to do	How to do
Use value different from set course	The problem is that radius control is only available in the steering mode NAVI. As soon as you change the steering mode to something else, your ship stops following the radius. Below is what you can do. Change from "NAVI" to "AUTO". This stops turning completely as the current gyro heading is selected as the new set course for the Autopilot. Then, set a new final value for set course and select a suitable max. rudder angle to prevent too fast turning. Set the steering wheel to a suitable angle to continue approximate radius (i.e. equal rudder angle than before). Then change from "NAVI" to "HAND". Continue manual steering. Change from "NAVI" to "NFU". Then, use the NFU steering lever. Continue manual steering.
Compensate too fast turning	As soon as you change the steering mode to something other than "NAVI," your ship stops following the radius. Below is what you can do. Change from "NAVI" to "AUTO". This stops the turning completely as the current gyro heading is selected as the new set course for the autopilot. Then set a final value of set course and select a suitable max. rudder angle to prevent too fast turning. Set the steering wheel to a suitable angle to continue approximately larger radius (i.e. smaller rudder angle than before). Then, change from "NAVI" to "HAND". Continue manual steering. Change from "NAVI" to "NFU". Continue manual steering.
Compensate too slow turning	As soon as you change steering mode to something other than "NAVI" your ship stop following radius. Below is what you can do Set the steering wheel to a suitable angle to continue approximate smaller radius (i.e. higher rudder angle than before). Then, change from "NAVI" to "HAND". Continue manual steering. Change from "NAVI" to "NFU". Continue manual steering.

29.4.9 Notes

Accuracy of route steering

Accurate route steering is defined as a small cross track error when automatically following the route. Two of the Route Parameters - Drift compensation and Gyro error compensation - have a significant effect on the accuracy of route steering. If you need more accurate route steering, then both of these parameters should be enabled. Before activating the Gyro error compensation, see the section on **Gyro error correction** to understand the possible methods for gyro error compensation.

29.5 Other Operations with Autopilot PT-500A

29.5.1 Speed used by autopilot

The Autopilot uses the speed from its own log input interface during AUTO mode. The operator may choose its own log input or manual speed with the **SPEED** button.

When NAVI mode is selected, Autopilot switches automatically to the speed from the serial line coming from an integrated computer. This speed is called the "internal speed reference".

29.5.2 Control strategy used by autopilot

The operator may choose among ECONOMY, PRECISION 1 and PRECISION 2 by using the **OPERATION MODE** button.

Control strategy (ECONOMY, PRECISION 1 and PRECISION 2) chooses course-keeping accuracy

29.5.3 Load conditions used by autopilot

The operator may choose among BALLAST, MIDDLE and FULL by using the **DRAFT MODE** button.

Load condition (BALLAST, MIDDLE and FULL) chooses rudder gain.

29.6 Description of Alarms with Autopilot PT-500A

29.6.1 Alarms

- The ECDIS control unit ALARM ACK lamp goes on.
- Type of alarm is displayed on the display ECDIS display as number and text.
- Alarm is acknowledged by pushing the ECDIS control unit's **ALARM ACK** button.
- List of typical alarms:

2451	Route: WP approach alarm
2452	Route: Turning disabled
2455	Route: Off course
2456	Route: WP approach error
2458	Route: Last WP approach
2460	Pilot: ROT will be exceed
2461	Route: ROT will be exceed
2468	Disabled - out of course
2469	Autopilot: Off course
2470	Disabled: Needs filter ON
2471	AP mode Conflict - Use AUTO
2475	Route: Needs filter ON
2476	Route: Needs log sensor
2485	Route: WP prewarning
2497	Route: Stop - Sensor Fail
2506	Route: Use AUTO control
2511	Route: Auto resume disable
2512	Use NFU rudder control
2514	Route: NAVI complete turn
2515	Conflict - NAVI complete turn
2516	Autopilot: Drift limit

29.6.2 Errors

Errors should not happen during normal operation. They are related to internal problems.

Integrated operation related alarms

The ECDIS control unit's ALARM ACK lamp goes on, type of alarm is displayed on the ECDIS display as number, and text alarm is acknowledged by pushing the ECDIS control unit's **ALARM ACK** button.

List of typical alarms:

2480	Auto pilot receive error
2488	Integrated steering lost

29.7 Expected Steering Performance Under Various Conditions

The system has many available steering modes. Below is a summary of effect of various environmental conditions

29.7.1 Expected steering performance for going ahead

Environment conditions	Heading control = "AUTO"	Track = "NAVI"
Calm sea, no wind, no current	COG is about the same as Set Course in Auto Pilot	Drift compensation set as ON or OFF: vessel follows monitored route
Moderate wind and/or current	Vessel has at tendency to drift	Drift compensation set as ON: vessel follows monitored route Drift compensation set as OFF: vessel follows monitored route in an off-track position inside the channel limit
High wind and/or current	Vessel is drifting	Drift compensation set as ON: vessel follows monitored route Drift compensation set as OFF: vessel may have troubles to follow monitored route inside the channel limit
Slow change of wind and/or current	There is no compensation for change	Drift compensation set as ON: vessel follows monitored route, but may need full channel limit area Drift compensation set as OFF: vessel may have troubles to follow monitored route inside the channel limit
Sudden change of wind and/or current (For example sudden change from no current to 5 kt current perpendicular to track)	There is no compensation for change	Drift compensation set as ON: vessel follows monitored route, but may need full channel limit area vessel may go outside channel limit and return back inside channel limit Drift compensation set as OFF: vessel may have troubles to follow monitored route inside the channel limit
Slow change of speed	There is no compensation for change	Drift compensation set as ON: vessel follows monitored route Drift compensation set as OFF: vessel may have troubles to follow monitored route inside the channel limit
Fast change of speed (For example speed decrease from 20 to 7 kt)	There is no compensation for change	Drift compensation set as ON: vessel follows monitored route, but may need full channel limit area vessel may go outside channel limit and return back inside channel limit Drift compensation set as OFF: vessel may have troubles to follow monitored route inside the channel limit

29.7.2 Expected steering performance for turns

Environment conditions	Heading control	Track
Calm sea, no wind, no current	There is no position control of turn. Turn is controlled by rudder angle limit.	Drift compensation set as ON or OFF: vessel follows monitored route
Moderate wind and/or current	There is no position control of turn. Turn is controlled by rudder angle limit.	Drift compensation set as ON: vessel follows monitored route, but may need full channel limit area Drift compensation set as OFF: Vessel goes inside or outside of turn
High wind and/or current	There is no position control of turn. Turn is controlled by rudder angle limit.	Drift compensation set as ON: Vessel follows monitored route, but may go outside channel limit area. Drift compensation set as OFF: Vessel goes fast inside or outside of turn.
Slow change of wind and/or current	There is no position control of turn. Turn is controlled by rudder angle limit.	Drift compensation set as ON or OFF: Vessel goes inside or outside of turn.
Sudden change of wind and/or current (For example sudden change from no current to 5 kt current perpendicular to track)	There is no position control of turn. Turn is controlled by rudder angle limit.	Drift compensation set as ON or OFF: Vessel goes fast inside or outside of turn.
Slow change of speed	There is no position control of turn. Turn is controlled by rudder angle limit.	Drift compensation set as ON or OFF: Vessel follows monitored route, but may need full channel limit area.
Fast change of speed (For example speed decrease from 20 to 7 kt)	There is no position control of turn. Turn is controlled by rudder angle limit.	Drift compensation set as ON or OFF: Vessel goes inside or outside of turn.

NOTE; Drift Compensation is set ON/OFF in Ship and Route Parameters of Navigation Parameters setting. For more information, see section 25.1.4 Navigation parameters setting.

29.8 Expected Steering Performance Under Critical Failure

Below is a summary of system behaviour in various failures when the "NAVI" steering mode is used.

29.8.1 Lost heading from autopilot (ECDIS may also have lost heading)

	Associated alarms	Expected system performance	What end operator should do
Immediately	Autopilot Alarm "EMERGENCY-05 Gyro Compass" is generated on Auto pilot control panel Sensor alarm "4055: Gyro error (Autopilot FAP-2000)" is generated at ECDIS.	If ship is in linear part, Rudder order is frozen for last value in order to approximately continue ahead. If ship is turning, rudder order is frozen for last value in order to approximately continue rate of turn.	Change immediately to manual control of rudder. Acknowledge alarms. Study situation.
Within few seconds	Alarm "2497 Route Stop-Sensor fail." Alarm "2471 AP mode conflict - Use AUTO" on ECDIS"		Change immediately to manual control of rudder. Acknowledge alarms. Study situation.
Repeat every 2 minutes	Alarm "2498 Use manual rudder control" is generated at ECDIS.	Reminder	Change immediately to manual control of rudder.

29.8.2 Lost heading from ECDIS (Autopilot still has heading)

	Associated alarms	Expected system performance	What end operator should do
	Sensor alarm, for example Alarm "4005: Gyro error" or "4006: Gyro error."		Acknowledge alarms. Study situation.
Within few seconds	Alarm "2002 No heading available" and alarm "2000 Filter: position Unreliable". Alarm "2497 Route Stop-Sensor fail"		Acknowledge alarms. Study situation.
After Alarm "2497 Route Stop-Sensor fail."	If vessel is in linear part of route alarm "2471 AP mode conflict - Use AUTO" in ECDIS and alarm "CAUTION-01 CHANGE TO AUTO" on Autopilot control panel If vessel is in turning part of route alarm "2515 Conflict-NAVI compl. Turn" in ECDIS and alarm "CAUTION-01 NAVI COMPL TURN" in Autopilot control panel. After the turn is completed the alarm changes in ECDIS as "2471 AP mode conflict - Use AUTO" and in Autopilot control panel as "CAUTION-01 CHANGE TO AUTO "	If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius are used to complete the turn as long as Autopilot mode selector is kept in position "NAVI".	Acknowledge alarms Study situation. If vessel is in linear part then Change steering mode to AUTO. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.

29.8.3 Lost speed

	Associated alarms	Expected system performance	What end operator should do
	Sensor alarm, for example Alarm "4008: Log error", "4012...4016: Position equipment error", etc.		Acknowledge alarms. Study situation.
Within 30 seconds	Alarm "2476 Route Needs log sensor"		Acknowledge alarms. Study situation.
After 2 minutes then every 4 minutes	If vessel is in linear part of route alarm "2506 Route: Use AUTO control" If vessel is in turning part of route alarm "2514 Route: NAVI complete turn"	Guidance for navigator	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
After 4 minutes then every 4 minutes	Alarm "2476 Route Needs log sensor"	Reminder	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail."		Acknowledge alarms. Study situation.
After Alarm "2497 Route Stop-Sensor fail."	If vessel is in linear part of route alarm "2471 AP mode conflict - Use AUTO" in ECDIS and alarm "CAUTION-01 CHANGE TO AUTO " on Autopilot control panel If vessel is in turning part of route alarm "2515 Conflict-NAVI compl. Turn" in ECDIS and alarm "CAUTION-01 NAVI COMPL TURN" in Autopilot control panel. After the turn is completed the alarm changes in ECDIS as "2471 AP mode conflict - Use AUTO" and in Autopilot control panel as "CAUTION-01 CHANGE TO AUTO "	If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius are used to complete the turn as long as Autopilot mode selector is kept in position "NAVI".	Acknowledge alarms Study situation. If vessel is in linear part then Change steering mode to AUTO. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.

29.8.4 Low speed

	Associated alarms	Expected system performance	What end operator should do
	Alarm "2008 Filter: Speed below xx."		Acknowledge alarms. Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source change."		Acknowledge alarms. Study situation.
Within 30 seconds	Alarm "2501 Route: Needs higher Speed."		Acknowledge alarms. Study situation.
After 2 minutes then every 4 minutes	If vessel is in linear part of route alarm "2506 Route: Use AUTO control" If vessel is in turning part of route alarm "2514 Route: NAVI complete turn"	Guidance for navigator	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
After 4 minutes then every 4 minutes	Alarm "2501 Route: Needs higher Speed."	Reminder	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail."		Acknowledge alarms. Study situation.
After Alarm "2497 Route Stop-Sensor fail."	If vessel is in linear part of route alarm "2471 AP mode conflict - Use AUTO" in ECDIS and alarm "CAUTION-01 CHANGE TO AUTO " on Autopilot control panel If vessel is in turning part of route alarm "2515 Conflict-NAVI compl. Turn" in ECDIS and alarm "CAUTION-01 NAVI COMPL TURN" in Autopilot control panel. After the turn is completed the alarm changes in ECDIS as "2471 AP mode conflict - Use AUTO" and in Autopilot control panel as "CAUTION-01 CHANGE TO AUTO "	If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius are used to complete the turn as long as Autopilot mode selector is kept in position "NAVI".	Acknowledge alarms Study situation. If vessel is in linear part then Change steering mode to AUTO. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.

29.8.5 Total lost position

	Associated alarms	Expected system performance	What end operator should do
	Alarm "4012...4016: Position equipment error" OR Kalman filter detects jump, etc.		Acknowledge alarms. Study situation.
Within 30 seconds	Alarms "2000 Filter: Position unreliable" and "2006 Route: Course jump possible."	Kalman Filter is switched Off and system uses dead reckoning for positioning. If you have log or dual-axis log, then dead reckoning is based on them and gyro. If you have log or dual-axis log, then dead reckoning is based on last plausible speed from position sensors. This is indicated by showing your ship's position, SOG and COG in red. The source indication for SOG and COG is "(LAST)".	Acknowledge alarms. Study situation.
After 2 minutes then every 4 minutes	If vessel is in linear part of route alarm "2506 Route: Use AUTO control" If vessel is in turning part of route alarm "2514 Route: NAVI complete turn"	Guidance for navigator	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
After 4 minutes then every 4 minutes	Alarm "2475 Route Needs filter ON"	Reminder	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
Within 10 minutes	Alarm "2497 Route Stop- Sensor fail."		Acknowledge alarms. Study situation.

<CONTINUED>

<Continued from previous page>

After Alarm "2497 Route Stop-Sensor fail."	If vessel is in linear part of route alarm "2471 AP mode conflict - Use AUTO" in ECDIS and alarm "CAUTION-01 CHANGE TO AUTO " on Autopilot control panel If vessel is in turning part of route alarm "2515 Conflict-NAVI compl. Turn" in ECDIS and alarm "CAUTION-01 NAVI COMPL TURN" in Autopilot control panel. After the turn is completed the alarm changes in ECDIS as "2471 AP mode conflict - Use AUTO" and in Autopilot control panel as "CAUTION-01 CHANGE TO AUTO "	If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius are used to complete the turn as long as Autopilot mode selector is kept in position "NAVI".	Acknowledge alarms Study situation. If vessel is in linear part then Change steering mode to AUTO. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
---	---	--	---

29.8.6 Lost differential position and position discrepancy

	Associated alarms	Expected system performance	What end operator should do
Precondition	If sensors in Filter calculation are NOT inside operator chosen position discrepancy limit. Alarm "2007 Position discrepancy"		Acknowledge alarms. Study situation.
	Alarm "4027...4031: Lost DGPS" or "4012...4016: Position equipment error"		Acknowledge alarms. Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source changed"		Acknowledge alarms. Study situation.
Within 30 seconds	Alarm "2478 Route: Needs good Pos"		Acknowledge alarms. Study situation.
After 2 minutes then every 4 minutes	If vessel is in linear part of route alarm "2506 Route: Use AUTO control" If vessel is in turning part of route alarm "2514 Route: NAVI complete turn"	Guidance for navigator	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
After 4 minutes then every 4 minutes	Alarm "2478 Route: Needs good Pos"	Reminder	Acknowledge alarms. Study situation. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail."		Acknowledge alarms. Study situation.

<CONTINUED>

<Continued from previous page>

	Associated alarms	Expected system performance	What end operator should do
After Alarm "2497 Route Stop-Sensor fail."	If vessel is in linear part of route alarm "2471 AP mode conflict - Use AUTO" in ECDIS and alarm "CAUTION-01 CHANGE TO AUTO " on Autopilot control panel If vessel is in turning part of route alarm "2515 Conflict-NAVI compl. Turn" in ECDIS and alarm "CAUTION-01 NAVI COMPL TURN" in Autopilot control panel. After the turn is completed the alarm changes in ECDIS as "2471 AP mode conflict - Use AUTO" and in Autopilot control panel as "CAUTION-01 CHANGE TO AUTO "	If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius are used to complete the turn as long as Autopilot mode selector is kept in position "NAVI".	Acknowledge alarms Study situation. If vessel is in linear part then Change steering mode to AUTO. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.

29.8.7 ECDIS lost messages from Autopilot

	Associated alarms	Expected system performance	What end operator should do
Within 15 seconds	Alarm "2488 Steering: Stop-system fail" generated at ECDIS.		Acknowledge alarms. Study situation.
After Alarm "2488 Route Stop-Sensor fail."	If vessel is in linear part of route alarm "2471 AP mode conflict - Use AUTO" in ECDIS and alarm "CAUTION-01 CHANGE TO AUTO " on Autopilot control panel If vessel is in turning part of route alarm "2515 Conflict-NAVI compl. Turn" in ECDIS and alarm "CAUTION-01 NAVI COMPL TURN" in Autopilot control panel. After the turn is completed the alarm changes in ECDIS as "2471 AP mode conflict - Use AUTO" and in Autopilot control panel as "CAUTION-01 CHANGE TO AUTO".	If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius are used to complete the turn as long as Autopilot mode selector is kept in position "NAVI".	Acknowledge alarms Study situation. If vessel is in linear part then Change steering mode to AUTO. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.

29.8.8 Autopilot lost messages form ECDIS

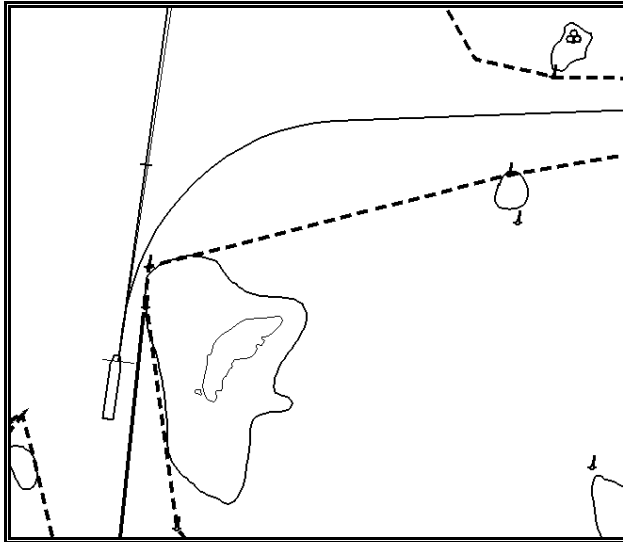
	Associated alarms	Expected system performance	What end operator should do
Within 15 seconds	Alarm "2488 Steering: Stop-system fail" and "2480 Autopilot FAP-2000 Receive error" is generated at the ECDIS.	.	Acknowledge alarms. Study situation.
After Alarm "2488 Route Stop-Sensor fail."	If vessel is in linear part of route alarm "2471 AP mode conflict - Use AUTO" in ECDIS and alarm "CAUTION-01 CHANGE TO AUTO" on Autopilot control panel If vessel is in turning part of route alarm "2515 Conflict-NAVI compl. Turn" in ECDIS and alarm "CAUTION-01 NAVI COMPL TURN" in Autopilot control panel. After the turn is completed the alarm changes in ECDIS as "2471 AP mode conflict - Use AUTO" and in Autopilot control panel as "CAUTION-01 CHANGE TO AUTO"	If ship is in linear part, actual heading is used as set heading. If ship is turning, last-set heading and radius are used to complete the turn as long as Autopilot mode selector is kept in position "NAVI".	Acknowledge alarms Study situation. If vessel is in linear part then Change steering mode to AUTO. If vessel is in turning state, then either keep steering mode NAVI to complete the turn or change to steering mode AUTO to stop turning.

29.9 How to Use the Curved EBL with YOKOGAWA PT-500A Autopilot

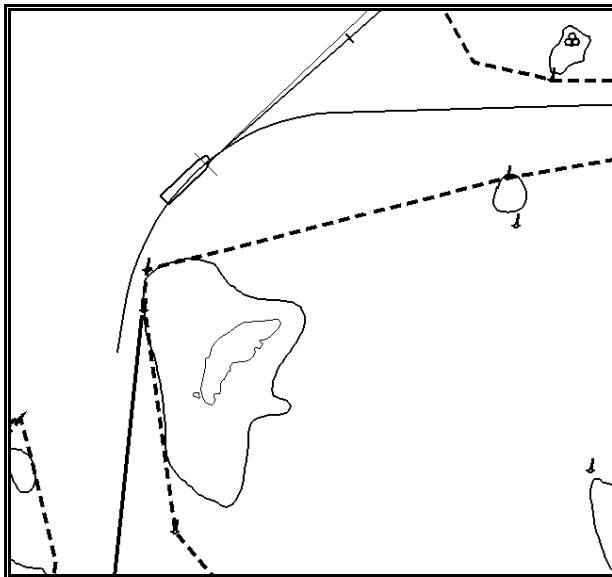
The curved EBL is a control tool to monitor automatic operation of Goto Waypoint (= "NAVI") steering mode. This EBL is available on the ECDIS display and selected ARPA radar displays.

After the WP Approach but before start of turn, the curved EBL displays the next intended turn. When your ship starts a turn initiated by Automatic Route steering the Curved EBL is locked to its position.

During the turn you can monitor how your ship performs the intended maneuver against the plan by comparing the Curved EBL position and your current your ship's position.



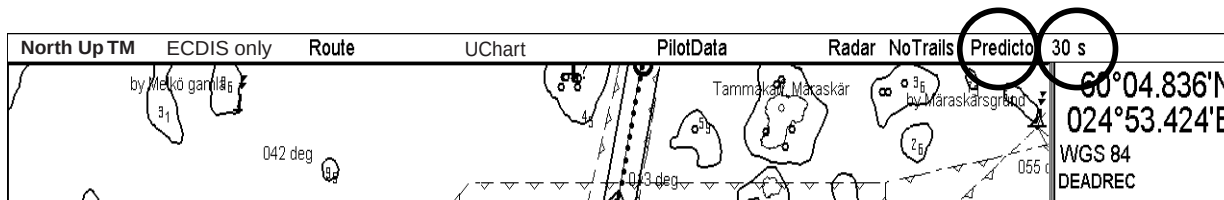
Curved EBL at the wheel over point.



Locked Curved EBL during turn.

29.10 Using the Predictor

The Predictor is a tool for estimating your ship's future positions and behaviour, and it is available on the status bar. Place the cursor on the text "Predictor" then use left mouse button to toggle the predictor ON/OFF. The current setting is shown in the mouse functions area. To set the time for the predictor, put the cursor on the time indication next to Predictor, spin the scrollwheel to choose a time then push the scrollwheel. The time from current position to the last of the predicted position may be chosen by the between 30 and 180 seconds, in 30 second intervals. The on-screen Predictor graphic consists of five pieces of your ships drawn in true scale to successive future positions.

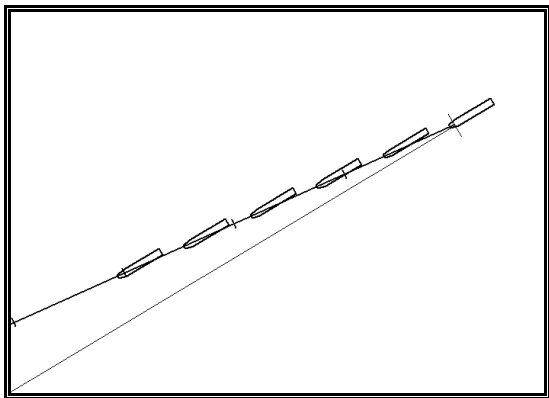


The predictor is calculated using current:

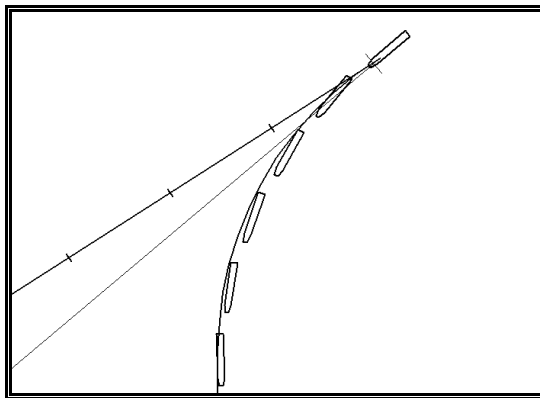
- Docking speed components:
 - Transversal bow speed
 - Transversal stern speed
 - Longitudinal center speed
- Rate of turn

These components are assumed to be stable during the prediction period.

The predictor can be used in every steering-state, even when steering without the Autopilot FAP-2000.



Predictor shows drift



Predictor in a turn

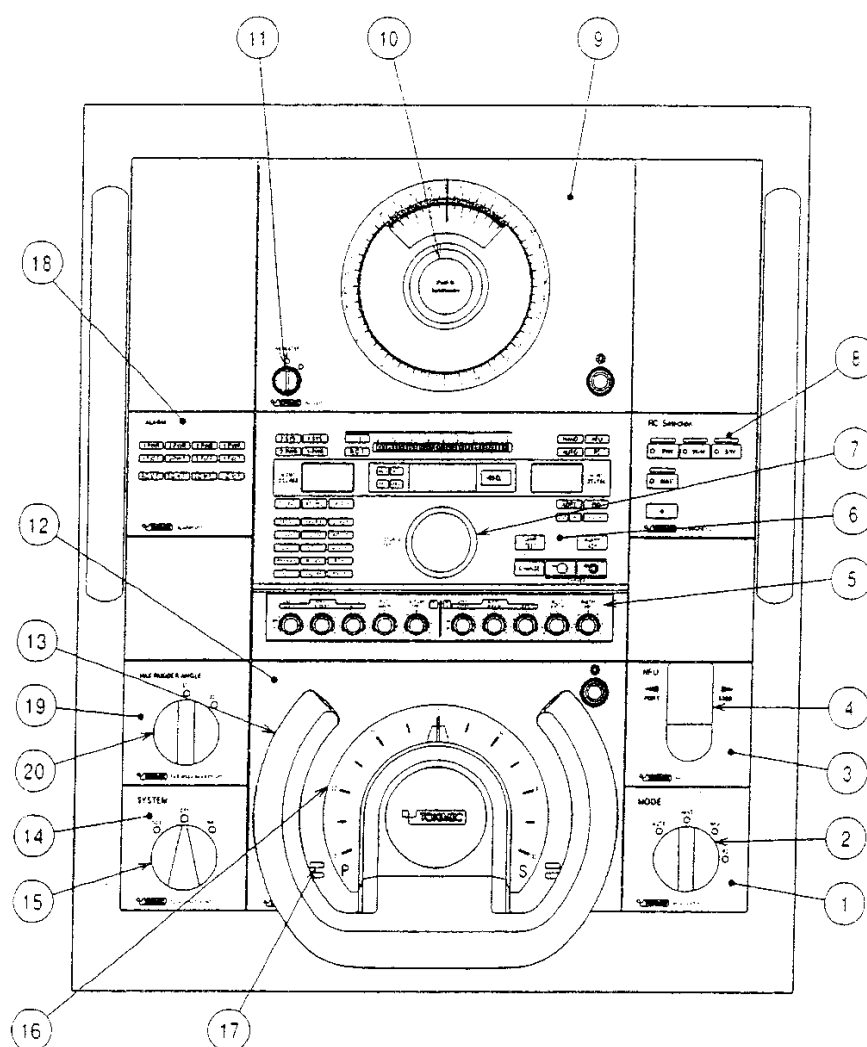
30. Steering with TOKYO KEIKI Autopilot PR-6000

30.1 Introduction

This chapter describes the steering functions available with the optional Autopilot PR-6000.

30.2 Steering Control Unit

Below is the control layout of the autopilot steering control unit.



Autopilot PR-6000 control panel

1. Mode selection unit
2. Mode selection switch
3. Non-Follow up unit

32. Steering With TOKYO KEIKI Autopilot PR-6000

4. Non-Follow up steering lever
5. Auto steering control knobs
6. Auto unit
7. Course setting knob
8. Remote control steering selection unit
9. Repeater unit
10. Repeater synchronising knob
11. Repeater switch
12. Helm unit
13. Steering wheel
14. System selection unit
15. System selection switch
16. Order rudder angle indicator
17. PS display lamps
18. Alarm unit
19. Max rudder angle selection unit
20. Max rudder angle selection switch

30.3 Steering Modes of the System

Note that all steering-related functions are available only if the ECDIS system is also connected to an optional Autopilot PR-6000 processor.

The Autopilot PR-6000 has the following steering modes:

- Hand steering (Mode selector: HAND)
- Autopilot steering (Mode selector: AUTO)
- NFU mode for Non-follow up steering mode (Mode selector: NFU)
- Track mode automatic Route steering, RC/Nav (Mode selector: RC)
- Remote Control steering on port wing, RC/P/W (Mode selector: RC), option
- Remote Control steering on starboard wing, RC/S/W (Mode selector: RC), option
- Remote Control steering on wheel house, RC/W/H (Mode selector: RC), option
- Override steering method, option

30.3.1 Hand steering (Mode selector: HAND)

Set the **Mode selection** switch to "HAND".

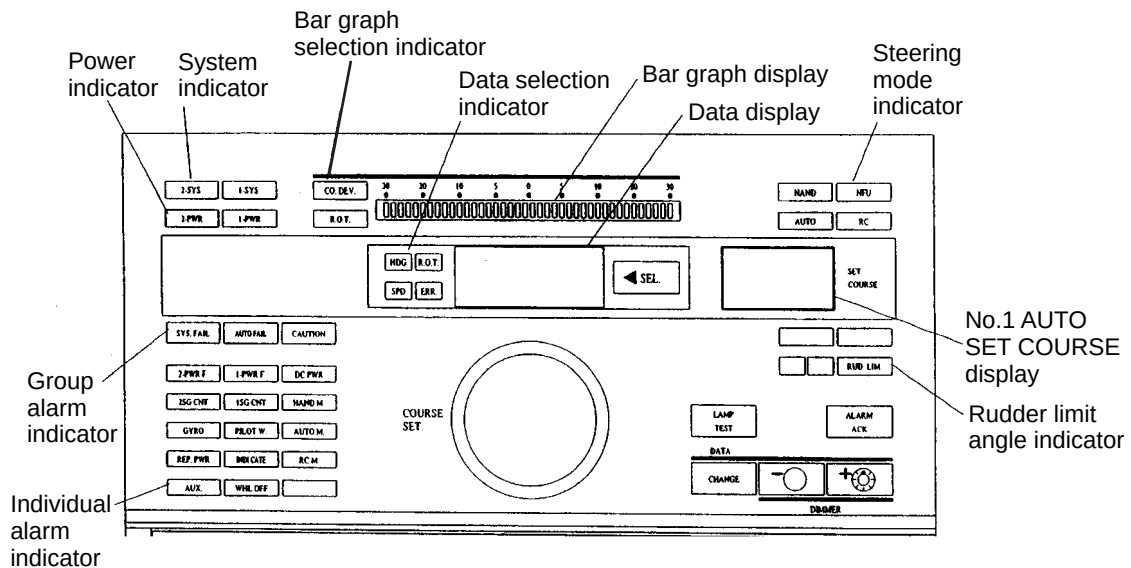
In this mode the ECDIS system displays the rudder angle and steering mode.

30.3.2 Autopilot steering (Mode selector: AUTO)

The operator sets the required heading of the vessel by operating the **Course Setting** knob. Turns are controlled by the rudder limit or Rate of Turn and initiated by the operator.

Turn the **Mode selection** switch to the AUTO position, and the set course is shown in the SET. COURSE display. The initial value of the setting course is the ship's heading at that time. To change the course, press the **Course setting** knob and release it when desired course appears. At this time, the course deviation (CO.DEV: COURSE DEVIATION) is shown in the bar graph and AUTO is lit. AUTO goes off when the ship is on the new course. See the figure below.

When the loading condition changes remarkably, yawing may be large at the departure. In this case, perform auto course changing by 20° of port and starboard two or three times, and observe the state for approx. 15 minutes.



Turn controlled by rudder angle

When a new course is set, turns are controlled by the rudder angle. You can set the desired rudder angle limit using the **Rudder limit** knob. For more information, see section 30.5 Other Operations with the TOKYO KEIKI PR-6000.

Turn controlled by Rate of Turn

Pressing the AUTO unit <-SEL switch a number of times lights the data selection indicator **R.O.T** and shows the rate of turn (unit deg/min). At this time, pressing the **DATA CHANGE** switch (located at the lower right) shows the turn rate order and the displayed value can be changed by pressing - or + while pressing the **DATA CHANGE** switch.

This value becomes the turn of rate order during automatic course changing. The setting, however, cannot be changed during automatic course changing.

30.3.3 Non-Follow Up steering (Mode selector: NFU)

The operator sets the Steering mode selector to NFU, then he can use steering with the non-follow up lever. While in the NFU steering mode the ECDIS system displays the rudder angle and indication of the steering mode.

30.3.4 Track mode automatic route steering, RC/NAV (Mode selector: RC)

Open Sea mode (Goto OS)

In the Open Sea mode, the planned track is followed at moderate and economical accuracy between waypoints and also during turns (position-controlled turn).

When approaching a next waypoint, the ECDIS alarms the operator both well before the turn and just before the turn.

All Waters mode (Goto AW)

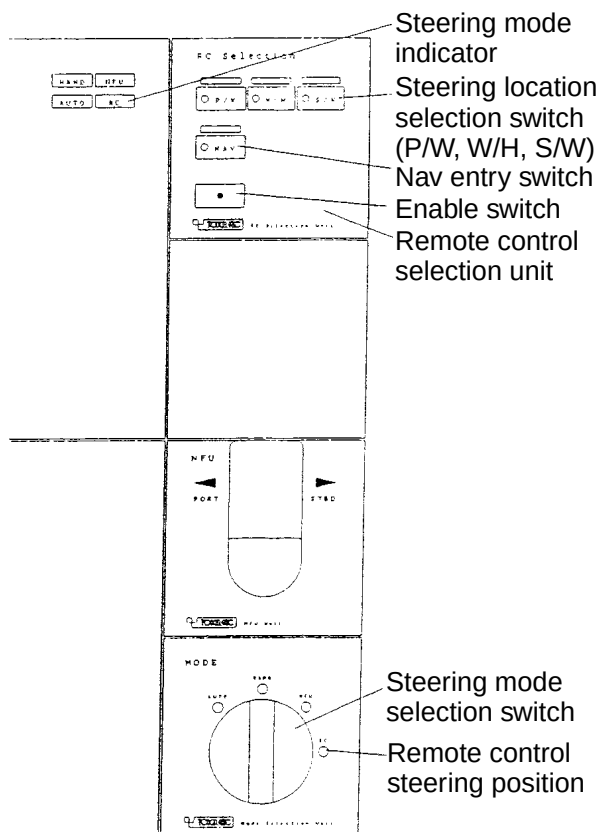
In the All Waters mode, the planned track is followed at the maximum accuracy between waypoints and also during turns (position-controlled turn).

When approaching a next waypoint, the ECDIS alarms the operator both well before the turn and just before the turn.

30.3.5 Remote hand steering (Mode selector: RC), (option)

When the **Mode selection** switch mode is set to RC, the mode becomes the RC mode, not the selected condition. (The steering mode indicator RC blinks. The hand steering is in use as long as RC blinks; the operation is same as in HAND mode.) At this time pressing the **Enable switch** button while pressing the steering location switch moves the mode to the remote steering mode and the lamp of the steering location comes on. The state of the steering mode indicator **RC** changes from blinking to lighting.

Turn the **Remote control steering** knob to steer.

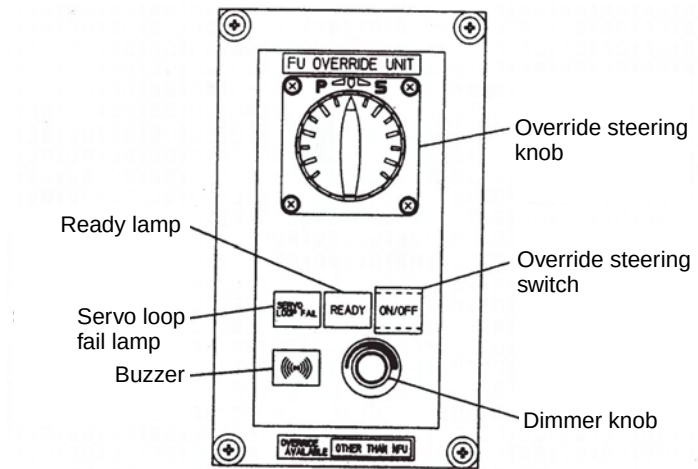


30.3.6 Override steering method (option)

FU override unit

Starting override steering:

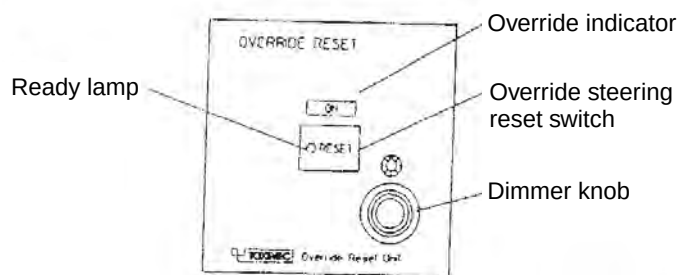
1. Confirm that the Ready lamp in the FU unit is ON.
2. Press the **ON/OFF override steering** switch to enable control of the steering from this unit, by the **Override steering** knob. At this time beeps sound intermittently from the steering stand then the selected steering mode indicator blinks.



FU override unit

Stopping override steering:

1. Push the **ON/OFF** switch to show ON in the FU override unit or push the **RESET** switch on the Override reset unit in the steering stand to return to the previous steering mode.
2. If the steering mode was AUTO, the heading at the time override steering became active is set as heading. Auto resume is disabled if the steering mode was RC/NAV. In this case, you have to turn the mode selection switch to another steering mode and select the RC mode again.



Override reset unit

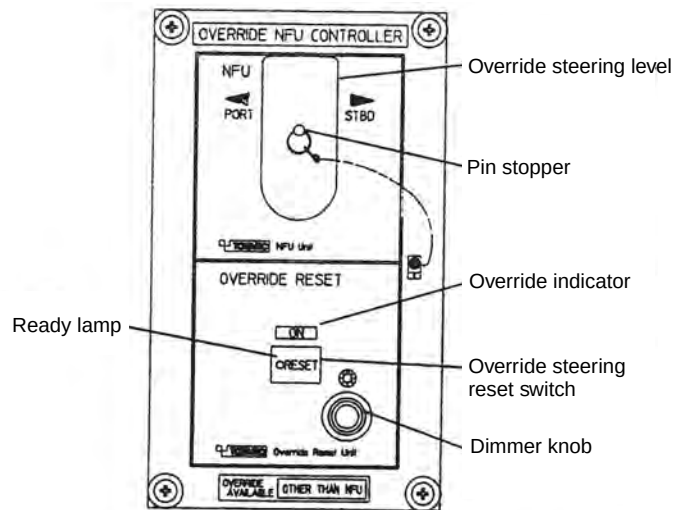
NFU override controller

Starting override steering:

1. Confirm that the Ready lamp in the NFU controller is ON.
2. Pull out the pin stopper inserted in the override NFU controller and turn the lever to the desired direction. At this time, beeps sounds from the steering stand then the selected steering mode blinks. The **ON** lamp in the override reset unit is lit.
3. The rudder is taken when the lever is turned, and the rudder stops when the lever is returned to the neutral position.

Stopping override steering:

1. Push the **RESET** switch on the override reset unit in the steering stand to return to the previous steering mode.
2. If the steering mode was AUTO, the heading at the time the override steering became active is set as heading. Auto resume is disabled if the steering mode was RC/NAV. In this case, you have to turn the mode selection switch to the other steering mode and select the RC mode again.



NFU override controller

30.4 Automatic Route Steering, RC/Nav (Mode: RC)

There are two types of automatic route steering: open sea (=Goto OS) mode or all waters (=Goto AW) mode. Automatic route steering can be used with a predefined monitored route.

The Goto OS and Goto AW steering modes can be activated when your ship is located inside a channel of a monitored route and in the linear part of a monitored route.

30.4.1 "Goto OS" mode

- Select "Goto OS" at the route monitor dialog box in the ECDIS:
- Set the **Mode selection** switch on the autopilot control unit to RC.
- On the autopilot control unit, press the **NAV** and **Enable switch** buttons together on the remote control steering unit to activate the automatic steering mode.
- Available for use when the position source is outputting accurate position.

30.4.2 "Goto AW" mode

- Select "Goto AW" at the route monitor dialog box in the ECDIS:
- Set the **Mode selection** switch on the autopilot control unit to RC.
- On the Autopilot control unit, press the **NAV** and **Enable switch** buttons together on the remote control steering unit to activate the automatic steering mode.
- Can be used when the position source is outputting accurate position.

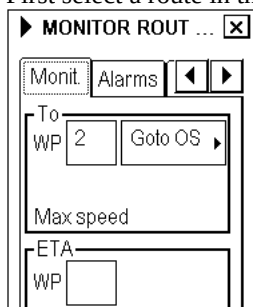
30.4.3 Summary of automatic route steering modes

	GOTO OS	GOTO AW
Set course	Automatic	Automatic
Set radius	Automatic	Automatic
Radius control	Yes	Yes
Design before execution	Yes	Yes
Full curved EBL on radar screen	Yes	Yes
Wind, current, etc. compensation in linear parts between WPT.	Low gain	High gain
Wind, current, etc. compensation in turns	Yes	Yes
Needs gyro	Yes	Yes
Needs log	Yes	Yes
Precision of position equipment	Good	High
Needs direct sog/cog sensor	No	Yes

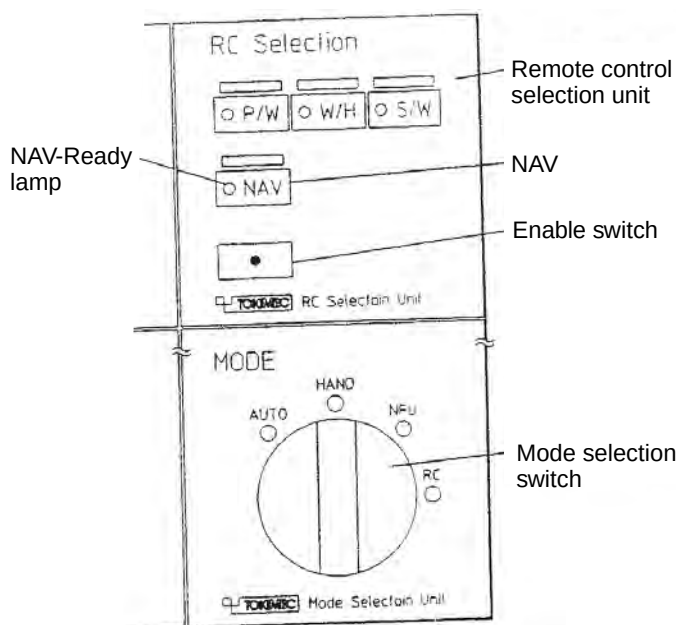
30.4.4 Activation of route steering

Do the following to activate route steering.

1. First select a route in the monitor mode on the ECDIS. Then open the route monitor window.



2. Select either Goto OS or Goto AW from the list box, which is located in the To WPT field. After you have selected a route in the monitor mode and desired steering mode (Goto OS or Goto AW), the NAV-Ready lamp comes on.



3. Turn the **Mode selection** switch to RC.
4. Press simultaneously **NAV** and **Enable switch** buttons.
Note that before you press **NAV** and **Enable switch** buttons, steering control is in HAND mode. Therefore it is important that before turning **Mode selection** switch to RC, check that wheel in center position (mid ship).
5. The steering mode indicator "RC" on the autopilot panel lights continuously.

Goto OS

When Go to OS is activated, the indication Goto OS appears in the route monitor window.

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185m
Off track	<147m
Goto OS	

If the planned course to approach a To WPT is defined using Great Circle, the indication "Goto OS Great circle" appears in the route monitor window.

Plan Speed	20.0 Kt
Plan	248.0°
Route	256.7°
Ch limit	185m
Off track	<147m
Goto OS Great circle	

Goto AW

When Goto AW is activated, the indication "Goto AW" appears in the route monitor window.

Plan Speed	20.0 Kt
Plan	248.0°
Route	247.8°
Ch limit	185m
Off track	<9m
Goto AW	

If the planned course to approach a To WPT is defined using Great Circle, the indication "Goto AW Great circle" appears in the route monitor window.

Plan Speed	20.0 Kt
Plan	248.0°
Route	247.8°
Ch limit	185m
Off track	<9m
GotoAW Great circle	

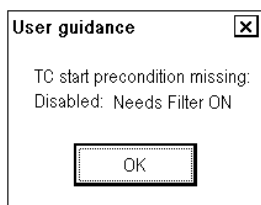
30.4.5 Missing preconditions for route steering

When route steering is not used or the ECDIS did not accept the requested route steering mode, there is no indication of route steering mode in the route monitor window, as shown right.

Plan Speed	20.0Kt
Plan	216.9°
Route	216.8°
Ch limit	185m
Off track	<32m

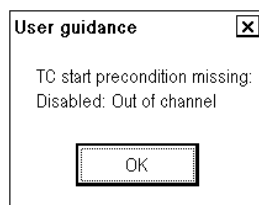
There are several requirements to start route steering. When you make a selection in the route monitor window in ECDIS, user guidance may appear if preconditions are not fulfilled. The user guidance window may appear when you try to start any route steering mode or if you try to change one route steering mode to another. For more information, see section 19.8 Filter Operation.

When you attempt to activate route steering without fulfilling preconditions, one of the following user guidance dialog boxes appears:



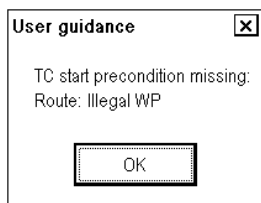
Reason: You tried to activate a route steering mode without the Kalman filter.

Remedy: Switch the Kalman filter "ON" and try again.



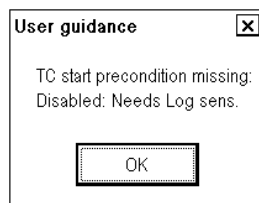
Reason: You tried to activate route steering outside of channel limits.

Remedy: Steer vessel inside channel and try again.



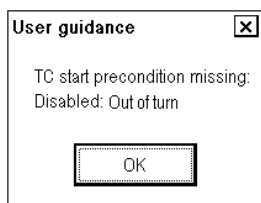
Reason: You tried to activate a route steering mode when the selection of the TO or FINAL waypoint is missing or illegal.

Remedy: Check the TO and FINAL waypoints.



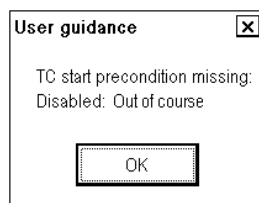
Reason: You tried to activate a route steering mode without an independent speed source. You need either a log, a dual-axis log or two position receivers.

Remedy: Check your selection of the sensors.



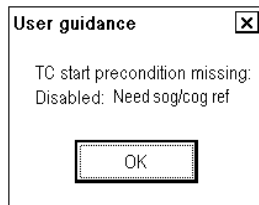
Reason: You tried to activate a route steering mode when the route monitoring of the system detects that your ship is turning, but your location is not within the turn.

Remedy: Check and reset correct To WPT for route monitoring.



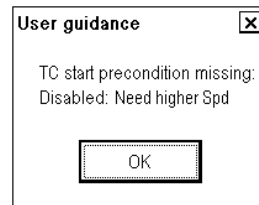
Reason: You tried to activate a route steering mode when there is a difference between current heading and the required set heading that is greater than set with **Route start limit angle** in the Route Parameters dialog box.

Remedy: Steer vessel heading inside the limit of the required set heading.



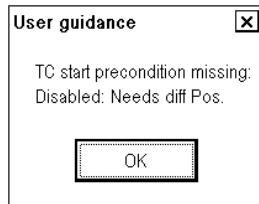
Reason: You tried to activate a route steering mode without SOG/COG reference.

Remedy: Check your selection of the sensors.



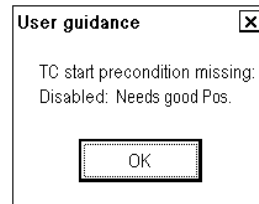
Reason: You tried to activate a route steering mode when your ship's speed is less than defined for route steering.

Remedy: Accelerate speed over the set limit then try again.



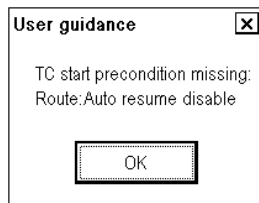
Reason: You tried to activate the Goto AW steering mode without a high-precision positioning device (GPS in differential correction mode).

Remedy: Check that GPS in differential mode is selected in the Sensors menu.



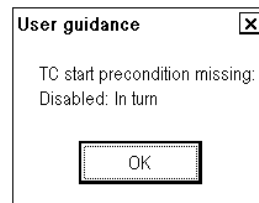
Reason: You tried to activate a route steering mode when Alarm 407 Position discrepancy is active.

Remedy: Switch off "bad" sensor in the Sensors page to remove alarm 407.



Reason: If alarm 2471 has been generated and later condition for alarm 2471 disappears without changing steering mode from RC to AUTO or HAND.

Remedy: First change the steering mode to AUTO or HAND then check that the preconditions for route steering are fulfilled before changing back to RC.



Reason: You tried to start a route steering mode when your ship is in the turning part of a monitored route.

Remedy: Steer vessel to a linear part of the monitored route then try again.

If the precondition exists when Goto OS or Goto AW is selected, but it is missing when you pressed the **NAV** and **Enable switch** buttons, one of following alarms occur.

Alarm "**2470 Disabled: Needs filter on**" informs you that the Kalman filter was not ON at the time of the request. Route steering requires that you use the Kalman filter, because the filter eliminates sudden jumps of the position and thus prevents unpredictable maneuvers of your ship. Check your selection of the sensors. See section 19.8 Filter Operation for more information.

Alarm "**2490 Disabled: Needs log sensor**" informs you that the Kalman filter did not have an independent speed source. You need either a log, a dual-axis log or two position receivers. Check your selection of the sensors. See section 19.8 Filter Operation for more information.

Alarm "**2468 Disabled: Out of course**" informs you that there is a difference between the current heading of your ship and the required set heading than that set by the operator in the **Route start limit angle** of route parameters.

Alarm "**2471 RC/NAV - TC STOP - Use AUTO**" informs you that the ECDIS and the autopilot cannot start the route steering mode. First change the mode from "RC" to "AUTO" then check that preconditions for route steering are fulfilled.

Alarm "**2477 Disabled: Out of channel**" informs you that the current location of your ship is not inside a channel of a monitored route.

30. Steering With TOKYO KEIKI Autopilot PR-6000

Alarm "**2464 Route: No selected route**" informs you that there is no route selected for route monitoring.

Alarm "**2465 Route: Illegal WPT**" informs you that there is a route selected for route monitoring, but the selection of the next or final waypoint is missing or illegal.

Alarm "**2510 Disabled: Out of turn**" informs you that your ship is located outside of the graphical area of turning (i.e. is linear part of track) and the track control system steering mode is Ass. Turn or Track Turn. Reselect correct TO WPT for monitoring.

Alarm "**2517 Disabled: In turn**" informs you that the current location of your ship is in a turn of a monitored route. Steer to a linear part of a monitored route to activate the track steering mode.

Alarm "**2518 Disabled: Not accepted**" informs you that the 30-second timeout period has passed after you pressed the **NAV** and **Enable switch** buttons on the TOKYO KEIKI control panel. After you select GotoOS or GotoAW at the ECDIS, you have 30 seconds to press the **NAV** and **Enable switch** buttons on the TOKYO KEIKI control panel, otherwise alarm 2518 is given. Another reason can be that your ship has moved into a turning part of a monitored route before you pressed the **NAV** and **Enable switch** buttons on the TOKYO KEIKI control panel.

30.4.6 Arrival to a waypoint

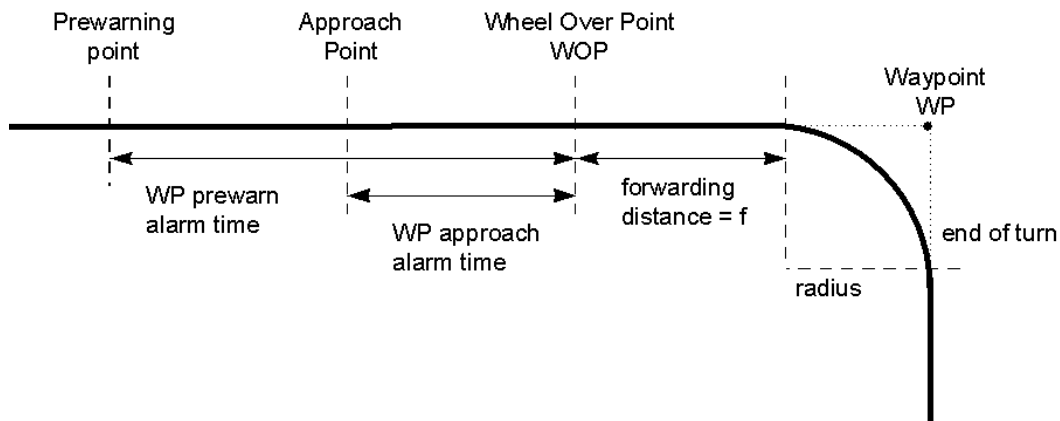
Automatic route steering navigation tries to keep your ship inside the channel limits and going to the next waypoint. Well before arriving at a next waypoint, the alarm "**2485 ROUTE:WPT PREWARNING**" is given. As soon as the alarm appears, verify that the maneuver is safe and there are no dangerous targets. If the maneuver is safe, press the **ALARM ACK** button on the ECDIS control unit. If the maneuver is not possible, you can leave the automatic route steering, by changing "RC" to "AUTO" or to "HAND" mode in autopilot control unit.

TURN IS ALWAYS ENABLED. THE ONLY WAY TO DISABLE THE AUTOMATIC TURN IS TO SELECT ANOTHER STEERING MODE FROM THE AUTOPILOT, FOR EX. "RC" OR "AUTO", ETC.

Note that alarm 2485 is programmable (the time before turn) and it is relative to the starting point of a maneuver. See the figure below.

At the moment you are about to arrive at the next waypoint, a second alarm "**2451 Route: WPT approach alarm**" appears. If you have acknowledged alarm 2485, then alarm 2451 is indicated (silent).

Note also that alarm 2451 is programmable (the time before turn) and it is relative to the starting point of a maneuver. See the figure below:



As soon as your ship arrives to a wheel over point, the ECDIS sends a new course command to the autopilot and the maneuver is started. During a maneuver, the radar display and the ECDIS display show the CURVED EBL, indicating the planned radius for maneuver.

After the waypoint approach alarm is acknowledged, the text "**GoOS Appr. enabled**" appears in the route monitor window of the ECDIS display, when the steering mode is Goto OS.

Plan Speed	20.0Kt
Plan	232.6°
Route	230.7°
Ch limit	185m
Off track	>59m
GoOS Appr. enabled	

Plan Speed	20.0Kt
Plan	232.6°
Route	230.7°
Ch limit	185m
Off track	>59m
GoAW Appr. enabled	

After you acknowledge the waypoint approach alarm, the text "**GoAW Appr. enabled**" appears in the route monitor window of the ECDIS display, when the steering mode is Goto AW.

During the turn, the text "**GotoOS Turn**" appears in the route monitor window of the ECDIS display, when the steering mode is Goto OS.

Plan Speed	20.0Kt
Plan	283.3°
Route	283.3°
Ch limit	185m
Off track	<7m
GotoOS Turn	

Plan Speed	20.0Kt
Plan	214.3°
Route	214.2°
Ch limit	185m
Off track	>7m
GotoAW Turn	

During the turn, the text "**GotoAW Turn**" appears in the route monitor window of the ECDIS display, when the steering mode is Goto AW.

Note: Approaching the last waypoint will give an alarm "**2458 Route: Last WPT approach**". With TOKYO KEIKI autopilot one should leave "RC" mode of the TOKYO KEIKI autopilot before performing acknowledge of the alarm **2458**. This will terminate the route correctly. If one acknowledge alarm **2458**, when TOKYO KEIKI autopilot is still in "RC" mode, then the route steering is automatically terminated and steering control is transferred to the autopilot and ECDIS indicates alarm "**2471 RC/NAV - TC STOP - Use AUTO**", and the autopilot alarm occurs. Change the steering mode from "RC" to "AUTO". When alarm 2471 occurs, the current heading value is used for Set Course value.

30.4.7 Route steering alarms

There are two types of route steering alarms: permanent and intermittent.

Permanent route steering alarms

Permanent alarms are available regardless of the steering mode:

- "Off track" value is shown in red.
- "Outside Channel" is shown in orange.
- **Out of Gate** is indicated by orange text. Out of gate indicates that, if your ship continues using the current course, then your ship will be outside of the channel at a wheel over point.

Plan Speed	20.0 Kt
Plan	248.0 °
Route	256.7 °
Ch limit	185 m
Off track	<247 m
Goto OS	
Outside Channel	

Plan Speed	20.0 Kt
Plan	248.0 °
Route	256.7 °
Ch limit	185 m
Off track	<247 m
Goto OS	
Out of Gate	

The permanent alarm show right is available only during the route steering mode:

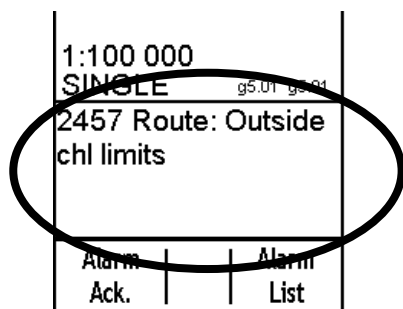
- **Rate of Turn Limit** is indicated by orange text.

Plan Speed	20.0 Kt
Plan	248.0 °
Route	256.7 °
Ch limit	185 m
Off track	<247 m
Goto OS	
Rate of Turn limit	

Intermittent steering alarms

Intermittent audiovisual alarms appear as follows:

- Visual alarm and buzzer are generated at the ECDIS control unit.
- Alarm number and text are visible at the lower right corner of the ECDIS screen (see example below)



Typical intermittent alarms not described in other sections are:

Alarm "2457 Route: Outside chl limits" appears when your ship is outside the planned channel.

Alarm "2455 Route: off course" compares the planned course and actual heading, if the TCS (Track Control System) requires a high attack angle towards the planned course to perform track control. This alarm is repeated every five minutes, if the condition continues.

Alarm "2456 Route: WPT approach error" appears when, because of a decrease in speed, the time to the waypoint approach alarm is more than 100 seconds away from the wheel over point after the operator has already acknowledged alarm "2451 Route: WPT approach alarm" (to enable the next automatic turn). After the alarm 2456, the next turn is not enabled and the system generates a new alarm "2451 Route: WPT approach alarm" when appropriate.

Alarm "2460 Pilot: ROT will be exceed" appears when the set radius value together with the current speed of the rate of turn is over the limit set with **Max. rate of turn** in the Route Parameters dialog box.

Alarm **"2461 Route: ROT will be exceed"** appears when the planned radius for a next waypoint together with the current speed of the rate of turn is over the limit set with **Max. rate of turn** in the Route Parameters dialog box. This alarm is activated if your ship is within the value set for **WPT approach alarm time** in the Route Parameters dialog box.

Alarm **"2471 RC/NAV-TC STOP - Use AUTO"** informs you that neither the ECDIS nor the TOKYO KEIKI autopilot can activate the track steering mode. In this case, change the mode from "RC" to "AUTO" then check that the preconditions for route steering are fulfilled.

Alarm **"2475 Route: Needs filter on"** appears when the position from the Kalman filter is not available. This alarm is repeated every 15 seconds, if the condition continues.

Alarm **"2476 Route: Needs log sensor"** appears when the position from the Kalman filter cannot be compared against an independently operating log. This alarm is repeated every 15 seconds, if the condition continues.

Alarm **"2488 Steering Stop-System Fail"** appears when the connection to the autopilot is lost during automatic route steering and the used integrated steering mode cannot be continued. **NOTE:** Normally you get alarm **"480 Autopilot Receive error"** first.

Alarm **"2489 Route: Changed to Goto OS"**, appears when alarm 2492 or 2507 has been valid 10 minutes. The steering mode is automatically changed to Goto OS.

Alarm **"2492 Route: Needs diff Pos"** appears for any use of Goto AW with the Kalman filter but without a high-precision sensor (example: DGPS). Alarm 2492 will be repeated every four minutes for the next 10 minutes. If the condition continues, alarm **"2489 Route: Changed to Goto OS"** is generated and the steering mode is automatically changed to Goto OS.

Alarm **"2497 Route: Stop - Sensor Fail"** if no gyro data is received or if conditions of alarm 2475 or 2476 have been valid for last minute.

Alarm **"2505 Route: Use Goto OS"** is instruction for the operator to change the steering mode to Goto OS. This alarm is generated if there are not sufficient conditions to continue Goto AW (alarm 2492 or 2507 has been valid two minutes). This alarm is repeated every four minutes.

Alarm **"2506 Route:Use AUTO control"** is instruction for the operator to change the steering mode to AUTO. This alarm is generated if there are not sufficient conditions to continue the Track mode (alarm 2475 or 2476 has been valid 10-15 seconds).

Alarm **"2507 Route: Need sog/cog ref."** appears when Goto AW is used with the Kalman filter but without direct Speed Over Ground (SOG) and Course Over Ground (COG), available from position sensor(s) or from bottom track of a dual-axis log. If the condition continues after 10 minutes, alarm **"2489 Route: Changed to Goto OS"** is generated and the steering mode is automatically changed to Goto OS.

Alarm **"2511 Route:Auto resume disable"** appears when alarm 2471 has been generated and later the condition for alarm 2471 disappears without changing the steering mode from "RC" to "AUTO" or "HAND". First change the steering mode to "AUTO" or "HAND" then check that the preconditions for route steering are fulfilled.

Alarm **"2512 Use NFU rudder control"** appears if the rudder servo unit cannot be controlled by the TOKYO KEIKI steering control unit. This alarm is generated to request a change to Non-Follow Up control of the rudder(s). First use the **System Selector Switch** to switch to "NFU" then use the **Non-Follow Up steering lever** to control the rudder(s).

Alarm **"2514 Route:Use AUTO control"** this alarm is generated if there are not sufficient conditions to continue the Track mode during turn (i.e. alarm 2475 or 2476 has been valid 10-15 seconds). Your ship will complete the turn with planned conditions.

Alarm **"2515 RC/NAV-TC STOP - Use AUTO"** informs you that the ECDIS and the TOKYO KEIKI autopilot cannot activate the track steering mode. First change the mode from "RC" to "AUTO" then check that the preconditions for route steering are fulfilled.

Alarm **"2517 Disabled: In turn"** informs you that the current location of your ship is in a turn of a monitored route. Steer to a linear part of the monitored route to activate the track steering mode.

Alarm "**2518 Disabled: Not accepted**" informs you that the 30-second timeout period has passed after you pressed the **NAV** and **Enable switch** buttons on the TOKYO KEIKI control panel. After you select "GotoOS" or "GotoAW" at the ECDIS, you have 30 seconds to press the **NAV** and **Enable switch** buttons on the TOKYO KEIKI control panel, otherwise alarm 2518 is given. Another reason can be that your ship has moved into a turning part of a monitored route before you pressed the **NAV** and **Enable switch** buttons on the TOKYO KEIKI control panel.

Alarm "**2519 Trackpilot: XTE comp.limit**" warns you if TCS is unable to get your ship to approach the track. An alarm is triggered if your ship is outside the channel limit and if the cross track error is still increasing.

Alarm "**2788 System Frozen**" appears as an early warning indication that the system may freeze. In this case, restart the ECDIS EC1000C processor.

30.4.8 Collision avoidance maneuver during automatic route steering

Often the route steering is interrupted by a collision avoidance maneuver, but there are also several other reasons to interrupt the route steering.

There are several possibilities to set the collision avoidance or any other maneuver:

- Use the HAND steering control. (Change mode from "RC" to "HAND").
- Use the local Autopilot Heading control. (Change mode from "RC" to "AUTO").
- Use the Non Follow Up steering lever to control the rudder pumps directly. (Change mode from "RC" to "NFU").

Now the route steering is disabled until the "RC" mode in Autopilot panel is selected again. Then, press the **NAV** and **Enable switch** buttons together. To go back to route steering, the ship heading must be pointed toward the next waypoint and the ship must be located inside the channel limits, otherwise an alarm is given.

30.4.9 How to stop or modify already enabled route turn

There are two reasons that an automatic route turn must be stopped or modified.

- The turn cannot be performed up to the final value.
- The turn which the ship is to perform goes outside of the planned turn. (Too fast or too slow.).

Stop the turn

To stop a turn, change the steering mode from "RC" to "HAND" on the steering control unit.

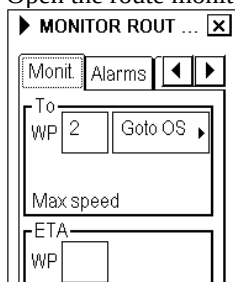
Modify a turn

What do you want to do	How to do
Use a different final value for set course	When you change the steering mode from "RC" to "AUTO", a turn is continued according to the RATE control set to follow the planned turn. Below is what you can do: • Use the Course setting knob to set a new value for set course. When you set a new course, a new turn is RATE controlled using the RATE limit set in the Autopilot control unit.
Compensate too fast turning	When changing the steering mode from "RC" to "AUTO", turn is continued according to the RATE control to follow the planned turn. Below is what you can do: • Set the steering wheel to a suitable angle to continue with a larger radius (i.e. smaller rudder angle than before). Then, change from "AUTO" to "HAND". Continue manual steering or • Set steering wheel to suitable angle to continue approximately larger radius (i.e. smaller rudder angle than before). Then change directly from "RC" to "HAND". Continue manual steering.
Compensate too slow turning	When changing steering mode from "RC" to "AUTO", turn is continued in RATE control to follow planned turn. Below is what you can do: • Set steering wheel to suitable angle to continue approximately smaller radius (i.e. higher rudder angle than before). Then change from "AUTO" to "HAND". Continue manual steering or • Set steering wheel to suitable angle to continue approximately smaller radius (i.e. higher rudder angle than before). Then change directly from "RC" to "HAND". Continue manual steering.

30.4.10 How to change mode of route steering

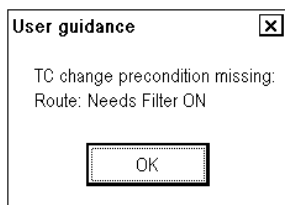
The mode of automatic route steering can be changed as follows:

Open the route monitor window.



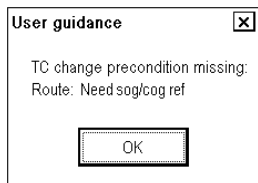
Select either "Goto OS" or "Goto AW" in the list box which is located in the "To WPT" field.

If you try to change the route steering mode without fulfilling preconditions, one of following User guidance dialog box appears:



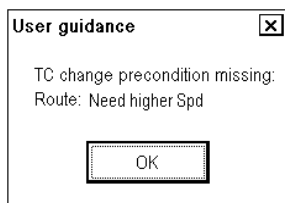
Reason: Change of route steering modes without the filter.

Remedy: Switch Kalman filter "ON" and try again.



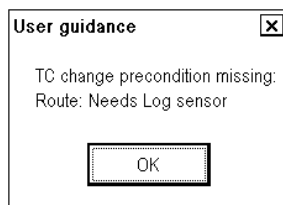
Reason:: Change of route steering mode without sog/cog reference.

Remedy: Check your selection of the sensors.



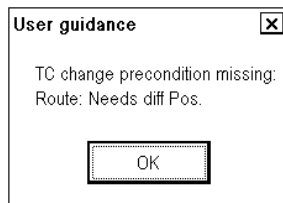
Reason: Change of route steering mode when speed of vessel is less than defined for route steering.

Remedy: Accelerate speed of vessel over set limit then try again.



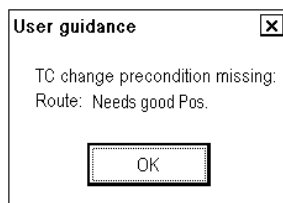
Reason: Change of route steering modes without independent speed source. You need either a log, a dual-axis log or two position receivers.

Remedy: Check your selection of the sensors.



Reason: Change from "Goto AW" to "Goto OS" steering mode without high precision positioning device (GPS in differential correction mode).

Remedy: Check that there is a GPS in differential mode available and selected to be used



Reason: Change of route steering mode when Alarm "407 Position discrepancy" is active.

Remedy: Switch off "bad" sensor in Sensors page to remove alarm 2407.

30.4.11 Notes on steering

Accuracy of route steering

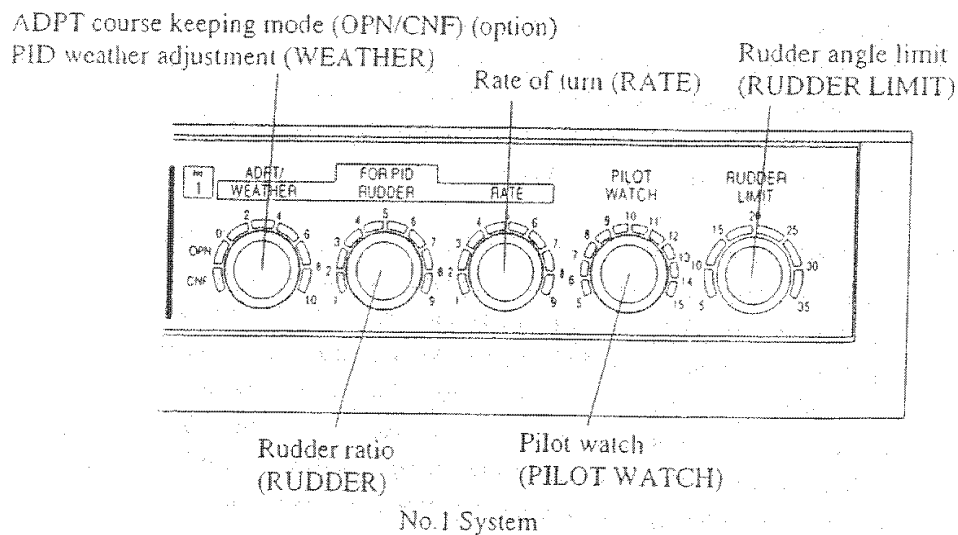
Accurate route steering is defined as small cross track error when automatically following the route. One of the Route Parameters - **Drift compensation** - has a significant effect for accuracy of route steering.

If you need more accurate route steering, then turn on **Drift comp.**

SHIP & ROUTE PAR... ✕	
Ship parameters	
Max speed	25.0 Kt
Max height	41.3 m
Max draught	21.2 m
Gyro correction	
Source	Auto
Spd/lat corr.	Off
Max corr.	2.1 °
Man corr.	3.0 °
Route parameters	
Max r.o.t.	60 °/mi
Turn end tol.	3 °
WP app.	30 s
WP prewarn	90 s
Start limit	45 °
Def. line rad	0.5 nm
Drift comp.	On

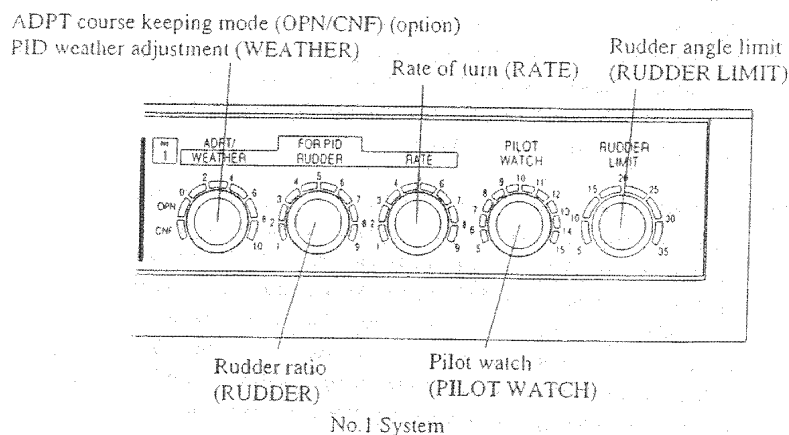
At the autopilot steering control unit you can set ADPT/WEATHER course keeping mode to CNF (Confined) to increase accuracy of route steering.

If the rudder is too active, you can set ADPT/WEATHER course keeping mode OPN or range 0-10 to have more economic sailing.



30.5 Other Operations with TOKYO KEIKI PR-6000

30.5.1 Adjusting method for Auto steering (Auto mode)



For the PID, the auto steering adjusting control knobs are weather control (AUTO/0-10), rudder ratio (1-9), rate of turn (1-9), pilot watch (5-15) and rudder angle limit (5-35).

Selection between automatic ADPT or manual PID steering control is made by setting ADPT course keeping mode (OPN/CNF). Lights **ADPT** and **CNF/OPN** are turned on.

If you select WEATHER PID control (0-10) you have manual PID control in use. Light **PID** is turned on.

30.5.2 Rate of Turn (RATE)

The optimum value of the rate of turn changes depending on the loading condition.

30.5.3 Rudder angle ratio (RUDDER)

The optimum value of the rudder ratio changes depending on the ship's speed.

30.5.4 Weather adjustment (WEATHER)

The weather adjustment becomes necessary when weather or sea state changes. It is a desirable condition that the ship goes straight with a rudder angle as small as possible (a lower angle than 5 degrees is desirable) and few rudder operations (less than 6 times a minute is desirable).

30.5.5 Course keeping mode selection (CNF-OPN)

Open sea (OPN) when economic condition is preferred. Course is kept with the least necessary steering, permitting a little meandering such as when sailing on the open sea.

Confined (CNF) keeps the ship straight on course. Large rudder may be necessary.

30.5.6 Pilot watch (PILOT WATCH)

During auto steering, when the course deviation exceeds the value set as the pilot watch, this alarm rings.

30.5.7 Rudder angle limit (RUDDER LIMIT)

This is the adjustment to limit the rudder motion to the least necessary rudder angle during mode:AUTO steering.

30.6 Description of Alarms with TOKYO KEIKI PR-6000

30.6.1 Alarms

- The ECDIS control unit's ALARM ACK lamp goes on.
- The type of alarm is displayed on the ECDIS screen as number and text.
- Alarm can be acknowledged by pushing the ECDIS control unit's **ALARM ACK** button.

Below is a list of typical alarms.

451	Route: WPT approach alarm
452	Route: Turning disabled
455	Route: Off course
456	Route: WPT approach error
458	Route: Last WPT approach
460	Pilot: ROT will be exceed
461	Route: ROT will be exceed
468	Disabled - out of course
470	Disabled: Needs filter ON
471	RC/NAV - TC STOP - Use AUTO
475	Route: Needs filter ON
476	Route: Needs log sensor
485	Route: WPT prewarning
489	Route: Changed to Goto OS
492	Route: Needs diff Pos
497	Route: Stop - Sensor Fail
505	Route: Use Goto OS
506	Route: Use AUTO control
507	Route: Need sog/cog ref
510	Disabled: Out of Turn
511	Route: Auto resume disable
512	Route: Use NFU rudder control
514	Route: Use AUTO control
515	RC/NAV - TC STOP - Use AUTO
517	Disabled: In turn
518	Disabled: Not accepted
519	Trackpilot: XTE comp.limit
788	System Frozen

30.6.2 Errors

Errors should not happen during normal operation. They are related to internal problems.

Integrated operation related alarms

- The ECDIS control unit's ALARM ACK lamp goes on.
- The type of alarm is displayed on the ECDIS screen as number and text.
- Alarm can be acknowledged by pushing the ECDIS control unit's **ALARM ACK** button.

Below is a list of typical alarms.

2480 Auto pilot receive error

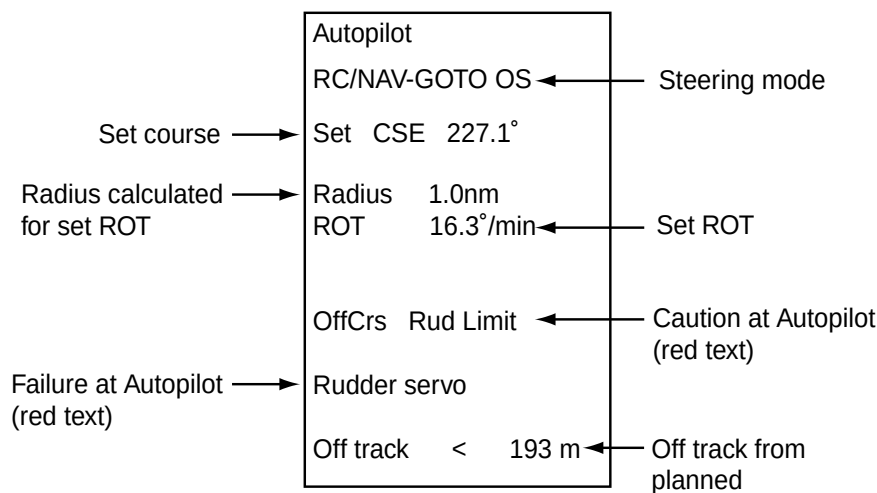
2488 Steering Stop-System Fail

30.7 Autopilot Dialog Box for Tokyo Keiki PR-6000

You can open the autopilot display on the sidebar of ECDIS. This displays shows various information about Autopilot state.

To activate the autopilot display:

1. Move the cursor over the route monitor window.
2. The mouse guidance box shows "Menu/ /Select Sidebar". Press the right mouse button to open the Sidebar menu.
3. Select **Autopilot** from the menu.



Autopilot dialog box

Steering mode can be:

HAND: Hand steering

AUTO: Autopilot steering

NFU: NFU Steering

OVERRIDE: Override steering

RC/NAV-GOTO OS: Track steering in Open Sea mode

RC/NAV-GOTO AW: Track steering in All Waters mode

RC/NAV-TC STO : Track steering stopped. Change steering mode from "RC" to some other steering mode.

Failure texts available on Autopilot dialog box are:

Missing gyro: Gyro data is missing or not received correctly at autopilot.

Rudder servo: Rudder feedback signal is missing or rudder servo not working correctly.

TC Stop: Track Steering (RC/NAV) cannot be continued and it has been stopped.

Caution texts available on Autopilot dialog box:

Rudder on limit: The autopilot has determined that a larger rudder angle is needed to reach set course but rudder is already on limit.

Off course: The autopilot has detected that vessel heading deviates from set course more than the set limit.

OffCrs Rud Limit: Combination of two cautions above.

Manual speed : Manually entered speed is used by the autopilot.

Speed warning : Ship's speed is less than half of the service speed during ADPT auto steering mode.

30.8 Expected Steering Performance Under Various Conditions

The system has many available steering modes. Below is a summary of effect of various environmental conditions.

Note 1:

Track Control System use a combination of drift compensation and off track compensation to keep your ship inside the channel limit. During a turn and after a turn for first 4 minutes this Track Control System uses drift compensation based on the drift situation before the turn. If drift situation changes a lot during the turn (current or wind) then vessel may sail outside the channel if the off track compensation cannot compensate the non-ideal drift compensation decided before the turn.

30.8.1 Expected steering performance for going ahead

Environmental conditions	Heading control = "AUTO"	Goto OS + "RC"	Goto AW+ "RC"
Calm sea, no wind, no current	COG is about the same as Set Course in Autopilot.	- Ship follows monitored route.	- Ship follows monitored route.
Moderate wind and/or current	Ship has at tendency to drift.	- Ship follows monitored route.	- Ship follows monitored route.
High wind and/or current	Ship is drifting.	- Ship follows monitored route*). - Ship may have trouble following monitored route inside the channel limit.**).	- Ship follows monitored route*). - Ship may have trouble following monitored route inside the channel limit.**).
Wind and/or current changes slowly.	There is no compensation for change	- Ship follows monitored route, but may need full channel limit area.	- Ship follows monitored route.

*) The track control system is able to compensate drift up to 45 degrees. If drift is larger, your ship may go outside channel limit.

**) The track control system is able to compensate cross-track error up to 30 degrees. However, the full compensation is not available immediately. Two alarms will warn the operator if the track control system estimates that it is not able to keep your ship within the channel limits. Alarm "2519 Trackpilot: XTE comp. limit" informs you that the no further cross-track error based compensation is possible. Alarm "2455 Route: Off course" informs you that the track control system cannot use a higher attack angle towards the track.

Environmental conditions	Heading control = "AUTO"	Goto OS + "RC"	Goto AW+ "RC"
Sudden change of wind and/or current (For example sudden change from no current to 5 kt current perpendicular to track)	There is no compensation for change	- Ship may go outside channel limit and return back inside channel limit.*) - Ship may have trouble in following monitored route inside the channel limit.**).	- Ship may go outside channel limit and return back inside channel limit.*) - Ship may have trouble in following monitored route inside the channel limit.**).
Slow change of speed	There is no compensation for change	- Ship follows monitored route.	- Ship follows monitored route.
Fast change of speed (For example speed decrease from 20 to 7 kt)	Ship performs normal autopilot turn under this condition	- Ship follows monitored route, but may need full channel limit area	- Ship follows monitored route, but may need full channel limit area.

*) The track control system is able to compensate drift up to 45 degrees. If the drift is larger, your ship may go outside the channel limit.

**) The track control system is able to compensate cross-track error up to 30 degrees. However, the full compensation is not available immediately. Two alarms will warn the operator if the track control system estimates that it is not able to keep your ship within channel limits. Alarm "2519 Trackpilot: XTE comp. limit" informs you that no further cross-track error based compensation is possible. Alarm "2455 Route: Off course" informs you that the track control system cannot use a higher attack angle towards the track.

30.8.2 Expected steering performance for turns

Environmental conditions	Heading control = "AUTO"	Goto OS + "RC"	Goto AW + "RC"
Calm sea, no wind, no current	Ship performs normal autopilot turn under this condition.	- Ship follows monitored route.	- Ship follows monitored route.
Moderate wind and/or current	Ship performs normal autopilot turn under this condition.	- Ship follows monitored route.	- Ship follows monitored route.
High wind and/or current	Ship performs normal autopilot turn under this condition.	- Ship follows monitored route, but may go outside channel limit area.*)" - Ship may have trouble in following monitored route inside the channel limit.**).	- Ship follows monitored route.*)" - Ship may have trouble in following monitored route inside the channel limit.**).
Slow change of wind and/or current	Ship performs normal autopilot turn under this condition.	- Ship follows monitored route	- Ship follows monitored route
Sudden change of wind and/or current (For example sudden change from no current to 5 kt current perpendicular to track)	Ship performs normal autopilot turn under this condition.	- Ship may go outside channel limit and return back inside channel limit.*)" - Ship may have trouble in following monitored route inside the channel limit.**).	- Ship may go outside channel limit and return back inside channel limit.*)" - Ship may have trouble in following monitored route inside the channel limit.**).

*) The track control system is able to compensate drift up to 45 degrees. If the drift is larger, your ship may go outside the channel limit..

**) The track control system is able to compensate cross-track error up to 30 degrees. However, the full compensation is not available immediately. Two alarms will warn the operator if the track control system estimates that it is not able to keep your ship within channel limits. Alarm "519 Trackpilot: XTE comp. limit" informs you that no further cross-track error based compensation is possible. Alarm "455 Route: Off course" informs you that the track control system cannot use a higher attack angle towards the track.

Environmental conditions	Heading control = "AUTO"	Goto OS + "RC"	Goto AW + "RC"
Slow change of speed	Ship performs normal autopilot turn under this condition.	- Ship follows monitored route, but may need full channel limit area.	- Ship follows monitored route.
Fast change of speed (For example speed decrease from 20 to 7 kt)	Ship performs normal autopilot turn under this condition.	- Ship follows monitored route, but may need full channel limit area	- Ship follows monitored route, but may need full channel limit area

Note: Drift compensation is turned on or off in the Ship and Route parameters in the Navigation Parameters dialog box. For further details, see section 25.1.4 Navigation parameters setting.

30.9 Expected Steering Performance Under Critical Failure

Below is a summary of the system behaviour in various failures when the Goto OS or Goto AW steering mode is in use.

Note: The backup navigator alarm is activated if the alarm is not acknowledged within 30 seconds. For more information about this alarm, see section 31.7 Description of Backup Navigator Alarm.

30.9.1 Lost heading from Autopilot (ECDIS may also have lost heading)

	Associated alarms	Expected system performance	What end operator should do
Immediately	- Sensor alarm "4055: Gyro error (Trackpilot)" is generated at ECDIS. - Warning lamp RC turns on. Mode lamp indicators AUTO and RC start flashing in autopilot control panel.	- If ship is in linear part, Rudder order is frozen for last value in order to approximately continue ahead. - If ship is turning, rudder order is frozen for last value in order to approximately continue rate of turn.	- Change immediately to manual control of rudder. - Acknowledge alarms. - Study situation.
Within few seconds	- Alarm "2497 Route Stop-Sensor fail." - Alarm "2471 RC/NAV-TC STOP - Use AUTO" on ECDIS".		- Change immediately to manual control of rudder. - Acknowledge alarms. - Study situation.
Repeated every 2 minutes	Alarm "2498 Use manual rudder control" is generated at ECDIS.	Reminder	Change immediately to manual control of rudder.

30.9.2 Lost heading from ECDIS (Autopilot still has heading)

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Sensor alarm, for example Alarm "4005: Gyro error" or "4006: Gyro error."		- Acknowledge alarms. - Study situation.
Within few seconds	- Alarm "2002 No heading available". - Alarm "2497 Route Stop-Sensor fail".		- Acknowledge alarms. - Study situation.
After Alarm "2497 Route Stop-Sensor fail."	Alarm "2471 RC/NAV-TC STOP - Use AUTO" in ECDIS is generated. Warning lamp RC turns on and steering mode indicator lamp RC start flashing in Autopilot control panel	- If ship is in linear part, actual heading is used as set course. - If ship is turning, last-set course and radius are used to complete the turn.	- Acknowledge alarms - Study situation. - Change steering mode to "AUTO".

30.9.3 Lost speed

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Sensor alarm, for example Alarm "4008: Log error", "4012...4016: Position equipment error", etc.		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2476 Route Needs log sensor".		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use AUTO control".	Guidance for navigator.	- Change immediately to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 4 minutes	Alarm "2476 Route Needs log sensor".	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail".		- Acknowledge alarms. - Study situation.
After Alarm "2497 Route Stop-Sensor fail."	Alarm "2471 RC/NAV-TC STOP - Use AUTO" in ECDIS is generated. Warning lamp RC turns on and steering mode indicator lamp RC start flashing in Autopilot control panel.	- If ship is in linear part, actual heading is used as set course. - If ship is turning, last set course and radius are used to complete the turn.	- Acknowledge alarms - Study situation. - Change steering mode to "AUTO".

30.9.4 Low speed

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "2008 Filter: Speed below xx."		- Acknowledge alarms. - Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source change".		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2501 Route: Needs higher Speed".		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use AUTO control".	Guidance for navigator	- Change immediately to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 2 minutes	Alarm "2501 Route: Needs higher Speed".	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail".	.	- Acknowledge alarms. - Study situation.
After Alarm "2497 Route Stop-Sensor fail."	Alarm "2471 RC/NAV-TC STOP - Use AUTO" in ECDIS is generated. Warning lamp RC turns on and steering mode indicator lamp RC start flashing in Autopilot control panel.	- If ship is in linear part, actual heading is used as set course. - If ship is turning, last set course and radius are used to complete the turn..	- Acknowledge alarms - Study situation. - Change steering mode to "AUTO".

30.9.5 Lost SOG/COG reference

Goto AW steering mode

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "2507 Route: Need sog/cog ref."		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2505 Route: Use Goto OS."	Instruction for navigator	- Change to Goto OS steering mode. - Acknowledge alarms.
After 4 minutes then every 4 minutes	Alarm "2507 Route: Need sog/cog ref."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2489 Route: Changed to Goto OS"	Automatic change of steering mode to Goto OS mode.	- Acknowledge alarms. - Study situation.

30.9.6 Total lost position

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	- Alarm "4012...4016: Position equipment error" - OR - Kalman filter detects jump, etc.		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarms "2000 Filter: Position unreliable" and "2006 Route: Course jump possible."	- Kalman Filter is switched Off and system uses dead reckoning for positioning. - If you have log or dual-axis log, then dead reckoning is based on them and gyro. - If you have log or dual-axis log, then dead reckoning is based on last plausible speed from position sensors. This is indicated by showing your ship's position, SOG and COG in red. The source indication for SOG and COG is "(LAST)".	- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use AUTO control"	Guidance for navigator	- Change immediately to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 4 minutes	Alarm "2475 Route Needs filter ON"	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail."		- Acknowledge alarms. - Study situation.
After Alarm "2497 Route Stop-Sensor fail."	Alarm "2471 RC/NAV-TC STOP - Use AUTO" in ECDIS is generated. Warning lamp RC turns on and steering mode indicator lamp RC start flashing in Autopilot control panel.	- If ship is in linear part, actual heading is used as set course. - If ship is turning, last set course and radius are used to complete the turn.	- Acknowledge alarms - Study situation. - Change steering mode to "AUTO".

30.9.7 Lost differential position

Goto AW steering mode

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
	Alarm "4027...4031: Lost DGPS" or "4012...4016: Position equipment error."		- Acknowledge alarms. - Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source changed."		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2492 Route: Needs diff pos."	Goto AW requires differential position.	- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2505 Route: Use Goto OS."	Guidance for navigator	- Change to Goto OS steering mode. - Acknowledge alarm.
After 4 minutes then every 4 minutes	Alarm "2492 Route: Needs diff pos."	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2489 Route: Changed to Goto OS."	Automatic change of steering mode to Goto OS mode.	- Acknowledge alarms. - Study situation.

30.9.8 Lost differential position and position discrepancy

	Associated alarms (generated at ECDIS)	Expected system performance	What end operator should do
Precondition	- If sensors in Filter calculation are NOT inside operator selected position discrepancy limit. - Alarm "2007 Position discrepancy"		- Acknowledge alarms. - Study situation.
	Alarm "4027...4031: Lost DGPS" or "4012...4016: Position equipment error"		- Acknowledge alarms. - Study situation.
Within 90 seconds	Alarm "2010 Filter: Pos source changed"		- Acknowledge alarms. - Study situation.
Within 30 seconds	Alarm "2478 Route: Needs good Pos"		- Acknowledge alarms. - Study situation.
After 2 minutes then every 4 minutes	Alarm "2506 Route: Use Auto control"	Guidance for navigator	- Change to local autopilot control. - Acknowledge alarms.
After 4 minutes then every 2 minutes	Alarm "2478 Route: Needs good Pos"	Reminder	- Acknowledge alarms. - Study situation.
Within 10 minutes	Alarm "2497 Route Stop-Sensor fail".		- Acknowledge alarms. - Study situation.
After Alarm "2497 Route Stop-Sensor fail."	Alarm "2471 RC/NAV-TC STOP - Use AUTO" in ECDIS is generated. Warning lamp RC turns on and steering mode indicator lamp RC start flashing in Autopilot control panel.	- If ship is in linear part, actual heading is used as set course. - If ship is turning, last set course and radius are used to complete the turn.	- Acknowledge alarms - Study situation. - Change steering mode to "AUTO".

30.9.9 Lost communication between ECDIS and Autopilot

	Associated alarms	Expected system performance	What end operator should do
Within 15 seconds	Alarm "2488 Steering: Stop-system fail" generated at ECDIS.		- Acknowledge alarms. - Study situation.
After Alarm "2488 Steering: Stop-system fail"	Alarm "2471 RC/NAV-TC STOP - Use AUTO" in ECDIS is generated. Warning lamp RC turns on and steering mode indicator lamp RC start flashing in Autopilot control panel.	- If ship is in linear part, actual heading is used as set course. - If ship is turning, last-set course and radius are used to complete the turn.	- Acknowledge alarms - Study situation. - Change steering mode to "AUTO".

30.9.10 Lost communication between Autopilot and ECDIS

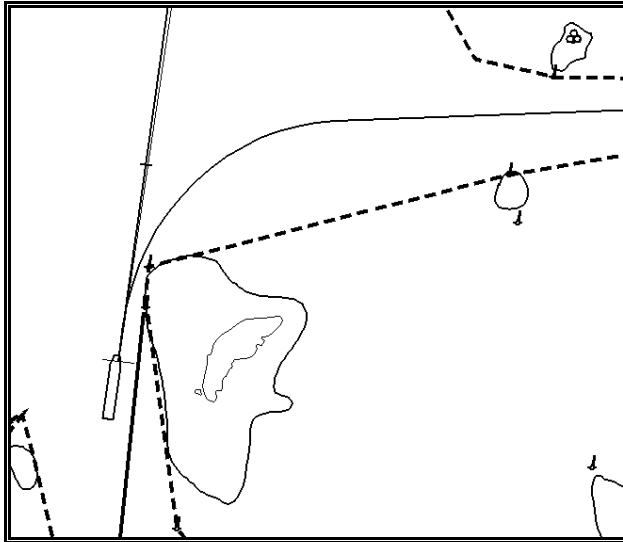
	Associated alarms	Expected system performance	What end operator should do
Within 15 seconds	Alarm "2488 Steering: Stop-system fail" and "2480 Trackpilot Receive error" is generated at the ECDIS.		- Acknowledge alarms. - Study situation.
After Alarm "2488 Steering: Stop-system fail"	Alarm "2471 RC/NAV-TC STOP - Use AUTO" in ECDIS is generated. Warning lamp RC turns on and steering mode indicator lamp RC start flashing in Autopilot control panel.	- If ship is in linear part, actual heading is used as set course. - If ship is turning, last set course and radius are used to complete the turn.	- Acknowledge alarms - Study situation. - Change steering mode to "AUTO".

30.10 How to use the Curved EBL with TOKYO KEIKI Autopilot

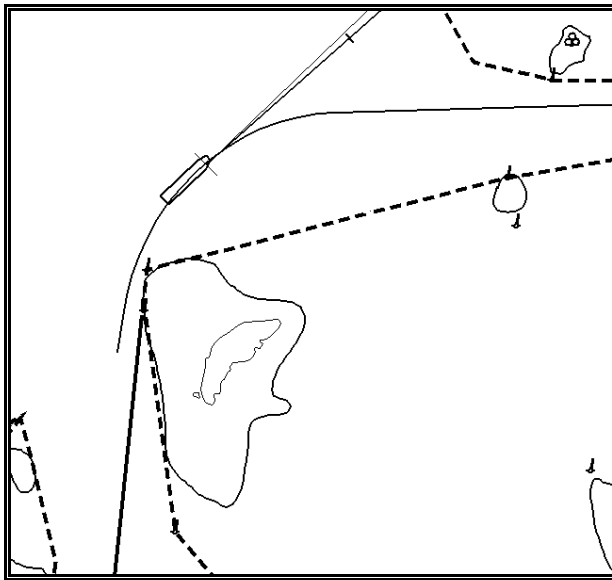
The curved EBL is a control tool to monitor automatic operation of GotoOS and Goto AW ("RC/Nav") steering modes. The curved EBL is available on ECDIS screen and on some selected radar displays.

After the WPT Approach but before start of turn, the curved EBL displays next intended turn. When your ship starts a turn (initiated by the automatic route steering) the Curved EBL is locked to its position.

During the turn you can monitor how your ship performs the intended maneuver against the plan by comparing the Curved EBL position and your current position.



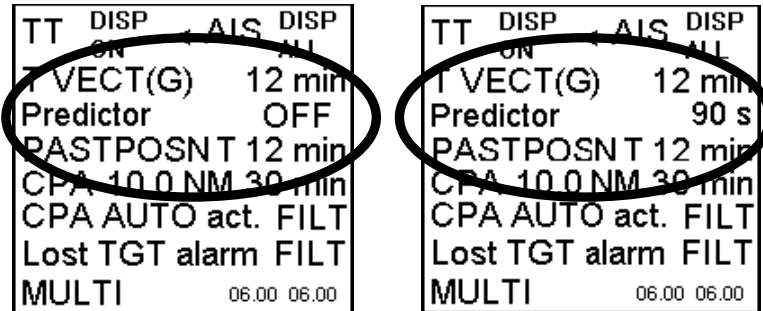
Curved EBL at the wheel over point.



Locked curved EBL during turn.

30.11 Using the Predictor

The Predictor is a tool for estimating your ship's future positions and behaviour, and it is in the information area. Place the cursor on the text "Predictor" then use left mouse button to toggle the predictor ON/OFF. The current setting is shown in the mouse functions area. To set the time for the predictor, put the cursor on the time indication next to Predictor, spin the scrollwheel to select a time then push the scrollwheel. The time from current position to the last of the predicted position may be selected by the between 30 and 180 seconds, in 30 second intervals. The on-screen Predictor graphic consists of five pieces of your ships drawn in true scale to successive future positions.

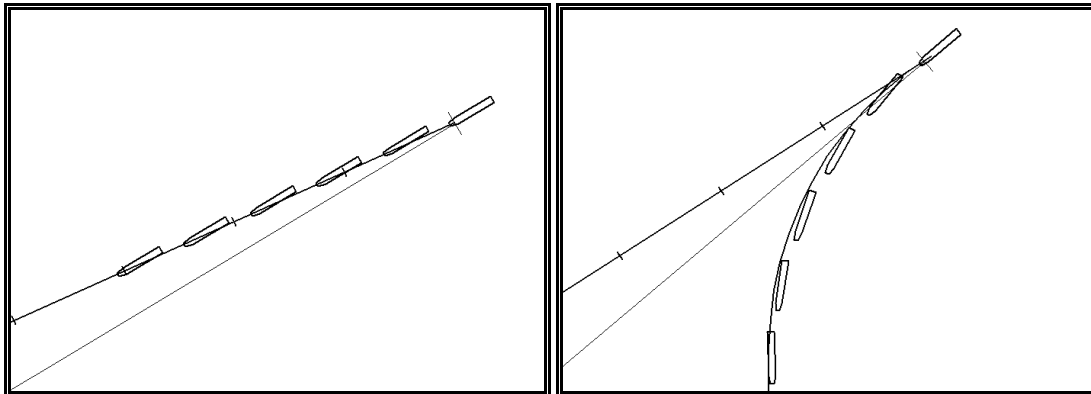


The predictor is calculated using current:

- Docking speed components:
 - Transversal bow speed
 - Transversal stern speed
 - Longitudinal center speed
- Rate of turn

These components are assumed to be stable during the prediction period.

The predictor can be used in every steering-state, even when steering without the Autopilot FAP-2000.



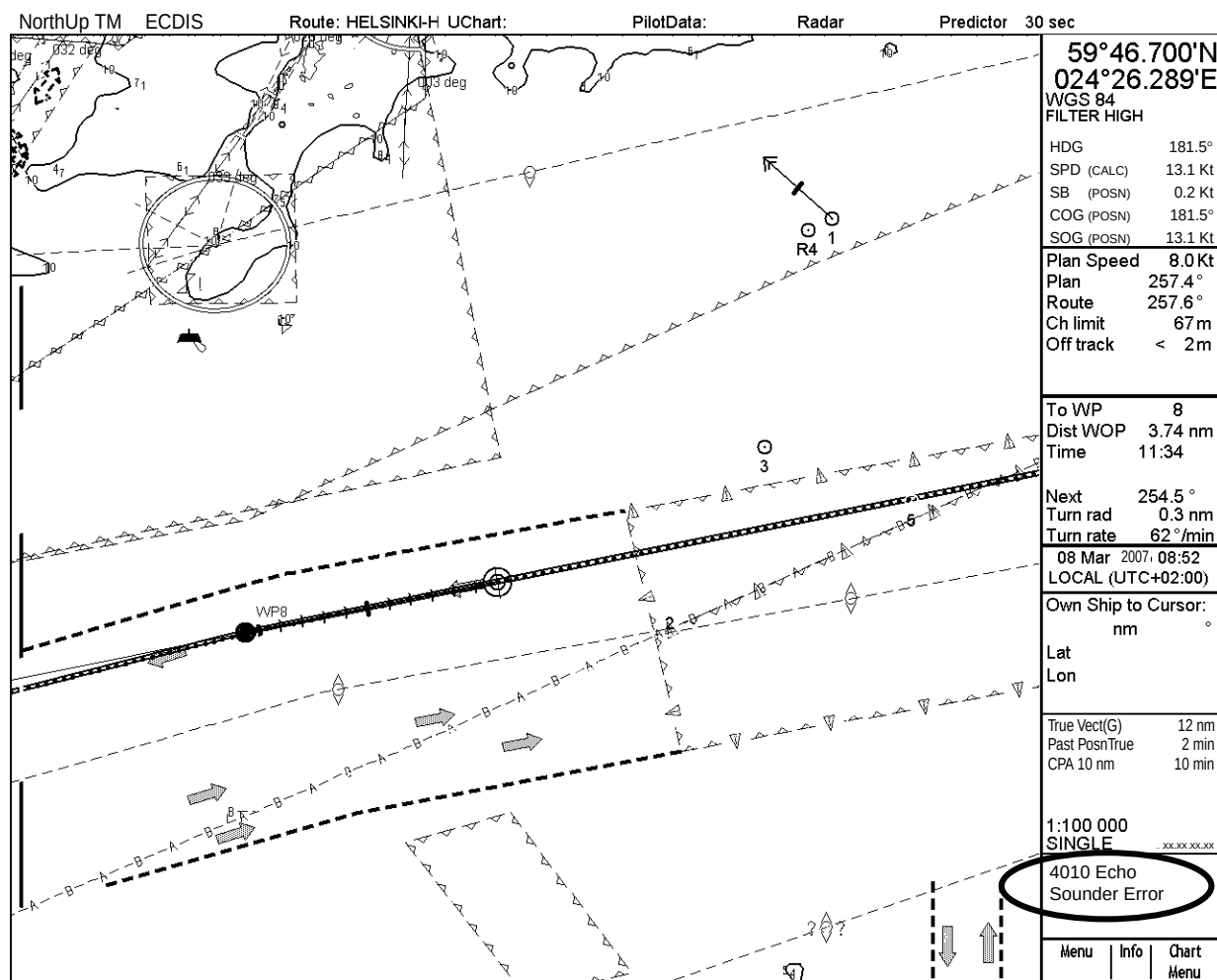
Predictor shows drift

Predictor in a turn

31. Alarms

31.1 Overview

Alarms are displayed on the ENC screen at the lower right corner, indicated with "1" in the figure below. "2" in the figure below is the alarm area, where you acknowledge alarms and display the Alarm Queue window which shows alarms generated. To acknowledge an alarm or display the Alarm Queue window, put the cursor in the alarm area then push the left mouse button to acknowledge an alarm or push the right mouse button to display the Alarm Queue window.



There are three kind of alarms generated by the ENC. To see a list of alarms, see "List of Alarms" on page 29-3.

31.2 Alarms Generated by Navigation Calculation

Navigation calculation generates the following alarms:

- Error detected in any sensor
- Radar communication error
- Software alarms, etc.

31.3 Alarms Generated by Chart Calculation

Chart calculation generates the following alarms:

- New pilot data notebook page available
- Chart alarms based on S57 charts
- Chart alarms based on user chart's dangerous symbols, lines and areas

31.4 Alarms Generated by Steering Calculation

Note that all steering-related functions are available only if the ECDIS processor is also connected to the optional Autopilot FAP-2000 processor. Some of the alarms such as Outside Channel limit are also available without the optional Autopilot FAP-2000 processor. Without the Autopilot FAP-2000 processor, all alarms generated by steering calculation appear in the same alarm queue as alarms generated by navigation calculation.

31.5 Alarms Generated by Radar Overlay

Alarms generated by Navigation Calculation, Chart Calculation and Steering calculation are common for each workstation (i.e. they can be seen on each workstation's alarm queue with same alarm number). Alarms generated by Radar overlay are generated locally on workstation where failure happens (i.e. they can only be seen on workstation where it happens). Each workstation has own alarm numbers for alarms generated by radar overlay.

Alarm range is Alarm 6x00 - Alarm 6x11, x indicates ECDIS workstation number 1-4.

It is possible to view alarm queue of ECDIS system on Conning display. Window on Conning Display is called Alarm message window, where all active or pending alarms of system are shown in priority order. If in the system there are more than one ECDIS workstation and more than one Radar overlay installed, to distinguish which Radar overlay is source of alarm they have own set of alarm in use.

For example: "6100 RadOv No Headline" for 1st workstation

"6200 RadOv No Headline" for 2nd workstation

31.6 Description of the Alarm Priority System

The permanently visible alarm is the top most urgent alarm at any moment. Alarms have priority from 1 to 10 to control urgency. Priority 1 is the highest. The list of alarms in this chapter shows these priorities for each alarm with following syntax: "/1" at the end first line means priority = 1, "/1/8" at the end of first line means that priority is = 1, if unacknowledged and priority = 8, if acknowledged but the state of alarm still exists. Unacknowledged alarm is shown in black text (or white depending on color scheme) on red background. An acknowledged alarm which still exists is shown in orange text on white background.

You may view the alarms in the Alarm Queue. Place the cursor on the alarm text then push the right mouse button. See the example below.

How to read the Alarm Queue (first row as an example):

- First digit "2" indicates alarm priority.
- Second four digits "5100" indicate alarm number.
- Text indicates reason of alarm "Safety Contour".

In the top alarm queue example, alarm priority changes from 1 to 8 after it is acknowledged. Then alarm 5100 is assigned highest priority.

In the bottom alarm queue example, the priority of alarm 5100 is changed to 10 after it is acknowledged. Then alarm 5103 is assigned highest priority.

Alarm Queue

2 5100 Safety Contour

2 5103 User Chart Danger Area

8 2001 No speed available

Alarm Queue

2 5103 User Chart Danger Area

10 5100 Safety Contour

31.7 Description of Backup Navigator Alarm

Track Control System (=TCS) standard IEC 62065 requires a "backup navigator alarm". This alarm is connected to the Central Alarm System. The idea behind the IEC 62065 requirement for "Backup Navigator Alarm" is that if the navigator on duty cannot handle the situation (i.e. he does not have time enough to check and to acknowledge all track control related alarm) then more person(s) are called automatically to the bridge. Alarm Transfer System included into Central Alarm System will then transfer "Backup Navigator Alarm" to intended person(s).

If during Track Control (= Program track, Goto Track, Goto WP etc.) any of alarms listed below is unacknowledged for more than 30 seconds then "Backup Navigator Alarm" closed contact relay is activated. Note that "Backup Navigator Alarm" is not activated, if any of above alarms happens when the ship is not performing any Track Control mode.

"Backup Navigator Alarm" is related to following alarms:

Alarm **"2000 Filter: Position unreliable"**

Alarm **"2008 Filter: speed below xx KN"**

Alarm **"2010 Filter: Pos source change"**

Alarm **"2451 Route: WP approach alarm"**

Alarm **"2458 Route: Last WP approach"**

Alarm **"2488 Steering:Stop-System fail"**

Alarm **"2489 Route: Changed to Goto WP"**

Alarm **"2496 ProgTrack: Stop - Sensor Fail"**

Alarm **"2497 Route: Stop - Sensor Fail"**

Alarm **"4005: Gyro error"**

Alarm **"4006: Gyro error"**

Alarm **"4008: Log error"**

Alarm **"4008: Dual axis log (WT) error"**

Alarm **"4009: Dual axis log (BT) error"**

Alarm **"4012...4016: Position equipment error"**

Alarm **"4027...4031: Lost DGPS"**

Alarm **"4033: ARPA radar spd/crs error"**

Alarm **"4055: Gyro error (Autopilot FAP-2000)"**

If ECDIS is a part of a Track Control System, the "Backup Navigator Alarm" should be connected. If ECDIS is NOT part of Track Control System, then "Backup Navigator Alarm" is not generated.

31.8 List of Alarms

31.8.1 List of navigation alarms

Alarm number 1101: REFTGT: NO FILE CHOSEN /7

USE 'REFERENCE TARGET' BUTTON TO
CHOOSE VALID REFERENCE TARGET FILE

Alarm number 1102: REFTGT: NEED 8 TARGETS /7

FILE MUST CONTAIN AT LEAST 8 TARGETS
IN ORDER TO UTILIZE REFERENCE
TARGETS USE 'REFERENCE TARGET'
BUTTON TO CHOOSE ANOTHER REF. TARGET

Alarm number 1200: DEPTH BELOW LIMIT /5/13

ECHO SOUNDER INDICATES WATER DEPTH
BELOW TRANSDUCER TO EXCEED SPECIFIED
SAFE LIMIT.

Alarm number 2000: FILTER: POSITION UNRELIABLE /1

ECDIS IS NOT ABLE TO ESTIMATE A
RELIABLE POSITION. VERIFY AND CHOOSE
SPEED AND POSITION SENSORS THROUGH
'SENSORS' FUNCTION .

Alarm number 2001: NO SPEED AVAILABLE /1/8

NO VALID SPEED SENSOR HAS BEEN FOUND.
VERIFY AND CHOOSE SPEED SENSORS IN
'SENSORS' BUTTON

Alarm number 2002: NO HEADING AVAILABLE /1/8

NO VALID HEADING SENSOR HAS BEEN
FOUND. VERIFY AND CHOOSE HEADING
SENSORS IN 'SENSORS' FUNCTION.

31. Alarms

Alarm number 2004: GYRO DATA UNRELIABLE /1/8

IF YOU HAVE BOTH GYRO1 AND GYRO2
CHOSEN AND IF THEY VALUE DIFFERS
MORE THAN 5 DEGREES ALARM IS
GENERATED. VERIFY AND CHOOSE HEADING
SENSORS IN 'SENSORS' FUNCTION.

Alarm number 2005: LOG DATA UNRELIABLE /1/8

LOG GIVES 0 KN SPEED, WHICH DOES NOT
CORRESPOND WITH OTHER SPEED SENSORS.
VERIFY AND CHOOSE SPEED SENSORS IN
'SENSORS' FUNCTION.

Alarm number 2006: ROUTE:COURSE JUMP POSSIBLE /1

SYSTEM HAS AUTOMATICALLY CHANGED TO
DEAD RECKONING. IF YOU NOW CHOOSE
"ON" A POSITION SENSOR YOU MAY GET A
JUMP FOR COURSE. CHANGE FROM ROUTE
STEERING TO MANUAL STEERING OR CHECK
POSITION VERY CAREFULLY BEFORE
CHOOSING "ON".

Alarm number 2007: POSITION DISCREPANCY /2/9

SYSTEM HAS DETECTED MORE DIFFERENCE
THAN SET LIMIT BETWEEN OWN SHIP
PRIMARY AND SECONDARY POSITIONS OR
BETWEEN OWN SHIP AND ANY SENSOR
POSITION. CHECK POSITION SENSORS

Alarm number 2008: FILTER: SPEED BELOW xx KN /1/8

 KALMAN FILTER REQUIRED THAT THE
 SPEED OF THE OWN SHIP IS MORE THAN
 SPEED LIMIT SET IN ECDIS
 INSTALLATION PARAMETERS. IF ROUTE
 STEERING WAS NOT USED, THEN KALMAN
 FILTER HAS BEEN SET AUTOMATICALLY
 OFF BY THE SYSTEM.

Alarm number 2009: POSITION SOURCE CHANGED /1

 POSITION SOURCE OF OWN SHIP PRIMARY
 POSITION HAS BEEN CHANGED
 AUTOMATICALLY TO ANOTHER SOURCE THAN
 BEFORE. VERIFY NEW SOURCE.

Alarm number 2010: FILTER:POS SOURCE CHANGE /2

 DGPS POSITION SENSOR USED IN FILTER
 POSITIONING HAS CHANGED ITS
 OPERATION MODE FROM NORMAL TO
 DIFFERENTIAL OR FROM DIFFERENTIAL TO
 NORMAL

Alarm number 2011: CHARTALIGN:OVER 30 MINUTES /2

 IF POSITION ALIGNMENT IS USED THEN
 USER IS REMINDED OF IT EVERY 30 MIN.

Alarm number 2013: SOG&COG DATA UNRELIABLE /1/8

 SOG AND/OR COG DATA FROM SENSORS IS
 UNRELIABLE. VERIFY AND CHOOSE
 SPEED/COURSE AND POS SENSORS IN
 'SENSORS' FUNCTION. IF REASON IS
 FAST MANOEUVRE, LIMIT CAN BE
 INCREASED BY SETTING "MAX RATE OF
 TURN" LIMIT OVER 150 DEG/MIN.

31. Alarms

Alarm number 2052: ROUTE:ILLEGAL ETA WAYPOINT /7

ETA WAYPOINT DOESN'T EXIST IN ROUTE
FILE OR ETA WAYPOINT IS NOT BETWEEN
NEXT AND FINAL WAYPOINT.
VERIFY IN 'ROUTE MONITOR' THAT A
VALID ROUTE IS CHOSEN.

Alarm number 2053: ROUTE:ILLEGAL NEXT WAYPOINT /7

NEXT WAYPOINT DOESN'T EXIST IN ROUTE
FILE. VERIFY IN 'ROUTE MONITOR'
THAT A VALID ROUTE IS CHOSEN.

Alarm number 2054: ROUTE:ILLEGAL FINAL WAYPOINT /7

FINAL WAYPOINT DOES NOT EXIST IN
ROUTE FILE. VERIFY IN 'ROUTE MONI-
TOR' THAT A VALID ROUTE IS CHOSEN.

Alarm number 2055: ARPA RADAR COMMUNICATION ERROR /3/10

ECDIS CANNOT COMMUNICATE WITH ARPA 1
VERIFY THAT
'AUTOTRACKING ON' AND 'INS ON' ARE
DECLICKED ON THE ARPA RADARS.

Alarm number 2056: ARPA RADAR COMMUNICATION ERROR /3/10

ECDIS CANNOT COMMUNICATE WITH ARPA 2
VERIFY THAT
'AUTOTRACKING ON' AND 'INS ON' ARE
DECLICKED ON THE ARPA RADARS.

Alarm number 2057: ARPA RADAR COMMUNICATION ERROR /3/10

ECDIS CANNOT COMMUNICATE WITH ARPA 3
VERIFY THAT
'AUTOTRACKING ON' AND 'INS ON' ARE
DECLICKED ON THE ARPA RADARS.

Alarm number 2058: ARPA RADAR COMMUNICATION ERROR /3/10

 ECDIS CANNOT COMMUNICATE WITH ARPA 4
 VERIFY THAT
 'AUTOTRACKING ON' AND 'INS ON' ARE
 DECLICKED ON THE ARPA RADARS.

Alarm number 2060: ROUTE: WP CHANGE DISABLED /7

 NEXT WAYPOINT CANNOT BE CHANGED
 DURING ROUTE STEERING. CHANGE FROM
 ROUTE STEERING MODE BEFORE CHOOSING
 A NEW NEXT WAYPOINT.

Alarm number 2061: CHART ALIGN: EXECUTING /7

 IF CHART ALIGNMENT IS DONE BY MEANS
 OF SELESMA ARPA RADAR, ALARM IS
 DISPLAYED WHEN YOU DEFINE ALIGNMENT.

Alarm number 2063: ROUTE:CHOOSE DISABLED /7

 A NEW ROUTE CANNOT BE CHOSEN DURING
 ROUTE STEERING. USE 'RADIUS CONTROL'
 TO OVERRIDE ROUTE STEERING BEFORE
 CHOOSING A NEW ROUTE.

Alarm number 2064: ROUTE:CANCEL DISABLED /7

 A ROUTE CANNOT BE CANCELED DURING
 ROUTE STEERING. USE 'RADIUS CONTROL'
 TO OVERRIDE ROUTE STEERING BEFORE
 CANCELING THE ROUTE.

31. Alarms

Alarm number 2067: MANUAL DRIFT DISABLED /7

MANUAL DRIFT VALUE CAN ONLY BE
INSERTED WHEN NO SENSORS PROVIDE
SPEED OVER GROUND DATA.
USE 'SENSORS' BUTTON TO VERIFY
AND CHOOSE SENSORS TO BE USED.

Alarm number 2071: SOURCE ARPA RADAR CHANGED /1

MASTER RADAR FOR ECDIS HAS BEEN
CHANGED. VERIFY NEW SOURCE OR
TRACKED ARPA TARGETS

Alarm number 2072: CHARTALIGN: NO LINE AVAIL /1

TO PERFORM CHART ALIGN WITH AN ARPA
RADAR THERE MUST BE TRANSFERRED USER
CHART'S LINES IN THE ARPA RADAR.
CHECK THAT YOUR CURRENT USER CHART
HAS LINES AND THAT THEY ARE VISIBLE
ON ARPA RADAR DISPLAY

Alarm number 2100: USERCHART: FILE READ ERR /7

CANNOT READ USER CHART IN MONITOR
MODE. MOVE USER CHART TO PLAN MODE
TO MAKE POSTPROCESSING AGAIN FOR
USER CHART.

Alarm number 2101: USER CHART: NEED POINTS /7

USER CHART HAS MORE THAN 60 LINES OR
20 SYMBOLS AND IT DOES NOT CONTAIN
ANY POINTS. USE 'USER CHART' MENU
TO CHOOSE A VALID USER CHART OR ADD
POINTS TO CURRENT USER CHART

Alarm number 2102: USERCHART: FILE NOT FOUND /7

CANNOT READ USER CHART IN MONITOR
MODE. MOVE USER CHART TO PLAN MODE
TO MAKE POSTPROCESSING AGAIN FOR
USER CHART.

Alarm number 2150: ROUTE: FILE READ ERROR /7

CANNOT OPEN ROUTE IN MONITOR MODE.
OPEN ROUTE IN PLAN MODE TO MAKE SOME
MODIFICATION OF WP DATA IN WP PAGE.
FOR EXAMPLE CHANGE RADIUS OF ANY WP.

Alarm number 2151: ROUTE: FILE READ ERROR /7

CANNOT READ ROUTE IN MONITOR MODE.
MOVE ROUTE TO PLAN MODE TO MAKE SOME
MODIFICATION OF WP DATA IN WP PAGE.
FOR EXAMPLE CHANGE RADIUS OF ANY WP.

Alarm number 2152: ROUTE: FILE NOT FOUND /7

CANNOT READ ROUTE IN MONITOR MODE.
MOVE ROUTE TO PLAN MODE TO MAKE SOME
MODIFICATION OF WP DATA IN WP PAGE.
FOR EXAMPLE CHANGE RADIUS OF ANY WP.

Alarm number 2454: ROUTE: END REACHED /1

YOU HAVE PASSED THE FINAL WAYPOINT
OF YOUR MONITORED ROUTE. CURRENT
MONITORED ROUTE HAS AUTOMATICALLY
CANCELLED

Alarm number 2457: ROUTE: OUTSIDE CHANNEL LIMITS /3/10

SHIP IS OUTSIDE CHANNEL LIMITS
SPECIFIED FOR CURRENT LEG OF ROUTE.
CHECK SHIP POSITION AND ROUTE

31. Alarms

Alarm number 2459: STEERING PARAMETER ERROR /7

TRACKPILOT PARAMETER HAS AN ERROR IN
ITS CONTENTS. CHECK AGAIN
INSTALLATION PARAMETERS OF ECDIS.

Alarm number 2480: TRACKPILOT RECEIVE ERROR /2/9

ECDIS CANNOT RECEIVE ANY DATA FROM
TRACKPILOT. CHANGE "MAIN STEERING"
-CHOOSEOR TO ANY OTHER POSITION THAN
AUTOP. CHECK AND VERIFY TRACKPILOT
OPERATION BEFORE NEW TRY

Alarm number 2488: STEERING:STOP-SYSTEM FAIL /2

CONNECTION TO THE TRACKPILOT HAS
BEEN LOST WHILE THE SYSTEM PERFORMED
ONE OF THE INTEGRATED STEERING MODES:
- GOTO TRACK
- GOTO WAYPOINT
- PROGRAM TRACK
CURRENT STEERING MODE CANNOT CONTINUE
CHECK NEW STEERING SITUATION

Alarm number 3000: PARAM CHANGE DISABLED /3

INSTALLATION PARAMETERS CANNOT BE
CHANGED IF THE ROUTE STEERING IS ON
OR THE KALMAN FILTER IS IN USE.
CHECK THE SITUATION AND TRY AGAIN.

Alarm number 3300: SENSOR DATAFLOW ERROR /1

ECDIS HAS INTERNAL SENSOR MANAGEMENT
ERROR ALL CONNECTION TO SENSOR DATA
IS LOST

Alarm number 3500: AIS TARGET OVERFLOW /2/9

MAXIMUM COUNT OF AIS TARGETS SET TO
BE DISPLAYED ON ECDIS HAS BEEN
EXCEEDED WITHIN DEFINED MAXIMUM
RANGE. IT IS POSSIBLE THAT SOME OF
AIS TARGETS ARE NOT DISPLAYED ON
ECDIS. TO GET ALL AIS TARGETS TO BE
DISPLAYED, INCREASE MAXIMUM COUNT OF
AIS TARGETS OR DECREASE VALUE OF
MAXIMUM RANGE.

Alarm number 3501: AIS TARGET STORAGE FULL /2/9

MAXIMUM COUNT OF AIS TARGETS WHICH
CAN BE STORED FOR DISPLAYING ON
ECDIS HAS BEEN EXCEEDED. IT IS
POSSIBLE THAT SOME OF AIS TARGETS
ARE NOT DISPLAYED ON ECDIS.

Alarm number 3502: DANGEROUS AIS TARGET /3/10

AIS TARGET HAS MET DANGEROUS TARGET
LIMIT SET BY CPA AND TCPA

Alarm number 3503: LOST AIS TARGET /3

NO Update INFORMATION RECEIVED FROM
TRACKED AIS TARGET WITHIN DEFINED
REPORTING INTERVAL OF SHIP TYPE

Alarm number 4000: NO SENSOR PARAMETERS /2

SENSOR PARAMETER FILES ARE MISSING.
LOAD INSTALLATION PARAMETERS OF
ECDIS. IF REQUIRED USE BACKUP COPY
OF PARAMETERS.

31. Alarms

Alarm number 4001: B-ADAPTER ERROR /4/11

B-ADAPTER DOES NOT OPERATE DUE TO A
SYSTEM FAULT. SWITCH OFF MAIN
CIRCUIT BREAKER AND THEN ON AGAIN.
CALL SERVICE IF FAILURE STILL EXISTS

Alarm number 4002: ENGINE CONTROL COMM ERROR /6/13

CONNECTION TO ENGINE CONTROL HAS
BEEN LOST. CHECK THAT CONNECTION IS
OK.

Alarm number 4005: GYRO ERROR /3/10

GYRO1 DATA IS NOT RECEIVED CORRECTLY
USE 'INITIAL SETTINGS' MENU TO SET
GYRO AGAIN. IF FAILURE STILL
EXISTS, USE 'SENSORS' SPEED/POSITION
PAGE TO CHOOSE VALID SENSORS.

Alarm number 4006: GYRO ERROR /3/10

GYRO2 DATA IS NOT RECEIVED CORRECTLY
USE 'SENSORS' SPEED/POSITION PAGE TO
CHOOSE VALID SENSORS.

Alarm number 4008: LOG ERROR /3/10

LOG DATA IS NOT RECEIVED CORRECTLY.
USE 'SENSORS' SPEED/COURSE
TO CHOOSE VALID SENSORS

Alarm number 4008: DUAL AXIS LOG (WT) ERROR /3/10

DUAL AXIS LOG DATA IS NOT RECEIVED
CORRECTLY. USE SPEED/COURSE PAGE
TO CHOOSE VALID SPEED SENSORS.

Alarm number 4009: DUAL AXIS LOG (BT) ERROR /3/10

DUAL AXIS LOG DATA IS NOT RECEIVED
CORRECTLY. USE SPEED/COURSE PAGE
TO CHOOSE VALID SPEED SENSORS.

Alarm number 4010: ECHO SOUNDER ERROR /3/10

ECHO SOUNDER DATA IS NOT RECEIVED
CORRECTLY.
VERIFY ECHO SOUNDER OPERATION.

Alarm number 4011: WIND SENSOR ERROR /3/10

WIND SENSOR DATA IS NOT RE CEIVED
CORRECTLY.
VERIFY WIND SENSOR OPERATION.

Alarm number 4012: POSITION EQUIPMENT ERROR /3/10

POSITION EQUIPMENT 1 DATA IS NOT
RECEIVED CORRECTLY. USE 'SENSORS'
POSITION TO CHOOSE VALID POS SENSOR.

Alarm number 4013: POSITION EQUIPMENT ERROR /3/10

POSITION EQUIPMENT 2 DATA IS NOT
RECEIVED CORRECTLY. USE 'SENSORS'
POSITION TO CHOOSE VALID POS SENSOR.

Alarm number 4014: POSITION EQUIPMENT ERROR /3/10

POSITION EQUIPMENT 3 DATA IS NOT
RECEIVED CORRECTLY. USE 'SENSORS'
POSITION TO CHOOSE VALID POS SENSOR.

31. Alarms

Alarm number 4015: POSITION EQUIPMENT ERROR /3/10

POSITION EQUIPMENT 4 DATA IS NOT
RECEIVED CORRECTLY. USE 'SENSORS'
POSITION TO CHOOSE VALID POS SENSOR.

Alarm number 4016: POSITION EQUIPMENT ERROR /3/10

POSITION EQUIPMENT 5 DATA IS NOT
RECEIVED CORRECTLY. USE 'SENSORS'
POSITION TO CHOOSE VALID POS SENSOR.

Alarm number 4018: ROT GYRO ERROR /3/10

ROT GYRO DATA IS NOT RECEIVED
CORRECTLY. VERIFY ROT GYRO DEVICE.

Alarm number 4019: PITCH&ROLL SENSOR ERROR 3/10

PITCH&ROLL DATA IS NOT RECEIVED
CORRECTLY. VERIFY SENSOR FOR
PITCH&ROLL DATA.

Alarm number 4021: ARPA RADAR SYSTEM ERROR /6/13

RADAR FROM CHANNEL 1 REPORT RADAR
SYSTEM FAILURE OR ECDIS CANNOT
COMMUNICATE WITH THE RADAR. VERIFY
THAT 'AUTOTRACKING ON' AND 'INC ON'
ARE DECLICKED ON THE RADAR.

Alarm number 4022: ARPA RADAR SYSTEM ERROR /6/13

RADAR FROM CHANNEL 2 REPORT RADAR
SYSTEM FAILURE OR ECDIS CANNOT
COMMUNICATE WITH THE RADAR. VERIFY
THAT 'AUTOTRACKING ON' AND 'INC ON'
ARE DECLICKED ON THE RADAR.

Alarm number 4023: ARPA RADAR SYSTEM ERROR /6/13

RADAR FROM CHANNEL 3 REPORT RADAR
SYSTEM FAILURE OR ECDIS CANNOT
COMMUNICATE WITH THE RADAR. VERIFY
THAT 'AUTOTRACKING ON' AND 'INC ON'
ARE DECLICKED ON THE RADAR.

Alarm number 4024: ARPA RADAR SYSTEM ERROR /6/13

RADAR FROM CHANNEL 1 REPORT RADAR
SYSTEM FAILURE OR ECDIS CANNOT
COMMUNICATE WITH THE RADAR. VERIFY
THAT 'AUTOTRACKING ON' AND 'INC ON'
ARE DECLICKED ON THE RADAR.

Alarm number 4027: DGPS POS. SOURCE CHANGE /3/10

DGPS POSITION SENSOR IN CHANNEL
NUMBER 1 HAS CHANGED ITS OPERATION
MODE FROM NORMAL TO DIFFERENTIAL OR
FROM DIFFERENTIAL TO NORMAL. CHECK
SENSORS AND IF REQUIRED CHOOSE MORE
SUITABLE POSITION SENSOR.

Alarm number 4028: DGPS POS. SOURCE CHANGE /3/10

DGPS POSITION SENSOR IN CHANNEL
NUMBER 2 HAS CHANGED ITS OPERATION
MODE FROM NORMAL TO DIFFERENTIAL OR
FROM DIFFERENTIAL TO NORMAL. CHECK
SENSORS AND IF REQUIRED CHOOSE MORE
SUITABLE POSITION SENSOR.

31. Alarms

Alarm number 4029: DGPS POS. SOURCE CHANGE /3/10

DGPS POSITION SENSOR IN CHANNEL
NUMBER 3 HAS CHANGED ITS OPERATION
MODE FROM NORMAL TO DIFFERENTIAL OR
FROM DIFFERENTIAL TO NORMAL. CHECK
SENSORS AND IF REQUIRED CHOOSE MORE
SUITABLE POSITION SENSOR.

Alarm number 4030: DGPS POS. SOURCE CHANGE /3/10

DGPS POSITION SENSOR IN CHANNEL
NUMBER 4 HAS CHANGED ITS OPERATION
MODE FROM NORMAL TO DIFFERENTIAL OR
FROM DIFFERENTIAL TO NORMAL. CHECK
SENSORS AND IF REQUIRED CHOOSE MORE
SUITABLE POSITION SENSOR.

Alarm number 4031: DGPS POS. SOURCE CHANGE /3/10

DGPS POSITION SENSOR IN CHANNEL
NUMBER 5 HAS CHANGED ITS OPERATION
MODE FROM NORMAL TO DIFFERENTIAL OR
FROM DIFFERENTIAL TO NORMAL. CHECK
SENSORS AND IF REQUIRED CHOOSE MORE
SUITABLE POSITION SENSOR.

Alarm number 4033: ARPA RADAR SPD/CRS ERROR /3/10

ARPA RADAR CHOSEN AS SPD AND CRS
SOURCE IS NOT RECEIVED CORRECTLY
USE 'SENSORS' SPEED/COURSE TO CHOOSE
VALID SPD/CRS SENSORS

Alarm number 4034: SPEEDPILOT RECEIVE ERROR /3/10

DATA FROM SPEEDPILOT IS NOT RECEIVED
CORRECTLY. CHECK CONNECTION OF
SPEEDPILOT.

Alarm number 4035: B-ADAPTER INTERFACE ERROR /1/8

B-ADAPTER DATA IS NOT RECEIVED
CORRECTLY DUE TO INTERNAL SOFTWARE
ERROR IN COMMUNICATION PROGRAM.
TO RESTART COMMUNICATION PROGRAM,
OPEN INSTALLATION PARAMETERS OF
ECDIS AND CLICK OK WITHOUT CHANGING
ANY PARAMETERS. OR RESTART ECDIS.

Alarm number 4036: AMWSS COMM ERROR /6/13

COMMUNICATION WITH AMWSS FAILS.
CHECK CONNECTION TO AMWSS

Alarm number 4037: AMWSS RECEIVE ERROR /6/13

DATA FROM AMWSS IS NOT RECEIVED
CORRECTLY. CHECK CONNECTION TO
AMWSS

Alarm number 4038: DATUM MISMATCH /3/10

POSITION SENSOR IN CHANNEL NUMBER 1
OUTPUTS POSITION ANOTHER DATUM AS
SET IN ECDIS INSTALLATION PARAMETERS
CHECK, THAT SENSOR OUTPUTS POSITION
IN WGS 84 DATUM.

Alarm number 4039: DATUM MISMATCH /3/10

POSITION SENSOR IN CHANNEL NUMBER 2
OUTPUTS POSITION ANOTHER DATUM AS
SET IN ECDIS INSTALLATION PARAMETERS
CHECK, THAT SENSOR OUTPUTS POSITION
IN WGS 84 DATUM.

31. Alarms

Alarm number 4040: DATUM MISMATCH /3/10

POSITION SENSOR IN CHANNEL NUMBER 3
OUTPUTS POSITION ANOTHER DATUM AS
SET IN ECDIS INSTALLATION PARAMETERS
CHECK, THAT SENSOR OUTPUTS POSITION
IN WGS 84 DATUM.

Alarm number 4041: DATUM MISMATCH /3/10

POSITION SENSOR IN CHANNEL NUMBER 4
OUTPUTS POSITION ANOTHER DATUM AS
SET IN ECDIS INSTALLATION PARAMETERS
CHECK, THAT SENSOR OUTPUTS POSITION
IN WGS 84 DATUM.

Alarm number 4042: DATUM MISMATCH /3/10

POSITION SENSOR IN CHANNEL NUMBER 5
OUTPUTS POSITION ANOTHER DATUM AS
SET IN ECDIS INSTALLATION PARAMETERS
CHECK, THAT SENSOR OUTPUTS POSITION
IN WGS 84 DATUM.

Alarm number 4044: DATUM CHANGE /1

POSITION SENSOR IN CHANNEL NUMBER 1
HAS CHANGED OUTPUT POSITION FROM
ANOTHER DATUM TO WGS 84 DATUM.

Alarm number 4045: DATUM CHANGE /3

POSITION SENSOR IN CHANNEL NUMBER 2
HAS CHANGED OUTPUT POSITION FROM
ANOTHER DATUM TO WGS 84 DATUM.

Alarm number 4046: DATUM CHANGE /3

POSITION SENSOR IN CHANNEL NUMBER 3
HAS CHANGED OUTPUT POSITION FROM
ANOTHER DATUM TO WGS 84 DATUM.

Alarm number 4047: DATUM CHANGE /3

POSITION SENSOR IN CHANNEL NUMBER 4
HAS CHANGED OUTPUT POSITION FROM
ANOTHER DATUM TO WGS 84 DATUM.

Alarm number 4048: DATUM CHANGE /3

POSITION SENSOR IN CHANNEL NUMBER 5
HAS CHANGED OUTPUT POSITION FROM
ANOTHER DATUM TO WGS 84 DATUM.

Alarm number 4050: ARPA ANTENNA ID ERROR /6/13

ECDIS CANNOT RECEIVE ANTENNA ID
FROM RADAR IN CHANNEL 1

Alarm number 4051: ARPA ANTENNA ID ERROR /6/13

ECDIS CANNOT RECEIVE ANTENNA ID
FROM RADAR IN CHANNEL 2

Alarm number 4052: ARPA ANTENNA ID ERROR /6/13

ECDIS CANNOT RECEIVE ANTENNA ID
FROM RADAR IN CHANNEL 3

Alarm number 4053: ARPA ANTENNA ID ERROR /6/13

ECDIS CANNOT RECEIVE ANTENNA ID
FROM RADAR IN CHANNEL 4

31. Alarms

Alarm number 4055: GYRO ERROR(TRACKPILOT) /3/10

GYRO DATA ON TRACKPILOT IS MISSING.
AL 10 IS ALSO ACTIVE ON TRACKPILOT'S
CONTROL PANEL. STUDY SITUATION ON
TRACKPILOT.

Alarm number 4063: ECDIS IP ERROR FOR LANADA /3/10

IF ECDIS IP-ADDRESS FOR LAN ADAPTERS
IS DIFFERENT BETWEEN WINDOWSXP CONTROL
PANEL AND ECDIS

Alarm number 4064: LAN FAIL FOR LAN ADAPTER /3/10

UNEXPEXED LAN ERROR -> MAYBE LAN
CABLE OR HUB BROKEN/DISCONNECTED.
ECDIS CONTINUE OPERATION WITHOUT
INTERFACES. FIX THE PROBLEM AND
RESTART THE ECDIS. CHECK IP ADDRESSES

Alarm number 4065: NO LAN ADAPTER INSTALLED /3/10

INSTALLATION MISTAKE. "NO LAN
ADAPTER(S) DEFINED. INSTALL ECDIS
SW AGAIN.

Alarm number 4066: LAN ADAPTER 1 PARAM ERROR /3/10

INSTALLATION MISTAKE. INSTALL ECDIS
SW AGAIN.

Alarm number 4067: LAN ADAPTER 2 PARAM ERROR /3/10

INSTALLATION MISTAKE. INSTALL ECDIS
SW AGAIN.

Alarm number 4068: LAN ADAPTER 3 PARAM ERROR /3/10

INSTALLATION MISTAKE. INSTALL ECDIS
SW AGAIN.

Alarm number 4069: LAN ADAPTER 4 PARAM ERROR /3/10

INSTALLATION MISTAKE. INSTALL ECDIS
SW AGAIN.

Alarm number 4070: ECDIS IP ERROR FOR ARPA /3/10

IF ECDIS IP-ADDRESS FOR LAN RADAR IS
DIFFERENT BETWEEN WINDOWSXP CONTROL
PANEL AND ECDIS. CHECK IP ADDRESSES.

Alarm number 4071: LAN FAIL FOR ARPA /3/10

UNEXPEXTED LAN ERROR -> MAYBE LAN
CABLE BROKEN/DISCONNECTED.
FIX THE PROBLEM AND RESTART THE ECDIS.

Alarm number 4072: LAN ARPA 1 CONN ERROR /3/10

ECDIS FAILED TO COMMUNICATE WITH LAN
RADAR 1. CHECK IP ADDRESSES BOTH FOR
LAN RADAR ON ECDIS AND ON RADAR.

Alarm number 4073: LAN ARPA 2 CONN ERROR /3/10

ECDIS FAILED TO COMMUNICATE WITH LAN
RADAR 2. CHECK IP ADDRESSES BOTH FOR
LAN RADAR ON ECDIS AND ON RADAR.

Alarm number 4074: LAN ARPA 3 CONN ERROR /3/10

ECDIS FAILED TO COMMUNICATE WITH LAN
RADAR 3. CHECK IP ADDRESSES BOTH FOR
LAN RADAR ON ECDIS AND ON RADAR.

31. Alarms

Alarm number 4075: LAN ARPA 4 CONN ERROR /3/10

ECDIS FAILED TO COMMUNICATE WITH LAN
RADAR 4. CHECK IP ADDRESSES BOTH FOR
LAN RADAR ON ECDIS AND ON RADAR.

Alarm number 4083: LAN ADAPTER PARAM CONFLICT /3/10

ID OF LAN ADAPTER ON ECDIS IS INCORRECT
OR PARAMETER "F" ON LAN ADAPTER IS
INCORRECT. CHECK THE PARAMETERS.

Alarm number 4201: EXT. NAVIGATION EQ. ERROR /6

NAVIGATION EQUIPMENT CONNECTED IN
ALARM INPUT 1 HAS INTERNAL FAILURE

Alarm number 4202: EXT. NAVIGATION EQ. ERROR /6

NAVIGATION EQUIPMENT CONNECTED IN
ALARM INPUT 2 HAS INTERNAL FAILURE

Alarm number 4203: EXT. NAVIGATION EQ. ERROR /6

NAVIGATION EQUIPMENT CONNECTED IN
ALARM INPUT 3 HAS INTERNAL FAILURE

Alarm number 4204: EXT. NAVIGATION EQ. ERROR /6

NAVIGATION EQUIPMENT CONNECTED IN
ALARM INPUT 4 HAS INTERNAL FAILURE

Alarm number 4205: EXT. NAVIGATION EQ. ERROR /6

NAVIGATION EQUIPMENT CONNECTED IN
ALARM INPUT 5 HAS INTERNAL FAILURE

Alarm number 4206: EXT. NAVIGATION EQ. ERROR /6

 NAVIGATION EQUIPMENT CONNECTED IN
 ALARM INPUT 6 HAS INTERNAL FAILURE

Alarm number 4207: EXT. NAVIGATION EQ. ERROR /6

 NAVIGATION EQUIPMENT CONNECTED IN
 ALARM INPUT 7 HAS INTERNAL FAILURE

Alarm number 4208: EXT. NAVIGATION EQ. ERROR /6

 NAVIGATION EQUIPMENT CONNECTED IN
 ALARM INPUT 8 HAS INTERNAL FAILURE

31.8.2 List of chart alarms

Alarm number 5001: NEW PILOT DATA /2/10

Alarm number 5100: SAFETY CONTOUR /2/10

Alarm number 5101: AREAS TO BE AVOIDED /2/10

Alarm number 5102: SPECIALLY PROTECTED AREAS/2/10

Alarm number 5103: USER CHART DANGER AREA /2/10

Alarm number 5104: TRAFFIC SEPARATION ZONE /2/10

Alarm number 5105: TRS CROSSING/ROUNDAABOUT /2/10

Alarm number 5106: TRS PRECAUTIONARY AREA /2/10

Alarm number 5107: TWO WAY TRAFFIC ROUTE /2/10

Alarm number 5108: DEEP WATER ROUTE /2/10

Alarm number 5109: RECOMMEND TRAFFIC LANE /2/10

Alarm number 5110: INSHORE TRAFFIC ZONE /2/10

31. Alarms

Alarm number 5111:	FAIRWAY	/2/10
Alarm number 5112:	RESTRICTED AREA	/2/10
Alarm number 5113:	CAUTION AREA	/2/10
Alarm number 5114:	OFFSHORE PRODUCTION AREA	/2/10
Alarm number 5115:	MILITARY PRACTICE AREA	/2/10
Alarm number 5116:	SEAPLANE LANDING AREA	/2/10
Alarm number 5117:	SUBMARINE TRANSIT LANE	/2/10
Alarm number 5118:	ICE AREA	/2/10
Alarm number 5119:	CHANNEL	/2/10
Alarm number 5120:	FISHING GROUND	/2/10
Alarm number 5121:	FISHING PROHIBITED	/2/10
Alarm number 5122:	PIPELINE AREA	/2/10
Alarm number 5123:	CABLE AREA	/2/10
Alarm number 5124:	ANCHORAGE AREA	/2/10
Alarm number 5125:	ANCHORAGE PROHIBITED	/2/10
Alarm number 5126:	DUMPING GROUND	/2/10
Alarm number 5127:	SPOIL GROUND	/2/10
Alarm number 5128:	DREDGED AREA	/2/10
Alarm number 5129:	CARGO TRANSSHIPMENT AREA	/2/10
Alarm number 5130:	INCINERATION AREA	/2/10

31.8.3 List of steering alarms with Autopilot FAP-2000

Alarm number 2451: ROUTE: WP APPROACH ALARM /1/8

 WAYPOINT IS NOW BEING APPROACHED.
 CLICK 'ACKN. WARNING' TO ACCEPT THE
 TURN.

Alarm number 2452: ROUTE: TURNING DISABLED /1

 WHEELOVER POINT HAS BEEN PASSED
 WITHOUT 'ACKN. WARNING* 'RADIUS
 CONTROL' MODE HAS THEN AUTOMATICALLY
 BEEN INITIATED

Alarm number 2455: ROUTE: OFF COURSE /4/11

 REQUIRED 'SET COURSE' FOR NEXT
 WAYPOINT EXCEEDS THE 'LOWER
 OFFCOURSE' OR 'HIGHER OFF COURSE'
 LIMIT OF PLANNED COURSE. ACCEPT THE
 SITUATION BY CLICKING 'ACKN. WARNING'

Alarm number 2456: ROUTE: WP APPROACH ERROR /1

 'TIME TO WOP' HAS CHANGED SINCE 'WP
 APPROACH' ALARM WAS ACKNOWLEDGED,
 POSSIBLY DUE TO A POSITION JUMP.
 VERIFY POSITION AND SPEED SENSORS
 IN 'SENSORS' PAGE

Alarm number 2458: ROUTE: LAST WP APPROACH /1/8

 FINAL WAYPOINT OF THE ROUTE IS
 REACHED. AUTOMATICALLY INITIATE
 'RADIUS CONTROL' MODE, AND CANCEL
 THE ROUTE.

31. Alarms

Alarm number 2460: PILOT: ROT WILL BE EXCEEDED /4/11

THE RADIUS SENT TO Autopilot IS
EXCEEDING THE MAXIMUM LIMIT FOR
TURNRATE. INCREASE THE RADIUS, OR
REDUCE SPEED.

Alarm number 2461: ROUTE:ROT WILL BE EXCEEDED /4/11

WAYPOINT IS BEING APPROACHED WITH
TOO HIGH SPEED FOR THE PLANNED
RADIUS, CAUSING MAX. TURNRATE TO BE
EXCEEDED. REDUCE THE SPEED OR
INCREASE RADIUS BY OVERDRIVING WITH
'MAN. SET COURSE'.

Alarm number 2464: ROUTE: NO CHOSEN ROUTE /7

NO ROUTE HAS BEEN CHOSEN, AND
ROUTE STEERING CANNOT BE INITIATED.
CHOOSE A ROUTE AND NEXT WAYPOINT
THROUGH 'ROUTE MONITOR' PUSHBUTTON.

Alarm number 2465: ROUTE: ILLEGAL WAYPOINT /7

ROUTE STEERING CANNOT START FROM
WAYPOINT 1. USE 'ROUTE MONITOR'
PUSHBUTTON TO CHOOSE "TO WP" TO BE 2
OR HIGHER.

Alarm number 2467: DISABLED: STEERING OFF /1

TRACKPILOT IS IN 'STEERING OFF'
MODE, AND STEERING COMMANDS CANNOT
BE EXECUTED. STEERING MUST BE ENA-
BLED AT THE MAIN STEERING CHOOSEOR

Alarm number 2468: DISABLED: OUT OF COURSE /1

 ROUTE STEERING CAN ONLY BE INITIATED
 WHEN SHIPS COURSE IS WITHIN THE
 'GOTO WP LIMIT' FOR 'GOTO WP' OR
 WITHIN THE 'GOTO TRACK LIMIT' FOR
 'GOTO TRACK'. USE 'RADIUS CONTROL'
 MODE TO STEER WITHIN THE LIMITS.

Alarm number 2469: TRACKPILOT: OFF COURSE /4/11

 TRACKPILOT DOES NOT STEER WITHIN
 LIMITS OF 'COURSE TO STEER' COMMAND'.
 VERIFY TRACKPILOT FUNCTIONS.

Alarm number 2470: DISABLED: NEEDS FILTER ON /1

 'ROUTE STEERING' MODE CAN BE USED
 ONLY WHEN 'FILTER' IS ON AND THERE
 ARE ENOUGH SPEED, HEADING AND
 POSITION SENSORS. VERIFY AND CHOOSE
 POSITION SENSORS IN 'SENSORS' PAGE

Alarm number 2475: ROUTE: NEEDS FILTER ON /2/9

 THIS IS A WARNING THAT YOU ARE USING
 ROUTE STEERING WITHOUT FILTERED
 POSITION AVAILABLE. VERIFY AND
 CHOOSE POSITION SENSORS IN 'SENSORS'

Alarm number 2476: ROUTE: NEEDS LOG SENSOR /2/9

 THIS IS A WARNING THAT YOU ARE USING
 ROUTE STEERING WITH ONE POSITION
 DEVICE AND WITHOUT ANY LOG DEVICE.
 VERIFY AND CHOOSE SENSORS IN 'SENSORS'

31. Alarms

Alarm number 2477: DISABLED: OUT OF CHANNEL /1

'GOTO WP' OR 'GOTO TRACK' CAN ONLY
BE INITIATED WHEN SHIP IS WITHIN
CHANNEL LIMIT OF MONITORED ROUTE.

Alarm number 2478: ROUTE: NEEDS GOOD POSIT. /2/9

THIS IS WARNING THAT YOU ARE USING
GOTO WP STEERING MODE WITHOUT
DIFF. POSITION AND POSITION
DISCREPANCY LIMIT BETWEEN PRIMARY
AND SECONDARY SENSORS IS EXCEEDED.
THIS IS REPEATED EVERY 2 MINUTES
UNTIL AFTER 10 MINUTES "ALARM 2497"
APPEARS.

Alarm number 2485: ROUTE: WP PREWARNING ALARM /2/9

WAYPOINT IS SOON BEING APPROACHED.

Alarm number 2489: ROUTE: CHANGED TO GOTO WP /3

SYSTEM CANNOT CONTINUE GOTO TRACK
MODE BECAUSE KALMAN FILTER POSITION
IS LOST OR NO LOG SENSOR IS
AVAILABLE KALMAN FILTER

Alarm number 2490: DISABLED: NEEDS LOG SENSOR /1

'ROUTE STEERING' MODE CAN BE USED
ONLY WHEN THERE IS AN INDEPENDENT
SPEED SOURCE. ALTERNATIVES ARE A
LOG OR TWO POSITION RECEIVERS

Alarm number 2491: DISABLED: NEEDS DIFF POS. /1

'GOTO TRACK' MODE CAN BE USED ONLY
IF A HIGH-PRECISION POSITION SENSOR
IS IN USE WITH KALMAN FILTER.

Alarm number 2492: ROUTE: NEEDS DIFF POS. /2

 'GOTO TRACK' MODE CANNOT CONTINUE
 WITHOUT A HIGH-PRECISION POSITION
 SENSOR. STEERING MODE IS
 AUTOMATICALLY CHANGED "GOTO WP" WITH
 ALARM 2489:ROUTE: CHANGED TO GOTO WP

Alarm number 2493: PROGTRACK: NEEDS FILTER ON /2/9

 A WARNING THAT YOU ARE USING PROGRAM
 TRACK WITHOUT FILTERED POSITION
 AVAILABLE.

Alarm number 2494: PROGTRACK: NEEDS LOG SENS. /2/9

 A WARNING THAT YOU ARE USING PROGRAM
 TRACK WITHOUT A LOG SENSOR OR
 WITHOUT TWO POSITION SENSORS

Alarm number 2495: PROGTRACK: NEEDS DIFF POS. /2/9

 A WARNING THAT YOU ARE USING PROGRAM
 TRACK WITHOUT A HIGH-PRECISION
 POSITION SENSOR

Alarm number 2496: PROGTRACK: STOP-SENSOR FAIL /1

 GYRO, SPEED AND/OR POSITION DATA IS
 NOT RECEIVED CORRECTLY.

Alarm number 2497: ROUTE: STOP-SENSOR FAIL /1

 GYRO, SPEED AND/OR POSITION DATA IS
 NOT RECEIVED CORRECTLY.

31. Alarms

Alarm number 2498: USE MANUAL RUDDER CONTROL /1

CHANGE IMMEDIATELY TO DIRECT CONTROL
OF RUDDER. THIS ALARM IS REMINDER
THAT TRACKPILOT HAS LOST GYRO
HEADING. IT IS REPEATED EVERY TWO
MINUTES.

Alarm number 2499: DISABLED: NEEDS GOOD POS /1

'ROUTE STEERING' MODE CANNOT BE
ACTIVATED WITHOUT DIFF. POSITION AND
IF POSITION DISCREPANCY LIMIT IS
EXCEEDED.

Alarm number 2501: ROUTE: NEED HIGHER SPEED /2/9

THIS IS WARNING THAT SPEED IS BELOW
LIMIT SET FOR KALMAN FILTER. IT IS
AVAILABLE TOGETHER "ALARM 2008".
"ALARM 2501" IS REPEATED EVERY 2
MINUTES UNTIL AFTER 10 MINUTES
"ALARM 2497" APPEARS.

Alarm number 2502: DISABLED: NEED HIGHER SPD /1

THIS IS WARNING THAT SPEED IS BELOW
LIMIT SET FOR KALMAN FILTER. IT IS
AVAILABLE TOGETHER "ALARM 2008"
TO ACTIVATE ROUTE STEERING USE
HIGHER SPEED .

Alarm number 2503: PROGTRACK: NEED HIGHER SPD /2/9

THIS IS WARNING THAT SPEED IS BELOW
LIMIT SET FOR KALMAN FILTER. IT IS
AVAILABLE TOGETHER "ALARM 2008".
"ALARM 2501" IS REPEATED EVERY 2
MINUTES UNTIL AFTER 10 MINUTES
"ALARM 2496" APPEARS.

Alarm number 2504: PROGTRACK: USE RADIUS CTRL. /2/9

THIS IS INSTRUCTION TO CHANGE
STEERING MODE. THIS ALARM IS
GENERATED IF THERE ARE NOT
SUFFICIENT SENSORS AVAILABLE TO
CONTINUE PROGRAM TRACK

Alarm number 2505: ROUTE: USE GOTO WP /2/9

THIS IS INSTRUCTION TO CHANGE
STEERING MODE. THIS ALARM IS
GENERATED IF THERE ARE NOT
SUFFICIENT SENSORS AVAILABLE TO
CONTINUE GOTO TRACK

Alarm number 2506: ROUTE: USE RADIUS CTRL. /2/9

THIS IS INSTRUCTION TO CHANGE
STEERING MODE. THIS ALARM IS
GENERATED IF THERE ARE NOT
SUFFICIENT SENSORS AVAILABLE TO
CONTINUE GOTO WP OR GOTO TRACK

Alarm number 2507: ROUTE: NEED SOG/COG REF. /2/9

'GOTO TRACK' MODE CANNOT CONTINUE
WITHOUT SOG/COG REFERENCE AVAILABLE
FROM POSITION SENSOR OR BOTTOM TRACK
OF DUAL AXIS LOG.

Alarm number 2508: DISABLED: NEED SOG/COG REF. /2

GOTO TRACK STEERING MODE CANNOT BE
ACTIVATED WITHOUT SOG/COG REFERENCE
AVAILABLE FROM POSITION SENSOR OR
BOTTOM TRACK OF DUAL AXIS LOG

31. Alarms

Alarm number 2509: PROG TRACK: NEED SOG/COG REF. /2/9

'PROGRAM TRACK' MODE CANNOT CONTINUE
WITHOUT SOG/COG REFERENCE AVAILABLE
FROM POSITION SENSOR OR BOTTOM TRACK
OF DUAL AXIS LOG.

Alarm number 2510: DISABLED: OUT OF TURN /2

GOTO TRACK OR GOTO WP STEERING MODE
CANNOT BE ACTIVATED IF THE ROUTE
MONITORING OF THE SYSTEM DETECTS
THAT ROUTE MONITOR IS in TURN, BUT
OWN SHIP LOCATION IS OUT OF TURN.
CHECK AND SET CORRECT "TO WP" AGAIN
FOR ROUTE MONITORING.

Alarm number 2516: Autopilot: DRIFT LIMIT /4/11

IF THE Autopilot NEEDS MORE THAN A
SET LIMIT TO COMPENSATE DRIFT(THE
LIMIT IS AVAILABLE IN INSTALLATION
PARAMETERS FOR TRACK MODE (MAX DRIFT
COMPENSATION)). THIS ALARM IS
REPEATED EVERY 5 MINUTES, IF THE
CONDITION CONTINUES.

31.8.4 List of steering alarms only with YOKOGAWA Autopilot

Alarm number 2471: 2471 AP MODE CONFLICT - USE AUTO/2/9

 YOU HAVE TRIED TO ACTIVATE TRACK
 STEERING OR YOU HAVE REACHED THE END
 OF THE ROUTE, BUT YOU HAVE NOT LEFT
 'TRACK' MODE CHANGE IMMEDIATELY TO
 'AUTO' MODE

Alarm number 2506: ROUTE:USE AUTO CONTROL /2/9

 THIS IS INSTRUCTION TO CHANGE
 STEERING MODE. THIS ALARM IS
 GENERATED IF THERE ARE NOT
 SUFFICIENT SENSORS AVAILABLE TO
 CONTINUE TRACK MODE

Alarm number 2511: ROUTE:AUTO RESUME DISABLE /1

 IF ALARM 2471 HAS BEEN GENERATED
 AND LATER CONDITION FOR ALARM 2471
 DISAPPEARS WITHOUT CHANGING STEERING
 MODE FROM "NAVI" TO "AUTO" OR "HAND".
 FIRST CHANGE STEERING MODE TO "AUTO"
 OR "HAND" AND CHECK THAT PRECONDITIONS
 FOR ROUTE STEERING ARE FULFILLED.

Alarm number 2512: USE NFU RUDDER CONTROL /1/8

 RUDDER SERVO UNIT CANNOT BE
 CONTROLLED BY YOKOGAWA STEERING
 CONTROL UNIT, THIS ALARM IS GENERATED
 TO CHANGE NON FOLLOW UP CONTROL OF
 RUDDER(S). FIRST CHANGE USING SYSTEM
 SELECTOR SWITCH FROM "FU" TO "NFU" AND
 THEN USE NON-FOLLOW UP STEERING LEVER
 TO CONTROL RUDDER(S).

31. Alarms

Alarm number 2514: ROUTE: NAVI COMPLETE TURN /2/9

THIS IS INSTRUCTION TO CHANGE
STEERING MODE. THIS ALARM IS
GENERATED IF THERE ARE NOT
SUFFICIENT SENSORS AVAILABLE TO
CONTINUE TRACK MODE AFTER TURN.

Alarm number 2515: CONFLICT-NAVI COMPL. TURN /2/9

THIS IS INSTRUCTION TO CHANGE
STEERING MODE FROM NAVI TO AUTO.
THIS ALARM IS GENERATED IF Autopilot
CANNOT CONTINUE TRACK MODE. TURN IS
COMPLETED WITH PLANNED RADIUS.
CONTINUE AUTO MODE AFTER TURN.

Alarm number 2516: Autopilot: DRIFT LIMIT /4/11

IF THE Autopilot NEEDS MORE THAN A
SET LIMIT TO COMPENSATE DRIFT(THE
LIMIT IS AVAILABLE IN INSTALLATION
PARAMETERS FOR TRACK MODE (MAX DRIFT
COMPENSATION)). THIS ALARM IS
REPEATED EVERY 5 MINUTES, IF THE
CONDITION CONTINUES.

31.8.5 List of radar overlay related alarms

Alarm number 6100: RADOV NO HEADLINE 6/13

NO HEADLINE AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6101: RADOV NO AZIMUTH 6/13

NO AZIMUTH AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6102: RADOV NO TRIGGER 6/13

NO TRIGGER AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6103: RADOV NO VIDEO /14

NO VIDEO AVAILABLE FOR RADAR
OVERLAY. CHECK ADJUSTMENT OF GAIN ON
ON RADAR OVERLAY. CHECK CONNECTORS
AND CABLING FOR RADAR OVERLAY

Alarm number 6104: RADOV NO GYRO 6/13

NO HEADING REFERENCE AVAILABLE FOR
ARPA PROCESSOR WHICH IS SOURCE FOR
RADAR OVERLAY. CHECK ARPA PROCESSOR

Alarm number 6105: RADOV HW FAILURE 6/13

RADAR OVERLAY HARDWARE FAILURE.
SWITCH POWER ON/OFF. REINSTALL
ECDIS SW.

31. Alarms

Alarm number 6106: LAN RADAR CONNECT STATE 5/12

INDICATION WHILE LAN CONNECTION FOR
ARPA FEATURES IS ESTABLISHED BETWEEN
ECDIS PROCESSOR AND ARPA PROCESSOR

Alarm number 6107: LAN RADAR CONNECT FAILURE 5/12

FAILURE TO ESTABLISH LAN CONNECTION
FOR ARPA FEATURES BETWEEN ECDIS
PROCESSOR AND ARPA PROCESSOR.
CHECK LAN CONNECTORS AND CABLES
POWER ON/OFF AND REINSTALL ECDIS SW.

Alarm number 6108: LAN RADAR DLL FAILURE 5/12

FAILURE INSIDE ECDIS PROCESSOR
BETWEEN DLL INTERFACE SW AND ECDIS
SOFTWARE. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

Alarm number 6110: RADOV CONNECT STATE 6/13

INDICATION WHILE LAN CONNECTION FOR
RADAR ECHO DATA IS ESTABLISHED
BETWEEN ECDIS PROCESSOR AND ARPA
PROCESSOR

Alarm number 6111: RADOV NO ECHODATA 7/14

FAILURE TO RECEIVE RADAR ECHO DATA
FROM ARPA PROCESSOR OVER LAN
CONNECTION CHECK LAN CONNECTORS AND
CABLES. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

Alarm number 6200: RADOV NO HEADLINE 6/13

NO HEADLINE AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6201: RADOV NO AZIMUTH 6/13

NO AZIMUTH AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6202: RADOV NO TRIGGER 6/13

NO TRIGGER AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6203: RADOV NO VIDEO /14

NO VIDEO AVAILABLE FOR RADAR
OVERLAY. CHECK ADJUSTMENT OF GAIN ON
ON RADAR OVERLAY. CHECK CONNECTORS
AND CABLING FOR RADAR OVERLAY

Alarm number 6204: RADOV NO GYRO 6/13

NO HEADING REFERENCE AVAILABLE FOR
ARPA PROCESSOR WHICH IS SOURCE FOR
RADAR OVERLAY. CHECK ARPA PROCESSOR

Alarm number 6205: RADOV HW FAILURE 6/13

RADAR OVERLAY HARDWARE FAILURE.
SWITCH POWER ON/OFF. REINSTALL
ECDIS SW.

31. Alarms

Alarm number 6206: LAN RADAR CONNECT STATE 5/12

INDICATION WHILE LAN CONNECTION FOR
ARPA FEATURES IS ESTABLISHED BETWEEN
ECDIS PROCESSOR AND ARPA PROCESSOR

Alarm number 6207: LAN RADAR CONNECT FAILURE 5/12

FAILURE TO ESTABLISH LAN CONNECTION
FOR ARPA FEATURES BETWEEN ECDIS
PROCESSOR AND ARPA PROCESSOR.
CHECK LAN CONNECTORS AND CABLES
POWER ON/OFF AND REINSTALL ECDIS SW.

Alarm number 6208: LAN RADAR DLL FAILURE 5/12

FAILURE INSIDE ECDIS PROCESSOR
BETWEEN DLL INTERFACE SW AND ECDIS
SOFTWARE. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

Alarm number 6210: RADOV CONNECT STATE 6/13

INDICATION WHILE LAN CONNECTION FOR
RADAR ECHO DATA IS ESTAB. BETWEEN
ECDIS PROCESSOR AND ARPA PROCESSOR

Alarm number 6211: RADOV NO ECHODATA 7/14

FAILURE TO RECEIVE RADAR ECHO DATA
FROM ARPA PROCESSOR OVER LAN
CONNECTION CHECK LAN CONNECTORS AND
CABLES. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

Alarm number 6300: RADOV NO HEADLINE 6/13

NO HEADLINE AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6301: RADOV NO AZIMUTH 6/13

NO AZIMUTH AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6302: RADOV NO TRIGGER 6/13

NO TRIGGER AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6303: RADOV NO VIDEO /14

NO VIDEO AVAILABLE FOR RADAR
OVERLAY. CHECK ADJUSTMENT OF GAIN ON
ON RADAR OVERLAY. CHECK CONNECTORS
AND CABLING FOR RADAR OVERLAY

Alarm number 6304: RADOV NO GYRO 6/13

NO HEADING REFERENCE AVAILABLE FOR
ARPA PROCESSOR WHICH IS SOURCE FOR
RADAR OVERLAY. CHECK ARPA PROCESSOR

Alarm number 6305: RADOV HW FAILURE 6/13

RADAR OVERLAY HARDWARE FAILURE.
SWITCH POWER ON/OFF. REINSTALL
ECDIS SW.

Alarm number 6306: LAN RADAR CONNECT STATE 5/12

INDICATION WHILE LAN CONNECTION FOR
ARPA FEATURES IS ESTABLISHED BETWEEN
ECDIS PROCESSOR AND ARPA PROCESSOR

31. Alarms

Alarm number 6307: LAN RADAR CONNECT FAILURE 5/12

FAILURE TO ESTABLISH LAN CONNECTION
FOR ARPA FEATURES BETWEEN ECDIS
PROCESSOR AND ARPA PROCESSOR.
CHECK LAN CONNECTORS AND CABLES
POWER ON/OFF AND REINSTALL ECDIS SW.

Alarm number 6308: LAN RADAR DLL FAILURE 5/12

FAILURE INSIDE ECDIS PROCESSOR
BETWEEN DLL INTERFACE SW AND ECDIS
SOFTWARE. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

Alarm number 6310: RADOV CONNECT STATE 6/13

INDICATION WHILE LAN CONNECTION FOR
RADAR ECHO DATA IS ESTABLISHED
BETWEEN ECDIS PROCESSOR AND ARPA
PROCESSOR

Alarm number 6311: RADOV NO ECHODATA 7/14

FAILURE TO RECEIVE RADAR ECHO DATA
FROM ARPA PROCESSOR OVER LAN
CONNECTION CHECK LAN CONNECTORS AND
CABLES. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

Alarm number 6400: RADOV NO HEADLINE 6/13

NO HEADLINE AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6401: RADOV NO AZIMUTH 6/13

NO AZIMUTH AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6402: RADOV NO TRIGGER 6/13

NO TRIGGER AVAILABLE FOR RADAR
OVERLAY. CHECK CONNECTORS AND
CABLING FOR RADAR OVERLAY

Alarm number 6403: RADOV NO VIDEO /14

NO VIDEO AVAILABLE FOR RADAR
OVERLAY. CHECK ADJUSTMENT OF GAIN ON
ON RADAR OVERLAY. CHECK CONNECTORS
AND CABLING FOR RADAR OVERLAY

Alarm number 6404: RADOV NO GYRO 6/13

NO HEADING REFERENCE AVAILABLE FOR
ARPA PROCESSOR WHICH IS SOURCE FOR
RADAR OVERLAY. CHECK ARPA PROCESSOR

Alarm number 6405: RADOV HW FAILURE 6/13

RADAR OVERLAY HARDWARE FAILURE.
SWITCH POWER ON/OFF. REINSTALL
ECDIS SW.

Alarm number 6406: LAN RADAR CONNECT STATE 5/12

INDICATION WHILE LAN CONNECTION FOR
ARPA FEATURES IS ESTABLISHED BETWEEN
ECDIS PROCESSOR AND ARPA PROCESSOR

Alarm number 6407: LAN RADAR CONNECT FAILURE 5/12

FAILURE TO ESTABLISH LAN CONNECTION
FOR ARPA FEATURES BETWEEN ECDIS
PROCESSOR AND ARPA PROCESSOR.
CHECK LAN CONNECTORS AND CABLES
POWER ON/OFF AND REINSTALL ECDIS SW.

31. Alarms

Alarm number 6408: LAN RADAR DLL FAILURE 5/12

FAILURE INSIDE ECDIS PROCESSOR
BETWEEN DLL INTERFACE SW AND ECDIS
SOFTWARE. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

Alarm number 6410: RADOV CONNECT STATE 6/13

INDICATION WHILE LAN CONNECTION FOR
RADAR ECHO DATA IS ESTABLISHED
BETWEEN ECDIS PROCESSOR AND ARPA
PROCESSOR

Alarm number 6411: RADOV NO ECHODATA 7/14

FAILURE TO RECEIVE RADAR ECHO DATA
FROM ARPA PROCESSOR OVER LAN
CONNECTION CHECK LAN CONNECTORS AND
CABLES. SWITCH POWER ON/OFF AND
REINSTALL ECDIS SW.

32. Maintenance and Troubleshooting

Periodic checks and maintenance are important for proper operation of any electronic system. This chapter contains maintenance and troubleshooting instructions to be followed to obtain optimum performance and the longest possible life of the equipment. Before attempting any maintenance or troubleshooting procedure please review the safety information below. If you cannot restore normal operation after following the troubleshooting procedures do not attempt to check inside any unit; there are no operator-serviceable parts inside. Any repair work should be referred to a qualified technician.

 **WARNING**

 **ELECTRICAL SHOCK HAZARD**
Do not open the equipment.

Only qualified personnel should work inside the equipment.

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

32.1 Maintenance

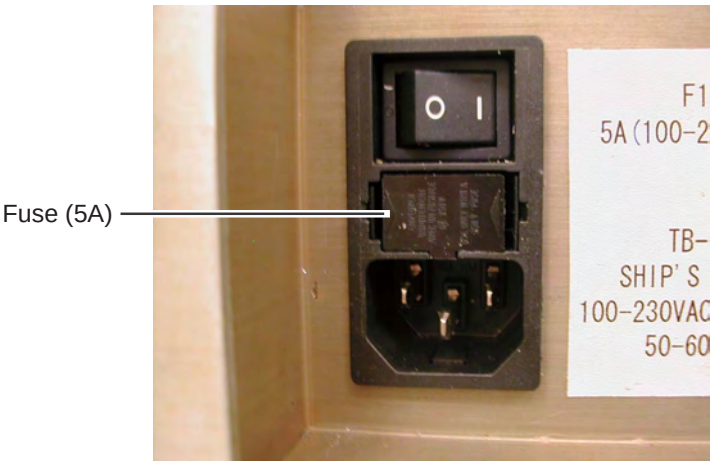
Regular maintenance is essential to good performance. A regular maintenance program should be established and should at least include the items shown in the table below.

Interval	Check point	Check and measures	Remarks
When needed	FURUNO-supplied LCD monitor and processor unit	Dust or dirt may be removed from the cabinet with soft cloth. Water-diluted mild detergent may be used if desired. DO NOT use chemical cleaners to clean the display unit; they may remove paint and markings. Wipe the LCD carefully to prevent scratching, using tissue paper and an LCD cleaner. To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt will not scratch the LCD. Do not use solvents such as thinner, acetone or benzene for cleaning. Also, do not use a degreaser or an antifog solution, as they can strip the coating from the LCD.	Do not use chemical-based cleaners to clean either unit. They can remove paint and markings.
	Filter on processor unit	Clean the filter at the rear of the processor unit if it becomes dusty.	
3 to 6 months	Cabling	Check that all cabling is firmly connected and is not damaged.	

32.2 Replacing the Fuse

The 5A fuse located at the back of the processor unit protects the system from overcurrent and internal fault. If the power cannot be turned on, check if the fuse has blown. If it has blown, find out the cause before replacing the fuse. If it blows again after replacement, contact your dealer for advice.

Name	Type	Code No.
Fuse (5A)	FGB0-A 5A AC125V	000-549-064



WARNING

Use the proper fuse.

Use of a wrong fuse can damage the equipment or cause fire.

32.3 Replacing the Battery

The PCG-820GV circuit board in the processor unit contains a lithium battery that preserves data when the power is turned off. When the voltage of the battery is low the time is wrong, all default settings are restored, etc. When this occurs, have the battery replaced by a qualified technician, at your earliest convenience.

32.4 Troubleshooting

The troubleshooting table below provides common faults and the remedy with which to restore normal operation. If you cannot restore normal operation do not check inside the equipment - there are no operator-serviceable parts inside.

Troubleshooting

If...	Then...	Remedy
the power cannot be turned on	- power connector may have loosened. - ship's mains is off. - fuse has blown.	- Check connector. - Check ship's mains. - Replace fuse.
nothing appears on the display	brilliance is too low.	Adjust brilliance.
ECDIS program doesn't start. "No connection to dongle. Have nice day" message appears	dongle connected to printer port may have loosened.	Check connection of dongle
monitored route is not displayed	- route has not been selected. - monitor route has not been selected visible top on chart.	- Select route as monitored. - Open Route page of Chart Display dialog box and select Monitor route parts to Std or Other.
planned route is not displayed	- route has not been selected. - planned route has not been selected visible top on chart.	- Select route as planned. - Open Route page of Chart Display dialog box and select planned route parts to Std or Other.
symbol of user chart cannot be erased	"Enable changes" is not selected. - symbols may be superimposed by one another.	- Select "Enable changes" in User Chart dialog box. - Click Delete button on Symbol page several times.
position cannot be found	- sensors are not selected in Sensor dialog box. - LAN adapter cable may have loosened.	- Check sensor selections in Sensors dialog box. - Connect LAN adapter cable.

(Continued on next page)

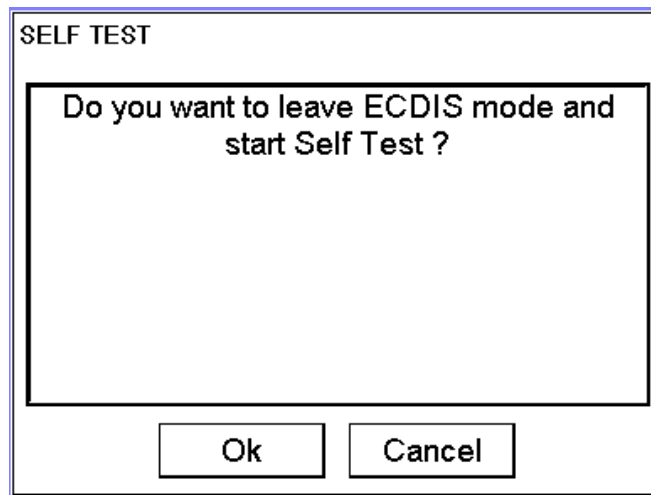
Troubleshooting (continued from previous page)

If...	Then...	Remedy
ARCS chart cannot be displayed	• ARCS display mode is not activated. • license has expired.	• Activate ARCS charts display mode: Open Chart menu and select Activate ARCS Charts from the menu. • Renew ARCS license.
S57 chart cannot be displayed	• S57 chart display mode is not activated.	• Activate S57 charts display mode: Open Chart menu and select Activate S57 Charts from the menu..
cannot convert CMAP charts "permit missing"	• if ECDIS software has been updated then C-MAP permit information has been lost.	• Define correct subscription of CMAP charts again by selecting correct zones or areas.
past track is not displayed	• past track is not selected visible.	• Open Tracking page of Chart Display dialog box and select Past track of System to either Std or Oth.
monitored user chart is not displayed on ECDIS display	• user chart is not selected visible. • user chart display is selected for planning mode.	• Open Mariner page of Chart Display dialog box and select User Chart's parts to either Std or Oth. • Unselect user chart in planning mode.
user chart is not displayed on radar display	• user chart is not selected in monitoring mode. • ECDIS has failed to post process chart for radar. • LAN Adapter cable may have loosened.	• Select user chart in monitoring mode. • Close User Chart dialog box to activate post processing for user chart. • Connect LAN adapter cable.

32.5 Keyboard Test

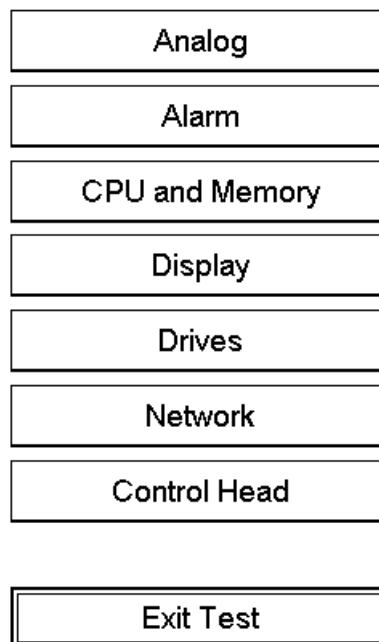
In addition to the color calibration tests mentioned in Chapter 26, the ECDIS provides a keyboard test that the operator may use to check keyboard of the RCU-018. (Other diagnostic tests are also provided, on the self-test menu, however these are intended for service technicians. For further details, see the service manual.)

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area, then push the left mouse button.
2. Choose Initial Settings and push the left mouse button.
3. Place the cursor on the triangle in the dialog box to show the Initial Settings menu.
4. Choose Selftest then push the left mouse button. You are asked if it is OK to leave ECDIS and start the self-test.

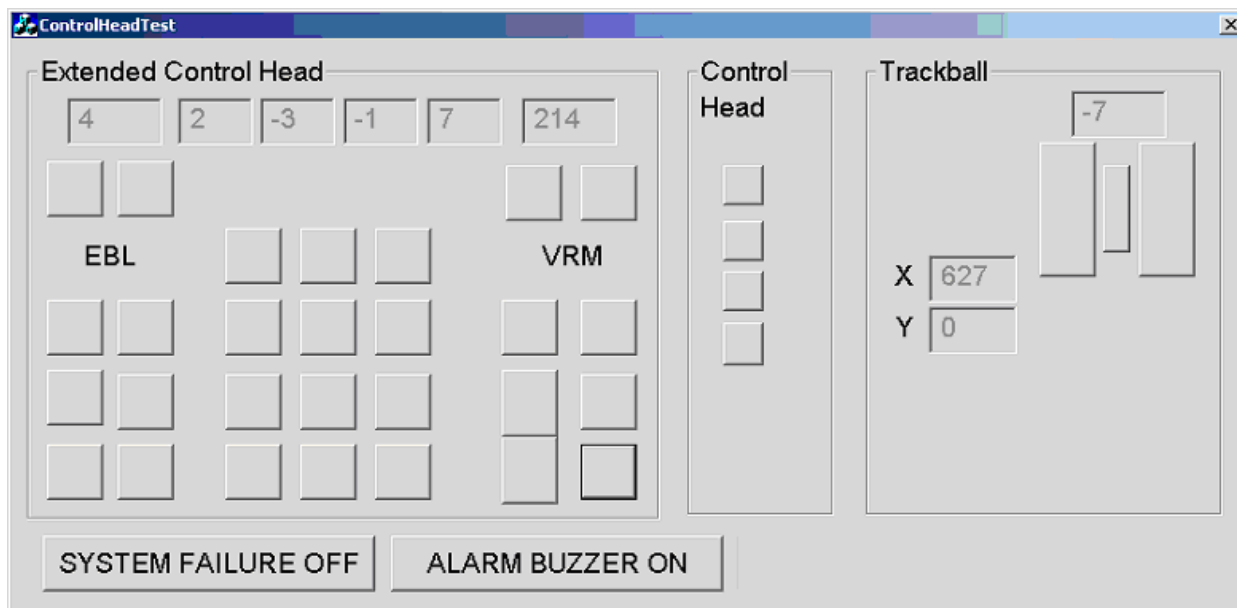


5. Click the **OK** button to show the self-test menu. As the message on the screen says move the cursor leftward and upward then push the left mouse button.

Self Test



6. Click the **Control Head** button to show the control head-checking screen.



7. Push each key, mouse button and scrollwheel. The perimeter of the on-screen key, button or scrollwheel blackens if the pushed item is functioning normally. (For the Control Unit RCU-015, push the hot keys. Their on-screen location is in the Control Head window.)
8. Operate radar-related controls (EBL and VRM rotary encoders, A/C RAIN, A/C SEA and GAIN). The figure in the corresponding on-screen location becomes larger or smaller with control operation.
9. Operate the trackball. The trackball's X and Y location is shown in the X and Y boxes.
10. Spin the scrollwheel. Confirm that the figure in the box above the scrollwheel's on-screen location becomes larger or smaller with scrollwheel operation.
11. Click the **ALARM BUZZER ON** button. Confirm that the buzzer sounds. Click the button again to silence the buzzer.
12. Click the **SYSTEM FAILURE OFF** button. Thirty seconds after the button is clicked the buzzer sounds and the **SYSTEM FAILURE** key flashes. Click the button again to stop the flashing and silence the buzzer.
13. Click the **Exit Test** button to quit the test.

32.6 Consumable Parts

The table below lists all the consumable parts in the processor unit. Replace these parts before their expected expiration.

Consumable parts

Part	Type	Code No.	Expected life
Processor cooler assy.	117492	000-151-567	7 years
Fan	AD0812LB-A73GL	000-151-580	7 years
Lithium battery (on CPU board)	CR2032	000-159-662-10	3 years
Power supply	UPF250-AA-B	000-151-575	10 years
Hard disk	MHW2040AC	000-159-044-10	20,000 hours

SPECIFICATIONS OF Electronic Chart Display and Information System (ECDIS) FEA-2107

This system is designed with up-to-date computer technology to comply with the IMO/IHO performance standards for Electronic Chart Display and Information System (ECDIS). It displays selected information from SENC (System Electronic Navigational Chart) with positional information from navigation sensors to assist the operator in route planning and monitoring. Additionally, it displays navigation-related information.

This system consists of

- 1) ECDIS processor (including floppy disk and CD-ROM drives)
- 2) Control unit (type according to system configuration)
- 3) 20.1-inch Monitor
- 4) LAN Adapter (serial interface) and
- 5) ECDIS B-Adapter (analog signal interface, option)

One single ECDIS processor can be used for route planning and monitoring.

An additional identical ECDIS processor, which is used for route planning, can be separately installed to fulfill backup arrangements for replacing of the paper charts. It will be connected to the principal processor with Local Area Network (LAN) of Ethernet type.

1 MONITOR UNIT CHARACTERISTICS

- | | | |
|-----|-----------------|---|
| 1.1 | Display type | 20.1-inch LCD |
| 1.2 | Pixel | 1,280 x 1,024 pixel (SXGA) |
| 1.3 | Video interface | |
| | Analog RGB | 0.7Vp-p, 75 ohm |
| | DVI-D/I | Pixel clock: 25-162MHz |
| 1.4 | Control I/O | RS-232C, Dsub-9pin, 9.6Kbps (for digitizer) |

2 DISPLAY ITEMS

- | | | |
|-----|-----------------------|---|
| 2.1 | Chart materials | - IMO/IHO S57 edition-3 ENC vectorized material
- BA ARCS rasterized material
- C-MAP CM-93/2 and CM-93/3 vectorized material |
| 2.2 | Own ship indication | Own ship's mark and numeral position in lat/lon, speed and course |
| 2.3 | ARPA target display | Range, bearing, speed, course, CPA/TCPA |
| 2.4 | Radar overlay picture | Option (standard supply for FAR-2117/2817 ser.) |
| 2.5 | Other information | Waypoint, route monitoring and chart Information, several alarms |

3 DISPLAY MODE

- | | | |
|-----|-----------------|-------------------------------|
| 3.1 | True motion | North up, Course up |
| 3.2 | Relative motion | North up, Course up, Route up |

4 OTHER DISPLAY FEATURES

- | | | |
|-----|----------------------|---|
| 4.1 | Chart zoom | Zoom-in/out indication |
| 4.2 | Cursor | EBL, VRM, parallel cursor |
| 4.3 | One touch activation | Single action to activate standard display |
| 4.4 | Chart information | Electronic chart information, selection of symbol, etc. |

5 USER INTERFACE

- | | | |
|-----|----------------------|---|
| 5.1 | Position calculation | Navigation by result of positioning found with external sensor
Dead reckoning with gyro and log
Highly accurate position with combination of gyro, log, external sensor and Kalman filter |
| 5.2 | Navigation planning | Planning by rhumb line, great circle
Route creation
Route data may be transferred to radar |
| 5.3 | Navigation recording | Latest 12 hours of navigation data may be recorded |
| 5.4 | Automatic navigation | Trackpilot (option) required |
| 5.5 | Route monitoring | Off-track display
Waypoint arrival alarm
Shallow depth alarm |
| 5.6 | User chart | User chart creation (2000 lines max. 1000 symbols max.)
User chart is overlaid on electronic map
User chart may be transferred to radar screen |
| 5.7 | Pilot data | Creation and display of pilot data
Pilot data may be transferred to radar (radar must be display) |
| 5.8 | MOB (Man Overboard) | Position and other data at time of man overboard are recorded
MOB mark is displayed on the screen |

6 DATA INTERFACE

- | | | |
|-----|--------------------|---------------------------------------|
| 6.1 | LAN adapter | |
| | Gyro | HDT (IEC 61162-1) |
| | Speed log | VBW (IEC 61162-1) |
| | Navigational E/S | DBT, DPT (IEC 61162-1) |
| | Position sensor | GLL, GGA, VTG, ZDA, DTM (IEC 61162-1) |
| | Wind data | MWV (IEC 61162-1) |
| | AIS | ABM, BBM, etc. (IEC 61162-2) |
| | Radar/ARPA | Two units |
| | Alarm output | 3ch: relay contact (normal close) |
| 6.2 | B-adapter (option) | |
| | Gyro | sync/step |
| | Speed log | 200p/m |
| | Alarm output | 8ch: relay contact (normal close) |
| | Analog sensors | 8ch: Rudder, ROT, RPM, PITCH, etc. |

7 POWER SUPPLY

- | | | |
|-----|----------------|---|
| 7.1 | Processor unit | 100-230 VAC: 1.5-0.5A, 1 phase, 50-60Hz |
| 7.2 | Monitor unit | 100-230 VAC, 0.6-0.4A, 1 phase, 50-60Hz |
| 7.3 | LAN adapter | 24 VDC: 0.15A |
| 7.4 | B-adapter | 24 VDC: 0.21A |

8 ENVIRONMENTAL CONDITIONS

- | | | |
|-----|----------------------|----------------|
| 8.1 | Ambient temperature | -15°C to +55°C |
| 8.2 | Relative humidity | 95% at 40°C |
| 8.3 | Waterproofing | |
| | Monitor unit (panel) | IPX5 |
| | Other units | IPX0 |

8.4 Bearing vibration IEC 60945

9 COATING COLOR

9.1	Monitor unit	N3.0 (not changed)
9.2	Processor unit	N3.0 (not changed)
9.3	B/LAN-Adapter	N3.0 (not changed)
9.4	Console	2.5GY5/1.5 (standard)

This page is intentionally left blank.

Appendix 1: Glossary of Terms

APPROACHING POINT (AP)

An operator-chosen point where a turning alarm is initiated.

AUTOMATIC RADAR PLOTTING AID (ARPA)

A system wherein radar targets are automatically acquired, tracked and collision situations computer assessed and warning given.

CHANNEL LIMIT (CHL)

During route planning a channel limit is defined for each leg. This limit can also be the borderline of the chart shown on the radar display. For further details, see Figure 1 on page 30-4.

COURSE

Course is the horizontal direction in which a craft is steered or intended to be steered, expressed as angular distance from north, usually from 000° at north, clockwise through 360°. Strictly, course applies to direction through the water, not the direction intended to be made good over the ground.

COURSE OVER GROUND (COG)

The direction of the path over ground actually followed by a craft. For more information, see Figure 1 on page AP-4.

CLOSEST POINT OF APPROACH (CPA)

The Closest Point of Approach of another ship to your ship. A operator can set CPA limit.

DATUM

A set of parameters specifying the reference surface or the reference co-ordinate systems used for geodetic control in the calculation of co-ordinates of points on the earth. Commonly, datum is defined as horizontal and vertical datum separately.

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM (ECDIS)

The navigation information system which is considered equivalent to the nautical paper chart, displaying chosen information from the chart data Base (see ENC) integrated with data from positional, and optionally other sensors. By displaying chart contents and other chart related and navigational information, ECDIS assists the mariner in route planning and, with on-line position indication, in route monitoring.

ELECTRONIC NAVIGATIONAL CHART (ENC)

The database held on the ship for use with ECDIS. The ENC is equivalent to new editions of paper charts, and may contain additional supplementary nautical information in addition to that contained in the paper chart.

FORWARDING DISTANCE (F)

The distance which the ship moves straight after a rudder command. For further details, see Figure 2 on page AP-4.

"FROM WP"

The last passed waypoint. For further details, see Figure 1 on page AP-4.

HEADING (HDG)

The horizontal direction in which the longitudinal axis of a ship actually points or heads at any instant, expressed as angular units from a reference direction, usually from 000° at the reference direction, clockwise through 360° (true, magnetic or compass heading). For further details, see Figure 1 on page AP-4.

GREAT CIRCLE

The intersection of the surface of a sphere and a plane through its center.

MAGNETIC VARIATION

The angle between the magnetic and geographic meridians at any place, expressed in degrees and minutes east or west to indicate the direction of magnetic north from true north.

"NEXT WP"

The waypoint after "TO WP".

OFF TRACK

Cross-track error (XTE) distance from intended track. For more information, see Figure 1 on page AP-4.

PLAN

The direction "From WP" to "To WP", a constant course on a rhumb line track or a varying course on a Great Circle track. For further details, see Figure 1 on page AP-4.

POSITION

The display indicates which position-fixing instruments are giving information for the position calculation.

RENC

Regional Electronic Nautical Chart center. RENC is defined by IMO and IHO as the source of SOLAS compliant Electronic Nautical Charts (ENC), which use S57ed3 coding. An example of such an RENC is the PRIMAR in Stavanger, Norway.

RANGE RING

A range ring is a circle with a defined radius located with its center at the position of your ship.

RHUMB LINE

A line on the surface of the earth making the same oblique angle with all meridians. A rhumb line is a straight line on a rhumb (or Mercator) projection.

ROUTE

The system's internal algorithm calculates course to eliminate off track. For further details, see Figure 1 on page AP-4.

SYSTEM ENC (SENC)

The manufacturer's own storage formats or data structure for the database.

SPEED OVER GROUND (SOG)

The speed of a craft along the actual path of travel over the ground. For further details, see Figure 1 on page AP-4.

"TO WP"

The waypoint which the ship is approaching. For further details, see Figure 1 on page AP-4.

VARIABLE RANGE MARKER (VRM)

The VRM is a range ring, the radius of which is continuously adjustable.

WAYPOINT (WP)

The crossing point between two legs in a route.

WHEEL OVER POINT (WOP)

The point where the rudder command is given. For further details, see Figure 2 on page AP-4.

WORLD GEODETIC SYSTEM (WGS)

A consistent set of parameters describing the size and shape of the earth, the positions of a network of points with respect to the center of mass of the Earth, transformations from major geodetic datums, and the potential of the Earth.

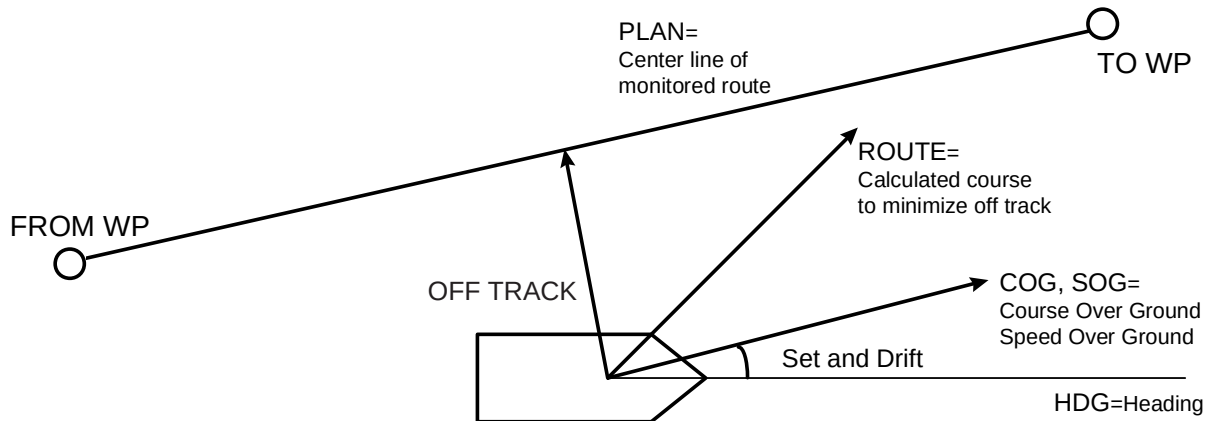


Figure 1

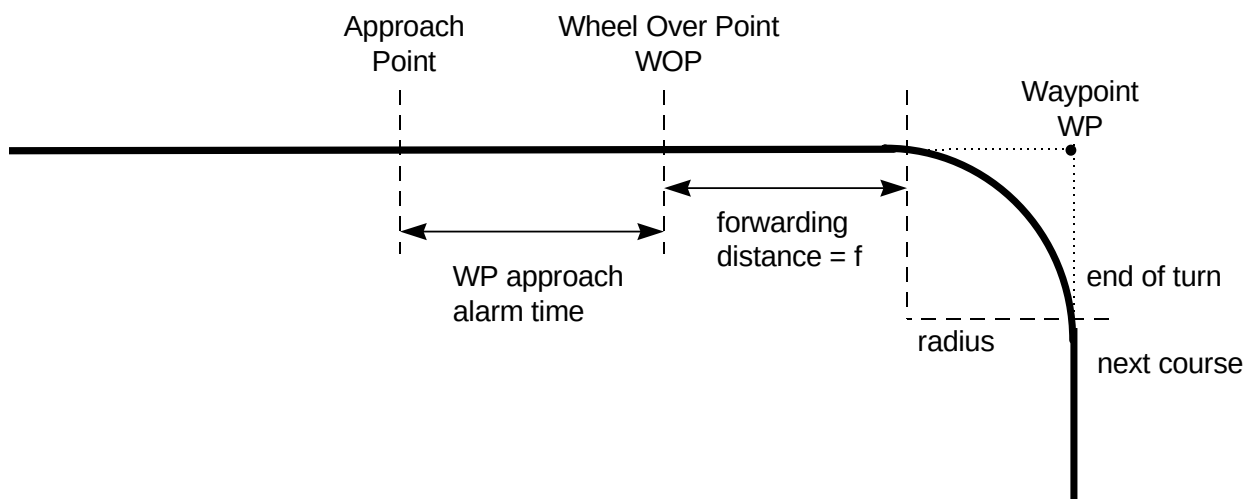


Figure 2

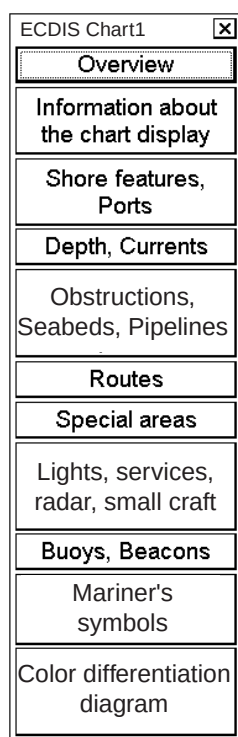
Appendix 2: IHO ECDIS Chart 1

A.2.1 IHO ECDIS Chart 1

International Hydrographic Organization (IHO) has published a set of charts where you can find examples of symbology used in S57 charts. You can study them by using the "Info/Help" feature and by switching different layers ON and OFF in the Chart Display dialog box. Everything is visible if you set all layers for "Standard" or "Other" in the Other 1 and Other 2 pages in the Chart Display dialog box.

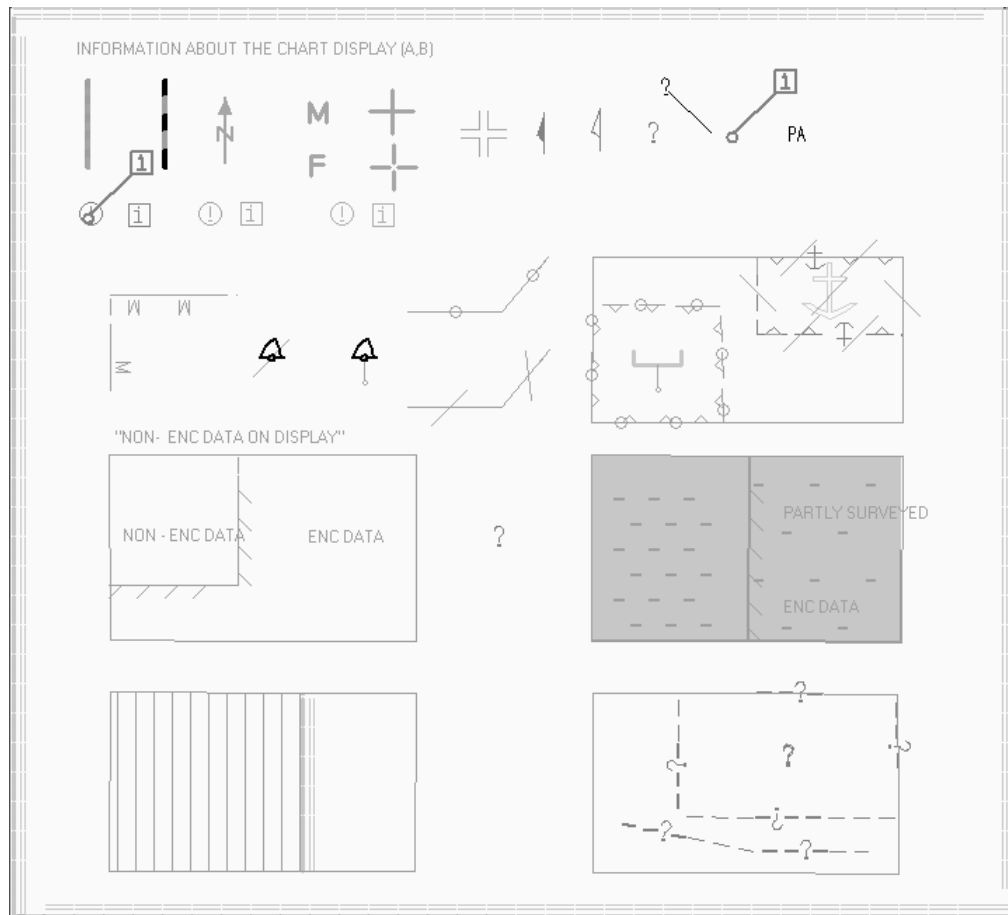
To open the IHO ECDIS Chart 1 on the display, do the following:

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Roll the wheel to choose ECDIS Chart 1 from the menu then push the scrollwheel.
3. Choose Overview from the menu then click the left mouse button.

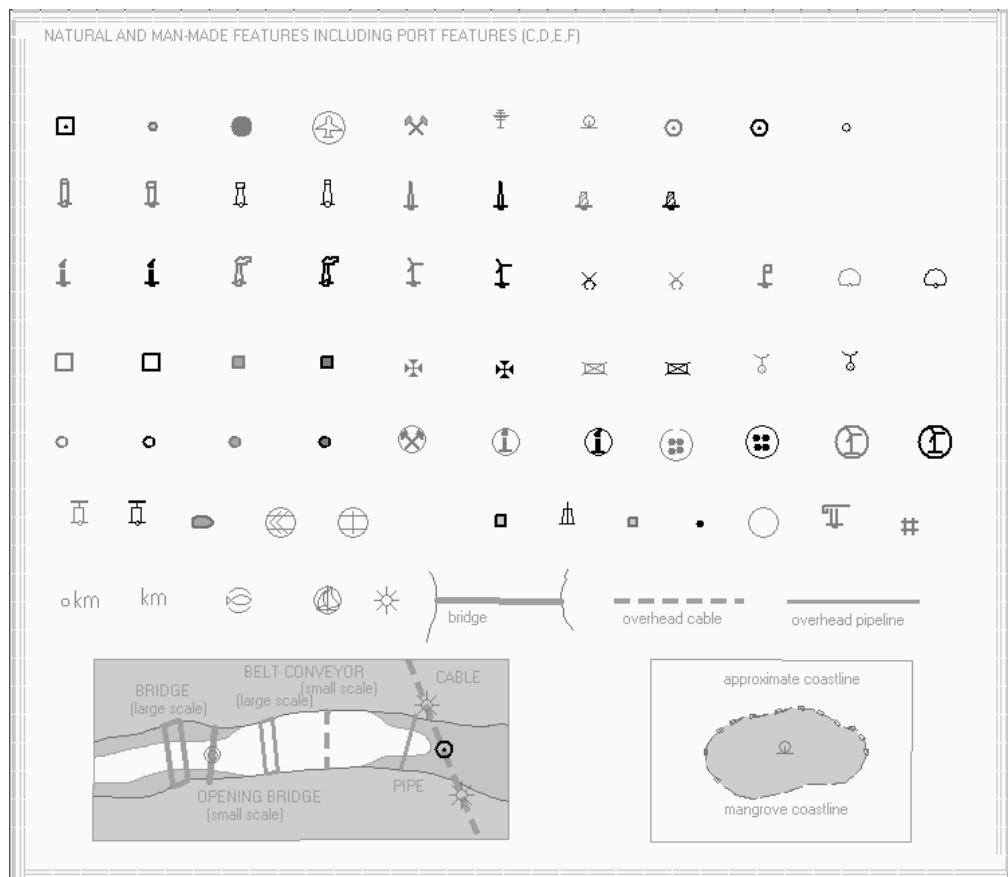


4. Spin the scrollwheel to choose desired item then push the scrollwheel.

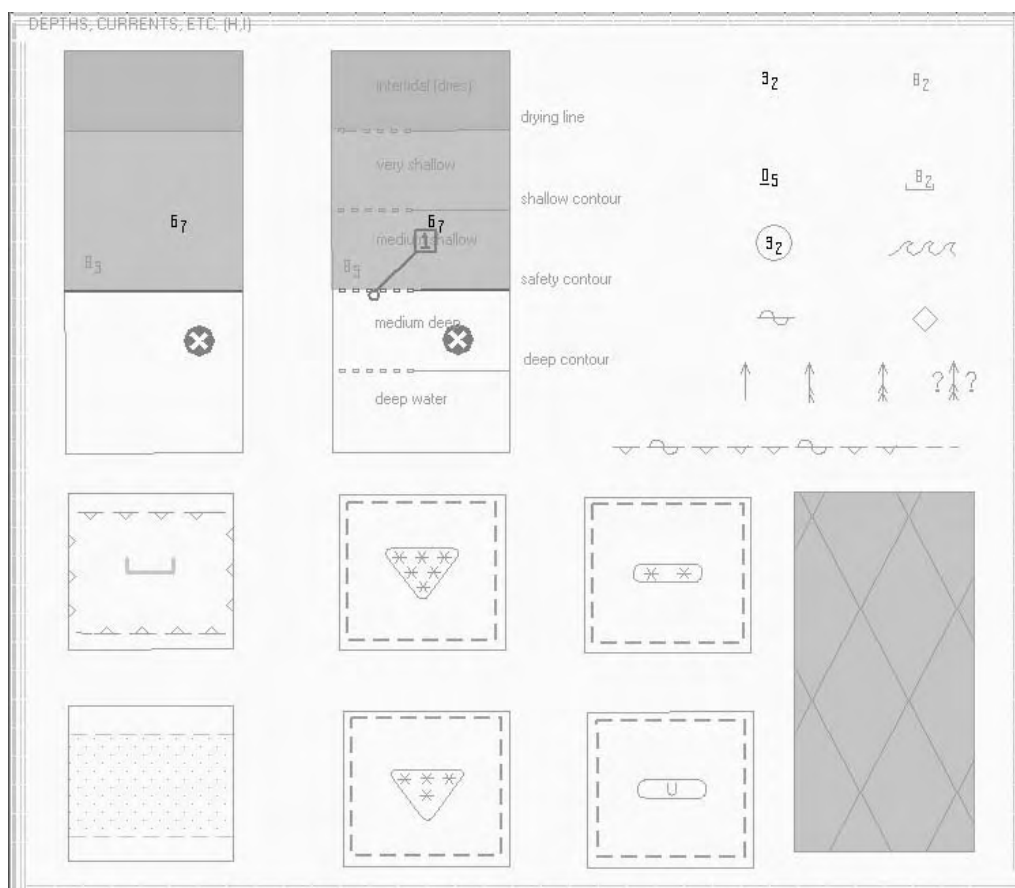
See the next several pages for the display associated with each dialog box item.



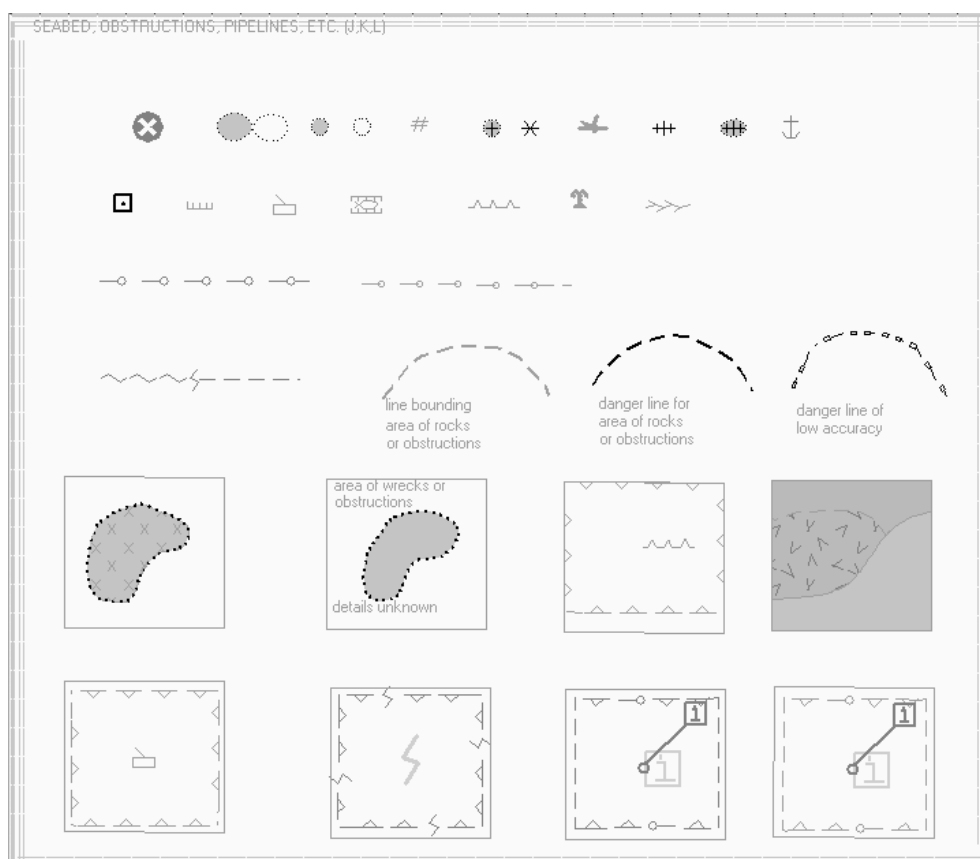
Information about the chart features



Shore features, Ports

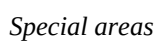


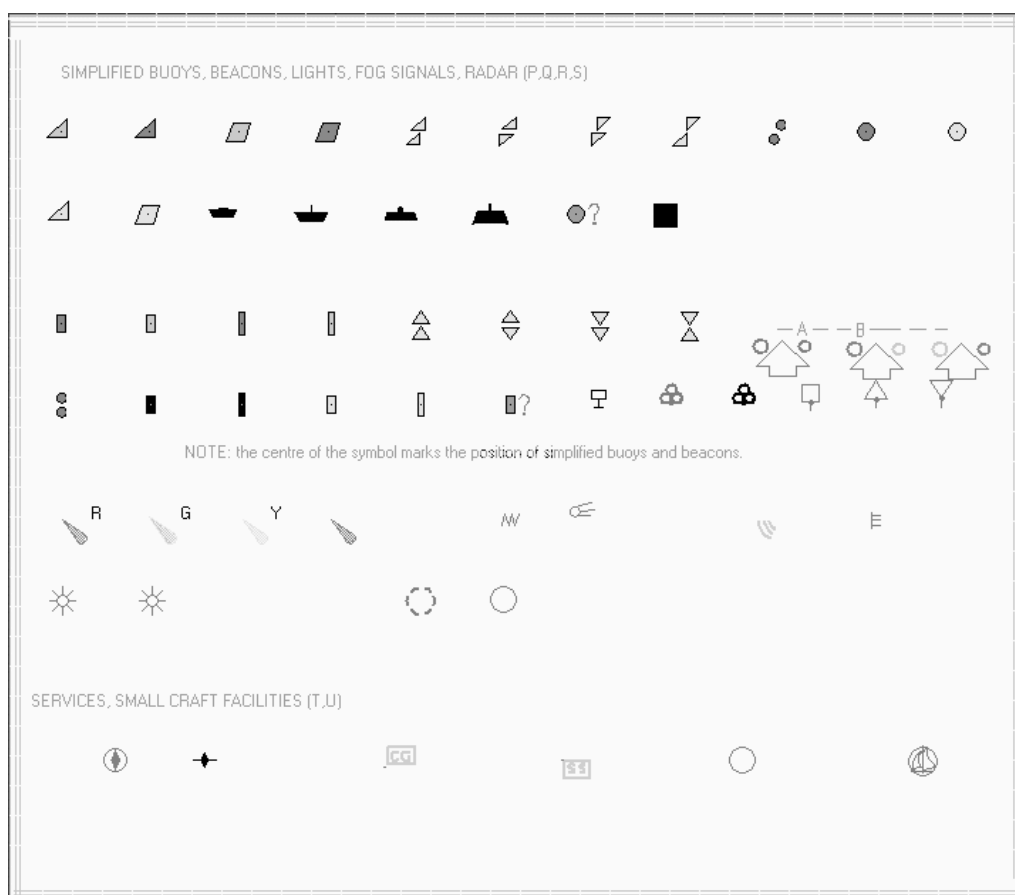
Depths, currents



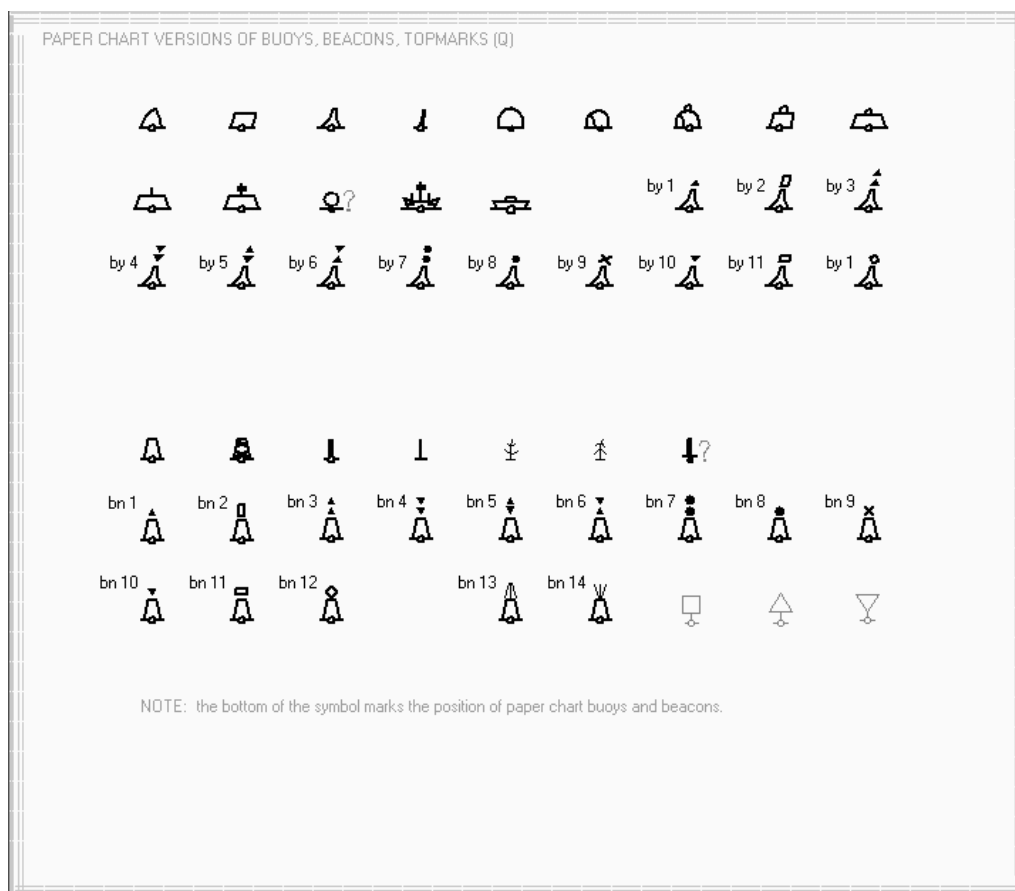
Seabed, obstructions, pipelines

AP-8

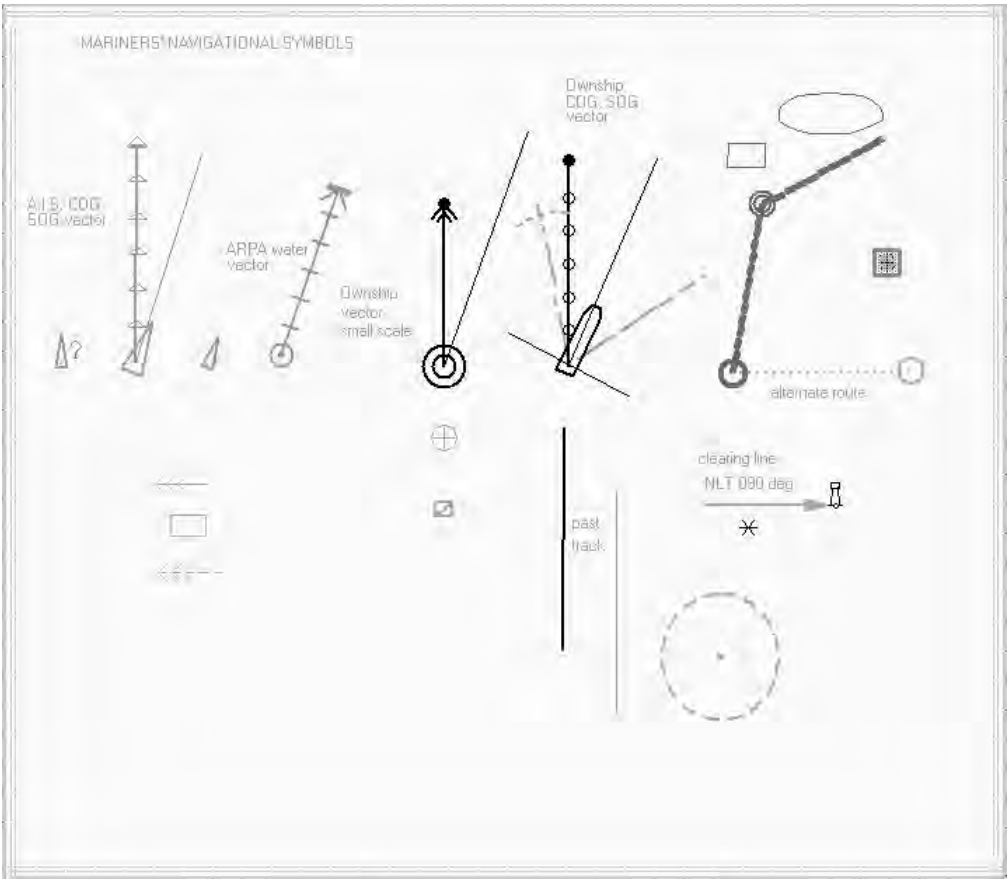




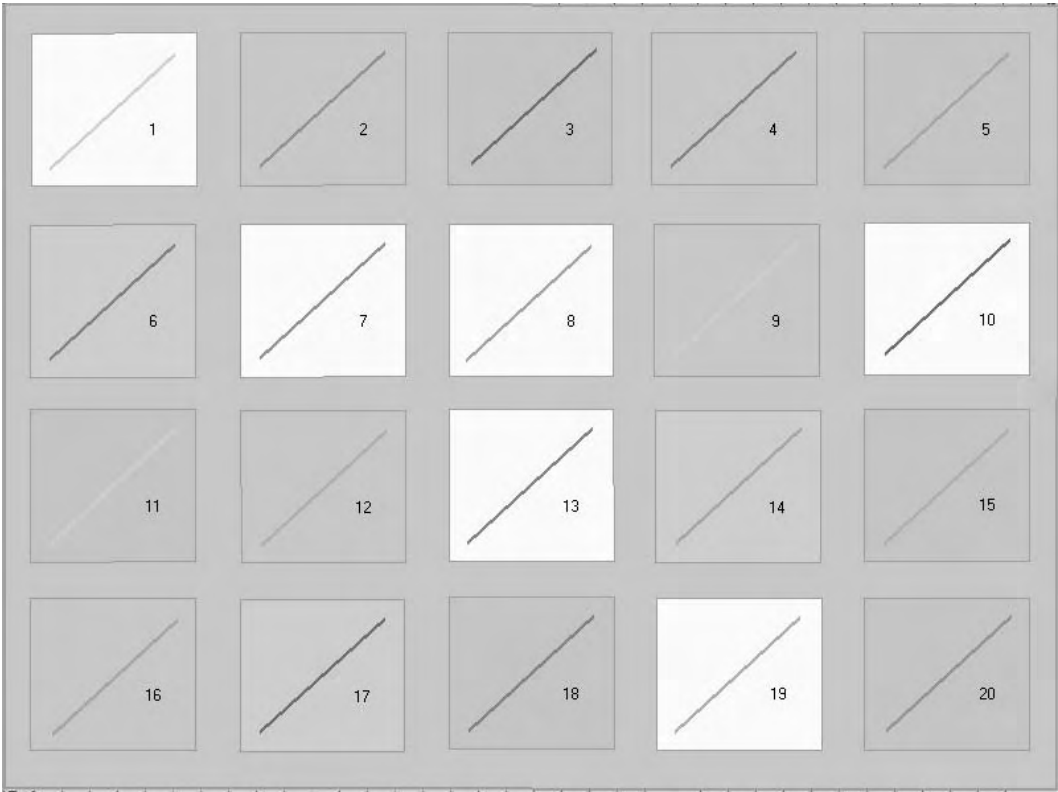
Lights, radars, services, small crafts



Buoys, beacons



Mariners symbols



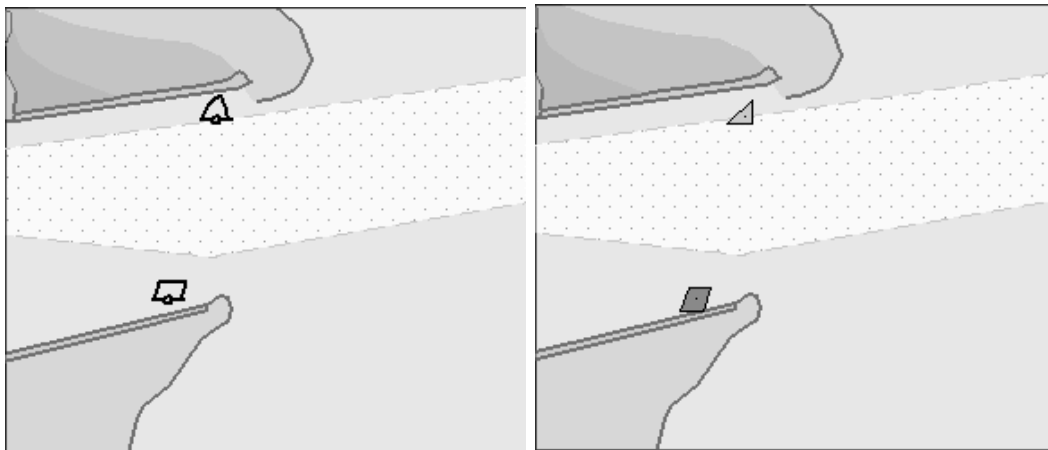
Color differentiation diagram

Appendix 3: Interpreting S57 Charts

A3.1 Interpreting S57 Charts

The following examples gives you a short introduction to the features of S57 charts.

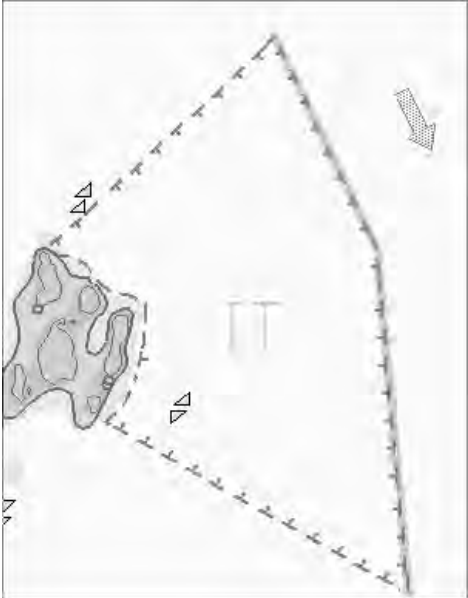
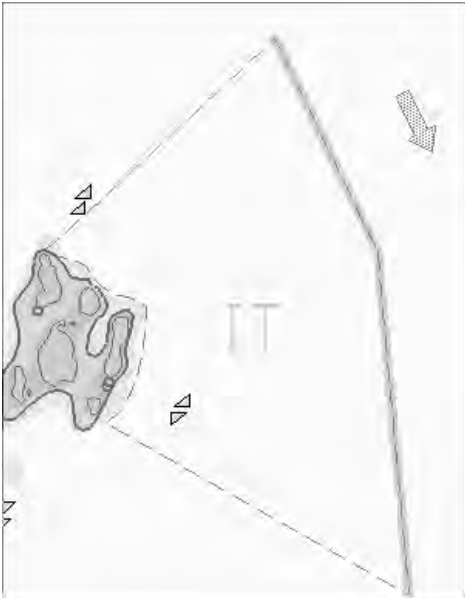
Paper chart or simplified symbols



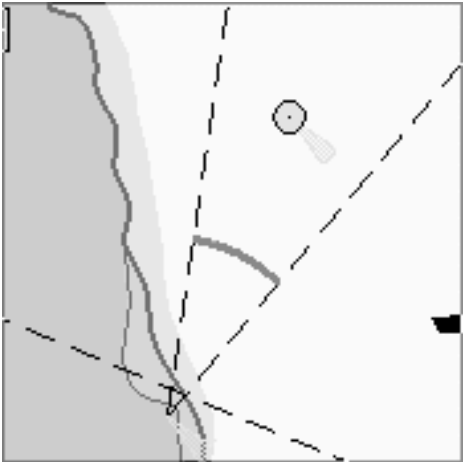
Two color or multi-color depth



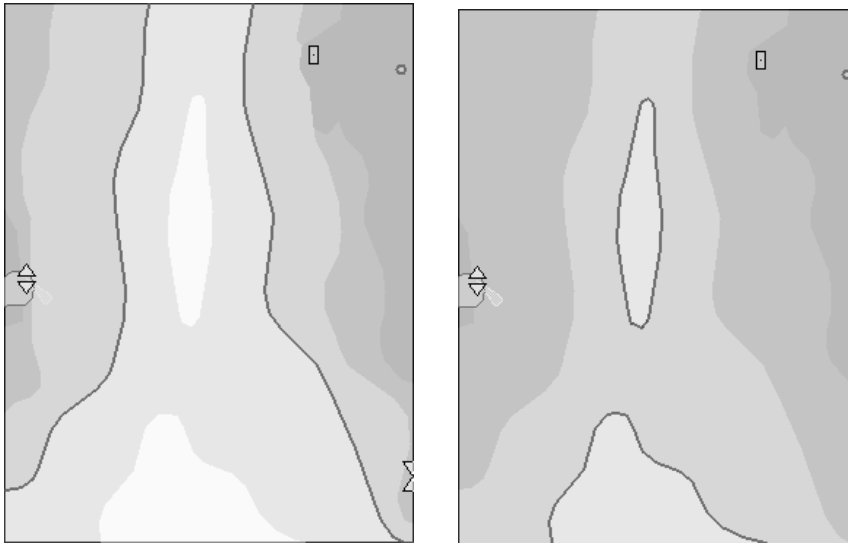
Plain or symbolized boundaries



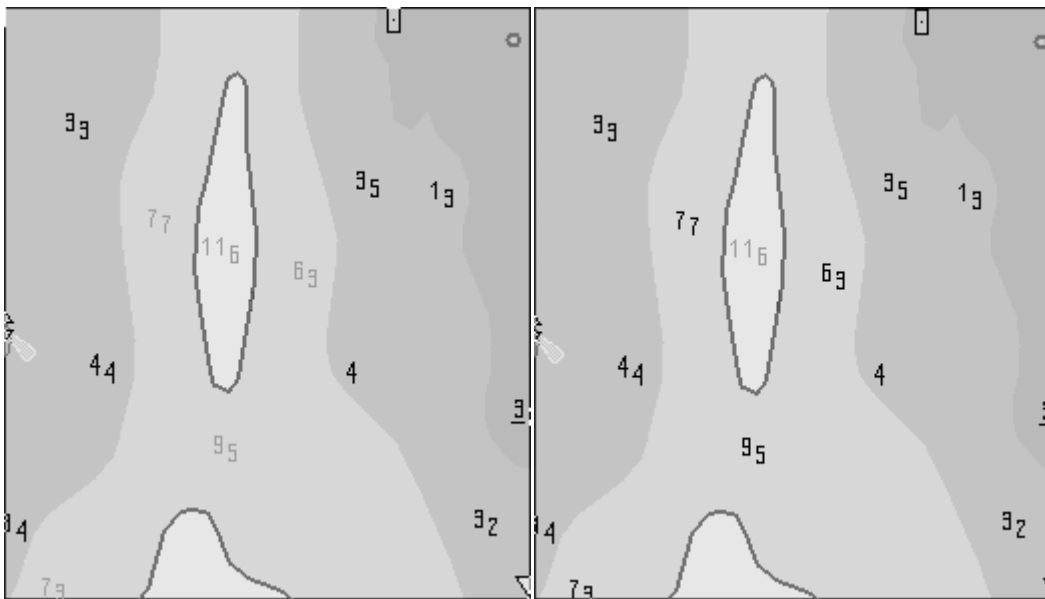
Limited or full light sectors



Shallow, safety and deep contours



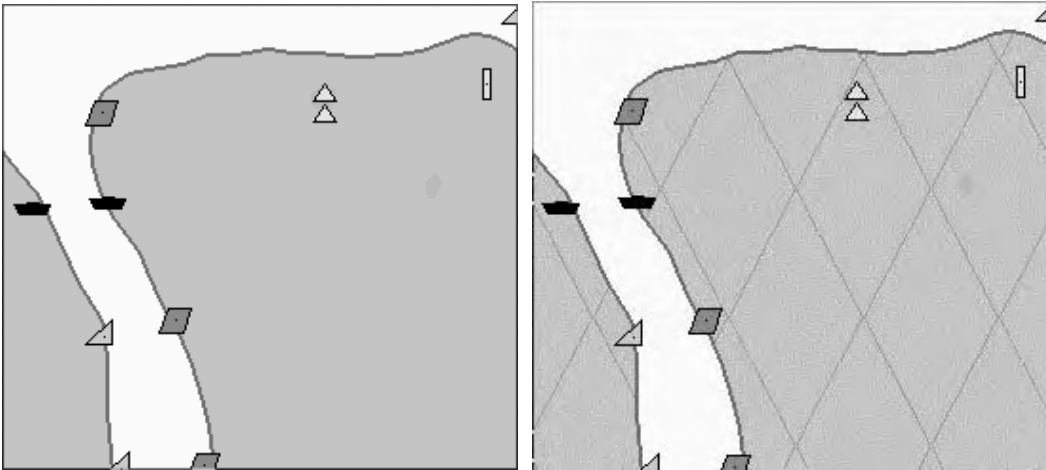
Shallow = 2m, Safety = 5m and Deep = 10m Shallow = 5m, Safety = 10m and Deep = 20m



Safety depth = 6m

Safety depth = 10m

Shallow pattern



Items on Standard page of Chart Display dialog box

Unknown object or presentation

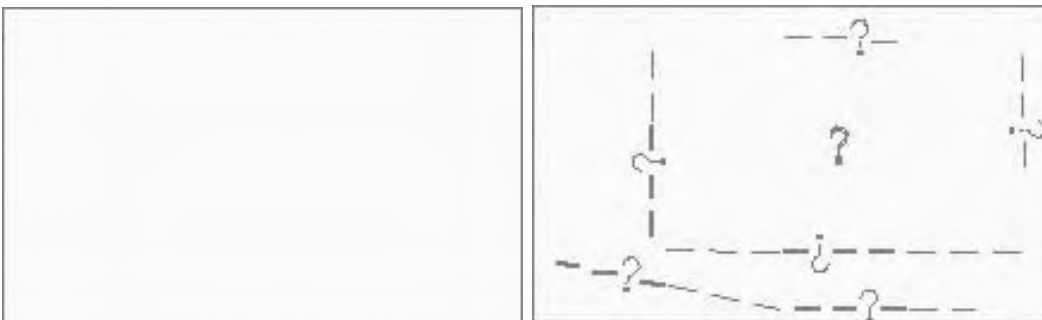
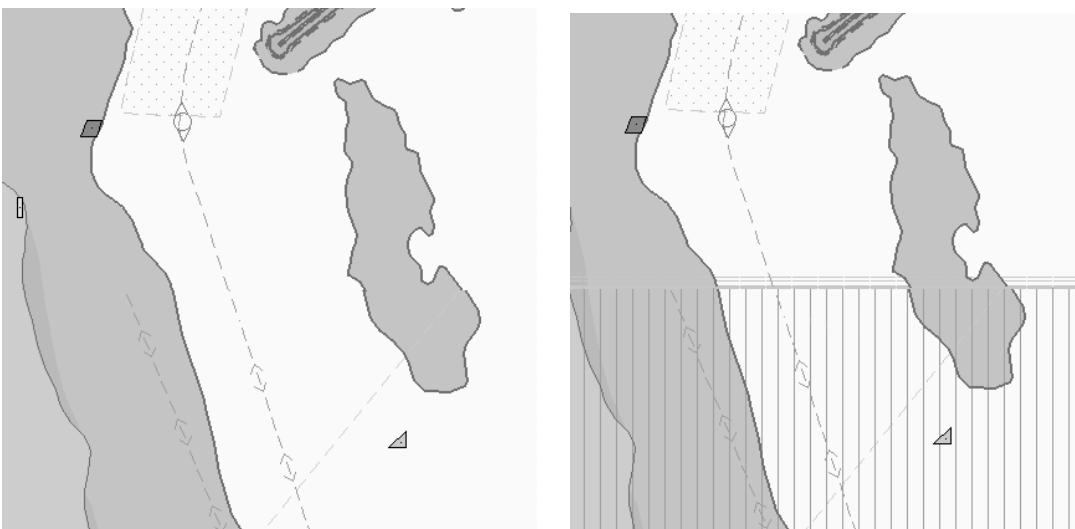


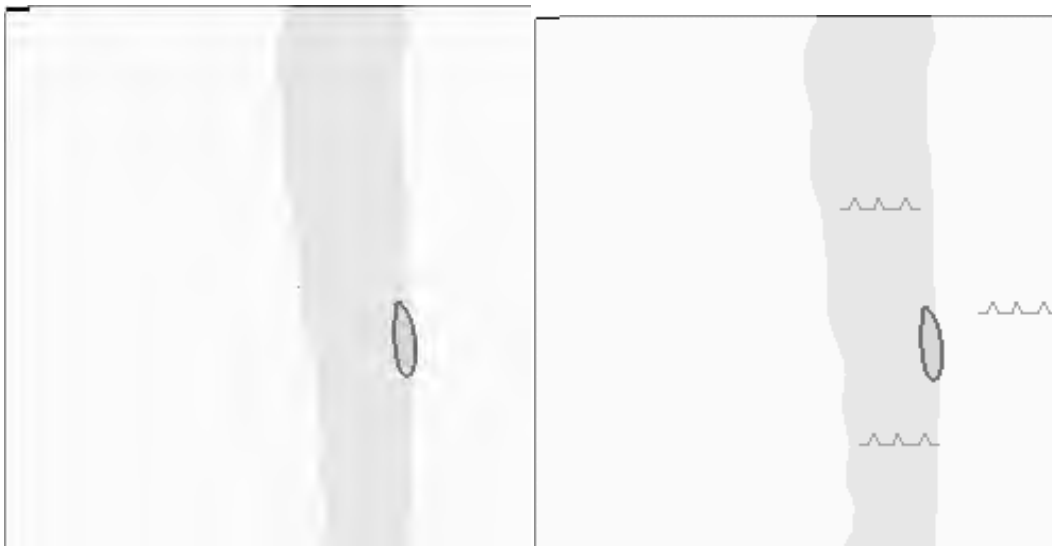
Chart data coverage



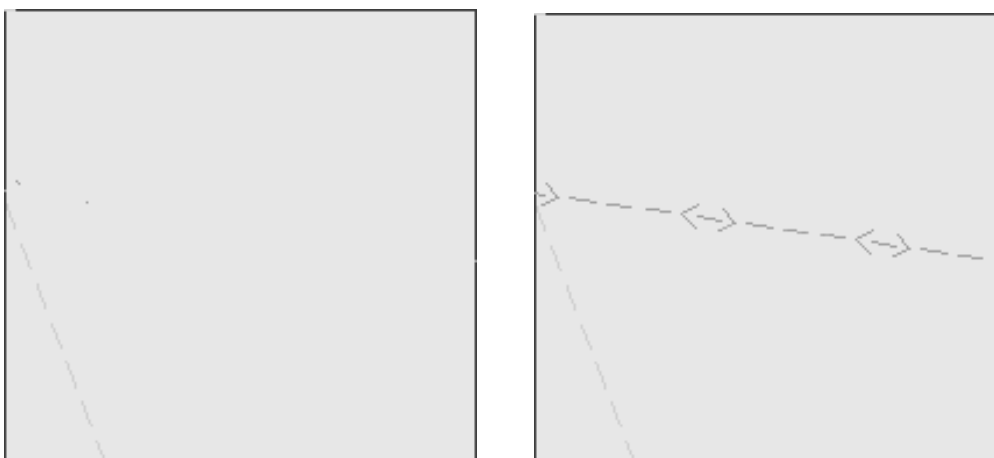
Land features



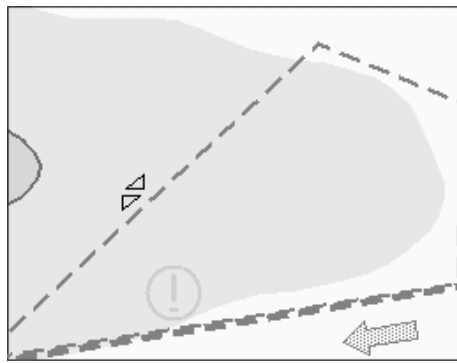
Water and seabed features



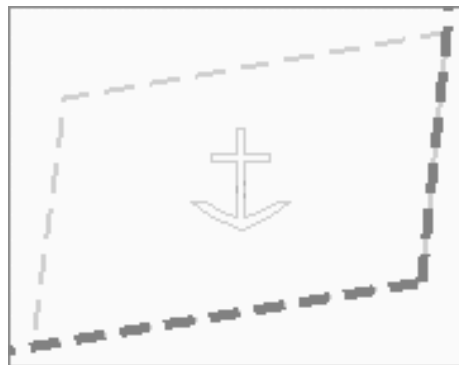
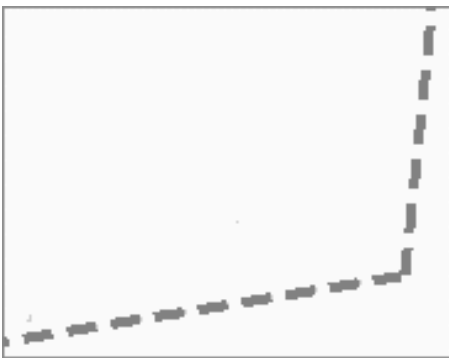
Traffic routes



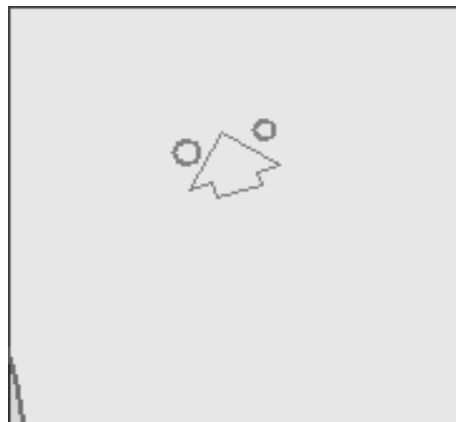
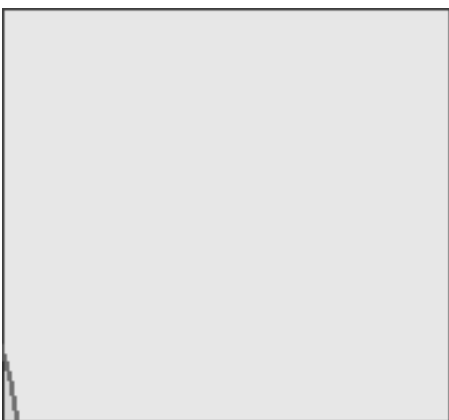
Cautionary areas



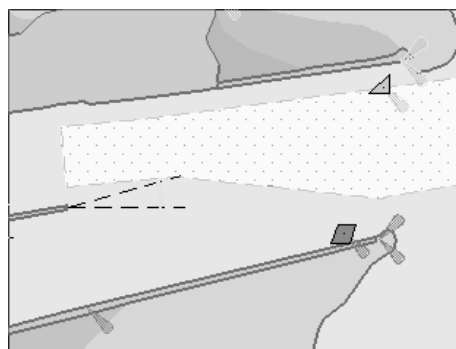
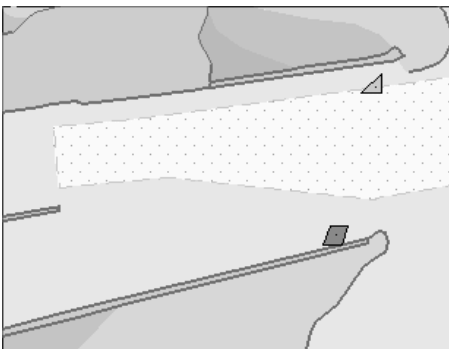
Information areas



Buoys and beacons



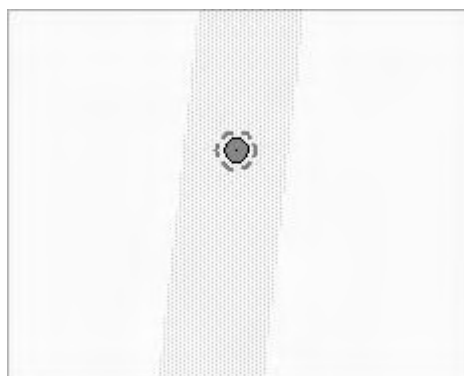
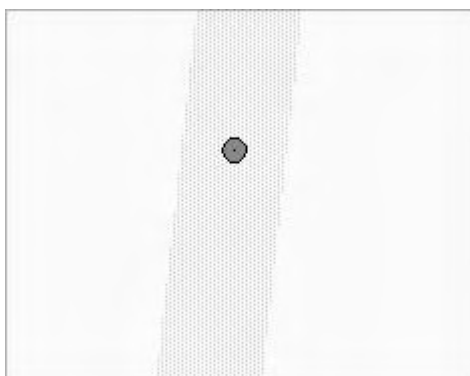
Lights



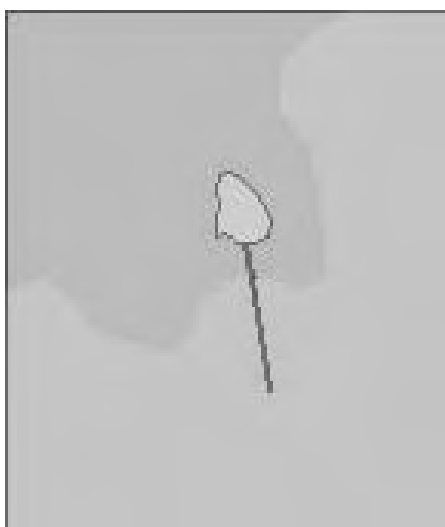
Fog signals



Radars

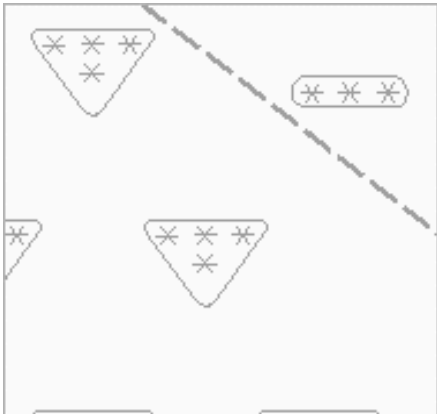
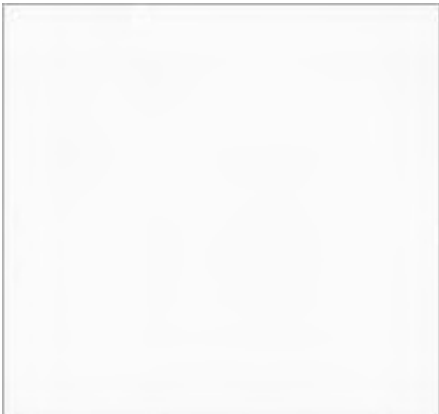


Services



Items on Other page in Chart Display dialog box

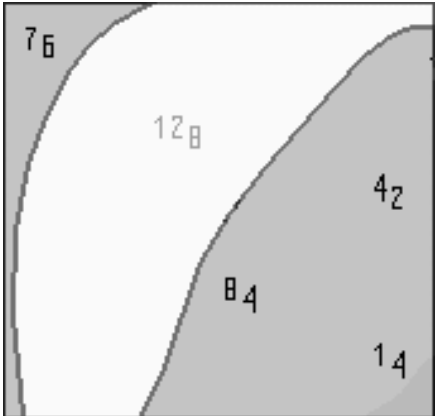
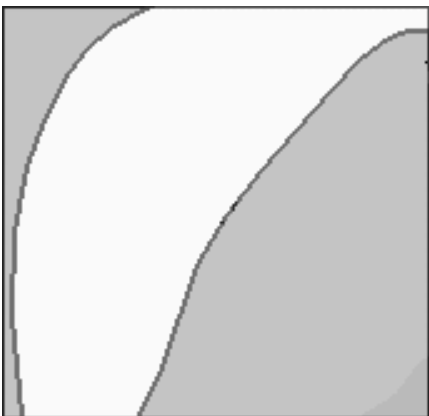
Information about chart data



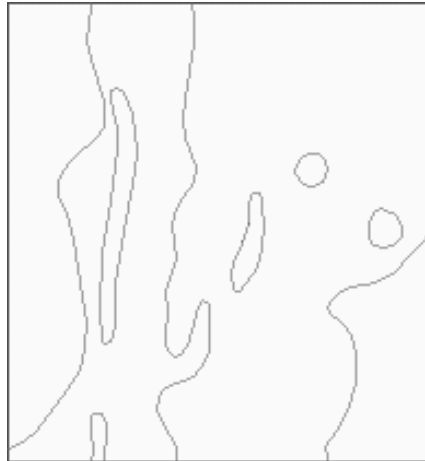
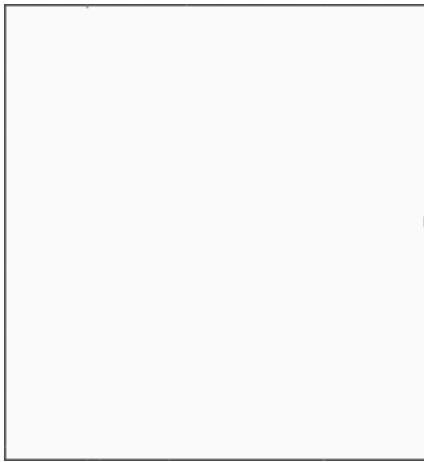
Land features



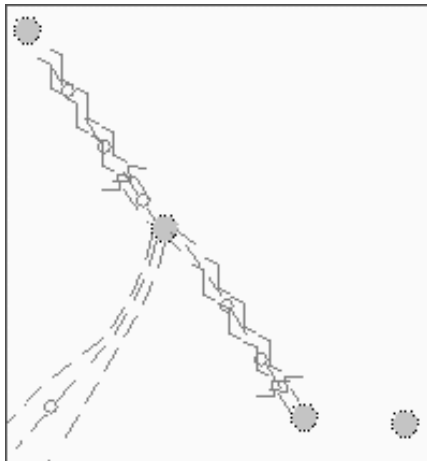
Soundings



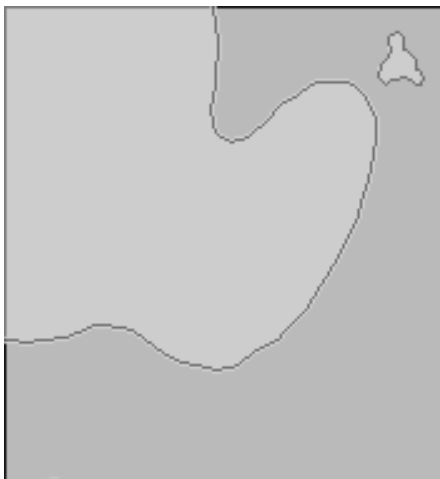
Depth contours, current magnetic



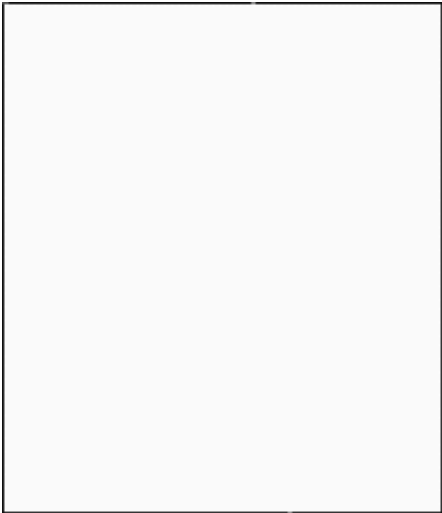
Seabed and obstructions



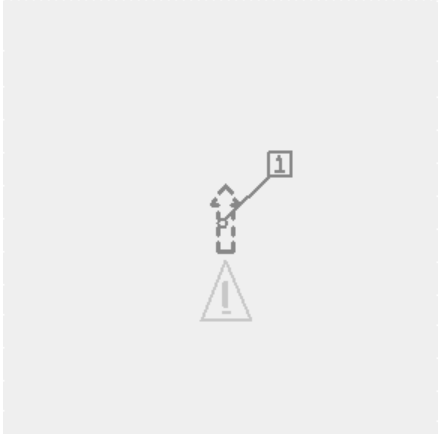
Services and small craft facilities



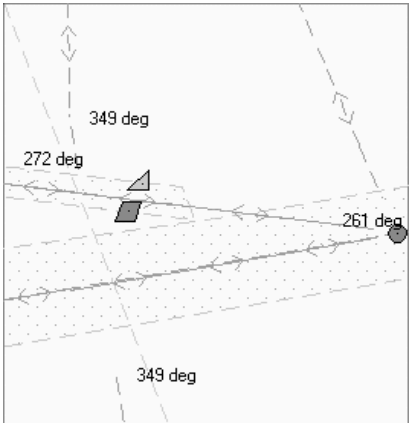
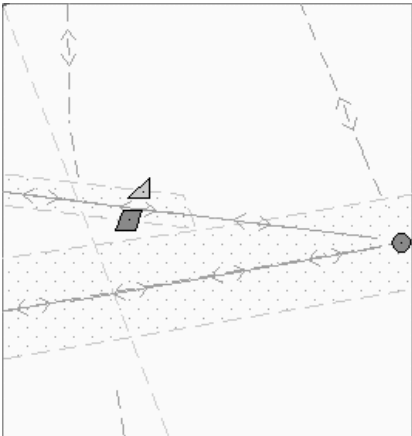
Special areas



Additional information available

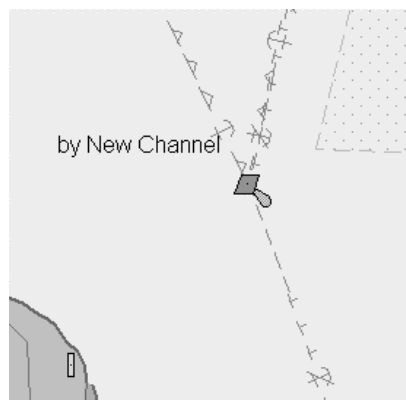
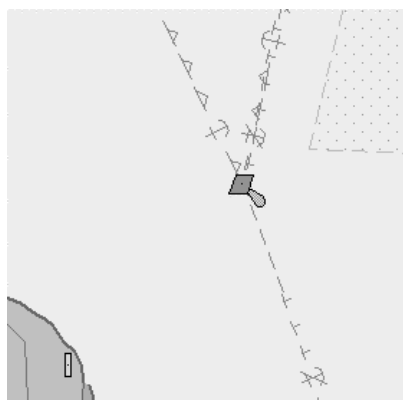


Important text

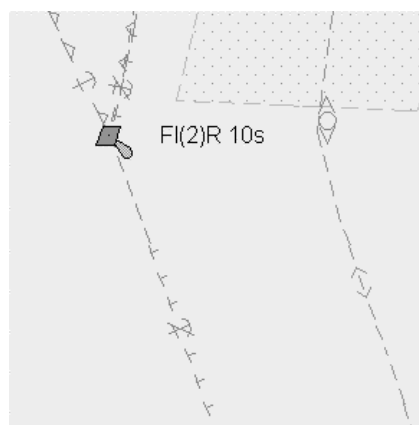


Text on Other page in Chart Display dialog box

Names for position reporting



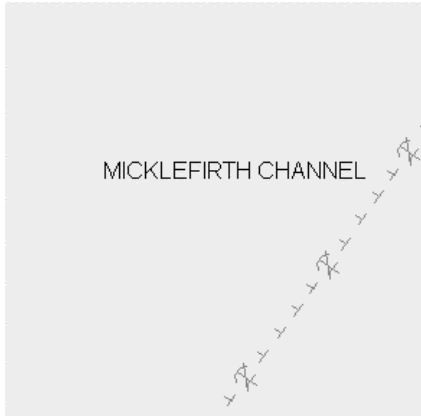
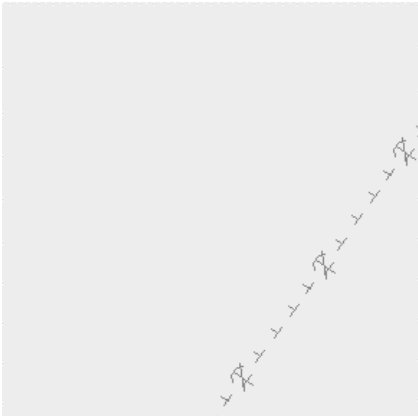
Light descriptions



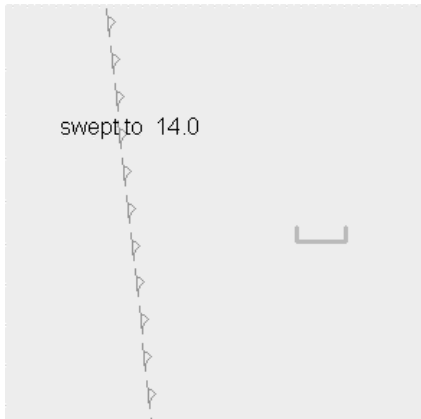
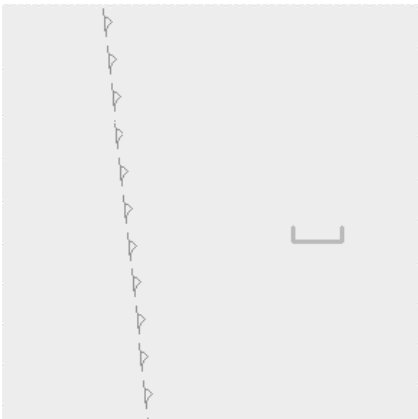
Nature of seabed



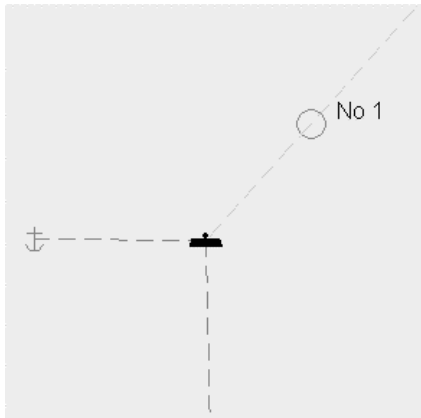
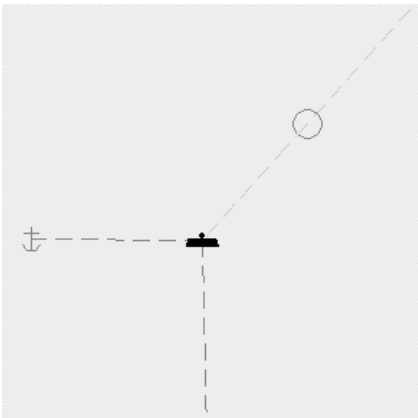
Geographic names, etc.



Swept depths, magnetics



Berth and anchorage numbers



Appendix 4:

C-MAP CM-93/3 Charts

A4.1 C-MAP Cartographic Service

Your ECDIS system has the capability of using and displaying the latest CMAP CM-93/3 worldwide vector chart database. These charts are fully compliant with the latest IHO S-57 3.1 specifications.

In order to prepare the system for use with the C-MAP CM-93/3 database, there are a number of things that must be done.

A4.1.1 Registration of the system at C-MAP Norway

Your system that has the capability to use the CM-93/3 database. To do so an Aladdin eToken (supplied by C-MAP) must be connected to the system (if the system has and supports USB). The eToken provides the system with a unique System ID that enables C-MAP to issue correct licenses. The actual System ID can be found on the eToken itself, on the back of the installation CD box or on a sticker placed on the equipment. This ID must be provided on all chart orders, either by email (license@C-MAP.no) or by fax +4751 464701

A4.1.2 Ordering charts

A chart order may be sent together with system registration as described above. It is essential that the required information be sent to C-MAP when ordering charts for a system. C-MAP issues order forms specifying the information that is required, and contains vital information that will allow C-MAP to monitor and maintain your licenses throughout the lifetime of the system. Charts can be ordered by Zone, Area or Cell and these can be seen on our Internet pages at www.C-MAP.no or by downloading the Chart Product Catalogue also available on the web site. Price quotations can be obtained via your chart dealer or direct from your local C-MAP office. Once the license order has been prepared it should be emailed to license@C-MAP.no or faxed to C-MAP Norway AS (+47 51 464701).

A4.1.3 Applying licenses

Once the order has been received at C-MAP, a license will be generated and transmitted back to the operator. This may be in the form of a single alphanumeric string (16 characters), or in the form of a file called PASSWORD.USR. Once this license has been received it should be input using the License Administrator software designed and supplied by the ECDIS/ECS manufacturer. There are two types of licenses, purchase and subscription. Purchase licenses are valid indefinitely while subscription licenses need to be renewed every 12 months from the start of the subscription. Failure to renew a subscription will result in the charts becoming unavailable.

A4.1.4 Troubleshooting

If you are having problems installing your software or charts please check the following before contacting C-MAP:

- That you have registered the WORLD database in the GDBADMIN application.
- That the registered WORLD database is available.
- That you have correctly typed the license string.

Contact Information: For information or help please call your nearest C-MAP Office (details can be found on the reverse side of the C-MAP chart CO box) or contact C-MAP Norway:

C-MAP Norway AS Post Box 212 Hovlandsveien 52 4379 Egersund Norway

Tel. +4751464700 Fax. +4751464701

Email: technical@C-MAP.no

A4.2 Chart Subscription Service

A4.2.1 C-MAP service

There are three different services available through C-MAP Cartographic service that can be used in FURUNO ECDIS FEA-2x07. Two of them are using CM-93/3 format. These data sets contain two databases:

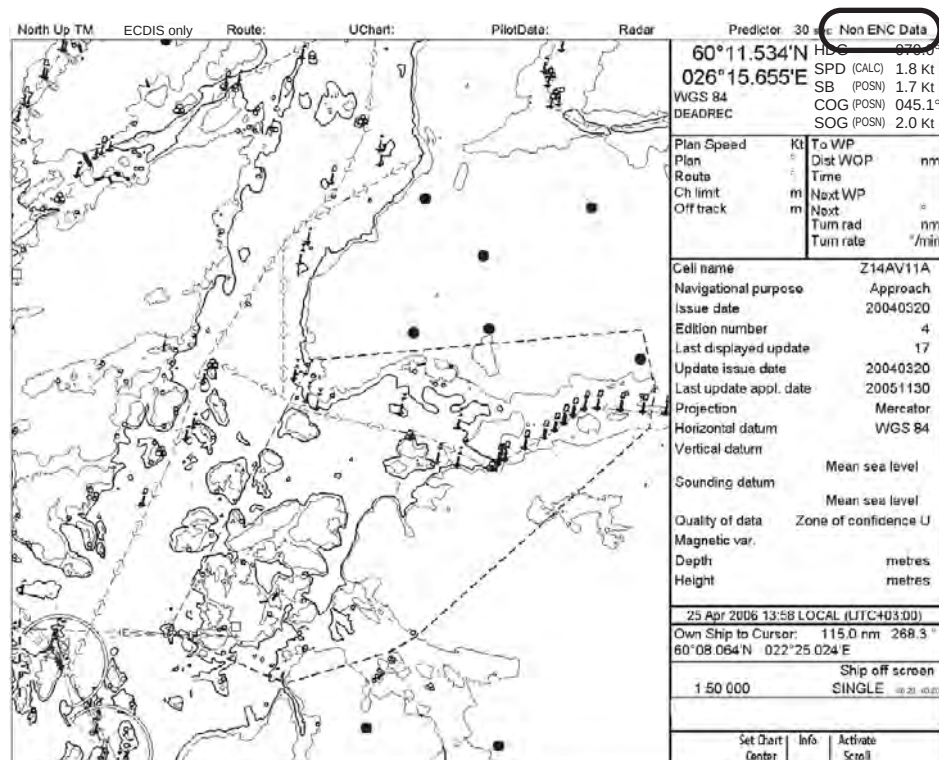
- Global Chart Database, which is available on CM93/3 professional CD-ROM. This database contains chart data originally produced both by C-MAP and Hydrographic Office.
- CM-ENC, Official Electronic Navigational Charts distributed by C-MAP on DVD.

Note: CM-ENC is not yet available. If you change CD ROM service to DVD service, you need to also have a new license for the DVD service. Contact your chart agent or C-MAP for details.

Additionally, the previous CM-93/2 Global Chart Database is compatible for use with the FEA-2x07.



When using any C-MAP chart, the indication "Non ENC Data" appears at the upper right corner on the ECDIS display.



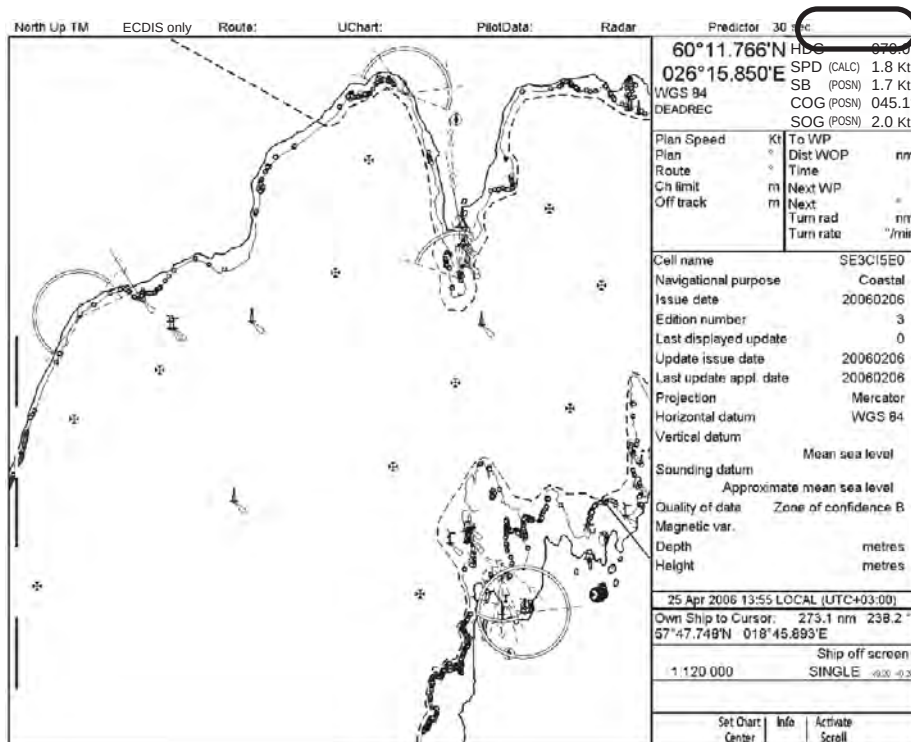
A4.2.2 RENC service

RENC service produced by Primer or IC-ENC is considered to legally fulfil SOLAS requirements as primary aid of navigation. National Hydrographic Organization (NHO) may have arranged similar subscription service as RENC on its own waters.

Chart data distributed through the service is S57 ed.3.0 or ed. 3.1-coded ENC.



When using charts loaded and updated using RENC or NHO service, there will be no indications at the upper right corner on the ECDIS display.



A4.3 CM93/3 Chart Display

A4.3.1 Introduction

CM93/3 charts are vector charts displayed together with ENC (S57) and CM93/2 charts. These charts have the priority order shown below.

1. ENC
2. CM93/3
3. CM93/2

If identical navigational purpose charts exist for a given area, priority is as shown above. Areas where ENC is not available and CM93/3 and CM93/2 are available, CM 93/3 is displayed. Areas where ENC and CM93/3 are not available, CM93/2 is displayed.

The chart legend, which provides various data about the chart currently displayed, can be toggled on and off by placing the cursor in the sidebar, clicking the right mouse button, choosing Chart Legend from the menu then pushing the scrollwheel.

This system is capable of showing more than one S57 chart at a time. This feature is called the multi-chart display. If one S57 chart does not cover the whole display, the system will open more S57 chart cells for display, if appropriate cells for the displayed area are available. The chart legend shows information about S57 charts displayed on the electronic chart display area. The information is displayed with reference to your ship's position if automatic TM reset is active, or with reference to the current position of the cursor if automatic TM Reset is OFF.

Cell name	Z12AS430
Navigational purpose	Coastal
Issue date	20030206
Edition number	3
Last displayed update	64
Update issue date	20030206
Last update appl. date	20051116
Projection	Mercator
Horizontal datum	WGS 84
Vertical datum	Mean sea level
Sounding datum	Mean sea level
Quality of data	Zone of confidence U
Magnetic var.	
Depth	metres
Height	metres

Cell name:

Name of chart.

Navigational purpose:

S57 charts are compiled for a variety of navigational purposes. The navigational purpose, for which an individual S57 chart has been compiled by a Hydrographic Office, is indicated in this field. Alternatives are Overview, General, Coastal, Approach, Harbour and Berthing.

Issue date:

Issue date of the Base cell of the chart.

Edition number:

Edition number of the chart.

Last displayed update:

Number of last update, which is visible on the chart screen.

Update issue date:

Date to which the last update, which is visible on the chart screen, is effective.

Last update appl. date:

Issue date of last update, which is visible on the chart screen.

Projection:

Projection of the chart. The projection is always Mercator.

Horizontal datum:

Horizontal datum of the chart data as published by the chart producer. By definition this must be WGS 84.

Vertical datum:

Vertical datum of the chart.

Sounding datum:

Datum used for soundings.

Quality of data:

Quantitative estimate of the accuracy of chart features, given by the chart producer.

Magnetic var.:

Amount of magnetic variation. A positive value indicates a change in an easterly direction and a negative value indicates a change in a westerly direction.

Depth:

Unit of measurement for depth.

Height:

Unit of measurement for height above sea level (for example, clearance height).

A4.3.2 Choosing CM93/3 chart material to use

To activate S57 chart material onto the display, do the following:

1. Place the cursor just above the chart scale indication in the information area.
2. Activate S57 Chart appears in the mouse functions area; push the left mouse button.

A4.3.3 Choosing charts for viewing**Choosing a chart from a catalogue**

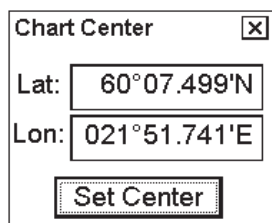
To choose a chart for viewing from a catalogue, do the following:

1. Choose Chart Catalogue from the Chart menu.
2. From the Chart Catalogue dialog box, use the cursor to choose desired chart.
3. Click the **Open** button.

Browsing your charts

You may view S57 charts using different positions and different scales. The basic tools for browsing charts are **Range -**, **Range+**, **Set Chart Center**, **ShipOffcenter** and **TM Reset**.

Set Chart Center allows you to look ahead from a place other than your ship's current position. Choose Set Chart Center from the Main menu to display the dialog box shown below. Use the scrollwheel to set the latitude and longitude position for chart center then click the **Set Center** button.



Note: The chart can also be centered (with less precise positioning) by placing the cursor at desired location, displaying Set Chart Center/Info/Activate Scroll in the dialog box and pushing the left mouse button.

To turn off automatic true motion reset, display and click TM Reset (in the guidance area). When true motion reset is off, the indication "Ship off screen" appears in the information area.

To restore your ship's position to the screen center, display TM Reset/Info/ShipOffcenter in the guidance area then push the right mouse button.

Range - and **Range+** change the chart scale. If true motion reset is active, ZOOM IN and ZOOM OUT keep the relative position of your ship with respect to the display. If true motion reset is on, ZOOM IN and ZOOM OUT keep the relative position pointed by the cursor with respect to the display.

The system automatically chooses next larger or smaller scale. If a chart with larger compilation scale is available at your current viewing position, the message "Larger Scale Data Exists" appears.

Looking for charts around your ship

You can use either true motion or relative motion. In the true motion mode, your ship moves until it reaches the true motion reset borderline, where it jumps back to an opposite position on the screen based on ship's course. In the relative motion mode, your ship stays in a fixed position, while the chart moves on screen.

If, in the true motion mode, you reset own position with TM Reset, your ship will immediately jump to the true motion reset position.

If, in the true motion mode, you use ShipOffcenter, your ship will go to that position on screen and continue true motion movement from that position. When it reaches the true motion reset borderline, it will automatically jump to the true motion reset position.

If, in the relative motion mode, you reset own position with TM Reset, your ship will immediately jump to the true motion reset position and use that position as fixed position to stay on screen.

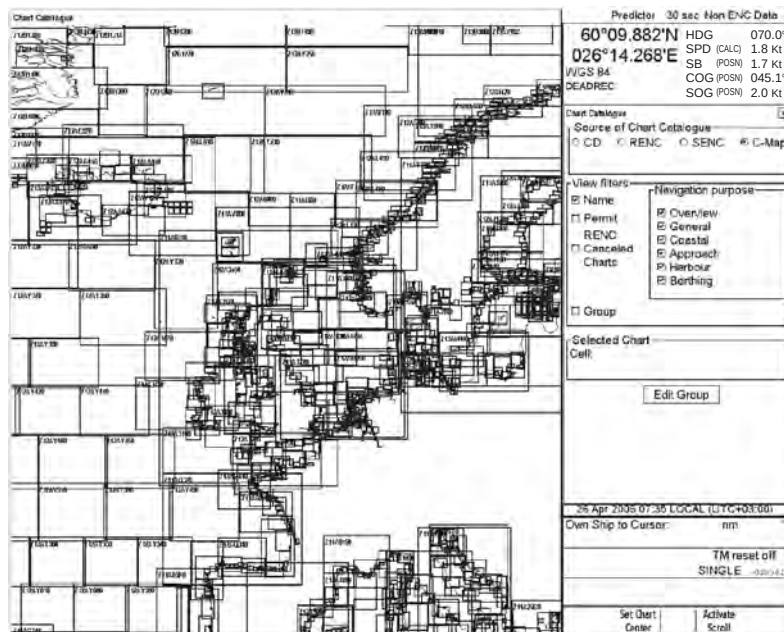
If you use relative motion, you can choose a new fixed position for your ship by using ShipOffcenter.

Use Range - and Range+ to choose desired chart scale.

A4.3.4 Chart catalogue of C-MAP charts

You can use the chart catalogue to graphically view content of loaded C-MAP database(s) into ECDIS.

1. Open the Chart menu and select Catalogue.
2. Select "Source of Chart Catalogue" as C-MAP. Use Navigation purpose selection to view desired charts.



3. Charts for which you possess a valid license are marked in green. Charts for which you have no license or the license has expired are shown as red borderlines.

1. Source of Chart Catalogue

- **CD ROM:** Display charts available in a named "CD ROM".
- **RENC:** Display charts available from an RENC.
- **SENC:** Display charts stored in your hard disk in SENC format.
- **C-MAP:** Display charts of CM93 ed. 3 chart database stored on ECDIS.

2. View Filters

- **Name:** Display also cell names in graphical coverage display.
- **Permit:** Display only charts for which you have permit.
- **RENC Cancelled Charts:** Display charts that are cancelled in an RENC.
- **Group:** Display charts that are member of selected group.
- **Navigation purpose:** Display charts for chosen navigation purpose (overview, general, coastal, approach, harbour, berthing).

3. Selected Chart

- **Cell:** Name of the chart
- **Open:** Opens selected chart to ECDIS display.

4. The **chart limit boxes** are color-coded as follows:

Green You can view chart on ECDIS.

Red You cannot view chart on ECDIS, because license is missing or license has expired for the chart

A4.4 S57 Managing C-MAP charts

A4.4.1 Licensing system used by the C-MAP

The licensing system used with CM-93/3 professional charts is based on the serial number of eToken.

The eToken is connected to USB port on the ECDIS and it identifies ECDIS for CM-93/3 professional charts. It must be connected to ECDIS always when using CM-93/3 professional charts.

The following information is needed to apply for subscription of CM-93/3 professional charts:

- Company Name:
- User Name:
- Dongle ID (available on tag of eToken):
- Reason for License (sale, development, demo)
- Coverage required (World, Zone x, Area x, cell x)
- Duration of license (3 month or 1 year)
- Database version (available on CD ROM label):

Based on this information, C-MAP is able to process a code that is delivered onboard as a text string or a file called "password.usr".

A4.4.2 Introduction

Below are the steps necessary for ordering CM-93/3 professional charts.

1. Find eToken ID. See "System ID for C-MAP".
2. Define your subscription and deliver this information to your chart agent together with System ID information.
3. You will receive C-MAP database(s) on CD-ROM or DVD. Load Database(s) into ECDIS. See "Load of CM93/3 database to ECDIS".
4. You will receive License(s) for C-MAP database(s) either in file or character string. See "License of CM93/3".

A4.4.3 System ID for C-MAP

Each ECDIS has individual eToken connected to USB. Find eToken ID in the following sequence:

Menu → Chart Menu → C-MAP Ed3 → Licenses

It is indicated as System ID.

A4.5 CM93/3 Database

There are three different CM93/3 Databases that can be loaded into ECDIS:

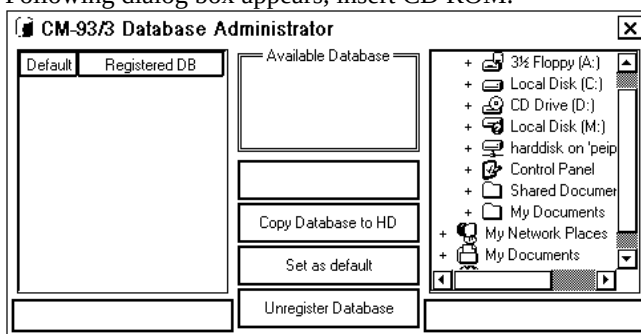
- CM93/3 Professional, available on CD-ROM
- CM93/3 Professional +, available on DVD
- CM-ENC, available on DVD

Note: CM-ENC is not yet available.

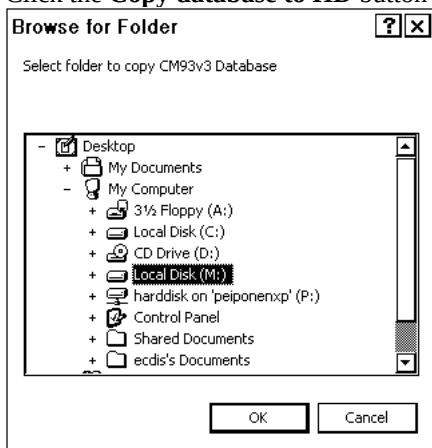
A4.5.1 Load of CM93/3 database to ECDIS

Charts are available on CM93/3 professional CD ROM. To load them from CD to ECDIS, proceed as follows:

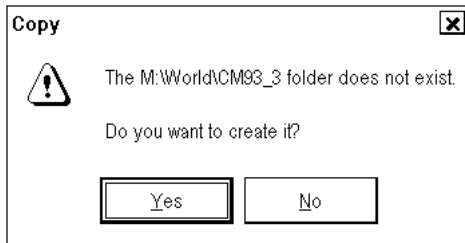
1. Menu → Chart Menu → C-MAP Ed3 → Load and register for use
Following dialog box appears, insert CD ROM.



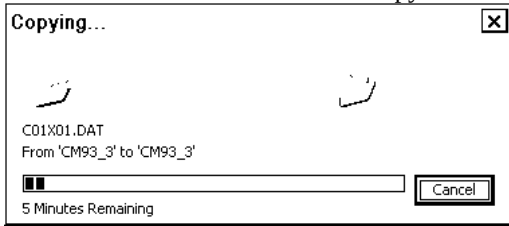
2. Click the **Copy database to HD** button and select drive M:\



3. Click the **OK** button. If there is no folder available, the following dialog box appears.



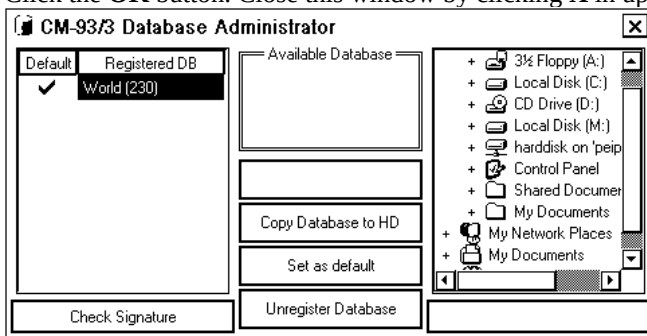
4. Click the **Yes** button. ECDIS will copy database.



5. After successful loading the following dialog box appears



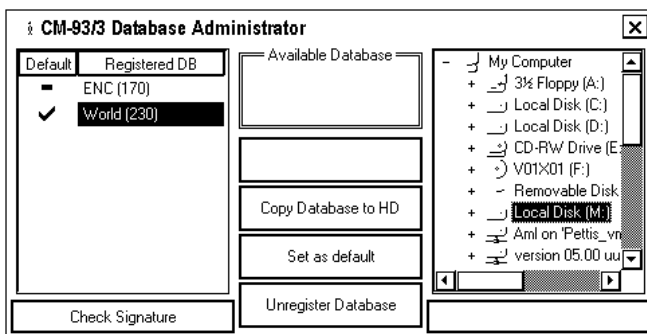
6. Click the **OK** button. Close this window by clicking **X** in upper right corner.



A4.5.2 Use of multiple databases

It is possible to use CM93/3 Professional, CM93/3 Professional + and CM-ENC databases at the same time at the same workstation. You can load databases to ECDIS, as introduced in "Load of CM93/3 database to ECDIS".

By selecting one of databases as a default, you select one database as lowest priority database to be displayed areas where no other CM93/3 databases are available.



Above is an example where CM-ENC and CM93/3 Professional databases are loaded into ECDIS.

Note: CM-ENC is not yet available.

A4.6 License of CM93/3

To view charts of C-MAP database(s), you need to load the license for the database. For each database (CM93/3 Professional, CM93/3 Professional + and CM-ENC) C-MAP generates own license.

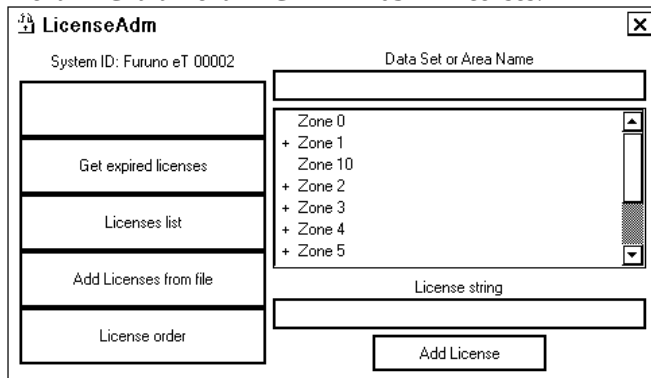
Note: CM-ENC is not yet available.

A4.6.1 Add license from file

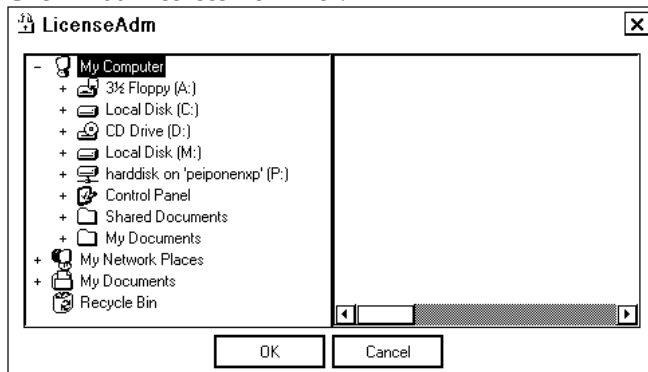
To get access to CM93/3 professional chart database, you have to enter a code, which is received from C-MAP directly or through Chart agent. The code defines coverage of charts you can display on ECDIS.

To enter code proceed as follows:

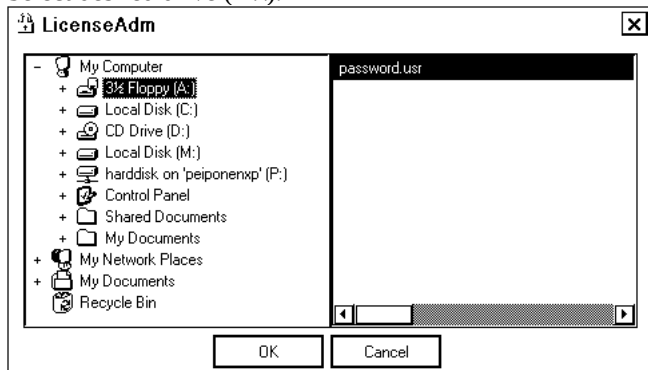
1. Menu -> Chart Menu -> C-MAP Ed3 -> Licenses.



2. Click "Add Licenses from file".



3. Select desired drive (A:\).

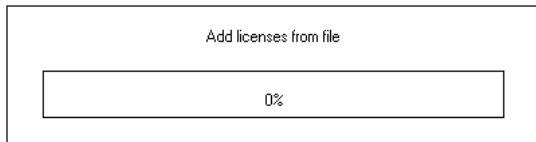


Appendix 4: C-MAP CM-93/3 Charts

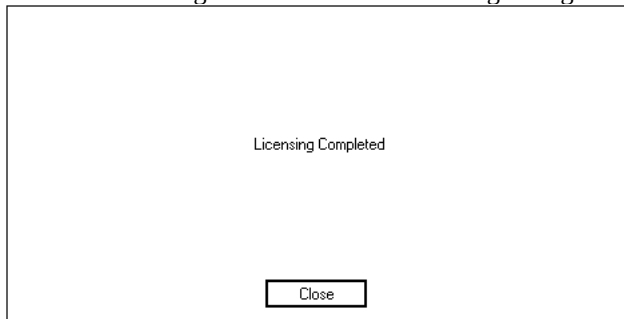
- Click the **OK** button. Then, you have to confirm loading of new code.



- Click the **YES** button. Code will be read.



- Successful loading is indicated with following dialog box.

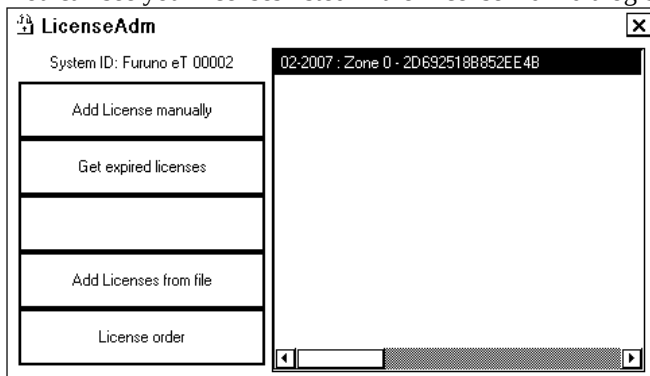


- Click the **Close** button.



If you will have dialog box shown above, it indicates that there is mismatch between chart database and password.usr. Check that you have password.usr that is delivered to you to be used together with CM-93/3 professional CD-ROM.

- You can see your licenses listed in the License Adm dialog box.

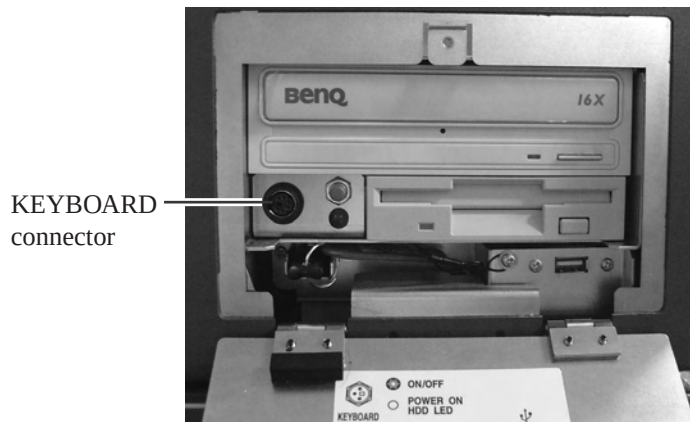


License for Zone 0 has been loaded in this system.

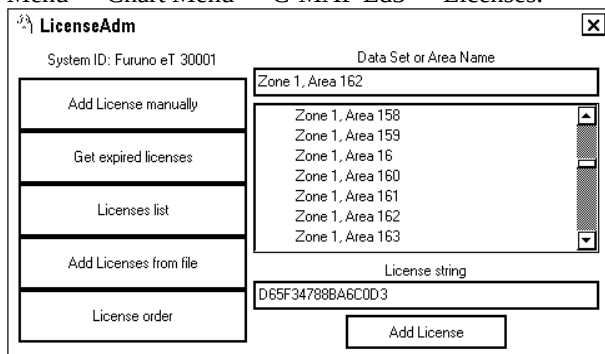
- Click **X** to close dialog box.

A4.6.2 Add license manually

If you receive license as a "License string," you can enter this string manually into ECDIS, using the service keyboard. To connect the keyboard, turn off the power, open the lid on the processor unit, connect the keyboard to the location shown below then turn the power on again.



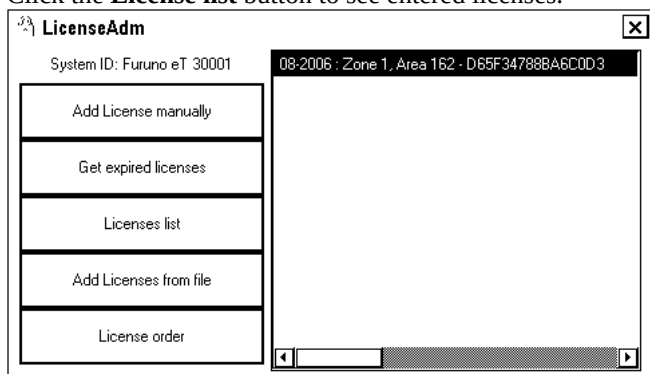
1. Menu -> Chart Menu -> C-MAP Ed3 -> Licenses.



2. From the service keyboard, enter string received from C-MAP in the "License string" field then click the **Add License** button.



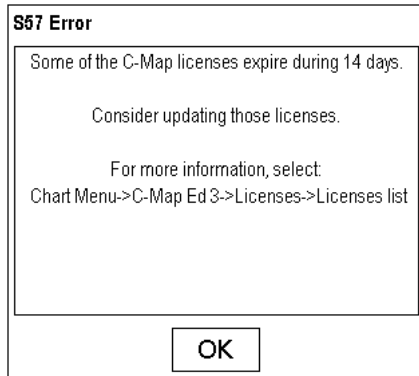
3. Click the **License list** button to see entered licenses.



4. Close the "LicenseAdm" dialog box by clicking the X sign in upper right corner.
5. Turn off the power, disconnect the service keyboard then turn on the power again.

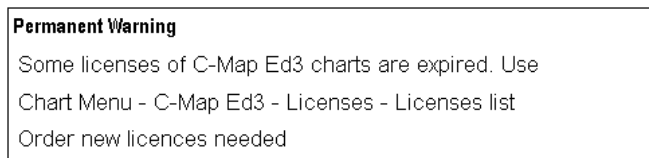
A4.6.3 Renewal of license

You will receive a notice 2 months prior to expiration of the licenses. This notice is repeated on a regular basis until the expiration date is reached. You need to renew license to view chart database after the expiration date.



When warning of license(s) expiration appears, contact your chart agent to renew your C-MAP license(s).

After expiration, charts of expired license(s) are displayed for a short period. The following Permanent Warning dialog box is displayed.



A4.7 How to Keep Charts up to Date

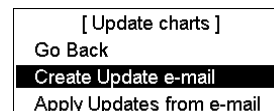
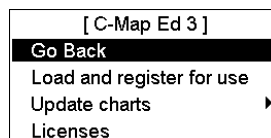
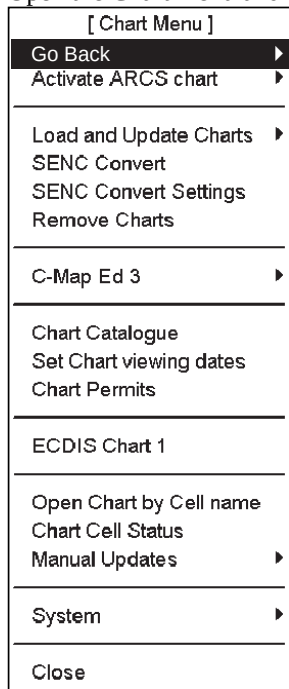
During period of subscription, you will receive CM-93/3 Professional CD ROM three times. To keep up-to-date between CD issuing periods, you can use Real Time Updating service.

ECDIS operators cannot connect to the internet directly from the ECDIS. You create an update order file from the ECDIS and send this by email directly to updates@C-MAP.no. This automatic email server will process the update request, prepare the updates and automatically send them. The end operator can then copy these updates to a floppy disk, USB memory stick or CD-ROM and apply them to the ECDIS.

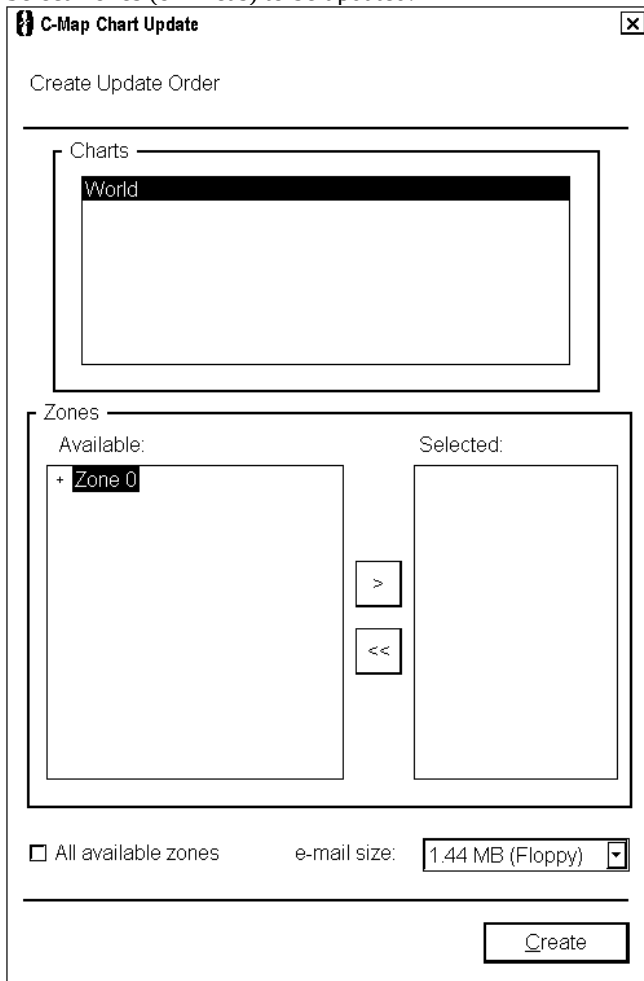
A4.7.1 Creating update order file

You can create an update order file as follows:

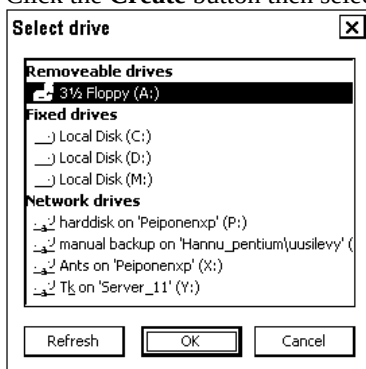
1. Open the Chart menu and select C-MAP Ed 3 from the menu. Select Update Charts in C-MAP Ed 3 menu.



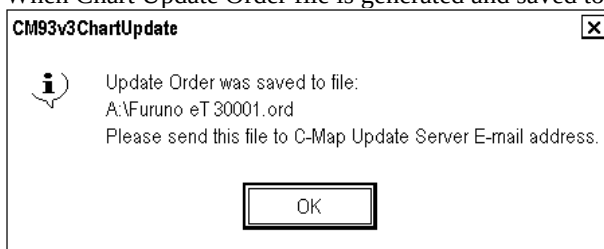
2. Select Zones (or Areas) to be updated.



3. Click the **Create** button then select the drive where to save the Chart Update Order file.



4. When Chart Update Order file is generated and saved to destination, the following dialog box appears:

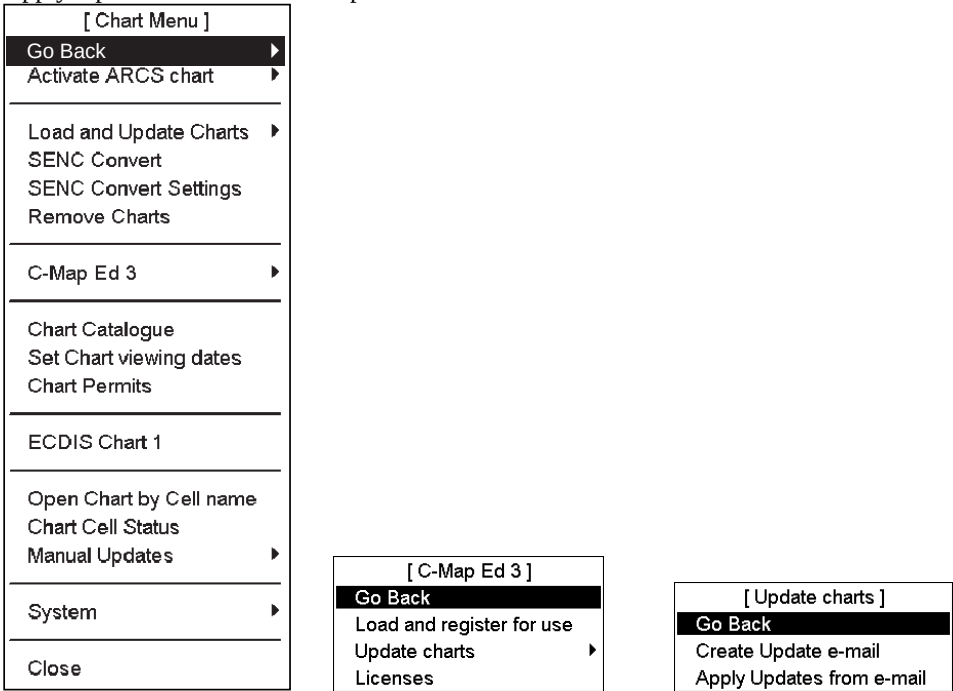


5. Click the **OK** button. Update order file to address updates@C-MAP.no
6. You will receive updates for your request automatically.

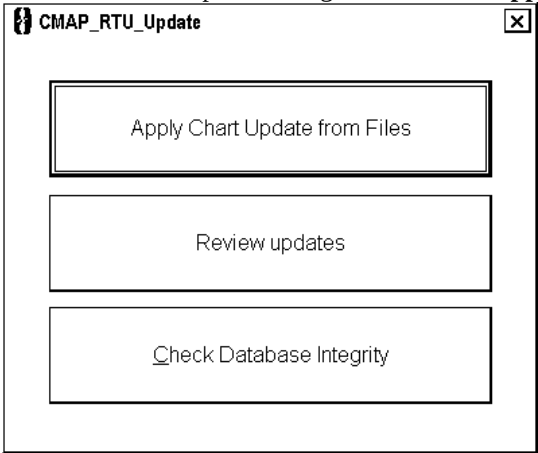
A4.7.2 Loading chart updates from the file

When you have received an update file via e-mail, then you can load it to ECDIS.

1. Open the Chart menu and select C-MAP Ed 3 in the menu. Select Update Charts in C-MAP Ed 3 menu and Apply Updates from e-mail in Update charts menu.

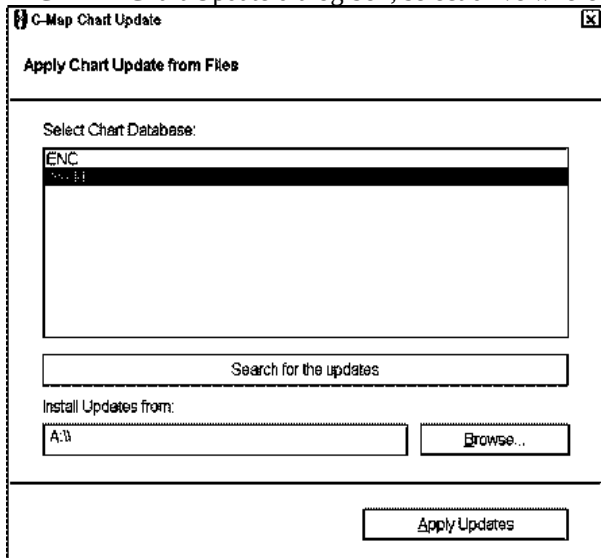


2. In C-MAP RTU Update dialog box, click the **Apply Chart Update from Files** button.

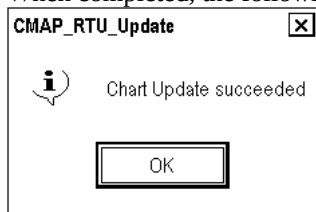


Appendix 4: C-MAP CM-93/3 Charts

3. In C-MAP Chart Update dialog box, select drive where updates are saved and click the **Apply Updates** button.



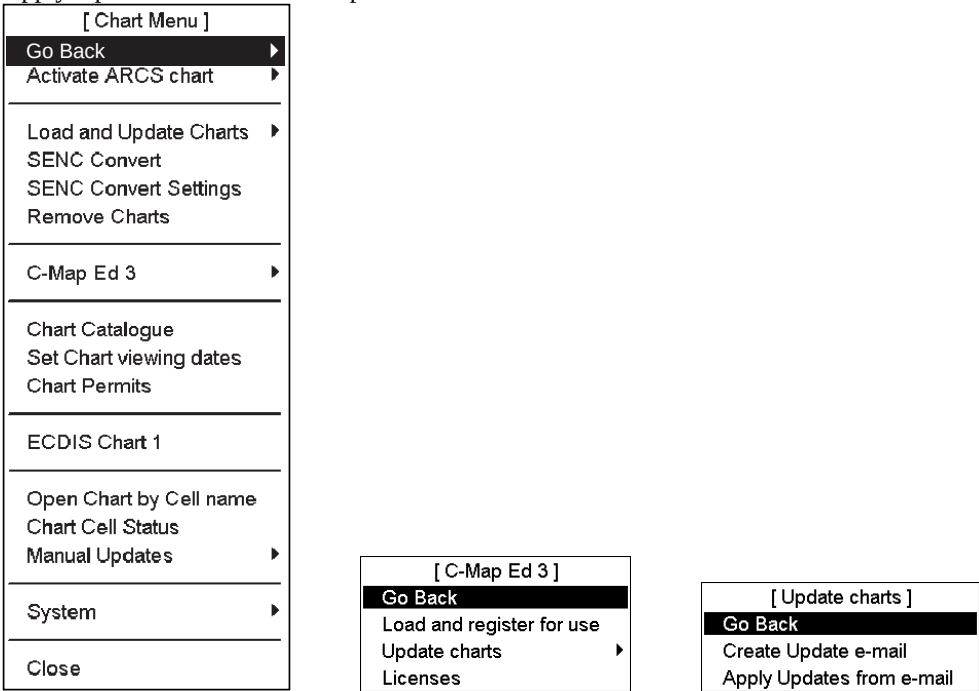
4. When completed, the following dialog box appears. Click the **OK** button.



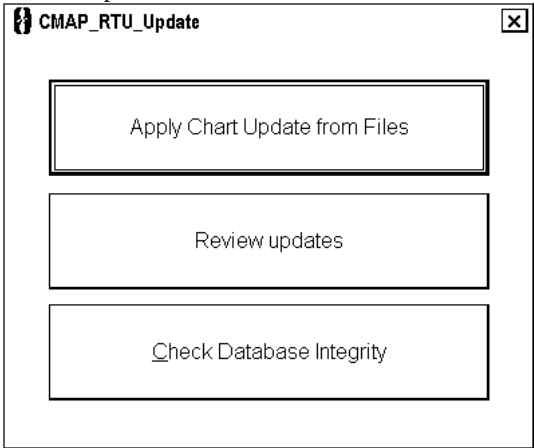
A4.7.3 Review of chart updates

You can see a list of changes for every updated chart as follows:

1. Open the Chart menu and select C-MAP Ed 3 in the menu. Select Update Charts in C-MAP Ed 3 menu and Apply Updates from e-mail in Update charts menu.

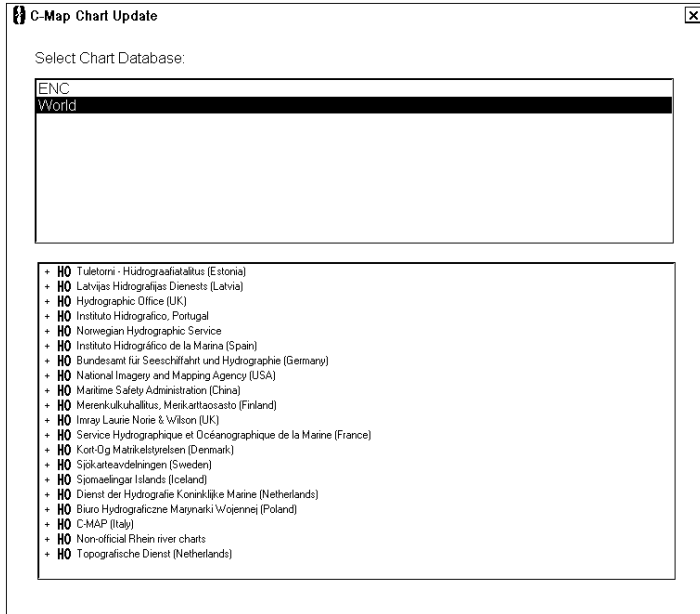


2. Review updates in text mode and click the **Review updates** button.



Appendix 4: C-MAP CM-93/3 Charts

3. Select from the list shown below.



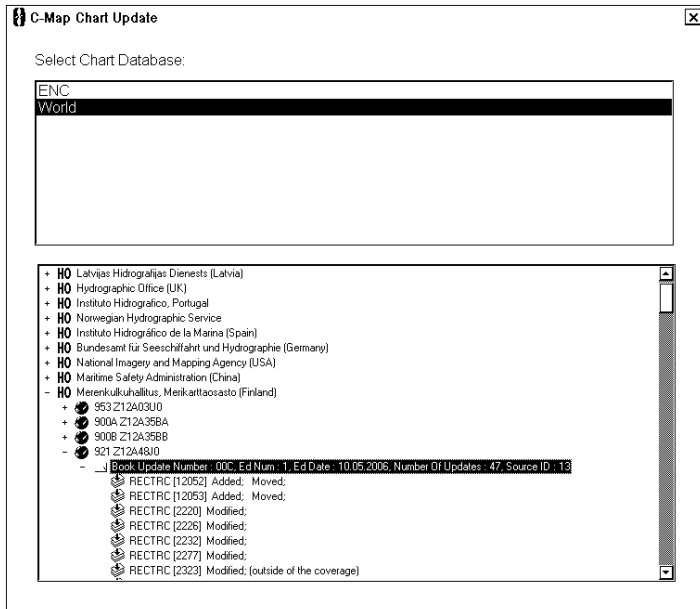
C-Map Chart Update

Select Chart Database:

ENC
World

- + HO Tuletoni - Hidrograafiatallus (Estonia)
- + HO Latvijas Hidrogrāfijas Dienests (Latvia)
- + HO Hydrographic Office (UK)
- + HO Instituto Hidrografico, Portugal
- + HO Norwegian Hydrographic Service
- + HO Instituto Hidrográfico de la Marina (Spain)
- + HO Bundesamt für Seeschifffahrt und Hydrographie (Germany)
- + HO National Imagery and Mapping Agency (USA)
- + HO Maritime Safety Administration (China)
- + HO Merenkukuhallitus, Merikarttaosasto (Finland)
- + HO Imray Laurie Nore & Wilson (UK)
- + HO Service Hydrographique et Océanographique de la Marine (France)
- + HO Kort-Ög Matrikelstyrelsen (Denmark)
- + HO Sjökartavärdningen (Sweden)
- + HO Sjömålingsväsendet (Iceland)
- + HO Dienst der Hydrografie Koninklijke Marine (Netherlands)
- + HO Biuro Hydrograficzne Marynarki Wojennej (Poland)
- + HO C-MAP (Italy)
- + HO Non-official Rhein river charts
- + HO Topografische Dienst (Netherlands)

4. Select a chart from the list.



C-Map Chart Update

Select Chart Database:

ENC
World

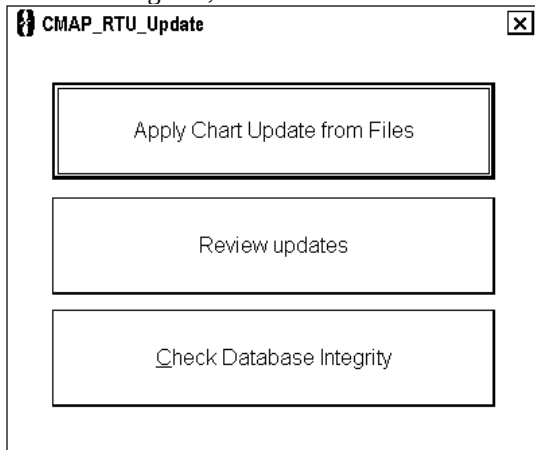
- + HO Latvijas Hidrogrāfijas Dienests (Latvia)
- + HO Hydrographic Office (UK)
- + HO Instituto Hidrografico, Portugal
- + HO Norwegian Hydrographic Service
- + HO Instituto Hidrográfico de la Marina (Spain)
- + HO Bundesamt für Seeschifffahrt und Hydrographie (Germany)
- + HO National Imagery and Mapping Agency (USA)
- + HO Maritime Safety Administration (China)
- HO Merenkukuhallitus, Merikarttaosasto (Finland)
 - + 953 Z12A03U0
 - + 900A Z12A35BA
 - + 900B Z12A35BB
 - 921 Z12A48U0

Book Update Number: 000, Ed Num: 1, Ed Date: 10.05.2006, Number Of Updates: 47, Source ID: 13

- RECTRC [12053] Added: Moved:
- RECTRC [2220] Modified:
- RECTRC [2226] Modified:
- RECTRC [2232] Modified:
- RECTRC [2277] Modified:
- RECTRC [2323] Modified: (outside of the coverage)

5. Click the X button.

6. In RTU dialog box, click the X button.



CMAP_RTU_Update

Apply Chart Update from Files

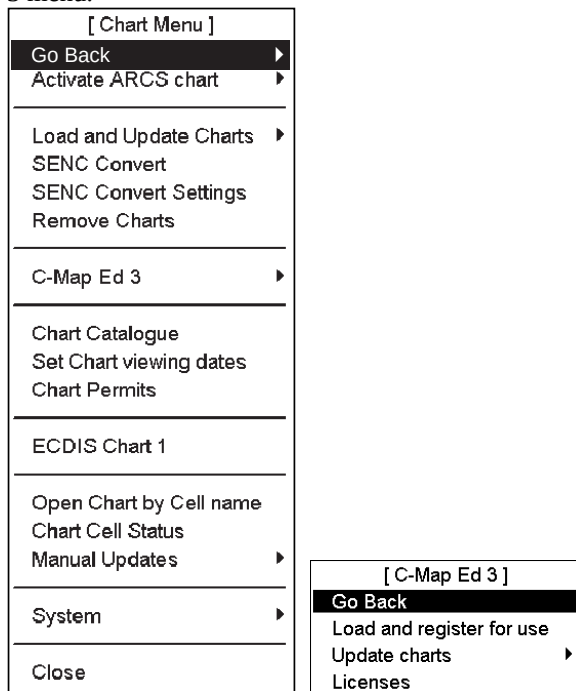
Review updates

Check Database Integrity

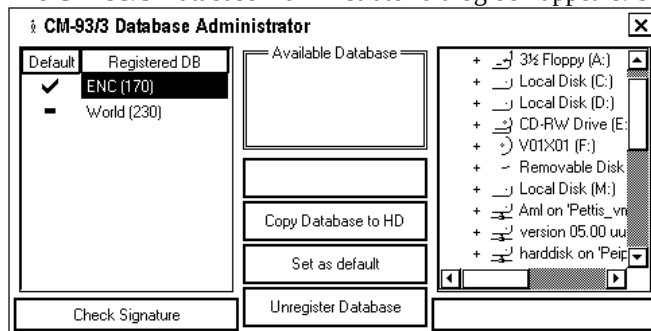
A4.8 Removing CM93/3 Charts

You can remove CM93/3 charts from ECDIS using Unregister. This will remove license and entire database from ECDIS.

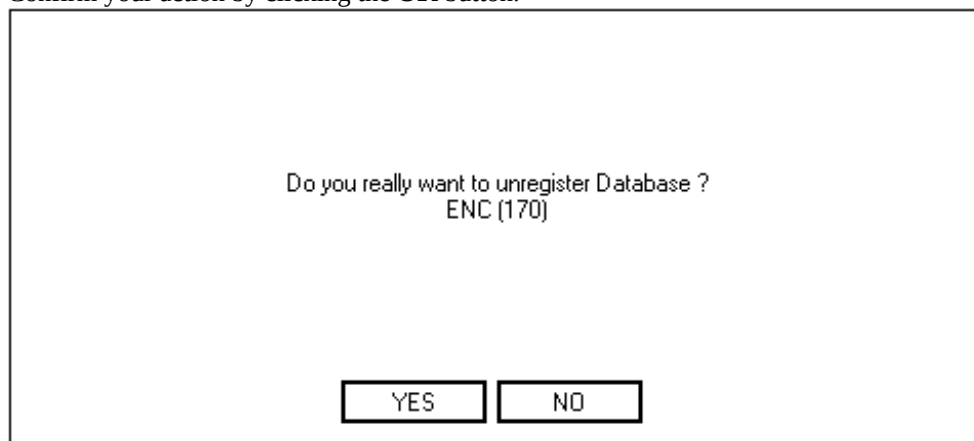
1. Open the Chart menu and select C-MAP Ed 3 from the menu. Select Load and register for use from the C-MAP Ed 3 menu.



2. The CM-93/3 Database Administrator dialog box appears. Select desired database.



3. Confirm your action by clicking the **OK** button.



4. Close CM-93/3 Database Administrator dialog box by clicking X sign in upper right corner.

This page intentionally left blank.

Appendix 5:

C-MAP CM-93/2 Charts

A5.1 C-MAP Charts

A5.1.1 Introduction

This electronic chart system is also compatible with C-MAP vector chart format CM-93 charts, available from C-MAP Norway A/S. This material is used like Hydrographic Offices S57ed3 charts, but it doesn't have ENC status as defined by IMO, IHO and IEC and thus it cannot be used to replace paper charts.

CM-93 format is encrypted to prevent unauthorised use, therefore the operator needs an authorisation code to view any CM-93 chart. This authorisation code is entered manually.

Before any CM-93 chart can be used in the ECDIS, it is loaded into your hard disk and converted into the system's own internal format (SENC). CM-93 charts can be updated only by loading a newer complete set of CM-93 charts. CM-93 chart material is stored into two CD ROMs.

For further details on CM-93 charts, see Chapter 8 Vector Chart Material.

Note: SENC conversion must be done in the single workstation mode. For how to switch from multi-mode to single mode, see the procedure in section 18.5.1 Changing mode to single or multi workstation. Further, to turn the radar overlay off, see section 22.2 Activating Radar Overlay on the ECDIS.

A5.1.2 S57 chart legend with C-MAP charts

S57 chart legend	
Cell name	04140023
Navigational purpose	Approach
Issue date	19990115
Edition number	1
Last displayed update	000
Update issue date	19990115
Last update appl. date	
Projection	Mercator
Horizontal datum	WGS 84
Vertical datum	
Sounding datum	
Quality of data	
Magnetic var.	
Depth	metres
Height	metres

An example of chart legend with C-MAP chart

A5.2 Managing C-MAP charts

A5.2.1 Licensing system used by the C-MAP

The licensing system used with C-MAP is based on serial numbered CD ROMs and authorisation codes received from C-MAP Norway A/S. You choose either required C-MAP areas or zones and your electronic chart system generates an operator code based on your selection, the serial number of the serial numbered C-MAP CD ROM and the hardware identifier of your electronic chart system. You send the operator code to C-MAP Norway A/S and they send to you an authorisation code. You enter the received authorisation code into the system then you can load and convert the CM-93 charts into your system.

A5.2.2 Getting started with C-MAP charts

1. Choose automatic conversion into the SENC and setting of Display and Approve update dates automatically. See section 8.4.2 Choosing automatic SENC conversion and displaying until date
2. Define your subscription of C-MAP charts. See section A5.2.4 Defining subscription of C-MAP charts.
3. Load C-MAP charts by CD ROM catalogue. See section A5.2.5 Loading C-MAP charts from a CD ROM into the system.

A5.2.3 Keeping C-MAP charts up to date

At regular intervals C-MAP will reissue its charts to keep them up-to-date. There are neither edition number nor update number in C-MAP charts, so the system recognises changed charts using issue date of the chart.

The procedure for loading the reissue is the same as loading of the C-MAP charts for the first time. If loaded chart is already in the hard disk with older issue date, the system loads chosen newer chart automatically. Other possible messages when loading C-MAP charts are explained in the section A5.2.5 Loading C-MAP charts from a CD ROM into the system.

If you get a new release of a C-MAP CD ROM, do the following:

1. On the Chart menu, turn off automatic SENC conversion and turn on Automatic Display Until.
2. Load C-MAP charts by CD ROM catalogue. See section A5.2.5 Loading C-MAP charts from a CD ROM into the system.

A5.2.4 Defining subscription of C-MAP charts

Before you can be an authorized operator of C-MAP charts you must do the following:

1. Purchase CD ROM(s) of C-MAP from your chart agent.
2. Load serial number of C-MAP into the ECDIS.
3. Choose charts that you want to use in the ECDIS, by zones or areas.
4. Generate operator code. This code is used to identify your chart folio for the producer of C-MAP.
5. Send operator code to your chart agent.

Based on operator code information, the producer of C-MAP charts is able to generate permission for the charts you have chosen. You will receive an authorization code from the producer of C-MAP charts.

After receiving an authorization code, do the following:

1. Enter authorization code into the ECDIS.
2. Use the function "Load by CD ROM catalogue" to choose which chart to load.
3. Build a group of required C-MAP charts.
4. Load C-MAP charts using the function "View loaded CD ROM catalogue".

Loading serial number of CD ROM

Each CD ROM has an individual serial number that is used to identify the operator of C-MAP charts. In order to load the serial number into the ECDIS, do the following:

[Chart Menu]

- Go Back
- Activate ARCS chart
- Load and Update Charts
- SENC Convert
- SENC Convert Settings
- Remove Charts
- C-Map Ed 3
- Chart Catalogue
- Set Chart viewing dates
- Chart Permits
- ECDIS Chart 1
- Open Chart by Cell name
- Chart Cell Status
- Manual Updates
- System
- Close

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Chart Permits from the menu then push the scrollwheel.

Permit Management

Select All Clear Public Key

Cell Expires Type Edit

Non-HO

Remove

Load File

Backup

Enter Man.

3. Click the **Non-HO** button to show the following window.

NON-HO User Code

☒ Zones ☐ Areas

Selected Not Selected

1//0

2//0

3//0

4//0

5//0

6//0

7//0

8//0

User / Auth Code

Load CD Ser No NVLD

Create User Code 000000000000000000

Enter Auth Code 000000000000000000

4. In the NON-HO User/Auth Code window, click the **Load CD Ser no.** button.
5. Insert your C-MAP CD ROM in the CD ROM-drive and choose desired drive.

Load and Update Charts from CD-ROM

Insert CD into drive or locate from network using Browse. Loading Serial Number will reset your current CMAP portfolio

Load Dir:

D:\

Browse Done

Default load dir

Reset Set

NON-HO User Code

☒ Zones ☐ Areas

Selected Not Selected

1//0

2//0

3//0

4//0

5//0

6//0

7//0

8//0

User / Auth Code

Load CD SerNo XXXX

Create User Code XXXXXXXXXXXXXXXXXXXX

Enter Auth Code 000000000000000000

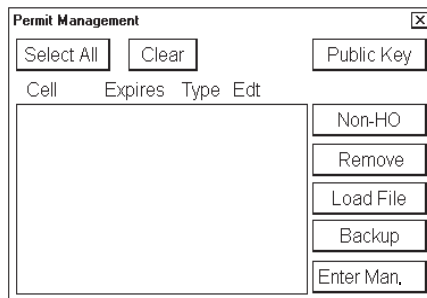
6. The CD ROM serial number is shown in the SerNo field.

Defining subscription by zones

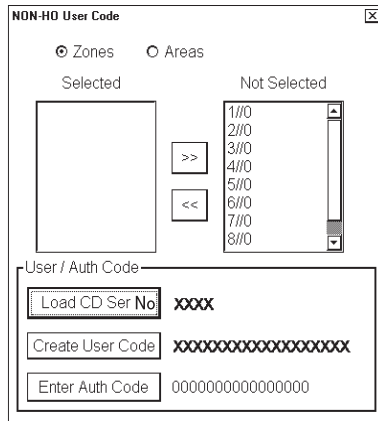
The contents of the CD ROM are divided into nine zones (1/0 - 9/0) and each zone has been divided in various numbers of areas (1/1 - 1/16...9/1 - 9/2). A various number of charts are included into each area. You can specify the charts you want to have in your chart folio either by zones or by areas.

To define subscription by zones, do the following:

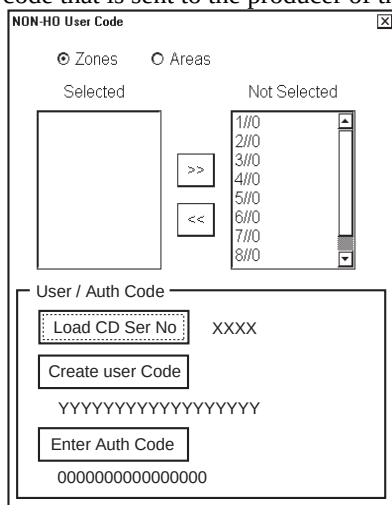
1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Chart Permits from the menu then push the scrollwheel.



3. Click the **Non-HO** button to show the following window.



4. Click the **Zones** radio button.
5. Highlight desired zones in the Not Selected box then click << button to move them into the Selected list box.
6. To create operator code for chosen zones, click the **Create User Code** button. The ECDIS generates an operator code that is sent to the producer of the C-MAP charts.



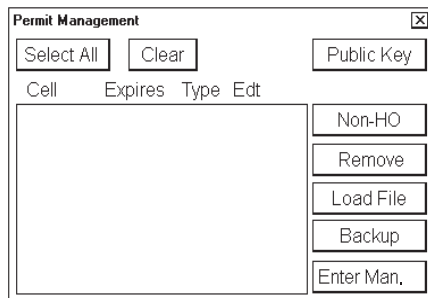
7. The operator code is shown in the Create User Code field.

Defining subscription by areas

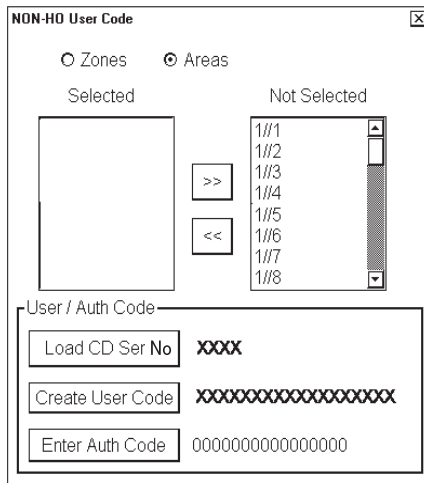
The contents of a CD ROM are divided into nine zones (1/0 - 9/0) and each zones has divided various number of areas (1/1 - 1/16 ... 9/1 - 9/2). The various number of charts are included by Area. You can define a chart you would like to have in your chart folio either by zones or by areas.

To define subscription by areas, do the following:

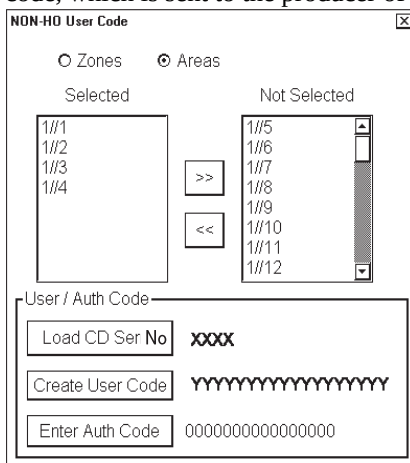
1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Chart Permits from the menu then push the scrollwheel.



3. Click the **Non-HO** button to show the following window.



4. Click the **Areas** radio button.
5. Highlight desired zones in the Not Selected box then click << button to move them into the Selected list box.
6. To create operator code for chosen zones, click the **Create User Code** button. The ECDIS generates a operator code, which is sent to the producer of the C-MAP charts.

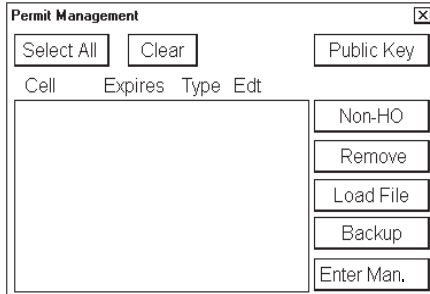


7. The operator code is shown in the Create User Code field.

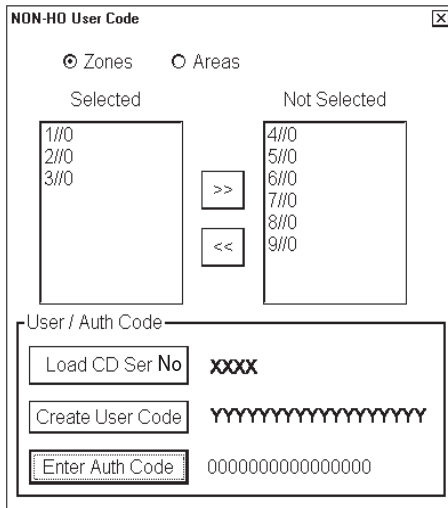
Entering authorisation code

An authorisation code allows you to define your subscription to C-MAP. Based on your operator code you receive an authorisation code from C-MAP. You have to enter this string into the ECDIS, following the procedure below.

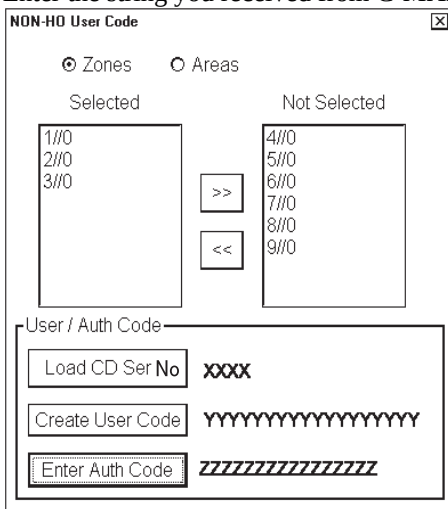
1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Chart Permits from the menu then push the scrollwheel.



3. Click the **Non-HO** button to show the following window.



4. Click the **Enter Auth Code** button.
5. Enter the string you received from C-MAP.

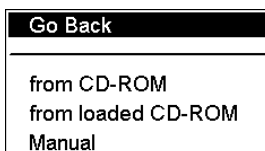
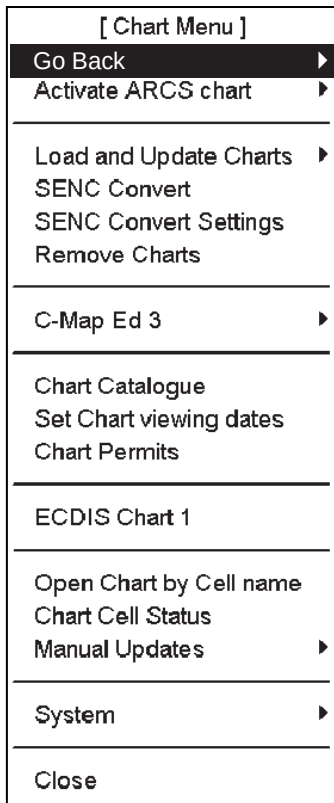


6. After entering authorisation code, you are ready to load and view desired charts into the ECDIS.

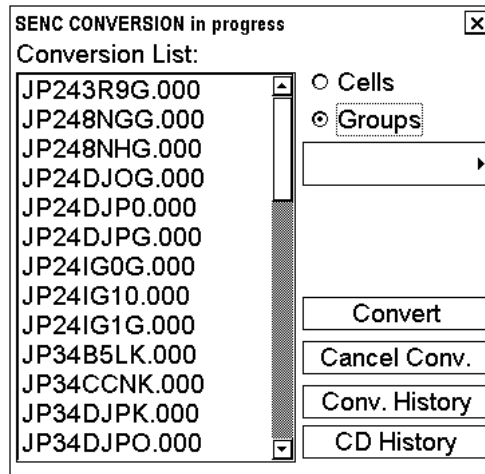
A5.2.5 Loading C-MAP charts from a CD ROM into the system

When you load C-MAP charts by CD ROM catalogue, the system first loads a CD ROM catalogue, which stores certain information into your hard disk such as cells ID, their position and edition number, from your LAN (Local Area Network) connection, floppy disk or CD ROM. After that the system asks which charts you want to load from the CD ROM.

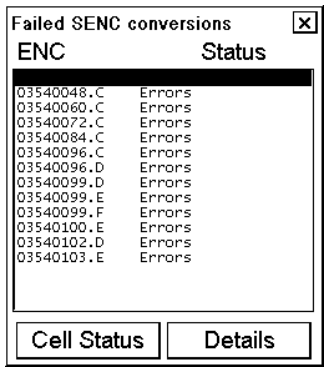
To load by CD ROM catalogue do the following:



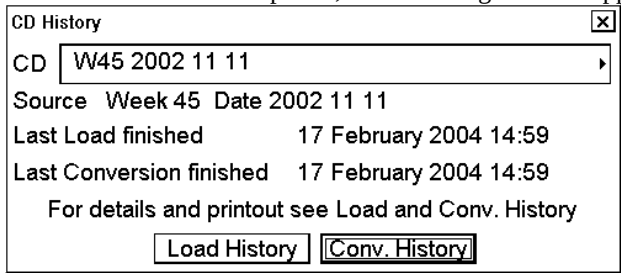
1. Insert CD ROM or floppy disk to drive. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Load and Update Charts from the menu and "from CD ROM" from the sub menu (see figure below).
3. The ECDIS loads content summary, publisher notes and Product List from the CD ROM then opens the Load or Update Charts loaded from CD ROM dialog box.
4. Uncheck "Missing only" then click the **Load** button. The system automatically copies all text and pictures files associated with charts from the CD ROM catalogue.
5. Charts are loaded into ECDIS then automatically converted to SENC format and the SENC Convert window appears.



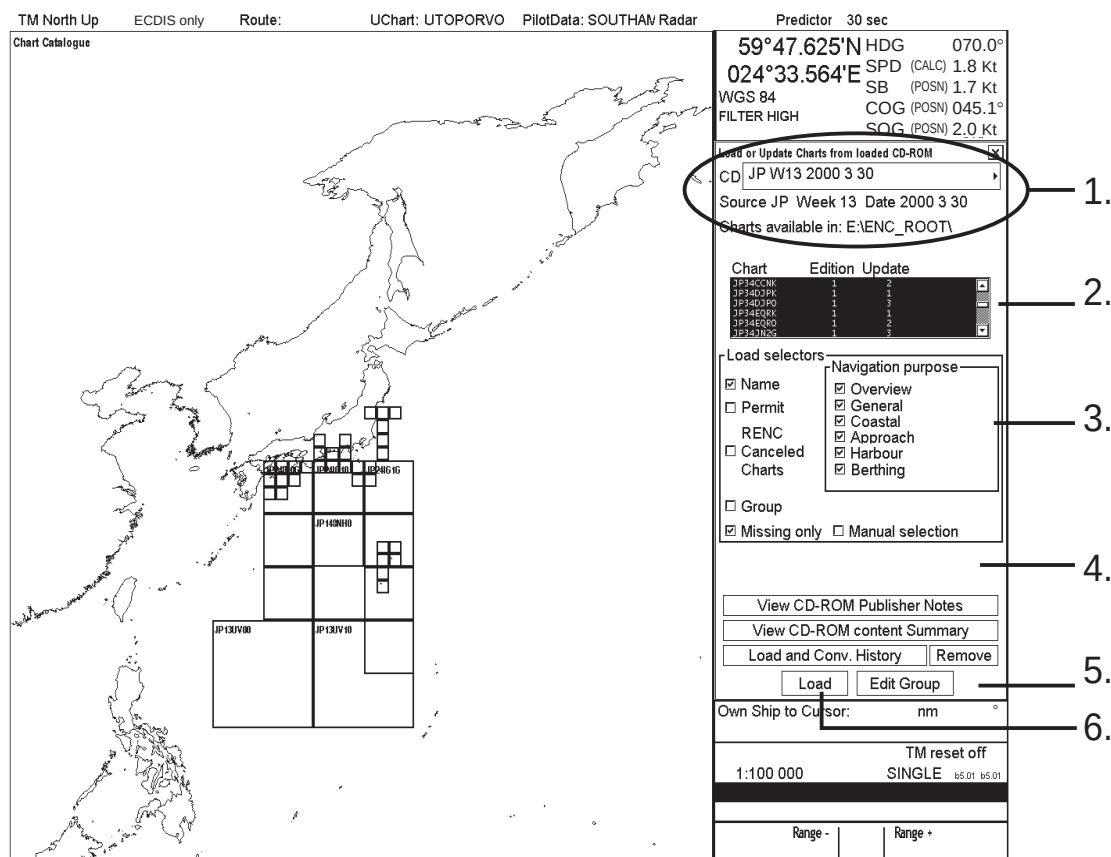
6. If an error is detected during conversion from ENC to SENC, the following window appears. To find the reason click the **Details** button.



7. When conversion is completed, the following window appears.



Interpretation of Load or Update Charts from loaded CD ROM window



1. The source and edition date of the CD is displayed here.
2. A list of charts stored in the CD ROM, edition number of the chart and the number of updates included in the chart.
3. In the **Load Selector** field, you can choose how to pick desired charts from the list:
 - **Name:** ECDIS will display chart names on graphical presentation if selected.
 - **Permit:** ECDIS will highlight the charts which are available in the CD ROM and for which you have permits.
 - **RENC Canceled Charts:** ECDIS will display charts on display, which are canceled on RENC and normally on CD-ROM.
 - **Group:** If you have predefined a group of charts, ECDIS will highlight those charts in the group, which are available in the CD ROM.
 - **Manual Selection:** You can highlight desired charts from the list.
 - **Missing only,** loads and displays on graphical presentation only charts and their updates, which are not already loaded into the ECDIS.
4. **View CD ROM Publisher Notes** button is used to view important notices published by chart producer, **View CD ROM content Summary** button is used to list charts available on CD-ROM and **Load and Conv. History** button check what is loaded and converted from the CD ROM. The **Remove** button is used to remove the CD ROM catalogue permanently from the ECDIS.
5. The **Edit Group** button is used to create and modify group. For more information, see section A5.2.7 Grouping S57 chart cells.
6. The **Load** button is used to start loading.

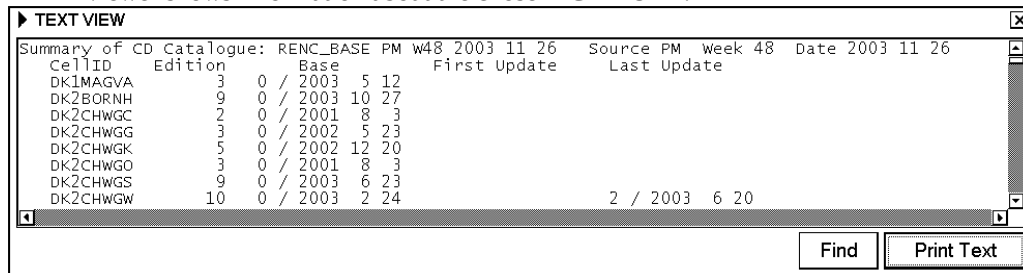
Note: The system can make conversion into the SENC and set the "Display Until" date automatically. This is the recommended way. For how to do this, see section 8.4.2 Choosing automatic SENC conversion and displaying until date.

Viewing CD ROM contents summary

You can view the Summary of the contents of the CD ROM. It contains information about charts you are going to load.

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Load and Update Charts from the menu and "from CD ROM" from the sub menu. Click the **Load** button.
3. Click the **View CD ROM content Summary** button.

A viewer shows information about the chosen "CD ROM".



Summary of CD Catalogue: RENC_BASE PM w48 2003 11 26 Source PM Week 48 Date 2003 11 26

CellID	Edition	Base	First Update	Last Update
DK1MAGVA	3	0 / 2003	5 12	
DK2BORNH	9	0 / 2003	10 27	
DK2CHWGC	2	0 / 2001	8 3	
DK2CHWGG	3	0 / 2002	5 23	
DK2CHWGG	5	0 / 2002	12 20	
DK2CHWGO	3	0 / 2001	8 3	
DK2CHWGS	9	0 / 2003	6 23	
DK2CHWGW	10	0 / 2003	2 24	

2 / 2003 6 20

Find Print Text

Each row contains:

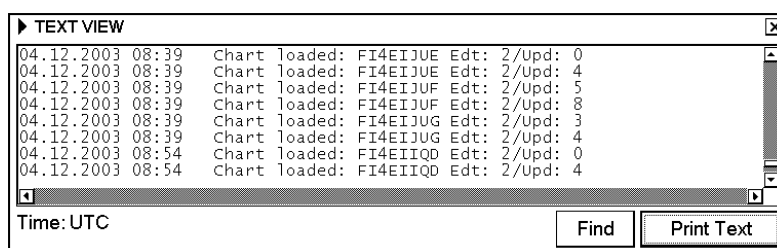
- Cell ID: Name of the chart
- Edition: Edition number of the chart
- Base: Included update number and issue date of Base cell of the chart
- First Update: Update number and issue date of the first update included
- Last Update: Update number and issue date of the last update included

4. If you want to make a hard copy of the Publisher Notes, click the **Print Text** button.
5. To close this window, click the X in the upper right corner.

Viewing load history of CD ROM

You can view what is loaded from a CD ROM using the Load History in Load or Update Charts from CD ROM.

1. Spin the scrollwheel to show Menu/Info/Chart Menu in the mouse functions area then push the right mouse button.
2. Choose Load and Update Charts from the menu and "from CD ROM" from the sub menu. Choose desired CD ROM from the list of CD ROMs.
3. Click the **Load and Conv. History** button.
4. A window that looks something like the one below appears.



Time: UTC

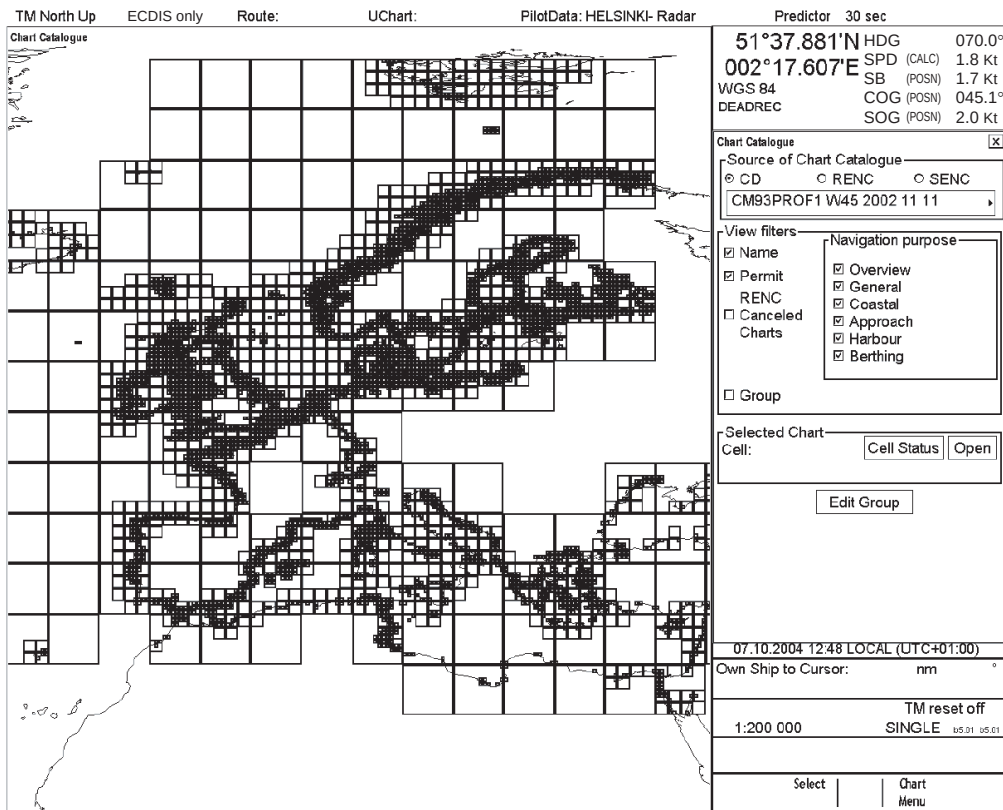
04.12.2003 08:39	Chart loaded: FI4EIJUE Edt: 2/Upd: 0
04.12.2003 08:39	Chart loaded: FI4EIJUE Edt: 2/Upd: 4
04.12.2003 08:39	Chart loaded: FI4EIJUE Edt: 2/Upd: 5
04.12.2003 08:39	Chart loaded: FI4EIJUE Edt: 2/Upd: 8
04.12.2003 08:39	Chart loaded: FI4EIJUG Edt: 2/Upd: 3
04.12.2003 08:39	Chart loaded: FI4EIJUG Edt: 2/Upd: 4
04.12.2003 08:54	Chart loaded: FI4EIIQD Edt: 2/Upd: 0
04.12.2003 08:54	Chart loaded: FI4EIIQD Edt: 2/Upd: 4

Find Print Text

5. You can verify which charts are already loaded from the CD ROM.

A5.2.6 Catalogue of S57 cells with C-MAP charts

A S57 catalogue is used to view your cells stored into your hard disk or named "CD ROM catalogues". You view limits of cells in the S57 catalogue window. It is possible to pick any cell to see information for it (cell, update's number) by going over its limit with the cursor.



1. Source of Chart Catalogue

- **CD ROM:** Display charts available in a named "CD ROM".
- **RENC:** Display charts available from an RENC.
- **SENC:** Display charts stored in your hard disk in SENC format.

2. View Filters

- **Name:** Display also cell names in graphical coverage display.
- **Permit:** Display only charts for which you have permit.
- **RENC Cancelled Charts:** Display charts, which are cancelled in an RENC.
- **Group:** Display charts, which are member of selected group.
- **Navigation purpose:** Display charts for chosen navigation purpose (overview, general, coastal, approach, harbour, berthing).

3. Selected Chart

- **Cell:** Name of the chart
- **Cell Status:** Opens Cell Status window.
- **Open:** Opens selected chart to ECDIS display.

4. Group: For further details, see the next section.

A5.2.7 Grouping S57 chart cells

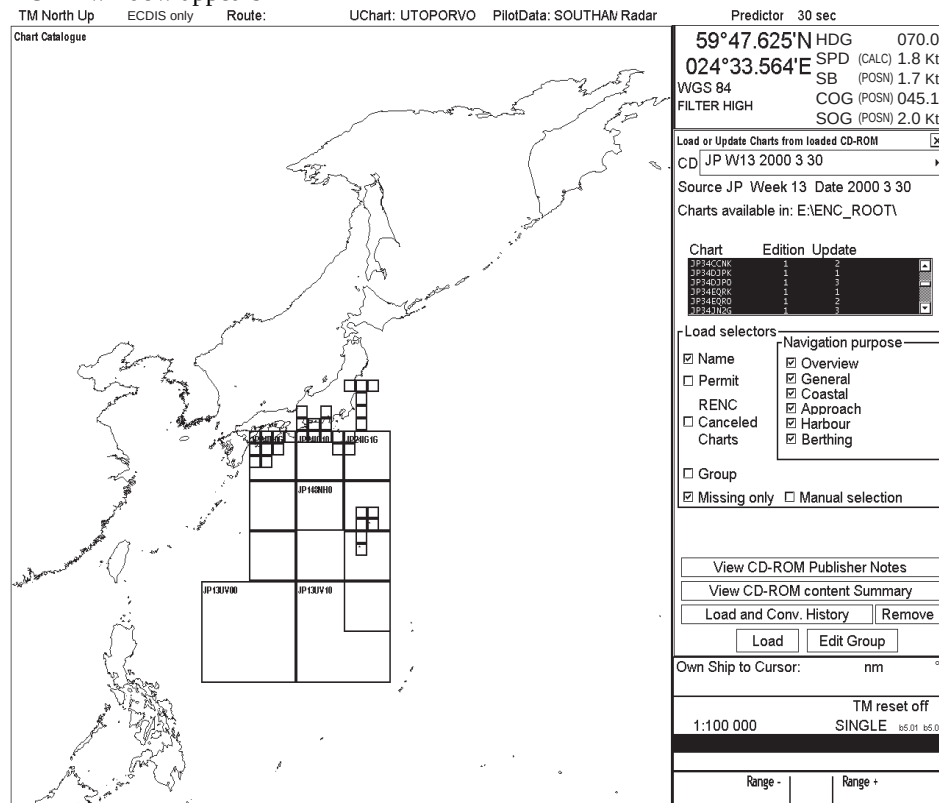
You can define groups of S57 charts. This means you can collect related charts, for example, all cells that cover a route from Liverpool to New York or all cells available from a National Hydrographic Office.

You can make a group and define charts included to group using either "Chart Catalogue" or "Load or Update Charts from loaded CD ROM" window.

Using Load or Update Charts from loaded CD ROM window

When you load or update S57 charts from CD ROM, you are able to define a group in "Load or Update Charts from loaded CD ROM" window. To do this, proceed as follows:

1. Select Load or Update charts>From CD ROM in Chart menu. A "Load or Update Charts from loaded CD ROM" window appears



2. Press the **Edit Group** button.
3. Press the **New** button.
4. Enter group name.

5. Press the **Add Frame** button.

TM North Up ECDIS only Route: UChart: PilotData: HELSINKI- Radar Predictor 30 sec Non ENC Data

Chart Catalogue

54°04.431'N HDG 070.0°
005°21.315'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
DEADREC COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM [X]
CD JP W13 2000 3 30
Source JP Week 13 Date 2000 3 30
Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
JP130000	1	1
JP130010	1	1
JP140000	1	2
JP140010	1	2
JP140020	1	4
JP140030	1	5

Load selectors - Navigation purpose

☒ Name ☒ Overview
☐ Permit ☒ General
☐ RENC ☒ Coastal
☒ Canceled ☒ Approach
☐ Charts ☒ Harbour
☒ Berthing

☐ Group ALL
☒ Missing only ☐ Manual selection

Edit group

Inside	Outside
JP130000	JP130000
JP130010	JP130010
JP140000	JP140000
JP140010	JP140010
JP140020	JP140020
JP140030	JP140030

Add Frame Close edit
New Group Remove Group

Own Ship to Cursor: nm

TM reset off
1:500 000 SINGLE 05.01 05.01

Show Value Nav Marks

6. Use the trackball to define frame then push the left mouse button.

TM North Up ECDIS only Route: UChart: PilotData: HELSINKI- Radar Predictor 30 sec Non ENC Data

Chart Catalogue

59°47.625'N HDG 070.0°
024°33.564'E SPD (CALC) 1.8 Kt
WGS 84 SB (POSN) 1.7 Kt
FILTER HIGH COG (POSN) 045.1°
SOG (POSN) 2.0 Kt

Load or Update Charts from loaded CD-ROM [X]
CD JP W13 2000 3 30
Source JP Week 13 Date 2000 3 30
Charts available in: E:\ENC_ROOT\

Chart	Edition	Update
JP130000	1	1
JP130010	1	1
JP140000	1	2
JP140010	1	2
JP140020	1	4
JP140030	1	5

Load selectors - Navigation purpose

☒ Name ☒ Overview
☐ Permit ☒ General
☐ RENC ☒ Coastal
☐ Canceled ☒ Approach
☐ Charts ☒ Harbour
☒ Berthing

☐ Group JAPAN
☒ Missing only ☐ Manual selection

Edit group

Inside	Outside
JP130000	JP130000
JP130010	JP130010
JP140000	JP140000
JP140010	JP140010
JP140020	JP140020
JP140030	JP140030

Done Cancel

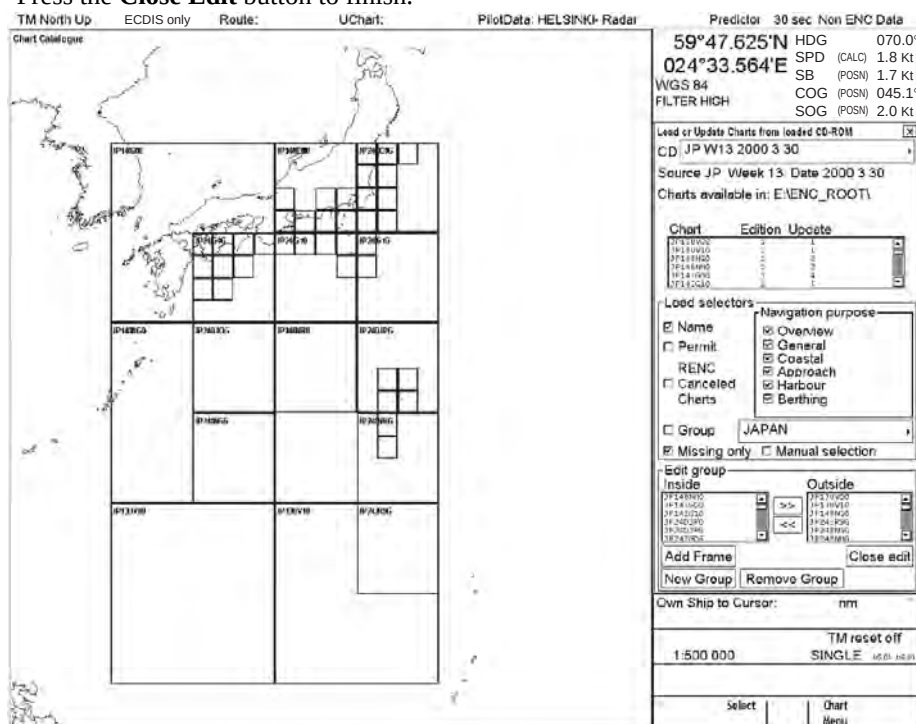
Own Ship to Cursor: nm

TM reset off
1:500 000 SINGLE 05.01 05.01

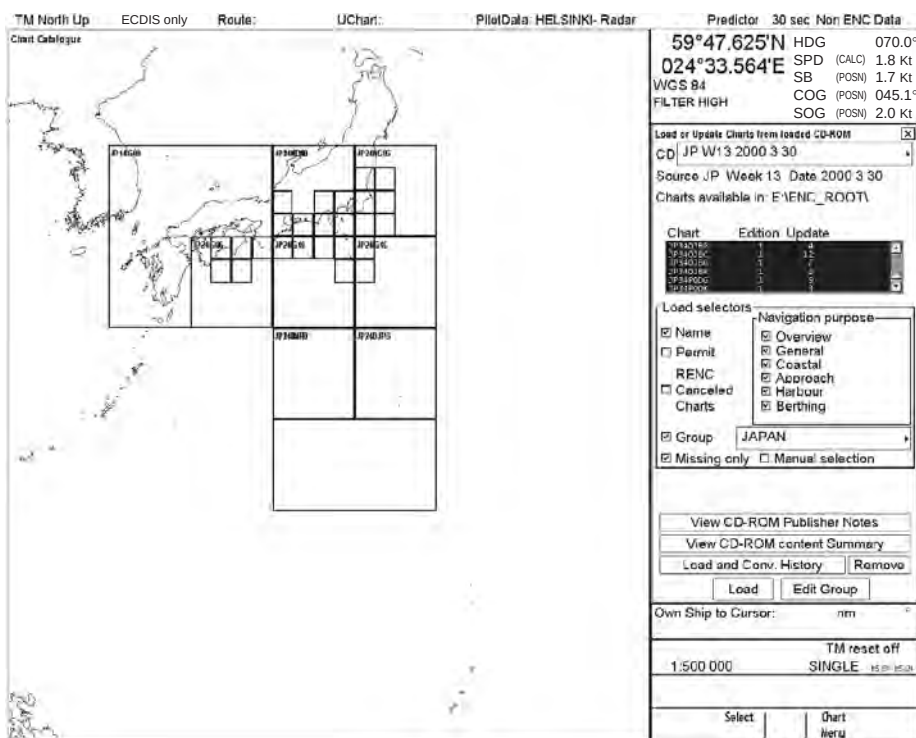
Select Chart Menu

7. Click the **Done** button.

8. Press the **Close Edit** button to finish.



9. Choose the group to load.

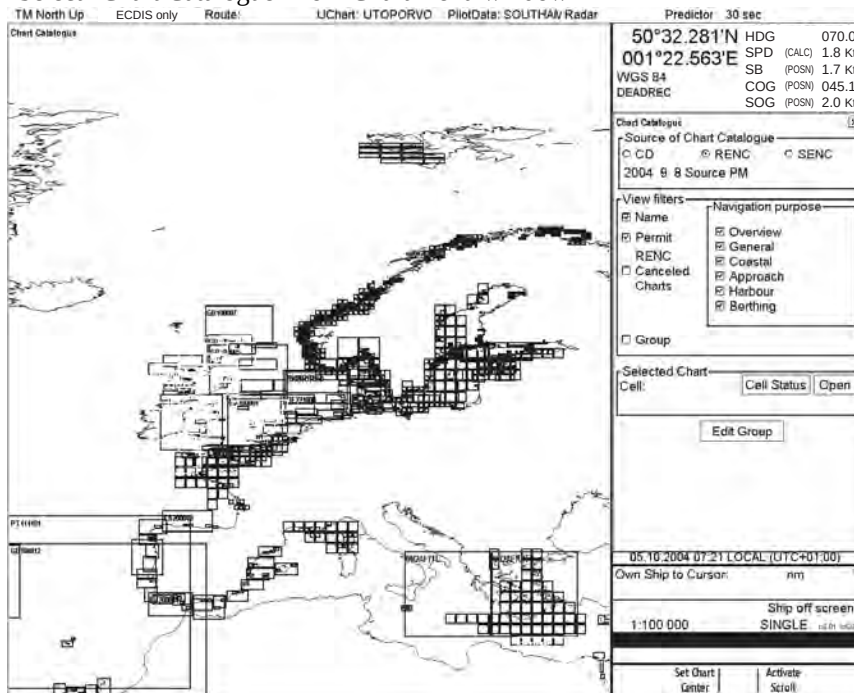


10. Press the **Load** button to load chart.

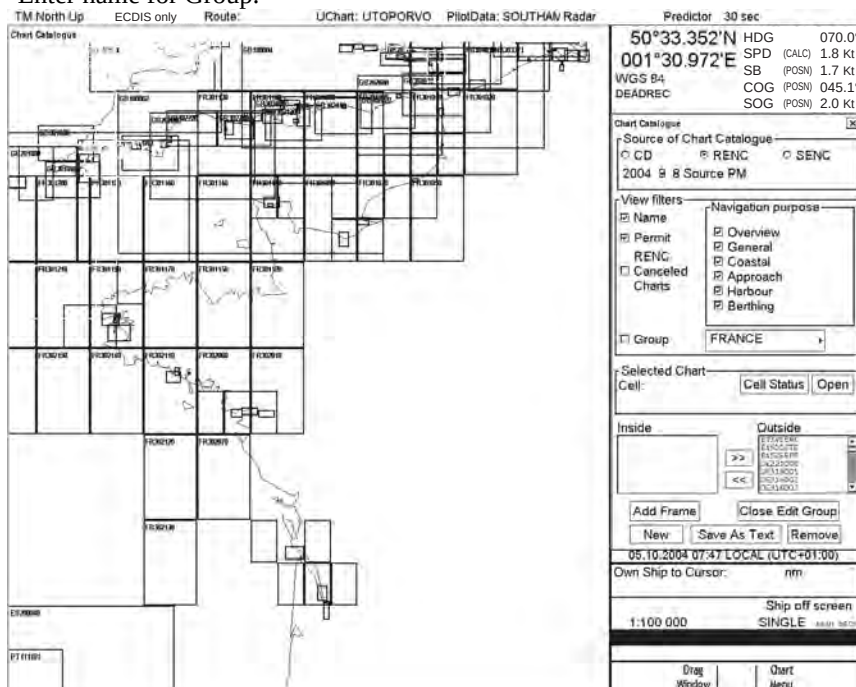
Using Chart catalogue window

Chart Catalogue can be used to define a group as follows:

1. Select "Chart Catalogue" from Chart menu window



2. Press the **Edit Group** button then click the **New** button.
3. Enter name for Group.

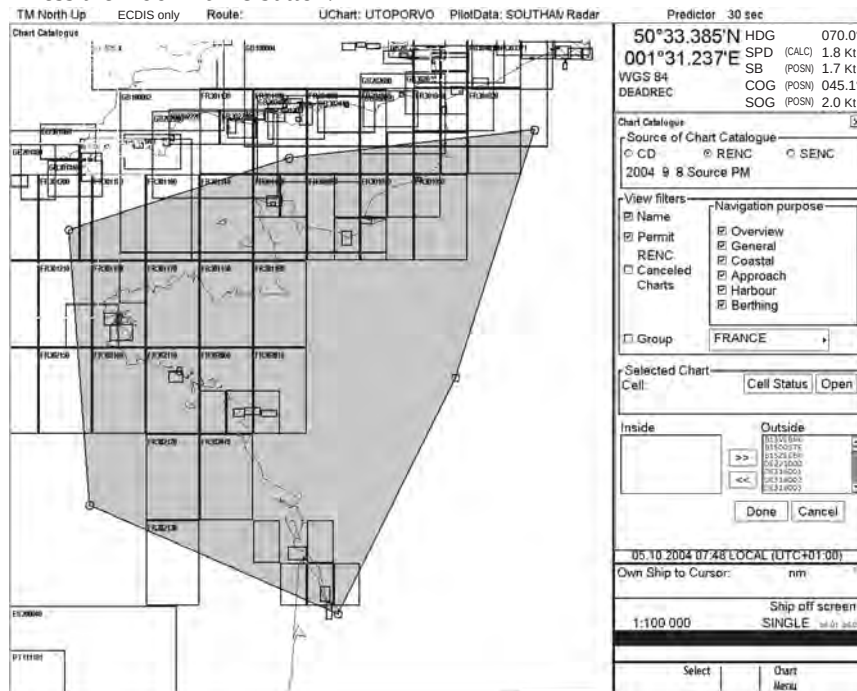


Text Input ✕

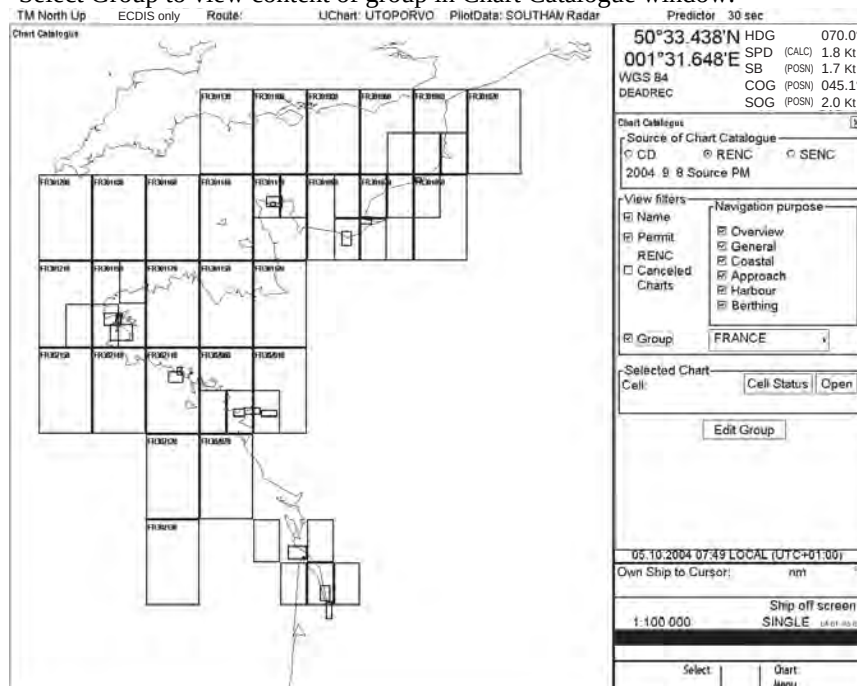
New Group Name

FRANCE

OK

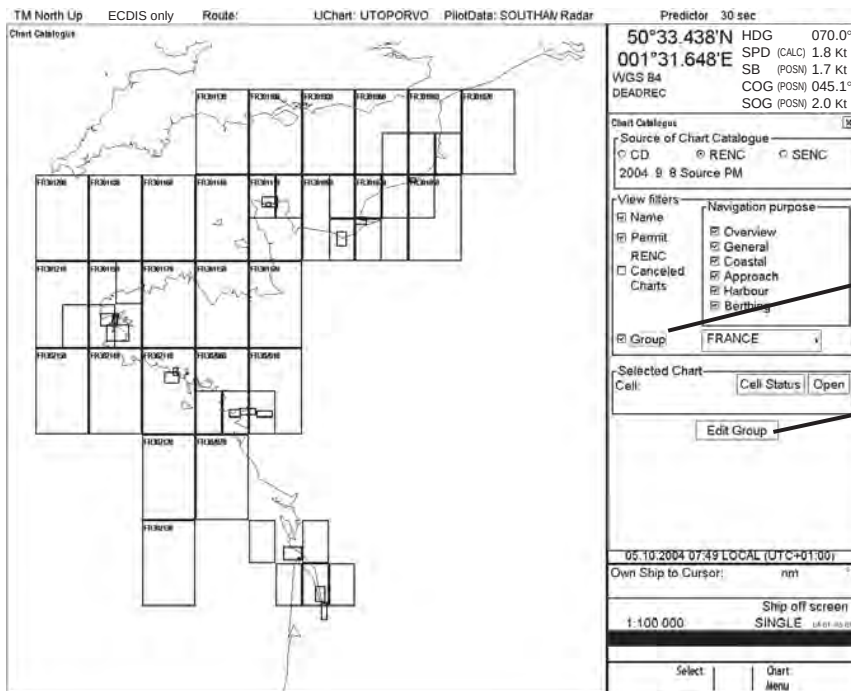
4. Press the **Add Frame** button.5. Define frame using left mouse button in "Select" mode then click the **Done** button.

6. Select Group to view content of group in Chart Catalogue window.



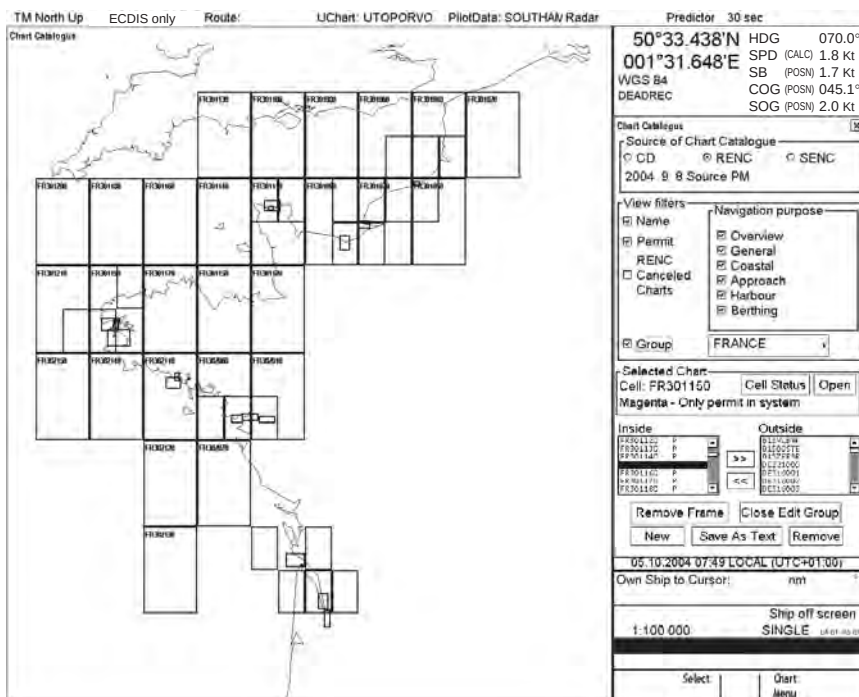
Removing S57 chart cells from a group

You can remove chart cells from a defined group as follows:



Select "Group" to activate a Group selection. Select desired group

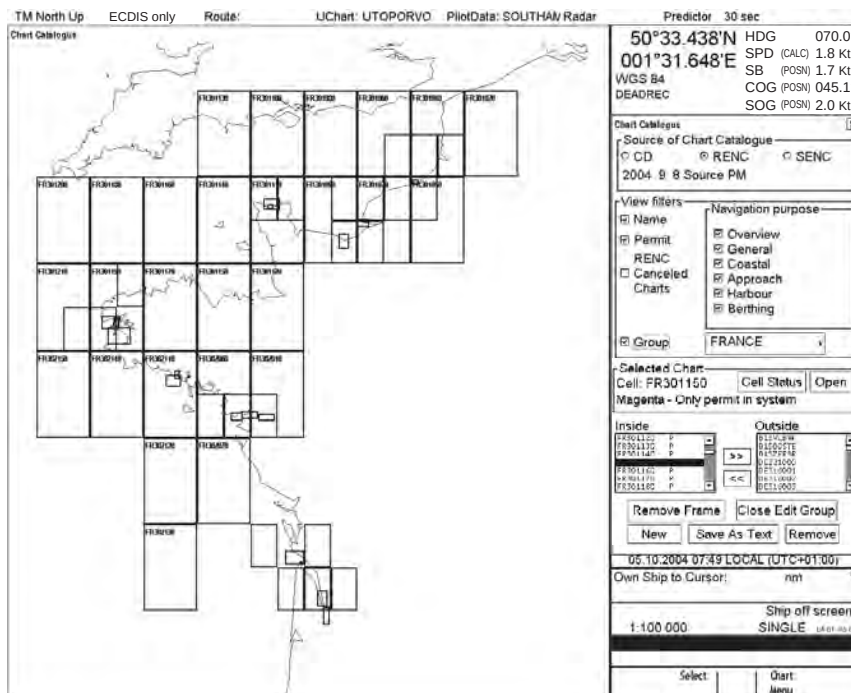
Press "Edit Group"



Use "Remove Frame" button, if you like to use Graphical gatalogue or pick individual cell using left mouse button "Select" and then click ">>>" button.

Deleting a group

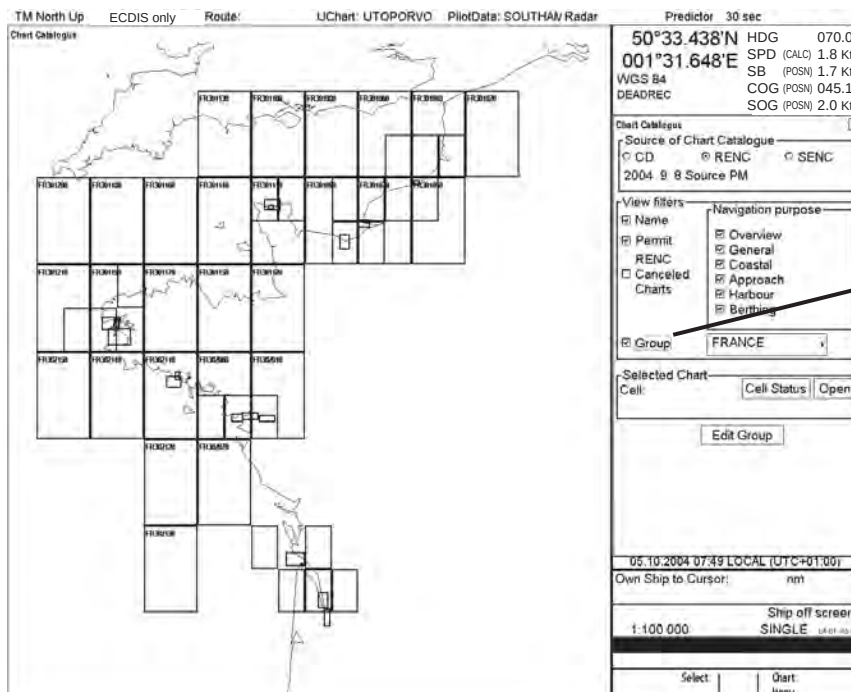
You can delete a defined group as follows:



Use "Remove" button to delete a group.

Viewing active group with catalogue

To view active group do the following:

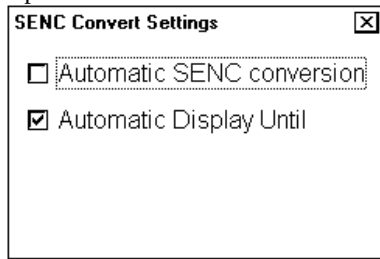


Select "Group" to activate a Group selection. Select desired group.

A5.2.8 Automatic display until setting

Display data may be set to system data automatically.

1. Open the Chart menu and choose SENC Convert Settings to show the following window.

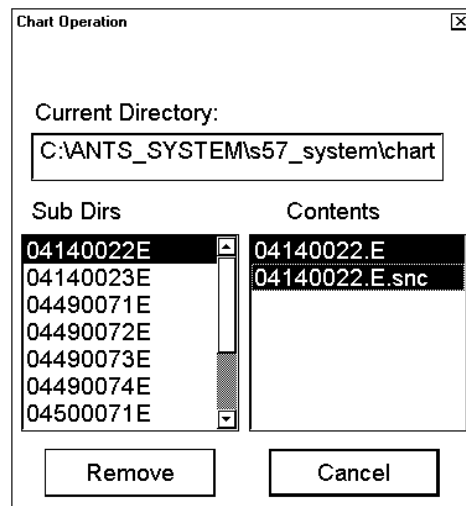


2. Check Automatic Display Until.

A5.2.9 Removing C-MAP charts from the system

To remove C-MAP charts from the system, do the following:

1. Open the Chart menu.
2. Choose Remove Charts from the menu then push the scrollwheel. The window shown right appears.
3. Choose desired chart cells to remove them from the system. You can remove native data (A, B, CD ROM; E, F or Z) or SENC format (snc).
4. Click the **Remove** button to remove selected C-MAP charts from your hard disk.



A5.2.10 Viewing status and date dependency of S57 chart cells and their updates

When you load S57 chart cell(s) and/or their updates, the system sets Display Until of S57 chart cell(s) as current date of the system. To set Approve Until as current date of the system, you must open the Set Chart viewing dates window and set it there. You can view status and date dependency of S57 chart cells and their updates as follows:

[Chart Menu]

Go Back ▶

Activate ARCS chart ▶

Load and Update Charts ▶

SENC Convert

SENC Convert Settings

Remove Charts

C-Map Ed 3 ▶

Chart Catalogue

Set Chart viewing dates

Chart Permits

ECDIS Chart 1

Open Chart by Cell name

Chart Cell Status

Manual Updates ▶

System ▶

Close

1. Open the Chart menu, choose Set Chart viewing dates from the menu then push the scrollwheel.
2. The Set Chart viewing date window appears.

Chart viewing dates

Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displ. until	Updates Approv. until
FI3EITR1	1/ 3	1/ 3	2005 3 10 (-)	2005 3 10 (-)
FI49IHMJ	2/ 10	2/ 10	2005 3 10 (-)	2005 3 10 (-)
FI49IHMK	2/ 3	2/ 3	2005 3 10 (-)	2005 3 10 (-)
FI49IHML	2/ 9	2/ 9	2005 3 10 (-)	2005 3 10 (-)
FI49IHMS	2/ 1	2/ 1	2005 3 10 (-)	2005 3 10 (-)
FI4EIGII	1/ 3	1/ 3	2005 3 10 (-)	2005 3 10 (-)
FI4EIGID	2/ 4	2/ 4	2005 3 10 (-)	2005 3 10 (-)
FI4EIGIK	2/ 2	2/ 2	2005 3 10 (-)	2005 3 10 (-)
FI4EIGIL	2/ 4	2/ 4	2005 3 10 (-)	2005 3 10 (-)
FI4EIHMI	1/ 7	1/ 7	2005 3 10 (-)	2005 3 10 (-)
FI4EIHMM	2/ 4	2/ 4	2005 3 10 (-)	2005 3 10 (-)
FI4EIHNN	1/ 6	1/ 6	2005 3 10 (-)	2005 3 10 (-)
FI4EIHMO	1/ 11	1/ 11	2005 3 10 (-)	2005 3 10 (-)
FI4EIHMP	1/ 12	1/ 12	2005 3 10 (-)	2005 3 10 (-)
FI4EIHMQ	1/ 6	1/ 6	2005 3 10 (-)	2005 3 10 (-)
FI4EIHMR	2/ 4	2/ 4	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQN	1/ 3	1/ 3	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQO	1/ 3	1/ 3	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQP	1/ 4	1/ 4	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQQ	1/ 10	1/ 10	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQR	3/ 13	3/ 13	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQS	2/ 16	2/ 16	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQT	2/ 11	2/ 11	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQU	2/ 11	2/ 11	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQV	1/ 4	1/ 4	2005 3 10 (-)	2005 3 10 (-)
FI4EIIQW	1/ 5	1/ 5	2005 3 10 (-)	2005 3 10 (-)

Latest RENC Product List 2005 2 23 Source PM

Oldest date 2005 3 10 2005 3 10

Newest date 2005 3 10 2005 3 10

Manual Updates 2005 3 10 2005 3 10

Display Until Approve Until

☒ Sync Manual Update Dates

☒ All SENCs

Recommended settings in this window are:

- Sync Manual Update Dates: ON position
- All SENCs: ON position

RENC edt / upd: The "RENC" column contains edition/update status from Product List.

SENC edt / upd: The "SENC" column contains edition/update status from "SENC", i.e., loaded and converted in the ECDIS.

Updates displ. until: View the date until updates is displayed. You can enter desired date by using the Display Until input box. The number after date shows the number of updates done for the displayed cell (number of displayed updates/number of updates in SENC format).

Updates approv. until: View the date until updates is approved. You can enter desired date by using the Approve Until input box (number of approved updates/number of updates in SENC format).

This page intentionally left blank.

Appendix 6: Route Backup

A6.1 Route Backup & Restore in ASCII Format

Sometimes it is useful to save some information about a route as an ASCII text file for use with some other application, or use some ASCII format-generated route in the ECDIS. ECDIS can generate an ASCII text file from a route. ECDIS can also generate a route from an ASCII text file. The following formats for route backup & restore are available:

ASCII PROPRIETARY

ASCII POSITION: List of Latitude/Longitude values

ASCII WPNAME POSITION: List of WP names and Latitude/Longitude

ASCII POSITION WPNAME: List of Latitude/Longitude and WP names

ASCII FULL: All route related information

ORION WEATH. ROUTING: compatible to import-export route information from/to Orion Pro

To make backup from a route in ASCII format, do the following:

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box.
2. Place the cursor on the triangle in the dialog box, choose Backup and Restore from the menu then push the scrollwheel.
3. In the Hard Disk field, choose desired file from the list box and desired backup format with Backup Format.
4. Choose backup drive from Drive in the Backup Device field. Click the **Backup** button to create backup file.

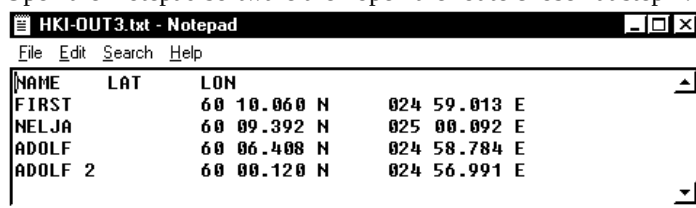
To restore a route, do the following:

1. Follow steps 1 and 2 above to open the Backup and Restore dialog box.
2. Choose desired Backup Format.
3. Choose backup drive in the Backup Device field and choose desired file with the list box in the same field.
4. Click the **Restore** button.

A6.1.1 Exporting ECDIS route data into an Excel file

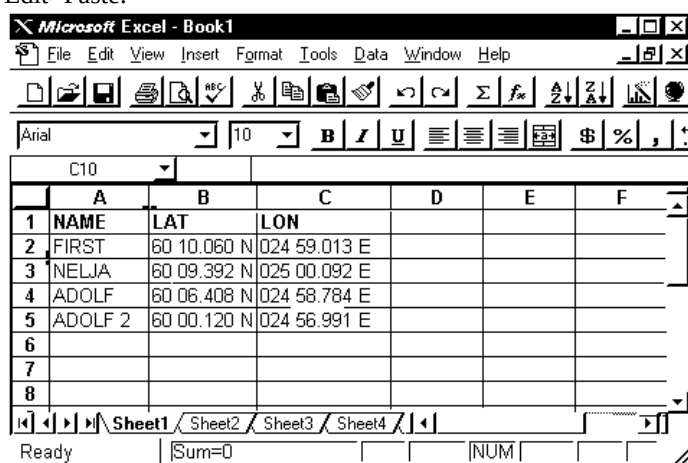
Below is an example of how to export waypoints' name and latitude/longitude values to a Microsoft Excel table.

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Place the cursor on the triangle in the dialog box, choose Backup and Restore from the menu then push the scrollwheel.
2. In the Hard Disk field, choose desired route then choose desired Backup Format (ASCII WPNAME POSITION).
3. Choose backup drive (A:\) from the Backup Device field then insert floppy disk in the processor unit of the ECDIS. Click the **Backup** button.
4. Move floppy disk to computer where you can run Notepad and MS Excel applications.
5. Open the Notepad software then open the route chosen at step 2.



Content of Notepad looks something like this.

6. Copy text to the clipboard: Edit>Choose All then Edit>Copy.
7. Open the MS Excel software. Open a new Excel file then copy text from the clipboard to the MS Excel: Edit>Paste.

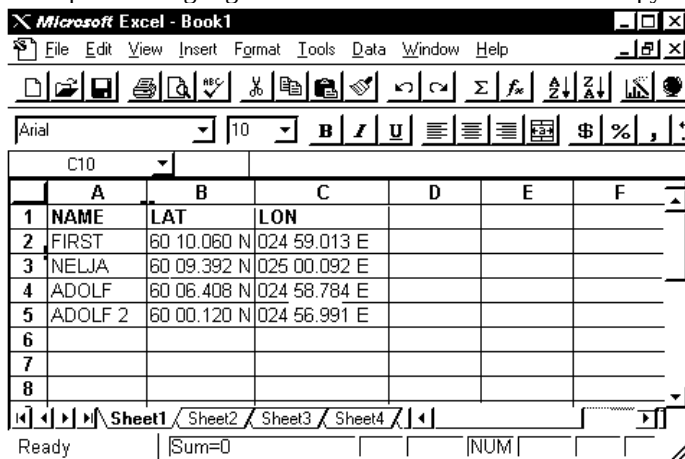


Content of MS Excel looks something like the one above.

A6.1.2 Importing route data from Excel file into ECDIS

Below is an example of how to import waypoints' name and latitude/longitude values from a Microsoft Excel table into ECDIS. Limit the length of waypoint names to eight alphanumeric characters and route names to 30 alphanumeric characters.

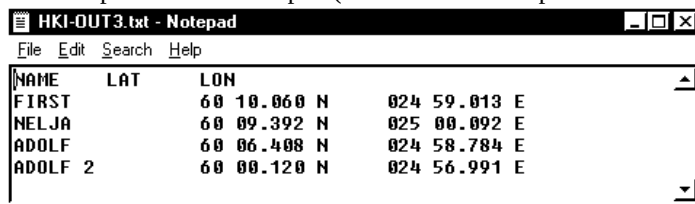
1. Open the MS Excel, which contains the route data you want to import to the ECDIS. Copy desired columns to the clipboard: Highlight data in MS Excel then choose >Copy.



	A	B	C	D	E	F
1	NAME	LAT	LON			
2	FIRST	60 10.060 N	024 59.013 E			
3	NELJA	60 09.392 N	025 00.092 E			
4	ADOLF	60 06.408 N	024 58.784 E			
5	ADOLF 2	60 00.120 N	024 56.991 E			
6						
7						
8						

Content of MS Excel may look something like this.

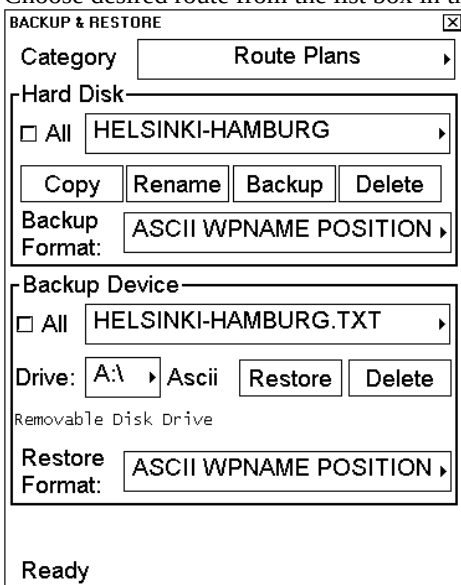
2. You can paste text to Notepad (First activate Notepad then select Edit>Paste)



NAME	LAT	LON
FIRST	60 10.060 N	024 59.013 E
NELJA	60 09.392 N	025 00.092 E
ADOLF	60 06.408 N	024 58.784 E
ADOLF 2	60 00.120 N	024 56.991 E

Content of Notepad looks something like this.

3. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Place the cursor on the triangle in the dialog box, choose Backup and Restore from the menu then push the scrollwheel.
4. In the Backup Device field, choose desired Restore Format (ASCII WPNAME POSITION).
5. Insert floppy disk into disk drive in the processor unit. Choose backup drive (A:\) from the Backup Device field. Choose desired route from the list box in the Backup Device field then click the **Restore** button.



BACKUP & RESTORE

Category: Route Plans

Hard Disk

☐ All: HELSINKI-HAMBURG

Copy Rename Backup Delete

Backup Format: ASCII WPNAME POSITION

Backup Device

☐ All: HELSINKI-HAMBURG.TXT

Drive: A:\ Ascii Restore Delete

Removable Disk Drive

Restore Format: ASCII WPNAME POSITION

Ready

Appendix 6: Route Backup

6. ECDIS generates new route, which has same name as text file.

The screenshot shows the 'PLAN ROUTE - SOUTH HAMPTON ROTTERDAM / 03.02.2004 07:27' window. It features a table of waypoints and a 'SHIP and ROUTE PARAMETERS' dialog box. Annotations with arrows point to specific fields, indicating their source: 'From text file' points to the first two waypoints; 'Steering mode: default = Rhumb line' points to the 'Str mode' column; 'Channel limit: default = 185 m' points to the 'Ch limit/m' column; and 'Speed Min: default = 0 Kt' points to the 'Spd min' column.

SHIP and ROUTE PARAMETERS

Ship parameters

Ship max. speed	20.0	Kt
Ship max. height	15.0	m
Ship draught	6.0	m
Gyro error correction	Off	
Gyro spd/lat error	Off	
Max gyro error correction	4.0	°
Manual gyro correction	-3.0	°

Route parameters

Max rate of turn	200	°/min
Turn end tolerance	2	°
WP approach alarm time	60	s
WP prewarn alarm time	120	s
Route start limit angle	20	°
Default line radius	1.0	nm
Drift compensation	On	
Gyro error compensation	Off	

PLAN ROUTE - SOUTH HAMPTON ROTTERDAM / 03.02.2004 07:27

WP	NAME	Lat	Lon	Leg°	Leg/Nm	Str mode	Rad/Nm	Ch limit/m	Spd min	Spd max
1		50°48.627'N	001°22.306'W		0.0	Rhumb Line	1.0	185	0	20
2		50°45.372'N	001°09.031'W	111.1	9.0	Rhumb Line	1.0	185	0	20
3		50°41.304'N	000°53.101'W	111.9	10.9	Rhumb Line	1.0	185	0	20
4		50°33.981'N	000°42.481'W	137.3	9.9	Rhumb Line	1.0	185	0	20
5		50°33.981'N	000°23.895'W	90.0	11.8	Rhumb Line	1.0	185	0	20

☐ Enable changes

WP count: 20 Total length: 279.2 Nm

Buttons: Insert before, Next WP, Delete, Import, Reverse, All Visible

Above is an example where you can see which fields are from text file and which fields are using default values generated by the ECDIS.

A6.2 Route Backup & Restore in Orion Pro Weather Routing Format

A6.2.1 Exporting Route from ECDIS to Orion Pro

To make backup from a route in format, which can then be imported to Orion Pro weather routing program, do the following:

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box.
2. Place the cursor on the triangle in the dialog box, choose Backup and Restore from the menu then push the scrollwheel.
3. In the Hard Disk field, choose desired file from the list box and **Orion weath. routing** format with Backup Format.
4. Choose backup drive from Drive in the Backup Device field. Click the **Backup** button to create backup file.

BACKUP & RESTORE

Category: Route Plans

Hard Disk

☐ All: LIVERPOOL-NEW YORK

Copy Rename Backup Delete

Backup Format: ORION WEATH. ROUTING

Backup Device

☐ All

Drive: A:\ Restore Delete

Removable Disk Drive

Restore Format: ANTS

Ready

Note that following information is transferred with route:

- WP number
- Latitude
- Longitude
- Steering mode (Rhumb Line or Great Circle)

A6.2.2 Importing Route from Orion Pro

To restore a route in format of Orion Pro weather routing program to ECDIS, do the following:

1. Place the cursor on Route in the status bar then click the **Plan** button to open the Plan Route dialog box. Place the cursor on the triangle in the dialog box, choose Backup and Restore from the menu then push the scrollwheel.
2. In the Backup Device field, choose desired Restore Format (ORION WEATH. ROUTING).
3. Insert floppy disk into disk drive in the processor unit. Choose backup drive (A:\) from the Backup Device field. Choose desired route from the list box in the Backup Device field then click the **Restore** button.

BACKUP & RESTORE

Category: Route Plans

Hard Disk

☐ All

Copy Rename Backup Delete

Backup Format: ANTS

Backup Device

☐ All LIVERPOOL-NEW YORK.CVT

Drive: A:\ Ascii Restore Delete

Removable Disk Drive

Restore Format: ORION WEATH. ROUTING

Ready

4. ECDIS generates a new route which has same name as text file.

Note that following information is transferred with route:

- WP number
- Latitude
- Longitude
- Steering mode (Rhumb Line or Great Circle)

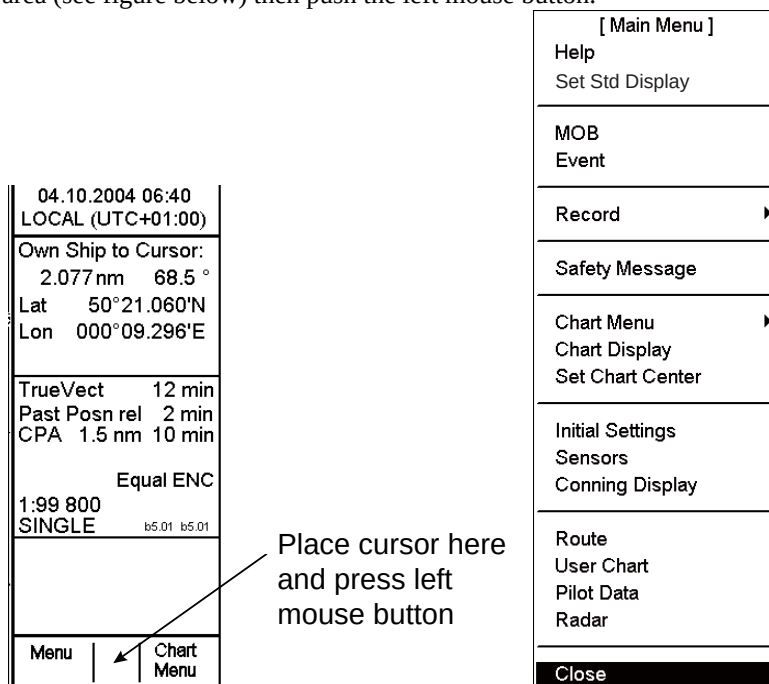
Appendix 7: Menu Overview

A7.1 Hierarchic Menu Tree

This appendix introduces menus available with the ECDIS.

A7.1.1 Menu

The Main menu contains various functions and menus which control the ECDIS. To show the Main menu, press the **MENU** key on the keyboard-equipped control unit or spin the scrollwheel to show Menu in the mouse functions area (see figure below) then push the left mouse button.

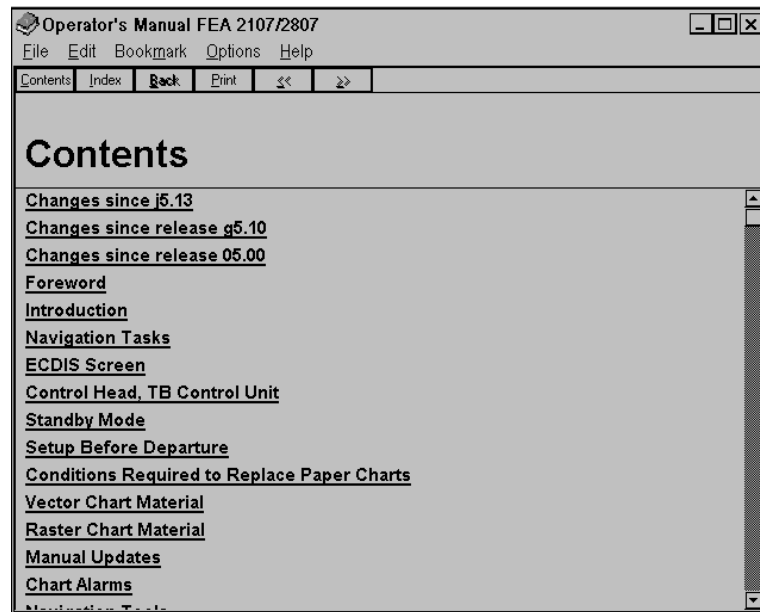


The Main menu

Help window

Use **Help** to call the Help window on the ECDIS display.

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	
	▶
Safety Message	
Chart Menu	
Chart Display	▶
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	



Set Std (Standard) Display

Use **Set Std Display** to call IMO-defined Standard display on the ECDIS and restore monitor brilliance to calibrated state.

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	
	▶
Safety Message	
Chart Menu	
Chart Display	▶
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

For detailed information, see section 9.5.7 Controlling visible navigation features.

Man Over Board (MOB)

Use **MOB** to inscribe Man Over Board mark on the ECDIS and log that position to the Voyage log.

[Main Menu]	
Help	Set Std Display
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

For detailed information, see section 23.2 Events and Man Over Board Functions.

Event

Use **Event** to record a textual description to the Voyage log.

[Main Menu]	
Help	Set Std Display
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

EVENT INFO		✕
Type:	User	
25.5.2004 10:38		
Local (UTC +03:00)		
Lat:	60°00.000'N	
Lon:	025°00.000'E	
PILOT CAME ONBOARD		
☒ Enable changes		

For detailed information, see section 23.2 Events and Man Over Board functions.

Record

Record provides access to the ECDIS's various logs.

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

[Record]	
Go Back	
Details Log	
Voyage Log	
Danger Target Log	
Alarms Log	
Current Alarms	
Chart Usage Log	
Backup and Restore	
Settings	
Reset	▶

For detailed information, see Chapter 23 Recording Functions.

Safety Message

Safety Message handles AIS transponder related messages.

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

▶ SAFETY MESSAGE [X]	
MESSAGE	
Filter	
All	▶
Name	
S17052004-103836	▶
Status: Unsent	
Vessel	
Call Sign:	
MMSI:	12345
Addressed to MMSI ▶	
Safety Message ▶	
Don't care of Channel ▶	
☒ Enable changes	

For detailed information, see Chapter 21 AIS Target Functions.

Chart Menu

Chart Menu maintains chart database for both vector (S57) and Raster charts (ARCS).

[Main Menu] Help Set Std Display MOB Event Record ▶ Safety Message Chart Menu ▶ Chart Display Set Chart Center Initial Settings Sensors Conning Display Route User Chart Pilot Data Radar Close	[Chart Menu] Activate ARCS chart ▶ Load and Update Charts ▶ SENC Convert SENC Convert Settings Remove Charts C-Map Ed 3 ▶ Chart Catalogue Set Chart viewing dates Chart Permits ECDIS Chart 1 Open Chart by Cell name Chart Cell Status Manual Updates ▶ System ▶ Close
---	--

This is the menu for vector (S57) charts.

For detailed information, see Chapter 8 Vector Chart Material.

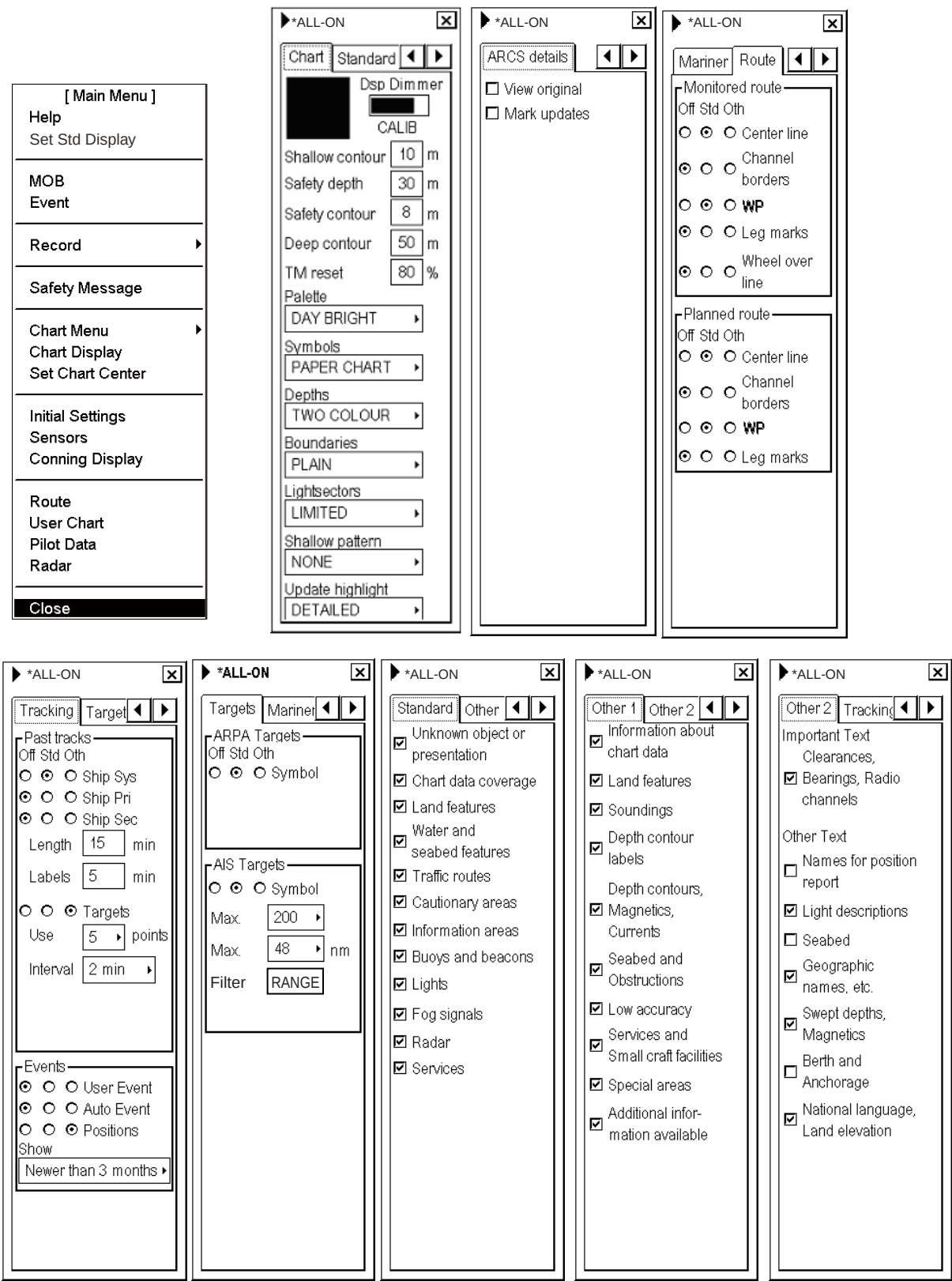
[Main Menu] Help Set Std Display MOB Event Record ▶ Safety Message Chart Menu ▶ Chart Display Set Chart Center Initial Settings Sensors Conning Display Route User Chart Pilot Data Radar Close	[Chart Menu] Activate S57 chart ▶ Load Charts ▶ Update Charts ▶ Load and Update History Remove Charts ▶ Chart Catalogue Chart Permits Licence Select Next Chart Open Chart ▶ Manual Updates ▶ System ▶ Close
---	---

This is the menu for ARCS charts.

For detailed information, see Chapter 9 Raster Chart Material.

Chart Display

Chart Display mainly controls visibility of chart related objects.



For detailed information, see section 8.10 Vector Chart Display and section 9.5 ARCS Chart Display.

Set Chart Center

Chart Center lets you specify the center of the chart display, with manually entered latitude and longitude values.

[Main Menu]	
Help	Set Std Display
MOB Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display Set Chart Center	
Initial Settings Sensors Conning Display	
Route User Chart Pilot Data Radar	
Close	

Chart Center		X
Lat:	60°07.499'N	
Lon:	021°51.741'E	
Set Center		

Initial Settings

Initial Settings mainly provides for set up of equipment parameters.

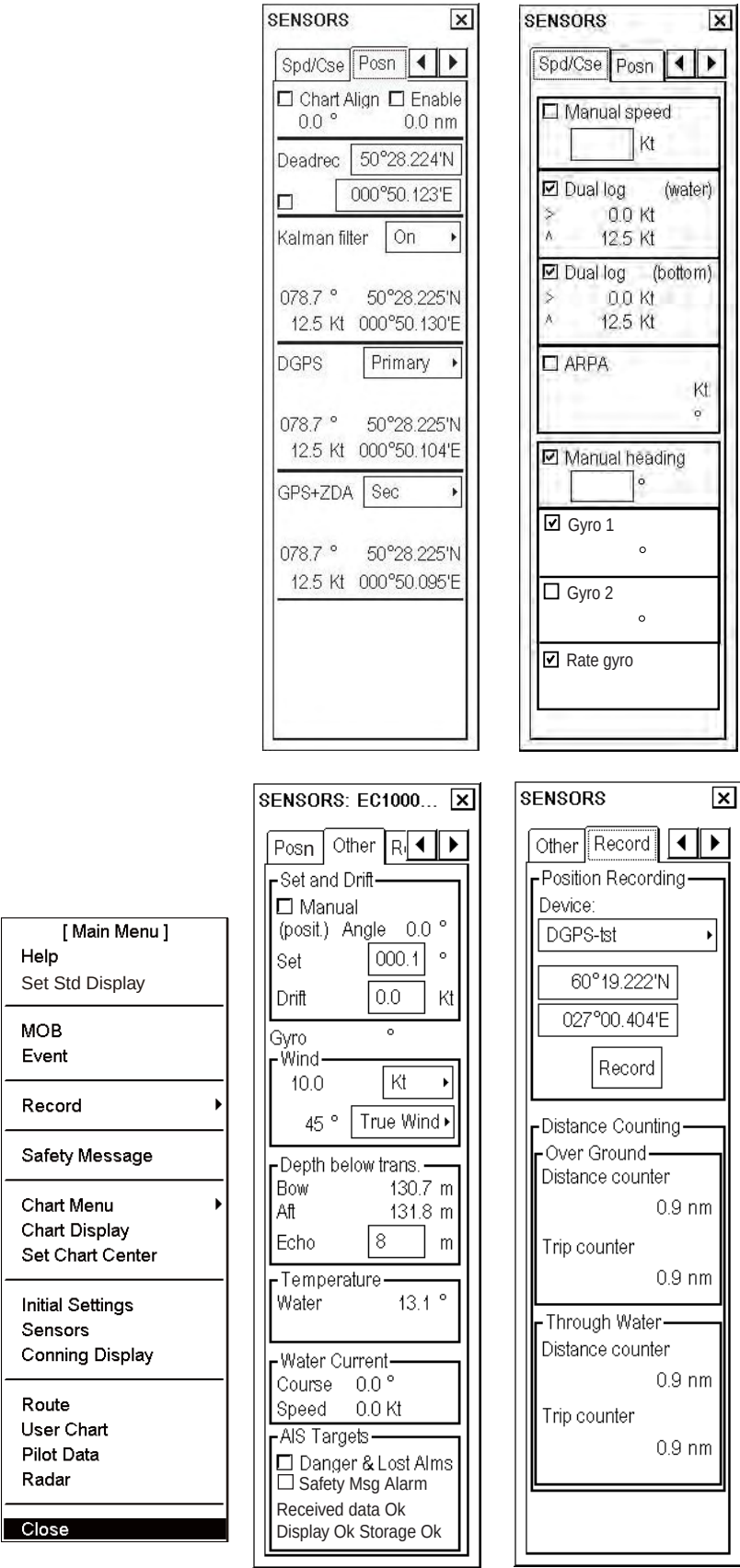
[Main Menu]	
Help	Set Std Display
MOB Event	
Record	▶
Safety Message	
Chart Menu	▶
Chart Display Set Chart Center	
Initial Settings Sensors Conning Display	
Route User Chart Pilot Data Radar	
Close	

[Initial Settings]	
Set time	
Function keys Operation ▶	
Parameter Backup Digitizer Backup and Restore	
Installation parameters C-Map Ed3 installation Navigation parameters ▶ Chart Alarm parameters Optimization parameters ▶	
Print Navigation parameters ▶	
Print Optimization parameters ▶	
Selftest Standby	
Presentation library	
Access Server and Diagnostic ▶	
Close	

For detailed information, see Chapter 24 Datum and Chapter 25 Parameters Setup.

Sensors

Sensors sets up the various sensor connected to the ECDIS.



For detailed information, see Chapter 19 Navigation Sensors.

Conning Display

Conning Display sets up the conning display, which may be shown in the sidebar.

[Main Menu]

Help

Set Std Display

MOB

Event

Record

Safety Message

Chart Menu

Chart Display

Set Chart Center

Initial Settings

Sensors

Conning Display

Route

User Chart

Pilot Data

Radar

Close

CONNING DISPLAY

Conning mode

Harbour 1

Background

BLUE

For detailed information, see Chapter 27 Conning Display.

Route

Route lets you select the planned and monitored routes to use.

[Main Menu]

Help

Set Std Display

MOB

Event

Record

Safety Message

Chart Menu

Chart Display

Set Chart Center

Initial Settings

Sensors

Conning Display

Route

User Chart

Pilot Data

Radar

Close

Monitor

SOUTHAMPTON ROTTERDAM

Plan

AR-RS

For detailed information, see Chapter 13 Route Planning and Chapter 14 Route Monitoring.

User Chart

User Chart lets you select the planned and monitored routes to use for the user chart.

[Main Menu]
Help
Set Std Display

MOB
Event

Record ▶

Safety Message

Chart Menu ▶
Chart Display
Set Chart Center

Initial Settings
Sensors
Conning Display

Route
User Chart
Pilot Data
Radar

Close

Display

☒ Monitor HELSINKI-HAMBURG ▶

☐ Plan HAMBURG-HELSINKI ▶

For detailed information, see Chapter 15 User Chart Control.

Pilot Data

Pilot Data processes pilot data, information for use in navigation.

[Main Menu]
Help
Set Std Display

MOB
Event

Record ▶

Safety Message

Chart Menu ▶
Chart Display
Set Chart Center

Initial Settings
Sensors
Conning Display

Route
User Chart
Pilot Data
Radar

Close

Display

☒ Monitor HELSINKI-HAMBURG ▶

☐ Plan HAMBURG-HELSINKI ▶

For further details, see Chapter 16 Pilot Data.

Radar

Radar provides radar functions.

[Main Menu]	
Help	
Set Std Display	
MOB	
Event	
Record	▶
Safety Message	
Chart Menu	
Chart Display	
Set Chart Center	
Initial Settings	
Sensors	
Conning Display	
Route	
User Chart	
Pilot Data	
Radar	
Close	

RADAR OVERLAY

Radar Overlay source

MAST X

Gain

78

Process

IR

IR 1

Clean

OFF

EchoAverage

EAV 2

Echo stretch

ES OFF

Noise

8 / 15

Display all levels

Mode

ECDIS and Radar

Transparency

Opaque

LAN Radar Overlay

RADAR OVERLAY

Radar Overlay source

MAST X

Gain

78

Sea clutter

0

Rain clutter

0

Process

IR

IR 1

EchoAverage

EAV 2

Echo stretch

ES OFF

Noise

8 / 15

Display all levels

Mode

ECDIS and Radar

Transparency

Opaque

Radar Overlay Card

For further details, see Chapter 22 Radar Overlay.

This page intentionally left blank.

Appendix 8: Digital Interface

A8.1 Data Sentences

A8.1.1 Input sentences

DBT, DPT, DTM, GGA, GLL, HDT, MTW, MWV, OSD, ROT, RSA, TTM, VBW, VDM, VTG, ZDA

A8.1.2 Output sentences

DTM, GLL, MWV, RTE, WPT

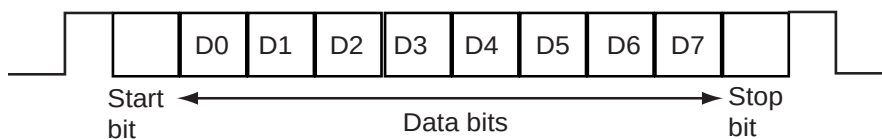
A8.1.3 Data reception

Data is received in serial asynchronous form in accordance with the standard referenced in IEC 61162-2.

The following parameters are used:

Baud rate: 38,400 bps: HDT, !AIVDM, !AIVDO and \$AIALR. All other sentences: 4800 bps

Data bits: 8 (D7 = 0), Parity: none, Stop bits: 1



A8.1.4 Sentence structure

Input sentences

DBT – Depth below transducer

\$--DBT,x.x,f,x.x,M,x.x,F*hh<CR><LF>

```

| | | | |
| | | | | +----- 4
| | | | +---+----- 3
| | +---+----- 2
+---+----- 1

```

1. Water depth, feet
2. Water depth, m
3. Water depth, fathoms
4. Checksum

DPT - Depth

\$--DPT,x.x,x.x,x.x,x*hh<CR><LF>

```

| | | |
| | | +---- 4
| | +----- 3
| +----- 2
+----- 1

```

1. Water depth relative to transducer, in meters
2. Offset from transducer, in meters(see notes 1 and 2)
3. Maximum range scale in use
4. Checksum

NOTE1 "positive"=distance from transducer to water-line.

"-"=distance from transducer to keel.

NOTE2 For IEC applications the offset should always be applied so as to provide depth relative to the keel.

DTM - Datum reference

\$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>

```

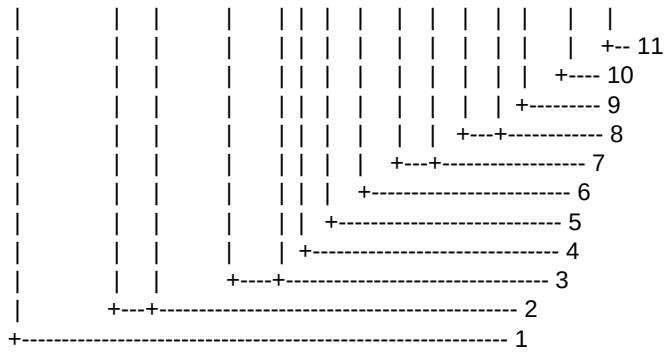
| | | | | | | |
| | | | | | | +--- 7
| | | | | | +----- 6
| | | | | +----- 5
| | | | +---+----- 4
| | +---+----- 3
| +----- 2
+----- 1

```

1. Local datum W84 - WGS84
W72 - WGS72
S85 - SGS85
P90 - PE90
999 - User defined
IHO datum code
2. Local datum subdivision code
3. Lat offset, min, N/S
4. Lon offset, min, E/W
5. Altitude offset, m
6. Reference dattum W84 - WGS84
W72 - WGS72
S85 - SGS85
P90 - PE90
7. Checksum

GGA - Global positioning system (GPS) fix data

\$--GGA,hhmmss.ss,llll.lll,a,yyyyy.yyy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. GPS quality indicator (see note)
5. Number of satellite in use, 00-12, may be different from the number in view
6. Horizontal dilution of precision
7. Antenna altitude above/below mean sealevel, m
8. Geoidal separation, m
9. Age of differential GPS data
10. Differential reference station ID, 0000-1023
11. Checksum

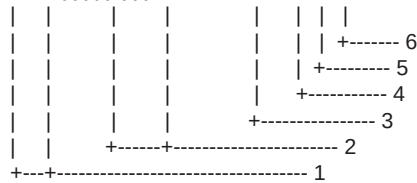
NOTE

- 0 = fix not available or invalid
- 1 = GPS SPS mode, fix valid
- 2 = differential GPS, SPS mode, fix valid
- 3 = GPS PPS mode, fix valid
- 4 = Real Time Kinetic. Satellite system used in RTK mode with fixed integers
- 5 = Float RTK. Satellite system used in RTK mode with floating fingers
- 6 = Estimated (dead reckoning) mode
- 7 = Manual input mode
- 8 = Simulator mode

The GPS quality indicator shall not be a null field.

GLL - Geographic position - latitude/longitude

\$-GLL,lll.lll,a,yyyyy.yy,a,hmmss.ss,A,a*hh<CR><LF>



1. Latitude, N/S
2. Longitude, E/W
3. UTC of position
4. Status: A=data valid, V=data invalid
5. Mode indicator(see note)
6. Checksum

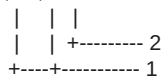
NOTE Positioning system Mode indicator:

A = Autonomous
 D = Differential
 E = Estimated (dead reckoning)
 M = Manual input
 S = Simulator
 N = Data not valid

The Mode indicator field supplements the Status field. The Status field shall be set to V=invalid for all values of Operating Mode except for A=Autonomous and D=Differential. The positioning system Mode indicator and Status field shall not be null fields.

HDT – Heading, True

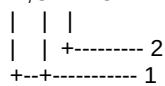
\$-HDT,x.x,T*hh<CR><LF>



1. Heading, degrees true
2. Checksum

MTW - Water temperature

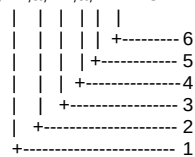
\$-MTW,x.x,C*hh<CR><LF>



1. Temperature, degrees C
2. Checksum

MWV - Wind speed and angle

\$-MWV,x.x,a,x.x,a,A*hh<CR><LF>



1. Wind angle, 0 to 359 (degrees)
2. Reference, R=relative, T=true
3. Wind speed
4. Wind speed units, K/M/N
5. Status, A=data valid, V=data invalid
6. Checksum

OSD - Own ship data

\$--OSD,x.x,A,x.x,a,x.x,a,x.x,x.x,a*hh<CR><LF>

```

| | | | | | | | | |
| | | | | | | | | +----- 10
| | | | | | | | | +----- 9
| | | | | | | | | +----- 8
| | | | | | | | | +----- 7
| | | | | | | | | +----- 6
| | | | | | | | | +----- 5
| | | | | | | | | +----- 4
| | | | | | | | | +----- 3
| | | | | | | | | +----- 2
| | | | | | | | | +----- 1

```

1. Heading, degrees true
2. Heading status: A=data valid, V=data invalid
3. Vessel course, degrees true
4. Course reference, B/M/W/R/P(see note)
5. Vessel speed
6. Speed reference, B/M/W/R/P(see note)
7. Vessel set, degrees true---Manually entered
8. Vessel drift(speed) ---Manually entered
9. Speed units, K(km/h) / N(Knots) / S(statute miles/h)
10. Checksum

NOTES - Reference systems(speed/course):

- B = bottom tracking log
- M = manually entered
- W = water referenced
- R = radar tracking(of fixed target)
- P = positioning system ground reference

ROT - Rate of turn

\$--ROT,x.x,A*hh<CR><LF>

```

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

```

1. Rate of turn, deg/min, "-"=bow turns to port
2. Status: A=data valid, V=data invalid
3. Checksum

RSA – Rudder sensor angle

\$--RSA,x.x,A,x.x,A*hh<CR><LF>

```

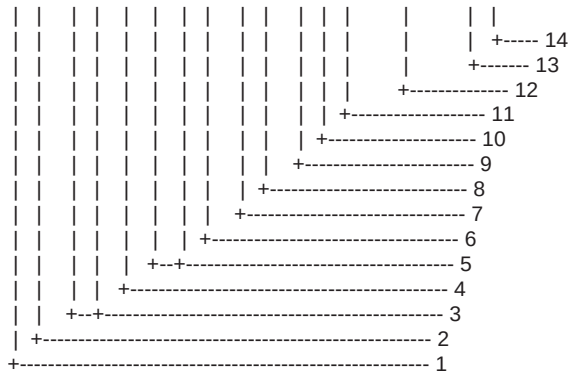
| | | | |
| | | | | +----- 3
| | | | | +---+----- 2
| | | | | +--+----- 1

```

1. Starboard(or single) rudder sensor, Status: A=data valid, V=data invalid
2. Port rudder sensor, Status: A=data valid, V=data invalid
3. Checksum

TTM - Tracked target message

\$--TTM,xx,x.x,x.x,a,x.x,x.x,a,x.x,x.x,a,c--c,a,a,hhmmss.ss,a*hh<CR><LF>



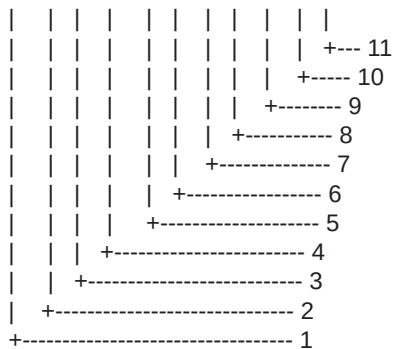
1. Target number, 00 to 99
2. Target distance from own ship
3. Bearing from own ship, degrees, true/relative(T/R)
4. Target speed
5. Target course, degrees true/relative(T/R)
6. Distance of closet point of approach
7. Time to CPA, min., "-"increasing
8. Speed/distance units, K/N/S
9. User data(e.g. target name)
10. Target status(see note)
11. Reference target = R, null otherwise
12. Time of data(UTC)
13. Type of acquisition A=automatic, M=manual, R=reported
14. Checksum

NOTE - Target status:

- L = lost, tracked target has been lost
- Q = query, target in the process of acquisition
- T = tracking

VBW - Dual ground/water speed

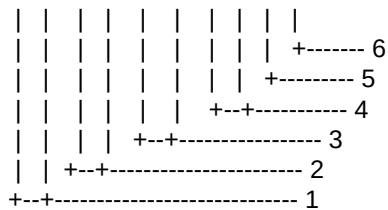
\$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A*x.x,A*hh<CR><LF>



1. Longitudinal water speed, knots
2. Transverse water speed, knots
3. Status: water speed, A=data valid V=data invalid
4. Longitudinal ground speed, knots
5. Transverse ground speed, knots
6. Status: ground speed, A=data valid V=data invalid
7. Stern transverse water speed, knots
8. Status: stern water speed, A=data valid V=data invalid
9. Stern transverse ground speed, knots
10. Status: stern ground speed, A=data valid V=data invalid
11. Checksum

VTG - Course over ground and ground speed

\$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>



1. Course over ground, degrees true
2. Course over ground, degrees magnetic
3. Speed over ground, knots
4. Speed over ground, km/h
5. Mode indicator(see note)
6. Checksum

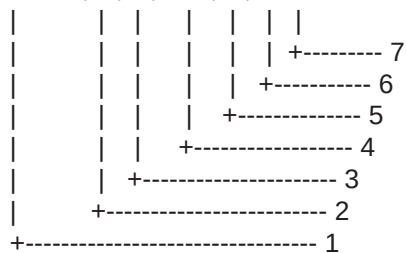
NOTE Positioning system Mode indicator:

- A = Autonomous
- D = Differential
- E = Estimated (dead reckoning)
- M = Manual input
- S = Simulator
- N = Data not valid

The positioning system Mode indicator field shall not be a null field.

ZDA - Time and date

\$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx*hh<CR><LF>



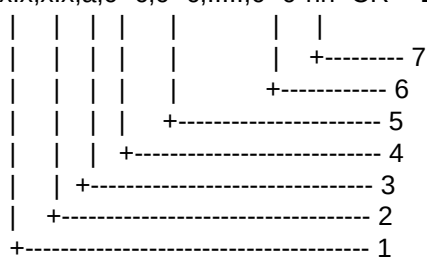
1. UTC
2. Day, 01 to 31(UTC)
3. Month, 01 to 12(UTC)
4. Year(UTC)
5. Local zone hours, 00h to +-13h
6. Local zone minutes, 00 to +59
as local hours
7. Checksum

Output sentences

DPT, DTM, GLL, MWV, OSD – See input sentences.

RTE – Routes

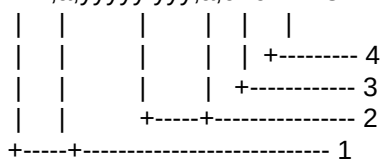
```
$--RTE,x.x,x.x,a,c--c,c--c,.....,c--c*hh<CR><LF>
```



1. Total number of messages being transmitted
2. Message number
3. Message mode:
 - c=complete route, all waypoints
 - w=working route, first listed waypoint is "FROM", second is "TO" and remaining reset of route
4. Route identifier
5. Waypoint identifier
6. Waypoint "n" identifier
7. Checksum

WPL - Waypoint location

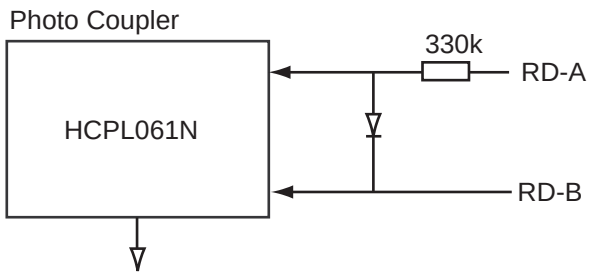
```
$--WPL,IIII.III,a,yyyyy.yyy,a,c--c*hh<CR><LF>
```



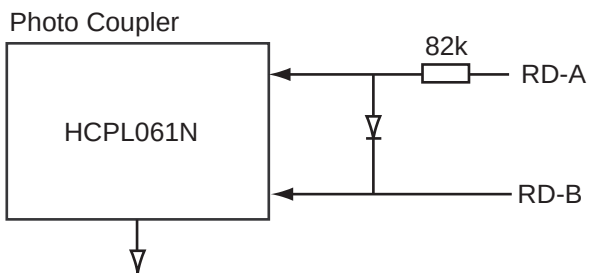
1. Waypoint latitude, N/S
2. Waypoint longitude, E/W
3. Waypoint identifier
4. Checksum

A8.1.5 Serial interface: input ports

Heading, log, wind, depth and navigation sensors



AIS transponder



Absolute maximum rating

Input

Forward current: 50mA

Reverse voltage: 3V

Output

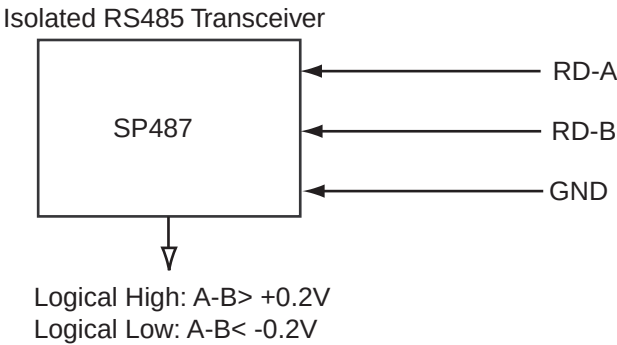
Supply voltage: 7V

High level output voltage: 7V

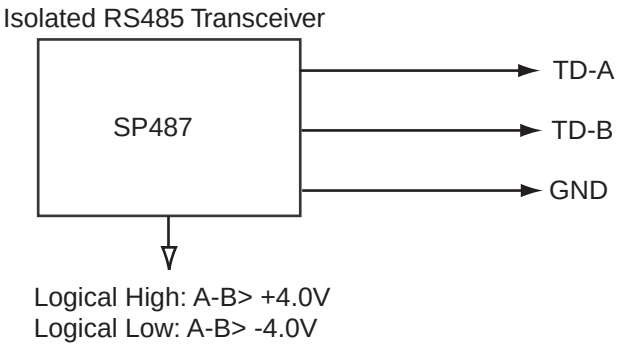
Low level output current: 50mA

A8.1.6 Serial interface: input/output ports

Input port (RD-A, RD-B)



Output port (TD-A, TD-B)



This page intentionally left blank.

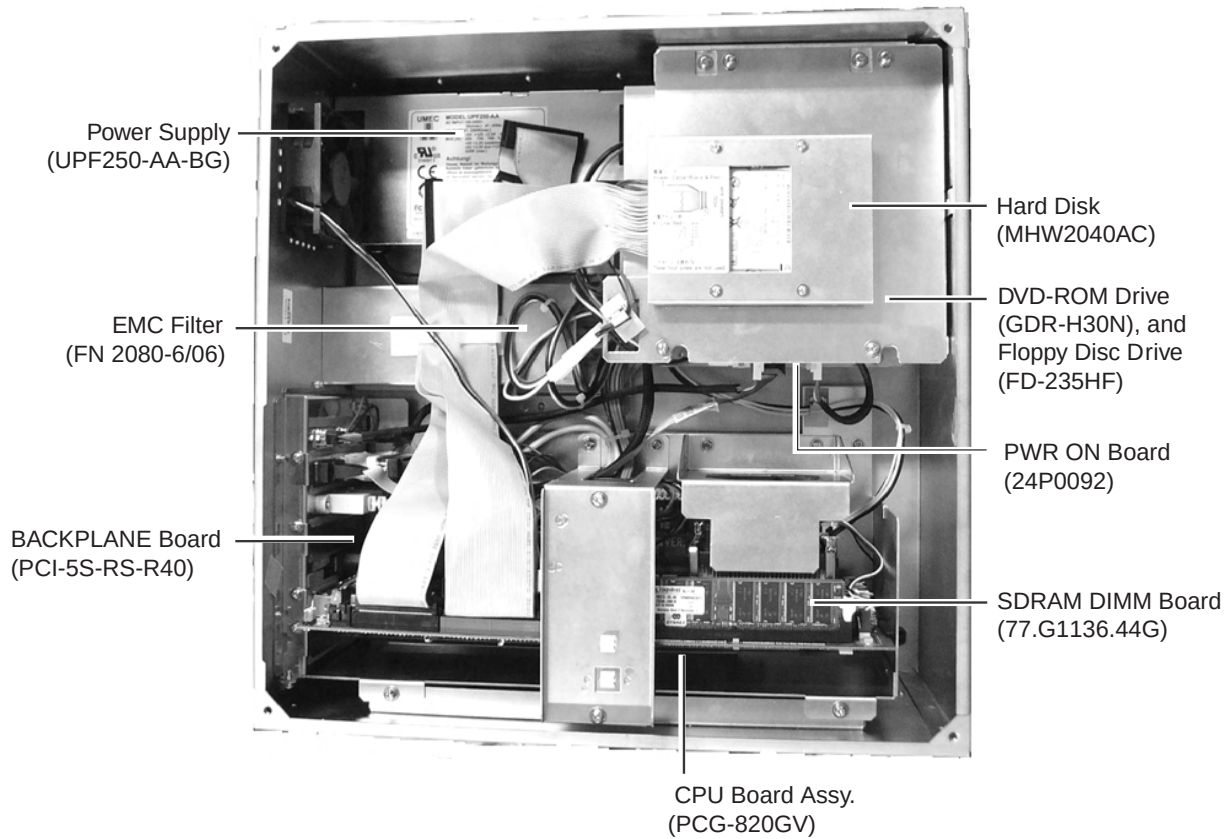
Appendix 9: Parts List and Parts Location

A9.1 Parts List FURUNO

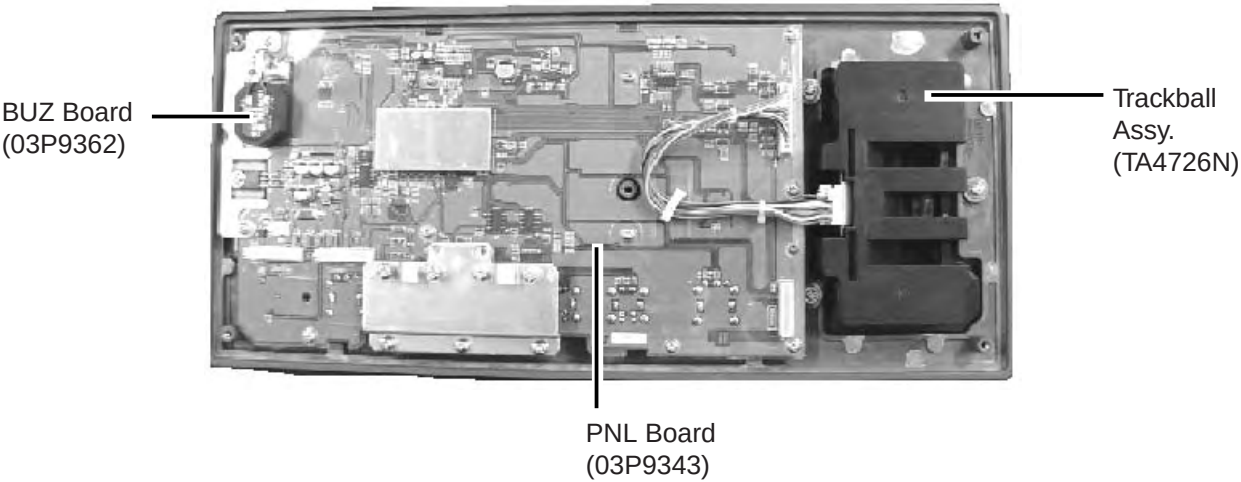
ELECTRICAL PARTS LIST 2008/09		Model	FEA-2807/FEA-2107/FEA-2107-BB
		Unit	Processor Unit EC-1000C Control Unit RCU-018 Control Unit RCU-015
		Ref.Dwg.	
		Blk.No.	
SYMBOL	PRINTED CIRCUIT BOARD/ ASSY. TYPE	CODE NO.	REMARKS
PROCESSOR UNIT EC-1000C			
EMC Filter	FN 2080-6/06	000-165-007	
DVD-ROM Drive	GDR-H30N	000-160-935-10	
Floppy Disc Drive	FD-235HF	000-165-010	
Hard Disk	MHW2040AC	000-159-044-10	
SDRAM DIMM Board	77.G1136.44G	000-164-603-10	
BACKPLANE Board	PCI-5S-RS-R40	000-170-056-10	
Power Supply	UPF250-AA-BG	000-165-006-11	
CPU Board Assy.	PCG-820GV	001-047-000	
PWR ON Board	24P0092	000-165-013	
CONTROL UNIT RCU-018			
PNL Board	03P9343	008-544-420	
BUZ Board	03P9362	008-535-600	
Trackball Assy.	TA4726N	000-147-139-01	
CONTROL UNIT RCU-015			
PNL Board	03P9344	008-536-380	
Trackball Assy	TA4726N	000-147-139-01	

A9.2 Parts Location

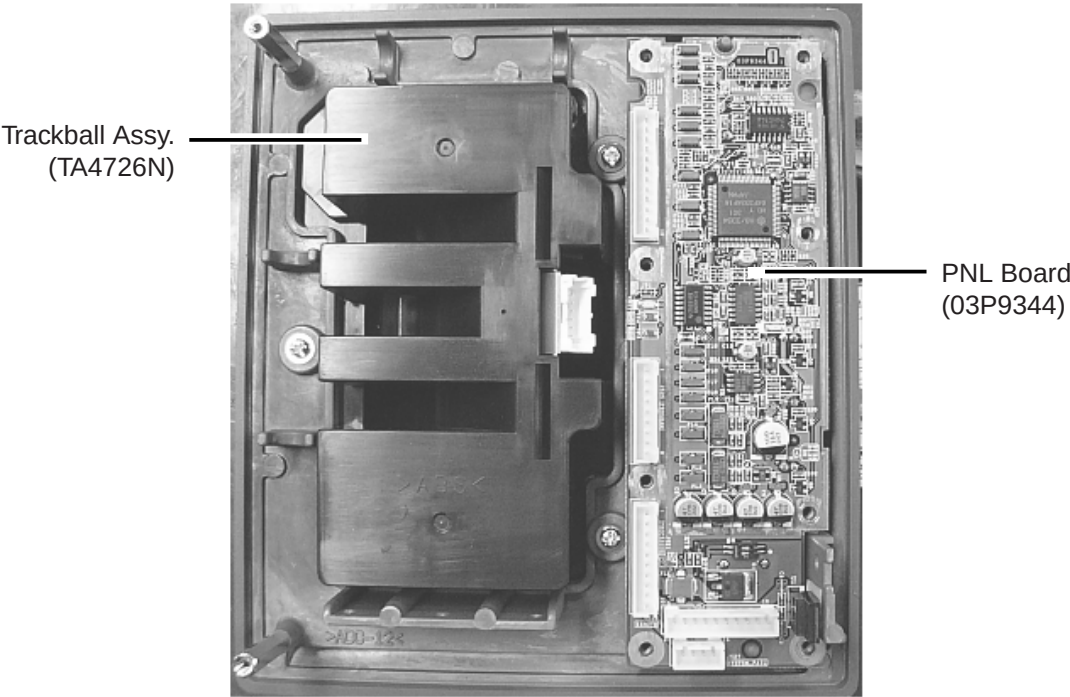
A9.2.1 Processor unit EC-1000C



A9.2.2 Control unit RCU-018



A9.2.3 Control unit RCU-015



This page intentionally left blank.

Index

A

Access server

- human interface log 18-12
- log 18-11
- monitoring 18-4
- troubleshooting 18-10

AIS

- alarms 21-4
- CPA and TCPA 21-6
- CPA and TCPA for AIS targets 21-6
- dangerous targets 21-3
- interface status 21-9
- introduction 21-1
- lost targets 21-3
- maximum number of targets 21-4
- range for detection 21-4
- safety message 21-10
- safety message, creating 21-11
- safety message, reading 21-12
- safety message, replying 21-13
- saving past target track 23-7
- target call sign 21-8
- target data 21-5
- target dialog box 21-8
- target name 21-8
- target past positions 21-7
- targets, displaying 21-2
- vector mode 21-3

Alarms

- AIS 21-4
- alarms log 23-13
- ARPA 20-4
- backup navigator alarms 31-4
- chart alarms 31-25
- chart calculation 31-2
- COG 19-11
- drift 19-11
- gyro 19-14
- heading 19-11
- Kalman filter 19-16
- navigation alarms 31-5
- navigation calculation 31-2
- non-acceptance of route steering 28-13
- position discrepancy 19-7
- priority 31-3
- program track mode 28-6
- radar overlay 31-2, 31-37
- ROT 19-11
- route steering (trackpilot) 28-16
- sensor related 19-26
- SOG 19-11
- steering alarm, Autopilot FAP-2000 .. 31-27
- steering alarm, Autopilot PR-6000 30-21
- steering alarm, Autopilot PT-500A 31-35
- steering calculation 31-2

- trackpilot 28-37

Alarms log

- printing 23-13
- viewing 23-12

Approve until date 8-77

ARCS details page 9-40

ARCS navigator

- chart permit loading 9-14
- description 9-12

ARCS skipper

- chart permit loading 9-15
- description 9-12

Area page 15-13

ARPA

- alarms 20-4
- ARPA targets 20-1
- CPA and TCPA 20-3
- dangerous targets 20-1
- displaying target data 20-3
- lost targets 20-1
- past positions 20-5
- saving past target track 23-7
- source of ARPA targets 20-4

Automatic route steering and

- Kalman filter 19-16

Autopilot FAP-2000

- accuracy of automatic route steering .. 28-19
- activating route steering 28-12
- alarms 28-37
- alarms for non-acceptance of
 - route steering 28-13
- alarms in program track mode 28-6
- arriving to a waypoint 28-14
- automatic route steering 28-8
- collision avoidance in automatic
 - route steering 28-18
- control panel 28-3
- control strategy 28-36
- curved EBL 28-40
- errors 28-39
- expected steering performance
 - (critical failure) 28-29
- expected steering performance
 - (going ahead) 28-24
- expected steering performance
 - (turns) 28-27
- GOTO track mode 28-10
- GOTO track mode preconditions 28-11
- GOTO waypoint mode 28-9
- GOTO waypoint mode preconditions .. 28-11
- heading control 28-5
- load conditions 28-36
- manual steering 28-2, 28-5
- multiple control panels 28-20
- preconditions for route steering 28-11

- program heading change..... 28-5
- program track..... 28-6
- programmed turns 28-21
- radius control 28-5
- route steering alarms..... 28-16
- speed used by..... 28-36
- steering modes..... 28-1
- stopping or modifying pre-enabled
 - route turn..... 28-18
- summary of manual steering modes 28-7
- track mode 28-2
- trackpilot steering 28-2
- Autopilot PR-6000
 - adjustments 30-20
 - alarms with..... 30-21
 - arrival to a waypoint..... 30-13
 - auto route steering 30-4, 30-7
 - auto route steering, changing mode ... 30-18
 - auto route steering, collision
 - avoidance in 30-16
 - autopilot dialog box..... 30-22
 - autopilot steering 30-3
 - curved EBL..... 30-35
 - errors..... 30-22
 - Goto AW mode..... 30-7
 - Goto OS mode..... 30-7
 - hand steering..... 30-2
 - non-follow up steering..... 30-3
 - predictor..... 30-36
 - remote hand steering 30-4
 - route steering alarms..... 30-14
 - route turn modification..... 30-17
 - steering control unit..... 30-1
 - steering method override 30-5
 - steering performance 30-24
- Autopilot PT-500A
 - alarms 29-11
 - arrival to waypoint..... 29-6
 - automatic route steering..... 29-3
 - collision avoidance in automatic
 - steering..... 29-8
 - control strategy 29-10
 - curved EBL..... 29-23
 - enabled turn, stop or modification 29-9
 - load conditions..... 29-10
 - predictor..... 29-24
 - route steering activation..... 29-5
 - route steering alarms..... 29-7
 - speed used by..... 29-10
 - steering control unit..... 29-1
 - steering modes..... 29-2
 - steering performance, critical failure. 29-14
 - steering performance, various
 - conditions 29-12
- Autopilot sidebar..... 3-9
- B**
 - Backup operations
 - ASCII file, saving route as..... 17-6
 - chart material..... 17-7
 - danger targets log backup..... 23-10
 - details log backup..... 23-10
 - file backup..... 17-3
 - file copy 17-2
 - file deletion 17-3
 - file reading 17-5
 - file renaming..... 17-2
 - file restoration 17-3
 - former vector system format files,
 - backing up 17-5
 - loading files of former vector system
 - format 17-5
 - route backup AP-67
 - route estoration from ASCII file 17-6
 - voyage log backup..... 23-10
- C**
 - Cancel conv. button..... 8-19
 - CD history button..... 8-19
 - Cell status button..... 8-20
 - Cells button 8-23
 - Chart alarms
 - alarms by category..... 11-12
 - alarms leg by leg..... 11-11
 - highlighting..... 11-5
 - objects for use in 11-3
 - route montoring 11-13
 - route planning for..... 11-10
 - safety contour 11-2
 - symbols, lines, areas, inserting..... 11-6
 - with ARCS charts 11-14
 - Chart catalogue of cells..... 8-26
 - Chart center
 - C-MAP charts AP-28
 - raster charts..... 9-33
 - vector charts 8-64
 - Chart legend
 - C-MAP CM-93/2..... AP-45
 - raster charts (ARCS) 9-1
 - vector charts (S57) 8-3
 - Chart legend sidebar..... 3-9
 - Chart menu
 - raster chart 9-11
 - vector chart 8-24
 - Chart page 9-37
 - Chart points (user charts)..... 15-4
 - Chart usage log 23-8
 - C-MAP CM-93/2
 - catalogue of S57 cells..... AP-56
 - CD ROM contents summary AP-55
 - chart legend AP-45
 - defining subscription by areas AP-50
 - defining subscription by zones AP-49
 - deleting cells from a group AP-63
 - deleting group AP-63
 - deleting subscription of AP-47
 - entering authorization code AP-51
 - licensing system..... AP-46
 - load history of CD ROM AP-55
 - loading charts from a CD ROM AP-52
 - loading serial no. of CD ROM AP-48
 - removing from system AP-64

- status and date dependency of S57
 - chart cells AP-65
 - viewing active group AP-63
- C-MAP CM-93/3
 - catalog of charts AP-29
 - chart ordering AP-23
 - choosing AP-27
 - license entry AP-33
 - license renewal AP-36
 - licensing system AP-23
 - loading AP-31
 - multiple databases AP-32
 - removing AP-43
 - RENC service AP-25
 - subscription service AP-24
 - system registration AP-23
 - troubleshooting AP-23
 - update creation AP-37
 - update loading AP-39
- Color calibration for ARCS charts 26-1
- Color differentiation for S57 charts 26-2
- Color palette 3-4
- Common reference access server 18-5
- Common reference system
 - access server 18-4
 - controlling 18-2
 - mode of workstations 18-9
 - sensor source for system 18-8
 - shared alarm management 18-3
 - usage rights 18-5
- Conning display
 - alarm message window 27-12
 - azimuth propulsion window 27-10
 - background color 27-13
 - color palette 27-13
 - combined wind, depth and
 - destination window 27-7
 - depth window 27-7
 - drift and radius window 27-4
 - fuel consumption window 27-8
 - heading window 27-3
 - interpretation of 27-2
 - introduction 27-1
 - main engine start air pressure
 - information 27-12
 - message window 27-11
 - mode 27-13
 - position window 27-4
 - propellers window 27-8
 - propulsion and thruster window 27-12
 - propulsion with actual and ordeered
 - information window 27-9
 - propulsion with main engine
 - (for DNV) 27-9
 - ROT window 27-3
 - route window 27-6
 - rudder window 27-4
 - speed window 27-3
 - speedpilot window 27-11
 - thruster and propulsion window 27-10
 - thruster window 27-8
 - trackpilot order window 27-12
 - trackpilot window 27-5
 - weather and wind window 27-7
- Control unit RCU-015
 - control description 4-3
 - hot keys 4-4
 - layout 4-3
- Control unit RCU-018
 - hot keys 4-4
 - layout 4-1
- Conv. history button 8-19
- Conv. log button 8-20
- Convert button 8-23
- Course
 - alarm 19-11
 - source 19-8
- Current page 16-5
- Curved EBL
 - use with Autopilot FAP-2000 28-40
 - use with Autopilot PT-500A 29-23
 - use with Autopilot PR-6000 30-35
- D**
- Danger target log
 - backup copy 23-10
 - conditions for 23-7
 - creating a user chart from 23-11
 - resetting 23-11
 - viewing 23-6
- Datum
 - choosing 25-3
 - ECDIS and 24-2
 - electronic sea charts and 24-1
 - paper charts and 24-1
 - positioning devices and 24-1
 - user charts 15-6
 - verifying 6-10
- Depth sensor 19-25
- Details log
 - backup copy 23-10
 - creating a user chart from 23-12
 - viewing 23-2
- Dialog boxes
 - activating 3-10
 - additional menus with 3-11
- Display mode 12-1
- Display until date 8-77
- Distance counter 23-14
- Distance counter reset 6-10
- Docking sidebar 3-9
- Double gyro interface 19-12
- Drift
 - alarm 19-11
 - source 19-8
- E**
- EBL operation 12-3
- ECDIS display
 - electronic chart area 3-2
 - information area 3-5

operator interface	3-4
overview	3-1
palette	3-4
sidebar	3-6
Event recording	23-1

F

Files

backing up	17-3
copying	17-2
deleting	17-3
former vector system format files, loading	17-5
former vector system format files, saving	17-5
reading	17-5
renaming	17-2
restoring	17-3

Forwarding distances

Autopilot PT-500A	25-5
Autopilot FAP-2000	25-5
Autopilot PR-6000	25-6

Fuse replacement	32-2
------------------------	------

G

Glossary	AP-1
----------------	------

GOTO track mode

description	28-10
preconditions for route steering	28-11

GOTO waypoint mode

description	28-9
preconditions for route steering	28-11

Gray scale test	26-3
-----------------------	------

Group

active vector chart group, viewing	8-36
active, choosing	9-30
active group removal from system	9-31
raster chart addition	9-28
raster chart removal from	9-29
raster charts	9-27

Gyro

alarm	19-14
error correction	19-21
indication of source	19-13
on-screen indication	19-13

H

Heading

alarm	19-11
source	19-8

Hot keys	4-4
----------------	-----

Human interface log	18-12
---------------------------	-------

I

IHO ECDIS Chart 1	AP-5
-------------------------	------

Information area	3-1, 3-5
------------------------	----------

K

Kalman filter

alarm	19-16
automatic route steering with	19-16
use of	19-15

L

Line page	15-11
-----------------	-------

Load and Conv. history button	8-19
-------------------------------------	------

Loading

chart permits for ARCS navigator	
----------------------------------	--

license	9-14
---------------	------

chart permits for ARCS skipper	
--------------------------------	--

license	9-15
---------------	------

messages for vector charts	8-13
----------------------------------	------

new raster charts by chart permit	9-17
---	------

non-compliant vector charts	8-16
-----------------------------------	------

raster charts by active group	9-18
-------------------------------------	------

raster charts, manually	9-19
-------------------------------	------

vector charts (S57) from CD,	
------------------------------	--

floppy disk or LAN	8-7
--------------------------	-----

M

Maintenance	32-1, 32-2
-------------------	------------

Manual updates

chart object position, editing	10-22
--------------------------------------	-------

chart objects, deleting	10-13
-------------------------------	-------

chart objects, inserting new	10-15
------------------------------------	-------

chart objects, modifying	10-14
--------------------------------	-------

chart viewing dates, controlling	10-3
--	------

history of manual updates	10-24
---------------------------------	-------

manual update editor	10-4
----------------------------	------

manually updated chart objects	
--------------------------------	--

properties, editing	10-21
---------------------------	-------

orange symbols, deleting	10-8
--------------------------------	------

orange symbols, editing position	10-9
--	------

orange symbols, inserting as	10-5
------------------------------------	------

orange symbols, inserting using	10-7
---------------------------------------	------

planning	10-4
----------------	------

symbols to use	10-2
----------------------	------

true symbols and manual	
-------------------------	--

update editor	10-12
---------------------	-------

Mariner page

raster charts	9-45
---------------------	------

vector charts	8-72
---------------------	------

Menu overview	AP-73
---------------------	-------

MOB	23-1
-----------	------

Monitor pilot data dialog box

current page	16-5
--------------------	------

view page	16-5
-----------------	------

Monitoring mode

pilot data	16-4
------------------	------

user charts	15-6
-------------------	------

Mouse functions area	3-1
----------------------------	-----

Mouse operations

alphanumeric data entry	4-6
-------------------------------	-----

menu and function activation	4-10
------------------------------------	------

parts of mouse	4-5
----------------------	-----

scrollwheel	4-8
-------------------	-----

N

Navigation marks	12-2
------------------------	------

Navigation parameters

route	25-4
-------------	------

ship	25-4
------------	------

Navigation sensors	19-1
--------------------------	------

O

Optimization parameters	25-7
Orientation	12-1
Other page	19-5
raster charts	9-39
vector charts	8-68

P

Palette	3-4
Paper charts, replacing with ECDIS	
charts	7-1
Parallel index lines	12-3
Parameters	
installation	25-3
menus for setting	25-1
navigation, route	25-4
navigation, ship	25-4
optimization	25-7
printing	25-2
set time	25-2
Parameters page	13-8
Permanent warnings	
raster charts (ARCS)	9-10
vector charts (S57)	8-4
Pilot data	
adding	16-8
creating	16-8
data record modification	16-9
modes	16-2
monitoring mode	16-4
other data of, changing	16-10
pilot data record position, changing	16-9
planning mode	16-6
record deletion	16-10
record importation	16-10
using	16-3
Plan pilot data dialog box	16-7
Planning mode	
pilot data	16-6
user charts	15-7
Point page	15-9
Position	
alignment by ARPA radar	19-19
alignment by ECDIS	19-17
alignment resetting	19-19
indication of source	19-6
primary and secondary	19-7
recording	23-5
Position discrepancy alarm	19-7
Position page	19-3
Power On/Off	1-4
Power switch	
control unit RCU-018, control unit	
RCU-015	1-4
processor unit	1-4
Predictor	28-43
Autopilot FAP-2000	28-43
Autopilot PR-6000	30-36
Autopilot PT-600A	29-24
Presentation library, vector charts	8-85

Printing

CD ROM contents (A57)	8-11
font size for logs, choosing	23-9
logs	23-8
navigation parameters	25-2
Processor unit	1-4

R

Radar overlay	
activating	22-2
adjusting	22-6
alarms	22-12
bearing error compensation	22-11
echo averaging	22-7
echo overload	22-8
echo stretch	22-7
error sources	22-10
gain	22-6
interference rejector	22-7
introduction	22-1
LAN	22-3
modes	22-5
position error compensation	22-11
radar overlay card	22-4
rain clutter	22-7
sea clutter	22-6
source	22-6
transparency	22-9
Range	8-64, 9-33
Raster charts (ARCS)	
active group, choosing	9-30
active group, updating by	9-21
ARCS catalogue	9-25
ARCS chart addition to group	9-28
ARCS chart group, creating	9-27
ARCS chart loading by active group	9-18
ARCS chart removal from a group	9-29
ARCS details page	9-40
ARCS license information	9-12
ARCS navigator	9-12
ARCS navigator chart permit loading	9-14
ARCS skipper	9-12
ARCS skipper chart permit loading	9-15
browsing charts	9-33
chart activation by position	9-36
chart center	9-33
chart choice, manual	9-35
chart datum, choosing	9-32
chart display features	9-46
chart display settings	9-46
chart features, controlling	9-37
chart group removal by active group	9-31
chart legend	9-1
chart load and update history	9-23
chart menu	9-11
chart page	9-37
chart permits for ARCS navigator	
license, loading	9-14
chart permits, removing	9-16
chart removal from system, manual	9-30
controlling navigation features	9-42

- cursor position in local datum 9-7
- details 9-2
- displaying 9-32
- group removal..... 9-30
- loading update loading, manual 9-22
- manual loading..... 9-19
- manual updates, displaying..... 10-2
- mariner page 9-45
- new ARCS chart loading by
 - chart permit 9-17
- notes for 9-4
- other page 9-39
- permanent messages..... 9-10
- range 9-33
- raster chart updating by permit..... 9-20
- route page 9-42
- SDD 9-4
- standard page..... 9-39
- T&P notices 9-2
- targets page 9-44
- tracking page..... 9-43
- update status 9-24
- WGS shift of current chart 9-5
- WGS shift value 9-8
- WGS shift, specifying amount 9-9
- Recording
 - chart usage log 23-8
 - conditions for danger target logging 23-7
 - conditions for voyage logging..... 23-4
 - danger target log 23-6
 - details log..... 23-2
 - event..... 23-1
 - MOB..... 23-1
 - position 23-5
 - voyage log 23-3
 - voyage log reset 23-4
- Reference point 12-4
- Remove button 8-13
- RENC
 - authentication 8-39
 - base CD ROM 8-49
 - CD ROM service 8-40
 - chart up-to-date status..... 8-42
 - C-MAP CM-93/3 AP-25
 - coverage of base or update CD ROM.... 8-57
 - message loading 8-59
 - messages in loading 8-61
 - permit CD ROM or floppy disk,
 - loading 8-58
 - permits for vector chart 8-39
 - permits management 8-44
 - product list for vector chart 8-39
 - product list up-to-date status 8-43
 - public key..... 8-45
 - public key for vector chart 8-45
 - security system..... 8-60
 - services 8-41
 - subscription warning 8-45
 - update CD ROM 8-53
- ROT
 - alarm 19-11
 - source 19-8
- Route monitoring
 - alarms 14-12
 - description..... 14-7
 - final waypoint 14-3
 - route assistant 14-5
 - route to monitor, choosing..... 14-1
 - route, displaying 14-4
 - TO waypoint..... 14-2
 - waypoint information 14-3
- Route page
 - raster charts..... 9-42
 - vector charts 8-69
- Route planning
 - alarms page..... 13-6
 - check page 13-7
 - choosing datum..... 13-3
 - geometry check 13-16
 - main menu for..... 13-2
 - new route 13-4
 - other waypoint data in existing
 - route, changing 13-13
 - parameters page 13-8
 - passage plan report 13-20
 - prepare page 13-9
 - route optimization 13-8, 13-17
 - waypoint addition at end of existing
 - route..... 13-13
 - waypoint deletion 13-14
 - waypoint import..... 13-14
 - waypoint insertion in existing route.. 13-13
 - waypoint position in existing route,
 - changing 13-10
 - waypoint processing 13-5
 - WP report..... 13-19
 - WP table report..... 13-18
- Route sidebar..... 3-8
- Routes
 - ASCII file, saving route as 17-6
 - exporting to Excel AP-68
 - former vector system format route,
 - loading 17-5
 - former vector system format routes,
 - saving..... 17-5
 - importing from Excel..... AP-69
 - restoring..... AP-67
 - route restoration from ASCII file..... 17-6
- S**
 - S57 chart description AP-11
- Safety message (AIS)
 - creating 21-11
 - reading 21-12
 - replying to 21-13
- Scrollwheel
 - items controllable by 4-8
 - wheel incrementing direction..... 4-9
- SENC conversion
 - automatic 8-18

cell status window initiation 8-96
 failed conversion window in
 vector chart 8-20
 history log 8-21
 history log for vector chart..... 8-21
 progress in vector charts..... 8-19
 SENC convert window in
 vector charts 8-23
 vector chart conversion, speeding up ... 8-17
 SENC convert settings dialog box..... 8-18
 Sensor source for system 18-8
 Sensors dialog box
 other page 19-5
 speed/course page..... 19-1
 Sensors for navigation 19-1
 Ship and route parameters dialog box... 19-21
 Ship offcenter
 raster charts 9-33
 vector charts 8-64
 Sidebar
 autopilot sidebar 3-9
 chart legend sidebar..... 3-9
 content of 3-7
 description 3-6
 docking sidebar 3-9
 route sidebar..... 3-8
 Software version no. 1-4
 Source data diagram (SDD) 9-4
 Speed
 alarm..... 19-11
 source 19-8
 Speed/course page..... 19-1
 Standard page
 raster charts 9-39
 vector charts 8-68
 Standby mode 5-1
 Symbol page 15-10
 System configuration
 multiple workstations 1-3
 single workstation..... 1-2

T

T&P notices 9-2
 Target dialog box 21-8
 Targets page
 raster charts 9-44
 vector charts 8-71
 Tidal page..... 15-12
 Time setting 25-2
 Tracking page
 raster charts 9-43
 vector charts 8-70
 Trip counter 23-14
 Trip counter reset 6-10
 Troubleshooting 32-3

U

Usage rights
 master 18-5
 multi or slave..... 18-6
 plan 18-7

User chart dialog box 15-3
 area page 15-13
 line page 15-11
 point page..... 15-9
 symbol page 15-10
 tidal page 15-12
 User charts
 area deletion 15-15
 area import 15-16
 area modification 15-15
 changing objects 15-17
 chart points 15-4
 creating 15-8
 creating from a log..... 23-11
 datum 15-6
 displaying 15-19
 former vector system format charts,
 saving 17-5
 former vector system format files,
 loading 17-5
 joining 15-18
 modes 15-2
 monitoring mode..... 15-6
 new area, adding 15-14
 object addition..... 15-16
 object deletion 15-17
 object import 15-18
 object modification..... 15-17
 objects used in..... 15-1
 planning mode 15-7
 position of corner point..... 15-15
 position of object 15-17
 reports 15-21
 user chart dialog box 15-3

V

Vector charts (S57)
 active group, viewing..... 8-36
 approve until date 8-77
 base CD ROM from RENC..... 8-49
 Cancel conv. button 8-19
 catalogue of cells 8-26
 CD history button 8-19
 CD ROM dialog box 8-10
 cell details 8-95
 cell status 8-94
 Cell status button 8-20
 cell status window to initiate SENC
 conversion..... 8-96
 Cells button..... 8-23
 cells from a group, deleting 8-35
 chart choosing by name on display 8-65
 chart coding 8-88
 chart display settings 8-73
 chart features, controlling..... 8-66
 chart legend 8-3
 chart material, choosing..... 8-64
 chart menu..... 8-24
 chart service (RENC)..... 8-39
 Conv. History button 8-19
 Conv. log button..... 8-20

- conversion to SENC, speeding up..... 8-17
 - Convert button 8-23
 - coverage area of base or update
 - CD ROM from RENC 8-57
 - coverage of RENC service, viewing 8-41
 - date dependency 8-78
 - deleting group..... 8-36
 - display base 8-68
 - ENC coverage indication..... 7-4
 - introduction 8-1
 - linked objects 8-90
 - Load and Conv. history button 8-19
 - Load and Conv. History button 8-12
 - load button..... 8-7, 8-53
 - loading (flow chart) 8-5
 - loading from CD, floppy disk or LAN..... 8-7
 - loading messages..... 8-14
 - mariner page 8-72
 - message loading 8-13
 - messages in RENC loading..... 8-61
 - non-compliant vector chart loading..... 8-16
 - objects and their information 8-85
 - other page 8-68
 - permanent warnings 8-4
 - permit CD ROM or floppy disk,
 - loading 8-58
 - product list..... 8-43
 - publisher notes 8-11
 - range 8-64
 - Remove button..... 8-13
 - removing chart cell from system 8-38
 - removing unnecessary CD ROM
 - catalogue 8-13
 - RENC authentication..... 8-39
 - RENC chart up-to-date status..... 8-42
 - RENC message, loading..... 8-59
 - RENC permits management 8-44
 - RENC public key 8-45
 - RENC security system 8-60
 - RENC subscription type 8-40
 - RENC subscription warning..... 8-44
 - route page 8-69
 - sailing directions 8-75
 - seasonal feature coding..... 8-80
 - seasonal features 8-76
 - SENC conversion..... 8-17
 - SENC conversion failed window..... 8-20
 - SENC conversion history log 8-21
 - SENC conversion progress..... 8-19
 - SENC conversion, automatic 8-18
 - SENC convert settings dialog box 8-18
 - SENC convert window 8-23
 - ship offcenter 8-64
 - standard page 8-68
 - status and viewing dates of chart cells . 8-37
 - symbology 8-84
 - tidal tables 8-75
 - TM reset..... 8-64
 - Tracking page 8-70
 - update CD ROM from RENC..... 8-53
 - vector chart updates 8-76
 - viewing dates 8-37, 8-76
 - viewing properties of chart object..... 8-87
 - visible navigation features 8-69
 - View CD ROM content summary button 8-11
 - View page 16-5
 - Voyage log
 - backup copy..... 23-10
 - conditions for 23-4
 - creating a user chart from..... 23-11
 - resetting 23-4, 23-11
 - viewing 23-3
 - VRM operation 12-3
- W**
- WGS shift
 - raster charts..... 9-5
 - specifying 9-9
 - value..... 9-8
 - Wind sensor..... 19-22
 - Workstations
 - harmonizing 18-4
 - mode 18-9
 - right as master 18-5
 - right as multi or slave 18-6
 - usage rights..... 18-5